Switchgear

PowerSafe

Commercial and Industrial Catalogue

SP&N Distribution Boards
TP&N Distribution Boards
MCCB Panelboards
Switch Disconnector Fuse
Modular Devices and Enclosures

Trusted Switchgear Technology

HAVELLS

We're Social

At Havells, we aim to provide the very best customer experience through our social media platforms. From the latest industry news, to helpful installation videos, make sure you check out Havells on YouTube and Twitter, and take advantage of the tools and information available.

www.twitter.com
/HavellsUK

#HavellsSG

www.youtube.com
/HavellsUK

Trusted **Switchgear** Technology

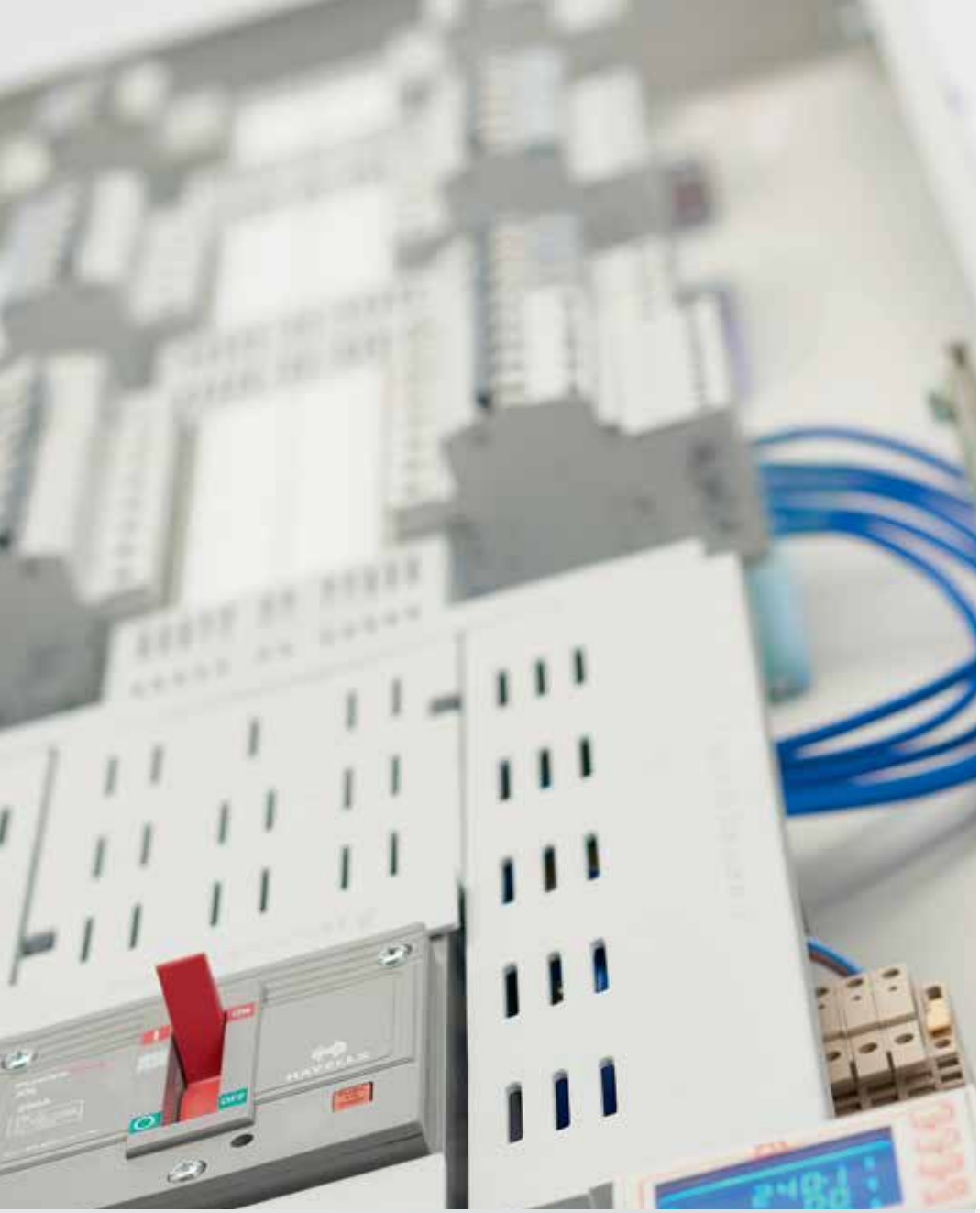
Havells is a global manufacturer of electrical and power distribution equipment. With state of the art factories, Havells have a capacity to produce more than 60 million poles of MCB/ RCD type products per year. The UK team lead customer innovation and design projects to ensure our customers benefit from UK market optimised solutions that meet local standards and regulatory requirements

Safety and Compliance

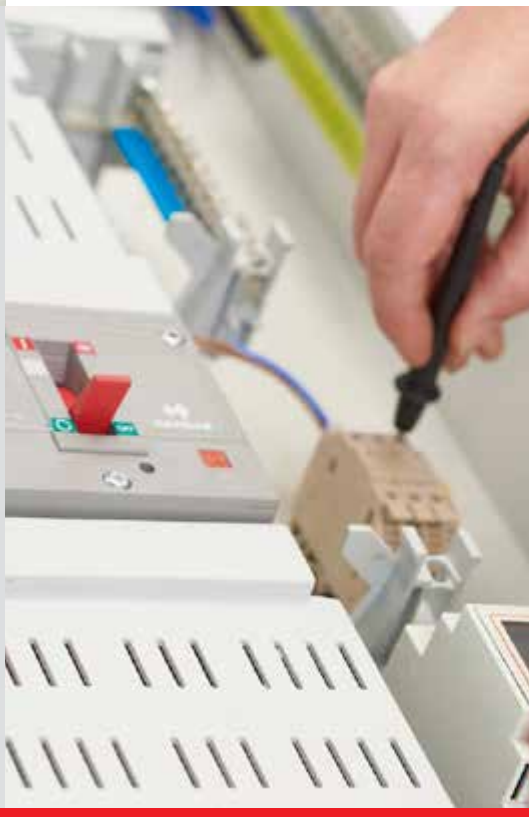
Safety and compliance is at the core of the Havells philosophy, which is reflected in the 21 state of the art manufacturing plants globally, producing acclaimed products synonymous with excellence and safety. The MCB / RCCB / RCBO plant in Baddi, India, is now the sixth largest MCB plant in the world. Many of the products from this plant carry the KEMA –KEUR quality mark. The mark is only achieved through continuous independent testing of products and processes, based on strict international standards.

A shared input to innovation and excellence

Customer input creates opportunities for innovation, which is reflected in Havells product solutions. Our core competence is circuit protection and control through circuit breaker and RCD technologies. However, there are other important technologies which directly impact electrical distribution in modern commercial buildings. In the UK, these technologies are applied to electrical distribution in specific ways, to address local norms and regulatory requirements. By partnering with 'best in Class' technology partners, Havells offer some uniquely innovative solutions in these areas. Metering and Voltage surge protection solutions are examples of UK specific requirements, where Havells have created practical and understandable solutions to the requirements of modern commercial buildings. A guide to surge protection and metering as applied in the UK are provided in this literature.



Contents



A continual **strive for** excellence

Practical solutions for tomorrow's buildings

Our UK team works with over 200 engineers at Havells QRG Centre for research and Innovation, developing new switchgear products which compliment the evolving regulations and standards in the UK, providing compliant solutions with a hassle free approach for the installer. We are committed to understanding the needs of our customers and continue to bring new ideas and solutions for electrical distribution. Product innovation is at the heart of Havells Switchgear and getting close to the issues facing the installer today, enables our team to find solutions for tomorrow.

Custom Engineering

With many years of manufacturing and engineering experience in the Electrical Industry, the Newhaven plant based in East Sussex provides local solutions tailored to meet a range of project requirements.
Key facilities include a fully automated paint plant, steel and copper fabrication and dedicated switchgear assembly lines offering customised solutions from pre-population of final circuit protection devices to sub distribution boards with integral metering and voltage surge protection.

Dedicated Switchgear Sales Team

Our Switchgear sales team know switchgear and have electrically qualified team members providing high quality local support to customers. With much of the product design led from the UK, the sales team and customers benefit from a wider support network within the Havells UK organisation. We value customer input and strive to be your trusted choice for Switchgear solutions.

New for 2016

LoadSafe - Enclosed Switch Disconnector Fuse 160A - 400A SDF Range

The existing enclosed switch disconnector fuse portfolio has been further extended up to 400A. With two new frame sizes covering ratings from 160A to 400A in TPN and TPsN Pole configurations the range is ideal for industrial applications requiring AC23A utilisation category. Other additions include separate fuse and isolator versions which can now be ordered specifically to suit requirements as necessary.

- Conforms to BS EN 60947-3
- 80kA Withstand Rating
- Front Operated Door Interlocked with defeat mechanism
- Handle can be padlocked in ON and OFF position
- AC23A Utilisation Category
- Full range of matching cable spreader boxes

Enclosed Earth Leakage Monitoring Solutions

To meet the demanding requirements of modern buildings the PowerSafe portfolio now includes a range of earth leakage monitoring relays and core balance current transformers.

Designed for applications where there is a TT earthing system or a high earth loop impedance on the main electrical supply the new earth leakage monitoring offers excellent protection against residual currents and earth faults.

Supplied as complete kits for use with MCB and MCCB distribution boards the range provides user selectable parameters of sensitivity (A) and time delay (sec) to specifically meet project requirements. The earth leakage monitoring devices also feature a digital display which provides real time instantaneous “leakage” values and has an auxiliary contact to connect to a BMS system for remote monitoring.

New for 2016

Compact RCBOs

Since the introduction of the 17th IET Wiring Regulations in 2008, there has been a dramatic increase in the use of single module RCBOs in final distribution boards in the UK, to provide residual current protection. This has had a major impact on the amount of additional cabling space required and presents numerous challenges for electrical installations. The Havells Compact RCBO features a new shorter footprint, and does not require a separate earth reference wire, improving cable routing in a distribution board and speeding installation.

Quality Features:

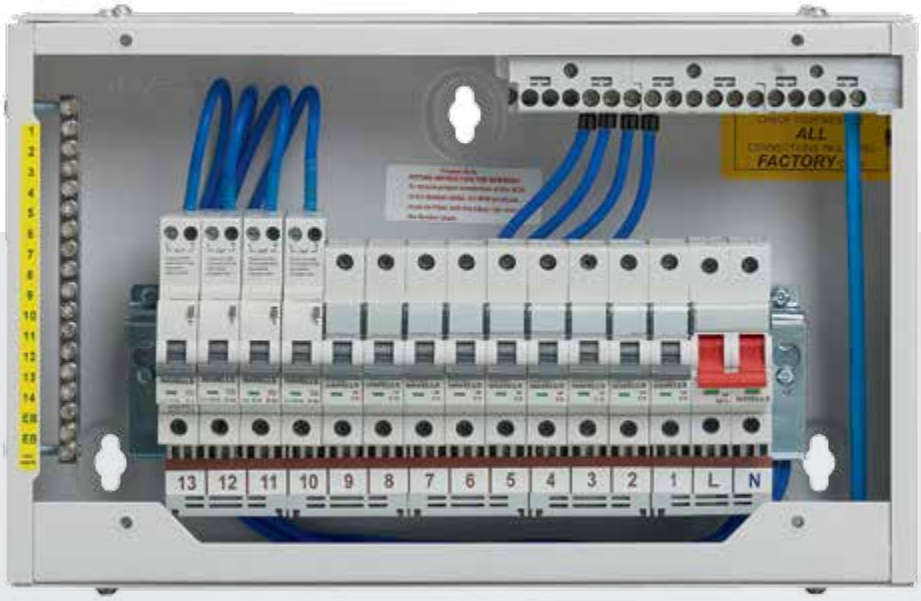
- Compact 1 Module Design - length only 100mm / 25mm shorter than a standard RCBO
- Electronic VD design
- No Functional Earth (FE) Cable Required
- 10kA Breaking Capacity
- Contact status indication

MID Approved Metered Distribution Board

Havells brings you the MID Approved Metered Distribution Board. The ready-to-go meter, often specified in distribution boards to meet the requirements of part L2 of the building regulations, also future proofs the installation for potential tenant billing of electricity, where an approved meter is a legal requirement.

Features

- Integrated Energy Monitoring pre-installed in Type B TPN distribution board
  – Speeds installation and eliminates meter installation errors on site
- MID approved meter (Annex B & D) - multifunction
  – A legal requirement for tenant billing in commercial buildings
- Pulsed output (kWh) and RS485 communication as standard
  – Provides wide compatibility with many EMS / BMS communication requirements


ALL
FACTORY
13 12 11 10 9 8 7 6 5 4 3 2 1 L N

PSA13


PSH106C
HAVELLS
1P
C 6
PSH132C
HAVELLS
1P
C 32

Type ‘A’ SPN Distribution Boards

Quality features

- Door opening to 180° for easy access
- Robust 2mm gland plates are removable to aid installation
- Main busbar is removable to aid installation when required
- Fully shrouded Neutral for increased safety
- Rigid construction, even with gland plates removed to reduce distortion during installation
- Full form MCB blanking modules for unused ways for increased electrical safety
- Door barrel lock accessory for increased security

General characteristics

Developed to meet the evolving Electrical Distribution requirements in modern Commercial and Industrial buildings, the new Havells type ‘A’ board delivers a high performance, easy to install solution. Performance tested with a conditional short circuit rating of 15kA to BS EN 60439, the range is complimented by a range of accessories including Surge protection solutions and metering options.

Type ‘A’ General Characteristics

IP Rating	IP3X
Paint Specification	RAL 7035 epoxy powder coating
Conditional Short Circuit Rating	15kA to BS EN 61439-3

Cable Capacities

100A Switch Disconnector	35mm^2
100A RCCB	35mm^2
Enclosure Earth Stud	M6
Incoming earth terminal	25mm^2
Incoming neutral terminal	50mm^2
Outgoing earth terminal	25mm^2
Outgoing neutral terminal	25mm^2

Type ‘A’ Distribution Boards

PSA13

100A Type ‘A’ SPN Distribution Boards

For applications requiring more than 16 SP ways, see our TPN board range, complete with single phasing kit options

Description	Rating	No. Ways	Part No.
4 way SPN Type ‘A’ distribution board	100A	4	PSA4
7 way SPN Type ‘A’ distribution board	100A	7	PSA7
10 way SPN Type ‘A’ distribution board	100A	10	PSA10
13 way SPN Type ‘A’ distribution board	100A	13	PSA13
16 way SPN Type ‘A’ distribution board	100A	16	PSA16

PSAS1001N

Incoming devices for Type ‘A’ SPN Distribution Boards

Incoming devices supplied separate to distribution board

Description	Rating	Poles	Sensitivity	Part No.
Switch disconnector	100A	2	-	PSAS1001N
RCCB Incoming device for SPN Type ‘A’	100A	1P+N	30mA	PSAS100HE
RCCB Incoming device for SPN Type ‘A’	100A	1P+N	100mA	PSAS100ME

PSAM100MID

MID Metered enclosure for Type ‘A’ SPN Distribution Boards

Type ‘A’ distribution board metered enclosure, fitted with multifunction MID Approved meter with pulse (kWh) and Modbus output as standard. Complete with switch disconnector and cable connection kit. Fits on right hand side of distribution board.

Description	Part No.
MID Metered enclosure for SPN Type ‘A’ distribution boards	PSAM100MID

PSA240M1E connected to PSA13

Surge protection device for SPN, Type ‘A’ distribution board

Surge protection requires SP 32A MCB to be order separately.

Description	Part No.
Enclosed surge protection kit - Type I & II	PSA240M1E

PSH132C

Outgoing devices - MCBs - 10kA, Single Pole

Types B, C and D, 10kA to IEC 60898

Description Current	Current (A)	Type B	Type C	Type D
Miniature Circuit Breaker 10kA	1A	-	PSH101C	-
Miniature Circuit Breaker 10kA	2A	-	PSH102C	-
Miniature Circuit Breaker 10kA	4A	-	PSH104C	-
Miniature Circuit Breaker 10kA	6A	PSH106B	PSH106C	PSH106D
Miniature Circuit Breaker 10kA	10A	PSH110B	PSH110C	PSH110D
Miniature Circuit Breaker 10kA	16A	PSH116B	PSH116C	PSH116D
Miniature Circuit Breaker 10kA	20A	PSH120B	PSH120C	PSH120D
Miniature Circuit Breaker 10kA	25A	PSH125B	PSH125C	PSH125D
Miniature Circuit Breaker 10kA	32A	PSH132B	PSH132C	PSH132D
Miniature Circuit Breaker 10kA	40A	PSH140B	PSH140C	-
Miniature Circuit Breaker 10kA	50A	PSH150B	PSH150C	-
Miniature Circuit Breaker 10kA	63A	PSH163B	PSH163C	-

For Type D MCBs above 32A please contact sales office for further details

PSCP132CR30

Outgoing devices - RCBOs Single Pole 30mA

Types B and C to IEC/ EN 61009

Description	Current (A)	Type B	Type C
Compact RCBO 10kA - A type	6	PSCP106BR30	PSCP106CR30
Compact RCBO 10kA - A type	10	PSCP110BR30	PSCP110CR30
Compact RCBO 10kA - A type	16	PSCP116BR30	PSCP116CR30
Compact RCBO 10kA - A type	20	PSCP120BR30	PSCP120CR30
Compact RCBO 10kA - A type	32	PSCP132BR30	PSCP132CR30
Standard Size RCBO 10kA - A type	40	PSH140BR30	PSH140CR30
Standard Size RCBO 10kA - A type	50	PSH150BR30	PSH150CR30

PSBM PSUDLA*

100A SPN Distribution Board general accessories

Description	Part No.
MCB Blanking module 18mm	PSBM
Universal device lockout attachment - fits MCBs, RCCB & RCBOs	PSUDLA
Door barrel lock with 2 keys	PSDBL

*MCB not included.

PSB61

PSB121MID

125A Type B TPN Distribution Boards

Quality features

- Removable door with easy align hinge design, to aid installation
- Cable trunking gasket included with every board to speed installation
- Multifunction, MID approved metered options as standard
- Metered boards are fully integrated, wired and ready to install
- SPSN, TPN, & TPSN incomer options
- Rigid construction, even with gland plates removed to reduce distortion during installation
- Full form MCB blanking modules for unused ways for increased electrical safety
- Door barrel lock accessory for increased security

General characteristics

Developed to meet the evolving Electrical Distribution requirements in modern Commercial and Industrial buildings, the new Havells type 'B' board delivers a high performance, easy to install solution. Performance tested with a conditional short circuit rating of 25kA to BS EN 61439-3, the range is complimented by a range of accessories including Surge protection solutions and metering options.

Type 'B' General Characteristics

IP Rating	IP3X
Paint Specification	RAL 7035 epoxy powder coating
Conditional Short Circuit Rating	25kA to BS EN 61439-3

Cable Capacities	**125A**
Switch Disconnector	50mm^2
100A RCCB	50mm^2
Enclosure Earth Stud	M8
Incoming earth terminal	50mm^2
Incoming neutral terminal	50mm^2
Outgoing earth terminal	25mm^2
Outgoing neutral ternal	25mm^2

125A Type ‘B’ Distribution Boards

PSB61

125A Type ‘B’ TPN Distribution Boards

BS EN61439-3 with 25kA Conditional Short Circuit Rating.

Description	Rating	No. Ways	Part No.
4 way TPN Type ‘B’ distribution board	125A	4	PSB41
6 way TPN Type ‘B’ distribution board	125A	6	PSB61
8 way TPN Type ‘B’ distribution board	125A	8	PSB81
12 way TPN Type ‘B’ distribution board	125A	12	PSB121
18 way TPN Type ‘B’ distribution board	125A	18	PSB181

PSB121MID

MID Approved Metered 125A Type ‘B’ TPN Distribution Boards

Complete with Mulitfunction MID approved meter with pulse (kWh) and Modbus output as standard.

Description	Rating	No. Ways	Part no.
6 way TPN B distribution board c/w MID multifunction meter	125A	6	PSB61MID
12 way TPN B distribution board c/w MID multifunction meter	125A	12	PSB121MID
18 way TPN B distribution board c/w MID multifunction meter	125A	18	PSB181MID

PSBS1253

Incoming devices for 125A Type ‘B’ TPN distribution boards

Incoming devices are supplied separate to distribution board

Description	Rating	Poles	Sensitivity	Part No.
Switch disconnector TPN	125A	3	-	PSBS1253
Switch disconnector SPSN with Single Phase Kit	125A	1P+N	-	PSBS1251NK
Switch disconnector TPSN	125A	3P+N	-	PSBS1253NK
RCCB Incoming device for TPN Type ‘B’	100A	4	30mA	PSBS1004HEK
RCCB Incoming device for TPN Type ‘B’	100A	4	100mA	PSBS1004MEK
RCCB Incoming Device for TPN Type ‘B’	100A	4	300mA	PSBS1004LEK
Time Delay RCCB for TPN Type ‘B’	100A	4	100mA	PSBS1004SEK
250A Splitter Module (2x125A 3 Pole MCCBs)	250A	3	-	PSB250SM

PSB250SM

PSBMP125MID

MID Metered enclosure for Type ‘B’ TPN distribution boards

Complete with MID multifunction meter with pulsed output (kWh) and modbus output as standard

Description	Part No.
MID certified metered enclosure for Type ‘B’ TPN distribution boards	PSBMP125MID

Surge protection device for Type ‘B’ TPN distribution board

PSB415M1E*

For further information on surge protection please refer to pages 52-55. Requires TP 63A Type C MCB (please order separately).

Description	Part No.
Enclosed surge protection kit - Type I & II*	PSB415M1E

*Install on left of distribution board.

Modular enclosures for Type ‘B’ distribution boards

PSME15D

Modular enclosures will accept modular devices including rail mounted meters and contactors.

Description	Part No.
Modular enclosure, 12 module din rail plain door	PSME12P
Modular enclosure, 12 module din rail glazed door	PSME12G
Modular enclosure, 15 module din rail hinged door	PSME15D
Modular enclosure, 30 module din rail hinged door	PSME30D

Cable extension boxes for Type ‘B’ distribution boards

PSBEX180

Description	Part No.
Cable extension box for Type ‘B’ distribution board 180mm	PSBEX180
Cable extension box for Type ‘B’ distribution board 250mm	PSBEX250

Outgoing devices - MCBs 10kA, Single Pole

PSH106C

Types B, C and D, 10kA to IEC 60898

Description	Current (A)	Type B	Type C	Type D
Miniature Circuit Breaker 10kA	1A	-	PSH101C	-
Miniature Circuit Breaker 10kA	2A	-	PSH102C	-
Miniature Circuit Breaker 10kA	4A	-	PSH104C	-
Miniature Circuit Breaker 10kA	6A	PSH106B	PSH106C	PSH106D
Miniature Circuit Breaker 10kA	10A	PSH110B	PSH110C	PSH110D
Miniature Circuit Breaker 10kA	16A	PSH116B	PSH116C	PSH116D
Miniature Circuit Breaker 10kA	20A	PSH120B	PSH120C	PSH120D
Miniature Circuit Breaker 10kA	25A	PSH125B	PSH125C	PSH125D
Miniature Circuit Breaker 10kA	32A	PSH132B	PSH132C	PSH132D
Miniature Circuit Breaker 10kA	40A	PSH140B	PSH140C	-
Miniature Circuit Breaker 10kA	50A	PSH150B	PSH150C	-
Miniature Circuit Breaker 10kA	63A	PSH163B	PSH163C	-

For Type D MCBs above 32A please contact sales office for further details

PSH332C

Outgoing devices - MCBs 10kA, Triple Pole

Types B, C and D, 10kA to IEC 60898

Description	Current (A)	Type B	Type C	Type D
Miniature Circuit Breaker 10kA	2A	-	PSH302C	-
Miniature Circuit Breaker 10kA	4A	-	PSH304C	-
Miniature Circuit Breaker 10kA	6A	PSH306B	PSH306C	PSH306D
Miniature Circuit Breaker 10kA	10A	PSH310B	PSH310C	PSH310D
Miniature Circuit Breaker 10kA	16A	PSH316B	PSH316C	PSH316D
Miniature Circuit Breaker 10kA	20A	PSH320B	PSH320C	PSH320D
Miniature Circuit Breaker 10kA	25A	PSH325B	PSH325C	PSH325D
Miniature Circuit Breaker 10kA	32A	PSH332B	PSH332C	PSH332D
Miniature Circuit Breaker 10kA	40A	PSH340B	PSH340C	-
Miniature Circuit Breaker 10kA	50A	PSH350B	PSH350C	-
Miniature Circuit Breaker 10kA	63A	PSH363B	PSH363C	-

For Type D MCBs above 32A please contact sales office for further details

PSCP132CR30

Outgoing devices - RCBOs 10kA Single Pole 30mA

Types B and C to IEC/ EN 61009

Description	Current (A)	Type B	Type C
Compact RCBO 10kA - A type	6	PSCP106BR30	PSCP106CR30
Compact RCBO 10kA - A type	10	PSCP110BR30	PSCP110CR30
Compact RCBO 10kA - A type	16	PSCP116BR30	PSCP116CR30
Compact RCBO 10kA - A type	20	PSCP120BR30	PSCP120CR30
Compact RCBO 10kA - A type	32	PSCP132BR30	PSCP132CR30
Standard Size RCBO 10kA - A type	40	PSH140BR30	PSH140CR30
Standard Size RCBO 10kA - A type	50	PSH150BR30	PSH150CR30

PSBM

PSUDLA*

General accessories

Description	Part No.
MCB Blanking module 18mm	PSBM
Universal device lockout attachment - fits MCBs, RCCB & RCBOs	PSUDLA
Door barrel lock with 2 keys	PSDBL
Top/bottom spare gland plate	PSGP
High integrity/clean earth kit	PSCE8
Additional earth bar	PSAEB15
Spare way label 12 way - pack of 5	PSLB12
Spare way label 18 way - pack of 5	PSLB18
Spare Interface Kit for Type ‘B’ distribution boards*	PSBIFK

PSBIFK

*MCB not included.

Watch our YouTube installation videos

simply scan the QR code below

or visit
youtube.com/havellsuk

PSB62

PSB227

250A Type B TPN Distribution boards

Quality features

- Bolted earth, neutral and phase connections suitable for larger cables
- Removable door with easy align hinge design, to aid installation
- Cable trunking gasket included with every board to speed installation
- Integral metering options available
- TPN, & TPSN incomer options
- Rigid construction, even with gland plates removed to reduce distortion during installation
- Full form MCB blanking modules for unused ways for increased electrical safety
- Door barrel lock accessory for increased security

General characteristics

Specifically designed to address applications requiring electrical supplies larger than 125A the 250A Type B distribution board range also features an optional add-on high current MCB extension box designed for outgoing circuits above 63A. This unique combined solution offers a cost effective alternative to an MCCB panelboard where only one or two outgoing circuits are required. The range is complimented by a range of accessories including Surge protection, MID metering and NEW earth leakage monitoring solutions for compliance with local UK regulations.

B Type General Characteristics

IP Rating	IP3X
Paint Specification	RAL 7035 epoxy powder coating
Conditional Short Circuit Rating	25kA to BS EN 61439-3

Cable Capacities	**250A**
Switch Disconnector	120mm^2 (M8)
Enclosure Earth Stud	M8
Incoming earth terminal	50mm^2
Incoming neutral terminal	50mm^2
Outgoing earth terminal	25mm^2
Outgoing neutral ternal	25mm^2

250A Type ‘B’ Distribution boards

250A Type ‘B’ TPN Distribution Boards

PSB122

3P and 4P incoming options available. A choice of 3P Incoming options are selectable from the table below (order separately). 4P versions are supplied with a 250A Cbi incomer, pre-installed.

Description	Rating	No. Ways	3P Part No.	4P Part No.
6 way TPN Type ‘B’ distribution board	250	6	PSB62	PSB4P62
12 way TPN Type ‘B’ distribution board	250	12	PSB122	PSB4P122
18 way TPN Type ‘B’ distribution board	250	18	PSB182	PSB4P182
24 way TPN Type ‘B’ distribution board	250	24	PSB242	PSB4P242

3P Incoming Devices For 250A Type ‘B’ TPN Distribution Boards

PSAAN3160MC

Description	Rating	Poles	kA Rating	Part No.
3 Pole 125A Circuit Breaker switch	125A	3	25kA	PSAAN3125CB
3 Pole 200A Circuit Breaker switch	200A	3	25kA	PSAAN3200CB
3 Pole 250A Circuit Breaker switch	250A	3	25kA	PSAAN3250CB
3 Pole 160A MCCB	160A	3	25kA	PSAAN3160MC
3 Pole 200A MCCB	200A	3	25kA	PSAAN3200MC
3 Pole 250A MCCB	250A	3	25kA	PSAAN3250MC

High Current MCB Extension Box & Accessories

PSB227

Extension busbar section to fit high current (27mm) MCBs upto 125A.

