HARLEY HADDOW

Horniman Museum - Security Control Room

Electrical Specification

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P01

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Document Revision Control

Revisions	Date	Reason for Issue	By	Approved

Contents

Ss_25_60_30_40
Individual services penetrations fire-stopping systems

Systems

Ss_25_60_30_40 Individual services penetrations fire-stopping systems

1. Description: Any service passing through a fire compartment
2. System performance: Ss_25_60_30/210 Design of fire stopping system;
   ;
   and Ss_25_60_30/230 Durability.
3. System manufacturer: Submit proposals .
4. Penetration seal: Pr_30_31_76_41 Intumescent foam fillers.
5. Capping sealant
   5.1. Sealant type:
   5.2. Primer:
6. Execution: Ss_25_60_30/610 Fire stopping systems workmanship generally and 30-85-30/612 Installing fire stopping system to individual services penetrations.
7. System completion: Ss_25_60_30/810 Cleaning after installation of fire stopping systems and Ss_25_60_30/820 Inspection of fire stopping systems type A.

System performance

Ss_25_60_30/210 Design of fire stopping system

Shared by: Ss_25_60_30_55 Multiple services penetrations fire-stopping systems

1. Detailed design
   1.1. Requirements: Complete the design of the fire stopping system.
   1.2. Purpose: To match the fire rating of the partition, barrier or wall the service is passing through.
   1.3. Submittals: Detailed design drawings, technical information, calculations and manufacturers' literature.

Ss_25_60_30/230 Durability

Shared by: Ss_25_60_30_55 Multiple services penetrations fire-stopping systems

1. Effective design life: 25 years.

Products

Pr_30_31_76_41 Intumescent foam fillers

1. Description:
2. Manufacturer: Rockwool Ltd.
3. Product reference: Linear and Trapezoidal Firestops.
4. Type: Submit proposals .
5. Profile: Submit proposals .
6. Thickness: Submit proposals .
7. Width: Submit proposals .
8. Execution: Pr_30_31_76/610 Suitability of joints for sealant application and Pr_30_31_76/620 Joint preparation for sealant application.

Execution

30-85-30/612 Installing fire stopping system to individual services penetrations

1. Size of penetration seal: To match wall thickness.

Pr_30_31_76/610 Suitability of joints for sealant application

1. Joint dimensions: Within limits specified for the sealant.
2. Substrate quality: Surfaces regular, undamaged and stable.
3. Joints not fit to receive sealant: Submit proposals for rectification.

Pr_30_31_76/620 Joint preparation for sealant application

1. Surfaces to which sealant must adhere: Remove temporary coatings, tapes, loosely adhering material, dust, oil, grease, surface water and contaminants that may affect bond.
2. Cleaning: Use materials and methods recommended by sealant manufacturer.
3. Vulnerable surfaces adjacent to joints: Mask and Do not stain or smear with primer or sealant.

Ss_25_60_30/610 Fire stopping systems workmanship generally

Shared by: Ss_25_60_30_55 Multiple services penetrations fire-stopping systems

1. Preparation: Remove loose dust and combustible materials.
2. Openings and gaps: Seal between building elements and services, to provide effective resistance to fire and the passage of smoke. Allow for capping sealants where required. Finish flush with surrounds.
3. Adjacent surfaces: Prevent overrun of filler, sealant or mortar on to finished surfaces.

System completion

Ss_25_60_30/810 Cleaning after installation of fire stopping systems

Shared by: Ss_25_60_30_55 Multiple services penetrations fire-stopping systems

1. Masking tapes: Remove.
2. Cleaning: Clean off splashes and droppings. Wipe down finishes.

Ss_25_60_30/820 Inspection of fire stopping systems type A

1. Notice for inspection (minimum): 5 working days.

Ω End of System

Ss_25_60_30_55
Multiple services penetrations fire-stopping systems

Systems

Ss_25_60_30_55 Multiple services penetrations fire-stopping systems

1. Description: Any service passing through a fire compartment
2. System performance: Ss_25_60_30/230 Durability;
   Ss_25_60_30/220 Fire performance;
   and Ss_25_60_30/210 Design of fire stopping system.
3. System manufacturer: Submit proposals .
4. Board barrier: Contractor's design .
5. Framing
   5.1. Material: Contractor's design .
   5.2. Framing: Contractor's design .
   5.3. Fixing: Contractor's design .
6. Sealant
   6.1. Sealant type: Contractor's design .
   6.2. Primer: Required.
7. Samples required: Ss_25_60_30/605 Preliminary installation.
8. Execution: Ss_25_60_30/610 Fire stopping systems workmanship generally;
   Ss_25_60_30/620 Installing fire stopping boarding;
   Ss_25_60_30/640 Applying intumescent foam;
   Ss_25_60_30/650 Applying intumescent mortar;
   Ss_25_60_30/670 Applying intumescent putty;
   Ss_25_60_30/685 Installing mineral wool flexible stopping;
   Ss_25_60_30/690 Fixing fire stopping pipe collars;
   and Ss_25_60_30/720 Applying fire stopping capping sealant.
9. System completion: Ss_25_60_30/810 Cleaning after installation of fire stopping systems and Ss_25_60_30/820 Inspection of fire stopping systems type B.

System performance

See Ss_25_60_30/210 Design of fire stopping system in Ss_25_60_30_40 Individual services penetrations fire-stopping systems

Ss_25_60_30/220 Fire performance

1. Resistance to fire: To BS 476-20 and BS 476-22, 30 minutes integrity and insulation.
2. Reaction to fire
   2.1. Standard: In accordance with Building Regulations;
   To BS 476-7;
   and To BS EN 13501-1.
   2.2. Class: Class 0;
   Class 1 to BS 476-7.;
   Class A1 to BS EN 13501-1;
   and Class A2 to BS EN 13501-1.

See Ss_25_60_30/230 Durability in Ss_25_60_30_40 Individual services penetrations fire-stopping systems

Execution

Ss_25_60_30/605 Preliminary installation

1. Required samples
   1.1. Types: Submit proposals .
   1.2. Purpose: For use as an installation reference sample.
   1.3. Timing: Construct during preliminary installation. Obtain approval of appearance before proceeding.

See Ss_25_60_30/610 Fire stopping systems workmanship generally in Ss_25_60_30_40 Individual services penetrations fire-stopping systems

Ss_25_60_30/620 Installing fire stopping boarding

1. Framing: Across face of opening.
2. Boarding
3. Fixing
   3.1. Centres: 100 mm.
4. Finishing: Countersink screw heads and Finish joint sealant flush with boards; rub down to receive paint finish.

Ss_25_60_30/640 Applying intumescent foam

1. New joints: Remove builder's debris, mortar droppings, grease, and other contaminants.
2. Old joints: Clean and remove existing sealant from each joint.
3. Priming: Lightly moisten substrate with water.
4. Application: Fill joint to approximately half its depth, and allow foam to expand to face of joint.
5. Trimming: Trim excess foam to give a neat, flush appearance.

Ss_25_60_30/650 Applying intumescent mortar

1. Sequence: Install mortar after services are permanently installed.
2. Shuttering: Install suitable shuttering panels to the faces of the opening.
3. Temperature: Do not apply mortar when it could be damaged by frost.
4. Mortar cure: Do not disturb mortar before final set has taken place.
5. Shuttering removal: After mortar has cured.

Ss_25_60_30/670 Applying intumescent putty

1. Sequence: Install putty after services are permanently installed.
2. Putty cure: Do not disturb putty before final set has taken place.

Ss_25_60_30/685 Installing mineral wool flexible stopping

1. Packing: Compress mineral wool and fit into full depth of opening or gap. Pack until fully filled.

Ss_25_60_30/690 Fixing fire stopping pipe collars

1. Opening: Provide an opening nominally 20–50 mm greater in diameter than the collar.
2. Fixing: Secure collar to surround.

Ss_25_60_30/720 Applying fire stopping capping sealant

1. Width of sealant: Within limits set by sealant manufacturer.

2. Excessive gaps: Submit proposals .
3. Depth of sealant: As required by sealant manufacturer to achieve specified fire resistance.
4. Width to depth ratio: As required by sealant manufacturer to achieve specified fire resistance.
5. Temperature: Do not apply water based sealants when they could be damaged by frost.

System completion

See Ss_25_60_30/810 Cleaning after installation of fire stopping systems in Ss_25_60_30_40 Individual services penetrations fire-stopping systems

Ss_25_60_30/820 Inspection of fire stopping systems type B

1. Notice for inspection (minimum): 5 working days.

Ω End of System

Ss_70_30_25_25
Earthing and bonding systems

Systems

Ss_70_30_25_25 Earthing and bonding systems

1. Description: The contractor shall design, coordinate, procure, install, set to work and commission a complete earthing and bonding system.

   Earth continuity shall be maintained throughout the entire installation in accordance with the requirements of the supply authority, BS 7430, BS 5486/BS EN 60439 and BS 7671 (18th Edition IEE Wiring Regulations).

   All conduits, trays, trunking, etc. shall be continuously earthed by means of a separate insulated protective conductor, while also maintaining continuity of each system. All circuit protective conductors in the building shall be collected together on the existing main copper earth bar(s).

   All earthing conductors shall be PVC/LSF insulated green/yellow copper cables or copper tape. Aluminium cables shall NOT be used.

   The earthing system shall be installed to suit all functional and protective requirements and to ensure the correct operation / disconnection times of protective devices.

   All systems will be installed to effectively protect the safety of human life and property.
2. System performance: Ss_70_30_25/220 Electricity distributor's requirements and Ss_70_30_25/210 Design of earthing and bonding systems.
3. Main protective bonding conductors: Pr_65_70_48_75 Single-core non-sheathed (LHSF) insulated cables.
4. Supplementary bonding conductors: Pr_65_70_48_75 Single-core non-sheathed (LHSF) insulated cables.
5. Circuit protective conductors: Refer to cable schedules. As a minimum use cable armour
6. Electrical identification: Pr_40_10_57_25 Electrical shock treatment signs; Pr_40_10_57_23 Electrical diagrams; and Pr_40_10_57_29 Equipment labels and warning notices.
7. Execution: Ss_70_30_25/630 General installation; Ss_70_30_25/640 Installing earth conductor joints and connections; Ss_70_30_25/660 Installing earthing conductor; Ss_70_30_25/670 Installing main protective bonding conductors; Ss_70_30_25/680 Installing supplementary bonding conductors; Ss_70_30_25/690 Dissimilar metals; Ss_70_30_25/700 Earthing and bonding of street furniture; Ss_70_30_25/720 Notices and labels; and Ss_70_30_25/730 Installing functional earthing conductors.
8. System completion: Ss_70_30_25/810 Inspection and testing and Ss_70_30_25/820 Documentation.

System performance

Ss_70_30_25/210 Design of earthing and bonding systems

1. Standards: In accordance with BS 7671 and BS 7430.
2. Design: Complete the design of the earthing and bonding systems.
3. Earthing conductor: Size in accordance with BS 7671, Regulation 543.1.3.
4. Main protective bonding conductors

4.1. Connect the following to the main earthing terminal: Lightning Protection, Building Structure,
4.2. Size (minimum): In accordance with BS 7671, Regulation 544.1.1.

5. Supplementary bonding conductors
   5.1. Bond the following: In accordance with BS7671.
   5.2. Size (minimum): Minimum of 2.5 mm² if sheathed or where mechanical protection is provided, otherwise 4 mm².
6. Circuit protective conductors: Size in accordance with BS 7671, Regulation 543.1.3.
7. Requirement: Submit proposals including detailed design drawings, technical information, calculations and manufacturers' literature.

Ss_70_30_25/220 Electricity distributor's requirements

1. Evidence of compliance: Submit, in accordance with the requirements of the Electricity Distributor.

Products

Pr_40_10_57_23 Electrical diagrams

Shared by: Ss_70_30_80_35 Hardwired low-voltage small power systems , Ss_70_80_33_35 Hardwired general lighting systems and Ss_70_30_45_45 Low-voltage distribution systems

1. Description:
2. Material: Paper print, encapsulated.
3. Format: Single line engineering drawings to BS EN 61082-1.
4. Information to be included: Supply characteristics.Maximum demand.Cable types and sizes.Switchgear ratings.Protective device types, ratings and function.
   Prospective fault current values at each item of switchgear.
   Earth fault loop impedance values at each item of switchgear.
   Circuits containing equipment vulnerable to testing.
5. Size:

Pr_40_10_57_25 Electrical shock treatment signs

Shared by: Ss_70_30_80_35 Hardwired low-voltage small power systems , Ss_70_80_33_35 Hardwired general lighting systems and Ss_70_30_45_45 Low-voltage distribution systems

1. Description:
2. Manufacturer: Submit proposals .
3. Format: Plastics encapsulated.
4. Content:
5. Size:
6. Geometric shape: Manufacturer's standard .
7. Colours: Full colour.

Pr_40_10_57_29 Equipment labels and warning notices

Shared by: Ss_70_30_80_35 Hardwired low-voltage small power systems , Ss_70_80_33_35 Hardwired general lighting systems and Ss_70_30_45_45 Low-voltage distribution systems

1. Description:
2. Manufacturer: Submit proposals .
3. Material: Face engraved rigid plastic laminate.
4. Label size: Manufacturer's standard .

5. Colour
   5.1. Background: White.
   5.2. Lettering: Black.
6. Typography
   6.1. Font: Helvetica medium.
   6.2. Size: Manufacturer's standard .
7. Notice wording: Submit proposals .

Pr_65_70_48_75 Single-core non-sheathed (LHSF) insulated cables

Shared by: Ss_70_30_80_35 Hardwired low-voltage small power systems and Ss_70_80_33_35 Hardwired general lighting systems

1. Description:
2. Manufacturer: Submit proposals .
3. Standards: To BS EN 50525-1 and BS EN 50525-3-41.
4. Third-party certification: British Approvals Service for Cables (BASEC) certified.
5. Cable type: H07Z-R.
6. Execution: Pr_65_70_48/635 Installing low-voltage cables.

