DATA SHEET

SFM SERIES

CBI electric low voltage

Miniature Circuit Breakers and Switch Disconnectors

FEATURES

- AS 3111 approved (Approval No. N15215)
- Available in single, double, triple pole and four pole units
- Precision circuit breaker utilizing hydraulic magnetic technology results in accurate temperature independent tripping
- IP2X "finger proof" line and load box (tunnel) type terminals can accommodate copper cables up to 50mm^2
- Clear positive identification for ON/OFF (I/O) provided
- Shunt trip provides for remote tripping
- Auxiliary switch provides for remote indication

APPLICATIONS

- The SFM series of miniature circuit breakers provides circuit and equivalent protection for 240/415V AC and 125/250V DC systems
- Protection of cables, lighting, appliances, motors and general commercial, industrial and mining equipment

HEINEMANN ELECTRIC PTY LTD

A member of the CBI electric low voltage group

HEINELEC® CIRCUIT PROTECTION

E-mail: heinelec@heinelec.com.au Website: www.heinemannelectric.com.au

DATA SHEET

SFM SERIES

Miniature Circuit Breakers and Switch Disconnectors

TECHNICAL DATA

PRODUCT TYPE:	SFM SERIES
Number of poles:	1, 2, 3, and 4 pole.
Standards:	AS 3111
Approval Number:	N15215
Standard Ampere Rating:	2,4,6,10,16,20,25,32,40,50,63,80,100A
Rated Voltage (Un): AC	1 pole 240V 2, 3 & 4 pole 415V
DC	1 pole 125V 2 pole 250V 3 pole 480V
Frequency:	50/60Hz for AC forms
Rated Breaking Capacity (kA):	6kA at 415/240V AC 5kA at 125V DC (1 pole) 3kA at 250V DC (2 pole) 1.5kA at 480V DC (3 pole)
Rated Impulse Withstand Voltage (Uimp):	6kV
Time Current Characteristics:	Curve 1 (Long) : (similar to Curve D) Curve 2 (Medium) : (similar to Curve C) Curve 3 (Short) :
Operating temperature:	-10 to +60°C
Storage temperature:	-20 to +60°C
Degree of Protection:	IP2X terminals
Rated Service Life (AC):	6000 electrical operations 4000 mechanical operations
Humidity:	To Mil-Std-202G Method 103B test condition A
Shock:	Single pole conforms to 50G shock at 6ms, when tested to Mil-Std-202G Method 213B test condition 1
Vibration:	Single pole conforms to Mil-Std-202G Method 204D test condition A It also conforms to IEC577, which is applicable to rolling stock
Mounting:	Surface, cliptray or front screws (M4)
Terminal connections:	Front connected box (tunnel) type main terminal suitable for up to 50mm^2 copper conductors (4Nm torque) Front connected screw type terminal suitable for up to 50mm^2 lugs (4Nm torque). Back/Rear connected stud type terminal fitted with M6 studs (2.5Nm torque)
Handle colour:	White – curve 2/3 circuit breaker AC Orange – curve 1 circuit breaker AC Blue – circuit breaker DC Green – switch disconnector (non-auto)

Miniature Circuit Breakers and Switch Disconnectors

TECHNICAL DATA

SFM CATALOGUE NUMBER

The catalogue number for any non-standard SFM miniature circuit breaker is created using the details contained in the tables below. The breaker is created from the left hand pole as viewed from the front of the panel.

Determine the following information:

1. Frame type
2. Number of poles (1, 2, 3 or 4)
3. Frequency and terminal configuration from table A
4. Internal circuit from table B
5. Current rating and time delay curve

The catalogue number consists of the following information:
Frame type & number of poles, terminal configuration and internal circuit, amp rating and the curve type.