Description	Rating	No. Ways	Part No.
High current MCB extension box	-	2 x TP, 6 x SP	PSB227

High Current MCBs (10kA -27mm)

PSHL1125C

EN 60947-2. These larger frame size MCBs are designed to fit ONLY in high current extension box and not directly into a standard distribution board.

Description	Current (A)	Single Pole		Triple Pole	
		Type C	Type D	Type C	Type D
Miniature Circuit Breaker	40A	-	PSHL140D	-	PSHL340D
Miniature Circuit Breaker	50A	-	PSHL150D	-	PSHL350D
Miniature Circuit Breaker	63A	-	PSHL163D	-	PSHL363D
Miniature Circuit Breaker	80A	PSHL180C	PSHL180D	PSHL380C	PSHL380D
Miniature Circuit Breaker	100A	PSHL1100C	PSHL1100D	PSHL3100C	PSHL3100D
Miniature Circuit Breaker	125A	PSHL1125C	PSHL1125D	PSHL3125C	PSHL3125D

PSB415M1E*

Surge protection device for Type ‘B’ TPN distribution board

For further information on surge protection please refer to pages 52-55. Requires TP 63A Type C MCB (please order separately).

Description	Part No.
Enclosed surge protection kit - Type I & II*	PSB415M1E

*Install on left of distribution board.

PSME15D

Modular enclosures for Type ‘B’ distribution boards

Modular enclosures will accept modular devices including rail mounted meters and contactors.

Description	Part No.
Modular enclosure, 12 module din rail plain door	PSME12P
Modular enclosure, 12 module din rail glazed door	PSME12G
Modular enclosure, 15 module din rail hinged door	PSME15D
Modular enclosure, 30 module din rail hinged door	PSME30D

PSBEX180

Cable extension boxes for Type ‘B’ distribution boards

Description	Part No.
Cable extension box for Type ‘B’ distribution board 180mm	PSBEX180
Cable extension box for Type ‘B’ distribution board 250mm	PSBEX250

PSH106C

Outgoing devices - MCBs 10kA, Single Pole

Types B, C and D, 10kA to IEC 60898

Description	Current (A)	Type B	Type C	Type D
Miniature Circuit Breaker 10kA	1A	-	PSH101C	-
Miniature Circuit Breaker 10kA	2A	-	PSH102C	-
Miniature Circuit Breaker 10kA	4A	-	PSH104C	-
Miniature Circuit Breaker 10kA	6A	PSH106B	PSH106C	PSH106D
Miniature Circuit Breaker 10kA	10A	PSH110B	PSH110C	PSH110D
Miniature Circuit Breaker 10kA	16A	PSH116B	PSH116C	PSH116D
Miniature Circuit Breaker 10kA	20A	PSH120B	PSH120C	PSH120D
Miniature Circuit Breaker 10kA	25A	PSH125B	PSH125C	PSH125D
Miniature Circuit Breaker 10kA	32A	PSH132B	PSH132C	PSH132D
Miniature Circuit Breaker 10kA	40A	PSH140B	PSH140C	-
Miniature Circuit Breaker 10kA	50A	PSH150B	PSH150C	-
Miniature Circuit Breaker 10kA	63A	PSH163B	PSH163C	-

For Type D MCBs above 32A please contact sales office for further details

PSH332C

Outgoing devices - MCBs 10kA, Triple Pole

Types B, C and D, 10kA to IEC 60898

Description	Current (A)	Type B	Type C	Type D
Miniature Circuit Breaker 10kA	2A	-	PSH302C	-
Miniature Circuit Breaker 10kA	4A	-	PSH304C	-
Miniature Circuit Breaker 10kA	6A	PSH306B	PSH306C	PSH306D
Miniature Circuit Breaker 10kA	10A	PSH310B	PSH310C	PSH310D
Miniature Circuit Breaker 10kA	16A	PSH316B	PSH316C	PSH316D
Miniature Circuit Breaker 10kA	20A	PSH320B	PSH320C	PSH320D
Miniature Circuit Breaker 10kA	25A	PSH325B	PSH325C	PSH325D
Miniature Circuit Breaker 10kA	32A	PSH332B	PSH332C	PSH332D
Miniature Circuit Breaker 10kA	40A	PSH340B	PSH340C	-
Miniature Circuit Breaker 10kA	50A	PSH350B	PSH350C	-
Miniature Circuit Breaker 10kA	63A	PSH363B	PSH363C	-

For Type D MCBs above 32A please contact sales office for further details

PSH132BR30

Outgoing devices - RCBOs 10kA Single Pole 30mA

Types B and C to IEC/ EN 61009

Description	Current (A)	Type B	Type C
Compact RCBO 10kA - A type	6	PSCP106BR30	PSCP106CR30
Compact RCBO 10kA - A type	10	PSCP110BR30	PSCP110CR30
Compact RCBO 10kA - A type	16	PSCP116BR30	PSCP116CR30
Compact RCBO 10kA - A type	20	PSCP120BR30	PSCP120CR30
Compact RCBO 10kA - A type	32	PSCP132BR30	PSCP132CR30
Standard Size RCBO 10kA - A type	40	PSH140BR30	PSH140CR30
Standard Size RCBO 10kA - A type	50	PSH150BR30	PSH150CR30

PSBM

PSUDLA*

PSBIFK

General accessories

Description	Part No.
MCB Blanking module 18mm	PSBM
Universal device lockout attachment - fits MCBs, RCCB & RCBOs	PSUDLA
Door barrel lock with 2 keys	PSDBL
Top/bottom gland plate	PSGP
High integrity/clean earth kit	PSCE8
Additional earth bar	PSAEB15
Spare way label 12 way - pack of 5	PSLB12
Spare way label 18 way - pack of 5	PSLB18
Spare Interface Kit for Type 'B' distribution boards*	PSBIFK
Single Phase Kit for Tri-Load and 250A distribution board	PSBTL1NK
250A Meter and CT Kit	PSBMP250MID

*MCB not included.

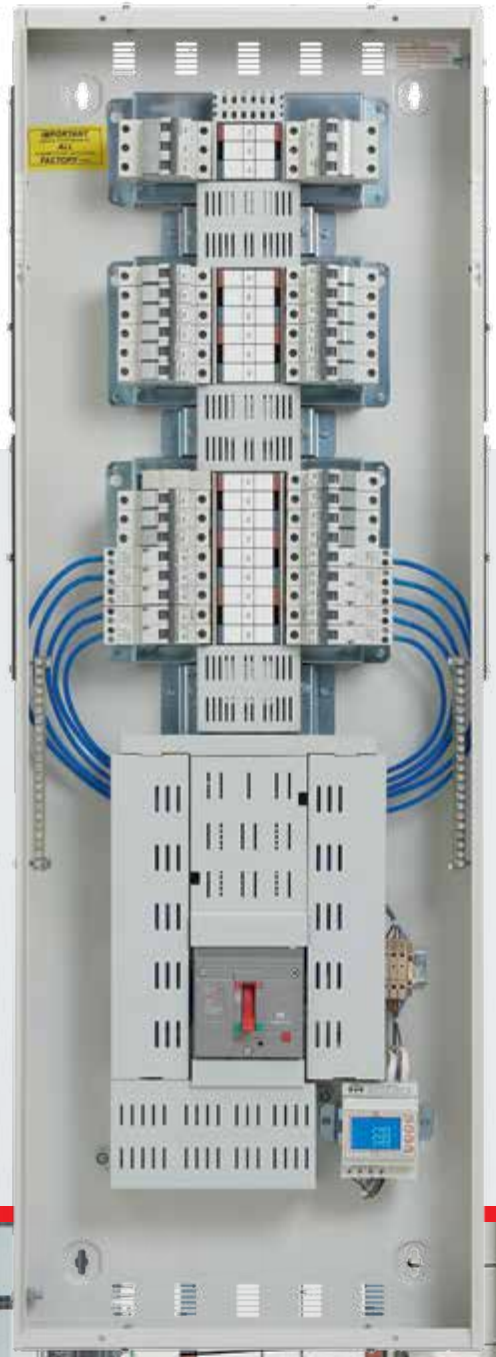
Enclosed Distribution Board Earth Leakage Monitoring

250A solution is supplied with earth leakage relay and core balance CT fitted to terminals within a standard 250mm high enclosure ready to bolt on to the bottom of 250A 4P TPN distribution board. A 240V Shunt trip is supplied ready to be fitted to incoming device.

- IEC 479-2
- Sensitivity settings: 30, 100, 300, 500 mA, 1, 2, 3, 5 A
- Adjustable trip time: Instantaneous, Selective, 0.1, 0.2, 0.3, 0.5, 1, 2, 3, 5 Seconds
- 2 relay outputs for indicating pre-alarm and alarm

PSPBELR250

Description	Sensitivity	Time Delay	Cable Size Termination (mm2)	Part No.
250A Earth Leakage Monitoring Enclosure for 4P Incoming 250A Distribution Boards (C/W CT, Relay and Shunt Trip)	30m/A - 5A	0.01-5s	95	PSBELR250



PSBTL246

Tri-Load / Tri-Load Renewable

Quality Features

- One board with three metered sections - configurable as a power and lighting board or power, lighting and mechanical services.
- Tri-Load renewable - power, lighting and integration of PV / wind within the distribution board, capturing export energy data as part of the standard metering function
- Variable configuration - Where required, the mechanical services section can be incorporated into either the power or the lighting section, creating a variable composition of each metered section
- Pre-wired - metering elements are fully installed and programmed
- Single piece main busbars - design eliminates potential hotspots
- Modbus RS485 - Modbus RS485 communication as standard
- Single phase - can be configured for Single phase applications
- Removable side gland plates and interface gasket included

General characteristics

Tri-load is the only standard distribution board that conveniently separates small power circuits, lighting circuits and mechanical services loads and provides net energy values of each load type. Tri-load is supplied fully configured and ready to go with the main switch pre-installed.

The metering meets the requirements of IEC 62503-21 Class 1.

Tri-Load B Type General Characteristics

IP Rating	IP3X
Paint Specification	RAL 7035 epoxy powder coating
Conditional Short Circuit Rating	25kA to BS EN 61439-3

Cable Capacities

200A Switch Disconnector	120mm^2 (M10 hole)
Enclosure Earth Stud	M8
Incoming earth terminal	M8
Incoming neutral terminal	M8
Outgoing earth terminal	25mm^2
Outgoing neutral terminal	25mm^2

Tri-Load / Tri-Load Renewable

Tri-Load Distribution Board

All Triload distribution boards are supplied with a 250A Cbi incoming device fitted. The metering function provides separate net values of electrical parameters for three separate groups of protective devices i.e. Power, Lighting and Mechanical Services from a single meter.

Description	Current (A)	Ways	3P Part No.	4P Part No.
12way TPN Type 'B' Tri-Load Distribution Board	200	2+4+6	PSBTL246	PSBTL4P246
18way TPN Type 'B' Tri-Load Distribution Board	200	2+6+10	PSBTL2610	PSBTL4P2610
24way TPN Type 'B' Tri-Load Distribution Board	200	2+10+12	On Request	PSBTL21012

Tri-Load MID Distribution Board

Provides the same level of metering functionality as a standard Tri-Load with the added benefit of an additional MID approved meter for tenant billing applications.

Description	Current (A)	Ways	3P Part No.	4P Part No.
12way TPN Type 'B' Tri-Load MID Distribution Board	200	2+4+6	PSBTL246MID	On Request
18way TPN Type 'B' Tri-Load MID Distribution Board	200	2+6+10	PSBTL2610MID	On Request
24way TPN Type 'B' Tri-Load MID Distribution Board	200	2+10+12	On Request	PSBTL21012MID

Tri-Load Renewable Distribution Board

Metering function provides separate net values of electrical parameters for two separate group loads and a separate section for the connection of supplies from micro-generated power i.e. Power, Lighting and export energy from Renewable sources.

Description	Current (A)	Ways	3P Part No.	4P Part No.
12way TPN Type 'B' Tri-Load Renewable Distribution Board	200	2+4+6	PSBTL246R	On Request
18way TPN Type 'B' Tri-Load Renewable Distribution Board	200	2+6+10	PSBTL2610R	On Request
24way TPN Type 'B' Tri-Load Renewable Distribution Board	200	2+10+12	On Request	PSBTL21012R

PSB415M1E*

Surge protection device for Type ‘B’ TPN distribution board

For further information on surge protection please refer to pages 62-63. Requires 3P 63A Type C MCB (please order separately).

Description	Part No.
Enclosed surge protection kit - Type I & II*	PSB415M1E

*Install on left.

PSME15D

Modular enclosures for Type ‘B’ distribution boards

Modular enclosures will accept modular devices including rail mounted meters and contactors.

Description	Part No.
Modular enclosure, 12 module din rail plain door	PSME12P
Modular enclosure, 12 module din rail glazed door	PSME12G
Modular enclosure, 15 module din rail hinged door	PSME15D
Modular enclosure, 30 module din rail hinged door	PSME30D

PSBEX180

Cable extension boxes for Type ‘B’ distribution boards

For requirements where additional space is required for larger cable sizes.

Description	Part No.
Cable extension box for Type ‘B’ distribution board 180mm	PSBEX180
Cable extension box for Type ‘B’ distribution board 250mm	PSBEX250

PSH106C

Outgoing devices - MCBs 10kA, Single Pole

Types B, C and D, 10kA to IEC 60898

Description	Current (A)	Type B	Type C	Type D
Miniature Circuit Breaker 10kA	1A	-	PSH101C	-
Miniature Circuit Breaker 10kA	2A	-	PSH102C	-
Miniature Circuit Breaker 10kA	4A	-	PSH104C	-
Miniature Circuit Breaker 10kA	6A	PSH106B	PSH106C	PSH106D
Miniature Circuit Breaker 10kA	10A	PSH110B	PSH110C	PSH110D
Miniature Circuit Breaker 10kA	16A	PSH116B	PSH116C	PSH116D
Miniature Circuit Breaker 10kA	20A	PSH120B	PSH120C	PSH120D
Miniature Circuit Breaker 10kA	25A	PSH125B	PSH125C	PSH125D
Miniature Circuit Breaker 10kA	32A	PSH132B	PSH132C	PSH132D
Miniature Circuit Breaker 10kA	40A	PSH140B	PSH140C	-
Miniature Circuit Breaker 10kA	50A	PSH150B	PSH150C	-
Miniature Circuit Breaker 10kA	63A	PSH163B	PSH163C	-

For Type D MCBs above 32A please contact sales office for further details

Outgoing devices - MCBs 10kA, Triple Pole

Types B, C and D, 10kA to IEC 60898

PSH332C

Description	Current (A)	Type B	Type C	Type D
Miniature Circuit Breaker 10kA	2A	-	PSH302C	-
Miniature Circuit Breaker 10kA	4A	-	PSH304C	-
Miniature Circuit Breaker 10kA	6A	PSH306B	PSH306C	PSH306D
Miniature Circuit Breaker 10kA	10A	PSH310B	PSH310C	PSH310D
Miniature Circuit Breaker 10kA	16A	PSH316B	PSH316C	PSH316D
Miniature Circuit Breaker 10kA	20A	PSH320B	PSH320C	PSH320D
Miniature Circuit Breaker 10kA	25A	PSH325B	PSH325C	PSH325D
Miniature Circuit Breaker 10kA	32A	PSH332B	PSH332C	PSH332D
Miniature Circuit Breaker 10kA	40A	PSH340B	PSH340C	-
Miniature Circuit Breaker 10kA	50A	PSH350B	PSH350C	-
Miniature Circuit Breaker 10kA	63A	PSH363B	PSH363C	-

For Type D MCBs above 32A please contact sales office for further details

Outgoing devices - RCBOs 10kA Single Pole 30mA

Types B and C to IEC/ EN 61009

PSCP132CR30

Description	Current (A)	Type B	Type C
Compact RCBO 10kA - A type	6	PSCP106BR30	PSCP106CR30
Compact RCBO 10kA - A type	10	PSCP110BR30	PSCP110CR30
Compact RCBO 10kA - A type	16	PSCP116BR30	PSCP116CR30
Compact RCBO 10kA - A type	20	PSCP120BR30	PSCP120CR30
Compact RCBO 10kA - A type	32	PSCP132BR30	PSCP132CR30
Standard Size RCBO 10kA - A type	40	PSH140BR30	PSH140CR30
Standard Size RCBO 10kA - A type	50	PSH150BR30	PSH150CR30

General accessories

PSBM PSUDLA*

PSBIFK

Description	Part No.
MCB Blanking module 18mm	PSBM
Universal device lockout attachment - fits MCBs, RCCB & RCBOs	PSUDLA
Door barrel lock with 2 keys	PSDBL
Top/bottom gland plate	PSGP
High integrity/clean earth kit	PSCE8
Additional earth bar	PSAEB15
Spare way label 12 way - pack of 5	PSLB12
Spare way label 18 way - pack of 5	PSLB18
Spare Interface Kit for Type 'B' distribution boards*	PSBIFK
Single Phase Kit for Tri-Load and 250A distribution board	PSBTL1NK

*MCB not included.

Enclosed Earth Leakage Monitoring

250A solution is supplied with earth leakage relay and core balance CT fitted to terminals within a standard 250mm high enclosure ready to bolt on to the bottom of 250A 4P TPN distribution board. A 240V Shunt trip is supplied ready to be fitted to incoming device.

- IEC 479-2
- Sensitivity settings: 30, 100, 300, 500 mA, 1, 2, 3, 5 A
- Adjustable trip time: Instantaneous, Selective, 0.1, 0.2, 0.3, 0.5, 1, 2, 3, 5 Seconds
- 2 relay outputs for indicating pre-alarm and alarm

PSPBELR250

Description	Sensitivity	Time Delay	Cable Size Termination (mm2)	Part No.
250A Earth Leakage Monitoring Enclosure for 4P Incoming 250A Distribution Boards (C/W CT, Relay and Shunt Trip)	30m/A - 5A	0.01-5s	95	PSBELR250


POWERSAFE
HAVELLS
HAVELLS
HS8T
HAVELLS
DP20A
HAVELLS
FP25A
HAVELLS
FP40A


PULSE MODBUS
B A G
CT INPUTS
-I3+ -I2+ -I1+
PK
N L3 L2 L1
PC AUX

Modular Devices and Enclosures

Quality features

- MID Approved meters for energy monitoring and tenant billing applications
- Modular contactors for control of motor, heating and lighting applications
- Digital and Analogue Time Switches for remote command and control of circuits
- Selectable Voltage Bell Transformer
- Modular Enclosures with hinged lockable door for mounting DIN devices

Havells extends its product portfolio with a complementary range of command and control products for use in both residual and commercial applications. The range includes AC7a Modular Contactors up to 63A, Programmable Time Switches in both analogue and digital and a selectable voltage bell transformer from 8-16V DC.

Time Switches

- Analogue and digital versions available
- Din rail mountable
- Manual override
- Fully programmable
- Bell transformer compliant to IEC 61558-1

MID Meters

- MID approval - Annex B & D
- Direct Connect upto 100A
- SPN and TPN versions
- Modbus and Pulse Outputs as standard

Modular Contactors

- AC7A Utilisation Category for small lighting and heating applications
- 2P and 4P versions
- Normally Open and Closed options

Modular Devices and Enclosures

Time Switches

Fully programmable with manual overide. EN 60730-2-7.

Description	Modules Width	Part No.
Analogue 1 Channel Timer 24/7	1	PSAT1
Digital 1 Channel Timer 24/7	2	PSDT1
Digital 2 Channel Timer 24/7	2	PSDT2

HSBT

Bell Transformer

IEC 61558-1

Description	Modules Width	Part No.
Bell Transformer	2	HSBT

CONTACTOR

Modular Contactors - 240v Coil

AC7A Modular DINrail contactors tested in accordance with IEC 60947-4-1 & IEC 61095.

Description	No. of Contacts	Width	Part No.
Contactor 20A	2NC	18MM (1 Module)	PSC202NC
Contactor 20A	2NO	18MM (1 Module)	PSC202NO
Contactor 25A	4NC	36MM (2 Module)	PSC254NC
Contactor 25A	4NO	36MM (2 Module)	PSC254NO
Contactor 40A	2NO2NC	54MM (3 Module)	PSC402NO2NC
Contactor 40A	4NO	54MM (3 Module)	PSC404NO
Contactor 40A	4NC	54MM (3 Module)	PSC404NC
Contactor 63A	2NO2NC	54MM (3 Module)	PSC632NO2NC
Contactor 63A	4NO	54MM (3 Module)	PSC634NO
Contactor 63A	4NC	54MM (3 Module)	PSC634NC

MODULAR ENCLOSURES

Modular Enclosures

Single and Double row options for fitting modular DIN devices.

Description	No. of Modules	Height (mm)	Width (mm)
15 Module DIN Enclosure	15	250	440
30 Module DIN Enclosure	30	405	440

PSMD1100MID

MID Approved Energy Meters

MID approved to Annex B&D for Billing purposed. Supplied with both Pulse and Modbus communication outputs as standard.

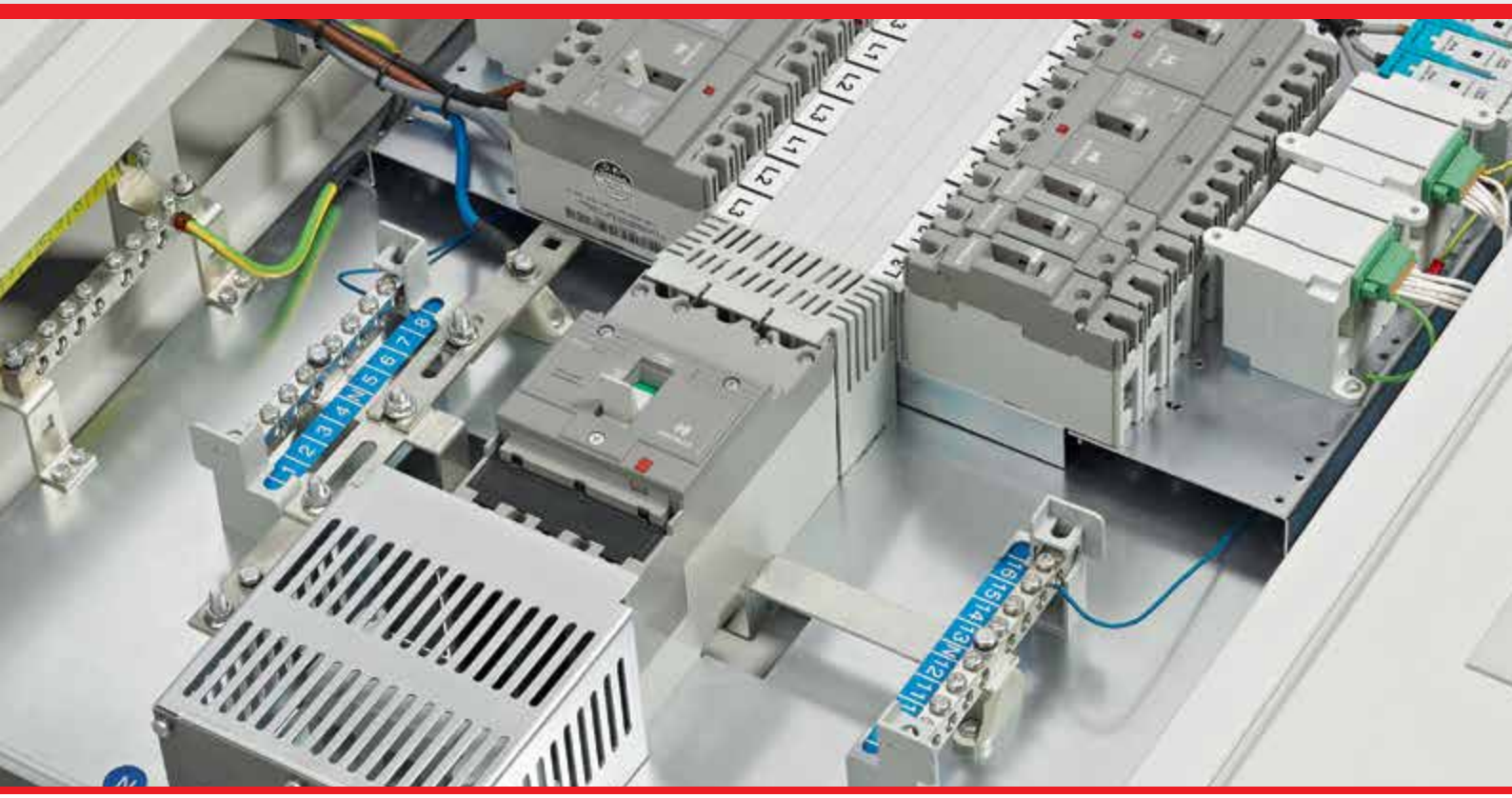
Description	Part No.
Single Phase 100A Direct Connect MID Meter	PSMD1100MID
Three Phase 100A Direct Connect MID Meter	PSMD3100MID
Three Phase 100A CT Driven MID Meter	PSMDMPMID
CT Kits 100A 3in1 Current Transformer	PSCT100

Watch our YouTube installation videos

simply scan the QR code below

or visit
youtube.com/havellsuk

PSPB2512



MCCB Panelboards

Quality Features

- Removable door with easy align hinge design, to aid installation
- Rigid construction to reduce distortion during installation
- Plated busbars
- Full Form MCCB blanking modules for unused ways for increase safety
- Plug connectable voltage reference fuses pre-installed for easy meter installation
- Comprehensive range of surge protection and metering solutions

A complete range of MCCB Panelboards for Electrical supplies from 250A – 630A. Outgoing MCCB's for current ratings up to 160A are available for Panelboards up to 400A. The 630A Panelboards provide options for outgoing circuits up to 250A. In addition to managing safe Electrical Distribution, the range reflects the wider peripheral demands within modern Commercial buildings installations and upgrades, addressing application requirements such as metering and surge protection.

MCCB Panelboard General Characteristics

	250A	**400A**	**630A**
IP Rating	IP3X	IP3X	IP3X
Paint Specification	RAL 7035 epoxy powder coating	RAL 7035 epoxy powder coating	RAL 7035 epoxy powder coating
Conditional Short Circuit Rating	35kA to BS EN 61439-1	50kA to BS EN 61439-1	50kA to BS EN 61439-1
Short Circuit Withstand Rating	30kA – 1s to BS EN 61439-1	30kA – 1s to BS EN 61439-1	50kA – 1s to BS EN 61439-1
Forms of Separation	Form 3b	Form 3b	Form 3b
Cable Capacities			
MCCB/SwD incoming device	120mm^2 max*	2 x 240mm^{2**} (M12 stud)	2 x 240mm^{2***} (M12 stud)
Incoming earth terminal	M10	M10	M10
Incoming neutral terminal	M8	M8	M12
Outgoing earth terminal	50mm^2 (16)	50mm^2 (18)	70mm^2(18)
Outgoing neutral terminal	50mm^2 (16)	50mm^2 (20)	70mm^2(20)
MCCB outgoing device	16A-160A = 70mm^2	16A-160A = 70mm^2	16A-160A = 70mm^2 200-250A = 150mm^2

* Recommended 120mm^2 with Cage Clamp
** Recommended 1 x 240mm^2
*** Recommended 2 x 185mm^2

MCCB Panelboards 250A MCCB Panelboard

250A MCCB Panelboards

- IEC61439-1
- Icc - 35kA
- Icw - 30kA 1s
- Plated busbars
- Outgoing devices; 16A -125A SP and 16A- 160A TP
- IP3X construction

PSPB256

Description	Rating	No. Ways	Part No.
4 way MCCB panelboard	250A	4	PSPB254
6 way MCCB panelboard	250A	6	PSPB256
8 way MCCB panelboard	250A	8	PSPB258
12 way MCCB panelboard	250A	12	PSPB2512

Incoming devices for 250A MCCB panelboard

Incoming Devices to be ordered separately. 4P options are supplied with an additional neutral link assembly.

PSFN3200CB

Description	Breaking Capacity kA	No. Ways	Poles	Part No.
Circuit breaker switch	25kA	160A	3	PSFN3160CB
Circuit breaker switch	25kA	200A	3	PSFN3200CB
Circuit breaker switch	25kA	250A	3	PSFN3250CB
MCCB incomer	25kA	160A	3	PSFN3160MC
MCCB incomer	25kA	200A	3	PSFN3200MC
MCCB incomer	25kA	250A	3	PSFN3250MC
MCCB incomer	25kA	160A	4	PSFN4160MC
MCCB incomer	25kA	200A	4	PSFN4200MC
MCCB incomer	25kA	250A	4	PSFN4250MC
Circuit Breaker Switch	25kA	250A	4	PSFN4250CB

Cable Extension Boxes for 250A Panelboard

Extension boxes can be mounted top or bottom and can be stacked as necessary.
Corner filler boxes to fill gaps when both side extension boxes and top/bottom extension boxes are fitted to MCCB panelboard.

