



उत्पाद मानक (हीप : हरिद्वार)

TG60667

PRODUCT STANDARD (HEEP: HARIDWAR)

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Based on own experience

SPECIFICATION FOR DC STARTER CABINETS FOR THERMAL POWER PLANTS

1. SCOPE OF SPECIFICATION

1.1 This specification covers the technical requirements for design, manufacturing and testing of the following DC starter cabinets for operation in various Thermal/ Combined Cycle Power Plants:-

- (a) DC.JOP- DC Jacking Oil Pump Starter Cabinet.
- (b) DC.EOP- DC Emergency Lube Oil Pump Starter Cabinet.
- (c) DC.SOP- DC Seal Oil Pump Starter Cabinet.

The specification covers the requirement of switchgears, control-gears and control panels to cater the need of all operational & control requirements including interlocks and protection of main equipment/ systems.

The DC Starter panel houses various power devices such as line contactor, thermal overload relay, switch disconnector unit, fuses, shunt & ammeter, signaling lamps etc for reliable operational start of the pump motor.

2.0 TECHNICAL REQUIREMENTS.

2.1 The Starter cabinet shall be free standing floor mounted type. The size of each starter cabinet shall be generally 800(W) X800(D) X2280(H) including lifting hooks and bottom channel. However, width of cabinet for 75 KW & 90 KW starter cabinet shall be 1000mm & 1200mm respectively.

2.2 Schematic Diagram (Including BOM) of each Starter shall be provided along with enquiry. After placement of PO, the party shall furnish manufacturing documents for BHEL approval.

2.3 All items (as per BOM) shall be procured from BHEL approved vendors as indicated in BOM. Prior approval shall be obtained for any deviation. The items shall be mounted on phenolic laminated paper base sheet or a better substitute.

2.4 The Cabinet shall have Single door at Front & Back for width ≤ 1000 mm. For Cabinets with width ≥ 1000 mm double door to be provided. Stiffeners shall be provided on front door for rigidity if required.

2.5 Ambient Conditions: - Temperature- 0- 50°C
Relative humidity 0- 95%

नाम NAME	दिनांक एवं हस्ताक्षर SIGNATURE & DATE
अनुवादक TRANSLATED BY	
निर्माणकर्ता WORKED BY	BRIJ LAL RAM 11/05/20
जांचकर्ता CHECKED BY	MAYURI KATIYAR 11/05/20
पर्यवेक्षणकर्ता SUPERVISED BY	RAJNISH GUPTA 11/05/20
स्वीकृति APPROVED : B.S. RANA (AGM CIE)	Gr. NO. 8.10
निर्माण PREPARED : CIE	आरी ISSUED : TSX
दिनांक DATE : 04.08.1980	

REV.NO. 03	
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इस प्रलेख में दी गई सूचना भारत भारती प्रत्येक व्यक्ति के सम्पत्ति है, प्रकाश प्रलेख एवं अन्यथा रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में प्रतिस्पर्धा हो न किया जाय।

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INVENTORY NO.REV.
NO.
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Brij Lal

11/05/20

जांचकर्ता
CHECKED BYMAYURI
KATIYAR

Mayuri

11/05/2020

2.6 The cabinets shall confirm to IP: 54 Degree of protection as per IS: 8623. All doors & removable covers shall be provided with neoprene rubber gaskets or better substitute. The Cabinets shall be installed in non AC covered Hall at site. 3-point door lock system with handle shall be provided on front & back door.

2.7 *Material of Fabricated Structure*- Cabinets shall be manufactured with front & rear doors/ covers of cold rolled (CR) sheet steel of minimum 2.0 mm thickness. Load bearing parts shall be of 2.5 mm minimum thickness. Alternately, load bearing part mounted on 7 fold or more profile structure with minimum thickness of 1.5mm is acceptable. The gland plates will be made of 3 mm CRCA sheets. Base frame will be made of 3 mm formed sheet in black colour. All steel sheets shall conform to IS:513. Anti-vibration rubber sheet mat of minimum thickness 15 mm for the individual cabinets to be supplied duly mounted between cabinets base frame.

2.8 The chemical pretreatment shall be done on ferrous components prior to manufacturing/ painting. The components shall be properly degreased, rinsed, descaled, pickled, derusted, passed through phosphating & passivation bath in accordance (7 tank process) with standard engineering practices.

2.9 While making slots, care should be taken so that dents do not appear on the sheets. Cut outs should not have any burrs.

2.10 *Exterior/ Interior colour and Door cutout details of Cabinets shall be given after placement of PO.* The Paint thickness shall be minimum 75 microns. Only powder coating painting is acceptable.

2.11 The size of Power & control cable will be indicated in Schematic Diagram. Proper identification of power & control cables shall be done at both ends. All wirings shall be done with 1100V grade FRLS PVC insulated single core flexible copper wire as under-

(a) DC Voltage Circuit (Control wiring)-1.5 Sq.mm (DC SOP, DC EOP, DC JOP)-Black.

(b) DC Voltage Circuit (Power wiring)-16, 32, 150 etc Sq.mm for (DC SOP, DC EOP, DC JOP respectively) - Black. Suitable size copper busbars may be substituted for power cable to facilitate layout.

(c) AC Control Circuit - 1.5 Sq.mm (Red, Yellow, Blue).

(d) Earthing circuit - 2.5 Sq.mm, green colour.

2.12 Terminal Blocks for control wiring shall be screwless type. There shall be no connection on customer side of Terminal Block. The Terminal Block shall be 650V grade having current rating of minimum 10A. Some spare terminals on items shall also be brought to Terminal Block. There shall be 20% spare terminals.