The generic layout is as follows: SFMX-X-X-X

Frame Type and No. of Poles	Frequency, Terminal Configuration and Internal Circuit	Amp Rating	Curve Type
SFMX	X	X	X

Table A:	
Code	**Frequency and Terminal Configuration**
A	50/60Hz back connected stud type main terminal
G	50/60Hz front connected box (tunnel) type main terminal
D	50/60Hz front connected screw type main terminal
B	DC back connected stud type main terminal
H	DC front connected box (tunnel) type main terminal
E	DC front connected screw type main terminal

Table B:	
Code	**Internal circuit**
0	Switch disconnector (non-auto)
1	Overload with back connected auxiliary switch
3	Overload
10	Shunt-trip (ST1), flexible leads Occupies additional pole (non-auto pole included)
11	Shunt-trip (ST1) with back connected auxiliary switch Occupies additional pole (non-auto pole included)
13	Switch disconnector (non-auto) with back connected auxiliary switch
14	Shunt trip and series cut-off switch (ST1CO) with flexible leads Occupies additional pole (non-auto pole NOT included)
15	Auxiliary switch with flexible leads.

Example: The following catalogue number depicts a 3 pole, 100A AC, Curve1, with front connected screw type main terminals: **SFM3-D3-100-1**

Miniature Circuit Breakers and Switch Disconnectors

FACTORY FITTED OPTIONS

Shunt Trip

The shunt trip is used for remote tripping of the circuit breaker. The shunt trip occupies the width of a single pole SFM (26mm) and is mechanically linked to an adjacent circuit breaker but is electrically isolated from it. The shunt trip pole is located to the left of multi-pole units when viewed from the front, with flexible leads (0.2mm^2 x 600mm) that exit below the 'load side' terminal and is rated at 24V to 250V AC and 12V to 125V DC.

The shunt trip is available in two configurations ST1 and ST1CO (shunt trip with cut-off switch):

- **Option 1: ST1 (Code 10)**
  Factory fitted, integral within a non-auto pole with flexible leads out. The shunt trip coil is short time rated.
- **Option 2: ST1CO (Code 14)**
  Factory fitted, additional pole occupies the width of a single pole with flexible leads out (non-auto pole NOT included). Shunt trip coil is wired in series with integral cut-off switch.

Auxiliary Switch

Auxiliary switch is used to provide remote indication for the position of the main contacts (Provides the circuit breaker status).

The single pole double throw (SPDT) auxiliary switch is rated at 3A 250V AC resistive and 2A 30V DC resistive and is available in two configurations:

- **Option 1: (Codes 1, 11 and 13)**
  Factory fitted, integral within MCB or Non-Auto pole. Rear mounted, with quick connect terminals (0.8 x 6.3mm).
- **Option 2: (Code 15)**
  Factory fitted, additional pole occupies the width of a single pole and is mechanically linked to an adjacent circuit breaker but is isolated from it. The auxiliary switch is located to the right of multi-pole units when viewed from the front. Flexible leads (0.2mm^2 x 600mm) exit below 'load side' terminal.

Handle Interlock

Mechanically interlocks the operating handles of 2, 3 or 4 pole breakers. Occupies an additional pole situated between the two circuit breakers, which are required to be interlocked. Catalogue number: SFMHI.

Handle Interlock

ACCESSORIES

Handle Lock

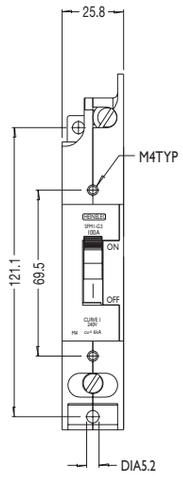
Permits padlocking of the operating handle in the off position to ensure safety during lockout, when maintenance is being conducted. The handle lock accepts padlocks with hasps up to 8mm in diameter.

SFM with handle lock

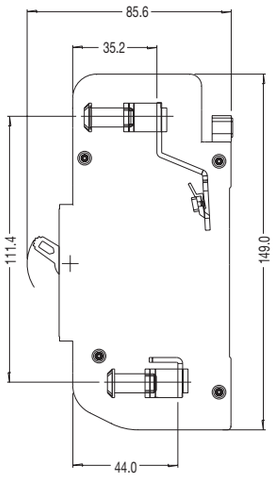
Miniature Circuit Breakers and Switch Disconnectors

