# Motor Protection Circuit Breakers 3VU13 and 3VU16

3VU13/3VU16 is suitable for use in fuseless motor feeders upto 11KW/22KW (25A/63A) respectively. 3VU motor protection circuit breakers are used for protection of motor against overload, single phasing and short-circuit faults.

#### **Applications**

#### • Motor Protection

Circuit breakers type 3VU13 & 3VU16 offer overload, short circuit and phase loss 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. High breaking capacity of 100kA is available in 3VU13 upto 6A and in 3VU16 upto 25A.

#### • Distribution Feeder Protection

Standard version of 3VU13 and 3VU16 has adjustable O/L and fixed S/C release. Main application is for disconnection and protection of 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

A separate 3VU13 range can be offered to protect the primary side of the transformers. The range is available upto 20A. To take care of the inrush current due to transformer switching, the S/C release is set at 19 times the rated current unlike 12 times of the rated current available in standard range.

#### Fuse Monitoring

3VU1340-1MS00 is offered for Fuse Monitoring application. This device is connected in parallel to the fuses. In case one of the fuses blows, the rated current will flow through the corresponding phase of this MPCB. MPCB, through its auxiliary contacts, provides a tripping signal to the contactor and thus the motor will be switched off. Hence, the motor will be protected from single phasing. (Refer page 51 for connection diagram)





#### **Standard**

3VU motor protection circuit breakers confirm to IS/IEC 60947-1, IS/IEC 60947-2, IS/IEC 60947-4-1, DIN VDE 0660

#### Range

3VU13: 0.16 - 25A

3VU16: 10 - 63A

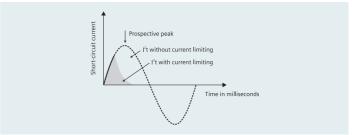
#### Benefits and features

#### High performance

Instantaneous Tripping
 3VU circuit breakers operate on the Current Limiting Principle.

#### **Current Limiting Principle**

In case of short-circuit condition motor protection circuit breaker trips before the short-circuit current reaches the prospective peak. Hence, for circuit breaker to be current limiting it must interrupt the short-circuit current in half cycle or less as shown below.



#### Current Limiting is achieved in 3VU as follows

In case of a short circuit, the contacts are opened electrodynamically 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. Thus ensures faster fault clearing.

 Ambient temperature compensation upto 55°C hence no deration required upto 55°C.

#### Safety

#### · Trip Free Mechanism

The breakers have a trip-free mechanism. Even by holding the toggle, tripping operation can not be stopped or blocked once it is started. Thus ensure positive opening in the event of fault.

- · Positive ON/OFF indication through toggle switch
- · Compact and space saving

#### User friendliness and safety

- SIGUT® connection technique ensures ease of wiring (can obviate use of lug)
- · Fingers touch proof terminals ensures operator safety
- Separate trip indication on short circuit and overload fault using alarm contact

#### **Flexibility**

- Can be used as a main and EMERGENCY STOP switch.
- Identical accessories reduce stock levels

#### Selection and ordering data

# 3VU13 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 <sup>\$</sup>	Recommended 415V Motor Rating in Kw/HP (DOL)	Std. pkg. (nos.)
0.16	0.1 - 0.16	1.9	3VU1340-1MB00	-	
0.24	0.16 - 0.24	2.9	3VU1340-IMC00	-	
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	1
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	

# 3VU13 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	Туре	Std. pkg. (nos.)
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	1
6	4-6	120	3VU1340-1TK00	
10	6-10	190	3VU1340-1TL00	
16	10-16	300	3VU1340-1TM00	
20	14-20	300	3VU1340-1TN00	

# Fuse monitoring motor protection circuit - breakers with 1NO+1NC auxiliary contacts

Rated Current In A	Overload release range A	Shortcircuit release setting A	Туре	Std. pkg. (nos.)
0.2	0.2	1.2	3VU1340-1MS00	1

# 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 <sup>\$</sup>	Recommended 415V Motor Rating in Kw/HP (DOL)	Std. pkg. (nos.)
10	6-10	120	3VU1640-1ML00	4/5.4	
16	10-16	190	3VU1640-1MM00	7.5/10	
25	16-25	300	3VU1640-1MN00	11/15	1
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	

#### 3VU16 Circuit - breakers for plant protection

Rated Current In A	Overload release range A	Shortcircuit release setting A	Type <sup>s</sup>	Std. pkg. (nos.)
63	45-63	600	3VU1640-1LS00	1

<sup>&</sup>lt;sup>\$</sup> 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.