PSPB415M1

Description	Part No.
Cable extension box 250mm high	PSPB25EXTB
Universal Corner Filler Box	PSPBCFB

Surge Protection Kit for MCCB

A side extension box with hinged door and cut outs must be used to house surge protection kit. For further information on surge protection, please refer to pages 52-55.
Requires TP 125A MCCB (please order separately - see page 38).

Description	Part No.
Surge Protection kit – Type 1, 2 and 3*	PSPB415M1

* Fit SPD in left hand side extension box.

PSPB250MP

Plug & Play Incoming Metering

Select the meter pack or the incoming meter kit (where incorporating the incoming supply metering within the side extension box). The incoming meter kit is a cost effective alternative to using a separate meter pack.

Description	Part No.
250A Meter Pack (bottom connection only)	PSPBS250MP
250A Plug and Play Incoming Meter Kit (fits into the bottom meter position of side ext box)	PSPBS250SW

PSPBL160SW

Plug & Play Outgoing Metering

Select meter kit per outgoing circuit which requires metering. For single phase metering please contact your local sales engineer or customer services.

Description	Part No.
63A Meter Kit (including CT, meter and plug-in loom)	PSPBL63SW
125A Meter Kit (including CT, meter and plug-in loom)	PSPBL125SW
160A Meter Kit (including CT, meter and plug-in loom)	PSPBL160SW
250A Meter Kit (including CT, meter and plug-in loom)	PSPBL250SW

PSPB25EXM8

Cable extension boxes – side mounted for outgoing metering (hinged door)

Description	No. of cutouts	Part No.
To fit panelboard PSPB254	3	PSPB25EXM4
To fit panelboard PSPB256	4	PSPB25EXM6
To fit panelboard PSPB258	5	PSPB25EXM8
To fit panelboard PSPB2512	7	PSPB25EXM12

Quikwire Accessories

Description	Part No.
Meter Extension Loom to bypass 3 metres (0.9m)	PSPBSW3ME
Meter Extension Loom to bypass 5 metres (1.2m)	PSPBSW5ME
Spare Connector Kit (includes voltage, CT and comms connectors)	PSPBSWCK

PSGH116

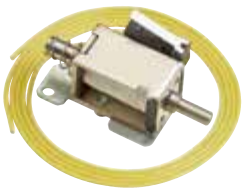
Outgoing devices – MCCBs – Single Pole PSGH range

Description	Rating	Poles	kA	Part No.
GH Frame MCCB	16A	1	25	PSGH116
GH Frame MCCB	20A	1	25	PSGH120
GH Frame MCCB	32A	1	25	PSGH132
GH Frame MCCB	40A	1	25	PSGH140
GH Frame MCCB	50A	1	25	PSGH150
GH Frame MCCB	63A	1	25	PSGH163
GH Frame MCCB	80A	1	25	PSGH180
GH Frame MCCB	100A	1	25	PSGH1100
GH Frame MCCB	125A	1	25	PSGH1125

PSGH3100

Outgoing devices - MCCBs - Triple Pole PSGH range

Description	Rating	Poles	kA	Part No.
GH Frame MCCB	16A	3	25	PSGH316
GH Frame MCCB	20A	3	25	PSGH320
GH Frame MCCB	32A	3	25	PSGH332
GH Frame MCCB	40A	3	25	PSGH340
GH Frame MCCB	50A	3	25	PSGH350
GH Frame MCCB	63A	3	25	PSGH363
GH Frame MCCB	80A	3	25	PSGH380
GH Frame MCCB	100A	3	25	PSGH3100
GH Frame MCCB	125A	3	25	PSGH3125
GH Frame MCCB	160A	3	25	PSGH3160



PSGHST240

MCCB accessories

Description	Part No.
FN Frame 240V Shunt Trip	PSFNST240
FN Frame 240V Under Voltage Release	PSFNUVR240
GH Frame 240V Shunt Trip	PSGHST240
GH Frame 240V Under Voltage Release	PSGHUVR240
FN Frame Dolly Lock Attachment	PSFNDBL
GH Frame Dolly Lock Attachment	PSGHDBL

PSGHUVR240

General accessories

Description	Part No.
Single pole PSGH MCCB blanking module (for unused ways)	PSPBGH1BM
Barrel door lock with two keys	PSPBDLK
Terminal shroud for outgoing MCCB for GH Type 3 Pole	PSPBGHTS3
Terminal shroud for outgoing MCCB for GH Type 1 Pole	PSPBGHTS1
Blanking module for unused meter cutout	PSPB96BM
Neutral and Earth Terminal Extension Kit (Additional 16 neutral and earth terminals)	PSPBNEK

PSPBDLK

MCCB Panelboards 400A MCCB Panelboard

PSPB406

400A MCCB Panelboard

- IEC61439-1
- Icc - 50kA
- Icw - 30kA 1s
- Plated busbars
- Outgoing devices; 16A–125A SP & 16A–160A TP
- IP3X construction

Description	Rating	No. Ways	Part No.
6 way MCCB panelboard	400A	6	PSPB406
12 way MCCB panelboard	400A	12	PSPB4012
18 way MCCB panelboard	400A	18	PSPB4018

Incoming devices for 400A MCCB panelboard

PSCH3400CB

Incoming Devices to be ordered separately. 4P options are supplied with an additional neutral link assembly.

Description	Breaking capacity kA	Rating	Poles	Part No.
CH Frame Circuit breaker switch	50kA	250A	3	PSCH3250CB
CH Frame Circuit breaker switch	50kA	320A	3	PSCH3320CB
CH Frame Circuit breaker switch	50kA	400A	3	PSCH3400CB
CH Frame MCCB incomer	50kA	250A	3	PSCH3250MC
CH Frame MCCB incomer	50kA	320A	3	PSCH3320MC
CH Frame MCCB incomer	50kA	400A	3	PSCH3400MC
CH Frame MCCB incomer	50kA	250A	4	PSCH4250MC
CH Frame MCCB incomer	50kA	400A	4	PSCH4400MC
CH Frame Circuit Breaker Switch	50kA	400A	4	PSCH4400CB

Cable Extension Box for 400A Panelboard

Extension boxes can be mounted top or bottom and can be stacked as necessary. Corner filler boxes to fill gaps when both side extension boxes and top/bottom extension boxes are fitted to MCCB panelboard.

Description	Part No.
Cable extension box 250mm high	PSPB25EXTB
Universal Corner Filler Box	PSPBCFB

PSPB415M1

Surge Protection Kit for MCCB Panelboard

A metered side extension box must be used to house surge protection kit. Surge Protection kit requires TP 125A MCCB (ordered separately. Please refer to page 41). For further information on surge protection, please refer to pages 52-55.

Description	Part No.
Surge Protection kit – Type 1, 2 and 3	PSPB415M1

Plug & Play Incoming Metering

PSPB400MP

Select the meter pack or the incoming meter kit (where incorporating the incoming supply metering within the side extension box). The incoming meter kit is a cost effective alternative to using a separate meter pack.

Description	Part No.
400A Meter Pack (bottom connection only)	PSPBS400MP
400A Incoming Meter (fits into bottom meter position of side ext box)	PSPBS400SW

Plug & Play Outgoing Metering

PSPBL160SW

Select meter kit per outgoing circuit which requires metering. For single phase metering please contact your local sales engineer or customer services.

Description	Part No.
63A Meter Kit (including CT, meter and looms)	PSPBL63SW
125A Meter Kit (including CT, meter and looms)	PSPBL125SW
160A Meter Kit (including CT, meter and looms)	PSPBL160SW
250A Meter Kit (including CT, meter and looms)	PSPBL250SW

Cable extension boxes - side mounted for outgoing metering (hinged door)

PSPB40EXM6

Description	No. of cutouts	Part No.
To fit panelboard PSPB406	4	PSPB40EXM6
To fit panelboard PSPB4012	7	PSPB40EXM12
To fit panelboard PSPB4018	10	PSPB40EXM18

Quikwire Accessories

Description	Part No.
Meter Extension Loom to bypass 3 metres (0.9m)	PSPBSW3ME
Meter Extension Loom to bypass 5 metres (1.2m)	PSPBSW5ME
Spare Connector Kit (includes voltage, CT and comms connectors)	PSPBSWCK

Outgoing devices – MCCBs – Single Pole PSGH range

Description	Rating	Poles	kA	Part No.
GH Frame MCCB	16A	1	25	PSGH116
GH Frame MCCB	20A	1	25	PSGH120
GH Frame MCCB	32A	1	25	PSGH132

PSGH116

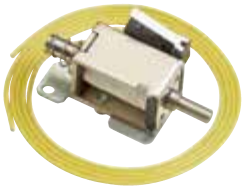
Outgoing devices – MCCBs – Single Pole PSGH range

Description	Rating	Poles	kA	Part No.
GH Frame MCCB	40A	1	25	PSGH140
GH Frame MCCB	50A	1	25	PSGH150
GH Frame MCCB	63A	1	25	PSGH163
GH Frame MCCB	80A	1	25	PSGH180
GH Frame MCCB	100A	1	25	PSGH1100
GH Frame MCCB	125A	1	25	PSGH1125

PSGH3100

Outgoing devices - MCCBs - Triple Pole PSGH range

Description	Rating	Poles	kA	Part No.
GH Frame MCCB	16A	3	25	PSGH316
GH Frame MCCB	20A	3	25	PSGH320
GH Frame MCCB	32A	3	25	PSGH332
GH Frame MCCB	40A	3	25	PSGH340
GH Frame MCCB	50A	3	25	PSGH350
GH Frame MCCB	63A	3	25	PSGH363
GH Frame MCCB	80A	3	25	PSGH380
GH Frame MCCB	100A	3	25	PSGH3100
GH Frame MCCB	125A	3	25	PSGH3125
GH Frame MCCB	160A	3	25	PSGH3160



PSGHST240

MCCB accessories

Description	Part No.
CH Frame 240V Shunt Trip	PSCHST240
CH Frame 240V Under Voltage Release	PSCHUVR240
GH Frame 240V Shunt Trip	PSGHST240
GH Frame 240V Under Voltage Release	PSGHUVR240
CH Frame Dolly Lock Attachment	PSCHDBL
GH Frame Dolly Lock Attachment	PSGHDBL

PSGHUVR240

General accessories

Description	Part No.
Single pole PSGH MCCB blanking module (for unused ways)	PSPBGH1BM
Barrel door lock with two keys	PSPBDLK
Terminal shroud for outgoing MCCB for GH Type 3 Pole	PSPBGHTS3
Terminal shroud for outgoing MCCB for GH Type 1 Pole	PSPBGHTS1
Blanking module for unused meter cutout	PSPB96BM
Neutral and Earth Terminal Extension Kit (Additional 16 neutral and earth terminals)	PSPBNEK

PSPBDLK

MCCB Panelboards 630A MCCB Panelboard

630A MCCB Panelboard

- IEC61439-1
- Icc - 50kA
- Icw - 50kA 1s
- Plated busbars
- Outgoing devices; 16A–125A SP & 16A–250A TP
- IP3X construction

PSPB638

Description	Rating	No. Ways	Part No.
6 way MCCB panelboard	630A	4+2	PSPB636
8 way MCCB panelboard	630A	6+2	PSPB638
12 way MCCB panelboard	630A	10+2	PSPB6312

Incoming devices for 630A MCCB panelboard

Incoming Devices to be ordered separately. 4P options are supplied with additional neutral link assembly.

PSCH3400CB

Description	Breaking capacity kA	Rating	Poles	Part No.
CH Frame Circuit breaker switch	50kA	320A	3	PSCH3320CB
CH Frame Circuit breaker switch	50kA	400A	3	PSCH3400CB
CH Frame Circuit breaker switch	50kA	630A	3	PSCH3630CB
CH Frame MCCB incomer	50kA	320A	3	PSCH3320MC
CH Frame MCCB incomer	50kA	400A	3	PSCH3400MC
CH Frame MCCB incomer	50kA	630A	3	PSCH3630MC
CH Frame MCCB incomer	50kA	400A	4	PSCH4400MC
CH Frame MCCB incomer	50kA	630A	4	PSCH4630MC
CH Frame Circuit breaker switch	50kA	400A	4	PSCH4400CB
CH Frame Circuit breaker switch	50kA	630A	4	PSCH4630CB

Cable Extension Box for 630A Panelboard

Extension boxes can be mounted top or bottom and can be stacked as necessary. Corner filler boxes to fill gaps when both side extension boxes and top/bottom extension boxes are fitted to MCCB panelboard.

PSPB6415M1

Description	Part No.
Cable extention box 250mm high	PSPB63EXTB
Corner filler box	PSPBCFB

Surge Protection Kit for MCCB

A metered side extension box must be used to house surge protection kit. Surge Protection kit requires TP 125A MCCB (ordered separately. Please refer to page 41). For further information on surge protection, please refer to pages 52-55.

Description	Part No.
Surge Protection kit – Type 1, 2 and 3	PSPB6415M1

PSPB630MP

Plug & Play Incoming Metering

Select the meter pack or the incoming meter kit (where incorporating the incoming supply metering within the side extension box). The incoming meter kit is a cost effective alternative to using a separate meter pack.

Description	Part No.
630A Meter Pack (bottom connection only)	PSPBS630MP
630A Incoming Meter (fits into bottom meter position of side ext box)	PSPBS630SW

PSPBL250SW

Plug & Play Outgoing Metering

Select meter kit per outgoing circuit which requires metering. For single phase metering please contact your local sales engineer or customer services.

Description	Part No.
63A Meter Kit (including CT, meter and plug-in loom)	PSPBL63SW
125A Meter Kit (including CT, meter and plug-in loom)	PSPBL125SW
160A Meter Kit (including CT, meter and plug-in loom)	PSPBL160SW
250A Meter Kit (including CT, meter and plug-in loom)	PSPBL250SW

PSPB63EXM8

Cable extension boxes – side mounted for outgoing metering (hinged door)

Description	No. of cutouts	Part No.
To fit panelboard PSPB636	4	PSPB63EXM6
To fit panelboard PSPB638	5	PSPB63EXM8
To fit panelboard PSPB6312	7	PSPB63EXM12

Quikwire accessories

Description	Part No.
Meter Extension Loom to bypass 3 metres (0.9m)	PSPBSW3ME
Meter Extension Loom to bypass 5 metres (1.2m)	PSPBSW5ME
Spare Connector Kit (includes voltage, CT and comms connectors)	PSPBSWCK

PSPBDLK

General accessories cont.

Description	Part No.
Single pole PSGH MCCB blanking module (for unused ways)	PSPBGH1BM
Barrel door lock with two keys	PSPBDLK
Terminal shroud for outgoing MCCB for GH Type 3 Pole	PSPBGHTS3
Terminal shroud for outgoing MCCB for GH Type 1 Pole	PSPBGHTS1
Blanking module for unused meter cutout	PSPB96BM
Neutral and Earth Terminal Extension Kit (Additional 16 neutral and earth terminals)	PSPBNEK

Outgoing devices – MCCBs – Single Pole PSGH range

PSGH116

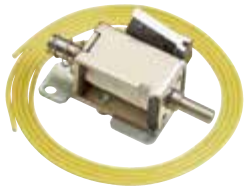
Description	Rating	Poles	kA	Part No.
MCCB	16A	1	25	PSGH116
MCCB	20A	1	25	PSGH120
MCCB	32A	1	25	PSGH132
MCCB	40A	1	25	PSGH140
MCCB	50A	1	25	PSGH150
MCCB	63A	1	25	PSGH163
MCCB	80A	1	25	PSGH180
MCCB	100A	1	25	PSGH1100
MCCB	125A	1	25	PSGH1125

Outgoing devices - MCCBs - Triple Pole PSGH range

PSGH3100

Description	Rating	Poles	kA	Part No.
MCCB	16A	3	25	PSGH316
MCCB	20A	3	25	PSGH320
MCCB	32A	3	25	PSGH332
MCCB	40A	3	25	PSGH340
MCCB	50A	3	25	PSGH350
MCCB	63A	3	25	PSGH363
MCCB	80A	3	25	PSGH380
MCCB	100A	3	25	PSGH3100
MCCB	125A	3	25	PSGH3125
MCCB	160A	3	25	PSGH3160

Outgoing devices - MCCBs - Triple Pole PSAAN range



PSGHST240

Description	Rating	Poles	kA	Part No.
MCCB	160A	3	25	PSAAN3160MC
MCCB	200A	3	25	PSAAN3200MC
MCCB	250A	3	25	PSAAN3250MC

MCCB accessories - 630A MCCB Panelboard

PSGHUVR240

Description	Part No.
CH Frame 240V Shunt Trip	PSCHST240
CH Frame 240V Under Voltage Release	PSCHUVR240
GH Frame 240V Shunt Trip	PSGHST240
GH Frame 240V Under Voltage Release	PSGHUVR240
AAN Frame 240V Shunt Trip	PSAANST240
AAN Frame 240V Under Voltage Release	PSAANUVR240
CH Frame Dolly Lock Attachment	PSCHDBL
GH Frame Dolly Lock Attachment	PSGHDBL
AAN Frame Dolly Lock Attachment	PSAANDBL

Enclosed Earth Leakage Monitoring

All solutions come complete with a 4P MCCB incoming device with 240V shunt trip. The earth leakage relay and toroidal Current transformer are prefitted and wired to terminals for simple installation.

- IEC 479-2
- Clear, simple display with a led bar graph or with an indicator of the exact leakage value on the LCD screen
- Sensitivity settings: 30, 100, 300, 500 mA, 1, 2, 3, 5 A
- Adjustable trip time: Instantaneous, Selective, 0.1, 0.2, 0.3, 0.5, 1, 2, 3, 5 Seconds
- 2 relay outputs for indicating pre-alarm and alarm

PSPBELR2504P

250A MCCB Panelboard Earth Leakage Monitoring

Description	Sensitivity	Time Delay	Cable Size Termination (mm2)	Part No.
250A Earth Leakage Monitoing Enclosure (C/W 4P MCCB, CT, Relay and Shunt Trip)	30m/A - 5A	0.01-5s	95	PSPBELR2504P

400A MCCB Panelboard Earth Leakage Monitoring

Description	Sensitivity	Time Delay	Cable Size Termination (mm2)	Part No.
400A Earth Leakage Monitoing Enclosure (C/W 4P MCCB, CT, Relay and Shunt Trip)	30m/A - 5A	0.01-5s	185	PSPBELR4004P

630A MCCB Panelboard Earth Leakage Monitoring

Description	Sensitivity	Time Delay	Cable Size Termination (mm2)	Part No.
630A Earth Leakage Monitoing Enclosure (C/W 4P MCCB, CT, Relay and Shunt Trip)	30m/A - 5A	0.01-5s	185	PSPBELR6304P

LSEDF633N

LoadSafe – 20A-400A Enclosed Switch Disconnector Fuse

Quality features

- Current ratings range between 20-400A
- 80kA Withstand Rating
- SPsN, TPN & TPsN pole configurations
- Front Operated Door Interlocked with defeat mechanism
- Handle can be padlocked in ON and OFF position
- Full range or matching cable spreader boxes

General characteristics

Havells new LoadSafe range of enclosed switch disconnectors fuse feature a compact design optimised for industrial applications requiring an AC23A utilisation category rating. Primarily engineered for use with BS88 fuse links the switch can also be used as an industrial switch disconnector with isolator links fitted, as supplied.

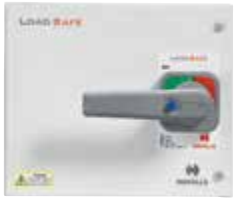
Switch Disconnector Fuse General Characteristics

IP Rating	IP4X
Paint Specification	RAL 7035 epoxy powder coating
Short Short Circuit Breaker Rating	85kA to BS EN 60947-3
Utilisation Category	AC23A

Cable Capacities

20A/32A	10mm2 (M6)
63A	25mm2 (M6)
100A/125A	35mm2 (M8)
160/200/250A	120mm2 (M10)
400A	240mm2 (M12)
Enclosure Earth Stud	M8

LoadSafe-Enclosed Switch Disconnector Fuse



LSEDF203N

Frame Size 1 - 20A-32A

Max size fuse size supplied with each Switch Disconnector Fuse e.g. LSEDF1003N is supplied with 3 x100A Fuse Links. For Isolator only version please order corresponding code.

Description	Pole Configuration	Fuse Part No	Isolator Part No
20A Switch Disconnector Fuse	SPSN	LSEDF201SN	LSES201SN
32A Switch Disconnector Fuse	SPSN	LSEDF321SN	LSES203N
20A Switch Disconnector Fuse	TPSN	LSEDF203N	LSES321SN
32A Switch Disconnector Fuse	TPSN	LSEDF323N	LSES323N

LSEDF613SN

Frame Size 2 - 63A

Max size fuse size supplied with each Switch Disconnector Fuse e.g. LSEDF1003N is supplied with 3 x100A Fuse Links. For Isolator only version please order corresponding code.

Description	Pole Configuration	Fuse Part No	Isolator Part No
63A Switch Disconnector Fuse	SPsN	LSEDF631SN	LSES631SN
63A Switch Disconnector Fuse	TPN	LSEDF633N	LSES633N
63A Switch Disconnector Fuse	TPsN	LSEDF633SN	N/A

LSEDF1003N

Frame Size 3 - 100A-125A

Max size fuse size supplied with each Switch Disconnector Fuse e.g. LSEDF1003N is supplied with 3 x100A Fuse Links. For Isolator only version please order corresponding code.

Description	Pole Configuration	Fuse Part No	Isolator Part No
100A Switch Disconnector Fuse	SPSN	LSEDF1001SN	N/A
125A Switch Disconnector Fuse	SPSN	LSEDF1251SN	N/A
100A Switch Disconnector Fuse	TPN	LSEDF1003N	LSES1003N
125A Switch Disconnector Fuse	TPN	LSEDF1253N	LSES1253N
100A Switch Disconnector Fuse	TPSN	LSEDF1003SN	N/A
125A Switch Disconnector Fuse	TPSN	LSEDF1253SN	N/A

* Maximum Cable Size based on using cable spreader boxes

Frame Size 4 - 160A - 250A

Max size fuse size supplied with each Switch Disconnector Fuse e.g. LSEDF1003N is supplied with 3 x100A Fuse Links. For Isolator only version please order corresponding code.

Description	Pole Configuration	Fused Part No	Isolator Part No
160A TPN Switch Disconnector Fuse	TPN	LSEDF1603N	N/A
160A TPSN Switch Disconnector Fuse	TPSN	LSEDF1603SN	N/A
200A TPN Switch Disconnector Fuse	TPN	LSEDF2003N	N/A
200A TPSN Switch Disconnector Fuse	TPSN	LSEDF2003SN	N/A
250A TPN Switch Disconnector Fuse	TPN	LSEDF2503N	LSES2503N
250A TPSN Switch Disconnector Fuse	TPSN	LSEDF2503SN	LSES2503SN

LSEDF1603N

Frame Size 5 - 400A

Max size fuse size supplied with each Switch Disconnector Fuse e.g. LSEDF1003N is supplied with 3 x100A Fuse Links. For Isolator only version please order corresponding code.

Description	Pole Configuration	Fused Part No	Isolator Part No
400A TPN Switch Disconnector Fuse	TPN	LSEDF4003N	LSES4003N
400A TPSN Switch Disconnector Fuse	TPSN	LSEDF4003SN	LSES4003SN

LSEDF4003N

Cable Spreader Boxes

Description	Part No
Cable Spreader Box For 160-250A TPN/TPSN SDF	LSEDF3P25CSB
Cable Spreader Box For 400A TPN/TPSN SDF	LSEDF3P40CSB
Cable Spreader Box for all SPSN Switch Disconnector Fuse	LSEDF1PCSB
Cable Spreader Box for all TPN / TPSN Switch Disconnector Fuse	LSEDF3PCSB

LSEDF1PCSB

A Guide to Metering Solutions

The requirements for Sub metering of electricity in non-domestic buildings mandated in Part L2 of the building regulations for England and Wales have recently been mirrored by the newly introduced Scottish building standards published in October 2015.

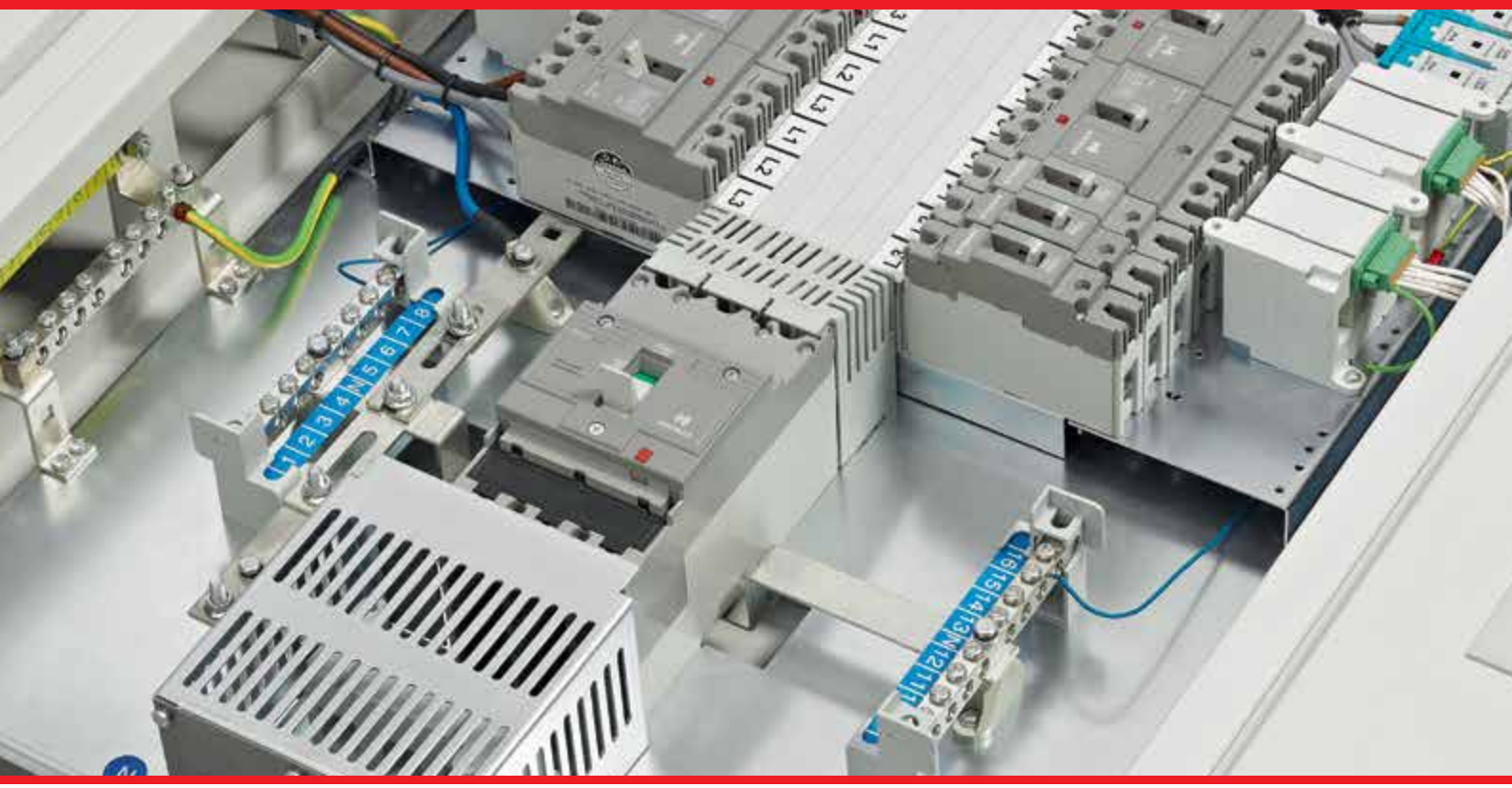
As an additional legal requirement, landlord billing of electricity in commercial buildings must be from 'approved meters' only. It is a criminal offence to use a non approved meter for billing.

- At least 90% of energy consumption in building larger than 500m2 must be accounted for
- An energy performance certificate demonstrating compliance is required for every building
- Automatic meter reading (AMR) in all new buildings over 1000m2 must be incorporated
- Additional metering would be required for plant items with input powers greater than or equal to those shown.

Havells offers a comprehensive solution to metering and measuring energy consumption in buildings. The key for Havells is our understanding of regulations, future requirements for metering and what it means to the installer.

The range of metering solutions includes both integrated and retrofit with features such as ease of install, pre-configuration (reducing risk of errors) and MID options making the installers life easy when considering metering.

