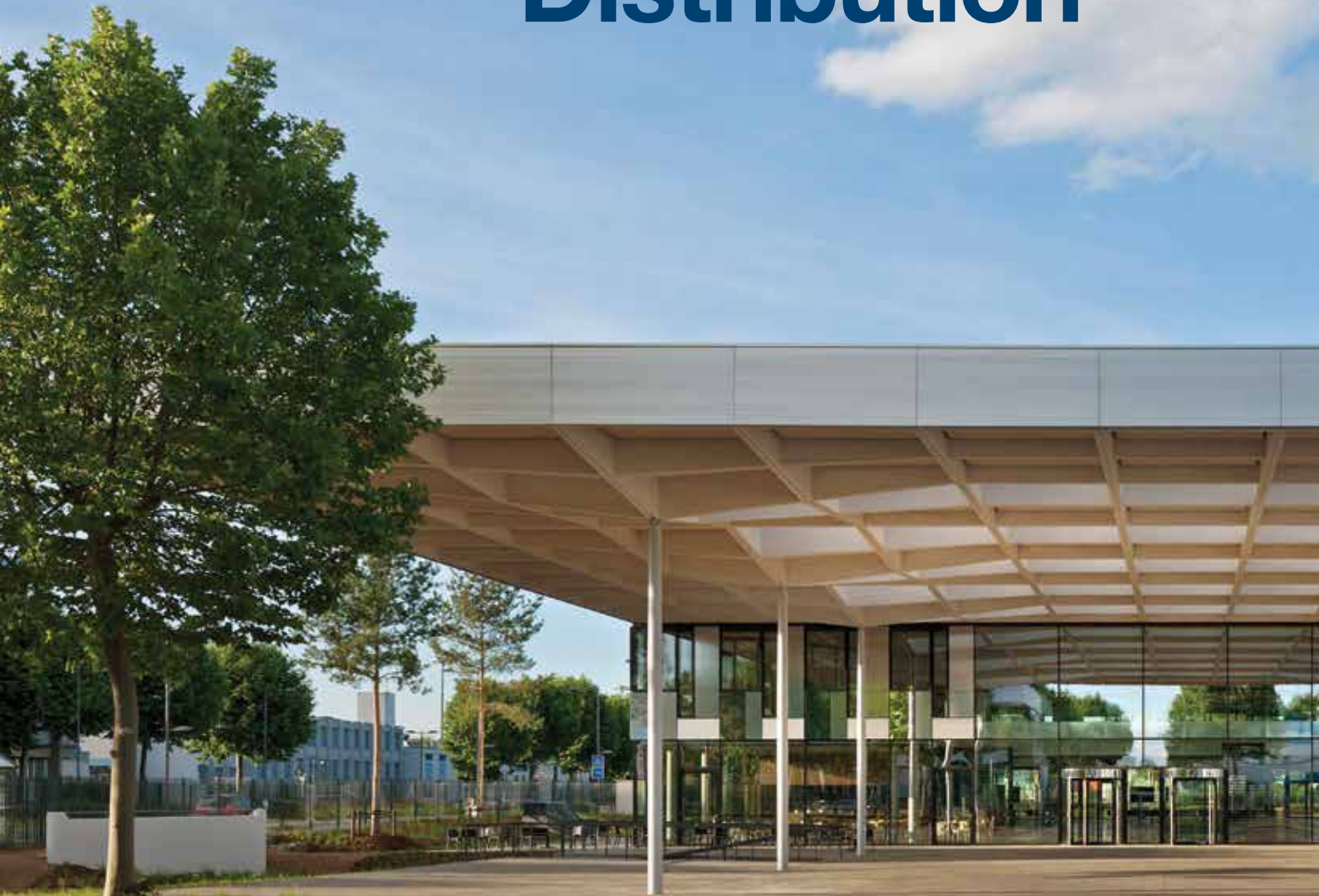


# Commercial Distribution



:hager

# Innovative Electrical Solutions

As an independent family-owned and run company Hager Group is one of the industry's leading innovators for commercial and residential applications. With 11,400 employees globally, our components and solutions are produced in 25 different locations to support our customers projects in more than 136 countries around the world.

In the UK we have a well-established research and development team combined with global resource to meet the needs of the market. This is backed up by the UK factory having ISO 9001:2015 and an on-site ASTA recognised laboratory to BS EN ISO/IEC 17025:2005, which ensures that products and solutions meet all of the relevant British standards. The UK site also has OHSAS 18001:2007, ISO 14001:2015 and the Investors in People Bronze Award.

Working out solutions in close consultation with customers we have the vision 'to add value to peoples' lives and their buildings through smart, eco-efficient and energy saving solutions and services'.





## Type A & B Distribution Boards



Our Invicta 3 Type B Boards have been developed as the solution for commercial installations. The whole nature of electrical sub and final distribution for commercial installations has changed in recent years, with demands for more outgoing ways, more RCD protection, more metering and more control devices.

### In The Range

---

SP&N / TP&N

---

Invicta 3 125A / 250A

---

IP65

---

Incomer Kits

---

Meter Packs

---

Dual / Tri Metered Boards

---

Hybrid

---

Extension / Cable Spreader Boxes

## Panelboards



Invicta 3 Panelboards are incredibly easy to install, the pan assembly, door and front cover can all be removed to make the product lighter when fixing to the wall. Keyhole slots and a central fifth keyhole fixing point make fitting and levelling the board even simpler.

### In The Range

---

Invicta 3 250A / 400A / 630A / 800A

---

Incomer Kits

---

Meter Packs

---

Meter Enclosures

---

Extension / Cable Spreader Boxes

---

Panel & DIN Rail Meters

---

CTs & Meter Cables



# Metering & Monitoring



UK wiring regulations and local building regulations create additional requirements for electrical distribution boards in commercial building applications. A range of incoming device options and scalable energy metering options ensure specific application requirements are met. Easy to specify and install, our metered distribution board options create scalable solutions for typical commercial building applications.

## In The Range

---

Side / Top / bottom / Corner Meter Enclosures

---

Panel Meters

---

DIN Rail Mounted Meters

---

CT to Plug-in Converter

---

Plug-in CTs

---

Meter Cables

# Protection Devices



For integration in to Electrical distribution systems in commercial building applications, our electrical distribution boards are available with a range of protective device incoming options. SD, MCCB and RCCB incomers are available. In addition, 4P changeover units are available for 125A Type B boards. Outgoing devices for MCB boards also include a wide range of RCBO devices covering 10mA, 30mA and 100mA applications in B and C curve.

## In The Range

---

MCBs

---

RCBOs

---

RCCBs

---

Motor Starters

---

Fuse Carriers

---

Surge Protection

---

Earth Fault Relays

---

MCCBs



# A thoughtful approach to Surge Protection

We have developed a brand new range of dedicated SPD kits, specifically for our Commercial Distribution boards.

Our kits have been created to provide optimum end equipment protection against surge transient voltages after an increased focus on this requirement in the 18<sup>th</sup> edition wiring regulations.

## Space saving integration.

Where required, board designs have been changed to enable all kits to fit within the actual distribution board, rather than in a separate enclosure next to the distribution board. This also allows for the shortest possible connection to the SPD from the incoming supply, providing optimum performance.

Our SPD kits have the additional benefit of not requiring any additional upstream protection devices, saving more space in the board for protection devices.



## Integrated testing

The wiring regulations advise that SPD's should be selected from one manufacturer to ensure that they work well together. Our Type 1 Panelboard SPDs have been tested to ensure coordination with Type 2 SPDs in TP&N boards.

We've developed our boards and SPD kits together and tested the effective performance of how well high voltage transients are managed down to levels that don't harm electrical equipment

**Through development testing, we have removed the need to consider many of the application & installation variables that previously made SPD selection and installation complicated.**



## A solid connection

Through extensive testing we know that removing secondary protective devices, using short conductor paths to SPD's and replacing cables with solid copper Earth links dramatically improves the effectiveness of the SPD.

Without these features our testing has shown that common installation variables can easily lead to a very significant reduction in the effective performance of the SPD, potentially leaving surge voltages at a level that can damage end equipment



# Type B TP&N Distribution Boards

Invicta 3 Type B boards have been designed for safe and simple installation, with features to benefit both installer and end user.

Take a look below to see all of the features we have designed in and how this is going to make installing a distribution board so much easier.



## 01 Aesthetics

Strong board aesthetics ideal for commercial offices, health care and education projects where boards may be sited in public areas.



## 02 Metering

A number of metering options provide a scalable solution to energy monitoring. Type B Distribution boards are also available with dual channel meters for separate monitoring of Power and lighting loads. A metered three section Type B board is also available to monitor power and lighting and mechanical services.



## 03 Trunking Entry

Unique trunking entry obround system top and bottom enables quick fitting to trunking and without the extra cost in time and materials. The edge is curved, ready to bring cables in without the worry of sharp edges.



## 04 Hybrid TP&N Board Available

Our Invicta TP&N Hybrid Distribution Board is available to provide two 3 phase loads of up to 125A or six single phase loads. The larger 80-125A MCB devices, whilst providing short circuit and overload protection, also give a disconnection point for downstream circuits (isolation). This ensures that there are no unprotected outgoing connections from the busbar system.



## 05 Shrouded Neutral Bar

Clear shrouded neutral bar to IP2X allows the contractor to install cables without removing the shroud. Ensures safe and easy installation.

# Invicta Panelboards

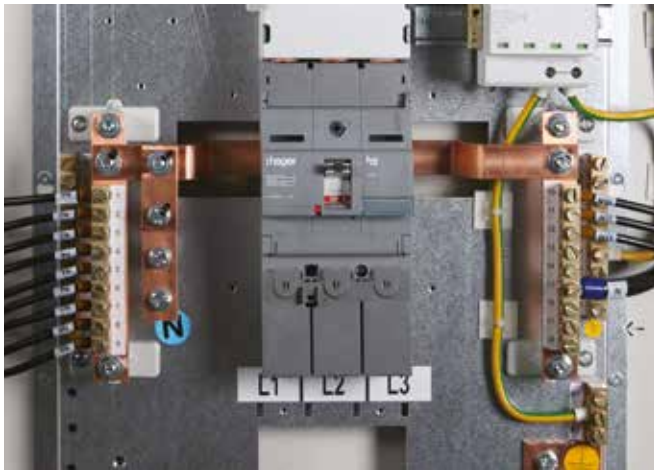
Our Invicta 3 Panelboards have been designed to make installation a breeze, take a look below for a brief overview of all of the features.



## 01 The Perfect Match

Our Invicta 3 panelboards have been designed to match perfectly with the Invicta 3 Type B distribution boards. The Invicta 3 Panelboard range is the most aesthetically pleasing available on the market, with its glazed door and curved edges.





## 02 Twin Earth & Neutral Bars

Allows easy identification of earth & neutral conductors with corresponding line conductors.



## 03 Removable Pan Assembly

To lighten the product when fixing to the wall, pan assemblies can also be purchased as a separate part or removed for fitting into cubicle switchboards.



## 04 Energy Metering

The installer only has to fit the packs into the board. All internal wiring is included. RJ45 connectors simplify the connection of CTs to meters.



## 05 Removable Gland Plates

The top and bottom removable gland plates allows cable entries to be prepared away from the board, preventing ingress of swarf etc.

# Metered Power & Lighting Board

Monitoring Power and light loads separately, creates a better understanding of the where electricity is being consumed. Our power and lighting boards employ dual channel meters and are supplied with the main incoming device pre-installed. Available as standard in a variety of configurations and sizes to suit most applications up to 24TP ways. A Tri-metered TPN board is also available as standard, where separate monitoring of Power, Lighting and Mechanical services loads in required.

## 01 Energy Saving



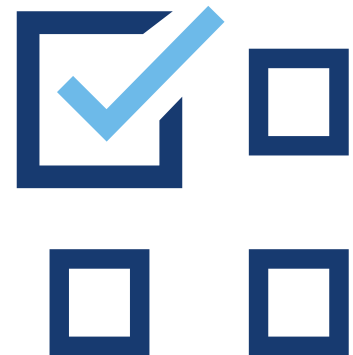
Installing and monitoring meters leads to savings of 5-10% of the energy being metered. For example, a meter that identifies pumps being left on for 24hrs, seven days a week, may save 60% of energy passing through if the pump is only used when required.

## 02 Building Regulations



The Building Regulations 2010 & approved document L2 recognise the valuable role of metering and include requirements of sub-metering in buildings other than dwellings.

## 03 Choice



There are many options to monitor energy consumption. Direct metering, measurement and estimation should all be considered.

## 04 Communication



Metering helps building occupiers to understand how energy is being used and lets them see the patterns of where and when energy is consumed. Useful trends can be shown from the data produced.

## 05 Control & Performance



Metering provides feedback to designers, manufacturers, government and the supply side industry on performance achieved, helping them to improve global energy performance by setting better targets.



# Arc Fault Detection

## What the regs say BS 7671 18<sup>th</sup> Edition

Regulation 421.1.7 recommending installation of AFDD in AC final circuits.

- Premises with sleeping accommodation
- Buildings with risk of fire due to processed or stored materials e.g. Wood working shops
- Buildings constructed of combustible materials e.g. Barns
- Locations with irreplaceable objects e.g. Museums

### Parallel Arc Fault



### Series Arc Fault



## Potential Causes

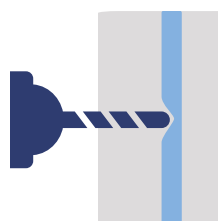
Arc faults can be caused by all types of line faults and worn contacts. An AFDD will trip the circuit when a potentially hazardous arc occurs, eliminating the resulting fire hazard.



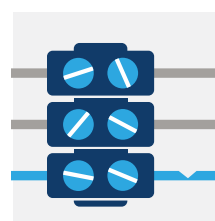
Kink/break in the cable



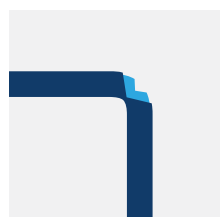
Cable wear due to frequent use



Line damage resulting from drilling or construction work



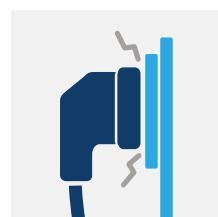
Incorrect wire stripping



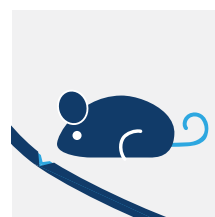
Incorrect bending radii



Loose screwed connections



Defective plugs



Rodent bites

For commercial applications, our AFDD can be wired in series with MCB's / RCBO's to create a flexible approach to AFDD integration.

Using any of our TPN Distribution board, standard din extension enclosures provide simple and scalable accommodation for AFDD requirements.

Note: our AFDD is an MCB + AFDD, so when used in series with another OCP device, it is likely that both devices will trip under an overcurrent event.

## Greater breaking capacity 10 kA

Higher prospective fault currents require devices with higher breaking capacities. So in addition to the 6kA range of AFDD for residential applications, we now offer devices with a 10kA breaking capacity, making them more suitable for typical commercial building installations.

This microprocessor based technology has been evolved to ensure algorithms profiling typical UK final circuit loads, provide safe reliable operation.

## Monitoring via Microprocessor

An AFDD is activated by both series and parallel arc faults. Unlike circuit breakers or RCDs, an AFDD does not have an electromechanical trigger, but utilises electronic technology to analyse the signature (waveform) of an arc. It reliably differentiates between an arc fault and the signature (waveform) in normal switching and control events, preventing false tripping.

## Effective areas of protective devices depending on fault position & type

Fault Between	Short Circuit	Overload	Residual current	Serial Arc	Parallel Arc
L-L	MCB/ RCBO	MCB/ RCBO	RCD/RCBO	AFDD	RCD/RCBO/AFDD
L-N					
L-PE					



**Auxiliary contact, alarm contact and shunt trip devices are available as supplements:**

- MZ201, auxiliary contact 1C + 1O
- MZ202, alarm contact 1C + 1O
- MZ203, shunt trip 230–415 V AC



AFDD with extension accessories from the MCB and RCCB/MCB range

# Commercial Distribution

Powering a building to its potential, it's what we do. We have the perfect solutions to help an office, factory or industrial site save energy and keep their occupants safe. From Panelboards to our range of enhanced TP&N boards with metering capabilities, our commercial offering will create the perfect electrical ecosystem for a building.





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**Distribution Boards**

Type A SP&N Distribution Boards	18
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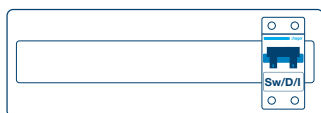


JK104

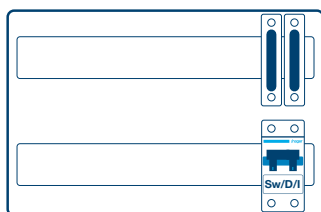
### SP&N Distribution Boards

#### Characteristics:

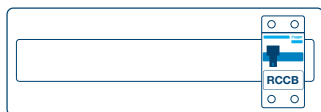
- SP&N distribution boards are available from 4-28 outgoing ways. The range comes with a choice of either 100A 2 pole switch disconnector, 63A 30mA 2 pole RCCB Type A or 100A 30mA 2 pole RCCB Type A, or a range of split load versions.
- Conforms to BS EN 61439-3.  $I_{nA} = 63A/100A$ ,  $I_{nC} = 63A$ ,  $I_{CC} = 10kA$
- Cable Sizes: 100A: 50mm<sup>2</sup>, 63A: 16mm<sup>2</sup>
- Ample wiring space, with provision to accept RCBO's.
- Full complement of earth and neutral terminal bars to accept up to 16mm<sup>2</sup> cable.
- Suitable for cable entry on all sides and back.
- For dimensions see page 64.



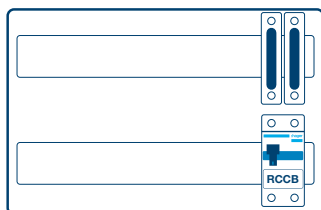
- 100A Switch Disconnector Incomer
- 63A 30mA Switch Disconnector Incomer



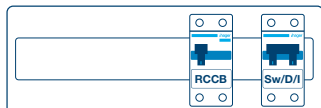
100A Switch Disconnector Incomer Dual Row



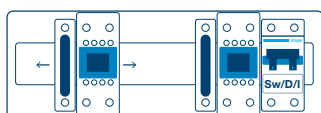
100A 30mA RCCB Incomer



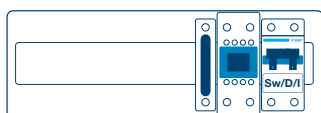
100A 30mA RCCB Incomer Dual Row



100A Switch Disconnector Incomer & 63A 30mA RCCB



100A Dual Metered with MID Meter - JKD114



100A Metered with MID Meter - JKD117

Description	Size	Cat ref.
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#### 100A Switch Disconnector Incomer

4 Way 100A Switch Disconnector Incomer	3	<b>JK104</b>
6 Way 100A Switch Disconnector Incomer	3	<b>JK106</b>
10 Way 100A Switch Disconnector Incomer	4	<b>JK110</b>
14 Way 100A Switch Disconnector Incomer	5	<b>JK114</b>
20 Way 100A Switch Disconnector Incomer	7	<b>JK120</b>
28 Way 100A Switch Disconnector Incomer Dual Row	5 (2)	<b>JK128</b>

#### 63A 30mA RCCB Incomer Type A

4 Way 63A 30mA RCCB Incomer	3	<b>JK404H</b>
6 Way 63A 30mA RCCB Incomer	3	<b>JK406H</b>
10 Way 63A 30mA RCCB Incomer	4	<b>JK410H</b>
14 Way 63A 30mA RCCB Incomer	5	<b>JK414H</b>
20 Way 63A 30mA RCCB Incomer	7	<b>JK420H</b>

#### 100A 30mA RCCB Incomer Type A

4 Way 100A 30mA RCCB Incomer	3	<b>JK304H</b>
6 Way 100A 30mA RCCB Incomer	3	<b>JK306H</b>
10 Way 100A 30mA RCCB Incomer	4	<b>JK310H</b>
14 Way 100A 30mA RCCB Incomer	5	<b>JK314H</b>
20 Way 100A 30mA RCCB Incomer	7	<b>JK320H</b>
28 Way 100A 30mA RCCB Incomer Dual Row	5 (2)	<b>JK328H</b>

#### 100A Switch Disconnector and 63A 30mA RCCB Type A

6 Way Split Load Configurable 100A Switch 63A 30mA RCCB	4	<b>JK706C</b>
10 Way Split Load Configurable 100A Switch 63A 30mA RCCB	5	<b>JK710C</b>
14 Way Split Load Configurable 100A Switch 63A 30mA RCCB	7	<b>JK714C</b>

#### 100A Switch Disconnector and 100A 30mA RCCB Type A

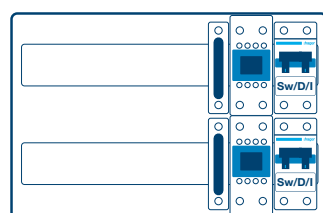
28 Way Split Load 14+14 100A Switch 100A 30mA RCCB Dual Row	5 (2)	<b>JK527H</b>
-------------------------------------------------------------	-------	---------------

#### 100A Dual Metered with MID Meter

14 Way Dual Metered 100A Configurable MID Pulsed, Modbus	7	<b>JKD114</b>
22 Way Dual Metered, Dual Row 100A MID Pulsed, Modbus	5 (2)	<b>JKD11111</b>

#### 100A Metered with MID Meter

17 Way Metered 100A MID Pulsed, Modbus	7	<b>JKD117</b>
----------------------------------------	---	---------------



100A Dual Metered with MID Meter - JKD11111

The relevant part of the BS EN 61439 series applies to the integration of mechanical and electrical components (switching devices, control devices, busbars, functional units, etc.), into an enclosure. Hager systems such as consumer unit, distribution board and panel board ranges are certified to the appropriate part of the BS EN 61439 series. When selecting other device / enclosure arrangements, please contact Hager technical support for guidance - 01952 675689.

### DIN Rail Enclosures

#### Characteristics:

- One, two or three row 8-66 module enclosures, fitted with DIN rails to accept any combination of Hager devices. Ample wiring space, with provision to accept RCBO's.
- Conforms to BS EN 62208.  $I_{nA} = 63A/100A$ ,  $I_{nC} = 63A$ ,  $I_{CC} = 10kA$
- Full complement of earth and neutral terminal bars to accept up to 16mm<sup>2</sup> cable.
- Suitable for cable entry on all sides and back.
- For dimensions see page 64.



JK008

Description	Size	Cat ref.
1 Row 8 Modules	3	<b>JK008</b>
1 Row 12 Modules	4	<b>JK012</b>
1 Row 16 Modules	5	<b>JK016</b>
1 Row 22 Modules	7	<b>JK022</b>
2 Row 24 Modules (2 x 12)	4 (2)	<b>JK024</b>
2 Row 32 Modules (2 x 16)	5 (2)	<b>JK032</b>
2 Row 44 Modules (2 x 22)	7 (2)	<b>JK044</b>
3 Row 66 Modules (3 x 22)	7 (3)	<b>JK066</b>

### Invicta 3 SP&N Distribution Boards

#### Characteristics:

- Boards are available with 14 & 29 outgoing ways. The range comes with a 100A 2 pole switch disconnecter to accept 50mm<sup>2</sup> cable. Ample wiring space, with provision to accept RCBO's.
- Conforms to BS EN 61439-3.  $I_{nA} = 63A/100A$ ,  $I_{nC} = 63A$ ,  $I_{CC} = 10kA$
- Full complement of earth and neutral terminal bars to accept up to 16mm<sup>2</sup> cable.
- Suitable for cable entry on all sides and back.
- Enclosures are available with plain or glazed doors.
- For dimensions see page 64.



JK114AG

Description	Cat ref.	Cat ref.
	Plain Door	Glazed Door
1 Row, 14 Way 100A Switch Disconnecter Incomer	<b>JK114A</b>	<b>JK114AG</b>
2 Row, 29 Way 100A Switch Disconnecter Incomer	<b>JK129A</b>	<b>JK129AG</b>

### Type A SP&N Distribution Board SPD Kit

- Consists of: 6mm<sup>2</sup> neutral, live & earth cables, 1x Double Pole SPD's.

Poles	$I_n$ kA	$I_n$ kA	$U_p$ kV	Width (mm)	Cat ref.
	L-N	N-PE			
2	5	15	≤ 1.2	35	<b>VM02SPD</b>



VM02SPD



JK106BG

<sup>1</sup> A **JK101SE** may be required to provide additional incoming cable space, see page 65.

<sup>2</sup> Full metal cover & door to comply with BS 7671 Amendment 3, where required for domestic dwelling applications.

### Invicta 3 125A TP&N Distribution Boards (125A Incoming, 63A Outgoing)

#### Characteristics:

- Surface mounted steel enclosures, IP3XD rated available with plain, glazed & Amendment 3 door options.
- Conforms to BS EN 61439-3,  $I_{nA} = 125A$ ,  $I_{nC} = 63A$ ,  $I_{CC} = 25kA$
- Supplied without incoming & outgoing devices. A Hager incomer kit must be used.
- Incoming cable sizes: 125A & 100A 50mm<sup>2</sup>, 63A 16mm<sup>2</sup>
- Option with factory fitted SPD Type 2 & 4 Pole SD incomer.
- For dimensions see page 65.

Description	Cat ref. Glazed door & SPD type 2	Cat ref. Plain door	Cat ref. Glazed door	Cat ref. Residential Applications
4 Triple Pole Ways 125A TP&N Board	<b>JK104BGSPD *</b>	<b>JK104B <sup>1</sup></b>	<b>JK104BG <sup>1</sup></b>	<b>JK104BA3 <sup>1 2</sup></b>
6 Triple Pole Ways 125A TP&N Board	<b>JK106BGSPD *</b>	<b>JK106B <sup>1</sup></b>	<b>JK106BG <sup>1</sup></b>	<b>JK106BA3 <sup>1 2</sup></b>
8 Triple Pole Ways 125A TP&N Board	<b>JK108BGSPD *</b>	<b>JK108B <sup>1</sup></b>	<b>JK108BG <sup>1</sup></b>	<b>JK108BA3 <sup>1 2</sup></b>
12 Triple Pole Ways 125A TP&N Board	<b>JK112BGSPD *</b>	<b>JK112B</b>	<b>JK112BG</b>	<b>JK112BA3 <sup>2</sup></b>
16 Triple Pole Ways 125A TP&N Board	<b>JK116BGSPD *</b>	<b>JK116B</b>	<b>JK116BG</b>	<b>JK116BA3 <sup>2</sup></b>
18 Triple Pole Ways 125A TP&N Board	<b>JK118BGSPD *</b>	<b>JK118B</b>	<b>JK118BG</b>	<b>JK118BA3 <sup>2</sup></b>
24 Triple Pole Ways 125A TP&N Board	<b>JK124BGSPD *</b>	<b>JK124B</b>	<b>JK124BG</b>	<b>JK124BA3 <sup>2</sup></b>



JKD1416PM

### 125A Dual Metered Boards - MID Meter

#### Characteristics:

- Boards are supplied with a dual channel meter that offers a pulsed & modbus output.
- Conforms to BS EN 61439-3,  $I_{nA} = 125A$ ,  $I_{nC} = 63A$ ,  $I_{CC} = 25kA$ .
- Provided with MID dual channel meter and 125A TP switch disconnector pre-fitted. Each individual pan is fully rated at 125A.
- For dimensions see page 68.

Description	Max cable capacity solid	Lower pan ways	Upper pan ways	Cat ref.
4+6 Way Power & Lighting Board	50mm <sup>2</sup>	4	6	<b>JKD146MID *</b>
6+6 Way Power & Lighting Board	50mm <sup>2</sup>	6	6	<b>JKD166MID *</b>
6+4 Way Power & Lighting Board	50mm <sup>2</sup>	6	4	<b>JKD164MID *</b>
6+8 Way Power & Lighting Board	50mm <sup>2</sup>	6	8	<b>JKD168MID *</b>
8+8 Way Power & Lighting Board	50mm <sup>2</sup>	8	8	<b>JKD188MID *</b>
8+6 Way Power & Lighting Board	50mm <sup>2</sup>	8	6	<b>JKD186MID *</b>
4+16 Way Power & Lighting Board	50mm <sup>2</sup>	4	16	<b>JKD1416MID *</b>
16+4 Way Power & Lighting Board	50mm <sup>2</sup>	16	4	<b>JKD1164MID *</b>
8+12 Way Power & Lighting Board	50mm <sup>2</sup>	8	12	<b>JKD1812MID *</b>
12+8 Way Power & Lighting Board	50mm <sup>2</sup>	12	8	<b>JKD1128MID *</b>
12+12 Way Power & Lighting Board	50mm <sup>2</sup>	12	12	<b>JKD11212MID *</b>



JK106BD

### IP65 Distribution Boards (Steel version not suitable for outdoor use)

#### Characteristics:

- Suitable for three phase applications where a high IP rating is required.
- Conforms to BS EN 61439-3,  $I_{nA} = 125A$ ,  $I_{nC} = 63A$ ,  $I_{CC} = 25kA$ .
- Available with either a steel (mild steel, powder coated) or Glass Reinforced Plastic (GRP) enclosure.
- Supplied without incoming and outgoing devices. A Hager incomer kit must be used.
- Available up to 125A direct connection with outgoing distribution, rated for MCBs from 0.5A to 63A.

Description	Cat ref. Steel	Cat ref. GRP
4 Way IP65 Metal 125A TPN Board 800 x 600 x 300	<b>JK104BD</b>	<b>JK104BF</b>
6 Way IP65 Metal 125A TPN Board 800 x 600 x 300	<b>JK106BD</b>	<b>JK106BF</b>
8 Way IP65 Metal 125A TPN Board 800 x 600 x 300	<b>JK108BD</b>	<b>JK108BF</b>
12 Way IP65 Metal 125A TPN Board 1250 x 850 x 300	<b>JK112BD</b>	<b>JK112BF</b>
16 Way IP65 Metal 125A TPN Board 1250 x 850 x 300	<b>JK116BD</b>	<b>JK116BF</b>

### MCBs & RCBOs for Invicta 3 Type B TP&N Distribution Boards - See pages 44-46 for more info

		0.5A	1A	2A	3A	4A	6A	10A
B Curve	Single Pole	-	-	-	-	-	<b>NBN106A</b>	<b>NBN110A</b>
	Triple Pole	-	-	-	-	-	<b>NBN306A</b>	<b>NBN310A</b>
C Curve	Single Pole	<b>NCN100A</b>	<b>NCN101A</b>	<b>NCN102A</b>	<b>NCN103A</b>	<b>NCN104A</b>	<b>NCN106A</b>	<b>NCN110A</b>
	Triple Pole	<b>NCN300A</b>	<b>NCN301A</b>	<b>NCN302A</b>	<b>NCN303A</b>	<b>NCN304A</b>	<b>NCN306A</b>	<b>NCN310A</b>
D Curve	Single Pole	<b>NDN100A</b>	<b>NDN101A</b>	<b>NDN102A</b>	<b>NDN103A</b>	<b>NDN104A</b>	<b>NDN106A</b>	<b>NDN110A</b>
	Triple Pole	<b>NDN300A</b>	<b>NDN301A</b>	<b>NDN302A</b>	<b>NDN303A</b>	<b>NDN304A</b>	<b>NDN306A</b>	<b>NDN310A</b>
RCBO (B Curve)	Single Pole	-	-	-	-	-	<b>ADA106U *</b>	<b>ADA110U *</b>
RCBO (C Curve)	Single Pole	-	-	-	-	-	<b>ADA156U *</b>	<b>ADA160U *</b>



### Incomer Kits for 125A Boards

Description	Max Cable Capacity Solid	Cat ref.
3 Pole 100A Switch Disconnecter Incomer Kit (Fits within distribution board)	50mm <sup>2</sup>	<b>JK11003S</b>
4 Pole 100A Switch Disconnecter Incomer Kit (Fits within distribution board)	50mm <sup>2</sup>	<b>JK11004S</b>
3 Pole 125A Switch Disconnecter Incomer Kit (Fits within distribution board)	50mm <sup>2</sup>	<b>JK11253S</b>
4 Pole 125A Switch Disconnecter Incomer Kit (Fits within distribution board)	50mm <sup>2</sup>	<b>JK11254S</b>
4 Pole 63A Contactor Incomer Kit includes Switch Disconnecter (fits below distribution board, 300mm high)	50mm <sup>2</sup>	<b>JK10634C</b> <sup>3</sup>
4 Pole 100A Contactor Incomer Kit includes Switch Disconnecter (fits below distribution board, 450mm high)	M8 Lug	<b>JK11004C</b> <sup>3</sup>
125A Direct Connection Kit (Fits within distribution board)	50mm <sup>2</sup>	<b>JK11254D</b>
4 Pole 63A 30mA RCCB Type A Incomer Kit (Fits within distribution board)	25mm <sup>2</sup>	<b>JK10634RH</b>
4 Pole 100A 30mA RCCB Type A Incomer Kit (Fits within distribution board)	50mm <sup>2</sup>	<b>JK11004RH</b>
4 Pole 100A 300mA RCCB Type A Incomer Kit (Fits within distribution board)	50mm <sup>2</sup>	<b>JK11004RL</b>
4 Pole 100A 300mA Time Delayed RCCB Type A Incomer Kit (Fits within distribution board)	50mm <sup>2</sup>	<b>JK11004RLD</b>
4 Pole 100A 100mA RCCB Type A Incomer Kit (Fits within distribution board)	50mm <sup>2</sup>	<b>JK11004RM</b>
4 Pole 100A 100mA Time Delayed RCCB Type A Incomer Kit (Fits within distribution board)	50mm <sup>2</sup>	<b>JK11004RMD</b>
125A 4 pole Changeover Incomer Kit (Fits within distribution board)	50mm <sup>2</sup>	<b>JK11254CO</b> <sup>3</sup>



JK11003S

<sup>3</sup> A 300 / 450mm space is required below the board for fitting.



JKD125MID

### Side by Side Incomer Kits for 125A Boards

#### Characteristics:

- Complete with 125A 3P SD incomer
- Cable sets to connect to distribution boards (left)
- Suitable for all 125A TP&N board sizes

Description	Cat ref.
Dual kWh Meter Pack 125A Incomer Pulsed & Modbus	M8 Lug <b>JKD125MID</b> *
Triple kWh Meter Pack 125A Incomer Pulsed & Modbus	M8 Lug <b>JKD125TMID</b> *

### Surge Protection Kits for 125A Boards

#### Characteristics:

- SPD kit for direct integration within 125A TPN boards
- Low U<sub>p</sub> value assured through use of solid busbar connectors and solid copper Earth
- SPD suitable for TN / TT Earth arrangements including TNC-S (PME)
- CT2 type SPD to accommodate multiple Earthing systems.
- Coordination verified with upstream Hager Panelboard SPDs.

Description	Cat ref.
Type 1 & 2 Surge Protection Kit for 125A TP&N Boards	<b>JK101SPD</b> *
Type 2 Surge Protection Kit for 125A TP&N Boards	<b>JK102SPD</b> *
Type 1 & 2 Surge Protection Kit for 125A Dual Metered Boards	<b>JKD101SPD</b> *
Type 2 Surge Protection Kit for 125A Dual Metered Boards	<b>JKD102SPD</b> *



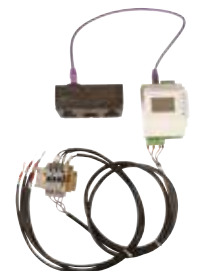
JK101SPD

### Meter Packs & Kits for 125A Boards - MID

#### Characteristics:

- **JKD1125MID** – This enclosed meter pack fits below any Hager standard 125A TPN boards. Can be used in conjunction with SPD kits – MID meter has Modbus and pulse comms.
- **JK140MID** – This MID meter kits can be fitted within the TPN board, but is not suitable for 4 & 6 way boards. This kit can not be used, when an SPD is fitted – MID Meter has Modbus and pulse comms.

Description	Cat ref.
Meter Enclosure & MID Meter	<b>JKD1125MID</b> *
Multifunction Meter Pack 125A Pulsed & Modbus	<b>JK140MID</b> *



JK140MID

16A	20A	25A	32A	40A	45A	50A	63A
<b>NBN116A</b>	<b>NBN120A</b>	<b>NBN125A</b>	<b>NBN132A</b>	<b>NBN140A</b>	-	<b>NBN150A</b>	<b>NBN163A</b>
<b>NBN316A</b>	<b>NBN320A</b>	<b>NBN325A</b>	<b>NBN332A</b>	<b>NBN340A</b>	-	<b>NBN350A</b>	<b>NBN363A</b>
<b>NCN116A</b>	<b>NCN120A</b>	<b>NCN125A</b>	<b>NCN132A</b>	<b>NCN140A</b>	-	<b>NCN150A</b>	<b>NCN163A</b>
<b>NCN316A</b>	<b>NCN320A</b>	<b>NCN325A</b>	<b>NCN332A</b>	<b>NCN340A</b>	-	<b>NCN350A</b>	<b>NCN363A</b>
<b>NDN116A</b>	<b>NDN120A</b>	<b>NDN125A</b>	<b>NDN132A</b>	<b>NDN140A</b>	-	<b>NDN150A</b>	<b>NDN163A</b>
<b>NDN316A</b>	<b>NDN320A</b>	<b>NDN325A</b>	<b>NDN332A</b>	<b>NDN340A</b>	-	<b>NDN350A</b>	<b>NDN363A</b>
<b>ADA116U</b> *	<b>ADA120U</b> *	<b>ADA125U</b> *	<b>ADA132U</b> *	<b>ADA140U</b> *	<b>ADA145U</b> *	-	-
<b>ADA166U</b> *	<b>ADA170U</b> *	<b>ADA175U</b> *	<b>ADA182U</b> *	<b>ADA190U</b> *	-	-	-



JK208BG

<sup>1</sup> Full metal cover & door to comply with BS 7671 Amendment 3.

### Invicta 3 250A TP&N Distribution Boards (250A Incoming, 63A Outgoing)

#### Characteristics:

- Surface mounted steel enclosures, IP3XD rated, available with plain, glazed & Amendment 3 door options.
- Conforms to BS EN 61439-3.  $I_{nA} = 250A$ ,  $I_{nC} = 63A$ ,  $I_{CC} = 25kA$ .
- Supplied without incoming and outgoing devices. A Hager incoming kit must be used.
- For dimensions see page 65.

Description	Cat ref. Plain door	Cat ref. Glazed door	Cat ref. Residential Applications
8 Triple Pole Ways 250A TP&N Board	<b>JK208B</b>	<b>JK208BG</b>	<b>JK208BA3</b> <sup>1</sup>
12 Triple Pole Ways 250A TP&N Board	<b>JK212B</b>	<b>JK212BG</b>	<b>JK212BA3</b> <sup>1</sup>
16 Triple Pole Ways 250A TP&N Board	<b>JK216B</b>	<b>JK216BG</b>	<b>JK216BA3</b> <sup>1</sup>
18 Triple Pole Ways 250A TP&N Board	<b>JK218B</b>	<b>JK218BG</b>	<b>JK218BA3</b> <sup>1</sup>
24 Triple Pole Ways 250A TP&N Board	<b>JK224B</b>	<b>JK224BG</b>	<b>JK224BA3</b> <sup>1</sup>



JKD2884PM

### 200A Tri Metered Boards (Power, Lighting & Mechanical Services)

#### Characteristics:

- Provides separate energy information for each group of outgoing devices.
- Boards are supplied with meters that offer a pulsed & modbus output.
- Provided with a 200A switch disconnecter incomer pre-fitted with ample cable space.
- Conforms to BS EN 61439-3.  $I_{nA} = 200A$ ,  $I_{nC} = 63A$ ,  $I_{CC} = 25kA$ .
- For dimensions see page 68.

Description	Max cable cap. solid	Lower pan ways	Middle pan ways	Upper pan ways	Cat ref.
8+8+4 Way Power, Lighting & Service Board	M8 Lug	8	8	4	<b>JKD2884PM</b>



JK20210BG

### Hybrid 250A TP&N Distribution Boards (250A Incoming, up to 125A outgoing)

#### Characteristics:

- A hybrid distribution board combining 2x TP ways of 27mm MCB devices to supply end loads up to 125A, with standard 18mm MCB/RCBOs for other smaller loads.
- Surface mounted steel enclosure, IP3XD rated, available with plain steel or glazed door options.
- Conforms to BS EN 61439-3.  $I_{nA} = 250A$ ,  $I_{nC} = 63A / 125A$ ,  $I_{CC} = 25kA$
- For dimensions see page 66.

Description	Cat ref. Plain Door	Cat ref. Glazed Door
<b>Hybrid 250A Distribution Boards - Supplied with 250A 3P Switch Disconnecter Incomer Pre-Fitted</b>		
250A 2+10 Way Hybrid TPN Board	<b>JK20210BSD</b>	<b>JK20210BGSD</b>
250A 2+16 Way Hybrid TPN Board	<b>JK20216BSD</b>	<b>JK20216BGSD</b>
250A 2+20 Way Hybrid TPN Board	<b>JK20220BSD</b>	<b>JK20220BGSD</b>
<b>Hybrid 250A TPN Distribution Boards Without Incomer Supplied</b>		
250A 2+10 Way Hybrid TPN Board	<b>JK20210B</b>	<b>JK20210BG</b>
250A 2+16 Way Hybrid TPN Board	<b>JK20216B</b>	<b>JK20216BG</b>
250A 2+20 Way Hybrid TPN Board	<b>JK20220B</b>	<b>JK20220BG</b>

#### MCBs & RCBOs for Invicta 3 Type B TP&N Distribution Boards - See pages 44-46 for more info

		0.5A	1A	2A	3A	4A	6A	10A
MCB B Curve	Single Pole	-	-	-	-	-	<b>NBN106A</b>	<b>NBN110A</b>
	Triple Pole	-	-	-	-	-	<b>NBN306A</b>	<b>NBN310A</b>
MCB C Curve	Single Pole	<b>NCN100A</b>	<b>NCN101A</b>	<b>NCN102A</b>	<b>NCN103A</b>	<b>NCN104A</b>	<b>NCN106A</b>	<b>NCN110A</b>
	Triple Pole	<b>NCN300A</b>	<b>NCN301A</b>	<b>NCN302A</b>	<b>NCN303A</b>	<b>NCN304A</b>	<b>NCN306A</b>	<b>NCN310A</b>
MCB D Curve	Single Pole	<b>NDN100A</b>	<b>NDN101A</b>	<b>NDN102A</b>	<b>NDN103A</b>	<b>NDN104A</b>	<b>NDN106A</b>	<b>NDN110A</b>
	Triple Pole	<b>NDN300A</b>	<b>NDN301A</b>	<b>NDN302A</b>	<b>NDN303A</b>	<b>NDN304A</b>	<b>NDN306A</b>	<b>NDN310A</b>
RCBO B Curve	Single Pole	-	-	-	-	-	<b>ADA106U</b>	<b>ADA110U</b>
RCBO C Curve	Single Pole	-	-	-	-	-	<b>ADA156U</b>	<b>ADA160U</b>

#### MCBs Suitable for Hybrid Distribution Boards Only - See page 50 for more info

		80A	100A	125A
MCB C Curve	Single Pole	<b>HMC180T</b>	<b>HMC190T</b>	<b>HMC199T</b>
	Triple Pole	<b>HMC380T</b>	<b>HMC390T</b>	<b>HMC399T</b>
MCB D Curve	Single Pole	<b>HMD180T</b>	<b>HMD190T</b>	<b>HMD199T</b>
	Triple Pole	<b>HMD380T</b>	<b>HMD390T</b>	<b>HMD399T</b>

### Incomer Kits for 250A Boards

Description	Connection	Cat ref.
3 Pole 250A MCCB Incomer Kit (Fits within distribution board)	M8 Lug	<b>JK22503M</b>
4 Pole 250A MCCB Incomer Kit (Fits within distribution board)	M8 Lug	<b>JK22504M</b>
3 Pole 250A Switch Disconnecter Incomer Kit (Fits within distribution board)	M8 Lug	<b>JK22503S</b>
4 Pole 250A Switch Disconnecter Incomer Kit (Fits within distribution board)	M8 Lug	<b>JK22504MCS</b>
4 Pole 250A Direct Connection Kit (Fits within distribution board)	M8 Lug	<b>JK22504D</b>
4 Pole 160A Contactor Incomer Kit includes Switch Disconnecter (fits below distribution board, 450mm high)	M8 Lug	<b>JK21604C</b>
3 Pole 125A MCCB Incomer Kit (Fits within distribution board)	M8 Lug	<b>JK21253M</b>
4 Pole 125A MCCB Incomer Kit (Fits within distribution board)	M8 Lug	<b>JK21254M</b>

### Surge Protection Kits for 250A Boards

#### Characteristics:

- SPD kit for direct integration within 250A TPN boards
- Type 1 + 2 SPD - Low Up value assured through use of solid copper Earth link
- Fail safe design SPD facilitates direct connection to main busbars
- SPD suitable for TN / TT Earth arrangements including TNC-S (PME)
- CT2 type SPD to accommodate multiple Earthing systems

Description	Cat ref.
Type 1 & 2 Surge Protection Kit for 250A TP&N Boards	<b>JK201SPD *</b>
Type 2 Surge Protection Kit for 250A TP&N Boards	<b>JK202SPD *</b>



JK201SPD

### Side by Side Incomer Kits for 250A TP&N Boards

#### Characteristics:

- Complete with 3P SD incomer
- Cable set to connect to distribution boards (left)
- Suitable for all 250A board sizes

Description	Connection	Cat ref.
Dual kWh Meter Module 250A Incomer Pulsed	M8 Lug	<b>JKD250MID *</b>
Triple kWh Meter Module 250A Incomer Pulsed & Modbus	M8 Lug	<b>JKD250TMID *</b>



JKD250PM (distribution boards are not included)

### Single Meter Packs for 250A Boards

#### Characteristics:

- Meter kit for standard 250A distribution boards & hybrid 250A distribution boards.
- Each meter pack contains: meter, 3 pole CT Block, 3 x fuses & carriers on DIN rail, wiring loom, incoming shroud & instructions.

Description	Cat ref.
Multifunction Meter Kit 250A Pulsed & Modbus	<b>JK240MID *</b>
Multifunction Meter Pack 250A Pulsed & Modbus	<b>JKD2250MID *</b>



JK240PM

16A	20A	25A	32A	40A	45A	50A	63A
<b>NBN116A</b>	<b>NBN120A</b>	<b>NBN125A</b>	<b>NBN132A</b>	<b>NBN140A</b>	-	<b>NBN150A</b>	<b>NBN163A</b>
<b>NBN316A</b>	<b>NBN320A</b>	<b>NBN325A</b>	<b>NBN332A</b>	<b>NBN340A</b>	-	<b>NBN350A</b>	<b>NBN363A</b>
<b>NCN116A</b>	<b>NCN120A</b>	<b>NCN125A</b>	<b>NCN132A</b>	<b>NCN140A</b>	-	<b>NCN150A</b>	<b>NCN163A</b>
<b>NCN316A</b>	<b>NCN320A</b>	<b>NCN325A</b>	<b>NCN332A</b>	<b>NCN340A</b>	-	<b>NCN350A</b>	<b>NCN363A</b>
<b>NDN116A</b>	<b>NDN120A</b>	<b>NDN125A</b>	<b>NDN132A</b>	<b>NDN140A</b>	-	<b>NDN150A</b>	<b>NDN163A</b>
<b>NDN316A</b>	<b>NDN320A</b>	<b>NDN325A</b>	<b>NDN332A</b>	<b>NDN340A</b>	-	<b>NDN350A</b>	<b>NDN363A</b>
<b>ADA116U</b>	<b>ADA120U</b>	<b>ADA125U</b>	<b>ADA132U</b>	<b>ADA140U</b>	<b>ADA145U</b>	-	-
<b>ADA166U</b>	<b>ADA170U</b>	<b>ADA175U</b>	<b>ADA182U</b>	<b>ADA190U</b>	-	-	-



JK116EG

### DIN Extension Boxes & Door Kits for 125A Primary Boards

**Characteristics:**

- Extension boxes have plain or glazed doors and a DIN rail for mounting modular devices.
- Conforms to BS EN 62208.
- Full width enclosure provided with sixteen modular ways per row.
- For dimensions see page 66.

Description	Cat ref. Plain door	Cat ref. Glazed door	Cat ref. Residential Applications
125A 16 Way 1 Row DIN Extension Box	<b>JK116E</b>	<b>JK116EG</b>	<b>JK116EA3</b>
125A 32 Way 2 Row DIN Extension Box	<b>JK132E</b>	<b>JK132EG</b>	<b>JK132EA3</b>
125A 16 Mod DIN Plain Spare Door Kit (Amendment 3)	-	-	<b>JK116EA3-DK</b>
125A 32 Mod DIN Plain Spare Door Kit (Amendment 3)	-	-	<b>JK132EA3-DK</b>



JK216E

### DIN Extension Boxes & Door Kits for 250A Primary Boards

Description	Cat ref. Plain door	Cat ref. Glazed door
250A 16 Way 1 Row DIN Extension Box	<b>JK216E</b>	<b>JK216EG</b>
250A 32 Way 2 Row DIN Extension Box	<b>JK232E</b>	<b>JK232EG</b>
250A 16 Way 1 Row DIN Extension Box (Amendment 3)	<b>JK216EA3</b>	-
250A 32 Way 2 Row DIN Extension Box (Amendment 3)	<b>JK232EA3</b>	-
250A 16 Mod DIN Plain Spare Door Kit (Amendment 3)	<b>JK216EA3-DK</b>	-
250A 32 Mod DIN Plain Spare Door Kit (Amendment 3)	<b>JK232EA3-DK</b>	-



JK101SE



JK101DK

### Cable Spreader Boxes & Door Kits for 125A & 250A Primary Boards

**Characteristics:**

- Cable spreader boxes are used for additional cabling space therefore do not require doors. Optional door kits are available.
- Conforms to BS EN 62208.
- For dimensions see page 66.

Description	Cat ref. 125A	Cat ref. 250A
Small Cable Spreader Box (supplied without a door)	<b>JK101SE</b>	<b>JK201SE</b>
Large Cable Spreader Box (supplied without a door)	<b>JK102LE</b>	<b>JK202LE</b>
Small Cable Spreader Box Door Kit	<b>JK101DK</b>	<b>JK101DK</b>
Large Cable Spreader Box Door Kit	<b>JK102DK</b>	<b>JK102DK</b>



JK08FK

(TP&N Board not included)

### Invicta 3 125A Flush Kits

**Characteristics:**

- Suitable for flush mounting our 8 - 24 way Invicta 3 TP&N Boards - 125A.
- Distribution board not included.
- Flush mounted distribution board solution has been revalidated to meet BS EN 61439-3 - additional requirements for flush mounted solutions
- Provides low profile high aesthetic solution for open areas.

Description	Cat ref.
Flush Mounting Kit for Invicta 3 TP&N - 8 Way	<b>JK108FK</b> ★
Flush Mounting Kit for Invicta 3 TP&N - 12 Way	<b>JK112FK</b> ★
Flush Mounting Kit for Invicta 3 TP&N - 16 Way	<b>JK116FK</b> ★
Flush Mounting Kit for Invicta 3 TP&N - 18 Way	<b>JK118FK</b> ★
Flush Mounting Kit for Invicta 3 TP&N - 24 Way	<b>JK124FK</b> ★

### Side DIN Enclosures for Primary Boards

**Characteristics:**

- Side extension boxes allow for the installation of DIN rail mounted devices.
- Conforms to BS EN 62208.
- Can be horizontally or vertically attached to distribution boards.
- All Side DIN Enclosures supplied with two removable gland plates.
- For dimensions see page 65.

Description	Number of rows	Cat ref. Glazed door	Cat ref. Residential Applications
<b>Side DIN Enclosures for 125A Primary Boards</b>			
4 Way 32 Mod Side DIN Enclosure for <b>JK104B(G)</b>	2	<b>JK104BDFG</b>	<b>JK104BDFA3</b>
6 Way 32 Mod Side DIN Enclosure for <b>JK106B(G)</b>	2	<b>JK106BDFG</b>	<b>JK106BDFA3</b>
8 Way 48 Mod Side DIN Enclosure for <b>JK108B(G)</b>	3	<b>JK108BDFG</b>	<b>JK108BDFA3</b>
12 Way 64 Mod Side DIN Enclosure for <b>JK112B(G)</b>	4	<b>JK112BDFG</b>	<b>JK112BDFA3</b>
16 Way 80 Mod Side DIN Enclosure for <b>JK116B(G)</b>	5	<b>JK116BDFG</b>	<b>JK116BDFA3</b>
<b>Side DIN Enclosures for 250A Primary Boards</b>			
8 Way 80 Mod Side DIN Enclosure for <b>JK208B(G)</b>	5	<b>JK208BDFG</b>	<b>JK208BDFA3</b>
12 Way 80 Mod Side DIN Enclosure for <b>JK212B(G)</b>	5	<b>JK212BDFG</b>	<b>JK212BDFA3</b>
16 Way 96 Mod Side DIN Enclosure for <b>JK216B(G)</b>	6	<b>JK216BDFG</b>	<b>JK216BDFA3</b>
18 Way 112 Mod Side DIN Enclosure for <b>JK218B(G)</b>	7	<b>JK218BDFG</b>	<b>JK218BDFA3</b>
24 Way 128 Mod Side DIN Enclosure for <b>JK224B(G)</b>	8	<b>JK224BDFG</b>	<b>JK224BDFA3</b>



JK104BDFG



JK208BDFG

### Side Extension Boxes for 125A Primary Boards

**Characteristics:**

- Side extension boxes allow cable ways to be fitted on site.
- Conforms to BS EN 62208.
- Available in either half or full distribution board width.
- All side extension boxes supplied with two removable gland plates.
- For dimensions see page 66.

Description	Cat ref. Plain door
<b>Side Extension Boxes for 125A Primary Boards</b>	
4 Way Side Extension Box for <b>JK104B(G)</b> Full Width	<b>JK104BSF</b>
6 Way Side Extension Box for <b>JK106B(G)</b> Full Width	<b>JK106BSF</b>
8 Way Side Extension Box for <b>JK108B(G)</b> Full Width	<b>JK108BSF</b>
12 Way Side Extension Box for <b>JK112B(G)</b> Full Width	<b>JK112BSF</b>
16 Way Side Extension Box for <b>JK116B(G)</b> Full Width	<b>JK116BSF</b>
<b>Side Extension Boxes for 250A Primary Boards</b>	
8 Way Side Extension Box for <b>JK208B(G)</b> Full Width	<b>JK208BSF</b>
12 Way Side Extension Box for <b>JK212B(G)</b> Full Width	<b>JK212BSF</b>
16 Way Side Extension Box for <b>JK216B(G)</b> Full Width	<b>JK216BSF</b>
18 Way Side Extension Box for <b>JK218B(G)</b> Full Width	<b>JK218BSF</b>
24 Way Side Extension Box for <b>JK224B(G)</b> Full Width	<b>JK224BSF</b>
<b>Half Width Side Extension Boxes for 125A Primary Boards</b>	
4 Way Half Width Extension Box	<b>JK104BSH</b>
6 Way Half Width Extension Box	<b>JK106BSH</b>
8 Way Half Width Extension Box	<b>JK108BSH</b>
12 Way Half Width Extension Box	<b>JK112BSH</b>
16 Way Half Width Extension Box	<b>JK116BSH</b>
Small Half Width Filler Box	<b>JK101BSH</b>
<b>Half Width Side Extension Boxes for 250A Primary Boards</b>	
8 Way Half Width Extension Box	<b>JK208BSH</b>
12 Way Half Width Extension Box	<b>JK212BSH</b>
16 Way Half Width Extension Box	<b>JK216BSH</b>
18 Way Half Width Extension Box	<b>JK218BSH</b>
24 Way Half Width Extension Box	<b>JK224BSH</b>
Small Half Width Filler Box	<b>JK201BSH</b>

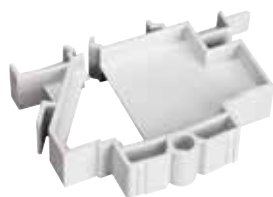


JK104BSF



JK104BSH





JK01B



JK222PK

### Invicta 3 125A & 250A & IP65 Distribution Board Accessories

Description	125A Accessories Cat ref.	250A Accessories Cat ref.
Door Locking Kit	<b>JK222PK</b>	<b>JK222PK</b>
Spare Label Pack - All Sizes (one pack)	<b>JKLABELPACK</b>	<b>JKLABELPACK</b>
Single Phasing Kit	<b>JK1SPKIT</b>	<b>JK250BSP</b>
Single Pole Busbar Blank	<b>JK01B</b>	<b>JK01B</b>
Single Pole 27mm Blank	<b>JK02B</b>	<b>JK02B</b>
JK1/2 Horizontal or Vertical Mechanical Connection Kit	<b>JK100HK</b>	<b>JK100HK</b>
Brass Gland Plate - 2.0mm	<b>JK1PLATEB</b>	<b>JK2PLATEB</b>
100A Top Tap Off Kit	<b>JK100TAP</b>	<b>JK100TAP</b>
Additional Earth Bar Kit High Integrity - 2 x 15 Connections	<b>JK030BEB</b>	<b>JK030BEB</b>
Document Clip	<b>JK01DC</b>	<b>JK01DC</b>
Neutral Connecting Block 100A	<b>KRN190</b>	<b>KRN190</b>
JK1/2 Neutral Clear Shroud	<b>JK1/NEUTRALSHROUD</b>	<b>JK1/NEUTRALSHROUD</b>
JK1/2 Busbar Stack Top Shroud	<b>JK1/2TOPSHROUD</b>	<b>JK1/2TOPSHROUD</b>
JK1/2 Main Incomer Shroud	<b>JK1/INCOMSHROUD</b>	<b>JK2/INCOMSHROUD</b>
Spare Gland Plate Including Drill Markings - 1.2mm	<b>JK1PLATEM</b>	<b>JK2PLATEM</b>



JK106BA3-DK

### Invicta 3 125A & 250A Amendment 3 Compliant Door Kit

Description	125A Cat ref.	250A Cat ref.
4 Way TPN Plain Spare Door Kit Amendment 3	<b>JK104BA3-DK</b>	-
6 Way TPN Plain Spare Door Kit Amendment 3	<b>JK106BA3-DK</b>	-
8 Way TPN Plain Spare Door Kit Amendment 3	<b>JK108BA3-DK</b>	<b>JK208BA3-DK</b>
12 Way TPN Plain Spare Door Kit Amendment 3	<b>JK112BA3-DK</b>	<b>JK212BA3-DK</b>
16 Way TPN Plain Spare Door Kit Amendment 3	<b>JK116BA3-DK</b>	<b>JK216BA3-DK</b>
18 Way TPN Plain Spare Door Kit Amendment 3	<b>JK118BA3-DK</b>	<b>JK218BA3-DK</b>
24 Way TPN Plain Spare Door Kit Amendment 3	<b>JK124BA3-DK</b>	<b>JK224BA3-DK</b>



JK06TK

### Invicta 3 125A & 250A Trunking Kits & Spares

#### Characteristics:

- Each trunking kit contains a trunking channel, lid, lid joining brackets, connecting brackets and end caps.

Description	100mm 4" Cat ref.	150mm 6" Cat ref.
Trunking Kit for Invicta 3 TP&N	<b>JK04TK</b> <sup>1</sup>	<b>JK06TK</b>
Spare Trunking Channel	<b>JK04TC</b> <sup>1</sup>	<b>JK06TC</b>
Spare Lid	<b>JK04TL</b> <sup>1</sup>	<b>JK06TL</b>
Spare End Cap	<b>JK04TE</b> <sup>1</sup>	<b>JK06TE</b>
Spare Connecting Bracket	<b>JK04TJ</b> <sup>1</sup>	<b>JK06TJ</b>
Spare Trunking Lid Joining Bracket	<b>JK04TP</b> <sup>1</sup>	<b>JK06TP</b>

<sup>1</sup> 4" trunking not suitable for JKD Power & Lighting Boards.

