Moulded Case Circuit Breakers Ex9MHV AC TM

- **Tested according to IEC/EN 60947-2**
- **Thermo-magnetic tripping unit for power distribution**
- **Frame sizes M2-M3**
- **Rated operating current from 63 A up to 630 A**
- **3 pole versions**
- **Rated ultimate short circuit breaking capacity I_{cu} up to 50 kA,**
- **Rated voltage 690 / 800 / 1000 / 1140V AC**

Moulded Case Circuit Breakers Ex9MHV Thermo-magnetic (TM) type are intended for applications in power distribution with nominal voltages up to 1140V AC. These breakers are based on the regular Ex9M series and are developed to provide all the required protections to installation with an unusual higher voltage, for example: 800V AC photovoltaic installations.

Testing according to IEC/EN 60947-2 standards ensures the functionality and reliability for wide variety of applications including isolation.

These breakers are offered with breaking capacities from 36 kA up to 50 kA at 800V AC. High rated impulse withstand voltage makes it possible to use them even in system with occurences of transient overvoltage waves of high intensity, e.g. in heavy industry.

Utilization category A circuit breakers.

Type Key

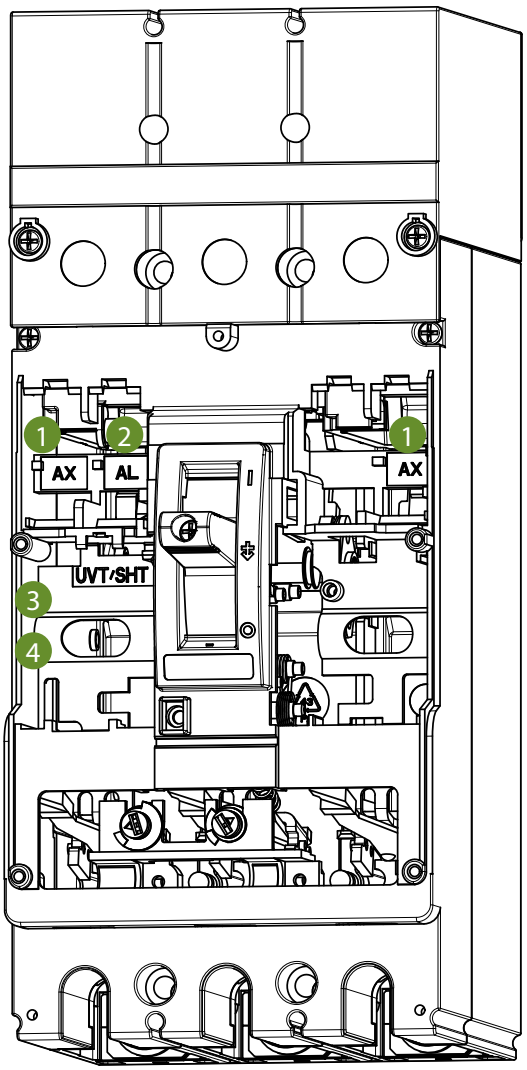
Ex9	M	3	HV	N	TM	630	3P
Product family	Product family	Frame size	Sub-series	Breaking capacity	Release technology	Rated current	Poles
Ex9	M: MCCB	2: to 250 A 3: to 630 A	HV: MCCB for higher voltages	S: 36 kA N: 50 kA	TM: Thermo Magnetic type for power distribution	2: to 250 A 3: to 630 A	3P: 3-pole

Certification marks

CE

Moulded Case Circuit Breakers Ex9MHV AC TM

Internal accessories



1	2	3	4
Auxiliary contact **AX21/M**	Signal contact **AL21/M**	Shunt trip release **SHT2*i*** 1 unit or UVT2*i*	Undervoltage release **UVT2*i*** 1 unit or SHT2*i*

Auxiliary contact AX21/M

Signal contact AL21/M

Shunt trip releases SHT2*i*

Undervoltage releases UVT2*i*

All internal accessories for the frame sizes M2+M3 are identical.

