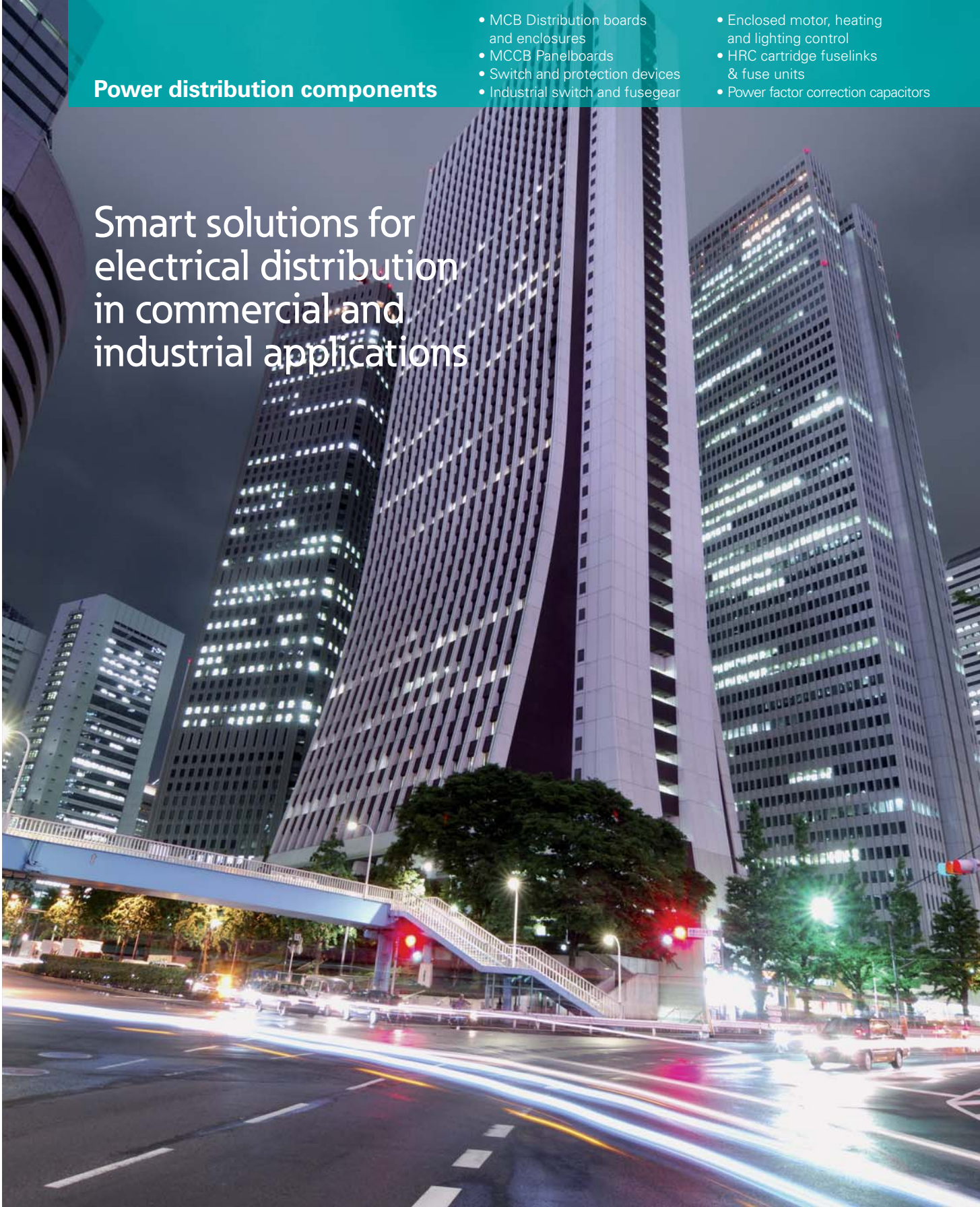


Power distribution components

- MCB Distribution boards and enclosures
- MCCB Panelboards
- Switch and protection devices
- Industrial switch and fusegear

- Enclosed motor, heating and lighting control
- HRC cartridge fuses & fuse units
- Power factor correction capacitors

Smart solutions for electrical distribution in commercial and industrial applications



EATON

Powering Business Worldwide



Automotive



Aerospace



Truck



Hydraulics



Electrical

Powering business worldwide

Eaton delivers the power inside hundreds of products that are answering the demands of today's fast changing world.

We help our customers worldwide manage the power they need for buildings, aircraft, trucks, cars, machinery and entire businesses. And we do it in a way that consumes fewer resources.

Next generation transportation

Eaton is driving the development of new technologies – from hybrid drivetrains and emission control systems to advanced engine components – that reduce fuel consumption and emissions in trucks and cars.

Higher expectations

We continue to expand our aerospace solutions and services to meet the needs of new aviation platforms, including the high-flying light jet and very light jet markets.

Powering Greener Buildings and Businesses

Eaton's Electrical Group is a leading provider of power quality, distribution and control solutions that increase energy efficiency and improve power quality, safety and reliability. Our solutions offer a growing portfolio of "green" products and services, such as energy audits and real-time energy consumption monitoring. Eaton's Uninterruptible Power Supplies (UPS), variable-speed drives and lighting controls help conserve energy and increase efficiency.

Building on our strengths

Our hydraulics business combines localised service and support with an innovative portfolio of fluid power solutions to answer the needs of global infrastructure projects, including locks, canals and dams.

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Powering electrical systems worldwide

When it comes to making more efficient use of the world's electrical power Eaton is at the cutting edge. Our industry-leading electrical power control systems help you reduce power consumption – and its attendant greenhouse gas emissions.

Eaton can help you manage your complete electrical power system, whether it is contained within a manufacturing facility, university campus, healthcare centre, data centre, geographically dispersed set of office buildings or retail stores, residential or any other entity where electricity must function with high quality and without interruption.

The result is an unparalleled integration of PowerChain® solutions that optimise energy usage, reduce energy consumption and enhance the comfort and sustainability of your facility.

- Government**
- Commercial property**
- Petrochemicals**
- Data centres**
- Healthcare**
- Pharmaceuticals**
- Education**
- Water and waste water**
- Residential**
- Utilities**
- Manufacturing**
- Retail**
- Pulp and paper**
- Telecommunications**



Eaton’s comprehensive range of power distribution solutions have been developed to meet today’s challenging electrical sub-distribution applications in commercial and industrial buildings. Through a proven competency in electrical distribution, Eaton delivers an innovative approach to aid compliance with the wider regulatory requirements associated with modern buildings.

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1.1

Product overview

Type A, SPN 125A distribution boards

IP3X robust steel enclosure to suit all applications



Modern, curved full door, covers all devices

Twist action handle, with optional door barrel locks also available

Hinged doors provide 180° opening for easy access



Removable gland plates are provided top/bottom for ease of installation

High quality clear sub circuit identification labels

Cover screwed by means of combination screws

Dual rated MCBs 10/15kA to IEC 60898 and IEC 60947-2 from 1A–63A

New 125A Switch Disconnecter incomer option

Features & benefits

- Unique 'full form' blanking modules for unused MCB ways. Provides secure shrouding of unused busbar stabs for increased electrical safety. Blanking modules have interlinking form for improved positional security.
- Main busbar is removable for flexible installation.
- Fully shrouded Neutral busbar for increased safety.
- Choice of metering option to suit application needs and aid compliance with latest Building Regulation – part L2.
- Door opens 180° to provide easy access and device operation.
- New standard incomer Switch Disconnecter rating of 125A provides higher rated solution for commercial buildings.
- Optional coupling kit available to electrically connect two distribution boards together vertically from a single supply cable to expand number of MCB ways.

General characteristics

Eaton's Memshield 3 MCB Distribution boards have evolved through an intimate knowledge and feedback from Electrical Contractors to provide solutions to a wide range of electrical distribution applications in commercial buildings. Memshield 3 delivers safe, reliable and high performance protection of electrical power distribution systems.

Type A Distribution boards are fully type tested with a conditional short circuit rating of 15kA to BS EN 60439. Associated devices are high performance MCBs, developed for Commercial and Industrial applications, dual rated at 10kA IEC – 60898 & 15kA IEC 60947-2 in B, C or D curves.



Type A SPN distribution boards

The SPN boards are rated at 125A as standard and available in 5 sizes with a choice of 4, 7, 10, 13 and 16 single pole outgoing ways. A choice of metering solutions are available as standard, providing clear electrical consumption information as well as a permanent capability of visualising information on a variety of other electrical parameters. The metering options have been developed to provide simple solutions to aid compliance with part L2 of the Building Regulations of England and Wales. A wide range of accessories including full profile blanking modules for unused MCB ways and door locking options, enhance electrical safety, whilst clean earth kits and vertical inter-connection kits to join two boards together, improves versatility of the range.

Type A SPN pan assemblies

The SPN pan assemblies offer a high degree of flexibility for custom applications and inclusion in other factory built assemblies. SPN types are rated at 125A and available with 4, 7, 10, 13, and 16 single pole outgoing ways.

Incoming devices

A range of incoming options are available, with the 125A SPSN switch disconnector being the most popular. In addition, there are a number of 100A RCCB options, which provide the added security of earth fault protection, covering 30mA–300mA applications. A direct connection terminal arrangement is also available for applications not requiring local isolation. Type A distribution boards can be stacked vertically to expand the number of outgoing ways using the vertical interconnection kit. For larger SP applications, requiring more outgoing ways – see our type B distribution boards with Single phase kit options.

Outgoing devices

For type A distribution boards, there is a choice of single pole MCBs plus RCBOs. MCBs are available in current ratings from 1A–63A, with trip types B, C and D, 10kA to IEC 60898 and 15kA to IEC 60947-2. RCBOs to IEC EN 61009 10kA are also available in a choice of trip sensitivity options from 10mA–100mA.





Features & benefits

- Welded 'case end' design board with removable gland plates provides super 'stiff' construction, even with gland plates removed. Construction virtually eliminates distortion during installation, ensuring final assembly fit and alignment.
- Unique cable trunking interface kit simplifies mounting of cable trunking and protects cables.
- Improved Neutral cable clamp design for simple & secure cable connection.
- Unique 'full form' blanking modules for unused MCB ways, provides secure shrouding of unused busbar stabs for increased safety. Blanking modules have interlinking form for improved positional security.
- Removable busbar assembly to assist installation.
- Additional Functional Earthing options and Clean Earth options available.
- Auto-formed, curved construction of main cover adds to board rigidity, with improved appearance.
- Removable door aids installation and 'easy hang' hinge design makes re-attachment of door simple.
- New 125A Switch Disconnecter Incomer for general commercial building applications.
- 250A options on 18 and 24 way boards.
- Compact 250A options on 18 and 24 way boards, where used with cable trunking.

General characteristics

Eaton's Memshield 3 MCB distribution boards have evolved through an intimate knowledge and feedback from electrical contractors, consulting engineers and end users to provide solutions to a wide range of electrical distribution applications in commercial buildings. Memshield 3 delivers safe, reliable and high performance protection of electrical power distribution systems.

Type B distribution boards are fully type tested with a conditional short circuit rating of 25kA to BS EN 60439. Associated devices are high performance MCBs, developed for commercial and industrial applications, dual rated at 10kA IEC – 60898 & 15kA IEC 60947-2 in B, C or D curve.

A wide range of accessories including full profile blanking modules for unused MCB ways and door locking options, enhance electrical safety, whilst clean earth kits improve versatility of the range.

Where used with 250A sized incomers, an extension box or the provision of suitable sized cable trunking is required to accommodate incoming cabling. A new cable trunking interface kit is available to provide additional mechanical protection of incoming cables.

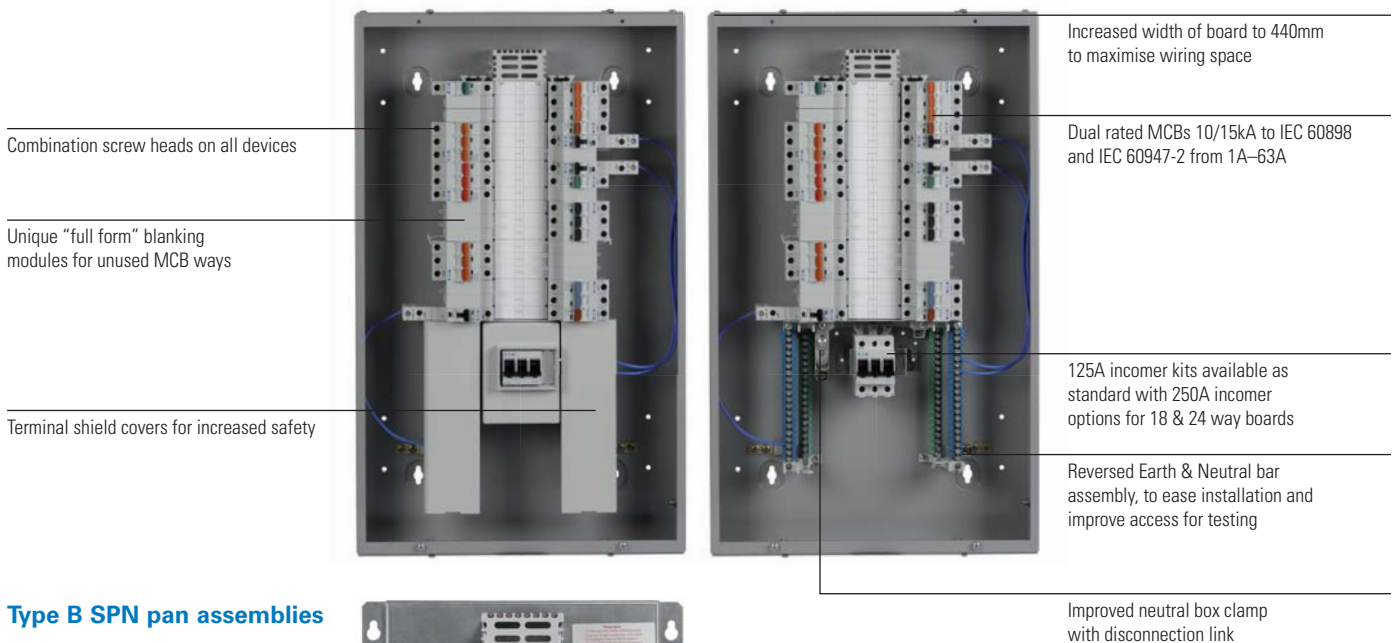
A choice of metering solutions are available as standard, providing clear electrical consumption information as well as a permanent capability of visualising information on a variety of other electrical parameters. The metering options have been developed to provide simple solutions to aid compliance with part L2 of the Building Regulations of England and Wales.

Type B TPN standard distribution boards

The optimised design for 125A TPN applications provides a choice of boards in sizes – 4, 6, 8, 12, 18 and 24 TP ways. 18 & 24 TP way variants are also suitable for 250A applications, where the number of MCB ways could require a larger supply current rating. A choice of incomers are available to suit different applications including RCCB options and a single phasing kit to provide a large single phase board arrangement.

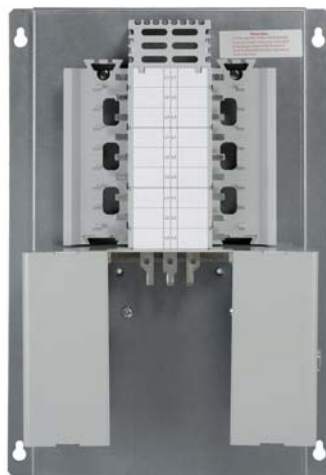
Incoming devices – 125A standard TPN board

The most popular choice will be the 125A switch disconnector incomer option, but other choices include a 4-pole TPSN, 2P SPSN, a range of RCCB switches and a contactor controlled incomer with switch disconnector for remote control of the supply to the board. A direct connection option is also available for applications that do not require local isolation.



Type B SPN pan assemblies

The TPN pan assemblies offer a high degree of flexibility for custom applications and inclusion in other factory built assemblies. 125A TPN types are available with 4, 6, 8, and 12 triple pole outgoing ways. 250A TPN types are available with 12, 18, and 24 triple pole outgoing ways.

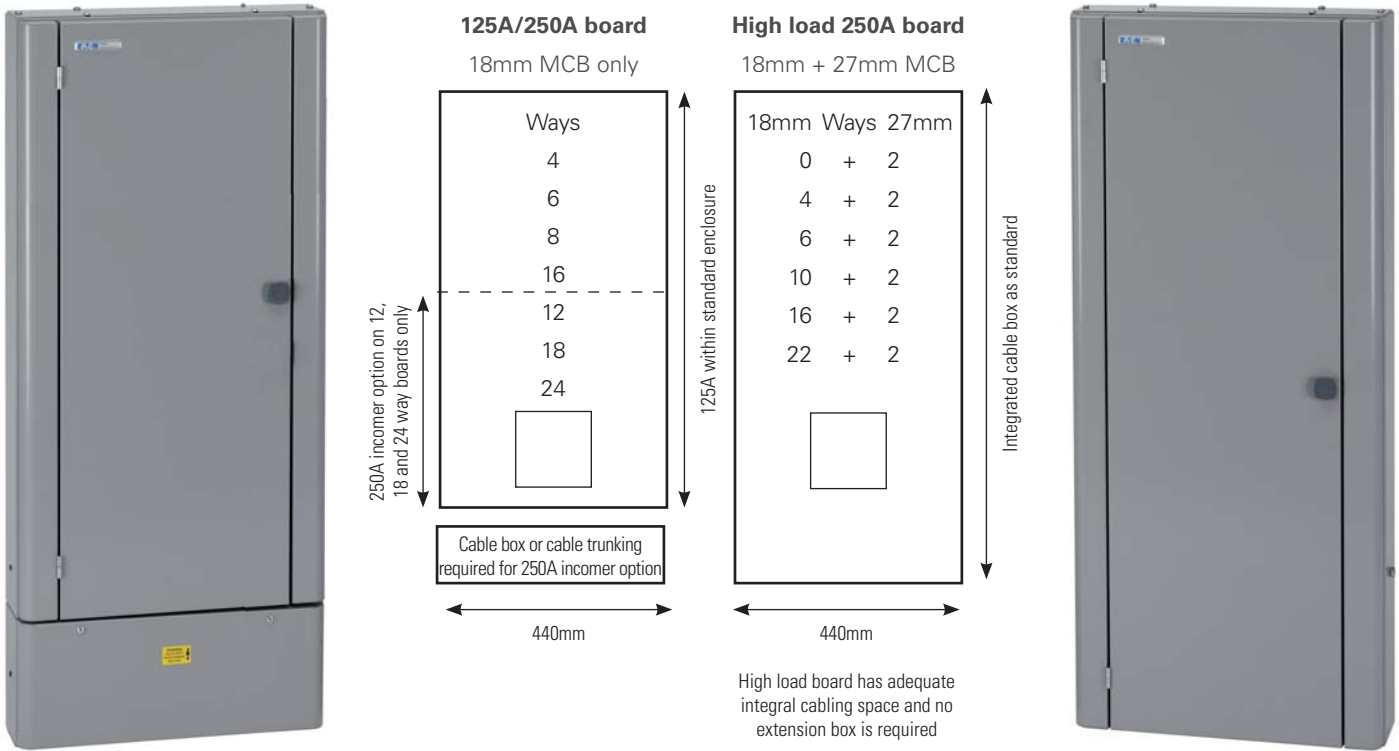


1.3

Product overview

Type B, TPN 250A distribution boards

Type B, TPN 250A distribution board solutions



Type B TPN 250A High Load distribution boards

Removable gland plates are provided top/bottom for ease of installation

Removable front door to aid accessibility to devices

Covers fit within enclosure dimensions allowing adjacent mounting



Modern, curved edges enhance appearance of board

Choice of SP & TP 18mm dual rated MCBs 10/15kA to IEC 60898 and IEC 60947-2 from 1A–63A

Two TP 27mm MCB ways, rated up to 125A

Secondary cover, slides over two location screws at bottom of board for easier fastening

Type B TPN 250A High Load distribution boards

Developed to respond to the needs of modern commercial building applications, a new 250A TPN range of MCB boards delivers increased versatility by having the ability to supply and protect sub loads up to 125A. Based principally around standard 18mm MCBs and RCBOs, this range has provision for two TP 27mm MCBs, up to 125A.

Available in sizes 2, 6, 8, 12, 18 and 24 TP ways, of which two ways are dedicated to the 27mm MCBs. 27mm MCBs are available SP or TP with ratings from 20A–125A.

Incoming devices – 250A TPN board and 18/24 way 125A board

These incomer options can be used with the 250A board or with the 18 or 24 way variant of the 125A board to provide a greater choice of solutions at 250A.

The most popular choice will be the 250A TPN switch disconnecter incomer option, but other choices include a 4-pole TPN switch disconnecter, a choice of MCCB incomers from 160A to 250A and a contactor controlled incomer pack. There is also a direct connection option available for applications that do not require local isolation.

Outgoing devices

For type B distribution boards, there is a choice of single pole or triple pole MCBs plus SP RCBOs. MCBs are available in current ratings from 1A–63A, with trip types B, C and D, 10kA to IEC 60898 and 15kA to IEC 60947-2. RCBOs to IEC 61009 10kA are also available in a choice of trip sensitivity options from 10mA–100mA. For the 250A “High Load” board, provision is given to accommodate a number of 27mm MCBs available in SP or TP sizes from 20A–125A to IEC 60947-2 .





200A TPN type B distribution board, with integrated split meter for power/lighting

- TPN distribution board with 'smart' meter for power and lighting loads.
- Unique MID compliant meter design calculates net values for each busbar section and total board load.
- Pulsed output or Modbus versions available as standard.
- Embedded vt technology and RJ 11 connections at meter minimises visible wiring.
- Supplied complete with factory fitted 200A Switch Disconnecter incomer switch.
- Suitable for TPN and SPN applications as supplied (shorting link included).
- Increased earthing options supplied as standard.



The feature packed Eaton meter packs and boards

To meet the needs of part L2 of the Building Regulations introduced in England and Wales in 2006, Eaton's Memshield 3 meter packs provide simple integration with matched aesthetics. The EBMPCT250 employs a multi-function, DIN rail mounted meter to measure electrical parameters on LV supplies to TPN distribution boards. It can also be used to meter single-phase loads. The unit is supplied complete with CTs and wiring terminals. This version is suitable for 100A–250A applications and as well as a pulsed output for kWh, the meter can be used to monitor other parameters, including line voltage and current. Electrical connection to the associated distribution board does not occupy any of the outgoing circuits. Modbus and MID certified meter versions are also available – see page 38.

The **EBMMPDC120** is supplied as a 120A direct connection solution, not requiring CTs. Cabling is simple and the meter provides a pulsed output for kWh. The meter is an OFGEM Approved and certified unit, providing clear kWh information.

Double meter pack for two standard TPN distribution boards facilitate separate monitoring of "small power" and "lighting" from one main supply.

For single phase EAM boards, a 65A meter pack provides simple integration. (Amps, kW, kWh, kVar and kVarh pulsed output, MID compliant. See page 34 for single phase EAM boards with factory fitted meters, including split power and lighting boards.)



Metering solutions – type A metered boards

- Type A SPN boards with integrated meter.
- Split load versions utilise a two channel meter, feeding two independent busbars and groups of MCB/RCBOs.
- Split load versions provide independent monitoring of "Power" and "Lighting" loads and total load.
- Aids compliance with Part L2 of the Building Regulations (England & Wales).
- See page 123 for dimensions.

Metering solutions – type B meter pack assemblies

Eaton's Memshield 3 meter packs provide simple integration with matched aesthetics. Split metering for separate small power and lighting has been added to the range to meet the needs of the L2 Regulations introduced in England and Wales in 2006. The meters provide a pulsed output for kWh and display other useful parameters, including line voltage and current. Modbus versions are also available and provide remote access to additional electrical parameters. For details refer to page 37. For dimensions refer to page 123.



Miniature circuit breakers (MCBs)












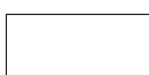


The Eaton range of 10kA/15kA high performance miniature circuit breakers (MCBs) have been designed to meet the latest UK, European and international standards, with ratings from 1A up to 63A.

The Eaton miniature circuit breakers are designed and tested in accordance with BS EN 60898 and are available in B, C and D characteristic curve as standard.

Technical characteristics

- Modular design, DIN rail mountable.
- 1, 2, 3, and 4-pole MCBs for commercial and Industrial applications.
- Rated breaking capacity 10kA to IEC 60898 and 15kA to IEC 60947-2.
- Rated currents from 1–63A in both B, C and D characteristic.
- Positive contact indication.
- Box clamp barrier to prevent incorrect cable/busbar insertion.
- Calibrated at 40° C.
- Can be used with both pin and comb type busbars.
- Suitable for use in Eaton Memshield 3 distribution boards and a wide range of other applications.

Toggle colour for commercial MCBs changes dependant on the rating as shown below:

	< 2A		16A
	2A		20A
	4A		25A
	6A		32A
	8A		40A
	10A		50A
	13A		63A



Residual current circuit breakers with overcurrent protection (RCBOs)

The Eaton range of combined residual current circuit breakers with integral overload protection (RCBOs), combine the highest level of protection for both people and circuits in a single one module device.

The Eaton range of RCBOs are available from 6A to 45A in both B and C curve with a choice of 10mA, 30mA, and 100mA trip sensitivities and fully comply to IEC 61009

Technical characteristics

- Compact modular design, DIN rail mountable, one module wide.
- Single module combined MCB/RCD unit.
- Solid neutral.
- Positive contact indication.
- Rated currents from 6–45A in both B and C characteristic.
- Trip sensitivity 10mA, 30mA, and 100mA available.
- Rated breaking capacity 10kA.
- Test trip button.



Residual current circuit breakers (RCCBs)

The Eaton range of residual current circuit breakers without integral overload protection (RCCBs), provide protection solutions to a wide range of applications.

The Eaton range of 2 and 4-pole RCDs are available with 10mA, 30mA, 100mA and 300mA sensitivities, and can be equipped with a wide range of modular accessories

Technical characteristics

- Modular design, DIN rail mountable, 2 or 4 modules wide.
- Double and four pole RCD for commercial and industrial applications.
- Rated short circuit capacity 10kA with fuse back up.
- Trip sensitivities 10, 30, 100 and 300mA.
- Positive contact indication.
- Test trip button.
- Rated currents from 16–100A.



Timers

The Eaton range comprises of a wide variety of different products which include analogue timers, digital timers, twilight switches and staircase timers. Timers are available either with 50Hz net-synchronisation or quartz control. Except for net-synchronised timers all units do have self power reserve to secure the time setting and program storage in case a power interruption does occur. Twilight switches are supplied with a remote light sensor, which can be easily installed on the outside wall where the required light intensity threshold can be simply adjusted on the modular device itself. The multifunctional staircase timer TE1 with many advanced switching facilities completes our range of timer products.

Technical characteristics (depending on type)

- Modular design.
- Analogue and digital timers.
- Time adjustment by 50 Hz net, quartz.
- Maximum 2 channel output.
- Manual override switching function.
- Power reserve for all quartz and DCF controlled timers.
- Remote Light Sensor for Twilight Switching.

Advantages of Eaton timers

- Easily programmable on front of device.
- Computer aided programming software available.
- Compact 18 mm design for restricted space opportunities.
- Separate IP40 covers are available for direct wall mounting.
- High level of accuracy.
- Maximum lamp load test data is available for reference.
- Automatic summer and winter time adjustment.
- Holiday & Random program settings.
- High power reserve up to 10 years.



Contactors and impulse switches

Contactors are frequently applied for switching of lamp loads, fans or pumps in both utility as well as industrial areas.

Eaton's "CR" contactors are very specific due to the applied operating coil and the construction of the main contacts. All contactors with ac/dc coils ensure silent operation which is further enhanced by a low power consumption.

Optimal contacts and low heat dissipation guarantee a long lifetime of the contactor which is available in a wide range of characteristics.

Technical characteristics

- Designed according to IEC 60947-4-1 and IEC 61095 standards.
- Suitable for applications in general control, heating & lighting applications.
- Available in 20, 25, 40 & 63 A ratings with up to 4-pole contacts.
- Coil voltages: 12 Vac/dc, 24 Vac/dc, 48 Vac/dc, 230 V ac, 220 Vdc.
- Optional add-on auxiliary contact available.
- DIN modular profile.
- Spacers available to extend lifetime (it is recommended to use 1 spacer between every 2 contactors installed).
- Day/night contactors available with manual override function.

Advantages of Eaton contactors

- Low inrush power for all ac/dc types.
- Availability of combined ac/dc type contactors ensure silent operation.
- Contactors of ac/dc coil type are operable on both ac and dc voltage. The 20 A and 25 A versions are also available with ac coil. All combined ac/dc type versions are equipped with surge protection on the operating coil.
- Equipped with contact indication.
- Optimal quality of contacts and low heat dissipation ensure a long life time.

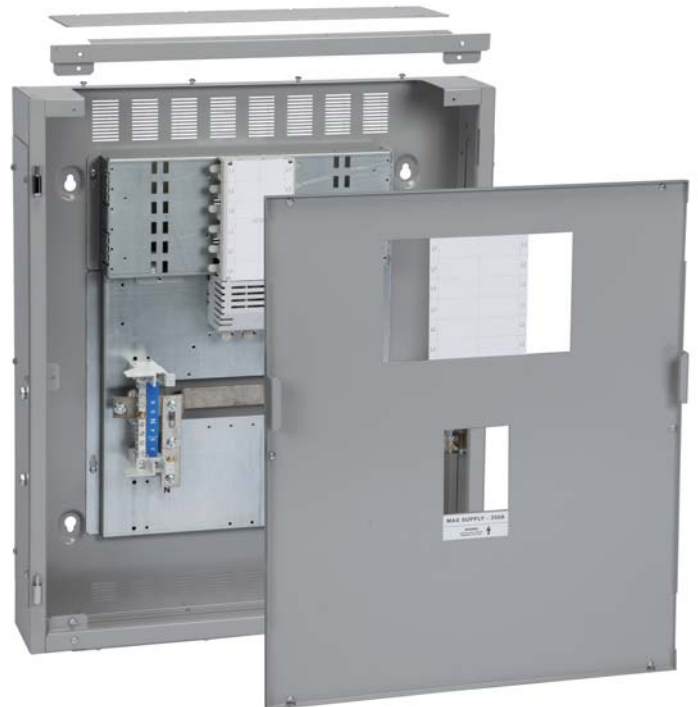
The feature packed Memshield 3 MCCB panelboard distribution system

A complete range of MCCB panelboards and pan assemblies providing all the options you need from a straightforward panelboard to a comprehensive panelboard system. The range now offers a variety of incoming devices and a greater choice of outgoing ways to provide more flexibility and choice to the user.

- 250A, 400A, 630A & 800A panelboard versions available.
- Can be configured for incomer device at top of panelboard.
- 3 or 4 pole incoming devices can be fitted.
- 4 to 18 outgoing TP ways.
- Outgoing MCCBs up to 400A, available in 25, 36 and 50kA breaking capacity.
- All TP MCCBs have adjustable thermal and magnetic trip units as standard. MCCBs with additional trip unit functionality are available to special order:
 - Distribution circuit protection, electronic.
 - Motor protection, thermal/magnetic.
 - Motor protection, electronic.
 - Motor protection without overload release.
 - Selective (discriminative) and generator protection, electronic.
- IP3X construction.
- Form 3b type 2 segregation.
- Tin-plated busbar systems throughout the range.
- Incoming and outgoing metering options to ensure Part L2 Building Regulations compliance. Plug-in cabling system provides for faster and error-proof installation.
- Reliable & safe operation assured through KEMA testing & certification.
- Wide range of extension boxes, metering, surge protection, and earth leakage incomer options available.
- Versatile solution, accommodating different frame size outgoing MCCBs to best match application needs.
- Enhanced safety through fully shrouded incoming devices, to protect against contact with live parts.
- Blanking plates finger protect unused outgoing ways.

Factory built assemblies

- Complete factory built assemblies can be specified for individual projects, on which the factory will be pleased to advise.
- Simple derivatives include: The fitment of side extension boxes, dual incomers and metering options etc.
- Through a modular panelboard system, more custom solutions can be accommodated to include:
 - 4-pole switching options.
 - Fused combination switch options for both incomers and outgoing ways.
 - Form 4 type 2 solutions.
- For more details on these services please contact our customer support team on 08700 545 333.



Option to remove top and bottom cross rails provides the ability to lay cables into the board instead of feeding them through the gland plate aperture, resulting in big time savings.





Surge protection devices (SPD) for MCB distribution boards and MCCB panelboards

Eaton has a combined lightning current and surge arrester, as well as an individual surge arrester to provide a coordinated solution for lightning protection and surge suppression fully compliant to BS EN 62305. This range of coordinated enclosed kits provides peace of mind that all equipment has comprehensive transient overvoltage protection caused by lightning strokes and switching in low voltage systems.

Surge arrester protection for distribution boards

EM3SSK1T2 (SPN distribution boards) & **EM3SSK3T2** (TPN distribution boards) technical summary:

- For the protection of low voltage distribution systems against transient overvoltage caused by indirect lightning strike and switching operations.
- The 3+1 circuit offers a universal solution for surge protection in low voltage distribution systems.
- Suitable for TT- and TN-S systems according to IEC 60364-5-53 Clause 534.
- Test class II according to IEC 61643-1+A1.
- SPD-type T2 according to EN 61643-11.



Combined lightning arrester and surge arrester protection for distribution boards and panelboards

EM3SSK3T12 (TPN distribution boards) & **EPBN1SPD123** (panelboards) technical summary:

- Lightning protection classes III and IV in accordance with IEC 62305.
- For the protection of low voltage distribution systems against transient overvoltage caused by direct and indirect lightning strike and switching operations.
- Application according to IEC 60364-5-53 Clause 534.
- Test class I, II, III in accordance with IEC 61643-1.
- SPD-type T1, T2, T3 in accordance with EN 61643-11.

Combined lightning arrester and surge arrester protection for panelboards

EPBN1SPD1234 technical summary:

- Lightning protection classes I, II, III and IV in accordance with IEC 62305.
- For the protection of low voltage distribution systems against direct lightning strike into the overhead power supply line or external lightning protection system and against indirect lightning stroke and switching operations.
- Application according to IEC 60364-5-53 Clause 534.
- Test class I, II, III in accordance with IEC 61643-1.
- SPD-type T1, T2, T3 in accordance with EN 61643-11.
- No discharge of ionised gases during operation.



Glasgow fuse-switch-disconnectors & switch-disconnectors

For many years, the Glasgow product name has been synonymous with quality, trust and reliability and as part of our long standing commitment to its tried and tested design we've reinvested for the future by re-tooling the whole range. All units are supplied with fuselinks or switchlinks fitted. Glasgow fuse switch disconnectors and switch disconnectors meet the constructional requirements for isolation of and are type tested to BS EN 60947-3. Conditional short circuit current rating tests at a value of 80kA rms Ue 415V have been carried out with Eaton HRC fuses fitted. Five frame sizes are available to provide a range from 63A to 800A, with utilisation category AC22A and AC23A Ue 415V ratings. Switch-disconnectors fitted with copper links give assigned AC20A Ui 660V and AC21A Ue 415V ratings. All units have retractable operating handles which drive overcentre mechanisms incorporating powerful operating springs. Opening and closing of the switches is thus independent of the action of the operator. Moving contact assemblies can be removed to facilitate installation or for contact inspection or renewal. Flag "on-off" indication is provided and terminal cover shields prevent contact with live metal. TPSN indicates triple-pole and switched neutral, the neutral pole making first and breaking last. Rated Insulation Voltage Ui 660V.

Enclosures

Surface-mounting enclosures comprise heavy gauge steel body plates incorporating cast iron frame members and are rustprotected, with a light grey paint finish (RAL7004). Front access doors, which are detachable, are fitted with dust-excluding gaskets and are interlocked to prevent opening when the switch is 'on'. The interlock can be defeated by a competent person for maintenance purposes. Operating handles may be locked in both the 'on' and 'off' positions. Castell type interlocks can be supplied to special order. Internal fixing holes allow units to be mounted closely side by side and all models have removable top and bottom end plates. These are pierced for connections, divided into front and rear (fixed) portions to simplify cabling using Eaton's MEM series split-type cable boxes, and provided with undrilled cover plates.

Fuses

Glasgow units are designed for use with HRC cartridge fuse links to BS88: Part 2. 63A and 100A units employ off-set contact fuse links. Details of suitable types of HRC cartridge fuse links are listed on page 101. All performance tests have been carried out using Eaton BS88 fuselinks.

Motor ratings

The motor ratings assigned to TPN switch-disconnector units are utilisation category AC23A (frequent operation) to BS EN 60947-3, which calls for make and break testing at 10 and 8 times rated current respectively for units having a motor rating up to and including 100 Amps. Ratings for switch-disconnector-fuses are dependent on suitable HRC fuses being fitted.

Auxiliary equipment

A comprehensive range of extension boxes and spreader boxes is available. Units are fitted with HRC Fuselinks of maximum rating but will accept fuselinks of a lower rating, refer to the Paramount HRC Fuselinks section on page 101. SPSN and TPSN indicate switched neutral. Neutral makes first and breaks last. If DP fuse-switch-disconnectors are required, use SPSN and replace the supplied switch link with a compatible fuselink.

Definitions of utilisation category

AC20a – Connecting and disconnecting under no load condition.

AC21a – Switching of resistive loads including moderate overloads.

AC22a – Switching of mixed resistive and inductive loads including moderate overloads.

AC23a – Switching of motor, or other high inductive loads.

Cable extension boxes

Fabricated sheet steel boxes can be fitted top/bottom of Glasgow switch units to provide additional space for spreading multi-core PVC insulated cables with solid aluminium conductors and for some larger cables with stranded copper conductors. For 1–3PCB, a plain flame retardant plywood plate is provided for fitting between the box and switch unit, the steel endplate supplied fitted to the switch unit being used on the box's cable entry side. For 4PCB, a plain steel plate is provided for cable entry on box. The switch enclosure has 8mm thick insulated endplates fitted both ends. For 5–6PCB, a 10mm thick insulated plate is provided for cable entry on box. The switch enclosure has 10mm thick insulated endplates fitted both ends, 5PCB includes a flame-retardant plywood packer for fitting between PCB and switch unit's endplate to provide lid flange clearance.

Spreader boxes

Cast metal split pattern, supplied with fixing bolts and plain bushes. Two types are available, suitable for straight or angled entry. They permit conductor spreading of larger PVC cables and fit directly on to Glasgow fuse-switch-disconnectors and switch-disconnectors.

Glasgow busbar chamber system

Eaton's busbar chamber system is designed to provide either compact, wall-mounting installations or – by using optional pedestal sets – easily assembled switchboards. Every facility is provided to enable Eaton's switchgear and distribution gear to be mounted easily and economically to busbar chambers which can be applied either to a suitable load-bearing vertical surface; or, by means of a pedestal set, affixed to a vertical surface which need not be load-bearing.



Busbar chambers

These are produced in 100, 200, 400, 630 and 800 Amp. ratings and in four nominal lengths. 100, 200 and 400 Amp units are available in all four sizes; 630 and 800 Amp ratings are offered in the three longest units only. All units in the range share the same height and depth dimensions. Similarly the twin busbars are located in precisely the same positions throughout the range and vary in size only in their front-to-back dimensions according to rating. Detachable end plates enable all units to be extended by coupling to a second busbar chamber using extension sets. Both top and bottom plates are also readily detachable so that marking out and machining can be carried out conveniently on a bench to accommodate Eaton's switchgear either above or below the chamber. Complete mounting kits, including templates, are available for mounting all Exel and Glasgow switchgear. Eaton chambers are fabricated from rust-protected sheet steel with a light grey paint finish. They have been type tested to BS EN 60439-1 with a rated conditional short circuit current rating of 63kA at Ue 550V and a rated short-time withstand current I_{cw} 20 times nominal rated current for one second. They are designed for use in factory-built assemblies to BS EN 60439-1. All chambers are subjected to an on-line dielectric test unit which provides a high voltage test between poles; and from poles to earth. Earth continuity is also tested. Rated insulation voltage 660V.

Pedestal and back-plate sets

Pedestal and back-plate sets are available to accommodate 1800, 1350 and 900mm nominal length busbar chambers in all ratings. These sets enable complete industrial switchboards to be built up easily and at competitive cost to produce a ready-painted unit of pleasing appearance. It is recommended that such switchboards are secured against a wall although this need not be a load-bearing structure. Switchgear of 315A and above must be mounted on the underside of the busbar chamber and fastened to the pedestal backplate. Each set comprises two pedestal sideplates and feet plus a pedestal backplate, all ready drilled; together with all necessary fastenings and spacers for floor-mounting bolts. Components are of rust-protected sheet steel with light grey paint finish.

Busbar chamber extension sets

Each unit can be coupled to any other Eaton chamber in the range of the same rating by removing adjacent end plates and using the appropriate busbar chamber extension set. These comprise a set of four copper links complete with all necessary clamps, washers and fasteners plus fitting instructions.

Connection sets for Glasgow fuse-switch-disconnectors & switch-disconnectors

Cable clamps covering all ratings are available for switchgear up to 200A. For connecting Glasgow units of 160A and above, solid copper connection sets are recommended as cost effective and convenient. These comprise pre-formed, insulated links in 4-pole sets supplied with all necessary clamps and fasteners. The appropriate switchgear mounting set (41, 51 or 61 BBMS) must be used with connection sets for 160–800A Glasgow units.

Busbar cable clamps and sockets

Incoming main cable clamps or sockets are not supplied due to the wide range which would be necessary to meet all requirements. Busbar cable clamps comprise plated brass U-clamps and steel slides with all bolts and washers. They are suitable for the connection of small solid or stranded copper conductors and also aluminium conductors using a barrier grease. Busbar cable sockets are plated brass castings complete with clamps and fixings, suitable for the termination of either copper or aluminium conductors. Both clamps and sockets allow for clamping on the busbars without drilling. For cabling direct on to busbars of 630–800A rating a special cable extension is required which can be made to special order.

Switchgear mounting sets

Available for all ratings of Exel switch-disconnectors/switch-disconnector fuses and Glasgow fuse-switch disconnectors and switch-disconnectors enabling these units to be mounted simply and efficiently either above or below the busbar chamber. Each mounting set comprises a template with instructions for machining the top/bottom plate of the busbar chamber; clamping channels, ready pierced for fasteners; all necessary fastenings; and, for Glasgow units, insulated shields and switch filler plates where appropriate.

Exel 2 switch-disconnectors & switch-disconnector fuses



Exel 2 switch disconnectors and switch-disconnector fuses meet the constructional requirements for isolation of and are type tested to BS EN 60947-3. Switches are of the quick make and break type, suitable for use on AC or DC. Units have removable moving contact assemblies to facilitate wiring. Exel 2 surface-mounting enclosures are fabricated from rust-protected sheet steel with a light grey paint finish. Removable blank top and bottom end plates (except for 20 and 32A top end plates which incorporate knockouts) and gasket doors give IP41 protection. Chromium-plated front operated handles, with "ON (I) OFF (O)" indication, and internal fixing enabling units to be mounted closely side by side. Interiors comprise porcelain bases fitted with non-ferrous conducting components.

Fuses and fuse carriers

HRC fuse carriers are designed for offset contact fuse links to BS 88: Part 2. Eaton HRC fuse links fitted to switch-disconnector-fuses are suitable on systems up to 415V AC. Eaton fuses used in these products are also suitable for 250V DC systems. All performance tests have been carried out using Eaton BS88 fuselinks. Units are fitted with HRC Fuselinks of maximum rating but will accept fuselinks of a lower rating, refer to the Paramount HRC Fuselinks section on page 101. HRC pattern switchfuses are fitted with type SCH carriers (20A, 32A, 63A-moulded; 100A, 125A-porcelain).

Motor ratings

The motor ratings assigned to TPN switch-disconnector units are utilisation category AC23A (frequent operation) to BS EN 60947-3, which calls for make and break testing at 10 and 8 times rated current respectively for units having a motor rating up to and including 100 Amps. Ratings for switch-disconnector-fuses are dependent on suitable HRC fuses being fitted.

Cable size

Maximum cable sizes are: 20A–6mm², 32A–10mm², 63A–35mm², 100/125A–70mm².

Type test compliance with standards

This range has been satisfactorily type-tested in accordance with BS EN 60947-3 with Eaton HRC fuselinks fitted.

Glasgow and Exel metering solutions



Some of the toughest energy regulations ever seen in the UK are now in force. Part L2 of the Building Regulations introduced in England and Wales in 2006 addresses the conservation of energy in public, commercial and industrial buildings, setting high standards for architects, engineers and contractors to create a more sustainable built environment.

To extend the existing Metering solutions for MCCB Panelboards and MCB Distribution boards, Eaton now provides an engineered solution for metering the supply to its market leading range of Fuse Disconnectors and Switch Disconnectors.

The Meterpacks provide generous cabling space for incoming cables and bolted lug connections. Meters are pre-installed and ready for use, requiring no setting up or additional electrical connections. Connection cables between the Meterpack and switchgear are also provided to simplify installation.

Principally developed for 100A (Exel)/200A(Glasgow) applications, the units can be used elsewhere to provide a ready to install, wire in, wire out solution for any 100A to 300A application.

With meter options of either pulsed output of kWh or Modbus RS485, the meters display useful parameters including kWh, line voltage, current, demand, etc.

Eaton's industrial switchgear metering solution completes a comprehensive range across the full range of Electrical distribution products and addresses the need to measure electricity consumption, whilst Split Metering options for separate small power and lighting circuits have also been added to distribution panels to fully meet the needs of the L2 regulations for every application.

These meter packs can also be directly retro-fitted to existing Glasgow and Exel installations providing a simplified and cost effective solution for upgrading to meet the needs of Part L2 of the Building Regulations.

Rotary isolators



Local switch-disconnectors standard duty, type RDMP, 20–63A, IP65, 2–8 poles

Complying with BS EN 60947-3 and IEC 408 the RDMP range of rotary cam switches are suitable for on load switching of general distribution a.c. power circuits and infrequent duty motor isolation.

Grey, moulded thermoplastic enclosures provide protection to IP65 making them suitable for most indoor and outdoor environmental conditions.

These compact isolators are fitted with red/yellow operating handles padlockable in the 'OFF' position with up to three padlocks.

Units supplied with an early break auxiliary contact are indicated by a figure 1 in the list number e.g. 2021RDMP.

The enclosure design allows easy access for cabling. Solid neutral and earth termination points are a standard feature.



Local switch-disconnectors standard duty, type PC2, IP55, 2–6 poles

Complying with BS EN 60947-3 and IEC 408 the PC2 range of rotary cam isolating switches are suitable for on load switching of general distribution A.C. power circuits and infrequent duty motor isolation.

Grey, pressed steel enclosures provide protection to IP55.

These compact disconnectors are fitted with black operating handles, padlockable in the 'OFF' position.

The enclosure design allows easy access for cabling by removal of the switch interior.

Switches with additional poles are available on request.

2 pole and 4 pole units have removable neutral links included for SPN (from 2P) or TPN (from 4P) conversions.

Earth terminals provided as standard.



Memlok changeover switches

Suitable for on-load control of alternative supplies. Surface mounted, 4 pole on-load changeover switches have a rated voltage of 415V. Higher voltage ratings available, details on request.

Switches comply with BS EN 60947-3, VDE0660. Double break blade & clip wiping action contact system ensures reduced contact bounce and the operator independent spring assisted mechanism ensures a positive and consistent switching action reducing arcing and contact wear. 32–200A units are provided with cable links and 400–800A with solid links suitable for use on either side of the switch. In all cases ample cable space is provided for both incoming and outgoing cables. Each unit is provided with an IP54 black handle and steel operating shaft.

All handles are insulated and may be padlocked in the 'OFF' position. Clear 'ON' (I) and 'OFF' (O) indication is provided. Door interlocking is provided by the handle in the 'ON' position.

Enclosures are finished in light grey BS4800 Shade 00A07. Also Memlok changeover switches are available in non-padlockable moulded enclosures to IP65. Four pole two-way rotary cam switches comprise double break silver alloy contacts. Memlok units comply with BS EN 60947-3.



Exel – distribution fuseboards

The Exel fuseboard range is available with standard enclosures to IP4X for the complete range of 20A to 200A distribution boards. A variety of extra features have been incorporated in the range including increased cabling space, superior door latches and locking devices (there is a choice of barrel lock or padlocking device), improved lid hinges and a unique safety carrier which effectively blanks off a single fuse-way allowing the circuit to be worked on in safety. Safety carriers have no provision for accepting a fuselink. The Exel distribution fuse boards are designed to comply with the requirements of BS5486: Part 11: 1989. All live parts are fully shrouded so that additional circuits may be wired and connected in safety whilst the existing circuits remain live and on load. The type of enclosure available gives protection to IP4X and is supplied with removable endplates. The range covers a wide variety of ratings from 20–200A; 20A and 32A with up to 12 ways in SPN and TPN configurations; 63A up to 8 ways, 100A up to 8 ways and 200A 4 way in TPN configurations. All ratings available with moulded HRC carriers to BS88: Part 2. Testing has been carried out using Eaton 'S' type HRC fuselinks. Fuse base mouldings are of high quality thermosetting material. The fuse units have skirted fuse carriers to prevent accidental contact with live parts when inserting or withdrawing a carrier. Separate shields are provided for the base contacts to prevent accidental contact when the carrier has been withdrawn. All fuseboards are suitable for systems with a rated insulation voltage U_e 660V AC, 500V DC.

Safety carriers

A range of safety carriers are available for insertion in a fusebase when its normal fuse carrier has been removed for isolation. The safety carriers are marked yellow for identification and have no provision for fuselink fixing.

Enclosures

Rust protected sheet steel IP4X enclosures have a light grey paint finish and are fitted with internal fixing holes. Enclosures have a robust, reliable construction. Enclosures for units from 20A to 100A are of all welded construction, 200A IP4X units have cast corner pieces. Removable top and bottom endplates incorporate knockouts on 20A and 32A units while 63–200A boards have blank endplates. Blank endplates are available on request for 20A and 32A boards. The enclosure allows gasketed access doors to be reversed for left hand or right hand opening. All sides are free from external projections and fuseboards can be mounted in inverted form if required.

Main terminations

32A, 2-way fuseboards have the main phase termination (tunnel type) attached to the fusebanks. All other fuseboards have the main terminations mounted on the back of the enclosure and are intended for use with cable sockets (sweating or crimp type) which are not provided. Busbar and main terminals are fully shrouded. A cable shroud to cover the cable socket is provided.

Earthing and neutral bars

Multi-way earthing bars are fitted with an integral earth bolt and have an outgoing terminal per fuse. They are rail mounted adjacent to the fully rated neutral bars. Neutral bars have main terminals of the same capacity as the phase terminals and have one outgoing terminal per fuse. Earth/neutral bar rails are fitted at the bottom of enclosures on 20A and 32A fuseboards and at the top on all others.

Additional outgoing circuits

All 20A and 32A units except 2-way versions have a main terminal suitable for looping out at full terminal capacity. This facility permits adjacent mounting of two fuseboards to extend outgoing circuits up to 24 way max. Additional shrouds (one per phase) required when using looping facility List No. **SH1539**.



HRC cartridge fuselinks, carriers and bases

Eaton's comprehensive range offers a selection of fuses to cater for many applications: Compact 415V a.c. S type industrial fuselinks complying with BS EN 60269-1 (BS88 – 1) or BS88 – 2 with ratings from 2 to 1250A. Skilful design techniques have meant that power dissipation has frequently been reduced despite the significant reduction in barrel size. Many ratings have also been tested for use in circuits up to 250V d.c.

Compact 415V a.c. S type motor circuit protection fuselinks complying with BS EN 60269-1 (BS88 – 1) or BS88 – 2 with ratings from 20M25A to 400M500A. This extended range of fuselinks is designed to withstand the inrush current associated with direct on line start motors whilst saving cost on the size of equipment to which they are fitted by virtue of their small dimensions.

Compact 240V and 415V a.c. SS, SN and SP type offset blade contact fuselinks complying with BS EN 60269-1 (BS88 – 1) or BS88 – 6 with ratings from 2 to 63A for use in industrial and commercial installations.

Compact 415V a.c. J type feeder pillar fuselinks complying with BS88 – 2 (formerly BS88: Part 5) for use by the Electricity Supply Industry in distribution systems. Ratings from 63–400A with 82mm fixing centres and 63–800A with 92mm fixing centres for wedge tightening contacts and 63–250A in ferrule form for single phase pole mounted cut outs.

Eaton HRC fuselinks are manufactured to exacting standards using precision assembly methods and undergo rigorous quality checking before dispatch including resistance testing all production. This ensures that performance will be consistent and conform with published characteristics within close tolerances. Type tests on Eaton equipment have been performed using Eaton fuselinks.

Eaton industrial and general purpose fuselinks have a breaking range and utilisation category gG which replaces the old class Q1 fusing factor. "g" indicates a full range breaking capacity fuselink and "G" indicates a fuselink for general application.

Eaton motor circuit protection fuselinks have a breaking range and utilisation category gM indicating a full range breaking capacity fuselink for the protection of motor circuits. These fuselinks have a dual current rating separated by the letter "M".

The lower current rating is the maximum continuous rating which also determines the rating and size of equipment to which the fuse is fitted. The higher current rating is the time current characteristic of the fuselink which determines its ability to withstand the motor starting current. Their selection frequently permits the use of lower rated switch and/or fusegear than would be the case using gG fuselinks with a consequent cost saving. Type gG fuselinks however may still be used and are the preferred option for assisted start motors where starting currents are reduced.

Eaton fuselinks are designed and manufactured in accordance with a Quality Management System in accordance with ISO 9001. Most fuselinks are ASTA Certified for a breaking capacity of 80kA at 415V a.c. and are endorsed ASTA 20 CERT showing compliance with the rules of the ASTA 20 scheme which includes assessment of the Quality Management System to ISO 9002 and detailed auditing of fuselink manufacture.

Eaton have for many years participated in developing and influencing fuse standards through BEAMA and BSI at national level and IEC at international level and therefore are able to produce designs incorporating forthcoming changes to standards.

Fuse carriers and bases – rewirable and HRC types

Types MBA and MBB fuse bases, type MRH rewirable fuse carriers and 100A HRC fuse carriers (List No. 100 SCHF) are manufactured from high grade vitreous porcelain.

HRC fuse carriers up to and including 100A (List Nos. 2 SCHF, 3 SCHF, 6 SCHF, 10 SCHF) comprise black track-resistant mouldings.

HRC and rewirable pattern carriers of the same rating are interchangeable.

Fuse bases are available in two types:

Type A – providing for busbar connection at one end and cable termination at the other.

Type B – providing for cable connection at both ends.

Terminal capacities for Type A and Type B bases:- 20A 6mm², 32A 10mm², 63A 35mm², 100A 70mm².

Rewirable fuse carriers are of the semi-enclosed type, and when fitted in Eaton's enclosures comply with the following 415/250V Categories of duty of BS 3036: 1958.

20, 32 and 63A – Category S2A.

100A – Category S4A.

100A fuse units may be fitted with SB3, SB4 or S0 fuselinks having 73mm fixing centres if used with adaptor List No. 100 MFLK HRC fuse carriers are designed for standard offset contact fuse links to BS88: Part 2 and are suitable for systems up to 660V.

All performance tests have been carried out using Eaton BS 88 Fuselinks.

Specification

A range of moulded HRC fuse units designed to accept bolt-in and clip-in HRC fuselinks.

Each unit is fully shrouded to prevent accidental contact with live parts when inserting or withdrawing a carrier and once the carrier has been removed completely.

The carrier and base mouldings are manufactured from high quality thermosetting material.

Units accepting bolt-in HRC fuselinks are available in ratings of 20, 32, 63, 100 and 200A and can be supplied in front connected, front/busbar connected, front/back connected and back connected versions.

They are designed to comply with BS88 – 2 and are suitable for systems up to 660V. Suitable HRC fuselinks are also to BS88 – 2. A full range of neutral links is available.

Those units which accept the clip-in fuselinks are rated at 32A and 63A, 415V. Each in a front connected and front/back connected version, with a 32A back/back type also available. Also suitable for DIN-rail mounting.

They comply with BS88 – 2 and accept clip-in HRC fuselinks to the same standard.

Clip-in type units allow fuselinks to be replaced very simply – no tools are required. Fuselinks are removed from the carrier using side pressure on the fuselink end tags while replacement involves a simple push fit only. Neutral links are available.

Terminal capacities: 20A 6mm², 32A 16mm², 63A 35mm², 100A 70mm², 200A 150mm².

Fuse units are available in four types:

Type A – providing for busbar connection at one end and cable termination at the other.

Type B – providing for cable connection at each end.

Type C – with back connecting studs.

Type D – providing for cable connection at one end with back connecting stud at the other.

Fuse units have been ASTA certified to BS88 – 2 and are suitable for systems up to 660V.

100A fuse units may be fitted with SB3, SB4 or S0 fuselinks having 73mm fixing centres if used with adaptor **100MFLK**.

Eaton's wide range of Motor Control Gear and Heating and Lighting Control equipment is an integral part of our single source commitment.

Since the late 1920's we have built countless motor starters, fitted and trusted by generations of contractors, while the increasing requirements of our markets have led us to constantly update and expand our ADS range to allow for an increased choice of current ratings and ingress protection.

This wealth of experience and expertise in the design and manufacture of Motor Control Gear is mirrored by our Heating and Lighting range which offers a versatile and comprehensive choice.

Standards

- Designed to meet or exceed UL, IEC and CSA
- IEC 60947-4-1
- VDE 0660
- IEC 60269
- BS EN 60947-4-1

ADS8 AC motor starters

Enclosures – moulded

- 9kW DOL max
- Tough polycarbonate in grey provides high IP protection to IP65
- Start and stop pushbuttons
- Internal earth terminals
- Cable entries – 20mm knockouts for M20 threaded glands

Enclosures – metalclad

- Attractively styled rust protected pressed steel finished in grey polyester powder paint
- Start and mushroom-headed stop pushbuttons
- Substantial earth terminal
- Cable entries – 20mm knockouts for M20 threaded glands

Switch-disconnectors

- Means of isolation and switching for mechanical maintenance
- Padlocking facility available
- Isolators type tested for on-load disconnection
- Interlocked with main cover

Overload relays

- Adjustable thermal pattern connected directly to contactor
- Ambient temperature compensated between -40°C to +60°C
- Phase failure sensitive relays
- Changeover trip contact
- Simple Auto-reset

Contactors

- Modern block type
- 6–15 x 106 mechanical and 1.5 x 106 electrical operations – AC3 duty.
- Provisions for fitting additional auxiliary contacts either N/O or N/C – depending on version

Optional fittings and specials

- Provision for various optional fitments on standard starters
- Special starter arrangements





ADS8 enclosed industrial starters

- Developed to increase the range of enclosed starters up to 90kW
- Design profile and numerous optional features available developed from experience of user requirements
- Starters will satisfy most specifications and are designed for mounting above or below busbar chambers
- Complements the lower rated ADS8 motor starters
- Provisions for TP interlocked and switch disconnectors with HRC main fuses
- Start and Stop pushbuttons, control circuit fuses, remote control terminal block and overload relays are fitted as standard
- Enclosures are robust rust-protected sheet steel with fully gasketed hinged covers

Contactors

- Modern block-type
- Each has provision for accepting additional auxiliary contacts

Overload relays

- Starters supplied with appropriate ambient temperature compensated phase-failure-sensitive thermal relay

Switch-disconnectors

- Door interlocked complete with padlocking facility
- Available with provisions for auxiliary contacts

Operating Conditions

-40°C to +60°C.

Optional features

- Motor rated ammeter with suppressed scale to indicate starting peaks
- Low voltage control circuit transformer
- Isolator auxiliary poles for separate control circuit supply
- Pilot indicating lamps
- Off/Auto or Local/Off/Remote selector switch
- Higher ratings up to 200kW available on request

Typical Specials

- Reversing starters
- Two-speed starters for dual or tapped-wound motors
- Stator and rotor starters
- Main/Standby starters



MSU pushbutton control units

- Designed to match Eaton's MEM series ADS motor starter range
- Simplicity, versatility and robust construction successfully allied to attractive styling
- One, two and three button types available in a variety of configurations
- 3-button types 23MSU and 23MSU/L supplied with fitted front label reading Forward, Reverse, Stop
- Separate loose label provided for situations requiring Up, Down, Stop
- Each contact block comprises 1 – N/O and 1 – N/C contact
- Start units are push to make (N/O)
- Stop units are push to break (N/C)
- Latching device where fitted holds stop pushbutton in depressed position until latch is released by clockwise rotation of mushroom head.
- One 'a' contact + one 'b' contact per way
- Form Za Uimp = 6kV
- Housings made from tough polycarbonate
- Enclosure material resistant to diluted mineral and organic acids
- 20mm conduit knockouts complete with M20 conduit threads incorporated at top and bottom
- Single way enclosures may be turned through 90° to permit side cable entry
- Ambient temperature rating -5°C to +40°C
- Switch and earth terminals 2 x 1mm² – 2.5mm² rigid, 2 x 1.5mm² – 2.5mm² flexible
- Single way control stations readily available with a range of 22mm cover mounted control and indicating devices

CSU pushbutton control units



- Robust construction
- Ideally suited for heavy industrial applications
- Available in general purpose enclosures to IP4X and dust and hoseproof enclosures to IP65
- Cast iron bases and front plates
- Earth terminal is provided
- Finished in a grey stoved paint finish
- Contacts are single pole double break
- Stop units push to break
- Start units push to make
- Ambient temperature -5°C to +40°C
- Maximum terminal capacity 2 x 2.5mm²

Autoline heating and lighting contactors



Open contactors

- 18A, 25A and 32A, 4-pole, with optional auxiliary contacts

Enclosed contactors

- 25A and 40A, 4-pole; 40A and 64A, 2-pole; 70A and 112A, single pole with fitted neutral link
- Robust pressed steel enclosures, rust protected with grey paint finish
- 220...240V units available with or without rectifiers for silent running
- 90-225A, 3-pole enclosed contactors can be supplied with switch-disconnector-fuse including HRC main fuses

Power factor correction capacitors

How can you economise?