A photograph of two men in a factory or workshop setting, focused on working on a network switch. The man on the left is wearing a dark blue long-sleeved shirt and white gloves, looking intently at the device. The man on the right is wearing a dark blue t-shirt and is smiling as he works with a red tool on the switch. The background is filled with industrial equipment and bright overhead lights.

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**:hager**



JN204BG



JN204B

### Invicta 3 Panelboards (250A Incoming 125A Outgoing)

#### Characteristics

- Comprises of IP3XD rated enclosure, pan assembly, twin neutral and earth bars.
- Conforms to BS EN 61439-2.  $I_{NA} = 250A$ ,  $I_{NC} = 125A$ ,  $I_{CC} = 25kA$ .
- Supplied without incoming kit, JN 250A incomer kit must be used.
- Form 3B type 2 using outgoing terminal shield (form 3A without terminal shield).
- Removable side gland plates are standard. Removable gland plates are provided top and bottom for ease of installation.
- For dimensions see page 73.

#### Cable Capacity Incomers & Outgoers

- Incomers: 3 and 4 pole incomers, cable capacity 150mm<sup>2</sup>, max lug width 25mm, M8 bolt, direct connection kit.
- Outgoers: 1 & 3 pole MCCB 70mm<sup>2</sup> flexible, 95mm<sup>2</sup> solid.

#### Options

- Key lock, meter pack, DIN rail, extension box, spreader box.

#### Outgoing MCCBs

- Adjustable thermal options on triple pole devices.

Description	Cat ref. Plain door	Cat ref. Glazed door
4 Triple Pole Ways 250A Panelboard	<b>JN204B</b>	<b>JN204BG</b>
6 Triple Pole Ways 250A Panelboard	<b>JN206B</b>	<b>JN206BG</b>
8 Triple Pole Ways 250A Panelboard	<b>JN208B</b>	<b>JN208BG</b>
12 Triple Pole Ways 250A Panelboard	<b>JN212B</b>	<b>JN212BG</b>
16 Triple Pole Ways 250A Panelboard	<b>JN216B</b>	<b>JN216BG</b>

### Incomer Kits

Description	Max cable capacity	Cat ref.
3 Pole 250A MCCB Incomer Kit (Adj. Thermal 0.63, 0.8, 1) 40kA (Magnetic 5, 7, 9, 11 x $I_{\Delta n}$ )	M8 Lug	<b>JN223BM</b>
4 Pole 250A MCCB Incomer Kit (Adj. Thermal 0.63, 0.8, 1) 40kA (Magnetic 5, 7, 9, 11 x $I_{\Delta n}$ )	M8 Lug	<b>JN224BM</b>
3 Pole 250A Non-Auto MCCB Incomer Kit	M8 Lug	<b>JN223BS</b>
4 Pole 250A Non-Auto MCCB Incomer Kit	M8 Lug	<b>JN224BS</b>
250A Direct Connection Kit	M8 Lug	<b>JN224BD</b>
Palm Kit for Larger Cable >50mm <sup>2</sup> to 2 x 120mm <sup>2</sup> with 10mm Bolt Fixing		<b>JN250SL *</b>

### 250A JN Panelboard Surge Protection Device Kit

#### Characteristics

- SPD kit for direct integration within 250A Panelboards
- Fail safe design SPD facilitates direct connection to main busbars
- SPD suitable for TN / TT Earth arrangements including TNC-S (PME)
- CT2 type SPD to accommodate multiple Earthing systems
- Solid copper Earth link for enhanced  $U_p$  performance
- Supplied with mounting & connection set



JN202SPD



JN201SPD (Device only)

Description	Cat ref. Plain door
SPD kit Type 1+2 for JN Panelboards	<b>JN201SPD *</b>
SPD kit Type 2 for JN Panelboards	<b>JN202SPD *</b>



### DIN Rail Extension Boxes

#### Characteristics

- Supplied with DIN Rail & without gland plate (utilise removed gland plate from panelboard)
- DIN rail extensions boxes have plain or glazed doors and DIN rail chassis.
- JK2 side extension boxes can be used with this range see page 25.
- For dimensions see page 67.



JN201BE

Description	Cat ref.	Cat ref.
	Plain Door	Glazed Door
1 Row 26 Mod (300mm Height)	<b>JN201BE</b>	<b>JN201BEG</b>
2 Row 52 Mod (450mm Height)	<b>JN203BE</b>	<b>JN203BEG</b>

### Cable Spreader Boxes & Door Kits

#### Characteristics

- Supplied without gland plates (utilise removed gland plate from panelboard)
- Cable spreader boxes are used for additional cabling space therefore do not require doors. Optional door kits are available.
- For dimensions see page 73.



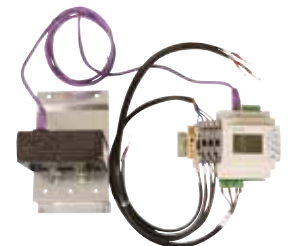
JN205BE

Description	Cat ref.
Small (300mm Height) (Door not included)	<b>JN205BE</b>
Large (450mm Height) (Door not included)	<b>JN206BE</b>
Door Kit for Small Cable Spreader Box	<b>JN205DK</b>
Door Kit for Large Cable Spreader Box	<b>JN206DK</b>

### Meter Pack 250A

#### Characteristics

- Comprises of a digital multi function meter, three control circuit fuse carriers, wiring harness and CTs.
- The meter pack fits directly into the main panelboard.
- For metering incoming supply to the panelboard.



JN201PM

Description	Cat ref.
Multifunction Meter Pack 250A Pulsed & Modbus	<b>JN201PM</b>
MID Multifunction Meter Pack 250A Pulsed & Modbus	<b>JN201MID</b>

### Accessories

Description	Cat ref.
Touch Up Paint 30ml	<b>JF95A</b>
Allen Key Set	<b>JF296A</b>
Gland Plate for Invicta 3 (250A)	<b>JN2PLATE</b>
Key Lock with One Key	<b>JK222PK</b>
x125 Frame Blank (3x blanks required per triple pole way)	<b>JN001BP</b>
Multi Padlock Plate (for integral toggle lock, fits to toggle for up to 3 padlocks max ø8mm)	<b>HXA039H</b>
Neutral Barrier Kit	<b>JN201NS</b>



JN001BP

**Outgoing Devices** - See page 60 for more info

#### MCCBs - Single Pole

Rating.	18kA Fixed Thermal	25kA Fixed Thermal
16A	<b>HDA014E *</b>	<b>HHA014E *</b>
20A	<b>HDA018E *</b>	<b>HHA018E *</b>
25A	<b>HDA023E *</b>	<b>HHA023E *</b>
32A	<b>HDA030E *</b>	<b>HHA030E *</b>
40A	<b>HDA038Z</b>	<b>HHA038Z</b>
50A	<b>HDA048Z</b>	<b>HHA048Z</b>
63A	<b>HDA061Z</b>	<b>HHA061Z</b>
80A	<b>HDA078Z</b>	<b>HHA078Z</b>
100A	<b>HDA098Z</b>	<b>HHA098Z</b>
125A	<b>HDA123Z</b>	<b>HHA123Z</b>

#### MCCBs - Triple Pole Adjustable Thermal

Rating.	18kA Adjustable Thermal 0.63, 0.8, 1 x I <sub>n</sub>	25kA Adjustable Thermal 0.63, 0.8, 1 x I <sub>n</sub>
25A	<b>HDA025U</b>	<b>HHA025U</b>
40A	<b>HDA040U</b>	<b>HHA040U</b>
63A	<b>HDA063U</b>	<b>HHA063U</b>
80A	<b>HDA080U</b>	<b>HHA080U</b>
100A	<b>HDA100U</b>	<b>HHA100U</b>
125A	<b>HDA125U</b>	<b>HHA125U</b>



JF406B

### Invicta 3 Panelboards (400A Incoming 125A Outgoing)

#### Characteristics

- Comprises of IP3XD enclosure, pan assembly, neutral bar and earth bar.
- Conforms to BS EN 61439-2.  $I_{nA} = 400A$ ,  $I_{nC} = 125A$ ,  $I_{CC} = 50kA$ .
- Supplied without incoming kit, one of the incomer kits listed below must be used.
- Form 3B type 2 using outgoing terminal shield (form 3A without terminal shield).
- Removable gland plates are provided top and bottom for ease of installation.
- For dimensions see page 74.

#### Cable Capacity Incomers & Outgoers

- Incomers: 3 and 4 pole incomers, cable capacity: M12 bolt, direct connection kit: M10 hexagonal bolt.
- Outgoers: 1 & 3 pole MCCB: 70mm<sup>2</sup> flexible/ 95mm<sup>2</sup> solid.

#### Options

- Key lock, meter pack, DIN rail, extension box, spreader box.

#### Outgoing MCCBs

- Adjustable thermal options on triple pole.

Description	Cat ref. Plain Door	Cat ref. Glazed door
6 Triple Pole Ways 400A Panelboard	<b>JF406B</b>	<b>JF406BG</b>
8 Triple Pole Ways 400A Panelboard	<b>JF408B</b>	<b>JF408BG</b>
12 Triple Pole Ways 400A Panelboard	<b>JF412B</b>	<b>JF412BG</b>
16 Triple Pole Ways 400A Panelboard	<b>JF416B</b>	<b>JF416BG</b>
18 Triple Pole Ways 400A Panelboard	<b>JF418B</b>	<b>JF418BG</b>

### Incomer Kits for 400A Panelboards

Description	Max cable capacity solid	Cat ref.
3 Pole 400A MCCB Incomer Kit 50kA Electronic LSI MCCB, I <sub>r</sub> adjustable 0.4 – 1.0 x I <sub>n</sub>	M12 Lug	<b>JF443BM</b>
4 Pole 400A MCCB Incomer Kit 50kA Electronic LSI MCCB, I <sub>r</sub> adjustable 0.4 – 1.0 x I <sub>n</sub>	M12 Lug	<b>JF444BM</b>
3 Pole 400A Switch Disconnecter Incomer Kit	M12 Lug	<b>JF443BS</b>
4 Pole 400A Switch Disconnecter Incomer Kit	M12 Lug	<b>JF444BS</b>
400A Direct Connection Kit	M10 Lug	<b>JF444BD</b>



JF801SPD

### 400A JF Panelboard Surge Protection Device Kit

#### Characteristics

- SPD kit for direct integration within 400A Panelboards
- Type 1 + 2 SPD with Integrated fuses facilitates direct connect to main busbars
- SPD suitable for TN / TT Earth arrangements including TNC-S (PME)
- CT2 type SPD to accommodate multiple Earthing systems
- Solid copper Earth link for assured lower U<sub>p</sub> performance

Description	Cat ref.
SPD kit Type 1 + 2 for JF Panelboards	<b>JF801SPD *</b>



JF801E

### DIN Rail Extension Boxes for 400A Panelboards

#### Characteristics

- DIN rail extension boxes have plain or glazed doors and DIN rail chassis.
- Cable spreader boxes are used for additional cabling space therefore do not require doors. If doors are desired optional door kits are available.
- Supplied with DIN Rail and without gland plate (utilise removed gland plate from panelboard).
- For dimensions see page 74.

Description	Cat ref. Plain Door	Cat ref. Glazed Door
1 Row 34 Mod (300mm Height)	<b>JF801E</b>	<b>JF801EG</b>
2 Row 68 Mod (450mm Height)	<b>JF803E</b>	<b>JF803EG</b>



### Cable Spreader Boxes & Door Kits for 400A Panelboards

#### Characteristics

- Supplied without gland plates (utilise removed gland plate from panelboard).
- Cable spreader boxes are used for additional cabling space therefore do not require doors. Optional door kits are available.
- For dimensions see page 74.



JF805E

Description	Cat ref.
Small (300mm Height) (Door not included)	<b>JF805E</b>
Large (450mm Height) (Door not included)	<b>JF806E</b>
Small Cable Spreader Box Door Kit	<b>JF805DK</b>
Large Cable Spreader Box Door Kit	<b>JF806DK</b>

### Meter Pack 400A

#### Characteristics

- These meter packs fit directly into the main panelboard. Suitable for single incoming cable.

Description	Cat ref.
Multifunction Meter Pack 400A Pulsed & Modbus	<b>JF403PM</b>

### Accessories

Description	Cat ref.
Locking Kit for Incoming Device (All Ratings)	<b>HXD039H</b>
Allen Key Set	<b>JF296A</b>
Gland Plate for Invicta 3 400A Range	<b>JFPLATE</b>
Key Lock with One Key	<b>JK222PK</b>
x125 Frame 1 Pole Blank (3x blanks required per triple pole)	<b>JN001BP</b>
Outgoer Locking Kit (fits to toggle for up to 3 padlocks max ø 8mm <sup>2</sup> )	<b>HXA039H</b>
Terminal Cover x160 1 Pole Long	<b>HYA029H</b>
Terminal Cover x160 3 Pole Long	<b>HYA021H</b>



JN001BP



HXD039H

### Outgoing Devices - See page 60 for more info

#### MCCBs - Single Pole

Rating.	18kA Fixed Thermal	25kA Fixed Thermal
16A	<b>HDA014E *</b>	<b>HHA014E *</b>
20A	<b>HDA018E *</b>	<b>HHA018E *</b>
25A	<b>HDA023E *</b>	<b>HHA023E *</b>
32A	<b>HDA030E *</b>	<b>HHA030E *</b>
40A	<b>HDA038Z</b>	<b>HHA038Z</b>
50A	<b>HDA048Z</b>	<b>HHA048Z</b>
63A	<b>HDA061Z</b>	<b>HHA061Z</b>
80A	<b>HDA078Z</b>	<b>HHA078Z</b>
100A	<b>HDA098Z</b>	<b>HHA098Z</b>
125A	<b>HDA123Z</b>	<b>HHA123Z</b>

#### MCCBs - Triple Pole Adjustable Thermal

Rating.	18kA Adjustable Thermal 0.63, 0.8, 1 x I <sub>n</sub>	25kA Adjustable Thermal 0.63, 0.8, 1 x I <sub>n</sub>
25A	<b>HDA025U</b>	<b>HHA025U</b>
40A	<b>HDA040U</b>	<b>HHA040U</b>
63A	<b>HDA063U</b>	<b>HHA063U</b>
80A	<b>HDA080U</b>	<b>HHA080U</b>
100A	<b>HDA100U</b>	<b>HHA100U</b>
125A	<b>HDA125U</b>	<b>HHA125U</b>



JF608B

### Invicta 3 Panelboards (630A/800A Incoming 125A Outgoing)

#### Characteristics

- Comprises of IP3XD enclosure, pan assembly, neutral bar and earth bar.
- Conforms to BS EN 61439-2.  $I_{nA} = 630/800A$ ,  $I_{nC} = 125A$ ,  $I_{cC} = 50kA$ .
- Supplied without incoming kit, one of the incomer kits listed below must be used.
- Form 3B type 2 using outgoing terminal shield (form 3A without terminal shield).
- Removable gland plates are provided top and bottom for ease of installation.
- Switch Disconnecter: 630A/800A, MCCB: 400A/630A, Direct connection: 800A.
- Incoming cable lugged via M12 hexagonal bolt.
- For dimensions see page 74.

#### Cable Capacity Incomers & Outgoers

- Incomers: 400A: 2 x 240mm<sup>2</sup>, 630A: 2 x 240mm<sup>2</sup> / 2 x 300mm<sup>2</sup>.
- Outgoers: Single pole up to 125A - 70mm<sup>2</sup> flexible, 95mm<sup>2</sup> solid, Triple pole up to 250A - 150mm<sup>2</sup> flexible.

#### Outgoing MCCBs

- Adjustable thermal options on triple pole.

Description	Cat ref. Plain Door	Cat ref. Glazed door
8 Triple Pole Ways 630A Panelboard	<b>JF608B</b>	<b>JF608BG</b>
12 Triple Pole Ways 630A/800A Panelboard	<b>JF812B</b>	<b>JF812BG</b>
18 Triple Pole Ways 630A/800A Panelboard	<b>JF818B</b>	<b>JF818BG</b>

<sup>1</sup> Max allowed incomer of 630A on this panelboard.

### Invicta 3 Panelboards (630A/800A Incoming 125A/250A Outgoing)

#### Characteristics

- These boards will accept a range of MCCB frame sizes: 125A frame: 16-125A single pole/triple pole, 250A frame: 80-250A triple pole only
- $I_{nA} = 630/800A$ ,  $I_{nC} = 250A$ ,  $I_{cC} = 50kA$ .

Description	Cat ref. Plain Door	Cat ref. Glazed door
6 Triple Pole Ways Panelboard (2 x 250A ① + 4 x 125A ②)	<b>JF60204B</b> <sup>1</sup>	<b>JF60204BG</b> <sup>1</sup>
8 Triple Pole Ways Panelboard (2 x 250A ① + 6 x 125A ②)	<b>JF80206B</b>	<b>JF80206BG</b>
8 Triple Pole Ways Panelboard (4 x 250A ① + 4 x 125A ②)	<b>JF80404B</b>	<b>JF80404BG</b>
12 Triple Pole Ways Panelboard (2 x 250A ① + 10 x 125A ②)	<b>JF80210B</b>	<b>JF80210BG</b>
12 Triple Pole Ways Panelboard (4 x 250A ① + 8 x 125A ②)	<b>JF80408B</b>	<b>JF80408BG</b>
18 Triple Pole Ways Panelboard (4 x 250A ① + 14 x 125A ②)	<b>JF80414B</b>	<b>JF80414BG</b>
18 Triple Pole Ways Panelboard (6 x 250A ① + 12 x 125A ②)	<b>JF80612B</b>	<b>JF80612BG</b>

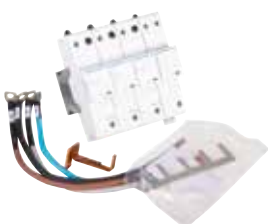
\* Select the required 630A/800A rated panelboard (e.g. **JF80206BG**) and add the suffix **800LBS** e.g. **JF80206BG800LBS**

### Incomer Kits for 630A/800A Panelboards

#### Characteristics

- A 300mm cable spreader box (**JF805E**) is required for all incomer kits.

Description	Max cable capacity	Cat ref.
4 Pole 400A Load Break Switch 25kA	M10 Lug	<b>JF844BSW</b>
4 Pole 630A Load Break Switch 25kA	M12 Lug	<b>JF864BSW</b>
4 Pole 800A Load Break Switch	M12 Lug	<b>*800LBS</b>
800A Direct Connection Kit 4 Pole	M12 Lug	<b>JF884BD</b>
3 Pole 400A MCCB Incomer Kit 50kA Electronic LSI MCCB, $I_r$ adjustable 0.4 – 1.0 x $I_n$	M12 Lug	<b>JF843BM</b>
4 Pole 400A MCCB Incomer Kit Electronic LSI MCCB, $I_r$ adjustable 0.4 – 1.0 x $I_n$	M12 Lug	<b>JF844BM</b>
3 Pole 630A MCCB Incomer Kit 50kA Electronic LSI MCCB, $I_r$ adjustable 0.4 – 1.0 x $I_n$	M12 Lug	<b>JF863BM</b>
4 Pole 630A MCCB Incomer Kit 50kA Electronic LSI MCCB, $I_r$ adjustable 0.4 – 1.0 x $I_n$	M12 Lug	<b>JF864BM</b>



JF801SPD

### 630/800A JF Panelboard Surge Protection Device Kit

#### Characteristics

- SPD kit for direct integration within JF Panelboards
- Type 1 + 2 SPD with Integrated fuses facilitate direct connect to main busbars
- SPD suitable for TN / TT Earth arrangements including TNC-S (PME)
- CT2 type SPD to accommodate multiple Earthing systems

Description	Cat ref.
SPD kit Type 1 + 2 for JF Panelboards	<b>JF801SPD</b> *

### DIN Rail Extension Boxes for 630A/800A Panelboards

#### Characteristics

- DIN rail extension boxes have plain or glazed doors and DIN rail chassis.
- Cable spreader boxes are used for additional cabling space therefore do not require doors. Optional door kits are available.
- Supplied with DIN rail and without gland plate (utilise removed gland plate from panelboard).
- For dimensions see page 74.



JF801E

Description	Cat ref.	Cat ref.
	Plain Door	Glazed door
1 Row 34 Mod (300mm Height)	<b>JF801E</b>	<b>JF801EG</b>
2 Row 68 Mod (450mm Height)	<b>JF803E</b>	<b>JF803EG</b>

### Cable Spreader Boxes & Door Kits for 630A/800A Panelboards

#### Characteristics

- Supplied without gland plates (utilise removed gland plate from panelboard).
- Cable spreader boxes are used for additional cabling space therefore do not require doors. Optional door kits are available.
- For dimensions see page 74.

Description	Cat ref.
Small (300mm Height) (Door not included)	<b>JF805E</b>
Large (450mm Height) (Door not included)	<b>JF806E</b>
Small Cable Spreader Box Door Kit	<b>JF805DK</b>
Large Cable Spreader Box Door Kit	<b>JF806DK</b>

### Meter Pack for 630A/800A Panelboards

#### Characteristics

- These meter packs fit directly into the main panelboard. Spreader box required to mount CT's.
- For Meter Enclosures see page 39.

Description	Cat ref.
Multifunction Meter Pack 800A Pulsed & Modbus	<b>JF803PM</b>

### Outgoing Devices Thermal Magnetic - See page 60 - 62 for more info

#### 1 MCCBs x250 40kA - Triple Pole

Rating.	Adjustable Thermal & Magnetic
100A	<b>HNB100H</b>
125A	<b>HNB125H</b>
160A	<b>HNB160H</b>
200A	<b>HNB200H</b>
250A	<b>HNB250H</b>

1 & 2 - Please see left hand page for corresponding numbers.

#### 2 MCCBs - 125A 18kA Single Pole

Rating.	18kA Fixed Thermal	25kA Fixed Thermal
16A	<b>HDA014E *</b>	<b>HHA014E *</b>
20A	<b>HDA018E *</b>	<b>HHA018E *</b>
25A	<b>HDA023E *</b>	<b>HHA023E *</b>
32A	<b>HDA030E *</b>	<b>HHA030E *</b>
40A	<b>HDA038Z</b>	<b>HHA038Z</b>
50A	<b>HDA048Z</b>	<b>HHA048Z</b>
63A	<b>HDA061Z</b>	<b>HHA061Z</b>
80A	<b>HDA078Z</b>	<b>HHA078Z</b>
100A	<b>HDA098Z</b>	<b>HHA098Z</b>
125A	<b>HDA123Z</b>	<b>HHA123Z</b>

#### 2 MCCBs - 125A 25kA Triple Pole Adjustable Thermal

Rating.	18kA Adjustable Thermal 0.63, 0.8, 1 x I <sub>n</sub>	25kA Adjustable Thermal 0.63, 0.8, 1 x I <sub>n</sub>
25A	<b>HDA025U</b>	<b>HHA025U</b>
40A	<b>HDA040U</b>	<b>HHA040U</b>
63A	<b>HDA063U</b>	<b>HHA063U</b>
80A	<b>HDA080U</b>	<b>HHA080U</b>
100A	<b>HDA100U</b>	<b>HHA100U</b>
125A	<b>HDA125U</b>	<b>HHA125U</b>



JHF812B

### Invicta 3 Panelboards (800A Incoming, 125A Outgoing)

#### Characteristics

- Comprises of IP3XD enclosure, pan assembly, neutral bar and earth bar
- Conforms to BS EN 61439-2.  $I_{NA} = 800A$ ,  $I_{NC} = 125A$ ,  $I_{CC} = 50kA$ .
- Supplied without incoming kit, one of the incomer kits listed below must be used.
- Form 3B type 2 using outgoing terminal shield (form 3A without terminal shield).
- Removable gland plates are provided top and bottom for ease of installation.
- MCCB: 800A 3 or 4 pole.
- Incoming cable lugs 44mm pad with 2 x M12 hexagonal bolt.
- For dimensions see page 75.

#### Cable Capacity Incomers & Outgoers

Incomers: 800A MCCB: 2 x 300mm<sup>2</sup>,

Outgoers: Single pole up to 125A - 70mm<sup>2</sup> flexible, 95mm<sup>2</sup> solid, Triple pole up to 250A - 150mm<sup>2</sup> flexible.

#### Outgoing MCCBs

- Adjustable thermal options on triple pole.

Description	Cat ref. Plain Door	Cat ref. Glazed door
12 Triple Pole Ways 800A Panelboard	<b>JHF812B</b>	<b>JHF812BG</b>
18 Triple Pole Ways 800A Panelboard	<b>JHF818B</b>	<b>JHF818BG</b>



JHF80408B

### Invicta 3 Panelboards (800A Incoming 125A / 250A Outgoing)

- These boards will accept two MCCB frame sizes: 125A frame: 16 - 125A, 250A frame: 100 - 250A.
- $I_{NA} = 800A$ ,  $I_{NC} = 250A$ ,  $I_{CC} = 50kA$ .

Description	Cat ref. Plain Door	Cat ref. Glazed door
8 Triple Pole Ways 800A Panelboard (2 x 250A ① + 6 x 125A ②)	<b>JHF80206B</b>	<b>JHF80206BG</b>
8 Triple Pole Ways 800A Panelboard (4 x 250A ① + 4 x 125A ②)	<b>JHF80404B</b>	<b>JHF80404BG</b>
12 Triple Pole Ways 800A Panelboard (2 x 250A ① + 10 x 125A ②)	<b>JHF80210B</b>	<b>JHF80210BG</b>
12 Triple Pole Ways 800A Panelboard (4 x 250A ① + 8 x 125A ②)	<b>JHF80408B</b>	<b>JHF80408BG</b>
18 Triple Pole Ways 800A Panelboard (4 x 250A ① + 14 x 125A ②)	<b>JHF80414B</b>	<b>JHF80414BG</b>
18 Triple Pole Ways 800A Panelboard (6 x 250A ① + 12 x 125A ②)	<b>JHF80612B</b>	<b>JHF80612BG</b>

### MCCB Incomer Kits for 800A Panelboards

Description	Palm lug max (width)	Cat ref.
800A 3 Pole MCCB Incomer Auto 50kA	60mm	<b>JHF883BM</b>
800A 4 Pole MCCB Incomer Auto 50kA	60mm	<b>JHF884BM</b>



JN001BP

### Accessories

Description	Cat ref.
Locking Kit for MCCB Incoming Device (All Ratings)	<b>HXD039H</b>
Allen Key Set	<b>JF296A</b>
End Plate for Invicta 3 800A Range	<b>JFPLATE</b>
Key Lock with One Key	<b>JK222PK</b>
x125 Frame 1 Pole Blank (3x blanks required per triple pole)	<b>JN001BP</b>
x250 Frame 3 Pole Blank (1x blank required per triple pole)	<b>JF003BP</b>
Outgoer Locking Kit (fits to toggle for up to 3 padlocks max ø 8mm <sup>2</sup> )	<b>HXA039H</b>

### Surge Protection SPD Options

#### Note:

- JF801SPD can not be fitted in JH\* Panelboards
- Please contact our engineered solutions team for factory fitted SPD options - 01952 677 899

### DIN Rail Extension Boxes for 800A Panelboards

- DIN rail extension boxes have plain or glazed doors and DIN rail chassis.
- Cable spreader boxes are used for additional cabling space therefore do not require doors. Optional door kits are available.
- Supplied with DIN rail and without gland plate (utilise removed gland plate from panelboard).
- For dimensions see page 74.

Description	Cat ref. Plain Door	Cat ref. Glazed door
1 Row 34 Mod (300mm Height)	<b>JF801E</b>	<b>JF801EG</b>
2 Row 68 Mod (450mm Height)	<b>JF803E</b>	<b>JF803EG</b>

### Cable Spreader Boxes for 800A Panelboards

- Supplied without gland plates (utilise removed gland plate from panelboard).
- Cable spreader boxes are used for additional cabling space therefore do not require doors. Optional door kits are available.
- For dimensions see page 74.

Description	Cat ref.
Small (300mm Height) (Door not included)	<b>JF805E</b>
Large (450mm Height) (Door not included)	<b>JF806E</b>
Small Cable Spreader Box Door Kit	<b>JF805DK</b>
Large Cable Spreader Box Door Kit	<b>JF806DK</b>

### Meter Pack for 800A Panelboards

- These meter packs fit directly into the main panelboard. Spreader box required to mount CT's.
- For Meter Enclosures see page 39.

Description	Cat ref.
Multifunction Meter Pack 800A Pulsed & Modbus	<b>JF803PM</b>

**Outgoing Devices Thermal Magnetic** - See page 60 - 62 for more info.

#### 1 MCCBs x250 40kA - Triple Pole

Rating.	Adjustable Thermal & Magnetic
100A	<b>HNB100H</b>
125A	<b>HNB125H</b>
160A	<b>HNB160H</b>
200A	<b>HNB200H</b>
250A	<b>HNB250H</b>

#### 2 MCCBs - 125A 18kA Single Pole

Rating.	18kA Fixed Thermal	25kA Fixed Thermal
16A	<b>HDA014E *</b>	<b>HHA014E *</b>
20A	<b>HDA018E *</b>	<b>HHA018E *</b>
25A	<b>HDA023E *</b>	<b>HHA023E *</b>
32A	<b>HDA030E *</b>	<b>HHA030E *</b>
40A	<b>HDA038Z</b>	<b>HHA038Z</b>
50A	<b>HDA048Z</b>	<b>HHA048Z</b>
63A	<b>HDA061Z</b>	<b>HHA061Z</b>
80A	<b>HDA078Z</b>	<b>HHA078Z</b>
100A	<b>HDA098Z</b>	<b>HHA098Z</b>
125A	<b>HDA123Z</b>	<b>HHA123Z</b>

#### 2 MCCBs - 125A 25kA Triple Pole Adjustable Thermal

Rating.	18kA Adjustable Thermal 0.63, 0.8, 1 x I <sub>n</sub>	25kA Adjustable Thermal 0.63, 0.8, 1 x I <sub>n</sub>
25A	<b>HDA025U</b>	<b>HHA025U</b>
40A	<b>HDA040U</b>	<b>HHA040U</b>
63A	<b>HDA063U</b>	<b>HHA063U</b>
80A	<b>HDA080U</b>	<b>HHA080U</b>
100A	<b>HDA100U</b>	<b>HHA100U</b>
125A	<b>HDA125U</b>	<b>HHA125U</b>





JF12504SM



JF450CF



JF4508TM

### Meter Enclosures for JF Panelboards

- Blanking plates not included (utilise removed blanking plate from panelboard).
- When selecting outgoing metering, the panelboard metering system is easily configured by selecting a side, top or combination that matches the panelboard (e.g. for the **JF406B/G** board, you can select a **JF12504SM** side mounted meter enclosure that can house 4 **ECM01** panel mounted meters). When using both side and top/bottom meter enclosures, corner filler enclosures are available.
- For help choosing your metering solution see the Method Chart on page 75.
- Please contact us for any non-standard requirements or assembly.
- For dimensions see page 77.

Suitable for board type / Description	Spaces for Meters	Cat ref.
<b>Side Meter Enclosures</b>		
6/8 Way JF Board	4 x Din 96 Cut-Outs	<b>JF12504SM</b>
12 Way JF Board	6 x Din 96 Cut-Outs	<b>JF14006SM</b>
16 Way JF Board	8 x Din 96 Cut-Outs	<b>JF15508SM</b>
18 Way JF Board	9 x Din 96 Cut-Outs	<b>JF17009SM</b>
Blanking Plate DIN 96	-	<b>JF96BP</b>
<b>Top/Bottom Meter Enclosures</b>		
300mm Enclosure	4 x DIN 96 Cut-Outs	<b>JF3004TM</b>
450mm Enclosure	8 x DIN 96 Cut-Outs	<b>JF4508TM</b>
Blanking Plate DIN 96	-	<b>JF96BP</b>
<b>Corner Filler Enclosures</b>		
300mm Corner Filler Side Enclosure	-	<b>JF300CF</b>
450mm Corner Filler Side Enclosure	-	<b>JF450CF</b>



JN11004SM



JN3003TM

### Side/Top/Bottom Meter Enclosures for JN Panelboards

#### Characteristics

- Blanking plates not included.
- For meters see page 39.
- For dimensions see page 77.

Suitable for board type / Description	Apertures for Meters	Cat ref.
<b>Side Meter Enclosures</b>		
4 Way JN Board	2 x DIN 96 Cut-Outs	<b>JN9502SM</b>
6/8 Way JN Board	4 x DIN 96 Cut-Outs	<b>JN11004SM</b>
12 Way JN Board	6 x DIN 96 Cut-Outs	<b>JN12506SM</b>
16 Way JN Board	8 x DIN 96 Cut-Outs	<b>JN15508SM</b>
<b>Top/Bottom Meter Enclosures</b>		
300mm Enclosure	3 x DIN 96 Cut-Outs	<b>JN3003TM</b>
450mm Enclosure	6 x DIN 96 Cut-Outs	<b>JN4506TM</b>
Blanking Plate	-	<b>JF96BP</b>
<b>Corner Filler Enclosures</b>		
300mm Corner Filler Side Enclosure JN	-	<b>JN300CF</b>
450mm Corner Filler Side Enclosure JN	-	<b>JN450CF</b>

### Single Phase Direct Connect kWh Meters - MID Approved

**Description:**

- MID approved meter range (except EC...180T)
- A range of both direct connect and CT supplied din rail mounted meters

**Characteristics:**

- CT supplied meters compatible with 1 A / 5A CT's (not suitable for use with cables / ct's from page 38)
- Choice of communication options – pulse output kWh, Modbus or Mbus



ECN140D

Description	Width (1 Mod =17.5mm)	Cat ref.
<b>40A kWh Meters</b>		
1Ph kWh Meter Direct 40A Pulsed Output 1M	1 Mod	<a href="#">ECN140D *</a>
1Ph kWh Meter Direct 40A 1M Pulsed Output MID	1 Mod	<a href="#">ECP140D *</a>
1Ph kWh Meter Direct 40A 1M MBUS MID	1 Mod	<a href="#">ECM140D *</a>
1Ph kWh Meter Direct 40A 1M MODBUS MID	1 Mod	<a href="#">ECR140D *</a>



ECA180T

### 3 x 80A kWh Meters - Not MID Approved

1Ph kWh Meter Direct 3x80A 4M Pulsed Output	4 Mod	<a href="#">ECP180T *</a>
1Ph kWh Meter Direct 3x80A 4M MBUS	4 Mod	<a href="#">ECM180T *</a>
1Ph kWh Meter Direct 3x80A 4M MODBUS	4 Mod	<a href="#">ECR180T *</a>

### 80A kWh Meters

1Ph kWh Meter Direct 80A 2M Pulsed Output MID	2 Mod	<a href="#">ECP180D *</a>
1Ph kWh Meter Direct 80A 2M MBUS MID	2 Mod	<a href="#">ECM180D *</a>
1Ph kWh Meter Direct 80A 2M MODBUS MID	2 Mod	<a href="#">ECR180D *</a>

### Three Phase Direct Connect kWh Meters - MID Approved

Description	Width (1 Mod =17.5mm)	Cat ref.
<b>80A kWh Meters</b>		
3Ph kWh Meter Direct 80A 4M MID	4 Mod	<a href="#">ECP380D *</a>
3Ph kWh Meter Direct 80A 4M MBUS MID	4 Mod	<a href="#">ECM380D *</a>
3Ph kWh Meter Direct 80A 4M MODBUS MID	4 Mod	<a href="#">ECR380D *</a>



ECM310D

### 125A kWh Meters

3Ph kWh Meter Direct 125A 6M S0 MID	6 Mod	<a href="#">ECP310D *</a>
3Ph kWh Meter Direct 125A 6M MBUS MID	6 Mod	<a href="#">ECM310D *</a>
3Ph kWh Meter Direct 125A 6M MODBUS MID	6 Mod	<a href="#">ECR310D *</a>

### Three Phase CT Fed kWh Meters

Description	Width (1 Mod =17.5mm)	Cat ref.
<b>1-5A kWh Meters</b>		
3Ph kWh Meter via CT 1-5A 4M Pulsed Output MID	4 Mod	<a href="#">ECP300C *</a>
3Ph kWh Meter via CT 1-5A 4M MBUS MID	4 Mod	<a href="#">ECM300C *</a>
3Ph kWh Meter via CT 1-5A 4M MODBUS MID	4 Mod	<a href="#">ECR300C *</a>



ECM300C



HGR96EWC

### Panel Mounted DIN 96 x 96 Meters

- Panel mounted meters suitable for use with Hager MCCB Panelboard enclosures
- DIN 96 x 96 mounting
- Cables not supplied with meters
- CT, CT cable & voltage reference cables to be selected from 38 - 39

Description	Cat ref.
Panel Mounted Multifunction Meter Pulse/Modbus	<b>ECM01</b>
Hager by Rayleigh MID Panel Mounted Meter Pulse/Modbus	<b>HGR96EWC *</b>
Hager by Rayleigh MID Panel Mounted Meter Mbus	<b>HGR96EWMB *</b>



HGR41EWC

### DIN Rail Mounted Meters

- Cables & CT supplied separately
- CT, CT Cable & voltage reference cables to be selected from this page.

Description	Cat ref.
DIN Rail Mounted Plug-in Meter CT Fed	<b>JKM01</b>
DIN Rail Mounted Plug-in Meter CT Fed - Dual Channel Input	<b>JKM02</b>
Hager by Rayleigh DIN Rail Mounted Plug-in Meter CT Fed	<b>HGR41EWC</b>



PGMF300

### Meter Cables

Description	Cat ref. Meter to Meter Supply Cable	Cat ref. Voltage Supply Cable
<b>Meter Supply Cable - PVC</b>		
1m - Voltage Supply Cable with Fuse Carrier (For JF Meter Enclosures)	-	<b>JF130VMF</b>
1m - Voltage Supply Cable with Fuse Carrier (For JN Meter Enclosures)	-	<b>JN130VMF</b>
0.15m - Hi Flex Supply Cable	<b>PGMFT150</b>	-
0.30m - Hi Flex Supply Cable	<b>PGMFT300</b>	<b>PGMF300</b>
0.50m - Hi Flex Supply Cable	<b>PGMFT500</b>	<b>PGMF500</b>
1.00m - Hi Flex Supply Cable	<b>PGMFT1000</b>	<b>PGMF1000</b>
1.30m - Hi Flex Supply Cable	<b>PGMFT1300</b>	<b>PGMF1300</b>
2.00m - Hi Flex Supply Cable	<b>PGMFT2000</b>	<b>PGMF2000</b>
3.00m - Hi Flex Supply Cable	<b>PGMFT3000</b>	<b>PGMF3000</b>



PGMFT300



PGRJ1000

### RJ45 Connection Cable

Description	Cat ref.
0.30m - RJ45 Connector Cable 67 7003	<b>PGRJ300</b>
0.50m - RJ45 Connector Cable 67 L7005 LSZH	<b>PGRJ500</b>
1.00m - RJ45 Connector Cable 67 L7005 LSZH	<b>PGRJ1000</b>
1.50m - RJ45 Connector Cable 67 L7005 LSZH	<b>PGRJ1500</b>
2.00m - RJ45 Connector Cable 67 L7005 LSZH	<b>PGRJ2000</b>
3.00m - RJ45 Connector Cable 67 L7005 LSZH	<b>PGRJ23000</b>

**3 Phase CT Splitter Box**

- This 3 Phase current transformer splitter box allows the separate monitoring of each phase of a three phase current transformer on individual energy meters.



JFS03

Description	Cat ref.
3 Phase CT Splitter Box	<b>JFS03</b>

**Plug-in CTs**

- No leads supplied with these CTs (RJ45 connection cable)  
 - For technical data see page 82.  
 - Suitable for use with ECM01, JKM01, JKM02 & Hager by Rayleigh meters.



EC1260CT

Description	Cat ref. 125A	Cat ref. 250A	Cat ref. 400A
60A 3 Phase CT	<b>EC1260CT</b>	<b>EC2560CT</b>	-
100A 3 Phase CT	<b>EC12100CT</b>	<b>EC25100CT</b>	-
125A 3 Phase CT	<b>EC12125CT</b>	<b>EC25125CT</b>	-
160A 3 Phase CT	<b>EC12160CT</b>	<b>EC25160CT</b>	-
200A 3 Phase CT	-	<b>EC25200CT</b>	-
250A 3 Phase CT	-	<b>EC25250CT</b>	<b>EC40250CT</b>
400A 3 Phase CT	-	-	<b>EC40400CT</b>
630A 3 Phase CT	-	-	<b>EC40630CT</b>
800A 3 Phase CT	-	-	<b>EC80800CT</b>

**Converter**

Description	Cat ref.
Standard CT to plug in adapter	<b>JFA03</b>



JFA03

**Accessories**

- Supply voltage connector plugs are for making up your own power cable looms.

Description	Cat ref.
Supply Voltage Connector Plugs Voltage IN (Male) Connector	<b>PG9523MALE</b>
Supply Voltage Connector Plugs Voltage OUT (Female) connector	<b>PG9522FEMALE</b>
CT Output and RJ45 Lead Tester	<b>JFT03</b>



JFT03 PG9522FEMALE



JF12504SM



JFG416U

### Cable Capacity

20A = 16mm <sup>2</sup>
32A = 16mm <sup>2</sup>
63A = 25mm <sup>2</sup>
100A = 95mm <sup>2</sup>
125A = 95mm <sup>2</sup>
160A = 95mm <sup>2</sup>
200A = 240mm <sup>2</sup>
250A = 240mm <sup>2</sup>
315A = 240mm <sup>2</sup>
400A = 240mm <sup>2</sup>
630A = 2 x 300mm <sup>2</sup>
800A = 2 x 300mm <sup>2</sup>

### Fuse Combination Switches 20 - 800A

#### Characteristics

- Provides individual protection and control of circuits.
- Enclosures up to 100A have been designed to provide adequate cabling space without the need for additional cable spreader boxes.
- Operation of the device is through a door mounted rotary handle which is mechanically interlocked to prevent access to live conductors when the switch is in the on position. The handle is padlockable in the off position.
- All versions will accept standard BS 88 fuse links and can be converted to switch disconnector by fitting copper links.

#### Utilisation category

- AC22B - 630 - 800A
- AC23A - 20 - 630A

#### Product features

- Conforms to: BS EN 60947-3
- Rated IP31.

**Note:** Maximum rated fuse links are fitted in all fuse combination switches.

**Note:** Copper links for conversion to isolating switches

- For dimensions see page 84.
- For technical information see page 86.

Description	Cat ref.	Cat ref. Cable extension boxes if required
<b>Fuse Combination Switches Single Pole &amp; Switched Neutral</b>		
20A Fuse Combination Switch SP&SN	<b>JFB202U</b>	-
32A Fuse Combination Switch SP&SN	<b>JFB203U</b>	-
63A Fuse Combination Switch SP&SN	<b>JFD206U</b>	-
100A Fuse Combination Switch SP&SN	<b>JFE210U</b>	<b>JZA701</b>
<b>Fuse Combination Switches Triple Pole &amp; Neutral</b>		
20A Fuse Combination Switch TP&N	<b>JFB302U</b>	-
32A Fuse Combination Switch TP&N	<b>JFB303U</b>	-
63A Fuse Combination Switch TP&N	<b>JFD306U</b>	-
100A Fuse Combination Switch TP&N	<b>JFE310U</b>	<b>JZA701</b>
125A Fuse Combination Switch TP&N	<b>JFG312U</b>	<b>JZA701</b>
160A Fuse Combination Switch TP&N	<b>JFG316U</b>	<b>JZA701</b>
200A Fuse Combination Switch TP&N	<b>JFG320U</b>	<b>JZA701</b>
250A Fuse Combination Switch TP&N	<b>JFG325U</b>	<b>JZA701</b>
315A Fuse Combination Switch TP&N	<b>JFH331U</b>	<b>JZA702</b>
400A Fuse Combination Switch TP&N	<b>JFH340U</b>	<b>JZA702</b>
630A Fuse Combination Switch TP&N	<b>JFI363U</b>	<b>JZA703</b>
800A Fuse Combination Switch TP&N	<b>JFI380U</b>	<b>JZA703</b>
<b>Fuse Combination Switches Triple Pole &amp; Switched Neutral</b>		
20A Fuse Combination Switch TP&SN	<b>JFB402U</b>	-
32A Fuse Combination Switch TP&SN	<b>JFB403U</b>	-
63A Fuse Combination Switch TP&SN	<b>JFD406U</b>	-
100A Fuse Combination Switch TP&SN	<b>JFE410U</b>	<b>JZA701</b>
125A Fuse Combination Switch TP&SN	<b>JFG412U</b>	<b>JZA701</b>
160A Fuse Combination Switch TP&SN	<b>JFG416U</b>	<b>JZA701</b>
200A Fuse Combination Switch TP&SN	<b>JFG420U</b>	<b>JZA701</b>
250A Fuse Combination Switch TP&SN	<b>JFG425U</b>	<b>JZA701</b>
315A Fuse Combination Switch TP&SN	<b>JFH431U</b>	<b>JZA702</b>
400A Fuse Combination Switch TP&SN	<b>JFH440U</b>	<b>JZA702</b>
630A Fuse Combination Switch TP&SN	<b>JFI463U</b>	<b>JZA703</b>
800A Fuse Combination Switch TP&SN	<b>JFI480U</b>	<b>JZA703</b>
<b>Copper Links</b>		
63A	<b>JC60L</b>	-
100A	<b>JC10L</b>	-
125 / 200A	<b>JC20L</b>	-
315 / 400A	<b>JC40L</b>	-
630A	<b>JC63L</b>	-

### Switch Fuses

#### Characteristics

- Amendment 3 compliant switch fuses have a full metal construction to comply with BS 7671, when used in residential applications
- For dimensions see page 87.

Description	Cat ref.	Cat ref. Amd 3 door
4 Module Metal Unit 1 x 100A Isolator, AC22A. Connection Capacity: 50mm <sup>2</sup> Rigid Conductor, 35mm <sup>2</sup> Flexible Conductor, 1 x 63A Fuse	<b>IU44-16</b>	<b>IU44-16D</b>
4 Module Metal Unit 1 x 100A Isolator, AC22A. Connection Capacity: 50mm <sup>2</sup> Rigid Conductor, 35mm <sup>2</sup> Flexible Conductor, 1 x 80A Fuse	<b>IU44-18</b>	<b>IU44-18D</b>
4 Module Metal Unit 1 x 100A Isolator, AC22A. Connection Capacity: 50mm <sup>2</sup> Rigid Conductor, 35mm <sup>2</sup> Flexible Conductor, 1 x 100A Fuse	<b>IU44-11</b>	<b>IU44-11D</b>



IU44-11

### Switch Disconnectors 20-800A

#### Characteristics

- Designed to provide individual isolation of circuits up to 800A.
- Provides adequate cabling space without the need for additional cable spreader boxes.
- Operation of the device is through a door mounted rotary handle which is mechanically interlocked to prevent access to live conductors when the switch is in the on position. The handle is padlockable in the off position.

#### Utilisation category

- AC-21, AC-22 (page 88)

#### Product features

- Conforms to: BS EN 60947-3
- IP rating: IP31.
- For technical information see page 84 - 88.



JAB402B

Rating	Cat ref.	Cat ref. Cable extension boxes if required
<b>Switch Disconnectors TP&amp;N</b>		
160A	<b>JAC316</b>	<b>JZA700</b>
200A	<b>JAE320</b>	<b>JZA701</b>
250A	<b>JAE325</b>	<b>JZA701</b>
315A	<b>JAG331</b>	<b>JZA701</b>
400A	<b>JAG340</b>	<b>JZA701</b>
630A	<b>JAH363</b>	<b>JZA702</b>
800A	<b>JAH380</b>	<b>JZA702</b>

#### Cable Capacity

- 20A = 16mm<sup>2</sup>
- 32A = 16mm<sup>2</sup>
- 63A = 25mm<sup>2</sup>
- 100A = 95mm<sup>2</sup>
- 125A = 95mm<sup>2</sup>
- 160A = 95mm<sup>2</sup>
- 200A = 240mm<sup>2</sup>
- 250A = 240mm<sup>2</sup>
- 315A = 240mm<sup>2</sup>
- 400A = 240mm<sup>2</sup>
- 630A = 2 x 300mm<sup>2</sup>
- 800A = 2 x 300mm<sup>2</sup>

#### Switch Disconnectors TP&SN

20A	<b>JAB402B</b>	-
32A	<b>JAB403B</b>	-
63A	<b>JAB406B</b>	-
100A	<b>JAB410B</b>	-
125A	<b>JAC412B</b>	-
160A	<b>JAC416</b>	<b>JZA700</b>
200A	<b>JAE420</b>	<b>JZA701</b>
250A	<b>JAE425</b>	<b>JZA701</b>
315A	<b>JAG431</b>	<b>JZA701</b>
400A	<b>JAG440</b>	<b>JZA701</b>
630A	<b>JAH463</b>	<b>JZA702</b>
800A	<b>JAH480</b>	<b>JZA702</b>





JG01S

**Cable Capacity**  
 20 - 40A = 16mm<sup>2</sup>  
 63 - 100A = 35mm<sup>2</sup>

### IP65 Switch Disconnectors

- A range of enclosed switch disconnectors to IP65 for individual isolation.
- The devices are padlockable in three positions and offer plenty of cabling space. Clip on auxiliary contacts can be fitted retrospectively.

**Product features**

- Conforms to: BS EN 60947-3.
- IP65 to BS EN 60529.

**Range:** TPN 10, 16, 25, 40, 63 & 80A.

**Utilisation category**

- AC- 21.
- AC- 22.
- For technical information see page 87.

I <sub>n</sub> AC 21	I <sub>n</sub> AC 22	Cat ref.
20A	10A	<b>JG00S</b>
25A	16A	<b>JG01S</b>
40A	25A	<b>JG02S</b>
63A	40A	<b>JG03S</b>
80A	63A	<b>JG04S</b>
100A	80A	<b>JG05S</b>

### Auxiliary Changeover Contacts

Description	Cat ref.
1 Normally Open / 1 Normally Closed Auxiliary Contacts 16-80A	<b>JG10A</b>
2 Normally Open / 2 Normally Closed Auxiliary Contacts 16-80A	<b>JG20A</b>



JG440DC

**Cable Capacity**  
 20 - 40A = 16mm<sup>2</sup>  
 63 - 100A = 35mm<sup>2</sup>

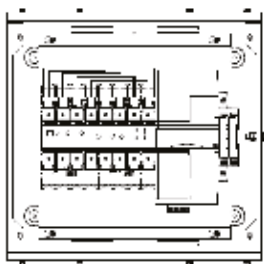
### IP65 Switch Disconnectors - DC

- Used in applications such as photovoltaic installations where they isolate the incoming side of the inverter.
- They are supplied in grey with a black handle so that it is easy to distinguish them from the yellow/red a.c. switches used on the outgoing side of the inverter.

**Product Features**

- Conforms to: BS EN 60947-3 IP65 to BS EN 60529.
- An interlock ensures that the cover cannot be removed in both the ON and PADLOCKED OFF positions.

Rating	Utilisation Category	Cat ref.
12A at 500V DC-21B, 10A at 600V DC-21B 8A at 800V DC-21B, 6A at 440V DC-22B	DC-21B	<b>JG416DC</b>
16A at 500V DC-21B, 12A at 600V DC-21B 10A at 800V DC-21B, 6A at 440V DC-22B	DC-21B DC-22B	<b>JG425DC</b>
20A at 500V DC-21B, 16A at 600V DC-21B 12A at 800V DC-21B, 16A at 440V DC-22B	DC-21B DC-22B	<b>JG440DC</b>



Interior diagram JK\*\*\*ATS

### Enclosed ATS

**Characteristics**

- A range of enclosed Automatic Transfer Switches in IP30 rated enclosure. Available in ratings 40A – 125A.
- Conforming to BS EN 60947-3 & IEC 60947-6-1
- Overvoltage Category II
- Pollution degree 3
- Electromagnetic compatibility – Environment category – A
- Rated voltage of assembly: U<sub>n</sub> = 415V a.c. 50Hz
- Rated operational voltage of assembly: U<sub>o</sub> = 415V a.c. 50Hz
- Rated insulation voltage of assembly: U<sub>i</sub> = 690V a.c. 50Hz (Power Circuits) / 300V (Control Circuits)
- Rated impulse voltage of assembly: U<sub>imp</sub> = 6kV (Power Circuits) / 2.5kV (Control Circuits)
- Rated current of assembly: I<sub>na</sub> / I<sub>nc</sub> = 125A max
- Rated peak withstand current: I<sub>pk</sub> = 105kA conditional (table 7, n = 2.1)
- Rated short-time withstand current: I<sub>sw</sub> = 7kA / 0.3 secs  
: I<sub>sw</sub> = 4kA / 1.0 sec
- For dimensions see page 76.

Description	Cat ref.
40A Enclosed ATS unit	<b>JK140ATS *</b>
63A Enclosed ATS unit	<b>JK163ATS *</b>
80A Enclosed ATS unit	<b>JK180ATS *</b>
100A Enclosed ATS unit	<b>JK1100ATS *</b>
125A Enclosed ATS unit	<b>JK1125ATS *</b>

### Enclosed MCCBs

- The devices are mounted in IP31 enclosures, with removable cable entry plates located on the top and bottom.
- Single & triple pole devices are equipped with fully rated neutral links.

#### Non-Auto MCCB

- Triple pole: 125A - 250A - 400A - 630A.
- Four pole: 125A - 250A - 400A - 630A.

#### Specification

- Conforms to BS EN 61439-2.

#### Cable Capacity

- 63 - 125A: Flexible cable: min 6mm<sup>2</sup>, max 70mm<sup>2</sup>, Rigid cable: min 6mm<sup>2</sup>, max 95mm<sup>2</sup>.
- RCD add-on adjustable from 0.03A, 0.1A, 0.3A, 1A, 3A, 6A.
- Time delay - Instantaneous, 60ms, 150ms, 300ms, 500ms, 1s.
- For technical details and dimensions see page 90.

Description	I <sub>cu</sub>	Cat ref.
<b>Enclosed MCCBs Single Pole &amp; Neutral</b>		
63A Single Pole Enclosed MCCB	18kA	<b>JG25BM</b>
100A Single Pole Enclosed MCCB	18kA	<b>JG28BM</b>
125A Single Pole Enclosed MCCB	18kA	<b>JG31BM</b>
<b>Enclosed MCCBs Triple Pole and Neutral (63-125A)</b>		
63A 3-Pole Enclosed MCCB (40A-50A 63A)	18kA	<b>JG26BM</b>
100A 3-Pole Enclosed MCCB (63A-80A-100A)	18kA	<b>JG29BM</b>
125A 3-Pole Enclosed MCCB (80A-100-125A)	18kA	<b>JG32BM</b>
125A 3-Pole Enclosed Non-Auto MCCB	Non-Auto	<b>JG34BS</b>
<b>Enclosed MCCBs Triple Pole and Neutral (160-250A)</b>		
160A 3-Pole Enclosed MCCB (Adjustable)	25kA	<b>JG36BM</b>
250A 3-Pole Enclosed MCCB (Adjustable)	25kA	<b>JG40BM</b>
250A 3-Pole Enclosed Non-Auto MCCB	Non-Auto	<b>JG42BS</b>
<b>Enclosed MCCBs Triple Pole and Neutral (400-630A)</b>		
400A 3-Pole Enclosed MCCB (Adjustable)	50kA	<b>JG44BM</b>
400A 3-Pole Enclosed Non-Auto MCCB	Non-Auto	<b>JG46BS</b>
630A 3-Pole Enclosed MCCB (Adjustable)	50kA	<b>JG48BM</b>
630A 3-Pole Enclosed Non-Auto MCCB	Non-Auto	<b>JG50BS</b>
<b>Enclosed MCCBs Four Pole (63-125A)</b>		
63A 4-Pole Enclosed MCCB (Adjustable)	18kA	<b>JG27BM</b>
63A 4-Pole Enclosed MCCB (Adjustable) + RCD Add-on	18kA	<b>JG27BR</b>
100A 4-Pole Enclosed MCCB (Adjustable)	18kA	<b>JG30BM</b>
100A 4-Pole Enclosed MCCB (Adjustable) + RCD Add-on	18kA	<b>JG30BR</b>
125A 4-Pole Enclosed MCCB (Adjustable)	18kA	<b>JG33BM</b>
125A 4-Pole Enclosed Non-Auto MCCB	Non-Auto	<b>JG35BS</b>
<b>Enclosed MCCBs Four Pole (160-250A)</b>		
160A 4-Pole Enclosed MCCB (Adjustable)	25kA	<b>JG37BM</b>
160A 4-Pole Enclosed MCCB RCD Add-on	25kA	<b>JG37BR</b>
200A 4-Pole Enclosed MCCB RCD Add-on	25kA	<b>JG38BR</b>
250A 4-Pole Enclosed MCCB (Adjustable)	25kA	<b>JG41BM</b>
250A 4-Pole Enclosed Non-Auto MCCB	Non-Auto	<b>JG43BS</b>
<b>Enclosed MCCBs Four Pole (400-630A)</b>		
400A 4-Pole Enclosed MCCB (Adjustable)	50kA	<b>JG45BM</b>
375A 4-Pole Enclosed MCCB RCD Add-on	50kA	<b>JG45BR</b>
400A 4-Pole Enclosed Non-Auto MCCB	Non-Auto	<b>JG47BS</b>
630A 4-Pole Enclosed MCCB (Adjustable)	50kA	<b>JG49BM</b>
630A 4-Pole Enclosed Non-Auto MCCB	Non-Auto	<b>JG51BS</b>



JG38BR



JG41BM



JG45BM



NCN116A

### MCBs 10kA

#### Characteristics

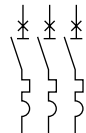
- Provides protection against short circuits, protection against overload current, control, isolation, trip free mechanism.

#### Isolation

- The state of isolation is clearly indicated by the "OFF" mechanical position on the toggle with the green colour.
- Connection capacity: 25mm<sup>2</sup> flexible conductor, 35mm<sup>2</sup> rigid conductor.
- Conforms to: BS EN 60898-2 (10kA), BS EN 60947-2 (15kA).



