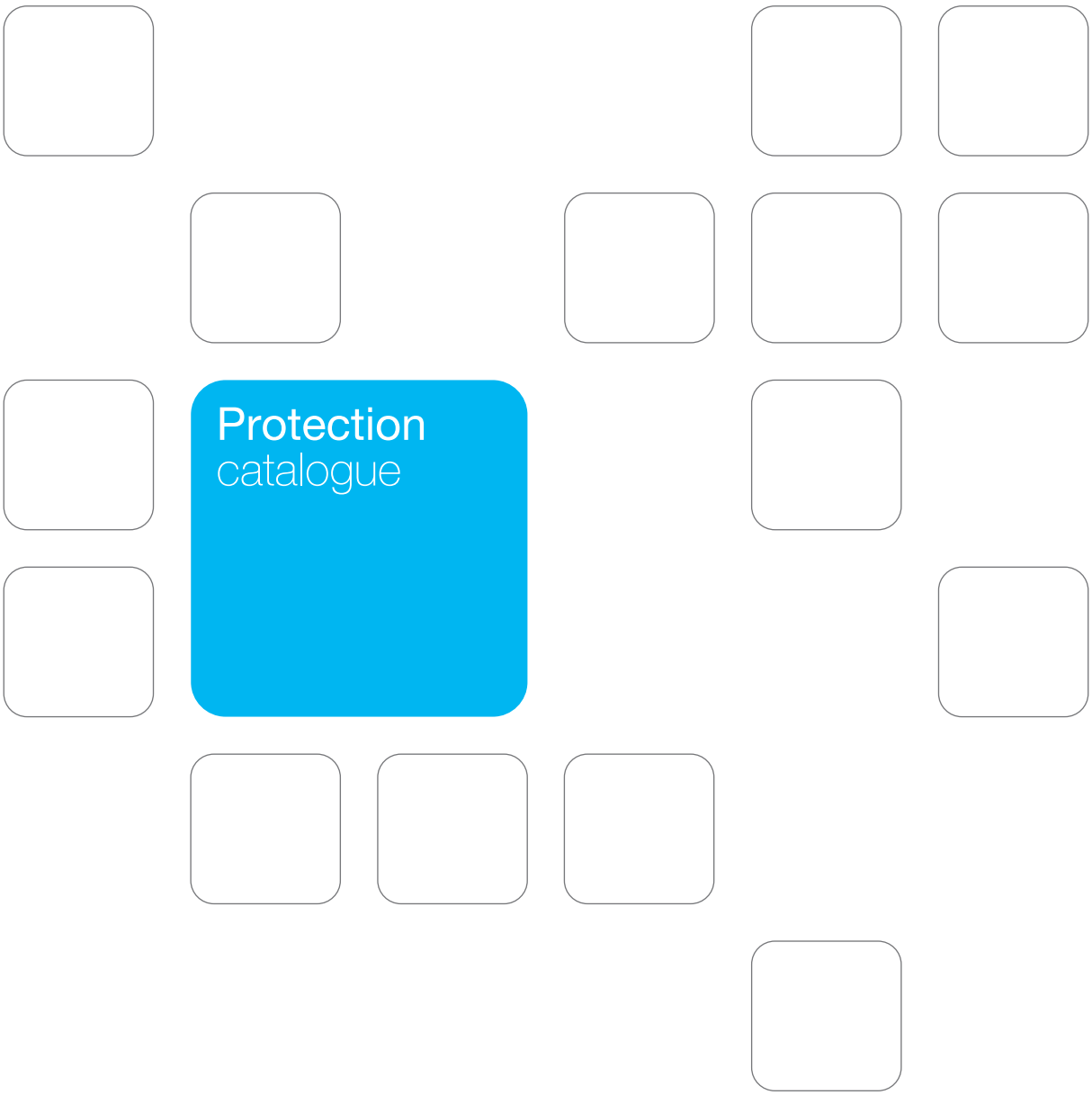
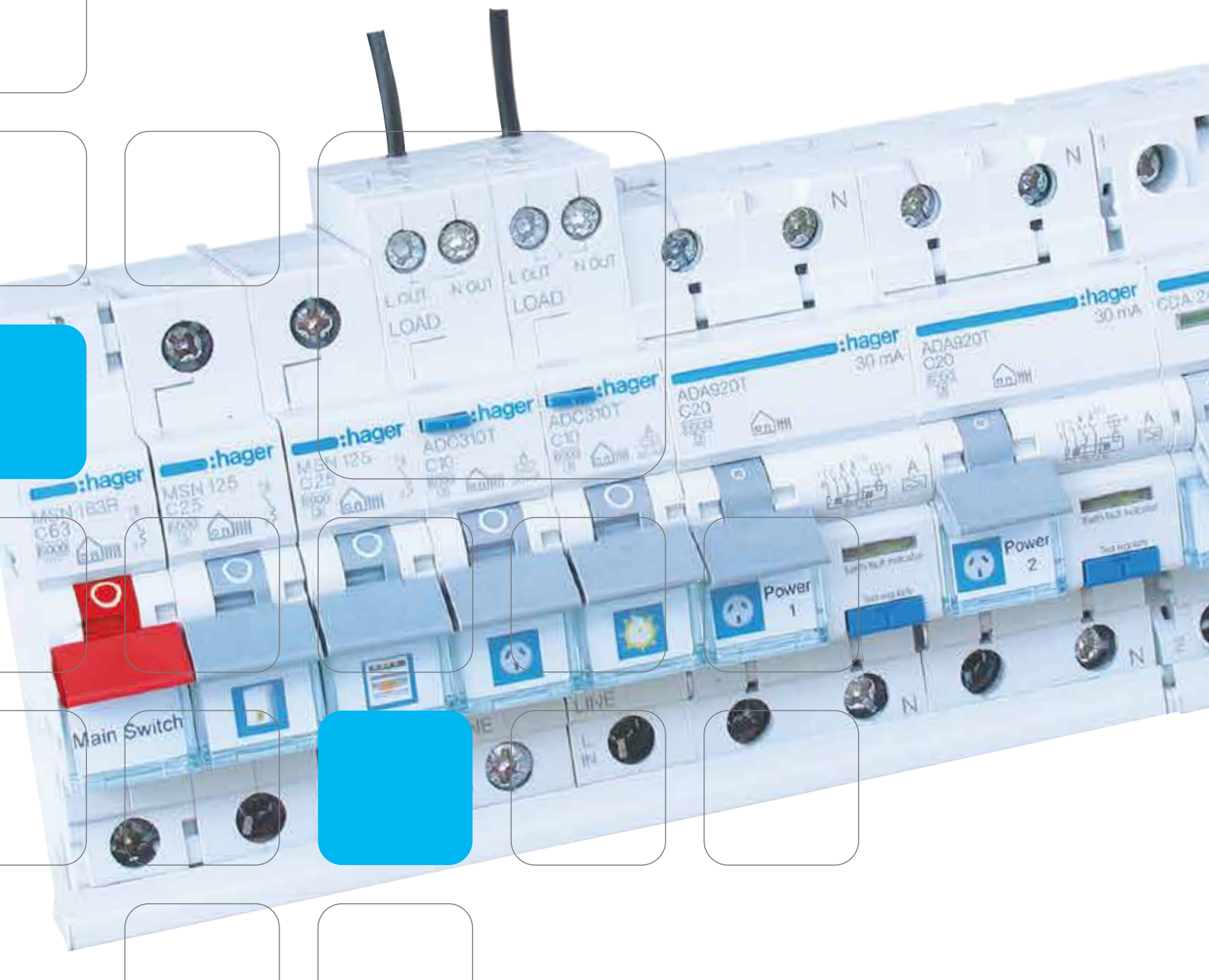


