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Air Conditioning Installation in Seahorse & Orchid Wards for CUH Paediatric Department – Electrical Specification & Schedules

W26-048

Revision 0

02/10/2026

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1 ELECTRICAL SERVICES INSTALLATION PARTICULARS:

1.1 The following is a description of the electrical installation works to be complete under the main contract works. This description of works highlights non-standard and project specific works that the electrical contractor is required to complete.

1.2 The projects entails the full electrical installation of the Air Conditioning Units to Seahorse & Orchid Wards in the CUH Paediatric Department.

1.3 The electrical contractor shall note that all works within occupied areas of the building are subject to approval following the submission of a project specific method statement.

1.4 The works shall be completed in a live hospital environment and all works shall be completed in accordance with the programme.

1.5 The electrical contractor shall be appointed based on his previous experience and shall allow in his tender a reasonable allowance for working on live construction site, operating hospital.

1.6 The electrical contractor shall be deemed to have acquainted himself with the necessary current rules and regulations, IS, EN and BS, and will be responsible for the consequences of non-observance thereof in any element of the electrical installation.

1.7 The electrical contractor shall carefully read the notes on the drawings and include for all associated costs in his tender.

1.8 The employer’s representative may issue instructions based on the recommendation of the Engineers regarding the removal and replacement or reinstatement at the Contractor's expense of any faulty or inferior material supplied or work executed.

1.9 The tender shall include all premium labour rates associated with abnormal working hours associated with any required shut-down periods, or any element of the works as described within the specification or detailed on the design drawings.

1.10 Should any ambiguities arise with drawings the Contractor shall allow for a solution that meets both the specification and design intent in full and that cost wise is the most beneficial to the Client.

1.11 The electrical contractor will provide a bill of quantities/ rates with his tender package/ submission. Any submitted tender will not be considered, unless this is included.

2 SITE VISIT:

2.1 The electrical contractor shall arrange, prior to the submission of the tender, a full site visit to establish the complete scale and scope of works within the tender period.

2.2 In submission of this tender the contractor will be deemed to have carried out a detailed survey of all proposed routes and risers to ascertain existing

services, space for proposed new services, connection points of new services to old/existing, routes of such new services and the present working conditions of same. The contractor shall have satisfied himself as to the location of all existing cables on site (LV, ELV etc) and ensure that the existing cables are not disturbed except as part of the works requirements. No future claims shall be entertained under lack of knowledge in this respect.

3 PROGRAMMING OF WORKS:

3.1 The works shall be completed within the programme to be agreed with the client.

3.2 The electrical contractor to liaise with the client after the contract is awarded and can redefine the programme.

4 SETTING OUT:

4.1 The electrical contractor shall be responsible for the accurate setting out of all works covered in this Specification and the taking of all site dimensions where applicable.

5 COORDINATED SERVICES DRAWINGS:

6 HEALTH AND SAFETY:

6.1 The electrical contractor’s attention is drawn to the fact that it is illegal, under Health and Safety at Work legislation, for a building owner to operate his building unless he is in possession of record drawings and operating instructions.

6.2 These documents MUST, therefore, be checked and approved PRIOR to handover and defaulting electrical contractors will automatically assume 24 hour responsibility for the services they have installed until the documentation is acceptable and handed over to the employer or his representative

7 BENCHMARK PRODUCTS:

7.1 The electrical contractor shall note all products / systems described within this specification and within the electrical schedules are benchmark products.

7.2 The benchmark products / systems that are identified in the schedules have been designed, co-ordinated and approved by the Client as meeting their requirements in full. They articulate the required minimum construction quality, performance and functional requirements in terms of design intent, spatial and structural accommodation, integrity and aesthetics.

7.3 The electrical contractor shall include in the tender for all equipment exactly as specified or equivalent and the summary of tender will be deemed to include all such equipment.

