

**Framework Confidentiality Agreement cum Undertaking**

This Agreement made on this the \_\_\_\_\_ day of (month) \_\_\_\_\_ 20\_\_\_\_ (“Effective Date”) by and between  
M/s BHARAT HEAVY ELECTRICALS LIMITED, having registered office at “BHEL House”, Siri Fort, New Delhi – 110049 (India), acting through its \_\_\_\_\_ Unit (hereinafter may be referred to as “BHEL” or “the Company”).

And

M/s \_\_\_\_\_ (address) \_\_\_\_\_  
represented by authorized representative Sri \_\_\_\_\_ (herein after referred to as the “Supplier”).

The Supplier and the Company may, unless the context otherwise requires, hereinafter be collectively referred to as “Parties” or singly as the “Party”.

**RECITALS**

Whereas, BHEL is engaged in the design, engineering, manufacturing, construction, testing, commissioning and servicing of a wide range of products, systems and services for the core sectors of the economy, viz. Power, Transmission, Industry, Transportation, Renewable energy, Oil & Gas and Defence and providing associated services to varied customers in relation to which BHEL/its affiliates own valuable information of a secret and confidential nature.

Whereas the Company may, in connection with Contract(s) (as defined hereunder) placed or to be placed upon the Supplier, or otherwise, from time to time, make available, Technical Information as is defined hereunder.

And Whereas BHEL is willing to provide such Technical Information to the Supplier from time to time and the Supplier understands and acknowledges that such Technical Information is valuable for the Company and as such is willing to protect confidentiality of such information, subject to the terms and conditions set out hereunder.

Now therefore, in view of the foregoing premises and in consideration of the mutual covenants and agreements hereinafter set forth, the Parties agree as under:

**1. Definitions:**

Unless the context so requires, in this Agreement, the following terms will bear the meaning ascribed to the said term in this clause.

- A. **“Contract”** means the Contract entered into with a Supplier and includes a Purchase Order, or a Work Order for procurement of any goods or for provision of any services.
- B. **“Effective Date”** means the date of this Agreement as mentioned in the preamble of this Agreement.

- C. **“Supplier”** includes a Contractor or a Vendor of the Company whether for supplying of goods or for providing any services under a Contract or both.
  - D. **“Technical Information”** includes Drawings, and/or Product Standards and/or Specifications and/or Corporate / Plant Specifications and/or Technological Process Sheets and/or Technical Data Sheets and/or Jigs & Fixtures and/or Pattern & Dies and/or Special Gauges and/or Tools etc. belonging to or wherein the Company has acquired from a third party a right of user and includes any improvement thereto from time to time whether carried out by the Company or by the Supplier.
  - E. **“Intended Purpose”** means the purpose for which the Technical Information is provided to the Supplier under or in connection with a Contract.
  - F. **“Improvement”** includes any modification made to, or adaptation of, the Technical Information which enhances or is calculated to enhance the performance (whether in terms of effectiveness or in terms of efficiency or both) of the product and/or the service to be provided by the Supplier under a Contract.
2. This Agreement shall come into force/deemed to have come into force, as the case may be, on the Effective Date; or, on the first date when the Technical Information or any part thereof is provided by BHEL to the Supplier; whichever is earlier.
3. **Agreement deemed to be incorporated in each Contract:** Unless and to the extent otherwise stipulated in the Contract, the conditions of this Agreement are deemed to be incorporated in all Contracts which may be entered into between the Company and the Supplier. Further, unless otherwise stipulated, the obligations under this Agreement are and will be independent of the obligations under the Contracts and such obligations of the Supplier hereunder will remain of full effect and validity notwithstanding that the period of validity of the Contracts has expired by efflux of time stipulated therein; or, the contract has been discharged by performance or breach; or, the termination of the Contracts for any reason whatsoever.
4. **Ownership:**
- 4.1 The Company may, from time to time, make available to the Supplier, Technical Information on a non-exclusive basis by way of loan.
  - 4.2 The Supplier acknowledges and agrees that all Technical Information and copies thereof that are or may be provided by the Company to the Supplier, are and shall remain the property of BHEL or that of the concerned entity from whom BHEL has obtained the Technical Information and such Technical Information are and shall constitute trade secrets of the BHEL. Nothing in this Agreement or in any disclosures made hereunder by or on behalf of the Company shall be construed as granting upon the Supplier any patent, copyright or design or any other intellectual property rights of whatsoever description that subsists or may hereinafter exist in the Technical Information. Furthermore, nothing in this Agreement or in any disclosures made hereunder by or on behalf of the Company shall be construed as granting upon the Supplier any license or rights of use of such patent, copyright or design or any other

intellectual property rights of whatsoever description which may now or hereafter exist in the Technical Information except for use of the Technical Information strictly in accordance with this Agreement and the Contract and/or as directed in writing by the Company, solely for the Intended Purpose under the Contract.

- 4.3 Neither Party is obligated by or under this Agreement to purchase from or provide to the other Party any service or product and that any such purchase/sale of any product and/or service by one Party to the other Party will be governed by the Contract if any, that may be entered into by and between the Company and the Supplier.
- 4.4 The Supplier is/has been made well aware and acknowledges that the Technical Information being/which may be shared with it by the Company has been either generated by the Company by incurring huge investment and cost or obtained from foreign collaborators under Technical Collaboration Agreement (TCA) with stringent confidentiality conditions.
- 4.5 The Supplier agrees and undertakes to adhere to confidentiality requirements as applicable to BHEL under a TCA and also ensure that the confidentiality requirements are adhered to by all its concerned employees or sub-contractors/suppliers (where permitted to be engaged by BHEL). Any damages, losses, expenses of any description whatsoever, arising out of or in connection with a breach of the confidentiality requirements under a TCA owing to any act or omission on the part of the Supplier or its employees or sub-contractors/suppliers that is claimed by a foreign collaborator from the Company shall be wholly borne by the Supplier and it shall keep BHEL fully indemnified in this behalf. The demand by the Company shall be conclusive upon the Supplier who shall thereupon forthwith pay to the Company without demur, dispute or delay the amount as demanded without demanding any further proof thereof.
- 4.6 The Supplier agrees and undertakes that unless so decided and advised by the Company in writing all rights/title to any Improvement to the Technical Information shall vest in the Company. The Supplier undertakes and agrees to inform forthwith to the Company of any such Improvement made to the Technical Information and transfer all drawings/documents or other materials connected with such Improvement to the Company and also agrees to fully cooperate with the Company for protecting the Company's interests in such Improvement in the Technical Information including but not limited to obtaining necessary protection for the intellectual property rights in such improvement, if so desired by the Company. If a question arises whether a modification amounts to Improvement to the Technical Information, the same shall be decided by the Company and such decision shall be final and binding upon the Supplier.

**5. Use and Non-Disclosure:**

- 5.1 Unless otherwise stipulated by the Company, all Technical Information made available to the Supplier, by the Company shall be treated as Confidential irrespective of whether the same is marked or otherwise denoted to be Confidential or not.

- 5.2 The Supplier undertakes and agrees that the Technical Information in its possession shall be held in strict confidence and will be used strictly in accordance with this Agreement and solely for the Intended Purpose under the Contract. Use of the Technical Information for any other purpose other than Intended Purpose is prohibited.
- 5.3 In particular, the Supplier shall not use Technical Information or any Improvement in its possession for the manufacture or procurement of the Product(s) or components or parts thereof or use the Technical Information or any portion thereof or any modification or adaptation thereof in any form to provide any product and/or service to any third party, without the prior written consent of the Company.
- 5.4 The Supplier shall not disclose any of such Technical Information to any third party without the prior written consent of the Company. The Supplier agrees that without prior written consent of the Company, the Supplier shall not disclose to a third party about the existence of this Agreement, or of the fact that it is/was in possession of or has experience in the use of any Technical Information nor shall the Supplier share in any manner whatsoever, with a third party, the name or details of any Contract(s) awarded by the Company to it or performed by the Supplier or the scope of work thereof or share any document or correspondence by and between the Company and the Supplier in or in connection with this Agreement or such Contract(s). Notwithstanding what is stated elsewhere, the overall responsibility of any breach of the confidentiality provisions under this Agreement shall rest with the Supplier.
- 5.5 The Supplier undertakes and agrees not to make copies or extracts of and not to disclose to others any or all of the Technical Information in its possession, except as follows:
- (a) The Supplier may disclose the Technical Information to such of its officers and employees strictly to the extent as is necessary for such officer or employee for the Intended Purpose, provided that the Confidential Information (or copies thereof) disclosed shall be marked clearly as the confidential and proprietary information of Company and that such officers and employees shall similarly be bound by undertakings of confidence, restricted use and non-disclosure in respect of the Technical Information. The Supplier shall be responsible for any breach of such confidentiality provisions by such officers and employees.
  - (b) With the prior written consent of Company, the Supplier may disclose for the Intended Purpose such Technical Information as is provided for in such consent to such of its professional advisers: consultants, insurers and subcontractors who shall be similarly bound by undertakings of confidence, restricted use and non-disclosure in respect of such Technical Information.
  - (c) The Supplier shall not be prevented to make any disclosure required by (i) order of a court of competent jurisdiction or (ii) any competent regulatory authority or agency where such disclosure is required by law, provided that where the Supplier

intends to make such disclosure, it shall first consult Company and take all reasonable steps requested by it to minimize the extent of the Technical Information disclosed and to make such disclosure in confidence and also shall cooperate with the Company in seeking any protective order or any other remedy from proper authority in this matter.

**6. Exceptions:**

The obligations of the Supplier pursuant to the provisions of this agreement shall not apply to any Confidential Information that:

- a) was/is known to, or in the possession of the Supplier prior to disclosure thereof by the Company;
- b) is or becomes publicly known, otherwise than as a result of a breach of this agreement by the Supplier.
- c) is developed independently of the Disclosing Party by the Supplier in circumstances that do not amount to a breach of the provisions of this Agreement or the Contract;
- d) is received from a third party in circumstances that do not result in a breach of the provisions of this Agreement.

7. The obligation of maintaining confidentiality of the Technical Information on each occasion, shall subsist for the entire duration during which the Technical Information / equipment is in possession of the Supplier and shall thereafter subsist for a further period of --- years from the date when the complete Technical Information has been returned to the Company and if Technical Information has been returned in portions on different dates then, the period of ---- years will be reckoned from the date when the last portion of the Technical Information has been returned. Notwithstanding the expiry of the confidentiality obligation, the obligation of the Supplier under clause 5.4 shall continue to subsist for a further period of ----- years.

**8. Warranties & Undertakings:**

a) The Supplier undertakes to ensure the due observance of the undertakings of confidence, restricted use and non-disclosure by its persons to whom it discloses or releases copies or extracts of the Technical Information.

b) The Supplier shall keep the Technical Information or improvement made therein properly segregated and not mix up the same with any other material/documents belonging to him/it or to any other third party.

c) The Supplier further undertakes that he/it shall not hypothecate or give on lease or otherwise alienate or do away with any of the Technical Information and/or equipment of the Company, made available to him/it, and undertakes that he/it shall hold the same as a trustee, in capacity of custodian thereof and use/utilise the same solely for the purpose of executing the Contract awarded by the Company.

d) The Supplier further undertakes that he/it shall return all the equipment and/or Technical Information as far as practicable in the same condition in which the same was made available to him/it by the Company together with any Improvement thereon and the documents connected with such Improvement, to the Company forthwith upon completion of the scope

of work or Contract for which such Technical Information was provided by the Company to it or as directed by the Company together with a confirmation by way of an affidavit or in such manner as directed by the Company that it has not retained any equipment and/or Technical Information/Improvement thereof. In case any such equipment and/or Technical Information or Improvement thereof shall remain in his possession or is not capable of being returned, the retention and use of such Technical Information or Improvement thereto shall continue to be governed by this Agreement.

e) The Supplier undertakes to indemnify the Company for all the direct, indirect and/or consequential losses, damages, expenses whatsoever including any consequential loss of business, profits suffered by the Company owing to breach by the Supplier of its obligations under this Agreement and/or the confidentiality requirements, if any, contained in the Contract and that the Supplier hereby agrees that the decision of the Company in all such or any such matter/s shall be final and binding on the Supplier. On mere written demand of the Company, the Supplier shall forthwith and without demur or delay pay to the Company any such sum as determined by the Company as the amount of loss or damage or expense which has been suffered by the Company. The Supplier agrees that the Company shall be entitled to withhold and appropriate any amount payable to the Supplier under any Contract then existing between the Company and the Supplier, in case the Supplier fails to make payment, in terms of the written demand, within 7 days thereof. Without prejudice to the foregoing actions, in respect to any breach of this Agreement, the Company shall be entitled to take any other action against the Supplier as per applicable laws, the Contract, Company's applicable policies, guidelines rules, procedures, etc.