Execution

Pr_65_70_48/635 Installing low-voltage cables

Shared by: Pr_65_70_48_29 Fire-resistant screened (LSHF) cables , Pr_65_70_48_55 Multicore screened thermosetting-insulated (LSHF) sheathed cables , Pr_65_70_48_91 Thermosetting-insulated and thermoplastic-sheathed (LSHF) cables , Pr_65_70_48_55 Multicore screened thermosetting-insulated (LSHF) sheathed cables and Pr_65_70_48_49 Light-duty PVC-insulated and sheathed flexible cables

1. Standard: In accordance with BS 7671.
2. Timing: Do not start internal cabling until building enclosure provides permanently dry conditions.
3. Preparation: Store cables above 5°C for 24 hours before installation.
   Clear cable path of debris.
4. Installation temperature (minimum): 5°C.
5. Cables: Install in one length. Dress cables flat, free from twists, kinks and strain.
6. Cable pulling: Do not overstress. Prevent kinks and twisting of the cable.
7. Cable protection: Cables passing through walls and floors to be sleeved with conduit or pipeduct to a minimum of 300 mm. Bush at both ends. Ensure that appropriate fire stopping materials are used to maintain the original fire integrity of the wall or floor around the penetration.
8. Concealed cable runs to wall accessories: Run vertically from the accessory.
9. Distance from other services running parallel (minimum): 150 mm. Position cables below heating pipes.
10. Jointing and termination
    10.1. Final circuit cables: At electrical accessories only.
    10.2. Core connections: Using compression lugs to equipment without integral clamping terminals.
    10.3. Terminating cables when not using glands: Take sheathing of cables into accessory boxes and equipment and protect against abrasion with grommets.

Ss_70_30_25/630 General installation

1. Standards: In accordance with BS 7430 and BS 7671.

Ss_70_30_25/640 Installing earth conductor joints and connections

1. Number of joints: Minimize.
2. Contact surfaces: Clean. Coat with corrosion inhibitor.
3. Bimetallic joints: Do not cross-contaminate.
4. Protection to joints and connections: Apply heat shrink clear sheathing.
5. Connections to test points: Clamp.
6. Protective cable terminations: Compression lugs with phosphor bronze nuts, bolts and washers.

Ss_70_30_25/660 Installing earthing conductor

1. Conductor location: Install between the main incoming earth and the main earthing terminal in one continuous length.
2. Connection: Make with compression lugs and phosphor bronze nuts and bolts and spring washers.
3. Connection to earth electrodes: Heavy duty copper alloy mechanical clamps.

Ss_70_30_25/670 Installing main protective bonding conductors

1. Separate and continuous connections: Install between each service and the main earth terminal.
2. Bonding connections at main earth terminal: Connect with compression lugs and phosphor bronze nuts and bolts and spring washers.

Ss_70_30_25/680 Installing supplementary bonding conductors

1. Earth connections: Connect with compression lugs.

Ss_70_30_25/690 Dissimilar metals

1. Connecting dissimilar metals: Prevent electrolytic action.

Ss_70_30_25/700 Earthing and bonding of street furniture

1. Standards: In accordance with BS 7671 and the Electricity Distributor’s requirements.
2. Supplies to street furniture: Use cables with separate phase, neutral and protective conductors.

Ss_70_30_25/720 Notices and labels

1. Earth bars: Describe each connection and label with 'SAFETY ELECTRICAL CONNECTION – DO NOT REMOVE'.
2. Earthing and main protective bonding connections: Describe each connection and label with 'SAFETY ELECTRICAL CONNECTION – DO NOT REMOVE'.
3. Supplementary bonding connections: Describe each connection and label with 'SAFETY ELECTRICAL CONNECTION – DO NOT REMOVE'.
4. Telecommunications functional earth connections: Label with 'TELECOMMS EARTH – DO NOT REMOVE'.
5. Earth free locations:

Ss_70_30_25/730 Installing functional earthing conductors

1. Standard: To BS 6701.
2. Standards:

3. Labelling: Identify the purpose of functional earth cables along their length using clip-on cable markers.
4. Spacing (maximum): 3 m.

System completion

Ss_70_30_25/810 Inspection and testing

1. Standards: In accordance with BS 7430 and BS 7671.
2. Notice before commencing tests (minimum): 5 Working Days.
3. Continuity of protective conductors
    3.1. Parallel earth paths: Isolate before testing.
    3.2. Equipment: Continuity tester with short circuit current not less than 200 mA, and a no load d.c. or a.c. voltage between 4 V and 24 V.
4. External earth fault loop impedance (Ze): Direct measurement.
5. Earth fault loop impedance (Zs): Direct measurement.

Ss_70_30_25/820 Documentation

1. Operating and maintenance instructions
    1.1. Scope: Submit for the system giving optimum settings for controls.
    1.2. Product information: Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
    1.3. Format: A4 Paper and Electronic copies.
    1.4. Number of copies: Two.
2. Record drawings
    2.1. Content: Location and arrangement of plant in plant rooms and Location of earth terminals.
    2.2. Format: Electronic drawing.
    2.3. Number of copies: Two.
3. Submittal date: At handover.

Ω End of System

Ss_70_30_45_45
Low-voltage distribution systems

Systems

Ss_70_30_45_45 Low-voltage distribution systems

1. Description: The contractor shall design, procure, install, set to work and commission a complete electrical distribution system fully compliant with BS 7671. The electrical distribution shall be designed with a minimum 25% spare capacity for future expansion.

   A new distribution board will be located within the cupboard as identified on the drawing. The distribution board will be TPN rated at 125A and be supplied from the existing panel board in the corner of the room from a newly installed 100A MCCB and associated submain cabling.

   - Corrosion resistant construction with durable finish.
   - Have IP31 degree of protection.
   - Have hinged lockable doors.
   - Have integral main incoming switch disconnectors, shunt trips or MCCB where specified or deemed necessary to fulfil appropriate regulations.
   - Have cable extension boxes where required
   - MCB's to have 10kA minimum fault withstand rating
   - Be fitted with captive blanking plates on unused ways
   - Be fitted with residual current devices (RCBO's), contactors or other auxiliary devices as described in other parts of this specification.
   - Matching adjacent enclosure (if required) by the same manufacturer
   - Have all terminals and outgoing cables marked indelibly with circuit references and phase, by using proprietary labels or cable ferrules as appropriate
   - Be fitted with engraved 'Traffolyte' labels (mechanically fixed) to the front face
   - Dual earth bars to allow connection of small power outlets with high integrity earthing.

   Protective Devices

   Protective devices will be selected to provide a co-ordinated system which will discriminate, ensuring a short circuit or overload fault condition will be cleared by the protective device immediately upstream of the fault, without causing the unnecessary operation of protective devices further upstream.

   Protective devices should be rated to withstand the anticipated fault current to ensure a fault does not cause detrimental effect to the distribution system. All protective devices will be provided with a means of locking the device in the off position to ensure safe operation of maintenance engineers. Submain distribution will be protected by Moulded Case Circuit Breakers (MCCBs).

   Final circuits shall be protected using miniature circuit breakers (MCB's) for lighting circuits and residual-current circuit breakers (RCBO's) for small power applications.

   RCBO's shall occupy one distribution board way space.

   Sub Main Cabling:

   Internally routed cables within the buildings should consist multicore LS0H/XLPE cables routed within ceiling / service voids as indicated on electrical containment layout and the main electrical distribution schematic.

Primary Containment:

Primary Cable containment shall be installed from the low voltage switch room to all areas within the building as shown on the layout drawings. Primary containment shall consist of the following:

Sub Mains: Cable tray and ladder from main switchboard to distribution boards and equipment.
Final Circuits: Metallic cable trunking along main routes and metal conduit to final outlets. Metal dado trunking along desk walls.
Fire Alarm: Metallic Cable tray from main fire alarm panel,
Telecoms, Security and Controls Cabling: Steel Cable basket and conduit to final outlets. Cable basket to be provided with metallic divider along its entire length to separate Comms and Controls cabling from Security Cabling.

Secondary containment:

All conduit used within the installation shall be rigid galvanised steel surface mounted exposed, routed via wall voids or ceiling voids.

2. System performance: Ss_70_30_45/215 Low-voltage distribution circuit cables generally; Ss_70_30_45/221 Conduit, trunking and ducting generally; Ss_70_30_45/231 Input power supply characteristics; and Ss_70_30_45/211 Design of low-voltage distribution systems.
3. Connection to low-voltage supply: Refer to Electrical schematic drawing and schedules
4. Switchgear: Pr_60_70_22_22 Distribution boards
5. Distribution circuit cabling: Pr_65_70_48_90 Thermosetting-insulated and thermoplastic-sheathed (LSHF) armoured cables; Pr_65_70_48_29 Fire-resistant screened (LSHF) cables; Pr_65_70_48_55 Multicore screened thermosetting-insulated (LSHF) sheathed cables; and Pr_65_70_48_91 Thermosetting-insulated and thermoplastic-sheathed (LSHF) cables.
6. Cable accessories: 90-55-10/320 Cable bands; and Pr_65_70_11_13 Cable cleats.
7. Containment: Pr_65_70_11_71 Rigid conduit; Pr_65_70_11_12 Cable baskets; Pr_65_70_11/410 Cable trunking and cable ducting for wall and ceiling mounting; and Pr_65_70_11_17 Cable trays.
8. Rewireable installation: Required.
9. Concealed installation: Required.
10. Monitoring and metering: Pr_80_51_51_23 Digital multifunction metering equipment.
11. Power conditioning equipment: Pr_65_72_27_50 Mains power supply transient overvoltage suppression devices
12. Accessories: Pr_60_70_36_75 High-voltage safety matting.
13. Electrical identification: Pr_40_10_57_25 Electrical shock treatment signs; Pr_40_10_57_29 Equipment labels and warning notices; and Pr_40_10_57_23 Electrical diagrams.
14. Execution: Ss_70_30_45/625 Installing low-voltage distribution systems; and Ss_70_30_45/650 Connection to the incoming supply.
15. System completion: Ss_70_30_45/811 Inspecting, testing and commissioning of switchgear generally; Ss_70_30_45/821 Documentation;

System performance

Ss_70_30_45/211 Design of low-voltage distribution systems

1. System designer: Member of the Institution of Engineering and Technology (IET) and Member of the Chartered Institution of Building Services Engineers (CIBSE).
2. Design: Complete the design of the low voltage distribution system.
3. Standard: In accordance with BS 7671.
4. Provision of low-voltage distribution: Provide electrical supplies to equipment requiring power.
5. Spare capacity throughout the low-voltage distribution system: 20% of current carrying capacity.
6. Requirement: Submit proposals including detailed design drawings, technical information, calculations and manufacturers' literature.

Ss_70_30_45/215 Low-voltage distribution circuit cables generally

1. Proposed selection of low-voltage distribution cables: Submit drawings, technical information, calculations and manufacturers' literature.

Ss_70_30_45/221 Conduit, trunking and ducting generally

1. Standard: In accordance with BS 7671.
2. Requirement: Submit proposals including detailed design drawings, technical information, calculations and manufacturers' literature.
3. Conduit, trunking and ducting sizes not stated: Submit.

Ss_70_30_45/231 Input power supply characteristics

1. Earthing type: TN-C-S.
2. Nominal voltage: Three phase 400 V a.c. +10%, -6%.
3. Nominal frequency: 50 Hz.
4. Type of protective device in the input supply circuit: Refer to DNO documentations.

Products

90-55-10/320 Cable bands

Shared by: Ss_70_30_80_35 Hardwired low-voltage small power systems and Pr_65_70_48_55 Multicore screened thermosetting-insulated (LSHF) sheathed cables

1. Manufacturer: Contractor's choice .
2. Format: Perforated metal bands.
    2.1. Material: Steel.
    2.2. Protective covering: LSHF.

See Pr_40_10_57_23 Electrical diagrams in Ss_70_30_25_25 Earthing and bonding systems

See Pr_40_10_57_25 Electrical shock treatment signs in Ss_70_30_25_25 Earthing and bonding systems

See Pr_40_10_57_29 Equipment labels and warning notices in Ss_70_30_25_25 Earthing and bonding systems

Pr_60_70_22_22 Distribution boards

1. Description:
2. Manufacturer: Schneider and ABB.

3. Standards: To BS EN 61439-1 and BS EN 61439-3.
4. Third-party certification: ASTA Type test certification.
5. Rated operational voltage (Ue): 415 V and 600 V.
6. Incoming device: Pr_60_70_48_47 Low-voltage switch-disconnectors.
7. Outgoing devices
    7.1. Type: Pr_65_72_27_52 Miniature circuit breakers, Arc Fault Detection Devices and Pr_65_72_27_73 Residual current circuit breakers with integral overcurrent protection.
    7.2. Quantity: Full Compliment.
8. Busbars and connections
    8.1. Type: Fully shrouded.
    8.2. Rated operational current (Ie): Manufacturer's standard .
    8.3. Rated short-time withstand current (Icw) for 1 s: 25 kA.
9. Neutral and earth bars: Individual terminal for each outgoing circuit. Two separate earth bars.
10. Neutral terminations: Match current carrying capacity of phase conductor.
11. Spare ways: 25%.
12. Enclosure
    12.1. Ingress protection (minimum): Manufacturer's standard .
    12.2. Material: Steel.
    12.3. Finish: Polyester powder coated.
    12.4. Colour: Manufacturer's standard .
    12.5. Locking mechanism: Cylinder locks with a standard key type.
13. Accessories: Manufacturer's standard .
14. Execution: Installing distribution boards.

Pr_60_70_36_75 High-voltage safety matting

1. Description:
2. Standard: To BS EN 61111.
3. Class: 0.
4. Width (minimum): 900mm
5. Length (minimum): Full Length of Switchboard and Control Panels.
6. Execution: Pr_60_70_36/611 Installing electrical insulating matting.

Pr_60_70_48_47 Low-voltage switch-disconnectors

1. Description:
2. Standards: To BS EN 60947-1 and BS EN 60947-3.
3. Third-party certification: ASTA Type test certification.
4. Rated operational voltage (Ue):
5. Rated operational current (In):
6. Rated operational frequency:
7. Switch arrangement:
8. Rated short-time withstand current (Icw) for 1 s:
9. Utilization category:
10. Terminals:
11. Mechanical interlocking:
12. Enclosure

12.1. Ingress protection (minimum):
12.2. Impact protection (minimum):
12.3. Material:
12.4. Finish:
12.5. Colour:
12.6. Gland plates:
13. Execution:

Pr_65_70_11/410 Cable trunking and cable ducting for wall and ceiling mounting

Shared by: Ss_70_30_80_35 Hardwired low-voltage small power systems and Ss_70_80_33_35 Hardwired general lighting systems

1. Standards: To BS EN 50085-1 and BS EN 50085-2-1.
2. Installation position: Refer to drawings
3. Resistance to compression: Manufacturer's standard .
4. Resistance to impact: Manufacturer's standard .
5. Electrical properties: With electrical continuity characteristics and Ensure copper connector bands installed between joints.
6. Protection by enclosure
   6.1. Protection against ingress of solid objects (minimum): To BS EN 60529, IP4X.
   6.2. Protection against ingress of water (minimum): To BS EN 60529, IPX1.
   6.3. Protection against access to hazardous parts (minimum): To BS EN 60529, IPXXD.
7. Access method: With tools.
8. Screening: Not required.
9. Sizes: Refer to Drawings for Sizes.
10. Compartments: Refer to drawings for numbers of compartments
11. Accessories and fittings
    11.1. Generally: Factory made by the cable trunking or ducting manufacturer and of the same material type and finish as the cable trunking or ducting.
12. Execution: Pr_65_70_11/765 Conduit, trunking and ducting zones and Reference to missing clause Installing trunking generally.

