

# SIEMENS

## Motor Protection Circuit Breakers

### 3VU13 & 3VU16

#### Introduction:

Robust and compact circuit breakers type 3VU, for protection of motors and other loads, designed and developed by Siemens Germany for the world market are now available in India.

3VU13/3VU16 are suitable for use in fuseless motor feeders upto 11KW/22KW and for other loads upto 25Amps/63Amps respectively.

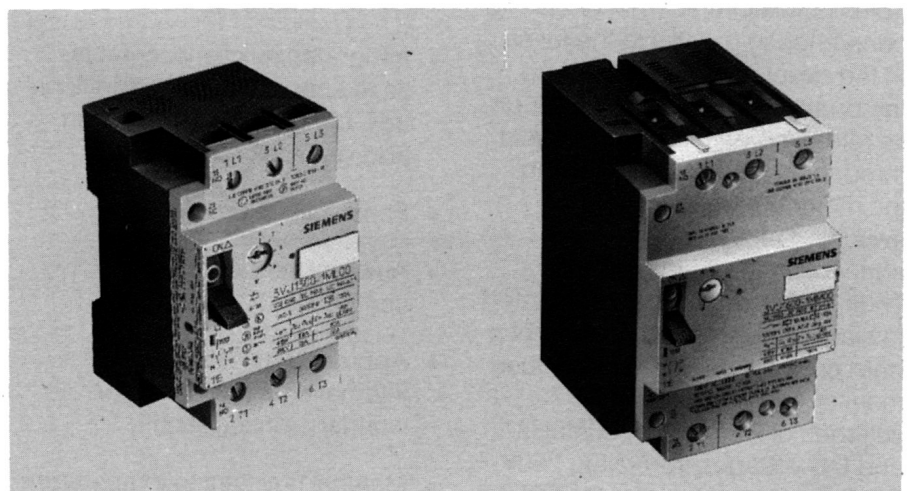
#### Application

In machine tools, textile machinery, automobile, food and many other process industries robust and compact devices are required for disconnection and protection of plant and individual loads.

Although such loads are of smaller ratings, the protection devices still have to have adequate short circuit breaking capacity. Further the devices should be compact, for simple, efficient and suitable for maintenance free installation. Siemens 3VU circuit breakers have proved themselves in such applications.

#### Motor Protection

Circuit breakers type 3VU13 & 3VU16 offer overload, short circuit and single phase protection for 3 phase motors upto 11kW and 22 kW respectively. The breaker has



a toggle switch for ease of operation and can be offered with auxiliary contacts, trip indicating contacts, U/V or Shunt release. For ratings upto 6A in 3VU13 and upto 25A in 3VU16, the breakers have high S/C capacity of 100kA. 3VU16 is also available with only S/C release for use with an external overload relay as in case of motor starters.

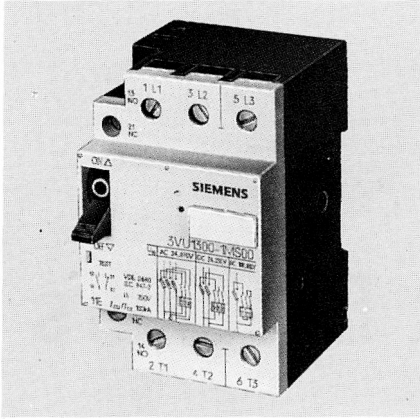
#### Distribution Feeder Protection

Standard 3VU13 and 3VU16 with adjustable O/L and fixed S/C release can be offered for disconnecting and protecting the distribution feeders, upto 25A and 63A respectively. A large number of overlapping ranges are available for offering closer protection to various loads.

#### Transformer protection

For protection of transformers on primary side having rated currents upto 20A, 3VU13 breakers having setting ranges of 0.16 to 20A are offered. The S/C release of such breakers do not have the usual 12 times  $I_r$  setting, but the S/C release is set at 19 times the rated current. The release is of instantaneous type. Thus, these breakers safely allow the 'Switching On' in-rush current peaks upto 30 times the rated current.

## Fuse Monitor:



3VU1300-MS00 is offered for Fuse Monitor application. The three poles of this circuit breaker can be connected in parallel to the fuses. In the event of one fuse blowing, the breaker gets actuated through its release & offers tripping signal through its auxiliary contacts, to the motor control device for switching off the motor (refer connection diagram on Page 7). Thus, the motors are not subjected to single phasing and costly motor burn outs are prevented. The fuse monitor can be used for AC voltages of 24 to 690V, 50/60Hz and DC voltages from 24 to 250V. For DC voltages greater than 250V & upto 600 V three current paths can be connected in series.

## Circuit Breakers for DC System

The circuit breaker type 3VU13 & 3VU16 can be used in DC circuits also upto 450V, DC. Details upon enquiry.

### Description

#### Safety First Concept

Fast Reaction :

The circuit breakers operate on the Current Limiting Principle. In case of a short circuit, the contacts are opened electro-dynamically by the short circuit current. The instantaneous overcurrent release, through the switching mechanism, trips all the three poles of the breaker. A large arc voltage is quickly built up in the arc chamber limiting the short circuit current.

## Trip Free Mechanism

The breakers have a trip-free mechanism and tripping cannot be prevented by the toggle switch position.

### Other features:

- The breaker operates on Current Limiting Principle.
- The breaker has a trip free mechanism.
- Space saving compact modular design.
- Finger touch proof and open terminals with SIGUT™ connection technique.
- Integrated auxiliary contacts save space and time. Additional aux. contacts available as an add-on block.
- Phase failure protection.
- Ambient temperature compensation upto 55°C.
- Approved by all major international standards for worldwide installation.
- Material resistant to temperature extremes.
- Strict safety and quality standards ensure reliable operation in all possible applications.
- Can be used as a main and EMERGENCY STOP switch.
- Positive ON/OFF indication through toggle switch.
- High rated insulation voltage.
- Similar design concept of both the breakers, allows easy handling.
- Identical accessories reduce stock levels.
- Technical data of the circuit breaker can be read from the front.
- Box terminals ensure connections even with different conductor cross-section.

## Current-Limiter

The circuit breakers 3VU13 for motor protection are short circuit proof for rated continuous currents upto 6 A at rated voltages AC 380/415V, i.e. no back-up fuses are required.

Breakers with a rated continuous current of 8 A & 10 A at the same voltage, have a rated short circuit breaking capacity of 10kA, breakers with 16, 20 and 25 A have 6 kA.

If the short circuit current at the point of installation is greater than the breaking capacity of the circuit breaker then backup fuses are normally required.

For the 3VU13, therefore, a special limiter (current limiter) has been developed for connecting in series with the breaker, this increases the switching capacity of the combination to 50 kA at AC 380/415V.

