



SFM, SF & SK Series Circuit Breakers



Innovative, Robust, Reliable and Efficient Protection



HEINEMANN ELECTRIC PTY LTD

HEINELEC
CIRCUIT PROTECTION

SLEAGERS
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SFM, SF & SK Circuit Breakers, RCBO's & RCCB's



The SFM Range of miniature circuit breakers offer protection solutions for large scale requirements. Complete with CBI's unique hydraulic-magnetic trip protection this range provides safe and reliable solutions for low voltage electrical protection against overload and short circuit. They deliver reliable, strong and efficient protection for commercial, industrial and mining applications.



Hydraulic-Magnetic Technology

CBI's signature Hydraulic-Magnetic Technology ensures the SFM, SF and SK Range always carries 100% of rated current with the trip point un-affected by ambient temperature.

The circuit breaker may be immediately reclosed after tripping, provided the fault has been cleared. There is no cooling down time required saving you time in resetting.

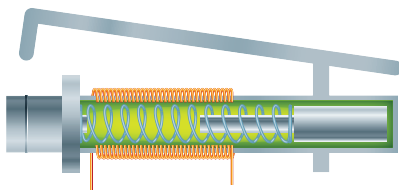
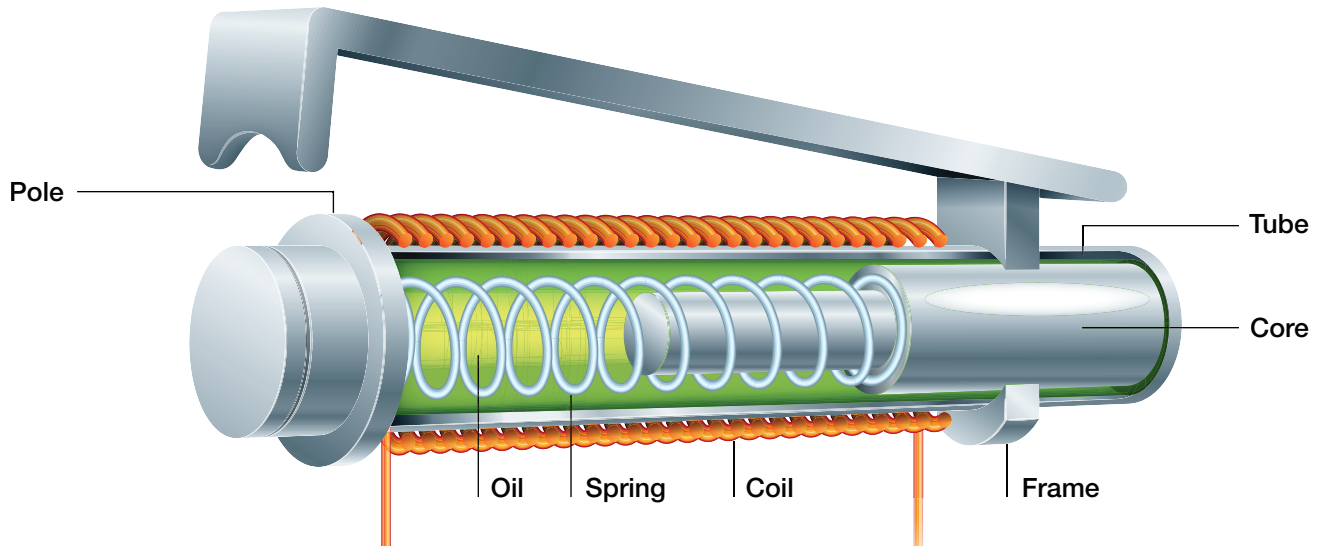
Applications

The SFM range of MCB's and RCBO's are for use against overload, short circuit and residual current protection in commercial, industrial and mining applications.

