PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**
SUBJECT	**BID SPECIFIC ATC**

1. **BHEL Contact (Technical):**
   For any **technical clarification**, please contact Mr. Jai Kumar, Sr. Manager (TBEM). Contact No. 0120-674-8534; e-mail: jaik@bhel.in

2. **BHEL Contact (Commercial):**
   For any **commercial clarification**, please contact Mr. SANDEEP, Dy Manager (TBMM). Contact No. 0120-674-8450; e-mail: kumar.sandeep@bhel.in

3. **Terms of Payment:**
   Supply and services of Spares items

   i) 100% of payment along with 100% GST & F&I shall be made within 45 days for MSE (Micro & Small Enterprises) / within 60 days for Medium Enterprises / within 90 days for non MSME suppliers 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.
   - CRAC (consignee receipt-cum-acceptance certificate) / MRC
   - 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

   Note:
   - Bills shall be submitted to BHEL TBG Noida office for processing along with billing checklist.
   - It should be ensured that Tax Invoice complies with statutory requirements under GST law to enable BHEL to avail Input Tax Credit.
   - 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).
   - Copy of GST Registration Certificate(s) shall be also be attached with Tax Invoice.

4. **Terms of Delivery:**
   As per GeM. However, unloading at site is in the scope of BHEL. Bidders to quote price accordingly.

5. **Delivery Requirement:**
   Supply - Within 14 Weeks (98 days) from the date of PO/input by BHEL as per Activity schedule (Annexure-II).

   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**. Price to be quoted as inclusive of GST, i.e., Ex-works including Packing & Forwarding Charges + F&I + GST.

   Note: Unloading & safe storage at site and transfer of material from storage to GIS hall shall be under BHEL scope. Bidder to quote prices accordingly.

PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**
SUBJECT	**BID SPECIFIC ATC**

7. Reverse Auction:

RA not applicable as Single tender.

8. Liquidated Damage for delayed Delivery:

If the Seller/Service Provider fails to deliver any or all of the Goods/Services within the original/re-fixed delivery period(s) specified in the contract, the Buyer will be entitled to deduct/recover the Liquidated Damages for the delay, unless covered under Force Majeure conditions aforesaid, @ 0.5% of the contract value of delayed quantity per week or part of the week of delayed period as pre-estimated damages not exceeding 10% of the contract value of delayed quantity without any controversy/dispute of any sort whatsoever.

9. Technical Specification:

Technical Specification Nos. TB-408-316-002A is applicable. No permissible Technical Deviation has been envisaged. Bidders to quote as per Technical Specifications.

10. Pre-Qualification Requirement:

Technical pre-qualifying requirement shall be as per technical specification.

11. Inspection:

To be inspected by Customer/ BHEL/ TPIA.

12. Destination/ Delivery Location:

BHEL C/o POWERGRID CORPORATION OF INDIA LIMITED, 400/220kV Substation, Betul Road,
Pathrota, Itarsi,
District: Hoshangabad, (M.P.) - 461111
State Madhya Pradesh(MP)
GSTIN 23AAACP0252G1Z1

13. Guarantee Clause:

The contractor shall guarantee that the equipment being supplied under this contract shall be new and of first quality workmanship and 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 calendar months from the date of last delivery.

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 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.

14. Performance Bank Guarantee (PBG):

Not Applicable for the tender less than 05 Lakhs in GeM Portal.

PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**
SUBJECT	**BID SPECIFIC ATC**

15. Acceptance of Offer:

Bidder's offer will be considered for evaluation based on PQR, Technical and other commercial documents submitted along with bid. Bidder's offer will be acceptable subject to final acceptance of vendor by ultimate customer (PGCIL) as approved supplier.

Customer approved Vendor as per POWERGRID compendium of Vendors shall be followed. The bidders which are not PGCIL approved supplier or not including in POWERGRID compendium, bidder shall submit necessary credentials/documents as per Annexure-I & II for onward submission to customer for approval.

16. Make in India:

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 Dtd. 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-IV.**

"This tender is not a global tender and only Class-I suppliers as defined under the DPIIT Order No. P-45021/2/2017-PP (BE-II) Dtd. 04.06.2020 and subsequent orders are eligible to bid in this tender. **Bids received from Class II & Non-local supplier shall be rejected**."

17. Compliance to GOI order for restrictions under Rule 144 (xi) of General Financial Rules (GFRS), 2017 (Annexure-IX) :

Refer clause at **Annexure-IX** and Certification at **Annexure-X/ Annexure-XI** (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.

18. MoP Circular (Annexure-XIV):

Bidder to comply the MOP circular dated 02-07-2020 **(Annexure-XIV)** and its subsequent amendment, if any, in prescribed format **(Annexure-XV)**. Non-compliance/ Non-submission will lead to rejection of Offer **(Not Applicable for cases where local content is 100%).**

19. Variation in Contract Value and Quantities:

Quantity variation clause shall be as per GeM.

20. Unpriced Bid:

Vendor to furnish unpriced bid mentioning "Quoted" against each BOQ line item and % of GST quoted in tender as per **Annexure-II.**

21. Details of Bidder:

Bidder to submit their complete contact information details as per **Annexure-IV (C).**

22. Evaluation Criteria:

Evaluation shall be done on total cost to BHEL basis.

PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**
SUBJECT	**BID SPECIFIC ATC**

23. Deviations:

a) Technical Deviation: No Technical Deviation is envisaged.
b) Commercial Deviation: No Commercial Deviation is envisaged.

24. Risk Purchase: (Also refer Annexure-VIII):

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 5% 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, 5% 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.

25. RXIL (TReDS) Platform:

TBG is registered with RXIL (TReDS) platform. MSME bidders are requested to get registered with RXIL (TReDS) platform to avail the facility as per GoI guidelines.

26. Bidder to submit **sealed and signed copy of the following** while uploading bid in GeM portal:

a) Bid Specific ATC: This document.
b) Annexure-I: Activity Schedule
c) Annexure-II: Unpriced Bid
d) Annexure-III: Contact Details of Bidder
e) Annexure-IV: Local Content Self-Certification
f) Annexure-V: Schedule of Commercial Deviation
g) Annexure-VI: Schedule of Technical Deviation
h) Annexure-VII: Risk purchase
i) Annexure-VIII: Checklist for supply bills.
j) Annexure IX: General financial rules
k) Annexure-X: Compliance to Government of India Order OM NO.6/18/2019-PPD Dtd. 23.07.2020 regarding restrictions under rule 144 (xi) of the General Financial Rules (GFRs), 2017
l) Annexure-XI: Compliance to Government of India Order OM NO.6/18/2019-PPD Dtd. 23.07.2020 regarding restrictions under rule 144 (xi) of the General Financial Rules (GFRs), 2017
m) Annexure-XII: Ministry of power Order.
n) Annexure-XIII: Vender compliance format.

Note: In case of non-receipt of above documents, the bidder is liable for rejection.

PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**
SUBJECT	**BID SPECIFIC ATC**

27. All other terms & conditions shall be as per GTC of GeM.

Note: This Purchase is against single tender enquiry and reserved for M/s GR Power being OEM of main supplied items at PGCIL – Itarsi Project.

Signature of the authorized representative of

Place : ……..
Date : ……..

Bidder's Name : ……
Designation : ……
Company Seal : ……

PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**
SUBJECT	**BID SPECIFIC ATC**

ANNEXURE-I

ACTIVITY SCHEDULE

ACTIVITY	ACTIVITY TIME IN WEEKS
Submission of documents necessary for getting manufacturing clearance Drawings, data sheets (In scope of vendor)	NA
Review and Approval of documents and issue of manufacturing clearance (In scope of BHEL)	NA
Manufacturing Time (In scope of vendor)	10
Inspection (In scope of BHEL)	02
Issue of MICC (In scope of BHEL)	01
Dispatch (In scope of vendor)	01
	14 Weeks

1. Inspection call to be raised by vendor 1 week in advance.
2. Supplier must ensure the completeness and correctness of the requisite documents before submission for approval. Delay in approval on account of incomplete / inadequate information shall be the responsibility of supplier.
3. Inspection call should be given in the prescribed format only. Inspection calls not in the prescribed format shall not be entertained.
4. Vendor to ensure resubmission of drawings / documents within 1 Week from the date of comment given by BHEL
5. Qty to be offered for inspection should be in accordance within Delivery-schedule – lot. BHEL reserves the right not to entertain multiple inspection calls for a Delivery – lot and delay on this account shall be the responsibility of Supplier.

Signature of the authorized representative of

Place : ……..
Date : ……..

Bidder's Name : ……
Designation : ……
Company Seal : ……

PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**
SUBJECT	**BID SPECIFIC ATC**

ANNEXURE-II

UNPRICED BID

Sl. No.	Item Description	Unit	Quantity	Total Ex-works	GST on Total Ex-works	Total F&I	GST on Total F&I	Total cost to BHEL (Ex-works+ F&I+GST)
1.	SPARES- ISOLATOR : 400KV,3150A,40KA FOR 1S, HORIZONTAL DOUBLE BREAK HDB TYPE ISOLATOR-COPPER CONTACT FINGERS FOR FEMALE & MALE CONTACTS FOR ONE POLE	SET	2	Quoted	Quoted **Mention GST % Quoted**	Quoted	Quoted **Mention GST % Quoted**	Quoted
2	SPARES - ISOLATOR : 400KV, STOPPER PIPE	NO	1	Quoted	Quoted **Mention GST % Quoted**	Quoted	Quoted **Mention GST % Quoted**	Quoted
3	SPARES - ISOLATOR : 400KV, SPRING ASSEMBLY	NO	1	Quoted	Quoted **Mention GST % Quoted**	Quoted	Quoted **Mention GST % Quoted**	Quoted
4	SPARES - ISOLATOR: 400KV, EARTH SWITCH FIXED CONTACT ARCING ROD	NO	1	Quoted	Quoted **Mention GST % Quoted**	Quoted	Quoted **Mention GST % Quoted**	Quoted
5	SPARES - ISOLATOR: 400KV, FEMALE CONTACT CORONA BRACKETS	NO	2	Quoted	Quoted **Mention GST % Quoted**	Quoted	Quoted **Mention GST % Quoted**	Quoted

PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**
SUBJECT	**BID SPECIFIC ATC**

6	SPARES - ISOLATOR : 220KV, 1600A, 40KA FOR 1S, HORIZONTAL DOUBLE BREAK HDB TYPE ISOLATOR- COPPER CONTACT FINGERS FOR FEMALE & MALE CONTACTS FOR ONE POLE	SET	2	Quoted	Quoted **Mention GST % Quoted**	Quoted	Quoted **Mention GST % Quoted**	Quoted
7	SPARES - ISOLATOR : 220KV, COPPER FLEXIBLE	NO	2	Quoted	Quoted **Mention GST % Quoted**	Quoted	Quoted **Mention GST % Quoted**	Quoted
8	SPARES - ISOLATOR : 220KV, FEMALE CONTACT CORONA BRACKETS	NO	4	Quoted	Quoted **Mention GST % Quoted**	Quoted	Quoted **Mention GST % Quoted**	Quoted
9	SPARES - ISOLATOR : 220KV, 1600A, 40KA FOR 1S, DOUBLE BREAK TANDEN TYPE ISOLATOR- COPPER CONTACT FINGERS FOR FEMALE & MALE CONTACTS FOR ONE POLE	SET	2	Quoted	Quoted **Mention GST % Quoted**	Quoted	Quoted **Mention GST % Quoted**	Quoted

Signature of the authorized representative of

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

Bidder's Name : .....
Designation : .....
Company Seal : .....

PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**
SUBJECT	**BID SPECIFIC ATC**

ANNEXURE-III

CONTACT DETAILS OF BIDDER

Work Address	
Correspondence Address	
PAN NO.	
GST No.	
Details of contact person for clarification regarding bid:	
Contact Person Name	
Designation	
email ID	
Mobile No.	
Landline No.	

Signature of the authorized representative of

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

Bidder's Name : .....
Designation : .....
Company Seal : .....

PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**
SUBJECT	**BID SPECIFIC ATC**

ANNEXURE-IV

Item/ Package Name	**Supply of Spares items for 400kV Isolators**
GeM Bid No.	
Project	**PGCIL Itarsi**
Percentage of Local Content	**…….%**

Format of Self-certification regarding Local Content in line with PPP-MII order, 2017 and its revision Dtd. 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 Dtd. 15.06.2017, its revision Dtd. 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(s)/ 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
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.)

PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**
SUBJECT	**BID SPECIFIC ATC**

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 : ……..

Date : ……..

Bidder's Name : ……

Designation : ……

Company Seal : ……

PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**
SUBJECT	**BID SPECIFIC ATC**

ANNEXURE-VI

SCHEDULE OF TECHNICAL DEVIATION

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

Sl. No.	Clause No. of Technical Specifications	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:

3. Continuation sheets of like size and format may be used as per the Bidder's Requirement and shall be annexed to this schedule.
4. 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 : ……..

Date : ……..

Bidder's Name : ……

Designation : ……

Company Seal : ……

PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**
SUBJECT	**BID SPECIFIC ATC**

ANNEXURE-VII

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:

a) 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.
b) Withdrawal from or abandonment of the work by contractor/ supplier before completion as per contract.
c) 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.
d) Termination of Contract on account of any other reason(s) attributable to Contractor/ Supplier.
e) Assignment, transfer, subletting of Contract without BHEL's written permission resulting in termination of Contract or part thereof by BHEL.
f) Non-compliance to any contractual condition or any other default attributable to Contractor/ Supplier.

1.3 Risk and Cost amount against Balance Work:

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

Risk & Cost Amount = [(A-B) + (A x H/100)]

where,
A = Value of Balance scope of Work/ Supply (*) as per rates of new contract
B = 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-B) is less than 0 (zero), value of (A-B) shall be taken as 0 (zero).

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

1.4 LD against delay in executed Work/ 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:

a) 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
b) Let the value of executed work/ supply till the time of termination of contract = X
c) 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
d) Delay in executed work/ supply attributable to contractor/ supplier i.e. T2 = [1-(X/Y)] x T1
e) 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.

1.5 Recovery from Supplier:

Recoveries from contractor/ supplier on whom risk & cost has been invoked shall be as per Clause No. 25 of Bid Specific ATC.

PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**
SUBJECT	**BID SPECIFIC ATC**

ANNEXURE-VIII

CHECKLIST FOR SUPPLY BILLS

Name of Project	
Package Description	
Invoice No. & Date	
PO No. & Date	

Sl. No.	Documents Required	Copies	Check Points	Page No.	Vendor Remarks (Y/ N/ NA)	Verification by MM (Y/ N/ NA)	Verification by Finance (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 agency)				
			5. PO No. and Date, LR No. and Date, Vehicle No. and Project Name are mentioned				
			6. Invoiced quantity are not more than the PO quantity and MICC quantity				
			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	1 Original + 2 Copy	2. 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/ MM/ Commercial is needed				
			6. LR is readable				
			7. In case of photocopy, LR is verified by MM				
			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)	1 Original + 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				

PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**
SUBJECT	**BID SPECIFIC ATC**

			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	1 Original + 2 Copy	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 and Invoice				
			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 the bill				
			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 validity 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				

PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**
SUBJECT	**BID SPECIFIC ATC**

7	Insurance Certificate	1 Original + 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 copy of open policy is also enclosed				
			6. In case of any discrepancy, consent of Commercial is required for processing the bill and amount will be deducted for invalid Insurance certificate				
8	PVC (if applicable) Invoice is submitted along with the Dispatch Invoice	1 Original + 2 Copy	PVC (If applicable) Invoice is submitted along with the Dispatch Invoice				
			1. PVC Invoice is attached along with Supply Invoice				
			2. Calculation sheet and applicable PVC indices are also enclosed				
			3. If delay in delivery, then PVC indices are as per PO conditions				
9	Material Receipt Certificate		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				
			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							
11	Date of Submission of Last Billing Document		Date to be mentioned		**Not to be filled by Vendor**		
12	LD Calculation, if applicable, as per PO		Calculation Sheet of LD due to delay in delivery is attached				
13	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. Withheld amount, if any_____				

PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**
SUBJECT	**BID SPECIFIC ATC**

14	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 reference to Sl. No. 4 above), Engineering/ MM acceptance as to the completeness is enclosed				
15	PO copy	1 Copy	PO copy with original seal and signature is attached along with amendment, if any				
16	DAN	1 Copy	Relevant DANs are attached duly signed by MM 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:

PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**
SUBJECT	**BID SPECIFIC ATC**

ANNEXURE-IX

CLAUSE 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 DTD. 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.

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 affairs website (https://www.mea.gov.in/).

PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**
SUBJECT	**BID SPECIFIC ATC**

ANNEXURE-X

VENDOR COMPLIANCE FORMAT IN BIDDER LETTER HEAD

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.

Signature of the authorized representative of

Place : ……..

Date : ……..

Bidder's Name : ……

Designation : ……

Company Seal : ……

PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**
SUBJECT	**BID SPECIFIC ATC**

ANNEXURE-XI

VENDOR COMPLIANCE FORMAT IN BIDDER LETTER HEAD

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.

Signature of the authorized representative of

Place : ……..
Date : ……..

Bidder's Name : ……
Designation : ……
Company Seal : ……

PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**
SUBJECT	**BID SPECIFIC ATC**

ANNEXURE-XII

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

PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**
SUBJECT	**BID SPECIFIC ATC**

ANNEXURE-XIII

VENDOR COMPLIANCE FORMAT IN BIDDER LETTER HEAD

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

GEM BID NO.	
PROJECT	**PGCIL Itarsi**
ITEM	**Supply of Spares items for 400kV Isolators**

This is to certify that all equipment, components, and parts imported for use in the Power Supply System and Network are in strict compliance to directions issued by Ministry of Power, Govt. of India vide order No. 25-111612018-PG Dtd. 02.07.2020. The imported component(s), part or assembly item(s) does not carry any malware/ Trojan, etc.

Note: Non-compliance of MoP Order and its subsequent amendment(s), (if any), by vendor shall lead to rejection of their offer or cancellation of contract, which is awarded by BHEL.

Signature of the authorized representative of

Place : ……..

Date : ……..

Bidder's Name : ……

Designation : ……

Company Seal : ……

BHARAT HEAVY ELECTRICALS LIMITED

TRANSMISSION BUSINESS ENGINEERING MANAGEMENT

DOCUMENT No.	**TB-408-316-002A**	Rev 00	Prepared	Checked	Approved
TYPE OF DOC.	**TECHNICAL SPECIFICATION**	**NAME**	DP	AS	JK
TITLE		**SIGN**			
		DATE			
ISOLATOR		**GROUP**	TBEM		
CUSTOMER	**PGCIL**				
PROJECT	**PGCIL 400kV Itarsi Substation**				

CONTENTS

Rev No.	Date	Altered	Checked	Approved	REVISION DETAILS

Distribution	To	*TBTS*	*O/C*	*TBMM*	*TBQM*	*TBCM*
	Copies	-	1	-	-	1

Project: PGCIL 400kV Itarsi Substation

Bharat Heavy Electricals Limited

Document No. TB-408-316-002A

Customer: PGCIL

SCOPE AND SPECIFIC TECHNICAL REQUIREMENT

1. SCOPE

This technical specification covers the scope supply of Spare part of 400kV and 220kV Isolator.

2. SPECIFIC TECHNICAL REQUIREMENTS

Scope of work include supply of following items.

S.no.	Description	Unit	Qty	Remark
1	**400 kV Isolator**			
1.1	Female contact corona brackets	No	2	
1.2	Stopper pipe	No	1	
1.3	Spring Assembly	No	1	
1.4	SPARES- ISOLATOR : 400KV, 3150A, 40KA FOR 1S, HORIZONTAL DOUBLE BREAK (HDB) TYPE ISOLATOR - COPPER CONTACT FINGERS FOR FEMALE & MALE CONTACTS FOR ONE POLE	Set	2	Total qty for 2 set is i) Copper contact finger for Male: 8 Nos. ii) Copper contact finger for female: 32 nos.
1.5	Es fix contact arcing rod	No	1	
2	**220 kV Isolator**			
2.1	female contact corona brackets	No	4	
2.2	Copper flexible	No	2	
2.3	SPARES- ISOLATOR : 220KV, 1600A, 40KA FOR 1S, HORIZONTAL DOUBLE BREAK (HDB) TYPE ISOLATOR - COPPER CONTACT FINGERS FOR FEMALE & MALE CONTACTS FOR ONE POLE	Set	2	Total qty for 2 set is i) Copper contact finger for Male: 8 Nos. ii) Copper contact finger for female: 24 nos.
2.4	SPARES- ISOLATOR : 220KV, 1600A, 40KA FOR 1S, HORIZONTAL DOUBLE BREAK (HDB) TANDEM TYPE ISOLATOR - COPPER CONTACT FINGERS FOR FEMALE & MALE CONTACTS FOR ONE POLE	Set	2	Total qty for 2 set is i) Copper contact finger for Male: 8 Nos. ii) Copper contact finger for female: 24 nos.

Refer Annexure-1 for Details.

Annexure-1

MODEL TECHNICAL SPECIFICATION

SECTION-SWITCHGEAR - ISOLATOR

(REV. NO. 11A)

Following are the major changes made in the Technical specification, Section-Switchgear - ISOLATOR, Rev. 11A:

Clause No.	Major Modification
Annexure-I, Sl. No. 15	Interpole cables are to be provided by the manufacturer
Annexure-I, Sl. No. 18	Maximum RIV values for 420kV and 245kV Isolators revised
4.0 (i)	Earthswitch overhang revised for 400kV and 220kV

Notes: The above is the list of major changes with respect to previous revision (Rev. 10). However, the bidders are advised to read the entire section for other changes and quote accordingly.

SWITCHGEAR – ISOLATOR

CONTENTS

SWITCHGEAR - ISOLATOR

1.0 GENERAL:

1.1 The Isolators and accessories shall conform in general to IEC: 62271-102 (or IS: 9921) except to the extent explicitly modified in specification and shall be in accordance with requirement of Section-GTR.

1.2 Complete isolator with all the necessary items for successful operation shall be supplied including but not limited to the following:

1.2.1 Isolator with complete Support Insulators, operating rod insulator, base frame, linkages, operating mechanism, control cabinet, interlock, interpole cables etc.

1.2.2 All necessary parts to provide a complete and operable isolator installation, control parts and other devices whether specifically called for herein or not.

1.2.3 The isolator shall be designed for use in the geographic and meteorological conditions as given in Section-GTR and Section-Project.

2.0 DUTY REQUIREMENTS:

a) Isolators and earth switches shall be capable of withstanding the dynamic and thermal effects of the maximum possible short circuit current of the systems in their closed position. They shall be constructed such that they do not open under influence of short circuit current.

b) The earth switches, wherever provided, shall be constructionally interlocked so that the earth switches can be operated only when the isolator is open and vice versa. The constructional interlocks shall be built in construction of isolator and shall be in addition to the electrical interlocks. Suitable mechanical arrangement shall also be provided for delinking electrical drive for manual operation.

c) In addition to the constructional interlock, isolator and earth switches shall have provision to prevent their electrical and manual operation unless the associated and other interlocking conditions are met. All these interlocks shall be of failsafe type. Suitable individual interlocking coil arrangements shall be provided. The interlocking coil shall be suitable for continuous operation from station DC supply and within a variation range as stipulated in Section-GTR.

d) The earthing switches shall be capable of discharging trapped charges of the associated lines.

e) The isolator shall be capable of making/breaking normal currents when no significant change in voltage occurs across the terminals of each pole of isolator on account of make/break operation.

3.0 CONSTRUCTIONAL FEATURES:

Isolators shall be outdoor, off-load type. Earth switches shall be provided on isolators wherever called for, with possibility of being mounted on any side of the isolator. 800kV isolator design shall be double break or vertical break or knee-type. 420kV & below rated isolators shall be double break type, unless specified otherwise. Isolator design shall be such as to permit addition of earth switches at a future date. The features and constructional details of isolators, earth switches and accessories shall be in accordance with requirements stated hereunder:

3.1 Contacts:

a) The contacts shall be self aligning and self cleaning type and shall be so designed that binding cannot occur after remaining in closed position for prolonged period in a heavily polluted atmosphere.

b) No undue wear or scuffing shall be evident during the mechanical endurance tests. Contacts and spring shall be designed so that readjustments in contact pressure shall not be necessary throughout the life of the isolator or earthing switch. Each contact or pair of contacts shall be independently sprung so that full pressure is maintained on all contacts at all time.

c) Contact springs shall not carry any current and shall not loose their characteristics due to heating effects.

d) The moving contact of double break isolator shall have preferably turn-and-twist type or other suitable type of locking arrangement to ensure adequate contact pressure.

e) The maximum allowable current density shall be 0.8A/mm^2 for current carrying Aluminium parts.

f) Flexible braided copper, where used, shall have corrosion resistant coating such as tinning or silvering.

3.2 Base :

Each single pole of the isolator shall be provided with a complete galvanised steel base provided with holes and designed for mounting on a standard

supporting structure. Common base frame shall be provided for 400/220/132kV isolators suitable for mounting on pipe structures.

3.3 **Blades :**

a) All metal parts shall be of non-rusting and non-corroding material. All current carrying parts shall be made from high conductivity electrolytic copper/aluminium. Bolts, screws and pins shall be provided with lock washers. Keys or equivalent locking facilities if provided on current carrying parts shall be made of copper silicon alloy or stainless steel or equivalent. The bolts or pins used in current carrying parts shall be made of non-corroding material. Ferrous parts, other than stainless steel shall not be used in close proximity of main current path. All ferrous castings, if used elsewhere shall be made of malleable cast iron or cast-steel. No grey iron shall be used in the manufacture of any part of the isolator.

b) The live parts shall be designed to eliminate sharp joints, edges and other corona producing surfaces, where this is impracticable, adequate corona rings shall be provided. Corona shields are not acceptable. Corona rings shall be made up of aluminum/aluminum alloy.

c) Isolators and earthing switches including their operating parts shall be such that they cannot be dislodged from their open or closed positions by short circuit forces, gravity, wind pressure, vibrations, shocks, or accidental touching of the connecting rods of the operating mechanism.

d) The isolator and earth switch shall be designed such that no lubrication of any part is required except at very infrequent intervals. i.e. after every 1000 operations or after 5 years whichever is earlier.

3.4 **Insulator :**

a) The insulator shall conform to IS: 2544, IEC-60168 and IEC-60815. The porcelain of the insulator shall conform to the requirements stipulated under Section-GTR.

b) Pressure due to the contact shall not be transferred to the insulators after the main blades are fully closed.

c) Insulator shall be type and routine tested as per IEC-60168. Besides following additional routine/acceptance tests shall also be conducted:

   (i) Bending load test in four directions at 50% of minimum bending load guaranteed on all insulators, as a routine test.

(ii) Bending load test in four directions at 100% of minimum bending load as a sample test on each lot.

(iii) Torsional test on sample insulators of a lot.

(iv) Ultrasonic test as a routine test.

d) Requirement of Insulators of Isolators shall be as follows:

i) **For 800 kV Insulator**:

Cantilever strength (min.)	=	1000kg
Top PCD	=	225 mm
No. of holes	=	4 x M16
Bottom PCD	=	356 mm
No. of holes	=	8 x 18mm dia.

ii) **For 420 kV Insulator**:

Cantilever strength (min.)	=	1000kg
Top PCD	=	127 mm
No. of holes	=	4 x M16
Bottom PCD	=	325 mm
No. of holes	=	8 x 18mm dia

iii) **For 245 kV Insulator**:

Cantilever strength (min.)	=	1000kg
Top PCD	=	127 mm
No. of holes	=	4 x M16
Bottom PCD	=	275 mm
No. of holes	=	8 x 18mm dia

iv) **For 145 kV Insulator**:

Cantilever strength (min.)	=	600kg
Top PCD	=	127 mm
No. of holes	=	4 x M16
Bottom PCD	=	254 mm
No. of holes	=	8 x 18mm dia

3.5 **Name Plate :**

The name plate shall conform to the requirements of IEC incorporating year of manufacture.

4.0 EARTHING SWITCHES :

a) Where earthing switches are specified these shall include the complete operating mechanism and auxiliary contacts.

b) The earthing switches shall form an integral part of the isolator and shall be mounted on the base frame of the isolator.

c) Earthing switches shall be only locally operated.

d) Each earth switch shall be provided with flexible copper/aluminum braids for connection to earth terminal. These braids shall have the same short time current carrying capacity as the earth blade. The transfer of fault current through swivel connection will not be accepted.

e) The plane of movement and final position of the earth blades shall be such that adequate electrical clearances are obtained from adjacent live parts in the course of its movement between ON and OFF position.

f) The frame of each isolator and earthing switches shall be provided with two reliable earth terminals for connection to the earth mat.

g) The earth switch should be able to carry the same fault current as the main blades of the Isolators and shall withstand dynamic stresses.

h) 800kV, 420 kV & 245 kV earth switches shall also comply with the requirements of IEC-62271-102, in respect of induced current switching duty as defined for Class-B and short circuit making capability class E-0 for earthing switches.

i) Earth switch blade in open condition shall not project (from the centre line of Insulator) by more than 4200mm for 400kV and 2810mm for 220kV respectively.

