



TECHNICAL MANUAL

Molded case circuit

breakers VA-99M 50 °C EKF

1 DESCRIPTION

Molded case circuit breakers VA-99M 50°C EKF are designed for infrequent routine close/open operations and overload/short-circuit protection in 50/60 Hz AC circuits under currents from 16 to 1600 A to be used in electrical installations for residential and civil engineering, industrial facilities, power substations, electrical distribution points, panel electrical equipment, etc.

The molded case circuit breakers comply with the requirements of IEC 60947-2.

2 DESIGN AND OPERATING PRINCIPLE

The molded case circuit breaker (MCCB) VA-99M is a monoblock consisting of a base and a front panel with an aperture for the operating handle and the TEST button cap to test the tripping mechanism.

The base, made of thermal- and flame-resistant ABS plastic, serves as a support structure for terminals, fixed and movable contacts, arc chutes, an operating handle and overcurrent protection unit. The bimetallic strip executes thermal protection. The trip units have factory settings and are non-adjustable.

When assembled, the base and the front panel enclose the internal mechanism and live parts, protecting personnel against electric shock when operating the circuit breaker.

Reinforced return spring enables rapid tripping action. The arc fault protection system consists of equidistant steel plates that direct the gas flow into an outlet window enclosed by a perforated wall, which ensures optimum discharge and dissipation. However, arc products can be discharged out of the breaker, when overcurrent protection trips the MCCB.

The motor mechanism has manual and remote control to ensure trouble-free operation, even in case of power disconnection. The front panel features an indicator of the motor mechanism status and a manual/automatic switch.

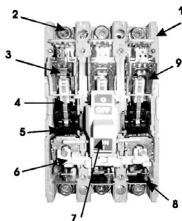
When the switch is in the "automatic" position, the extended rotary handle is disabled. The wiring diagram is located on the left side of the motor mechanism.

The MCCB VA-99M power supply can be connected from both fixed and movable contact sides, i.e. connection is possible from the top and bottom of the circuit breaker.

The operating handle of the molded case circuit breaker has three positions "ON", "OFF" and "TRIP". To switch on the MCCB after tripping, move the operating handle from the intermediate position to the "OFF" position and then to the "ON" position.

INTERNAL ARRANGEMENT

1. Housing made of thermal-resistant, flame-retardant ABS plastic
2. Connecting terminals
3. Fixed power contacts
4. Movable contacts
5. Insulation rail
6. Flat rail
7. Operating handle
8. Adjusting screws
9. Arc chute



3 TECHNICAL DATA

Type code

VA-99MM XX/XXA XP XXkA XX°C

						Molded case circuit breaker VA-99M
						MCCB model
						Rated tripping current, A
						Number of poles
						Ultimate short-circuit breaking capacity, kA
						Temperature setting (for TM trip units)

Main technical data are given in tables 1–6.

Table 1 — Technical data of VA-99M 63, VA-99M 100, and VA-99M 100 1P

Parameters	Values					
	VA-99M 63		VA-99M 100			VA-99M 100 1P
Poles	3P, 4P		3P, 4P			1P
Rated current I_e , A	16, 20, 25, 32, 40, 50, 63		16, 20, 25, 32, 40, 50, 63, 80, 100, 125			16, 20, 25, 32, 40, 50, 63, 80, 100, 125
Rated operating voltage U_e , V AC	220/230 240	380/400 415	220/230 240	380/400 415	690	220/230 240
Ultimate short-circuit breaking capacity I_{cu} , kA	36	25	36	25	10	25
Service short-circuit breaking capacity I_{cs} , kA	28	18	28	18	5	18
TM trip unit setting temperature, °C	50					
Min. mechanical endurance, O-C cycles	7000					
Min. electrical endurance, O-C cycles	2000					
Rated peak short-circuit current I_{cm} , kA	2,1 $\times I_{cu}$					
Rated insulation voltage U_i , V	800					
Rated impulse withstand voltage U_{imp} , kV	8					
Utilization category according to IEC 60947-2	A					