9. Without prejudice to any other mode of recovery as may be available to the Company for recovery of the amount determined as due as per Clause 8(e) hereinabove, the Company shall have a right to withhold, recover and appropriate the amount due towards such losses, damages, expenses, from any amount due to the Supplier in respect of any other Contract (s) placed on him/it by any department/office/Unit/Division of the said Company.

**10. Arbitration & Conciliation:**

a) In case amicable settlement is not reached between the Parties, in respect of any dispute  
or

difference or claim or controversy arising out of the formation, breach, termination, validity or execution of the Contract(or Agreement) or the respective rights and liabilities of the parties or in relation to interpretation of any provision of the Contract or in any manner touching upon the Contract, then, either Party may, by a notice in writing to the other Party refer such dispute or difference or controversy or claim, (except as to any matters, the decision of which is specifically provided for therein) to the sole arbitration by the arbitrator appointed by Head/In-Charge of the Unit/Division/Region.

b) The Arbitrator shall pass a reasoned award and the award of the Arbitrator shall be final and binding upon the parties to the dispute.

c) Subject as aforesaid, the provisions of Arbitration and Conciliation Act 1996 (India), or other statutory modifications or re enactments thereof and the rules made thereunder and for

the time being in force shall apply to the arbitration proceedings under this clause. The seat of arbitration shall be at ----- **(Insert the name of the city/town of the concerned BHEL Unit/Division).**

d) In case of Contract with Public Sector Enterprise (PSE) or a Government Department, the following shall be applicable:

In the event of any dispute or difference relating to the interpretation and application of the provisions of the Contract, such dispute or difference shall be referred to by either party to the arbitration of one of the arbitrators in the department of public enterprises to be nominated by the Secretary to the Government of India in-charge of the Department of Public Enterprises. The Arbitration and Conciliation Act, 1996 shall not be applicable to arbitration under this clause. The award of the arbitrator shall be binding upon the parties to the dispute, provided, however, any party aggrieved by such award may make further reference for setting aside or revision of the award to the Law Secretary, Department of Legal Affairs, Ministry of Law and Justice, Government of India. Upon such reference the dispute shall be decided by the Law Secretary or the Special Secretary or Additional Secretary when so authorized by the Law Secretary, whose decision shall bind the parties hereto finally and conclusively.

e) Notwithstanding the existence or any dispute or differences and/or reference for the arbitration, the Supplier shall proceed with and continue without hindrance the performance of its obligations under this Contract with due diligence and expedition in a professional manner.

**11. Governing Law & Jurisdiction:**

This Agreement shall be governed by and be construed as per applicable Indian Laws in force at the relevant time.

Subject to clauses 10(a) and 10(d) hereinabove, all matters in connection with the subject agreement shall be subject to exclusive jurisdiction of Courts situated at -----**(insert the name of the place where the BHEL Unit/Division is located)**

**SIGNATURE**

**WITNESSES**

1.

Name

Address:

2.

Name:

Address:



उत्पाद मानक (हीप : हरिद्वार)

TG60668

PRODUCT STANDARD (HEEP: HARIDWAR)

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Page 1 of 5

**Based on own experience**

**SPECIFICATION FOR GENERATOR INSTRUMENTATION CABINET FOR THERMAL POWER PLANTS**

**1.0 SCOPE OF SPECIFICATION**

This specification covers the technical requirements for design, manufacturing and testing **GENERATOR INSTRUMENTATION CABINET (GIC)** for operation in various Thermal/ Combined Cycle Power Plants.

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 generator instrumentation cabinet houses the instruments such as the level switch, digital indicators, and safety barriers required for reliable operation of the different measuring circuits.

**2.0 TECHNICAL REQUIREMENTS.**

- 2.1 The GIC shall be free standing floor mounted type. The size of each GIC shall be 800(W) X800(D) X2280(H) including lifting hooks and bottom channel.
- 2.2 *Schematic Diagram (Including BOM) of GIC 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.
- 2.4 The Cabinet shall have Single door at Front & back. Stiffeners shall be provided on front door for rigidity in front door if required.
- 2.5 Ambient Conditions: - Temperature 0- 50 Deg.C  
Relative humidity 0- 95%
- 2.6 The cabinet shall conform 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.
- 2.7 *Material of Fabricated Structure-* Cabinets shall be manufactured with front & rear doors/ covers of cold rolled (CR) sheet steel of min. 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.

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**स्वतंत्रताधिकार एवं गोपनीय**  
 यह दस्तावेज भारतीय भारी विद्युत यंत्रणों की संपत्ति है। इस दस्तावेज को बिना अनुमति के किसी भी प्रकार से प्रसारित, प्रतिलिखित, प्रकाशित, या अन्य किसी भी प्रकार से प्रसारित नहीं किया जा सकता है।

SIGN & DATE  
 07/08/20  
 INVENTORY NO.  
 P. 6376

SIGN & DATE			नाम NAME	हस्ताक्षर एवं तारीख SIGNATURE & DATE
TSX	Sandeep Gupta	11/05/20	अनुवादक TRANSLATED BY	
DAX	Schaucka		निरीक्षण WORKED BY	BRIJ LAL RAM 11/05/20
			संश्लेषण CHECKED BY	MAYURI KATIYAR 11/05/20
AGREED DEPTT	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	पर्यवेक्षणकर्ता SUPERVISED BY	RAJNISH GUPTA 11/05/20
<b>SUPERSEDES</b>			स्वीकृति APPROVED :	B.S. RANA (AGM CIE) 11/05/20
REV.NO. 04			निर्माण PREPARED :	CIE
DI. 07/08/2021			जारी ISSUED :	TSX
CHANGE ADVICE NO. TGE(CIE)-21-239			दिनांक DATE	04.08.1980
				Gr. NO. 8.10

SUPERSEDES INVENTORY	श्रेणी एवं मात्रा में अर्थव्यय वस्तु	<p>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.</p> <p>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 &amp; passivation bath in accordance (7 tank process) with standard engineering practices</p> <p>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.</p>
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COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	<p>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.</p> <p>2.11 The size of Power &amp; control cable will be indicated in Schematic Diagram. Proper identification of power &amp; 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-</p> <ul style="list-style-type: none"> <li>(a) DC Voltage Circuit (Control wiring)-1.5 Sq.mm-Black.</li> <li>(b) AC Control Circuit - 1.5 Sq.mm- (Red, Yellow, Blue).</li> <li>(c) Earthing circuit - 1.5 Sq.mm, green colour</li> <li>(d) DC Voltage Circuit (Power wiring)-2.5 Sq.mm -Black.</li> </ul> <p>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. Also there shall be 20% spare terminals.</p>
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स्वत्वाधिकार एवं गोपनीय ये पृष्ठ, वे वे के अंगूठे वाले हैं। यह दस्तावेज़ किसी भी संस्था के संपत्ति है। इस दस्तावेज़ को बिना अनुमति के किसी भी तृतीय पक्ष को देना, प्रसारित करना या अन्यथा उपयोग करना वर्जित है।	<p>2.13 Wiring between items mounted on the door and items inside the panel shall have sufficient cable loop for door opening.</p> <p>2.14 A fan at one of the louvers at top shall be provided, connected to the TB. Minimum power of this fan shall be 35W.</p> <p>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 <math>\pm 0.5</math> mm.</p> <p>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.</p> <p>2.17 The cabinet will be supplied with the <u>Name Plate</u> 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 "GENERATOR INSTRUMENTATION CABINET (CXW01B)"</p>
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Sign of Engineer SIGN & DATE	<p>2.18 The cabinet will be complete with all mounting accessories for site installation. Details will be brought out by the supplier in the offer. 3 point door lock system with handle shall be provided on front and back door.</p>
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श्रेणी एवं मात्रा INVENTORY NO P 6376	REV. NO. 04		निर्माणकर्ता WORKED BY BRIJ LAL RAM		11/05/20
			जांचकर्ता CHECKED BY MAYURI KATIYAR		11/05/2020



# उत्पाद मानक (हीप : हरिद्वार)

TG60668

## PRODUCT STANDARD (HEEP: HARIDWAR)

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SUPERSEDES  
INVENTORY

मशीन की सूची में  
अतिरिक्त वस्तुएं

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स्वतंत्राधिकार एवं गोपनीय

यह दस्तावेज या इसमें उल्लेख किये गए किसी भी पेटेंट/प्रवादाधिकार/सिद्धि का स्वामी है। इसका उपयोग बिना अनुमति के किसी भी प्रकार से न किया जाए।

SIGN & DATE

08/02/20

- 2.19 Supplier will be required to take prior approval for every deviation from the indenting specifications / drawings, if any.
- 2.20 At any stage of manufacture BHEL reserve the right to modify the specification/ drawing for improvement or to meet customer's requirements.
- 2.21 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.
- 2.22 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.
- 2.23 Compatible field items like level probes for level switches & transmitters etc. shall be sent in separate box along with cabinet to site.
- 2.24 Channel for cable support shall be provided parallel to Terminal Block for outgoing cables.
- 2.25 A legend plate of super bright acrylic sheet shall be provided below the selector switch to indicate service details in GIC.Details will be given with cut out details.
- 2.26 All items shall conform to specifications in Schematic drawing.

### 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.

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

Manufacturing shall start only after our approval.

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

4.1 ROUTINE TESTING: - The generator instrumentation cabinet 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.

INVENTORY NO.

P.6376

REV. NO.  
04

निर्माणकर्ता  
WORKED BY

BRIJ LAL RAM

Brij Lal

11/05/20

जांचकर्ता  
CHECKED BY

MAYURI KATIYAR

Mayuri

11/05/2020

दिनांक एवं तारीख SIGN & DATE	SUPERSEDES INVENTORY	मूल्य एवं मात्रा की अवधि तालिका	<p>4.1.3 IR value of cabinet before &amp; after HV Test. The value shall not be less than 20M ohms.</p> <p>4.1.4 HV test at suitable voltage as per relevant IS shall be carried out on cabinet.</p> <p>4.1.5 Functional checking of equipment as per Approved schematics.</p> <p>4.1.6 All Level Switches' functioning to be checked by connecting the Probe and dipping the Probe in water container.</p> <p>All the tests shall be covered in Quality Plan.</p> <p>Cabinet shall be checked for connections, wiring and layout as per good engineering practices.</p>
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**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 4.1

**7.0 PACKING & TRANSPORTATION: -**

7.1 GIC shall be packed and dispatched to site as per Purchase Order.

7.2 The accessories (if any) shall be sent along with main cabinet.



7.3 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.

7.4 Packing shall be properly identified and marked giving details of dimensions net/ gross weight. The destination address will be communicated with enquiry.