Features

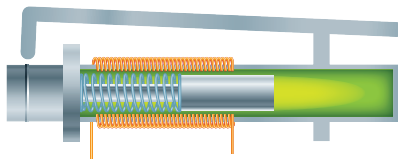
- > Precision circuit breaker utilizing hydraulic magnetic technology
- > Always carry 100% of rated current. Trip point unaffected by ambient temperature
- > RCBOs can be immediately reclosed after tripping, once fault is cleared
- > No cooling down time required thus saving time and testing (No thermal memory)
- > No ageing deterioration of sensing mechanism as units are hermetically sealed
- > Handle is sealable and padlock-able (with padlock attachment)
- > IP2X terminals
- > Suits HVC chassis - 250A rated & HPC chassis - 400A
- > RCBO is suitable for applications with pulsating DC components
- > RCBO insulation resistance testing can be made with handle in the off position - no disconnection of the unit is required

Operation Principles of CBI's Hydraulic Magnetic Circuit Breakers



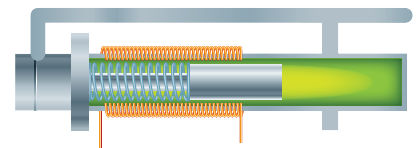
Overload 1

Load current flows through a series connected solenoid coil around a tube which contains an iron core, a spring and damping fluid. Only where current above circuit breaker rating occurs does the magnetic flux in the solenoid coil generate sufficient pull on the iron core to move it toward the pole piece.



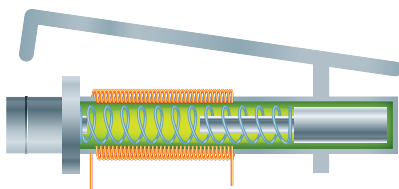
Overload 2

Whilst this movement is in progress the damping fluid regulates the speed of travel of the iron core thereby controlling time delay. Time delay is important in that if overload is of short duration the core returns to its rest position once the overload disappears.



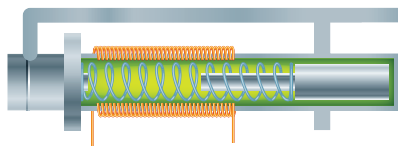
Overload 3

If overload persists the core will reach the pole piece after a time delay particular to that current and in so doing the reluctance of the magnetic circuit drops and the armature will be attracted to the pole piece with sufficient force to trip the mechanism. The contacts separate, current ceases to flow and the core returns to its rest position.



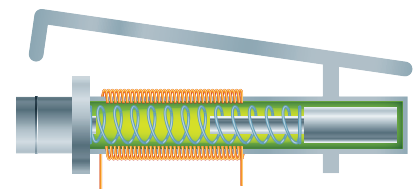
Short Circuit 1

Load current produced by magnetic force flows through series connected solenoid coil around a tube which contains an iron core, a spring and damping fluid.



Short Circuit 2

With high values of overload or short circuit the magnetic flux produced by the coil is sufficient to attract the armature to the pole piece and trip the breaker without the iron core moving (instantaneous trip region).



Short Circuit 3

After tripping the circuit breaker may be reclosed immediately once fault has been cleared as there will have been no build up of heat and therefore no cooling down period required.