Table 1 continued

Parameters	Values		
	VA-99M 63	VA-99M 100	VA-99M 100 1P
Type of trip unit	Thermal-magnetic		
Set point of electromagnetic trip unit	10xIn/5xIn		
Power consumption, W	25		
Protection degree	IP30		
Operating temperature, °C	from -25 to +50		
Weight, kg	1	1,25	-
Min. service life, years	10		

Table 2 — Technical data of VA-99M 250, VA-99M 400

Parameters	Values					
	VA-99M 250			VA-99M 400		
Poles	3P, 4P					
Rated current In, A	100, 125, 160, 200, 225, 250			250, 315, 400		
Rated operating voltage Ue, V AC	220/230 240	380/400 415	690	220/230 240	220/230 240	690
Ultimate short-circuit breaking capacity Icu, kA	50	35	15	50	35	15
Service short-circuit breaking capacity Ics, kA	36	26	8	36	26	8
TM trip unit setting temperature, °C	50					

Table 2 continued

Parameters	Values	
	VA-99M 250	VA-99M 400
Min. mechanical endurance, O-C cycles	4000	
Min. electrical endurance, O-C cycles	2000	
Rated insulation voltage U_i , V	800	
Rated impulse withstand voltage U_{imp} , kV	8	
Utilization category according to IEC 60947-2	A	
Type of trip unit	Thermal-magnetic	
Set point of electromagnetic trip unit	10xI _n /5xI _n	
Power consumption, W	70	85
Protection degree	IP30	
Operating temperature, °C	from -25 to +50	
Weight, kg	2	5,75
Min. service life, years	10	

Table 3 — Technical data of VA-99M 630, VA-99M 800, and VA-99M 1250

Parameters	Values								
	VA-99M 630			VA-99M 800			VA-99M 1250		
Poles	3P, 4P								
Rated current In, A	400, 500, 630			630, 800, 1000			800, 1000, 1250		
Rated operating voltage Ue, V AC	220 230 240	380 400 415	690	220 230 240	380 400 415	690	220 230 240	380 400 415	690
Ultimate short-circuit breaking capacity Icu, kA	75	50	35	75	50	35	75	50	35

Table 3 continued

Parameters	Values								
	VA-99M 630			VA-99M 800			VA-99M 1250		
Service short-circuit breaking capacity Ics, kA	50	35	15	50	35	15	50	35	15
TM trip unit setting temperature, °C	50								
Min. mechanical endurance, O-C cycles	4000			4000			2500		
Min. electrical endurance, O-C cycles	2000			2000			1500		
Rated peak short-circuit current Icm, kA	2,2xIcu								
Rated insulation voltage Ui, V	800								
Rated impulse withstand voltage Uimp, kV	8								
Utilization category according to IEC 60947-2	A								
Type of trip unit	Thermal-magnetic								
Set point of electromagnetic trip unit	10xIn								
Power consumption, W	100			160			160		
Protection degree	IP30								
Operating temperature, °C	from -25 to +50								
Weight, kg	8,25			24,6			26,8		
Min. service life, years	10								

Table 4 — Technical data of VA-99M with electronic trip unit

Parameters	Values						
	VA-99M 100/63A	VA-99M 100/100A	VA-99M 250/250A	VA-99M 400/400A	VA-99M 630/630A	VA-99M 800/800A	VA-99M 1250/1250A
Rated current I_n , A	63	100	250	400	630	800	1250
Rated insulation voltage U_i , V	800	800	800	800	800	800	800
Rated impulse voltage, U_{imp} , kV	8						
Rated operating voltage U_e , V	380/400/415						
Ultimate short-circuit breaking capacity I_{cu} , kA	25	25	35	35	50	50	50
Service short-circuit breaking capacity I_{cs} , kA	18	18	26	26	35	35	35
Set point of thermal protection current I_{r1} , A	32-63	63-100	100-250	160-400	252-630	630-800	850-1250
Rated short-time withstand current I_{cw} , kA	1,2 t = 0,5 sec.	1,2 t = 0,5 sec.	1,2 t = 0,5 sec.	5 t = 1 sec.	8 t = 1 sec.	10 t = 1 sec.	20 t = 1 sec.
Utilization category	B						
Trip unit	Electronic						

