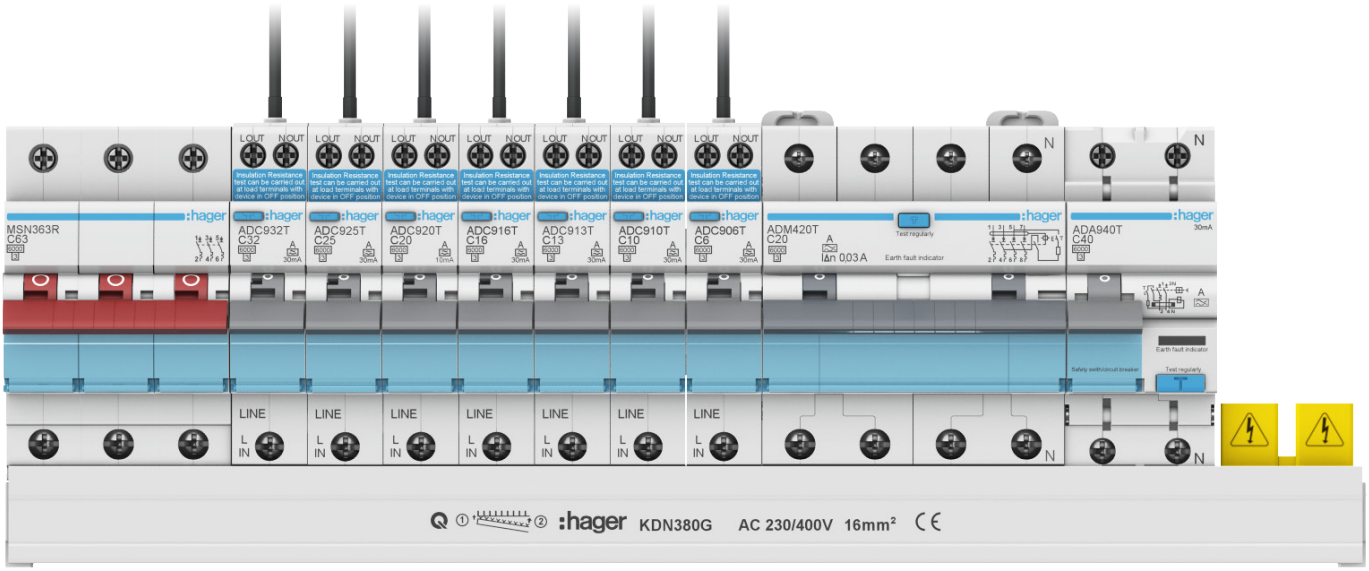
Modular
Circuit Protection

Our onekonekt range of Modular Circuit Protection offers high quality and practical solutions and options for protecting electrical circuits, people, equipment, and property.

We offer a wide range of circuit protection such as Miniature Circuit Breakers (MCB), Residual Current Breaker with Overcurrent Protection (RCBO), Residual Current Circuit Breaker (RCCB) and Surge Protection Devices (SPD).

A range of accessories are also available including Busbars, Auxiliary Contacts and Relays.



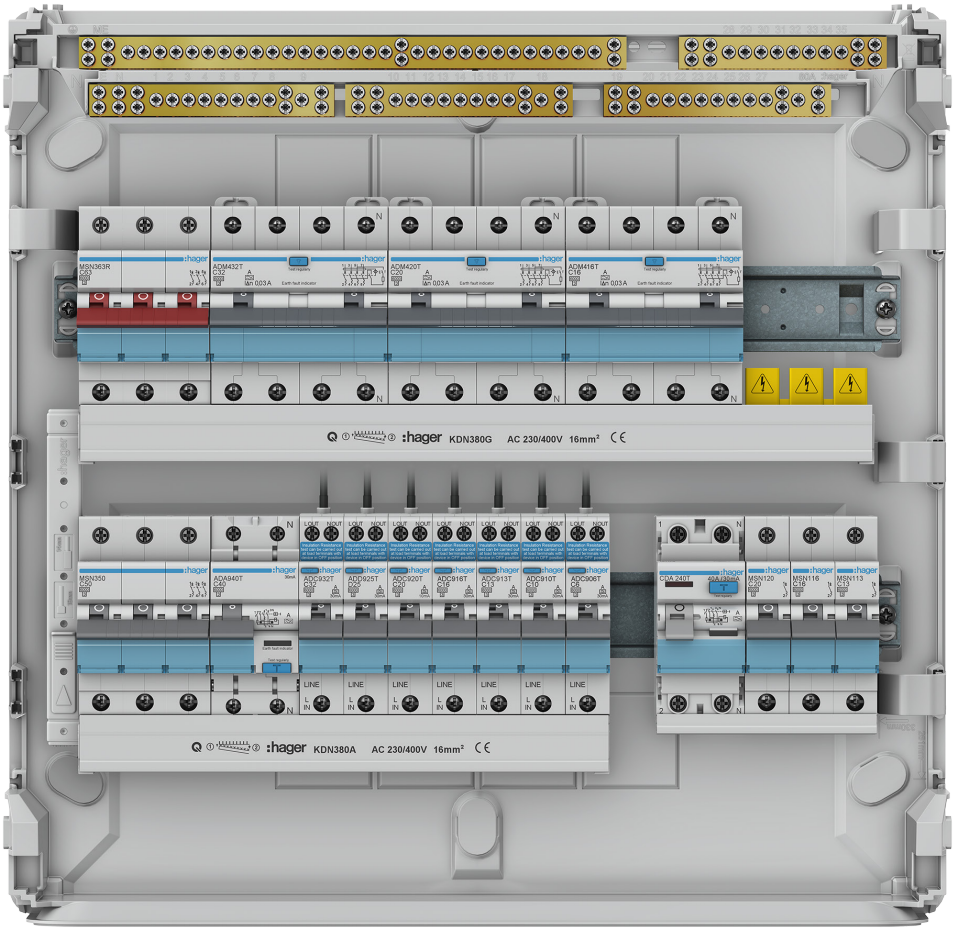
03

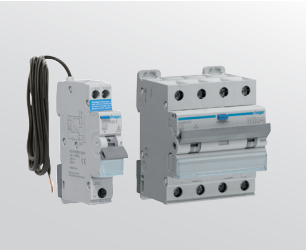
Page

onekonekt
Residential installation system

Easier, safer, faster

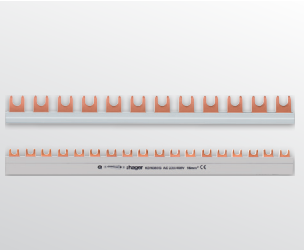
The use of busbar in our industry is not a new concept. However, providing a full range of residential protection devices, for both single phase and three phase installations, that connect to the same busbar, increasing safety, reducing installation time, improving technical characteristics and aesthetics within one system, definitely is.





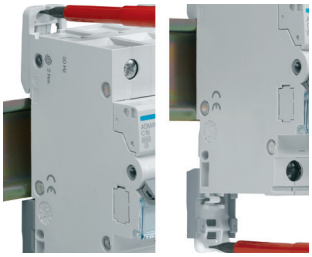
01

Protect your loads with a compact RCBO protection device. Can be used in both 6kA and 10kA applications.



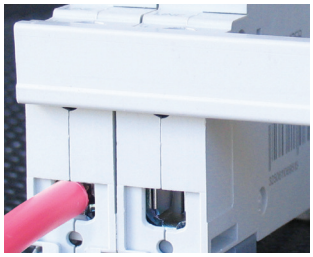
02

The onekonekt system is based on a single phase or three phase forked busbar.



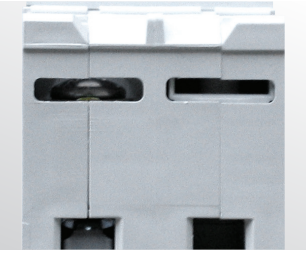
03

Multi-position extended length DIN clip feature, makes removing a product off the DIN rail quick and simple.



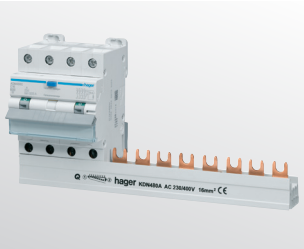
04

Provision of two terminals on all devices enable supply from either cables in the cage terminal or busbars in the slot terminal.



05

The neutral busbar slot on two and four module wide RCD and RCBO devices is insulated, allowing one or three phase live busbar to pass through.



06

Busbar is held in position prior to tightening screw terminals with our unique clip system.

07

Protective windows allow for circuit identification to remain in place, including the Hager Semiolog labelling tool.

08

Unused busbar forks or length can remain in-situ for future use. For safety, compliance and rapid future expansion or modification.

Description
For general distribution loads, our MSNxxx Miniature Circuit Breaker (MCB) range short circuit and overcurrent protection of installations by isolating the circuit.

The red toggle on the MSNx63R gives a visual differentiation when used as a main switch device.

Technical data
- Tripping curve - ‘C’ magnetic setting between 5 and 10 In
- Breaking capacity: 6,000A
- Voltage rating: 230V /400V (Not for use on DC)
- Current rating: 6 to 63A
- Bi-connect terminals enable supply from either cables in the cage or busbars in the slot.

Connection capacity
- 25mm² rigid
- 16mm² flexible

Accessories for MSNxxx
- LZ060, MZN175, MZ201, MZ202, MZ203, MZ204, MZ206, MZN120, MZN121, Bx163T

Standards
- AS/NZS 60898-1
- AS/NZS 3000

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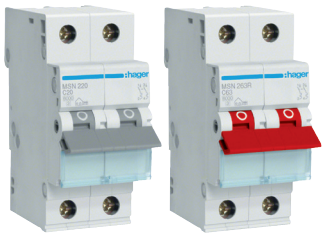
MSN163 MSN163R

Single pole

Current Rating (A)	Module(s)	Width (mm)	Box Qty	Cat ref.
6	1 mod	17.5	12	**MSN106**
10	1 mod	17.5	12	**MSN110**
16	1 mod	17.5	12	**MSN116**
20	1 mod	17.5	12	**MSN120**
25	1 mod	17.5	12	**MSN125**
32	1 mod	17.5	12	**MSN132**
32	1 mod	17.5	12	**MSN132R**
40	1 mod	17.5	12	**MSN140**
40	1 mod	17.5	12	**MSN140R**
50	1 mod	17.5	12	**MSN150**
63	1 mod	17.5	12	**MSN163**
63	1 mod	17.5	12	**MSN163R**



MSN220 MSN263R

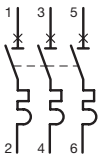
Double pole

Current Rating (A)	Module(s)	Width (mm)	Box Qty	Cat ref.
10	2 mod	35	6	**MSN210**
16	2 mod	35	6	**MSN216**
20	2 mod	35	6	**MSN220**
25	2 mod	35	6	**MSN225**
32	2 mod	35	6	**MSN232**
40	2 mod	35	6	**MSN240**
50	2 mod	35	6	**MSN250**
63	2 mod	35	6	**MSN263**
63	2 mod	35	6	**MSN263R**

MSN320

MSN363R

Triple pole



Current Rating (A)	Module(s)	Width (mm)	Box Qty	Cat ref.
6	3 mod	52.5	4	**MSN306**
10	3 mod	52.5	4	**MSN310**
16	3 mod	52.5	4	**MSN316**
20	3 mod	52.5	4	**MSN320**
25	3 mod	52.5	4	**MSN325**
32	3 mod	52.5	4	**MSN332**
32	3 mod	52.5	4	**MSN332R**
40	3 mod	52.5	4	**MSN340**
40	3 mod	52.5	4	**MSN340R**
50	3 mod	52.5	4	**MSN350**
63	3 mod	52.5	4	**MSN363**
63	3 mod	52.5	4	**MSN363R**

Description
For general distribution loads, our NTxxxx Miniature Circuit Breaker (MCB) range provides short circuit and overcurrent protection of installations by isolating the circuit.

Technical data
- Tripping curve - 'C' magnetic setting between 5 and 10In
- Breaking capacity: 10kA
- Voltage rating: 230V /400V (Not for use on DC)
- Current rating: 2 to 63A
- Load and line circuits may be connected top or bottom.

Connection capacity
- 35mm² rigid
- 26mm² flexible

Accessories
- LZ060, MZN175, MZ201, MZ202, MZ203, MZ204, MZ206, MZN120, MZN121, Bx163T

Standards
- AS/NZS 60898-1
- AS/NZS 3000

Technical information Page 83


NT110C

Single pole

Current Rating (A)	Module(s)	Width (mm)	Pack Qty	Cat ref.
2	1 mod	17.5	12	**NT102C**
4	1 mod	17.5	12	**NT104C**
6	1 mod	17.5	12	**NT106C**
10	1 mod	17.5	12	**NT110C**
16	1 mod	17.5	12	**NT116C**
20	1 mod	17.5	12	**NT120C**
25	1 mod	17.5	12	**NT125C**
32	1 mod	17.5	12	**NT132C**
40	1 mod	17.5	12	**NT140C**
50	1 mod	17.5	12	**NT150C**
63	1 mod	17.5	12	**NT163C**

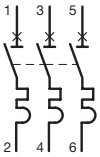

NT216C

Double pole

Current Rating (A)	Module(s)	Width (mm)	Pack Qty	Cat ref.
2	2 mod	35	6	**NT202C**
4	2 mod	35	6	**NT204C**
6	2 mod	35	6	**NT206C**
10	2 mod	35	6	**NT210C**
16	2 mod	35	6	**NT216C**
20	2 mod	35	6	**NT220C**
25	2 mod	35	6	**NT225C**
32	2 mod	35	6	**NT232C**
40	2 mod	35	6	**NT240C**
50	2 mod	35	6	**NT250C**
63	2 mod	35	6	**NT263C**


NT304C

Triple pole



Current Rating (A)	Module(s)	Width (mm)	Pack Qty	Cat ref.
2	3 mod	52.5	6	**NT302C**
4	3 mod	52.5	6	**NT304C**
6	3 mod	52.5	6	**NT306C**
10	3 mod	52.5	6	**NT310C**
16	3 mod	52.5	6	**NT316C**
20	3 mod	52.5	6	**NT320C**
25	3 mod	52.5	6	**NT325C**
32	3 mod	52.5	6	**NT332C**
40	3 mod	52.5	6	**NT340C**
50	3 mod	52.5	6	**NT350C**
63	3 mod	52.5	6	**NT363C**

Description
For general distribution loads, our NDNxxxx Miniature Circuit Breaker (MCB) range provides short circuit and overcurrent protection of installations by isolating the circuit.

Technical data
- Tripping curve - ‘D’ magnetic setting between 10 and 20In
- Breaking capacity:
  10kA (AS/NZS 60898-1)
  15kA (IEC 60947-2)
- Voltage rating: 230V /400V
  (Not for use on DC)
- Current rating: 6 to 63A

Connection capacity
- 35mm² rigid
- 26mm² flexible

Accessories
- LZ060, MZN175, MZ201, MZ202, MZ203, MZ204, MZ206, MZN120, MZN121, Bx163T

Standards
- AS/NZS IEC 60947-2 compliant

Technical information Page 85


NDN116A

Single pole

Current Rating (A)	Module(s)	Width (mm)	Pack Qty	Cat ref.
6	1 mod	17.5	12	**NDN106A**
10	1 mod	17.5	12	**NDN110A**
16	1 mod	17.5	12	**NDN116A**
20	1 mod	17.5	12	**NDN120A**
25	1 mod	17.5	12	**NDN125A**
32	1 mod	17.5	12	**NDN132A**
40	1 mod	17.5	12	**NDN140A**
50	1 mod	17.5	12	**NDN150A**
63	1 mod	17.5	12	**NDN163A**

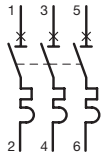

NDN232A

Double pole

Current Rating (A)	Module(s)	Width (mm)	Pack Qty	Cat ref.
6	2 mod	35	6	**NDN206A**
10	2 mod	35	6	**NDN210A**
16	2 mod	35	6	**NDN216A**
20	2 mod	35	6	**NDN220A**
25	2 mod	35	6	**NDN225A**
32	2 mod	35	6	**NDN232A**
40	2 mod	35	6	**NDN240A**
50	2 mod	35	6	**NDN250A**
63	2 mod	35	6	**NDN263A**


NDN316A

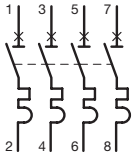
Triple pole



Current Rating (A)	Module(s)	Width (mm)	Pack Qty	Cat ref.
6	3 mod	52.5	4	**NDN306A**
10	3 mod	52.5	4	**NDN310A**
16	3 mod	52.5	4	**NDN316A**
20	3 mod	52.5	4	**NDN320A**
25	3 mod	52.5	4	**NDN325A**
32	3 mod	52.5	4	**NDN332A**
40	3 mod	52.5	4	**NDN340A**
50	3 mod	52.5	4	**NDN350A**
63	3 mod	52.5	4	**NDN363A**


NDN432A

Four pole



Current Rating (A)	Module(s)	Width (mm)	Pack Qty	Cat ref.
6	4 mod	70	3	**NDN406A**
10	4 mod	70	3	**NDN410A**
16	4 mod	70	3	**NDN416A**
20	4 mod	70	3	**NDN420A**
25	4 mod	70	3	**NDN425A**
32	4 mod	70	3	**NDN432A**
40	4 mod	70	3	**NDN440A**
50	4 mod	70	3	**NDN450A**
63	4 mod	70	3	**NDN463A**

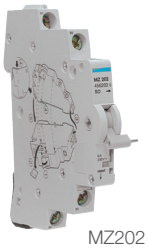
Description
Auxiliaries are common to all MCBs. These auxiliaries are fitted to the left hand side of the devices.

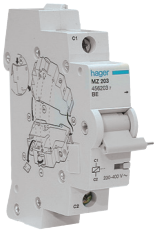
Connection
- 10mm² rigid
- 6mm² flexible

Compatibility chart and Technical information Page 94

Accessories

Description	Characteristics	Module(s)	Width (mm)	Cat ref.
Combination auxiliary & alarm contacts 6A-240V~	2 x 1NO + 1NC Allows remote indication of main contact status and indicates a fault condition.	1	17.5	**CZ001**
Auxiliary contacts 6A - 230V~ 	1NO + 1NC allows remote indication of main contact status	0.5	8.75	**MZ201**
Alarm contacts 6A - 230V~. 	1NO + 1NC indicates a fault over current on overload or short circuit (e.g. MCB tripped)	0.5	8.75	**MZ202**
Shunt trip relay Allows remote tripping of (combined) RCD when a voltage is applied. 	230V - 415V AC 110V to 130V DC	1	17.5	**MZ203**
	24V - 48V AC 12V - 48V DC	1	17.5	**MZ204**
Undervoltage release 230V AC	If supply falls to 35 to 70% of nominal voltage the MCB will trip Coil consumption: 3.5 VA	1	17.5	**MZ206**
Locking device	To lock the MCB handle in on/off position	1	17.5	**MZN175**
Heat dissipation inserts	Avoids overheating for DIN rail modules when several devices mounted side by side are carrying high continuous loads	0.5	8.75	**LZ060**
Terminal cover & screw shield for MCBs				**MZN120**
Phase barriers NDNxxx MCBs	1 set of 3			**MZN121**


MZ202


MZ203

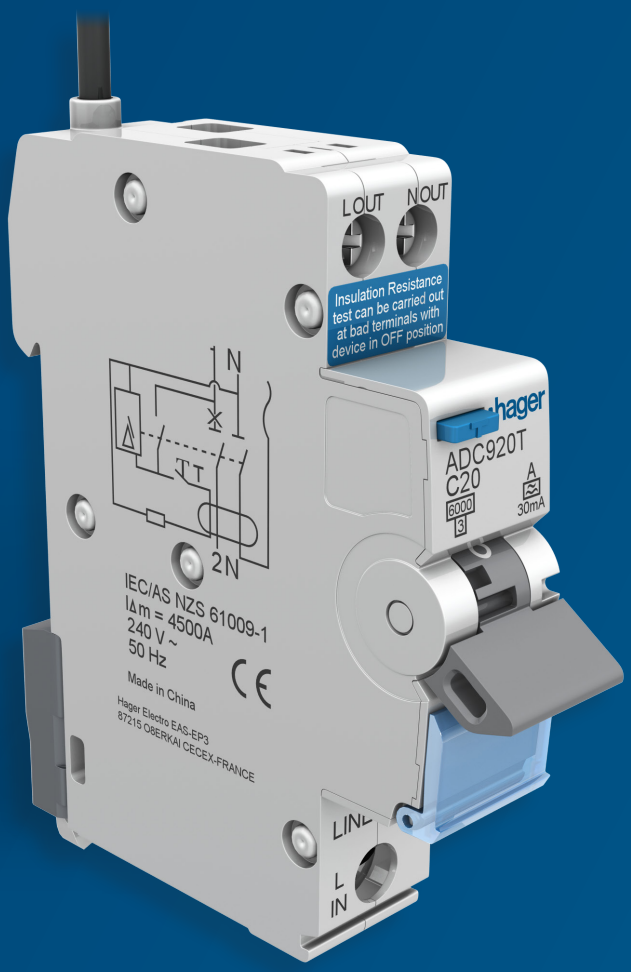

MZN175


LZ060


MZN120


MZN121

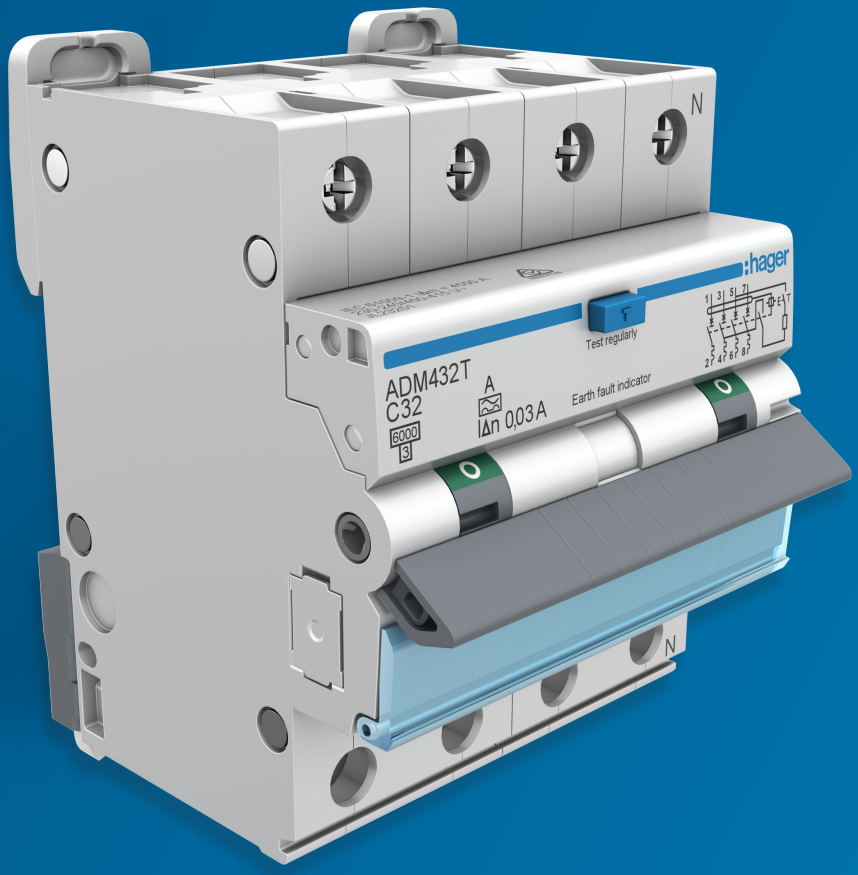
Single Module RCBO for all applications



Safe and Simple

Our ADC9xxT RCBO or ‘onekombo’ is only one module wide, making it ideal for retrofit installations where space can be limited. onekombo RCBO devices can be used in DIN rail enclosures and invicta panelboards.

