

## MEM® Enclosed Switchgear and Motor Control

- Fuse-switch-disconnectors & switch disconnectors
- Enclosed busbar chambers
- HRC distribution fuseboards & fuses
- Load break switches
- DOL, DOLR & Star-Delta starters
- Pushbutton control units
- Heating & lighting controls



Designed with the needs of the installer and building owner in mind



# 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® Management 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**



From the very start Eaton’s MEM product series has earned a worldwide reputation for reliable, high quality switch and fusegear – an area in which we are clear market leaders. Constantly updated and refined to comply with the very latest international standards the range can accommodate the diverse requirements of the contractor, specifier, OEM and distributor alike.

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### 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 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 33. 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 33. 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 MEM 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 MEM 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 MEM 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<sub>cw</sub> 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 MEM 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 33. 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–6mm<sup>2</sup>, 32A–10mm<sup>2</sup>, 63A–35mm<sup>2</sup>, 100/125A–70mm<sup>2</sup>.

### 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.

### SPSN surface mounting switchfuse



A surface mounting switch-disconnector-fuse in rust-protected sheet steel with light grey paint finish to BS4800 00A07. End plates incorporate dual concentric knockouts for cable entry. A hinged secondary cover allows access to switch and fuse carrier. Designed for offset contact fuselinks to BS88: Part 2. The moulded fuse unit is shrouded to prevent accidental contact with live parts. Units are supplied as standard with a 80A or 100A fuselink fitted List No. 80SO or 100SO. (2–63A SB3/SB4 fuselinks may be site fitted if required.) A double pole isolating switch is fitted, type tested to BS EN 60947-3 with a utilisation category AC22A having a rated operational current  $I_e$  240V and a conditional short circuit rating of 16kA. A dolly locking device is available List No. **AL1** for use with padlock List No. **PD2**. Maximum cable sizes are:- incoming cables 50mm<sup>2</sup>, outgoing cables 35mm<sup>2</sup>.

### Specialist heavy duty switchgear



#### 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.



#### Exel IP local switch-disconnectors heavy duty, IP55, 20–1250A, 3–6 Poles

The IP55 range complies with BS EN 60947-3. It consists of switches mounted in sheet steel enclosures, rust protected and having a powder coat finish.

All enclosures have bolt-on removable front covers with gland plates top and bottom. Cable entries must be site drilled. Switches are base mounted on the enclosure back plate.

Each enclosure has ample wiring space making additional cable boxes unnecessary when using standard copper cable.

Two tone grey operating handles are suitable for padlocking.

The range of disconnectors may be installed indoors or outdoors under sheltered conditions. They are ideally suited to installations where vibration or mechanical shock conditions prevail.

A variety of contact configurations and additional features are available on request.



#### Exel IP local switch-disconnectors heavy duty, IP65, 20–1250A, 3–6 Poles

The IP65 range complies with BSEN60947. This range has been designed specifically for indoor or outdoor locations where short term exposure to rain or low pressure jets of water may be experienced.

Each switch is mounted in a weatherproof enclosure with a sealed switch spindle and lid mounted handle providing interlocking facility allowing the lid to be removed only when the switch is in the 'OFF' position.

The enclosure is robustly constructed of sheet steel with a durable, corrosion resistant coating of 70 microns (minimum) polyester powder coat providing a degree of protection of IP65.

Switches are supplied with – gland plates fitted to all units. Suitable weatherproof glands should be used during installation and cabling.

Operating handles have facility for padlocking in both 'ON' and 'OFF' positions.

The standard range is available in configurations of up to six main poles up to 160A and 3 or 4 pole for higher ratings.

#### Automatic changeover contactors – heavy duty, type HL, 40–600A, IP55, TPN

Type HL auto-changeover contactor units are designed to automatically switch from a main to a standby power supply to feed a common load in the event of loss of the selected main supply source. Upon restoration of the mains supply the standby contactor automatically drops out and the mains supply contactor re-closes, restoring the 'mains supply to load' condition.

- Wall mounting heavy duty enclosures (IP55)
- Removable undrilled gland plates.
- Internally mounted components
- Mechanically and electrically interlocked triple pole heavy duty contactors
- Single solid neutral link
- No-volt detection control relay and control circuit protection fuses

Although already offering a multitude of configurations and optional features, for those with particular requirements our Specials facility can cater for a variety of special purpose applications.

Optional facilities

- For use on three phase three wire system (no neutral)
- Four pole contactors to provide switched neutral on generator supplies
- Timer to delay closing of alternative supply contactor to allow stand-by generator to run up to speed
- Timer to provide delay in closing mains contactor on restoration of mains supply
- Three phase and neutral mains supply, single phase alternative supply
- Pilot lamps to indicate which contactor is closed and/or which supply is available
- 230...240V 50Hz rectified DC coils for silent running
- Duty selector switch to interchange lead contactor
- Phase failure/phase reversal relay on mains supply

Items produced on application through Eaton's Specials facilities. Specific terms apply.

#### 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.

### Fireman's emergency switches



DP switches have heavy duty cast iron enclosures finished in red, IP55. Surface and flush mounting versions available. They comply with BS7671: 1992 (17th Edition of IEE Regulations) Clause 537 and 476-03-05 to 476-03-07. Switches are type-tested to BS EN 60947-3 and have Utilisation Category AC22, 250V. They are of the quick make and break type, AC or DC. Pole operated ring handle automatically locks in the 'OFF' position. White vitreous enamel nameplates with red lettering, for compliance with BS7671: 1992 Clause 537-04-06, of size 152mm x 102mm with 4–4.8mm fixing holes are available – List No. **2FNP**. For fire safety signs to BS5499-1 as required for Petrol Filling Stations under Health & Safety Executive Publication HS(G)41 reference should be made to specialist safety sign companies.

### 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 10 ways, 100A up to 8 ways and 200A up to 6 ways 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 Ue 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.

550V a.c. S type industrial fuselinks complying with BS EN 60269-1 (BS88 – 1) or BS88 – 2 with ratings from 2 to 800A are also available in the most commonly used fixing centres. Also rated at 250V d.c.

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.

NH type blade contact 500V a.c. fuselinks complying with IEC 60269-2 fuse system A and DIN VDE 0636 Part 201. Ratings from 2–1600A in size 000 to size 4a. For use in industrial applications where European practice prevails.

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 or 550V 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 6mm<sup>2</sup>, 32A 10mm<sup>2</sup>, 63A 35mm<sup>2</sup>, 100A 70mm<sup>2</sup>.

Rewirable fuse carriers are of the semi-enclosed type, and when fitted in Eaton's MEM 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 finished in black. Other colours are available.

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 6mm<sup>2</sup>, 32A 16mm<sup>2</sup>, 63A 35mm<sup>2</sup>, 100A 70mm<sup>2</sup>, 200A 150mm<sup>2</sup>.

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 MEM 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 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 1mm<sup>2</sup> – 2.5mm<sup>2</sup> rigid, 2 x 1.5mm<sup>2</sup> – 2.5mm<sup>2</sup> 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 2.5mm<sup>2</sup>

#### 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





Eaton's MEM 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.

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# 2.1

## Industrial switch & fusegear

### Glasgow fuse-switch-disconnectors & switch-disconnectors

See page 52 for technical data and overall dimensions.

103GNL



#### Glasgow switch-disconnector

- All listed are TPN

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

Stud size: 63/100A = tunnel terminal, 160/200A = M10, 300/400 = M14, 500/800A = see page 53, "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 33.
- 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	<b>61GNC</b>
				DP	<sup>1)</sup>
				TPN	<b>63GNC</b>
				TPSN	<b>64GC</b>
100	100SD5	SB3, SB4, SO & SD5	100MLK	SPSN	<b>101GNC</b>
				DP	<sup>1)</sup>
				TPN	<b>103GNC</b>
				TPSN	<b>104GC</b>
160	160SF6	SF3 & SF6	200MLK	SPSN	<b>151GNC</b>
				DP	<sup>1)</sup>
				TPN	<b>153GNC</b>
				TPSN	<b>154GC</b>
200	200SF6	SF3 & SF6	200MLK	SPSN	<b>201GNC</b>
				DP	<sup>1)</sup>
				TPN	<b>203GNC</b>
				TPSN	<b>204GC</b>
315	315SF7	SF3 & SF7	400MLK	TPN	<b>303GNC</b>
				TPSN	<b>304GC</b>
400	400SF8	SF3 & SF8	400MLK	TPN	<b>403GNC</b>
				TPSN	<b>404GC</b>
500	500SH9	SH8 & SH9	630MLK	TPN	<b>503GNC</b>
				TPSN	<b>504GC</b>
630	630SH9	–	630MLK	TPN	<b>603GNC</b>
				TPSN	<b>604GC</b>
800	800SH10	SH8 & SH10	800MLK	TPN	<b>803GNC</b>
				TPSN	<b>804GC</b>

<sup>1)</sup>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 53, "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	<b>GNMPCT200</b>
Meterpack for any 200A Glasgow fuse switch disconnecter & switch disconnecter	Modbus	320	<b>GNMPCT200M</b>

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 20

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

## 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	<b>1PCB<sup>1)</sup></b>
	63GNC/63GNL	<b>2PCB<sup>1)</sup></b>
	64GC	
100	101GNC	<b>1PCB<sup>2)</sup></b>
	103GNC/103GNL	<b>2PCB<sup>2)</sup></b>
	104GC	
160	151GNC	<b>2PCB<sup>3)</sup></b>
	153GNC	<b>3PCB<sup>3)</sup></b>
	154GC	
200	201GNC	<b>2PCB</b>
	203GNC/203GNL (315A AC21)	<b>3PCB</b>
	204GC	
315	303GNC	<b>4PCB</b>
	304GC	
400	403GNC/use 403GNL (630A AC21)	
	404GC	
500	503GNC	<b>5PCB<sup>4)</sup></b>
	504GC	
630	603GNC/use 603GNL (1000A, AC21)	
	604GC	
800	803GNC/use 803GNL (1000A, AC21)	
	804GC	

<sup>1)</sup>Not required for copper cables or al. below 35mm<sup>2</sup>

<sup>2)</sup>Not required for copper cables or al. below 50mm<sup>2</sup>

<sup>3)</sup>Not required for copper cables

<sup>4)</sup>For parallel cables use 6 PCB + 802 GCC + 2 x 90 CSB or CSBA (see diagram on page 53)

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 <sup>2</sup>	PVC SWA stranded cables:		Eaton list number				
				2-core	4-core					
63	50CSB	50CSBA	16	2-core	4-core	<sup>1)</sup>				
			25	2-core	4-core	<sup>1)</sup>				
			35	2-core	4-core	<sup>1)</sup>				
100	50CSB	50CSBA	25	2-core	4-core	<sup>1)</sup>				
			35	2-core	4-core	<sup>1)</sup>				
			50	2-core		<sup>1)</sup>				
160	50CSB	50CSBA	50	2-core		<sup>1)</sup>				
					4-core	<b>405 APL</b>				
				70	2-core	<sup>1)</sup>				
					4-core	<b>405 APL</b>				
				95	2-core	<b>405 APL</b>				
	60CSB	60CSBA	50	2-core		<sup>1)</sup>				
					4-core	<b>406 APL</b>				
				70	2-core	<sup>1)</sup>				
					4-core	<b>406 APL</b>				
				95	2-core	<b>406 APL</b>				
200	50CSB	50CSBA	70	2-core		<sup>1)</sup>				
					4-core	<b>405 APL</b>				
				95	2-core	<b>405 APL</b>				
					4-core	<b>505 APL</b>				
				120	2-core	<b>405 APL</b>				
	60CSB	60CSBA	70	2-core		<sup>1)</sup>				
					4-core	<b>406 APL</b>				
				95	2-core	<b>406 APL</b>				
					4-core	<b>506 APL</b>				
				120	2-core	<b>406 APL</b>				
300/400	70CSB	70CSBA	150	2-core	4-core	<b>506 APL</b>				
				185	–	4-core	<b>507 APL</b>			
				240	–	4-core	<b>637 APL</b>			
				300	–	4-core	<b>757 APL</b>			
				500/630	90CSB	90CSBA	240	–	4-core	<b>639 APL</b>
								300	–	4-core
Parallel cables <sup>2)</sup>				2/150	–	4-core	2 x <b>509 APL</b> <sup>2)</sup>			
				2/185	–	4-core	2 x <b>639 APL</b> <sup>2)</sup>			
				2/240	–	4-core	2 x <b>639 APL</b> <sup>2)</sup>			
				2/300	–	4-core	2 x <b>759 APL</b> <sup>2)</sup>			

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

<sup>2)</sup> 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 53

EBK110SP



## Glasgow spares

Nominal unit rating, I <sub>e</sub> (A)	Eaton list number
<b>Moving contact fuse carrier; 1 per pole</b>	
63	<b>EBK110SP</b>
100	<b>0BK103SP</b>
160...200	<b>EBK105SP</b>
315...400	<b>EBK113SP</b>
<b>Fixed contact base complete; 1 per pole</b>	
63...100	<b>102GCEBSP</b>
160...200	<b>202GCEBSP</b>
315...400 (2 per pole)	<b>402GCEBSP</b>

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	<b>PD1<sup>1)</sup></b>
Padlock bracket 63–400	<b>6LD</b>
Padlock bracket 500–800	<b>8LD</b>
Padlock <sup>2)</sup>	<b>PD1</b>

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

<sup>2)</sup>Non standard hasps on padlock available to order.

# 2.2

## Industrial switch & fusegear

### Glasgow busbar chamber system

See page 54 for technical data and overall dimensions.

142BBC



#### Busbar chambers

Nominal unit rating, I <sub>e</sub> (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, I <sub>e</sub> (A)	Eaton list number
100	21 BBL
200	21 BBL
400	41 BBL
630	81 BBL
800	81 BBL

For busbar supports, see page 55 for details

400FSCS



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

Nominal rating, I <sub>e</sub> (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 <sub>e</sub> (A)	Bore diameter mm	Capacity mm <sup>2</sup>	Eaton list number
U-Clamps	20–63	–	25	<b>2 BBCL</b>
	63–100	–	70	<b>3 BBCL</b>
	100–200	–	120	<b>6 BBCL</b>
Sockets	100–200	16.7	150	<b>62 BBSK</b>

### Busbar clamps and sockets – 400–800A Busbars

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

21BBMS



### Switchgear mounting sets

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

# 2.3

## Industrial switch & fusegear

### Exel 2 switch-disconnectors & switch-disconnector fuses

See page 56 for technical data and overall dimensions.

15AXTN2



#### Exel 2 switch-disconnector

Nominal rating, I <sub>e</sub> (A)	Utilisation category at U <sub>e</sub> 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 <sup>1)</sup>	EP 842	20SA2	SPSN	–	
		11				–	DP	<b>15AXD2</b>
		–				–	TPN	<b>15AXTN2</b>
32	32	–	32	–	32SB3	SPSN	–	
		22				–	DP	<b>30AXD2</b>
		–				–	TPN	<b>30AXTN2</b>
63	63	–	63	EP 539	63SB4	SPSN	–	
		39				–	DP	<b>60AXD2</b>
		–				–	TPN	<b>60AXTN2</b>
100	100	–	100	–	100SD5 <sup>2)</sup>	SPSN	–	
		52				–	DP	<b>100AXD2</b>
		–				–	TPN	<b>100AXTN2</b>
125	125	52	–	–	125SD6 <sup>2)</sup>	TPN	<b>125AXTN2</b>	

SPSN indicates switched neutral. <sup>1)</sup>20A units are DC22. <sup>2)</sup>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 <sub>e</sub> (A)	Utilisation category at U <sub>e</sub> 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 <sup>1)</sup>	EP 842	20SA2	SPSN	<b>15KXSC2F<sup>2)</sup></b>	
		11				–	DP	<b>15KXDC2F</b>
		–				–	TPN	<b>15KXTNC2F</b>
32	32	–	32	–	32SB3	SPSN	<b>30KXSC2F</b>	
		22				–	DP	<b>30KXDC2F</b>
		–				–	TPN	<b>30KXTNC2F</b>
63	63	–	63	EP 539	63SB4	SPSN	<b>60KXSC2F</b>	
		39				–	DP	<b>60KXDC2F</b>
		–				–	TPN	<b>60KXTNC2F</b>
100	100	–	100	–	100SD5 <sup>3)</sup>	SPSN	<b>100KXSC2F</b>	
		52				–	DP	<b>100KXDC2F</b>
		–				–	TPN	<b>100KXTNC2F</b>
125	125	52	–	–	125SD6 <sup>3)</sup>	TPN	<b>125KXTNC2F</b>	

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

<sup>3)</sup>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	<b>XLMPCT100</b>
Meterpack for any 100/125A Exel 2 switch disconnector fuse & switch disconnector	Modbus	150	<b>XLMPCT100M</b>



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 <sub>e</sub> (A)	Type	Eaton list number
20/32	Door locking bracket	<b>4 LD</b>
63/100/125	Door locking bracket	<b>5 LD</b>
—	Padlock for use with above	<b>PD1</b>

## Exel 2 Spares

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

<sup>1)</sup>1 required for switched neutral pole on SPSN switchfuses.

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

# 2.4

## Industrial switch & fusegear

SPSN Switchfuse

See page 57 for technical data and overall dimensions.

100ESSCF



### SPSN switchfuse

Nominal rating,  
 $I_e$  (A)

Eaton list  
number

80

**80ESSCF**

100

**100ESSCF**

See page 57 for technical data and overall dimensions.

4100DA



### Memlok on-load changeover switches

Nominal rating, I <sub>e</sub> (A)	Eaton list number
32	432DA
63	463DA
100	4100DA
200	4200DA
400	4400DA
630	4630DA
800	4800DA

200DAM



### Memlok moulded changeover switches

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

<sup>1)</sup>Including operating handle.

215AF



### Fireman's emergency switches

Nominal rating, I <sub>e</sub> (A)	Conduit entry top & bottom	Eaton list number
20	1–20mm	215AF
20 (Flush)	1–20mm	220AFF <sup>1)</sup>
32	1–25mm	230AF

<sup>1)</sup>Recess required: 136H x 124W x 73D (mm)

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 <sub>e</sub> (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

# 2.6

## Industrial switch & fusegear

Specialist heavy duty switchgear

See page 62 for RDMP technical data and overall dimensions.

See page 63 for PC2 technical data and overall dimensions.

See page 64 for Exel IP technical data and overall dimensions.

204RDMP



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

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

<sup>1)</sup>Includes early break auxiliary contact.

PC28G403



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

Nominal unit rating, I <sub>e</sub> (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

DE5512531



## Exel IP local switch-disconnectors heavy duty, IP55, 20–1250A, 3–6 poles

- Terminal shield supplied as optional extra, to be ordered separately

Nominal unit rating, Ie (A)	Poles	Eaton list number – Terminal shield	Eaton list number – Switch
20	3P	1713203	DE552031
40	3P	1713203	DE554031
63	3P	1713203	DE556331
125	3P	1314230	DE5512531
160	3P	1314230	DE5516031
250	3P	1314735	DE5525031
400	3P	1314735	DE5540031
630	3P	1314830	DE5563031
1000	3P	1314830	DE55100031
1250	3P	Not available	DE55125031
20	3P + N	1713203	DE55203N
40	3P + N	1713203	DE55403N
63	3P + N	1713203	DE55633N
125	3P + N	1314230	DE551253N
160	3P + N	1314230	DE551603N
250	3P + N	1314735	DE552503N
400	3P + N	1314735	DE554003N
630	3P + N	1314830	DE556303N
1000	3P + N	1314830	DE5510003N
20	4P	1713202	DE552041
40	4P	1713202	DE554041
63	4P	1713202	DE556341
125	4P	1314230	DE5512541
160	4P	1314230	DE5516041
250	4P	1314735	DE5525041
400	4P	1314735	DE5540041
630	4P	1314830	DE5563041
1000	4P	1314830	DE55100041
1250	4P	Not available	DE55125041
20	6P	1713203	DE552061
40	6P	1713203	DE554061
63	6P	1713203	DE556361
125	6P	1314230	DE5512561
160	6P	1314230	DE5516061

DE6516031



## Exel IP local switch-disconnectors heavy duty, IP65, 20–1250A, 3–6 poles

- Terminal shield supplied as optional extra, to be ordered separately

Nominal unit rating, Ie (A)	Poles	Eaton list number – Terminal shield	Eaton list number – Switch
20	3P	1713203	DE652031
40	3P	1713203	DE654031
63	3P	1713203	DE656331
125	3P	1314230	DE6512531
160	3P	1314230	DE6516031
250	3P	1314735	DE6525031
400	3P	1314735	DE6540031
630	3P	1314830	DE6563031
1000	3P	1314830	DE65100031
1250	3P	Not available	DE65125031
20	3P + N	1713203	DE65203N
40	3P + N	1713203	DE65403N
63	3P + N	1713203	DE65633N
125	3P + N	1314230	DE651253N

# 2.6

## Industrial switch & fusegear

Specialist heavy duty switchgear

### Exel IP local switch-disconnectors heavy duty, IP65, 20–1250A, 3–6 poles (contd)

Nominal unit rating, I <sub>e</sub> (A)	Poles	Eaton list number – Terminal shield	Eaton list number – Switch
160	3P + N	1314230	DE651603N
250	3P + N	1314735	DE652503N
400	3P + N	1314735	DE654003N
630	3P + N	1314830	DE656303N
1000	3P + N	1314830	DE6510003N
20	4P	1713202	DE652041
40	4P	1713202	DE654041
63	4P	1713202	DE656341
125	4P	1314230	DE6512541
160	4P	1314230	DE6516041
250	4P	1314735	DE6525041
400	4P	1314735	DE6540041
630	4P	1314830	DE6563041
1000	4P	1314830	DE65100041
1250	4P	Not available	DE65125041
20	6P	1713203	DE652061
40	6P	1713203	DE654061
63	6P	1713203	DE656361
125	6P	1314230	DE6512561
160	6P	1314230	DE6516061

See page 58 for technical data and overall dimensions.