Pr_65_70_11_12 Cable baskets

Shared by: Ss_75_10_21_21 Data distribution systems and Ss_75_40_02_11 Card access control systems

1. Description:
2. Standard: To BS EN 61537.
3. Material: 5 mm steel wire.
4. Coating material: Hot dip galvanized.
5. Sizes
   5.1. Width: Refer to Design drawings.
   5.2. Side height: 105 mm.
6. Features
   6.1. Segregation: Refer to drawings
   6.2. Protective cover: Not required.

7. Execution: Pr_65_70_11/630 Installing cable basket.

Pr_65_70_11_13 Cable cleats

Shared by: Pr_65_70_48_55 Multicore screened thermosetting-insulated (LSHF) sheathed cables

1. Description:
2. Manufacturer: Contractor's choice .
3. Standard: To BS EN 61914.
4. Format: Contractor's choice .
5. Material: None ferrous metallic.
6. Resistance to impact: Medium.
7. Environmental influences
    7.1. Non-metallic and composite components: Resistant to ultraviolet light.
    7.2. Metallic and composite components: High resistance to corrosion.

Pr_65_70_11_15 Cable ties

Shared by: Ss_70_30_80_35 Hardwired low-voltage small power systems and Pr_65_70_48_55 Multicore screened thermosetting-insulated (LSHF) sheathed cables

1. Description:
2. Standard: To BS EN 62275.
3. Format: Wrap around self-locking releasable.
4. Material: Metal.
5. Contribution to fire : Non-flame propagating.
6. Environmental influences
    6.1. Non-metallic and composite components: Resistant to ultraviolet light.
    6.2. Metallic and composite components: Resistant to corrosion.

Pr_65_70_11_17 Cable trays

Shared by: Ss_70_30_80_35 Hardwired low-voltage small power systems , Ss_75_50_28_29 Fire detection and alarm systems , Pr_65_70_15_06 Balanced twisted-pair cables type B , Pr_65_70_15_06 Balanced twisted-pair cables type A and Pr_65_70_48_55 Multicore screened thermosetting-insulated (LSHF) sheathed cables

1. Description:
2. Manufacturer: Submit proposals .
3. Standard: To BS EN 61537.
4. Material: Metal.
5. Resistance against flame propagation: Non flame propagating.
6. Electrical properties
    6.1. Continuity characteristics: With electrical continuity.
    6.2. Conductivity characteristics: With electrical conductive system component.
7. Coating material: Hot dip galvanized.
8. Execution: Reference to missing clause Installing cable tray and cable ladder;
   Pr_65_70_11/650 Multiple cable runs;
   and Pr_65_70_11/661 Cable support zones.

Pr_65_70_11_71 Rigid conduit

Shared by: Ss_70_30_80_35 Hardwired low-voltage small power systems , Ss_70_80_33_35 Hardwired general lighting systems , Ss_75_40_02_11 Card access control systems , Ss_75_50_28_29 Fire detection and alarm systems and Pr_65_70_48_55 Multicore screened thermosetting-insulated (LSHF) sheathed cables

1. Description:
2. Manufacturer: Contractor's choice .
3. Standards: To BS EN 61386-21.
4. Material: Metallic.
5. Mechanical properties
   5.1. Resistance to compression: Medium.
   5.2. Resistance to impact: Medium.
6. Resistance to bending: Rigid.
7. Ingress protection (minimum): To BS EN 60529, IP x4.
8. Resistance to corrosion: Medium/ high composite protection - Class 2 inside; class 4 outside.
9. Tensile strength: Medium.
10. Suspended load capacity: Medium.
11. Sizes (OD): Contractor's choice .
12. Execution: Reference to missing clause Installing rigid metallic conduit; Reference to missing clause Installing conduit connections to equipment; and Pr_65_70_11/765 Conduit, trunking and ducting zones.

Pr_65_70_48_29 Fire-resistant screened (LSHF) cables

Shared by: Ss_70_30_80_35 Hardwired low-voltage small power systems and Ss_75_50_28_29 Fire detection and alarm systems

1. Description:
2. Standard: To BS 7629-1.
3. Third-party certification: British Approvals Service for Cables (BASEC) certified and Loss Prevention Certification Board (LPCB) certified.
4. Fire resistance category: ENHANCED 120.
5. Screen: Aluminium tape.
6. Execution: Pr_65_70_48/635 Installing low-voltage cables and Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket.

Pr_65_70_48_55 Multicore screened thermosetting-insulated (LSHF) sheathed cables

1. Description:
2. Standard: To BS 8436.
3. Third-party certification: British Approvals Service for Cables (BASEC) certified.
4. Size: To be designed by detail designer
5. Sheath colour: Black.
6. Execution: Pr_65_70_48/635 Installing low-voltage cables and Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket.

Pr_65_70_48_90 Thermosetting-insulated and thermoplastic-sheathed (LSHF) armoured cables

1. Description:
2. Standard: To BS 6724.
3. Third-party certification: British Approvals Service for Cables (BASEC) certified.
4. Size: To be designed by detail designer
5. Insulation: Manufacturer's standard .
6. Sheath colour: Black.
7. Execution: Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket.

Pr_65_70_48_91 Thermosetting-insulated and thermoplastic-sheathed (LSHF) cables

1. Description:
2. Standard: To BS 7211.
3. Third-party certification: British Approvals Service for Cables (BASEC) certified.
4. Cable type: Manufacturer's standard .
5. Size: To be designed by detail designer
6. Execution: Pr_65_70_48/635 Installing low-voltage cables and Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket.

Pr_65_72_27_50 Mains power supply transient overvoltage suppression devices

1. Description:
2. Manufacturer: Schneider Electric
3. Product reference: Acti 9 iPRF1, PRD1 - 16332
4. Standard: To BS EN 61643-11, type 1 and To BS EN 61643-11, type 2.
5. Number of poles: TP&N
6. Remote monitoring: Required.
7. Execution: Pr_65_72_27/610 Installing surge protective devices for low voltage power supplies.

Pr_65_72_27_52 Miniature circuit breakers

1. Description:
2. Manufacturer: As distribution board.
3. Standards: To BS EN 60898-1 and BS EN 60898-2.
4. Third party certification: ASTA Type test certification.
5. Rated operational current (In): To be designed by detail designer
6. Rated operational voltage (Ue): 440 V a.c.
7. Rated frequency: 50 Hz.
8. Rated short-circuit capacity (Icn): 10 kA.
9. Tripping characteristic: Type B;
   Type C;
   and Type D.
10. Pollution degree category: Manufacturer's standard .
11. Mounting method: DIN rail.

12. Accessories: Arc fault detection device to BS EN 62606;
    Locking kit;
    Phase barriers;
    and Terminal covers.

Pr_65_72_27_73 Residual current circuit breakers with integral overcurrent protection

1. Description:
2. Manufacturer: As of distribution boards.
3. Standards: To BS EN 61009-1 and To BS EN 61009-1 and BS EN 62423.
4. Operating characteristic: A.
5. Tripping characteristic: Type B;
   Type C;
   and Type D.
6. Rated operational voltage (Ue): 400 V a.c.
7. Rated frequency: 50 Hz.
8. Rated short-circuit capacity (Icn): 10 kA.
9. Rated residual operating current: 30 mA.
10. Mounting method: DIN rail.
11. Accessories: Arc fault detection device to BS EN 62606;
    Locking kit;
    Phase barriers;
    and Terminal covers.

Pr_80_51_51_23 Digital multifunction metering equipment

1. Description:
2. Manufacturer: Schneider PM5000 series with MID 2014/32/EU certification
3. Display type: Liquid crystal display (LCD).
4. Metering functions: Active energy (kWh);
   Active power (kW);
   Apparent power (kVA);
   Frequency (Hz);
   Maximum active power demand (kW);
   Phase currents (A);
   Power factor;
   and Voltage between phases (V).
5. Mounting: Recessed into switchgear in located identified on the schematic.
6. Execution: Pr_80_51_51/620 Installing electrical monitoring and metering equipment.

Execution

Pr_60_70_36/611 Installing electrical insulating matting

1. Front access equipment: Install electrical insulating matting in front of the equipment.
2. Rear access equipment: Install electrical insulating matting in front of and behind the equipment.
3. Installation: Fix securely to the floor.
4. Position: Infront of all Panel boards, Distribution boards and UPS.

Pr_65_70_11/630 Installing cable basket

1. Standards: In accordance with BS 7671 and IET Guidance Note 1.

2. Joints: Cut adjacent cross basket wires. Make smooth any burrs or edges.
3. Accessories: Form on site and connect with basket manufacturer's coupling components.
4. Fire barriers: Provide where required to maintain fire performance of fabric.
5. Support
    5.1. Fixing arrangement: Independently fix and support from building structure using threaded rod fixed to channel cable support with shake proof washers and hex nuts.
    5.2. Clearance from building fabric (minimum): 20 mm.
6. Components: Avoid contact between dissimilar metals.
7. Routing of cable basket: Submit drawings showing the proposed routes.

Pr_65_70_11/650 Multiple cable runs

1. Requirement: Use cable trunking when three or more conduits are run in parallel.

Pr_65_70_11/661 Cable support zones

1. Ceiling voids: Provide clear distance of 150 mm (minimum) between underside of any cable supports and brackets and the topside of ceiling.
    1.1. Clear distance between underside of cable supports and brackets and topside of ceiling (minimum): 150 mm.

Pr_65_70_11/765 Conduit, trunking and ducting zones

Shared by: Pr_65_70_11_30 Flexible conduit

1. General requirements: Reference to missing clause Installing conduit, trunking and ducting .
2. Ceiling voids:
    2.1. Clear distance between underside of conduit, trunking and ducting and topside of ceiling (minimum): 150 mm.

See Pr_65_70_48/635 Installing low-voltage cables in Ss_70_30_25_25 Earthing and bonding systems

Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket

Shared by: Pr_65_70_48_55 Multicore screened thermosetting-insulated (LSHF) sheathed cables

1. Cabling: Install when cable supports are complete.
2. Position: Place single and multi-core cables side by side.
3. Fastening
    3.1. Fastenings generally: Secure cables, do not indent sheaths. Position to enable any submain cable to be individually removed. Cleat all cables on riser sections.
    3.2. Submain cables <95 mm²: 90-55-10/320 Cable bands. Cleat for riser sections
        3.2.1. Spacing (maximum): 600 mm.
    3.3. Submain cables >95 mm²: Pr_65_70_11_13 Cable cleats.
        3.3.1. Spacing (maximum): 600 mm.
    3.4. Final circuit cabling: Pr_65_70_11_15 Cable ties.
        3.4.1. Spacing (maximum): 600 mm.
    3.5. Extra-low-voltage, communications and fibre-optic cabling: Pr_65_70_11_15 Cable ties.
        3.5.1. Spacing (maximum): 600 mm.

Pr_65_72_27/610 Installing surge protective devices for low voltage power supplies

1. Standards: In accordance with BS 7671 and DD CLC/TS 61643-12.
2. Point of installation: On a.c. side of photovoltaic system inverter.
3. Mounting arrangement: Separate enclosure.
4. Connection arrangement: In series with the main circuit current carrying path.
5. Interconnecting cable
    5.1. Cable type: Device manufacturer's standard.
    5.2. Cable size: Device manufacturer's standard.
    5.3. Cable length (maximum): 500 mm.
    5.4. Cable installation: Tightly bind connecting leads together.

Pr_80_51_51/620 Installing electrical monitoring and metering equipment

1. Standard: In accordance with BS 7671.
2. Digital metering equipment: Connect to building management system.

Ss_70_30_45/625 Installing low-voltage distribution systems

1. Standard: In accordance with BS 7671.
2. Layout: Position cabling and equipment to provide safe and easy access for operation and maintenance.

Ss_70_30_45/650 Connection to the incoming supply

1. Customer's installation: Liaise with DNO and Clients energy provider for meter installation.

System completion

Ss_70_30_45/811 Inspecting, testing and commissioning of switchgear generally

1. Standard: In accordance with BS 7671.
2. Notice before testing and commissioning: 7 days.
3. Switches and circuit breakers: Clean to remove all visible traces of dust.
4. Protective devices settings: Configure to match the grading study.
5. Switchboard monitoring: Continuous for 30 minutes following first energizing.
6. Additional inspecting and testing: Check levelling and alignment of assembly.
   Check operation of instruments and metering devices.
   Check and adjust tightness of busbar connections and supports.
   Check tightness of bolted connections.
   Check busbar joints with duct or resistance measurements.
   Check earth connections at compartments, switches and earth electrodes.
   Check clearance of live parts from direct contact.
   Check polarity and phase sequence of protective devices.
   Check operation of protective devices using secondary and primary current injection.
   Manually operate protective devices.
   Carry out earth fault protection simulation tests.
   Check functional operation of circuit breakers.
   Check operation of switch tripping devices.
7. Testing and commissioning results: Submit two copies.
8. Certificates of calibration for meters and instruments: Submit.

Ss_70_30_45/821 Documentation

1. Operating and maintenance instructions
    1.1. Scope: Submit for the system giving optimum settings for controls.
    1.2. Product information: Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
    1.3. Format: Paper and Electronic.
    1.4. Number of copies: Two.
2. Record drawings
    2.1. Content: For all low voltage distribution circuits: the cable origin, circuit designation, route, loading, conductor material and c.s.a., insulation type and colour, number of cores per cable, number of cables in trunking and conduit;
    Location, route and depth of underground cables;
    Location of LV switchgear including distribution boards;
    Routes of trunking, conduit, cable tray and cable ladders;
    and Schematic drawings showing all low voltage distribution circuits: the cable origin, circuit designation, cable type, size, number of cores, size and type of overcurrent protective device.
    2.2. Drawing format: Electronic drawing.
    2.3. Number of copies: Two.
3. Submittal date: At handover.

Ω End of System

Ss_70_30_80_35
Hardwired low-voltage small power systems

Systems

Ss_70_30_80_35 Hardwired low-voltage small power systems

1. Description: The contractor shall design, procure, install, set to work and commission a complete small power installation to all areas of the building in line with the provision outlined on the layouts.

   The contractor is responsible for developing the design to pick up all power outlets require to serve all mechanical, electrical, security etc equipment necessary to satisfy all section of the Mechanical, Electrical and Architectural Specification.

   Generally small power outlet shall be located as per the architects setting out drawings and in accordance with Part M of the building regulations.

   The installation will be flush, with containment concealed within voids or recessed into the fabric of the building. Only within plant areas will the installation be surface mounted.