Table 4 continued

Parameters	Values						
	VA-99M 100/63A	VA-99M 100/100A	VA-99M 250/250A	VA-99M 400/400A	VA-99M 630/630A	VA-99M 800/800A	VA-99M 1250/1250A
Min. mechanical endurance, O-C cycles	8500	8500	7000	4000	4000	2500	2500
Min. electrical endurance, O-C cycles	1500	1500	1000	1000	1000	500	500
Poles	3P, 4P						
Protection degree	IP30						
Operating temperature, °C	from - 5 to + 50						
Min. service life, years	10						

Electronic trip unit VA-99M



Ir (A)



Kt1



Isd (xIr)



Ktsd



Ii (xIr)



IRO (xIr)

Ir (A) — Overload tripping setpoint, A. Setting values for each dimension are shown in Table 4.

Kt1 (s) — Overload tripping delay time $2I_{r1}$, sec. Setting range: 12-150 sec.

Isd (xIr) — Short circuit tripping setpoint is set relative to the preset I_{r1} . The switch has 10 positions ($2-12 \times I_{r1}$).

Ktsd (s) — Short-circuit current tripping delay time. Setting range: 0,06-0,3 sec. The function is available when any time t_2 is set except OFF.

Ii (xIr) — Instant short-circuit current tripping setpoint is set relative to the preset I_{r1} . The switch has 10 positions ($4-14 \times I_{r1}$).

IRO (xIr) — Overload alarm current setpoint is set relative to the preset I_{r1} , it does not trip the circuit breaker. The switch has 8 positions ($0.7-1 \times I_{r1}$).

Table 5.1 — Kt1 Settings

Reverse delay time (s) $T = \frac{(2I_{r1})^2}{I^2} t_1$ (I _{sd} > I _{r1})	Kt1 (s) Encoder settings		12	60	80 (100)	100 (150)	
	E.g.: 2I _{r1}	In≤250 (T) Tripping time	12	60	80	100	OFF (without protection)
	E.g.: 4I _{r1}		3	15	20	25	
	E.g.: 2I _{r1}	In≥400 (T) Tripping time	12	60	100	150	
	E.g.: 4I _{r1}		3	15	25	37.5	
	Error		±20%				

Table 5.2 — Ktsd Settings

		Action		0.9 Isd~1.1Isd Take action during		≤0.9 Isd no action			
						>1.1Isd action			
Fixed time characteristics	I>1.5Isd & I<Ii	Encoder settings tsd (s)		0.06	0.1	0.2	0.3	OFF [without protec- tion]	
		≥1.1 Isd	T	0.06	0.1	0.2	0.3		
		Error		±0.02	±0.03	±0.04	±0.06		
Reverse time functions	I>Isd & I≤1.5Isd	≥1.1 Isd	T	$T = \frac{(1.5 \text{ Isd})^2}{I^2} \text{ tsd}$					
		Error		±20%					

Table 6 — Technical data of VA-99M with electromagnetic trip unit

Parameters	Values							
	VA-99M 100		VA-99M 250		VA-99M 400		VA-99M 800	
Rated operating voltage Ue, V AC	380 400 415	690	380 400 415	690	380 400 415	690	380 400 415	690
Ultimate short-circuit breaking capacity Icu, kA	25	10	35	10	35	15	50	30
Service short-circuit breaking capacity Ics, kA	18	5	26	5	26	8	35	15
Rated currents In, A	32, 63, 100, 125		160, 250		400		630	
Min. mechanical endurance, O-C cycles	7000		7000		4000		4000	
Min. electrical endurance, O-C cycles	2000							
Rated peak short-circuit current Icm, kA	2,1xIcu				2,2xIcu			

Table 6 continued

Parameters	Values			
	VA-99M 100	VA-99M 250	VA-99M 400	VA-99M 800
Rated insulation voltage U_i , V	800			
Utilization category according to IEC 60947-2	A			
Type of trip unit	electromagnetic			
Set point of electromagnetic trip unit	10xI _n			
Poles	3P, 4P			
Power consumption, W	25	70	85	160
Protection degree	IP30			
Operating temperature, °C	from - 25 to + 50			
Weight, kg	1,25	2	5,75	24,6
Min. service life, years	10			

TRIPPING CHARACTERISTICS

Tripping characteristics of the molded case circuit breakers VA-99M.

