

WIRING DEVICES**A) PART 1 – GENERAL****1.01 WORK DESCRIPTION**

- A. The drawings for the lighting and power points indicate approximate positions of all lighting fittings, switches, power outlet points, isolating switch points and the like. The actual positions of all fittings, switches, the wiring details and cable routes shall be co-ordinated with other trades on site and submitted for the approval of the Engineer. All time and cost required adjusting the layout or adjusting the completed installation to Engineer satisfaction and to suit site co-ordination is included in the Contract.
- B. During the exact positioning of lighting and power points, due consideration shall be given to the operational requirements of the installation, the selection of the most accessible routes for wiring and the convenience of switching.
- C. No additional cost will be entertained should the final positions be relocated within the same room or not more than five (5) metres away from the original locations due to any requirement.
- D. For the purpose of this Specification and related Drawings, each lighting and small power point circuits shall in general be coded with a prefix to indicate the corresponding distribution board number; details on the circuit way and phase shall be submitted for the approval of Engineer.
- E. Certain types of electrical equipment or systems involving sudden changes, or low frequency or of direct electric current such as fluorescent lamps, contactors, etc. shall be fitted with radio and television interference suppression components suitable to meet the levels specified in BS 800 "Limits of Radio Interference".
- F. This section included the specification of the following :
1. Distribution boards
 2. Miniature circuit breakers
 3. Earth leakage circuit breakers
 4. 6A Switch Socket Outlet
 5. 16A Switch Socket Outlets
 6. Shaver Outlets
 7. Isolating Switches
 8. Conduit Boxes
 9. Contactors
 10. Dimmers Switch
 11. Time Switch
 12. Cooler Control Units
 13. Water Heater Switches
 14. Bell Push Switches

1.02 STANDARDS

- A. The complete wiring installation shall be engineered according to manufacturer data and constructed in accordance with the latest revision of the IS and the appropriate BS/IEC
- B. In the adoption of standards and requirements, the Contractor shall take the following precedence:
1. Engineer's decision;
 2. Local codes of practice;
 3. Drawings;
 4. Specification;
 5. International standards and requirements.

1.03 SUBMISSION

- A. All technical submissions shall be approved by the Engineer prior to the respective stages of construction.
- B. As a minimum requirement, the submission shall include the following:
 1. Equipment catalogues submission with manufacturer's data;
 2. Sample submission include all wiring accessories;
 3. Shop Drawings of the lighting and power positions, circuit numbers, cable routings, switching arrangement, mounting height, etc. The positions and mounting heights shall be coordinated with other services. Fixing details of all wiring accessories shall also be included.
 4. Drawings showing the installation details.
 5. Labeling system
 6. Builder's works requirement.

PART 2 – PRODUCT**2.01 LIGHTING POINT INSTALLATION**

- A. The various types of light fittings to be supplied and installed are described in the drawings and the Schedule of Lighting Fittings on Drawing
- B. Surface mounted light fitting shall terminate at a junction box having entries appropriate to the run of conduit and shall be complete with porcelain/ PVC connector suitable for the size and number of connections to be made at the point and the wiring required to connect the specified fitting. Wiring to the light fittings within the false ceiling spaces shall be by means of heat resistant (butyl or silicon rubber insulated to BS 6500) cables i.e. between the junction box and the lamp holder/terminal blocks, in flexible conduits.
- C. At every light fitting an approved type earthing terminal shall be provided for connection of the circuit protective conductor of the final circuit.
- D. Ferrous metalwork shall be of minimum thickness of 1mm. treated against corrosion by galvanising after welding or be lead primer or other approved process. Metalwork shall be painted with one priming coat, one under-coat and two top coats finished stove-enamelled matt white, unless otherwise specified.
- E. Cables used for internal wiring of the lighting fittings shall be of appropriate type and size and number. Conductor shall be of size not less than 1.5 sq.mm. single core or the equivalent. The insulation of the cables shall be able to withstand throughout the life of the fitting the maximum temperature to which it will be subject in normal use without deterioration which could affect the safety of the fitting.
- F. Cables within the lighting fittings shall be neatly bundled by nylon self locking cable ties; wiring shall be properly routed and secured away from control gear etc. wherever possible.
- G. All cable terminations within the light fittings shall be suitably shrouded to the approval of the Engineer.
- H. All lighting fittings shall be self-supporting complete with the appropriate fixing accessories such as clips, supporting brackets, suspension sets, nuts, washers, screws etc. for the proper installation of the fittings on different types of ceiling panels. Suspension sets shall be of adjustable type suitable to carry the weight of the lighting fittings and unless otherwise stated or indicated on Drawings, the suspension sets shall be generally 900 mm in length; exact lengths required shall suit site situations.
- I. All lamps complete with control gear necessary in operational condition shall be provided together with the lighting fittings as specified.

