Specification guide for general housing and apartment installations

A guide to consumer unit and wiring accessory solutions to meet the demands of general housing and apartment installations.

Powering Business Worldwide

Specification guide for general housing and apartment installations

Contents

1 Preliminaries and General Conditions

1.1 Scope of Contract

The work covered by this Specification comprises the supply, delivery to site, erection, testing, setting to work, cleaning, making ready for continuous use all materials necessary to form a complete Electrical Installation within the proposed development.

The Electrical Contractor shall be responsible for carrying out all the works, as detailed in the Specification and drawings. It will be the Electrical Contractor's responsibility to liaise with the Main Contractor regarding detailed programming at the time of appointment.

The Electrical Contractor shall be responsible for the following works as detailed in their quotation/design package:

- Electrical Supplies
- Electrical Containment and Distribution
- Earthing and Bonding
- Lighting Installation
- Emergency Lighting Installation
- External/Car Park Lighting
- Communal Lighting and Power
- Lift Supplies and Electrical Services for Associated Mechanical Services
- Fire Alarm System
- Video Intercom and Access Control System
- Lightning Protection System
- Testing and Commissioning
- Electric Heating System
- Testing and Commissioning
- Temporary Works
- Provision of Operating and Maintenance Manuals

1.2 Definitions

In construing these General Conditions and Specification, the following words shall have the meaning herein assigned to them:

The Employer shall mean :-

The individual or organisation for whom the works are to be carried out.

The Quantity Surveyor shall mean :-

The company responsible for financial matters acting for the Client.

The Architect shall mean :-

The company responsible for the general and detail design of the building and where appropriate act as lead consultant for the project.

The Structural Engineer shall mean :-

The company responsible for the design of the above and below ground main structural/drainage services.

The Electrical Consultant shall mean:-

The company responsible for the design of the Electrical Engineering Services and/or the overall responsibility for checking compliance of the installation with the relevant criteria and standards.

The CDM Co-ordinator shall mean :-

The company responsible for provision of a Pre-tender Health and Safety Plan and for the compiling of the Health and Safety file together with health and safety matters.

The Main Contractor shall mean :-

The company carrying out the main building works and by whom the Contractor may be directly employed, for the purpose of the Contract.

The Electrical Contractor shall mean :-

The company tendering for/carrying out the electrical installation works.

1.3 Main Contract Conditions and Form of Contract

It is the responsibility of the Electrical Contractor to obtain details of the main contract preliminaries and general conditions at the time of tendering from the Main Contractor and/or the Electrical Consultant/Architect.

No additions to the tender sum will be considered for lack of knowledge or inclusion of items necessary by the Contractor for items required by the main contract preliminaries and general conditions.

1.4 Precedence

Should any clauses in this Specification conflict with the Main Contract particulars the latter shall take precedence.

1.5 Plans and Drawings

The specification is to be read in conjunction with the Schedule of Drawings showing the engineering installation.

Notwithstanding the provision of these drawings, the Electrical Contractor will be held responsible for the works embodied therein and shall take his own particulars and provide at his own expense working detailed drawings.

Prior to the preparation of the co-ordinated working drawings, the Contractor shall liaise with the other Sub-contractors to ensure that due consideration of other services is taken into account.

1.6 Quality of Workmanship and Materials

The whole of the materials used in the installation, are to be new and the best of their respective kinds, and suitable for their intended use. These shall be obtained from the manufacturers specified and the work shall be carried out in the best workmanlike manner and in accordance with the current rules and regulations of the Professional Engineering Institute as appropriate, the Fire Officer, the requirements of the Supply Authority and to the satisfaction of the Consultant.

Where applicable, materials should be in accordance with the appropriate British Standards.

At all times the site where sub-contractors are working should be kept clear of excess materials and waste. Good housekeeping standards shall be strictly enforced.

1.7 Ordering

The Contractor shall place all orders for materials and equipment immediately upon completing the sub-contract documents.

The tender shall include:

packing, carriage, delivery, unloading, storage, placing in position, protection from weather and watching of all materials. It shall also include all labour of

every kind whatsoever, whether skilled or unskilled, required in the provision and fixing of the work.

1.8 Storing Materials

The Contractor shall supply, erect, maintain and clear away on completion, suitable workshops, storerooms, offices and sheds as necessary for the sub-contract works.

All materials are to be stored in a manner to avoid damage and/or deterioration thereto.

1.9 Damage to Plant and Buildings

The Contractor is to be held entirely responsible for all damage done to the Works whether such damage be wilful or due to carelessness on the part of the person or persons or to any other cause whatsoever except damage due to any cause over which neither the Main Contractor nor the Sub-contractor has any control.

The Contractor shall make good at his own expense any damage which may be caused by him or his workmen to the premises or property of the Main Contractor or any person or persons during the carrying out of this sub-contract and during the period of maintenance specified.

1.10 Access for Plant

Before any work is put in hand on any equipment, the Electrical Contractor is to check on site the dimensions of all doorways, access doors etc., so that equipment can be admitted to its allotted position.

1.11 Scaffold and Access Equipment

The Contractor is to provide all plant including scaffolding, equipment, planking, ladders etc., necessary for the full and proper completion of the work.

The use of main contractor's access equipment can be negotiated providing competence can be proved via valid PASMA and IPAF cards.

1.12 Builders work

The Electrical Contractor shall be responsible for preparing all builders work details, drawings relating to his installation in adequate time to avoid delay in the building programme.

Builders' work to be carried out for the Electrical Contractor by the Main Contractor will be subject to confirmation of the order.

1.13 Cover and Protect

Every care shall be taken of the various works during the contract and shall be provided with suitable protection as necessary.

The Contractor shall make good or pay for making good of all work that may suffer from want of casing or protection.

1.14 Attendance by Main Contractor

The following services and facilities shall generally be provided by the Main Contractor free of charge to the Sub-contractor :-

a) Use of all welfare facilities.

b) All temporary general lighting and electricity supply necessary for the execution of the sub-contract works.

c) All water necessary for the execution of the sub-contract works.

d) Cutting away and making good.

Scaffolding erected for use in the Main Contractors work will be available for use by the Sub-contractor.

Clearing away rubbish and the removal from site of surplus materials shall be the responsibility of the Sub-contractor.

If agreed with the Main Contractor, rubbish and waste materials may be deposited in the Main Contractor's skips providing strict adherence to the Site Waste Management Plan. Waste should be segregated and sub-contractors will be contra charged for waste that is not correctly deposited.

1.15 Site and Works

The Contractor shall be held to admit that he has satisfied himself as to the exigencies of the site that he is recommended to visit and has inspected the drawings and the specification sufficiently to advise himself of their full intent and purpose. No claim whatsoever arising by reason for the Contractors failure to observe these precautions, will be entertained.

1.16 Site Representative

The Contractor shall keep a competent site representative in charge of the work, who shall be in constant attendance during progress of the works undertaken by themselves.

1.17 Site Meetings

The Contractor shall attend site meetings as required by the Consultant and Main Contractor and due allowance should be made in the tender for attendance at such meetings.

1.18 Handover Procedure

Following the inspection of the installation and certification by the Consultant and agreement of a Defects List, the installation will be accepted as being handed over for use by the Employer.

1.19 Damage

The Contractor shall be responsible for all damage caused to the fabric of the building as a result of his installation or actions. The Contractor shall ensure that all services and equipment installed by him are safe from being damaged or causing damage.

1.20 Practical Completion

Before the sub-contract works are included in a certificate of Practical Completion, the sub-contract works, or such part as is referred to in the Certificate, shall be completed. The completion shall include setting to work, testing and commissioning, including proving the performance is in accordance with the Specification.

1.21 Obligations After Practical Completion

Between the issue of a Certificate of Practical Completion and the Certificate of making Good Defects relating to the whole or part of the sub-contract works the Contractor shall provide at his own cost the following:-

a) A prompt call-back service, available at all reasonable times, to attend to any faults.

b) Carry out a final test at the end of the Defects Liability Period to demonstrate to the Consultant that the sub-contract works are operating efficiently and that all components are functioning correctly.

1.22 Instructions of Employers Staff or Others

The Contractor shall include in his tender for skilled staff to instruct the Employer or others, in the operation, maintenance and servicing of the installations.

1.23 Defects Liability

The Contractor shall be liable for making good any defects on the installation, for a period of twelve months from the date of issue of the Certificate of Practical Completion for the installation.

1.24 Insurance

All contractors shall carry all necessary insurances as required.

1.25 Variations

Variations to the order either alterations, additions or omissions shall be determined by one of the following methods and agreed with the QS: Measurement, Quotation or Day Work.

1.26 Schedule of Rates

If requested the contractor shall prepare a detailed Contract Sum Analysis highlighting the breakdown of the total tender price. The CSA shall be broken down so as to provide a pricing schedule of quantities and unit rate for each "package" item.

1.27 Health & Safety and CDM

The Contractor shall make the allowances for complying in full with latest health and safety, CDM regulations and all relevant legislation. The Contractor shall be required to prepare all documentation e.g. method statements, material information, risk assessments/analysis as required by the regulations.