5.0 OPERATING MECHANISM :

a) The bidder shall offer motor operated Isolators and earth switches. Isolators of 36 kV and below and earth switches of 72.5 kV and below rating shall be manual operated.

b) Common Marshalling Box/Control cabinet/operating mechanism box shall conform to the requirement stipulated in Section-GTR and shall be made of cast aluminium/aluminum sheet of adequate thickness (minimum 3 mm) or stainless steel (grade-304) of minimum thickness 2mm.

c) A “Local/Remote” selector switch and a set of open/ close push buttons shall be provided on the control cabinet of the isolator to permit its operation through local or remote push buttons.

d) Provision shall be made in the control cabinet to disconnect power supply to prevent local/remote power operation.

e) Motor shall be an AC motor and conform to the requirements of Section-GTR.

f) Suitable reduction gearing shall be provided between the motor and the drive shaft of the isolator. The mechanism shall stop immediately when motor supply is switched off. If necessary a quick electro-mechanical brake shall be fitted on the higher speed shaft to effect rapid braking.

g) Manual operation facility (with handle) should be provided with necessary interlock to disconnect motor.

h) Gear should be of forged material suitably chosen to avoid bending/jamming on operation after a prolonged period of non-operation. Also all gear and connected material should be so chosen/surface treated to avoid rusting.

i) Blocked rotor test of motor shall be conducted as a routine test. During the blocked rotor test, overload protection relay should operate to prevent failure of motor.

j) Only stranded conductor shall be used for wiring. Minimum size of the conductor for control circuit wiring shall be 1.5 sq.mm. (Copper).

k) The operating mechanism shall be located such that it can be directly mounted on any one of the support structure.

l) Snap type limit/auxiliary switches shall be used with Factory set values. No adjustment shall be required at site during commissioning.

m) For individual pole operated electrically ganged isolator, a common marshalling cabinet shall be provided to interface cables from all three phases for further wiring to power, control and protection system.

n) Plug-in type terminals shall be used for interconnecting cables.

6.0 OPERATION :

a) The main Isolator and earth switches shall be individual pole operated for 800/420 kV and gang operated in case of 245 kV & 145 kV. However, 245 kV Tandem Isolators shall be individual-pole operated. The operating mechanism of all the three poles shall be well synchronized and interlocked.

b) The design shall be such as to provide maximum reliability under all service conditions. All operating linkages carrying mechanical loads shall be designed for negligible deflection and strain less than 1%. The length of inter insulator and interpole operating rods shall be capable of adjustments, by means of screw thread which can be locked with a lock- nut after an adjustment has been made. The isolator and earth switches shall be provided with “over dead center” device in the operating mechanism at open and close position to prevent accidental opening by wind, vibration, short circuit forces or movement of the support structures.

c) Each isolator/pole of isolator and earth switch shall be provided with a manual operating handle enabling one man to open or close the isolator with ease while standing at ground level. Non-detachable type manual operating handle shall have provision for padlocking. For detachable type manual operating handles, suitable provision shall be made inside the operating mechanism box for parking the detached handles. The provision of manual operation shall be located at a convenient operating height from the base of isolator support structure.

d) The isolator contacts shall be positively driven by the operating mechanism continuous control throughout the entire cycle of operation. The operating pipes and rods shall be sufficiently rigid to maintain positive control under the most adverse conditions and when operated in tension or compression for isolator closing / opening operation. They shall also be capable of withstanding all torsional and bending stresses due to operation of the isolator. Wherever supported, the operating rods shall be provided with bearings on each support and at the ~~either~~ ends. The operating rods/ pipes shall be provided with suitable universal couplings to account for any angular misalignment.

e) All rotating parts shall be provided with grease packed roller or ball bearings in sealed housings designed to prevent the ingress of moisture, dirt or other foreign matter. Bearings pressure shall be kept low to ensure long life and ease of operation. Locking pins wherever used shall be rust- proof.

f) Signaling of closed position shall not take place unless it is certain that the movable contacts, have reached a position in which rated normal current, peak withstand current and short time withstand current can be carried safely. Signaling of open position shall not take place unless movable contacts have reached a position such that clearance between contacts is atleast 80% of the isolating distance.

g) The position of movable contact system (main blades) of each of the Isolators and earthing switches shall be indicated by a mechanical indi- cator at the lower end of the vertical rod of shaft for the Isolators and earthing switch. The indicator shall be of metal and shall be visible from operating level.

h) The contractor shall furnish the following details alongwith quality norms, during detailed engineering stage:

(i) Current transfer arrangement from main blades of isolator alongwith milli volt drop immediately across transfer point.

(ii) Details to demonstrate smooth transfer of rotary motion from motor shaft to the insulator alongwith stoppers to prevent over travel.

7.0 TERMINAL CONNECTOR STUD/PAD:

The isolator terminal pads/studs shall be made of high quality copper or aluminum and shall be conforming to Australian standard AS-2935 for rated current. The terminal pad shall have protective covers which shall be removed before interconnections. Only terminal pads shall be used for current ratings above 1250A. Terminal pads shall be mounted below the current transfer contacts so that the cantilever pull from the terminal connector is not transferred through the current transfer point to the support insulator. The terminal pad shall be suitable for horizontal plane connection with terminal connector. The terminal pads for all isolators with 3150A & above rating shall have six holes for terminal pad.

8.0 SUPPORT STRUCTURE:

800 kV/420 kV/245 kV/145 kV Isolators along with Earth switches shall be suitable for mounting on standard support structures.

9.0 TESTS:

9.1 In continuation to the requirements stipulated under Section-GTR the isolator alongwith its earthing switch and operating mechanism should have been type tested as per IEC/IS and shall be subjected to routine tests in accordance with IEC-62271-102. Minimum 1000 Nos. mechanical operations in line with mechanical endurance test, M0 duty, shall be carried out on 1 (one) isolator out of every lot of Isolators, assembled completely with all accessories including insulators, as acceptance test for the lot. The travel characteristics measured at a suitable location in the base of insulator along with motor current/power drawn, during the entire travel duration are to be recorded at the start and completion and shall not vary by more than (+/-) 10% after completion of 1000 cycles of operation. After completion of test, mechanical interlock operation to be checked.

9.2 The test reports of the type tests as per IEC 62271-102 and the following additional type tests (additional type tests are required for isolators rated above 72.5 kV only) shall also be submitted for the Employer's review.

(i) Radio interference voltage test as per Annexure-A of Section-GTR.

(ii) Corona Extinction Voltage test as per Annexure-A of Section-GTR (for 800/420 kV Isolators only).

(iii) Seismic withstand test on isolator mounted on Support structure as per Annexure-B of Section-GTR. The test shall be performed in the following position :

Isolator open	E/S Closed
Isolator open	E/S Open
Isolator Closed	E/S Open

10.0 MANDATORY SPARES:

Bidder shall include in his proposal mandatory spares as mentioned in the Bidding Documents.

11.0 TECHNICAL PARAMETERS: As per table given at **Annexure-I**:

12.0 PRE-COMMISSIONING TESTS

12.1 Contractor shall perform any additional test based on specialties of the items as per the field Q.P./Instructions of the equipment manufacturer or Employer

without any extra cost to the Employer. The Contractor shall arrange all instruments required for conducting these tests alongwith calibration certificates at his own cost.

An indicative list of tests on isolator and earthswitch is given below. For pre-commissioning procedures and formats for Isolators and Grounding switch, Doc.No.: CF/ISO/07/R-4, dtd-01.04.2013 under POWERGRID Document no. D- 2-01-03-01-04 will be the reference document. This document will be available at respective sites and shall be referred by the contractor.

(a) Insulation resistance of each pole

(b) Manual and electrical operation and interlocks

(c) Insulation resistance of control circuits and motors

(d) Ground connections

(e) Contact resistance

(f) Proper alignment so as to minimize vibration during operation

(g) Measurement of operating Torque for isolator and Earth switch

(h) Resistance of operating and interlocks coils

(i) Functional check of the control schematic and electrical & mechanical interlocks

(j) 50 operations test on isolator and earth switch

12. 2 The Contractor shall ensure that erection, testing and commissioning of Isolators above 72.5 kV class shall be carried out under the supervision of the Isolator manufacturer's representative and the cost of the same shall be included in the erection price of the respective equipment.

Annexure-I

1. **Technical Parameters for 765kV, 400kV, 220kV and 132kV Isolators**

Sl. No.	Description	Unit	800kV ISO	420kV ISO	245kV ISO	145kV ISO
1	Rated voltage	kVrms	800	420	245	145
2	Rated frequency	Hz	50	50	50	50
3	No. of poles	Nos.	3	3	3	3
4	Design ambient temperature	°C	50	50	50	50
5	Type		Outdoor	Outdoor	Outdoor	Outdoor
6	Rated current at 50°C ambient temperature	A	3150	3150	1600A / 2500 A (as applicable)	1250
7	Rated short time withstand current of isolator and earth switch	kA	40 / 50 for 1 sec (as applicable)	40 /50 /63 for 1 sec (as applicable)	40 / 50 for 1 sec (as applicable)	31.5 for 1 sec
8	Rated dynamic short time withstand current of isolator and earth switch	kAp	102kAp	100 kAp / 125 kAp / 157.5 kAp (as applicable)	100 kAp / 125 kAp (as applicable)	80kAp
9	Temperature rise over design ambient temperature	As per Table-3 of IEC-62271-1				
10	Rated mechanical terminal load	N	As per table III of IEC-62271-102 or as per value calculated in Section-GTR whichever is higher			
11	Mechanical Endurance Class	Isolator-M2 E/S-M0				
12	Operating mechanism of isolator/erathswitch	A.C. Motor operated				
13	No. of auxiliary contacts on each isolator	Besides requirement of this spec., 5 NO + 5 NC contacts wired on each isolator to terminal block exclusively for Employer's use in future.				
14	No. of auxiliary contacts on each earthing switch	Besides requirement of this spec., 3 NO + 3 NC contacts wired on each isolator to terminal block exclusively for Employer's use in future.				

Sl. No.	Description	Unit	800kV ISO	420kV ISO	245kV ISO	145kV ISO
14	Max. Operating time	secs	20 sec. for Isolator and 25 seconds for earth switch	20 secs	12 secs	12 secs
15	Number of terminal in control cabinet	All contacts & control circuits are to be wired up to control cabinet plus 24 spare terminals evenly distributed.				
16	Rated Insulation levels					
a)	Full wave impulse withstand voltage (1.2/50 microsec.)					
i)	between line terminals and ground	kVpeak	±2100	±1425	±1050	±650
ii)	between terminals with isolator open	kVpeak	±2100 kVp impulse on one terminal and 455 kVp power frequency voltage of opposite polarity on other terminal	±1425 kVp impulse on one terminal and 240 kVp power frequency voltage of opposite polarity on other terminal	±1200	±750
b)	Switching impulse withstand voltage (250/2500 micro-second) dry and wet					
i)	between line terminals and ground	kV peak	± 1550	± 1050	-NA-	-NA-
ii)	between terminals with Isolator open	kV peak	1175 kVp impulse on one terminal and 650 kVp power frequency voltage of opposite polarity on other terminal	900 kVp impulse on one terminal and 345 kVp power frequency voltage of opposite polarity on other terminal	-NA-	-NA-
c)	One minute power frequency dry withstand voltage					
i)	between line terminals and ground	kV rms	830	520	460	275
ii)	between terminals with isolator open	kV rms	1150	610	530	315
17	Minimum Corona extinction voltage	KV rms	508	320	156	92

Sl. No.	Description	Unit	800kV ISO	420kV ISO	245kV ISO	145kV ISO
	with Isolator in all positions					
18	Max. radio interference voltage for frequency between0.5 MHz and 2 MHz. in all positions	micro volts	2500 at 508 kVrms	1000 at 266 kVrms	1000 at 156 kVrms	500 at 92 kVrms
19	Minimum Creepage distance					
i)	Phase to ground	mm	As per Section-GTR	As per Section-GTR	As per Section-GTR	As per Section-GTR
20	Seismic acceleration		As per IS:1893	As per IS:1893	As per IS:1893	As per IS:1893
21	Thermal Rating of Auxiliary Contacts	A	10 A at 220 V DC	10 A at 220 V DC	10 A at 220 V DC	10 A at 220 V DC
22	Breaking Capacity of auxiliary contacts		2 A DC with circuit time constant not less than 20 ms	2 A DC with circuit time constant not less than 20 ms	2 A DC with circuit time constant not less than 20 ms	2 A DC with circuit time constant not less than 20 ms
	Distance between support structures foundations (within same phase)	m	6.0	4.0	2.5	-
23	System neutral earthing		Effectively Earthed	Effectively Earthed	Effectively Earthed	Effectively Earthed

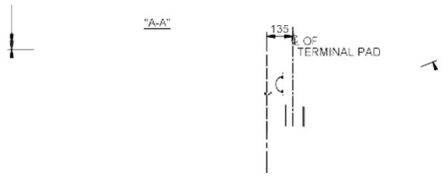
Note: The above insulation levels are applicable for altitude up to 1000 meters above M.S.L. For higher altitudes, suitable correction factor as per relevant IEC shall be applied.

