PROJECT:	**UPRVUNL PANKI**
ITEM:	**Supply of CSD at UPRVUNL PANKI SITE**
SUBJECT:	**BID SPECIFIC ATC**

1.	For any **Technical Clarification**, Please contact Mr. Akhilesh Kumar, Dy. Manager (TBEM). Contact No. 0120-06748528; e-mail: akhileshk@bhel.in
2.	For any **commercial clarification**, please contact Mr. Sandeep, Dy. Manager (TBMM). Contact No. 0120-6748540; e-mail: kumar.sandeep@bhel.in
3.	**Terms of Payment:**

(Supply & Services)	As per GTC (Payment due date shall be 90 Days) Supply Payment: a) 95% of payment within 90 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows: • LR / GR duly endorsed by BHEL Site Official. • Material Receipt Certificate issued by BHEL Site Official. • GST Compliant Tax Invoice • Packing List (Case-wise) • Copy of Transit Insurance Certificate from underwriters. • Material Inspection Clearance Certificate (MICC) issued by BHEL Quality Management • Guarantee Certificate • Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management wherever specifically mentioned in the Purchase Order b) 5% of payment days within 90 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows: • Certificate of successful completion of Supervision of Erection, Testing & Commissioning at Site if it is in the scope of the supplier or Certificate of successful completion of Testing & Commissioning at Site if it is in the scope of the supplier. • Certificate of completion of final documentation as per Purchase Order / Technical Specification issued by BHEL Engineering Management. **Note: Wherever Service charges like Supervision to supply are envisaged in tender, such charges should not exceed 2% of the total contract value.** ***Vendor has to submit the duly signed check-list along with Bill.***

4.	**Terms of Delivery:**
As per NIT. However, unloading at site is in the scope of BHEL. Bidders to quote price accordingly.	
5.	**Delivery Time:**
Immediate. Vendor to submit delivery plan in Activity schedule. Early Delivery is acceptable. **Note:** In case, BHEL's delivery requirement is not met by vendor(s), then a chance may be given to all such vendors to review their quoted delivery schedule in line with BHEL's delivery requirement. However, if vendor fails to meet the requisite delivery plan, then BHEL reserves the right not to consider the offer of such vendor(s).	
6.	**Prices:**
The quoted prices shall be on **Firm basis including packing and forwarding charges**. Price to be quoted as inclusive of GST. i.e. Ex-Works + F&I + GST.	
7.	**Liquidated Damage of delayed Delivery:**

PROJECT:	**UPRVUNL PANKI**
ITEM:	**Supply of CSD at UPRVUNL PANKI SITE**
SUBJECT:	**BID SPECIFIC ATC**

In case of delay in execution of Purchase Order beyond the contractual delivery time, an amount of 0.5% of the total PO ex-works value & F&I charges for supply per week of delay or part thereof subject to a maximum of 10% of the total PO Ex-Works Value & F&I charges shall be deducted as Liquidated Damages (LD). Along with the applicable GST (IF ANY) ON LD.	
8.	**Item & BOQ:**
BOQ: As per Annexure	
9.	**Technical Specification:**
As per approved drawings of PO No. 06P2000007 Dated: 17.06.2019	
10.	**Pre-Qualification Requirement:**
As per Approved drawings	
11.	**MQP (Manufacturing Quality Plan):**
MQP format is indicative only, however inspection shall be carried out as per approved Quality Plan. Supplier has to submit Quality Plan to BHEL for Customer approval.	
12.	**Inspection:**
Inspection shall be carried out as per customer as per approved Quality Plan.	
13.	**Destination / Delivery Location**:
Shall be provided later	
14.	**Bill to Address:**
Bharat Heavy Electricals Limited-TBG, 10th Floor, Plot No.C-20/1A/1, Joy Tower, Sector-62, Noida-201301, U.P. **GSTN-**09AAACB4146P2ZC	

15.	**Guarantee Clause (Defect Liability Period):**
The equipment / material supplied and services rendered (if applicable) shall be guaranteed to be free from all defects and faults in design & engineering, material, workmanship & manufacture and in full conformity with the Purchase Order / Contract, Technical Specifications & approved drawings / data sheets, if any, for 18 months from the date of last delivery or 12 months from the date of commissioning, whichever is earlier.	
16.	**Performance Bank Guarantee:**
PBG- To be kept valid till the completion of guarantee period.	
17.	Bidders to ensure that Third party / customer issued certificates being submitted as proof of PQR qualification should have verifiable details of document / certificate issuing authority such as name & designation of Issuing Authority and its organization contact number and e-mail Id etc. In case the same found not available, Purchaser has right to reject such document from evaluation.
18.	**Acceptance of Offer:**
Subject to end user	
19.	**Deviations:**
a) Technical Deviation: No Technical Deviation is envisaged. b) Commercial Deviation: No Commercial Deviation is envisaged.	
20.	All other terms & conditions shall be as per GTC of GeM

Note: This Purchase is against single tender being OEM items. The offer shall be accepted from M/s GE T&D Ltd. only.

PROJECT:	**UPRVUNL PANKI**
ITEM:	**Supply of CSD at UPRVUNL PANKI SITE**
SUBJECT:	**BID SPECIFIC ATC**

Signature & Seal of supplier
Date

Annexure-V

SCHEDULE OF COMMERCIAL DEVIATION

The following are the deviations/ variations exception from the General Terms and Conditions:

SL. NO.	CLAUSE NO. OF TERMS AND CONDITIONS	STATEMENT OF DEVIATION
	NIL DEVIATION	NIL DEVIATION

In case, this schedule is not submitted, it will be presumed that the equipment /material to be supplied under this contract is deemed to be in compliance with the General Terms and Conditions.

If there is NIL deviation, even then the format to be filled as NIL DEVIATION.

Note : 1. Continuation Sheets of like size and format may be used as per the Bidder's Requirement and shall be annexed to this schedule.

2. Deviation mentioned in this schedule shall only be considered.

This Format is to be submitted in original duly signed by bidder. Reproduction of the same in any sort is not acceptable.

Signature of the authorized representative of

Place: é é é é é é é

Bidder's name

Date : é é é é é é é .

:é é é é é é é é é é é é é é é

PROJECT:	**UPRVUNL PANKI**
ITEM:	**Supply of CSD at UPRVUNL PANKI SITE**
SUBJECT:	**BID SPECIFIC ATC**

Designation:é é é é é é é é é é é é é é é é
..
Company
Seal:é é é é é é é é é é é é é é

SCHEDULE OF TECHNICAL DEVIATION

The following are the deviations/ variations exception from the Technical Specifications:

SL. NO.	CLAUSE NO. OF TERMS AND CONDITIONS	STATEMENT OF DEVIATION
	NIL DEVIATION	NIL DEVIATION

In case, this schedule is not submitted, it will be presumed that the equipment /material to be supplied under this contract is deemed to be in compliance with the Technical Specifications,

If there is NIL deviation, even then the format to be filled as NIL DEVIATION.

Note : 1. Continuation Sheets of like size and format may be used as per the Bidder's Requirement and shall be annexed to this schedule.

2. Deviation mentioned in this schedule shall only be considered.

This Format is to be submitted in original duly signed by bidder. Reproduction of the same in any sort is not acceptable.

Signature of the authorized representative of

Place: é é é é é é é .
Date : é é é é é é é .

Bidder's name :é é é é é é é é é é é é é é
Designation:é é é é é é é é é é é é é é ..

PROJECT:	**UPRVUNL PANKI**
ITEM:	**Supply of CSD at UPRVUNL PANKI SITE**
SUBJECT:	**BID SPECIFIC ATC**

UNPRICED BID

Item No.	Item Description	Item Quantity	Unit of Measure	Unit Price (Inclusive of F&I & GST)	GST % Applicable
1	SUPPLY-CONTROL SWITCHING DEVICE: CSD WITH ALL ACCESSORIES LIKE TRANSDUCERS ETC COMPLETE IN ALL RESPECT (EXCEPT SPECIAL CABLES)	02	SET	Mention as "Quoted"	Mention GST %
2	SERVICE- CONTROL SWITCHING DEVICE: SUPERVISION OF ERECTION, TESTING & COMMISSIONING OF SUPPLIED CSD AT SITE. (INCLUDING INTERFACE WITH CIRCUIT BREAKER)	04	MANDAY	Mention as "Quoted"	Mention GST %

Signature & Seal of Supplier
Date:

Addendum to General Terms and Conditions GTC-201

1	Offer Submission/ Opening Time	Offer Submission Time: 14:00 Hrs IST Offer Opening Time: 14:30 Hrs IST
2	Instruction to Bidder(s)	(a) For Supply where Supervision of Erection, Testing & Commissioning (ETC) at Site is in the scope of the supplier or Supply where Testing & Commissioning (T&C) at Site is in scope of the supplier, minimum 10% of total ex-works value shall be quoted under supervision of ETC/T&C. In case bidder quotes less than 10%, then 10% of Total PO value excluding GST and F&I shall be allocated to the supervision of ETC/T&C scope. Service charges shall be back calculated to keep 10% of total cost to BHEL (without GST). This price adjustment shall be done from supply Ex works prices only on prorata basis for all supply line items. (b) For Supply where Erection, Testing & Commissioning (ETC) at Site is in the scope of the supplier, minimum 20% of total ex-works value shall be quoted under ETC. In case bidder quotes less than 20%, then 20% of Total PO value excluding GST and F&I shall be allocated to the ETC scope. Service charges shall be back calculated to keep 20% of total cost to BHEL (without GST). This price adjustment shall be done from supply Ex works prices only on prorata basis for all supply line items. (c) Bidder's offer will be technically acceptable subject to final acceptance of vendor by ultimate customer as approved supplier. Price Bid will be opened only for those bidders in respect of which vendor approval is received from respective customer. Necessary credentials/documents to be submitted to customer for approval.
3	Offer Submission Mode	Clause No. 1.3 of GTC – Tender is invited through e-Procurement System only. The bidder shall submit their bid through e-Procurement platform at https://bhel.abcprocure.com. Vendors participating through e-procurement portal for this tender should have Class-III Digital Signature Certificate (DSC) for Signing & Encryption of bids issued by any of the valid Certifying Authorities (approved by Controller of Certifying Authorities) in India.
4	Validity of Purchase Order	Purchase order shall be valid for two years from date of Purchase Order.
5	Work Address	Bidder to mention their works address below from where material will be supplied Works Address---------- ---------- ----------
6	Pre- Qualification Requirement(PQR)	As per Annexure-I The bidder must ensure that they are meeting the PQR (Technical) and should submit all the requisite credentials as per PQR.
7	Deviation	Technical Deviation: No Technical Deviation is envisaged. Commercial Deviation: No Commercial Deviation envisaged except defined in GTC.
8	Delivery Plan	As per Activity Schedule-Annexure-II
9	Terms of Payment	As per clause 3.1 to 3.7 of GTC (as applicable). Supplier to submit bills alongwith billing checklist as per Annexure-III
10	Performance Bank Guarantee (PBG)	Clause No. 7 of GTC, If no option is specified by the bidder, by default option – B for Bank Guarantee shall be considered. BG for Main supply items and Spares shall be submitted separately alongwith first bill. **Note:** BG should be submitted on non-judicial stamp paper of appropriate value by the supplier alongwith first submission of bill to BHEL.

Addendum to General Terms and Conditions GTC-201

11	Liquidated Damage	Clause no. 13 of GTC - In case of delay in execution of Purchase Order beyond the contractual delivery time, an amount of 0.5% of delayed lot value (Ex Works and F&I charges) for supply per week of delay or part thereof subject to a maximum of 10% of delayed lot value (Ex Works and F&I charges) shall be deducted as Liquidated Damages (LD) along with applicable GST (if any) on LD. LD will calculated for lotwise and Manufacturing Clearance (MFC) date will be the last date of inputs for that particular lot Lot-1: items for which MFC is issued from 1-15 days of calendar month Lot-2: items for which MFC is issued from 16-30/31 days of calendar month Lot-3: items for which MFC is issued from 1-15 days of next calendar month, Lot-4: items for which MFC is issued from 16-30/31 days of next calendar month and so on...
12	Arbitration	As per Annexure-IV
13	Reverse Auction	"BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com) for this tender. RA shall be conducted among all the techno-commercially qualified bidders. Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered as initial bids of bidders in RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking." Abridged Version of "Guidelines for Reverse Auction-2020" may also be seen at BHEL website (www.bhel.com) on "Supplier Registration" Page.
14	Splitting of Contract	Splitting of Contract not applicable for this tender.
15	Make In India (PPP-MII)	For this procurement, the local content to categorize a supplier as class-I local supplier / class-II local supplier / Non-Local supplier and purchase preference to class-I local supplier, is as defined in Public Procurement (Preference to Make in India), Order 2017 dated 04.06.2020, issued by DPIIT. In case of subsequent orders issued by the nodal ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT but before opening of part-II bids against this NIT. "Bidder to specify the percentage of local content as per the format of self-declaration for local content" as per Annexure-V." "This tender is not a global tender and only class-I and Class II suppliers as defined under the DPIIT order no. P-45021/2/2017-PP (BE-II) dated 04.06.2020 are eligible to bid in this tender. Bids received from Class-II & Non-Local supplier shall be rejected."
16	Compliance to GOI Order for restrictions under Rule 144 (xi) of General Financial Rules (GFRs), 2017	Refer Clause at Annexure-VI and Certification at Annexure-VII / Annexure-VIII (whichever is applicable) regarding restrictions under Rule 144 (xi) of General Financial Rules (GFRs), 2017. Bidder to comply the clause and submit the certification. Non-compliance/ Non-submission of certification will lead to rejection of Offer.
17	MOP Circular	Bidder to comply the MOP circular dated 02-07-2020 (Annexure-IX) and its subsequent amendment, if any, in prescribed format (Annexure-X). Non-compliance/ Non-submission will lead to rejection of Offer [Not Applicable for cases where local content is 100%]. Vendor to quote as per specified price format of NIT, otherwise their offer shall be liable to be rejected. Following confirmation to be provided by vendor: ***"We confirm that we have quoted as per specified price format provided along with this tender".***
18	Integrity Pact	*As per Annexure-XI.*
19	Risk and Cost	*As per Annexure-XII.*
20	Prevention for cartel formation	The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process. In case, the Bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies/ guidelines.

Addendum to General Terms and Conditions GTC-201

21	Docuemts Required for Customer approval	Bidders to submit below documents alongwith their offer but not limited to: (a) PAN, GST, Certificate of Incorporation (b) Factory Registration Certificate (c) Overall organization Chart with Manpower Details (Design/Manufacturing/Quality etc.) (d) List of Plant and Machinery (e) List of Testing and Measuring equipment (f) Third party approval, if any (viz. ISO, BIS) (g) Pollution clearance wherever applicable (h) Energy conservation & Efficiency Report(Applicable to industries having contact load more than 100KVA) (i) Manufacturing Quality Plan (MQP) (j) List of past supplies references along with copy of major PO (k) Performance certificate from end user (j) Photographs of factory, plant and machinery & testing facilities
22	BHEL Supplier Registration Portal	The link for Online Supplier registration Portal is https://supplier.bhel.in/ The link for Online Supplier Registration Portal may also be seen at BHEL website (www.bhel.com) on “Supplier Registration” Page.

The Notice Inviting Tender (NIT)/ the tender requirement of BHEL will not be henceforth published in newspapers. All the concerned are hereby notified that tender enquiries of BHEL will be published on BHEL tender website (www.bhel.com) and Government’s Central Public Procurement Portal (https://eprocure.gov.in/).

Sign and seal of idder

BHARAT HEAVY ELECTRICALS LTD.
(TRANSMISSION BUSINESS GROUP)

GENERAL TERMS AND CONDITIONS FOR TENDER ENQUIRY / CONTRACT

This is to be submitted duly signed by bidder in original. Clause-wise deviations and / or additional conditions / clarifications, if any, are to be brought out clearly in "Schedule of Commercial Deviation". Deviations and / or additional conditions / clarifications, if any, mentioned elsewhere in the bid / offer, shall not be considered.

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1.	**INSTRUCTION TO BIDDERS :** 1.1 Sealed bids are invited for the items mentioned in the tender enquiry conforming to the NIT including Technical Specifications. Bids should be typed and free from overwriting and erasures. Corrections or additions / deletions, if any, must be clearly written and attested, otherwise offer may be rejected. 1.2 Bidder must ensure that their bid is submitted / dropped in the tender box on or before **14-00 Hrs.** IST on the due date of opening, unless otherwise specified in the NIT, at the address as follows :- Tender Box, Materials Management, Transmission Business Group, Bharat Heavy Electricals Limited, 5th Floor, Tower-A, Advant Navis IT Business Park, Plot-7, Sector-142, Noida Expressway, Noida, Dist. G. B. Nagar, U. P. – 201305 1.3 In case tender enquiry is floated though the e-procurement system, offer / bid has to be submitted through the e-procurement system **ONLY** as per instructions given in the e-procurement portal (https://bheleps.buyjunction.in). 1.4 The bids shall be opened at 14-30 Hrs. IST on the due date of opening, in the presence of participating bidders who may like to be present, unless otherwise specified in the NIT. Bids received late are liable for rejection. Bidders sending bids by courier or post will have to ensure that it is timely delivered at the above address. 1.5 Bids are to be submitted duly signed with seal in two parts :- a) **Techno-commercial Bid (Part-I**) – To be submitted in 2 sets (original + copy). A copy of Price Bid (Part-II) clearly mentioning all the necessary information as per format **without prices** "Un-Priced Bid" is also to be enclosed in Part-I Bid. b) **Price Bid (Part-II)** – To be submitted only in one set in a separate sealed envelope. This should not contain any Technical and / or Commercial Terms and Conditions. The rates should be quoted both in figures and words. 1.6 The Part-I and Part-II Bids are to be sealed in separate envelopes and

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	marked as "Techno-commercial Bid (Part-I)" and "Price Bid (Part-II)" respectively. Both the envelopes are to be kept in another common envelope and marked as "BID". Each envelope should be sealed and superscribed with tender enquiry no., item / package name, project name and due date of opening. Bidder's name and address shall also be mentioned on each envelope. 1.7 For any technical clarification, please contact official mentioned in the tender enquiry / NIT. 1.8 For any commercial clarification please contact official issuing tender enquiry / NIT. 1.9 Price bid (Part-II) should not contain any additional information / description other than given in "Un-Priced Bid" submitted with "Techno-commercial Bid (Part-I)" except prices, otherwise bid is liable for rejection. 1.10 Price Bid submitted along with the bid shall remain valid up to validity of offer. Any discount / revised offer submitted by the bidder on its own shall be accepted provided it is received before the due date and time of offer submission (i.e. Part-I Bid). The discount shall be applied on pro-rata basis to all items including optional items, if any, unless specified otherwise by the bidder. Discount offered shall be valid for full duration of validity of the offer including extension of validity, if any. Unsolicited Supplementary / Revised Price Bid submitted after the due date and time of offer submission (i.e. Part-I Bid), during validity period of offer, unless asked by BHEL, shall not be considered. Withdrawal of quotation by the bidder, at any stage after its opening, may entail suitable action against such bidder by BHEL. 1.11 The consultants / firm (and any of its affiliates) shall not be eligible to participate against tender enquiry for the related goods or works or services for the same project, if they were engaged by BHEL-TBG for the consultancy services. 1.12 In case any Foreign OEM / Foreign Principal insists on engaging the services of an agent, such agent shall not be allowed to represent more than one manufacturer / supplier in the same tender. Moreover, either the agent could bid on behalf of the manufacturer / supplier or the manufacturer / supplier could bid directly but not both. In case bids are received from the manufacturer / supplier and the agent, bid received from the agent shall be ignored. 1.13 Non-conformities / errors / discrepancies in quoted prices in price bids shall be dealt as follows :- a) If, in the price structure quoted for the required goods / services / works, there is discrepancy between the unit price and the total price (which is obtained by multiplying the unit price by the quantity), the unit price shall prevail and the total price corrected accordingly, unless in the opinion of BHEL there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price corrected accordingly. b) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected.

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	c) If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above. d) If there is such discrepancy in an offer as mentioned in (a), (b) & (c) above, the same shall be conveyed to the bidder with target date upto which the bidder has to send his acceptance on the above lines and if the bidder does not agree to the decision of the BHEL, the bid is liable to be ignored. 1.14 In case the scope of the successful bidder / supplier against this tender enquiry includes Erection, Testing and Commissioning (ETC) of the equipment / material at site in addition to Supply, Purchase Order shall be placed for Supply Portion and Contract shall be separately awarded for ETC at Site Portion. General Terms and Conditions for Tender Enquiry / Contract mentioned herein shall be applicable for both Supply & ETC at Site. Additional Terms and Conditions for Tender Enquiry / Contract for Erection, Testing and Commissioning at Site "BHEL/TBG/GTC-ETC/2016 REV01" shall be applicable for ETC at Site only which is to be read in conjunction with General Terms and Conditions for Tender Enquiry / Contract mentioned herein. However, any breach of either the Purchase Order or the Contract shall be deemed to be breach of the other. 1.15 Taxes and Duties payable extra as per Clause No. 2.3 in NIT, if not specified/quoted clearly as extra shall be considered as included in Ex-works Price and therefore shall not be reimbursed. Taxes and duties not payable extra as per NIT shall be deemed to be included in Ex-works Price. 1.16 If the rates for taxes and duties in respect of the quoted materials and / or services assumed by the Supplier are less than the tariff prevailing at the time of tendering, Supplier will be responsible for such under quotations. However if the rates assumed are higher than the correct rates prevailing at the time tendering, the difference will be to the credit of BHEL. Note : Representative / official deputed by the bidder to witness tender opening must produce authorization letter for the same.
2.	**PRICES :** 2.1 Unless specifically indicated in the NIT, all prices shall be FIRM. No enhancement of rate for whatsoever reasons unless and until asked by BHEL shall be allowed. 2.2 Unless specifically indicated in the NIT, the prices shall be on INR basis. 2.3 Unless specifically indicated in the NIT, the prices are to be quoted on FOR (Site / Destination) basis excluding GST. The break-up of prices shall be as under :- a) Ex-works Price: Ex-works price including packing & forwarding charges.

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	b) Freight: Freight for door delivery up to destination / site / store are to be quoted separately. c) Insurance: Insurance for door delivery up to destination / site / store are to be quoted separately. d) Type Test Charges: If asked in the technical specification, it is to be quoted separately for each test. e) Charges for Supervision of Erection, Testing & Commissioning (ETC) at Site: To be quoted separately if specified in NIT/Price Schedule. f) Charges for Testing & Commissioning at Site: To be quoted separately if specified in NIT/Price Schedule. g) Charges for Erection, Testing & Commissioning at Site: To be quoted separately if specified in NIT/Price Schedule. h) Training Charges: To be quoted separately if specified in NIT/Price Schedule. 2.4 **GST rates** along with HSN/SAC code as applicable on Sr No (a) to (h) above is to be mentioned separately in percentage in both un-priced bid and price bid. Note : i) Unless otherwise specified in the NIT, the purchase order shall be placed on Ex-works basis for Indian bidders. ii) Prices quoted by Indian bidders shall be in Indian Rupees only. iii) In case Supervision of Erection, Testing & Commissioning (ETC) at Site or Testing & Commissioning at Site or Erection, Testing & Commissioning at Site is also in scope of the bidder along with supply, bidder has to ensure that prices quoted for such services also are in line with special terms & conditions of the NIT, if any. iv) Unless otherwise specified in the NIT, Unloading at Site / Destination shall not be in the scope of the supplier. v) Prices in respect of Sr No (a) to Sr No (h) of Clause 2.3 above are to be quoted inclusive of all taxes & Duties, charges. Levies , royalty etc if any, excluding GST.
3.	**TERMS OF PAYMENT :** 3.1 **For Supply only in scope of the supplier** 100% of payment within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : · LR / GR duly endorsed by BHEL Site Official. · Material Receipt Certificate issued by BHEL Site Official. . GST Compliant Tax Invoice · Packing List (Case-wise) · Copy of Transit Insurance Certificate from underwriters. · Material Inspection Clearance Certificate (MICC) issued by BHEL Quality Management · Guarantee Certificate · Copy of Performance Bank Guarantee (PBG) · Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management wherever specifically mentioned in the Purchase Order.

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	3.2 **For Supply where Supervision of Erection, Testing & Commissioning (ETC) at Site is in scope of the supplier or Supply where Testing & Commissioning at Site is in scope of the supplier** a) 95% of payment within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : · LR / GR duly endorsed by BHEL Site Official. · Material Receipt Certificate issued by BHEL Site Official. . GST Compliant Tax Invoice · Packing List (Case-wise) · Copy of Transit Insurance Certificate from underwriters. · Material Inspection Clearance Certificate (MICC) issued by BHEL Quality Management · Guarantee Certificate · Copy of Performance Bank Guarantee (PBG) · Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management wherever specifically mentioned in the Purchase Order. b) 5% of payment within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : · Certificate of successful completion of Supervision of Erection, Testing & Commissioning at Site if it is in the scope of the supplier or Certificate of successful completion of Testing & Commissioning at Site if it is in the scope of the supplier. · Certificate of completion of final documentation as per Purchase Order / Technical Specification issued by BHEL Engineering Management 3.3 **For Supply where Erection, Testing & Commissioning (ETC) at Site is in scope of the supplier** a) 90% of payment within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : · LR / GR duly endorsed by BHEL Site Official. · Material Receipt Certificate issued by BHEL Site Official. · GST Compliant Tax Invoice · Packing List (Case-wise) · Copy of Transit Insurance Certificate from underwriters. · Material Inspection Clearance Certificate (MICC) issued by BHEL Quality Management · Guarantee Certificate · Copy of Performance Bank Guarantee (PBG) · Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management wherever specifically mentioned in the Purchase Order b) 10% of payment within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : · Certificate of successful completion of Erection, Testing & Commissioning at Site issued by BHEL Site Official / Construction Management · Certificate of completion of final documentation as per Purchase Order / Technical Specification issued by BHEL Engineering Management 3.4 For Type Test Charges 100% payment along with applicable GST within 60 days from the date of receipt

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	of complete GST compliant Tax invoice along with copy of Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management in 3 sets (original + 2 copies) on completion of delivery (at site, if F&I is in scope of supplier) of main supplies (excluding spares) for which Type Tests are applicable. List of main supplies (excluding spares) for which Type Tests are applicable shall be certified by BHEL Engineering Management. 3.5 For Charges for Supervision of Erection, Testing & Commissioning at Site 100% payment along with applicable GST within 60 days from the date of receipt of complete GST compliant Tax invoice along with certificate of successful completion of Supervision of Erection, Testing & Commissioning at Site issued by BHEL Site Official / Construction Management in 3 sets (Original + 2 copies). 3.6 For Charges for Testing & Commissioning at Site 100% payment along with applicable GST within 60 days from the date of receipt of complete GST compliant Tax invoice along with certificate of successful completion of Testing & Commissioning at Site issued by BHEL Site Official / Construction Management in 3 sets (Original + 2 copies). 3.7 For Training Charges 100% payment along with applicable GST within 60 days from the date of receipt of complete GST compliant Tax invoice along with certificate of completion of training issued by BHEL Engineering Management in 3 sets (original + 2 copies). Note : i) Supplier has to submit invoice(s) as per PO or approved billing break-up of prices (if applicable as per NIT). ii) In case of supplies for overseas project, Material Receipt Certificate issued by BHEL Authorized Representative shall also be acceptable. iii) In case of Transit Insurance under Open Insurance Policy, Intimation / Declaration of Transit Insurance as per terms of the relevant Open Insurance Policy along with copy of Open Insurance Policy from underwriters shall also be acceptable. iv) Supplier has to ensure commencement of transit insurance from the date not later than LR / GR date. v) Supplier has to submit Tax Invoice(s). Supplier should ensure that Tax Invoice should comply all statutory requirements under GST Law to enable BHEL to avail input credit vi) MSMED Act, 2006 and the rules made thereunder as amended from time to time shall be applicable for release of payment to suppliers qualified & registered as Micro & Small Enterprises based on documents mentioned in the NIT for MSME. vii) Supplier has to submit PBG (as per BHEL format) & Guarantee Certificate as per

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	PO terms. viii) In case any shortages and / or damages in supplies, an amount calculated based on comments against Material Receipt Certificate issued by the BHEL Site Official shall be withheld from the supply payment against 3.1(a) or 3.2(a) above to be deemed fit by BHEL subject to a minimum of 10% of the total ex-works value of the invoice corresponding to the LR / GR against which any shortages and / or damages are reported. The withheld amount shall be released after the shortages and / or damages in supplies are supplied / replenished against Certification by BHEL Site Official. ix) Payment of GST component shall be made only if vendor has deposited the Tax and credit for the same is reflected in GSTN (GST Network). In case credit of the same is not reflected in GSTN , vendor may alternatively furnish BG of GST Amount for a period valid for not less than 1 month .In case of disallowance of credit /non reflection of credit in GSTN , amount will be recovered from supplier along with applicable Interest , penalty etc from any of his dues. x) If GST is payable by BHEL on reverse Charge Mechanism basis, vendor should ensure the submission of GST compliant Tax invoice immediately on dispatch/ performance of service. In case of non-compliance any additional charges towards interest , penalty etc , will be to vendors account. xi) TDS under GST Act, if applicable, shall be deducted unless Exemption Certificate If applicable, from the appropriate authority is furnished to BHEL along with Invoice.
4.	**INTEREST LIABILITY :** In case of any delay in payment due to any reason, BHEL shall not pay any interest on delayed payment. Also, no interest shall be payable by BHEL on the bank guarantee / deposit amount or balance payment or any other money which may become due owing to difference or misunderstanding or any dispute before any quasi judicial authority between BHEL and the Supplier / Contractor.
5.	**GUARANTEE :** The equipment / material supplied and services rendered (if applicable) shall be guaranteed to be free from all defects and faults in design & engineering, material, workmanship & manufacture and in full conformity with the Purchase Order / Contract, Technical Specifications & approved drawings / data sheets, if any, for 18 months from the date of last delivery or 12 months from the date of commissioning, whichever is earlier. Wherever Erection, Testing & Commissioning at Site are also in the scope of the Supplier, the guarantee period shall be 18 months from the date of last delivery or 12 months from the date of commissioning, whichever is later. The defective equipment / material / component shall be replaced free of cost at site. Freight & Insurance during transit shall also be in the scope of the supplier / contractor. Any expenditure for dismantling and re-erection of the replaced equipment / material / component shall be to supplier's / contractor's account. All replacements during the guarantee period shall be delivered at site promptly and satisfactorily within a period not more than 45 days from the date of reporting the defect / rejection etc. In the event of the supplier / contractor failing to replace the defective equipment / material / component within the time period mentioned above, BHEL may proceed to

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	undertake the replacement of such defective equipment / material / component at the risk and cost of the supplier / contractor without prejudice to any other rights under the contract and recover the same from PBG / other dues of this Purchase Order / Contract or any other Purchase Order / Contract executed by the supplier / contractor. Note : i) In case of Illumination System, items viz. Lamps, Tubes, Ballast, Starters, Capacitors & Fuses will not be under Guarantee after commissioning. ii) In addition to the above guarantee period, Extended Guarantee / Warranty, if any, shall be as per NIT / Technical Specifications. iii) In case offer of agent of Foreign OEM / Foreign Principal is considered, as per Clause No. 1.12 above, Guarantee as mentioned above has to be provided by the Foreign OEM / Foreign Principal also.
6.	**LATENT DEFECT :** Liability for latent defects shall be for defects inherently lying within material or arising out of design deficiency which does not manifest itself during guarantee period but later and shall be limited to five years from the expiry of the guarantee period.
7.	**PERFORMANCE BANK GUARANTEE (PBG) :** Supplier shall arrange to submit Performance BG / deposit on a non-judicial stamp paper of appropriate value along with first invoice or within 60 days from placement of Purchase Order (PO) whichever is earlier, in line with one of the applicable options as follows :- <u>Option "A"</u> A single rolling PBG for Rs. 50 Lakhs initially valid for 18 months with claim period of 3 months extra over and above 18 months for all the Purchase Orders being executed for Transmission Business Group, BHEL. However, validity of the PBG shall be extended till 18 months from the date of last delivery with 3 months claim period extra over and above 18 months. Single Rolling PBG option shall not be applicable in case Ex-works value of the PO at the time of placement of PO exceeds Rs. One Crore. <u>Option "B"</u> PBG for 10% of the total Ex-works PO value, valid for 18 months from the date of last delivery with claim period of 3 months extra over and above 18 months. Ex-works PO value at the time of placement of PO shall be considered for calculation of the PBG amount. <u>Option "C"</u> In case the total Ex-works PO value at the time of placement of PO does not exceed Rs. Ten Lakhs, interest free Deposit of 10% of the total Ex-works PO value at the time of placement of PO in form of Demand Draft favouring "Bharat Heavy Electricals Limited" and payable at New Delhi / Delhi / Noida shall also be acceptable to BHEL in lieu of PBG, which shall be released after expiry of 21 months from the date of last delivery after deduction, if any, within 60 days from receipt of invoice in 3 sets (original + 2 copies) to be submitted by the supplier. Note : i) The Bank Guarantee shall be from any bank as per Annexure for List of Banks (32 Nos.). The original PBG should be sent by issuing Bank directly to AGM (Finance), TBG, BHEL, Noida. ii) Extension of validity of the PBG in original, as per above clause, should be sent by issuing Bank directly to AGM (Finance), TBG, BHEL, Noida at least 45 days

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	before expiry of validity of the PBG. iii) Unless otherwise specified in the NIT, deviation taken for non-submission of PBG / Deposit, as applicable, shall not be accepted. iv) Supplier has to confirm one of the applicable options for submission of PBG / Deposit before placement of PO. v) In case of non–submission PBG / Deposit, as applicable, BHEL reserve the right for Risk Purchase as per terms of the NIT and impose Suspension of Business Dealings with the Supplier / Contractor. vi) BHEL reserve the right to encash the Bank Guarantee and forfeit the amount in the event of any default, failure or neglect on part of the Supplier in fulfilment of performance of the Purchase Order. vii) Value of the Bank Guarantee (at the time of submission) shall remain unchanged for any subsequent variations in Purchase Order value up to ± 20%. Beyond this variation of ± 20%, the Supplier shall arrange to enhance or may reduce the value of the Bank Guarantee accordingly for the total variation promptly. viii)Vendor to ensure submission of Certificate of Final Documentation /Confirmation regarding Non applicability of Final Documentation, as the case may be, as referred in clause No 9 regarding Final Documentation. BG shall be released only after submission of the same to BHEL TBMM.
8.	**SUBMISSION OF DRAWINGS / DOCUMENTS FOR APPROVAL :** Supplier shall submit the master document list within 7 days from date of Purchase Order / Contract, unless otherwise specified in the NIT, with planned dates for submission which shall be in line with activity schedule as per Purchase Order / Contract and shall be finalized with BHEL Engineering Management. Date of first submission of drawings / documents shall be certified by BHEL Engineering Management after the receipt of applicable drawings / documents (e.g. project specific cover sheet, GTP, OGA drawings, schemes, type test reports etc.) by BHEL. During detailed engineering stage, necessary hard copies of the engineering drawings / documents shall also be submitted by the supplier as per the Purchase Order / Contract requirement. The supplier shall also submit the packing drawings as per technical specifications. In case item(s) offered require any interface details of other item (not in the scope of supplier & required for operating the equipment), the supplier has to submit interfaces schedule along with submission of engineering drawings / documents. It shall be responsibility of the supplier to get the details of the interfaced item from BHEL before manufacturing to avoid any mismatch at site.
9.	**FINAL DOCUMENTATION :** Final documentation as called in the Technical /contract specification is to be submitted within 3 months from the date of first delivery of respective equipment, item/material. After submission of Final Documentation, BHEL Engineering Management (TBEM) will issue a Certificate of Completion of Final Documentation. Wherever Final Documentation is not applicable, BHEL Engineering Management (TBEM) will issue confirmation regarding the same, Vendor to submit the Certificate of Final Documentation /Confirmation regarding Non applicability of Final Documentation, as the case may be, to BHEL TBMM. In case of Non Submission of Certificate of Final Documentation /Confirmation regarding Non applicability of Final Documentation, BG will be liable for encashment.
10.	**INSPECTION :** BHEL / customer / third party shall inspect equipment / material before despatch. Stage inspection during manufacturing may also be carried out. Material to be despatched only after getting Material Despatch Clearance Certificate (MDCC) / MICC issued by BHEL. Supplier shall send inspection call on prescribed format / web site only, with an

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	advance notice of 15 days. Supplier to ensure submission of all routine / acceptance test reports, inspection reports and all other documents related to inspection, immediately to BHEL. BHEL representative is authorised to carry out audits along with Third Party Inspection Agency at vendor's / supplier's works before clearing the items for despatch.
11.	**DESPATCH DOCUMENTS :** Despatch documents to be immediately sent to BHEL on despatch are as follows :- • Copy of Invoice • Copy of LR / GR in case of Indian suppliers or BL / AWB in case of foreign suppliers • Copy of Packing List (Case-wise) • Copy of Transit Insurance Certificate from underwriters • Copy of Guarantee Certificate
12.	**DELIVERY PERIOD :** Delivery / Completion requirement shall be mentioned in the NIT. Bidder to specify best delivery / completion period possible in weeks from the date of LOI / PO as per activity schedule for consideration by BHEL. Time required for type test, if applicable, is to be separately indicated. Note : LR / GR date or invoice date (whichever is later) for indigenous supplies and BL / AWB date for FOB / CIF (if applicable) contracts shall be considered as delivery date.
13.	**LIQUIDATED DAMAGES FOR DELAYED DELIVERY**: In case of delay in execution of Purchase Order beyond the contractual delivery time, an amount of 0.5% of the total Purchase Order value for supply (incl. taxes and duties, freight & insurance as applicable) per week of delay or part thereof subject to a maximum of 10% of the total Purchase Order value for supply (incl. taxes and duties, freight & insurance as applicable) shall be deducted as Liquidated Damages (LD) along with applicable GST (if any) on LD. However, in case of staggered (lot-wise) contractual delivery schedule, an amount of 0.5% of the total Purchase Order value for supply (incl. taxes, duties, freight & insurance as applicable) of delayed lot per week of delay or part thereof subject to maximum of 10% of the total Purchase Order value.(Incl taxes, duties, Freight &Insurance as applicable) shall be deducted as Liquidated Damages (LD) along with applicable GST (if any) on LD. Note : i) In case of any amendment / revision in P.O./WO, the LD shall be linked to the amended / revised Purchase Order / Contract value and delivery / completion time / schedule, if applicable. ii) LR / GR date or invoice date (whichever is later) for indigenous supplies and BL / AWB date for FOB / CIF (if applicable) for imported supplies shall be treated as the date of dispatch for levying LD as above. iii) However, for indigenous supply, if time period between date of receipt of material at site / destination by Site Official & the date of LR / GR or invoice (whichever is later) is more than 30 days, where distance from place of despatch as per LR / GR is upto 1000 Kms or if time period between date of receipt of material at site / destination by Site Official & the date of LR / GR or invoice (whichever is later) is more than 45 days, where distance from place of despatch as per LR / GR is more than 1000 Kms, such excess period shall also be considered for LD

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	purpose. iv) If, as per supplier, delay is not attributable to the supplier, delay analysis with documentary evidence may be submitted by the supplier at the earliest but not later than six months from the end of the financial year in which the payment is withheld. Based on the above details / documents submitted by the supplier, BHEL shall take final decision and if considered appropriate by BHEL, withheld amount (full or part as the case may be) shall be released, otherwise, full or balance withheld amount shall be treated as deduction of Liquidated Damages (LD) towards delayed delivery.
14.	**VALIDITY OF OFFER :** The offer shall be valid for 120 days from the due date of opening of tender (i.e. techno-commercial bid unless otherwise specified in the NIT). Prices of Spares, wherever they optional items, shall be valid till two years from the date of placement of PO.
15.	**ACCEPTANCE / REJECTION OF TENDER :** BHEL reserve the right to reject in full or part, any or all tender without assigning any reason thereof. BHEL also reserve right to vary the quantities as mentioned in the NIT. Acceptance of offer is subject to vendor approval by customer before opening of price bid. BHEL shall not be bound by any power of attorney granted by tenderer or by changes in composition of the firm made subsequent to award of order / contract. BHEL may however recognize such power of attorney and changes after obtaining proper legal advice, cost of which will be chargeable to the seller / contractor concerned. If the tenderer deliberately gives wrong information, BHEL reserves the right to reject such an offer at any stage or cancel the order / contract, if awarded, and forfeit the security deposit and bank guarantee.
16.	**DEVIATION :** The bids having deviation(s) w.r.t. tender are liable for rejection. However, BHEL, at its discretion, may load the prices for evaluation of offer with prior intimation to bidder.
17.	**TENDER EVALUATION :** Comparative statement shall be prepared and evaluated on total cost basis at destination/site (as per terms of NIT) considering overall quantity indicated in NIT unless contrary to same is specifically mentioned in the tender enquiry / NIT. Total cost for this purpose shall include cost of scope of work as mentioned in NIT along with applicable taxes & duties, and other services etc. (if applicable). GST input credit available to BHEL shall be reduced from prices while determining L1 status. In case all bidders are foreign & Port of Import (destination port) is same for all the bidders, evaluation of offers shall be done on CIF (Port of Import) basis. Otherwise, evaluation of offers shall be done on the basis of delivered cost at site /destination to BHEL. Further, in case of foreign bidders, marine freight & insurance are to be quoted separately & the purchase order may be placed on FOB basis with an option for delivery on CIF / CFR basis, if required, later. In case of foreign bidders, Exchange Rate (TT selling rate of State Bank of India) as on date of tender opening (Part-I Bid in case of two part bid) shall be considered. If the relevant day happens to be a bank holiday, then the forex rate as on the previous bank (SBI) working day shall be taken for tender evaluation.
18.	**LOADING CRITERIA :** List of permissible deviations & loading criteria thereof are as follows :- a) Payment Terms Base rate of SBI (as applicable on the date of bid opening / techno-commercial bid opening in case of two part bids) + 6% shall be considered for loading for the

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	period of relaxation sought by bidder(s) against terms of payment in the NIT. b) Liquidated Damages (LD) for Delayed Delivery Loading on LD clause shall be to the extent to which it is not agreed to by the bidder (at offered value). c) In case of foreign bidders, if the quoted prices is on CIF basis only, it shall be loaded to arrive at total FOR (Site / Destination) price, as applicable, by factors as follows :- i) Port handling / clearing charges: @ 1% of CIF value to arrive at Customs Assessable Value. ii) Custom Duty (including CVD & SAD) as per NIT prevailing on date of price bid opening. iii) Inland Freight & Transit Insurance: @ 5% of CIF value where distance between site / destination and Port of Discharge is upto 1000 Kms or @ 7% of CIF value where distance between site / destination and Port of Discharge is more than 1000 Kms. Note : Additional deviations (if considered acceptable by BHEL) & the loading criteria shall be communicated to all the qualified bidders before price bid opening.
19.	**ARBITRATION :** In the event of any dispute emanating from and relating to this contract, the matter shall be referred to the sole arbitration of the person appointed by the competent authority of BHEL. Subject to aforesaid, the provisions of "The Arbitration and Conciliation Act, 1996" and the rules made thereunder as amended from time to time in India shall apply to the arbitration proceedings. The venue of arbitration shall be in New Delhi. Further there shall be no claim for any pre-reference or pendente-lite interest on the claims and any claim for such interest made shall be void. However, in case of contract with Public Sector Enterprise / Undertaking (PSE/PSU) or Govt. Dept., the extant guidelines of Govt. of India shall be followed.
20.	**LEGAL SETTLEMENT :** Indian Courts at New Delhi / Delhi shall have exclusive jurisdiction to decide the dispute, if any, arising out of or in respect of the contract(s) to which these conditions are applicable. Contract, including all matters connected with contract, shall be governed by the Indian Law, both substantive and procedural, for the time being in force including modification thereto.
21.	**SUB-CONTRACTING :** In case further subcontracting of BHEL Purchase Order / Contract or part thereof is envisaged by supplier, the same can be done after written permission is obtained from BHEL. However it shall not absolve the Supplier / Contractor of the responsibility of fulfilling BHEL Purchase Order / Contract requirements. In case of subcontracting of Purchase Order / Contract awarded by BHEL or part thereof without such permission, BHEL reserve the right to cancel the Purchase Order / Contract and source such material / component / equipment / system from any other agency at the risk and cost of the Supplier / Contractor. If Supplier / Contractor is an individual or proprietary concern and the individual or the proprietor dies or the partnership is dissolved or substantially affected, then unless BHEL is satisfied that legal representative of individual Supplier / Contractor or proprietor of proprietary concern and surviving partners of partnership firm are capable of carrying out and completing the Purchase Order / Contract, BHEL shall be entitled to cancel the Purchase Order / Contract as to its incomplete portion and without being in any way liable to payment of any compensation to legal

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	representative of Supplier / Contractor and / or to surviving partners of Supplier's / Contractor's firm on account of cancellation of the Purchase Order / Contract. Decision of BHEL that legal representatives of deceased Supplier / Contractor or surviving partners of the Supplier's / Contractor's firm cannot carry out and complete the Purchase Order / Contract shall be final and binding on the parties hereto. Terms and Conditions shall not get affected in case of de-merger / amalgamation / taking-over / re-constitution etc.
22.	**RISK PURCHASE :** In case the Supplier / Contractor fails to supply or fails to comply with terms & conditions of the Purchase Order / Contract or delivers equipment / material not of the contracted quality or fails to adhere to the contract specifications or fails to perform as per the activity schedule and there are sufficient reasons even before expiry of the delivery / completion period to justify that supplies shall be inordinately delayed beyond contractual delivery / completion period, BHEL reserve the right to cancel the Purchase Order / Contract either in whole or in part thereof without compensation to Supplier / Contractor and if BHEL so desires, may procure such equipment / material / items not delivered or others of similar description where equipment / material / items exactly complying with particulars are not readily procurable in the opinion of BHEL which is final and in such manner as deemed appropriate, at the risk and cost of the Supplier / Contractor and the Supplier / Contractor shall be liable to BHEL for any excess cost to BHEL. However, the Supplier / Contractor shall continue execution of the Purchase Order / Contract to the extent not cancelled under the provisions of this clause. Recovery amount on account of purchases made by BHEL at the risk and cost of Supplier / Contractor shall be the difference of total value of new Purchase Order (PO) value and total value of old Purchase Order for applicable items, where the total value of new PO is more than total value of old PO for applicable items, plus additional 15% of the total ex-works value of new PO as overheads. The Supplier / Contractor shall on no account be entitled to any gain on such risk & cost purchase. In case the purchase order (PO) value of the new PO is less than the PO value of the old PO, 15% of the total ex-works value of the new PO shall be recovered as overheads and the difference between the PO value of the old PO and the new PO shall not be considered for calculation of the recovery amount.
23.	**ADJUSTMENT OF RECOVERY :** Any amount payable by the Supplier / Contractor under any of the condition of this contract shall be liable to be adjusted against any amount payable to the Supplier / Contractor under any other Purchase Order / Contract awarded to him by any BHEL unit. This is without prejudice to any other action, as may be deemed fit, by BHEL.
24.	**FORCE MAJEURE CONDITION :** If by reason of war, civil commotion, act of god, Government restrictions, strike, lockout which are not in control of Supplier / Contractor the deliveries / services are delayed, Supplier / Contractor shall not be held responsible. If at any time during the continuance of the Purchase Order / Contract, the performance in whole or in part by either party of any obligations under the Purchase Order / Contract is prevented or delayed by reason of any war hostilities, acts of the public enemy, restrictions by Govt. of India, civil commotion, sabotage, fires, floods, explosion, epidemics, quarantine restrictions, strike, lock-outs or acts of God (hereinafter referred to as "event"), which are not in control of Supplier / Contractor or BHEL, then provided notice of the happening of such event is given by either party to the other within fifteen (15) days from the date of occurrence thereof, neither party shall by reason of such event be entitled to terminate the Purchase Order /

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	Contract nor shall have any claim for damages against each other in respect of such non-performance and delay in performance. Performance under the Purchase Order / Contract shall be resumed immediately after such event has come to an end or ceased to exist and decision of BHEL as to whether the deliveries have to be resumed or not shall be final, conclusive and binding on the parties hereto. In the event of the parties hereto not able to agree that a force majeure event has occurred, the parties shall submit the disputes for resolution pursuant to the provisions hereunder, provided that the burden of proof as to whether a force majeure event has occurred shall be upon the party claiming such an event. Notwithstanding above provisions, BHEL shall reserve the right to cancel the Purchase Order / Contract, wholly or partly, in order to meet the overall project schedule and make alternative arrangements for completion of delivery and other schedules.
25.	**MANUFACTURING QUALITY PLAN (MQP) :** Supplier to submit approved MQP in line with requirement of BHEL/customer.
26.	**SUPPLIER PERFORMANCE MONITORING AND RATING SYSTEM :** BHEL reserve the right for evaluation of Supplier Performance Rating as per Supplier Performance Monitoring and Rating System of BHEL for necessary action. Details are available at BHEL Website www.bhel.com for reference.
27.	**DEALING WITH BANNED SUPPLIERS / CONTRACTORS IN BHEL :** Offers of the bidders, who are on the banned list, as also the offers of the bidders who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL website www.bhel.com for reference.
28.	**ORDER OF PRECEDENCE :** The order of precedence shall be as follows :- a) Special Terms & Conditions (STC) for Tender Enquiry / Contract, if any b) General Terms & Conditions (GTC) for Tender Enquiry / Contract & Additional General Terms & Conditions (GTC) for Tender Enquiry / Contract for Erection Testing & Commissioning (ETC) at Site, if applicable Provisions in (a) above shall prevail over (b). In case of conflict, between Technical Specifications and STC / GTC, bidder to seek necessary clarifications from BHEL concerned official as specified in NIT.
29.	**PACKING :** Packing shall be in conformity with specifications and shall be such as to ensure prevention of damages, corrosion, deterioration, shortages, pilferage and loss in transit or storage. In case of shipment by sea or air, the packing shall be sea-worthy or air-worthy respectively and of international standards. Different types of spares i.e. start-up / commissioning spares and initial spares (mandatory spares and recommended O&M spares) are to be packed separately. Packing List shall be submitted as per standard format along with advance set of documents for claiming payment which shall also indicate :- a) Case / Packing size (as applicable). b) Gross weight and net weight of each package. c) Detailed contents of the package with quantity of each item separately. Project, Item / Package Description, BHEL's PO No. with date & Case / Packing Mark should also be clearly mentioned on the Case / Packing and Packing List for identification. Also, Packing List must be duly signed & should include respective Invoice No. & LR No. Note : Foreign suppliers to furnish details to arrange inland transportation by BHEL, if applicable, as follows :-

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	i) No. of Packages ii) Size with Weight (Gross & Net) of each Package iii) No. of Containers with type & size required for inland transportation iv) Type of Cargo (Break Bulk / LCL / FCL) v) Customs Tariff No.
30.	**COLOUR CODING :** Aluminium stickers are required to be attached to large components but plastic sheet tags should be tied with small components, giving details like purchase order, description of the component, quantity etc. Tags should be of the colour as follows :- a) Main equipment : Yellow or White tag b) Start-up / Commissioning spares : Blue tag c) Mandatory spares : Pink or Red tag d) Recommended / O&M spares : Green tag
31.	**MICRO, SMALL & MEDIUM ENTERPRISES (MSME) :** MSMED Act 2006 as amended from time to time & extant regulations of Govt. of India for MSME will be applicable. Micro & Small Enterprises (MSE) can avail the intended benefits only if they submit along with the offer / bid, attested copies of either Acknowledgement of Entrepreneur Memorandum Part-II (EM-II certificate) having deemed validity (five years from the date of issue of acknowledgement in EM-II) or valid NSIC certificate or EM-II certificate along with attested copy of a CA certificate (As per BHEL format where deemed validity of EM-II certificate of five years have expired) applicable for the relevant financial year (latest audited). Date to be reckoned for determining the deemed validity will be the date of opening (for Techno-commercial Bid : Part-I in case of two part bid). Non-submission of such documents will lead to consideration of their bid at par with other bidders. No benefit shall be applicable for this enquiry if any deficiency in the above required documents are not submitted before price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal. Documents should be notarized or arrested (in original) by a Gazetted officer. Copy of Udyog Aadhaar Memorandum with Acknowledgement of Ministry of Micro, Small & Medium Enterprises should also be furnished.
32.	**BUSINESS ETHICS / SUSPENSION OF BUSINESS DEALINGS WITH SUPPLIERS / CONTRACTORS :** If any bidder / supplier / contractor during pre-tendering / tendering / post tendering / award / execution / post-execution, indulges in malpractices cheating, bribery, fraud or other misconduct or formation of cartel so as to influence the bidding process or influences the price or fails to perform or is in default without any reasonable cause etc or performs any act considered objectionable as per extant guidelines, action may be taken against such bidders/supplier/contractor as per extant "Guidelines for Suspension of Business Dealings with Suppliers/Contractors". Abridged version of same is available at BHEL website (www.bhel.com) on "Supplier Registration" Page.
33.	**REVERSE AUCTION :** BHEL reserve the right to go for Reverse Auction (RA) instead of opening the sealed envelope price bid, submitted by the bidder or price bid submitted by the bidder through e-procurement system. This will be decided after techno-commercial evaluation. All bidders to give their acceptance for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA. In case BHEL decides to go for Reverse Auction, only those bidders who have given their unconditional acceptance to participate in RA will be allowed to participate in the Reverse Auction. Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit "online sealed bid" in the Reverse Auction. Non-submission of "online sealed bid" by the bidder will be

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	considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue. General Terms and Conditions of RA are available at Annexure. Business Rules for RA shall be sent to the bidders before conducting RA. Abridged Version of "Common Guidelines for Conducting Reverse Auction" may also be seen at BHEL website (www.bhel.com) on "Supplier Registration" Page & "Tender Notifications" Page.
34.	**INTEGRITY PACT :** Bidders shall have to enter into Integrity Pact with BHEL, duly signed with seal in original, if specified in NIT / RFQ failing which bidder's offer shall be liable for rejection.
35.	**TERMINATION OF CONTRACT :** BHEL shall have the right to cancel the Purchase Order / Contract without any financial implication to BHEL if vendor approval by end user / customer is withdrawn or in case of Suspension of Business Dealings with the Suppliers / Contractors by BHEL. BHEL shall have the right to cancel Purchase Order / Contract, wholly or in part, in case they are obliged to do so on account of any decline, diminution, curtailment or stoppage of their business and in that event, the Supplier's / Contractor' compensation claim shall be settled mutually. In case of cancellation of Purchase Order / Contract for main supply, all other associated Purchase Orders / Contracts like those for Mandatory Spares / Recommended Spares / Erection, Testing & Commissioning (ETC) / Supervision of ETC, if any, would also get cancelled.
36.	**SHELF LIFE :** Supplier has to inform the list of the items / sub-items which have limited shelf life like consumables or those required for the first fill and shall indicate the corresponding shelf life period in the offer. Such items / sub-items shall be manufactured / despatched only after getting formal clearance from BHEL.
37.	**LIMITATION OF LIABILITY :** Notwithstanding any other provisions, except in cases of wilful misconduct and / or criminal negligence / acts, a) Neither the Supplier / Contractor nor BHEL shall be liable to the other, whether in Purchase Order / Contract, tort, or otherwise, for any consequential loss or damage, loss of use, loss of production or loss of profits or interest costs, provided however that this exclusion shall not apply to any obligation of the Supplier / Contractor to pay Liquidated Damages to the BHEL and b) Notwithstanding any other provisions incorporated elsewhere in the contract, the aggregate liability of the Contractor in respect of this contract, whether under the Contract, in tort or otherwise, shall not exceed total Contract Price, provided however that this limitation shall not apply to any obligation of the Vendor to indemnify BHEL with respect to Patent Infringement or Intellectual Property Rights.
38.	**SHORTAGES / DAMAGES :** a) Against Supply only or Supply where Supervision of Erection, Testing & Commissioning (ETC) at Site or Supply where Testing & Commissioning at Site is in scope of the supplier : Any shortages and / or damages in supplies shall be supplied / replenished free of cost by the supplier as early as possible but not later than 30 days from the date of intimation by BHEL to the supplier.