In the diagrams, areas 1, 2, 3 have meaning:

1 - "cold" tripping area of thermal trip unit;

2 - "hot" tripping area of thermal trip unit;

3 - tripping area of electromagnetic trip unit.

Tripping curve of VA-99M 63

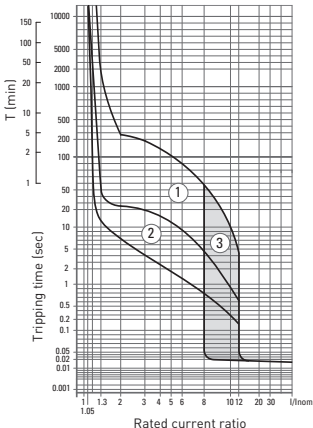


Table 7.1 — Values to test VA-99M 63 thermal trip units

Test current, A	Tripping time, s	Result
$2 \cdot I_n$	≤ 300	MCCB tripping
$4 \cdot I_n$	≤ 170	MCCB tripping

Tripping curve of VA-99M 100

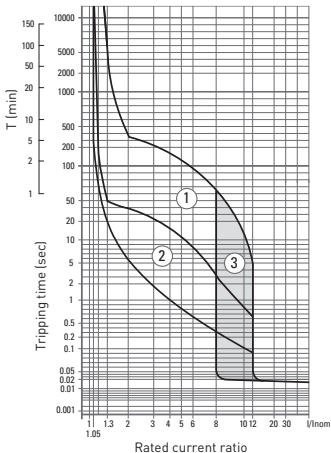


Table 7.2 — Values to test VA-99M 100 thermal trip units

Test current, A	Tripping time, s	Result
$2 \cdot I_n$	≤ 400	MCCB tripping
$4 \cdot I_n$	≤ 180	MCCB tripping

Tripping curve of VA-99M 250

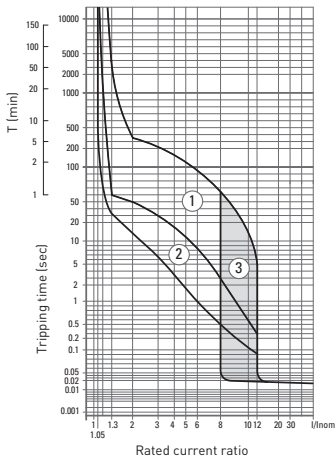


Table 7.3 — Values to test VA-99M 250 thermal trip units

Test current, A	Tripping time, s	Result
$2 \cdot I_n$	≤ 380	MCCB tripping
$4 \cdot I_n$	≤ 170	MCCB tripping

Tripping curve of VA-99M 400

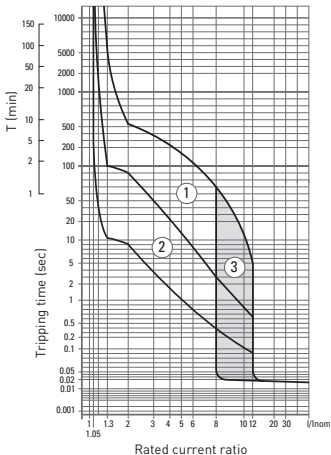


Table 7.4 — Values to test VA-99M 400 thermal trip units

Test current, A	Tripping time, s	Result
$2 \cdot I_n$	≤ 550	MCCB tripping
$4 \cdot I_n$	≤ 200	MCCB tripping