SF1EL | Technical Data

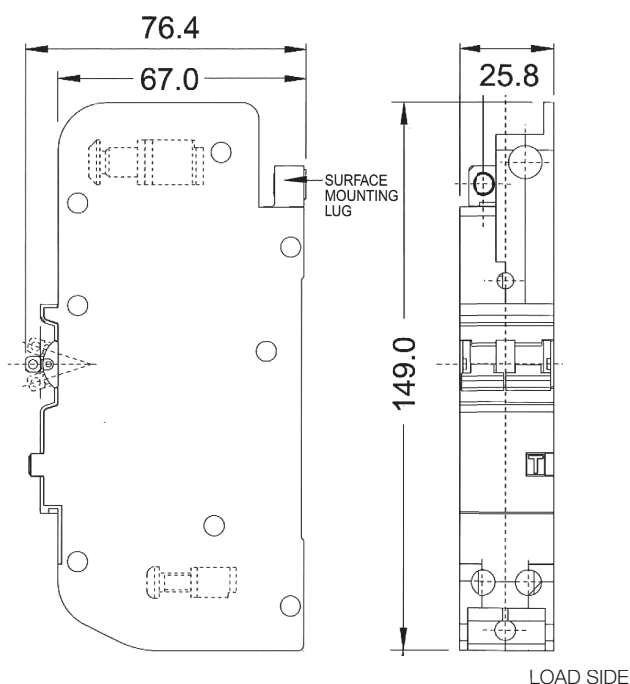


SF1EL
RCBO

Equipment Type	RCBO
Standards	AS/NZS 3111, AS/NZS 3190
Approval Number	NSW21007
Number of Poles	1 + N
Rated Breaking Capacity (Icu)	6kA at 110V AC/240V AC
Standard Ampere Rating (A)	6, 10, 16, 20, 25, 32, 40 A
Residual Operating Current (mA)	30mA, 10mA
Rated Voltage (V)	240V AC (110V-240V operating voltage)
Frequency (Hz)	50-60Hz
Impulse Withstand Voltage (kV)	6kV
DC Withstand Voltage	600V DC
Mechanism	Hydraulic Magnetic & RCD
Tripping Curves	Curve 1 (D), Curve 2 (C)
Handle Colour	White / Green
Terminal Configuration	Clip Tray or Surface Mount
Operating Temperature	-40°C to + 85°C
Torque Settings	Line 3.9Nm, Load 2.5Nm

Dimensional Details

SF1EL | Miniature Circuit Breaker (mm)



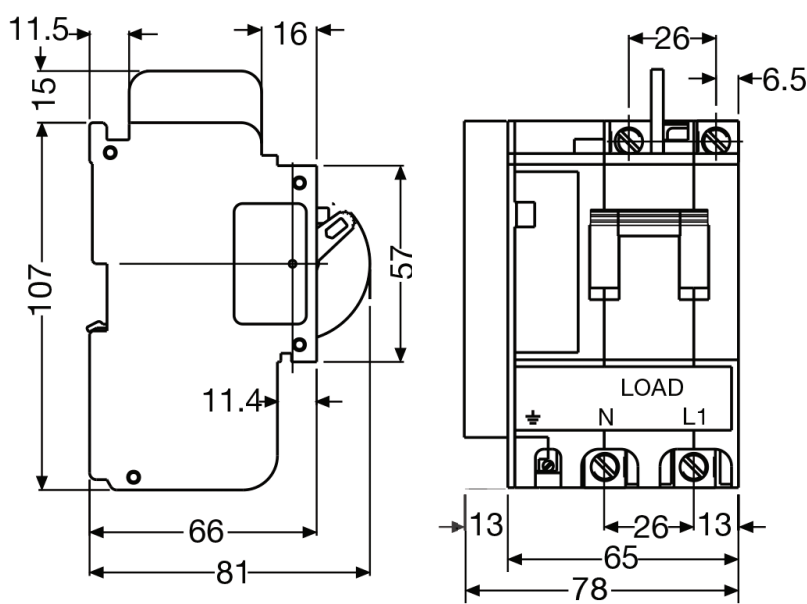
SF15AE – SF15CE | Technical Data



Equipment Type	RCBO	RCCB
Standards	AS/NZS 3111, AS/NZS 3190	AS/NZS 3111, AS/NZS 3190
Approval Number	N15215	N15216
Number of Poles	2P, 1Ø + N 3 pole width	2P, 1Ø + N 3 pole width
Rated Breaking Capacity (Icu)	6kA at 240V AC	6kA at 240V AC
Standard Ampere Rating (A)	10, 16, 20, 25, 32, 40, 63, 80, 100 A	100 A
Residual Operating Current (mA)	30mA	30mA
Rated Voltage (V)	240V AC	240V AC
Frequency (Hz)	50-60Hz	50-60Hz
Impulse Withstand Voltage (kV)	6kV	6kV
Mechanism	Hydraulic Magnetic	Hydraulic Magnetic
Tripping Curves	Curve 2 (C)	No Curve
Handle Colour	White / Green	Green
Terminal Configuration	Front connected box type	Front connected box type
Functional Earth (E)	Yes	Yes