Rating	Width (1 Mod = 17.5mm)	Cat ref. "B" Curve	Cat ref. "C" Curve	Cat ref. "D" Curve
<b>Single Pole MCBs</b>				
0.5A	1 Mod	-	<b>NCN100A</b>	<b>NDN100A</b>
1A	1 Mod	-	<b>NCN101A</b>	<b>NDN101A</b>
2A	1 Mod	-	<b>NCN102A</b>	<b>NDN102A</b>
3A	1 Mod	-	<b>NCN103A</b>	<b>NDN103A</b>
4A	1 Mod	-	<b>NCN104A</b>	<b>NDN104A</b>
6A	1 Mod	<b>NBN106A</b>	<b>NCN106A</b>	<b>NDN106A</b>
10A	1 Mod	<b>NBN110A</b>	<b>NCN110A</b>	<b>NDN110A</b>
16A	1 Mod	<b>NBN116A</b>	<b>NCN116A</b>	<b>NDN116A</b>
20A	1 Mod	<b>NBN120A</b>	<b>NCN120A</b>	<b>NDN120A</b>
25A	1 Mod	<b>NBN125A</b>	<b>NCN125A</b>	<b>NDN125A</b>
32A	1 Mod	<b>NBN132A</b>	<b>NCN132A</b>	<b>NDN132A</b>
40A	1 Mod	<b>NBN140A</b>	<b>NCN140A</b>	<b>NDN140A</b>
50A	1 Mod	<b>NBN150A</b>	<b>NCN150A</b>	<b>NDN150A</b>
63A	1 Mod	<b>NBN163A</b>	<b>NCN163A</b>	<b>NDN163A</b>



Rating	Width (1 Mod = 17.5mm)	Cat ref. "B" Curve	Cat ref. "C" Curve	Cat ref. "D" Curve
<b>Triple Pole MCBs</b>				
0.5A	3 Mod	-	<b>NCN300A</b>	<b>NDN300A</b>
1A	3 Mod	-	<b>NCN301A</b>	<b>NDN301A</b>
2A	3 Mod	-	<b>NCN302A</b>	<b>NDN302A</b>
3A	3 Mod	-	<b>NCN303A</b>	<b>NDN303A</b>
4A	3 Mod	-	<b>NCN304A</b>	<b>NDN304A</b>
6A	3 Mod	<b>NBN306A</b>	<b>NCN306A</b>	<b>NDN306A</b>
10A	3 Mod	<b>NBN310A</b>	<b>NCN310A</b>	<b>NDN310A</b>
16A	3 Mod	<b>NBN316A</b>	<b>NCN316A</b>	<b>NDN316A</b>
20A	3 Mod	<b>NBN320A</b>	<b>NCN320A</b>	<b>NDN320A</b>
25A	3 Mod	<b>NBN325A</b>	<b>NCN325A</b>	<b>NDN325A</b>
32A	3 Mod	<b>NBN332A</b>	<b>NCN332A</b>	<b>NDN332A</b>
40A	3 Mod	<b>NBN340A</b>	<b>NCN340A</b>	<b>NDN340A</b>
50A	3 Mod	<b>NBN350A</b>	<b>NCN350A</b>	<b>NDN350A</b>
63A	3 Mod	<b>NBN363A</b>	<b>NCN363A</b>	<b>NDN363A</b>

**MCBs 10kA (Continued)**

Rating	Width (1 = 17.5mm)	Cat ref. "B" Curve	Cat ref. "C" Curve	Cat ref. "D" Curve
<b>Double Pole MCBs</b>				
0.5A	2 Mod	-	<b>NCN200A</b>	<b>NDN200A</b>
1A	2 Mod	-	<b>NCN201A</b>	<b>NDN201A</b>
2A	2 Mod	-	<b>NCN202A</b>	<b>NDN202A</b>
3A	2 Mod	-	<b>NCN203A</b>	-
4A	2 Mod	-	<b>NCN204A</b>	<b>NDN204A</b>
6A	2 Mod	<b>NBN206A</b>	<b>NCN206A</b>	<b>NDN206A</b>
10A	2 Mod	<b>NBN210A</b>	<b>NCN210A</b>	<b>NDN210A</b>
16A	2 Mod	<b>NBN216A</b>	<b>NCN216A</b>	<b>NDN216A</b>
20A	2 Mod	<b>NBN220A</b>	<b>NCN220A</b>	<b>NDN220A</b>
25A	2 Mod	<b>NBN225A</b>	<b>NCN225A</b>	<b>NDN225A</b>
32A	2 Mod	<b>NBN232A</b>	<b>NCN232A</b>	<b>NDN232A</b>
40A	2 Mod	<b>NBN240A</b>	<b>NCN240A</b>	<b>NDN240A</b>
50A	2 Mod	<b>NBN250A</b>	<b>NCN250A</b>	<b>NDN250A</b>
63A	2 Mod	<b>NBN263A</b>	<b>NCN263A</b>	<b>NDN263A</b>
<b>Four Pole MCBs</b>				
0.5A	4 Mod	-	<b>NCN400A</b>	<b>NDN400A</b>
1A	4 Mod	-	<b>NCN401A</b>	<b>NDN401A</b>
2A	4 Mod	-	<b>NCN402A</b>	<b>NDN402A</b>
3A	4 Mod	-	<b>NCN403A</b>	<b>NDN403A</b>
4A	4 Mod	-	<b>NCN404A</b>	<b>NDN404A</b>
6A	4 Mod	<b>NBN406A</b>	<b>NCN406A</b>	<b>NDN406A</b>
10A	4 Mod	<b>NBN410A</b>	<b>NCN410A</b>	<b>NDN410A</b>
16A	4 Mod	<b>NBN416A</b>	<b>NCN416A</b>	<b>NDN416A</b>
20A	4 Mod	<b>NBN420A</b>	<b>NCN420A</b>	<b>NDN420A</b>
25A	4 Mod	<b>NBN425A</b>	<b>NCN425A</b>	<b>NDN425A</b>
32A	4 Mod	<b>NBN432A</b>	<b>NCN432A</b>	<b>NDN432A</b>
40A	4 Mod	<b>NBN440A</b>	<b>NCN440A</b>	<b>NDN440A</b>
50A	4 Mod	<b>NBN450A</b>	<b>NCN450A</b>	<b>NDN450A</b>
63A	4 Mod	<b>NBN463A</b>	<b>NCN463A</b>	<b>NDN463A</b>



NCN316A



NCN416A

**Accessories**

Description	Cat ref.
Padlockable Locking Kit for MCB, RCCB & RCBO	<b>MZN175</b>
Padlock with 2 keys 3/4"	<b>JK25A</b>



MZN175  
(device & padlock  
not included)



ACB125



ADB106



AEC132

### RCBOs - Single Pole - 10kA B & C Curve Type A

#### Characteristics

- Compact protection devices which combine the overcurrent functions of an MCB with the earth fault functions of an RCCB in a single unit.
- These devices are single pole & solid neutral.
- Locking kit = Cat ref.: **MZN175**.

#### Technical Data

- Conforms to IEC 61009-1, IEC 61009-2-2, EN 61009-1.

#### Sensitivities (fixed)

- 10mA, 30mA & 100mA.
- Flying neutral lead: 700mm.
- Terminal Capacities, 25mm<sup>2</sup> rigid, 16mm<sup>2</sup> flexible.

#### Operating Voltage

- 230V a.c.

Current rating	Width (1 Mod = 17.5mm)	B Curve Cat ref.	C Curve Cat ref.
<b>Sensitivity 30mA (10kA) B / C Curve, Type A</b>			
6A RCBO Single Pole 30mA 10kA	1 Mod	<b>ADA106U</b>	<b>ADA156U</b>
10A RCBO Single Pole 30mA 10kA	1 Mod	<b>ADA110U</b>	<b>ADA160U</b>
16A RCBO Single Pole 30mA 10kA	1 Mod	<b>ADA116U</b>	<b>ADA166U</b>
20A RCBO Single Pole 30mA 10kA	1 Mod	<b>ADA120U</b>	<b>ADA170U</b>
25A RCBO Single Pole 30mA 10kA	1 Mod	<b>ADA125U</b>	<b>ADA175U</b>
32A RCBO Single Pole 30mA 10kA	1 Mod	<b>ADA132U</b>	<b>ADA182U</b>
40A RCBO Single Pole 30mA 10kA	1 Mod	<b>ADA140U</b>	<b>ADA190U</b>
45A RCBO Single Pole 30mA 10kA	1 Mod	<b>ADA145U</b>	<b>ADA195U</b>
<b>Sensitivity 10mA (10kA) B / C Curve, Type A</b>			
6A RCBO Single Pole 10mA 10kA	1 Mod	<b>ACA106U</b>	<b>ACA156U</b>
16A RCBO Single Pole 10mA 10kA	1 Mod	<b>ACA116U</b>	<b>ACA166U</b>
25A RCBO Single Pole 10mA 10kA	1 Mod	<b>ACA125U</b>	<b>ACA175U</b>
32A RCBO Single Pole 10mA 10kA	1 Mod	<b>ACA132U</b>	<b>ACC182U</b>
<b>Sensitivity 100mA (10kA) C Curve, Type A</b>			
10A RCBO Single Pole 100mA 10kA	1 Mod	-	<b>AEC110</b>
16A RCBO Single Pole 100mA 10kA	1 Mod	-	<b>AEC116</b>
20A RCBO Single Pole 100mA 10kA	1 Mod	-	<b>AEC120</b>
25A RCBO Single Pole 100mA 10kA	1 Mod	-	<b>AEC125</b>
32A RCBO Single Pole 100mA 10kA	1 Mod	-	<b>AEC132</b>

### Arc Fault Detection Devices

#### Characteristics:

- Protection device which combines an MCB with Arc Fault Detection.
- Conforms to BS EN 62606
- Current rating 6A - 40A 10kA
- Available in B & C curve
- Terminal Capacities, 25mm<sup>2</sup> rigid, 16mm<sup>2</sup> flexible.

Description	Cat ref.
<b>B Curve Arc Fault Detection Devices (10kA)</b>	
6A 2P Arc Fault Detection Device + MCB B Curve 10kA	<a href="#">ARC506U *</a>
10A 2P Arc Fault Detection Device + MCB B Curve 10kA	<a href="#">ARC510U *</a>
13A 2P Arc Fault Detection Device + MCB B Curve 10kA	<a href="#">ARC513U *</a>
16A 2P Arc Fault Detection Device + MCB B Curve 10kA	<a href="#">ARC516U *</a>
20A 2P Arc Fault Detection Device + MCB B Curve 10kA	<a href="#">ARC520U *</a>
25A 2P Arc Fault Detection Device + MCB B Curve 10kA	<a href="#">ARC525U *</a>
32A 2P Arc Fault Detection Device + MCB B Curve 10kA	<a href="#">ARC532U *</a>
40A 2P Arc Fault Detection Device + MCB B Curve 10kA	<a href="#">ARC540U *</a>
<b>C Curve Arc Fault Detection Devices (10kA)</b>	
6A 2P Arc Fault Detection Device + MCB C Curve 10kA	<a href="#">ARC556U *</a>
10A 2P Arc Fault Detection Device + MCB C Curve 10kA	<a href="#">ARC560U *</a>
13A 2P Arc Fault Detection Device + MCB C Curve 10kA	<a href="#">ARC563U *</a>
16A 2P Arc Fault Detection Device + MCB C Curve 10kA	<a href="#">ARC566U *</a>
20A 2P Arc Fault Detection Device + MCB C Curve 10kA	<a href="#">ARC570U *</a>
25A 2P Arc Fault Detection Device + MCB C Curve 10kA	<a href="#">ARC575U *</a>
32A 2P Arc Fault Detection Device + MCB C Curve 10kA	<a href="#">ARC582U *</a>
40A 2P Arc Fault Detection Device + MCB C Curve 10kA	<a href="#">ARC590U *</a>



ARC506U



ARC540U





ADC816F

### RCBOs - Single Pole & Switched Neutral - 4.5kA C Curve

#### Characteristics

- Compact protection devices which provide MCB overcurrent protection and RCCB earth fault protection in a single unit.
- The device switches both the line and neutral conductors. All ratings have 30mA earth fault protection. The units feature indicators which show whether a trip is due to an overcurrent or earth fault.

#### Technical Data

- Breaking capacity: 4.5kA.
- Conforms to EN 61009-1.
- Operating Voltage: 230V a.c. -15% +10% 50Hz.
- Mechanical life: 20,000 operations.
- Connection Capacity: Rigid conductor 25mm<sup>2</sup>, Flexible conductor 16mm<sup>2</sup>
- **Note:** Not for use in fixed busbar consumer units or distribution boards.

Current rating	Width (1 Mod = 17.5mm)	C Curve Cat ref.
6A RCBO SPSN 4.5kA	2 Mod	<b>ADC806F</b>
10A RCBO SPSN 4.5kA	2 Mod	<b>ADC810F</b>
16A RCBO SPSN 4.5kA	2 Mod	<b>ADC816F</b>
20A RCBO SPSN 4.5kA	2 Mod	<b>ADC820F</b>
25A RCBO SPSN 4.5kA	2 Mod	<b>ADC825F</b>
32A RCBO SPSN 4.5kA	2 Mod	<b>ADC832F</b>



ADA990U

### RCBOs - Single Pole & Switched Neutral - 6kA B & C Curve

#### Characteristics

- Compact protection devices which provide MCB overcurrent protection and RCCB earth fault protection in a single unit.
- The device switches both the line and neutral conductors. All ratings have 30mA earth fault protection. The units feature indicators which show whether tripping is due to an overcurrent or earth fault.

#### Technical Data

- Breaking capacity: 6kA.
- Conforms to EN 61009-1.
- Operating Voltage: 230V a.c. +10%/-15% 50Hz.
- Mechanical life: 20,000 operations.
- Connection Capacity: Rigid conductor 25mm<sup>2</sup>, Flexible conductor 16mm<sup>2</sup>
- Neutral connection flying lead - 700mm.

Current rating	Width (1 Mod = 17.5mm)	B Curve Cat ref.	C Curve Cat ref.
6A RCBO SPSN 6kA	2 Mod	<b>ADA906U</b>	<b>ADA956U</b>
10A RCBO SPSN 6kA	2 Mod	<b>ADA910U</b>	<b>ADA960U</b>
16A RCBO SPSN 6kA	2 Mod	<b>ADA916U</b>	<b>ADA966U</b>
20A RCBO SPSN 6kA	2 Mod	<b>ADA920U</b>	<b>ADA970U</b>
25A RCBO SPSN 6kA	2 Mod	<b>ADA925U</b>	<b>ADA975U</b>
32A RCBO SPSN 6kA	2 Mod	<b>ADA932U</b>	<b>ADA982U</b>
40A RCBO SPSN 6kA	2 Mod	<b>ADA940U</b>	<b>ADA990U</b>



BD163T

### Triple Pole RCD Add-On Blocks for MCB Devices

#### Characteristics

- Compatible with **NBN, NCN & NDN** range of MCB devices.
- Can be used in combination with any Hager 3 pole 10kA MCB up to 63A. Requires the use of the adjacent outgoing way.
- Type A RCD provides added protection against 'pulsating d.c. current'
- 3 Phase earth leakage protection up to 63A.
- One module add-on block + MCB combinations suit all Hager distribution boards.
- BS EN 61009-1 Appendix G.
- For technical details see page 101.

Sensitivity I <sub>Δn</sub>	I <sub>n</sub> A	Width (35mm)	Cat ref.
30mA	63A	4 Mod	<b>BD163T</b>
100mA	63A	4 Mod	<b>BE163T</b>
300mA	63A	4 Mod	<b>BF163T</b>

### RCCB Add-On Blocks for MCB Devices

#### Characteristics

- Provide earth fault protection when associated with the 10kA (types **NBN, NCN, NDN**) range of MCBs.
- Designed to be fitted to the right hand side of 2 and 4 pole MCBs and the completed unit provides protection against overload, short circuit & earth faults.
- Protection against nuisance tripping.
- All devices have a test facility.
- Note: Not for use in fixed busbar distribution boards.

#### Technical Data

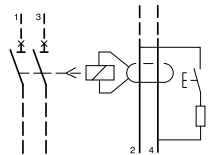
- Nominal voltage 230 - 400V.
- Selective (time delay) versions are available in 100mA & 300mA.
- Connection Capacity: 16mm<sup>2</sup> Flexible, 25mm<sup>2</sup> Rigid.
- Conforms to BS EN 61009 Appendix G



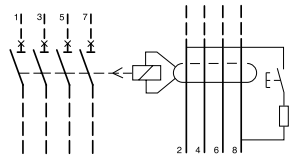
BD264



BD464



Sensitivity $I_{\Delta n}$	$I_n$ A	Width (1 Mod = 17.5mm)	Cat ref.
<b>Double Pole RCCB Add-On Blocks</b>			
30mA	63A	2 Mod	<b>BD264</b>
100mA	63A	2 Mod	<b>BE264</b>
300mA	63A	2 Mod	<b>BF264</b>
Time Delayed  100mA	63A	2 Mod	<b>BN264</b>
Time Delayed  300mA	63A	2 Mod	<b>BP264</b>



Sensitivity $I_{\Delta n}$	$I_n$ A	Width (1 Mod = 17.5mm)	Cat ref.
<b>Four Pole RCCB Add-On Blocks</b>			
30mA	63A	3 Mod	<b>BD464</b>
100mA	63A	3 Mod	<b>BE464</b>
300mA	63A	3 Mod	<b>BF464</b>
Time Delayed  100mA	63A	3 Mod	<b>BN464</b>
Time Delayed  300mA	63A	3 Mod	<b>BP464</b>

### One Module Add-On Blocks for MCB Devices

#### Characteristics

- Compatible with **NBN, NCN & NDN** range of MCB devices.
- Can be used in combination with any Hager 3 pole 10kA MCB up to 63A. Requires the use of the adjacent outgoing way.
- Type A RCD provides added protection against 'pulsating d.c. current'
- 3 Phase earth leakage protection up to 63A.
- One module add-on block + MCB combinations suit all Hager distribution boards.
- BS EN 61009-1 Appendix G.
- For technical details see page 101.



BD163T

Sensitivity $I_{\Delta n}$	$I_n$ A	Width (1 Mod = 17.5mm)	Cat ref.
30mA	63A	4 Mod	<b>BD163T</b>
100mA	63A	4 Mod	<b>BE163T</b>
300mA	63A	4 Mod	<b>BF163T</b>

# 1 1/2 Mod MCBs

## 80 - 125A 10kA C Curve, 15kA C & D Curve



HMF199T



HMF299T



HMF399T



HMF499T

### MCBs 80 - 125A

- Suitable for isolation (according to BS EN 60947-2). The isolation of the circuit breakers is indicated by a green indicator on the toggle.

#### Standards

- 10 kA: BS EN 60898-1, 10 kA BS EN 60947-2
- 15 kA: BS EN 60898-1, 15 kA BS EN 60947-2
- $I_n$  80 to 125A

#### Connection Capacity

- 35mm<sup>2</sup> flexible (50mm<sup>2</sup> possible with some cable pin lugs).
- 70mm<sup>2</sup> rigid.

#### Nominal Voltage

- 230/415 V a.c.
- Calibration setting: 30 °C
- (BS EN 60898-1)
- Insulation voltage: 500 V

#### Lockable Toggle

- MCB can be locked in "Off" position by the integrated locking facility on the toggle.
- This lock allows the insertion of a 2.5-3.5mm plastic cable tie where you can fit a warning card if necessary, allowing a safer working environment.
- Compatible with RCD Add-On Blocks.

Rating	Width (1 = 17.5mm)	Cat ref. 10kA C Curve	Cat ref. 15kA C Curve	Cat ref. 15kA D Curve
<b>Single Pole MCBs</b>				
80A	1 1/2 Mod	<b>HMF180T</b>	<b>HMC180T</b>	<b>HMD180T</b>
100A	1 1/2 Mod	<b>HMF190T</b>	<b>HMC190T</b>	<b>HMD190T</b>
125A	1 1/2 Mod	<b>HMF199T</b>	<b>HMC199T</b>	<b>HMD199T</b>

#### Double Pole MCBs

80A	3 Mod	<b>HMF280T</b>	<b>HMC280T</b>	<b>HMD280T</b>
100A	3 Mod	<b>HMF290T</b>	<b>HMC290T</b>	<b>HMD290T</b>
125A	3 Mod	<b>HMF299T</b>	<b>HMC299T</b>	<b>HMD299T</b>

#### Triple Pole MCBs

80A	4 1/2 Mod	<b>HMF380T</b>	<b>HMC380T</b>	<b>HMD380T</b>
100A	4 1/2 Mod	<b>HMF390T</b>	<b>HMC390T</b>	<b>HMD390T</b>
125A	4 1/2 Mod	<b>HMF399T</b>	<b>HMC399T</b>	<b>HMD399T</b>

#### Four Pole MCBs

80A	6 Mod	<b>HMF480T</b>	<b>HMC480T</b>	<b>HMD480T</b>
100A	6 Mod	<b>HMF490T</b>	<b>HMC490T</b>	<b>HMD490T</b>
125A	6 Mod	<b>HMF499T</b>	<b>HMC499T</b>	<b>HMD499T</b>



MZN130

### Terminal Covers Screw Cap

#### Description

To cover connection terminals and screws of circuit breaker. The screw covers can be sealed.

#### Cat ref.

**MZN130**



MZN131

### Phase Barrier

#### Description

1 Set of 3 Phase Separators

#### Cat ref.

**MZN131**

**RCCB Add-On Blocks Type a.c. for HMF, HMC, HMD MCBs (Not suitable for Hybrid DBs)**

**Fixed**

- High sensitivity 30 mA instantaneous, low sensitivity 300 mA instantaneous

**Adjustable**

- Sensitivity  $I_{\Delta n}$  0.3-0.5 - 1A
- Delay  $\Delta t$  0 - 60 - 150 ms

**Adjustable Blocks**

- The setting is done by actuating dial on the front face. The setting dials are protected by a transparent sealable cover.

**Disassembly**

- The bistable latch (two positions) facilitate the assembly or disassembly by the bottom of the add-on block.
- These RCD add-on blocks exist in version AC.
- The earth fault is indicated when the handle is in the lower position (yellow colour). Test button for earth fault check.

**Connection Capacity**

- 35mm<sup>2</sup> flexible connection
- 70mm<sup>2</sup> rigid connection.

**Nominal voltage**

- 2 pole 230V, three & four pole: 230 / 400V
- Test button: 230 / 400V.
- Conforms with BS EN 61009-1 appendix G.
- Conforms with BS EN 60947-2.



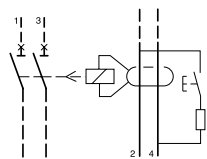
BDC280E



BDC380E



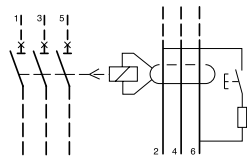
BDC480E



Sensitivity Fixed / Adjustable $I_{\Delta n}$	$I_n/A$	Width (1 = 17.5mm)	Cat ref.
--------------------------------------------------	---------	-----------------------	----------

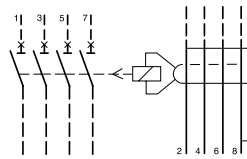
**Double Pole RCD Add-On Blocks**

Fixed 30mA	125A	6 Mod	<b>BDC280E</b>
Adjustable 0.3-0.5-1A	125A	6 Mod	<b>BTC280E</b>
Time Delayed $\Delta t$ 0-60-150ms			



**Triple Pole RCD Add-On Blocks**

Fixed 30mA	125A	6 Mod	<b>BDC380E</b>
Adjustable 0.3-0.5-1A	125A	6 Mod	<b>BTC380E</b>
Time Delayed $\Delta t$ 0-60-150ms			



**Four Pole RCD Add-On Blocks**

Fixed 30mA	125A	6 Mod	<b>BDC480E</b>
Fixed 300mA	125A	6 Mod	<b>BFC480E</b>
Adjustable 0.3-0.5-1A	125A	6 Mod	<b>BTC480E</b>
Time Delayed $\Delta t$ 0-60-150ms			

**Single Pole & Switched Neutral MCB - 6kA C Curve**

**Description**

- For protection and control of circuits against overloads and short circuits.

**Technical Data**

- Conforms to BS EN 60898
- Voltage rating - 230V a.c.

**Connection Capacity**

- Rigid 16mm<sup>2</sup>
- Flexible 10mm<sup>2</sup>
- Locking kit = Cat ref.: **MZN175**



MLN710A

Rating	Width (1 = 17.5mm)	Cat ref.
6A SPSN MCB 6kA	1 Mod	<b>MLN706A</b>
10A SPSN MCB 6kA	1 Mod	<b>MLN710A</b>
16A SPSN MCB 6kA	1 Mod	<b>MLN716A</b>
20A SPSN MCB 6kA	1 Mod	<b>MLN720A</b>
32A SPSN MCB 6kA	1 Mod	<b>MLN732A</b>
40A SPSN MCB 6kA	1 Mod	<b>MLN740A</b>

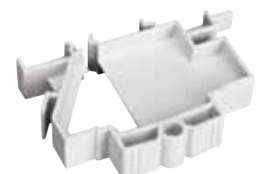
**Single Module Blank**

**Description**

Shrouds busbar and blanks spare ways

**Cat ref.**

**JK01B**



JK01B



CDC225U



CFC425U

### 2 & 4 Pole RCCBs

#### Characteristics

- To open a circuit automatically in the event an earth fault between line and earth, and/or neutral and earth.

#### Technical Data

- Conforms to BS EN 61008, IEC1008

- Terminal capacities: 16-63A Rigid 25mm<sup>2</sup>, Flexible 16mm<sup>2</sup> / 80 & 100A Rigid 50mm<sup>2</sup>, Flexible 35mm<sup>2</sup>

#### Features

- Positive contact indication is provided by the rectangular flag indicator

- Red = Closed

- Green = Open

- Indication of trip is provided by the oval flag indicator

- Yellow = Tripped

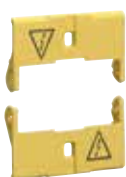
- All RCCBs have trip free mechanisms and can be padlocked either on or off with the use of a **MZN175**.

#### Operating Voltage

- 2P 127- 230V a.c.

- 4P 230 - 400V a.c.

Sensitivity type A	2 Pole Type A Cat ref.	4 Pole Type A Cat ref.	4 Pole Type AC Cat ref.
<b>RCCBs Sensitivity 30mA</b>			
RCCB 25A 30mA	<b>CDA225U</b>	<b>CDA425U</b>	<b>CDC425U</b>
RCCB 40A 30mA	<b>CDA240U</b>	<b>CDA440U</b>	<b>CDC440U</b>
RCCB 63A 30mA	<b>CDA263U</b>	<b>CDA463U</b>	<b>CDC463U</b>
RCCB 80A 30mA	<b>CD283U</b>	<b>CD480G</b>	<b>CD480U</b>
RCCB 100A 30mA	<b>CD285U</b>	<b>CD484G</b>	<b>CD484U</b>
RCCB 125A 30mA	-	-	<b>CDC490</b>
<b>RCCBs Sensitivity 100mA</b>			
RCCB 25A 100mA	<b>CEA225U</b>	-	<b>CEC425U</b>
RCCB 40A 100mA	<b>CEA240U</b>	<b>CE440J</b>	<b>CEC440U</b>
RCCB 63A 100mA	<b>CEA263U</b>	<b>CE463J</b>	<b>CEC463U</b>
RCCB 80A 100mA	<b>CE281J</b>	<b>CE481J</b>	<b>CE480U</b>
RCCB 100A 100mA	<b>CE285J</b>	<b>CE485J</b>	<b>CE484U</b>
<b>RCCBs Sensitivity 300mA</b>			
RCCB 25A 300mA	<b>CFA225U</b>	<b>CF425J</b>	<b>CFC425U</b>
RCCB 40A 300mA	<b>CFA240U</b>	<b>CF440J</b>	<b>CFC440U</b>
RCCB 63A 300mA	<b>CFA263U</b>	<b>CF463J</b>	<b>CFC463U</b>
RCCB 80A 300mA	-	<b>CF480J</b>	<b>CF480U</b>
RCCB 100A 300mA	<b>CF285U</b>	<b>CF484G</b>	<b>CF484U</b>
<b>RCCBs Time Delayed</b>			
RCCB 100A 100mA	<b>CN284J</b>	<b>CN487U</b>	<b>CN484U</b>
RCCB 100A 300mA	<b>CP284J</b>	<b>CP484G</b>	<b>CP484U</b>



CZN006

### Terminal Covers

Current Rating	2 Pole Cat ref.	4 Pole Cat ref.
16 - 63A	<b>CZN005</b>	<b>CZN006</b>
80 - 100A	<b>CZ007</b>	<b>CZ008</b>

**RCCB Auxiliaries**

**Auxiliary Interface**

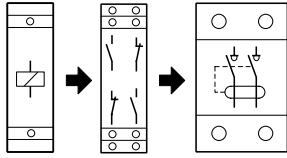
- Indicates the position of the associated RCCB on, off or tripped. Also acts as RCCB interface with standard MCB auxiliaries **MZ203-MZ206**.

**Shunt Trip**

- Allows remote tripping of the associated device, operation of the coil is indicated by a flag on the front of the device.

**Under Voltage Release**

- Allows RCCB to be closed, only when voltage is above 85% of  $U_n$ . RCCB will automatically trip when voltage falls to between 70-35% of  $U_n$  (230V). Operation of the release is indicated by a flag on the front of the device.



**MZ203** to **MZ206**    **CZ001**    RCCB



CZ001



MZ203

Description	Width (1 Mod = 17.5mm)	Cat ref.
<b>Auxiliary Interface</b> 2 Normally Open / 2 Normally Closed 6A a.c.1 230V	1 Mod	<b>CZ001</b>

**Auxiliaries for MCBs & RCCBs**

**Characteristics**

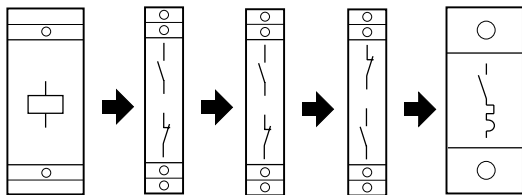
- All auxiliaries are common to both single and multi-pole 10kA circuit breakers and RCCBs.

**Connection capacity**

- 4mm<sup>2</sup> flexible, 6mm<sup>2</sup> rigid

**Shunt Trip:** Allows remote tripping of devices. Operation of the coil is indicated by a flag on the front of the device.

**Under Voltage Release:** Allows MCB to be closed only when voltage is above 85% of  $U_n$ . MCB will automatically trip when voltage falls to between 70-35% of  $U_n$ . Operation of the coil is indicated by a flag on the front of the device.



**MZ203** to + **MZ201** + **MZ201** + **MZ202** + MCB  
**MZ206**    **MZ201**    **MZ201**    **MZ201**



MZ201



MZ202



MZ204

Description	Width (1 Mod = 17.5mm)	Cat ref.
<b>Auxiliary Contacts 5A - 230V a.c.</b> 1NO +1NC Allows remote indication of main contact status	½ Mod	<b>MZ201</b>
<b>Auxiliary Contacts &amp; Alarm Induction</b> Allows indication of MCB status when turned off or tripped	½ Mod	<b>MZ202</b>
<b>Shunt Trip</b> 230V - 415V a.c. 110V - 130V d.c. 24 - 48V a.c. 12 - 48V d.c.	1 Mod	<b>MZ203</b> <b>MZ204</b>
<b>Under Voltage Release</b> 230V a.c. 48V d.c.	1 Mod	<b>MZ206</b> <b>MZ205</b>





MM501N

### Motor Starters

- To ensure localised control and protection of single and three phase motors.

#### Technical Data

- Adjustable thermal relay
- AC 3 utilisation category

#### Connection capacity

- 2 conductors: Max size flexible 1 to 4mm<sup>2</sup>, rigid 1.5 to 6mm<sup>2</sup>

#### Options

- Conforms to IEC 947-1, IEC 947-2 (appropriate parts of)

Current setting	Standard power ratings of 3 phase motors 50/60Hz (a.c. 3 category)		Width (1 Mod = 17.5mm)	Cat ref.
	230V (kW)	400V (kW)		
0.1 - 0.16A	-	-	-	<b>MM501N</b>
0.16 - 0.25A	-	0.06	2 ½ Mod	<b>MM502N</b>
0.25 - 0.4A	0.06	0.09	2 ½ Mod	<b>MM503N</b>
0.4 - 0.6A	0.09	0.12	2 ½ Mod	<b>MM504N</b>
0.6 - 1.0A	0.09	0.12	2 ½ Mod	<b>MM505N</b>
1.0 - 1.6A	0.25	0.55	2 ½ Mod	<b>MM506N</b>
1.6 - 2.5A	0.55	0.8	2 ½ Mod	<b>MM507N</b>
2.5 - 4A	0.8	1.5	2 ½ Mod	<b>MM508N</b>
4 - 6A	1.5	2.5	2 ½ Mod	<b>MM509N</b>
6 - 10A	2.5	4	2 ½ Mod	<b>MM510N</b>
10 - 16A	4	7.5	2 ½ Mod	<b>MM511N</b>
16 - 20A	5.5	9	2 ½ Mod	<b>MM512N</b>
20 - 25A	7.5	12.5	2 ½ Mod	<b>MM513N</b>



MZ520N

### Auxiliary & Alarm Contacts for Motor Starters

- Auxiliary Contacts - Act as an indicating device to monitor the ON or OFF position.
- Alarm Contact - Mounted inside the motor starter

Characteristics	Width (1 Mod = 17.5mm)	Cat ref.
Auxiliary Contacts 1 Normally Closed + 1 Normally Open 2A AC 1 - 400V a.c.	½ Mod	<b>MZ520N</b>
Alarm Contact 1 Normally Closed 1A AC 1 - 400V a.c. / 2A AC 1 - 230V a.c.	½ Mod	<b>MZ527N</b>



MZ528N

### Under Voltage Release for Motor Starters

- To prevent automatic restarting of the controlled device

Characteristics	Cat ref.
230V a.c. 50Hz	<b>MZ528N</b>
400V a.c. 50Hz	<b>MZ529N</b>



MZ521N

### Surface Mounting Enclosure for Motor Starters

Description	Dimensions (H x W x D mm)	Cat ref.
IP55 Surface Mounting Enclosure for Motor Starter	78 x 150 x 95	<b>MZ521N</b>



MZ530N

### Emergency Stop Button

Description	Cat ref.
IP65 External Emergency Stop Button	<b>MZ530N</b>

### HRC Fuse Carriers (supplied without cartridge fuse)

#### Characteristics

- Protection and control of circuits against overloads and short-circuits.
- Suitable for fuses which comply with BS HD 60269-1 and with the standardised performance requirements for industrial fuse links specified in BS HD 60269-2 (formerly BS 88-2).

#### Technical Data

- Rating voltage: 415 V a.c., 250 V d.c.
- Rated breaking capacities: 80 kA at 415 V a.c., 40 kA at 250 V d.c.
- The LS201 HRC fuse carrier is suitable for the following type of BS 88-2 cartridge fuses:
  - 2A – 8A: with nickel-plated or silver plated caps.
  - 10A – 32A: with silver plated caps only.

Characteristics	Width (1 = 17.5mm)	Cat ref.
<b>HRC Fuse Carriers</b>		
32A max. (Supplied without fuse)	1 Mod	<b>LS201</b>



LS201

### HRC Spare Cartridge Fuses

2A (29 x 12.7mm)	-	<b>L17100</b>
4A (29 x 12.7mm)	-	<b>L17200</b>
6A (29 x 12.7mm)	-	<b>L17300</b>
8A (29 x 12.7mm)	-	<b>L17400</b>

### SPSN Fuse Carriers (supplied without cartridge fuse)

#### Characteristics

- Protection and control of circuits against overloads and short-circuits.

#### Technical Data

- Characteristics type (fuse) gF
- Short-circuit rating: 4kA (10-20A), 6kA (25 & 32A).
- Voltage rating - 250V a.c.
- Connection Capacity: Rigid 16mm<sup>2</sup>, Flexible 10mm<sup>2</sup>

Rating	Width (1 = 17.5mm)	Cat ref. SPSN Fuse Carrier	Cat ref. Fuse Type gF
10A	1 Mod	<b>L12401</b>	<b>LF138</b>
16A	1 Mod	<b>L12501</b>	<b>LF139</b>
20A	1 Mod	<b>L12601</b>	<b>LF140</b>
25A	1 Mod	<b>L12701</b>	<b>LF141</b>
32A	1 Mod	<b>L12801</b>	<b>LF142</b>



L12401



LF140



LF138

### HRC Fuse Carriers (supplied with cartridge fuse)

#### Characteristics

- Protection and control of circuits against overloads and short-circuits.

#### Technical Data

- Suitable for fuses which fully comply with BS 88-3 (Formerly BS1361).
- Short-circuit rating: 16.5kA
- Connection Capacity: Top: 16 mm<sup>2</sup> flexible cable & busbar.

Current rating	Colour	Width (1 = 17.5mm)	Cat ref. HRC Fuse Carrier	Cat ref. HRC Spare Fuse
<b>HRC Fuse Carriers</b>				
5A 230V	White	1 Mod	<b>LB113</b>	<b>L15300</b>
15A 230V	Blue	1 Mod	<b>LB115</b>	<b>L15500</b>
20A 230V	Yellow	1 Mod	<b>LB116</b>	<b>L15600</b>
30A 230V	Red	1 Mod	<b>LB118</b>	<b>L15800</b>
Spare Fuse Holder up to 20A	-	-	<b>L14700</b>	-



LB113

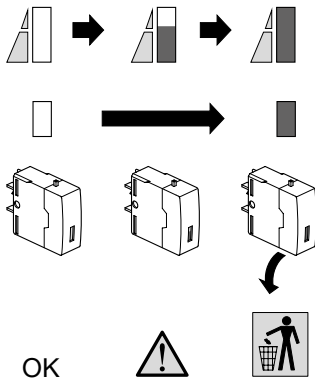


L14700

### Surge Protection

#### Characteristics

- SPD's protect electrical and electronic equipment against transients, originating from lightning, switching of transformers, lighting and motors. These transient voltages can cause premature ageing of equipment, downtime, or complete destruction of electronic components and materials. SPDs are strongly recommended on installations that are exposed to transient voltages, to protect sensitive and expensive electrical equipment such as TV, video, Hi-Fi, PC, alarm etc.
- The range of SPDs is separated into three types of protection:
  1. Main protection - class 1  
SPDs with higher discharge current ( $I_{max}$  10/350), to evacuate as much of the transient over-voltages associated with lightening strikes
  2. Main protection - class 2  
With a discharge current ( $I_{max}$  8/20), to evacuate as much of the transient over-voltage to earth as possible protection level ( $U_p \leq 1200V$ ).
  3. Main protection - class 3  
To cut-down the transient surge as low as possible to protect very sensitive equipment.



#### Technical Data

- Conforms to IEC61643-1.
- R Versions: reserve status indicator, signalling.
- D Versions: end of life indicator, auxiliary contact for remote indication.
- Connection Capacity (terminal blocks L, N & E): Rigid conductor: 10mm<sup>2</sup>, Flexible conductor: 6mm<sup>2</sup>.
- 230V a.c. 1A.
- 12V...10mA.

#### Installation and Connection

- The main protection SPDs are installed directly after the main incoming switch or RCCB
- SPDs are suitable for any supply system e.g TNCS, TNS, TT.
- Connected in parallel to the equipment to be protected.
- Protection is assured in both common and differential modes.

#### SPDs with Low Let Through Voltage Levels Type 3

- To protect very sensitive electronic equipment. This fine protection complements the main protection and can protect one or many electronic devices.
- Optimal coordination is obtained when cascaded with a main protection device.
- A green LED on the front face indicates the status of the **SP202N**, connected in series with the equipment that needs to be protected (with a maximum line current of 25A). Protection is assured in both common and differential modes.

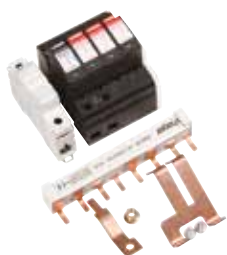
#### Replacement Cartridges

- Allow simple replacement without the need to cut-off the power supply.
- Cartridges are available for all discharge currents (40kA and 15kA) with and without condition indication.
- A keying system exists to prevent a line cartridge being interchanged by mistake with a neutral one and visa versa. Neutral cartridges have a discharge current of 65kA.
- For technical details see page 104

### Surge Protection Kits

#### Characteristics

- Developed to ensure effective protection of end equipment from fast transient overvoltages, where supplied from Hager Commercial distribution boards.
- Solid copper Earth links on all SPD kits and other design principles ensure optimum protection of end equipment through validated low  $U_p$  effective SPD performance.
- For more information on these Surge Protection Kits see distribution board pages.



JK101SPD



JKD101SPD



JK201SPD

#### Surge Protection Kits for 125A TP&N Boards

- Type 1 & 2 Surge Protection Kit for 125A Boards
- Type 2 Surge Protection Kit for 125A Boards

Cat ref.

[JK101SPD \\*](#)

[JK102SPD \\*](#)

- Type 1 & 2 Surge Protection Kit for 125A Power & Lighting Boards
- Type 2 Surge Protection Kit for 125A Power & Lighting Boards

[JKD101SPD \\*](#)

[JKD102SPD \\*](#)

#### Surge Protection Kits for 250A TP&N Boards

- Type 1 & 2 Surge Protection Kit for 250A Boards
- Type 2 Surge Protection Kit for 250A Boards

[JK201SPD \\*](#)

[JK202SPD \\*](#)

#### Surge Protection Kits for JN Panelboards

- SPD kit Type 1+2 for JN Panelboards
- SPD kit Type 2 for JN Panelboards

[JN201SPD \\*](#)

[JN202SPD \\*](#)

#### Surge Protection Kit for JF Panelboards

- SPD kit Type 1 + 2 for JF Panelboards

[JF801SPD \\*](#)

### Class 1 + 2 (Class 1 + 2 + 3 if less than 5m) (with lifetime indicator)

TN / TT	Poles	$I_{imp}$ L-N	$I_{imp}$ N-PE	$U_p$ kV	Single or Three Phase	Width (mm)	Cat ref.	Cat ref. with remote contact
TN / TT	2	12.5	25	≤1.5	Single	35	<b>SPA201</b>	-
TN / TT	4	12.5	50	≤1.5	Three	70	<b>SPA401</b>	-
TN	4	25	100	≤1.5	Three	140	<b>SPN801</b>	<b>SPN801R</b>
TT	4	25	100	≤1.5	Three	140	<b>SPN802</b>	<b>SPN802R</b>



SPN801R

### Class 2 (with lifetime indicator)

Poles	$I_n$ kA L-N	$I_n$ kA N-PE	$U_p$ kV	Single or Three Phase	Width (mm)	Cat ref.	Cat ref. with remote contact
2	5	15	≤ 1.2	Single	35	<b>SPN215D</b>	<b>SPN215R</b>
2	15	40	≤ 1.2	Single	35	<b>SPN240D</b>	<b>SPN240R</b>
4	5	15	≤ 1.5	Three	70	<b>SPN415D</b>	<b>SPN415R</b>
4	15	40	≤ 1.5	Three	70	<b>SPN440D</b>	<b>SPN440R</b>



SPN415D

### Class 3 (Fine Protection) (with lifetime indicator)

Poles	$I_n$ kA L-N	$I_n$ kA N-PE	$U_p$ kV	Width (mm)	Cat ref.
2	3	3	≤ 1.5	17.5	<b>SPN203N</b>

### PV Applications (DC side) (with lifetime indicator)

Poles	$I_n$ kA L-N	$I_n$ kA N-PE	$U_p$ kV	Single or Three Phase	Width (mm)	Cat ref.
3	12.5	25	≤ 4	-	52.5	<b>SPV325</b>

### Replacement Cartridges

Description	Cat ref.
Phase replacement for <b>SPN215D, SPN415D, SPN115D</b>	<b>SPN015D</b>
Phase replacement for <b>SPN215R, SPN415R, SPN115R</b>	<b>SPN015R</b>
Phase replacement for <b>SPN240D, SPN440D</b>	<b>SPN040D</b>
Phase replacement for <b>SPN240R, SPN44R</b>	<b>SPN040R</b>
Neutral replacement for <b>SPN215D, SPN415D, SPN215R, SPN415R</b>	<b>SPN040N</b>



SPN040D

### Replacement Cartridges (SPN8\* Range)

Description	Cat ref.
Phase replacement for <b>SPN801, SPN801R, SPN802, SPN802R</b>	<b>SPN080</b>
Neutral replacement for <b>SPN801, SPN801R, SPN802, SPN802R</b>	<b>SPN080N</b>



SPN080



HR500



HR510



HR520



HR440



HR441

## Earth Fault Relays

### Characteristics

- Provides monitoring of earth fault currents. When the fault current rises above the selected level, the output contacts of the product operate.
- Depending on the relay selected, it can have either fixed or adjustable sensitivity. A time delay is also available for selectivity purposes. The relays are linked with detection torroids, available in circular and rectangular variants.
- Positive safety: the relay trips in the event of a break in the relay/torroid link.
- Positive reset required after a fault is detected.
- Test button for simulation of a fault.
- Protected against nuisance tripping from transients.
- Conforms to BS EN 61008.

### Technical Data

- Type A RCD protection.
- Output: 1 C/O contact, 250V a.c. 5/6A AC1.
- Visual display of fault by red LED.

### Specific device features of HR525 & HR534.

- Display of fault current before it triggers the relay (5% to 75%).
- Extra output contact (250V 0.1A max.) to enable remote indication if fault currents over 50% of  $I_{\Delta n}$ .
- Remote test and reset (opto-coupled).

### Connection capacity

- Relay - 1.5 to 6mm<sup>2</sup>
- Relay - torroid link: 2 wires, 25m max.
- Test and remote reset link: 3 wires, 20m max.
- For enclosure selection, please consult us.

Description	Characteristics	Width	Cat ref.
<b>Earth Fault Relay with Separate Detection Torroids</b>			
Earth fault relay C/O contact 5A a.c.1	Instant trip, fixed sensitivity $I_{\Delta n} = 30\text{mA}$	1 Mod	<b>HR500</b>
Earth fault relay C/O contact 5A a.c.1	Instant trip, fixed sensitivity $I_{\Delta n} = 300\text{mA}$	1 Mod	<b>HR502</b>
Earth fault relay C/O contact 6A a.c.1	Adjustable sensitivity $I_{\Delta n} = 30\text{mA}, 100\text{mA}, 300\text{mA}$ 500mA, 1A, 3A, 10A Instant trip or time delay 0.1 - 0.3 - 0.4 - 0.5 - 1 - 3 secs	3 Mod	<b>HR510</b>
Earth fault relay C/O contact 6A a.c.1	Adjustable sensitivity $I_{\Delta n} = 30\text{mA}, 100\text{mA}, 300\text{mA}$ 500mA, 1A, 3A, 10A LED optical scale Instant trip or time delay 0.1 - 0.3 - 0.4 - 0.5 - 1 - 3 secs	3 Mod	<b>HR520</b>
Earth fault relay C/O contact 6A a.c.1	Adjustable sensitivity $I_{\Delta n} = 30\text{mA}, 100\text{mA}, 300\text{mA}$ 500mA, 1A, 3A, 10A LED optical scale Instant trip or time delay 0.1 - 0.2 - 0.25 - 0.3 - 0.4 - 0.5 secs	3 Mod	<b>HR522</b>
Earth fault relay C/O contact 6A a.c.1	Adjustable sensitivity $I_{\Delta n} = 500\text{mA}, 1\text{A}, 3\text{A}, 5\text{A},$ 10A, 20A & 30A LED optical scale Instant trip or time delay 0.1 - 0.2 - 0.25 - 0.3 - 0.4 - 0.5 secs	3 Mod	<b>HR523</b>
Earth fault relay C/O contact 6A a.c.1 Trip / reclose input feature	Adjustable sensitivity $I_{\Delta n} = 30\text{mA}, 100\text{mA}, 300\text{mA},$ 500mA, 1A, 3A, 5A, 10A & 30A LCD Display Instant trip or time delay 0.02 - 0.1 - 0.3 - 0.4 - 0.5 - 1 - 3 - 5 - 10 secs	3 Mod	<b>HR525</b>
Earth fault relay C/O contact 6A a.c.1 Solid State relay output Trip / reclose input feature	Adjustable sensitivity $I_{\Delta n} = 30\text{mA}, 100\text{mA}, 300\text{mA},$ 500mA, 1A, 3A, 5A, 10A & 30A LCD Display Instant trip or time delay 0.02 - 0.1 - 0.3 - 0.4 - 0.5 - 1 - 3 - 5 - 10 secs	3 Mod	<b>HR534</b>
<b>Earth Fault Relay with Integral Torroids</b>			
Earth fault relay with integral torroid adjustable sensitivity 25mm <sup>2</sup> max. cable size	Adjustable sensitivity $I_{\Delta n} = 30\text{mA}, 100\text{mA}, 300\text{mA},$ 500mA, 1A & 3A Instant trip or time delay 0.1 - 0.3 - 0.5 - 0.75 - 1 secs	4 Mod	<b>HR440</b>
Earth fault relay with integral torroid adjustable sensitivity 35mm <sup>2</sup> max. cable size	Adjustable sensitivity $I_{\Delta n} = 30\text{mA}, 100\text{mA}, 300\text{mA},$ 500mA, 1A & 3A Instant trip or time delay 0.1 - 0.3 - 0.5 - 0.75 - 1 secs	6 Mod	<b>HR441</b>

**Circular Section Torroids**

Characteristics	Cat ref.
ø 30mm	<b>HR700</b>
ø 35mm	<b>HR701</b>
ø 70mm	<b>HR702</b>
ø 105mm	<b>HR703</b>
ø 140mm	<b>HR704</b>
ø 210 mm	<b>HR705</b>



HR702

**Rectangular Section Torroids**

Dimensions	Cat ref.
70 x 175mm	<b>HR830</b>
115 x 305mm	<b>HR831</b>
150 x 350mm	<b>HR832</b>



HR830

**Rectangular Split Torroids**

Dimensions	Cat ref.
20 x 30mm	<b>HR820</b>
50 x 80mm	<b>HR821</b>
80 x 80mm	<b>HR822</b>
80 x 121mm	<b>HR823</b>
80 x 161mm	<b>HR824</b>



HR820





HDA125Z

### Moulded Case Circuit Breakers x160 18kA

#### Characteristics

- Thermal magnetic trip unit, two versions: Z version: fixed thermal and fixed magnetic. U version: adjustable thermal and fixed magnetic.
- Access to mechanical test button on cover.
- Lockable cover protects MCCB settings.
- Integrated padlocking handle: Ø 4mm.
- Connection capacity: 95mm<sup>2</sup> rigid cables, 70mm<sup>2</sup> flexible cables.
- Cage terminals
- Conforms to BS EN 60947-2.
- Fixed thermal:  $1 \times I_n$
- Adjustable thermal:  $0.63 - 0.8 - 1 \times I_n$
- For technical details see table on page 111.

Description	Breaking Capacity	Cat ref. 1 pole	Cat ref. 3 pole
<b>Moulded Case Circuit Breakers, 18kA, Fixed Thermal</b>			
MCCBs x160 - 16A	$I_{cu} / I_{cs}$ : 18 kA	<a href="#">HDA014E *</a>	<b>HDA016Z</b>
MCCBs x160 - 20A	$I_{cu} / I_{cs}$ : 18 kA	<a href="#">HDA018E *</a>	<b>HDA020Z</b>
MCCBs x160 - 25A	$I_{cu} / I_{cs}$ : 18 kA	<a href="#">HDA023E *</a>	<b>HDA025Z</b>
MCCBs x160 - 32A	$I_{cu} / I_{cs}$ : 18 kA	<a href="#">HDA030E *</a>	<b>HDA032Z</b>
MCCBs x160 - 40A	$I_{cu} / I_{cs}$ : 18 kA	<a href="#">HDA038Z *</a>	<b>HDA040Z</b>
MCCBs x160 - 50A	$I_{cu} / I_{cs}$ : 18 kA	<a href="#">HDA048Z *</a>	<b>HDA050Z</b>
MCCBs x160 - 63A	$I_{cu} / I_{cs}$ : 18 kA	<a href="#">HDA061Z *</a>	<b>HDA063Z</b>
MCCBs x160 - 80A	$I_{cu} / I_{cs}$ : 18 kA	<a href="#">HDA078Z *</a>	<b>HDA080Z</b>
MCCBs x160 - 100A	$I_{cu} / I_{cs}$ : 18 kA	<a href="#">HDA098Z *</a>	<b>HDA100Z</b>
MCCBs x160 - 125A	$I_{cu} / I_{cs}$ : 18 kA	<a href="#">HDA123Z *</a>	<b>HDA125Z</b>
MCCBs x160 - 160A	$I_{cu} / I_{cs}$ : 18 kA	-	<b>HDA160Z</b>

#### Moulded Case Circuit Breakers, 18kA, Adjustable Thermal

MCCBs x160 - 25A	$I_{cu} / I_{cs}$ : 18 kA	-	<b>HDA025U</b>
MCCBs x160 - 40A	$I_{cu} / I_{cs}$ : 18 kA	-	<b>HDA040U</b>
MCCBs x160 - 63A	$I_{cu} / I_{cs}$ : 18 kA	-	<b>HDA063U</b>
MCCBs x160 - 80A	$I_{cu} / I_{cs}$ : 18 kA	-	<b>HDA080U</b>
MCCBs x160 - 100A	$I_{cu} / I_{cs}$ : 18 kA	-	<b>HDA100U</b>
MCCBs x160 - 125A	$I_{cu} / I_{cs}$ : 18 kA	-	<b>HDA125U</b>
MCCBs x160 - 160A	$I_{cu} / I_{cs}$ : 18 kA	-	<b>HDA160U</b>

#### Moulded Case Circuit Breakers 25kA Fixed Thermal

MCCBs x160 - 16A	$I_{cs}$ : 20 kA, $I_{cu}$ : 25 kA	<a href="#">HHA014E *</a>	<b>HHA016Z</b>
MCCBs x160 - 20A	$I_{cs}$ : 20 kA, $I_{cu}$ : 25 kA	<a href="#">HHA018E *</a>	<b>HHA020Z</b>
MCCBs x160 - 25A	$I_{cs}$ : 20 kA, $I_{cu}$ : 25 kA	<a href="#">HHA023E *</a>	<b>HHA025Z</b>
MCCBs x160 - 32A	$I_{cs}$ : 20 kA, $I_{cu}$ : 25 kA	<a href="#">HHA030E *</a>	<b>HHA032Z</b>
MCCBs x160 - 40A	$I_{cs}$ : 20 kA, $I_{cu}$ : 25 kA	<a href="#">HHA038Z *</a>	<b>HHA040Z</b>
MCCBs x160 - 50A	$I_{cs}$ : 20 kA, $I_{cu}$ : 25 kA	<a href="#">HHA048Z *</a>	<b>HHA050Z</b>
MCCBs x160 - 63A	$I_{cs}$ : 20 kA, $I_{cu}$ : 25 kA	<a href="#">HHA061Z *</a>	<b>HHA063Z</b>
MCCBs x160 - 80A	$I_{cs}$ : 20 kA, $I_{cu}$ : 25 kA	<a href="#">HHA078Z *</a>	<b>HHA080Z</b>
MCCBs x160 - 100A	$I_{cs}$ : 20 kA, $I_{cu}$ : 25 kA	<a href="#">HHA098Z *</a>	<b>HHA100Z</b>
MCCBs x160 - 125A	$I_{cs}$ : 20 kA, $I_{cu}$ : 25 kA	<a href="#">HHA123Z *</a>	<b>HHA125Z</b>
MCCBs x160 - 160A	$I_{cs}$ : 20 kA, $I_{cu}$ : 25 kA	-	<b>HHA160Z</b>

#### Moulded Case Circuit Breakers 25kA Adjustable Thermal

MCCBs x160 - 25A	$I_{cs}$ : 20 kA, $I_{cu}$ : 25 kA	-	<b>HHA025U</b>
MCCBs x160 - 40A	$I_{cs}$ : 20 kA, $I_{cu}$ : 25 kA	-	<b>HHA040U</b>
MCCBs x160 - 63A	$I_{cs}$ : 20 kA, $I_{cu}$ : 25 kA	-	<b>HHA063U</b>
MCCBs x160 - 80A	$I_{cs}$ : 20 kA, $I_{cu}$ : 25 kA	-	<b>HHA080U</b>
MCCBs x160 - 100A	$I_{cs}$ : 20 kA, $I_{cu}$ : 25 kA	-	<b>HHA100U</b>
MCCBs x160 - 125A	$I_{cs}$ : 20 kA, $I_{cu}$ : 25 kA	-	<b>HHA125U</b>
MCCBs x160 - 160A	$I_{cs}$ : 20 kA, $I_{cu}$ : 25 kA	-	<b>HHA160U</b>

### Accessories for x160 Devices

#### Indication contacts

- 1 changeover switch (ON/OFF): indicates the position of the MCCB "open" or "close".
- 1 changeover alarm contact: indicates MCCB tripped.

#### Coil connection

- Connection capacity: 0.75 mm<sup>2</sup> flexible or rigid cables
- The cable capacity of the terminals is 0.5 to 1.25mm<sup>2</sup>.

#### Shunt trip

- Remote tripping of MCCBs
- Operating voltage: 0.7 to 1.1 x U<sub>N</sub>

#### Under voltage release

- Enables tripping of MCCBs or moulded case switches when voltage level drop between 35 and 70% of U<sub>N</sub>. Pick up voltage 0.85 x U<sub>N</sub>.
- Padlockable direct rotary handle is equipped with front cover and handle, fixing without additional screws.



HXA021H

HXA024H



HXA014H



HXA039H



HYA021H



HYA023H

Description	Cat ref.
<b>Auxiliary Contacts</b>	
1 Changeover contact (On/Off), 250V a.c. / 3A, 125V d.c. / 0.4A, 1 NO+ 1 NC	<b>HXA021H</b>
1 Changeover alarm contact, 250 V a.c. / 3A, 125 V d.c. / 0.4A, NO + 1 NC	<b>HXA024H</b>
Low level contact (On/Off), 125V a.c. , NO + 1 NC	<b>HXA025H</b>
Low Level alarm contact, 125 V a.c. , NO + 1 NC	<b>HXA026H</b>

#### Shunt Trips

24V DC	<b>HXA001H</b>
48V DC	<b>HXA002H</b>
100-120V a.c.	<b>HXA003H</b>
200-240V a.c.	<b>HXA004H</b>
380-450V a.c.	<b>HXA005H</b>

#### Undervoltage Releases

24V DC	<b>HXA011H</b>
100-120V a.c.	<b>HXA013H</b>
200-240V a.c.	<b>HXA014H</b>
380-450V a.c.	<b>HXA015H</b>

#### Delayed Undervoltage Releases

24V DC	<b>HXA051H</b>
100-120V a.c.	<b>HXA053H</b>
200-240V a.c.	<b>HXA054H</b>
380-450V a.c.	<b>HXA055H</b>

#### Accessories

Locking Device to Mount on MCCB for Handle Locking for 3 Padlock Max ø 8mm	<b>HXA039H</b>
Set of Three Extended Spreader Connections	<b>HYA014H</b>
Pair of Terminal Covers for Extended Straight Connections 1 Pole	<b>HYA029H</b>
Pair of Terminal Covers for Extended Straight Connections 3 Pole	<b>HYA021H</b>
Pair of Terminal Covers for Extended Spreader Connections	<b>HYA023H</b>

### Add-On Blocks for x160 Devices

#### Characteristics

- These devices are intended to be fixed on the right side of the devices.
- Type A RCD protection for protection against pulsating d.c.
- High Immunity reduces unexpected tripping (generated by micro-processing, electronic ballast etc.).
- Fixed version: 300 mA sensitivity and instantaneous tripping, adjustable version: adjustable sensitivity and time delay.
- Test button for electrical functioning check.
- LED fault indication and auxiliary output for remote indication - (25-50% I<sub>ΔN</sub>).
- Assembly and disassembly facilitated by the drawer assembly system.
- Connection capacity: 95 mm<sup>2</sup> rigid cables, 70 mm<sup>2</sup> flexible cables.
- Sensitivity I<sub>ΔN</sub>, adjustable: 0.03 - 0.1 - 0.3 - 1 - 3 - 6A
- Adjustable tripping: instantaneous or time delay: 0.06 - 0.15 - 0.3, 0.5 - 1s
- Conforms to BS EN 60947-2.



HBA125H

Description	Cat ref. 3P
Fixed Add-on Block - 125A	<b>HBA127H</b>
Adjustable Add-on Block - 125A	<b>HBA125H</b>
Adjustable Add-on Block - 160A	<b>HBA160H</b>



HDA125Z

**Moulded Case Circuit Breakers x250 25kA**

**Characteristics**

- Thermal magnetic trip unit, two versions: Z version: fixed thermal and fixed magnetic. H version: adjustable thermal magnetic.
- Access to mechanical test button on cover.
- Lockable cover protects MCCB settings.
- Integrated padlocking handle: Ø 4mm.
- Connection capacity: 150mm<sup>2</sup> rigid cables, palm lug max. width: 25mm
- Conforms to BS EN 60947-2
- AC 22/23A.
- For technical data see page 121.