A great deal of money is spent annually to achieve savings in production methods, improved plant efficiency and optimum lighting arrangements; essential in the highly competitive world of industry today. However, poorly managed energy supplies result in unnecessary, and avoidable wastage. Power factor correction is the established method of reducing electricity costs in industry and commerce. You can eliminate waste in electricity consumption by improving your power factor and saving up to 20% on your electricity costs. This could also help you to increase your output without the need to install new cables or extra supply capacity. To find out more contact us for a power factor check.

What is power factor correction?

Most loads on an electrical distribution system fall into one of three categories; resistive, inductive or capacitive. In your own plant, the most common is likely to be inductive. Typical examples of this include transformers, fluorescent lighting and AC induction motors. Most inductive loads use a conductive coil winding to produce an electromagnetic field, allowing the motor to function.

All inductive loads require two kinds of power to operate:

- Active power (kwatts) to produce the motive force
- Reactive power (kvar) to energise the magnetic field

The operating power from the distribution system is composed of both active (working) and reactive (non-working) elements. The active power does useful work in driving the motor whereas the reactive power only provides the magnetic field.

The bad news is that you are charged for both!

The objective, therefore, should be to reduce the reactive power drawn from the supply by improving the power factor.

If an AC motor were 100% efficient it would consume only active power but, since most motors are only 75% to 80% efficient, they operate at a low power factor. This means poor energy and cost efficiency because the Regional Electricity Companies charge you at penalty rates for a poor power factor.

By installing capacitors to improve your power factor you could SAVE MONEY on your electricity bill.

Additional potential benefits include:

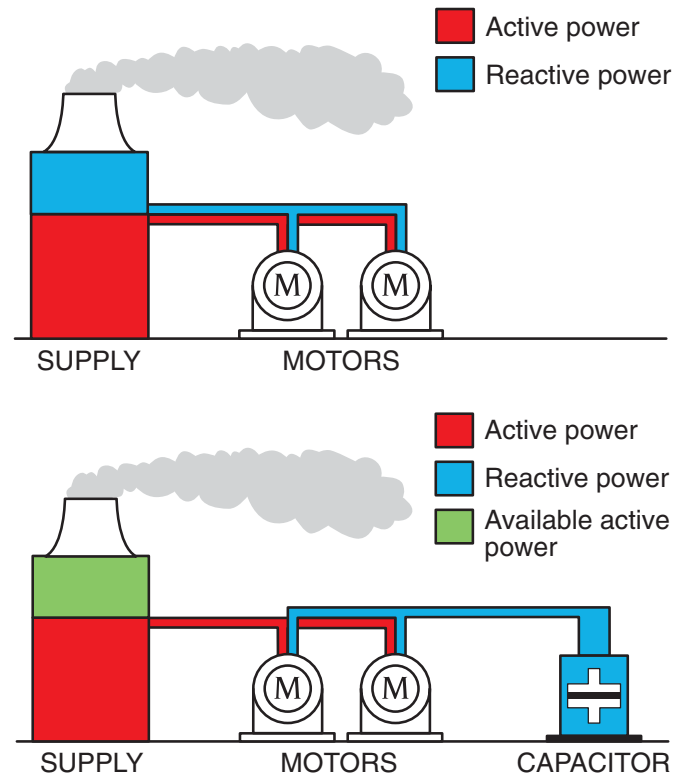
- Reduction of heating losses in transformers and distribution equipment
- Longer plant life
- Stabilised voltage levels
- Increase in capacity of your existing system and equipment
- Improved profitability

What do I have to do to save money?

Simply contact us on +44(0)121 685 2011 and we will arrange for an engineer to carry out a power factor survey. This will be done quickly, with no interruption to your operations and with absolutely no obligation on your part. We shall then be able to advise you of the savings you can achieve which could be as much as 20% of your current electricity bill.

Do you need to take action if you already have capacitors?

Modern capacitors are made of metallised polypropylene film. If they develop a fault, then instead of the whole capacitor failing, only a small section of the metallisation burns away,



leaving the capacitor working at a slightly lower output. Over the years, your capacitors could have lost so much output that you could be paying the penalty for a poor power factor.

Our engineers would be pleased to carry out a test on your installation to determine whether it is running economically.

As the power factor drops the system becomes less efficient. A drop from 1.0 to 0.9 results in 15% more current being required for the same load.

A power factor of 0.7 requires approximately 43% more current; and a power factor of 0.5 requires approximately 100% (twice as much) to handle the same load.

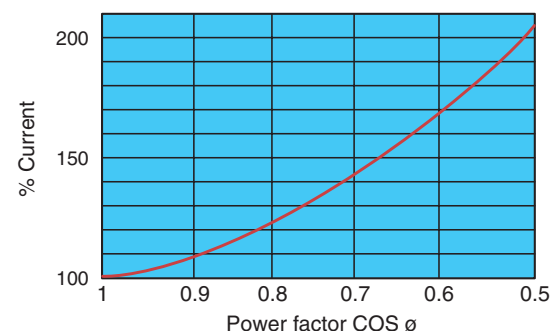
Do you have a problem with harmonics?

If you have...

- Nuisance tripping of circuit breakers or fuses blowing
- Erroneous operation of control system equipment
- Electronic communication interference
- Excessive heating and failure of transformers, motors, capacitors, fluorescent lighting ballasts etc.
- Excessive neutral current

...you could have a harmonic problem.

Our engineers will be pleased to check this for you.





Eaton capacitors non-auto range

The Eaton non-auto range of capacitors is designed for individual correction of motors, transformers and other items of plant. The capacitors are manufactured in robust steel cases suitable for the work place. They can be supplied with open terminals for mounting within cubicles or other switchgear or with fully enclosed terminals for use elsewhere. Single or three phase units are available in a wide range of sizes.

- Low loss
- Self healing
- Non flammable
- Easily maintained
- Environmentally friendly

Eaton capacitors non-auto application

Most AC electrical machines draw from the electricity supply apparent power in excess of the useful power required by the machine. By connecting the Eaton capacitor into circuit, it is possible to reduce the excess current. This saves energy and makes the most efficient use of your electricity installation.

Eaton capacitors non-auto construction

The capacitor consists of a number of low loss self healing elements assembled in a robust steel case which is suitable for the work place.

Protection system

Each element is fitted with a protection system which ensures an extended capacitor life and complete end of life safety.

Elements are self healing and have an over pressure double pole automatic disconnect feature that ensures that if the element fails it is electrically safe.

Capacitor features

Low loss – less than 0.5 Watts per kvar, including discharge resistors.

Environmentally safe – The dry type construction eliminates flammable impregnants and does not cause leakage or pollution problems.



Eaton capacitors 100

The Eaton 100 range of capacitors is designed for the automatic power factor correction of industrial loads. The capacitors are manufactured in robust steel cases suitable for the work place. The equipment is arranged to switch capacitors as the load requirement varies, thus ensuring that the system power factor is maintained at an economic level.

- Low loss
- Self healing
- Non flammable
- Easily maintained
- Environmentally friendly
- Fully automatic control

Eaton capacitors 100 application

Most AC electrical machines draw from the electricity supply apparent power in excess of the useful power required by the machine. By connecting the Eaton capacitor into circuit, it is possible to reduce the excess current. This saves energy and makes the most efficient use of your electricity installation.

Eaton capacitors 100 construction

The capacitor consists of a number of low loss self healing elements assembled in a robust steel case which is suitable for the work place. Each unit is available with a fusebase/fuseswitch or MCCB incomer.

Protection system

Each element is fitted with a protection system which ensures an extended capacitor life and complete end of life safety.

Elements are self healing and have an over pressure double pole automatic disconnect feature that ensures that if the element fails it is electrically safe.

Capacitor features

Low loss – less than 0.5 Watts per kvar, including discharge resistors.

Environmentally safe – The dry type construction eliminates flammable impregnants and does not cause leakage or pollution problems.



Eaton capacitors 300 – standard

The Eaton capacitors 300 cubicle is designed for the automatic power factor correction of industrial loads. It can be supplied with a reactive sensing relay or arranged to operate from existing control devices (slave). The equipment is arranged to switch capacitors as the load requirement varies, thus ensuring that the system power factor is maintained at an economic level.

- Fully automatic control
- Easily extendable
- Low loss
- Self-healing
- Individually protected elements
- Non flammable construction
- Environmentally friendly
- Easy maintenance
- Front or rear cable access

The cubicle is designed to be compatible with switchboards, its construction, therefore, is to the same exacting standards required by a switchboard manufacturer.

Hinged doors are fitted as standard which permits easy inspection and maintenance. The equipment is designed for full front access both for installation and maintenance. It can, therefore, be fitted where space is at a premium.

The modular body construction as standard, enables the equipment to be easily extended at a later date if required.

The cubicle incorporates capacitor units with the following features:

Dry long life low dielectric loss.

Metallised polypropylene windings encapsulated in epoxy resin and mounted within a sheet steel case.

Fitted with an internal fuse.

Self-healing – internal faults vaporize the metallisation.

Low losses – less than 0.5W/kvar.

Environmentally friendly, non-toxic and non-flammable.

Complete with discharge resistors.

Cubicle construction

Each Eaton capacitors 300 cubicle can house up to 300 kvar of capacitors switched in stages of 25 to 100 kvar dependent upon requirements.

The control equipment comprises:

- Set of DIN removable fuses and carriers per 1 or 2 switching stages.
- Suitably rated contactor per switching stage.
- Hand/Off/Auto selector switch per switching stage when required.
- 'Capacitor Energised' indication lamp per switching stage when required.
- Set of control fuses.

The cubicle has throughgoing busbars and all internal wiring and interconnections. Control wiring is clearly labelled.

All switching stages are clearly numbered and the panel is complete with all necessary information labels.



Eaton capacitors 300 – detuned

The Eaton capacitors 300 cubicle is designed for the automatic power factor correction of industrial loads. It can be supplied with a reactive sensing relay or arranged to operate from existing control devices. The equipment is arranged to switch capacitors as the load requirement varies, thus ensuring that the system power factor is maintained at an economic level.

- De-tuned to reduce harmonics
- Reduced nuisance tripping of MCCBs
- Fully automatic control
- Easily extendable
- Low loss
- Self-healing
- Individually protected elements
- Non flammable construction
- Environmentally friendly
- Easy maintenance
- Front or rear cable access

The cubicle is designed to be compatible with switchboards, its construction, therefore, is to the same exacting standards required by a switchboard manufacturer.

Hinged doors are fitted as standard which permits easy inspection and maintenance.

The equipment is designed for full front access both for installation and maintenance. It can, therefore, be fitted where space is at a premium.

The modular body construction as standard, enables the equipment to be easily extended at a later date if required.

The cubicle incorporates capacitor units with the following features:

Dry long life low dielectric loss.

Metallised polypropylene windings encapsulated in epoxy resin and mounted within a sheet steel case.

Fitted with an internal fuse.

Self-healing – internal faults vaporize the metallisation.

Low losses – less than 0.5 W/kvar.

Environmentally friendly, non-toxic and non-flammable.

Complete with discharge resistors.

Cubicle construction

Each Eaton capacitors 300 cubicle can house up to 250 kvar of capacitors switched in stages of 25 to 100 kvar dependent upon requirements.

The control equipment comprises:

- Set of DIN removable fuses and carriers per switching stage.
- Suitably rated contactor per switching stage.
- Hand/Off/Auto selector switch per switching stage when required.
- 'Capacitor Energised' indication lamp per switching stage when required.
- Set of control fuses.
- Natural ventilation is deemed acceptable, however forced ventilation is available on request.

The cubicle has throughgoing busbars and all internal wiring and interconnections. Control wiring is clearly labelled.

All switching stages are clearly numbered and the panel is complete with all necessary information labels.

Reactor details:

- Aluminium or Copper windings (on request, dependant on customer specification).
- Low losses.
- Low noise.
- High overloading capacity.
- 7% de-tuning factor as standard, others available on request.
- 189Hz as standard.

What are harmonics?

Harmonic distortion in electrical power systems is becoming more and more prevalent. The ever increasing use of devices having non-linear operating characteristics means more harmonics are being produced in the power system.

This section looks at the problems this is causing and the solutions that can be achieved by the use of Eaton capacitors.

Harmonic problems must not be confused with transient disturbances. Harmonics are continuous, steady state disturbances whereas transient disturbances are of short duration caused by 'spikes', surges, or impulses.

For most electrical engineering applications it is assumed that all alternating currents and voltages have a sinusoidal waveform.

An alternating waveform that is not sinusoidal is said to be complex. This complex waveform may be shown to be built up of a series of sinusoidal waveforms whose frequencies are integral multiples of a frequency of the fundamental, or basic, wave. The sinusoidal components of a complex wave are called the harmonics.

Thus the second harmonic has a frequency of twice the fundamental, the third three times, etc.



Eaton's Memshield 3 MCB distribution boards have evolved through an intimate knowledge and feedback from electrical contractors, consulting engineers and end users to provide solutions to a wide range of electrical distribution applications in commercial buildings. Memshield 3 delivers safe, reliable and high performance protection of electrical power distribution systems in accordance with BS EN 60439-3.

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2.1

Memshield 3 MCB distribution boards and enclosures

Type A, SPN distribution boards

See page 122 for technical data and overall dimensions

EAM10



125A SPN, type A distribution boards

- When more than 16 SP ways are required, see our TPN board ranges, complete with single phase kit options
- IP3X

Description	Rating (A)	Total no. of outgoing ways	Eaton list number
4 way SPN, type A distribution board	125	4	EAM4
7 way SPN, type A distribution board	125	7	EAM7
10 way SPN, type A distribution board	125	10	EAM10
13 way SPN, type A distribution board	125	13	EAM13
16 way SPN, type A distribution board	125	16	EAM16

EAMS1251N



Incoming devices for SPN, type A distribution boards

- Incoming devices supplied separate to distribution board

Description	Rating (A)	Poles	Sensitivity (mA)	Eaton list number
Switch-disconnector	125	SPSN	–	EAMS1251N
RCCB incoming device for SPN, type A distribution board	90	1P+N	30	EAMS100HE
RCCB incoming device for SPN, type A distribution board	90	1P+N	100	EAMS100ME
RCCB incoming device for SPN, type A distribution board	90	1P+N	300	EAMS100LE
Direct connection kit for SPN, type A distribution board	100	1P+N	–	EAMBT1002

EAMMP65



Metered SPN, type A distribution boards & standard meter packs

- Type A SPN boards, fitted with multifunction meters, can display; Amps, kW, kWh, kVar and kVarh pulsed output etc.
- Split load versions utilise a two channel meter, feeding two independent busbars and groups of MCB/RCCBs
- Split load versions provide independent monitoring of “Power” and “Lighting” loads and total load.
- Aids compliance with Part L2 of the building regulations (England & Wales)
- IP3X

Description	Rating (A)	Total no. of outgoing ways	Installed meter, characteristics ³⁾	Eaton list number
Meterpack for SPN, type A distribution boards	65	–	Pulsed output, kWh	EAMMP65
9 way SPN, type A distribution board ¹⁾	65	9	Pulsed output, kWh	EAM9M
9 way SPN, type A distribution board ¹⁾	65	9	Modbus	EAM9MB
12 way SPN, type A distribution board ¹⁾	65	12	Pulsed output, kWh	EAM12M
12 way SPN, type A distribution board ¹⁾	65	12	Modbus	EAM12MB
Split metered SPN, type A distribution board ^{1), 2)}	100	9 + 3	Pulsed output, kWh	EAMSL93M
Split metered SPN, type A distribution board ^{1), 2)}	100	9 + 3	Modbus	EAMSL93MB
Split metered SPN, type A distribution board ^{1), 2)}	100	6 + 6	Pulsed output, kWh	EAMSL66M
Split metered SPN, type A distribution board ^{1), 2)}	100	6 + 6	Modbus	EAMSL66MB

¹⁾ Includes factory fitted switch disconnector and single channel meter

²⁾ Includes two channel meter, 65A max load per channel

³⁾ Output type is Pulsed or Modbus

EM3SSK1T2



Surge protection device for SPN, type A distribution boards

- See page 122 for technical data

Description	Eaton list number
Enclosed surge protection kit for SPN boards – type 2	EM3SSK1T2

EMDH104



Outgoing devices, MCBs – 10/15kA, single pole

- Trip types B, C and D
- Dual rated, 10kA to IEC 60898 and 15kA to IEC 60947-2

Description	Rated current (A)	Width (mm)	Short circuit rating (kA)	Eaton list number		
				Trip type B	Trip type C	Trip type D
Miniature circuit breaker	1	18	10/15	EMBH101	EMCH101	EMDH101
Miniature circuit breaker	2	18	10/15	EMBH102	EMCH102	EMDH102
Miniature circuit breaker	4	18	10/15	EMBH104	EMCH104	EMDH104
Miniature circuit breaker	6	18	10/15	EMBH106	EMCH106	EMDH106
Miniature circuit breaker	8	18	10/15	EMBH108	EMCH108	EMDH108
Miniature circuit breaker	10	18	10/15	EMBH110	EMCH110	EMDH110
Miniature circuit breaker	13	18	10/15	EMBH113	EMCH113	EMDH113
Miniature circuit breaker	16	18	10/15	EMBH116	EMCH116	EMDH116
Miniature circuit breaker	20	18	10/15	EMBH120	EMCH120	EMDH120
Miniature circuit breaker	25	18	10/15	EMBH125	EMCH125	EMDH125
Miniature circuit breaker	32	18	10/15	EMBH132	EMCH132	EMDH132
Miniature circuit breaker	40	18	10/15	EMBH140	EMCH140	EMDH140
Miniature circuit breaker	50	18	10/15	EMBH150	EMCH150	EMDH150¹⁾
Miniature circuit breaker	63	18	10/15	EMBH163	EMCH163	EMDH163¹⁾

¹⁾ 15kA to IEC60947-2 rating only

EMCH116R30



Outgoing devices, RCBOs single pole – trip type C – 30mA sensitivity

- Eaton's range of residual current circuit breakers with integral overload protection (RCBOs), are manufactured to IEC/EN 61009 and meet the latest European and international standards.
- For other RCBO sensitivity options refer to full details on page 49.

Description	Rating (A)	Trip type	Sensitivity (mA)	Eaton list number
Eaton RCBO 6A 10kA type C SP	6	C	30	EMCH106R30
Eaton RCBO 10A 10kA type C SP	10	C	30	EMCH110R30
Eaton RCBO 16A 10kA type C SP	16	C	30	EMCH116R30
Eaton RCBO 20A 10kA type C SP	20	C	30	EMCH120R30
Eaton RCBO 32A 10kA type C SP	32	C	30	EMCH132R30
Eaton RCBO 40A 6kA type C SP	40	C	30	EMCH140R30
Eaton RCBO 45A 6kA type C SP	45	C	30	EMCH145R30

EMBH116R30



Outgoing devices, RCBOs single pole – trip type B – 30mA sensitivity

Description	Rating (A)	Trip type	Sensitivity (mA)	Eaton list number
Eaton RCBO 6A 10kA type B SP	6	B	30	EMBH106R30
Eaton RCBO 10A 10kA type B SP	10	B	30	EMBH110R30
Eaton RCBO 16A 10kA type B SP	16	B	30	EMBH116R30
Eaton RCBO 20A 10kA type B SP	20	B	30	EMBH120R30
Eaton RCBO 32A 10kA type B SP	32	B	30	EMBH132R30
Eaton RCBO 40A 6kA type B SP	40	B	30	EMBH140R30
Eaton RCBO 45A 6kA type B SP	45	B	30	EMBH145R30

2.1

Memshield 3 MCB distribution boards and enclosures

Type A, SPN distribution boards

EMDL



General accessories for SPN, type A distribution boards

Description

Eaton list
number

MCB blanking module – 18mm

EMBP

Half MCB blanking strip – 9mm

EMABP

Universal device lockout attachment – fits MCBs, RCCBs and RCBOs

ASPDL

Padlock suitable for ASPDL

PD2

Door barrel lock with 2 keys

EMDL

Door padlocking kit

EMPL

Padlock suitable for EMPL

PD1

Vertical coupling kit for connecting 2 SPN Distribution boards (125A max. total load)¹⁾

EAMCK

Clean earth for A board 5 terminals

EAME5

Clean earth for A board 11 terminals

EAME11

¹⁾ Incoming device required for each linked distribution boards

EMPL



See page 122 for technical data and overall dimensions

EBM81



125A/250A TPN, type B distribution boards

- IP4X

Description	Rating (A)	Total no. of outgoing ways	Eaton list number
4 way TPN, type B distribution board	125	4	EBM41
6 way TPN, type B distribution board	125	6	EBM61
8 way TPN, type B distribution board	125	8	EBM81
12 way TPN, type B distribution board	125	12	EBM121
16 way TPN, type B distribution board	125	16	EBM161
12 way TPN, type B distribution board	125/225 ¹⁾	12	EBM122
18 way TPN, type B distribution board	125/250 ¹⁾	18	EBM182
24 way TPN, type B distribution board	125/250 ¹⁾	24	EBM242

¹⁾ 225A/250A options – if used with cable extension box or with cable trunking. See 250A incomer options below

EBM121D



125A SPSN, type B distribution board with SPSN main switch disconnector fitted

- IP4X

Description	Rating (A)	Total no. of outgoing ways	Eaton list number
12 way SPSN type B distribution board	125	12	EBM121D

EBMS1253



125A incomer options for type B distribution boards

- Incoming devices supplied separate to distribution board.

Description	Rating (A)	Pole configuration	Eaton list number
Switch disconnecter	125	TP	EBMS1253
Switch disconnecter kit (including single phasing link)	125	SPSN	EBMS1251N
Switch disconnecter	125	TPSN	EBMS1253N
Direct connection (lugs connector)	125/250	TP	EBMBT2503
30mA RCCB ¹⁾	100	TPSN	EBMR30
100mA RCCB ¹⁾	100	TPSN	EBMR100
300mA RCCB ¹⁾	100	TPSN	EBMR300
300mA RCCB with time delay	100	TPSN	EBMR300T
Switch disconnecter feeding 125A TP AC1 contactor, housed in extension box	125	TP	EBMCC1253

¹⁾ Includes 50mm² terminal adapter

EBM62H



250A TPN, type B high load distribution board

- These boards include 2 TPN outgoing ways for 27mm MCB (upto 125A)
- Adequate integral cabling space means that no extension box is required.
- IP4X

Description	Rating (A)	Total no. of 18mm TP outgoing ways (63A max)	Total no. of 27mm TP outgoing ways (125A max)	Total no. of outgoing ways	Eaton list number
2 way TPN, type B distribution board	200	0	2	2	EBM22H
6 way TPN, type B distribution board	250	4	2	6	EBM62H
8 way TPN, type B distribution board	250	6	2	8	EBM82H
12 way TPN, type B distribution board	250	10	2	12	EBM122H
18 way TPN, type B distribution board	250	16	2	18	EBM182H
24 way TPN, type B distribution board	250	22	2	24	EBM242H

EBMMB250



250A incomer options for type B distribution boards

- Incoming devices supplied separate to distribution board.
- Where used with **EBM182** or **EBM242**, a separate cable extension box or suitable cable trunking is required

Description	Rating (A)	Pole configuration	Eaton list number
Switch-disconnector	250	TP	EBMS2503
Direct connection (lugs connector)	250	TP	EBMBT2503
MCCB incomer kit (includes MCCB)	250	TP	EBMMB250
MCCB incomer kit (includes MCCB)	200	TP	EBMMB200
MCCB incomer kit (includes MCCB)	160	TP	EBMMB160
Switch disconnector feeding 250A TP AC1 contactor, housed in extension box	250	TP	EBMCC2503
Single phase conversion kit for 250A rated board only (requires EBMS2503 to be ordered separately)			EBMS25

EBMMPCT250



Meterpack assemblies – TPN, type B distribution boards

Description	Rating (A) (total load)	Installed meter, characteristics	Eaton list number
Meterpack for TPN, type B distribution boards	250	Pulsed output, kWh	EBMMPCT250
Meterpack for TPN, type B distribution boards	250	Modbus + pulsed output, kWh	EBMMPCT250M
Meterpack for TPN, type B distribution boards	250	MID certified meter	EBMMPCT250MID
Double meterpack for 2 x TPN, type B distribution boards	250	Pulsed output, kWh	EBMMPSL250
Double meterpack for 2 x TPN, type B distribution boards	250	Modbus + pulsed output, kWh	EBMMPSL250M
Double meterpack for 2 x TPN, type B distribution boards	125	Pulsed output, kWh	EBMMPSL125
Double meterpack for 2 x TPN, type B distribution boards	125	Modbus + pulsed output, kWh	EBMMPSL125M
Meterpack for TPN, type B distribution boards	120	Ofgem approved	EBMMPDC120

EBMSL642MB



Split metered power and lighting board – 200A TPN, type B

- Includes factory fitted 200A switch disconnector and two channel meter
- Adequate integral cabling space means that no extension box is required.
- IP4X

Description	Rating (A)	Total no. of outgoing ways	Installed meter, characteristics ¹⁾	Eaton list number
Split metered TPN, type B distribution board	200	6+4	Pulsed output, kWh	EBMSL642M
Split metered TPN, type B distribution board	200	6+4	Modbus	EBMSL642MB
Split metered TPN, type B distribution board	200	8+6	Pulsed output, kWh	EBMSL862M
Split metered TPN, type B distribution board	200	8+6	Modbus	EBMSL862MB
Split metered TPN, type B distribution board	200	10+8	Pulsed output, kWh	EBMSL1082M
Split metered TPN, type B distribution board	200	10+8	Modbus	EBMSL1082MB
Split metered TPN, type B distribution board	200	14+10	Pulsed output, kWh	EBMSL14102M
Split metered TPN, type B distribution board	200	14+10	Modbus	EBMSL14102MB

¹⁾ Output type is Pulsed or Modbus

EM3SSK3T12



Surge protection device for type B distribution boards

- See page 122 for technical data

Description	Eaton list number
Enclosed surge protection kit for TPN boards – type 1&2	EM3SSK3T12
Enclosed surge protection kit for TPN boards – type 2	EM3SSK3T2

EMDH104



Outgoing devices – MCBs – 10/15kA, single pole

- Trip types B, C and D
- Dual rated, 10kA to IEC 60898 and 15kA to IEC 60947-2

Description	Rated current (A)	Width (mm)	Short circuit rating (kA)	Eaton list number		
				Trip type B	Trip type C	Trip type D
Miniature circuit breaker	1	18	10 /15	EMBH101	EMCH101	EMDH101
Miniature circuit breaker	2	18	10 /15	EMBH102	EMCH102	EMDH102
Miniature circuit breaker	4	18	10 /15	EMBH104	EMCH104	EMDH104
Miniature circuit breaker	6	18	10 /15	EMBH106	EMCH106	EMDH106
Miniature circuit breaker	8	18	10 /15	EMBH108	EMCH108	EMDH108
Miniature circuit breaker	10	18	10 /15	EMBH110	EMCH110	EMDH110
Miniature circuit breaker	13	18	10 /15	EMBH113	EMCH113	EMDH113
Miniature circuit breaker	16	18	10 /15	EMBH116	EMCH116	EMDH116
Miniature circuit breaker	20	18	10 /15	EMBH120	EMCH120	EMDH120
Miniature circuit breaker	25	18	10 /15	EMBH125	EMCH125	EMDH125
Miniature circuit breaker	32	18	10 /15	EMBH132	EMCH132	EMDH132
Miniature circuit breaker	40	18	10 /15	EMBH140	EMCH140	EMDH140
Miniature circuit breaker	50	18	10 /15	EMBH150	EMCH150	EMDH150 ¹⁾
Miniature circuit breaker	63	18	10 /15	EMBH163	EMCH163	EMDH163 ¹⁾

¹⁾ 15kA to IEC60947-2 rating only

EMCH310



Outgoing devices – MCBs – 10/15kA, three pole

- Trip types B, C and D
- Dual rated, 10kA to IEC 60898 and 15kA to IEC 60947-2

Description	Rated current (A)	Width (mm)	Short circuit rating (kA)	Eaton list number		
				Trip type B	Trip type C	Trip type D
Miniature circuit breaker	1	54	10/15	EMBH301	EMCH301	EMDH301
Miniature circuit breaker	2	54	10/15	EMBH302	EMCH302	EMDH302
Miniature circuit breaker	4	54	10/15	EMBH304	EMCH304	EMDH304
Miniature circuit breaker	6	54	10/15	EMBH306	EMCH306	EMDH306
Miniature circuit breaker	8	54	10/15	EMBH308	EMCH308	EMDH308
Miniature circuit breaker	10	54	10/15	EMBH310	EMCH310	EMDH310
Miniature circuit breaker	13	54	10/15	EMBH313	EMCH313	EMDH313
Miniature circuit breaker	16	54	10/15	EMBH316	EMCH316	EMDH316
Miniature circuit breaker	20	54	10/15	EMBH320	EMCH320	EMDH320
Miniature circuit breaker	25	54	10/15	EMBH325	EMCH325	EMDH325
Miniature circuit breaker	32	54	10/15	EMBH332	EMCH332	EMDH332
Miniature circuit breaker	40	54	10/15	EMBH340	EMCH340	EMDH340
Miniature circuit breaker	50	54	10/15	EMBH350	EMCH350	EMDH350 ¹⁾
Miniature circuit breaker	63	54	10/15	EMBH363	EMCH363	EMDH363 ¹⁾

¹⁾ 15kA to IEC60947-2 rating only

EMCS1100



Outgoing devices (for 250A high load distribution board only) – MCBs, single pole

Rated current In (A)	Width (mm)	Short circuit rating (IEC/EN 60947-2)	Eaton list number		
			Trip type B	Trip type C	Trip type D
20	27	25kA	EMBS120	EMCS120	EMDS120
32	27	25kA	EMBS132	EMCS132	EMDS132
40	27	25kA	EMBS140	EMCS140	EMDS140
50	27	25kA	EMBS150	EMCS150	EMDS150
63	27	25kA	EMBS163	EMCS163	EMDS163
80	27	20kA	EMBS180	EMCS180	EMDS180
100	27	20kA	EMBS1100	EMCS1100	EMDS1100
125	27	15kA	EMBS1125	EMCS1125	–

EMCS3125



Outgoing devices (for 250A high load distribution board only) – MCBs, three pole

Rated current In (A)	Width (mm)	Short circuit rating (IEC/EN 60947-2)	Eaton list number		
			Trip type B	Trip type C	Trip type D
20	27	25kA	EMBS320	EMCS320	EMDS320
32	27	25kA	EMBS332	EMCS332	EMDS332
40	27	25kA	EMBS340	EMCS340	EMDS340
50	27	25kA	EMBS350	EMCS350	EMDS350
63	27	25kA	EMBS363	EMCS363	EMDS363
80	81	20kA	EMBS380	EMCS380	EMDS380
100	81	20kA	EMBS3100	EMCS3100	EMDS3100
125	81	15kA	EMBS3125	EMCS3125	–

EMCH116R30



Outgoing devices, RCBOs single pole – trip type C – 30mA sensitivity

- Eaton's range of residual current circuit breakers with integral overload protection (RCBOs), are manufactured to IEC/EN 61009 and meet the latest European and international standards.
- For other RCBO sensitivity options refer to full details on page 49.

Description	Rating (A)	Trip type	Sensitivity (mA)	Eaton list number
Eaton RCBO 6A 10kA type C SP	6	C	30	EMCH106R30
Eaton RCBO 10A 10kA type C SP	10	C	30	EMCH110R30
Eaton RCBO 16A 10kA type C SP	16	C	30	EMCH116R30
Eaton RCBO 20A 10kA type C SP	20	C	30	EMCH120R30
Eaton RCBO 32A 10kA type C SP	32	C	30	EMCH132R30
Eaton RCBO 40A 6kA type C SP	40	C	30	EMCH140R30
Eaton RCBO 45A 6kA type C SP	45	C	30	EMCH145R30

EMBH116R30



Outgoing devices, RCBOs single pole – trip type B – 30mA sensitivity

Description	Rating (A)	Trip type	Sensitivity (mA)	Eaton list number
Eaton RCBO 6A 10kA type B SP	6	B	30	EMBH106R30
Eaton RCBO 10A 10kA type B SP	10	B	30	EMBH110R30
Eaton RCBO 16A 10kA type B SP	16	B	30	EMBH116R30
Eaton RCBO 20A 10kA type B SP	20	B	30	EMBH120R30
Eaton RCBO 32A 10kA type B SP	32	B	30	EMBH132R30
Eaton RCBO 40A 10kA type B SP	40	B	30	EMBH140R30
Eaton RCBO 45A 6kA type B SP	45	B	30	EMBH145R30

EMBP



General accessories, type B

Description	Eaton list number
MCB blanking module – 18mm	EMBP
Half MCB blanking strip – 9mm	EMABP
MCB blanking module – 27mm	EMBPH
Universal device lockout attachment – fits MCBs, RCCBs and RCBOs	ASPDL
Lockout attachment for 27mm MCBs	ASPDL27
Lockout attachment for 250A switch/MCCB	131669
Shunt trip 230-240V AC for 250A switch/MCCB	118724
Undervoltage release 230–240V AC for 250A switch/MCCB	118721
Padlock suitable for ASPDL & ASPDL27	PD2
Door barrel lock with 2 keys	EMDL
Door padlocking kit	EMPL
Padlock suitable for EMPL	PD1
Top/bottom gland plate	EBMGP4
IP42 gland plate kit	EMGP142
Cable trunking interface kit	EBMTK
Spare way label 12 way – pack of 5	EBLB1
Spare way label 18 way – pack of 5	EBLB2
Enclosure for NZM1 3-pole MCCB incomer	EBMMBKIT

EBMTK



EBMXPC1



Cable extension boxes, type B

Description	Box height	Eaton list number
Cable spreader extension box	180mm	EBMXPC1
Cable spreader extension box	250mm	EBMXPC2

EBMNE8



High integrity/clean earth kit

Description	No. of ways	Eaton list number
High integrity/clean earth kit for type B Board	8	EBMNE8

Note: Up to 4 high integrity earth bars can be fitted to a type B distribution board

2.3

Memshield 3 MCB distribution boards and enclosures

Type B, TPN distribution boards

EBMXDC9



Modular enclosures

- Modular enclosures will accept MCBs, RCCBs, RCBOs, fuse modules and command control products.
- Modular enclosures **EBMXDC6** to **EBMXDC45** are fitted with earth and neutral bars as standard.
- Modular enclosures **EBMXDC15** and **EBMXDCG15** have same profile width suitable for mounting onto type A, SPN distribution board **EAM13** or any type B, TPN distribution board.

See page 123 for technical data and overall dimensions.

Description	Capacity in 18mm modules	Glazed door	Eaton list number
Modular enclosure, 15 module din rail – glazed door	15	Yes	EBMXDCG15
Modular enclosure, 6 module din rail – unglazed door	6	No	EBMXDC6
Modular enclosure, 9 module din rail – unglazed door	9	No	EBMXDC9
Modular enclosure, 15 module din rail – unglazed door	15	No	EBMXDC15
Modular enclosure, 18 module din rail – unglazed door	18	No	EBMXDC18
Modular enclosure, 2 x 15 module din rail – unglazed door	30	No	EBMXDC30
Modular enclosure, 3 x 15 module din rail – unglazed door	45	No	EBMXDC45
Half MCB blanking strip – 9mm	–	–	EMABP

EBMXE15



Enclosure accessories

Description	Eaton list number
Additional earth bar (15 additional holes)	EBMXE15
Door barrel lock with 2 keys	EMDL
Door padlocking kit	EMPL
Padlock suitable for EMPL	PD1

Distribution boards type A and type B – cable capacities

Cable capacities	Type A	Type B
125A switch disconnecter	50mm ²	50mm ²
100A RCCB (type A = 90A)	35mm ²	50mm ²
250A switch disconnecter	–	120mm ² (+ M8 lugs)
160A–250A MCCB incomer	–	250A = 120mm ² (+ M8 lugs)
100A direct connection kit	35mm ²	–
250A direct connection lugs	–	120mm ² (+ M8 lugs)
125A contactor incomer	–	50mm ²
250A contactor incomer	–	120mm ² (+ M8 lugs)
Enclosure earth stud	M6	M8
Incoming earth terminal	25mm ²	125A = 25mm ² , 250A = 70mm ²
Incoming neutral terminal	90/100A = 35mm ² , 125A = 50mm ²	125A = 50mm ² , 250A = 120mm ² (+ M8 lugs)
Outgoing earth terminal	25mm ²	25mm ²
Outgoing neutral terminal	25mm ²	25mm ²

Interiors & incoming devices for single phase and three phase

Eaton MCB pan assemblies offer a high degree of flexibility for custom applications. SPN types are available with 4, 7, 10, 13, and 16 ways. TPN types are available with 4, 6, 8, 12, 18 and 24 ways.

Technical characteristics

- Eaton MCB pan assemblies are suitable for inclusion in other factory built assemblies and as replacements for distribution board interiors.
- MCB pan assemblies feature fully shrouded busbars.

See pages 125–126 for the technical details of Eaton MCB pan assemblies.

EAMP10



125A SPN type A pan assemblies with earth & neutral bars

Description	Rating (A)	Total no. of outgoing ways	Eaton list number
4 way SPN, type A pan assembly	125	4	EAMP4
7 way SPN, type A pan assembly	125	7	EAMP7
10 way SPN, type A pan assembly	125	10	EAMP10
13 way SPN, type A pan assembly	125	13	EAMP13
16 way SPN, type A pan assembly	125	16	EAMP16

EAMS1251N



Incoming devices for SPN, type A pan assemblies

- Incoming devices supplied separate to pan assembly

Description	Rating (A)	Poles	Sensitivity (mA)	Eaton list number
Switch-disconnector	125	SPSN	–	EAMS1251N
RCCB	100	1P+N	30	EAMS100HE
RCCB	100	1P+N	100	EAMS100ME
RCCB	100	1P+N	300	EAMS100LE
Direct connection kit	100	1P+N	–	EAMBT1002

EBMP61



125A/250A TPN type B pan assemblies with earth & neutral bars

Description	Rating (A)	Total no. of outgoing ways	Eaton list number
4 way TPN, type B pan assembly	125	4	EBMP41
6 way TPN, type B pan assembly	125	6	EBMP61
8 way TPN, type B pan assembly	125	8	EBMP81
12 way TPN, type B pan assembly	125	12	EBMP121
12 way TPN, type B pan assembly	250	12	EBMP122
18 way TPN, type B pan assembly	250	18	EBMP182
24 way TPN, type B pan assembly	250	24	EBMP242

EBMS1253



125A incomer options for type B pan assemblies

- Incoming devices supplied separate to pan assembly

Description	Rating (A)	Pole configuration	Eaton list number
Switch disconnector	125	TP	EBMS1253
Switch disconnector kit (including single phasing link)	125	SPSN	EBMS1251N
Switch disconnector	125	TPSN	EBMS1253N
Direct connection (lugs connector)	250	TP	EAMBT2503
30mA RCCB	100	TPSN	EBMR30
100mA RCCB	100	TPSN	EBMR100
300mA RCCB	100	TPSN	EBMR300
300mA RCCB with time delay	100	TPSN	EBMR300T

2.4

MCB pan assemblies

EBMMB250



250A incomer options for type B pan assemblies

- Incoming devices supplied separate to pan assembly

Description	Rating (A)	Pole configuration	Eaton list number
Switch-disconnector	250	TP	EBMS2503
Direct connection (lugs connector)	250	TP	EBMBT2503
MCCB incomer kit (includes mCCB)	250	TP	EBMMB250
MCCB incomer kit (includes MCCB)	200	TP	EBMMB200
MCCB incomer kit (includes mCCB)	160	TP	EBMMB160
Single phase conversion kit for 250A rated board only (requires EBMS2503 to be ordered separately)			EBMS25



Eaton provides a comprehensive range of modular solutions for circuit protection and control. Eaton's 10/15kA MCBs are high performance current limiting devices with the ability to disconnect overloads and short circuits. They are available with trip types B, C and D with many features of benefit to all customers. RCBOs with overload protection combine protection for people and circuits in a single module width device where space is at a premium.

Double pole and four pole RCCBs are available in a range of current ratings and four trip sensitivities, 10, 30, 100 and 300mA.

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3.2	RESIDUAL CURRENT CIRCUIT BREAKERS (RCCBs)	48
3.3	RESIDUAL CURRENT CIRCUIT BREAKER WITH OVERCURRENT PROTECTION (RCBOs)	49
3.4	ACCESSORIES	50

3.1

Distribution board switch and protection devices

Miniature circuit breakers, MCBs

MCBs are available in current ratings from 1A–63A, with trip types B, C and D, 10kA to IEC 60898 and 15kA to IEC 60947-2

See page 131 for technical data and overall dimensions

EMDH104



Miniature circuit breakers – dual rated 10/15kA, single pole

Description	Rated current (A)	Width (mm)	Short circuit rating (kA)	Eaton list number Trip type B	Trip type C	Trip type D
Miniature circuit breaker	1	18	10/15	EMBH101	EMCH101	EMDH101
Miniature circuit breaker	2	18	10/15	EMBH102	EMCH102	EMDH102
Miniature circuit breaker	4	18	10/15	EMBH104	EMCH104	EMDH104
Miniature circuit breaker	6	18	10/15	EMBH106	EMCH106	EMDH106
Miniature circuit breaker	8	18	10/15	EMBH108	EMCH108	EMDH108
Miniature circuit breaker	10	18	10/15	EMBH110	EMCH110	EMDH110
Miniature circuit breaker	13	18	10/15	EMBH113	EMCH113	EMDH113
Miniature circuit breaker	16	18	10/15	EMBH116	EMCH116	EMDH116
Miniature circuit breaker	20	18	10/15	EMBH120	EMCH120	EMDH120
Miniature circuit breaker	25	18	10/15	EMBH125	EMCH125	EMDH125
Miniature circuit breaker	32	18	10/15	EMBH132	EMCH132	EMDH132
Miniature circuit breaker	40	18	10/15	EMBH140	EMCH140	EMDH140
Miniature circuit breaker	50	18	10/15	EMBH150	EMCH150	EMDH150¹⁾
Miniature circuit breaker	63	18	10/15	EMBH163	EMCH163	EMDH163¹⁾

¹⁾ 15kA to IEC60947-2 rating only

EMBH125N



Miniature circuit breakers – dual rated 10/15kA, single pole + neutral

Description	Rated current (A)	Width (mm)	Short circuit rating (kA)	Eaton list number Trip type B	Trip type C	Trip type D
Miniature circuit breaker	1	36	10/15	EMBH101N	EMCH101N	EMDH101N
Miniature circuit breaker	2	36	10/15	EMBH102N	EMCH102N	EMDH102N
Miniature circuit breaker	4	36	10/15	EMBH104N	EMCH104N	EMDH104N
Miniature circuit breaker	6	36	10/15	EMBH106N	EMCH106N	EMDH106N
Miniature circuit breaker	8	36	10/15	EMBH108N	EMCH108N	EMDH108N
Miniature circuit breaker	10	36	10/15	EMBH110N	EMCH110N	EMDH110N
Miniature circuit breaker	13	36	10/15	EMBH113N	EMCH113N	EMDH113N
Miniature circuit breaker	16	36	10/15	EMBH116N	EMCH116N	EMDH116N
Miniature circuit breaker	20	36	10/15	EMBH120N	EMCH120N	EMDH120N
Miniature circuit breaker	25	36	10/15	EMBH125N	EMCH125N	EMDH125N
Miniature circuit breaker	32	36	10/15	EMBH132N	EMCH132N	EMDH132N
Miniature circuit breaker	40	36	10/15	EMBH140N	EMCH140N	EMDH140N
Miniature circuit breaker	50	36	10/15	EMBH150N	EMCH150N	EMDH150N¹⁾
Miniature circuit breaker	63	36	10/15	EMBH163N	EMCH163N	EMDH163N¹⁾

¹⁾ 15kA to IEC60947-2 rating only

EMCH220



Miniature circuit breakers – dual rated 10/15kA, double pole

Description	Rated current (A)	Width (mm)	Short circuit rating (kA)	Eaton list number Trip type B	Trip type C	Trip type D
Miniature circuit breaker	1	36	10/15	EMBH201	EMCH201	EMDH201
Miniature circuit breaker	2	36	10/15	EMBH202	EMCH202	EMDH202
Miniature circuit breaker	4	36	10/15	EMBH204	EMCH204	EMDH204
Miniature circuit breaker	6	36	10/15	EMBH206	EMCH206	EMDH206
Miniature circuit breaker	8	36	10/15	EMBH208	EMCH208	EMDH208
Miniature circuit breaker	10	36	10/15	EMBH210	EMCH210	EMDH210
Miniature circuit breaker	13	36	10/15	EMBH213	EMCH213	EMDH213
Miniature circuit breaker	16	36	10/15	EMBH216	EMCH216	EMDH216
Miniature circuit breaker	20	36	10/15	EMBH220	EMCH220	EMDH220
Miniature circuit breaker	25	36	10/15	EMBH225	EMCH225	EMDH225
Miniature circuit breaker	32	36	10/15	EMBH232	EMCH232	EMDH232
Miniature circuit breaker	40	36	10/15	EMBH240	EMCH240	EMDH240
Miniature circuit breaker	50	36	10/15	EMBH250	EMCH250	EMDH250¹⁾
Miniature circuit breaker	63	36	10/15	EMBH263	EMCH263	EMDH263¹⁾

¹⁾ 15kA to IEC60947-2 rating only

EMCH363



Miniature circuit breakers – dual rated 10/15kA, three pole

Description	Rated current (A)	Width (mm)	Short circuit rating (kA)	Eaton list number Trip type B	Trip type C	Trip type D
Miniature circuit breaker	1	54	10/15	EMBH301	EMCH301	EMDH301
Miniature circuit breaker	2	54	10/15	EMBH302	EMCH302	EMDH302
Miniature circuit breaker	4	54	10/15	EMBH304	EMCH304	EMDH304
Miniature circuit breaker	6	54	10/15	EMBH306	EMCH306	EMDH306
Miniature circuit breaker	8	54	10/15	EMBH308	EMCH308	EMDH308
Miniature circuit breaker	10	54	10/15	EMBH310	EMCH310	EMDH310
Miniature circuit breaker	13	54	10/15	EMBH313	EMCH313	EMDH313
Miniature circuit breaker	16	54	10/15	EMBH316	EMCH316	EMDH316
Miniature circuit breaker	20	54	10/15	EMBH320	EMCH320	EMDH320
Miniature circuit breaker	25	54	10/15	EMBH325	EMCH325	EMDH325
Miniature circuit breaker	32	54	10/15	EMBH332	EMCH332	EMDH332
Miniature circuit breaker	40	54	10/15	EMBH340	EMCH340	EMDH340
Miniature circuit breaker	50	54	10/15	EMBH350	EMCH350	EMDH350¹⁾
Miniature circuit breaker	63	54	10/15	EMBH363	EMCH363	EMDH363¹⁾

¹⁾ 15kA to IEC60947-2 rating only

EMCH410



Miniature circuit breakers – dual rated 10/15kA, four pole

Description	Rated current (A)	Width (mm)	Short circuit rating (kA)	Eaton list number Trip type B	Trip type C	Trip type D
Miniature circuit breaker	1	72	10/15	EMBH401	EMCH401	EMDH401
Miniature circuit breaker	2	72	10/15	EMBH402	EMCH402	EMDH402
Miniature circuit breaker	4	72	10/15	EMBH404	EMCH404	EMDH404
Miniature circuit breaker	6	72	10/15	EMBH406	EMCH406	EMDH406
Miniature circuit breaker	8	72	10/15	EMBH408	EMCH408	EMDH408
Miniature circuit breaker	10	72	10/15	EMBH410	EMCH410	EMDH410
Miniature circuit breaker	13	72	10/15	EMBH413	EMCH413	EMDH413
Miniature circuit breaker	16	72	10/15	EMBH416	EMCH416	EMDH416
Miniature circuit breaker	20	72	10/15	EMBH420	EMCH420	EMDH420
Miniature circuit breaker	25	72	10/15	EMBH425	EMCH425	EMDH425
Miniature circuit breaker	32	72	10/15	EMBH432	EMCH432	EMDH432
Miniature circuit breaker	40	72	10/15	EMBH440	EMCH440	EMDH440
Miniature circuit breaker	50	72	10/15	EMBH450	EMCH450	EMDH450¹⁾
Miniature circuit breaker	63	72	10/15	EMBH463	EMCH463	EMDH463¹⁾

¹⁾ 15kA to IEC60947-2 rating only


3.2

Distribution board switch and protection devices

Residual current circuit breakers

See page 147 for technical data and overall dimensions


EAM162H



RCCBs – 2-pole double module – 10mA–30mA sensitivity

Description	Poles	Rating (A)	Sensitivity (mA)	Eaton list number
16A 2-pole RCCB 10mA	2P	16	10	EAM162V
16A 2-pole RCCB 30mA	2P	16	30	EAM162H
25A 2-pole RCCB 30mA	2P	25	30	EAM252H
40A 2-pole RCCB 30mA	2P	40	30	EAM402H
63A 2-pole RCCB 30mA	2P	63	30	EAM632H
80A 2-pole RCCB 30mA	2P	80	30	EAM802H
100A 2-pole RCCB 30mA	2P	100	30	EAM1002H


EAM402M



RCCBs – 2-pole double module – 100mA sensitivity

Description	Poles	Rating (A)	Sensitivity (mA)	Eaton list number
25A 2-pole RCCB 100mA	2P	25	100	EAM252M
40A 2-pole RCCB 100mA	2P	40	100	EAM402M
63A 2-pole RCCB 100mA	2P	63	100	EAM632M
80A 2-pole RCCB 100mA	2P	80	100	EAM802M
100A 2-pole RCCB 100mA	2P	100	100	EAM1002M


EAM802L



RCCBs – 2-pole double module – 300mA sensitivity

Description	Poles	Rating (A)	Sensitivity (mA)	Eaton list number
25A 2-pole RCCB 300mA	2P	25	300	EAM252L
40A 2-pole RCCB 300mA	2P	40	300	EAM402L
80A 2-pole RCCB 300mA	2P	80	300	EAM802L
100A 2-pole RCCB 300mA	2P	100	300	EAM1002L


EAM404H



RCCBs – 4-pole – 30mA sensitivity

Description	Poles	Rating (A)	Sensitivity (mA)	Eaton list number
40A 4-pole RCCB 30mA	4P	40	30	EAM404H
63A 4-pole RCCB 30mA	4P	63	30	EAM634H
80A 4-pole RCCB 30mA	4P	80	30	EAM804H
100A 4-pole RCCB 30mA	4P	100	30	EAM1004H


EAM404M



RCCBs – 4-pole – 100mA sensitivity

Description	Poles	Rating (A)	Sensitivity (mA)	Eaton list number
40A 4-pole RCCB 100mA	4P	40	100	EAM404M
63A 4-pole RCCB 100mA	4P	63	100	EAM634M
80A 4-pole RCCB 100mA	4P	80	100	EAM804M
100A 4-pole RCCB 100mA	4P	100	100	EAM1004M

EAM404L



RCCBs – 4-pole – 300mA sensitivity

Description	Poles	Rating (A)	Sensitivity (mA)	Eaton list number
40A 4-pole RCCB 300mA	4P	40	300	EAM404L
63A 4-pole RCCB 300mA	4P	63	300	EAM634L
80A 4-pole RCCB 300mA	4P	80	300	EAM804L
100A 4-pole RCCB 300mA	4P	100	300	EAM1004L
100A 4-pole RCCB 300mA	4P	100	300, trip time delay	EAM1004LT

See page 148 for technical data and overall dimensions

EMBH106R10



RCBOs single pole – trip type B – 10mA sensitivity

Description	Rating (A)	Trip type	Sensitivity (mA)	Eaton list number
Eaton RCBO 6A 10kA type B SP	6	B	10	EMBH106R10
Eaton RCBO 10A 10kA type B SP	10	B	10	EMBH110R10
Eaton RCBO 16A 10kA type B SP	16	B	10	EMBH116R10
Eaton RCBO 20A 10kA type B SP	20	B	10	EMBH120R10
Eaton RCBO 32A 10kA type B SP	32	B	10	EMBH132R10

EMBH110R30



RCBOs single pole – trip type B – 30mA sensitivity

Description	Rating (A)	Trip type	Sensitivity (mA)	Eaton list number
Eaton RCBO 6A 10kA type B SP	6	B	30	EMBH106R30
Eaton RCBO 10A 10kA type B SP	10	B	30	EMBH110R30
Eaton RCBO 16A 10kA type B SP	16	B	30	EMBH116R30
Eaton RCBO 20A 10kA type B SP	20	B	30	EMBH120R30
Eaton RCBO 32A 10kA type B SP	32	B	30	EMBH132R30
Eaton RCBO 40A 6kA type B SP	40	B	30	EMBH140R30
Eaton RCBO 45A 6kA type B SP	45	B	30	EMBH145R30

EMBH116R100



RCBOs single pole – trip type B – 100mA sensitivity

Description	Rating (A)	Trip type	Sensitivity (mA)	Eaton list number
Eaton RCBO 6A 10kA type B SP	6	B	100	EMBH106R100
Eaton RCBO 10A 10kA type B SP	10	B	100	EMBH110R100
Eaton RCBO 16A 10kA type B SP	16	B	100	EMBH116R100
Eaton RCBO 20A 10kA type B SP	20	B	100	EMBH120R100
Eaton RCBO 32A 10kA type B SP	32	B	100	EMBH132R100

EMCH120R10



RCBOs single pole – trip type C – 10mA sensitivity

Description	Rating (A)	Trip type	Sensitivity (mA)	Eaton list number
Eaton RCBO 6A 10kA type C SP	6	C	10	EMCH106R10
Eaton RCBO 10A 10kA type C SP	10	C	10	EMCH110R10
Eaton RCBO 16A 10kA type C SP	16	C	10	EMCH116R10
Eaton RCBO 20A 10kA type C SP	20	C	10	EMCH120R10
Eaton RCBO 32A 10kA type C SP	32	C	10	EMCH132R10

EMCH110R30



RCBOs single pole – trip type C – 30mA sensitivity

Description	Rating (A)	Trip type	Sensitivity (mA)	Eaton list number
Eaton RCBO 6A 10kA type C SP	6	C	30	EMCH106R30
Eaton RCBO 10A 10kA type C SP	10	C	30	EMCH110R30
Eaton RCBO 16A 10kA type C SP	16	C	30	EMCH116R30
Eaton RCBO 20A 10kA type C SP	20	C	30	EMCH120R30
Eaton RCBO 32A 10kA type C SP	32	C	30	EMCH132R30
Eaton RCBO 40A 6kA type C SP	40	C	30	EMCH140R30
Eaton RCBO 45A 6kA type C SP	45	C	30	EMCH145R30

EMCH132R100



RCBOs single pole – trip type C – 100mA sensitivity

Description	Rating (A)	Trip type	Sensitivity (mA)	Eaton list number
Eaton RCBO 6A 10kA type C SP	6	C	100	EMCH106R100
Eaton RCBO 10A 10kA type C SP	10	C	100	EMCH110R100
Eaton RCBO 16A 10kA type C SP	16	C	100	EMCH116R100
Eaton RCBO 20A 10kA type C SP	20	C	100	EMCH120R100
Eaton RCBO 32A 10kA type C SP	32	C	100	EMCH132R100

3.4

Distribution board switch and protection devices

Accessories – MCBs, RCCBs & RCBOs

ASPDL



Padlocking devices

For MCBs, RCCBs, RCBOs & switch disconnectors

- The wide range of Eaton devices are complimented by a range of padlocking devices.
- For MCBs and RCCBs the device mechanism is trip free which allows it to be padlocked 'ON' for security, but in the event of a fault condition the device will still operate to disconnect the fault. The device will move to the tripped position when the lock is removed. These devices can also be padlocked in the 'OFF' position.

Description	Eaton list number
Universal device lockout attachment – fits MCBs, RCCBs and RCBOs	ASPDL
Lockout attachment for 27mm MCBs	ASPDL27
Padlock	PD2

ASALMSN



Auxiliary and alarm contacts including test function

For 18mm MCB & RCBO

Auxiliary and alarm contact devices can be fitted together on one MCB. Each is incorporated in a 1/2 module (9 mm) casing with terminals protected to IP 20 capable of accepting cable up to 2.5 mm². These devices are designed and manufactured to IEC 60947-5-1 and incorporate a changeover switch providing remote indication of an MCB which has tripped under fault conditions.

Technical characteristics

- This auxiliary switch allows remote indication of the position of the MCB contacts.
- Auxiliary and Alarm contact ratings:
 - AC14 240 Vac 50Hz, 6A.
 - DC14 125 Vdc, 1A.
- The auxiliary contact will not differentiate between an MCB that is "off" or "tripped".
- The auxiliary contact can be used in conjunction with a remote supply and signal lamps, bells or buzzers.

Description	Quantity per carton	Eaton list number
Auxiliary switch incorporating a test function	1	ASAUXSN¹⁾
Alarm switch incorporating reset and test function	1	ASALMSN¹⁾

¹⁾Not suitable for use in distribution boards

ASSNTSN415



Shunt trips

For 18mm MCB & RCBO

Technical characteristics

- Suitable for all Eaton MCBs including those with either auxiliary or alarm contacts.
- A shunt trip and undervoltage release can be fitted together on one MCB.
- Each is incorporated in a 1 module (18 mm) casing with terminals protected to IP 20 capable of accepting cable up to 2.5 mm².
- The shunt trip and UVR are simply clipped to the left hand side of an MCB and have terminals at one end to allow connection to pan assemblies and comb busbar.

A shunt release provides remote tripping of an MCB with three voltage options for AC & DC applications.

Description	dc characteristics	ac characteristics	Quantity per carton	Eaton list number
MCB shunt trip	48 V–60 Vdc	48 V–110 Vac	1	ASSNTSN110¹⁾
MCB shunt trip	110 Vdc	240 Vac	1	ASSNTSN415¹⁾

¹⁾Not suitable for use in distribution boards
Other voltages are available.

ASUVRSC230



Under voltage release

For 18mm MCB & RCBO

- Under voltage release (UVR) for remote tripping of an emergency stop loop.
- The UVR is simply clipped to the left hand side of an MCB and have terminals at one end to allow connection to pan assemblies and comb busbar.

Description	ac characteristics	Quantity per carton	Eaton list number
Under voltage release	240 Vac	1	ASUVRSC230¹⁾

¹⁾Not suitable for use in distribution boards



Eaton's wide range of modular timers, twilight switches and staircase timers are suitable for any residential or commercial application offering automatic lighting control. Contactors, impulse switches and relays are frequently applied for switching of lamp loads, fans or pumps in both utility as well as industrial areas.

4.1 TIMERS

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4.2 CONTACTORS AND IMPULSE SWITCHES

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4.3 TRANSFORMERS

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4.1

Modular control and switching devices

Timers

See page 135 for timers technical data and overall dimensions.

TAD1NC



Analogue day timers – 50Hz net synchronised

Program range	Type	Channels	Contact configuration	Power reserve	Min cycling time	Width (mm)	Eaton list number
Day	50Hz net	1	CO	–	30 min.	54	TAD1NC
Day	50Hz net, 18mm	1	NO	–	15 min	18	TAD1NCS

TAD1



Analogue day timers – quartz controlled

Program range	Type	Channels	Contact configuration	Power reserve	Min cycling time	Width (mm)	Eaton list number
Day	Quartz	1	CO	72 hrs.	30 min.	54	TAD1
Day	Quartz, 18 mm	1	NO	72 hrs.	15 min	18	TAD1S

TAW1



Analogue week timers – quartz controlled

Program range	Type	Channels	Contact configuration	Power reserve	Min cycling time	Width (mm)	Eaton list number
Week	Quartz	1	CO	72 hrs.	3 hrs.	54	TAW1
Week	Quartz, 18 mm	1	NO	72 hrs.	2 hrs.	18	TAW1S

TDW1S



Digital week timers – 1 & 2 channel

Program range	Type	Channels	Contact configuration	Power reserve	Min cycling time	Program steps	Width (mm)	Eaton list number
Week	Quartz	1	CO	10 yrs.	1 min.	28	36	TDW1
Week	Quartz, 18 mm	1	CO	3 yrs.	1 min.	28	18	TDW1S
Week	Quartz	2	2 CO	10 yrs.	1 min.	42	36	TDW2
Week	Quartz, advanced	2	2 CO	10 yrs.	1 min.	42	36	TDW2E

TE7



Staircase timer – standard version

Description	Delay off time adjustment	Contact configuration	Width (mm)	Eaton list number
Staircase timer basic function	0.5–20 min	NO	18	TE7

TE1



Staircase timer – multifunctional version

Description	Delay off time adjustment	Contact configuration	Width (mm)	Eaton list number
Staircase timer multi function	0.5–20 min	NO	18	TE1

- For other coil voltages contact technical support

See page 142 for contactors technical data and overall dimensions.