2.13 Wiring between items mounted on the door and items inside the panel shall have sufficient cable loop for door opening.

2.14 For power wiring terminal strips of suitable size (current carrying capacity should be at least 50% more than rated current of line contactor) should be provided for incoming power terminals and outgoing terminals to motors/ starting resistance. Channels for cable support shall be provided parallel to Terminal Block for outgoing cables.

2.15 Gap between edges of flanges, where two components meet, shall not be more than 1 mm uniformly. Gap around the doors/ covers and frame should not be more than 2.5 mm and should be uniform throughout the length with a tolerance of ± 0.5 mm.



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- 2.16 Earth bus of size 25x3 mm tinned copper (with 6 holes) shall be provided along the entire width of the cabinets with 2 no. Brass Earthing studs (M10) at both sides for connecting to plant earthing.
- 2.17 The cabinet will be supplied with the Name Plate fixed near front top edge as per description (in white colour) given below. The supplier may use black super-bright acrylic sheet of good aesthetics of dimension of approximately 600(L) x 40(H) fixed on the cabinet. Other material of the nameplate will be subject to BHEL's approval. The display on Name Plate shall be as follows:-
- DC.JOP Starter Cabinet (ANK01A) for DC.JOP panel.
DC.EOP Starter Cabinet (ANK01B) for DC EOP panel.
DC.SOP Starter Cabinet (CXW01A) for DC SOP panel.
- 2.18 The cabinet will be supplied with Danger sticker '220V DC' fixed on the panel.
- 2.19 Anodized aluminium name plate with white engraving on black back ground shall be provided for each item. The height of the letters shall be 3mm and the width shall be 2mm (or as specified in enquiry/order). The letters shall be symmetrically engraved.
- 2.20 The cabinet will be complete with all mounting accessories for site installation. Details will be brought out by the supplier in the offer.
- 2.21 Supplier will be required to take prior approval for every deviation from the indenting specifications / drawings, if any.
- 2.22 At any stage of manufacture BHEL reserve the right to modify the specification/ drawing for improvement or to meet customer's requirements.
- 2.23 All wiring shall be neat, secured, well dressed and routed through PVC cable channel / duct. The PVC cable channel/ duct (with cover) of good quality and aesthetic appearance shall be provided to properly cover the bunch of wires.

3.0 DOCUMENTS TO BE SENT ON RECEIPT OF PO

The vendor should send following drawings for our approval within 3 weeks of receiving PO.

- General Arrangement Drawing
- Schematic Diagram (including BOM)
- Details of Fabricated Structure like sheet thickness, Gland plate, Base plate, load bearing structure etc.
- Quality Plan in BHEL format giving details of Tests to be carried out during various stages of manufacturing.
- Copy of Type Test certificate.

Manufacturing shall start only after BHEL approval.

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4.0 TESTING: -Panels shall be tested as per already Approved QP and IS: 8623.

4.1 ROUTINE TESTING: -All Starter Cabinets shall be subjected to following Tests at supplier works: -

4.1.1 Dimensional/ Visual checking as per approved General arrangement drawing.

4.1.2 Checking of paint shade and paint thickness, adhesiveness.

4.1.3 IR value of cabinet before & after HV Test. The value shall not be less than 20M ohms.

4.1.4 HV test at 2KV rms for 1 sec. between live & earth parts as per relevant IS (excluding electronics components/ modules).

4.1.5 Functional checking of equipment as per Approved schematics.

All the tests shall be covered in Quality Plan.

Panels shall be checked for connections, wiring layout etc as per good engineering practices.

4.2 TYPE TESTING: -

Type test certificate for Degree of Protection. It should not be older than 5 years

5.0 QUALITY PLAN & INSPECTION: -

5.1 BHEL reserves the right to depute BHEL/ customer's representative at any stage of testing as per Approved QP.

5.2 Test certificates for Routine & Type tests certificates conducted earlier shall be furnished at the time of Inspection.

6.0 ACCEPTANCE NORMS

6.1 Compliance to clause 4.0

6.2 Carrying out Routine Test as per clause 4.0

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7.0 PACKING & TRANSPORTATION: -

- 7.1 Each Starter Cabinet shall be packed separately and dispatched to site as per PO.
- 7.2 The equipment/ accessories shall be fixed before dispatch and packing should be done with adequate cautioning material to minimize movement of internal and be able to withstand transit risks, loading & unloading.
- 7.3 Packing shall be properly identified and marked giving details of dimensions' net/ gross weight. The destination address will be communicated with enquiry.
- 7.4 Peelable compound coating (polyurethane) shall be provided, if possible.
- 7.5 The package shall be suitably protected from moisture ingress.
- 7.6 The package is likely to be stored in covered shade for approx. 6 months at site before commissioning.

8.0 DOCUMENTS TO BE SENT ALONG WITH SUPPLIES.

- 8.1 Eight prints of O&M manual (separate for each Starter Cabinet) comprising of 'AS built' General View, Schematic Diagram (including BOM), Wiring Diagram, connection details on terminal block, catalogues of all items, handling instructions and any other drawing/ document facilitating maintenance shall be sent to site.
- 8.2 Two (2) CD's containing soft copies of O&M manual.
- 8.3 Two (2) nos. of O&M Manual and one CD shall be sent to HEEP Haridwar.

9.0 MANDATORY SPARES

Mandatory spares if required, shall be called under separate material code in enquiry. This shall be packed in separate GREEN colored box for distinct identification at site.

10.0 GUARANTEE

The equipment shall be guaranteed for a minimum of 18 months from the date of supply or 12 months from the date of commissioning whichever is earlier.

11.0 CROSS REFERRED STANDARDS: IS: 8623, IS:513

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