### Current-Limiter Operation

When a short circuit occurs the limiter trips and breaks the current paths, as well as the series connected circuit breaker. The short circuit causes the limiter contacts to open, due to the current separation forces, as well as by the electro-magnetic high-speed trip mechanism, and remain open.

With this method welding of the current-limiter contacts via a self-closing spring is prevented.

After clearing the fault which caused the short circuit, the limiter must be re-set by hand before the circuit breaker can be switched "ON" again.

This prevents inadvertently switching onto a still present short circuit.

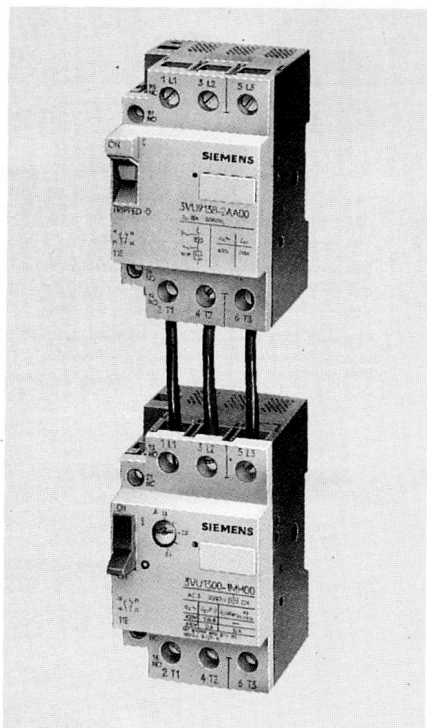
The development of our current-limiter provides triple protection:

- short circuit-proof up to 50 kA
- Weld-free by means of contacts which remain open after tripping
- re-closing lock out after a short

circuit has occurred.

Current Limiter can be connected as an incomer to individual 3VU13 (as shown in diagram below) or as a incomer to many 3VU13 feeders. In this case the total current through Limiter should not exceed 56 A.

### Isolating Module



or

The Module adapts on top of 3VU13 circuit breaker to enable positive visual disconnection from main three phase supply.

The Isolating Module can be padlocked in either connected or disconnected position.

### Accessories

The following can be added to the left hand side:

- Shunt release for remote tripping
- or
- Undervoltage release to prevent restarting of the motor when the supply returns
- or
- Undervoltage release with 2 leading auxiliary contacts, which in the open position avoid accidental energization to the control circuit.
- or
- Remote Switching Module with which the 3VU13 can be switched ON and OFF remotely. The Remote Switching Module has the same housing dimensions as the 3VU13 and is snapped on to a Rail on the left hand side of the breaker. To switch the Breaker 'ON' the module is energised via "ON" push button. To hold the solenoid, a NO auxiliary contact of the 3VU13 is required.

The following can be added to the

right hand side:

- Short circuit signalling contacts (1NO + 1NC) which signals a short circuit trip. Since it must be reset by hand, it also fulfills the function of a reclosing lockout

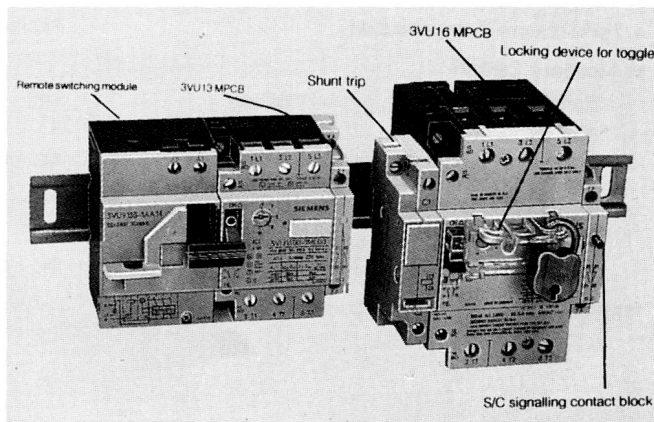
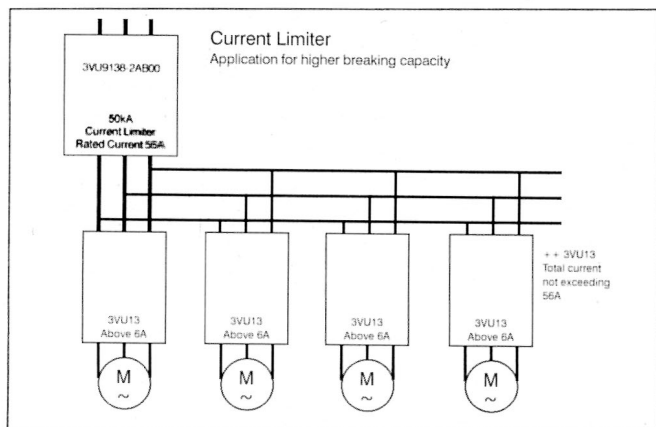
and / or

- Auxiliary contacts 1NO + 1NC which can be added in addition to the integrated auxiliary contacts in the circuit breaker, increasing the number of auxiliary to 2NO + 2NC

The auxiliary contacts, short circuit and signalling contacts are compatible with electronic systems.

### Characteristic Curves

The characteristic curves for overload and short circuit release, and the current limiting feature of the 3VU breakers are depicted on pages 4&5 alongwith the technical data.