1.28 Operating and Maintenance Manuals

Draft copies of all Operating and Maintenance manuals shall be made available in advance of the completion date in order that the Contract Administrator has the opportunity to comment and the corrections/ amendments recorded, thereby allowing sufficient time for the approved documents to be available at the time of signing of the Certificate of Practical Completion.

Once the manuals have been amended to incorporate any comments made by the Contract Administrator, the Contractor shall print and submit to the Contract Administrator three copies thereof suitably bound within a hard backed ring binder.

During the course of the works the Contractor shall maintain on site a complete set of drawings marked up to identify all changes to the contractors working drawings during the course of the works to facilitate easy and accurate preparation of the "as installed" drawings and to ensure that the drawings are in all respects a true record of the installations.

The draft manual shall include the contractors proposed "as-installed" Record Drawings of the whole of the works of each installation as installed including the following:

- General Arrangements of all services to a scale of not less that 1:100.
- Schedules of all equipment etc.
- Schematic layouts as determined by the Contract Administrator.

The manuals shall be contained in volumes strongly bound and suitable for heavy usage over a long period to be read in conjunction with the "as installed" drawings and shall comprise the following:-

(a) A general description of the scope, purpose and manner of working of each system and the apparatus forming the installations.

(b) A detailed description of the scope, purpose and manner of working each system of automatic controls.

(c) Data on general design parameters and associated normal operating temperatures, pressures, etc., based on the commissioning tests.

(d) Clear and comprehensive instructions for the starting up, running and shut down of each system or apparatus.

(e) Clear and comprehensive instructions for dealing with emergency conditions for each system or apparatus.

(f) Instructions in respect of any precautionary measure from time to time necessary (e.g. against corrosion or freezing).

(g) Instructions in respect of the care of apparatus normally subject to seasonal disuse.

(h) Instructions as to the nature, extent and frequency of servicing necessary to properly maintain the Works in good condition as to the materials to be used for this purpose. This information shall be supported by maintenance instructions provided by the suppliers of particular component apparatus.

(i) The names and addresses of suppliers of all major components of the installations as may potentially be required to obtain spare parts or replacements.

(j) List of recommended spares.

(k) Test and completion certificates.

(l) Commissioning Reports from equipment manufacturers and commissioning specialists.

Copies of manufacturer's data shall be supplied in respect of the nature, type and method of operation of specific items of equipment. Such data, in the form of individual booklets and the like, shall be indexed and cross referenced to the Operating and Maintenance Instructions.

Where the Works include modifications to existing installations the Contractor shall include in the Operating and Maintenance Instructions all the above information for the existing installations whether included in the works or not.

The "as-installed" drawings and schedules shall be specially prepared for record purposes, and copies as finally provided shall be included within the operating and maintenance manuals consisting of one set of full size prints on heavy quality paper, one full set of photo-reduced A3 prints and on a compact disk (or DVD), per manual.

Drawing information shall be supplied electronically on disc in the latest version of AutoCad.

A full electronic copy of the complete finalised manuals shall also be provided on the aforementioned compact disc or DVD in PDF format. After the installations are completed, tested, set to work and handed over, the

Contractor shall supervise and be completely responsible for the running of all installations for a period of one week.

During this period the Contractor shall instruct the maintenance and on site staff in the running, operating and maintenance of the installations, in particular any specialist installations.

Subject to the satisfactory completion of the foregoing the Contract Administrator will then issue a Certificate of Practical Completion.

Workmanship and Materials

2

2 Workmanship and Materials

2.1 Introduction

In this specification the word Contract shall be read as meaning all the works involved with the mechanical and electrical engineering services contract.

2.2 Related Documents

The specification shall be read in conjunction with the following:

- Preliminaries.
- Additional Requirements.
- Drawings.
- Particular Specification.
- Schedules.
- All relevant British Standard Specifications and Codes of Practice.
- Health and Safety Executive Documents and Safety Codes.
- CIBSE Guides.
- Home Office Guides.
- Building Regulations.

In any case of doubt as to the interpretation of the documentation the Contractor shall refer the matter to the Contract Administrator prior to submission of the tender.

Claims due to want of knowledge will not be accepted after receipt of the tender.

2.3 Materials and Workmanship

All specified materials and goods supplied by the Contractor shall comply with current British Standard Specifications and shall be of approved pattern. Specific manufacturers, trade names or figure numbers mentioned in the specification are for the purpose of defining the required class of material, quality, design or workmanship.

The Contractor shall include for such specified plant, equipment and materials.

The Contractor shall provide workmanship to the highest standards produced by experienced people and fully in accordance with the requirements of the regulations and codes of practice detailed above.

The complete mechanical and electrical installations shall be installed under the supervision of a supervisor/foreman to ensure the best workmanship and coordination of all parties.

Particular Specification for Electrical Services

3

3 Particular Specification for Electrical Services

3.1 General

This Section of the Specification deals with the general standards of materials, workmanship, design, supply, approved methods of installation and testing & final commissioning of the electrical installation as specified and scheduled herein and/or indicated on the drawings issued herewith.

This Section must be read and applied in conjunction with other detailed sections of the Specification and the drawings and schedule issued herewith.

3.2 Materials

All materials are to be supplied by the Electrical Contractor and must be to relevant British Standards.

Wiring accessories and consumer units shall be manufactured by Eaton.

3.3 Regulations

The Electrical Contractor is to comply with any and all Regulations and Codes of Good Practice, with Supply Authorities and must submit any equipment items for inspection or test if required to do so, without additional charge to the sub-contract.

The Electrical Installation must be compliant and in accordance with:

- The latest edition of BS7671:2008 Requirements for Electrical Installations and current to subsequent amendments as issued by the IET and also comply to any Statutory Regulations and Associated Memoranda as detailed in Appendix 2 of BS 7671.
- The Electricity at Work Regulations 1989.
- Electricity Safety, Quality and Continuity Regulation 2002 (ESQCR).
- Building Control (relevant parts as affects electrical installations).

It is expected that the Electrical sub-contractor will be responsible for relevant aspects of the Health & Safety At Work Act etc. 1974, CDM Regulations 2007, Electricity at Work Regulations 1989, ESQCR 2002 and is to comply with the Control of Substances Hazardous to Health Regulations 2002 (COSHH), in so far as they apply to the materials and methods used in the sub-contract work carried out by him and in relation to other sub-contractors on site.

3.4 Drawings for Approval

The Electrical Contractor shall prepare and issue via the Main Contractor all detailed installation drawings, including distribution, plant and layout drawings as required to enable the contract works to be integrated into the works as a whole, before the installation is commenced all in accordance with the main contract programme.

3.5 Cables

Wiring to the outlets detailed in this specification and accompanying drawings shall be carried out with 300/500v PVC insulated PVC sheathed type. All cables shall be BASEC approved, have copper conductors and comply with BS 604:2000 (2006).

Fire Resistant Cables. All multi core cables shall be low smoke, zero halogen, have a minimum CSA of 1.5mm^2 and comply with relevant BS 8519, BS EN 60332-1-2:2004.

Fire Detection and Alarm Systems shall comply to relevant parts of BS 5839.

3.5.1 Cables Under Floors and Above Ceilings

Particular care needs to be taken when installing cables below floors or above ceilings.

Guidance can be found in Regulation 522.6.100 of BS7671:2008.

In loft areas and ceiling voids, cables are particularly likely to come into contact with, or be totally enclosed in, thermal insulation. The adverse effect such thermal insulation has on the current-carrying capacity of cables must be taken into account in the circuit design. Alternatively, cables should be routed to avoid contact with thermal insulation.

3.6 Consumer Units and Distribution Boards

Consumer units shall be cream/white in colour. The consumer unit shall be manufactured complete with controlling devices with the exception with outgoing ways which will be installed as required. The consumer unit must be modular to accommodate any other devices e.g. contactors, meters, bell transformers etc. and have sufficient spare ways to allow for future expansion. Eaton plastic Consumer units would normally be selected however Metal clad variants are also available if required perhaps to accommodate cable glands. A landlord's TPN Memshield distribution board shall be fitted in apartment blocks. Supplies for communal services shall be fed from this location (accessible by authorised persons only) in include: lighting/external lighting, lift supply, access control equipment, cleaner's socket etc. as appropriate.

3.7 Lighting

3.7.1 Standard Lampholders

They shall incorporate a metal liner for added strength around the 'J' slots.

Ceiling rose must incorporate a flexible base material to avoid cracking on uneven ceilings.

Ceiling rose bases to be suitably fixed to a noggin/bearer or joist. Earthing terminal to be provided at every lighting point and switch.

3.7.2 Lamp Activated Type

They shall only have access to live parts via a screwdriver.

The safety mechanism cannot be bypassed by inserting screwdriver in the 'J' slots and turning.

Lamp Activated Lamp Holders are an additional safety feature and shall be fitted on two-way lighting circuits.

Cable to be clamped via a captive cable clamp not via a tortuous path method.

Battenholders and angled battenholders must be available.

Ceiling rose bases to be suitably fixed to a noggin/bearer or joist. Earthing terminal to be provided at every lighting point and switch.

3.7.3 Plug-in Lighting

Should comply with BS 7001. Have 3 and 4 pin available and to be supplied with fixing screws.

3.7.4 External Lighting

The electrical contractor shall allow for decorative porch lighting and suitable lighting to rear of dwelling. PIR/Photocell control with manual override.