15

Protection devices

MCBs, RCBOs, RCCBs, fuse carriers and surge protection

Hager offers a wide range of Modular Protection Devices, such as miniature circuit breakers, auxiliaries and accessories, RCCB‘s, RCBO’s, fuse carriers, DIN HRC fuse carriers, three phase earth leakage add-on blocks and surge protection devices, providing practical solutions for protecting people, installations and equipment.



Expert Tips - MPD's residential	D.2
MCB's - residential	D.4
MCB's - commercial	D.5
Expert Tips - RCBO's residential	D.12
RCBO's - residential	D.14
RCBO's - commercial	D.15
RCCB's - safety switches	D.16
One module add-on blocks	D.18
Insulated busbars & connectors	D.19
Fuses & carriers BS88	D.20
new DIN HRC fuse carriers & DIN NH fuses	D.21
Surge protection selection guide	D.22
Surge protection devices	D.23

onekonekt

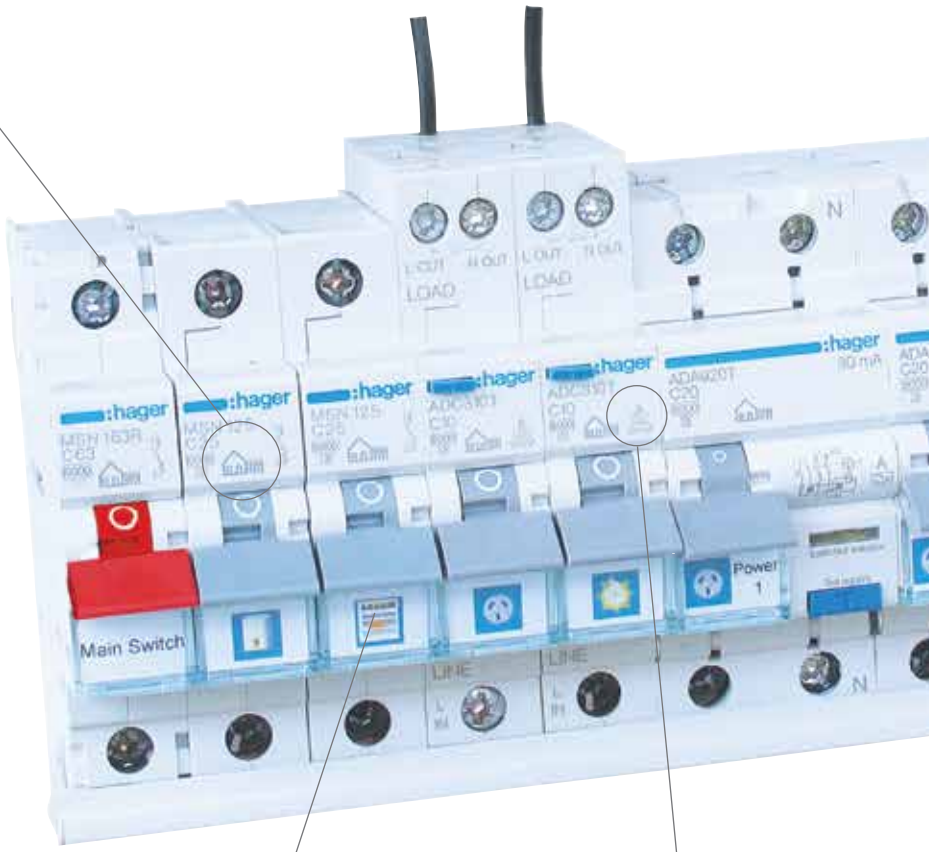
Residential range of mo

Our onekonekt system offers one of the most versatile & flexible solutions to residential electricians on the market today. The use of busbar in our industry is not a new concept. However, providing a full range of residential protection devices that connect to the same busbar, increasing safety, reducing installation time, improving technical characteristics and aesthetics within one system, definitely is.

Design

The range is easily identifiable as part of the residential offer with a large grey toggle and house symbol printed on the front.

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



Simple busbar options:

1

Single phase busbar

or

2

Three phase busbar

3

Optional: Neutral Bi-pole bar

Visibility

Semiolog labelling

Download our Semiolog labelling tool free from: www.hagerelectro.com.au/download/software-and-tools/1803 to customise your circuit identification.