2.02 SWITCHES

- A. Lighting switches, unless otherwise specified, shall be single pole, quick make and slow-break, silent switch action type with solid silver alloy contacts and totally enclosed switch action for flush or surface mounting as required.
- B. Lighting switches shall be suitable for indoor or outdoor service according to location, housed in standardized purpose manufactured galvanized steel boxes completed with conduit knockouts made up into single or multi-gang units employing a grid switch system of fully interchangeable components at standardized fixing centres of matching switches of different types and ratings but of identical dimensions, push buttons, neon indicator lamps, blanking units, grids, steel boxes and plates all capable of integration into standard composite assemblies in any combination as required.
- C. Grids shall be adjustable for variation in depth of plaster and for squaring errors and of the same type for surface or flush mounting.
- D. Switches in mechanical plant rooms and electrical sub-stations and switch rooms shall be of the metal clad type approved by the Engineer, mounted in flush or surface conduit boxes as specified elsewhere.
- E. Switches located on brick or concrete walls shall be mounted in horizontal arrangement in plaster depth steel boxes or in galvanized steel boxes using box suspension straps and cover plates. Countersunk screws shall be provided for fixing to the conduit boxes.
- F. Switches for external use shall be of weatherproof construction with IP65 rating, unless otherwise specified.
- G. Samples of all switches, conduit boxes and plaster depth boxes shall be submitted to the Engineer for approval prior to installation.
- H. Samples shall be rated for 6 Amps (minimum light switch rating 6A), 16 Amps or 20 Amps as determined by circuit load which for inductive lighting circuit shall be assessed at twice the steady state connected load current, one way or two ways as indicated on the drawings and fixed generally at a height of 1200 mm from floor level and where located in rooms the switch shall, where possible be located on the inside of the room on the handle side of the door as close to the door as is practicable.
- I. An earthing terminal, connected to the earth continuity terminal shall be provided and connected to the circuit protective conductor at every lighting switch positions.
- J. Single pole switches shall be connected to break the phase wire of the supply; the neutral wire shall not be routed through switch boxes.
- K. Switches which are mounted in the same location shall be of multi-gang type, of the maximum number of gangs available.
- L. All switches used shall be of approved or prescribed items as required by local Authorities.
- M. Circuit from different phase and circuit from emergency power should have separate switch plate.

2.03 ISOLATION SWITCH

- A. Isolating switches shall be of the current ratings and number of poles (generally double pole for single phase and 4-pole three phases) as indicated on the Drawings.

- B. Isolating switches shall be of the totally enclosed pattern, metal-clad or polycarbonate with positive quick-make and quick-break action.
- C. Switches shall be capable of passing and also interrupting their full rated current safely and without damage.
- D. Ferrous materials shall be galvanised, switch handles shall be interlocked to prevent opening the cover with the switch "ON".