3.8 Lighting Switches and Control

Switches shall be minimum 10 amp rating and must be X-rated as manufactured by Eaton. Where multiple switches are required, they shall be assembled in ganged units. Unless specified otherwise, flush switches shall have white moulded plates and must be able to substitute individual switch modules within a plate to allow for a combination of switch functions on the plate such as intermediate, bell push, 2 way switching. Switches to be at least 32mm long to offer ease of switching.

Grid switches shall clearly show function, rating, circuit diagram and terminal identification on the back of each module.

Grid switches shall be at least 16mm wide and 40mm long to allow marking of legends and ease of use.

The Electrical Contractor shall be responsible for agreeing the correct position of switches with regard to door hangs etc., on site before installation. No claims for non-compliance to this requirement will be accepted.

Consideration should be given to running a Neutral supply to each light switch position also for future use with electronic controls etc.

3.9 Socket Outlets, TV, Telephone and Connection Units

All sockets will be switched and twin except where installed at low level for fixed kitchen appliances.

Socket outlets and connection units shall be rated 13 amp switched as manufactured by Eaton.

TV co-axial sockets shall be installed as instructed. Telephone points to be installed as shown on drawing with a master point shown on drawing for BT connection. The Electrical Contractor shall install a suitable flush steel box for the master socket.

For apartments which include communal TV/Sky then the contractor shall propose their integrated reception system details after consultation with specialist sub-contractor.

Unless specified otherwise, flush sockets and connection units shall have white moulded plates.

All sockets and connection units shall be wired on ring main circuits, unless otherwise specified.

Eaton's COPA clip-on range allows for the front/decorative plate to be removed prior to plastering/ painting by finishing trades. However where this range is not used the Electrical Contractor shall make allowance for sacrificial accessories to be fitted until final fix/screw back. This will eliminate damage caused to accessories by paint/plaster/decoration etc.

3.10 Domestic Smoke/Heat/CO Detectors

The Electrical Contractor shall install mains operated/ battery back up alarms as shown on drawing. Smoke/Heat detectors to be interconnected.

3.11 Mounting Heights

Unless otherwise specified, all items of equipment shall be mounted within the Zone detailed by the On-Site Guide i.e. maximum of 1200mm to the top of an accessory and 450mm to the underside. Socket outlets installed above worktop height should be a minimum of 1050mm to the underside AFFL. A schedule of mounting heights will be shown on the "approved" for installation drawing.

3.12 Earthing and Bonding

The Electrical Contractor shall be responsible for ensuring that the earthing and bonding system installed complies with the 17th Edition of the IET Regulations for Electrical Installations, particularly with regard to exposed and extraneous conductive parts and exposed metallic parts of the building structure etc.

All earth continuity conductors and bonding leads shall be not less than the minimum sizes as given in BS 7671:2008 (17th Edition of the IET Regulations as detailed in Chapter 54).

The Electrical Contractor shall provide all necessary earthing conductors to fully comply with the above and ensure all labelling and warning notices comply with BS 951.

3.13 Final Sub-Circuits

The Electrical Contractor shall be responsible for the final sub-circuit distribution.

Cables shall be suitably sized to allow for volt drop, thermal constraints, loading etc. Cables shall be installed and routed as detailed in the latest edition of the On-Site Guide.

Lighting circuits shall be radial and protected by a suitably rated protective devices and shall have a CSA of 1.5mm^2.

To minimise the risk of nuisance and injury a minimum of two lighting circuits shall be installed.

The ring main shall serve an area not exceeding 100m^2 and shall have a CSA of 2.5mm^2 if protected by a 32 amp device. The installation should have a minimum of two ring mains and if required the kitchen shall have its own ring.

Radial circuits to electric cookers, showers etc. will be suitably sized and protected.

3.14 Inspection and Testing

The Electrical Contractor provides for the inspection and testing on site and shall provide all the necessary duly certified and calibrated instruments, labour and accessories required for the purpose of carrying out the tests.

The Electrical Contractor shall provide all relevant test certificates including the relevant NICEIC Electrical Installation Certificate, for all tests carried out. On completion of the installation the test results prescribed by the latest amendments of BS 7671:2008 and Guidance Note 3 shall be recorded. Upon satisfactory completion the duly signed certificates shall be submitted in a timely manner. Payment for completed dwellings shall only be made after the certificate has been received.

Electrical Contractors shall be registered with a Part P compliant registration i.e. NICEIC, Elecsa.

3.15 Lift Supplies

As part of the Electrical Contractor's design he shall supply and install a suitably sized cable and RJ communications outlet for the specialist lift installer. The contractor shall liaise with the lift company to ensure compliance.

3.16 Emergency Lighting

The Electrical Contractor shall design and install emergency lighting in communal areas to facilitate the

safe evacuation in the event of loss of supply i.e. Fire. The system shall comply to relevant parts of BS 5266.

3.17 Fire Alarm System

The Electrical Contractor shall install a new analogue addressable system to BS 5839-1 2002 + A2 2008 L1 to common areas of the apartment block. In addition a heat detector complete with sounder base shall be installed in the entrance of each apartment and connected to the FA system. The new system shall be open protocol and the Electrical Contractor shall indicate in his tender the company he proposes to use.

Supply to the FAP shall be taken from a single pole way from the distribution equipment closest to the electrical intake i.e. LV Switchboard or 16A SP MCCB from panel board.

The system shall interface with door access equipment, electric gates, smoke/vent system etc. to ensure they open on fire.

The Electrical Contractor shall allow for a suitable framed zone map adjacent to the main FAP.

The zoned mimic shall show building plan, installed equipment and their individual addresses.

3.18 Door Access Control and Intercom

General

The system shall comprise of the design, supply, installation, testing and commissioning of a complete video intercom system, consisting of the following:

- Internal wall mounted video intercom unit complete with door release button in each apartment final location/room to be agreed with the Client.
- Main Controller.
- External vandal resistant video intercom unit complete with call button and built in colour/monochrome camera to the entrance doors of the apartment block.
- External vandal resistant video intercom unit complete with call button and keypad to the entrance gates of the site. Note the gates to be operated either by the keypad or a door release button in each apartment.
- Wiring.
- Power Supplies.

System of Wiring

All wiring shall be carried out in line with manufacturers' recommendations and installed on cable trays and clipped direct within ceiling voids with flush mounted drops to accessories in LSOH PVC conduits.

Conduits and cable trays shall be provided for all wiring; under NO circumstances shall cables be clipped direct or installed in PVC mini trunking.

Wiring to the external gates shall be contained in buried cable ducts.

Operation

The external video call units shall be complete with call button, as required, and the internal units shall be complete with a door release button.

Note, the external video call unit to the entrance gates shall be complete with call button and keypad.

A unit shall be provided on a card reader post to be mounted on each side of the gates.

Use of the external call button shall cause the internal intercom to activate.

Once one of the internal units has been answered a line of 2-way communication shall commence between the internal unit and the external call unit.

The use of the door release button on the internal unit shall cause the collapsible bolt on the entrance door to release (or the gate to open) for a timed period.

The gates shall also be able to be operated by use of a keypad which shall cause the gate to open release for a timed period.

Demonstration/Acceptance Certificate

The Employer shall provide a full demonstration of the system to the Client and provide an encapsulated basic user's guide/lay man's guide to the system for the Client.

The Contractor shall also provide a demonstration/acceptance certificate for the system which shall be signed by the Employer following the aforementioned demonstration for inclusion within the operating and maintenance manual.

Approved Specialist

The Contractor shall employ a specialist to design, supply, install, test and commission the system, who in turn shall provide a certified installation and full demonstration to the client. The specialist shall also provide full operating and maintenance documentation.

The Contractor shall indicate in his tender which company he proposes to use.

3.19 TV Distribution System

General

The Contractor shall design, supply, install, test and commission an integrated reception system (IRS) with both satellite and freeview digital to be provided to each apartment.

All dishes, aerials, cabling, amps, distribution amps, multi switch units, power supplies etc. shall be provided by the Electrical Contractor.

Site Test

The Contractor shall perform a site test to determine that all Freeview and satellite services are available and that the quality of the signals will enable him to meet the relevant specification requirements indicated. Any shortfall in service must be reported.

Performance of System

It shall be the responsibility of the Contractor to familiarise itself with the site and local conditions prior to tendering.

Television Aerials and Satellite Dishes

Shall be from a recognised supplier and comply with the CAI Code of Practice.

The final position for aerials and the satellite dish shall be agreed prior to installation.

Safety

The total system shall be installed to comply with the requirements of all relevant Health and Safety legislation and the safety statement as issued by the CAI.

All relevant equipment must be Safety Earth Bonded in compliance with BS EN 50083. All co-axial outer connections must be permanently bonded to the building's earthing system.

It is the responsibility of the Contractor, and in particular the installing or servicing engineer, to ensure the system complies with all safety matters.

3.20 Lightning Protection

General

A complete lightning protection system shall be designed, supplied, installed, tested and commissioned to the premises to be fully in accordance with the requirements of BS 6651 and BSEN 62305.

System

The system shall comprise, air termination networks, down conductors, earth electrodes and all cross connections and mechanical fixings positioned, as indicated on the drawings and in accordance with the above.