CR2011230A

Contactors, 20 A – ac coil

When several contactors are mounted it is advisable to fit a blanking module, List number **EMBP**, every two contactors.



Description	Rating (A)	Coil voltage (Vac)	Coil voltage (Vdc)	Width (mm)	Contacts	Eaton list number
Contactors	20	230	–	18	1 NO + 1 NC	CR2011230A
Contactors	20	230	–	18	2 NC	CR2002230A
Contactors	20	230	–	18	2 NO	CR2020230A

CR2020024

Contactors, 20 A – ac/dc coil

When several contactors are mounted it is advisable to fit a blanking module, List number **EMBP**, every two contactors.



Description	Rating (A)	Coil voltage (Vac)	Coil voltage (Vdc)	Width (mm)	Contacts	Eaton list number
Contactors	20	230	220	18	1 NO + 1 NC	CR2011230
Contactors	20	230	220	18	2 NC	CR2002230
Contactors	20	230	220	18	2 NO	CR2020230

CR2540230A

Contactors, 25 A – ac coil

When several contactors are mounted it is advisable to fit a blanking module, List number **EMBP**, every two contactors.



Description	Rating (A)	Coil voltage (Vac)	Coil voltage (Vdc)	Width (mm)	Contacts	Eaton list number
Contactors	25	230	–	36	2 NO + 2 NC	CR2522230A
Contactors	25	230	–	36	3 NO	CR2530230A
Contactors	25	230	–	36	4 NC	CR2504230A
Contactors	25	230	–	36	4 NO	CR2540230A

CR2504024

Contactors, 25 A – ac/dc coil

When several contactors are mounted it is advisable to fit a blanking module, List number **EMBP**, every two contactors.



Description	Rating (A)	Coil voltage (Vac)	Coil voltage (Vdc)	Width (mm)	Contacts	Eaton list number
Contactors	25	230	220	36	2 NO + 2 NC	CR2522230
Contactors	25	230	220	36	3 NO	CR2530230
Contactors	25	230	220	36	4 NC	CR2504230
Contactors	25	230	220	36	4 NO	CR2540230

CR4030024

Contactors, 40 A – ac/dc coil

When several contactors are mounted it is advisable to fit a blanking module, List number **EMBP**, every two contactors.



Description	Rating (A)	Coil voltage (Vac)	Coil voltage (Vdc)	Width (mm)	Contacts	Eaton list number
Contactors	40	230	220	54	2 NC	CR4002230
Contactors	40	230	220	54	2 NO	CR4020230
Contactors	40	230	220	54	3 NO	CR4030230
Contactors	40	230	220	54	4 NO	CR4040230

4.2

Modular control and switching devices

Contactors and impulse switches

CR6320230



Contactors, 63 A – ac/dc coil

When several contactors are mounted it is advisable to fit a blanking module, List number EMBP, every two contactors.

Description	Rating (A)	Coil voltage (Vac)	Coil voltage (Vdc)	Width (mm)	Contacts	Eaton list number
Contactor	63	230	220	54	2 NO	CR6320230
Contactor	63	230	220	54	4 NO	CR6340230

CRM2540230A



Day/night contactors, 20–25 A – ac coil

When several contactors are mounted it is advisable to fit a blanking module or spacer every two contactors. Day/night contactors do have a manual override function, which enables the user to bring the contactor in either a forced “ON” or “OFF” position. The contactor can only be brought into the forced “ON” position when it is de-energised. When the contactor is energised the operation will return into the normal/automatic position.

Description	Rating (A)	Coil voltage (Vac)	Width (mm)	Contacts	Eaton list number
Contactor	20	230	18	2 NO	CRM2020230A
Contactor	25	230	36	4 NO	CRM2540230A

CRA611



Auxiliary contacts

Can be connected at the right-side of the contactor.

Description	Rating (A)	Width (mm)	Contacts	Eaton list number
Auxiliary	6	9	1 NO + 1 NC	CRA611
Auxiliary	6	9	2 NO	CRA620

TR-G3/8

Transformers



Description	Volts	Amps	Width (mm)	Module	Eaton list number
Bell Transformer 2 module	12	0.6	36	1	TR-G3/8
	8	1.0			

Earth leakage relays & CTs

Suitable for use with all Eaton MCCBs & MCBs to provide add-on earth leakage protection functionality. The earth leakage relay is used with an **ELRCT** series current transformer (core balance) and an appropriate MCB/MCCB shunt trip or undervoltage release. Power supply required 220-240V ac,

50/60Hz. Output contacts (volt-free) rated at 250V ac, 6A. Power and system LEDs show status of the relay, CT continuity, level of earth leakage, earth leakage trip. Eaton earth leakage relays are designed & tested in accordance with IEC61008-1. See page 144 for dimensional details.

ELR1ADJ

Earth leakage relays – adjustable trip



Description	Sensitivity	Time delay	Width	Eaton list number
Earth leakage relay	Adjustable 30mA, 100mA, 300mA, 500mA, 1A, 3A, 5A	Adjustable 0.02, 0.1, 0.3, 0.5, 1, 3, 5s	36mm	ELR1ADJ

ELR30F

Earth leakage relays – fixed trip



Description	Sensitivity	Time delay	Width	Eaton list number
Earth leakage relay	Fixed 30mA	Instantaneous (0.02s)	36mm	ELR30F
Earth leakage relay	Fixed 300mA	Instantaneous (0.02s)	36mm	ELR300F

ELRCT20–ELRCT105

Current transformers (core balance)

- One current transformer required per relay.



Description	Inner dimension	Eaton list number
Current Transformer	20mm diameter	ELRCT20
	30mm diameter	ELRCT30
	35mm diameter	ELRCT35
	70mm diameter	ELRCT70
	105mm diameter	ELRCT105
	140mm diameter	ELRCT140
	210mm diameter	ELRCT210
	70mm x 175mm	ELRCT70-175
	115mm x 305mm	ELRCT115-305
	150mm x 350mm	ELRCT150-350
200mm x 500mm	ELRCT200-500	



A complete range of MCCB panelboards and pan assemblies providing all the options you need from a straightforward panelboard to a comprehensive panelboard system. The range now offers a variety of incoming devices and a greater choice of outgoing ways to provide more flexibility and choice to the user.

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5.1

Memshield 3 MCCB panelboards and associated devices

Incoming device ratings up to 250A – outgoing device ratings up to 160A

Specification

- Panelboards to IEC61439-2. Form 3b Type 2
- Busbar system KEMA certified 50kA Icc, Icw 25kA 1s
- IP3X construction
- MCCBs to IEC60947-2. kA ratings shown are Ics=Icu at 400V ac
- Switch disconnectors to IEC60947-3

Features

- 4, 6, 8, or 12 outgoing TP ways
- Outgoing devices; NZM1 16A–125A SP & 20A–160A TP
- Tin-plated busbars
- Can be configured for incomer device at top of panelboard
- Removable side gland plates as standard
- Wide range of extension boxes, metering, surge protection, and earth leakage incomer options available

See page 146 for dimensions.

EPBN1425



- Minimum ordering requirement: panelboard + incoming device + incomer connection kit + outgoing devices + blanking plates

Description	Associated incoming device	Current rating (A)	No. of ways	Eaton list number
Incoming rating up to 250A, outgoing ratings up to 160A	NZM2 MCCB or N2 switch disconnector or direct lugs connection	250	4	EPBN1425
			6	EPBN1625
			8	EPBN1825
			12	EPBN11225

NZMC2-A250KCO



MCCB incoming device

- 36kA or 50kA options
- Select appropriate incomer device from table below
- Maximum cable capacity 185mm²
- Adjustable trip. Thermal trip adjustment 0.8 to 1 x I_n, Magnetic trip adjustment 6 to 10 x I_n

Poles	Incoming device type	Current rating (A)	Eaton list number	
			Short circuit rating 36kA	50kA
3-pole	NZM2 MCCB	160	NZMC2-A160KCO	NZMN2-A160KCO
		200	NZMC2-A200KCO	NZMN2-A200KCO
		250	NZMC2-A250KCO	NZMN2-A250KCO
4-pole (3 phase and switched neutral)	NZM2 MCCB	160	NZMC2-4-A160KCO	NZMN2-4-A160KCO
		200	NZMC2-4-A200KCO	NZMN2-4-A200KCO
		250	NZMC2-4-A250KCO	NZMN2-4-A250KCO

N2-250KCO



Switch disconnector (non-automatic) incoming device

- Select appropriate incomer device from table below
- Maximum cable capacity 185mm²

Poles	Incoming device type	Current rating (A)	Eaton list number
3-pole	N2 Switch disconnector	250	N2-250KCO
4-pole	N2 Switch disconnector	250	N2-4-250KCO

EPBKN125L



Incomer connection kit/metering connection kit

- See incoming metering section below to order metering components

Poles	Maximum rating (A)	Eaton list number
3-pole incomer connection kit	250	EPBKN1253
3-pole incomer connection kit – includes metering CT and CT to meter cable	250	EPBKN1253M
4-pole incomer connection kit	250	EPBKN1254
4-pole incomer connection kit – includes metering CT and CT to meter cable	250	EPBKN1254M
Direct connection lugs kit	250	EPBKN125L
Direct connection lugs kit – includes metering CT and CT to meter cable	250	EPBKN125LM
Adapter kit for use when incomer device mounted at top of panelboard	230	EPBKTFSN2¹⁾

¹⁾Maximum rating of panelboard when top fed is 230A

NZMB1-1-AF63 and NZMB1-A160



Outgoing devices – NZM1 frame MCCBs

- Maximum cable capacity 70mm²
- Single pole fixed trip. Triple pole thermal trip adjustment 0.8 to 1 x I_n, magnetic trip adjustment 6 to 10 x I_n

Rating (A)	Eaton list number	
	Single pole 25kA	Triple pole 25kA ^{1) 2)}
16	NZMB1-1-AF16	–
20	NZMB1-1-AF20	NZMB1-A20
32	NZMB1-1-AF32	NZMB1-A32
40	NZMB1-1-AF40	NZMB1-A40
50	NZMB1-1-AF50	NZMB1-A50
63	NZMB1-1-AF63	NZMB1-A63
80	NZMB1-1-AF80	NZMB1-A80
100	NZMB1-1-AF100	NZMB1-A100
125	NZMB1-1-AF125	NZMB1-A125
160	–	NZMB1-A160

¹⁾36kA triple pole also available, change 'B' to 'C' in list number, ie **NZMC1-A125**

²⁾50kA triple pole also available, change 'B' to 'N' in list number, ie **NZMN1-A125**

EPBN1BP1



Accessories

Description	Eaton list number
SP blanking module NZM1 frame (i.e. order 3 per TP way)	EPBN1BP1
Panel door lock with 2 keys (have same key code)	EPBDLK1
Terminal shroud for outgoing MCCB type NZM1 1P	NZM1-1-XKSA
Terminal shroud for outgoing MCCB type NZM1 3P	NZM1-XKSA
Shunt trip 208-250AC/DC for NZM1 (excl. 1P)	259744
Shunt trip 208-250AC/DC for NZM2/N2	259763
Undervoltage release 208–240AC for NZM1 (excl. 1P)	259471
Undervoltage release 208–240AC for NZM2/N2	259499

EPBN1425SXB



Cable extension boxes – side mounted

Description	Eaton list number
To fit 4 way panelboard EPBN1425	EPBN1425SXB
To fit 6 way panelboard EPBN1625	EPBN1625SXB
To fit 8 way panelboard EPBN1825	EPBN1825SXB
To fit 12 way panelboard EPBN11225	EPBN11225SXB

5.1

Memshield 3 MCCB panelboards and associated devices

Incoming device ratings up to 250A – outgoing device ratings up to 160A

EPBN1EX250



Cable extension boxes – top/bottom mounted

Description

250mm high

Eaton list number

EPBN1EX250

EPBN1CX250



Corner filler boxes

Description

For use where top/bottom/meter boxes are fitted in conjunction with side cable boxes

Eaton list number

EPBN1CX250

EPBN1EXDIN



Din rail extension boxes

Description

For housing din rail mounted command/control equipment, ie timers/contactors

Height

250mm

**Number 18mm
Din modules**

15

Eaton list number

EPBN1EXDIN

Metering components – refer to pages 80–83 for more explanation

(Requires appropriate incomer connection kit with metering option selected from above)

EPBMETER1



Incoming metering – digital

Description

Incomer meter enclosure (can be fitted to top or bottom of panelboard). Meter not included

Eaton list number

EPBN1EX250M

Multifunction meter measuring parameters:

Voltage (P-P / P/N) (individual/average)

Current (I1, I2, I3) (individual/average)

Frequency

Power factor (individual/average)

Active, reactive, apparent power (individual/total)

Active, reactive, apparent energy (total)

EPBMETER1

Voltage supply to meter tap off kit (includes protection fuses). One per panelboard required, irrespective of number of meters

EPBN1SUPM

EPBN11225SXM



Outgoing side mounted metering – digital

Description	Number of meter spaces in metering enclosure	Number of meter blanking plates included	Eaton list number
Side mounted metering enclosure to fit 4 way panelboard EPBN1425	2	1	EPBN1425SXM¹⁾
Side mounted metering enclosure to fit 6 way panelboard EPBN1625	3	2	EPBN1625SXM¹⁾
Side mounted metering enclosure to fit 8 way panelboard EPBN1825	4	3	EPBN1825SXM¹⁾
Side mounted metering enclosure to fit 12 way panelboard EPBN11225	6	5	EPBN11225SXM¹⁾
Outgoing CT Kit (1 off required per metered outgoing TP way) to suit NZM1 frame MCCBs. 160A maximum rating. Includes CT to meter plug-in cable and meter to meter voltage supply linking cable with connectors			EPBCTMT160
Multifunction meter measuring parameters: Voltage (P-P / P/N) (individual/average) Current (I1, I2, I3) (individual/average) Frequency Power factor (individual/average) Active, reactive, apparent power (individual/total) Active, reactive, apparent energy (total)			EPBMETER1
Voltage supply to meter tap off kit (includes protection fuses), not required if incoming metering is being used			EPBN1SUPM
Extra long (2m) meter to meter voltage supply linking cable with connectors			EPBN3LKKTM
Extra long (2.5m) CT to meter plug-in cable			EPBN3LKRJ45
CT supporting mount to allow CT to be fitted in side mounted cable extension box if terminal shields being fitted to MCCBs			EPBSXBCTMT
Spare blanking plate for unused meter ways in metering enclosure			EM96BP

¹⁾ Suffix 'M' indicates cut-outs for meters and hinged door for outgoing metering suitable for left and right hand applications. Can be used with side mounted cable extension boxes if required

EPBN1SPD123



Transient voltage surge suppression units, externally mounted in own enclosure

- See page 84 for full technical specification
- Includes 63A TP NZM1 MCCB for protection/isolation
- See page 127 for dimensions

Description	Eaton list number
SPD-type T1, T2, T3 in accordance with EN 61643-11, lightning protection classes III and IV in accordance with IEC 62305	EPBN1SPD123
SPD-type T1, T2, T3 in accordance with EN 61643-11, lightning protection classes I, II, III and IV in accordance with IEC 62305	EPBN1SPD1234

EPBKEL250



Earth leakage protection

- Direct bolt-on module used in conjunction with 4-pole incomer device, 250A maximum rating
- Sensitivity adjustable from 0.1A to 3A. Time delay adjustable from 60ms to 450ms

Description	Eaton list number
Earth leakage protection add-on kit for incomer device. 250mm high extension box included	EPBKEL250

Cable size summary

Incoming cables

MCCB or switch disconnector size max/type	185mm ² /tunnel terminals
Direct connection lugs incomer	M8
Neutral	M8
Earth	M10

Outgoing cables

NZM1 MCCB size max/type	70mm ² /cable clamp (95mm ² can be fitted depending on cable manufacturer)
Neutral size max/type	50mm ² tunnel terminals and 2 x M8 bolts
Earth size max/type	50mm ² tunnel terminals

5.2

Memshield 3 MCCB panelboards and associated devices

Incoming device ratings up to 400A – outgoing device ratings up to 160A

Specification

- Panelboards to IEC61439-2. Form 3b Type 2
- Busbar system KEMA certified 50kA Icc, Icw 30kA 1s
- IP3X construction
- MCCBs to IEC60947-2. kA ratings shown are Ics=Icu at 400V ac
- Switch disconnectors to IEC60947-3

Features

- 6 or 12 outgoing TP ways
- Outgoing devices; NZM1 16A–125A SP & 20A–160A TP
- Tin-plated busbars
- Can be configured for incomer device at top of panelboard
- Removable side gland plates as standard
- Wide range of extension boxes, metering, surge protection, and earth leakage incomer options available

See page 147 for dimensions.

EPBN1640



- Minimum ordering requirement: panelboard + incoming device + incomer connection kit + outgoing devices + blanking plates

Description	Associated incoming device	Current rating (A)	No. of ways	Eaton list number
Incoming rating up to 400A, outgoing ratings up to 160A	NZM3 MCCB or N3 switch disconnector or direct lugs connection	400	6	EPBN1640
			12	EPBN11240

NZMN3-A400



MCCB incoming device

- 50kA
- Select appropriate incomer device from table below
- Maximum cable capacity 240mm²
- Adjustable trip. Thermal trip adjustment 0.8 to 1 x I_n, Magnetic trip adjustment 6 to 10 x I_n

Poles	Incoming device type	Current rating (A)	Eaton list number Short circuit rating
3-pole	NZM3 MCCB	250	NZMN3-A250
		320	NZMN3-A320
		400	NZMN3-A400
4-pole (3 phase and switched neutral)	NZM3 MCCB	250	NZMN3-4-A250
		320	NZMN3-4-A320
		400	NZMN3-4-A400

N3-400



Switch disconnector (non-automatic) incoming device

- Select appropriate incomer device from table below
- Maximum cable capacity 240mm²

Poles	Incoming device type	Current rating (A)	Eaton list number
3-pole	N2 switch disconnector	400	N3-400
4-pole	N2 switch disconnector	400	N3-4-400

EPBKN2403



Incomer connection kit/metering connection kit

- See incoming metering section below to order metering components

Poles	Maximum rating (A)	Eaton list number
3-pole incomer connection kit	400	EPBKN2403
3-pole incomer connection kit – includes metering CT and CT to meter cable	400	EPBKN2403M
4-pole incomer connection kit	400	EPBKN2404¹⁾
4-pole incomer connection kit – includes metering CT and CT to meter cable	400	EPBKN2404M
Direct connection lugs kit	400	EPBKN240L
Direct connection lugs kit – includes metering CT and CT to meter cable	400	EPBKN240LM
Adapter kit for use when incomer device mounted at top of panelboard	370	EPBKTFSN3²⁾

¹⁾ Requires use of cable extension box **EPBN2EX250**

²⁾ Maximum rating of panelboard when top fed is 370A

NZMB1-1-AF63 and NZMB1-A160



Outgoing devices – NZM1 frame MCCBs

- Maximum cable capacity 70mm²
- Single pole fixed trip. Triple pole thermal trip adjustment 0.8 to 1 x I_n, magnetic trip adjustment 6 to 10 x I_n

Rating (A)	Eaton list number Single pole 25kA	Triple pole 25kA ^{1) 2)}
16	NZMB1-1-AF16	–
20	NZMB1-1-AF20	NZMB1-A20
32	NZMB1-1-AF32	NZMB1-A32
40	NZMB1-1-AF40	NZMB1-A40
50	NZMB1-1-AF50	NZMB1-A50
63	NZMB1-1-AF63	NZMB1-A63
80	NZMB1-1-AF80	NZMB1-A80
100	NZMB1-1-AF100	NZMB1-A100
125	NZMB1-1-AF125	NZMB1-A125
160	–	NZMB1-A160

¹⁾ 36kA triple pole also available, change 'B' to 'C' in list number, ie **NZMC1-A125**

²⁾ 50kA triple pole also available, change 'B' to 'N' in list number, ie **NZMN1-A125**

EPBDLK1



Accessories

Description	Eaton list number
SP blanking module NZM1 frame (i.e. order 3 per TP way)	EPBN1BP1
Panel door lock with 2 keys (have same key code)	EPBDLK1
Terminal shroud for outgoing MCCB type NZM1 1P	NZM1-1-XKSA
Terminal shroud for outgoing MCCB type NZM1 3P	NZM1-XKSA
Shunt trip 208–250AC/DC for NZM1 (excl. 1P)	259744
Shunt trip 208–250AC/DC for NZM3/N3	259763
Undervoltage release 208–240AC for NZM1 (excl. 1P)	259471
Undervoltage release 208–240AC for NZM3/N3	259499

EPBN21240SXB



Cable extension boxes – side mounted

Description	Eaton list number
To fit 6 way panelboard EPBN1640	EPBN2640SXB
To fit 12 way panelboard EPBN11240	EPBN21240SXB

5.2

Memshield 3 MCCB panelboards and associated devices

Incoming device ratings up to 400A – outgoing device ratings up to 160A

EPBN2EX250



Cable extension boxes – top/bottom mounted

Description

250mm high

Eaton list number

EPBN2EX250

EPBN2CX250



Corner filler boxes

Description

For use where top/bottom/meter boxes are fitted in conjunction with side cable boxes

Eaton list number

EPBN2CX250

EPBN2EXDIN



Din rail extension boxes

Description

For housing din rail mounted command/control equipment, ie timers/contactors

Height

250mm

Number 18mm Din modules

15

Eaton list number

EPBN2EXDIN

Metering components – refer to pages 80–83 for more explanation

(Requires appropriate incomer connection kit with metering option selected from above)

EPBN2EX250M



Incoming metering – digital

- See page 80 for detailed selection guide

Description

Incomer meter enclosure (can be fitted to top or bottom of panelboard). Meter not included

Eaton list number

EPBN2EX250M

Multifunction meter measuring parameters:

Voltage (P-P / P/N) (individual/average)

Current (I1, I2, I3) (individual/average)

Frequency

Power factor (individual/average)

Active, reactive, apparent power (individual/total)

Active, reactive, apparent energy (total)

EPBMETER1

Voltage supply to meter tap off kit (includes protection fuses). One per panelboard required, irrespective of number of meters

EPBN3SUPM

EPBN21240SXM



Outgoing side mounted metering – digital

- See page 82 for detailed selection guide

Description	Number of meter spaces in metering enclosure	Number of meter blanking plates included	Eaton list number
Side mounted metering enclosure to fit 6 way panelboard EPBN1640	3	2	EPBN2640SXM ¹⁾
Side mounted metering enclosure to fit 12 way panelboard EPBN11240	6	5	EPBN21240SXM ¹⁾
Outgoing CT Kit (1 off required per metered outgoing TP way) to suit NZM1 frame MCCBs. 160A maximum rating. Includes CT to meter plug-in cable and meter to meter voltage supply linking cable with connectors			EPBCTMT160
Outgoing CT Kit (1 off required per metered outgoing TP way) to suit NZM1 frame MCCBs. 250A maximum rating. Includes CT to meter plug-in cable and meter to meter voltage supply linking cable with connectors			EPBCTMT250
Multifunction meter measuring parameters: Voltage (P-P / P/N) (individual/average) Current (I1, I2, I3) (individual/average) Frequency Power factor (individual/average) Active, reactive, apparent power (individual/total) Active, reactive, apparent energy (total)			EPBMETER1
Voltage supply to meter tap off kit (includes protection fuses), not required if incoming metering is being used			EPBN3SUPM
Extra long (2m) meter to meter voltage supply linking cable with connectors			EPBN3LKKTM
Extra long (2.5m) CT to meter plug-in cable			EPBN3LKRJ45
CT supporting mount to allow CT to be fitted in side mounted cable extension box if terminal shields being fitted to MCCBs			EPBSXBCTMT
Spare blanking plate for unused meter ways in metering enclosure			EM96BP

¹⁾ Suffix 'M' indicates cut-outs for meters and hinged door for outgoing metering suitable for left and right hand applications. Can be used with side mounted cable extension boxes if required

EPBN1SPD123



Transient voltage surge suppression units, externally mounted in own enclosure

- See page 84 for full technical specification
- Includes 63A TP NZM1 MCCB for protection/isolation
- See page 147 for dimensions

Description	Eaton list number
SPD-type T1, T2, T3 in accordance with EN 61643-11, lightning protection classes III and IV in accordance with IEC 62305	EPBN1SPD123
SPD-type T1, T2, T3 in accordance with EN 61643-11, lightning protection classes I, II, III and IV in accordance with IEC 62305	EPBN1SPD1234

EPBKEL400



Earth leakage protection

- Kit comprises 350mm high extension box fitted with earth leakage relay, core balance transformer, all cables/terminals/protection fuses, and 230V shunt trip (for tripping of incomer device). Requires 4-pole incomer device. 400A maximum rating
- Sensitivity adjustable from 30mA to 5A. Time delay adjustable from 0.02 to 5 seconds

Description	Eaton list number
Earth leakage protection add-on module for incomer device	EPBKEL400

Cable size summary

Incoming cables

MCCB or switch disconnecter size max/type	240mm ² /M12 bolt
Direct connection lugs incomer	M12
Neutral	M8
Earth	M10

Outgoing cables

NZM1 MCCB size max/type	70mm ² /cable clamp. (95mm ² can be fitted depending on cable manufacturer)
Neutral size max/type	50mm ² tunnel terminals and 2 x M8 bolts
Earth size max/type	50mm ² tunnel terminals

5.3

Memshield 3 MCCB panelboards and associated devices

Incoming device ratings up to 400A – outgoing device ratings up to 250A

Specification

- Panelboards to IEC61439-2. Form 3b Type 2
- Busbar system KEMA certified 50kA Icc, Icw 35kA 1s
- IP3X construction
- MCCBs to IEC60947-2. kA ratings shown are Ics=Icu at 400V ac
- Switch disconnectors to IEC60947-3

Features

- 6, 12 or 18 outgoing TP ways
- Outgoing devices; these panelboards utilise two frame sizes of MCCB: NZM2 125A–250A TP, and NZM1 SP 16A–125A or TP 20A–160A
- Tin-plated busbars
- Can be configured for incomer device at top of panelboard
- Removable side gland plates as standard
- Wide range of extension boxes, metering, surge protection, and earth leakage incomer options available

See page 147 for dimensions.

EPBN2640



- Minimum ordering requirement: panelboard + incoming device + incomer connection kit + outgoing devices + blanking plates

Description	Associated incoming device	Current rating (A)	No. of outgoing ways	Eaton list number
Incoming rating up to 400A, outgoing ratings up to 250A	NZM3 MCCB or N3 Switch Disconnector or direct lugs connection	630	6 (2 x 250A + 4 x 160A)	EPBN2640
			12 (2 x 250A + 10 x 160A)	EPBN21240
			18 (2 x 250A + 16 x 160A)	EPBN21840

NZMN3-A400



MCCB incoming device

- 50kA
- Select appropriate incomer device from table below
- Maximum cable capacity 240mm²
- Adjustable trip. Thermal trip adjustment 0.8 to 1 x I_n, Magnetic trip adjustment 6 to 10 x I_n

Poles	Incoming device type	Current rating (A)	Eaton list number
3-pole	NZM3 MCCB	250	NZMN3-A250
		320	NZMN3-A320
		400	NZMN3-A400
4-pole (3 phase and switched neutral)	NZM3 MCCB	250	NZMN3-4-A250
		320	NZMN3-4-A320
		400	NZMN3-4-A400

N3-400



Switch disconnector (non-automatic) incoming device

- Select appropriate incomer device from table below
- Maximum cable capacity 240mm²

Poles	Incoming device type	Current rating (A)	Eaton list number
3-pole	N2 switch disconnector	400	N3-400
4-pole	N2 switch disconnector	400	N3-4-400

EPBKN2404



Incomer connection kit/metering connection kit

- See incoming metering section below to order metering components

Poles	Maximum rating (A)	Eaton list number
3-pole incomer connection kit	400	EPBKN2403
3-pole incomer connection kit – includes metering CT and CT to meter cable	400	EPBKN2403M
4-pole incomer connection kit	400	EPBKN2404¹⁾
4-pole incomer connection kit – includes metering CT and CT to meter cable	400	EPBKN2404M
Direct connection lugs kit	400	EPBKN240L
Direct connection lugs kit – includes metering CT and CT to meter cable	400	EPBKN240LM
Adapter kit for use when incomer device mounted at top of panelboard	370	EPBKTFNS3²⁾

¹⁾ Requires use of cable extension box **EPBN2EX250**

²⁾ Maximum rating of panelboard when top fed is 370A

NZMC2-A250-BT



Outgoing devices – NZM2 frame MCCBs

- Maximum cable capacity 185mm²
- Up to 2 can be fitted
- Adjustable trip. Thermal trip adjustment 0.8 to 1 x I_n, magnetic trip adjustment 6 to 10 x I_n

Rating (A)	Eaton list number	
	Triple pole 36kA	Triple pole 50kA
125	NZMC2-A125-BT	NZMN2-A125-BT
160	NZMC2-A160-BT	NZMN2-A160-BT
200	NZMC2-A200-BT	NZMN2-A200-BT
250	NZMC2-A250-BT	NZMN2-A250-BT

NZMB1-1-AF63 and NZMB1-A160



Outgoing devices – NZM1 frame MCCBs

- Maximum cable capacity 70mm²
- Single pole fixed trip. Triple pole thermal trip adjustment 0.8 to 1 x I_n, magnetic trip adjustment 6 to 10 x I_n

Rating (A)	Eaton list number		
	Single pole 25kA	Triple pole 25kA	Triple pole 36kA ¹⁾
16	NZMB1-1-AF16	–	–
20	NZMB1-1-AF20	NZMB1-A20	NZMC1-A20
32	NZMB1-1-AF32	NZMB1-A32	NZMC1-A32
40	NZMB1-1-AF40	NZMB1-A40	NZMC1-A40
50	NZMB1-1-AF50	NZMB1-A50	NZMC1-A50
63	NZMB1-1-AF63	NZMB1-A63	NZMC1-A63
80	NZMB1-1-AF80	NZMB1-A80	NZMC1-A80
100	NZMB1-1-AF100	NZMB1-A100	NZMC1-A100
125	NZMB1-1-AF125	NZMB1-A125	NZMC1-A125
160	–	NZMB1-A160	NZMC1-A160

¹⁾ 50kA triple pole also available, change 'C' to 'N' in list number, ie **NZMN1-A125**

EPBN1BP1 tunnel terminals



Accessories

Description	Eaton list number
SP blanking module NZM1 frame (i.e. order 3 per TP way)	EPBN1BP1
TP blanking module NZM2 frame	EPBN2BP3
Panel door lock with 2 keys (have same key code)	EPBDLK1
Terminal shroud for outgoing MCCB type NZM1 1P	NZM1-1-XKSA
Terminal shroud for outgoing MCCB type NZM1 3P	NZM1-XKSA
Terminal shroud for outgoing MCCB type NZM2 3P	NZM2-XKSA
Shunt trip 208–250AC/DC for NZM1 (excl. 1P)	259744
Shunt trip 208–250AC/DC for NZM2/N2	259763
Shunt trip 208–250AC/DC for NZM3/N3	259763
Undervoltage release 208–240AC for NZM1 (excl. 1P)	259471
Undervoltage release 208–240AC for NZM2/N2	259499
Undervoltage release 208–240AC for NZM3/N3	259499

5.3

Memshield 3 MCCB panelboards and associated devices

Incoming device ratings up to 400A – outgoing device ratings up to 250A

EPBN2640SXB



Cable extension boxes – side mounted

Description	Eaton list number
To fit 6 way panelboard EPBN2640	EPBN2640SXB
To fit 12 way panelboard EPBN21240	EPBN21240SXB
To fit 18 way panelboard EPBN21840	EPBN21840SXB

EPBN2EX250



Cable extension boxes – top/bottom mounted

Description	Eaton list number
250mm high	EPBN2EX250

EPBN2CX250



Corner filler boxes

Description	Eaton list number
For use where top/bottom/meter boxes are fitted in conjunction with side cable boxes	EPBN2CX250

EPBN2EXDIN



Din rail extension boxes

Description	Height	Number 18mm Din modules	Eaton list number
For housing din rail mounted command/control equipment, ie timers/contactors	250mm	18	EPBN2EXDIN

Metering components – refer to pages 80–83 for more explanation

(Requires appropriate incomer connection kit with metering option selected from above)

EPBN2EX250M



Incoming metering – digital

- See page 80 for detailed selection guide

Description	Eaton list number
Incomer meter enclosure (can be fitted to top or bottom of panelboard). Meter not included	EPBN2EX250M
Multifunction meter measuring parameters: Voltage (P-P / P/N) (individual/average) Current (I1, I2, I3) (individual/average) Frequency Power factor (individual/average) Active, reactive, apparent power (individual/total) Active, reactive, apparent energy (total)	EPBMETER1
Voltage supply to meter tap off kit (includes protection fuses). One per panelboard required, irrespective of number of meters	EPBN3SUPM

EPBN21240SXM



Outgoing side mounted metering – digital

- See page 82 for detailed selection guide

Description	Number of meter spaces in metering enclosure	Number of meter blanking plates included	Eaton list number
Side mounted metering enclosure to fit 6 way panelboard EPBN1640	3	2	EPBN2640SXM ¹⁾
Side mounted metering enclosure to fit 12 way panelboard EPBN11240	6	5	EPBN21240SXM ¹⁾
Outgoing CT Kit (1 off required per metered outgoing TP way) to suit NZM1 frame MCCBs. 160A maximum rating. Includes CT to meter plug-in cable and meter to meter voltage supply linking cable with connectors			EPBCTMT160
Outgoing CT Kit (1 off required per metered outgoing TP way) to suit NZM2 frame MCCBs. 250A maximum rating. Includes CT to meter plug-in cable and meter to meter voltage supply linking cable with connectors			EPBCTMT250
Multifunction meter measuring parameters: Voltage (P-P / P/N) (individual/average) Current (I1, I2, I3) (individual/average) Frequency Power factor (individual/average) Active, reactive, apparent power (individual/total) Active, reactive, apparent energy (total)			EPBMETER1
Voltage supply to meter tap off kit (includes protection fuses), not required if incoming metering is being used			EPBN3SUPM
Extra long (2m) meter to meter voltage supply linking cable with connectors			EPBN3LKKTM
Extra long (2.5m) CT to meter plug-in cable			EPBN3LKRJ45
CT supporting mount to allow CT to be fitted in side mounted cable extension box if terminal shields being fitted to MCCBs			EPBSXBCTMT
Spare blanking plate for unused meter ways in metering enclosure			EM96BP

¹⁾ Suffix 'M' indicates cut-outs for meters and hinged door for outgoing metering suitable for left and right hand applications. Can be used with side mounted cable extension boxes if required

EPBN1SPD123



Transient voltage surge suppression units, externally mounted in own enclosure

- See page 84 for full technical specification
- Includes 63A TP NZM1 MCCB for protection/isolation
- See page 127 for dimensions

Description	Eaton list number
SPD-type T1, T2, T3 in accordance with EN 61643-11, lightning protection classes III and IV in accordance with IEC 62305	EPBN1SPD123
SPD-type T1, T2, T3 in accordance with EN 61643-11, lightning protection classes I, II, III and IV in accordance with IEC 62305	EPBN1SPD1234

EPBKEL400



Earth leakage protection

- Kit comprises 350mm high extension box fitted with earth leakage relay, core balance transformer, all cables/terminals/protection fuses, and 230V shunt trip (for tripping of incomer device). Requires 4-pole incomer device. 400A maximum rating
- Sensitivity adjustable from 30mA to 5A. Time delay adjustable from 0.02 to 5 seconds

Description	Eaton list number
Earth leakage protection add-on kit for incomer device	EPBKEL400

Cable size summary

Incoming cables

MCCB or switch disconnector size max/type	240mm ² /M12 bolt
Direct connection lugs incomer	M12
Neutral	M8
Earth	M10

Outgoing cables

NZM2 MCCB size max/type	185mm ² /cable clamp
NZM1 MCCB size max/type	70mm ² /cable clamp. (95mm ² can be fitted depending on cable manufacturer)
Neutral size max/type	50mm ² tunnel terminals and 4 x M8 bolts
Earth size max/type	50mm ² tunnel terminals and 4 x M8 bolts

5.4

Memshield 3 MCCB panelboards and associated devices

Incoming device ratings up to 630A – outgoing device ratings up to 250A

Specification

- Panelboards to IEC61439-2. Form 3b Type 2
- Busbar system KEMA certified 50kA Icc, Icw 50kA 1s
- IP3X construction
- MCCBs to IEC60947-2. kA ratings shown are Ics=Icu at 400V ac
- Switch disconnectors to IEC60947-3

Features

- 6, 12 or 18 outgoing TP ways
- Outgoing devices; these panelboards utilise two frame sizes of MCCB: NZM2 125A–250A TP, and NZM1 SP 16A–125A or TP 20A–160A
- Tin-plated busbars
- Can be configured for incomer device at top of panelboard
- Removable side gland plates as standard
- Wide range of extension boxes, metering, surge protection, and earth leakage incomer options available
- Door lock included

See page 147 for dimensions.

EPBN2863



- Minimum ordering requirement: panelboard + incoming device + incomer connection kit + outgoing devices + blanking plates

Description	Associated incoming device	Current rating (A)	No. of outgoing ways	Eaton list number
Incoming rating 630A, outgoing ratings up to 250A	NZMLW MCCB or NLW CBS or direct lugs connection	630	8 (4 x 250A + 4 x 160A)	EPBN2863
			12 (4 x 250A + 8 x 160A)	EPBN21263
			18 (4 x 250A + 14 x 160A)	EPBN21863

NZMLW-630



MCCB incoming device

- 50kA
- Select appropriate incomer device from table below
- Maximum cable capacity 2 x 240mm²
- Adjustable trip. Thermal trip adjustment 0.5 to 1 x I_n, Magnetic trip adjustment 2 to 8 x I_n

Poles	Incoming device type	Current rating (A)	Eaton list number
3-pole	NZMLW MCCB	630	NZMLW-A630
4-pole (3 phase and switched neutral)	NZMLW MCCB	630	NZMLW-4-A630

NLW-630



Circuit breaker switch incoming device

- 50kA
- Select appropriate incomer device from table below
- Maximum cable capacity 2 x 240mm²

Poles	Incoming device type	Current rating (A)	Eaton list number
3-pole	NLW Circuit breaker switch	630	NLW-630
4-pole	NLW Circuit breaker switch	630	NLW-4-630

EPBKN2633



Incomer connection kit/metering connection kit

- See incoming metering section below to order metering components

Poles	Maximum rating (A)	Eaton list number
3-Pole incomer connection kit	630	EPBKN2633
3-Pole incomer connection kit – includes metering CT and CT to meter cable	630	EPBKN2633M
4-Pole incomer connection kit	630	EPBKN2634
4-Pole incomer connection kit – includes metering CT and CT to meter cable	630	EPBKN2634M
Direct connection lugs kit	630	EPBKN263L
Direct connection lugs kit – includes metering CT and CT to meter cable	630	EPBKN263LM
Adapter kit for use when incomer device mounted at top of panelboard	570	EPBKTFSLW¹⁾

¹⁾Maximum rating of panelboard when top fed is 570A

NZMC2-A250-BT



Outgoing devices – NZM2 frame MCCBs

- Maximum cable capacity 185mm²
- Up to 4 can be fitted
- Adjustable trip. Thermal trip adjustment 0.8 to 1 x I_n, magnetic trip adjustment 6 to 10 x I_n

Rating (A)	Eaton list number	
	Triple pole 36kA	Triple pole 50kA
125	NZMC2-A125-BT	NZMN2-A125-BT
160	NZMC2-A160-BT	NZMN2-A160-BT
200	NZMC2-A200-BT	NZMN2-A200-BT
250	NZMC2-A250-BT	NZMN2-A250-BT

NZMB1-1-AF63 and NZMB1-A160



Outgoing devices – NZM1 frame MCCBs

- Maximum cable capacity 70mm²
- Single pole fixed trip. Triple pole thermal trip adjustment 0.8 to 1 x I_n, magnetic trip adjustment 6 to 10 x I_n

Rating (A)	Eaton list number		
	Single pole 25kA	Triple pole 25kA	Triple pole 36kA ¹⁾
16	NZMB1-1-AF16	–	–
20	NZMB1-1-AF20	NZMB1-A20	NZMC1-A20
32	NZMB1-1-AF32	NZMB1-A32	NZMC1-A32
40	NZMB1-1-AF40	NZMB1-A40	NZMC1-A40
50	NZMB1-1-AF50	NZMB1-A50	NZMC1-A50
63	NZMB1-1-AF63	NZMB1-A63	NZMC1-A63
80	NZMB1-1-AF80	NZMB1-A80	NZMC1-A80
100	NZMB1-1-AF100	NZMB1-A100	NZMC1-A100
125	NZMB1-1-AF125	NZMB1-A125	NZMC1-A125
160	–	NZMB1-A160	NZMC1-A160

¹⁾ 50kA triple pole also available, change 'C' to 'N' in list number, ie **NZMN1-A125**

EPBN1BP1



Accessories

Description	Eaton list number
SP blanking module NZM1 frame (i.e. order 3 per TP way)	EPBN1BP1
TP blanking module NZM2 frame	EPBN2BP3
Terminal shroud for outgoing MCCB type NZM1 1P	NZM1-1-XKSA
Terminal shroud for outgoing MCCB type NZM1 3P	NZM1-XKSA
Terminal shroud for outgoing MCCB type NZM2 3P	NZM2-XKSA
Shunt trip 208–250AC/DC for NZM1 (excl. 1P)	259744
Shunt trip 208–250AC/DC for NZM2/N2	259763
Shunt trip 110V–240VAC for NZMLW/NLW	SNT4LP11K
Undervoltage release 208–240AC for NZM1 (excl. 1P)	259471
Undervoltage release 208–240AC for NZM2/N2	259499
Undervoltage release 240VAC for NZMLW/NLW	UVH4LP11K

EPBN21863SXB



Cable extension boxes – side mounted

Description	Eaton list number
To fit 8 way panelboard EPBN2863	EPBN21263SXB
To fit 12 way panelboard EPBN21263	EPBN21263SXB
To fit 18 way panelboard EPBN21863	EPBN21863SXB

5.4

Memshield 3 MCCB panelboards and associated devices

Incoming device ratings up to 630A – outgoing device ratings up to 250A

EPBN3EX250



Cable extension boxes – top/bottom mounted

Description

250mm high

Eaton list number

EPBN3EX250

EPBNCX250



Corner filler boxes

Description

For use where top/bottom/meter boxes are fitted in conjunction with side cable boxes

Eaton list number

EPBN2CX250

EPBN3EXDIN



Din rail extension boxes

Description

For housing din rail mounted command/control equipment, ie timers/contactors

Height

250mm

Number 18mm Din modules

30

Eaton list number

EPBN3EXDIN

Metering components – refer to pages 80–83 for more explanation

(Requires appropriate incomer connection kit with metering option selected from above)

EPBN3EX250M



Incoming metering – digital

- See page 80 for detailed selection guide

Description

Incomer meter enclosure (can be fitted to top or bottom of panelboard). Meter not included

Eaton list number

EPBN3EX250M

Multifunction meter measuring parameters:

Voltage (P-P / P/N) (individual/average)

Current (I1, I2, I3) (individual/average)

Frequency

Power factor (individual/average)

Active, reactive, apparent power (individual/total)

Active, reactive, apparent energy (total)

EPBMETER1

Voltage supply to meter tap off kit (includes protection fuses). One per panelboard required, irrespective of number of meters

EPBN3SUPM

EPBN21263SXM



Outgoing side mounted metering – digital

- See page 82 for detailed selection guide

Description	Number of meter spaces in metering enclosure	Number of meter blanking plates included	Eaton list number
Side mounted metering enclosure to fit 8 way panelboard EPBN2863	6	5	EPBN21263SXM
Side mounted metering enclosure to fit 12 way panelboard EPBN21263	6	5	EPBN21263SXM
Side mounted metering enclosure to fit 18 way panelboard EPBN21863	9	8	EPBN21863SXM
Outgoing CT Kit (1 off required per metered outgoing TP way) to suit NZM1 frame MCCBs. 160A maximum rating. Includes CT to meter plug-in cable and meter to meter voltage supply linking cable with connectors			EPBCTMT160
Outgoing CT Kit (1 off required per metered outgoing TP way) to suit NZM2 frame MCCBs. 250A maximum rating. Includes CT to meter plug-in cable and meter to meter voltage supply linking cable with connectors			EPBCTMT250
Multifunction meter measuring parameters: Voltage (P-P / P/N) (individual/average) Current (I1, I2, I3) (individual/average) Frequency Power factor (individual/average) Active, reactive, apparent power (individual/total) Active, reactive, apparent energy (total)			EPBMETER1
Voltage supply to meter tap off kit (includes protection fuses), not required if incoming metering is being used			EPBN3SUPM
Extra long (2m) meter to meter voltage supply linking cable with connectors			EPBN3LKKTM
Extra long (2.5m) CT to meter plug-in cable			EPBN3LKRJ45
CT supporting mount to allow CT to be fitted in side mounted cable extension box if terminal shields being fitted to MCCBs			EPBSXBCTMT
Spare blanking plate for unused meter ways in metering enclosure			EM96BP

¹⁾ Suffix 'M' indicates cut-outs for meters and hinged door for outgoing metering suitable for left and right hand applications. Can be used with side mounted cable extension boxes if required

EPBN1SPD123



Transient voltage surge suppression units, externally mounted in own enclosure

- See page 84 for full technical specification
- Includes 63A TP NZM1 MCCB for protection/isolation
- See page 127 for dimensions

Description	Eaton list number
SPD-type T1, T2, T3 in accordance with EN 61643-11, lightning protection classes III and IV in accordance with IEC 62305	EPBN1SPD123
SPD-type T1, T2, T3 in accordance with EN 61643-11, lightning protection classes I, II, III and IV in accordance with IEC 62305	EPBN1SPD1234

EPBKEL800



Earth leakage protection

- Kit comprises 350mm high extension box fitted with earth leakage relay, core balance transformer, all cables/terminals/protection fuses, and 230V shunt trip (for tripping of incomer device). Requires 4-pole incomer device. 630A maximum rating
- Sensitivity adjustable from 30mA to 5A. Time delay adjustable from 0.02 to 5 seconds

Description	Eaton list number
Earth leakage protection add-on kit for incomer device	EPBKEL800

Cable size summary

Incoming cables

MCCB or switch disconnector size max/type	2 x 240mm ² /M10 bolt
Direct connection lugs incomer	M12
Neutral	M12
Earth	M10

Outgoing cables

NZM2 MCCB size max/type	185mm ² /cable clamp
NZM1 MCCB size max / type	70mm ² /cable clamp. (95mm ² can be fitted depending on cable manufacturer)
Neutral size max / type	50mm ² tunnel terminals and 4 x M8 bolts
Earth size max / type	50mm ² tunnel terminals and 8 x M8 bolts

5.5

Memshield 3 MCCB panelboards and associated devices

Incoming device ratings up to 800A – outgoing device ratings up to 400A

Specification

- Panelboards to IEC61439-2. Form 3b Type 2
- Busbar system KEMA certified 50kA Icc, Icw 50kA 1s
- IP3X construction
- Outgoing MCCBs to IEC60947-2. kA ratings shown are Ics=Icu at 400V ac
- Incoming MCCB/circuit breaker switch to IEC60947-2 Icu 50kA, Ics 25kA

Features

- 8, or 12 outgoing TP ways
- Outgoing devices; these panelboards utilise three frame sizes of MCCB: NZM3 250A–400A, NZM2 125A–250A TP, and NZM1 SP 16A–125A or TP 20A–160A
- Tin-plated busbars
- Can be configured for incomer device at top of panelboard
- Removable side gland plates as standard
- Wide range of extension boxes, metering, surge protection, and earth leakage incomer options available
- Door lock included

See page 147 for dimensions.

EPBN31280



- Minimum ordering requirement: panelboard + incoming device + incomer connection kit + outgoing devices + blanking plates

Description	Associated incoming device	Current rating (A)	No. of outgoing ways	Eaton list number
Incoming rating 800A, outgoing ratings up to 400A	NZMLW MCCB or NLW CBS	800	8 (2 x 400A + 2 x 250A + 4 x 160A)	EPBN3880
			12 (2 x 400A + 4 x 250A + 6 x 160A)	EPBN31280

NZMLW-800



MCCB incoming device

- 50kA
- Select appropriate incomer device from table below
- Maximum cable capacity 2 x 240mm²
- Adjustable trip. Thermal trip adjustment 0.5 to 1 x In, Magnetic trip adjustment 2 to 8 x In

Poles	Incoming device type	Current rating (A)	Eaton list number Short circuit rating 50kA
3-pole	NZMLW MCCB	800	NZMLW-A800
4-pole (3 phase and switched neutral)	NZMLW MCCB	800	NZMLW-4-A800

NLW-800



Circuit breaker switch incoming device

- 50kA
- Select appropriate incomer device from table below
- Maximum cable capacity 2 x 240mm²

Poles	Incoming device type	Current rating (A)	Eaton list number
3-pole	NLW Circuit breaker switch	800	NLW-800
4-pole	NLW Circuit breaker switch	800	NLW-4-800

EPBKN3803



Incomer connection kit/metering connection kit

- See incoming metering section below to order metering components

Poles	Maximum rating (A)	Eaton list number
3-Pole incomer connection kit	800	EPBKN3803
3-Pole incomer connection kit – includes metering CT and CT to meter cable	800	EPBKN3803M
4-Pole incomer connection kit	800	EPBKN3804
4-Pole incomer connection kit – includes metering CT and CT to meter cable	800	EPBKN3804M
Adapter kit for use when incomer device mounted at top of panelboard	720	EPBKTFSLW¹⁾

¹⁾Maximum rating of panelboard when top fed is 720A

NZMN3-A400-BT



Outgoing devices – NZM3 frame MCCBs.

- Maximum cable capacity 240mm²
- Up to 2 can be fitted
- Adjustable trip. Thermal trip adjustment 0.8 to 1 x I_n, magnetic trip adjustment 6 to 10 x I_n

Rating (A)	Eaton list number Triple pole 50kA
250	NZMN3-A250-BT
320	NZMN3-A320-BT
400	NZMN3-A400-BT

NZMC2-A250-BT



Outgoing devices – NZM2 frame MCCBs

- Maximum cable capacity 185mm²
- Up to 4 can be fitted
- Adjustable trip. Thermal trip adjustment 0.8 to 1 x I_n, magnetic trip adjustment 6 to 10 x I_n

Rating (A)	Eaton list number Triple pole 36kA	Triple pole 50kA
125	NZMC2-A125-BT	NZMN2-A125-BT
160	NZMC2-A160-BT	NZMN2-A160-BT
200	NZMC2-A200-BT	NZMN2-A200-BT
250	NZMC2-A250-BT	NZMN2-A250-BT

NZMB1-1-AF63
and NZMB1-A160



Outgoing devices – NZM1 frame MCCBs

- Maximum cable capacity 70mm²
- Single pole fixed trip. Triple pole thermal trip adjustment 0.8 to 1 x I_n, magnetic trip adjustment 6 to 10 x I_n

Rating (A)	Eaton list number Single pole 25kA	Triple pole 25kA	Triple pole 36kA ¹⁾
16	NZMB1-1-AF16	–	–
20	NZMB1-1-AF20	NZMB1-A20	NZMC1-A20
32	NZMB1-1-AF32	NZMB1-A32	NZMC1-A32
40	NZMB1-1-AF40	NZMB1-A40	NZMC1-A40
50	NZMB1-1-AF50	NZMB1-A50	NZMC1-A50
63	NZMB1-1-AF63	NZMB1-A63	NZMC1-A63
80	NZMB1-1-AF80	NZMB1-A80	NZMC1-A80
100	NZMB1-1-AF100	NZMB1-A100	NZMC1-A100
125	NZMB1-1-AF125	NZMB1-A125	NZMC1-A125
160	–	NZMB1-A160	NZMC1-A160

¹⁾ 50kA triple pole also available, change 'C' to 'N' in list number, ie **NZMN1-A125**

EPBN3BP3



Accessories

Description	Eaton list number
SP blanking module NZM1 frame (i.e. order 3 per TP way)	EPBN1BP1
TP blanking module NZM2 frame	EPBN2BP3
TP blanking module NZM3 frame	EPBN3BP3
Terminal shroud for outgoing MCCB type NZM1 1P	NZM1-1-XKSA
Terminal shroud for outgoing MCCB type NZM1 3P	NZM1-XKSA
Terminal shroud for outgoing MCCB type NZM2 3P	NZM2-XKSA
Shunt trip 208–250AC/DC for NZM1 (excl. 1P)	259744
Shunt trip 208–250AC/DC for NZM2/N2	259763
Shunt trip 208–250AC/DC for NZM3/N3	259763
Shunt trip 110V–240VAC for NZMLW/NLW	SNT4LP11K
Undervoltage release 208–240AC for NZM1 (excl. 1P)	259471
Undervoltage release 208–240AC for NZM2/N2	259499
Undervoltage release 208–240AC for NZM3/N3	259499
Undervoltage release 240VAC for NZMLW/NLW	UVH4LP11K

5.5

Memshield 3 MCCB panelboards and associated devices

Incoming device ratings up to 800A – outgoing device ratings up to 400A

EPBN21863SXB



Cable extension boxes – side mounted

Description	Eaton list number
To fit 8 way panelboard EPBN3880	EPBN21263SXB
To fit 12 way panelboard EPBN31280	EPBN21863SXB

EPBN3EX250



Cable extension boxes – top/bottom mounted

Description	Eaton list number
250mm high	EPBN3EX250

EPBN2CX250



Corner filler boxes

Description	Eaton list number
For use where top/bottom/meter boxes are fitted in conjunction with side cable boxes	EPBN2CX250

EPBN3EXDIN



Din rail extension boxes

Description	Height	Number 18mm Din modules	Eaton list number
For housing din rail mounted command/control equipment, ie timers/contactors	250mm	30	EPBN3EXDIN

Metering components – refer to pages 80–83 for more explanation

(Requires appropriate incomer connection kit with metering option selected from above)

EPBN3EX250M



Incoming metering – digital

- See page 80 for detailed selection guide

Description	Eaton list number
Incomer meter enclosure (can be fitted to top or bottom of panelboard). Meter not included	EPBN3EX250M
Multifunction meter measuring parameters: Voltage (P-P / P/N) (individual/average) Current (I1, I2, I3) (individual/average) Frequency Power factor (individual/average) Active, reactive, apparent power (individual/total) Active, reactive, apparent energy (total)	EPBMETER1
Voltage supply to meter tap off kit (includes protection fuses). One per panelboard required, irrespective of number of meters	EPBN3SUPM

EPBN21263SXM



Outgoing side mounted metering – digital

- See page 82 for detailed selection guide

Description	Number of meter spaces in metering enclosure	Number of meter blanking plates included	Eaton list number
Side mounted metering enclosure to fit 8 way panelboard EPBN3880	6	5	EPBN21263SXM
Side mounted metering enclosure to fit 12 way panelboard EPBN31280	9	8	EPBN21863SXM
Outgoing CT Kit (1 off required per metered outgoing TP way) to suit NZM1 frame MCCBs. 160A maximum rating. Includes CT to meter plug-in cable and meter to meter voltage supply linking cable with connectors			EPBCTMT160
Outgoing CT Kit (1 off required per metered outgoing TP way) to suit NZM2 frame MCCBs. 250A maximum rating. Includes CT to meter plug-in cable and meter to meter voltage supply linking cable with connectors			EPBCTMT250
Outgoing CT Kit (1 off required per metered outgoing TP way) to suit NZM3 frame MCCBs. 400A maximum rating. Includes CT to meter plug-in cable and meter to meter voltage supply linking cable with connectors.			EPBCTMT400
Multifunction meter measuring parameters: Voltage (P-P / P/N) (individual/average) Current (I1, I2, I3) (individual/average) Frequency Power factor (individual/average) Active, reactive, apparent power (individual/total) Active, reactive, apparent energy (total)			EPBMETER1
Voltage supply to meter tap off kit (includes protection fuses), not required if incoming metering is being used			EPBN3SUPM
Extra long (2m) meter to meter voltage supply linking cable with connectors			EPBN3LKKTM
Extra long (2.5m) CT to meter plug-in cable			EPBN3LKRJ45
CT supporting mount to allow CT to be fitted in side mounted cable extension box if terminal shields being fitted to MCCBs			EPBSXBCTMT
Spare blanking plate for unused meter ways in metering enclosure			EM96BP

¹⁾ Suffix 'M' indicates cut-outs for meters and hinged door for outgoing metering suitable for left and right hand applications. Can be used with side mounted cable extension boxes if required

EPBN1SPD123



Transient voltage surge suppression units, externally mounted in own enclosure

- See page 84 for full technical specification
- Includes 63A TP NZM1 MCCB for protection/isolation
- See page 127 for dimensions

Description	Eaton list number
SPD-type T1, T2, T3 in accordance with EN 61643-11, lightning protection classes III and IV in accordance with IEC 62305	EPBN1SPD123
SPD-type T1, T2, T3 in accordance with EN 61643-11, lightning protection classes I, II, III and IV in accordance with IEC 62305	EPBN1SPD1234

EPBKEL800



Earth leakage protection

- Kit comprises 350mm high extension box fitted with earth leakage relay, core balance transformer, all cables/terminals/protection fuses, and 230V shunt trip (for tripping of incomer device). Requires 4-pole incomer device. 800A maximum rating
- Sensitivity adjustable from 30mA to 5A. Time delay adjustable from 0.02 to 5 seconds

Description	Eaton list number
Earth leakage protection add-on kit for incomer device	EPBKEL800

Cable size summary

Incoming cables

MCCB or switch disconnector size max/type	2 x 240mm ² /M12 bolt
Neutral	M12
Earth	M10

Outgoing cables

NZM3 MCCB size max/type	240mm ² /cable clamp
NZM2 MCCB size max /type	185mm ² /cable clamp
NZM1 MCCB size max /type	70mm ² /cable clamp. (95mm ² can be fitted depending on cable manufacturer)
Neutral size max/type	50mm ² tunnel terminals and 4 x M8 bolts
Earth size max/type	50mm ² tunnel terminals and 8 x M8 bolts

5.6

Memshield 3 MCCB panelboards and associated devices

Plug-in incoming metering

When configuring panelboard incoming metering, simply identify panelboard and incomer type, then order the following modules detailed in the selection chart below-

1. Incoming meter connection kit
2. Incoming meter enclosure
3. Meter
4. Voltage supply to meter tap-off kit
5. Top or bottom mounted cable extension box (When necessary see note)

Plug-in connectivity is provided between meter, CT and supply.

Incoming metering can be configured with outgoing metering.

Meter connection arrangement



Incoming metering module selection

Meter module	Panelboard	EPBN1425, EPBN1625, EPBN1825, EPBN11225			EPBN1640, EPBN11240			EPBN2640, EPBN21240, EPBN21840			
		250A 3P MCCB/switch	250A 4P MCCB/switch	250A 3P lugs	400A 3P MCCB/switch	400A 4P MCCB/switch	400A 3P lugs	400A 3P MCCB/switch	400A 4P MCCB/switch	400A 3P lugs	
Incoming metering connection kit	EPBKN1253M	✓									
	EPBKN1254M		✓								
	EPBKN125LM			✓							
	EPBKN2403M				✓				✓		
	EPBKN2404M					✓			✓		
	EPBKN240LM						✓			✓	
Incoming meter enclosure	EPBN1EX250M	✓	✓	✓							
	EPBN2EX250M				✓	✓	✓	✓	✓	✓	
Meter	EPBMETER1	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Voltage supply to meter tap-off kit	EPBN1SUPM	✓	✓	✓							
	EPBN3SUPM				✓	✓	✓	✓	✓	✓	
Cable extension box ¹⁾	EPBN2EX250				✓	✓		✓	✓		
Meter module	Panelboard	EPBN2863, EPBN21263, EPBN21863			EPBN3880, EPBN31280						
		630A 3P MCCB/switch	630A 4P MCCB/switch	630A 3P lugs	800A 3P MCCB/switch	800A 4P MCCB/switch					
Incoming metering connection kit	EPBKN2633M	✓									
	EPBKN2634M		✓								
	EPBKN3803M				✓						
	EPBKN3804M					✓					
	EPBKN263LM			✓							
Incoming meter enclosure	EPBN3EX250M	✓	✓	✓	✓	✓					
Meter	EPBMETER1	✓	✓	✓	✓	✓					
Voltage supply to meter tap-off kit	EPBN3SUPM	✓	✓	✓	✓	✓					
Cable extension box ¹⁾	EPBN3EX250	✓	✓		✓	✓					

¹⁾When incoming meter enclosure is fitted at the feed end of the panelboard there is no need for a cable extension box

Meter

Meter is available with pulsed and modbus outputs.
Simply installed with 2 locking screws.



Incoming meter enclosure

250mm high enclosure with hinged front door.
Simply bolted to the top or the bottom of the panelboard.

Supply tap-off

Provision to fit tap-off to either the left and/or right hand side of the pan assembly.
Only 1 per panelboard is required but provision to fit two is an option.