   Wiring shall be undertaken utilising LS0H single core cables contained within metal trunking or conduit, with suitably rated MCB's or combined RCBO's located within the distribution boards.

   Fixed equipment shall generally be served by dedicated fused connection units (FCU) or local isolating switches. FCU's shall be arranged for flex outlet or direct rear entry connection to suit the required equipment.

   All socket outlets shall be protected by a residual current device (RCD) in addition to the MCB. Typically, this shall be achieved by the use of a combined RCBO located with the distribution board.
2. System performance: Ss_70_30_80/215 Low voltage small power cables generally;
   Ss_70_30_80/220 Selection of conduit, trunking and ducting generally;
   Ss_70_30_80/230 Multi-gang power outlets;
   and Ss_70_30_80/210 Design of low voltage small power systems.
3. Final circuit cabling: Pr_65_70_48_29 Fire-resistant screened (LSHF) cables;
   Pr_65_70_48_75 Single-core non-sheathed (LHSF) insulated cables;
   LSZH / LSF Single Core Cables;
   Thermosetting Insulated and LSZH Cables (XLPE/LSZH Twin & Earth);
   and Pr_65_70_48_55 Multicore screened thermosetting-insulated (LSHF) sheathed cables.
4. Cable accessories: Pr_65_70_11_15 Cable ties and 90-55-10/320 Cable bands.
5. Containment: Pr_65_70_11_17 Cable trays;
   Pr_65_70_11_30 Flexible conduit;
   Pr_65_70_11_71 Rigid conduit;
   and Pr_65_70_11/410 Cable trunking and cable ducting for wall and ceiling mounting.
6. Rewireable installation: Required.
7. Concealed installation: Required.
8. Final connections: Thermosetting insulated and thermoplastic sheathed (LSHF) cables.
9. Electrical accessories and outlets: Pr_65_72_97_83 Surface and concealed wiring enclosures;
   Pr_65_72_97_31 Fused connection units;
   Pr_65_72_97_12 Cable outlet plates;
   Pr_65_72_97_84 Standard socket outlets;
   Pr_65_72_97_41 Industrial socket outlets;
   Pr_65_72_97_30 Fan isolators;
   and Pr_65_72_97_21 Cooker connection units.

10. Electrical identification: Pr_40_10_57_25 Electrical shock treatment signs; Pr_40_10_57_29 Equipment labels and warning notices; and Pr_40_10_57_23 Electrical diagrams.
11. Execution: Ss_70_30_80/620 Small power installation and Ss_70_30_80/630 Installing cabling to socket outlets.
12. System completion: Ss_70_30_80/820 Documentation.

System performance

Ss_70_30_80/210 Design of low voltage small power systems

1. Provision of small power: For fixed and portable equipment requiring power.
2. Design: Complete for the low voltage small power systems.
3. Standards: In accordance with BS 7671.
4. Diversity: In accordance with IETGuidance Note 1.
5. Spare capacity throughout the small power system: 25%.
6. Requirement: Submit proposals including detailed design drawings, technical information, calculations and manufacturers' literature.

Ss_70_30_80/215 Low voltage small power cables generally

1. Standard: In accordance with BS 7671.
2. Proposed selection of low voltage cables: Submit drawings, technical information, calculations and manufacturers' literature.
3. Format: Amtech.

Ss_70_30_80/220 Selection of conduit, trunking and ducting generally

1. Standard: In accordance with BS 7671.
2. Requirement: Submit proposals including detailed design drawings, technical information, calculations and manufacturers' literature.
3. Conduit, trunking and ducting sizes not stated: Submit.

Ss_70_30_80/230 Multi-gang power outlets

1. Quantity: Refer to drawings.

Products

See 90-55-10/320 Cable bands in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_40_10_57_23 Electrical diagrams in Ss_70_30_25_25 Earthing and bonding systems

See Pr_40_10_57_25 Electrical shock treatment signs in Ss_70_30_25_25 Earthing and bonding systems

See Pr_40_10_57_29 Equipment labels and warning notices in Ss_70_30_25_25 Earthing and bonding systems

See Pr_65_70_11/410 Cable trunking and cable ducting for wall and ceiling mounting in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_11_13 Cable cleats in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_11_15 Cable ties in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_11_17 Cable trays in Ss_70_30_45_45 Low-voltage distribution systems

Pr_65_70_11_30 Flexible conduit

1. Description:
2. Standards: To BS EN 61386-23.
3. Material: Metallic.
4. Mechanical properties
   4.1. Resistance to compression: Medium.
   4.2. Resistance to impact: Medium.
5. Resistance to bending: Flexible.
6. Ingress protection (minimum): To BS EN 60529, IP x4.
7. Resistance to external influences
   7.1. Protection against ingress of solid objects (minimum):
   7.2. Protection against ingress of water (minimum):
8. Resistance to corrosion: Medium/ high composite protection – Class 2 inside; class 4 outside.
9. Tensile strength: Medium.
10. Suspended load capacity: Medium.
11. Sizes (OD): Contractor's choice .
12. Execution: ;
    Pr_65_70_11/765 Conduit, trunking and ducting zones;
    and Pr_65_70_11/715 Installing pliable and flexible conduit.

See Pr_65_70_11_71 Rigid conduit in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_48_29 Fire-resistant screened (LSHF) cables in Ss_70_30_45_45 Low-voltage distribution systems

Pr_65_70_48_55 Multicore screened thermosetting-insulated (LSHF) sheathed cables

1. Description:
2. Manufacturer: Submit proposals .
3. Standard: To BS 8436.
4. Third-party certification: Not required.
5. Size: Manufacturer's standard .
6. Sheath colour:
7. Reaction to fire class
   7.1. Fire behaviour:
   7.2. Additional classification for smoke production:
   7.3. Additional classification for flaming droplets and/ or particles:
   7.4. Additional classification for acidity:
8. Execution: Pr_65_70_48/635 Installing low-voltage cables;
   90-55-15/640 Extra low and low voltage cable routes;
   90-55-15/645 Low voltage cables concealed in walls and partitions;
   90-55-15/650 Extra low and low voltage cables in accessible roof spaces;
   90-55-15/655 Extra low and low voltage surface mounted cables;
   Pr_65_70_48/660 Installing low-voltage cables in conduit and trunking;
   and Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket.

See Pr_65_70_48_75 Single-core non-sheathed (LHSF) insulated cables in Ss_70_30_25_25 Earthing and bonding systems

Pr_65_72_97_12 Cable outlet plates

1. Description:
2. Manufacturer: MK Electric
3. Standard: To BS 5733.
4. Current rating: 20 A.
5. Mounting: Flush.
6. Flex outlet: Submit proposals .
7. Cable termination: Screwed.
8. Plate
9. Execution: Pr_65_72_97/610 Installing electrical accessories.

Pr_65_72_97_21 Cooker connection units

1. Description:
2. Manufacturer: MK Electric
3. Standard: To BS 5733.
4. Individual terminal block capacity (minimum): 10 mm² stranded cable.
5. Mounting: Flush.
6. Cable termination: Screwed.
7. Plate
   7.1. Material: To match socket outlets
   7.2. Finish: To match socket outlets
8. Insert colour: To match socket outlets
9. Execution: Pr_65_72_97/610 Installing electrical accessories.

Pr_65_72_97_30 Fan isolators

1. Description:
2. Manufacturer: MK Electric
3. Standards: To BS EN 60669-1 and BS EN 60669-2-4.
4. Current rating: Refer to drawings and schedules
5. Poles: Triple pole.
6. Mounting: Surface.
7. Ingress protection (minimum): Submit proposals .
8. Cable termination: Screwed.
9. Plate
   9.1. Material: Plastics.
   9.2. Finish: Manufacturer's standard .
10. Insert colour: Manufacturer's standard .
11. Execution: Pr_65_72_97/610 Installing electrical accessories.

Pr_65_72_97_31 Fused connection units

1. Description:
2. Manufacturer: MK Electric
3. Standard: To BS 1363-4.
4. Control

4.1. Type: Double pole, switched and Unswitched. Refer to drawings for types and locations
4.2. Indicator lamp: LED power 'On'.
5. Mounting: Flush.
6. Flex outlet: Base entry.
7. Cable termination: Screwed.
8. Fuse carrier access: Screw.
9. Plate
9.1. Material: To match socket outlets
9.2. Finish: To match socket outlets
10. Insert colour: To match socket outlets
11. Execution: Pr_65_72_97/610 Installing electrical accessories.

Pr_65_72_97_41 Industrial socket outlets

1. Description:
2. Manufacturer: MK Electric
3. Standards: To BS EN 60309-1 and BS EN 60309-2.
4. Material: Polycarbonate.
5. Impact protection (minimum): IK10.
6. Ingress protection (minimum): To BS EN 60529, IP 67.
7. Controls: Integral switch with interlock.
8. Mounting: Surface angle mount.
9. Voltage rating: 200–250 V and 380–480 V.
10. Current rating: 16 A;
32 A;
and 63 A.
11. Frequency rating: 50–60 Hz.
12. Pin configuration: 3 pole;
2 pole and earth;
3 pole and earth;
and 3 pole, neutral and earth.
13. Cable termination: Screwed.
14. Execution: Pr_65_72_97/610 Installing electrical accessories.

Pr_65_72_97_83 Surface and concealed wiring enclosures

1. Description:
2. Manufacturer: MK Electric
3. Standards
3.1. Concealed enclosures: To BS 4662.
3.2. Surface enclosures: To BS 5733.
4. Enclosure
4.1. Material: Moulded plastics and Pressed steel.
4.2. Finish: Submit proposals .
5. Enclosure depth (minimum): 40mm
6. Execution: Pr_65_72_97/610 Installing electrical accessories.

Pr_65_72_97_84 Standard socket outlets

1. Description:
2. Manufacturer: MK Electric
3. Standard: To BS 1363-2.
4. Arrangement: Refer to drawing.
5. Control
   5.1. Type: Double pole, switched.
   5.2. Switch position: Inboard.
   5.3. Indicator lamp: Not required.
   5.4. Interlock: Three-pin equal pressure.
6. Mounting: Flush and Refer to drawings.
7. Features: Dual earth terminals.
8. Cable termination: Screwed.
9. Plate
   9.1. Material: Submit for approval by Client and Architect prior to procurement
   9.2. Finish: Submit for approval by Client and Architect prior to procurement
10. Execution: Pr_65_72_97/610 Installing electrical accessories.

Execution

90-55-15/640 Extra low and low voltage cable routes

Shared by: Pr_65_70_15_06 Balanced twisted-pair cables type B and Pr_65_70_15_06 Balanced twisted-pair cables type A

1. Cables generally:
   1.1. Concealed cable runs to wall accessories: Run vertically from the accessory.
   1.2. Exposed cable runs: Submit proposals .
2. Distance from other services running parallel (minimum): 150 mm. Position cables below heating pipes.

90-55-15/645 Low voltage cables concealed in walls and partitions

1. Position: In a zone within 150 mm of wall perimeter (except at the floor); and run vertically or horizontally from these zones, or from floor level, to switches, accessories, etc.
2. Protection: Pr_65_70_11_71 Rigid conduit.

90-55-15/650 Extra low and low voltage cables in accessible roof spaces

Shared by: Pr_65_70_15_06 Balanced twisted-pair cables type B and Pr_65_70_15_06 Balanced twisted-pair cables type A

1. Cables running across ceiling joists: Pr_65_70_11_17 Cable trays.

90-55-15/655 Extra low and low voltage surface mounted cables

Shared by: Pr_65_70_15_06 Balanced twisted-pair cables type B and Pr_65_70_15_06 Balanced twisted-pair cables type A

1. Fastening: Direct to surface.
2. Orientation: Dress cables flat, free from twists, kinks and strain.

3. Terminating cables when not using glands: Take sheathing of cables into accessory boxes and equipment and protect against abrasion with grommets.

See Pr_65_70_11/650 Multiple cable runs in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_11/661 Cable support zones in Ss_70_30_45_45 Low-voltage distribution systems

Pr_65_70_11/715 Installing pliable and flexible conduit

1. General requirements: Reference to missing clause Installing conduit generally and Reference to missing clause Installing conduit, trunking and ducting.
2. Joints: Push fit.
3. Connections to trunking: Female adaptors and externally screwed brass bushes.
4. Connections to equipment: Flange mount.

See Pr_65_70_11/765 Conduit, trunking and ducting zones in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_48/635 Installing low-voltage cables in Ss_70_30_25_25 Earthing and bonding systems

Pr_65_70_48/660 Installing low-voltage cables in conduit and trunking

Shared by: Pr_65_70_15_06 Balanced twisted-pair cables type B and Pr_65_70_15_06 Balanced twisted-pair cables type A

1. Cable installation: Orderly and capable of being withdrawn.
2. Single core wiring: Arrange using the loop-in method.
3. Cables within trunking: Tie at 2 m intervals for cables of the same circuit reference. Label ties with circuit reference number at 10 m intervals.
4. Cables in vertical conduit: Provide cable clamps in accessible conduit boxes at 5 m intervals.
5. Extra-low-voltage cables: Install within a separate partition from low voltage cables where installed in multi compartment trunking.

See Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket in Ss_70_30_45_45 Low-voltage distribution systems

Pr_65_72_97/610 Installing electrical accessories

Shared by: 90-60-25/325 Light switches , Pr_70_75_04_52 Modular jacks and Pr_70_75_04_06 Balanced twisted pair cable outlet plates

1. Standard: In accordance with BS 7671.
2. Accessory faceplates: Free from any traces of plaster, grout, paint or similar.
3. Positioning: Coordinate with other wall or ceiling mounted equipment.
4. Alignment: Align adjacent accessories on the same vertical or horizontal axis.
5. Fixing: Fix securely, plumb and level to vertical and horizontal axes.
6. Separation distance between adjacent accessories (minimum): 30 mm and Refer to Architects Setting Out Drawings.

Ss_70_30_80/620 Small power installation

1. Standard: In accordance with BS 7671.

Ss_70_30_80/630 Installing cabling to socket outlets

1. General: Refer to drawings and Distribution Board schedules.

System completion

Ss_70_30_80/820 Documentation

1. Operating and maintenance instructions
   1.1. Scope: Submit for the system giving optimum settings for controls.
   1.2. Product information: Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
   1.3. Format: Paper copy and Electronic copy.
   1.4. Number of copies: Two.
2. Record drawings
   2.1. Content: For all low voltage final circuits, the cable origin, circuit designation, route, loading, conductor material and c.s.a, insulation type and colour, number of cores per cable, number of cables in trunking and conduit;
   Whether cables are run on surface, concealed in walls, floors, above suspended ceilings or within roof spaces;
   Location, route and depth of underground cables;
   Location of LV switchgear including distribution boards;
   Routes of trunking, conduit, cable tray and cable ladders;
   and Location of all electrical outlets, including isolators, starters, control equipment and electrical accessories Schematic drawings showing all low voltage final circuits, the cable origin, circuit designation, cable type, size, number of cores, size and type of overcurrent protective device..
   2.2. Format: Electronic drawing.
   2.3. Number of copies: Two.
3. Submittal date: At handover.