The lightning protection specialist shall measure the earth resistance and provide earth electrodes as required.

Connections to earthing electrodes shall be housed in concrete inspection housings provided as part of the lightning protection system.

Bonding to Other Facilities

Bonding to the metalwork of other services and to metalwork in and on the structure shall be deemed to be included.

Metalwork shall be bonded in and on the structure shall include (but not be limited to) all parts of the metal frame, louvers, handrails, services plant and metal roofing components.

The sub-contractor is to ensure that the lightning protection system is bonded to the main electrical earthing terminal.

Jointing Conductors

All jointing conductors shall be made by proprietary accessories, with each joint prepared within non-oxidizing compound prior to and on completion of the joints.

Where dissimilar metals are to be connected a reliable bi-metallic connector shall be used to connect the conductors.

Materials

Air terminations, roof conductors and down conductors shall be of copper, copper alloy or aluminium, except that aluminium shall not be used below ground level.

Earth electrodes shall be of solid drawn high conductivity copper rods, with steel cores if required.

Testing

On completion of the installation, each individual test link shall be disconnected from the network, tested and values recorded, with a test applied to the whole installation in accordance with the prescribed requirements of the British Standard Code of Practice.

The Contractor shall ensure that the lightning protection system has combined maximum reading of 10 ohms on completion. Should 10 ohms path not be achieved the sub-contractor shall allow for the installation of additional electrodes/pits and/or down conductors, where necessary.

On completion of the installation, the Contractor shall produce all installation and test certificates for the complete lightning protection system.

3.21 As Fitted Drawings and Manuals

The Electrical Contractor shall print and submit three copies suitably bound within a hard backed ring binder.

The "as installed" drawings are in all respects a true record of the electrical installations.

On completion of the works and within one month of issue of the Certificate of Practical Completion, the Electrical Contractor shall supply to the CDM Co-Ordinator completed record drawings generally as follows:-

Electrical "As Fitted" copies printed at relevant paper size (A0/A1) and also a CD ROM of "as fitted" drawings in AutoCAD DWG format or PDF format.

The Electrical Contractor shall also provide complete operational manuals incorporating complete details of all works and equipment he has provided and installed.

These documents shall be presented in an A4 loose-leaf binder with the project title and manual title printed on the front face and spine of the binder.

In addition to the As-Fitted drawings and Operating and Maintenance manuals, the Electrical Contractor shall produce a simplified non-technical "User Guide" as a separate document. The "User Guide" shall include but not be limited to the following and describe and identify both in text and drawings, no larger than A3 size:

- Location of each incoming service.
- How to turn service 'On' and 'Off'.
- Describe in non-technical terms the systems installed.
- Daily routines for turning systems 'On' and 'Off' if appropriate.
- Emergency measures to be taken in the event of loss of supply i.e. who to notify, telephone numbers etc.
- Daily procedures to follow for installed safety systems.
- Emergency procedures to follow for installed safety systems.

4 Description of Domestic Installation Systems

4.1 Materials

All wiring accessories are to be of Eaton manufacture and can be selected from the typical layout section – **4.9 Typical Accessories & Layout Selection Guide**.

Range options are:
PREMERA – Thermo-setting plastic ('P' references).
COPA – greater flexibility using clip-on cover plates ('C' references).
XTRA – Surface metalclad for garages.

All consumer switchgear & devices are to be of Eaton manufacture.

4.2 Mains

The Electricity Supply Company shall provide a suitable electricity supply (usually TN-C-S) for the dwelling terminating and connected to the incoming terminals on their meter and earth terminal. Final connection made via an approved isolator.

The Electrical Contractor shall provide and install suitable cabling between the Regional Electricity Company's isolator and the consumer's main switchgear. This will be PVC 6181Y double insulated "tails" and PVC 6491X Green/Yellow singles. The single phase and neutral supply shall be assumed to be rated 100A. Cable sizing shall be in accordance with Chapter 54 of BS 7671:2008.

4.3 Consumer Switchgear

4.3.1 Main Control

The main control shall be a flush or surface mounting consumer unit that shall be cream/white in colour.

The consumer unit will be factory assembled (with the exception of outgoing devices) and comply with the requirements of BS EN 60439-3:1991.

The consumer unit shall have a suitable number of outgoing ways with sufficient spare ways and be fitted with the appropriate type of Miniature Circuit Breakers MCB's to BS EN 60898 or RCBO's to BS EN 61009.

The main controlling DP isolator switch will be generally rated at no less than 100 amp. The secondary devices protecting individual circuits will be either 30mA RCBO's (which combine the function of an MCB with an RCD) or else MCB's, grouped under the secondary control of two or more RCCB's with a minimum rating of 63 amp and 30mA sensitivity.

The various circuits shall be arranged to comply with the requirements of the latest IET wiring Regulations (BS 7671:2008). Your attention is drawn to Regulations 411.3.3. (Reference additional protection by means of 30mA RCD's), 314.1 & 314.2 (Segregation of circuits to avoid danger and minimise inconvenience in the event of a fault) and 522.6.101. (Protection of wiring concealed in walls or partitions).

These circuits are suitably split over two or more RCD protected zones or else fed by individual RCBOs.

Any unused ways within the consumer unit must be fitted with blanking plates – Eaton's Ref No. **ABP1**.

Note:- Other Eaton ancillary devices must be fitted within the consumer unit.

Typical consumer units to provide compliance with 17th edition wiring regulations would be as follows:

- Dual RCD unit c/w 100A DP switch and 2 x 80A 30mA RCCB protected zones, e.g. **EAD12H80H80D**.
- Dual RCD High Integrity unit, c/w 100A DP switch and 2 x 80A 30mA RCCB, protected zones plus 3 circuits fed directly off the main switch for use with RCBOs, e.g. **EAD12H80H803D**.
- An Isolator controlled unit with 100A DP main-switch and arranged to feed all outgoing ways via individual RCBOs, e.g. **EAD11R**.

4.3.2 Circuit Identification

The circuit identification label (Way Label) shall be completed to give clear and permanent indication of the function of the device. This shall be pre-printed from the selection provided by the manufacturer.

Following installation the Electrical Contractor is to use the manufacturers self-adhesive labels to instruct the tenant in the operation of MCBs, RCBOs, and RCCBs and consumer units.

4.3.3 Typical Quantities of Twin Socket Outlets

A generous provision of twin socket outlets shall be distributed around the dwelling to ensure current and future demand is taken account of and minimise the risk of trailing leads. Guidance to the recommended number can be obtained from Appendix 8 of the on-site guide.

Wherever a telephone point is shown a twin socket must also be installed. Where the main television/entertainment centre is a minimum of two twin sockets must be installed.

4.4 Kitchen

The electrical installation to the kitchen generally consists of power supplies to serve the following:-

(1) Cooker.

(2) Appliances such as fridge/freezer, kettle, microwave, washing machine etc.

(3) Extractor Hood/Fan.

(4) TV and associated aerial socket outlet.

(5) Lighting.

(6) Central heating system (if applicable).

Wiring to kitchen equipment shall emanate from the main consumer unit. Where general purpose 13 amp socket outlets are installed, they shall be wired on a 32 amp ring main.

4.4.1 Cooker

A 45 amp cooker control unit or 50 amp DP switch shall be provided to serve the cooker. This unit shall receive an independent supply from the consumer unit fed from its own appropriately rated MCB.

The cooker control unit or switch shall be fixed to the side of the cooker space. A 45 amp cable/ cooker outlet plate should be fixed approximately 600mm AFFL directly behind the cooker.

4.4.2 Appliances

Fixed equipment such as fridges, freezers, washing machines, etc., where set into kitchen units shall be served by an appropriate 13 amp switched or un-switched socket outlet located behind the appliance approximately 600mm AFFL.

Connection units controlling low level sockets to be printed with the appropriate appliance marking, e.g. 'freezer'.

The grid switch rockers feeding these appliance outlets, to be clearly marked with the appliance being controlled: 'washing machine', 'tumble dryer', 'fridge', 'freezer' etc. e.g. **F9023WH**, **TD**, **FG** or **FZ**.

4.4.3 Extractor Hood

The Electrical Contractor shall make provision of an electrical connection for an Extractor Hood in addition to any other mechanical fan if detailed on the drawing.

4.4.4 TV/Aerial Socket

Should provision for a TV be required within the kitchen a TV aerial socket outlet shall be provided.

4.4.5 Lighting

Suitable local lighting control shall be installed to switch the luminaire/s.

If indicated on the kitchen drawing the Electrical Contractor shall install decorative lighting for additional task lighting to the worktop via underside of eye level units. A separate local switch shall be installed.

4.4.6 Central Heating System

For a gas fired system a suitable fused connection unit shall be installed protected by a 3 amp fuse.

4.5 Living Rooms

Lounge

Socket outlets shall be generously distributed around the living area to facilitate the convenient connection of fixed and portable electrical equipment. At least two twin sockets to be installed adjacent to the TV position and one adjacent to telephone outlets.

Consideration must be given to future use and expansion. Guidance on minimum socket outlet provision may be obtained in the On-Site Guide.

A switched fuse spur unit to be provided for focal point fire.

Dining Area

In a dining area a minimum of two twin sockets shall be installed to accommodate portable appliances.