Tripping curve of VA-99M 630

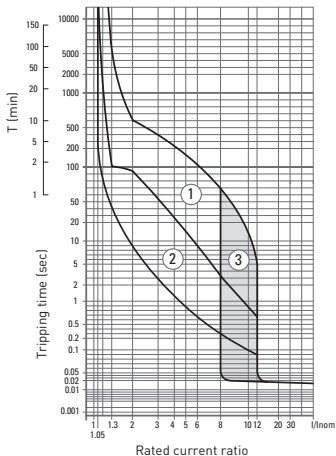


Table 7.5 — Values to test VA-99M 630 thermal trip units

Test current, A	Tripping time, s	Result
$2 \cdot I_n$	≤ 600	MCCB tripping
$4 \cdot I_n$	≤ 390	MCCB tripping

Tripping curve of VA-99M 800

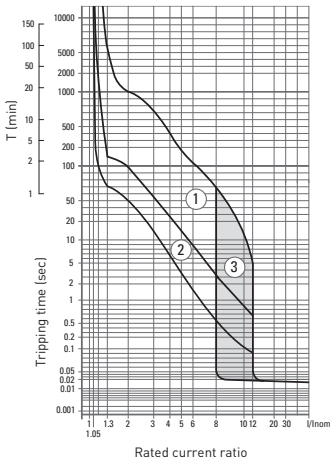


Table 7.6 — Values to test VA-99M 800 thermal trip units

Test current, A	Tripping time, s	Result
$2 \cdot I_n$	≤ 1000	MCCB tripping
$4 \cdot I_n$	≤ 390	MCCB tripping

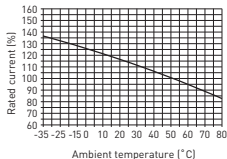
TEMPERATURE DERATING FACTOR

The devices shall be commissioned at normal operating temperature. The tripping time of the molded case circuit breaker is determined by its tripping curve. The setting value of the overload protection (I_r) shall be adjusted according to the diagrams below.

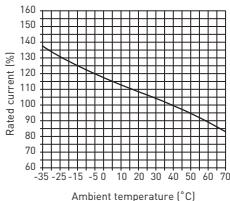
TEMPERATURE FACTOR

Ambient temperature derating factor for MCCB VA-99M with TM trip unit

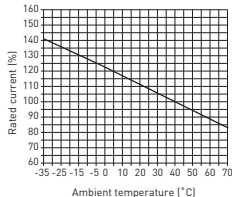
VA-99M 63



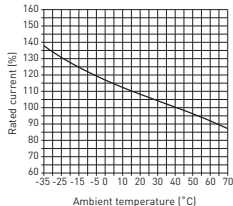
VA-99M 100



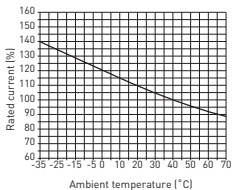
VA-99M 250



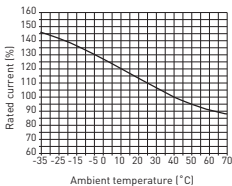
VA-99M 400



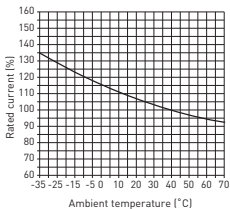
VA-99M 630



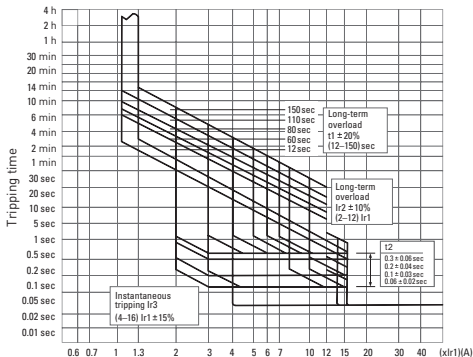
VA-99M 800



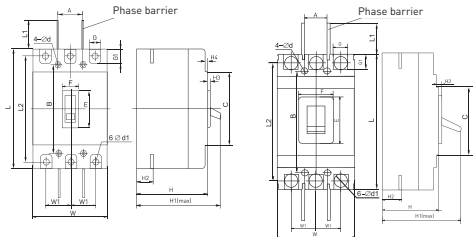
VA-99M 1250



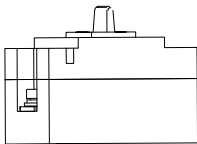
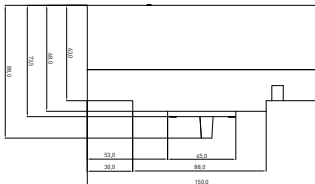
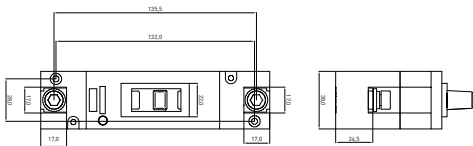
TRIPPING CURVE FOR VA-99M WITH ELECTRONIC TRIP UNIT