Incoming metering connection kit

This includes all copper connectors, CT, shielding and CT to meter cable. Can be top or bottom fed.

This does not include the incoming device, which has to be ordered separately.



Cable extension box (when necessary)

250mm high enclosure, fitted incoming end.

When incoming meter enclosure is fitted at the feed end of the 400A/630A/800A boards there is no need for a cable extension box.



5.7

Memshield 3 MCCB panelboards and associated devices

Plug-in outgoing metering

When configuring panelboard outgoing metering, simply identify panelboard and number of outgoing breaker type, then order the following modules detailed in the selection chart below-

1. Outgoing CT kit
2. Outgoing side mounted meter extension box
3. Meter
4. Voltage supply to meter tap-off kit
5. Extra long meter to meter voltage linking kit to feed to meter extension box on other side of panelboard if necessary
6. Extra long CT to meter linking cable if required.

Plug-in connectivity is provided between meter, CT and supply.

Outgoing metering can be configured with incoming metering.

Meter connection arrangement



Outgoing metering module selection

Meter module	Panelboard	EPBN1625	EPBN1625	EPBN1825	EPBN11225	EPBN1640	EPBN11240	EPBN2640	EPBN21240	EPBN21840	EPBN2863	EPBN21263	EPBN21863	EPBN3880	EPBN31280
Outgoing CT kit (1 off required per outgoing way)	EPBCTMT160 (NZM1 160A)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	EPBCTMT250 (NZM2 250A)							✓	✓	✓	✓	✓	✓	✓	✓
	EPBCTMT400 (NZM3 400A)													✓	✓
Outgoing side mounted meter extension box	EPBN1425SXM	✓													
	EPBN1625SXM		✓												
	EPBN1825SXM			✓											
	EPBN11225SXM				✓										
	EPBN2640SXM					✓		✓							
	EPBN21240SXM						✓		✓						
	EPBN21840SXM									✓					
	EPBN21263SXM										✓	✓		✓	
EPBN21863SXM												✓		✓	
Meter	EPBMETER1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Voltage supply to meter tap-off kit	EPBN1SUPM	✓	✓	✓	✓										
	EPBN3SUPM					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CT mount for outgoing meter cable way ¹⁾	EPBSXBCTMT	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extra long meter to meter voltage linking kit	EPBN3LKKTM	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extra long CT to meter linking kit	EPBN3LKRJ45	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

¹⁾ Only required when terminal shields are fitted to outgoing MCCBs. The CT can be fitted in a side-mounted cable extension box. One CT mount per outgoing CT.

Meter

Meter is available with pulsed and modbus outputs.
Simply installed with 2 locking screws.



Outgoing meter kit

One kit per outgoing way, includes CT, CT to meter cable, and meter to meter voltage linking cable.

NZM1 – 160A max
NZM2 – 250A max
NZM3 – 400A max



Outgoing side mounted meter extension box

Can be fitted on the left and right hand side of the panelboard.
All outgoing meter apertures, except one, have removable blanking shields fitted.



Supply tap-off

Provision to fit tap-off to either the left and/or right hand side of the pan assembly.
Only 1 per panelboard is required but provision to fit two is an option.



Extra long CT to meter linking cable

Required when CT is fitted on opposite side to meter extension box. 2.5m long.



Extra long meter to meter voltage linking kit

Required when:
Incoming and outgoing metering on one side = 1 off
Outgoing metering on both sides = 2 off
Incoming and outgoing metering on both sides = 3 off
2m long



Combined lightning arrester and surge suppression devices have been developed specifically for applications with MCCB panelboards ensuring outstanding product performance for all sensitive, mission critical and general purpose loads. Providing protection from direct and indirect lightning strikes, the IEC 61643 tested devices have impressive voltage protection levels (U_p), nominal discharge current (8/20) μs I_n & maximum discharge current I_{max} for transient surge suppression, combined with impulse current I_{imp} (10/350) μs for lightning strike protection. These devices are fully compliant with BS EN 62305.

EPBN1SPD123 technical summary:

- For the protection of low voltage distribution systems against transient overvoltage caused by direct and indirect lightning strike and switching operations.
- Application according to IEC 60364-5-53 Clause 534.
- Test class I, II, III in accordance with IEC 61643-1.
- SPD-type T1, T2, T3 in accordance with EN 61643-11.
- Lightning protection classes III and IV in accordance with IEC 62305.

EPBN1SPD1234 technical summary:

- For the protection of low voltage distribution systems against direct lightning strike into the overhead power supply line or external lightning protection system and against indirect lightning strike and switching operations.
- Application according to IEC 60364-5-53 Clause 534.
- Test class I, II, III in accordance with IEC 61643-1.
- SPD-type T1, T2, T3 in accordance with EN 61643-11.
- No discharge of ionised gases during operation.
- Lightning protection classes I, II, III and IV in accordance with IEC 62305.

EPBN1SPD123



Description

Eaton list
number

SPD-type T1, T2, T3 in accordance with EN 61643-11, lightning protection classes III and IV in accordance with IEC 62305

EPBN1SPD123

SPD-type T1, T2, T3 in accordance with EN 61643-11, lightning protection classes I, II, III and IV in accordance with IEC 62305

EPBN1SPD1234

MCCB pan assemblies, interiors, three phase, with earth & neutral bars

- Eaton MCCB pan assemblies offer a high degree of flexibility, suitable for inclusion in other factory built assemblies and as replacements for panelboard interiors.
- For incoming and outgoing device compatibility see associated panelboard details.

See pages 150–151 for dimensional drawings

EPBPN31280



Product range

Description	Current rating (A)	Total no of outgoing ways	Eaton list number
Memshield 3 panelboard pan assembly 250A, 4 Way. Outgoing up to 160A	250	4	EPBPN1425
Memshield 3 panelboard pan assembly 250A, 6 Way. Outgoing up to 160A	250	6	EPBPN1625
Memshield 3 panelboard pan assembly 250A, 8 Way. Outgoing up to 160A	250	8	EPBPN1825
Memshield 3 panelboard pan assembly 250A, 12 Way. Outgoing up to 160A	250	12	EPBPN11225
Memshield 3 panelboard pan assembly 400A, 6 Way. Outgoing up to 160A	400	6	EPBPN1640
Memshield 3 panelboard pan assembly 400A, 12 Way. Outgoing up to 160A	400	12	EPBPN11240
Memshield 3 panelboard pan assembly 400A, 6 Way. Outgoing up to 250A	400	6	EPBPN2640
Memshield 3 panelboard pan assembly 400A, 12 Way. Outgoing up to 250A	400	12	EPBPN21240
Memshield 3 panelboard pan assembly 400A, 18 Way. Outgoing up to 250A	400	18	EPBPN21840
Memshield 3 panelboard pan assembly 630A, 8 Way. Outgoing up to 250A	630	8	EPBPN2863
Memshield 3 panelboard pan assembly 630A, 12 Way. Outgoing up to 250A	630	12	EPBPN21263
Memshield 3 panelboard pan assembly 630A, 18 Way. Outgoing up to 250A	630	18	EPBPN21863
Memshield 3 panelboard pan assembly 800A, 8 Way. Outgoing up to 400A	800	8	EPBPN3880
Memshield 3 panelboard pan assembly 800A, 12 Way. Outgoing up to 400A	800	12	EPBPN31280



Eaton’s MEM series products have earned a worldwide reputation for reliable high quality switch and fusegear – and above all market leading status.

Constantly updated and refined to comply with the very latest international standards, the market leading switchgear range, specialist heavy duty items and dedicated distribution and control equipment fulfils the diverse requirements of the contractor, specifier, OEM and distributor alike.

6.1	GLASGOW FUSE-SWITCH-DISCONNECTORS & SWITCH-DISCONNECTORS	88
6.2	GLASGOW BUSBAR CHAMBER SYSTEM	92
6.3	EXEL 2 SWITCH-DISCONNECTORS & SWITCH-DISCONNECTOR FUSES	94
6.4	MEMLOK CHANGEOVER SWITCHES	96
6.5	ROTARY ISOLATORS	97
6.6	EXEL – DISTRIBUTION FUSEBOARDS	98

See page 152 for technical data and overall dimensions.

103GNL



Glasgow switch-disconnector

- All listed are TPN

Nominal unit	Nominal rating, rating, Ie (A)	Copper switch Ie AC21 (A)	Suitable links fitted	Motor rating fuselinks	Ue 415V HP AC23A kW	Eaton list number
63	125	63MLK	SB3, SB4	22	30	63GNL
100	125	100MLK	SB3, SB4, SO & SD5	22	30	103GNL
160 (use 200A switch-disconnector)	–	–	–	–	–	–
200	315	200MLK	SF3 to SF6	90	125	203GNL
315 (use 400A switch-disconnector)	–	–	–	–	–	–
400	630	400MLK	SF3 to SF8	110	150	403GNL
500 (use 630A switch-disconnector)	–	–	–	–	–	–
630	1000	630MLK	SF3 to SF8	225	300	603GNL
800	1000	800MLK	SH8 to SH10	300	400	803GNL

Stud size: 63/100A = tunnel terminal, 160/200A = M10, 300/400 = M14, 500/800A = see page 153, "copper terminal plate"

203GNC



Glasgow fuse-switch-disconnector

- Units are fitted with HRC Fuselinks of maximum rating but will accept fuselinks of a lower rating, refer to the Paramount HRC Fuselinks section on page 152.
- SPSN and TPSN indicate switched neutral.
- Neutral makes first and breaks last.

Nominal unit rating, Ie (A)	Eaton 415V fuse(s) fitted	Suitable fuselinks	Suitable copper switch links	Poles	Eaton list number
63	63SB4	SB3 & SB4	63MLK	SPSN	61GNC
				DP	¹⁾
				TPN	63GNC
				TPSN	64GC
100	100SD5	SB3, SB4, SO & SD5	100MLK	SPSN	101GNC
				DP	¹⁾
				TPN	103GNC
				TPSN	104GC
160	160SF6	SF3 & SF6	200MLK	SPSN	151GNC
				DP	¹⁾
				TPN	153GNC
				TPSN	154GC
200	200SF6	SF3 & SF6	200MLK	SPSN	201GNC
				DP	¹⁾
				TPN	203GNC
				TPSN	204GC
315	315SF7	SF3 & SF7	400MLK	TPN	303GNC
				TPSN	304GC
400	400SF8	SF3 & SF8	400MLK	TPN	403GNC
				TPSN	404GC
500	500SH9	SH8 & SH9	630MLK	TPN	503GNC
				TPSN	504GC
630	630SH9	–	630MLK	TPN	603GNC
				TPSN	604GC
800	800SH10	SH8 & SH10	800MLK	TPN	803GNC
				TPSN	804GC

¹⁾ If DP fuse-switch-disconnectors are required, use SPSN and replace the supplied switch link with a compatible fuselink.

Stud size: 63/100A = tunnel terminal, 160/200A = M10, 300/400 = M14, 500/800A = see page 153, "copper terminal plate"

GNMPCT200



Meterpack assemblies for 200A Glasgow units

- Meterpack suitable for electrical supplies up to 320A
- CT and Meter are pre-installed with voltage protection fuses to the meter
- Generous cabling space to bolted lug connections, with linking cables for associated switchgear are included to speed installation

Description	Meter characteristics	Rating	Eaton list number
Meterpack for any 200A Glasgow fuse switch disconnecter & switch disconnecter	Pulsed	320	GNMPCT200
Meterpack for any 200A Glasgow fuse switch disconnecter & switch disconnecter	Modbus	320	GNMPCT200M

50CSB



Spreader boxes

- Provide additional space for spreading multi-core PVC insulated cables
- Supplied with fixing bolts and plain bushes
- Adapter plates required for each unit, see page 90

Nominal unit rating, Ie (A)	Eaton list number	
	Straight	45° angled
63	50CSB	50CSBA
100	50CSB	50CSBA
160/200	60CSB	60CSBA
315/400	70CSB	70CSBA
500/630	90CSB	90CSBA
800	90CSB	90CSBA

Extension boxes

- For fitting to Glasgow switch units to provide additional space for spreading multi-core PVC insulated cables with solid aluminium conductors and for some larger cables with stranded copper conductors

Nominal unit rating (A)	Fuse switch-disconnector/switch-disconnector	Eaton list number
63	61GNC	1PCB¹⁾
	63GNC/63GNL	2PCB¹⁾
	64GC	
100	101GNC	1PCB²⁾
	103GNC/103GNL	2PCB²⁾
	104GC	
160	151GNC	2PCB³⁾
	153GNC	3PCB³⁾
	154GC	
200	201GNC	2PCB
	203GNC/203GNL (315A AC21)	3PCB
	204GC	
315	303GNC	4PCB
	304GC	
400	403GNC/use 403GNL (630A AC21)	
	404GC	
500	503GNC	5PCB⁴⁾
	504GC	
630	603GNC/use 603GNL (1000A, AC21)	
	604GC	
800	803GNC/use 803GNL (1000A, AC21)	
	804GC	

¹⁾ Not required for copper cables or al. below 35mm²

²⁾ Not required for copper cables or al. below 50mm²

³⁾ Not required for copper cables

⁴⁾ For parallel cables use 6 PCB + 802 GCC + 2 x 90 CSB or CSBA (see diagram on page 153)

506APL



Adapter plate to fit spreader boxes

- Available for fitting to spreader boxes, tapped to receive Type B compression glands to BS6121-1.
Supplied complete with fixing bolts

Nominal unit rating, Ie (A)	Straight spreader box	45° angled spreader box	Cable mm ²	PVC SWA stranded cables:		Eaton list number				
				2-core	4-core					
63	50CSB	50CSBA	16	2-core	4-core	¹⁾				
			25	2-core	4-core	¹⁾				
			35	2-core	4-core	¹⁾				
100	50CSB	50CSBA	25	2-core	4-core	¹⁾				
			35	2-core	4-core	¹⁾				
			50	2-core	4-core	¹⁾				
160	50CSB	50CSBA	50	2-core	4-core	¹⁾				
				4-core	405 APL					
				70	2-core	¹⁾				
			70	4-core	405 APL					
				95	2-core	405 APL				
				4-core	505 APL					
	60CSB	60CSBA	50	2-core	4-core	¹⁾				
				4-core	406 APL					
				70	2-core	¹⁾				
			70	4-core	406 APL					
				95	2-core	406 APL				
				4-core	506 APL					
200	50CSB	50CSBA	70	2-core	4-core	¹⁾				
				4-core	405 APL					
				95	2-core	405 APL				
			95	4-core	505 APL					
				120	2-core	405 APL				
				4-core	505 APL					
	60CSB	60CSBA	70	2-core	4-core	¹⁾				
				4-core	406 APL					
				95	2-core	406 APL				
			95	4-core	506 APL					
				120	2-core	406 APL				
				4-core	506 APL					
300/400	70CSB	70CSBA	150	–	4-core	507 APL				
				185	–	4-core	637 APL			
				240	–	4-core	637 APL			
			300	–	4-core	757 APL				
				500/630	90CSB	90CSBA	240	–	4-core	639 APL
								300	–	4-core
400	–	4-core	759 APL							
Parallel cables ²⁾	2/150	–	4-core				2 x 509 APL ²⁾			
	2/185	–	4-core				2 x 639 APL ²⁾			
	2/240	–	4-core				2 x 639 APL ²⁾			
800	90CSB	90CSBA	2/300	–	4-core	2 x 759 APL ²⁾				

¹⁾ Sufficient spreading space in switch-disconnector units to mount 'B' gland on to enclosure.

²⁾ For 500 / 630 & 800A unit applications where parallel cables are used you need to order; **6PCB + 802GCC** (copper connection piece) + 2x **90CSB** or **90CSBA** see configuration on page 153.

EBK110SP



Glasgow spares

Nominal unit rating, I _e (A)	Eaton list number
Moving contact fuse carrier; 1 per pole	
63	EBK110SP
100	OBK103SP
160...200	EBK105SP
315...400	EBK113SP
Fixed contact base complete; 1 per pole	
63...100	102GCEBSP
160...200	202GCEBSP
315...400 (2 per pole)	402GCEBSP

Aerosol spray paint, Light grey to RAL7004. Eaton list number: **2AP**

8LD



Lid locking devices

- Facilities are provided for locking off operating handles and securing doors

Current rating (A)	Eaton list number
Handle locking 63–800	PD1¹⁾
Padlock bracket 63–400	6LD
Padlock bracket 500–800	8LD
Padlock ²⁾	PD1

¹⁾ Operating handles of all units can be locked 'ON' or 'OFF' using padlock only.

²⁾ Non standard hasps on padlock available to order.

6.2

Industrial switch & fusegear Glasgow busbar chamber system

See page 154 for technical data and overall dimensions.

142BBC



Busbar chambers

Nominal unit rating, Ie (A)	Nominal length, mm	Eaton list number
100	550	142 BBC
	900	143 BBC
	1350	144 BBC
	1800	146 BBC
200	550	242 BBC
	900	243 BBC
	1350	244 BBC
	1800	246 BBC
400	550	442 BBC
	900	443 BBC
	1350	444 BBC
	1800	446 BBC
630	900	643 BBC
	1350	644 BBC
	1800	646 BBC
800	900	843 BBC
	1350	844 BBC
	1800	846 BBC

Pedestal and back-plate sets

Nominal length of busbar chamber, mm	Eaton list number
900	31 BBPU
1350	41 BBPU
1800	61 BBPU

21BBL



Busbar chamber extension sets

Nominal rating, Ie (A)	Eaton list number
100	21 BBL
200	21 BBL
400	41 BBL
630	81 BBL
800	81 BBL

For busbar supports, see page 155 for details

400FSCS



Connection sets for Glasgow fuse-switch-disconnectors & switch-disconnectors

Nominal rating, Ie (A)	Eaton list number
160, 200	200 FSCS
315, 400	400 FSCS
500, 630, 800	800 FSCS

62BBSK



Busbar clamps and sockets – 100–200A Busbars

Type	Nominal rating, I _e (A)	Bore diameter mm	Capacity mm ²	Eaton list number
U-Clamps	20–63	–	25	2 BBCL
	63–100	–	70	3 BBCL
	100–200	–	120	6 BBCL
Sockets	100–200	16.7	150	62 BBSK

Busbar clamps and sockets – 400–800A Busbars

Type	Nominal rating, I _e (A)	Bore diameter mm	Capacity mm ²	Eaton list number
U-Clamps	20–63	–	25	4 BBCL
	63–100	–	70	5 BBCL
	100–200	–	120	6 BBCL
Sockets	100–200	16.7	150	62 BBSK
	200–315	19.0	185	72 BBSK
	315–400	22.5	240	82 BBSK

21BBMS



Switchgear mounting sets

Description	Nominal rating, I _e (A)	Eaton list number
Exel Switch-disconnector-fuses/	20, 32	11 BBMS
Switch-disconnectors	63, 100, 125	21 BBMS
Glasgow Fuse-switch-disconnectors/	63, 100	31 BBMS
Switch-disconnectors	160, 200	41 BBMS
	315, 400	51 BBMS
	500, 630, 800	61 BBMS

See page 156 for technical data and overall dimensions.

15AXTN2



Exel 2 switch-disconnector

Nominal rating, I _e (A)	Utilisation category at U _e 415V to BS EN 60947-3		250V DC rating to BS5419 DC23 (A)	Blank endplate	Eaton HRC fuses fitted	Poles	Eaton list number	
	AC22A (A)	AC23A (A)						
20	20	–	20 ¹⁾	EP 842	20SA2	SPSN	–	
		11				–	DP	15AXD2
		–				–	TPN	15AXTN2
32	32	–	32	–	32SB3	SPSN	–	
		22				–	DP	30AXD2
		–				–	TPN	30AXTN2
63	63	–	63	EP 539	63SB4	SPSN	–	
		39				–	DP	60AXD2
		–				–	TPN	60AXTN2
100	100	–	100	–	100SD5 ²⁾	SPSN	–	
		52				–	DP	100AXD2
		–				–	TPN	100AXTN2
125	125	52	–	–	125SD6 ²⁾	TPN	125AXTN2	

SPSN indicates switched neutral. ¹⁾20A units are DC22. ²⁾These units have dual fixings to accept SB3, SB4 and SO fuselinks. 2x M5 screws required

100KXSC2F



Exel 2 switch-disconnector-fuse

Nominal rating, I _e (A)	Utilisation category at U _e 415V to BS EN 60947-3		250V DC rating to BS5419 (A)	Blank endplate fitted	Eaton HRC fuses DC23	Poles	Eaton list number	
	AC22A (A)	AC23A (A)						
20	20	–	20 ¹⁾	EP 842	20SA2	SPSN	15KXSC2F ²⁾	
		11				–	DP	15KXDC2F
		–				–	TPN	15KXTNC2F
32	32	–	32	–	32SB3	SPSN	30KXSC2F	
		22				–	DP	30KXDC2F
		–				–	TPN	30KXTNC2F
63	63	–	63	EP 539	63SB4	SPSN	60KXSC2F	
		39				–	DP	60KXDC2F
		–				–	TPN	60KXTNC2F
100	100	–	100	–	100SD5 ³⁾	SPSN	100KXSC2F	
		52				–	DP	100KXDC2F
		–				–	TPN	100KXTNC2F
125	125	52	–	–	125SD6 ³⁾	TPN	125KXTNC2F	

SPSN indicates switched neutral. ¹⁾20A units are DC22. ²⁾Also available in red paint finish – List No. 15kXSC2FRED.

³⁾These units have dual fixings to accept SB3, SB4 and SO fuselinks. 2x M5 screws required

XLMPCT100



Meterpack assemblies for 100/125A Exel 2 units

- Meterpack suitable for electrical supplies up to 150A
- CT and Meter are pre-installed with voltage protection fuses to the meter
- Generous cabling space to bolted lug connections, with linking cables for associated switchgear are included to speed installation

Description	Meter characteristics	Rating	Eaton list number
Meterpack for any 100/125A Exel 2 switch disconnector fuse & switch disconnector	Pulsed	150	XLMPCT100
Meterpack for any 100/125A Exel 2 switch disconnector fuse & switch disconnector	Modbus	150	XLMPCT100M

4LD



Lid locking facilities

- All units are supplied with operating handles that provide lock-on, lock-off facilities, using padlock PD4. Door locking facilities, using padlock PD1, are available for fitment on site.

Nominal unit rating, I _e (A)	Type	Eaton list number
63/100/125	Door locking bracket	5 LD
–	Padlock for use with above	PD1

Exel 2 Spares

Description	Rating (A)	Quantity required	Eaton list number
Moving contact assembly	20	1	OLV727SP
	32	1	OLV728SP
	63	1	OLV725SP
	100/125	1	OLV726SP
Switch base with arc shroud	32	1 per pole	230AXEBSP¹⁾
	63	1 per pole	260AXEBSP¹⁾
	100/125	1 per pole	2100AXEBSP¹⁾
	100/125	1 per pole	2100AXDEBSP
Combined switch/fusebase with arc shroud	32	1 per pole	230KXEBSP
	63	1 per pole	260KXEBSP
Fusebase only	100/125	1 per pole	100MBDEBSP
Arc shroud only	32	1 per pole	SH265SP
	63	1 per pole	SH754SP
	100/125	1 per pole	CV1109SP

¹⁾ 1 required for switched neutral pole on SPSN switchfuses.

Aerosol spray paint, Light grey to RAL7004. Eaton list number: **2AP**

6.4

Industrial switch & fusegear

Memlok changeover switches

See page 156 for technical data and overall dimensions.

200DAM



Memlok moulded changeover switches

Nominal rating, I _e (A)	Conduit knockouts		Eaton list number
	Top	Bottom	
Moulded four pole	ISO thread		
20	2 x 20	2 x 20	200DAM ¹⁾
25	2 x 20	2 x 20	250DAM ¹⁾
	2 x 25	2 x 25	250DAM ¹⁾
40	1 x 16	1 x 16	400DAM ¹⁾
63	2 x 25	2 x 25	630DAM ¹⁾
	1 x 16	1 x 16	

¹⁾Including operating handle.

600MEB



Main earthing terminal bars

- Memform terminal bars are intended for the connection of circuit protective conductors, main bonding conductors and functional earthing conductors, etc., as referred to in IEE Wiring Regulation 542-04 (BS7671)
- A bolted link facilitates testing of earthing resistance
- Manufactured from solid hard drawn copper and mounted on painted steel supports complete with fixing holes and warning labels
- For ease of installation all terminals are captive
- Extra terminals are provided for supplementary bonding

Maximum incomer, I _e (A)	Size and number of terminals		Overall length mm	Overall width mm	Copper thickness mm	Eaton list number
	Earthing	Protective bonding				
600	1 x M10	3 x M10 2 x M6	320	32	31.75 x 6.35	600MEB
1000	2 x M12 1 x M8	3 x M12 8 x M8	665	51	50.8 x 6.35	1000MEB

See page 160 for RDMP technical data and overall dimensions.

See page 160 for PC2 technical data and overall dimensions.

See page 161 for Exel IP technical data and overall dimensions.

204RDMP



Local disconnectors standard duty, type RDMP, 20–63A, IP65

Nominal unit rating, I _e (A)	Poles	Eaton list number
20	2P + N	2021RDMP ¹⁾
25	2P + N	2521RDMP ¹⁾
40	2P + N	4021RDMP ¹⁾
63	2P + N	6321RDMP ¹⁾
20	3P + N	2031RDMP ¹⁾
25	3P + N	2531RDMP ¹⁾
40	3P + N	4031RDMP ¹⁾
63	3P + N	6331RDMP ¹⁾
20	4P	204RDMP
25	4P	254RDMP
40	4P	404RDMP
63	4P	634RDMP
20	4P + N	2041RDMP ¹⁾
25	4P + N	2541RDMP ¹⁾
40	4P + N	4041RDMP ¹⁾
63	4P + N	6341RDMP ¹⁾
20	6P + N	2061RDMP ¹⁾
25	6P + N	2561RDMP ¹⁾
40	6P + N	4061RDMP ¹⁾
63	6P + N	6361RDMP ¹⁾
25	8P	258RDMP
63	8P	638RDMP

¹⁾ Includes early break auxiliary contact.

PC28G403



Local disconnectors standard duty, type PC2, 20–63A, IP54

Nominal unit rating, I _e (A)	Poles	Eaton list number
20	2P	PC28G202
25	2P	PC28G252
40	2P	PC28G402
63	2P	PC28G632
20	3P	PC28G203
25	3P	PC28G253
40	3P	PC28G403
63	3P	PC28G633
20	4P	PC28G204
25	4P	PC28G254
40	4P	PC28G404
63	4P	PC28G634
20	6P	PC28G206
25	6P	PC28G256
40	6P	PC28G406
63	6P	PC28G636

See page 157 for technical data and overall dimensions.

304XTNC



Exel distribution fuseboards

Nominal rating, Ie (A)	Poles	No. of ways	Max. terminal capacity mm ² (copper cables)		Outgoing terminal bore diameter, mm	Suitable HRC fuselinks	Spare fuse carrier	Safety carrier	Eaton list number (without fuselinks)
			Main	Outgoing					
IP4X enclosures									
20	SPN	4	95	6	4	SA2	20 MFH	20 MFS	204XSNC
		6	95	6	4	SA2	20 MFH	20 MFS	206XSNC
		8	120	6	4	SA2	20 MFH	20 MFS	208XSNC
		12	120	6	4	SA2	20 MFH	20 MFS	212XSNC
	TPN	4	95	6	4	SA2	20 MFH	20 MFS	204XTNC
		6	95	6	4	SA2	20 MFH	20 MFS	206XTNC
		8	120	6	4	SA2	20 MFH	20 MFS	208XTNC
		12	120	6	4	SA2	20 MFH	20 MFS	212XTNC
32	SPN	4	95	16	5.5	SB3	32 MFH	32 MFS	304XSNC
		6	95	16	5.5	SB3	32 MFH	32 MFS	306XSNC
		8	150	16	5.5	SB3	32 MFH	32 MFS	308XSNC
		12	150	16	5.5	SB3	32 MFH	32 MFS	312XSNC
	TPN	4	95	16	5.5	SB3	32 MFH	32 MFS	304XTNC
		6	95	16	5.5	SB3	32 MFH	32 MFS	306XTNC
		8	150	16	5.5	SB3	32 MFH	32 MFS	308XTNC
		10	150	16	5.5	SB3	32 MFH	32 MFS	310XTNC
63	TPN	2	240	35	8	SB3 & SB4	63 MFH	63 MFS	602XTNC
		4	240	35	8	SB3 & SB4	63 MFH	63 MFS	604XTNC
		6	240	35	8	SB3 & SB4	63 MFH	63 MFS	606XTNC
		8	240	35	8	SB3 & SB4	63 MFH	63 MFS	608XTNC
100	TPN	4	240	70	12	SD5 ¹⁾	100 MFH	100 MFS	1004XTNC
		6	500 ²⁾	70	12	SD5 ¹⁾	100 MFH	100 MFS	1006XTNC
		8	500 ²⁾	70	12	SD5 ¹⁾	100 MFH	100 MFS	1008XTNC
200	TPN	4	630 ²⁾	150	18	SF6	200 MFH	200 MFS	2004XTNC

All units are supplied without fuselinks which must be ordered separately.

¹⁾SB3, SB4 and SO fuselinks may be fitted if used with adaptor – Eaton list number **100MFLK**.

²⁾Can be adapted to allow fitment of 2–240mm² max. cable sockets with suitable copper spacing piece Eaton list number **WA1212** (set of 4).

8LD



Lid locking facilities

- A choice of locking device is available

Description	Eaton list number
Barrel lock for 20A to 100A units	1CLX
Padlock bracket for 20A to 100A units	9LD
Padlock bracket for 200A units	8LD
Padlock for use with above	PD1

ETM2209SP



Exel distribution fuseboard – spares

Description	Boards	SP outgoing ways	Eaton list number
Earth bars – 20/32A fuseboards	–	up to 12	ETM2209SP
	–	up to 18	ETM2210SP
	–	up to 24	ETM2211SP
	–	up to 36	ETM2212SP
Neutral bars – 20/32A fuseboards	–	up to 12	ETM2223SP
	–	up to 18	ETM2224SP
	–	up to 24	ETM2225SP
	–	up to 36	ETM2226SP
Main incoming terminal block – 20/32A fuseboards	4/6 way	–	EP539

Aerosol spray paint, Light grey to RAL7004. Eaton list number: **2AP**



- Options to suit every application
- Compact 415V fuses
- Breaking capacity of 80kA at 415V
- Motor rated fuses
- Compact moulded HRC fuse units
- Fully shrouded for safety
- For bolt-in & clip-in fuses

7.1	PARAMOUNT	102
7.2	FUSE CARRIERS & BASES	108

See page 158 for overall dimensions.

10SA2

**415V industrial fuselinks – offset bolted contacts**

- S-Type compact industrial bolted pattern fuselinks with offset contacts. ASTA 20 Certified BS EN 60269-1 (BS88 – 1) or BS88 – 2 for a breaking capacity of 80 kA at 415V a.c.

Fixing centres, mm	BS88 ref	Rating, In		Dimensional equivalents			Eaton list number		
		Normal (A)	Motor (A)	GEC/Lawson	Brush/Hawker	Bussmann/Dorman			
44.5	A1	2	–	NIT2	2F21	NITD2	2SA2		
		4	–	NIT4	4F21	NITD4	4SA2		
		6	–	NIT6	6F21	NITD6	6SA2		
		10	–	NIT10	10F21	NITD10	10SA2		
		16	–	NIT16	16F21	NITD16	16SA2		
		20	–	NIT20	20F21	NITD20	20SA2		
				25	–	NIT20M25	20M25F21	NITD20M25	20SA2M25
				32	–	NIT20M32	20M32F21	NITD20M32	20SA2M32
				25	–	NIT25	25F21	NITD25	25SA2
				32	–	NIT32	32F21	NITD32	32SA2
				40	–	NIT32M40	–	NITD32M40	32SA2M40
				50	–	NIT32M50	–	NITD32M50	32SA2M50
				63	–	NIT32M63	–	NITD32M63	32SA2M63
73	A2	2	–	TIA2	2H07	AA02	2SB3		
		4	–	TIA4	4H07	AA04	4SB3		
		6	–	TIA6	6H07	AA06	6SB3		
		10	–	TIA10	10H07	AA010	10SB3		
		16	–	TIA16	16H07	AA016	16SB3		
		20	–	TIA20	20H07	AA020	20SB3		
		25	–	TIA25	25H07	AA025	25SB3		
		32	–	TIA32	32H07	AA032	32SB3		
				40	–	TIA32M40	32M40H07	AA032M40	32SB3M40
				50	–	TIA32M50	32M50H07	AA032M50	32SB3M50
				63	–	TIA32M63	32M63H07	AA032M63	32SB3M63
		63SB4	A3	35	–	TIS35	–	–	35SB4
				40	–	TIS40	40K07	BA040	40SB4
50	–			TIS50	50K07	BA050	50SB4		
63	–			TIS63	63K07	BA063	63SB4		
				80	–	TIS63M80	63M80K07	BA063M80	63SB4M80
				100	–	TIS63M100	63M100K07	BA063M100	63SB4M100
–	80		–	OS80/TIS80	80K07R	OSD80	80SO		
	100		–	OS100/TIS100	100K07R	OSD100	100SO		
				125	–	OS100M125/ TIS100M125	OSD100M125	100SOM125	
				160	–	–	OSD100M160	100SOM160	
				125	–	OOT125	–	125SO	
				160	–	OOT160	–	160SO	
				200	–	–	–	200SO	
94	A4	32	–	TCP32	32L14	CE035	32SD5		
		40	–	TCP40	40L14	CE040	40SD5		
		50	–	TCP50	50L14	CE050	50SD5		
		63	–	TCP63	63L14	CE063	63SD5		
		80	–	TCP80	80L14	CE080	80SD5		
		100	–	TCP100	100L14	CE0100	100SD5		
				125	–	TCP100M125	100M125L14	CE0100M125	100SD5M125
				160	–	TCP100M160	100M160L14	CE0100M160	100SD5M160
		200	–	TCP100M200	100M200L14	CE0100M200	100SD5M200		

100SD5



415V industrial fuselinks – offset bolted contacts (contd)

Fixing centres, mm	BS88 ref	Rating, In Normal (A)	Motor (A)	Dimensional equivalents			Eaton list number
				GEC/Lawson	Brush/Hawker	Bussmann/Dorman	
	–	125	–	TFP125	125M14	DE0125	125SD6
		160	–	TFP160	160M14	DE0160	160SD6
		200	–	TFP200	200M14	DE0200	200SD6
		250	–	TFP200M250	200M250M14	DE0200M250	200SD6M250
		315	–	–	–	–	200SD6M315

These industrial bolted pattern fuselinks are of two types – with offset contacts of ratings 2–200A and with centre contacts of ratings 2–1250A. They are available to BS references A1 to A4, B1 to B4, C1 to C3, D1 and in certain other sizes.

415V industrial fuselinks – centre bolted contacts

- S-Type compact industrial bolted pattern fuselinks with centre contacts. ASTA 20 Certified or tested to BS EN 60269-1 (BS88-1) or BS88-2 for a breaking capacity of 80 kA at 415V a.c.

Fixing centres, mm	BS88 ref	Rating In Normal (A)	Motor	Dimensional equivalents			Eaton list number
				GEC/Lawson	Brush/Hawker	Bussmann/Dorman	
97	–	2	–	TB2	2K08	AC2	2SE3
		4	–	TB4	4K08	AC4	4SE3
		6	–	TB6	6K08	AC6	6SE3
		10	–	TB10	10K08	AC10	10SE3
		16	–	TB16	16K08	AC16	16SE3
		20	–	TB20	20K08	AC20	20SE3
		25	–	TB25	25K08	AC25	25SE3
		32	–	TB32	32K08	AC32	32SE3
111	–	2	–	TBC2	2K09	AD2	2SF3
		4	–	TBC4	4K09	AD4	4SF3
		6	–	TBC6	6K09	AD6	6SF3
		10	–	TBC10	10K09	AD10	10SF3
		16	–	TBC16	16K09	AD16	16SF3
		20	–	TBC20	20K09	AD20	20SF3
		25	–	TBC25	25K09	AD25	25SF3
		32	–	TBC32	32K09	AD32	32SF3
97	–	40	–	TB40	40K08	BC40	40SE4
		50	–	TB50	50K08	BC50	50SE4
		63	–	TB63	63K08	BC63	63SE4
97	–	63	80	–	–	–	63SE4M80
		63	100	–	–	–	63SE4M100
111	B1	40	–	TBC40	40K09	BD40	40SF4
		50	–	TBC50	50K09	BD50	50SF4
		63	–	TBC63	63K09	BD63	63SF4
		80	–	–	–	–	63SF4M80
		100	–	–	–	–	63SF4M100
		80	–	TC80	80L09	CD80	80SF5
		100	–	TC100	100L09	CD100	100SF5
		125	–	TC100M125	100M125L09	CD100M125	100SF5M125
		160	–	TC100M160	100M160L09	CD100M160	100SF5M160
		200	–	TC100M200	100M200L09	CD100M200	100SF5M200
		111	B2	125	–	TF125	125M09
160	–			TF160	160M09	DD160	160SF6
200	–			TF200	200M09	DD200	200SF6
250	–			TF200M250	200M250M09	DD200M250	200SF6M250
315	–			–	–	–	200SF6M315
111	B3	250	–	TKF250	250N09	ED250	250SF7
		315	–	TKF315	315N09	ED315	315SF7
		400	–	–	–	–	315SF7M400
133	–	250	–	TKM250	250N11	EFS250	250SG7
		315	–	TKM315	315N11	EFS315	315SG7

20SE3



32SF3



200SF6



400SH8

**415V industrial fuselinks – centre bolted contacts (contd)**

Fixing centres, mm	BS88 ref	Rating In		Dimensional equivalents			Eaton list number
		Normal (A)	Motor (A)	GEC/Lawson	Brush/Hawker	Bussmann/Dorman	
111	B4	355	–	TMF355	355PO9	ED355	355SF8
		400	–	TMF400	400PO9	ED400	400SF8
			500	TMF400M500	–	ED400M500	400SF8M500
133/184	C1	355	–	TM355	355P11	EF355	355SH8
		400	–	TM400	400P11	EF400	400SH8
111	–	450	–	3T450	–	–	450SF9
		500	–	3T500	–	–	500SF9
		560	–	3T560	–	–	560SF9
		630	–	3T630	–	–	630SF9
133/184	C2	450	–	TTM450	450R11	FF450	450SH9
		500	–	TTM500	500R11	FF500	500SH9
		560	–	TTM560	560R11	FF560	560SH9
		630	–	TTM630	630R11	FF630	630SH9
165/229	–	450	–	TT450	450R12	FG450	450SY9
		500	–	TT500	500R12	FG500	500SY9
		630	–	TT630	630R12	GG630	630SY9
133/184	C3	710	–	TLM710	700S11	GF710	710SH10
		800	–	TLM800	800S11	GF800	800SH10
165/229	–	710	–	TLT710	700S12	GG700	710SY10
		800	–	TLT800	800S12	GG800	800SY10
149	D1	1000	–	TXU1000	1000U44	GH1000	1000SJ11
		1250	–	TXU1250	1250U44	GH1250	1250SJ11

630SY9



1250SJ11



20SN2

**SN type offset blade fuselinks**

- ASTA 20 Certified or tested to BS EN 60269-1 (BS88-1) and BS88-6 for a breaking capacity of 80 kA at 415V a.c. For use in industrial and commercial installations.

Overall length, mm	Overall dia. mm	Rating In Normal (A)	Motor (A)	Equivalents GEC/Lawson	Brush/Hawker	Bussmann/Dorman	Eaton list number
60	14	2	–	NS2	2FO6	NSD2	2SN2
		4	–	NS4	4FO6	NSD4	4SN2
		6	–	NS6	6FO6	NSD6	6SN2
		10	–	NS10	10FO6	NSD10	10SN2
		16	–	NS16	16FO6	NSD16	16SN2
		20	–	NS20	20FO6	NSD20	20SN2
			25	NS20M25	20M25FO6	NSD20M25	20SN2M25
			32	NS20M32	20M32FO6	NSD20M32	20SN2M32
			25	NS25	25FO6	NSD25	25SN2
			32	NS32	32FO6	NSD32	32SN2
58	17.5	32	40	NS32M40	–	NSD32M40	32SN2M40
			50	NS32M50	–	NSD32M50	32SN2M50
			63	NS32M63	–	NSD32M63	32SN2M63

63SP



SP type offset blade fuselinks

- ASTA 20 Certified to BS EN 60269-1 (BS88 – 1) and BS88 – 6 for a breaking capacity of 80 kA at 415V a.c. For use in industrial and commercial installations.

Overall length, mm	Overall dia. mm	Rating In (A)	Equivalents GEC/Lawson	Brush/Hawker	Bussmann/Dorman	Eaton list number
68	17	16	–	–	ESD16	16SP
		20	–	–	ESD20	20SP
		25	–	–	ESD25	25SP
		32	–	–	ESD32	32SP
		40	40ES	40G05	ESD40	40SP
		50	50ES	50G05	ESD50	50SP
		63	63ES	63G05	ESD63	63SP

604R



R and RL type house service cut-out fuselinks

- Type IIa (R) and IIb (RL) house service cut-out fuselinks. ASTA 20 Certified or tested to BS1361 for a breaking capacity of 33 kA at 415V a.c. For use in domestic and commercial installations mainly in supply authorities cut-outs.

Overall length, mm	Overall dia. mm	Rating, In Normal (A)	Equivalents GEC/Lawson	Brush/Hawker	Bussmann/Dorman	Eaton list number
57	22.23	15	RHF15	15KR85	–	154R
		20	RHF20	20KR85	–	204R
		30	RHF30	30KR85	RHD30	304R
		40	RHF40	40KR85	RHD40	404R
		45	–	45KR85	–	454R
		50	RHF50	50KR85	RHD50	504R
		60	RHF60	60KR85	RHD60	604R
		80	RHF80	80KR85	RHD80	804R
		100	–	100KR85	–	1004R
		57	30	30	RHL30	30LR85
60	RHL60			60LR85	RHLD60	604RL
80	RHL80			80LR85	RHLD80	804RL
100	RHL100			100LR85	RHLD100	1004RL

30LC



LC type fuselinks

- ASTA 20 Certified to BS EN 60269-1 (BS88 – 1) for a breaking capacity of 50 kA at 240V a.c. Also complies with BS7654. For use in street lighting cut-outs.

Overall length, mm	Overall dia. mm	Rating, In (A)	Colour code	Carton qty.	Equivalents GEC	Dorman	Eaton list number
23	6.35	5	White	100	D55	DSD5	5LC
26	10.32	5	Black	50	–	–	1505LC
29	12.7	6	Black	20	–	–	3006LC
26	10.32	10	Black	50	–	–	1510LC
29	12.7	10	Black	50	–	–	3010LC
26	10.32	15	Blue	50	D1515	DSD15	15LC
29	12.7	16	Black	20	–	–	3016LC
26	10.32	20	Yellow	50	D1520	DSD20	20LC
29	12.7	20	Black	50	–	–	3020LC
29	12.7	25	Black	20	–	–	3025LC
29	12.7	30	Red	50	D3030	DSD30	30LC
35	16.67	35	Black	10	–	–	35LCS
35	16.67	40	Black	10	–	–	40LCS
35	16.67	45	Green	10	D4545	DSD45	45LCS

6LS



LS type street lighting fuselinks

- ASTA 20 Certified to BS EN 60269-1 (BS88-1) for a breaking capacity of 50kA at 240V a.c.
Also complies with BS7654 for use in street lighting cut-out.

Fixing centres, mm	Overall length, mm	Overall dia. mm	Rating, In (A)	Equivalents ¹⁾ GEC	Brush	Dorman/Bussmann	Eaton list number
LS-Type, offset contacts							
38	47	14	2	LST2	2D19L	STD2	2LS
			4	LST4	4D19L	STD4	4LS
			6	LST6	6D19L	STD6	6LS
			10	LST10	10D19L	STD10	10LS
			16	LST16	16D19L	STD16	16LS
			20	LST20	20D19L	STD20	20LS
			25	LST25	25D19L	STD25	25LS
			32	LST32	32D19L	STD32	32LS

¹⁾Equivalent columns list fuselinks having similar ratings and fixing centres.

20SS



SS type offset blade fuselinks

- ASTA 20 Certified to BS EN 60269-1 (BS88-1) for a breaking capacity of 50kA at 240V a.c.
Also complies with BS7654 for use in street lighting cut-out.

Fixing centres, mm	Overall length, mm	Overall dia. mm	Rating, In (A)	Equivalents ¹⁾ GEC	Brush	Dorman/Bussmann	Eaton list number
–	51	12	2	SS2	2D04	SSD2	2SS
			4	SS4	4D04	SSD4	4SS
			6	SS6	6D04	SSD6	6SS
			10	SS10	10D04	SSD10	10SS
			16	SS16	16D04	SSD15	16SS
			20	SS20	20D04	SSD20	20SS
			25	SS25	25D04	SSD25	25SS
			32	SS32	32D04	SSD32	32SS

¹⁾Equivalent columns list fuselinks having similar ratings and fixing centres.

315JCS82



J type feeder pillar fuselinks

- ASTA 20 Certified or tested to BS88 – 2 (formerly BS88: Part 5) for a breaking capacity of 80 kA at 415V a.c.
- Available in standard 82mm and 92mm fixing centres up to 400A and 800A respectively for wedge tightening contacts. Also available in ferrule form up to 250A for pole mounted cut-outs.
- For use by the Electricity Supply Industry in distribution systems.
- Available with silver elements, details on request.

Fixing centres, mm	Equivalents Fluvent	Lawson	SIBA	GEC	EMP	Dorman	Bussmann/ Brush	Rating, In (A)	Eaton list number								
82	DL2-2	JPU	5002301	JP	2/EJA	JPD	MJ30	63	63JCS82								
								80	80JCS82								
								100	100JCS82								
								125	125JCS82								
								160	160JCS82								
								200	200JCS82								
								250	250JCS82								
								315	315JCS82								
								PJ30	355	355JCS82							
									400	400JCS82							
								92	DL3-2	JSU	5002601	JS	3/EJB	JSD	MJ31	63	63JCS92
																80	80JCS92
100	100JCS92																
125	125JCS92																
160	160JCS92																
200	200JCS92																
250	250JCS92																
315	315JCS92																
PJ31	355	355JCS92															
	400	400JCS92															
RJ31	450	450JCS92															
	500	500JCS92															
SJ31	560	560JCS92															
	630	630JCS92															
	710	710JCS92															
	800	800JCS92															

400JCS92



See page 159 for overall dimensions.

63MRH2



Fuse carriers

Nominal rating I _n (A)	(Fuses fitted to HRC carrier version)	Eaton list number Re-wirable fuse carriers	Eaton list number HRC Fuse Carrier
10	10SA2	15 MRH2¹⁾	1 SCHF²⁾
20	20SA2	15 MRH2¹⁾	2 SCHF²⁾
32	32SB3	32 MRH2¹⁾	3 SCHF²⁾
63	63SB4	63 MRH2¹⁾	6 SCHF²⁾
100	100SD5	100 MRH2¹⁾	10 SCHF²⁾ 100 SCHF¹⁾

¹⁾Porcelain

²⁾Moulded

3SCHF



32MBB2



Fuse bases

- Fuse bases are available in two types:
 - Type A – providing for busbar connection at one end and cable termination at the other.
 - Type B – providing for cable connection at both ends.

Nominal rating I _n (A)	Eaton list number Type A	Type B
20	15 MBA2	15 MBB2
32	32 MBA2	32 MBB2
63	63 MBA2	63 MBB2
100	100 MBA2	100 MBB2

20MFA



Complete fuse units (carriers and bases) – bolt-in type A (front/busbar)

Nominal rating, I _n (A)	Colour	Neutral link	Suitable Eaton HRC fuselinks	Eaton list number
20	Black	20MLK	2-20SA2	20MFA
32	Black	32MLK	2-32SB3	32MFA
63	Black	63MLK	35-63SB4 or 2-32SB3	63MFA
100	Black	100MLK	32-100SD5 ¹⁾	100MFA
Compact range				
32	Black	20MLK	2-32SA2	32CMFA

¹⁾SB3, SB4 or SO fuselinks may be fitted if used with adaptor – Eaton list number: **100MFLK**.

32MFB



Complete fuse units (carriers and bases) – bolt-in type B (front/front)

Nominal rating, In (A)	Colour	Neutral link	Suitable Eaton HRC fuses	Eaton list number
20	Black	20MLK	2-20SA2	20MFB
	White	20MLK	2-20SA2	20MFBW
32	Black	32MLK	2-32SB3	32MFB
	White	32MLK	2-32SB3	32MFBW
63	Black	63MLK	35-63SB4 or 2-32SB3	63MFB
100	Black	100MLK	32-100SD5 ¹⁾	100MFB
Compact range				
32	Black	20MLK	2-32SA2	32CMFB
63	Black	32MLK	35-63SB4 or 2-32SB3	63CMFB
100	Black	63MLK	80-100SO or 35-63SB4	100CMFB
200	Black	100MLK	125-200SD6 or 32-100SD5	200CMFB
315	Black	200MLK	250-315SF7 or 125-200SF6	315CMFB

¹⁾SB3, SB4 or SO fuses may be fitted if used with adaptor – Eaton list number: **100MFLK**.

63MFC



Complete fuse units (carriers and bases) – bolt-in type C (back/back)

Nominal rating, In (A)	Colour	Neutral link	Suitable Eaton HRC fuses	Eaton list number
20	Black	20MLK	2-20SA2	20MFC
63	Black	63MLK	35-63SB4 or 2-32SB3	63MFC
100	Black	100MLK	32-100SD5 ¹⁾	100MFC
Compact range				
100	Black	63MLK	80-100SO or 35-63SB4	100CMFC
	White	63MLK	80-100SO or 35-63SB4	100CMFCW
200	Black	100MLK	125-200SD6 or 32-100SD5	200CMFC

¹⁾SB3, SB4 or SO fuses may be fitted if used with adaptor – Eaton list number: **100MFLK**.

200CMFC



63MFD



Complete fuse units (carriers and bases) – bolt-in type D (front/back)

Nominal rating, In (A)	Colour	Neutral link	Suitable Eaton HRC fuses	Eaton list number
32	Black	32MLK	2-32SB3	32MFD
63	Black	63MLK	35-63SB4 or 2-32SB3	63MFD

32CFF



Complete fuse units (carriers and bases) – clip-in type

Nominal rating, In (A)	Colour	Neutral link	Suitable Eaton HRC fuses	Eaton list number
Front/Front				
32	Black	32CLK	2-32SN2	32CFF
	White	32CLK	2-32SN2	32CFFW
63	Black	63CLK	16-63SP	63CFF
	White	63CLK	16-63SP	63CFFW



Since the late 1920's we have built countless motor starters, fitted and trusted by generations of contractors, while the increasing requirements of our markets have led us to constantly update and expand our ADS range to allow for an increased choice of current ratings and ingress protection.

This wealth of experience and expertise in the design and manufacture of Motor Control Gear is mirrored by our Heating and Lighting range which offers a versatile and comprehensive choice.

8.1	ADS8 AC CONTACTORS, STARTERS AND ASSEMBLIES	112
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8.1

Enclosed motor, heating and lighting control

ADS8 AC contactors, starters and assemblies

This chapter covers the ADS8 range of DOL, DOL Reversing and Star Delta starters with associated overload relays and accessories / spares. Overload relays are supplied separately and enclosures are IP54 metal clad. A higher rated IP65 moulded 9kW DOL starter is also available.

- IEC / EN60947
- CE marked

See page 113 for overload relays.

See page 177 for trip and electrical life curves.

See page 166 for dimensional drawings.

28ADSM1X



9kW DOL starter without switch disconnect

- IP 65 moulded surface mounting enclosure, less overload relay

Maximum current rating (AC3) A	Maximum kW rating AC3 415v 3ph	Control coil voltage 50Hz ¹⁾ Vac	Eaton list number
18	9	220–240	28ADSM1X
		380–415	48ADSM1X

¹⁾Other control voltages available, contact Eaton

28ADS3X



15kW DOL starter without switch disconnect

- IP 54 metalclad surface mounting enclosure, less overload relay

Maximum current rating (AC3) A	Maximum kW rating AC3 415v 3ph	Control coil voltage 50Hz ¹⁾ Vac	Eaton list number
18	9	220–240	28ADS1X
		380–415	48ADS1X
25	11	220–240	28ADS2X
		380–415	48ADS2X
32	15	220–240	28ADS3X
		380–415	48ADS3X

¹⁾Other control voltages available, contact Eaton

28ADSA1X



15kW DOL starter with switch disconnect

- IP 54 metalclad surface mounting enclosure, less overload relay

Maximum current rating (AC3) A	Maximum kW rating AC3 415v 3ph	Control coil voltage 50Hz ¹⁾ Vac	Eaton list number
18	9	220–240	28ADSA1X
		380–415	48ADSA1X
25	11	220–240	28ADSA2X
		380–415	48ADSA2X
32	15	220–240	28ADSA3X
		380–415	48ADSA3X

¹⁾Other control voltages available, contact Eaton

48ARD1X



11kW DOL Reversing starter without switch disconnect

- IP 54 metalclad surface mounting enclosure, less overload relay

Maximum current rating (AC3) A	Maximum kW rating AC3 415v 3ph	Control coil voltage 50Hz ¹⁾ Vac	Eaton list number
18	9	220–240	28ARD1X
		380–415	48ARD1X
25	11	220–240	28ARD2X
		380–415	48ARD2X

¹⁾Other control voltages available, contact Eaton

28SDA2X18



25kW Star Delta starter without switch disconnect

- IP 54 metalclad surface mounting enclosure, less overload relay

Maximum current rating (AC3) A	Maximum kW rating AC3 415v 3ph	Control coil voltage 50Hz ¹⁾ Vac	Eaton list number
31	15	220–240	28SDA2X18
		380–415	48SDA2X18
43	22	220–240	28SDA3X25
		380–415	48SDA3X25
55	25	220–240	28SDA3X32
		380–415	48SDA3X32

¹⁾Other control voltages available, contact Eaton

8TT92



DOL, DOL reversing, line connected thermal overload relays

Full load current A	Motor rating kW	Eaton list number
0.63–1	0.37	8TT87
1–1.6	0.55	8TT88
1.6–2.5	1.1	8TT89
2.5–4	1.5	8TT90
4–6	2.2	8TT91
5.5–8	3.7	8TT98
7–10	4	8TT92
10–13	5.5	8TT93
13–18	9	8TT94
18–25	11	8TT104
23–32	15	8TT96

8TT92SD



Star Delta, phase connected thermal overload relays

Full load current A	Motor rating kW	Eaton list number
4.3–6.9	3	8TT90SD
6.9–10.4	5.5	8TT91SD
9.5–13.8	7	8TT98SD
12.1–17.3	9	8TT92SD
17.3–22.5	11	8TT93SD
22.5–31	15	8TT94SD
31–43	22	8TT104SD
40–55	25	8TT96SD

4832VCO



Replacement contactors, DOL, DOL reversing & Star Delta Main contactor

- Open contactor, 3 pole with 1NO auxiliary
- Contactor technical details, see page 163

Maximum current rating (AC3) A	Maximum kW rating AC3 415v 3ph	Control coil voltage 50Hz ¹⁾ Vac	Eaton list number
18	9	220 – 240	2818VCO
		380 – 415	4818VCO
25	11	220 – 240	2825VCO
		380 – 415	4825VCO
32	15	220 – 240	2832VCO
		380 – 415	4832VCO
50	25	220 – 240	2850VCO
		380 – 415	4850VCO

¹⁾Other control voltages available, contact Eaton

8.1

Enclosed motor, heating and lighting control

ADS8 AC contactors, starters and assemblies

4832VCOSD



Replacement contactors, Star Delta. Star & Delta contactors

- Open contactor, 3 pole with 1NC auxiliary
- Contactor technical details, see page 163

Maximum current rating (AC3) A	Maximum kW rating AC3 415v 3ph	Control coil voltage 50Hz ¹⁾ Vac	Eaton list number
18	9	220–240	2818VCOSD
		380–415	4818VCOSD
25	11	220–240	2825VCOSD
		380–415	4825VCOSD
32	15	220–240	2832VCOSD
		380–415	4832VCOSD
50	25	220–240	2850VCOSD
		380–415	4850VCOSD

¹⁾Other control voltages available, contact Eaton

8COIL418



Replacement coils, DOL, DOL reversing starters

Maximum current rating (AC3) A	Maximum kW rating AC3 415v 3ph	Control coil voltage 50Hz ¹⁾ Vac	Eaton list number
18	9	110	8COIL118
		220–240	8COIL218
		380–415	8COIL418
25	11	110	8COIL132
		220–240	8COIL232
		380–415	8COIL432
32	15	110	8COIL132
		220–240	8COIL232
		380–415	8COIL432
50	25	220–240	8COIL250
		380–415	8COIL450

¹⁾Other control voltages available, contact Eaton

8COIL418



Replacement coils, Star Delta starters

Maximum current rating (AC3) A	Maximum kW rating AC3 415v 3ph	Control coil voltage 50Hz ¹⁾ Vac	Eaton list number
31	15	220–240	8COIL218
		380–415	8COIL418
43	22	220–240	8COIL232
		380–415	8COIL432
55	25	220–240	8COIL232
		380–415	8COIL432

¹⁾Other control voltages available, contact Eaton

8TA2DS2



Replacement pneumatic timer, Star Delta Starter

Description	Contact rating (A) AC11, 500v	Ith, Ui 600v	Eaton list number
Pneumatic timer	6	10	8TA2DS2

8TA8DN11



Replacement and additional auxiliary contacts

- Suitable for all DOL, DOLR and Star Delta Starters

Description	Contact configuration	Contact rating Ith (A) Ui 600v	Eaton list number ¹⁾
Side mounting auxiliary contact	1NO – 1NC	10	8TA8DN11
Front mounting auxiliary contact	1NO – 1NC	10	8TA1DN11

¹⁾See pages 79–80 for permissible configurations

This chapter covers the moulded IP65 pushbutton control units – type MSU and the heavy duty cast iron CSU pushbutton control units (IP41 and IP65).

See page 174 for overall dimensions.

- IEC / EN60947
- CE marked

22MSU



MSU pushbutton control units (moulded IP65)

Number of buttons	Description	Eaton list number
1	Start	21MSSU
1	Stop	21MSU
1	Stop, latching pattern (push to latch, turn to release)	21MSUL
1	Stop (50mm dia. mushroom head)	21MSUM
1	Stop, latching pattern – (push to latch, turn to release) (50mm dia. mushroom head)	21MSUML
2	Start-Stop	22MSU
2	Start-Latch Stop/Reset	22MSUL
3	Forward-Reverse-Stop (Alternative label: Up-Down-Stop)	23MSU
3	Forward-Reverse-Latch Stop/Reset (Alternative label: Up-Down-Stop)	23MSUL

Spare switch unit (not suitable for 22mm devices)

Description	Eaton list number
Complete replacement unit with N/O and N/C contacts and fixing screw	21MSB

21MSU2K



MSU pushbutton control units (moulded IP65)

- Single way control stations incorporating 22mm control devices

Description	Eaton list number
Mushroom head latch stop, key release with 1-N/C contact	21MSULK
Two position key operated selector switch with 1-N/O contact labelled 0/1 (Key removable in both positions)	21MSU2K
Two position key operated spring return to "off" selector switch with 1-N/O and 1-N/C contact labelled 0/1 (Key removable in off position)	21MSU2SK

1CSUL



CSU pushbutton control units (IP41/IP65)

Number of buttons	Description	Eaton list number
1	Stop (IP41)	1CSU
1	Latched stop/reset (IP41)	1CSUL
1	Stop, large mushroom head 50mm dia. (IP41)	1CSUM
1	Latched stop/reset (IP65)	1CSUWL

8.3

Enclosed motor, heating and lighting control

Autoline heating and lighting contactors

This chapter covers the range of Autoline heating and lighting contactors, in 1 pole, 2 pole and 4 pole configuration, with ratings at AC1 and AC5a. Metalclad enclosures have an IP55 rating.

See page 175 for overall dimensions.

- IEC / EN60947
- IEC408
- CE marked

248ALCFP



Heating and lighting contactors

Description	Cable capacity mm ²	Coil voltage 50 Hz	Heating and general mixed loads, slightly inductive, amps per pole AC1	Lighting load, amps per pole AC5a	Eaton list number
4P enclosed without rectifier	4	220–240	25	12	228ALCFP
4P enclosed without rectifier	4	380–415	25	12	248ALCFP
4P enclosed without rectifier	10	220–240	40	32	428ALCFP
4P enclosed without rectifier	10	380–415	40	32	448ALCFP
4P enclosed with rectifier	4	220–240	25	12	228ALCFPR
4P enclosed with rectifier	10	220–240	40	32	428ALCFPR
2P enclosed without rectifier	16	220–240	40	25	228ALCDP
2P enclosed without rectifier	25	220–240	64	40	428ALCDP
2P enclosed with rectifier	16	220–240	40	25	228ALCDPR
2P enclosed with rectifier	25	220–240	64	40	428ALCDPR
1P enclosed without rectifier	50	220–240	70	50	228ALCSPN
1P enclosed without rectifier	50	220–240	112	50	428ALCSPN
1P enclosed with rectifier	50	220–240	70	50	228ALCSPNR
1P enclosed with rectifier	50	220–240	112	50	428ALCSPNR

248ALCFP



Replacement contactors – Autoline

Maximum current	Control coil voltage rating, AC1 (A)	Poles 50Hz Vac	Eaton list number
25	220–240	4P	2812004VCOA
25	380–415	4P	4812004VCOA
40	220–240	4P	2825004VCOA
40	380–415	4P	4825004VCOA
40	220–240	2P	2812004VCOA
40	380–415	2P	4812004VCOA
64	220–240	2P	2825004VCOA
64	380–415	2P	4825004VCOA
70	220–240	1P	2812004VCOA
70	380–415	1P	4812004VCOA
112	220–240	1P	2825004VCOA
112	380–415	1P	4825004VCOA



Eaton’s power factor correction products are available in three types. The economical non-auto low voltage capacitors are an ideal choice for use in electrical installations where the total load changes very little from hour to hour and day to day. For installations where the load is more variable, Eaton offers 100 standard and 300 standard and de-tuned products, which constantly monitor the power factor of the installation and automatically adjust the correction so that it accurately matches the instantaneous requirements.