Performance

6kA - Type A

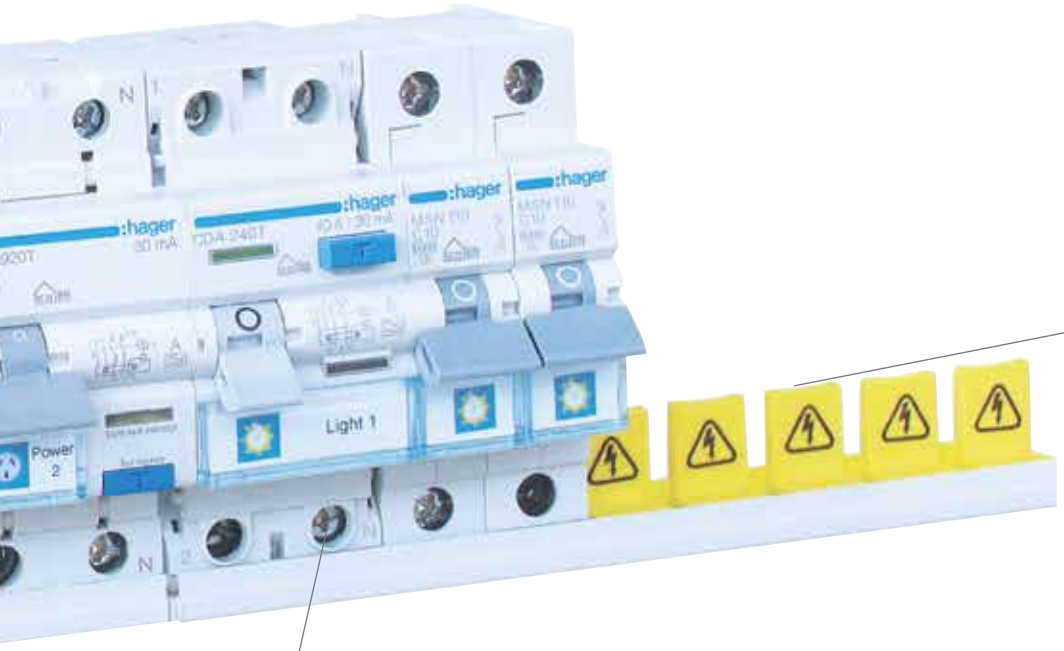
All earth leakage devices are type A which increase the accuracy in identifying earth leakage faults found in many modern electrical devices such as washing machines, LCD TV, computers etc.

dular devices

onekombo

leads to safety and simplicity

Hager's onekombo single module (RCBO) range leads to safety and simplicity: if offers a breaking capacity of 6kA and can be completely integrated with other Hager residential modular protection devices on the same busbar.



Safety

Insulated fork & endcaps

Unused forks can remain in-situ for the addition of future circuits using our insulated fork caps.

Busbar and endcaps ensure complete insulation of the bar.

Ease of use

Neutral bypass

The neutral busbar slot is fully insulated so there is no need to cut the forks off the bar.

Flexibility

Bi-connect terminals

Bi-connect terminals on all devices enable supply from either cables in the cage or busbars in the slot; guaranteeing full connection capacity.

Description
Protection and control of circuits against overloads and short-circuits in residential installations.

Technical data
- Complies with AS/NZS 60898
- Tripping curve - 'C' magnetic setting between 5 and 10In
- Breaking capacity: 6000A
- Voltage rating: 240/415V AC
- Current rating: 6 to 63A
- Bi-connect allowing two connection points

Connection capacity
- 25mm² rigid
- 16mm² flexible

new

MSN163 MSN163R

Single pole

Current Rating (A)	Width	Pack Qty	Cat ref.
6	1 mod	12	**MSN106**
10	1 mod	12	**MSN110**
13	1 mod	12	**MSN113**
16	1 mod	12	**MSN116**
20	1 mod	12	**MSN120**
25	1 mod	12	**MSN125**
32	1 mod	12	**MSN132**
40	1 mod	12	**MSN140**
50	1 mod	12	**MSN150**
63	1 mod	12	**MSN163**
63	1 mod	12	**MSN163R**

MSN220

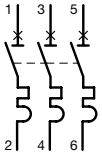
Double pole

Current Rating (A)	Width	Pack Qty	Cat ref.
6	2 mod	6	**MSN206**
10	2 mod	6	**MSN210**
16	2 mod	6	**MSN216**
20	2 mod	6	**MSN220**
25	2 mod	6	**MSN225**
32	2 mod	6	**MSN232**
40	2 mod	6	**MSN240**
50	2 mod	6	**MSN250**
63	2 mod	6	**MSN263**

MSN320

MSN363R

Triple pole



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

Description
Protection and control of circuits against overloads and short-circuits in commercial and light industrial installations

Technical data
- Conforms with IEC 60898-1 and AS/NZS 60898
- Tripping curve - 'C' magnetic setting between 5 and 10In
- Breaking capacity: 10,000A
- Voltage rating: 230/400V AC
- Current rating: 2 to 63A

Connection capacity
- 25mm² rigid
- 16mm² flexible

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


NT110C

Single pole

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

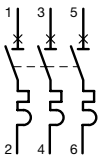

NT216C

Double pole

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


NT304C

Triple pole



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

Description
Protection and control of circuits against overloads and short-circuits in commercial and light industrial installations Can also be used as a main switch device

Technical data
- Conforms with IEC 60898-1, 60947-2 and AS/NZS 60898
- Tripping curve - 'D' magnetic setting between 10 and 20In
- Breaking capacity: 10,000A
- Voltage rating: 230/400V AC
- Current rating: 6 to 63A

Connection capacity
- 35mm² rigid
- 25mm² flexible

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


NDN116A

Single pole

Current rating (a)	Width in 17.5mm	Pack qty	Cat ref.
6	1	12	**NDN106A**
10	1	12	**NDN110A**
16	1	12	**NDN116A**
20	1	12	**NDN120A**
25	1	12	**NDN125A**
32	1	12	**NDN132A**
40	1	12	**NDN140A**
50	1	12	**NDN150A**
63	1	12	**NDN163A**

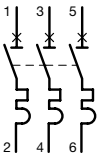

NDN232A

Double pole

Current rating (a)	Width in 17.5mm	Pack qty	Cat ref.
6	2	6	**NDN206A**
10	2	6	**NDN210A**
16	2	6	**NDN216A**
20	2	6	**NDN220A**
25	2	6	**NDN225A**
32	2	6	**NDN232A**
40	2	6	**NDN240A**
50	2	6	**NDN250A**
63	2	6	**NDN263A**


NDN316A

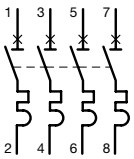
Triple pole



Current rating (a)	Width in 17.5mm	Pack qty	Cat ref.
6	3	4	**NDN306A**
10	3	4	**NDN310A**
16	3	4	**NDN316A**
20	3	4	**NDN320A**
25	3	4	**NDN325A**
32	3	4	**NDN332A**
40	3	4	**NDN340A**
50	3	4	**NDN350A**
63	3	4	**NDN363A**