Hall

A minimum of one twin socket shall be installed.

4.5.1 Bell/Chime System

The lounge or hall shall be provided with a front door mains operated bell/chime system.

The extra low voltage transformer for the system shall be fitted within the consumer unit.

Wiring shall be suitably insulated to the highest voltage within the enclosure:

Consumer unit bell transformer – Eaton's Ref No. **TR-G3/8**.

4.5.2 Lighting

Suitable local lighting control shall be installed to switch the luminaire/s. Lighting levels should be appropriate as should the use of convenient one and two way switching arrangements/positions.

4.5.3 Burglar Alarm System

The Electrical Contractor shall install an unswitched 3 amp connection unit for a future intruder alarm system. The position should be shown on the drawing for final approval.

4.6 Bedrooms

A generous provision of twin sockets shall be provided within the bedrooms. In main bedrooms two shall be installed either side of the bed for telephone, table light, alarm clock etc. Other outlets shall allow for future TV connection and vacuum cleaner. Other bedrooms which could be children's room or for future home office use, shall have a provision to cover anticipated additional demand for power.

4.6.1 Lighting

Lighting to the bedroom shall generally consist of a centrally located pendant. Suitable local lighting control shall be installed to switch the luminaire/s.

4.7 Bathroom

The electrical installation to the bathroom generally consists of power supplies to serve the following :-

(1) Electrical shower point.

(2) Shaver supply unit.

(3) Heaters.

(4) Extract fan.

(5) Lighting.

Electrical installations within bathrooms are classed as Special Locations. Specific use of RCD protected in accordance with regulation 701.411.3.3 must be adhered to.

4.7.1 Electric Shower Point

Where an instantaneous electric shower unit is installed it shall receive a suitably sized cable and MCB protected independent supply from within the consumer unit.

Local means of isolation shall be installed via a ceiling mounted pull cord or wall mounted plate switch.

4.7.2 Shaver Supply Unit

A dual voltage safety isolating shaver supply unit shall be installed within the bathroom. The supply to this unit shall be connected into the bathroom lighting circuit and comply with BS EN 61558-2-5.

4.7.3 Extract Fan

Where indicated on the plans i.e. kitchens, bathrooms, en-suite etc. extract fans to be supplied and fitted by Electrical Contractor. Ducting of fans to be carried out by Electrical Contractor as per fan manufacturer's specification.

The fan isolator shall be connected into the bathroom lighting circuit and operate when the bathroom light switch is activated.

The fan may also incorporate an over-run facility which will allow the fan to run for a short time once the bathroom light has been switched off, wiring for this to be as detailed in the fan manufacturers circuit diagram.

4.7.4 Lighting

Lighting to the bathroom shall generally consist of a centrally located energy efficient luminaire with suitable

IP rating. The control switch mounted externally from the bathroom may be ganged with landing switch.

4.8 Garage

All properties with a garage shall be fitted with two twin sockets located for maximum flexibility and a centrally mounted enclosed luminaire controlled via a local switch.

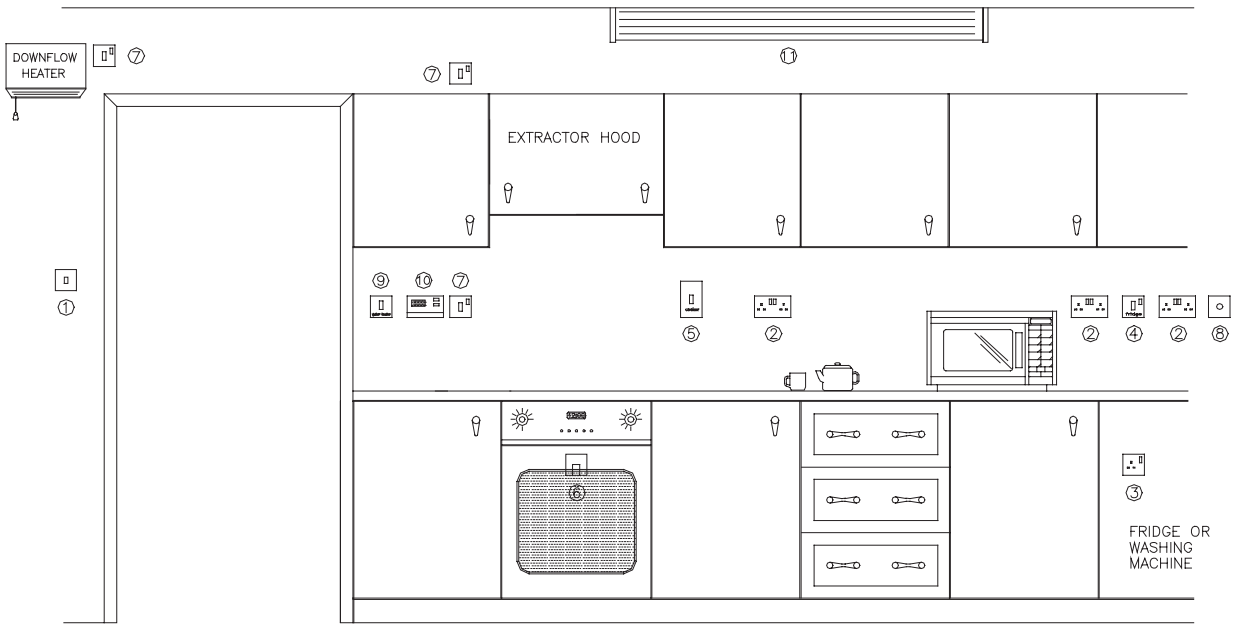
If electric garage doors are indicated then a non-RCD protected ceiling mounted single socket shall be provided adjacent to the door gear.

If the garage is remote from the property then the Electrical Contractor shall install a suitable SWA cable on proprietary glands to suit.

Any sockets mounted externally shall have a degree of protection due to external influences of IP66. The sockets to be RCD protect either locally or via the consumer unit and have characteristics as specified in regulation 415.1.1 of BS 7671.

Description of Domestic Installation Systems

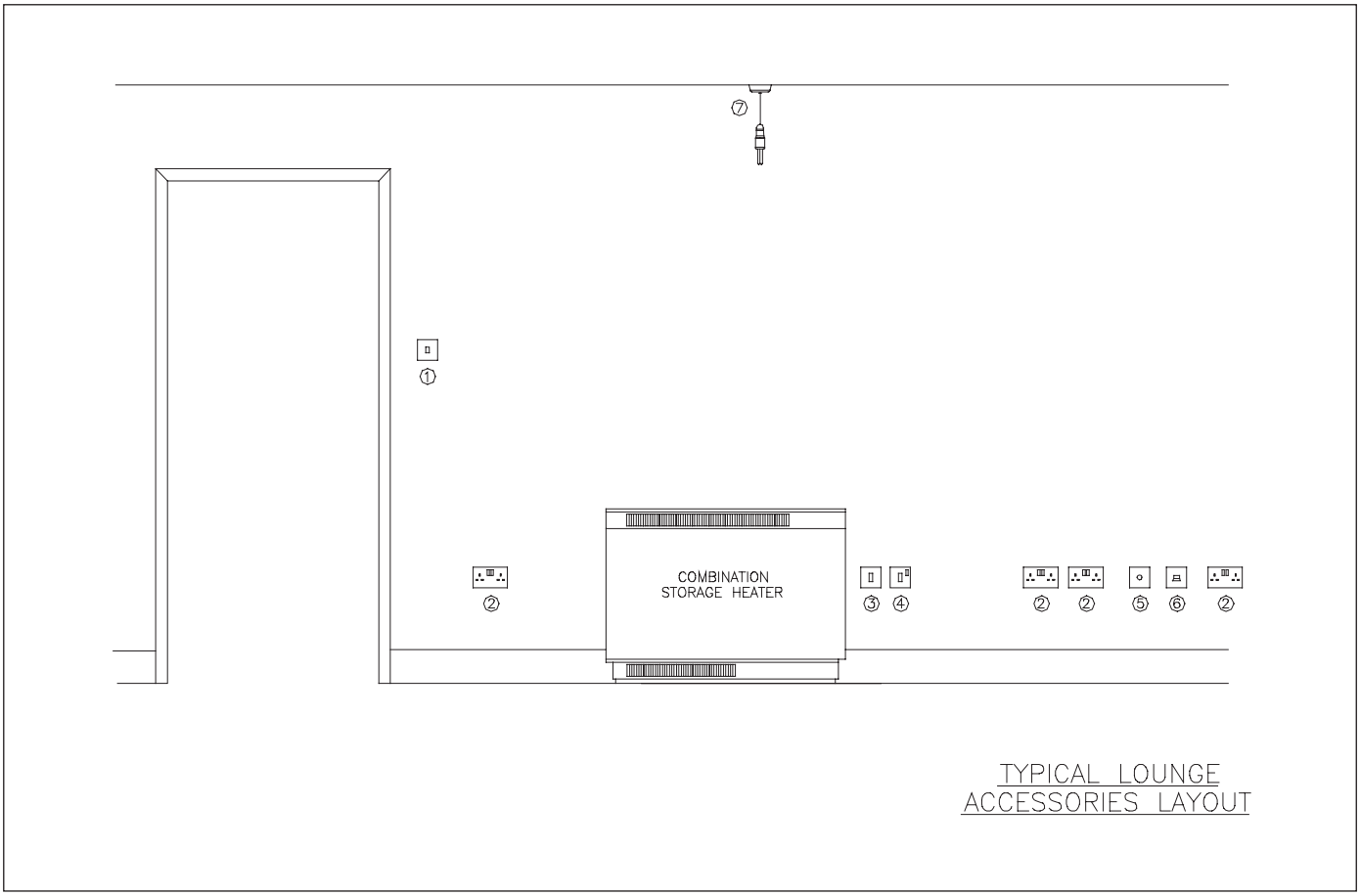
Typical accessories & layout selection guide