**x250 25kA**

- Fixed thermal:  $1 \times I_n$
- Fixed magnetic:  $> 10 \times I_n$

**x250 40kA**

- Adjustable thermal: 0.63, 0.8,  $1 \times I_n$
- Adjustable magnetic: 6 - 8 - 10 -  $13 \times I_n$  (100 - 200A). 5 - 7 - 9 -  $11 \times I_n$  (250A).

Description	Breaking capacity	Cat ref. 3P
<b>Moulded Case Circuit Breakers 25kA - Fixed</b>		
MCCBs x250 - 100A	$I_{CS}$ : 20 kA, $I_{CU}$ : 25 kA	<b>HNB100Z</b>
MCCBs x250 - 125A	$I_{CS}$ : 20 kA, $I_{CU}$ : 25 kA	<b>HNB125Z</b>
MCCBs x250 - 160A	$I_{CS}$ : 20 kA, $I_{CU}$ : 25 kA	<b>HNB160Z</b>
MCCBs x250 - 200A	$I_{CS}$ : 20 kA, $I_{CU}$ : 25 kA	<b>HNB200Z</b>
MCCBs x250 - 250A	$I_{CS}$ : 20 kA, $I_{CU}$ : 25 kA	<b>HNB250Z</b>
<b>Moulded Case Circuit Breakers 40kA - Fixed</b>		
MCCBs x250 - 100A	$I_{CS}$ : 20 kA, $I_{CU}$ : 40 kA	<b>HNB100Z</b>
MCCBs x250 - 125A	$I_{CS}$ : 20 kA, $I_{CU}$ : 40 kA	<b>HNB125Z</b>
MCCBs x250 - 160A	$I_{CS}$ : 20 kA, $I_{CU}$ : 40 kA	<b>HNB160Z</b>
MCCBs x250 - 200A	$I_{CS}$ : 20 kA, $I_{CU}$ : 40 kA	<b>HNB200Z</b>
MCCBs x250 - 250A	$I_{CS}$ : 20 kA, $I_{CU}$ : 40 kA	<b>HNB250Z</b>
<b>Moulded Case Circuit Breakers 40kA - Adjustable</b>		
MCCBs x250 - 100A	$I_{CS}$ : 20 kA, $I_{CU}$ : 40 kA	<b>HNB100H</b>
MCCBs x250 - 125A	$I_{CS}$ : 20 kA, $I_{CU}$ : 40 kA	<b>HNB125H</b>
MCCBs x250 - 160A	$I_{CS}$ : 20 kA, $I_{CU}$ : 40 kA	<b>HNB160H</b>
MCCBs x250 - 200A	$I_{CS}$ : 20 kA, $I_{CU}$ : 40 kA	<b>HNB200H</b>
MCCBs x250 - 250A	$I_{CS}$ : 20 kA, $I_{CU}$ : 40 kA	<b>HNB250H</b>

### Accessories for x250 Devices

#### Indication contacts

- 1 changeover switch (ON/OFF): indicates the position of the MCCB "open" or "close".
- 1 changeover alarm contact: indicates MCCB tripped.

#### Coil connection

- Connection capacity: 0.75 mm<sup>2</sup> flexible or rigid cables
- The cable capacity of the terminals is 0.5 to 1.25mm<sup>2</sup>.

#### Shunt trip

- Remote tripping of MCCBs
- Operating voltage: 0.7 to 1.1 x U<sub>n</sub>

#### Under voltage release

- Enables tripping of MCCBs or moulded case switches when voltage level drop between 35 and 70% of U<sub>n</sub>. Pick up voltage 0.85 x U<sub>n</sub>
- Padlockable direct rotary handle is equipped with front cover and handle, fixing without additional screws.



HXA021H

HXA024H

Description	Cat ref.
<b>Auxiliary Contacts</b>	
1 Changeover contact (On/Off), 250V a.c. / 3A, 125V d.c. / 0.4A, 1 NO+ 1NC	<b>HXA021H</b>
1 Changeover alarm contact, 250 V a.c. / 3A, 125 V d.c. / 0.4A, NO + 1 NC	<b>HXA024H</b>
Low level contact (On/Off), 125V a.c. , NO + 1 NC	<b>HXA025H</b>
Low Level alarm contact, 125 V a.c. , NO + 1 NC	<b>HXA026H</b>
<b>Shunt Trips</b>	
24V DC	<b>HXA001H</b>
48V DC	<b>HXA002H</b>
100-120V a.c.	<b>HXA003H</b>
200-240V a.c.	<b>HXA004H</b>
380-450V a.c.	<b>HXA005H</b>
<b>Undervoltage Releases</b>	
24V DC	<b>HXA011H</b>
100-120V a.c.	<b>HXA013H</b>
200-240V a.c.	<b>HXA014H</b>
380-450V a.c.	<b>HXA015H</b>
<b>Delayed Undervoltage Releases</b>	
24V DC	<b>HXA051H</b>
100-120V a.c.	<b>HXA053H</b>
200-240V a.c.	<b>HXA054H</b>
380-450V a.c.	<b>HXA055H</b>
<b>Accessories</b>	
Locking Device to Mount on MCCB for Handle Locking for 3 Padlock Max ø 8mm	<b>HXA039H</b>
Set of Four Extended Straight Connections	<b>HXB010H</b>
Set of Four Extended Spreader Connections	<b>HYB011H</b>
Set of Three Interphase Barriers	<b>HYB019H</b>
Pair of Terminal Covers for Extended Straight Connections	<b>HYB021H</b>
Pair of Terminal Covers for Extended Spreader Connections	<b>HYB023H</b>



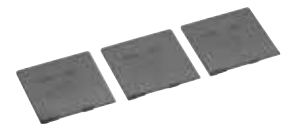
HXA014H



HXA039H



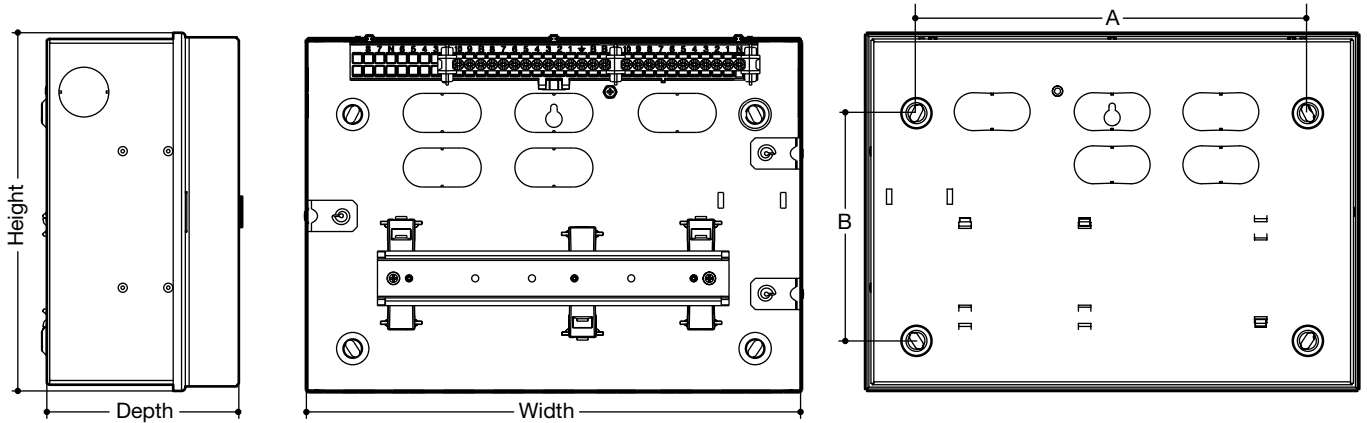
HYB010H



HYB019H



HYB021H

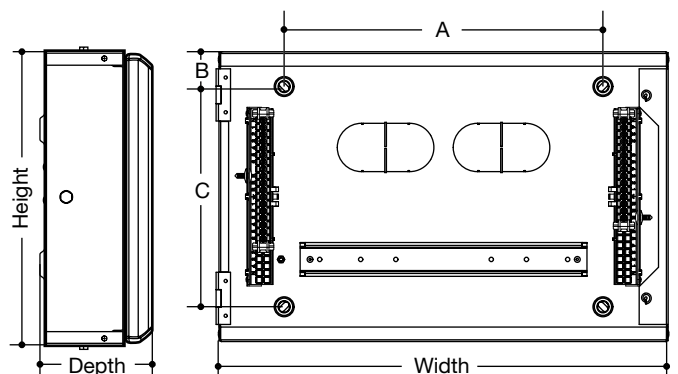


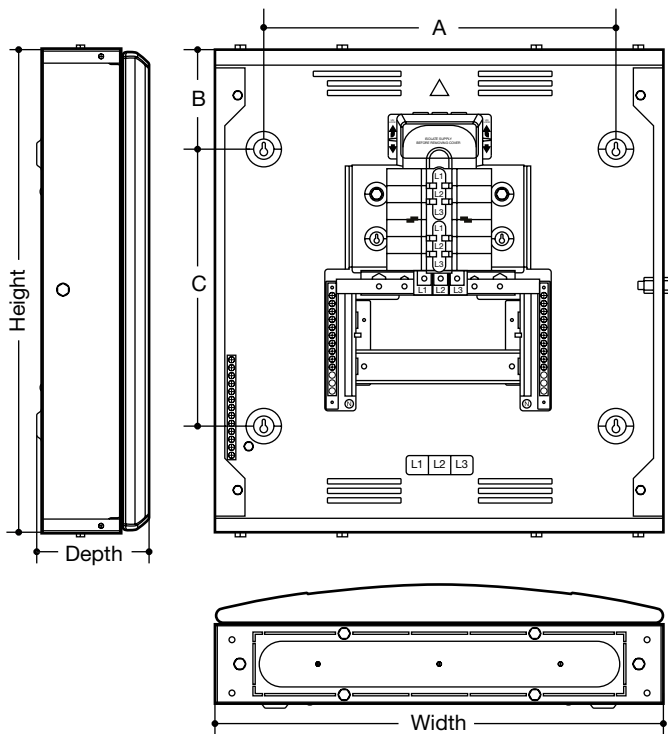
SP&N A Boards

Enclosure Size	Dimensions			Fixing Centres		Knockout Size	N° of Knockouts				
	Width	Height	Depth	A	B		Top	Bottom	Left	Right	Back
3	254	236	125	186	150	∅ 20	3	3	-	-	-
						∅ 32	1	1	1	1	-
						∅ 25	1	1	-	-	-
						25 x 50	-	-	-	-	3
4	326	236	125	258	150	∅ 20	6	6	-	-	-
						∅ 32	1	1	1	1	-
						∅ 25	1	1	-	-	-
						25 x 50	-	-	-	-	5
5	398	236	125	330	150	∅ 20	8	8	-	-	-
						∅ 32	1	1	1	1	-
						∅ 25	1	1	-	-	-
						25 x 50	-	-	-	-	7
7	505	236	125	437	150	∅ 20	11	11	-	-	-
						∅ 32	1	1	1	1	-
						∅ 25	1	1	-	-	-
						25 x 50	-	-	-	-	9
4 (2)	326	472	125	258	388	∅ 20	6	6	-	-	-
						∅ 32	1	1	2	2	-
						∅ 25	1	1	-	-	-
						25 x 50	-	-	-	-	6
5 (2)	398	472	125	330	388	∅ 20	8	8	-	-	-
						∅ 32	1	1	2	2	-
						∅ 25	1	1	-	-	-
						25 x 50	-	-	-	-	8
7 (2)	505	472	125	437	388	∅ 20	11	11	-	-	-
						∅ 32	1	1	2	2	-
						∅ 25	1	1	-	-	-
						25 x 50	-	-	-	-	10

Invicta 3 SP&N A Boards

	Dimensions (mm)			Fixing Centres (mm)		
	Height	Width	Depth	A	B	C
JK114A/AG	300	465	107.7	350	35	228
JK129A/AG	450	465	107.7	330	35	378





**125A Primary Boards**

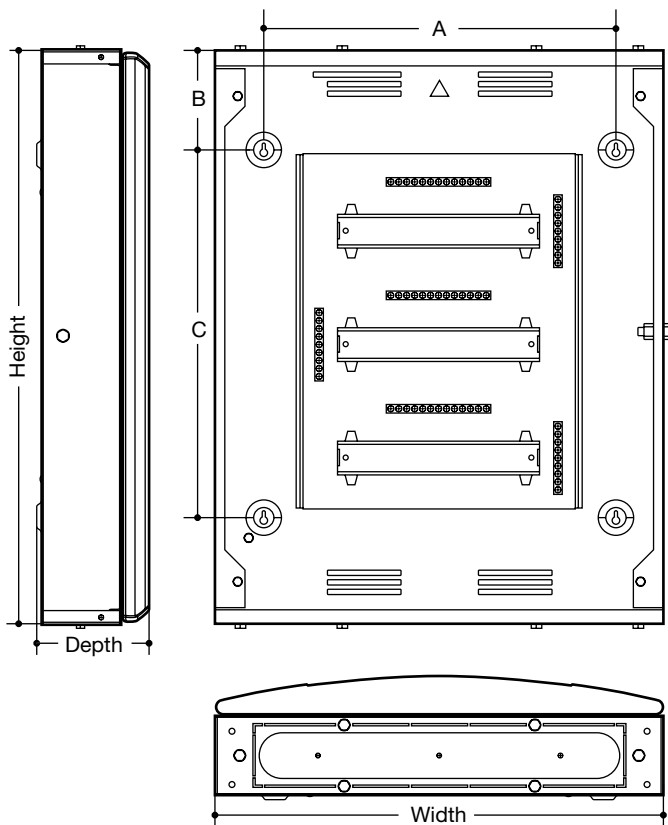
	Dimensions (mm)			Fixing Centres (mm)		
	Height	Width	Depth	A	B	C
<b>JK104B/BG/A3</b>	500	465	132.5	365	100	300
<b>JK106B/BG/A3</b>	550	465	132.5	365	100	350
<b>JK108B/BG/A3</b>	625	465	132.5	365	100	425
<b>JK112B/BG/A3</b>	850	465	132.5	365	100	650
<b>JK116B/BG/A3</b>	950	465	132.5	365	100	750
<b>JK118B/BG/A3</b>	1100	465	132.5	365	100	900
<b>JK124B/BG/A3</b>	1250	465	132.5	365	100	1050

**250A Primary Boards**

	Dimensions (mm)			Fixing Centres (mm)		
	Height	Width	Depth	A	B	C
<b>JK208B/BG/A3</b>	950	465	165.5	365	100	750
<b>JK212B/BG/A3</b>	1100	465	165.5	365	100	900
<b>JK216B/BG/A3</b>	1250	465	165.5	365	100	1050
<b>JK218B/BG/A3</b>	1400	465	165.5	365	100	1200
<b>JK224B/BG/A3</b>	1550	465	165.5	365	100	1350

**Contactor Incomers**

	Dimensions (mm)		
	Height	Width	Depth
<b>JK10634C</b>	300	465	165.5
<b>JK11004C</b>	450	465	234.5
<b>JK21604C</b>	450	465	234.5



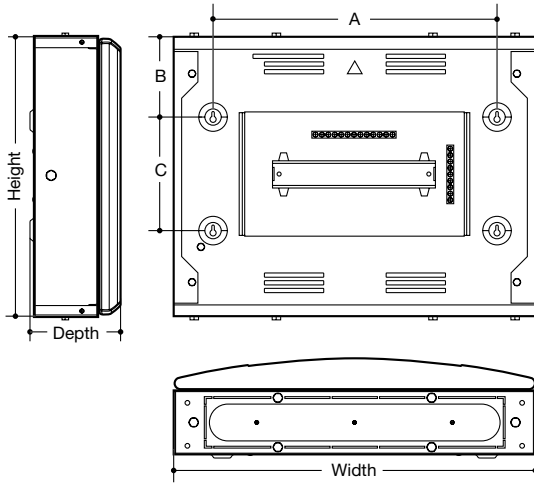
**125A Side DIN Enclosures**

	Dimensions (mm)			Fixing Centres (mm)		
	Height	Width	Depth	A	B	C
<b>JK104BDFG</b>	500	465	132.5	365	100	300
<b>JK106BDFG</b>	550	465	132.5	365	100	350
<b>JK108BDFG</b>	625	465	132.5	365	100	425
<b>JK112BDFG</b>	850	465	132.5	365	100	650
<b>JK116BDFG</b>	950	465	132.5	365	100	750

**250A Side DIN Enclosures**

	Dimensions (mm)			Fixing Centres (mm)		
	Height	Width	Depth	A	B	C
<b>JK208BDFG</b>	950	465	165.5	365	100	750
<b>JK212BDFG</b>	1100	465	165.5	365	100	900
<b>JK216BDFG</b>	1250	465	165.5	365	100	1050
<b>JK218BDFG</b>	1400	465	165.5	365	100	1200
<b>JK224BDFG</b>	1550	465	165.5	365	100	1350



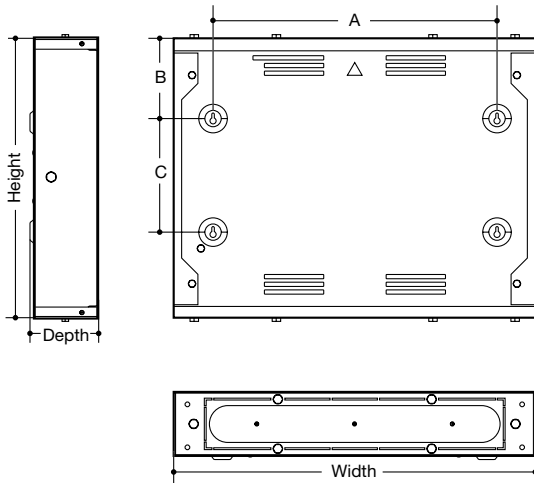


### 125A DIN Extension Boxes

	Dimensions (mm)			Fixing Centres (mm)		
	Height	Width	Depth	A	B	C
<b>JK116E/EG</b>	300	465	132.5	365	150	-
<b>JK132E/EG</b>	450	465	132.5	365	80	290

### 250A DIN Extension Boxes

	Dimensions (mm)			Fixing Centres (mm)		
	Height	Width	Depth	A	B	C
<b>JK216E/EG</b>	300	465	165.5	365	150	-
<b>JK232E/EG</b>	450	465	165.5	365	80	290

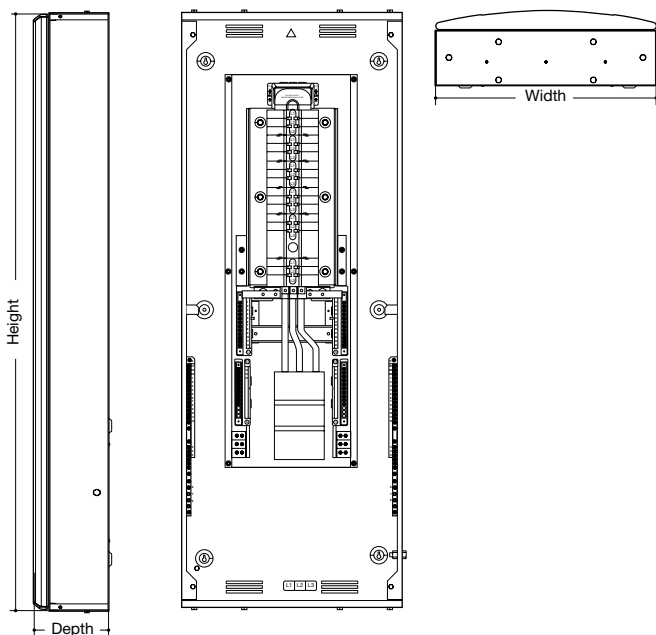


### 125A Cable Spreader Boxes

	Dimensions (mm)				Fixing Centres (mm)		
	Height	Width	Depth	Depth with optional door	A	B	C
<b>JK101SE</b>	300	465	91.5	132.5	365	150	-
<b>JK102LE</b>	450	465	91.5	132.5	365	80	290

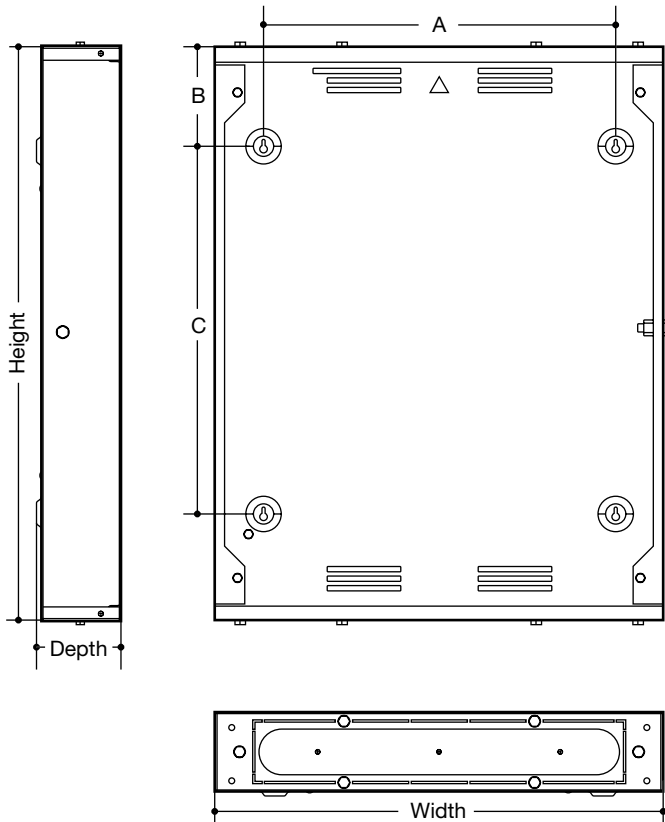
### 250A Cable Spreader Boxes

	Dimensions (mm)				Fixing Centres (mm)		
	Height	Width	Depth	Depth with optional door	A	B	C
<b>JK201SE</b>	300	465	124.5	165.5	365	150	-
<b>JK202LE</b>	450	465	124.5	165.5	365	80	290



### Hybrid 250A TPN Distribution Boards

	Dimensions (mm)		
	Height	Width	Depth
<b>JK20210B/BG</b>	1250	465	165.5
<b>JK20216B/BG</b>	1400	465	165.5
<b>JK20220B/BG</b>	1400	465	165.5
<b>JK20210B/BGSD</b>	1250	465	165.5
<b>JK20216B/BGSD</b>	1400	465	165.5
<b>JK20220B/BGSD</b>	1400	465	165.5



125A Side Extension Boxes

	Dimensions (mm)			Fixing Centres (mm)		
	Height	Width	Depth	A	B	C
<b>JK104BSF</b>	500	465	91.5	365	100	300
<b>JK106BSF</b>	550	465	91.5	365	100	350
<b>JK108BSF</b>	625	465	91.5	365	100	425
<b>JK112BSF</b>	850	465	91.5	365	100	650
<b>JK116BSF</b>	950	465	91.5	365	100	750

250A Side Extension Boxes

	Dimensions (mm)			Fixing Centres (mm)		
	Height	Width	Depth	A	B	C
<b>JK208BSF</b>	950	465	124.5	365	100	750
<b>JK212BSF</b>	1100	465	124.5	365	100	900
<b>JK216BSF</b>	1250	465	124.5	365	100	1050
<b>JK218BSF</b>	1400	465	124.5	365	100	1200
<b>JK224BSF</b>	1550	465	124.5	365	100	1350

125A Half Width Side Extension Boxes

	Dimensions (mm)			Fixing Centres (mm)		
	Height	Width	Depth	A	B	C
<b>JK104BSH</b>	500	232.5	91.5	170	100	300
<b>JK106BSH</b>	550	232.5	91.5	170	100	350
<b>JK108BSH</b>	625	232.5	91.5	170	100	425
<b>JK112BSH</b>	850	232.5	91.5	170	100	650
<b>JK116BSH</b>	950	232.5	91.5	170	100	750
<b>JK101BSH</b>	300	232.5	91.5	170	100	100

250A Half Width Side Extension Boxes

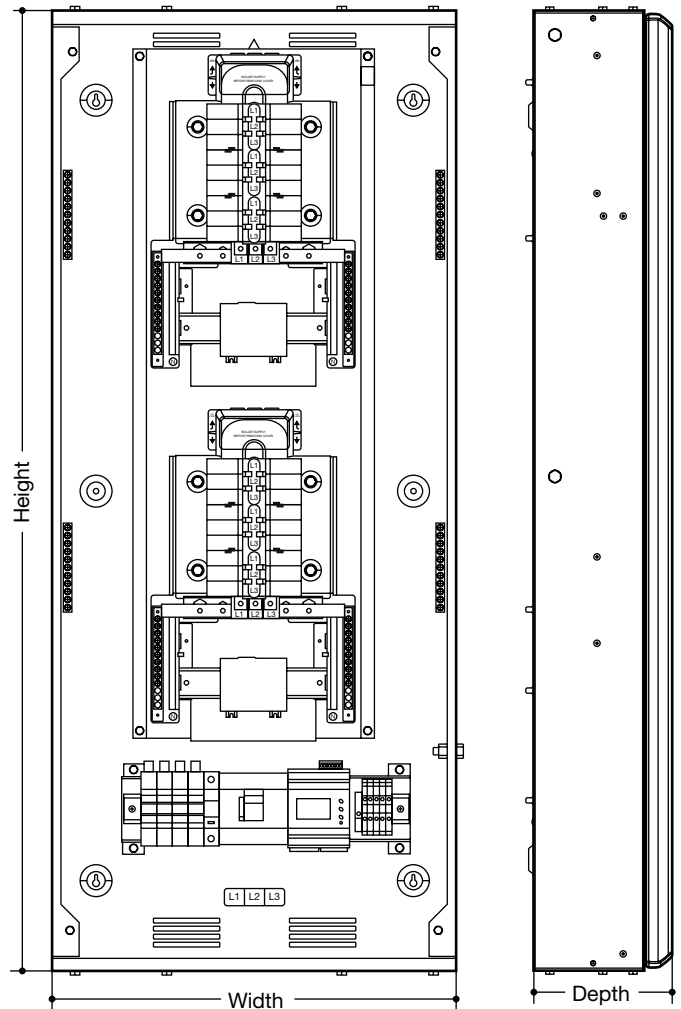
	Dimensions (mm)			Fixing Centres (mm)		
	Height	Width	Depth	A	B	C
<b>JK208BSH</b>	950	232.5	124.5	170	100	750
<b>JK212BSH</b>	1100	232.5	124.5	170	100	900
<b>JK216BSH</b>	1250	232.5	124.5	170	100	1050
<b>JK218BSH</b>	1400	232.5	124.5	170	100	1200
<b>JK224BSH</b>	1550	232.5	124.5	170	100	1350
<b>JK201BSH</b>	300	232.5	124.5	170	100	100

### Dual Power & Lighting Boards

	Dimensions (mm)		
	Height	Width	Depth
<b>JKD146PM</b>	1100	465	165.5
<b>JKD166PM</b>	1100	465	165.5
<b>JKD164PM</b>	1100	465	165.5
<b>JKD168PM</b>	1250	465	165.5
<b>JKD188PM</b>	1250	465	165.5
<b>JKD186PM</b>	1250	465	165.5
<b>JKD1416PM</b>	1400	465	165.5
<b>JKD1164PM</b>	1400	465	165.5
<b>JKD1812PM</b>	1400	465	165.5
<b>JKD1128PM</b>	1400	465	165.5
<b>JKD11212PM</b>	1400	465	165.5

### Triple Power, Lighting & Services Board

	Dimensions (mm)		
	Height	Width	Depth
<b>JKD2884PM</b>	1850	465	165.5



### Meter Characteristics

Supply	60 to 300V AC, 50/60Hz (±5%)
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### Serial Communication

Interface Standard and Protocol	RS485 and MODBUS RTU
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### Input (CT)

Pluggable RJ45	Input 1/ Input 2
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### Output



Pulse Output:	Voltage Range : 24V DC max
Current Capacity :	100mA max
Pulse Duration :	Selectable Between 0.1 to 2.0sec
Pulse Weight :	Selectable between 0.01 to 9.99kWh

### Accuracy of meter

Measurement	Accuracy
Voltage VL-N	0.5% of full range
Voltage VL-L	0.5% of full range
Current A	0.5% of full range
Frequency For L-N Voltage > 20V For L-L Voltage > 35V"	0.1% of full range
Active power	1.0% of full range
Apparent Power	1.0% of full range
Reactive Power	1.0% of full range
Power Factor	±0.01% of full Range
Active Energy	1.0% of full range
Reactive Energy	1.0% of full range
Max/Min Active Power	1.0% of full range
Max/Min Reactive Power	1.0% of full range
Max Apparent Power	1.0% of full range
Power Consumption	Less than 8VA

Characteristics	JK1**	JK2**
Standards	Designed, manufactured and tested to BS EN 61439-3	Designed, manufactured and tested to BS EN 61439-3
Busbar Current Rating	125A	250A
Busbar Type	Fully shrouded copper	Fully shrouded copper
Busbar Rating	25kA Conditional	25kA Conditional
Incoming	100A Switch	250A MCS
	125A Switch	250A MCCB
	63A contactor AC3	160A contactor AC3
	100A contactor AC3	Direct connection
	Direct connection	
RCCB incomers		
Outgoing Ways	4, 6, 8, 12, 16, 18, 24 Triple pole outgoing ways	8, 12, 16, 18, 24 Triple pole way outgoing ways
Outgoing Protection	Type B MCB (6A to 63A, 1P & 3P) Type C, D MCB, (0.5A to 63A, 1P & 3P) 1Mod and 2Mod RCBO	Type B MCB (6A to 63A, 1P & 3P) Type C, D MCB, (0.5A to 63A, 1P & 3P) 1Mod and 2Mod RCBO
Voltage Rating in AC	230 / 415V	230 / 415V
IP Protection	IP3X to BS EN 60529	IP3X to BS EN 60529
Enclosure Body Type	Steel	Steel
Enclosure Paint Type	Powder Coat Grey White BS4800 00A01	Powder Coat Grey White BS4800 00A01
Cable Entry	Obround protected cable entry points	Obround protected cable entry points
<b>Terminal Connection Capacity</b>		
Incoming Line Terminal	50mm <sup>2</sup>	120mm <sup>2</sup>
Incoming Earth Terminal	M8 stud	M8 stud
Incoming Neutral Terminal	50mm <sup>2</sup> cage or M6 stud	M8 Stud
Outgoing Earth Terminals	16mm <sup>2</sup>	16mm <sup>2</sup>
Outgoing Neutral Terminals	16mm <sup>2</sup>	16mm <sup>2</sup>
Enclosure Earth Stud	M8	M8
<b>Installation</b>		
Mounting	4 x key hole fixing holes plus central top key hole for one fixing hanging / levelling Surface Wall Mount	4 x key hole fixing holes plus central top key hole for one fixing hanging / levelling Surface Wall Mount
Gland Plate	Top and bottom removable	Top and bottom removable
Integrated Locking System	Coin lock as standard, key lock as accessory	Coin lock as standard, key lock as accessory

### Torque Settings

	 Pz No.	 (mm)	Cables >1.5mm <sup>2</sup> Tightening torque (N.m)		Cables ≤1.5mm <sup>2</sup> Tightening torque (N.m)		Cable Stripping (mm)
			Single Cable	Multi Cables	Single Cable	Multi Cable	
<b>Consumer unit terminals</b>							
Earth and neutral terminal bars	2	6.5	2	2	1.5	1.5	10
<b>Isolation</b>							
SB switch disconnectors	2	6.5	3.6	3.6	3.6	3.6	15
<b>Circuit protection</b>							
MTN MCB	2	6.5	2.8	2.8	2.8	2.8	13
NBN/NCN/NDN MCB	2	6.5	2.8	2.8	2.8	2.8	13
RCBO	2	5.5	2.1	2.1	2.1	2.1	13
RCCB	2	5.5	2.8	2.8	2.8	2.8	13

Interface Characteristics	Dual Power & Lighting Boards	Triple Power, Lighting & Services Board
Rated & operational voltage ( $U_n / U_e$ )	415V a.c. 50Hz	415V a.c. 50Hz
Rated insulation voltage ( $U_i$ )	690V a.c. 50Hz	690V a.c. 50Hz
Rated impulse withstand voltage ( $U_{imp}$ )	4kV	4kV
Rated current of the Assembly ( $I_{nA}$ )	125A	200A
Rated current of pan assembly	Lower Pan ( $I_n$ ) = 125A (RDF=1) Upper Pan ( $I_n$ ) = 125A (RDF=1)	Lower Pan ( $I_n$ ) = 125A (RDF=1) Middle Pan ( $I_n$ ) = 125A (RDF=1) Upper Pan ( $I_n$ ) = 125A (RDF=1)
Rated current of an Outgoing Circuit ( $I_{nC}$ )	MCB 0.5A - 63A (marked rated current on device) RCBO 6A - 45A (marked rated current on device)	MCB 0.5A - 63A (marked rated current on device) RCBO 6A - 45A (marked rated current on device)
Rated conditional short-circuit current of the assembly ( $I_{cC}$ )	10kA with equipment and arrangements specified in Hager's technical documentation/catalogue	10kA <sup>1</sup> with equipment and arrangements specified in Hager's technical documentation/catalogue
Protection against electric shock	Equipment shall be installed in an electrical system conforming to IEC 60364 / BS 7671	Equipment shall be installed in an electrical system conforming to IEC 60364 / BS 7671
Rated Diversity Factor (RDF) / Values of assumed loading	10 way to 24 way = 0.5 Note: RDF only applies to continuously and simultaneously loaded circuits.	10 way to 24 way = 0.5 Note: RDF only applies to continuously and simultaneously loaded circuits.
Rated frequency ( $f_n$ )	50 Hz	50 Hz
Pollution degree	2	2
Types of system earthing for which the assembly is designed	TNC-S, TN-S and TT when installed in an electrical system conforming to BS 7671	TNC-S, TN-S and TT when installed in an electrical system conforming to BS 7671
Intended locations	Indoor use only	Indoor use only
<b>Stationary Assembly</b>		
Degree of protection	IP3XD with Door Closed IP2XC with Door Open	IP3XD with Door Closed IP2XC with Door Open
Intended use	Distribution boards intended to be operated by ordinary persons (DBO)	Distribution boards intended to be operated by ordinary persons (DBO)
Electromagnetic compatibility (EMC) classification	EMC Environment B	EMC Environment B
External design	Wall-mounted, surface type, enclosed assembly.	Wall-mounted, surface type, enclosed assembly.
Mechanical impact protection	IK05	IK05
The type of construction	Fixed parts	Fixed parts
DBO Type	Type B DBO	Type B DBO
Incoming Line Terminal	70mm <sup>2</sup> (switch disconnecter)	70mm <sup>2</sup> (switch disconnecter)
Incoming Neutral Terminal	50mm <sup>2</sup> Cage	50mm <sup>2</sup> Cage
Enclosure Earth Stud	M8	M8
Standards	BS EN 61439-3	BS EN 61439-3

Interface Characteristics	JKD125PM	JKD125TPM	JKD250PM	JKD250TPM
Rated & operational voltage ( $U_N / U_E$ )	415V a.c. 50Hz	415V a.c. 50Hz	415V a.c. 50Hz	415V a.c. 50Hz
Rated insulation voltage ( $U_i$ )	690V a.c. 50Hz	690V a.c. 50Hz	690V a.c. 50Hz	690V a.c. 50Hz
Rated impulse withstand voltage ( $U_{imp}$ )	4kV	4kV	4kV	4kV
Rated current of the Assembly ( $I_{NA}$ )	125A Right Side Pan Assembly ( $I_N$ ) 125A Left Side Pan Assembly ( $I_N$ ) 125A	125A Right Side Pan Assembly ( $I_N$ ) 125A Middle Pan Assembly ( $I_N$ ) 125A Left Side Pan Assembly ( $I_N$ ) 125A	250A Right Side Pan Assembly ( $I_N$ ) 250A Left Side Pan Assembly ( $I_N$ ) 250A	250A Right Side Pan Assembly ( $I_N$ ) 200A Middle Pan Assembly ( $I_N$ ) 200A Left Side Pan Assembly ( $I_N$ ) 200A
Rated conditional short-circuit current of the assembly ( $I_{CC}$ )	10kA with equipment and arrangements specified in Hager's technical documentation/catalogue	10kA with equipment and arrangements specified in Hager's technical documentation/catalogue	10kA with equipment and arrangements specified in Hager's technical documentation/catalogue	10kA with equipment and arrangements specified in Hager's technical documentation / catalogue
Protection against electric shock	Equipment shall be installed in an electrical system conforming to IEC 60364 / BS 7671	Equipment shall be installed in an electrical system conforming to IEC 60364 / BS 7671	Equipment shall be installed in an electrical system conforming to IEC 60364 / BS 7671	Equipment shall be installed in an electrical system conforming to IEC 60364 / BS 7671
Rated frequency ( $f_N$ )	50 Hz	50 Hz	50 Hz	50 Hz
Pollution degree	2	2	2	2
Types of system earthing for which the ASSEMBLY is designed	TNC-S, TN-S and TT when installed in an electrical system conforming to BS 7671	TNC-S, TN-S and TT when installed in an electrical system conforming to BS 7671	TNC-S, TN-S and TT when installed in an electrical system conforming to BS 7671	TNC-S, TN-S and TT when installed in an electrical system conforming to BS 7671
Intended locations	Indoor use only	Indoor use only	Indoor use only	Indoor use only
Degree of protection	IP3XD with Door Closed IP2XC with Door Open	IP3XD with Door Closed IP2XC with Door Open	IP3XD with Door Closed IP2XC with Door Open	IP3XD with Door Closed / IP2XC with Door Open
Intended use	Distribution boards intended to be operated by ordinary persons (DBO)	Distribution boards intended to be operated by ordinary persons (DBO)	Distribution boards intended to be operated by ordinary persons (DBO)	Distribution boards intended to be operated by ordinary persons (DBO)
Electromagnetic compatibility (EMC) classification	EMC Environment B	EMC Environment B	EMC Environment B	EMC Environment B
External design	Wall-mounted, surface type, enclosed assembly.	Wall-mounted, surface type, enclosed assembly.	Wall-mounted, surface type, enclosed assembly.	Wall-mounted, surface type, enclosed assembly.
Mechanical impact protection	IK05	IK05	IK05	IK05
The type of construction	Fixed parts	Fixed parts	Fixed parts	Fixed parts
Incoming Line Terminal	M8	M8	M8	M8
Incoming Neutral Terminal	M8 Lug	M8 Lug	M8 Lug	M8 Lug
Enclosure Earth Stud	M8	M8	M8	M8



### Meter Characteristics

Supply	60 to 300V AC, 50/60Hz (±5%)
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### Serial Communication

Interface Standard and Protocol	RS485 and MODBUS RTU
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### Input (CT)

Pluggable RJ45	Input 1/ Input 2
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### Output

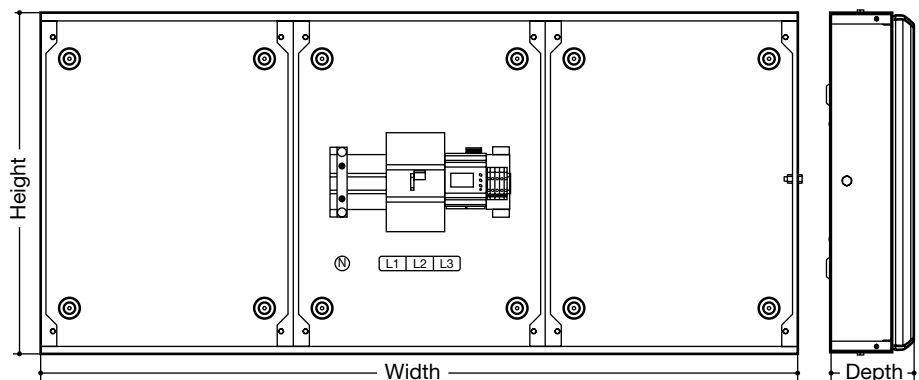
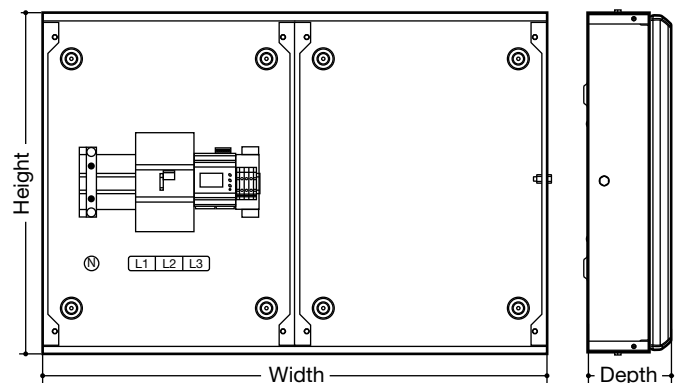
Pulse Output:	Voltage Range : 24V DC max
Current Capacity :	100mA max
Pulse Duration :	Selectable Between 0.1 to 2.0sec
Pulse Weight :	Selectable between 0.01 to 9.99kWh

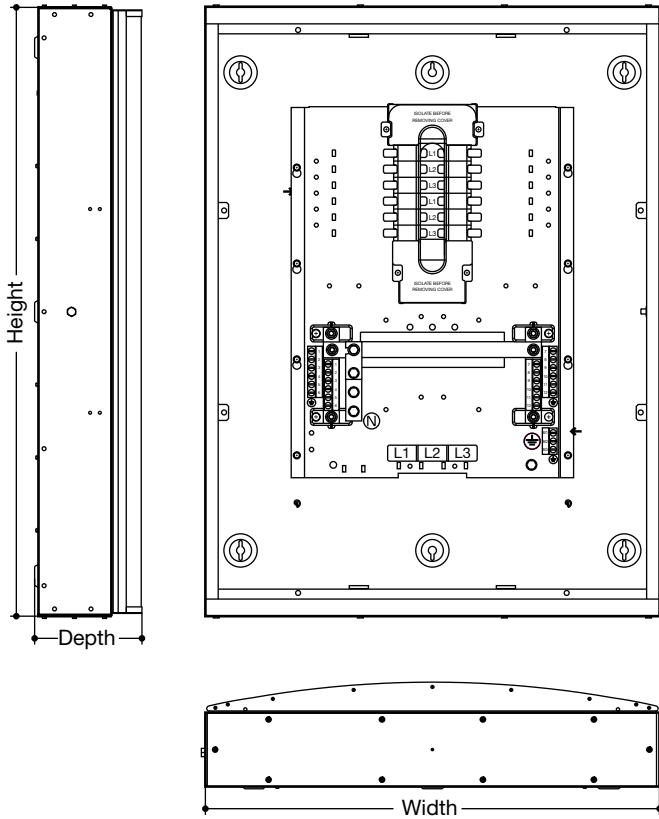
### Accuracy of meter

Measurement	Accuracy
Voltage VL-N	0.5% of full range
Voltage VL-L	0.5% of full range
Current A	0.5% of full range
Frequency For L-N Voltage >20V For L-L Voltage >35V"	0.1% of full range
Active power	1.0% of full range
Apparent Power	1.0% of full range
Reactive Power	1.0% of full range
Power Factor	±0.01% of full Range
Active Energy	1.0% of full range
Reactive Energy	1.0% of full range
Max/Min Active Power	1.0% of full range
Max/Min Reactive Power	1.0% of full range
Max Apparent Power	1.0% of full range
Power Consumption	Less than 8VA

### Dual & Triple Meter Incomers

	Dimensions (mm)		
	Height	Width	Depth
<b>JKD125PM</b>	625	930	132.5
<b>JKD125TPM</b>	625	1395	132.5
<b>JKD250PM</b>	625	930	132.5
<b>JKD250TPM</b>	625	1395	132.5





**Primary Boards**

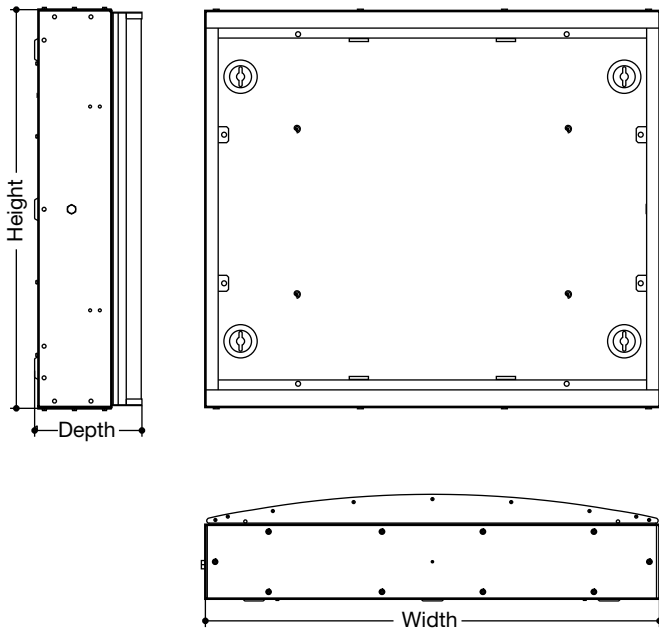
	Dimensions (mm)		
	Height	Width	Depth
JN204B/G	950	710	160
JN206B/G	1100	710	160
JN208B/G	1100	710	160
JN212B/G	1250	710	160
JN216B/G	1550	710	160

**Terminals**

Neutral	Earth	Bond
2 x 6 x 50mm	2 x 6 x 50mm	1 x 3 x 50mm
2 x 9 x 50mm	2 x 9 x 50mm	1 x 3 x 50mm
2 x 12 x 50mm	2 x 12 x 50mm	1 x 3 x 50mm
2 x 18 x 50mm	2 x 18 x 50mm	1 x 3 x 50mm
2 x 24 x 50mm	2 x 24 x 50mm	1 x 3 x 50mm

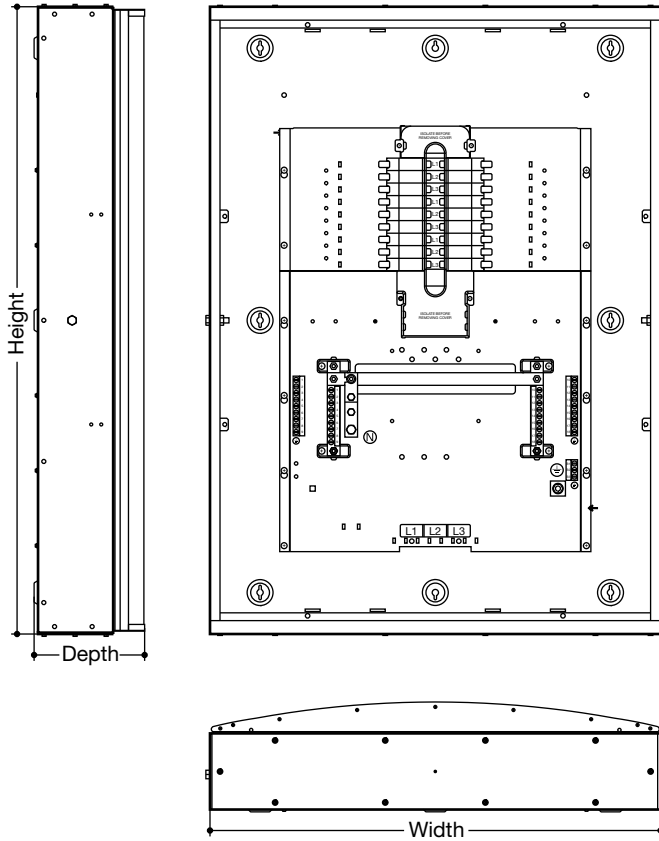
Cables outgoing ways:  
25 - 50mm<sup>2</sup> CSA Flex  
25 - 70mm<sup>2</sup> CSA Solid

MCCB Connections      M8  
Earth                      M8  
Neutral                    M8



**Extension Boxes**

	Dimensions (mm)		
	Height	Width	Depth
JN201BE/G	300	710	160
JN203BE/G	450	710	160
JN205BE	300	710	125
JN206BE	450	710	125



### Primary Boards

	Dimensions (mm)		
	Height	Width	Depth
JF406B/G	1250	900	220
JF408B/G	1250	900	220
JF412B/G	1400	900	220
JF416B/G	1550	900	220
JF418B/G	1700	900	220
JF808B/G	1250	900	220
JF812B/G	1400	900	220
JF818B/G	1700	900	220
JF60204B/G	1250	900	220
JF80206B/G	1250	900	220
JF80404B/G	1250	900	220
JF80210B/G	1400	900	220
JF80408B/G	1400	900	220
JF80414B/G	1700	900	220
JF80612B/G	1700	900	220

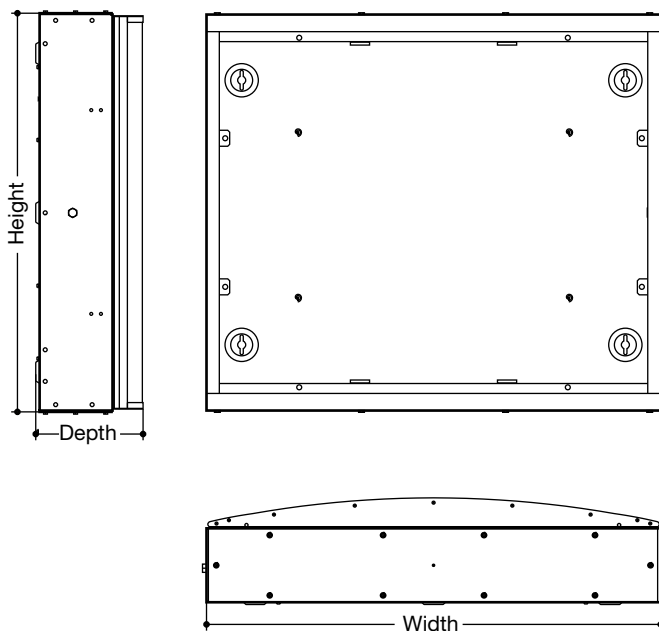
### Terminals

Neutral		Earth	Bond
2 x 9 x 50mm		2 x 9 x 50mm	1 x 3 x 50
2 x 12 x 50mm		2 x 12 x 50mm	1 x 3 x 50
2 x 18 x 50mm		2 x 18 x 50mm	1 x 3 x 50
2 x 24 x 50mm		2 x 24 x 50mm	1 x 3 x 50
2 x 12 x 50mm		2 x 12 x 50mm	1 x 3 x 50
2 x 18 x 50mm		2 x 18 x 50mm	1 x 3 x 50
2 x 27 x 50mm		2 x 27 x 50mm	1 x 3 x 50
2 x 6 x 50mm		2 x M8 Bolt	2 x 9 x 50mm
2 x 9 x 50mm	2 x M8 Bolt	2 x 12 x 50mm	1 x 3 x 50
2 x 6 x 50mm	4 x M8 Bolt	2 x 12 x 50mm	1 x 3 x 50
2 x 15 x 50mm	2 x M8 Bolt	2 x 18 x 50mm	1 x 3 x 50
2 x 12 x 50mm	4 x M8 Bolt	2 x 18 x 50mm	1 x 3 x 50
2 x 21 x 50mm	4 x M8 Bolt	2 x 27 x 50mm	1 x 3 x 50
2 x 18 x 50mm	6 x M8 Bolt	2 x 27 x 50mm	1 x 3 x 50

Cables outgoing ways:  
 25 - 50mm<sup>2</sup> CSA Flex  
 25 - 70mm<sup>2</sup> CSA Solid

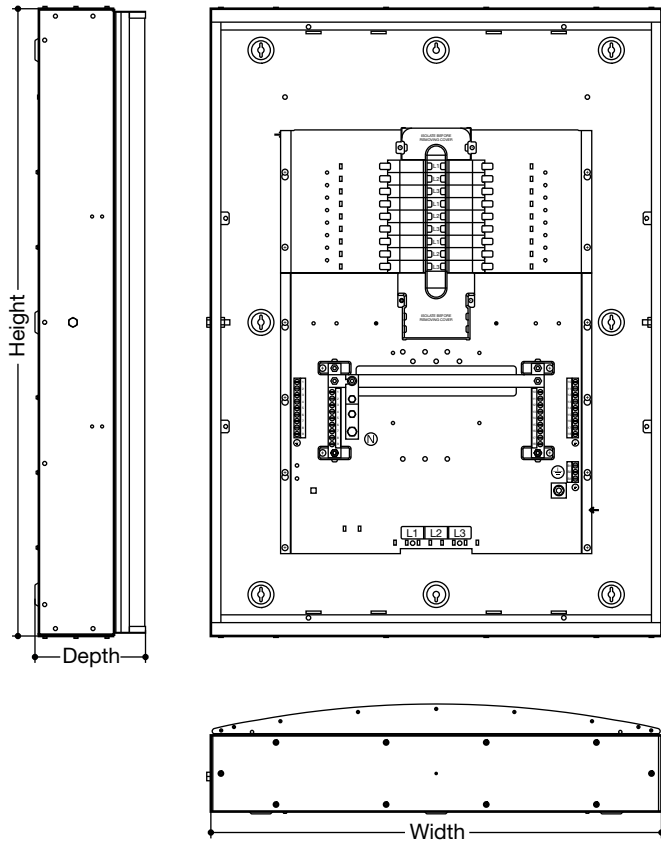
MCCB Connections:  
 400A M10  
 630A M12

Earth:  
 400A M10  
 630A M10



### Extension Boxes

	Dimensions (mm)		
	Height	Width	Depth
JF801E/G	300	900	220
JF803E/G	450	900	220
JF805E	300	900	158
JF806E	450	900	158



**Primary Boards**

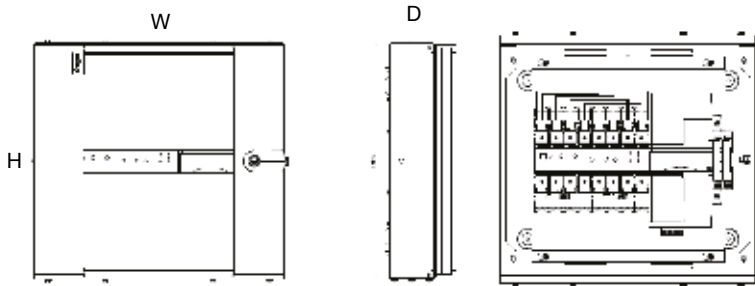
	Dimensions (mm)		
	Height	Width	Depth
<b>JHF812B/G</b>	2050	900	220
<b>JHF818B/G</b>	2200	900	220
<b>JHF80206B/G</b>	1900	900	220
<b>JHF80404B/G</b>	1900	900	220
<b>JHF80210B/G</b>	2050	900	220
<b>JHF80408B/G</b>	2050	900	220
<b>JHF80414B/G</b>	2200	900	220
<b>JHF80612B/G</b>	2200	900	220

**Invicta 3 Panelboard Metering Method Chart**

Use the process below to aid you in selecting the appropriate Invicta 3 Panelboard, side extension boxes, meters, meter supply cables and CT's.

