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27 BATTERY AND BATTERY CHARGER

27.1 GENERAL

27.1.1 Scope

1 This Part specifies the requirements for battery and battery charger.

2 Related Parts and Sections are as follows:

This Section
Part 2..... FBA
Part 3..... Protective Devices
Part 6..... Cables and small wiring
Part 7..... Conduits
Part 8..... Trunking
Part 9..... Cable Trays
Part 10..... Accessories and General Power

27.1.2 Description

1 A single battery and battery charger shall be provided for each FBA of motor control centre, control desk or control panel.

27.1.3 References

1 The following Standards are referred to in this Part:

EIC 157 .....Low Voltage Switchgear and Control gear; (IEC 60947 Low-voltage switchgear and controlgear)

EIC 158 .....Low Voltage Control gear; (IEC-60947-4-1 Low-voltage switchgear and controlgear - Part 4-1: Contactors and motor-starters - Electromechanical contactors and motor-starters; IEC TR 63196 Switchgear and controlgear and their assemblies for low-voltage - Energy efficiency; IEC 61095 Electromechanical contactors for household and similar purposes)

EN 60146-1 .....Semiconductor converters - General requirements and line commutated ;(IEC 60146-1-1 Semiconductor converters - General requirements and line commutated converters - Part 1-1: Specification of basic requirements; IEC TR 60146-1-2 Semiconductor converters - General requirements and line commutated converters - Part 1-2: Application guidelines)

EN 60623 .....Secondary cells and batteries containing alkaline or other non-acid electrolytes - Vented nickel-cadmium prismatic rechargeable single cells; (IEC 60623 Secondary cells and batteries containing alkaline or other non-acid electrolytes - Vented nickel-cadmium prismatic rechargeable single cells)

27.1.4 Submissions

1 Submissions shall be in accordance with Part 1 of this Section and Part 7 of Section 1.

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2 Shop Drawings submission shall include dimensional drawings of the battery and battery charger, including sections and elevations, showing the following:

(a) sizes and positions of components

(b) positions and method of fixing cable and boxes

(c) location of terminal boards

(d) Internal wiring diagram

(e) Power and control diagrams

(f) External connection drawings

(g) Component parts lists

(h) Other pertinent data.

(i) Spare parts list

3 Submission of project data shall be as follows:

(a) full specifications of the enclosure and the components of the equipment with relevant sheets of manufacturer's catalogues

(b) confirmation that the equipment complies with the relevant specifications.

(c) Detailed battery and battery charger size calculation

(d) Previous approval in similar applications

27.2 PRODUCTS

27.2.1 General

1 The batteries and chargers shall be used as back-up power source for uninterruptible and bumpless operation of controls, instrumentation, alarm and monitoring equipment, but not for switchgear tripping/closing or other special function batteries.

2 Where alternate a.c. supplies are available, provide for taking the supply to the battery charger from either source (e.g. from either side of the bus-section switch) with facilities for automatic changeover from one source to the other in the event of failure of the supply system.

3 The battery and charger unit shall be housed in the common control section of the MCC provided that the battery is of the sealed type and shall not release any corrosive media. If the battery is not sealed it shall be mounted in a separate compartment.

4 A separate sheet steel floor standing cubicle having adequate ventilation and separate compartments for the batteries (lower compartment) and chargers (upper compartment) with associated control and protection devices and accessories may be used as a stand-alone unit for large capacities where it is difficult to accommodate within a dedicated section of the MCC and in case of all other applications wherever specified.

5 When used as a stand-alone unit, the access to the batteries shall be via lockable, hinged doors, and to the chargers via removable covers.

6 Batteries and charger units shall be suitable for the intended service under the prevailing climate and environments conditions and Tropical use.

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7 Unless specified elsewhere the, the battery charger shall confirm to the specification herein.

8 Form 4 panels when equipped with battery and charger shall be provided with fully segregated/shrouded arrangement for the batteries within the cubicle, ensuring proper ventilation. Alternatively batteries may be located in a separate enclosure installed within the close proximity of the control panel.

27.2.2 Batteries

1 Nickel Cadmium sealed batteries shall be used confirming to EN 60623.

2 The batteries shall be maintenance free long life Nickel Cadmium sealed type with a nominal output of 24 volts, and shall be of adequate capacity to maintain full operation of the relevant load equipment's' plus an additional 20 per cent, for a period of 8 hours during mains failure, assuming a normal charge condition at the start of the mains failure.

3 All batteries shall be protected from mechanical damage and any accidental electric shorting. All batteries shall be supplied in banks sized for easy handling, and all interconnections shall be included. Batteries shall not be housed above charger units or any other equipment and shall be so ventilated that gases do not permeate into adjacent equipment.