304XTNC



### Exel distribution fuseboards

Nominal rating, Ie (A)	Poles	No. of ways	Max. terminal capacity mm <sup>2</sup> (copper cables)		Outgoing terminal bore diameter, mm	Suitable HRC fuselinks	Spare fuse carrier	Safety carrier	Eaton list number (without fuselinks)		
			Main	Outgoing							
<b>IP4X enclosures</b>											
20	SPN	4	95	6	4	SA2	20 MFH	20 MFS	<b>204XSNC</b>		
		6	95	6	4	SA2	20 MFH	20 MFS	<b>206XSNC</b>		
		8	120	6	4	SA2	20 MFH	20 MFS	<b>208XSNC</b>		
		12	120	6	4	SA2	20 MFH	20 MFS	<b>212XSNC</b>		
	TPN	4	95	6	4	SA2	20 MFH	20 MFS	<b>204XTNC</b>		
		6	95	6	4	SA2	20 MFH	20 MFS	<b>206XTNC</b>		
		8	120	6	4	SA2	20 MFH	20 MFS	<b>208XTNC</b>		
		12	120	6	4	SA2	20 MFH	20 MFS	<b>212XTNC</b>		
	32	SPN	4	95	16	5.5	SB3	32 MFH	32 MFS	<b>304XSNC</b>	
			6	95	16	5.5	SB3	32 MFH	32 MFS	<b>306XSNC</b>	
			8	150	16	5.5	SB3	32 MFH	32 MFS	<b>308XSNC</b>	
			12	150	16	5.5	SB3	32 MFH	32 MFS	<b>312XSNC</b>	
TPN		2	35 <sup>1)</sup>	16	5.5	SB3	32 MFH	32 MFS	<b>302XTNC</b>		
		4	95	16	5.5	SB3	32 MFH	32 MFS	<b>304XTNC</b>		
		6	95	16	5.5	SB3	32 MFH	32 MFS	<b>306XTNC</b>		
		8	150	16	5.5	SB3	32 MFH	32 MFS	<b>308XTNC</b>		
		10	150	16	5.5	SB3	32 MFH	32 MFS	<b>310XTNC</b>		
		12	150	16	5.5	SB3	32 MFH	32 MFS	<b>312XTNC</b>		
		63	TPN	2	240	35	8	SB3 & SB4	63 MFH	63 MFS	<b>602XTNC</b>
				4	240	35	8	SB3 & SB4	63 MFH	63 MFS	<b>604XTNC</b>
6	240			35	8	SB3 & SB4	63 MFH	63 MFS	<b>606XTNC</b>		
8	240			35	8	SB3 & SB4	63 MFH	63 MFS	<b>608XTNC</b>		
10	500			35	8	SB3 & SB4	63 MFH	63 MFS	<b>610XTNC</b>		
100	TPN	2	240	70	12	SD5 <sup>2)</sup>	100 MFH	100 MFS	<b>1002XTNC</b>		
		3	240	70	12	SD5 <sup>2)</sup>	100 MFH	100 MFS	<b>1003XTNC</b>		
		4	240	70	12	SD5 <sup>2)</sup>	100 MFH	100 MFS	<b>1004XTNC</b>		
		6	500 <sup>3)</sup>	70	12	SD5 <sup>2)</sup>	100 MFH	100 MFS	<b>1006XTNC</b>		
		8	500 <sup>3)</sup>	70	12	SD5 <sup>2)</sup>	100 MFH	100 MFS	<b>1008XTNC</b>		
200	TPN	2	630 <sup>3)</sup>	150	18	SF6	200 MFH	200 MFS	<b>2002XTNC</b>		
		3	630 <sup>3)</sup>	150	18	SF6	200 MFH	200 MFS	<b>2003XTNC</b>		
		4	630 <sup>3)</sup>	150	18	SF6	200 MFH	200 MFS	<b>2004XTNC</b>		
		6	630 <sup>3)</sup>	150	18	SF6	200 MFH	200 MFS	<b>2006XTNC</b>		

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

<sup>1)</sup>8mm diameter

<sup>2)</sup>SB3, SB4 and SO fuselinks may be fitted if used with adaptor – Eaton list number **100MFLK**.

<sup>3)</sup>Can be adapted to allow fitment of 2–240mm<sup>2</sup> 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	<b>1CLX</b>
Padlock bracket for 20A to 100A units	<b>9LD</b>
Padlock bracket for 200A units	<b>8LD</b>
Padlock for use with above	<b>PD1</b>

# 2.7

## Industrial switch & fusegear

Exel – distribution fuseboards

ETM2209SP



### Exel distribution fuseboard – spares

Description	Boards	SP outgoing ways	Eaton list number
Earth bars – 20/32A fuseboards	–	up to 12	<b>ETM2209SP</b>
	–	up to 18	<b>ETM2210SP</b>
	–	up to 24	<b>ETM2211SP</b>
	–	up to 36	<b>ETM2212SP</b>
Neutral bars – 20/32A fuseboards	–	up to 12	<b>ETM2223SP</b>
	–	up to 18	<b>ETM2224SP</b>
	–	up to 24	<b>ETM2225SP</b>
	–	up to 36	<b>ETM2226SP</b>
Main incoming terminal block – 20/32A fuseboards	4/6 way	–	<b>EP539</b>
	2/8 way	–	<b>EP879</b>
	10/12 way 20A, 10 way 32A	–	<b>EP880</b>
	12 way 32A	–	<b>EP881</b>
Blank endplates – 20/32A fuseboards	–	–	<b>EBS843SP</b>

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

<b>3.1</b>	HRC cartridge fuses .....	34
<b>3.2</b>	Fuse carriers & bases .....	42

# 3.1

## HRC cartridge fuses

Paramount

See page 59 for overall dimensions.

10SA2



### 415V industrial fuses – offset bolted contacts

- S-Type compact industrial bolted pattern fuses 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	<b>2SA2</b>		
		4	–	NIT4	4F21	NITD4	<b>4SA2</b>		
		6	–	NIT6	6F21	NITD6	<b>6SA2</b>		
		10	–	NIT10	10F21	NITD10	<b>10SA2</b>		
		16	–	NIT16	16F21	NITD16	<b>16SA2</b>		
		20	–	NIT20	20F21	NITD20	<b>20SA2</b>		
				25	–	NIT20M25	20M25F21	NITD20M25	<b>20SA2M25</b>
				32	–	NIT20M32	20M32F21	NITD20M32	<b>20SA2M32</b>
				25	–	NIT25	25F21	NITD25	<b>25SA2</b>
				32	–	NIT32	32F21	NITD32	<b>32SA2</b>
				40	–	NIT32M40	–	NITD32M40	<b>32SA2M40</b>
				50	–	NIT32M50	–	NITD32M50	<b>32SA2M50</b>
				63	–	NIT32M63	–	NITD32M63	<b>32SA2M63</b>
73	A2	2	–	TIA2	2H07	AA02	<b>2SB3</b>		
		4	–	TIA4	4H07	AA04	<b>4SB3</b>		
		6	–	TIA6	6H07	AA06	<b>6SB3</b>		
		10	–	TIA10	10H07	AA010	<b>10SB3</b>		
		16	–	TIA16	16H07	AA016	<b>16SB3</b>		
		20	–	TIA20	20H07	AA020	<b>20SB3</b>		
		25	–	TIA25	25H07	AA025	<b>25SB3</b>		
		32	–	TIA32	32H07	AA032	<b>32SB3</b>		
				40	–	TIA32M40	32M40H07	AA032M40	<b>32SB3M40</b>
				50	–	TIA32M50	32M50H07	AA032M50	<b>32SB3M50</b>
				63	–	TIA32M63	32M63H07	AA032M63	<b>32SB3M63</b>
		94	A3	35	–	TIS35	–	–	<b>35SB4</b>
				40	–	TIS40	40K07	BA040	<b>40SB4</b>
50	–			TIS50	50K07	BA050	<b>50SB4</b>		
63	–			TIS63	63K07	BA063	<b>63SB4</b>		
				80	–	TIS63M80	63M80K07	BA063M80	<b>63SB4M80</b>
				100	–	TIS63M100	63M100K07	BA063M100	<b>63SB4M100</b>
				80	–	OS80/TIS80	80K07R	OSD80	<b>80SO</b>
				100	–	OS100/TIS100	100K07R	OSD100	<b>100SO</b>
				125	–	OS100M125/ TIS100M125	–	OSD100M125	<b>100SOM125</b>
				160	–	–	–	OSD100M160	<b>100SOM160</b>
				125	–	OOT125	–	–	<b>125SO</b>
				160	–	OOT160	–	–	<b>160SO</b>
				200	–	–	–	–	<b>200SO</b>
100SD5	A4	32	–	TCP32	32L14	CE035	<b>32SD5</b>		
		40	–	TCP40	40L14	CE040	<b>40SD5</b>		
		50	–	TCP50	50L14	CE050	<b>50SD5</b>		
		63	–	TCP63	63L14	CE063	<b>63SD5</b>		
		80	–	TCP80	80L14	CE080	<b>80SD5</b>		
		100	–	TCP100	100L14	CE0100	<b>100SD5</b>		
				125	–	TCP100M125	100M125L14	CE0100M125	<b>100SD5M125</b>
				160	–	TCP100M160	100M160L14	CE0100M160	<b>100SD5M160</b>
		200	–	TCP100M200	100M200L14	CE0100M200	<b>100SD5M200</b>		

20SB3



63SB4



100SD5



## 415V industrial fuses – 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	<b>125SD6</b>
		160	–	TFP160	160M14	DE0160	<b>160SD6</b>
		200	–	TFP200	200M14	DE0200	<b>200SD6</b>
		250	–	TFP200M250	200M250M14	DE0200M250	<b>200SD6M250</b>
		315	–	–	–	–	<b>200SD6M315</b>

These industrial bolted pattern fuses 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.

## 550V industrial fuses – offset bolted contacts

- S-Type industrial bolted pattern fuses with offset contacts. ASTA 20 Certified or tested to BS EN 60269-1 (BS88 – 1) or BS88 – 2 for a breaking capacity of 80 kA at 550V a.c.

Fixing centres, mm	BS88 ref	Rating In Normal (A)	Motor	Dimensional equivalents			Eaton list number	
				GEC/Lawson	Brush/Hawker	Bussmann/Dorman		
16SB3-550	A1	2	–	NIT2	2F21	NITD2	<b>2SA2-550</b>	
		4	–	NIT4	4F21	NITD4	<b>4SA2-550</b>	
		6	–	NIT6	6F21	NITD6	<b>6SA2-550</b>	
		10	–	NIT10	10F21	NITD10	<b>10SA2-550</b>	
		16	–	NIT16	16F21	NITD16	<b>16SA2-550</b>	
		20	–	NIT20	20F21	NITD20	<b>20SA2-550</b>	
		73	A2	2	–	TIA2	2H07	AA02
4	–	TIA4		4H07	AA04	<b>4SB3-550</b>		
6	–	TIA6		6H07	AA06	<b>6SB3-550</b>		
10	–	TIA10		10H07	AA010	<b>10SB3-550</b>		
16	–	TIA16		16H07	AA016	<b>16SB3-550</b>		
20	–	TIA20		20H07	AA020	<b>20SB3-550</b>		
25	–	TIA25		25H07	AA025	<b>25SB3-550</b>		
32	–	TIA32		32H07	AA032	<b>32SB3-550</b>		
200SD6-550	A3	40		–	TIS40	40K07	BA040	<b>40SB4-550</b>
		50		–	TIS50	50K07	BA050	<b>50SB4-550</b>
		63	–	TIS63	63K07	BA063	<b>63SB4-550</b>	
94	A4	80	–	TCP80	80L14	CE080	<b>80SD5-550</b>	
		100	–	TCP100	100L14	CE0100	<b>100SD5-550</b>	
	–	125	–	TFP125	125M14	DE0125	<b>125SD6-550</b>	
	–	160	–	TFP160	160M14	DE0160	<b>160SD6-550</b>	
	–	200	–	TFP200	200M14	DE0200	<b>200SD6-550</b>	

16SB3-550



200SD6-550



20SE3



## 415V industrial fuses – centre bolted contacts

- S-Type compact industrial bolted pattern fuses 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	<b>2SE3</b>
		4	–	TB4	4K08	AC4	<b>4SE3</b>
		6	–	TB6	6K08	AC6	<b>6SE3</b>
		10	–	TB10	10K08	AC10	<b>10SE3</b>
		16	–	TB16	16K08	AC16	<b>16SE3</b>
		20	–	TB20	20K08	AC20	<b>20SE3</b>
		25	–	TB25	25K08	AC25	<b>25SE3</b>
		32	–	TB32	32K08	AC32	<b>32SE3</b>

# 3.1

## HRC cartridge fuses

Paramount

32SF3



### 415V industrial fuses – centre 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	
111	–	2	–	TBC2	2K09	AD2	<b>2SF3</b>
		4	–	TBC4	4K09	AD4	<b>4SF3</b>
		6	–	TBC6	6K09	AD6	<b>6SF3</b>
		10	–	TBC10	10K09	AD10	<b>10SF3</b>
		16	–	TBC16	16K09	AD16	<b>16SF3</b>
		20	–	TBC20	20K09	AD20	<b>20SF3</b>
		25	–	TBC25	25K09	AD25	<b>25SF3</b>
		32	–	TBC32	32K09	AD32	<b>32SF3</b>
97	–	40	–	TB40	40K08	BC40	<b>40SE4</b>
		50	–	TB50	50K08	BC50	<b>50SE4</b>
		63	–	TB63	63K08	BC63	<b>63SE4</b>
97	–	63	80	–	–	–	<b>63SE4M80</b>
		63	100	–	–	–	<b>63SE4M100</b>
111	B1	40	–	TBC40	40K09	BD40	<b>40SF4</b>
		50	–	TBC50	50K09	BD50	<b>50SF4</b>
		63	–	TBC63	63K09	BD63	<b>63SF4</b>
		80	–	–	–	–	<b>63SF4M80</b>
		100	–	–	–	–	<b>63SF4M100</b>
		80	–	TC80	80L09	CD80	<b>80SF5</b>
		100	–	TC100	100L09	CD100	<b>100SF5</b>
		125	–	TC100M125	100M125L09	CD100M125	<b>100SF5M125</b>
		160	–	TC100M160	100M160L09	CD100M160	<b>100SF5M160</b>
		200	–	TC100M200	100M200L09	CD100M200	<b>100SF5M200</b>
		125	–	TF125	125M09	DD125	<b>125SF6</b>
		160	–	TF160	160M09	DD160	<b>160SF6</b>
		200	–	TF200	200M09	DD200	<b>200SF6</b>
111	B2	250	–	TF200M250	200M250M09	DD200M250	<b>200SF6M250</b>
		315	–	–	–	–	<b>200SF6M315</b>
		250	–	TKF250	250N09	ED250	<b>250SF7</b>
		315	–	TKF315	315N09	ED315	<b>315SF7</b>
		400	–	–	–	–	<b>315SF7M400</b>
133	–	250	–	TKM250	250N11	ED250	<b>250SG7</b>
		315	–	TKM315	315N11	ED315	<b>315SG7</b>
111	B4	355	–	TMF355	355P09	ED355	<b>355SF8</b>
		400	–	TMF400	400P09	ED400	<b>400SF8</b>
		500	–	TMF400M500	–	ED400M500	<b>400SF8M500</b>
133/184	C1	355	–	TM355	355P11	EF355	<b>355SH8</b>
		400	–	TM400	400P11	EF400	<b>400SH8</b>
		450	–	3T450	–	–	<b>450SF9</b>
		500	–	3T500	–	–	<b>500SF9</b>
111	–	560	–	3T560	–	–	<b>560SF9</b>
		630	–	3T630	–	–	<b>630SF9</b>
		450	–	TTM450	450R11	FF450	<b>450SH9</b>
		500	–	TTM500	500R11	FF500	<b>500SH9</b>
133/184	C2	560	–	TTM560	560R11	FF560	<b>560SH9</b>
		630	–	TTM630	630R11	FF630	<b>630SH9</b>
		450	–	TT450	450R12	FG450	<b>450SY9</b>
		500	–	TT500	500R12	FG500	<b>500SY9</b>
111	–	560	–	TT560	560R12	GG560	<b>560SY9</b>
		630	–	TT630	630R12	GG630	<b>630SY9</b>
		710	–	TLM710	700S11	GF710	<b>710SH10</b>
		800	–	TLM800	800S11	GF800	<b>800SH10</b>
165/229	–	710	–	TLT710	700S12	GG700	<b>710SY10</b>
		800	–	TLT800	800S12	GG800	<b>800SY10</b>
149	D1	1000	–	TXU1000	1000U44	GH1000	<b>1000SJ11</b>
		1250	–	TXU1250	1250U44	GH1250	<b>1250SJ11</b>

200SF6



400SH8



630SY9



1250SJ11



100SF5-550



## S type 550V industrial fuselink – centre bolted contacts

- S-Type 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 550V a.c.