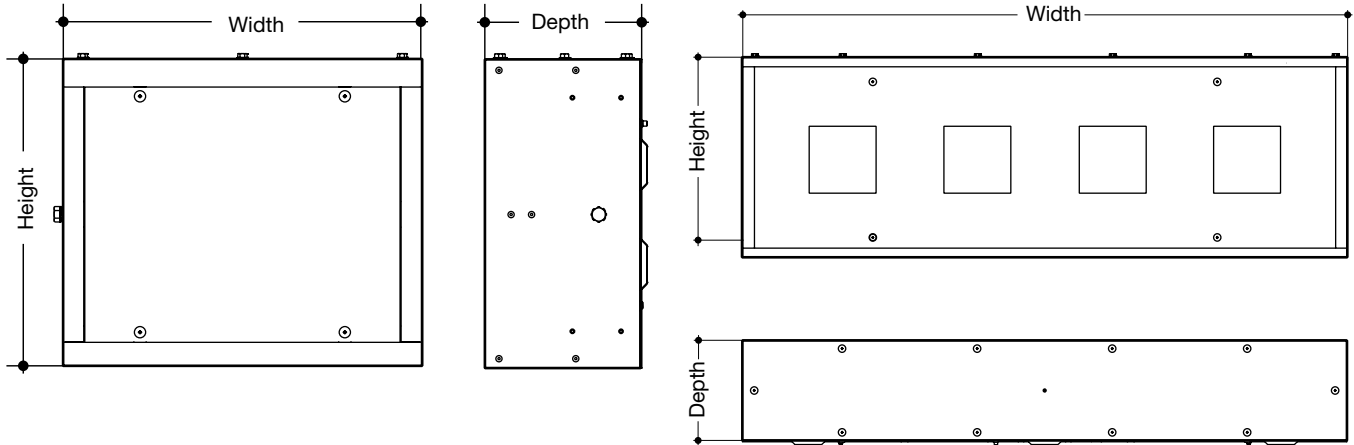
Step	Selection method	Catalogue page	Order code	Qty
1	Select panelboard eg. 6 way with glazed door <b>(JN206BG)</b>	250A Page 28. 400A Page 30. 630A/800A Page 32. 800A Page 34.	<b>JN206BG</b>	1
2	Identify quantity of meters required eg. 4 metered ways modbus <b>(ECM01)</b>	Page 39.	<b>ECM01</b>	4
3	Select position for meter enclosure (Top or side) eg. Top - 450mm enclosure 6xDIN 96 Cut- Outs or Side - 6/8 Way JN Board 4xDIN 96 Cut-Outs	For JN Page 28. For JF Page 39.	<b>JN4506TM</b> <b>JN11004SM</b>	1 1
4	Number of blanking plates required eg. Top - 450mm enclosure 6xDIN 96 Cut- Outs or Side - 6/8 Way JN Board 4xDIN 96 Cut-Outs	Page 39.	<b>JF96BP</b>	2 0
5	Meter voltage supply including fuses. (1st meter only includes incoming) e.g. <b>JN130VMF</b>	Page 38.	<b>JN130VMF</b>	1
6	Supply cable for remaining meters (Link meter to meter) e.g. <b>PGMFT150</b>	Page 38.	<b>PGMFT150</b>	3
7	Identify which CT's are required eg. 60 Amp Qty 1 eg. 100 Amp Qty 2 eg. 125A Qty 1	Page 38.	<b>EC1260CT</b> <b>EC12100CT</b> <b>EC12125CT</b>	1 2 1

Characteristics	250A	400A	630 / 800A	800A
Series	JN2**	JF4**	JF6**/JF8**	JHF8**
Busbar current rating	250A	400A	800A	800A (for 800A MCCB only)
Busbar type	Type B Fully Shrouded Copper			
Busbar rated short-time with-stand current	25kA for 1 sec	35kA for 1 sec	35kA for 1 sec	35kA for 1 sec
Internal separation	Form 3A			
Incoming	Up to 250A MCCB, MCS	Up to 400A MCCB, MCS	Up to 630A MCCB, 800A LBS	800A MCCB
Outgoing	16 - 125A max.	16 - 125A max.	16 - 125A 100A - 250A	16 - 125A 100A - 250A
Voltage rating in a.c.	415V	415V	415V	415V
IP Protection	IP30			
Enclosure body type	Steel			
Enclosure paint type	Powder coat Grey White BS 4800 00A01			
Cable entry	Via Gland Plates			
<b>Terminal Connection capacity</b>				
Incoming earth terminal	M8	M10	M10	M10
Incoming neutral terminal	M8	M12	M12	M12
Outgoing earth terminals	Up to 50mm <sup>2</sup>	Up to 50mm <sup>2</sup>	Up to 50mm <sup>2</sup>	Up to 50mm <sup>2</sup>
Outgoing neutral terminals	Up to 50mm <sup>2</sup>	Up to 50mm <sup>2</sup>	16A - 125A: Up to 50mm <sup>2</sup> 100A - 250A: M8 Stud	16A - 125A: Up to 50mm <sup>2</sup> 100A - 250A: M8 Stud
Enclosure earth stud	M8	M10	M10	M10
<b>Installation</b>				
Mounting	Surface (Wall)			



### Enclosed ATS

	Dimensions (mm)			
	Width	Height	Depth	Weight
<b>JK140ATS</b>	450	465	132.5	10.5
<b>JK163ATS</b>	450	465	132.5	10.5
<b>JK180ATS</b>	450	465	132.5	10.5
<b>JK100ATS</b>	450	465	132.5	10.5
<b>JK125ATS</b>	450	465	132.5	10.5

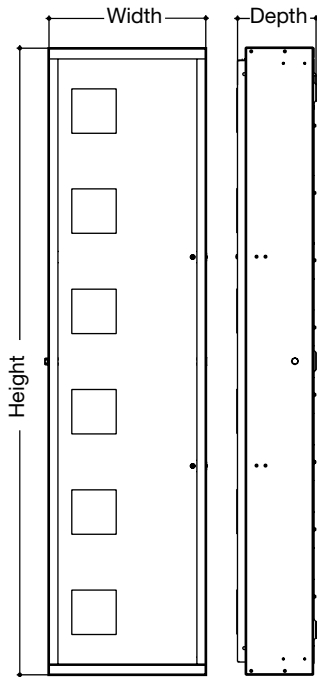


**Corner Filler Enclosures**

	Dimensions (mm)		
	Width	Height	Depth
<b>JF300CF</b>	350	300	160
<b>JF450CF</b>	350	450	160

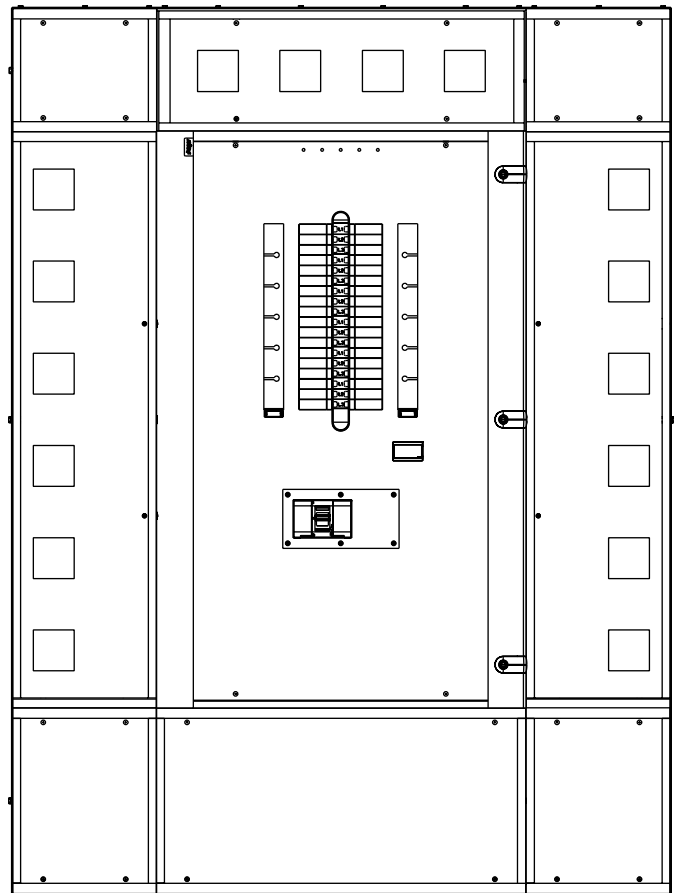
**Top/Bottom Enclosures**

	Dimensions (mm)		
	Width	Height	Depth
<b>JF3004TM</b>	900	300	160
<b>JF4508TM</b>	900	450	160



**Side Enclosures**

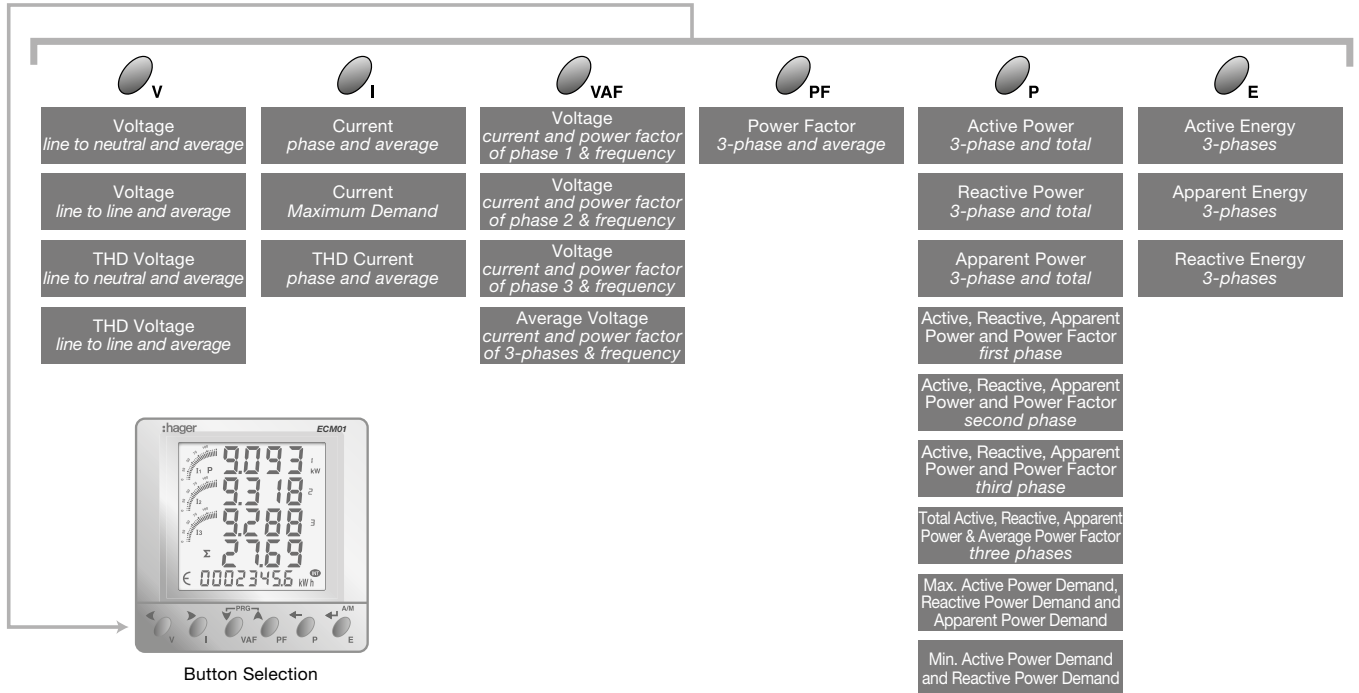
	Dimensions (mm)		
	Width	Height	Depth
<b>JF12504SM</b>	350	1250	160
<b>JF14006SM</b>	350	1400	160
<b>JF15508SM</b>	350	1550	160
<b>JF17009SM</b>	350	1700	160



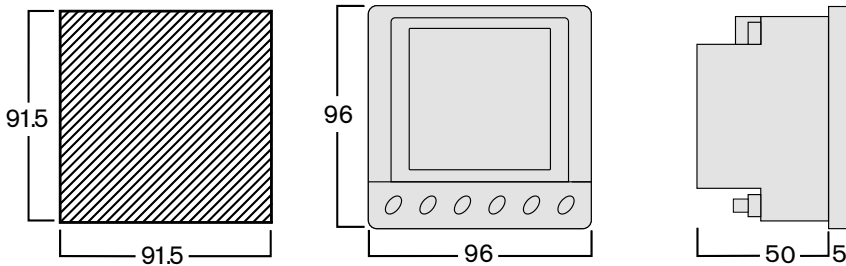


- 96 x 96mm Flush mounting
- Single phase or 3 phase (4 wire) network balanced or unbalanced load
- Built in energy pulsed output or with pulsed output and RS485 (modbus)
- Backlit LCD display with bargraph current indication on every page
- Automatic or manual scrolling display
- 330mV current transformer input
- Active energy class 1 (EN62053-21)
- Reactive energy class 2 (EN62053-23)
- Programmable VT ratio
- 3-phase: 140...460Vac measured voltage
- Single phase: 80...265Vac measured voltage
- THD up to 31<sup>st</sup> harmonic for voltage and current
- Self supplied auxiliary
- Programmable CT ratio 5 to 10,000A
- Frequency 45/65Hz
- Wide range of measured parameters (see table below)
- Selectable CT phase correction allows reversal of L1 and L3
- Weight 230g

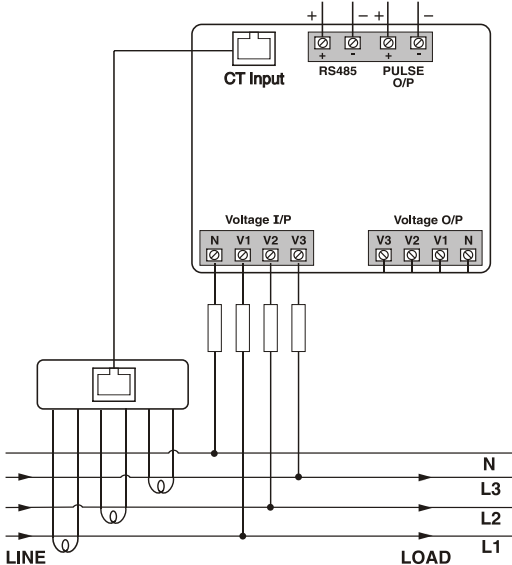
### Function Diagram



### Dimensions Diagram (mm)

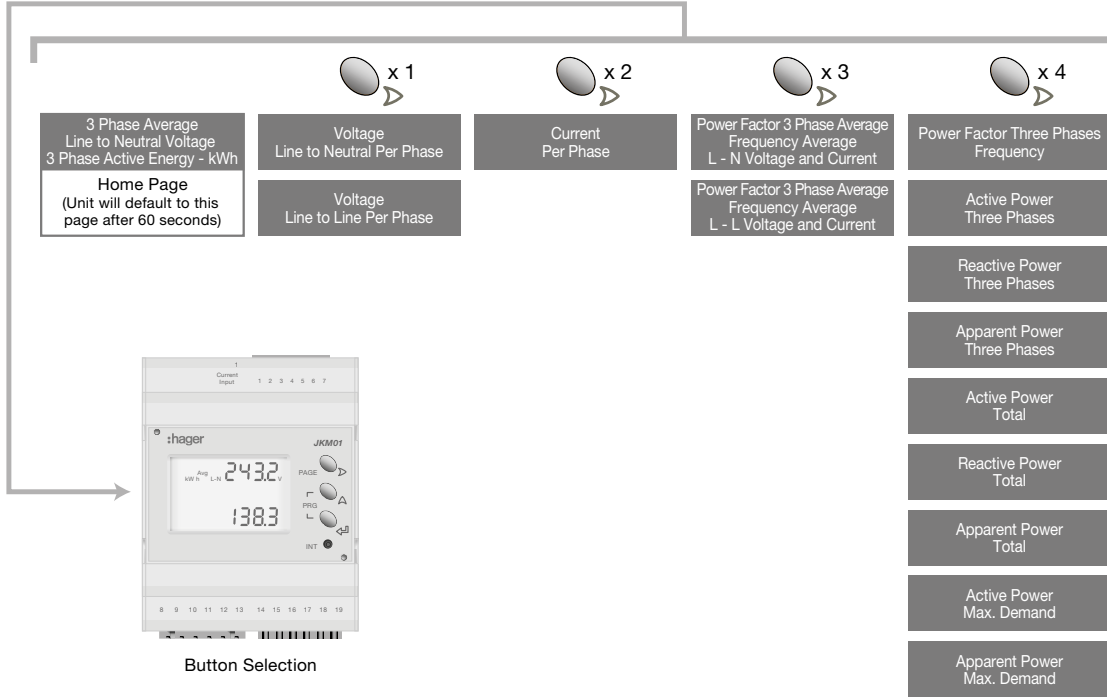


Please allow space at the rear of the meter for cable connections.

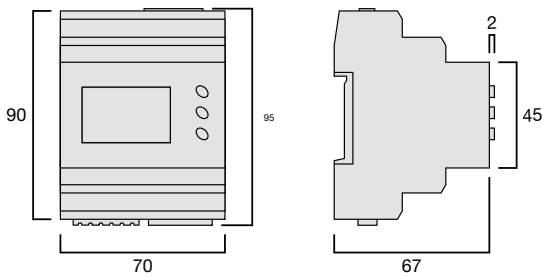


- 4 Module DIN rail mounting
- Single phase or 3 phase (4 wire) network balanced or unbalanced load
- Built-in energy pulse output and RS485 MODBUS communication
- Wide range of measured parameters (see table below)
- High quality backlit LCD display
- 330mV current transformer input
- Active energy class 1 (EN62053-21)
- Reactive energy class 2 (EN62053-23)
- THD up to 31st harmonic for voltage and current
- 3-phase: 140...460Vac measured voltage
- Single phase: 80...265Vac measured voltage
- Self supplied auxiliary
- Programmable CT ratio 5...10,000A
- Programmable VT ratio
- Frequency 45/65Hz
- Selectable CT phase correction allows reversal of L1 and L3
- Weight 190g

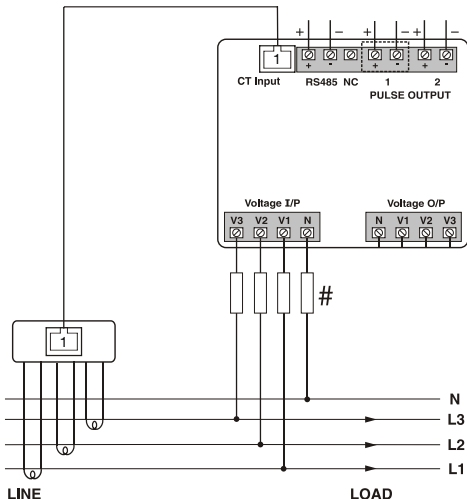
### Function Diagram



### Dimension Diagrams (mm)

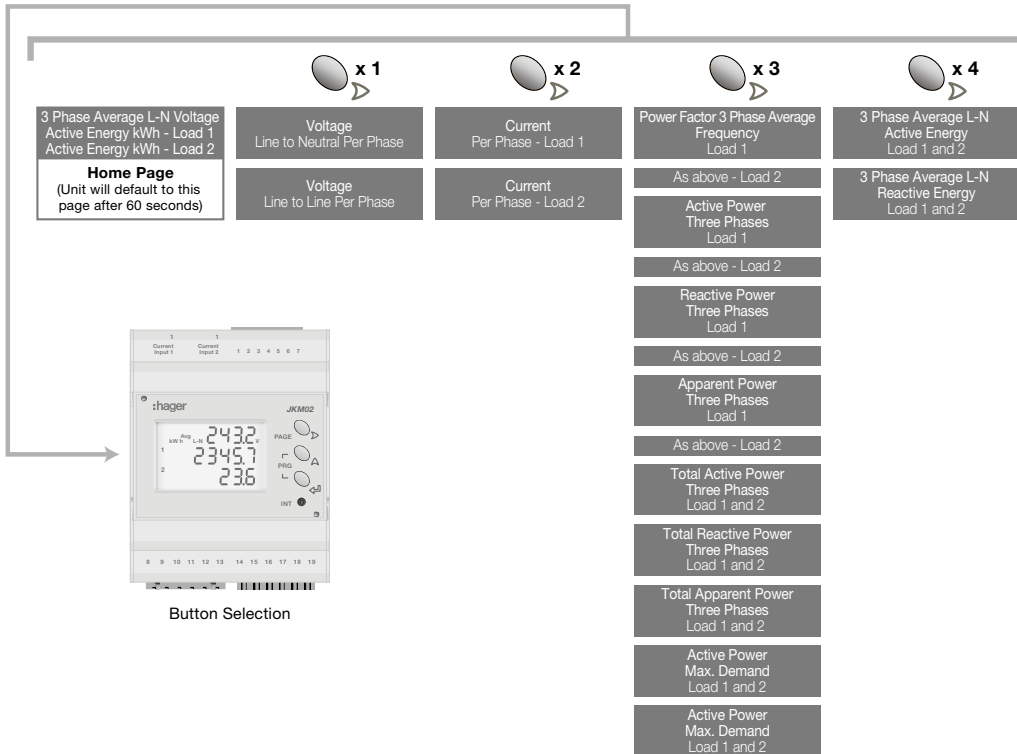


Please allow space above and below the meter for cable connections.

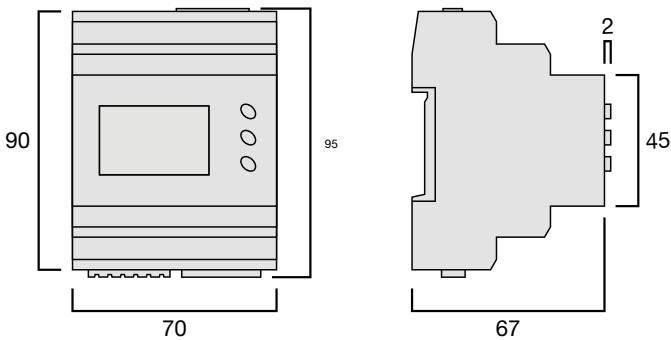


- Split Load, Dual CT input meter
- 4 Module DIN rail mounting
- Single phase or 3 phase (4 wire) network balanced or unbalanced load
- Built-in dual energy pulse output, one for each load and RS485 MODBUS communication
- Wide range of measured parameters (see table below)
- High quality backlit LCD display
- 330mV current transformer input
- Active energy class 1 (EN62053-21)
- Reactive energy class 2 (EN62053-23)
- THD up to 31st harmonic for voltage and current
- 3-phase: 140...460Vac measured voltage
- Single phase: 80...265Vac measured voltage
- Self supplied auxiliary
- Programmable CT ratio 5...10,000A per load
- Programmable VT ratio
- Frequency 45/65Hz
- Selectable CT phase correction allows reversal of L1 and L3
- Weight 200g

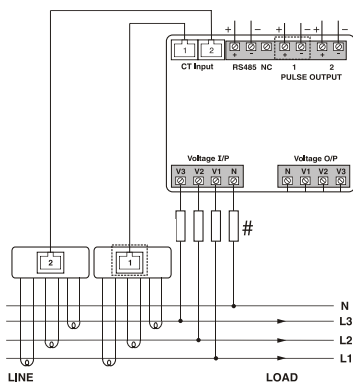
### Function Diagram



### Dimension Diagrams (mm)



Please allow space above and below the meter for cable connections.



- Connect up to three standard or split core CT's (1A or 5A secondaries)
- Integrated protection circuitry

**Standard CT to plug-in Adaptor**

The **JFA03** converter allows for the connection of up to three standard current transformers, or standard split-core current transformers (with 1A or 5A secondary's), to the plug-in system.

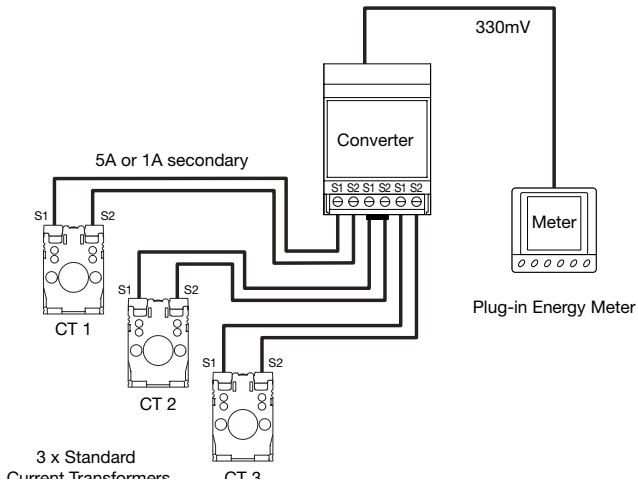
The unit has integrated protection circuitry allowing for disconnection from meter under load conditions for maintenance.

**Important Note**

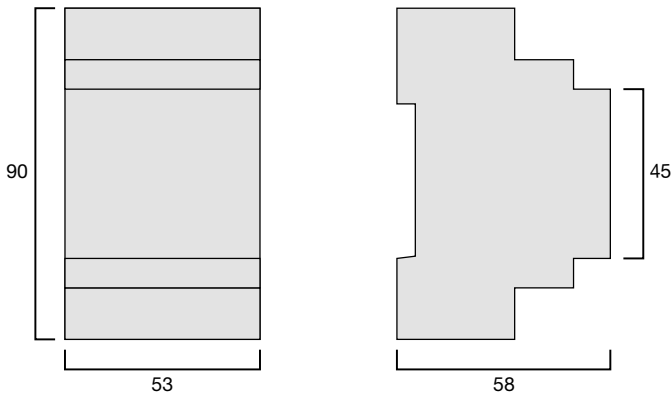
This converter does not provide electrical isolation. Current transformer secondaries may not be earthed and should be wired as shown.

**Technical Specification**

Burden:	<2VA per channel (5A Version) <0.5VA per channel (1A Version)
Accuracy:	0.4%
Suggested Cable Size: (CT to Adaptor)	1.5mm <sup>2</sup> or 2.5mm <sup>2</sup> (2.5mm <sup>2</sup> Max.)
Mounting:	DIN rail 35mm
Termination:	CT to adaptor - Rising clamp screw terminals Adaptor to Meter - RJ45 Patch Cable
Operating Temperature:	-10°C...+45°C
Storage Temperature:	-25°C...+70°C



**Dimension Diagrams (mm)**



### Description

Designed for use with Hager x160 MCCBs and the plug-in multifunction power meters.

Internal safety circuitry is provided which limits the output voltage to a safe level, allowing the transformer secondary to be left disconnected under load.

### Installation

The CT uses plug-in technology allowing much faster installation, saving you time and money. Additionally, all our three phase current transformers have been designed with hole centres and apertures to fit most standard industrial circuit breakers.

	EC1260CT, EC12100CT, EC12125CT, EC12160CT	EC2560CT, EC25100CT, EC2512CT, EC25160CT, EC25200CT, EC25250CT	EC40250CT, EC40400CT, EC40630CT	EC80800CT
Accuracy Class	1	1	1	1
Aperture	3 @ 15.5 x 30mm	3 @ 21 x 25mm	3 @ 31 x 31mm	3 @ 54 x 50mm
Width	75mm	105mm	140mm	215mm
Primary Current	60 to 160A	60 to 250A	250 to 630A	800A
Hole Centres	25mm	35mm	45mm	70mm
Housing Material	Self extinguishing Nylon IEC185 classification VO according to UL-94			
Reference Standard	EN6004-8			
Weight	500g	550g	680g	1200g

### EC1260CT, EC12100CT, EC12125CT, EC12160CT

### EC2560CT, EC25100CT, EC2512CT, EC25160CT, EC25200CT, EC25250CT

### EC40250CT, EC40400CT, EC40630CT

### EC80800CT

#### Current Transformer Ratios

Primary Current	Output	
60	330	<b>060</b>
100	330	<b>100</b>
125	330	<b>125</b>
160	330	<b>160</b>

330mV Secondary

#### Current Transformer Ratios

Primary Current	Output	
60	330	<b>060</b>
100	330	<b>100</b>
125	330	<b>125</b>
160	330	<b>160</b>
200	330	<b>200</b>
250	330	<b>250</b>

330mV Secondary

#### Current Transformer Ratios

Primary Current	Output	
250	330	<b>250</b>
400	330	<b>400</b>
630	330	<b>630</b>

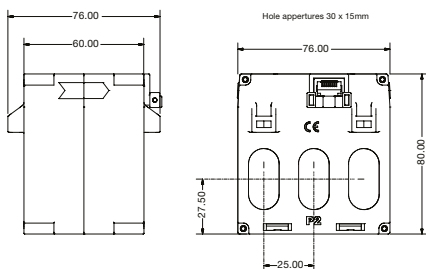
330mV Secondary

#### Current Transformer Ratios

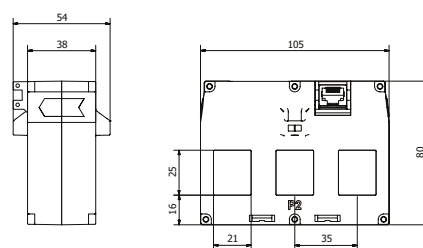
Primary Current	Output	Code
A	mV	
800	330	<b>800</b>

330mV Secondary

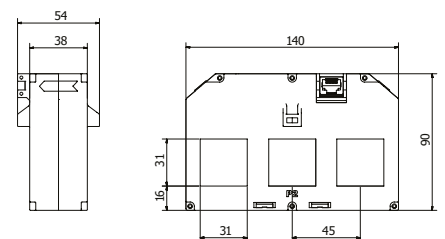
### EC1260CT, EC12100CT, EC12125CT, EC12160CT



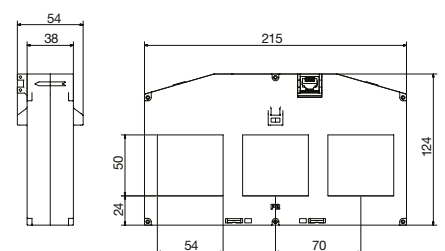
### EC2560CT, EC25100CT, EC2512CT, EC25160CT, EC25200CT, EC25250CT



### EC40250CT, EC40400CT, EC40630CT



### EC80800CT

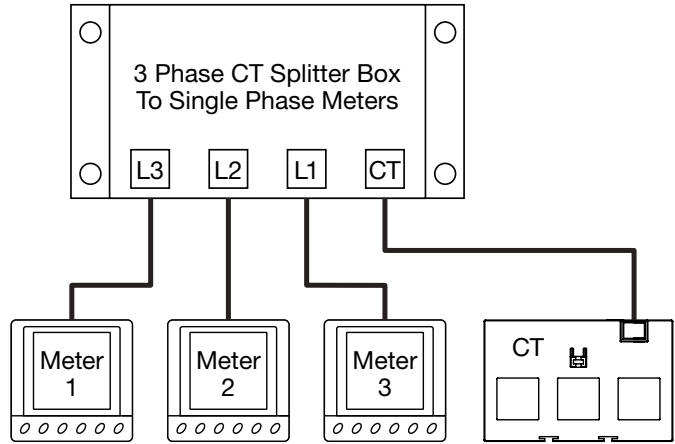


**CT Output and RJ45 Lead Tester**

This device makes it possible to test the RJ45 patch lead used to connect the current transformer to the meter. It also enables a standard electricians multimeter to measure the individual secondary outputs of the current transformer. To test the RJ45 patch lead, simply disconnect the lead from the meter and current transformer. Plug one end into socket 1 and the other end into socket 2 on the test box. Press the test button - the Green LED will light to indicate the lead is OK or the Red LED will light to indicate a faulty lead. When the lead is proven to be OK you can then check the individual secondary outputs of the current transformer. To measure the secondary output plug one end of the RJ45 patch lead into the current transformer and the other end into socket 2 on the test box. You can now use a standard multimeter to test the secondaries using the test points on the front of the test box. The output measured for each phase should be between 0 and 330mV a.c.  
Model Reference: **JFT03**

**3 Phase CT Splitter Box**

This 3 Phase CT Splitter Box allows the separate monitoring of each phase of a three phase current transformer on individual energy meters.  
Model Reference: **JFS03**



**Meter Voltage Supply Cable**

Our high quality Meter Voltage Supply Cables are fitted with a plug at one end and insulated bootlace ferrules at the other and provide power to the plug-in meter from your mains supply.

**Meter to Meter Supply Cable**

Our high quality Meter to Meter Voltage Supply Cables are fitted with a plug at one end and socket at the other. This allows multiple plug-in meters to be energised from a common supply. Up to 32 meters can be powered in a 'daisy chain' arrangement using this method.

**RJ45 Connection Cable**

The high quality low loss Category 5e RJ45 Connection Cable provides secondary connection between the plug-in current transformer and meter.

Two type of cable material are available:- LSZH (Low Smoke Zero Halogen).



### Fuse Combination Switches

All dimensions are in mm and exclude the handle.  
Add 45mm to the depth to allow for the handle (110mm for 630 / 800A)

SPSN	Description	Dimensions (mm)		
		Width	Height	Depth
JFB202U	20A SPSN	200	250	150
JFB203U	32A SPSN	200	250	150
JFD206U	63A SPSN	300	325	150
JFE210U	100A SPSN	375	400	200

TPN	Description	Dimensions (mm)		
		Width	Height	Depth
JFB302U	20A TPN	200	250	150
JFB303U	32A TPN	200	250	150
JFD306U	63A TPN	300	325	150
JFE310U	100A TPN	375	400	200
JFG312U	125A TPN	375	500	200
JFG316U	160A TPN	375	500	200
JFG320U	200A TPN	375	500	200
JFG325U	250A TPN	375	500	200
JFH331U	315A TPN	500	650	300
JFH340U	400A TPN	500	650	300
JFI363U	630A TPN	600	800	350
JFI380U	800A TPN	600	800	350

TPSN	Description	Dimensions (mm)		
		Width	Height	Depth
JFB402U	20A TPSN	200	250	150
JFB403U	32A TPSN	200	250	150
JFD406U	63A TPSN	300	325	150
JFE410U	100A TPSN	375	400	200
JFG412U	125A TPSN	375	500	200
JFG416U	160A TPSN	375	500	200
JFG420U	200A TPSN	375	500	200
JFG425U	250A TPSN	375	500	200
JFH431U	315A TPSN	500	650	300
JFH440U	400A TPSN	500	650	300
JFI463U	630A TPSN	600	800	350
JFI480U	800A TPSN	600	800	350

### Cable Extension Boxes for Fuse Combination Switches

	Rating	Dimensions (mm)		
		Width	Height	Depth
JZA701	125 / 250A	375	200	200
JZA702	315 / 400A	500	250	300
JZA703	630 / 800A	600	300	350

### Switch Disconnectors

All dimensions are in mm and exclude the handle.

3 Pole	Description	Dimensions (mm)			
		Width	Height	Depth	Handle Depth
JAC316	160A TPN	250	300	150	195
JAE320	200A TPN	375	400	200	245
JAE325	250A TPN	375	400	200	245
JAG331	315A TPN	375	500	200	245
JAG340	400A TPN	375	500	200	245
JAH363	630A TPN	500	650	300	345
JAH380	800A TPN	500	650	300	345

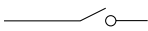
4 Pole	Description	Dimensions (mm)			
		Width	Height	Depth	Handle Depth
JAB402B	20A TPSN	175	232	65	78
JAB403B	32A TPSN	175	232	65	78
JAB406B	63A TPSN	175	232	65	81
JAB410B	100A TPSN	200	300	80	97
JAC412B	125A TPSN	200	300	80	97
JAC416	160A TPSN	250	300	150	195
JAE420	200A TPSN	375	400	200	245
JAE425	250A TPSN	375	400	200	245
JAG431	315A TPSN	375	500	200	245
JAG440	400A TPSN	375	500	200	245
JAH463	630A TPSN	500	650	300	345
JAH480	800A TPSN	500	650	300	345

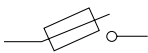
Thermal current $I_{th}$ (40°C)	20A		32A		63A		100A		125A		160A		200A	
Fuse size: BS	A1		A1		A2-A3		A4		B1-B2		B1-B2		B1-B3	
<b>Rated insulated voltage</b>														
$U_i$ (V)	800		800		800		800		800		800		800	
Impulse voltages $U_{imp}$	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000	12000	12000	-
Operational current $I_e$ (A)	A	B	A	B	A	B	A	B	A	B	A	B	A	B
415V ac AC-22A/AC-23B	20	20	32	32	63	63	100	100	125	125	160	160	200	200
Motor power (kW) 400V ac	9		15		30		51		63		80		100	
Reactive power 400V ac (kVAR)	15		45		25		45		55		60		75	
<b>Overload capacity</b>														
Short-circuit with fuses (kA Rms)	50		50		50		50		50		50		50	
Fuse rating (A) BS 88	20		32		63		100		125		160		200	
<b>Making &amp; Breaking Capacity</b>														
Breaking capacity 400V AC-23B (A RMS)	160		256		500		800		1000		1280		1600	
Making capacity 400V AC-22 (A RMS)	200		320		630		1000		1250		1600		2000	
Withstand mechanical (number of operations)	20,000		20,000		10,000		10,000		10,000		10,000		10,000	
Tightening torque	2		2		6		9		9		9		20	
<b>Connection (mm<sup>2</sup>)</b>														
Minimum Cu cable section	2.5		2.5		10		25		35		50		70	
Maximum Cu cable section	16		16		25		95		95		95		240	
Fuse types	NIT20		NIT32		TIS63		TCP100		TF125		TF160		TF200	

Thermal current $I_{th}$ (40°C)	250A		315A		400A		630A		800A	
Fuse size: BS	B1-B3		B1-B4		B1-B4		C1-C2		C1-C2-C3	
Rated insulated voltage $U_i$ (V)	800		800		800		1000		1000	
Operational current $I_e$ (A) A = Frequent operation B = Infrequent operation	A	B	A	B	A	B	A	B	A	B
415V a.c. AC-22A/AC-23B	250	250	315	315	400	400	630	630	800	800
Motor power (kW) 400V a.c.	-		160	160	220	220	355	355	-	
Reactive power 400V a.c. (kVAR)	-		125		150		2 x 125		-	
<b>Overload capacity</b>										
Short-circuit with fuses (kA Rms)	50		50		50		50		50	
Fuse rating (A) BS 88	250		315		400		630		800	
<b>Making &amp; Breaking Capacity</b>										
Breaking capacity 400V AC-23B (A R.M.S)	2000		2520		3200		-		-	
Making capacity 400V AC-23B (A R.M.S)	2500		3150		4000		-		-	
Withstand mechanical (number of operations)	10,000		10,000		10,000		8000		8000	
Tightening torque (Nm)	-		20		20		40		40	
<b>Connection (mm<sup>2</sup>)</b>										
Minimum Cu cable section	70		185		185		2 x 150		2 x 150	
Maximum Cu cable section	240		240		240		2 x 300		2 x 300	
Fuse types	TKF250		TKF315		TMF400		TTM630		TLM800	

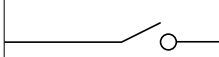
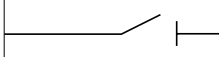
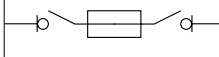



### Fuse - Combination Units - BS EN 60947-3

Many people are attracted to fuse-combination units by their simplicity in application and their reliability in operation. They are particularly useful for use on very high prospective fault level systems where the high energy limiting characteristic of the HRC fuse can be effectively utilised. In the past fuse-combination units came in two forms:

**Switch Fuse**  A switch in which one or more poles have a fuse in series.

**Fuse Switch**  A switch in which one or more poles have a fuse carrier/link which forms the moving contact.

The definitions of these two basic types of fuse combination units have now been extended to include units suitable for making, breaking and isolation and units which are only suitable for providing isolation for maintenance work.

Definition	Symbol	Function
Switch Fuse		Making and breaking current
Disconnecter Fuse		Isolating
Switch Disconnecter Fuse		Making, breaking and isolating
Fuse Switch		Making and breaking current
Fuse Disconnecter		Isolating
Fuse Switch Disconnecter		Making, breaking and isolating

However, in order to keep the selection of fuse-combination units as simple as possible, Hager offer a range of high performance double break switch-fuses, which also satisfy the isolating requirement of the British standard. These are correctly shown as and defined as a Fuse Combination Switch.

**Switch disconnectors - BS EN 60947-3.** A range of switch disconnectors (isolators) are available for use on lower current ratings from 20A to 125A. These switches are rated at AC-22 and provide a cost effective alternative to the fuse combination switch, especially where the utilisation category AC-23 is not required. ie; mixed resistive and inductive loads.

### Utilisation categories

Utilisation categories are not new but they are important because they help the designer or specifier identify the correct unit for a particular application.

The designation of the utilisation category is made up of three parts:

1. The prefix AC or DC, which indicates the nature of the current.
2. The two digit number, which indicates the type of application the unit is suitable for:
  - 20 Connecting and disconnecting under no-load.
  - 21 Switching of resistive loads.
  - 22 Switching of mixed resistive and inductive loads.
  - 23 Switching of highly inductive loads.
3. The suffix A or B, which indicates whether the unit is suitable for frequent or infrequent operation.
  - A Frequent operation
  - B Infrequent operation.

For example a fuse-combination unit feeding a 400V AC circuit of mixed resistive and inductive loads which would need to be operated frequently would require a minimum utilisation category of AC-22A.

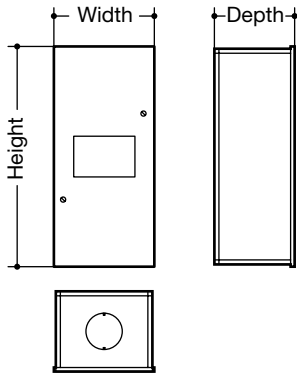
If the load was highly inductive, i.e. motor loads, then the minimum utilisation category would be AC-23A.

Generally, category AC-23 does not cover the switching of capacitors. Usually this is the subject of agreement between manufacturer and user.

### Motor Power Circuit Protection

Fuse-combination units can be used very effectively for motor power circuit protection, the energy limiting HRC fuse offering very good protection to its associated starter. Category AC-23A should be specified for this duty. Special motor circuit protection fuse links are available which eliminate the need to fit a larger bodied fuse just to take care of the starting current of the motor.

The protection of motor power circuits should not be confused with the direct switching of a single motor. If a fuse-combination unit is required to perform this function then it must comply with the requirements of Appendix A of BS EN 60947-3 which makes provision for different utilisation categories for this application.



### Switch Fuses

	Dimensions (mm)				
	Width	Height	Depth	Depth with Door	Knockouts
<b>IU44-16</b>	115	187	61.5	-	2 x 25mm
<b>IU44-18</b>	125	312	73.5	-	None
<b>IU44-11</b>	125	312	73.5	-	None
<b>IU44-16-D</b>	125	312	74	96	None
<b>IU44-18-D</b>	125	312	74	96	None
<b>IU44-11-D</b>	125	312	74	96	None

### IP65 Enclosed Isolating Switch

All dimensions are in mm and exclude the handle.  
Add 27mm to the depth to allow for the handle on 10-25A products.  
Add 32mm to the depth to allow for the handle on 40-80A products.

Description		Dimensions (mm)		
		Width	Height	Depth
<b>JG00S</b>	10A TPN	100	136	74
<b>JG01S</b>	16A TPN	100	136	105
<b>JG02S</b>	25A TPN	100	136	105
<b>JG03S</b>	40A TPN	136	201	105
<b>JG04S</b>	63A TPN	136	201	118
<b>JG05S</b>	80A TPN	136	201	118

Enclosed thermal current $I_{the}$	16	25	40	63	80
Rated insulation voltage $U_i$ (V)	690	690	690	690	690
Rated thermal current $I_{the}$ (A)	25	40	63	80	100
<b>Rated operational current</b>					
AC21 400V $I_e$ (A)	25	40	63	80	100
AC22 400V	16	25	40	63	100
AC22 400V $\cos \phi$ 0.65	16	20	32	63	100
AC23 400V	16	20	32	63	100
AC23 400V $\cos \phi$ 0.35	16	15	25	40	63
<b>Rated operational power</b>					
AC23 230V (kW)	4	5.5	7.5	11	15
AC23 400V	7.5	11	15	22	30
<b>Rated fused short circuit current</b>					
Back-up fuse (A)	63	63	63	80	100
R.M.S value $I_k$ (kA)	50	50	50	50	50
Peak value (kA)	5.4	6.6	7.2	8.3	8.7
Rated short circuit making capacity ( $I_{cm}$ ) (kA) 690V	2.5	2.5	2.5	3.3	3.3
Rated short time withstand current ( $I_{cw}$ ) (kA) 690V (1s)	1	1.1	1.6	1.7	2.3
<b>Rated breaking capacity <math>I_{cn}</math> (A) AC23</b>					
400V $\cos \phi$ 0.35	250	270	320	480	504
Electrical endurance (number of operations)	3000	3000	3000	3000	-
Mechanical endurance (number of operations)	50,000	50,000	50,000	50,000	-
Terminals mm <sup>2</sup>	1.5 - 16	1.5 - 16	1.5 - 16	2.5 - 35	2.3 - 35
Max. thermal torque (Nm)	1.8	1.8	1.8	2.5	2.5

Enclosed thermal current $I_{the}$	20	32	63	100	125	160	200	250	315	400	630	800
Rated insulation voltage $U_i$ (V)	800	800	800	800	800	800	800	800	800	800	1000	1000
Rated thermal current $I_{the}$ (A)	20	32	63	100	125	160	200	250	315	400	630	800
<b>Rated operational current</b>												
AC21A 500VAC	20	32	63	100	125	160	160	250	250	250	630	800
AC22A 500VAC	20	32	63	100	125	125	125	250	250	250	500	800
AC21A 690VAC	20	32	63	100	125	160	160	200	200	200	500	800
AC22A 690VAC	20	32	63	100	125	125	125	125	125	125	315	800
<b>Overload capacity</b>												
l <sub>cw</sub> rated short time withstand value (kA/s)	1.26	1.26	1.5	1.5	7	7	7	9	9	9	13	26
R.M.S value (kA)	0.16	0.256	0.504	0.64	1	1.28	1.28	2	2	2	5.04	6.4
Peak withstand value (kA)	-	-	-	-	20	20	18	30	23	23	45	55
Rated short circuit making capacity (kA)	1.8	1.8	2.1	2.1	11.9	11.9	11.9	15.3	15.3	15.3	26	54.6
Rated impulse withstand voltage $U_{imp}$ (kV)	8	8	8	8	8	8	8	8	8	8	12	12
Mechanical endurance (number of operations)	100,000	100,000	100,000	100,000	10,000	10,000	10,000	10,000	10,000	10,000	5,000	5,000
Maximum cable size	16	16	50	50	50	95	95	150	185	240	2 x 300	2 x 300
Tightening torque (Nm)	2	2	4	4	9	9	9	20	20	20	20	-

Product Reference	JAB402B	JAB403B	JAB406B	JAB410B	JAC412B
Thermal Current $I_n$	20A	32A	63A	100A	125A
Switch	3PSN	3PSN	3PSN	3PSN	3PSN
Rated Insulation Voltage $U_i$	800V	800V	800V	800V	800V
Rated Impulse Voltage $U_{imp}$	8kV	8kV	8kV	8kV	8kV

<b>Dimensions</b>					
Height (mm)	232		232		300
Width (mm)	175		175		200
Depth (mm)	81		81		83

<b>Operational Current <math>I_e</math> (A)</b>					
415V AC - AC21A / AC21B	20/20		32/32		125/125
415V AC - AC22A / AC22B	20/20		32/32		125/125
415V AC - AC23A / AC23B	20/20		32/32		125/125
500V AC - AC21A / AC21B	20/20		32/32		125/125
500V AC - AC22A / AC22B	20/20		32/32		125/125
500V AC - AC23A / AC23B	20/20		25/25		100/100
690V AC - AC21A / AC21B	20/20		32/32		125/125
690V AC - AC22A / AC22B	20/20		32/32		100/126
690V AC - AC23A / AC23B	20/20		25/25		63/63

<b>Operational Power in AC-23 (kW)</b>					
At 415V AC	9		15		55
At 500V AC	9		15		55
At 690V AC	11		15		55

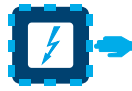

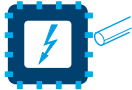
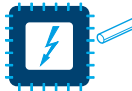


<b>Overload Capacity</b>					
Fuse rating	20		32		125
Fused $I_{cc}$	50		50		25
$I_{CW}$ (kA)	2.5 / 0.3s		2.5 / 0.3s		5.0 / 0.3s
$I_{pk}$ (kA)	6		6		12

<b>Cable Connection</b>					
Max Cu cable CSA mm <sup>2</sup>	16		16		70

The IP rating for all low voltage enclosures up to 1000 V a.c. and 1500 V d.c. is defined in identical fashion by the standards EN 60529 - IEC 529. It comprises the letters IP followed by two character numerals and or additional/ supplementary letters.

**The first character numeral** indicates the degree of protection provided by the enclosure against access to hazardous parts by preventing or limiting the ingress of a part of the human body or an object held by a person and ingress of solid foreign objects.

**The first character numeral:**  
Protection against foreign objects


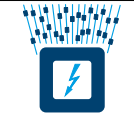

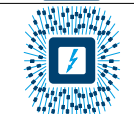
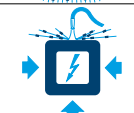
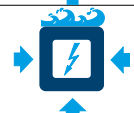
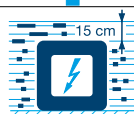
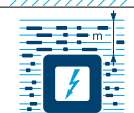
IP	Description	
0		Non-protected
1		Protected against solid objects $\geq$ than 50mm
2		Protected against solid objects $\geq$ than 12.5mm
3		Protected against solid objects $\geq$ than 2.5mm
4		Protected against solid objects $\geq$ than 1.0mm
5		Dust-protected
6		Dust-tight

**Additional letter (optional)**  
Protection of people against access to hazardous parts

	Description
A	Protected against access to hazardous parts with the back of the hand
B	Protected against access to hazardous parts with a finger
C	Protected against access to hazardous parts with a tool - $\phi$ 2.5mm
D	Protected against access to hazardous parts with a tool - $\phi$ 1mm

**The second character numeral** indicates the degree of protection provided by the enclosure with respect to harmful effects on the equipment due to the ingress of water. An X signifies that the tests are not applicable to the product.

**The second character numeral:**  
Protection against ingress of water with harmful effects

IP	Description	
0		Non-protected
1		Protected against dripping water
2		Protected against dripping water when tilted up to 15°
3		Protected against spraying water
4		Protected against splashing water
5		Protected against jetting
6		Protected against powerful jetting
7		Protected against the effect of temporary immersion
8		Protected against continuous immersion

**Additional letter (optional)**  
Specific information on the product

	Description
H	High voltage apparatus
M	Motion during water test
S	Stationary during water test
W	Weather conditions



Interface Characteristics	JG44BM, JG45BM, JG46BS, JG47BS	JG48BM, JG50BS, JG49BM, JG51BS	JG36BM, JG37BM, JG40BM, JG42BS, JG41BM, JG43BS	JG37BR, JG38BR	JG45BR
Rated & operational voltage ( $U_n / U_e$ )	415V a.c. 50Hz				
Rated insulation voltage ( $U_i$ )	690V a.c. 50Hz				
Rated impulse withstand voltage ( $U_{imp}$ )	6kV				
Rated current of the Assembly ( $I_{nA}$ )	400A	630A	JG36BM, JG37BMM -160A JG40BM, JG42BS, JG41BM, JG43BS - 250A	JG37BR - 160A JG38BR - 200A	375A
Rated conditional short-circuit current of the assembly ( $I_{CC}$ )*	50kA		25kA		50kA
Rated peak withstand current ( $I_{pk}$ )	105kA		52.5kA		105kA
Standards - Enclosed MCCB assembly	BS EN 61439-2				
Standards - MCCB only	BS EN 60947-2				
Rated frequency (fn)	50 Hz				
Pollution degree	3				
Types of system earthing for which the ASSEMBLY is designed	TNC-S, TN-S and TT when installed in an electrical system conforming to BS 7671				
Intended locations	Indoor use only				
Stationary assembly external design	Wall mounted				
Degree of protection	IP30 with cover fitted				
Intended use	Skilled persons only				
Electromagnetic compatibility (EMC) classification	EMC Environment B				
External design	Wall-mounted, surface type, enclosed assembly.				
Mechanical impact protection	IK05				
Form of separation	Form 2a				
Connection of functional unit: Incoming/outgoing circuit protection	F (fixed)				
Incoming Line Terminal(s)	M10 Bolt	M12 Bolt	M8 Socket Cap Screw		M10 Bolt
Incoming Neutral Terminal	M10 Bolt		JG37BM, JG41BM, JG43BS - M8 Socket Cap Screw JG36BM, JG40BM, JG42BS - M10 Bolt	M8 Socket Cap Screw	M10 Bolt
Enclosure Earth Stud	M10	M12	M8		M10

#### Enclosed MCCB (63A - 125A)

##### Characteristics

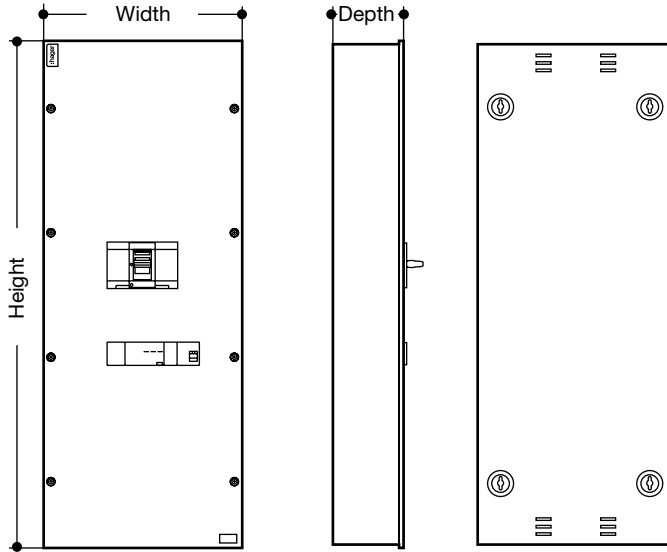
Series	JG25BM, JG26BM, JG27BM, JG27BR, JG28BM, JG29BM, JG30BM, JG31BM, JG32BM, JG33BM, JG30BR, JG34BS, JG35BS
MCCB	63A to 125A MCCB
MCCB + RCCB Add on block	63A & 100A
Voltage rating in AC	240 / 415 V
IP Protection	IP3X
Enclosure body type	Steel
Enclosure paint type	Powder coat Grey white BS 4800 00A01

##### Terminal Connection capacity

Maximum terminal capacity	95mm <sup>2</sup>
Enclosure earth stud	M8

##### Installation

Mounting	Wall
----------	------



	Dimensions (mm)			(kg)
	Height	Depth	Width	Weight
JG25BM	420	106	200	3.9
JG26BM	420	106	200	4.5
JG27BM	420	106	200	4.5
JG27BR	420	106	300	20
JG28BM	420	106	200	3.9
JG29BM	420	106	200	4.5
JG30BM	420	106	200	4.5
JG31BM	420	106	200	3.9
JG32BM	420	106	200	4.5
JG33BM	420	106	200	4.5
JG30BR	420	106	300	8
JG34BS	420	106	200	4.5
JG35BS	420	106	200	4.5
JG44BM	900	151	400	21.9
JG46BS	900	151	400	21.9
JG45BM	900	151	400	23.2
JG47BS	900	151	400	23.2
JG48BM	1130	153	500	29.6
JG50BS	1130	153	500	29.6
JG49BM	1130	153	500	32.1
JG51BS	1130	153	500	32.1
JG36BM	660	135	260	10.5
JG37BM	660	135	260	10.5
JG40BM	660	135	260	10.5
JG42BS	660	135	260	10.5
JG41BM	660	135	260	10.5
JG43BS	660	135	260	10.5
JG37BR	865	120	260	11.5
JG38BR	865	120	260	11.5
JG45BR	1019	151	400	21.9

### Torque settings

M8	13Nm
M10	22Nm
M12	45-65Nm

### Electrical Characteristics

	MLN	MTN	NBN	NCN	NDN	HMF*	HMC*	HMD*
Poles	SP+SN	SP	SP DP TP 4P	SP DP TP 4P	SP DP TP 4P	SP DP TP 4P		
Rated Operational Voltage $U_e$ (V)	230	230	230 / 400	230 / 400	230 / 400	230/400		
Nominal Current	6 - 40A	6 - 63A	6 - 63A	0.5 - 63A	0.5 - 63A	80 - 125A		
Breaking Capacity ( $I_{CN}$ ) to BS EN 60898	6kA	6kA	10kA	10kA	10kA	10kA	15kA	
Breaking Capacity ( $I_{CS}$ ) to BS EN 60898	6kA	6kA	7.5kA	7.5kA	7.5kA	7.5kA	7.5kA	
Breaking Capacity ( $I_{CU}$ ) to BS EN 60947 Part 2	N/A	N/A	15kA	15kA	15kA	N/A	15kA	
Breaking Capacity ( $I_{CS}$ ) to BS EN 60947 Part 2	N/A	N/A	7.5kA	7.5kA	7.5kA	N/A	7.5kA	
Rated Insulation Voltage $U_i$ (V)	500V	500V	500V	500V	500V	500V		
Rated Impulse Voltage $U_{imp}$ (kV)	4kV	4kV	6kV	6kV	6kV	6kV		
Electrical Endurance	10,000 cycles	10,000 cycles						
Connection of Auxiliaries	No		Yes					

**Table 1**

\*Din rail mount only, not for use in fixed busbar distribution boards.

### Power Loss

The power loss of MCB's is closely controlled by the standards and is calculated on the basis of the voltage drop across the main terminals measured at rated current. The power loss of our circuit breakers is very much lower than that required by the British Standard, so in consequences run cooler and are less affected when mounted together.

The table below gives the watts loss per pole at rated current.

MCB Rated current (A)	0.5	1	2	3	4	6	10	13	16	20	25	32	40	50	63
Watts loss per pole	1.2	1.3	1.5	2.0	1.8	1.4	1.9	2.1	2.5	2.8	3.2	3.8	4.0	4.5	5.1

### For use with DC

Because of their quick make and break design and excellent arc quenching capabilities, our circuit breakers are suitable for DC applications.

The following parameters must be considered:

1. System voltage:  
Determined by the number of poles connected in series (see **Table 14**).

2. Short circuit current:  
(See **Table 14**).

3. Tripping Characteristics:  
If the thermal trip remains unchanged the magnetic trip will become less sensitive requiring derating by  $\sqrt{2}$  the ac value (See **Table 14**).

No. of poles	1 pole		2 poles in series	
Range	max voltage	breaking capacity L/R=15ms	Max voltage	breaking capacity L/R=15ms
MTN	60V	6kA	125V	6kA
NBC NCN NDN	60V	10kA	125V	10kA

**Table 13**

Characteristic curve	B		C		D	
	50Hz	dc	50Hz	dc	50Hz	dc
I <sub>rm1</sub>	3In	4.5 In	5In	7.5 In	10 In	15 In
I <sub>rm2</sub>	5In	7.5 In	10In	15 In	20 In	30 In

**Table 14**

### Connection

The circuit breaker can have the line/load connected to either the top or bottom terminals

### Temperature Derating

MCBs are designed and calibrated to carry their rated current and to operate within their designated thermal time/current zone at 30°C. Testing is carried out with the breaker mounted singly in a vertical plane in a controlled environment. Therefore if the circuit breaker is required to operate in conditions which differ from the reference conditions, certain factors have to be applied to the standard data.

I <sub>n</sub> (A)	-25°C	-20°C	-15°C	-10°C	-5°C	0°C	5°C	10°C	15°C	20°C	25°C	30°C	35°C	40°C	45°C	50°C	55°C	60°C
0.5	0.72	0.7	0.68	0.66	0.64	0.62	0.6	0.58	0.56	0.54	0.52	0.5	0.48	0.46	0.44	0.42	-	-
1	1.44	1.4	1.36	1.32	1.28	1.24	1.2	1.16	1.12	1.08	1.04	1	0.96	0.92	0.88	0.84	0.8	0.76
2	2.88	2.8	2.72	2.64	2.56	2.48	2.4	2.32	2.24	2.16	2.08	2	1.92	1.84	1.76	1.68	1.6	1.52
3	4.32	4.2	4.08	3.96	3.84	3.72	3.6	3.48	3.36	3.24	3.12	3	2.88	2.76	2.64	2.52	2.4	2.28
4	5.76	5.6	5.44	5.28	5.12	4.96	4.8	4.64	4.48	4.32	4.16	4	3.84	3.68	3.52	3.36	3.2	3.04
6	8.64	8.4	8.16	7.92	7.68	7.44	7.2	6.96	6.72	6.48	6.24	6	5.76	5.52	5.28	5.04	4.8	4.56
10	14.4	14	13.6	13.2	12.8	12.4	12	11.6	11.2	10.8	10.4	10	9.6	9.2	8.8	8.4	8	7.6
13	18.7	18.2	17.7	17.2	16.6	16.1	15.6	15.1	14.6	14.0	13.5	13	12.5	12	11.4	10.9	10.4	9.9
15	21.6	21	20.4	19.8	19.2	18.6	18	17.4	16.8	16.2	15.6	15	14.4	13.8	13.2	12.6	12	11.4
16	23	22.4	21.8	21.1	20.5	19.8	19.2	18.6	17.9	17.3	16.6	16	15.4	14.7	14.1	13.4	12.8	12.2
20	28.8	28	27.2	26.4	25.6	24.8	24	23.2	22.4	21.6	20.8	20	19.2	18.4	17.6	16.8	16	15.2
25	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19
32	46.1	44.8	43.5	42.2	41	39.7	38.4	37.1	35.8	34.6	33.3	32	30.7	29.4	28.2	26.9	25.6	24.3
40	57.6	56	54.4	52.8	51.2	49.6	48	46.4	44.8	43.2	41.6	40	38.4	36.8	35.2	33.6	32	30.4
50	-	-	-	-	-	62	60	58	56	54	52	50	48	46	44	42	40	38
63	-	-	-	-	-	-	-	-	-	-	-	63	60.5	58	55.4	52.9	50.4	47.9

### Diversity Factor - Commercial Distribution boards to BS EN 61439-3

Consideration should be given to the proximity heating effect of the breakers when fully loaded and mounted together in groups.

Adjacent circuit breakers having a load 'on' time exceeding 30 minutes or where the load not exceeding 30 minutes has an 'off' time less than the 'on' time, will need to have the rated diversity factor applied.

No. of Outgoing Circuits	Assumed Loading Factor
2 and 3	0.8
4 and 5	0.7
6 to 9 inclusive	0.6
10 and above	0.5

### Frequency

Circuit breakers are designed to operate at a frequency of 50-60Hz. Should the supply differ from this then the following factors should be applied

Thermal – unchanged

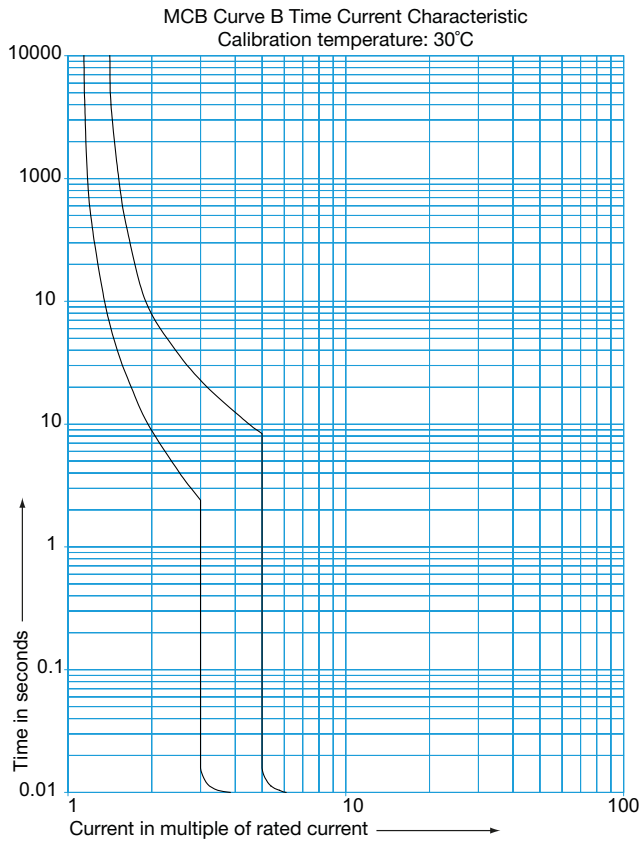
Magnetic – value multiplied by coefficient K

F (Hz)	17Hz - 60Hz	100Hz	200Hz	400Hz
K	1	1.1	1.2	1.5

Consideration should be given to the proximity heating effect of the breakers when fully loaded and mounted together in groups. (continuously & simultaneously loaded).