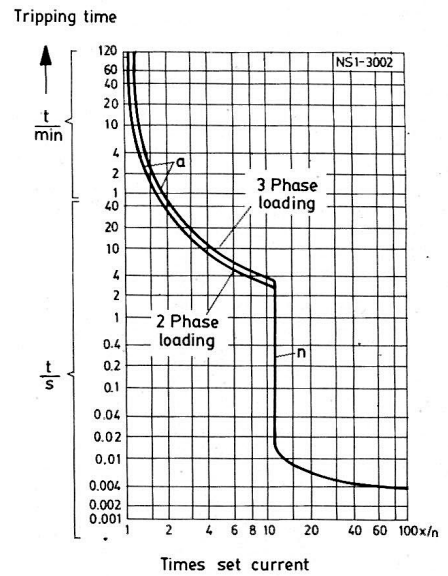


# Technical Data - 3VU13 / 3VU16

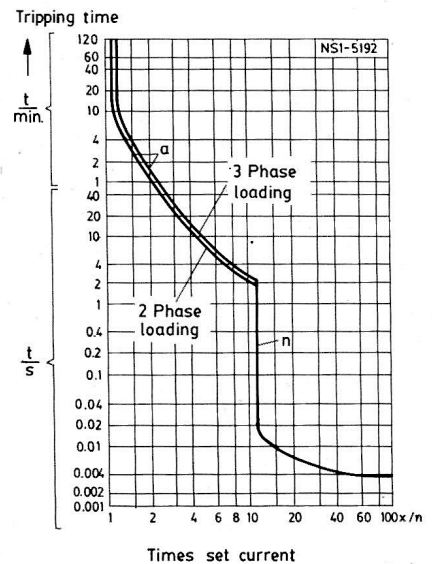
• Specification**	IEC 947-1,	IEC 947-2,	IEC 947-4-1
• Type	<b>3VU13</b>		<b>3VU16</b>
• No of poles		3	3
• Max Rated Current			
– Distribution	Amps	25	63
– Motor	Amps	25	50
• Permissible Ambient Temperature at Full Rated Current	°C		-20 to +55
• Rated Voltage Ue	AC V	690	
• Rated Frequency	Hz	50/60	
• Rated Insulation Voltage	V	750	
• Rated Impulse Withstand Voltage	kV	6	
• Utilization Category			
IEC947-1 (Circuit Breaker)		A	
IEC947-4 (Motor starters)		AC 3	
• Rated Breaking Capacity		Refer Table I	
• S/C Protection		Refer Table I	
• Rated Breaking Capacity DC			
t = 15ms			
1 Contact	2Contacts	3Contacts	
	in series	in series	
110V	220V	330V	kA
to 150V	to 300V	to 450	kA
			10
			10
• KW Rating With Max Current Rating			Distr Motor
220/230V	kW	7	18 11
240V	kW	7.5	20 15
380/400V	kW	12.5	31 22
415V	kW	13	34 22
500V	kW	16	41 30
660V	kW	22	55 37
690V	kW	23	57 45
• Wattloss Per Breaker	A	W	A W
	0.6	5	2.4 8
	4	6	6 7
	6	7	25 14
	25	9	63 23
• Protection Class With Open Terminals & With Cable Connection		IP00/IP2LO	
• Protection Against Touch as per DIN VDE		Available	
• Mechanical Life at 25A/above 25A		100000	100000/30000
• Switching Frequency with Current Loading	OP/hr	25	25
• Single Phase Protection Sensivity		Available	
• Temperature Compensation		Available	
• <b>Auxiliary Switch</b>			
- Rated Voltage	AC, V	230 400	500
- Rated Current	Amps	3 1.5	1.2
- Utilization Category		AC - 15	
- Rated Voltage	DC, V	24 60	220
- Rated Current	Amps	2.3 0.7	0.3
- Utilization		DC - 13	

\*\* NEMA Rating upon enquiry

## Characteristics

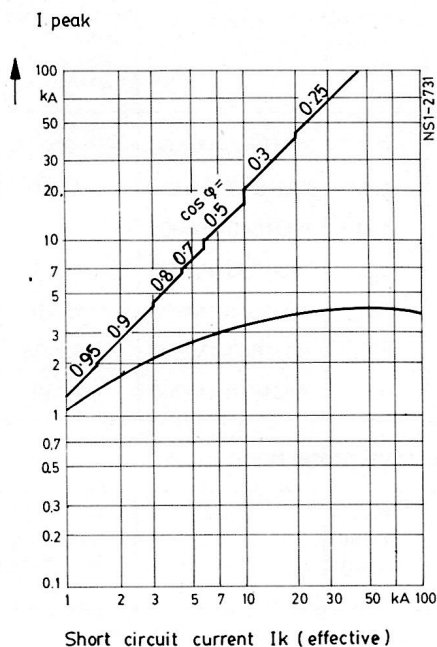


Time current characteristics of 3VU13

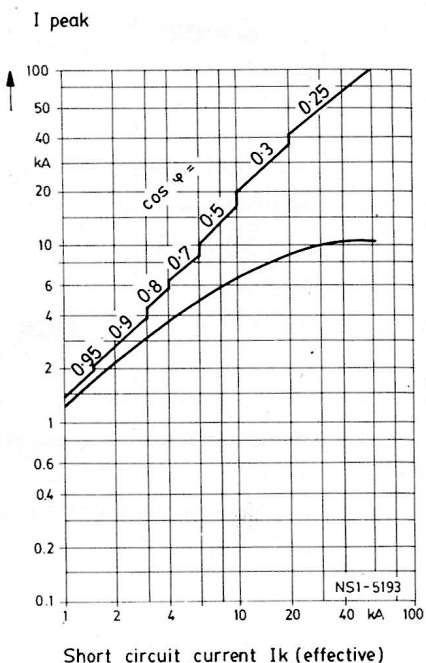


Time current characteristics of 3VU16

## Technical Data-3VU13/3VU16



Cut off characteristics of 3VU1300-0MK00



Cut off characteristics of 3VU1600-0MN00

### 3VU13

### 3VU16

#### • Under Voltage Release

- Consumption During Pick-up, VA/W	10/6
- Consumption During Running, VA/W	4.7/2
- Dropout	0.7 to 0.35 times $U_e$
- Pickup	85 to 110% of $U_e$
- Max Operating Time	ms
	20

#### • Shunt Release

- Consumption	VA/W	10/6
- Max Continuous Rating	Sec	5
- Pickup		0.7 to 1.1 times $U_e$

#### • Power Connections (Incoming from top or bottom possible)

- Method			SIGUT®
- Single / Multiple Core Cable	mm <sup>2</sup>	2 x (1 to 6)	1 x 1.5 to 2 x 16 or 1 x 25+1 x 10
- Finely Stranded with Pin type Lugs	mm <sup>2</sup>	2 x (1 to 4)	1 x 1.5 to 2 x 10 or 1 x 16+1 x 10
- Tightening Torque	Nm	1 to 1.5	2.5 to 3
- Control Terminals method			SIGUT
- Single / Multiple Core Cable	mm <sup>2</sup>		1 x 0.5 to 2 x 2.5
- Finely Stranded with Pin type Lugs	mm <sup>2</sup>		1 x 0.5 to 2 x 2.5
- Tightening Torque	Nm		1 to 1.3
- S/C Protection for Auxiliary Circuit			
gL/gG Fuses	Amps		10
Breaker	Amps		6

#### • Current Limiter for 3VU13

- Rated current $I_n$		56 Amps
- Rated Voltage $U_e$		500 V 50 / 60 Hz.
- Power Connection	mm <sup>2</sup>	2 x (1 to 6)
- Power Connection with special feed In terminals Type 3VU9135-IBB01	mm <sup>2</sup>	25

#### • Remote Controlled Operating Mechanism for 3VU13

- Rated Operational control voltage, VAC	Us	220/240
During Pick Up	W	230
In Continuous Operation	W	5
• Mounting		on DIN Rail in any position.