Fixing centres, mm	BS88 ref	Rating In		Dimensional equivalents			Eaton list number
		Normal (A)	Motor (A)	GEC/Lawson	Brush/Hawker	Bussmann/Dorman	
111	B1	80	–	TC80	80L09	CD80	<b>80SF5-550</b>
		100	–	TC100	100L09	CD100	<b>100SF5-550</b>
	B2	125	–	TF125	125M09	DD125	<b>125SF6-550</b>
		160	–	TF160	160M09	DD160	<b>160SF6-550</b>
		200	–	TF200	200M09	DD200	<b>200SF6-550</b>
	B3	250	–	TKF250	250N09	ED250	<b>250SF7-550</b>
315		–	TKF315	315N09	ED315	<b>315SF7-550</b>	
133	–	250	–	TKM250	250N11	EFS250	<b>250SG7-550</b>
		315	–	TKM315	315N11	EFS315	<b>315SG7-550</b>
111	B4	355	–	TMF355	355P09	ED355	<b>355SF8-550</b>
		400	–	TMF400	400P09	ED400	<b>400SF8-550</b>
133/184	C1	355	–	TM355	355P11	EF355	<b>355SH8-550</b>
		400	–	TM400	400P11	EF400	<b>400SH8-550</b>
	C2	450	–	TTM450	450R11	FF450	<b>450SH9-550</b>
		500	–	TTM500	500R11	FF500	<b>500SH9-550</b>
		560	–	TTM560	560R11	GF550	<b>560SH9-550</b>
	C3	630	–	TTM630	630R11	GF630	<b>630SH9-550</b>
		710	–	TLM710	700S11	GF700	<b>710SH10-550</b>
		800	–	TLM800	800S11	GF800	<b>800SH10-550</b>

630SH9-550



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		Equivalents			Eaton list number		
		Normal (A)	Motor (A)	GEC/Lawson	Brush/Hawker	Bussmann/Dorman			
60	14	2	–	NS2	2F06	NSD2	<b>2SN2</b>		
		4	–	NS4	4F06	NSD4	<b>4SN2</b>		
		6	–	NS6	6F06	NSD6	<b>6SN2</b>		
		10	–	NS10	10F06	NSD10	<b>10SN2</b>		
		16	–	NS16	16F06	NSD16	<b>16SN2</b>		
		20	–	NS20	20F06	NSD20	<b>20SN2</b>		
				25	–	NS20M25	20M25F06	NSD20M25	<b>20SN2M25</b>
				32	–	NS20M32	20M32F06	NSD20M32	<b>20SN2M32</b>
				25	–	NS25	25F06	NSD25	<b>25SN2</b>
				32	–	NS32	32F06	NSD32	<b>32SN2</b>
58	17.5	32	40	NS32M40	–	NSD32M40	<b>32SN2M40</b>		
			50	NS32M50	–	NSD32M50	<b>32SN2M50</b>		
			63	NS32M63	–	NSD32M63	<b>32SN2M63</b>		

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	<b>16SP</b>	
		20	–	–	ESD20	<b>20SP</b>	
		25	–	–	ESD25	<b>25SP</b>	
		32	–	–	ESD32	<b>32SP</b>	
		40	–	40ES	40G05	ESD40	<b>40SP</b>
		50	–	50ES	50G05	ESD50	<b>50SP</b>
		63	–	63ES	63G05	ESD63	<b>63SP</b>

604R



### R and RL type house service cut-out fuses

- Type IIa (R) and IIb (RL) house service cut-out fuses. 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	–	<b>154R</b>
		20	RHF20	20KR85	–	<b>204R</b>
		30	RHF30	30KR85	RHD30	<b>304R</b>
		40	RHF40	40KR85	RHD40	<b>404R</b>
		45	–	45KR85	–	<b>454R</b>
		50	RHF50	50KR85	RHD50	<b>504R</b>
		60	RHF60	60KR85	RHD60	<b>604R</b>
		80	RHF80	80KR85	RHD80	<b>804R</b>
57	30	100	–	100KR85	–	<b>1004R</b>
		30	RHL30	30LR85	RHLD30	<b>304RL</b>
		60	RHL60	60LR85	RHLD60	<b>604RL</b>
		80	RHL80	80LR85	RHLD80	<b>804RL</b>
		100	RHL100	100LR85	RHLD100	<b>1004RL</b>

30LC



### LC type fuses

- 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	<b>5LC</b>
26	10.32	5	Black	50	–	–	<b>1505LC</b>
29	12.7	6	Black	20	–	–	<b>3006LC</b>
26	10.32	10	Black	50	–	–	<b>1510LC</b>
29	12.7	10	Black	50	–	–	<b>3010LC</b>
26	10.32	15	Blue	50	D1515	DSD15	<b>15LC</b>
29	12.7	16	Black	20	–	–	<b>3016LC</b>
26	10.32	20	Yellow	50	D1520	DSD20	<b>20LC</b>
29	12.7	20	Black	50	–	–	<b>3020LC</b>
29	12.7	25	Black	20	–	–	<b>3025LC</b>
29	12.7	30	Red	50	D3030	DSD30	<b>30LC</b>
35	16.67	35	Black	10	–	–	<b>35LCS</b>
35	16.67	40	Black	10	–	–	<b>40LCS</b>
35	16.67	45	Green	10	D4545	DSD45	<b>45LCS</b>

6LS



### LS type street lighting fuses

- 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 <sup>1)</sup> GEC	Brush	Dorman/Bussmann	Eaton list number
<b>LS-Type, offset contacts</b>							
38	47	14	2	LST2	2D19L	STD2	<b>2LS</b>
			4	LST4	4D19L	STD4	<b>4LS</b>
			6	LST6	6D19L	STD6	<b>6LS</b>
			10	LST10	10D19L	STD10	<b>10LS</b>
			16	LST16	16D19L	STD16	<b>16LS</b>
			20	LST20	20D19L	STD20	<b>20LS</b>
			25	LST25	25D19L	STD25	<b>25LS</b>
			32	LST32	32D19L	STD32	<b>32LS</b>

<sup>1)</sup>Equivalent columns list fuses having similar ratings and fixing centres.

20SS



## SS type offset blade fuses

- 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 <sup>1)</sup> GEC	Brush	Dorman/Bussmann	Eaton list number
–	51	12	2	SS2	2D04	SSD2	<b>2SS</b>
			4	SS4	4D04	SSD4	<b>4SS</b>
			6	SS6	6D04	SSD6	<b>6SS</b>
			10	SS10	10D04	SSD10	<b>10SS</b>
			16	SS16	16D04	SSD15	<b>16SS</b>
			20	SS20	20D04	SSD20	<b>20SS</b>
			25	SS25	25D04	SSD25	<b>25SS</b>
			32	SS32	32D04	SSD32	<b>32SS</b>

<sup>1)</sup>Equivalent columns list fuses having similar ratings and fixing centres.

20DR



## DR type general purpose fuses

- ASTA 20 Certified to BS EN 60269-1 (BS88-1) for a breaking capacity of 80 kA at 415V a.c. Also complies with BS7654. For general purpose use in industrial and commercial installations.

Fixing centres, mm	Overall length, mm	Overall dia. mm	Rating, In (A)	Equivalents <sup>1)</sup> GEC	Brush	Bussmann	Eaton list number
–	29	12.7	2	MD2	–	SMD2	<b>2DR</b>
			4	MD4	–	SMD4	<b>4DR</b>
			6	MD6	–	SMD6	<b>6DR</b>
			8	MD8	–	SMD8	<b>8DR</b>
			10	MD10	–	SMD10	<b>10DR</b>
			12	–	–	–	<b>12DR</b>
			16	MD16	–	SMD16	<b>16DR</b>
			20	MD20	–	SMD20	<b>20DR</b>
			25	MD25	–	SMD25	<b>25DR</b>
			32	MD32	–	SMD32	<b>32DR</b>

<sup>1)</sup>Equivalent columns list fuses having similar ratings and fixing centres.

F5GG25U000



## NH type DIN knife blade fuses

- 500V G type with dual indicator and unisolated gripping lugs (usodin). Tested to IEC 60269-2 fuse system A for a breaking capacity of 120kA at 500V a.c with dimensions also to DIN VDE 0636 Part 201. For use in industrial applications where European practice prevails.

Size	Length (O/A mm)	Rating, In (A)	Equivalents MEM	Cooper Bussmann	Ferraz Shawmut	Eaton list number
000	78.5	2	–	2NHG000B	NH000GG50V2	<b>F5GG2U000</b>
		4	–	4NHG000B	NH000GG50V4	<b>F5GG4U000</b>
		6	NHC006	6NHG000B	NH000GG50V6	<b>F5GG6U000</b>
		10	NHC0010	10NHG000B	NH000GG50V10	<b>F5GG10U000</b>
		16	NHC0016	16NHG000B	NH000GG50V16	<b>F5GG16U000</b>
		20	NHC0020	20NHG000B	NH000GG50V20	<b>F5GG20U000</b>
		25	NHC0025	25NHG000B	NH000GG50V25	<b>F5GG25U000</b>
		32	NHC0032	32NHG000B	NH000GG50V32	<b>F5GG32U000</b>
		35	NHC0035	35NHG000B	NH000GG50V35	<b>F5GG35U000</b>
		40	NHC0040	40NHG000B	NH000GG50V40	<b>F5GG40U000</b>
00	78.5	50	NHC0050	50NHG000B	NH000GG50V50	<b>F5GG50U000</b>
		63	NHC0063	63NHG000B	NH000GG50V63	<b>F5GG63U000</b>
		80	NHC0080	80NHG000B	NH000GG50V80	<b>F5GG80U000</b>
		100	NHC0100	100NHG000B	NH000GG50V100	<b>F5GG100U000</b>
		125	NH00125	125NHG000B	NH00GG50V125	<b>F5GG125U00</b>
		160	NH00160	160NHG000B	NH00GG50V160	<b>F5GG160U00</b>

F5GG100U1



# 3.1

## HRC cartridge fuselinks

Paramount

F5GG63U2



F5GG355U3



### NH type din knife blade fuselinks (contd)

Size	Length (O/A mm)	Rating, In (A)	Equivalents MEM	Cooper Bussmann	Ferraz Shawmut	Eaton list number
1	135	25	NH0125	25NHG01B	NH1GG50V25	<b>F5GG25U1</b>
		35	NH0135	35NHG01B	NH1GG50V35	<b>F5GG35U1</b>
		50	NH0150	50NHG01B	NH1GG50V50	<b>F5GG50U1</b>
		63	NH0163	63NHG01B	NH1GG50V63	<b>F5GG63U1</b>
		80	NH0180	80NHG01B	NH1GG50V80	<b>F5GG80U1</b>
		100	NH01100	100NHG01B	NH1GG50V100	<b>F5GG100U1</b>
		125	NH01125	125NHG01B	NH1GG50V125	<b>F5GG125U1</b>
		160	NH01160	160NHG01B	NH1GG50V160	<b>F5GG160U1</b>
		200	NH01200	200NHG01B	NH1GG50V200	<b>F5GG200U1</b>
		224	NH01224	224NHG01B	NH1GG50V224	<b>F5GG224U1</b>
2	150	250	NH01250	250NHG01B	NH1GG50V250	<b>F5GG250U1</b>
		25	NH0225	25NHG02B	NH2GG50V25	<b>F5GG25U2</b>
		35	NH0235	35NHG02B	NH2GG50V35	<b>F5GG35U2</b>
		50	NH0250	50NHG02B	NH2GG50V50	<b>F5GG50U2</b>
		63	NH0263	63NHG02B	NH2GG50V63	<b>F5GG63U2</b>
		80	NH0280	80NHG02B	NH2GG50V80	<b>F5GG80U2</b>
		100	NH02100	100NHG02B	NH2GG50V100	<b>F5GG100U2</b>
		125	NH02125	125NHG02B	NH2GG50V125	<b>F5GG125U2</b>
		160	NH02160	160NHG02B	NH2GG50V160	<b>F5GG160U2</b>
		200	NH02200	200NHG02B	NH2GG50V200	<b>F5GG200U2</b>
		224	NH02224	224NHG02B	NH2GG50V224	<b>F5GG224U2</b>
		250	NH02250	250NHG02B	NH2GG50V250	<b>F5GG250U2</b>
		315	NH02315	315NHG02B	NH2GG50V315	<b>F5GG315U2</b>
		355	NH02355	355NHG02B	NH2GG50V355	<b>F5GG355U2</b>
		400	NH02400	400NHG02B	NH2GG50V400	<b>F5GG400U2</b>
		3	150	315	NH03315	315NHG03B
355	NH03355			355NHG03B	NH3GG50V355	<b>F5GG355U3</b>
400	NH03400			400NHG03B	NH3GG50V400	<b>F5GG400U3</b>
500	NH03500			500NHG03B	NH3GG50V500	<b>F5GG500U3</b>
630	NH03630			630NHG03B	NH3GG50V630	<b>F5GG630U3</b>
4a	200	800	–	800NH4AG	NH4AGG50V800-8	<b>F5GG800U4A</b>
		1000	–	1000NH4AG	NH4AGG50V1000-8	<b>F5GG1000U4A</b>
		1250	–	1250NH4AG	NH4AGG50V1250-8	<b>F5GG1250U4A</b>
		1600	–	1600NH4AG	–	<b>F5GG1600U4A</b>

Neutral links, handles and other ratings and dimensions of fuselinks for use on the L.V. distribution network are available – details on request.

Neutral Links: KS 00, KS 01, KS 02, KS 03. Handle: NHH



315JCS82



### J type feeder pillar fuses

- 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	<b>63JCS82</b>	
								80	<b>80JCS82</b>	
								100	<b>100JCS82</b>	
								125	<b>125JCS82</b>	
								160	<b>160JCS82</b>	
								200	<b>200JCS82</b>	
								250	<b>250JCS82</b>	
								315	<b>315JCS82</b>	
								PJ30	355	<b>355JCS82</b>
									400	<b>400JCS82</b>

400JCS92



92	DL3-2	JSU	5002601	JS	3/EJB	JSD	MJ31	63	<b>63JCS92</b>	
								80	<b>80JCS92</b>	
								100	<b>100JCS92</b>	
								125	<b>125JCS92</b>	
								160	<b>160JCS92</b>	
								200	<b>200JCS92</b>	
								250	<b>250JCS92</b>	
								315	<b>315JCS92</b>	
								PJ31	355	<b>355JCS92</b>
									400	<b>400JCS92</b>
RJ31	450	<b>450JCS92</b>								
	500	<b>500JCS92</b>								
SJ31	560	<b>560JCS92</b>								
	630	<b>630JCS92</b>								
	710	<b>710JCS92</b>								
	800	<b>800JCS92</b>								

200JCF



### Ferrule cap type

–	JF	5005701	FHLA	–	–	MJ25	63	<b>63JCF</b>
							80	<b>80JCF</b>
							100	<b>100JCF</b>
							125	<b>125JCF</b>
							160	<b>160JCF</b>
							200	<b>200JCF</b>
							250	<b>250JCF</b>

# 3.2

## HRC cartridge fuses

Fuse carriers and bases

See page 60 for overall dimensions.

63MRH2



### Fuse carriers

Nominal rating I <sub>n</sub> (A)	(Fuses fitted to HRC carrier version)	Eaton list number Re-wirable fuse carriers	Eaton list number HRC Fuse Carrier
10	10SA2	<b>15 MRH2<sup>1)</sup></b>	<b>1 SCHF<sup>2)</sup></b>
20	20SA2	<b>15 MRH2<sup>1)</sup></b>	<b>2 SCHF<sup>2)</sup></b>
32	32SB3	<b>32 MRH2<sup>1)</sup></b>	<b>3 SCHF<sup>2)</sup></b>
63	63SB4	<b>63 MRH2<sup>1)</sup></b>	<b>6 SCHF<sup>2)</sup></b>
100	100SD5	<b>100 MRH2<sup>1)</sup></b>	<b>10 SCHF<sup>2)</sup></b> <b>100 SCHF<sup>1)</sup></b>

<sup>1)</sup>Porcelain

<sup>2)</sup>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 <sub>n</sub> (A)	Eaton list number Type A	Type B
20	<b>15 MBA2</b>	<b>15 MBB2</b>
32	<b>32 MBA2</b>	<b>32 MBB2</b>
63	<b>63 MBA2</b>	<b>63 MBB2</b>
100	<b>100 MBA2</b>	<b>100 MBB2</b>

20MFA



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

Nominal rating, I <sub>n</sub> (A)	Colour	Neutral link	Suitable Eaton HRC fuses	Eaton list number
20	Black	20MLK	2-20SA2	<b>20MFA</b>
32	Black	32MLK	2-32SB3	<b>32MFA</b>
63	Black	63MLK	35-63SB4 or 2-32SB3	<b>63MFA</b>
100	Black	100MLK	32-100SD5 <sup>1)</sup>	<b>100MFA</b>
200	Black	200MLK	125-200SF6 or 80-100SF5	<b>200MFA</b>

63CMFA



### Compact range

32	Black	20MLK	2-32SA2	<b>32CMFA</b>
63	Black	32MLK	35-63SB4 or 2-32SB3	<b>63CMFA</b>
100	Black	63MLK	80-100SO or 35-63SB4	<b>100CMFA</b>
200	Black	100MLK	125-200SD6 or 32-100SD5	<b>200CMFA</b>
315	Black	200MLK	250-315SF7 or 125-200SF6	<b>315CMFA</b>

<sup>1)</sup>SB3, SB4 or SO fuses may be fitted if used with adaptor – Eaton list number: **100MLK**.

32MFB



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

Nominal rating, In (A)	Colour	Neutral link	Suitable Eaton HRC fuselinks	Eaton list number
20	Black	20MLK	2-20SA2	<b>20MFB</b>
	White	20MLK	2-20SA2	<b>20MFBW</b>
32	Black	32MLK	2-32SB3	<b>32MFB</b>
	White	32MLK	2-32SB3	<b>32MFBW</b>
63	Black	63MLK	35-63SB4 or 2-32SB3	<b>63MFB</b>
	White	63MLK	35-63SB4 or 2-32SB3	<b>63MFBW</b>
100	Black	100MLK	32-100SD5 <sup>1</sup>	<b>100MFB</b>
	White	100MLK	32-100SD5 <sup>1</sup>	<b>100MFBW</b>
200	Black	200MLK	125-200SF6 or 80-100SF5	<b>200MFB</b>
	White	200MLK	125-200SF6 or 80-100SF5	<b>200MFBW</b>

100CMFBW



### Compact range

32	Black	20MLK	2-32SA2	<b>32CMFB</b>
	White	20MLK	2-32SA2	<b>32CMFBW</b>
63	Black	32MLK	35-63SB4 or 2-32SB3	<b>63CMFB</b>
	White	32MLK	35-63SB4 or 2-32SB3	<b>63CMFBW</b>
100	Black	63MLK	80-100SO or 35-63SB4	<b>100CMFB</b>
	White	63MLK	80-100SO or 35-63SB4	<b>100CMFBW</b>
200	Black	100MLK	125-200SD6 or 32-100SD5	<b>200CMFB</b>
	White	100MLK	125-200SD6 or 32-100SD5	<b>200CMFBW</b>
315	Black	200MLK	250-315SF7 or 125-200SF6	<b>315CMFB</b>
	White	200MLK	250-315SF7 or 125-200SF6	<b>315CMFBW</b>

<sup>1</sup>SB3, SB4 or SO fuselinks 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 fuselinks	Eaton list number
20	Black	20MLK	2-20SA2	<b>20MFC</b>
	White	20MLK	2-20SA2	<b>20MFCW</b>
32	Black	32MLK	2-32SB3	<b>32MFC</b>
	White	32MLK	2-32SB3	<b>32MFCW</b>
63	Black	63MLK	35-63SB4 or 2-32SB3	<b>63MFC</b>
	White	63MLK	35-63SB4 or 2-32SB3	<b>63MFCW</b>
100	Black	100MLK	32-100SD5 <sup>1</sup>	<b>100MFC</b>
	White	100MLK	32-100SD5 <sup>1</sup>	<b>100MFCW</b>
200	Black	200MLK	125-200SF6 or 80-100SF5	<b>200MFC</b>
	White	200MLK	125-200SF6 or 80-100SF5	<b>200MFCW</b>

200CMFC



### Compact range

32	Black	20MLK	2-32SA2	<b>32CMFC</b>
	White	20MLK	2-32SA2	<b>32CMFCW</b>
63	Black	32MLK	35-63SB4 or 2-32SB3	<b>63CMFC</b>
	White	32MLK	35-63SB4 or 2-32SB3	<b>63CMFCW</b>
100	Black	63MLK	80-100SO or 35-63SB4	<b>100CMFC</b>
	White	63MLK	80-100SO or 35-63SB4	<b>100CMFCW</b>
200	Black	100MLK	125-200SD6 or 32-100SD5	<b>200CMFC</b>
	White	100MLK	125-200SD6 or 32-100SD5	<b>200CMFCW</b>
315	Black	200MLK	250-315SF7 or 125-200SF6	<b>315CMFC</b>
	White	200MLK	250-315SF7 or 125-200SF6	<b>315CMFCW</b>

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

# 3.2

## HRC cartridge fuses

Fuse carriers and bases

100MFD



### 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
20	Black	20MLK	2-20SA2	<b>20MFD</b>
32	Black	32MLK	2-32SB3	<b>32MFD</b>
63	Black	63MLK	35-63SB4 or 2-32SB3	<b>63MFD</b>
100	Black	100MLK	32-100SD5 <sup>1)</sup>	<b>100MFD</b>
200	Black	200MLK	125-200SF6 or 80-100SF5	<b>200MFD</b>

315CMFD



### Compact range

32	Black	20MLK	2-32SA2	<b>32CMFD</b>
63	Black	32MLK	35-63SB4 or 2-32SB3	<b>63CMFD</b>
100	Black	63MLK	80-100SO or 35-63SB4	<b>100CMFD</b>
200	Black	100MLK	125-200SD6 or 32-100SD5	<b>200CMFD</b>
315	Black	200MLK	250-315SF7 or 125-200SF6	<b>315CMFD</b>

<sup>1)</sup>SB3, SB4 or SO fuses may be fitted if used with adaptor – Eaton list number: **100MLK**.

32CFF



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

Nominal rating, In (A)	Colour	Neutral link	Suitable Eaton HRC fuses	Eaton list number
<b>Front/Front</b>				
32	Black	32CLK	2-32SN2	<b>32CFF</b>
	White	32CLK	2-32SN2	<b>32CFFW</b>
63	Black	63CLK	16-63SP	<b>63CFF</b>
	White	63CLK	16-63SP	<b>63CFFW</b>
<b>Front/Back</b>				
32	Black	32CLK	2-32SN2	<b>32CFB</b>
	White	32CLK	2-32SN2	<b>32CFBW</b>
63	Black	63CLK	16-63SP	<b>63CFB</b>
	White	63CLK	16-63SP	<b>63CFBW</b>
<b>Back/Back</b>				
32	Black	32CLK	2-32SN2	<b>32CBB</b>
	White	32CLK	2-32SN2	<b>32CBBW</b>

Note: Carriers available for NH fuses – details on request.

32CBB





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.

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# 4.1

## 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 47 for overload relays.

See page 81 for trip and electrical life curves.