TYPICAL KITCHEN ACCESSORIES LAYOUT

Eaton's MEM® series – Wall and ceiling accessories selection guide (kitchen)

Description	PREMERA White moulded (Eaton list no.)	COPA White c/w cover plate (Eaton list no.)	COPA Interior (Eaton list no.)	Stainless Steel Plate only (Eaton list no.)	Satin Bronze Plate only (Eaton list no.)	Highly Polished Plate only (Eaton list no.)	Polished Brass Plate only (Eaton list no.)
❶ 10 amp single pole plate switch	**P011/P012**	**C021WH**	**C021**	**CM011SS**	**CM011SB**	**CM011HP**	**CM011PB**
❷ Twin 13 amp switched socket outlet	**P622**	**C622WH**	**C622**	**CM622SS**	**CM622SB**	**CM622HP**	**CM622PB**
❸ Single 13 amp switched socket outlet	**P621**	**C621WH**	**C621**	**CM621SS**	**CM621SB**	**CM621HP**	**CM621PB**
❹ 13 amp switched fused connection unit	**P221**	**C221WH**	**C221**	**CM221SS**	**CM221SB**	**CM221HP**	**CM221PB**
(with appliance marking).	**F9023XX**	–	–	–	–	–	–
or 20 amp DP grid switch	–	–	–	–	–	–	–
❺ 45 amp DP cooker control unit	**P425N**	**C425NWH**	**C425N**	**CM425NSS**	**CM425NSB**	**CM425NHP**	**CM425NPB**
❻ 45 amp cable/cooker outlet plate	**P345**	–	–	–	–	–	–
❼ 13 amp switched fused connection unit with flex outlet	**P221**	**C221WH**	**C221**	**CM221SS**	**CM221SB**	**CM221HP**	**CM221PB**
❽ TV co-axial socket	**P351**	**C351WH**	**C351**	**CM351SS**	**CM351SB**	**CM351HP**	**CM351PB**
❾ 20 amp DP switch marked "water heater"	**P401**	**C401WH**	**C401**	**CM401SS**	**CM401SB**	**CM401HP**	**CM401PB**
❿ Hot water/central heating programmer	–	–	–	–	–	–	–
⓫ Fluorescent luminaire	–	–	–	–	–	–	–

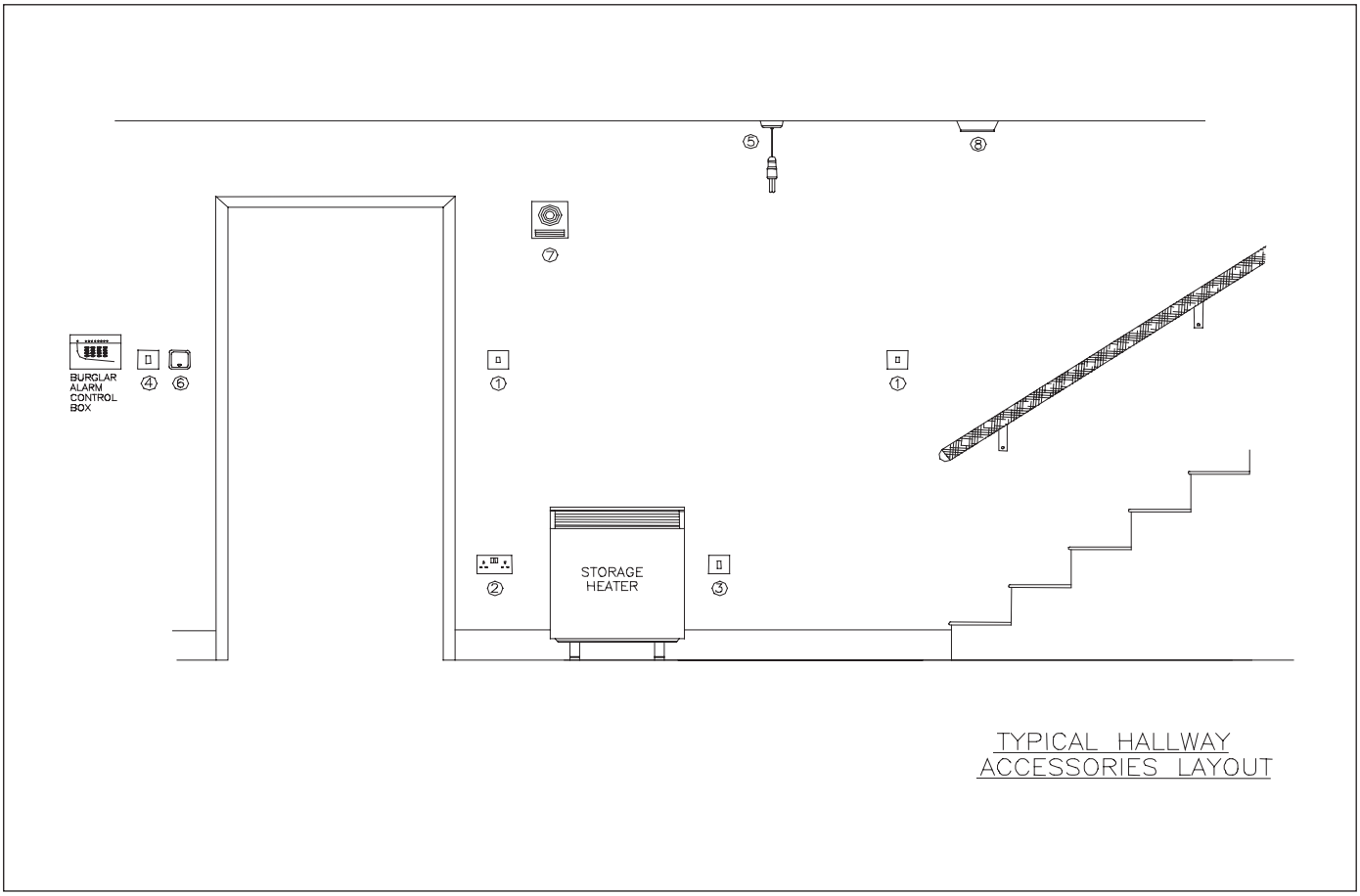


Eaton's MEM® series – Wall and ceiling accessories selection guide (lounge)

Description	PREMERA White moulded (Eaton list no.)	COPA White c/w cover plate (Eaton list no.)	COPA Interior (Eaton list no.)	Stainless Steel Plate only (Eaton list no.)	Satin Bronze Plate only (Eaton list no.)	Highly Polished Plate only (Eaton list no.)	Polished Brass Plate only (Eaton list no.)
❶ 10 amp single pole plate switch or	**P011/21**	**C021WH**	**C021**	**CM011SS**	**CM011SB**	**CM011HP**	**CM011PB**
1 gang 400 Watt 1 way dimmer switch	**P9141** (2 way)	**C9141WH** (2 way)	**C9141** (2 way)	**CM9141SS** (2 way)	**CM9141SB** (2 way)	**CM9141HP** (2 way)	**CM9141PB** (2 way)
❷ Twin 13 amp switched socket outlet	**P622**	**C622WH**	**C622**	**CM622SS**	**CM622SB**	**CM622HP**	**CM622PB**
❸ 20 amp DP switch	**P401**	**C401WH**	**C401**	**CM401SS**	**CM401SB**	**CM401HP**	**CM401PB**
❹ 13 amp switched fused connection unit with flex outlet	**P221**	**C221WH**	**C221**	**CM221SS**	**CM221SB**	**CM221HP**	**CM221PB**
❺ TV co-axial socket	**P351**	**C351WH**	**C351**	**CM351SS**	**CM351SB**	**CM351HP**	**CM351PB**
❻ 1 gang single telephone line jack	**P360**	**C360WH**	**C360**	**CM360SS**	**CM360SB**	**CM360HP**	**CM360PB**
❼ Pendant set – 6"/9"	**F1250/51**	–	–	–	–	–	–

