

MINIATURE CIRCUIT BREAKERS



Miniature Circuit Breakers

FM3

6A ... 63A



FM6

6A ... 63A



FM10

6A ... 63A



FMN Phase - Neutral Miniature Circuit Breakers

6A ... 32A



FMS Disconnectors

40A ... 100A



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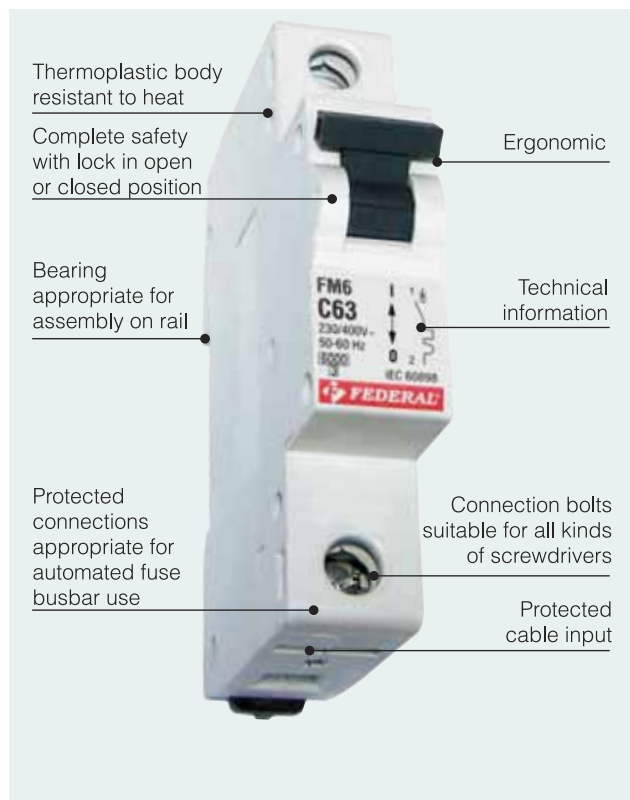
TS 5018-1 TS EN 60898-1
EN 60898-1
IEC 60898-1
CE

Assembly Position : Free
Altitude : 2000 m (max)
Relative Humidity : 50% (40°C) , 90% (20°C)
Ambient Temperature : between -5°C and + 40°C
Pollution Degree : II
Protection Class : IP20

TS EN 60947-3
CE

Assembly Position : Free
Altitude : 2000 m (max)
Relative Humidity : 50% (40°C) , 90% (20°C)
Ambient Temperature : between -5°C and + 40°C
Pollution Degree : III
Protection Class : IP00
Utilization Class : AC-22ATS 5018-1 TS EN 60898-1

MINIATURE CIRCUIT BREAKERS



Federal miniature circuit breakers protect the electrical circuit they are connected to against over current and short circuits. They allow easy open-close of the circuit. Miniature circuit breakers are manufactured with 1, 2, 3 and 4 poles from 6A to 63A in accordance CE. There are two separate types as B and C. In case of a short circuit, B types open the circuit at 3 or 5 times more than nominal current and C types open the circuit at 5 or 10 times more than the nominal current. miniature circuit breakers with 2, 3, 4 poles disable the device they are connected to, thanks to their mechanisms in case of a failure in any phase.

B type: Used in illumination of houses, plugs and control circuits.

C type: Used in inductive loads like transformer, several fluorescent lamps etc.

The device opening the current is enabled by lifting the lever in case of any failure. Lever-free opening mechanism shall open the current again as the failure continues. Federal miniature circuit breakers open the circuit in a very short time in case of a short circuit. In this way, thermal and magnetic forced of the short circuit current are limited. It provides ease in assembly thanks to small dimensions and capability of mounting on rails. Thanks to the design of connection terminals, accidentally touches are eliminated. Federal miniature circuit breakers resist an impact voltage of 6kV, operate continuously under an ambient temperature of 55°C and resist a relative humidity of 95%. 25 mm² cable can be connected to specially-designed cable inputs.