See page 70 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 <sup>1)</sup> Vac	Eaton list number
18	9	220–240	<b>28ADSM1X</b>
		380–415	<b>48ADSM1X</b>

<sup>1)</sup>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 <sup>1)</sup> Vac	Eaton list number
18	9	220–240	<b>28ADS1X</b>
		380–415	<b>48ADS1X</b>
25	11	220–240	<b>28ADS2X</b>
		380–415	<b>48ADS2X</b>
32	15	220–240	<b>28ADS3X</b>
		380–415	<b>48ADS3X</b>

<sup>1)</sup>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 <sup>1)</sup> Vac	Eaton list number
18	9	220–240	<b>28ADSA1X</b>
		380–415	<b>48ADSA1X</b>
25	11	220–240	<b>28ADSA2X</b>
		380–415	<b>48ADSA2X</b>
32	15	220–240	<b>28ADSA3X</b>
		380–415	<b>48ADSA3X</b>

<sup>1)</sup>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 <sup>1)</sup> Vac	Eaton list number
18	9	220–240	<b>28ARD1X</b>
		380–415	<b>48ARD1X</b>
25	11	220–240	<b>28ARD2X</b>
		380–415	<b>48ARD2X</b>

<sup>1)</sup>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 <sup>1)</sup> Vac	Eaton list number
31	15	220–240	<b>28SDA2X18</b>
		380–415	<b>48SDA2X18</b>
43	22	220–240	<b>28SDA3X25</b>
		380–415	<b>48SDA3X25</b>
55	25	220–240	<b>28SDA3X32</b>
		380–415	<b>48SDA3X32</b>

<sup>1)</sup>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	<b>8TT87</b>
1–1.6	0.55	<b>8TT88</b>
1.6–2.5	1.1	<b>8TT89</b>
2.5–4	1.5	<b>8TT90</b>
4–6	2.2	<b>8TT91</b>
5.5–8	3.7	<b>8TT98</b>
7–10	4	<b>8TT92</b>
10–13	5.5	<b>8TT93</b>
13–18	9	<b>8TT94</b>
18–25	11	<b>8TT104</b>
23–32	15	<b>8TT96</b>

8TT92SD



## Star Delta, phase connected thermal overload relays

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

4832VCO



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

- Open contactor, 3 pole with 1NO auxiliary
- Contactor technical details, see page 67

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

<sup>1)</sup>Other control voltages available, contact Eaton

# 4.1

## 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 67

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

<sup>1)</sup>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 <sup>1)</sup> Vac	Eaton list number
18	9	110	<b>8COIL118</b>
		220–240	<b>8COIL218</b>
		380–415	<b>8COIL418</b>
25	11	110	<b>8COIL132</b>
		220–240	<b>8COIL232</b>
		380–415	<b>8COIL432</b>
32	15	110	<b>8COIL132</b>
		220–240	<b>8COIL232</b>
		380–415	<b>8COIL432</b>
50	25	220–240	<b>8COIL250</b>
		380–415	<b>8COIL450</b>

<sup>1)</sup>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 <sup>1)</sup> Vac	Eaton list number
31	15	220–240	<b>8COIL218</b>
		380–415	<b>8COIL418</b>
43	22	220–240	<b>8COIL232</b>
		380–415	<b>8COIL432</b>
55	25	220–240	<b>8COIL232</b>
		380–415	<b>8COIL432</b>

<sup>1)</sup>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	<b>8TA2DS2</b>

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 <sup>1)</sup>
Side mounting auxiliary contact	1NO – 1NC	10	<b>8TA8DN11</b>
Front mounting auxiliary contact	1NO – 1NC	10	<b>8TA1DN11</b>

<sup>1)</sup>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 78 for overall dimensions.

- IEC / EN60947
- CE marked

22MSU



## MSU pushbutton control units (moulded IP65)

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

### 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	<b>21MSB</b>

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	<b>21MSULK</b>
Two position key operated selector switch with 1-N/O contact labelled 0/1 (Key removable in both positions)	<b>21MSU2K</b>
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)	<b>21MSU2SK</b>

1CSUL



## CSU pushbutton control units (IP41/IP65)

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

# 4.3

## 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 79 for overall dimensions.

- IEC / EN60947
- IEC408
- CE marked

248ALCFP



#### Heating and lighting contactors

Description	Cable capacity mm <sup>2</sup>	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	<b>228ALCFP</b>
4P enclosed without rectifier	4	380–415	25	12	<b>248ALCFP</b>
4P enclosed without rectifier	10	220–240	40	32	<b>428ALCFP</b>
4P enclosed without rectifier	10	380–415	40	32	<b>448ALCFP</b>
4P enclosed with rectifier	4	220–240	25	12	<b>228ALCFPR</b>
4P enclosed with rectifier	10	220–240	40	32	<b>428ALCFPR</b>
2P enclosed without rectifier	16	220–240	40	25	<b>228ALCDP</b>
2P enclosed without rectifier	25	220–240	64	40	<b>428ALCDP</b>
2P enclosed with rectifier	16	220–240	40	25	<b>228ALCDPR</b>
2P enclosed with rectifier	25	220–240	64	40	<b>428ALCDPR</b>
1P enclosed without rectifier	50	220–240	70	50	<b>228ALCSPN</b>
1P enclosed without rectifier	50	220–240	112	50	<b>428ALCSPN</b>
1P enclosed with rectifier	50	220–240	70	50	<b>228ALCSPNR</b>
1P enclosed with rectifier	50	220–240	112	50	<b>428ALCSPNR</b>

248ALCFP



#### Replacement contactors – Autoline

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



With dimensional drawings, standards and specification data, the technical data chapter provides in depth information for all of our customers on all Eaton products displayed in this product guide.

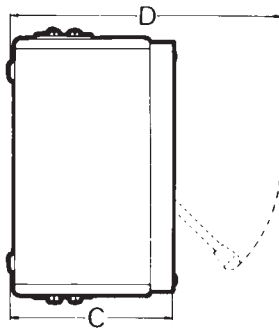
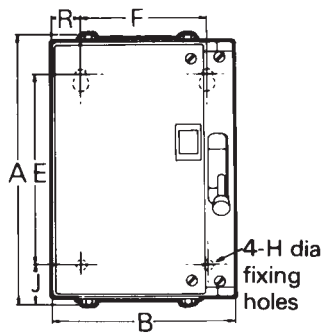
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# 5.1

## Technical data

### 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

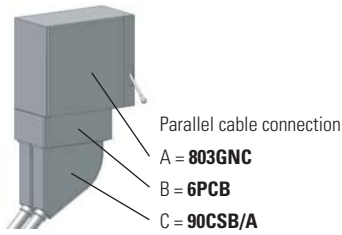
Nominal unit rating, Ie (A)	Utilisation category at Ue 415V to BS EN 60947-3		
	Switch-disconnector AC21A Ie	Fuse-switch-disconnector AC22A Ie	AC23A Ie
63	125A	63A	41A
100	125A	100A	41A
160	Use 200A	160A	160A
200	315A	200A	160A
315	Use 400A	315A	200A
400	400A	400A	200A
500	Use 630A	500A	385A
630	630A	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:

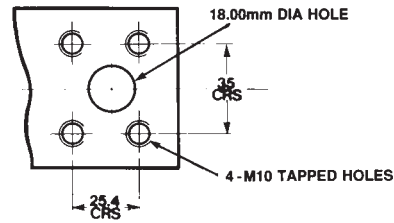
Rated operational current, Ie (A)	Operating cycles		Total
	Without current	With current	
63–100	8,500	1,500	10,000
160–315	7,000	1,000	8,000
400–630	4,000	1,000	5,000
800	2,500	500	3,000

**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.

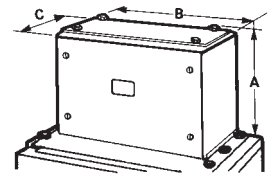


**Copper terminal plate**

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.

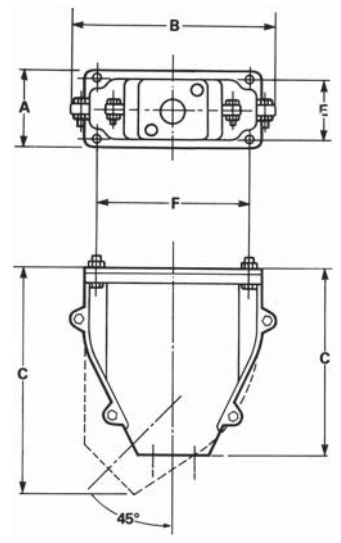
**Cable extension boxes dimensions**

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**

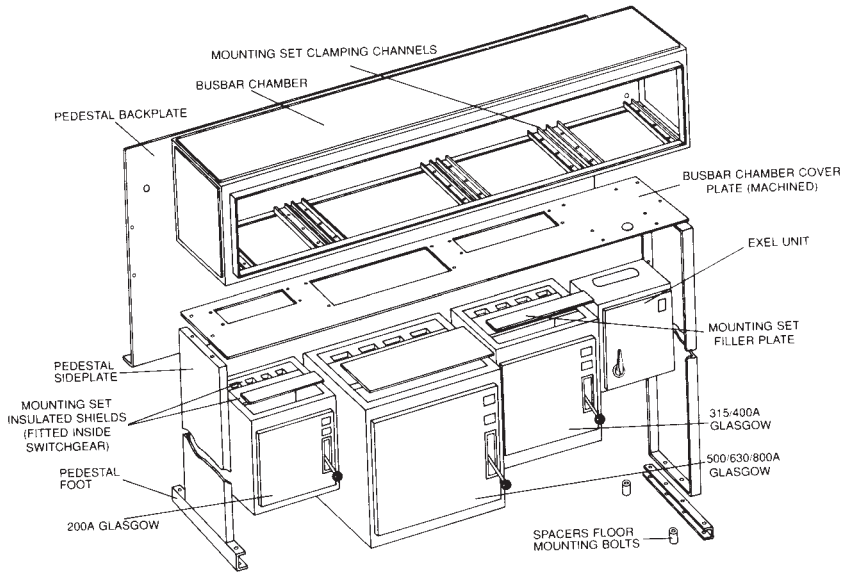
Eaton list number	Dimensions, mm					Fixing bolts	
	A	B	C	E	F	No.	Type
<b>Straight entry</b>							
50 CSB	83	232	170	67	171	4	M6
60 CSB	108	283	260	89	216	4	M8
70 CSB	133	384	322	114	318	4	M8
90 CSB	133	530	450	114	457	4	M10
<b>45° Angled entry</b>							
50 CSBA	83	232	250	67	171	4	M6
60 CSBA	108	283	310	89	216	4	M8
70 CSBA	133	384	390	114	318	4	M8
90 CSBA	133	530	510	114	457	4	M10



# 5.1

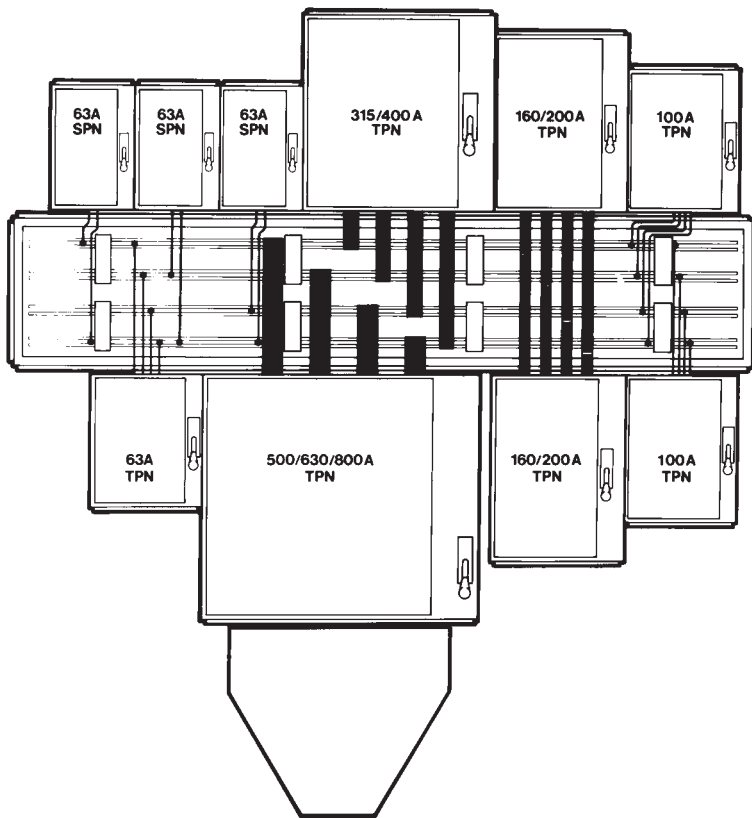
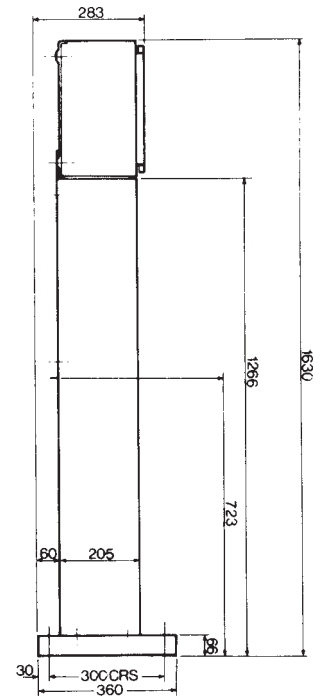
## Technical data

### 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.

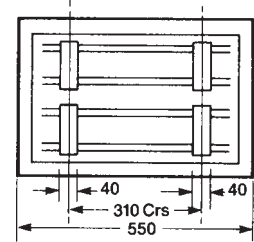
### Pedestal and back-plate sets



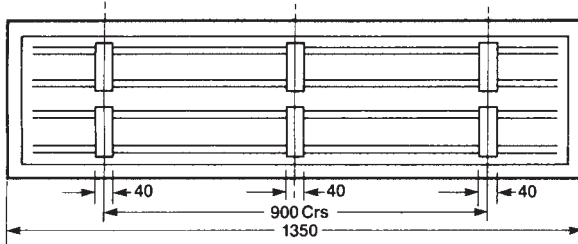
**Busbar chamber – dimensions**

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

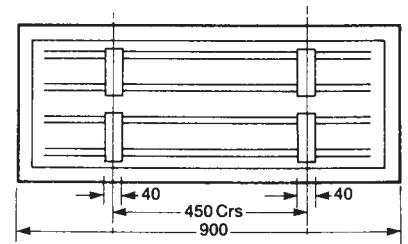
Nominal length chamber 550m



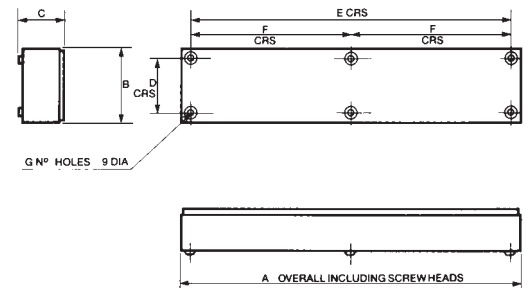
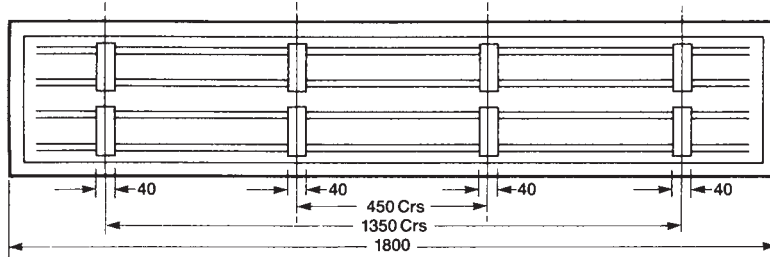
Nominal length chamber 1350mm



Nominal length chamber 900mm

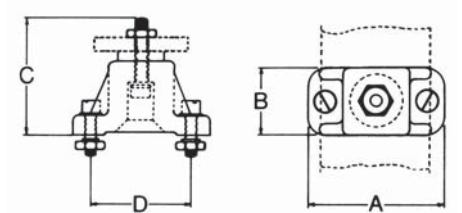


Nominal length chamber 1800mm



**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:

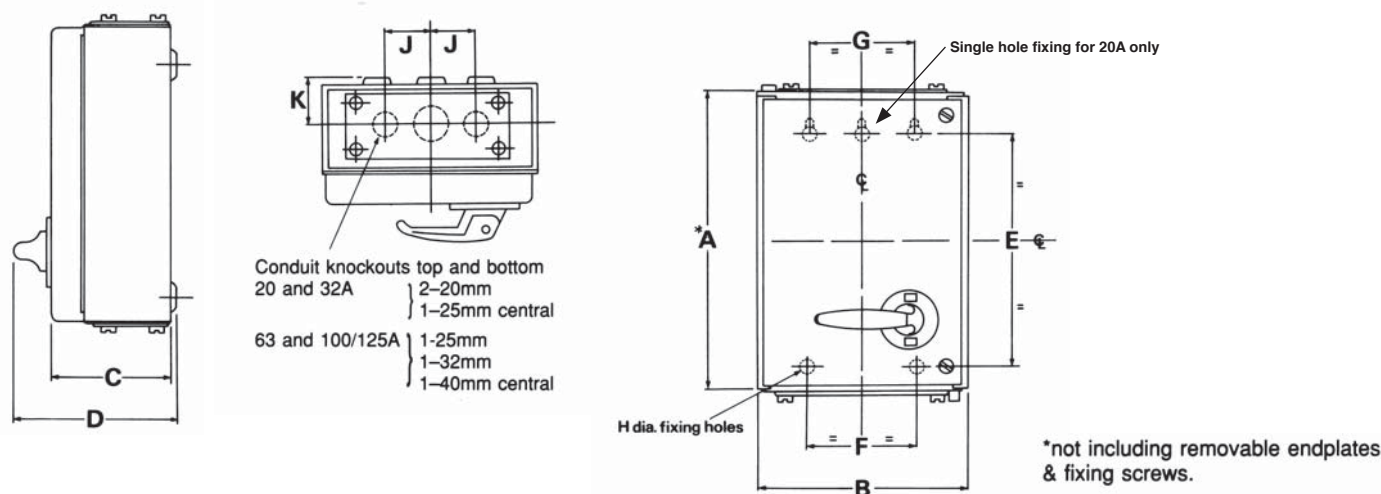
Description	Cycles
Operating cycles without current	8500
Operating cycles at rated current	1500
	Total 10000

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## Technical data

### Exel 2 dimensions

Current rating, A	Dimensions, mm									
	A	B	C	D	E	F	G	H	J	K
<b>Switch-disconnectors</b>										
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
<b>Switch-disconnector-fuses</b>										
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

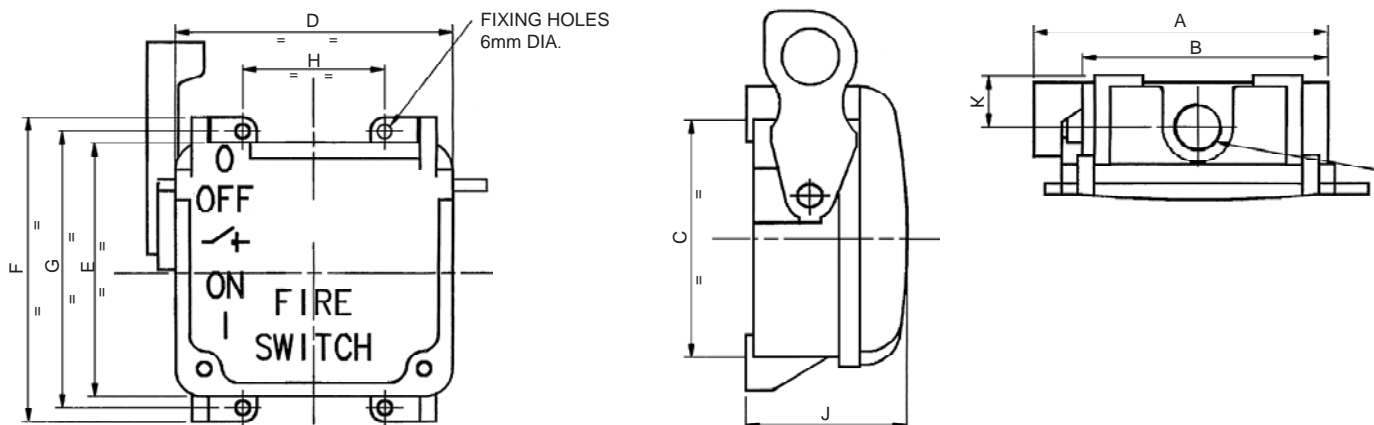


### Performance values

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

### Fireman's switch dimensions

Current rating (A)	Overall dimensions and fixing centres in mm									
	A	B	C	D	E	F	G	H	J	K
20	135	116.7	109.5	123.8	116.7	139.7	127	63.5	71.5	23.8
32	153.5	135	138	142	145.3	173	158.7	76.2	83.4	24.6