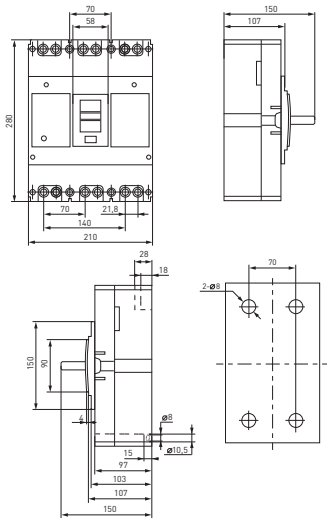
4 OVERALL AND INSTALLATION DIMENSIONS



Dimensions		Name				
		VA-99M 63	VA-99M 100	VA-99M 250	VA-99M 400	VA-99M 630
Overall dimensions, mm	C	85	84	102	127	134
	E	48	50	50	86	88
	F	22	22	22	90	64
	G	14	17	23	32	45
	G1	14	16	24	32	34
	H	72	68	88	106	111
	H1	90	88	110	150	156
	H2	20	24	24	38	44
	H3	4,5	4	4	6	6,5
	H4	7	7	5	—	—
	L	136	150	165	258	272
	L1	14	60	80	105	105
	L2	117	132	144	225	234
	W	76	92	107	149	183
Installation dimensions, mm	W1	25	30	35	44	58
	A	25	30	35	44	58
	B	117	129	126	194	200
	$\varnothing D$	3,5	4,5	5,5	7	7
	$\varnothing D1$	7	10	10	26	30

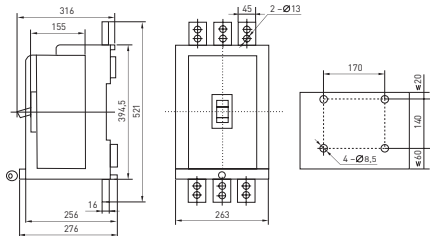


Overall dimensions of VA-99M 100 1P

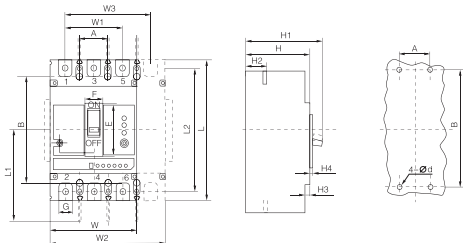


Overall and installation dimensions of VA-99M 800-1000A*

* Motor mechanism 230V AC VA-99M 800 EKF (mccb99m-a-135) shall not be used with the MCCB VA-99M 800/1000A 3P 50kA 50°C EKF (mccb99-800-1000mm).

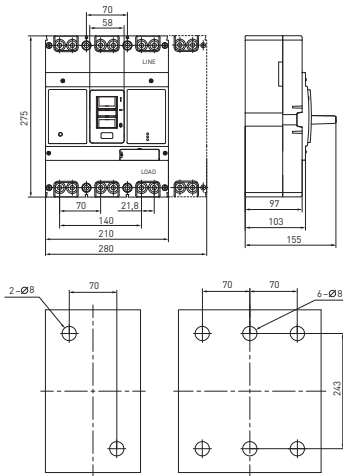


Overall and installation dimensions of VA-99M 1250A



Overall and installation dimensions of VA-99M 100, VA-99M 250, VA-99M 400, VA-99M 630-800 with electronic trip unit

