



ABU DHABI SEWERAGE SERVICES COMPANY (ADSSC)

GENERAL SPECIFICATION FOR ELECTRICAL WORKS

DIVISION 16 ELECTRICAL

SECTION 16060 DISCONNECT SWITCHES (DS)

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DOCUMENT CONTROL SHEET

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1 FUSE SWITCHES

- a) The Contractor shall comply with the provisions of Section 15001: General M&E Requirements.
- b) Fuse switches, where specified, shall comprise flush/surface mounted heavy-duty composite air break switches and fuse units complying with BS EN 60947-3 and fitted with fuses to BS EN 60269 and shall be rated and equipped as detailed. Composite units shall be contained within an enclosure of metal and shall be fitted with an earthing terminal or equivalent to enable the enclosures to be earthed irrespective of any means of connection such as is provided for attaching armouring or other metallic covering of the cable supplying the composite unit.
- c) Fuse switch shall be capable of making, carrying and breaking current under normal circuit condition, which may include specified operating overload conditions and also carrying for specified time currents under specified circuit conditions such as those of short circuit.
- d) The switch breaking capacity shall be related to AC 23 utilization category or other approved equivalent standard for 415V 3-phase 50Hz 4-wire operation for use on specified fault level and for service and site climatic conditions as described in Section 16020: Factory Built Assembly (FBA).
- e) BS EN 60269 compliant HRC fuses shall be provided as a mean of overcurrent/overload protective device to protect the switch. The maximum rated current of the fuse with regard to the prospective short circuit current in the actual circuit shall be mentioned.
- f) The fuse shall be connected after the switch so that a short circuit will not occur in the fuse-combination, thus for an expected fault to take place after the combination fuse switch unit
- g) In the event of a fault this combination shall provide protection, permitting switching without, for example contact welding and preventing separation of main contacts in case of fault occurring during running.
- h) The combination fuse switch unit shall be housed in an enclosure so constructed that the cover cannot be opened until the switch is fully opened and the construction shall be such that when the cover is opened a competent examiner can override the interlock and operate the switch. After such operation the cover shall be prevented from closing with the switch position indicator in a false position.
- i) Switches shall be provided with mechanical ON/OFF indicators and operating handles.
- j) Means shall be provided for locking the switch in the OFF position only.

- k) The combination fuse switch unit shall be fitted with 2NO + 2 NC auxiliary contacts wired to the terminals.

2 ISOLATOR

- a) The switch when used alone as explained above as an isolator shall confirm to the utilization category AC23 and shall fully comply with the requirement specified for isolating functions specially the isolating distance in accordance with the applicable standard.
- b) An isolator shall be capable of opening and closing the circuit ON-LOAD with full voltage applied across the terminals.
- c) The isolator shall be capable of carrying currents under normal circuit conditions and carrying for specified time currents under abnormal conditions such as those of short-circuit.
- d) All other features of the isolator shall be same as specified above for combination fuse switch unit.

3 FUSES

- a) These shall be selected according to the application and be suitable for the type of load they feed, for example motor starting, cable protection, protection for the semi conductor devices, control transformer protection etc.
- b) Fuses shall be sized according to the condition under which they will operate such as normal, small sustained overload, heavy overload etc. in order to consider the operating characteristics accordingly.
- c) The fuse shall either include a suitable fuse carrier or it shall be capable of isolation. If the fuse carrier is included it shall be such that when it is being withdrawn normally or when it is completely withdrawn the operator is completely protected from accidental contact with any live metal of its fuse link, fuse contacts and fixed contacts.
- d) Fuse/links shall be fixed inside cubicles with sufficient spacing to facilitate easy fuse/link withdrawal.
- e) If the fuse is capable of isolation it shall be so interlocked with the switch that isolation is complete before the fuse enclosure can be opened further. The switch shall be prevented from closing while the fuse-cover is open.
- f) All fuses shall be of HBC/HRC cartridge type to BS 88/BS EN 60269.