2.04 6 AMP SWITCH SOCKET OUTLETS

- A. Switch socket outlets shall be as per BS1363 single pole 6 Amp 3 round pin shuttered outlets, one or two gang for indoor service except otherwise specified and either surface or flush mounting according to location.
- B. Switches shall be of the quick-make slow break type with silent, totally enclosed switch action and solid silver alloy contacts. Switched socket outlets for indoor use shall be housed in suitable galvanized steel boxes to BS 4662 with conduit knockouts. Types and finishes of socket plates shall match those for the lighting switches.
- C. Generally switch socket outlets shall be positioned 300 mm above floor level except in plant rooms, kitchen, etc. where they shall be positioned 1400 mm above floor level or 150 mm above counters or benches whichever is suitable.
- D. Switch socket outlet in all mechanical plant rooms, electrical switch rooms shall be of the metal clad type, with recessed or protected switch dolly, mounted in flush or surface conduit boxes as specified elsewhere.
- E. All switch socket outlets used shall be of an approved quality.

2.05 16 AMP SWITCH SOCKET OUTLETS

- A. 16 Amp switch socket outlets shall be 3 pin round type to BS 546 shuttered, of a finished similar to 6 Amp switch socket outlets and flush mounted in galvanised steel conduit boxes to BS 4662 requirements.

2.06 WEATHERPROOF ISOLATOR

- A. Weatherproof enclosure shall be of the high impact, water resistant to IP65. The isolator provided shall complete with lockable device. Isolators shall be double-pole, 4-pole as specified.

2.07 LIGHTING DIMMERS SWITCH

- A. Lighting dimmer switch shall be the solid state, variable load, Thyristor controlled type suitable for controlling fluorescent and or incandescent lighting circuits operating at $230V \pm 6\%$ 50Hz single phase AC supply.
- B. Dimmer switch shall be manufactured to eliminate TV and radio frequency interference in compliance with IS.
- C. The ratings of the dimmer units shall be suitable for lighting circuit specified on Drawing.

2.08 TIME SWITCHES

- A. Time switches shall be self-contained units suitable for mains operation. All units shall have a self-starting synchronous motor with a single-pole fuse in the motor circuit, a 3-way terminal block and a thirty-six (36) hours spring reserve complete with an automatic solar dial.

- B. When fitted, the solar dial shall be capable of switching ON at sunset and OFF at sunrise throughout the year by control of a secondary calendar dial with month and day settings, and the automatic switching time shall be adjustable.
- C. Time switches shall be encased in a dust-tight metal casing have a hinged front cover with a clear Perspex window. The casing shall be effectively earthed.
- D. A manual bypass switch shall be incorporated with the time switch to facilitate maintenance of the latter.

2.09 MINIATURE CIRCUIT BREAKER

- A. The MCB shall be suitable for manual closing and opening and automatic tripping under overload and short circuit. The MCB shall also be trip free type.
- B. Single pole/three pole versions shall be furnished as required.
- C. The MCB shall be rated for 10 KA fault level.
- D. The MCB shall be suitable for its housing in the lighting boards and shall be suitable for connection at the outgoing side by tinned cable lugs and for bus-bars connection on the incoming side.
- E. The terminal of the MCBs and the open and close conditions shall be clearly and indelibly marked.
- F. The MCB shall generally conform to IS: 8828.

2.10 EARTH LEAKAGE CIRCUIT BREAKER

- A. ELCB shall be 4 pole 415 volts 50Hz, 30-300mA sensitivity. These shall be of approved make. The rating of the ELCB shall be as required. These shall be suitable for manual closing and opening and automatic tripping under earth fault circuit of 30-300mA as specified in item of work.
- B. The enclosure of the ELCB shall be moulded from high quality insulating material. The material shall be fire retardant, anti tracking, non-hygroscopic, impact resistant and shall with stand high temperature.
- C. All parts of switching mechanism shall be non-greasing, self lubricating material so as to provide consistent and trouble free operation.
- D. Operation of ELCB shall be independent of mounting position and shall be trip free type.