TECHNICAL DATA

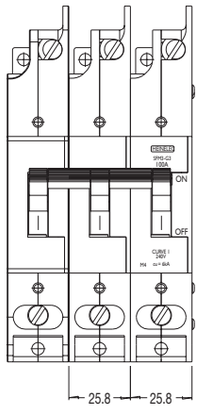
PHYSICAL DIMENSIONS (shown in millimetres)



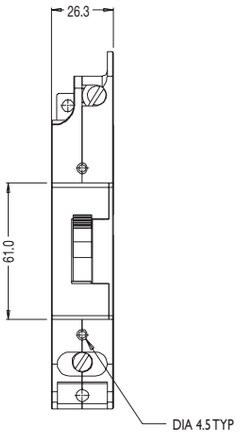
FRONTVIEW



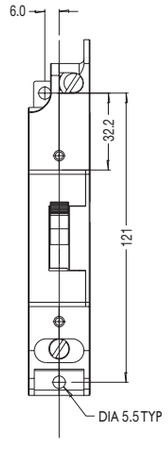
SIDEVIEW



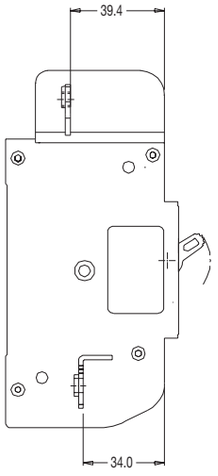
BOXTERMINAL
MULTIPLE POLES

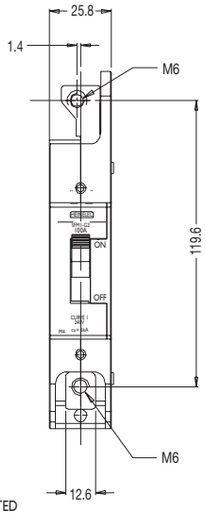


PANEL CUTOUT

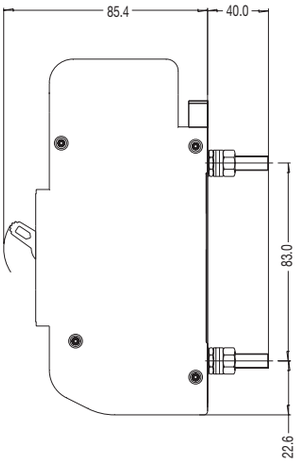


SURFACE MOUNT
DRILL PLAN

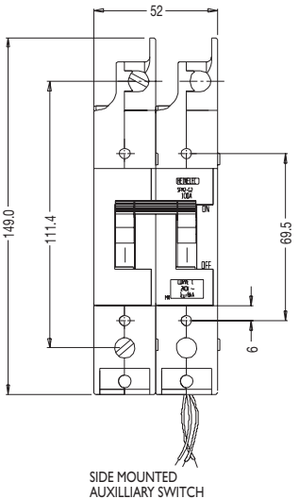




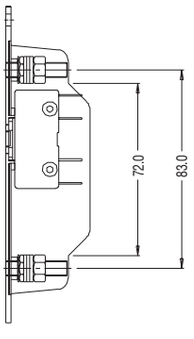
FRONT CONNECTED
SCREWTERMINAL



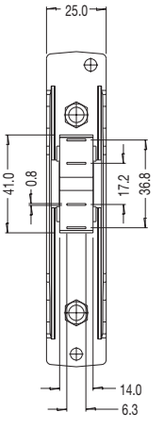
SIDEVIEW BACK CONNECTED STUDS



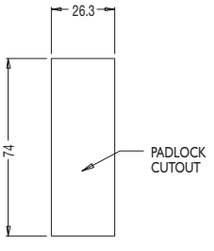
SIDE MOUNTED
AUXILLIARY SWITCH



SIDEVIEW BACK
CONNECTED STUD
WITH AUX. SWITCH



REARVIEW



PANEL CUTOUT DIMENSIONS
USED WITH PADLOCK
ATTACHMENT

Miniature Circuit Breakers and Switch Disconnectors

SELECTION DATA

Circuit breaker selection for motor circuits: D.O.L. starting

240V 50Hz SINGLE PHASE HEINELEC Breaker Curve & Current Rating				
Full Load Current	Approx Motor kW	SFM1 (1) Curve 2 (Std)	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