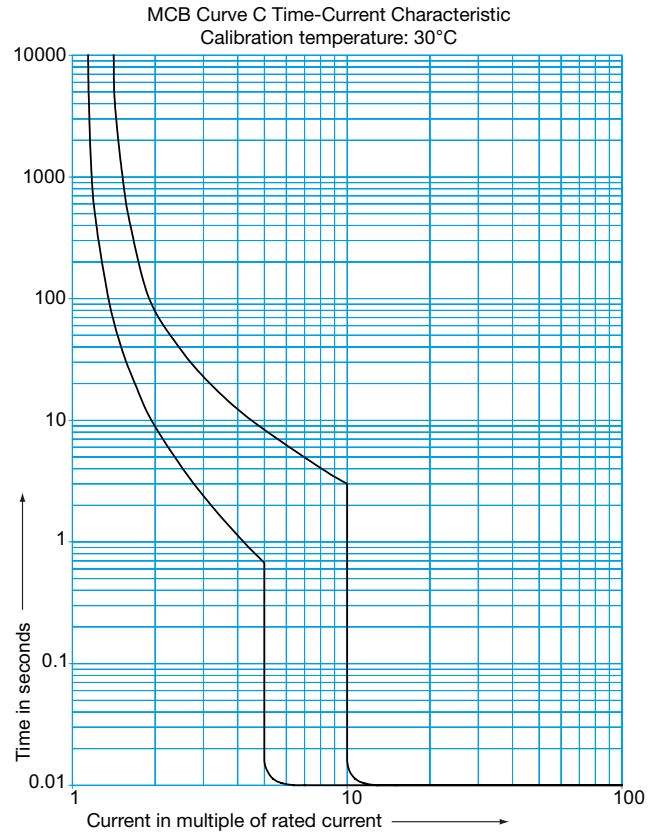
### B Curve (BS EN 60898)

MCBs: MTN rated 6 - 63A  
NBN rated 6 - 63A



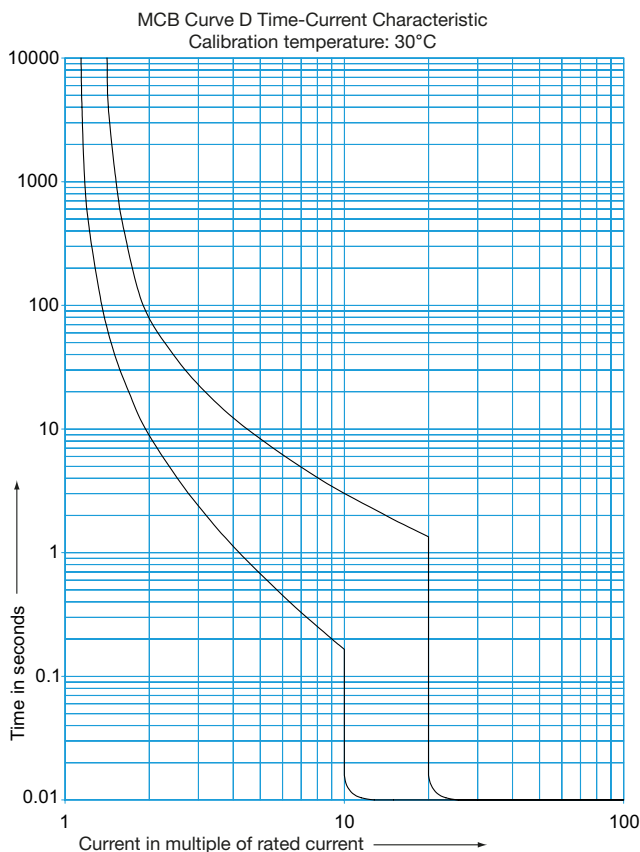
### C Curve (BS EN 60898)

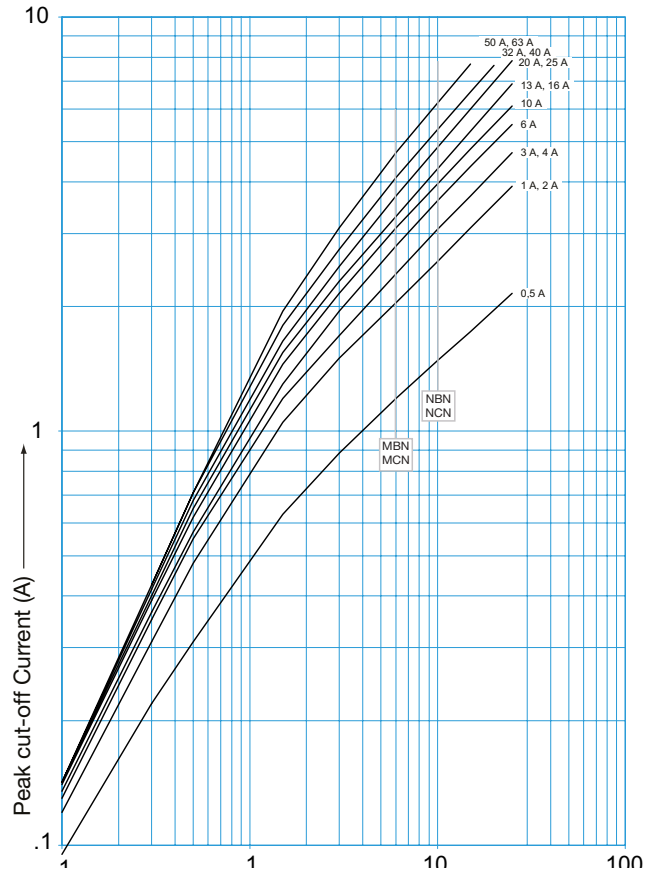
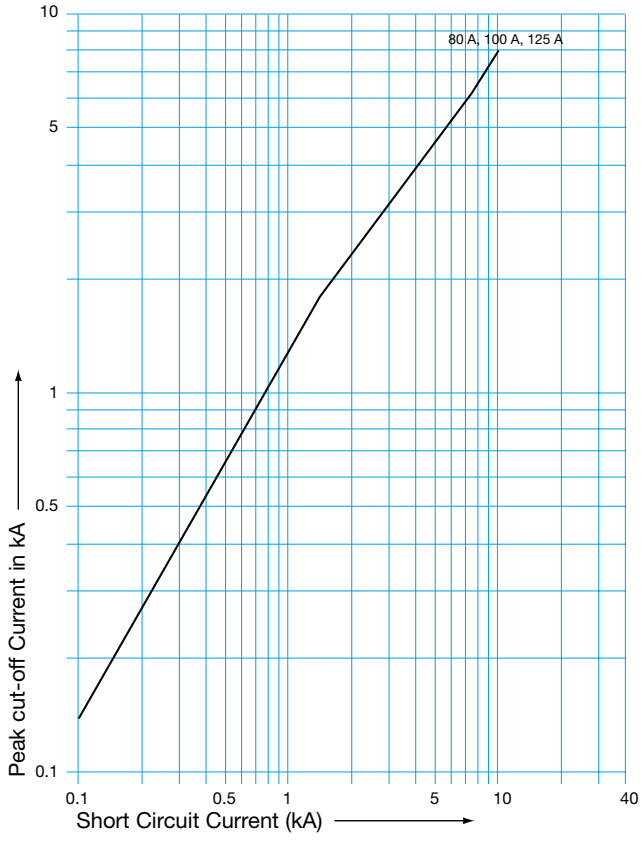
MCBs: NCN rated 0.5 - 63A  
MLN rated 2 - 32A  
HMF/HMC rated 80 - 125A



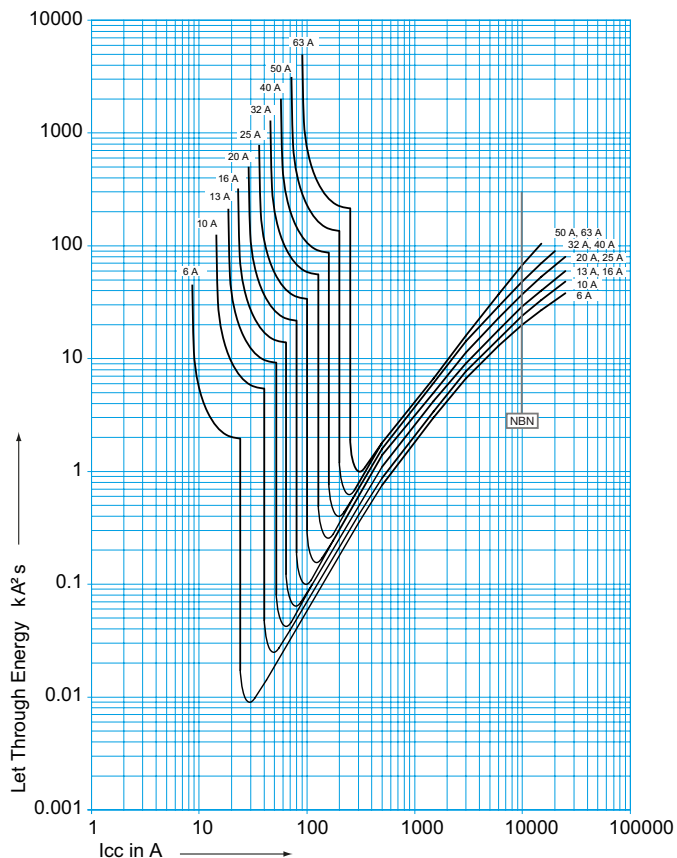
### D Curve (BS EN 60898)

MCBs: NDN rated 6 - 63A  
HMD rated 80 - 125A

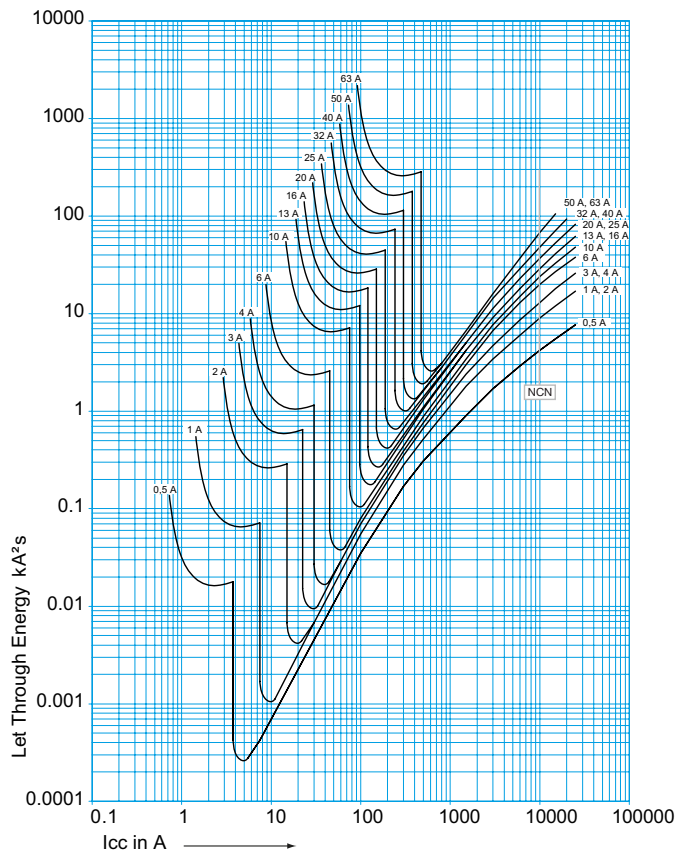




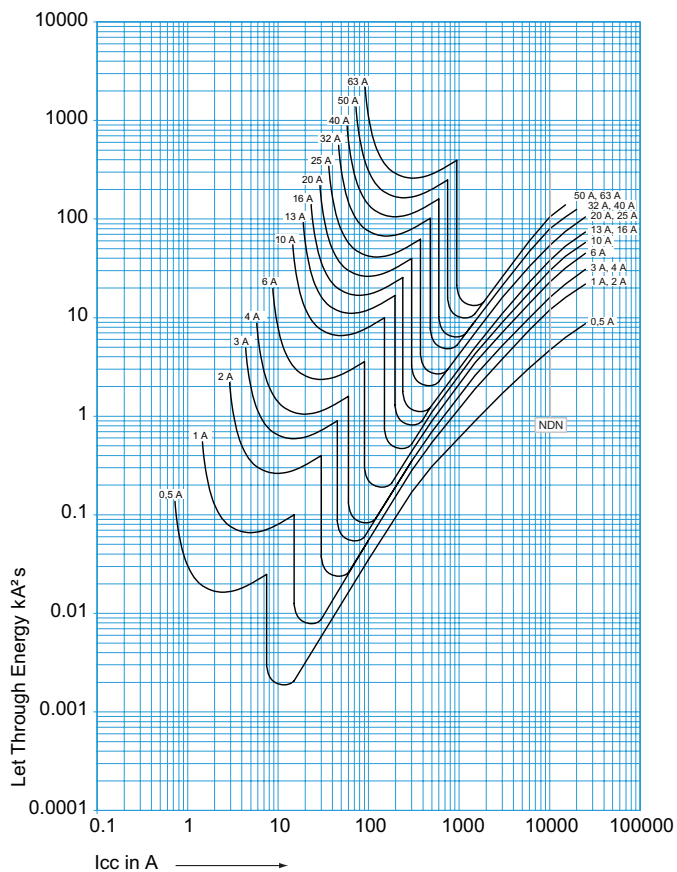
**B Curve**



**C Curve**



**D Curve**





**Functions**

Tripping and indication auxiliary contacts are common to the range of multi-pole 10kA MCBs, and RCCBs. They should be mounted on the left hand side of the device.

**Auxiliary Contact MZ201 (Fig 9)**

Allows remote indication of the status of the device contacts to which it is associated.

**Auxiliary Contact and Alarm Contact MZ202**

This accessory has two separate functions. Like the MZ201 auxiliary contact, however the alarm contact will provide indication if the breaker trips under fault conditions.

**Wiring Diagram**

MZ201 Auxiliary Contact and Alarm Contract

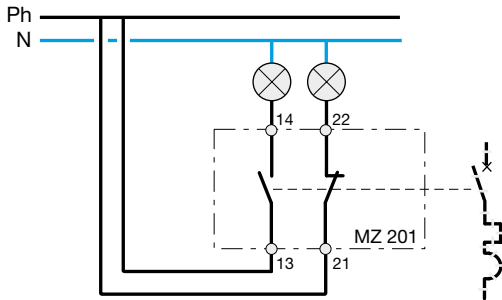


Fig. 9

Electrical Characteristics

MZ201/MZ206	MZ203	MZ206
1 x O 1 x C Contact 230V ~ 6A AC-1		
	230 - 415~ 110 - 130...	230V~ 50Hz

**Grouping / Combination of Several Auxiliaries**

On 2, 3 and 4 pole MCBs 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 and MZ206).

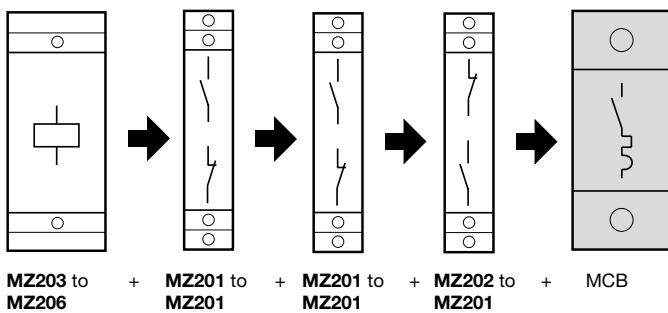


Fig. 11

**MZ203 Shunt Trip\***

Allows tripping of the device by feeding the coil. The contacts also allow for remote indication of operation.

**MZ206 Under Voltage Release\* (Fig 10)**

Allows the MCB to trip when the voltage drops or by pressing a remote off switch (i.e. emergency stop).

\* Indication that the product has tripped due to the voltage release is provided by a flag on the product.

**MZ206 Under Voltage Release**

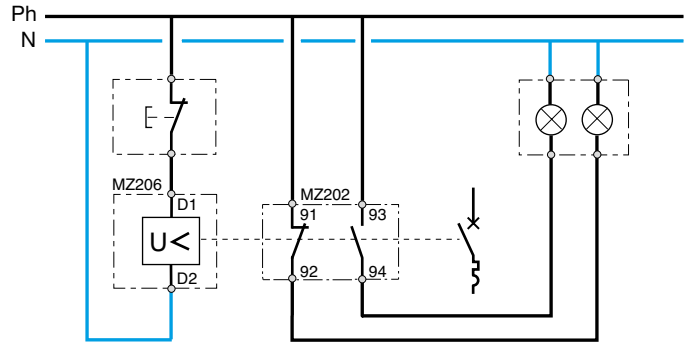


Fig. 10

**Electrical connection**

By terminal fitted with fixed clamp screws wiring capacity.

Flexible : 2 x 1.5mm<sup>2</sup>

Rigid : 2 x 1.5mm<sup>2</sup>

**MZ203**

Power - 8VA

tolerance : -15% of U<sub>n</sub>

**MZ206**

Latching voltage is between 35 and 70% of U<sub>n</sub> 230V~

Coil consumption 3VA

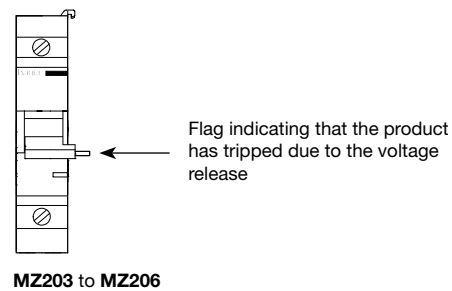


Fig. 12

### Earth Fault Loop impedance ( $Z_s$ ) values for MCBs and MCCBs

Below are the maximum permissible values of  $Z_s$  to obtain disconnection for compliance with BS 7671:2008 Amendment 3

$I_n$	Max Let-Through Energy (kA <sup>2</sup> s) at PSCC			Max $Z_s$ (ohms)	
	3kA	6kA	10kA	0.2 - 1s sec	5 sec
<b>MTN/NBN (B Curve)</b>					
6	5.9	10.5	15	7.28	7.28
10	6.5	12.2	21.5	4.37	4.37
16	8.0	17.5	30	2.73	2.73
20	8.8	19.5	34	2.19	2.19
25	10	21	38	1.75	1.75
32	11	24	42	1.37	1.37
40	12.5	29	50	1.09	1.09
50	15	34	61	0.87	0.87
63	16	38	72	0.69	0.69
<b>NCN/HM (C Curve)</b>					
0.5	0.01	0.01	0.01	43.7	62.43
1	4.0	7.0	10	21.85	31.21
2	4.0	7.0	10	10.93	15.61
3	5.0	10.0	15	7.28	10.40
4	5.9	10.5	15	5.46	7.80
6	5.9	10.5	15	3.64	5.20
10	6.5	12.2	21.5	2.19	3.12
16	8.0	17.5	30	1.37	1.95
20	8.8	19.5	34	1.09	1.56
25	10	21	38	0.87	1.25
32	11	24	42	0.68	0.98
40	12.5	29	50	0.55	0.78
50	15	34	61	0.44	0.62
63	16	38	72	0.35	0.50
80	-	-	-	0.27	0.39
100	-	-	-	0.22	0.31
125	-	-	-	0.1	0.25
<b>NDN (D Curve)</b>					
0.5	0.01	0.01	0.01	21.85	62.43
1	4.0	7.0	10	10.93	31.21
2	4.0	7.0	10	5.46	15.61
3	5.0	10.0	15	3.64	10.40
4	5.9	10.5	15	2.73	7.80
6	5.9	10.5	15	1.82	5.20
10	6.5	12.2	21.5	1.09	3.12
16	8.0	17.5	30	0.68	1.95
20	8.8	19.5	34	0.55	1.56
25	10	21	38	0.44	1.25
32	11	24	42	0.34	0.98
40	12.5	29	50	0.27	0.78
50	15	34	61	0.22	0.62
63	16	38	72	0.17	0.50
80				0.14	0.39
100				0.11	0.31
125				0.09	0.25



### Residual Current Devices

A residual current device (RCD) is the generic term for a device which simultaneously performs the functions of detection of the residual current, comparison of this value with the rated residual operating value and opening the protected circuit when the residual current exceeds this value. These devices can take several different forms i.e. Residual Current Circuit Breaker (RCCB), Residual Current Circuit Breaker with integral Overload protection (RCBO), or a residual current device incorporated within a socket outlet or other accessory (SRCD)

Residual current circuit breakers (RCCB) protect against earth faults only and not short circuits. They are usually therefore used in conjunction with overcurrent protective devices.

### MCB/RCCB Co-ordination

Short circuit capacity of the RCCB only

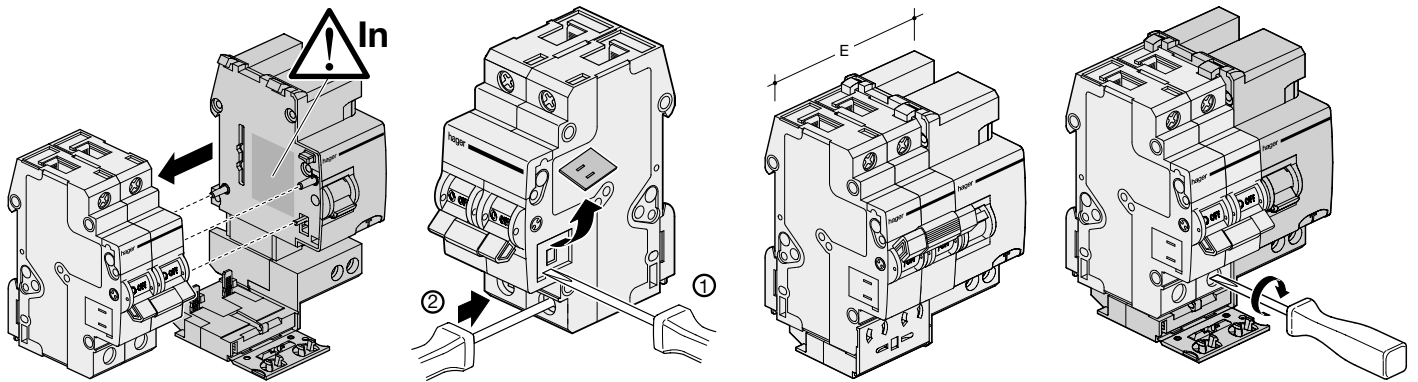
With MCB's

RCCB		MTN 6-63A B	NBN 6-63A B	NCN 6-63A C	NDN 6-63A D
<b>2 poles</b>					
16A	1500A	6kA	10kA	10kA	6kA
25A	1500A	6kA	10kA	10kA	6kA
40A	1500A	6kA	10kA	10kA	6kA
63A	1500A	6kA	10kA	10kA	6kA
80A	1500A	6kA	10kA	10kA	6kA
100A	1500A	6kA	10kA	10kA	6kA
<b>4 poles</b>					
16A	1500A	6kA	6kA	6kA	4.5kA
25A	1500A	6kA	6kA	6kA	4.5kA
40A	1500A	6kA	6kA	6kA	4.5kA
63A	1500A	6kA	6kA	6kA	4.5kA
80A	1500A	6kA	6kA	6kA	4.5kA
100A	1500A	6kA	6kA	6kA	4.5kA

	Double Pole RCCB Add-on Block			Four Pole RCCB Add-on Block			3 Phase Earth Leakage Protection		
$I_n$	≤63A								
Sensitivity	30mA	100mA	300mA	30mA	100mA	300mA	30mA	100mA	300mA
Cat ref. (Standard)	<b>BD264</b>	<b>BE264</b>	<b>BF264</b>	<b>BD464</b>	<b>BE464</b>	<b>BF464</b>	<b>BD163T</b>	<b>BE163T</b>	<b>BF163T</b>
Cat ref. (Time Delayed)	<b>BN264</b>	<b>BP264</b>		<b>BN464</b>	<b>BP464</b>				
<b>MCB Suitability</b>									
NBN	6-63A	6-63A	6-63A	6-63A	6-63A	6-63A	6-63A	6-63A	6-63A
NCN	0.5-63A	0.5-63A	0.5-63A	0.5-63A	0.5-63A	0.5-63A	0.5-63A	0.5-63A	0.5-63A
NDN	0.5-63A	0.5-63A	0.5-63A	0.5-63A	0.5-63A	0.5-63A	0.5-63A	0.5-63A	0.5-63A
Width when combined with MCB	4 Module 70mm			7 Module 122.5mm			4 Module 70mm		

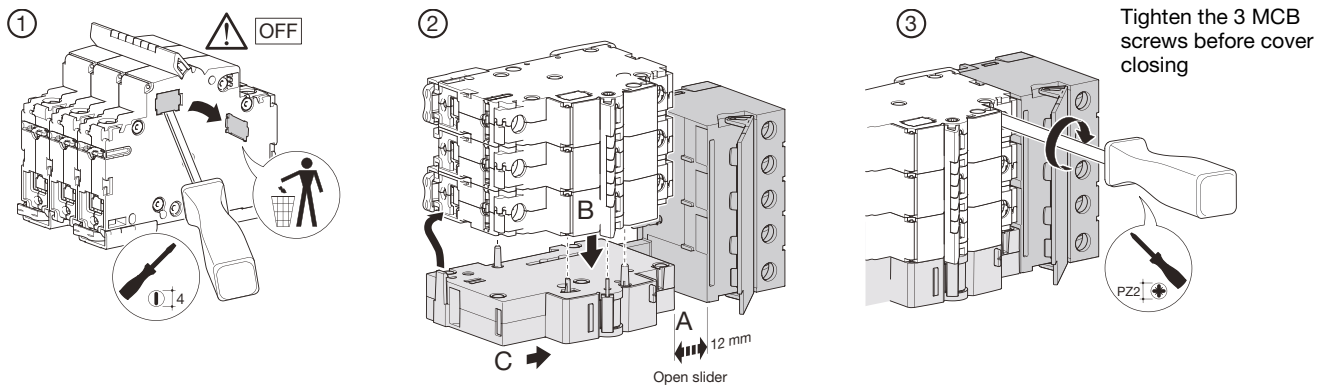
**Mounting**

**Double Pole RCCB Add-on Block**



**Mounting**

**Three Pole RCCB Add-on Block**



### Transformer Protection

Tables 19 & 20 show the recommended MCB's for the protection of single phase (230V) and three phase (400V) transformers.

#### Single Phase 230V

Transformer Rating (VA)	Primary Current	Recommended MCB		
		NBN	NCN	NDN
50	0.22	-	1	6
100	0.43	-	2	6
200	0.87	-	3	6
250	1.09	6	4	6
300	1.30	10	4	6
400	1.74	10	6	6
500	2.17	16	10	6
750	3.26	16	10	6
1000	4.35	25	16	10
2500	10.87	63	40	20
5000	21.74	-	63	32
7500	32.60	-	-	50
10000	43.48	-	-	63

#### Three Phase 400V

Transformer Rating (VA)	Primary Current	Recommended MCB		
		NBN	NCN	NDN
500	0.72	-	3	6
750	1.08	6	4	6
1000	1.44	10	6	6
2000	2.88	16	10	6
3000	4.33	25	16	10
4000	5.77	32	20	10
5000	7.21	40	25	16
7500	10.82	63	32	20
10000	14.43	-	50	25
15000	21.64	-	63	32
20000	28.86	-	-	50
25000	36.07	-	-	63

### Motor Circuit Protection

Tables 28,29,30 and 31 give general recommendations for the selection of circuit breakers and HRC fuses for the protection of motor power circuits and are based on the assumptions shown in Table 28 for a cage motor running at approximately 1400 Rev/Min.

Motor Rating	DOL Starting Conditions	Assisted Start Conditions
Up to 0.75kW	5 x FLC for 6 secs	2.5 x FLC for 15 secs
1.1 to 7.5kW	6 x FLC for 10 secs	2.5 x FLC for 15 secs
11 to 75kW	7 x FLC for 10 secs	2.5 x FLC for 15 secs
90 to 160kW	6 x FLC for 15 secs	2.5 x FLC for 20 secs

#### 1 Phase 230V DOL Starting

kW	hp	FLC A	Recommended Circuit Breaker			
			(A) NBN	(A) NCN	(A) NDN	Fuse (A)
0.18	0.25	2.8	16	10	10	10
0.25	0.33	3.2	16	10	10	16
0.37	0.5	3.5	16	10	10	16
0.55	0.75	4.8	20	16	16	16
0.75	1.0	6.2	25	20	20	20
1.1	1.5	8.7	40	25	25	25
1.5	2.0	11.8	50	32	32	32
2.2	3.0	17.5	-	50	50	40
3.0	4.0	20	-	63	63	50
3.75	5.0	24	-	-	-	63
5.5	7.5	36	-	-	-	80
7.5	10	47	-	-	-	100

#### 3 Phase 400V Assisted Starting Star-Delta

kW	hp	FLC A	Recommended Circuit Breaker		
			(A) NCN	(A) NDN	HRC Fuse (A)
3	4	6.3	16	10	16
4	5.5	8.2	20	10	16
5.5	7.5	11.2	32	16	20
7.5	10	14.4	40	25	25
11	15	21	50	32	32
15	20	27	-	40	35
18.5	25	32	-	50	40
22	30	38	-	63	50
30	40	51	-	-	63
37	50	63	-	-	80
45	60	76	-	-	80
55	75	91	-	-	100
75	100	124	-	-	160
90	125	154	-	-	200
110	150	183	-	-	200
132	175	219	-	-	250
150	200	240	-	-	315
160	220	257	-	-	315

3 Phase 400V DOL Starting

kW	hp	FLC A	Recommended Circuit Breaker			
			(A) <b>NBN</b>	(A) <b>NCN</b>	(A) <b>NDN</b>	HRC Fuse (A)
0.18	0.25	0.87	-	2	-	4
0.25	0.33	1.17	-	3	-	4
0.37	0.5	1.2	-	3	-	4
0.55	0.75	1.8	-	4	-	6
0.75	1.0	2.0	10	6	6	6
1.1	1.5	2.6	16	10	6	10
1.5	2.0	3.5	16	10	10	16
2.2	3.0	4.4	20	16	16	16
3.0	4.0	6.3	25	20	20	20
4.0	5.5	8.2	32	25	25	25
5.5	7.5	11.2	50	40	40	32
7.5	10	14.4	63	50	50	40
11	15	21	-	-	-	63
15	20	27	-	-	-	80
18.5	25	32	-	-	-	80
22	30	38	-	-	-	80
30	40	51	-	-	-	100
37	50	63	-	-	-	125
45	60	76	-	-	-	125
55	75	91	-	-	-	160
75	100	124	-	-	-	200
90	125	154	-	-	-	250
110	150	183	-	-	-	315
132	175	219	-	-	-	355
150	200	240	-	-	-	355
160	220	257	-	-	-	355



		SPN801 / SPN801R	SPN802 / SPN802R
Tested to		EN 61643-11 (VDE0675-6-11) 2002-12	EN 61643-11 (VDE0675-6-11) 2002-12
		L1/L2/L3/N => PE	L1/L2/L3 => N N => PE
SPD type / class		Type 1 + Type 2 / I / B	
Type of connection		Parallel connection	
Type of power supply system		TN-S - System	TT - System
Type of protection		Common modes	Common and differential modes
Nominal voltage	$U_N$	230V / 400V ac	
Rated voltage	$U_C$	255V ac	
Voltage protection level	$U_p$	≤ 1.5kV	255V ac
TOV-voltage	$U_T$	440V / 5s	1200V / 200ms
Rated load current	$I(L)$	315A	
	$I(L-L)$	125A	
Follow current interrupting rating	$I_{fi}$	50 kA	100kA
Nominal discharge current (8/20)	$I_n$	100kA	25kA 100kA
Impulse current (10/350)	$I_{imp}$	100kA	25kA 100kA
Residual current	$I_{PE}$	≤ 100mA	
Max. rating of overcurrent protection	fuse	125A gL / gG serial or 315A parallel	
	MCCB	125A serial or 160A parallel	
Short-circuit withstand capability with max. overcurrent protection	fuse	50kA ac	25kA ac
	MCCB	50kA ac	25kA ac
Response time	$t_A$	< 100ns	
Operating temperature range		- 40°C ....+ 60°C	
Indication of SPD disconnecter		Green - red on L1, L2, L3, N	
Cross sectional area	min	10mm <sup>2</sup> solid / flexible	
L1, L2, L3, PE	max	50mm <sup>2</sup> multi-stranded / 35mm <sup>2</sup> flexible	
Tightening torque for terminals		7.0 Nm	
Mounting on		35mm DIN rail in accordance with EN 60715	
Enclosure material		grey thermoplastic, UL 94V-0	
Degree of protection		IP20	
Modular width		8	8
Weight		1260 g	1272 g
Approval marking		VDE	

		SPA201	SPA401
Tested to		EN 61643-11 2002-12	
SPD type / class		Type 1 + Type 2 / Class I	
Energy-coordinated protection effect on terminal equipment		Type 1 + Type 2	
Energy-coordinated protection effect on terminalequipment ≤ 5 m		Type 1 + Type 2 + Type 3	
Type of connection		Parallel connection	
Type of power supply system		TT / TN system	
Type of protection		common and differential modes	
Nominal voltage	$U_N$	230V/400V ac	
Rated voltage	$U_c$	255V ac	
Voltage protection level	$U_p$	≤ 1.5kV	
TOV Voltage	$U_T$	440V / 5s 1200V / 200ms	
Rated load current	I(L)	n/a	
	I(L-L)	n/a	
Follow current interrupting rating	$I_{fi}$	25kA rms 100A rms	
Nominal discharge current (8/20)	$I_n$	12.5kA 25kA	12.5kA 50kA
	$I_{imp}$	12.5kA 25kA	12.5kA 50kA
Max. rating of overcurrent protection	fuse	160A gL / gG	
	MCCB	n/a	160A
Short-circuit withstand capability with max. overcurrent protection	fuse	25kA rms	
	MCB	n/a	
Response time	$t_A$	≤ 100ns	
Operating temperature range		- 40°C ....+ 80°C	
Indication of SPD disconnecter		Green/Red flag on L and N	Green/Red flag on L1, L2, L3 and N
Cross sectional area	min	1,5mm <sup>2</sup> solid / flexible	
	max	35mm <sup>2</sup> stranded / 25mm <sup>2</sup> flexible	
Tightening torque for terminals		4 Nm	
Mounting on		35mm DIN rail in accordance with EN 60715	
Enclosure material		grey thermoplastic, UL 94V-0	
Degree of protection		IP20	
Modular width		2	4
Weight		275 g	480 g
Approval marking		KEMA	

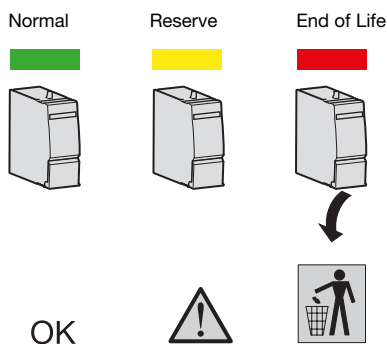
		SPN215D/R	SPN415D/R	SPN440D/R
Tested to		EN 61643-11 (VDE0675-6-11) 2002-12		
SPD type		Type 2 according to EN 61643-11		
SPD class		Class II according to IEC 61643-1		
Type of connection		Parallel connection		
Maximum continuous operating voltage $U_c$	Line / Neutral	$\leq 255V$		
	Neutral/ PE	$\leq 275V$		
Voltage protection level	$U_p$	$\leq 1kV$	$\leq 1kV$	$\leq 1.2kV$
Nominal discharge current (8/20 $\mu s$ ) [(DC+/DC-) --> PE]	$I_n$	5kA	5kA	15kA
Max. discharge current (8/20 $\mu s$ ) [(DC+/DC-) --> PE]	$I_{max}$	15kA	15kA	40kA
Short-circuit withstand capability with max. overcurrent protection		10kA - 32A	10kA - 32A	20kA - 32A
Operating temperature range		- 40°C ....+ 80°C		
Indication of SPD disconnecter		Green - Yellow - Red		
Cross sectional area	min	1,5mm <sup>2</sup> solid / flexible		
	max	35mm <sup>2</sup> multi-stranded / 25mm <sup>2</sup> flexible		
Tightening torque for terminals		4.0 Nm		
Mounting on		35mm DIN rail in accordance with EN 60715		
Enclosure material		grey thermoplastic, UL 94V-0		
Degree of protection		IP20		
Modular width (DIN 43880)		2	2	4
Auxiliary contact. Voltage/ nominal current (only applicable on the R suffix products)		230V/ 0.5A 12Vdc 10mA		

		SPV325
Tested to		EN 61643-11 (VDE0675-6-11) 2002-12
SPD type		Type 2 according to EN 61643-11
SPD class		Class II according to IEC 61643-1
Type of connection		Parallel connection
Maximum continuous operating voltage	$U_{cPV}$	$\leq 1000V$
Voltage protection level	$U_p$	$\leq 4kV$
Voltage protection level for 5kA	$U_p$	$\leq 3,5kV$
Total discharge current (8/20 $\mu s$ )	$I_{total}$	40kA
Nominal discharge current (8/20 $\mu s$ ) [(DC+/DC-) --> PE]	$I_n$	12.5kA
Max. discharge current (8/20 $\mu s$ ) [(DC+/DC-) --> PE]	$I_{max}$	25kA
Short-circuit withstand capability with max. overcurrent protection	$I_{scwPV}$	50 A / 1000 V DC
Response time	$t_A$	$\leq 25ns$
Operating temperature range		- 40°C ....+ 80°C
Indication of SPD disconnecter		green - red
Cross sectional area	min	1.5mm <sup>2</sup> solid / flexible
	max	35mm <sup>2</sup> multi-stranded / 25mm <sup>2</sup> flexible
Tightening torque for terminals		4.0 Nm
Mounting on		35mm DIN rail in accordance with EN 60715
Enclosure material		Grey thermoplastic, UL 94V-0
Degree of protection		IP20
Installation width		3 modules, DIN 43880
Weight		316g

Characteristics		
Tested to		EN 61643-11 (VDE0675-6-11) 2007-08
SPD type / class		Type 3 / III
Ports		one port
Type of connection		Parallel connection
Type of power supply system		TT / TN system
Nominal voltage	$U_N$	230V ac
Rated voltage	$U_C$	255V ac
Voltage protection level ( L - N)	$U_p$	$\leq 1.25kV$
Voltage protection level (L/N - PE)	$U_p$	$\leq 1.5kV$
TOV - Characteristic (L - N)	$U_T$	335V / 5s
TOV - Characteristic (L/N - PE) (I)	$U_T$	400V / 5s
TOV - Characteristic (L/N - PE) (II)	$U_T$	1200V / 200 ms
Rated load current	$I_L$	16 Aeff
Nominal discharge current (8/20)	$I_n$	3kA
Maximal discharge current (8/20)	$I_{max}$	5kA
Combination wave (1,2/50 - 8/20) (L - N)	$U_{oc}$	6 kV
Combination wave (1,2/50 - 8/20) (L/N - PE)	$U_{oc}$	10 kV
Residual current	IPE	$\leq 5\mu A$
Replacement cartridge		NO
Maximal rating of overcurrent protection	fuse	16 A gL / gG
	MCB	16A B curve
Short-circuit withstand capability with max. overcurrent protection	fuse	6kA eff ac
	MCB	1kA eff ac
Response time	$t_A$	$\leq 25ns$
Operating temperature range		- 25°C ....+ 40°C
Indication of SPD disconnector		NO
Remote signalisation contact		Green light off
Cross sectional area	min	1.5mm <sup>2</sup> solid / flexible
	max	10mm <sup>2</sup> stranded / 6mm <sup>2</sup> flexible
Tightening torque for terminals		1.2 Nm
Mounting on		35mm DIN rail in accordance with EN 60715
Enclosure material		Grey thermoplastic, UL 94V-2
Degree of protection		IP20
Installation width		2 modules, DIN 43880

### Reserve Indicator Light

Neutral cartridges cannot be put into spares reserved for phase cartridges and visa versa.



	Non-Adjustable		Adjustable						
	HR500	HR502	HR510	HR520	HR522	HR523	HR525/HR534	HR440	HR441
Supply Voltage ~50/60Hz	220-240V								
Residual Voltage ~50/60Hz	500V Maximum								
Power Absorbed	3VA	5VA							
Output	Volt Free Contacts								
Contact Rating	6A / 250V AC-1								
Sensitivity $I_{\Delta n}$	30mA	300mA	30mA / 100mA / 300mA / 500mA / 1A / 3A / 10A		500mA / 1A / 3A / 5A / 10A / 20A / 30A		30mA / 100mA / 300mA / 500mA / 1A / 3A / 5A / 10A / 30A		30mA / 100mA / 300mA
Instantaneous / Time Delay	Instantaneous		Instantaneous or Time Delay 0.1 - 0.3 - 0.4 - 0.5 - 1 - 3 seconds		Instantaneous or Time Delay 0.1 - 0.2 - 0.25 - 0.3 - 0.4 - 0.5 seconds		Instantaneous or Time Delay 0.02 - 0.1 - 0.3 - 0.4 - 0.5 - 1 - 3 - 5 - 10 seconds		Instantaneous or Time Delay 0.1 - 0.3s - 0.5s - 0.75s - 1s
Torroid Withstand Capacity	50kA / 0.2s								
Distance between Torroid and Relay	50 Meter Maximum								
Relay Cable Connection • Rigid • Flexible	1.5mm <sup>2</sup> to 10mm <sup>2</sup> 1mm <sup>2</sup> to 6mm <sup>2</sup>								
Torroid Cable Connection • Rigid • Flexible	1.5mm <sup>2</sup> to 4mm <sup>2</sup> 1mm <sup>2</sup> to 2.5mm <sup>2</sup>								
Relay • Working Temperature • Storage Temperature	-10°C to +55°C -25°C to +40°C		-5°C to +55°C -25°C to +40°C						
Torroid • Working Temperature • Storage Temperature	-10°C to +70°C -40°C to +70°C		-10°C to +70°C -40°C to +70°C						

### Main Characteristics

#### “Reset” Button

When pressed, the output remains switched and return to normal is obtained by either: by pressing the “reset” clear pushbutton or cutting off the power supply. If the “reset” button is not pressed the device remains in the fault position.

#### Test Button

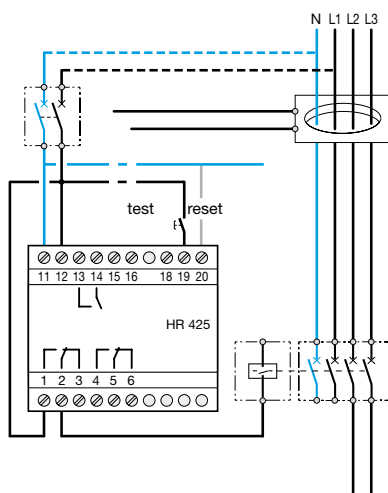
Pressing the test button allows a fault simulation which operates the relay and the output contacts. The fault level display is shown by an LED on the front of the product.

#### $I_{\Delta n}$ Selector

Sensitivity setting: 0.03A instantaneous  
0.1A/0.3A/1A and 3A time delay

#### Time Delay Selector

Adjustable time setting - instantaneous / 0.13s / 0.3s / 1s and 3s



### Sealable Settings

A sealable cover prevents interference once the settings have been made.

#### Standard Output (1 C/O contact)

Switching to state 1 on:

- Failure of the core/relay connection
- Fault current in the monitored installation

#### Positive Safety Outlet (1 C/O contact)

Switching to state 1: Switching on the power

Switching to state 0: Failure of the core/relay connection  
fault current in the monitored installation  
failure of relay supply  
internal failure of relay

Optical scale display by 5 LEDs of the fault in % of  $I_{\Delta n}$

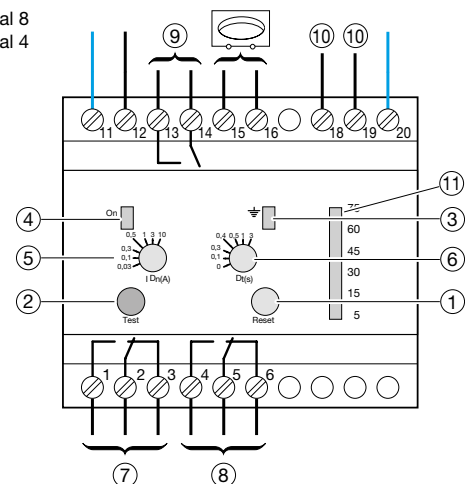
Optical scale display by (5 LEDs) of the fault in % of  $I_{\Delta n}$

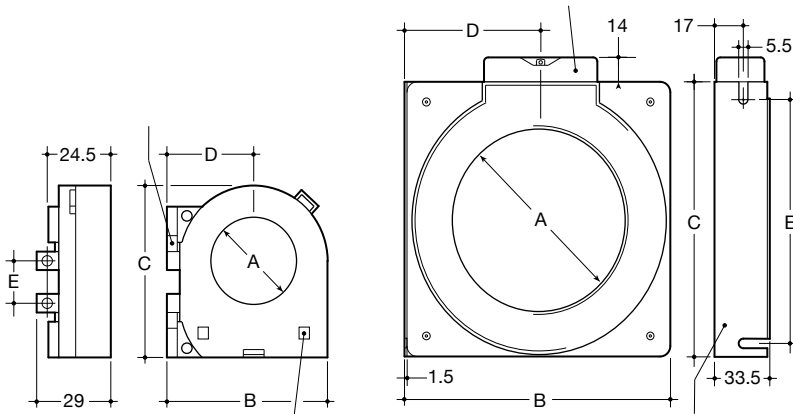
Common pin 6:

State 1 : output terminal 8

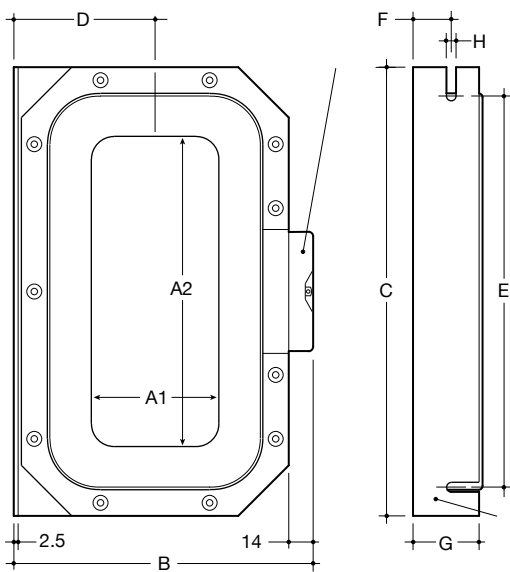
State 0 : output terminal 4

1. Reset push button
2. Test push button
3. Fault signal LED
4. Device on indicator
5. Sensitivity setting
6. Time delay setting
7. Standard output
8. Safety output
9. Prealarm output
10. Remote reset
11. Optical scale

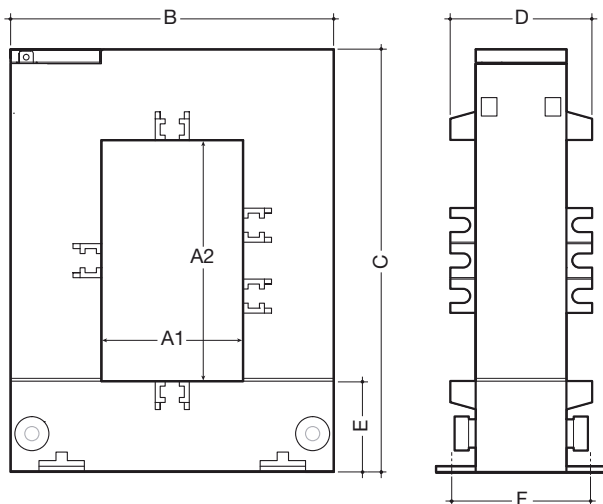




Cat ref.	Dimensions (mm)				
	A	B	C	D	E
HR700	30	70	70	30	-
HR701	35	92	86	43.5	74
HR702	70	115	118	60.5	97
HR703	105	158	162.5	84.5	140
HR704	140	218	200	103.5	183
HR705	210	290	295	150	265

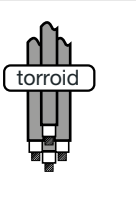
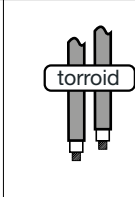
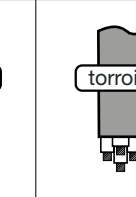
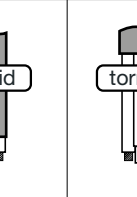
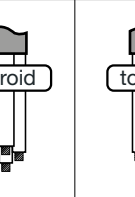
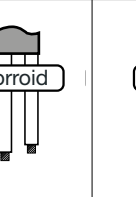
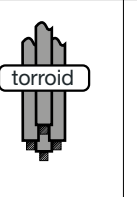


Cat ref.	Type	Dimensions (mm)								
		A1	A1	B	C	D	E	F	G	H
HR830	70x175	70	175	176	260	85	225	22	40	7.5
HR831	115x305	115	305	239	400	116	360	25	50	8.5
HR832	150x350	150	350	284	460	140	415	28	50	8.5



Cat ref.	Dimensions (mm)						
	A1	A1	B	C	D	E	F
HR820	20	30	89	110	41	32	46
HR821	50	80	114	145	50	32	46
HR822	80	80	145	145	50	32	46
HR823	80	121	145	185	50	32	46
HR824	80	161	184	244	70	37	46

### Mounting of Circular Torroids

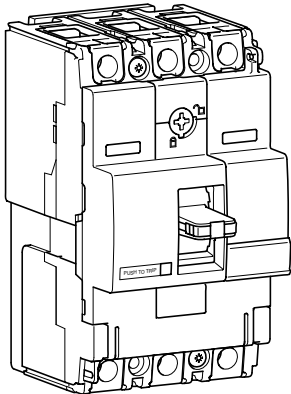
		With Cables						
		U 1000 R2V Single Pole	U 1000 R2V Single Pole	U 1000 R2V Multi Pole	U 1000 R2V Multi Pole	U 1000 R2V Multi Pole	H07 V - U Single Pole	H07 V - U Single Pole
Ø	Type of Torroids							
30	<b>HR700</b>	4 x 16mm <sup>2</sup>	2 x 50mm <sup>2</sup>	35mm <sup>2</sup>	35mm <sup>2</sup>	50mm <sup>2</sup>	4 x 35mm <sup>2</sup>	2 x 70mm <sup>2</sup>
35	<b>HR701</b>	4 x 25mm <sup>2</sup>	2 x 70mm <sup>2</sup>	50mm <sup>2</sup>	35mm <sup>2</sup>	70mm <sup>2</sup>	4 x 50mm <sup>2</sup>	2 x 95mm <sup>2</sup>
70	<b>HR702</b>	4 x 185mm <sup>2</sup>	2 x 400mm <sup>2</sup> or 4 x 150mm <sup>2</sup>	240mm <sup>2</sup>	35mm <sup>2</sup>	300mm <sup>2</sup>	4 x 240mm <sup>2</sup>	2 x 400 or 4 x 185mm <sup>2</sup>
105	<b>HR703</b>	4 x 500mm <sup>2</sup>	2 x 630mm <sup>2</sup> or 4 x 185mm <sup>2</sup>	300mm <sup>2</sup>	35mm <sup>2</sup>	300mm <sup>2</sup>	4 x 400mm <sup>2</sup>	2 x 400 or 4 x 240mm <sup>2</sup>
140	<b>HR704</b>	4 x 630mm <sup>2</sup>	2 x 630mm <sup>2</sup> or 4 x 240mm <sup>2</sup>	300mm <sup>2</sup>	35mm <sup>2</sup>	300mm <sup>2</sup>	4 x 400mm <sup>2</sup>	2 x 400 or 4 x 240mm <sup>2</sup>
210	<b>HR705</b>	4 x 630mm <sup>2</sup>	2 x 630mm <sup>2</sup> or 4 x 240mm <sup>2</sup>	300mm <sup>2</sup>	35mm <sup>2</sup>	300mm <sup>2</sup>	4 x 400mm <sup>2</sup>	2 x 400 or 4 x 240mm <sup>2</sup>
70 x 175	<b>HR830</b>	4 x 630mm <sup>2</sup>	2 x 630mm <sup>2</sup> or 4 x 240mm <sup>2</sup>	300mm <sup>2</sup>	35mm <sup>2</sup>	300mm <sup>2</sup>	4 x 400mm <sup>2</sup>	2 x 400 or 4 x 240mm <sup>2</sup>
115 x 305	<b>HR831</b>	4 x 630mm <sup>2</sup>	2 x 630mm <sup>2</sup> or 4 x 240mm <sup>2</sup>	300mm <sup>2</sup>	35mm <sup>2</sup>	300mm <sup>2</sup>	4 x 400mm <sup>2</sup>	2 x 400 or 4 x 240mm <sup>2</sup>
150 x 350	<b>HR832</b>	4 x 630mm <sup>2</sup>	2 x 630mm <sup>2</sup> or 4 x 240mm <sup>2</sup>	300mm <sup>2</sup>	35mm <sup>2</sup>	300mm <sup>2</sup>	4 x 400mm <sup>2</sup>	2 x 400 or 4 x 240mm <sup>2</sup>
20 x 30	<b>HR820</b>	4 x 16mm <sup>2</sup>	2 x 70mm <sup>2</sup>	10mm <sup>2</sup>	35mm <sup>2</sup>	16mm <sup>2</sup>	4 x 10mm <sup>2</sup>	2 x 35mm <sup>2</sup>
50 x 80	<b>HR821</b>	4 x 240mm <sup>2</sup>	2 x 630mm <sup>2</sup> or 4 x 185mm <sup>2</sup>	120mm <sup>2</sup>	35mm <sup>2</sup>	150mm <sup>2</sup>	4 x 185mm <sup>2</sup>	2 x 240mm <sup>2</sup>
80 x 80	<b>HR822</b>	4 x 500mm <sup>2</sup>	2 x 630mm <sup>2</sup> or 4 x 185mm <sup>2</sup>	300mm <sup>2</sup>	35mm <sup>2</sup>	300mm <sup>2</sup>	4 x 400mm <sup>2</sup>	2 x 400 or 4 x 240mm <sup>2</sup>
80 x 120	<b>HR823</b>	4 x 630mm <sup>2</sup>	2 x 630mm <sup>2</sup> or 4 x 240mm <sup>2</sup>	300mm <sup>2</sup>	35mm <sup>2</sup>	300mm <sup>2</sup>	4 x 400mm <sup>2</sup>	2 x 400 or 4 x 240mm <sup>2</sup>
80 x 160	<b>HR824</b>	4 x 630mm <sup>2</sup>	2 x 630mm <sup>2</sup> or 4 x 240mm <sup>2</sup>	300mm <sup>2</sup>	35mm <sup>2</sup>	300mm <sup>2</sup>	4 x 400mm <sup>2</sup>	2 x 400 or 4 x 240mm <sup>2</sup>



Frame	x160				x250		
Product	MCS Switch	MCCB			MCS Switch	MCCB	
Reference	HCA	HDA	HHA	HNA	HCB	HHB	HNB
Number of poles	[No.] 3-4	1-2-3-4	1-2-3-4	3-4	3-4		
<b>Electrical characteristics</b>							
Rated current	$I_n$ [A]	160			250		
Current rated range	[A]	125-160	16-125 (1P), 16-160 (2, 3, 4P)		250	100-250	
Rated service voltage, (AC)	$U_e$ [V]	220-440			220-440		
Frequency	F [Hz]	50/60			50/60		
Rated insulation voltage	$U_i$ [V]	690			800		
Rated impulse withstand voltage	$U_{imp}$ [kV]	8			8		
Rated ultimate short-circuit breaking capacity, ( $I_{cu}$ )							
(AC) 50-60 Hz 220/230 V	$I_{cu}$ [kA]	-	25	35	85	-	35
(AC) 50-60 Hz 380/415 V	$I_{cu}$ [kA]	-	18	25	40	-	25
(AC) 50-60 Hz 480/500/525 V	$I_{cu}$ [kA]	-	6	7.5	12.5	-	-
(AC) 50-60 Hz 660/690 V	$I_{cu}$ [kA]	-	-	-	6	-	-
(DC) 250 V - 2 poles in series	$I_{cu}$ [kA]	-	12.5	20	25	-	25
Rated service short-circuit breaking capacity, ( $I_{cs}$ )							
(AC) 50-60 Hz 220/230 V	$I_{cs}$ [kA]	-	25	25	40	-	25
(AC) 50-60 Hz 380/415 V	$I_{cs}$ [kA]	-	18	20	20	-	20
(AC) 50-60 Hz 480/500/525 V	$I_{cs}$ [kA]	-	3	4	7.5	-	-
(AC) 50-60 Hz 660/690 V	$I_{cs}$ [kA]	-	-	-	3	-	-
(DC) 250 V - 2 poles in series	$I_{cs}$ [kA]	-	7	10	13	-	13
Rated short-circuit making capacity	$I_{cm}$ [kA]	2.8	-	-	-	6	-
Rated short-time withstand current for 1s	$I_{cw}$ [kA]	2	-	-	-	3	-
Category of use (EN 60947-2)		-	A			-	A
Calibration temperature		-	50°C			-	50°C
Derating 40°C		-	100%			-	100%
	50°C	-	100%			-	100%
	55°C	-	95%			-	94%
	60°C	-	93%			-	91%
	65°C	-	90%			-	88%
Suitability for isolation		ok				ok	
Electric endurance in number of cycles		10000				10000	
Mechanical endurance in number of operations		20000				20000	
Operating temperature		-25 to +70°C			-25 to +70°C		
Storage temperature		-35 to +70°C			-35 to +70°C		
Power loss (at $I_n$ for 3P)	[W]	39				60	
Reference standard		IEC 60947-3	IEC 60947-2		IEC 60947-3	IEC 60947-2	
Releases: switch		ok	-		ok	-	
Releases: TM (thermomagnetic)		-	ok		-	ok	
T fixed, M fixed		-	ok (1P)		-	ok	
T adjustable, M fixed		-	ok		-	-	
T adjustable, M adjustable		-	-		-	ok	
Thermal adjustment value		-	0.63 to 1 x $I_n$		-	0.63 to 1 x $I_n$	
Magnetic adjustment value		-	-		-	6-8-10-13 x $I_n$ (200A) 5-7-9-11 $I_n$ (250A)	
Releases: LSI (electronic)		-	-		-	-	
Long delay		-	-		-	-	
Short delay		-	-		-	-	
Time delay		-	-		-	-	
<b>Terminations</b>							
Standard terminal type		cage			lugs		
Maximum terminal capacity		95 mm <sup>2</sup>			185 mm <sup>2</sup> (cage)		
Terminal width	mm	-			25		
Terminal shields		ok			ok		
Cage terminal		integrated			ok		
Extended connections		ok			ok		
Rear connections		no			ok		
<b>Dimensions</b>							
Height	mm	130			165		
Width	1P mm	-	25	-	-	-	-
	2P mm	-	50	-	-	-	-
	3P mm	75			105		
	4P mm	100			140		
Depth	mm	68			68		
Weight	1P kg	-	0.29	-	-	-	-
	2P kg	-	0.48	-	-	-	-
	3P kg	0.715			1.3		
	4P kg	0.95			1.6		

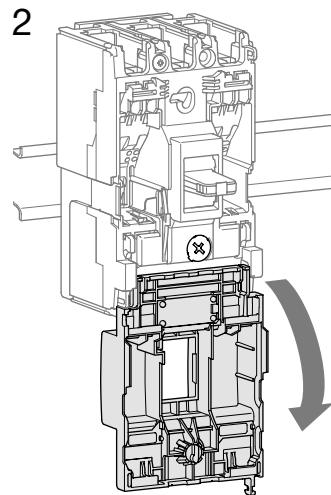
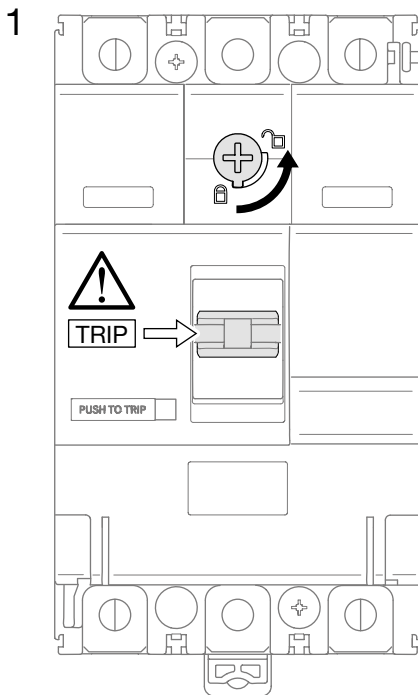
Product Frame	Add-on blocks			
	x160	x160	x160	x250
Number of poles	3, 4	3, 4	3, 4	4
Tripping Access	mechanical	mechanical	mechanical	mechanical
Standards CEI/EN 60947-2 appendix B	✓	✓	✓	✓
<b>Electrical Characteristics</b>				
Max rated current (40) $I_n$ A	$I_n$	125A	125 - 160A	160 - 250A
Rated service voltage $U_e$ V AC (50/60Hz)	$U_e$	240 - 415V	240 - 415V	240 - 415V
<b>Mechanical Characteristics</b>				
Top and bottom supply		✓	✓	✓
For tripping, no additional external electrical sources		✓	✓	✓
Possible operating with two active phases		✓	✓	✓
<b>Settings</b>				
Sensitivity $I_{\Delta n}$	$I_{\Delta n}$ (A)	300mA	0.03, 0.1, 0.3, 1, 3, 6A	0.03, 0.1, 0.3, 1, 3, 6A
Time delay $\Delta t$	$\Delta t$ (s)	inst.	inst., 0.06, 0.15, 0.3, 0.5, 1	inst., 0.06, 0.15, 0.3, 0.5, 1
Max. opening time	ms	10	10	10
Delay add-on block is not possible if $I_{\Delta n} = 30mA$		-	✓	✓
Selective product		-	✓	✓
Mechanical test button		✓	✓	✓
Isolating test without cable removal		✓	✓	✓
Electrical test button		✓	✓	✓
Reset button		✓	✓	✓
Sealable setting button		-	✓	✓
Isolation level signaling by led 25 and 50%		-	✓	✓
$I_n$ running signalisation by led		-	✓	✓
Residual default signaling contact		✓	✓	✓
Signaling contact 50% $I_{dn}$		-	✓	✓
Anti-transient	type AC	✓	✓	✓
Pulsating DC current	type A	✓	✓	✓
High immunity	type HI	✓	✓	✓
-25°C		✓	✓	✓
<b>Accessories and connection</b>				
Steel terminal cage (x3/x4)		✓	✓	accessories
Connection by lugs		-	-	✓
Extended connections (x4)		✓	✓	✓
Spreaders (x4)		✓	✓	✓
Terminal covers (3P/4P)		-	-	✓
Interphase barriers (x3)		✓	✓	✓
Rigid cables connection capacity mm <sup>2</sup>		4 - 95	4 - 95	35 - 185
Flexible cables connection capacity mm <sup>2</sup>	(with terminal)	4 - 70	4 - 70	35 - 150
Tightening torque Nm		6	6	12
Copper bar (width) in mm		-	-	25
<b>Mounting</b>				
Clips on DIN rail		✓	✓	-
Fixed on mounting plate		-	-	✓
Fixation type		side	side	bottom
Mounting by customer		✓	✓	✓
<b>Dimensions and weight</b>				
Dimensions (WxHxD) in mm Side mounted 4P	W	100	100	140
	H	165	165	107.5
	D	95	95	85
Weight	3P	1.4	1.4	-
	4P	1.55	1.55	1.2

MCCBs

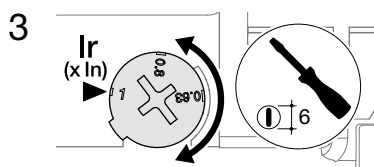


		220/240V AC IEC 60 947-2	380/415V AC IEC 60 947-2
<b>HDA</b>	$I_{cu}$	25 kA	18 kA
	$I_{cs}$	25 kA	18 kA
<b>HHA</b>	$I_{cu}$	35 kA	25 kA
	$I_{cs}$	25 kA	20 kA
<b>HCA</b>	$I_{cm}$	-	2.8 kA
	$I_{cw}$	-	2 kA - 1s

Thermal settings



For DIN rail mounting, use **HYA033H**.