Dimensions		Name			
		VA-99M 100	VA-99M 250	VA-99M 400	VA-99M 630-800
		with electronic trip unit			
Overall dimensions, mm	E	50	62	88,6	81
	F	22	22	65	66
	G	17,6	22	30	44
	H	92	90	106	107
	H1	108	109	150	150
	H2	28,5	24	38	45,3
	H3	10	5	4,5	8
	H4	4	4	3,5	9
	L	150	165	258	280
	L1	100	132,5	220,5	240
	L2	132	144	224	243
	W	92	107	149	210
	W1	60	70	96	140
	W2	122	142	198	280
	W3	90	105	144	210
Installation dimensions, mm	A	30	35	44	70
	B	129	126	194	243
	Ø d	4,5	4,5	7	7



Overall and installation dimensions of VA-99M 1250 with electronic trip unit

5 DELIVERY SCOPE

Molded case circuit breakers VA-99M are supplied in one individual package. For all available documentation, scan the QR-code on the insert or on the inside of the package.

6 INSTALLATION, CONNECTION AND OPERATION

6.1. Storage and operation conditions

The molded case circuit breakers VA-99M shall be stored in the original package indoors with natural ventilation at ambient air temperature from -40 to $+55$ °C and relative humidity up to 80% at $+25$ °C.

The molded case circuit breakers can be operated at temperatures between -25 °C and $+50$ °C.

The average temperature during 24 hours shall not exceed $+35$ °C.

Altitude above sea level shall not exceed 2000 meters.

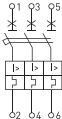
Pollution degree: III.

The device supports connection of aluminium and copper wires. Do not connect copper and aluminium wires to one terminal at the same time.

Degree of ingress protection (according to IEC 60529): IP30 - circuit breaker housing; IP00 - terminals for connection of external conductors.

At the air temperature of $+40$ °C, the relative humidity shall not exceed 50%. The relative humidity may be higher at lower air temperatures. The maximum monthly average relative humidity shall not exceed 90% in the wettest month at the lowest monthly average temperature of $+25$ °C. Be aware that sudden changes in temperature can lead to condensation on the surface of the molded case circuit breaker.

6.2 Connection

VA-99M	Power busbar	Conductor with cable lug
		

6.3 Installation of accessories

Accessories for MCCBs VA-99M with thermomagnetic trip unit are not compatible with MCCBs with other types of trip units.

7 SAFETY REQUIREMENTS

By protection method against electric shock, molded case circuit breakers VA-99M conform to IEC 61140 class 0 and shall be installed in distribution enclosures with protection degree of min. IP30 according to IEC 60529.

8 TRANSPORTATION AND STORAGE

8.1 The molded case circuit breakers VA-99M can be transported by any type of enclosed transport that ensures the protection of packed products against mechanical impacts and weather exposure.

8.2 The molded case circuit breakers VA-99M shall be stored in the original package indoors at the ambient temperatures from -40°C to $+55^{\circ}\text{C}$ and relative humidity of max. 85% at $+25^{\circ}\text{C}$.

9 MANUFACTURER'S WARRANTY

The manufacturer guarantees that the molded case circuit breaker corresponds to the requirements of IEC 60947-2 provided that the consumer follows the operating, transportation and storage conditions.

Warranty period: 7 years from the date of sale, specified in the sales receipt.

Shelf life: 7 years from the date of manufacture, specified on the product package or housing.

Service life: 10 years.

Manufacturer: OOO Elektroresheniya, Otradnaya st., 2b/9, 127273, Moscow, Russia, tel. +7 (495) 788-88-15.

MEA regional headquarters: EKF ELECTRICAL SOLUTION FZCO, Office 249, Techno Hub-2, Dubai Silicon Oasis, P.O. box 341079, Dubai, United Arab Emirates, tel. +971-4-547-06-18.

10 DISPOSAL

Life-expired and failed products shall be disposed of in compliance with the national and local laws and regulations in force.

To dispose of the product, send it to an authorized company for recycling in compliance with the national and local laws and regulations in force.

11 CERTIFICATE OF ACCEPTANCE

The molded case circuit breaker VA-99M 50°C EKF has been approved for operation.

Date of manufacture:
for information, refer to the product package.

Quality control stamp

EAC

v3



[ekfggroup.com](http://ekfgroup.com)