7.5 Peel-able compound coating (polyurethane) shall be provided if possible.

7.6 Assembled items contain PCB and parts. The package shall be suitably protected from moisture ingress.

7.7 The package is likely to be stored in covered shade for 6 months at site.

दिनांक एवं तारीख SIGN & DATE	मूल्य एवं मात्रा की अवधि तालिका	SUPERSEDES INVENTORY	REV. NO.		निर्माणकर्ता WORKED BY	BRIJ LAL RAM		07/09/2021
मूल्य एवं मात्रा की अवधि तालिका P-6376	दिनांक एवं तारीख SIGN & DATE 14/09/2021		04		जांचकर्ता CHECKED BY	MAYURI KATIYAR		07/09/2021

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स्वतंत्रतापूर्वक एवं गोपनीय  
 इस दस्तावेज़ में दी गई जानकारी केवल BHEL/ ग्राहक के लिए है। इसका उपयोग बिना BHEL/ ग्राहक की अनुमति के नहीं किया जाना चाहिए।

दिनांक  
SIGN & DATE



# उत्पाद मानक (हीप : हरिद्वार)

TG60668

## PRODUCT STANDARD (HEEP: HARIDWAR)

पृष्ठ 5 का 5  
Page 5 of 5

सुपरसेड  
INVENTORY

माली सूची नंबर की  
सहायता के साथ

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स्वसाक्षिकार एवं गोपनीय  
यह दस्तावेज कंपनी की संपत्ति है। इसका उपयोग केवल कंपनी के अधिकारियों द्वारा ही किया जा सकता है। इस दस्तावेज को किसी भी प्रकार से प्रसारित करना या इसका उपयोग किसी अन्य उद्देश्य के लिए करना वर्जित है।

दिनांक  
SIGN & DATE

माली सूची नंबर  
INVENTORY NO.

REV. NO. 04	निर्माणकर्ता WORKED BY	BRIJ LAL RAM	Brij Lal	11/05/20
	जांचकर्ता CHECKED BY	MAYURI KATIYAR	मयुरी	11/05/2020

**8.0 DOCUMENTS TO BE SENT ALONGWITH SUPPLIES.**

8.1 Eight (8) prints of O&M manual of GIC 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 in maintenance shall be sent to site.

8.2 2 (two) CD's containing soft copies of O&M manual.

8.3 2 (two) numbers 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**



# उत्पाद मानक (हीप : हरिद्वार)

TG60667

## PRODUCT STANDARD (HEEP: HARIDWAR)

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Page 1 of 5

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SIGN & DATE

SUPERSEDES  
INVENTORY  
NO.

मासगी सूची संख्या को  
अधिकृतित करना है

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**स्वत्वधिकार एवं गोपनीय**  
इस प्रलेख में दी गई सूचना भारत हेवी एलेक्ट्रिकल्स लिमिटेड की सम्पत्ति है, इसका प्रयोग एवं प्रकाशक रूप में किसी भी तरह प्रयोग को कि संसारी के हित में प्रतिस्पर्धाक हो न किया जाय।

दिनांक एवं हस्ताक्षर  
SIGN & DATE

मासगी सूची संख्या  
INVENTORY NO.

**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 disconnecter 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  $\leq 1000$ mm. For Cabinets with width  $\geq 1000$ 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%

08/06/20

P.6375

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	

**SUPERSEDES**

REV.NO. 03  
Dt. 11.05.2020  
CHANGE ADVICE  
NO. TGE(CIE)-20-18

SUPERSEDES INVENTORY	<p>2.6 The cabinets shall confirm to IP: 54 Degree of protection as per IS: 8623. All doors &amp; 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 &amp; back door.</p> <p>2.7 <i>Material of Fabricated Structure-</i> Cabinets shall be manufactured with front &amp; 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.</p> <p>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 &amp; passivation bath in accordance (7 tank process) with standard engineering practices.</p> <p>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.</p> <p>2.10 <i>Exterior/ Interior colour and Door cutout details of Cabinets shall be given after placement of PO.</i> The Paint thickness shall be minimum 75 microns. Only powder coating painting is acceptable.</p> <p>2.11 The size of Power &amp; control cable will be indicated in Schematic Diagram. Proper identification of power &amp; 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-</p>
-------------------------	--

- (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  $\pm 0.5$  mm.

स्वत्वाधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत हेतु एल्युमिनियम लिमिटेड की सम्पत्ति है, जसका प्रयोग एवं अनुपयोग रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में सुविधाकारक हो न कि नुकसानकारक हो, न किया जाय।	
दिनांक एवं हस्ताक्षर SIGN & DATE	

सामग्री सूची संख्या INVENTORY NO.	REV. NO.  03		निर्माणकर्ता WORKED BY	BRIJ LAL RAM	<i>Brij Lal</i>	11/05/20
P.6375-4808/20			जांचकर्ता CHECKED BY	MAYURI KATIYAR	<i>मयूरी</i>	11/05/2020

दिनांक एवं हस्ताक्षर  
SIGN & DATE



# उत्पाद मानक (हीप : हरिद्वार)

TG60667

## PRODUCT STANDARD (HEEP: HARIDWAR)

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Page 3 of 5

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सामग्री सूची संख्या को  
अधिकृत किया जाता है

- 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.

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

Manufacturing shall start only after BHEL approval.

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स्वत्वाधिकार एवं गोपनीय

इस प्रलेख में दी गई सूचना भारत हेवी एलेक्ट्रिकल्स लिमिटेड की सम्पत्ति है, इसका प्रलेख एवं अवलोकन रूप में किसी भी तरह प्रयोग को बिना लिखित रूप में अनुमति के बिना न किया जाए।

दिनांक एवं हस्ताक्षर  
SIGN & DATE

08/05/20

सामग्री सूची संख्या  
INVENTORY NO.

P.6575

REV. NO.  
03

निर्माणकर्ता  
WORKED BY

BRIJ LAL RAM

Brij Lal

11/05/20

जांचकर्ता  
CHECKED BY

MAYURI KATIYAR

मयूरी

11/05/2020

दिनांक एवं हस्ताक्षर  
SIGN & DATE



# उत्पाद मानक (हीप : हरिद्वार)

TG60667

## PRODUCT STANDARD (HEEP: HARIDWAR)

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SUPERSEDES  
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सामग्री सूची संख्या को  
अधिकृतित करता है

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इस प्रलेख से की गई प्रतियां भारत हीवी एलेक्ट्रिकल्स लिमिटेड की सम्पत्ति हैं, इन्का प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग को कि संशुद्धि के बिना में हानिकारक हो, न किया जाये।

दिनांक एवं हस्ताक्षर  
SIGN & DATE

05/05/20

**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

सामग्री सूची संख्या  
INVENTORY NO.

P.6575

REV. NO.  
03

निर्माणकर्ता  
WORKED BY

BRIJ LAL RAM

Brijlal

11/05/20

जांचकर्ता  
CHECKED BY

MAYURI KATIYAR

मयुरी

11/05/2020

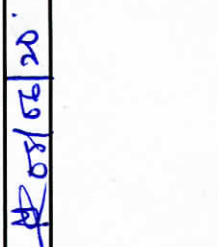
**PRODUCT STANDARD (HEEP: HARIDWAR)**



सामग्री सूची संख्या को अधिकृत किया जाता है	SUPERSEDES INVENTORY	<p><b>7.0 PACKING &amp; TRANSPORTATION: -</b></p> <p>7.1 Each Starter Cabinet shall be packed separately and dispatched to site as per PO.</p> <p>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 &amp; unloading.</p> <p>7.3 Packing shall be properly identified and marked giving details of dimensions' net/ gross weight. The destination address will be communicated with enquiry.</p> <p>7.4 Peelable compound coating (polyurethane) shall be provided, if possible.</p> <p>7.5 The package shall be suitably protected from moisture ingress.</p> <p>7.6 The package is likely to be stored in covered shade for approx. 6 months at site before commissioning.</p>	
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COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company	<p><b>8.0 DOCUMENTS TO BE SENT ALONG WITH SUPPLIES.</b></p> <p>8.1 Eight prints of O&amp;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.</p> <p>8.2 Two (2) CD's containing soft copies of O&amp;M manual.</p> <p>8.3 Two (2) nos. of O&amp;M Manual and one CD shall be sent to HEEP Haridwar.</p>
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स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स लिमिटेड की संपत्ति है, इसका प्रयुक्त एवं अपरिचित रूप से किसी भी तरह प्रयोग को कि कंपनी के हित में हानिकारक हो न किताब जाए।	<p><b>9.0 MANDATORY SPARES</b></p> <p>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.</p> <p><b>10.0 GUARANTEE</b></p> <p>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.</p>
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दिनांक एवं हस्ताक्षर SIGN & DATE	<p><b>11.0 CROSS REFERRED STANDARDS: IS: 8623, IS:513</b></p>
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दिनांक एवं हस्ताक्षर SIGN & DATE	
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सामग्री सूची संख्या INVENTORY NO.	REV. NO.		निर्माणकर्ता WORKED BY	BRIJ LAL RAM		11/05/20
P. 6375	03		जांचकर्ता CHECKED BY	MAYURI KATIYAR		11/05/2020

डॉक्यूमेंट सरवर पर मौजिद कर दी गई है। DOCUMENT RELEASED FROM SERVER/ CTA		हस्ताक्षर दिनांक SIGN & DATE		डॉक्यूमेंट सरवर पर जमा कर दी गई है। DOCUMENT DEPOSITED IN SERVER		हस्ताक्षर दिनांक SIGN & DATE		संशोधन पत्र CHANGE ADVICE FORM	
		संशोधन सूचना संख्या CHANGE ADVICE NO.		उत्पाद का प्रकार TYPE OF PRODUCT		जीएम्एस/जीआर रस्पपी/सीबीएम सं GMS / GRSP /CBOM No.		स्वीकृतिकर्ता APPROVED BY B.S. RANA AGM (CIE)	
(1)		जारीकर्ता विभाग ISSUING DEPTT.		(2)		(3)		(4)	
(1)		(2)		(3)		(4)		(5)	
(6)		(7)		(8)		(9)		(10)	
(11)		(12)		(13)		(14)		(15)	
(16)		(17)		(18)		(19)		(20)	
(21)		(22)		(23)		(24)		(25)	
(26)		(27)		(28)		(29)		(30)	

CODES FOR REASON OF CHANGES:- 01- ENGINEERING ERROR INCLUDING D.O. ERRORS, 02- DESIGN UPGRADATION (INCLUDING ADDITION OF VARIANT), 03- DESIGN REVIEW INCLUDING CHANGES DUE TO CHANGE ADVICE IN OTHER DOCUMENTS, 04- TO MEET MANUFACTURING REQUIREMENTS, 05- TO MEET TECHNOLOGICAL MODIFICATIONS, 06- TO SUIT CUSTOMER REQUIREMENTS, 07 TO REPLACE STATUTORY REQUIREMENTS, 08 TO REPLACE DAMAGED/TURN OUT ORIGINALS BY A FRESH ORIGINALS, 09- ANY OTHER

AGREED सहमति (20)

आभियांत्रिकी ENGG.	शैथिलिकी TECHNOLO- GY	क्यालिटी QUALITY	जिग एवं टूल विभाग J & T DEPTT.	वेल्डिंग TECHNOLOGY	केन्द्रीय संयंत्र प्रयोग CPL	अन्य विभाग ( )
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REAFFIRM  
This standard supersedes under same. NO.