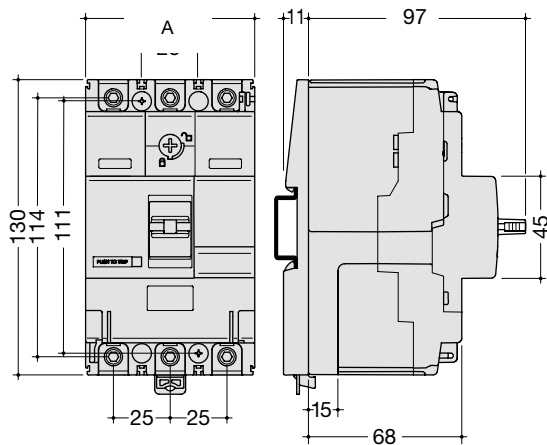
Thermal adjustment from 0.63 to  $1 \times I_n$

Magnetic adjustment fixed  $> 10 \times I_n$

$I_n$	16 - 50 A	63 - 80 A	100 - 125 A	160 A
$I_{mag}$	600 A	1000 A	1500 A	1600 A

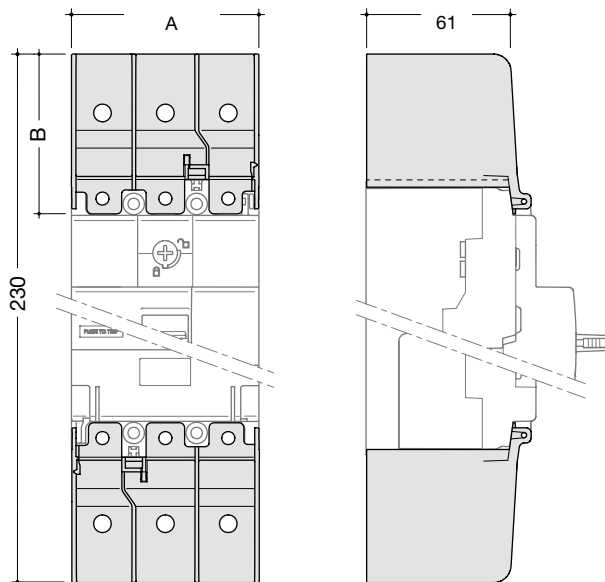
Dimensions

MCCB x160



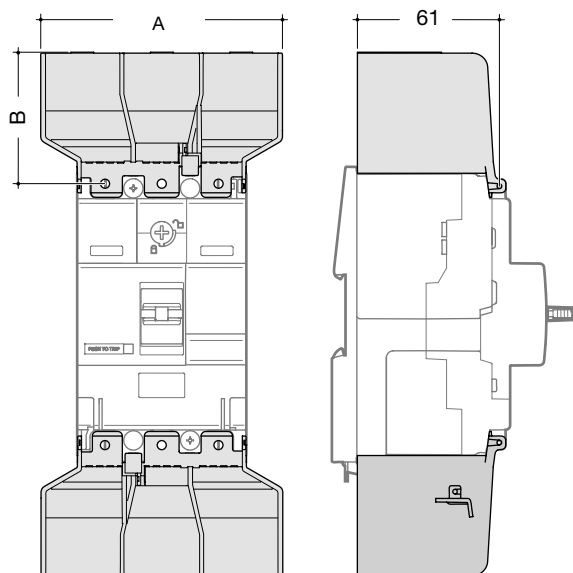
	A (mm)
1P	24.8
3P	74.5
4P	99.5

Terminal covers for extended straight connections



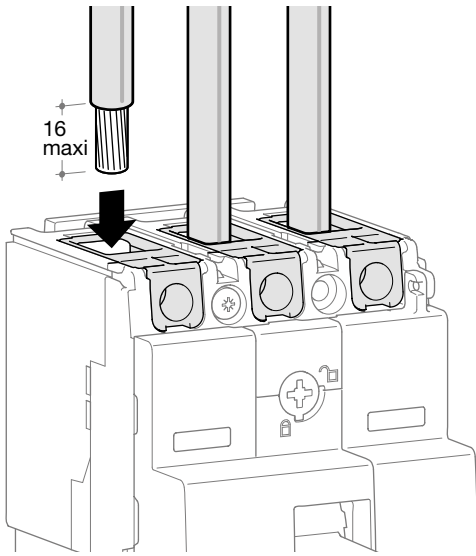
	A (mm)
1P	24.4
3P	74.5
4P	99.5

Terminal cover for extended spreader connections






	A (mm)
3P	106.5
4P	141.5



Connection with terminals



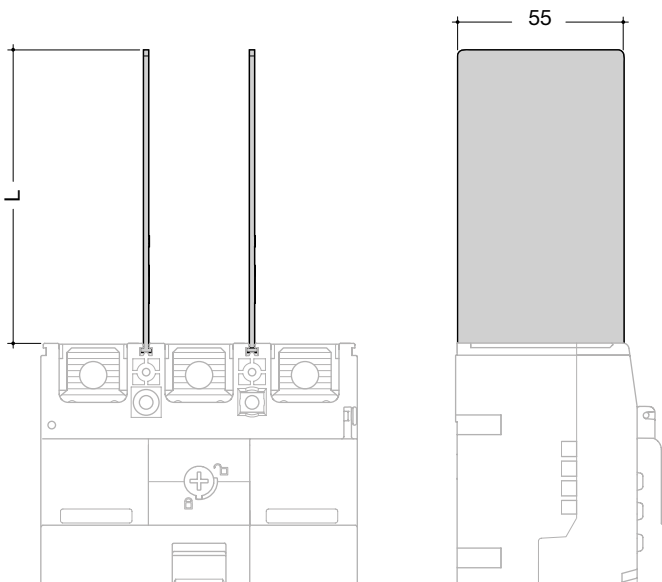
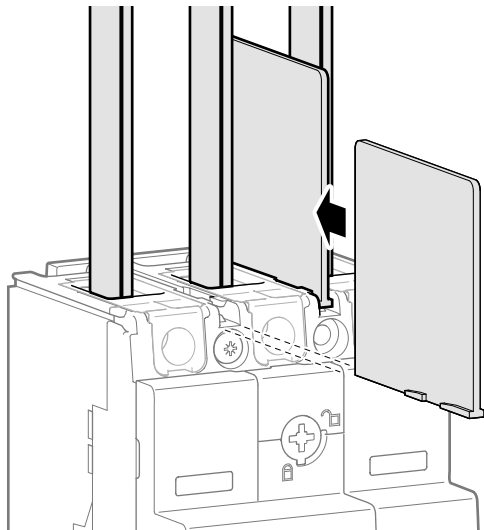
Terminals for copper conductors (standard)

	min. 6 mm <sup>2</sup>	max. 70 mm <sup>2</sup>
	min. 6 mm <sup>2</sup>	max. 95 mm <sup>2</sup>
	6 Nm	

Terminals for aluminium / copper conductors (accessory)  
**HYA005H, HYA006H**

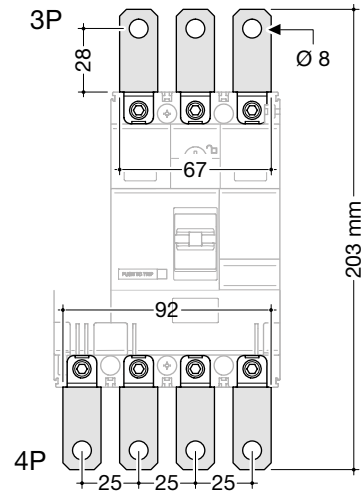
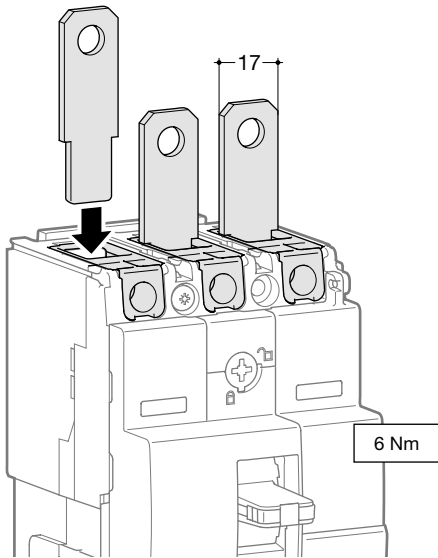
	min. 35 mm <sup>2</sup>	max. 70 mm <sup>2</sup>
	10 Nm	

Interphase barriers

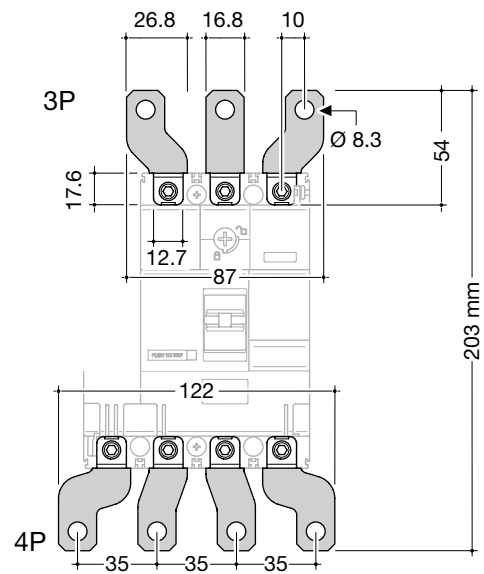
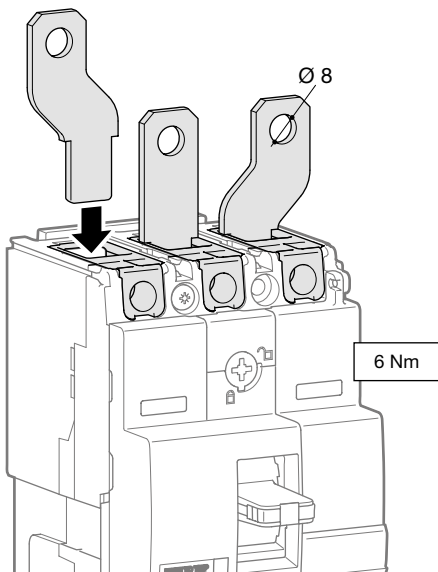


	L (mm)
<b>HYA019H</b>	50
<b>HYB019H</b>	97

Extended straight connections

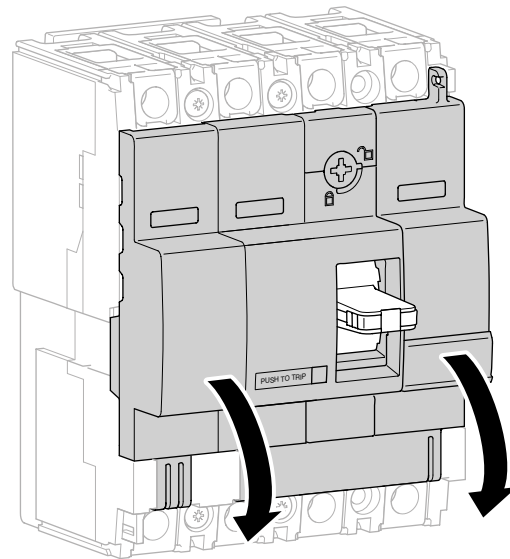
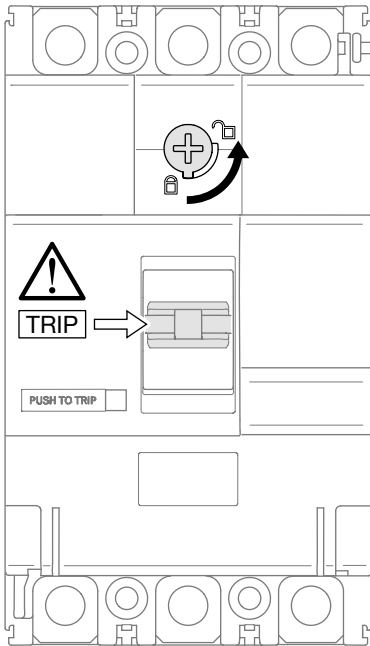


Extended spreader connections



Auxiliaries

Auxiliaries for MCCBs and moulded case switches



Mounting combination for auxiliaries and releases

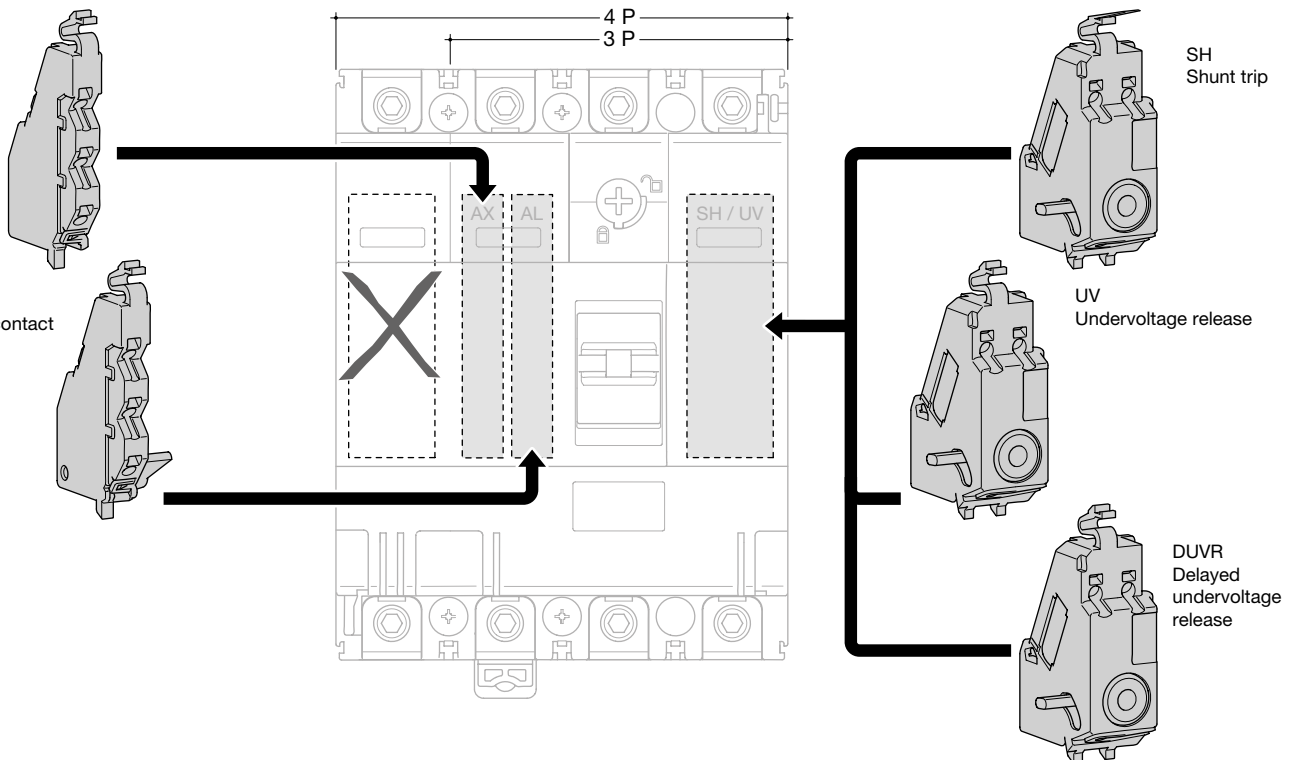
AX  
Auxiliary contact

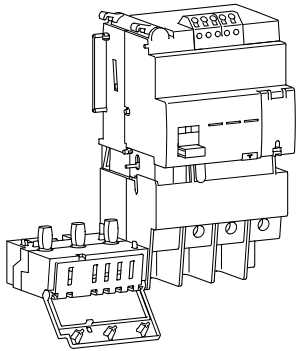
AL  
Alarm contact

SH  
Shunt trip

UV  
Undervoltage release

DUVR  
Delayed  
undervoltage  
release





When associated with MCCB, the add-on block provides an earth fault protection and protects against electrical shocks by direct or indirect contact.

The add-on blocks are protected against nuisance tripping caused by transient voltages. It's able to detect sinusoidal alternating currents and residual pulsating direct currents (A type ). It also avoids miss tripping (HI type - High Immunity).

### Characteristics

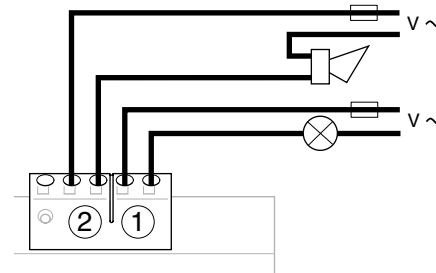
**Reset button :**  
Signals add-on block tripping and must be reset before switching on the installation.

**Test button for RCD function :**  
Checks the electrical operating of the MCCB / Add-on block association.

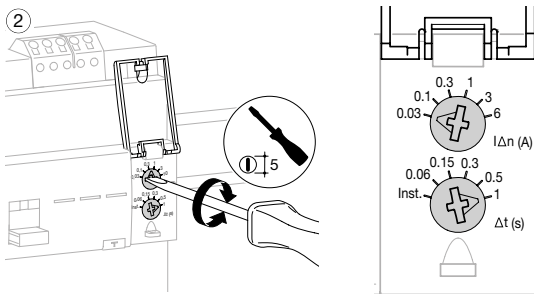
**Mechanical test button :**  
Checks the mechanical operating of the MCCB / Add-on block association.

**LED signaling residual current level in the installation:**  
25% (orange) and 50% (red)  $I_{\Delta n}$ ; green light to signal correct operating.

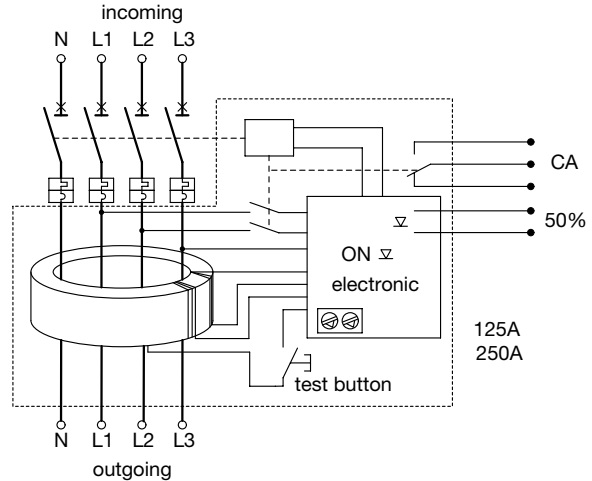
**Remote tripping and advanced warning (50%  $I_{\Delta n}$ ) signaling thanks to these contacts:**



### Earth leakage current ( $I_{\Delta n}$ ) and delay ( $\Delta t$ ) setting



### Add-on block operating

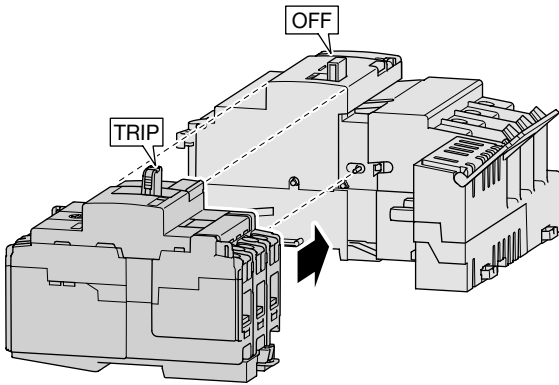


		A ( $I_{\Delta n}$ )					
		0.03	0.1	0.3	1	3	6
(t) S	Inst.	OK	OK	OK	OK	OK	OK
	0.06	no	OK	OK	OK	OK	OK
	0.15	no	OK	OK	OK	OK	OK
	0.3	no	OK	OK	OK	OK	OK
	0.5	no	OK	OK	OK	OK	OK
	1	no	OK	OK	OK	OK	OK

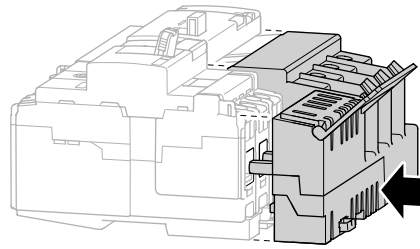


Add-on block mounting

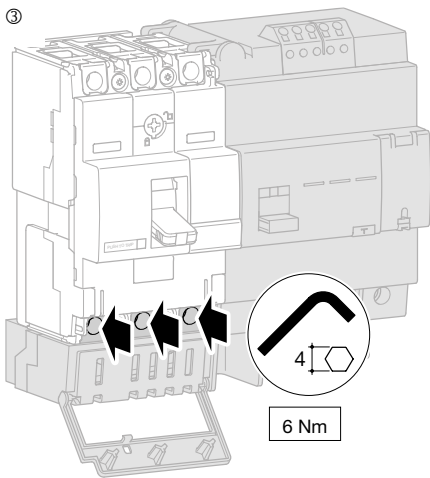
①



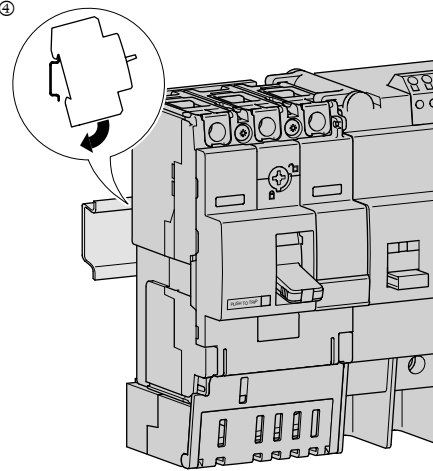
②



③



④

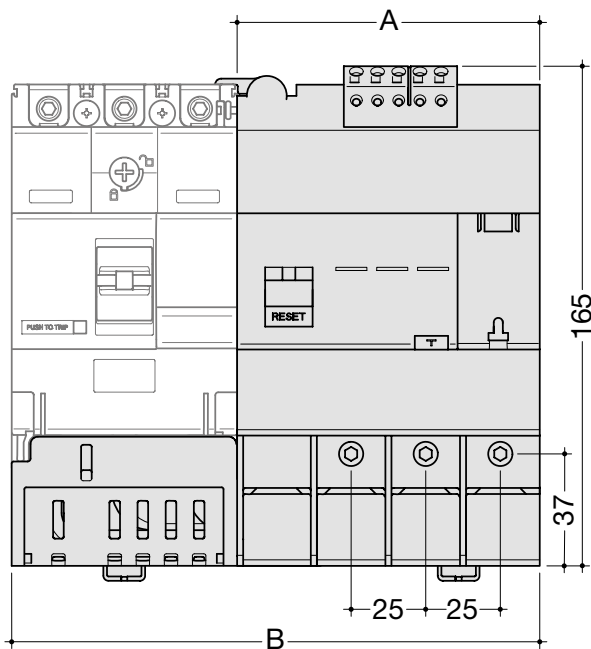


Exclusive drawer assembly system allows quick mounting and makes MCCB and add-on block association a complete monoblock unit.

Reinforced insulation connection (class II)

System avoids the omission of terminal tightening

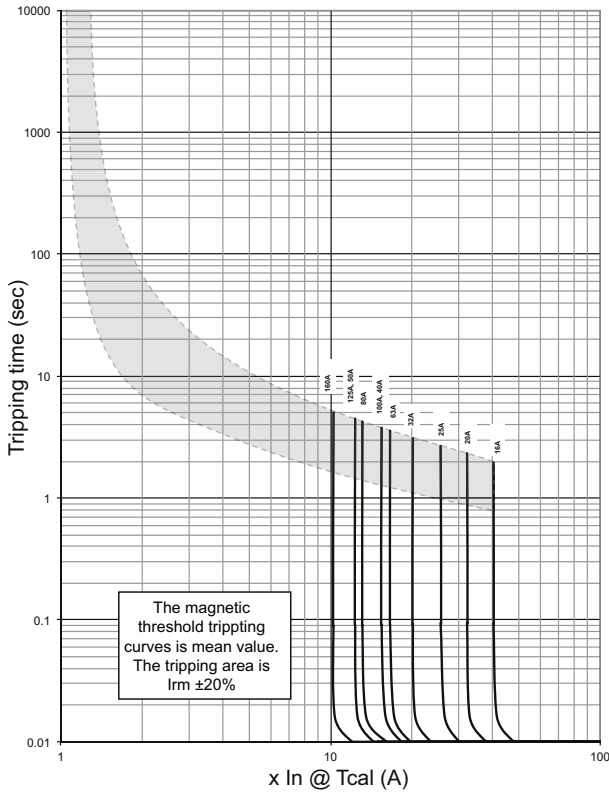
Dimensions



	3P	4P
A (mm)	100	100
B (mm)	174.5	199.5

Tripping curve

MCCB x160



MCCB Disconnection Data

Earth Fault Loop Impedance Data

Disconnection time 0.2s, 0.4s, 1s

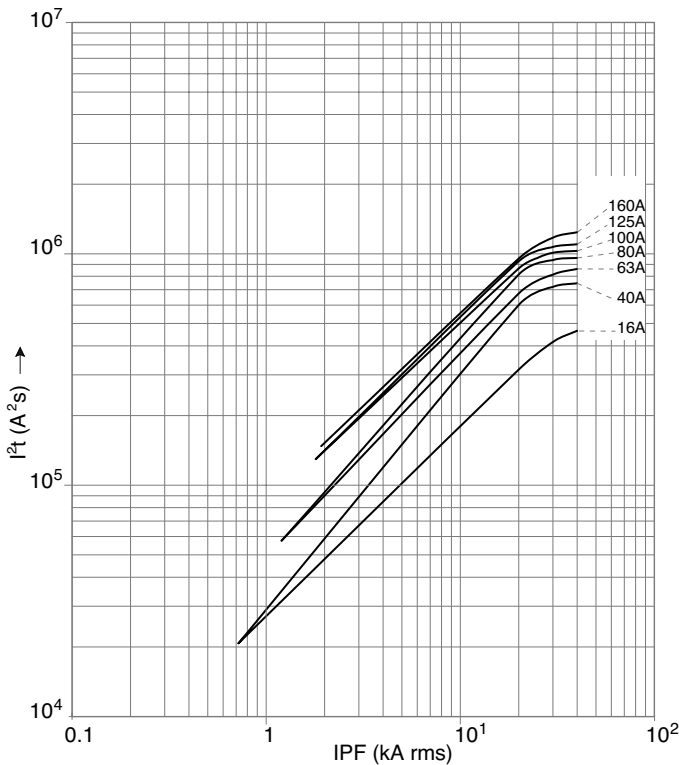
Device rating (A)	Instantaneous trip ( $xI_n$ )	Instantaneous trip (A)	add 20% tolerance ( $I_a$ )	$Z_s = (230 \times 0.95) / I_a$
16	40.3	644.8	773.8	0.28
20	32.2	644.0	773	0.28
25	25.7	643	771	0.28
32	20.13	644.2	773.0	0.28
40	15.0	600.0	720.0	0.30
50	12.0	600.0	720.0	0.30
63	16.6	1045.8	1255.0	0.17
80	13.1	1048.0	1258	0.17
100	15.4	1540.0	1848.0	0.12
126	12.3	1538	1845.0	0.12
160	10.22	1635.2	1962.2	0.11

Disconnection time 5s

Device rating (A)	trip ( $xI_n$ )	$I_a$ (A)	$Z_s = (230 \times 0.95) / I_a$
16	10	160	1.37
20	10	200	1.09
25	10	250	0.87
32	10	320	0.68
40	10	400	0.55
50	10	500	0.44
63	10	630	0.35
80	10	800	0.27
100	10	1000	0.22
125	10	1250	0.17
160	10	1600	0.14

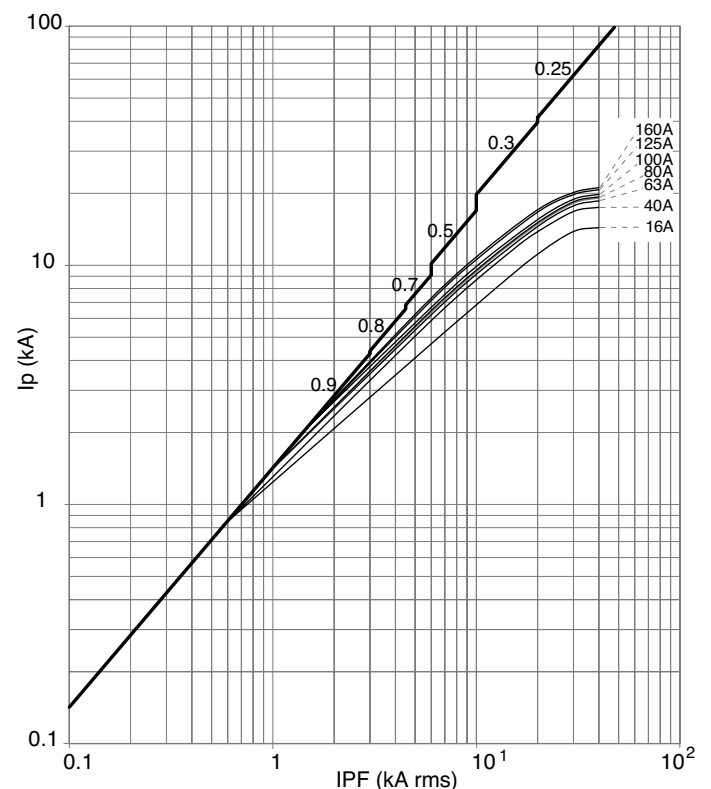
Thermal constraint curve at 400V (Let-through energy)

MCCB x160

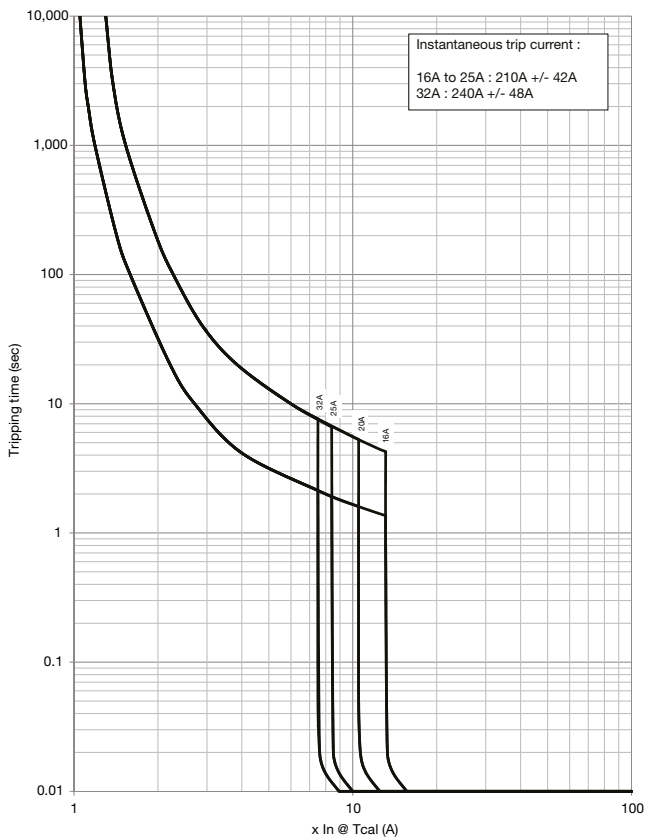


Current limiting curve at 400V (Let-through peak current)

MCCB x160



**Tripping Curve SP MCCB x160 16A - 32A**



Earth Fault Loop Impedance Data To BS 7671:2018

Disconnection time 0.2s, 0.4s, 1s

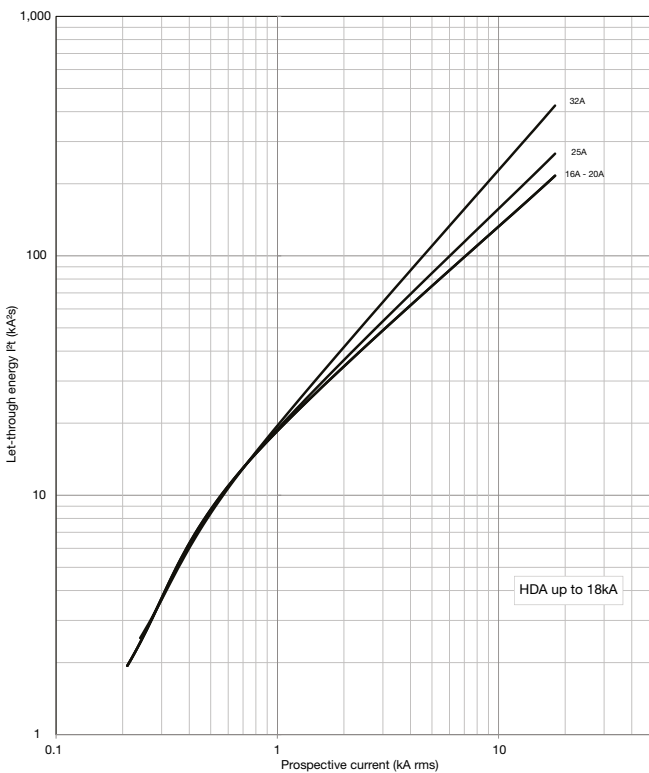
Device rating (A)	Instantaneous trip (xIn)	Instantaneous trip (A)	add 20% tolerance (Ia)	Zs = 230 x Cmin / Ia
16	13.0	210.0	252.0	0.87
20	10.5	210.0	252.0	0.87
25	8.5	210.0	252.0	0.87
32	7.5	240.0	288.0	0.76

Earth Fault Loop Impedance Data To BS 7671:2018

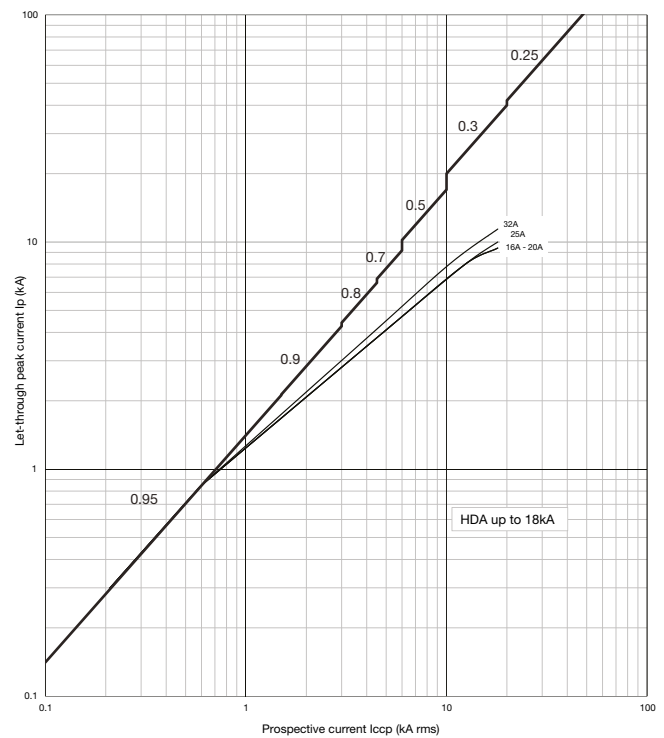
Disconnection time 5s

Device rating (A)	Instantaneous trip (xIn)	Instantaneous trip (A)	If Magnetic trip add 20% tolerance (Ia)	Zs = 230 x Cmin / Ia
16	11.0	176.0	176.0	1.24
20	10.5	210.0	210.0	0.99
25	8.5	212.5	255.0	0.86
32	7.5	240.0	288.0	0.76

**Thermal constraint curve at 230V (Let through energy)**



**Current limiting curve at 230V (Let through peak current)**

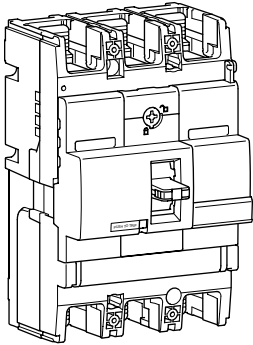


The earth fault loop impedance requirements for larger devices can be calculated by the formula given in BS7671:2008

$$Z_s \leq \frac{230 \times C_{min}}{I_a}$$

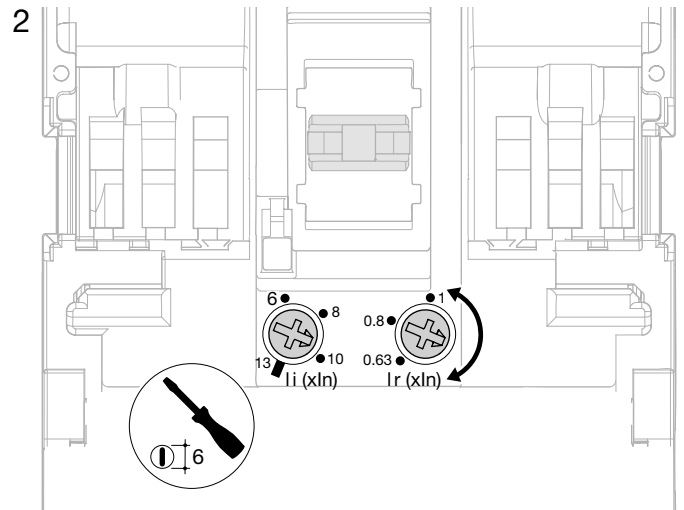
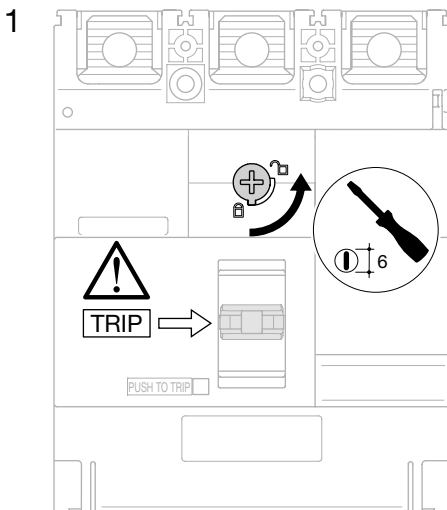
Where  $I_a = I_n$  of MCCB x Mag setting x 1.2

MCCBs



		220/240V AC IEC 60 947-2	380/415V AC IEC 60 947-2
<b>HHB</b>	I <sub>cu</sub>	35 kA	25 kA
	I <sub>cs</sub>	25 kA	20 kA
<b>HNB</b>	I <sub>cu</sub>	85 kA	40 kA
	I <sub>cs</sub>	40 kA	20 kA
<b>HCB</b>	I <sub>cm</sub>	-	9 kA
	I <sub>cw</sub>	-	3 kA - 1s

Magnetic and thermal settings

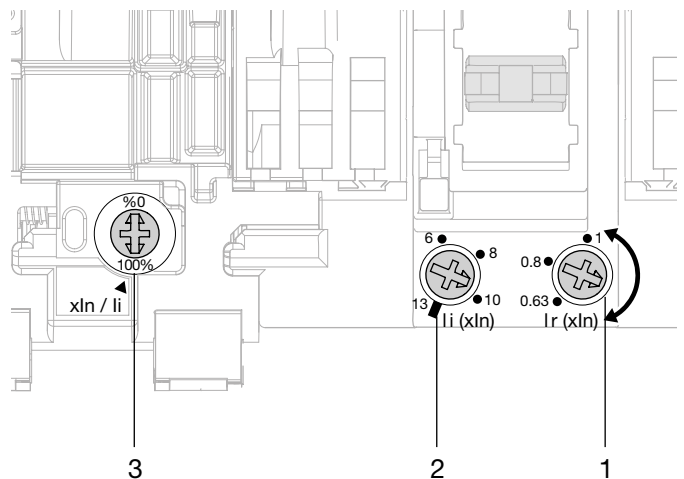


Thermal adjustment from 0.63, 0.8, 1 x I<sub>n</sub>

Magnetic adjustment from 6 to 13 x I<sub>n</sub> (100 - 200A)

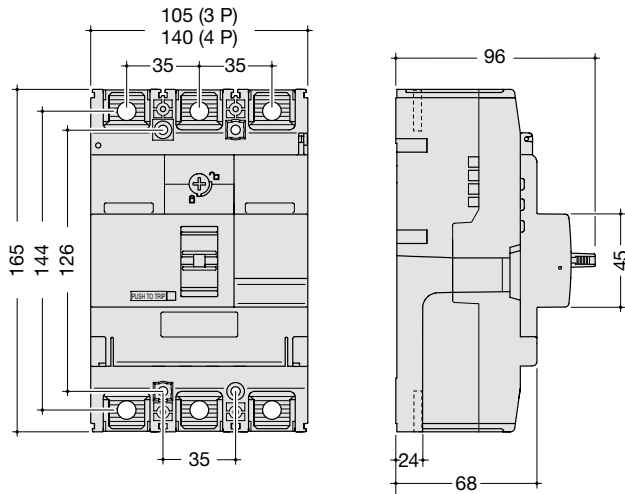
from 5 to 11 x I<sub>n</sub> (250A)

	100 - 200A	250A
I <sub>r</sub> (x I <sub>n</sub> ) 1	0.63 - 0.8 - 1 x I <sub>n</sub>	
I <sub>i</sub> (x I <sub>n</sub> ) 2	6 - 8 - 10 - 13 x I <sub>n</sub>	5 - 7 - 9 - 11 x I <sub>n</sub>
x I <sub>n</sub> /I <sub>i</sub> 3	0 - 100%	
	0 - 60%	

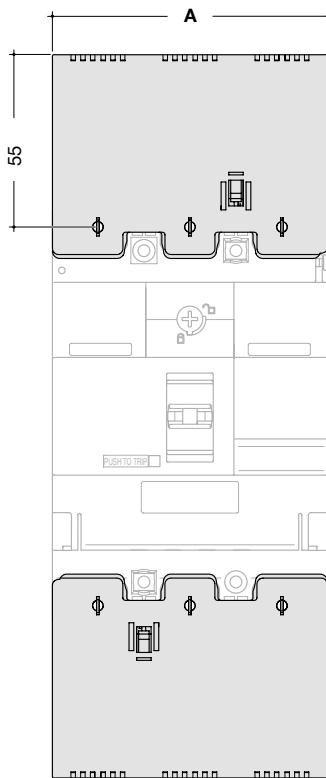


**Dimensions**

**MCCB x250**

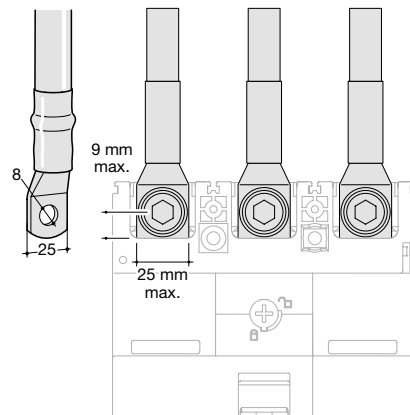
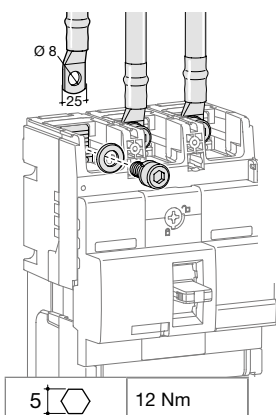


**Terminal covers for extended straight connections**

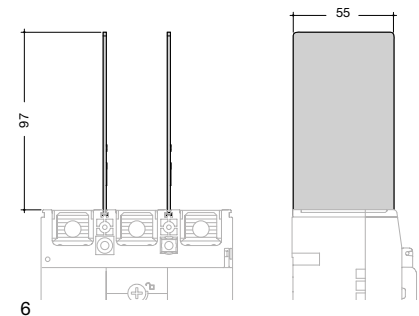


	A (mm)
<b>3P</b>	105
<b>4P</b>	140

**Connection with end lugs**

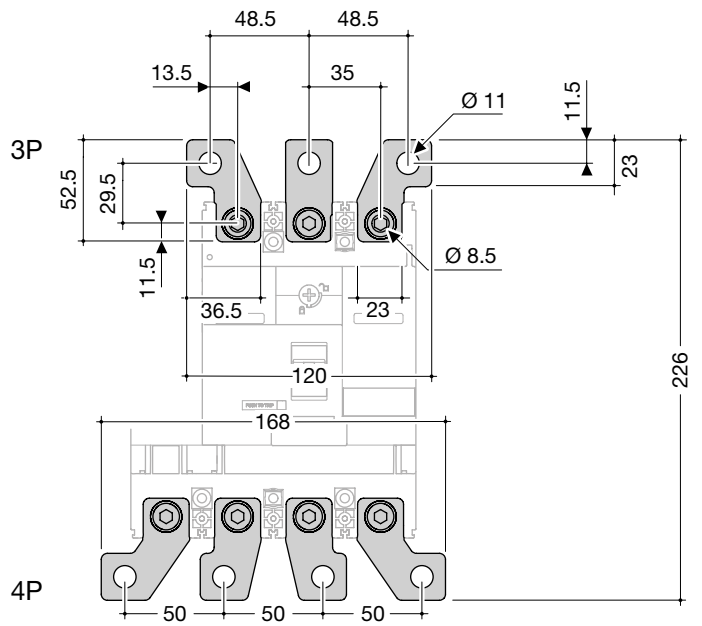
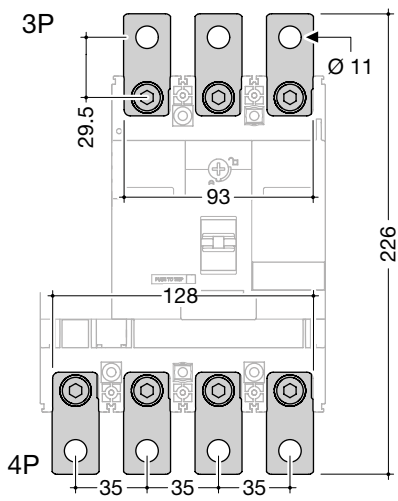
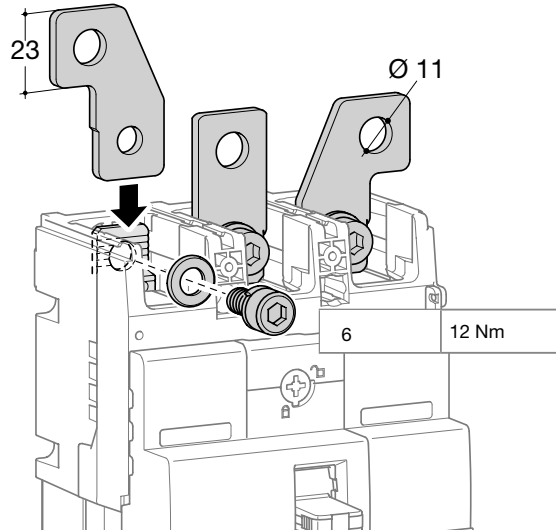
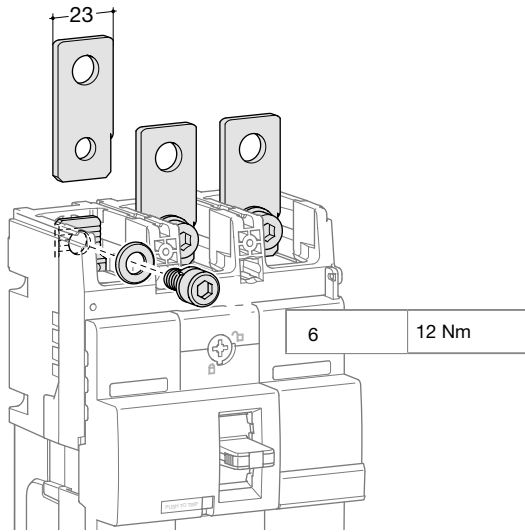


**Interphase barriers**



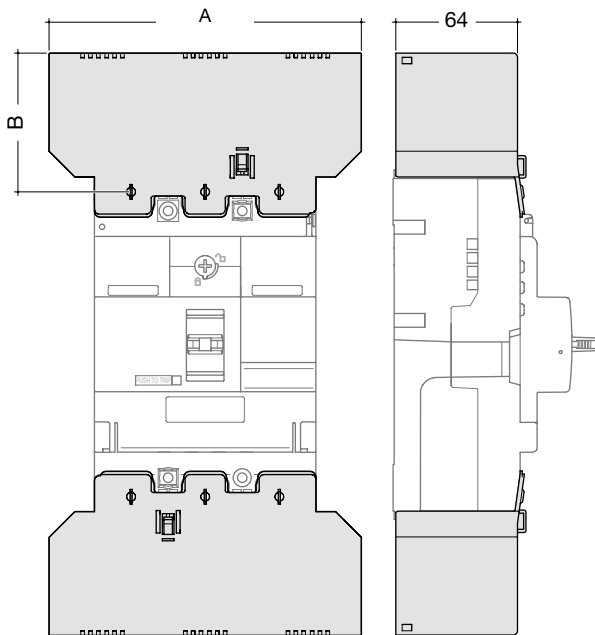
Connection

Extended straight and spreader connections



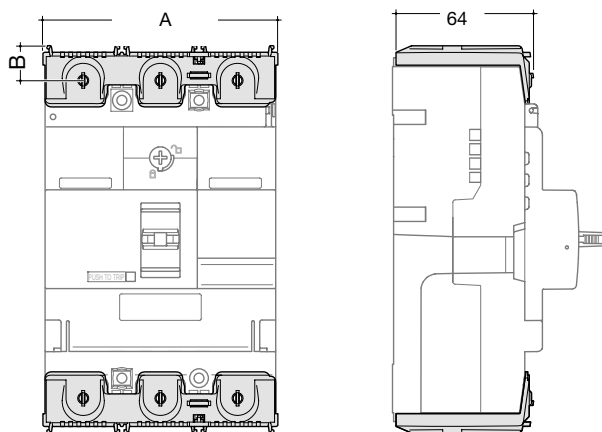
Accessories

Terminal cover for extended spreader connections



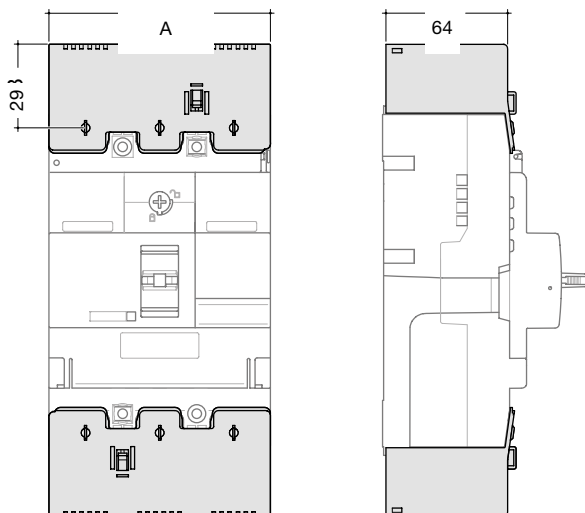
	A (mm)	B (mm)	C (mm)
3P	147.5	54.5	64
4P	196	54.5	64

Terminal cover for rear connections



	A (mm)
3P	105
4P	140

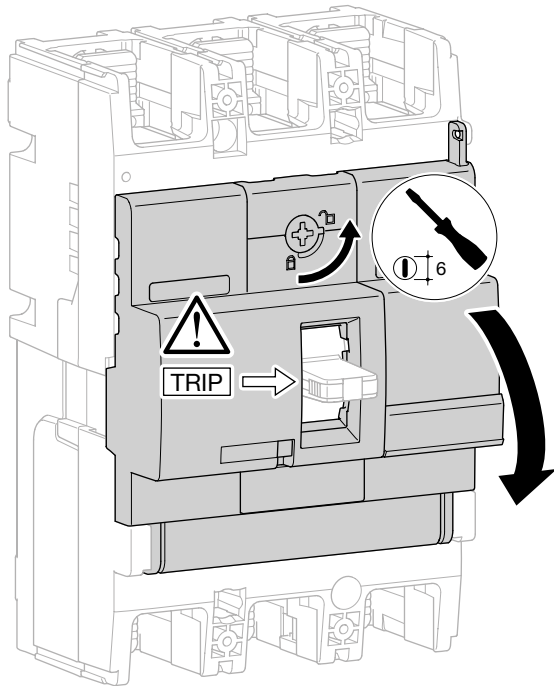
Terminal covers for collar terminals



	A (mm)
3P	105
4P	140

Auxiliaries

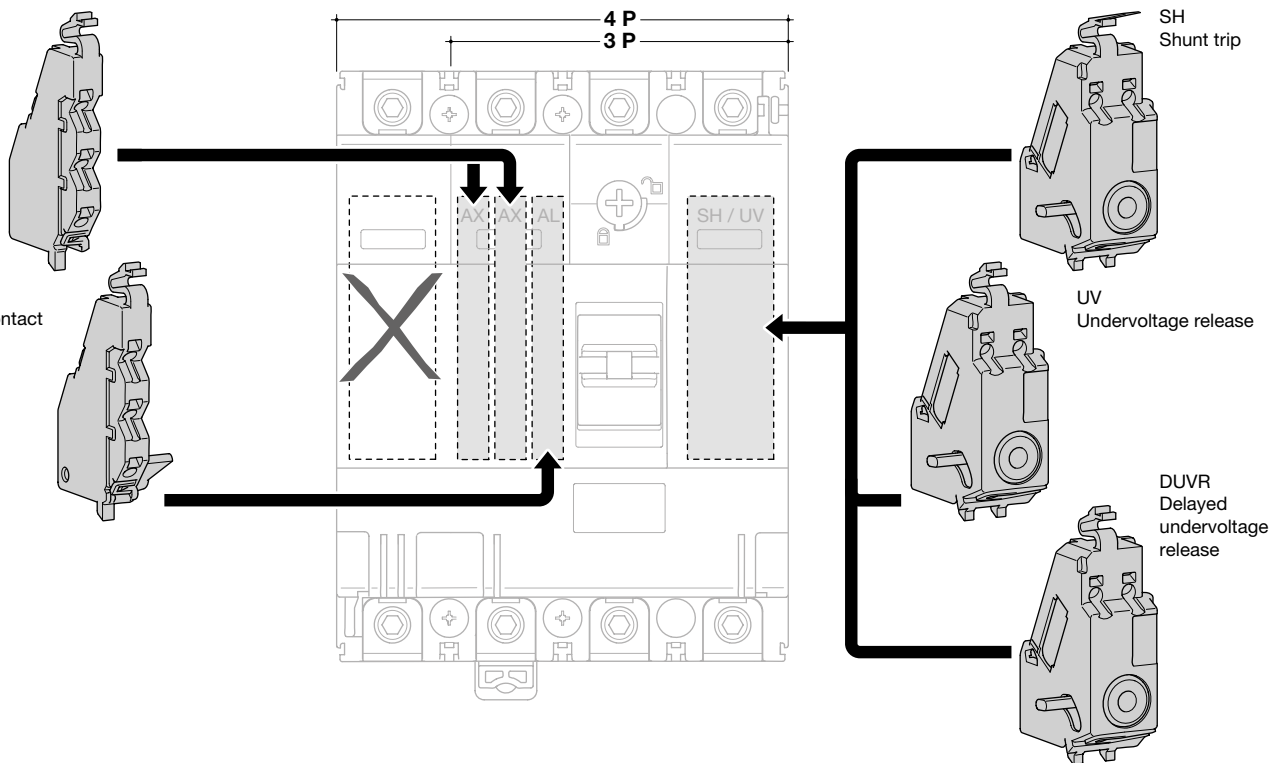
Auxiliaries for MCCBs and moulded case switches