7.4 The electrical contractor shall not that all alternative products are subject to a submittal process and as such are not accepted until such time as the submittals process has been completed. If the contractor does not or cannot demonstrate to the satisfaction of the engineer, that the alternative products meet the requirements of the benchmark products the contractor will provide the benchmark product. This process is based on the following format, A - accepted, B – accepted based on amended submittal or C – resubmit information or rejected.

8 STRIPOUT WORKS:

9 CABLE CONTAINMENT INSTALLATION:

9.1 The electrical contractor shall utilise existing containment for the power and controls cabling of the installation. However if during the contractors sitewalk it is determined that new new containment is required, any allowance is to be shared as part of the Tender submission for review by the Electrical Consultant.

10 DISTRIBUTION BOARD INSTALLATION:

10.1 The electrical contractor shall allow for the modification of the 3no. Sub Distribution Boards shown on the drawings across the Seahorse & Orchid Wards for the addition of circuit breakers and cabling to feed the new AC Units.

11 GENERAL AND EMERGENCY LIGHTING INSTALLATION:

11.1 The electrical contractor shall allow for the removal and reinstallation of all general and emergency light fittings during the installation works.

11.2 The electrical contractor shall liaise with the campus incumbent emergency lighting specialist and maintenance team for any recommissioning works required following the completion of the installation works.

12 GENERAL SERVICES & POWER INSTALLATION:

13 DATA SERVICES INSTALLATION:

14 FIRE ALARM SERVICES INSTALLATION:

14.1 The electrical contractor shall allow for the removal and reinstallation of all fire alarm during the installation works.

14.2 The electrical contractor shall liaise with the campus incumbent fire alarm specialist for any temporary coverage required during the installation works.

14.3 The electrical contractor shall also liaise with the campus incumbent fire alarm specialist and maintenance team for any recommissioning works required following the completion of the installation works.

15 INDUCTION LOOP INSTALLATION:

16 DOOR ACCESS CONTROL SYSTEM:

17 CCTV SYSTEM:

18 INTRUDER ALARM SYSTEM:

19 MECHANICAL WIRING SYSTEM:

19.1 The electrical contractor shall complete the mechanical wiring installation as indicated on the mechanical wiring drawings.

19.2 The electrical contractor shall allow for the supply, installation and termination of all power and control cabling associated with the mechanical installation.

20 EARTHING / SURGE PROTECTION:

20.1 Earthing shall be carried out in strict accordance with the ETCI Rules and the requirements of this specification and drawings. Equipotential bonding of metallic equipment shall also be carried out according to the ETCI Rules.

21 LIFT INSTALLATION:

22 TESTING AND COMMISSIONING:

22.1 The electrical contractor shall refer to each section of the specification for the commissioning requirement for each system for handover at the end of the project.

22.2 The following is a list of items that will be required in advance of any proposed practical complete of the works on site.

22.3 If any of the following items are not complete to the satisfaction of the engineer, then practical completion will not be achieved on the project.

22.4 The electrical contractor shall ensure that the main contractor is fully appraised of these items and their implication on the project programme and practical completion of the works.

Service/ System:	Description:	Status:
General Item	Note: Practical completion will not be offer without all services snags to be signed off by contractor to the satisfaction of the design team.	
General Item	Note: Practical completion will not be offer without draft O&M information & as installed drawings.	
General Item	Note: Labelling to be completed for all systems in line	