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	b) Against Supply where Erection, Testing & Commissioning (ETC) at Site is in scope of the supplier : Any shortages and / or damages in supplies and during handling / storage, erection, testing and commissioning at site shall be supplied / replenished free of cost by the Supplier / Contractor, as early as possible, to meet the contractual completion time / schedule. Note: There shall not be any extension in the contractual delivery time / schedule due to any shortages and / or damages in supplies.
39.	**VARIATION OF CONTRACT VALUE / QUANTITY VARIATION :** BHEL shall have the right to variation in quantities of items within ± 30% of the total Purchase Order / Contract value at the time of placement of PO or award of Contract on overall basis for all amendments together within two years from the date of original Purchase Order / Contract or completion of execution of the Purchase Order / Contract whichever is earlier but quantities of individual items may vary to any extent or may get deleted unless otherwise specified in the technical specifications. No compensation is payable due to variation in the quantities and the Supplier / Contractor shall be bound to accept the same the contracted prices / rates without any escalation. However, if the Purchase Order / Contract is on "Lumpsum" basis, no variation of Purchase Order / Contract value shall be admissible to the Supplier / Contractor within the scope of Purchase Order / Contract, as long as the inputs remain unchanged.
40.	**STATUTORY VARIATION :** GST rates prevailing at the time of dispatch of goods/ completion of services shall be payable by BHEL. All other taxes, duties, charges, royalty,cess ,other levies shall be deemed to be included in the Ex Works Prices /Charges quoted by bidders and no variations shall be payable in respect thereof . No other variations such as on customs duty, exchange rate, minimum wages, prices of controlled commodities, any other input etc. shall be payable by the BHEL. Notwithstanding anything above, where the actual completion of the supply / services occurs beyond the period stipulated in the Purchase Order / Contract or any extension thereof, variations referred to above, will be limited to the rates prevailing on the dates of such agreed completion periods only. For variations after the agreed completion periods, the Supplier / Contractor alone shall bear the impact for the upward revisions and for downward revisions BHEL shall be given the benefit of reduction in applicable taxes /GST. This will be without prejudice to the levy of liquidated damages for delay in delivery / completion. If new tax is introduced by Central/ State Govt/ Municipality becomes directly applicable on items specified in Bill of Quantities/Purchase Order/Contract, full reimbursements shall be made provided it becomes applicable on items specified in Bill of Quantities. However, any additional tax implication due to delay in delivery, beyond the Contractual Delivery, attributable to supplier shall be borne by supplier.
41.	**MODE OF PAYMENT :** Payment shall be made directly to the Supplier / Contractor by BHEL through NEFT / RTGS.
42.	**CONFIDENTIALITY :** Supplier / Contractor shall, at all times, undertake to maintain complete confidentiality of all data, information, software, drawings & documents etc. belonging to BHEL and also of systems, procedures, reports, input documents, manuals, results and any other BHEL documents discussed and / or finalized during the course of execution of Purchase Order / Contract.

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43.	**INDEMNIFICATION :** The Supplier / Contractor shall indemnify and keep indemnified and hold harmless BHEL and its employees and officers from and against any and all claims, suits, actions or administrative proceedings, demands, losses, damages, costs and expenses and any other claim of whatsoever nature in respect of the death or injury of any person or loss of or damage to any property arising during the course and out of the execution of the Purchase Order / Contract.
44.	**TITLE OF GOODS :** a) Ownership of the equipment / material procured in India, shall be transferred to BHEL upon loading on to the mode of transport to be used for transportation of the said equipment / material from the works to the site / destination and upon endorsement of the dispatch documents in favour of BHEL. b) Ownership of the equipment / material to be imported into the country where the site is located, if not procured in India, shall be transferred to BHEL upon loading on the mode of transport to be used for transportation of the equipment / material from the country of origin to that country / destination and upon endorsement of despatch document in favour of BHEL. c) Notwithstanding the transfer of ownership of the equipment / material, the responsibility for care and safe custody thereof together with the risk of loss or damage thereto for whatsoever reason shall remain with the Supplier.
45.	**COMPLIANCE OF STATUTORY REQUIREMENTS :** The vendor shall comply with all State and Central Laws / Acts, Statutory Rules, Regulations etc., as may be enacted by the Government during the tenure of the Purchase Order / Contract and having in force and applicable to the Purchase Order / Contract and nothing shall be done by the Supplier / Contractor in contravention of any Law / Act and / or Rules / Regulations, thereunder or any amendment thereof. The Supplier / Contractor shall pay all taxes, fees, licence charges / deposits, duties, tolls, royalty, commissions or other charges which may be levied on account of any of his operations connected with the Purchase Order / Contract. In case BHEL is constrained to make any of such payments, BHEL shall recover the same from the Supplier / Contractor either from moneys due to him or otherwise as deemed fit.
46.	**ACCEPTANCE OF ORDER :** Supplier should acknowledge and accept the Letter of Award / Purchase Order issued by BHEL within 7 days of the issue of Letter of Award / Purchase Order. In case of any discrepancy / typographical error in issue of Purchase Order / Contract, the agreed terms & conditions, scope of work, rates / prices for placement of PO / award of contract shall be applicable and BHEL reserves the right to issue amendment(s) to PO / Contract for correction of discrepancies / typographical errors in the PO / Contract at a later date.
47.	**FRAUD PREVENTION POLICY :** The Bidder along with its associate / collaborators / sub-contractors / sub-vendors / consultants / service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website http://www.bhel.com and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice.

Signature of Bidder (Authorized Signatory) with Date & Seal

Enq No. dated xx/xx/2022, Project- UPRVUNL PANKI

SL.NO.	ACTIVITY	ACTIVITY TIME IN Days	Remarks
	(A)	(B)	(I)
1	Order Acknowledgement by Supplier	1	
1	Submission of Documents necessary for getting manufacturing clearance like Drawings, Data sheet, MQP etc.	4	
2	Manufacturing Clearance & CAT-A approval to Vendor after drawing submission	4	
3	Manufacturing time after CAT-A approval & Manufacturing Clearance. Including time of raising Inspection Call		Vendor to Fill
4	BHEL/Customer Inspection & Dispatch Clearnace	7	
5	Dispatch	7	
	*Delay/Preponement if any, shall be adjusted in delivery time.		

Check List for Supply bills

Name Of the Project							
Package Description							
Invoice No. & Date							
PO No. & date							
Sr. No	Documents Required	Copies	Check Points	Page no.	Vendor Remarks	Verification by MM	Verification by Fin
					(Y/N/NA)	(Y/N/NA)	(Y/N/NA)
1	Original for Buyer Invoice - GST compliant invoice	1 Original+2 Copy	1. Please ensure GST complaint invoice in original				
			2. Consignee address : BHEL C/o followed by site address				
			3. Item description and unit of quantity are matched with PO				
			4. Buyer address and GSTN No as required (TBG Noida or Nodal				
			5. PO No and date, LR No and date, Vehicle No and Project name				
			6. Invoiced quantity are not more than th PO quantity and MICC				
			7. Ex works unit rate , Taxes and F&I rates are same as per PO				
			8. Signed and stamped by vendor				
2	Receipted LR (signed & stamped)/ confirmation from site regarding receipt of packages/ Boxes	1Orignal+2 Copy	1. Consignee address : BHEL C/o followed by Site address				
			2. In case of material purchased from sub vendor , Consignee address Vendor's name C/o BHEL C/o Site address				
			3. Vendor's Invoice no and Vehicle No are mentioned				
			4. No of boxes/No of packages are same as per Packing list				
			5. In case of and adverse remark on LR (Like shortages/damages/broken etc) , clarification from site/TBMM/TBCM is nedded				
			6. LR is readable				
			7. In case of photo copy, LR is verified by TBMM				
			8. LR date is after the date of MICC/(MDCC if issued) or same date				
3	Packing List - showing number of packages, and gross weight/net Weight (if applicable)	1Orignal+2 Copy	1. PO No and date, LR No and date, Invoice No and date, Site Name and address, Consignor and consignee address are mentioned				
			2. Item description and quantity are matched with Invoice and PO				
			3. Signed and stamped by vendor				
			4. No of packages/ Item descriptions are matched with MRC and LR				
4	MICC from BHEL	1Original+2Copy	1. BHEL MICC has been issued prior to the date of dispatch or on same date				
			2. In case where MICC date is after the date of dispatch then MDCC date is same or prior to the date of dispatch				
			3. Project Name, PO,Po Date, Vendor's name and address is correct				
			4. Item description, Quantity and unit of quantity are same as per PO				
			5. All hold point in MICC , if any, have been resolved before submission of bill				
			6. Signed and stamped by BHEL Executive				
			7. MICC and MDCC quantity are not less than Invoice quantity and cover all invoiced items.				
5	Guarantee Certificate	1 Original+2 Copy	1. Project Name, PO No., Invoice No , LR No and date are mentioned .				
			2. Guarantee Certificate is strictly matched with PO T&C				
			3. Signed and stamped by vendor				
6	Bank Guarantee	1 Copy	'1. Ensure submission of BG directly from Bank before supply of material so that BG confirmation may be arranged before processing				
			2. Bill can be processed only after receipt of BG confirmation directly from bank				
			3. It should be in the name of BHEL , TBG Noida with registered office address Siri Fort, New Delhi				
			4. It should be in prescribed format.				
			5. BG value and valdity plus claim period should be minimum as specified in PO / RC. Please check before supply , If BG extension is required please arrange the same				
			6. Vendor's name address should be same as per PO				
			7. Po No / RC No and date should be correct				
7	Insurance Certifcate	1 Orignal+2 Copy	1. Invoice No and date, Vendor's Name,Place from Consignor to Consignee are mentioned				
			2. It has not been issued later than the LR date				
			3. Insured value is not less than the Invoice value				
			4. Signed and stamped by Insurance Company				
			5. In case of Open Insurance Policy, declaration has been submitted to Insurance Company as per declaration clause of Open policy and				
			6. In case of any discrepancy , consent of TBCM is required for processing the bill and amount will be deducted for invalid Insurance				
8	PVC (If applicable) Invoice is submitted along with the Despatch Invoice	1Original+2Copy	PVC (If applicable) Invoice is submitted along with the Despatch Invoice				
			1. PVC invoice is attched along with supply Invoice				
			2. Calculation sheet and applicable PVC indices are also enclosed				
			3. If delay in delivery, then PVC indicies are as per PO conditions.				
9			1. LR No and date, Invoice No and date, Vehicle No and date , Site Name an address are mentioned				
			2. Date of receipt of material				

Check List for Supply bills

Name Of the Project							
Package Description							
Invoice No. & Date							
PO No. & date							
Sr. No	Documents Required	Copies	Check Points	Page no.	Vendor Remarks	Verification by MM	Verification by Fin
					(Y/N/NA)	(Y/N/NA)	(Y/N/NA)
	Material receipt Certificate		3. Item description and quantity are same as per Invoice / Packing List				
			4. It is signed and stamped by Site executive				
			5. In case of any shortages / damages / adverse remark , clarification is needed				
10	Other Documents		To be seen as per specific requirement of PO.				
To be filled by BHEL (MM) only							
10	Date Of Submission of Last Billing Document		Date to be mentioned		Not to be filled by vendor		
11	LD Calculation, if applicable, as per PO.		Calculation Sheet of LD due to delay in delivery is attached				
12	Receipted LR (signed & stamped)/ confirmation from site regarding receipt of packages/ Boxes	1 Copy	Damages if any mentioned in the Receipted LR have been accounted for. Withhel amount if any_____				
13	Packing List - showing number of packages and gross weight & net Weight (If applicable)	1 Original	If Packing list does not match with Purchase order (with ref to sl 4 above), Engg/MM acceptance as to the completeness is enclosed.				
14	PO copy	1 Copy	PO copy with original seal and signature is attached along with amendment if any				
15	Dan	1 copy	Relevant DANs are attached duly signed by TBMM representative.				
Note*	Every Field to be ticked. If some document is not applicable, same should be mentioned, All Pages to be numbered upward from the bottom Page						
	Invoice control No				Vendor Signature	MM Signature	Finance Signature
					Date:	Date:	Date:

Check List for Freight(Exclusive as per Transportation contract)

Name Of the Project	
Package Description	
Invoice No. & Date	
PO No. & date	

Sr. No	Documents Required	Copies	Check Points	Page no.	Vendor Remarks	Verification by MM	Verification by Fin
					(Y/N/NA)	(Y/N/NA)	(Y/N/NA)
1	Invoice	1 Original	Freight Invoice				
			Invoice for the Main Supply submitted				
2	Receipted LR (signed & stamped)/ confirmation from site regarding receipt ofpackages/ Boxes	1 Copy	1. Consignee address : BHEL C/o followed by Site address				
			2. In case of material purchased from sub vendor , Consignee address Vendor's name C/o BHEL C/o Site address				
			3. Vendor's Invoice no and Vehicle No are mentioned				
			4. No of boxes/No of packages are same as per Packing list				
			5. In case of and adverse remark on LR (Like shortages/damages/broken etc) , clarification from site/TBMM/TBCM is nedded				
			6. LR is readable				
			7. In case of photo copy, LR is verified by TBMM				
			8. LR date is after the date of MICC/(MDCC if issued) or same date				
3	Transporter's document indicating the freight amount. Original money receipt to be submitted if required as per SCC	1 Original	As per Rate Contract (if any)/ WO.				
4	PVC (If applicable) Invoice is submitted along with the Despatch Invoice		1. PVC invoice is attched along with supply Invoice 2. Calculation sheet and applicable PVC indices are also enclosed 3. If delay in delivery, then PVC indicies are as per PO conditions.				
5	LD Calculation, if applicable		Calculation Sheet of LD due to delay in delivery is attached				
6	MRC		1. LR No and date, Invoice No and date, Vehicle No and date , Site Name an address are mentioned				
			2. Date of receipt of material				
			3. Item description and quantity are same as per Invoice / Packing List of supply				
			4. It is signed and stamped by Site executive				
			5. In case of any shortages / damages / adverse remark , clarification is needed				
	Invoice control No				Vendor Signature	MM Signature	Finance Signature
					Date:	Date:	Date:

Applicable check list for MRC Bills:

Name Of the Project	
Package Description	
Invoice No. & Date	
PO No. & date	

Sr. No	Documents Required	Copies	Check Points	Page no.	Vendor Remarks (Y/N/NA)	Verification by MM (Y/N/NA)	Verification by Fin (Y/N/NA)
1	Invoice	1 Original	MRC Bill enclosed				
2	Material Receipt Certificate	1 Copy	1. LR No and date, Invoice No and date, Vehicle No and date , Site Name an address are mentioned				
			2. Date of receipt of material				
			3. Item description and quantity are same as per Invoice / Packing List of supply				
			4. It is signed and stamped by Site executive				
			5. In case of any shortages / damages / adverse remark , clarification from site/MM/CM is needed				
3	Submission of all final documents for the packages as detailed in Anx-10 of GCC rev 00, duly certified by Engg. Deptt. of purchaser or As per PO	1 Copy	Certificate as per PO requirement is attached				
Note*	Every Field to be ticked. If some documents is not applicable, same should be mentioned, All Pages to be numbered starting from the Last Page.						
	Invoice control No				Vendor Signature	MM Signature	Finance Signature
					Date:	Date:	Date:

Annexure-IV

(A) CONCILIATION (MODEL CONCILIATION CLAUSE FOR CONDUCTING CONCILIATION PROCEEDINGS UNDER THE BHEL CONCILIATION SCHEME, 2018)

The Parties agree that if at any time (whether before, during or after the arbitral or judicial proceedings), any Disputes (which term shall mean and include any dispute, difference, question or disagreement arising in connection with construction, meaning, operation, effect, interpretation or breach of the agreement, contract or the Memorandum of Understanding (whichever is inapplicable), which the Parties are unable to settle mutually), arise inter-se the Parties, the same may, be referred by either party to Conciliation to be conducted through Independent Experts Committee to be appointed by competent authority of BHEL from the BHEL Panel of Conciliators.

Notes:

1. No serving or a retired employee of BHEL/Administrative Ministry of BHEL shall be included in the BHEL Panel of Conciliators.

2. Any other person(s) can be appointed as Conciliator(s) who is/are mutually agreeable to both the parties from outside the BHEL Panel of Conciliators.

The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided in **Annexure-A to this GCC (Enclosed).**

The Annexure-A together with it's appendices will be treated as if the same is part and parcel hereof and shall be as effectual as if set out herein in these GCC."

(B) ARBITRATION (WITH SOLE ARBITRATOR)

1.1. Except as provided elsewhere in this Contract, in case amicable settlement is not reached between the Parties, in respect of any dispute or difference; arising out of the formation, breach, termination, validity or execution of the Contract; 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 to the Sole Arbitrator and such Arbitrator appointed by Head of the BHEL Unit/Region/Division issuing the Contract.

1.2. The Arbitrator shall pass a reasoned award and the award of the Arbitrator shall be final and binding upon the Parties.

1.3. Subject as aforesaid, the provisions of Arbitration and Conciliation Act 1996 (India) and amended in 2015 and further amendment passed in 2019 or 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 New Delhi. The language of arbitration shall be English and the documents shall be submitted in English.

1.4. The cost of arbitration shall initially be borne equally by the Parties subject to the final apportionment of the cost of the arbitration in the award of the Arbitrator.

1.5. Notwithstanding the existence or any dispute or differences and/or reference for the arbitration, the Contractor shall proceed with and continue without hindrance the performance of its obligations under this Contract with due diligence and expedition in a professional manner except where the Contract has been terminated by either Party in terms of this Contract.

1.6. **SETTLEMENT OF COMMERCIAL DISPUTES BETWEEN CPSES INTER SE AND CPSE(S) AND GOVERNMENT DEPARTMENT(S)/ ORGANISATION(S) – ADMINISTRATIVE MECHANISM FOR RESOLUTION OF CPSES DISPUTES (AMRCD) – REGARDING**

Vide Dept. of Public Enterprises OM No. F. No. 4(1)/2013-DPE(GM)/FTS-1835 dated 22.05.2018 it has been conveyed that *"To make the mechanism more effective and binding on the disputing parties, a new mechanism namely Administrative Mechanism for resolution of CPSEs Disputes (AMRCD) having two level (tier) structure has been evolved in consultation with various stakeholders to replace the existing PMA mechanism which stands wound up from the date of issue of this OM."* Accordingly, the existing Permanent Machinery of Arbitration (PMA) stands wound up with effect from 22.05.2018 and cases relating to disputes or differences relating to the interpretation and application of the provisions of commercial contract(s) between CPSEs / Port Trust / Central or State Government Department / Organisations (excluding disputes concerning Railways, Income Tax, Customs and Excise Departments) shall be taken up by either party for its resolution through Administrative Mechanism for Resolution of CPSEs Disputes (AMRCD).

(C) JURISDICTION AND GOVERNING LAWS

The Courts at New Delhi shall have exclusive jurisdiction over any matter arising out of or in connection with this Contract. This Contract shall be construed as per and be governed by the Laws of India.

ANNEXURE TO MODEL CONCILIATION CLAUSE FOR CONDUCT OF CONCILIATION UNDER THE BHEL CONCILIATION SCHEME, 2018

BRIEF PROCEDURE FOR CONDUCT OF CONCILIATION PROCEEDINGS

1. The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided herein:

2. The party desirous of resorting to Conciliation shall send an invitation/notice in writing to the other party to conciliate specifying all points of Disputes with details of the amount claimed. The party concerned shall not raise any new issue thereafter. Parties shall also not claim any interest on claims/counter-claims from the date of notice invoking Conciliation till the conclusion of the Conciliation proceedings.

3. The party receiving the invitation/notice for Conciliation shall within 30 days of receipt of the notice of Conciliation intimate its consent for Conciliation along with its counter-claims, if any.

4. The Conciliation in a matter involving claim or counter-claim (whichever is higher) up to Rs 5 crores shall be carried out by sole Conciliator nominated by BHEL while in a matter involving claim or counter-claim (whichever is higher) of more than Rs 5 crores Conciliation shall be carried out by 3 Conciliators nominated by BHEL.

5. The Parties shall be represented by only their duly authorized in-house executives/officers and neither Party shall be represented by a Lawyer.

6. The first meeting of the IEC shall be convened by the IEC by sending appropriate communication/notice to both the parties as soon as possible but not later than 30 days from the date of his/their appointment. The hearings in the Conciliation proceeding shall ordinarily be concluded within two (2) months and, in exceptional cases where parties have expressed willingness to settle the matter or there exists possibility of settlement in the matter, the proceedings may be extended by the IEC by a maximum of further 2 months with the consent of the Parties subject to cogent reasons being recorded in writing.

7. The IEC shall thereafter formulate recommendations for settlement of the Disputes supported by reasons at the earliest but in any case within

15 days from the date of conclusion of the last hearing. The recommendations so formulated along with the reasons shall be furnished by the IEC to both the Parties at the earliest but in any case within 1 month from the date of conclusion of the last hearing.

8. Response/modifications/suggestions of the Parties on the recommendations of the IEC are to be submitted to the IEC within time limit stipulated by the IEC but not more than 15 days from the date of receipt of the recommendations from the IEC.

9. In the event, upon consideration, further review of the recommendations is considered necessary, whether by BHEL or by the other Party, then, the matter can be remitted back to the IEC with request to reconsider the same in light of the issues projected by either/both the Parties and to submit its recommendations thereon within the following 15 days from the date of remitting of the case by either of the Parties.

10. Upon the recommendations by the Parties, with or without modifications, as considered necessary, the IEC shall be called upon to draw up the Draft Settlement Agreement in terms of the recommendations.

11. When a consensus can be arrived at between the parties only in regard to any one or some of the issues referred for Conciliation the draft Settlement Agreement shall be accordingly formulated in regard to the said Issue(s), and the said Settlement Agreement, if signed, by the parties, shall be valid only for the said issues. As regards the balance issues not settled, the parties may seek to resolve them further as per terms and conditions provided in the contract.

12. In case no settlement can be reached between the parties, the IEC shall by a written declaration, pronounce that the Conciliation between the parties has failed and is accordingly terminated.

13. Unless the Conciliation proceedings are terminated in terms of para 22 (b), (c) & (d) herein below, the IEC shall forward his/its recommendations as to possible terms of settlement within one (1) month from the date of last hearing. The date of first hearing of Conciliation shall be the starting date for calculating the period of 2 months.

14. In case of 3 members IEC, 2 members of IEC present will constitute a valid quorum for IEC and meeting can take place to proceed in the matter after seeking consent from the member who is not available. If necessary, videoconferencing may be arranged for facilitating participation of the members. However, the IEC recommendations will be signed by all members. Where there is more than one (1) Conciliator, as a general rule they shall act jointly. In the event of differences between the Members of IEC, the decision/recommendations of the majority of the Members of IEC shall prevail and be construed as the recommendation of the IEC.

15. The Draft Settlement Agreement prepared by the IEC in terms of the consensus arrived at during the Conciliation proceedings between the Parties shall be given by the IEC to both the parties for putting up for approval of their respective Competent Authority.

16. Before submitting the draft settlement agreement to BHEL's Competent Authority viz. the Board Level Committee on Alternative Dispute Resolution (BLCADR) for approval, concurrence of the other party's Competent Authority to the draft settlement agreement shall be obtained by the other party and informed to BHEL within 15 days of receipt of the final draft settlement agreement by it. Upon approval by the Competent Authority, the Settlement Agreement would thereafter be signed by the authorized representatives of both the Parties and authenticated by the members of the IEC.

17. In case the Draft Settlement Agreement is rejected by the Competent Authority of BHEL or the other Party, the Conciliation proceedings would stand terminated.

18. A Settlement Agreement shall contain a statement to the effect that each of the person(s) signing thereto (i) is fully authorized by the respective Party(ies) he/she represents, (ii) has fully understood the contents of the same and (iii) is signing on the same out of complete freewill and consent, without any pressure, undue influence.

19. The Settlement Agreement shall thereafter have the same legal status and effect as an arbitration award on agreed terms on the substance of the dispute rendered by an arbitral tribunal passed under section 30 of the Arbitration and Conciliation Act, 1996.

20. Acceptance of the Draft Settlement Agreement/recommendations of the Conciliator and/or signing of the Settlement Agreement by BHEL shall

however, be subject to withdrawal/closure of any arbitral and/or judicial proceedings initiated by the concerned Party in regard to such settled issues.

21. Unless otherwise provided for in the agreement, contract or the Memorandum of Understanding, as the case may be, in the event of likelihood of prolonged absence of the Conciliator or any member of IEC, for any reason/incapacity, the Competent Authority/Head of Unit/Division/Region/Business Group of BHEL may substitute the Conciliator or such member at any stage of the proceedings. Upon appointment of the substitute Conciliator(s), such reconstituted IEC may, with the consent of the Parties, proceed with further Conciliation into the matter either de-novo or from the stage already reached by the previous IEC before the substitution.

22. The proceedings of Conciliation under this Scheme may be terminated as follows:
    a. On the date of signing of the Settlement agreement by the Parties; or,
    b. By a written declaration of the IEC, after consultation with the parties, to the effect that further efforts at conciliation are no longer justified, on the date of the declaration; or,
    c. By a written declaration of the Parties addressed to the IEC to the effect that the Conciliation proceedings are terminated, on the date of the declaration; or,
    d. By a written declaration of a Party to the other Party and the IEC, if appointed, to the effect that the Conciliation proceedings are terminated, on the date of the declaration.
    e. On rejection of the Draft Settlement Agreement by the Competent Authority of BHEL or the other Party.

23. The Conciliator(s) shall be entitled to following fees and facilities:

Sl No	**Particulars**	**Amount**
1	Sitting fees	Each Member shall be paid a Lump Sum fee of Rs 75,000/- for the whole case payable in terms of paragraph No. 27 herein below.
2	Towards drafting of settlement agreement	In cases involving claim and/or counter-claim of up to Rs 5crores. Rs 50,000/- (Sole Conciliator)

Sl No	Particulars	Amount
		In cases involving claim and/or counter-claim of exceeding Rs 5 crores but less than Rs 10 crores. Rs 75,000 (per Conciliator) In cases involving claim and/or counter-claim of more than Rs 10 crores. Rs 1,00,000/- (per Conciliator) Note: The aforesaid fees for the drafting of the Settlement Agreement shall be paid on Signing of the Settlement Agreement after approval of the Competent Authority or Rejection of the proposed Settlement Agreement by the Competent Authority of BHEL.
3	Secretarial expenses	Rs 10,000/- (one time) for the whole case for Conciliation by a Sole Member IEC. Where Conciliation is by multi member Conciliators –Rs 30,000/- (one time)- to be paid to the IEC
4	Travel and transportation and stay at outstation i) Retired Senior Officials of other Public Sector Undertakings (pay scale wise equivalent to or more than E-8 level of BHEL)	As per entitlement of the equivalent officer (pay scale wise) in BHEL.
	Others	As per the extant entitlement of whole time Functional Directors in BHEL.

Sl No	Particulars	Amount
		Ordinarily, the IEC Member(s) would be entitled to travel by air Economy Class.
5	Venue for meeting	Unless otherwise agreed in the agreement, contract or the Memorandum of Understanding, as the case may be, the venue/seat of proceedings shall be the location of the concerned Unit / Division / Region / Business Group of BHEL. Without prejudice to the seat/venue of the Conciliation being at the location of concerned BHEL Unit / Division / Region / Business Group, the IEC after consulting the Parties may decide to hold the proceedings at any other place/venue to facilitate the proceedings. Unless, Parties agree to conduct Conciliation at BHEL premises, the venue is to be arranged by either Party alternately.

24. The parties will bear their own costs including cost of presenting their cases/evidence/witness(es)/expert(s)on their behalf. The parties agree to rely upon documentary evidence in support of their claims and not to bring any oral evidence in IEC proceedings.

25. If any witness(es) or expert(s) is/are, with the consent of the parties, called upon to appear at the instance of the IEC in connection with the matter, then, the costs towards such witness(es)/expert(s) shall be determined by the IEC with the consent of the Parties and the cost so determined shall be borne equally by the Parties.

26. The other expenditures/costs in connection with the Conciliation proceedings as well as the IEC's fees and expenses shall be shared by the Parties equally.

27. Out of the lump sum fees of Rs 75,000/- for Sitting Fees, 50% shall be payable after the first meeting of the IEC and the remaining 50% of the Sitting Fees shall be payable only after termination of the conciliation proceedings in terms of para 22 hereinabove.

28. The travelling, transportation and stay at outstation shall be arranged by concerned Unit as per entitlements as per Serial No. 3 of the Table at para 23 above, and in case such arrangements are not made by the BHEL Unit, the same shall be reimbursed to the IEC on actuals limited to their entitlement as per Serial No. 4 of the Table at Para 23 above against supporting documents. The IEC Member(s) shall submit necessary invoice for claiming the fees/reimbursements.

29. The Parties shall keep confidential all matters relating to the conciliation proceedings. Confidentiality shall extend also to the settlement agreement, except where its disclosure is necessary for purposes of its implementation and enforcement or as required by or under a law or as per directions of a Court/Governmental authority/ regulatory body, as the case may be.

30. The Parties shall not rely upon or introduce as evidence in any further arbitral or judicial proceedings, whether or not such proceedings relate to the Disputes that is the subject of the Conciliation proceedings:
    a. Views expressed or suggestions made by the other party in respect of a possible settlement of the Disputes;
    b. admissions made by the other party in the course of the Conciliator proceedings;
    c. proposals made by the Conciliator;
    d. The fact that the other Party had indicated his willingness to accept a proposal for settlement made by the Conciliator.

31. The Parties shall not present the Conciliator(s) as witness in any Alternative Dispute Resolution or Judicial proceedings in respect of a Disputes that is/was the subject of that particular Conciliation proceeding.

32. None of the Conciliators shall act as an arbitrator or as a representative or counsel of a Party in any arbitral or judicial proceeding in respect of a Disputes that is/was the subject of that particular Conciliation proceeding.

33. The Parties shall not initiate, during the Conciliation proceedings, any arbitral or judicial proceedings in respect of a Disputes that is the subject matter of the Conciliation proceedings except that a Party may initiate arbitral or judicial proceedings where, in his opinion, such proceedings are necessary for preserving his rights including for preventing expiry of period of limitation. Unless terminated as per the provisions of this Scheme, the Conciliation proceedings shall continue

notwithstanding the commencement of the arbitral or judicial proceedings and the arbitral or judicial proceedings shall be primarily for the purpose of preserving rights including preventing expiry of period of limitation.

34. The official language of Conciliation proceedings under this Scheme shall be English unless the Parties agree to some other language.

Format 2 to BHEL Conciliation Scheme, 2018

FORMAT FOR SEEKING CONSENT FOR REFERRING THE DISPUTES TO CONCILIATION THROUGH IEC

To,

M/s. (Stakeholder's name)

Sub: Resolution of the Disputes through conciliation by Independent Expert Committee (IEC).

Ref: Contract No/MoU/Agreement/LOI/LOA& date _____.

Sir,

With reference to above referred Contract/MoU/Agreement/LOI/LOA, you have raised certain Disputes/claims. Vide your letter dated____ you have requested BHEL to refer the Disputes/claims to IEC for Conciliation.

We are enclosing herewith Format (3) for giving consent and the terms and conditions of BHEL Conciliation Scheme, 2018 governing conciliation through IEC. You are requested to give your unconditional consent to the said terms and conditions of the Scheme by returning the same duly sealed and signed on each page. On receipt of your consent, matter will be put to the Competent Authority for consideration and decision.

Please note that BHEL has also certain claims against you (if applicable). BHEL reserves its right to agree or not to agree conciliation of the said disputes through BHEL and this letter is being issued without prejudice to BHEL's rights and contentions available under the contract and law.

Yours faithfully,

Representative of BHEL

Format 3 to BHEL Conciliation Scheme, 2018

FORMAT FOR GIVING CONSENT BY CONTRACTOR/VENDOR/CUSTOMER/COLLABORATOR/CONSORTIUM PARTNERSFOR REFERRING THE DISPUTES TO CONCILIATION THROUGH IEC

To,

BHEL

.....

Sub: Resolution of Disputes through Conciliation by Independent Expert Committee (IEC).

Ref: Contract/MoU/Agreement/LOI/LOA No & date____

With reference to above referred contract, our following bills/invoices/claims submitted to BHEL are still unpaid giving rise to Disputes:

SL. no.	Claim Description	Bill submitted to BHEL (no. and date)	Amount of the bill/claim	Amount received from BHEL	Outstanding Amount

Accordingly we request you to kindly refer the Disputes in respect of above claims to IEC for Conciliation.

We hereby agree and give our unconditional consent to the terms and conditions of BHEL Conciliation Scheme, 2018 governing conciliation through IEC. We have signed the same on each page and enclosed it for your consideration.

Yours faithfully,

(Signature with stamp)

Authorized Representative of Contractor
Name, with designation
Date

Format 5 to BHEL Conciliation Scheme, 2018

STATEMENT OF CLAIMS/COUNTER CLAIMS TO BE SUBMITTED TO THE IEC BY BOTH THE PARTIES

1. Chronology of the Disputes

2. Brief of the Contract/MoU/Agreement/LOI/LOA

3. Brief history of the Disputes:

4. Issues:

5. Details of Clam(s)/Counter Claim(s):

Sl. No.	**Description of claim(s)/Counter Claim**	**Amount (in INR)Or currency applicable in the contract**	**Relevant contract clause**

6. Basis/Ground of claim(s)/counter claim(s) (along with relevant clause of contract)

Note– *The Statement of Claims/Counter Claims may ideally be restricted to maximum limit of 20 pages. Relevant documents may be compiled and submitted along with the statement of Claims/Counter Claims. The statement of Claims/Counter Claims is to be submitted to all IEC members and to the other party by post as well as by email.*

Item/Package Name :	
Enquiry No.:	
Project:	
Type of project	
Percentage of Local Content	***(Bidder to enter the applicable % of local content)***

Self-certification to be submitted in INR 100/- non judicial stamp paper

Format of Self certification regarding Local Content in line with PPP-MII order, 2017 & its revision dated 04.06.2020.

Date:……..

I _____S/o, D/o, W/o, _____Resident of_____ hereby solemnly affirm and declare as under:

That I will agree to abide by the terms and conditions of the Public Procurement (Preference to Make in India) Order, 2017 (*hereinafter PPP-MII order*) of Government of India issued vide Notification No: P-45021/2/2017-BE-II dated 15/06/2017, its revision dated 04/06/2020 and any subsequent modifications/Amendments**,** if any**.**

That the information furnished hereinafter is correct to the best of my knowledge and belief and I undertake to produce relevant records before the procuring entity/BHEL or any other Government authority for the purpose of assessing the local content of goods/services/works supplied by me for ……. *(Enter the name of the Equipment/Item for Project).*

That the local content for all inputs which constitute the said goods/services/works has been verified by me and I am responsible for the correctness of the claims made therein.

That the goods/services/works supplied by me for ……. *(Enter the name of the Equipment/Item for Project)* **contains…….**% (mention the Local content in %age) Local Content.

That the value addition for the purpose of meeting the 'Minimum Local Content 'has been made by me at …… (*Enter the details of the location(s) at which value addition is made).*

That in the event of the local content of the goods/services/works mentioned herein is found to be incorrect and not meeting the prescribed supplier class categorization criteria as per said order, based on the assessment of procuring agency (ies)/BHEL/Government Authorities for the purpose of assessing the local content, action shall be taken against me in line with the PPP-MII order and provisions of the Integrity pact/ Bidding Documents.

I agree to maintain the following information in the Company's record for a period of 8 years and shall make this available for verification to any statutory authority.

i Name and details of the Local Supplier
(Registered Office, Manufacturing unit location, nature of legal entity)

ii. Date on which this certificate is issued

Item/Package Name :	
Enquiry No.:	
Project:	
Type of project	
Percentage of Local Content	***(Bidder to enter the applicable % of local content)***

Self-certification to be submitted in INR 100/- non judicial stamp paper

iii. Goods/services/works for which the certificate is produced

iv. Procuring entity to whom the certificate is furnished

v. Percentage of local content claimed and whether it meets the Minimum Local Content prescribed

vi. Name and contact details of the unit of the Local Supplier (s)

vii. Sale Price of the product

viii Ex-Factory Price of the product

ix. Freight, insurance and handling

x. Total Bill of Material

xi List and total cost value of input used to manufacture the Goods/to provide services/in construction of works

xii. List and total cost of input which are domestically sourced. Value addition certificates from suppliers, if the input is not in-house to be attached

xiii. List and cost of inputs which are imported, directly or indirectly

For and on behalf of…… (Name of firm/entity)

Authorized signatory (To be duly authorized by the Board of Directors)
<Insert Name, Designation and Contact No.>

Annexure-VI

Clause regarding regarding restrictions under Rule 144 (XI) of the General Financial Rules (GFRs), 2017 as per Government of India order OM No.6/18/2019-PPD dated 23.07.2020

I. Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority.

II. "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not failing in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.

III. "Bidder from a country which shares a land border with India" for the purpose of this Order means:

a. An entity Incorporated, established or registered in such a country; or
b. A subsidiary of an entity Incorporated, established or registered in such a country; or
c. An entity substantially controlled through entitles incorporated, established or registered in such a country; or
d. An entity whose *beneficial owner* is situated in such a country, or
e. An Indian (or other) agent of such an entity; or
f. A natural person who is a citizen of such a country; or
g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above

IV. The *beneficial owner* for the purpose of (iii) above will be as under:

1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has a controlling ownership interest or who exercises control through other means.
   Explanation-
   a. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent. of shares or capital or profits of the company;
   b. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholder's agreements or voting agreements;
2. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;
3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of Individuals;
4. Where no natural person is Identified under (1) or (2) or (3) above the beneficial owner is the relevant natural person who holds the position of senior managing official;
5. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.

V. An Agent is a person employed to do any act for another or to represent another in dealings with third person.

Annexure-VI

Clause regarding regarding restrictions under Rule 144 (XI) of the General Financial Rules (GFRs), 2017 as per Government of India order OM No.6/18/2019-PPD dated 23.07.2020

VI. The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.

***** *The above clause is not applicable to the bidders from those countries (even if* sharing a land border with India) to which the GoI has extended lines of credit or in which the GoI is engaged in development projects.

* List of countries to which lines of credit have been extended or in which development projects are undertaken are available on the Ministry of External affaires website (https://www.mea.gov.in/)

Annexure-VII

Compliance to be submitted in INR 100/- non judicial stamp paper

Sub: **Compliance to Government of India order OM No.6/18/2019-PPD dated 23.07.2020 regarding restrictions under Rule 144 (XI) of the General Financial Rules (GFRs), 2017**

Sl No.	Description	Bidder's confirmation
1	*We, M/s_____have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; We hereby certify that we are not from such a country.*	*Agreed*

(Note: Non-compliance of above said GoI Order and its subsequent amendment, (if any), by any bidder(s) shall lead for commercial rejection of their bids by BHEL)

Bidder's authorized signatory with stamp & seal

Annexure-VIII

Compliance to be submitted in INR 100/- non judicial stamp paper

Sub: **Compliance to Government of India order OM No.6/18/2019-PPD dated 23.07.2020 regarding restrictions under Rule 144 (XI) of the General Financial Rules (GFRs), 2017**

Sl No.	Description	Bidder's confirmation
1	*We, M/s_____have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India. We are from such a country which shares a land border with India & have been registered with the Competent Authority as specified in above said order. We hereby certify that we fulfil all requirements in this regard and are eligible to be considered.* ***Evidence of valid registration by the Competent Authority is attached.***	*Agreed*

(Note: Non-compliance of above said GoI Order and its subsequent amendment, (if any), by any bidder(s) shall lead for commercial rejection of their bids by BHEL)

Bidder's authorized signatory with stamp & seal

Annexure-IX

No.25-111612018-PG

Government of India

Ministry of Power

Shram Shakti Bhawan, Rafi Marg, New Delhi • — 110001

Tele Fax: 011-23730264

Dated 02/07/2020

ORDER

Power Supply System is a sensitive and critical infrastructure that supports not only our national defence, vital emergency services including health, disaster response, critical national infrastructure including classified data & communication services, defence installations and manufacturing establishments, logistics services but also the entire economy and the day-today life of the citizens of the country. Any danger or threat to Power Supply System can have catastrophic effects and has the potential to cripple the entire country. Therefore, the Power Sector is a strategic and critical sector.

The vulnerabilities in the Power Supply System & Network mainly arise out of the possibilities of cyber attacks through malware / Trojans etc. embedded in imported equipment. Hence, to protect the security, integrity and reliability of the strategically important and critical Power Supply System & Network in the country, the following directions are hereby issued:-

1. All equipment, components, and parts imported for use in the Power Supply System and Network shall be tested in the country to check for any kind of embedded malware/trojans/cyber threat and for adherence to Indian Standards.
2. All such testings shall be done in certified laboratories that will be designated by the Ministry of Power (MOP).
3. Any import of equipment/components/parts from "prior reference" countries as specified or by persons owned by, controlled by, or subject to the jurisdiction or the directions of these "prior reference" countries will require prior permission of the Government of India
4. Where the equipment/components/parts are imported from "prior reference" countries, with special permission, the protocol for testing in certified and designated laboratories shall be approved by the Ministry of Power (MOP).

This order shall apply to any item imported for end use or to be used as a component, or as a part in manufacturing, assembling of any equipment or to be used in power supply system or any activity directly or indirectly related to power supply system.

This issues with the approval of Hon'ble Minister of State for Power and New & Renewable Energy (Independent Charge).

(Goutam Ghosh)

Director Tel: 011-23716674 To:

1. All Ministries/Departments of Government of India (As per list)
2. Secretary (Coordination),Cabinet Secretariat
3. Vice Chairman, NITI Aayog

सेवा भवन, आर. के. पुरम-I, नई दिल्ली-110066 टेली: 011-26732257 ईमेल: ce-rndcea@nic.in वेबसाइट: www.cea.nic.in

Sewa Bhawan, R.K Puram-I, New Delhi - 110066 Tele: 011-26732257 Email: ce-rndcea@nic.in Website: www.cea.nic.in

Annexure-

Vendor Compliance format in bidder letter head

In view of by order No. 25-111612018-PG, Dated 02.07.2020 of Ministry of Power, GOI

Enquiry No :
Project :
Name of items/Pac age :

Sl No	Description	idder confirmation
1	The vendor should supply all items in strict compliance to directions issued by Ministry of Power, Govt. of India vide order No. 25-111612018-PG dated 02.07.2020.	Agreed / Disagreed / Not Applicable
2	Vendor shall be responsible for conducting all necessary testing in accordance with testing protocol in line with MoP order.	Agreed / Disagreed / Not Applicable
3	All necessary permissions and approvals from Govt of India for import of equipment/ parts/ components shall be submitted, if equipment/ parts/ components are sourced from prior reference countries.	Agreed / Disagreed / Not Applicable

Note: Non-compliance of MoP Order and its subsequent amendment, if any , by any bidder s shall lead for commercial rejection of their bids by HEL

Bidder's authorized signatory

with stamp seal

Annexure-XI

INTEGRITY PACT:

Bidders shall have to enter into Integrity Pact with BHEL, duly signed with seal in original, if specified in NIT / RFQ failing which bidder's offer shall be liable for rejection.

(a) IP is a tool to ensure that activities and transactions between the company and its bidders/contractors are handled in a fair, transparent and corruption free manner. Following Independent External Monitor (IEMs) on the present panel have been appointed by BHEL with the approval of CVC to oversee implementation of IP in BHEL.

Details of IEM for this tender is furnished below
Name: Shri Arun Chandra Verma, IPS (Retd.)
Email: acverma1@gmail.com

Name: Shri Virendra Bahadur Singh, IPS (Retd.)
E-mail: vbsinghips@gmail.com

(b) The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory) along with techno-commercial bid (Part-1, in case of Two/three part bid). Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this pact would be a preliminary qualification.

(c)Please refer section -8 of the IP for Role and responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to any of the above IEM(s). All correspondence with the IEM shall be done through e-mail only.

Note: No routine correspondence shall be addressed to the IEM (Phone/post/email) regarding the clarification, time extensions or any other administrative queries, etc. on the tender issued. All such clarification/issues shall be addressed directly to the tender issuing (procurement) department's officials as mentioned on Point 2 & 3.

Annexure XI

INTEGRITY PACT

Between

Bharat Heavy Electricals Ltd. (BHEL), a company registered under the Companies Act 1956 and having its registered office at "BHEL House", Siri Fort, New Delhi - 110049 (India) hereinafter referred to as "The Principal", which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the ONE PART

and

_____, (description of the party along with address), hereinafter referred to as "The Bidder/ Contractor" which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART

Preamble

The Principal intends to award, under laid-down organizational procedures, contract/s for _____

_____

_____ . The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

In order to achieve these goals, the Principal will appoint Independent External Monitor(s), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1- Commitments of the Principal

1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-

1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.

1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/ additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.

1.1.3 The Principal will exclude from the process all known prejudiced persons.

1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions:

Section 2 - Commitments of the Bidder(s)/ Contractor(s)

2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.

2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he/ she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant Indian Penal Code (IPC) and Prevention of Corruption Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

2.1.4 Foreign Bidder(s)/ Contractor(s) shall disclose the name and address of agents and representatives in India and Indian Bidder(s)/ Contractor(s) to disclose their foreign principals or associates. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

2.3 The Bidder(s)/ Contractor(s) shall not approach the Courts while representing the matters to IEMs and will await their decision in the matter.

Section 3 - Disqualification from tender process and exclusion from future contracts

If the Bidder(s)/ Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/ Contractor(s) from the tender process or take action as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

Section 4 - Compensation for Damages

4.1 If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent Earnest Money Deposit/ Bid Security.

4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to section 3, the Principal shall be entitled to

demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher.

Section 5 - Previous Transgression

5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.

5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

Section 6 - Equal treatment of all Bidders/ Contractors / Sub-contractors

6.1 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors. In case of sub-contracting, the Principal contractor shall be responsible for the adoption of IP by his sub-contractors and shall continue to remain responsible for any default by his sub-contractors.

6.2 The Principal will disqualify from the tender process all bidders who do not sign this pact or violate its provisions.

Section 7 - Criminal Charges against violating Bidders/ Contractors /Subcontractors

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

Section 8 - Independent External Monitor(s)

8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.

8.3 The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/ Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s) / Sub-contractor(s) with confidentiality in line with Non- disclosure agreement.

8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

8.5 The role of IEMs is advisory, would not be legally binding and it is restricted to resolving issues raised by an intending bidder regarding any aspect of the tender which allegedly restricts competition or bias towards some bidders. At the same time, it must be understood that IEMs are not consultants to the Management. Their role is independent in nature and the advice once tendered would not be subject to review at the request of the organization.

8.6 For ensuring the desired transparency and objectivity in dealing with the complaints arising out of any tendering process, the matter should be examined by the full panel of IEMs jointly as far as possible, who would look into the records, conduct an investigation, and submit their joint recommendations to the Management.

8.7 The IEMs would examine all complaints received by them and give their recommendations/ views to CMD, BHEL, at the earliest. They may also send their report directly to the CVO and the Commission, in case of suspicion of serious irregularities requiring legal/ administrative action. IEMs will tender their advice on the complaints within 10 days as far as possible.

8.8 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.

8.9 IEM should examine the process integrity, they are not expected to concern themselves with fixing of responsibility of officers. Complaints alleging mala fide on the part of any officer of the organization should be looked into by the CVO of the concerned organisation.

8.10 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant Indian Penal Code/ Prevention of Corruption Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

8.11 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.

8.12 The word `Monitor' would include both singular and plural.

Section 9 - Pact Duration

9.1 This Pact shall be operative from the date IP is signed by both the parties till the final completion of contract for successful bidder and for all other bidders 6 months after the contract has been awarded. Issues like warranty / guarantee etc. should be outside the purview of IEMs.

9.2 If any claim is made/ lodged during currency of IP, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/ determined by the CMD, BHEL.

Section 10 - Other Provisions

10.1 This agreement is subject to Indian Laws and jurisdiction shall be registered office of the Principal, i.e. New Delhi.

10.2 Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

10.3 If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.

10.4 Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

10.5 Only those bidders / contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

For & On behalf of the Principal

(Office Seal)

For & On behalf of the Bidder/

Contractor

(Office Seal)

Place----------

Date----------

Witness:_____

(Name & Address) _____

_____

Witness:_____

(Name & Address) _____

_____

Annexure- II

RISK PURCHASE

1.1. In case the Supplier / Contractor fails to supply or fails to comply with terms & conditions of the Purchase Order / Contract or delivers equipment / material not of the contracted quality or fails to adhere to the contract specifications or fails to perform as per the activity schedule and there are sufficient reasons even before expiry of the delivery / completion period to justify that supplies shall be inordinately delayed beyond contractual delivery / completion period, BHEL reserve the right to cancel the Purchase Order / Contract either in whole or in part thereof without compensation to Supplier / Contractor and if BHEL so desires, may procure such equipment / material / items not delivered or others of similar description where equipment / material / items exactly complying with particulars are not readily procurable in the opinion of BHEL which is final and in such manner as deemed appropriate, at the risk and cost of the Supplier / Contractor and the Supplier / Contractor shall be liable to BHEL for any excess cost to BHEL. However, the Supplier / Contractor shall continue execution of the Purchase Order / Contract to the extent not cancelled under the provisions of this clause.

1.2. Risk & Cost Clause, in line with Conditions of Contract may be invoked in any of the following cases:

i) Contractor/ supplier's poor progress of the work vis-à-vis execution timeline as stipulated in the Contract, backlog attributable to contractor/ supplier including unexecuted portion of work/ supply does not appear to be executable within balance available period considering its performance of execution.

ii) Withdrawal from or abandonment of the work by contractor/supplier before completion as per contract.

iii) Non completion of work/ Non-supply by the Contractor/ supplier within scheduled completion/delivery period as per Contract or as extended from time to time, for the reasons attributable to the contractor/ supplier.

iv) Termination of Contract on account of any other reason(s) attributable to Contractor/ Supplier.

v) Assignment, transfer, subletting of Contract without BHEL's written permission resulting in termination of Contract or part thereof by BHEL.

vi) Non-compliance to any contractual condition or any other default attributable to Contractor/ Supplier.

1. . Ris and Cost amount against alance or :

In case Risk & Cost is invoked, the amount of Risk & Cost against balance work shall be calculated as under:

Ris Cost Amount A- A x H/100

Where,

A= Value of Balance scope of Work/ Supply (*) as per rates of new contract

= Value of Balance scope of Works/ Supply (*) as per rates of old contract being paid to the contractor/ supplier at the time of termination of contract i.e. inclusive of PVC & ORC, if any.

H = Overhead Factor to be taken as 5 (five)

In case A- is less than 0 ero , value of A- shall be ta en as 0 ero .

alance scope of wor / supply

Difference of Contract Quantities and Executed Quantities as on the date of issue of Letter for 'Termination of Contract', shall be taken as balance scope of Work / Supply for calculating risk & cost amount.

Contract quantities are the quantities as per original contract. If, Contract has been amended, quantities as per amended Contract shall be considered as Contract Quantities.

Items for which total quantities to be executed have exceeded the Contract Quantities based on drawings issued to contractor from time to time till issue of Termination letter, then for these items total Quantities as per issued drawings would be deemed to be contract quantities.

Substitute/ extra items whose rates have already been approved would form part of contract quantities for this purpose. Substitute/ extra items which have been executed but rates have not been approved, would also form part of contract quantities for this purpose and rates of such items shall be determined in line with contractual provisions.

However, increase in quantities on account of additional scope in new tender shall not be considered for this purpose.

NOTE: Incase portion of wor is being withdrawn, contract quantities pertaining to portion of wor withdrawn shall be considered as 'Balance scope of work/supply' for calculating Risk & Cost amount.

1. . LD against delay in executed wor /supply in case of Termination of Contract

LD against delay in executed Work /Supply shall be calculated in line with LD clause of the contract for the delay attributable to contractor/ supplier. For this purpose, contract value shall be taken as Executed Value of work/supply for the purpose of limiting maximum LD value.

Method for calculation of "LD against delay in executed Work/ supply" is given below:

i) Let the time period from scheduled date of start of work till termination of contract excluding the period of Hold (if any) not attributable to contractor/ supplier= T1
ii) Let the value of executed work/ supply till the time of termination of contract= X
iii) Let the Total Executable Value of work/ supply for which inputs/fronts were made available to contractor/ supplier and were planned for execution till termination of contract = Y
iv) Delay in executed work/ supply attributable to contractor/supplier i.e. $T2=(1-\frac{X}{Y})x$ T1
v) LD shall be calculated in line with LD clause of the Contract for the delay attributable to contractor/ supplier taking "X" as Contract Value and "T2" as delay attributable to contractor/ supplier.

Note: In case portion of service/ supply is withdrawn, no LD shall be applicable for portion of service/ supply withdrawn.

1. . Recovery from Supplier

Recoveries from contractor/ supplier on whom risk & cost has been invoked shall be as per Clause No. 23 of GTC.