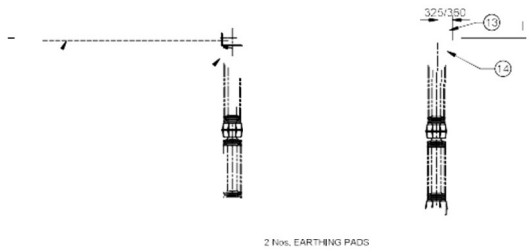
2. Technical Parameters for 72.5 kV, 36 kV and 11 kV Isolator

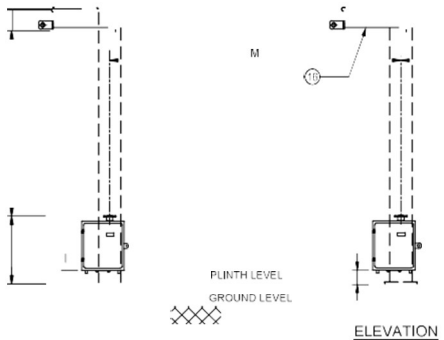
Sl. No.	Description	Unit	72.5kV ISO	36kV ISO	12kV ISO
1	Rated voltage	kVrms	72.5	36	11
2	Rated frequency	Hz	50	50	50
3	No. of poles	Nos.	3	3	3
4	Design ambient temperature	°C	50	50	50
5	Type		Outdoor, Mechanically gang operated	Outdoor, Mechanically gang operated	Outdoor, Mechanically gang operated
6	Rated current at 50°C ambient temperature	A	As per requirement	As per requirement	As per requirement
7	Rated short time withstand current of isolator and earth switch	kA	25 kA for 3 sec	25 kA for 3 sec	25 kA for 3 sec
8	Rated dynamic short time withstand current of isolator and earth switch	kAp	62.5kAp	62.5kAp	62.5kAp
9	Temperature rise over design ambient temperature	As per Table-3 of IEC-62271-1			
10	Rated mechanical terminal load	N	As per table III of IEC-62271-102 or as per value calculated in Section-GTR whichever is higher		
11	Mechanical Endurance Class		Isolator-M1 E/S-M0		
12	Operating mechanism of isolator/erathswitch		Isolator - A.C. Motor operated E/S – Manual operated	Isolator - Manual operated E/S – Manual operated	Isolator - Manual operated E/S – Manual operated
13	No. of auxiliary contacts on each isolator	Besides requirement of this spec., 5 NO + 5 NC contacts wired on each isolator to terminal block exclusively for Employer's use in future.			
14	No. of auxiliary contacts on each earthing switch	Besides requirement of this spec., 3 NO + 3 NC contacts wired on each isolator to terminal block exclusively for Employer's use in future.			
14	Max. Operating time	sec	12 sec.	NA for manual operation	NA for manual operation

Sl. No.	Description	Unit	72.5kV ISO	36kV ISO	12kV ISO
15	Number of terminal in control cabinet (Interpole cabling shall be supplied by Contractor)	All contacts & control circuits are to be wired up to control cabinet plus 24 spare terminals evenly distributed.			
16	Rated Insulation levels				
a)	Full wave impulse withstand voltage (1.2/50 microsec.)				
i)	between line terminals and ground	kVpeak	±325	±170	-
ii)	between terminals with isolator open	kVpeak	±375 kVp	±180 kVp	-
b)	One minute power frequency dry withstand voltage				
i)	between line terminals and ground	kV rms	140	70	-
ii)	between terminals with isolator open	kV rms	160	80	-
17	Minimum Creepage distance				
i)	Phase to ground	mm	As per Section-GTR	As per Section-GTR	As per Section-GTR
20	Seismic acceleration		As per IS:1893	As per IS:1893	As per IS:1893
21	Thermal Rating of Auxiliary Contacts	A	10 A at 220V/110V DC	10 A at 220V/110V DC	10 A at 220V/110V DC
22	Breaking Capacity of auxiliary contacts		2 A DC with circuit time constant not less than 20 ms	2 A DC with circuit time constant not less than 20 ms	2 A DC with circuit time constant not less than 20 ms
	Distance between support structures foundations (within same phase)	m	As per layout		
23	System neutral earthing		Effectively Earthed	Effectively Earthed	Effectively Earthed

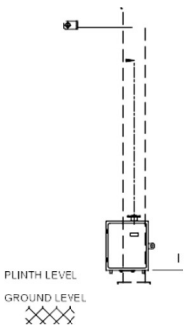
Note: The above insulation levels are applicable for altitude up to 1000 meters above M.S.L. For higher altitudes, suitable correction factor as per relevant IEC shall be applied.



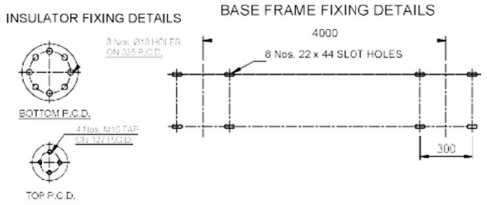


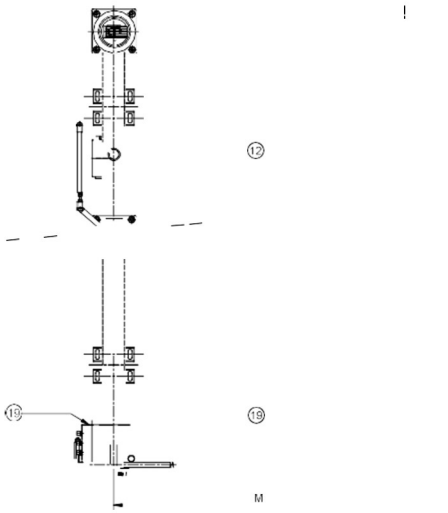


ELEVATION

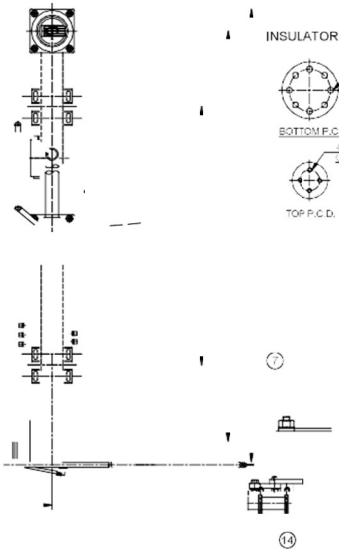


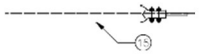
END VIEW





PLAN





PART LIST

BOQ

	ASSY	LOOSE
1. FIXED CONTACT ASSEMBLY	6 Nos.	
2. MOVING CONTACT ASSEMBLY	3 Nos.	
3. CORONA RING ON INSULATOR		9 Nos
4. INSULATOR STACKS (NOT IN OUR SCOPE OF SUPPLY)		9 Nos
5. OPERATING LEVER FOR MAIN SWITCH(40 NB GI PIPE)		6 Nos
6. ELEVATOR PLATE	6 Nos.	
7. BASE CHANNEL (200 x 200 x 5 thk. M.S BOX CHANNEL (HDG)	3 Nos.	
8. UNIVERSAL JOINT ASSEMBLY		3 Nos.
9. ROTATING SHAFT WITH LEVER ARM & CLAMP (M.S. HOT DIP GALVANIZED)	3 Nos.	
10. DOWN OPERATING PIPE FOR MAIN SWITCH(50 NB GI PIPE)		3 Nos.
11. SUPPORTING STRUCTURE (NOT IN OUR SCOPE OF SUPPLY)		6 Nos.
12. OPERATING MECHANISM FOR MAIN SWITCH (MOTOR)	3 Nos.	
13. COVER FOR FIXED CONTACT		6 Nos.
14. EARTH SWITCH FIXED CONTACT ASSEMBLY WITH COVER	3 Nos.	
15. EARTH SWITCH MOVING CONTACT ASSEMBLY	3 Nos.	
16. OPERATING PIPE FOR EARTH SWITCH (40 NB GI PIPE)		3 Nos.
17. COUNTER BALENCING SPRING		3 Nos.
18. EARTH SWITCH DOWN OPERATING PIPE (50 NB GI PIPE)		3 Nos.
19. OPERATING MECHANISM FOR EARTH SWITCH (MOTOR)	3 Nos.	
20. COPPER FLEXIBLE BRAIDED	1 SET.	

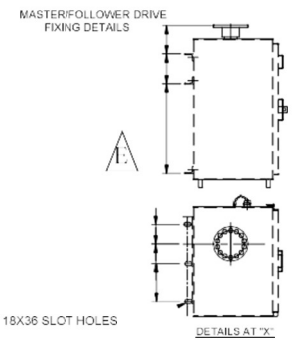
REFERENCE DRAWINGS:

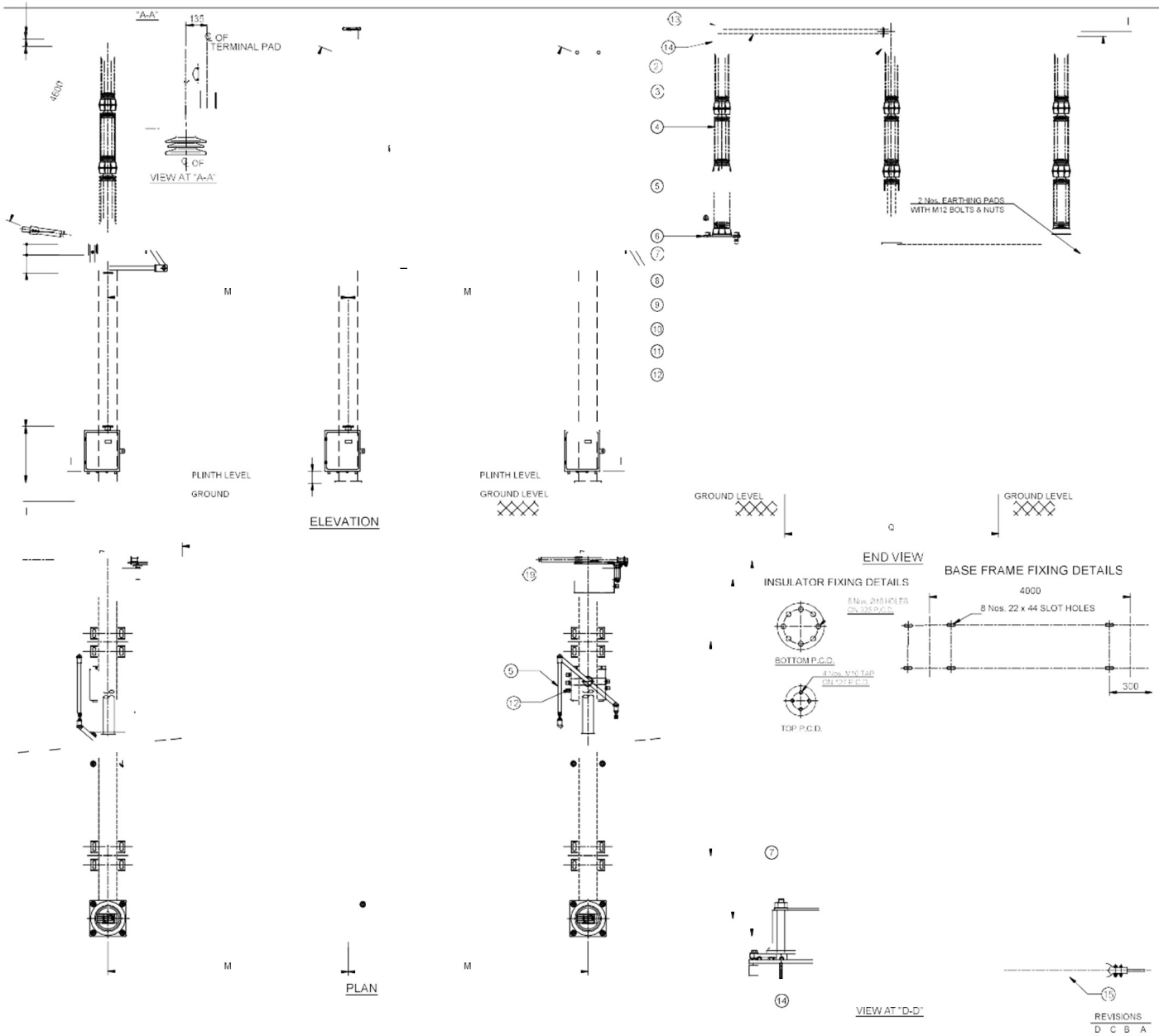
FOR MAIN SWITCH CONTACT ASSEMBLY (FOR 3150 A) – – – – – – 4. RM 2006 05
FOR MAIN SWITCH CONTACT ASSEMBLY (FOR 4000 A) – – – – – 4. RM 2006 06
FOR EARTH SWITCH CONTACT ASSEMBLY – – – – – – – – – – – – 4. RE 2006 07 07A
FOR OPERATING MECHANISM (MASTER) M.S. DETAILS – – – – – – 3. M 2018 08
FOR OPERATING MECHANISM (FOLLOWER) M.S. DETAILS – – – – – 3. M 2018 09
FOR SCHEMATIC DIAGRAM (MASTER / FOLLOWER) DETAILS – – – – 3. M 2018 10
FOR OPERATING MECHANISM (MASTER) E.S. DETAILS – – – – – – 3. M 2018 11
FOR OPERATING MECHANISM (FOLLOWER) E.S. DETAILS – – – – – 3. M 2018 12
FOR SCHEMATIC DIAGRAM (MASTER / FOLLOWER) DETAILS – – – – 3. M 2006 13
FOR AUXILIARY SWITCH CONTACT TRAVEL DIAGRAM FOR MS&ES – 3. M 2018 55A, 4.1 2006 65
FOR NAME PLATE DETAILS – – – – – – – – – – – – – – – – – – 3. Z 2006 16
FOR MECHANICAL INTERLOCK DETAILS – – – – – – – – – – – – – 4. Z 2006 17
FOR COUNTER WEIGHT SPRING DETAILS – – – – – – – – – – – – – 4. S 2009

NOTES :