4 Needs to mention information & details about Buried Batteries (batteries which are buried under ground) life, protection and its maintenance procedure, where Batteries are buried under ground in a chamber (usually these buried batteries are applicable for Solar Panels in order to protect batteries from high ambient temperature of more than 50 degrees centigrade and high relative humidity).

27.2.3 Battery Chargers

1 Battery Chargers shall confirm to EN 60146-1.

2 Battery chargers complete with associated controls shall be provided and mounted on its own chassis and housed in one of the section of the FBA, stand-alone panel or in a separate enclosure as applicable.

(a) The front panel for each charger unit shall include:-

1 No. "ON/OFF" Mains switch
1 No. Lamp to indicate "A.C. Supply On" (white)
1 No. Charger Ammeter
1 No. Lamp to indicate "Boost Charge" (Red)
1 No. Lamp to indicate "Float Charge" (White)
1 No. Lamp to indicate "Charger Failed" (Amber)
1 No. Lamp test push button

(b) Each charger unit shall also be provided with:-

1 No. "Float/Boost" selector switch, mounted internally
1 No. Set of a.c. supply fuses
1 No. volt-free contact for charger failed alarm
1 No. volt-free contact for low d.c. output voltage alarm
1 No. volt free contact for loss of d.c. output voltage alarm

3 The chargers shall protect the batteries from deep discharge and over charging.

4 Volt free contacts shall operate in fail-safe mode and be wired to terminal block.

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5 The Charger unit shall also be equipped with the following:-

6 1 No. DC output voltmeter, scaled to indicate regions of “Low”, “Normal” and “High” output voltages, by the use of different colored sectors.

7 1 No. D.C. output switch

8 1 No. D.C. output Ammeter

9 The charger unit shall also be provided with one set of full capacity rated output d.c. terminals and fuses.

10 In the event of failure of the charger, the batteries shall ensure operation of controls, instrumentation, alarm and monitoring equipment for at least 6 hours. A separate relay contact shall be provided to indicate “Critical Alarm Condition – Charger Fail".

11 The chargers shall be of the constant potential type, and shall be designed to regulate the charger output voltage to within +/- 1 percent.

12 A suitable means shall be provided to the approval of Engineer to protect the batteries from deep discharge. Alarm shall be provided for this condition.

13 The D.C. terminal voltage shall be regulated such that under “Float” or “Boost” charge condition the DC voltage does not rise to more than 10 percent above the nominal.

14 The charger unit shall also be provided with both short circuit and reverse polarity functions.

15 The charger when selected to “Float” shall be capable of restoring the battery to 75 percent capacity within 7 - 8 hours.

16 Under “Boost” condition the charger shall be capable of restoring a fully discharged battery to 75 percent capacity within 4 - 5 hours.

17 Fix inside the cubicle a wiring diagram indicating and identifying all outgoing terminals, components and fuses, and also a warning label in Arabic and English giving maintenance and safety instructions.

18 The Battery Charger shall be connected to PLC/SCADA control room and all the information’s available in the charger shall be transmitted to SCADA for battery chargers larger than 50 KW.

27.3 QUALITY CONTROL AND TEST PROCEDURES

27.3.1 General

1 The manufacturer shall provide proof of a stringent Quality Control Program or Inspection Test Plan (ITP). In particular the main equipment manufacturing stages sanctioned by appropriate tests such as: incoming components inspection, discrete sub-assembly tests and complete functional checks on the final product. Equipment shall undergo on-load burn-in leaving the factory. Final inspection and calibration operations shall be documented in a report drawn up by the supplier’s Quality Inspection department and/or qualified Third Party Agency (TPA).

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2 Complete charge and discharge tests on each battery and combined battery and charger shall be conducted and results recorded so as to permit verification of the ampere-hour capacity of the battery. During these tests five reference cells shall be selected at random and the voltage curves thereof shall be checked when the battery is discharged over three and ten hour periods. The automatic control feature of the charger shall be demonstrated over the specified load range.

3 The integrated functional test shall be conducted at manufacturer's works to ensure satisfactorily functioning of the equipment.

4 The Assembly shall not leave the manufacturer's works until the works test sheets have been duly approved and stamped by the Engineer and written permission is obtained for their dispatch to site.

27.4 ENVIRONMENT

27.4.1 General

1 Environmental conditions shall be in accordance with Section 1 Part 1 unless specified herein.

2 Minimum ambient temperature shall be 0°C.

3 Maximum relative humidity shall be 95%.

END OF PART

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