BANK GUARANTEE FOR PERFORMANCE SECURITY

Bank Guarantee No:

Date:

To

NAME

& ADDRESSES OF THE BENEFICIARY

Dear Sirs,

In consideration of the Bharat Heavy Electricals Limited [1] (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at _____ through its Unit at……..(name of the Unit) having awarded to (Name of the Vendor / Contractor / Supplier) having its registered office at_____[2] hereinafter referred to as the 'Contractor/Supplier', which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns), a contract Ref No……dated ……[3] valued at Rs……[4] (Rupees ----------)/FC……(in words……..) for ……[5] (hereinafter called the 'Contract') and the Contractor having agreed to provide a Contract Performance Guarantee, equivalent to ……% (…. Percent) of the said value of the Contract to the Employer for the faithful performance of the Contract,

we, ……, (hereinafter referred to as the Bank), having registered/Head office at …….. and inter alia a branch at …… being the Guarantor under this Guarantee, hereby, irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer a maximum amount Rs ---------- ------- (Rupees ----------) without any demur, immediately on a demand from the Employer, .
Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____ _____.

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Contractor/ Supplier in any suit or proceeding pending before any Court or Tribunal relating thereto our liability under this present being absolute and unequivocal.

The payment so made by us under this Guarantee shall be a valid discharge of our liability for payment thereunder and the contractors/supplier shall have no claim against us for making such payment.

We the ……bank further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract and that it shall continue to be enforceable till all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied or discharged.

We …….. BANK further agree with the Employer that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said Contractor/Supplier from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said Contractor/Supplier and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor/Supplier or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Contractor/Supplier or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee that the Employer may have in relation to the Contractor's liabilities.

This Guarantee shall remain in force upto and including…….. [6] and shall be extended from time to time for such period as may be desired by Employer.
This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Contractor/Supplier but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms thereof.

Unless a demand or claim under this guarantee is made on us in writing on or before the ……[7]we shall be discharged from all liabilities under this guarantee thereafter.

We, …… BANK lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.
Notwithstanding anything to the contrary contained hereinabove:

a) The liability of the Bank under this Guarantee shall not exceed…… [8]
b) This Guarantee shall be valid up to ……[9]
c) Unless the Bank is served a written claim or demand on or before _____[10] all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

We, _____ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

For and on behalf of
(Name of the Bank)

Dated…….
Place of Issue…….

[1] *NAME AND ADDRESS OF EMPLOYER I.e Bharat Heavy Electricals Limited*

[2] *NAME AND ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER.*

[3] *DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE*

[4] *PROJECT/SUPPLY DETAILS*

[5] *BG AMOUNT IN FIGURES AND WORDS*

[6] *VALIDITY DATE*

[7] *DATE OF EXPIRY OF CLAIM PERIOD*

[8] *BG AMOUNT IN FIGURES AND WORDS.*

[9] *VALIDITY DATE*

[10] *DATE OF EXPIRY OF CLAIM PERIOD*

Note:

1. **Units are advised that expiry of claim period may be kept 2/3 months after validity date.**

2. **In Case of Bank Guarantees submitted by Foreign Vendors-**

   a. **From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India)** can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.

   b. **From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)**

   b.1 In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by **any of the Consortium Banks only** will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank (BHEL's Consortium Bank). It is advisable that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor. The tender stipulation should clearly specify these requirements.

   b.2 **In case, Foreign Vendors intend to provide BG from** Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at **sl.no. b.1** will required to be followed.

   b.3 The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time). In case, of Foreign Vendors, the BG Format provided to them should clearly specify the same.

   b.4 The BG should clearly specify that the demand or other document can be presented in electronic form.

CONTENTS

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1.	400kV CIRCUIT BREAKER DRAWINGS		
1.1	ELECTRICAL DRAWINGS	3271005701ED316R01	21
1.2	GENERAL ARRANGEMENT	3271005701GA316R01	18
1.3	NAME PALTE	3271005701NP316R01	2

NTPC DRG. No. : 9962-001-TB-572-PVE-C-117	REV.: 0
VENDOR:	GE T&D INDIA LIMITED, CHENNAI
PROJECT:	1 X 660MW PANKI THERMAL POWER EXTENSION PROJECT.
OWNER:	UTTAR PRADESH RAJYA VIDYUT UTPADAN NIGAM LTD.
REVIEW CONSULTANT:	NTPC LTD. (A GOVERNMENT OF INDIA ENTERPRISE)
CONSULTANT:	DEVELOPMENT CONSULTANTS PVT. LTD. KOLKATA
EPC CONTRACTOR:	BHARAT HEAVY ELECTRICALS LTD.

DOC NO. : TB-4-316-401-E01B
STATUS
DISTRIBUTION

REV.	DATE	ALTD	CHD	APPD

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA

DEPT CODE		NAME	SIGN	DATE
M	DRN	KS		17.07.19
	DESN	KS		17.07.19
	CHD	KS		17.07.19
	APPD	KPB		17.07.19

TITLE
400kV CIRCUIT BREAKER DRAWINGS

DEPT.
SIGN
SCALE : NTS

DRAWING NO.
3271005701CO316R01

SHEET : 1 OF 1 | REV. : 0

SL NO	DRAWING NO	SHT.NO	TITLE	REV 0		REV 1		REV 2	
				DATE	DETAILS	DATE	DETAILS	DATE	DETAILS
1	3271005701ED316R01	1 OF 21	CONTENTS OF ELECTRICAL DRAWINGS	17.07.2019	ORIGINAL ISSUE				
2	3271005701ED316R01	2 OF 21	GENERAL NOTES	17.07.2019	ORIGINAL ISSUE				
3	3271005701ED316R01	3 OF 21	LEGEND	17.07.2019	ORIGINAL ISSUE				
4	3271005701ED316R01	4 OF 21	LEGEND	17.07.2019	ORIGINAL ISSUE				
5	3271005701ED316R01	5 OF 21	CLOSING AND ANTIPUMPING CIRCUIT	17.07.2019	ORIGINAL ISSUE				
6	3271005701ED316R01	6 OF 21	TRIP SYSTEM 1	17.07.2019	ORIGINAL ISSUE				
7	3271005701ED316R01	7 OF 21	TRIP SYSTEM 2	17.07.2019	ORIGINAL ISSUE				
8	3271005701ED316R01	8 OF 21	SF6 GAS ALARM & LOCKOUT AND POLE DISCREPANCY	17.07.2019	ORIGINAL ISSUE				
9	3271005701ED316R01	9 OF 21	REMOTE ALARMS	17.07.2019	ORIGINAL ISSUE				
10	3271005701ED316R01	10 OF 21	AC CIRCUITS	17.07.2019	ORIGINAL ISSUE				
11	3271005701ED316R01	11 OF 21	SPARE AUXILIARY CONTACTS	17.07.2019	ORIGINAL ISSUE				
12	3271005701ED316R01	12 OF 21	TERMINAL BLOCK DETAILS	17.07.2019	ORIGINAL ISSUE				
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14	3271005701ED316R01	14 OF 21	CROSS REFERENCE DETAILS	17.07.2019	ORIGINAL ISSUE				
15	3271005701ED316R01	15 OF 21	CROSS REFERENCE DETAILS	17.07.2019	ORIGINAL ISSUE				
16	3271005701ED316R01	16 OF 21	CROSS REFERENCE DETAILS	17.07.2019	ORIGINAL ISSUE				
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21	3271005701ED316R01	21 OF 21	CROSS REFERENCE DETAILS	17.07.2019	ORIGINAL ISSUE				

SALE ORDER NO.: 3271005701
TOTAL CB QTY
400KV, 3150A (W/O PIR & W/O CSD) - 05 Nos.
400KV, 3150A (W/O PIR & WITH CSD) - 06 Nos.

NTPC DRG. No. : 9962-001-TB-572-PVE-C-117 REV.: 0

VENDOR: GE T&D INDIA LIMITED, CHENNAI

PROJECT: 1 X 660MW PANKI THERMAL POWER EXTENSION PROJECT.

OWNER: UTTAR PRADESH RAJYA VIDYUT UTPADAN NIGAM LTD.

REVIEW CONSULTANT: NTPC LTD. (A GOVERNMENT OF INDIA ENTERPRISE)

CONSULTANT: DEVELOPMENT CONSULTANTS PVT. LTD. KOLKATA

EPC CONTRACTOR: BHARAT HEAVY ELECTRICALS LTD.

DOC NO. : TB-4-316-401-E01B

STATUS

DISTRIBUTION

REV.	DATE	ALTD	CHD	APPD

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA

DEPT CODE		NAME	SIGN	DATE
M	DRN	KS		17.07.19
	DESN	KS		17.07.19
	CHD	KS		17.07.19
	APPD	KPB		17.07.19

TITLE: CONTENTS OF ELECTRICAL DRAWINGS

DEPT. SIGN SCALE : NTS

DRAWING NO. 3271005701ED316R01

SHEET : 1 OF 21 REV. : 0

NOTES :

1) SCHEME SHOWS BREAKER TRIPPED, WITHOUT SF6 GAS PRESSURE AND CLOSING SPRING CHARGED

2) CONTACTORS SHOWN IN DE-ENERGISED CONDITION

3) PANEL WIRED WITH PVC COPPER WIRE SIZE 2.5 Sq.mm

4) COLOUR OF WIRES: BLACK - AC CIRCUIT, GREY - DC CIRCUIT, GREEN - EARTH

5) CONTINUOUS POWER USED FOR SUPERVISION OF COILS SHOULD NOT EXCEED 4 WATT

6) ALL TERMINALS USED IN CONTROL CUBICLE ARE OF STUD TYPE ELMEX TYPE CATM3 / CONNECTWELL TYPE CSTSB3.

7) ALL TERMINALS USED IN MECHANISM CUBICLE ARE OF STUD TYPE ELMEX TYPE CATM3 / CONNECTWELL TYPE CSTSB3.

8) LOCATION REFERENCE

◉	——	MULTICORE TERMINAL
DM	——	DENSIMETER
MC	——	MECHANISM CUBICLE
CC	——	CONTROL CUBICLE

9) GAS PRESSURE

SF6 PRESSURE	SF6 PRESSURE MPa (ABSOLUTE) AT 20°C
FILLING	0.70
ALARM (P1)	0.64
LOCKOUT (P2)	0.61
LOCKOUT (P2)	0.61

DESCRIPTION	WITH CONTROL SWITCHING DEVICE	WITHOUT CONTROL SWITCHING DEVICE
CLOSING CIRCUIT SHT.5/21	REMOVE SHORT BETWEEN TBX#1 & TBX#2 SHORT TBX#2 & TBX#3	REMOVE SHORT BETWEEN TBX#2 & TBX#3 SHORT TBX#1 & TBX#2
	REMOVE SHORT BETWEEN TBX#4,5,6 & TBX#7	SHORT TERMINAL TBX#4,5,6 & TBX#7
TRIP SYSTEM 1 SHT.6/21	REMOVE SHORT BETWEEN TBX#8 & TBX#9	SHORT TERMINAL TBX#8 & TBX#9
CSD CONNECTIONS SHT.6A/21	REFER SHT.6A/21 SHEET	IGNORE SHT.6A/21 SHEET
TRIP SYSTEM 2 SHT.7/21	REMOVE SHORT BETWEEN TBX#10 & TB1#11	SHORT TERMINAL TBX#10 & TB1#11

10) THE SCHEMATIC FOR BREAKER IS DESIGNED FOR BOTH WITH CONTROL SWITCHIG DEVICE & WITHOUT CONTROL SWITCHING DEVICE. THE SCHEMATIC SELECTION FOR WITH CONTROL SWITCHING / WITHOUT CONTROL SWITCHING CAN BE DONE WITH THE JUMPER / TERMINAL SHORTING SELECTION IN TB#X TERMINAL IN THE CONTROL CUBICLE. THE DETAIL IS GIVEN IN THE ABOVE TABLE.

TAGNAME	DESCRIPTION	SPECIFICATION	MAKE	MODEL	ALTERNATE MAKE	ALTERNATE MODEL	QUANT	PANEL NUMBER
43A	LOCAL / OFF / REMOTE SWITCH, POLE:5L+5R	LOCAL-OFF-REMOTE NON LOCKABLE SWITCH,25 AMP, POLE:5	KAYCEE	5MD59BO	SWITRON/EQUIVALENT	-	1	CC
94A	CONTACTOR - ANTIPUMPING PHASE A	AUX.CONTACTOR 2NO+2NC 220V DC	SIEMENS	3RH21 22-1BM40	SCHNEIDER/EATON/EQUIVALENT	CA3KN22MD/DILA-22(220VDC)	1	CC
94B	CONTACTOR - ANTIPUMPING PHASE B	AUX.CONTACTOR 2NO+2NC 220V DC	SIEMENS	3RH21 22-1BM40	SCHNEIDER/EATON/EQUIVALENT	CA3KN22MD/DILA-22(220VDC)	1	CC
94C	CONTACTOR - ANTIPUMPING PHASE C	AUX.CONTACTOR 2NO+2NC 220V DC	SIEMENS	3RH21 22-1BM40	SCHNEIDER/EATON/EQUIVALENT	CA3KN22MD/DILA-22(220VDC)	1	CC
A3	CONTACTOR - SF6 LOW PRESSURE LOCKOUT-1	AUX.CONTACTOR 4NO 220V DC	SIEMENS	3RH21 40-1BM40	SCHNEIDER/EATON/EQUIVALENT	CA3KN40MD/DILEEM-10-G(220VDC)	1	CC
A3	ADD ON BLOCK - SF6 LOW PRESSURE LOCKOUT-1	AUX. CONTACTOR ADD ON BLOCK 1NO+1NC	SIEMENS	3RH29 11-1HA11	SCHNEIDER/EATON/EQUIVALENT	LA1KN11/DILA-XHI11	1	CC
A4	CONTACTOR - SF6 LOW PRESSURE LOCKOUT-1	AUX.CONTACTOR 3NO+1NC 220V DC	SIEMENS	3RH21 31-1BM40	SCHNEIDER/EATON/EQUIVALENT	CA3KN31MD/DILA-31(220VDC)	1	CC
A5	PHASE DISCREPANCY TIMER	TIMING : 0.05-100 HR , 2CO, 24-220V AC/DC	SIEMENS	3RP15 25-1BW30	ALLENBRADLEY/EQUIVALENT	FSM4UU18	1	CC
A6	CONTACTOR - TRIP 1	AUX.CONTACTOR 3NO+1NC 220V DC	SIEMENS	3RH21 31-1BM40	SCHNEIDER/EATON/EQUIVALENT	CA3KN31MD/DILA-31(220VDC)	1	CC
A7	CONTACTOR - TRIP 2	AUX.CONTACTOR 3NO+1NC 220V DC	SIEMENS	3RH21 31-1BM40	SCHNEIDER/EATON/EQUIVALENT	CA3KN31MD/DILA-31(220VDC)	1	CC
A8	CONTACTOR - SF6 LOW PRESSURE LOCKOUT-2	AUX.CONTACTOR 4NO 220V DC	SIEMENS	3RH21 40-1BM40	SCHNEIDER/EATON/EQUIVALENT	CA3KN40MD/DILEEM-10-G(220VDC)	1	CC
A9	CONTACTOR - PHASE DISCREPANCY	AUX.CONTACTOR 3NO+1NC 220V DC	SIEMENS	3RH21 31-1BM40	SCHNEIDER/EATON/EQUIVALENT	CA3KN31MD/DILA-31(220VDC)	1	CC
A10	CONTACTOR - DC SUPPLY 1 SUPERVISION	AUX.CONTACTOR 2NO+2NC 220V DC	SIEMENS	3RH21 22-1BM40	SCHNEIDER/EATON/EQUIVALENT	CA3KN22MD/DILA-22(220VDC)	1	CC
A10	ADD ON BLOCK - DC SUPPLY 1 SUPERVISION	AUX. CONTACTOR ADD ON BLOCK 1NO+1NC	SIEMENS	3RH29 11-1HA11	SCHNEIDER/EATON/EQUIVALENT	LA1KN11/DILA-XHI11	1	CC
A11	CONTACTOR - DC SUPPLY 2 SUPERVISION	AUX.CONTACTOR 2NO+2NC 220V DC	SIEMENS	3RH21 22-1BM40	SCHNEIDER/EATON/EQUIVALENT	CA3KN22MD/DILA-22(220VDC)	1	CC
A12	CONTACTOR - SF6 LOW PRESSURE LOCKOUT-2	AUX.CONTACTOR 3NO+1NC 220V DC	SIEMENS	3RH21 31-1BM40	SCHNEIDER/EATON/EQUIVALENT	CA3KN31MD/DILA-31(220VDC)	1	CC
D1	RPH DIODE	CDL4U WITH 1.5KE 400A DIODE	CONNECTWELL	CDL4U + 1.5KE 400A DIODE	EQUIVALENT	-	1	CC
D2	RPH DIODE	CDL4U WITH 1.5KE 400A DIODE	CONNECTWELL	CDL4U + 1.5KE 400A DIODE	EQUIVALENT	-	1	CC
D3	RPH DIODE	CDL4U WITH 1.5KE 400A DIODE	CONNECTWELL	CDL4U + 1.5KE 400A DIODE	EQUIVALENT	-	1	CC
D4	RPH DIODE	CDL4U WITH 1.5KE 400A DIODE	CONNECTWELL	CDL4U + 1.5KE 400A DIODE	EQUIVALENT	-	1	CC
D5	RPH DIODE	CDL4U WITH 1.5KE 400A DIODE	CONNECTWELL	CDL4U + 1.5KE 400A DIODE	EQUIVALENT	-	1	CC
D6	RPH DIODE	CDL4U WITH 1.5KE 400A DIODE	CONNECTWELL	CDL4U + 1.5KE 400A DIODE	EQUIVALENT	-	1	CC
DS	DOOR SWITCH	DOOR SWITCH NORMALLY CLOSED 2A	SURAJ	DS	EQUIVALENT	-	1	CC
H	PANEL HEATER	HEATER 60W, 230V AC	APT	Mk II A	GRISHEGO/SOFIA/EQUIVALENT	-	1	CC
IL	CUBICLE ILLUMINATION LAMP	11W, 230V AC, CFL,MODEL : B22	PHILIPS	11W, 230V AC, CFL,MODEL : B22	OSRAM	EQUIVALENT	1	CC
IL1	INDICATION LAMP - CB CLOSED	LED RED 220V DC	TEKNIC	3PLBR4L-220VDC	SIEMENS/SCHNEIDER/EQUIVALENT	3SB52 85-6HC05	1	CC
IL2	INDICATION LAMP - CB TRIPPED	LED GREEN 220V DC	TEKNIC	3PLBR3L-220VDC	SIEMENS/SCHNEIDER/EQUIVALENT	3SB52 85-6HE05	1	CC
IL3	INDICATION LAMP - CB SPRING CHARGED	LED AMBER 220V DC	TEKNIC	3PLBR5L-220VDC	SIEMENS/SCHNEIDER/EQUIVALENT	3SB52 85-6HL05	1	CC
MCB1	MCB - MOTOR SUPPLY - MECHANISM A	MCB AC 16A DP 10KA CURVE C	SCHNEIDER	XC60-A9N2P16C	EATON/EQUIVALENT	PLSM-C16/2	1	CC
MCB2	MCB - MOTOR SUPPLY - MECHANISM B	MCB AC 16A DP 10KA CURVE C	SCHNEIDER	XC60-A9N2P16C	EATON/EQUIVALENT	PLSM-C16/2	1	CC
MCB3	MCB - MOTOR SUPPLY - MECHANISM C	MCB AC 16A DP 10KA CURVE C	SCHNEIDER	XC60-A9N2P16C	EATON/EQUIVALENT	PLSM-C16/2	1	CC
MCB4	CUBICLE ILLUMINATION AND HEATER MCB	MCB AC 16A DP 10KA CURVE C	SCHNEIDER	XC60-A9N2P16C	EATON/EQUIVALENT	PLSM-C16/2	1	CC
MCB5	MCB - DC SUPPLY 1	MCB DC 6A DP	SCHNEIDER	C60H-A9N61526	EATON/EQUIVALENT	PLS6-C6/2-DC-MW	1	CC
MCB6	MCB - DC SUPPLY 2	MCB DC 6A DP	SCHNEIDER	C60H-A9N61526	EATON/EQUIVALENT	PLS6-C6/2-DC-MW	1	CC
OC-A	OPERATION COUNTER - PHASE A	BREAKER OPERATION COUNTER(RESETTABLE -6 DIGIT) - 220DC	GIC	CR-26_SD51A385	EQUIVALENT	-	1	CC
OC-B	OPERATION COUNTER - PHASE B	BREAKER OPERATION COUNTER(RESETTABLE -6 DIGIT) - 220DC	GIC	CR-26_SD51A385	EQUIVALENT	-	1	CC
OC-C	OPERATION COUNTER - PHASE C	BREAKER OPERATION COUNTER(RESETTABLE -6 DIGIT) - 220DC	GIC	CR-26_SD51A385	EQUIVALENT	-	1	CC
PBS1	PUSHBUTTON - CB CLOSE	PUSHBUTTON GREEN +1NO BLOCK	SIEMENS	3SB50 00-0AE01+3SB54 00-0B	SCHNEIDER/EQUIVALENT	XB5AA31N	1	CC
PBS1	PUSH BUTTON-CB TRIP	PUSHBUTTON 1NO ADDON BLOCK	SIEMENS	3SB54 00-0B	SCHNEIDER/EQUIVALENT	XB5AA41N	1	CC
PBS2	PUSH BUTTON-CB TRIP	PUSHBUTTON RED +1NO BLOCK	SIEMENS	3SB50 00-0AC01+3SB54 00-0B	SCHNEIDER/EQUIVALENT	XB5AA41N	1	CC
PBS2	PUSH BUTTON-CB TRIP	PUSHBUTTON 1NO ADDON BLOCK	SIEMENS	3SB54 00-0B	SCHNEIDER/EQUIVALENT	XB5AA41N	1	CC
S	SOCKET WITH SWITCH	6PIN, 5/15AMP	OSWAL	SKT+SW	ANCHOR/EQUIVALENT	-	1	CC
TH	CUBICLE THERMOSTAT	THERMOSTAT 20deg. TO 80deg. C	GIRISHECO	DLX-5	APT/EQUIVALENT	175/30-90(Mk II A)	1	CC
TB1	TERMINAL BLOCK	TYPE:CATM3	ELMEX	CATM3	CONNECTWELL/EQUIVALENT	CSTSB3	45	CC
TB2	TERMINAL BLOCK	TYPE:CATM3	ELMEX	CATM3	CONNECTWELL/EQUIVALENT	CSTSB3	45	CC
TB3	TERMINAL BLOCK	TYPE:CATM3	ELMEX	CATM3	CONNECTWELL/EQUIVALENT	CSTSB3	45	CC
TB4	TERMINAL BLOCK	TYPE:CATM3	ELMEX	CATM3	CONNECTWELL/EQUIVALENT	CSTSB3	45	CC
TB5	TERMINAL BLOCK	TYPE:CATM3	ELMEX	CATM3	CONNECTWELL/EQUIVALENT	CSTSB3	45	CC
TB6	TERMINAL BLOCK	TYPE:CATM3	ELMEX	CATM3	CONNECTWELL/EQUIVALENT	CSTSB3	45	CC
TB7	TERMINAL BLOCK	TYPE:CATM3	ELMEX	CATM3	CONNECTWELL/EQUIVALENT	CSTSB3	45	CC
TBX	TERMINAL BLOCK	TYPE:CUT4	ELMEX	CUT4	CONNECTWELL/EQUIVALENT	CTS4UN	13	CC

TAGNAME	DESCRIPTION	SPECIFICATION	MAKE	MODEL	ALTERNATE MAKE	ALTERNATE MODEL	QUANT	PANEL NUMBER
52CC	CLOSING COIL PHASE A	BREAKER COIL 345W, 220V DC, 4W CONTINUOUS	GE	HEH4910211023	-	-	1	MC-A
52TC1	TRIP COIL 1 PHASE A	BREAKER COIL 345W, 220V DC, 4W CONTINUOUS	GE	HEH4910211023	-	-	1	MC-A
52TC2	TRIP COIL 2 PHASE A	BREAKER COIL 345W, 220V DC, 4W CONTINUOUS	GE	HEH4910211023	-	-	1	MC-A
DMA	DENSITY MONITOR	DENSIMETER 3NO (P1- ALARM & P2- LOCKOUT)	WIKA	233.52.100-7149721 (HRCC160200002)	TRAFAG/EQUIVALENT	-	1	MC-A
DS	MECHANISM A DOOR SWITCH	DOOR SWITCH NORMALLY CLOSED 2A	SURAJ	DS	EQUIVALENT	-	1	MC-A
H	MECHANISM A HEATER	HEATER 60W, 230V AC	APT	Mk II A	APT/GRISHEGO/SOFIA/EQUIVALENT	Mk II A	1	MC-A
IL	MECHANISM A CUBICLE ILLUMINATION LAMP	11W, 230V AC, CFL,MODEL : B22	PHILIPS	11W, 230V AC, CFL,MODEL : B22	PHILIPS/OSRAM/EQUIVALENT	-	1	MC-A
LS	LIMIT SWITCH MECHANISM A	AUX. SWITCH CONTACTS: 4NO + 4NC, 15AMP	GE	JE4910510001	-	-	1	MC-A
M	SPRING CHARGE MOTOR MECHANISM A	220-250V AC/DC,700WATT	AGNI	HRCC4100029-2 (S310-220)	GROSCHOPP/WUXI/EQUIVALENT	JE4910107005-230V AC	1	MC-A
S1	AUXILIARY SWITCHS S1 MECHANISM A	AUX. SWITCH CONTACTS: 4NO + 4NC, 15AMP	GE	JE4910510001	-	-	1	MC-A
S2	AUXILIARY SWITCHS S2 MECHANISM A	AUX. SWITCH CONTACTS: 4NO + 4NC, 15AMP	GE	JE4910510001	-	-	1	MC-A
S3	AUXILIARY SWITCHS S3 MECHANISM A	AUX. SWITCH CONTACTS: 4NO + 4NC, 15AMP	GE	JE4910510001	-	-	1	MC-A
S4	AUXILIARY SWITCHS S4 MECHANISM A	AUX. SWITCH CONTACTS: 4NO + 4NC, 15AMP	GE	JE4910510001	-	-	1	MC-A
TH	MECHANISM A THERMOSTAT	THERMOSTAT 20deg. TO 80deg. C	GIRISHECO	DLX-5	APT/EQUIVALENT	175/30-90(Mk II A)	1	MC-A
TB1	TERMINAL BLOCK MECHANISM A	TYPE:CATM3	ELMEX	CATM3	CONNECTWELL/EQUIVALENT	CSTSB3	45	MC-A
TB2	TERMINAL BLOCK MECHANISM A	TYPE:CATM3	ELMEX	CATM3	CONNECTWELL/EQUIVALENT	CSTSB3	45	MC-A
52CC	CLOSING COIL PHASE B	BREAKER COIL 345W, 220V DC, 4W CONTINUOUS	GE	HEH4910211023	-	-	1	MC-B
52TC1	TRIPPIING COIL 1 PHASE B	BREAKER COIL 345W, 220V DC, 4W CONTINUOUS	GE	HEH4910211023	-	-	1	MC-B
52TC2	TRIPPIING COIL 2 PHASE B	BREAKER COIL 345W, 220V DC, 4W CONTINUOUS	GE	HEH4910211023	-	-	1	MC-B
DMB	DENSITY MONITOR	DENSIMETER 3NO (P1- ALARM & P2- LOCKOUT)	WIKA	233.52.100-7149721 (HRCC160200002)	TRAFAG/EQUIVALENT	-	1	MC-B
DS	MECHANISM B DOOR SWITCH	DOOR SWITCH NORMALLY CLOSED 2A	SURAJ	DS	EQUIVALENT	-	1	MC-B
H	MECHANISM B HEATER	HEATER 60W, 230V AC	APT	Mk II A	APT/GRISHEGO/SOFIA/EQUIVALENT	Mk II A	1	MC-B
IL	MECHANISM B CUBICLE ILLUMINATION LAMP	11W, 230V AC, CFL,MODEL : B22	PHILIPS	11W, 230V AC, CFL,MODEL : B22	OSRAM/EQUIVALENT	-	1	MC-B
LS	LIMIT SWITCH MECHANISM B	AUX. SWITCH CONTACTS: 4NO + 4NC, 15AMP	GE	JE4910510001	-	-	1	MC-B
M	SPRING CHARGE MOTOR MECHANISM B	220-250V AC/DC,700WATT	AGNI	HRCC4100029-2 (S310-220)	GROSCHOPP/WUXI/EQUIVALENT	JE4910107005-230V AC	1	MC-B
S1	AUXILIARY SWITCHS S1 MECHANISM B	AUX. SWITCH CONTACTS: 4NO + 4NC, 15AMP	GE	JE4910510001	-	-	1	MC-B
S2	AUXILIARY SWITCHS S2 MECHANISM B	AUX. SWITCH CONTACTS: 4NO + 4NC, 15AMP	GE	JE4910510001	-	-	1	MC-B
S3	AUXILIARY SWITCHS S3 MECHANISM B	AUX. SWITCH CONTACTS: 4NO + 4NC, 15AMP	GE	JE4910510001	-	-	1	MC-B
S4	AUXILIARY SWITCHS S4 MECHANISM B	AUX. SWITCH CONTACTS: 4NO + 4NC, 15AMP	GE	JE4910510001	-	-	1	MC-B
TH	MECHANISM B THERMOSTAT	THERMOSTAT 20deg. TO 80deg. C	GIRISHECO	DLX-5	APT/EQUIVALENT	175/30-90(Mk II A)	1	MC-B
TB1	TERMINAL BLOCK MECHANISM B	TYPE:CATM3	ELMEX	CATM3	CONNECTWELL/EQUIVALENT	CSTSB3	45	MC-B
TB2	TERMINAL BLOCK MECHANISM B	TYPE:CATM3	ELMEX	CATM3	CONNECTWELL/EQUIVALENT	CSTSB3	45	MC-B
52CC	CLOSING COIL PHASE C	BREAKER COIL 345W, 220V DC, 4W CONTINUOUS	GE	HEH4910211023	-	-	1	MC-C
52TC1	TRIPPIING COIL 1 PHASE C	BREAKER COIL 345W, 220V DC, 4W CONTINUOUS	GE	HEH4910211023	-	-	1	MC-C
52TC2	TRIPPIING COIL 2 PHASE C	BREAKER COIL 345W, 220V DC, 4W CONTINUOUS	GE	HEH4910211023	-	-	1	MC-C
DMC	DENSITY MONITOR	DENSIMETER 3NO (P1- ALARM & P2- LOCKOUT)	WIKA	233.52.100-7149721 (HRCC160200002)	TRAFAG/EQUIVALENT	-	1	MC-C
DS	MECHANISM C DOOR SWITCH	DOOR SWITCH NORMALLY CLOSED 2A	SURAJ	DS	EQUIVALENT	-	1	MC-C
H	MECHANISM C HEATER	HEATER 60W, 230V AC	APT	Mk II A	APT/GRISHEGO/SOFIA/EQUIVALENT	Mk II A	1	MC-C
IL	MECHANISM C CUBICLE ILLUMINATION LAMP	11W, 230V AC, CFL,MODEL : B22	PHILIPS	11W, 230V AC, CFL,MODEL : B22	OSRAM/EQUIVALENT	-	1	MC-C
LS	LIMIT SWITCH MECHANISM C	AUX. SWITCH CONTACTS: 4NO + 4NC, 15AMP	GE	JE4910510001	-	-	1	MC-C
M	SPRING CHARGE MOTOR MECHANISM C	220-250V AC/DC,700WATT	AGNI	HRCC4100029-2 (S310-220)	GROSCHOPP/WUXI/EQUIVALENT	JE4910107005-230V AC	1	MC-C
S1	AUXILIARY SWITCHS S1 MECHANISM C	AUX. SWITCH CONTACTS: 4NO + 4NC, 15AMP	GE	JE4910510001	-	-	1	MC-C
S2	AUXILIARY SWITCHS S2 MECHANISM C	AUX. SWITCH CONTACTS: 4NO + 4NC, 15AMP	GE	JE4910510001	-	-	1	MC-C
S3	AUXILIARY SWITCHS S3 MECHANISM C	AUX. SWITCH CONTACTS: 4NO + 4NC, 15AMP	GE	JE4910510001	-	-	1	MC-C
S4	AUXILIARY SWITCHS S4 MECHANISM C	AUX. SWITCH CONTACTS: 4NO + 4NC, 15AMP	GE	JE4910510001	-	-	1	MC-C
TH	MECHANISM C THERMOSTAT	THERMOSTAT 20deg. TO 80deg. C	GIRISHECO	DLX-5	APT/EQUIVALENT	175/30-90(Mk II A)	1	MC-C
TB1	TERMINAL BLOCK MECHANISM C	TYPE:CATM3	ELMEX	CATM3	CONNECTWELL/EQUIVALENT	CSTSB3	45	MC-C
TB2	TERMINAL BLOCK MECHANISM C	TYPE:CATM3	ELMEX	CATM3	CONNECTWELL/EQUIVALENT	CSTSB3	45	MC-C

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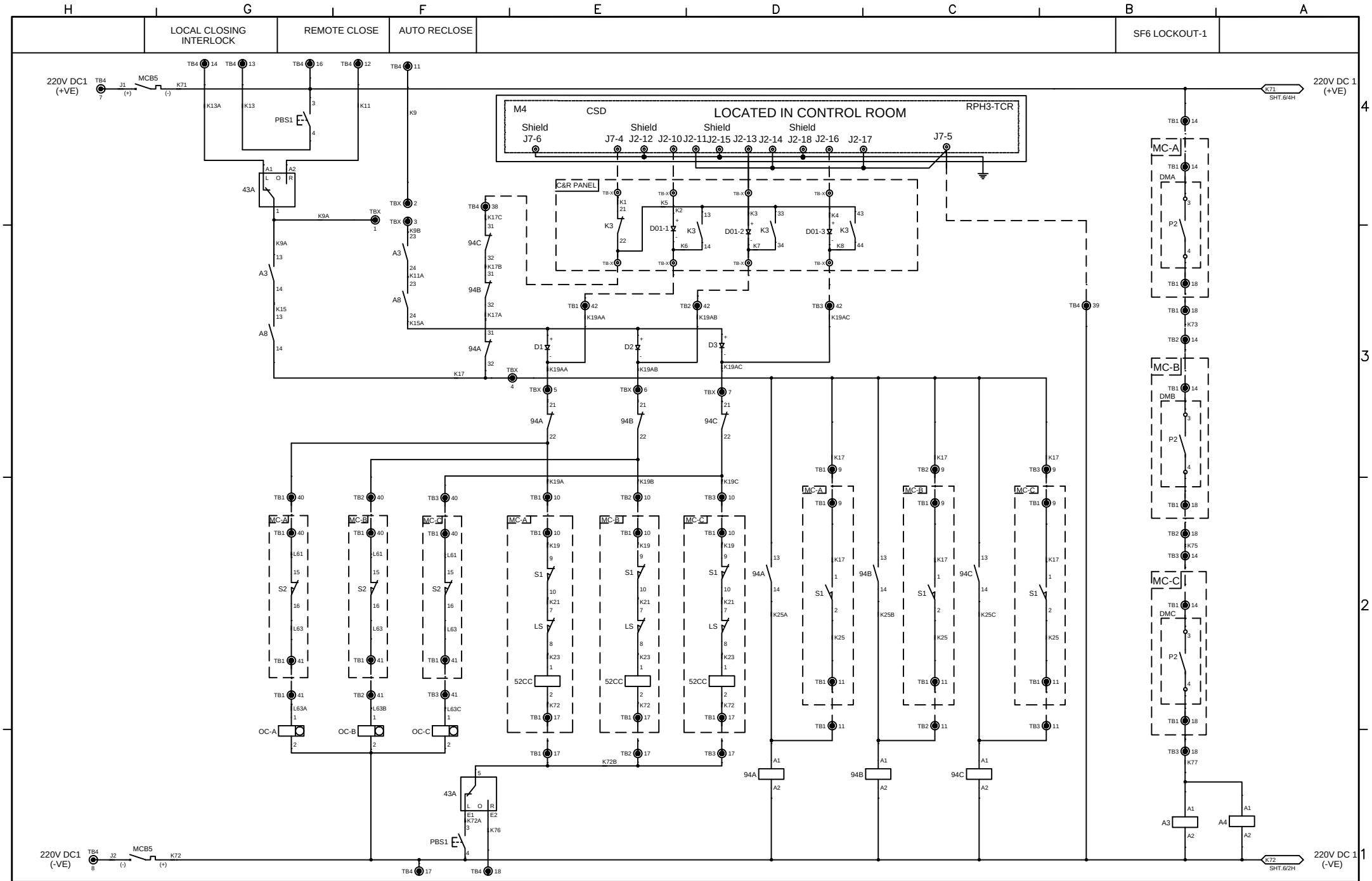
CABLENAME



CLOSING AND ANTIPUMPING CIRCUIT	T&D Chennai India	3271005701ED316R01	REV	VER	PAGE
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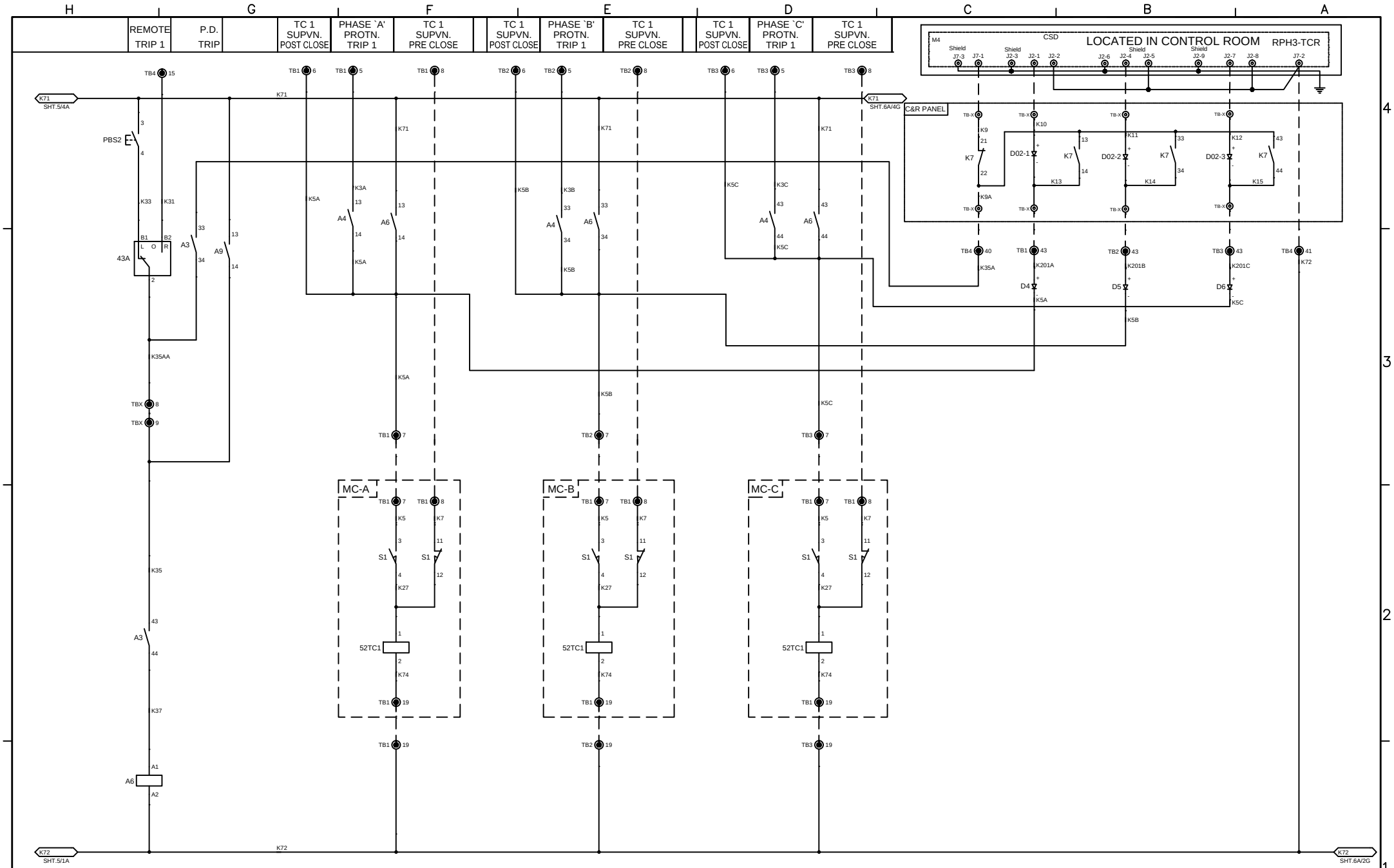

TRIP SYSTEM 1

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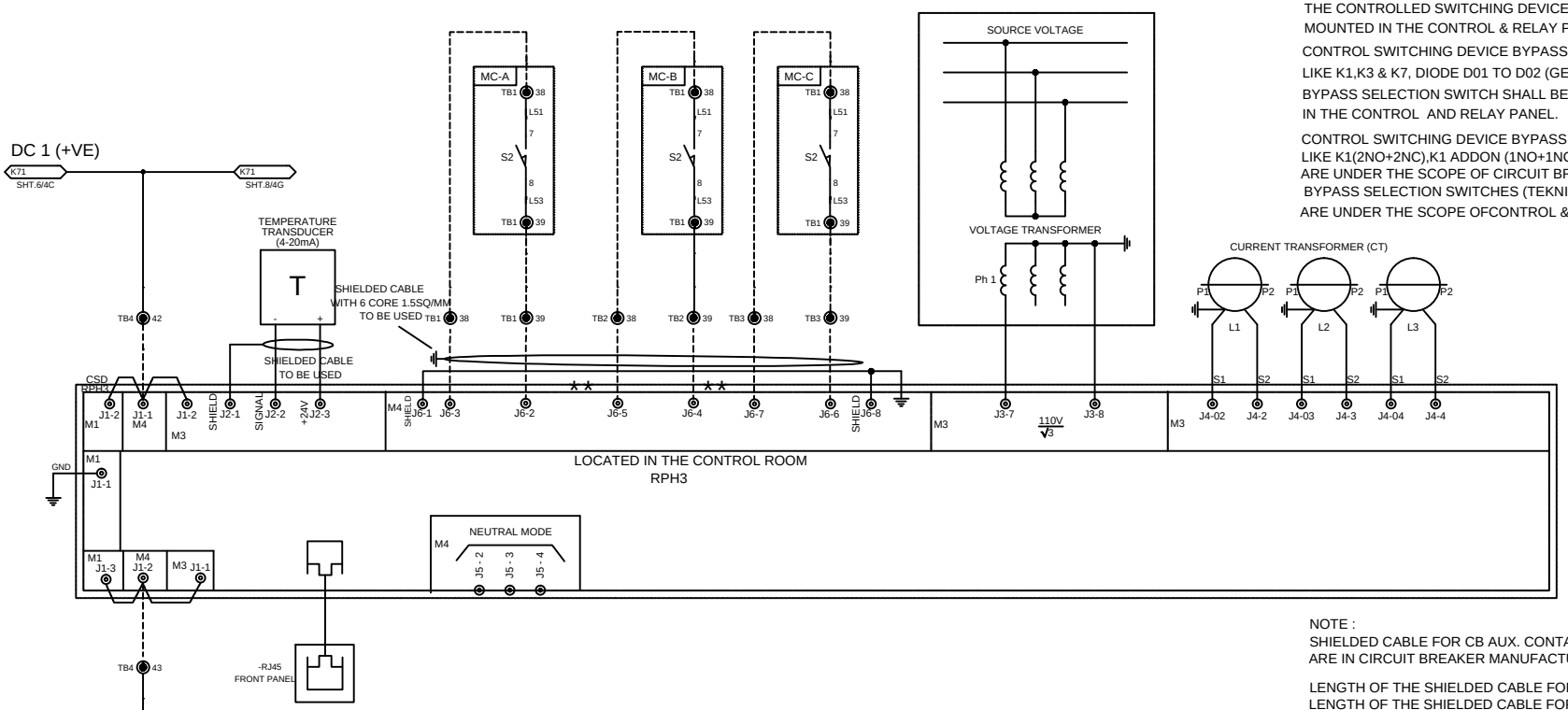
NOTE :

THE CONTROLLED SWITCHING DEVICE SHALL BE MOUNTED IN THE CONTROL & RELAY PANEL

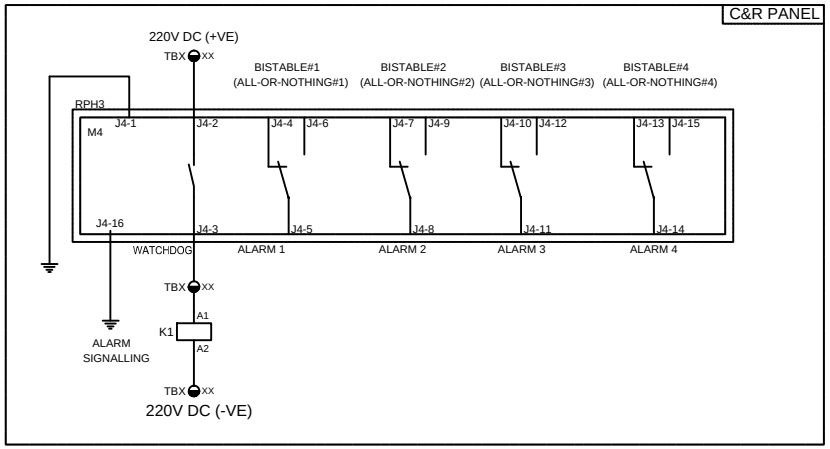
CONTROL SWITCHING DEVICE BYPASS CIRCUIT COMPONENTS LIKE K1,K3 & K7, DIODE D01 TO D02 (GE DIODE MODULE)) & BYPASS SELECTION SWITCH SHALL BE MOUNTED AND WIRED IN THE CONTROL AND RELAY PANEL.

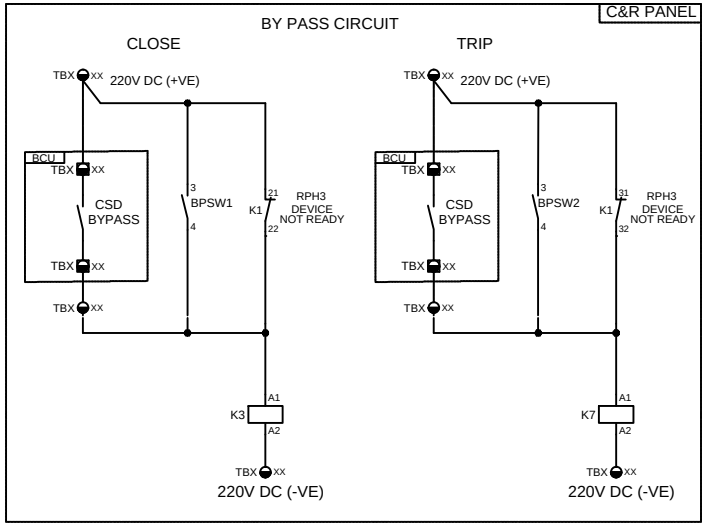
CONTROL SWITCHING DEVICE BYPASS CIRCUIT COMPONENTS LIKE K1(2NO+2NC),K1 ADDON (1NO+1NC),K3 & K7(3NO+1NC), D01-D02(DIODE MODULE) ARE UNDER THE SCOPE OF CIRCUIT BREAKER MANUFACTURER.
BYPASS SELECTION SWITCHES (TEKNIC MAKE, MODEL: P2AS2-2P) WITH 22.5DIA PANEL CUTOUT ARE UNDER THE SCOPE OFCONTROL & RELAY PANEL MANUFACTURER.



NOTE :
SHIELDED CABLE FOR CB AUX. CONTACT & TEMPERATURE TRANSDUCERS ARE IN CIRCUIT BREAKER MANUFACTURER'S SCOPE OF SUPPLY.