9

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Eaton capacitors 300 – standard	118
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EP2541E



Eaton capacitors non-auto

KVAR (415V)	Terminal size	Terminal ctr's	Earth stud size	Weight (Kg)	Eaton list number
25	M8	35	M8	6	EP2541E
50	M8	35	M8	8	EP5041E
75	M10	60	M10	16	EP7541E
100	M10	60	M10	18	EP10041E

MC25M1



Eaton capacitors 100 auto

KVAR (415V)	Stages	Weight (Kg)	Incoming device	Eaton list number
25	1 x 25	20	Fusebase	MC25M1
		21	Fuseswitch	MC25M1S
			MCCB	MC25M1M
50	2 x 25	25	Fusebase	MC50M2
		26	Fuseswitch	MC50M2S
			MCCB	MC50M2M
75	3 x 25	31	Fusebase	MC75M3
		33	Fuseswitch	MC75M3S
			MCCB	MC75M3M
100	4 x 25	35	Fusebase	MC100M4
		37	Fuseswitch	MC100M4S
			MCCB	MC100M4M

If you require a specific KVAR rating other than the above, please contact Eaton for further details.

MC25M5



Eaton capacitors 300 standard

KVAR (415V)	Stages	Weight (Kg)	Incoming device	Eaton list number
125	5 x 25	210	Direct connection	MC125M5
			Fuseswitch	MC125M5S
			MCCB	MC125M5M
150	3 x 50	235	Direct connection	MC150M3
			Fuseswitch	MC150M3S
			MCCB	MC150M3M
175	3 x 50 + 1 x 25	245	Direct connection	MC175M4
			Fuseswitch	MC175M4S
			MCCB	MC175M4M
200	4 x 50	260	Direct connection	MC200M4
			Fuseswitch	MC200M4S
			MCCB	MC200M4M
225	4 x 50 + 1 x 25	270	Direct connection	MC225M5
			Fuseswitch	MC225M5S
			MCCB	MC225M5M
250	5 x 50	280	Direct connection	MC250M5
			Fuseswitch	MC250M5S
			MCCB	MC250M5M
275	5 x 50 + 1 x 25	290	Direct connection	MC275M6
			Fuseswitch	MC275M6S
			MCCB	MC275M6M
300	6 x 50	300	Direct connection	MC300M6
			Fuseswitch	MC300M6S
			MCCB	MC300M6M

Applications above 300KVAR are also available, please contact Eaton for further details..

MC100M2DT



Eaton capacitors 300 detuned

KVAR (415V)	Stages	Weight (Kg)	Incoming device	Eaton list number
100	2 x 50	230	Direct connection	MC100M2DT
			Fuseswitch	MC100M2SDT
			MCCB	MC100M2MDT
125	2 x 50 + 1 x 25	240	Direct connection	MC125M3DT
			Fuseswitch	MC125M3SDT
			MCCB	MC125M3MDT
150	3 x 50	260	Direct connection	MC150M3DT
			Fuseswitch	MC150M3SDT
			MCCB	MC150M3MDT
175	3 x 50 + 1 x 25	400	Direct connection	MC175M4DT
			Fuseswitch	MC175M4SDT
			MCCB	MC175M4MDT
200	4 x 50	420	Direct connection	MC200M4DT
			Fuseswitch	MC200M4SDT
			MCCB	MC200M4MDT
225	4 x 50 + 1 x 25	430	Direct connection	MC225M5DT
			Fuseswitch	MC225M5SDT
			MCCB	MC225M5MDT
250	5 x 50	440	Direct connection	MC250M5DT
			Fuseswitch	MC250M5SDT
			MCCB	MC250M5MDT
275	5 x 50 + 1 x 25	450	Direct connection	MC275M6DT
			Fuseswitch	MC275M6SDT
			MCCB	MC275M6MDT
300	6 x 50	470	Direct connection	MC300M6DT
			Fuseswitch	MC300M6SDT
			MCCB	MC300M6MDT
325	6 x 50 + 1 x 25	480	Direct connection	MC325M7DT
			Fuseswitch	MC325M7SDT
			MCCB	MC325M7MDT
350	7 x 50	500	Direct connection	MC350M7DT
			Fuseswitch	MC350M7SDT
			MCCB	MC350M7MDT
375	7 x 50 + 1 x 25	510	Direct connection	MC375M8DT
			Fuseswitch	MC375M8SDT
			MCCB	MC375M8MDT
400	8 x 50	530	Direct connection	MC400M8DT
			Fuseswitch	MC400M8SDT
			MCCB	MC400M8MDT
425	8 x 50 + 1 x 25	540	Direct connection	MC425M9DT
			MCCB	MC425M9MDT
450	9 x 50	560	Direct connection	MC450M9DT
			MCCB	MC450M9MDT
475	9 x 50 + 1 x 25	700	Direct connection	MC475M10DT
			MCCB	MC475M10MDT
500	10 x 50	720	Direct connection	MC500M10DT
			MCCB	MC500M10MDT
525	10 x 50 + 1 x 25	730	Direct connection	MC525M11DT
			MCCB	MC525M11MDT
550	11 x 50	750	Direct connection	MC550M11DT
			MCCB	MC550M11MDT
575	11 x 50 + 1 x 25	760	Direct connection	MC575M12DT
			MCCB	MC575M12MDT
600	12 x 50	780	Direct connection	MC600M12DT
			MCCB	MC600M12MDT

Applications above 600KVAR are also available. Applications above 400KVAR are also available with an ACB as the protective device
Please contact Eaton for further details.

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Distribution boards type A and type B, technical overview

	Type A	Type B
IP Rating	IP3X	IP4X
Enclosure body type	Steel – welded case end with cable glad plate	Steel – welded case end with cable glad plate
Paint specification	RAL 7004 epoxy polyester	RAL 7004 epoxy polyester
Conditional short circuit rating	15kA to BS EN 60439	25kA to BS EN 60439
Busbar short time withstand (I _{cw})	5kA 0.1s	10kA 0.5s / 17kA 0.25s
Cable Capacities		
125A switch disconnecter	50mm ²	50mm ²
100A RCCB (type A = 90A)	35mm ²	50mm ²
250A switch disconnecter	–	120mm ² (+ M8 lugs)
160A – 250A MCCB incomer	–	250A = 120mm ² (+ M8 lugs)
100A direct connection kit	35mm ²	–
250A direct connection lugs	–	120mm ² (+ M8 lugs)
125A contactor incomer	–	50mm ²
250A contactor incomer	–	120mm ² (+ M8 lugs)
Enclosure earth stud	M6	M8
Incoming earth terminal	25mm ²	125A = 25mm ² , 250A = 70mm ²
Incomming neutral terminal	90/100A = 35mm ² , 125A = 50mm ²	125A = 50mm ² , 250A = 120mm ² (+ M8 lugs)
Outgoing earth terminal	25mm ²	25mm ²
Outgoing neutral terminal	25mm ²	25mm ²

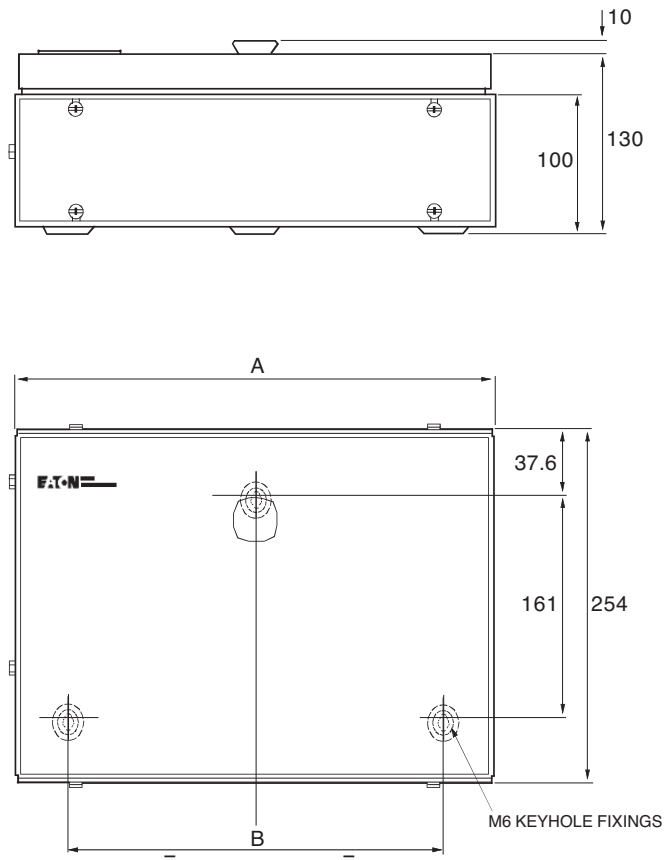
Type 1/type 2 combined lightning/surge arrester, technical data

Electrical		EM3SSK3T12 & EMSSK3T12L	EM3SSK3T12P
Lightning protection system class		III, IV	I, II, III, IV
Responding time (rate of voltage rise 5 kV/μs)	L-N/ N-PE	< 25 ns / < 100 ns	< 25 ns
Voltage protection level U _p	L-N/L-PE / N-PE	< 1.5kV	1.5 kV
Maximum continuous operating voltage U _C	L-N/N-PE	280 VAC/255 VAC	440 VAC / 260 VAC
Temporary overvoltage test value U _T (5 s)	L-N/L-PE	348 VAC/370 VAC	
(200 ms)	N-PE	1200 VAC	200 VAC (200 ms)
Rated frequency		50/60 Hz	50/60 Hz
Discharge current (8/20) μs I _{max} /I _n		–	100 kA
Open circuit voltage U _{oc}		20 kV	–
Nominal discharge current (8/20) μs I _n	L-N/N-PE	3x25 kA/100 kA	–
Maximum discharge current I _{max}	L-N/N-PE	3x50 kA/100 kA	–
Impulse current I _{imp} (10/350) μs:			
Peak current	L-N/N-PE	3x12.5 kA/100 kA	100 kA
Charge Q		50 As	50 As
Specific energy		2500 kJ/Ω	2500 kJ/Ω
Follow current interrupt rating I _{fi}	N-PE	100 A _{r.m.s}	–
at 260 V	L-(PE)N/N-PE	–	3kA _{rms} /100A _{rms}
at 440 V	L-(PE)N/N-PE	–	1,5kA _{rms} /–
Short-circuit current strength at max. back-up fuse		–	25kA _{rms}
Maximum back-up fuse		160 AgL/gG	125 AgL
Maximum short-circuit current		50 kA _{r.m.s}	–

Type 2 surge arrester technical data

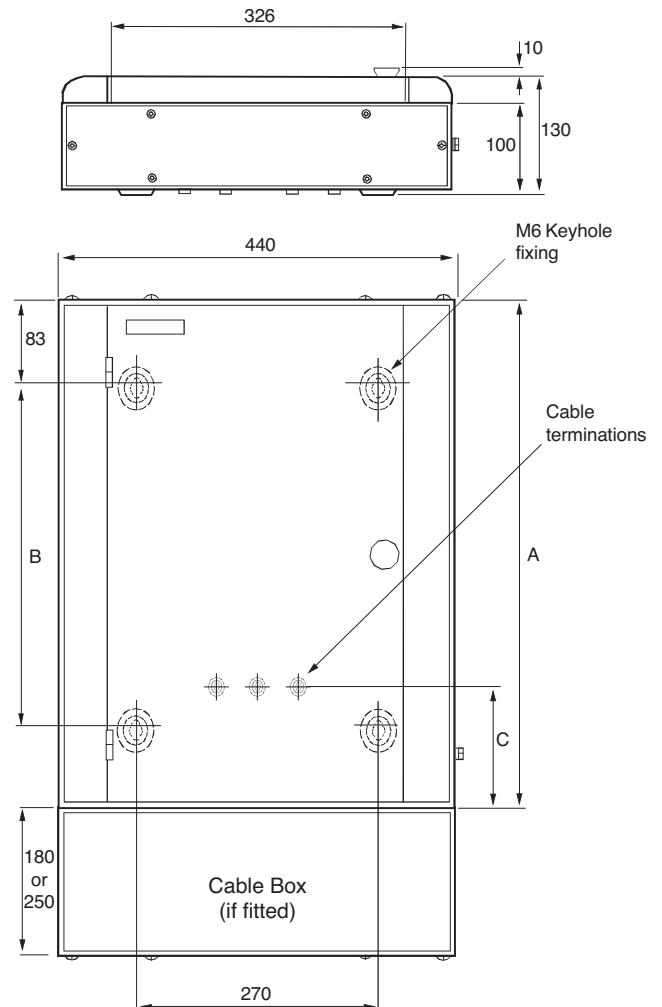
Electrical		EM3SSK1T2	EM3SSK3T2
Responding time (rate of voltage rise 5 kV/μs)	L-N/N-PE/L-PE	< 25ns/< 100ns/< 100ns	< 25ns/< 100ns/< 100ns
Maximum continuous operating voltage U _C	L-N/N-PE	335VAC/260VAC	280VAC/260VAC
Temporary overvoltage test value U _T (5 s)	L-N	415 VAC	350 VAC
(200 ms)	N-PE	1200 VAC	1200 VAC
Rated frequency		50/60 Hz	50/60 Hz
Nominal discharge current I _n	L-N/N-PE/L-PE	20 kA (8/20)μs	20 kA (8/20)μs
Voltage protection level U _p at I _n	L-N/N-PE/L-PE	≤1600V/≤1000V/≤1650V	≤1000V/≤1000V/≤1300V
Maximum discharge current I _{max}	L-N/N-PE/L-PE	40 kA (8/20)μs	40 kA (8/20)μs

Memshield 3 type A SPN Distribution Board, dimensional drawing



List No.	A (mm)	B (mm)
EAM4, EBMXDC6	238	163
EAMMP65	238	163
EAM7, EBMXDC9	292	217
EAM10	346	271
EAM13, EBMXDC15, EBMXDCG15	440	365
EAM9M/MB	440	365
EAM16, EBMXDC18	454	379
EAM12M/MB	454	379
EAMSL66M/MB	454	379
EAMSL93M/MB	454	379

Memshield 3 type B TPN Distribution Board, dimensional drawing



List No.	A (mm)	B (mm)	C (mm) 125A incomer	250A incomer	Lugs incomer
EBM41	429	245	144	–	150
EBM61	482	298	144	–	150
EBM81, EBMXDC30	564	380	173	–	179
EBM121, EBM121D, EBMXDC45	724	540	227	–	233
EBM161	830	540	227	–	233
EBM122	861	677	334	76	340
EBM182	1021	837	334	76	340
EBM242	1180	996	334	76	340
250A high load boards¹⁾					
EBM22H	817	633	–	237	500
EBM62H	1020	836	–	296	559
EBM82H	1055	871	–	277	540
EBM122H	1180	996	–	296	559
EBM182H	1342	1158	–	298	561
EBM242H	1501	1317	–	298	561

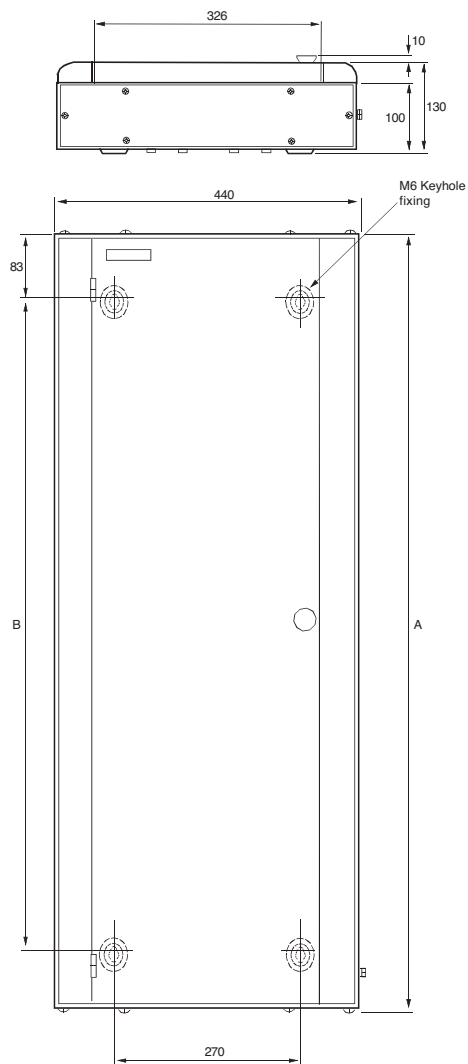
¹⁾ Cable box not required

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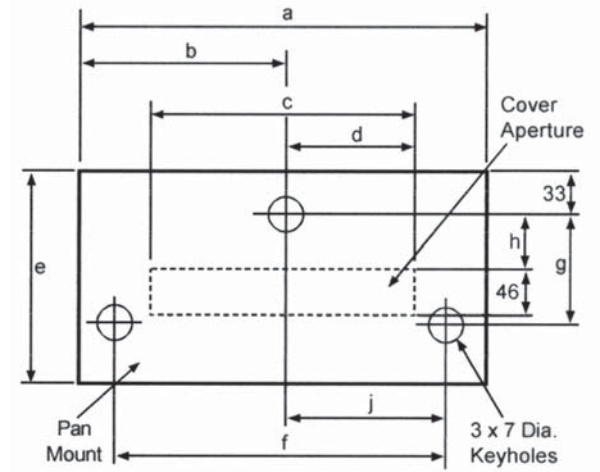
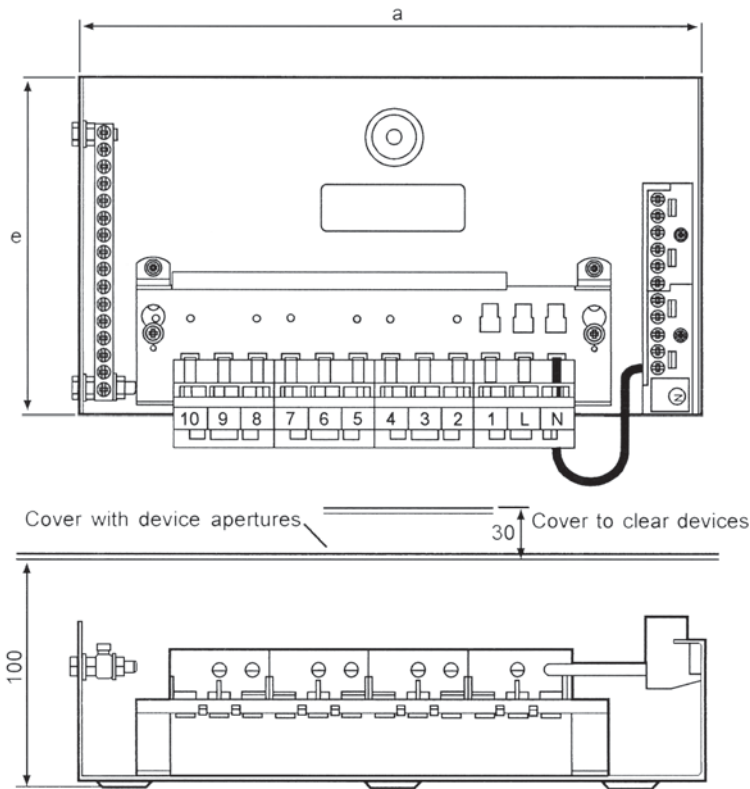
Technical data

Split metered power and lighting board – 200A TPN

Split metered power and lighting board – 200A TPN, dimensional drawing



List No.	A (mm)	B (mm)
EBMSL642M	1130	946
EBMSL642MB	1130	946
EBMSL862M	1236	1052
EBMSL862MB	1236	1052
EBMSL1082M	1342	1158
EBMSL1082MB	1342	1158
EBMSL14102M	1501	1317
EBMSL14102MB	1501	1317

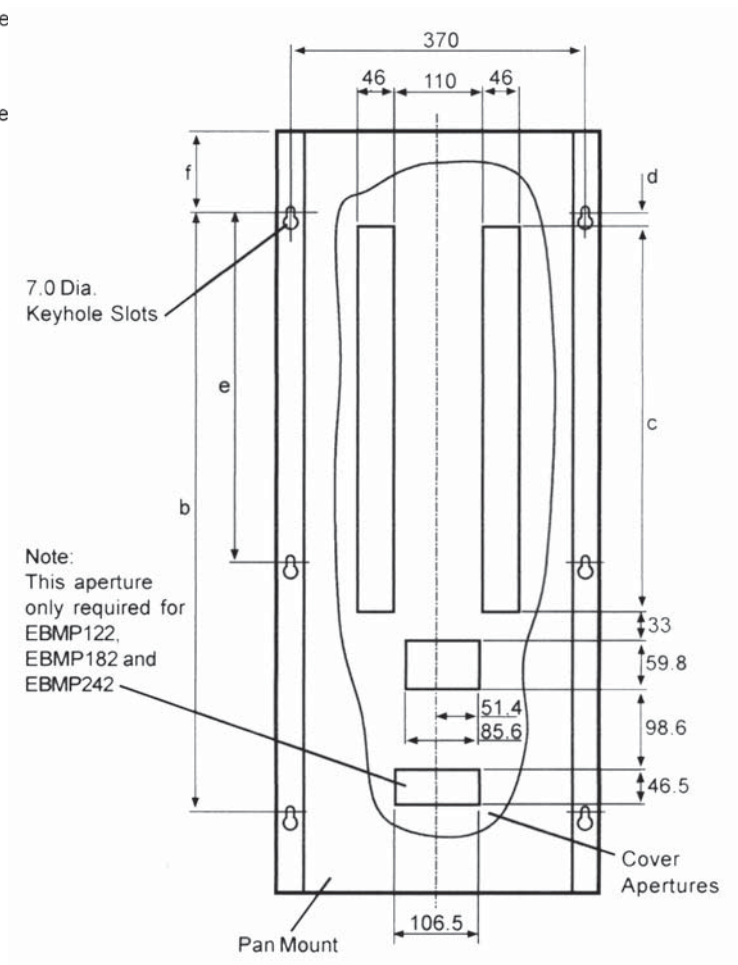
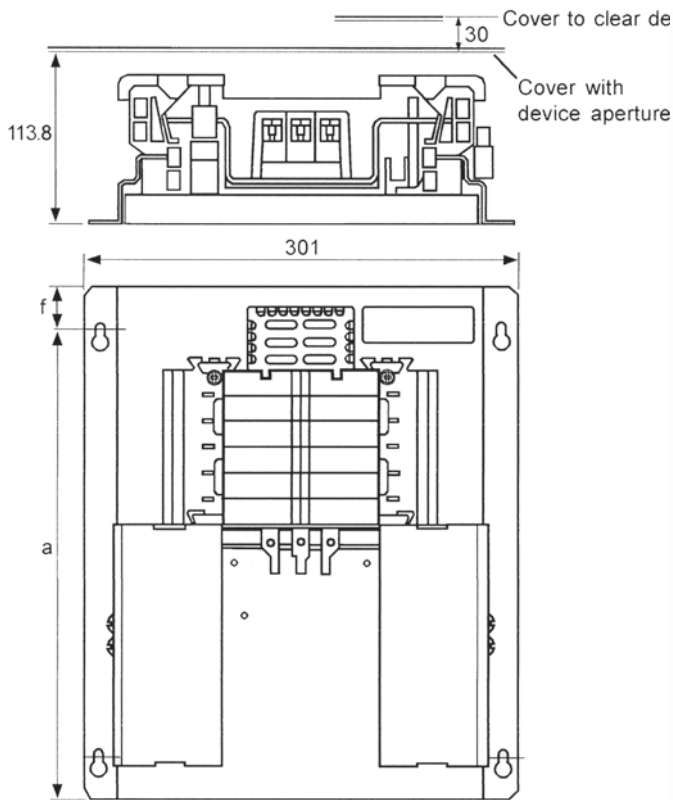


List No.	Dimensions (mm)										Minimum recommended enclosure size (mm)
	a	b	c	d	e	f	g	h	j		
EAMP4	190	105.5	107.7	48.8	180	160	96	70	77	238 (W) x 254 (L)	
EAMP7	274	129.5	160.9	79	180	214	96	70	107	292 (W) x 254 (L)	
EAMP10	328	164	214.1	127.5	180	266	96	70	127.5	346 (W) x 254 (L)	
EAMP13	382	183.5	267.3	131.3	192	319	109	82	161	440 (W) x 260 (L)	
EAMP16	435	226.5	320.5	141.5	198	372	105	79	171	495 (W) x 260 (L)	

10.1

Technical data

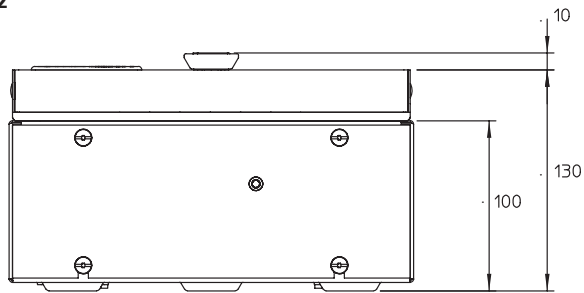
Memshield 3 type B TPN pan assemblies



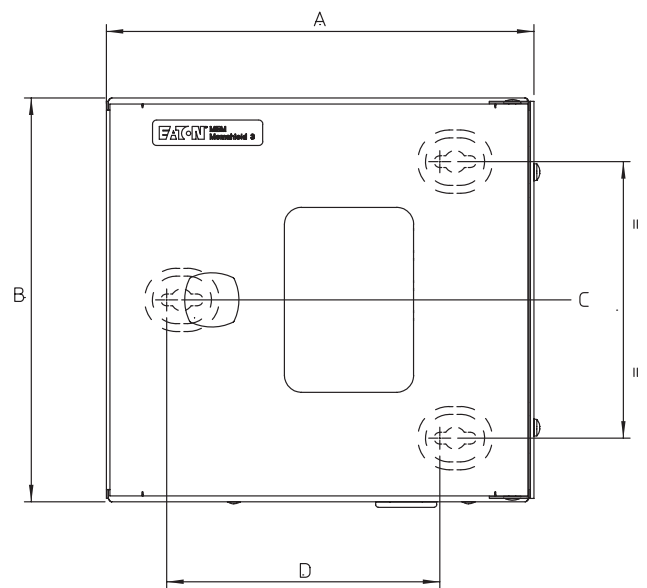
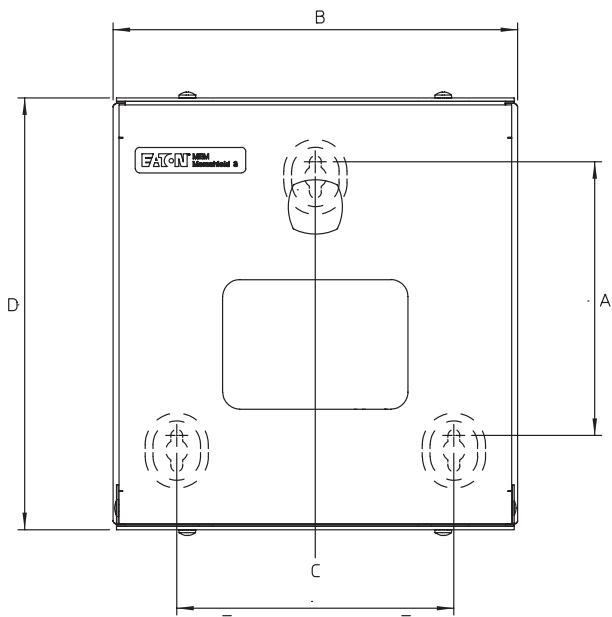
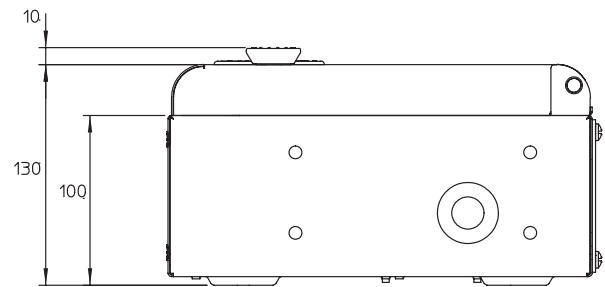
List No.	Dimensions (mm)						Minimum recommended enclosure size (mm)
	a	b	c	d	e	f	
EBMP41	333.6	303.3	107.5	35.7	–	21	440 (W) x 425 (L)
EBMP61	413.7	383.5	160.6	35.7	–	21	440 (W) x 478 (L)
EBMP81	511.5	481.2	213.7	53.2	–	21	440 (W) x 560 (L)
EBMP121	638.1	589.2	319.9	22.2	–	40	440 (W) x 720 (L)
EBMP122	750	710	319.9	16.7	336.5	40	440 (W) x 861 (L)
EBMP182	910	870	479.2	16.7	435	40	440 (W) x 1016 (L)
EBMP242	1070	1030	638.5	16.7	515	40	440 (W) x 1176 (L)

Memshield 3, surge protection devices, dimensional drawings

EM3SSK1T2



EM3SSKT2/EM3SSKT12



List No.	A (mm)	B (mm)	C (mm)	D (mm)
EM3SSK1T2	254	238	163	161

List No.	A (mm)	B (mm)	C (mm)	D (mm)
EM3SSK3T2	254	238	163	161
EM3SSK3T12	254	238	163	161

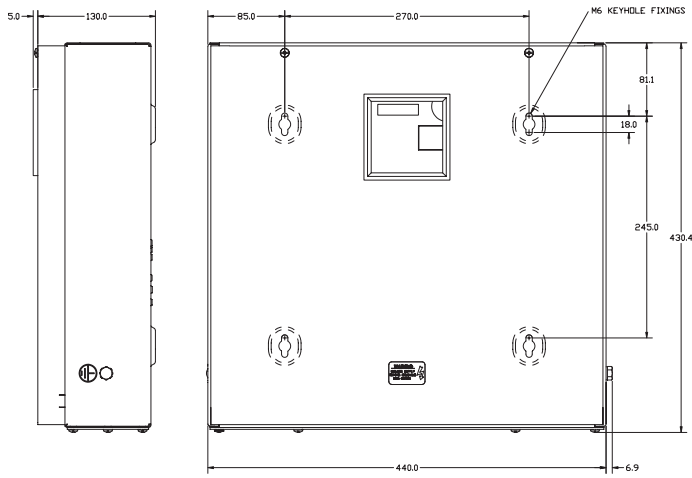
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Technical data

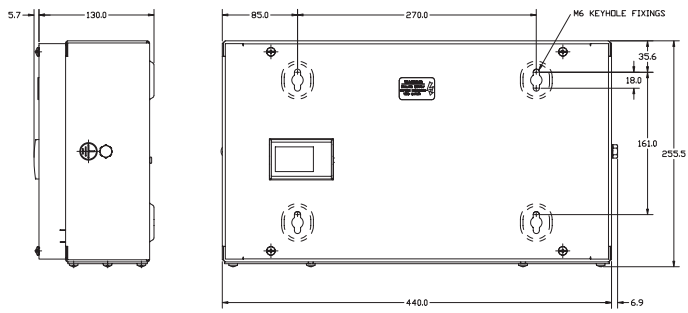
Memshield 3, meter pack assemblies

Memshield 3, Meter pack assemblies, dimensional drawings

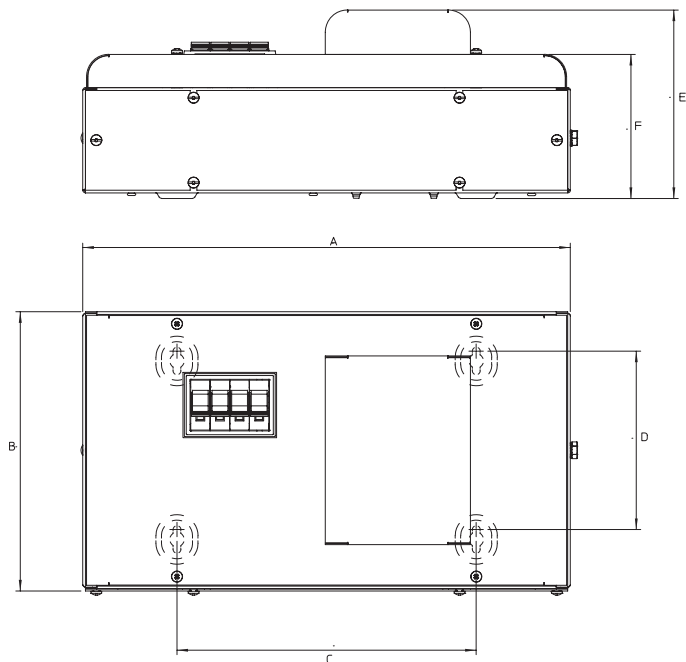
EBMMPCD120



EBMMPCT250/EBMMPCT250M/EBMMPCT250MID



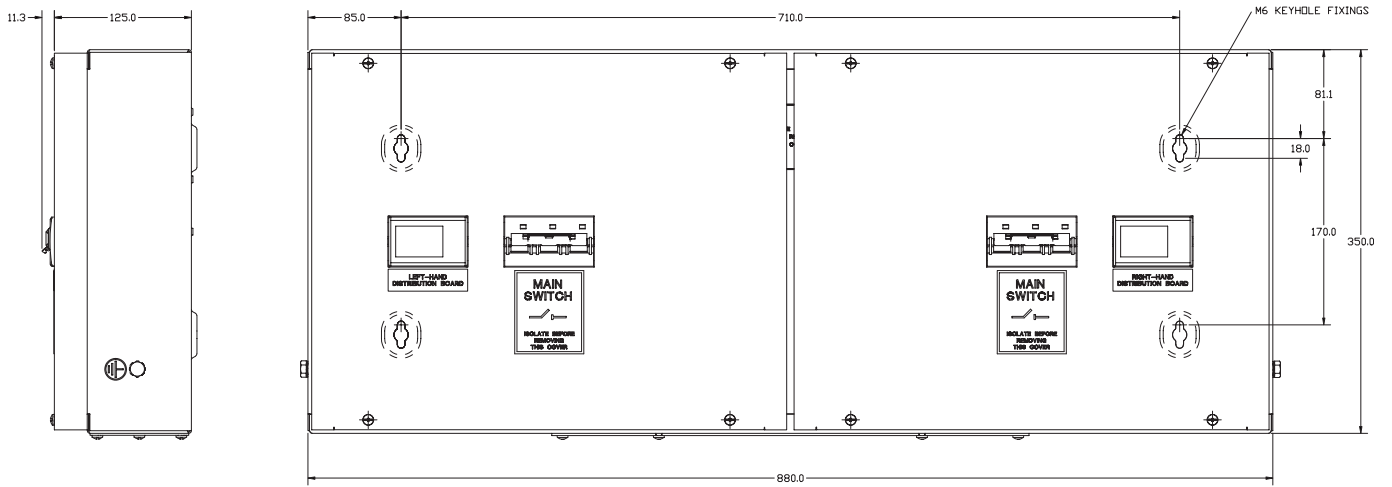
Memshield 3, contactor incomer, dimensional drawings



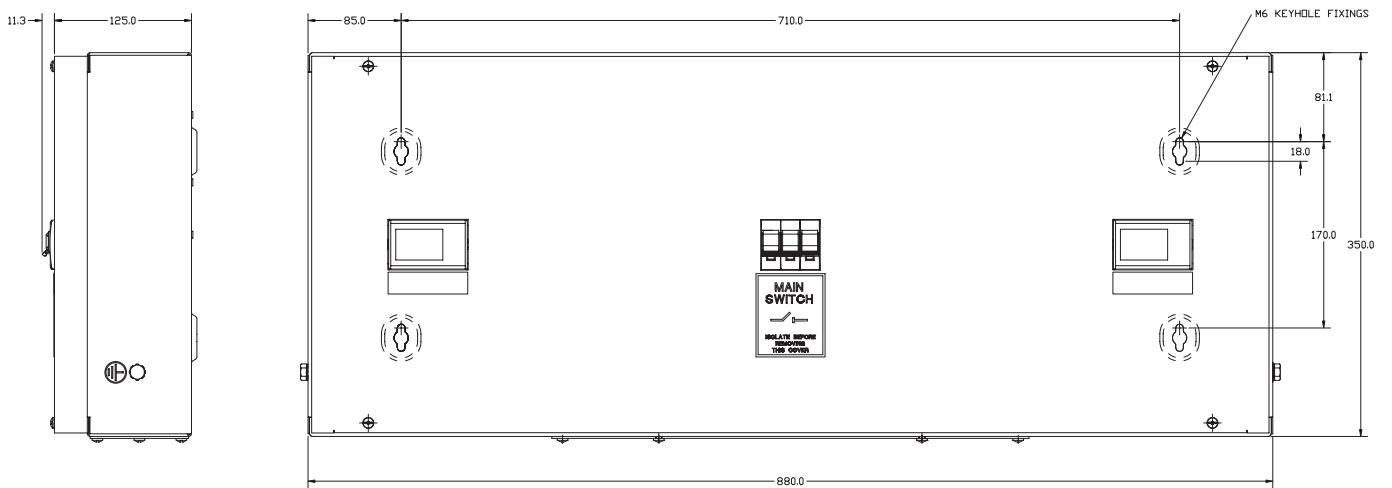
List No.	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)
EBMCC1253	440	252	270	161	170	130
EBMCC2503	440	595	270	501	130	130

Memshield 3, Meter pack assemblies, dimensional drawings (contd)

EBMMPSL250/EBMMPSL250M



EBMMPSL125/EBMMPSL125M



18mm miniature circuit breakers (MCBs), technical data

Eaton's range of 10/15kA high performance miniature circuit breakers (MCBs) are manufactured and tested to IEC EN 60898, and IEC EN 60947-2, meeting the latest UK, European and international standards, with ratings from 1A to 63A as standard.

DIN rail mountable and suitable for use with both pin and comb type busbar systems, Eaton's MCBs are suitable for use on 230/400 VAC systems and are calibrated for use at 40°C. These devices suite with the other modular devices including RCBOs, RCCBs and isolators, for use within Eaton Memshield 3 Distribution boards and a wide range of other applications.

The Eaton MCBs are fitted with box clamp terminals suitable for use with cables up to 25mm², and have a unique box clamp barrier to prevent incorrect cable insertion.

Eaton miniature circuit breakers are available with B, C and D characteristic curve as standard. Type C MCBs are most commonly used in commercial and general applications where there are lighting or motor loads involving high switching surges that may cause unwanted operation of type B devices. Type D devices are more commonly used on general industrial applications with much higher inrush surges.

IEC/EN 60898 Type	Instantaneous Trip Current (x I _n)	Typical Application	Eaton 10/15A MCB type
B	3 to 5	General distribution	EMBH
C	5 to 10	Commercial Light industrial	EMCH
D	10 to 20	General Industrial	EMDH

Type B: Suitable for general, domestic and commercial installations having little or no switching surges.

Type C: Suitable for general use in commercial or industrial applications where the greater use of fluorescent lighting and small motors can produce switching surges, which may cause nuisance tripping of type B breakers.

Type D: Suitable for general industrial applications where there are a lot of high inrush switching surges associated with equipment such as transformers, large motors, welding and X ray equipment.

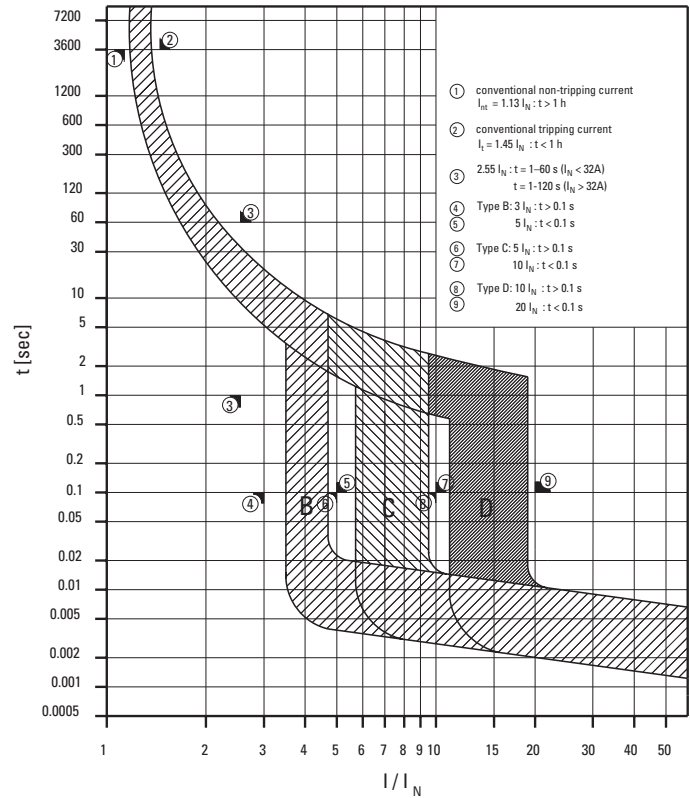
Earth fault loop impedances (Zs) to provide compliance with BS 7671

The wiring regulations BS 7671 makes specific reference to MCB types and the maximum earth loop impedance allowable to meet the required disconnection times.

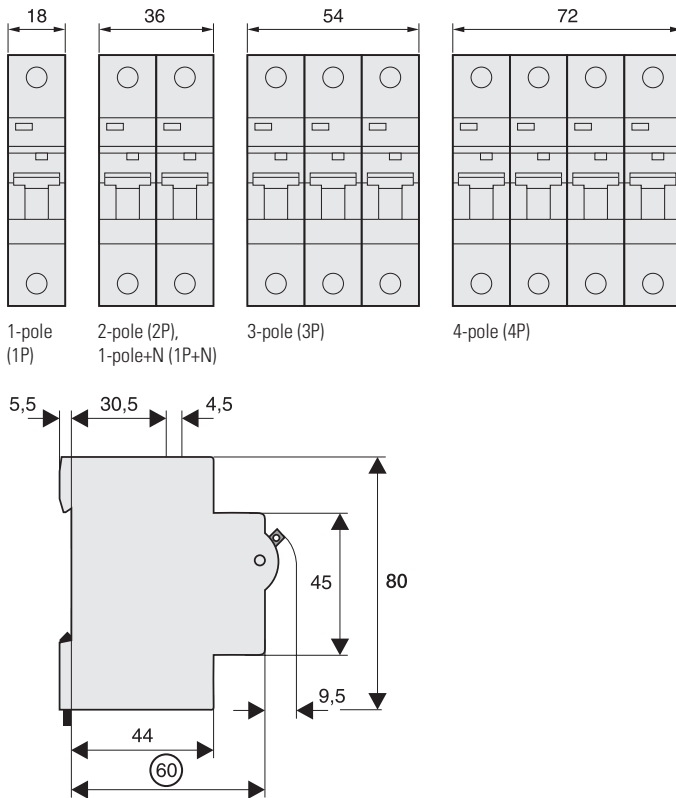
It can be seen that it is much easier to achieve adequate disconnection times with type B devices than it is with types C and indeed type D devices.

Maximum earth fault loop impedance i.e. Zs ohms for final circuits fed from miniature circuit breakers MCBs or RCBOs with U_o of 230V, for instantaneous operation giving compliance with 0.4s disconnection time of Reg 411.3.2.2 and 5s disconnection time of 411.3.2.3

Tripping characteristic type B, C & D



10/15kA MCBs dimensional drawings



10/15kA MCBs technical data

Product standard	IEC EN 60898 & IEC EN 60947-2
No of poles	1p, 1p&N, 2p, 3p, 4p
Mechanical specification	
Device width (pole)	17.7mm
Terminal type	Box clamp
Terminal capacity	1–25mm ²
Terminal Screw	M5 combination
Terminal torque	2.0Nm – 2.4Nm max
Mounting	DIN rail
Degree of protection	IP 20
Positive contact indication	Red/Green flag indicator
Electrical specification	
Rated voltage	230/240 V AC 48V DC (per pole)
Current ratings	1, 2, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63 A
Rated impulse and withstand voltage	4kV (1.2/50) μ sec
Rated short circuit capacity	10kA to IEC EN 60898 and 15kA to IEC EN 60947-2
Selectivity class	3 to EN 60898
Tripping characteristic	
Instantaneous tripping current I_{mt}	Type B: $3 I_n < I_{mt} < 5 I_n$ Type C: $5 I_n < I_{mt} < 10 I_n$ Type D: $10 I_n < I_{mt} < 20 I_n$
Conventional non tripping current	$I_{nt} = 1.13 I_n$
Conventional tripping current	$I_t = 1.45 I_n$
Ref/Calibration temp	40 \pm 0 C
Number of operating cycles elec	>4000
Number of operating cycles mech	>20000

MCB Max Zs (Ohms) figures

Range	I_n (A)	Disconnection 0.4s	Disconnection 5s
Type B (EMBH Series)	1	46.000	46.000
	2	23.000	23.000
	4	11.500	11.500
	6	7.667	7.667
	8	5.750	5.750
	10	4.600	4.600
	13	3.538	3.538
	16	2.875	2.875
	20	2.300	2.300
	25	1.840	1.840
	32	1.438	1.438
	40	1.150	1.150
	50	0.920	0.920
63	0.730	0.730	
Type C (EMCH Series)	1	23.000	41.071
	2	11.500	20.536
	4	5.750	10.268
	6	3.833	6.845
	8	2.875	5.134
	10	2.300	4.107
	13	1.769	3.159
	16	1.438	2.567
	20	1.150	2.054
	25	0.920	1.643
	32	0.719	1.283
	40	0.575	1.027
	50	0.460	0.821
63	0.365	0.652	
Type D (EMDH Series)	1	11.500	41.071
	2	5.750	20.536
	4	2.875	10.268
	6	1.917	6.845
	8	1.438	5.134
	10	1.150	4.107
	13	0.885	3.159
	16	0.719	2.567
	20	0.575	2.054
	25	0.460	1.643
	32	0.359	1.283
	40	0.288	1.027
	50	0.230	0.821
63	0.183	0.652	

10.1

Technical data

27mm style miniature circuit breakers (for 250A distribution boards)

27mm style miniature circuit breakers (for 250A distribution boards)

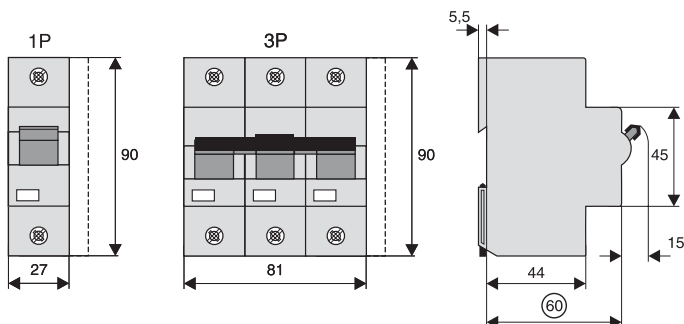
Eaton's 27mm style miniature circuit breakers (MCBs) are manufactured and tested to IEC EN 60947-2, meeting the latest UK, European and international standards, with ratings from 20A to 125A single and triple pole as standard.

Eaton's MCBs are suitable for use on 230/400 VAC systems and are calibrated for use at 40°C. and are available with B, C, and D characteristic curve, with breaking capacities up to 25kA.

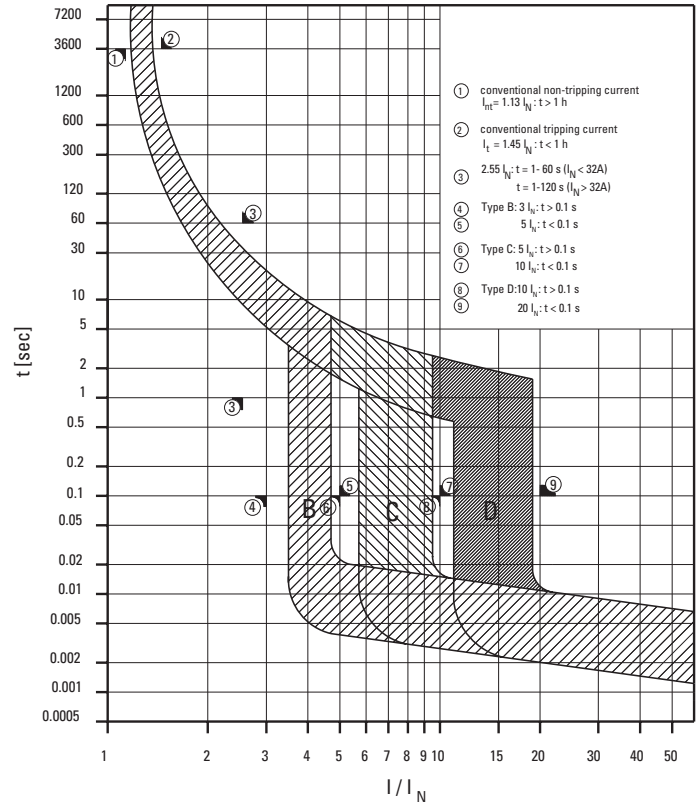
15/25kA MCBs technical data

Product standard	IEC EN 60947-2
No of poles	1p, 3p
Mechanical specification	
Device width (pole)	27mm
Terminal type	Box clamp
Terminal capacity	2.5–50mm ²
Terminal Screw	Combination head
Terminal torque	2.0Nm – 2.4Nm max
Mounting	DIN rail
Degree of protection	IP 20
Positive contact indication	Red/Green flag indicator
Electrical specification	
Rated voltage	230/400 V AC
	60V DC (per pole)
Current ratings	63, 80, 100, 125 A
Rated impulse and withstand voltage	4kV (1.2/50) μ sec
Rated short circuit capacity	
Types B and C	20–63A – 25kA
	80–100A – 20kA
	125A – 15kA
Rated short circuit capacity	
Type D	20–63A – 25kA
	80A – 20kA
	100A – 15kA
Selectivity class	In accordance with class C
Tripping characteristic	
Instantaneous Tripping current I_{mt}	Type B: $3 I_n < I_{mt} < 5 I_n$ Type C: $5 I_n < I_{mt} < 10 I_n$ Type D: $10 I_n < I_{mt} < 20 I_n$
Conventional non tripping current	$I_{nt} = 1.13 I_n$
Conventional tripping current	$I_t = 1.45 I_n$
Ref/Calibration temp	40°C
Number of operating cycles elec	>20000

Miniature circuit breakers – dimensional drawings



Tripping characteristic type B, C & D



Eaton Memshield-3 MCB Max Zs (Ohms)

Range	I_n (A)	Disconnection 0.4s	Disconnection 5s
Type B (EMBS Series)	20	2.300	2.300
	32	1.438	1.438
	40	1.150	1.150
	50	0.920	0.920
	63	0.730	0.730
	80	0.575	0.575
	100	0.460	0.460
Type C (EMCS Series)	20	1.150	2.054
	32	0.719	1.283
	40	0.575	1.027
	50	0.460	0.821
	63	0.365	0.652
	80	0.288	0.513
	100	0.230	0.411
Type D (EMDS Series)	20	0.575	2.054
	32	0.359	1.283
	40	0.288	1.027
	50	0.230	0.821
	63	0.183	0.652
	80	0.144	0.513
	100	0.115	0.411

Residual current circuit breakers (RCCBs) technical data

Eaton's range of residual current circuit breakers without integral Overload protection (RCCBs), are manufactured to IEC EN/61008 and meet the latest European and International standards.

DIN rail mountable in 2 and 4 module widths these RCCBs provide protection solutions to a wide range of applications. With standard thermal ratings of 16A to 100A and trip sensitivities of 10mA, 30mA, 100mA and 300mA, these devices can be equipped with a range of modular accessories.

The Eaton RCCBs suite with the complete range of modular devices, and are for use within Eaton's Memshield 3 distribution boards and other applications.

These devices will accommodate cables up to 35mm².

Terminology

RCD – Residual current device:-This is the generic term covering a range of devices that are able to detect residual currents sometimes also referred to as earth leakage current. The residual current is measured by detecting the difference between the current flowing in the live and neutral conductors of a circuit and where the residual current is above a predefined level the RCD will trip. RCDs are available in a range of trip sensitivities for different applications.

RCCB – Residual current circuit breaker is an RCD which will cause disconnection of the electrical supply should it detect a residual current passing through the device, above a specified tripping current limit e.g. 30mA. This device does not provide over current protection and is therefore also referred to as an RCCB without integral over-current protection.

RCBO – Residual current circuit breaker, with overload protection, is an RCCB which will cause disconnection of the electrical supply should it detect a residual current above a specified tripping current limit, combined with integral overload, over-current, and shortcircuit protection associated with a miniature circuit breaker.

The 17th Edition of the IEE wiring regulations BS7671 now places much greater emphasis on the use of 30mA RCDs to provide "additional protection" in many areas covered by the regulations, such as circuits feeding socket outlets and for the protection of concealed wiring.

Trip sensitivities

10mA – Provides the highest degree of RCD protection in hazardous environments where supplementary protection against electric shock is required. This very high sensitivity should only be applied to final circuits where a high degree of risk exists.

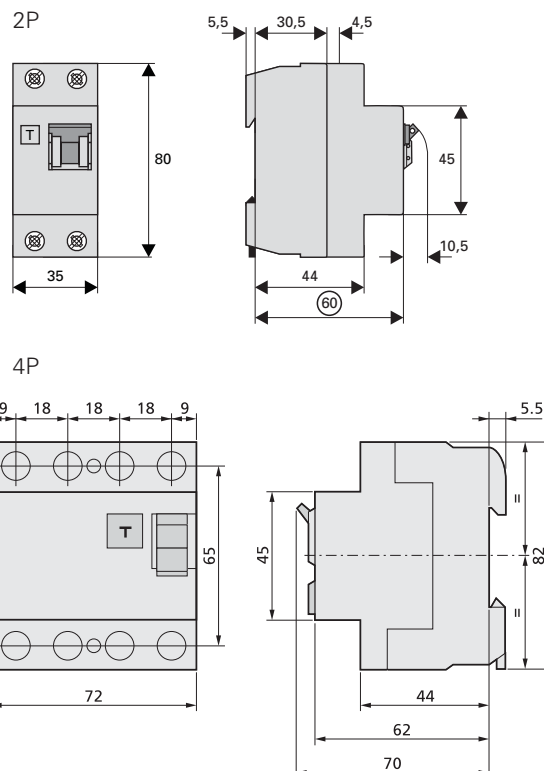
30mA – Provides a high degree of protection against electric shock due to direct and indirect contact. A 30mA RCD will trip within 40mS when a fault current of 150mA is detected.

This type of RCD is required to satisfy the requirements for "additional protection" in accordance with BS7671 (IEE wiring regs.)

100mA – Provides a degree of protection against electric shock resulting from indirect contact, and is generally used to protect a group of circuits as well as providing overall protection against Fire risk.

300mA – Provides a lower level of RCD protection in the form of an overall protection against the risk of fire resulting from faults in electrical wiring etc.

RCCB dimensions (mm)



RCCB technical data

Specifications	2-pole RCCB	4-pole RCCB
Product standard	IEC EN 61008	IEC EN 61008
No of poles	2p	4p
Mechanical specification		
Device width	35 mm	70 mm
Terminal type	Box clamp	Box clamp
Terminal capacity	1.5–35mm ²	35mm ²
Terminal Screw	M5 combination	M5 combination
Terminal torque	2.4Nm max	2.4Nm max
Mounting	DIN rail	DIN rail
Degree of protection	IP 20	IP 20
Positive contact indication	Yes (toggle position)	Red/green flag
Electrical specification		
Rated voltage	230/400 V AC	230/400 V AC
Current ratings	16, 40, 63, 80, 100 A	16, 40, 63, 80, 100 A
Rated impulse and withstand voltage	4kV (1.2/50) u sec	4kV (1.2/50) u sec
Rated short circuit capacity	10kA (with back up)	10kA (with back up)
Sensitivity	AC	AC
Tripping characteristic		
Rated tripping currents	10, 30, 100, 300 mA	10, 30, 100, 300 mA
Tripping type	Instantaneous	Instantaneous
Number of operating cycles elec	>4000	>4000
Number of operating cycles mech	>20000	>20000

10.1

Technical data

Residual current circuit breakers – with overload (RCBOs)

Residual current circuit breakers – with overload protection (RCBOs) technical data

Eaton's range of residual current circuit breakers with integral overload protection (RCBOs), are manufactured to IEC EN 61009 and meet the latest European and International standards.

DIN rail mountable in a single module width these RCBOs provide a comprehensive protection solution to a wide range of applications. Range is available with standard current ratings from 6A to 45A, in both B and C type characteristics and trip sensitivities of 10, 30 and 100mA.

The Eaton RCBOs suite with the complete range of modular devices, and are for use within Eaton's Memshield 3 distribution boards and other applications, and will accommodate cables up to 25mm².

Trip Sensitivity

Provides a high degree of protection against electric shock due to direct contact. A 30mA RCD will trip within 40mS when a fault current of 150mA is detected.

This type of RCD is required to satisfy the requirements for "additional protection" in accordance with BS7671 (IEE wiring regs.)

10mA and 100mA trip sensitivities are also available for a wide range of applications.