	with the labelling convention issued for the project.	
Distribution Boards	Factory test results for assembled panels	
Distribution Boards	Demonstration of the flash & megger testing of panels assembled on site.	
Distribution Boards	Demonstrate the operation of all function al units within the distribution board such as main isolator, changeover switches, door mounted switches.	
Distribution Boards	Demonstrate operation of the mustimeter installation on the distribution & verify the information is being relayed correctly to the BMS	
UPS	Copy of the testing & handover documents for each UPS.	
UPS	Demonstration in factory or on site the full load battery duration is as specified.	
UPS	Demonstration of the external bypass arrangement.	
UPS	Demonstration of all alarms are relayed back to BMS & central monitoring system if applicable.	
IPS	Copy of the testing & handover documents for each IPS.	
IPS	Copy of the as installed schematics for each IPS.	
IPS	Demonstration of alarms on each IPS unit & at each remote alarm panel.	
IPS	Simulation of faults on circuits to verify alarms & to confirm location description on all panels.	
ERB	Copy of earth test results for each ERB.	
ERB	Copy of the as installed drawings indicating the ERB locations & the areas covered.	
ERB	Checking of documented earth test results against demonstrated results to engineer.	
Power	ETCI test results for new final circuits.	
General Lighting	ETCI test results for new final circuits.	
General Lighting	Confirmation installation completed in line with layout &	

	reflected ceiling drawings.	
General Lighting	Demonstrate lighting as operational.	
General Lighting	Demonstrate lighting sensors are operating indicated on drawings.	
Emergency Lighting	Confirmation installation completed in line with layout & reflected ceiling drawings.	
Emergency Lighting	Demonstration of the operation of local circuit monitoring.	
Emergency Lighting	Demonstration of 3-hour duration test with no failures in any areas of the building.	
Emergency Lighting	Measurement of the emergency lighting levels in all areas of the building.	
Emergency Lighting	Demonstration of the operation of the addressable emergency lighting system testing functions.	
Emergency Lighting	Demonstration of the device identification in the field corresponds with operation of the addressable emergency lighting system information.	
Emergency Lighting	Confirmation of the fault reporting from addressable emergency lighting system.	
Emergency Lighting	Emergency lighting installation certificate.	
Emergency Lighting	Emergency lighting commission certificate.	
Fire Alarm	Demonstrate function tests of all detection devices on the device loop.	
Fire Alarm	Demonstrate function tests of all manual call point on the device loop.	
Fire Alarm	Demonstrate function tests of all interface units on the device loop.	
Fire Alarm	Demonstrate operation of all third-party equipment interfaced with the fire alarm system.	
Fire Alarm	Demonstration of sounders are pulsing in compartments adjoining the compartment in which the fire alarm is activated.	
Fire Alarm	Demonstrate sound level test are achieved in all areas	

	of the building.	
Fire Alarm	Demonstration of network communication between all panels & repeater panels.	
Fire Alarm	Full demonstration of the cause & effect strategy.	
Fire Alarm	Fire alarm installation certificate.	
Fire Alarm	Fire alarm commission certificate.	
IPMS/ Wifi	Checks of data point testing.	
IPMS/ Wifi	Copy of test results for completed installation to date.	
Nurse Call	Function testing of all call points & verification that field identification corresponds to system displays.	
Nurse Call	Copy of installation/ commissioning/ handover certificate for completed installation.	
Staff Attack	Function testing of all call points & verification that field identification corresponds to system displays.	
Staff Attack	Copy of installation/ commissioning/ handover certificate for completed installation.	
Baby Tagging	Function testing of all call points & verification that field identification corresponds to system displays.	
Baby Tagging	Copy of installation/ commissioning/ handover certificate for completed installation.	
Patient Wander	Demonstration of the operation of the locking & releasing operations of the patient wandering installation without patient tag.	
Patient Wander	Demonstration of the operation of the locking & releasing operations of the patient wandering installation with patient tag.	
Patient Wander	Copy of installation/ commissioning/ handover certificate for completed installation.	
Access Control	Demonstration of the operation of the wired system locking & releasing operations of the access control installation.	
Access Control	Demonstration of the operation of the wireless system locking & releasing operations of the access control	