Space saving 4P RCBO



From complex to Compact

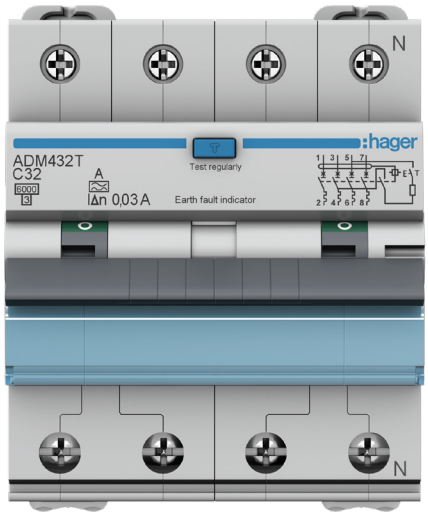
At only four modules wide and compatible with Hager onekonekt and Modular Circuit Protection - three phase RCBO protection has never been so space friendly.

With the choice of either 6kA or 10kA, from 6A to 40A and in either 30mA or 100mA, our four pole RCBO provides combined RCD and MCB protection in a single robust DIN rail mounted design.

A compact solution for DIN rail enclosures

Our residential range of single module and four module Residual Current Circuit Breakers with Overcurrent Protection (RCBO) can be integrated with other Hager Modular Circuit Protection Devices.

Our ADC9xxT RCBO or ‘onekombo’ is only one module wide, making it ideal for retrofit installations where space can be limited. onekombo RCBO devices can be used in DIN rail enclosures and invicta panelboards.

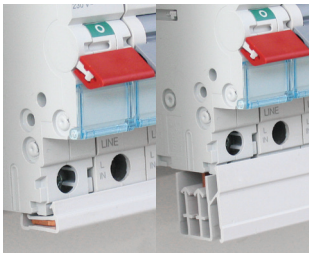


One module RCBO onekombo characteristics:	
- Rated current (In):	- 6A to 32A
- Rated voltage (Un):	- 230V~
- Rated residual operating current (IΔn):	- 30mA
- Curve type:	- C
- Operating characteristic:	- Type A
- Rated frequency:	- 50Hz
- Rated short-circuit capacity (Icn):	- 6kA
- Standards compliance:	- AS/NZS 61009

Four module RCBO characteristics:	
- Rated current (In):	- 6A to 40A
- Rated voltage (Un):	- 400V~
- Rated residual operating current (IΔn):	- 30mA, 100mA
- Curve type:	- C
- Operating characteristic:	- Type A
- Rated frequency:	- 50Hz
- Rated short-circuit capacity (Icn):	- 6kA, 10kA
- Standards compliance:	- AS/NZS 61009

01

Type A RCBOs increase the accuracy in identifying DC faults in electrical devices.



02

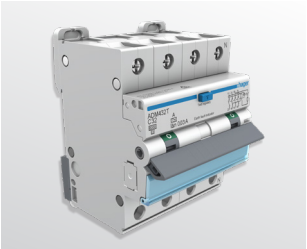
Devices are ompatible with the onekonekt busbar system.

03

Long multi position DIN clips allow for easy removal of a single product on the DIN rail busbar without disconnecting other devices or wiring.

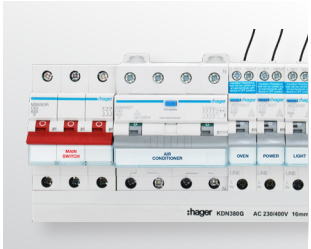
04

Four module RCBOs have the earth fault trip indication displayed in a separate window to assist in fault finding.



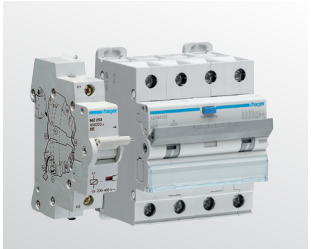
05

A space saving solution to protect 4 pole loads with a four module wide RCBO device.



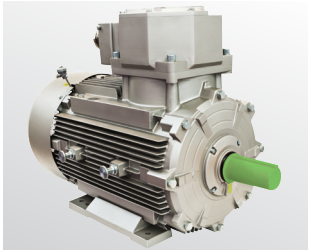
06

The neutral in the four module RCBOs can be wired to the neutral link or connected through our KB181x busbar to comply with AS/NZS 3000.



07

Mounted to the left of the four module RCBO, auxiliaries remotely indicate the position or trip condition of the device.



08

The four module RCBO is suitable for balanced or unbalanced loads across phases when 400V AC is between phases.

Description
Our Axx9xxT RCBO or ‘onekombo’ are only one module wide, making them ideal for retrofit in installations where space is limited.

Available as ‘C’ or ‘D’ curve in various current ratings from 6A - 40A. Supplied with a 1 metre long neutral-in fly lead. Available in 10 and 30mA.

Onekombo RCBO devices can be used in DIN rail enclosures and the invicta panelboard range.

Features
- Type A devices
- Switched neutral
- Fault indication window
- Bi-connect terminals enable supply from either cables in the cage or busbars in the slot.
- Bi-directional
- Facility insulation resistance test

1 mod connection capacity
- 10mm² flexible
- 16mm² rigid

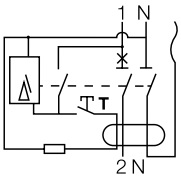
Standards
- Compliant to IEC 61009.1 and AS/NZS 61009.1
- ACC9xxT is Type I to comply with AS/NZS 3190 requirements, suitable for patient areas.

Technical information:
Page 87


ADC910T


ACC925T

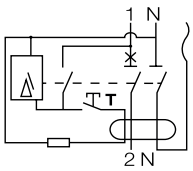
RCBO 1P+N 6kA
C curve



Current rating (A)	Residual current Idn	Module(s)	Width (mm)	Cat ref.
6A	30mA	1 mod	17.5	**ADC906T**
10A	30mA	1 mod	17.5	**ADC910T**
13A	30mA	1 mod	17.5	**ADC913T**
16A	30mA	1 mod	17.5	**ADC916T**
20A	30mA	1 mod	17.5	**ADC920T**
25A	30mA	1 mod	17.5	**ADC925T**
32A	30mA	1 mod	17.5	**ADC932T**
10A	10mA	1 mod	17.5	**ACC910T**
16A	10mA	1 mod	17.5	**ACC916T**
20A	10mA	1 mod	17.5	**ACC920T**
25A	10mA	1 mod	17.5	**ACC925T**
32A	10mA	1 mod	17.5	**ACC932T**


ADD920T

RCBO 1P+N 6kA
D curve



Current rating (A)	Residual current Idn	Module(s)	Width (mm)	Cat ref.
10A	30mA	1 mod	17.5	**ADD910T**
16A	30mA	1 mod	17.5	**ADD916T**
20A	30mA	1 mod	17.5	**ADD920T**
25A	30mA	1 mod	17.5	**ADD925T**

Description
Our AxA9xxT RCBO are two module wide, making them ideal for retrofit in installations where space is limited.

Available as 'C' curve in various current ratings from 6A - 40A. Available in 30 and 100mA.

Can can be used in DIN rail enclosures and the invicta panelboard range.

Features
- Type A devices
- Switched neutral
- Fault indication window
- Bi-connect terminals enable supply from either cables in the cage or busbars in the slot.
- Bi-directional load and line circuits may be connected top or bottom.
- Facility insulation resistance test

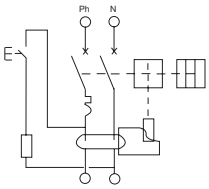
2 mod connection capacity
- 16mm² flexible
- 25mm² rigid

Accessories
- No auxiliary input

Standards
- Compliant to IEC 61009.1 and AS/NZS 61009.1

Technical information:
Page 88

RCBO 1P+N 6kA C curve



Current rating (A)	Residual current Idn	Module(s)	Width (mm)	Cat ref.
10A	30mA	2 mod	35	**ADA910T**
16A	30mA	2 mod	35	**ADA916T**
20A	30mA	2 mod	35	**ADA920T**
25A	30mA	2 mod	35	**ADA925T**
32A	30mA	2 mod	35	**ADA932T**
40A	30mA	2 mod	35	**ADA940T**


ADA910T

Description
Our ADM4xxT are 4 pole RCBO devices which provide a combination of overcurrent and earth leakage protection.

Available as ‘C’ curve in various current ratings from 6A to 40A. Available in 30mA and 100mA.

4P RCBO devices can only be used for DIN rail enclosures. Suitable for balanced and unbalanced loads.

Features
- Type A devices
- Earth fault indication window
- Trip free mechanisms
- Load and line circuits may be connected top or bottom.
- Bi-connect terminals enable supply from either cables in the cage or busbars in the slot.
- Switched neutral

4 mod connection capacity
- 16mm² flexible
- 25mm² rigid

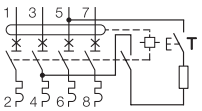
Accessories
- MZ201, MZ202, MZ203, MZ204, MZ206

Standards
- Compliant to IEC 61009.1 and AS/NZS 61009.1

Technical information:
Page 89


ADM420T

RCBO 4P 6kA
C curve



Current rating (A)	Residual current Idn	Module(s)	Width (mm)	Cat ref.
10A	30mA	4 mod	70	**ADM410T**
16A	30mA	4 mod	70	**ADM416T**
20A	30mA	4 mod	70	**ADM420T**
25A	30mA	4 mod	70	**ADM425T**
32A	30mA	4 mod	70	**ADM432T**
40A	30mA	4 mod	70	**ADM440T**

Description
Our ADA5xxT are 2 pole RCBO devices which provide a combination of overcurrent and earth leakage protection.

Available as 'C' curve in various current ratings from 10A to 45A. Available in 10mA.

ADA5xxT devices are should **NOT** be installed on the busbar.

Our ADX4xxT are 4 pole RCBO devices which provide a combination of overcurrent and earth leakage protection.

Available as 'C' curve in various current ratings from 20A to 40A. Available in 30mA and 100mA and rated at 10kA

The four pole RCBO devices can only be used in DIN rail enclosures. Suitable for balanced and unbalanced loads.

Features
- Type A devices
- Switched neutral
- Fault indication window
- Bi-connect terminals enable supply from either cables in the cage or busbars in the slot.
- Load and line circuits may be connected top or bottom.
- Trip free mechanisms

Connection capacity
- 16mm² flexible
- 25mm² rigid

Accessories 4 mod devices only
- MZ201, MZ202, MZ203, MZ204, MZ206, MZN175

Standards
- Compliant to IEC 61009.1 and AS/NZS 61009.1

Technical information ADA5:
Page 90

Technical information ADX4:
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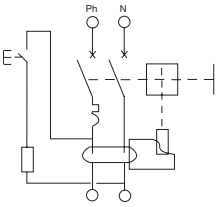
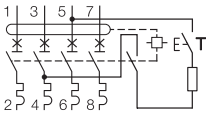
RCBO 1P+N 10kA Type A, C curve



Current rating (A)	Residual current Idn	Module(s)	Width (mm)	Cat ref.
10A	30mA	2 mod	35	**ADA560T**
16A	30mA	2 mod	35	**ADA566T**
20A	30mA	2 mod	35	**ADA570T**
25A	30mA	2 mod	35	**ADA575T**
32A	30mA	2 mod	35	**ADA582T**


ADA566T

RCBO 4P 10kA Type A C curve



Current rating (A)	Residual current Idn	Module(s)	Width (mm)	Cat ref.
20A	30mA	4 mod	70	**ADX420T**
32A	30mA	4 mod	70	**ADX432T**
40A	30mA	4 mod	70	**ADX440T**


ADX432T

Description
Residual Current Circuit Breaker (RCCB) or 'Safety Switches' are designed to open a protected circuit automatically when the circuit leaks current to earth, greater or equal to the devices rated tripping current.

For use in residential, commercial or industrial installations.

Type A
Type A RCCB is used where the earth fault waveform is sinusoidal AC and/or pulsating DC up to 6mA (computer loads, etc).

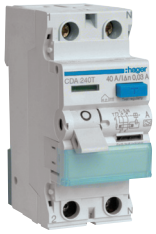
Features
- Positive contact indication windows
- Earth fault indication window
- Load and line circuits may be connected top or bottom
- Bi-connect terminals enable supply from either cables in the cage or busbars in the slot.

Connection capacity
- 25mm^2 - Rigid (50mm^2 for 80A,100A)
- 16mm^2 - Flexible (35mm^2 for 80A, 100A)

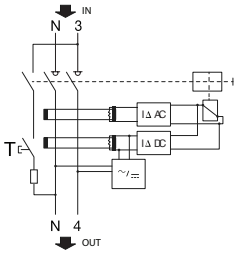
Accessories
- MZ201, MZ202, MZ203, MZ204, MZ206, MZN175, LZ060
- CZ001 for CDA2xxT and CDA4xxT
- MZN121 for others

Standards
- All types conform with AS/NZS 61008.1
- Type F compliant to IEC62493

Technical information: Page 92


CDA240T

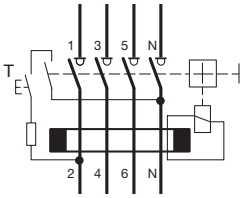
RCCB 1P+N Type A



Current rating (A)	Residual current Idn	Module(s)	Width (mm)	Cat ref.
40A	30mA	2 mod	35	**CDA240T**
63A	30mA	2 mod	35	**CDA263T**
100A	30mA	2 mod	35	**CDA584T**


CDA440T

RCCB 3P+N Type A



Current rating (A)	Residual current Idn	Module(s)	Width (mm)	Cat ref.
40A	30mA	4 mod	70	**CDA440T**
63A	30mA	4 mod	70	**CDA463T**
100A	30mA	4 mod	70	**CDA684T**

Description
Residual Current Circuit Breaker (RCCB) or 'Safety Switches' are designed to open a protected circuit automatically when the circuit leaks current to earth, greater or equal to the devices rated tripping current.

For use in residential, commercial or industrial installations.

Type F
Type F RCCB can detect and respond similarly as Type A and considers a maximum fault current of 30mA. It also detects mixed frequency residual currents (such as some air conditioning controllers using variable frequency from 10Hz to 1000Hz speed drives, some Class I power tools, etc).

Features
- Positive contact indication windows
- Earth fault indication window
- Load and line circuits may be connected top or bottom
- Bi-connect terminals enable supply from either cables in the cage or busbars in the slot.

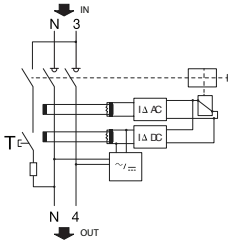
Connection capacity
- 25mm^2 - Rigid (50mm^2 for 80A,100A)
- 16mm^2 - Flexible (35mm^2 for 80A, 100A)

Accessories
- MZ201, MZ202, MZ203, MZ204, MZ206, MZN175, LZ060
- CZ001 for CDA2xxT and CDA4xxT
- MZN121 for others

Standards
- All types conform with AS/NZS 61008.1
- Type F compliant to IEC62493

Technical information: Page 92

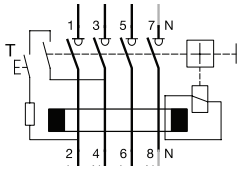
RCCB 1P+N Type F



Current rating (A)	Residual current Idn	Module(s)	Width (mm)	Cat ref.
40A	30mA	2 mod	35	**CDF540T**
63A	30mA	2 mod	35	**CDF563T**


CDF540T

RCCB 3P+N Type F



Current rating (A)	Residual current Idn	Modules	Width (mm)	Cat ref.
63A	30mA	4 mod	70	**CDF663T**


CDF663T

Description
Residual Current Circuit Breaker (RCCB) or 'Safety Switches' are designed to open a protected circuit automatically when the circuit leaks current to earth, greater or equal to the devices rated tripping current.

For use in residential, commercial or industrial installations.

Type B
Type B RCCB or 'Safety Switch' is used where earth fault waveform is sinusoidal AC, pulsating DC or smooth DC (VSD applications, lifts, medical equipments, etc).

- Can handle mixed frequency AC currents up to 1000Hz
- AC and/or pulsating currents with DC components
- Direct earth fault currents up to 10mA
- Earth fault current generated by a rectifier.

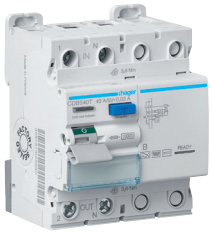
Features
- Earth fault indication window
- Line circuit is connected on top and load on bottom
- Polarity / directional

Connection capacity
- 25mm^2 - Rigid
- 16mm^2 - Flexible
- **CDBxxx incompatible with KDNxxx busbar**

Accessories
- MZ201, MZ202, MZ203, MZ204, MZ206, MZN175, MZN121

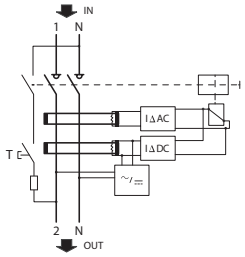
Standards
- Compliant to IEC61008.1, AS/ZS61008.1 and IEC62423

Technical information: Page 93



CDB540T

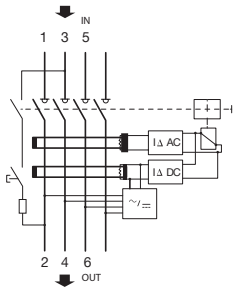
RCCB 1P+N Type B



Current rating (A)	Residual current Idn	Module(s)	Width (mm)	Cat ref.
40A	30mA	4 mod	70	**CDB540T**

CDB663T

RCCB 3P+N Type B



Current rating (A)	Residual current Idn	Module(s)	Width (mm)	Cat ref.
63A	30mA	4 mod	70	**CDB663T**

Accessories compatible for all RCBOs
- MZN175

Accessories compatible for AxM4xxT, AxA5xxT and AxX4xxT RCBOs only
- MZ201, MZ202, MZ203, MZ204, MZ206

Accessories compatible for all RCCBs
- CZ001, MZ201, MZ202, MZ203, MZ204, MZ206, MZN175

Combination Auxiliary & Alarm Switch
If shunt trip or undervoltage release is required, the CZ001 must be used as a coupler for RCCBs (CDA2xxT and CDA4xxT)

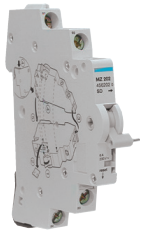
Connection
- 10mm² rigid
- 6mm² flexible

Compatibility chart and technical information: Page 94

Accessories

Description	Characteristics	Module(s)	Width (mm)	Cat ref.
Combination auxiliary & alarm contacts Allows remote indication of main contact status and indicates a fault condition (eg Safety Switch tripped) for RCCBs (CDA2xxT & CDA4xxT).	2 x (1NO + 1NC) 6A-240V~	1	17.5	**CZ001**
Auxiliary contacts Allows remote indication of main contact status for RCBOs and RCCBs (CxA5xxT & CxA6xxT). 	6A - 240V~ 1NO + 1NC	0.5	8.75	**MZ201**
Alarm contacts indicates a fault over current on overload or short circuit (e.g. RCBO tripped). For RCBOs and RCCBs (CxA5xxT & CxA6xxT). 	6A - 240V~ 1NO + 1NC	0.5	8.75	**MZ202**
Shunt trip relay Allows remote tripping of (combined) RCD when a voltage is applied. 	230V - 415V AC 110V to 130V DC	1	17.5	**MZ203**
	24V - 48V AC 12V - 48V DC	1	17.5	**MZ204**
Undervoltage release Trips the (combined) RCD when the voltage falls between 35% and 70% of nominal voltage.	230V AC Coil consumption: 3.5 VA	1	17.5	**MZ206**
Locking device Allows locking of the device; toggle in the lock on/off position; will accept two padlocks with hasps of 4.75mm diameter maximum.	Supplied without padlock	1	17.5	**MZN175**
Heat dissipation inserts	Avoids overheating for DIN rail modules when several devices mounted side by side are carrying high continuous loads	0.5	8.75	**LZ060**
Phase barriers for RCCBs (Inc 10kA)	1 set of 3			**MZN121**


CZ001


MZ202


MZ203


MZN175


LZ060

Description
A range of connection devices to simplify installation of modular devices such as MCBs, RCDs etc...