RCBOs technical data

Specifications

Product standard	IEC EN 61009
No of poles	1p & solid N

Mechanical specification

Device width	17.7 mm
Terminal type	Box clamp
Terminal capacity	1–25mm ²
Terminal Screw	M5 combination
Terminal torque	2.4Nm max
Mounting	DIN rail
Degree of protection	IP 20
Positive contact indication	Yes (Red/Green flag)

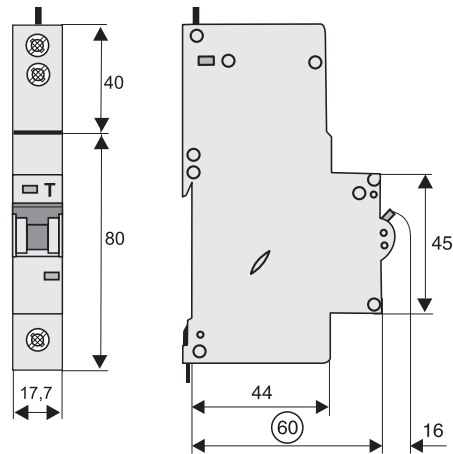
Electrical specification

Rated voltage	230/240 V AC
Current ratings	6, 10, 16, 20, 25, 32, 40, 45A
Rated impulse and withstand voltage	4kV (1.2/50) u sec
Rated short circuit capacity	6kA, 10kA
Sensitivity	AC

Tripping characteristic

Instantaneous Tripping current I _{mt}	Type B: 3 I _n < I _{mt} < 5 I _n Type C: 5 I _n < I _{mt} < 10 I _n
Conventional non tripping current	I _{nt} = 1.13 I _n
Conventional tripping current	I _t = 1.45 I _n
Ref/Calibration temp	40o C
Rated tripping currents	10, 30, 100mA
Tripping type	Instantaneous
Number of operating cycles elec	>4000
Number of operating cycles mech	>20000

RCBOs dimensions (mm)



Analogue Timers, technical details

Analogue Timers	TAD1NC	TAD1NCS	TAW1	TAD1	TAD1S	TAW1S
General						
Standards	EN 60730-2-7, EN 60730-1					
Nominal operating voltage & tolerance	230 Vac ± 10 %	230 Vac ± 10 %	230 Vac ± 10%	230 Vac ± 10 %	230 Vac ± 10 %	230 Vac ± 10 %
Frequency	50 Hz	50 Hz	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz
Power consumption	max. 2.5 VA	max. 2.5 VA	max. 2.5 VA	max. 2.5 VA	max. 2.5 VA	max. 2.5 VA
Time base control	Net	Net	Quartz	Quartz	Quartz	Quartz
Accuracy at 20 °C	acc. Net	acc. Net	£ ₋ ± 1 sec./day	£ ₋ ± 1 sec./day	£ ₋ ± 1 sec./day	£ ₋ ± 1 sec./day
Power reserve at 20 °C	–	–	±3 days	±3 days	±3 days	±3 days
Type of battery	–	–	NiMH	NiMH	NiMH	NiMH
Mechanical endurance (switching cycles)	> 30.000	> 30.000	> 30.000	> 30.000	> 30.000	> 30.000
Electrical endurance (switching cycles)	> 10.000	> 10.000	> 10.000	> 10.000	> 10.000	> 10.000
Protection class (acc. EN 60529)	IP20	IP20	IP20	IP20	IP20	IP20
Permissible ambient temperature	-20 °C...+50 °C	-25 °C...+50 °C	-20 °C...+50 °C	-20 °C...+50 °C	-10 °C...+50 °C	-10 °C...+50 °C
Storage temperature	-20 °C...+50 °C	-25 °C...+50 °C	-20 °C...+50 °C	-20 °C...+50 °C	-10 °C...+50 °C	-10 °C...+50 °C
Protection class (acc. EN 60 730-1) at proper installation	II	II	II	II	II	II
Switching contact(s)						
Type of switching contact	1 x CO	1 x NO	1 x CO	1 x CO	1 x NO	1 x NO
Contact material	Hard silver	Hard silver	Hard silver	Hard silver	Hard silver	Hard silver
Switching capacity at 250 Vac, cos j = 1	16 A	16 A	16 A	16 A	16 A	16 A
Switching capacity at 250 Vac, cos j = 0,6	4A	4A	4A	4A	4A	4A
Programming features						
Period of program	Day	Day	Week	Day	Day	Week
Number of channels	1	1	1	1	1	1
Minimum cycle time	30 min.	15 min.	4 hours	30 min.	15 min.	2 hours
Maximum programming steps in memory	48	96	42	48	96	84
Manual/Hand/Permanent switching 1)	ON, OFF,					
Hand, Auto	ON, Auto	ON, OFF,				
Hand, Auto	ON, OFF,					
Hand, Auto	ON, Auto	ON, Auto				
Dimensions & Weight						
Number of module width	3	1	3	3	1	1
Dimensions 17.5 mm	Width	52.5 mm	17.5 mm	52.5 mm	52.5 mm	17.5 mm
Height	90 mm	90 mm	90 mm	90 mm	90 mm	90 mm
Depth	65.5 mm	65.5 mm	65.5 mm	65.5 mm	65.5 mm	65.5 mm
Weight	135 gr.	120 gr.	175 gr.	150 gr.	120 gr.	120 gr.
Terminals						
Terminal capacity – fine stranded wire	1...2.5 mm ²	1...2.5 mm ²	1...2.5 mm ²	1...2.5 mm ²	1...2.5 mm ²	1...2.5 mm ²
Terminal capacity – solid wire	1...4 mm ²	1...4 mm ²	1...4 mm ²	1...4 mm ²	1...4 mm ²	1...4 mm ²
Terminal screw size	M3.5	M3.5	M3.5	M3.5	M3.5	M3.5
Terminal screw head type (Pozidrive)	PZ Size 1	PZ Size 1	PZ Size 1	PZ Size 1	PZ Size 1	PZ Size 1
Maximum torque	0.8 Nm	0.8 Nm	0.8 Nm	0.8 Nm	0.8 Nm	0.8 Nm

1) Remark

ON = Permanent ON

OFF = Permanent OFF

Hand = ON or OFF, valid until next program cycle overrules

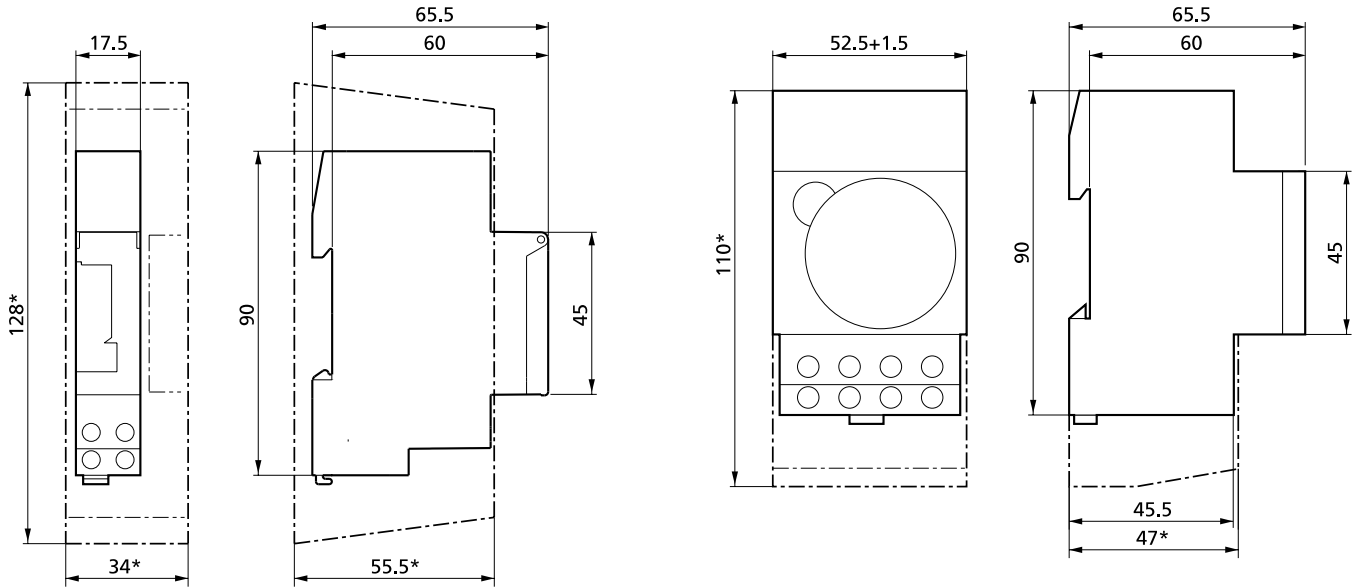
Auto = According program

10.1

Technical data

Control and switching devices dimensions and data

Analogue Timers, technical drawings



Analogue day and week Timers, type TAD1NCS, TAD1S and TAW1S.
Dimensions are applicable when using terminal covers.

Analogue day and week Timers, types TAD1NC, TAD1 and TAW 1.
Dimensions are applicable when using terminal covers.

Digital week timers, technical details

Digital Timers – week program	TDW1	TDW1S	TDW2	TDW2E
General				
Standards	EN 60730-2-7, EN 60730-1			
Nominal operating voltage	230...240 Vac	230 Vac	230...240 Vac	230...240 Vac
Nominal operating voltage tolerance	-10%...+6%	-10%...+10%	-10%...+6%	-10%...+6%
Frequency	50...60 Hz	50...60 Hz	50...60 Hz	50...60 Hz
Power consumption	max. 6 VA	± 2.5 VA	max. 6 VA	max. 6 VA
Time base control	Quartz	Quartz	Quartz	Quartz
Accuracy at 20 °C	$f_{-} \pm 1 \text{ sec./day}$	$f_{-} \pm 1 \text{ sec./day}$	$f_{-} \pm 1 \text{ sec./day}$	$f_{-} \pm 1 \text{ sec./day}$
Power reserve at 20 °C	10 years	3 years	10 years	10 years
Type of battery	Lithium	Lithium (CR2032)	Lithium	Lithium
Mechanical endurance (switching cycles)	> 100.000	> 100.000	> 100.000	> 100.000
Electrical endurance (switching cycles)	> 40.000	> 40.000	> 40.000	> 40.000
Protection class (acc. EN 60529)	IP20	IP20	IP20	IP20
Permissible ambient temperature	-10 °C...+50 °C	-10 °C...+50 °C	-10 °C...+50 °C	-10 °C...+50 °C
Storage temperature	-25 °C...+50 °C	-25 °C...+50 °C	-25 °C...+50 °C	-25 °C...+50 °C
Protection class at proper installation	II (acc. EN 60730-1)	II (acc. EN 60355-1)	II (acc. EN 60730-1)	II (acc. EN 60730-1)

Digital week timers, technical details (continued)

Digital Timers – week program	TDW1	TDW1S	TDW2	TDW2E
Switching contact(s)				
Type of switching contact	1 x CO	1 x CO	2 x CO	2 x CO
Contact material	Ag Sn O2	Ag Sn O2	Ag Sn O2	Ag Sn O2
Switching capacity at 250 Vac, cosj = 1	16 A	16 A	16 A	16 A
Switching capacity at 250 Vac, cosj = 0,6	10:00 AM	6:00 AM	10:00 AM	10:00 AM
Digital Timers – week program	TDW1	TDW1S	TDW2	TDW2E
Switching capacity for lighting :				
-Incandescent lamp	2300 W	1000 W	2300 W	2300 W
-Halogen lamp	2300 W	1000 W	2300 W	2300 W
– Fluorescent lamp :				
single fitting uncompensated (inductive)	1000 W	800 W	1000 W	1000 W
single fitting compensated (capacitive 42mF)	400 W	200 W	400 W	400 W
double fitting series compensated	1000 W	800 W	1000 W	1000 W
– Compact fluorescent lamp electronic				
7 W	9 x	7 x	9 x	9 x
11 W	7 x	6 x	7 x	7 x
15 W	7 x	5 x	7 x	7 x
20 W	7 x	5 x	7 x	7 x
23 W	7 x	5 x	7 x	7 x
Programming features				
Period of program	Week	Week	Week	Week
Number of channels	1	1	2	2
Minimum cycle time	1 min.	1 min.	1 min.	1 min.
Maximum programming steps in memory	28	28	42	42
Summer –/wintertime automatic (or manual on/off)	Yes	Yes	Yes	Yes
Random program	No	No	No	Yes
Holiday program	No	No	No	Yes
Cycle program	No	No	No	Yes
Pulse switching	No	No	No	Yes
Manual/Hand/Permanent switching 1)	ON, OFF, Hand, Auto	ON, OFF, Hand, Auto	ON, OFF, Hand, Auto	ON, OFF, Hand, Auto
LCD backlighting	No	No	No	Yes
Dimensions & weight				
Number of module width	2	1	2	2
Width	35 mm	17.9 mm	35 mm	35 mm
Height	86 mm	85.5 mm	86 mm	86 mm
Depth	65.5 mm	65.5 mm	65.5 mm	65.5 mm
Weight	170 gr.	85 gr.	170 gr.	170 gr.
Terminals				
Terminal capacity – fine stranded wire	1...2.5 mm ²	1...2.5 mm ²	1...2.5 mm ²	1...2.5 mm ²
Terminal capacity – solid wire	1...4 mm ²	1...4 mm ²	1...4 mm ²	1...4 mm ²
Terminal screw size	M3.5	M3.5	M3.5	M3.5
Terminal screw head type (Pozidrive)	PZ Size 1	PZ Size 1	PZ Size 1	PZ Size 1
Maximum torque	0.8 Nm	0.8 Nm	0.8 Nm	0.8 Nm

1) Remark

ON = Permanent ON

OFF = Permanent OFF

Hand = ON or OFF, valid until next program cycle overrules

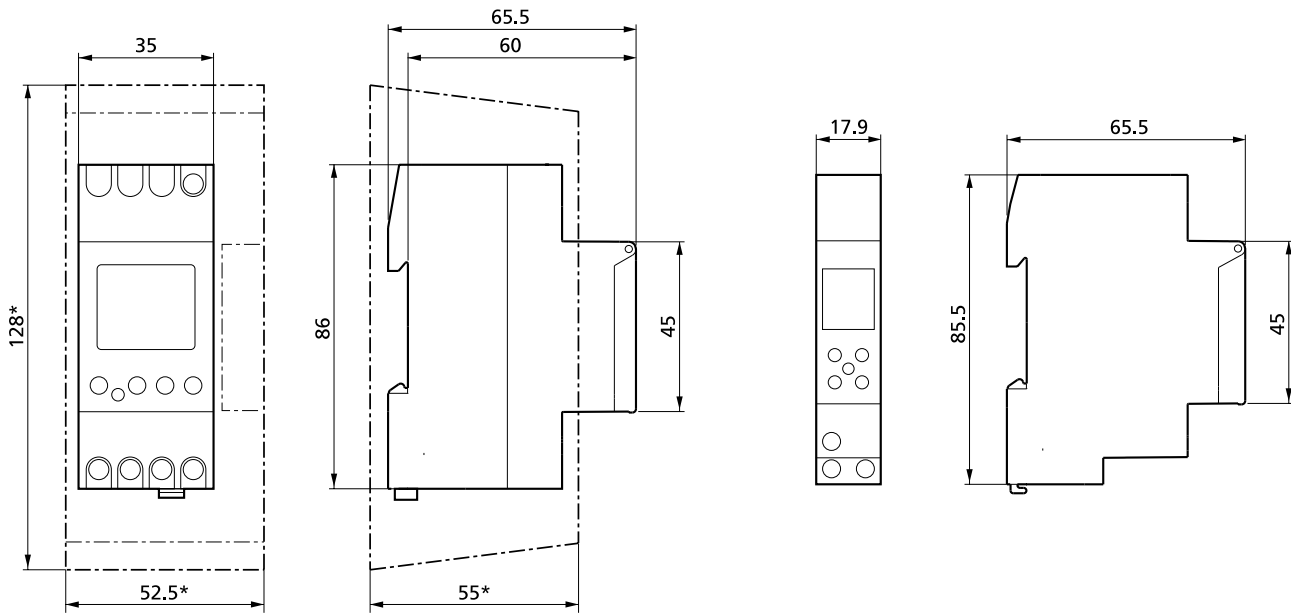
Auto = According program

10.1

Technical data

Control and switching devices dimensions and data

Digital week timers, technical drawings



Digital week Timers, types TDW1, TDW2 and TDW2E.
Dimensions are applicable when using terminal covers.

Digital week Timers, type TDW1S.

Staircase timers, technical details

Staircase Timer	TE7	TE1
General		
Standards	EN 60669-2-3, EN 60669-2-1, EN 60669-1	
Nominal operating voltage	220...240 Vac	220...240 Vac
Nominal operating voltage tolerance	-15%...+10%	-15%...+10%
Frequency	50...60 Hz	50...60 Hz
Power consumption	± 6 VA	± 6 VA
Time setting	0.5–20 min.	0.5–20 min.
Mechanical endurance (switching cycles)	> 100.000	> 100.000
Electrical endurance (switching cycles)	> 40.000	> 40.000
Protection class (acc. EN 60529)	IP20	IP20
Permissible ambient temperature	-10 °C...+50 °C	-25 °C...+50 °C
Storage temperature	-25 °C...+50 °C	-25 °C...+50 °C
Protection class at proper installation	II	II
Switching contact(s)		
Type of switching contact	1 x NO (not potential free)	1 x NO (not potential free)
Contact material	Ag Sn O2	Ag Sn O2
Switching capacity at 250 Vac, cos φ=1	16 A	16 A
Switching capacity for lighting :		
–	2300 W	3600 W
–	2300 W	3600 W
–		
Single fitting uncompensated (inductive)	2300 W	3600 W *
Single fitting compensated (capacitive 120 mF)	400 W	1200 W *
Double fitting series compensated	2300 W	3600 W *
Single/double fitting electronic supply	300 W	1000 W
7 W	9 x	34 x
9 W	7 x	27 x
11 W	7 x	27 x
15 W	7 x	24 x
20 W	7 x	22 x
23 W	7 x	22 x
Features		
Maximum load for push button illumination (incandescent lamp)	150 mA	150 mA
Automatic 3/4 wire detection	Yes	Yes
Separate control input 8–240 Vac/dc galvanic separated (e.g. for intercom)	No	Yes
Permanent on function	Yes	Yes
Warning before switching off (2 times flashing) *	No	Yes
Time extension (1 hour)	No	Yes
Pulse switching (on & off)	No	Yes
Dimensions & weight		
Number of module width	1	1
Width	17.5 mm	17.5 mm
Height	90 mm	90 mm
Depth	65.5 mm	65.5 mm
Weight	99 gr.	99 gr.
Staircase Timer	TE7	TE1
Terminals		
Terminal capacity – fine stranded wire	1...2.5 mm ²	1...2.5 mm ²
Terminal capacity – solid wire	1...4 mm ²	1...4 mm ²
Terminal screw size	M3.5	M3.5
Terminal screw head type (Pozidrive)	PZ Size 1	PZ Size 1
Maximum torque	0.8 Nm	0.8 Nm

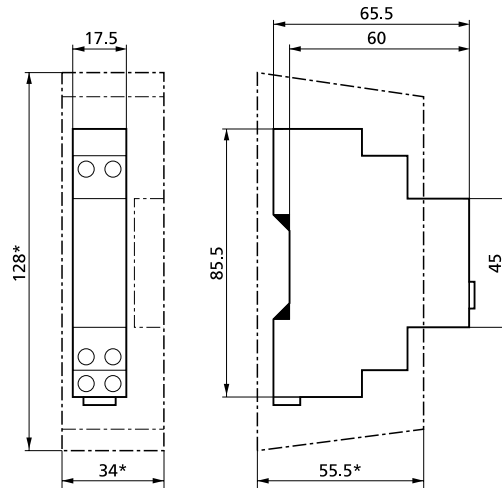
Note : Lamp load marked with * may not be used in combination with 'warning function'

10.1

Technical data

Control and switching devices dimensions and data

Staircase timers, technical drawings

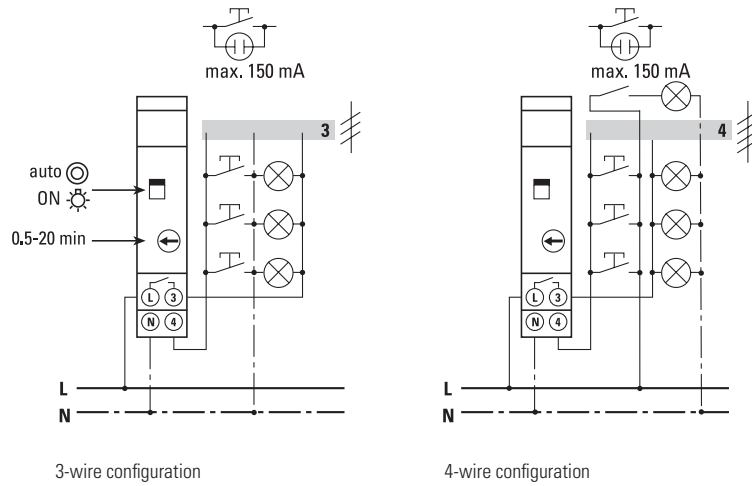


Staircase Timer, type TE7 and TE1.

*) Dimension applicable when using terminal covers.

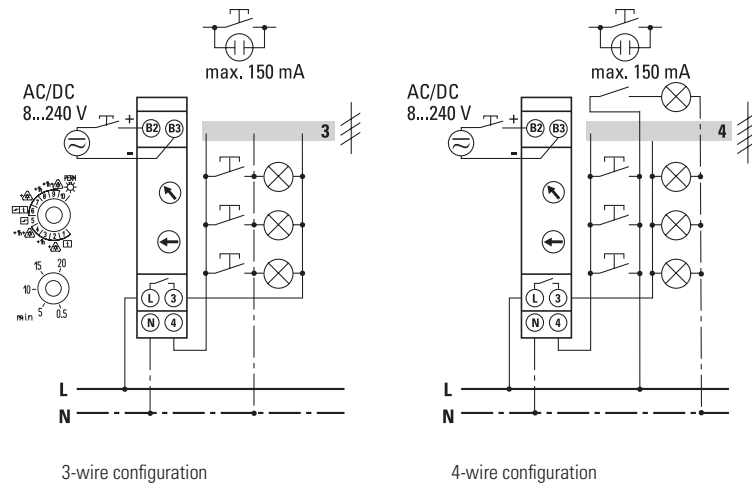
Staircase timer TE7, example wiring diagrams

The staircase timers can be wired utilising either the 3-wire or 4-wire configuration as shown in the wiring diagrams below.



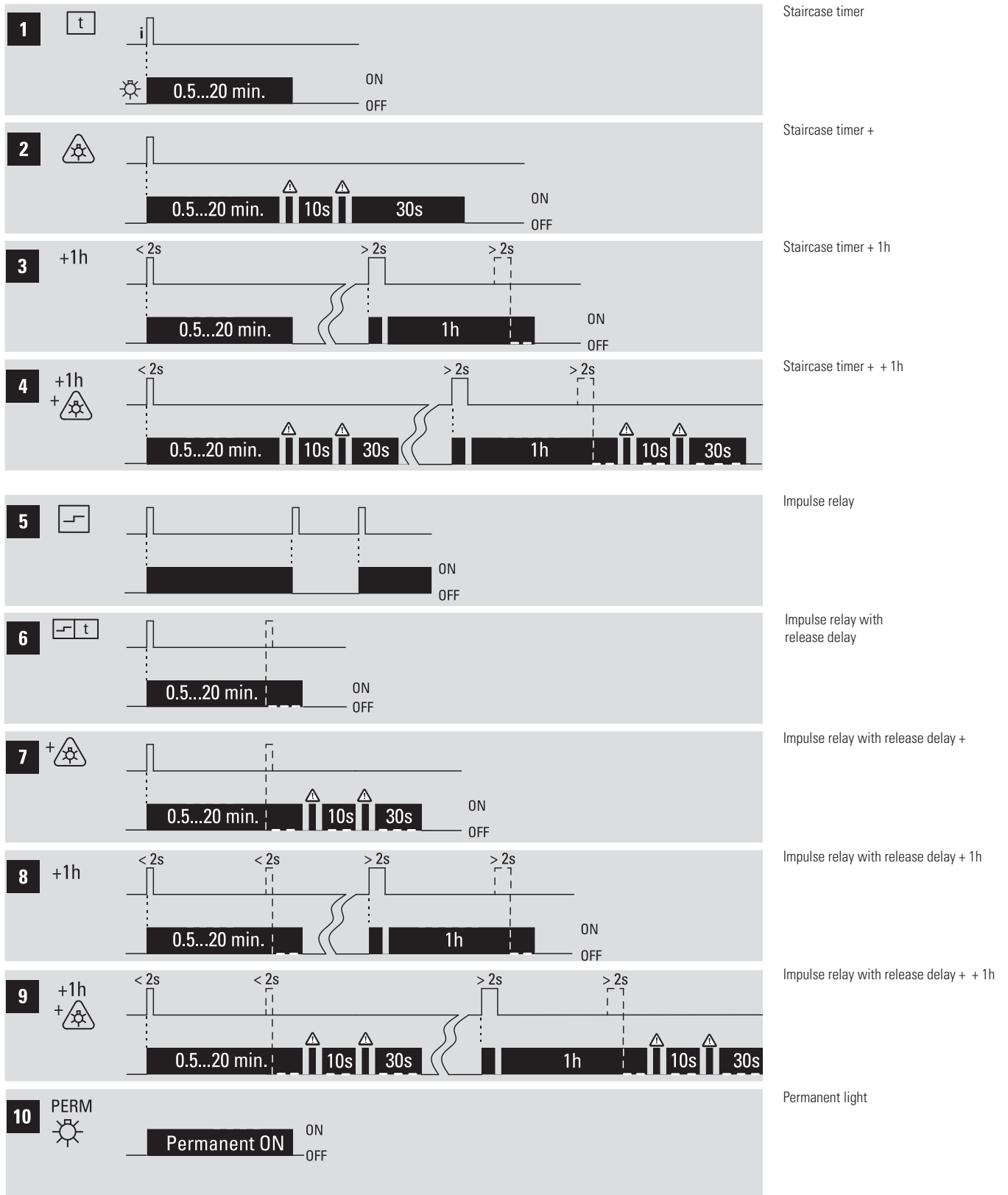
Multifunctional staircase timer TE1, example wiring diagram

The staircase timers can be wired utilising either the 3-wire or 4-wire configuration as shown in the wiring diagrams below.



Multifunctional staircase timer TE1, available functions

Following functions can be set on the multifunctional staircase timer



Contactors type CR, technical data

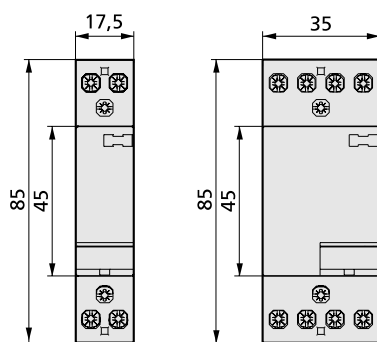
Products	Contactors				Aux. contact
Rating	20 A	25 A	40 A	63 A	6A
General					
Standards	IEC 60947-4-1, IEC 61095				IEC 60947-5-1
Nominal operating voltage 1-phase U _e 1-ph.	230 V	230 V	230 V	230 V	230 V
Nominal operating voltage 3-phase U _e 3-ph.	400 V	400 V	400 V	-	-
Overvoltage protection on coil	430 V (*5)	430 V (*5)	430 V	430 V	
Mechanical endurance (switching cycles)	3.000.000	3.000.000	3.000.000	3.000.000	3.000.000
Protection class (acc. DIN 40 050, IEC 529)	IP20	IP20	IP20	IP20	IP20
Permissible ambient temperature	-5...+55 °C	-5...+55 °C	-5...+55 °C	-5...+40 °C	-5...+55 °C
Storage temperature	-30...+80 °C	-30...+80 °C	-30...+80 °C	-30...+80 °C	-30...+80 °C
Contact rating					
Rated insulation voltage U _i	440 V	440 V	500 V	500 V	500 V
Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz'	50/60 Hz
Rated impulse withstand voltage U _{imp}	4 kV	4 kV	4 kV	4 kV	4 kV
Rated thermal current I _{th}	20 A	25 A	40 A	63 A	6 A
AC1/AC7a Rated operational current I _e	20 A	25 A	40 A	63 A	-
AC1/AC7a Operational power rating at U _e = 230 Vac P _{max}	4 kW	9 kW	16 kW	24 kW	-
AC1/AC7a Operational power rating at U _e = 400 Vac P _{max}	16 kW	26 kW	40 kW	-	-
AC3/AC7b Operational power rating at U _e = 230 Vac P _{max}	1,3 kW (*1)	2,2 kW	5,5 kW	8,5 kW	-
AC3/AC7b Operational power rating at U _e = 400 Vac P _{max}	4 kW	11 kW	15 kW	-	-
DC1 Rated thermal current at U _e = 24 Vdc I _e	20 A	25 A	40 A	63 A	-
DC1 Rated thermal current at U _e = 110 Vdc I _e	1A	2A	4A	4A	-
DC1 Rated thermal current at U _e = 220 Vdc I _e	0,5 A	0,5 A	0,8 A	0,8 A	-
DC1 Rated thermal current at U _e = 24 Vdc (2-poles in series) I _e	20 A	25 A	40 A	63 A	-
DC1 Rated thermal current at U _e = 110 Vdc (2-poles in series) I _e	3 A	4 A	10 A	10 A	-
DC1 Rated thermal current at U _e = 220 Vdc (2-poles in series) I _e	1,5 A	1,5 A	6 A	6 A	-
DC1 Rated thermal current at U _e = 24 Vdc (3-poles in series)	-	25 A	40 A	63 A	-
DC1 Rated thermal current at U _e = 110 Vdc (3-poles in series)	-	6:00 AM	30 A	35 A	-
DC1 Rated thermal current at U _e = 220 Vdc (3-poles in series)	-	2,5 A	20 A	30 A	-
Electrical endurance					
Maximum operating cycles at AC1/AC7a application	200.000 x	200.000 x	100.000 x	100.000 x	-
Maximum operating cycles at AC3/AC7b application	300.000 x	500.000 x	150.000 x	150.000 x	-
Maximum operating cycles at AC5a application	100.000 x	100.000 x	100.000 x	100.000 x	-
Maximum operating cycles at AC5b application	100.000 x (*2)	100.000 x (*2)	100.000 x (*3)	100.000 x (*4)	-
Maximum operating cycles per hour	600 x	600 x	600 x	600 x	600 x
Power dissipation per contact at I _n	1,7 W	2,2 W	4 W	8 W	-
Maximum back-up fuse	25 A gL	35 A gL	63 A gL	80 A gL	-
Rating	20 A	25 A	40 A	63 A	6 A
Operating coil (for combined ac/dc types only – CR...)					
Coil inrush power (for all voltage ratings)	2,5 W	3 W	5 W	5 W	-
Coil consumption (for all voltage ratings)	2,5 W	3 W	5 W	5 W	-
Closing delay	15-25 ms	15-30 ms	15-20 ms	15-20 ms	-
Opening delay	35-45 ms	50-80 ms	35-45 ms	35-45 ms	-
Operating coil (for ac types only – CR...A)					
Coil inrush power (for all voltage ratings)	13 W/15 VA	17 W/27 VA	-	-	-
Coil consumption (for all voltage ratings)	2 W/5 VA	1 W/2.7 VA	-	-	-
Closing delay	15 ms	15-25 ms	-	-	-
Opening delay	10 ms	35-45 ms	-	-	-

Contactors type CR, technical data (continued)

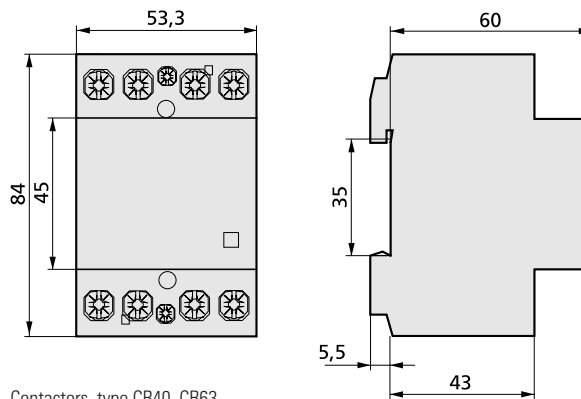
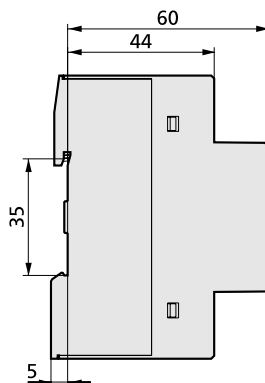
Products	Contactors				Aux. contact
Dimensions					
Width	18 mm	35 mm	54 mm	54 mm	9 mm
Height	85 mm	85 mm	85 mm	85 mm	85 mm
Depth	60 mm	60 mm	60 mm	60 mm	60 mm
Terminals for main & auxiliary contacts					
Terminal capacity – fine stranded wire	1...6 mm ²	1...6 mm ²	1...16 mm ²	1...16 mm ²	1...2,5 mm ²
Terminal capacity – solid wire	1...10 mm ²	1...10 mm ²	1...25 mm ²	1...25 mm ²	1...2,5 mm ²
Terminal screw size	M3,5	M3,5	M5	M5	M3
Terminal screw head type (Pozidrive)	PZ Size 1	PZ Size 1	PZ Size 2	PZ Size 2	PZ Size 1
Maximum torque	1,2 Nm	1,2 Nm	2,0 Nm	2,0 Nm	0,8 Nm
Terminals for operating coils					
Terminal capacity – fine stranded wire	1...2,5 mm ²	1...2,5 mm ²	1...2,5 mm ²	1...2,5 mm ²	
Terminal capacity – solid wire	1...2,5 mm ²	1...2,5 mm ²	1...2,5 mm ²	1...2,5 mm ²	
Terminal screw size	M3	M3	M3	M3	
Terminal screw head type (Pozidrive)	PZ Size 1	PZ Size 1	PZ Size 1	PZ Size 1	
Maximum torque	0,6 Nm	0,6 Nm	0,6 Nm	0,6 Nm	

Remarks:

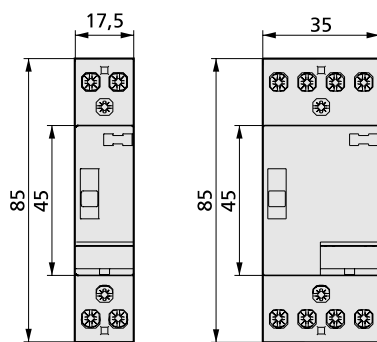
- *1) Only applicable for normally open contact(s)
- *2) At 1,5 kW
- *3) At 3 kW
- *4) At 5 kW
- *5) For CR... types only (combined ac/dc types), NOT for CR... A types



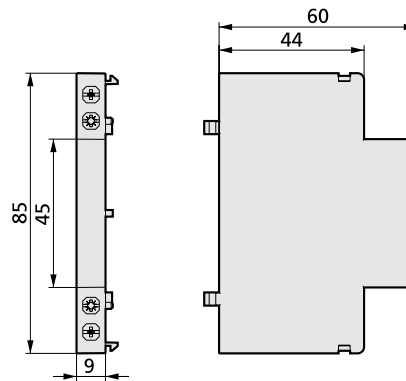
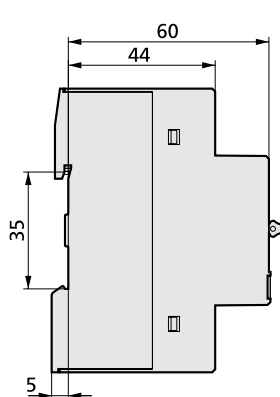
Contactors, type CR20, CR25



Contactors, type CR40, CR63



Day/night contactors, type CRM20, CRM25



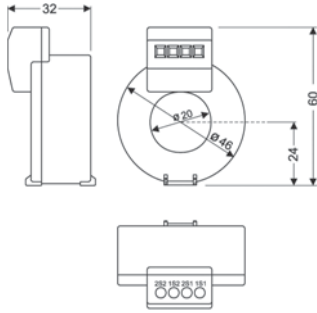
Auxiliary contact

10.1

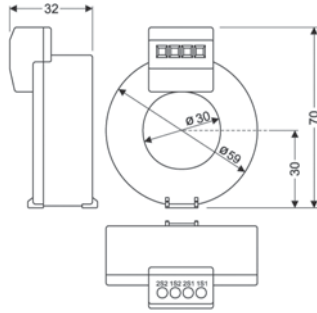
Technical data

Earth leakage relays and CTs

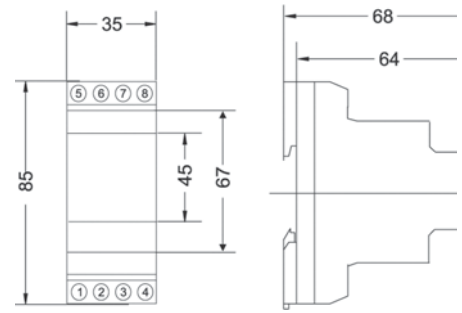
Earth leakage relays and CTs, dimensional drawings



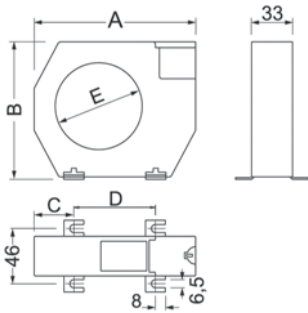
ELRCT20



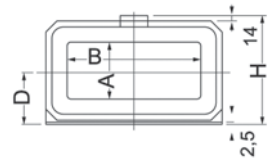
ELRCT30



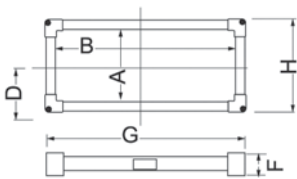
ELRCT30



Type	A	B	C	D	E
ELRCT35	100	79	26	48.5	35
ELRCT70	130	110	32	66	70
ELRCT105	170	146	38	94	105
ELRCT140	220	196	48.5	123	140
ELRCT210	299	284	69	161	210



Type	A	B	C	D	E	F	G	H	I
ELRCT70-175	70	175	225	85	22	46	261	176	7.5
ELRCT115-305	115	305	360	116	25	55	402	240	8
ELRCT150-350	150	350	415	140	28	55	460	285	8



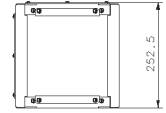
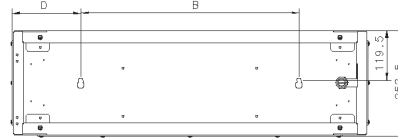
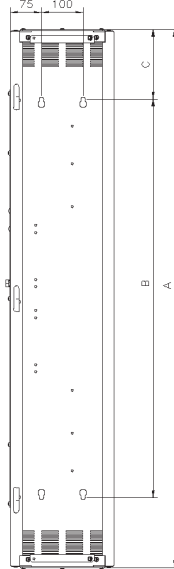
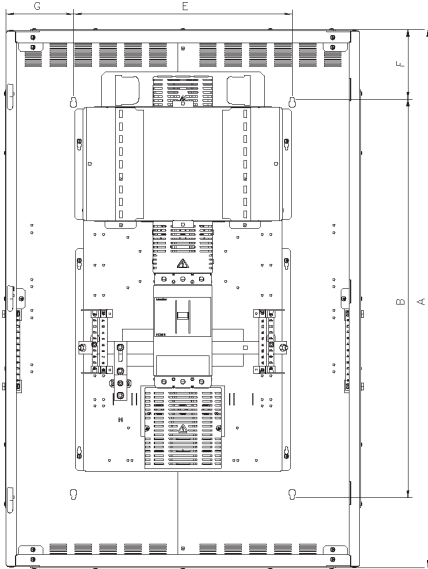
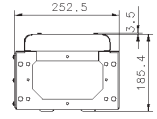
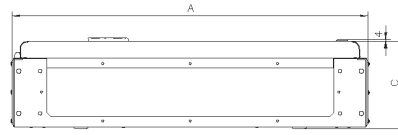
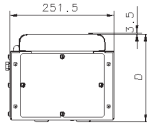
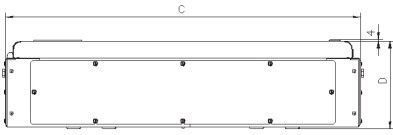
Type	A	B	C	D	E	F	G	H	I
ELRCT200-500	200	500	-	120	-	40	556	239	-

MCCB type	Rating (A)	Disconnection 0.4s		Disconnection 5s	
		Minimum setting	Maximum setting	Minimum setting	Maximum setting
NZM1 range	16	–	1.438	–	1.563
	20	1.917	1.150	1.917	1.250
	25	1.533	0.920	1.533	1.000
	32	1.198	0.719	1.198	0.781
	40	0.958	0.575	0.958	0.625
	50	0.767	0.460	0.767	0.500
	63	0.608	0.365	0.608	0.397
	80	0.479	0.288	0.479	0.313
	100	0.383	0.230	0.383	0.250
	125	0.307	0.184	0.307	0.200
	160	0.240	0.144	0.258	0.156
NZM2 range	125	0.307	0.184	0.307	0.200
	160	0.240	0.144	0.240	0.156
	200	0.192	0.115	0.192	0.125
	250	0.153	0.092	0.153	0.100
NZM3 range	250	0.153	0.092	0.153	0.100
	320	0.120	0.072	0.120	0.078
	400	0.096	0.058	0.096	0.063
NZMLW range	630	0.183	0.046	0.183	0.046
	800	0.144	0.036	0.144	0.036

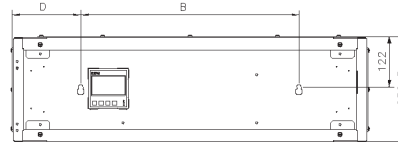
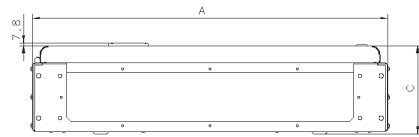
10.2

Technical data Panelboard dimensional drawings

Panelboard dimensional drawings



Filler boxes



Panelboards

Side extension boxes

Extension boxes

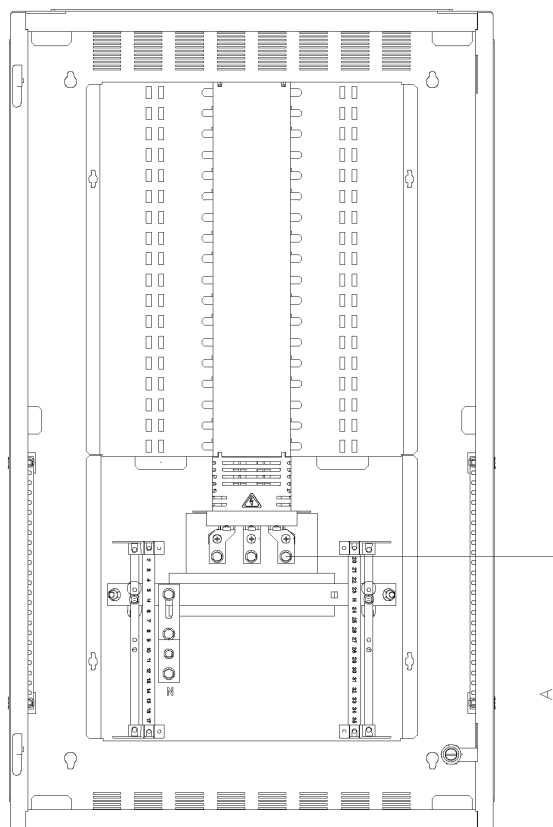
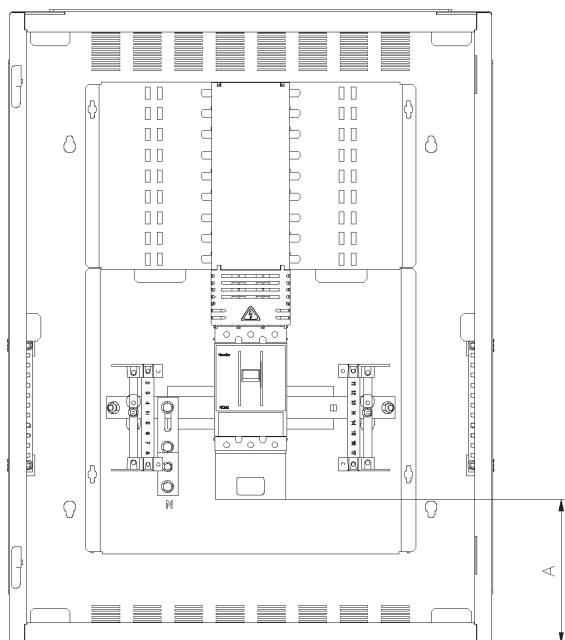
Panelboard dimensions

Description	Eaton list number	Dimensions (mm)						
		A	B	C	D	E	F	G
Extension boxes	EPBN1EX250	705	525	185.5	90	–	–	–
	EPBN2EX251	855	525	210.5	165	–	–	–
	EPBN3EX252	980	625	210.5	177.5	–	–	–
Filler boxes	EPBN1CX250	185.5	–	–	–	–	–	–
	EPBN2CX250	210.5	–	–	–	–	–	–
Panelboards	EPBN1425	830	544	703	185.5	525	143	89
	EPBN1625	920	544	703	185.5	525	188	89
	EPBN1825	1010.5	837.5	703	185.5	525	86.5	89
	EPBN11225	1191.5	1002	703	185.5	525	94.75	89
	EPBN1640	1291.5	956.5	853	210.5	525	167.5	164
	EPBN11240	1563	1228	853	210.5	525	167.5	164
	EPBN2640	1291.5	956.5	853	210.5	525	167.5	164
	EPBN21240	1563	1228	853	210.5	525	167.5	164
	EPBN21840	1834.5	1499.5	853	210.5	525	167.5	164
	EPBN2863	1650	1315	978	210.5	625	167.5	176.5
	EPBN21263	1650	1315	978	210.5	625	167.5	176.5
	EPBN21863	1915.5	1580.5	978	210.5	625	167.5	176.5
	EPBN3880	1650	1315	978	210.5	625	167.5	176.5
	EPBN31280	1915.5	1580.5	978	210.5	625	167.5	176.5
Side cable box	EPBN1425SXB	830	544	143	185.5	–	–	–
	EPBN1525SXB	920	544	188	185.5	–	–	–
	EPBN1825SXB	1010.5	837.5	86.5	185.5	–	–	–
	EPBN11225SXB	1191.5	1002	94.75	185.5	–	–	–
	EPBN2640SXB	1291.5	856.5	167.5	210.5	–	–	–
	EPBN21240SXB	1563	1228	167.5	210.5	–	–	–
	EPBN21840SXB	1834.5	1499.5	167.5	210.5	–	–	–
	EPBN21263SXB	1650	1315	167.5	210.5	–	–	–
	EPBN21863SXB	1915.5	1580.5	167.5	210.5	–	–	–
Meter packs	EPBN1EX250M	705	525	185.5	90	–	–	–
	EPBN2EX250M	855	525	210.5	165	–	–	–
	EPBN3EX250M	980	625	210.5	177.5	–	–	–
Side meter box	EPBN1425SXM	830	544	143	185.5	–	–	–
	EPBN1525SXM	920	544	188	185.5	–	–	–
	EPBN1825SXM	1010.5	837.5	86.5	185.5	–	–	–
	EPBN11225SXM	1191.5	1002	94.75	185.5	–	–	–
	EPBN2640SXM	1291.5	856.5	167.5	210.5	–	–	–
	EPBN21240SXM	1563	1228	167.5	210.5	–	–	–
	EPBN21840SXM	1834.5	1499.5	167.5	210.5	–	–	–
	EPBN21263SXM	1650	1315	167.5	210.5	–	–	–
	EPBN21863SXM	1915.5	1580.5	167.5	210.5	–	–	–
Din enclosures	EPBN1EXDIN	705	525	185.5	90	–	–	–
	EPBN2EXDIN	855	525	210.5	165	–	–	–
	EPBN3EXDIN	980	625	210.5	177.5	–	–	–
Surge suppression box	EPBN1SPD123	185.5	–	–	–	–	–	–
	EPBN1SPD1234	210.5	–	–	–	–	–	–

10.2

Technical data

Panelboard dimensional drawings



Rating (A)	Panelboard/incomer connection kit combination		Dimensions A (mm)
250	EPBN1425	EPBKN1253	210
	EPBN1625	EPBKN1253M	
	EPBN1825	EPBKN1254	
	EPBN11225	EPBKN1254M	
	398	EPBN1425	
		EPBN1625	EPBKN125L
		EPBN1825	EPBKN125LM
		EPBN11225	
400	EPBN1640	EPBKN2403	380
	EPBN11240	EPBKN2403M	
	EPBN2640	EPBKN2404	
	EPBN21240	EPBKN2404M	
	731	EPBN1640	
		EPBN11240	EPBKN240L
		EPBN2640	EPBKN240LM
		EPBN21240	
630	EPBN2863	EPBKN2633	705
	EPBN21263	EPBKN2633M	
	EPBN21863	EPBKN2634	
	775		EPBKN2634M
		EPBN2863	EPBKN263L
		EPBN21263	EPBKN263LM
800	EPBN21863		
	EPBN3880	EPBKN3803	454
	EPBN31280	EPBKN3803M	
		EPBKN3804	
	EPBKN3804M		

- 3 phase 3 or 4 wire system.
- Liquid crystal display with backlight. 4 lines, 4 digits per line to show electrical parameters. 5th line, 8 digits to show energy. Bar graph for current indication as percentage of CT rating.
- 96 x 96mm panel mount, 55mm rear panel.
- Modbus comms & pulse output.
- Fast installation plug-in cabling for current and voltage inputs. Feed-through voltage supply capability.
- Phase sequence detection and correction capability.
- Multifunction meter measuring parameters:
 - Voltage (P-P / P/N) (individual/average)
 - Current (I1, I2, I3) (individual/average)
 - Frequency
 - Power factor (individual/average)
 - Active, reactive, apparent power (individual/total)
 - Active, reactive, apparent energy (total)
- Display scrolling selectable for automatic or manual.
- Meter is self-powered from voltage supply. Auxiliary voltage supply not required.
- Front panel indicator when Pulse Output or Comms operates.

The range of meter is a class 1 multi-function, panel mounting meter to measure electrical parameters on LV supplies to The meter is a Class 1 multi-function, panel mounting meter to measure electrical parameters on LV supplies to and from TP&N distribution boards. It is ideal for applications such as:

- Energy monitoring.
- Power factor analysis.
- Supply capacity.
- Building regs part L2.
- Building performance.
- Environmental standards e.g. IS14001, EMAS, ECA.
- Climate change levy.
- Carbon trading.
- Carbon footprints.

The six dedicated buttons are labelled as V, I, VAF, PF, P, E. The parameters available by pressing each key are detailed below:

Measurements available via:

Button 1 (V)	Line to neutral voltage of three phase and average line to line voltage Line to line voltage of three phase and average line to line voltage
Button 2 (I)	Phase current of three phase and average phase current. Phase current of three phase and maximum phase current.
Button 3 (VAF)	Voltage, current, power factor of first phase and frequency Voltage, current, power factor of second phase and frequency Voltage, current, power factor of third phase and frequency Average value of voltage, current, power factor of three phase and frequency
Button 4 (PF)	Power factor of three phase and average power factor
Button 5 (P)	Active power of three phase and total active power Reactive power of three phase and total reactive power Apparent power of three phase and total apparent power Active, reactive, apparent power and power factor of first phase Active, reactive, apparent power and power factor of second phase Active, reactive, apparent power and power factor of third phase Total active, reactive, apparent power and average power factor of three phase Maximum active power demand, reactive power demand, apparent power demand Minimum active power demand, reactive power demand
Button 6 (E)	Active energy of three phase Apparent energy of three phase Reactive energy of three phase

Accuracy

Measurement	Accuracy
Voltage VL-N	± 0.5% of full scale
Voltage VL-L	± 0.5% of full scale
Current	± 0.5% of full scale
Frequency	± 0.1% For voltage >20V L-N For voltage >35V L-N
Active power	Class 1
Apparent power	Class 1
Reactive power	Class 1

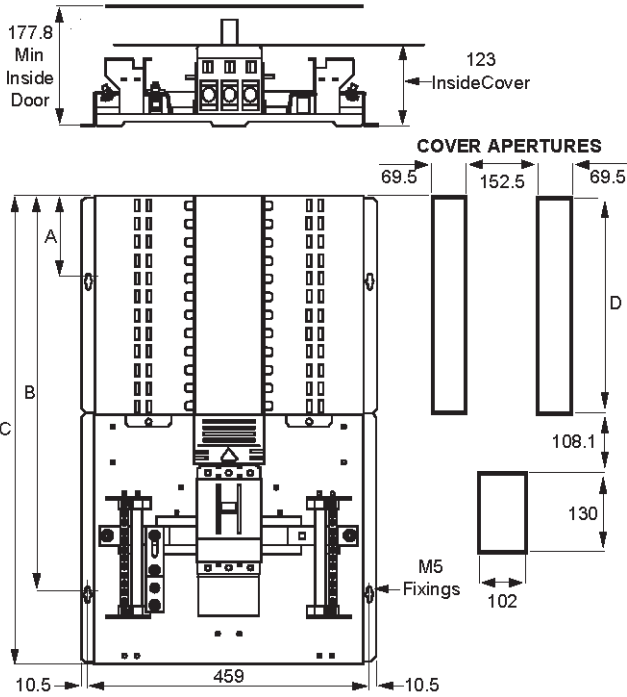
Measurement	Accuracy
Power factor	± 0.01
Active energy	Class 1
Apparent energy	Class 1
Reactive energy	Class 1
MAX / MIN active power	Class 1
MAX / MIN reactive power	Class 1
MAX apparent power	Class 1

10.2

Technical data

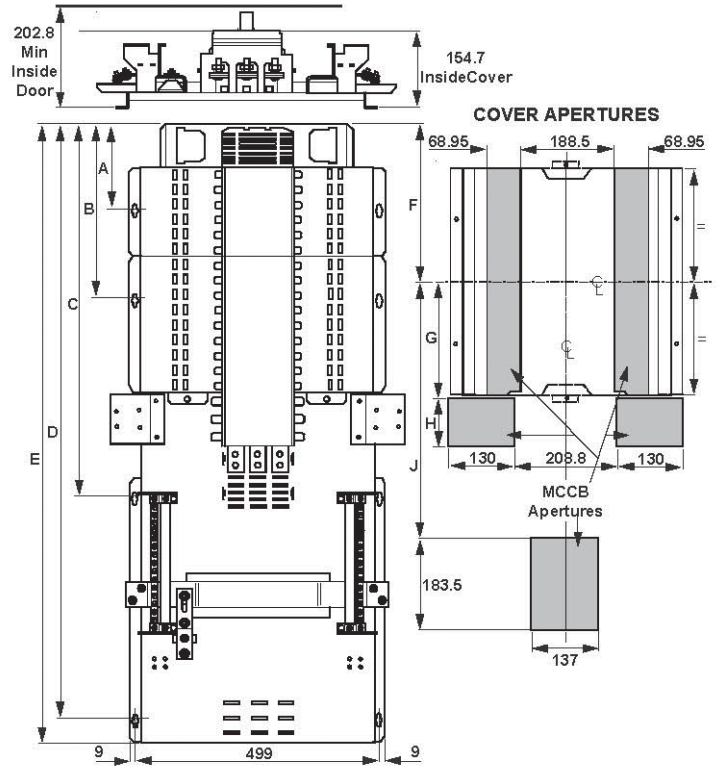
MCCB pan assemblies, dimensions

250A pan assembly dimensions EPBPN1425–EPBPN11225



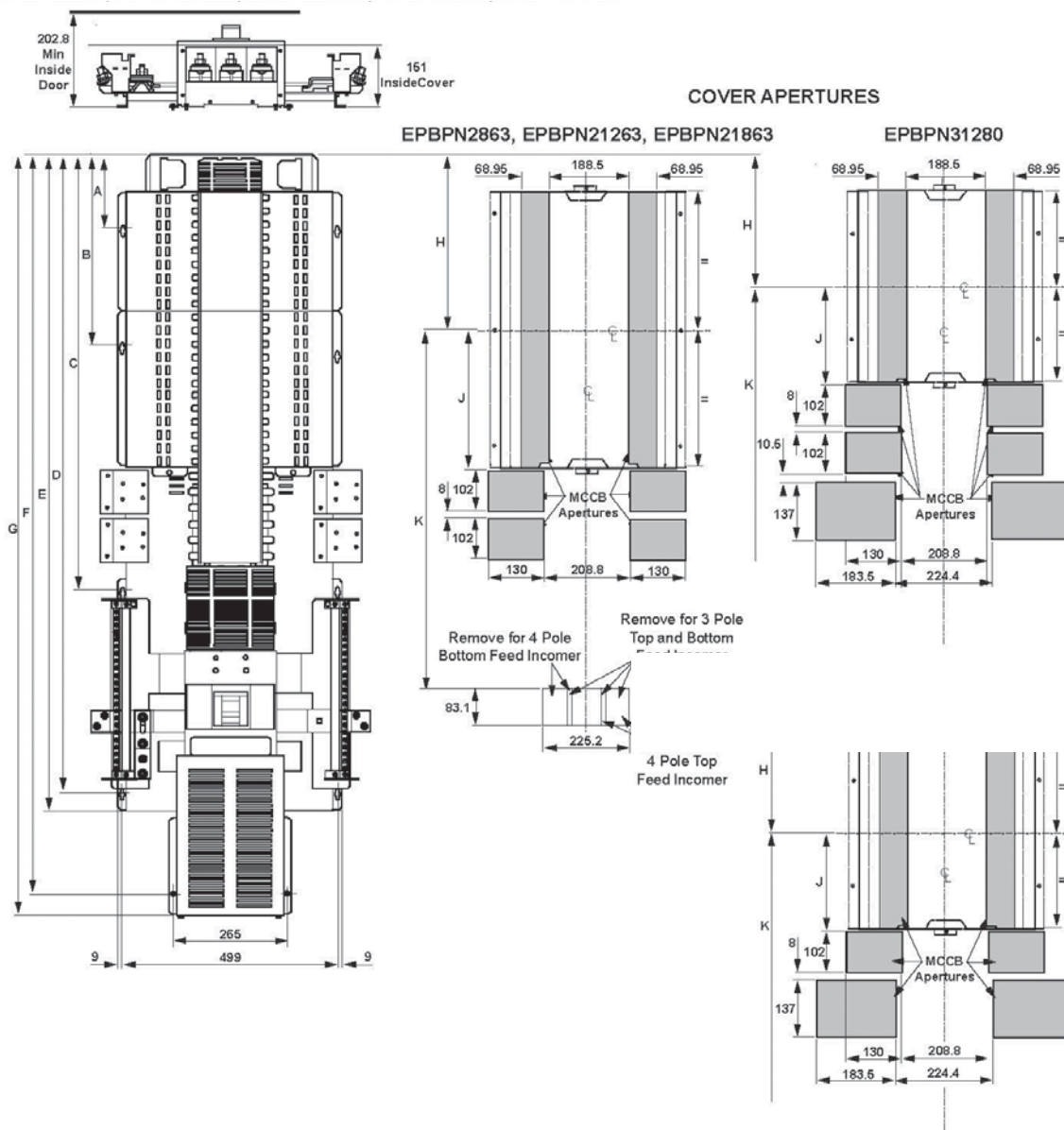
Eaton list number	A	B	C	D
EPBPN1425	29.5	483	592.5	181.5
EPBPN1625	29.5	578.5	683	272
EPBPN1825	131	669	773.5	362.5
EPBPN11225	131	850	954.5	543.5

400A pan assembly dimensions EPBPN1640–EPBPN21840



Eaton list number	A	B	C	D	E	F	G	H	J
EPBPN1640	167	N/A	473.5	923	979.5	222.25	N/A	N/A	318.25
EPBPN11240	167	438.5	725.5	1175	1231.8	358	N/A	N/A	454
EPBPN2640	167	N/A	473.5	923	979.5	177	96.75	102	383
EPBPN21240	167	348	745	1194.5	1251	312.75	232.5	102	518.75
EPBPN21840	167	529	1016.5	1466	1522.5	448.25	368.25	102	654.5

630–800A pan assembly dimensions EPBPN2863, EPBPN21263, EPBPN21863, EPBPN3880, EPBPN31280



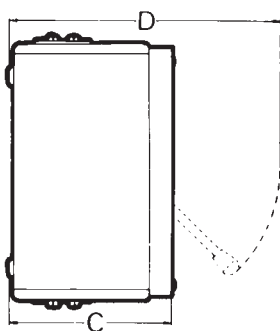
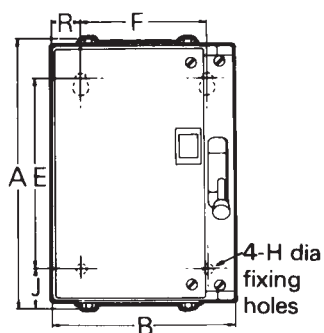
Eaton list number	A	B	C	D	E	F	G	H	J	K
EPBPN2863	167	N/A	543.5	996	1052.5	1240	1291	177	96.75	601.5
EPBPN21263	167	N/A	724.5	1177	1233.5	1421	1472	267.5	187.25	692
EPBPN21863	167	438.5	996	1448.5	1505	1692	1743	403.25	323	828
EPBPN3880	167	N/A	580.5	1033	1089.5	1277	1328	177	96.75	638.5
EPBPN31280	167	N/A	761.5	1214	1270.5	1458	1509	222.25	142	794.5

10.3

Technical data Enclosed switch & fusegear

Glasgow fuse-switch-disconnectors and switch-disconnectors dimensions

Nominal unit rating, In (A)	Poles	Dimensions, mm								
		A	B	C	D	E	F	H	J	R
63	SPSN, DP	289	199	180	283	203	127	7.9	43	36
	TPN, TPSN	289	275	180	283	203	203	7.9	43	36
100	SPSN, DP	327	199	180	283	241	127	7.9	43	35
	TPN, TPSN	327	275	180	283	241	203	7.9	43	35
160, 200	SPSN, DP	431	280	229	383	340	140	7	45	70
	TPN, TPSN	431	340	229	383	340	200	7	45	70
315, 400	TPN, TPSN	501	467	291	545	385	375	10	58	46
500, 630, 800	TPN, TPSN	596	680	381	715	440	550	14	78	65



Units have retractable handles. 'D' dimension indicates fully extended operating position.

Rating to BS EN 60947-3 general performance characteristics

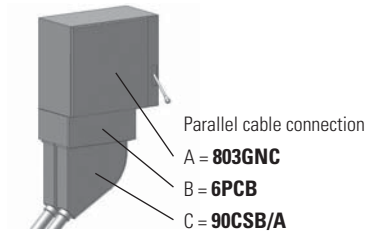
Nominal unit rating, Ie (A)	Utilisation category at Ue 415V to BS EN 60947-3		
	Switch-disconnector AC21A Ie	Fuse-switch-disconnector AC22A Ie	AC23A Ie
63	125A	63A	41A
100	125A	100A	41A
160	Use 200A	160A	160A
200	315A	200A	160A
315	Use 400A	315A	200A
400	400A	400A	200A
500	Use 630A	500A	385A
630	630A	630A	385A
800	800A	800A	500A

Operational performance

- In accordance with BS EN 60947-3: "A" categories all ratings have been tested to values specified below:

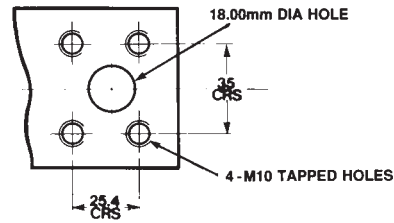
Rated operational current, Ie (A)	Operating cycles		Total
	Without current	With current	
63–100	8,500	1,500	10,000
160–315	7,000	1,000	8,000
400–630	4,000	1,000	5,000
800	2,500	500	3,000

Glasgow parallel cable connection & copper terminal plate



Parallel cable connection
A = **803GNC**
B = **6PCB**
C = **90CSB/A**

An **803GCC** (copper connection piece) is required in addition to switch enclosure for parallel cable connection.

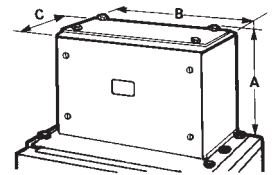


Copper terminal plate

Each copper terminal plate has 1-M16 x 50mm bolt, nut and washers for single hole sockets. 4-M10 tapped holes are also provided for 4 hole sockets or solid copper.