	installation.	
Access Control	Demonstration of the car barrier systems opening via access control.	
Access Control	Copy of installation/ commissioning/ handover certificate for completed installation.	
Patient Wander/Access Control	Demonstration of the integration between the patient wander & access control systems.	
Patient Wander/ Fire Door Holders	Demonstration of the integration between the patient wander & fire door holders.	
Baby Tagging/Access Control	Demonstration of the integration between the baby tagging & access control systems.	
Baby Tagging / Fire Door Holders	Demonstration of the integration between the baby tagging & fire door holders.	
Intercom	Demonstration of the communication of the intercom systems.	
Intercom	Demonstration of the intercom systems opening car barrier remotely.	
Intercom	Demonstration of the intercom systems opening locked doors remotely.	
Intercom	Copy of installation/ commissioning/ handover certificate for completed installation.	
Car Barrier/ Motorised Gates	Demonstration of the car barrier systems opening via access control.	
Car Barrier/ Motorised Gates	Demonstration of the intercom systems opening locked doors remotely.	
Car Barrier/ Motorised Gates	Demonstration of the operation of safety sensors & ground loops.	
Car Barrier/ Motorised Gates	Copy of installation/ commissioning/ handover certificate for completed installation.	
Zebra Crossing	Copy of installation/ commissioning/ handover certificate for completed installation.	
Zebra Crossing	Demonstration of operation.	
Lift	Demonstration of the operation of the Lift 1.	

Lift	Demonstration of the operation of the Lift 2.	
Lift	Demonstration of the operation of the Lift 3.	
Lift	Copy of installation/ commissioning/ handover certificate for completed installation.	

CABLE CONTAINMENT INSTALLATION

1 CABLE TRUNKING INSTALLATION:

1.1 The electrical contractor shall supply and install a complete cable trunking installation as indicated on the drawings and detailed in the specification.

1.2 The cable trunking shall be manufactured with sheet steel in compliance with IS EN 10346 and constructed in compliance with IS EN 50085-1. The cable trunking shall have the dimensions and finish as detailed in the table below,

Trunking Size:	Steel Thickness:	Trunking Size:	Steel Thickness:
50 x 50 mm	1.0 mm	150 x 75 mm	1.6 mm
75 x 50 mm	1.2 mm	150 x 100 mm	1.6 mm
75 x 75 mm	1.2 mm	150 x 150 mm	1.6 mm
100 x 50 mm	1.2 mm	200 x 100 mm	1.6 mm
100 x 75 mm	1.2 mm	200 x 150 mm	1.6 mm
100 x 100 mm	1.4 mm	200 x 200 mm	1.6 mm

1.3 The electrical contractor shall only use proprietary bends, tees, reducers, risers and couplers manufactured by the cable trunking system specified. manufacturer.

1.4 The use site fabrication of accessories shall be kept to a minimum by the electrical contractor. Where special sections are required the material, thickness and finish shall be as specified for standard items and fabricated to the manufacturers recommended details and agreed with the engineer.

1.5 The electrical contractor shall allow a minimum of 25mm clear space from the cable trunking to adjacent horizontal and vertical surfaces with fixings (brackets) for cable trunking provided at regular intervals not exceeding 1200mm and at 225mm from bends and intersections. The trunking shall be fixed with appropriate round head sheradised or cadmium plated screws.

1.6 The electrical contractor shall connect all cable trunking with a manufacturers coupling and allow for the installation of copper earth continuity links.

1.7 The electrical contractor shall note the practice of cutting and bending the material of the trunking to form flange attachments will not be accepted, standard flanged couplings shall be used.

1.8 The electrical contractor shall note that connections between trunking and equipment shall be by a standard flanged coupling or screwed coupler and bush. The cable entries are provided with smooth bore bushes or grommets and the return edge of the lid of the trunking is left intact.

1.9 The electrical contractor shall not exceed the fill capacity of trunking determined from the ETCI rules and standard tables issued by the manufacturer of the trunking and the trunking runs and header trunkings installed at a distribution board shall be sized to allow for all cables being installed and the 25% future ways.

1.10 The electrical contractor shall allow for holes in trunking to be drilled, punched or cut by ring saw on site with the interior of all trunking shall be free of burrs, sharp edges and swarf prior to the installation of conduits and cabling.