Moulded Case Circuit Breakers Ex9MHV AC TM

External accessories Ex9M2HV-M3HV AC TM

Tunnel terminals
MC2*i* W

Mounting depth spacers
WG *i*

Box terminals
MC2*i*

Screw terminals
MCS2*i*

Tunnel terminals MC2*i* W

Mounting depth spacers WG *i*

Box terminals MC2*i*

Screw terminals MCS2*i*

Moulded Case Circuit Breakers Ex9MHV AC TM

Version Ex9M2HV-S up to 250 A, I_{cu} = 36 kA

- 3 pole Moulded Case Circuit Breakers
- $I_{cs} = I_{cu}$ = 36 kA at 800 V AC
- I_r can be set in range (0.7 — 1.0) × I_n
- I_i fixed at 10 × I_n for devices from 63 A up to 100 A
- I_i can be set in range (7 — 12) × I_n for the devices 125 A and 160 A
- I_i can be set in range (5 — 10) × I_n for devices from 180 A up to 250 A
- Mounting screws, box terminals as well as phase barriers in the scope of delivery

Poles	Rated current i_n	Overcurrent release I_r	instant. release I_i	Article No.	Type	Packing
3	63 A	44-63 A	630 A	113655	Ex9M2HV S TM 63 3P	1/8
3	80 A	56-80 A	800 A	113656	Ex9M2HV S TM 80 3P	1/8
3	100 A	70-100 A	1000 A	113657	Ex9M2HV S TM 100 3P	1/8
3	125 A	87-125 A	875-1500 A	113658	Ex9M2HV S TM 125 3P	1/8
3	160 A	112-160 A	1120-1920 A	113659	Ex9M2HV S TM 160 3P	1/8
3	180 A	126-180 A	900-1800 A	113660	Ex9M2HV S TM 180 3P	1/8
3	200 A	140-200 A	1000-2000 A	113661	Ex9M2HV S TM 200 3P	1/8
3	225 A	158-225 A	1125-2250 A	113662	Ex9M2HV S TM 225 3P	1/8
3	250 A	175-250 A	1250-2500 A	113663	Ex9M2HV S TM 250 3P	1/8

Version Ex9M2HV-N up to 250 A, I_{cu} = 50 kA

- 3 pole Moulded Case Circuit Breakers
- I_{cs} = 36 kA, I_{cu} = 50 kA at 800 V AC
- I_r can be set in range (0.7 — 1.0) × I_n
- I_i fixed at 10 × I_n for devices from 63 A up to 100 A
- I_i can be set in range (7 — 12) × I_n for the devices 125 A and 160 A
- I_i can be set in range (5 — 10) × I_n for devices from 180 A up to 250 A
- Mounting screws, box terminals as well as phase barriers in the scope of delivery

Poles	Rated current i_n	Overcurrent release I_r	instant. release I_i	Article No.	Type	Packing
3	63 A	44-63 A	630 A	113664	Ex9M2HV N TM 63 3P	1/8
3	80 A	56-80 A	800 A	113665	Ex9M2HV N TM 80 3P	1/8
3	100 A	70-100 A	1000 A	113666	Ex9M2HV N TM 100 3P	1/8
3	125 A	87-125 A	875-1500 A	113667	Ex9M2HV N TM 125 3P	1/8
3	160 A	112-160 A	1120-1920 A	113668	Ex9M2HV N TM 160 3P	1/8
3	180 A	126-180 A	900-1800 A	113669	Ex9M2HV N TM 180 3P	1/8
3	200 A	140-200 A	1000-2000 A	113670	Ex9M2HV N TM 200 3P	1/8
3	225 A	158-225 A	1125-2250 A	113671	Ex9M2HV N TM 225 3P	1/8
3	250 A	175-250 A	1250-2500 A	113672	Ex9M2HV N TM 250 3P	1/8

Moulded Case Circuit Breakers Ex9MHV AC TM

Version Ex9M3HV-S up to 630 A, I_{cu} = 36 kA

- 3 pole Moulded Case Circuit Breakers
- $I_{cs} = I_{cu}$ = 36 kA at 800 V AC
- I_r can be set in range (0.7 — 1.0) × I_n
- I_i can be set in range (5 — 10) × I_n
- Mounting screws, screw type terminals as well as phase barriers in the scope of delivery