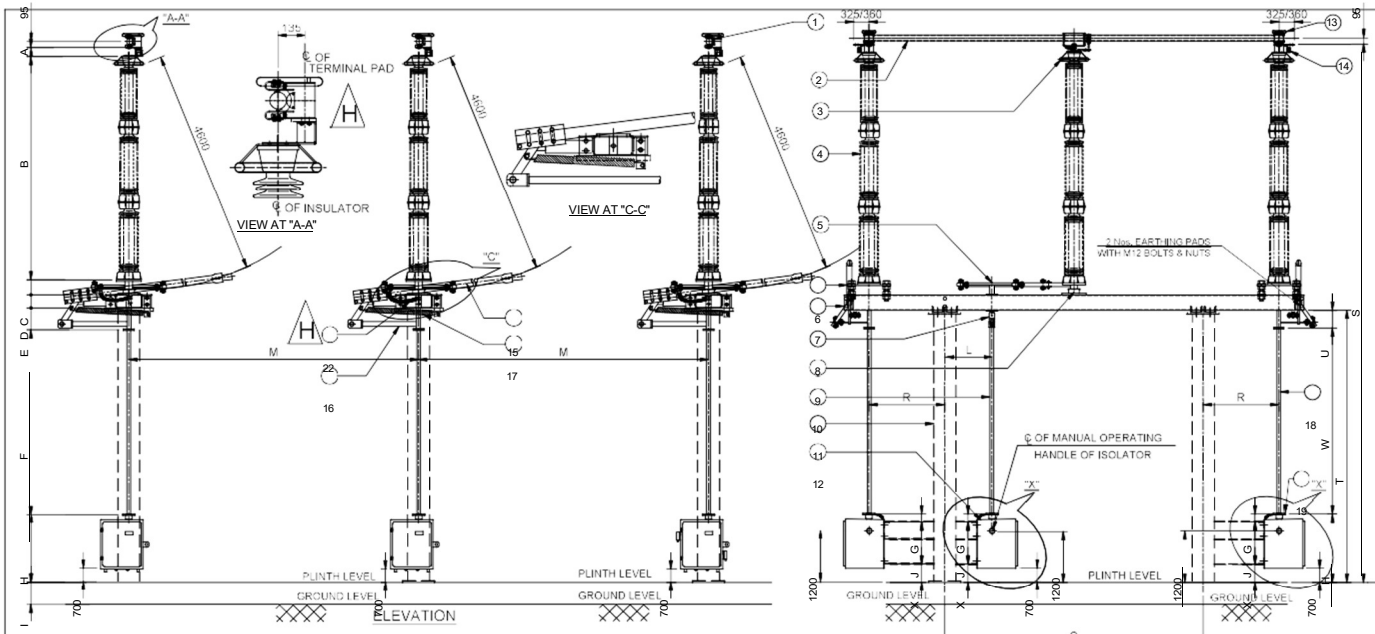
1. ALL DIMENSIONS ARE IN MILLIMETERS
2. ALL FERROUS PARTS ARE HOT DIP GALVANIZED
3. ALL NON - FERROUS CONTACT POINTS ARE SILVER PLATED (25 MICRONS Min.)
4. THE INDICATED DIMENSIONS ARE SUBJECTED TO THE MANUFACTURING TOLERANCES :
   UPTO 50 mm
   101 TO 300 mm
5. SHORT TIME CURRENT RATING 40 / 50 & 63 KA rms. FOR 1 Sec.
6. MIN. CREEPAGE DISTANCE 10,500 mm
7. ROTATING STOOL BASE HAVING 2 Nos. DOUBLE END SEALED BALL BEARINGS OF ADEQUATE DIAMETER
8. APPLICABLE STANDARDS IS : 9921 PART I TO V/IEC : 62271 - 102 IEC 60694
9. MAX. TERMINAL LOAD SHALL BE AS PER IEC : 62271 - 102
10. ALL G.I. PIPES ARE CLASS "B" TYPE AS PER IS : 1239
11. DRAWING IS NOT TO SCALE.

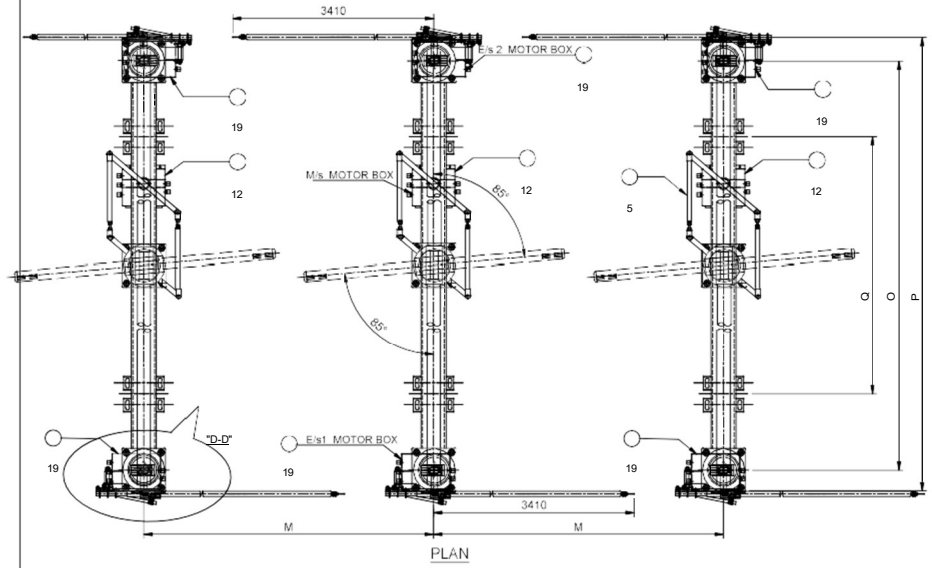
WEIGHT OF THE ISOLATOR EXCLUDING INSULATOR - 1890 KGS (APPROX)

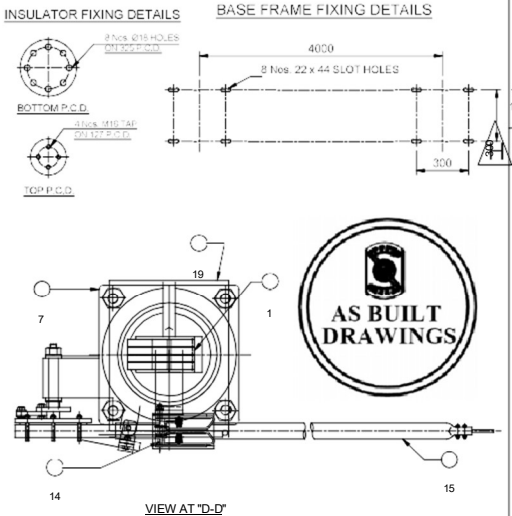


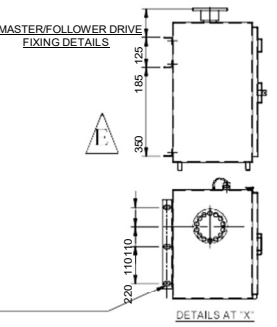


A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
130	3650	90	200	150	2375	125	1400	300	535	440	450	6000 7000	300	4770	5200	4000	385	8000	3925	200	NA	2325	740	NA	NA









PART LIST

	ASSY	LOOSE
1. FIXED CONTACT ASSEMBLY	6 Nos.	
2. MOVING CONTACT ASSEMBLY	3 Nos.	
3. CORONA RING ON INSULATOR		9 Nos.
4. INSULATOR STACKS (NOT IN OUR SCOPE OF SUPPLY)		9 Nos.
5. OPERATING LEVER FOR MAIN SWITCH(40 NB GI PIPE)		6 Nos.
6. ELEVATOR PLATE	6 Nos.	
7. BASE CHANNEL (200 x 200 x 5 thk. M.S BOX CHANNEL (HDG)	3 Nos.	
8. UNIVERSAL JOINT ASSEMBLY		3 Nos.
9. ROTATING SHAFT WITH LEVER ARM & CLAMP (M.S. HOT DIP GALVANIZED)	3 Nos.	
10. DOWN OPERATING PIPE FOR MAIN SWITCH(50 NB GI PIPE)		3 Nos.
11. SUPPORTING STRUCTURE (NOT IN OUR SCOPE OF SUPPLY)		6 Nos.
12. OPERATING MECHANISM FOR MAIN SWITCH (MOTOR)	3 Nos.	
13. COVER FOR FIXED CONTACT		6 Nos.
14. EARTH SWITCH FIXED CONTACT ASSEMBLY WITH COVER	6 Nos.	
15. EARTH SWITCH MOVING CONTACT ASSEMBLY	6 Nos.	
16. OPERATING PIPE FOR EARTH SWITCH (40 NB GI PIPE)		6 Nos.
17. COUNTER BALENCING SPRING		6 Nos.
18. EARTH SWITCH DOWN OPERATING PIPE (50 NB GI PIPE)		6 Nos.
19. OPERATING MECHANISM FOR EARTH SWITCH (MOTOR)	6 Nos.	
20. COPPER FLEXIBLE BRAIDED	1 SET.	

REFERENCE DRAWINGS:

FOR MAIN SWITCH CONTACT ASSEMBLY (FOR 3150 A)	4. RM 2006 05
FOR MAIN SWITCH CONTACT ASSEMBLY (FOR 4000 A)	4. RM 2006 06
FOR EARTH SWITCH CONTACT ASSEMBLY	4. RE 2006 07 07A
FOR OPERATING MECHANISM (MASTER) M.S. DETAILS	3. M 2018 08
FOR OPERATING MECHANISM (FOLLOWER) M.S. DETAILS	3. M 2018 09
FOR SCHEMATIC DIAGRAM (MASTER / FOLLOWER) DETAILS	3. M 2018 10
FOR OPERATING MECHANISM (MASTER) E.S. DETAILS	3. M 2018 11
FOR OPERATING MECHANISM (FOLLOWER) E.S. DETAILS	3. M 2018 12
FOR SCHEMATIC DIAGRAM (MASTER / FOLLOWER) DETAILS	3. M 2006 13
FOR AUXILIARY SWITCH CONTACT TRAVEL DIAGRAM FOR MS&ES	4. M 2018 95A, 4.1 2006 95
FOR NAME PLATE DETAILS	3. Z 2006 16
FOR MECHANICAL INTERLOCK DETAILS	4. Z 2006 17
FOR COUNTER WEIGHT SPRING DETAILS	4. S 2009

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. ALL FERROUS PARTS ARE HOT DIP GALVANIZED
3. ALL NON - FERROUS CONTACT POINTS ARE SILVER PLATED (25 MICRONS Min.)
4. THE INDICATED DIMENSIONS ARE SUBJECTED TO THE MANUFACTURING TOLERANCES :
   UPTO 50 mm ---------- ±3% 51 TO 100 mm ---------- ±2%
   101 TO 300 mm ---------- ±1% ABOVE 300 mm ---------- ±0.5%
5. SHORT TIME CURRENT RATING 40 / 50 & 63 KA rms, FOR 1 Sec.
6. MIN. CREEPAGE DISTANCE 10,500 mm
7. ROTATING STOOL BASE HAVING 2 Nos. DOUBLE END SEALED BALL BEARINGS OF ADEQUATE DIAMETER
8. APPLICABLE STANDARDS IS : 9921 PART I TO VIEC : 62271 - 102 IEC 60694
9. MECH. TERMINAL LOAD SHALL BE AS PER IEC : 62271 - 102
10. ALL GI PIPES ARE CLASS 'B' TYPE AS PER IS : 1239.
11. DRAWING IS NOT TO SCALE.

WEIGHTS :

NET WEIGHT OF THE ISOLATOR EXCLUDING INSULATOR : 2430 Kgs (Approx.)

AS BUILT DRAWINGS

DIMENSIONS

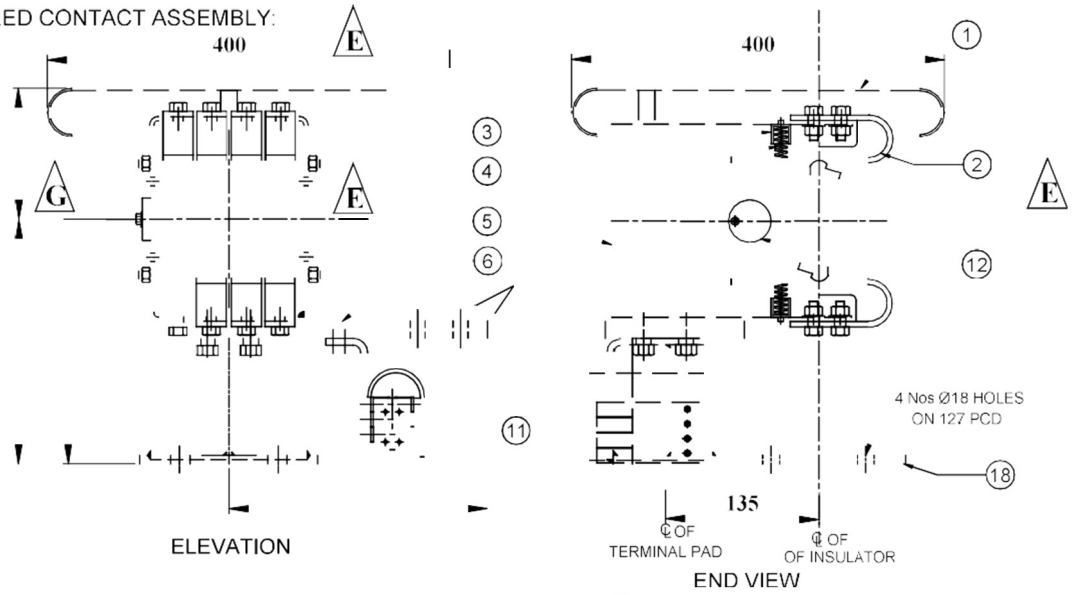
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
130	3650	90	200	150	2375	125	1400	300	535	440	450	6000 / 7000	300	4770	5200	4000	385	8000	3925	200	NA	2325	740	NA	NA

REVISIONS				TITLE		
D	C	B	A		SCALE N.T.S	
				420 kV, 3150 / 4000 A, TRIPLE POLE, HDB ISOLATOR WITH TWO E/S (ELECTRICALLY GANG OPERATED)	DATE	16 - 01 - 2019
					DRAWN	
					CHECKED	
					APPROVED	

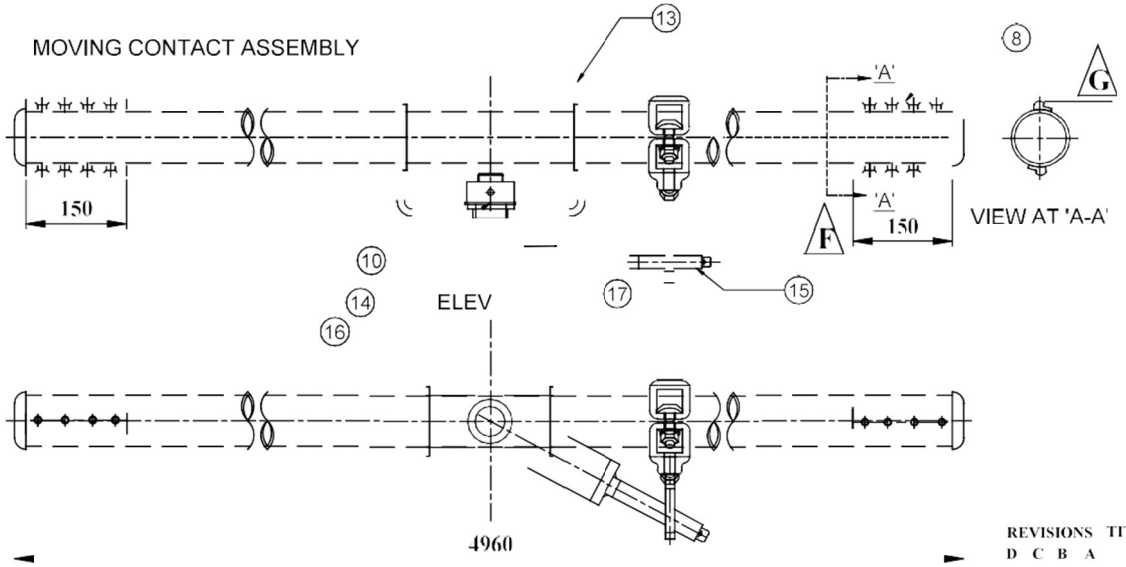
GR POWER SWITCHGEAR LTD.,
JEEDIMETLA HYDERABAD-500 055 INDIA

DRG.NO: 3. HR 2006 04 REV J

FIXED CONTACT ASSEMBLY:



MOVING CONTACT ASSEMBLY



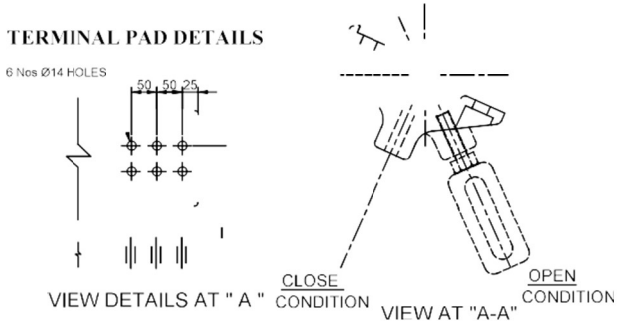
PART LIST & BILL OF MATERIAL:	QTY/3 POLE
1. FIXED CONTACT HOOD (Alu.)	6
2. JAWS (32 x 6.35 mm Cu. FLAT, 4 PAIRS. SILVER PLATED)	48
3. BUSH (NYLON)	48
4. SPRING (STAINLESS STEEL)	48
5. F.C. SUPPORT (Al)	6
6. JUMPER PLATE (200 x 20 Alu. FLAT)	6
7. MOVING CONTACT ARM (89 OD x 10 THK. Alu. TUBE)	3
8. MOVING CONTACT ENDS Cu PROFILE (SILVER PLATED)	12
9. MOVING CONTACT END CAP (NYLON)	6
10. SPACER (NYLON)	6
11. E.S FIXED CONTACT WITH COVER(REF. DRG. NO. 4 RE 2006 07)	3.Nos For Single E.S 6.Nos For Double E.S
12. STOPPER (NYLON)	6
13. MC SUPPORT WITH NYLON BUSH(MS HDG)	6
14. CENTER MECHANISM (MS HDG)	3
15. BRASS ROLLER	3
16. MC BOTTOM PLATE (10 mm THICK, MS HDG)	3
17. MC SPRING (SS)	3
18. FC BOTTOM PLATE (10mm THICK MS HDG)	6

NOTE:

1. ALL DIMENSIONS ARE IN MILLIMETER
2. ALL FERROUS PARTS ARE HOT DIP GALVANIZED
3. ALL NON FERROUS CONTACT POINTS ARE SILVER PLATED (25 MICRONS Min) REMAINING CONTACT AREAS (COPPER) ARE TIN PLATED
4. THE MOVING CONTACT ASSEMBLY SHOWN IS FOR TURN & TWIST ASSEMBLY
5. THE INDICATED DIMENSIONS ARE SUBJECTED TO THE MANUFACTURING TOLERANCES :

UPTO 50 mm	---------- ±3%	51 TO 100 mm	---------- ±2%
101 TO 300 mm	---------- ±1%	ABOVE 300 mm	---------- ±0.5%

TERMINAL PAD DETAILS



REVISIONS TITLE:
D C B A

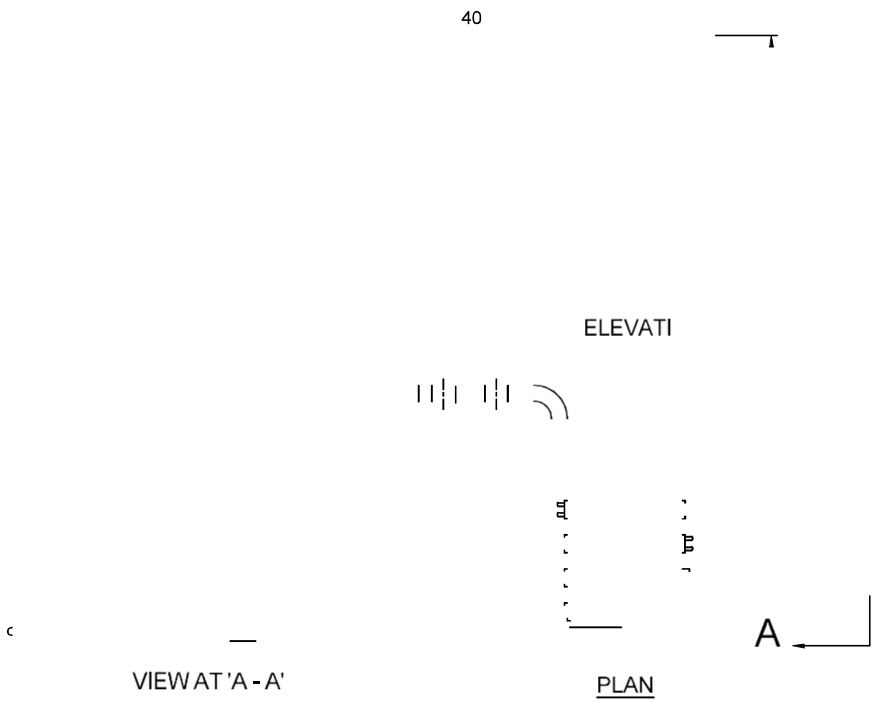
MAIN CONTACT ASSEMBLY
(FOR 420 kV, 3150 A DB ISOLATOR)

GR POWER SWITCHGEAR LTD.,
JEEDIMETLA HYDERABAD-500 055 INDIA

SCALE:N.T.S
DATE 12-01-2019
DRAWN
CHECKED
APPROVED
DRG.NO:

REV
G

FIXED CONTACT ASSEMBLY :



1. CONTACT HOLDER (75 x 12 Alu. FLAT)
2. CONTACT FINGER (25 x 4 Cu. FLAT 4 PAIRS SILVER PLATED)
3. MOVING CONTACT (50 x 10 Cu. FLAT, SILVER PLATED)
4. CONTACT ARM (60 OD x 50 ID Alu. TUBE)
5. TINNED COPPER BRAIDED FLEXIBLE (25 x 3 mm, 4 Nos.)
6. COVER FOR EARTH SWITCH FIXED CONTACT
7. SPRING (SS)

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. ALL COPPER CONTACT POINTS ARE SILVER PLATED (25 MICRONS) REMAINING AREA TIN PLATED
3. ALL FERROUS PARTS ARE HOT DIP GALVANIZED
4. THE INDICATED DIMENSIONS ARE SUBJECTED TO THE MANUFACTURING TOLERANCES :

UPTO 50 mm	---------- ±3%	51 TO 100 mm	---------- ±2%
101 TO 300 mm	---------- ±1%	ABOVE 300 mm	---------- ±0.5%

Ø9 SS ARCING HORN

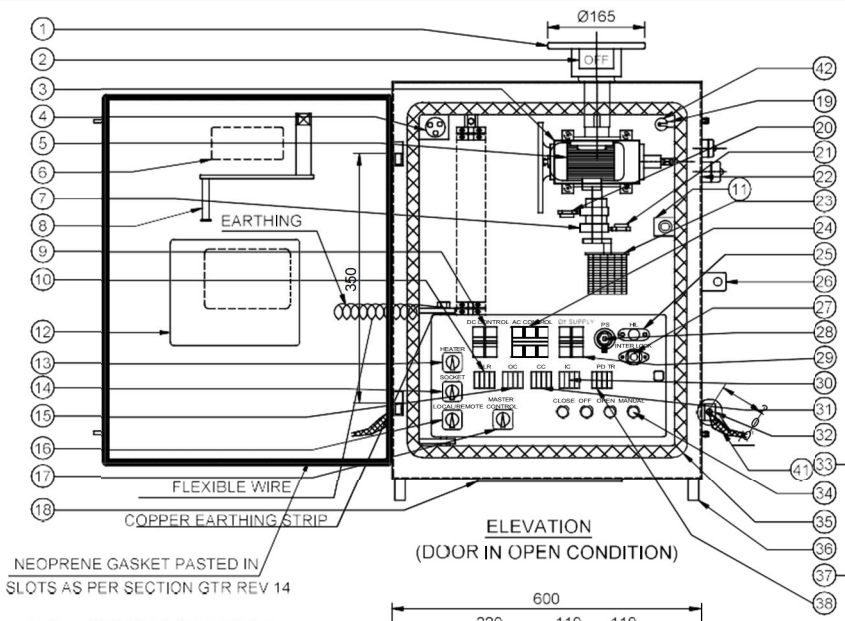
MOVING CONTACT ASSEMBLY :

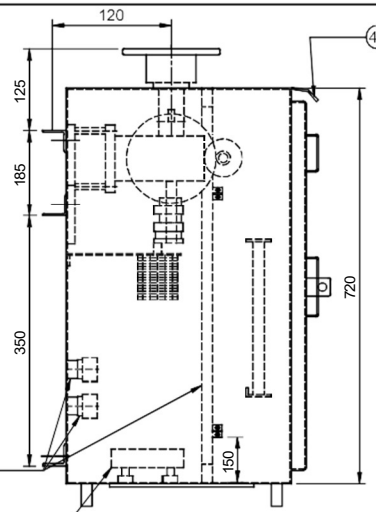
REVISIONS TITLE:
D C B A

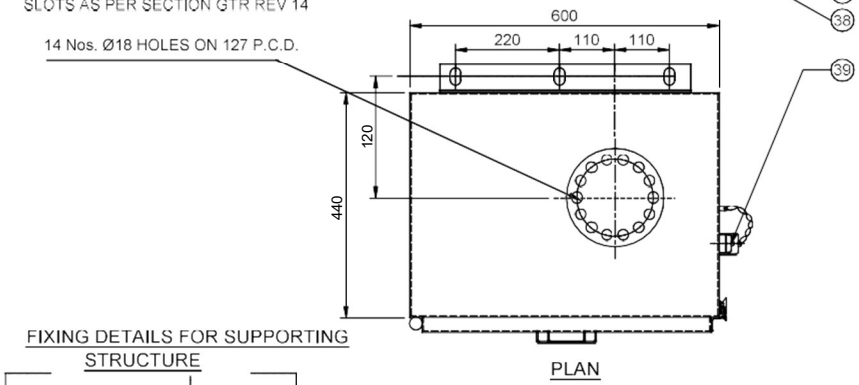
EARTH SWITCH CONTACT ASSEMBLY
(FOR 420 kV DB ISOLATOR)
(FOR STC : 40 / 50 KA/1Sec)

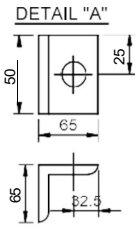
GR POWER SWITCHGEAR LTD.,
JEEDIMETLA HYDERABAD-500 055 INDIA

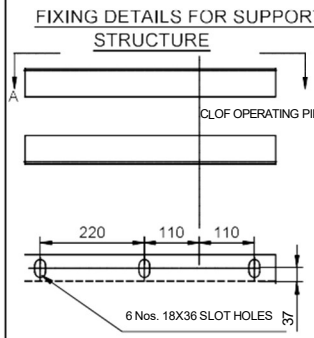
SCALE:N.T.S
DATE 27 - 12 - 2017
DRAWN
CHECKED
APPROVED
DRG.NO: 4. RE 2006 07
REV E

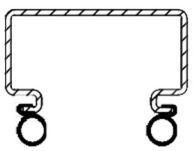












AS BUILT DRAWINGS

PART LIST:

1. OUTPUT FLANGE (10 mm THICK, 14 HOLES)
2. ON/OFF INDICATOR
3. GEAR BOX (SPUR / WORM & WORM SHAFT, RATIO 1 : 630)
4. THERMOSTAT (30 TO 85°C RECOMMENDED SETTING 40°)
5. MOTOR (Ø3, 415 Volts, 0.5 HP MOTOR)
6. CAUTION NAME PLATE
7. LIMIT SWITCH OPERATING CAM
8. OPERATING HANDLE FIXED TO DOOR
9. DC CONTROL SWITCH (2 POLE MCB)
10. OVER LOAD RELAY CUM SINGLE PHASE PREVENTOR (OLR)
11. DOOR OPERATD LIGHT SWITCH (LS)
12. SCHEMATIC DIAGRAM PLATE
13. HEATER SWITCH (HS)
14. POWER SOCKET SWITCH (PSS)
15. OPENING CONTACTOR (OC)
16. LOCAL/REMOTE SELECTOR SWITCH(S3)
17. MASTER CONTROL SWITCH (S4)
18. DETACHABLE CABLE GLANDS FIXING PLATE (WITH OUT GLANDS)
19. CUBICLE LAMP HOLDER
20. LIMIT SWICH (LSO)
21. LIMIT SWITCH (LSC)
22. CUBICLE WITH DOOR (3 mm THICK Alu. SHEET)
23. AUX. SWITCH (12 NO + 12 NC + 2 MBB)
24. AC CONTROL SWITCH (3 POLE MCB) WITH AC FAILURE INDICATION
25. PUSH CAP (FOR HIL)
26. PROVISION FOR PAD LOCK
27. HANDLE INTERLOCK (HIL)
28. POWER SOCKET (PSS, 15A) / INDUSTRIAL TYPE
29. Ø1 AC SUPPLY SWITCH (2 POLE MCB)
30. INTERLOCK CONTACTOR (IC)
31. CLOSING CONTACTOR (CC)
32. EARTHING TERMINAL (2 Nos. 65 x 65 x 5 Alu. ANGLE (WELDING TO BOX) WITH 1/2" x 2" BOLT WITH CHECK NUT AND WASHERS
33. TERMINAL BLOCK (CAT-M4 AND UBT - 4 TYPE OF ELMEX OR ITS EQUIVALENT) B
34. OPEN / CLOSE / MANUAL / OFF PUSH BUTTON (PBO / PBC / PBH / EPB)
35. RUBBER GASKET (EPDM)
36. SUPPORTING PIPE (Alu. WELDED TO BOX)
37. HEATER, 80 WATTS, 240 V
38. POLE DISCREPANCY TIMER (PD TR)
39. MANUAL OPERATING CAP / COVER (Aluminum)
40. RAIN SHADE
41. COPPER BRAIDED FLEXIBLE FOR EARTHING (155 Sq.mm X 200 mm long) C
42. LED LAMP