KDN180A

KDN380G

Insulated busbars - Fork type

Description	Module(s)	Width (mm)	Cat ref.
1 phase 80A	12 mod	210	**KDN180A**
1 phase 80A	18 mod	315	**KDN180G**
2 phase 80A	12 mod	210	**KDN280A**
3 phase 80A	12 mod	210	**KDN380A**
3 phase 80A	18 mod	315	**KDN380G**

KB181GI

Insulated busbars - Tongue Type

Description	Characteristics	Module(s)	Width (mm)	Cat ref.
1 neutral 80A. Suits neutral supply in onekonekt range of RCBOs	6 tongues over 12 poles	12 mod	210	**KB181A1**
1 neutral 80A. Suits neutral supply in onekonekt range of RCBOs	9 tongues over 18 poles	18 mod	315	**KB181G1**

KB163P

KB163N

Insulated busbars - Tongue type
Supplied with 10 tongue pole covers

Description	Characteristics	Module(s)	Width (mm)	Cat ref.
1 phase 63A	13 tongues over 13 pole	13 mod	227.5	**KB163P**
1 neutral 63A	13 tongues over 13 poles	13 mod	227.5	**KB163N**

KCL363L

Vertical Busbars (left side only)
Used in association with our horizontal busbars (KDN380x)

Description	Characteristics	Cat ref.
3 phase 63A, 2 rows	Suits specific golf enclosures and 12P wide vector enclosures	**KCL363L**
3 phase 63A, 3 rows	Suits specific golf enclosures and 12P wide vector enclosures	**KCL368L**

KZN021

KZ059

Insulated caps

Description	Characteristics	Quantity	Cat ref.
Busbar end caps	Suits KDN1xx & KB181xx	50	**KZN021**
Busbar end caps	Suits KDN2xx/KDN3xx	10	**KZN023**
Busbar fork protective cover	5 pole covers x10		**KZ059**

KRN163

Other accessories

Description	Characteristics	Cat ref.
RCD neutral links	Brass link for neutral fitting to RCD's: 3 x 10mm²	**KM03A**
Cable adaptor - one hole	35mm² to suit golf enclosure	**KM035**

KM03A

Cable Connectors

Description	Cat ref.
Chassis mounted 63A to supply power to the DIN Rail for cables: 25mm²	**KRN163**
Chassis or DIN Rail mounted 125A to connect main neutral cable: 50mm²	**KRN199**

Keeping people and property safe

Every electrical and electronic device has a specific dielectric strength against voltage fluctuations. If the voltage exceeds this strength, malfunctions and damage will occur.

Surge Protection Devices (SPDs) are designed to reduce the risk to people, property, electrical installations and connected devices from damage caused by surges, transients and lightning.

SPDs are inactive until a certain abnormal electrical energy threshold is crossed. Once the energy threshold is reached, SPDs temporarily divert damaging surge energy away from people and property.

Surge Protection Devices (SPD) are designed to reduce the risk to electrical installations and connected devices from damage caused by surges, transients from lightning, faults and switching sources.

The risk to a specific installation is determined from a composite of factors such as weather, location, geography and surrounding infrastructure. For definitive requirements for installation of Surge Protection Devices in New Zealand - please refer to the latest version of AS/NZS:1768 and AS/NZS:3000.

Cascading

Cascading is the term used to describe the method of combining several levels or types of SPDs into one installation, to create a robust surge protection system. Similar systems and the logic behind them are common to other electrical protection devices. Hager recommends a cascading surge protection system for enhanced voltage regulation, current diverting capacity and reliability.

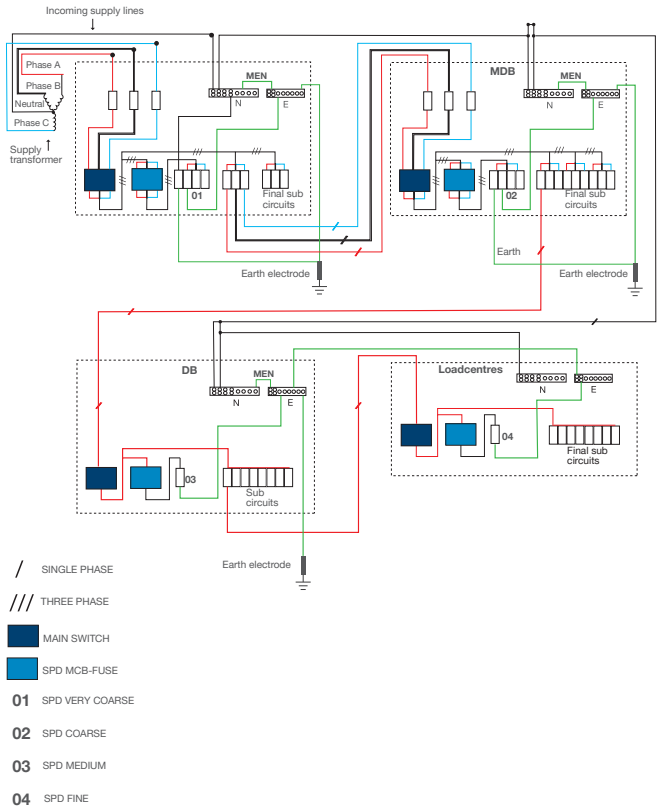
To simplify selection, Hager uses the terminology:
Very Coarse, Coarse, Medium and Fine Surge Protection Devices.

Wiring

SPDs should first be installed at the point of electrical supply (service entrance, incoming mains or sub-mains) on a switchboard, directly after the main switch or isolator, but before other circuit protective devices (especially any RCD or RCBO). Hager SPDs are available to suit installations wired in three phase or single phase.

To gain maximum protection from the SPD, resistance needs to be minimised, conductors used to connect SPD should be kept as short as possible, and the conductor diameter sized appropriately for the application. SPD conductors are oversized to ensure a safe lower resistance path during operation.

Protection against SPD short circuits needs to be provided by an over-current protective device such as a fuse or circuit breaker. This overcurrent device must be suitably rated to discriminate with the SPD - it must permit the flow of surge current without operating. Hager SPD products contain wiring and installation instructions on your choice of fuse or circuit breaker – these are also available at page 98-99.

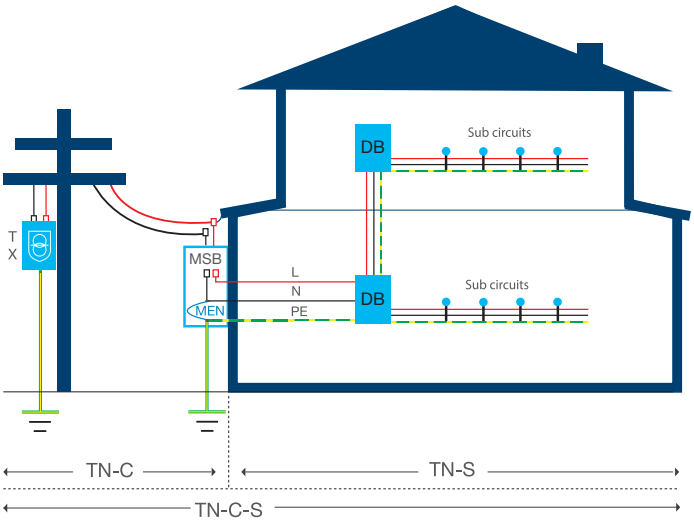


Earthing

The correct selection of the appropriate SPD is based on the location and style of earthing present in the installation, and location of the SPD in the installation.

Hager SPDs are available in two earthing configurations:
1. TNC
2. TNS / TT

The type of earthing most commonly used in low voltage electrical distribution systems in both Australia and New Zealand is referred to as Multiple Earth-Neutral (MEN). When considering a MEN earthing system as a whole, it is treated as a hybrid TN-C-S. (See example diagram below)



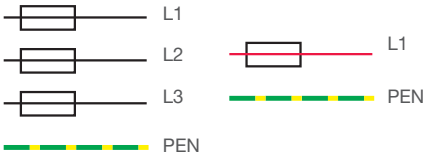
A TN-C earthing system is present between the transformer that supplies the site and the installation MSB, and is used in MEN Switchboard Solutions.

In a TN-S earthing system is commonly used inside the domestic installations (from the Main Switchboard MEN downstream) and for Separate Neutral-Earth Switchboard Solutions

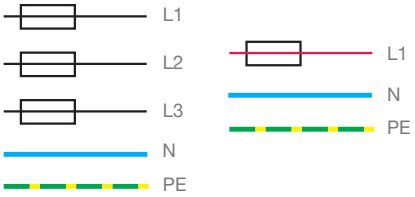
TN-C-S is comprised of both: The supply side of the system uses a combined Protective Earth Neutral (PEN) conductor for earthing, and the load side (downstream of the MSB) of the system uses a separate conductor for Protective Earth (PE) and Neutral (N).

If the SPD can be located within two meters of the MEN point, select a TN-C type SPD.

Example of TN-C wiring layout:



Example of TN-S wiring layout:



Hager SPD are suitable for 240V SWER, but not suitable for 480V SWER. Select SPD as per the standard TN-C-S system.

Hager provides a simplified four part guide to select appropriate SPDs:

Part 1 - Direct or frequent lightning protection
Lightning has the highest potential for surge damage. The criteria for installing a dedicated lightning protective product is through the following questions:

- **Is the installation in a lightning prone area?**
- **Is the installation adjacent to tall structures, tall trees or near a hill top?**
- **Does the installation contain a lightning rod?**

If the answer is YES to any of the above, Hager recommends installation of a 'Spark Gap' device as the initial component of the SPD system.

Hager offers the SPA range of Spark Gap devices:
- For three phase, the **SPA312, SPA412**
- For single phase, the **SPA212**

Part 2 - Indirect Lightning and Transient Protection
To ensure protection of an installation, it is vital to have adequate protection from the harmful effect of indirect or nearby lightning transients. These transients are commonly introduced into an installation from nearby lightning strikes usually from thunder storms.

Thunder Day Map

This map illustrates the lightning activity across New Zealand and is based upon the 'Thunder Day Map' that appears in AS/NZS 1768: 2017.

As indicated, New Zealand is split into three zones of activity.

To choose the appropiate indirect lightning protection, it is important to determine what zone the installation is located in:

1 Zone 1 - Install **'Coarse'** surge protection and cascading **'Medium'** and **'Fine'** surge protection.

2 Zone 2 - Install **'Medium'** surge protection and additional cascaded Fine protection for critical sub circuits

3 Zone 3 - Install **'Medium'** surge protection and consider **'Fine'** surge protection for protecting final circuits.

Part 3 - Surrounding infrastructure
Aside from geographic location, the type of installation and the impact of surrounding infrastructure should be considered. An installation in any of the lightning zones shown may require additional or upgraded protection from non-lightning sources of surge.

- **Is the installation supplied by exposed or long power lines or sub-mains? i.e. rural or large commercial estate**
- **Is the installation near a source of man-made switching transients; power plants or substations, or part of a large industrial or commercial zone with large motors?**
- **Is the electricity supply unreliable? - are there frequent blackouts or brownouts?**

If the answer is YES to any of the above, the SPD system selected in Part 2 should be upgraded to a higher rating.

Part 4 - Fine Protection
By installing supplementary cascaded 'Fine' surge protection, the protection of connected devices and appliances can be ensured. Hager 'Fine' SPDs should only be installed to provide supplementary protection - a higher rated SPD must be installed upstream of 'Fine' protection.

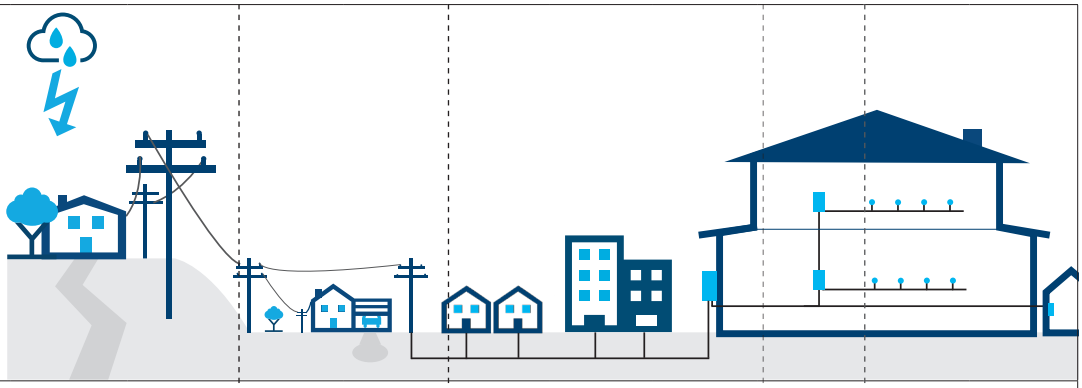
- **Is the circuit longer than 10 metres, or does it leave the building? e.g. External signage, garden or pool sheds, pumps, illumination and security systems.**
- **Does a sub-board or sub-circuit contain expensive or critical electronic devices? e.g. OLED and LED TV's, PCs, NAS, security cameras and alarms, home theatre or high end audio equipment, electronic appliances with variable drives or invertor technology, mobility or medical equipment, battery or EV chargers.**

If the answer is YES to any of the above, Hager recommends installing supplementary 'Fine' protection.
- Install a **SPB208D** for single phase final circuits.
- Install a **SPB408D** for three phase final circuits.

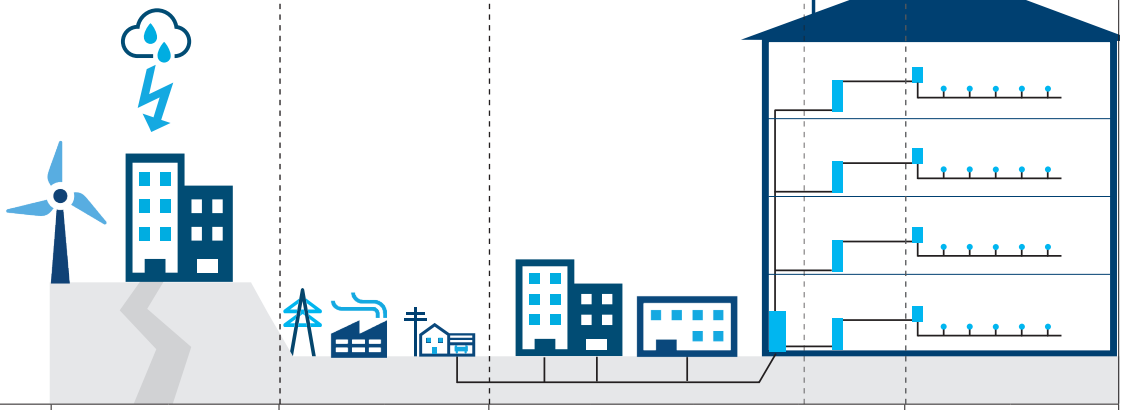
Example SPD wiring diagrams can be found on page 98 and 99.
For definitive requirements for installation of Surge Protection Devices, please refer to the latest version of AS/NZS:1768 and AS/NZS:3000.

Installation examples:
- **For rural, exposed or dispersed multi-building properties**
  A cascading surge protection system should be installed, starting with 'Very Coarse' and a 'Spark Gap' at the Point of Supply / Main Switch Board (MSB), then 'Coarse' for Major Sub-mains and detached buildings, followed by 'Medium' at Distribution Boards or Loadcentres and supplementary 'Fine' for any long sub-circuits that have expensive or critical electronic equipment.
- **For commercial buildings and apartments**
  Properties should have cascading surge protection installed, with 'Very Coarse' or 'Coarse' at the MSB, 'Medium' for any Sub-mains or Distribution Boards and ideally supplementary 'Fine' protection in Loadcentres. If SPD installation at the MSB is not possible, a higher rated SPD should be considered for the tenancy point of supply.
- **For urban residential and light commercial premises**
  For urban and suburban houses or small retail premises. Hager recommends 'Medium' protection at the MSB – however in zones with increased lightning exposure or proximity to industrial and commercial sites, upgrading to 'Coarse' protection with cascading is recommended.

Residential applications



Commercial and institutional applications



Type of Installation	**Very Coarse** - Highly exposed to lightning - Point of supply entry for highly exposed, lightning prone sites including on hills and ridges, by tall trees or structures or connected by long overhead service power lines - Any installation with a Lightning Rod, LPS or Spark Gap Device - Proximity to very large motors or transformers; usually industrial sites, power plants or substations	**Coarse** - Somewhat exposed to lightning - Proximity to industrial or large commercial sites that have or induce transients from large transformers or motors. - Or supplied by long service supply cables including private power poles - Rural, Commercial or Large Institutional - Power lines: metering box, point of connection, private power pole	**Medium** - Rarely exposed to lightning with underground service entrance, and short distance to neighbours - Suitable for most subtropical urban and suburban homes and domestic applications - Suitable for cascaded use, downstream of higher rated SPDs such as in: Major Sub-mains, Distribution Boxes or Load Centres. - Available with (R) or without (D) contact for condition monitoring	**Fine** - Supplementary protection for final circuits with expensive, critical or important equipment - Load centres and equipment on long circuits or remote from other SPDs - Residential apartments or flats with computer, audio visual, measurement, security, laboratory and scientific equipment

Type of Surge Protection	**Type 1 Spark Gap Type 2 100kA**		**Type 2 65kA**		**Type 2 40kA**				**Type 2 8kA**	
	Three phase	Single phase	Three phase	Single phase	Three phase		Single phase		Three phase	Single phase
Spark Gap Direct or frequent lightning protection	SPA312, SPA412	SPA212	-	-	-	-	-	-	-	-
TN-C Used at or near the service supply point and MSB. If the SPD can be located within two meters of the MEN point, select a TN-C type surge protection device.	SPB300R	SPB100R	SPB365R	SPB165R	SPB340D	SPB340R	SPB140D	SPB140R	-	-
TN-S / TT Used after or downstream from the MSB or Switchboard MEN and in separate Neutral-Earth switchboard solutions.	SPB400R	SPB200R	SPB465R	SPB265R	SPB440D	SPB440R	SPB240D	SPB240R	SPB408D	SPB208D

Description
Our SPBxxx devices protect electrical and electronic equipment against transients originating from lightning and switching sources. These transients can cause premature aging of equipment, logic failures and down time, to the complete destruction of electrical components.

Installation and connection
- Very Coarse, Coarse, Medium and Fine
- Spark Gap and MOV technology
- Single phase or Three phase
- TN-C or TN-S / TT
- Part numbers ending in 'R' have a contact to allow for wiring in alarm to indicate cartridge replacement.
- Part numbers ending in 'D' have no contact.
- Replacement NE & L-PE cartridges available

Note
- SPBxxxx cartridges are not compatible with legacy SPNxxxx products

Technical information:
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Wiring Example:
Page 98 and 99

Spark Gap
Category C3 (Type 1) - Supplied with remote contact

Description	Iimp kA	Up kV	Uc V	Width	Cat ref.
For areas where lightning is frequent. Test wave 10/350µs	12.5 / 25	≤1.5	264	2 mod	**SPA212**
	12.5	≤1.5	264	4 mod	**SPA312**
The SPA212, SPA312 and SPA412 offer improved protection in a more compact form factor.	12.5 / 50	≤1.5	264	4 mod	**SPA412**


SPA212


SPA412

Very Coarse
Category C2 (Type 2) - Supplied with remote contact

Description	iMax kA	In kA	Up kV	Uc V	Width	Cat ref.
Single phase						
SPD 1P T2 TNC 100kA Remote contact	100	40	2	320	1 mod	**SPB100R**
SPD 2P T2 TNS/TT 100kA Remote contact	100	40	2	320	2 mod	**SPB200R**
Three phase						
SPD 3P T2 TNC 100kA Remote contact	100	40	2	320	3 mod	**SPB300R**
SPD 4P T2 TNS/TT 100kA Remote contact	100	40	2	320	4 mod	**SPB400R**


SPB100R


SPB400R

Coarse
Category C2 (Type 2) - Supplied with remote contact

Description	Iimp kA	iMax kA	In kA	Up kV	Uc V	Width	Cat ref.
Single phase							
SPD 1P T2 TNC 65kA Remote contact	12.5	65	20	1.45	320	1 mod	**SPB165R**
SPD 2P T2 TNS/TT 65kA Remote contact	12.5	65	20	1.45	320	2 mod	**SPB265R**
Three phase							
SPD 3P T2 TNC 65kA Remote contact	12.5	65	20	1.45	320	3 mod	**SPB365R**
SPD 4P T2 TNS/TT 65kA Remote contact	12.5	65	20	1.45	320	4 mod	**SPB465R**


SPB165R


SPB465R

Description
Our SPBxxx devices protect electrical and electronic equipment against transients originating from lightning and switching sources. These transients can cause premature aging of equipment, logic failures and down time, to the complete destruction of electrical components.