Poles	Rated current i_n	Overcurrent release I_r	instant. release I_i	Article No.	Type	Packing
3	250 A	175-250 A	1250-2500 A	113673	Ex9M3HV S TM 250 3P	1/2
3	315 A	220-315 A	1575-3150 A	113674	Ex9M3HV S TM 315 3P	1/2
3	350 A	245-350 A	1750-3500 A	113675	Ex9M3HV S TM 350 3P	1/2
3	400 A	280-400 A	2000-4000 A	113676	Ex9M3HV S TM 400 3P	1/2
3	500 A	350-500 A	2500-5000 A	113677	Ex9M3HV S TM 500 3P	1/2
3	630 A	441-630 A	3150-6300 A	113678	Ex9M3HV S TM 630 3P	1/2

Version Ex9M3HV-N up to 630 A, I_{cu} = 50 kA

- 3 and 4-pole Moulded Case Circuit Breakers
- $I_{cs} = I_{cu}$ = 50 kA at 800 V AC
- I_r can be set in range (0.7 — 1.0) × I_n
- I_i can be set in range (5 — 10) × I_n
- Mounting screws, screw type terminals as well as phase barriers in the scope of delivery

Poles	Rated current i_n	Overcurrent release I_r	instant. release I_i	Article No.	Type	Packing
3	250 A	175-250 A	1250-2500 A	113679	Ex9M3HV N TM 250 3P	1/2
3	315 A	220-315 A	1575-3150 A	113680	Ex9M3HV N TM 315 3P	1/2
3	350 A	245-350 A	1750-3500 A	113681	Ex9M3HV N TM 350 3P	1/2
3	400 A	280-400 A	2000-4000 A	113682	Ex9M3HV N TM 400 3P	1/2
3	500 A	350-500 A	2500-5000 A	113683	Ex9M3HV N TM 500 3P	1/2
3	630 A	441-630 A	3150-6300 A	113684	Ex9M3HV N TM 630 3P	1/2

Technical Data Ex9M2HV AC TM

AC TM Moulded Case Circuit Breakers up to 250 A

General parameters

Suitable for commercial as well as industrial applications		
I_r can be set in range (0.7 — 1.0) × I_n		
I_i fixed at 10 × I_n for devices from 63 A up to 100 A		
I_i can be set in range (7 — 12) × I_n for 125 A and 160 A; (5 — 10) × I_n for other devices up to 250 A		
Internal accessories		
Auxiliary contact unit	AX21M	112071
Alarm contact unit	AL21M	112072
Shunt trip releases	SHT22	101416 — 101424
Undervoltage releases	UVT22	101425 — 101426
Max. number of installed internal accessories is 2 pcs of AX21M, 1 pc of AL21M and 1 pc of a release (SHT22 or UVT22)		
External accessories		
Phase barrier	PB22	112111
Screw type terminals	MCS22	107874
Connection terminals	MC22	103709, 103869, 103711, 103713
Mounting screws, screw type terminals, top terminal protection covers as well as phase barriers in the scope of delivery		

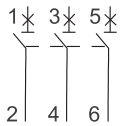
Technical Data Ex9M2HV AC TM

AC TM Moulded Case Circuit Breakers up to 250 A

Electrical parameters

	Ex9M2HV-S	Ex9M2HV-N
Tested according to	IEC/EN 60947-2	
Rated op. voltage U_e	690 / 800 / 1000 / 1140 V AC	
Rated insulation voltage U_i	1 250 V	
Rated impulse withstand voltage U_{imp}	8 kV	
Rated frequency	50/60 Hz	
Rated ultimate short-circuit breaking capacity I_{cu}	50 kA / 690 V 36 kA / 800 V 15 kA / 1000 V 10 kA / 1140 V	80 kA / 690 V 50 kA / 800 V 30 kA / 1000 V 10 kA / 1140 V
Rated service short-circuit breaking capacity I_{cs}	50 kA / 690 V 36 kA / 800 V 15 kA / 1000 V 10 kA / 1140 V	80 kA / 690 V 36 kA / 800 V 15 kA / 1000 V 10 kA / 1140 V
Rated current	63 / 80 / 100 / 125 / 160 / 180 / 200 / 225 / 250 A	
Utilization category	A	
Mechanical service life	15 000 operation cycles	
Electrical service life	1 500 operation cycles / 800 V AC	
Line voltage connection	arbitrary above or below	

Wiring diagram



3P

Dependence of Tripping Characteristics on Ambient Temperature

T [°C]	I_n (T) [A]								
	63 A	**80 A**	**100 A**	**125 A**	**160 A**	**180 A**	**200 A**	**225 A**	**250 A**
-40	88	112	140	175	224	252	280	315	350
-35	86.5	110	137	172	220	247	275	309	343
-25	83	106	132	165	212	238	265	300	332
-15	80	102	127	159	204	229	255	288	319
-5	77	98	122	153	196	220	245	276	306
0	75	96	120	150	192	216	240	270	300
10	72	92	115	144	184	207	230	259	287
20	69	88	110	137	176	198	220	247	275
30	66	84	105	131	168	189	210	236	262
40	63	80	100	125	160	180	200	225	250
50	58.5	74.5	93	118	152	171	190	213	237
60	53	67	84	106	136	157	175	196	218
70	46	56	80	96	120	144	166	180	207

Power dissipation characteristics

I_n	**63 A**	**80 A**	**100 A**	**125 A**	**160 A**	**180 A**	**200 A**	**225 A**	**250 A**
Pole resistance (mΩ)	1.7	1.3	0.88	0.7	0.55	0.55	0.55	0.4	0.4
Pole power dissipation (W)	6.7	8.3	8.8	10.9	14.1	17.8	22	20.3	25

Technical Data Ex9M2HV AC TM

AC TM Moulded Case Circuit Breakers up to 250 A

Mechanical parameters

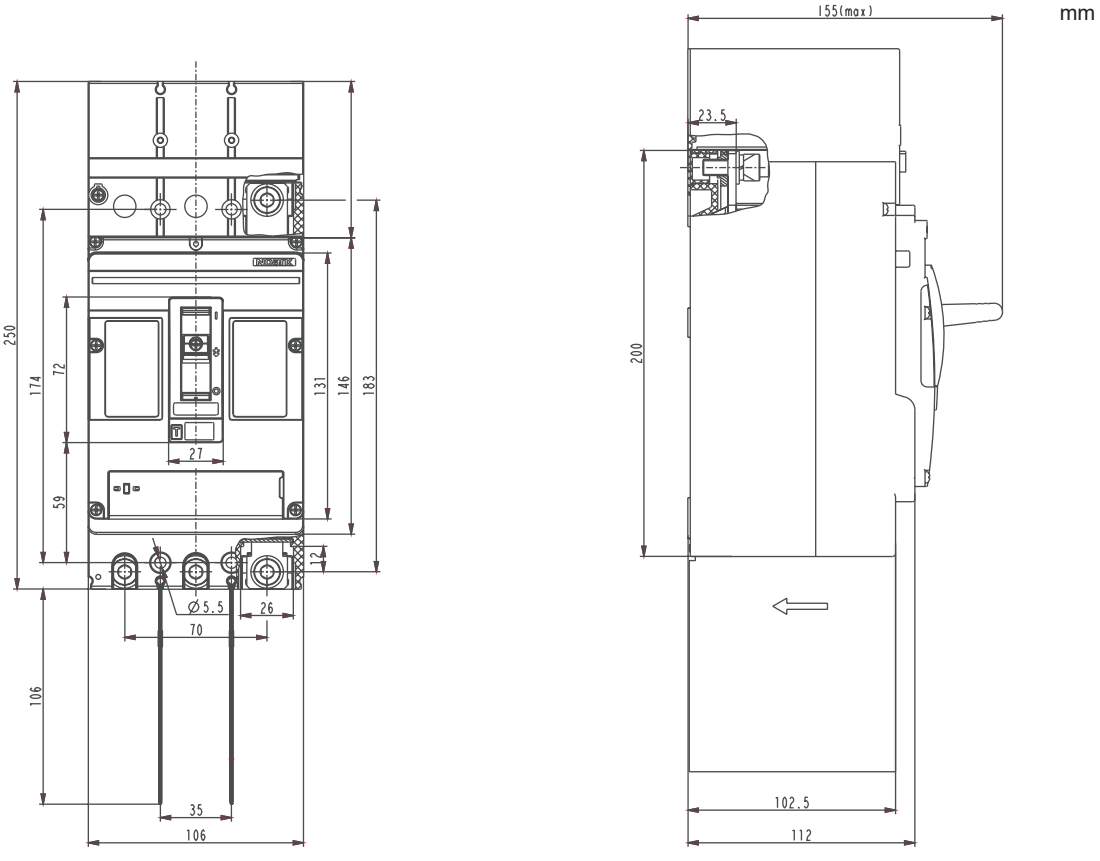
Device width 3P / 4P	106 mm
Device height	200 mm
Device depth	112 mm
Mounting	onto panel
Degree of protection	IP40, IP20 terminals
Terminals	M8 screws
Busbar thickness	≤ 6 mm
Busbar width	≤ 25 mm
Cable lug width	≤ 25 mm
Fastening torque of terminals	11 Nm
Ambient temperature	-40 — +70 °C
Relative humidity	≤ 50 % at 40 °C, ≤ 90 % monthly average
Pollution degree	3
Mounting position	vertical, can be rotated by 90° in each axis

Derating coefficient of technical parameters based on altitude

Altitude	**≤ 2 000 m**	**3 000 m**	**4 000 m**	**5 000 m**
Derrating op. current I_n coefficient	1	0.96	0.93	0.9
Maximum rated op. voltage U_e	1140 V AC	1030 V AC	950 V AC	850 V AC
Rated insulation voltage U_i	1250 V AC	1120 V AC	1000 V AC	880 V AC
Rated impulse withstand voltage U_{imp}	8 kV	8 kV	8 kV	8 kV
Dielectric properties (U_{imp}=8 kV)	2550 V AC	2300 V AC	2050 V AC	1800 V AC

Dimensions

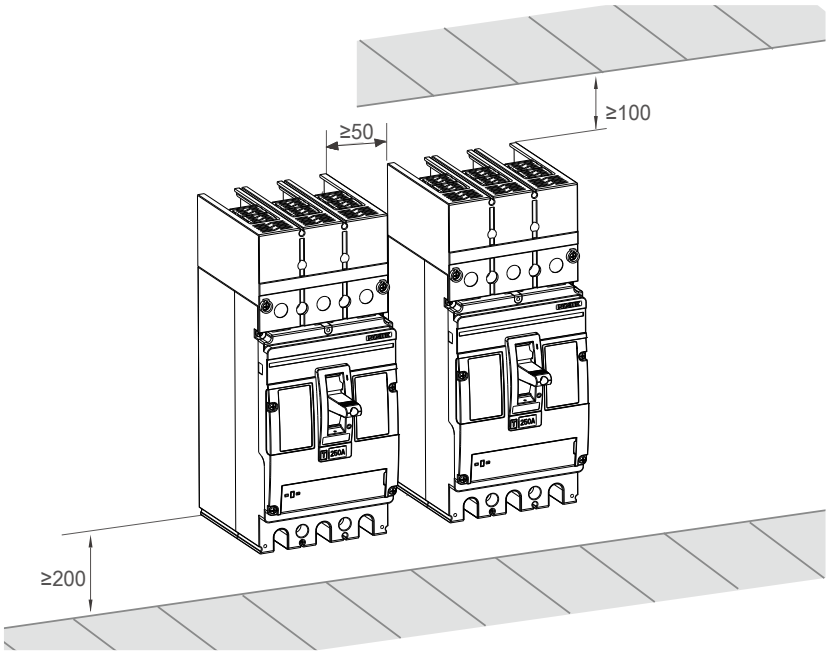
mm



Technical Data Ex9M2HV AC TM

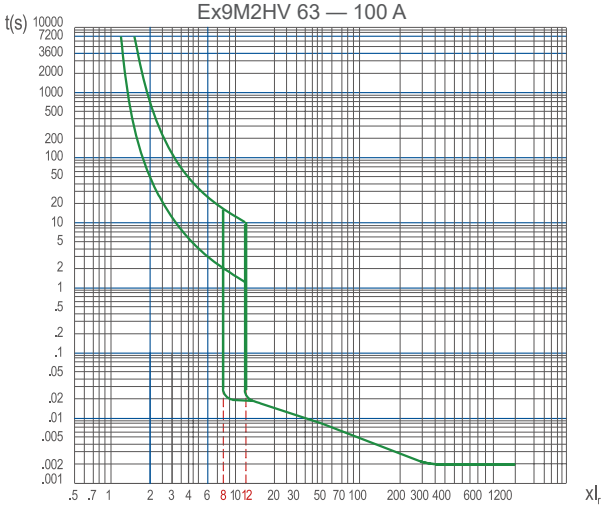
AC TM Moulded Case Circuit Breakers up to 250 A

Installation space

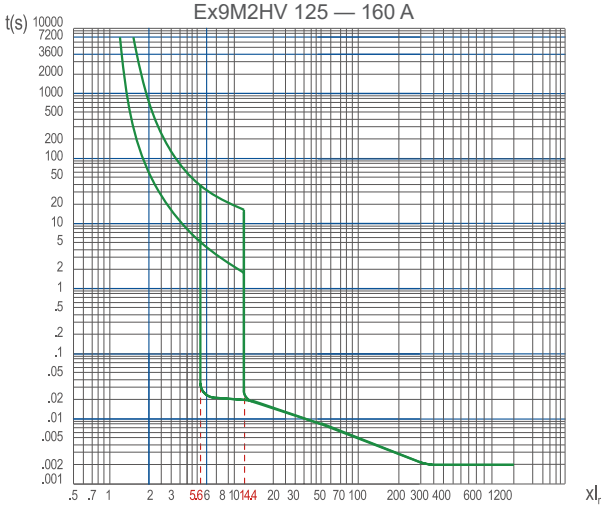


Tripping characteristics

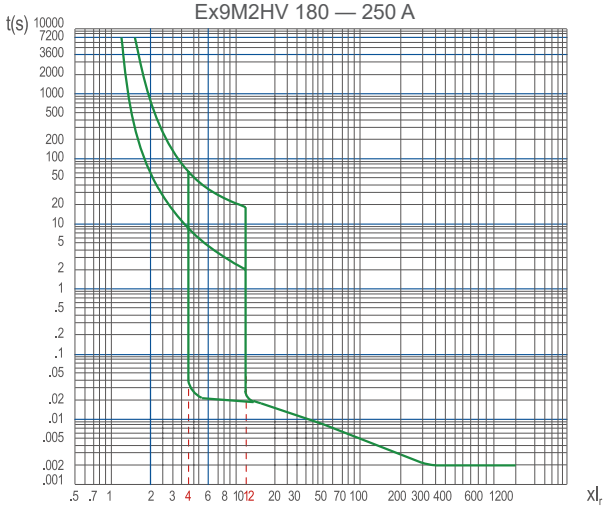
Ex9M2HV 63 — 100 A



Ex9M2HV 125 — 160 A



Ex9M2HV 180 — 250 A



Technical Data Ex9M3HV AC TM

AC TM Moulded Case Circuit Breakers up to 630 A

General parameters

Suitable for commercial as well as industrial applications		
I_r can be set in range (0.7 — 1.0) × I_n		
I_i can be set in range (5 — 10) × I_n		
Internal accessories		
Auxiliary contact unit	AX21M	112071
Alarm contact unit	AL21M	112072
Shunt trip releases	SHT22	101416 — 101424
Undervoltage releases	UVT22	101425 — 101426
Max. number of installed internal accessories is 2 pcs of AX21M, 1 pc of AL21M and 1 pc of a release (SHT22 or UVT22)		
External accessories		
Phase barrier	PB23	112112
Connection terminals	MC23	103715 — 103722
Mounting screws, screw type terminals, top terminal protection covers as well as phase barriers in the scope of delivery		

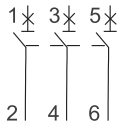
Technical Data Ex9M3HV AC TM

AC TM Moulded Case Circuit Breakers up to 630 A

Electrical parameters

	Ex9M3HV-S	Ex9M3HV-N
Tested according to	IEC/EN 60947-2	
Rated op. voltage U_e	690 / 800 / 1000 / 1140 V AC	
Rated insulation voltage U_i	1 250 V	
Rated impulse withstand voltage U_{imp}	12 kV	
Rated frequency	50/60 Hz	
Rated ultimate short-circuit breaking capacity I_{cu}	50 kA / 690 V 36 kA / 800 V 25 kA / 1000 V 10 kA / 1140 V	80 kA / 690 V 50 kA / 800 V 35 kA / 1000 V 10 kA / 1140 V
Rated service short-circuit breaking capacity I_{cs}	50 kA / 690 V 36 kA / 800 V 15 kA / 1000 V 10 kA / 1140 V	80 kA / 690 V 50 kA / 800 V 20 kA / 1000 V 10 kA / 1140 V
Rated current	250 / 315 / 350 / 400 / 500 / 630 A	
Utilization category	A	
Mechanical service life	15 000 operation cycles	
Electrical service life	1 500 operation cycles / 800 V AC	
Line voltage connection	arbitrary above or below	

Wiring diagram



3P

Dependence of Tripping Characteristics on Ambient Temperature

T [°C]	I_n (T) [A]					
	250 A	**315 A**	**350 A**	**400 A**	**500 A**	**630 A**
-40	350	441	490	560	700	882
-35	343	433	481	550	687	866
-25	332	418	465	530	662	836
-15	319	402	447	510	637	804
-5	306	386	429	490	612	772
0	300	378	420	480	600	756
10	287	362	402	460	575	724
20	275	346	385	440	550	693
30	262	331	367	420	525	661
40	250	315	350	400	500	630
50	237	300	332	380	450	580
60	225	286	295	360	406	530
70	212	271	276	320	360	490

Power dissipation characteristics

I_n	**250 A**	**315 A**	**350 A**	**400 A**	**500 A**	**630 A**
Pole resistance (mΩ)	0.35	0.25	0.25	0.2	0.12	0.12
Pole power dissipation (W)	21.9	24.8	30.6	32	30	47.6

Technical Data Ex9M3HV AC TM

AC TM Moulded Case Circuit Breakers up to 630 A

Mechanical parameters

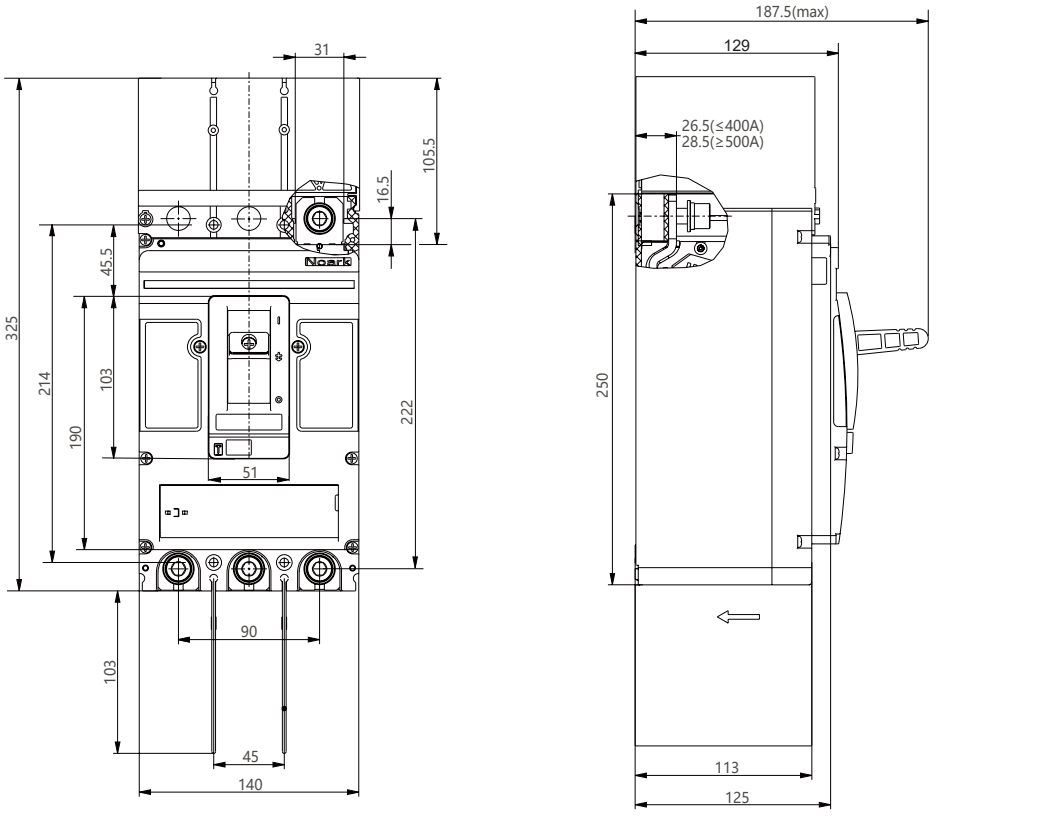
Device width 3P	140 mm
Device height	250 mm
Device depth	130 mm
Mounting	onto panel
Degree of protection	IP40, IP20 terminals
Terminals	M10 screws
Busbar thickness	≤ 8 mm
Busbar width	≤ 30 mm
Cable lug width	≤ 30 mm
Fastening torque of terminals	25 Nm
Ambient temperature	-40 — +70 °C
Relative humidity	≤ 50 % at 40 °C, ≤ 90 % monthly average
Pollution degree	3
Weight 3P / 4P	5.2 kg / 6.7 kg
Mounting position	vertical, can be rotated by 90° in each axis

Derating coefficient of technical parameters based on altitude

Altitude	**≤ 2 000 m**	**3 000 m**	**4 000 m**	**5 000 m**
Derrating op. current I_n coefficient	1	0.96	0.93	0.9
Maximum rated op. voltage U_e	1140 V AC	1030 V AC	950 V AC	850 V AC
Rated insulation voltage U_i	1250 V AC	1120 V AC	1000 V AC	880 V AC
Rated impulse withstand voltage U_{imp}	8 kV	8 kV	8 kV	8 kV
Dielectric properties (U_{imp}=8 kV)	2550 V AC	2300 V AC	2050 V AC	1800 V AC

Dimensions

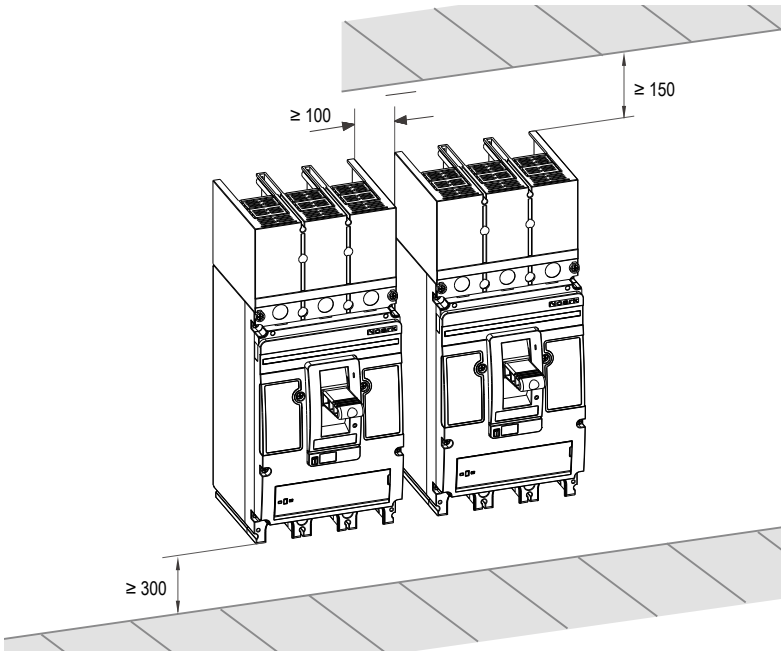
mm



Technical Data Ex9M3HV AC TM

AC TM Moulded Case Circuit Breakers up to 630 A

Installation space



Tripping characteristics