Ω End of System

Ss_70_80_33_35
Hardwired general lighting systems

Systems

Ss_70_80_33_35 Hardwired general lighting systems

1. Description: The contractor shall design, procure, install, set to work and commission a complete decorative and functional lighting and emergency lighting installation.

   The lighting installation shall be a mix of luminaires as identified on the drawings and in the schedule.

   Lighting Control Strategy

   - All areas: Manual switching

   Emergency Lighting Power Arrangement

   In case of power failure, the emergency lighting system will provide a minimum level of illumination as per BS 5266

   Emergency lighting system shall enable the safe evacuation of the building.

   The installation ensures emergency lighting highlights emergency equipment, signage and changes of direction or floor levels.

   In the event of supply failure, power will be delivered to the emergency lighting system through integral 3-hour emergency power packs.

   Illuminate exit signs shall be provided at final exits to the building and intermediate changes of direction within the building on escape routes, in accordance with the architects escape routes.

2. System performance: Ss_70_80_33/220 Escape route lighting;
   Ss_70_80_33/240 Lighting performance;
   Ss_70_80_33/270 Lighting cables generally;
   Ss_70_80_33/280 Conduit, trunking and ducting generally; Ss_70_80_33/215 Design of emergency lighting systems; Ss_70_80_33/210 Design of general lighting systems
3. Final circuit cabling: Pr_65_70_48_75 Single-core non-sheathed (LHSF) insulated cables;
   Thermosetting Insulated and LSZH sheathed cable (XLPE/LSZH Twin & Earth);
   and Multicore Protected Screened Fixed Wiring Cable to BS 8436.
4. Containment: Pr_65_70_11_71 Rigid conduit and Pr_65_70_11/410 Cable trunking and cable ducting for wall and ceiling mounting.
5. Rewireable installation: Required.
6. Concealed installation: Required.
7. Luminaire types: Refer to Luminaire Schedule and Refer to Drawings.
8. Lamp types: Pr_70_70_46_78 Self-ballasted LED lamps.
9. Connections to luminaires: Pr_65_70_48_49 Light-duty PVC-insulated and sheathed flexible cables.
10. Lighting controls: 90-60-25/325 Light switches;
11. Electrical identification: Pr_40_10_57_25 Electrical shock treatment signs;
    Pr_40_10_57_29 Equipment labels and warning notices;
    and Pr_40_10_57_23 Electrical diagrams.

12. Execution: Ss_70_80_33/630 Installing general lighting systems;
    Ss_70_80_33/640 Installing emergency lighting systems
    Ss_70_80_33/710 Installing safety signs;
    and Ss_70_80_33/720 Labelling of lighting controls.
13. System completion: Ss_70_80_33/810 Testing and commissioning of general lighting systems;
    Ss_70_80_33/812 Testing and commissioning emergency lighting systems;
    Ss_70_80_33/815 Photometric survey of general lighting systems;
    Ss_70_80_33/817 Photometric survey of emergency lighting systems;
    Ss_70_80_33/820 Documentation relating to general lighting;
    and Ss_70_80_33/822 Documentation relating to emergency lighting.

System performance

Ss_70_80_33/210 Design of general lighting systems

1. Design: Complete the design of the general lighting systems.
2. Standard: To BS EN 12464-1. In accordance with SLL Code for lighting.
3. Design calculations: Utilise software such as DiaLux
4. Submit the following information: Schedule of design and calculated maintained average illuminance values. Computer generated point calculations with contribution from inter-reflected light showing isolux contour plots for working plane and room surfaces.

Ss_70_80_33/215 Design of emergency lighting systems

1. Design: Complete the design of the emergency lighting and signage systems.
2. Standards: To BS EN 1838, BS EN 50172 and in accordance with BS 5266-1.
3. Submit the following information: Lamp and luminaire technical information. Luminaire photometric data, including lamp light output data at beginning and end of battery discharge. Schedule of design and calculated maintained average illuminance values.
4. Emergency lighting classification
    4.1. Type: X.
    4.2. Duration of emergency mode: 180 minutes.

Ss_70_80_33/220 Escape route lighting

1. Position: To be confirmed as part of contractors design
2. Minimum horizontal illuminance at floor level on centre line of escape route: 1 lx.

Ss_70_80_33/240 Lighting performance

1. Task area: Desktop.
2. Maintained average illuminance level (lx): 300
3. Uniformity (minimum): 0.7.
4. Colour rendering index (Ra): 80–89.
5. Colour temperature (K): 4000.
6. Means of control: Local.

Ss_70_80_33/270 Lighting cables generally

1. Standard: In accordance with BS 7671.
2. Requirement: In accordance with the specification, drawings and schedules
3. Conductor sizes (minimum)
    3.1. Lighting circuits: 1.5 mm².
    3.2. Final connection: As phase conductor.

4. Cable sizes not stated: Request from Harley Haddow Engineer.

Ss_70_80_33/280 Conduit, trunking and ducting generally

1. Standard: In accordance with BS 7671.
2. Requirement: Submit proposals , including detailed design drawings, technical information, calculations and manufacturers' literature.
3. Conduit, trunking and ducting sizes not stated: Submit.

Products

90-60-25/325 Light switches

1. Manufacturer: MK Electric
2. Standard: To BS EN 60669-1.
3. Current rating: 10 A.
4. Actuating method: Rocker
5. Poles: Single pole.
6. Arrangement: Submit proposals
7. Mounting: Flush and Grid where applicable.
8. Cable termination: Screwed.
9. Plate:
    9.1. Material: Plastic
    9.2. Finish: White
10. Execution: Pr_65_72_97/610 Installing electrical accessories; and Pr_65_72_97/640 Installing light switches.

See Pr_40_10_57_23 Electrical diagrams in Ss_70_30_25_25 Earthing and bonding systems

See Pr_40_10_57_25 Electrical shock treatment signs in Ss_70_30_25_25 Earthing and bonding systems

See Pr_40_10_57_29 Equipment labels and warning notices in Ss_70_30_25_25 Earthing and bonding systems

See Pr_65_70_11/410 Cable trunking and cable ducting for wall and ceiling mounting in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_11_71 Rigid conduit in Ss_70_30_45_45 Low-voltage distribution systems

Pr_65_70_48_49 Light-duty PVC-insulated and sheathed flexible cables

1. Description:
2. Manufacturer: Submit proposals .
3. Standards: To BS EN 50525-1 and BS EN 50525-2-11.
4. Third-party certification: British Approvals Service for Cables (BASEC) certified.
5. Cable type: H03VV-F. Where on view, cable specification to be submitted for review by the Architect and Engineer.
6. Size: Manufacturer's standard .
7. Sheath colour: White where concealed out of view. Where exposed to view, sheath will be clear with conductor material being tinned copper cable. Specification of finish to be approved by the architect prior to procurement.
8. Execution: Pr_65_70_48/665 Installing flexible cables.

See Pr_65_70_48_75 Single-core non-sheathed (LHSF) insulated cables in Ss_70_30_25_25 Earthing and bonding systems

Pr_70_70_46_78 Self-ballasted LED lamps

1. Description:
2. Manufacturer: Refer to luminaire schedule.
3. Standards: To BS EN 62560 and BS EN 62612.
4. Third-party certification: BSI Kitemark approved.
5. Wattage: Refer to luminaire schedule
6. Colour temperature: Refer to luminaire schedule
7. Colour rendering index (Ra): 80–89.
8. Rated life (minimum): Manufacturer's standard .
9. Initial lumens (minimum): Manufacturer's standard .
10. Dimmable: Yes. DALI compatable driver.

Execution

See Pr_65_70_11/765 Conduit, trunking and ducting zones in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_48/635 Installing low-voltage cables in Ss_70_30_25_25 Earthing and bonding systems

Pr_65_70_48/665 Installing flexible cables

1. General requirements: Pr_65_70_48/635 Installing low-voltage cables .
2. Cables: Grip securely at connections. Where cord grips do not form an integral part of the accessory or equipment, provide separate proprietary cord grips.

See Pr_65_72_97/610 Installing electrical accessories in Ss_70_30_80_35 Hardwired low-voltage small power systems

Pr_65_72_97/640 Installing light switches

1. Multigang switches: Connect so that there is a logical relationship with luminaire positions.
2. Unused switch spaces: Fit with blanks.
3. Segregation: Internally segregate each phase with phase barriers. Include warning plates.

Ss_70_80_33/630 Installing general lighting systems

1. Standard: In accordance with BS 7671 and CIBSECommissioning Code L.
2. Commissioning method statement: Submit prior to commissioning.
3. Luminaire layout: Refer to Drawings.
4. Fixing master/ lighting distribution boxes: Direct to underside of floor slab.
5. Connection of luminaire supporting couplers
    5.1. General luminaires: White plug with white cover.
    5.2. Flex length (maximum): 2 m.
6. Switches and controls
    6.1. Location: Refer to drawings.

Ss_70_80_33/640 Installing emergency lighting systems

1. Standards: In accordance with BS 5266-1 and BS 7671.

2. Connection of luminaire supporting couplers
   2.1. Emergency luminaires: Red plug with red cover.
   2.2. Flex length (maximum): 2 m.
3. Permanent electrical supplies to self-contained emergency luminaires: Refer to drawings and Distribution Board Schedules

Ss_70_80_33/710 Installing safety signs

1. Standard: Escape route signs in accordance with BS 5499-4, other safety signs in accordance with BS 5499-10.
2. Position: Refer to the drawings.
3. Fixing: To building fabric so that the removal of the sign requires a special tool.
4. Orientation: Plumb and level.

Ss_70_80_33/720 Labelling of lighting controls

1. Equipment and sensor identification labels: Provide.
2. Lighting controls: Label each component describing its purpose.
3. Output circuits: Label each cable at point of connection to lighting distribution boxes, master distribution boxes and lighting control modules.

System completion

Ss_70_80_33/810 Testing and commissioning of general lighting systems

1. Standards: In accordance with CIBSECommissioning Code L.
2. Test results: Submit two copies of system commissioning completion certificate.
3. Certificates of calibration for meters and instruments: Submit.

Ss_70_80_33/812 Testing and commissioning emergency lighting systems

1. Commissioning: In accordance with BS 5266-1, Annex H.
2. Results: Submit two copies of emergency lighting completion certificates, in accordance with BS 5266-1, Annex H, Figures H.1, H.2, H.3, and H.4.
3. Certificates of calibration for meters and instruments: Submit.

Ss_70_80_33/815 Photometric survey of general lighting systems

1. Standard: In accordance with SLLCode for lighting.
2. Position: Submit proposals .
3. Test conditions: Full blackout.
   Allow lamps and luminaire output to stabilize prior to beginning measurement.
4. Average illuminance measurement method: Full grid.
5. Results
   5.1. Submit for the following: Maintained average illuminance.
   Diversity.
   Uniformity.
   5.2. Format: Electronic.
   5.3. Number of copies: Two.
6. Survey photographs: Submit for each location.

Ss_70_80_33/817 Photometric survey of emergency lighting systems

1. Standard: In accordance with BS 5266-1, Annex D.

2. Position: Submit proposals .
3. Test conditions: Full blackout.
   Minimize extraneous light.
4. Results
   4.1. Format: Electronic.
   4.2. Number of copies: Two.

Ss_70_80_33/820 Documentation relating to general lighting

1. Operating and maintenance instructions
   1.1. Scope: Submit for the system giving optimum settings for controls.
   1.2. Product information: Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
   1.3. Format: A4 Paper and electronic copies.
   1.4. Number of copies: Two.
2. Record drawings
   2.1. Content: General arrangement drawings showing the location of luminaires, lighting circuit distribution boxes, master and slave distribution boxes, switch modules, manual and automatic switches and controls including timeswitches, passive infrared detectors, and daylight sensors and Schematic diagram showing all final circuit cabling, the cable origin, device addresses for automated controls, route from controls to luminaires, and the location of all joints and tees. Include conductor material and c.s.a., insulation type and colour, number of cores per cable, number of cables in ducts, on tray or ladder.
   2.2. Format: Electronic drawing.
   2.3. Number of copies: Two.
3. Submittal date: At handover

Ss_70_80_33/822 Documentation relating to emergency lighting

1. Operating and maintenance instructions
   1.1. Scope: Submit for the system giving optimum settings for controls.
   1.2. Product information: Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
   1.3. Format: A4 Paper and electronic copies.
   1.4. Number of copies: Two.
2. Record drawings
   2.1. Content: General arrangement drawings showing the location of emergency luminaires, lighting circuit distribution boxes, master and slave distribution boxes, switch modules, manual and automatic emergency lighting test panels and Schematic diagram showing all final circuit cabling, the cable origin, device addresses for automated controls, route from controls to luminaires, and the location of all joints and tees. Include conductor material and c.s.a., insulation type and colour, number of cores per cable, number of cables in ducts, on tray or ladder.
   2.2. Format: Electronic drawing.
   2.3. Number of copies: Two.
3. Submittal date: At handover.
4. Certification for re-engineered luminaires: Submit completed ICEL 1004 model test record certificate.

5. Logbook: Submit, including the following information: Date of commissioning of the system, including any certificate relating to alterations;
   Date of each periodic inspection and test;
   Date and brief details of each service, inspection or test carried out;
   Dates and brief details of any defects and of remedial action taken;
   Date and brief details of any alteration to the emergency lighting installation;
   If any automatic testing device is employed, a description of the main characteristic and the mode of operation;
   Details of replacement components
   of luminaires such as lamp type, battery and fuses.

Ω End of System

Ss_75_10_21_21
Data distribution systems

Systems

Ss_75_10_21_21 Data distribution systems

1. Description: The contractor shall design, procure, install, set to work and commission a complete integrated structured cabling system to the security room.

   The contractor shall:

   - Provide fibre optic cabling and electrical containment from the server room to the CCTV rack
   - Provide Cat6a cabling and outlets to the positions identified on the drawings as a minimum
   - Develop the design and ensure all additional data outlet points required for any of the system specified to work correctly.

   Installation of Category 6A Data outlets within all areas as indicated using Category 6A Cca S1b, d2 a2 4-pair U/FTP cable. A minimum of 40mm deep back boxes shall be utilised.

   At each location identified on the drawings and subsequently required to allow the functionality of other systems, the data cable shall be terminated with a Category 6A Screened RJ45 connector.

   At the equipment cabinet location each cable shall be terminated on to Keystone Category 6A Modular RJ45 patch panels. Each cable and outlet shall be labelled at both ends.