1.11 The electrical contractor shall allow for the installation of fire pillows in the free space around the cables where cable trunking pass through fire compartment walls.

2 PERFORATED CABLE TRAY INSTALLATION:

2.1 The electrical contractor shall supply and install a complete perforated cable tray system as indicated on the drawings and as detailed in the specification.

2.2 The perforated cable tray shall be manufactured of galvanised sheet steel complying with IS EN 10346 and constructed in compliance with IS EN 61537. The cable tray shall have the dimensions and finish as detailed in the table below,

Width	Minimum Wall Height	Steel Thickness	Finish
100mm	35mm	1.5mm (Internal) 2.5mm (External)	Corrosion protection complying with EN ISO 12944 Hot dip galvanised complying with IS EN 10346 & IS EN 1461
150mm			
225mm			
300mm			
450mm			
600mm			

2.3 Cable trays will meet the following requirements:

- Interlocking ends with self-locking couplers that do not require additional bolting.
- Electrical continuity without additional earth bonding.
- Magnetic shield insulation without cover 20dB, with cover 50dB.
- Electromagnetic compatibility to VDE 0870-1.
- Transfer impedance without cover 1.14mΩ/m, with cover 0.71mΩ/m.
- Embedded perforations in the base of the cable tray for increased ventilation and simplified connection to the support system.
- Both lengthways and crossways perforation slots in the base of the cable tray.
- Continuous side perforation slots 7 x 20mm.
- The facility to fit snap-in segregation strips into the base of the cable tray.

- Covers will be supplied with pre-installed turnbuckles.
- Sprung steel clips will be manufactured from stainless steel.
- Cable trays for life safety and fire-fighting applications and those that run along and across escape routes shall be tested in accordance with DIN 4102 Pt12 and approved for function maintenance classes E30 to E90. As OBO Bettermann or equal approved.
- Fire-resistant cables shall be segregated from non-fire-resistant cables. Fire resistant cables shall be supported on a system that has an approval of equal duration to that of the cables it is supporting

2.4 The electrical contractor shall only use proprietary bends, tees, reducers, risers and couplers manufactured by the perforated tray system specified. manufacturer.

2.5 The use site fabrication of accessories shall be kept to a minimum by the electrical contractor. Where special sections are required the material, thickness and finish shall be as specified for standard items and fabricated to the manufacturers recommended details and agreed with the engineer.

2.6 The electrical contractor shall use 6mm diameter mushroom-head sheradised or cadmium plated steel fixing screws, bolts and nuts to fix together adjacent sections of cable tray and/or accessories. There shall be a minimum of 100mm overlap between adjacent sections and accessories.

2.7 The electrical contractor shall note that the cable tray shall only be cut along a line of plain metal i.e. not through the perforations, with all cut edges of galvanised cable tray shall be prepared and treated with a zinc rich paint.

2.8 Where welding has been employed in the fabrication of cable tray and/or accessories the area around the joint shall be mechanically prepared and thereafter treated with zinc chromate primer or zinc rich paint according to the original finish of the metal.

2.9 The electrical contractor shall provide grommets and profile as appropriated to protect the external cable sheath from damage.

2.10 A minimum clear space of 25mm shall be left behind all cable tray and shall be at least 150mm separation between the cable tray and mechanical services.

2.11 The electrical contractor shall allow a minimum of 25mm clear space at the rear of the cable tray with fixings (brackets) for cable tray provided at regular intervals not exceeding 1200mm and at 150mm from bends and intersections.

2.12 The electrical contractor shall note that cable tray shall not be installed in an inverted position without prior permission from the engineer. In the case of a cable tray being installed in an inverted position all cabling shall be supported using non-combustible clips or cable ties.

2.13 The electrical contractor shall provide fixings (brackets) fabricated from hot dipped galvanised steel channels and installed in compliance with IS EN 61537.

2.14 The electrical contractor shall use standard conduit take off plates to connect conduits to cable tray system.

2.15 The electrical contractor shall allow for the installation of fire pillows in the free space around the cables where cable trays pass through fire compartments.