Dimensional Details

SF15AE | RCBO (mm) | SF15CE | RCCB (mm)



SF36AE – SF36CE | Technical Data



SF36AE
RCBO

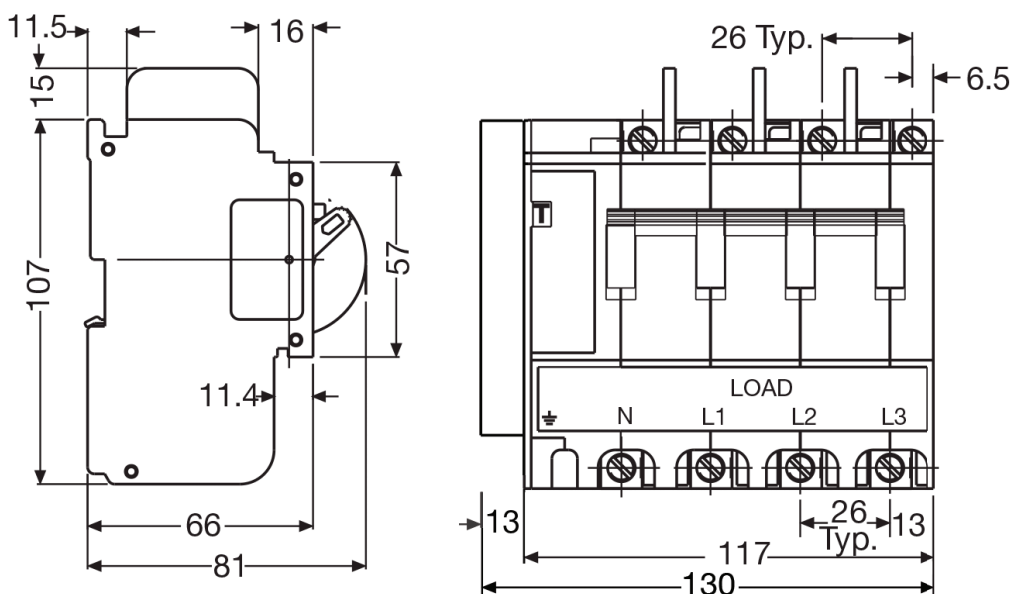


SF36CE
RCCB

Equipment Type	RCBO	RCCB
Standards	AS/NZS 3111, AS/NZS 3190	AS/NZS 3111, AS/NZS 3190
Approval Number	N15215	N15216
Number of Poles	4P, 3Ø + N 5 pole width	4P, 3Ø + N 5 pole width
Rated Breaking Capacity (Icu)	6kA at 415V AC	6kA at 415V AC
Standard Ampere Rating (A)	10, 16, 20, 25, 32, 40, 50 63, 80 A	80 A
Residual Operating Current (mA)	30mA	30mA
Rated Voltage (V)	415V AC	415V AC
Frequency (Hz)	50-60Hz	50-60Hz
Impulse Withstand Voltage (kV)	6kV	6kV
Mechanism	Hydraulic Magnetic	Hydraulic Magnetic
Tripping Curves	Curve 2 (C)	No Curve
Handle Colour	White / Green	Green
Terminal Configuration	Front connected box type	Front connected box type

Dimensional Details

SF36AE | RCBO (mm) | **SF36CE** | RCCB (mm)