### **Technical Data**

According to DIN VDE 0660; IS/IEC 60947-1; IS/IEC 60947-2; IS/IEC 60947-4-1

Number of poles  Max. rated current I <sub>n</sub> • motor protection  A	25		3		
• motor protection A	25				
	25				
area de la companya del companya de la companya del companya de la	20	i	52		
• distribution A	25	j	63		
Permissible ambient temperature					
• at full rated current °C		0 +55			
• in storage °C		0 +80			
Rated operational voltage $U_{\rm e}$	690	90			
Rated frequency Hz	50/	)/60			
Rated insulation voltage $U_i$	750	50			
Rated impulse with stand voltage $U_{\rm imp}$ kV	6				
Utilization category					
• to IS/IEC 60947-2 (motor starter protection)	А				
to IS/IEC 60947-4-1 (motor starters)	AC-	2-3			
	ating cycles				
• up to 25 A 1/h		00,000	100,00	0	
• 25 A upwards 1/h	-		30,000		
Number of operating cycles/h (on load) 1/h	25	25 25			
Degree of protection with open terminals/with conductors connected	IPO	IP00/IP20			
Temperature compensation to IS/IE	EC 60947-4-1 Yes	Yes			
Phase failure sensitivity to IS/IE	EC 60947-4-1 Yes	Yes			
Auxiliary contact for 3VU13 and 3VU16					
Rated operational voltage $U_{\rm e}$ AC $$ V	230	30 40	0	500	
Rated operational current $I_{\rm e}$	3	1.5	i	1.2	
Utilization category	AC-	C-15			
Rated operational voltage $U_{\rm e}$ DC L/R 200 ms DC $$ V	24	60		220	
Rated operational current I <sub>e</sub> A	2.3	3 0.7	,	0.3	
Utilization category	DC-	C-13			
Wattloss Per Breaker					
		ırrent Watt ting	Curren rating	t Watt	
	0.6	6 5	2.4	8	
	4	6	6	7	
	6	7	25	14	
	25	9	63	23	
Cross-section for main conductors					
Solid or stranded mm <sup>2</sup>	2 x	2 x (1 6) 1 x 1.5 2 x 16 or 1 x 25 + 1 x 10			
Finely stranded with end sleeve mm <sup>2</sup>	2 x	2 x (1 4) 1 x 1.5 2 x 10 or 1 x 16 + 1 x 10			
Cross-sections for auxiliary and control connecting leads					
Solid or stranded mm <sup>2</sup>	1 x	x 0.5 2 x 2.5			
Finely stranded with end sleeve mm <sup>2</sup>	1 x	x 0.5 2 x 2.5			

## **Technical data for accessories:**

		3VU13	3VU16
Undervoltage Release			
Consumption During Pick-up	VA/W	10/6	
Consumption During Running	VA/W	4.7/2	
Dropout	V	0.7 to 0.35 X Ue	2
Pickup	V	85 to 110% of Ue	
Max Operating Time	ms	20	
Shunt Release			
Consumption	VA/W	10/6	
Max Continuous Rating	Sec	5	
Pickup	V	0.7 to 1.1 X Ue	
Current Limiter for 3VU13			
Rated current In		56 Amps	
Rated Voltage Ue	500 V, 50 / 60 Hz.		
Power Connection	mm <sup>2</sup>	2 x (1 to 6)	
Mounting			
		on DIN Rail in ar	y position.

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

### 3VU13

Rated curre	ent A	0.16-1	1.6	2.4	3.2-4	5-6	8-10	13-16	20-25
Rated Shor	t circuit brea	aking capacity @ 4	115V						
lcu	kA	100	100	100	100	100	10(50)	6(50)	6(50)
lcs	kA	100	100	100	100	100	10(50)	6(50)	6(50)
Maximun back up fuse (gL/gG)									
Diazed	А	*	*	*	*	*	80	80	80
NH	А	*	*	*	*	*	80	80	80
() Values in	n bracket are	with current limi	ter; * Fuse not red	quired					
For 3VU13	breakers of	ratings 8A & abov	e, in place of fuse	es, the Current Lir	miter can be used	to increase the S/	C breaking capaci	ty.	
Rated Brea	Rated Breaking Capacity DC; t = 15ms								
1 Con	1 Contact 2 Contacts 3 Contacts in series in series 10 kA								
110-1	50V	220-300V	330-450V						

### 3VU16

Rated current	Α	1.6-2.4	4	6	10	16	25	32-63		
Rated Short circuit breaking capacity @ 415V										
lcu	kA	100	100	100	100	100	100	35		
lcs	kA	100	100	100	100	100	50	17		
Maximun ba	Maximun back up fuse (gL/gG); * Fuse not required									
Diazed	А	*	*	*	*	*	*	-		
NH	А	*	*	*	*	*	*	200		
Rated Breaki	Rated Breaking Capacity DC; t = 15ms, upon enquiry									

#### **Characteristic Curves**