2.16 The electrical contractor shall allow cable trays installed externally shall be fitted with covers.

3 CABLE BASKET INSTALLATION:

3.1 The electrical contractor shall supply and install a complete cable basket system as indicated on the drawings and as detailed in the specification.

3.2 The cable basket shall be manufactured of galvanised steel complying with IS EN 10346 and constructed in compliance with IS EN 61537. The cable basket shall have the dimensions and finish as detailed in the table below,

Width	Minimum Wall Height	Steel Thickness	Finish
100mm	35mm	1.5mm (Internal) 2.5mm (External)	Corrosion protection complying with EN ISO 12944 Hot dip galvanised complying with IS EN 10346 & IS EN 1461
150mm			
225mm			
300mm			
450mm			
600mm			

3.3 Cable baskets will meet the following requirements:

- Interlocking ends that do not require additional bolting.
- Electrical continuity without additional earth bonding.
- Magnetic shield insulation without cover 15dB, with cover 25dB.
- Electromagnetic compatibility to VDE 0870-1.
- Transfer impedance without cover 6.17mΩ/m, with cover 5.5mΩ/m.
- Mesh grid of 50 x 100mm
- The facility to fit snap-in segregation strips into the base of the cable basket.
- Covers will be supplied with sprung steel clamps.
- Sprung steel clips will be manufactured from stainless steel.
- Cable baskets for life safety and fire-fighting applications and those that run along and across escape routes shall be tested in accordance with DIN 4102 Pt12 and approved for function maintenance classes E30 to E90.
- Fire-resistant cables shall be segregated from non-fire-resistant cables. Fire resistant cables shall be supported on a system that has an approval of equal duration to that of the cables it is supporting.

3.4 The electrical contractor shall only use proprietary bends, tees, reducers, risers and couplers manufactured by the cable basket system specified manufacturer.

3.5 The use site fabrication of accessories shall be kept to a minimum by the electrical contractor. Where special sections are required the material, thickness and finish shall be as specified for standard items and fabricated to the manufacturers recommended details and agreed with the engineer.

3.6 A minimum clear space of 25mm shall be left behind all cable basket and shall be at least 150mm separation between the cable basket and mechanical services.

3.7 The electrical contractor shall allow a minimum of 25mm clear space at the rear of the cable basket with fixings (brackets) for cable basket provided at regular intervals not exceeding 1200mm and at 150mm from bends and intersections.

3.8 The electrical contractor shall note that cable basket shall not be installed in an inverted position without prior permission from the engineer. In the case of a cable basket being installed in an inverted position all cabling shall be supported using non-combustible clips or cable ties.

3.9 The electrical contractor shall provide fixings (brackets) fabricated from hot dipped galvanised steel channels and installed in compliance with IS EN 61537.

3.10 The electrical contractor shall use standard conduit take off plates to connect conduits to cable basket system.

4 CABLE LADDER INSTALLATION:

4.1 The electrical contractor shall supply and install a complete cable ladder system as indicated on the drawings and as detailed in the specification.

4.2 The cable ladder shall be manufactured of galvanised steel complying with IS EN 10346 and constructed in compliance with IS EN 61537.

4.3 The cable ladders will meet the following requirements:

- Electrical continuity without additional earth bonding.
- Magnetic shield insulation without cover 10dB, with cover 15dB, G mesh cable basket 15dB.
- Electromagnetic compatibility to VDE 0870-1.
- Supplied folded up for ease of transport and storage (45, 60 and 110mm sidewall only).
- Continuous side perforation slots.
- The facility to fit snap-in segregation strips into the base of the cable ladder (45, 60 and 110mm sidewall only).
- Covers will be supplied with pre-installed turnbuckles.
- Sprung steel clips will be manufactured from stainless steel.

4.4 The cable ladders shall be heavy duty with a sidewall of 45mm and where cable ladders installed externally shall be fitted with covers.