Plant item	Rated input power (kW)
Boiler installations comprising one or more boilers or CHP plant feeding a common distribution circuit	50
Chiller installations comprising one or more chiller units feeding a common distribution circuit	20
Electric humidifiers	10
Motor control centres providing power to fans and pumps	10
Final electrical distribution boards	50



What is MID?

The Measuring Instruments Directive (MID) was introduced by the European Commission to promote free trade of measuring instruments throughout Europe.

Any meter used for billing of electricity, must be either MID approved or approved under UK national legislation. Meters already installed, that were approved under UK national legislation prior to October 2006 may remain installed indefinitely, as long as they are measuring accurately. Any new meter manufactured and approved after October 2006 must be approved under the MID regulations. In the UK, the MID is applicable for loads up to 100kW. After October 2016 every new meter installed for billing must be MID approved. It is a criminal offence to use a non approved meter for billing.

For MID metered boards - see pages 14 & 26

A Guide to Surge Protection

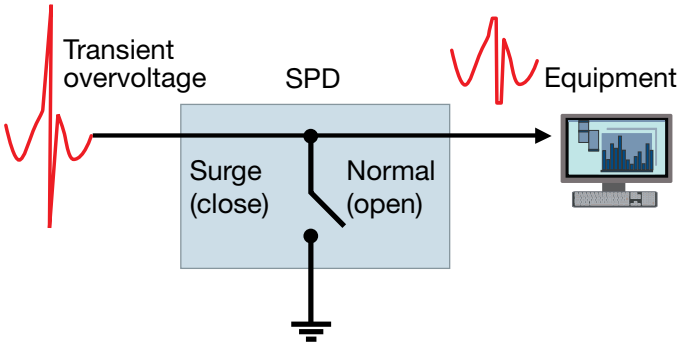
Havells and Furse®

Furse® is a world leader in the design, manufacture and supply of earthing and lightning protection systems.

A Havells / Furse® strategic alliance offers fully type tested solutions of complete assemblies, including Type A/B distribution boards and MCCB panel boards. This concept is unique to the current selection of surge protection devices within an electrical system as a proven level of energy let through voltage can be confirmed for a complete assembly and not simply sub components. (certificates can be found in our technical section).

The configuration of surge protection devices within each assembly has been standardised to reduce installation variables to ensure that a surge protection devices operates at optimum performance maintaining the integrity of the electrical system.

- Fully type tested solutions validated by Furse® (Thomas and Betts).
- Standardised kits to reduce installation variables for optimum performance.
- Compliance to BS EN62305 and IET Wiring Regulations, BS 7671:2008 (+A1:2011).



SPD function

The lightning discharge or transient overvoltage is impeded from reaching further into the structure and is instead diverted safely to earth. In doing so, the SPD prevents dangerous sparking through flashover and also protects equipment.

The following pages will guide you through the key areas you need to understand regarding surge protection and the impact of transient voltage

- What is transient overvoltage?
- Damage and degradation to electrical equipment caused by transient overvoltage
- Protecting electrical installation against transient overvoltage using surge protection
- Legal requirements of surge protection
- Selecting the correct surge protection

Transient overvoltage protection

Sensitive and critical equipment connected to the electrical system must be protected against transient overvoltages in accordance with BS EN 62305 and the latest amendment to the IET Wiring Regulations, BS 7671:2008 (+A1:2011).

Transient overvoltages are short duration, high magnitude voltage peaks with fast rising edges, often described as a 'spike' or a 'surge', which can reach up to 6kV in a well-insulated power distribution system (see Figure 1).

They are mostly caused by:

- Indirect lightning activity (up to 1km away), which can enter a building via connected metallic service lines through resistive or inductive coupling (see Figures 2 and 3),
- The electrical switching of large inductive loads (e.g. air conditioning units, lifts and transformers) within buildings, or
- Direct lightning strikes, where partial lightning currents in an external lightning protection system (LPS) or other conductive parts attempts to flash over to internal metallic installations

Transient overvoltages degrade and damage electronic systems, leading to disruption, expensive downtime and fire/electric shock hazard.

This can have severe consequences to life, to commercial & industrial activity, and to the provision of critical public services.

Degradation of Electrical equipment in the building, by transient overvoltages begins from the point that the susceptibility level of electrical equipment is exceeded (if unknown, calculated as twice the peak operating voltage of the electrical system, approximately 715V for 230V supplies).

Transient overvoltages affecting equipment susceptibility occur on the active conductors, i.e. between phase and neutral in the electrical system.

Outright damage is caused when transient overvoltages exceed the equipment's withstand voltage, typically 1.5kV for sensitive equipment such as computers etc. The transient overvoltages occur between the active conductors and the protective conductor, i.e. phase/neutral to PE.

Protection against transient overvoltages is vital for sensitive and critical electrical equipment, and is achieved in accordance with BS 7671 and BS EN 62305 through the installation of Surge Protective Devices (SPDs).

Surge protection within the Havells PowerSafe Distribution board range has been optimized through testing with Furse®. The combined solution achieves the lowest possible let through voltage and removes many of the installation variables associated with SPD's. Uniquely, the Havells / Furse® solution provides a tested level of system performance at the Distribution board.

This SPD solution achieves the only proven installed protective performance below equipment susceptibility level available today.

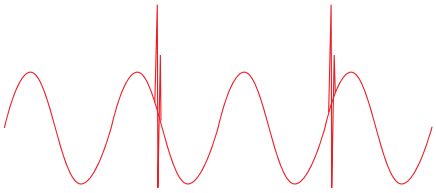


Figure 1: Example of a transient overvoltage 'surge'

Much more frequent than direct lightning strikes, transient overvoltages cause damage and long term degradation of electronic systems, leading to costly downtime and disruption if these systems fail completely.

Transient overvoltages from indirect lightning can enter a structure via connected metallic service lines (mains power or data communications lines), as a result of resistive or inductive coupling (see Figures 2 and 3), where these metallic services are not protected by SPDs.

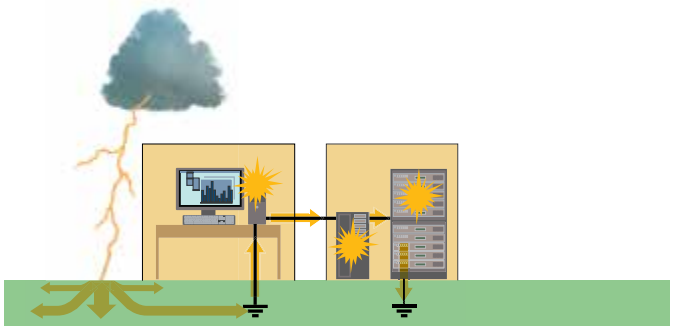


Figure 2: Resistive coupling

A nearby lightning strike injects a massive current into the ground. The current flows away from the strike point – preferentially through the path of least resistance.

Earth electrodes, electrical cables and the circuitry of the electronic equipment (once damaged), are all better conductors than soil. Partial lightning current therefore channels through the structure via separate earths, and as the current attempts to flow, devastating transient overvoltages occur across the sensitive components of the equipment.

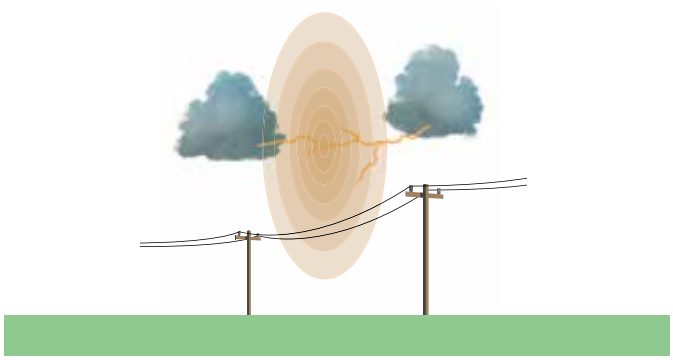


Figure 3: Inductive coupling

Lightning discharges give rise to an electromagnetic field. If metallic service lines pass through this electromagnetic field a voltage will be picked up by, or induced onto, the lines.

Transient overvoltages can therefore enter a structure via these connected metallic services, and damage electronic systems as the overvoltage attempts to flow to earth.

Protecting electrical installations against transient overvoltages using SPDs

British Standard BS EN 62305:2011 Protection against lightning and the IET Wiring Regulations 17th Edition, BS 7671:2008 (+A1:2011) define requirements for selection and installation of SPDs to protect against transient overvoltage risk.

SPDs are recommended as follows, according to the installation:

- Lightning current/equipotential bonding SPDs (Type 1 or Combined Type 1+2) to protect against flashover – required on incoming/outgoing metallic service lines which have 'live cores' if a building includes an external LPS or overhead service lines at risk from a direct lightning strike
- Transient overvoltage SPDs (Type 2/Type 3 or Combined Type 2+3) to protect against transient overvoltages caused by indirect lightning strikes and switching events

For either Type, the function of the SPD is to limit transient overvoltages to a safe level by diverting excess energy either to earth or away from the sensitive and critical electrical equipment (see Figure 4).

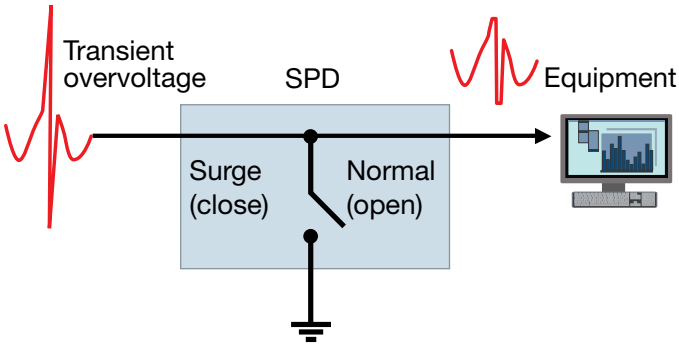
BS 7671 and BS EN 62305 make clear however that installation of lightning current/equipotential bonding SPDs alone provides no effective protection against failure of sensitive and critical electronic systems.

Transient overvoltage SPDs should be installed downstream at sub-distribution boards and at critical electrical equipment to ensure effective protection.

BS 7671 gives guidance, through Sections 443 & 534, on transient overvoltage protection of AC power supplies to ensure satisfactory electrical installation, which includes:

- SPD installation as close as practicable to the origin of the supply, generally in the main distribution board, after the meter – to counter incoming high level transient overvoltages at the service entrance
- SPD installation as close as practicable to terminal equipment (sub-distribution level or local to critical equipment) – to cover risk from voltage oscillations within the electrical system
- Short connecting leads (ideally less than 0.25m) between the SPD and the conductor – to reduce risk of additive inductive voltages after the SPD
- SPD coordination throughout the installation

The Havells PowerSafe solution with Furse® SPD kit has been specifically designed to achieve all these requirements. Furse® SPD kits are available for all Havells PowerSafe main distribution and sub-distribution boards, and are supplied with a standard cable loom, to ensure the shortest possible lead length between the SPD and distribution board.



SPD Coordination

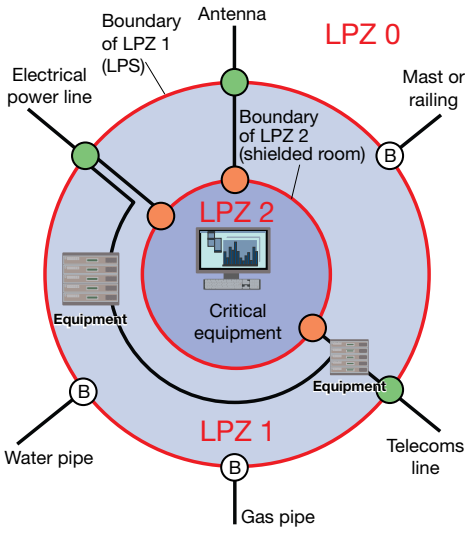
Coordination of SPDs within the electrical installation is required by both BS 7671 and BS EN 62305.

BS EN 62305 establishes that the coordinated SPD approach to transient overvoltages requires the creation of a series of 'Lightning Protection Zones' (LPZs). Within the LPZ concept, zones are defined within a building based on the level of risk, with each zone having successively less exposure to transient overvoltages.

Appropriate SPDs are fitted wherever service lines cross from one LPZ to another to create a series of SPDs whose locations and let-through voltages are coordinated in such a way as to ensure equipment protection. Figure 5 provides an example of the basic LPZ concept.

For practical installation purposes on AC power lines, the boundaries between LPZs are expected to be at the service entrance/main distribution board, sub-distribution board and terminal equipment levels.

Poor coordination could mean that the downstream SPDs or terminal equipment are subject to too high a transient overvoltage. Use of SPDs from a single manufacturer however, as per the Havells/Furse® solution, will ensure SPD coordination across all LPZs.



SPD 0/1 - Lightning current protection

SPD 1/2 - Overvoltage protection

(B) Connected service directly bonded

Figure 5: LPZ concept/ coordinated SPDs

LPZ 0 (outside the structure) is where the threat of lightning currents and fields is most severe, whereas at LPZ 2 (within the structure) the threat of lightning surge energy is considerably reduced such that electronics can be safely located there.

A lightning current/equipotential bonding SPD is installed at the service entrance (LPZ boundary 0/1) to handle the majority of surge energy, sufficiently relieving transient overvoltage SPDs (LPZ boundary 1/2) installed downstream (typically at sub-distribution level or local to critical equipment) to control transient overvoltages to safe levels.

Note: within the illustration, 2 internal zones are shown for simplicity, although more zones may be applicable dependent on the installation/equipment to be protected.

The benefits of choosing the Havells/Furse® solution

Havells Type 'A' SPN, Type 'B' TPN and MCCB distribution boards are available with Furse® ESP mains power SPD kits, which can be quickly and easily installed either in the metering section (MCCB boards) or in the enclosure provided (Type 'A' SPN or Type 'B' TPN boards).

This innovative solution has been specifically designed and tested to ensure optimum transient overvoltage protection on AC power supplies, with controlled and verified installation performance to BS 7671 and BS EN 62305.

The combined Havells distribution board and Furse® SPD kit permits unrivalled specification for AC power distribution and transient overvoltage protection, including:

- A fully tested SPD to IEC Class III equipment level test, providing a proven low let-through voltage of 600V on 230V AC supplies, at the SPDs terminals
- Controlled installation between SPD and distribution board with supplied short length connecting leads ensuring minimal additive inductive voltages
- Installed performance of the SPD verified in line with the typical susceptibility level of equipment
- Combined Type 1+2+3 SPD performance for effective protection against both flashover and transient overvoltages
- Full Mode SPD capability for protection between all conductor combinations, L-E, L-N, N-E, ensuring continuous operation of electrical equipment
- Full SPD coordination on-site where Havells distribution boards are installed together with Furse® ESP mains power SPDs

The Havells/Furse® solution effectively removes all the product selection and installation variables of BS 7671 for transient overvoltage protection on AC power supplies.

Installation is hassle-free as all components and instructions are provided in the SPD kit, enabling contractors to progress quickly throughout the site without worrying about the effectiveness of the installed protection, saving both time and cost.

The Furse® ESP mains power SPD is an enhanced SPD to BS EN 62305, designed to protect both the susceptibility and withstand voltage of electrical equipment.

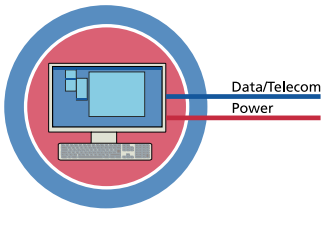
Once installed, it will provide reliable, long lasting transient overvoltage protection of the AC power supply, with the ability to withstand repeated transients and give clear pre end-of-life warning, allowing plenty of time for replacement, so as to ensure users are not left unprotected.

Selecting the correct Furse® SPD

Selection of the appropriate Havells Distribution Board with Furse® ESP mains power SPD depends on the installation point, in accordance with the chart below:

Installation location TN-S or TN-C-S supplies	Service entrance, after meter (main distribution board)	Sub-distribution board located > 10m from main distribution board	Critical terminal equipment located > 10m from sub-distribution board
No structural LPS fitted, underground mains supply feed[1]	Install: MCCB board + SPD kit **PSPB415M1** or Type 'B' TPN board + SPD kit **PSB415M1E**	Install: Type 'B' TPN board + SPD kit **PSB415M1E** or Type 'A' SPN board + SPD kit **PSA240M1E**	Install: Local SPD connected to equipment, such as the Furse ESP MC range
Structural LPS fitted, multiple connected metallic services known (gas, water, data, telecoms)[2]			

1. For installations where no structural LPS is installed and there is an exposed overhead mains supply, contact Havells.
2. For installations where a structural LPS is installed and connected metallic services (gas, water, data, telecoms) are unknown, contact Havells.



WARNING Equipment is **ONLY** protected if **all** incoming lines have protection fitted

IMPORTANT NOTE:

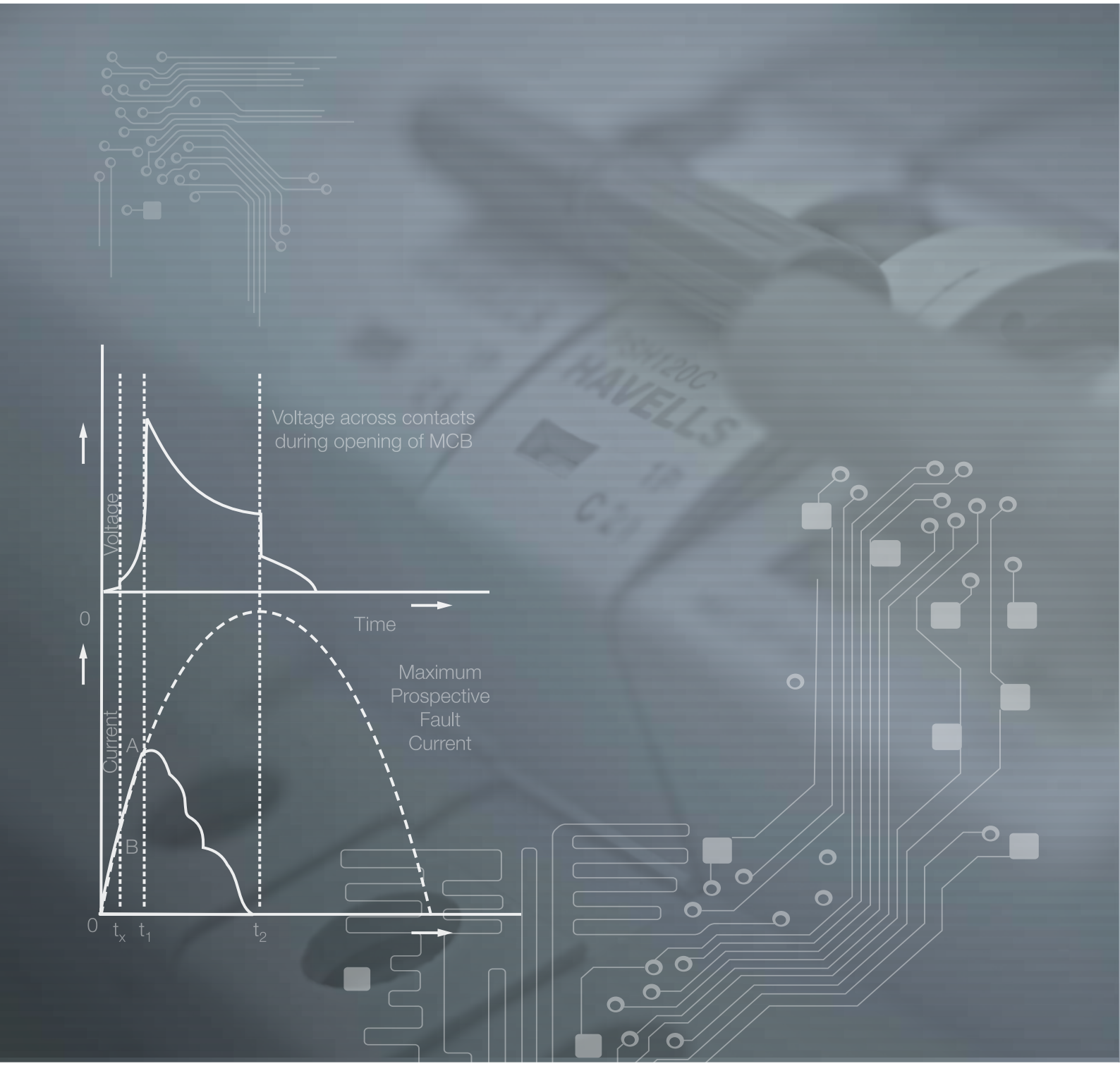
Installation of Furse ESP mains power SPDs only reduces risk of transient overvoltages entering the structure on mains power lines where the protectors are installed. Transient overvoltages may enter the structure via any metallic services connected to it. For full protection, installation of SPDs to protect all incoming and outgoing services (mains/data) needs to be assessed.

Furthermore, it should not be considered that installation of Furse ESP mains power SPDs alone constitutes a Lightning Protection System for a structure.

Lightning protection for structures must be risk assessed in accordance with BS EN 62305 in order to ensure all appropriate protection measures are taken (external and internal lightning protection system/LEMP protection). For further reference see British Standard BS EN 62305, or the Furse Guide to BS EN 62305 (available at www.furse.com).

Furse is a brand owned by Thomas & Betts Corporation.

Technical specification



Type ‘A’ Distribution Boards and Enclosures

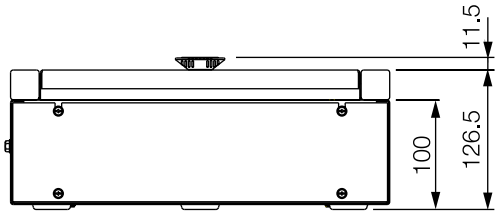
A Type General Characteristics

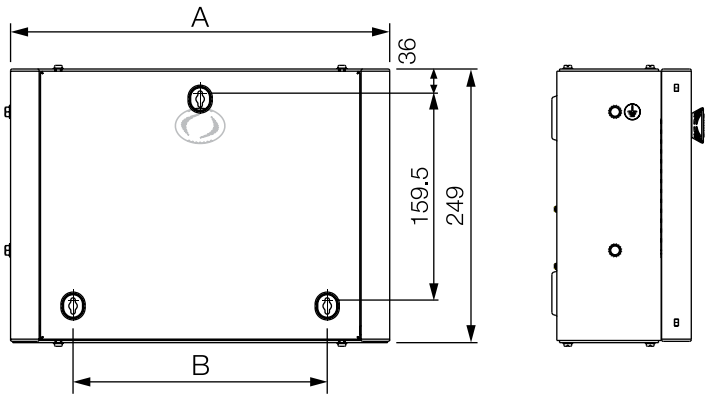
IP Rating	IP3X
Paint Specification	RAL 7035 epoxy powder coating
Conditional Short Circuit Rating	15kA to BS EN 61439-3

Cable Capacities

100 Switch Disconnector	35mm^2
100A RCCB	35mm^2
Enclosure Earth Stud	M6
Incoming earth terminal	25mm^2
Incoming neutral terminal	50mm^2
Outgoing earth terminal	25mm^2
Outgoing neutral terminal	25mm^2

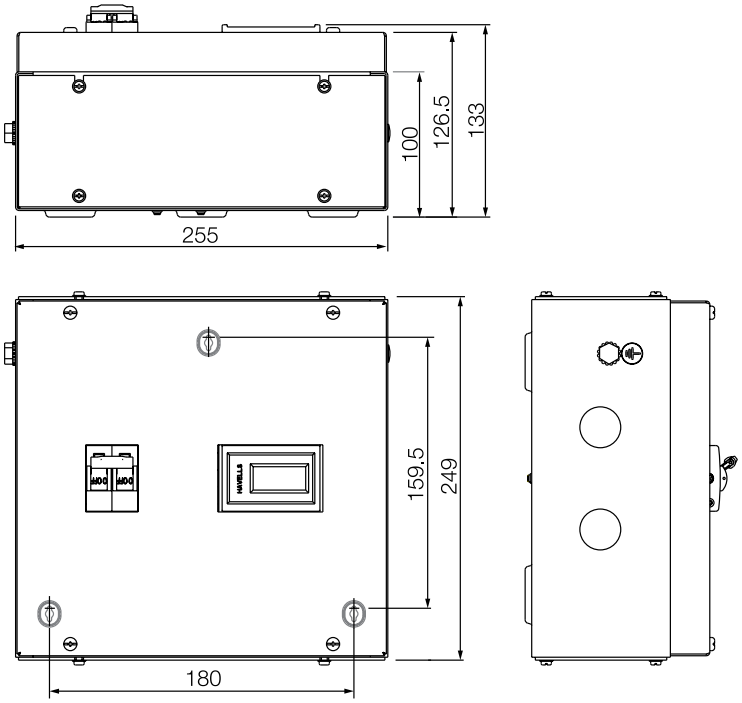
100A SPN Type ‘A’ Distribution Boards (PSA4-PSA16)



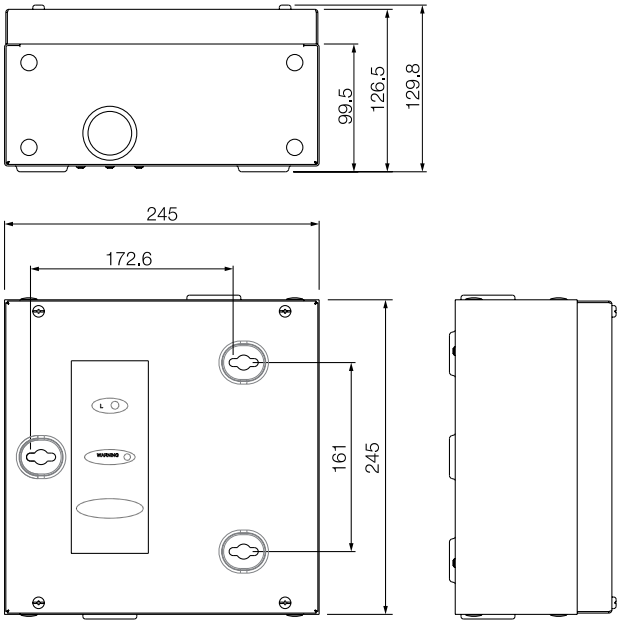


Way	Dimension (mm)		Part No.
	A	B	
4	237	162	PSA4
7	291	216	PSA7
10	345	270	PSA10
13	399	324	PSA13
16	453	378	PSA16

Metered Enclosure for SPN Type ‘A’ Distribution Boards (PSAM100MID)



Surge Protection Enclosure For SPN Type ‘A’ Distribution Boards (PSA240M1E)



Type ‘B’ Distribution Boards and Enclosures

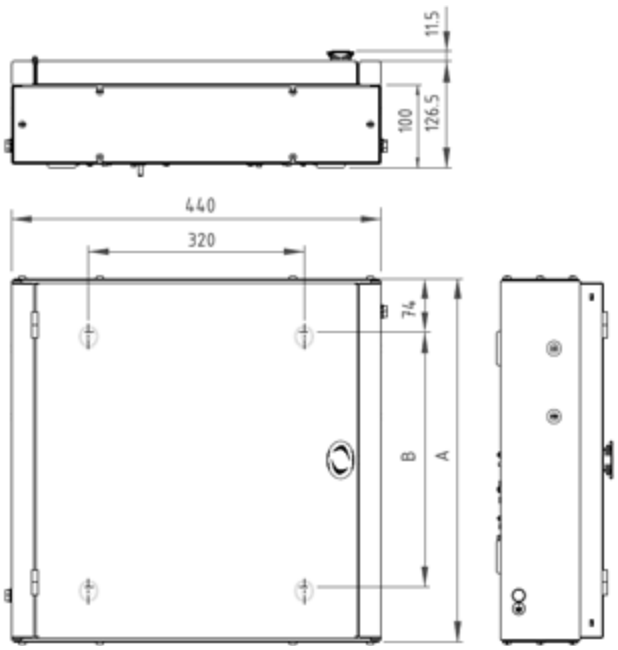
B Type General Characteristics

IP Rating	IP3X
Paint Specification	RAL 7035 epoxy powder coating
Conditional Short Circuit Rating	25kA to BS EN 61439-3