SM15A – SM36A | Technical Data



SM15A
RCBO



SM36A
RCBO

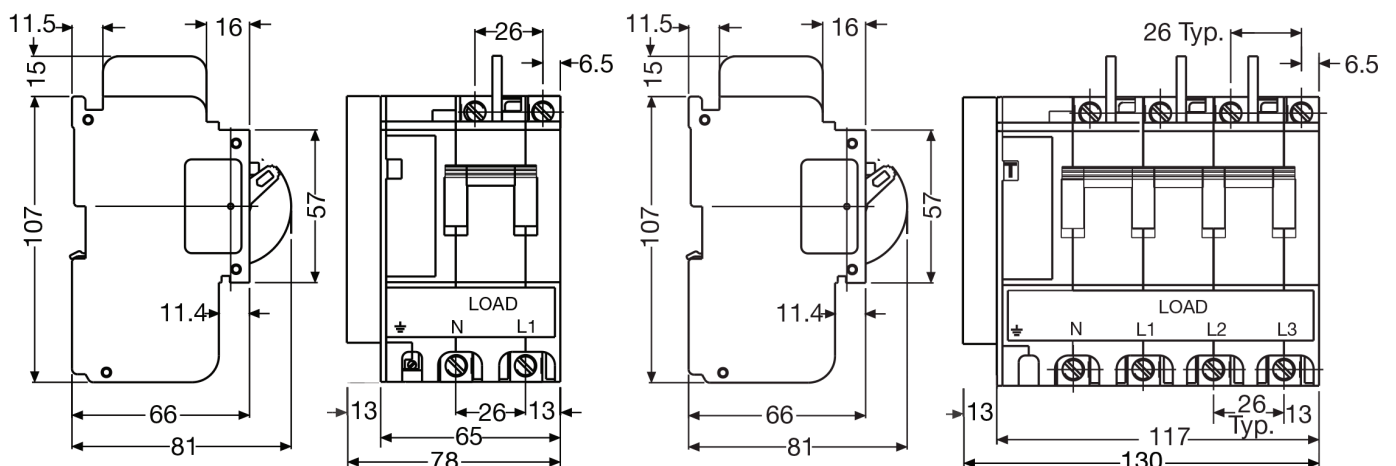
Equipment Type	RCBO	RCBO
Standards	AS/NZS 3111 AS/NZS 3190	AS/NZS 3111 AS/NZS 3190
Approval Number	N15215	N15215
Number of Poles	2P, 1Ø + N 3 pole width	4P, 3Ø + N 5 pole width
Rated Breaking Capacity (Icu)	6kA at 110/240V AC	6kA at 415V AC
Standard Ampere Rating (A)	10, 16, 20, 25, 32, 40, 63, 80, 100 A	20, 32, 40, 63, 80A
Residual Operating Current (mA)	100mA, 500mA	100mA, 250mA, 500mA
Rated Voltage (V)	240V AC	415V AC
Frequency (Hz)	50-60Hz	50-60Hz
Impulse Withstand Voltage (kV)	6kV	6kV
Mechanism	Hydraulic Magnetic	Hydraulic Magnetic
Tripping Curves	Curve 2 (C)	Curve 2 (C)
Handle Colour	White / Green	White / Green
Terminal Configuration	Front connected box type	Front connected box type
Functional Earth (E)	Yes	No

Note | SM36C RCCB & SM36C80-100 also available | see web for full technical data | Range accessories by application

Dimensional Details

SM15A | RCBO (mm)

SM36A | RCBO (mm) | **SM36C** | RCCB (mm)



SFM MCB | Technical Data

			
	SFM1-G3 MCB	SFM2-G3 MCB	SFM3-G3 MCB
Equipment Type	MCB	MCB	MCB
Standards	AS 3111	AS 3111	AS 3111
Approval Number	N15215	N15215	N15215
Number of Poles	1	2	3
Rated Breaking Capacity (Icu)	6kA at 240/415V AC	6kA at 415V AC	6kA at 415V AC
Standard Ampere Rating (A)	2,4,6,10,16,20,25,32,40,50,63,80,100 A	2,4,6,10,16,20,25,32,40,50,63,80,100 A	2,4,6,10,16,20,25,32,40,50,63,80,100 A
Rated Voltage (V)	240V AC	415V AC	415V AC
Frequency (Hz)	50-60Hz	50-60Hz	50-60Hz
Impulse Withstand Voltage (kV)	6kV	6kV	6kV
DC	125V	250V	480V
Mechanism	Hydraulic Magnetic	Hydraulic Magnetic	Hydraulic Magnetic
Tripping Curves	Curve 1(D), 2(C), 3(B)	Curve 1(D), 2(C), 3(B)	Curve 1(D), 2(C), 3(B)
Handle Colour	Curves 2 & 3: White, Curve 1: Orange	Curves 2 & 3: White, Curve 1: Orange	Curves 2 & 3: White, Curve 1: Orange
Terminal Configuration	Front connected box type	Front connected box type	Front connected box type