**ANNEXURE 418119E2502**  
**MANDATORY SPARE LIST FOR 2X800 MW MAHAN**  
**BHEL MATERIAL CODE NO. W96415211293**

Sl. No.	Customer Sl. No.	Description	Quantity	Unit
1	30/2.3.0.1	DC CONTACTOR 300A, 2P, 220V DC	1	NO
2	30/2.3.0.1	DC CONTACTOR 300A, 1P, 220V DC	1	NO
3	30/2.3.0.1	DC CONTACTOR 150A, 2P, 220V DC	1	NO
4	30/2.3.0.1	DC CONTACTOR 600A, 2P, 220V DC	1	NO
5	30/2.3.0.1	DC CONTACTOR 600A, 1P, 220V DC	1	NO
6	30/2.3.0.2	TIMER 0.5-5 SEC 220 V DC, ON DELAY	2	NO
7	30/2.3.0.2	VOA- AUX RELAY 220V DC JYOTI	4	NO
8	30/2.3.0.2	AUX RELAY, 24V DC, 4 C/O JYOTI	2	NO
9	30/2.3.0.2	TRANSDUCER VI, I/P 75MV, O/P 4-20MA	1	NO
10	30/2.3.0.2	DC MAGNETIC O/L RELAY 179A,(100-300)A	1	NO
11	30/2.3.0.3	DC O/L RELAY 549A,(300-900)A	1	NO
12	35/2.A.2	LEVEL PROBE FOR LEVEL SWITCH TG60184 Fig. 3	4	NO
13	35/2.A.2	LEVEL PROBE (PRECHAMBER SCREW TYPE) TG60184 Fig. 4	1	NO
14	35/2.A.2	LEVEL SWITCH (TG60184 )	4	NO
15	38/F.3	DIGITAL INDICATOR	2	NO
16	38/F.4	PUSH BUTTON - RED	2	NO
17	38/F.4	PUSH BUTTON - GREEN	2	NO
18	38/F.5	LED LIGHT RED, 220V DC	2	NO
19	38/F.5	LED LIGHT GREEN, 220V DC	2	NO
20	38/F.5	LED LIGHT AMBER, 220V DC	2	NO
21	38/F.5	LED LIGHT WHITE, 220V DC	2	NO
22	35/2.A.1	PW LEVEL PROBE FOR LVL IND. TG60544, Probe Length=1140 MM	1	NO
23	35/2.A.1	H2 SIDE SOT LEVEL PROBE FOR LVL IND. TG60544, Probe Length=465 MM	1	NO
24	35/2.A.1	LEVEL TRANSMITTER TG60544	1	NO

**NOTE:**

1. ALL ITEMS AGAINST MANDATORY SPARES ARE TO BE PACKED SEPARATELY IN GREEN COLORED BOX (ES).
2. SPARE BOX (ES) SHOULD BE CLEARLY LABELLED AS "MANDATORY SPARES FOR DC STARTER PANELS & GENERATOR INSTRUMENTATION CABINET, MAT. CODE NO. W96415211293".

-sd-  
Satish Kumar  
SDGM/CIE

-sd-  
Mayuri Katiyar  
Mgr/CIE







SUPERSEDES INVENTORY  
 आगामी सूची संख्या में  
 अधिस्थान करण है

**8.0 ACCEPTANCE NORMS :**

8.1 As per clause 6.0 & 7.0

**9.0 TEST AND GUARANTEE CERTIFICATES:** Two copies of test certificates for routine & type tests and guarantee certificates in English shall be furnished.

**10.0 QUALITY PLAN AND INSPECTION:**

The complete QA plan giving the details of tests to be carried out during the various stages of manufacturing will be furnished for approval along with the offer in BHEL format. BHEL reserves it's right to depute their / customer's representative during final testing at supplier works. The supplier will arrange this inspection without any additional charges.

**11.0 DOCUMENTS:**

- 11.1 Two copies of descriptive catalogues in English language giving complete technical information including dimensional details of all hardware and external terminal details for customer interconnection shall be furnished along with the offer.
- 11.2 Two copies of the block schematics illustrating the principal of operation of the system shall be furnished along with the offer.
- 11.3 Two sets of final schemes and wiring/ layout drawings shall be furnished along with the supply.
- 11.4 Two copies of the manual (which shall include detailed construction / operation, servicing manuals incorporating various electrical schemes indicating the values of various electrical and electronic components) to facilitate proper operation and servicing of the system, shall be supplied.
- 11.5 One soft copy in CD-ROM for O&M manual/drawings etc will also be supplied against each purchase order.


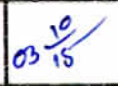

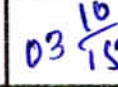
**12.0 PACKING/DESPATCH:**

- 12.1 The equipment/ accessories shall be packed in a suitable water proof / vibration proof packing boxes capable of bearing transit hazards. Various packing boxes shall be properly identified and marked giving details of dimensions met gross weight.
- 12.2 The equipment shall have proper casing /covers for its instruments/assemblies for safe handling/storage.

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 इस दस्तावेज में दी गई सूचना भारत भारती स्वतंत्रताधिकार की सुरक्षा के तहत प्रसारित की जा सकती है। इस दस्तावेज को किसी भी प्रकार से प्रसारित करने से निषेध है।

दिनांक/दिनांक  
 SIGN & DATE  


आगामी सूची संख्या INVENTORY NO. <i>P-3507</i>	REV. NO.  08		निर्माणकर्ता WORKED BY BRIJ LAL 	
			जांचकर्ता CHECKED BY RAJNISH 	



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# उत्पाद मानक

## TG60184

पृष्ठ 9 का 5

## PRODUCT STANDARD

Page 5 Of 9

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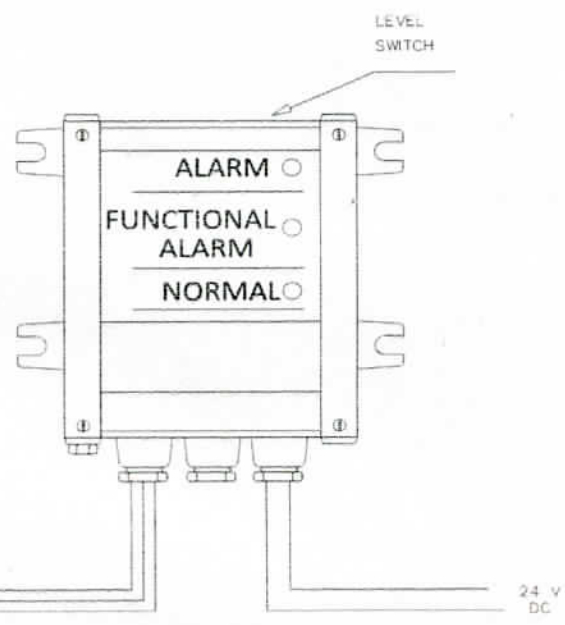
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सामग्री का  
INVENTORY NO.

REV. NO.  
08



NOTE:- INTERCONNECTION CABLE IS NOT IN VENDOR SCOPE.

SCHEMATIC DRG. - LEVEL SWITCH AND PROBE

निर्माणकर्ता WORKED BY	BRIJ LAL	<i>Brij Lal</i>	<i>03/10/15</i>
जांचकर्ता CHECKED BY	RAJNISH	<i>Rajnish</i>	<i>03/10/15</i>

*P. 3507*



# उत्पाद मानक

# TG60184

## PRODUCT STANDARD

पृष्ठ 9 का 6

Page 6 Of 9

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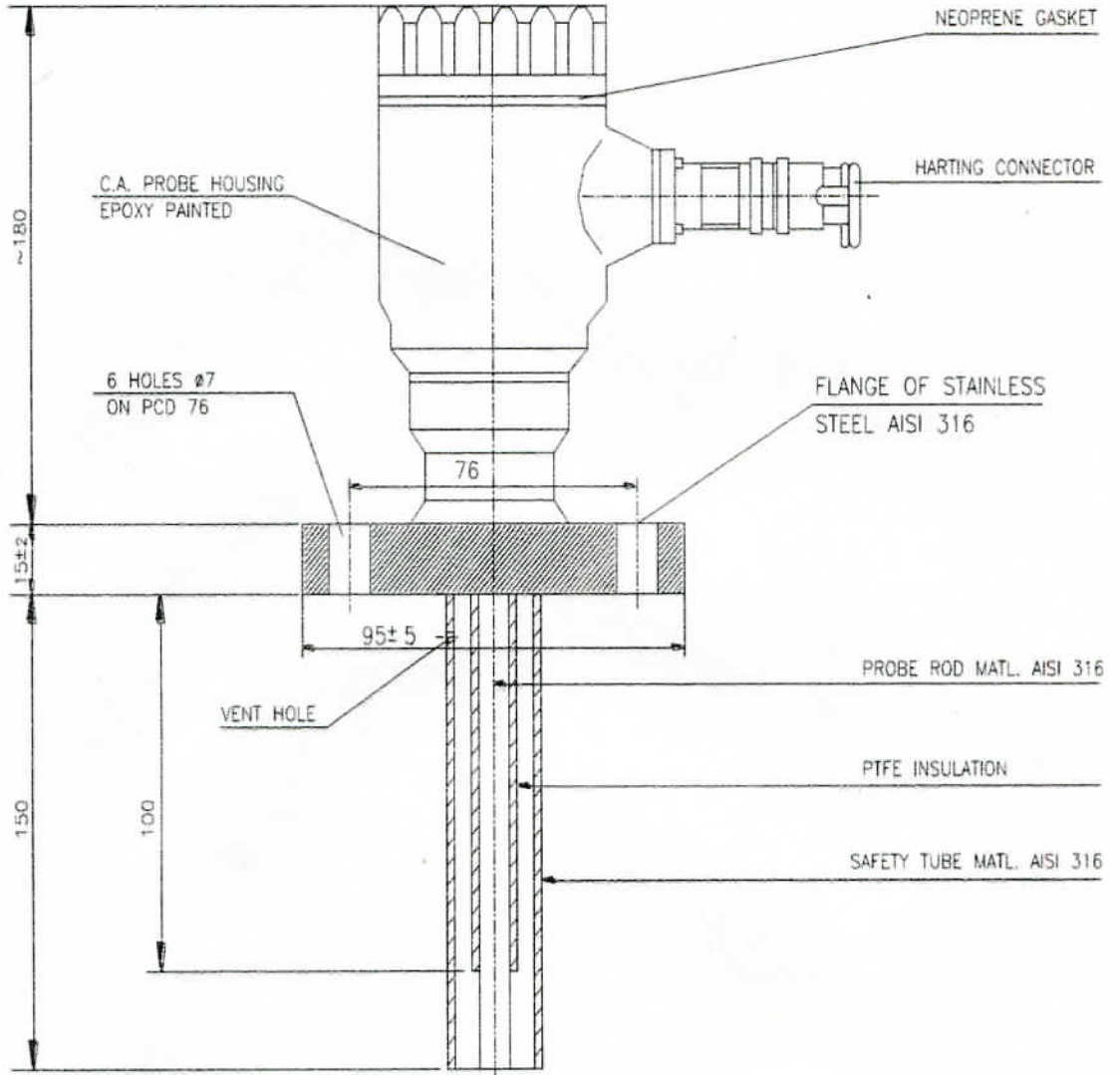
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INVENTORY NO.



LEVEL PROBE FIGURE-1 (TYPICAL ARRANGEMENT)

REV. NO.