Cable Capacities

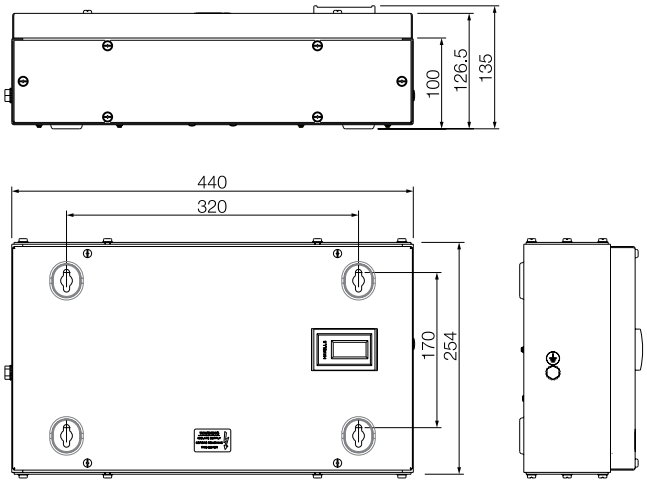
125 Switch Disconnector	50mm^2
100A RCCB	35mm^2
Enclosure Earth Stud	M8
Incoming earth terminal	50mm^2
Incoming neutral terminal	50mm^2
Outgoing earth terminal	25mm^2
Outgoing neutral terminal	25mm^2

125A TPN Type ‘B’ Distribution Boards (PSB41-PSB181)

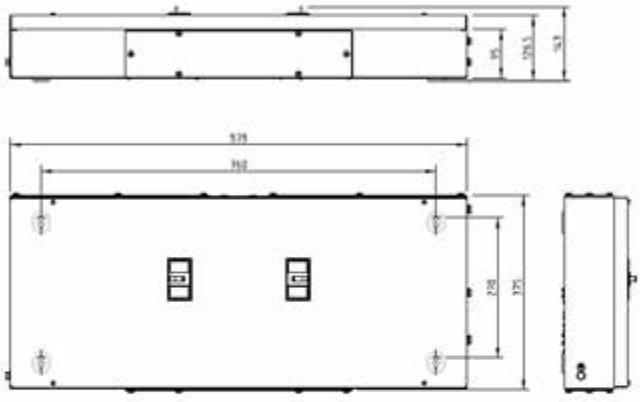


Way	Dimension (mm)		Part No.
	A	B	
4	432	268	PSB41
6	486	322	PSB61
8	540	410	PSB81
12	702	572	PSB121
18	945	815	PSB181

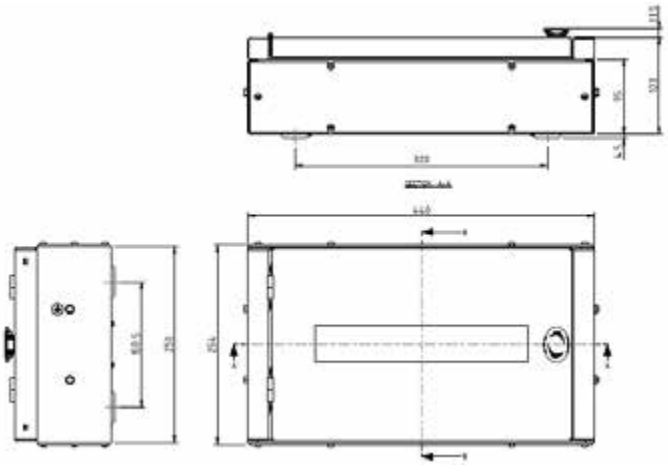
125A Meterpack for Type ‘B’ Distribution Boards (PSBMP125MID)



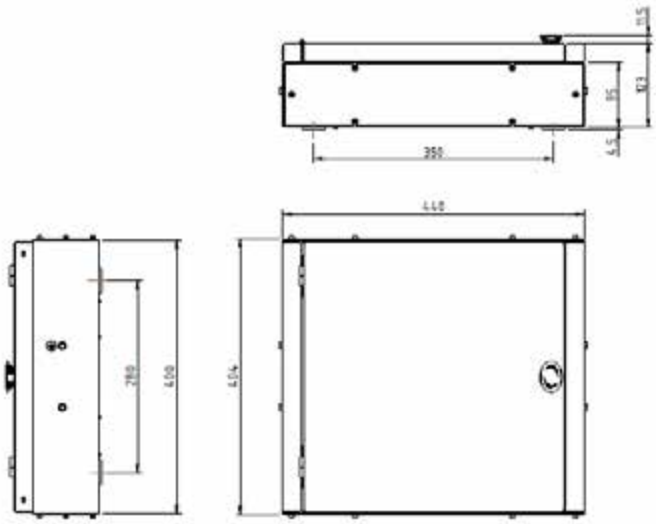
250A Splitter Module for TPN Distribution Boards (PSB250SM)



PSME15D

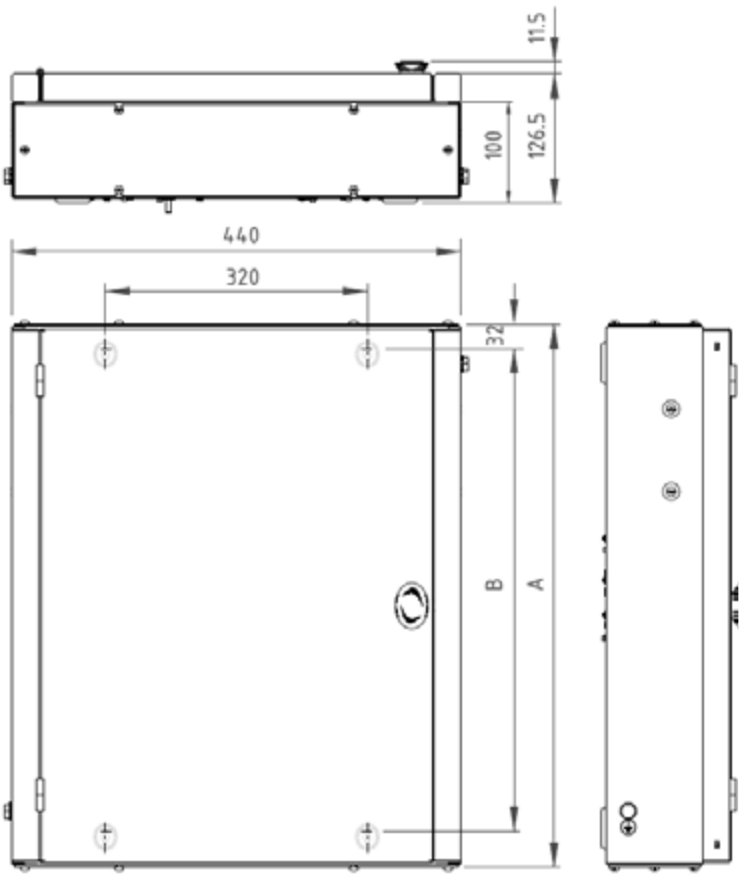


PSME30D



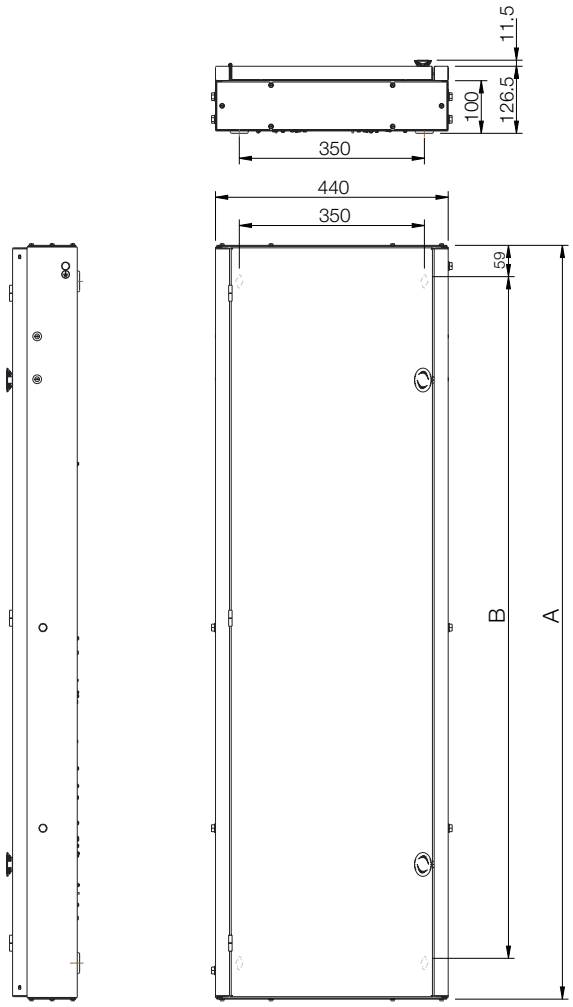
Type ‘B’ Distribution Boards and Enclosures

125A TPN Type ‘B’ Distribution Board with integral multifunction meter (PSB61M-PSB181M)



Way	Dimension (mm)		Part No.
	A	B	
6	581	500	PSB61MID
12	799	716	PSB121MID
18	1040	959	PSB181MID

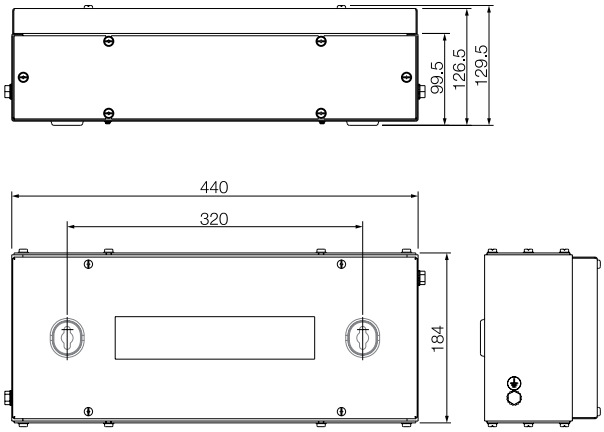
250A TPN Type ‘B’ Distribution Boards (PSB62-PSB242)



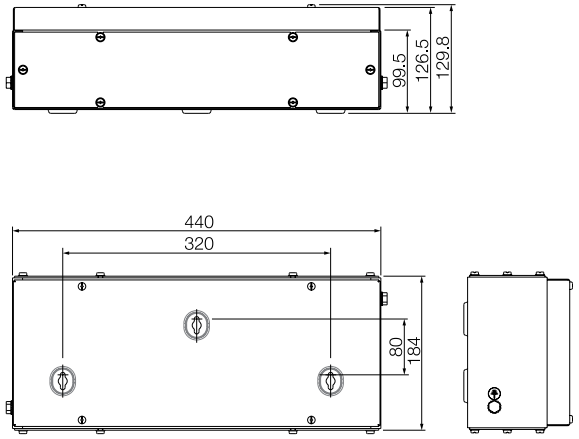
Way (250A)	Dimension		Part No.
	A (mm)	B (mm)	
6	956	820	PSB62
12	1118	982	PSB122
18	1263	1127	PSB182
24	1425	1289	PSB242

Type ‘B’ Distribution Boards and Enclosures

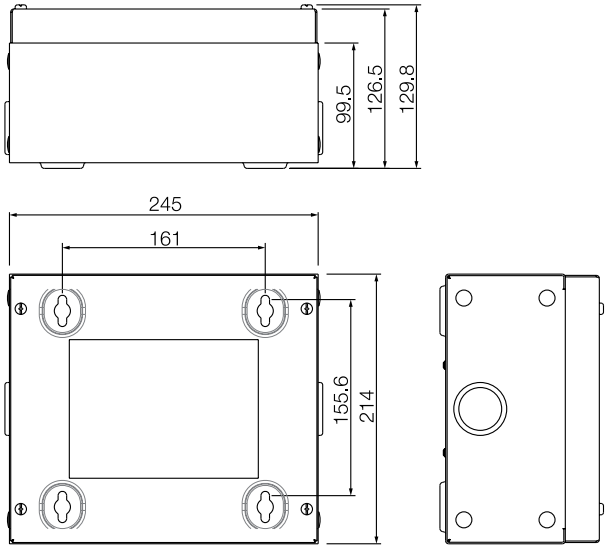
Modular enclosure for Type ‘B’ Distribution Boards, 12 module din rail glazed door (PSME12G)



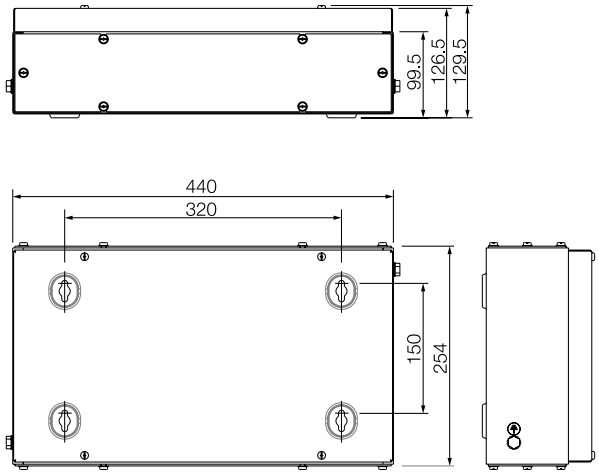
Cable extension box for Type ‘B’ Distribution Board 180mm (PSBEX180)



Surge Protection Enclosure for TPN Distribution Board (PSB41SM1E)

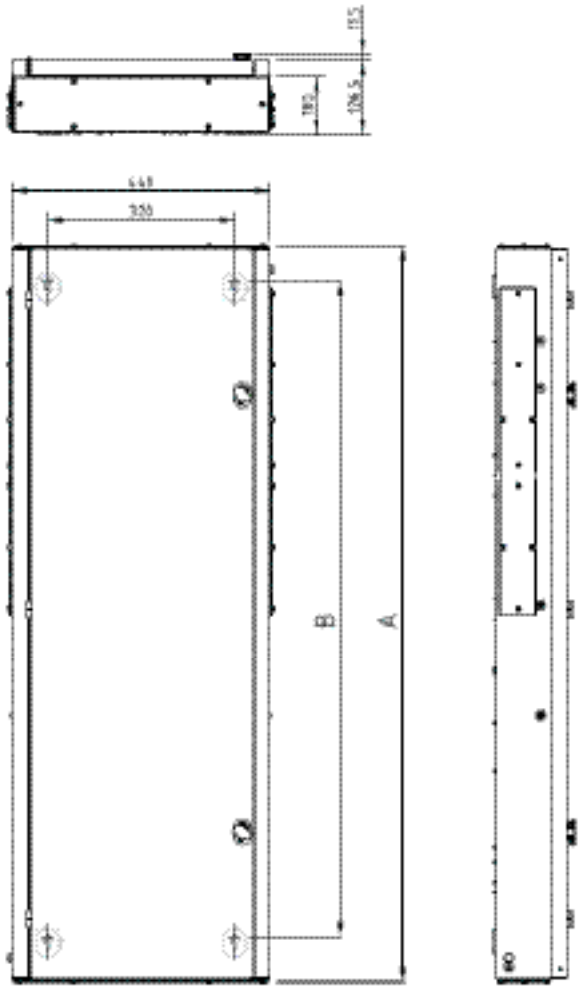


Cable extension box for Type ‘B’ Distribution Board 250mm (PSBEX250)



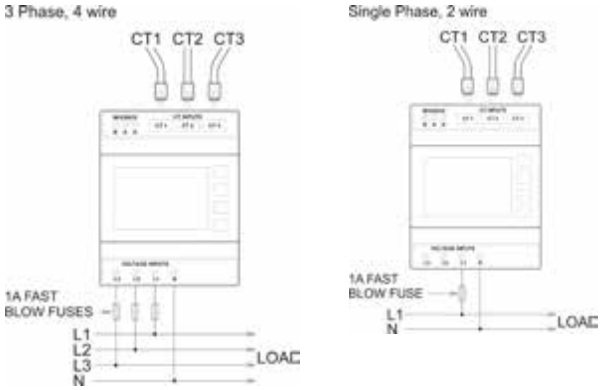
Tri-Load Dimension and Meter Specification

200A TPN Type ‘B’ Tri-Load Distribution Boards



Way (200A)	Dimension		Part No.
	A (mm)	B (mm)	
2+4+6	1256	1120	PSBTL246, PSBTL4P246, PSBTL246R, PSBTL246MID
2+6+10	1418	1282	PSBTL2610, PSBTL4P2610, PSBTL2610R, PSBTL2610MID
2+10+12	1580	1444	PSBTL21012, PSBTL21012R, PSBTL21012MID

Tri-Load Meter Wiring Diagram



Warning.

It is essential that the primary current is isolated BEFORE connecting or disconnecting the secondary current connections.

Tri-Load Meter Specification

Direct measurement of 173 to 400V AC L-L (100 to 230Vac L-N)

Range of Use

Values of measured quantities, components of measured quantities, and quantities which affect measurement errors to some degree, for which the product gives meaningful readings:

Voltage	:	31... 120% of range maximum
Current	:	1... 120% of nominal
Active power	:	1... 144% of nominal
Apparent power	:	1... 120% of nominal

Power is only registered when voltage and current are within their respective range of use.

Accuracy

Voltage (V)	0-5% of range maximum
Current (A)	0-5% of range maximum
Neutral current calculated (A)	4% of range maximum
Frequency (Hz)	0-2%
Power factor (PF)	1% of unity
Active power (W)	± 1% of range maximum
Reactive power (VAr)	± 1% of range maximum
Apparent Power (VA)	± 1% of range maximum
Active energy (kWh)	Class 1 (IEC 62053-21) section 4.6[1]
Reactive energy (kVArh)	Class 2 IEC 62053-23[2]
THD	1% up to 31st harmonic
Response time to stap	1s typical to>99%

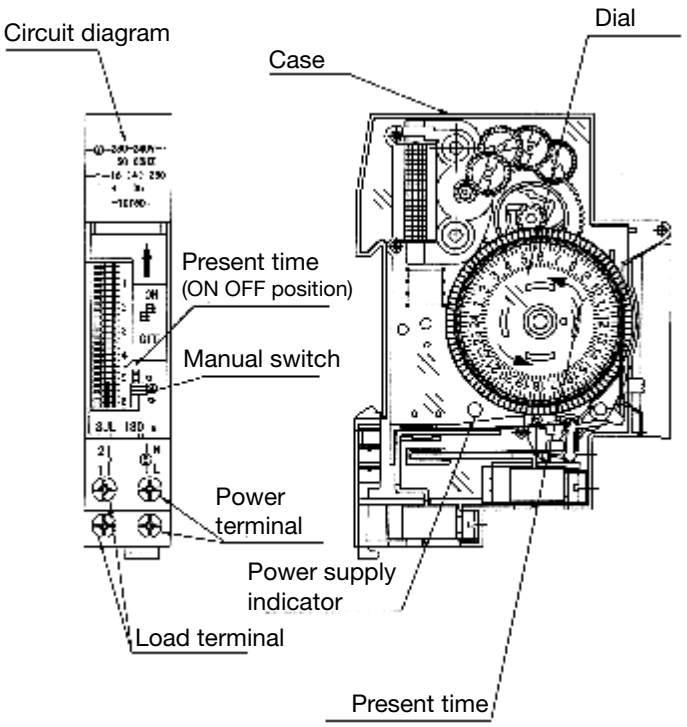
Modular Devices and Enclosures

Time Switches

Analogue Time Switch 1Channel

Technical Data

Rated Voltage	:	230V – 240V
Frequency	:	50-60 Hz
Own consumption	:	Max 1W
Contact	:	Zero, less then 3mm
Switching Power	:	16A, 250V COS =1 12A, 250V COS = 0.7
Incandescent lamp load	:	2300W
Halogen lamp load	:	2300W
Timing basic	:	Quartz
Working Precision	:	<+1 sec/ day
Shortest switching time	:	15 mins
Display	:	Mechanical dial
Operating control	:	Dial
Power Reserve	:	72 hours
Weight	:	85 g

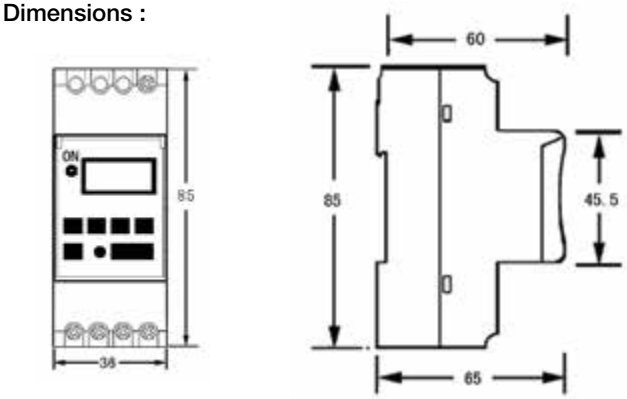


Digital Time Switch 1 Channel

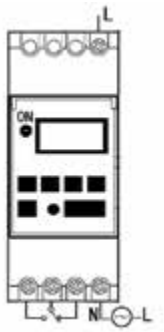
Technical Data

Voltage limit	:	AC220V ~ 240V 50Hz
On/off operation	:	8on & 8off
Minimum interval	:	1 minute
Weight	:	Approx 150g
Display	:	LCD
Battery backup	:	15 day
Number of circuits	:	1 NO / NC
Load capacity	:	16A 250VAC (ohmic load cos Ø=1)
Service life	:	Mechanically 107, Electrically 105
Ambient temperature	:	0~40 ˚C
Storage temperature	:	-20~70 ˚C
Power consumption	:	5VA

Dimensions :



Connections:

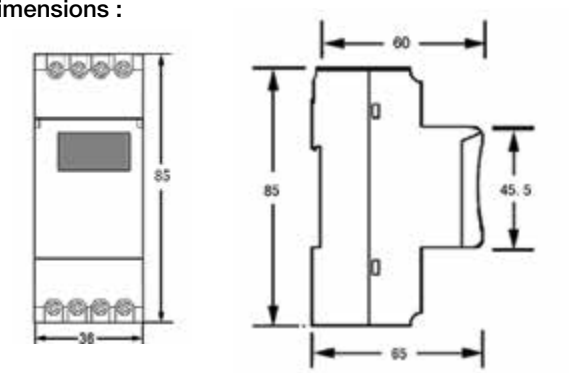


Digital Time Switch 2 Channel

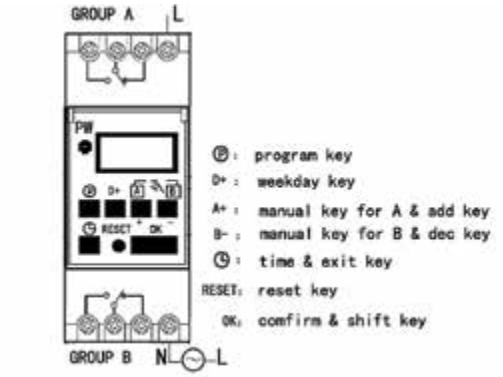
Technical Data

Voltage	:	AC200V~240V 50HZ
Clock precision	:	_2 Second/day (25 ˚C)
Set numbers for on/off	:	4 ON and 4 OFF each
Power Consumption	:	<4VA
Display	:	LCD Display
Electric life	:	105
Mechanical life	:	107
Number of contacts	:	2NO / 2NC
Control current COSØ=1)	:	Resistance Load: 16A/250VAC
Induction Load	:	8A/250VAC COSØ=0.6)
Operation temperature	:	0~+40 ˚C
Humidity	:	35~85%RH
Weight	:	About 125g
Charge Reserve (With Lithium Battery)	:	2 years approx (if not powered)

Dimensions :



Connections:



Bell Transformer

Designed for bell circuits with a rated input voltage 230V~ and rated frequency 50/60Hz which require a low voltage output.

Technical Data

Rated Input Voltage	:	230V~
Rated Output Voltage	:	8, 16, 24V
Rated Frequency	:	50/60Hz
Rated Power Output	:	8VA
Power Consumption	:	1.15W
Max Cable Capacity	:	10mm2

Modular Contactors

Standard – IEC 60195

- Thermal Rating per pole (AC7a) – 20A, 25A, 40A, 63A
- Control Circuit/ Coil – 230V
- Normally Open and Closed options Available:
  - ✓ 20A – 2 Pole Normally Open/ Closed
  - ✓ 25A – 2 Pole Normally Open/ Closed
  - ✓ 40A – 4 Pole Normally Open/ Closed
  - ✓ 63A – 4 Pole Normally Open / Closed
- Conductor Cross Section, Control Circuit to – 25mm2
- Conductor Cross Section, Main Circuit to – 10mm2 solid/ 6mm2 stranded

Modular Contactors Technical Data

	Type			PSC202	PSC254	PSC404	PSC634	Unit of Measure
GENERAL	Standards			IEC/EN 61095, IEC/EN 60947-4-1, IEC/EN 60947-5-1				
	Module width			1	2	3		
	Ambient temp.				-5 ...+55			°C
	Storage temp.				-30 ...+80			°C
	No. of contactors (side-by-side)			max. 3 (<40°C) max. 2 (40-55°C)	no limitation	max. 3 (<40°C) max. 2 (40-55°C)		
	Contact reliability			17V; ≥50 mA				
	Min. distance of open contacts			3.6				mm
	Power dissipation per pole			1.7	1.7	4	8	W
	Overload current withstand capability			72	68	176	240	A
	Max. back-up fuse for short-circuit protection gL Coordination type 2			20	25	63 300	80	A
	Max. operating frequency	AC-1/AC-3/ AC-5b/AC-6b				600		op. c./h
		AC-15				1,200		
		no load				3,000		
	Weight			0.13	0.24	0.42	0.42	kg
	Rated insulation voltage			230	440	400		V
	Rated impulse withstand voltage			4				kV
	Thermal current			20	25	40	63	A
	Rated operational voltage			230	400			V
	Rated frequency			50/60				Hz
	Rated operational current	AC-1/AC-7a		20	25	40	63	A
	Operational power AC-1/AC-7a	1-pole	230 V	4	5.4	8.7	13.3	
		3-pole	230 V	-	9	16	24	kW
		3-pole	400 V	-	16	26	40	

	Type			PSC202	PSC254	PSC404	PSC634	Unit of Measure
GENERAL	Electrical endurance	AC-1/AC-7a		2,00,000		1,00,000		op.c
	Rated operational current	AC-3/AC-7b		9	8.5	22	30	A
	Operational power	1-phase motor	230V	1.3[2)]	3.7[2)]	5[2)]		1.3 only for NO[1)]
	AC-3/AC-7b	3-phase motor	230V	-	2,2	5.5	8.5	kW
		3-phase motor	400V		4	11	15	
MAIN CIRCUT	Electrical endurance	AC-3/AC-7b		3,00000	5,00,000	150,000	150,000	op.c
	Switching of capacitors	AC-6b	230V	30	36	220	330	µF
	Electrical endurance	AC-6b		2,00,000		1,00,000		op.c
	Rated operational current endurance	DC-1						
	1-pole	U	e = 24 V DC	20	25	40	63	
		U	e = 110 V DC	6	6	4	4	A
		U	e = 220 V DC	0.6	0.6	1.2	1.2	
	2-poles connected in series	U	e = 24 V DC	20	25	40	63	
		U	e = 110 V DC	10	10	10	10	A
		U	e = 220 V DC	6	6	8	8	
	3-poles connected in series	U	e = 24 V DC	-	25	40	63	
		U	e = 110 V DC	-	20	30	35	A
		U	e = 220 V DC	-	15	20	30	
	4-poles connected in series	U	e = 24 V DC	-	25	40		
		U	e = 110 V DC	-	20	40	63	A
		U	e = 220 V DC	-	15	40	63	
	Electrical endurance	DC-1		-	100000			op.c
	Terminal capacity		rigid flexible	M3.5		1.5…25 1.5…25		mm[2)]
	Screw			M3.5		M5		
	Screw head			PZ2		PZ2		
	Tightening torque			2		3		
AUXLIARY CONTACTSD	Rated operational voltage			230	400			Nm
	Coil consumption		switch-on	12/10	33/25	5/5	5/5	VA/W
			operation	2.8/1.2	5.5/1.6	5/5	5/5	
	Make/break delays		make	15_25	10_30	15_20	15_20	MS
			break	10_30	10_30	35_45	35_45	
CONTRTOL CIRCUIT	Terminal capacity		rigid	1....2.5				S
			flexible	1....2.5				
	Screw			M3,5		M3		
	Screw head			PZ1				
	Tightening torque			0.6				Nm

Type ‘A’ and ‘B’ Digital Metering Devices

PS6 - (PSB61MID, PSB121MID, PSB181MID, PSBDMPMID)