NDN432A

Four pole



Current rating (a)	Width in 17.5mm	Pack qty	Cat ref.
6	4	3	**NDN406A**
10	4	3	**NDN410A**
16	4	3	**NDN416A**
20	4	3	**NDN420A**
25	4	3	**NDN425A**
32	4	3	**NDN432A**
40	4	3	**NDN440A**
50	4	3	**NDN450A**
63	4	3	**NDN463A**

Description
Protection and control of circuits against overloads and short-circuits in commercial and industrial installations

Technical data
- Conforms with IEC 60898-1, 60947-2 and AS/NZS 60898
- Tripping curve - 'C' magnetic setting between 5 and 10In
- Breaking capacity: 10,000A
- Voltage rating: 230/400V AC
- Current rating: 80 to 125A

Connection capacity
- 70mm² rigid
- 35mm² flexible

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


HMF199T

Single pole

In / A	Width	Cat ref.
80	1.5	**HMF180T**
100	1.5	**HMF190T**
125	1.5	**HMF199T**

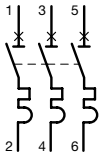

HMF299T

Double pole

In / A	Width	Cat ref.
80	3	**HMF280T**
100	3	**HMF290T**
125	3	**HMF299T**


HMF399T

Triple pole



In / A	Width	Cat ref.
80	4.5	**HMF380T**
100	4.5	**HMF390T**
125	4.5	**HMF399T**

Description
Protection and control of circuits against overloads and short-circuits in commercial and industrial installations

Technical data
- Conforms with IEC 60898-1, 60947-2 and AS/NZS 60898
- Tripping curve - 'D' magnetic setting between 10 and 20In
- Tripping curve - 'C' magnetic setting between 5 and 10In
- Breaking capacity: 15,000A
- Voltage rating: 230/400V AC
- Current rating: 80 to 125A

Connection capacity
- 70mm² rigid
- 35mm² flexible

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


HMC199T

Single pole

In / A	Width in	Cat ref. 'C' curve	Cat ref. 'D' curve
80	1.5	**HMC180T**	**HMD180T**
100	1.5	**HMC190T**	**HMD190T**
125	1.5	**HMC199T**	**HMD199T**

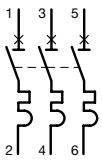

HMD299T

Double pole

In / A	Width in	Cat ref. 'C' curve	Cat ref. 'D' curve
80	3	**HMC280T**	**HMD280T**
100	3	**HMC290T**	**HMD290T**
125	3	**HMC299T**	**HMD299T**


HMC399T

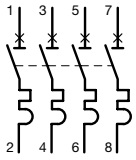
Triple pole



In / A	Width in	Cat ref. 'C' curve	Cat ref. 'D' curve
80	4.5	**HMC380T**	**HMD380T**
100	4.5	**HMC390T**	**HMD390T**
125	4.5	**HMC399T**	**HMD399T**


HMD499T

Four pole



In / A	Width in	Cat ref. 'C' curve	Cat ref. 'D' curve
80	4.5	**HMC480T**	**HMD480T**
100	4.5	**HMC490T**	**HMD490T**
125	4.5	**HMC499T**	**HMD499T**

Accessories for circuit breakers HMF, HMC & HMD

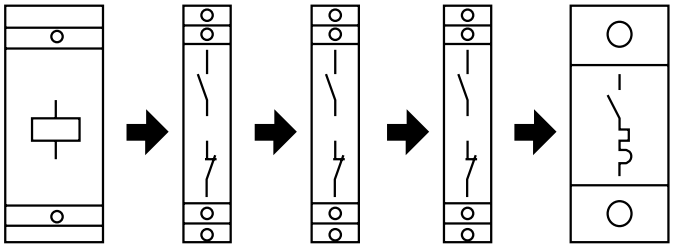

MZN130


MZN131

Accessories

Description	Characteristics	Cat ref.
Terminal covers	Sealable	**MZN130**
Phase barrier	1 set of 3 phase barriers	**MZN131**

Description
Within the commercial range all auxiliaries are common to both single & multi-pole circuit breakers and RCBOs. These auxiliaries are fitted to the left hand side of the devices.

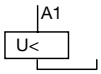



MZ202


MZ203


MZN175

Accessories

Description	Characteristics	Width in	Cat ref.
Auxiliary contact 6A - 230V~ 	NO + 1NC allows remote indication of main contact status	0.5	**MZ201**
Auxiliary contact with reset 6A - 230V~ 	Auxiliary contact as above. Reset switch triggers on overload or short circuit	0.5	**MZ202**
Shunt trip relay 230V - 415V AC 110V to 130V DC	Allows for remote tripping of MCB. The coil is protected by a contact which cuts the supply after MCB trips	1	**MZ203**
24V - 48V AC 12V - 48V DC 		1	**MZ204**
Undervoltage 	If supply falls to 35 to 70% of nominal voltage the MCB will trip	1	**MZ206**
Locking device	To lock the MCB handle in on/off position	2	**MZN175**
Heat dissipation inserts	Avoids overheating for DIN rail modules when several devices mounted side by side are carrying high continuous loads	0.5	**LZ060**
Terminal cover & screw shield			**MZN120**
Phase barriers	1 set of 3		**MZN121**

Fault loop impedance
With the introduction of AS/NZS 3000:2007 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 3000:2007.

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: 2007)

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.