LENGTH OF THE SHIELDED CABLE FOR CB AUX.CONTACT - 1.5 KM
LENGTH OF THE SHIELDED CABLE FOR TEMPERATURE TRANSDUCER - 20 MTRS





CSD CONNECTIONS		T&D Chennai India	3271005701ED316R01	REV 0 / VER 1	PAGE 6A / 21

LOCAL TRIP 2	REMOTE TRIP 2	P.D. TRIP		TC 2 SUPVN. POST CLOSE	PHASE `A' PROTN. TRIP 2	TC 2 SUPVN. PRE CLOSE	TC 2 SUPVN. POST CLOSE	PHASE `B' PROTN. TRIP 2	TC 2 SUPVN. PRE CLOSE	TC 2 SUPVN. POST CLOSE	PHASE `C' PROTN. TRIP 2	TC 2 SUPVN. PRE CLOSE	SF6 LOCKOUT 2	DC SUPPLY 2 SUPERVISION

220V DC2 (+VE) — TB4 9 — J5 — MCB6 (+) (-) — K371

220V DC2 (-VE) — TB4 10 — J6 — MCB6 (-) (+) — K372

C&R PANEL
- CSD FAIL
- TRIP COIL 1 FAIL (R/Y/B)
- DC SUPPLY 1 FAIL
- TBX XX

PBS2 — K333 — K331 — C1 L O R C2 — 43A — A9 — K335

K337A — A8 — K335A — A7

MC-A: K305A — TB1 23 — K305 — K307 — S2 — K325 — 52TC2 — K374 — TB1 27
MC-B: K305B — TB2 23 — K305 — K307 — S2 — K325 — 52TC2 — K374 — TB2 27
MC-C: K305C — TB3 23 — K305 — K307 — S2 — K325 — 52TC2 — K374 — TB3 27

A12 — A7 — K303A / K303B / K303C

MC-A DMA / MC-B DMB / MC-C DMC — P2 — K371 — K373 — K375 — K377

A11 — A8 — A12

K371 SHT.8/4G

K372 SHT.8/1G

TRIP SYSTEM 2	T&D Chennai India	3271005701ED316R01	REV	VER	PAGE
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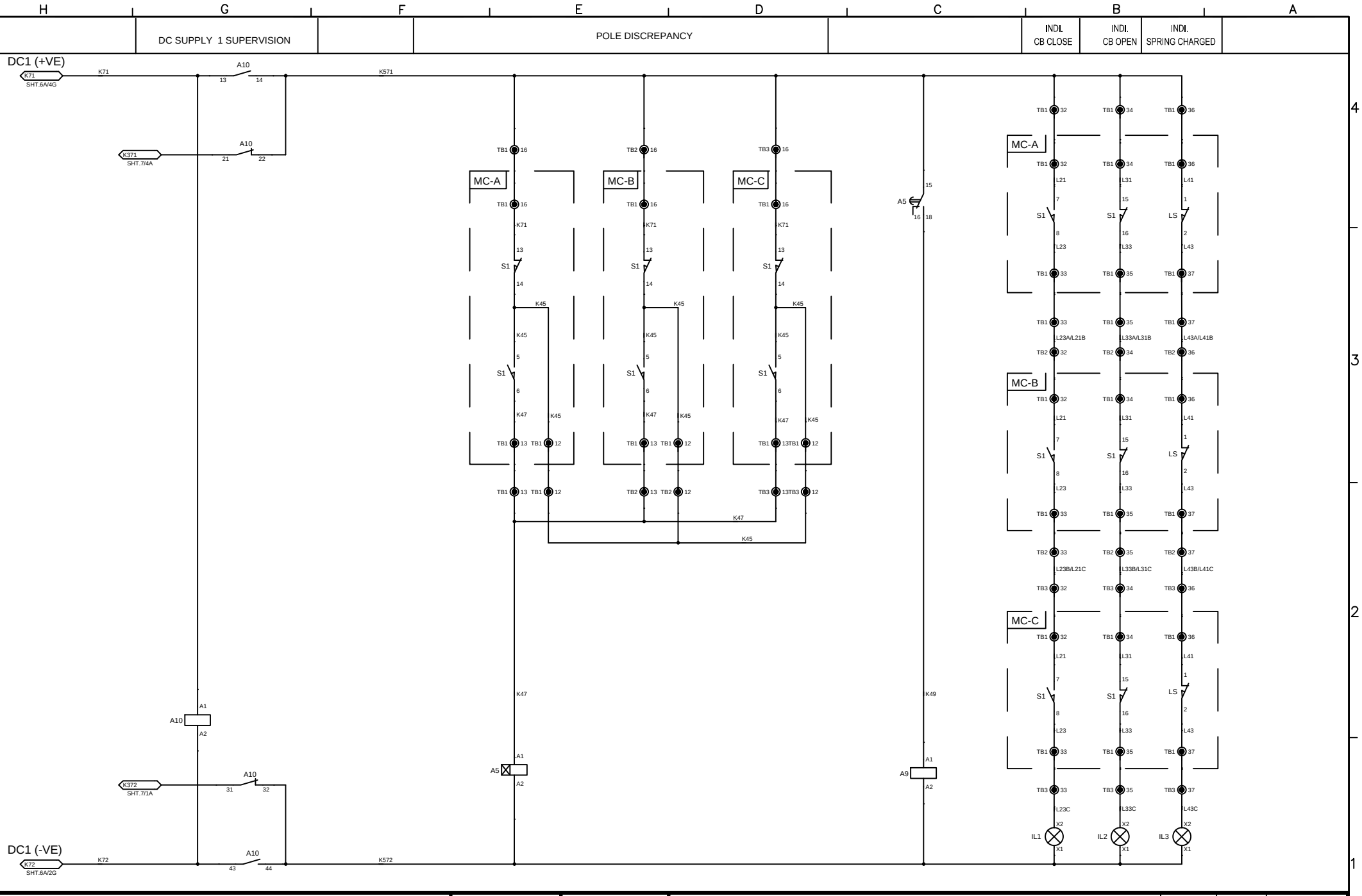

SF6 GAS ALARM & LOCK POLE DISCREPANCY & I		T&D Chennai India	3271005701ED316R01	REV	VER	PAGE
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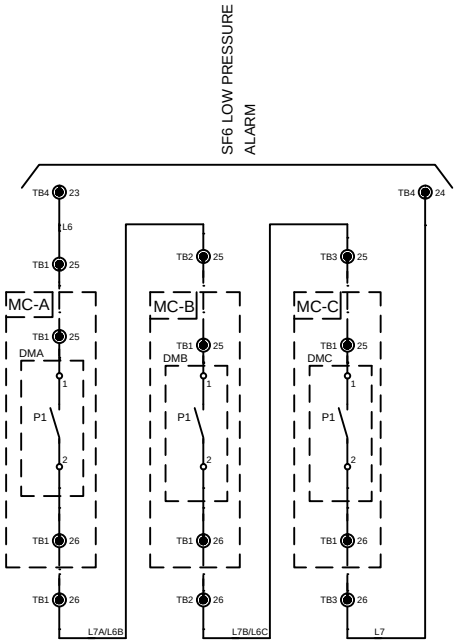

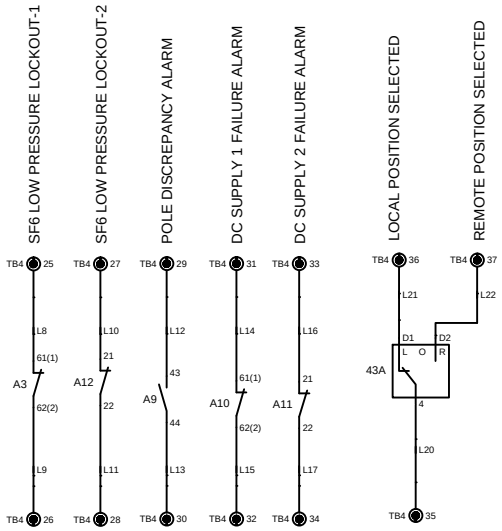

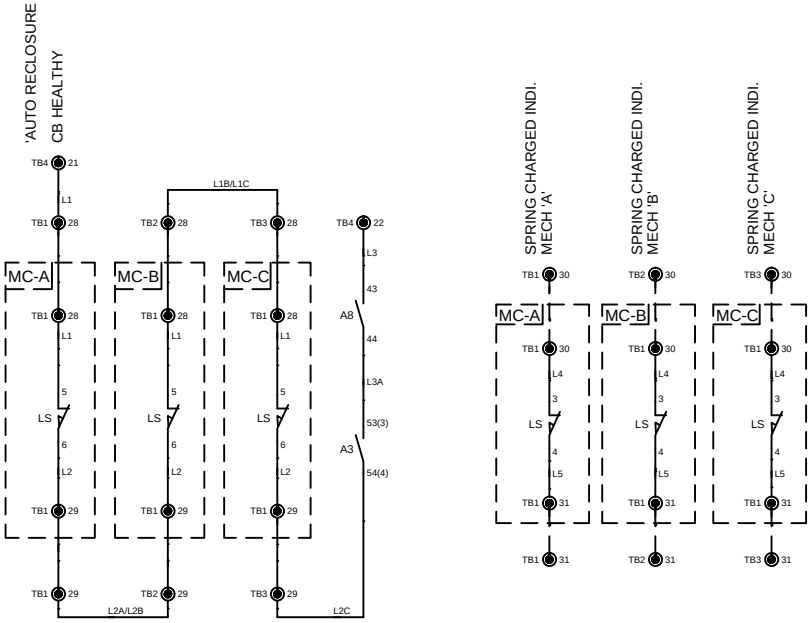

REMOTE ALARMS		T&D Chennai India	3271005701ED316R01	REV	VER	PAGE
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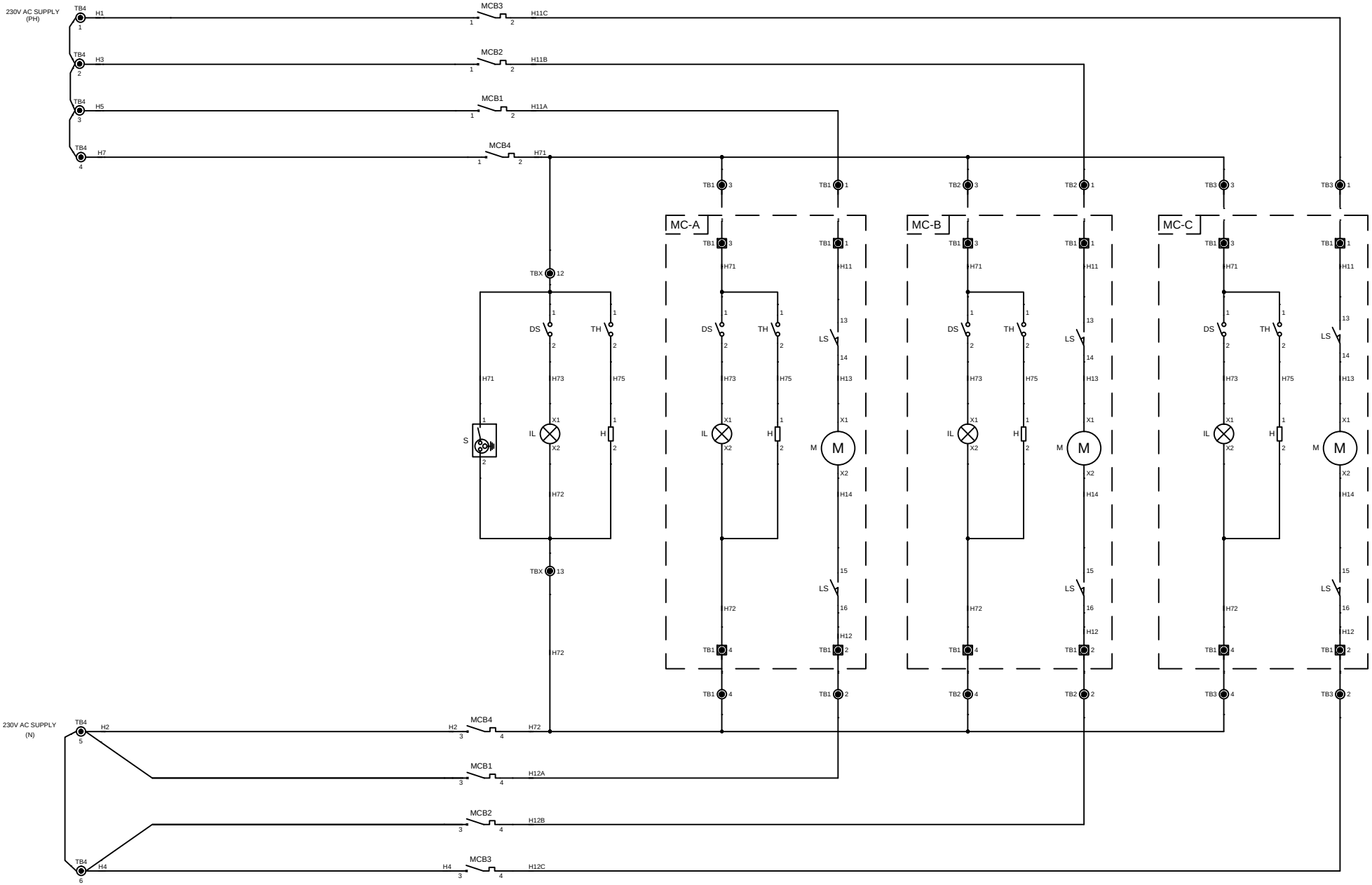

AC CIRCUITS

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Chennai India

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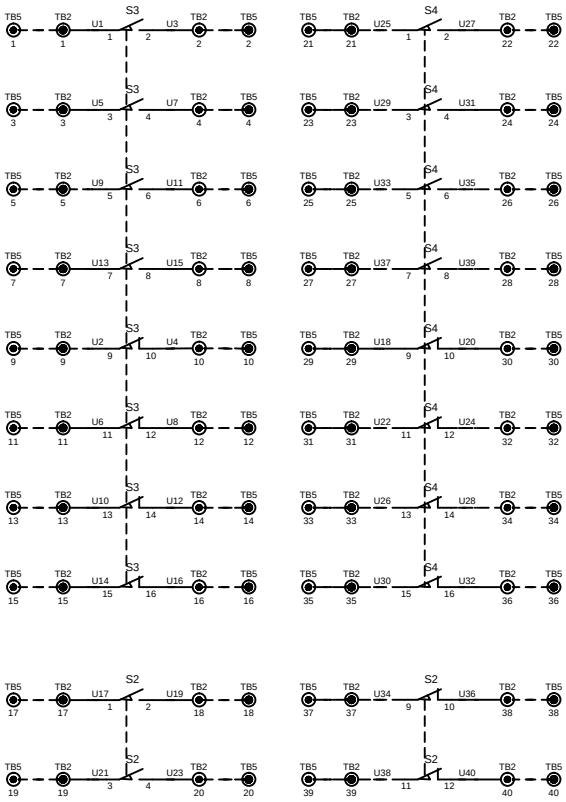
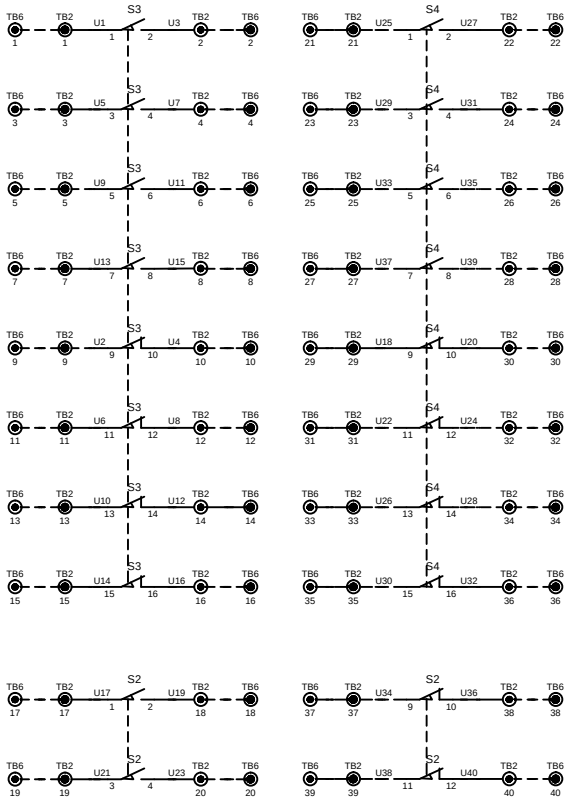
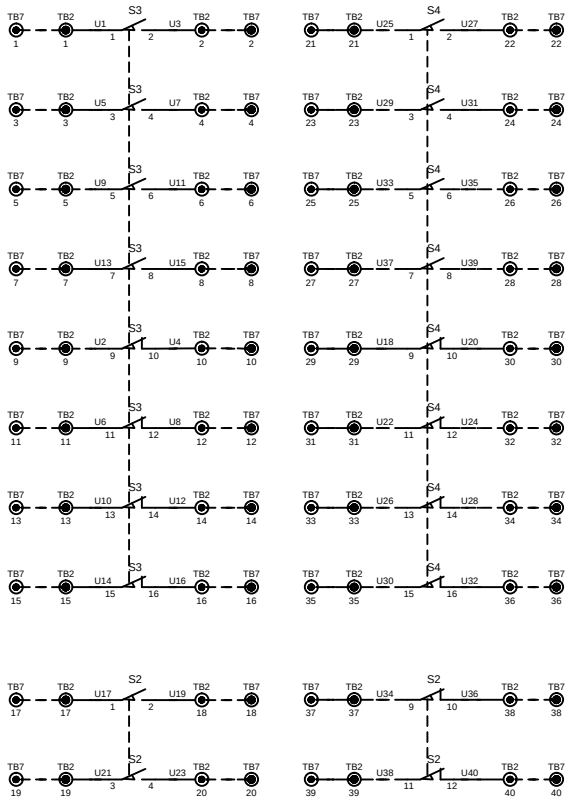
" MECHANISM - A " SPARE AUXILIARY CONTACTS



" MECHANISM - B " SPARE AUXILIARY CONTACTS



" MECHANISM - C " SPARE AUXILIARY CONTACTS



SPARE AUXILIARY CONTACTS	T&D Chennai India	3271005701ED316R01	REV	VER	PAGE
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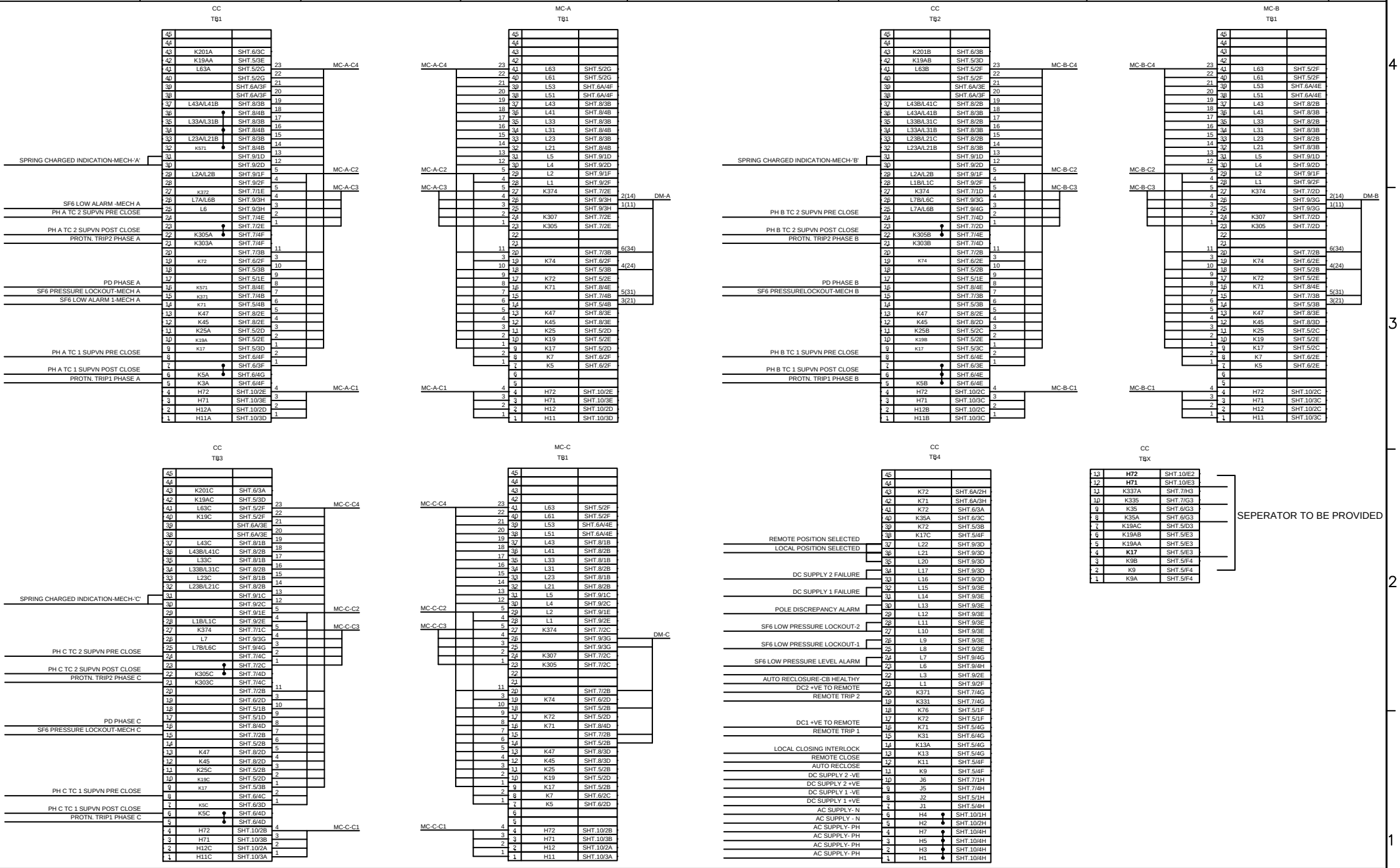

TERMINAL BLOCK DETAILS	T&D Chennai India	3271005701ED316R01	REV	VER	PAGE
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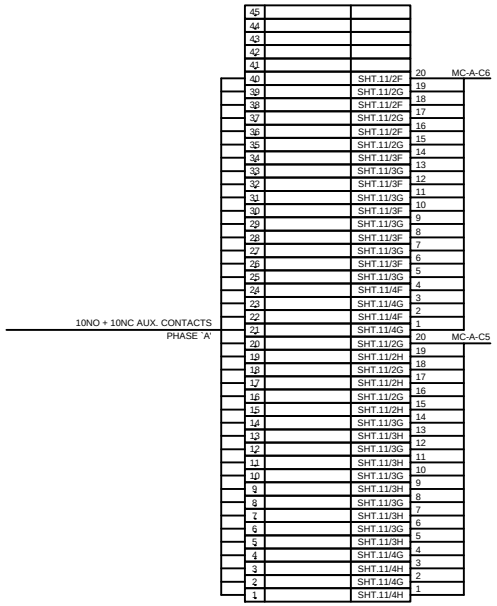
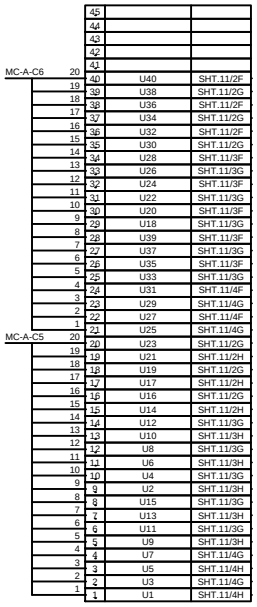
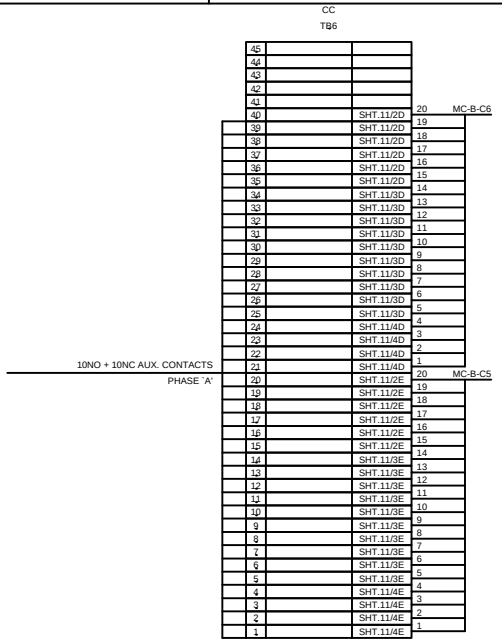
CC
TB5



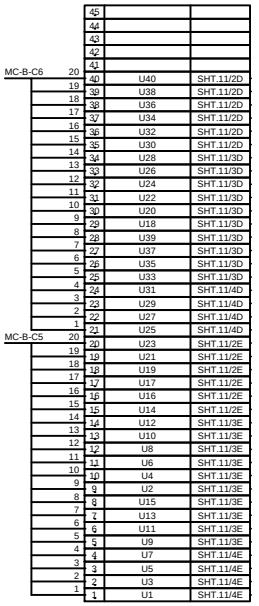
MC-A
TB2



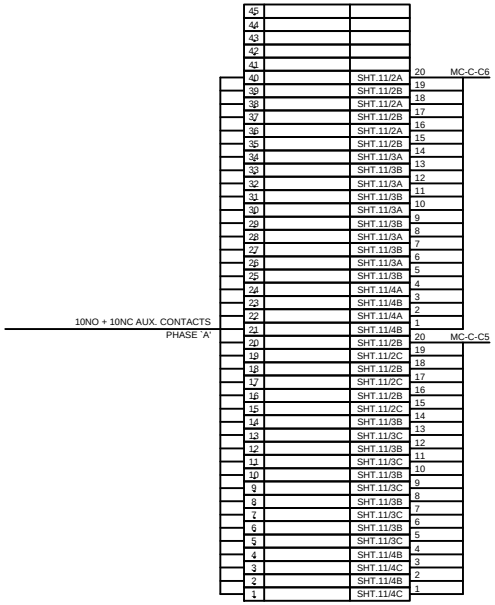
CC
TB6



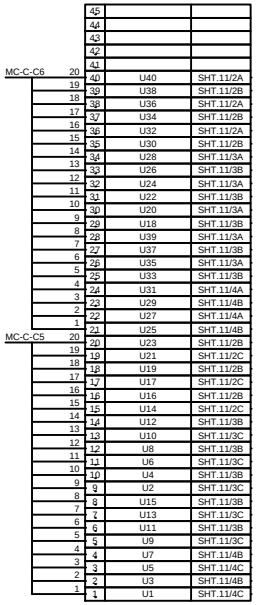
MC-B
TB2



CC
TB7



MC-C
TB2



NOTE:

CABLES ARE IN CB MANUFACTURER'S SCOPE OF SUPPLY

(LENGTH SHOWN ARE ONLY INDICATIVE)

CABLE `MC-A-C1,MC-A-C2,MC-A-C3
CABLE `MC-B-C1,MC-B-C2,MC-B-C3
CABLE `MC-C-C1,MC-C-C2,MC-C-C3
- 6 CORE ARMOURED 2.5SQ.MM CABLE (120 METERS)

CABLE `MC-A-C4,MC-B-C4,MC-C-C4
CABLE `MC-A-C5,MC-A-C6
CABLE `MC-B-C5,MC-B-C6
CABLE `MC-C-C5,MC-C-C6
- 24 CORE ARMOURED 2.5SQ.MM CABLE (120 METERS)

TERMINAL BLOCK DETAILS		T&D Chennai India	3271005701ED316R01	REV	VER	PAGE
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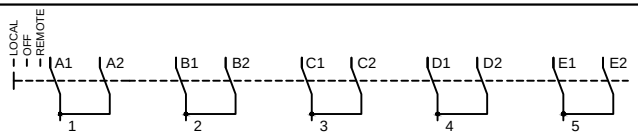
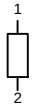
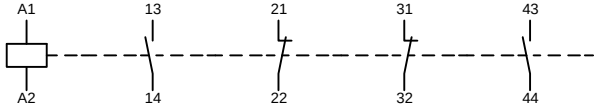
CABLENAME

SPECIFICATION	LOCAL-OFF-REMOTE NON LOCKABLE SWITCH,25 AMP, POLE:5								
MAKE	KAYCEE								
MODEL	5MD59BO								
TAG	DESCRIPTION	PANEL REF	HANDLE POLE	POLE	POLE	POLE	POLE	POLE	
43A	LOCAL / OFF / REMOTE SWITCH, POLE:5L+5R	CC	SHT.5/4G	SHT.6/3H	SHT.7/3G	SHT.9/3D	SHT.5/1F		
SPECIFICATION	BREAKER COIL 345W, 220V DC, 4W CONTINUOUS								
MAKE	GE								
MODEL	HEH4910211023								
TAG	DESCRIPTION	PANEL REF	COIL						
52CC	CLOSING COIL PHASE A	MC-A	SHT.5/2E						
52TC1	TRIP COIL 1 PHASE A	MC-A	SHT.6/2F						
52TC2	TRIP COIL 2 PHASE A	MC-A	SHT.7/2E						
52CC	CLOSING COIL PHASE B	MC-B	SHT.5/2E						
52TC1	TRIPPIING COIL 1 PHASE B	MC-B	SHT.6/2E						
52TC2	TRIPPIING COIL 2 PHASE B	MC-B	SHT.7/2D						
52CC	CLOSING COIL PHASE C	MC-C	SHT.5/2D						
52TC1	TRIPPIING COIL 1 PHASE C	MC-C	SHT.6/2D						
52TC2	TRIPPIING COIL 2 PHASE C	MC-C	SHT.7/2C						
SPECIFICATION	AUX.CONTACTOR 2NO+2NC 220V DC								
MAKE	SIEMENS								
MODEL	3RH21 22-1BM40								
TAG	DESCRIPTION	PANEL REF	COIL	NO	NC	NC	NO		
94A	CONTACTOR - ANTIPUMPING PHASE A	CC	SHT.5/1D	SHT.5/2D	SHT.5/3E	SHT.5/3F	SPARE		
94B	CONTACTOR - ANTIPUMPING PHASE B	CC	SHT.5/1C	SHT.5/2C	SHT.5/3E	SHT.5/3F	SPARE		
94C	CONTACTOR - ANTIPUMPING PHASE C	CC	SHT.5/1C	SHT.5/2C	SHT.5/3D	SHT.5/3F	SPARE		

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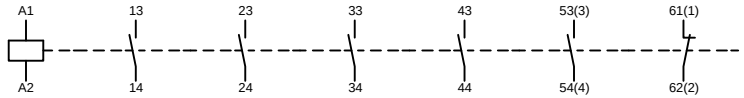
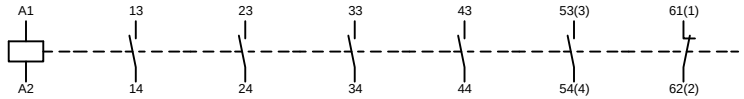
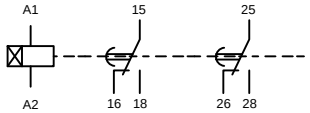
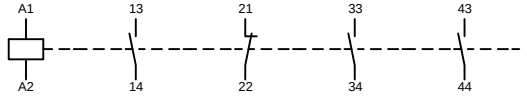
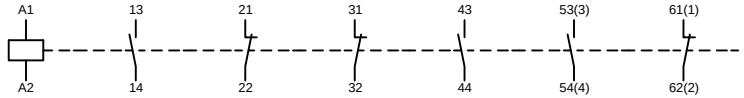
SPECIFICATION	AUX.CONTACTOR 4NO 220V DC									
MAKE	SIEMENS									
MODEL	3RH21 40-1BM40									
TAG	DESCRIPTION	PANEL REF	COIL	NO	NO	NO	NO	NO	NC	
A3	CONTACTOR - SF6 LOW PRESSURE LOCKOUT-1	CC	SHT.5/1B	SHT.5/3G	SHT.5/3F	SHT.6/3G	SHT.6/2G	SHT.9/1E	SHT.9/3E	
SPECIFICATION	AUX.CONTACTOR 4NO 220V DC									
MAKE	SIEMENS									
MODEL	3RH21 40-1BM40									
TAG	DESCRIPTION	PANEL REF	COIL	NO	NO	NO	NO	NO	NC	
A8	CONTACTOR - SF6 LOW PRESSURE LOCKOUT-2	CC	SHT.7/1B	SHT.5/3G	SHT.7/2G	SHT.7/1E	SHT.5/3F	SHT.9/2E	SHT.9/3E	
SPECIFICATION	TIMING : 0.05-100 HR , 2CO, 24-220V AC/DC									
MAKE	SIEMENS									
MODEL	3RP15 25-1BW30									
TAG	DESCRIPTION	PANEL REF	TIMER	C/O	C/O					
A5	PHASE DISCREPANCY TIMER	CC	SHT.8/1E	SHT.8/4C	SPARE					
SPECIFICATION	AUX.CONTACTOR 3NO+1NC 220V DC									
MAKE	SIEMENS									
MODEL	3RH21 31-1BM40									
TAG	DESCRIPTION	PANEL REF	COIL	NO	NC	NO	NO			
A4	CONTACTOR - SF6 LOW PRESSURE LOCKOUT-1	CC	SHT.5/1A	SHT.6/4F	SPARE	SHT.6/4E	SHT.6/4D			
A6	CONTACTOR - TRIP 1	CC	SHT.6/1G	SHT.6/4F	SPARE	SHT.6/4E	SHT.6/4D			
A7	CONTACTOR - TRIP 2	CC	SHT.7/2G	SHT.7/3E	SPARE	SHT.7/3D	SHT.7/3C			
A9	CONTACTOR - PHASE DISCREPANCY	CC	SHT.8/1C	SHT.6/3G	SPARE	SHT.7/3F	SHT.9/3E			
A12	CONTACTOR - SF6 LOW PRESSURE LOCKOUT-2	CC	SHT.7/1B	SHT.7/3F	SHT.9/3E	SHT.7/3D	SHT.7/3C			
SPECIFICATION	AUX.CONTACTOR 2NO+2NC 220V DC									
MAKE	SIEMENS									
MODEL	3RH21 22-1BM40									
TAG	DESCRIPTION	PANEL REF	COIL	NO	NC	NC	NO	NO	NC	
A10	CONTACTOR - DC SUPPLY 1 SUPERVISION	CC	SHT.8/2G	SHT.8/4G	SHT.8/4G	SHT.8/1G	SHT.8/1G	SPARE	SHT.9/3E	

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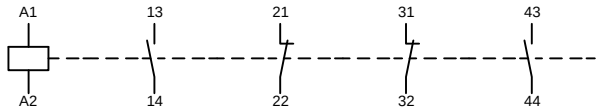
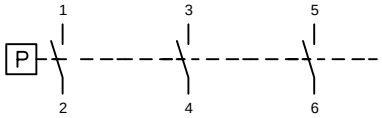
SPECIFICATION	AUX.CONTACTOR 2NO+2NC 220V DC							
MAKE	SIEMENS							
MODEL	3RH21 22-1BM40							
TAG	DESCRIPTION	PANEL REF	COIL	NO	NC	NC	NO	
A11	CONTACTOR - DC SUPPLY 2 SUPERVISION	CC	SHT.7/2A	SPARE	SHT.9/3D	SPARE	SPARE	
SPECIFICATION	CDL4U WITH 1.5KE 400A DIODE							
MAKE	CONNECTWELL							
MODEL	CDL4U + 1.5KE 400A DIODE							
TAG	DESCRIPTION	PANEL REF						
D1	RPH DIODE	CC	SHT.5/3E					
D2	RPH DIODE	CC	SHT.5/3E					
D3	RPH DIODE	CC	SHT.5/3D					
D4	RPH DIODE	CC	SHT.6/3C					
D5	RPH DIODE	CC	SHT.6/3B					
D6	RPH DIODE	CC	SHT.6/3A					
SPECIFICATION	DENSIMETER 3NO (P1- ALARM & P2- LOCKOUT)							
MAKE	WIKA							
MODEL	233.52.100-7149721							
TAG	DESCRIPTION	PANEL REF	NO	NO	NO			
DMA	DENSITY MONITOR	MC-A	SHT.9/3H	SHT.5/4B	SHT.7/4B			
DMB	DENSITY MONITOR	MC-B	SHT.9/3G	SHT.5/3B	SHT.7/3B			
DMC	DENSITY MONITOR	MC-C	SHT.9/3G	SHT.5/2B	SHT.7/2B			

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SPECIFICATION	DOOR SWITCH NORMALLY CLOSED 2A				
MAKE	SURAJ				
MODEL	DS				
TAG	DESCRIPTION	PANEL REF			
DS	DOOR SWITCH	CC		SHT.10/3E	
DS	MECHANISM A DOOR SWITCH	MC-A		SHT.10/3E	
DS	MECHANISM B DOOR SWITCH	MC-B		SHT.10/3C	
DS	MECHANISM C DOOR SWITCH	MC-C		SHT.10/3B	
SPECIFICATION	HEATER 60W, 230V AC				
MAKE	APT				
MODEL	Mk II A				
TAG	DESCRIPTION	PANEL REF			
H	PANEL HEATER	CC		SHT.10/3E	
H	MECHANISM A HEATER	MC-A		SHT.10/3D	
H	MECHANISM B HEATER	MC-B		SHT.10/3C	
H	MECHANISM C HEATER	MC-C		SHT.10/3B	
SPECIFICATION	11W, 230V AC, CFL,MODEL : B22				
MAKE	PHILIPS				
MODEL	11W, 230V AC, CFL,MODEL : B22				
TAG	DESCRIPTION	PANEL REF			
IL	CUBICLE ILLUMINATION LAMP	CC		SHT.10/3E	
IL	MECHANISM A CUBICLE ILLUMINATION LAMP	MC-A		SHT.10/3E	
IL	MECHANISM B CUBICLE ILLUMINATION LAMP	MC-B		SHT.10/3C	
IL	MECHANISM C CUBICLE ILLUMINATION LAMP	MC-C		SHT.10/3B	
SPECIFICATION	LED RED 220V DC				
MAKE	TEKNIC				
MODEL	3PLBR4L-220VDC				
TAG	DESCRIPTION	PANEL REF			
IL1	INDICATION LAMP - CB CLOSED	CC		SHT.8/1B	

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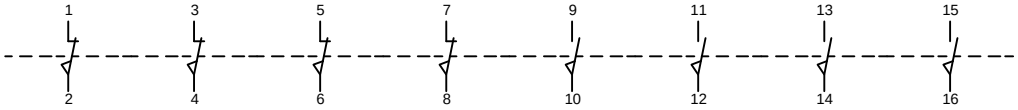
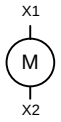
SPECIFICATION	LED GREEN 220V DC											
MAKE	TEKNIC												
MODEL	3PLBR3L-220VDC												
TAG	DESCRIPTION	PANEL REF											
IL2	INDICATION LAMP - CB TRIPPED	CC		SHT.8/1B									
SPECIFICATION	LED AMBER 220V DC											
MAKE	TEKNIC												
MODEL	3PLBR5L-220VDC												
TAG	DESCRIPTION	PANEL REF											
IL3	INDICATION LAMP - CB SPRING CHARGED	CC		SHT.8/1B									
SPECIFICATION	AUX. SWITCH CONTACTS: 4NO + 4NC, 15AMP											
MAKE	GE												
MODEL	JE4910510001-												
TAG	DESCRIPTION	PANEL REF		NC	NC	NC	NC	NO	NO	NO	NO		
LS	LIMIT SWITCH MACHANISM A	MC-A		SHT.8/4B	SHT.9/1C	SHT.9/1F	SHT.5/2E	SPARE	SPARE	SHT.10/3D	SHT.10/2D		
LS	LIMIT SWITCH MACHANISM B	MC-B		SHT.8/3B	SHT.9/1C	SHT.9/1E	SHT.5/2E	SPARE	SPARE	SHT.10/3C	SHT.10/2C		
LS	LIMIT SWITCH MACHANISM C	MC-C		SHT.8/2B	SHT.9/1C	SHT.9/1E	SHT.5/2D	SPARE	SPARE	SHT.10/3A	SHT.10/2A		
SPECIFICATION	220-250V AC/DC,700WATT											
MAKE	AGNI												
MODEL	HRCC4100029-2 (S310-220)												
TAG	DESCRIPTION	PANEL REF											
M	SPRING CHARGE MOTOR MECHANISM A	MC-A		SHT.10/3D									
M	SPRING CHARGE MOTOR MECHANISM B	MC-B		SHT.10/3C									
M	SPRING CHARGE MOTOR MECHANISM C	MC-C		SHT.10/3A									

SPECIFICATION	MCB AC 16A DP 10KA CURVE C				
MAKE	SCHNEIDER				
MODEL	XC60-A9N2P16C				
TAG	DESCRIPTION	PANEL REF	POLE 1	POLE 2	
MCB1	MCB - MOTOR SUPPLY - MECHANISM A	CC	SHT.10/4F	SHT.10/1F	
MCB2	MCB - MOTOR SUPPLY - MECHANISM B	CC	SHT.10/4F	SHT.10/1F	
MCB3	MCB - MOTOR SUPPLY - MECHANISM C	CC	SHT.10/4F	SHT.10/1F	
MCB4	CUBICLE ILLUMINATION AND HEATER MCB	CC	SHT.10/4F	SHT.10/2F	
SPECIFICATION	MCB DC 6A DP				
MAKE	SCHNEIDER				
MODEL	C60H-A9N61526				
TAG	DESCRIPTION	PANEL REF	POLE 1	POLE 2	
MCB5	MCB - DC SUPPLY 1	CC	SHT.5/4H	SHT.5/1H	
MCB6	MCB - DC SUPPLY 2	CC	SHT.7/4G	SHT.7/1G	
SPECIFICATION	BREAKER OPERATION COUNTER(RESETTABLE -6 DIGIT) - 220DC				
MAKE	GIC				
MODEL	CR-26_SD51A385				
TAG	DESCRIPTION	PANEL REF	COIL		
OC-A	OPERATION COUNTER - PHASE A	CC	SHT.5/2G		
OC-B	OPERATION COUNTER - PHASE B	CC	SHT.5/2F		
OC-C	OPERATION COUNTER - PHASE C	CC	SHT.5/2F		
SPECIFICATION	PUSHBUTTON GREEN +1NO BLOCK				
MAKE	SIEMENS				
MODEL	3SB50 00-0AE01+3SB54 00-0B				
TAG	DESCRIPTION	PANEL REF	PB NO	NO	
PBS1	PUSHBUTTON - CB CLOSE	CC	SHT.5/4G	SHT.5/1F	

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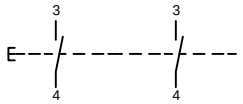
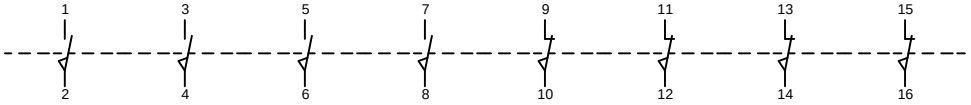
SPECIFICATION	PUSHBUTTON RED +1NO BLOCK													
MAKE	SIEMENS													
MODEL	3SB50 00-0AC01+3SB54 00-0B													
TAG	DESCRIPTION	PANEL REF	PB	NO	NO									
PBS2	PUSH BUTTON-CB TRIP	CC	SHT.6/4H	SHT.7/4G										
SPECIFICATION	6PIN, 5/15AMP													
MAKE	OSWAL													
MODEL	SKT													
TAG	DESCRIPTION	PANEL REF												
S	SOCKET WITH SWITCH	CC	SHT.10/3F											
SPECIFICATION	AUX. SWITCH CONTACTS: 4NO + 4NC, 15AMP													
MAKE	GE													
MODEL	JE4910510001													
TAG	DESCRIPTION	PANEL REF	NO	NO	NO	NO	NC	NC	NC	NC				
S1	AUXILIARY SWITCHS S1 MECHANISM A	MC-A	SHT.5/2D	SHT.6/2F	SHT.8/3E	SHT.8/4B	SHT.5/2E	SHT.6/2F	SHT.8/3E	SHT.8/4B				
S1	AUXILIARY SWITCHS S1 MECHANISM B	MC-B	SHT.5/2C	SHT.6/2E	SHT.8/3E	SHT.8/3B	SHT.5/2E	SHT.6/2E	SHT.8/3E	SHT.8/3B				
S1	AUXILIARY SWITCHS S1 MECHANISM C	MC-C	SHT.5/2B	SHT.6/2D	SHT.8/3D	SHT.8/2B	SHT.5/2D	SHT.6/2C	SHT.8/3D	SHT.8/2B				
S2	AUXILIARY SWITCHS S2 MECHANISM A	MC-A	SHT.11/2H	SHT.11/2H	SHT.7/2E	SHT.6A/4F	SHT.11/2G	SHT.11/2G	SHT.7/2E	SHT.5/2G				
S2	AUXILIARY SWITCHS S2 MECHANISM B	MC-B	SHT.11/2E	SHT.11/2E	SHT.7/2D	SHT.6A/4E	SHT.11/2D	SHT.11/2D	SHT.7/2D	SHT.5/2F				
S2	AUXILIARY SWITCHS S2 MECHANISM C	MC-C	SHT.11/2C	SHT.11/2C	SHT.7/2C	SHT.6A/4E	SHT.11/2B	SHT.11/2B	SHT.7/2C	SHT.5/2F				
S3	AUXILIARY SWITCHS S3 MECHANISM A	MC-A	SHT.11/4H	SHT.11/4H	SHT.11/3H	SHT.11/3H	SHT.11/3H	SHT.11/3H	SHT.11/3H	SHT.11/2H				
S3	AUXILIARY SWITCHS S3 MECHANISM B	MC-B	SHT.11/4E	SHT.11/4E	SHT.11/3E	SHT.11/3E	SHT.11/3E	SHT.11/3E	SHT.11/3E	SHT.11/2E				
S3	AUXILIARY SWITCHS S3 MECHANISM C	MC-C	SHT.11/4C	SHT.11/4C	SHT.11/3C	SHT.11/3C	SHT.11/3C	SHT.11/3C	SHT.11/3C	SHT.11/2C				
S4	AUXILIARY SWITCHS S4 MECHANISM A	MC-A	SHT.11/4G	SHT.11/4G	SHT.11/3G	SHT.11/3G	SHT.11/3G	SHT.11/3G	SHT.11/3G	SHT.11/2G				
S4	AUXILIARY SWITCHS S4 MECHANISM B	MC-B	SHT.11/4D	SHT.11/4D	SHT.11/3D	SHT.11/3D	SHT.11/3D	SHT.11/3D	SHT.11/3D	SHT.11/2D				
S4	AUXILIARY SWITCHS S4 MECHANISM C	MC-C	SHT.11/4B	SHT.11/4B	SHT.11/3B	SHT.11/3B	SHT.11/3B	SHT.11/3B	SHT.11/3B	SHT.11/2B				

SPECIFICATION	THERMOSTAT 20deg. TO 80deg. C		1		
MAKE	GIRISHECO				
MODEL	DLX-5		2		
TAG	DESCRIPTION	PANEL REF			
TH	CUBICLE THERMOSTAT	CC		SHT.10/3E	
TH	MECHANISM A THERMOSTAT	MC-A		SHT.10/3D	
TH	MECHANISM B THERMOSTAT	MC-B		SHT.10/3C	
TH	MECHANISM C THERMOSTAT	MC-C		SHT.10/3B	

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3	3271005701GA316R01	3 OF 18	FOUNDATION PLAN	17.07.2019	ORIGINAL ISSUE				
4	3271005701GA316R01	4 OF 18	SUPPORT STRUCTURE	17.07.2019	ORIGINAL ISSUE				
5	3271005701GA316R01	5 OF 18	MECHANISM CUBICLE	17.07.2019	ORIGINAL ISSUE				
6	3271005701GA316R01	6 OF 18	CONTROL CUBICLE	17.07.2019	ORIGINAL ISSUE				
7	3271005701GA316R01	7 OF 18	EQUIPMENT LAYOUT OF MECHANISM CUBICLE	17.07.2019	ORIGINAL ISSUE				
8	3271005701GA316R01	8 OF 18	EQUIPMENT LAYOUT OF CONTROL CUBICLE	17.07.2019	ORIGINAL ISSUE				
9	3271005701GA316R01	9 OF 18	INTERRUPTER INSULATOR	17.07.2019	ORIGINAL ISSUE				
10	3271005701GA316R01	10 OF 18	CROSS SECTIONAL VIEW OF INTERRUPTER	17.07.2019	ORIGINAL ISSUE				
11	3271005701GA316R01	11 OF 18	SUPPORT INSULATOR	17.07.2019	ORIGINAL ISSUE				
12	3271005701GA316R01	12 OF 18	CORONA CAP	17.07.2019	ORIGINAL ISSUE				
13	3271005701GA316R01	13 OF 18	SF6 GAS LINE DIAGRAM	17.07.2019	ORIGINAL ISSUE				
14	3271005701GA316R01	14 OF 18	PLATFORM/LADDER ASSEMBLY	17.07.2019	ORIGINAL ISSUE				
15	3271005701GA316R01	15 OF 18	TRANSDUCER MOUNTING DETAILS	17.07.2019	ORIGINAL ISSUE				
16	3271005701GA316R01	16 OF 18	CROSS SECTIONAL VIEW OF OPERATING MECHANISM	17.07.2019	ORIGINAL ISSUE				
17	3271005701GA316R01	17 OF 18	CROSS SECTIONAL VIEW OF INTERRUPTER (WITHOUT PIR)	17.07.2019	ORIGINAL ISSUE				
18	3271005701GA316R01	18 OF 18	CROSS SECTIONAL VIEW OF INTERRUPTER (WITH PIR)	17.07.2019	ORIGINAL ISSUE				

SALE ORDER NO.: 3271005701
TOTAL CB QTY
400KV, 3150A (W/O PIR & W/O CSD) - 05 Nos.
400KV, 3150A (W/O PIR & WITH CSD) - 06 Nos.

NTPC DRG. No. : 9962-001-TB-572-PVE-C-117 REV.: 0

VENDOR: GE T&D INDIA LIMITED, CHENNAI

PROJECT: 1 X 660MW PANKI THERMAL POWER EXTENSION PROJECT.

OWNER: UTTAR PRADESH RAJYA VIDYUT UTPADAN NIGAM LTD.

REVIEW CONSULTANT: NTPC LTD. (A GOVERNMENT OF INDIA ENTERPRISE)

CONSULTANT: DEVELOPMENT CONSULTANTS PVT. LTD. KOLKATA

EPC CONTRACTOR: BHARAT HEAVY ELECTRICALS LTD.

DOC NO. : TB-4-316-401-E01B

STATUS

DISTRIBUTION

REV.	DATE	ALTD	CHD	APPD

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA

DEPT CODE		NAME	SIGN	DATE
M	DRN	KS		17.07.19
	DESN	KS		17.07.19
	CHD	KS		17.07.19
	APPD	KPB		17.07.19

TITLE: CONTENTS OF GENERAL ARRANGEMENT

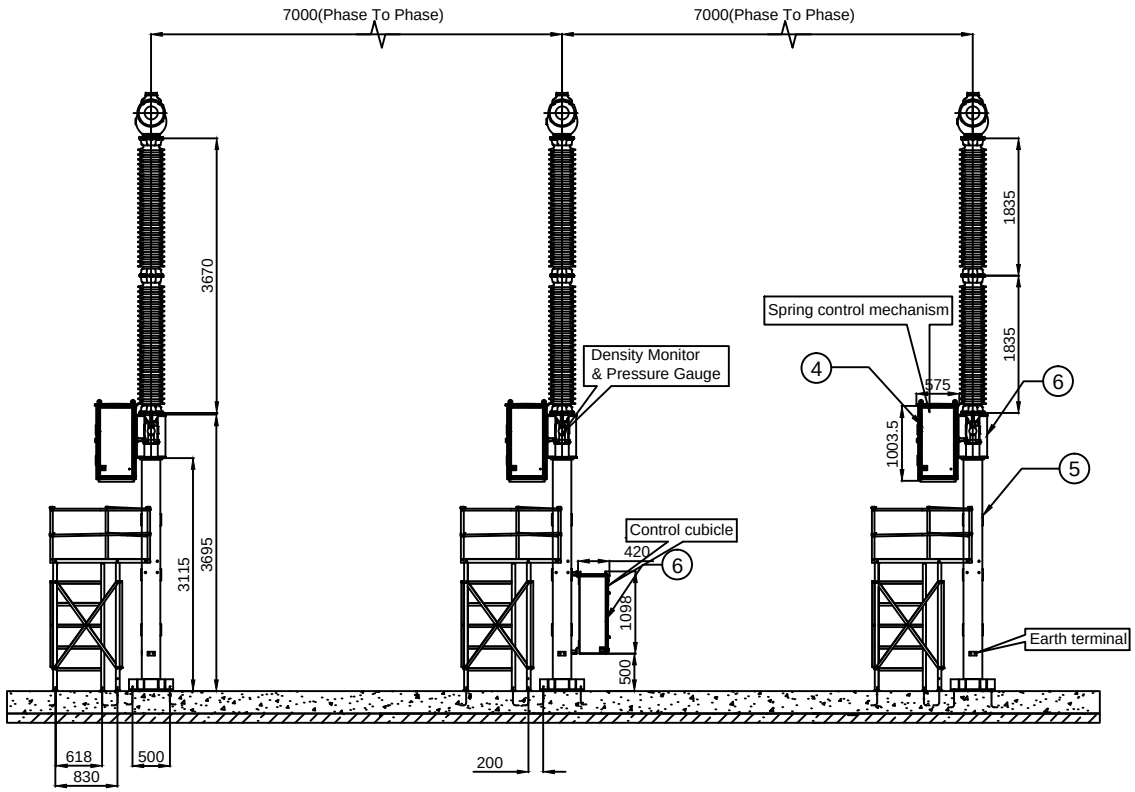
DEPT. SIGN SCALE : NTS

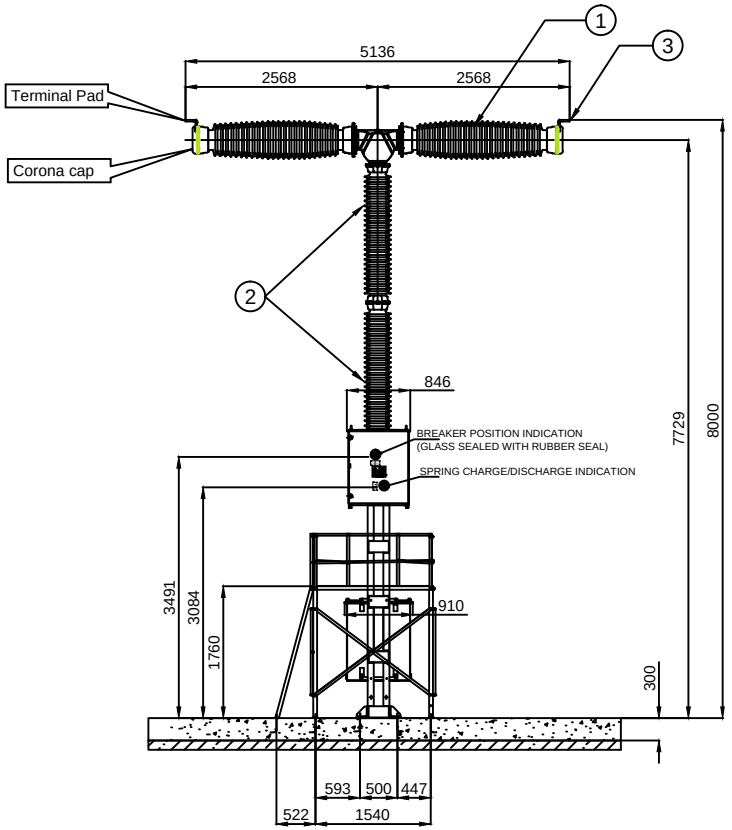
DRAWING NO. 3271005701GA316R01

SHEET : 1 OF 18 REV. : 0

ALL DIMENSIONS ARE IN MM

SCALE 50:1





PERMISSIBLE STRENGTH ON THE TERMINALS	
HORIZONTAL TENSILE STRENGTH	175 daN (≏178 Kgf)
TRANSVERSAL HORIZONTAL STRENGTH	125 daN (≏127 Kgf)
VERTICAL STRENGTH	150daN (153 kgf)
MASS OF AN INTERRUPTING PART (POLE COLUMN)	1290 kg
MASS OF THE ONE COMPLETE SUPPORT STRUCTURE	300 kg
MASS OF ONE COMPLETE MECHANISM	200 kg
MASS OF CONTROL CUBICLE	150 kg
MASS OF CIRCUIT BREAKER (WITHOUT SUPPORT STRUCTURE)	4470 kg
MASS OF CIRCUIT BREAKER (WITH SUPPORT STRUCTURE)	5370 kg

MAXIMUM STATIC & DYNAMIC LOADS	
UPWARD F2	0 daN (≏ 0 Kgf)
DOWNWARD F1	3170 daN (≏3230 Kgf)
CREEPAGE DISTANCE TO EARTH IN mm	13020 mm(Min.)
CREEPAGE DISTANCE BETWEEN TERMINAL IN mm	13020 mm(Min.)