Technical Specifications::

Type		FM3	FM6	FM10
Characteristic		B, C		
Breaking capacity	kA _{rms}	3	6	10
Rated current	A	6,10,16,20,25,32,40,50,63		
Rated operating voltage - U _e	V	230/400		
Rated insulation voltage - U _i	V	690		
Rated impulse withstand voltage - U _{imp}	kV	6		
Number of poles		1, 2, 3, 4		
Frequency	Hz	50 - 60		
Mechanical life	operation	20.000		
Electrical life	operation	>4.000		
Min. - max. connection section	mm ²	1 ... 16		
Min. - max. clamping torque	Nm	2 ... 3		

MINIATURE CIRCUIT BREAKERS

	Connection diagram	Rated current In (A)	Breaking capacity Ics (kA)	Order codes	
				Characteristic B	Characteristic C
 FM3	1, 2, 3, 4 poles    	6	3	9EC-B033□-0006	9EC-C033□-0006
		10	3	9EC-B033□-0010	9EC-C033□-0010
		16	3	9EC-B033□-0016	9EC-C033□-0016
		20	3	9EC-B033□-0020	9EC-C033□-0020
		25	3	9EC-B033□-0025	9EC-C033□-0025
		32	3	9EC-B033□-0032	9EC-C033□-0032
		40	3	9EC-B033□-0040	9EC-C033□-0040
		50	3	9EC-B033□-0050	9EC-C033□-0050
		63	3	9EC-B033□-0063	9EC-C033□-0063
 FM6	   	6	6	9ED-B063□-0006	9ED-C063□-0006
		10	6	9ED-B063□-0010	9ED-C063□-0010
		16	6	9ED-B063□-0016	9ED-C063□-0016
		20	6	9ED-B063□-0020	9ED-C063□-0020
		25	6	9ED-B063□-0025	9ED-C063□-0025
		32	6	9ED-B063□-0032	9ED-C063□-0032
		40	6	9ED-B063□-0040	9ED-C063□-0040
		50	6	9ED-B063□-0050	9ED-C063□-0050
		63	6	9ED-B063□-0063	9ED-C063□-0063
 FM10	   	6	10	9EE-B103□-0006	9EE-C103□-0006
		10	10	9EE-B103□-0010	9EE-C103□-0010
		16	10	9EE-B103□-0016	9EE-C103□-0016
		20	10	9EE-B103□-0020	9EE-C103□-0020
		25	10	9EE-B103□-0025	9EE-C103□-0025
		32	10	9EE-B103□-0032	9EE-C103□-0032
		40	10	9EE-B103□-0040	9EE-C103□-0040
		50	10	9EE-B103□-0050	9EE-C103□-0050
		63	10	9EE-B103□-0063	9EE-C103□-0063

Note: Desired number of poles is written in □ part. (1,2,3,4)

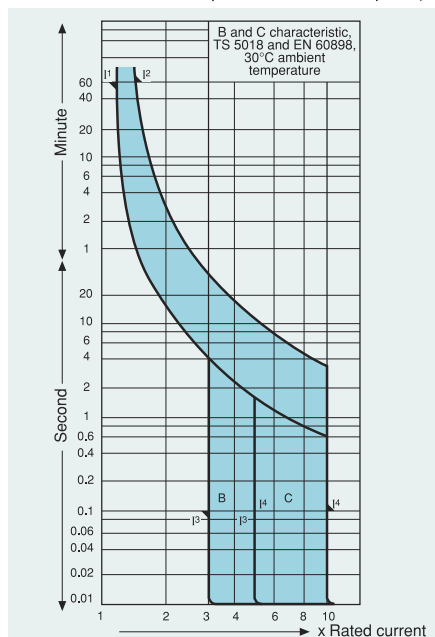


Fig-1 Current-Time Curve (FM3 In < 40A)

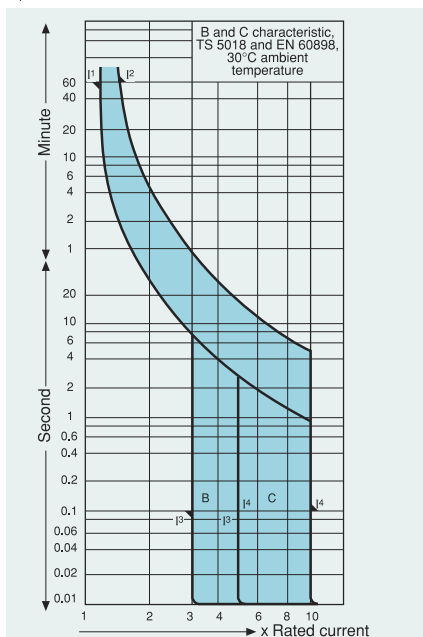


Fig-2 Current-Time Curve (FM3 In=50A, 63A)

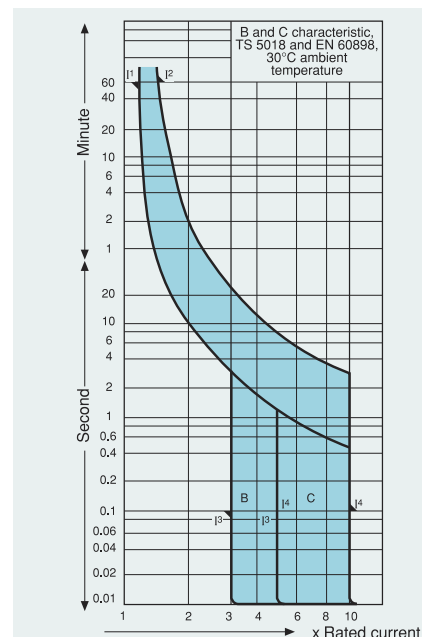


Fig-3 Current-Time Curve (FM6 - FM10)

Characteristic	B	C
I1 (t ≥ 1h)	1,13 x In	1,13 x In
I2 (t < 1h)	1,45 x In	1,45 x In
I3 (t ≥ 0,1s)	3 x In	5 x In
I4 (t < 0,1s)	5 x In	10 x In

MINIATURE CIRCUIT BREAKERS



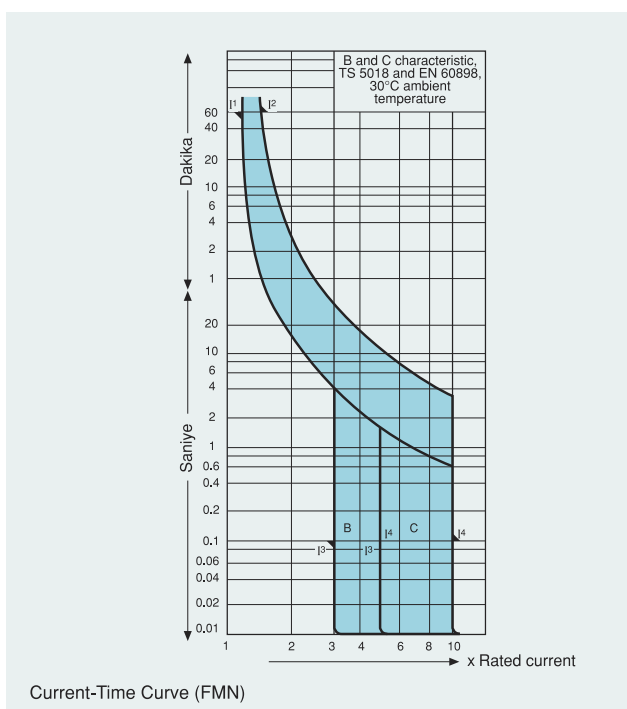
PHASE-NEUTRAL MINIATURE CIRCUIT BREAKERS

Federal phase-neutral miniature circuit breakers protect the electrical circuit they are connected to against over current and short circuits. They are manufactured at 230V (50Hz/60Hz) rated voltage, from 6A to 32A, at 4,5 kA breaking capacity with 1 pole, at IEC 60898-1 standards in accordance with CE. They are not affected from temporary voltage fluctuations. Our phase-neutral miniature circuit breakers, which break the phase line and neutral line at the same time, are known with their small dimensions and high performance. There is a risk of connecting neutral line and phase line wrong for two-pole miniature circuit breaker. Neutral line may have more potential than ground. This fact may cause fires and harm to human life.