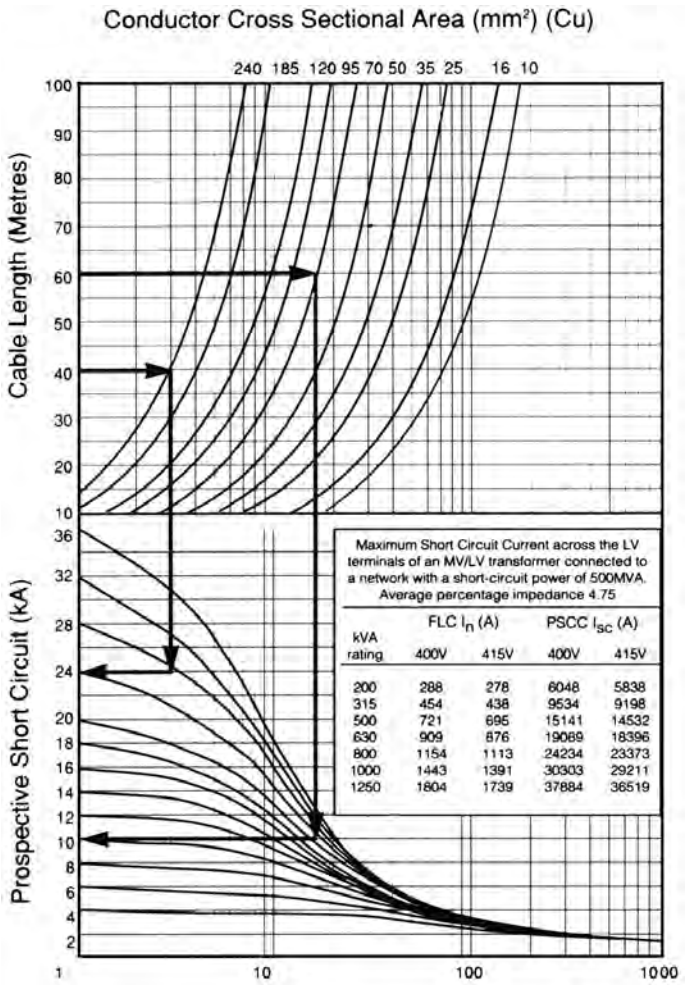


Figure 1

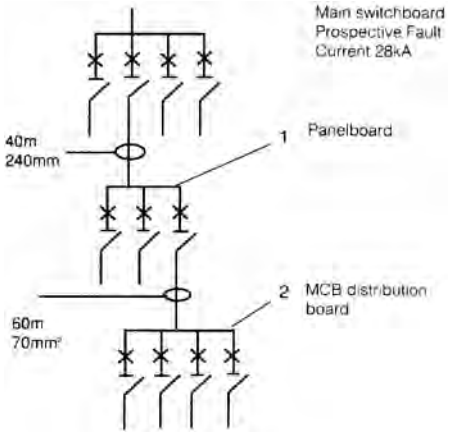


Figure 2

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.

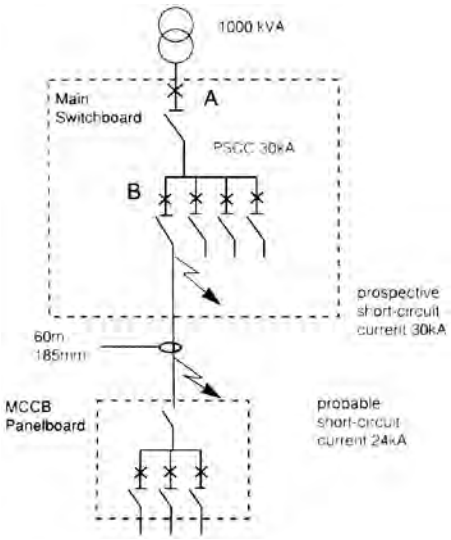


Figure 3

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.

RCBOs
‘one**kombo**’ range

Leads to safety and simplicity

Hager’s residential range of ‘onekombo’ single module electronic residual current circuit-breakers with overcurrent protection (RCBOs) leads to safety and simplicity: it offers a breaking capacity of 6kA and can be completely integrated with other Hager modular protection devices. Particularly compact, the ‘onekombo’ is only one module wide making it ideal for retrofit installations where space is limited, allowing a greater number of RCBOs to be installed in the one enclosure.

The advantages for you:

- 6kA, 30mA, C curve - The MCB component of the RCBO protects lines against overload and short circuits up to 6kA and comes available in tripping characteristic C
- To assist in the prevention of nuisance tripping, the Type A ‘onekombo’ gives the added safeguard against ‘pulsating DC components’ that can be generated from modern appliances e.g. washing machine, computer, etc...

Technical data:

• Rated current (In)	10A to 32A
• Rated voltage (Un)	240V
• Rated residual operating current (I△n)	30mA
• Curve Type	C
• Operating characteristic	Type A
• Rated Frequency	50Hz
• Rated short-circuit capacity (Icn)	6kA
• IP rating or Protection degree	IP2x terminals
• Standard	AS/NZS 61009

Expert tips

1

Design
Easily identifiable as part of the residential offer: large grey toggle and house symbol.

2

Quick to install
Equipped with a Neutral-in fly lead, the ‘onekombo’ range has one less cable to connect reducing installation time.

3

Bi-connect terminals
Bi-connect terminals enable supply from either cables in the cage or busbars in the slot guaranteeing full connection capacity.

4

Connectivity
The option to ‘busbar’ or ‘onekonekt’ with other Hager breakers using the bi-connect terminals, simplifies the board connection and drastically decreases the number of cables.

5

Compatibility
The ‘onekombo’ range can be connected with either a single phase or a three phase busbar.

6

Simple replacement
The bi-stable DIN clip ensures easy removal of a single product on the busbar without disconnecting other devices or wiring.

Description
RCBO's are compact combination devices which provide MCB overcurrent protection & earth leakage protection. The Type A devices, some with line neutral switched, are available with various current ratings ranging from 6A - 40A

Features
- Conforms with IEC 60898-1 and AS/NZS 61009.1
- Earth fault indication window
- Trip free mechanisms

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

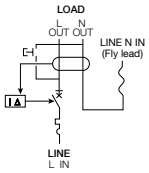
2 mod connection capacity
- 16mm² flexible
- 25mm² rigid

Specifically designed for DIN rail enclosures

Accessories
- Toggle locking device


ADC320T

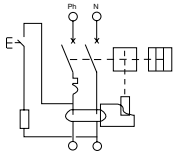
RCBO 6ka Type A



Residual current Irn	Current rating (A)	Width	Cat ref.
30mA	10A	1 mod	**ADC310T**
30mA	13A	1 mod	**ADC313T**
30mA	16A	1 mod	**ADC316T**
30mA	20A	1 mod	**ADC320T**
30mA	25A	1 mod	**ADC325T**


ADA910T

RCBO 6ka Type A

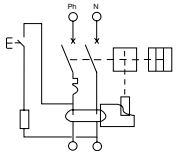


Residual current Irn	Current rating (A)	Width	Cat ref.
10mA	10A	2 mod	**ACA910T**
10mA	13A	2 mod	**ACA913T**
10mA	16A	2 mod	**ACA916T**
30mA	10A	2 mod	**ADA910T**
30mA	13A	2 mod	**ADA913T**
30mA	16A	2 mod	**ADA916T**
30mA	20A	2 mod	**ADA920T**
30mA	25A	2 mod	**ADA925T**
30mA	32A	2 mod	**ADA932T**
30mA	40A	2 mod	**ADA940T**

RCBO's
Residential 2 Pole


ADA320T

RCBO 4.5ka Type A
(Available mid 2015)



Residual current Irn	Current rating (A)	Width	Cat ref.
30mA	6A	1 mod	**ADA306T**
30mA	10A	1 mod	**ADA310T**
30mA	16A	1 mod	**ADA316T**
30mA	20A	1 mod	**ADA320T**
30mA	25A	1 mod	**ADA325T**
30mA	32A	1 mod	**ADA332T**

Description
RCBO's are compact combination devices which provide MCB overcurrent protection & earth leakage protection. The Type A & Type AC devices, with line neutral switched, are available with various current ratings ranging from 6A - 45A.