08

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WORKED BY

BRIJ LAL

*Brij Lal* 03/10/15

जांचकर्ता  
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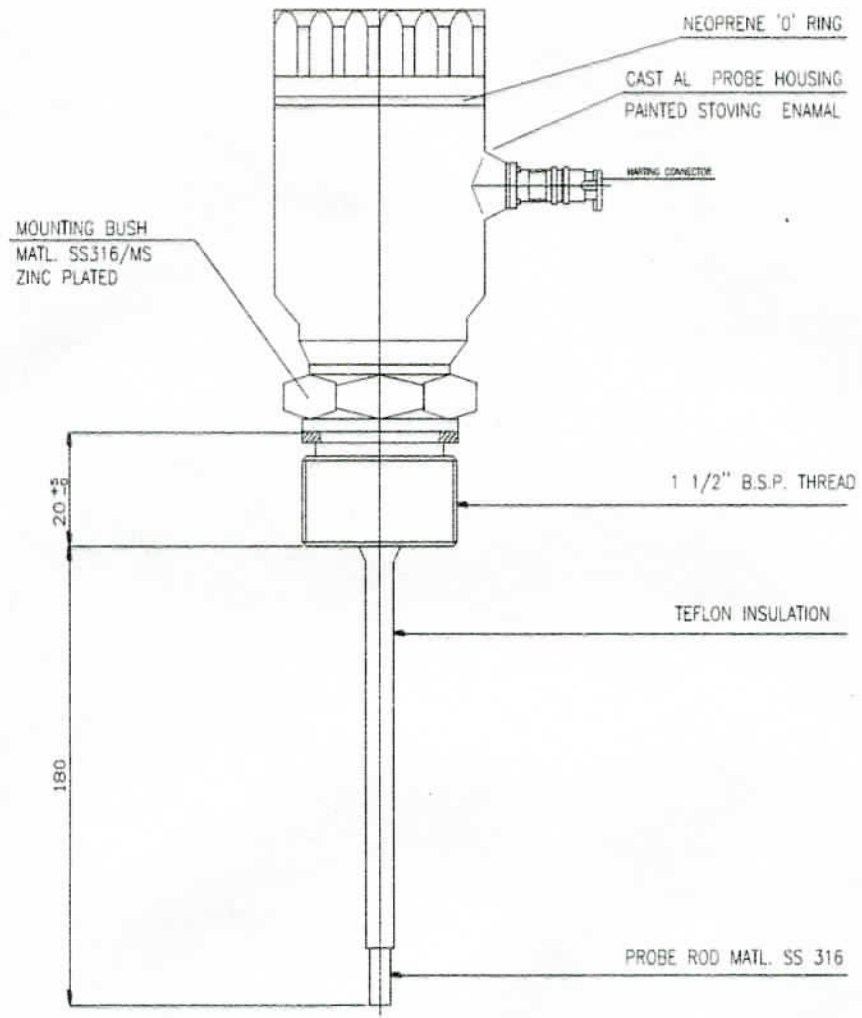
*Rajnish* 03/10/15

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LEVEL PROBE FIGURE-2 (TYPICAL ARRANGEMENT)

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 जांचकर्ता  
 CHECKED BY RAJNISH

Brij Lal  
 Rajnish

03/10/15  
 03/10/15

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# उत्पाद मानक

## TG60184

पृष्ठ 9 का 8  
Page 8 Of 9

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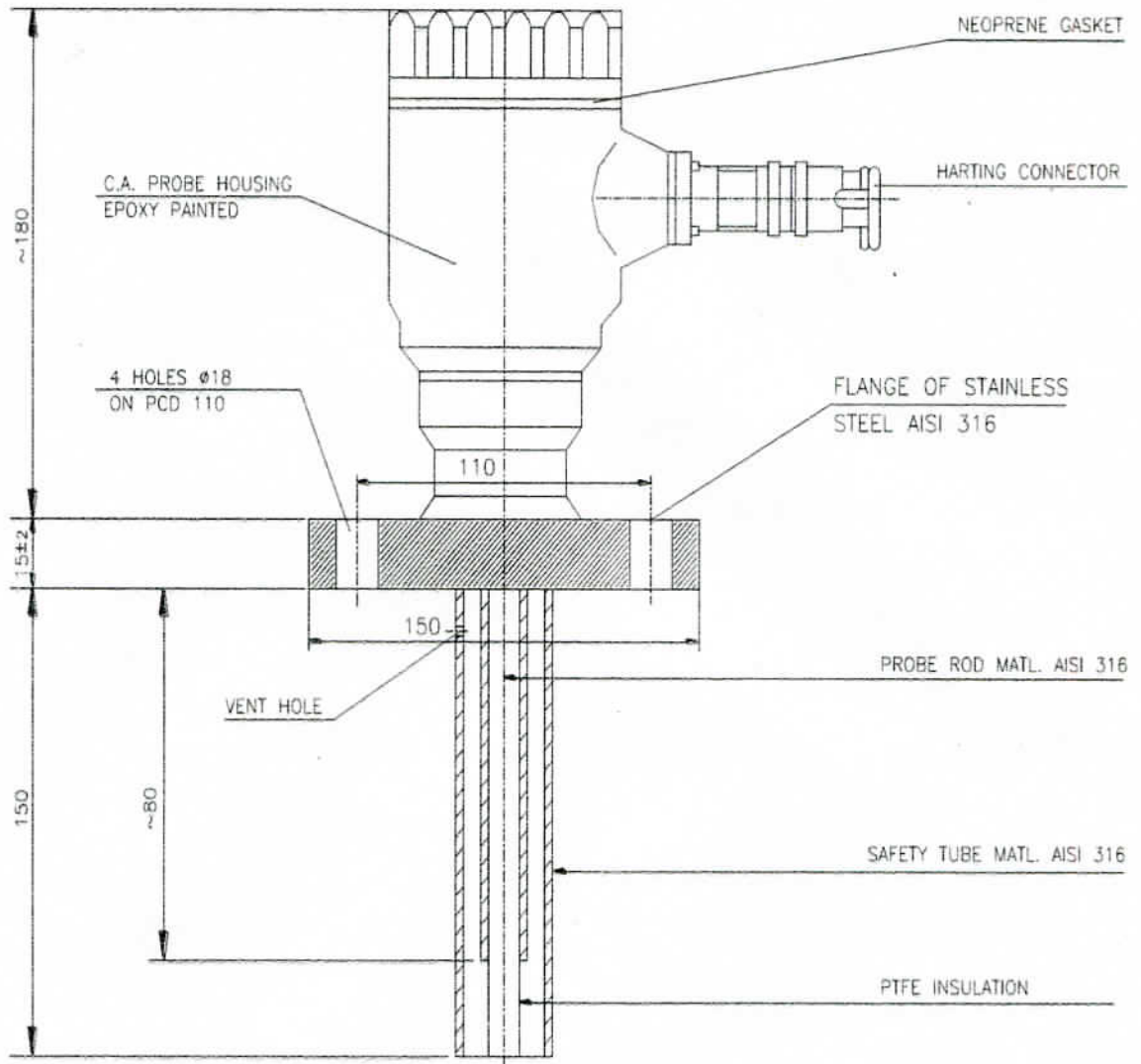
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संशोधित करना है

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यह दस्तावेज कि अथवा इसका कौनो भी अंश बिना लिखित अनुमति के प्रसारित नहीं किया जा सकता है।

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### LEVEL PROBE FIGURE-3 (TYPICAL ARRANGEMENT)

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जांचकर्ता  
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*Brij Lal* 03/10/15

*Rajnish* 03/10/15

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# उत्पाद मानक

## TG60184

### PRODUCT STANDARD

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Page 9 Of 9

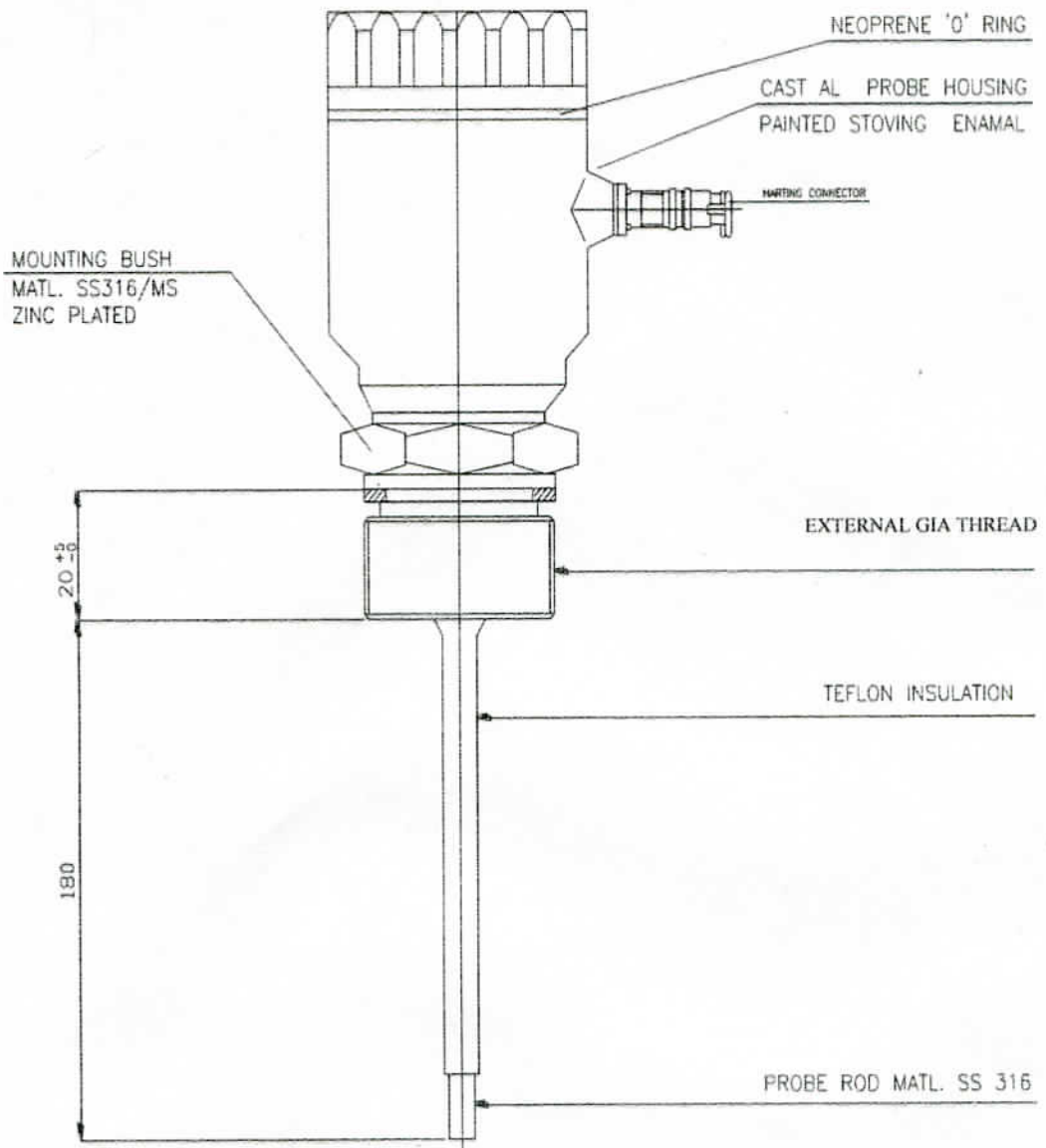
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LEVEL PROBE FIGURE-4 (TYPICAL ARRANGEMENT)

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**RAJNISH**

*Rajnish* 03/10/15





# उत्पाद मानक (हीप : हरिद्वार)

TG60544

पृष्ठ 8 का 1  
Page 1 of 8

## PRODUCT STANDARD (HEEP: HARIDWAR)

### CAPACITANCE TYPE LEVEL TRANSMITTER AND PROBE

#### 1.0 INTRODUCTION:

This specification covers the requirement of capacitance type level transmitter and probe with electronic insert suitable for monitoring level of DM water in primary water tank of large rating turbogenerators. The transmitter will have features of integrated digital display and self-diagnostics. The equipment shall be suitable for ambient temperature from 0- 60 °C and relative humidity upto 95%. All items in the specification shall be sourced from same vendor.