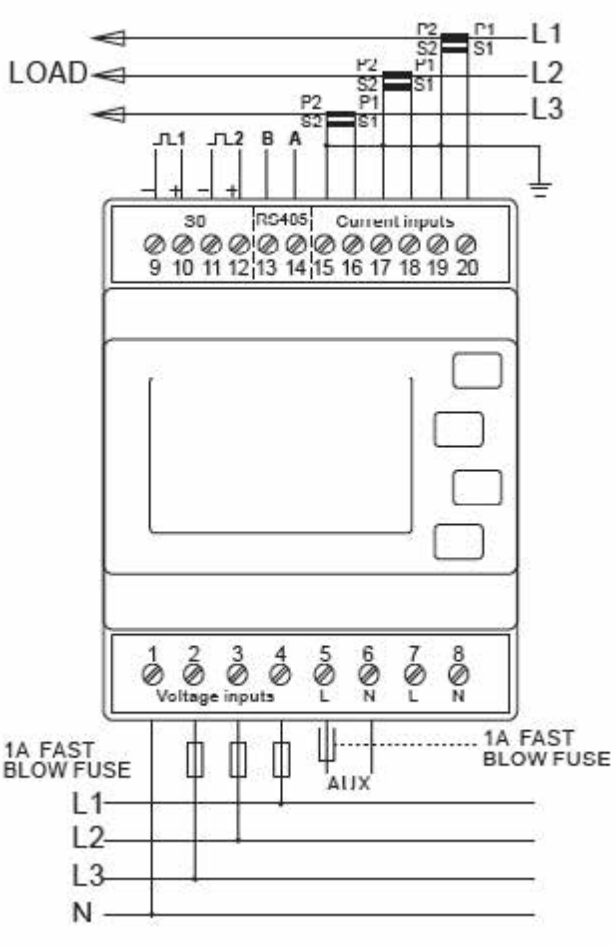
Parameters

- Phase to phase voltage
- Phase to neutral voltage
- Frequency
- Voltage total harmonic distortion (THD) current
- Neutral current (calculated)
- Current max demand
- Current total harmonic (THD)
- kW, kVA & kVAr
- Power max demand
- Power factor
- Import kWh
- Export kWh
- Import kVArh
- Export kVArh
- Total kWh (Active energy)
- Total kWArh (Reactive energy)

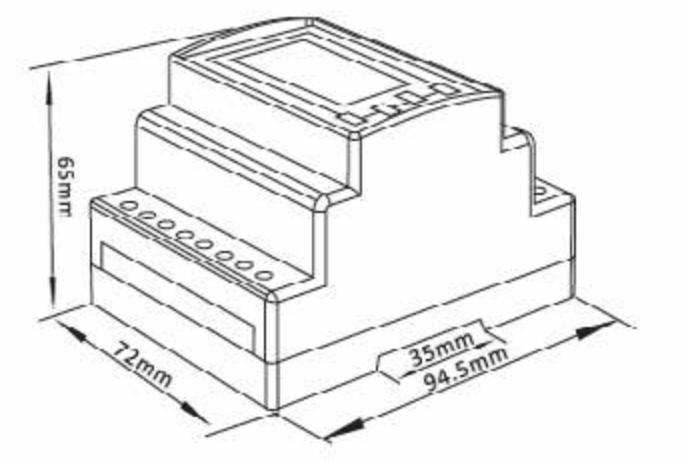
Accuracy

Voltage	0•5% of range maximum
Current	0•5% of nominal
Frequency	0•2% of mid-frequency
Power factor	1% of unity (0.01)
Active power (W)	±1% of range maximum
Reactive power (VAr)	±2% of range maximum
Apparent power (VA)	±1% of range maximum
Active energy (Wh)	Class 1 IEC 62052-21
Reactive energy (VARh)	±2% of range maximum
Total harmonic distortion	1% up to 31st harmonic
Temperature co-efficient	Voltage and current = 0.013%/°C typical

Wiring Diagram



Dimensions



Type ‘A’ and ‘B’ Digital Metering Devices

PS7 / PS8 - (PSAM100MID, PSMD1100MID, PSMD3100MID)

Parameters

PS7 - Single Phase Direct Connect 100A
PS8 - Three Phase Direct Connect 100A

Voltage and Current

- Phase to neutral voltage 176 to 276V a.c.
- Percentage total voltage harmonic distortion (THD%) for phase to N
- Phase current
- Current THD%

Power factor and Frequency and Max. Demand

- Frequency in Hz
- Instantaneous Power Power 0 to999MW
- Reactive Power 0 to 999MVAr
- Volt-amps 0 to 999 MVA
- Maximum demanded power since last Demand reset Power factor

Energy Measurements

- Imported active energy 0 to 99999.9 kWh
- Exported active energy 0 to 99999.9 kWh
- Imported reactive energy 0 to 99999.9 kVArh
- Exported reactive energy 0 to 99999.9 kVArh
- Total active energy 0 to 99999.9 kWh
- Total reactive energy 0 to 99999.9 kVArh

MID Approved

- Annex B & D

Accuracy

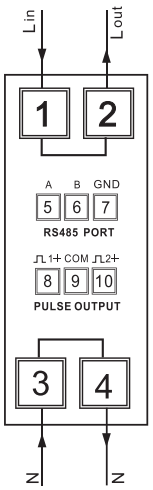
- Voltage 0•5% of range maximum
- Current 0•5% of nominal
- Frequency 0•2% of mid-frequency
- Power factor 1% of unity (0.01)
- Active power (W) ±1% of range maximum
- Reactive power (VAr) ±2% of range maximum
- Apparent power (VA) ±1% of range maximum
- Active energy (Wh) Class 1 IEC 62053-21
- Reactive energy (VARh) ±2% of range maximum
- Total harmonic distortion 1% up to 31st harmonic
- Temperature co-efficient Voltage and current = 0.013%/°C typical
- Active energy = 0•018%/°C, typical
- Response time to step input 1s, typical, to >99% of final reading, at 50 Hz.

Environment

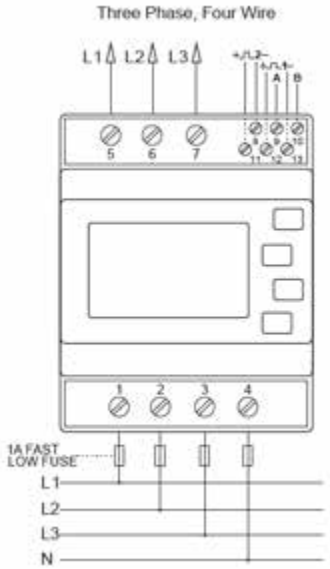
- Operating temperature -25°C to +55°C*
- Storage temperature -40°C to +70°C*
- Relative humidity 0 to 90%, non-condensing
- Altitude Up to 2000m
- Warm up time 1 minute
- Vibration 10Hz to 50Hz, IEC 60068-2-6, 2g
- Shock 30g in 3 planes

*Maximum operating and storage temperatures are in the context of typical daily and seasonal variation.

Wiring Diagram (PS7)



Wiring Diagram (PS8)



Type ‘A’ and ‘B’ Surge Protection Devices

Surge Protection devices have been designed to be installed on the left hand side of all distribution boards and MCCB panelboards.

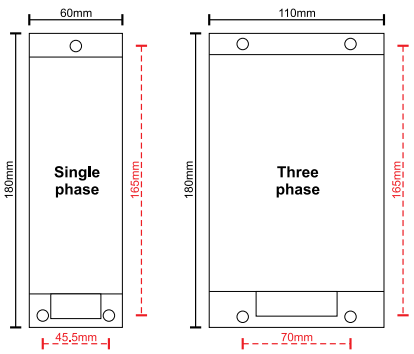
Electrical specification	(PS) ESP 240 M1	(PS) ESP 415 M1
Nominal voltage - Phase-Neutral Uo (RMS)	240V	240V
Maximum voltage - Phase-Neutral Uc (RMS)	280V	280V
Temporary Overvoltage TOV U_T[1]	350V	350V
Short circuit withstand capability	25kA, 50Hz	
Working voltage (RMS)	200-280V	346-484V
Frequency range	47-63Hz	
Max. back-up fuse (see installation instructions)	125A	
Leakage current (to earth)	<250µA	
Indicator circuit current	<10mA	
Volt free contact[2] – current rating – nominal voltage (RMS)	Screw terminal 1A 250V	

[1] Temporary Overvoltage rating is for a maximum duration of 5 seconds tested to BS EN/EN/IEC 61643.
[2] Minimum permissable load is 5V DC, 10mA to ensure reliable operation.

Transient specification Type 1 (BS EN/EN), Class I (IEC)	(PS) ESP 240 M1	(PS) ESP 415 M1
Nominal discharge current 8/20µs (per mode) In	20kA	
Let-through voltage Up at In[1]	900V	900V
Impulse discharge current 10/350µs limp (per mode)[2]	4kA	
Let-through voltage Up at limp[1]	750V	750V
Impulse discharge current (per phase) limp[3]	6.25kA	
Type 2 (BS EN/EN), Class II (IEC)		
Nominal discharge current 8/20µs (per mode) In	20kA	
Let-through voltage Up at In[1]	900V	900V
Maximum discharge current Imax (per mode)[2]	40kA	
Maximum discharge current Imax (per phase)	80kA	
Type 3 (BS EN/EN), Class III (IEC)		
Let-through voltage Up at Uoc[1] of 6kV 1.2/50µs and Isc of 3kA 8/20µs (per mode)[4]	600V	600V

[1] The maximum transient voltage let-through of the protector throughout the test (±5%), phase to neutral, phase to earth and neutral to earth.
[2] The electrical system, external to the unit, may constrain the actual current rating achieved in a particular installation.
[3] Rating is considered as the current capability of the protector for equipotential bonding near the service entrance.
[4] Combination wave test within BS 6651:1999 App. C, Cats C-Low & B-High, IEEE C62.41-2002 Location Cats C1 & B3, SS CP 33:1996 App. F, AS 1768-1991 App. B, Cat B, UL1449 mains wire-in.

Mechanical specification	(PS) ESP 240 M1	(PS) ESP 415 M1
Temperature range	–40 to +70°C	
Connection type	Screw terminal	
Conductor size (stranded)	16mm²	
Earth connection	Screw terminal	
Volt free contact	Connect via screw terminal with conductor up to 2.5mm² (stranded)	
Degree of protection (IEC 60529)	IP20	
Case material	Steel	
Weight – unit	0.6kg	1.0kg
– packaged	0.7kg	1.1kg



If you desire a protector with an extra high maximum surge current use the ESP M2 or M4 series. If your supply is fused at 16 amps, or less, the in-line protectors (ESP 240 (or 120-5A (or -16A) and their ready boxed derivatives) may be more suitable. If you need to mount the display panel separately from the main protector unit, use the ESP M1R series.

Transient Overvoltage Performance Test Certificate

Surge Protective Device (SPD):

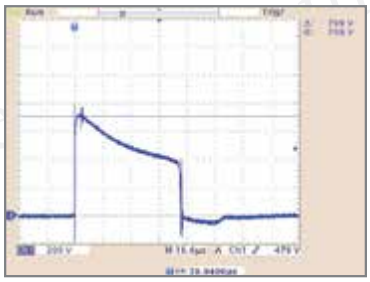
Furse ESP 415 M1

For installation in Havells distribution boards:

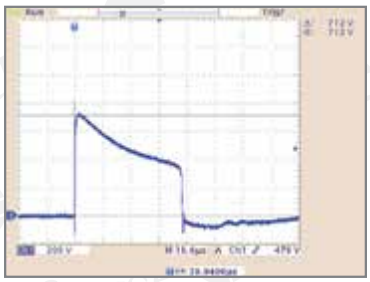
Type 'B' TPN: PSB41, PSB61, PSB61M, PSB81, PSB121, PSB121M, PSB181, PSB181M

The Havells/Furse solution combines best-in-class mains power distribution with transient overvoltage protection ensuring controlled and verified SPD installation in line with IET Wiring Regulations 17th Edition, BS 7671:2008(+A1:2011), for optimal protection of installed equipment.

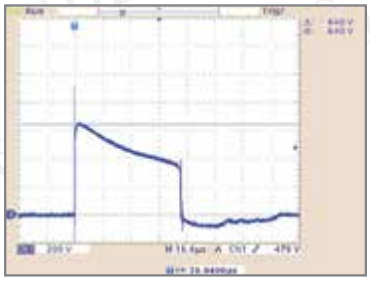
Installed performance test:
IEC 61643-11 Class III Combination waveform
6 kV (1.2/50 µs voltage) 3 kA (8/20 µs current)



Transient overvoltage performance L-N



Transient overvoltage performance L-PE



Transient overvoltage performance N-PE

Transient specification (at SPD terminals)	
Voltage protection level U_p at U_{oc} of 6 kV 1.2/50 µs and I_{sc} of 3 kA 8/20 µs (per mode)	600 V[1]

[1] The maximum transient overvoltage let-through the SPD throughout the test (±5%), phase to neutral, phase to earth and neutral to earth.

Transient specification (installed performance - SPD to Type 'B' TPN board)	
Target voltage protection level U_p: (2 x peak operating voltage, 230 V AC system)	715 V
L-N: Voltage protection level U_p at U_{oc} of 6 kV 1.2/50 µs and I_{sc} of 3 kA 8/20 µs (per mode)	708 V[2]
L-PE: Voltage protection level U_p at U_{oc} of 6 kV 1.2/50 µs and I_{sc} of 3 kA 8/20 µs (per mode)	712 V[2]
N-PE: Voltage protection level U_p at U_{oc} of 6 kV 1.2/50 µs and I_{sc} of 3 kA 8/20 µs (per mode)	640 V[2]

All testing performed in accordance with IEC 61643-11 Class III test 6 kV (1.2 µs voltage) 3 kA (8/20 µs current) for verifying SPD transient overvoltage protective performance at terminal equipment level.

[2] Typical values, subject to manufacturing component tolerances. Essential detail relates to voltage protection level U_p <715 V for effective protection below impulse immunity/susceptibility of equipment.

This document certifies that the Furse ESP 415 M1 SPD has been installed on the Havells Type 'B' TPN distribution board in accordance with best practice principles to IET Wiring Regulations 17th Edition, BS 7671:2008(+A1:2011) and tested to achieve the voltage protection levels (U_p) shown above.

Signed:

K. Herrington

Keith Herrington
R&D Manager, Furse ESP

Date: 12th July 2012

Havells UK: Longbow House, 14-20 Chiswell Street, London, EC1Y 4TW Tel: 0843 2275 388
Furse: Wilford Road, Nottingham, NG2 1EB Tel: 0115 964 3700

Transient Overvoltage Performance Test Certificate

Surge Protective Device (SPD):

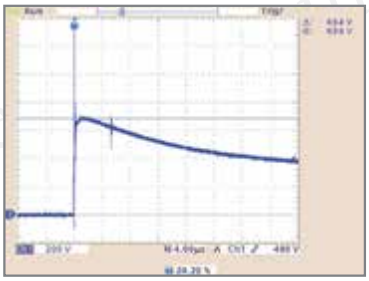
Furse ESP 240 M1

For installation in Havells distribution boards:

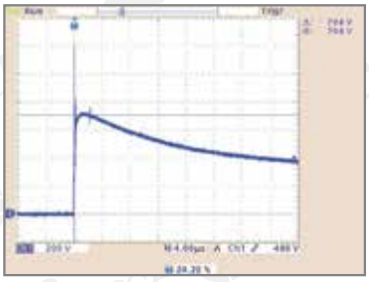
Type 'A' SPN: PSA4, PSA7, PSA10, PSA13, PSA16

The Havells/Furse solution combines best-in-class mains power distribution with transient overvoltage protection ensuring controlled and verified SPD installation in line with IET Wiring Regulations 17th Edition, BS 7671:2008(+A1:2011), for optimal protection of installed equipment.

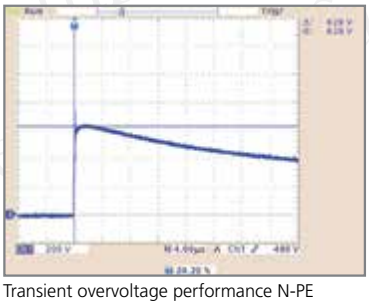
Installed performance test:
IEC 61643-11 Class III Combination waveform
6 kV (1.2/50 µs voltage) 3 kA (8/20 µs current)



Transient overvoltage performance L-N



Transient overvoltage performance L-PE



Transient overvoltage performance N-PE

Transient specification (at SPD terminals)	
Voltage protection level U_p at U_{oc} of 6 kV 1.2/50 µs and I_{sc} of 3 kA 8/20 µs (per mode)	600 V[1]

[1] The maximum transient overvoltage let-through the SPD throughout the test (±5%), phase to neutral, phase to earth and neutral to earth.

Transient specification (installed performance - SPD to Type 'A' SPN board)	
Target voltage protection level U_p: (2 x peak operating voltage, 230 V AC system)	715 V
L-N: Voltage protection level U_p at U_{oc} of 6 kV 1.2/50 µs and I_{sc} of 3 kA 8/20 µs (per mode)	684 V[2]
L-PE: Voltage protection level U_p at U_{oc} of 6 kV 1.2/50 µs and I_{sc} of 3 kA 8/20 µs (per mode)	704 V[2]
N-PE: Voltage protection level U_p at U_{oc} of 6 kV 1.2/50 µs and I_{sc} of 3 kA 8/20 µs (per mode)	628 V[2]

All testing performed in accordance with IEC 61643-11 Class III test 6 kV (1.2 µs voltage) 3 kA (8/20 µs current) for verifying SPD transient overvoltage protective performance at terminal equipment level.

[2] Typical values, subject to manufacturing component tolerances. Essential detail relates to voltage protection level U_p <715 V for effective protection below impulse immunity/susceptibility of equipment.

This document certifies that the Furse ESP 240 M1 SPD has been installed on the Havells Type 'A' SPN distribution board in accordance with best practice principles to IET Wiring Regulations 17th Edition, BS 7671:2008(+A1:2011) and tested to achieve the voltage protection levels (U_p) shown above.

Signed:

K. Herrington

Keith Herrington
R&D Manager, Furse ESP

Date: 12th July 2012

Havells UK: Longbow House, 14-20 Chiswell Street, London, EC1Y 4TW Tel: 0843 2275 388
Furse: Wilford Road, Nottingham, NG2 1EB Tel: 0115 964 3700

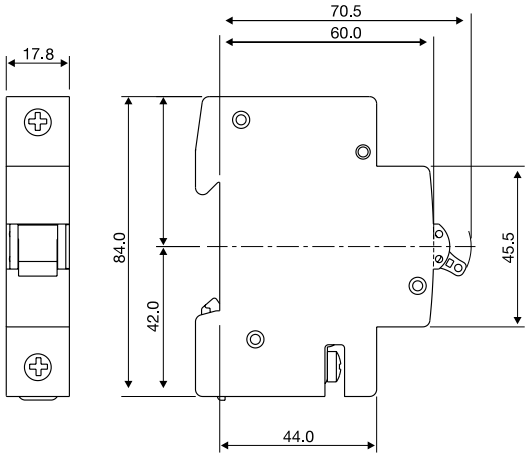
Miniature Circuit Breakers (MCBs)

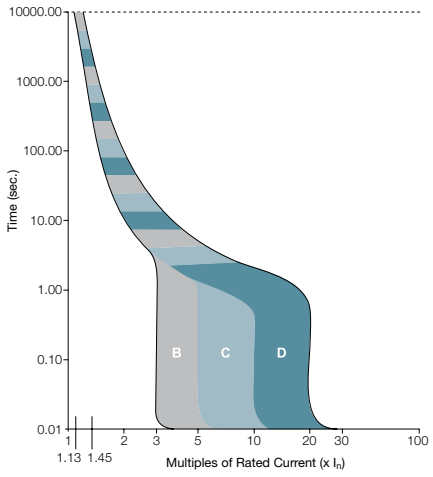
General Characteristics

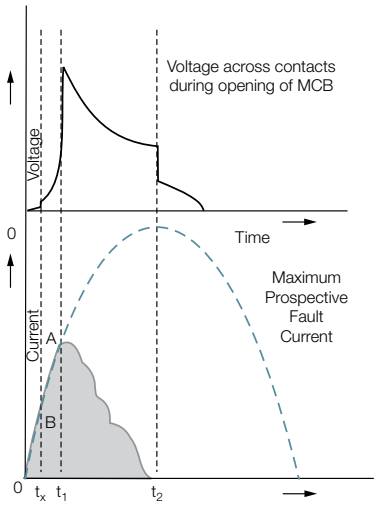
Standard Conformity	EN 60898-1
Type / Series B C	
Rated Current (In)	A 6-40 0.5 - 63* 0.5 - 63*
Rated Voltage (Ue)	V~ 240/415 240/415 240/415
Rated Frequency (f)	Hz 50
No. of Poles (Execution)	1P, 3P,
Rated Short Circuit Breaking Capacity	10 kA
Magnetic Release Setting	(3-5)In (5-10)In (10-20)In
Rated Insulation Voltage (Ui)	V 660
Rated Impulse Voltage (Uimp)	kV 4
Electrical / Mechanical Endurance	<32A 20000
(no. of operations)	>32A 10000
Ambient Working Temperature (oC)	-5°C to 55°C
Vibration	g 3
Protection Class	IP-20
Installation Position	Vertical / Horizontal
Mounting Clip	on DIN Rail (35mm x 7.5mm)
Case & Cover	Moulded, flame-retardant thermoplastic material

Cable Capacity

Cable clamp 25mm2







Tripping Characteristics

Based on the Tripping Characteristics, MCBs are available in 'B', 'C' and 'D' curve to suit different types of applications.

'B' Curve: for protection of electrical circuits with equipment that does not cause surge current (lighting and distribution circuits). Short circuit release is set to (3-5)

'C' Curve: for protection of electrical circuits with equipment that causes surge current (inductive loads and motor circuits).

Short circuit release is set to (5 - 10) In

'D' Curve: for protection of electrical circuits which causes high inrush current, typically 12-15 times the thermal rated current (transformers, X-ray machines etc.)

Short circuit release is set to (10 - 20) In

Current Limiting Design

In a current limiting breaker, the tripping & arc control mechanism are so designed that under short circuit conditions, the contacts are physically separated and the electrodynamic forces set up by fault current, assist the extinction in less than half cycle.

The figure shows the current limiting effect of circuit breakers.

Fault Traces for Voltage & Current

0 = Point of fault initiation

tx = Contact opening time (i.e., creation of arc)

t1 = Current / Voltage peak (i.e., current limitation)

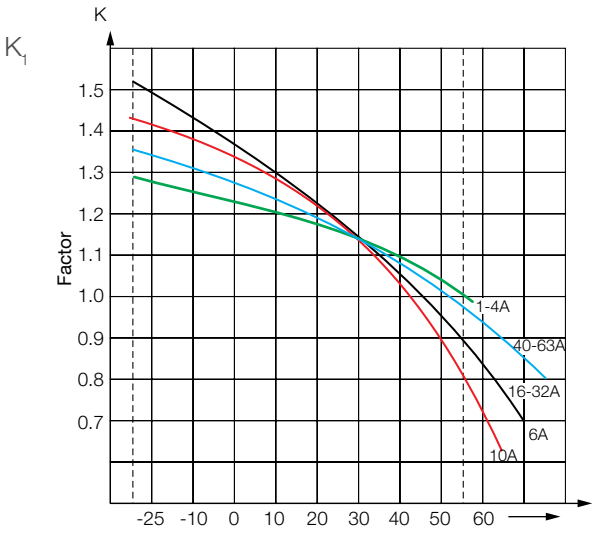
t2 = Time to total extinction of arc (i.e., complete shutdown of fault current)

Miniature Circuit Breakers (MCBs)

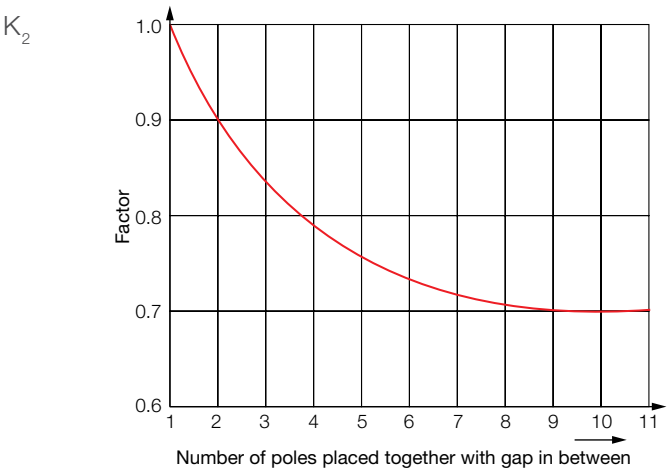
Ambient Temperature Compensation/Diversity Factor Chart

Maximum Permissible Rated Current (K, factor)
Diversity Factor (K, Factor)

Graph 1

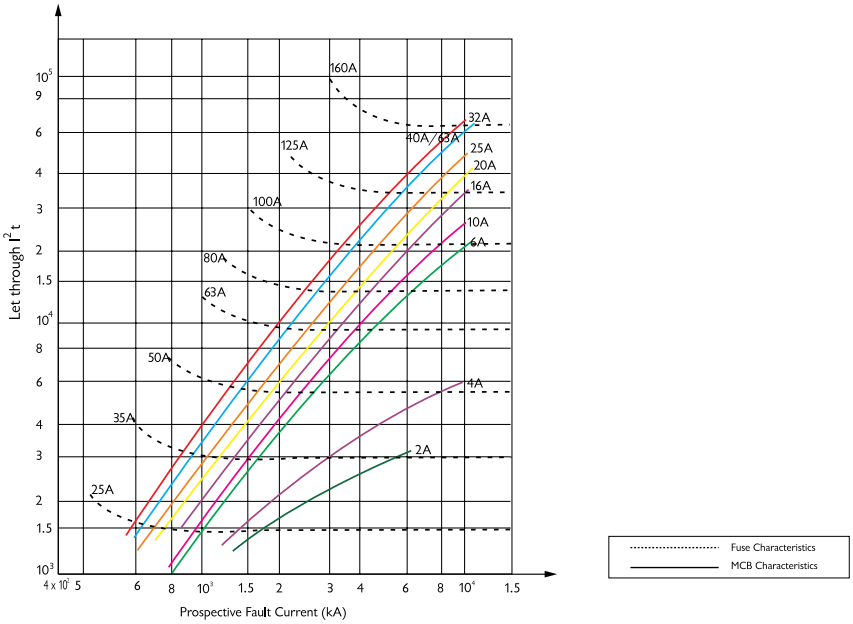


Graph 2



Calculation I_n / MCB = K_1 x K_2 x I_n
Example 4 MCBs with I_n = 10 A, and the amb. temp. is 50 °C kept with no gap in between
Solution K1 =0.89 (from graph 1) K2 =0.78 (from graph 2)
I_n / pole = 0.89 x 0.78 x 10 = 6.94 A

Let Through Energy I2t



Miniature Circuit Breakers (MCBs)

Selection of MCB for Motor Protection

			1 Phase 230V DOL Starting		3 Phase 400V DOL Starting		3 Phase 400V Assisted Starting Star Delta		
S. No.	kW	HP	Full Load Current	MCB Selection	Full Load Current	MCB Selection	Full Load Current	MCB Selection	
				C		C		C	D
1	0.18	0.24	2.8	10	0.9	2	–	–	–
2	0.25	0.34	3.2	10	1.2	2	–	–	–
3	0.37	0.50	3.5	10	1.2	2	–	–	–
4	0.55	0.74	4.8	16	1.8	3	–	–	–
5	0.75	1.01	6.2	20	2.0	3	–	–	–
6	1.1	1.47	8.7	25	2.6	6	–	–	–
7	1.5	2.01	11.8	32	3.5	10	–	–	–
8	2.2	2.95	17.5	50	4.4	10	–	–	–
9	3	4.02	20.0	63	6.3	16	6.3	16	10
10	3.75	5.03	24.0	80	8.2	20	8.2	20	10
11	5.5	7.37	26.0	80	11.2	25	11.2	32	16
12	7.5	10.05	47.0	125	14.4	40	14.4	40	25
13	10	13.40	–	–	21.0	50	21.0	50	32
14	15	20.11	–	–	27.0	100	27.0	63	40
15	18.5	24.80	–	–	32.0	125	32.0	–	50
16	22	29.49	–	–	38.0	125	38.0	–	63
17	30	40.21	–	–	51.0	125	51.0	–	63

Cold Resistance & Power Loss Details

Rated Current I_N (A)	Cold Resistance I_N (A)	Power Loss per Pole P_v (W)
1	1178.00	1.3
2	281.00	1.5
4	92.00	2.2
6	16.55	0.7
10	11.68	1.4
13	10.10	1.7
16	8.00	2.2
20	5.25	2.5
25	3.78	3.1
32	2.57	3.4
40	1.94	3.9
63	1.40	7.3

Maximum Backup Protection

MCB Current Rating	Backup Fuse Rating
1	25
2	35
4	50
6	80
10-63	100

Remarks:- Tolerance ±5%

Residual Current Circuit Breakers with Overload protection (RCBOs)