   The structured cabling installation shall be designed, installed tested and commissioned to meet the following standards:
   " CENELEC
   " BS EN 50173
   " BS EN 50174
   " BS EN 6701:A1
   " EIA/TIA T568B

   Backbone Optical Fibre Infrastructure

   The contractor shall provide a backbone fibre optic infrastructure from the server to the security rack to support error free signal transmission and fully operational Internet connectivity. The performance of the installed fibre optic cable plant shall support bandwidth-intensive applications including 1Gbit/s through 10Gbit/s and beyond as defined in IEEE 802.3z, 802.3ae, 802.3aq and 802.3ak Standards.

   Designated media shall consist of multi core OM3 Multimode cabling compliant with ISO 11801 standards. The flammability performance must meet EuroClass Cca-S1a,a1,d0 as a minimum.

   The exact specification of the fibre cabling required is to be confirmed with Thomas Dakin (tdakin@horniman.ac.uk) at the Horniman Museum prior to procurement.

   Horizontal Cabling

   Acceptable construction of cable is as follows:
   " The cable must be four-pair Category 6A with a low-flammability sheath (complying to current BS6701 A1:2017 Cca-sab d2 a2 Classification as a minimum)

" The cable must be of U/FTP Screened Twisted Pair
" The cables must be metre marked.
" The cable must be Ice Blue in colour.
" The Cable shall not exceed 6.7mm outside diameter.
" The flammability performance must meet EuroClass Cca-s1b d2 a2 as a minimum.
" Must have current independent third-party approval status at channel link level to a minimum of ISO/IEC 11801

Horizontal Cabling Connecting Hardware

All Structured Cabling System Manufacturer patch panels shall comply with;
" 19" rack mounting, in exact multiples of 1U (44 mm) in height
" Racks to be a minimum of 8U (7U switches + 1U fibre panel)
" Cable termination must be via Keystone Toolless Insulation Displacement Connectors (IDC)
" Front connectors to be Screened RJ45 style IEC 60603-7-5
" Tool-less Termination or punch down
" Electrical performance to be Category 6A
" Port ID labelling system
" 25 Year Product Warranty
" Black finish
" Must have current independent third-party approval status at Component Level to a minimum of ISO/IEC 11801

2. System performance: Ss_75_10_21/240 Telecommunications outlets;
   Ss_75_10_21/260 Connections with other systems;
   and Ss_75_10_21/210 Design of data distribution systems.
3. Applications: 10GBase-T (ISO/IEC/IEEE 8802-3 an 10 gigabit ethernet);
   PoE (ISO/IEC/IEEE 8802-3 atPower over Ethernet);
   Building IT and Comms Field equipment to central rack location;
   and PC Workstations, Wifi and CCTV outlets.
4. Cabling hierarchy
   4.1. Campus distributors (CD): Pr_80_77_28_21 Data equipment cabinets;
   and Pr_70_75_04_52 Modular jacks.
   4.2. Building distributors (BD): Pr_70_75_04_52 Modular jacks;
   Pr_80_77_28_21 Data equipment cabinets
   and Pr_80_77_28_06 Balanced twisted pair cabling patch panels.
   4.3. Building backbone cabling: Pr_65_70_15_58 Optical fibre cables.
   4.4. Subsidiary distributors: Pr_70_75_04_52 Modular jacks;
   Pr_80_77_28_21 Data equipment cabinets;
   Pr_80_77_28_06 Balanced twisted pair cabling patch panels;
   and Pr_80_77_28_27 Fibre-optic patch panels.
   4.5. Horizontal cabling: Pr_65_70_15_06 Balanced twisted-pair cables type A.
   4.6. Telecommunications outlets (TO): Pr_70_75_04_06 Balanced twisted pair cable outlet plates and Twin RJ45 plate per position shown.
5. Containment: Pr_65_70_11_12 Cable baskets and uPVC Trunking.
6. Rewireable installation: Required.
7. Concealed installation: Required.
8. System accessories: Pr_40_10_57_88 Telecommunications equipment and outlets labels;
   Pr_70_75_88_21 Data and telecom transient overvoltage surge suppression devices;
   and As Small Power Accessories.
9. Execution: Ss_75_10_21/615 System installer;
   Ss_75_10_21/625 Installing information technology cabling;
   Ss_75_10_21/645 Installing connecting hardware;
   Ss_75_10_21/650 Installing cabinets;

Ss_75_10_21/660 Connection to the public telephone network;
and Ss_75_10_21/670 Labelling.

10. System completion: Ss_75_10_21/810 Testing and inspection of data distribution systems and Ss_75_10_21/820 Documentation for data distribution systems.

System performance

Ss_75_10_21/210 Design of data distribution systems

1. Design: Complete the design of the data distribution system.
2. Standards: To BS EN 50173-1;
   To BS EN 50173-2;
   To BS EN 50174-1;
   and In accordance with BS 8492.
3. Cabling topology
   3.1. Building backbone cabling: Star.
   3.2. Horizontal cabling: Star.
4. Requirement: Submit proposals including detailed design drawings indicating cabinet general arrangement, cabling topology schematics, distribution point layouts, equipment room layout, interconnection diagrams and work area layout drawings. Include technical information, calculations and manufacturers' literature.

Ss_75_10_21/240 Telecommunications outlets

1. Requirements: Refer to design drawing

Ss_75_10_21/260 Connections with other systems

1. Requirements: Refer to Design drawings and Schematics.

Products

Pr_40_10_57_88 Telecommunications equipment and outlets labels

1. Description:
2. Material: Face engraved rigid plastic laminate.
3. Label size: Manufacturer's standard .
4. Colour
   4.1. Background: White.
   4.2. Lettering: Black.
5. Typography
   5.1. Font: Manufacturer's standard .
   5.2. Size: Submit proposals .
6. Content: Label each outlet with complete circuit reference and Label patch panels with complete circuit reference.

See Pr_65_70_11_12 Cable baskets in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_11_17 Cable trays in Ss_70_30_45_45 Low-voltage distribution systems

Pr_65_70_15_06 Balanced twisted-pair cables type A

1. Description:
2. Standard: To BS EN 50288-2-1;
   To BS EN 50288-3-1;

To BS EN 50288-4-1;
To BS EN 50288-5-1;
and To BS EN 50288-6-1.

3. Third-party certification:
4. Category: Catagory 6A
5. Screening: Required.
6. Cable type:
7. Conductors: Solid.
8. Execution: 90-55-15/640 Extra low and low voltage cable routes;
   90-55-15/650 Extra low and low voltage cables in accessible roof spaces;
   90-55-15/655 Extra low and low voltage surface mounted cables;
   and Pr_65_70_48/660 Installing low-voltage cables in conduit and trunking.

Pr_65_70_15_58 Optical fibre cables

1. Description:
2. Manufacturer: Submit proposals .
3. Standard
   3.1. Singlemode: To BS EN IEC 60793-2-50.
4. Third-party certification: British Approvals Service for Cables (BASEC) certified.
5. Physical characteristics: Singlemode.
6. Category: OS2.
7. Optical fibre strands: 48.
8. Sheath
   8.1. Material: LSHF.
   8.2. Colour: Orange.
9. Environment: Indoors.

Pr_70_75_04_06 Balanced twisted pair cable outlet plates

1. Description:
2. Manufacturer: To match general faceplates. Modular outlet to match cable.
3. Standard: To BS EN 50173-1.
4. Category: $6_{A.}$.
5. Screening: Match cabling.
6. Outlet arrangement: 90°.
7. Outlet ports: Double RJ45.
8. Spring loaded shutter: Required.
9. Circuit designation label with transparent cover: Required.
10. Cable termination: Insulation displacement connection (IDC).
11. Plate
    11.1. Material: To Match power outlets.
    11.2. Finish: To Match Power Outlets.
12. Execution: Pr_65_72_97/610 Installing electrical accessories.

Pr_70_75_04_52 Modular jacks

1. Description:
2. Manufacturer: Submit proposals .

3. Standard: To BS EN 50173-1.
4. Category: 6_A.
5. Screening: Match cabling.
6. Outlet arrangement: 90°.
7. Outlet ports: Double RJ45.
8. Spring loaded shutter: Required.
9. Circuit designation label with transparent cover: Required.
10. Cable termination: Insulation displacement connection (IDC).
11. Insert colour: Match plate finish.
12. Execution: Pr_65_72_97/610 Installing electrical accessories.

Pr_70_75_88_21 Data and telecom transient overvoltage surge suppression devices

1. Description:
2. Manufacturer: Schneider Electric
3. Product reference: Acti 9 iPRC A9L16337 for incoming telecoms lines

   Acti 9 iPRD - A9L08200 for SP&N Distribution Boards feeding data racks and equipment

   Acti 9 iPRD - A9L20300 for TP&N Distribution Boards feeding data racks and equipment
4. Execution:

Pr_80_77_28_06 Balanced twisted pair cabling patch panels

1. Description:
2. Manufacturer: Submit proposals .
3. Standard: To BS EN 50173-1.
4. Arrangement: 19 inch with pre-drilled rear gland holes with integral cable clamps and sliding tray.
5. Adaptor plates: Six.
6. Height: 4 U.
7. Ports with RJ-45 outlets: 48.
8. Category: 6_A.
9. Cable connections
   9.1. Front: RJ-45.
   9.2. Rear: Insulation displacement connection (IDC).
10. Outlet labelling
    10.1. Front: Engraved port number with circuit description and transparent cover.
    10.2. Rear: Engraved port number.

Pr_80_77_28_21 Data equipment cabinets

1. Description:
2. Manufacturer: Submit proposals .
3. Format: To accept 19 inch racking with front and rear adjustable rails.
4. Enclosure
   4.1. Mounting: Refer to drawings and schematic
   4.2. Size
      4.2.1. Width: Refer to drawings and schematic.

4.2.2. Depth: Refer to drawings and schematic.
4.2.3. Height: Refer to drawings and schematic
4.3. Material: Submit proposals .
4.4. Finish: Black powder coating.
4.5. Front door: Ventilated with lock.
4.6. Rear door: Ventilated with lock.
4.7. Side panels: Removable.
4.8. Handles: Recessed side mounted.
4.9. Base: Locking castor wheels.
5. Cabinet locks: Common key.
6. Ventilation: Integral roof fan.
7. Socket outlets
7.1. Type: To BS 1363-2.
7.2. Arrangement: Two vertical power module with eight outlets mounted at rear and master power switch at front.
8. Lighting: Not required.
9. Space for active equipment: 8 U.
10. Cable entry with grommets: Top.
11. Horizontal cable supports: 2 U for each 48 port patch panel with 1 U spare.
12. Vertical cable supports: Left and right hand sides at 8 U spacing.
13. Spare U sections: Provide individual blanking plates.
14. Accessories: 3 U drawer;
Keyboard and mouse sliding shelf;
and Vented equipment shelf.

Pr_80_77_28_27 Fibre-optic patch panels

1. Description:
2. Manufacturer: Submit proposals .
3. Standard: To BS EN 50173-1.
4. Arrangement: 19 inch with pre-drilled rear gland holes with integral cable clamps and sliding tray.
5. Adaptor plates: Six.
6. Splice tray: Four.
7. Height: 4 U.
8. Ports: 48.
9. Connector type: Manufacturer's standard .
10. Labelling:

Execution

See 90-55-15/640 Extra low and low voltage cable routes in Ss_70_30_80_35 Hardwired low-voltage small power systems

See 90-55-15/650 Extra low and low voltage cables in accessible roof spaces in Ss_70_30_80_35 Hardwired low-voltage small power systems

See 90-55-15/655 Extra low and low voltage surface mounted cables in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_65_70_11/630 Installing cable basket in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_11/650 Multiple cable runs in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_11/661 Cable support zones in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_48/660 Installing low-voltage cables in conduit and trunking in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_65_72_97/610 Installing electrical accessories in Ss_70_30_80_35 Hardwired low-voltage small power systems

Ss_75_10_21/615 System installer

1. Registration: Corporate member of the Telecommunications Industry Association (TIA) and Registered installer of the Fibreoptic Industry Association (FIA).
2. Evidence of registration: Submit.

Ss_75_10_21/625 Installing information technology cabling

1. Standards
   1.1. Generally: To BS 6701, BS EN 50174-1 and in accordance with BS 7671.
   1.2. Indoor installations: To BS EN 50174-2.
   1.3. Outdoor installations: To BS EN 50174-3.
2. Timing: Do not start internal cabling until building enclosure provides permanently dry conditions.
3. Cables: Install in one uninterrupted run.
4. Arrangement: Position vertically and horizontally in line with equipment served, and parallel with building lines.
5. Orientation: Dress cables flat, free from twists, kinks and strain. Optical fibre cables to be run parallel to, or on top of, copper cables.
6. Cable pulling: Do not overstress.
7. Cable binders
   7.1. Type: Velcro Bands.
   7.2. Spacing (minimum): Where used to tie multiple cables together, irregularly space with maximum distance on horizontal cabling runs of 1000 mm and on vertical runs of 300 mm. All cable binders to be loosely fitted.
8. Jointing: At equipment and terminal fittings only.
9. External cabling: Terminate within 2 m of entrance to building.
10. Cables routes generally
    10.1. Concealed cable runs to wall accessories: Run vertically from the accessory.
    10.2. Exposed cable runs: Submit proposals .
11. Cable segregation
    11.1. Cables from other systems: Segregate from other cabling and cross at right angles. Where installed in trunking, locate in a dedicated telecommunications compartment.
    11.2. Distance from other cables: In accordance with BS EN 50174-2, section 6.2.
    11.3. Distance from steam and low temperature hot water systems running parallel: 500 mm minimum.
12. Terminations: Support cable within 150 mm of termination.
13. Balanced twisted-pair cabling
    13.1. Maximum untwist at terminations: 12 mm.

Ss_75_10_21/645 Installing connecting hardware

1. Connecting hardware: Consistent throughout system.

Ss_75_10_21/650 Installing cabinets

1. Cable termination sequence: Left to right and bottom to top.
2. Clear access (minimum)
   2.1. Cabinet front: 1.2 m.
   2.2. Cabinet rear: 4RU rack server
   2.3. Cabinet sides: 4RU rack server
3. Fixing: Level and secure to floor or wall. Group wall-mounted cabinets into logical arrangements.
4. Cable route: Do not exceed 24 cables in any loom. Maximum distance between cable supports: 300 mm.
5. Patch panels: Install any fibre optic patch panels at top of cabinet with copper patch panels below.
6. Interconnecting cabinets: Connect without side panels with manufacturer's baying kit.
7. Cabinet identification
   7.1. Type: Face engraved rigid plastic laminate.
   7.2. Colour
      7.2.1. Background: White.
      7.2.2. Lettering: Black.
   7.3. Typography
      7.3.1. Font: Helvetica medium.
      7.3.2. Size: Submit proposals .