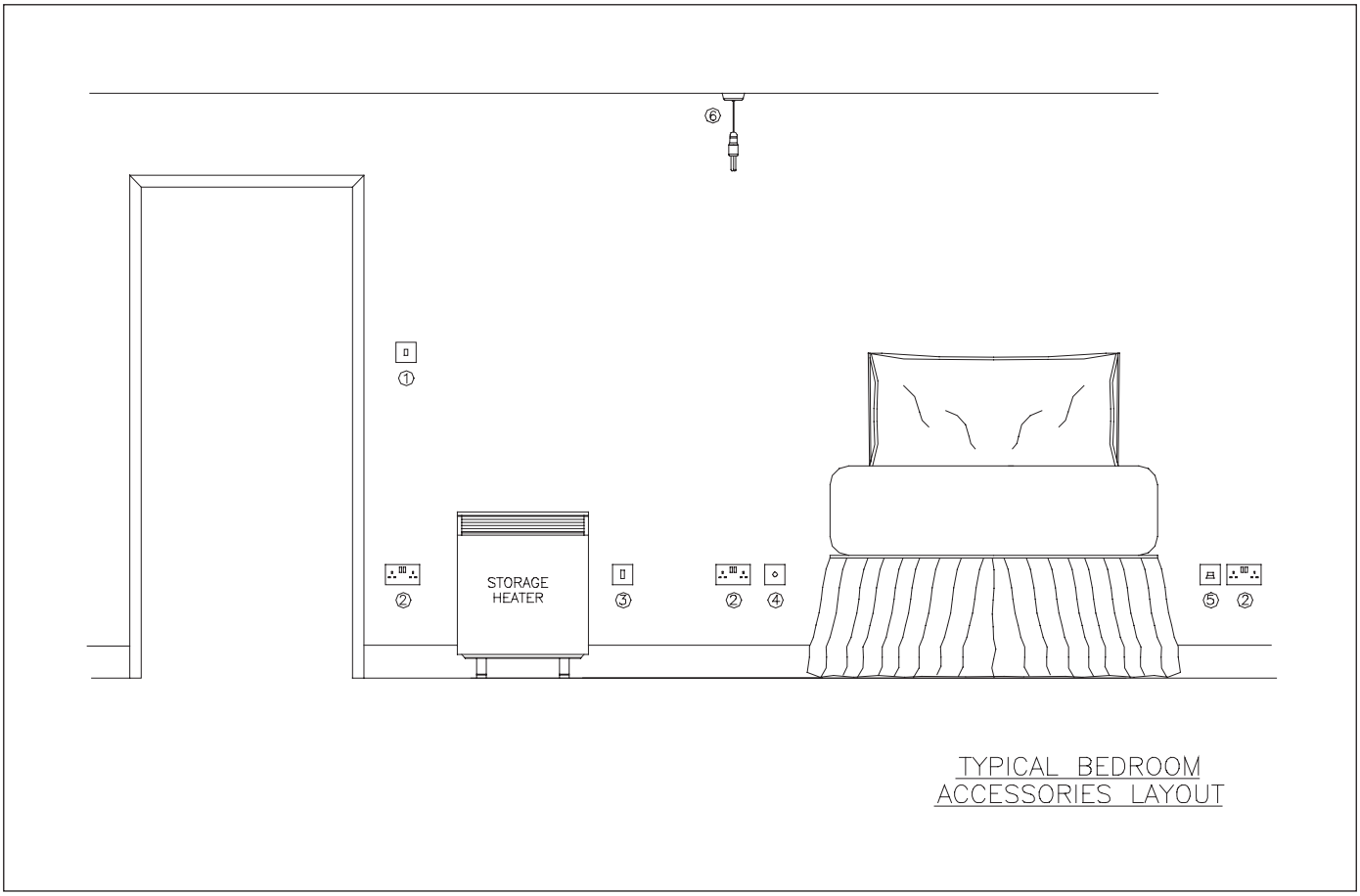
Description of Domestic Installation Systems

Typical accessories & layout selection guide



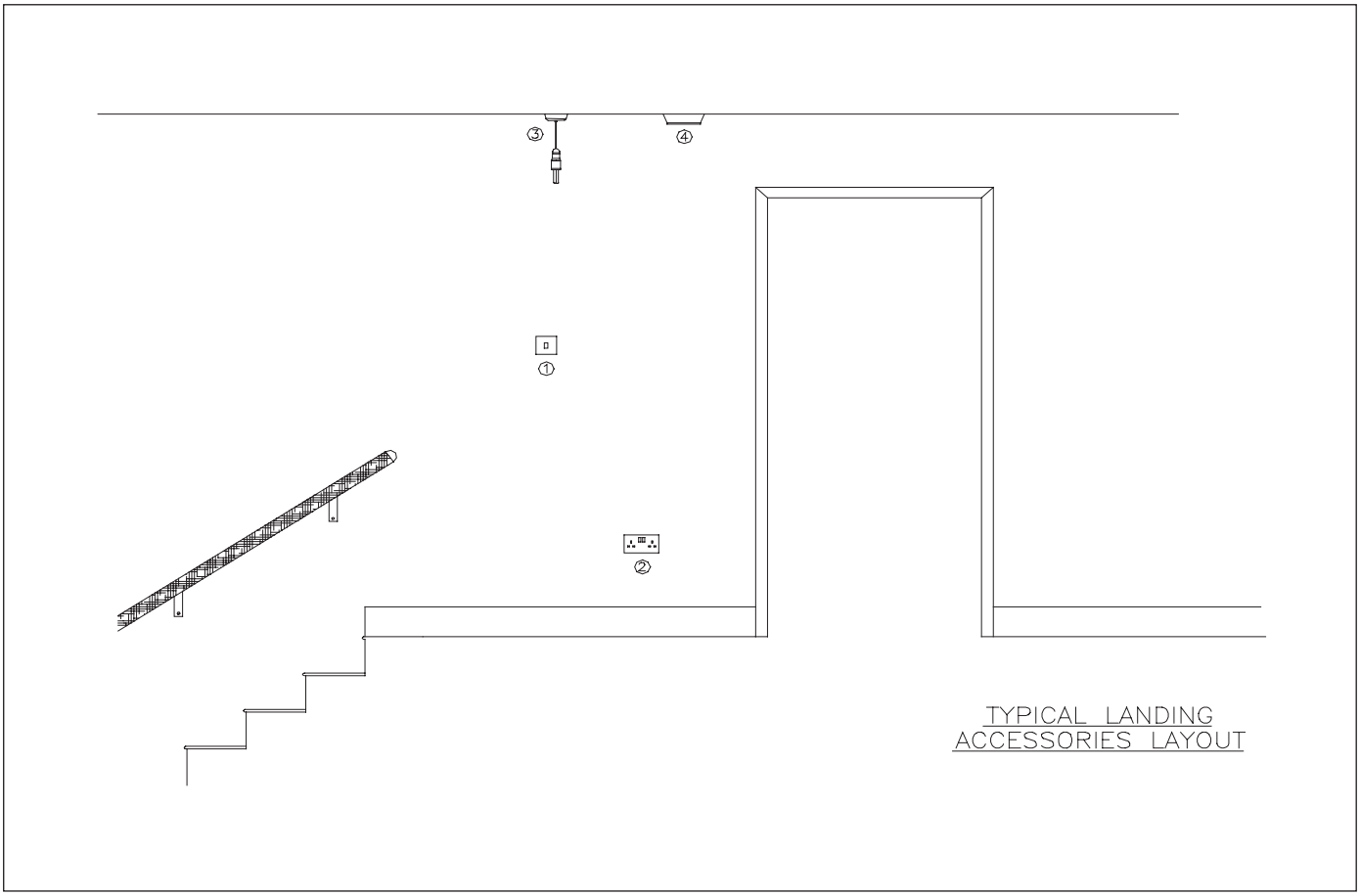
Eaton's MEM® series – Wall and ceiling accessories selection guide (hall)

Description	PREMERA White moulded (Eaton list no.)	COPA White c/w cover plate (Eaton list no.)	COPA Interior (Eaton list no.)	Stainless Steel Plate only (Eaton list no.)	Satin Bronze Plate only (Eaton list no.)	Highly Polished Plate only (Eaton list no.)	Polished Brass Plate only (Eaton list no.)
❶ 10 amp single pole plate switch	**P011/P012**	**C021WH**	**C021**	**CM011SS**	**CM011SB**	**CM011HP**	**CM011PB**
❷ Twin 13 amp switched socket outlet	**P622**	**C622WH**	**C622**	**CM622SS**	**CM622SB**	**CM622HP**	**CM622PB**
❸ 20 amp DP switch with flex outlet	**P401**	**C401WH**	**C401**	**CM401SS**	**CM401SB**	**CM401HP**	**CM401PB**
❹ 13 amp unswitched fused connection unit fitted + 3 amp fuse	**P223**	–	–	–	–	–	–
❺ Pendant set – 6"/9"	**F1250/51**	–	–	–	–	–	
❻ Splashproof IP54 moulded bell push (at front door)	**F2633**	–	–	–	–	–	–
❼ Mains operated bell/chime (consumer unit bell transformer)	**AA2BT**	–	–	–	–	–	–
❽ Mains operated combined smoke detector/sounder	–	–	–	–	–	–	–