Installation and connection
- Very Coarse, Coarse, Medium and Fine
- Spark Gap and MOV technology
- Single phase or Three phase
- TN-C or TN-S / TT
- Part numbers ending in 'R' have a contact to allow for wiring in alarm to indicate cartridge replacement.
- Part numbers ending in 'D' have no contact.
- Replacement L-N cartridges available

Note
- SPBxxxx cartridges are not compatible with legacy SPNxxxx products

Technical information:
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Wiring Example:
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SPB140D


SPB440R

Medium
Category B and C1 (Type 2)

Description	iMax kA	In kA	Up kV	Uc V	Width	Cat ref.
Single phase						
SPD 1P T2 TNC 40kA	40	20	1.35	275	1 mod	**SPB140D**
SPD 1P T2 TNC 40kA Remote contact	40	20	1.35	275	1 mod	**SPB140R**
SPD 2P T2 TNS/TT 40kA	40	20	1.35	275	2 mod	**SPB240D**
SPD 2P T2 TNS/TT 40kA Remote contact	40	20	1.35	275	2 mod	**SPB240R**
Three phase						
SPD 3P T2 TNC 40kA	40	20	1.35	275	3 mod	**SPB340D**
SPD 3P T2 TNC 40kA Remote contact	40	20	1.35	275	3 mod	**SPB340R**
SPD 4P T2 TNS/TT 40kA	40	20	1.35	275	4 mod	**SPB440D**
SPD 4P T2 TNS/TT 40kA Remote contact	40	20	1.35	275	4 mod	**SPB440R**


SPB208D


SPB408D

Fine
Category A (Type 2) - Supplied without remote contact

Description	iMax kA	In kA	Up kV	Uc V	Width	Cat ref.
Single phase						
SPD 2P TNS/TT 8 kA	8	2	0.9	275	2 mod	**SPB208D**
Three phase						
SPD 4P TNS/TT 8 kA	8	2	0.9	275	4 mod	**SPB408D**

Description
Our SPBxxxx replacement cartridges and bases are IP2X This allows for simple 'hot swap' remove and replacement of expended cartridges.

- SPD cartridges should be replaced when the visual indicator changes to a distinct 'Red'.
- Replacement cartridges are available for all different ratings and types
- A keying system exists to prevent a line (L-N) cartridge being interchanged by mistake with a neutral one (N-PE) and vice versa.
- Three phase SPD requires 3x L-N
- SPBxxxx cartridges are not compatible with legacy SPNxxxx products
- **SPD 'R" model contactor wiring layout has changed for all new SPBxxxR SPDs**

Technical information:
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SPB Replacement Active Cartridges - L-N

For TN-S and TN-C SPD

Description	Type	iMax kA	Cat ref.
Cartridge L-N; In 40kA, Imax 100kA	Very Coarse	100	**SPB010R**
Cartridge L-N; In 20kA, Imax 65kA	Coarse	65	**SPB065R**
Cartridge L-N; In 20kA, Imax 40kA	Medium	40	**SPB040D**
Cartridge L-N; In 2kA, Imax 8kA	Fine	8	**SPB008D**

SPB065R

SPB008D

SPB Replacement Neutral Cartridges - N-PE

For TN-S SPD

Description	Type	iMax kA	Cat ref.
Cartridge N-PE; In 20kA, Imax 100kA	Very Coarse	100	**SPB010N**
Cartridge N-PE; In 20kA, Imax 65kA	Coarse	65	**SPB065N**
Cartridge N-PE; In 20kA, Imax 40kA	Medium	40	**SPB040N**

SPB010N

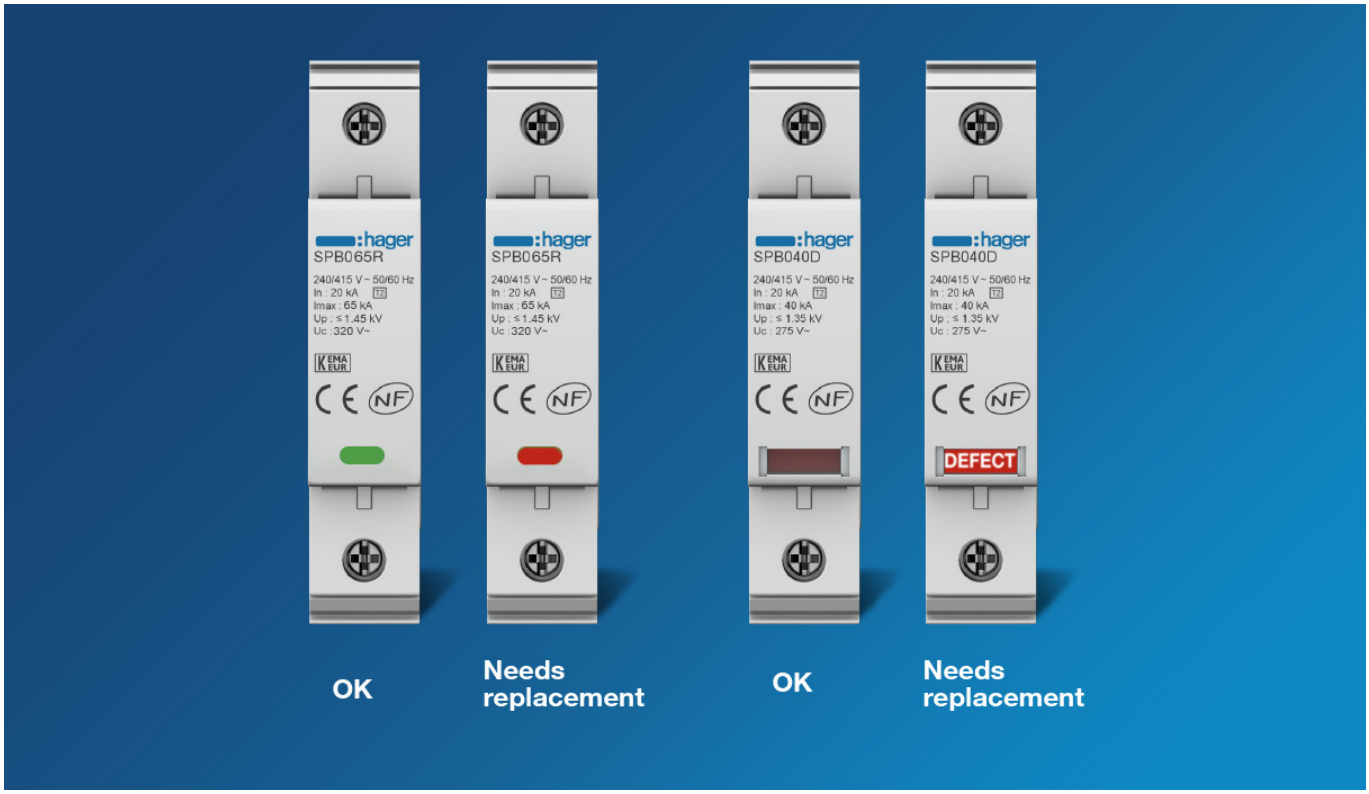
SPB040N

How do I know if I need to replace an SPB SPD cartridge?

– Overall if the colour changes to a distinct Red, additionally if the 'pin' at the back of the cartridge is retracted then the cartridge should be replaced.

– For Very Coarse (100kA) and Coarse (65kA) SPB SPDs - a small oval indicator will change colours from Green (Ok) to Red (Faulty)

– For Medium (40kA) and Fine (8kA) SPB SPDs - a rectangular window is present, when this window is distinct or bright red, there is a fault.
- Please note these rectangular style fault indicators may look somewhat red, or red tinged when new.



– To confirm the SPD condition, please check the pin at the back of the removed cartridge, as highlighted in the right picture above.

– If this 'pin' is protruding outside and visible, then the SPD cartridge is in good condition.

– If the SPD is Faulty or EOL, this 'pin' disappears (retracts).

Fault loop impedance
With the introduction of AS/NZS 3000:2018 there are new wiring rules for electrical contractors and electrical consultants to consider when designing an electrical installation.

This guide is only concerned with one new area, fault loop impedance, and it's affect on the choice of conductor and circuit breaker for a given circuit. Voltage drop and overcurrent requirements should also be given consideration.

An earth fault situation is caused when an active conductor comes into contact with an earthed conductor - fault current then flows. Contractors and consultants must make sure that the conductors in a circuit will allow sufficient energy to flow to cause the circuit breaker to trip in the required time (disconnection time for 230V supply is 0.4s for socket–outlets up to 63A, or handheld Class 1 equipment intended for manual movement during use. 5 seconds for other circuits including submains and final sub circuits supplying fixed or stationary equipment (clause 1.5.5.3)

To make sure that this fault current is large enough to trip a circuit breaker in the required time the fault loop impedance (Zs) must be below a certain value. If Zs is too large then the circuit breaker may take too long to trip(> 0.4s) or may not trip at all.

- Circuit length: Circuit impedance increases with the length of a circuit.
- Cross-sectional area of cable: The smaller the cross -sectional area of a cable, the higher it's impedance per meter will be.
- Thermal and magnetic settings of a circuit breaker: Hager circuit breakers have both rated current and magnetic characteristics.

The higher the rated current and magnetic settings, the more energy is required to trip the circuit breaker in the required time (< 0.4 s). So a circuit breaker with a magnetic setting of 14 x In will require more energy to trip it (in the required time) than a circuit breaker with a magnetic setting of 7.5 x In.

If more energy is required to flow, then a larger cross-sectional area cable may be needed. If this is not possible then installing a Hager RCD will provide a simple and economical solution.

So circuit length, cross sectional area of the cable and circuit breaker settings all need to be taken into account to ensure correct function of a circuit.

The tables below are a guide to the maximum circuit length for a given Hager circuit breaker. Using these tables will help ensure that the disconnection time for a 230V a.c. supply is met according to AS/NZS 3000:2018.

Conductor size		**Protective device rating**	**Hager circuit breaker (AS/NZS60898)**	
Active	**Earth**		**Type C**	**Type D**
mm2	**mm2**	**A**	**MCL (max circuit length in meters)**	
1	1	6	91	55
1	1	10	55	33
1.5	1.5	10	82	49
1.5	1.5	16	51	31
2.5	2.5	16	85	51
2.5	2.5	20	68	41
4	2.5	25	67	40
4	2.5	32	52	31
6	2.5	40	48	29
10	4	50	62	37
16	6	63	76	45
16	6	80	59	36
25	6	80	66	40
25	6	100	53	32
35	10	100	85	51
35	10	125	68	41
50	16	125	106	63
50	16	160	83	50
70	25	160	126	75
70	25	200	100	60

Maximum circuit length (MCL) and maximum circuit impedance (Zs) for Hager MCBs (MSNxxx, NTxxxC & NDNxxxA ranges).

Where: MCL = Maximum circuit length

Above table based on supply of voltage of 230V / 400V (AS/NZS 3000:2018)

Calculation of Prospective Short Circuit Current
Several excellent proprietary computer programs are now available for calculating the prospective fault level at any point in the installation. They are also able to select the correct size and type of cable and match this with the correct circuit protective device.

Estimation of Prospective Fault Current
Actually calculating prospective short-circuit current is not in itself difficult but it does require basic data which is not always available to the electrical installation designer.
It is therefore usual to use a simple chart as shown in FIGURE 1 to estimate the prospective short circuit current. This type of chart always gives a prospective fault level greater than that which would have been arrived at by calculation using accurate basic data. Therefore it is safe to use but sometimes may result in an over engineered system.

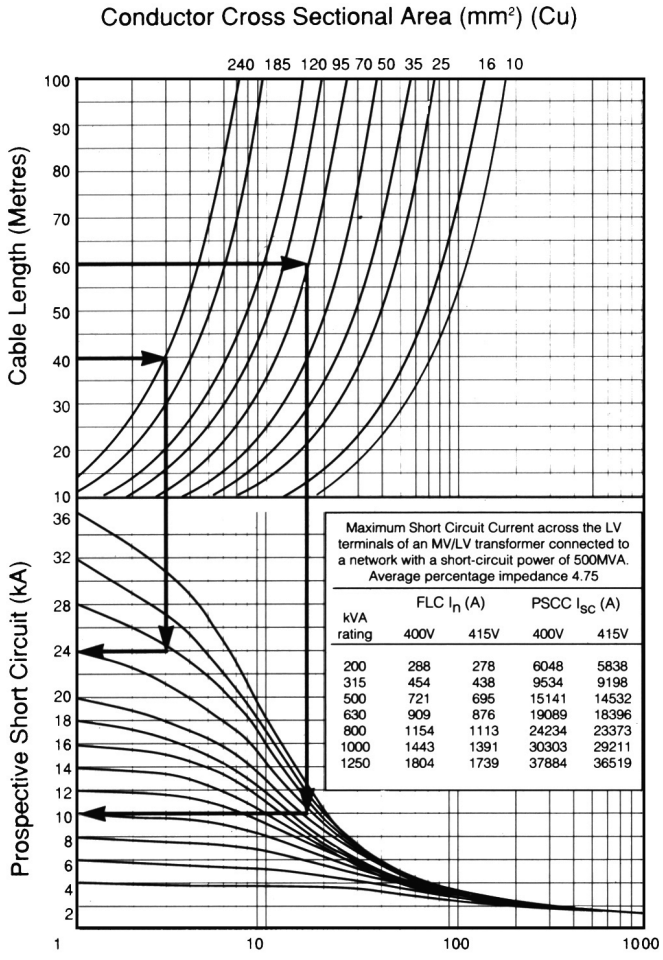


Figure 1

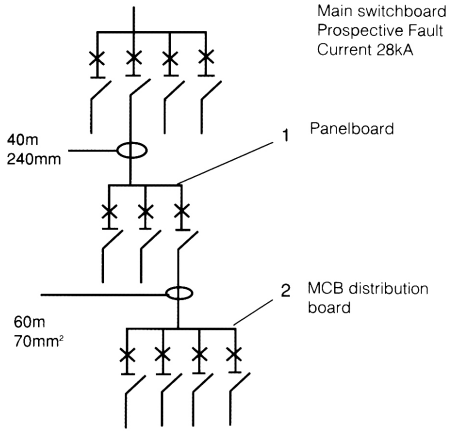


Figure 2

Example in figure 2

1 Project 40m of cable length across on to the 240mm² cable curve. From this point project down onto the 28kA curve. From this point projecting across we note that the prospective fault level at the panelboard is 24kA.

2 Project 60m of cable length across onto the 70mm² cable curve. From this point project down on to the 24kA curve. From this point projecting across we see that the prospective fault level at the MCB distribution board is 10kA.

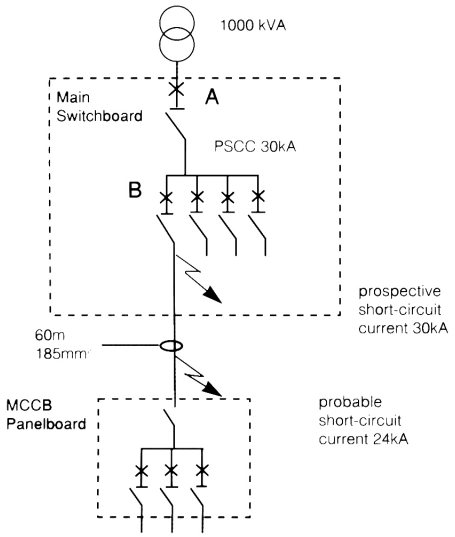
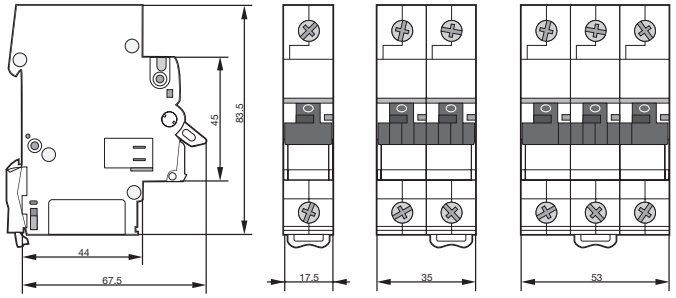


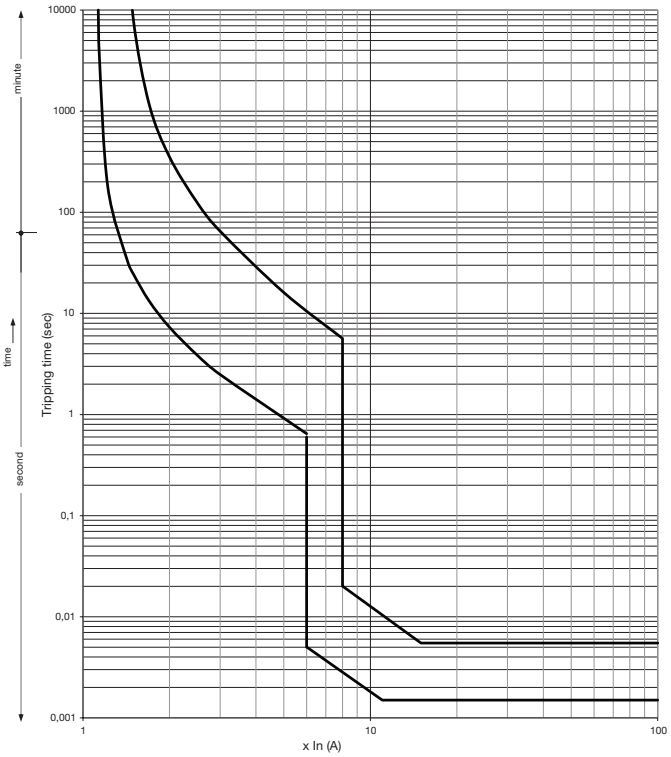
Figure 3

The relationship between probable short-circuit current and service short-circuit breaking capacity is explained. The probable short circuit is the type of short circuit which is most likely to occur; this is nearly always at the extremity of the protected cable and more often than not a single phase or earth fault.
Figure 3 shows a typical 3 phase 4 wire 400V system fed by a 1000 kVA transformer. The transformer is adjacent to the main switchboard so the prospective short-circuit current (PSCC*) on the main switchboard busbars is estimated as 30kA. The probable short-circuit current on the panelboard feeder circuit is estimated as 24kA, if it were a 3 phase symmetrical fault, or 12kA for a phase to neutral fault, which in fact would be the most likely type of fault. (Note: when estimating a phase to neutral prospective short-circuit current, the length of conductor is doubled.) Therefore for this application the main switchboard incoming circuit breaker (A) should have an Ics 30kA and an Icu 30kA. The panelboard feeder circuit breaker (B) should have an Icu 30kA and an Ics 24kA.

Dimensions



Tripping curve - All In Tcal= 30°C C curve



Specifications

Standards		AS/NZS 60898
Thermal trip characteristic		C curve (5-10 x In)
Breaking capacity Icn		6000A
Voltage rating		240/415V AC
Frequency		50-60Hz
Current rating		6A - 63A
No. of operations		20,000
Connection capacity	**Rigid**	25mm² max.
	Flexible	16mm² max.
Tightening torque		2.8Nm
Toggle		Sealable in Off position
Operating temperature		-25°C to 60°C

Grouping factor		**Assumed load factor**
Number of outgoing circuits	**2 & 3**	0.8
	4 & 5	0.7
	6 to 9	0.6
	10 +	0.5

Temperature derating table 1P/2P (calibration temperature 30°C)

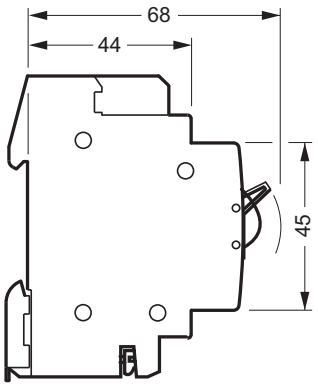
Ambiant temp (°C)	**Rated current (A)**								
	8	**10**	**16**	**20**	**25**	**32**	**40**	**50**	**63**
-25	9.22	11.14	21.82	27.36	33.35	41.83	51.36	67.46	83.89
-20	9.12	10.98	21.31	26.70	32.58	41.01	50.43	66.02	82.07
-15	9.01	10.83	20.81	26.03	31.81	40.18	49.49	64.58	80.24
-10	8.91	10.50	20.41	25.40	31.01	39.62	48.53	63.69	78.67
-5	8.80	10.53	19.81	24.71	30.27	38.54	47.54	61.71	76.58
0	8.69	10.38	19.31	24.05	29.51	37.71	46.54	60.27	74.75
5	8.58	10.22	18.81	23.39	28.74	36.89	45.52	58.83	72.93
10	8.46	10.07	18.31	22.73	27.97	36.07	44.47	57.40	71.10
15	8.35	9.92	17.81	22.07	27.20	35.24	43.39	55.96	69.27
20	8.24	9.77	17.31	21.41	26.43	34.42	42.29	54.52	67.44
25	8.12	9.62	16.81	20.75	25.66	33.60	41.16	53.09	65.61
30	8	10	16.00	20	25	32	40	50	63
35	7.88	9.31	15.80	19.42	24.13	31.95	38.80	50.21	61.96
40	7.76	9.16	15.30	18.76	23.36	31.13	37.57	48.78	60.13
45	7.63	9.01	14.80	18.10	22.59	30.31	36.29	47.34	58.30
50	7.51	8.50	14.50	17.50	21.75	30.00	34.97	47.00	57.00
55	7.38	8.70	13.80	16.78	21.05	28.66	33.59	44.46	54.65
60	7.25	8.55	13.30	16.12	20.28	27.84	32.15	43.03	52.82
65	7.11	8.40	12.80	15.46	19.51	27.01	30.65	41.59	50.99
70	6.98	8.25	12.30	14.80	18.75	26.19	29.07	40.15	49.16

Calibration temperature for MSN140 and MSN163 is 40°C. Please refer to the product data sheet for the temperature derating table.