Mounting combination for auxiliaries and releases

AX  
 Auxiliary contact

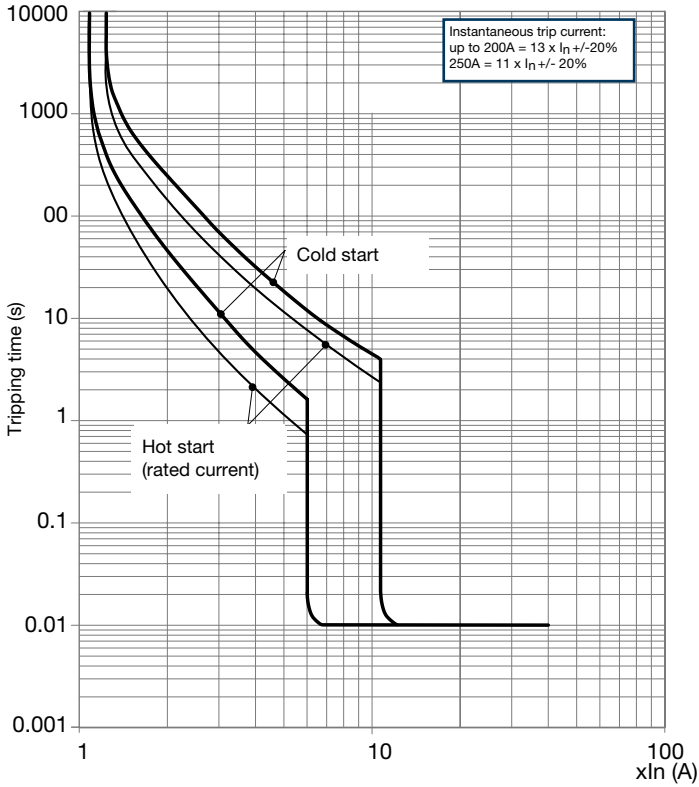
AL  
 Alarm contact





Tripping curve

MCCB x250

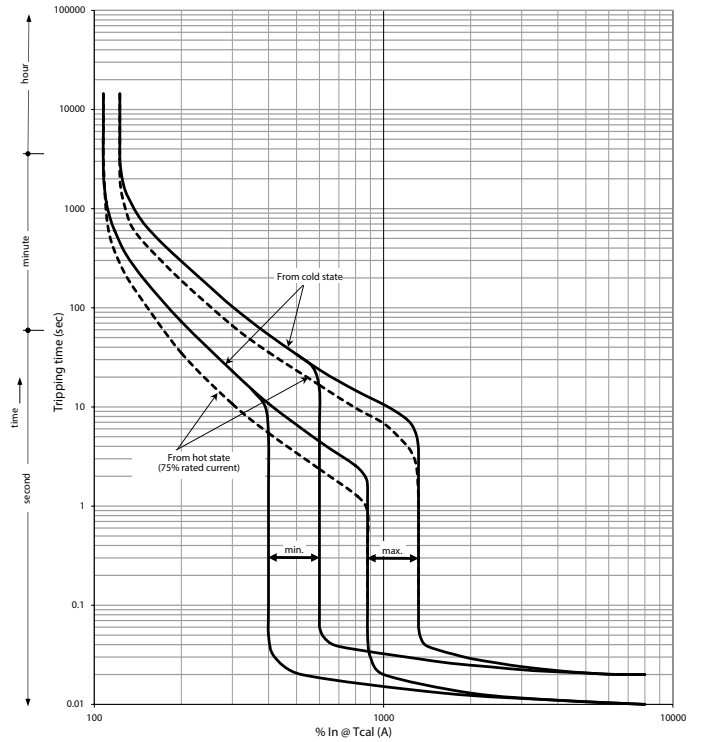


Earth fault loop impedance ( $Z_s$ ) can be calculated from the formula  $Z_s \leq \frac{230}{I_a} \times 0.95$

Where  $I_a = I_n$  of MCCB x mag setting x 1.2

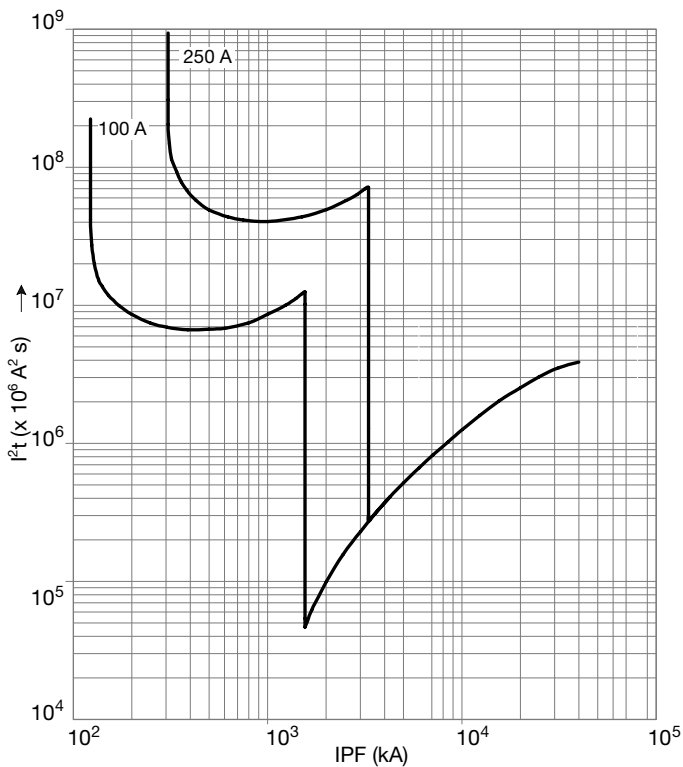
Tripping curve

MCCB h250 TM



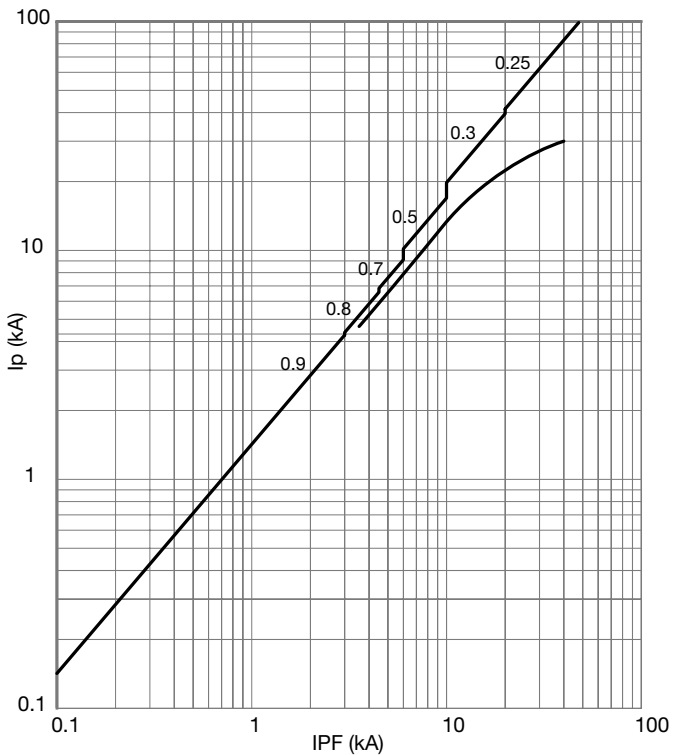
Thermal constraint curve at 400V (Let-through energy)

MCCB x250



Current limiting curve at 400V (Let-through peak current)

MCCB x250



Max Values (kA)		Upstream												
		Fuse BS 88												
		I <sub>n</sub> (A)	10	16	20	25	32	40	45	50	63	80	100	
Downstream	MTN B Curve	6A	80	80	80	80	80	80	80	80	80	80	6	6
		10A	80	80	80	80	80	80	80	80	80	80	6	6
		16A	-	80	80	80	80	80	80	80	80	80	42	6
		20A	-	-	80	80	80	80	80	80	80	80	42	6
		25A	-	-	-	80	80	80	80	80	80	80	42	6
		32A	-	-	-	-	80	80	80	80	80	80	42	6
		40A	-	-	-	-	-	80	80	80	80	80	42	6
		50A	-	-	-	-	-	-	-	80	80	80	42	6
		63A	-	-	-	-	-	-	-	-	80	80	42	23
	NBN B Curve	6A	80	80	80	80	80	80	80	80	80	80	80	15
		10A	80	80	80	80	80	80	80	80	80	80	80	15
		16A	-	80	80	80	80	80	80	80	80	80	80	80
		20A	-	-	80	80	80	80	80	80	80	80	80	80
		25A	-	-	-	80	80	80	80	80	80	80	80	80
		32A	-	-	-	-	80	80	80	80	80	80	80	80
40A		-	-	-	-	-	80	80	80	80	80	80	80	
50A		-	-	-	-	-	-	-	80	80	80	80	80	
63A		-	-	-	-	-	-	-	-	80	80	80	80	
NCG C Curve	0,5A	80	15	15	15	15	15	15	15	15	15	15	15	
	1A	80	80	80	80	80	80	80	80	15	15	15	15	
	2A	80	80	80	80	80	80	80	80	15	15	15	15	
	3A	80	80	80	80	80	80	80	80	80	80	15	15	
	4A	80	80	80	80	80	80	80	80	80	80	15	15	
	6A	80	80	80	80	80	80	80	80	80	80	80	15	
	10A	80	80	80	80	80	80	80	80	80	80	80	80	
	16A	-	80	80	80	80	80	80	80	80	80	80	80	
	20A	-	-	80	80	80	80	80	80	80	80	80	80	
	25A	-	-	-	80	80	80	80	80	80	80	80	80	
	32A	-	-	-	-	80	80	80	80	80	80	80	80	
	40A	-	-	-	-	-	80	80	80	80	80	80	80	
	50A	-	-	-	-	-	-	-	80	80	80	80	80	
	63A	-	-	-	-	-	-	-	-	80	80	80	80	
	NDN D Curve	0,5A	80	15	15	15	15	15	15	15	15	15	15	15
1A		80	80	80	80	80	80	80	80	15	15	15	15	
2A		80	80	80	80	80	80	80	80	15	15	15	15	
3A		80	80	80	80	80	80	80	80	80	80	15	15	
4A		80	80	80	80	80	80	80	80	80	80	15	15	
6A		80	80	80	80	80	80	80	80	80	80	80	15	
10A		80	80	80	80	80	80	80	80	80	80	80	80	
16A		-	80	80	80	80	80	80	80	80	80	80	80	
20A		-	-	80	80	80	80	80	80	80	80	80	80	
25A		-	-	-	80	80	80	80	80	80	80	80	80	
32A		-	-	-	-	80	80	80	80	80	80	80	80	
40A		-	-	-	-	-	80	80	80	80	80	80	80	
50A		-	-	-	-	-	-	-	80	80	80	80	80	
63A		-	-	-	-	-	-	-	-	80	80	80	80	
HMC / HMF C Curve		80A	-	-	-	-	-	-	-	-	-	-	80	80
	100A	-	-	-	-	-	-	-	-	-	-	-	80	
	125A	-	-	-	-	-	-	-	-	-	-	-	-	
HMD D Curve	80A	-	-	-	-	-	-	-	-	-	-	80	80	
	100A	-	-	-	-	-	-	-	-	-	-	-	80	
	125A	-	-	-	-	-	-	-	-	-	-	-	-	

Max Values (kA)		Upstream												
		Fuse BS 88												
		In	10A	16A	20A	25A	32A	40A	45A	50A	63A	80A	100A	
Downstream	ADA3**G B Curve, 6kA, Type A	6A	80	80	80	80	80	80	80	80	80	6	6	
		10A	80	80	80	80	80	80	80	80	80	80	42	6
		16A	-	80	80	80	80	80	80	80	80	80	42	6
		20A	-	-	80	80	80	80	80	80	80	80	42	6
		32A	-	-	-	-	80	80	80	80	80	80	42	6
		40A	-	-	-	-	-	80	80	80	80	80	42	6
		45A	-	-	-	-	-	-	80	80	80	80	42	6
	ADA1**U B Curve, 10kA, Type A	6A	80	80	80	80	80	80	80	80	80	80	80	10
		10A	80	80	80	80	80	80	80	80	80	80	80	10
		16A	-	80	80	80	80	80	80	80	80	80	80	10
		20A	-	-	80	80	80	80	80	80	80	80	80	10
		25A	-	-	-	80	80	80	80	80	80	80	80	10
		32A	-	-	-	-	80	80	80	80	80	80	80	80
		40A	-	-	-	-	-	80	80	80	80	80	80	80
	45A	-	-	-	-	-	-	80	80	80	80	80	80	
	ADA1**U C Curve, 6kA, Type A	6A	80	80	80	80	80	80	80	80	80	80	80	10
		10A	80	80	80	80	80	80	80	80	80	80	80	10
		16A	-	-	80	80	80	80	80	80	80	80	80	10
		20A	-	-	-	80	80	80	80	80	80	80	80	10
		25A	-	-	-	-	80	80	80	80	80	80	80	80
		32A	-	-	-	-	-	80	80	80	80	80	80	80
		40A	-	-	-	-	-	-	80	80	80	80	80	80

Max Values (kA)		Upstream																										
		NBN B Curve												NCN C Curve														
		I <sub>n</sub> (A)	6	10	13	16	20	25	32	40	50	63	0.5	1	2	3	4	6	10	13	16	20	25	32	40	50	63	
Downstream	ADA1**U B Curve, 10kA Type A	6A	15	15	15	15	15	15	15	15	15	15	-	-	-	-	-	15	15	15	15	15	15	15	15	15	15	
		10A	-	15	15	15	15	15	15	15	15	15	-	-	-	-	-	-	15	15	15	15	15	15	15	15	15	
		16A	-	-	-	15	15	15	15	15	15	15	-	-	-	-	-	-	-	-	15	15	15	15	15	15	15	15
		20A	-	-	-	-	15	15	15	15	15	15	-	-	-	-	-	-	-	-	-	15	15	15	15	15	15	15
		25A	-	-	-	-	-	15	15	15	15	15	-	-	-	-	-	-	-	-	-	-	15	15	15	15	15	15
		32A	-	-	-	-	-	-	15	15	15	15	-	-	-	-	-	-	-	-	-	-	-	15	15	15	15	15
		40A	-	-	-	-	-	-	-	15	15	15	-	-	-	-	-	-	-	-	-	-	-	-	15	15	15	15
		45A	-	-	-	-	-	-	-	-	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	15	15	15
	ADA1**U C Curve, 10kA, Type A	6A	15	15	15	15	15	15	15	15	15	15	-	-	-	-	-	15	15	15	15	15	15	15	15	15	15	
		10A	-	15	15	15	15	15	15	15	15	15	-	-	-	-	-	-	15	15	15	15	15	15	15	15	15	
		16A	-	-	-	15	15	15	15	15	15	15	-	-	-	-	-	-	-	-	15	15	15	15	15	15	15	
		20A	-	-	-	-	15	15	15	15	15	15	-	-	-	-	-	-	-	-	-	15	15	15	15	15	15	
		25A	-	-	-	-	-	15	15	15	15	15	-	-	-	-	-	-	-	-	-	-	15	15	15	15	15	
		32A	-	-	-	-	-	-	15	15	15	15	-	-	-	-	-	-	-	-	-	-	-	15	15	15	15	
40A		-	-	-	-	-	-	-	15	15	15	-	-	-	-	-	-	-	-	-	-	-	-	15	15	15		
45A		-	-	-	-	-	-	-	-	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	15	15		

Max Values (kA)		Upstream																								
		NDN D Curve												HMB B Curve			HMC / HMF C Curve			HMD D Curve						
		I <sub>n</sub> (A)	0.5	1	2	3	4	6	10	13	16	20	25	32	40	50	63	80	100	125	80	100	125	80	100	125
Downstream	ADA1**U B Curve, 10kA Type A	6A	-	-	-	-	-	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
		10A	-	-	-	-	-	-	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
		16A	-	-	-	-	-	-	-	-	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
		20A	-	-	-	-	-	-	-	-	-	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
		25A	-	-	-	-	-	-	-	-	-	-	15	15	15	15	15	15	15	15	15	15	15	15	15	15
		32A	-	-	-	-	-	-	-	-	-	-	-	15	15	15	15	15	15	15	15	15	15	15	15	15
		40A	-	-	-	-	-	-	-	-	-	-	-	-	15	15	15	15	15	15	15	15	15	15	15	15
		45A	-	-	-	-	-	-	-	-	-	-	-	-	-	15	15	15	15	15	15	15	15	15	15	15
	ADA1**U C Curve, 10kA, Type A	6A	-	-	-	-	-	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
		10A	-	-	-	-	-	-	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
		16A	-	-	-	-	-	-	-	-	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
		20A	-	-	-	-	-	-	-	-	-	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
		25A	-	-	-	-	-	-	-	-	-	-	15	15	15	15	15	15	15	15	15	15	15	15	15	15
		32A	-	-	-	-	-	-	-	-	-	-	-	15	15	15	15	15	15	15	15	15	15	15	15	15
40A		-	-	-	-	-	-	-	-	-	-	-	-	15	15	15	15	15	15	15	15	15	15	15	15	
45A		-	-	-	-	-	-	-	-	-	-	-	-	-	15	15	15	15	15	15	15	15	15	15	15	

Max Values (kA)		Upstream		
		NKN / NBN / NCN / NDN	HMC / HMF C Curve	HMD D Curve
		I <sub>cn</sub>	15kA	15kA
Downstream	ARC9*** B Curve	6kA	15	12
	ARC9*** C Curve	6kA	15	12
	ARC5*** B Curve	10kA	15	15
	ARC5*** C Curve	10kA	15	15

Downstream	Max Values (kA)	Upstream										
		x160			x250		H250 TM		H250 TM+		H250 LSI	
		18kA	25kA	40kA	25kA	40kA	25kA	50kA	50kA	70kA	50kA	70kA
		TM			TM		TM		TM+		LSI	
	<b>NBN /NCN / NDN</b>	18	20	40	25	40	25	50	23	50	23	50
	<b>HMC</b> C Curve	18	25	40	25	40	25	50	23	50	23	50
	<b>HMD</b> D Curve	18	25	40	25	40	25	50	23	50	23	50

Downstream	Max Values (kA)	In	Upstream																
			HDA x160 18 / 25kA										x250 25 / 40kA						
			16	20	25	32	40	50	63	80	100	125	160	100A	125A	160A	200A	250A	
RCBO - ADA1**U B Curve, 10kA Type A	6A	18	18	18	18	18	18	18	18	18	18	18	18	18	13	13	13	13	13
	10A	18	18	18	18	18	18	18	18	18	18	18	18	18	13	13	13	13	13
	16A	18	18	18	18	18	18	18	18	18	18	18	18	18	13	13	13	13	13
	20A	-	18	18	18	18	18	18	18	18	18	18	18	18	13	13	13	13	13
	25A	-	-	18	18	18	18	18	18	18	18	18	18	18	13	13	13	13	13
	32A	-	-	-	18	18	18	18	18	18	18	18	18	18	13	13	13	13	13
	40A	-	-	-	-	18	18	18	18	18	18	18	18	18	13	13	13	13	13
	45A	-	-	-	-	-	18	18	18	18	18	18	18	18	13	13	13	13	13
	6A	18	18	18	18	18	18	18	18	18	18	18	18	18	13	13	13	13	13
RCBO - ADA1**U C Curve, 10kA, Type A	10A	18	18	18	18	18	18	18	18	18	18	18	18	13	13	13	13	13	
	16A	18	18	18	18	18	18	18	18	18	18	18	18	13	13	13	13	13	
	20A	-	18	18	18	18	18	18	18	18	18	18	18	13	13	13	13	13	
	25A	-	-	18	18	18	18	18	18	18	18	18	18	13	13	13	13	13	
	32A	-	-	-	18	18	18	18	18	18	18	18	18	13	13	13	13	13	
	40A	-	-	-	-	18	18	18	18	18	18	18	18	13	13	13	13	13	
	45A	-	-	-	-	-	18	18	18	18	18	18	18	13	13	13	13	13	

Downstream	Max Values (kA)	Upstream														
		HDA / HHA x160 TM		HNB / HNB x250 TM		HHG / HNG / HEG h250 TM			HNC / HEC h250 LSI		HND / HED h630 LSI		HNE / HEE h1000 LSI		HNF / HEF h1600 LSI	
		18kA	25kA	25kA	40kA	25kA	50kA	65kA	50kA	70kA	50kA	70kA	50kA	70kA	50kA	70kA
HDA / HHA x160 TM	18kA	-	25kA	25kA	40kA	25kA	40kA	40kA	40kA	40kA	40kA	40kA	40kA	40kA	40kA	40kA
	25kA	-	-	-	40kA	-	50kA	65kA	50kA	70kA	50kA	50kA	50kA	50kA	50kA	50kA
HNB / HNB x250 TM	25kA	-	-	-	40kA	-	50kA	65kA	50kA	70kA	50kA	50kA	50kA	50kA	50kA	50kA
	40kA	-	-	-	-	-	50kA	65kA	50kA	70kA	50kA	70kA	50kA	70kA	50kA	50kA
HHG / HNG / HEG h250 TM	25kA	-	-	-	40kA	-	50kA	65kA	50kA	70kA	50kA	50kA	50kA	50kA	50kA	
	50kA	-	-	-	-	-	-	65kA	-	70kA	-	70kA	-	70kA	-	70kA
	65kA	-	-	-	-	-	-	-	-	70kA	-	70kA	-	70kA	-	70kA
HNC / HEC h250 LSI	50kA	-	-	-	-	-	-	-	-	70kA	-	70kA	-	70kA	-	70kA
	70kA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HND / HED h630 LSI	50kA	-	-	-	-	-	-	-	-	-	-	70kA	-	70kA	-	70kA
	70kA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HNE / HEE h1000 LSI	50kA	-	-	-	-	-	-	-	-	-	-	-	-	70kA	-	70kA
	70kA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HNF / HEF h1600 LSI	50kA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70kA
	70kA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Max Values (kA)		Upstream										
		Fuse BS88										
I <sub>n</sub>	I <sub>n</sub>	10A	16A	20A	25A	32A	40A	45A	50A	63A	80A	100A
		MTN B Curve	6A	0.20	0.20	0.30	0.40	0.60	1.30	1.80	2.50	4.00
10A	-		0.20	0.30	0.40	0.50	1.10	1.50	2.10	3.30	T	T
16A	-		-	0.30	0.30	0.40	0.90	1.20	1.70	2.70	5.30	T
20A	-		-	-	0.30	0.40	0.80	1.10	1.50	2.30	4.70	T
25A	-		-	-	-	0.40	0.70	0.90	1.30	2.10	4.10	T
32A	-		-	-	-	-	-	0.50	0.70	1.10	2.20	T
40A	-		-	-	-	-	-	-	0.90	1.50	2.90	T
50A	-		-	-	-	-	-	-	-	1.30	2.50	T
63A	-	-	-	-	-	-	-	-	-	2.10	5.30	
NBN B curve	6A	-	-	-	-	-	0.80	1.10	1.60	2.80	6.40	T
	10A	-	-	-	-	-	0.70	1.00	1.40	2.40	5.10	T
	16A	-	-	-	-	-	0.60	0.80	1.10	1.90	4.10	13.60
	20A	-	-	-	-	-	0.50	0.70	1.00	1.70	3.60	11.00
	25A	-	-	-	-	-	-	0.60	0.90	1.50	3.10	9.00
	32A	-	-	-	-	-	-	0.60	0.80	1.30	2.70	7.40
	40A	-	-	-	-	-	-	-	0.70	1.10	2.30	6.10
	50A	-	-	-	-	-	-	-	0.60	1.00	1.90	5.10
63A	-	-	-	-	-	-	-	-	-	1.60	4.30	
Downstream NCN C curve	0,5A	8.70	T	T	T	T	T	T	T	T	T	T
	1A	-	-	-	-	0.90	3.40	6.50	T	T	T	T
	2A	-	-	-	-	0.70	2.70	4.80	T	T	T	T
	3A	-	-	-	-	0.50	1.50	2.20	3.30	6.20	T	T
	4A	-	-	-	-	-	1.30	2.00	3.00	5.50	T	T
	6A	-	-	-	-	-	1.00	1.40	1.90	3.10	6.50	T
	10A	-	-	-	-	-	0.80	1.10	1.50	2.20	4.00	11.40
	16A	-	-	-	-	-	0.70	1.00	1.20	1.90	3.40	8.40
	20A	-	-	-	-	-	0.70	0.90	1.10	1.70	3.10	7.40
	25A	-	-	-	-	-	0.60	0.80	1.00	1.60	2.90	6.70
	32A	-	-	-	-	-	-	-	0.90	1.40	2.70	6.20
	40A	-	-	-	-	-	-	-	-	1.30	2.40	5.70
	50A	-	-	-	-	-	-	-	-	-	1.90	4.80
63A	-	-	-	-	-	-	-	-	-	-	4.40	
Downstream NDN D curve	0,5A	12.70	T	T	T	T	T	T	T	T	T	T
	1A	-	-	-	0.50	1.00	3.40	5.90	T	T	T	T
	2A	-	-	-	-	0.90	3.00	5.10	T	T	T	T
	3A	-	-	-	-	0.70	1.80	2.70	3.90	7.30	T	T
	4A	-	-	-	-	0.50	1.30	2.10	3.10	5.60	T	T
	6A	-	-	-	-	-	1.00	1.40	1.80	2.90	5.60	T
	10A	-	-	-	-	-	0.90	1.20	1.50	2.30	4.30	14.80
	16A	-	-	-	-	-	0.70	1.00	1.30	2.00	3.60	8.90
	20A	-	-	-	-	-	-	0.90	1.10	1.70	3.20	7.80
	25A	-	-	-	-	-	-	-	1.00	1.50	2.90	7.00
	32A	-	-	-	-	-	-	-	-	1.30	2.50	5.90
	40A	-	-	-	-	-	-	-	-	-	2.20	5.10
	50A	-	-	-	-	-	-	-	-	-	-	4.20
63A	-	-	-	-	-	-	-	-	-	-	-	

Upstream

Max Values (kA)		I <sub>n</sub>	Fuse BS88									
			10A	16A	20A	25A	32A	40A	50A	63A	80A	100A
Downstream	ADA3**G B Curve, 6kA, 30mA Type A	6A	0.10	0.20	0.30	0.40	0.50	1.00	1.60	3.00	T	T
		10A	-	0.20	0.30	0.40	0.50	0.90	1.50	2.70	6.00	T
		16A		-	0.20	0.30	0.50	0.90	1.40	2.30	4.80	T
		20A				0.30	0.40	0.80	1.30	2.10	4.30	T
		32A					-	0.60	1.10	1.50	3.10	T
		40A						-	1.00	1.40	2.80	T
		45A							1.10	1.60	2.90	T
Downstream	ADA1**U B Curve, 10kA, 30mA Type A	6A	0.10	0.20	0.30	0.40	0.50	1.00	1.60	3.00	7.10	T
		10A	-	0.20	0.30	0.40	0.50	0.90	1.50	2.70	6.00	T
		16A			0.20	0.30	0.50	0.90	1.40	2.30	4.80	T
		20A				0.30	0.40	0.80	1.30	2.10	4.30	T
		25A				-	0.40	0.70	1.20	1.80	4.00	T
		32A					-	0.60	1.10	1.50	3.10	8.40
		40A						-	1.00	1.40	2.80	7.70
Downstream	ADA1**U C Curve, 10kA, 30mA Type A	6A	0.10	0.10	0.20	0.30	0.50	1.10	2.00	3.30	6.80	T
		10A	-	-	0.20	0.30	0.40	0.90	1.50	2.50	5.40	T
		13A		-	-	-	0.40	0.80	1.40	2.20	4.50	T
		16A			-	-	-	0.70	1.20	1.90	3.70	T
		20A				-	-	-	1.10	1.70	3.50	T
		25A					-	-	-	1.30	2.60	7.50
		32A						-	-	-	2.40	6.60
40A							-	1.30	2.60	6.20		

Upstream

Max Values (kA)		I <sub>cn</sub>	I <sub>n</sub> max	Upstream											
				10A	16A	20A	25A	32A	35A	40A	50A	63A	80A	100A	
Downstream	ARCxxx 1Ph+N B	6kA	ARC906D	6A	0.50	1.00	2.30	2.80	3.80	T	T	T	T	T	T
			ARC910D	10A	-	0.70	1.40	1.70	2.20	3.50	4.30	T	T	T	T
			ARC916D	16A	-	0.50	1.30	1.50	1.90	2.90	3.30	T	T	T	T
			ARC920D	20A	-	-	1.10	1.30	1.70	2.60	3.00	T	T	T	T
			ARC925D	25A	-	-	-	1.10	1.50	2.40	2.80	5.40	T	T	T
Downstream	ARCxxx 1Ph+N C	6kA	ARC956D	6A	0.80	1.10	2.40	2.80	4.00	T	T	T	T	T	
			ARC960D	10A	0.50	0.80	1.40	1.60	2.10	3.40	4.10	T	T	T	T
			ARC966D	16A	-	-	1.30	1.50	1.90	3.00	3.50	T	T	T	T
			ARC970D	20A	-	-	-	-	1.50	2.30	2.60	5.20	T	T	T
			ARC975D	25A	-	-	-	-	-	2.20	2.50	4.80	T	T	T
Downstream	ARCxxx 1Ph+N B	10kA	ARC506D	6A	0.50	1.00	2.30	2.80	3.80	7.00	8.70	T	T	T	T
			ARC510D	10A	-	0.70	1.40	1.70	2.20	3.50	4.30	T	T	T	T
			ARC516D	16A	-	0.50	1.30	1.50	1.90	2.90	3.30	6.90	T	T	T
			ARC520D	20A	-	-	1.10	1.30	1.70	2.60	3.00	6.00	T	T	T
			ARC525D	25A	-	-	-	1.10	1.50	2.40	2.80	5.40	8.80	T	T
Downstream	ARCxxx 1Ph+N C	10kA	ARC556D	6A	0.80	1.10	2.40	2.80	4.00	7.20	8.40	T	T	T	T
			ARC560D	10A	0.50	0.80	1.40	1.60	2.10	3.40	4.10	T	T	T	T
			ARC566D	16A	-	-	1.30	1.50	1.90	3.00	3.50	7.50	T	T	T
			ARC570D	20A	-	-	-	-	1.50	2.30	2.60	5.20	T	T	T
			ARC575D	25A	-	-	-	-	-	2.20	2.50	4.80	9.10	T	T

Max Values (kA)	Upstream														
	1A	2A	3A	4A	6A	10A	13A	16A	20A	25A	32A	40A	50A	63A	
NBN B curve	$I_n$	-	-	-	-	-	-	-	-	-	-	-	-	-	
	6A	-	-	-	-	-	-	-	-	-	-	-	-	-	
	10A	0.06	-	-	-	-	-	-	-	-	-	-	-	-	
	13A	-	-	-	-	-	-	-	-	-	-	-	-	-	
	16A	-	-	-	-	-	-	-	-	-	-	-	-	-	
	20A	-	-	-	-	-	-	-	-	-	-	-	-	-	
	25A	-	-	-	-	-	-	-	-	-	-	-	-	-	
	32A	-	-	-	-	-	-	-	-	-	-	-	-	-	
	40A	-	-	-	-	-	-	-	-	-	-	-	-	-	
	50A	-	-	-	-	-	-	-	-	-	-	-	-	-	
	63A	-	-	-	-	-	-	-	-	-	-	-	-	-	
	0.5A	0.06	0.13	0.19	0.66	2.17	4.35	T	T	T	T	T	T	T	T
	1A	0.03	0.06	0.08	0.12	0.16	0.18	0.28	0.38	0.50	0.79	0.71	1.18	1.98	3.08
	2A	0.03	0.05	0.07	0.10	0.13	0.15	0.23	0.31	0.41	0.55	0.44	0.50	0.84	2.24
3A	-	0.05	0.06	0.08	0.10	0.11	0.17	0.22	0.28	0.35	0.30	0.34	0.64	0.99	
4A	-	0.04	0.06	0.07	0.10	0.11	0.16	0.21	0.27	0.34	0.29	0.32	0.42	0.58	
6A	-	-	0.06	0.07	0.09	0.10	0.15	0.19	0.24	0.30	0.25	0.28	0.36	0.47	
10A	-	-	-	-	0.08	0.09	0.14	0.17	0.22	0.28	0.24	0.27	0.35	0.45	
13A	-	-	-	-	0.08	0.09	0.14	0.17	0.22	0.28	0.24	0.27	0.35	0.45	
16A	-	-	-	-	-	-	0.13	0.17	0.22	0.27	0.23	0.26	0.33	0.43	
20A	-	-	-	-	-	-	-	0.17	0.21	0.26	0.22	0.25	0.32	0.41	
25A	-	-	-	-	-	-	-	-	-	0.26	0.24	0.31	0.40	0.50	
32A	-	-	-	-	-	-	-	-	-	0.25	-	0.31	0.39	0.48	
40A	-	-	-	-	-	-	-	-	-	-	-	-	0.39	0.48	
50A	-	-	-	-	-	-	-	-	-	-	-	-	-	0.48	
63A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0.5A	0.05	0.10	0.15	0.45	1.14	2.19	T	T	T	T	T	T	T	T	
1A	0.03	0.05	0.07	0.12	0.16	0.19	0.30	0.41	0.58	0.88	0.80	1.28	2.06	3.10	
2A	-	0.05	0.06	0.10	0.13	0.16	0.26	0.35	0.47	0.70	0.65	1.02	1.64	2.44	
3A	-	0.04	0.06	0.08	0.10	0.12	0.18	0.24	0.31	0.41	0.34	0.51	0.81	1.18	
4A	-	-	-	0.07	0.09	0.11	0.17	0.22	0.29	0.37	0.31	0.35	0.47	0.70	
6A	-	-	-	-	0.09	0.10	0.14	0.19	0.24	0.30	0.26	0.29	0.37	0.49	
10A	-	-	-	-	-	-	-	0.17	0.22	0.28	0.24	0.27	0.34	0.45	
13A	-	-	-	-	-	-	-	0.17	0.22	0.28	0.24	0.27	0.34	0.45	
16A	-	-	-	-	-	-	-	-	-	0.26	0.24	0.31	0.40	0.50	
20A	-	-	-	-	-	-	-	-	-	-	-	-	0.40	0.50	
25A	-	-	-	-	-	-	-	-	-	-	-	-	0.40	0.50	
32A	-	-	-	-	-	-	-	-	-	-	-	-	0.40	0.50	
40A	-	-	-	-	-	-	-	-	-	-	-	-	-	0.48	
50A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
63A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Downstream



Max Values (kA)	Upstream															HMC C curve			HMD D curve		
	NDN D curve																				
	0,5A	1A	2A	3A	4A	6A	10A	16A	20A	25A	32A	40A	50A	63A	80A	100A	125A	80A	100A	125A	
6A	-	-	-	-	-	0.14	0.35	0.67	1.06	1.49	1.62	2.33	2.65	2.61	3.08	3.2	5.2	4.65	5.45		
10A	-	-	-	-	-	-	-	0.61	0.97	1.37	1.49	2.14	2.44	2.4	2.84	2.95	4.8	4.29	5.03		
13A	-	-	-	-	-	-	-	0.61	0.97	1.37	1.49	2.14	2.44	2.4	2.84	2.95	4.8	4.29	5.03		
16A	-	-	-	-	-	-	-	-	0.86	1.21	1.32	1.91	2.17	2.14	2.53	2.63	4.29	3.84	4.5		
20A	-	-	-	-	-	-	-	-	0.80	1.13	1.23	1.78	2.02	1.99	2.36	2.45	4.01	3.58	4.2		
25A	-	-	-	-	-	-	-	-	-	1.04	1.13	1.64	1.86	1.84	2.17	2.26	3.7	3.3	3.88		
32A	-	-	-	-	-	-	-	-	-	-	1.01	1.47	1.67	1.65	1.96	2.03	3.33	2.97	3.49		
40A	-	-	-	-	-	-	-	-	-	-	-	1.31	1.50	1.48	1.75	1.82	2.99	2.67	3.13		
50A	-	-	-	-	-	-	-	-	-	-	-	-	1.32	1.3	1.54	1.61	2.64	2.36	2.77		
63A	-	-	-	-	-	-	-	-	-	-	-	-	-	1.13	1.34	1.39	2.29	2.04	2.4		
0,5A	0.01	0.02	0.06	0.10	0.16	0.26	1.44	T	T	T	T	T	T	T	T	T	T	T	T		
1A	-	-	0.03	0.05	0.07	0.10	0.20	0.44	0.58	1.03	2.54	5.48	7.56	7.26	T	T	T	T	T		
2A	-	-	-	0.04	0.06	0.09	0.17	0.36	0.44	0.73	1.53	1.84	4.05	5.34	5.17	7.8	8.64	T	T		
3A	-	-	-	-	-	-	0.14	0.25	0.30	0.41	0.69	0.82	1.74	2.27	2.2	3.12	3.37	T	7.6		
4A	-	-	-	-	-	-	0.14	0.24	0.29	0.39	0.62	0.73	1.50	1.93	1.87	2.6	2.8	7.27	5.85		
6A	-	-	-	-	-	-	0.12	0.21	0.26	0.34	0.48	0.54	0.95	1.16	1.13	1.47	1.56	3.29	2.77		
10A	-	-	-	-	-	-	-	0.20	0.24	0.32	0.47	0.51	0.87	1.05	1.03	1.31	1.38	2.8	2.38		
13A	-	-	-	-	-	-	-	0.20	0.24	0.32	0.47	0.51	0.87	1.05	1.03	1.31	1.38	2.8	2.38		
16A	-	-	-	-	-	-	-	-	0.23	0.31	0.44	0.48	0.79	0.95	0.93	1.17	1.24	2.44	2.09		
20A	-	-	-	-	-	-	-	-	-	0.30	0.43	0.47	0.75	0.89	0.87	1.09	1.15	2.22	1.91		
25A	-	-	-	-	-	-	-	-	-	0.29	0.42	0.46	0.73	0.86	0.85	1.06	1.11	2.13	1.84		
32A	-	-	-	-	-	-	-	-	-	-	0.44	0.68	0.81	0.79	0.99	1.04	1.98	1.71	2.11		
40A	-	-	-	-	-	-	-	-	-	-	-	0.67	0.80	0.78	0.97	1.02	1.92	1.66	2.04		
50A	-	-	-	-	-	-	-	-	-	-	-	-	0.80	0.78	0.96	1.01	1.84	1.6	1.95		
63A	-	-	-	-	-	-	-	-	-	-	-	-	-	0.74	0.91	0.95	1.73	1.51	1.84		
0,5A	-	0.02	0.08	0.14	0.25	0.46	4.05	T	T	T	T	T	T	T	T	T	T	T	T		
1A	-	-	0.03	0.04	0.06	0.10	0.19	0.48	0.66	1.13	2.20	2.59	5.27	7.35	7	T	T	T	T		
2A	-	-	-	0.04	0.06	0.08	0.16	0.41	0.53	0.90	1.74	2.05	4.12	5.27	5.12	7.66	8.54	T	T		
3A	-	-	-	-	0.05	0.08	0.14	0.28	0.34	0.47	0.86	1.00	1.96	2.48	2.41	3.28	3.51	9.71	7.35		
4A	-	-	-	-	-	-	0.13	0.25	0.31	0.43	0.75	0.87	1.71	2.16	2.1	2.86	3.06	8.08	6.1		
6A	-	-	-	-	-	-	0.12	0.21	0.26	0.35	0.51	0.57	0.99	1.20	1.18	1.51	1.6	3.32	2.8		
10A	-	-	-	-	-	-	-	0.20	0.24	0.32	0.47	0.51	0.87	1.05	1.03	1.31	1.38	2.8	2.38		
13A	-	-	-	-	-	-	-	0.20	0.24	0.32	0.47	0.51	0.87	1.05	1.03	1.31	1.38	2.8	2.38		
16A	-	-	-	-	-	-	-	-	0.22	0.30	0.43	0.47	0.77	0.92	0.9	1.13	1.19	2.34	2		
20A	-	-	-	-	-	-	-	-	-	0.29	0.42	0.46	0.73	0.87	0.85	1.07	1.12	2.16	1.86		
25A	-	-	-	-	-	-	-	-	-	-	0.41	0.45	0.71	0.84	0.82	1.02	1.07	2.03	1.76		
32A	-	-	-	-	-	-	-	-	-	-	-	0.43	0.69	0.81	0.8	0.99	1.04	1.68	2.06		
40A	-	-	-	-	-	-	-	-	-	-	-	-	0.67	0.79	0.77	0.96	1	1.86	1.61		
50A	-	-	-	-	-	-	-	-	-	-	-	-	-	0.76	-	0.92	0.97	1.76	1.53		
63A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.94	0.94	1.68	1.47		

Downstream

Max Values (kA)		Upstream																							
		NBN B Curve									NCN C Curve														
		In	6A	10A	16A	20A	25A	32A	40A	50A	63A	0,5A	1A	2A	3A	4A	6A	10A	16A	20A	25A	32A	40A	50A	63A
Downstream	ADA1**U B Curve, 10kA Type A	6A	-	0.05	0.08	0.09	0.11	0.16	0.20	0.25	0.31	-	-	-	-	-	-	0.09	0.14	0.19	0.26	0.29	0.37	0.48	0.61
		10A	-	-	0.07	0.09	0.11	0.15	0.19	0.24	0.30	-	-	-	-	-	-	-	0.14	0.18	0.26	0.29	0.36	0.46	0.58
		16A	-	-	-	0.09	0.10	0.15	0.19	0.23	0.29	-	-	-	-	-	-	-	-	-	0.25	0.28	0.35	0.45	0.56
		20A	-	-	-	-	-	0.15	0.18	0.23	0.29	-	-	-	-	-	-	-	-	-	-	0.27	0.34	0.44	0.55
		25A	-	-	-	-	-	0.14	0.18	0.23	0.28	-	-	-	-	-	-	-	-	-	-	0.27	0.34	0.43	0.53
		32A	-	-	-	-	-	-	-	0.22	0.27	-	-	-	-	-	-	-	-	-	-	-	-	-	0.51
		40A	-	-	-	-	-	-	-	-	0.27	-	-	-	-	-	-	-	-	-	-	-	-	-	0.50
		45A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	ADA1**U C Curve, 10kA, Type A	6A	-	-	0.08	0.09	0.11	0.15	0.19	0.24	0.30	-	-	-	-	-	-	0.09	0.14	0.18	0.26	0.29	0.37	0.47	0.60
		10A	-	-	-	0.09	0.10	0.15	0.19	0.24	0.29	-	-	-	-	-	-	-	0.14	0.18	0.25	0.28	0.36	0.45	0.57
		16A	-	-	-	-	-	0.15	0.19	0.23	0.29	-	-	-	-	-	-	-	-	-	0.25	0.28	0.35	0.45	0.56
		20A	-	-	-	-	-	-	0.18	0.23	0.29	-	-	-	-	-	-	-	-	-	-	0.27	0.34	0.44	0.54
		25A	-	-	-	-	-	-	-	0.22	0.28	-	-	-	-	-	-	-	-	-	-	-	0.33	0.42	0.52
		32A	-	-	-	-	-	-	-	-	0.27	-	-	-	-	-	-	-	-	-	-	-	-	-	0.50
40A		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.48	
45A		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Max Values (kA)		Upstream																			
		NDN D Curve										HMC / HMF C Curve					HMD D Curve				
		In	0,5A	1A	2A	3A	4A	6A	10A	16A	20A	25A	32A	40A	50A	63A	80A	100A	125A	80A	100A
Downstream	ADA1**U B Curve, 10kA Type A	6A	-	-	-	-	-	0.14	0.22	0.27	0.35	0.49	0.55	0.86	1.01	1.00	1.23	1.29	2.92	2.38	3.18
		10A	-	-	-	-	-	-	0.22	0.26	0.34	0.48	0.52	0.81	0.95	0.93	1.14	1.19	2.60	2.11	2.83
		16A	-	-	-	-	-	-	-	0.25	0.33	0.46	0.50	0.77	0.90	0.89	1.08	1.13	2.34	1.92	2.54
		20A	-	-	-	-	-	-	-	-	0.32	0.45	0.49	0.76	0.88	0.87	1.06	1.11	2.17	1.81	2.34
		25A	-	-	-	-	-	-	-	-	-	0.44	0.48	0.73	0.85	0.84	1.02	1.07	2.05	1.71	2.21
		32A	-	-	-	-	-	-	-	-	-	-	-	0.69	0.80	0.79	0.94	0.99	1.77	1.49	1.90
		40A	-	-	-	-	-	-	-	-	-	-	-	-	0.78	0.76	0.92	0.95	1.67	1.43	1.80
		45A	-	-	-	-	-	-	-	-	-	-	-	-	-	0.84	0.83	0.97	1.01	1.71	1.46
	ADA1**U C Curve, 10kA, Type A	6A	-	-	-	-	-	0.13	0.22	0.26	0.34	0.48	0.53	0.84	0.99	0.97	1.20	1.26	2.84	2.31	3.09
		10A	-	-	-	-	-	-	0.21	0.25	0.33	0.47	0.51	0.80	0.93	0.91	1.12	1.17	2.51	2.04	2.72
		16A	-	-	-	-	-	-	-	-	0.33	0.46	0.50	0.77	0.89	0.87	1.06	1.11	2.24	1.84	2.43
		20A	-	-	-	-	-	-	-	-	-	0.45	0.49	0.75	0.87	0.85	1.03	1.08	2.10	1.74	2.27
		25A	-	-	-	-	-	-	-	-	-	-	0.47	0.72	0.83	0.81	0.99	1.03	1.96	1.62	2.11
		32A	-	-	-	-	-	-	-	-	-	-	-	-	0.78	0.77	0.92	0.96	1.70	1.45	1.83
40A		-	-	-	-	-	-	-	-	-	-	-	-	-	0.75	0.73	0.88	0.92	1.62	1.40	1.74
45A		-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.82	0.80	0.95	0.98	1.63	1.42



Max Values (kA)		Upstream																				
		x160 18/25/40kA TM HDA											x250 25/40kATM					H250 50/70kA LSI				
Downstream	RCBO ADA1**U B Curve 10kA type A	I <sub>n</sub>	16A	20A	25A	32A	40A	50A	63A	80A	100A	125A	160A	100A	125A	160A	200A	250A	40A	125A	250A	
		6A	1.35	1.35	1.35	1.35	1.35	1.35	1.35	3.33	3.33	7.07	7.07	7.98	4.35	6.72	T	T	T	T	T	T
		10A	1.26	1.26	1.26	1.26	1.26	1.26	1.26	2.96	2.96	6.31	6.31	7.15	3.87	5.99	9.78	T	T	T	T	T
		16A	-	1.19	1.19	1.19	1.19	1.19	1.19	2.64	2.64	5.45	5.45	6.13	3.42	5.19	8.18	T	T	T	T	T
		20A		-	1.16	1.16	1.16	1.16	1.16	2.44	2.44	4.73	4.73	5.27	3.08	4.53	6.97	T	T	T	T	T
		25A			-	1.12	1.12	1.12	1.12	2.30	2.30	4.49	4.49	5.00	2.92	4.29	6.59	9.81	T	T	T	T
		32A				-	1.03	1.03	1.03	1.98	1.98	3.77	3.77	4.19	2.49	3.61	5.45	8.22	9.15	T	T	T
		40A					-	1.00	1.00	1.87	1.87	3.59	3.59	3.99	2.35	3.43	5.20	7.85	8.75	T	T	T
		45A						1.05	1.05	1.90	1.90	3.56	3.56	3.94	2.38	3.41	5.09	7.38	8.12	T	T	T
		RCBO ADA1** C curve 10kA type A	6A	1.33	1.33	1.33	1.33	1.33	1.33	3.23	3.23	6.91	6.91	7.85	4.22	6.55	T	T	T	T	T	T
10A	1.23		1.23	1.23	1.23	1.23	1.23	2.85	2.85	6.00	6.00	6.81	3.71	5.71	9.35	T	T	T	T	T		
16A	-		1.17	1.17	1.17	1.17	1.17	1.17	2.54	2.54	5.22	5.22	5.87	3.28	4.97	7.92	T	T	T	T	T	
20A				1.13	1.13	1.13	1.13	1.13	2.36	2.36	4.69	4.69	5.25	3.01	4.48	7.03	T	T	T	T	T	
25A				-	1.08	1.08	1.08	1.08	2.20	2.20	4.38	4.38	4.90	2.81	4.18	6.50	9.84	T	T	T	T	
32A						1.01	1.01	1.01	1.90	1.90	3.65	3.65	4.06	2.40	3.50	5.30	7.96	8.85	T	T	T	
40A							0.97	0.97	1.80	1.80	3.42	3.42	3.79	2.26	3.27	4.92	7.25	8.03	T	T	T	
45A						1.02	1.02	1.81	1.81	3.40	3.40	3.76	2.27	3.26	4.86	7.13	7.92	T	T	T		

Max Values (kA)	Upstream																		Downstream																	
	x160 18 / 25 / 40kA TM									x250 25 / 40kA TM									H250 25 / 50 / 65kA TM									H250 50 / 70kA LSI								
	16A	20A	25A	32A	40A	50A	63A	80A	100A	125A	160A	100A	125A	160A	200A	250A	20	32	50	63	100	125	160	200	250	40A	125A	250A								
<b>NBN</b> B curve	6A	1.20	1.63	2.22	3.13	4.26	5.81	7.92	T	T	T	T	T	T	T	T	1.63	2.22	3.13	4.26	5.81	7.92	T	T	T	T	T									
	10A	1.11	1.52	2.07	2.91	3.97	5.41	7.35	T	T	T	T	T	T	T	T	1.52	2.07	2.91	3.97	5.41	7.35	T	T	T	T	T									
	16A	-	1.34	1.83	2.59	3.54	4.83	6.61	8.97	T	T	9.94	T	T	T	T	1.34	1.83	2.59	3.54	4.83	6.61	T	T	T	T	T									
	20A	-	-	1.70	2.40	3.27	4.46	6.13	8.38	T	T	9.30	T	T	T	T	-	1.70	2.40	3.27	4.46	6.13	T	T	T	T	T									
	25A	-	-	-	2.24	3.04	4.13	5.68	7.73	T	T	8.56	T	T	T	T	-	-	2.24	3.04	4.13	5.68	T	T	T	T	T									
	32A	-	-	-	-	2.74	3.73	5.14	7.03	9.30	9.30	7.77	T	T	T	T	-	-	-	2.74	3.73	5.14	T	T	T	T	T									
<b>NCN</b> C curve	40A	-	-	-	-	3.33	4.57	6.32	8.36	9.06	6.99	9.24	T	T	T	T	-	-	-	-	3.33	4.57	T	T	T	T	T									
	50A	-	-	-	-	-	4.01	5.57	7.42	8.04	6.20	8.19	T	T	T	T	-	-	-	-	-	4.01	T	T	T	T	T									
	63A	-	-	-	-	-	-	4.78	6.45	6.99	5.34	7.13	9.68	T	T	T	-	-	-	-	-	-	T	T	T	T	T									
	0.5A	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T									
	1A	2.05	6.26	T	T	T	T	T	T	T	T	T	T	T	T	T	6.26	T	T	T	T	T	T	T	T	T	T	T								
	2A	0.56	2.46	8.16	T	T	T	T	T	T	T	T	T	T	T	T	2.46	T	T	T	T	T	T	T	T	T	T	T								
<b>NDN</b> D curve	3A	-	-	1.28	3.81	8.22	T	T	T	T	T	T	T	T	T	T	-	3.81	T	T	T	T	T	T	T	T	T									
	4A	-	-	0.79	2.88	7.43	T	T	T	T	T	T	T	T	T	T	-	2.88	T	T	T	T	T	T	T	T	T									
	6A	-	-	-	0.81	1.78	3.89	7.47	T	T	T	T	T	T	T	T	-	0.81	3.89	7.47	T	T	T	T	T	T	T									
	10A	-	-	-	0.67	1.34	2.69	5.53	9.18	T	T	T	T	T	T	T	-	0.67	2.69	5.53	T	T	T	T	T	T	T									
	16A	-	-	-	0.58	0.97	1.63	2.79	4.87	7.76	7.76	5.86	9.06	T	T	T	-	0.58	1.63	2.79	5.86	9.06	T	T	T	T	T									
	20A	-	-	-	0.56	0.91	1.50	2.50	4.25	6.80	6.80	5.08	7.87	T	T	T	-	0.56	1.50	2.50	5.08	7.87	T	T	T	T	T									
<b>HMC / HMF</b> C curve	25A	-	-	-	0.54	0.88	1.44	2.39	4.05	6.48	7.25	4.83	7.45	T	T	T	-	0.54	1.44	2.39	4.83	7.45	T	T	T	T	T									
	32A	-	-	-	-	0.84	1.37	2.26	3.80	6.12	6.12	4.52	6.96	T	T	T	-	-	1.37	2.26	4.52	6.96	T	T	T	T	T									
	40A	-	-	-	-	-	1.31	2.13	3.50	5.56	5.56	4.13	6.46	9.78	T	T	-	-	1.31	2.13	4.13	6.46	9.78	T	T	T	T									
	50A	-	-	-	-	-	-	1.99	3.23	5.07	5.07	3.80	5.96	8.66	T	T	-	-	-	1.99	3.80	5.96	8.66	T	T	T	T	T								
	63A	-	-	-	-	-	-	-	3.11	4.85	4.85	3.65	5.68	8.29	T	T	-	-	-	-	3.65	5.68	8.29	T	T	T	T	T								
	0.5A	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T								
<b>HMD</b> D curve	1A	-	2.94	T	T	T	T	T	T	T	T	T	T	T	T	2.94	T	T	T	T	T	T	T	T	T	T	T									
	2A	-	1.41	9.75	T	T	T	T	T	T	T	T	T	T	T	1.41	T	T	T	T	T	T	T	T	T	T	T									
	3A	-	-	0.84	3.54	8.47	T	T	T	T	T	T	T	T	T	T	-	3.54	T	T	T	T	T	T	T	T	T									
	4A	-	-	0.66	2.58	7.29	T	T	T	T	T	T	T	T	T	T	-	2.58	T	T	T	T	T	T	T	T	T									
	6A	-	-	-	0.70	1.61	3.69	7.40	T	T	T	T	T	T	T	T	-	0.70	3.69	7.40	T	T	T	T	T	T	T	T								
	10A	-	-	-	0.63	1.25	2.47	5.00	8.48	T	T	9.90	T	T	T	T	-	0.63	2.47	5.00	9.90	T	T	T	T	T	T	T								
<b>HMC / HMF</b> C curve	16A	-	-	-	0.56	0.95	1.62	2.81	4.96	7.83	8.83	6.00	9.09	T	T	-	0.56	1.62	2.81	6.00	9.09	T	T	T	T	T										
	20A	-	-	-	0.54	0.89	1.47	2.47	4.24	6.74	7.52	5.07	7.72	T	T	-	0.54	1.47	2.47	5.07	7.72	T	T	T	T	T										
	25A	-	-	-	0.52	0.85	1.39	2.32	3.93	6.32	6.32	4.68	7.24	T	T	-	0.52	1.39	2.32	4.68	7.24	T	T	T	T	T										
	32A	-	-	-	-	0.83	1.34	2.18	3.62	5.82	5.82	4.30	6.68	T	T	-	-	1.34	2.18	4.30	6.68	T	T	T	T	T										
	40A	-	-	-	-	-	1.26	2.04	3.33	5.28	5.28	3.93	6.18	9.25	T	T	-	-	1.26	2.04	3.93	6.18	9.25	T	T	T	T									
	50A	-	-	-	-	-	-	1.94	3.11	4.85	4.85	3.65	5.68	8.29	T	T	-	-	-	1.94	3.65	5.68	8.29	T	T	T	T	T								
<b>HMC / HMF</b> C curve	63A	-	-	-	-	-	-	2.93	4.49	4.49	5.08	3.41	5.24	7.77	9.58	T	-	-	-	3.41	5.24	7.77	9.58	T	-	-	-									
	80A	-	-	-	-	-	-	-	3.29	3.29	3.65	2.61	3.74	5.58	7.03	7.51	-	-	-	2.61	3.74	5.58	7.03	7.51	-	-	-									
	100A	-	-	-	-	-	-	-	-	3.29	3.65	-	3.74	5.58	7.03	7.51	-	-	-	-	-	-	3.74	5.58	7.03	7.51	-	-								
	125A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
	80A	-	-	-	-	-	-	-	-	3.25	3.25	3.52	2.71	3.59	4.90	5.86	6.27	-	-	-	2.71	3.59	4.90	5.86	6.27	-	-	-								
	100A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
125A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-									



Max Values (kA)	IEC60898-1	I <sub>cn</sub>	I <sub>n</sub> max	Upstream																	
				x160 18/25/40kA TM													x250 25/40kA TM				
				16A	20A	25A	32A	40A	50A	63A	80A	100A	125A	160A	100A	125A	160A	200A	250A		
Downstream AFDD ARCxxx 1Ph+N B	ARC906D	6kA	6A	1.89	1.89	1.89	1.89	1.89	1.89	T	T	T	T	T	T	T	T	T	T		
	ARC910D		10A	1.42	1.42	1.42	1.42	1.42	1.42	3.90	3.90	T	T	T	5.25	T	T	T	T		
	ARC916D		16A	-	1.33	1.33	1.33	1.33	1.33	3.34	3.34	T	T	T	4.44	T	T	T	T		
	ARC920D		20A	n/a	-	1.23	1.23	1.23	1.23	2.76	2.76	T	T	T	3.61	5.58	T	T	T		
	ARC925D		25A	n/a	n/a	-	1.20	1.20	1.20	2.47	2.47	4.80	4.80	5.35	3.13	4.59	T	T	T		
AFDD ARCxxx 1Ph+N C	ARC956D	6kA	6A	1.85	1.85	1.85	1.85	1.85	1.85	5.29	5.29	T	T	T	T	T	T	T	T		
	ARC960D		10A	1.40	1.40	1.40	1.40	1.40	1.40	3.81	3.81	T	T	T	5.15	T	T	T	T		
	ARC966D		16A	-	1.32	1.32	1.32	1.32	1.32	3.27	3.27	T	T	T	4.35	T	T	T	T		
	ARC970D		20A	n/a	-	1.21	1.21	1.21	1.21	2.68	2.68	T	T	T	3.49	5.36	T	T	T		
	ARC975D		25A	n/a	n/a	-	1.16	1.16	1.16	2.49	2.49	5.24	5.24	T	3.24	4.98	T	T	T		
AFDD ARCxxx 1Ph+N B	ARC506D	10kA	6A	1.84	1.84	1.84	1.84	1.84	1.84	5.28	5.28	T	T	T	7.12	T	T	T	T		
	ARC510D		10A	1.42	1.42	1.42	1.42	1.42	1.42	3.53	3.53	7.50	7.50	8.48	4.61	7.12	T	T	T		
	ARC516D		16A	-	1.33	1.33	1.33	1.33	1.33	3.08	3.08	6.35	6.35	7.14	3.99	6.05	T	T	T		
	ARC520D		20A	n/a	-	1.23	1.23	1.23	1.23	2.62	2.62	5.21	5.21	5.83	3.35	4.98	7.72	T	T		
	ARC525D		25A	n/a	n/a	-	1.20	1.20	1.20	2.38	2.38	4.42	4.42	4.88	2.97	4.24	6.28	8.97	T		
AFDD ARCxxx 1Ph+N C	ARC556D	10kA	6A	1.81	1.81	1.81	1.81	1.81	1.81	4.69	4.69	T	T	T	6.14	9.52	T	T	T		
	ARC560D		10A	1.40	1.40	1.40	1.40	1.40	1.40	3.46	3.46	7.40	7.40	8.37	4.53	7.03	T	T	T		
	ARC566D		16A	-	1.32	1.32	1.32	1.32	1.32	3.03	3.03	6.24	6.24	7.02	3.91	5.94	9.43	T	T		
	ARC570D		20A	n/a	-	1.21	1.21	1.21	1.21	2.53	2.53	4.94	4.94	5.51	3.21	4.72	7.25	T	T		
	ARC575D		25A	n/a	n/a	-	1.16	1.16	1.16	2.39	2.39	4.72	4.72	5.28	3.04	4.51	6.97	T	T		









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