NOTES :

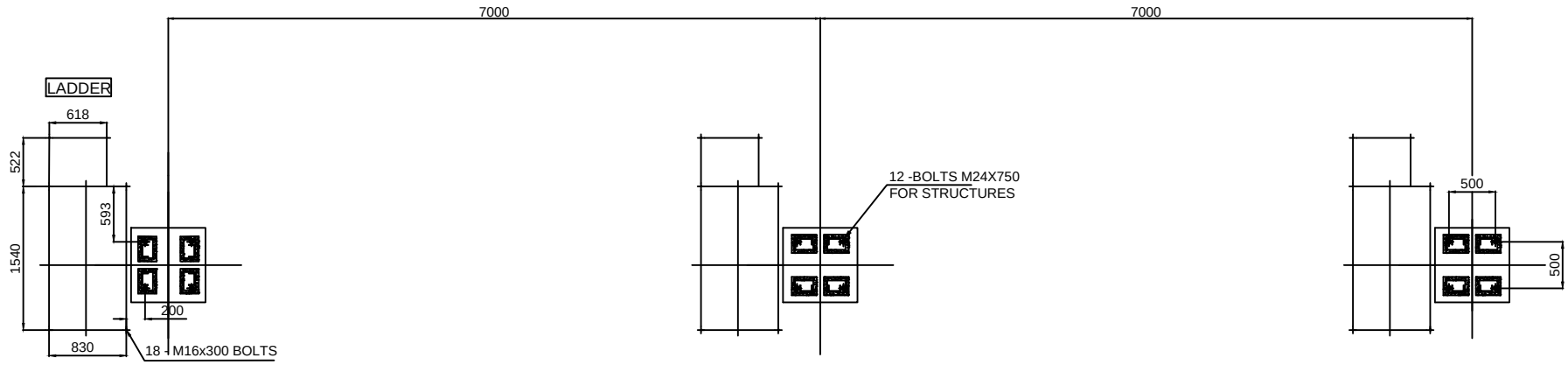
1. SUPPORT STRUCTURE SHALL BE GALVANISED TO 610g/SQ.M/ 85 Micron
2. TERMINAL CONNECTORS ARE NOT IN CB MANUFACTURER SCOPE OF SUPPLY

SL. NO.	DESCRIPTION	MATERIAL
1	INTERRUPTER CHAMBER	PORCELAIN
2	SUPPORT INSULATOR	PORCELAIN
3	TERMINAL PAD	ALUMINIUM ALLOY
4	MECHANISM CUBICLE	CR SHEET
5	SUPPORT STRUCTURE	STRUCTURAL STEEL AS PER IS 2062
6	CONTROL CUBICLE	CR SHEET

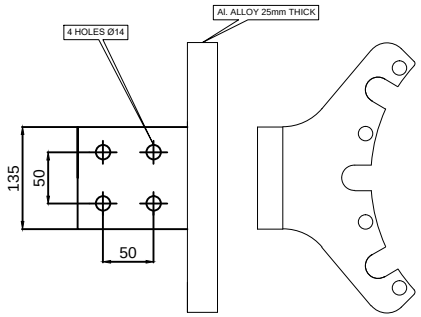
OUTLINE AND GENERAL ARRANGEMENT	T&D Chennai India	3271005701GA316R01	REV	VER	PAGE
			0	1	2 / 18

ALL DIMENSIONS ARE IN MM
SCALE 35:1

FOUNDATION PLAN (NOT IN CB MANUFACTURER'S SCOPE OF WORK)



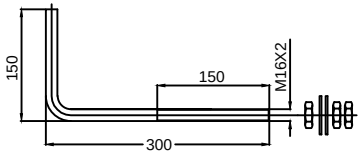
TERMINAL PAD DETAILS



TERMINAL PAD DETAILS

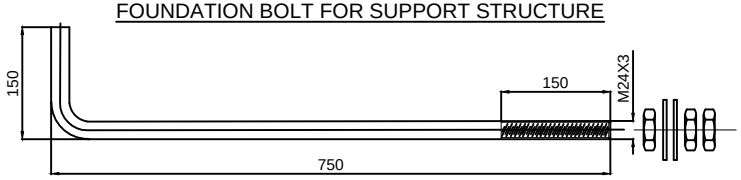
SCALE 5:1

FOUNDATION BOLT FOR PLATFORM



SCALE 5:1

FOUNDATION BOLT FOR SUPPORT STRUCTURE

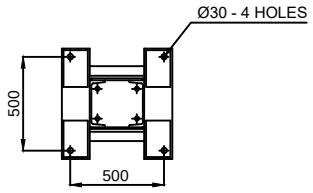


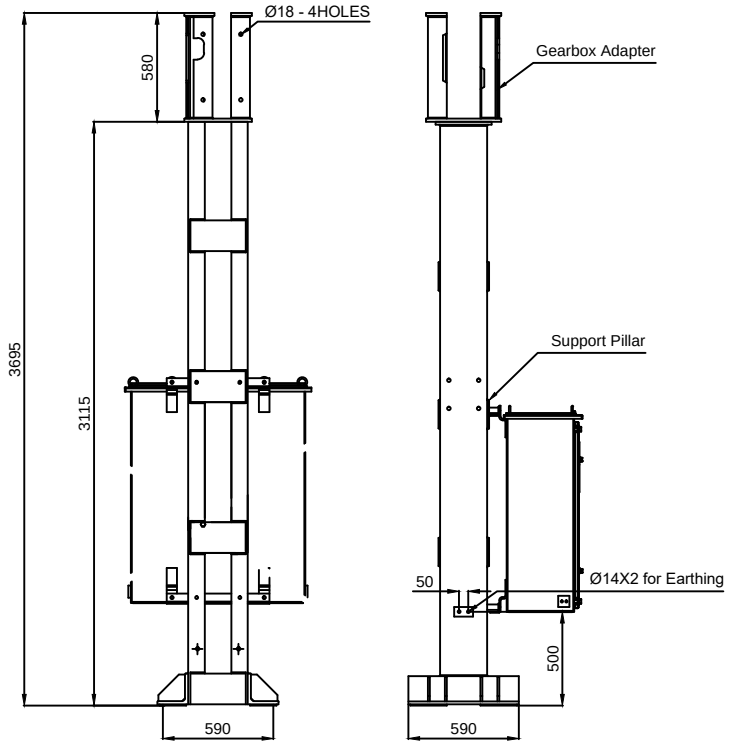
SCALE 5:1

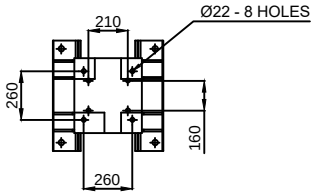
FOUNDATION PLAN		T&D Chennai India	3271005701GA316R01	REV	VER	PAGE
				0	1	3/18

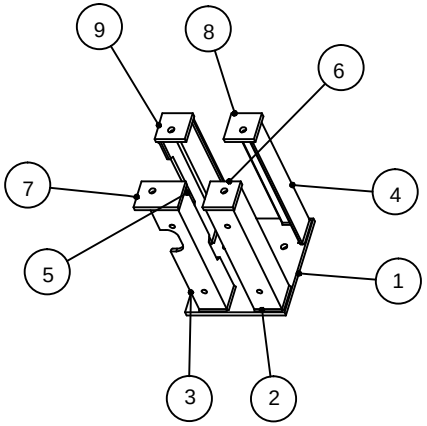
ALL DIMENSIONS ARE IN MM

SCALE 20:1

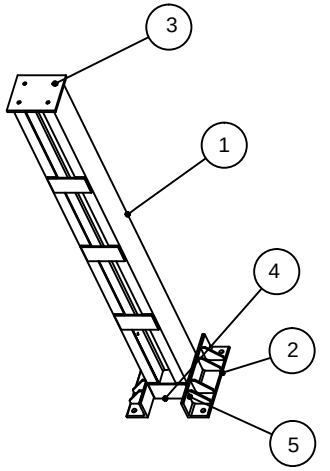








Sl No	Dwg No	Size	Material	Qty
9	HRCC4100010_P9	□ 110×110×16	IS2062:2006-E250-Fe410W (B or C)	1
8	HRCC4100010_P8	□ 110×110×16	IS2062:2006-E250-Fe410W (B or C)	1
7	HRCC4100010_P7	□ 160×110×16	IS2062:2006-E250-Fe410W (B or C)	1
6	HRCC4100010_P6	□ 110×110×16	IS2062:2006-E250-Fe410W (B or C)	1
5	HRCC4100010_P5	∠ 100×100×12	IS2062:2006-E250-Fe410W (B or C)	1
4	HRCC4100010_P4	∠ 100×100×12	IS2062:2006-E250-Fe410W (B or C)	1
3	HRCC4100010_P3	∠ 100×100×12	IS2062:2006-E250-Fe410W (B or C)	1
2	HRCC4100010_P2	∠ 100×100×12	IS2062:2006-E250-Fe410W (B or C)	1
1	HRCC4100010_P1	□ 400×360×16	IS2062:2006-E250-Fe410W (B or C)	1



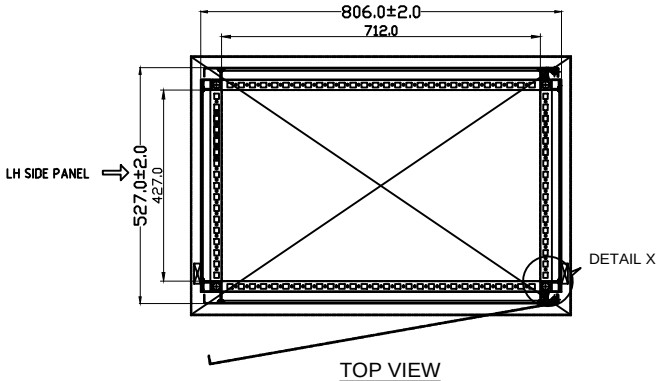
Sl No	Dwg No	Size	Material	Qty
5	HRCC4100009_P5	□129×129×10	IS2062:2006-E250-Fe410W (B or C)	8
4	HRCC4100009_P4	□270×150×10	IS2062:2006-E250-Fe410W (B or C)	8
3	HRCC4100009_P3	□350×300×16	IS2062:2006-E250-Fe410W (B or C)	1
2	HRCC4100009_P2	◿150×150×16	IS2062:2006-E250-Fe410W (B or C)	2
1	HRCC4100009_P1	⌊250 ISMC	IS2062:2006-E250-Fe410W (B or C)	2

1- Hot dip galvanising Zn 50 (III) - (P)
Average mass of coating - 610 g/m2
Average thickness of coating - 85 microns

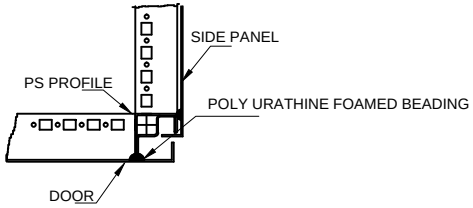
2- Weight - 280 + 60 Kg

SUPPORT STRUCTURE	T&D Chennai India	3271005701GA316R01	REV	VER	PAGE
			0	1	4 / 18

ALL DIMENSIONS ARE IN MM



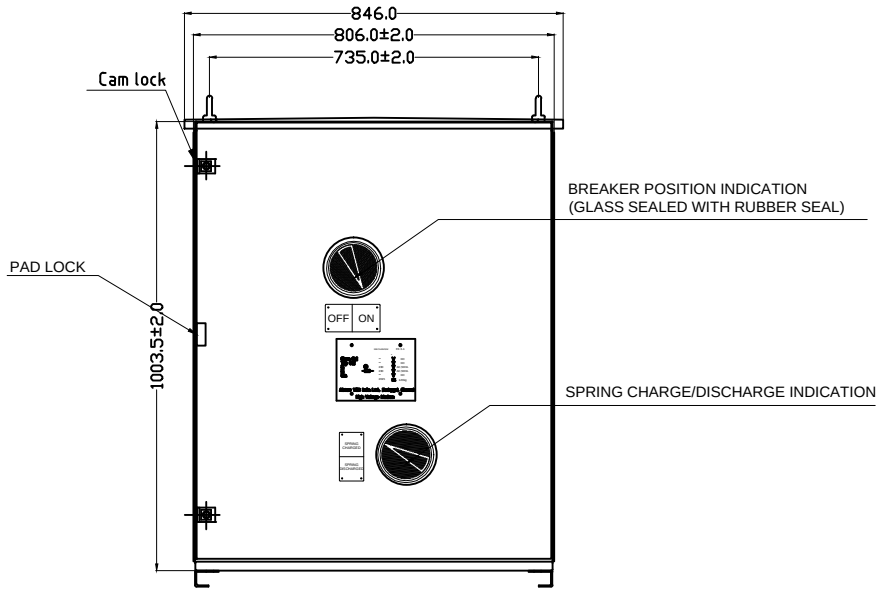
TOP VIEW



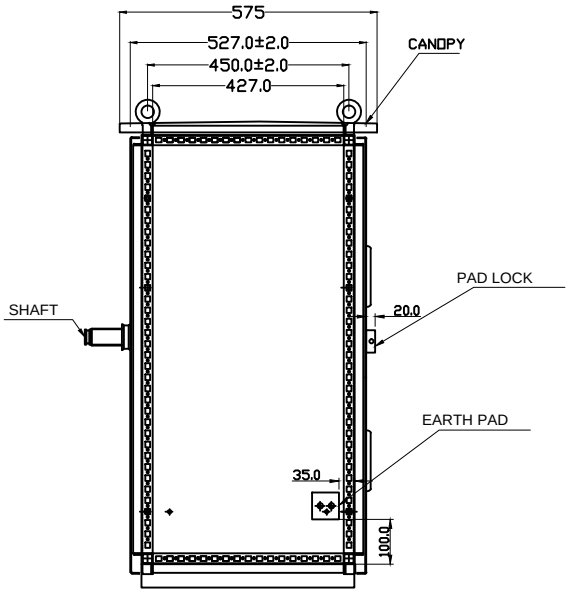
DETAIL "X"

NOTES :

1. CUBICLE SHEET THICKNESS SHALL BE OF 2mm CR SHEET
2. PAINT SHADE FOR
   EXTERIOR : RAL 7032
   INTERIOR : RAL 7032
3. INGRESS PROTECTION : IP 55
4. 1 No. OF UNDRILLED GLAND PLATE WILL BE PROVIDED

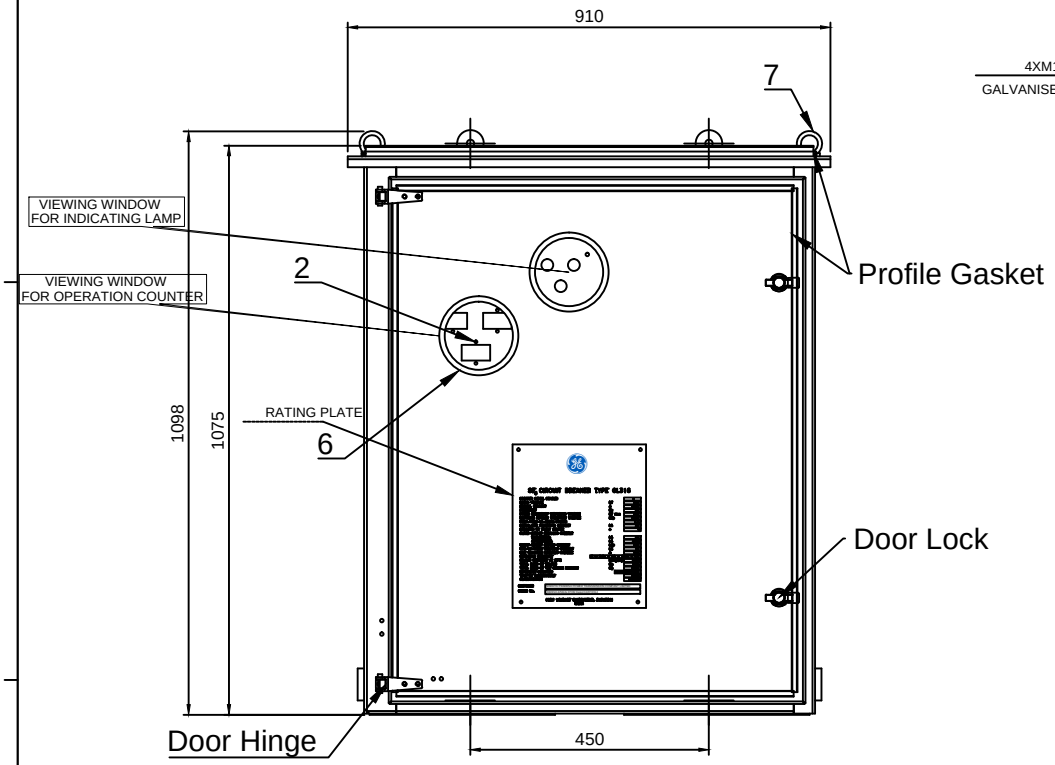


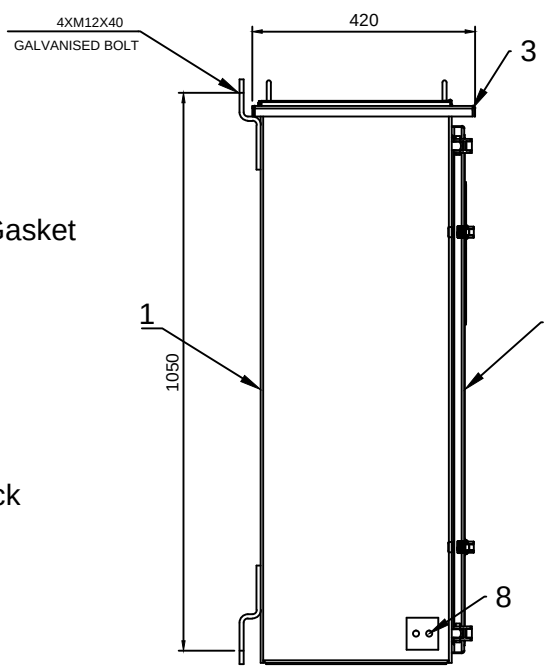
FRONT VIEW

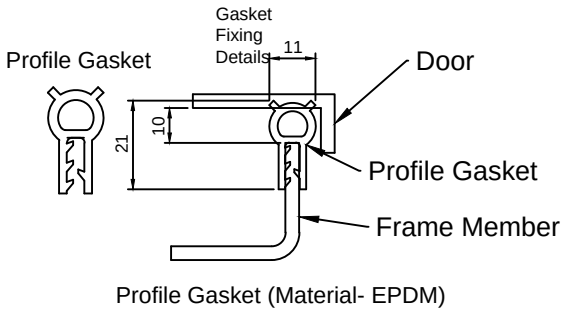


SIDE VIEW

MECHANISM CUBICLE		T&D Chennai India	3271005701GA316R01	REV	VER	PAGE
				0	1	5/18

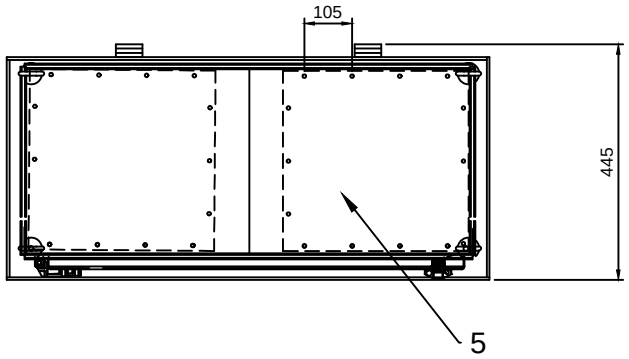






Profile Gasket (Material- EPDM)

Item no.	Description	DRG No.	Qty.
8	Location for Earthing		
7	I Bolt		4
6	View Glass Beeding	48.120.483	2
5	Cable Tray	HRCC4100054-P14	2
4	Front Door Assy	HRCC4100054-A4	1
3	Top Cover Assy	HRCC4100054-A3	1
2	Component Door Assy	HRCC4100054-A2	1
1	Box Body	HRCC4100054-A1	1

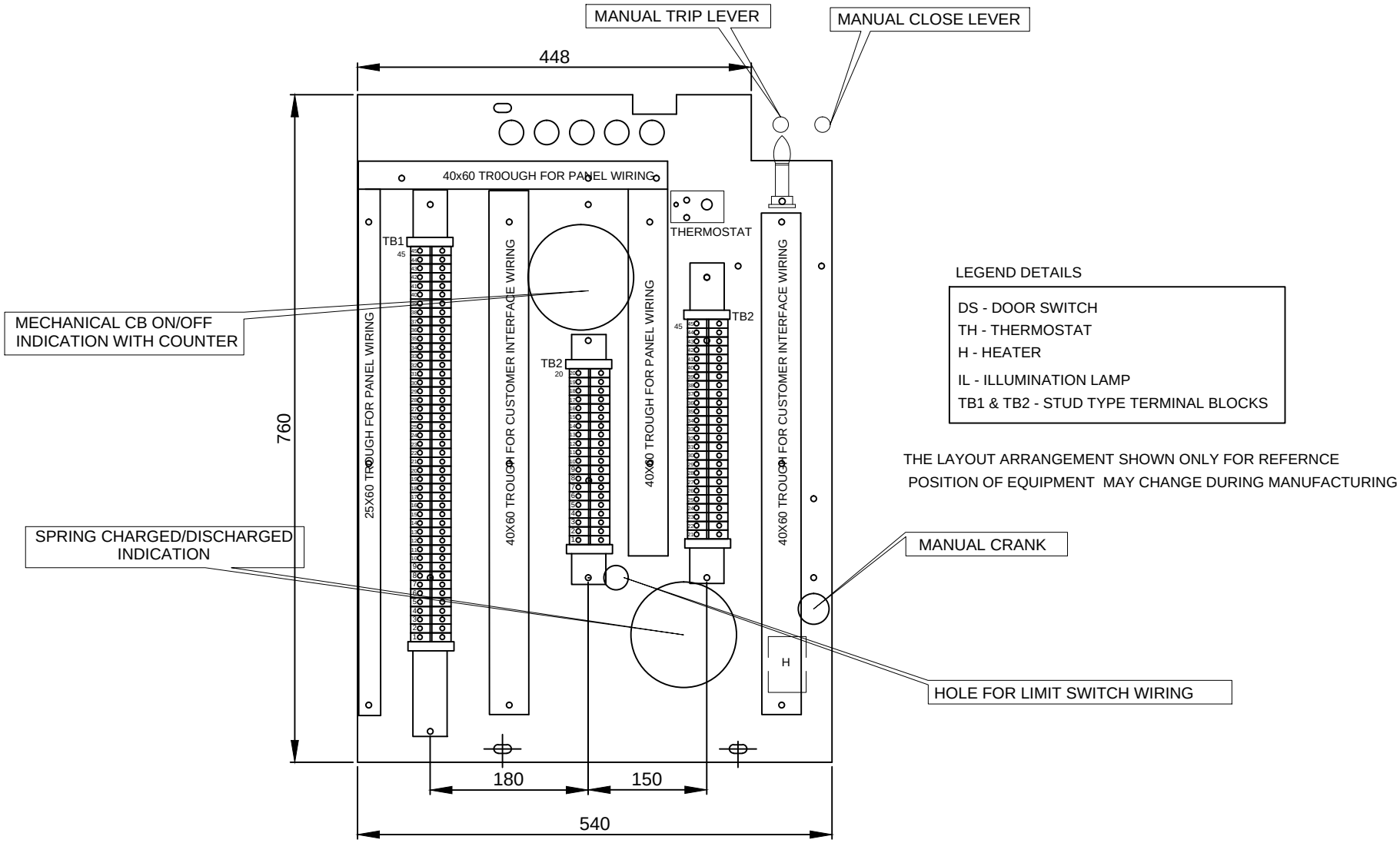


NOTES :

1. CUBICLE SHEET THICKNESS SHALL BE OF 2mm CR SHEET
2. PAINT SHADE FOR
   EXTERIOR : RAL 7032
   INTERIOR : RAL 7032
3. INGRESS PROTECTION : IP 55
4. 2 Nos. OF UNDRILLED GLAND PLATES OF SIZE 240 x 390, 3 mm CR THICK WILL BE PROVIDED
5. EARTH PAD WILL BE PROVIDED

CONTROL CUBICLE	T&D Chennai India	3271005701GA316R01	REV	VER	PAGE
			0	1	6/18

ALL DIMENSIONS ARE IN MM



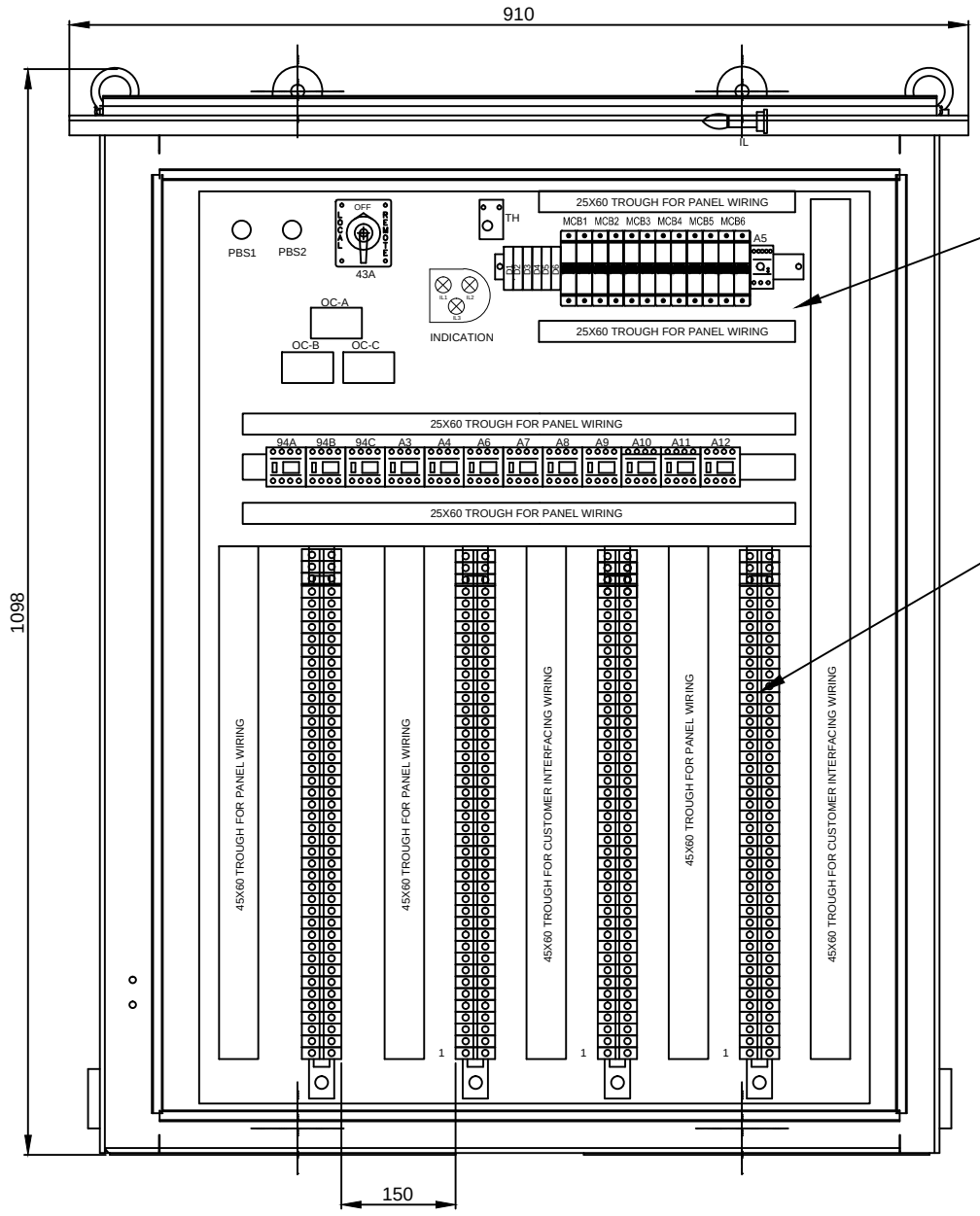
LEGEND DETAILS

DS - DOOR SWITCH
TH - THERMOSTAT
H - HEATER
IL - ILLUMINATION LAMP
TB1 & TB2 - STUD TYPE TERMINAL BLOCKS

THE LAYOUT ARRANGEMENT SHOWN ONLY FOR REFERNCE
POSITION OF EQUIPMENT MAY CHANGE DURING MANUFACTURING

EQUIPMENT LAYOUT OF MECHANISM CUBICLE		T&D Chennai India	3271005701GA316R01	REV	VER	PAGE
				0	1	7/18

ALL DIMENSIONS ARE IN MM

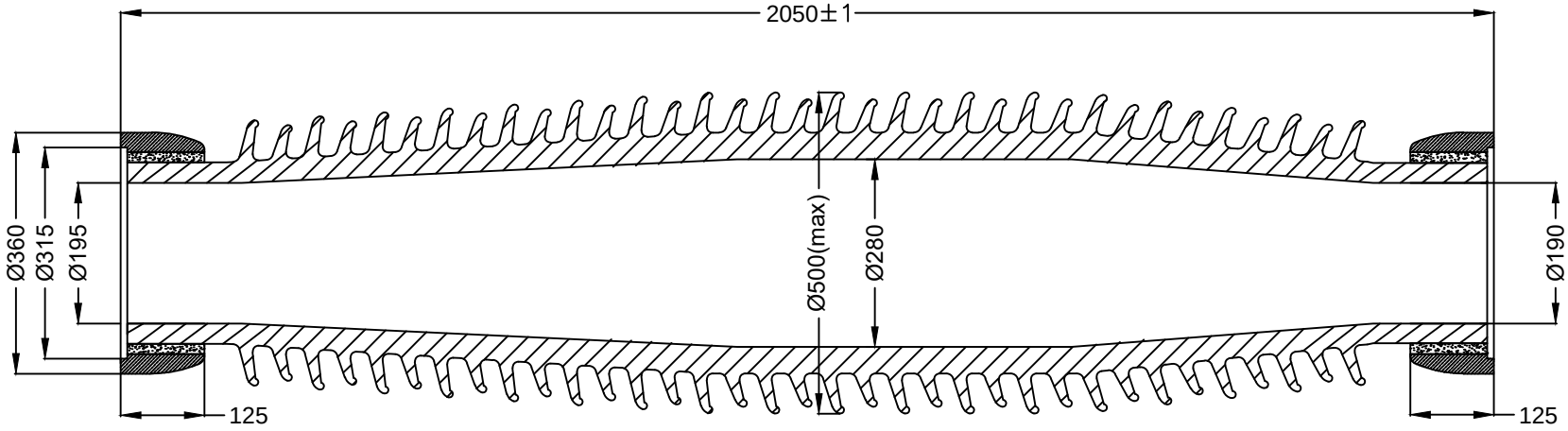


NOTE :

HEATER & SOCKET MOUNTED AT THE LEFT SIDE OF THE CONTROL CUBICLE
SEPERATOR PROVIDED BETWEEN AC & DC TERMINALS
THE LAYOUT ARRANGEMENT SHOWN ONLY FOR REFERNCE
POSITION OF EQUIPMENTS MAY CHANGE DURING MANUFACTURING

EQUIPMENT LAYOUT OF CONTROL CUBICLE		T&D Chennai India	3271005701GA316R01	REV	VER	PAGE
				0	1	8/18

ALL DIMENSIONS ARE IN MM

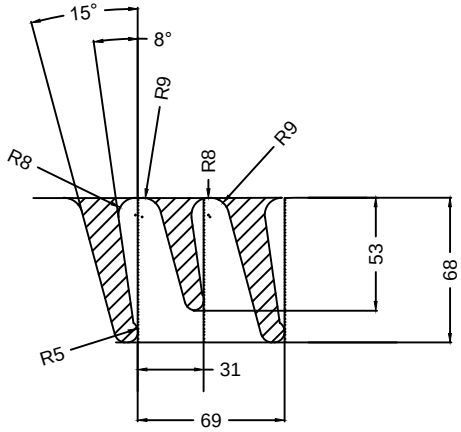


MECHANICAL CHARACTERISTICS:

1	BENDING STRENGTH, Kgm	:	2000
2	HYDRAULIC PRESSURE TEST (routine), bar for 1 min.	:	30
3	DESIGN PRESSURE (in bar)	:	10

ELECTRICAL CHARACTERISTICS:

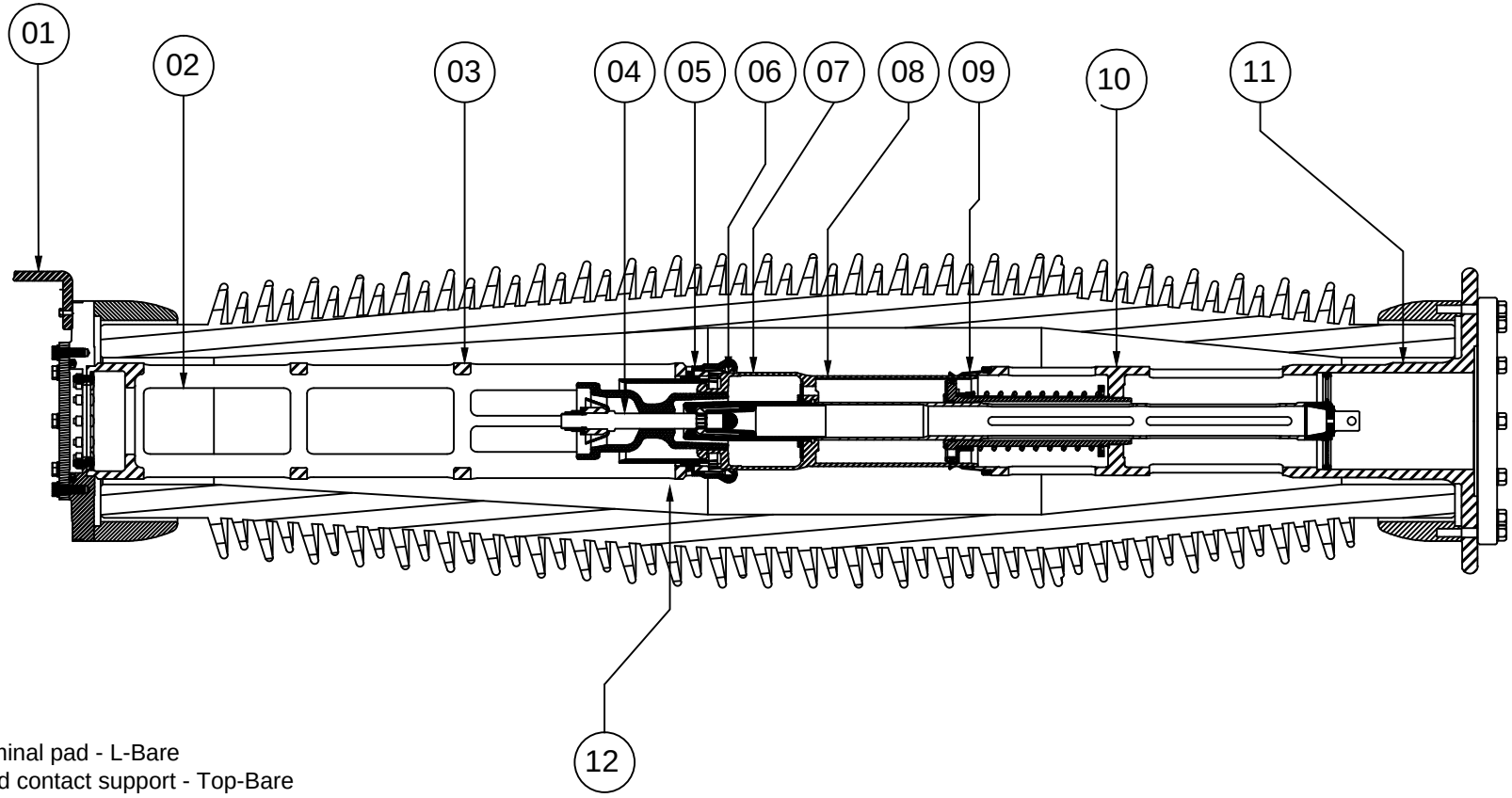
1	1 min. P.F. WITHSTAND VOLTAGE, kV rms :	:	460
2	LIGHTNING IMPULSE WITHSTAND VOLTAGE, kV peak	:	1050
3	CREEPAGE DISTANCE, mm	:	6740



SCALE : 3 : 1

SHED PROFILE (As per IEC–815)

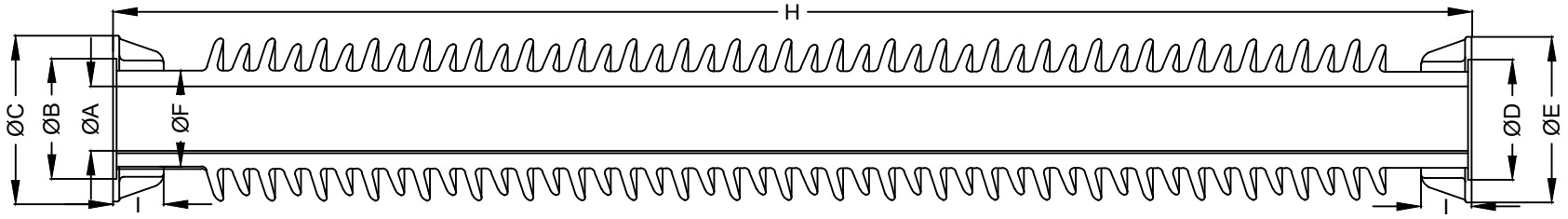
INTERRUPTER INSULATOR	T&D Chennai India	3271005701GA316R01	REV 0	VER 1	PAGE 9/18



01. Terminal pad - L-Bare
02. Fixed contact support - Top-Bare
03. Fixed contact support - Bottom-Bare
04. Fixed Arcing contact
05. Fixed contact ring
06. Fixed contact (kept very near the crown)
07. Moving Cylinder - Top- Plated
08. Moving Cylinder - Middle- Plated
09. Mobile contact (crown)
10. Mobile contact support - Top- Bare
11. Mobile contact support - Bottom- Bare
12. SF6 Gas

CROSS SECTIONAL VIEW OF INTERRUPTER		T&D Chennai India	3271005701GA316R01	REV	VER	PAGE
				0	1	10/18

ALL DIMENSIONS ARE IN MM



TOP/BOTTOM INSULATOR

MECHANICAL CHARACTERISTICS:

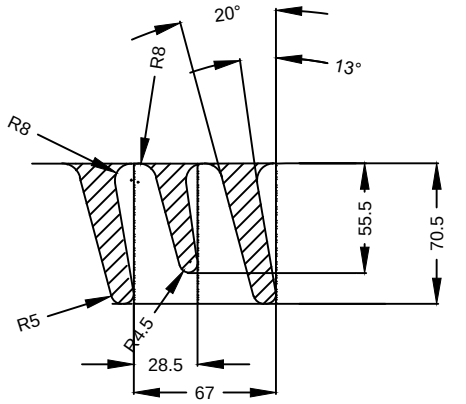
1 BENDING STRENGTH, Kgm (AT BASE)
2 HYDRAULIC PRESSURE TEST (routine), bar for 1 min.
3 DESIGN PRESSURE (in bar)

ELECTRICAL CHARACTERISTICS:

1 1 min. P.F. WITHSTAND VOLTAGE, kV rms
2 LIGHTNING IMPULSE WITHSTAND VOLTAGE, kV peak
3 CREEPAGE DISTANCE, mm

INSULATOR CHARACTERISTICS	
TOP	BOTTOM
3000	3500
30	30
10	10
410	410
900	900
6510	6510

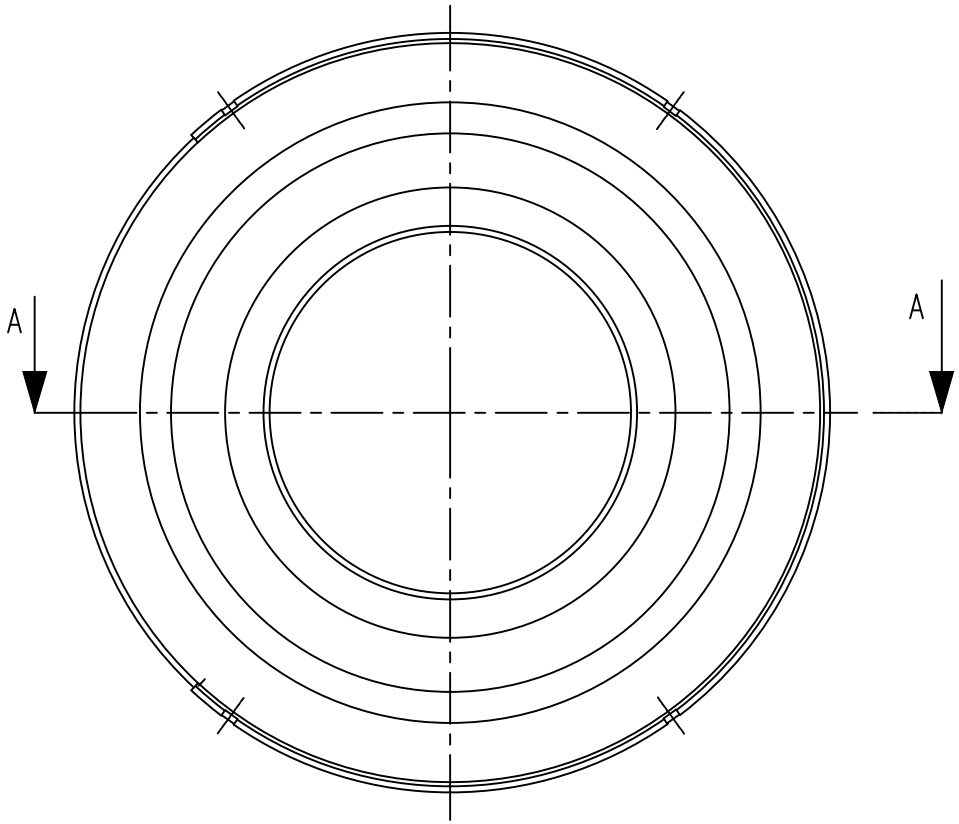
INSULATOR DIMENSIONS		
Ø	TOP	BOTTOM
H	1835	1835
A	121	121
B	225	225
C	310	310
D	225	225
E	310	310
F	190	200
I	95	95



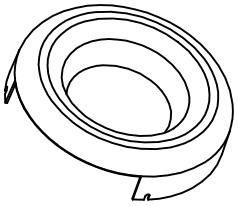
SHED PROFILE (As per IEC–60815)

SUPPORT INSULATOR		T&D Chennai India	3271005701GA316R01	REV	VER	PAGE
				0	1	11/18

ALL DIMENSIONS ARE IN MM

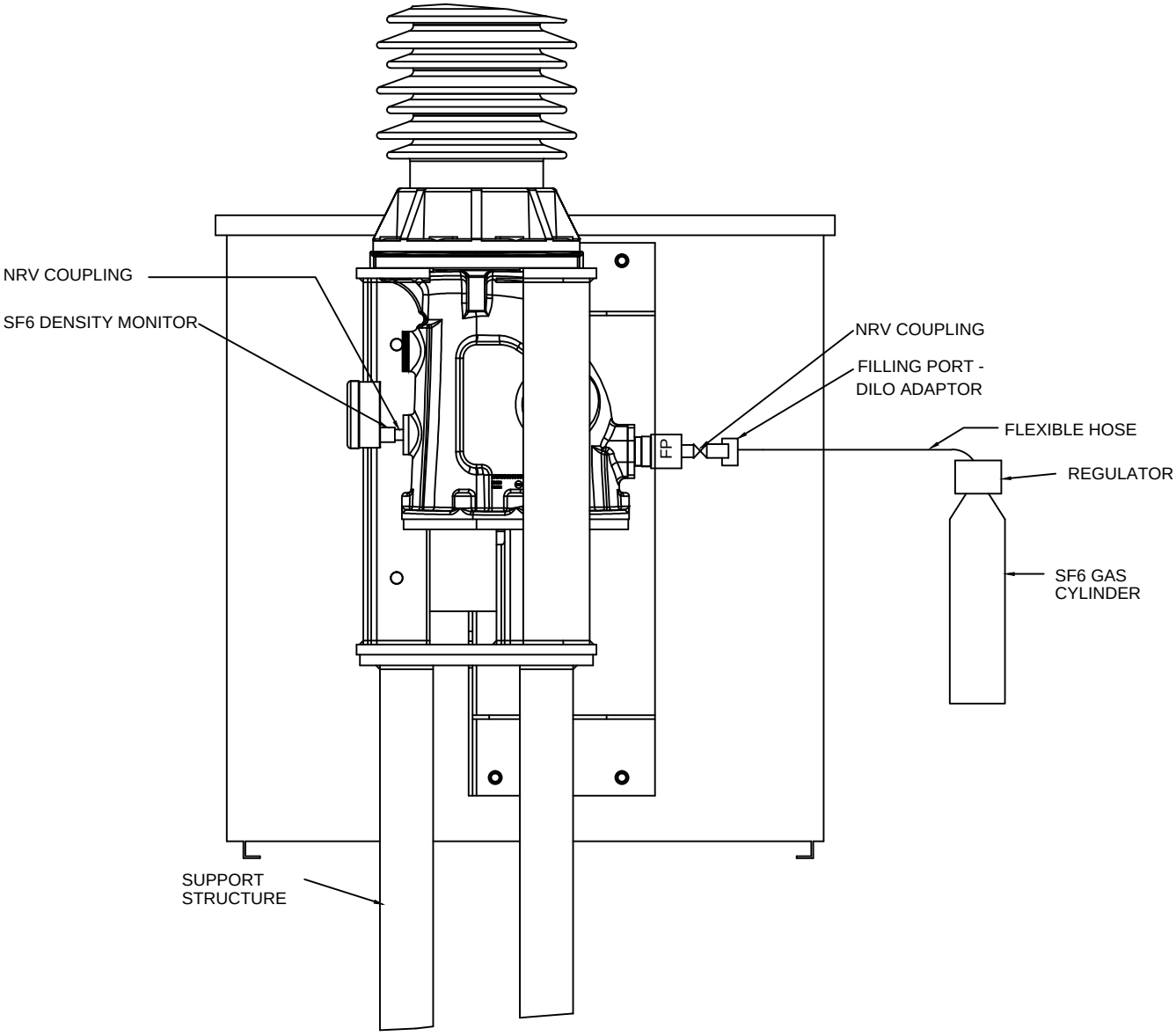


SECTION A-A



MATERIAL :
ALUMINIUM SHEET AS PER IS737-1986 40800

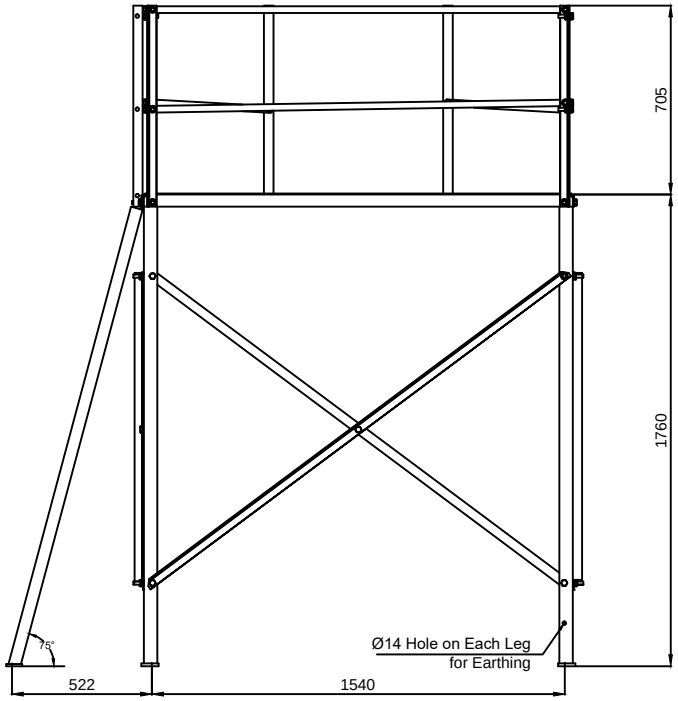
CORONA CAP		T&D Chennai India	3271005701GA316R01	REV	VER	PAGE
				0	1	12/18

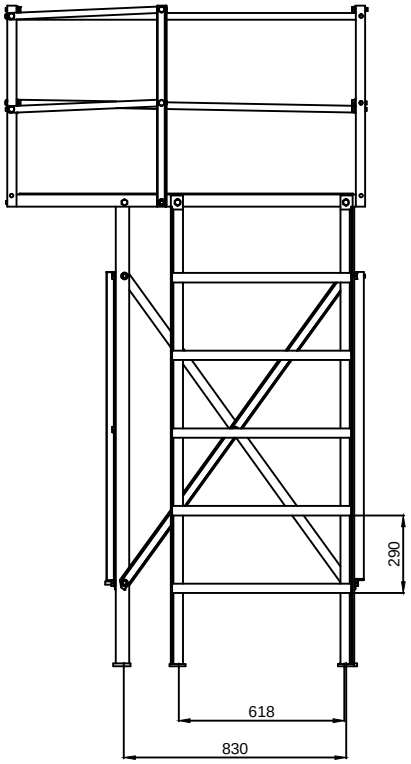


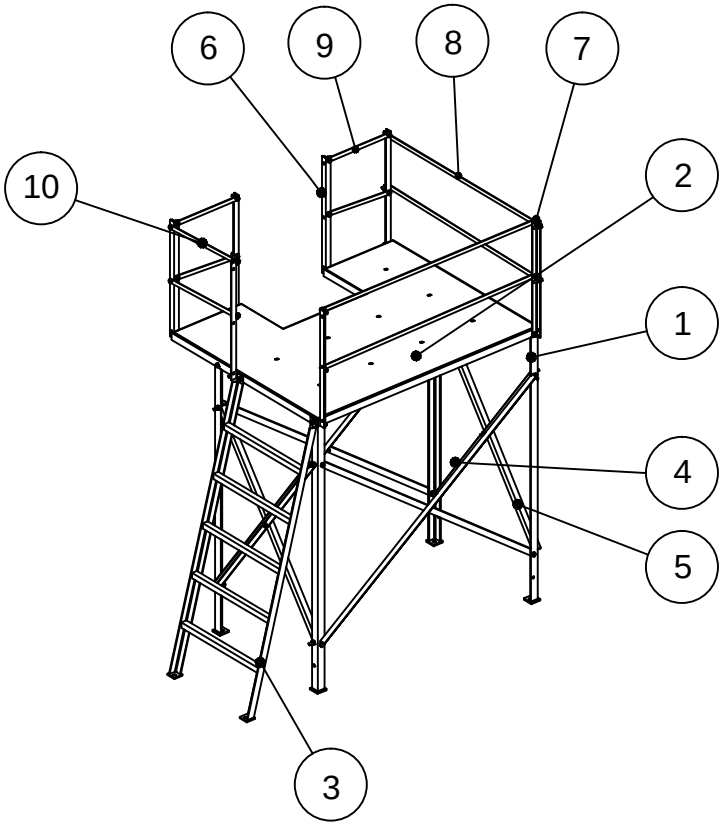
SF6 GAS LINE DIAGRAM	T&D Chennai India	3271005701GA316R01	REV	VER	PAGE
			0	1	13/18

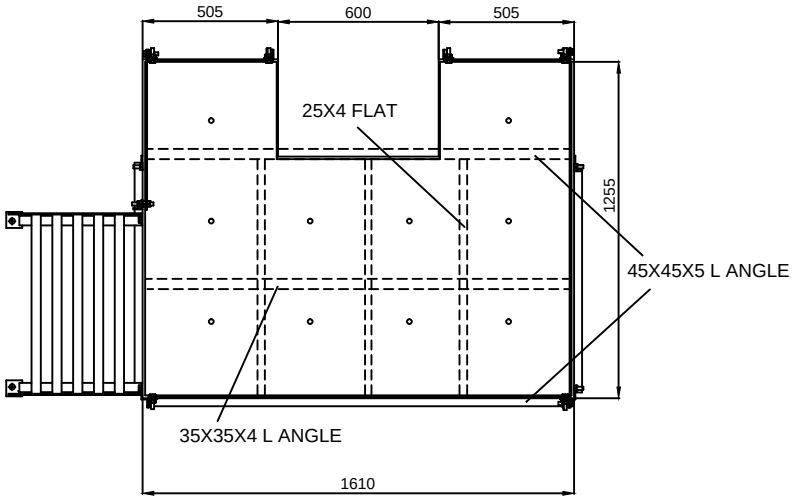
ALL DIMENSIONS ARE IN MM

SCALE 14:1



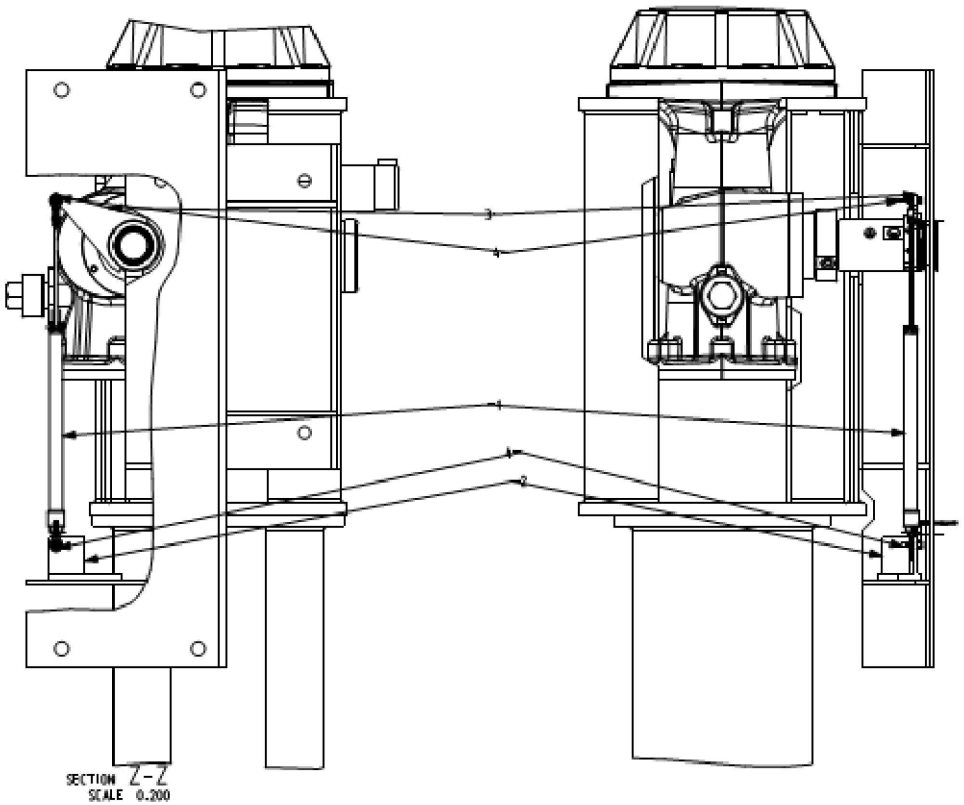


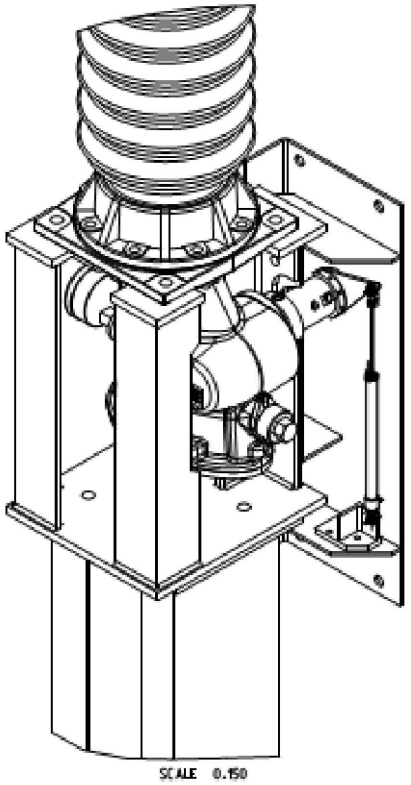




S.NO	PART NUMBER	DESCRIPTION	MATERIAL	SECTION	QTY
13	WASHER_D12	WASHER 12MM	NT417 002		65
12	M12_NUT	HEX NUT M12 HDG	NT416 121		57
11	M12X40_BOLT	HEX BOLT M12 X 40 HDG	NT411 022		55
10	2400058_P10	HAND RAIL BRACING D	IS 2062 Fe410	FLAT 25X4	2
9	2400058_P09	HAND RAIL BRACING C	IS 2062 Fe410	FLAT 25X4	4
8	2400058_P08	HAND RAIL BRACING B	IS 2062 Fe410	FLAT 25X4	2
7	2400058_P07	HAND RAIL BRACING A	IS 2062 Fe410	FLAT 25X4	2
6	2400058_P06	HAND RAIL LEG	IS 2062 Fe410	ISLA 35X35X4	7
5	2400058_P05	STIFFENER SHORT	IS 2062 Fe410	ISLA 35X35X4	4
4	2400058_P04	STIFFNER LONG	IS 2062 Fe410	ISLA 35X35X4	4
3	2400058_P03	LADDER ASSY	IS 2062 Fe410		1
2	2400058_P02	LANDING	IS 2062 Fe410	Chequered Plate - 4mm Thick.	1
1	2400058_P01	LEG	IS 2062 Fe410	ISLA 50X50X5	4

PLATFORM / LADDER ASSEMBLY	T&D Chennai India	3271005701GA316R01	REV	VER	PAGE
			0	1	14 / 18

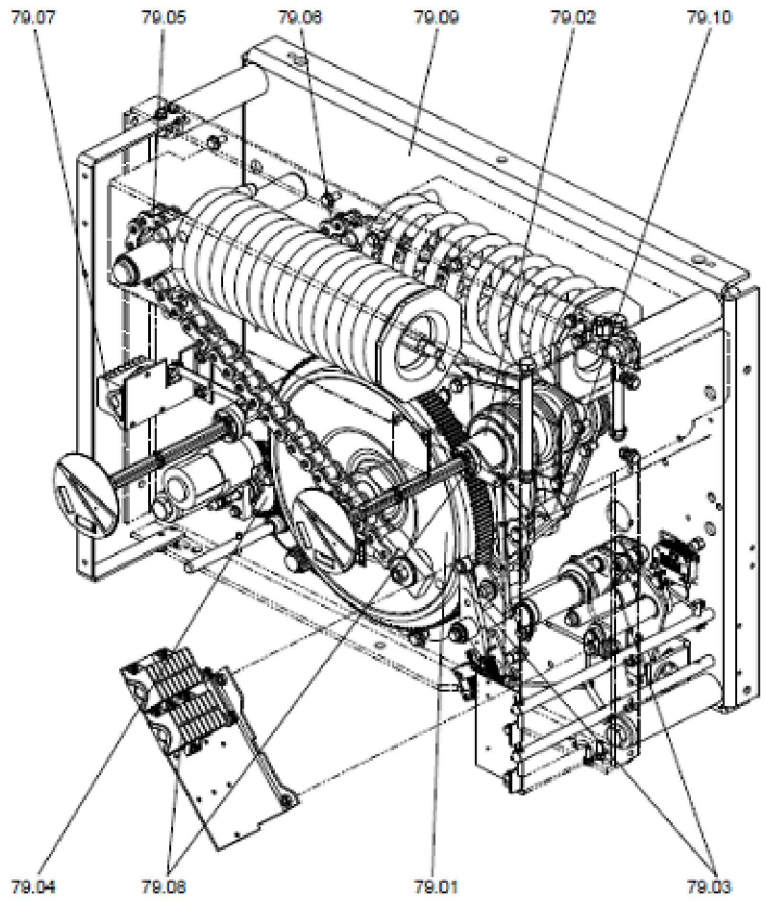




S.NO	PART	QTY
1.	TRANSDUCER (GEFRAN - PZ34A - 200)	1
2.	BASE FIXTURE	1
3.	ROTATING ARM	1
4.	STEPPED PIN	2

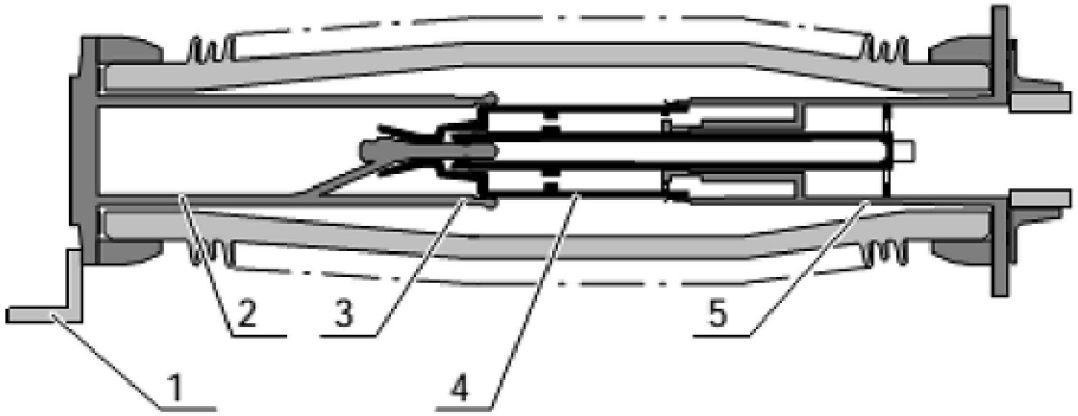
TRANSDUCER MOUNTING DETAILS	T&D Chennai India	3271005701GA316R01	REV	VER	PAGE
			0	1	15/18

79.00 Mechanical assembly



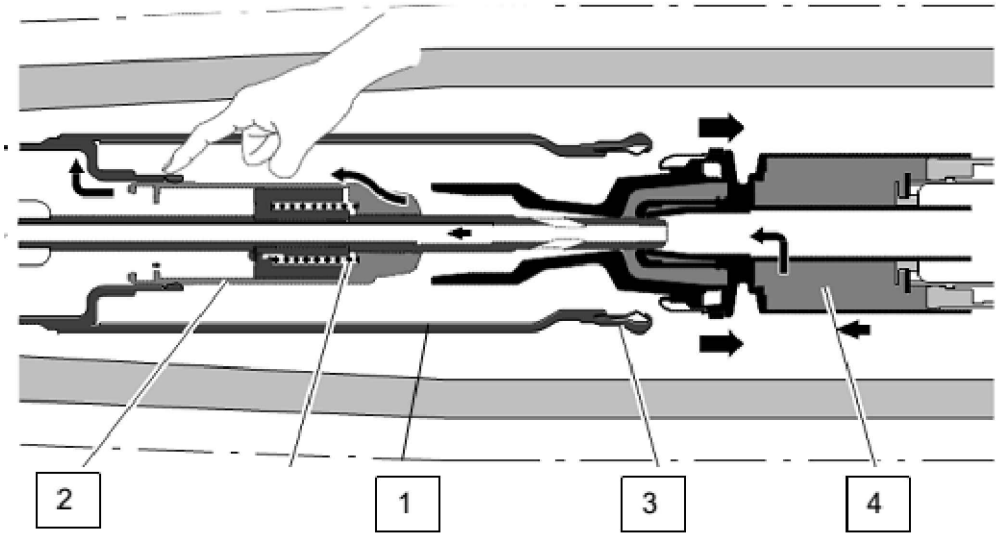
79.01	Closing shaft	79.07	Motor limit switch, spring position indicator
79.02	Main shaft	79.08	Auxiliary switch, operating cycle counter, mechanical closing interlock, circuit breaker position indicator
79.03	Latches		
79.04	Gearing		
79.05	Closing spring assembly	79.09	Operating mechanism housing
79.06	Trip spring assembly	79.10	Trip dashpot

CROSS SECTIONAL VIEW OF OPERATING MECHANISM		T&D Chennai India	3271005701GA316R01	REV	VER	PAGE
				0	1	16/18



S.NO	PART
1.	TERMINAL PAD
2.	FIXED CONTACT SUPPORT
3.	MAIN CONTACTS
4.	MOVING CONTACT
5.	MOVING CONTACT SUPPORT

CROSS SECTIONAL VIEW OF INTERRUPTER	T&D Chennai India	3271005701GA316R01	REV	VER	PAGE
			0	1	17/18



S.NO	PART
1.	FIXING CONTACT SUPPORT
2.	RESISTOR CONTACTS
3.	MAIN CONTACTS
4.	MOVING CONTACT

CROSS SECTIONAL VIEW OF INTERRUPTER (WITH PIR)		T&D Chennai India	3271005701GA316R01	REV	VER	PAGE
				0	1	18/18

SL NO	DRAWING NO	SHT.NO	TITLE	REV 0		REV 1		REV 2	
				DATE	DETAILS	DATE	DETAILS	DATE	DETAILS
1	3271005701NP316R01	1 OF 2	CONTENTS OF NAME PLATE	17.07.2019	ORIGINAL ISSUE				
2	3271005701NP316R01	2 OF 2	RATING PLATE	17.07.2019	ORIGINAL ISSUE				

SALE ORDER NO.: 3271005701
TOTAL CB QTY
400KV, 3150A (W/O PIR & W/O CSD) - 05 Nos.
400KV, 3150A (W/O PIR & WITH CSD) - 06 Nos.