415V 50Hz 3 PHASE HEINELEC Breaker Curve & Current Rating				
Full Load Current	Approx Motor kW	SFM3 (1) Curve 2 (Std)	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	20	
14		40	20	
15	7.5	50	20	10
16		50	25	
17-20	10	63	32	12-1/2
21-22	11	63	32	15
23-26		80	40	
27-28	15	80	40	20
29-31		100	50	
32-36	18.5	100	50	25
37-44	22		63	30
45-51	25		80	35
52-56	30		80	40
57-60	34		80	45
61-68	37		100	50
69-72			100	
73-80	45			60

(1) Selection is based on holding 125% of F.L.C. continuously irrespective of ambient temperature and 600% of F.L.C. for a minimum of 5 seconds for D.O.L. starting. (350% & 12 seconds for reduced current). Provides short circuit, locked rotor and overload protection above 250% of motor F.L.C.

(2) Selection is based on holding 125% of F.L.C. continuously irrespective of ambient temperature and 600% of F.L.C. for a minimum of 5 seconds for D.O.L. starting. (350% & 12 seconds for reduced current). Provides short circuit, locked rotor and overload protection above 200% of motor F.L.C.

Miniature Circuit Breakers and Switch Disconnectors

SELECTION DATA

Circuit breaker selection for motor circuits: Star Delta, Auto-transformer, Resistor or Reactance starting

415V 50Hz 3 PHASE HEINELEC & HEIDIN Breaker Curve & Current Rating				
Full Load Current	Approx Motor kW	SFM3 (1) Curve 2 (Std)	SFM3 (2) Curve 1	Approx Motor H.P.
1.5	0.55	4	4	
2.0	0.75	6	4	1
3.0	1.1	10	6	1-1/2
4.0	1.5	10	6	2
5.0	2.2	16	10	3
6.0		16	10	
7.0	3.0	20	10	4
8.0	3.7	20	16	5
9.0	4.0	25	16	6
10		25	16	
11	5.5	32	16	7-1/2
12		32	16	
13		32	20	
14		32	20	
15	7.5	40	20	10
16		40	25	
17-20	10	50	32	12-1/2
21-22	11	63	32	15
23-26		63	40	
27-28	15	63	40	20
29-31		80	50	
32-36	18.5	80	50	25
37-44	22		63	30
45-51	25		80	35
52-56	30		80	40
57-60	34		80	45
61-68	37		100	50
69-72			100	
73-80	45		100	60