Table 1 3VU13 / 3VU16 breaking capacity at 415V

#### 3VU13

Current Rating $I_n$	0.16	1.6	2.4	3.2	5	8	13	20
	to 1			& 4	& 6	& 10	& 16	& 25
Rated S/C Breaking Capacity at 415 V:								
$I_{cu}$	KA	100	100	100	100	10(50)	6(50)	6(50)
$I_{cs}$	KA	100	100	100	100	10(50)	6(50)	6(50)
Max Back up fuse (gL/gG)								
Diazed	A	*	*	*	*	80	80	80
NH	A	*	*	*	*	80	80	80

\* Fuse not required

( ) Values in bracket are with Current Limiter.

For 3VU13 breakers of ratings 8A & above, in place of fuses, the Current Limiter can be used to increase the S/C breaking capacity.

#### 3VU16

Current Rating $I_n$ A	1.6	4	6	10	16	25	32 to 63
	& 2.4						
Rated S/C Breaking Capacity at 415 V:							
$I_{cu}$	KA	100	100	100	100	100	35
$I_{cs}$	KA	100	100	100	100	50	17
Max Back up fuse (gL/gG)							
Diazed	A	*	*	*	*	*	-
NH	A	*	*	*	*	*	200

\* Fuse not required

## Selection Table for 3VU13 and 3VU16 MPCBs.

### 3VU 13 Circuit - breakers with 1no+1nc auxiliary contacts for motor and plant protection

Rated Current In A	Overload release range A	Shortcircuit release setting A	Type	Recommended 415V Motor Ratings in Kw/HP (DOL)
0.16	0.1 - 0.16	1.9	3VU1340-1MB00	-
0.24	0.16 - 0.24	2.9	3VU1340-1MC00	-
0.4	0.24 - 0.4	4.8	3VU1340-1MD00	-
0.6	0.4-0.6	7.2	3VU1340-1ME00	-
1	0.6-1	12	3VU1340-1MF00	0.25/0.33
1.6	1-1.6	19	3VU1340-1MG00	0.37/0.5
2.4	1.6-2.4	29	3VU1340-1MH00	0.75/1
3.2	2-3.2	38	3VU1340-1NH00	1.1/1.5
4	2.4-4	48	3VU1340-1MJ00	1.5/2
5	3.2-5	60	3VU1340-1NJ00	2.2/3
6	4-6	72	3VU1340-1MK00	3/4
8	5-8	96	3VU1340-1NK00	3.7/5
10	6-10	120	3VU1340-1ML00	4/5.4
13	8-13	156	3VU1340-1NL00	5.5/7.5
16	10-16	190	3VU1340-1MM00	7.5/10
20	14-20	240	3VU1340-1MN00	9.3/12.5
25	18-25	300	3VU1340-1MP00	11/15

### Circuit - breakers with 1no + 1nc auxiliary contacts for line-side protection of transformers with high inrush current

Rated Current In A	Overload release range A	Shortcircuit release setting A	Type
0.16	0.1-0.16	2.9	3VU1340-1TBO0
0.24	0.16-0.24	4.8	3VU1340-1TC00
0.4	0.24-0.4	7.2	3VU1340-1TD00
0.6	0.4-0.6	12	3VU1340-1TE00
1	0.6-1	15	3VU1340-1TF00
1.6	1-1.6	29	3VU1340-1TG00
2.4	1.6-2.4	48	3VU1340-1TH00
4	2.4-4	72	3VU1340-1TJ00
6	4-6	120	3VU1340-1TK00
10	6-10	190	3VU1340-1TL00
16	10-16	300	3VU1340-1TM00
20	14-20	300	3VU1340-1TN00

### Circuit - breakers with 1no + 1nc auxiliary contacts

Rated Current In A	Overload release range A	Shortcircuit release setting A	Type
0.2	0.2	1.2	3VU1340-1MS00

### 3VU16 Circuit - breakers with 1no + 1nc auxiliary contacts for motor and plant protection

Rated Current In A	Overload release range A	Shortcircuit release setting A	Type	Recommended 415V Motor Ratings in Kw/HP (DOL)
6	4-6	72	3VU1640-1MK00	3/4
10	6-10	120	3VU1640-1MLO0	4/5.4
16	10-16	190	3VU1640-1MM00	7.5/10
25	16-25	300	3VU1640-1MN00	11/15
32	22-32	380	3VU1640-1MP00	15/20
40	28-40	480	3VU1640-1MQ00	18.5/25
52	36-52	600	3VU1640-1MR00	22/30

### Circuit - breakers for plant protection

Rated Current In A	Overload release range A	Shortcircuit release setting A	Type	Unit Price Rs.	Std. Pkg. (Nos)
63	-	600	3VU1640-1LS00	6326.-	1

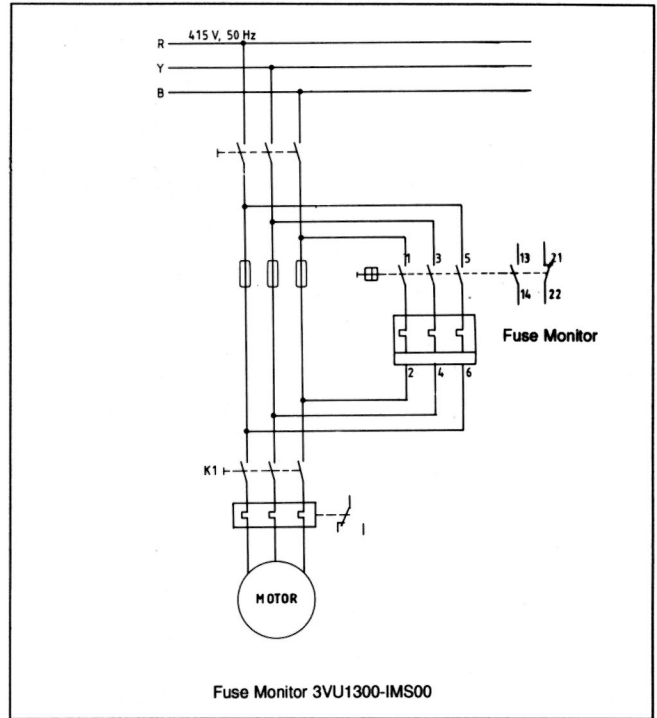
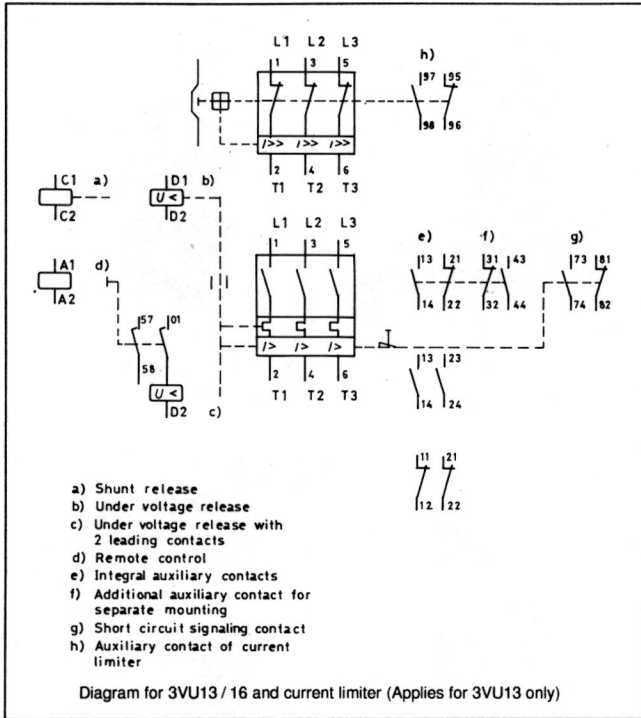
### Circuit - breakers for starter protection, with 1NO + 1NC auxiliary contacts