Features
- Conforms with IEC 60898-1 and AS/NZS 61009.1
- Earth fault indication window
- Trip free mechanisms

Connection capacity
- 16mm² flexible
- 25mm² rigid

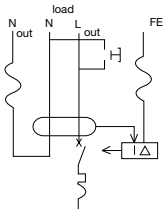
Accessories
- Toggle locking device

Applicable to 2 mod devices only
- Auxiliary & alarm contact
- Shunt trip
- Undervoltage release

new


AD120B

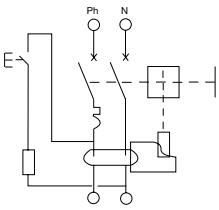
RCBO Type A



kA rating	Residual current Irn	Current rating (A)	Width	Cat ref.
10kA	30mA	6A	1 mod	**AD106B**
10kA	30mA	10A	1 mod	**AD110B**
10kA	30mA	16A	1 mod	**AD116B**
10kA	30mA	20A	1 mod	**AD120B**
10kA	30mA	25A	1 mod	**AD125B**
10kA	30mA	32A	1 mod	**AD132B**
6kA	30mA	40A	1 mod	**ADA140T**
6kA	30mA	45A	1 mod	**ADA145T**


ADA566T

RCBO 10kA Type A



Residual current Irn	Current rating (A)	Width	Cat ref.
10mA	10A	2 mod	**ACA560T**
10mA	13A	2 mod	**ACA563T**
10mA	16A	2 mod	**ACA566T**
30mA	6A	2 mod	**ADA556T**
30mA	10A	2 mod	**ADA560T**
30mA	13A	2 mod	**ADA563T**
30mA	16A	2 mod	**ADA566T**
30mA	20A	2 mod	**ADA570T**
30mA	25A	2 mod	**ADA575T**
30mA	32A	2 mod	**ADA582T**

Description
The safety switch is designed to open a circuit automatically in the case of a fault between phase and earth and/or neutral and earth, greater than or equal to rated tripping current.
Use in domestic, commercial or industrial installations.

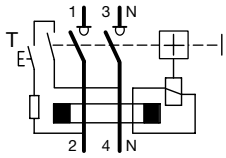
Features
- Conforms with IEC 60898-1 and AS/NZS 61008.1
- Voltage rating, 230/415V~
- Positive contact indication windows
- Earth fault indication window
- Trip free mechanisms

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

Accessories
- Auxiliary & alarm contacts
- Toggle locking device
- Neutral links
- Shunt trip
- Undervoltage release


CDA240T

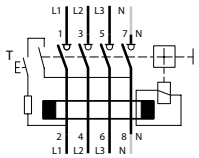
Residential
Double pole

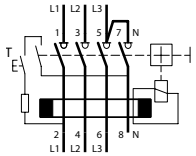


Description	Residual current Irn	Current rating (A)	Width	Cat ref.
Type A	30mA	25A	2 mod	**CDA225T**
	30mA	40A	2 mod	**CDA240T**
	30mA	63A	2 mod	**CDA263T**
Type AC	30mA	80A	2 mod	**CD280T**
	30mA	100A	2 mod	**CD284T**


CDA440T

Residential
Four pole

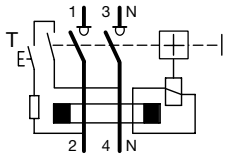




Description	Residual current Irn	Current rating (A)	Width	Cat ref.
Type A	30mA	25A	4 mod	**CDA425T**
	30mA	40A	4 mod	**CDA440T**
	30mA	63A	4 mod	**CDA463T**
	30mA	80A	4 mod	**CD481T**
	30mA	100A	4 mod	**CD485T**


CE240T

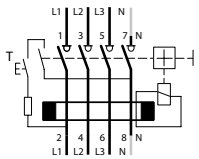
Commercial
Double pole

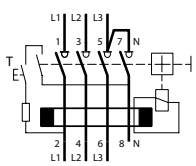


Description	Residual current Irn	Current rating (A)	Width	Cat ref.
Type A	100mA	25A	2 mod	**CE225T**
	100mA	40A	2 mod	**CE240T**
	100mA	63A	2 mod	**CE263T**
Type AC	100mA	80A	2 mod	**CE281T**
	100mA	100A	2 mod	**CE285T**


CE485T

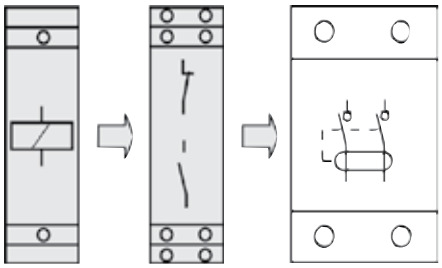
Commercial
Four pole





Description	Residual current Irn	Current rating (A)	Width	Cat ref.
Type A	100mA	80A	4 mod	**CE481T**
	100mA	100A	4 mod	**CE485T**

Combination auxiliary & alarm switch:
If shunt trip or undervoltage release is required, the CZ001 must be used as a coupler.




CZ001


MZ203

Accessories

Description	Characteristics	Width	Cat ref.
Combination auxiliary & alarm switch Allows remote indication of main contact status SD indicates a fault condition (eg Safety Switch tripped)	2NO + 2NC 6A-230V~	1 mod	**CZ001**
Auxiliary switch Allows remote indication of main contact status	1NO + 1NC 6A-230V~	0.5 mod	**MZ201**
Alarm switch Indication of a fault condition	1NO + 1NC 6A-230V~	0.5 mod	**MZ202**
AC shunt trip Allows remote tripping of device	230-415V AC 110-130V DC	1 mod	**MZ203**
	12-48V AC 24-48V DC	1 mod	**MZ204**
AC undervoltage When voltage falls by 35% of Un; fitted with an auxiliary switch		1 mod	**MZ206**
Locking kit Allows locking of the device; toggle in the on/off position; will accept two padlocks with hasps of 4.75mm diameter maximum	Supplied without padlock		**MZN175**

Features
Only requires four poles

One add-on block suits any Hager MCB combination, 10kA, C curve or D curve up to 63A.