Temperature derating table 3P (calibration temperature 30°C)

Ambiant temp (°C)	Rated current (A)										
	6	**8**	**10**	**13**	**16**	**20**	**25**	**32**	**40**	**50**	**63**
-25	6.85	9.18	13.33	16.03	20.42	25.32	31.54	39.93	50.03	63.65	78.38
-20	6.75	9.08	13.06	15.78	20.06	24.89	31.00	39.28	49.20	62.53	76.96
-15	6.66	8.97	12.79	15.52	19.69	24.44	30.46	38.61	48.36	61.40	75.55
-10	6.50	8.87	12.51	15.26	19.32	23.99	29.90	37.93	47.51	60.24	74.06
-5	6.47	8.77	12.22	15.00	18.93	23.53	29.33	37.24	46.63	59.05	72.71
0	6.38	8.66	11.93	14.73	18.54	23.06	28.75	36.54	45.75	57.85	71.30
5	6.28	8.55	11.63	14.46	18.14	22.58	28.16	35.82	44.84	56.62	69.88
10	6.19	8.45	11.32	14.18	17.74	22.09	27.56	35.09	43.91	55.36	68.46
15	6.09	8.34	11.01	13.89	17.32	21.58	26.94	34.35	42.97	54.07	67.05
20	6.00	8.23	10.68	13.60	16.89	21.07	26.31	33.58	42.00	52.75	65.63
25	5.90	8.11	10.35	13.30	16.45	20.54	25.66	32.80	41.01	51.39	64.21
30	6	8	10.00	13.00	16.00	20.00	25	32	40.00	50.00	63.00
35	5.71	7.87	9.63	12.69	15.49	19.36	24.27	31.14	38.76	48.50	61.38
40	5.62	7.74	9.25	12.36	14.97	18.71	23.51	30.25	37.49	46.96	59.97
45	5.52	7.60	8.85	12.03	14.43	18.02	22.73	29.33	36.16	45.36	58.55
50	5.30	7.47	8.44	11.69	13.87	17.31	21.92	28.39	34.79	43.71	57.00
55	5.34	7.33	8.00	11.34	13.28	16.57	21.08	27.41	33.36	41.99	55.72
60	5.24	7.18	7.53	10.98	12.66	15.80	20.21	26.39	31.87	40.19	54.30
65	5.15	7.04	7.04	10.60	12.02	14.99	19.30	25.34	30.30	38.31	52.88
70	5.05	6.89	6.50	10.22	11.34	14.12	18.34	24.24	28.64	36.34	51.47

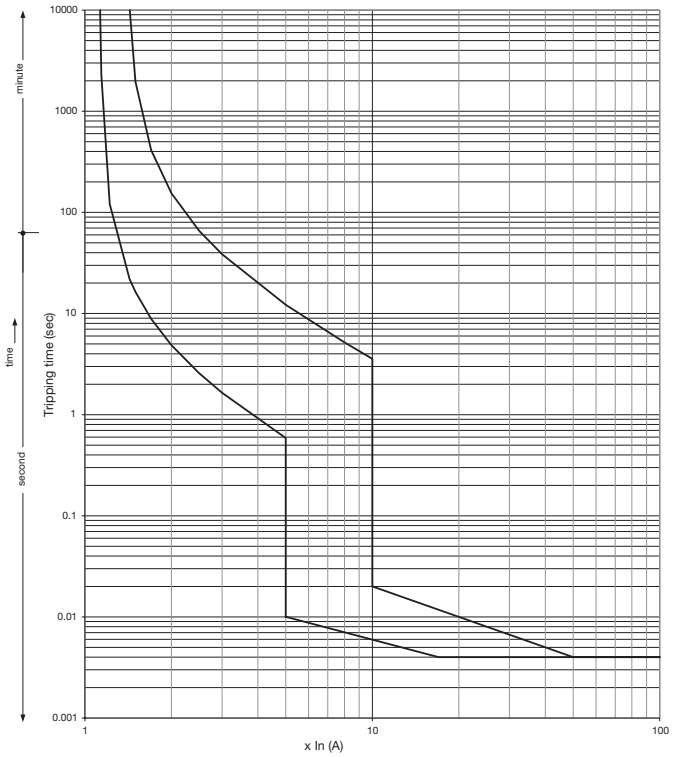
Dimensions



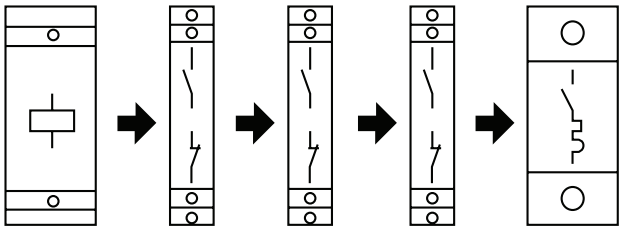
Specifications

Standards		AS/NZS 60898
Thermal trip characteristic		C curve (5-10 x In)
Breaking capacity		10,000A
Voltage rating		230/400V AC
Current rating		2A - 63A
No. of operations		20,000
Connection capacity	**Rigid**	35mm² max.
	Flexible	25mm² max.
Tightening torque		2.8Nm

Tripping curve - Tcal= 30°C C curve



Auxiliary possibilities



MZ203 to MZ209 | **MZ201** | **MZ201** | **MZ202** | **MCB & RCBO**

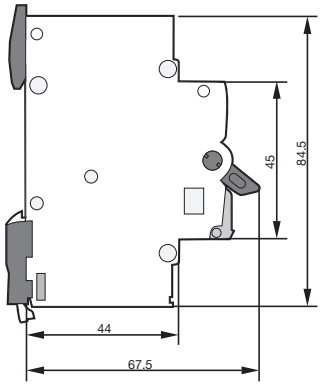
Temperature derating table 1P/2P (calibration temperature 30°C)

Ambiant temp (°C)	Rated current (A) 2	4	6	10	16	20	25	32	40	50	63
-25	2.27	4.41	7.17	12.4	20.0	23.8	32.2	38.7	46.8	64.7	81.1
-20	2.25	4.37	7.08	12.2	19.7	23.5	31.6	38.1	46.2	63.5	79.6
-15	2.23	4.34	6.98	12.0	19.3	23.2	31.0	37.5	45.6	62.3	78.1
-10	2.20	4.30	6.87	11.8	19.0	22.8	30.4	37.0	45.0	61.1	76.6
-5	2.18	4.26	6.77	11.6	18.6	22.5	29.8	36.4	44.4	59.9	75.0
0	2.15	4.23	6.67	11.4	18.3	22.2	29.1	35.8	43.8	58.7	73.4
5	2.13	4.19	6.56	11.2	17.9	21.8	28.5	35.2	43.2	57.4	71.8
10	2.10	4.15	6.45	10.9	17.6	21.5	27.8	34.6	42.6	56.1	70.1
15	2.08	4.12	6.34	10.7	17.2	21.1	27.1	33.9	42.0	54.7	68.4
20	2.05	4.08	6.23	10.5	16.8	20.7	26.4	33.3	41.3	53.4	66.7
25	2.03	4.04	6.12	10.2	16.4	20.4	25.7	32.7	40.7	52.0	64.9
30	2	4	6	10	16	20	25	32	40	50	63
35	1.97	3.96	5.88	9.8	15.6	19.6	24.2	31.3	39.3	48.8	62.8
40	1.95	3.92	5.76	9.5	15.2	19.2	23.5	30.6	38.6	47.7	62.6
45	1.92	3.88	5.64	9.2	14.7	18.8	22.7	29.9	37.9	46.5	62.3
50	1.89	3.84	5.51	9.0	14.3	18.4	21.8	29.2	37.2	45.3	62.1
55	1.86	3.80	5.38	8.7	13.8	18.0	21.0	28.5	36.5	44.1	61.9
60	1.83	3.76	5.25	8.4	13.3	17.6	20.0	27.7	35.7	43.0	61.7
65	1.81	3.72	5.13	8.2	12.9	17.2	19.3	27.0	35.1	41.8	61.4
70	1.78	3.68	5.00	7.9	12.4	16.8	18.4	26.3	34.3	40.6	61.2

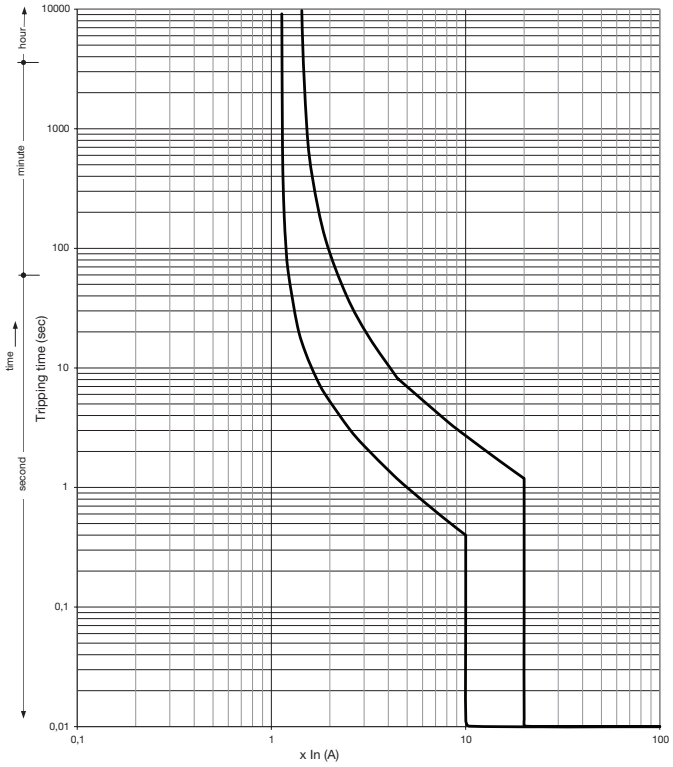
Temperature derating table 3P (calibration temperature 30°C)

Ambiant temp (°C)	Rated current (A)										
	2	**4**	**6**	**10**	**16**	**20**	**25**	**32**	**40**	**50**	**63**
-25	2.54	4.64	7.77	12.7	20.5	24.6	31.44	40.79	50.4	64.0	78.9
-20	2.49	4.59	7.62	12.5	20.1	24.3	30.91	40.07	49.6	62.8	77.6
-15	2.45	4.53	7.48	12.3	19.8	23.9	30.37	39.34	48.7	61.7	76.2
-10	2.40	4.48	7.33	12.1	19.4	23.5	29.82	38.59	47.8	60.5	74.9
-5	2.36	4.42	7.18	11.8	19.0	23.1	29.26	37.83	46.9	59.3	73.5
0	2.31	4.36	7.02	11.6	18.6	22.7	28.69	37.06	46.0	58.0	72.1
5	2.26	4.30	6.86	11.3	18.2	22.2	28.11	36.26	45.0	56.8	70.7
10	2.21	4.25	6.70	11.1	17.8	21.8	27.52	35.45	44.1	55.5	69.2
15	2.16	4.19	6.53	10.8	17.3	21.4	26.91	34.62	43.1	54.2	67.7
20	2.11	4.12	6.36	10.6	16.9	20.9	26.29	33.77	42.1	52.8	66.2
25	2.05	4.06	6.18	10.3	16.5	20.5	25.65	32.90	41.1	51.4	64.6
30	2	4	6	10	16	20	25	32	40	50	63
35	1.94	3.94	5.81	9.7	15.5	19.5	24.33	31.08	38.9	48.5	61.4
40	1.89	3.87	5.62	9.4	15.0	19.0	23.64	30.13	37.8	47.0	59.7
45	1.83	3.81	5.42	9.1	14.5	18.5	22.93	29.15	36.6	45.5	57.9
50	1.76	3.74	5.21	8.8	14.0	18.0	22.20	28.13	35.4	43.8	56.1
55	1.70	3.67	4.99	8.5	13.5	17.5	21.44	27.08	34.2	42.1	54.3
60	1.63	3.60	4.77	8.1	12.9	16.9	20.66	25.98	32.9	40.4	52.4
65	1.58	3.54	4.57	7.8	12.4	16.4	19.96	25.02	31.8	38.9	50.7
70	1.51	3.47	4.36	7.5	11.9	15.9	19.23	24.00	30.6	37.2	48.9

NDNxxxA dimensions



Tripping curve - All In Tcal= 30°C D curve



Specifications

Standards		AS/NZS 60898
Thermal trip characteristic		D curve (10-20 x In)
Breaking capacity		10,000A
Voltage rating		240/415V AC
Current rating		6A - 63A
No. of operations		20,000
Connection capacity	**Rigid**	35mm² max.
	Flexible	25mm² max.
Tightening torque		2.8Nm

Grouping factor		**Assumed load factor**
Number of outgoing circuits	**2 & 3**	0.8
	4 & 5	0.7
	6 to 9	0.6
	10 +	0.5

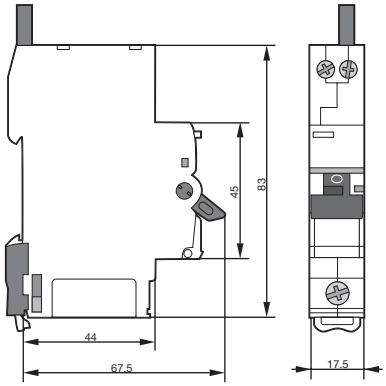
Temperature derating table 1P/2P (calibration temperature 30°C)

Ambiant temp (°C)	**Rated current (A)**										
	2	**4**	**6**	**10**	**16**	**20**	**25**	**32**	**40**	**50**	**63**
-25	2.67	5.18	7.51	12.9	20.5	25.08	31.41	39.5	51.3	65.1	81.0
-20	2.62	5.09	7.39	12.6	20.1	24.66	30.89	38.9	50.4	63.9	79.6
-15	2.56	4.99	7.26	12.4	19.7	24.24	30.35	38.2	49.5	62.6	78.1
-10	2.51	4.89	7.13	12.1	19.4	23.80	29.80	37.6	48.5	61.4	76.5
-5	2.45	4.79	7.00	11.9	19.0	23.36	29.24	37.0	47.5	60.1	75.1
0	2.39	4.68	6.87	11.6	18.6	22.91	28.68	36.3	46.5	58.9	73.5
5	2.33	4.58	6.73	11.4	18.2	22.45	28.10	35.6	45.5	57.7	72.0
10	2.27	4.47	6.59	11.1	17.8	21.98	27.51	34.9	44.5	56.5	70.5
15	2.20	4.35	6.45	10.9	17.3	21.51	26.90	34.2	43.5	55.3	69.0
20	2.14	4.24	6.30	10.6	16.9	21.02	26.28	33.5	42.4	54.0	67.5
25	2.07	4.12	6.15	10.3	16.5	20.51	25.65	32.8	41.4	52.8	65.9
30	2	4	6	10	16	20	25	32	40	50	63
35	1.93	3.87	5.84	9.7	15.5	19.47	24.33	31.2	39.0	49.4	62.0
40	1.85	3.74	5.68	9.4	15.0	18.93	23.65	30.4	37.9	48.2	60.5
45	1.77	3.61	5.52	9.1	14.5	18.37	22.94	29.6	36.7	46.7	58.7
50	1.69	3.47	5.35	8.7	14.0	17.80	22.21	28.8	35.8	47.0	58.3
55	1.60	3.33	5.17	8.4	13.5	17.20	21.46	27.9	33.6	42.8	52.8
60	1.51	3.17	4.99	8.0	12.9	16.58	20.68	27.0	32.2	40.3	50.5
65	1.41	3.01	4.80	7.6	12.3	15.94	19.87	26.1	30.7	37.6	48.1
70	1.31	2.85	4.60	7.2	11.7	15.28	19.02	25.2	29.1	34.5	45.6

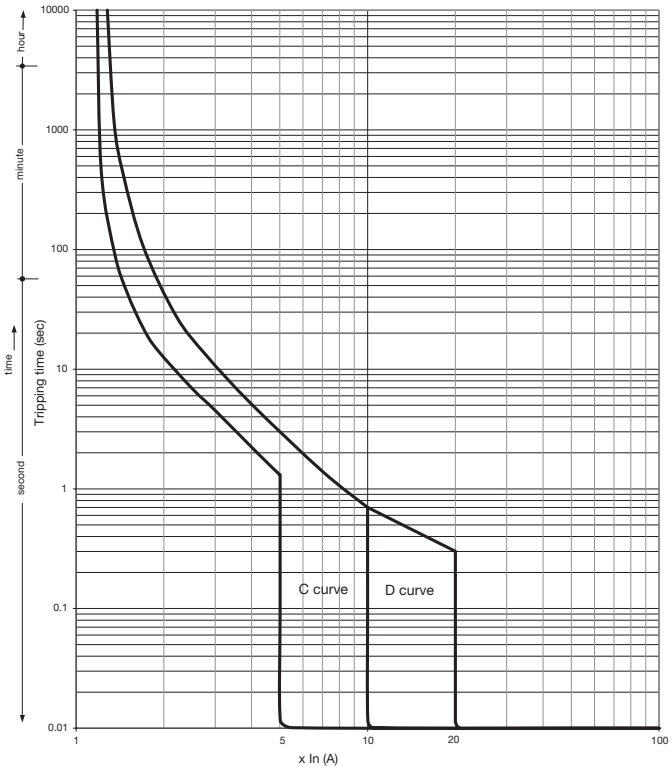
Temperature derating table 3P (calibration temperature 30°C)

Ambiant temp (°C)	Rated current (A)										
	2	**4**	**6**	**10**	**16**	**20**	**25**	**32**	**40**	**50**	**63**
-25	2.59	4.88	7.61	12.7	20.3	24.8	31.04	39.04	55.3	63.0	78.7
-20	2.54	4.80	7.48	12.5	19.9	24.4	30.54	38.45	54.1	61.9	77.4
-15	2.50	4.73	7.35	12.3	19.6	24.0	30.03	37.86	52.8	60.9	76.1
-10	2.45	4.65	7.21	12.0	19.2	23.6	29.51	37.25	51.6	59.7	74.7
-5	2.39	4.58	7.07	11.8	18.8	23.2	28.99	36.64	50.3	58.6	73.4
0	2.34	4.50	6.93	11.6	18.5	22.7	28.45	36.01	48.9	57.5	72.0
5	2.29	4.42	6.78	11.3	18.1	22.3	27.91	35.37	47.5	56.3	70.6
10	2.23	4.34	6.63	11.1	17.7	21.9	27.35	34.73	46.1	55.1	69.1
15	2.18	4.26	6.48	10.8	17.3	21.4	26.78	34.06	44.7	53.9	67.6
20	2.12	4.17	6.32	10.5	16.9	21.0	26.20	33.39	43.2	52.6	66.1
25	2.06	4.09	6.16	10.3	16.4	20.5	25.61	32.70	41.6	51.3	64.6
30	2	4	6	10	16	20	25	32	40	50	63
35	1.93	3.90	5.81	9.6	15.5	19.5	24.23	31.26	38.0	48.5	61.0
40	1.85	3.79	5.61	9.2	14.9	18.9	23.44	30.50	35.8	46.9	58.9
45	1.77	3.69	5.41	8.8	14.4	18.4	22.61	29.72	33.5	45.3	56.7
50	1.69	3.58	5.19	8.3	13.8	17.8	21.76	28.92	31.0	43.6	54.4
55	1.61	3.46	4.97	7.9	13.2	17.2	20.87	28.10	28.3	41.9	52.0
60	1.51	3.34	4.74	7.4	12.6	16.6	19.94	27.26	25.4	40.0	49.6
65	1.42	3.22	4.50	6.8	11.9	16.0	18.97	26.38	22.0	38.1	46.9
70	1.31	3.10	4.24	6.2	11.2	15.3	17.94	25.48	18.0	36.1	44.2