Note | Accessories by application | 4 Pole version made to order only | DC has a blue handle colour for Curve 2

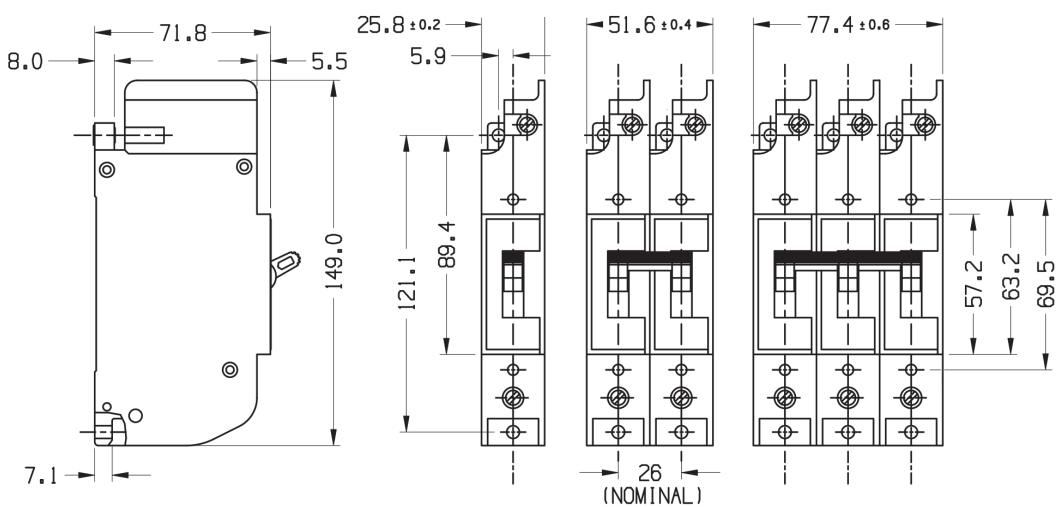
1,2,3 Pole Switch Disconnectors

	SFM1-G0 ISOLATOR	SFM2-G0 ISOLATOR	SFM3-G0 ISOLATOR
Standard Ampere Rating (A)	63,80,100 A	63, 80,100 A	63, 80,100 A
Rated Voltage (V)	240V AC	415V AC	415V AC
Handle Colour	Green	Green	Green

Note | See next page for SFM dimensional details

SFM Dimensional Details

SFM | 1 Pole, 2 Pole, 3 Pole MCB (mm)



SK MCCB | Technical Data



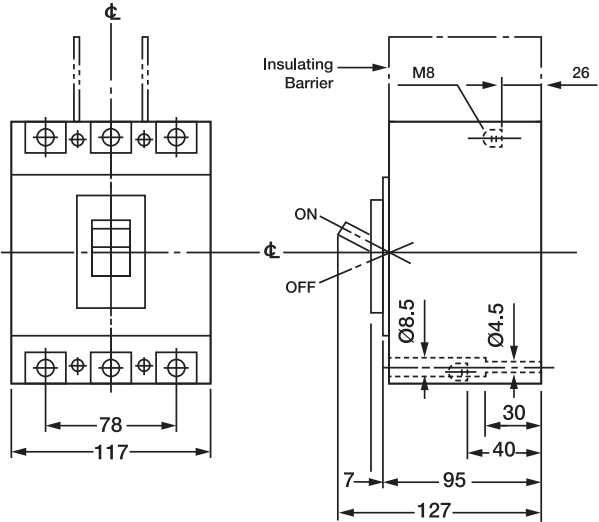
Equipment Type	MCCB
Standards	AS 2184
Approval Number	N15215
Number of Poles	3
Rated Breaking Capacity (kA)	43 kA
Rated Voltage (V)	600V AC