- g) Fuse holders and fittings shall be made of moulded plastic insulating material of an approved make. Ceramic materials will not be accepted. Fuse fittings shall be fully shrouded and it shall be possible to change the fuses without danger of contact with live metal.
- h) Fuse fittings shall have basic sizes of 16, 32, 63, 100 and 200A and the fuse holders shall be able to accept fuse links of that rating on any BS rating down to the next basic size.
- i) A mechanical indication device shall be built into the fuse to indicate operation/fail status.

4 CHANGEOVER SWITCH

- a) A changeover switch, where specified, shall be provided in accordance with BS EN 60947-3. It shall be manually operated multipole type suitable to provide changeover and safety isolation between two low voltage power supplies rated 415V 3-phase 4-wire 50Hz under load conditions.
- b) The switch breaking capacity shall be related to AC 23 utilization category or other approved equivalent standard for 415V 3-phase 4-wire 50Hz operation for use on specified fault level and for service and site climatic conditions as described in Section 16020: Factory Built Assembly (FBA).
- c) The changeover switch shall be periodically maintained to ensure proper operation and system reliability.

5 TRANSFER SWITCH ATS/MTS/BYPASS

- a) A transfer switch, where specified, shall be provided in accordance with BS EN 60947-6.
- b) The transfer switch shall be of the withdrawable type allowing easy removal of the switch for maintenance and without disconnecting the power cables.
- c) ATS/MTS functions shall be mechanically and electrically interlocked to ensure proper sequence of operation.
- d) Bypass switch contacts to close only during the bypass isolation operation. Bypass of the load to either normal or emergency power source with complete isolation of the ATS shall be possible regardless of the status of the ATS.
- e) The switch breaking capacity shall be related to AC 23 utilization category or other approved equivalent standard for 415V 3-phase 4-wire 50Hz operation for use on specified fault level and for service and site

climatic conditions as described in Section 16020: Factory Built Assembly (FBA).

- f) The ATS, MTS and Bypass Isolation switch shall be provided from a single manufacturer.
- g) A visual indication shall be provided to indicate ATS/MTS/Bypass position.
- h) The ATS shall incorporate adjustable 3 Phase under- and over-voltage and frequency sensing on normal and emergency source.
- i) Whenever there is a voltage dip of 80% or below in any phase of the normal source or frequency displacement of 2Hz from the nominal for a maximum period of 10 seconds (field adjustable) a contact shall close to initiate starting of the engine generator.
- j) Upon emergency source reaching required power supply of 415V 3-Phase 50Hz $\pm 5\%$, the load shall be transferred to the emergency source after a programmable set time delay.
- k) When the normal source has been restored to 90% or more of the rated voltage on all phases, the load shall be retransferred to the normal source after a programmable set time delay.
- l) Upon restoration of the normal source to full voltage and frequency, the generator will continue to run unloaded for about 5 to 10 minutes programmable and then shutdown. The generator shall now be ready for next operation automatically in case of failure of a normal source.
- m) It may be possible that the generator fails during running on load; retransfer under such condition to normal source shall be made instantaneously upon restoration of proper voltage and frequency.
- n) The transfer function shall be achieved through purpose designed microprocessor based controller equipped with LCD digital display and a keypad/touch pad for parametering.
- o) Auxiliary contacts wired to terminal shall be provided to indicate normal and emergency source availability.
- p) A periodic NO-LOAD test on Transfer switches shall be conducted and logged.

6 SOURCE TESTS

- a) Provide testing and analysis covered under Section 16010: General M&E Requirements.
- b) All Switches shall be subject to the following witness tests to BS EN 60947 or other approved equivalent standard for voltages up to and including 1000 Volts:
 - i). Routine tests including H.V. pressure test, millivolt drop tests and mechanical tests.
 - ii). Functional tests
 - iii). Current injection tests as described under Section 16020 FBA
 - iv). Type Test Certificates giving records of performance for identical circuit breakers shall be made available.

END OF SECTION