2.11 LIGHTING/SMALL POWER DISTRIBUTION BOARDS

- A. Distribution boards shall be of standard make with MCBs as per approved make given. Distribution boards shall be constructed out of steel sheet all weld enclosure with double door IP42 protection and shall be powder coated.
- B. Ample clearance between the conductors of opposite pole, between conductors and sheet steel body shall be maintained in order to obviate any chance of short circuit. Removable conduits entry plates shall be provided at top and bottom to facilitate drilling holes at site to suit individual requirements.
- C. Also on additional/separate adopter box of suitable length and size shall be provided to accommodate wires and cables. No. of conduits etc. and nothing shall be payable on this account.
- D. The MCBs shall be mounted on high grade rigid insulating support and connected by electrolytic copper bus bars.
- E. Each incoming MCB isolator shall be provided with solder-less cable sockets for crimping.

- F. Phase separation barriers made out of arc resistant materials shall be provided between the phases. Bus bars shall be colour coded for phase identification.
- G. Distribution boards shall be recessed in wall niche or if required mounted on the surface of the wall with necessary clamp bolts etc.
- H. The mounting height shall not exceed 1200mm from finished floor level. Distribution board shall be provided with proper circuit identification name plate and danger sticker/plate as per requirements.
- I. All the distribution boards shall be provided with engraved name plates with 'lighting', 'power' or 'UPS' with DB Nos., as the case may be.
- J. Each DB shall be provided with a circuit list giving details of each circuit. All the outgoing circuit wiring shall be provided with identification ferrules giving the circuit number & phase.
- K. Each distribution board shall have a separate neutral connection bar and a separate earth connection bar mounted within the DB each having the same number of terminals as the total number of outgoing individual circuits from the distribution board. Conduit & cable armouring shall be bonded together & connected to the distribution board earth bar.
- L. Where oversized cables are specified due to voltage drop problems, it shall be contractors responsibility to ensure that satisfactory terminal arrangements are provided without an extra cost.

2.12 TELEPHONE OUTLETS

- A. Telephone outlets where called for shall be single or twin of the flush mounted type suitable to receive the plug-in telephone cable lead to the approval of the Telecom. The finishes of the telephone outlet plates at various areas shall be as specified for lighting switches.

2.13 WATER COOLER DRINKING FOUNTAIN SWITCHES

- A. Water cooler switches shall be flush-mounted having double pole AC switch rated at 20 amps and marked "water cooler".
- B. Associated connector units shall be provided next to the water cooler.
- C. The switches and the connector shall be IP65 waterproof rating.

2.14 BELL PUSH SWITCHES

- A. Bell push switches shall be flush-mounted having a single-pole AC switch rated at 6 amps and marked with bell symbol.

2.15 SHAVER OUTLETS

- A. Shaver outlets shall comprise a 20VA continuously rated double wound isolating transformer to provide an earth-free AC supply at mains frequency, complete with self resetting thermal overload device fitted in the primary circuit an insulated voltage selector switch to provide either 115 or 230 volt output, one ON-OFF switch and one universal socket outlet suitable for British, American, Continental and Australian razor plugs, all contained in a recessed sheet steel box with insulated moulded front plate suitable for flush, mounting and suitably inscribed to give a clear indication of the voltages available at the outlet and the service of the outlet.

2.16 COOLER CONTROL UNITS

- A. Cooler Control Units shall be flush mounted having a double pole AC switch rated at 30 amps complete with pilot indicating lamps and a self adhesive plastic identification label mounted on a removable chassis contained within steel box finished aluminium stoved enamel provided with conduit knockouts

and earthing terminals. The cover plates shall be of the same finish as those specified for the lighting switches.

- B. Associated connector units shall be provided adjacent to the cooler units.
- C. Wirings between the cooler control units and associated connector units shall be provided in concealed conduits.

2.17 WATER HEATER SWITCHES

- A. Water heater switches shall be flush mounted having double pole AC switch rated at 20 amps fitted with pilot lamp and marked "water heater". The cover plates shall be of the same finish as those specified for the other switches. Associated connector units shall be provided next to the water heater units.

2.18 POWER SUPPLY FOR LIGHTING AT WET CONDITION

- A. Residual Current Circuit Breakers shall be provided individually for each circuits serving lighting subject to wet condition.

END OF SECTION