Dimensions



Tripping curve - All In Tcal= 30°C C curve and D curve



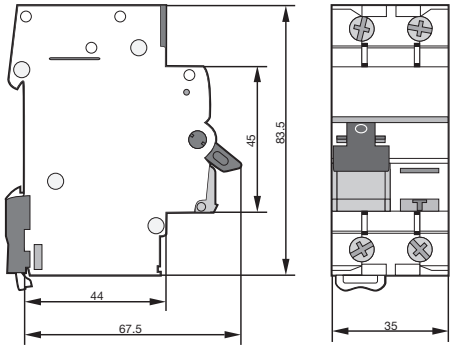
Specifications

Standards		AS/NZS 61009.1
Wave form of earth fault detected		Type A
Residual current tripping technology		Voltage dependent, bi-directional and facility insulation resistance test
Thermal trip characteristic		C curve (5-10 x In) for ADC9xxT and ACC9xxT
		D curve (10-20 x In) for ADD9xxT
Breaking capacity Icn		6000A
Frequency		50Hz
Voltage rating		230 - 240V AC
Current rating In		6A - 32A for ADC9xxT and ACC9xxT
		6A - 25A for ADD9xxT
Residual operating current		30mA for ADC9xxT and ADD9xxT
		10mA for ACC9xxT
No. of operations		30,000
Connection capacity	**Rigid**	16mm² max.
	Flexible	10mm² max.
Tightening torque		2.1Nm bottom and 1.9Nm top
Neutral-IN connectivity		Stranded cable 1m long
Toggle		Sealable Off position
Operating temperature		-25°C to 70°C

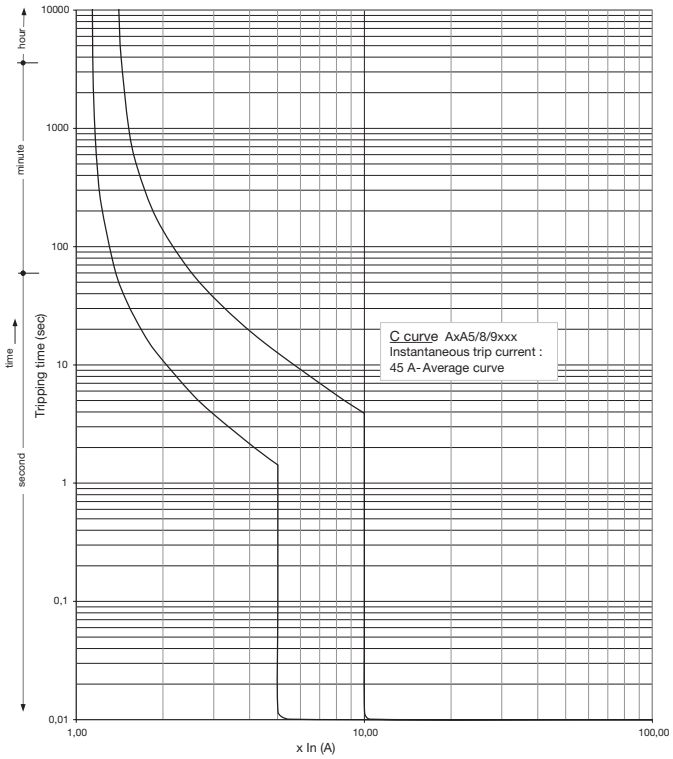
Temperature derating table (calibration temperature 30°C)

Ambiant temp (°C)	Rated current (A)					
	6	**10**	**16**	**20**	**25**	**32**
-25	7.4	12.3	20.5	25.5	32.4	38.6
-20	7.3	12.1	20.1	25	31.7	38
-15	7.1	11.9	19.7	24.5	31.1	37.4
-10	7	11.7	19.3	24	30.4	36.8
-5	6.9	11.5	18.9	23.5	29.7	36.2
0	6.8	11.3	18.5	23	29	35.6
5	6.6	11.1	18.1	22	28.4	35
10	6.5	10.8	17.6	23.2	27.7	34.4
15	6.4	10.6	17.2	21.5	27	33.8
20	6.3	10.4	16.8	21	26.3	33.2
25	6.1	10.2	16.4	20.5	25.7	32.6
30	6	10	16	20	25	32
35	5.9	9.8	15.7	19.6	24.3	31.3
40	5.7	9.6	15.5	19.2	23.7	30.7
45	5.6	9.4	15.2	18.8	23	30
50	5.5	9.2	15	18.4	22.3	29.3
55	5.4	9	14.7	18	21.6	28.6
60	5.2	8.7	14.5	17.6	21	28
65	5.1	8.5	14.2	17.2	20.3	27.3
70	5	8.3	14	16.8	19.6	26.6

Dimensions



Tripping curve - All In Tcal= 30°C C curve



Specifications

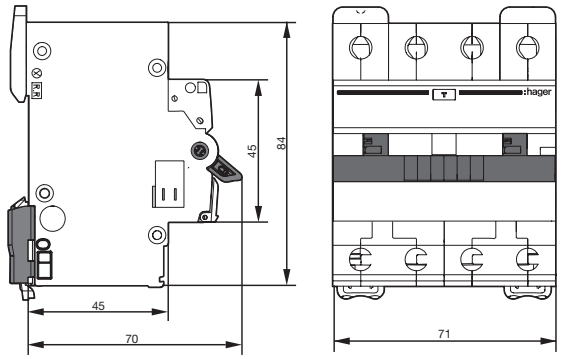
Standards		AS/NZS 61009.1
Wave form of earth fault detected		Type A
Residual current tripping technology		Voltage independent, bi-directional and facility insulation resistance test
Thermal trip characteristic		C curve (5-10 x In)
Breaking capacity Icn		6000A
Voltage rating		240V AC
Frequency		50Hz
Current rating		6A - 40A
Residual operating current		30mA for ADA9xxT
		100mA for AEA9xxT
Test button operational voltage		Network voltage
No. of operations		4000 for AEA9xxT
		2000 for ADA9xxT
Connection capacity	**Rigid**	25mm² max.
	Flexible	16mm² max.
Tightening torque		2.1 Nm
Neutral-IN connectivity		Neutral in the cage - insulated busbar slot
Toggle		Sealable Off position
Operating temperature		-25°C to 40°C

Temperature derating table (calibration temperature 30°C)

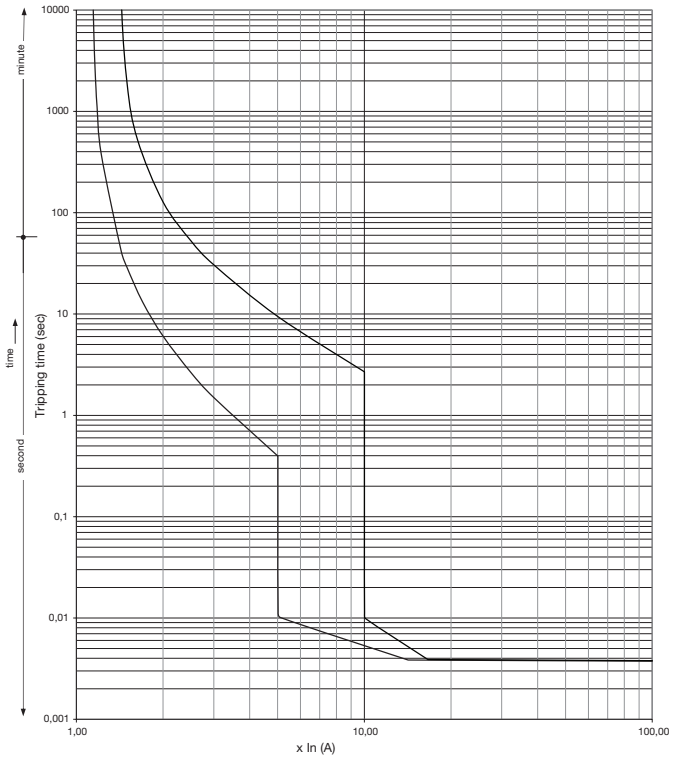
Ambiant temp (°C)	Rated current (A)						
	10	**13**	**16**	**20**	**25**	**32**	**40**
-25	12	15.3	18.5	22.7	28.2	38.3	46.9
-20	11.9	15.1	18.3	22.5	27.9	37.8	46.3
-15	11.7	14.9	18.1	22.2	27.6	37.2	45.6
-10	11.5	14.7	17.9	22	27.4	36.7	45
-5	11.3	14.5	17.7	21.8	27.1	36.1	44.4
0	11.1	14.3	17.4	21.5	26.8	35.6	43.8
5	11	14.1	17.2	21.3	26.5	35	43.1
10	10.8	13.9	17	21	26.2	34.4	42.5
15	10.6	13.7	16.7	20.8	25.9	33.8	41.9
20	10.4	13.5	16.5	20.5	25.6	33.2	41.3
25	10.2	13.2	16.2	20.3	25.3	32.6	40.6
30	10	13	16	20	25	32	40
35	9.9	12.8	15.8	19.8	24.8	31.5	39.4
40	9.7	12.6	15.6	19.6	24.5	31	38.8
45	9.6	12.4	15.4	19.4	24.3	30.5	38.2
50	9.4	12.2	15.2	19.2	24	30	37.5
55	9.3	12	15	19	23.8	29.5	36.9
60	9.1	11.8	14.8	18.8	23.5	29	36.2

These RCBOs may be fed in any position: load and line circuits may be connected top or bottom.

Dimensions



Tripping curve - Tcal= 30°C C curve



Specifications

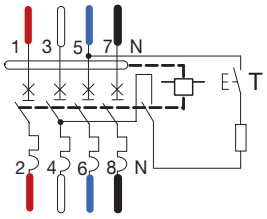
Standards		AS/NZS 61009.1
Wave form of earth fault detected		Type A
Residual current tripping technology		Voltage independent, bi-directional and facility insulation resistance test
Thermal trip characteristic		C curve (5-10 x In)
Breaking capacity Icn		6000A
Frequency		50Hz
Voltage rating		240 - 415V AC
Current rating		6A - 40A
Residual operating current		30mA for ADM4xxT
Test button operational voltage		375V to 440V
No. of operations		4000
Connection capacity	**Rigid**	25mm² max.
	Flexible	16mm² max.
Tightening torque		2Nm
Neutral-IN connectivity		Neutral in the cage - insulated neutral busbar slot
Toggle		Sealable On/Off position
Operating temperature		-25°C to 40°C

Temperature derating table (calibration temperature 30°C)

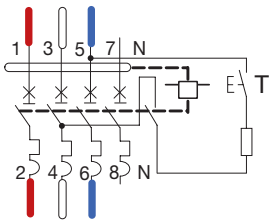
Ambiant temp (°C)	Rated current (A)					
	10	**16**	**20**	**25**	**32**	**40**
-25	12.30	19.43	23.8	31.7	39.9	49.8
-20	12.11	19.14	23.5	31.2	39.3	49
-15	11.92	18.85	23.2	30.6	38.6	48.2
-10	11.72	18.56	22.9	30	37.9	47.3
-5	11.52	18.26	22.5	29.4	37.2	46.5
0	11.31	17.95	22.2	28.9	36.5	45.6
5	11.11	17.64	21.8	28.3	35.8	44.7
10	10.89	17.33	21.5	27.6	35.1	43.8
15	10.68	17.00	21.1	27	34.3	42.9
20	10.46	16.68	20.8	26.4	33.6	42
25	10.23	16.34	20.4	25.7	32.8	41
30	10	16	20	25	32	40
35	9.75	15.62	19.6	24.3	31.2	38.9
40	9.50	15.24	19.1	23.6	30.3	37.7
45	9.24	14.85	18.6	22.8	29.4	36.5
50	8.97	14.44	18.2	22	28.5	35.2
55	8.69	14.02	17.7	21.2	27.5	33.9
60	8.41	13.59	17.2	20.4	26.5	32.6

Electrical connection - not suitable for single phase circuits

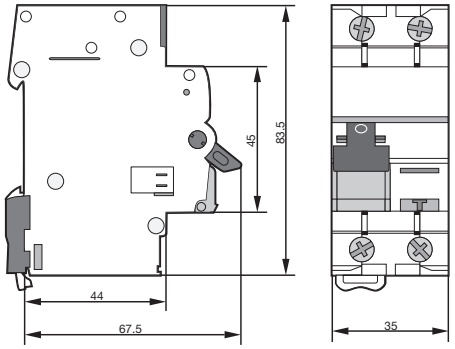
4 poles
Three phase and neutral (unbalanced load)



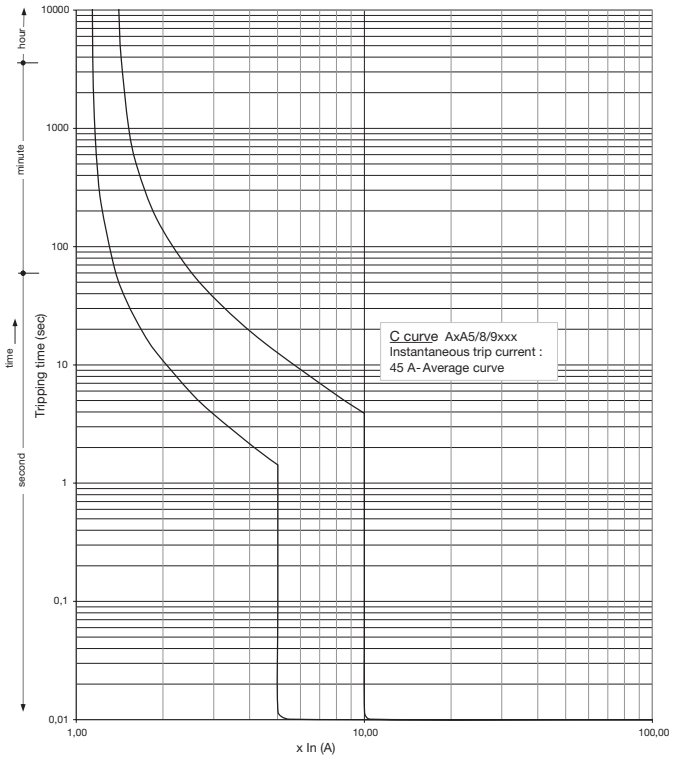
4 poles
Three phase (balanced load)



Dimensions



Tripping curve - All In Tcal= 30°C C curve



Specifications

Standards		AS/NZS 61009.1
Wave form of earth fault detected		Type A
Residual current tripping technology		Voltage independent, bi-directional and facility insulation resistance test
Thermal trip characteristic		C curve (5-10 x In)
Breaking capacity Icn		10,000A
Voltage rating		240V AC
Frequency rating		50Hz
Current rating		6A - 32A
Residual operating current		30mA for ADA5xxT
Test button operational voltage		375V to 440V
No. of operations		2000
Connection capacity	**Rigid**	25mm² max.
	Flexible	16mm² max.
Tightening torque		2.1 Nm
Toggle		Sealable Off position
Operating temperature		-25°C to 40°C

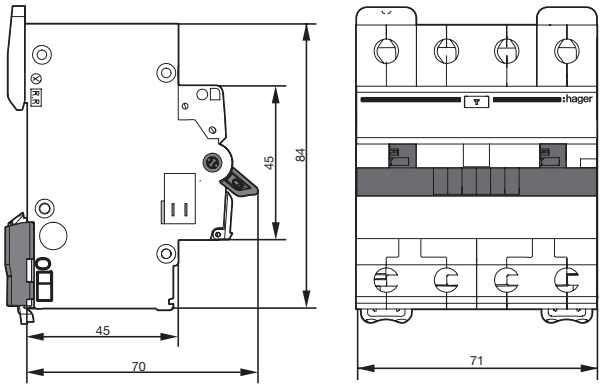
Temperature derating table (calibration temperature 30°C)

Ambiant temp (°C)	Rated current (A)				
	10	**16**	**20**	**25**	**32**
-25	12.02	18.53	22.69	28.19	38.30
-20	11.85	18.31	22.46	27.91	37.77
-15	11.68	18.10	22.23	27.64	37.24
-10	11.50	17.88	21.99	27.36	36.69
-5	11.33	17.65	21.75	27.07	36.14
0	11.15	17.43	21.51	26.79	35.58
5	10.97	17.20	21.27	26.50	35.01
10	10.78	16.97	21.02	26.21	34.43
15	10.59	16.73	20.77	25.91	33.84
20	10.40	16.49	20.52	25.61	33.24
25	10.20	16.25	20.26	25.31	32.63
30	10	16	20	25	32
35	9.86	15.80	19.80	24.76	31.52
40	9.71	15.61	19.60	24.52	31.03
45	9.56	15.41	19.39	24.27	30.54
50	9.41	15.20	19.18	24.02	30.03
55	9.26	15.00	18.98	23.77	29.52
60	9.10	14.79	18.76	23.52	29.00

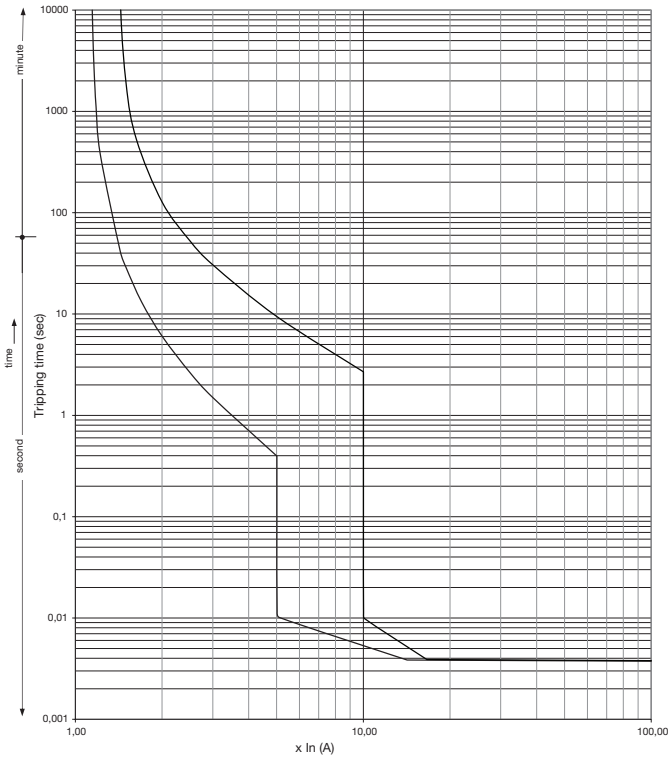
These RCBOs may be fed in any position: load and line circuits may be connected top or bottom.

NOTE: ADA5xxT devices are should **NOT** be installed on the busbar.

Dimensions



Tripping curve - Tcal= 30°C C curve



Specifications

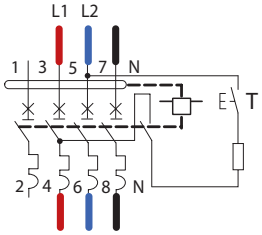
Standards		AS/NZS 61009.1
Wave form of earth fault detected		Type A
Residual current tripping technology		Voltage independent, bi-directional and facility insulation resistance test
Thermal trip characteristic		C curve (5-10 x In)
Breaking capacity Icn		10,000A
Voltage rating		240 - 415V AC
Frequency		50Hz
Current rating		6A - 40A
Residual operating current		30mA for ADX4xxT
Test button operational voltage		375V to 440V
No. of operations		4000
Connection capacity	**Rigid**	25mm² max.
	Flexible	16mm² max.
Tightening torque		2Nm
Neutral-IN connectivity		Neutral in the cage - insulated neutral busbar slot
Toggle		Sealable On/Off position
Operating temperature		-25°C to 40°C

Temperature derating table (calibration temperature 30°C)

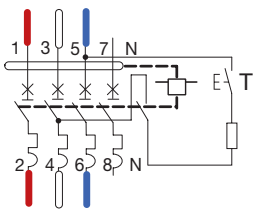
Ambiant temp (°C)	Rated current (A)		
	20A	**32A**	**40A**
-25	23.83	39.90	49.79
-20	23.51	39.25	48.98
-15	23.18	38.59	48.16
-10	22.85	37.91	47.32
-5	22.52	37.23	46.47
0	22.17	36.52	45.60
5	21.83	35.81	44.72
10	21.47	35.08	43.81
15	21.11	34.34	42.89
20	20.75	33.58	41.95
25	20.38	32.80	40.99
30	20	32	40
35	19.56	31.15	38.86
40	19.10	30.28	37.69
45	18.63	29.39	36.48
50	18.16	28.46	35.23
55	17.66	27.51	33.93
60	17.16	8.41	11.26

ADX4xxT electrical connection - not suitable for single phase circuits

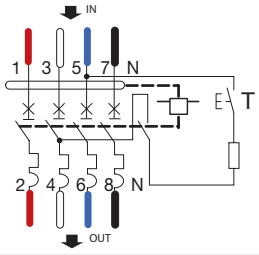
4 poles
Two phase
(balanced load)



4 poles
Three phase
(balanced load)



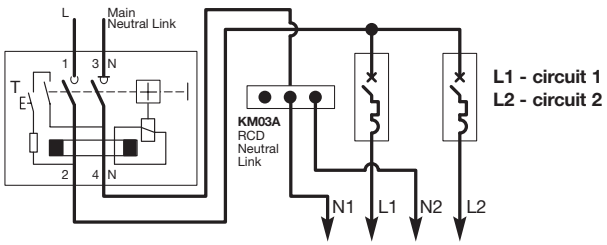
4 poles
Three phase
and neutral
(unbalanced
load)



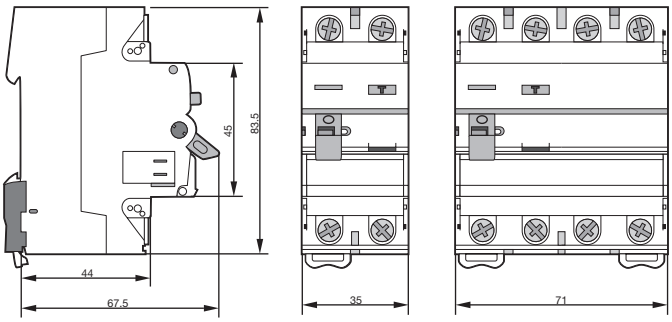
Electrical Connection

RCCB load and line circuits may be connected top or bottom.