Rated Current In A	Overload release range A	Shortcircuit release setting A	Type	Recommended 415V Motor Ratings in Kw/HP (DOL)
1.6		19	3VU1640-1CG00	0.37/0.5
2.4		29	3VU1640-1CH00	0.75/1
4		48	3VU1640-1CJ00	1.5/2
6		72	3VU1640-1CK00	3/4
10	without thermal overload releases			
		120	3VU1640-1CL00	4/5.4
16		190	3VU1640-1CM00	7.5/10
25		300	3VU1640-1CN00	11/15
32		380	3VU1640-1CP00	15/20
40		480	3VU1640-1CQ00	18.5/25
52		600	3VU1640-1CR00	22/30

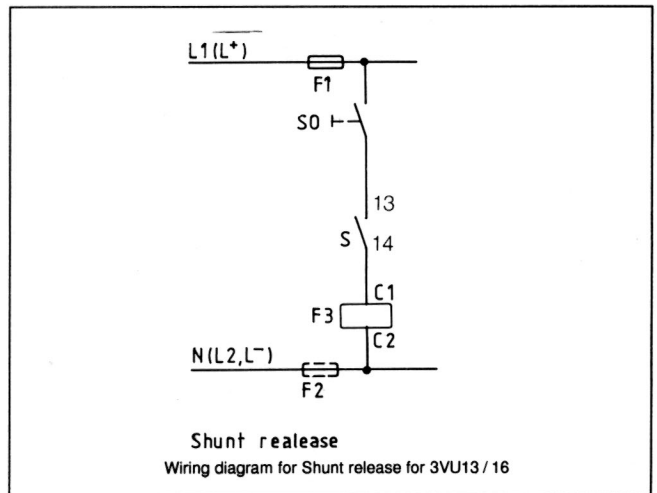
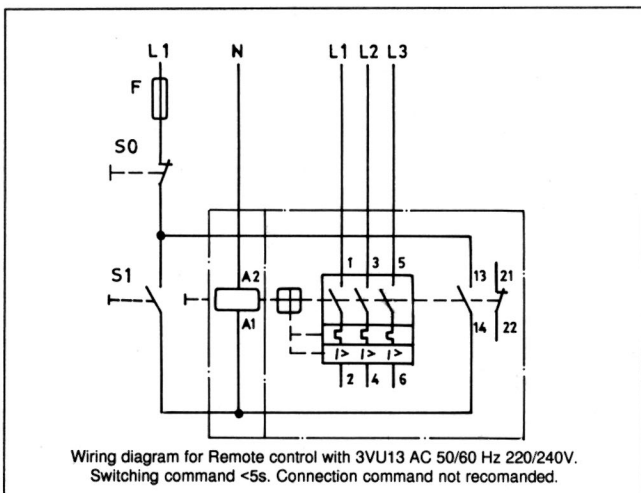
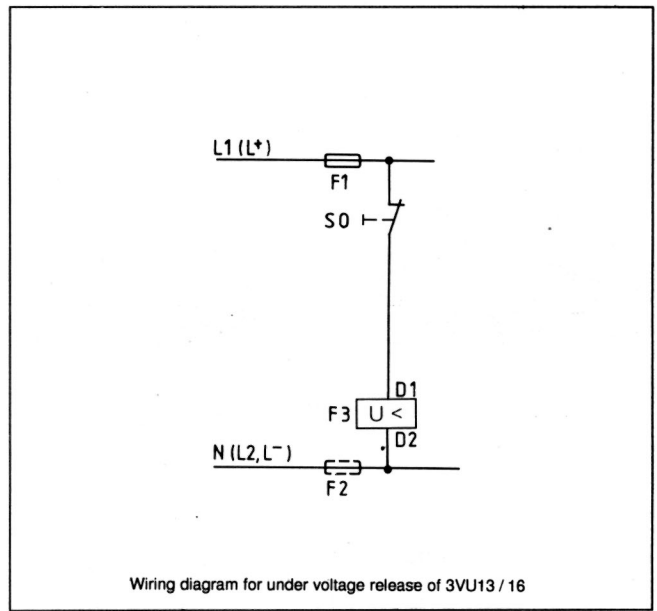
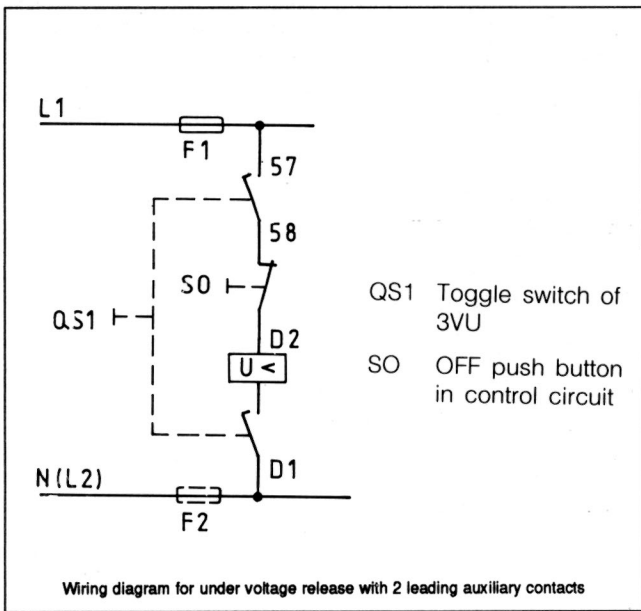
The 3VU13 and 3VU16 circuit breakers are also available without auxiliary contacts.

To order the same, the 8th place of the type number is to be replaced with the digit 0.