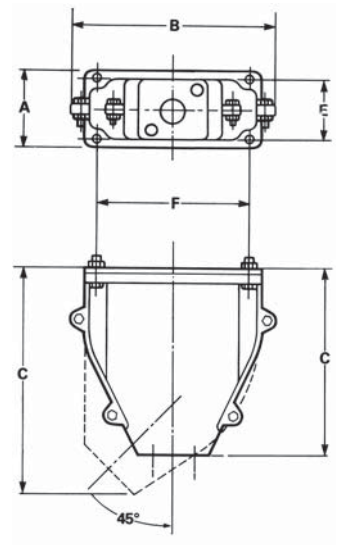
Cable extension boxes dimensions

Eaton list number	Dimensions, mm		
	A	B	C
1PCB	148	133	113
2PCB	148	209	113
3PCB	148	259	132
4PCB	302	347	184
5PCB	213	515	187
6PCB	213	515	327



Spreader boxes dimensions

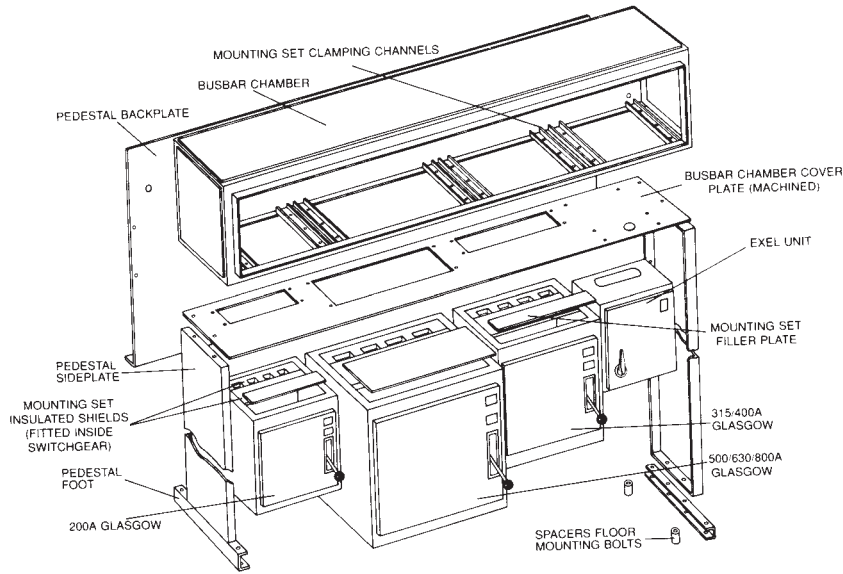
Eaton list number	Dimensions, mm					Fixing bolts	
	A	B	C	E	F	No.	Type
Straight entry							
50 CSB	83	232	170	67	171	4	M6
60 CSB	108	283	260	89	216	4	M8
70 CSB	133	384	322	114	318	4	M8
90 CSB	133	530	450	114	457	4	M10
45° Angled entry							
50 CSBA	83	232	250	67	171	4	M6
60 CSBA	108	283	310	89	216	4	M8
70 CSBA	133	384	390	114	318	4	M8
90 CSBA	133	530	510	114	457	4	M10



10.3

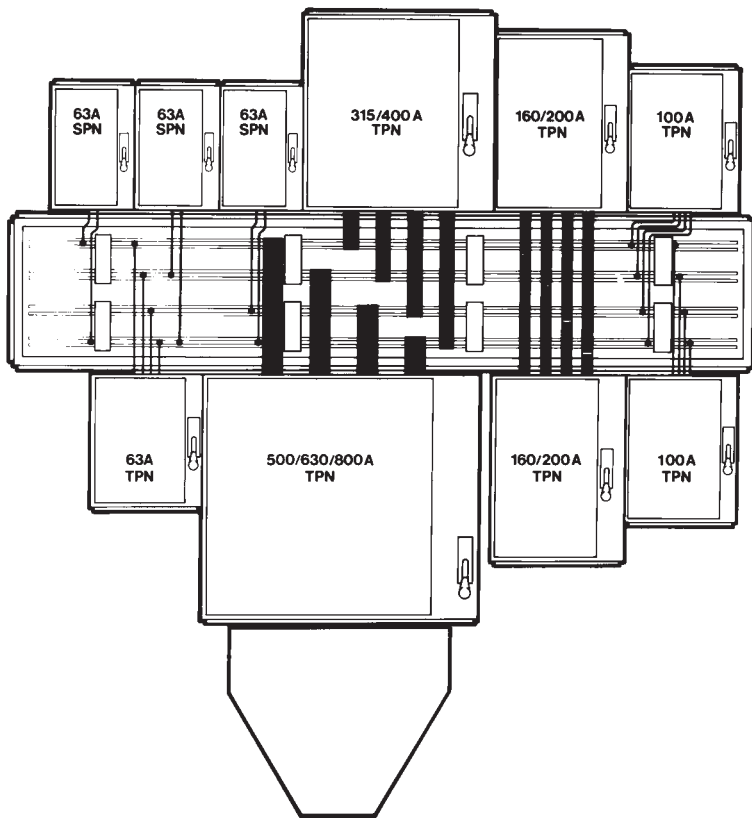
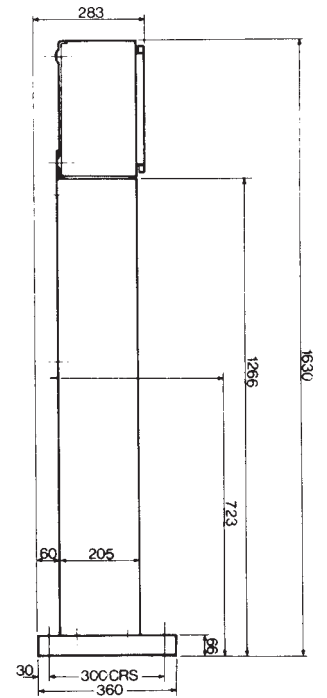
Technical data Enclosed switch & fusegear

Busbar chambers



Eaton's busbar chamber system is designed to provide either compact, wall-mounting installations or – by using optional pedestal sets – easily assembled switchboards. All units in the range share the same height and depth dimensions. Similarly the twin busbars are located in precisely the same positions throughout the range and vary in size only in their front-to-back dimensions according to rating. Detachable end plates enable all units to be extended by coupling to a second busbar chamber using extension sets.

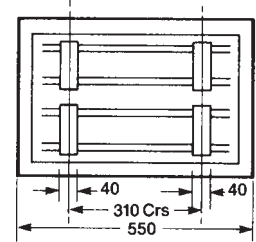
Pedestal and back-plate sets



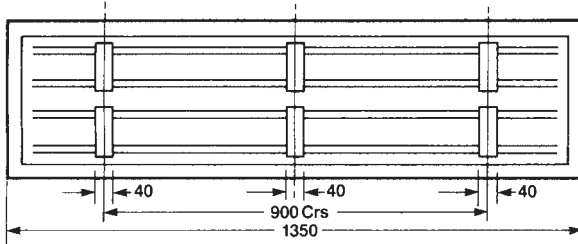
Busbar chamber – dimensions

Nominal length, mm	Dimensions, mm						
	A	B	C	D	E	F	G
550	562	364	222	280	474	–	4
900	912	364	222	280	824	–	4
1350	1362	364	222	280	1274	–	4
1800	1812	364	222	280	1724	862	6

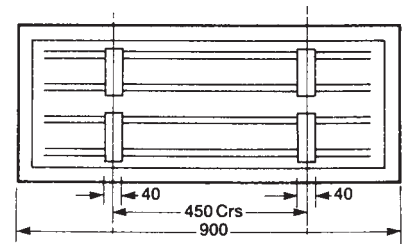
Nominal length chamber 550mm



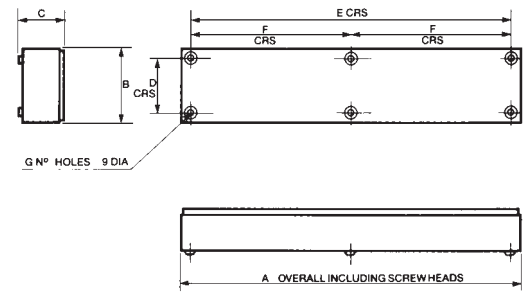
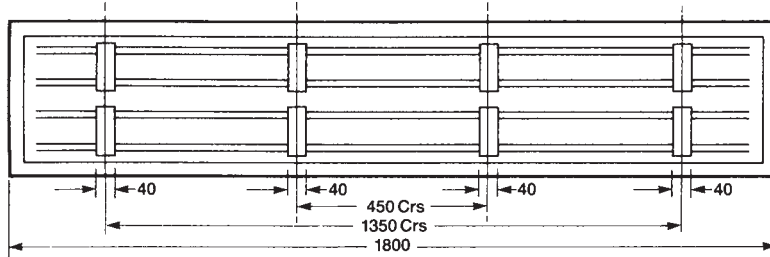
Nominal length chamber 1350mm



Nominal length chamber 900mm

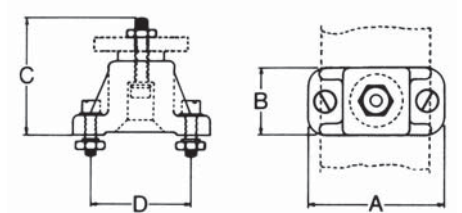


Nominal length chamber 1800mm



Busbar supports

Eaton list number	Dimensions, mm				Busbar fixing bolt	Suitable busbar section
	A	B	C	D		
10 BM	73	35	60	54	M6	32 x 6.4
10 BMD	73	35	79	54	M10	51 x 6.4
10 BML	95	51	79	64	M10	Larger busbars



These porcelain supports are suitable for use with flat busbars only and not with Eaton's MEM multiple type bars.

Operational performance

- In accordance with BS EN 60947-3 all ratings have been tested to values specified below:

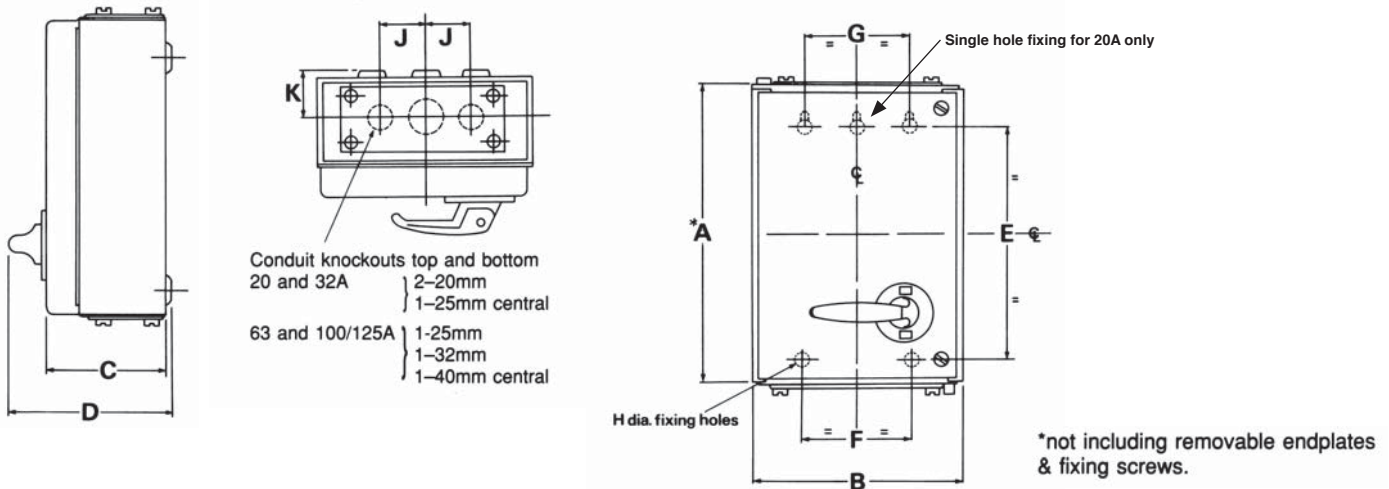
Description	Cycles
Operating cycles without current	8500
Operating cycles at rated current	1500
	Total 10000

10.3

Technical data Enclosed switch & fusegear

Exel 2 dimensions

Current rating, A	Dimensions, mm									
	A	B	C	D	E	F	G	H	J	K
Switch-disconnectors										
20	159	193	92	127	112	114	–	5.6	38.5	34
32	173	245	101	137	116	114	114	6.4	38.5	34
63	230	310	129	173	152	168	168	6.7	58	54
100/125	329	367	167	210	241	221	221	6.7	58	54
Switch-disconnector-fuses										
20	219	193	92	127	171	114	–	5.6	38.5	34
32	267	245	101	137	209	114	114	6.4	38.5	34
63	351	310	129	173	273	168	168	6.7	58	54
100/125	503	367	167	210	416	221	221	6.7	58	54

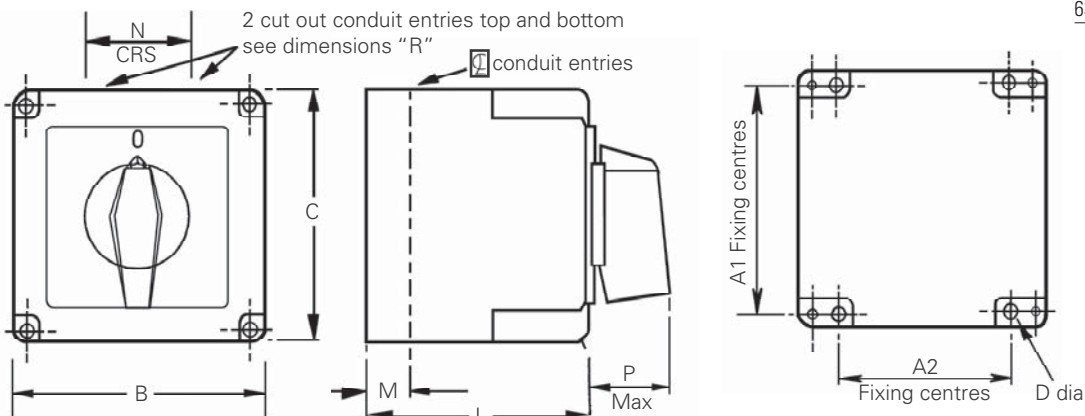


Performance values

Unit	Short time withstand current (r.m.s. amps for 1 second)	Short circuit making capacity (peak amps at 415v ac)	Rated fused short-circuit (prospective r.m.s. amps at 415v ac)
20A	640A	2.96 kA	80 kA
32A	960A	5.12 kA	80 kA
63A	2000A	6.62 kA	80 kA
100/125A	3750A	8.42 kA	80 kA

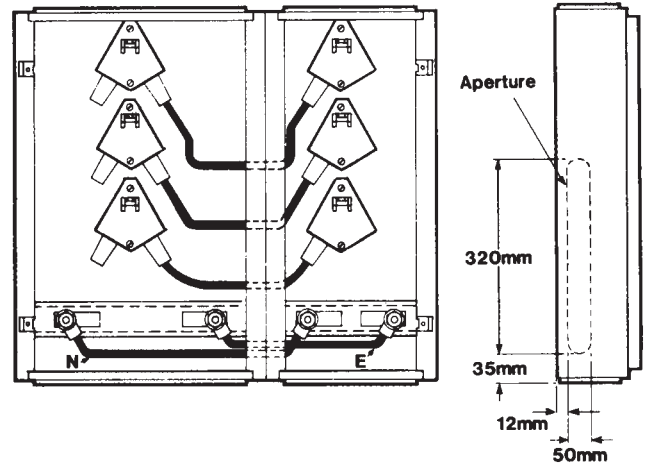
Memlok moulded changeover switches dimensions

Current rating (A)	Overall dimensions and fixing centres in mm											Current rating (A)	Terminal capacities (mm ²)	
	A1	A2	B	C	D	L	M	N	P	R ISO thread	1 x		2 x	
20&25	79	63	90	90	4.5	98	19	30	30	2 x 20	20	4	2.5	
40&63	146	112	125	176	6.5	119	21	68	36	2 x 25, 2 x 16	25	6	4	
											40	10	6	
											63	16	10	



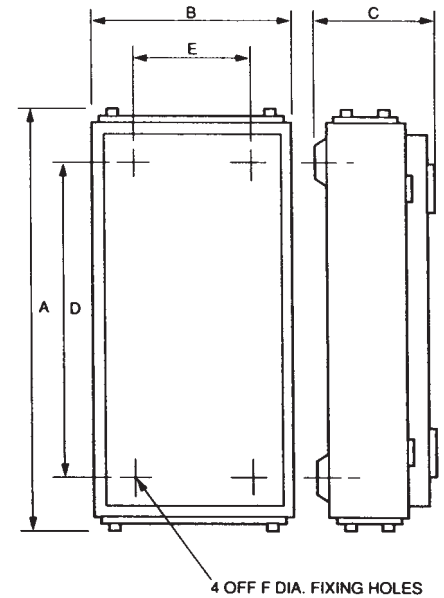
Exel distribution fuseboards – diversity factors

No. of ways	Maximum rated operational current per way, Ie				
	200A	100A	63A	32A	<20A
2	–	1	–	–	–
4	0.8	0.9	0.9	0.9	0.9
6	–	0.8	0.8	0.8	0.8
8	–	0.66	0.8	0.8	0.8
10	–	–	–	0.66	–
12	–	–	–	0.66	–
Therefore, incomer rating =					
2	–	–	126A	–	–
4	640A	360A	227A	115A	72A
6	–	480A	302A	154A	96A
8	–	528A	403A	205A	128A
10	–	–	–	211A	–
12	–	–	–	253A	–



Exel distribution fuseboards – enclosure dimensions IP4X (mm)

Nominal rating, Ie	Poles	Number of ways	A	B	C	D crs	E crs	F dia.	
20A	SPN	4	386	304	148	252	191	8	
		6	386	304	148	252	191	8	
		8	386	368	148	252	255	8	
		12	386	448	148	252	335	8	
	TPN	4	631	304	148	442	191	8	
		6	631	304	148	442	191	8	
		8	631	368	148	442	255	8	
		12	631	448	148	442	335	8	
32A	SPN	4	386	304	148	252	191	8	
		6	386	304	148	252	191	8	
		8	386	368	148	252	255	8	
		12	386	496	148	252	383	8	
	TPN	4	710	304	148	576	191	8	
		6	710	304	148	576	191	8	
		8	710	368	148	576	255	8	
		10	710	448	148	576	335	8	
12	710	496	148	576	383	8			
	63A	TPN	2	546	473	227	458	369	10
			4	972	330	227	884	226	10
			6	972	330	227	884	226	10
8			972	473	227	884	369	10	
100A	TPN	4	1066	330	227	978	226	10	
		6	1066	549	227	978	445	10	
		8	1066	549	227	978	445	10	
200A	TPN	4	1560	529	270	1334	325	10	



Exel distribution fuseboards – earth bar terminal capacities

Description	Nominal rating of fuseboard, Ie				
	20A	32A	63A	100A	200A
Main (stud)	M10	M10	M10	M10	M10
Outgoing, mm ²	10	10	25	25	70

10.3

Technical data

Enclosed switch & fusegear

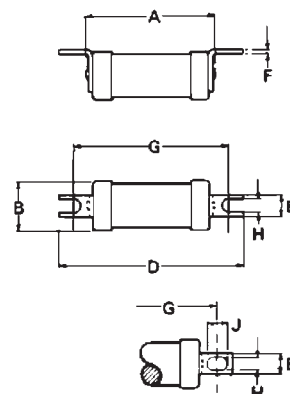
Exel distribution fuseboards – main terminal stud sizes

Description	No. of ways	Nominal rating of fuseboard, Ie				
		20A	32A	63A	100A	200A
SPN	4	M10	M10	–	–	–
	6	M10	M10	–	–	–
	8	M10	M10	–	–	–
	12	M10	–	–	–	–
TPN	2	–	–	M12	–	–
	3	–	–	M12	–	–
	4	M10	M10	M12	M12	M16
	6	M10	M10	M12	M16	–
	8	M10	M10	M16	M16	–
	12	–	M10	–	–	–

[†]Tunnel terminal 35mm² max.

415V industrial fuselinks – offset bolted contacts, dimensions

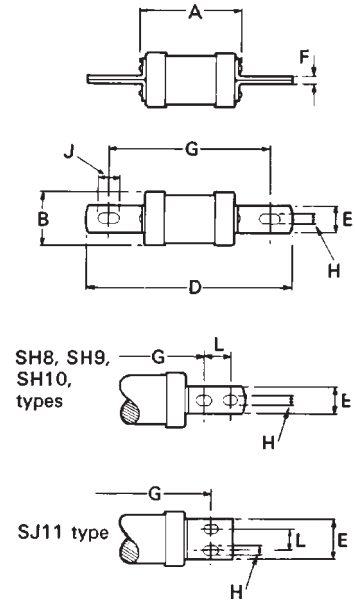
Eaton list number	Dimension, mm							
	A max.	B max.	D max.	E	F	G nom.	H	J
SA2	34	14	54	11	0.8	44.5	4.8	–
SA2M (25–40A)	34	14	54	11	0.8	44.5	4.8	–
SA2M (50–63A)	36	17.5	55	11	1.2	44.5	4.8	–
SB3	35	14	85	9	1.2	73	5.5	8
SB3M	56	22	86	9	1.2	73	5.5	8
SB4	35	17.5	86	9	1.2	73	5.5	8
SB4M	56	22	88	13	1.2	73	5.5	10
SO (80–100A)	55	21	86	13	1.2	73	5.5	10
SOM	55	26	91	13	1.2	73	5.5	10
SO (125–200A)	47	31	90	19	3.2	73	6.1	–
SD5	59	22	110	15	3.2	94	9	–
SD5M (125–160A)	58	26	109	15	3.2	94	9	11
SD5M (200A)	47	31	110	19	3.2	94	9	10
SD6	47	31	110	19	3.2	94	9	10
SD6M	47	31	110	19	3.2	94	9	10



SB3, SB3M, SB4, SB4M, SD5M, SD6, SD6M, SO (80–100A) & SOM types

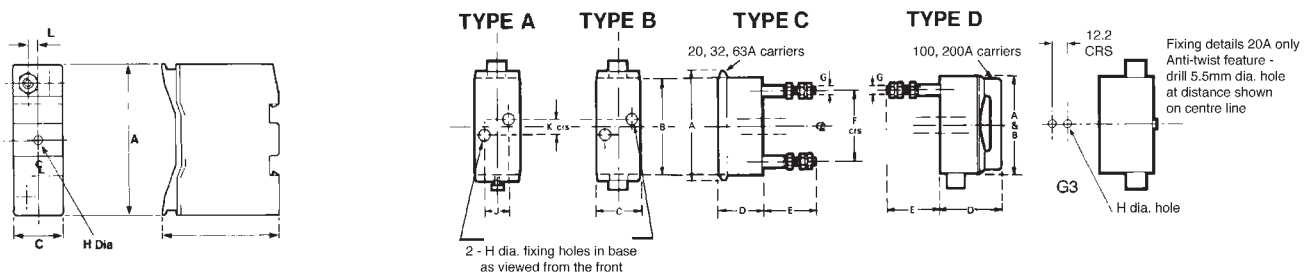
415V industrial fuselinks – centre bolted contacts, dimensions

Fuse link type	Dimensions, mm			E	F	G nom.	H	J	L
	A max.	B max.	D max.						
SE3	57	22	114	13	1.6	97	7.1	10	–
SF3	57	22	129	14	1.6	111	8.7	12	–
SE4	57	22	114	13	1.6	97	7.1	10	–
SF4	57	22	129	14	1.6	111	8.7	12	–
SE4M	57	22	114	13	1.6	97	7.1	10	–
SF4M	58	21	126	14	3.2	111	8.7	11	–
SF5	59	22	127	14	3.2	111	8.7	11	–
SF5M (125–160A)	58	26	126	14	3.2	111	8.7	11	–
SF5M200	47	31	136	19	3.2	111	9	12.5	–
SF6	47	31	136	19	3.2	111	9	12.5	–
SF6M	47	31	136	19	3.2	111	9	12.5	–
SF7	47	31	136	19	3.2	111	9	12.5	–
SF7 (315)	50	38	136	25	4.8	111	9	12.5	–
SF7M	50	38	136	25	4.8	111	9	12.5	–
SG7	47	59	158	19	3.2	133	10.5	12.5	–
SG7 (315)	50	38	209	25	4.8	133	10.5	12.5	25
SF8	50	39	136	25	4.8	111	9	12.5	–
SF8M	75	53	135	25	4.8	111	9	12.5	–
SH8	50	40	209	25	4.8	133	10.5	12.5	25.4
SF9	54	74	134	25	9.5	111	10.5	18	–
SH9	80	74	209	25	6.3	133	10.5	16	25.4
SY9	80	74	261	38	6.3	165	10.5	16	32
SH10	84	83	209	25	9.5	133	10.5	16	25.4
SY10	80	83	261	38	6.3	165	10.5	16	32
SJ11	83	100	198	63.5	9.5	149	14.3	19	32



Complete fuse units – dimensions

Nominal rating, In	Dimensions, mm											Hole dia. (mm min) insulated stud (types C and D)
	A	B	C	D	E	F	G	H	J	K	L	
20A	87	79	27	50	63	56	6	5.5	–	–	–	12
32A	109	101	31	62	60	78	6	5.5	12.7	6.4	–	12
32A clip-in	75	–	25	57.7	–	–	6	5.5	–	–	4.4	–
63A	118	110	35	72	71	79	8	5.5	12.7	6.4	–	14.5
63A clip-in	88.7	–	31.5	66.34	–	–	8	5.5	–	–	4.8	–
100A	154	154	54	108	80	117	10	6.5	19	22	–	18.5
Compact range												
32A	87	79	27	–	–	56	6	5.5	–	–	–	12
63A	109	101	31	–	–	78	6	5.5	12.7	6.4	–	12
100A	118	110	35	72	71	79	8	5.5	12.7	6.4	–	14.5
200A	154	154	54	108	80	117	10	6.5	19	22	–	18.5
315A	193	193	70	–	–	138	–	7	38	57	–	24.5



10.3

Technical data Enclosed switch & fusegear

Local disconnectors standard duty, type RDMP, 2–63A, IP65, 2–8 pole

Nominal unit rating Ie (A)	AC23A-3ph 415V (kW)	AC23-1p motors 240V (kW)	Optional current DC21 (resistive loads) (A)			Rated short withstand current RMS for 10sec Icw (A)	Rated conditional short circuit current (prospective RMS amps at 415V AC, fused)		Max terminal capacity mm ²
			24V	110V	220V		kA	Fuse rated BS88 (max) (A)	
20A	7.5	2.5	20	4	0.6	80	10	20	1x4
							50	16	2x2.5
25	11.0	3.7	25	4	0.7	150	10	25	1x6
							50	20	2x4
40	18.5	6.0	40	6	0.9	250	10	40	1x10
							50	40	2x6
63	30	7.5	63	8	1	400	10	63	1x16
							50	63	2x10

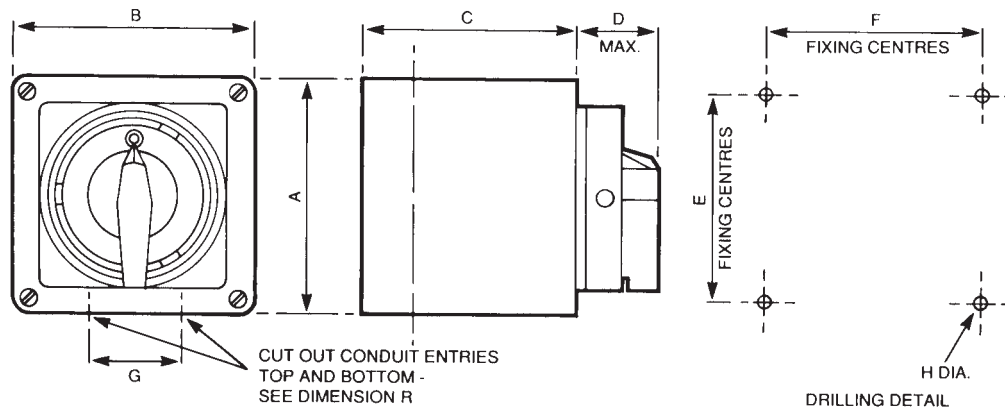
Note: Units supplied with a late make/early break auxiliary are indicated by a figure 1 in the list number e.g. 2041RDMP
Auxiliary terminals are marked 1 and 2. Auxiliary contact rating as main poles.

Local switch-disconnectors standard duty, type RDMP, 20–63A, IP65, 2–8 poles – dimensions

Nominal unit rating, Ie (A)	Dimensions, mm									
	A	B	C ¹⁾	C ²⁾	D	E	F	G	H	R (ISO thread)
20 and 25	90	90	71	98	30	79	63	30	4.5	2 x 20
40 and 63	176	125	85	119	36	146	112	68	5.5	2 x 25 1 x 16

¹⁾2–4 pole, 20 & 40A, 2–3 pole, 25 & 63A

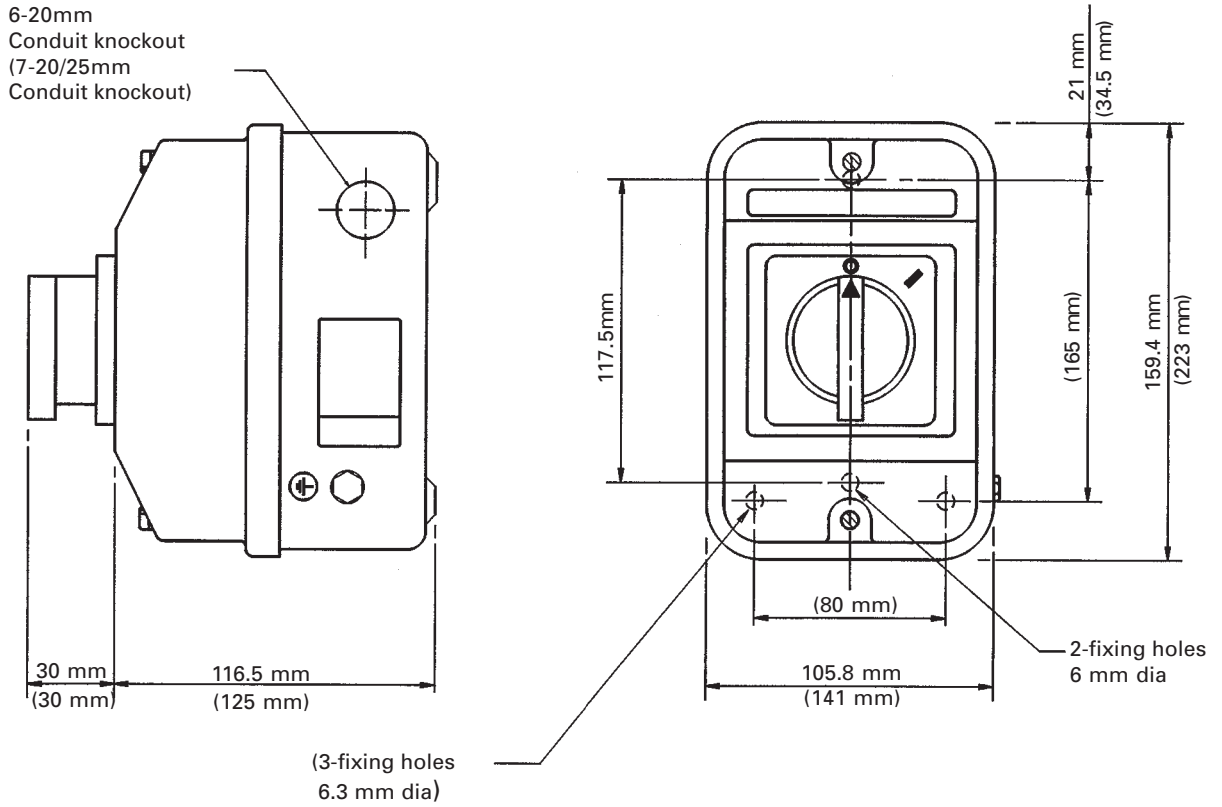
²⁾6 pole, 20 & 40A, 4–6 pole, 25 & 63A



Local disconnectors standard duty, type PC2, 20–63A, IP55, 2–6 poles

Nominal unit rating, Ie (A)	Operational current, Ie and power, 415V 3ph category		Operational current, Ie and power, 660V 3ph category		Rated short time withstand current RMS for 1 sec Icw (kA)	Rated conditional short circuit current (prospective RMS amps at 415V AC, fused)		Max terminal capacity	Degree of protection mm ²
	AC21 (A)	AC23 (kW)	AC21 (A)	AC23 (kW)		kA	Fuse rating		
20	20	5.5	20	5.5	0.25	25	20A	1 x 4	IP55
						50	16A	2 x 2.5	
25	25	7.5	25	7.5	0.40	25	25A	1 x 6	IP55
						50	20A	2 x 4	
40	40	15	40	15	0.80	62	40A	1 x 10	IP55
								2 x 6	
63	63	22	63	18.5	1.70	50	63A	1 x 16	IP55

Local disconnectors standard duty, type PC2, 20–63A, IP55, 2–6 pole dimensions



Dimensions in brackets () refer to **PC28G632, PC28G633, PC28G634, PC28G636**.

10.3

Technical data

Enclosed motor, heating and lighting control

AC motors, 3 phase full load current table, 1450rpm approx.

Provided as a guide to the selection of suitable Eaton control gear

The tables are based on motors of approx, 1450 rpm of average efficiency and power factor. Motors of higher speed than 1450 rpm usually take a lower current than that shown in the table; while motors of lower speed usually take higher current. Wide variations from these figures can arise, especially on single phase motors and engineers should, whenever possible, determine the actual full load current (F.L.C.) from the motor rating plate in each case

Motor rating kW	Approx F.L.C. at line voltage				
	220V	240V	380V	400-415V	550V
0.07	–	–	–	–	–
0.1	0.7	0.6	0.4	0.4	0.3
0.12	1	0.9	0.5	0.5	0.3
0.18	1.3	1.2	0.8	0.7	0.4
0.25	1.6	1.5	0.9	0.9	0.6
0.37	2.5	2.3	1.4	1.3	0.8
0.56	3.1	2.8	1.8	1.6	1.1
0.75	3.5	3.2	2	1.8	1.4
1.1	5	4.5	2.8	2.6	1.9
1.5	6.4	5.8	3.7	3.4	2.6
2.2	9.5	8.7	5.5	5	3.5
3	12	11	7	6.5	4.7
3.7	15	13	8	8	6
4	16	14	9	8	6
5.5	20	19	12	11	8
7.5	27	25	16	15	11
9.3	34	32	20	18	14
10	37	34	22	20	15
11	41	37	23	22	16
15	64	50	31	28	21
18.5	67	62	39	36	26
22	74	70	43	39	30
30	99	91	57	52	41

AC motors, 1 phase full load current table, 1450rpm approx.

Motor rating (kW)	Approx F.L.C. at line voltage		
	110V	220V	230-240V
0.07	2.4	1.2	1.1
0.1	3.3	1.6	1.5
0.12	3.8	1.9	1.7
0.18	4.5	2.3	2.1
0.25	5.8	2.9	2.6
0.37	7.9	3.9	3.6
0.56	11	5.5	5
0.75	15	7.3	6.7
1.1	21	10	9
1.5	26	13	12
2.2	37	19	17
3	49	24	22
3.7	54	27	25
4	60	30	27
5.5	85	41	38
7.5	110	55	50

ADS8 Contactors, technical characteristics overview: Voltage & maximum rated current for motor control

- Maximum rated operational voltage is 690v in all units

Contactor Reference	Starter type	Voltage	Maximum rated current for motor control (A)
2818VCO	DOL and Main ¹⁾	220–240v Coil	18
2825VCO	DOL and Main ¹⁾	220–240v Coil	25
2832VCO	DOL and Main ¹⁾	220–240v Coil	32
2850VCO	DOL and Main ¹⁾	220–240v Coil	50
4818VCO	DOL and Main ¹⁾	380–415v Coil	18
4825VCO	DOL and Main ¹⁾	380–415v Coil	25
4832VCO	DOL and Main ¹⁾	380–415v Coil	32
4850VCO	DOL and Main ¹⁾	380–415v Coil	50
2818VCOSD	Star and Delta ¹⁾	220–240v Coil	18
2825VCOSD	Star and Delta ¹⁾	220–240v Coil	25
2832VCOSD	Star and Delta ¹⁾	220–240v Coil	32
2850VCOSD	Star and Delta ¹⁾	220–240v Coil	50
4818VCOSD	Star and Delta ¹⁾	380–415v Coil	18
4825VCOSD	Star and Delta ¹⁾	380–415v Coil	25
4832VCOSD	Star and Delta ¹⁾	380–415v Coil	32
4850VCOSD	Star and Delta ¹⁾	380–415v Coil	50
2812004VCOA	Autoline 4 pole ²⁾	220–240v Coil	25
2825004VCOA	Autoline 4 pole ²⁾	220–240v Coil	40
4812004VCOA	Autoline 4 pole ²⁾	380–415v Coil	25
4825004VCOA	Autoline 4 pole ²⁾	380–415v Coil	40

¹⁾DOL and Star Delta (3 phase 440v, 50–60hz, for AC3 Duty)

²⁾Autoline 4 pole (3 phase 440v, 50–60hz, for AC1 Duty)

ADS8 Contactors, technical characteristics overview: Maximum standard power rating

Contactor Reference	Maximum standard power rating (for motor control for AC3 Duty; temperature less than or equal to 55°C)					
	415v (kW/hp)	220–230v (kW)	380–400v (kW)	440v (kW)	500v (kW)	660–690v (kW)
2812VCO	5.5/7.5	3	5.5	5.5	7.5	7.5
2818VCO	9/12.5	4	7.5	9	10	10
2825VCO	11/15	5.5	11	11	15	15
2832VCO	15/20	7.5	15	15	18.5	18.5
2850VCO	25/35	15	22	30	30	33
4812VCO	5.5/7.5	3	5.5	5.5	7.5	7.5
4818VCO	9/12.5	4	7.5	9	10	10
4825VCO	11/15	5.5	11	11	15	15
4832VCO	15/20	7.5	15	15	18.5	18.5
4850VCO	25/35	15	22	30	30	33
2812VCOSD	5.5/7.5	3	5.5	5.5	7.5	7.5
2818VCOSD	9/12.5	4	7.5	9	10	10
2825VCOSD	11/15	5.5	11	11	15	15
2832VCOSD	15/20	7.5	15	15	18.5	18.5
2850VCOSD	25/35	15	22	30	30	33
4812VCOSD	5.5/7.5	3	5.5	5.5	7.5	7.5
4818VCOSD	9/12.5	4	7.5	9	10	10
4825VCOSD	11/15	5.5	11	11	15	15
4832VCOSD	15/20	7.5	15	15	18.5	18.5
4850VCOSD	25/35	15	22	30	30	33
2812004VCOA	5.5/7.5	3	5.5	5.5	7.5	7.5
2825004VCOA	11/15	5.5	11	11	15	15
4812004VCOA	5.5/7.5	3	5.5	5.5	7.5	7.5
4825004VCOA	11/15	5.5	11	11	15	15

10.3

Technical data

Enclosed motor, heating and lighting control

ADS8 Contactors, technical characteristics overview: 3 phase AC3

Contactor reference	3 phase AC3 (UL and CSA)		
	230v	460/480v	575/600v
2812VCO	3	7.5	10
2818VCO	5	10	15
2825VCO	7.5	15	20
2832VCO	10	20	25
2850VCO	15	40	40
4812VCO	3	7.5	10
4818VCO	5	10	15
4825VCO	7.5	15	20
4832VCO	10	20	25
4850VCO	15	40	40
2812VCOSD	3	7.5	10
2818VCOSD	5	10	15
2825VCOSD	7.5	15	20
2832VCOSD	10	20	25
2850VCOSD	15	40	40
4812VCOSD	3	7.5	10
4818VCOSD	5	10	15
4825VCOSD	7.5	15	20
4832VCOSD	10	20	25
4850VCOSD	15	40	40
2812004VCOA	3	7.5	10
2825004VCOA	7.5	15	20
4812004VCOA	3	7.5	10
4825004VCOA	7.5	15	20

ADS8 Contactors, technical characteristics: maximum thermal current, average coil consumption & heat dissipation

- Maximum operating rate with both AC and DC is 3600 operations per hour in all units.

Contactor reference	Maximum thermal current I _{th} (A) (temp less than or equal to 40°C)	Average coil consumption (inrush/sealed)			Heat dissipation at		
		50Hz (VA)	60Hz (VA)	50/60HZ (VA)	DC (W)	50 & 60 Hz (W)	DC (W)
2812VCO	25	60/7	60/7.5	70/8	9/9	2 to 3	9
2818VCO	32	60/7	60/7.5	70/8	9/9	2 to 3	9
2825VCO	40	90/7.5	90/8.5	100/8.5	11/11	2.5 to 3.5	11
2832VCO	50	90/7.5	90/8.5	100/8.5	11/11	2.5 to 3.5	11
2850VCO	80	200/ 20	200/22	245/26	22/22	6 to 10	22
4812VCO	25	60/7	60/7.5	70/8	9/9	2 to 3	9
4818VCO	32	60/7	60/7.5	70/8	9/9	2 to 3	9
4825VCO	40	90/7.5	90/8.5	100/8.5	11/11	2.5 to 3.5	11
4832VCO	50	90/7.5	90/8.5	100/8.5	11/11	2.5 to 3.5	11
4850VCO	80	200/ 20	200/22	245/26	22/22	6 to 10	22
2812VCOSD	25	60/7	60/7.5	70/8	9/9	2 to 3	9
2818VCOSD	32	60/7	60/7.5	70/8	9/9	2 to 3	9
2825VCOSD	40	90/7.5	90/8.5	100/8.5	11/11	2.5 to 3.5	11
2832VCOSD	50	90/7.5	90/8.5	100/8.5	11/11	2.5 to 3.5	11
2850VCOSD	80	200/ 20	200/22	245/26	22/22	6 to 10	22
4812VCOSD	25	60/7	60/7.5	70/8	9/9	2 to 3	9
4818VCOSD	32	60/7	60/7.5	70/8	9/9	2 to 3	9
4825VCOSD	40	90/7.5	90/8.5	100/8.5	11/11	2.5 to 3.5	11
4832VCOSD	50	90/7.5	90/8.5	100/8.5	11/11	2.5 to 3.5	11
4850VCOSD	80	200/ 20	200/22	245/26	22/22	6 to 10	22
2812004VCOA	25	60/7	60/7.5	70/8	9/9	2 to 3	9
2825004VCOA	40	90/7.5	90/8.5	100/8.5	11/11	2.5 to 3.5	11
4812004VCOA	25	60/7	60/7.5	70/8	9/9	2 to 3	9
4825004VCOA	40	90/7.5	90/8.5	100/8.5	11/11	2.5 to 3.5	11

ADS8 Contactors, technical characteristics overview: mechanical life & power contact terminal capacity

Contactor reference	Mechanical life (millions of operations)		Power contact terminal capacity mm ²
	50/60 Hz	50/60Hz	
2812VCO	20	15	4
2818VCO	20	15	6
2825VCO	16	12	10
2832VCO	16	12	10
2850VCO	16	6	25
4812VCO	20	15	4
4818VCO	20	15	6
4825VCO	16	12	10
4832VCO	16	12	10
4850VCO	16	6	25
2812VCOSD	20	15	4
2818VCOSD	20	15	6
2825VCOSD	16	12	10
2832VCOSD	16	12	10
2850VCOSD	16	6	25
4812VCOSD	20	15	4
4818VCOSD	20	15	6
4825VCOSD	16	12	10
4832VCOSD	16	12	10
4850VCOSD	16	6	25
2812004VCOA	20	15	4
2825004VCOA	16	12	10
4812004VCOA	20	15	4
4825004VCOA	16	12	10

ADS8 Contactors, technical characteristics overview: overall dimensions, weight & mounting hole centres

- Mounting position (wrt normal vertical mounting plane) +/- 30° in all units.
- Ambient temperature compensation and operating limits -30°C to +60°C in all units.
- Ambient temperature storage limits -60°C to +70°C in all units.
- Auxilliary contacts
 Type VCO (main & DOL) 1N/O in all units
 Type VCOSD (Star Delta) 1N/C in all units
 Rated thermal current (A) is 10 in all units

Contactor reference	Overall dimensions (mm)			Weight Kg	Mounting hole centres (mm)	
	Width	Depth	Projection		Width	Depth
2812VCO	45	74	80	0.32	35	50 / 60
2818VCO	45	74	85	0.35	35	50 / 60
2825VCO	56	84	93	0.505	40	50 / 60
2832VCO	56	84	98	0.525	40	50 / 60
2850VCO	75	127	114	1.15	40	100 / 110
4812VCO	45	74	80	0.32	35	50 / 60
4818VCO	45	74	85	0.35	35	50 / 60
4825VCO	56	84	93	0.505	40	50 / 60
4832VCO	56	84	98	0.525	40	50 / 60
4850VCO	75	127	114	1.15	40	100 / 110
2812VCOSD	45	74	80	0.32	35	50 / 60
2818VCOSD	45	74	85	0.35	35	50 / 60
2825VCOSD	56	84	93	0.505	40	50 / 60
2832VCOSD	56	84	98	0.525	40	50 / 60
2850VCOSD	75	127	114	1.15	40	100 / 110
4812VCOSD	45	74	80	0.32	35	50 / 60
4818VCOSD	45	74	85	0.35	35	50 / 60
4825VCOSD	56	84	93	0.505	40	50 / 60
4832VCOSD	56	84	98	0.525	40	50 / 60

10.3

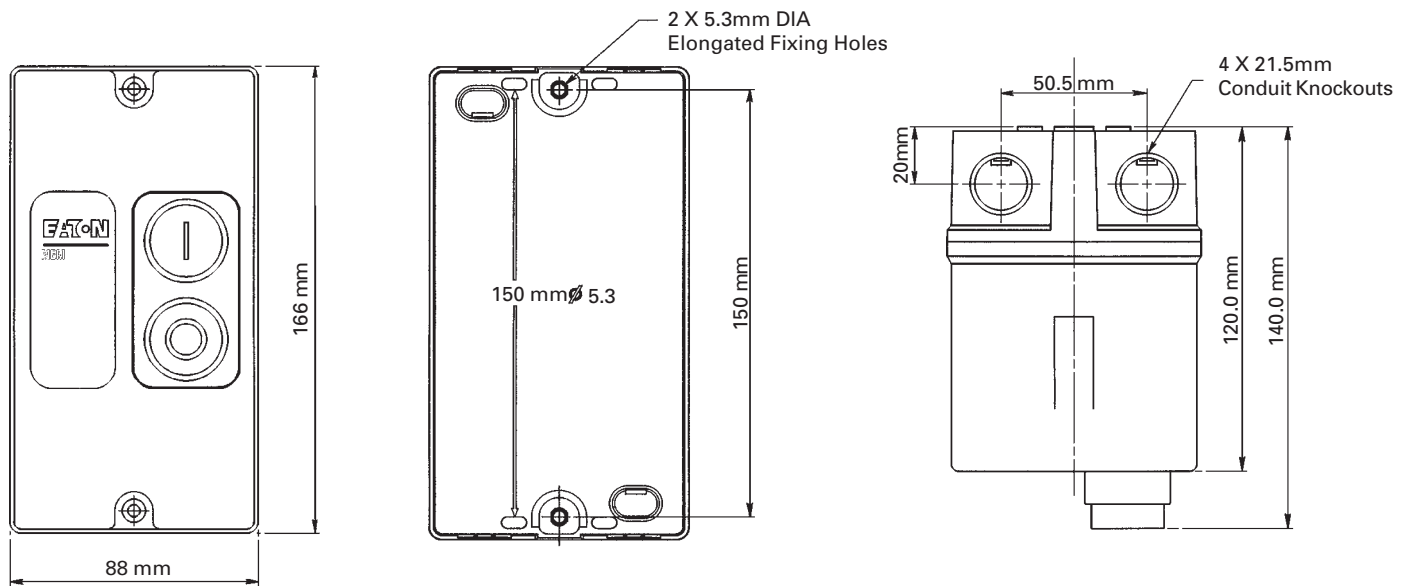
Technical data

Enclosed motor, heating and lighting control

ADS8 Contactors, technical characteristics overview: overall dimensions, weight & mounting hole centres (contd)

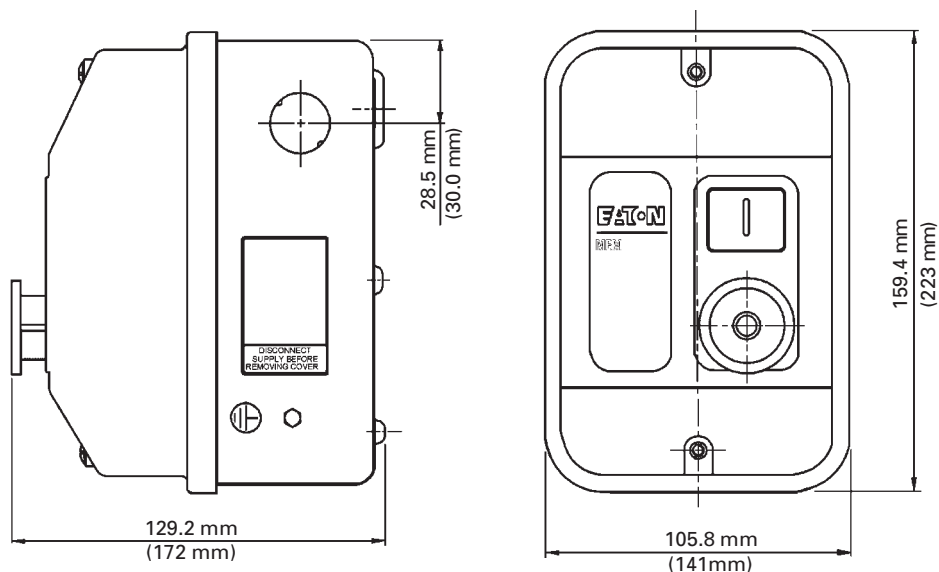
Contactor reference	Overall dimensions (mm)			Weight Kg	Mounting hole centres (mm)	
	Width	Depth	Projection		Width	Depth
4850VCOSD	75	127	114	1.15	40	100 / 110
2812004VCOA	45	74	80	0.32	35	50 / 60
2825004VCOA	56	84	93	0.505	40	50 / 60
4812004VCOA	45	74	80	0.32	35	50 / 60
4825004VCOA	56	84	93	0.505	40	50 / 60

9kW DOL starter without switch disconnect, IP 65 moulded surface mounting enclosure, dimensional drawings

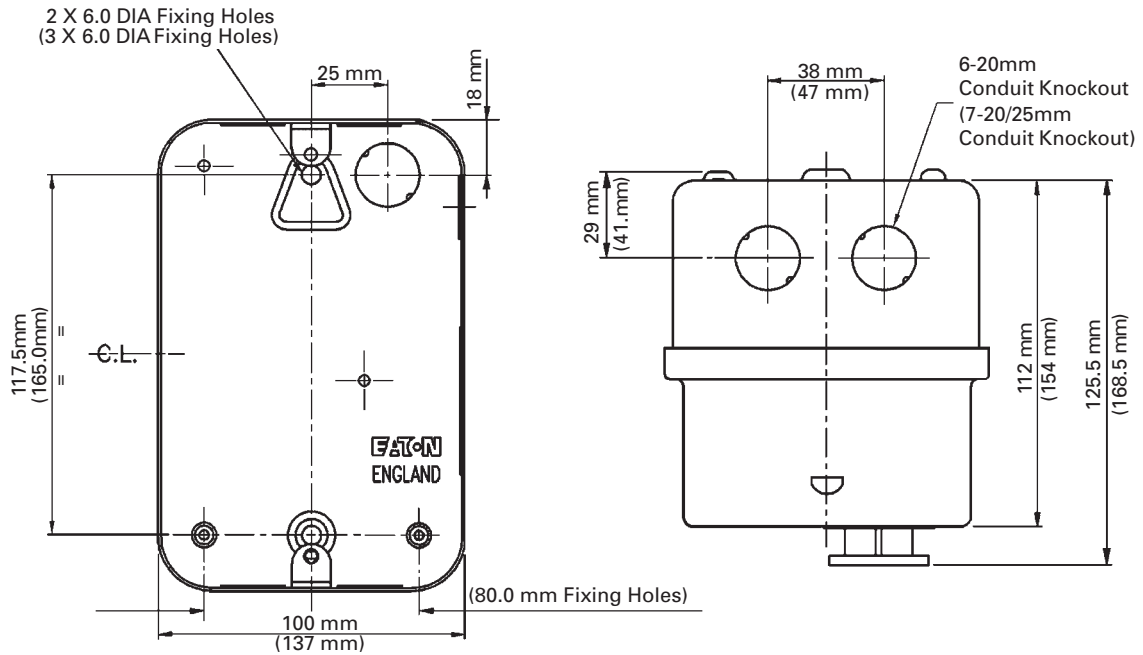


15kW DOL starter without switch disconnect, IP 54 metalclad surface mounting enclosure, dimensional drawings

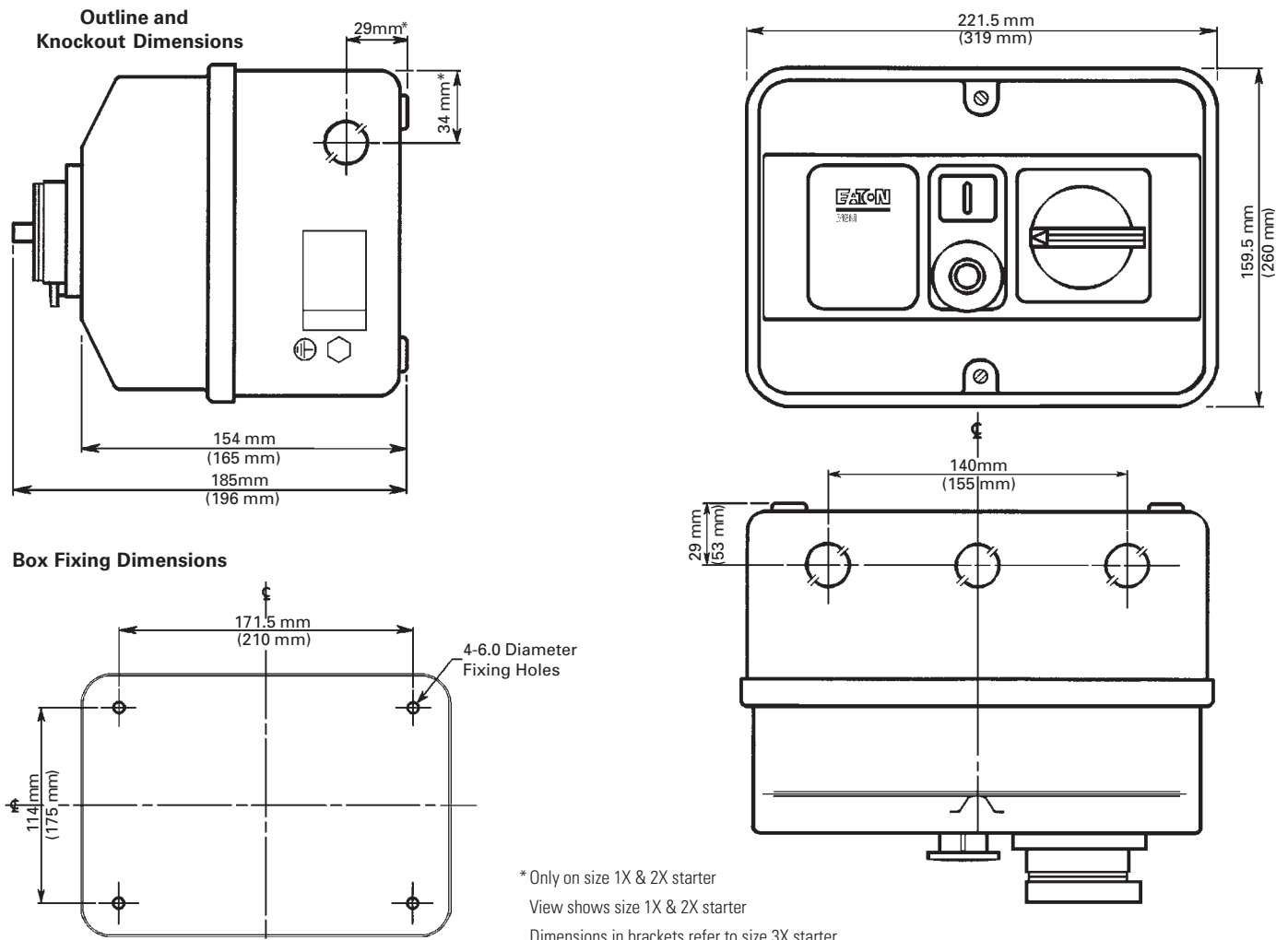
- Dimensions in brackets refer to types 2528ADS(2X) & 3228ADS(3X) sized enclosures



15kW DOL starter without switch disconnect, IP 54 metalclad surface mounting enclosure, dimensional drawings (contd)



15kW DOL starter with switch disconnect, IP 54 metalclad surface mounting enclosure, dimensional drawings



10.3

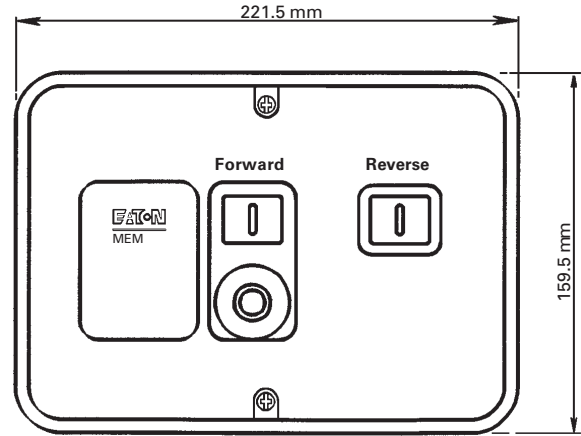
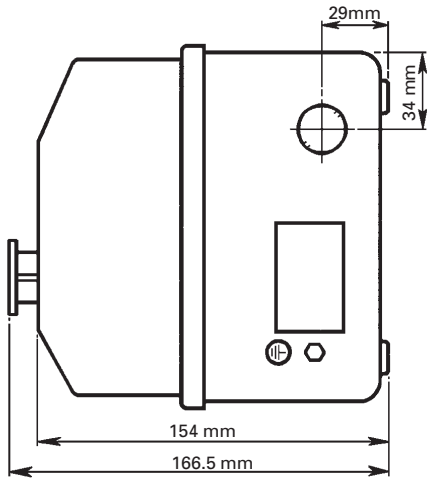
Technical data

Enclosed motor, heating and lighting control

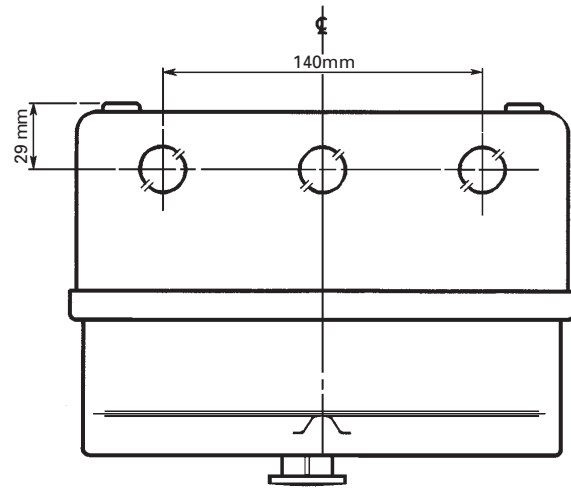
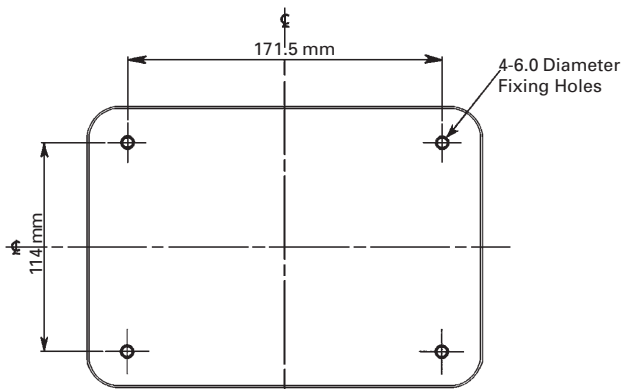
11kW DOL reversing starter without switch disconnect, IP 54 metalclad surface mounting enclosure, dimensional drawings

- 8 X 20.9mm (3/4") conduit knockouts are provided for cable entry at top, bottom and side of the enclosure and the earth terminal may be reversed for external connection but the components must be assembled in the same order as supplied.