DDC NO. : TB-4-316-401-E01B
STATUS
DISTRIBUTION

REV.	DATE	ALTD	CHD	APPD

NTPC DRG. No. : 9962-001-TB-572-PVE-C-117 REV.: 0

VENDOR: GE T&D INDIA LIMITED, CHENNAI

PROJECT: 1 X 660MW PANKI THERMAL POWER EXTENSION PROJECT.

OWNER: UTTAR PRADESH RAJYA VIDYUT UTPADAN NIGAM LTD.

REVIEW CONSULTANT: NTPC LTD.
(A GOVERNMENT OF INDIA ENTERPRISE)

CONSULTANT: DEVELOPMENT CONSULTANTS PVT. LTD.
KOLKATA

EPC CONTRACTOR: BHARAT HEAVY ELECTRICALS LTD.

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA

DEPT CODE		NAME	SIGN	DATE
M	DRN	KS		17.07.19
	DESN	KS		17.07.19
	CHD	KS		17.07.19
	APPD	KPB		17.07.19

TITLE: CONTENTS OF NAME PLATE

DEPT. SIGN | SCALE : NTS | DRAWING NO. 3271005701NP316R01 | SHEET : 1 OF 2 | REV. : 0

ALL DIMENSIONS ARE IN MM

SF_6 CIRCUIT BREAKER TYPE GL316

BREAKER SERIAL NUMBER		*
RATED VOLTAGE	kV	420
NORMAL CURRENT	A	3150
FREQUENCY	Hz	50
POWER FREQUENCY WITHSTAND VOLTAGE		
ACROSS OPEN CONTACTS	kV rms	610
TO EARTH	kV rms	520
LIGHTNING IMPULSE WITHSTAND VOLTAGE	kVp	1425
SWITCHING SURGE WITHSTAND VOLTAGE	kVp	1050
FIRST-POLE-TO-CLEAR FACTOR		1.3
SHORT-TIME WITHSTAND CURRENT	kA	50
DURATION OF SHORT CIRCUIT	s	3
SHORT-CIRCUIT BREAKING CURRENT		
SYMMETRICAL	kA	50
ASYMMETRICAL	kA	61.2
SHORT-CIRCUIT MAKING CURRENT	kAp	125
OUT-OF-PHASE BREAKING CURRENT	kA rms	12.5
LINE CHARGING BREAKING CURRENT	A	600
OPERATING SEQUENCE	O – 0.3s – CO – 3min – CO	
SF_6 GAS PRESSURE AT 20°C, 1013 hPa	MPa (abs)	0.70
TOTAL MASS OF SF_6 GAS	Kg	38
MASS OF CIRCUIT BREAKER	Kg	5370
REFERENCE STANDARD		IEC 62271-100
YEAR OF MANUFACTURE		2019
CLASSIFICATION		C2-M2

CUSTOMER: UTTAR PRADESH RAJYA VIDYUT UTPADAN NIGAM LTD.

P.ORDER No.: 06P2000007 DATED 17.06.2019

GE T&D INDIA LIMITED, PADAPPAI, CHENNAI

300

240

BREAKER RATING PLATE

MECHANISM ** FK 3-2

SL.NO.	*		
CLOSE COIL	220	V	DC
TRIP COIL	220	V	DC
U	230	V	AC,50Hz.
U	60W,230	V	AC,50Hz.
Ua	220	V	DC
YEAR OF MFG.	2019	m.	200 kg

GE T&D INDIA LIMITED, PADAPPAI, CHENNAI

75

96

MECHANISM RATING PLATE

* BREAKER SL. No. WILL BE CONFIRMED BEFORE DESPATCH.

** A/B/C AS APPLICABLE

NOTES :-

MATERIAL	:	STAINLESS STEEL
TYPE OF ETCHING	:	ENGRAVING
BACKGROUND	:	SILVER
LETTER SIZE	:	4 MM
THICKNESS OF PLATE	:	1.2 MM

RATING PLATE	T&D Chennai India	3271005701NP316R01	REV	VER	PAGE
			0	1	2/2

SN	DOCUMENT TITLE	UNIT	QTY	MAKE
1.	Control Switching Device suitable for complete 400kV CB along with signal cable & other accessories	Nos.	4	GE

CONTENTS

NTPC DRG. No. : 9962-001-TB-572-PVE-B-002 REV.: 0

VENDOR: GE T&D INDIA LIMITED, CHENNAI

PROJECT: 1 X 660MW PANKI THERMAL POWER EXTENSION PROJECT.

OWNER: UTTAR PRADESH RAJYA VIDYUT UTPADAN NIGAM LTD.

REVIEW CONSULTANT: NTPC LTD. (A GOVERNMENT OF INDIA ENTERPRISE)

CONSULTANT: DEVELOPMENT CONSULTANTS PVT. LTD. KOLKATA

EPC CONTRACTOR: BHARAT HEAVY ELECTRICALS LTD.

DOC NO. : TB-4-316-401-E01F

STATUS

DISTRIBUTION

REV.	DATE	ALTD	CHD	APPD

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA

DEPT CODE		NAME	SIGN	DATE
M	DRN	KS		22.08.19
	DESN	KS		22.08.19
	CHD	KS		22.08.19
	APPD	KPB		22.08.19

TITLE: CIRCUIT BREAKER (400kV) -CONTROL SWITCHING DEVICE

DEPT. SIGN | SCALE : NTS | DRAWING NO. 3271005701CSD | SHEET : 1 OF 1 | REV. : 0

Controlled Switching Device

SL.No.	P.O ref	DESCRIPTION	TYPE	UNIT	QTY	MANUFACTURER /MAKE
1	2	Controlled Switching Device, Suitable for complete 400kV CB along with signal cable and all other accessories as per specification etc.	RPH 3	No.	4	GE
2	4	LAPTOP - Intel® Pentium® N3710 (1.6 GHz, up to 2.56 GHz, 2 MB cache, 4 cores) / 4 GB DDR3L-1600 SDRAM (1 x 4 GB) /500 GB 5400 rpm SATA / SuperMulti DVD burner / 15.6" diagonal HD BrightView WLED-backlit (1366 x 768) / 802.11b/g/n (1x1) and Bluetooth® 4.0 Combo / Windows 8.1 Professional OEM Pack	Intel® Pentium® N3710 (1.6 GHz, up to 2.56 GHz, 2 MB cache, 4	Nos.	1	DELL/HP

NTPC DRG. No. : 9962-001-TB-572-PVE-C-117	REV.: 0
VENDOR:	GE T&D INDIA LIMITED, CHENNAI
PROJECT:	1 X 660MW PANKI THERMAL POWER EXTENSION PROJECT.
OWNER:	UTTAR PRADESH RAJYA VIDYUT UTPADAN NIGAM LTD.
REVIEW CONSULTANT:	NTPC LTD. (A GOVERNMENT OF INDIA ENTERPRISE)
CONSULTANT:	DEVELOPMENT CONSULTANTS PVT. LTD. KOLKATA
EPC CONTRACTOR:	BHARAT HEAVY ELECTRICALS LTD.

DDC NO. : TB-4-316-401-E01B	
STATUS	
DISTRIBUTION	

REV.	DATE	ALTD	CHD	APPD

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA

DEPT CODE		NAME	SIGN	DATE
M	DRN	KS		22.08.19
	DESN	KS		22.08.19
	CHD	KS		22.08.19
	APPD	KPB		22.08.19

TITLE: CONTROLLED SWITCHING DEVICE

DEPT. SIGN | SCALE : NTS | DRAWING NO. 3271005701CSD | SHEET : 1 OF 1 | REV. : 0

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHECKED	01	12.11.13	CHECKED			CHECKED
		APPD			APPD			APPD

CONTENTS

R1

NOTE:– CSD TTR already approved vide letter CC:PE:9571:573:32660

ADDITIONAL INFORMATION
W.O.No. 83011

NAME OF CUSTOMER: NTPC LTD.
NAME OF PROJECT : NORTH KARANPURA STPP (3X660MW)

भारत हेवी इलेक्ट्रिकल्स लिमिटेड
ट्रांसमिशन परियोजना विभाग
BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION PROJECTS DIVISION

	नाम /NAME	हस्ता./SIGN.	दि./DATE
बनाया DRAWN		–sd–	
जाँचा CHECKED		–sd–	
स्वीकृत APPROVED		–sd–	

शीर्षक/TITLE

CONTROL SWITCHING DEVICE FOR
CIRCUIT BREAKER

विभाग DEPT.
कोड CODE
अनुपात / SCALE

ड्राईग.क्र./NTPC DRAWING NO. 4410–001–572–PVE–E–0123
पुनः/REV. 01

पृष्ठ क्र./SHEET No. –
अगला पृष्ठ /NEXT SHEET ––

A4 (9–96) [210x297]

Controlled Switching Device

Customer:	M/s BHEL, 5th Floor, Advant Navis IT Business park, Plot No 7, Sector - 142, Noida - 201305
Project:	NTPC,North Karanpura
PO NO:	145P149
Manufacturer Name & Address:	ALSTOM T&D INDIA LIMITED, 142 - Vandalur Walajabad main road, salamangalam village, padappai - 601301

Ref: 3271003344/P2

SL.No.	P.O ref	DESCRIPTION	TYPE	UNIT	QTY	MANUFACTURER/ MAKE
1	8	Controlled Switching Device, Suitable for complete 400kV CB along with signal cable and all other accessories as per specification etc.	RPH 3	No.	9	ALSTOM
2	9	LAPTOP - Intel® Pentium® N3710 (1.6 GHz, up to 2.56 GHz, 2 MB cache, 4 cores) / 4 GB DDR3L-1600 SDRAM (1 x 4 GB) /500 GB 5400 rpm SATA / SuperMulti DVD burner / 15.6" diagonal HD BrightView WLED-backlit (1366 x 768) / 802.11b/g/n (1x1) and Bluetooth® 4.0 Combo / Windows 8.1 Professional OEM Pack	**HP Notebook - 15-ay089tu**	Nos.	1	HP

Lap top should be compatible with RPH3 controller & have RJ45 port, LAN port & with latest configuration .

For GE T&D India Limited

GRID | ALSTOM

एनटीपीसी लिमिटेड
(भारत सरकार का उद्यम)
NTPC Limited
(A Govt. of India Enterprise)
(Formerly National Thermal Power Corporation Ltd.)
केन्द्रीय कार्यालय नोएडा
Corporate Centre NOIDA

Reference: CC:PE:9571:573:32660 Date:16-03-15

From:	B.DASH CTF (SOLAPUR TF)	To:	M/S ABB VADODARA ABB Ltd., PO Maneja, Vadodara-390013,Gujarat
		CC:	- - -

SUBJECT : SOLAPR, SWITCHYARD PACKAGE

Please find enclosed following drawings/documents for necessary action at your end as indicated in purpose code.

VENDOR DRG NO:	3VIN100500T0249
NTPC DRG NO:	9571-573-PVE-W-457A
REVISION NO:	03
DRG TITLE:	Control switching device - Type Test Report
APP CATEGORY:	IV
RELEASE DATE:	16-03-15
COMMENTS:	no comments

Control Switching Device - Type Test Reports

Revised type test report is being submitted in line with MOM held dated 2 -02-1 .
Letter regarding SERMA ma e RPH enclosed

NOA No:- CS- 1- -2-FC-NOA- 0 DTD. 0.0 .2012

CLIENT

NTPC LTD.
(A Govt. Of India Enterprise)

Prepared & Checked:	Approved:

Switchyard Pac age for
Solapur Super Thermal Power Project 2x 0M

REV	DATE
3	3-Mar-15

Control Switching Device - Type Test Reports

NTPC Doc. No : 1- -PVE- - A

ABB **A INDIA Limited**

GRID
GAS INSULATED SUBSTATIONS
Aix-les-Bains

1, rue Paul Doumer
BP 601
73106 AIX-LES-BAINS CEDEX (France)
Phone: 33 (0) 4 79 88 79 80
Fax: 33 (0) 4 79 88 79 39
www.grid.alstom.com

Ref.: RPH3 CSD device **Date: 27.02.2015**

TO WHOMSOEVER IT MAY CONCERN

Dear Sir,

Sub: Approval of Controlled Switching Device Model Type - RPH3 of M/s Alstom make.

We introduce ourselves from the Product Development Center for Electronics for Air Insulated Switchgear and Gas Insulated Substation business of Alstom Grid.

We refer to the above product supplied from our High Voltage Circuit Breaker Manufacturing unit at Padappai, near Chennai in India and would like to clarify / confirm as follows, for your perusal:

1. We confirm that the RPH3 controller has been designed either hardware or software by our electronic R&D team based in France.

2. All intellectual propriety rights for the RPH3 regarding the software or hardware are the Alstom's property.

3. We would like to clarify that Alstom chose SERMA as Subcontractor after passing the Alstom quality audit.
   Serma is compliant to ISO1901 and also with our Alstom strict internal quality rules. This is ensuring by audit performed by our Quality department.

4. Due to the point 3, the company SERMA is appointed to assembly the RPH3 controller. As of now SERMA is the only manufacturer for ALSTOM for RPH3 relays

5. We confirm that all RPH3 pass a complete set of routine tests at SERMA on ALSTOM test bench provided and verified by Alstom Electronics Experts.

6. Alstom can change of subcontractor if needed. The RPH3 quality will be maintained thanks to the Alstom quality chart & process.

7. Further we confirm that RPH3 relay with Sl No: 1301005 is manufactured at SERMA for ALSTOM.

8. We guarantee the performance of the RPH3 supplied & commissioned by us.

Thanking you and assuring you of our best services at all times, we remain.
Yours faithfully,

For ALSTOM Grid

Jean-Luc RAYON
AIS&GIS Electronic Products Manager

Product Type: **Controlled Switching Device**
Rating: **420kV CB**
Project: **NTPC Mouda-II & Solapur**

Sl. No	NTPC Query on CSD	ALSTOM Clarification
1	Comments marked on respective pages.	Noted
2	Pls clarify What is meant by permanently connected?? We are using both the input & output modules. Hence, this test is applicable on input & output ports also.	Please refer attached below compliance & Technical note on CSD (on HF disturbance test)
3	Test on Binary inputs, binary outputs, communication port shall also be included.	
4	**Apparatus under test** : • Product : Circuit breaker point on wave control system • Trade mark : AREVA • Manufacturer : SERMA Pls clarify on this. • Reference : RPH3 • Type : • serial number : 710	Letter enclosed from ALSTOM regarding SERMA make RPH3
5	The equipment under test has been tested with the following auxiliary equipment(s): • 2 Powers supplies 125 Vdc Pls clarify as the model proposed to NTPC is 220V powered. • 1 Power supply 5.2 Vdc • 1 Device OMICRON • 1 Circuit breaker • 1 Computer	Control Voltage 220 V DC – NTPC Requirement : Power supply is not specific to any control voltage, hence voltage which was applied during test is applicable for 220V DC supply too.
6	Pls clarify as the supplied model is 220 V dc powered. • 0V • 125Vdc • GND • 0V/125Vdc/GND together PC : Performance criteria P : Pass according to the performance assessment criteria and to the performance criteria. NC : Fail according to the performance assessment criteria and to the performance criteria. NA : Non applicable in view of the equipment nature.	

1.0 PURPOSE

This technical note explains the query on type test done on RPH relay.

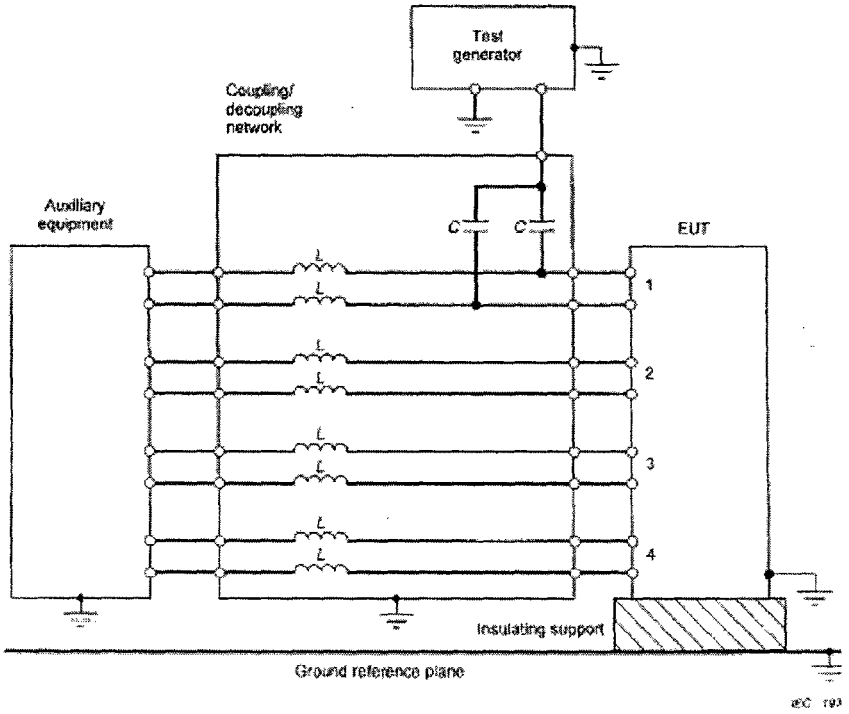
2.0 QUERY

Binary Input and output port which is used for communication also needs to be tested.

3.0 STANDARD REQUIREMENT

As per IEC 60255-22 Clause 5,

When the test is conducted in common mode, the EUT (Equipment Under Test) shall be connected as per the following configuration.

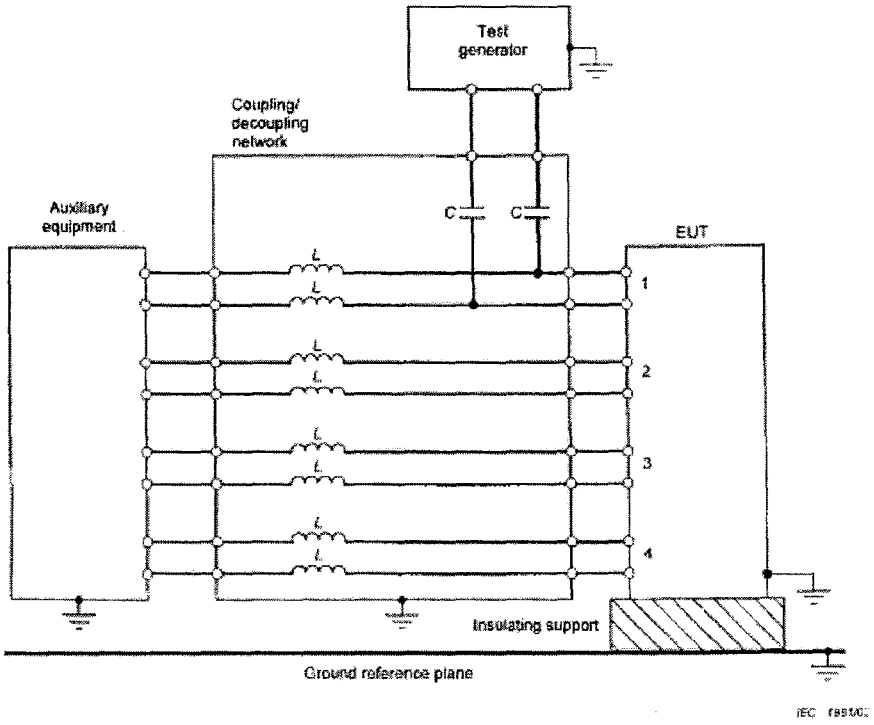


Key

L	high-frequency blocking inductor, 1,5 mH
C	high-frequency coupling capacitor, 0,5 µF
1, 2, 3, 4	EUT input and output ports

Figure 2 – Common mode test between each independent port and earth

When the test is conducted in differential mode, the EUT (Equipment Under Test) shall be connected as per the following configuration.



Key

L	high-frequency blocking inductor, 1,5 mH
C	high-frequency coupling capacitor, 0,5 µF
1, 2, 3, 4	EUT input and output ports

Figure 4 – Differential mode test

The Test acceptance criteria is as follows

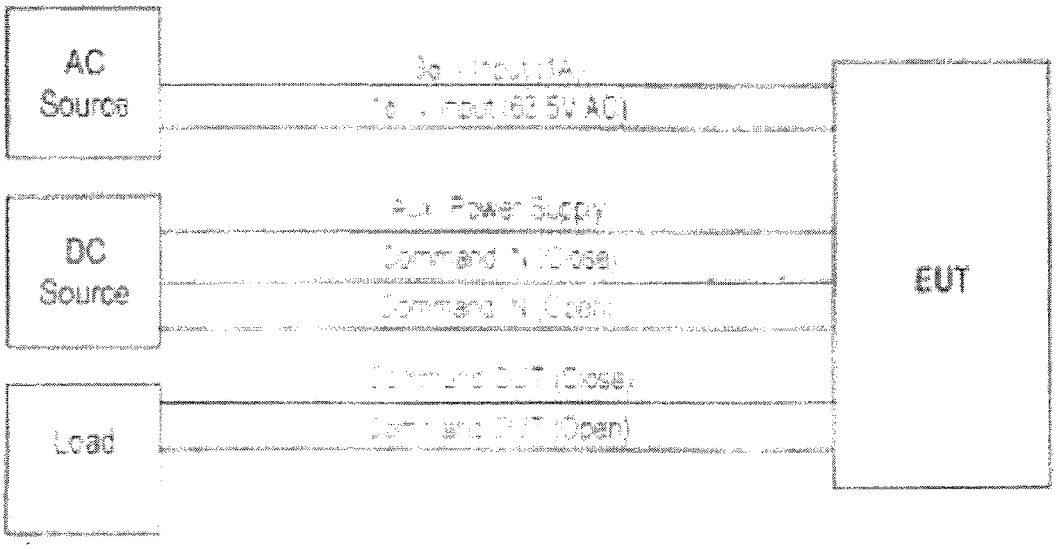
Performance criteria	Descriptions
A	Normal performance within limits specified by the manufacturer, requestor or purchaser.
B	Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance without operator intervention.
C	Temporary loss of function or degradation of performance, the correction of which requires operator intervention.
D	Loss of function or degradation of performance, which is not recoverable, owing to damage to hardware or software, or loss of data.

4.0 TEST RESULTS

As per the test report S-CEM/EMCD/2013-2014/236, the equipment under test has been connected with

EUT Configuration

The Equipment Under Test (EUT) is connected with power sources and control command cables and the load instead of HV circuit breaker for HV current and voltage monitoring current and voltage AC inputs are also connected. Power supply port and control supply monitoring and control command IN ports are commonly connected.



The EUT is tested as per the standard and the following results achieved.

EMC IMMUNITY TEST AND RESULTS

Name of the Test	Basic Standard	Product Standard	AC/DC/Signal Port	Specification	* Performance criteria met by EUT
1 MHz Burst Immunity	IEC 61000-4-18	IEC 60255-22-1	[illegible]	1Mhz, 75ms ±2.5 kV for Common Mode ± 1 kV for Differential Mode	Criteria-A

* Annexure-A shows the Performance Criteria as per Applicable Standard.

5.0 CONCLUSION

The input and output ports are connected to the Input source and Load respectively. The EUT as a system is applied with the test electrical disturbance and the results are within the acceptance criteria. Hence the CSD along with the input and output port are validated with respect to the standard.

Name: R.Senthilkumar

Signature: 12/12/14

Name: S.Shanmugam

Signature: 12/12/2014

SAMEER

Certificate No. T-0464

S-CEM/EMCD/TR/2013-2014/236

EMI/EMC TEST REPORT FOR CONTROLLED SWITCHING DEVICE MANUFACTURED BY M/s. ALSTOM T&D INDIA LIMITED, CHENNAI

SAMEER-CENTRE FOR ELECTROMAGNETICS
(An Institution Setup by Ministry of Communications and Information Technology, Government of India)
2nd Cross Road, CIT Campus, Taramani, Chennai - 600 113, India
Tel: +91-44-22541352, 22541817 Fax: +91-44-22541424 / 1936 Email: ccc@scemcd.gov.in Web: www.scemcd.gov.in

February 2014

EMI/EMC TEST REPORT FOR BAY CONTROLLED SWITCHING DEVICE MANUFACTURED BY M/s. ALSTOM T&D INDIA LIMITED, CHENNAI

Test Request Particulars

01. Test request from	M/s. Alstom T&D India Limited, Chennai
02. Equipment Under Test	Controlled Switching Device
03. Number of test sample	One
04. Types of tests requested	1 MHz Burst Immunity Test as per IEC 60255-22-1, 2007
05. Manufacturer	M/s. Alstom T&D India Limited, Chennai
06. Model Number of EUT	RPH3
07. Serial Number of EUT	1301005
08. Test plan concurred by (Customer Representative)	Mr. Padmanabha Gowda, Sr. Manager - TPM, Alstom T&D India Limited, Chennai
09. EUT Arrived on	February 10, 2014
10. Test Date	February 10, 2014
11. Test Venue	SAMEER-CEM, Chennai
12. Status of the EUT on receipt	Functional

Certified that the data reported in this report are valid only for the test sample mentioned above at the time of and under the stated conditions of measurement. Particulars of Manufacturer / Supplier, given in this report, are based on the information given by the customer, along with test request and SAMEER-CEM does not assume any responsibility for the correctness of that information for the above mentioned equipment under test.

Test Plan & Reviewed by:

(Salil P.)
Scientist-D

Approved by:

(Sanjay Baisakhiya)
Head, EMC Division

Office Seal

EMI/EMC TEST RESULTS AND SUMMARY FOR CONTROLLED SWITCHING DEVICE

EMC IMMUNITY TEST AND RESULTS

Name of the Test	Basic Standard	Product Standard	AC/DC/Signal Port	Specification	* Performance criteria met by EUT
1 MHz Burst Immunity	IEC 61000-4-18	IEC 60255-22-1	105V DC Power line	1MHz , 75ns ±2.5 kV for Common Mode ± 1 kV for Differential Mode	Criteria-A
			63.5V AC reference voltage input line		
			Current input line (1A)		

** Annexure-A shows the Performance Criteria as per Applicable Standard.*

1 MHz BURST IMMUNITY TEST

1. **Applicable Standard:** Test specification as per IEC 60255-22-1, Ed 3.0, 2007
Test procedure as per IEC 61000-4-18, Ed1.1, 2011

2. Environmental Conditions:

Ambient Temperature : 24°C
Relative Humidity : 56 %
Atmospheric Pressure : 1003 mbar [abs]

3. Test Instrumentation:

Item Descriptions	Make	Model Number	Serial Number
System Controller	Haefely	PSURGE 8000	149819
Damped Sinusoidal Generator	Haefely	PIM 150	150028

4. EUT Configuration: Given in Annexure-1.

5. Test Specifications:

Oscillation frequency : 1 MHz ± 10%
Rise time (1 neg. half cycle) : 75 ns ± 20%
Amplitude : ±2.5 kV in common mode and ±1.0 kV in differential mode
Output impedance : 200Ω
Repetition frequency : 400 Hz
Polarity : Positive / Negative
Burst Duration : 2 Seconds
Burst Interval : 5 Seconds
Number of pulses : 10 (5 on each polarity)
Coupling method : CM1, CM2 & DM

CM1: Between each independent port and earth
CM2: Between each independent port and all other independent ports coupled to earth
DM – Differential mode

6. Test Procedure:

The EUT was subjected to 1 MHz Damped Sinusoidal Surges of Amplitude ± 0.5 kV, ± 1.0 kV, ± 2.5 kV in common mode and ± 0.25 kV, ± 0.5 kV, ±1 kV in differential mode by superimposing the noise on DC input supply line, AC voltage reference line and Three phase current input line through the Coupling / Decoupling Network (CDN). During the test, the EUT was observed for malfunctions if any. Monitoring parameters of the EUT were given in Annexure-1.

7. Test Observations:

(a) DC Power Line (for the M1,M3,M4)

Ports	Coupling	Test Voltage (kV)	Observation
DC Input Line (105V DC)	DM	±0.25kV, ±0.5kV & ±1kV	✓
	CM1 , CM2	±0.5kV, ±1kV & ±2.5kV	✓

(b) AC Reference Voltage Line

Ports	Coupling	Test Voltage (kV)	Observation
63.5V AC reference voltage line	DM	±0.25kV, ±0.5kV & ±1kV	✓
	CM1 , CM2	±0.5kV,±1kV & ±2.5kV	✓

(C)Three Phase Current Input Line

Ports	Coupling	Test Voltage (kV)	Observation
Current input line (Three phase 1Amps)	DM	±0.25kV, ±0.5kV & ±1kV	✓
	CM1 , CM2	±0.5kV,±1kV & ±2.5kV	✓

Note: *✓→ During the test, no change in the status of the LED observed in the EUT. Before and after the test DC Voltage, AC reference Voltage and the three phase current input were checked in the laptop and it was found OK.*

8. Enclosed Documents:

Annexure-2 : Photograph of the EUT.
Annexure-3 : Photograph of 1 MHz Burst Immunity Test Setup (DC Power line).
Annexure-3A : 1 MHz Burst Immunity Test Setup (63.5V AC Input line)
Annexure-3B : 1 MHz Burst Immunity Test Setup (3 Phase current input line)

Test Conducted by:

B. Malathi

(B. Malathi)
Project Assistant-A

Annexure-A

Performance Criteria

Immunity:

Performance criteria	Descriptions
A	Normal performance within limits specified by the manufacturer, requestor or purchaser.
B	Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention.
C	Temporary loss of function or degradation of performance, the correction of which requires operator intervention.
D	Loss of function or degradation of performance, which is not recoverable, owing to damage to hardware or software, or loss of data.

Annexure-1
(Given by the Customer)

EUT Description:

The EUT (Controlled Switching Device) is used with HV circuit breakers to have switching of the circuit breakers on the point of wave to minimize the switching surges.

Application:

In high voltage sub-stations controlled switching devices (POW) are used for circuit breaker controlled operations. The controlled switching is required for having optimized switching point to minimize the switching surges.

EUT Configuration

The Equipment Under Test (EUT) is connected with power sources and control command cables and the load instead of HU circuit breaker for HV current and voltage monitoring current and voltage AC inputs are also connected. Power supply port and control supply monitoring and control command IN ports are commonly connected.

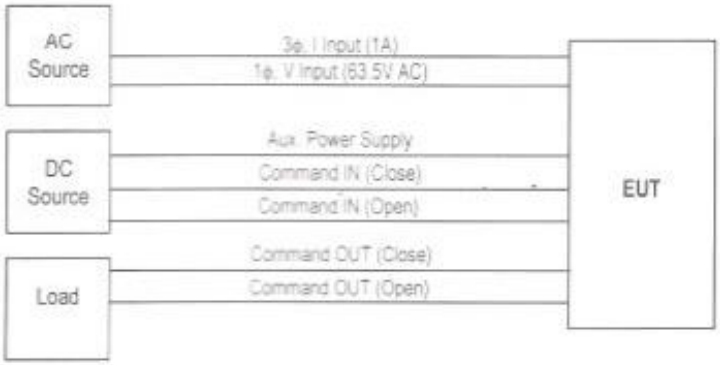
Monitoring Parameter for power line:

The EUT was monitored as given below

- During the test , Application and system alarm LED should not glow
- Current should be 1Amp. the AC voltage should be 63.5V AC on the 220V AC port and the DC Voltage should be 105V DC on the 250V DC port before and after the test

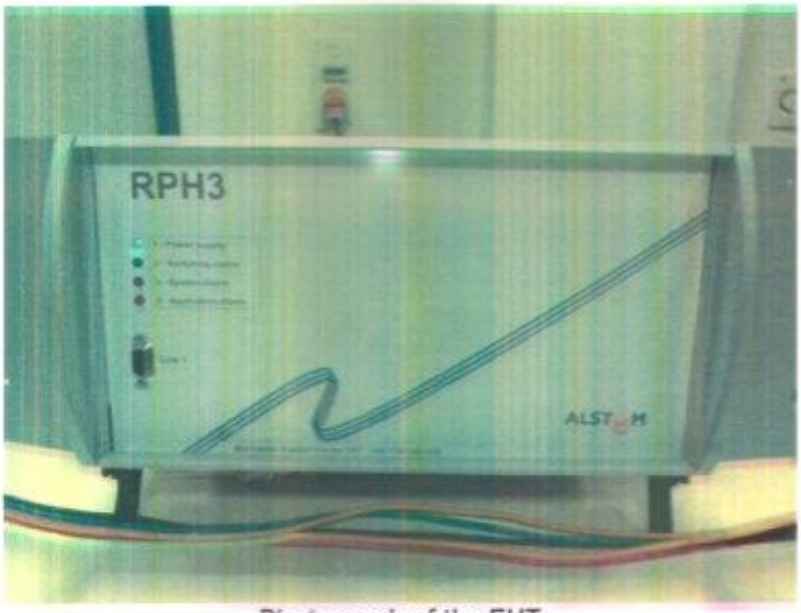
Accessories Details:

Sl.No.	Equipments	Make	Model Number	Serial Number
1.	A/C Source	Programma	FREJA 300	1202551
2.	D/C Source	Sigma	DC Drive	4158099130123



Block Diagram of the EUT Configuration

Annexure-2



Photograph of the EUT

Model & Serial Number of the EUT

Annexure-3

1 MHz Burst Immunity Test Setup (DC Power Line)

Annexure-3A

1 MHz Burst Immunity Test Setup (AC Input Line)

Annexure-3B

1 MHz Burst Immunity Test Setup
(3 Phase Current Input Line)

Accreditation
N° 1-0312
Scope
available on
www.cofrac.fr

TEST REPORT

N° 80252-569248

ISSUED TO : **SERMA INGENIERIE**
10 Rue des osiers
78310 COIGNIERES

Subject : Electromagnetic compatibility tests and Safety tests according to the customer request

Apparatus under test :

- Product : Circuit breaker point on wave control system
- Trade mark : AREVA
- Manufacturer : SERMA
- Reference : RPH3
- Type :
- serial number : 710

Test date : March and July 2008

Composition of document : 35 pages and 1 related document.

Fontenay-aux-Roses, September 18th, 2008

The technical manager,

LABORATOIRE CENTRAL
DES INDUSTRIES ELECTRIQUES
S.Erim ROUSSEL
RCS Nanterre B 408 363 174
33 Avenue du Général Leclerc
92260 FONTENAY AUX ROSES

1 – TESTING PROGRAM

The tests have been carried out according to the requirements of SERMA INGENIERIE described in the hardware specification enclosed to this report and the technical and commercial proposition from LCIE.

The standards used are given below:

1.1- EMC TEST

Standard EN 61000-4-2 of 1995 + A1 of 1998 + A2 de 2001
- Immunity to electrostatic discharges

Standard EN 61000-4-3 of 2006
- Immunity to radiated, radio-frequency, electromagnetic field

Standard EN 61000-4-4 of 2005
- Immunity to electric fast transients/burst

Standard EN 61000-4-5 of 2007
- Immunity to surges

Standard EN 61000-4-6 of 2007
- Immunity to conducted disturbances, induced by radio-frequency fields

Standard EN 61000-4-8 of 1994 + A1 of 2001
- Immunity to power frequency magnetic field

Standard EN 61000-4-16 of 1998 + A1 of 2004
- Immunity to conducted common mode disturbance 15Hz to 150kHz

Standard EN 61000-4-17 of 1999, Annex 1 of 2004
- Ripple on DC input Power port

Standard EN 61000-4-29 of 2001
- DC supply interruption

Standard: EN 55022 of 2007 (Class A apparatus)
- Measurement of radiated emission levels
- Measurement of continuous conducted emission levels.

1.2- SAFETY TEST

Standard NF EN 60255-6 of 1996
- Voltage tolerance

Standard NF EN 60255-5 of 2001
- Dielectric Strength
- Insulation resistance
- Impulse Voltage

2 - EQUIPMENT CHARACTERISTICS

2.1 - Label identification

No label identification

2.2 - Equipment configuration

The equipment under test has the following dimensions: 400 x 300 x 40 cm high.

Characteristics to the equipment see to the related document.

The equipment under test is considered as table-top equipment tested at 80 cm from the ground plane.

The equipment under test has been tested in the following operating mode(s):

- Operation of closure of the high voltage circuit breaker. For the test we realize 1 operation for minute.

The equipment under test has been tested with the following auxiliary equipment(s):

- 2 Powers supplies 125 Vdc
- 1 Power supply 5.2 Vdc
- 1 Device OMICRON
- 1 Circuit breaker
- 1 Computer

2.3 - Performance criteria

CRITERION A :

- The equipment shall continue to operate as intended without operator intervention.
- No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer (...) or may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

CRITERION B :

- After the test, the equipment shall continue to operate as intended without operator intervention.
- No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer (...) or may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
- During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test.

CRITERION C :

- Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions.
- Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

2.4 - Performance level

The manufacturer defined the following performance levels:

- Check by soft :

  Verification of the data OMICRON

- Check of the state of the equipment:
-

  Temperature (6 to 8 °C)
  Hydraulic pressure of breaker (6 to 8 bar)

2.5 – Methodology of performance level control

During tests, it was checked that the equipment under test remained in the performance levels defined into 2.4 by following methodology:

- Inspection of line noise and audio levels according to the LCIE operating mode.
- Visual inspection of the computer and LED of EUT

3 – OPERATING CONDITIONS

The apparatus was placed successively :

- in a semi-anechoic chamber measuring 11.8 × 8.1 × 9.5 m high,
- in a semi-anechoic chamber measuring 8 x 5 x 3.2 m high,
- on a ground plan measuring 2.5 × 2.5 m.

and was powered with 2 x 125Vdc .

Climatic conditions :

Température	:	21 to 30 °C
Relative humidity	:	25 to 43 %

4 – MEASUREMENT UNCERTAINITY

Kind of measurement	*Wide uncertainty laboratory* (k=2) ±x	*CISPR uncertainty limit* ±y
Measurement of conducted disturbances in voltage on the power port	3.57 dB	3.6 dB
Measurement of conducted disturbances in voltage on the telecommunication port.	3.28 dB	Under consideration
Measurement of conducted disturbances in voltage on the antenna port.	3.12 dB	Under consideration
Measurement of conducted disturbances in voltage on the modulator's RF out port.	3.12 dB	Under consideration
Measurement of discontinuous conducted disturbances in voltage	3.47 dB	3.6 dB
Measurement of conducted disturbances in current	2.90 dB	Under consideration
Measurement of radiated electric field on the Fontenay-aux-Roses site in semi-anechoïc shielded room (Except vertical antenna from 30 MHz to 200 MHz)	5.09 dB	5.2 dB
Measurement of radiated electric field on the Fontenay-aux-Roses site in semi-anechoïc shielded room (Vertical antenna from 30 MHz to 200 MHz)	5.35 dB	5.2 dB
Measurement of radiated electric field on the Ecuelles open area test site	5.07 dB	5.2 dB
IN SITU measurement of radiated electric field from 30 to 1000MHz	Under consideration	5.2 dB
Measurement of disturbance power	3.37 dB	4.5 dB
Measurement of current harmonics	11.11%	/
Flicker measurement	9.26%	/
Immunity to conducted disturbances, induced by radio electric field (coupling method in compliance with EN 61000-4-6)	2.36 dB	/
Immunity to conducted disturbances, induced by radio electric field on the antenna port of differential mode (coupling method in compliance with EN 55020)	2.62 dB	/
Immunity to conducted disturbances, induced by radio electric field on the antenna port of common mode (coupling method in compliance with EN 55020)	3.14 dB	/
Immunity to conducted disturbances, induced by radio electric field on the audio in/out port (coupling method in compliance with EN 55020)	3.06 dB	/
Immunity to conducted disturbances, induced by radio electric field on the AC power port (coupling method in compliance with EN 55020)	3.06 dB	/
Measurement of signal noise ratio (according to EN 55020)	1.16dB	
Immunity to conducted disturbances, induced by radio electric field, method oh the injection clamp	2.76 dB	/
Immunity to radiated radio electric field from 80 MHz to 2.6GHz (in compliance with EN 61000-4-3)	2.64 dB	/
Immunity to radiated radio electric field from 80 MHz to 2.6GHz (in compliance with EN 55020)	1.62 dB	/

The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the CISPR 16-4-2 of 2003. The conformity of the sample is directly established by the applicable limits values, except for radiated electric field measurement in vertical antenna from 30 to 200 MHz on the Fontenay-Aux-Roses site, compliance is deemed to occur if no measured disturbance, increased by 0.15 dB, exceeds the disturbance limit.

5 – TESTING RESULTS

Enclosure port

TEST	TEST SPECIFICATION	PC	RESULTS P	F	NA
1.1 - Power frequency Magnetic field Photo n° 9	Test level : 100 A/m Frequency : 50 Hz Test time : 60 s	A	[X1]	[ ]	[ ]
1.2 - Radio-electric frequency electromagnetic field with amplitude modulation Photo n° 1	Test level : 10 V/m Type of modulation : AM - Modulation frequency : 1kHz - Modulation depth : 80 % Frequency range : 80 MHz to 1000 MHz Sweep step : 1% Time exposure : 2 s/step Logperiodic antenna				
	• Horizontal position	A	[X]	[ ]	[ ]
	• Vertical position	A	[X]	[ ]	[ ]
1.3 - Electrostatic discharges Photos n° 2 & 3	Contact discharges Levels : ± 6 kV and ± 8 kV Application points :				
	• Horizontal coupling plane	B	[X]	[ ]	[ ]
	• Vertical coupling plane	B	[X]	[ ]	[ ]
	• Front side RS 232	B	[X]	[ ]	[ ]
	• M4 , 3 screws	B	[X]	[ ]	[ ]
	• M3 , 6 screws	B	[X]	[ ]	[ ]
	• M2 , 3 screws + Ethernet shield	B	[X]	[ ]	[ ]
	• Earth terminal + 2 screws	B	[X]	[ ]	[ ]
	Air discharges Levels : ± 8 kV and ± 15 kV Application points :				
	• 4 side	B	[X]	[ ]	[ ]
	• 4 LED front side	B	[X]	[ ]	[ ]
	• Enclosure (Front side and rear side)	B	[X]	[ ]	[ ]
	• Airing hole	B	[X]	[ ]	[ ]
	• Connectors	B	[X]	[ ]	[ ]
1.4 - Surges Between enclosure and earth	Level (Peak value) : ± 2 kV, ± 3 kV, ± 4 kV Tr/Th (µs) : 1.2/50 (8/20) Number of surges : 5 per polarity Interval between surge : 60 s Port :				
	• Enclosure	B	[X]	[ ]	[ ]

PC : Performance criteria
P : Pass according to the performance assessment criteria and to the performance criteria.
NC : Fail according to the performance assessment criteria and to the performance criteria.
NA : Non applicable in view of the equipment nature.

Observations:

X – The equipment under test fulfils the functional requirements of the performance criteria

Remark:

X1: The customer request was 300 A/m and 1000 A/m (If possible) but our generator is able to generate a magnetic field of 100 A/m only.

Signal and telecommunication ports

TEST	TEST SPECIFICATION	PC	RESULTS P	F	NA
2.1 - Radio-electric frequency in common mode Photo n° 4	Test level : 10 V_{rms} Frequency range : 150 kHz to 80 MHz Type of modulation : AM - Modulation depth : 80 % - Modulation frequency : 1 kHz Sweep step : 1 % Time exposure : 2 s/step Application with injection clamp Port :				
	• Ethernet + RS485 (Rack M2)	A	[X]	[ ]	[ ]
	• Brown and yellow Bundles (Rack M4)	A	[X]	[ ]	[ ]
	• Red + green + blue Bundles (Rack M4)	A	[X]	[ ]	[ ]
	• White Bundles (Rack M4)	A	[X]	[ ]	[ ]
	• Black + beige Bundles (Rack M3)	A	[X]	[ ]	[ ]
	• Light blue + light red Bundles (Rack M3)	A	[X]	[ ]	[ ]
2.2 - Fast transients/bursts In common mode Photo n° 5	Level (Peak value) : ± 2 kV Tr/Th (ns) : 5/50 Repetition frequency : 5 kHz Burst duration : 15 ms Burst period : 300 ms Exposure time : 60 s Port :				
	• Bundle M2	B	[X]	[ ]	[ ]
	• Bundle M3	B	[X]	[ ]	[ ]
	• Bundle M4	B	[X]	[ ]	[ ]

PC : Performance criteria
P : Pass according to the performance assessment criteria and to the performance criteria.
NC : Fail according to the performance assessment criteria and to the performance criteria.
NA : Non applicable in view of the equipment nature.

Observation :

X – The equipment under test fulfils the functional requirements of the performance criteria

Direct current power ports

TEST	TEST SPECIFICATION	PC	RESULTS P	F	NA
3.1 - Radio-electric frequency in common mode Photo n° 4	Test level : 10 V_{rms} Frequency range : 150 kHz to 80 MHz Type of modulation : AM - Modulation depth : 80 % - Modulation frequency : 1 kHz Sweep step : 1 % Time exposure : 2 s/step Application with injection clamp Port : • DC 125 V	A	[X]	[ ]	[ ]
3.2 - Surges Photo n° 6	Common Mode Test level : ± 2 kV, ± 4 kV Tr/Th (µs) : 1.2/50 (8/20) Number of surge : 5 per polarity Interval between surge : 60 s Port : • DC 125V	B	[X]	[ ]	[ ]
	Differential mode Test level : ± 2 kV Tr/Th (µs) : 1.2/50 (8/20) Number of surge : 5 per polarity Interval between surge : 60 s Port : • DC 125V	B	[X]	[ ]	[ ]
3.3 - Fast transients / burst in common mode Photo n° 5	Test level : ± 4 kV Tr/Th (ns) : 5/50 Repetition frequency : 5 kHz Burst duration : 15 ms Burst period : 300 ms Exposure time : 60 s Port : • 0V	B	[X]	[ ]	[ ]
	• 125Vdc	B	[X]	[ ]	[ ]
	• GND	B	[X]	[ ]	[ ]
	• 0V/125Vdc/GND together	B	[X]	[ ]	[ ]

PC : Performance criteria
P : Pass according to the performance assessment criteria and to the performance criteria.
NC : Fail according to the performance assessment criteria and to the performance criteria.
NA : Non applicable in view of the equipment nature.

Observation :

X – The equipment under test fulfils the functional requirements of the performance criteria

TEST	TEST SPECIFICATION	PC	RESULTS		
			P	F	NA
3.4 - DC Supply interruption Photo n° 8	Voltage dips of : 50 % Duration dips : 100 ms Duration between dips : 30 s Number of dips : 3 Port : • DC 125 V	A	[X]	[ ]	[ ]
	Voltage dips of : 0 % Duration dips : 20 ms Duration between dips : 30 s Number of dips : 3 Port : • DC 125 V	A	[X]	[ ]	[ ]
3.5 – Immunity to conducted common mode disturbance Photo n° 7	Frequency range : 15 to 150 Hz Test level : 30 V_{rms} to 3 V_{rms} Sweep step : 60 s/decade Port : • DC 125 V	A	[X]	[ ]	[ ]
	Frequency range : 150 to 1500 Hz Test level : 3 V_{rms} to 30 V_{rms} Sweep step : 60 s/decade Port : • DC 125 V	A	[X]	[ ]	[ ]
	Frequency range : 1500 to 15000 Hz Test level : 30 V_{rms} Sweep step : 60 s/decade Port : • DC 125 V	A	[X]	[ ]	[ ]
	Frequency : 50 Hz Test level : 30 V_{rms} Time exposure : 10 s Port : • DC 125 V	A	[X]	[ ]	[ ]
	Frequency : 50Hz Test level : 300 V_{rms} Time exposure : 1 s Port : • DC 125 V	A	[X]	[ ]	[ ]

PC : Performance criteria
P : Pass according to the performance assessment criteria and to the performance criteria.
NC : Fail according to the performance assessment criteria and to the performance criteria.
NA : Non applicable in view of the equipment nature.