4.5 The electrical contractor shall only use proprietary bends, tees, reducers, risers and couplers manufactured by the cable ladder system specified manufacturer.

4.6 The use site fabrication of accessories shall be kept to a minimum by the electrical contractor. Where special sections are required the material, thickness and finish shall be as specified for standard items and fabricated to the manufacturers recommended details and agreed with the engineer.

4.7 A minimum clear space of 25mm shall be left behind all cable ladder and shall be at least 150mm separation between the cable ladder and mechanical services.

4.8 The electrical contractor shall allow a minimum of 25mm clear space at the rear of the cable ladder with fixings (brackets) for cable ladder provided at regular intervals not exceeding 1200mm and at 150mm from bends and intersections.

5 CONDUIT INSTALLATION:

5.1 The contractor shall allow for a complete hot dipped galvanised steel conduit installation from the main cable containment runs to the final outlets indicated on the drawings.

5.2 The steel conduit used by the electrical contractor shall be manufactured in compliance IS EN 61386-1:2008, no conduit having an outside diameter of less than 25mm shall be used.

5.3 The contractor shall note that flexible conduit may only be used by approval from the engineer.

5.4 Conduit shall be run neatly on the surface or buried within the carcase of the buildings or in the ground as indicated or as directed by the Engineers.

5.5 Conduit runs shall be determined by the Contractor and agreed by the Engineers before any work is started. Conduit shall be run at least 150mm clear of plumbing and mechanical services.

5.6 A draw-in box shall be provided in all conduit runs exceeding 10 metres in length or containing more than two right-angle bends, with all conduit boxes both standard and adaptable to the structure of the building independently of the conduit

5.7 The electrical contractor shall support the conduit at regular intervals, not exceeding 1200mm on horizontal runs, 1500mmm on vertical runs or 500mm from a change in direction of the conduit or near a termination box.

5.8 The length of thread on the ends of the conduit shall suit the length of internal thread in the end of the fitting or accessory. Excess length of thread will not be permitted.

5.9 Conduits when cut and threaded shall be free from all 'burrs' prior to fixing.

5.10 Conduit terminating at boxes, trunking or accessories not provided with spout or tapped entries shall be made mechanically and continuous there with by means of a flanged coupler and bush with male thread. Exposed conduit threads shall be given a coat of zinc rich paint.

5.11 In all cases services back boxes shall be installed so that there leading edge of the back box finishes within 5mm of the face of the plasterboard wall. The back box shall also have a minimum of 15mm cover within the plasterboard wall. To achieve the electrical contractor shall allow for extension collars on all back boxes installed as part of the project.

MECHANICAL WIRING INSTALLATION

1 GENERAL:

1.1 The electrical contractor shall include for supply, installation and connection were applicable of all equipment supplied and erected as part of the mechanical works.

1.2 The electrical contractor shall allow for a dedicated cable tray, trunking and conduit installation for the power and control wiring associated with the mechanical installation.

1.3 The contractor shall note that all isolator switches provided for the mechanical plant installation shall be manufactured from metal or high impact plastic with rotary operated handle.

2 POWER INSTALLATION:

2.1 The electrical contractor shall allow for the following works associated the mechanical plant power wiring,

- Supply, installation and glanding of all power wiring,
- Testing of all power wiring
- Termination of all power wiring,
- Labelling of all power wiring,

2.2 The electrical contractor shall note that the erection, positioning and installation of all plant equipment are to be completed by the mechanical contractor or controls specialist supplier.

3 CONTROL INSTALLATION:

3.1 The electrical contractor shall allow for the following works associated the mechanical plant power wiring,

- Supply, installation and glanding of all control wiring,
- Testing of all control wiring,
- Termination of all power wiring,
- Labelling of all power wiring,

3.2 The electrical contractor shall note that the erection, positioning and installation of all control equipment is to be completed by the mechanical contractor or controls specialist supplier.

4 FIRE SMOKE DAMPER INSTALLATION: