

MF1-M Series

External Circuit Breaker (ECB)

(Motor operated)

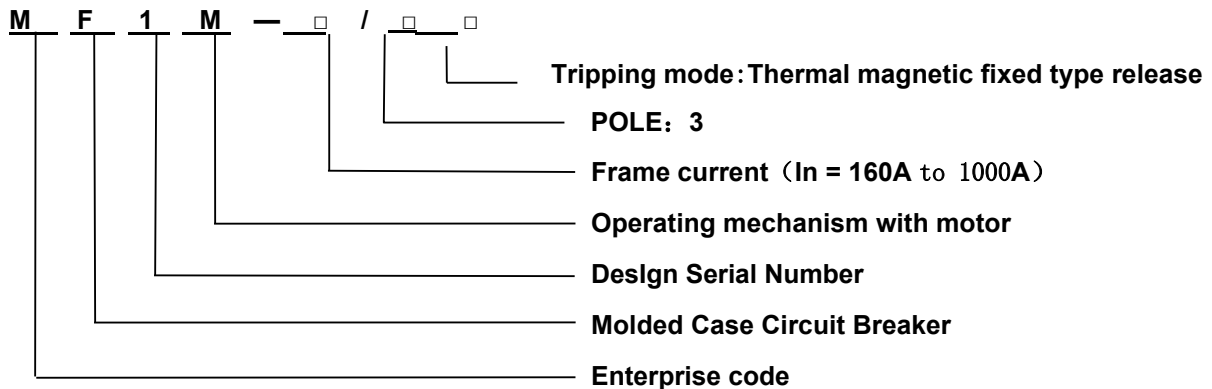


1. Application:

MF1-M Series External Circuit Breaker (hereinafter called as "Motor circuit breaker"), rated insulating voltage AC 1000V is suitable for using in the circuit of AC 50Hz/ 60Hz, rated voltage 230/400V (-5% to +5%) three phase with asymmetric load or single phase, rated working current from 160A to 1000A with T/M fixed type release, The Motor circuit breaker has the functions of overload, short circuit protection and remote control and is fully in compliance of IEC Standard: 60947-2 & SEC Specification 37-SDMS-05.

2. Products and Implications:

Product Type and Meaning



Note: Rated working current (In): 160, 200, 250, 300, 400, 500, 600, 800, 1000A

3. Brief Introduction to Functions and Operations:

- Use of Circuit Breaker: Distribution protection type, motor protection type;
- All poles close, trip, and open simultaneously for a fault on any pole. ECB has Arc suppression devices inside.
- According to the operation mode: handle operation, motor operation; Terminals are of tinned copper.
- The motor circuit breaker has the functions of remote control, dividing (or receiving the AC250V/1A signal from the watt-hour meter to disconnect MCCB), and direct manual operation
- Before completing a "close breaker" remote order, the action is accepted manually. For Connect/ Disconnect, manual and remote operations is functional. For locking it is only Manual.
- When the switch is locked, the ECB can no longer be closed or operated during the trip.
- Characteristic description of cover
- The external circuit breaker is compact, rugged and reliable in design. Parts of external breakers are protected from corrosion. It is user friendly for installation. Cables are easily replaceable.
- Incoming supply terminals shall be at the bottom and outgoing load terminals shall be at the top as viewed from the front as per below figure.
- The external circuit breakers position identifications, that is, "ON"- "TRIPPED"- "OFF", are indicated by the handle position on top, center and bottom respectively for a vertical mounted breaker.

5. Main performance indicators:

Characteristics of Thermomagnetic Distribution Protection; according to IEC60947-2; Reference temperature +55°C

Action characteristics	ambient temperature +55°C		Electromagnetic release action current
	1.05I _n (cool state) non-action time (h)	1.30I _n (hot state) action time (h)	
I _n ≤ 63	≤ 1h	< 1h	I _n ≤ 63
63 < I _n ≤ 250	≤ 2h	< 2h	63 < I _n ≤ 250
250 < I _n ≤ 800	≤ 2h	< 2h	250 < I _n ≤ 800

● Main Technical Performance Index

Frame current I _n (A)		MF1-M-250	MF1-M-400
Reference standard		IEC60947-2	
Rated working current I _e (A)		160, 200, 250	300, 400
Pole (P)		3	
Voltage frequency		AC 50/60Hz	
Rated insulation voltage U _i (V)		1000	
Rated working voltage U _e (V)		230 / 400	
Rated impulse withstand voltage U _{imp} (KV)		8	
Mechanical life (time)		5500	5500
Electric life (time)		2000	1000
Rated short circuit breaking capacity	I _{cu} (400V/230V)	20KA / 25KA	20KA / 25KA
	I _{cs} (400V/230V)	20KA / 25KA	20KA / 25KA
Ionization distance (mm)		≤ 50	≤ 100
Utilization Category		A	

● **Main Technical Performance Index**

Frame current $I_n(A)$	MF1-M-630	MF1-M-1000
Reference standard	IEC60947-2	
Rated working current $I_e(A)$	500A, 600A	800A, 1000A
Pole (P)	3	
Voltage frequency	AC 50/60Hz	
Rated insulation voltage $U_i (V)$	1000	
Rated working voltage $U_e (V)$	400 / 415	
Rated impulse withstand voltage $U_{imp} (KV)$	8	
Mechanical life (time)	5000	4000
Electric life (time)	2000	1000
Rated short circuit breaking capacity	$I_{cu} (400V/230V)$	40KA / 65KA
	$I_{cs} (400V/230V)$	40KA / 65KA
Ionization distance (mm)	≤50	≤100
Utilization Category	A	

Main Technical Indicators of Motor Performance of Motor Circuit Breaker

Frame	MF1-M-630	MF1-M-1000
Rated control circuit voltage (V)	AC230	AC230
Rated operating voltage of motor $U_e (V)$	DC 24	DC 24
Start motor power (W)	50	70
Normal motor power (W)	12	19
Operational disconnection time (s)	0.06-0.1	
Operation frequency (min)	3	
Hi-Pot (V)/1sec	AC 500	AC 500
Noise test	≤65dB 30 cm from motor end	≤70dB 50 cm from motor end

Note: 1. The terminal block include additional connection terminals for the control cables.

2. The external circuit breaker must have three (3) poles (three-phases) – four (4) wires, with the neutral solidly grounded.

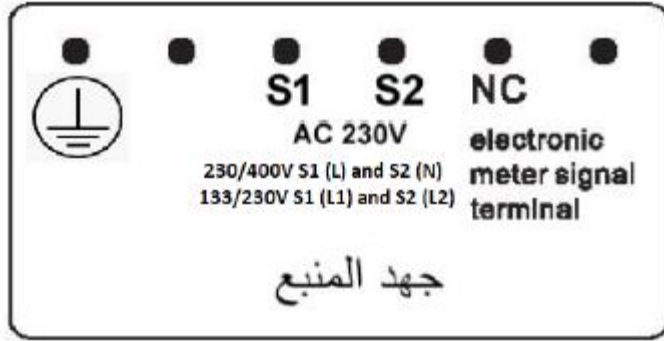
3. Minimal switching Power 30 kVA by phase. Minimal switching Voltage 400V.

4. Short-circuit breaking capacity I_{cn} is according to the ECB Rated Current I_n (at 55°C) and operation Voltage.

5. Contact resistance is not more than $500\mu\Omega$ and Insulation resistance $\geq 1000 M\Omega$. Dielectric Strength between contacts $\geq 2000 VAC$. Dielectric Strength between contact and coil (60 Hz) $\geq 3000 VAC$. Dielectric Strength between contact and coil (60 Hz) $\geq 3000 VAC$.

Dielectric Strength between contacts assembly $\geq 4000 VAC$. Short circuit characteristic according to IEC 60909-21 (UC3, 3.0kA) at least.

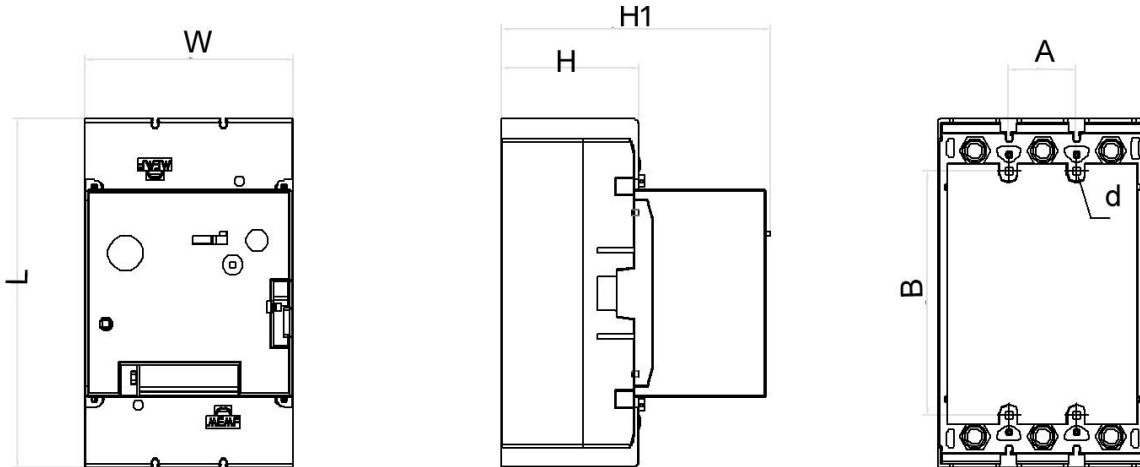
- Wiring diagram (MF1-M-250, MF1-M-400)



① Input Rated Voltage (Uc) : AC230V.