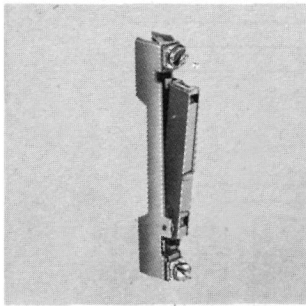
### Connection diagram



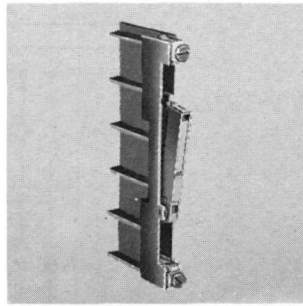
### Connection diagrams



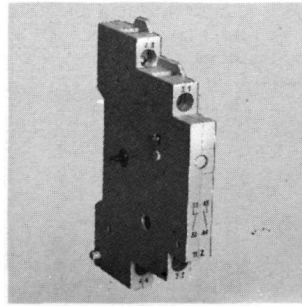
## Spares and Accessories 3VU13/16



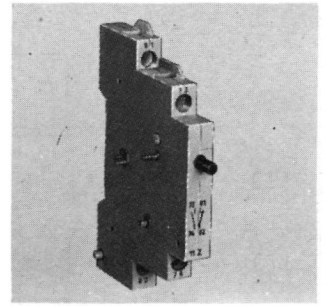
3VU9131-4AA00  
Auxiliary block for retrofitting in 3VU13, 1NO.



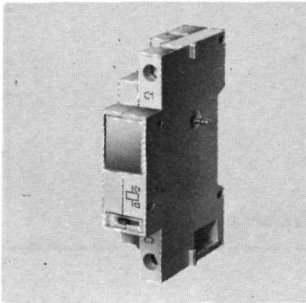
3VU9161-4AA00  
Auxiliary block for retrofitting in 3VU16, 1NO.



3VU9131-3AA0  
Add on Auxiliary block  
1NO + 1NC

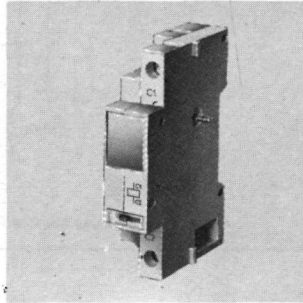


3VU9131-7AA00  
S/C Trip indicating contacts  
1NO + 1NC



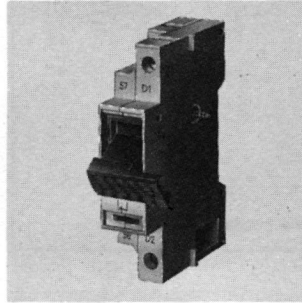
- 3VU9132-0AB15  
220/230V 50Hz
- 3VU9132-0AB18  
415V/50Hz

Under Voltage release



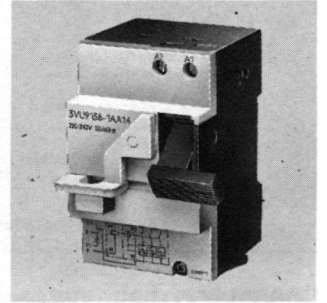
- 3VU9132-0AB55  
220/230V 50Hz
- 3VU9132-0AB58  
415V/50Hz

Shunt release

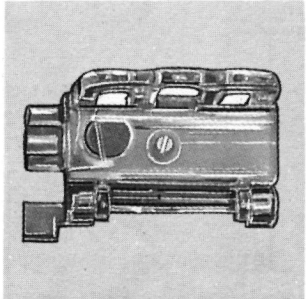


- 3VU9132-0AB35  
220/230V 50Hz
- 3VU9132-0AB38  
415V/50Hz

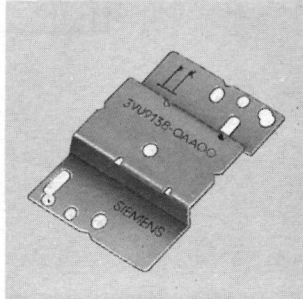
Under Voltage release with 2  
Leading contact



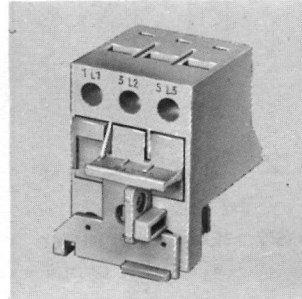
3VU9138-1AA14  
Remote Switching Module  
for 3VU13 (Solenoid)  
220/240 VAC, 50/60Hz



3VU9168-0KA00  
Padlocking for Toggle  
Handle 3VU13/16

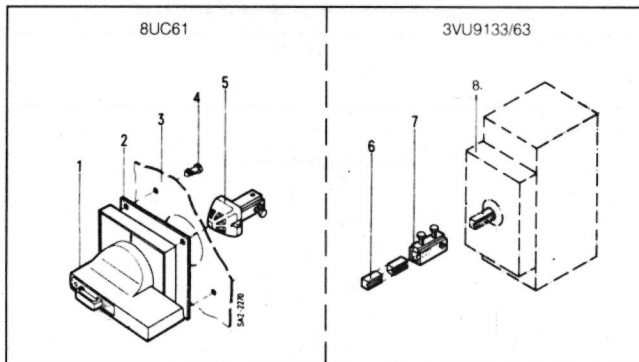


3VU9138-0AA00  
Adapter plate for screw  
mounting 3VU13



3VU9138-3AA00  
Isolating Module for fitting  
to 3VU13 (lockable)

### Door operating mechanism for 3VU13/16\*



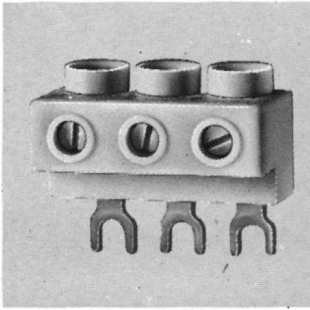
Breaker Operator Kit for 3VU13 – 3VU9133  
Breaker Operator Kit for 3VU16 – 3VU9163

- |                              |                             |
|------------------------------|-----------------------------|
| 1. Handle with masking frame | 5. Drive coupling           |
| 2. Gasket                    | 6. Extension shaft - 300 mm |
| 3. Door                      | 7. Adapter                  |
| 4. Fixing screws             | 8. Breaker operator         |

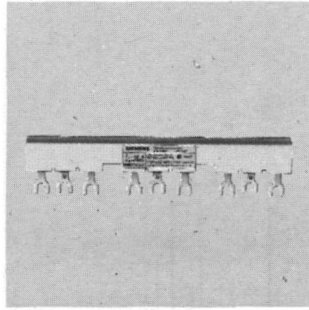
\* For complete assembly, please order both front drive and breaker operator kit.