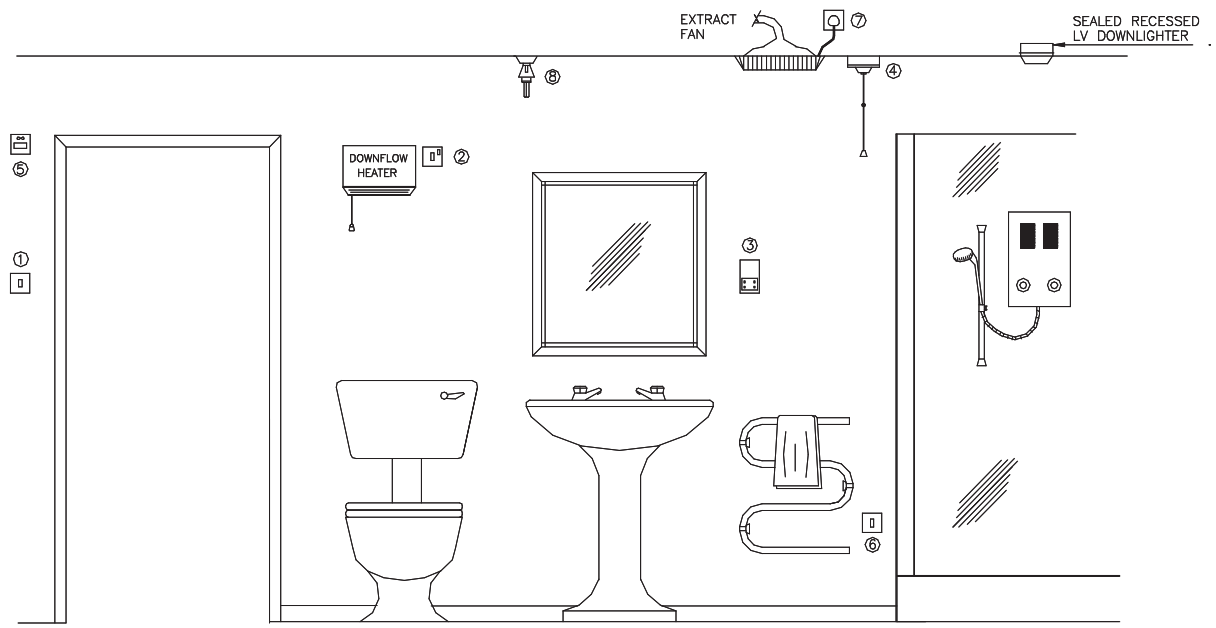
Eaton's MEM® series – Wall and ceiling accessories selection guide (bedroom)

Description	PREMERA white moulded (Eaton list no.)	COPA White c/w cover plate (Eaton list no.)	COPA Interior (Eaton list no.)	Stainless Steel Plate only (Eaton list no.)	Satin Bronze Plate only (Eaton list no.)	Highly Polished Plate only (Eaton list no.)	Polished Brass Plate only (Eaton list no.)
❶ 10 amp single pole plate switch (1 way)	**P011**	**C011WH**	**C011WH**	**CM011SS**	**CM011SB**	**CM011HP**	**CM011PB**
❷ Twin 13 amp switched socket outlet	**P622**	**C622WH**	**C622WH**	**CM622SS**	**CM622SB**	**CM622HP**	**CM622PB**
❸ 20 amp DP switch with flex outlet	**P401**	**C401WH**	**C401WH**	**CM401SS**	**CM401SB**	**CM401HP**	**CM401PB**
❹ TV co-axial socket	**P351**	**C351WH**	**C351WH**	**CM351SS**	**CM351SB**	**CM351HP**	**CM351PB**
❺ Single telephone line jack	**P360**	**C360WH**	**C360WH**	**CM360SS**	**CM360SB**	**CM360HP**	**CM360PB**
❻ Pendant set – 6"/9"	**F1250/51**	–	–	–	–	–	–



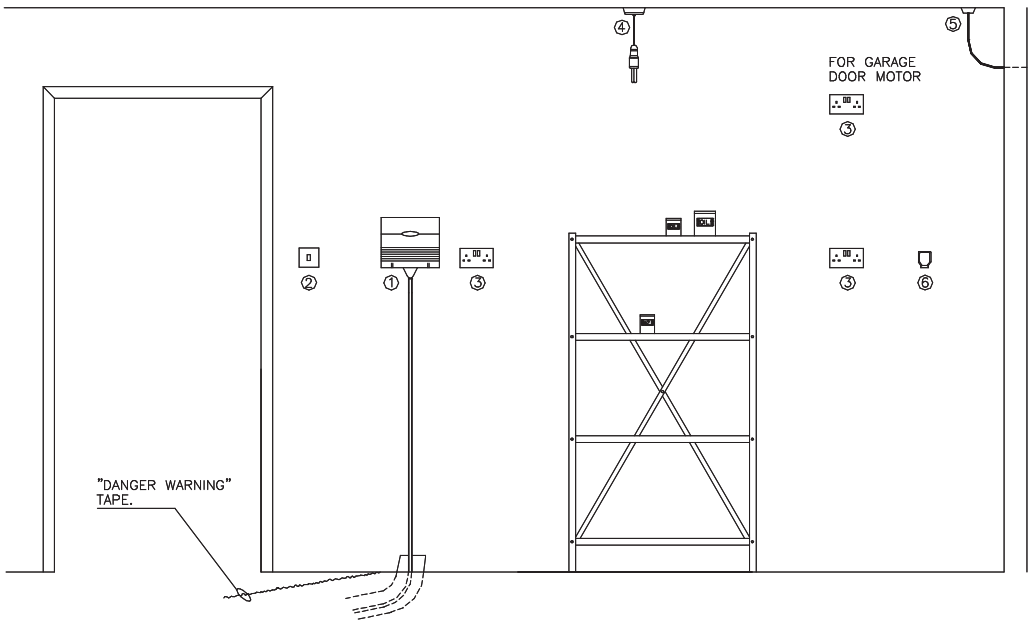
Eaton's MEM® series – Wall and ceiling accessories selection guide (landing)

Description	PREMERA white moulded (Eaton list no.)	COPA White c/w cover plate (Eaton list no.)	COPA Interior (Eaton list no.)	Stainless Steel Plate only (Eaton list no.)	Satin Bronze Plate only (Eaton list no.)	Highly Polished Plate only (Eaton list no.)	Polished Brass Plate only (Eaton list no.)
❶ 10 amp single pole plate switch (2 way)	**P021**	**C021WH**	**C021**	**CM011SS**	**CM011SB**	**CM011HP**	**CM011PB**
❷ Twin 13 amp switched socket outlet	**P622**	**C622WH**	**C622**	**CM622SS**	**CM622SB**	**CM622HP**	**CM622PB**
❸ Pendant set – 6"/9"	**F1250/51**	–	–	–	–	–	–
❹ Mains operated combined smoke detector sounder	–	–	–	–	–	–	–



Eaton's MEM® series – Wall and ceiling accessories selection guide (bathroom)

Description	PREMERA white moulded (Eaton list no.)	COPA White c/w cover plate (Eaton list no.)	COPA Interior (Eaton list no.)	Stainless Steel Plate only (Eaton list no.)	Satin Bronze Plate only (Eaton list no.)	Highly Polished Plate only (Eaton list no.)	Polished Brass Plate only (Eaton list no.)
❶ 10 amp single pole plate switch (1/2 gang)	**P011/22**	**C011/22WH**	**C011/22**	**C011/12SS**	**C011/12SB**	**C011/12HP**	**C011/12PB**
❷ 13 amp switched fused connection unit with flex outlet	**P221**	**C221WH**	**C221**	**CM221SS**	**CM221SB**	**CM221HP**	**CM221PB**
❸ Dual voltage shaver supply unit	**P370**	**C370WH**	**C370**	**CM370SS**	**CM370SB**	**CM370HP**	**CM370PB**
❹ 50 amp DP ceiling switch with neon flag indicator and mounting pattress	**F1340/4570**	–	–	–	–	–	–
❺ Fan isolator with fan symbol	**P048**	**C048WH**	**C048**	**CM048SS**	**CM048SB**	**CM048HP**	**CM048PB**
❻ 13 amp unswitched fused connection unit with flex outlet	**P220**	**C220WH**	**C220**	**CM220SS**	**CM220SB**	**CM220HP**	**CM220PB**
❼ 13 amp unswitched socket outlet	**P111**	**C111WH**	**C111**	–	–	–	–
❽ Battenholder with H/O skirt (lamp activated)	**F1491**	–	–	–	–	–	–



Eaton's MEM® series – Wall and ceiling accessories selection guide (garage)

Description	Eaton list number	Surface Metalclad (Eaton list number)
❶ Moulded consumer unit c/w DP 30 mA trip RCCB incomer	**EAD2/3H63**	**EAS2H63**
❷ 10 amp single pole plate switch	–	**X021MG**
or 16 amp IP66 splashproof switch	**P721**	–
❸ Twin 13 amp switch socket outlet	–	**X622MG**
or twin 13 amp IP66 weatherproof moulded socket outlet	**P762/P622**	–
or 13 amp RCD protected socket outlet 30mA trip	–	**X686MG**
❹ Pendant set – 6"/9"	**F1250/51**	–
❺ Ceiling outlet, LSC independent plug and ceiling cover	**F8501**	–
❻ Single IP66 13 amp socket outlet	**P761/P621**	–

Eaton is dedicated to ensuring that reliable, efficient and safe power is available when it's needed most. With unparalleled knowledge of electrical power management across industries, experts at Eaton deliver customized, integrated solutions to solve our customers' most critical challenges.

Our focus is on delivering the right solution for the application. But, decision makers demand more than just innovative products. They turn to Eaton for an unwavering commitment to personal support that makes customer success a top priority. For more information, visit **www.eaton.uk.com/electrical**.

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