#### 2.0 SCOPE:

- 2.1 A capacitance type level transmitter in sheet steel housing with epoxy powder coated finish. It will be suitable for base mounting in the client's panel.
- 2.2 A level probe with electronic insert suitable for vertical mounting with flange connection as per figure-1, 2, 3 & 4 of the specification. Level transmitter and probe shall be sourced from the same vendor.

#### 3.0 COMPLIANCE WITH STANDARD:

There is no national/international standard available on the above subject. However this standard is based on BHEL's experience.

#### 4.0 PRINCIPLE OF OPERATION :

It shall work on the principle of a capacitance changes due to change in liquid level in the PW tank. The electronic insert mounted on the probe head shall convert the capacitance in to current/ voltage signals which shall provide indication of the water level in tank in scale 0-100%. The 4-20 mA output signal shall also be made available for remote application. There shall be provision to set reference value of 0% and 100% in the tank through settings at the transmitter.

#### 5.0 TECHNICAL REQUIREMENTS:

- 5.1 The instrument should be suitable for demineralized water as well as lubricating oil.
- 5.2 The internal resistance of electronic insert should be low, so that disturbance pick up in the cable has practically no influence on the working of the instrument.
- 5.3 Probe shall be suitable for vertical mounting as per figure-1, 2, 3, 4. All the dimensions mentioned will be met to ensure perfect matching.

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P-6207

				नाम NAME	दिनांक एवं हस्ताक्षर SIGNATURE & DATE
TSX	Brajesh Kumar	21/11/21	अनुवादक TRANSLATED BY	BRIJ LAL RAM	21/11/21
QAX	SACHIN JAIN	26-10-21	निर्माणकर्ता WORKED BY	MAYURI KATIYAR	21/10/21
मदरम विभाग AGREED DEPTT	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	जांचकर्ता CHECKED BY	RAJNISH GUPTA	26/10/21
(SUPERSEDES)			पर्यवेक्षणकर्ता SUPERVISED BY		
REV.NO	11		स्वीकृति APPROVED :	VINOD KUMAR (AGM/ CIE)	Gr. NO. 8.10
DI	21/05/2022		निर्माण PREPARED :	CIE	दिनांक DATE :
CHANGE ADVICE NO	TSX (CIE) 22-137		द्वारा ISSUED :	TSX	02.06.2000



# उत्पाद मानक (हीप : हरिद्वार)

TG60544

पृष्ठ 8 का 2

## PRODUCT STANDARD (HEEP: HARIDWAR)

Page 2 of 8

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30/11/21

सामग्री सूची संख्या  
INVENTORY  
P-6207

- 5.4 The instrument shall be suitable for:-  
Power Consumption :  $\leq 10$  W  
Accuracy :  $\pm 2\%$  of full scale  
Power Supply : 24V DC  $\pm 10\%$  or as specified in enquiry.
- 5.5 The level probe shall be suitable for operation at vacuum of 400 mm of Hg column to 6Kg/cm<sup>2</sup> pressure.
- 5.6 The 4-20mA DC output shall be suitable for burden upto 600 Ohms.
- 5.7 The probe shall be mounted in Hydrogen atmosphere while the level transmitter shall be mounted in safe area. Accordingly, the system comprising level probe, and level transmitter shall have intrinsic safety features.
- 5.8 The transmitter shall be with built-in indicator/display.
- 5.9 The type of protection for level probe and insert shall be IP-55 (as per IS 2147) or better.
- 5.10 Repeatability will be  $\pm 0.5\%$  of full range or better.
- 5.11 Material of Probe:  
Probe head : Die cast Aluminum/SS AISI 316  
Top Flange /Probe rod : S.S. AISI 316  
Probe insulation : PTFE  
Probe dimensions : As per figure-1, 2, 3, 4 or as specified in enquiry
- 5.12 Two copies of complete dimensional mounting and wiring details of the equipment offered shall be sent along with offer.
- 5.13 The terminals on level transmitter probe head shall be suitable for termination of 2 wires of 1.5 mm<sup>2</sup> copper cable. The terminals of reputed make shall be used.

### 6.0 ROUTINE TESTING: Level transmitter and probe shall be subjected to following tests at supplier's works:-

- 6.1 Dimensional details/visual checking as per the approved drawing.
- 6.2 Functional checking of the equipment.
- 6.3 Burn in test for electronics (for 48 hrs. at 55 °C). If this Test has already been done during manufacturing, the certificate of compliance or Test results will be furnished for review during inspection.

### 7.0 TYPE TESTING:

The type test certificates of similar equipment for the following climatic tests ( which shall not be older than 5 years) as per IEC60068 / IS9000 ( relevant parts) will be furnished along with the offer. If these are not available, the party will carry out these type tests from reputed test house before offering the equipment for inspection. In event, the party intends to conduct these tests at their Works, the same will be witnessed by BHEL representatives. These tests shall be as listed (but not limited to) below:-

- 7.1 Dry heat test
- 7.2 Damp heat test
- 7.3 Protection Class Test (IS 2147)
- 7.4 Change of temperature Test.

REV.NO.1)

निर्माणकर्ता WORKED BY	BRIJ LAL	बृजलाल	21/10/21
जांचकर्ता CHECKED BY	MAYURI KATIYAR	मयूरी	21/10/21





# उत्पाद मानक (हीप : हरिद्वार)

## PRODUCT STANDARD (HEEP: HARIDWAR)

TG60544

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Page 4 of 8

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- 13.0 SPARE PARTS:**  
Recommended spare parts for 3 years trouble free operation of the system be offered along with the main equipment. BHEL reserves the right to order the spare parts either along with the main equipment or separately, in which case validity of the offer for spare parts shall be extended by 6 months from the date of placement of order for main equipment. The offer for spares shall indicate breakup of price for each component separately.
- 14.0 IDENTIFICATION:-**  
Each assembly shall be provided with Rating Plate / Tag having engraved on it the Make, Type, BHEL code no, Application, SL no., Year of manufacture etc.
- 15.0 GUARANTEE:-**  
The equipment shall be guaranteed for a minimum period of 18 months from the date of supply or 12 months from the date of commissioning which ever is earlier.
- 16.0 STORAGE:-**  
The storage procedure for the equipment shall be specified in the offer. The equipment is likely to be stored in environment with temp range 0 to 55 °C and humidity upto 95%.
- 17.0 CROSS-REFERRED STANDARDS :**  
IS 2147; IEC 60068-2; IS 9001; AISI-316, ANSI 37.90a, IS: 8623

REV.NO.1

fuekZ.kdrkZ WORKED BY	BRIJ LAL	ब्रिज लाल	21/10/21
TkkapdrkZ CHECKED BY	MAYURI KATIYAR	मयूरी	21/10/21



# उत्पाद मानक (हीप : हरिद्वार)

## PRODUCT STANDARD (HEEP: HARIDWAR)

TG60544

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Page 5 of 8

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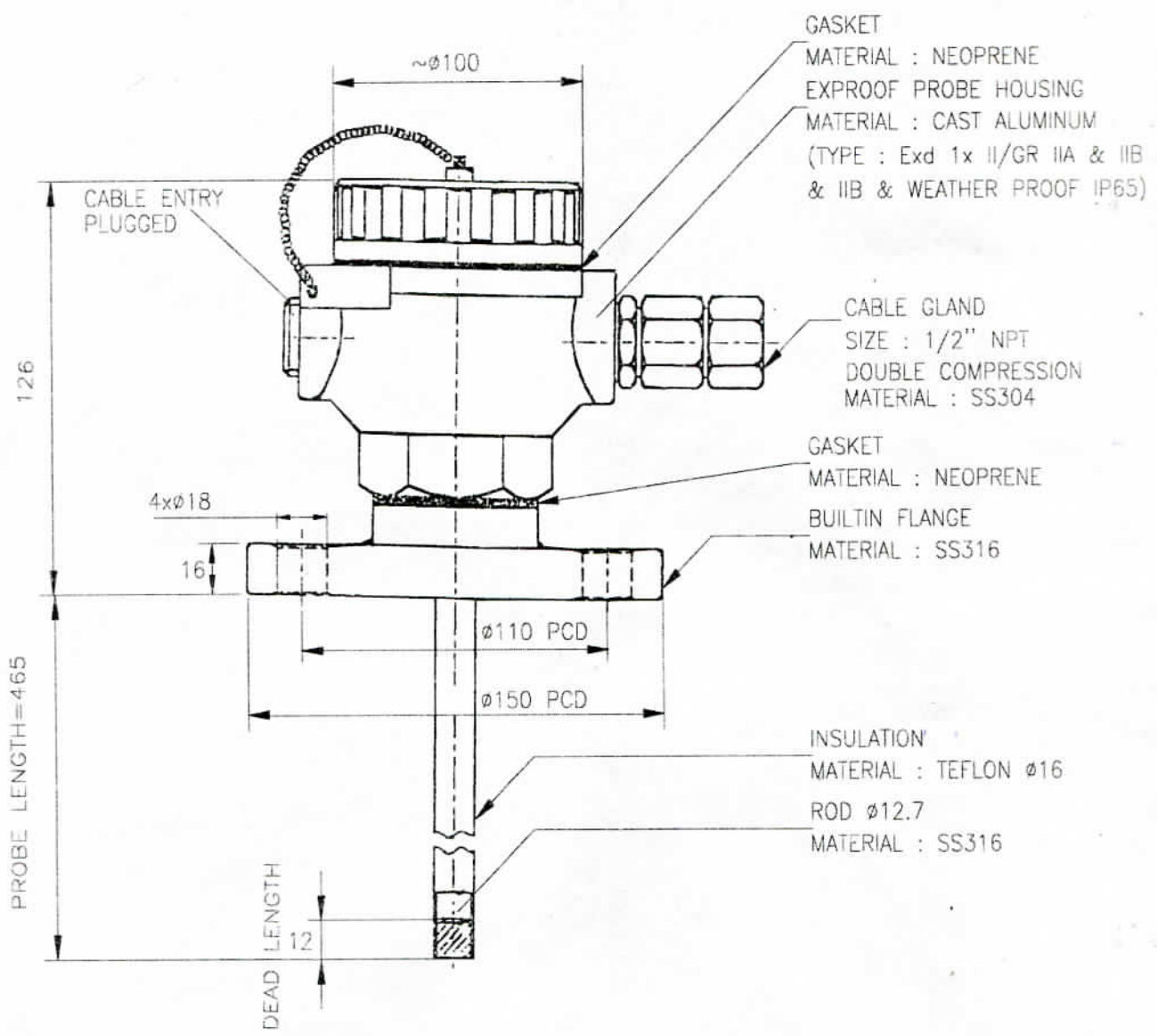
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TkkapdrkZ CHECKED BY	MAYURI KATIYAR	<i>मयुरी</i>	<i>21/10/21</i>

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PRODUCT STANDARD (HEEP: HARIDWAR)