Ss_75_10_21/660 Connection to the public telephone network

1. Public telephone network: Connect to the main telecommunication cabinet.
2. Cable type: BT specification CW1308. Copper connections for lifts and Redcare. Incoming private ethernet connection to be provided by a fibre cable
3. Number of pairs (minimum): 20 pair for Copper. Fibre to be confirmed by client prior to procurement from Openreach

Ss_75_10_21/670 Labelling

1. Standards: To BS EN 50174-1, BS EN 50174-2 and BS EN 50174-3.
2. Equipment: Label with unique identifier on face engraved rigid plastic laminate.
3. Cable schedules
   3.1. Location: At each cabinet.
   3.2. Contents: Incoming cable designation, purpose and origin and Outgoing cable designation, purpose and destination.
4. Patch panels: Machine printed label with patch panel identifier.
5. Outlet ports: Machine printed label with circuit description.
6. Cables: Wrap around machine printed label with cable identifier within 100 mm of each termination and every 4 m throughout the cable length.
7. Outlets: Machine printed label with circuit description.
8. Format: Submit proposals .

System completion

Ss_75_10_21/810 Testing and inspection of data distribution systems

1. Standards: To BS EN 50346.
2. Testing and inspection agent: Submit proposals .

3. Notice before commencing tests (minimum): 5 days.
4. Inspection of cabling: Inspect cables for kinks, bends, snags and compression and deformation damage.
5. Permanent link: Measure length of each cabling segment (connector to connector).
6. Pin assignment and continuity: Verify and submit results.
7. Cable temperature during testing: Submit.
8. Results: Submit in accordance with BS EN 50346, Annex A.
9. Certificates of calibration for meters and instruments: Submit.

Ss_75_10_21/820 Documentation for data distribution systems

1. Standard: To BS EN 50174-1.
2. Operating and maintenance instructions
   - 2.1. Scope: Submit for the system giving optimum settings for controls.
   - 2.2. Product information: Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
   - 2.3. Format: A4 Paper and electronic copies.
   - 2.4. Number of copies: Two.
3. Record drawings
   - 3.1. Content: Point of entry of PABX cable into building;
     Route of incoming connection cable to the public telephone network from point of entry into building and PABX;
     For all data cabling, the cable origin, circuit designation, route, conductor material and c.s.a., insulation type and colour, number of cores per cable, number of cables in ducts, on tray or ladder;
     General arrangement drawings.Cabling topology schematics.Distribution point layout drawings;
     and Equipment room layout drawings.Interconnection diagrams.
   - 3.2. Format: Electronic drawing.
   - 3.3. Number of copies: Two.
4. System warranty: Submit.
5. Submittal date: At handover.
6. Cabling topology schematics
   - 6.1. Location: Adjacent to comms equipment.
   - 6.2. Format: Laminated A1 size paper print.
   - 6.3. Installation: Wall mounted with cup and screw fixings.

Ω End of System

Ss_75_40_02_05
Audio intercom systems

Systems

Ss_75_40_02_05 Audio intercom systems

1. Description: The contractor shall design, procure, install, set to work and commission the required movements of the existing intercom phones.

   Identified on the strip out drawings there are multiple existing intercom phones that need to be relocated to the new reception desk as part of the works.
2. System performance: Ss_75_40_02/225 Design of audio and video intercom systems.
3. System supplier: Submit proposals .
4. System type: Standalone door stations.
5. Execution: Ss_75_40_02/630 Equipment labelling and system diagrams and Ss_75_40_02/650 Installing intercom systems.
6. System completion: Ss_75_40_02/820 Documentation; Ss_75_40_02/870 Testing and commissioning audio intercom systems; and Ss_75_40_02/880 Testing and commissioning video intercom systems.

System performance

Ss_75_40_02/225 Design of audio and video intercom systems

1. Calling method: Existing
2. Method of authorization: Manual door release by human operator only.
3. Remote handset intercommunication: Audio function.
4. Functional requirements: Local doorbell facility on remote internal handsets and Line isolation (cable fault tolerance).
5. Integration with other systems: Electronic access control system

Execution

Ss_75_40_02/630 Equipment labelling and system diagrams

Shared by: Ss_75_40_02_11 Card access control systems

1. Access points and door controllers: Label with a unique identification code.
2. System diagram: Provide showing the location and identity of all system equipment.
3. Position: Next to the access system controller.

Ss_75_40_02/650 Installing intercom systems

1. Installing cabling
   1.1. Standard: In accordance with BS 7671.
   1.2. Routes: Contractor's choice .
   1.3. Security measures: Suitably protect all cabling from inadvertent damage or tampering to avoid compromising the security of the system.

System completion

Ss_75_40_02/820 Documentation

Shared by: Ss_75_40_02_11 Card access control systems

1. Standards: To BS EN 60839-11-1 and BS EN 60839-11-2.
2. System communications: Submit details of the communication network and any relevant protocols used.
3. Operating and maintenance instructions
   - 3.1. Scope: Submit for the system, giving all configuration settings.
   - 3.2. Product information: Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
   - 3.3. Format: A4 Paper and electronic copies.
   - 3.4. Number of copies: Two.
4. Record drawings
   - 4.1. Content: For all access control cabling, the cable origin, circuit designation, route from controller to access control point, conductor material and c.s.a., insulation type and colour, number of cores per cable, number of cables in ducts, on tray or ladder;
     General arrangement drawings;
     and Location of each access point, its associated controller and power supply.
   - 4.2. Format: Electronic drawing.
   - 4.3. Number of copies: Two.
5. Submittal date: At handover.

Ss_75_40_02/870 Testing and commissioning audio intercom systems

1. Call button: Verify the operation of call buttons.
2. Audio communication: Verify two-way audio communication.
3. Remote release: Verify the operation of remote door release facilities.
4. Visual indication: Check that LCD information is correctly displayed. Check that all LEDs are operational and function at the correct stage of the call process.
5. Cables: Check that all cables are correctly terminated and that connections are tight.
6. Voltage: Verify that voltage levels for all items of equipment throughout the system are within the manufacturer's stated range.

Ss_75_40_02/880 Testing and commissioning video intercom systems

1. Call button: Verify the operation of call buttons.
2. Audio communication: Verify two-way audio communication.
3. Video image: Verify the operation of the video camera and remote display. Adjust the image for contrast and brightness to suit the environmental conditions of the location.
4. Remote release: Verify the operation of remote door release facilities.
5. Visual indication: Check that LCD information is correctly displayed. Check that all LEDs are operational and function at the correct stage of the call process.
6. Cables: Check that all cables are correctly terminated and that connections are tight.
7. Voltage: Verify that voltage levels for all items of equipment throughout the system are within the manufacturer's stated range.

Ω End of System

Ss_75_40_02_11
Card access control systems

Systems

Ss_75_40_02_11 Card access control systems

1. Description: The contractor shall design, coordinate, procure, install, set to work and commission new access control to the two security room doors.

   Access control doors shall be provided with new card/fob readers compatible with the existing system.
2. System performance: Ss_75_40_02/210 Design of electronic access control systems; Ss_75_40_02/230 Connection to fire detection and alarm systems.
3. System supplier: Submit proposals .
4. Registration: A member of British Security Industry Association and A Gold member of National Security Inspectorate.
5. System type: Networked and Web-based connectivity.
6. Equipment interconnectivity: Wired
7. Control software: Resident on door controllers.
8. Method of authorization: Pr_75_30_30_68 Proximity cards; Pr_75_30_30_71 Request-to-exit buttons; and Pr_75_30_30_27 Emergency door release break glass units.
9. Readers: Pr_75_30_30_67 Proximity card readers.
10. Locking mechanisms: Pr_75_30_27_50 Magnetic locks
11. Controls: Pr_70_75_15_21 Desktop computers and Servers.
12. Door status monitoring: Monitored locks.
13. Cable type: Pr_65_70_15_06 Balanced twisted-pair cables type B.
14. Containment: Pr_65_70_11_12 Cable baskets and Pr_65_70_11_71 Rigid conduit.
15. Rewireable installation: Required.
16. Concealed installation: Required.
17. System accessories: Two card read/writing devices
18. Execution: Ss_75_40_02/620 Installing electronic access control systems and Ss_75_40_02/630 Equipment labelling and system diagrams.
19. System completion: Ss_75_40_02/810 Testing and commissioning electronic access control systems; Ss_75_40_02/820 Documentation; and Ss_75_40_02/830 Spares and consumables.

System performance

Ss_75_40_02/210 Design of electronic access control systems

1. Design: Complete the design of the electronic access control system.
2. Requirement: Submit proposals including detailed design drawings, technical information, calculations and manufacturers' literature.
3. Standards: BS EN 60839-11-1 and BS EN 60839-11-2.
4. Security grading: To BS EN 60839-11-1, Grade 4.
5. Environmental classification: To BS EN 60839-11-1, Class II.
6. Number of users (minimum): 100.

7. Number of transactions (minimum): 100 per 24 hour.
8. Spare capacity: Required.
9. Database
    9.1. Redundancy: Not required.
    9.2. Backup arrangements: Automatic.
10. Operation in the event of mains failure: Access points open.
11. Anti-passback: Submit proposals .
12. Functional requirements: Time and attendance logging.

Ss_75_40_02/230 Connection to fire detection and alarm systems

1. Operation in the event of a fire signal: Doors fail safe when the building is occupied.

Products

See Pr_65_70_11_12 Cable baskets in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_11_17 Cable trays in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_11_71 Rigid conduit in Ss_70_30_45_45 Low-voltage distribution systems

Pr_65_70_15_06 Balanced twisted-pair cables type B

1. Description:
2. Standard: To BS EN 50288-2-1;
   To BS EN 50288-3-1;
   To BS EN 50288-4-1;
   To BS EN 50288-5-1;
   and To BS EN 50288-6-1.
3. Third-party certification:
4. Category: Catagory 6A
5. Screening: Required.
6. Cable type:
7. Conductors: Solid.
8. Reaction to fire class
    8.1. Fire behaviour:
    8.2. Additional classification for smoke production:
    8.3. Additional classification for flaming droplets and/ or particles:
    8.4. Additional classification for acidity:
9. Execution: 90-55-15/640 Extra low and low voltage cable routes;
   90-55-15/650 Extra low and low voltage cables in accessible roof spaces;
   90-55-15/655 Extra low and low voltage surface mounted cables;
   and Pr_65_70_48/660 Installing low-voltage cables in conduit and trunking.

Pr_70_75_15_21 Desktop computers

1. Description:
2. Manufacturer: Software to be installed on network server with the ability to be accessed from any connected PC subject to entering credentials
3. Data storage:

Pr_75_30_27_50 Magnetic locks

1. Description:
2. Manufacturer: ASSA ABLOY UK
3. Product reference: Refer to door schedule
4. Standard: To BS EN 13637, when used on escape routes.
5. Rated operational voltage (Ue): 24 V d.c.
6. Operation in the event of mains failure: Fail unlocked when building occupied
7. Holding force (minimum): 8 kN.
8. Monitoring: Micro-switch.
9. Features: Anti-tamper.
10. Material and finish: Brushed aluminium.
11. Colour: Black.
12. Instant release circuit: Required.
13. Operating temperature range: -60°C to 80°C.
14. Execution: Pr_75_30_27/640 Installing electric locks.

Pr_75_30_30_27 Emergency door release break glass units

1. Description:
2. Manufacturer: Submit proposals .
3. Security grading: To BS EN 60839-11-1, Grade 4.
4. Environmental classification: To BS EN 60839-11-1, Class II.
5. Frangible element: Resettable.
6. Test method: Key.
7. Protective cover: Required.
8. Number of poles: Two.
9. Switch rating: Suitable for 3 A at 125 V a.c.
10. Monitoring
    10.1. Audible indication: Required.
    10.2. Visual indication: Not required.
11. Colour: Green.
12. Labelling: “EMERGENCY DOOR RELEASE”.
13. Mounting: Fully recessed.
14. Execution: Pr_75_30_30/650 Installing emergency break glass units and request to exit buttons.

Pr_75_30_30_67 Proximity card readers

1. Description:
2. Manufacturer: Submit proposals .
3. Security grading: To BS EN 60839-11-1, Grade 4.
4. Environmental classification: To BS EN 60839-11-1, Class IV.
5. Material and finish: Submit proposals . Approval of colour and finish to be sought from the Architect.
6. Impact protection (minimum): To BS EN 62262, IK10.
7. Type of operation: Networked.
8. Communication interface: Ethernet.

9. Number of users (minimum): 100.
10. Operating frequency: 125 kHz.
11. Proximity read range: Up to 50 mm.
12. Integral keypad: Not required.
13. Remote door opening: Required. To interface with the door intercom system where provided.
14. Mounting position: Recessed. Setting out to be confirmed by the architect.
15. Visual indication: Multi-coloured LED displaying red when access point status secure, green when unlocked.
16. Audio status indication: Multiple tone sequences.
17. Accessories: Weather-guard.
18. Execution: Pr_75_30_30/610 Installing keypads and readers.

Pr_75_30_30_68 Proximity cards

1. Description:
2. Manufacturer: Submit proposals .
3. Operating frequency: 125 kHz proximity chip and antenna.
4. Proximity read range: Up to 50 mm.
5. Contactless cards
   5.1. Standard: Physical characteristics to BS ISO/IEC 14443-1.
   5.2. Material: Submit proposals .
   5.3. Colour: White.
   5.4. Magnetic stripe: Manufacturer's standard .
6. Printing capability: Submit proposals .
7. Programming: RF programmable.
8. Code: Unique to BS 7227.
9. Unique, visible identification number: Submit proposals .
10. Authentication: Submit proposals .
11. Format: Submit proposals .
12. Manufacturer’s guarantee against electronic failure (minimum): 100,000 swipes
13. Operating temperature range: -10°C to 60°C.
14. Accessories: Key ring attachment.

Pr_75_30_30_71 Request-to-exit buttons

1. Description:
2. Manufacturer: Submit proposals . In line with visual services schedule
3. Security grading: To BS EN 60839-11-1, Grade 4.
4. Environmental classification: To BS EN 60839-11-1, Class II.
5. Material and finish: Stainless steel.
6. Colour: Silver.
7. Mounting arrangement: Fully recessed.
8. Engraving: 'PRESS TO EXIT'.
9. Operation: Momentary mechanical switch.
10. Switch rating: Suitable for 2 A at 30 V d.c.
11. Illuminated button: Not required.
12. Button characteristics: Round push button.