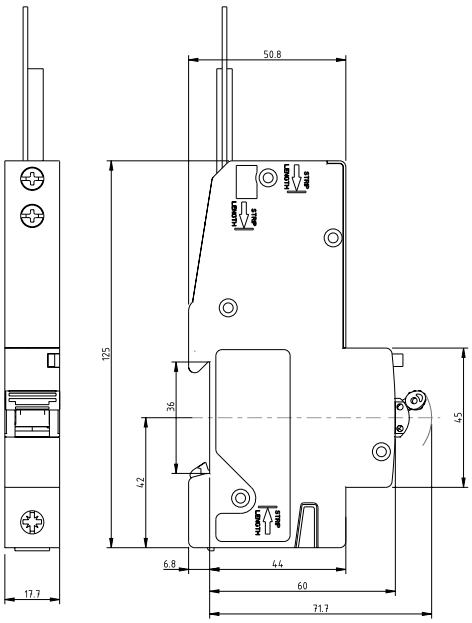
General Characteristics - Standard

No. of Pole	1P+ Solid Neutral
Specification Reference :	IEC 61009-1 'A' type
Rated Residual Operating Current	IDn 10 & 30mA
Instantaneous Tripping Current	'B' & 'C' curve
Rated Voltage	Un Vac 240V~
Rated Insulation Voltage	Un Vac 500V
Rated Frequency	50Hz
Rated Short Circuit Capacity Icn	6kA/10kA
Rated Residual Making	
Breaking Capacity	IDm 500A
Method of Mounting	(DIN Rail)
Degree of Protection	IP 20
Ambient Working Temperature	-5°C to + 55°C
Mechanical Endurance	
(No. of Operations)	3000
Electrical Endurance	
(No. of Operations)	2000
Trip Time (milli Second)	<40
Vibration Resistance	3g

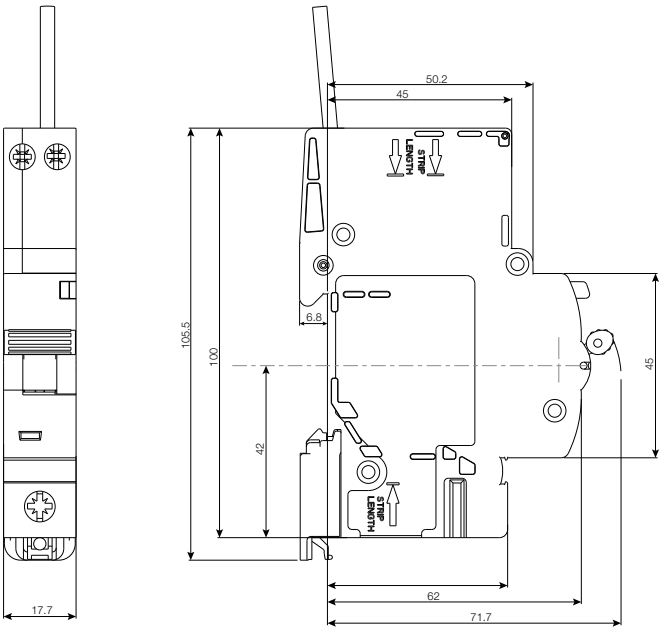
General Characteristics - Compact

No of Pole	1P+ Solid Neutral
Specification Reference	IEC 61009 'A' Type
Rated Voltage	Un Vac 240V~
Rated Insulation Voltage	Un Vac 500V
Rated Frequency	50Hz
Rated Short Circuit Capacity Icn	10kA
Degree of Protection	IP 20
Ambient Working Temperature	-5°C to + 55°C
Mechanical Endurance	
(No. of Operations)	3000
Electrical Endurance	
(No. of Operations)	2000
Trip Time (milli Second)	<40
Vibration Resistance	3g
Max Cable Capacity	Incoming - 35mm2
	Outgoing - 10mm2
Recommended Torque	2Nm

Standard RCBO Dimensions



Compact RCBO Dimensions



Residual Current Circuit Breakers (RCCBs)

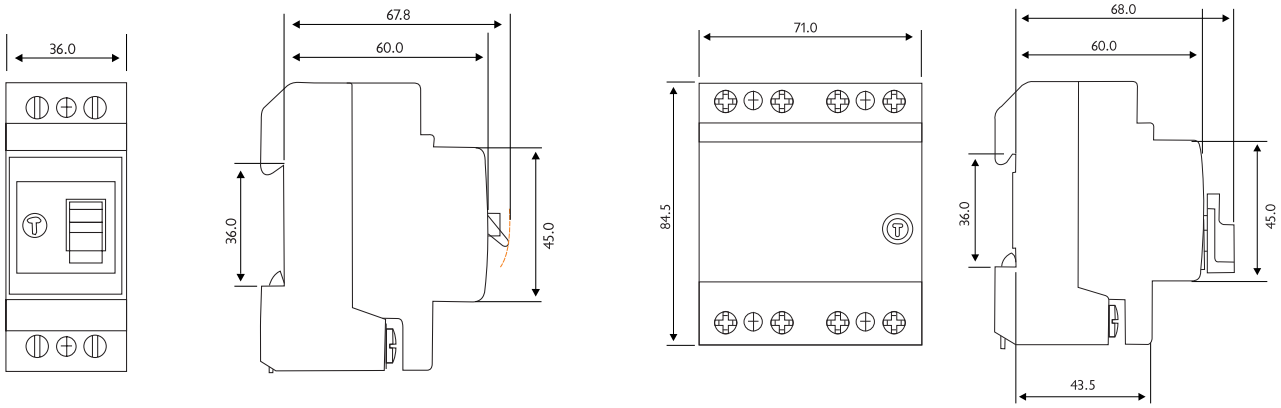
General Characteristics

Standard Conformity	IEC 60947-3
Rated Current (In)	A 40A - 63A, 80 - 125A
Rated Voltage (ac) (Ue)	V 240/415
Rated Frequency (f)	Hz 50
Nos. of Poles (Execution)	2P, 3P, 4P
Utilization Category	AC 22A
Rated Insulation Voltage (Ui)	V 660
Rated Impulse Voltage (Uimp)	kV 4
Electrical / Mechanical Endurance Nos (No. of operations)	10000
Ambient Temperature	0C -5 to +55
Terminal Capacity (Max)	sq.mm 25
Vibration	g 5
Protection Class	IP-20
Installation Position	Vertical / Horizontal
	Mounting Clip on DIN Rail (35mm x 7.5mm)
Case & Cover	Moulded, flame retardant thermoplastic material

Cable Capacity

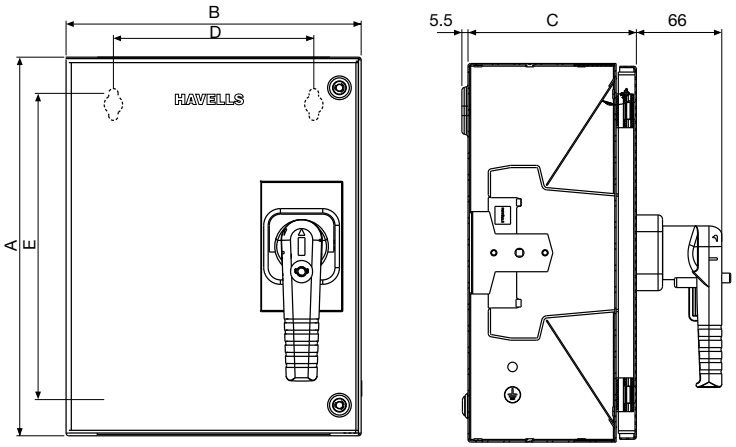
2P - 35mm2, 3P & 4P - 50mm^2
Max. Torque - 3Nm

2 Pole

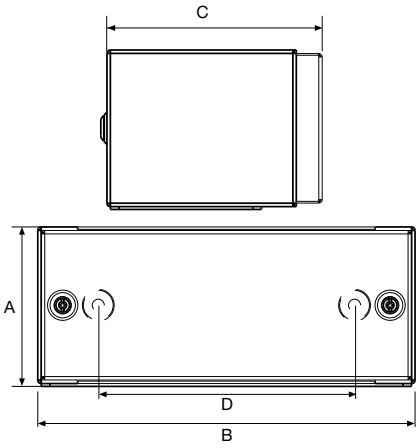


Enclosed Switch Disconnector Fuse - 20A-400A

Switch Disconnector Fuse



Cable Spreader Box



Dimensions

	TPN/TPsN					SPsN		
	20A / 32A	63A	100A/125A	160A-250A	400A	20A-32A	63A	100A-125A
A	225	265	340	450	570	225	265	340
B	265	265	265	410	500	200	200	200
C	151	151	151	221	255	151	151	151
D	180	180	180	270	360	115	115	115
E	180	200	275	350	470	160	200	275

Cable Spreader Box				
	TPN / TPsN			SPN / SPsN
	20A-125A	160A-250A	400A	20A-125A
A	110	150	170	110
B	265	410	500	200
C	151	221	255	151
D	180	270	260	115

Installation Data

FRAME SIZE	Rating (A)	Lug size (Max.) Cu. Lugs (mm^2)	Thread Size	Terminating Tightening Torque (Nm)	Recommended Fuse BS type
Frame 1	20-32	6/10*	M6	3.7	A2
Frame 2	63	16/25*	M6	3.7	A3
Frame 3	100	35/50*	M8	9	A4
	125	50/70*	M8	9	A4
Frame 4	160	70/95*	M10	48	B2
	200	95/150*	M10	48	B2
	250	120/185*	M10	48	B2
Frame 5	400	240/300*	M10	48	B4

*Based on cable spreader boxes fitted

Fuse Comparison Chart

FRAME SIZE	PART NO	BS88 REF	Busmman Reference	Lawson Reference	Fuse Fixing Centres	Tag Type
1	LSEDF201SN	A2	AAO 2A - 20A	TIA 2A - 20A	73mm	OFFSET
	LSDEF203N					
	LSEDF321SN		AAO 2A - 32A	TIA 2A - 32A		
	LSEDF323N					
2	LSEDF631SN	A3	AAO 2A-32A, BAO 40A -63A	TIA 2A-32A, TIS 40A -63A	73mm	
	LSEDF633N					
	LSEDF633SN					
3	LSEDF1001SN	A4	CEO 32A - 100A	TCP 32A - 100A	94mm (Max Barrel Dia 31mm)	
	LSEDF1003N					
	LSEDF1003SN					
	LSEDF1251N		CEO 32A - 100A, DEO 125A	TCP 32A - 100A, CTFP 125A		
	LSEDF1253N					
	LSEDF1253SN					
4	LSEDF1603N	B2	DD 80 - 160 A	TF 80 - 160A	111MM	Centre
	LSEDF1603SN					
	LSEDF2003N		DD 80 - 200A	TF 80 - 200A		
	LSEDF2003SN					
	LSEDF2503N	B3	DD 80 - 200A, ED 250A	TF 80 - 200A, TKF 250A		
	LSEDF2503SN					
	LSES2503N					
	LSES2503SN					
5	LSEDF4003N	B4	ED 250A - 400A	TMF 315A - 400A	111MM (Max Barrel dia 50mm)	
	LSEDF4003SN					
	LSES4003N					
	LSES4003SN					

MCCB Panel Board and Enclosures

MCCB Panel board General Characteristics

	250A	400A	630A
IP Rating	IP3X	IP3X	IP3X
Paint Specification	RAL 7035 epoxy powder coating	RAL 7035 epoxy powder coating	RAL 7035 epoxy powder coating
Conditional Short Circuit Rating	35kA to BS EN 61439-1	50kA to BS EN 61439-1	50kA to BS EN 61439-1
Short Circuit Withstand Rating	30kA – 1s to BS EN 61439-1	30kA – 1s to BS EN 61439-1	50kA – 1s to BS EN 61439-1
Cable Capacities			
MCCB/SwD incoming device	150mm2 max*	2 x 240mm2** (M12 stud)	2 x 240mm2*** (M12 stud)
Incoming earth terminal	M10	M10	M10
Incoming neutral terminal	M8	M8	M12
Outgoing earth terminal	50mm^2(16)	50mm^2 (18)	70mm^2 (18)
Outgoing neutral terminal	50mm^2 (16)	50mm^2 (20)	70mm^2 (20)
MCCB outgoing device	16A-160A = 70mm2	16A-160A = 70mm2	16A-160A = 70mm^2, 200-250A = 150mm^2

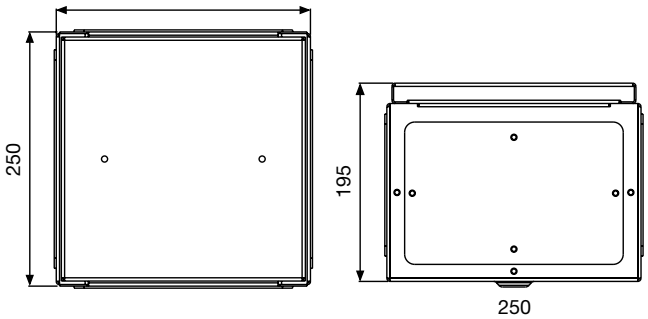
* Recommended 120mm^2
** Recommended 1 x 240mm^2
*** Recommended 2 x 185mm^2

MCCB Panel Board

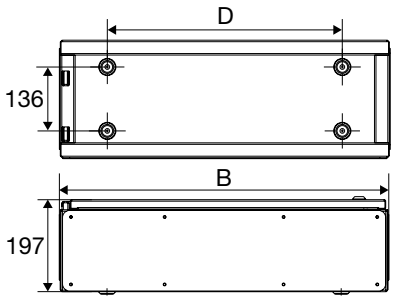
	Ways	Part No	A (mm)	B (mm)	C (mm)	D (mm)
250A	4	PSB254	888	700	782	564
	6,8	PSPB256/ PSPB258	1034	700	940	654
	12	PSPB2512	1190	700	1097	564
400A	6	PSPB406	1055	700	922	500
	12	PSPB412	1295	700	1160	500
	18	PSPB4018	1530	700	1396	500
630A	6	PSPB636	1175	850	1043	650
	8	PSPB638	1255	850	1122	650
	12	PSPB6312	1415	850	1280	650

Note: Depth for 250A, 400A, 630A = 197mm

Corner Filler Box

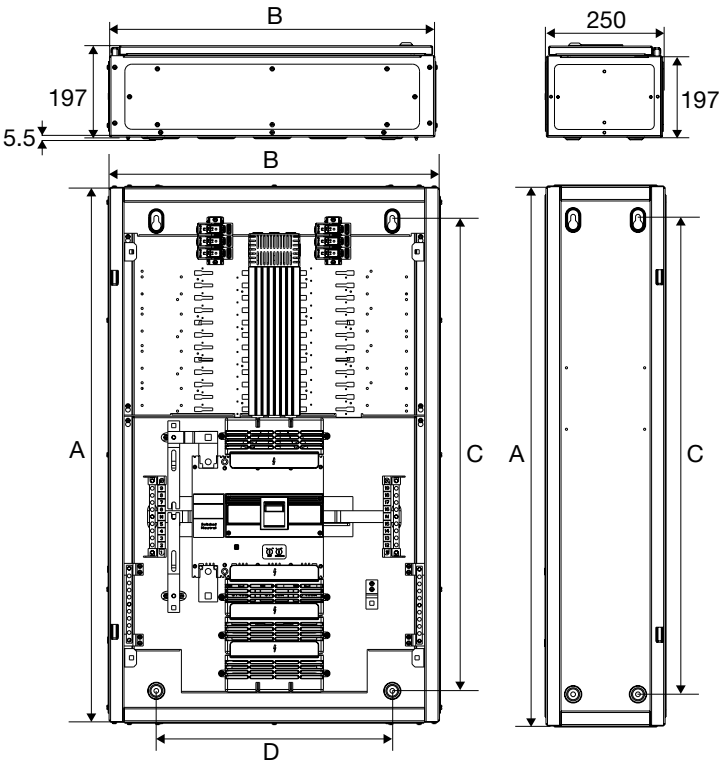


Meter Box



Panel Board

Side Cable Box



Transient Overvoltage Performance Test Certificate

Surge Protective Device (SPD):

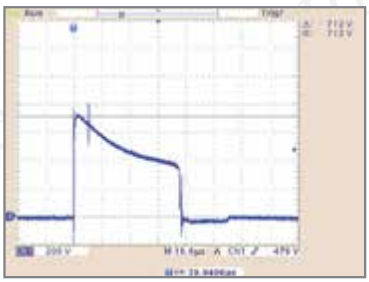
Furse ESP 415 M1

For installation in Havells distribution boards:

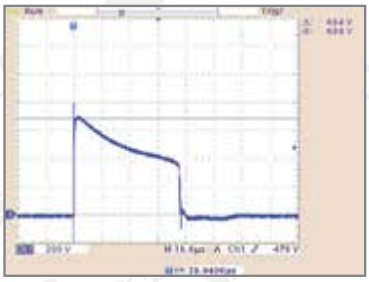
MCCB: PSPB254, PSPB256, PSPB258, PSPB406, PSPB408, PSPB4012, PSPB636, PSPB6312

The Havells/Furse solution combines best-in-class mains power distribution with transient overvoltage protection ensuring controlled and verified SPD installation in line with IET Wiring Regulations 17th Edition, BS 7671:2008(+A1:2011), for optimal protection of installed equipment.

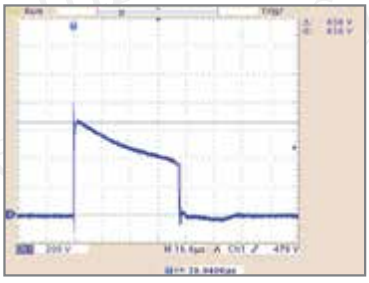
Installed performance test:
IEC 61643-11 Class III Combination waveform
6 kV (1.2/50 µs voltage) 3 kA (8/20 µs current)



Transient overvoltage performance L-N



Transient overvoltage performance L-PE



Transient overvoltage performance N-PE

Transient specification (at SPD terminals)	
Voltage protection level U_p at U_{oc} of 6 kV 1.2/50 µs and I_{sc} of 3 kA 8/20 µs (per mode)	600 V[1]

[1] The maximum transient overvoltage let-through the SPD throughout the test (±5%), phase to neutral, phase to earth and neutral to earth.

Transient specification (installed performance - SPD to MCCB board)	
Target voltage protection level U_p: (2 x peak operating voltage, 230 V AC system)	715 V
L-N: Voltage protection level U_p at U_{oc} of 6 kV 1.2/50 µs and I_{sc} of 3 kA 8/20 µs (per mode)	712 V[2]
L-PE: Voltage protection level U_p at U_{oc} of 6 kV 1.2/50 µs and I_{sc} of 3 kA 8/20 µs (per mode)	684 V[2]
N-PE: Voltage protection level U_p at U_{oc} of 6 kV 1.2/50 µs and I_{sc} of 3 kA 8/20 µs (per mode)	656 V[2]

All testing performed in accordance with IEC 61643-11 Class III test 6 kV (1.2 µs voltage) 3 kA (8/20 µs current) for verifying SPD transient overvoltage protective performance at terminal equipment level.

[2] Typical values, subject to manufacturing component tolerances. Essential detail relates to voltage protection level U_p <715 V for effective protection below impulse immunity/susceptibility of equipment.

This document certifies that the Furse ESP 415 M1 SPD has been installed on the Havells MCCB distribution board in accordance with best practice principles to IET Wiring Regulations 17th Edition, BS 7671:2008(+A1:2011) and tested to achieve the voltage protection levels (U_p) shown above.

Signed:

K. Herrington

Keith Herrington
R&D Manager, Furse ESP

Date: 12th July 2012

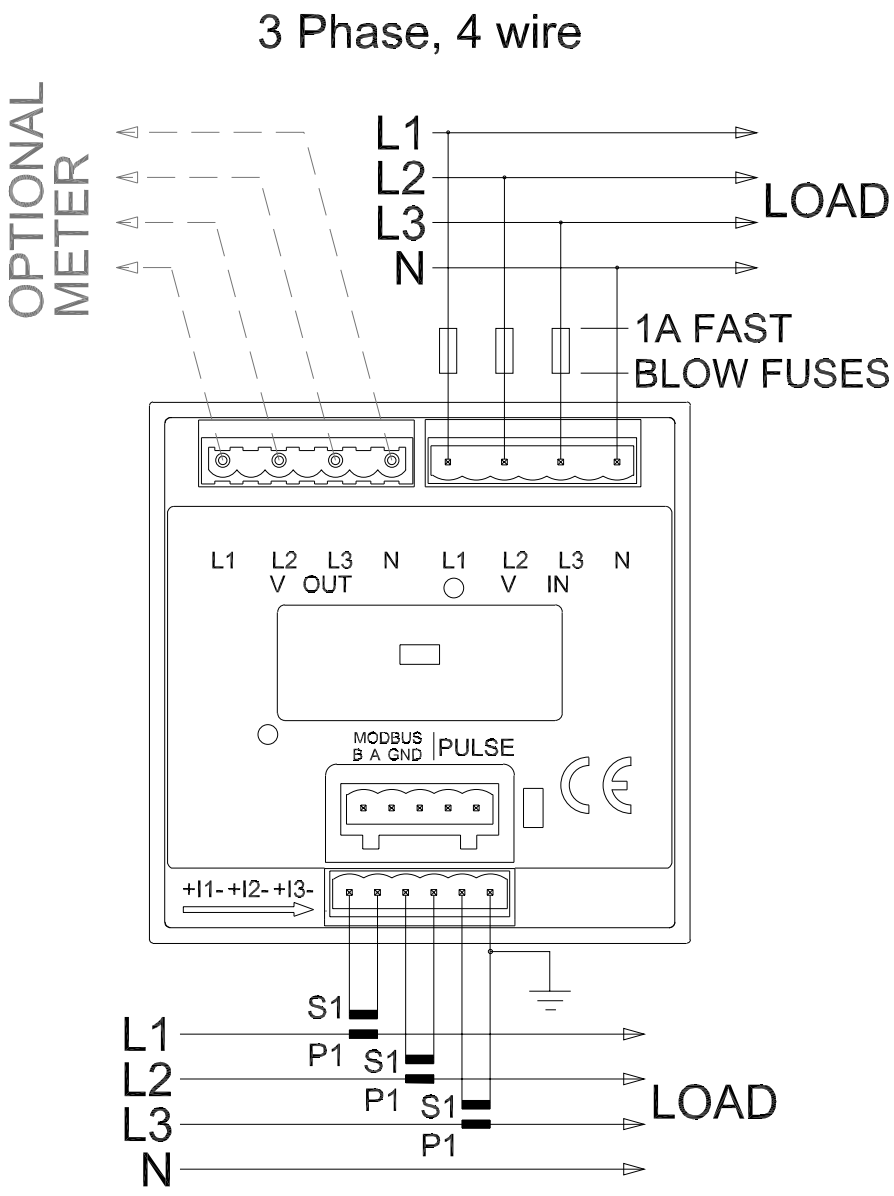
Havells UK: Longbow House, 14-20 Chiswell Street, London, EC1Y 4TW Tel: 0843 2275 388
Furse: Wilford Road, Nottingham, NG2 1EB Tel: 0115 964 3700

MCCB Panel Board Digital Metering System

96 x 96 Panel Mounted Energy Meter (PS3 Quickwire) Specification	
Input	
Nominal input voltage	100-289V AC L-N (173-500V AC L-L)
Max. continuous input overload voltage	120% of nominal
Max. short duration voltage	2 x range maximum (1 second application input repeated 5 times at 5 minute intervals)
Nominal input voltage burden	< 0.2VA per phase
Nominal input current	5A AC rms
Max. continuous input	120% of nominal
overload current	
Max. short duration input current	10 x nominal (1 second application repeated 5 times at 5 minute intervals)
Frequency	45-66Hz
Auxiliary	
Operating range	110-400V AC nominal +/-10% (99-440V AC absolute limits) or 120-350V DC +/-20% (96-420V DC absolute limits)
Accuracy	
Voltage (V)	0.5%
Current (A)	0.5%
Neutral current calculated (A)	4%
Frequency (Hz)	0.1 Hz
Power factor (PF)	1% of unity
Active power (W)	+/- 1% of range
Reactive power (VAr)	+/- 1% of range
Apparent power (VA)	+/- 1% of range
Active energy (kWh)	Class 1 (IEC 62053-21)
Reactive energy (kVArh)	+/- 1% of range
THD	1% up to 31st harmonic
Response time	1sec
Output modules (optional)	1 per module
Pulsed output relays	(2 modules fitted per Ci3)
Contact rating	50mA max at 250V AC
Type	Solid state relay
RS485 ModbusTM	1 ModbusTM channel per module
output module	(maximum of 1 module fitted per Ci3)
Type	2-wire half duplex
Baud rate	2400, 4800, 9600, 19200, 38400
Enclosure	DIN 96 panel mount
Enclosure style	96x96x64.1mm (depth behind panel without module 58mm, with module 82.5mm)
Dimensions	92x92mm
Panel cut-out	1-5mm (1-3mm when used with IP65 cover)
Panel thickness	IP52
Front protection rating	IP30
Case protection rating	Polycarbonate to UL94V0
Material	300g
Weight	Shrouded screw-clamp 0.05-4mm wire
Terminals	
Environment	
Operating temperature	-10°C to +55°C
Storage temperature	-20°C to +70°C
Relative humidity	0-90% non-condensing
Shock	30g in 3 planes
Vibration	10Hz to 50Hz
Dielectric voltage	Withstand test 3.25kV rms 50Hz for 1 minute between comms and measuring inputs, comm and aux, aux and measuring inputs

MCCB Panel Board Digital Metering System

Quikwire – Plug in metering



Moulded Case Circuit Breakers (MCCBs)

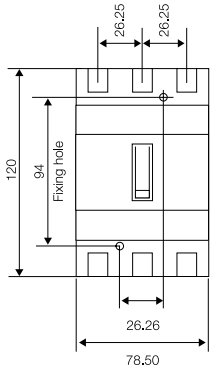
GH Frame

Standard conformity :	IEC 60947-2
Rated operational voltage :	500V AC
Rated Insulation Voltage :	750V AC
Type of release :	Thermomagnetic
Utilisation Category :	A
Rated frequency :	50/60 Hz
Ambient temp :	40oC (50oC on request)
Operating altitude :	2000 meters
Humidity :	0 - 90%
Rated impulse voltage :	8 KV

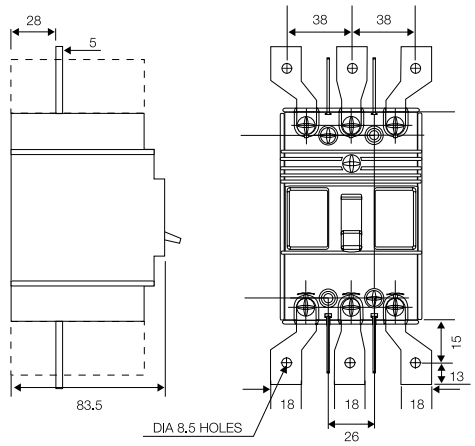
Cable Capacity

Tunnel Terminals: 70mm2

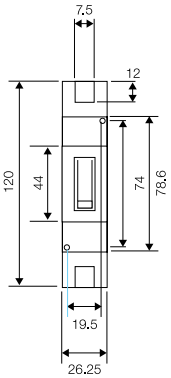
Frame		GH
No. of Poles		1P/3P/4P
Standard current range / rating (I_n)	A	16-160*
Thermal Release Setting		Fixed
Magnetic release setting for current rating:		
16A - 32A	A	350
40A - 50A	A	500
63A - 80A	A	800
100A - 160A	A	1000
Rated ultimate short circuit breaking capacity (Icu), KA (at different voltages)	240V Δ	25
	240V	40
	415V	25
	440V	16
	500V	12
Ics = % Icu		50%
Weight SP	Kg	0.35
TP	Kg	0.93
4PwSN	Kg	1.2
Terminal capacity (cable)	Sq.mm	70
Bus bar (width)	mm	10
Recommended Torque	Nm	4.2