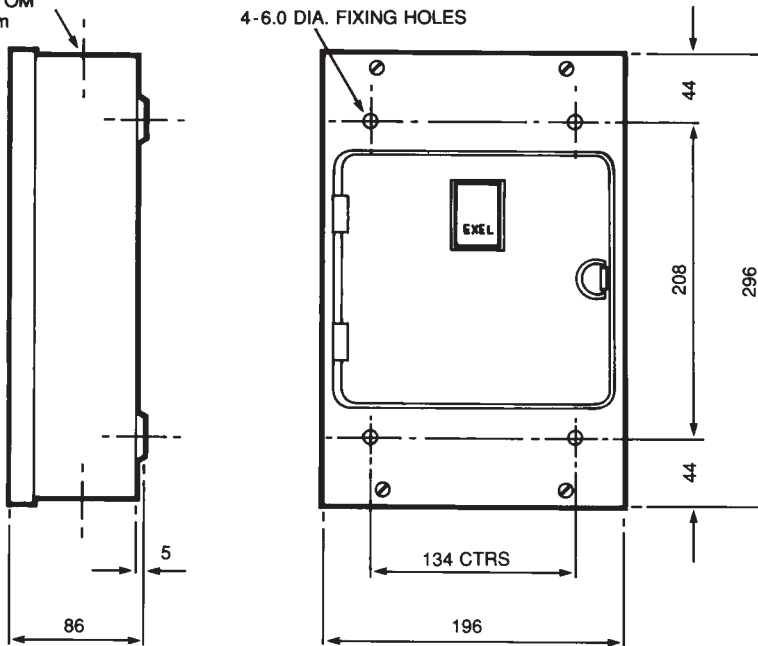




**SPSN switchfuse dimensions**

1 DUAL CONCENTRIC CONDUIT KNOCKOUT TOP & BOTTOM  
40mm / 32mm

4 - 6.0 DIA. FIXING HOLES

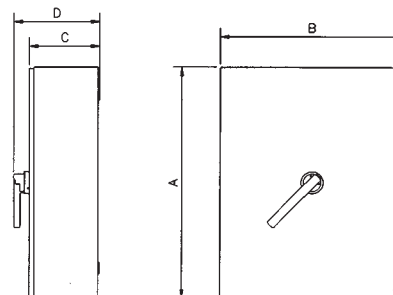


DIMENSIONS 100 ESSCF

**Memlok on-load changeover switches dimensions**

Nominal rating, Ie (A)	Dimensions, mm				Weight kg
	A	B	C	D	
32	320	372	170	225	9.6
63	320	372	170	225	10
100	370	372	170	225	10.6
200	474	460	320	375	25
400	800	550	245	300	46.4
630	800	650	245	300	47
800	800	650	245	300	51

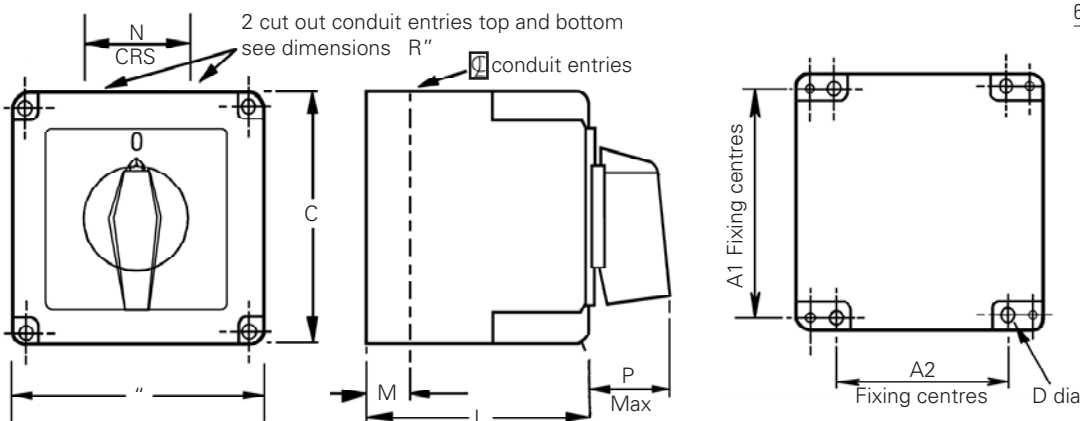
Note: Dimensions C & D measured from bottom of foot detail



**Memlok moulded changeover switches dimensions**

Current rating (A)	Overall dimensions and fixing centres in mm										R ISO thread
	A1	A2	B	C	D	L	M	N	P		
20&25	79	63	90	90	4.5	98	19	30	30	2 x 20	
40&63	146	112	125	176	6.5	119	21	68	36	2 x 25, 2 x 16	

Current rating (A)	Terminal capacities (mm <sup>2</sup> )	
	1 x	2 x
20	4	2.5
25	6	4
40	10	6
63	16	10

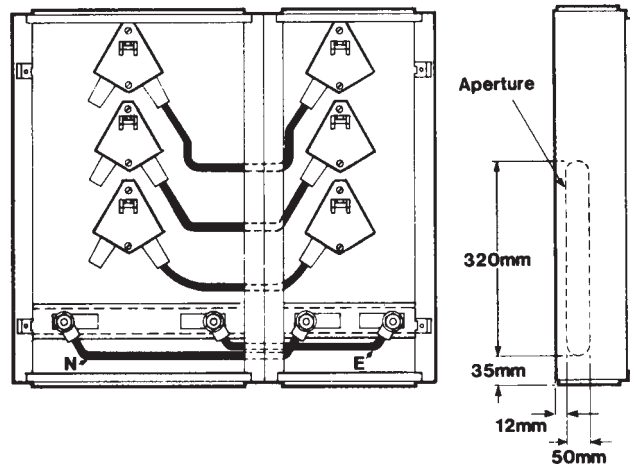


# 5.1

## Technical data

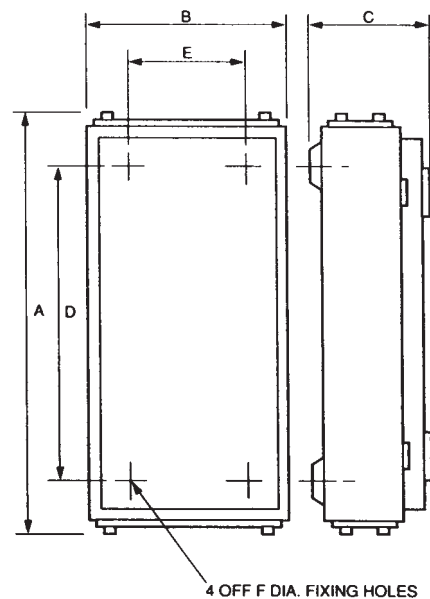
### Exel distribution fuseboards – diversity factors

No. of ways	Maximum rated operational current per way, I <sub>e</sub>				
	200A	100A	63A	32A	<20A
2	1	1	1	1	–
3	0.9	1	–	–	–
4	0.8	0.9	0.9	0.9	0.9
6	0.66	0.8	0.8	0.8	0.8
8	–	0.66	0.8	0.8	0.8
10	–	–	0.66	0.66	–
12	–	–	–	0.66	0.66
<b>Therefore, incomer rating =</b>					
2	400A	200A	126A	64A	–
3	540A	300A	–	–	–
4	640A	360A	227A	115A	72A
6	800A	480A	302A	154A	96A
8	–	528A	403A	205A	128A
10	–	–	416A	211A	–
12	–	–	–	253A	160A



### Exel distribution fuseboards - enclosure dimensions IP4X (mm)

Nominal rating, I <sub>e</sub>	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	2	386	368	148	252	255	8
		4	710	304	148	576	191	8
		6	710	304	148	576	191	8
		8	710	368	148	576	255	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
	TPN	10	972	473	227	884	369	10
		2	546	549	227	458	445	10
		3	1066	330	227	978	226	10
		4	1066	330	227	978	226	10
100A	TPN	6	1066	549	227	978	445	10
		8	1066	549	227	978	445	10
		2	1560	410	270	1334	206	10
		3	1560	410	270	1334	206	10
200A	TPN	4	1560	529	270	1334	325	10
		6	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 <sup>2</sup>	10	10	25	25	70

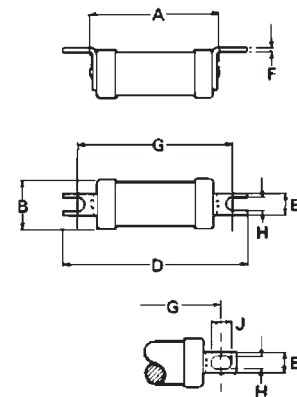
**Exel distribution fuseboards – main terminal stud sizes**

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	M10	–	–	–
TPN	2	–	1	M12	M12	M16
	3	–	–	M12	M12	M16
	4	M10	M10	M12	M12	M16
	6	M10	M10	M12	M16	M16
	8	M10	M10	M16	M16	–
	12	M10	M10	M16	–	–

<sup>1</sup>Tunnel terminal 35mm<sup>2</sup> max.

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

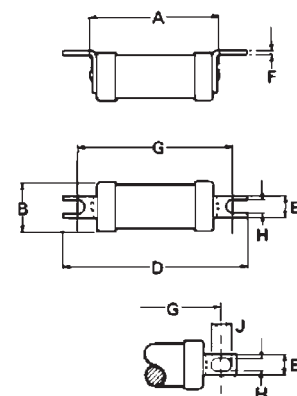
Eaton list number	Dimension, mm							
	A max.	B max.	D max.	E	F	G nom.	H	J
<b>SA2</b>	34	14	54	11	0.8	44.5	4.8	–
<b>SA2M</b> (25–40A)	34	14	54	11	0.8	44.5	4.8	–
<b>SA2M</b> (50–63A)	36	17.5	55	11	1.2	44.5	4.8	–
<b>SB3</b>	35	14	85	9	1.2	73	5.5	8
<b>SB3M</b>	56	22	86	9	1.2	73	5.5	8
<b>SB4</b>	35	17.5	86	9	1.2	73	5.5	8
<b>SB4M</b>	56	22	88	13	1.2	73	5.5	10
<b>SO</b> (80–100A)	55	21	86	13	1.2	73	5.5	10
<b>SOM</b>	55	26	91	13	1.2	73	5.5	10
<b>SO</b> (125–200A)	47	31	90	19	3.2	73	6.1	–
<b>SD5</b>	59	22	110	15	3.2	94	9	–
<b>SD5M</b> (125–160A)	58	26	109	15	3.2	94	9	11
<b>SD5M</b> (200A)	47	31	110	19	3.2	94	9	10
<b>SD6</b>	47	31	110	19	3.2	94	9	10
<b>SD6M</b>	47	31	110	19	3.2	94	9	10



**SB3, SB3M, SB4, SB4M, SD5M, SD6, SD6M, SO (80–100A) & SOM types**

**550V industrial fuselinks – offset bolted contacts, dimensions**

Fuse link type	Dimensions, mm							
	A max.	B max.	D max.	E	F	G nom.	H	J
SA2-550	34	14	54	11	0.8	44.5	4.8	–
SB3-550	35	14	85	9	1.2	73	5.5	8
SB4-550	55	21	87	13	1.2	73	5.5	8
SD5-550	59	21	109	14	3.2	94	8.7	11
SD6-550	48	41	110	19	3.2	94	9	10



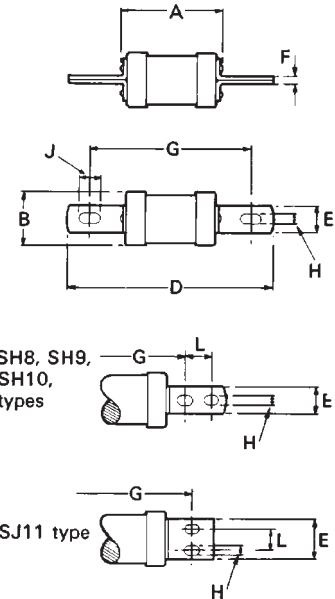
**SB3, SB4, SD6, types only**

# 5.1

## Technical data

### 415V industrial fuselinks – centre bolted contacts, dimensions

Fuse link type	Dimensions, mm		D max.	E	F	G nom.	H	J	L
	A max.	B 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



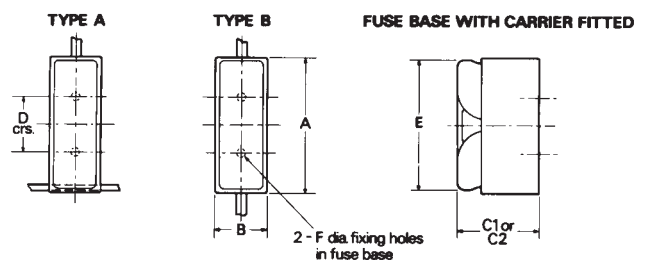
### S-type 550V industrial fuselinks – centre bolted contacts, dimensions

Eaton list number	Dimensions, mm		D max.	E	F	G nom.	H	J	L
	A max.	B max.							
SF5-550	65	36	135	19	3.2	111	8.7	15	–
SF6-550	65	38	135	19	3.2	111	8.7	15	–
SF7-550	76	50	135	25	3.2	111	9.5	12.5	–
SG7-550	76	50	162	25	3.2	133	10.5	16	–
SF8-550	78	59	135	25	4.8	111	9.5	12.5	–
SH8-550	78	59	210	25	4.8	133	10.5	16	25
SH9-550	80	74	210	25	6.3	133	10.5	16	25
SY9-550	80	74	261	38	6.3	165	10.5	16	32
SH10-550	84	83	209	25	9.5	133	10.5	16	25
SY10-550	84	83	261	38	6.3	165	10.5	16	32



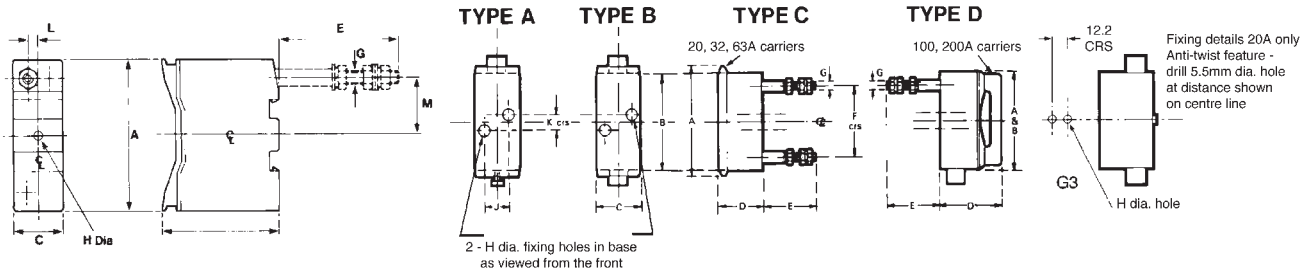
### Fuse carriers and bases – dimensions

Nominal rating, In	Dimensions, mm						
	A	B	C1	C2	D	E	F
20A	75	29	56	52	1	68	4.8
32A	106	35	60	68	41	105	5.2
63A	132	46	86	90	41	129	5.6
100A	165	60	116	121	57	162	6.8



**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	M	
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	40	–	6	5.5	–	–	4.4	28.5	12
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	71	–	8	5.5	–	–	4.8	31.6	14.5
100A	154	154	54	108	80	117	10	6.5	19	22	–	–	18.5
200A	193	193	70	149	89	138	12	7	38	57	–	–	24.5
<b>Compact range</b>													
32A	87	79	27	50	63	56	6	5.5	–	–	–	–	12
63A	109	101	31	62	60	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	149	89	138	12	7	38	57	–	–	24.5



# 5.1

## Technical data

### Local disconnectors standard duty, type RDMP, 2–63A, IP65, 2–8 pole

Nominal unit rating I <sub>e</sub> (A)	AC23A-3ph 415V (kW)	AC23-1p motors 240V (kW)	Optional current DC21 (resistive loads) (A)			Rated short withstand current RMS for 10sec I <sub>cs</sub> (A)	Rated conditional short circuit current (prospective RMS amps at 415V AC, fused)		Max terminal capacity mm <sup>2</sup>
			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

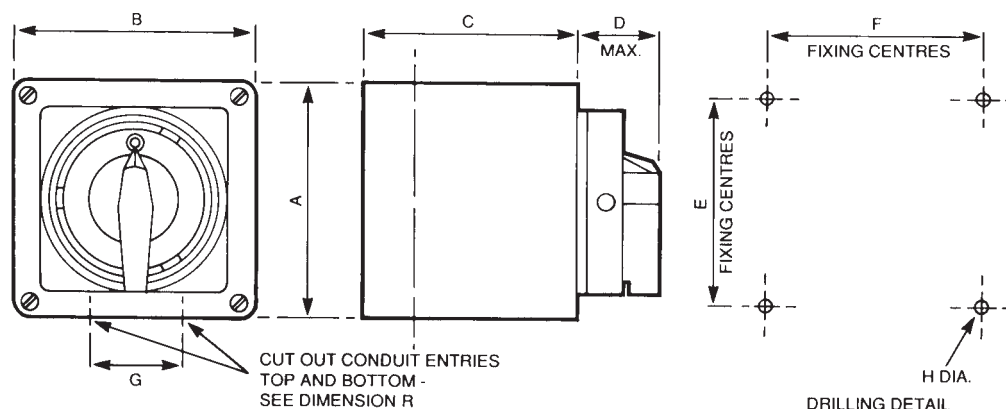
Note: Units supplied with a late make/early break auxiliary are indicated by a figure 1 in the list number e.g. 2041RDMP  
Auxiliary terminals are marked 1 and 2. Auxiliary contact rating as main poles.

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

Nominal unit rating, I <sub>e</sub> (A)	Dimensions, mm									
	A	B	C <sup>1)</sup>	C <sup>2)</sup>	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

<sup>1)</sup>2–4 pole, 20 & 40A, 2–3 pole, 25 & 63A

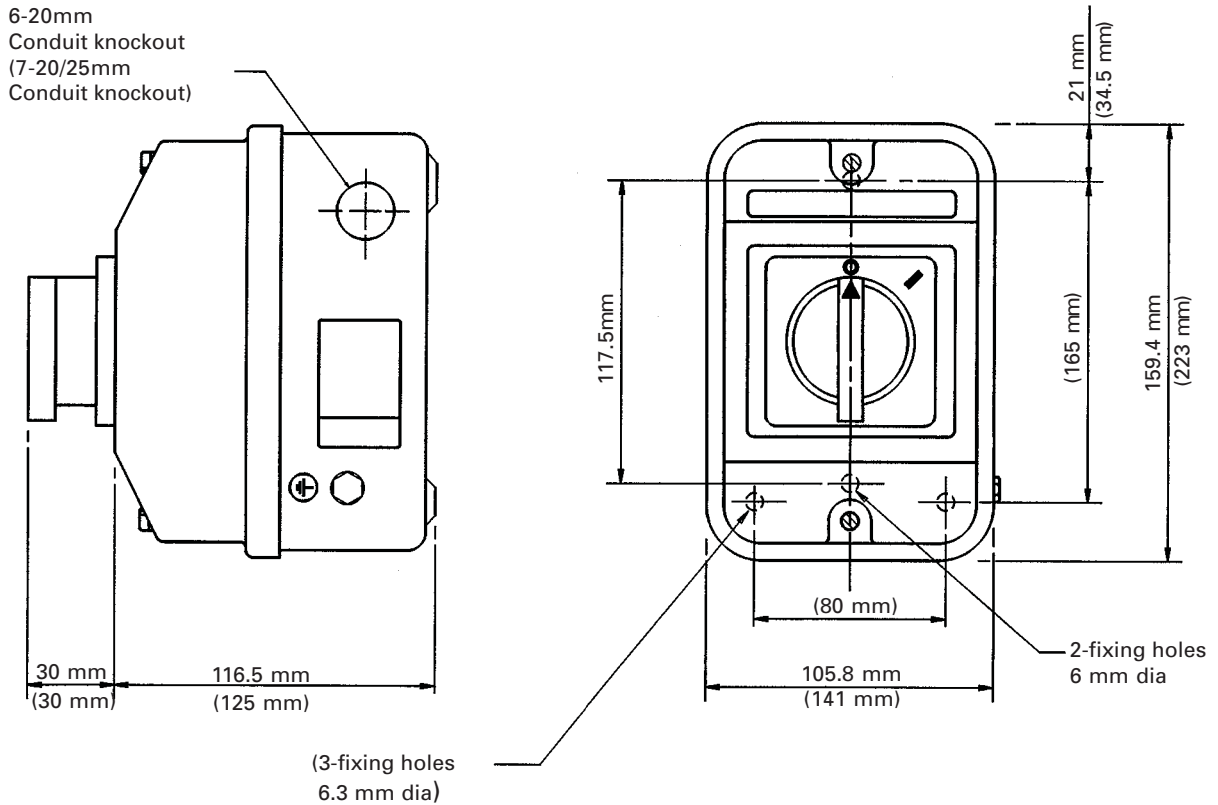
<sup>2)</sup>6 pole, 20 & 40A, 4–6 pole, 25 & 63A



### Local disconnectors standard duty, type PC2, 20–63A, IP55, 2–6 poles

Nominal unit rating, I <sub>e</sub> (A)	Operational current, I <sub>e</sub> and power, 415V 3ph category		Operational current, I <sub>e</sub> and power, 660V 3ph category		Rated short time withstand current RMS for 1 sec I <sub>cs</sub> (kA)	Rated conditional short circuit current (prospective RMS amps at 415V AC, fused)		Max terminal capacity	Degree of protection mm <sup>2</sup>
	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.

Exel IP local switch-disconnectors heavy duty – technical data for IP55 & IP65 units

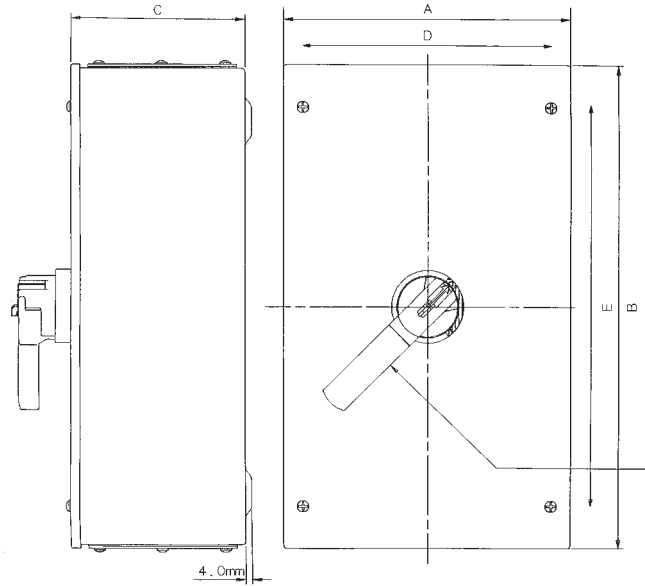
Description	Nominal unit rating, Ie									
	20A	40A	63A	125A	160A	250A	400A	630A	1000A	1250A
<b>Operational current, Ie and power, 415V category:</b>										
AC22	20A	40A	63A	125A	160A	250A	400A	630A	1000A	1250A
AC23	11kW	22kW	37kW	59kW	90kW	147kW	180kW	375kW	425kW	750kW
	21A	40A	63A	125A	154A	249A	305A	630A	690A	1250A
<b>Operational current, Ie and power, 690V category:</b>										
AC22	20A	40A	63A	125A	125A	250A	315A	630A (B)	1000A (B)	1250A
AC23	18.5kW	30kW	59kW	–	–	129kW	129kW	425kW	425kW	630kW
	21A	40A	63A	–	–	134A	134A	437A	437A	630A
<b>Rated short time withstand current RMS for 1 sec</b>										
	0.66kA	0.66kA	0.66kA	3.6kA	3.6kA	6.6kA	6.6kA	20.4kA	20.4kA	50kA
<b>Short circuit making It op</b>										
	2.2kA	2.2kA	2.2kA	17.6kA	17.6kA	26.5kA	26.5kA	76kA	76kA	105kA
<b>Rated conditional short circuit current prospective rms amps at 415V AC, fused – kA/fuse rating</b>										
	100kA/80A	100kA/80A	100kA/80A	100kA/100A	100kA/100A	100kA/250A	100kA/250A	100kA/630A	100kA/630A	–
<b>Rated conditional short circuit current prospective rms amps at 690V AC, fused – kA/fuse rating</b>										
	100kA/80A	100kA/80A	100kA/80A	50kA/160A	50kA/160A	50kA/500A	50kA/500A	50kA/1000A	50kA/1000A	–
<b>Max terminal / cable size, mm<sup>2</sup></b>										
	25	25	25	15 wide	15 wide	20 wide	25 wide	30 wide	35 wide	50 wide
				x 2 thick	x 2 thick	x 3 thick	x 3 thick	x 6 thick	x 6 thick	x 10 thick
<b>Hole, mm<sup>2</sup></b>										
	–	–	–	6.5	6.5	9	11	11	14	18.5

# 5.1

## Technical data

### Exel IP local switch-disconnectors heavy duty – dimensions

Nominal unit rating, Ie	Dimensions, mm				
	A	B	C	D	E
DE55 20–63A 3P & 4P	145	245	115	70	170
DE55 20–63A 3N & 6P	225	245	130	150	170
DE55 125–160A	325	325	130	250	250
DE55 125–160A 6P	405	325	150	330	250
DE55 250–400A	385	705	135	310	630
DE55 630–1250A	505	1105	205	430	1030
DE65 20–63A	220	245	135	150	170
DE65 20–63A 6P	220	245	135	150	170
DE65 125–160A	320	330	140	250	250
DE65 125–160A 6P	400	325	150	330	250
DE65 250–400A	380	705	140	310	630
DE65 630–1250A	505	1105	190	430	1030





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.

# 5.3

## 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)
2812VCO	DOL and Main <sup>1)</sup>	220–240v Coil	12
2818VCO	DOL and Main <sup>1)</sup>	220–240v Coil	18
2825VCO	DOL and Main <sup>1)</sup>	220–240v Coil	25
2832VCO	DOL and Main <sup>1)</sup>	220–240v Coil	32
2850VCO	DOL and Main <sup>1)</sup>	220–240v Coil	50
4812VCO	DOL and Main <sup>1)</sup>	380–415v Coil	12
4818VCO	DOL and Main <sup>1)</sup>	380–415v Coil	18
4825VCO	DOL and Main <sup>1)</sup>	380–415v Coil	25
4832VCO	DOL and Main <sup>1)</sup>	380–415v Coil	32
4850VCO	DOL and Main <sup>1)</sup>	380–415v Coil	50
2812VCOSD	Star and Delta <sup>1)</sup>	220–240v Coil	12
2818VCOSD	Star and Delta <sup>1)</sup>	220–240v Coil	18
2825VCOSD	Star and Delta <sup>1)</sup>	220–240v Coil	25
2832VCOSD	Star and Delta <sup>1)</sup>	220–240v Coil	32
2850VCOSD	Star and Delta <sup>1)</sup>	220–240v Coil	50
4812VCOSD	Star and Delta <sup>1)</sup>	380–415v Coil	12
4818VCOSD	Star and Delta <sup>1)</sup>	380–415v Coil	18
4825VCOSD	Star and Delta <sup>1)</sup>	380–415v Coil	25
4832VCOSD	Star and Delta <sup>1)</sup>	380–415v Coil	32
4850VCOSD	Star and Delta <sup>1)</sup>	380–415v Coil	50
2812004VCOA	Autoline 4 pole <sup>2)</sup>	220–240v Coil	25
2825004VCOA	Autoline 4 pole <sup>2)</sup>	220–240v Coil	40
4812004VCOA	Autoline 4 pole <sup>2)</sup>	380–415v Coil	25
4825004VCOA	Autoline 4 pole <sup>2)</sup>	380–415v Coil	40

<sup>1)</sup>DOL and Star Delta (3 phase 440v, 50–60hz, for AC3 Duty)

<sup>2)</sup>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

# 5.3

## 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 <sub>th</sub> (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 <sup>2</sup>
	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

# 5.3

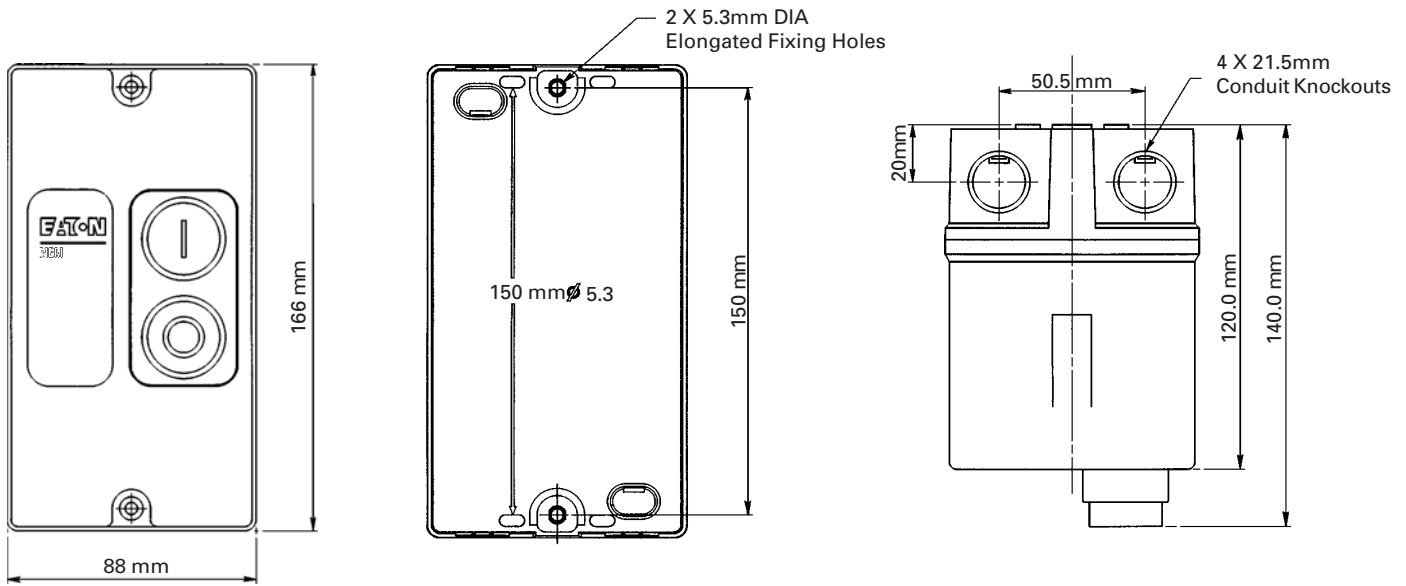
## Technical data

Enclosed motor, heating and lighting control

### ADS8 Contactors, technical characteristics overview: overall dimensions, weight & mounting hole centres (contd)

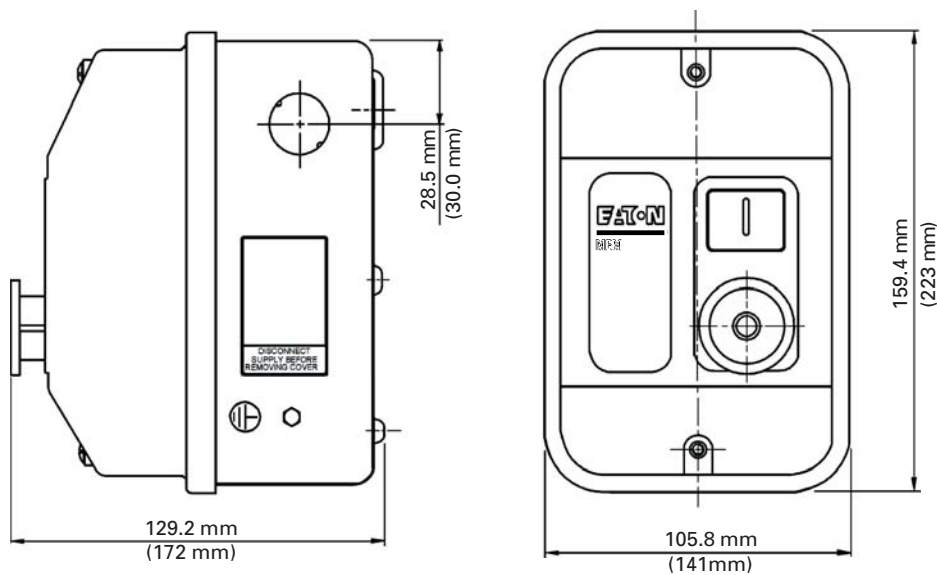
Contactor reference	Overall dimensions (mm)			Weight Kg	Mounting hole centres (mm)	
	Width	Depth	Projection		Width	Depth
4850VCOSD	75	127	114	1.15	40	100 / 110
2812004VCOA	45	74	80	0.32	35	50 / 60
2825004VCOA	56	84	93	0.505	40	50 / 60
4812004VCOA	45	74	80	0.32	35	50 / 60
4825004VCOA	56	84	93	0.505	40	50 / 60

### 9kW DOL starter without switch disconnect, IP 65 moulded surface mounting enclosure, dimensional drawings

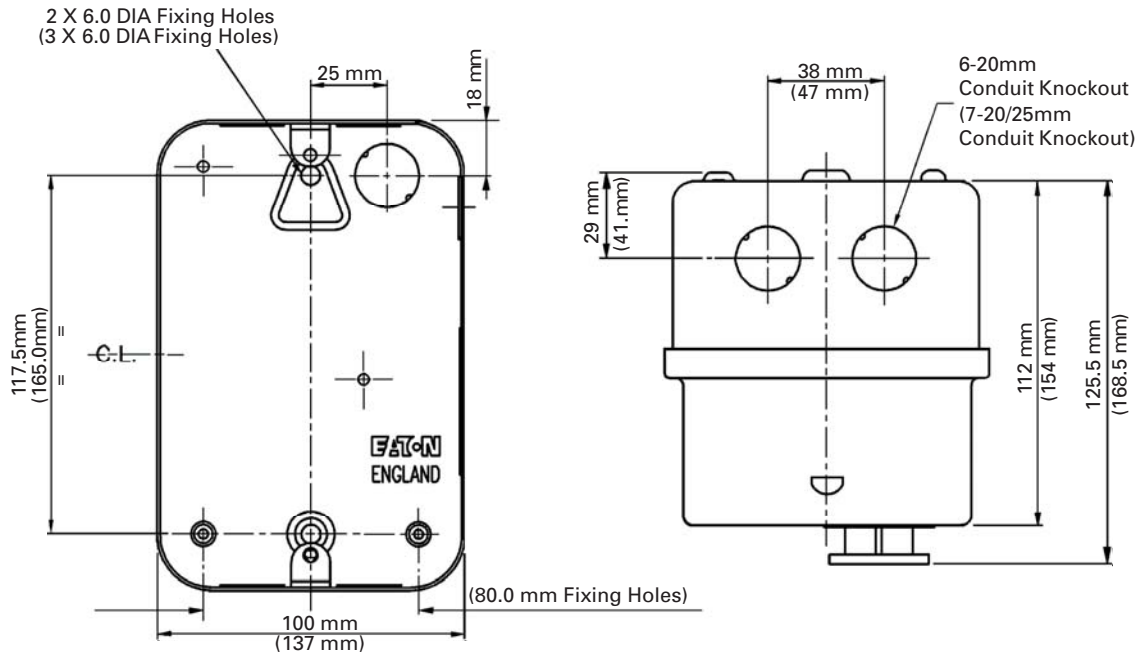


### 15kW DOL starter without switch disconnect, IP 54 metalclad surface mounting enclosure, dimensional drawings

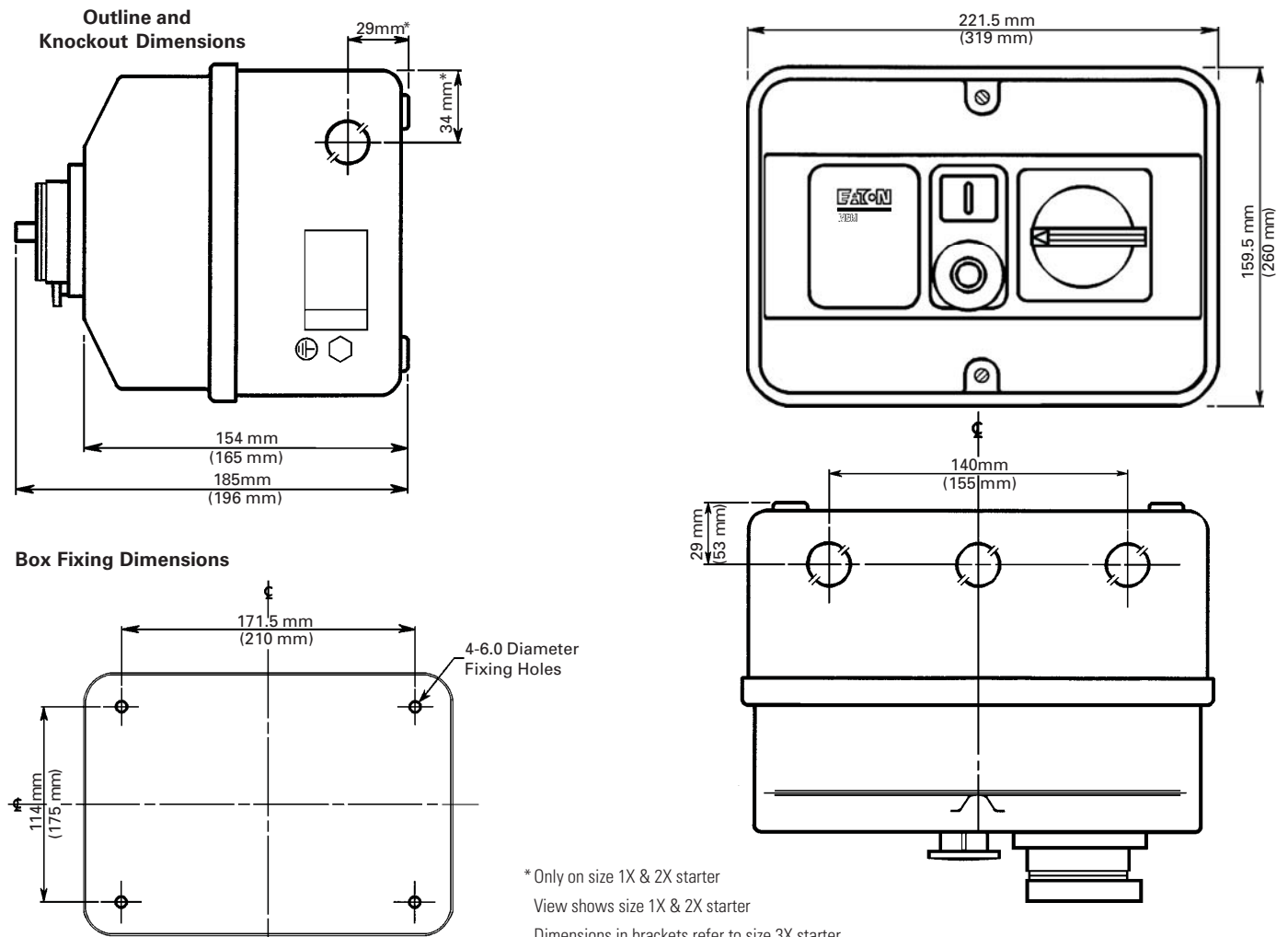
- Dimensions in brackets refer to types **2528ADS(2X)** & **3228ADS(3X)** sized enclosures



**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**



# 5.3

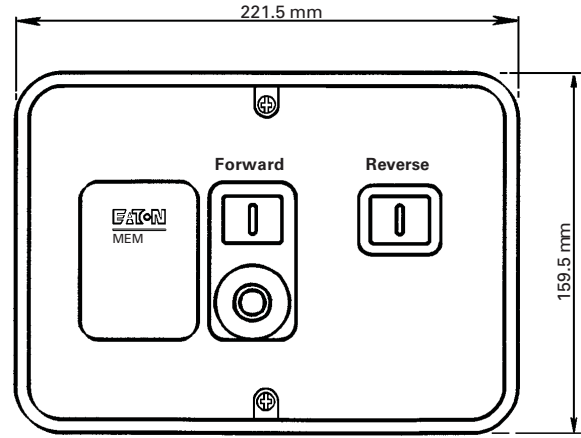
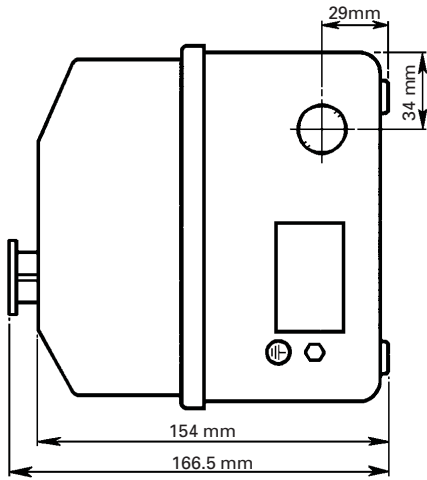
## Technical data

Enclosed motor, heating and lighting control

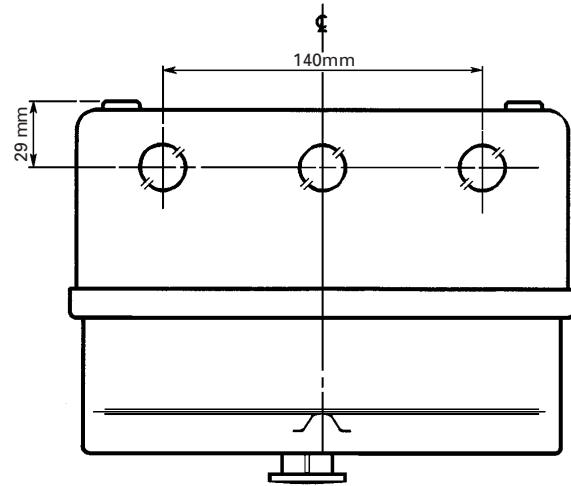
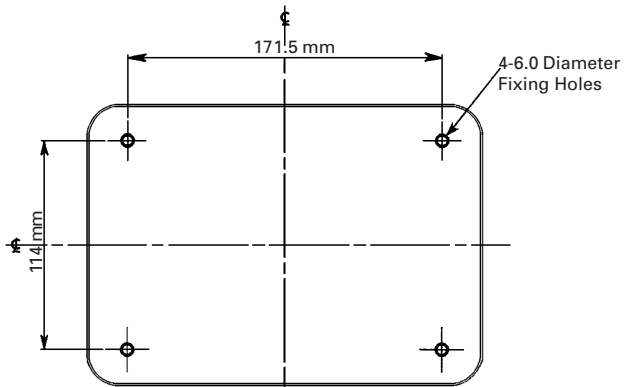
### 11kW DOL reversing starter without switch disconnect, IP 54 metalclad surface mounting enclosure, dimensional drawings