Standard Ampere Rating (A)	10, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 175, 200, 225, 250
Frequency (Hz)	50-60Hz
DC Withstand Voltage	250V DC
Mechanism	Hydraulic Magnetic
Tripping Curves	Curve 2 (C)
Handle Colour	Black
Terminal Configuration	Busbar or Screw connection
Max Conductor Size	From 15mm ² for 10A to 120mm ² for 250A

SK Dimensional Details

SK | MCCB (mm)

Note | Accessories by application



SFM Range | Motor Circuit Protection

240V, 50Hz Single Phase

Full Load Current (A)	Approx Motor kW	SFM1(1) Curve 2	SFM1(2) Curve 1	Approx Motor h.p.
1.8	0.12	10	4	1/6
2.7	0.18	10	4	1/4
3.0	0.25	10	4	1/3
4.0	0.37	16	10	1/2
4.8	0.37	16	10	1/2
5.2	0.55	16	10	3/4
6.3	0.75	20	10	1
8.0	1.1	25	16	1-1/2
10.0	1.5	32	16	2
14.5	2.2	40	20	3
18.5	3.0	50	32	4
24.0	3.7	63	40	5
33.0	5.5	80	50	7-1/2

Selection 1

(1) Selection is based on holding 130% of F.L.C. continuously irrespective of ambient temperature and 600% of F.L.C. for a minimum of 0.05 seconds for D.O.L. starting. (350% & 12 seconds for reduced current). Provides short circuit, locked rotor & overload protection above 250% of motor F.L.C.

Selection 2

(2) Selection is based on holding 130% of F.L.C. continuously irrespective of ambient temperature and 600% of F.L.C. for a minimum of 1 seconds for D.O.L. starting. (350% & 12 seconds for reduced current). Provides short circuit, locked rotor & overload protection above 200% of motor F.L.C.

415V, 50Hz Three Phase

Full Load Current (A)	Approx Motor kW	SFM3(1) Curve 2	SFM3(2) Curve 1	Approx Motor h.p.
1.0	0.37	4	4	1/2
1.5	0.55	6	4	
2.0	0.75	10	4	1
3.0	1.1	16	6	1-1/2
4.0	1.5	16	10	2
5.0	2.2	16	10	3
6.0		20	10	
7.0	3.0	20	16	4
8.0	3.7	25	16	5
9.0	4.0	25	16	6
10		32	16	
11	5.5	32	16	7-1/2
12		40	16	
13		40	16	
14		40	20	
15	7.5	50	20	10
16		50	20	
17-20	10	63	25	12-1/2
21-22	11	63	32	15
23-26		80	32	
27-28	15	80	40	20
29-31		100	40	
32-36	18.5	100	50	25
37-44	22		50	25
45-51	25		63	35
52-56	30		80	40
57-60	34		80	45
61-68	37		80	50
69-72			100	
73-80	45		100	60

SFM, SF & SK Range | Load Centres



The SFM and SF Range of circuit protection equipment are suitable for use in ADVS and HPR CBI Electric distribution boards as well as HCF Load centres whilst the SK Range is available in CBI's custom switchboards. Powder coated and built from heavy duty steel, Heinelec CBI's Premier, Mining Duty and Xtreme Load Centres are proven to

withstand the harshest of weather conditions. The SF Circuit Breaker Range is also suited for use in the CBI Xtreme Load Centres, the most durable, cost effective and adaptable load centres on the market. The Xtreme Load Centre is painted in X15 Orange IP66 and features a stackable modular design for future growth needs.

Discover the benefits of Hydraulic Magnetic Technology in the SFM, SF and SK Ranges today.

CBI have a staff of qualified engineers and project managers to help with all your residential, commercial, industrial & mining needs. Simply call 1800 770 870 to speak to one of our sales team today.

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