TG60544  
पृष्ठ 8 का 6  
Page 6 of 8

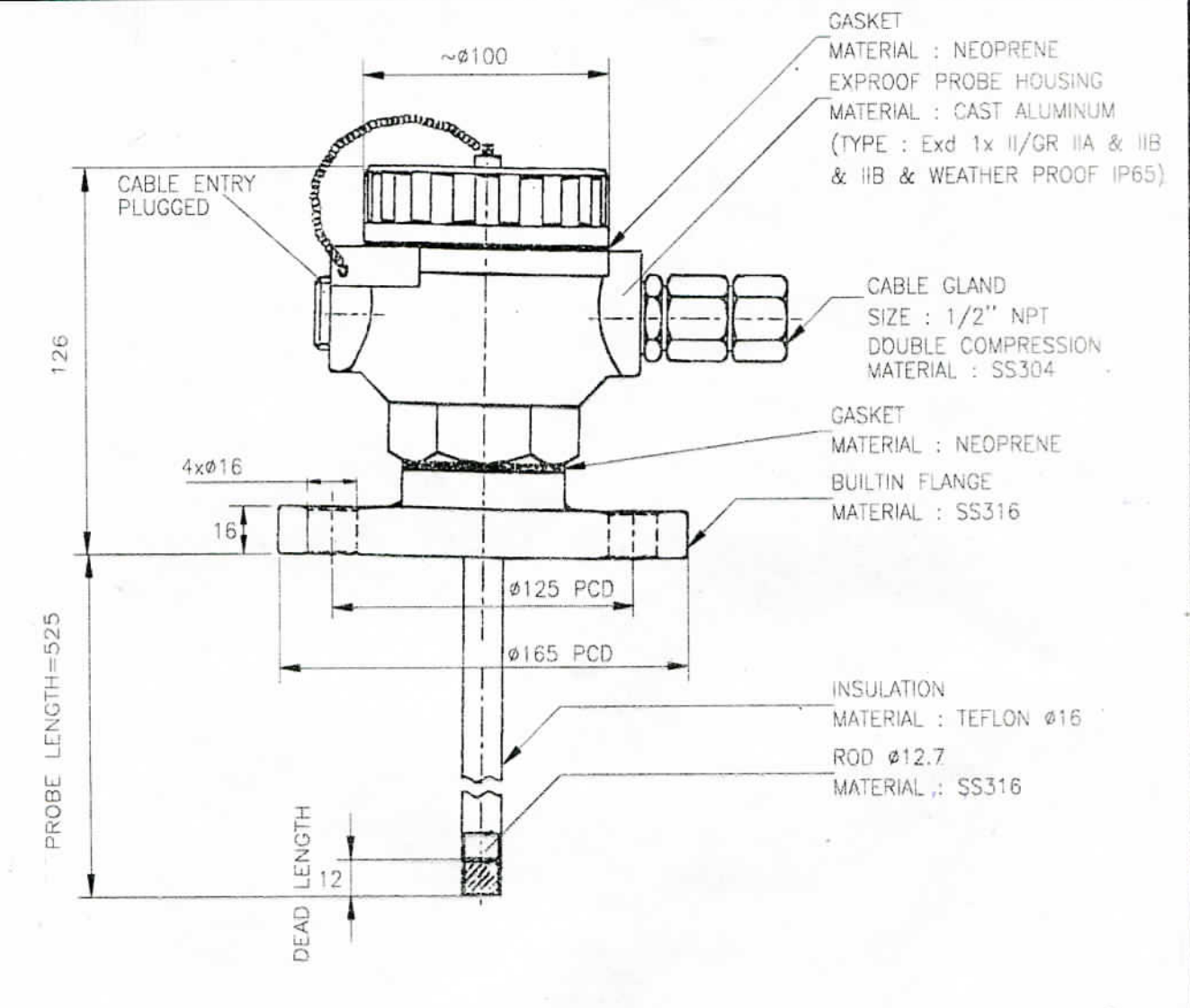
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LEVEL PROBE FIGURE-2 (TYPICAL ARRANGEMENT)

(ALL DIMENSIONS IN MM)

REV.NO. 11	fuekZ kdrkZ WORKED BY BRIJ LAL	ब्रिज लाल	21/10/21
	TkkapdrkZ CHECKED BY MAYURI KATIYAR	मयुरी	21/10/21

दिनांक अथवा  
SIGN & DATE



# उत्पाद मानक (हीप : हरिद्वार)

TG60544

पृष्ठ 8 का 7  
Page 7 of 8

SUPERSEDES  
INVENTORY

मापनी प्रती-संख्या को  
अपडेट करे

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Electrical Limited. It must not be used directly or indirectly in any way  
detrimental to the interest of the company

स्वत्वधिकार एवं गोपनीय

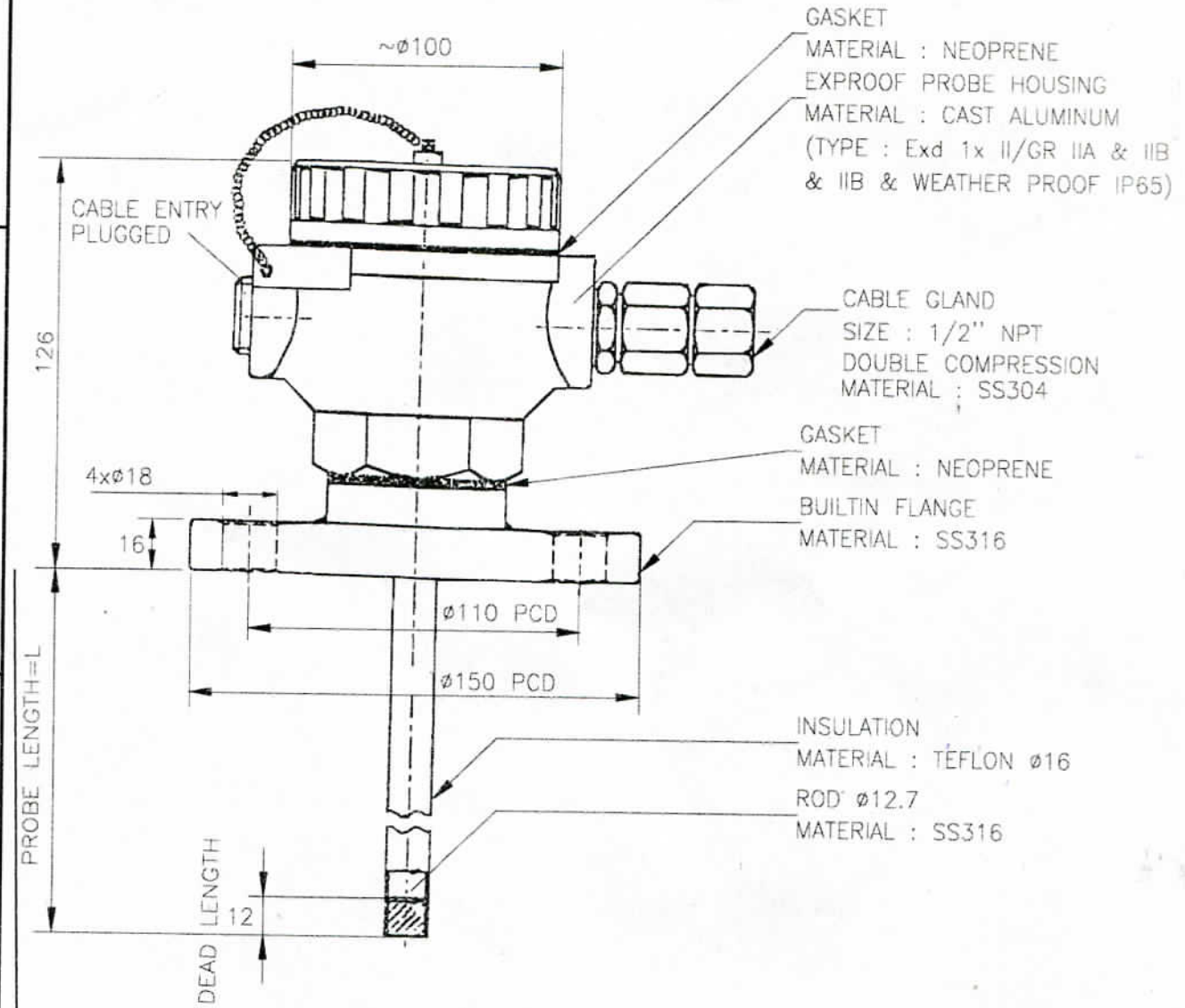
यह दस्तावेज या इसी दस्तावेज का प्रतिलिपि बिलिविदे की संपत्ति है, इसके अलावा  
एक अनुमति बिना इसे किसी भी तरह से प्रकट नहीं किया जा सकता है। इस दस्तावेज को न कहीं  
अन्य व्यक्ति को देना, प्रकट करना या इस दस्तावेज के लिए नुकसान पहुंचाने का प्रयास करना  
अपराध है।

दिनांक अथवा  
SIGN & DATE

Signed 01/6/22

मापनी प्रती संख्या  
INVENTORY NO.

P.6207



L=LENGTH AS IN MAT CODE

LEVEL PROBE FIGURE-3 (TYPICAL ARRANGEMENT)

(ALL DIMENSIONS IN MM)

REV.  
NO.  
11

निर्माणकर्ता  
WORKED BY

BRIJ LAL RAM

श्रीजलाल

21/05/22

जांचकर्ता  
CHECKED BY

RAJNISH

राजनिश

21/05/22

उत्पाद मानक (हीप : हरिद्वार)  
**PRODUCT STANDARD (HEEP: HARIDWAR)**

TG60544

पृष्ठ 8 का 8  
 Page 8 of 8

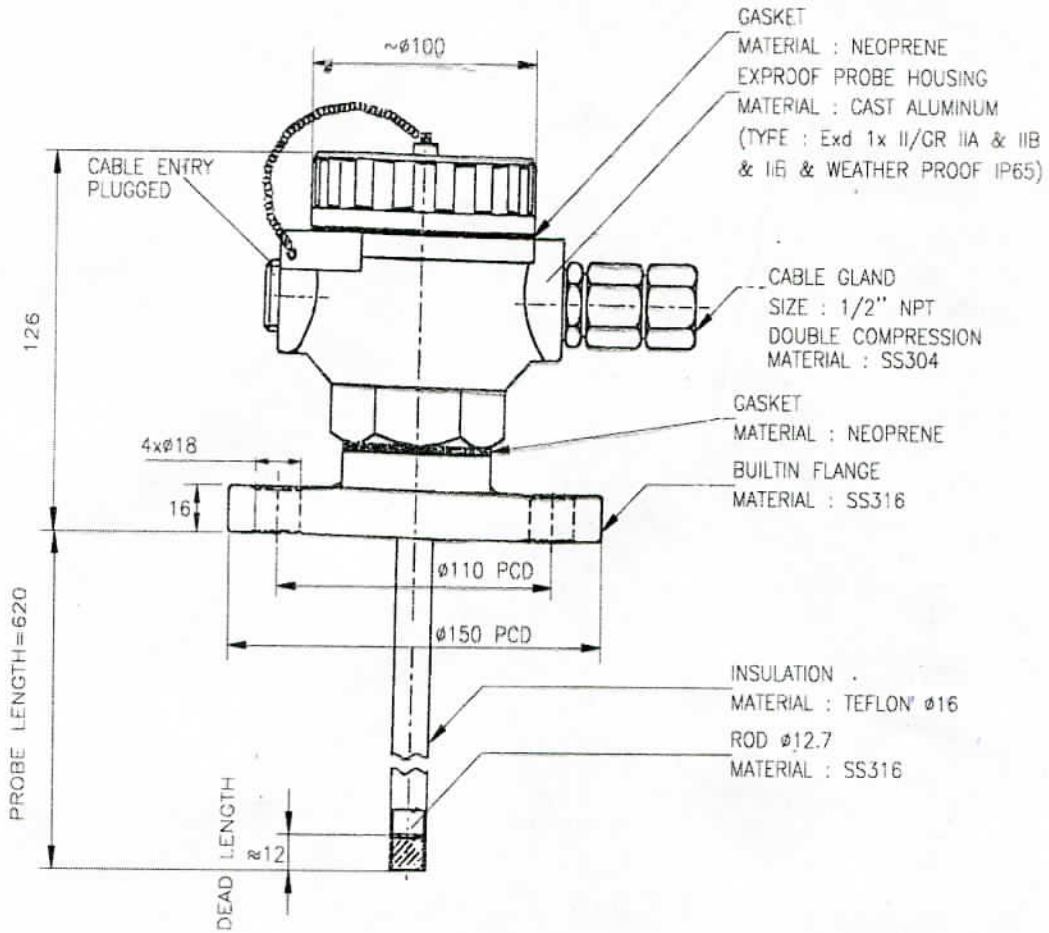
fnukad .oa  
 glrk(k) SIGN &  
 INVENTORY NO