- 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



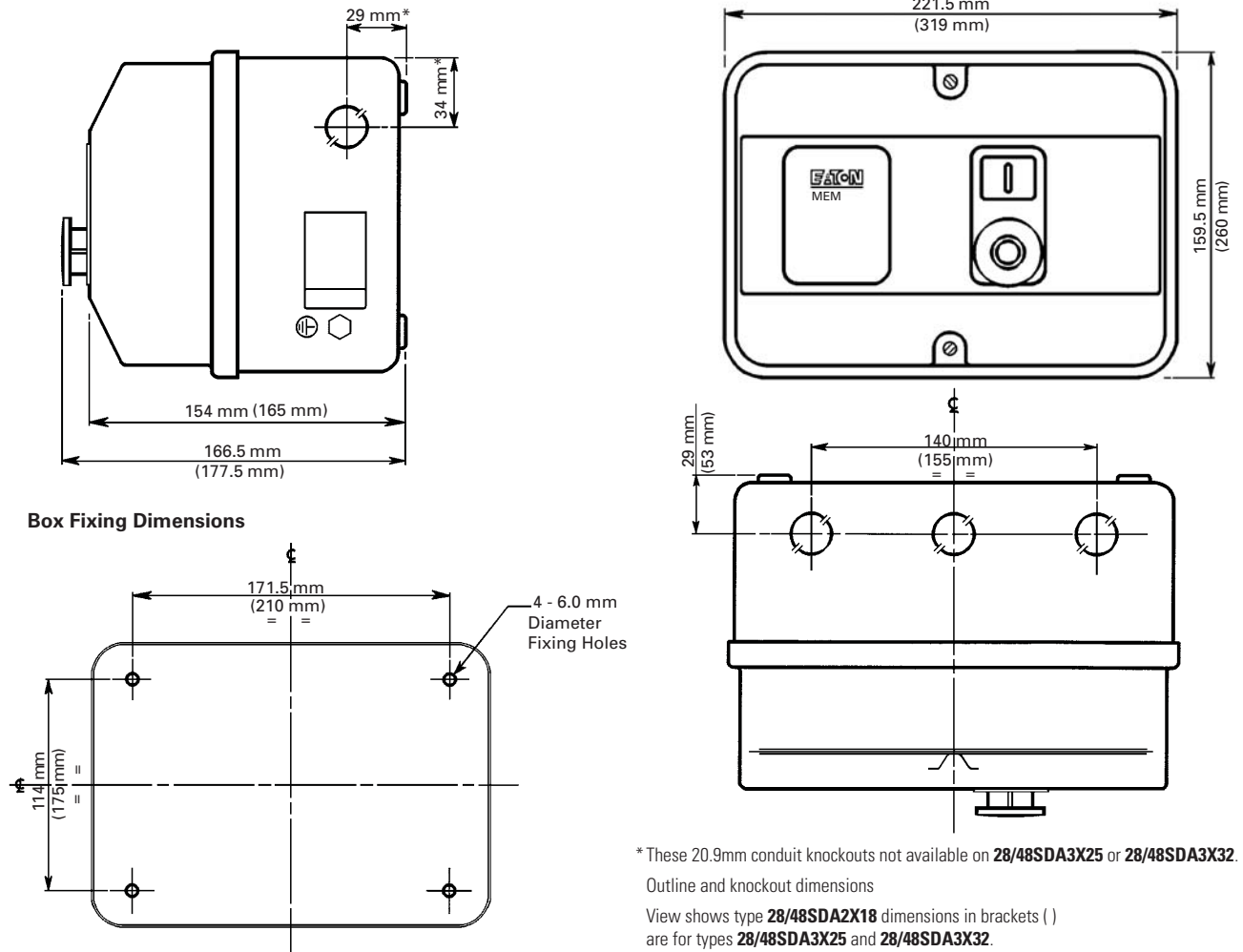
#### Box Fixing Dimensions





## 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.



\*These 20.9mm conduit knockouts not available on **28/48SDA3X25** or **28/48SDA3X32**.

Outline and knockout dimensions

View shows type **28/48SDA2X18** dimensions in brackets ( ) are for types **28/48SDA3X25** and **28/48SDA3X32**.

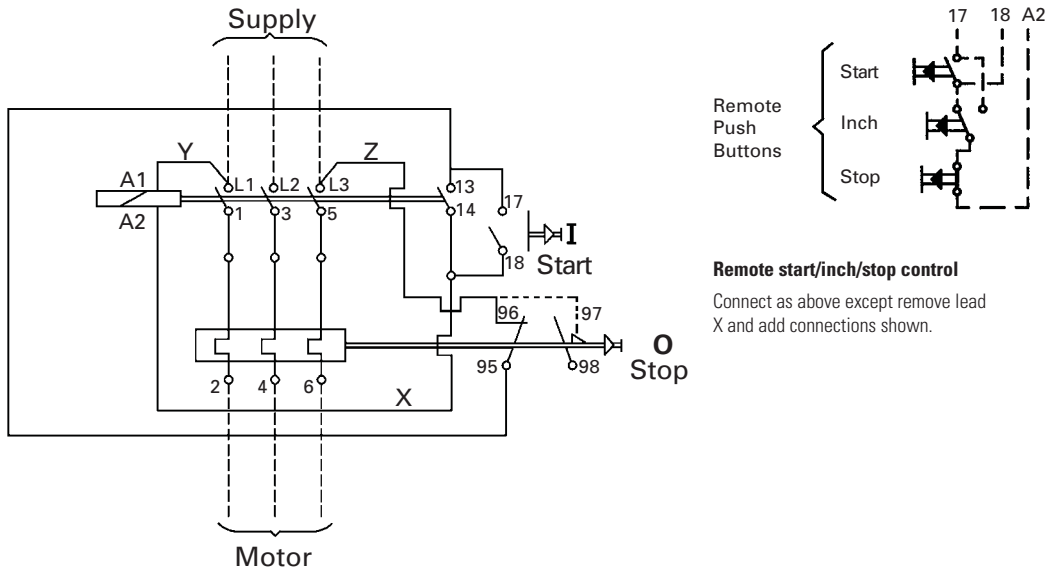
# 5.3

## Technical data

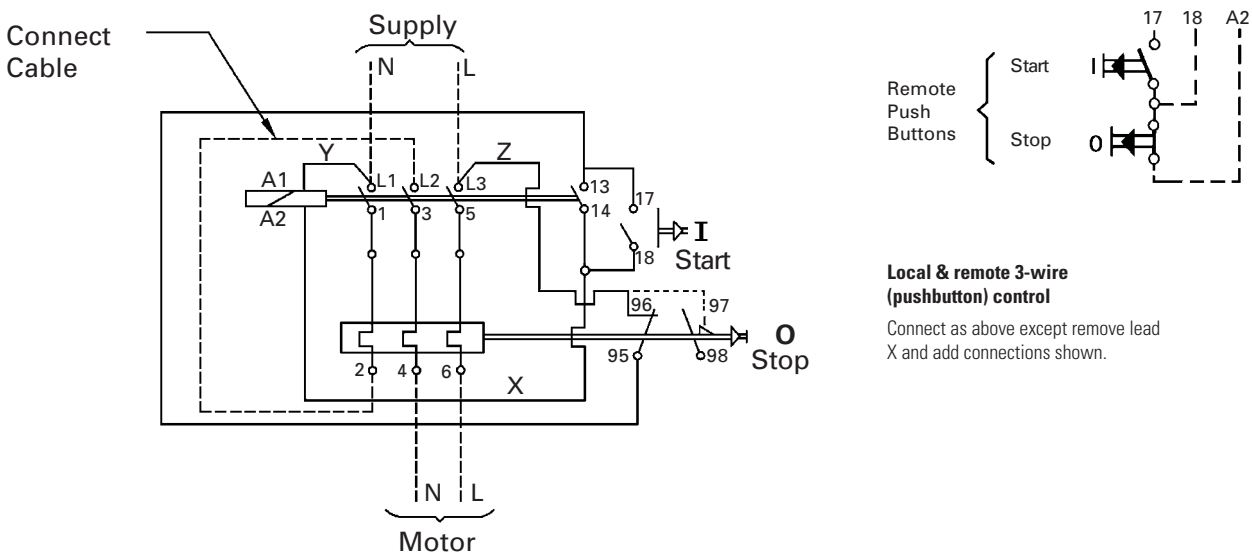
Enclosed motor, heating and lighting control

### 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.

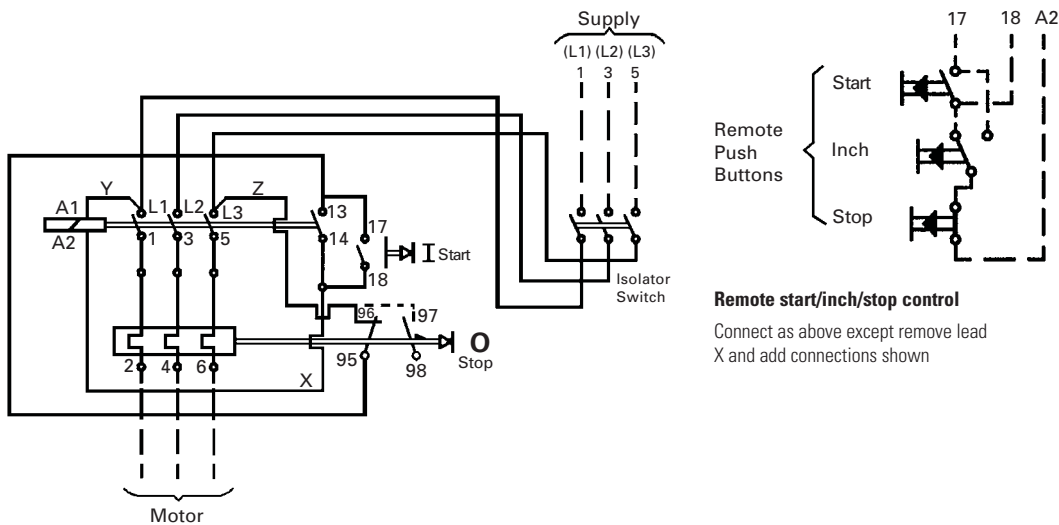
**Note:** the voltage rating of the fuse(s) must be suitable for the control circuit voltage.

**Short circuit protection:** Maximum sizes of fuses or MCB's to give short-circuit protection to this starter are tabulated on page 77.

**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

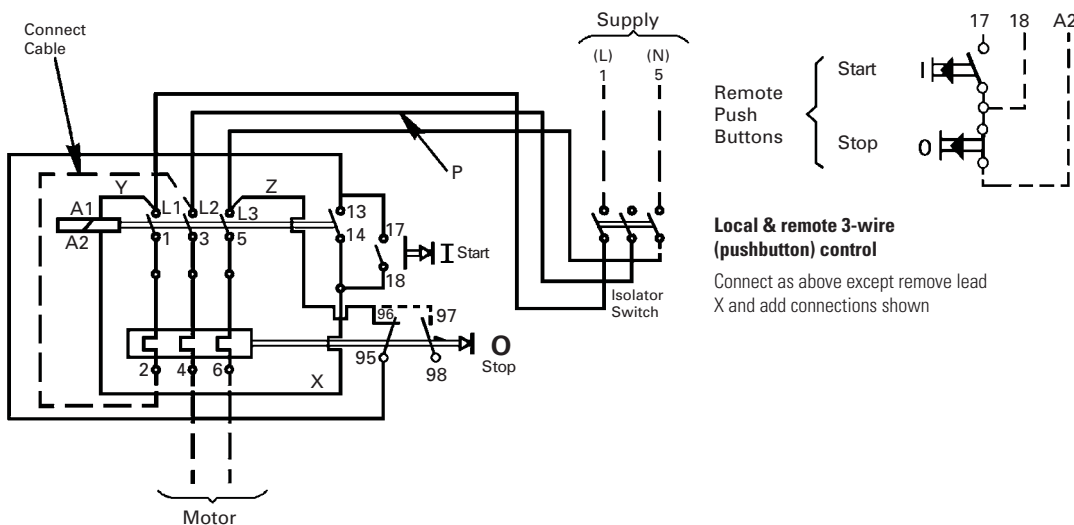


#### Remote start/inch/stop control

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 77.

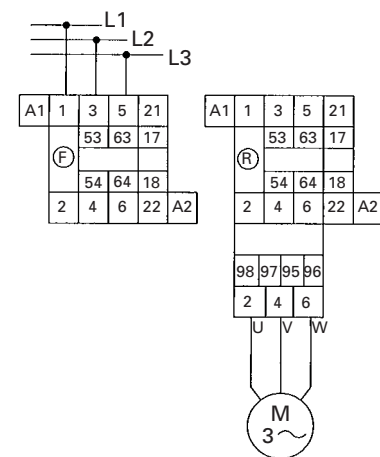
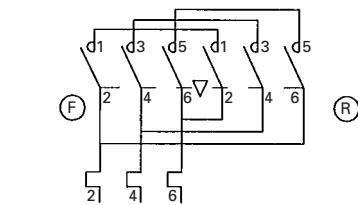
# 5.3

## Technical data

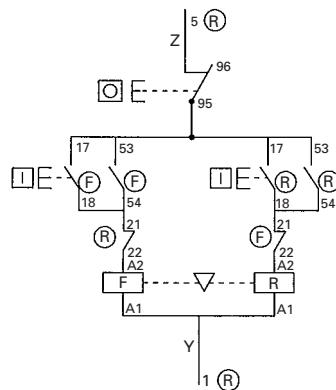
Enclosed motor, heating and lighting control

### 11kW DOL reversing starter without switch disconnect, IP 54 metalclad surface mounting enclosure, wiring diagrams

#### Circuit Diagrams:- Power

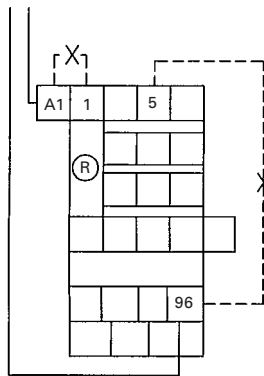


#### Control

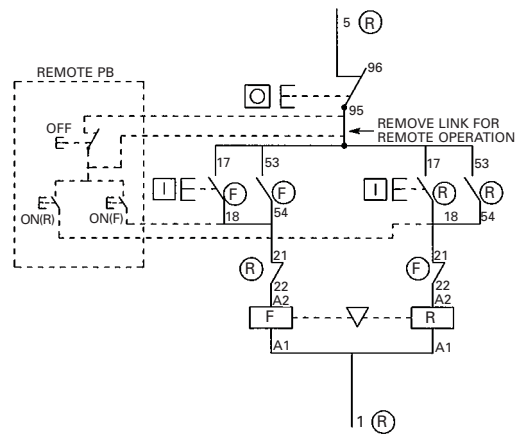


▽ Mechanical interlock

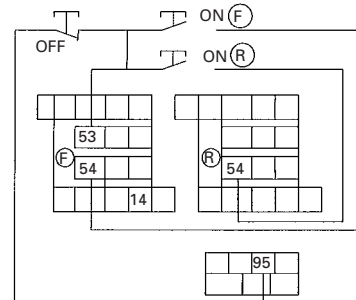
#### Separate Supply of Control Circuit



#### 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.

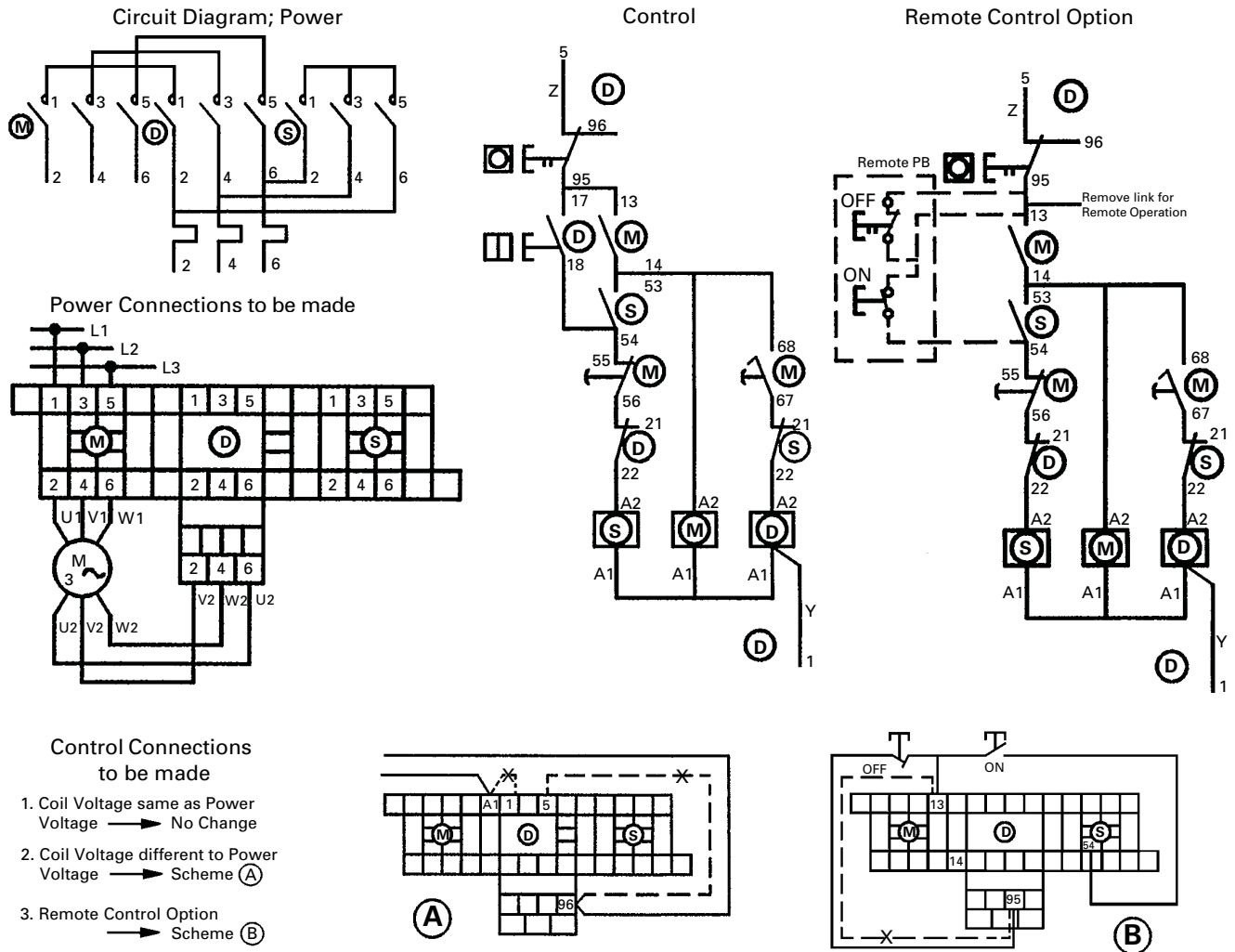
**Short circuit protection:** Maximum sizes of fuses or MCB's to give short-circuit protection to this starter are tabulated on page 77

#### 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

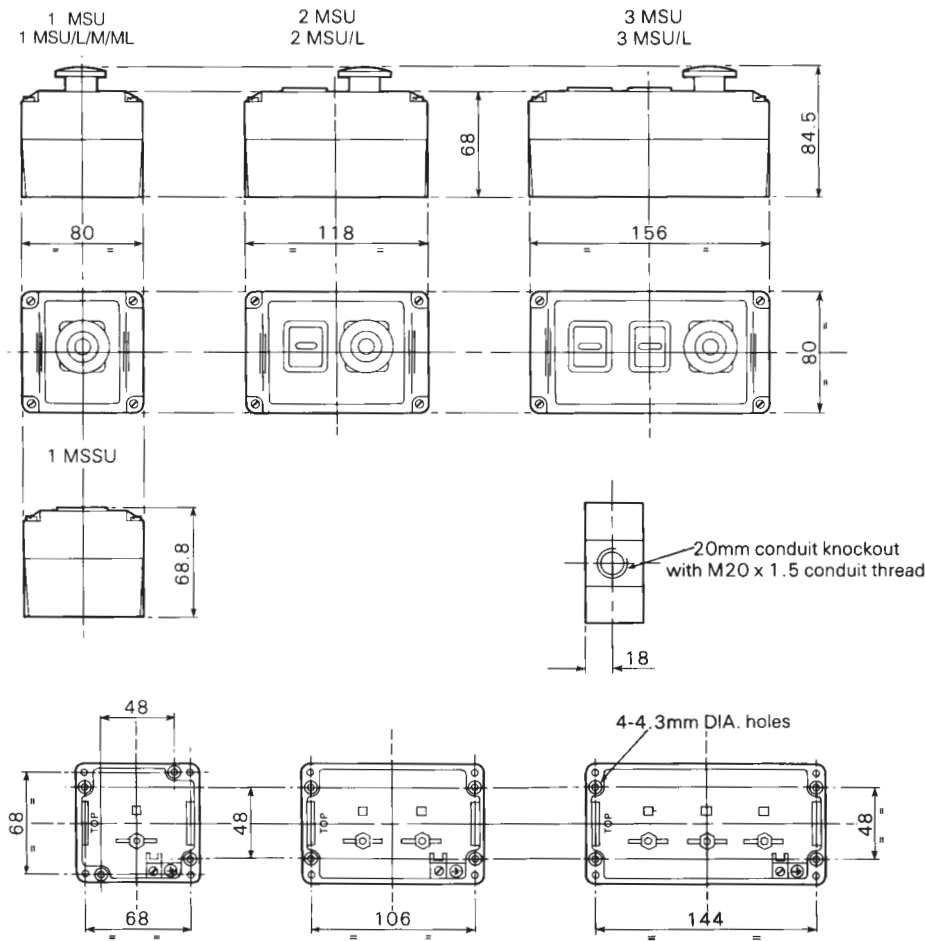
Overload Relay list number	Motor FLC Ie (A)	SCPD Back-up protection MAX HRC fuse BS88:1 aM (A)	Back-up protection Max MCB Type C
<b>Direct on line</b>			
8TT87	0.63–1	4	<b>MCH306</b>
8TT88	1–1.6	6	<b>MCH306</b>
8TT89	1.6–2.5	10	<b>MCH306</b>
8TT90	2.5–4	16	<b>MCH310</b>
8TT91	4–6	16	<b>MCH310</b>
8TT98	5.5–8.0	20	<b>MCH316</b>
8TT92	7–10	25	<b>MCH320</b>
8TT93	10–13	32	<b>MCH320</b>
8TT94	13–18	40	<b>MCH332</b>
8TT104	18–25	50	<b>MCH340</b>
8TT96	23–32	63	<b>MCH363</b>
<b>Star Delta</b>			
8TT90SD	4.3–6.9	16	<b>MCH310</b>
8TT91SD	6.9–10.4	16	<b>MCH310</b>
8TT98SD	9.5–13.8	20	<b>MCH316</b>
8TT92SD	12.1–17.3	25	<b>MCH320</b>
8TT93SD	17.3–22.5	32	<b>MCH320</b>
8TT94SD	22.5–31	40	<b>MCH332</b>
8TT104SD	31–43	50	<b>MCH340</b>
8TT96SD	40–55	63	<b>MCH363</b>

# 5.3

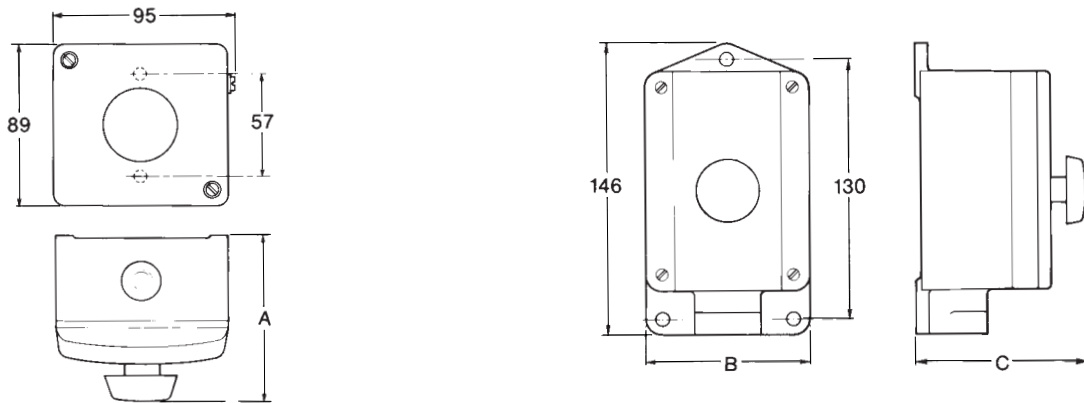
## Technical data

Enclosed motor, heating and lighting control

### MSU pushbutton control units (moulded IP65) dimensions



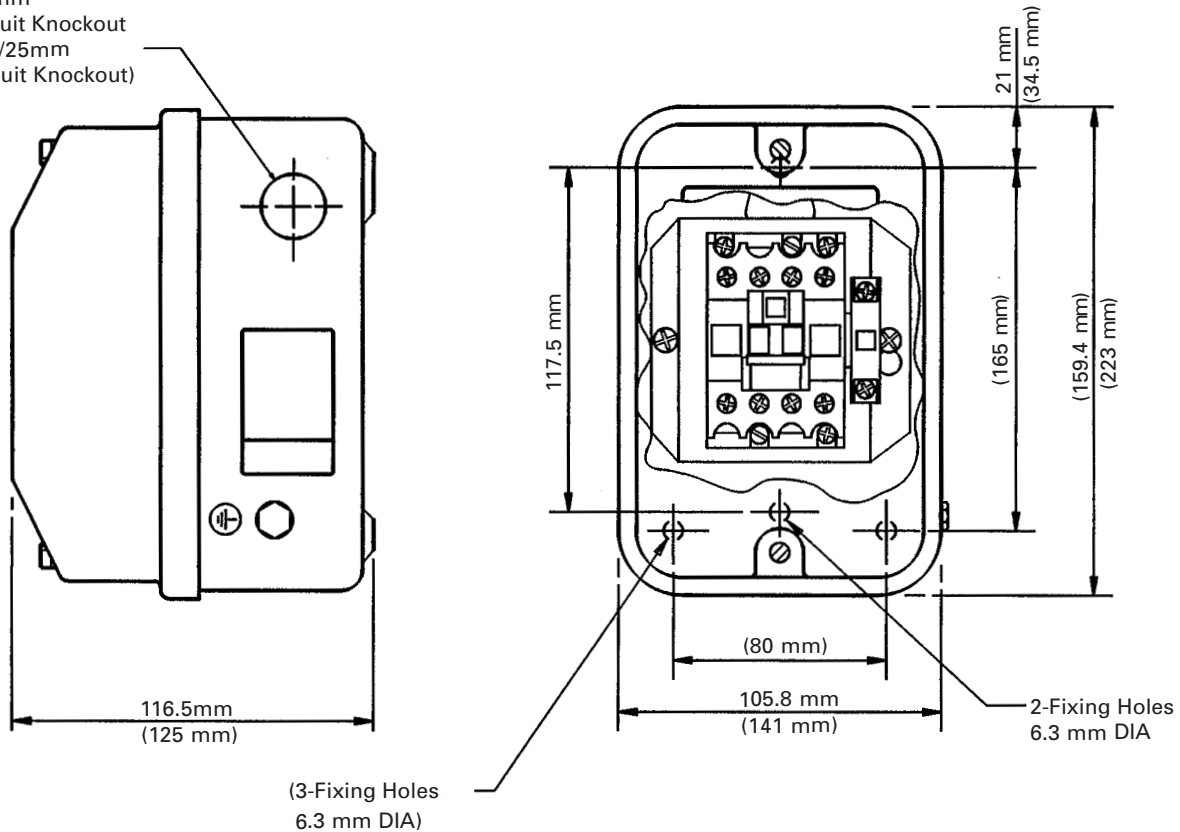
### CSU pushbutton control units dimensions



List number	Dim A (mm)	Dim B (mm)	Dim C (mm)
1CSU	83	—	—
1CSUL	92	—	—
1CSUM	86	—	—
1CSUWL	—	83	92

## Heating and lighting contactors

6-20mm  
Conduit Knockout  
(7-20/25mm  
Conduit Knockout)



Dimensions in brackets ( ) refer to **228ALDPR, 228ALCSPN/R, 428ALCFP/R, 448ALCFP, 428ALCDP/R, 428ALCSPN/R**. All others refer to list numbers; **228ALCFP/R, 248ALCFP** and **228ALCDP**.

## Additional side mounting auxiliary contacts for DOL, DOL reversing, Star Delta starters and Autoline

- 1 NO, 1NC lth 10A Ui 600v

Description	Current rating (A)	Coil voltage	Starter list number	Maximum side mount auxiliaries	Eaton list number
DOL Starter	25	220–240	<b>28ADS2X</b>	2	<b>8TA8DN11</b>
DOL Starter	25	380–415	<b>48ADS2X</b>	2	<b>8TA8DN11</b>
DOL Starter	32	220–240	<b>28ADS3X</b>	2	<b>8TA8DN11</b>
DOL Starter	32	380–415	<b>48ADS3X</b>	2	<b>8TA8DN11</b>
Starter with disconnecter	18	220–240	<b>28ADSA1X</b>	2	<b>8TA8DN11</b>
Starter with disconnecter	18	380–415	<b>48ADSA1X</b>	2	<b>8TA8DN11</b>
Starter with disconnecter	25	220–240	<b>28ADSA2X</b>	1	<b>8TA8DN11</b>
Starter with disconnecter	25	380–415	<b>48ADSA2X</b>	1	<b>8TA8DN11</b>
Starter with disconnecter	32	220–240	<b>28ADSA3X</b>	1	<b>8TA8DN11</b>
Starter with disconnecter	32	380–415	<b>48ADSA3X</b>	1	<b>8TA8DN11</b>
Reversing starter	18	220–240	<b>28ARD1X</b>	1 reverse, 1 forward	<b>8TA8DN11</b>
Reversing starter	18	380–415	<b>48ARD1X</b>	1 reverse, 1 forward	<b>8TA8DN11</b>
Reversing starter	25	220–240	<b>28ARD2X</b>	1 reverse, 1 forward	<b>8TA8DN11</b>
Reversing starter	25	380–415	<b>48ARD2X</b>	1 reverse, 1 forward	<b>8TA8DN11</b>
Star Delta starter	18	220–240	<b>28SDA2X18</b>	1 main, 1 star	<b>8TA8DN11</b>
Star Delta starter	18	380–415	<b>48SDA2X18</b>	1 main, 1 star	<b>8TA8DN11</b>
Star Delta starter	25	220–240	<b>28SDA3X25</b>	1 main, 1 star	<b>8TA8DN11</b>
Star Delta starter	25	380–415	<b>48SDA3X25</b>	1 main, 1 star	<b>8TA8DN11</b>
Star Delta starter	32	220–240	<b>28SDA3X32</b>	1 main, 1 star	<b>8TA8DN11</b>
Star Delta starter	32	380–415	<b>48SDA3X32</b>	1 main, 1 star	<b>8TA8DN11</b>
Autoline 4 pole		230–240	<b>228ALCFP</b>	2	<b>8TA8DN11</b>
Autoline 4 pole with rectifier		230–240	<b>228ALCFPR</b>	1	<b>8TA8DN11</b>

**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	Maximum starter rating (kW)	Relay tightening torque (Nm)		Contactor tightening torque (Nm)	
		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**

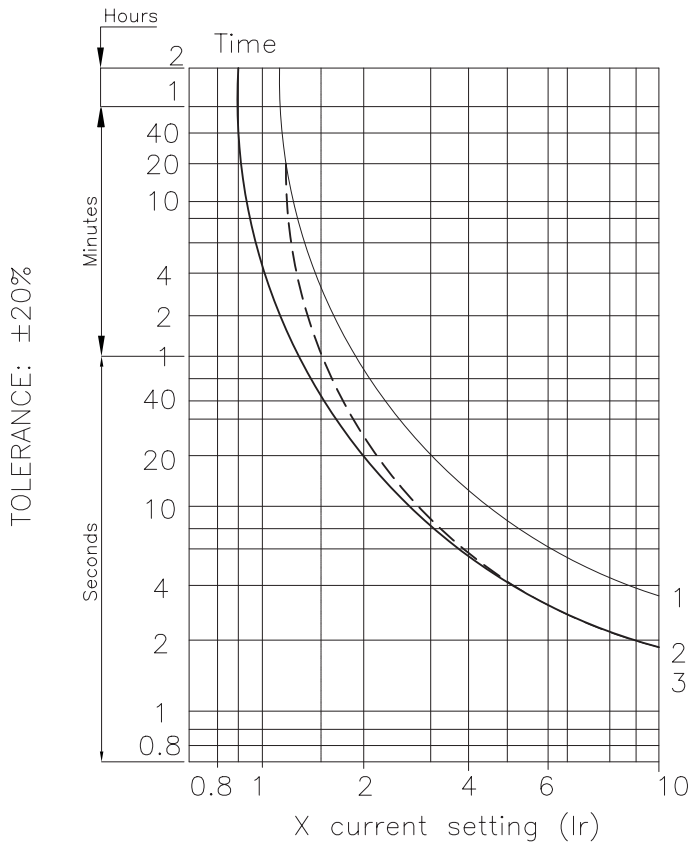
Starter type	Contactor tightening torque (Nm) Power
228ALCFP	1.7
248ALCFP	1.7
428ALCFP	2.5
448ALCFP	2.5
228ALCFPR	1.7
428ALCFPR	2.5
228ALCDP	3.0
428ALCDP	3.5
228ALCDPR	3.0
428ALCDPR	3.0
228ALCSPN	3.5
428ALCSPN	4.0
228ALCSPNR	4.0
428ALCSPNR	4.0



**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**



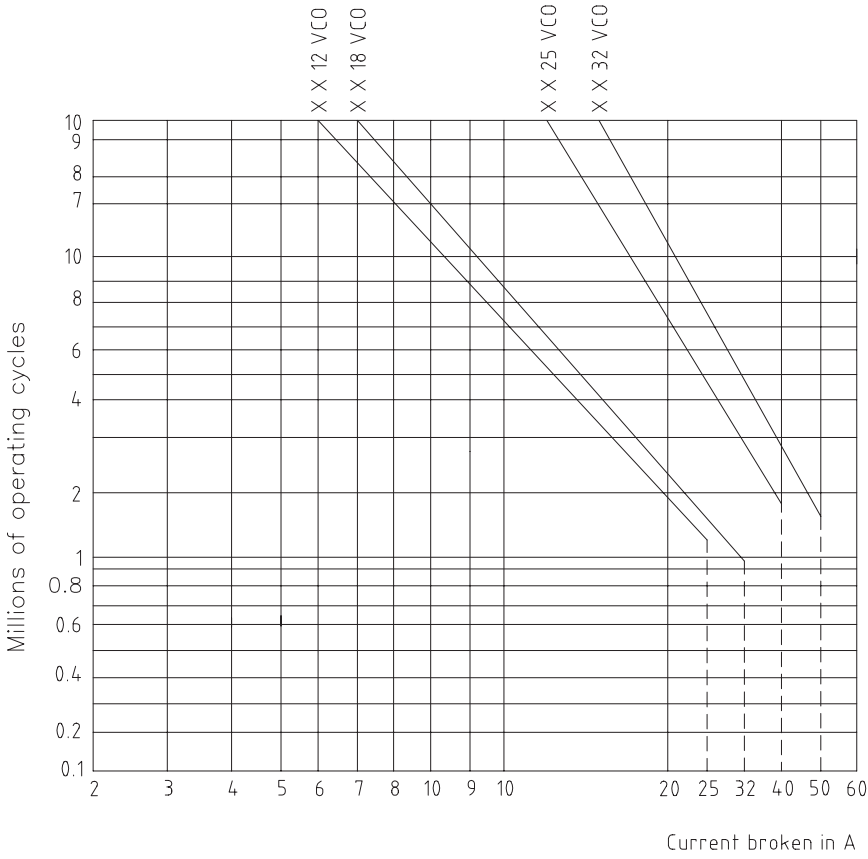
- 1. ——— Balanced operation, 3–phase, from cold state
- 2. - - - - - Balanced operation, 3–phase, after a long period at the set current (hot state)
- 3. ——— Operation following the loss of one phase (single phase tripping) from cold state

# 5.3

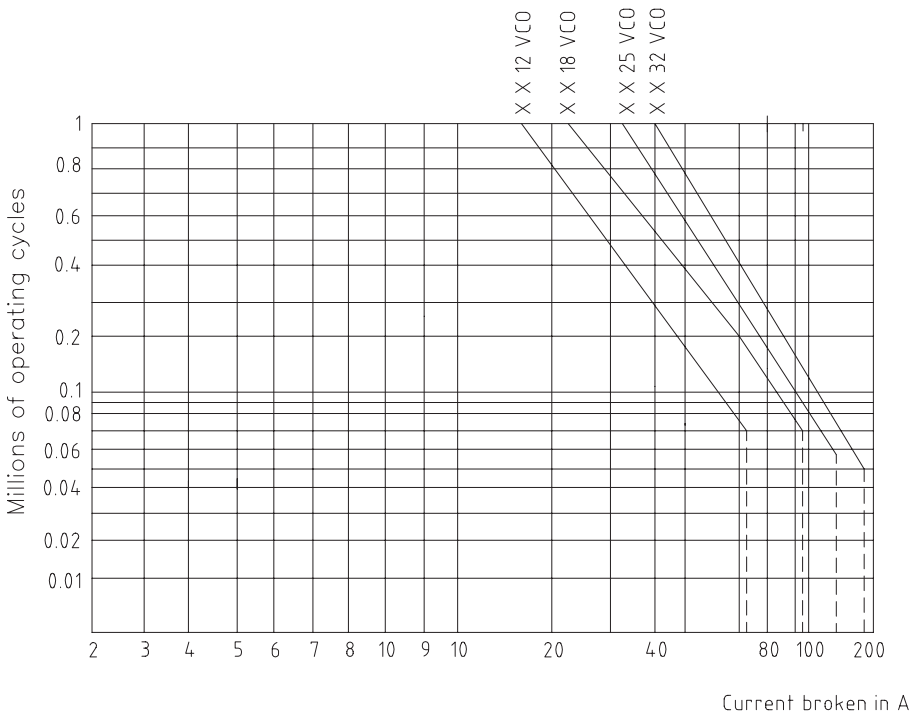
## Technical data

Enclosed motor, heating and lighting control

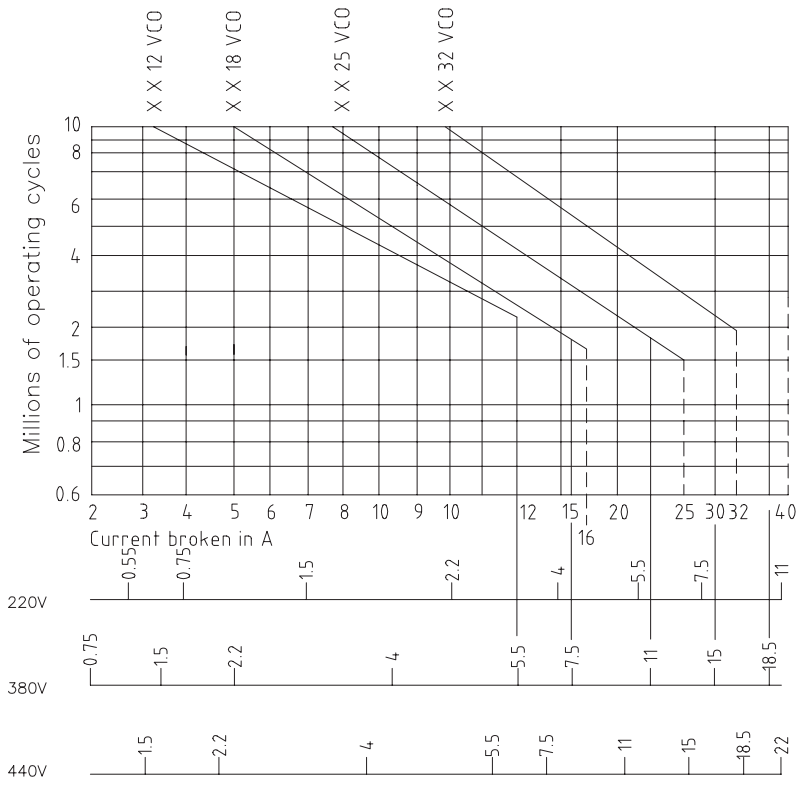
**Contactor utilisation category, AC1 (Ue < 440v) electrical life curve**



**Contactor utilisation category, AC2 (Ue < 440v) electrical life curve**



Contactor utilisation category, AC3 ( $U_e \leq 440V$ ) electrical life curve



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