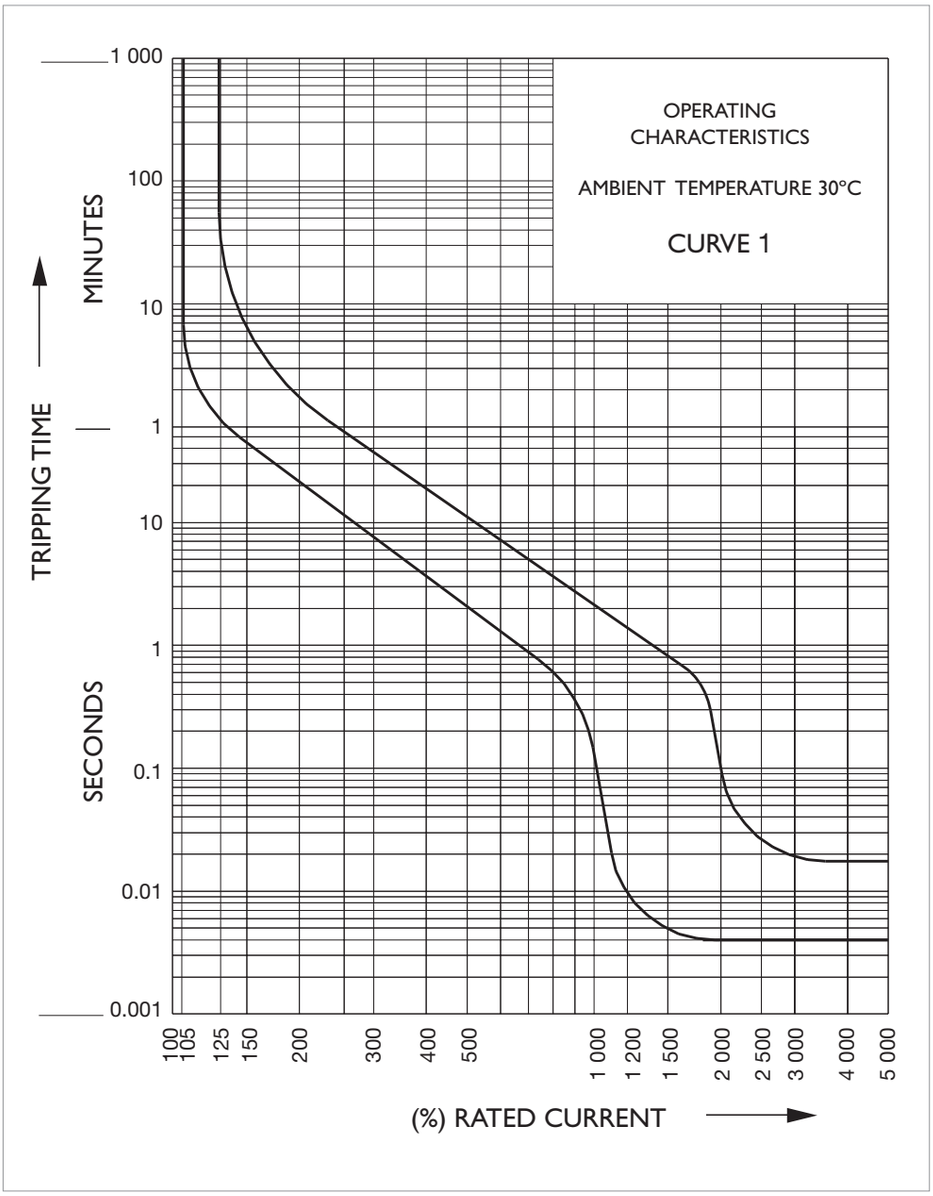
(1) Selection is based on holding 125% of F.L.C. continuously irrespective of ambient temperature and 600% of F.L.C. for a minimum of 5 seconds for D.O.L. starting. (350% & 12 seconds for reduced current). Provides short circuit, locked rotor and overload protection above 250% of motor F.L.C.

(2) Selection is based on holding 125% of F.L.C. continuously irrespective of ambient temperature and 600% of F.L.C. for a minimum of 5 seconds for D.O.L. starting. (350% & 12 seconds for reduced current). Provides short circuit, locked rotor and overload protection above 200% of motor F.L.C.