Technical Features:

Type	FMN
Breaking capacity	kA_{rms} 4,5
Rated current	A 6,10,16,20,25,32
Rated operating voltage - U_e	V 230/400
Rated insulation voltage - U_i	V 690
Rated impulse withstand voltage - U_{imp}	kV 6
Frequency	Hz 50 - 60
Mechanical Life	operation 20.000
Electrical Life	operation >4000
Weight	gr. 7
Min. - max. connection section	mm^2 1 - 6
Min. - max. clamping torque	Nm 1,2 - 2

Characteristic	B	C
I_1 ($t \geq 1h$)	$1,13 \times I_n$	$1,13 \times I_n$
I_2 ($t < 1h$)	$1,45 \times I_n$	$1,45 \times I_n$
I_3 ($t \geq 0,1s$)	$3 \times I_n$	$5 \times I_n$
I_4 ($t < 0,1s$)	$5 \times I_n$	$10 \times I_n$



Order Codes:

Characteristic B	Characteristic C
9EC-B0431-0006	9EC-C0431-0006
9EC-B0431-0010	9EC-C0431-0010
9EC-B0431-0016	9EC-C0431-0016
9EC-B0431-0020	9EC-C0431-0020
9EC-B0431-0025	9EC-C0431-0025
9EC-B0431-0032	9EC-C0431-0032

MINIATURE CIRCUIT BREAKERS



DISCONNECTORS

On-off switches without thermal and magnetic feature are called disconnectors. Federal disconnectors are manufactured from 40A to 100A, with 1,2,3 and 4 poles, in accordance with TS EN 60947-3 standard and CE norms. Thanks to their 2, 3 and 4-pole switch lever mechanisms, they break the system simultaneously. They can be used safely with distribution and control elements.

Technical Characteristic :

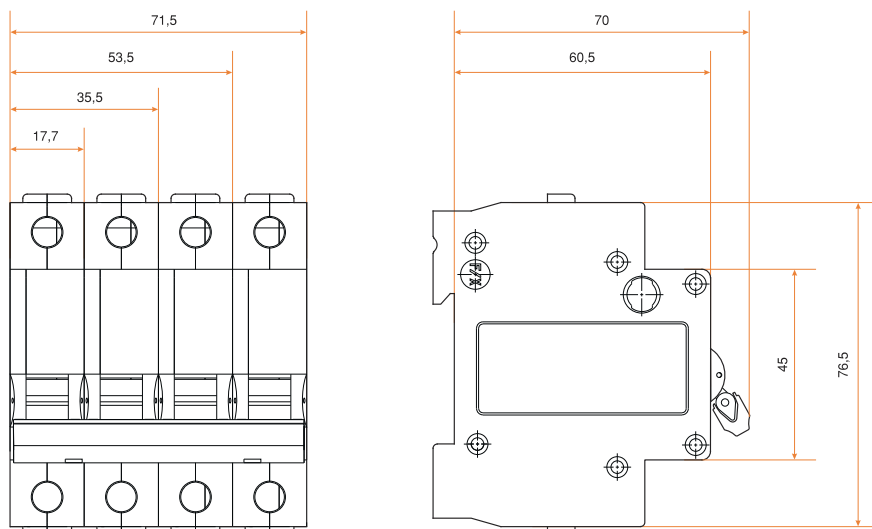
Type	FMS
Number of poles	1,2,3,4
Utilization class	AC-22A
Rated current In	A 40,63,80,100
Rated operating voltage Ui	V 500 V
Rated impulse withstand voltage - Uimp lth	kV 6
Rated frequency	Hz 50/60
Short-time withstand current	A/1s 12xIn
Short circuit making capacity	A/1 s 20xIn
Mechanical life	Operation 10.000
Electrical life	Operation >1500
Min. - max. connection sections	mm ² 6-35
Min. - max. clamping torque	Nm 2-3

Order Codes :