2 poles



Dimensions



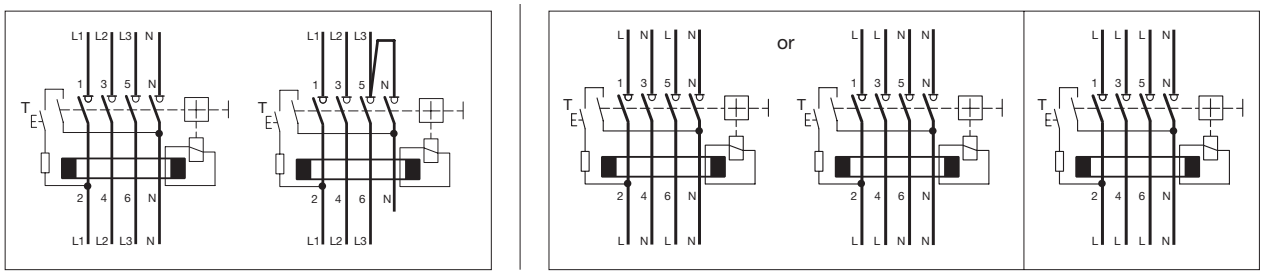
4 poles (CDA4xxT)

Three phase & neutral (unbalanced load)

Three phase (balanced load)

Single phase
Two circuits

Single phase
Three circuits
common neutral



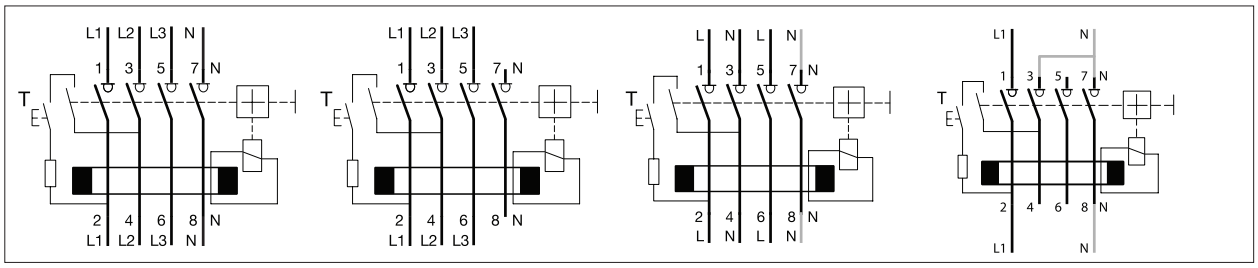
4 poles (CxA5xxT, CxA6xxT & CDFxxxT)

Three phase & neutral use

Three phase use, no neutral

Single phase use
Two circuits

One circuit



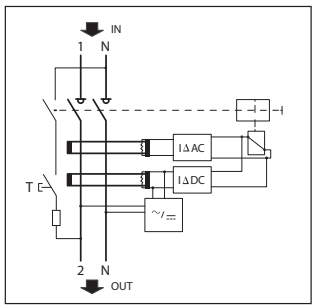
Specifications

		CDA2xxT	CDA4xxT	CxA5xxT	CxA6xxT	CDF5xxT/CDF6xxT
Standards		AS/NZS 61008.1	AS/NZS 61008.1	AS/NZS 61008.1	AS/NZS 61008.1	AS/NZS 61008.1 and IEC62423
Wave form of earth fault current detected		Type A	Type A	Type A	Type A	Type F
Residual current tripping technology		Voltage independent, bi-directional, facility insulation resistance test	Voltage independent, bi-directional, facility insulation resistance test	Voltage independent, bi-directional, facility insulation resistance test	Voltage independent, bi-directional, facility insulation resistance test	Voltage independent, bi-directional, facility insulation resistance test
Voltage rating	**2 mod**	230V AC		240 AC		230-240V AC
	4 mod		230/400V AC		240/415V AC	230-240/400-415V AC
Frequency		50Hz	50Hz	50Hz	50Hz	50Hz
Current rating	**2 mod**	25A to 63A - 30mA		80A to 100A - 30mA		40A to 63A - 30mA
				25A to 100A - 100mA		
	4 mod		25A to 63A - 30mA		80A to 100A - 30mA	40A to 63A 30mA
					25A to 100A - 100mA	
Rated conditional short circuit Inc		6kA	6kA	10kA	10kA	10kA
Test button operational voltage	**2 mod**	195V to 265V		19w5V to 264V		195V to 264V
	4 mod		195V to 456V		195V to 456V	195V to 456V
Connection capacity	**≤ 63A**	25mm² rigid max	25mm² rigid max	25mm² rigid max	25mm² rigid max	25mm² rigid max
		16mm² flexible max	16mm² flexible max	16mm² flexible max	16mm² flexible max	16mm² flexible max
	≥ 80A			50mm² rigid max	50mm² flexible max	
				35mm² flexible max	35mm² flexible max	
Tightening torque		2.8Nm	2.8Nm	3.6Nm	3.6Nm	3.6Nm
Operating temperature		-25°C to 40°C	-25°C to 40°C	-25°C to 50°C	-25°C to 50°C	-25°C to 70°C
Toggle		Sealable Off position	Sealable Off position	Sealable On/Off position	Sealable On/Off position	Sealable On/Off position

Electrical Connection

Ensure the correct direction of the electrical current.
Supply terminals on top and load terminals on the bottom.

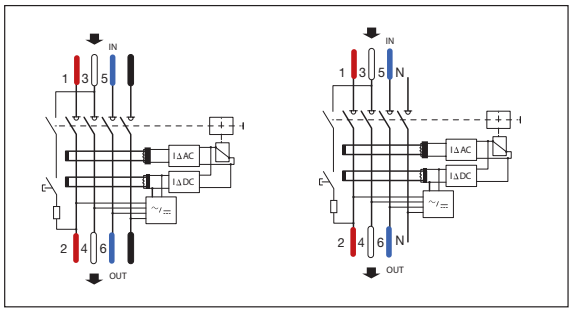
1P+N



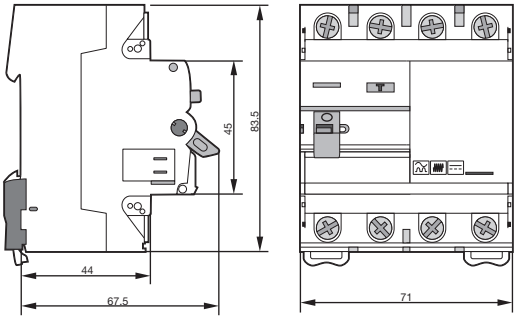
3P+N

Three phase & neutral (unbalanced load)

Three phase (balanced load)



Dimensions

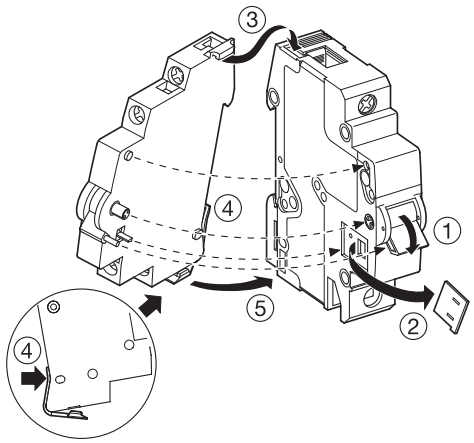


LED indicator
Waveform of leakage current detected:

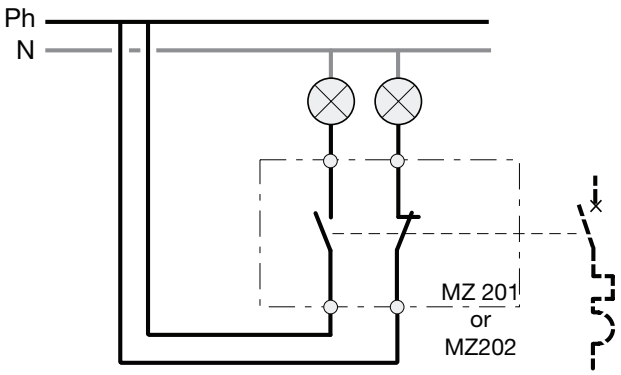
Specifications

		CDBxxxT
Standards		AS/NZS 61008.1 and IEC62423
Wave form of earth fault current detected		Type B
Residual current tripping technology		Voltage independent - disconnect outgoing cables before circuit insulation resistance test.
Voltage rating	**1P+N**	230-240V AC
	3P+N	230-240/400-415V AC
Frequency		50Hz
Current rating		25A to 63A - 30mA
Rated conditional short circuit Inc		10kA
Test button operational voltage		195V to 456V
Connection capacity	**≤ 63A**	25mm² rigid max
		16mm² flexible max
Tightening torque		3.6Nm
Connectivity		Not suitable for 1P/3P fork busbar
Operating temperature		-25°C to 70°C
Toggle		Sealable On-Off position

	Cat ref.	MSNxxx	NTxxxC	NDNxxxA	Axx3xxT AxA1xxT Ax1xxB	ADA9xxT	AxA5xxT	AxM4xxT AxX4xxT	CDA2xxT CDA4xxT	Cxx5xxT Cxx6xxT
Switch type		MCB	MCB	MCB	RCBO	RCBO	RCBO	RCBO	RCCB	RCCB
kA rating		6kA	10kA	10kA	4.5 & 6kA	6kA	10kA	6 & 10kA	-	-
No. of modules		1/2/3	1/2/3	1/2/3	1	2	2	4	2/4	2/4
Combination auxiliary and alarm contacts	**CZ001**	-	-	-	-	-	-	-	•	-
Heat dissipation inserts	**LZ060**	•	•	•	•	•	•	•	•	•
Auxiliary contacts	**MZ201**	•	•	•	-	-	•	•	With CZ001	•
Alarm contacts	**MZ202**	•	•	•	-	-	•	•	With CZ001	•
Shunt trip relays	**MZ203**	•	•	•	-	-	•	•	•	•
	MZ204	•	•	•	-	-	•	•	•	•
Undervoltage releases	**MZ206**	•	•	•	-	-	•	•	•	•
Terminal covers	**MZN120**	•	•	•	-	-	-	-	-	-
	MZN130	-	-	-	-	-	-	-	-	-
Phase barriers	**MZN121**	•	•	•	-	-	-	-	-	•
	MZN131	-	-		-	-	-	-	-	-
Toggle locking device	**MZN175**	•	•	•	•	•	•	•	•	•

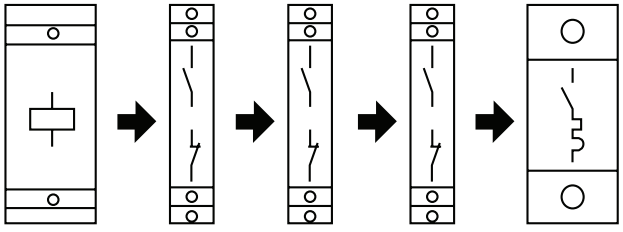


Wiring diagram - MZ201 or MZ202 contact
MZ201 auxiliary contact or MZ 202 Alarm contact



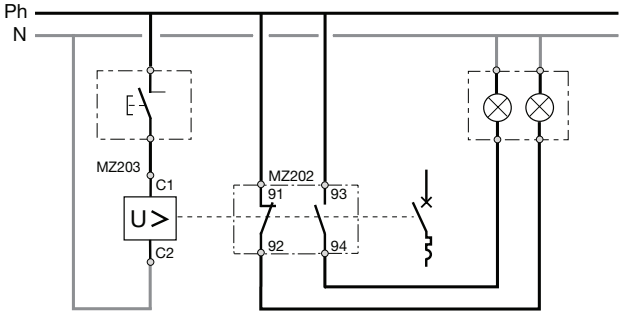
Grouping / combination of several auxiliaries
On compatible 1, 2 and 3 pole MCBs, RCBOs and RCCBs (CxA5xxT and CxA6xxT) it is possible to associate 3 auxiliaries - 2 indication auxiliaries and 1 release auxiliary. In this case, it is important to first fix the indication auxiliary (MZ201 and MZ202) and then the release auxiliary (MZ203, MZ204 and MZ206).

Auxiliary possibilities



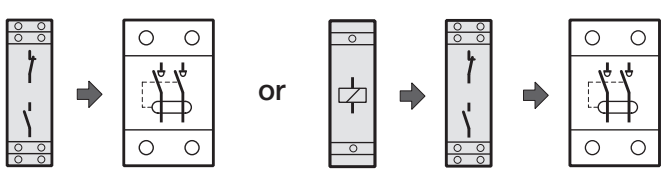
MZ203 to MZ206 | **MZ201** | **MZ201** | **MZ202** | **MCB, RCBO, CxA5xxT & CxA6xxT RCCBs**

Wiring diagram - MZ203 shunt trip + MZ202 Alarm Contact
An emergency stop button (NO) and a shunt trip - commonly used in automation.



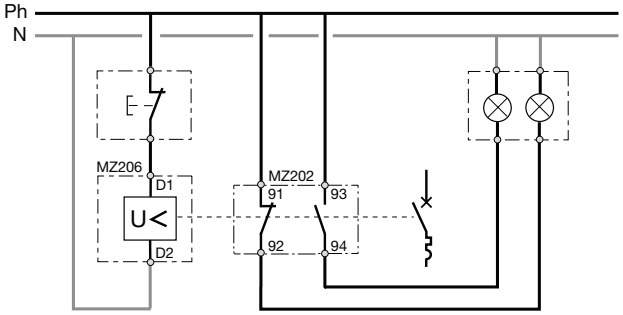
Combination auxiliary and alarm contact
If shunt trip or undervoltage release is required, the CZ001 must be used as a coupler for RCCBs (CDA2xxT and CDA4xxT).

RCCB Auxiliary possibilities



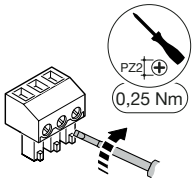
CZ001 | **CDA2xxT CDA4xxT** | **MZ201... MZ206** | **CZ001** | **CDA2xxT CDA4xxT**

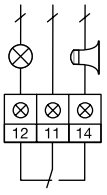
Wiring diagram - MZ206 Undervoltage release + MZ202 Alarm Contact
An emergency stop button (NC) and an undervoltage release. For when positive safety is required. e.g. emergency button.



Electrical characteristics

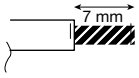
Ref		Spark Gap SPA212	Spark Gap SPA312	Spark Gap SPA412	Very Coarse SPB100R	Very Coarse SPB200R	Very Coarse SPB300R	Very Coarse SPB400R	Coarse SPB165R	Coarse SPB265R	Coarse SPB365R	Coarse SPB465R
AS/NZ1768 Location Category		Cat C3	Cat C3	Cat C3	Cat C2	Cat C2	Cat C2	Cat C2	Cat C2	Cat C2	Cat C2	Cat C2
AS/NZ1768: Zone Boundary		LPZ 0A – LPZ 1	LPZ 0A – LPZ 1	LPZ 0A – LPZ 1	LPZ 0A – LPZ 1	LPZ 0A – LPZ 1	LPZ 0A – LPZ 1	LPZ 0A – LPZ 1	LPZ 0A – LPZ 1	LPZ 0A – LPZ 1	LPZ 0A – LPZ 1	LPZ 0A – LPZ 1
EN 61643 SPD Type		T1+T2+T3	T1+T2+T3	T1+T2+T3	T2	T2	T2	T2	T2	T2	T2	T2
IEC 61643-1 SPD Class		I, II, III	I, II, III	I I, II, III	II	II	II	II	II	II	II	II
Single Max impulse (8/20 µs)	I_{max}	50kA	50kA	50kA	100kA	100kA	100kA	100kA	65kA	65kA	65kA	65kA
Nominal discharge current (8/20µs)	I_n	12.5kA/25kA	12.5kA	12.5kA/50kA	40kA	40kA	40kA	40kA	20kA	20kA	20kA	20kA
Pulse discharge current (10/350µs)	I_{imp}	12.5kA	12.5kA	12.5kA	2.5kA	2.5kA	2.5kA	2.5kA	12.5kA	12.5kA	12.5kA	12.5kA
Max. continuous operating voltage	U_C	264 V	264 V	264 V	320 V AC	320 V AC	320 V AC	320 V AC	320 V AC	320 V AC	320 V AC	320 V AC
Voltage protection (common)	U_P	L - N ≤ 1.5 kV N - PE ≤ 1,5 kV	L - PEN ≤ 1,5 kV	L - N ≤ 1,5 kV N - PE ≤ 1,5 kV	2kV	2kV	2kV	2kV	1.45kV	1.45kV	1.45kV	1.45kV
Residual current	I_{PE}	<10 µA	N/A	<10 µA	<0.45 mA	<5 µA	<0.45 mA	<5 µA	<0.45 mA	<5 µA	<0.45 mA	<5 µA
Isccr		25 kArms Ifi (N - PE) = 100 A	25 kArms	25 kArms Ifi (N-PE) = 100Ar	25kA	25kA	25kA	25kA	25kA	25kA	25kA	25kA
Maximum rating MCB for overcurrent protection		160A	160A	160A	63A "C"	63A "C"	63A "C"	63A "C"	63A "C"	63A "C"	63A "C"	63A "C"
Recommended MCB rating		63A "C"	63A "C"	63A "C"	63A "C"	63A "C"	63A "C"	63A "C"	40A "C"	40A "C"	40A "C"	40A "C"
Max Back-up Fuse		160A gG	160A gG	160A gG	250A	250A	250A	250A	160A	160A	160A	160A
Recomended Back-up Fuse		-	-	-	63A to 125A	63A to 125A	63A to 125A	63A to 125A	63A to 125A	63A to 125A	63A to 125A	63A to 125A
Conductor Connection Capacity		Min 6mm² Max 35 mm²	Min 6mm² Max 35 mm²	Min 6mm² Max 35 mm²	Min 6mm² Max 35 mm²	Min 6mm² Max 35 mm²	Min 6mm² Max 35 mm²	Min 6mm² Max 35 mm²	Min 6mm² Max 35 mm²	Min 6mm² Max 35 mm²	Min 6mm² Max 35 mm²	Min 6mm² Max 35 mm²
Operating Temperature		-40…80 °C	-40…80 °C	-40…80 °C	-40…80 °C	-40…80 °C	-40…80 °C	-40…80 °C	-40…80 °C	-40…80 °C	-40…80 °C	-40…80 °C
Contact for Remote Monitoring		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Number of modules total		2	4	4	1	2	3	4	1	2	3	4
Single phase		Y	-	-	Y	Y	-	Y	Y	-	-	Y
Three Phase		-	Y	Y	-	-	Y	-	-	Y	Y	-
TNC		-	TNC	-	TNC	-	TNC	-	TNC	-	TNC	-
TNS/TT		TNS/TT	-	TNS/TT	-	TNS/TT	-	TNS/TT	-	TNS/TT	-	TNS/TT
Indication of SPD status / condition		Green = Good Red = Bad	Green = Good Red = Bad	Green = Good Red = Bad	Green = Good Red = Bad	Green = Good Red = Bad	Green = Good Red = Bad	Green = Good Red = Bad	Green = Good Red = Bad	Green = Good Red = Bad	Green = Good Red = Bad	Green = Good Red = Bad
L-N Replacement cartridge		-	-	-	SPB010R	SPB010R	SPB010R	SPB010R	SPB065R	SPB065R	SPB065R	SPB065R
N-PE Replacement cartridge		-	-	-	-	SPB010N	-	SPB010N	-	SPB065N	-	SPB065N
L-N		-	-	-	1	1	3	1	1	3	3	1
N-PE		-	-	-	0	1	0	1	0	1	0	1
Dimensions: Length, Width, Height		76.6 x 36 x 99	76.6 x 72 x 99	76.6 x 72 x 99	77.5 x 17.5 x 98.7	77.5 x 35 x 98.7	77.5 x 52.5 x 98.7	77.5 x 70 x 98.7	77.5 x 17.5 x 98.7	77.5 x 35 x 98.7	77.5 x 52.5 x 98.7	77.5 x 70 x 98.7

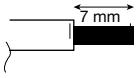




U max. / I max. AC:	250 V 1.5 A
U max. / I max. DC:	30 V / 1 A

0.14 - 1.5mm²
AWG 28 - 16



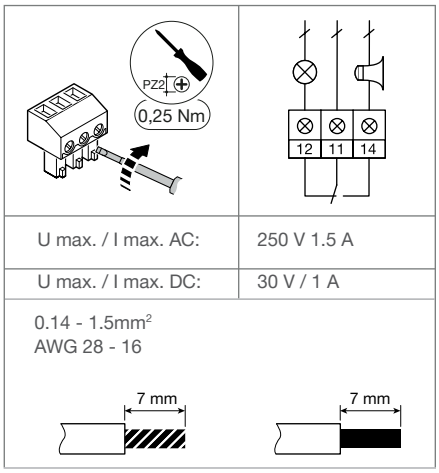


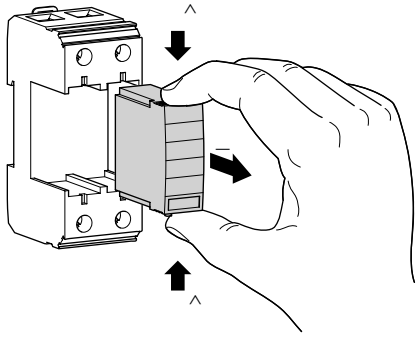
SPD 'R" model contactor wiring layout has changed for all new SPBxxxR SPDs.