13. Execution: Pr_75_30_30/650 Installing emergency break glass units and request to exit buttons.

Execution

See 90-55-15/640 Extra low and low voltage cable routes in Ss_70_30_80_35 Hardwired low-voltage small power systems

See 90-55-15/650 Extra low and low voltage cables in accessible roof spaces in Ss_70_30_80_35 Hardwired low-voltage small power systems

See 90-55-15/655 Extra low and low voltage surface mounted cables in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_65_70_11/630 Installing cable basket in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_11/650 Multiple cable runs in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_11/661 Cable support zones in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_11/765 Conduit, trunking and ducting zones in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_48/660 Installing low-voltage cables in conduit and trunking in Ss_70_30_80_35 Hardwired low-voltage small power systems

Pr_75_30_27/640 Installing electric locks

1. Location of components: Refer to archtiects door schedule
2. Mounting arrangement: Refer to architects door schedule
3. Fire rating: Ensure that the installation of a lock does not compromise the integrity of a fire door.
4. Operation: Align door and frame mounted components to provide a clean break during release – free egress should be provided with minimal effort. Ensure that locks do not restrict access through the door or cause an injury hazard.

Pr_75_30_30/610 Installing keypads and readers

1. Mounting
    1.1. Mounting position: Install the reader on the wall within 200 mm of the latch edge of the door. Submit proposal for mounting position for approval by the Architect.
    1.2. Mounting arrangement: Recessed.
    1.3. Height (finished floor level to underside of equipment): 900 mm. Submit proposal for mounting position for approval by the Architect.
2. Administration reader: Install adjacent to the access controller or PC administering the software to allow registration of users.

Pr_75_30_30/650 Installing emergency break glass units and request to exit buttons

1. Location of components: Refer to setting out drawings.
2. Mounting arrangement: Recessed into wall.
3. Height (finished floor level to underside of equipment): Refer to setting out drawings.

Ss_75_40_02/620 Installing electronic access control systems

1. Standards: To BS EN 60839-11-1 and BS EN 60839-11-2.
2. Location of the access controller: Local to door location but in an accessible out of view location. Proposal to be submitted for approval prior to installation.

3. Installing cabling
    3.1. Standard: In accordance with BS 7671.
    3.2. Routes: Refer to electrical drawings.
    3.3. Security measures: Suitably protect all cabling from inadvertent damage or tampering to avoid compromising the security of the system.

See Ss_75_40_02/630 Equipment labelling and system diagrams in Ss_75_40_02_05 Audio intercom systems

System completion

Ss_75_40_02/810 Testing and commissioning electronic access control systems

1. Standards: To BS EN 60839-11-1 and BS EN 60839-11-2.
2. System commissioning agent: System manufacturer.
3. Notice before commencing tests (minimum): 5 days.
4. System programming: Configure access permissions;
   Configure time grids, zones and slots;
   and Configure user database and credentials.
5. Cable testing
    5.1. Insulation resistance: Submit results.
    5.2. Earth continuity: Submit results.
6. Access points: Verify the correct operation of reader, across each access level. Check alignment of lock mechanism. Configure unlock times.
7. Standby supply: Verify operation in the event of a mains failure. Check capacity and submit results. Verify operation of battery charger.
8. Equipment tamper detection: Verify operation.

See Ss_75_40_02/820 Documentation in Ss_75_40_02_05 Audio intercom systems

Ss_75_40_02/830 Spares and consumables

1. Credentials to be supplied: 250 of each type used.
2. Spares to be supplied
    2.1. Fuses: 10 x internal access control unit fuses.
    2.2. Frangible elements: 10 x emergency break glass elements.
    2.3. Printer ink cartridges: Three.

Ω End of System

Ss_75_50_28_29
Fire detection and alarm systems

Systems

Ss_75_50_28_29 Fire detection and alarm systems

1. Description: The contractor shall design, coordinate, procure, install, set to work and commission the required adaptions to the existing fire alarm system. The scope of the works is:
    - New smoke detection and notification devices on existing loop within the security control room, breakout and reception area
    - New fire alarm interface units on existing loop within the security control room to release the access control doors.
    - Relocate the existing fire alarm repeater panel from the security room to the new reception

    The specialist subcontractor procured to detailed design install and commission the fire alarm system shall modify the full cause and effect schedule to account for the works and present for review by the main contractor and Clients agent prior to completion of system configuration.

    Automatic detection shall be provided throughout the building as well as all ceiling and floor voids which are 800mm deep or greater.

    The fire alarm system shall consist of manual break glass call points (complete with lift up protective covers to reduce false alarms in out of view areas), automatic smoke and heat detectors, electronic sounder/strobe units and suitable interface modules to suit the building layout.

    Combined smoke/heat detectors shall be utilised to allow adjustment of sensitivity thresholds.

    Alarm shall be given by the system from electronic sounders throughout and / or flashing beacons in selected areas, all electronic sounders shall have an adjustable output and hence be set at a suitable value to meet the requirements of BS5839.

    Generally, all ceiling mounting devices shall be fed from cable contained on dedicated containment systems within the ceiling void or floor void above. For all wall mounted devices such as break glass units, cabling shall rise up the wall from the device recessed in metal conduit into the ceiling void connecting to the respective device

2. System performance: Ss_75_50_28/210 Design of fire detection and alarm systems in non-domestic premises
   Ss_75_50_28/260 Integration with other alarm and security systems;
   Ss_75_50_28/265 Interfaces to equipment;
3. System manufacturer: Submit proposals .
4. System type: Addressable.
5. Detection devices
    5.1. Atmosphere: Normal.
    5.2. Types: Pr_75_80_30_50 Manual call points;
    and Pr_75_80_30_65 Point smoke detectors.
6. Equipment interconnectivity: Pr_65_70_48_29 Fire-resistant screened (LSHF) cables.
7. Cable containment: Pr_65_70_11_17 Cable trays and Pr_65_70_11_71 Rigid conduit.
8. Rewireable installation: Required.

9. Concealed installation: Required.
10. Internal alarms

    10.1. Secondary: Xenon Beacons.
11. System accessories: Pr_75_30_30_28 Emergency door release mechanisms; Pr_75_80_30_71 Remote indicators;
12. Execution: Ss_75_50_28/610 Installing fire detection and alarm systems in non-domestic premises; Ss_75_50_28/630 Installing cabling for fire detection and alarm systems in non-domestic premises; and Ss_75_50_28/695 Installing interfaces to other equipment and systems.
13. System completion: Ss_75_50_28/805 System information; Ss_75_50_28/806 Device identification and testing; Ss_75_50_28/809 Measurement of sound pressure levels; Ss_75_50_28/810 Testing and commissioning fire detection and alarm systems in non-domestic premises; Ss_75_50_28/820 Documentation for fire detection and alarm systems in non-domestic premises; and Ss_75_50_28/830 Spares and consumables.

System performance

Ss_75_50_28/210 Design of fire detection and alarm systems in non-domestic premises

1. System designer: LPCB LPS 1014 Certified Specialist Sub-Contractor
2. Standards: Complete the design of the fire detection and alarm system in accordance with BS 5839-1.
3. Category: As existing
4. Requirement: Submit proposals including detailed design drawings, technical information, calculations and manufacturers' literature.
5. System design certificate: Submit with design proposals.

Ss_75_50_28/260 Integration with other alarm and security systems

1. Objectives: In the event of a fire alarm, shut down the MVHR ventilation system and access control doors shall open.
2. Systems to be integrated: - Access Control
   - Mechanical Ventilation

Ss_75_50_28/265 Interfaces to equipment

1. Interfaces to equipment not forming part of the fire detection and alarm system: Design system to interact with the equipment in the event of a fire or fault signal.
2. Equipment and mode of operation: See operation in text above

Products

See 90-55-10/320 Cable bands in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_11_13 Cable cleats in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_11_15 Cable ties in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_11_17 Cable trays in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_11_71 Rigid conduit in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_48_29 Fire-resistant screened (LSHF) cables in Ss_70_30_45_45 Low-voltage distribution systems

Pr_75_30_30_28 Emergency door release mechanisms

1. Description:
2. Manufacturer: Submit proposals .
3. Standard: To BS EN 1155.
4. Mounting type: Refer to Architects door schedule and request where no information provided.
5. Power: 24 V d.c.
6. Hold-open power size: Manufacturer's standard .
7. Corrosion resistance: Manufacturer's standard .
8. Integral manual release button: Required.
9. Execution: Pr_75_30_30/661 Installing electrically powered hold-open devices.

Pr_75_80_30_50 Manual call points

1. Description:
2. Manufacturer: Submit proposals .
3. Standard: To BS EN 54-11 and To BS EN 54-17.
4. Third party certification: LPCB approved.
5. Designation: Type A.
6. Frangible element: Non-resettable.
7. Integral red visual indicator: Required.
8. Environmental category: Indoor.
9. Mounting: Fully recessed.
10. Protective covers: Required.
11. Power source: Loop Powered.
12. Execution: Pr_75_80_30/630 Installing manual call points.

Pr_75_80_30_65 Point smoke detectors

1. Description:
2. Manufacturer: Submit proposals .
3. Standard: To BS EN 54-7 and To BS EN 54-17.
4. Third party certification: LPCB approved.
5. Detector type: Optical.
6. Power source: Loop Powered.
7. Execution: Pr_75_50_76/620 Installing point detectors.

Pr_75_80_30_71 Remote indicators

1. Description:
2. Manufacturer: Submit proposals .
3. Enclosure
   - 3.1. Material: ABS plastic.
   - 3.2. Colour: White.
4. Lamp: High intensity LED.
5. Lens

5.1. Material: Polycarbonate.

5.2. Colour: Clear.

6. Execution: Pr_75_80_30/670 Installing remote indicators.

Execution

See Pr_65_70_11/650 Multiple cable runs in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_11/661 Cable support zones in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_11/765 Conduit, trunking and ducting zones in Ss_70_30_45_45 Low-voltage distribution systems

See Pr_65_70_48/635 Installing low-voltage cables in Ss_70_30_25_25 Earthing and bonding systems

See Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket in Ss_70_30_45_45 Low-voltage distribution systems

Pr_75_30_30/661 Installing electrically powered hold-open devices

1. Method of operation: Automatic release following receipt of a signal from the fire detection and alarm system control and indicating equipment.

Pr_75_50_76/620 Installing point detectors

Pr_75_80_30/630 Installing manual call points

1. Position: Refer to design drawing.
2. Mounting height: Same level as light switches in area of location.
3. Test key: Locate to allow easy test operation.
4. Labelling
   4.1. Type: Face engraved rigid plastic laminate.
   4.2. Background: White.
   4.3. Lettering: Red, identifying the manual call point address.

Pr_75_80_30/670 Installing remote indicators

1. Concealed detection devices: Install individual LED indicators.

Ss_75_50_28/610 Installing fire detection and alarm systems in non-domestic premises

1. Standard: In accordance with BS 5839-1.

Ss_75_50_28/630 Installing cabling for fire detection and alarm systems in non-domestic premises

1. General requirements: Ss_75_50_28/610 Installing fire detection and alarm systems in non-domestic premises .
2. Standard: In accordance with BS 7671.
3. Cable route: Segregate from other cabling. Where installed in trunking, locate in a dedicated fire cabling compartment.
4. Cable topology: Loop circuits without spurs or tees.
5. Cable pulling: Submit proposals .
6. Timing: Do not start internal cabling until building enclosure provides permanently dry conditions.

7. Mechanical protection: Basket / Conduits.
8. Fastening cables
    8.1. To building fabric: Metal P-clips with red plastic coating.
    8.2. To cable supports: Metal bands with red plastic coating.
9. Cables passing through the building fabric: Sleeve and seal to prevent transmission of gas and dust.
10. Jointing: At equipment terminals.
11. Cable terminals: Use ceramic terminal blocks.
12. Maximum circuit resistance: Measure before concealment. Submit results.

Ss_75_50_28/695 Installing interfaces to other equipment and systems

1. General requirements: Ss_75_50_28/610 Installing fire detection and alarm systems in non-domestic premises .
2. Connection to equipment: Install interconnecting wiring between interface unit and equipment controlled.
3. Interface units: Label, describing their function.

System completion

Ss_75_50_28/805 System information

1. Device list: Before commissioning, Submit proposals, including proposed device, zone and group names.
2. Zone diagram: Before commissioning Submit proposals.

Ss_75_50_28/806 Device identification and testing

1. Device identification: Label devices with a unique address corresponding to that used by the CIE. Label non-addressable devices with a unique reference corresponding to that shown on the record drawings.
2. Device testing: Verify the operation of each device. Submit a schedule of devices, including the device test methods and results.

Ss_75_50_28/809 Measurement of sound pressure levels

1. Sound pressure levels: Measure throughout the building.
2. Test instrument
    2.1. Standard: To BS EN 61672-1.
    2.2. Setting: Slow response, weighting A.
3. Doors: Close before measuring sound pressure levels.
4. Results: Submit electronic layout drawing showing location of measurements with results.

Ss_75_50_28/810 Testing and commissioning fire detection and alarm systems in non-domestic premises

1. Standard: In accordance with BS 5839-1.
2. System commissioning agent: Fire alarm speciallist.
3. Notice before commencing tests (minimum): Two weeks.

Ss_75_50_28/820 Documentation for fire detection and alarm systems in non-domestic premises

1. Standard: In accordance with BS 5839-1.

2. Operating and maintenance instructions
    2.1. Scope: Submit for the system giving optimum settings for controls.
    2.2. Product information: Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
    2.3. Format: A4 Paper and electronic copies.
    2.4. Number of copies: Two.
3. Logbook: Submit one copy in accordance with BS 5839-1 Annex F.
4. Record drawings
    4.1. Content: General arrangement drawings showing the location of all control and indicating equipment, manual call points, detectors, radio transmitters and aerials, sounders, visual alarm signal devices, short circuit isolators, end of line devices, remote indicators, interface units connecting to other equipment, and automatic door hold open devices and Schematic diagram showing all control cabling, the cable origin, device addresses, route from control and indicating equipment to manual call points, detectors, radio transmitters and aerials, sounders, visual alarm signal devices, short circuit isolators, end of line devices, remote indicators, interface units connecting to other equipment, and automatic door hold open devices. Include conductor material and c.s.a, insulation type and colour, number of cores per cable, number of cables in ducts, on tray or ladder.
    4.2. Drawing format: Electronic drawing.
    4.3. Number of copies: Two.
    4.4. Submittal date: At handover.
5. Fire evacuation plan: Submit electronic colour CAD layout.
6. Certification
    6.1. Design certificate: Submit two copies in accordance with BS 5839-1 Annex G.1.
    6.2. Installation certificate: Submit two copies in accordance with BS 5839-1 Annex G.2.
    6.3. Commissioning certificate: Submit two copies in accordance with BS 5839-1 Annex G.3.

Ss_75_50_28/830 Spares and consumables

1. Supply the following spares
    1.1. Frangible elements for manual call points: Eight.
    1.2. Detectors: Two of each type.
2. Printer ink and paper roll: Replace immediately before handover.

Ω End of System

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