TEST	TEST SPECIFICATION	PC	RESULTS		
			P	F	NA
3.6 – Ripple on DC input power port	Level : 4 Level test : 15 % Frequency : 50 Hz During test : 10 min • DC 125 V	A	[X]	[ ]	[ ]

Observation :

X – During and/or after the application of the perturbation, the equipment under test fulfils the functional requirements established in the technical specification

EMISSION STANDARD EN 55022 OF 2006 (CLASS B)

TEST	TEST SPECIFICATION	RESULTS			
		P	F	NA	Rem
4.1 - Limits of conducted disturbances to power supply ports	Frequency range : 0.15 MHz to 30 MHz Ports : • DC 125 V • DC 0V Diagrams n° 2 and 3	[ ] [ ]	[X] [X]	[ ] [ ]	[1] [1]
4.2 - Limits of Conducted disturbances to telecommunication ports	Frequency range : 0.15 MHz to 30 MHz Port(s) : • Ethernet Diagram n° 1	[X]	[ ]	[ ]	[ ]
5 - Limits of radiated disturbances	Frequency range : 30 MHz to 1000 MHz Measurements performed at 3 10 m Antenna : • bilog (30 MHz à 1000 MHz) • Horizontal • Vertical Diagrams n° 4 and 5	[X] [X]	[ ] [ ]	[ ] [ ]	[ ] [ ]

C : conforme - NC : non conforme - NA : non applicable - Rem : remarque

Remark

1: These measurements have been performed in March of 2008. In July, we continued this qualification but not performed again this test at the customer request.

SAFETY TEST

TEST	TEST SPECIFICATION	RESULTS			
		P	F	NA	Rem
5.1 - Dielectric Strength	Measurements during 1 minute See table n° 1	[X]	[ ]	[ ]	[ ]
5.2 - Insulation Resistance	Measurements at 500 VDC during 1 minute See table n° 2	[X]	[ ]	[ ]	[ ]
5.3 - Impulse Voltage Photo n° 10	- Common mode Test level : ± 5 kV Numbers of pulse : 3 Interval between pulse : 20 s - Differential mode Test level : ± 1 kV Numbers of pulse : 3 Interval between pulse : 20 s See table n°3	[X] [X]	[ ] [ ]	[ ] [ ]	[ ] [ ]
5.4 – Voltage tolerance	Level test + 20 % : 150 Vdc Test Duration : 20 min Level test - 30 % : 85 Vdc Test Duration : 20 min	[X] [X]	[ ] [ ]	[ ] [ ]	[ ] [ ]

C : conforme - NC : non conforme - NA : non applicable - Rem : remarque

6 - CONCLUSION

The apparatus of trade mark AREVA and model RPH3 is in compliance with the requirements requested for the following standards:
In EMC

- EN 61000-4-2
- EN 61000-4-3
- EN 61000-4-4
- EN 61000-4-5
- EN 61000-4-6
- EN 61000-4-16
- EN 61000-4-17
- EN 61000-4-29

In Safety

- NF EN 60255-6
- NF EN 60255-5

The apparatus of trade mark AREVA and model RPH3 is not in compliance with the requirements requested for the following standard:

- EN 55022 (class A apparatus) in Conducted Emissions

Concerning the immunity test to magnetic field at 50 Hz, the apparatus of trade mark AREVA and model RPH3 is in compliance to the standard EN 61000-4-8 with a severity level of 100A/m. This test have not been performed with a severity level of 300 A/m (see remark page 6).

Diagram n° 1

Conducted Emissions

Ethenet

Equipement: RPH3
Manufacturer: AREVA
Operating Condition: circuit breaker
Test Site: S75
Operator: GDe
Test Specification:
Comment:
Start of Test: 2008-03-06

SCAN TABLE: "EN 55022 Voltage"

Short Description: EN 55022 Voltage
Unit: dBµV

Detector: Mode:

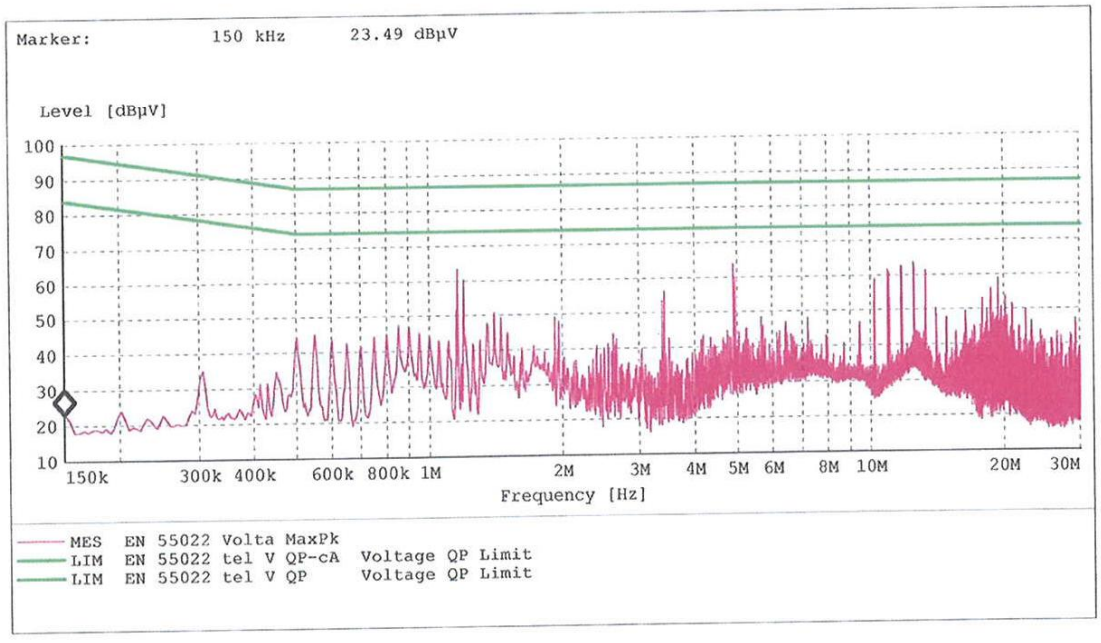


Diagram n° 2

Conducted Emissions

DC 125V

Equipement: RPH3
Manufacturer: AREVA
Operating Condition: circuit breaker
Test Site: S75
Operator: GDe
Test Specification:
Comment:
Start of Test: 2008-03-06

SCAN TABLE: "EN 55022 Voltage"

Short Description: EN 55022 Voltage
Unit: dBµV

Detector: Mode:

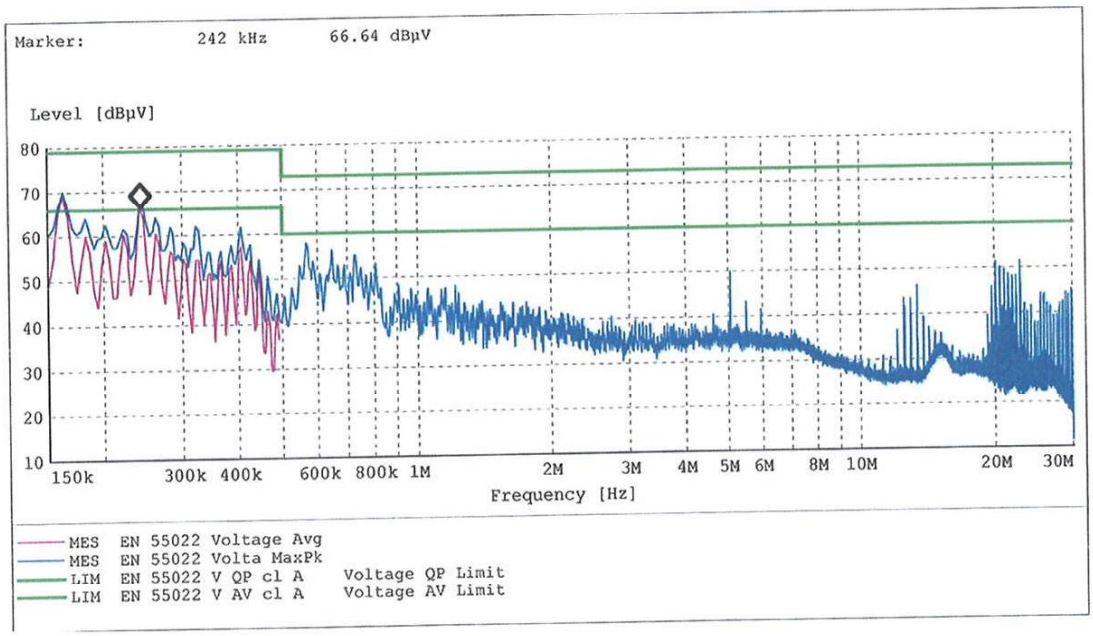


Diagram n° 3

Conducted Emissions

DC 0V

Equipement: RPH3
Manufacturer: AREVA
Operating Condition: circuit breaker
Test Site: S75
Operator: GDe
Test Specification:
Comment:
Start of Test: 2008-03-06

SCAN TABLE: "EN 55022 Voltage"

Short Description: EN 55022 Voltage
Unit: dBµV

Detector: Mode:

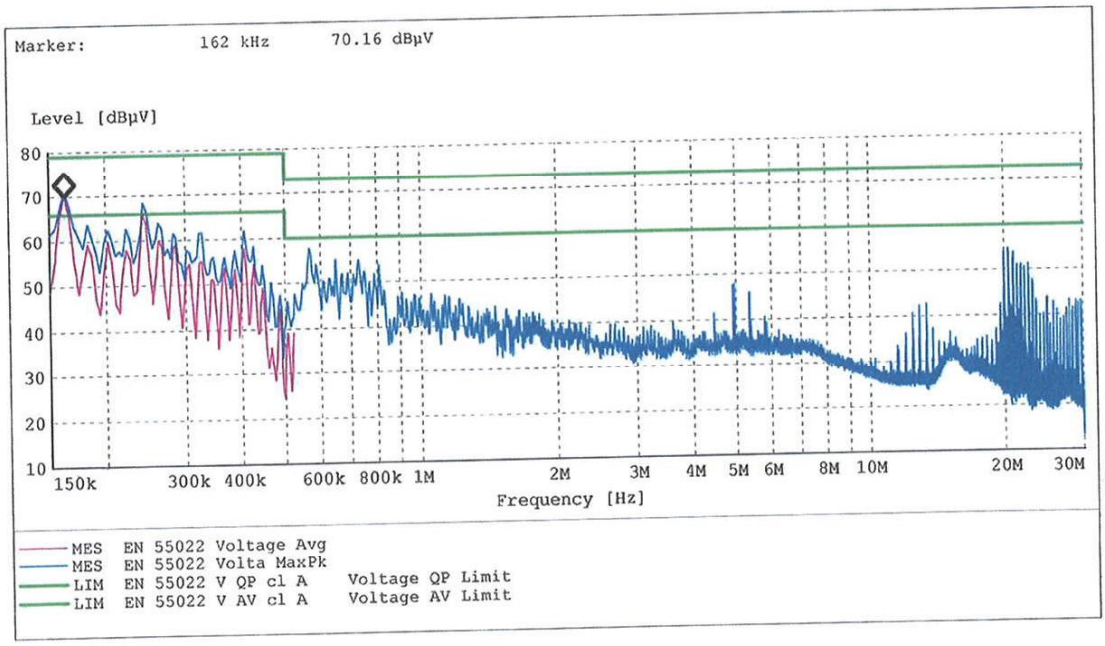


Diagram n° 4

Radiated Emissions

Horizontal antenna

Equipement: RPH3
Manufacturer: AREVA
Operating Condition: circuit breaker
Test Site: S75
Operator: GDe
Test Specification:
Comment:
Start of Test: 2008-03-06

SCAN TABLE: "EN 55022 Field"

Short Description: EN 55022 Field Strength
Unit: dBµV/m

Detector: Mode:

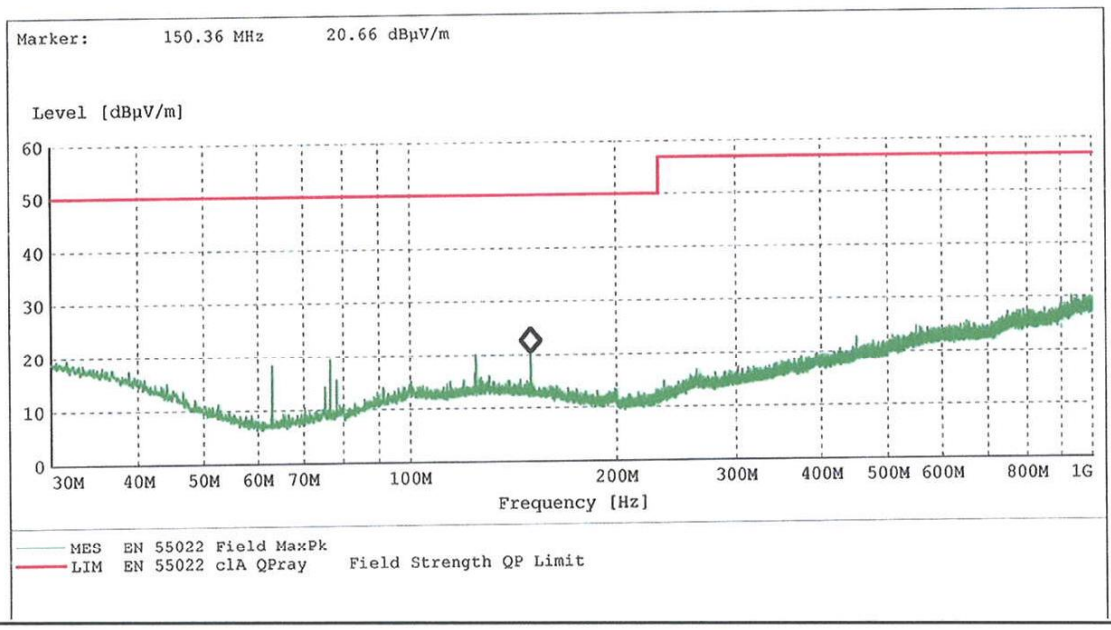


Diagram n° 5

Radiated Emissions

Vetical antenna

Equipement: RPH3
Manufacturer: AREVA
Operating Condition: circuit breaker
Test Site: S75
Operator: GDe
Test Specification:
Comment:
Start of Test: 2008-03-06

SCAN TABLE: "EN 55022 Field"

Short Description: EN 55022 Field Strength
Unit: dBµV/m

Detector: Mode:

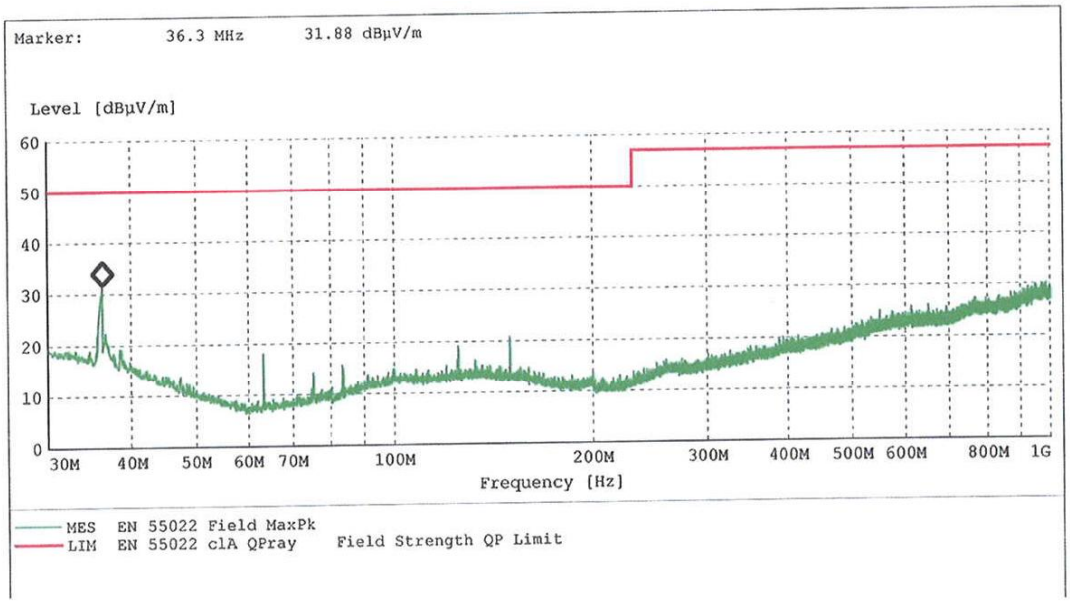


Photo n° 1

Immunity to radio-electric frequency electromagnetic field with amplitude modulation

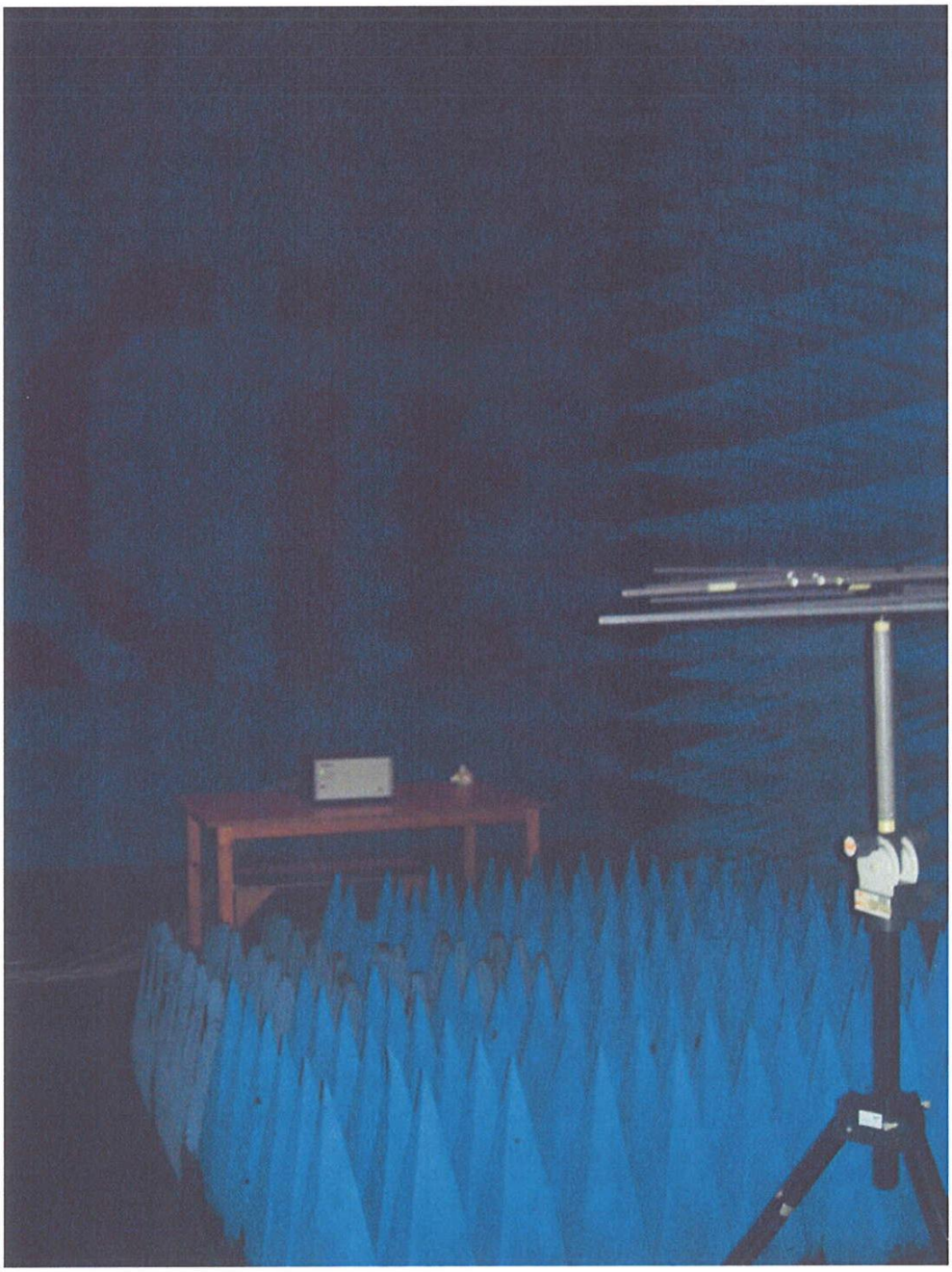
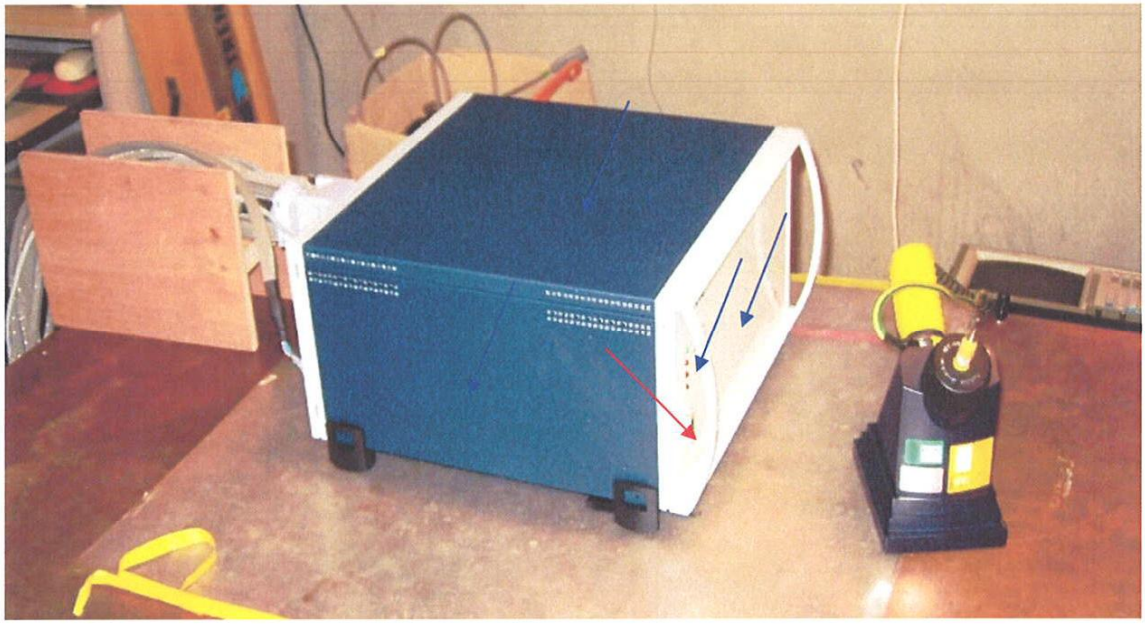


Photo n° 2

Immunity to electrostatic discharges

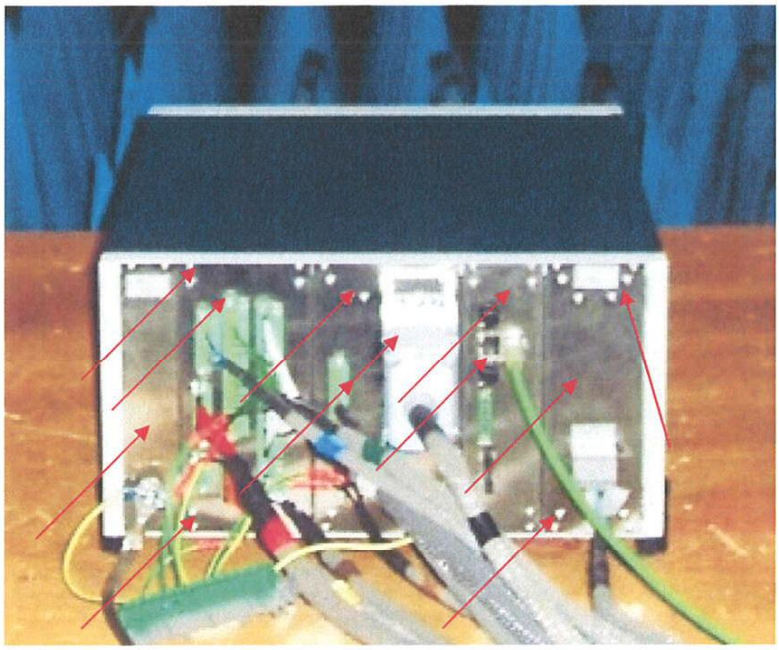


→ **Air discharges**

→ **Contact discharges**

Photo n° 3

Immunity to electrostatic discharges

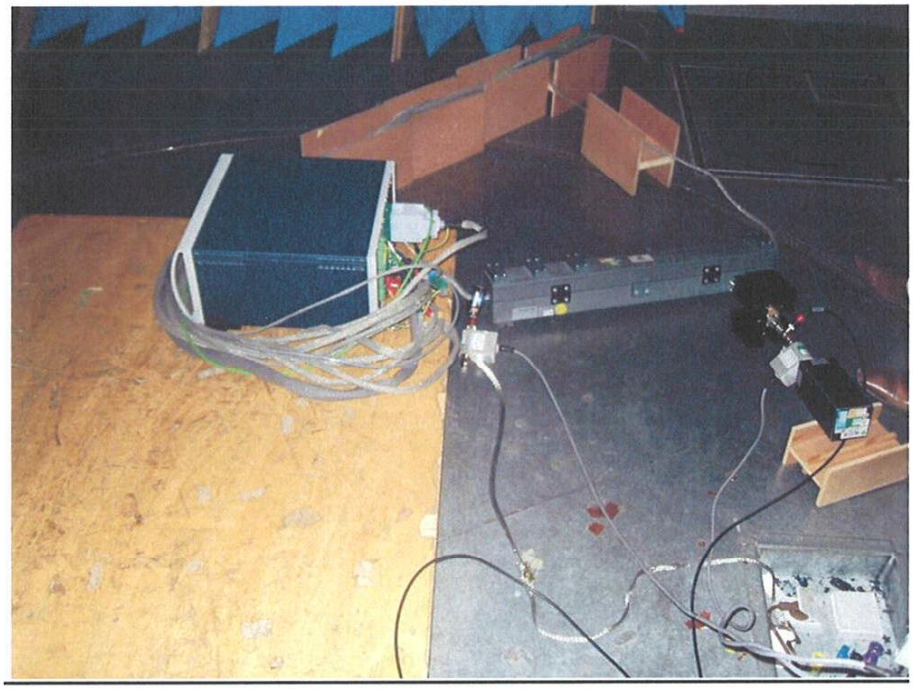


→ **Air discharges**

→ **Contact discharges**

Photo n° 4

Immunity to conducted disturbances, induced by radio-electric fields



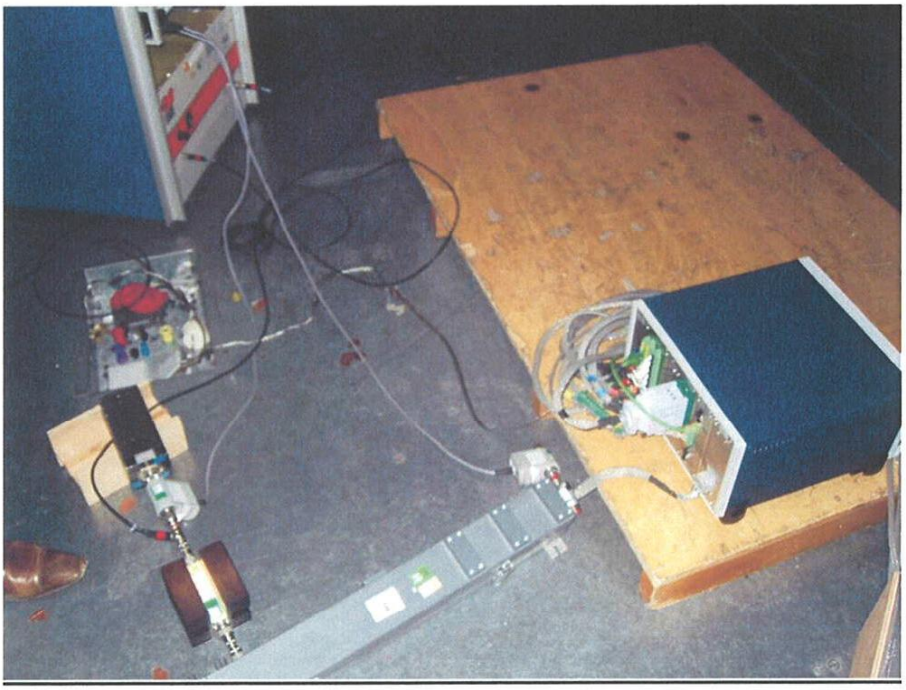


Photo n° 5

Immunity to fast transients/bursts.

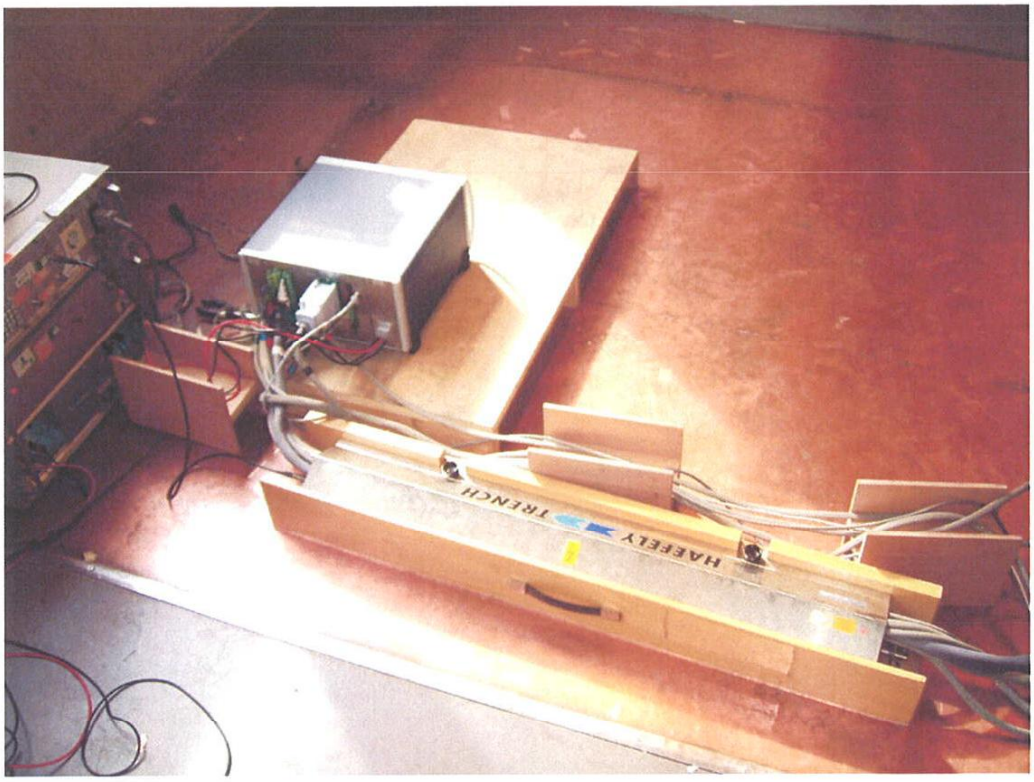


Photo n° 6

Immunity to Surges

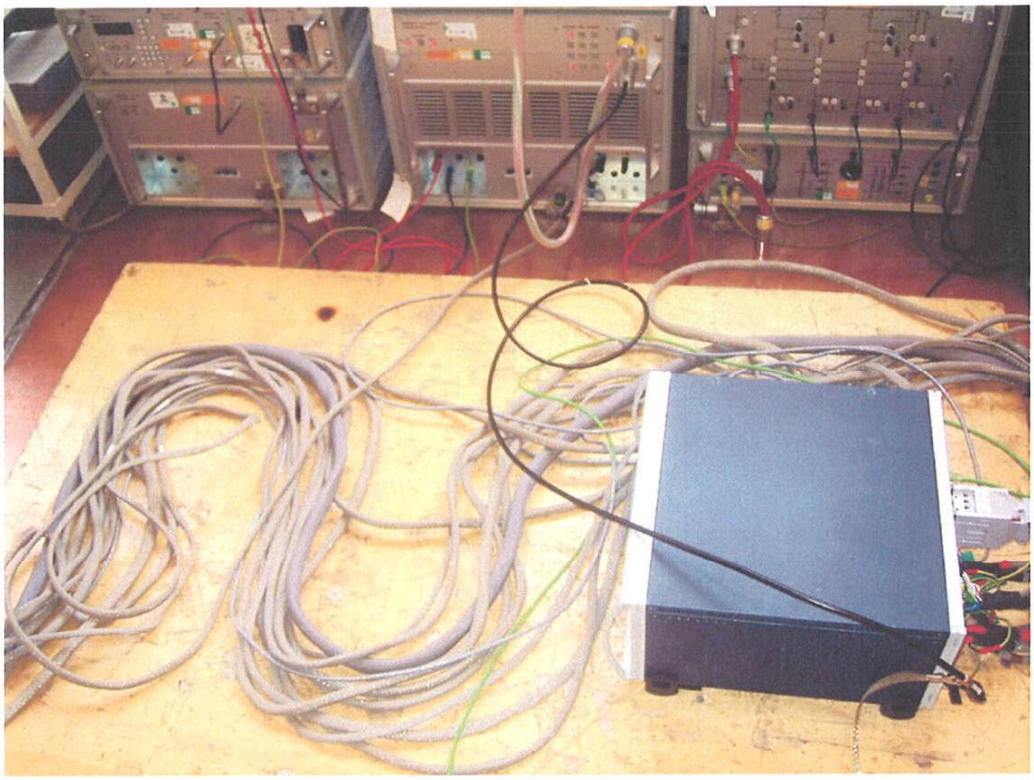


Photo n° 7

Immunity to conducted common mode disturbance between 15Hz and 150kHz.

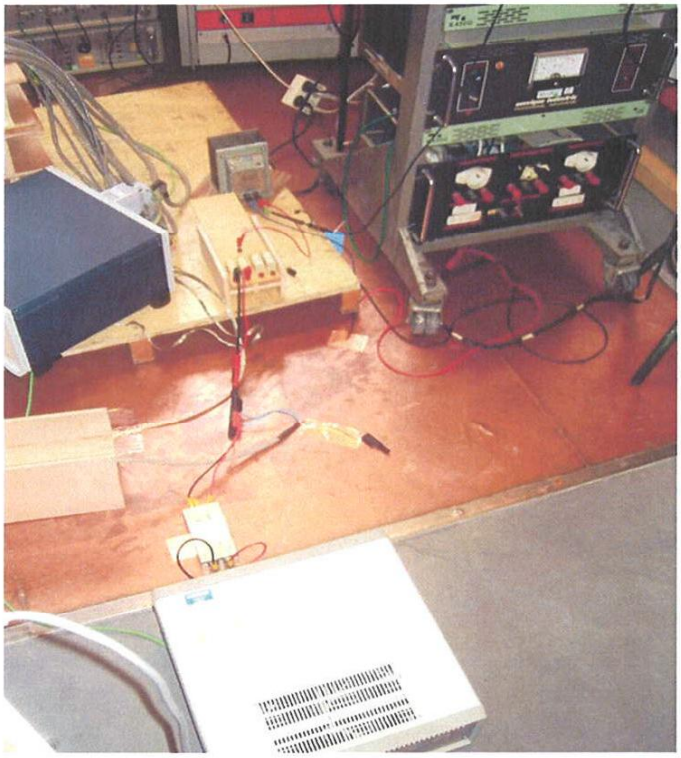


Photo n° 8

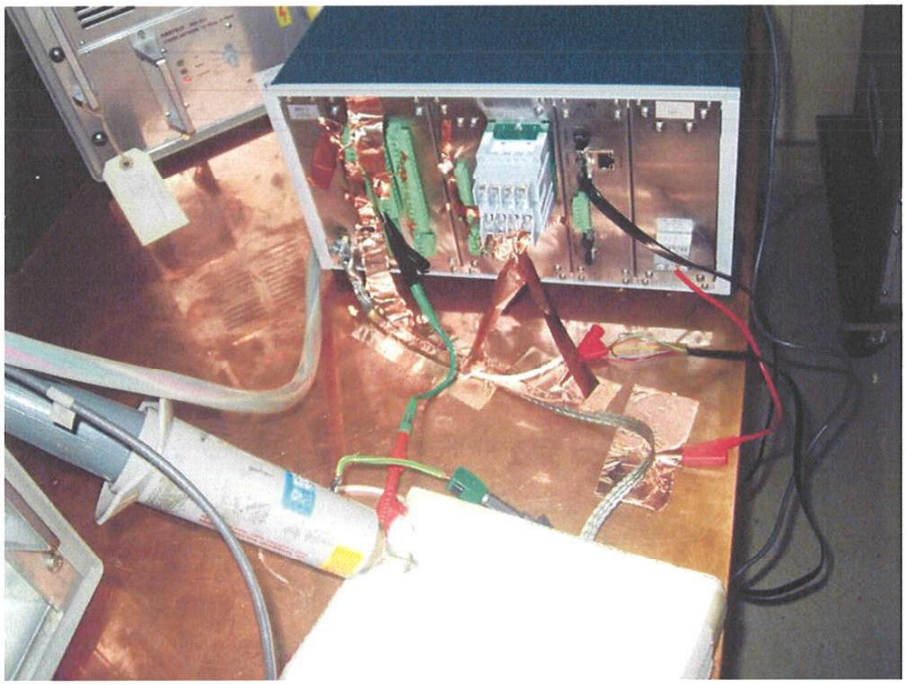
Ripple on DC input power port

Photo n° 9

Power frequency Magnetic field

Photo n° 10

Impulse voltage



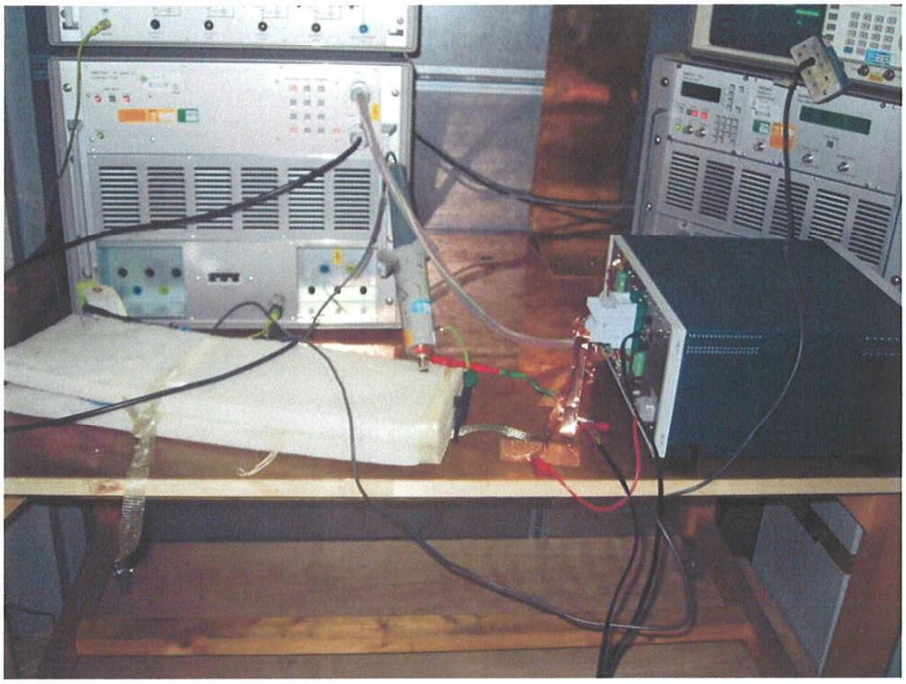


TABLE N° 1

Dielectric Strength

Electric strength measurements during 1 minute			**Pass**
Test voltage applied between:	Test voltage (V)	Leakage current (mA)	Breakdown
Line / neutral to earth	2000	< 0.1	No
RS485 link to earth	2000	< 0.1	No
RJ45 link to earth	2000	< 0.1	No
C orders tri input to earth	2000	< 0.1	No
O orders tri input to earth	2000	< 0.1	No
Alarm monostable output to earth	2000	< 0.1	No
Alarm bistable output 1to earth	2000	< 0.1	No
Alarm bistable output 2 to earth	2000	< 0.1	No
Alarm bistable output 3 to earth	2000	< 0.1	No
Alarm bistable output 4 to earth	2000	< 0.1	No
Alarm mono b to Alarm mono a	2000	< 0.1	No
Alarme bist 1b and commun bist 1 to Alarme bist 1a	1000	< 0.1	No
Alarme bist 2b and commun bist 2 to Alarme bist 2a	1000	< 0.1	No
Alarme bist 3b and commun bist 3 to Alarme bist 3a	1000	< 0.1	No
Alarme bist 4b and commun bist 4 to Alarme bist 4a	1000	< 0.1	No
VT source input to earth	2000	< 0.1	No
VT line inputs to earth	2000	< 0.1	No
CT inputs to earth	2000	< 0.1	No
Coil outputs (C & O commands) to earth	2000	< 0.1	No

TABLE N° 2

Insulation resistance

Insulation resistance measurements at 500 VDC during 1 minute	**Pass**
Insulation resistance R between:	R (MΩ)
Line / neutral to earth	> 200
RS485 link to earth	> 200
RJ45 link to earth	> 200
C orders tri input to earth	> 200
O orders tri input to earth	> 200
Alarm monostable output to earth	> 200
Alarm bistable output 1 to earth	> 200
Alarm bistable output 2 to earth	> 200
Alarm bistable output 3 to earth	> 200
Alarm bistable output 4 to earth	> 200
Alarm mono b to Alarm mono a	> 200
Alarme bist 1b and commun bist 1 to Alarme bist 1a	> 200
Alarme bist 2b and commun bist 2 to Alarme bist 2a	> 200
Alarme bist 3b and commun bist 3 to Alarme bist 3a	> 200
Alarme bist 4b and commun bist 4 to Alarme bist 4a	> 200
VT source input to earth	> 200
VT line inputs to earth	> 200
CT inputs to earth	> 200
Coil outputs (C & O commands) to earth	> 200

TABLE N° 3

Impulse Voltage

Impulse Voltage			**Pass**
Test voltage applied between:	Test voltage (V)	Mode	Breakdown
Line / neutral to earth	± 5000	Common	No
RS485 link to earth	± 5000	Common	No
RJ45 link to earth	± 5000	Common	No
C orders tri input to earth	± 5000	Common	No
C orders tri input	± 1000	Differential	No
O orders tri input to earth	± 5000	Common	No
O orders tri input	± 1000	Differential	No
Alarm monostable output to earth	± 5000	Common	No
Alarm monostable output	± 1000	Differential	No
Alarm bistable output 1 to earth	± 5000	Common	No
Alarm bistable output 1	± 1000	Differential	No
Alarm bistable output 2 to earth	± 5000	Common	No
Alarm bistable output 2	± 1000	Differential	No
Alarm bistable output 3 to earth	± 5000	Common	No
Alarm bistable output 3	± 1000	Differential	No
Alarm bistable output 4 to earth	± 5000	Common	No
Alarm bistable output 4	± 1000	Differential	No
Alarm mono b to Alarm mono a	± 5000	Common	No
Alarme bist 1b and commun bist 1 to Alarme bist 1a	± 5000	Common	No
Alarme bist 2b and commun bist 2 to Alarme bist 2a	± 5000	Common	No
Alarme bist 3b and commun bist 3 to Alarme bist 3a	± 5000	Common	No
Alarme bist 4b and commun bist 4 to Alarme bist 4a	± 5000	Common	No
VT source input to earth	± 5000	Common	No
VT line inputs to earth	± 5000	Common	No
CT inputs to earth	± 5000	Common	No
Coil outputs (C & O commands) to earth	± 5000	Common	No

Equipment list

Test	*Apparatus*	*Trade Mark*	*Type*	*Registration number*
	Open area test site			
X	*Spectrum analyseur*	HEWLETT PACKARD	8566B	A4060004
X	*Preselector*	HEWLETT PACKARD	85685A	A4069001
X	*Quas-Peak adaptator*	HEWLETT PACKARD	85650A	B2163019
X	*Preamplifier*	HEWLETT PACKARD	8449B	A4069002
X	*Signal Generator*	ROHDE & SCHWARZ	SMY02	A5442013
	Signal Generator	HEWLETT PACKARD	E4433B	A5488014
X	*Signal Generator*	ROHDE & SCHWARZ	SMP02	B2163019
	Mire	PHILIPS	PM 5518-TX	A5240009
	RLTE	SECRET	ENS 1039	C2324001
X	*Current clamp*	EURO MC		A5329052
X	Voltage sensing probe	SCHAFFNER	CVP2200	A5329031
X	*V ISLN*	SCHARZBECK	NNLK8129	C2320091
	V ISLN	ROHDE & SCHWARZ	ESH3-Z6	C2322020
X	*Bilog antenna*	CHASE	CBL 6112A	C2040040
X	*Bilog antenna*	AH SYSTEM	SAS-2001251	C2040025
	Wide Band dipole	ROHDE & SCHWARZ	HUF-Z1	C2040011
	Logperiodic antenna	ROHDE & SCHWARZ	HL 023 A2	C2040001
	Logperiodic antenna	E\D	AN112	C2040029
X	*Horn antenna*	ETS	3115	C2042023
X	*Horn antenna*	EMCO	3115	C2042016

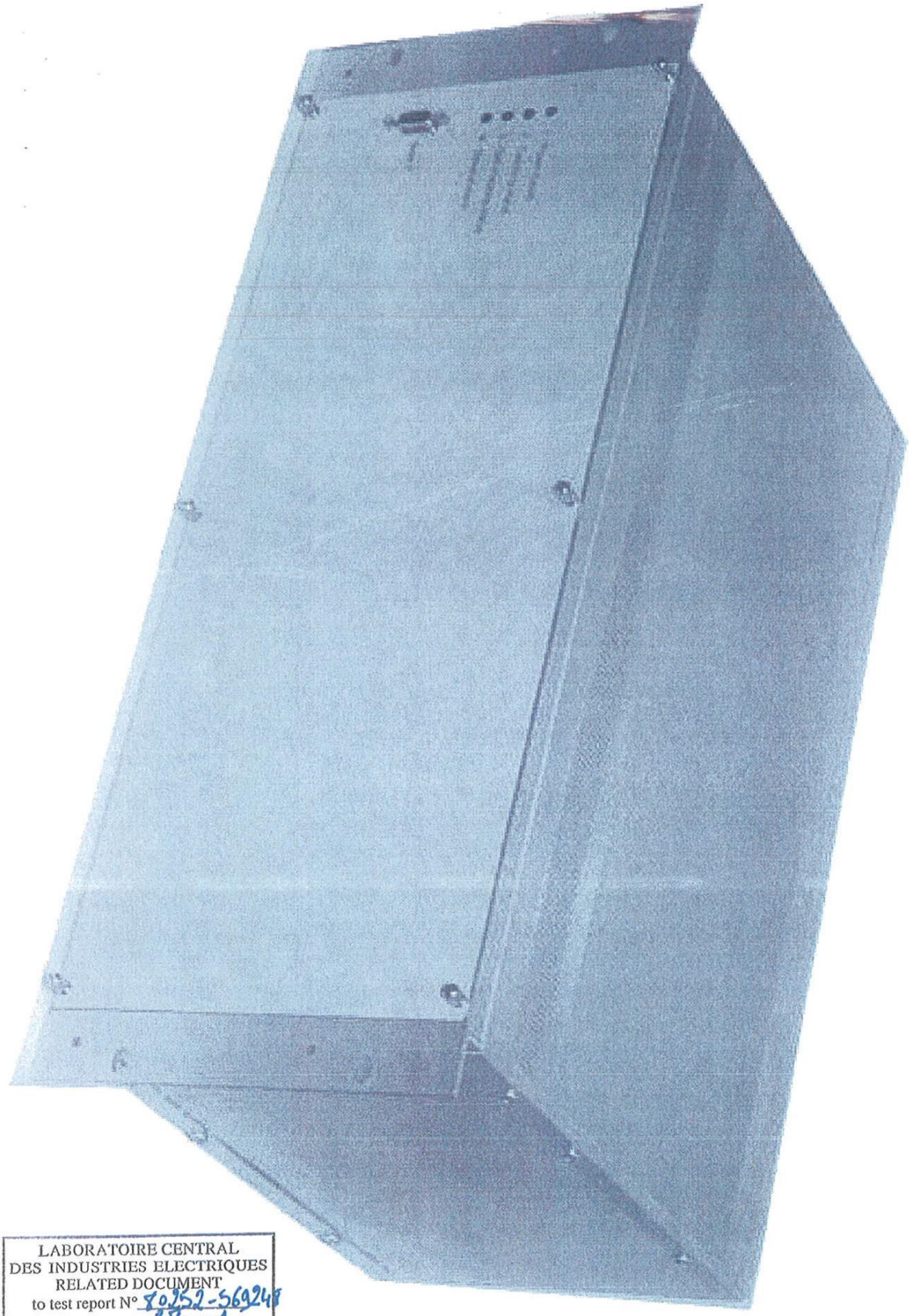
Test	Apparatus	Trade Mark	Type	Registration number
	Immunity to electrostatic discharges			
X	*Electrostatic discharge simulator system*	SCHAFFNER	NSG 435	A5322005
	Electrostatic discharge simulator system	SCHAFFNER	NSG 432	A5322001
	Immunity to radiated field			
X	*Semi anechoic chamber 11.8 x 8.1 x 9.5 m*	*SIEPEL*	*C01*	*D3044008*
x	*Software*	L.C.I.E.	1000-4-3/1000-4-6	-
x	*Controler PC*	IPC	BE ES4-4	BE ES4-4
x	Broadband measurement system	HOLADAY	HI-4400	A2240012
x	*Field probe*	AMPLIFIER RESEARCH	FP2000	A2249015
	Field probe	AMPLIFIER RESEARCH	FP2080	A2249011
	Field probe	HOLADAY	HI-4421G	A2249014
	Field probe	HOLADAY	HI-4421G	A2249001
x	*Voltage sensing probe*	ROHDE & SCHWARZ	URV5-Z2	A1509022
x	*Voltage sensing probe*	ROHDE & SCHWARZ	URV5-Z2	A1509023
x	*Power meter*	ROHDE & SCHWARZ	NRVD	A1503003
X	*Amplifier*	AMPLIFIER RESEARCH	100W 1000M	A7086010
	Amplifier	AMPLIFIER RESEARCH	500W1000M7	A7085004
x	*Amplifier*	AMPLIFIER RESEARCH	200T1G3	A7086009
	Amplifier	MILMEGA	95975	A7086002
	Amplifier	KALMUS	750FC	A7102003
	Biconic antenna	EATON	96002	C2040010
x	*Logperiodic antenna*	AMPLIFIER RESEARCH	AT 1080	C2040043
x	*Horn antenna*	EMCO	3115	C2042018
x	*Coupler*	AMPLIFIER RESEARCH	DC7154	A7132004
x	*Coupler*	AMPLIFIER RESEARCH	DC6180	A7130027
x	*Signal generator*	ROHDE & SCHWARZ	SMP02	B2163020
	Function synthesizer	HEWLETT PACKARD	8904A	A5440001
	Semi anechoic chamber 8 x 5 x 3,2 m	*SIDT*	*S75*	*D3044001*
	Software	L.C.I.E.	1000-4-3/1000-4-6	-
	Broadband measurement system	HOLADAY	HI-4400	A2240001
	Field probe	AMPLIFIER RESEARCH	FP2000	A2249015
	Voltage sensing probe	ROHDE & SCHWARZ	URV5-Z2	A1509008
	Voltage sensing probe	ROHDE & SCHWARZ	URV5-Z2	A1509009
	Power meter	ROHDE & SCHWARZ	NRVD	A1503003
	Amplifier	AMPLIFIER RESEARCH	100W1000	A7086010
	Biconic antenna	ROHDE & SCHWARZ	HUF-Z2-837.2010.52	C2040003
	Logperiodic antenna	AMPLIFIER RESEARCH	AT1080	C2040043
	Stripline antenna	-	-	-
	Coupler	AMPLIFIER RESEARCH	DC6180	C5364019
	Coupler	AMPLIFIER RESEARCH	DC2600	A7130027
	Signal generator	ROHDE & SCHWARZ	SMG	A5400001
	Signal generator	ROHDE & SCHWARZ	SMG	A5400006
	Signal generator	ROHDE & SCHWARZ	SMX	A5442002
	Signal generator	ROHDE & SCHWARZ	SMY01	A5442014
	Signal generator	ROHDE & SCHWARZ	SMY02	A5442013

Test	Apparatus	TRADE MARK	Type	Registration number
		Immunity to fast transientburst		
X	*Reference ground plan 2,5 x 2,5 m*	*L.C.I.E.*	*C03*	-
X	*Fast transient burst generator*	HAEFELY	PHV 41.2	A5329016
X	*Coupling clamp*	HAEFELY	093 506.1	-
	32 A three phases coupling network	HAEFELY	FP-EFT 32.1	A5329018
	Reference ground plan 3 x 3 m	*L.C.I.E.*	*S48*	-
	Fast transient burst generator	SCHAFFNER	Modula 6000	A5320016
	Coupling clamp	SCHAFFNER	CDN 125	-
	Fast transient burst generator	SCHAFFNER	BEST	A5320015
		/ Immunity to surge		
X	*Reference ground plan 2 ,5 x 2,5 m*	*L.C.I.E.*	*C03*	-
	Surge generator	HAEFELY	PHV 30.2	A5329020
X	*32 A three phases coupling network*	HAEFELY	FP-SURGE 32.1	A5329024
X	*Surge generator*	HAEFELY	PSURGE 4010	-
	Coupling network	HAEFELY	IP 6.2	A5329022
	Coupling network	HAEFELY	DEC 1A	A5329023
	Reference ground plan 3 x 3 m	*L.C.I.E.*	*S48*	-
	Surge generator	SCHAFFNER	Modula 6000	A5320016
	Surge generator	SCHAFFNER	BEST	A5320015
		Immunity to injected current		
X	*Semi anechoic chamber 11.8 x 8.1 x 9.5 m*	*SIEPEL*	*C01*	*D3044008*
	Reference ground plan 2.5 x 2.5 m	*L.C.I.E.*	*C03*	-
X	*Signal generator*	RHODE & SCHWARZ	SMX	A5442002
X	*Amplifier*	AMPLIFIER RESEARCH	100A250	A7085005
X	*Voltage sensing probe*	RHODE & SCHWARZ	URV5-Z4	A2280001
X	*Voltage sensing probe*	RHODE & SCHWARZ	URV5-Z4	A2280002
X	*Millivoltmeter*	RHODE & SCHWARZ	URV5	A1481001
X	*Current clamp*	TEGAM	94430-2	A1092020
X	*Attenuator 6 dB*	SOHDY	AT 50-6N	A7122006
X	*Load 50 ohms*	BIRD	8164	A7152001
X	*Injection clamp*	LÜTHI	EM101	C2320026
	Current clamp	SINGER	93686-1	A1092008
X	*Decoupling clamp*	LÜTHI	FTC101	C2320027

UNCERTAINTIES CHART

Type de mesure / *Kind of measurement*	*Wide uncertainty laboratory* (k = 2) ±x(dB)	*/ CISPR uncertainty limit* ±y(dB)
Measurement of conducted disturbances in voltage on the AC power port on the Fontenay-aux-Roses site.	3.56	3.6
Measurement of conducted disturbances in voltage on the AC power port on the Ecuelles site.	3.50	3.6
Measurement of conducted disturbances in voltage on the DC power port on the Fontenay-aux-Roses site.	3.56	3.6
Measurement of conducted disturbances in voltage on the DC power port on the Ecuelles site.	3.56	3.6
Measurement of conducted disturbances in voltage on the telecommunication port.	3.28	*Under consideration*
Measurement of conducted disturbances in current	2.90	*Under consideration*
Measurement of radiated electric field from 30 to 200 MHz in horizontal position on the Fontenay-aux-Roses site	4.58	5.2
Measurement of radiated electric field from 30 to 200 MHz in vertical position on the Fontenay-aux-Roses site	4.82	5.2
Measurement of radiated electric field from 200 to 1000 MHz on the Fontenay-aux-Roses site	4.92	5.2
Measurement of radiated electric field from 1 to 18 GHz on the Fontenay-aux-Roses site	6.54	*Under consideration*
Measurement of radiated electric field from 30 to 1000 MHz on the Ecuelles site	4.72	5.2
Measurement of radiated electric field from 1 to 6 GHz on the Ecuelles site	5.60	*Under consideration*
Measurement of radiated electric field from 6 to 18 GHz on the Ecuelles site	5.83	*Under consideration*
Measurement of disturbance power	3.37	4.5
Immunity to conducted disturbances, induced by radio electric field	2.36	/
Immunity to conducted disturbances, induced by radio electric field, method oh the injection clamp	2.76	/
Immunity to radiated radio electric field from 80 MHz to 2.6 GHz	2.64	/

The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the CISPR. The conformity of the sample is directly established by the applicable limits values



LABORATOIRE CENTRAL
DES INDUSTRIES ELECTRIQUES
RELATED DOCUMENT
to test report N° 80252-569248
28 pages

SERMA INGENIERIE

EQUIP1

Circuit breaker point on wave control system
Part 1 – Hardware specification

APPROVAL SIGNATURES

NAME	Version	DATE	SIGNATURE

RECORD OF REVISION

VERSION	DATE	AUTHOR	COMMENTS

SERMA INGENIERIE

TABLE OF CONTENTS

1 FUNCTIONAL DESCRIPTION

EQUIP1 is dedicated to the controlled switching of breakers with single pole drives. It can be used for both energising and de-energising of high voltage devices. Its aim is to decrease the level of switching over-voltages.
The insulation of the lines and substation for very high voltage networks, exceeding 362kV, is determined by the switching over-voltage withstand and no longer by lightning impulses. A reduction in the level of switching over-voltages therefore has an important economic impact.
Switching over-voltages are generated mainly during closing and even more critically during reclosing of the no-load lines. A certain number of means are available to the operators in order to reduce their level, i.e. closing resistors, controlled switching relays and surge arresters; they can be combined each other to get the required level. Closing of the shunt reactors can also create occasional switching over-voltages. These over-voltages can be dangerous for the network and the circuit-breaker itself. Controlled switching relays and surge arresters are again the remedy.
The transients which develop during the closing of the capacitor banks or no-load transformers can also be limited by the insertion of a resistor or controlled closing.
The EQUIP1 is dedicated to switching the following loads : capacitors, transformers , shunt reactors , and lines .
For practical purposes , the application described below will be restricted to line switching . The hardware will be designed to accommodate all applications , but the software described in this first step will deal only with line switching .