Miniature Circuit Breakers and Switch Disconnectors

SELECTION DATA

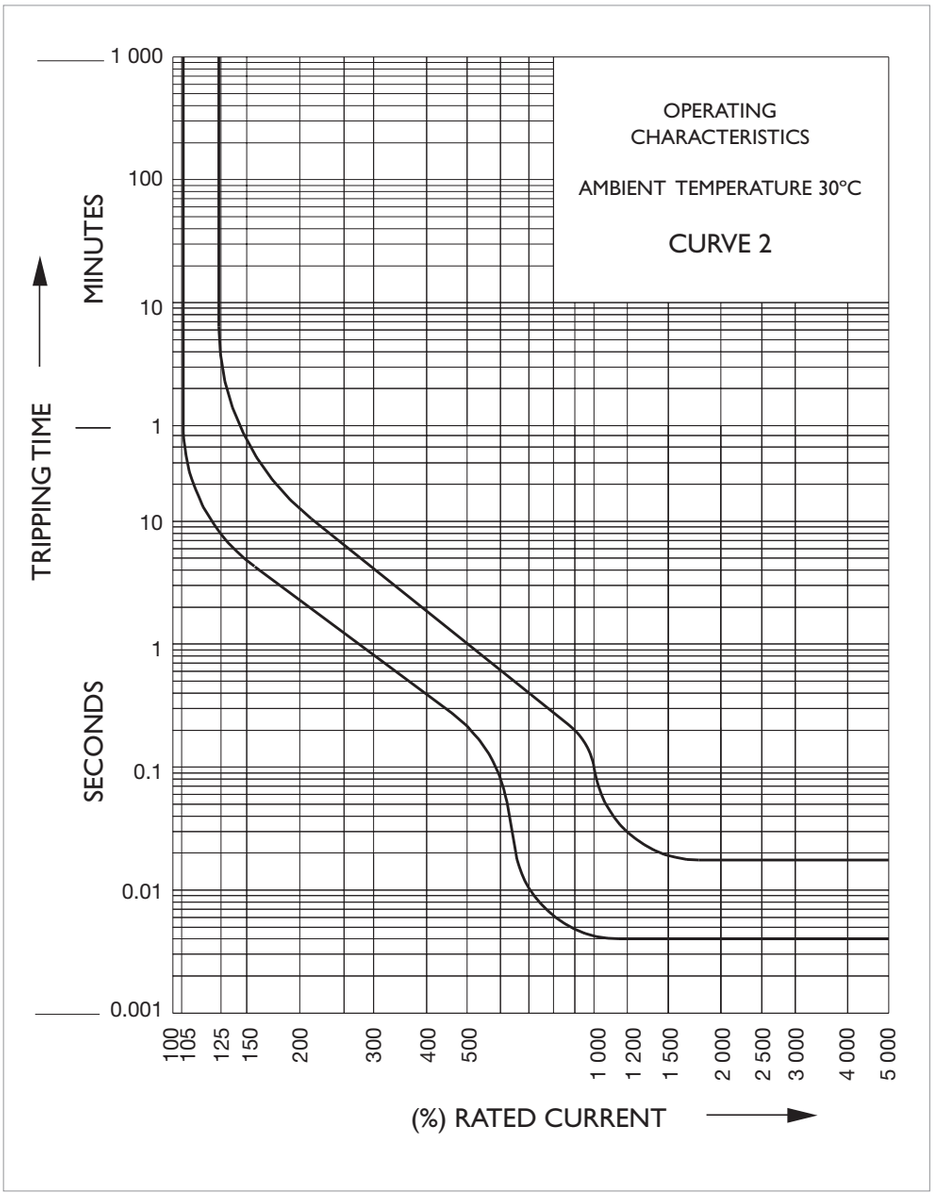
Time Current Characteristics



Miniature Circuit Breakers and Switch Disconnectors

SELECTION DATA

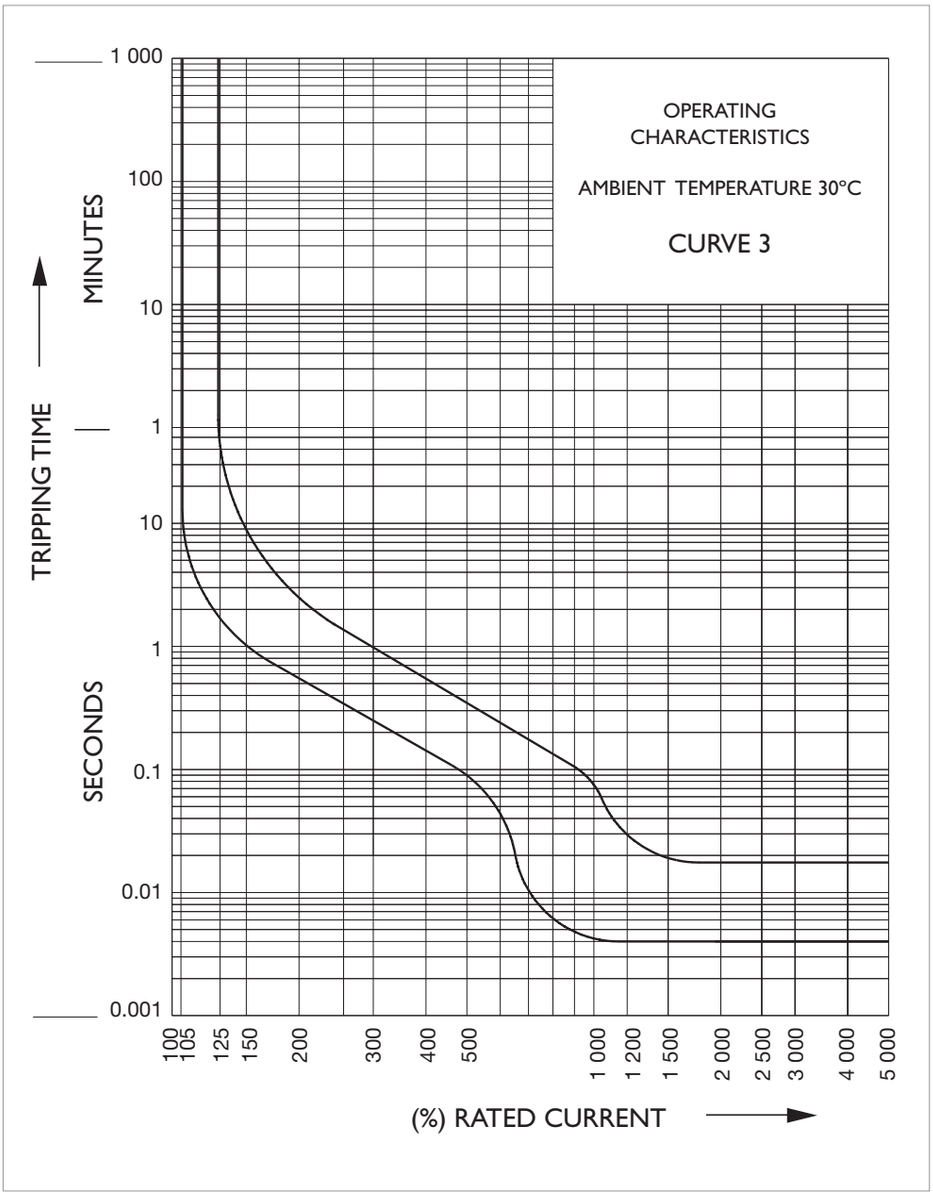
Time Current Characteristics



Miniature Circuit Breakers and Switch Disconnectors

SELECTION DATA

Time Current Characteristics



NOTES

HEINEMANN ELECTRIC PTY LTD

SALES OFFICES

Melbourne
Head Office
Tel: +61 3 9560 3333
Fax: +61 3 9562 0172
Free Call: 180 077 0870
Email: heinelec@heinelec.com.au
www.heinemannelectric.com.au

Newcastle
Tel: +61 2 4952 6653
Fax: +61 2 4952 5020
Free Call: 180 077 0870
Email: henew@heinelec.com.au

Perth
Tel: +61 8 9478 3341
Fax: +61 8 9478 3501
Free Call: 180 077 0870
Email: heper@heinelec.com.au

Sydney
Tel: +61 2 9808 3000
Fax: +61 2 9809 6296
Free Call: 180 077 0870
Email: hesyd@heinelec.com.au

Brisbane
Tel: +61 7 3854 1646
Fax: +61 7 3252 3055
Free Call: 180 077 0870
Email: hebri@heinelec.com.au

Adelaide
Tel: +61 8 8443 5344
Fax: +61 8 8234 1023
Free Call: 180 077 0870
Email: heade@heinelec.com.au

Townsville
Tel: +61 7 4775 5300
Fax: +61 7 4725 1029
Free Call: 180 077 0870
Email: hetow@heinelec.com.au

DISTRIBUTORS

Hobart
Electrical Agencies
Tel: +61 3 6273 1855
Fax: +61 3 6273 1158
Free Call: 180 077 0870
Email: elecag@bigpond.net.au

Darwin
Jewell Distributors Pty Ltd
Tel: +61 8 8947 0870
Fax: +61 8 8947 0764
Free Call: 180 077 0870
Email: jewell.distributors@bigpond.com

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Innovation through experience

November 2006 UMA