One module RCD add-on block + MCB combinations suit all Hager panelboards including the new performa series of panelboards

The RCD add-on block + MCB provides the protective characteristics of both devices, thereby protecting the panelboards entire circuit and removing the need to wire between DIN mounted RCD & MCB. This results in a significant reduction of time, labour & the size & cost of integrated RCD socket outlets.

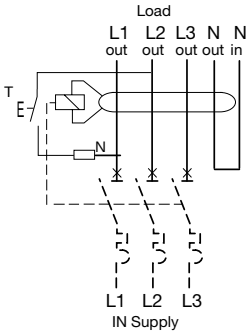
The 'Type A' add-on block gives the added protection against any 'pulsating DC component' generating from such loads as; power tools, motor speed controllers etc.

Conforms with IEC 60898-1 and AS/NZS 61008.1 when used with a Hager MCB.

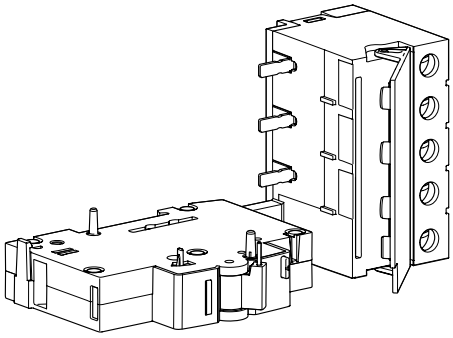
BD163T

One Module Add-On Block

Description	Characteristics	Cat ref.
3 phase earth leakage protection Up to 63A	30mA	**BD163T**
	100mA	**BE163T**
	300mA	**BF163T**

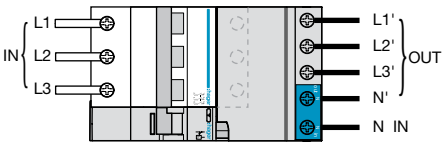


Technical information

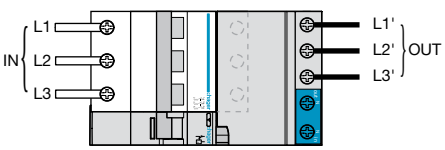


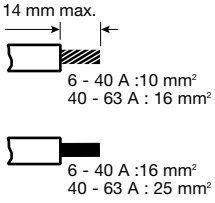
Electrical connection

3Ph + N



3Ph





Description
A range of connection devices to simplify installation of modular devices such as MCB's, RCD's etc...

KDN180A

Insulated busbars - Fork type

Description	Width	Cat ref.
1 phase 80A	12 mod	**KDN180A**
1 phase 80A	18 mod	**KDN180G**
2 phase 80A	12 mod	**KDN280A**
3 phase 80A	12 mod	**KDN380A**
3 phase 80A	18 mod	**KDN380G**

KB181GI

Insulated busbars - Tongue type

Description	Width	Cat ref.
6 tongue	12 mod	**KB181A1**
9 tongue	18 mod	**KB181G1**

KZ059

Insulated caps

Description	Characteristics	Cat ref.
Busbar end caps	Suits KDN1xx & KB181xx	**KZN021**
Busbar end caps	Suits KDN2XX/KDN3XX	**KZN023**
Fork caps - yellow		**KZ059**

KRN163

Cable Connectors

Description	Cat ref.
Tongue type connection from top for cables: 25mm	**KF81A**
Tongue type connection from top for cables: 2 x 16mm	**KF82A**
Tongue type connection from side for cables: 35mm^2	**KF83A**
Tongue type connection from side of cables: 35mm^2 with longer tongue	**KF83D**
Fork type connection from side for cables: 25mm^2	**KF84A**
DIN mounted	**KRN163**

KM03A

Other accessories

Description	Characteristics	Cat ref.
RCD neutral links	3 tunnel link for fitting to RCD's	**KM03A**
Cable adaptor	35mm^2 to suit golf enclosure	**KM035**

Description
Protection and control of circuits against overloads and short circuits suitable for fuses which comply with BS88: Part I:1998

Technical data
- Rated voltage:
  415V AC
  250V DC
- Fusing factor: class Q1
- Rated breaking capacity:
  80kA at 415V AC
  40kA at 250V DC
- Fuse cartridge not supplied

Connection capacity
- 16mm² rigid cable
- 16mm² flexible + busbar


LS201


LS201

Fuse Carriers & Fuses

Description	Current rating (A)	Width	Cat ref.
Fuse carriers for BS88 fuses (supplied without fuse cartridge)	32A max	1 mod	**LS201**
BS88 cartridge fuses 29 x 12.7mm	6A		**L17300**
	8A		**L17400**
	10A		**L17500**
	16A		**L17600**
	20A		**L17700**
	25A		**L17800**
	32A		**L17900**


L14700

Accessories

Description	Width	Cat ref.
Handle link pin	3 mod	**L023**
Spare fuse holder (DIN mounted)	1 mod	**L14700**
Locking kit		**MZ178**

Description
Size according to DIN
from 00 to 2 to suit fuses
according to AS/NZS60269

Technical data
DIN fuses typically have breaking
capacity to 100kA at 500V
(supplied without fuse cartridge)

Connection capacity
- 70 - 240mm


LT150

Fuse switch disconnectors

Description	Cat ref.
3 x size 00 160A DIN blade fuses	**LT052**
3 x size 1 250A DIN blade fuses	**LT150**
3 x size 2 400A DIN blade fuses	**LT250**

Cable clamps

Description	Cat ref.
Suitable for LT052 (6 - 70mm2)	**LZ051**
Suitable for LT150 (70 - 150mm2)	**LZ151**
Suitable for LT250 (120 - 240mm2)	**LZ152**

DIN NH
Fuses

Description
DIN fuses with a breaking
capacity up to 120kA at 500V
- Class gG
- IEC 60269
- sizes from 000 to 2

new


LNH0080M


LNH2160M

NH Fuses

Description	Current rating (A)	Cat ref.
Size 000	50A	**LNH0050M**
	63A	**LNH0063M**
	80A	**LNH0080M**
	100A	**LNH0100M**
Size 00	125A	**LNH0125M**
	160A	**LNH0160M**
Size 1	100A	**LNH1100M**
	125A	**LNH1125M**
	160A	**LNH1160M**
	200A	**LNH1200M**
	250A	**LNH1250M**
Size 2	160A	**LNH2160M**
	200A	**LNH2200M**
	250A	**LNH2250M**
	315A	**LNH2315M**
	400A	**LNH2400M**

Direct lightning protection
The criteria for installing a lightning protective product.