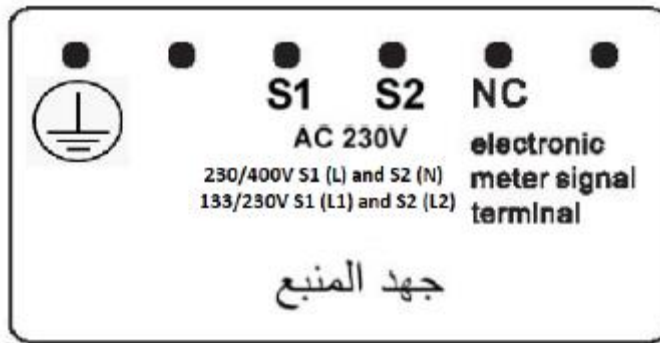
② Power meter output AC250V/1A signal, to break off the motor circuit breaker.

6. Overall and Installation Dimension:



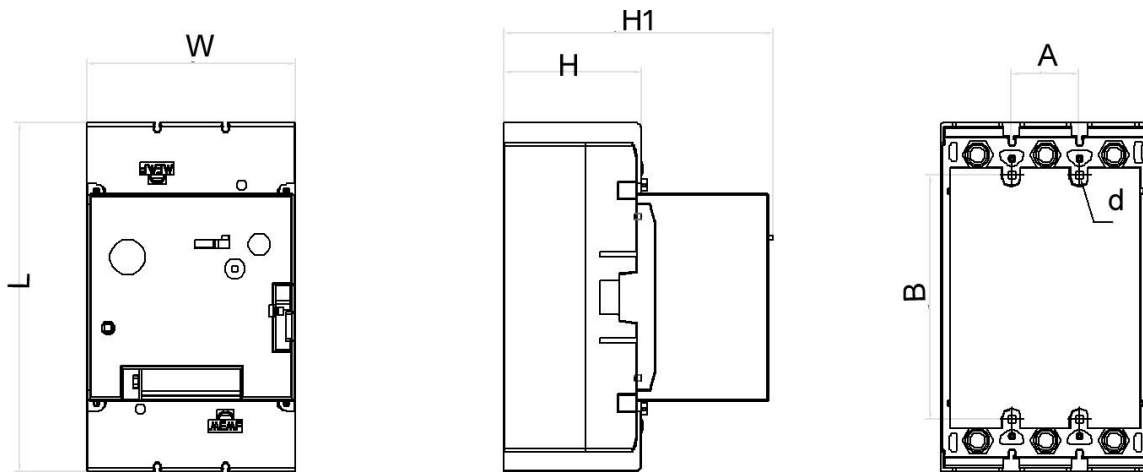
Overall Dimension (mm)	Frame	MF1-M-250	MF1-M-400
	L		179
W		107	140
H		70.5	108
H1		138.6	150
Installation Dimension (mm)	A	35	44
	B	125.4	215
	Φd	4.5	6.0

● **Wiring diagram (MF1-M-630, MF1-M-1000)**



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- ① **Input Rated Voltage (Uc) : AC230V.**
- ② **Power meter output AC250V/1A signal, to break off the motor circuit breaker.**

Overall and Installation Dimension:



Overall Dimension (mm)	Frame	MF1-M-630	MF1-M-1000
	L		300
W		210	210
H		119	120
H1		175	205
Installation Dimension (mm)	A	60	70
	B	205	243
	Φd	7.0	7.0

7. Use and Maintenance

- For Motor circuit breaker (including products packed in Carton), during transportation, storage and use, the product shall not be affected by rain, and placed or installed in an environment free from rain and snow, and free from air flow.
- The Motor circuit breaker shall be inspected regularly, and the inspection period shall be determined according to the working conditions, and the power shall be cut off during inspection. The main Inspection items include.
- The main Inspection items include: knob operation ON/OFF/TRIP, Motor operation ON/OFF/TRIP, clean up dust and dirt, specially pay attention to remove the dirt between the incoming and outgoing poles to prevent short-circuit between the poles, and tighten the terminals..

8. Ordering Noticing:

Users must specify when ordering:

- When ordering, please must write clear information about model, poles, current, Quantity and Voltage specification of the motor circuit breakers, for example: If order MF1-M-250, three poles, distribution, rated current 200A, with the motor circuit breaker 100sets, which can be shortly write: MF1-M-250/3P 200A 100sets.
- If you add other attachments, please note the name of the attachment later.

9. Outgoing Terminals:

Outgoing terminals are suitable to both Cu and AL conductors.

For outgoing terminals 300 and 400 Amps rated ECB, outgoing terminals, are box type for direct connection without the use of cable lugs and suitable for copper conductors up to 185 and 240 mm².

For Outgoing terminals 500, 600, 800 and 1000 Amps rated ECBs, outgoing terminals are suitable for direct connection of tinned copper bus bar by mean of bolts and nuts.

External circuit breakers are provided with self-fitting knock out type terminal covers for incoming and outgoing terminals with built in separators with sealings provision.

- Each external circuit breaker are equipped with brass or corrosion proof steel bolts of sufficient length for mounting the breaker on un-threaded 3 mm thick steel sheets, polyester sheets or steel rails. The size of bolts are M4.