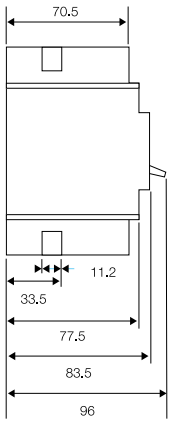
Three Pole



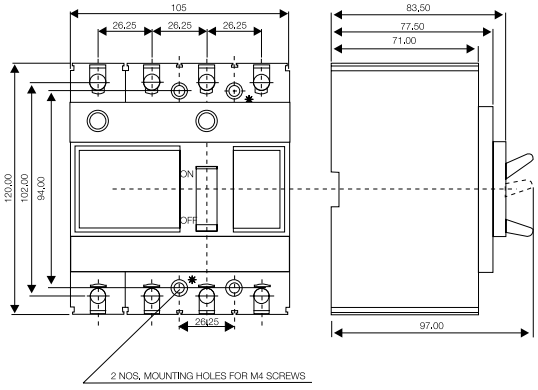
Three Pole with Extended Terminals



Single Pole

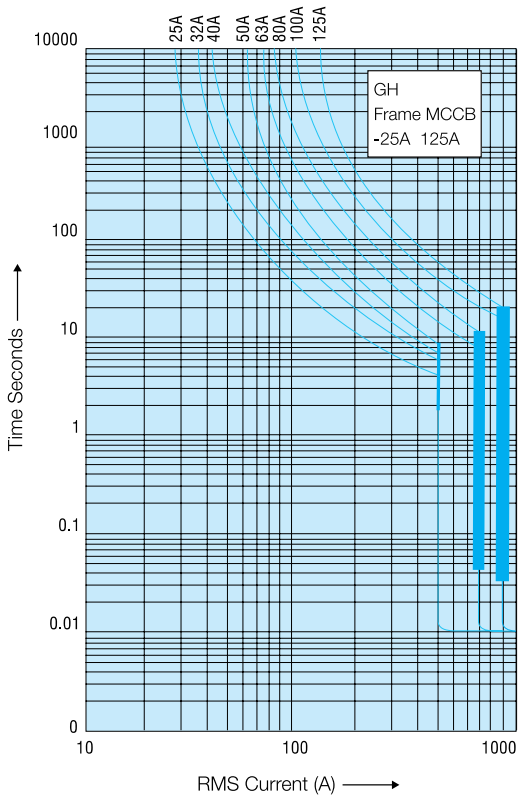


Three Pole

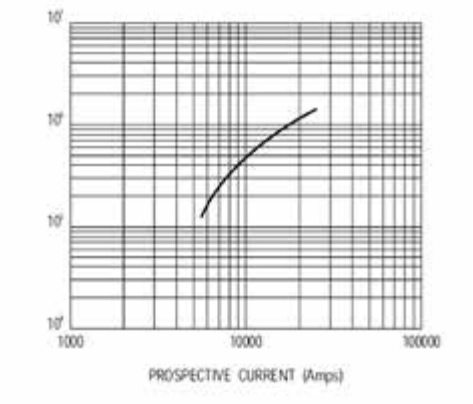


Four Pole with Switched Neutral

Time/Current Characteristics



Energy Let Through Characteristics



Moulded Case Circuit Breakers (MCCBs)

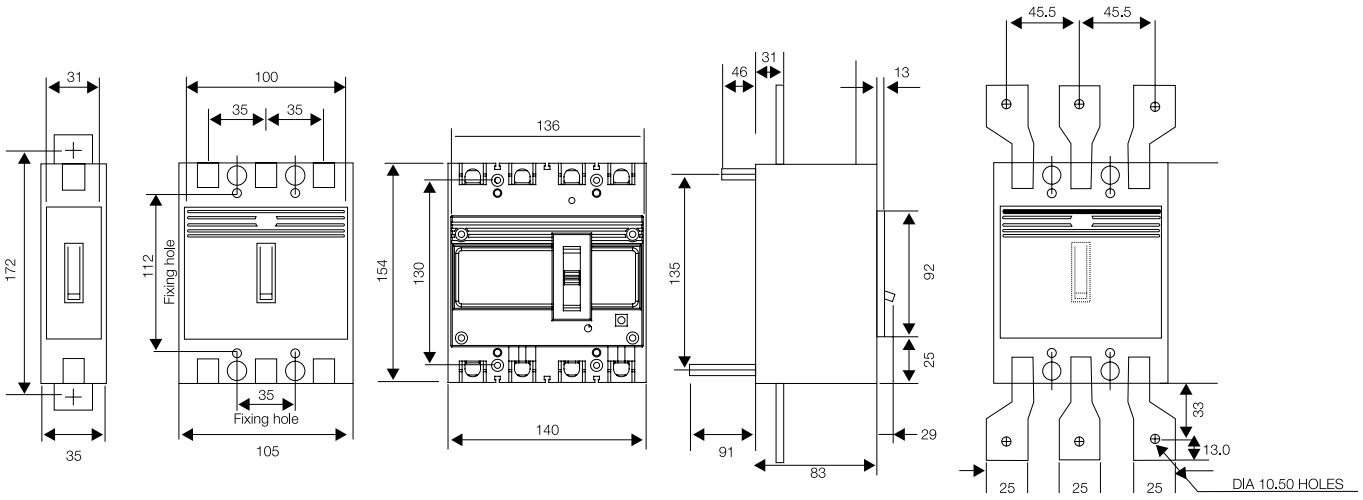
AAN Frame

Standard conformity :	IEC 60947-2
Rated operational voltage :	500V AC
Rated Insulation Voltage :	750V AC
Type of release :	Thermomagnetic
Utilisation Category :	A
Rated frequency :	50/60 Hz
Ambient temp :	40oC (50oC on request)
Operating altitude :	2000 meters
Humidity :	0 - 90%
Rated impulse voltage :	8 KV

Cable capacity

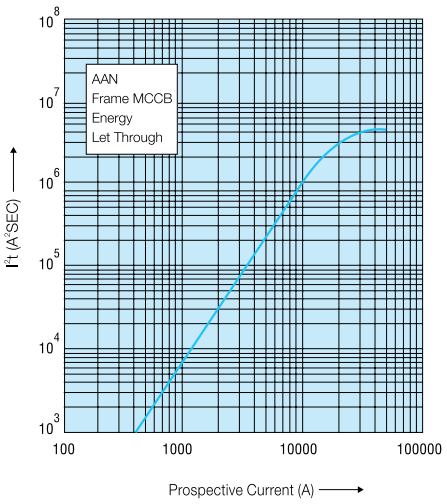
Tunnel Terminals: 150mm2

Frame		AAN	
No. of Poles		1P/3P/4PwSN	
Standard current range / rating (I_n)	A	25-250*	
Thermal release setting (Adjustable)		70-100% of I_n	
Magnetic release setting for current rating:			
25A - 63A		400A	
80A - 125A		800A	
160A - 250A		1600A	
Rated ultimate short circuit breaking capacity (Icu), KA (at different voltages)		(25-125A)	(25-250A)
	240V	50	40
	415V	35	25
	440V	35	25
	500V	25	18
Ics = % Icu		75%	75%
Weight SP (Single Pole)	Kg	0.7	
TP (Triple Pole)	Kg	1.8	
FPwSN (Four Pole Switched Neutral)	Kg	2.4	
Terminal capacity (cable)	Sq.mm	70 (upto 100A)/150 (125A-250A)	
Bus bar (width)	Sq.mm	25 (125A-250A)	
Recommended Torque	Nm	10	

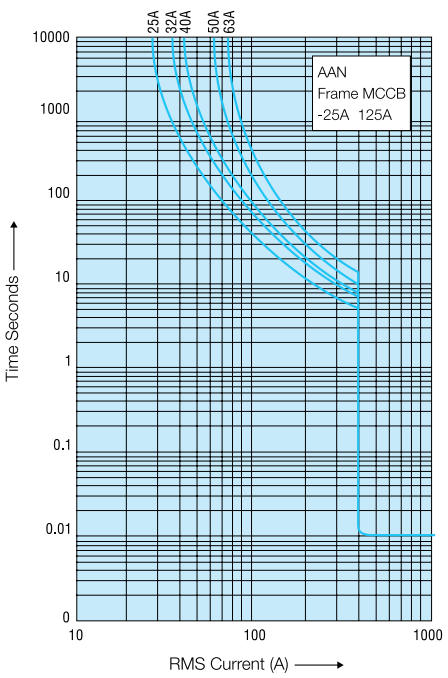


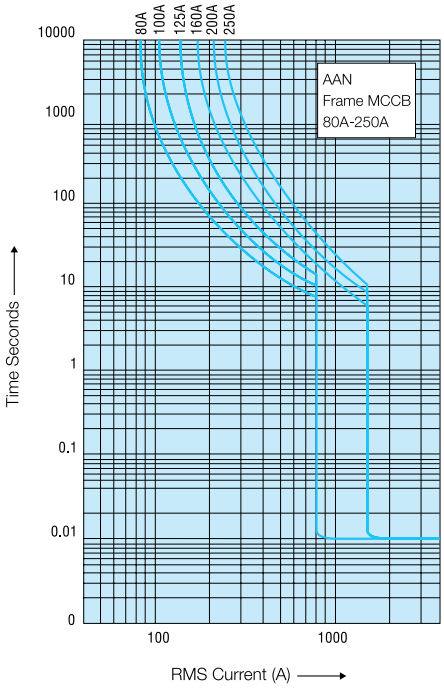
Single Pole | Three Pole | Four Pole with Switched Neutral | Three Pole with Extended Terminals

Energy Let Through Characteristics



Time/Current Characteristics





Moulded Case Circuit Breakers (MCCBs)

FN Frame

Standard conformity :	IEC 60947-2
Rated operational voltage :	500V AC
Rated Insulation Voltage :	750V AC
Type of release :	Thermomagnetic
Utilisation Category :	A
Rated frequency :	50/60 Hz
Ambient temp :	40oC (55oC on request)
Operating altitude :	2000 meters
Humidity :	0 - 90%
Rated impulse voltage :	8 KV

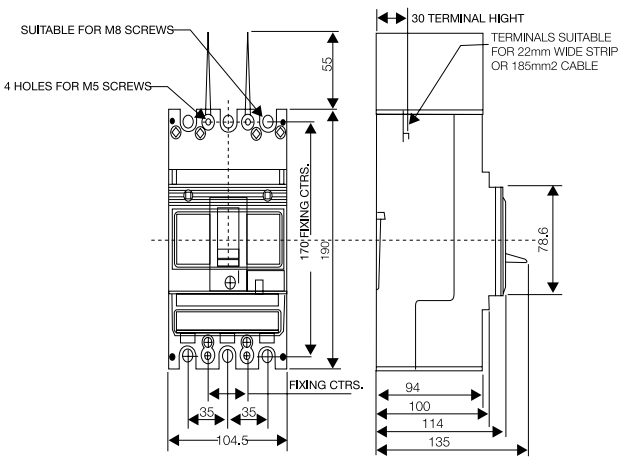
Cable capacity

Tunnel Terminals: 120mm^2 with cage clamp or palm width lugs

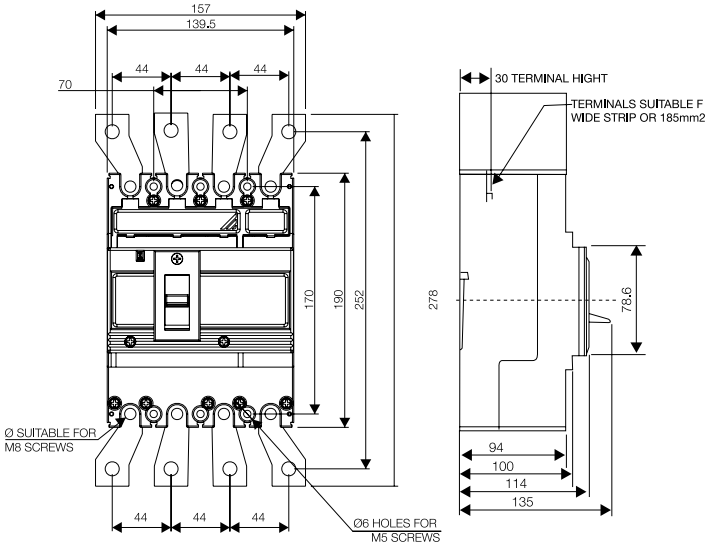
FN-Frame

Frame			FN
No. of Poles			3P/4PwSN
Standard current ratings (I_n)		A	25-250*
Thermal release setting			Fixed
Magnetic release setting for current rating			Fixed
25A - 32A			500A
40A - 80A			800A
100A - 125A			1250A
160A - 250A			1600A
Rated ultimate short circuit breaking capacity (Icu), KA (at different voltages)		240V	50
		380V	35
		415V	35
		500V	25
Ics = % Icu			100%
Weight	TP (Triple Pole)/FPwSN	Kg	2.9/3.8
	Terminal Type		M8
	Terminal capacity (cable)	Sq.mm	120
	Bus bar (width)	mm	18

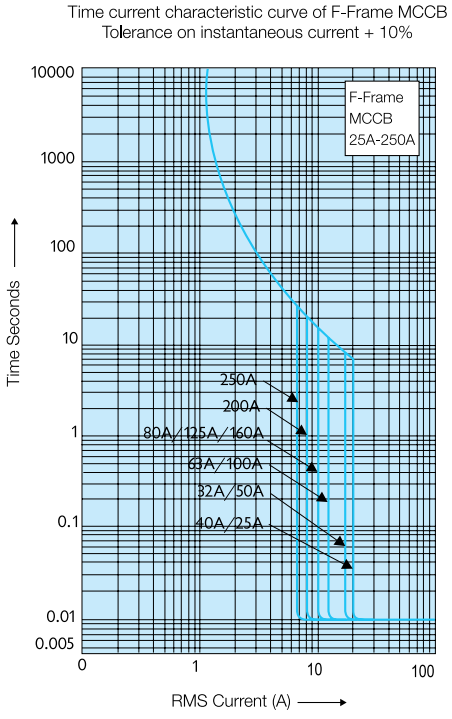
Three Pole



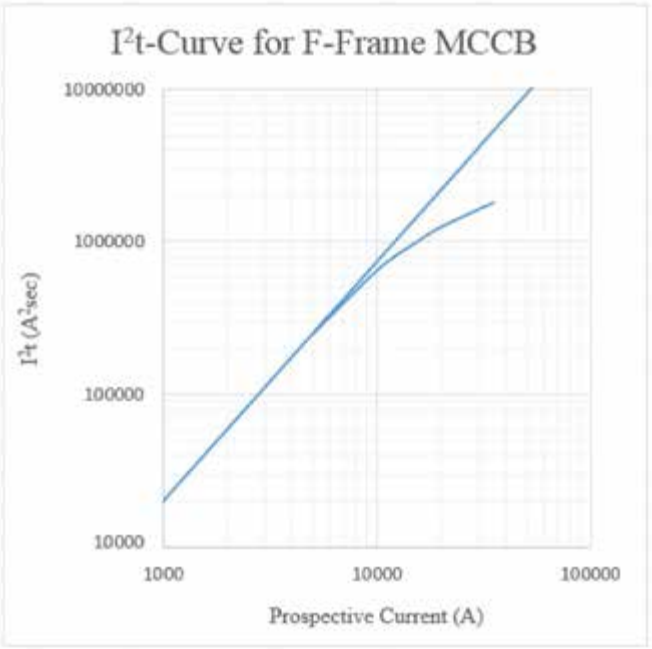
Four Pole with Switch Netural



Time/Current Characteristics



Energy Let Through Curve



Moulded Case Circuit Breakers (MCCBs)

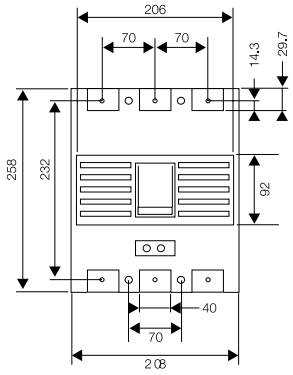
CH Frame

Standard conformity :	IEC 60947-2
Rated operational voltage :	500V AC
Rated Insulation Voltage :	690V AC
Type of release :	Thermomagnetic
Utilisation Category :	A
Rated frequency :	50/60 Hz
Ambient temp :	40oC (50oC on request)
Operating altitude :	2000 meters
Humidity :	0 - 90%
Rated impulse voltage :	8 KV

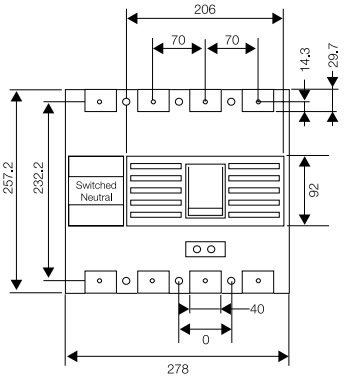
Cable capacity

240mm2 (M12 stud)

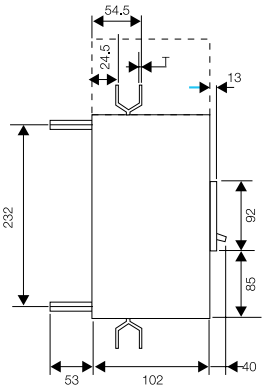
Frame			CN
No. of Poles			3P/4PwSN
Standard current ratings (I_n)		A	160-800*
Thermal release setting (Adjustable)			70-100% of I_n
Magnetic release setting			Adjustable
160-315A CN/CH Frame			5-10 times I_n
400-800A CN/CH Frame			4-10 times I_n
Rated ultimate short circuit breaking capacity (Icu), KA (at different voltages)		240V	70
		380V	50
		415V	50
		500V	35
Ics = % Icu			50%
Weight	TP (Triple Pole)	Kg	9.2
	FPwSN (Four Pole with Switched Neutral)	Kg	11.6
	Terminal capacity (cable)	Sq.mm	–
	Bus bar (width)	mm	40

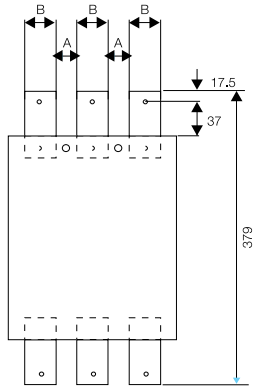


Three Pole



Four Pole with Switched Neutral

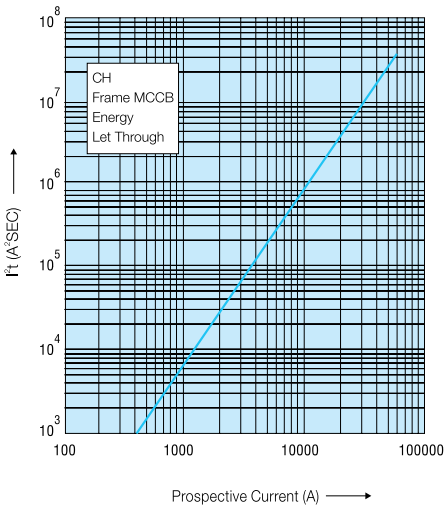




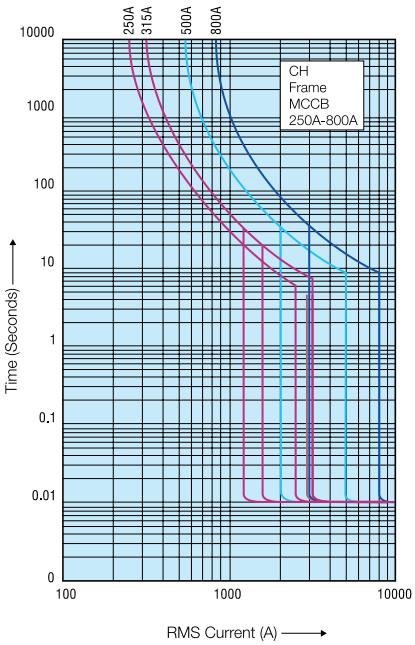
Three Pole with Extended Terminals

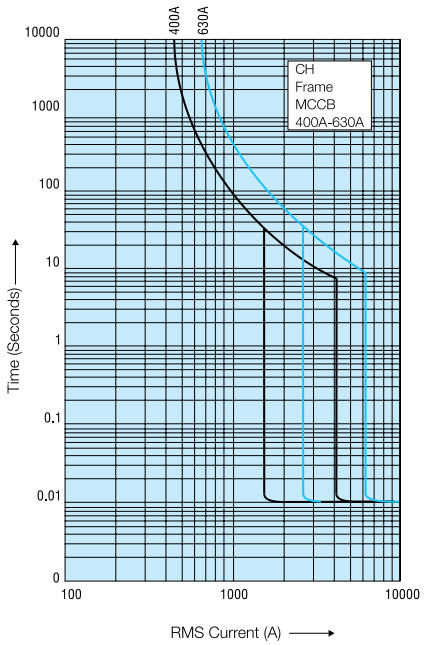
S. No.	Frame	A	B	T
1	16 - 250A	40	30	5
2	315 - 400A	20	50	5
3	500 - 800A	20	50	6

Energy Let Through (I^2t) Characteristics



Time/Current Characteristics





Maximum Earth Loop Impedance

GH Frame MCCB

Tripping Elements	
Overload: Fixed	**Instantaneous - Non Adjustable**
Rating	SP, TP
(16-32A)	350
(40-50A)	500
(63-80A)	800
(100-160A)	1000

GH Frame Maximum Earth Loop Impedances for Triple Pole MCCBS Zs (Ohms) for Uo = 240 VAC												
Current rating (A)	16	20	25	32	40	50	63	80	100	125	150	160
0.4 Second Tripping Time	0.62Ω	0.62Ω	0.62Ω	0.62Ω	0.27Ω	0.27Ω	0.27Ω	0.27Ω	0.22Ω	0.22Ω	0.22Ω	0.22Ω
5.00 Second Tripping Time	1.5Ω	1.2Ω	0.96Ω	0.75Ω	0.60Ω	0.48Ω	0.38Ω	0.30Ω	0.24Ω	0.32Ω	0.27Ω	0.25Ω

GH Frame Maximum Earth Loop Impedances for Single Pole MCCBS Zs (Ohms) for Uo = 240 VAC												
Current rating (A)	16	20	25	32	40	50	63	80	100	125	150	160
0.4 Second Tripping Time	0.43Ω	0.43Ω	0.43Ω	0.43Ω	0.27Ω	0.27Ω	0.27Ω	0.27Ω	0.17Ω	0.17Ω	0.17Ω	0.17Ω
5.00 Second Tripping Time	1.5Ω	1.2Ω	0.96Ω	0.75Ω	0.60Ω	0.48Ω	0.38Ω	0.30Ω	0.24Ω	0.24Ω	0.20Ω	0.19Ω

AAN Frame MCCB

Tripping Elements	
Overload: Adjustable 70-100% of In	**Instantaneous - Fixed**
Rating	SP, TP
(25-63A)	400
(80-125A)	800
(160-250A)	1600

AAN Frame Maximum Earth Loop Impedances for Triple Pole MCCBS Zs (Ohms) for Uo = 240 VAC											
Current rating (A)	25	32	40	50	63	80	100	125	160	200	250
0.4 Second Tripping Time	0.500Ω	0.500Ω	0.500Ω	0.500Ω	0.500Ω	0.250Ω	0.250Ω	0.250Ω	0.125Ω	0.125Ω	0.125Ω
5.00 Second Tripping Time	0.500Ω	0.500Ω	0.500Ω	0.500Ω	0.500Ω	0.250Ω	0.250Ω	0.250Ω	0.125Ω	0.125Ω	0.125Ω

FN Frame MCCB

FN Frame Maximum Earth Loop Impedances for Triple Pole MCCBs Zs (Ohms) for Uo = 240 VAC											
Current rating (A)	25	32	40	50	63	80	100	125	160	200	250
0.4 Second Tripping Time	0.436Ω	0.436Ω	0.27Ω	0.27Ω	0.27Ω	0.27Ω	0.17Ω	0.17Ω	0.136Ω	0.136Ω	0.136Ω
5 Second Tripping Time	0.96Ω	0.75Ω	0.6Ω	0.48Ω	0.38Ω	0.3Ω	0.24Ω	0.192Ω	0.15Ω	0.12Ω	0.096Ω

Maximum Earth Loop Impedance

CN/CH Frame MCCB

Tripping Elements	
Overload: Adjustable 70-100% of In	**Instantaneous - Adjustable 160-315A (5-10 In), 400-800A (4-10 In)**
Rating	SP, TP
(160-315A)	5-10 In
(400-800A)	4-10 In

CN/CH Frame Maximum Earth Loop Impedances Zs (Ohms) for Uo = 240 VAC						
Current rating (A)	160	200	250	315	400	500
0.4 Second Tripping Time	0.13636Ω	0.1091Ω	0.0873Ω	0.0693Ω	0.0545Ω	0.0436Ω
5.00 Second Tripping Time	0.2727Ω	0.2182Ω	0.1745Ω	0.1385Ω	0.1364Ω	0.1091Ω
Current rating (A)	630	800	-	1250	-	Magnetic Trip Stting
0.4 Second Tripping Time	0.0346Ω	0.0272Ω	-	0.0175Ω	-	High
5.00 Second Tripping Time	0.0866Ω	0.0682Ω	-	0.0436Ω	-	Low

PowerSafe 10kA MCB

MCB B Type Maximum Earth Loop Impedances for SP MCBs Zs (Ohms) for UO = 240 VAC										
Current Rating (A)	6	10	13	16	20	25	32	40	50	63
5 Second Tripping Time	10.00Ω	6.00Ω	4.61Ω	3.75Ω	3.00Ω	2.40Ω	1.88Ω	1.50Ω	1.20Ω	0.95Ω
0.4 Second Tripping Time	8.00Ω	4.80Ω	3.69Ω	3.00Ω	2.40Ω	1.92Ω	1.50Ω	1.20Ω	0.96Ω	0.76Ω

MCB C Type Maximum Earth Loop Impedances for Single Pole, Double Pole, Three Pole MCBs Zs (Ohms) for UO = 240 VAC										
Current Rating (A)	6	10	13	16	20	25	32	40	50	63
5 Second Tripping Time	10.00Ω	6.00Ω	4.61Ω	3.75Ω	3.00Ω	2.40Ω	1.88Ω	1.50Ω	1.20Ω	0.95Ω
0.4 Second Tripping Time	4.00Ω	2.40Ω	1.84Ω	1.50Ω	1.20Ω	0.96Ω	0.75Ω	0.60Ω	0.48Ω	0.38Ω

MCB/MCCB Discrimination table

PowerSafe Device		GH Frame – 25kA MCCB										AAN Frame – 25kA MCCB				
Circuit Breaker Rating (A)		16	20	32	40	50	63	80	100	125	160	25	32	40	50	63
B Curve 6kA and 10kA MCB	2	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	4	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	13	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	16			T	T	T	T	T	T	T	T	T	T	T	T	T
	20				T	T	T	T	T	T	T	T	T	T	T	T
	25				T	T	T	T	T	T	T		T	T	T	T
	32					T	T	T	T	T	T			T	T	T
	40						T	T	T	T	T				T	T
	50							T	T	T	T					T
	63								T	T	T					
C Curve 6kA and 10kA MCB	2	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	4	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	13	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	16			T	T	T	T	T	T	T	T	T	T	T	T	T
	20				T	T	T	T	T	T	T	T	T	T	T	T
	25				T	T	T	T	T	T	T		T	T	T	T
	32					T	T	T	T	T	T			T	T	T
	40						T	T	T	T	T				T	T
	50							T	T	T	T					T
	63								T	T	T					
25kA GH Frame MCCB	16				T	T	T	T	T	T	T					
	20				T	T	T	T	T	T	T					
	25				T	T	T	T	T	T	T					
	32				T	T	T	T	T	T	T					
	40						10kA	10kA	T	T	T					
	50						10kA	10kA	T	T	T					
	63								T	T	T					
	80								T	T	T					
	100															
	125															
	160															
25kA – AAN Frame MCCB	25											7.5kA	7.5kA	7.5kA	8kA	8kA
	32											7.5kA	7.5kA	7.5kA	8kA	8kA
	40															
	50															
	63															
	80															
	100															
	125															
	160															
	200															
	250															
35kA – FN Frame MCCB	125															
	160															
	200															
	250															

	Not applicable for Discrimination as these combinations have Ith values or breaking capacities downstream higher than that of upstream CB.
Value	Value Partial Discrimination for which current values are mentioned and the maximum fault current value for which discrimination is ensured. For fault currents above this value, the 2 circuit breakers trip simultaneously.
T	Total Discrimination, also for all fault current values the circuit breaker CB2 opens and CB1 remains closed.

						FN Frame – 35kA MCCB			CH Frame – 50kA MCCB							D Frame – 50kA MCCB				
80	100	125	160	200	250	160A	200A	250A	160	250	320	400	500	630	800	630	800	1000	1250	1600
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	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	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	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	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	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	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
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	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	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	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	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	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	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
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	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	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	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	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	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
			T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			14kA	14kA	14kA	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			14kA	14kA	14kA	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			14kA	14kA	14kA	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			14kA	14kA	14kA	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			13kA	14kA	14kA	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			12.5kA	14kA	14kA	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			12.5kA	13kA	13kA	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
				12.5kA	13kA		14kA	15kA				T	T	T	T	T	T	T	T	T
10kA	10kA	10kA	14kA	14kA	14kA	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
10kA	10kA	10kA	14kA	14kA	14kA	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
10kA	10kA	10kA	14kA	14kA	14kA	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
10kA	10kA	10kA	14kA	14kA	14kA	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
10kA	10kA	10kA	14kA	14kA	14kA	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			14kA	14kA	14kA	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			13kA	13kA	13kA	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
			13kA	13kA	13kA	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	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	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	T	T	T	T	T	T
											T	T	T	T	T	T	T	T	T	T

CAT5857

Havells Sylvania UK Ltd
Avis Way, Newhaven
East Sussex BN9 0ED

Customer Service: 0800 440 2478

havells.co.uk

HAVELLS