SUPERSEDES  
 INVENTORY NO

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**LoRokf/kdkj .oa xksiuh:**

bl izysfk esa nh ybz lwpuK Hkkjr gsoh bysDV^dYI dh IEIRr; gS bldk izR;rk .oa vizR;rk :lk is fidh Hkh rjg iz;ksx] tks fd daiuh as rgr esa gkfudkj gks u fd;k tk, A



LEVEL PROBE FIGURE-4 (TYPICAL ARRANGEMENT)

(ALL DIMENSIONS IN MM)

glrk(k) .oa fnukad  
 SIGN & DATE

Handwritten signature and date: 25/10/21

Lkxexzh lwph  
 Iet;k

REV.NO.1  
 P.6207

fuekZ.kdrkZ  
 WORKED BY

BRIJ LAL

श्रुज लाल 21/10/21

TkkapdrkZ  
 CHECKED BY

MAYURI  
 KATIYAR

मयुरी 21/10/21

MANUFACTURER'S NAME AND ADDRESS		STANDARD QUALITY PLAN					TO BE FILLED BY BHEL			TO BE FILLED BY BHEL				
VENDOR'S NAME		ITEM	QP NO.	QA/BE/QP/304										
BHEL		DC STARTER CABINET	REV. NO.	03	Date:	01.10.2022								
DRG. No. & Rev.		As per P.O.												
SPEC.		TG60667												
Rev.		As per P.O.												
CHARACTERISTICS		CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY		REMARKS				
2		4	5	6	7	8	9	M	B	N	11			
1		3						10						

1.0 RAW MATERIALS																								
SL. NO.		COMPONENT & OPERATIONS		CHARACTERISTICS		CLASS		TYPE OF CHECK		QUANTUM OF CHECK		REFERENCE DOCUMENT		ACCEPTANCE NORMS		FORMAT OF RECORDS		AGENCY		REMARKS				
1		2		3		4		5		6		7		8		9		10		11				
2.0 IN PROCESS INSPECTION																								
2.1		Fabrication & assembly of cabinet/panel		Weld Finish, Layout of Mounting of Equipment & it's Make, Type and Ratings		Major		Physical		100%		Appd. Drg./Spec.		Appd. Drg./Spec.		--		P		--				
3.0 FINAL INSPECTION																								
3.1		Type test for degree of protection		Electrical		Major		Electrical		-		Appd. Drg./Spec.		Appd. Drg./Spec.		TC		V		--		Note 3		
3.2		Routine test																						
3.2.1		Starter cabinet visual & dimensional checks: Dimensional Conformity with GA Drg., Waviness, Straightness, Perpendicularity, earthing size		Major		Major		Measurement		100%		Appd. Drg./Spec.		Appd. Drg./Spec.		IR		P		W				
3.2.2		Starter cabinet operation: Manual Operation for its Moving Parts, Interlocking /Door Interlocking of Items, Location of Labels/Ferrule, Inspection of Wiring with Proper Size/ Type/ Grade of Power & Control Cables, Terminal blocks, Continuity of Panel Wiring, illumination, anti-vibration pad, proper earthing bus, name plate etc.		Major		Major		Physical		100%		Appd. Drg./Spec.		Appd. Drg./Spec.		IR		P		W				
3.2.3		Starter cabinet components BOM (Make, type, rating)		Major		Major		Physical		100%		Appd. Drg./Spec./BOM		Appd. Drg./Spec./BOM		IR		P		W				
3.2.4		Paint shade & paint thickness		Major		Major		Physical		100%		Appd. Drg./Spec.		Appd. Drg./Spec.		IR		P		W				
3.2.5		I.R. before and after H.V. Test		Major		Major		Electrical		100%		Appd. Drg./Spec.		Appd. Drg./Spec.		IR		P		W				
3.2.6		H.V. Test		Major		Major		Electrical		100%		Appd. Drg./Spec.		Appd. Drg./Spec.		IR		P		W				
3.2.7		Functional checking of cabinet's various components, equipment, devices, interlock, protection circuits, indication feedback etc.		Major		Major		Electrical		100%		Appd. Drg./Spec.		Appd. Drg./Spec.		IR		P		W				
3.3		Compliance of technical requirements		Major		Major		Visual		100%		Appd. Drg./Spec.		Appd. Drg./Spec.		COC		P		W				
3.4		Recommended or mandatory spares (if applicable)		Major		Major		Visual		100%		Appd. Drg./Spec.		Appd. Drg./Spec.		IR		P		W				
3.5		Identification and Marking		Major		Major		Visual		100%		Appd. Drg./Spec.		Appd. Drg./Spec.		IR		P		W				
3.6		Soundness of Packing against Transit Damage		Major		Major		Visual		100%		Appd. Drg./Spec.		Appd. Drg./Spec.		--		P		V				

Note: 1. Witness by inspection agency to be random 10% of each material code (minimum 1 piece per material code) from each lot. However, vendor to carry out 100% tests internally and tests report shall be reviewed by inspection engineer during inspection at Vendor's works. 2. Manufacturer to maintain calibrated instruments having better accuracy than the item under the test. Inspection Engineer shall check the same. 3. Type tests clearance from BHEL Engg. to be verified (by inspection engineer) during inspection at vendor's works. 4. Vendor has to provide TC/IR mentioning above Q.P. clauses and also index/summary sheet for co-relation of TC/IR with QP clauses. TPIA to check the same.


Digitally signed by Sachin Jain  
 Date: 2022.10.07 19:16:31 +05'30'

LEGEND: DRG: BHEL APPROVED DRAWING, APPD.: BHEL APPROVED, SPEC: SPECIFICATION, BOM: BILL OF MATERIAL, MTC: MATERIAL TEST CERTIFICATE, T.C.: TEST CERTIFICATE, I.R.: INSPECTION REPORTS, COC: CERTIFICATE OF CONFORMANCE, M: MANUFACTURER / SUBCONTRACTOR, B: BHEL /BHEL NOMINATED INSPECTION AGENCY, N: END CUSTOMER, P: PERFORM, W: WITNESS, V: VERIFICATION, "V" RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER

MANUFACTURER/  
SUBCONTRACTOR

FOR CUSTOMER USE

APPROVED BY

MANUFACTURER'S NAME AND ADDRESS		STANDARD QUALITY PLAN					TO BE FILLED BY BHEL			TO BE FILLED BY BHEL											
 BHEL		VENDOR'S NAME		ITEM		GENERATOR INSTRUMENT		QP NO.	QA/BE/QP/305												
						CABINET		REV. NO.	00		Date: 01.10.2022										
								As per P.O.													
		SPEC.		Rev.		TG60668															
		As per P.O.																			
COMPONENT & OPERATIONS		CHARACTERISTICS		CLASS		TYPE OF CHECK		QUANTUM OF CHECK		REFERENCE DOCUMENT		ACCEPTANCE NORMS		FORMAT OF RECORDS		AGENCY		REMARKS			
2		3		4		5		6		7		8		9		M		B		N	
1																				10	
																				11	

1.0 RAW MATERIALS		2.0 IN PROCESS INSPECTION		3.0 FINAL INSPECTION							
1.1	CRCA sheet, Electricals Fittings, Equipment/ Instruments & Wiring Materials,	Major	Physical	100%	Appd. Drg./Spec.	Appd. Drg./Spec.	TC/ COC	P	V	--	
2.1	Fabrication & assembly of Weld Finish, Layout of Mounting of cabinet/panel Equipment & it's Make, Type and Ratings	Major	Physical	100%	Appd. Drg./Spec.	Appd. Drg./Spec.	--	P	--	--	
3.1	Type test for degree of protection	Major	Electrical	-	Appd. Drg./Spec.	Appd. Drg./Spec.	TC	V	V	--	Note 3
3.2	Routine test										
3.2.1	Cabinet visual & dimensional checks: Dimensional Conformity with GA Drg., Waviness, Straightness, Perpendicularity, earthing size etc.	Major	Measurement	100%	Appd. Drg./Spec.	Appd. Drg./Spec.	IR	P	W	--	
3.2.2	Cabinet operation: Manual Operation for its Moving Parts, Interlocking /Door Interlocking of Items, Location of Labels/Ferrule, Inspection of Wiring with Proper Size/ Type/ Grade of Power & Control Cables, Terminal blocks, Continuity of Panel Wiring, illumination, anti-vibration pad, proper earthing bus, name plate etc.	Major	Physical	100%	Appd. Drg./Spec.	Appd. Drg./Spec.	IR	P	W	--	
3.2.3	Cabinet components BOM (Make, type, rating)	Major	Physical	100%	Appd. Drg./Spec./BOM	Appd. Drg./Spec./BOM	IR	P	W	--	
3.2.4	Paint shade & paint thickness	Major	Physical	100%	Appd. Drg./Spec.	Appd. Drg./Spec.	IR	P	W	--	
3.2.5	I.R. before and after H.V. Test	Major	Electrical	100%	Appd. Drg./Spec.	Appd. Drg./Spec.	IR	P	W	--	
3.2.6	H.V. Test	Major	Electrical	100%	Appd. Drg./Spec.	Appd. Drg./Spec.	IR	P	W	--	
3.2.7	Functional checking of cabinet's various components, equipment, devices, interlock, protection circuits, indication feedback etc.	Major	Electrical	100%	Appd. Drg./Spec.	Appd. Drg./Spec.	IR	P	W	--	
3.2.8	Functional checking of level switch with probe	Major	Electrical	100%	Appd. Drg./Spec.	Appd. Drg./Spec.	IR	P	W	--	
3.3	Compliance of technical requirements	Major	Visual	100%	Appd. Drg./Spec.	Appd. Drg./Spec.	COC	P	W	--	
3.4	Recommended or mandatory spares (if applicable)	Major	Visual	100%	Appd. Drg./Spec.	Appd. Drg./Spec.	IR	P	W	--	
3.5	Identification and Marking	Major	Visual	100%	Appd. Drg./Spec.	Appd. Drg./Spec.	IR	P	W	--	
3.6	Soundness of Packing against Transit Damage	Major	Visual	100%	Appd. Drg./Spec.	Appd. Drg./Spec.	--	P	V	--	

Note: 1. Witness by inspection agency to be random 10% of each material code (minimum 1 piece per material code) from each lot. However, vendor to carry out 100% tests internally and tests report shall be reviewed by inspection engineer during inspection at Vendor's works. 2. Manufacturer to maintain calibrated instruments having better accuracy than the item under the test. Inspection Engineer shall check the same. 3. Type tests clearance from BHEL Engg. to be verified ( by inspection engineer) during inspection at vendor's works. 4. Vendor has to provide TC/IR mentioning above Q.P. clauses and also index/summary sheet for co-relation of TC/IR with QP clauses. TPIA to check the same.

MANUFACTURER/ SUBCONTRACTOR	LEGEND: DRG: BHEL APPROVED DRAWING, APPD.: BHEL APPROVED, SPEC: SPECIFICATION, BOM: BILL OF MATERIAL, MTC: MATERIAL TEST CERTIFICATE, T.C.: TEST CERTIFICATE, I.R.: INSPECTION REPORTS, COC: CERTIFICATE OF CONFORMANCE, M: MANUFACTURER / SUBCONTRACTOR, B: BHEL /BHEL NOMINATED INSPECTION AGENCY, N: END CUSTOMER, 'P': PERFORM, 'W': WITNESS, 'V': VERIFICATION, 'y' RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER	FOR CUSTOMER USE	APPROVED BY
			Digitally signed by Sachin Jain Date: 2022.10.07 19:17:35 +05'30'