1.1 Closing on no-load lines

1.1.1 Origin of overvoltages

The closing and reclosing of no-load lines generates a voltage wave which, when reflected from the open end of the line, provokes over-voltages along the length of the line with a maximum at the end of the line. These over-voltages must not, of course, result in flashovers on the network. Therefore, the value of the over-voltages generated determines the insulation level of all of the line's pylons and has a very significant impact on the cost of the line.
Reclosing of lines causes larger over-voltages than simple closing because of the likelihood, in this case, of closing on a line which has kept a trapped charge with the opposite polarity; the voltage wave generated is therefore double that which develops during simple closing on a discharged line. This reclosing can only occur during a fault on the network, so it therefore occurs less frequently than simple closing which enables daily configuration of the network. Knowing that the large majority of faults are single-phase faults (approximately 90%) the choice of single-phase or three-phase reclosing in the event of a single-phase fault will have a significant influence on the statistical level of over-voltages generated on the network. In fact, if single-phase reclosing occurs on a single-phase fault, the reclosing does not cause a problem because the line does not remain charged due to the existence of the fault. On the other hand, if three-phase reclosing occurs on a single-phase fault, the reclosing of the two unfaulted lines is performed on trapped charge and therefore creates larger over-voltages.

This philosophical difference regarding reclosing has led to a historical difference between the design of European 420kV networks and American 362 and 550kV networks. In Europe, the use of single-phase reclosing has led to sizing the line insulation so that it can withstand the over-voltages generated by simple closing, i.e. in the order of 3pu, but without equipping either the circuit-breakers or the network with additional means of reducing the overvoltages. In North America, the use of three-phase reclosing would have required an insulation level in excess of 4pu if other means of reducing the over-voltages had not been taken; this has led to the use of closing resistor breakers to limit the over-voltages and has consequently enabled the lines to be insulated at approximately to 2.2 to 2.5pu.
The level of over-voltages generated on closing depends on a certain number of factors, such as the length of the lines, the configuration of the line, the power of the network, the difference in the closing times between the poles of the circuit-breaker and the line's degree of compensation .
These different factors combined with the different means of reducing the over-voltages must be taken into account during the determination of the line's insulation level.
Point of wave principle consists of closing the breaker when the voltage across its terminals is as close as possible to zero so as to propagate the smallest possible voltage wave along the line and limit the over-voltage . This implies good repeatability for the operating times even after the circuit-breaker has spent a prolonged period in an open position, good constancy for the circuit-breaker's dielectric characteristic and unperturbed network voltage. To deal with the problem of reclosing, the value of the line voltage must be evaluated at the moment when it is required to close. There are two possibilities: reclosing on a trapped-charge line and reclosing on a shunt reactor compensated line:

1.1.2 Uncompensated (no-load) lines

An uncompensated line is one without a shunt reactor, and thus its particularity is that it remains charged after an opening.:

-The line is fitted with Inductive Voltage Transformers on each phase. In this case, following an opening of the no-load line, the instrument transformer will rapidly discharge the line generally in less time than it takes for a re-closing. Therefore, all closings, or re-closings, will be on a discharged line. When using controlled switching, the closing target must be at zero of the source voltage, both for closings and re-closings, the simplest case to lend itself to controlled switching is that of the controlled switching of capacitor banks.

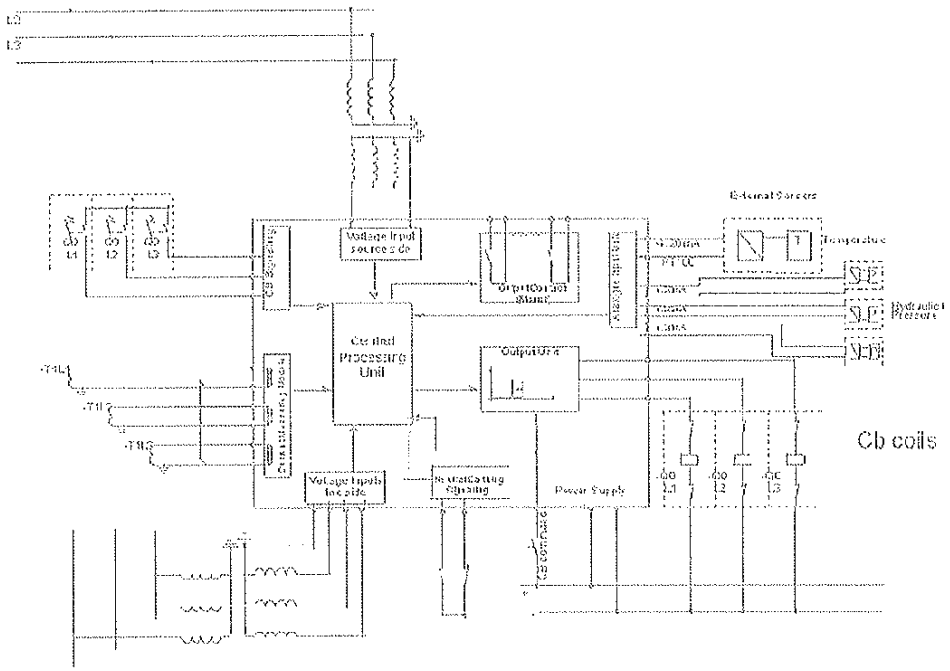
-The line is fitted with Capacitive type Voltage Transformers, conventional or not, which will not discharge the line.

* If the operation of the line uses three-phase re-closing, this means that all single-phase faults, which represent more than 90% of line faults, two phases will be re-closed onto trapped charges. The controlled operation should be dealt with differently depending on whether one is carrying out a closing operation on a discharged line or a re-closing. The trapped charge held by the line can evolve as a result of atmospheric conditions. As the capacitive voltage transformer is not able to measure the evolution of the trapped charge it is necessary to assess it.
* If the operation of the line uses single-phased re-closings, the number of cases in which the re-closing could be onto a trapped charge becomes extremely small and is limited to the cases of two-phase faults and untimely three phase re-closings.

1.1.3 Compensated Lines

Shunt reactor compensated lines are particular in the fact that, after opening, there is an oscillation at a frequency somewhere in the order of 50 to 90% of the network frequency. The voltage appearing across the circuit breaker terminals shows various degrees of fluctuation, depending on the degree of compensation. The optimal switching moment for re-closing is a minimum of the voltage beat.
The level of shunt compensation for a line can vary from one instant to the next as a result of the power carried by the line. A line can thus be compensated at one instant but not at another, or to a lesser degree and the level of compensation must be assessed by the controller.

1.2 Functional diagram of EQUIP1 :



1.3 Basic functional description of EQUIP1

Once the control or protection order is acknowledged by the EQUIP1 its transmission to the coils is delayed by a variable period as a function of the network parameters, the charge and the circuit-breaker, to switch each phase at the optimum instant.

The duration of the circuit-breaker operations can vary as a function of external factors such as temperature, the power supply voltage to the coils and the hydraulic system pressure. With reduced control voltage at the circuit breaker coil there is less energy available trigger the breaker into a mechanical action, and operating times of breaker then increase .For hydraulic breakers , each operation uses some amount of oil in the circuits , thereby decreasing the pressure of remaining oil in the tank , and the energy available to carry out next operation .The lower the pressure , the longer the operating times will be .The ambient temperature is the most complex parameter of influence. The electrical resistance of the trip coils, the oil viscosity and the pressure of the SF6 gas are dependent on the temperature. In addition, changes of length in the driving linkage and the porcelains occur. All these parameters influence the operating time in different ways. In some extreme configurations , each of these 3 parameters can alter the operating time by some milliseconds. In order to obtain the accuracy required, the influence of the external factors on the operating times must be compensated for. All the compensation factors are calculated continuously so as to be able to react instantaneously to an order.

The phase-synchronous trigger-signal is taken from the network voltage (1 phase only). The trigger-signal is based on the voltage-zeros of the reference voltage. Network voltage is also used as a reference. The amount of phase shift between current and voltage is almost always +90°el. or -90°el. (A deviation of ±1°el. creates a variation of ±0,06 ms of the switching point.)

The optimum switching instant is the actual making or interrupting the current through the circuit breaker contacts . Because of dielectric characteristics of circuits breakers , arcing occurs after main contacts have separated , and pre-arcing before main contacts actually close . These pre-arcing and arcing times have to be calculated (depending on network configuration, load configuration, circuit breaker design , etc...) and programmed into the EQUIP1

1.4 Dimension :

EQUIP1 housing is designed for mounting in a 19" – rack or wall mounting.

Height : 4U
Depth : 350 mm max
Width : 19"

1.5 Connection

Terminal bloc with screws type PHOENIX CONTACT MSTB2.5 or PHOENIX CONTACT MC 1.5 (male + female assembly) will be used for all connections ,except :

- Communication ports (RS232-SuBD9, 100BaseFx / Tx),
- Connection to primary CT (ENTRELEC connection kit ,ESSAILEC type)
- Power supply and voltage inputs direct connection of cables on AWG 24-10 type blocs.

All connectors will be connected on the back panel of EQUIP1 , except the RS232 communication port.

1.6 I/O List

1.6.1 Low voltage inputs

Type of interface	*Type of measurement*	*Number of inputs outputs*	*Sampling frequency*	*Connections points per I/O*	*Total Connections*	*notes*
4 - 20 mA	Oil Pressure	3	100 Hz	2+1 (shield)	9	If hydraulic mechanism
4 - 20 mA	Temperature	1	1 Hz	2+1 (shield)	3	External temperature

1.6.2 Power supply monitoring

Type of interface	*Type of measurement*	*Number of inputs outputs*	*Sampling frequency*	*Connections points per I/O*	*Total Connections*	*notes*
DC Input	Power supply	1	On O/C orders event	2	2	Digitalisation : 12bits -1%

1.6.3 Voltage/ Current inputs

Type of interface	*Type of measurement*	*Number of inputs outputs*	*Sampling frequency*	*Connections points per I/O*	*Total Connections*	*notes*
AC input	Primary voltage (line)	3	1 kHz	2	6	Line voltage for line switching
AC input	Primary voltage (source)	1	1 kHz	2	2	Source voltage (phase 1)
AC input	Primary currents	3	1 kHz	2	6	Line current for line switching For 5A input (1A by software)

1.6.4 Control inputs

Type of interface	*Type of measurement*	*Number of inputs outputs*	*Sampling frequency Jitter delay*	*Connections points per I/O*	*Total Connections*	*notes*
Isolated power digital input	O et C orders (tri)	2	5µs	2+1 (shield)	6	Triggered input
Non isolated single phase orders monitoring	O orders (mono)	3	5µs	2+1 (shield)	7 (1 shield)	Triggered input Output of auxiliary CT on Coils O1 & O2 cables. (Analog and digital filtering)
Power digital input (Auxiliary switches signalling)	Neutral earthing signalling	2	1s	2+1 (shield)	4 (common shield & +)	NO + NC
	CB signalling	3	5 kHz	2+1 (shield)	7 (1 shield)	CB position

1.6.5 communication link

Type of communication	*Localisation*	*Protocol*	*connection*	*Function*
Local link	Front	RS232 – Modbus*	SuBD 9pts 3+1(shield)	Configuration (protected), records, upgrade software (protected)
RS485 link	Rear	RS485 – Modbus*	Screw terminal 2+1(shield)	
Ethernet link	Rear	100Base Fx & Tx – TCP/IP – 61850	Optical & RJ45	

1.6.6 Alarms output

Type of interface	*Type of measurement*	*Number of inputs /outputs*	*Connections points per I/O*	*Total Connections*	*notes*
Monostable output	Alarms	1	2 + 1 (shield)	3	NO
bistable output	Alarms	4	3 + 1 (shield)	16	Inverter (NO + NC)

1.6.7 Control output

Type of interface	*use*	*Number of inputs /outputs*	*Connections points per I/O*	*Total Connections*	*notes*
Coil Output	Close & open command	6	3(command+shield) + 3 (power supply + shield)	21	Common power supply

1.6.8 Power supply

	Pin out
Ground	1
Power supply	2

2 SPECIFICATION OF SUBPARTS

2.1 Power supply

2.1.1 Characteristics

Supply voltage :
- Nominal: 48 V à 250 VDC.
- Operative range: 35 V à 300 VDC
- Two range possible : 35V-125VDC & 125V-300VDC
- Protected against polarity inversion.
- Option : special power supply for 48 V -44 % ANSI-Standard available

Monitoring of 48V output :
- Fault detection

2.2 U/I inputs : isolating transformers with their measuring channel (without anti-aliasing filter)

2.2.1 Voltage inputs

2.2.1.1 Source side (1 input) :

Nominal (2 options): 100/√3 V; 220/√3 V AC
Operative range(2 options): 15 V -105 VAC; 30 V - 250 VAC
Rated frequency: 50 / 60 Hz ±10 %
Power consumption of measuring inputs: < 2 VA
Insulation level between input and output windings : 2kV rms
Cut-off frequency : > 500 Hz
Accuracy (composite error : magnitude + phase) : 1% (0.57° = 32 µs @50Hz)
Resolution : 12 bits

2.2.1.2 Line side (3 inputs) :

Nominal (2 options): 100/√3 V; 220/√3 V AC
Operative range (2 options) : 15 V -150 VAC; 30 V - 330 VAC
Rated frequency: 20-66 Hz
Power consumption of measuring inputs: < 2 VA
Cut-off frequency : > 500 Hz
Accuracy (composite error : magnitude + phase) : 1% (0.57° = 32 µs @50Hz)
Resolution : 12 bits

2.2.2 Current inputs

Nominal: 1 A and 5 A
Rated short time current : 200A - 1 s
Operative range : 0.5 à 3In
Rated frequency: 50/60 Hz ±1 %
Power consumption of measuring inputs: < 2 VA à 3In
Cut-off frequency : > 500 Hz
Accuracy (composite error : magnitude + phase) : 3% (1.7° = 95 µs @50Hz)
Resolution : 12 bits

2.3 U/I inputs: digitalisation and 4-20 mA sensors

2.3.1 Digitalisation

Sampling rate :

- AC channels (4U + 3I) :1 Khz
- Pressure channels : 100Hz
- Temperature channel : 1Hz

Anti-aliasing filtering : AC channels (4U + 3I)

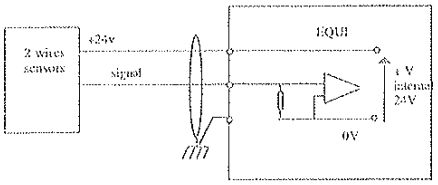
- Filter : Low pass Bessel 2nd order (Delay ~ 600 µs)
- Cut-off frequency : > 500 Hz
- Delay accuracy without calibration : 200 µs max*
  Synchronisation shift (60µs), accuracy of capacity anti-aliasing filter (120µs), Frequency (20µs)
- Delay accuracy after calibration* : (20Hz to 66Hz) : 20 µs max
  Use stable capacity COG 30ppm10% . +/-10%
  Jitter delay vs temperature : 2 * 30ppm * 30°C * 600 µs = 1µs (negligible)

Anti-aliasing filtering : Pressure & Temperature channels

- Filter : Low pass 1st order
- Cut-off frequency : Fc = Fe / 3

** It's necessary to made a digital correction of the delay by interpolation to synchronise all AC channels in them.*

2.3.2 Input circuits for 4-20 mA inputs



Quantity	4
Insulation	None
Accuracy	+/- 0,2 mA
Sampling frequency	100Hz (pressure), 1 Hz (temperature)
A/D conversion	12bits minimum
Common mode rejection ratio	> 100 dB

Value of measurement	*Diagnostic*
[0 ; 3 mA[	Open circuit
[3 ; 25]	Valid data
>25 mA for more than 10 s	Short circuit

2.4 Data processing, alarms

2.4.1 Data processing

Digital signal processor (DSP) :

Frequency : 250 MHz
Floating point 32/64 bits DSP
CPU Performance : > 250 Mflops

Memory :

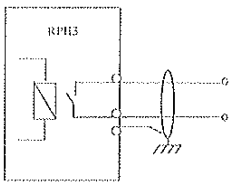
Memory (flash eprom) size for parameters : 4 kBytes
Memory (flash eprom) size for archive : 1 MBytes

Real Time clock (RTC) :

Accuracy :	4mn/year
Temperature range :	-40°C / 85°C
Power supply backup :	super capacitor
Timekeeping of the super capacitor :	2 weeks @ 85°C
Life time of super capacitor :	15 years

2.4.2 Alarms , power supply alarm

2.4.2.1 Power supply alarm



Maximum quantity	1
Type	monostable
Number of pole	1 contact per relay (NO)
Operating voltage	250 Vcc
Continuous current	5 A
Permitted overload	100A / 30ms
Power breaking with time constant	10Ω under 48v with τ = 20 ms
Insulation	channel to earth, channel to channel

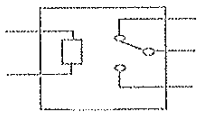
Insulation between coil and contact :

Test	Value	Reference
Dielectric strength	2 kV – 50/60 Hz for 1 minute	IEC 60255-5
Insulation resistance	100 MΩ @ 500 V	IEC 60255-5
Impulse voltage	5 kV common mode 1 kV differential mode	IEC 60255-5

2.4.2.2 alarms

Functions :

- self-checking (soft + hard)
- general status
- switching status



Type of relay	Bistable
Number of pole	2 contact per relay (Inverter NO + NC)
Operating voltage	230 V DC
Continuous current	5 A
Permitted overload	100A / 30ms
Power breaking with time constant	10VA under 48v with τ = 20 ms
Insulation	channel to earth, channel to channel*

** Insulation between coil and contact and between different contacts of the same relay.*

Test	Value	Reference
Dielectric strength	2 kV – 50/60 Hz for 1 minute	IEC 60255-5
Insulation resistance	100 MΩ at 500 V	IEC 60255-5
Impulse voltage	5 kV common mode 1 kV differential mode	IEC 60255-5

2.4.2.3 Front panel Leds

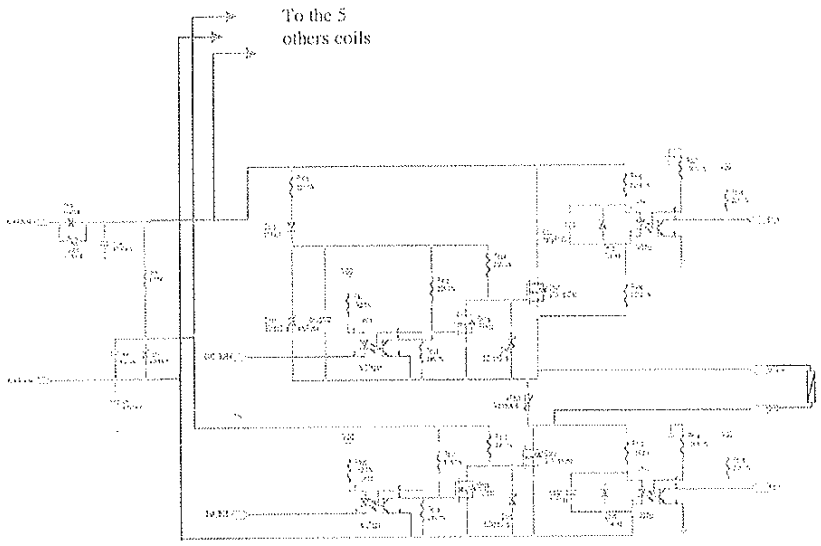
Quantity : 4

Color	function
Green	Power supply
Red	Switching status
Red	Self-checking alarm
Red	General alarm

2.5 Outputs: coil orders

We have 6 channels (3 for open and 3 for close coil CB command)
See details in the "DSCS_EQUIP1_Schematics_&_Calculs" document.

Drawing for one channel :



External connections (one by output) :

Bob+
Bob-
Shield of Bob

External connection (one for the six output) :

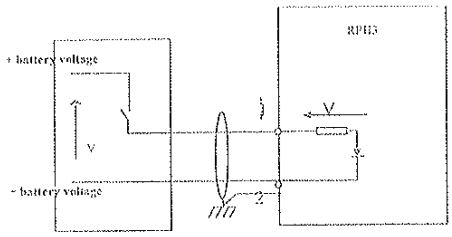
AlimBobine+
AlimBobine-
Shield of AlimBobine

Internal signals (one by channel) :

Ena_bob
Cmd_bob
E1_1
E2_1

2.6 Inputs : protection/control orders, Auxiliary switches signalling, single-phase open orders monitoring , neutral earthing switch signalling

2.6.1 protection/control orders (O & C Orders tri) : isolated digital inputs

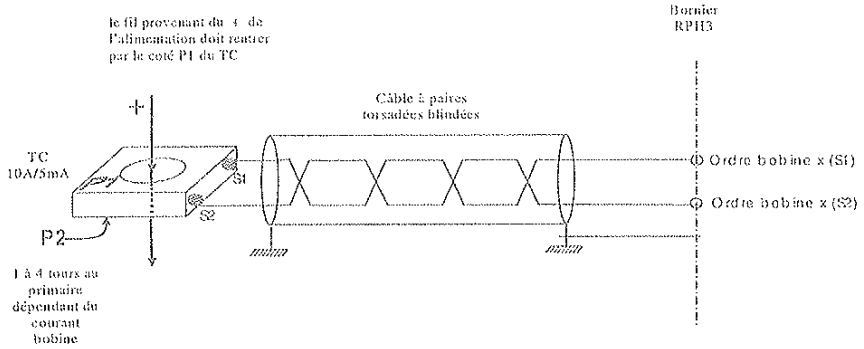


Voltage	48V DC to 250VDC
Current nominal	8 mA to 3 mA
State 0 guarantee	10v
State 1 guarantee	20v
Insulation	channel to earth, channel to channel

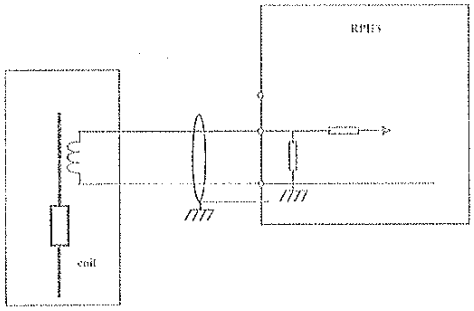
Test	Value	Reference
Dielectric strength	2 kV – 50/60 Hz for 1 minute	IEC 60255-5
Insulation resistance	100 MΩ at 500 V	IEC 60255-5
Impulse voltage	5 kV common mode 1 kV differential mode	IEC 60255-5

2.6.2 single-phase open orders monitoring

2.6.2.1 Principe

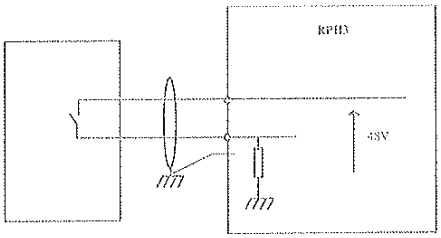


To limit the number of inputs on the EQUIP1, there will be TWO wires coming from the protection and going through the auxiliary CT: one for protection 1, the second for protection 2 (back-up)
These voltage inputs are considered at logic level "1" as soon as they reach a predefined threshold.

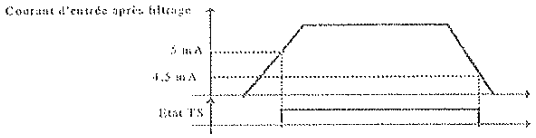


Voltage	5Vcc max 100 ms
State 0 guarantee	1,8v
State 1guarantee	4,1v
Threshold	2,5 V
Hysteresis	0,5v
Impedance	10 kΩ
Filtration	Low pass filter to 1600 Hz
Insulation	none

2.6.3 Auxiliary switches signalling (CB Signalling + Neutral earth signalling)



These current inputs are considered at logic level « 1 » if their power consumption reach a predefined threshold : 5 mA. Logic level « 0 » is defined by a no power consumption. An hysteresis of 10% is take account.



Voltage	48V powered by EQUIP1
Nominal Current	8 mA
Hysteresis	2.8v
State 0 guarantee	7v
State 1 guarantee	23v
Timing	0.2 ms
Filtration	Low pass filter to 1600 Hz
Insulation	none

Treatment of the neutral earth signalling :

There are two complementary acquisition of the same operation. One with a NO contact, the other with a NC contact. In normal operation, when one contact is opened the other is closed.
The change over time from open to close position and vice-versa takes approximately 10 seconds.
During this time, the 2 contacts are opened and the EQUIP1 must be blocked (Flag of neutral intermediate).

3 DESIGN RULES

3.1 ENVIRONMENTAL REQUIREMENTS

3.1.1 SEALING

IP 30 (IP 50 if possible).

The EQUIP1 is installed within the relay room or control room. It is not designed to be installed outdoor.

3.1.2 ATMOSPHERIC

Test	Value	Reference
Low temperature	-25°C	Cold start test
High temperature	+ 50°C	IEC 60068-2-2
Damp heat	+ 40°C, 93% 48h	IEC 60068-2-3

3.1.3 MECHANICAL

No mechanical tests requirements since the EQUIP1 is going to be installed in control rooms or relay rooms.

Electrical tests :

N°	Reference	Test	Value	Note
1	IEC 60255-5	Dielectric strength	CM : 2 kV – 50/60 Hz for 1 minute DM : 1kV – 50/60 Hz for 1 minute	1,2
2	IEC 60255-5	Insulation resistance	>100 MΩ at 500 V	
3	IEC 60255-5	Impulse voltage	CM : ±5 kV 0.5J DM : ±1 kV 0.5J	2
4	IEC 60255-6	Voltage tolerance	DC : -30% to + 20% AC : -30% to +15%	
5	IEC 61000-4-29	DC Supply interruption	50% dip : 100ms Interruption : 20 ms	
6	IEC 61000-4-16	Immunity to conducted common mode disturbance 0 to 150kHz	Level4 Continuous : 30V @ 50Hz or 60Hz 1 sec : 300V @ 50Hz or 60Hz	
7	IEC 61000-4-17	Ripple on DC input power port	Level3, 15% of the nominal value	

EMC tests :

N°	Reference	Test	Value	Note
8	IEC 61000-4-2	Electrostatic discharge	Level 4 8kV contact - 15 kV air	3
9	IEC 61000-4-3	Radio frequency impulse	Level 3 10V/m – 80MHz to 1Ghz modulation by sinus 1kHz @ 80%	
10	IEC 61000-4-4	Fast transient burst	Level 4 Conducted : 4 kV 2.5kHz Radiated : 2 kV 2.5 kHz (4 kV on G15 group)	3
11	IEC 61000-4-5	Surge Immunity	Level 4 CM 4 kV, DM 2 kV	3,4
12	IEC 61000-4-6	Conducted disturbances	Level 3 10V for 150kHz to 80MHz modulation by sinus 1kHz @ 80%	
13	IEC 61000-4-8	Magnetic disturbance immunity	Level 5 100A/m continuous - 1000A/m 3s	3
14	IEC 61000-4-10	Damped oscillatory magnetic field	Level 5 100 A/m	3
15	IEC 61000-4-12	High frequency disturbance	Level 3 CM 2,5 kV CM, DM 1 kV (200Ω) 100 kHz 50c/s, 1 MHz 400c/s (2s, F=2.5kHz)	3
16	EN 55022	Electromagnetic compatibility	Class A	

Notes :

1. No flashover or degradation of performance should be seen after tests. Leak current of generator should remain below 3 mA.
   For circuits fitted with anti-parasites CM condensators (G2,G14) test will be made with a test voltage equal to √2*rated value (= 3500 VDC), all other things remaining equal.

2. No flashover or degradation of performance should be seen after tests.

3. Errors of display on DELs is allowed.

4. Generator impedance :
   CM : G2 -> 12Ω, others -> 42Ω
   DM : G2 -> 2Ω, others -> 42Ω

Criteria :

A. Normal performance within the specifications limits (steady-state conditions)

B. Temporary degradation of performance. Degradation of only external communication allowed (RS232, RS485, Ethernet). A reset or restart is not allowed. No degradation of performance causing false trips, alarms, I/O and all real-time functions.

3.2 ENVIRONMENT IMPACT

The system should be follow the "NF ISO14000 (environment management system) to reduce its environment impact. The environment impact should be taken into account from the design phase, to the manufacturing phase and for the "end of life" disposal.
According to EU 2002/95/EG, EQUIP1 should not use any lead-based soldering material.

3.3 DEPENDABILITY

3.3.1 MTBF

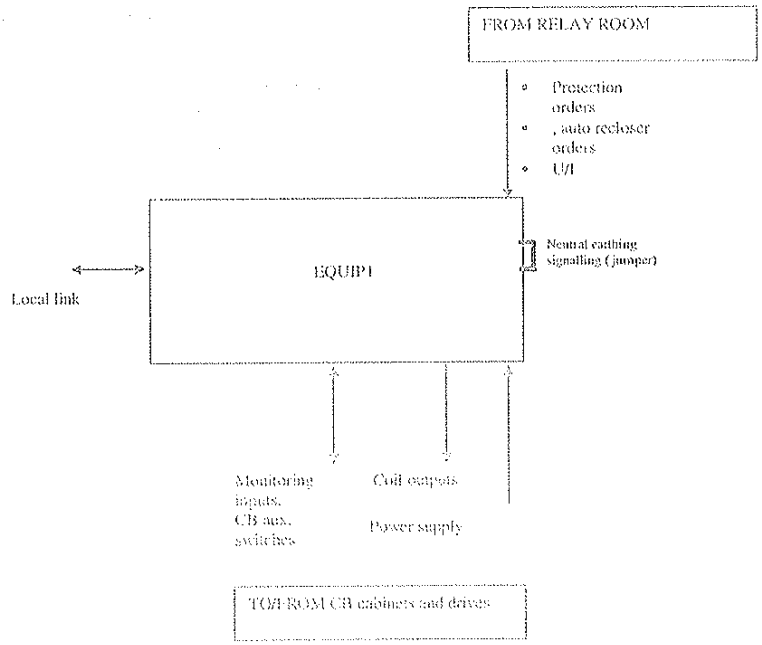
The reliability prediction is based on the prediction models for electronic MIL-HDBK-217.
A figure approaching 150 000 hrs is expected for the MTBF

3.3.2 MTTR

30 to 60 mn
time to substitute a EQUIP1 or a sensor, if the spare is present.

4 GENERAL DIAGRAM

4.1 Wiring configuration



3.1.4 ELECTRICAL & EMC

Insulation groups :

Group	Designation
G1	O Orders mono inputs (Coil monitoring), CB signalling, Neutral earth signalling, 4-20mA inputs, RS232, Ground
G2	Power supply
G3	RS485 link
G4	RJ45 link
G5	C Orders tri input
G6	O Orders tri input
G7	Alarm monostable output
G8	Alarm bistable output 1
G9	Alarm bistable output 2
G10	Alarm bistable output 3
G11	Alarm bistable output 4
G12	VT source input
G13a	VT line inputs
G13b	
G13c	
G14a	CT inputs
G14b	
G14c	
G15	Coil outputs (C & O commands)

Test applied by group :

Group	Test N°	EMC Criteria
Module EQUIP1	8, 9, 13, 14, 16_{Rad}	A or B
G1	10_{Rad}	A
G2	1_{CM}, 2_{CM}, 3_{CM}, 4, 5, 6, 7, 10_{Cond}, 10_{Rad}, , 11_{CM} 11_{DM}, 12, 15_{CM} ,15_{DM}, 16_{Cond}	A
G3, G4	1_{CM}, 2_{CM}, 3_{CM}, 10_{Rad}, 11_{CM}	B
G5, G6	1_{CM}, 2_{CM}, $3_{CM\ \&\ DM}$, 10_{Rad}, 11_{CM} , 11_{CM}, 15_{DM}	A
G7 à G11	$1_{CM\ \&\ DM}$, $2_{CM\ \&\ DM}$, $3_{CM\ \&\ DM}$, 10_{Rad}, 11_{CM} , 11_{DM} ,15_{CM} ,15_{DM}	A
G12	1_{CM}, 2_{CM}, 3_{CM}, 10_{Rad}, 11_{CM}	A
G13a, G13b, G13c	1_{CM}, 2_{CM}, 3_{CM}, 10_{Rad}, 11_{CM}	A
G14a, G14b, G14c	1_{CM}, 2_{CM}, 3_{CM}, 10_{Rad}, 11_{CM}	A
G15	1_{CM}, 2_{CM}, 3_{CM}, 10_{Rad}, 11_{CM} ,11_{DM}, ,15_{CM}	A

CM : Common mode - DM : Differential mode - Rad : Radiated – Cond : Conducted

No. P-45021/2/2017-PP (BE-II)
Government of India
Ministry of Commerce and Industry
Department for Promotion of Industry and Internal Trade
(Public Procurement Section)

Udyog Bhawan, New Delhi
Dated: 16th September, 2020

To

All Central Ministries/Departments/CPSUs/All concerned

ORDER

Subject: Public Procurement (Preference to Make in India), Order 2017– Revision; regarding.

Department for Promotion of Industry and Internal Trade, in partial modification [Paras 2, 3, 5, 10 & 13] of Order No.P-45021/2/2017-B.E.-II dated 15.6.2017 as amended by Order No.P-45021/2/2017-B.E.-II dated 28.05.2018, Order No.P-45021/2/2017-B.E.-II dated 29.05.2019 and Order No.P-45021/2/2017-B.E.-II dated 04.06.2020, hereby issues the revised 'Public Procurement (Preference to Make in India), Order 2017" dated 16.09.2020 effective with immediate effect.

Whereas it is the policy of the Government of India to encourage 'Make in India' and promote manufacturing and production of goods and services in India with a view to enhancing income and employment, and

Whereas procurement by the Government is substantial in amount and can contribute towards this policy objective, and

Whereas local content can be increased through partnerships, cooperation with local companies, establishing production units in India or Joint Ventures (JV) with Indian suppliers, increasing the participation of local employees in services and training them,

Now therefore the following Order is issued:

1. This Order is issued pursuant to Rule 153 (iii) of the General Financial Rules 2017.

2. **Definitions**: For the purposes of this Order:

   'Local content' means the amount of value added in India which shall, unless otherwise prescribed by the Nodal Ministry, be the total value of the item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent.

   'Class-I local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, meets the minimum local content as prescribed for 'Class-I local supplier' under this Order.

.....Contd. p/2

'Class-II local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, meets the minimum local content as prescribed for 'Class-II local supplier' but less than that prescribed for 'Class-I local supplier' under this Order.

'Non - Local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, has local content less than that prescribed for 'Class-II local supplier' under this Order.

'L1' means the lowest tender or lowest bid or the lowest quotation received in a tender, bidding process or other procurement solicitation as adjudged in the evaluation process as per the tender or other procurement solicitation.

'Margin of purchase preference' means the maximum extent to which the price quoted by a "Class-I local supplier" may be above the L1 for the purpose of purchase preference.

'Nodal Ministry' means the Ministry or Department identified pursuant to this order in respect of a particular item of goods or services or works.

'Procuring entity' means a Ministry or department or attached or subordinate office of, or autonomous body controlled by, the Government of India and includes Government companies as defined in the Companies Act.

'Works' means all works as per Rule 130 of GFR- 2017, and will also include *'turnkey works'*.

3. Eligibility of 'Class-I local supplier'/ 'Class-II local supplier'/ 'Non-local suppliers' for different types of procurement

(a) In procurement of all goods, services or works in respect of which the Nodal Ministry / Department has communicated that there is sufficient local capacity and local competition, only 'Class-I local supplier', as defined under the Order, shall be eligible to bid irrespective of purchase value.

(b) Only 'Class-I local supplier' and 'Class-II local supplier', as defined under the Order, shall be eligible to bid in procurements undertaken by procuring entities, except when Global tender enquiry has been issued. In global tender enquiries, 'Non-local suppliers' shall also be eligible to bid along with 'Class-I local suppliers' and 'Class-II local suppliers'. In procurement of all goods, services or works, not covered by sub-para 3(a) above, and with estimated value of purchases less than Rs. 200 Crore, in accordance with Rule 161(iv) of GFR, 2017, Global tender enquiry shall not be issued except with the approval of competent authority as designated by Department of Expenditure.

(c) For the purpose of this Order, works includes Engineering, Procurement and Construction (EPC) contracts and services include System Integrator (SI) contracts.

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3A. Purchase Preference

(a) Subject to the provisions of this Order and to any specific instructions issued by the Nodal Ministry or in pursuance of this Order, purchase preference shall be given to 'Class-I local supplier' in procurements undertaken by procuring entities in the manner specified here under.

(b) In the procurements of goods or works, which are covered by para 3(b) above and which are divisible in nature, the 'Class-I local supplier' shall get purchase preference over 'Class-II local supplier' as well as 'Non-local supplier', as per following procedure:

i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is 'Class-I local supplier', the contract for full quantity will be awarded to L1.

ii. If L1 bid is not a 'Class-I local supplier', 50% of the order quantity shall be awarded to L1. Thereafter, the lowest bidder among the 'Class-I local supplier' will be invited to match the L1 price for the remaining 50% quantity subject to the Class-I local supplier's quoted price falling within the margin of purchase preference, and contract for that quantity shall be awarded to such 'Class-I local supplier' subject to matching the L1 price. In case such lowest eligible 'Class-I local supplier' fails to match the L1 price or accepts less than the offered quantity, the next higher 'Class-I local supplier' within the margin of purchase preference shall be invited to match the L1 price for remaining quantity and so on, and contract shall be awarded accordingly. In case some quantity is still left uncovered on Class-I local suppliers, then such balance quantity may also be ordered on the L1 bidder.

(c) In the procurements of goods or works, which are covered by para 3(b) above and which are not divisible in nature, and in procurement of services where the bid is evaluated on price alone, the 'Class-I local supplier' shall get purchase preference over 'Class-II local supplier' as well as 'Non-local supplier', as per following procedure:

i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is 'Class-I local supplier', the contract will be awarded to L1.

ii. If L1 is not 'Class-I local supplier', the lowest bidder among the 'Class-I local supplier', will be invited to match the L1 price subject to Class-I local supplier's quoted price falling within the margin of purchase preference, and the contract shall be awarded to such 'Class-I local supplier' subject to matching the L1 price.

iii. In case such lowest eligible 'Class-I local supplier' fails to match the L1 price, the 'Class-I local supplier' with the next higher bid within the margin of purchase preference shall be invited to match the L1 price and so on and contract shall be awarded accordingly. In case none of the 'Class-I local supplier' within the margin of purchase preference matches the L1 price, the contract may be awarded to the L1 bidder.

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(d) "Class-II local supplier" will not get purchase preference in any procurement, undertaken by procuring entities.

3B. Applicability in tenders where contract is to be awarded to multiple bidders - In tenders where contract is awarded to multiple bidders subject to matching of L1 rates or otherwise, the 'Class-I local supplier' shall get purchase preference over 'Class-II local supplier' as well as 'Non-local supplier', as per following procedure:

a) In case there is sufficient local capacity and competition for the item to be procured, as notified by the nodal Ministry, only Class I local suppliers shall be eligible to bid. As such, the multiple suppliers, who would be awarded the contract, should be all and only 'Class I Local suppliers'.

b) In other cases, 'Class II local suppliers' and 'Non local suppliers' may also participate in the bidding process along with 'Class I Local suppliers' as per provisions of this Order.

c) If 'Class I Local suppliers' qualify for award of contract for at least 50% of the tendered quantity in any tender, the contract may be awarded to all the qualified bidders as per award criteria stipulated in the bid documents. However, in case 'Class I Local suppliers' do not qualify for award of contract for at least 50% of the tendered quantity, purchase preference should be given to the 'Class I local supplier' over 'Class II local suppliers'/ 'Non local suppliers' provided that their quoted rate falls within 20% margin of purchase preference of the highest quoted bidder considered for award of contract so as to ensure that the 'Class I Local suppliers' taken in totality are considered for award of contract for at least 50% of the tendered quantity.

d) First purchase preference has to be given to the lowest quoting 'Class-I local supplier', whose quoted rates fall within 20% margin of purchase preference, subject to its meeting the prescribed criteria for award of contract as also the constraint of maximum quantity that can be sourced from any single supplier. If the lowest quoting 'Class-I local supplier', does not qualify for purchase preference because of aforesaid constraints or does not accept the offered quantity, an opportunity may be given to next higher 'Class-I local supplier', falling within 20% margin of purchase preference, and so on.

e) To avoid any ambiguity during bid evaluation process, the procuring entities may stipulate its own tender specific criteria for award of contract amongst different bidders including the procedure for purchase preference to 'Class-I local supplier' within the broad policy guidelines stipulated in sub-paras above.

4. **Exemption of small purchases**: Notwithstanding anything contained in paragraph 3, procurements where the estimated value to be procured is less than Rs. 5 lakhs shall be exempt from this Order. However, it shall be ensured by procuring entities that procurement is not split for the purpose of avoiding the provisions of this Order.

5. **Minimum local content**: The 'local content' requirement to categorize a supplier as 'Class-I local supplier' is minimum 50%. For 'Class-II local supplier', the 'local content' requirement is minimum 20%. Nodal Ministry/ Department may prescribe only a higher

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percentage of minimum local content requirement to categorize a supplier as 'Class-I local supplier'/ 'Class-II local supplier'. For the items, for which Nodal Ministry/ Department has not prescribed higher minimum local content notification under the Order, it shall be 50% and 20% for 'Class-I local supplier'/ 'Class-II local supplier' respectively.

6. **Margin of Purchase Preference**: The margin of purchase preference shall be 20%.

7. **Requirement for specification in advance**: The minimum local content, the margin of purchase preference and the procedure for preference to Make in India shall be specified in the notice inviting tenders or other form of procurement solicitation and shall not be varied during a particular procurement transaction.

8. **Government E-marketplace**: In respect of procurement through the Government E-marketplace (GeM) shall, as far as possible, specifically mark the items which meet the minimum local content while registering the item for display, and shall, wherever feasible, make provision for automated comparison with purchase preference and without purchase preference and for obtaining consent of the local supplier in those cases where purchase preference is to be exercised.

9. **Verification of local content**:

   a. The 'Class-I local supplier'/ 'Class-II local supplier' at the time of tender, bidding or solicitation shall be required to indicate percentage of local content and provide self-certification that the item offered meets the local content requirement for 'Class-I local supplier'/ 'Class-II local supplier', as the case may be. They shall also give details of the location(s) at which the local value addition is made.

   b. In cases of procurement for a value in excess of Rs. 10 crores, the 'Class-I local supplier'/ 'Class-II local supplier' shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.

   c. Decisions on complaints relating to implementation of this Order shall be taken by the competent authority which is empowered to look into procurement-related complaints relating to the procuring entity.

   d. Nodal Ministries may constitute committees with internal and external experts for independent verification of self-declarations and auditor's/ accountant's certificates on random basis and in the case of complaints.

   e. Nodal Ministries and procuring entities may prescribe fees for such complaints.

   f. False declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the General Financial Rules along with such other actions as may be permissible under law.

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g. A supplier who has been debarred by any procuring entity for violation of this Order shall not be eligible for preference under this Order for procurement by any other procuring entity for the duration of the debarment. The debarment for such other procuring entities shall take effect prospectively from the date on which it comes to the notice of other procurement entities, in the manner prescribed under paragraph 9h below.

h. The Department of Expenditure shall issue suitable instructions for the effective and smooth operation of this process, so that:

   i. The fact and duration of debarment for violation of this Order by any procuring entity are promptly brought to the notice of the Member-Convenor of the Standing Committee and the Department of Expenditure through the concerned Ministry /Department or in some other manner;

   ii. on a periodical basis such cases are consolidated and a centralized list or decentralized lists of such suppliers with the period of debarment is maintained and displayed on website(s);

   iii. in respect of procuring entities other than the one which has carried out the debarment, the debarment takes effect prospectively from the date of uploading on the website(s) in the such a manner that ongoing procurements are not disrupted.

10. **Specifications in Tenders and other procurement solicitations**:

a. Every procuring entity shall ensure that the eligibility conditions in respect of previous experience fixed in any tender or solicitation do not require proof of supply in other countries or proof of exports.

b. Procuring entities shall endeavour to see that eligibility conditions, including on matters like turnover, production capability and financial strength do not result in unreasonable exclusion of 'Class-I local supplier'/ 'Class-II local supplier' who would otherwise be eligible, beyond what is essential for ensuring quality or creditworthiness of the supplier.

c. Procuring entities shall, within 2 months of the issue of this Order review all existing eligibility norms and conditions with reference to sub-paragraphs 'a' and 'b' above.

d. Reciprocity Clause

   i. When a Nodal Ministry/Department identifies that Indian suppliers of an item are not allowed to participate and/ or compete in procurement by any foreign government, due to restrictive tender conditions which have direct or indirect effect of barring Indian companies such as registration in the procuring country, execution of projects of specific value in the procuring country etc., it shall provide such details to all its procuring entities including CMDs/CEOs of PSEs/PSUs, State Governments and other procurement agencies under their administrative control and GeM for appropriate reciprocal action.

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ii. Entities of countries which have been identified by the nodal Ministry/Department as not allowing Indian companies to participate in their Government procurement for any item related to that nodal Ministry shall not be allowed to participate in Government procurement in India for all items related to that nodal Ministry/ Department, except for the list of items published by the Ministry/ Department permitting their participation.

iii. The stipulation in (ii) above shall be part of all tenders invited by the Central Government procuring entities stated in (i) above. All purchases on GeM shall also necessarily have the above provisions for items identified by nodal Ministry/ Department.

iv. State Governments should be encouraged to incorporate similar provisions in their respective tenders.

v. The term 'entity' of a country shall have the same meaning as under the FDI Policy of DPIIT as amended from time to time.

e. Specifying foreign certifications/ unreasonable technical specifications/ brands/ models in the bid document is restrictive and discriminatory practice against local suppliers. If foreign certification is required to be stipulated because of non-availability of Indian Standards and/or for any other reason, the same shall be done only after written approval of Secretary of the Department concerned or any other Authority having been designated such power by the Secretary of the Department concerned.

f. "All administrative Ministries/Departments whose procurement exceeds *Rs.* 1000 Crore per annum shall notify/ update their procurement projections every year, including those of the PSEs/PSUs, for the next 5 years on their respective website."

10A. Action for non-compliance of the Provisions of the Order: In case restrictive or discriminatory conditions against domestic suppliers are included in bid documents, an inquiry shall be conducted by the Administrative Department undertaking the procurement (including procurement by any entity under its administrative control) to fix responsibility for the same. Thereafter, appropriate action, administrative or otherwise, shall be taken against erring officials of procurement entities under relevant provisions. Intimation on all such actions shall be sent to the Standing Committee.

11. **Assessment of supply base by Nodal Ministries**: The Nodal Ministry shall keep in view the domestic manufacturing / supply base and assess the available capacity and the extent of local competition while identifying items and prescribing the higher minimum local content or the manner of its calculation, with a view to avoiding cost increase from the operation of this Order.

12. **Increase in minimum local content**: The Nodal Ministry may annually review the local content requirements with a view to increasing them, subject to availability of sufficient local competition with adequate quality.

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13. **Manufacture under license/ technology collaboration agreements with phased indigenization**: While notifying the minimum local content, Nodal Ministries may make special provisions for exempting suppliers from meeting the stipulated local content if the product is being manufactured in India under a license from a foreign manufacturer who holds intellectual property rights and where there is a technology collaboration agreement / transfer of technology agreement for indigenous manufacture of a product developed abroad with clear phasing of increase in local content.

13A. In procurement of all goods, services or works in respect of which there is substantial quantity of public procurement and for which the nodal ministry has not notified that there is sufficient local capacity and local competition, the concerned nodal ministry shall notify an upper threshold value of procurement beyond which foreign companies shall enter into a joint venture with an Indian company to participate in the tender. Procuring entities, while procuring such items beyond the notified threshold value, shall prescribe in their respective tenders that foreign companies may enter into a joint venture with an Indian company to participate in the tender. The procuring Ministries/Departments shall also make special provisions for exempting such joint ventures from meeting the stipulated minimum local content requirement, which shall be increased in a phased manner.

14. **Powers to grant exemption and to reduce minimum local content**: The administrative Department undertaking the procurement (including procurement by any entity under its administrative control), with the approval of their Minister-in-charge, may by written order, for reasons to be recorded in writing,

    a. reduce the minimum local content below the prescribed level; or
    b. reduce the margin of purchase preference below 20%; or
    c. exempt any particular item or supplying entities from the operation of this Order or any part of the Order.

    A copy of every such order shall be provided to the Standing Committee and concerned Nodal Ministry / Department. The Nodal Ministry / Department concerned will continue to have the power to vary its notification on Minimum Local Content.

15. **Directions to Government companies**: In respect of Government companies and other procuring entities not governed by the General Financial Rules, the administrative Ministry or Department shall issue policy directions requiring compliance with this Order.

16. **Standing Committee**: A standing committee is hereby constituted with the following membership:

    Secretary, Department for Promotion of Industry and Internal Trade—Chairman
    Secretary, Commerce—Member
    Secretary, Ministry of Electronics and Information Technology—Member
    Joint Secretary (Public Procurement), Department of Expenditure—Member
    Joint Secretary (DPIIT)—Member-Convenor

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The Secretary of the Department concerned with a particular item shall be a member in respect of issues relating to such item. The Chairman of the Committee may co-opt technical experts as relevant to any issue or class of issues under its consideration.

17. **Functions of the Standing Committee**: The Standing Committee shall meet as often as necessary, but not less than once in six months. The Committee

    a. shall oversee the implementation of this order and issues arising therefrom, and make recommendations to Nodal Ministries and procuring entities.
    b. shall annually assess and periodically monitor compliance with this Order
    c. shall identify Nodal Ministries and the allocation of items among them for issue of notifications on minimum local content
    d. may require furnishing of details or returns regarding compliance with this Order and related matters
    e. may, during the annual review or otherwise, assess issues, if any, where it is felt that the manner of implementation of the order results in any restrictive practices, cartelization or increase in public expenditure and suggest remedial measures
    f. may examine cases covered by paragraph 13 above relating to manufacture under license/ technology transfer agreements with a view to satisfying itself that adequate mechanisms exist for enforcement of such agreements and for attaining the underlying objective of progressive indigenization
    g. may consider any other issue relating to this Order which may arise.

18. **Removal of difficulties**: Ministries /Departments and the Boards of Directors of Government companies may issue such clarifications and instructions as may be necessary for the removal of any difficulties arising in the implementation of this Order.

19. **Ministries having existing policies**: Where any Ministry or Department has its own policy for preference to local content approved by the Cabinet after 1st January 2015, such policies will prevail over the provisions of this Order. All other existing orders on preference to local content shall be reviewed by the Nodal Ministries and revised as needed to conform to this Order, within two months of the issue of this Order.

20. **Transitional provision**: This Order shall not apply to any tender or procurement for which notice inviting tender or other form of procurement solicitation has been issued before the issue of this Order.

(Rajesh Gupta)
Director
Tel: 23063211
rajesh.gupta66@gov.in