Outline and Knockout Dimensions

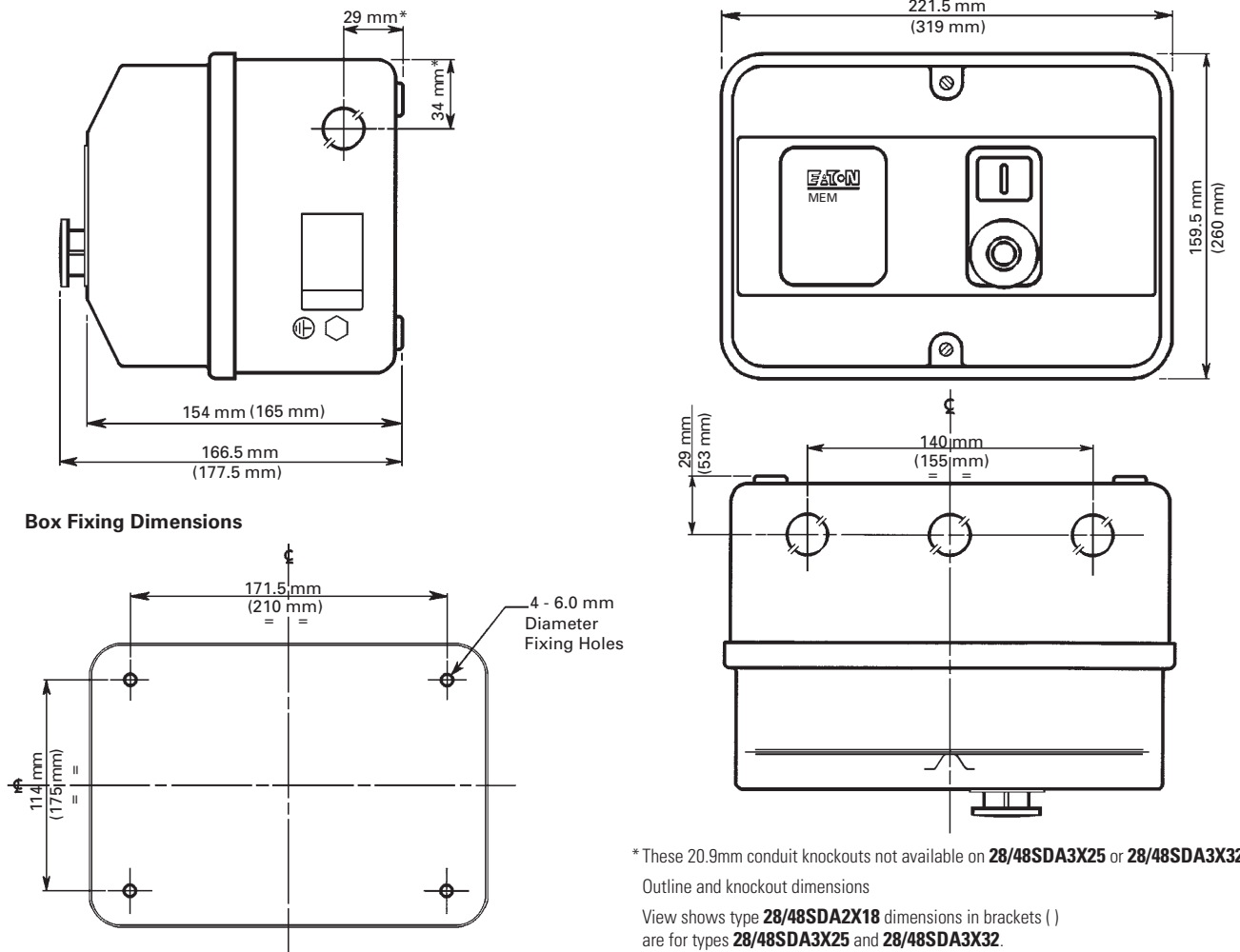


Box Fixing Dimensions



25kW Star Delta starter without switch disconnect, IP 54 metalclad surface mounting enclosure, dimensional drawings

- **Star Delta starter enclosure (IP54 to BSEN60529:1992)** 20.9mm (3/4") conduit knockouts are provided for cable entry at top, bottom and side of the enclosure and the earth terminal may be reversed for external connection, but the components must be assembled in the same order as supplied.



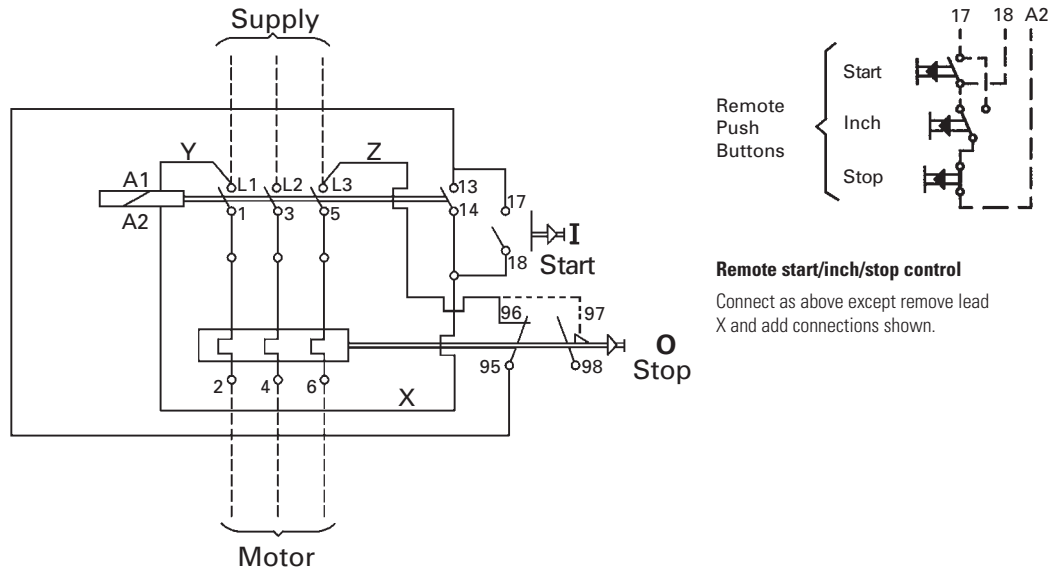
10.3

Technical data

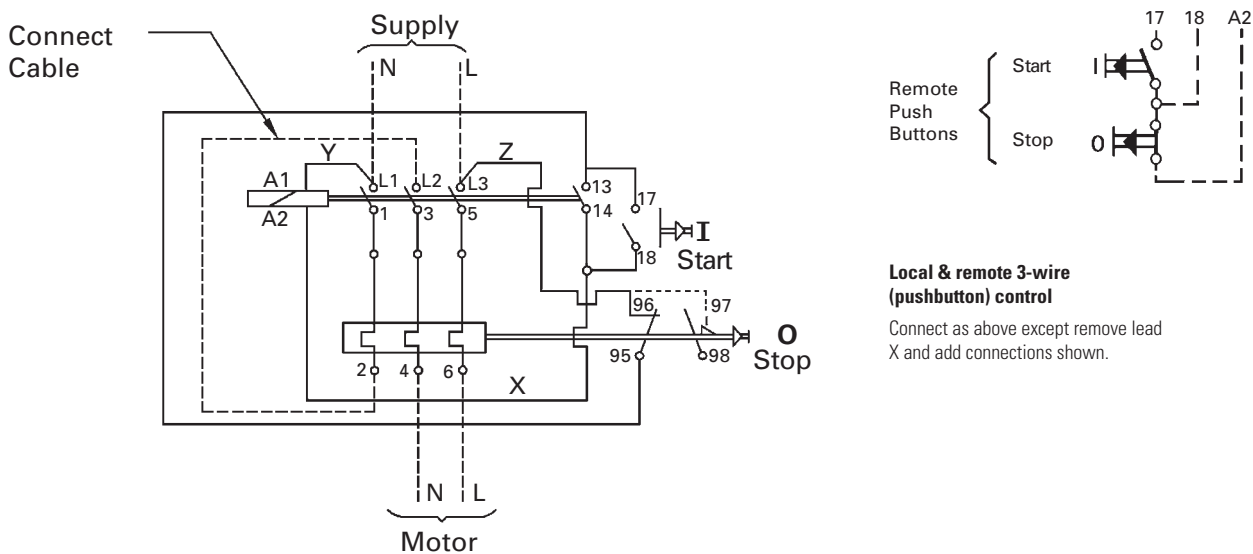
Enclosed motor, heating and lighting control

9–15 kW DOL starter without switch disconnect, moulded & metal surface mounting enclosure, wiring diagrams

A. Three phase motors-DOL starter. Local 3-wire (pushbutton) control.



B. Single phase motors-DOL starter. Local 3-wire (pushbutton) control.



Coil phase to neutral: remove connector Y, connect Neutral to A1

Separate coil supply: remove connectors Y and Z, connect coil supply to A1 and 96.

Coil voltage: Ensure correct voltage coil is fitted for separate coil supply and phase to neutral applications.

External interlock: Remove connection Z and insert interlock between 5 and 96.

Alarm circuit: At trip an alarm signal voltage equal to the coil voltage is available between 98 and A1 when a link is added between 96 & 97. The switch is rated at 440VA, 500V maximum.

Control circuit fuses (10A MAX).

Coil connected Phase to neutral (1 fuse): remove connector Z and connect fuse between 5 and 96.

Coil Connected Phase to Phase (2 fuses): remove connector Z and connect fuse between 5 and 96. Remove connector Y and connect fuse between 1 and A1.

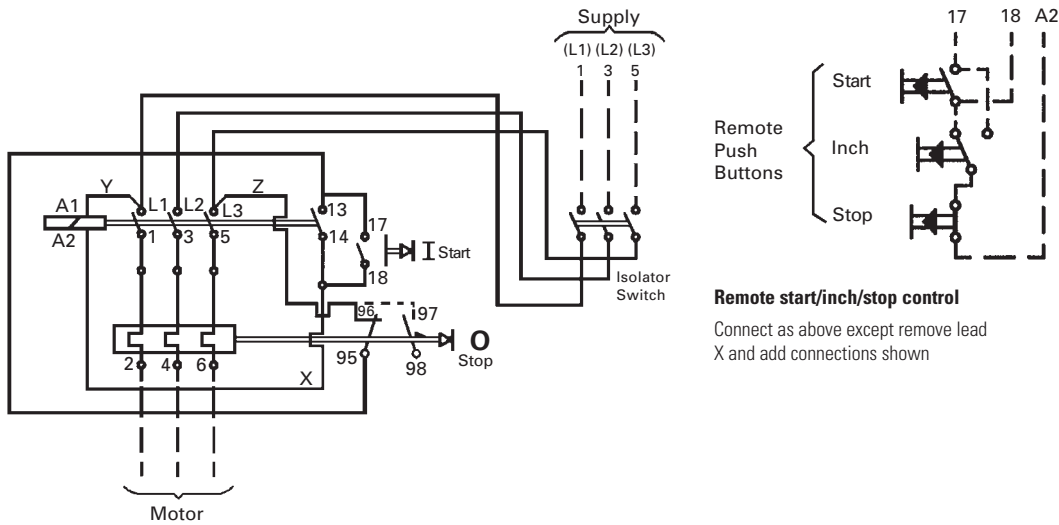
Note: the voltage rating of the fuse(s) must be suitable for the control circuit voltage.

Short circuit protection: Maximum sizes of fuses or MCB's to give short-circuit protection to this starter are tabulated on page 173.

To reverse direction of rotation (3-Phase Motors): Interchange any two supply lines 1, 3 or 5.

15kW DOL starter with switch disconnect, IP 54 metalclad surface mounting enclosure, wiring diagrams

Three phase motors-DOL starter isolator local 3-wire (pushbutton) control

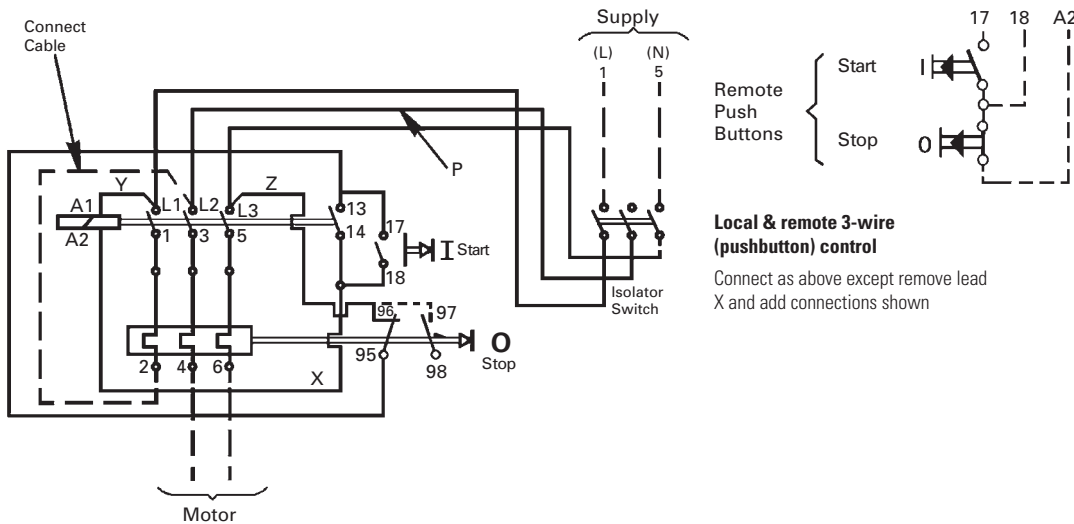


Remote start/inch/stop control

Connect as above except remove lead X and add connections shown

Single phase motors-DOL starter isolator local 3-wire (pushbutton) control

Connect supply to 1 and 5 at the isolator. Connect motor to 4 and 6 at the overload relay. Remove existing cable P and connect a cable of cross-sectional area equal to the supply cable between 2 and 3 as shown.



Local & remote 3-wire (pushbutton) control

Connect as above except remove lead X and add connections shown

Coil phase to neutral: remove connector Y, connect Neutral to A1

Separate coil supply: remove connectors Y and Z, connect coil supply to A1 and 96.

Coil voltage: Ensure correct voltage coil is fitted for separate coil supply and phase to neutral applications.

Control circuit fuses (10A MAX).

Coil connected Phase to neutral (1 fuse): remove connector Z and connect fuse between 5 and 96.

Coil Connected Phase to Phase (2 fuses): remove connector Z and connect fuse between 5 and 96. Remove connector Y and connect fuse between 1 and A1.

Note: the voltage rating of the fuse(s) must be suitable for the control circuit voltage.

External interlock: Remove connection Z and insert interlock between 5 and 96.

Alarm circuit: At trip an alarm signal voltage equal to the coil voltage is available between 98 and A1 when a link is added between 96 & 97. The switch is rated at 440VA, 500V maximum.

Short circuit protection: Maximum sizes of fuses or MCB's to give short-circuit protection to this starter are tabulated on page 173.

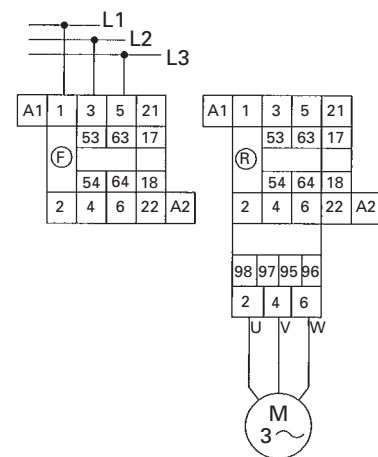
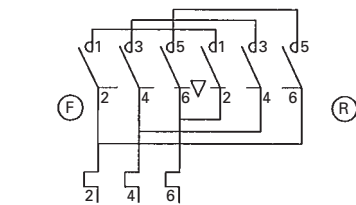
10.3

Technical data

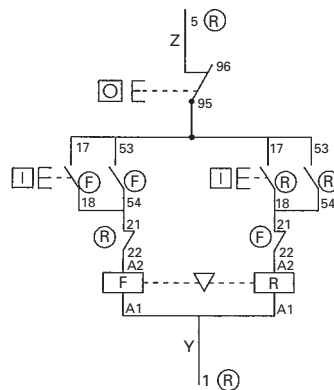
Enclosed motor, heating and lighting control

11kW DOL reversing starter without switch disconnect, IP 54 metalclad surface mounting enclosure, wiring diagrams

Circuit Diagrams:- Power

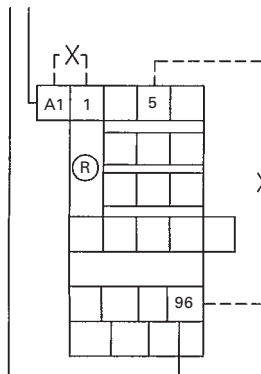


Control

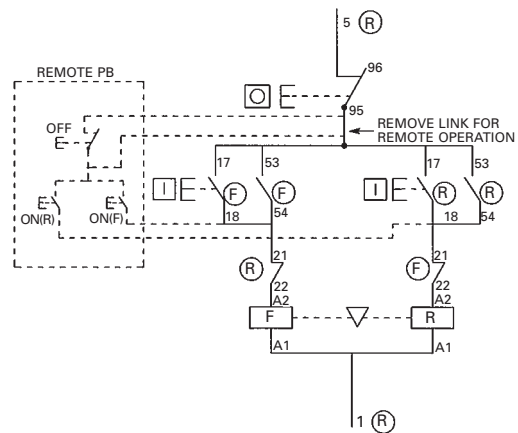


▽ Mechanical interlock

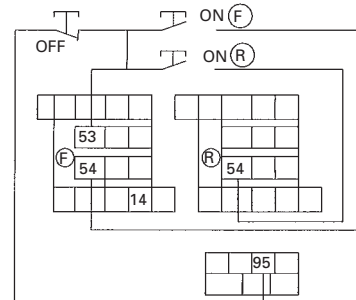
Separate Supply of Control Circuit



Remote Control Option



▽ Mechanical Interlock



Option for Remote Control

Coil phase to neutral: Remove connector Y, connect Neutral to A1 F

Separate coil supply: Remove connectors Y and Z, connect coil supply to A1 R and 96.

Coil voltage: Ensure correct voltage coil is fitted for separate coil supply and phase to neutral applications.

Control circuit fuses (10A MAX).

Coil connected Phase to neutral (1 fuse): remove connector Z and connect fuse between 5 and 96.

Coil Connected Phase to Phase (2 fuses): remove connector Z and connect fuse between 5 and 96. Remove connector Y and connect fuse between 1 and A1 R.

Note: The voltage rating of the fuses must be suitable for the control circuit voltage.

External interlock: Remove connector Z and connect interlock between 5 and 96. When using remote control, connect external interlock in series with remote 2 wire (switch control).

To reverse direction of rotation: (3 Phase Motors) interchange any two supply lines 1, 3 or 5.

Alarm circuit: At trip an alarm signal voltage equal to the coil voltage is available between 98 and A1 when a link is added between 96 and 97. The switch is rated at 400VA, 500V maximum.

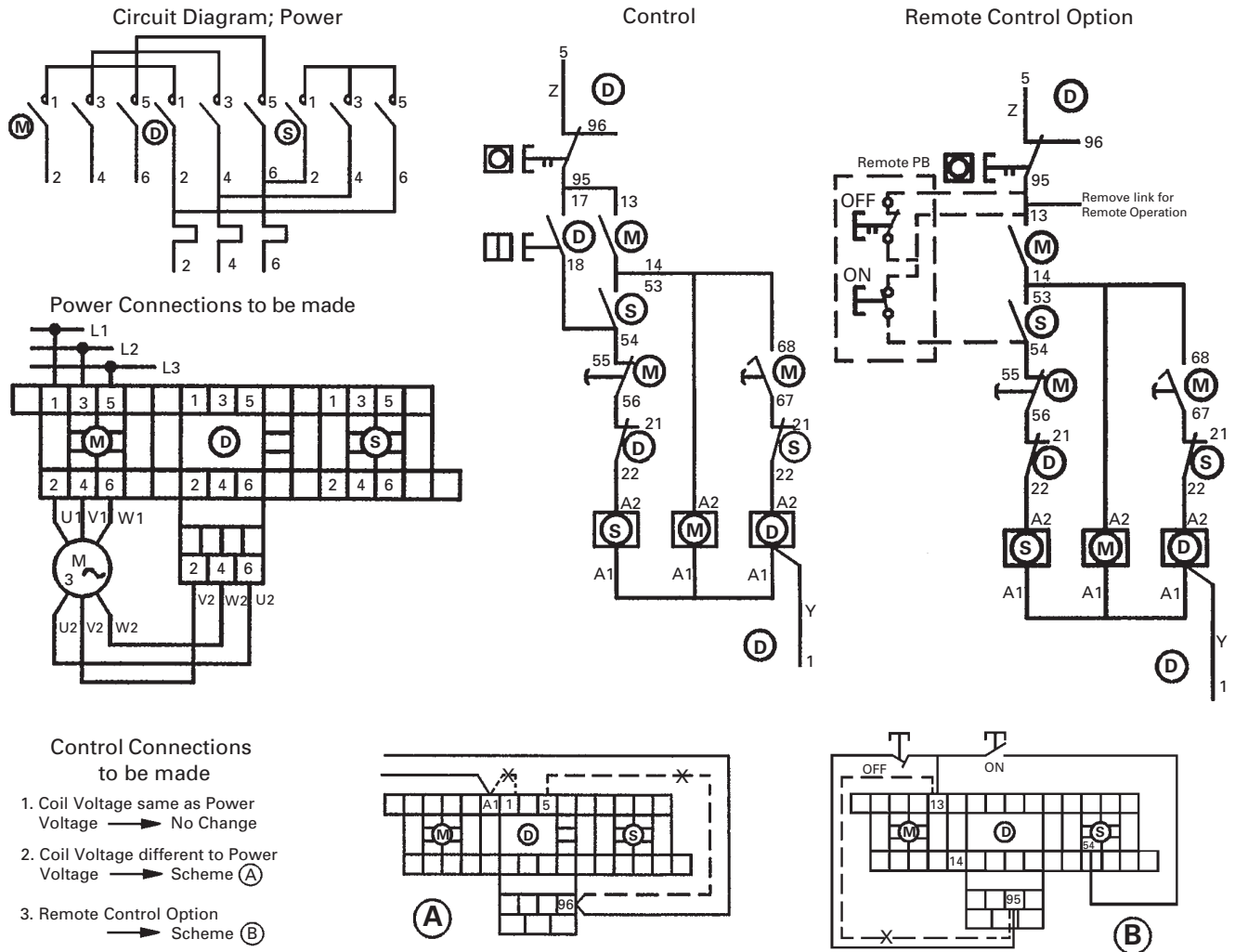
Short circuit protection: Maximum sizes of fuses or MCB's to give short-circuit protection to this starter are tabulated on page 173.

Limit Switch Connections

Forward limit: Remove connection between 54Forward and 21Reverse – connect limit switch between 54F and 21R.

Reverse limit: Remove connection between 54Reverse and 21Forward— connect limit switch between 54R and 21F.

25kW Star Delta starter without switch disconnect, IP 54 metalclad surface mounting enclosure, wiring diagram



Short circuit protection

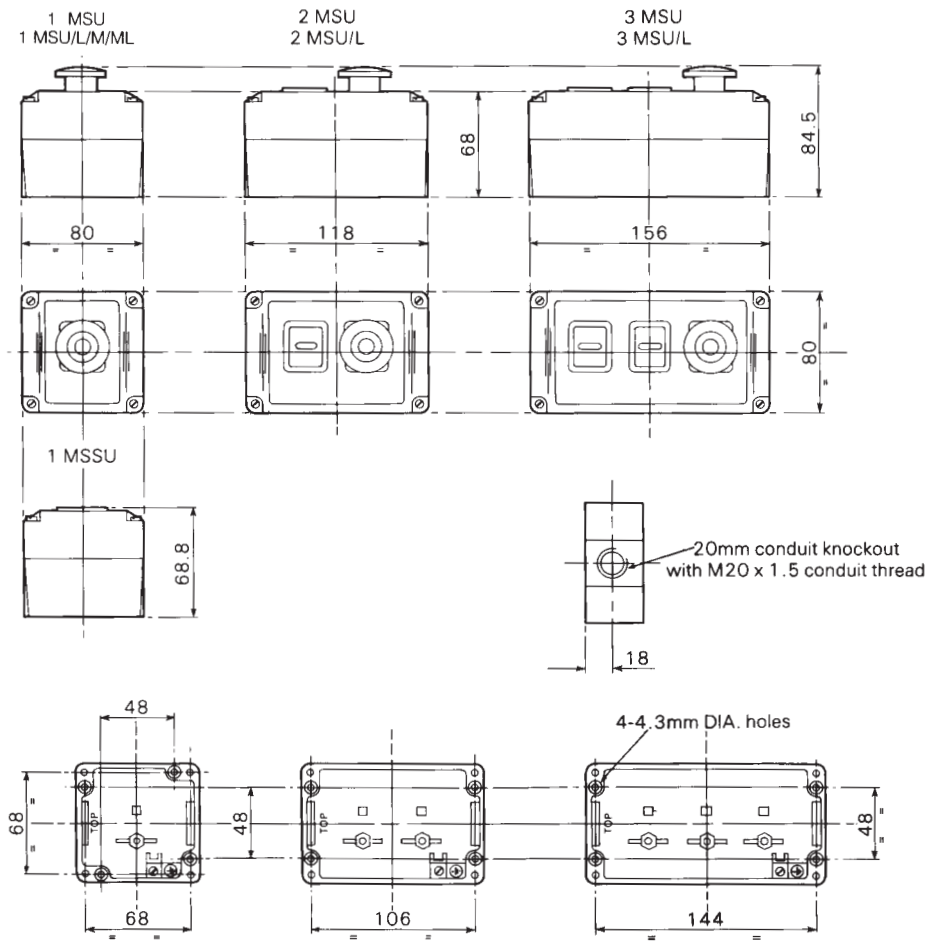
Overload Relay list number	Motor FLC Ie (A)	SCPD Back-up protection MAX HRC fuse BS88:1 aM (A)	Back-up protection Max MCB Type C
Direct on line			
8TT87	0.63–1	4	MCH306
8TT88	1–1.6	6	MCH306
8TT89	1.6–2.5	10	MCH306
8TT90	2.5–4	16	MCH310
8TT91	4–6	16	MCH310
8TT98	5.5–8.0	20	MCH316
8TT92	7–10	25	MCH320
8TT93	10–13	32	MCH320
8TT94	13–18	40	MCH332
8TT104	18–25	50	MCH340
8TT96	23–32	63	MCH363
Star Delta			
8TT90SD	4.3–6.9	16	MCH310
8TT91SD	6.9–10.4	16	MCH310
8TT98SD	9.5–13.8	20	MCH316
8TT92SD	12.1–17.3	25	MCH320
8TT93SD	17.3–22.5	32	MCH320
8TT94SD	22.5–31	40	MCH332
8TT104SD	31–43	50	MCH340
8TT96SD	40–55	63	MCH363

10.3

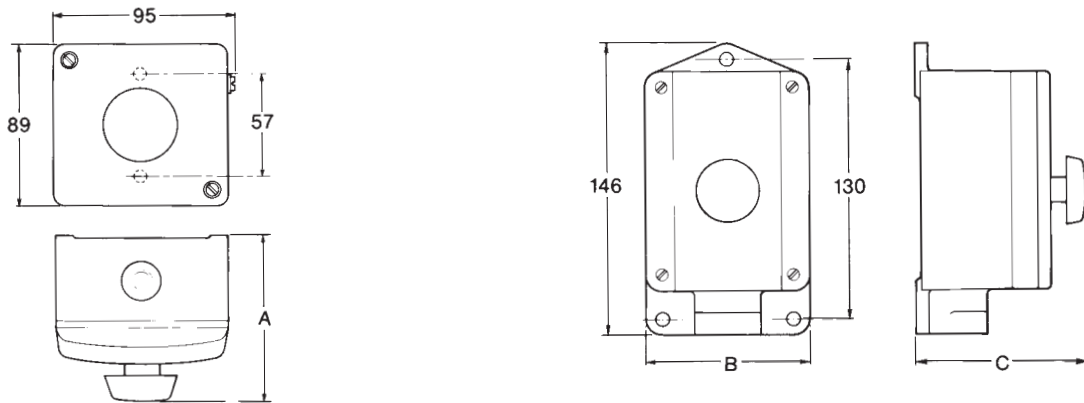
Technical data

Enclosed motor, heating and lighting control

MSU pushbutton control units (moulded IP65) dimensions



CSU pushbutton control units dimensions



List number	Dim A (mm)	Dim B (mm)	Dim C (mm)
1CSU	83	—	—
1CSUL	92	—	—
1CSUM	86	—	—
1CSUWL	—	83	92

Additional side mounting auxiliary contacts for DOL, DOL reversing, Star Delta starters and Autoline (contd)

Description	Current rating (A)	Coil voltage	Starter list number	Maximum side mount auxiliaries	Eaton list number
Autoline 4 pole		400–415	248ALCFP	2	8TA8DN11
Autoline 2 pole		230–240	228ALCDP	2	8TA8DN11
Autoline 2 pole with rectifier		230–240	228ALCDPR	1	8TA8DN11
Autoline 1 pole and neutral		230–240	228ALCSPN	1	8TA8DN11
Autoline 1 pole and neutral with rectifier		230–240	228ALCSPNR	1	8TA8DN11
Autoline 4 pole		230–240	428ALCFP	2	8TA8DN11
Autoline 4 pole with rectifier		230–240	428ALCFPR	1	8TA8DN11
Autoline 4 pole		400–415	448ALCFP	2	8TA8DN11
Autoline 2 pole		230–240	428ALCDP	2	8TA8DN11
Autoline 2 pole with rectifier		230–240	428ALCDPR	1	8TA8DN11
Autoline 1 pole and neutral		230–240	428ALCSPN	1	8TA8DN11
Autoline 1 pole and neutral with rectifier		230–240	428ALCSPNR	1	8TA8DN11

Replacement front mounting auxiliary contacts and pneumatic timer for Star Delta

- 1 NO, 1NC lth 10A Ui 600v

For Star Delta

	Pneumatic timer Eaton list number	Front mounting auxiliary Eaton list number
28SDA2X18	8TA2DS2	8TA1DN11
28SDA2X25	8TA2DS2	8TA1DN11
28SDA2X32	8TA2DS2	8TA1DN11
48SDA2X18	8TA2DS2	8TA1DN11
48SDA2X25	8TA2DS2	8TA1DN11
48SDA2X32	8TA2DS2	8TA1DN11

Tightening torques for Star Delta and DOL starters

Starter type (Nm)	Maximum starter	Relay tightening torque (Nm)		Contactor tightening torque		
		rating (kW)	Power	Aux	Power	Aux
DOL	9	1.85	1.2	1.7	1.2	
DOL	11	1.85	1.2	1.85	1.85	
DOL	15	2.5	1.2	2.5	1.2	
Star delta	15	1.85	1.2	1.7	1.2	
Star delta	22	1.85	1.2	1.85	1.85	
Star delta	25	2.5	1.2	2.5	1.2	

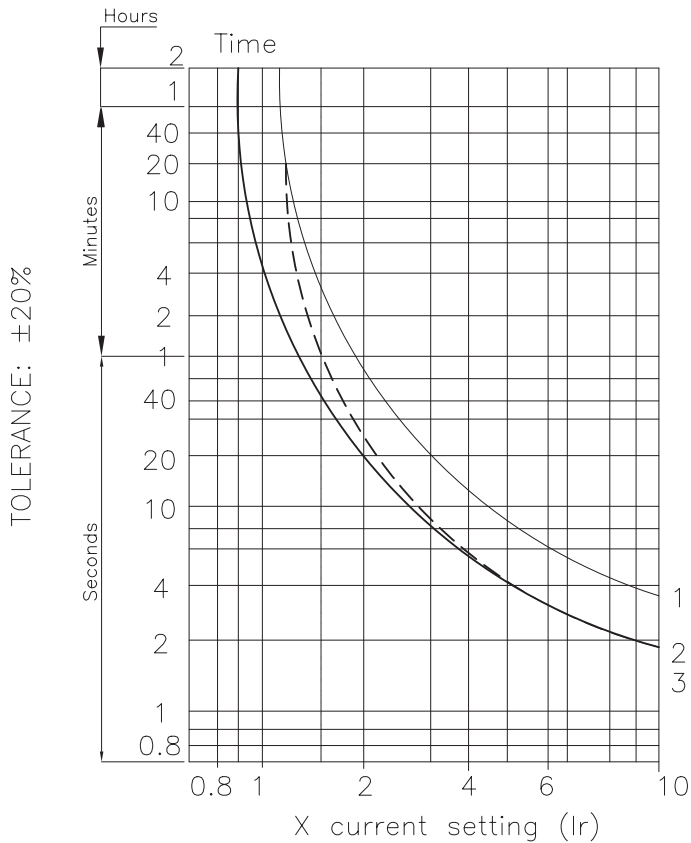
Tightening torques for Autoline contactors

Starter type	Contactor tightening torque (Nm) Power
228ALCFP	1.7
248ALCFP	1.7
428ALCFP	2.5
448ALCFP	2.5
228ALCFPR	1.7
428ALCFPR	2.5
228ALCDP	3.0
428ALCDP	3.5
228ALCDPR	3.0
428ALCDPR	3.0
228ALCSPN	3.5
428ALCSPN	4.0
228ALCSPNR	4.0
428ALCSPNR	4.0

Tightening torques for spare contactors

Starter type	Relay tightening torque (Nm)		Contactor tightening torque (Nm)	
	Power	Aux	Power	Aux
2818VCO/SD	1.85	1.2	1.7	1.2
4818VCO/SD	1.85	1.2	1.7	1.2
2825VCO/SD	1.85	1.2	1.85	1.85
4825VCO/SD	1.85	1.2	1.85	1.85
2832VCO/SD	2.5	1.2	2.5	1.2
4832VCO/SD	2.5	1.2	2.5	1.2
2812004VCOA	–	–	1.7	–
4812004VCOA	–	–	1.7	–
2825004VCOA	–	–	1.85	–
4825004VCOA	–	–	1.85	–

8TT series, overload relay tripping characteristics



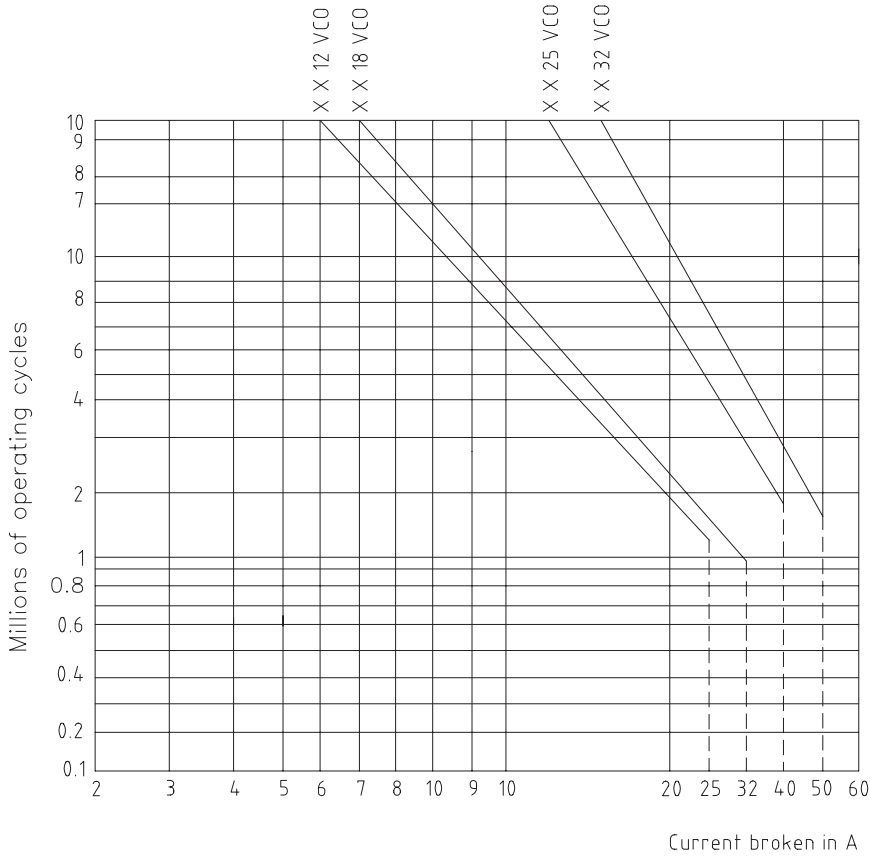
- 1. ——— Balanced operation, 3-phase, from cold state
- 2. - - - - - Balanced operation, 3-phase, after a long period at the set current (hot state)
- 3. ——— Operation following the loss of one phase (single phase tripping) from cold state

10.3

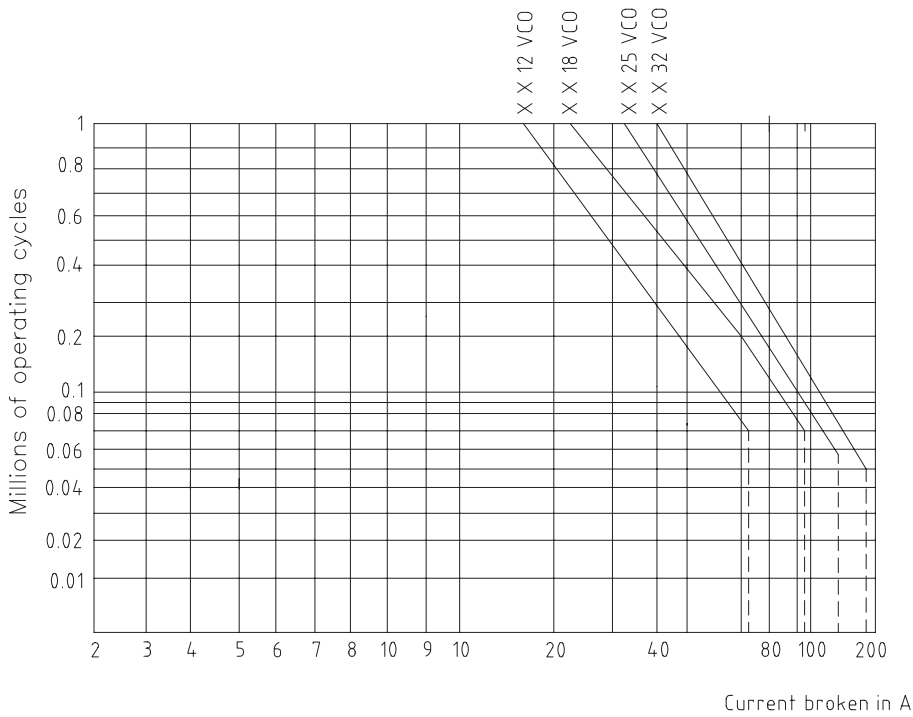
Technical data

Enclosed motor, heating and lighting control

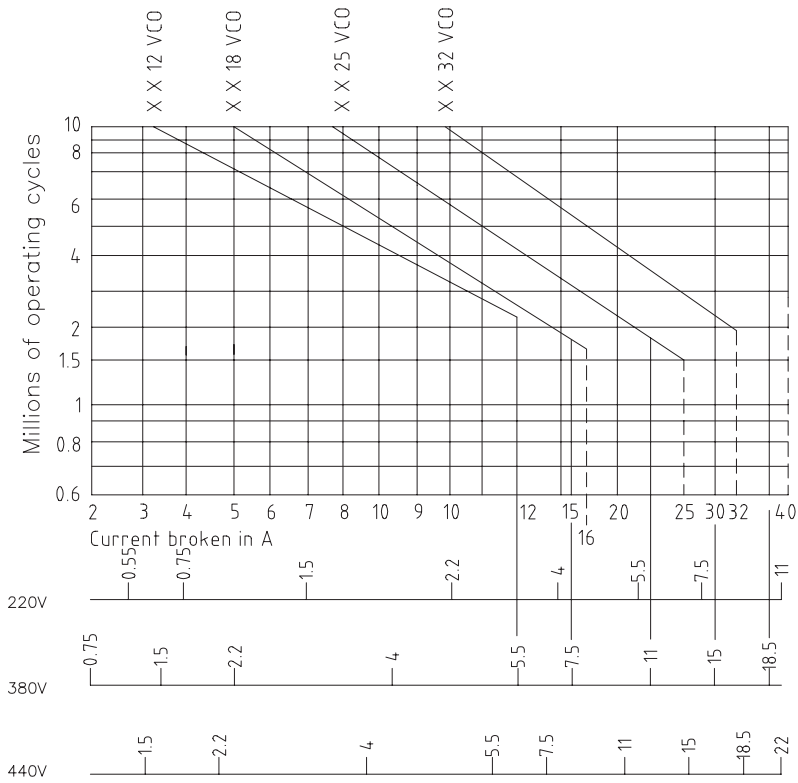
Contactor utilisation category, AC1 (Ue < 440v) electrical life curve



Contactor utilisation category, AC2 (Ue < 440v) electrical life curve



Contactor utilisation category, AC3 ($U_e \leq 440V$) electrical life curve

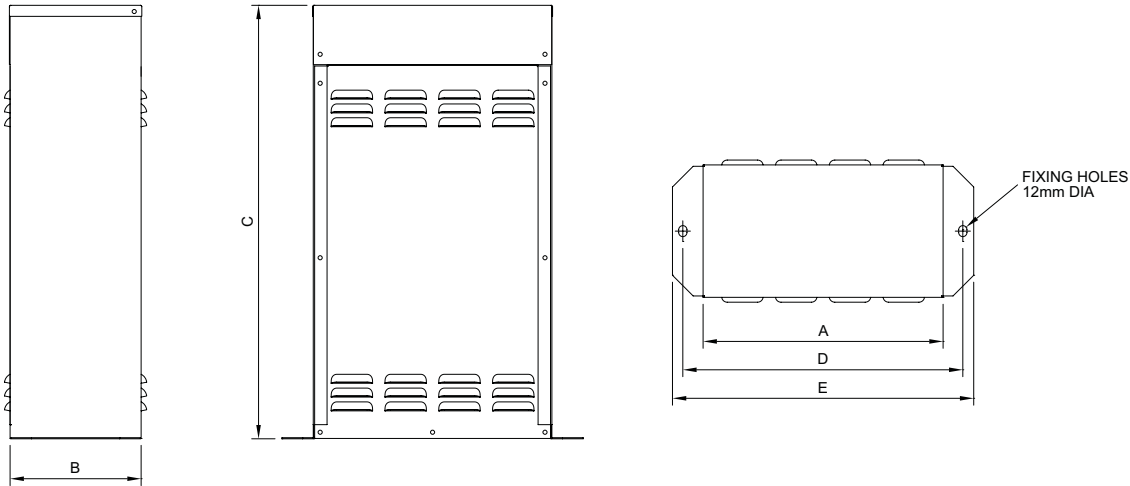


10.4

Technical data

Power factor correction capacitors

Non-auto capacitor dimensions



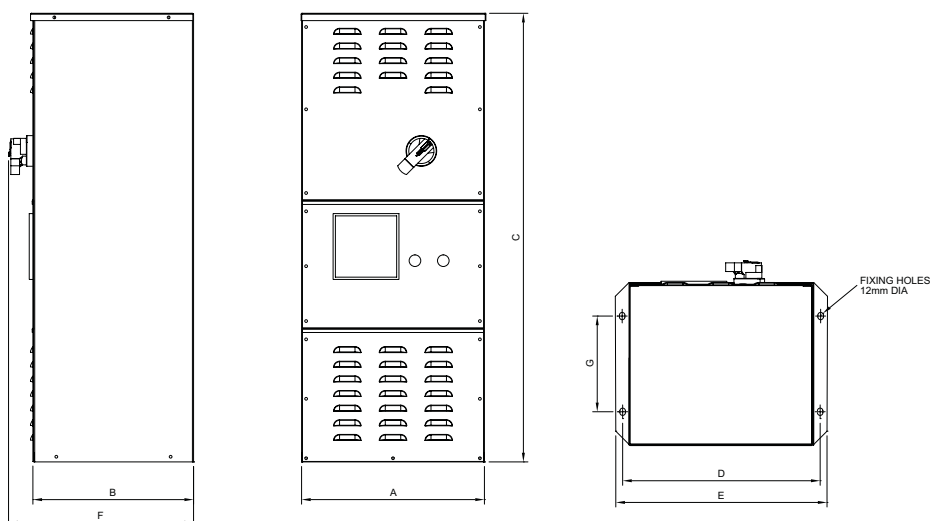
KVAR (415V)	A	B	C	D	E
25	190	190	376	212	245
50	190	190	376	212	245
75	346	190	628	405	435
100	346	190	628	405	435

Non-auto capacitor specification

Manufacturing standards:	IEC 61439-2, IEC 60439-1
Voltage range:	Standard voltage 400V capacitors suitable for use on other voltages (200–660V) supplied on request
Frequency range:	50Hz or 60Hz (dependent on customer specification)
Phases:	3 phase (single phase on request)
Terminals:	3 Terminal standard (2 and 6 on request)
Discharge resistors:	Fitted as standard and permanently connected across the capacitor terminals
Customer connections:	By means of M4, 6, 8, 10, 12 brass set screws. The size of screw dependent on capacitor size
Case material:	Zinc plated steel
Case thickness:	1mm
Location:	Interior (exterior cases are available on request)
Protection:	IP21
Ambient temperature:	–25° +40°C
Losses (including discharge resistors):	Less than 0.5 watts/kvar
Cubicle paint colour:	Light grey RAL 7035

Variations to above specifications available on request.

100 capacitor dimensions



KVAR (415V)	A	B	C	D	E	F	G
25	400	200	905	425	245	253	n/a
50	400	200	905	425	455	253	n/a
75	390	350	980	425	455	403	215
100	390	350	980	425	455	403	215

100 capacitor specification

Manufacturing standards:	IEC 61439-2, IEC 60439-1
Voltage range:	Standard voltage 400V capacitors suitable for use on other voltages (200–660V) supplied on request
Frequency range:	50Hz or 60Hz (dependent on customer specification)
Phases:	3 phase (single phase on request)
Terminals:	3 terminal standard (2 and 6 on request)
Discharge resistors:	Fitted as standard and permanently connected across the capacitor terminals
Customer connections:	By means of M4, 6, 8, 10, 12 brass set screws. The size of screw dependent on capacitor size
Case material:	Zinc plated steel
Case thickness:	1mm
Location:	Interior (exterior cases are available on request)
Protection:	IP21
Ambient temperature:	–25° +40°C
Losses (including discharge resistors):	Less than 0.5 watts/kvar
Cubicle paint colour:	Light grey RAL 7035

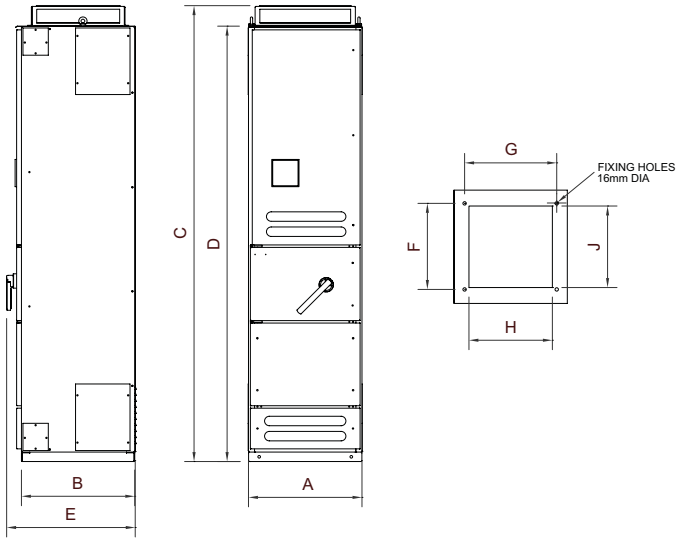
Variations to above specifications available on request.

10.4

Technical data

Power factor correction capacitors

300 standard cubicle dimensions



KVAR (415V)	A	B	C	D	E ¹⁾	F	G	H	J
125	600	600	2100	2000	680	455	487	440	430
150	600	600	2100	2000	680	455	487	440	430
175	600	600	2100	2000	680	455	487	440	430
200	600	600	2100	2000	680	455	487	440	430
225	600	600	2100	2000	680	455	487	440	430
250	600	600	2100	2000	680	455	487	440	430
275	600	600	2400	2300	680	455	487	440	430
300	600	600	2400	2300	680	455	487	440	430

¹⁾ Not applicable for direct connection

300 standard cubicle specifications

Manufacturing standards:	IEC 61439-2, IEC 60439-1
Voltage Range:	Standard operating voltages 380/400/415Vac, 3ph
Frequency range:	50Hz (60Hz rating on request)
Cable chamber and customer cable entry arrangements:	Undrilled detachable gland plate. Top or bottom entry as required.
Cubicle material:	2mm mild steel enclosure (1.6mm doors) painted light grey - RAL 7035 (other colours dependant on customer specification)
Earthing:	Internal earth bar linked to framework.
Fixing:	Floor fixing by means of 4 x 16mm diameter holes per cubicle.
Protection:	IP31 indoor. (IP42 on request – Derating may be required)
Ambient temperature:	-25°C +55°C.

Variations to above specifications available on request.

Terminal compartment

A terminal compartment is fitted as standard complete with suitably rated incoming connection points*.

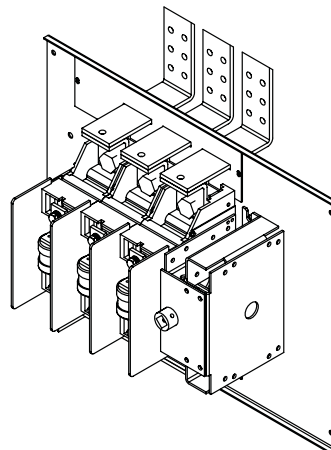
Alternatively, an incoming protective device can be fitted to the incoming section.

The device can be fitted to the top or bottom of the capacitor bank.

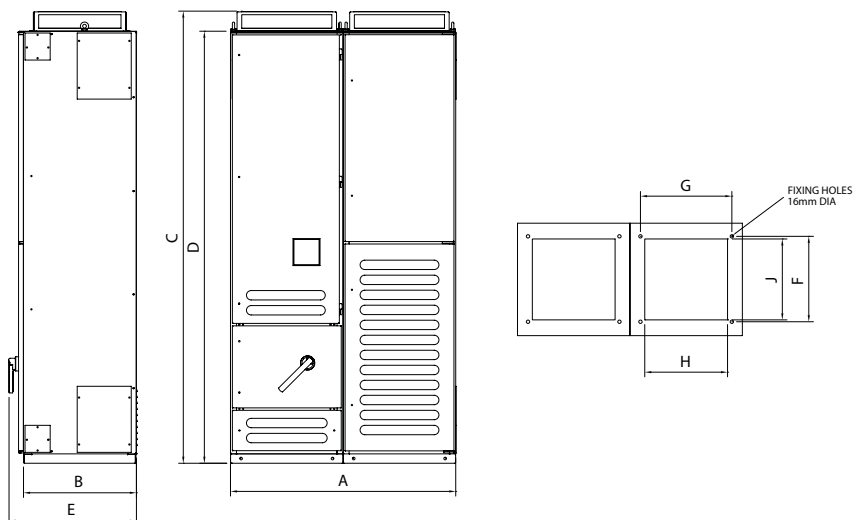
A detachable undrilled gland plate is fitted as standard.

To accept top or bottom cable entry. Cable entry will be bottom, unless otherwise specified.

* Accomodation of oversized cables is available, if specified.



300 detuned cubicle dimensions



KVAR (415V)	A	B	C	D	E ¹⁾	F	G	H	J
100	600	600	2400	2300	680	455	487	440	430
125	600	600	2400	2300	680	455	487	440	430
150	600	600	2400	2300	680	455	487	440	430
175	1200	600	2400	2300	680	455	487	440	430
200	1200	600	2400	2300	680	455	487	440	430
225	1200	600	2400	2300	680	455	487	440	430
250	1200	600	2400	2300	680	455	487	440	430
275	1200	600	2400	2300	680	455	487	440	430
300	1200	600	2400	2300	680	455	487	440	430
325	1200	600	2400	2300	680	455	487	440	430
350	1200	600	2400	2300	680	455	487	440	430
375	1200	600	2400	2300	680	455	487	440	430
400	1200	600	2400	2300	680	455	487	440	430
425	1800	600	2400	2300	680	455	487	440	430
450	1800	600	2400	2300	680	455	487	440	430
475	1800	600	2400	2300	680	455	487	440	430
500	1800	600	2400	2300	680	455	487	440	430
525	1800	600	2400	2300	680	455	487	440	430
550	1800	600	2400	2300	680	455	487	440	430
575	1800	600	2400	2300	680	455	487	440	430
600	1800	600	2400	2300	680	455	487	440	430

¹⁾ Not applicable for direct connection

300 detuned cubicle specifications

Manufacturing standards:	IEC 61439-2, IEC 60439-1
Voltage range:	Standard operating voltages 380/400/415Vac, 3ph
Frequency range:	50Hz (60Hz rating on request)
Cable chamber and customer cable entry arrangements:	Undrilled detachable gland plate. Top or bottom entry as required
Cubicle material:	2mm mild steel enclosure (1.6mm doors) painted light grey - RAL 7035 (other colours dependant on customer specification)
Earthing:	Internal earth bar linked to framework
Fixing:	Floor fixing by means of 4 x 16mm diameter holes per cubicle
Protection:	IP31 indoor. (IP42 on request – derating may be required)
Ambient temperature:	-25°C +55°C

Variations to above specifications available on request.

10.5

Technical data Degrees of protection – IP

The degrees of protection against ingress of foreign bodies and liquids are indicated by the first two characteristic numerals as detailed in tables 1 and 2. For switch and control gear the classification is recognised internationally and is described in detail in BS EN 60529.

First number

Protection against solid foreign objects IP	Requirements	Meaning protection of persons against access to hazardous parts with:
0	No protection	non-protected
1	Full penetration of 50mm diameter sphere not allowed. Contact with hazardous parts not permitted	back of hand
2	Full penetration of 12.5mm diameter sphere not allowed The jointed test finger shall have adequate clearance from hazardous parts	finger
3	The access probe of 2.5mm diameter shall not penetrate	tool
4	The access probe of 1.0mm diameter shall not penetrate	wire
5	Limited ingress of dust permitted (no harmful deposit)	wire
6	Totally protected against ingress of dust	wire

Second number

Protection against harmful ingress of water IP	Requirements	Meaning protection from water
0	No protection.	non-protected
1	Protected against vertically falling drops of water – limited ingress permitted	vertically dripping
2	Protected against vertically falling drops of water with enclosure tilted 15° from the vertical – limited ingress permitted	dripping up to 15° from the vertical
3	Protected against sprays to 60° from the vertical – limited ingress permitted	limited spraying
4	Protected against water splashed from all directions – limited ingress permitted	splashing from all directions
5	Protected against low pressure jets of water from all directions – limited ingress permitted	hosing jets from all directions
6	Protected against strong jets of water – limited ingress permitted	strong hosing jets from all directions.
7	Protected against the effects of immersion between 15cm and 1m	temporary immersion
8	Protected against long periods of immersion under pressure	continuous immersion

Additional letter

(Optional) IP	Requirements	Meaning protection of persons against access to hazardous parts with:
A for use with 0	Penetration of 50mm diameter sphere up to guard face must not contact hazardous parts.	back of hand
B for use with 0 & 1	Test finger penetration to a maximum of 80mm must not contact hazardous parts.	finger
C for use with 1 & 2	Wire of 2.5mm diameter x 100mm long must not contact hazardous parts when spherical stop face is partially entered.	tool
D for use with 1, 2 & 3	Wire of 1.0mm diameter x 100mm long must not contact hazardous parts when spherical stop face is partially entered.	wire

Note: limited penetration allowed with all four additional letters.

1 SCHF.....	108	154R.....	105	21 BBMS.....	93
10 BM.....	155	15AXD2.....	94	2100AXDEBSP.....	95
10 BMD.....	155	15AXTN2.....	94	2100AXEBSP.....	95
10 BML.....	155	15KXDC2F.....	94	212XSNC.....	98
10 SCHF.....	108	15KXSC2F.....	94	21MSB.....	115
100 MBA2.....	108	15kXSC2FRED.....	94	21MSSU.....	115
100 MBB2.....	108	15KXTNC2F.....	94	21MSU.....	115
100 MRH2.....	108	15LC.....	105	21MSU2K.....	115
100 SCHF.....	108	160JCS82.....	107	21MSU2SK.....	115
1000MEB.....	96	160JCS92.....	107	21MSUL.....	115
1000SJ11.....	104	160SD6.....	103	21MSULK.....	115
1004R.....	105	160SF6.....	103	21MSUM.....	115
1004RL.....	105	160SO.....	102	21MSUML.....	115
1004XTNC.....	98	16LS.....	106	228ALCDP.....	116, 175, 176
1006XTNC.....	98	16SA2.....	102	228ALCDPR.....	116, 176
1008XTNC.....	98	16SB3.....	102	228ALCFP.....	116, 175
100AXD2.....	94	16SE3.....	103	228ALCFP/R.....	175
100AXTN2.....	94	16SF3.....	103	228ALCFPR.....	116, 175
100CMFB.....	109	16SN2.....	104	228ALCSPN.....	116, 176
100CMFC.....	109	16SP.....	105	228ALCSPN/R.....	175
100CMFCW.....	109	16SS.....	106	228ALCSPNR.....	116, 176
100JCS82.....	107	1CLX.....	98	228ALDPR.....	175
100JCS92.....	107	1CSU.....	115	22MSU.....	115
100KXDC2F.....	94	1CSUL.....	115	22MSUL.....	115
100KXSC2F.....	94	1CSUM.....	115	230AXEBSP.....	95
100KXTNC2F.....	94	1CSUWL.....	115	230KXEBSP.....	95
100MBDEBSP.....	95	1PCB.....	89, 153	23MSU.....	115
100MFA.....	108	2 BBCL.....	93	23MSUL.....	115
100MFB.....	109	2 SCHF.....	108	242 BBC.....	92
100MFC.....	109	200 FSCS.....	92	243 BBC.....	92
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100SD5.....	102	200CMFB.....	109	246 BBC.....	92
100SD5M125.....	102	200CMFC.....	109	248ALCFP.....	116, 175, 176
100SD5M160.....	102	200DAM.....	96	250DAM.....	96
100SD5M200.....	102	200JCS82.....	107	250JCS82.....	107
100SF5.....	103	200JCS92.....	107	250JCS92.....	107
100SF5M125.....	103	200SD6.....	103	250SF7.....	103
100SF5M160.....	103	200SD6M250.....	103	250SG7.....	103
100SF5M200.....	103	200SD6M315.....	103	2521RDMP.....	97
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100SOM160.....	102	200SF6M315.....	103	2541RDMP.....	97
101GNC.....	88	200SO.....	102	254RDMP.....	97
102GCEBSP.....	91	201GNC.....	88	2561RDMP.....	97
103GNC.....	88	2021RDMP.....	97	258RDMP.....	97
103GNL.....	88	202GCEBSP.....	91	259471.....	61, 65, 69, 73
104GC.....	88	2031RDMP.....	97	259499.....	61, 65, 69, 73
10LS.....	106	203GNC.....	88	259744.....	61, 65, 69, 73
10SA2.....	102	203GNL.....	88	259763.....	61, 65, 69, 73
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10SE3.....	103	204GC.....	88	25SA2.....	102
10SF3.....	103	204R.....	105	25SB3.....	102
10SN2.....	104	204RDMP.....	97	25SE3.....	103
10SS.....	106	204XSNC.....	98	25SF3.....	103
11 BBMS.....	93	204XTNC.....	98	25SN2.....	104
118721.....	41	2061RDMP.....	97	25SP.....	105
118724.....	41	206XSNC.....	98	25SS.....	106
1250SJ11.....	104	206XTNC.....	98	260AXEBSP.....	95
125AXTN2.....	94	208XSNC.....	98	260KXEBSP.....	95
125JCS82.....	107	208XTNC.....	98	28/48SDA2X18.....	169
125JCS92.....	107	20LC.....	105	28/48SDA3X25.....	169
125KXTNC2F.....	94	20LS.....	106	28/48SDA3X32.....	169
125SO.....	102	20MFA.....	108	2812004VCOA.....	116
125SD6.....	103	20MFB.....	109	2818VCO.....	113
125SF6.....	103	20MFBW.....	109	2818VCO5D.....	114
131669.....	41	20MFC.....	109	2825004VCOA.....	116
142 BBC.....	92	20SA2.....	102	2825VCO.....	113
143 BBC.....	92	20SA2M25.....	102	2825VCO5D.....	114
144 BBC.....	92	20SA2M32.....	102	2832VCO.....	113
146 BBC.....	92	20SB3.....	102	2832VCO5D.....	114
15 MBA2.....	108	20SE3.....	103	2850VCO.....	113
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15 MRH2.....	108	20SN2.....	104	28ADS1X.....	112
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3025LC.....	105	4041RDMP.....	97	506 APL.....	90
303GNC.....	88	404GC.....	88	507 APL.....	90
304GC.....	88	404R.....	105	509 APL.....	90
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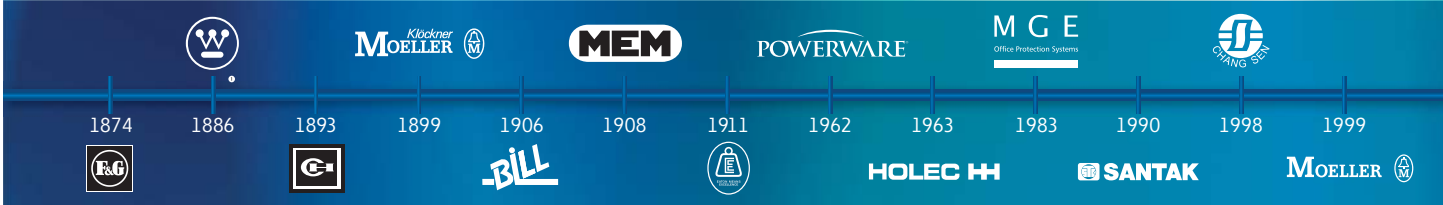
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