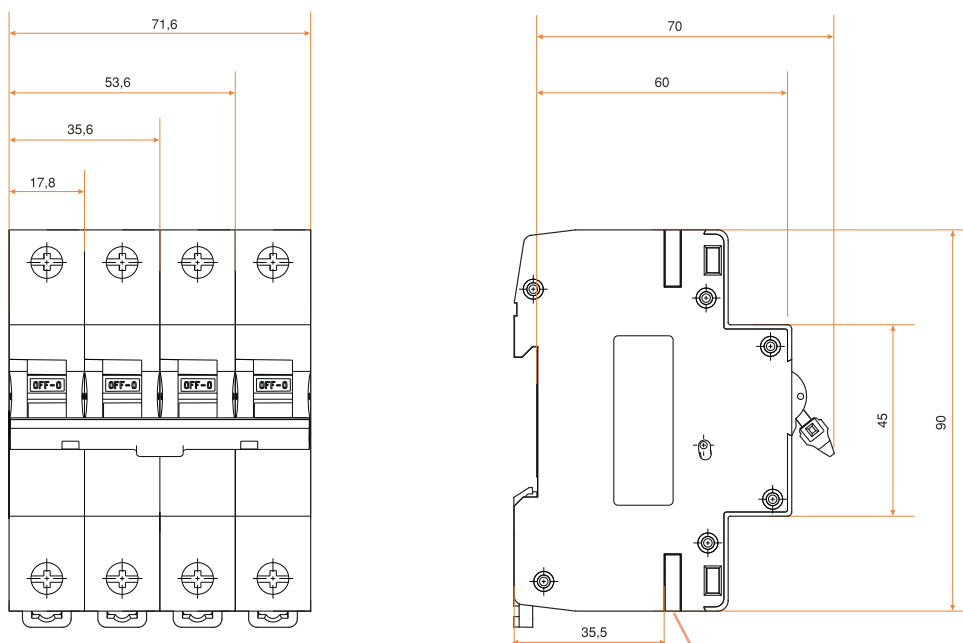
Rated Current In (A)	1 Pole	2 Pole	3 Pole	4 Pole
40	9RA-00201-0040	9RA-00202-0040	9RA-00203-0040	9RA-00204-0040
63	9RA-00201-0063	9RA-00202-0063	9RA-00203-0063	9RA-00204-0063
80	9RA-00201-0080	9RA-00202-0080	9RA-00203-0080	9RA-00204-0080
100	9RB-00201-0100	9RB-00202-0100	9RB-00203-0100	9RB-00204-0100

MINIATURE CIRCUIT BREAKERS

FM3



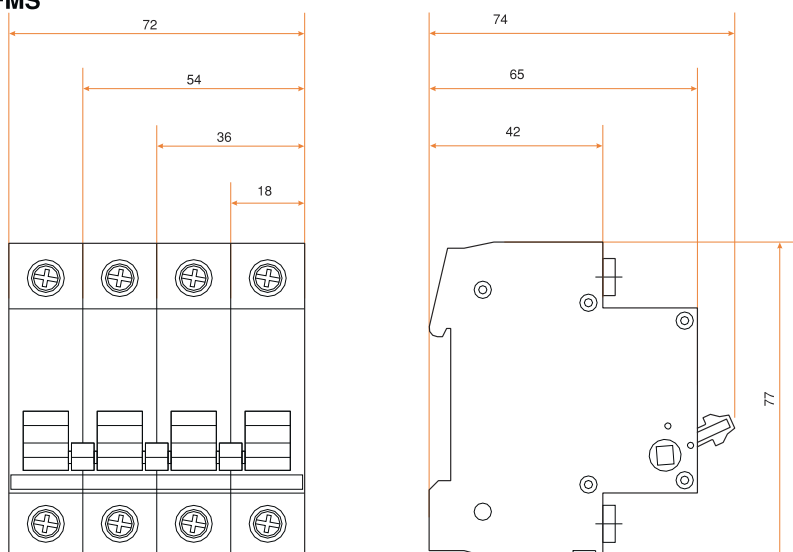
FM6 - FM10



Federal Electric FM6, FM10 miniature circuit breakers may be used with FK2, FK4 residual current circuit breakers, thanks to automat busbar.

MINIATURE CIRCUIT BREAKERS

FMS



FMN