- Does the installation contain a lightning rod?

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

If the answer is YES to any of the above, it is recommended to install the SPA212A (3 phase = SPA412A) spark gap device. This will provide protection against direct lightning strikes.

Both references, SPA212A & SPA412A (single & three phase respectively) have dual earth and phase / neutral terminals. This connection method reduces any additional voltage drop in the connecting cables to virtually zero thereby obtaining the best possible Up to the installation.

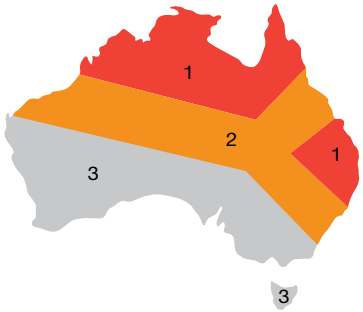
Further installation protection is provided by the fact that the devices are connected in both common and differential modes (L-E/N-E/L-N) together within inbuilt auto protection up to 12.5kA.

If the answer is NO to the above, a spark gap device is not required.

Tip: If maximum demand of the installation is 125A or less then use both terminal screws per pole for through connection. This will minimise the residual current. If the maximum demand is greater than 125A then tap off each phase for parallel connection. Refer to the user instructions for a wiring diagram.

The next step is the selection of the Transient Protective device.

Indirect Transient Protection
To ensure protection of the installation it is vital to have adequate protection from the harmful effect of transients.



Hager Thunder Day Map

This regional map illustrates the lightning activity across Australia and is based upon the 'Thunder Day Map' that appears in
AS/NZS 1768 (Int): 2003. This map is compiled by the Bureau of Meteorology. As indicated, the country is split into three zones of activity. The orange zone is maximum exposure, the yellow zone is high exposure and the grey zone is moderate exposure to lightning activity. The process of selecting the correct SPD for protection against transients is a simple one.

- In what region is the installation located?

1 Install SPN165R; the installation is protected from indirect transients up to 65kA.

2 Install SPN140D/R; the installation is protected from indirect transients up to 40kA.

3 Install SPN115D/R; the installation is protected from indirect transients up to 15kA.

Tip: For three phase installations, you will require three of the selected SPDs E.g: 3 x SPN165R

All Hager Class II medium protection products have plug-in cartridges available in two versions:

- SPD's with a base element and cartridge with a status indicator (to show the end of the life of the device). This is indicated with the suffix D at the end of the item number.

- SPD's with a base element which contains an auxiliary contact for remote signalling (audible and visual), and a cartridge with a reserve status indicator. The reserve status function has an added intermediate step which indicates that the cartridge needs to be replaced. While the installation is still protected, the cartridge should be replaced as soon as possible. This product is indicated with the suffix R at the end of the item number.

- SPN165 only available as R

The next system consideration is the protection of the installation's sensitive and valuable electronic equipment.

Equipment Protection
To ensure that today's and importantly tomorrow's, sensitive and valuable electronic devices continue to provide entertainment and service, it is vital to bring the residual voltage below 800V. This will minimise the chance of damage to microchips within these devices. Answering the question below will allow you to ascertain which Hager device best suits the needs of the installation.

- Does the installation contain electronic appliances? Eg. TV's,VCR's, microwave ovens, Hi-Fi system, computers, fax machines, DVD players, etc...

If the answer is YES, install SPN208S. By installing this device the residual voltage (Up) remaining in the system will be less than 800V. If the installation is 3 phase then install a SPN408S.

If the answer is NO, the installation requires no further protection.

Description
Hager SPD's protect electric and electronic equipment against transients, originating from lightning and switching transient sources.

These transients can cause anything from the premature aging of equipment, logic failures and down time, to the complete destruction of electrical components and the entire electrical distribution system.

Surge protective devices are strongly recommended in sites that are exposed to lightning, to protect sensitive and expensive electrical equipment such as TV's, washing machines, Hi-Fi's, PC's, VCR's, alarms etc..


SPA212A

Class I spark gap arrester

Description	Poles	Iimp kA	In kA	Up kV	Uc V	Width	Cat ref.
For areas where risk of lightning is prevalent. Test wave 10/350us	2	12.5	-	<2.5	255	4 mod	**SPA212A**
	4	12.5	-	<2.5	255	8 mod	**SPA412A**


SPN140R

Class II medium protection

Description	Poles	Iimp kA	In kA	Up kV	Uc V	Width	Cat ref.
Metal Oxide Varistors (MOV's) High diverting capacity Replaceable cartridge Reserve option indication and changeover contact on 'R' catalogue reference	1	65	20	<1.5	275	1 mod	**SPN165R**
	1	40	15	<1.2	275	1 mod	**SPN140R**
	1	40	15	<1.2	275	1 mod	**SPN140D**
	1	15	5	<1.0	275	1 mod	**SPN115R**
	1	15	5	<1.0	275	1 mod	**SPN115D**


SPN208S

Class II fine protection

Description	Poles	Iimp kA	In kA	Up kV	Uc V	Width	Cat ref.
To be used in cascade with medium protection devices. Refer to cascade table for Up values	2	8	2	1.2	255	2 mod	**SPN208S**
	4	8	2	1.25	255	3 mod	**SPN408S**


SPN040D

Class II replacement cartridge

Description	Poles	Reserve status ind.	Standard status ind.	Width	Cat ref.
For SPN1XXX	1	Yes	-	1 mod	**SPN065R**
	1	Yes	-	1 mod	**SPN040R**
	1	-	Yes	1 mod	**SPN040D**
	1	Yes	-	1 mod	**SPN015R**
	1	-	Yes	1 mod	**SPN015D**


SPN505

Telephone protection

Description	Line	In kA	Characteristics	Width	Cat ref.
Protection for those devices connected to the telephone network. Protection is assured in both common & differential modes.	Analog	10	Un: 130V DC Uc: 170V DC	1.5 mod	**SPN505**

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