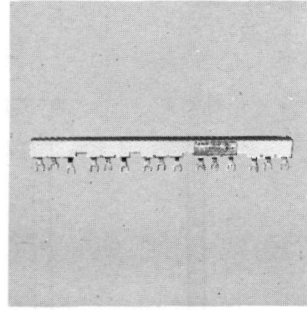
### 3Ø Insulated Bus-bar System for 3VU13



3VU9135-1BB01  
3Ø feed-in Terminal max  
63A, for bus-bar system



3VU9135-1AB03  
3Ø Busbars for 3 Breakers  
Max. 63 Amps

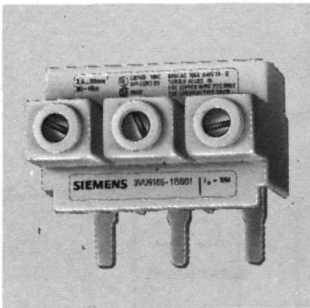


3VU9135-1AB05  
3Ø Busbar for 5 Breakers  
Max 63 Amps

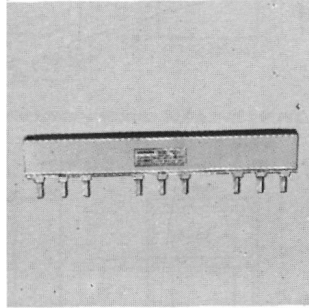
Also available

- 3VU9135-1AB02  
3Ø Busbar for 2 Breakers
- 3VU9135-1AB04  
3Ø Busbar for 4 Breakers

### 3Ø Insulated Bus-bar System for 3VU16

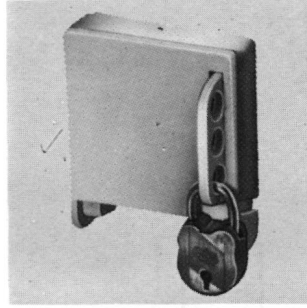


3VU9165-1BB01  
3Ø feed-in Terminal max  
100A, for bus-bar system



3VU9165-1AB03  
3Ø Busbars for 3 breakers

### Padlock for rotary operating mechanism of 3VU13 Housing



3VU9133-3KA00

Also available

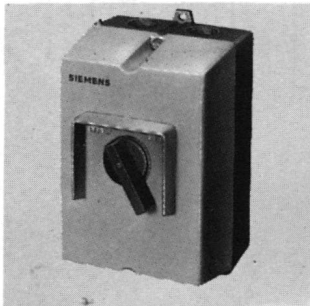
- Cast aluminium housing  
(IP65) for 3VU13
- Busbar adaptor system  
for 3VU13

Also available

3Ø Bus-bars for 2 breakers : 3VU9165-1AB02

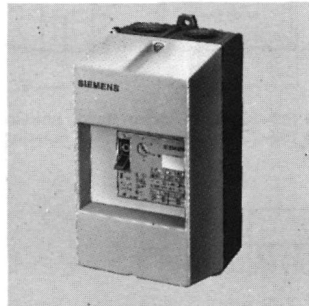
### Moulded Plastic Housings for 3VU13

With rotary operating  
mechanism



3VU9133-2GA00  
Suitable to accommodate  
3VU with one voltage  
release & Aux. contact

### Moulded Plastic Housings of 3VU13 for direct actuation



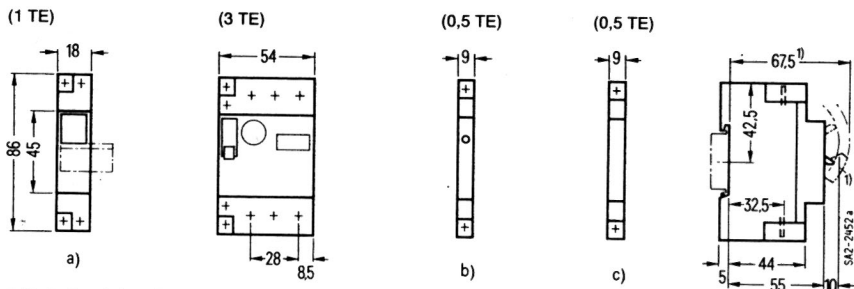
3VU9133-3BA00  
Suitable to accommodate  
3VU with one voltage  
release

Also available

- 3VU9133-0AA00  
Suitable to accommodate  
3VU without any release &  
aux. contact
- 3VU133-0CA00  
Suitable to accommodate  
3VU with one voltage  
release & aux. contact

# Circuit-Breakers

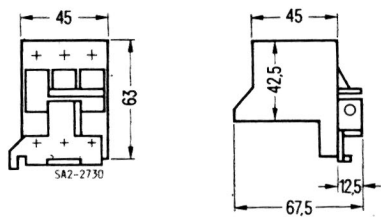
## 3VU13 circuit-breakers and accessories



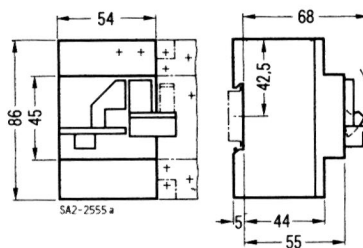
### 3VU13 circuit-breakers

- can be combined with
- a) undervoltage or shunt release and/or
  - b) short-circuit signalling switch and/or
  - c) auxiliary contacts

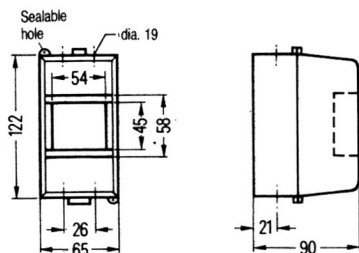
**3VU9 138-2AB00 limiter**  
The limiter has the same dimensions as the standard version of the 3VU13 circuit-breaker



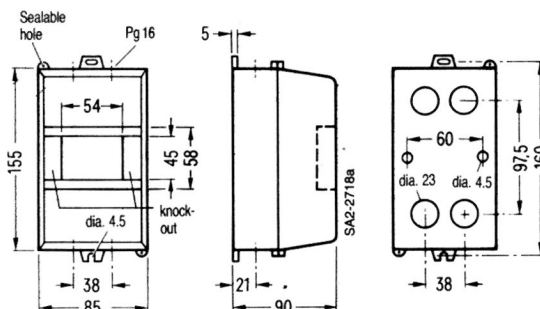
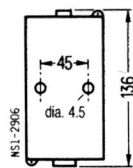
### 3VU9 138-3AA00 isolating module



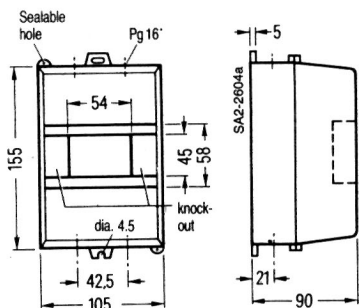
### 3VU9 138-1AA14 remote control mechanism