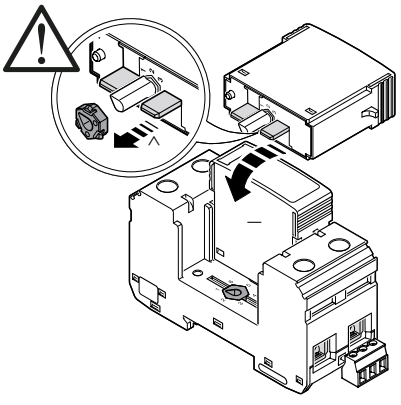
Electrical characteristics

Ref		Medium SPB140D	Medium SPB140R	Medium SPB240D	Medium SPB240R	Medium SPB340D	Medium SPB340R	Medium SPB440D	Medium SPB440R	Fine SPB208D	Fine SPB408D
AS/NZ1768 Location Category		Cat C1 /B	Cat C1 /B	Cat C1 /B	Cat C1 /B	Cat C1 /B	Cat C1 /B	Cat C1 /B	Cat C1 /B	Cat A	Cat A
AS/NZ1768: Zone Boundary		LPZ 1 – LPZ OB	LPZ 1 – LPZ OB	LPZ 1 – LPZ OB	LPZ 1 – LPZ OB	LPZ 1 – LPZ OB	LPZ 1 – LPZ OB	LPZ 1 – LPZ OB	LPZ 1 – LPZ OB	LPZ 2 – LPZ 3	LPZ 2 – LPZ 3
EN 61643 SPD Type		T2	T2	T2	T2	T2	T2	T2	T2	T2	T2
IEC 61643-1 SPD Class		II	II	II	II	II	II	II	II	II	II
Single Max impulse (8/20 µs)	I_{max}	40kA	40kA	40kA	40kA	40kA	40kA	40kA	40kA	8kA	8kA
Nominal discharge current (8/20µs)	I_n	20kA	20kA	20kA	20kA	20kA	20kA	20kA	20kA	2kA	2kA
Pulse discharge current (10/350µs)	I_{imp}	-	-	-	-	-	-	-	-	-	-
Max. continuous operating voltage	U_C	275 V AC	275 V AC	275 V AC	275 V AC	275 V AC	275 V AC	275 V AC	275 V AC	275 V AC	275 V AC
Voltage protection (common)	U_P	1.35kV	1.35kV	1.35kV	1.35kV	1.35kV	1.35kV	1.35kV	1.35kV	0.9kV	0.9kV
Residual current	I_{PE}	<0.45 mA	<0.45 mA	<5 µA	<5 µA	<0.45 mA	<0.45 mA	<5 µA	<5 µA	<5 µA	<5 µA
Isccr		25kA	25kA	25kA	25kA	25kA	25kA	25kA	25kA	10kA	10kA
Maximum rating MCB for overcurrent protection		32A "C"	32A "C"	32A "C"	32A "C"	32A "C"	32A "C"	32A "C"	32A "C"	32A "C"	32A "C"
Recommended MCB rating		32A "C"	32A "C"	32A "C"	32A "C"	32A "C"	32A "C"	32A "C"	32A "C"	32A "C"	32A "C"
Max Back-up Fuse		125A	125A	125A	125A	125A	125A	125A	125A	125A	125A
Recomended Back-up Fuse		32A to 100A	32A to 100A	32A to 100A	32A to 100A	32A to 100A	32A to 100A	32A to 100A	32A to 100A	20A to 32A	20A to 32A
Connection Capacity		Min 1.5mm² Max 35 mm²	Min 1.5mm² Max 35 mm²	Min 1.5mm² Max 35 mm²	Min 1.5mm² Max 35 mm²	Min 1.5mm² Max 35 mm²	Min 1.5mm² Max 35 mm²	Min 1.5mm² Max 35 mm²	Min 1.5mm² Max 35 mm²	Min 1.5mm² Max 35 mm²	Min 1.5mm² Max 35 mm²
Operating Temperature		-40…80 °C	-40…80 °C	-40…80 °C	-40…80 °C	-40…80 °C	-40…80 °C	-40…80 °C	-40…80 °C	-40…80 °C	-40…80 °C
Contact for Remote Monitoring		N	Y	N	Y	N	Y	N	Y	N	N
Number of modules total		1	1	2	2	3	3	4	4	2	4
Single phase		Y	Y	Y	Y	-	-	-	-	Y	-
Three Phase		-	-	-	-	Y	Y	Y	Y	-	Y
TNC		TNC	TNC	-	-	TNC	TNC	-	-		
TNS/TT		-	-	TNS/TT	TNS/TT	-	-	TNS/TT	TNS/TT	TNS/TT	TNS/TT
Indication of SPD disconnector		Bright Red = Replace	Bright Red = Replace	Bright Red = Replace	Bright Red = Replace	Bright Red = Replace	Bright Red = Replace	Bright Red = Replace	Bright Red = Replace	Bright Red = Replace	Bright Red = Replace
L-N Replacement cartridge		SPB040D	SPB040D	SPB040D	SPB040D	SPB040D	SPB040D	SPB040D	SPB040D	SPB008D	SPB008D
N-PE Replacement cartridge		-	-	SPB040N	SPB040N	-	-	SPB040N	SPB040N	SPB040N	SPB040N
L-N		1	1	1	1	3	3	3	3	1	3
N-PE		0	0	1	1	0	0	1	1	1	1
Dimensions: Length, Width, Height		65.7 x 17.5 x 98.7	65.7 x 17.5 x 98.7	65.7 x 35 x 98.7	65.7 x 35 x 98.7	65.7 x 52.5 x 98.7	65.7 x 52.5 x 98.7	65.7 x 70 x 98.7	65.7 x 70 x 98.7	58 x 35 x 90	65.7 x 70 x 90

SPD 'R" model contactor wiring layout has changed for all new SPBxxxR SPDs.





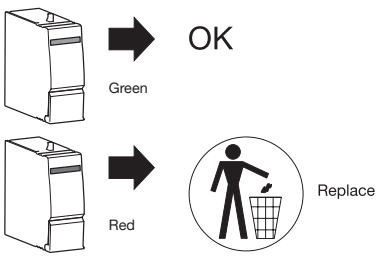


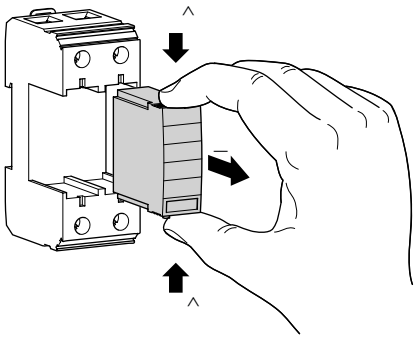
How do I know if I need to replace a SPD cartridge?
- For Very Coarse (100kA) and Coarse (65kA) SPDs - a small oval indicator will change colours from Green (Ok) to Red (Faulty).
- For Medium (40kA) and Fine (8kA) SPDs - a rectangular window is is present, when this window is bright red, there is a fault.
- Please note the rectangular style fault indicators may look somewhat red, or red tinged when new.
- If the red 'pin' at the rear of the cartridge is retracted, replace the cartridge. If proud (as pictured to to the left, then it is good.

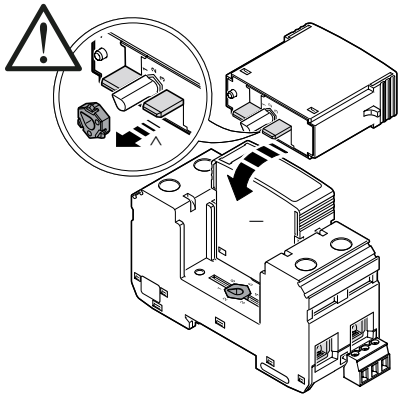
Electrical characteristics

Ref		Very Coarse SPB010R	Very Coarse SPB010N	Coarse SPB065R	Coarse SPB065N	Medium SPB040D	Medium SPB040N	Fine SPB008D
AS/NZ1768 Location Category		Cat C3	Cat C3	Cat C2	Cat C2	Cat C1/B	Cat C1/B	Cat CA
AS/NZ1768: Zone Boundary		LPZ 0A – LPZ 1	LPZ 0A – LPZ 1	LPZ 0A – LPZ 1	LPZ 0A – LPZ 1	LPZ 1 – LPZ OB	LPZ 1 – LPZ OB	LPZ 2 – LPZ 3
EN 61643 SPD Type		T1	T1	T2	T2	T2	T2	T2
IEC 61643-1 SPD Class		I	I	II	II	II	II	II
Single Max impulse (8/20 µs)	I_{max}	100kA	100kA	65kA	65kA	40kA	40kA	8kA
Nominal discharge current (8/20µs)	I_n	40kA	40kA	20kA	20kA	20kA	20kA	2kA
Pulse discharge current (10/350µs)	I_{imp}	2.5kA	2.5kA	-	-	-	-	-
Max. continuous operating voltage	U_C	320 V AC	260 V AC	275 V AC	260 V AC	275 V AC	260 V AC	275 V AC
Voltage protection (common)	U_P	2kV	1.5kV	1.35kV	1.5kV	1.35kV	1.5kV	0.9kV
Residual current	I_{PE}	-	-	-	-	-	-	-
Isccr		-	-	-	-	-	-	-
Maximum rating MCB for overcurrent protection		-	-	-	-	-	-	-
Recommended MCB rating		-	-	-	-	-	-	-
Max Back-up Fuse		-	-	-	-	-	-	-
Recomended Back-up Fuse		-	-	-	-	-	-	-
Connection Capacity		-	-	-	-	-	-	-
Operating Temperature		-40…80 °C	-40…80 °C	-40…80 °C	-40…80 °C	-40…80 °C	-40…80 °C	-40…80 °C
Remote Contact		-	-	-	-	-	-	-
Number of modules total		1	1	1	1	1	1	1
Single phase		-	-	-	-	-	-	-
Three Phase		-	-	-	-	-	-	-
TNC		-	-	-	-	-	-	-
TNS/TT		-	-	-	-	-	-	-
Indication of SPD disconnector		Green = good Red = replace	Green = good Red = replace	Green = good Red = replace	Green = good Red = replace	Bright Red = Replace	Bright Red = Replace	Bright Red = Replace
L-N Replacement cartridge		-	-	-	-	-	-	-
N-PE Replacement cartridge		-	-	-	-	-	-	-
L-N		1 x L-N	-	1 x L-N	-	1 x L-N	-	1 x L-N
N-PE		-	1 x N-PE	-	1 x N-PE	-	1 x N-PE	-

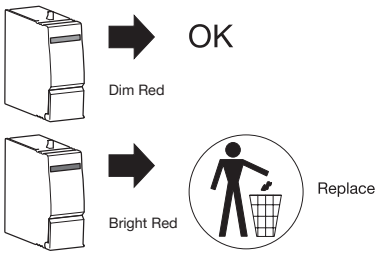
Very Coarse and Coarse SPDs





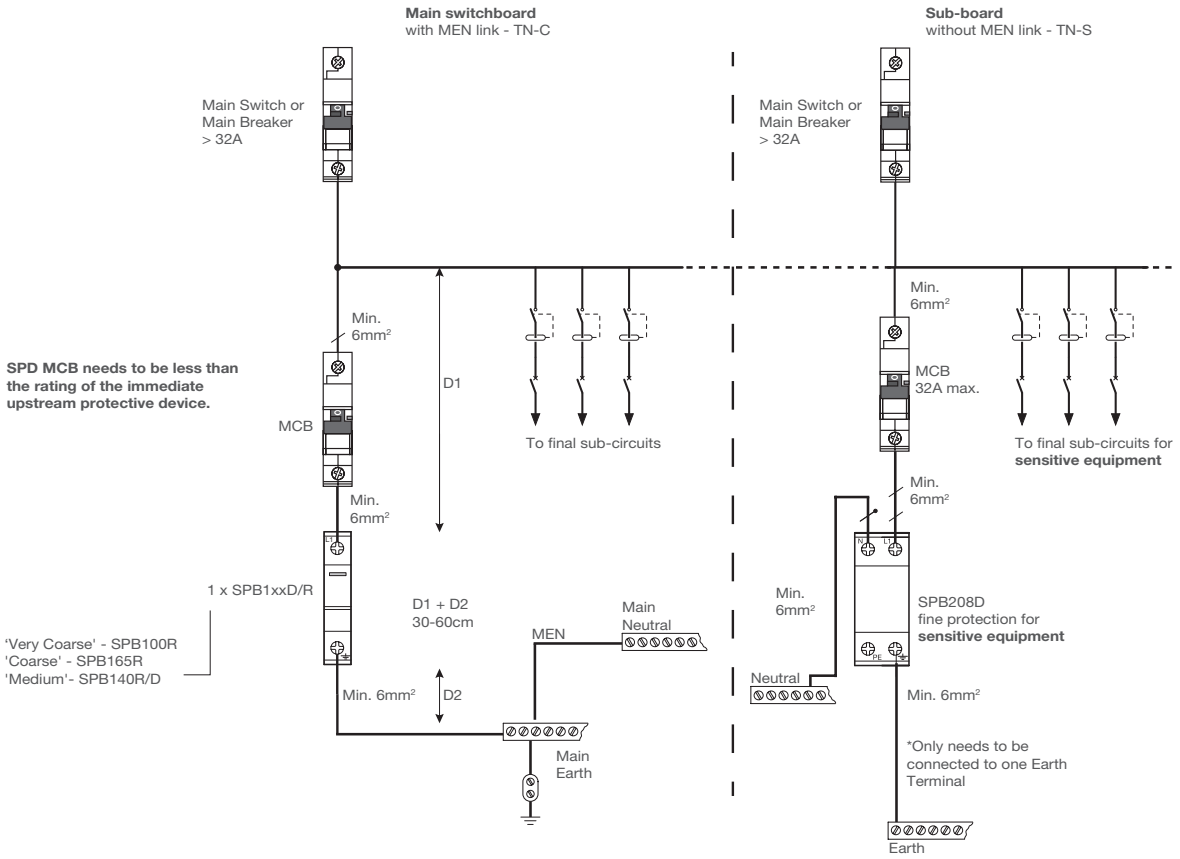


Medium and Fine SPDs

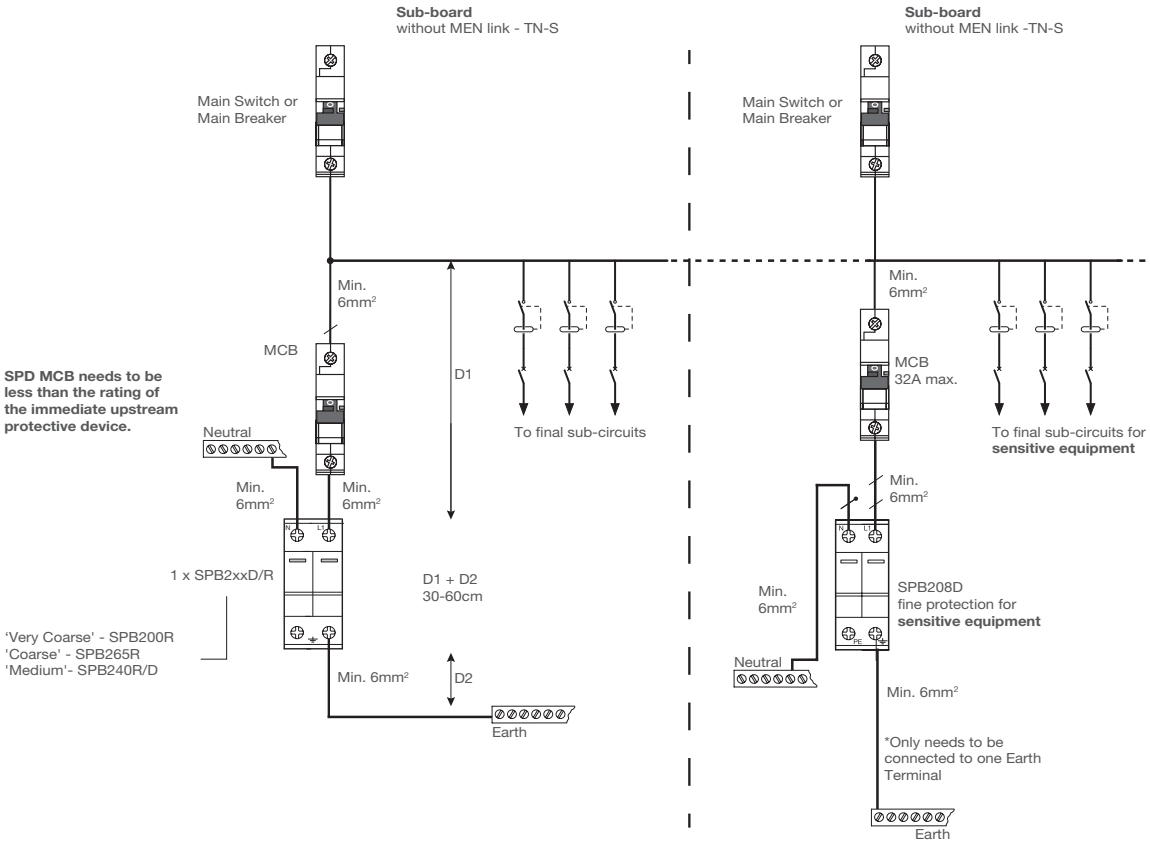


The indicator circled on on the left shows this cartridge needs to replaced, the cartridge not circled to the right of it is ok.

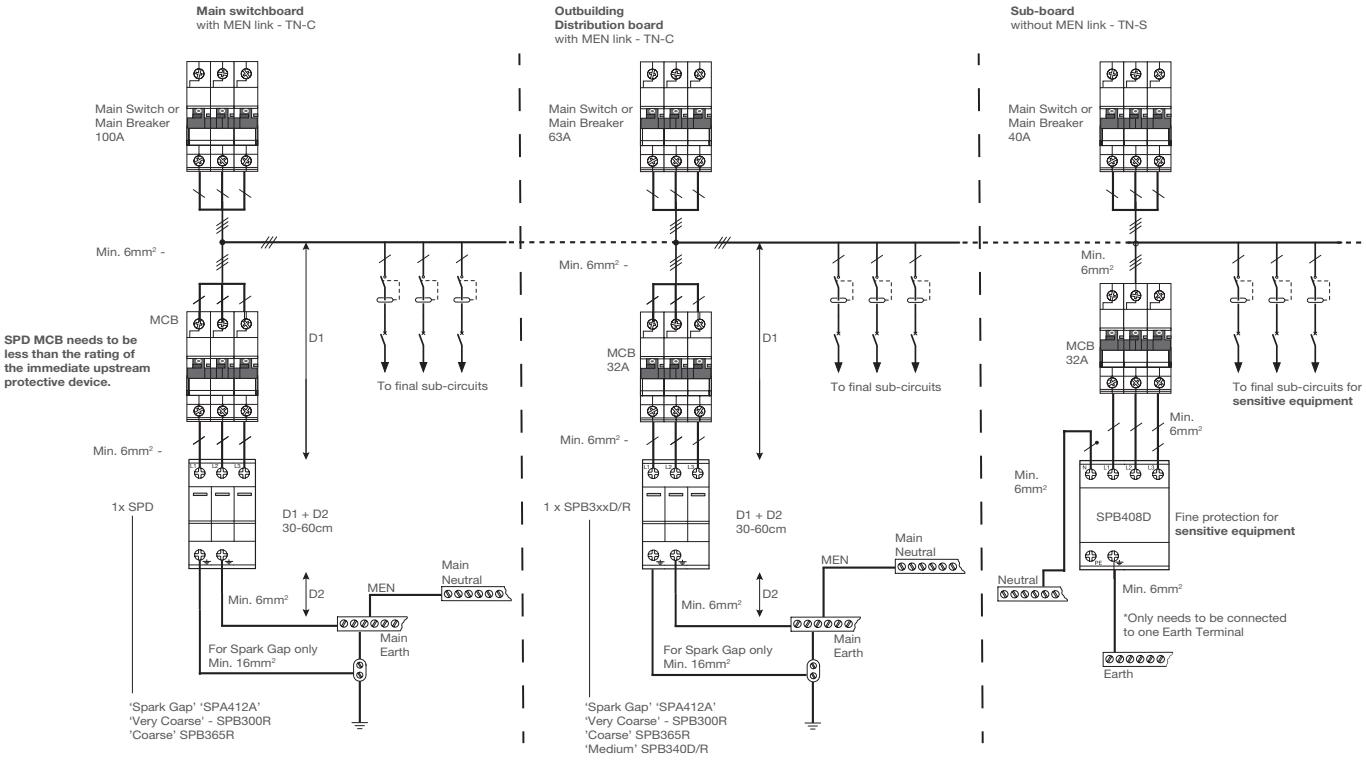
Surge protection single phase layout example in Main switchboard with MEN link



Surge protection single phase layout example in sub-board without MEN link



Surge protection three phase layout example in Main switchboard with MEN link



Surge protection three phase layout example in sub-board without MEN link