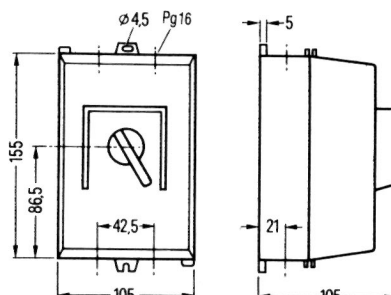
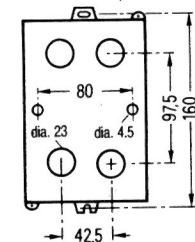
### 3VU9 133-0AA00 moulded-plastic housing



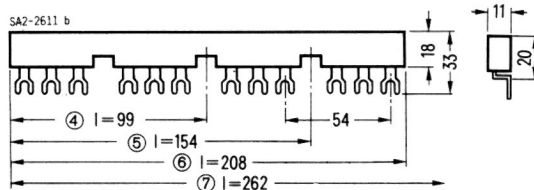
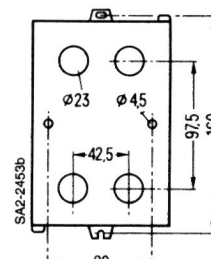
### 3VU9 133-0BA00 moulded-plastic housing



### 3VU9 133-0CA00 moulded-plastic housing

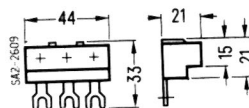


### 3VU9 133-2GA00 moulded-plastic housing, 3VU9 133-2DA00 cast-aluminium housing

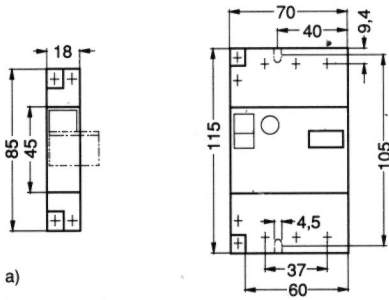


### 3VU9 135-1AB02, 3VU9 135-1AB03, 3VU9 135-1AB04, 3VU9 135-1AB05 three-phase busbar

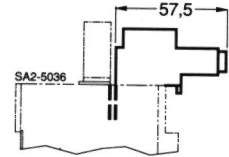
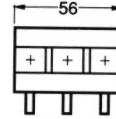
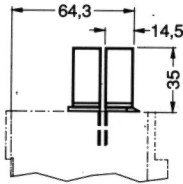
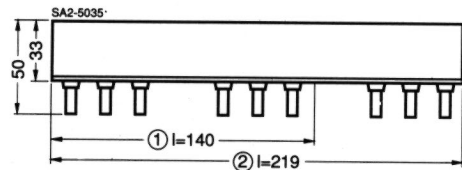
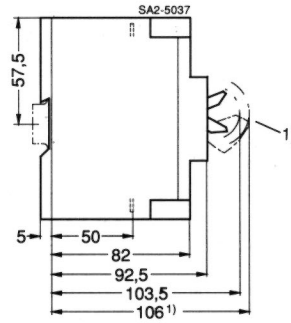
- ④ For 2 devices: 3VU9 135-1AB02
- ⑤ For 3 devices: 3VU9 135-1AB03
- ⑥ For 4 devices: 3VU9 135-1AB04
- ⑦ For 5 devices: 3VU9 135-1AB05



### 3VU9 135-1BB01 three-phase feed-in terminal, raised design



**3VU16 circuit-breakers**  
 can be combined with  
 a) undervoltage or shunt release  
 and/or  
 b) short-circuit signalling switch and/or  
 c) auxiliary contacts



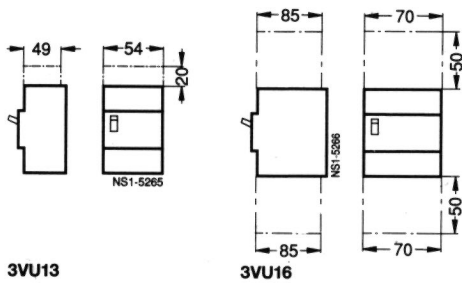
**3VU9 165-1AB02, 3VU9 165-1AB03**  
 three-phase busbar

- ① For 2 devices: 3VU9 135-1AB02
- ② For 3 devices: 3VU9 135-1AB03

**3VU9 165-1BB01**  
 three-phase feed-in terminal

**Required space above arc chutes for 3VU13 and 3VU16**

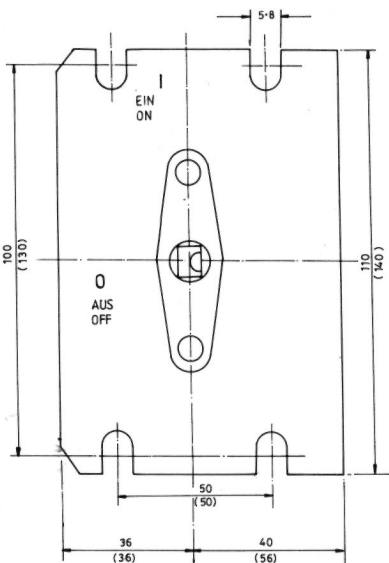
Minimum clearance to adjacent parts as well as non-insulated live parts.



3VU13

3VU16

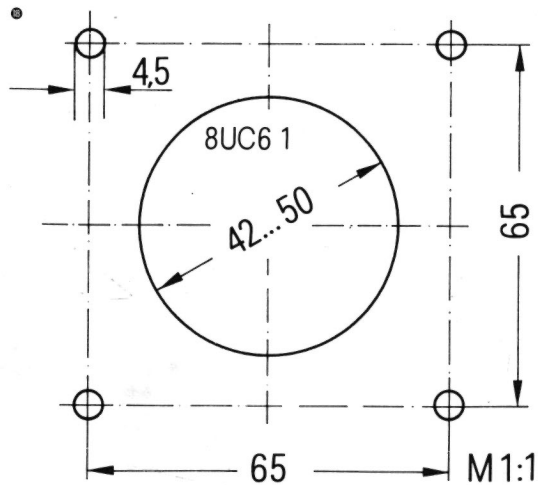
**Door operating mechanism with extension shaft (300mm) with door interlock & padlocking facilities.**



Mounting bracket of 3VU 13 / 16  
 3VU9133-1PA01 for 3VU 13  
 3VU9163-1PA02 for 3VU 16

(Figures in bracket are for 3VU 16)

**Mounting bracket**



**Handle**

Switchgear Division  
Control Systems & Products  
Post Box No. 85  
Thane Belapur Road,  
Thane 400 601  
Maharashtra, India  
Tel. : 7692381 - 4  
Fax : 7694626

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Siemens Ltd.  
SGR-01-112-009  
This replaces SGR-01-112-008

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