NOTE :

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. CUBICLE WILL BE POWDER COATED AS PER IS : 11232, RAL 7032 FOR OUTSIDE AND GLOSSY WHITE FOR INSIDE
3. DEGREE OF PROTECTION IP : 55 AS PER IS : 13947
4. 20% SPARE TERMINALS WILL BE PROVIDED
5. WIRING WILL BE DONE WITH 1100 V. GRADE 1.5 Sq.MM Cu. STRANDED P.V.C. INSULATED CONDUCTOR
6. WEIGHT OF THE BOX : 100 Kg (Approx.)
7. MAKE OF ALL COMPONENTS SHALL BE AS PER POWER GRID QA & I APPROVAL
8. GASKET DETAILS SHALL BE AS PER GTR, REV. 14

CUSTOMER	: POWER GRID CORPORATION OF INDIA LTD.
PROJECT	: Substation package-SS19: Extension of 765kV Solapur, 765kV Aurangabad, 765kV Wardha, 400kV Khandwa, 400kV Rajgarh, 400kV Champa, 400/220kV Itarsi & 400/220kV Jabalpur substations. Under Western Region System Strengthening Scheme (WRSS-20)
CONTRACTOR	: M/s. BHARAT HEAVY ELECTRICALS LIMITED
L.O.A. No.	: CC-CS/901-WR2/SS-3931/3/G3/NOA-I/8864 & 8865 DT. 29.07.19

REVISIONS				
D	C	B	A	
				REVISED AS PER CUTOMER COMMENT ON 17.06.2020
				REVISED AS PER CUTOMER COMMENT ON 30.05.2020
				REVISED AS PER CUTOMER COMMENT ON 07.03.2020

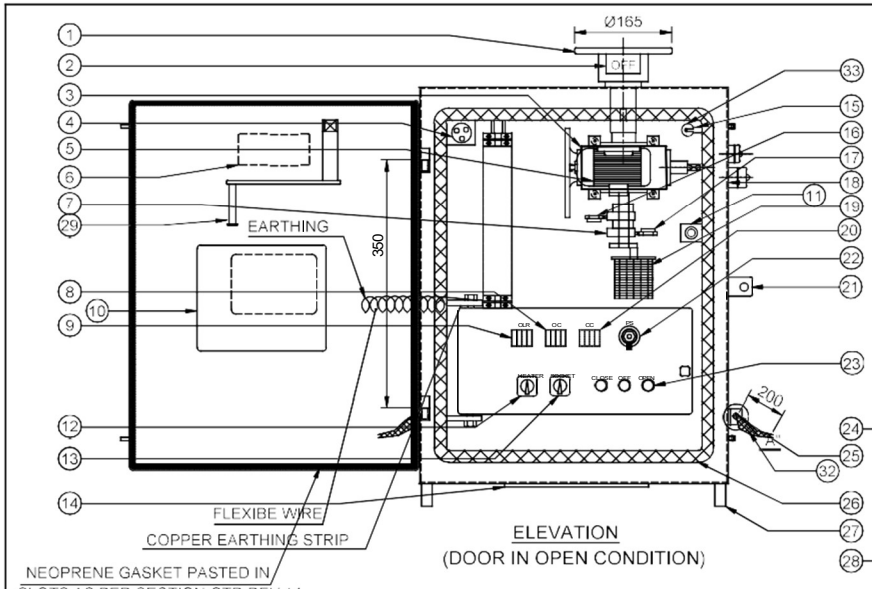
TITLE:

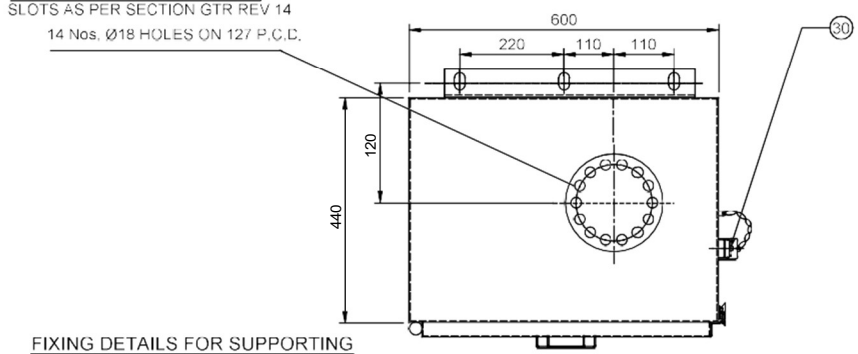
G.A. OF MOTOR OPERATING MECHANISM FOR ISOLATOR (MASTER DRIVE FOR 420 KV)

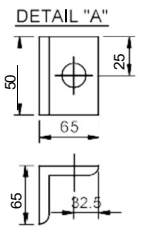
SCALE: N.T.S	
DATE	06 . 03 . 2020
DRAWN	
CHECKED	
APPROVED	

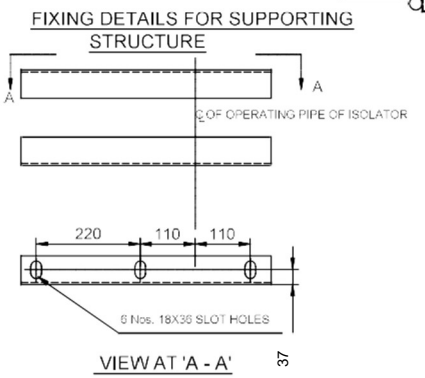
GR POWER SWITCHGEAR LTD., JEEDIMETLA HYDERABAD-500 055 INDIA

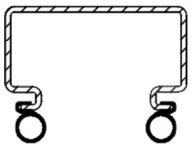
DRG.NO: 3. M 3347 02 REV C











PART LIST:

1. OUTPUT FLANGE (10 mm THICK, 14 HOLES)
2. ON/OFF INDICATOR
3. GEAR BOX (SPUR / WORM & WORM SHAFT, RATIO 1 : 630)
4. THERMOSTAT (30 TO 85°C RECOMMENDED SETTING 40°)
5. MOTOR (Ø3, 415 Volts, 0.5 HP MOTOR)
6. CAUTION NAME PLATE
7. LIMIT SWITCH OPERATING CAM
8. OPENING CONTACTOR (OC)
9. OVER LOAD RELAY CUM SINGLE PHASE PREVENTOR (OLR)
10. SCHEMATIC DIAGRAM PLATE
11. DOOR OPERATED LIGHT SWITCH (LS)
12. HEATER SWITCH (HS)
13. POWER SOCKET SWITCH (PSS)
14. DETACHABLE CABLE GLANDS FIXING PLATE (WITH OUT GLANDS)
15. CUBICLE LAMP HOLDER
16. LIMIT SWICH (LSO)
17. LIMIT SWITCH (LSC)
18. CUBICLE WITH DOOR (3 mm THICK Alu. SHEET)
19. AUX. SWITCH (12 NO + 12 NC + 2 MBB)
20. CLOSING CONTACTOR (CC)
21. PROVISION FOR PAD LOCK
22. POWER SOCKET (PSS, 15A) / INDUSTRIAL TYPE
23. OPEN / CLOSE / OFF PUSH BUTTON (PBO / PBC / EPB)
24. TERMINAL BLOCK (CAT-M4 AND UBT - 4 TYPE OF ELMEX OR ITS EQUIVALENT)
25. EARTHING TERMINAL (2 Nos. 65 x 65 x 5 Alu. ANGLE (WELDING TO BOX) WITH 1/2" x 2" BOLT WITH CHECK NUT AND WASHERS
26. RUBBER GASKET (EPDM)
27. SUPPORTING PIPE (Alu. WELDED TO BOX)
28. HEATER, 80 WATTS, 240 V
29. OPERATING HANDLE FIXED TO DOOR
30. MANUAL OPERATING CAP / COVER (Aluminum)
31. RAIN SHADE
32. COPPER BRAIDED FLEXIBLE FOR EARTHING (155 Sq.mm X 200 mm long)
33. LED LAMP

B

C

NOTE :

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. CUBICLE WILL BE POWDER COATED AS PER IS : 11232, RAL 7032 FOR OUTSIDE AND GLOSSY WHITE FOR INSIDE
3. DEGREE OF PROTECTION IP : 55 AS PER IS : 13947
4. 20% SPARE TERMINALS WILL BE PROVIDED
5. WIRING WILL BE DONE WITH 1100 V. GRADE 1.5 Sq.MM Cu. STRANDED P.V.C. INSULATED CONDUCTOR
6. WEIGHT OF THE BOX : 100 Kg (Approx.)
7. MAKE OF ALL COMPONENTS SHALL BE AS PER POWER GRID QA & I APPROVAL
8. GASKET DETAILS SHALL BE AS PER GTR, REV. 14

AS BUILT DRAWINGS

CUSTOMER	:	POWER GRID CORPORATION OF INDIA LTD.
PROJECT	:	Substation package-SS19: Extension of 765kV Solapur, 765kV Aurangabad, 765kV Wardha, 400kV Khandwa, 400kV Rajgarh, 400kV Champa, 400/220kV Itarsi & 400/220kV Jabalpur substations. Under Western Region System Strengthening Scheme (WRSS-20)
CONTRACTOR	:	M/S. BHARAT HEAVY ELECTRICALS LIMITED
LOA. No.	:	CC-CS/901-WR2/SS-3931/3/G3/NOA-I 8864 & 8865 DT. 29.07.19

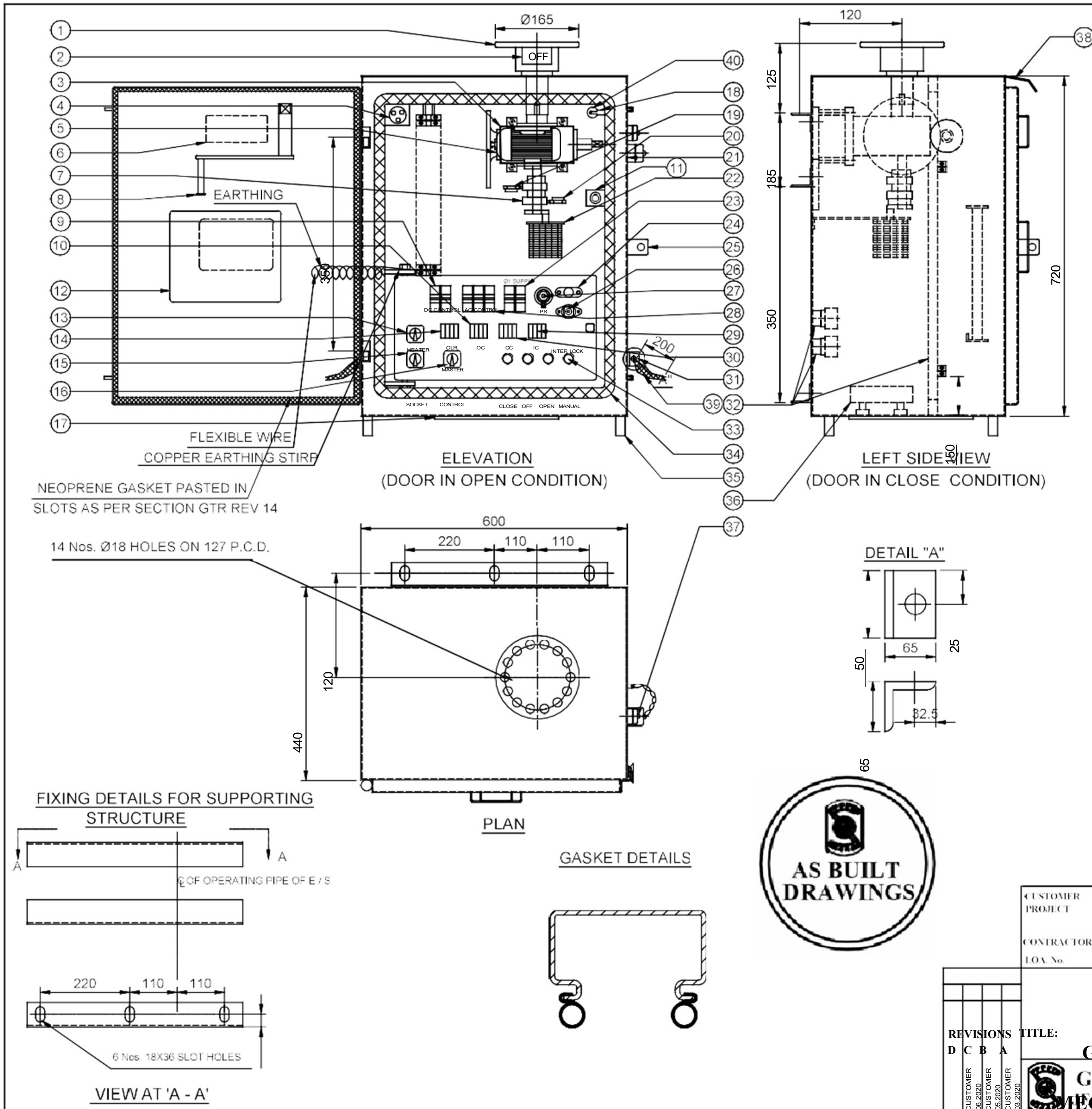
REVISIONS			
D	C	B	A
REVISED AS PER CUSTOMER COMMENT ON 07.03.2020	REVISED AS PER CUSTOMER COMMENT ON 30.05.2020	REVISED AS PER CUSTOMER COMMENT ON 30.05.2020	REVISED AS PER CUSTOMER COMMENT ON 07.03.2020

TITLE:

G.A. OF MOTOR OPERATING MECHANISM FOR ISOLATOR (FOLLOWER DRIVE FOR 420 KV)

SCALE:N.T.S	
DATE	06 . 03 . 2020
DRAWN	
CHECKED	
APPROVED	
DRG.NO:	REV
3. M 3347 03	C

GR POWER SWITCHGEARS LTD.,
JEEDIMETLA HYDERABAD-500 055 INDIA



PART LIST:

1. OUTPUT FLANGE (10 mm THICK, 14 HOLES)
2. ON/OFF INDICATOR
3. GEAR BOX (SPUR / WORM & WORM SHAFT, RATIO 1 : 630)
4. THERMOSTAT (30 TO 85°C RECOMMENDED SETTING 40°)
5. MOTOR (Ø3, 415 Volts, 0.5 HP MOTOR)
6. CAUTION NAME PLATE
7. LIMIT SWITCH OPERATING CAM
8. OPERATING HANDLE FIXED TO DOOR
9. DC CONTROL SWITCH (2 POLE MCB)
10. OPENING CONTACTOR (OC)
11. INDICATION FOR LIGHT SWITCH (LS)
12. SCHEMATIC DIAGRAM PLATE
13. HEATER SWITCH (HS)
14. OVER LOAD RELAY CUM SINGLE PHASE PREVENTOR (OLR)
15. POWER SOCKET SWITCH (PSS)
16. MASTER CONTROL SWITCH
17. DETACHABLE CABLE GLANDS FIXING PLATE (WITH OUT GLANDS)
18. CUBICLE LAMP HOLDER
19. LIMIT SWICH (LSO)
20. LIMIT SWITCH (LSC)
21. CUBICLE WITH DOOR (3 mm THICK Alu. SHEET)
22. AUX. SWITCH (8 NO + 8 NC)
24. PUSH CAP (FOR HIL)
25. PROVISION FOR PAD LOCK
26. HANDLE INTERLOCK (HIL)
27. POWER SOCKET (PSS, 15A) / INDUSTRIAL TYPE
28. AC CONTROL SWITCH (3 POLE MCB)
29. INTERLOCK CONTACTOR (IC)
30. CLOSING CONTACTOR (CC)
31. EARTHING TERMINAL (2 Nos. 65 x 65 x 5 Alu. ANGLE (WELDING TO BOX) WITH 1/2" x 2" BOLT WITH CHECK NUT AND WASHERS
32. TERMINAL BLOCK (CAT-M4 AND UBT - 4 TYPE OF ELMEX OR ITS EQUIVALENT)
33. OPEN / CLOSE / OFF PUSH BUTTON (PBO / PBC / EPB)
34. RUBBER GASKET (EPDM)
35. SUPPORTING PIPE (Alu. WELDED TO BOX)
36. HEATER, 80 WATTS, 240 V
37. MANUAL OPERATING CAP / COVER (Aluminum)
38. RAIN SHADE
39. COPPER BRAIDED FLEXIBLE FOR EARTHING (155 Sq.mm X 200 mm long) C
40. LED LAMP

B

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. CUBICLE WILL BE POWDER COATED AS PER IS : 11232, RAL 7032 FOR OUTSIDE AND GOSSY WHITE FOR INSIDE
3. DEGREE OF PROTECTION IP : 55 AS PER IS : 13947
4. 20% SPARE TERMINALS WILL BE PROVIDED
5. WIRING WILL BE DONE WITH 1100 V. GRADE 1.5 Sq.MM Cu. STRANDED P.V.C. INSULATED CONDUCTOR
6. WEIGHT OF THE BOX : 100 Kg (Approx.)
7. MAKE OF ALL COMPONENTS SHALL BE AS PER POWER GRID QA & I APPROVAL
8. GASKET DETAILS SHALL BE AS PER GTR, REV. 14

CUSTOMER	POWER GRID CORPORATION OF INDIA LTD.
PROJECT	Substation package-SS19: Extension of 765kV Solapur, 765kV Aurangabad, 765kV Wardha, 400kV Khandwa, 400kV Rajgarh, 400kV Champa, 400/220kV Itarsi & 400/220kV Jabalpur substations, Under Western Region System Strengthening Scheme (WRSS-20)
CONTRACTOR	M/s. BHARAT HEAVY ELECTRICALS LIMITED
LOA. No.	CC-CS/901-WR2/SS-3931/3/G3/NOA-I/8864 & 8865 DT. 29.07.19

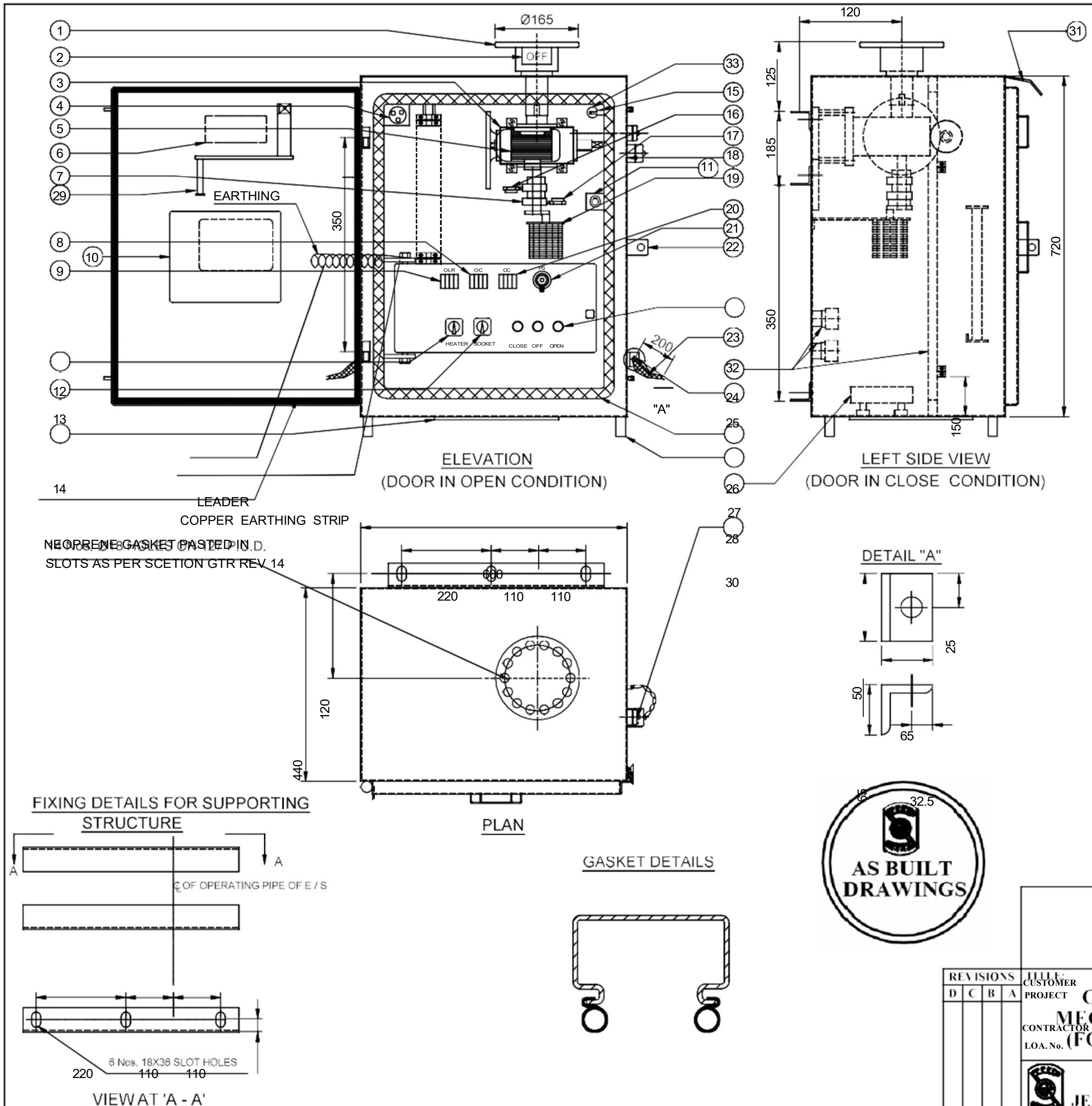
REVISIONS: D, C, B, A
C: REVISED AS PER CUSTOMER COMMENT ON 17.06.2020
B: REVISED AS PER CUSTOMER COMMENT ON 30.05.2020
A: REVISED AS PER CUSTOMER COMMENT ON 07.03.2020

TITLE: G.A. OF MOTOR OPERATING MECHANISM FOR EARTH SWITCH (MASTER DRIVE FOR 420 KV)

GR POWER SWITCHGEAR LTD., HYDERABAD, INDIA

SCALE:N.T.S
DATE: 06 . 03 . 2020
DRAWN
CHECKED
APPROVED
DRG.NO: 3 M 3347 05
REV: C

37



PART LIST:

1. OUTPUT FLANGE (10 mm THICK, 14 HOLES)
2. ON/OFF INDICATOR
3. GEAR BOX (SPUR / WORM & WORM SHAFT, RATIO 1 : 630)
4. THERMOSTAT (30 TO 85°C RECOMMENDED SETTING 40°)
5. MOTOR (Ø3, 415 Volts, 0.5 HP MOTOR)
6. CAUTION NAME PLATE
7. LIMIT SWITCH OPERATING CAM
8. OPENING CONTACTOR (OC)
9. OVER LOAD RELAY CUM SINGLE PHASE PREVENTOR (OLR)
10. SCHEMATIC DIAGRAM PLATE
11. INDICATION FOR LIGHT SWITCH (LS)
12. HEATER SWITCH (HS)
13. POWER SOCKET SWITCH (PSS)
14. DETACHABLE CABLE GLANDS FIXING PLATE (WITH OUT GLANDS)
15. CUBICLE LAMP HOLDER
16. LIMIT SWICH (LSO)
17. LIMIT SWITCH (LSC)
18. CUBICLE WITH DOOR (3 mm THICK Alu. SHEET)
19. AUX. SWITCH (8 NO + 8 NC)
20. CLOSING CONTACTOR (CC)
21. PROVISION FOR PAD LOCK
22. POWER SOCKET (PSS, 15A) / INDUSTRIAL TYPE
23. OPEN / CLOSE / OFF PUSH BUTTON (PBO / PBC / EPB)
24. TERMINAL BLOCK (CAT-M4 AND UBT - 4 TYPE OF ELMEX OR ITS EQUIVALENT)
25. EARTHING TERMINAL (2 Nos. 65 x 65 x 5 Alu. ANGLE (WELDING TO BOX) WITH 1/2" x 2" BOLT WITH CHECK NUT AND WASHERS (B)
26. RUBBER GASKET (EPDM)
27. SUPPORTING PIPE (Alu. WELDED TO BOX)
28. HEATER, 80 WATTS, 240 V
29. OPERATING HANDLE FIXED TO DOOR
30. MANUAL OPERATING CAP / COVER (Aluminum)
31. RAIN SHADE
32. COPPER BRAIDED FLEXIBLE FOR EARTHING (155 Sq.mm X 200 mm long)
33. LED LAMP

(C)

NOTE :

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. CUBICLE WILL BE POWDER COATED AS PER IS : 11232, RAL 7032 FOR OUTSIDE AND GLOSY WHITE INSIDE
3. DEGREE OF PROTECTION IP : 55 AS PER IS : 13947
4. 20% SPARE TERMINALS WILL BE PROVIDED
5. WIRING WILL BE DONE WITH 1100 V. GRADE 1.5 Sq.MM Cu. STRANDED P.V.C. INSULATED CONDUCTOR
6. WEIGHT OF THE BOX : 100 Kg (Approx.)
7. MAKE OF ALL COMPONENTS SHALL BE AS PER POWER GRID QA & I APPROVAL
8. GASKET DETAILS SHALL BE AS PER GTR, REV. 14

CUSTOMER : POWER GRID CORPORATION OF INDIA LTD.

PROJECT : Substation package-SS19: Extension of 765kV Solapur, 765kV Aurangabad, 765kV Wardha, 400kV Khandwa, 400kV Rajgarh, 400kV Champa, 400/220kV Itarsi & 400/220kV Jabalpur substations. Under Western Region System Strengthening Scheme (WRSS-20)

CONTRACTOR : M/s. BHARAT HEAVY ELECTRICALS LIMITED

LOA. No. : CC-CS/901-WR2/SS-3931/3/G3/NOA-I/8864 & 8865 DT. 29.07.19

REVISIONS			
D	C	B	A
	REVISED AS PER CUSTOMER COMMENT ON 17.06.2020	REVISED AS PER CUSTOMER COMMENT ON 30.05.2020	REVISED AS PER CUSTOMER COMMENT ON 07.03.2020

TITLE: **G.A. OF MOTOR OPERATING MECHANISM FOR EARTH SWITCH (FOLLOWER DRIVE FOR 420 KV)**

SCALE:N.T.S	
DATE	06 . 03 . 2020
DRAWN	
CHECKED	
APPROVED	
DRG.NO: 3. M 3347 06	REV C

JEEDIMETLA HYDERABAD-500 055 INDIA

37

GR POWER SWITCHGEAR LTD.,

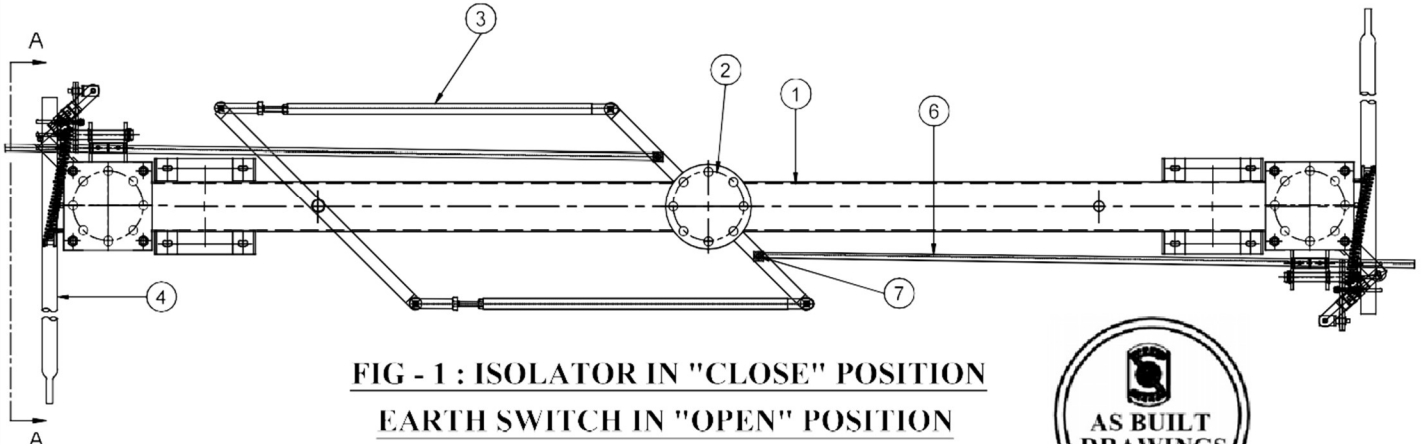


FIG - 1 : ISOLATOR IN "CLOSE" POSITION
EARTH SWITCH IN "OPEN" POSITION

AS BUILT DRAWINGS

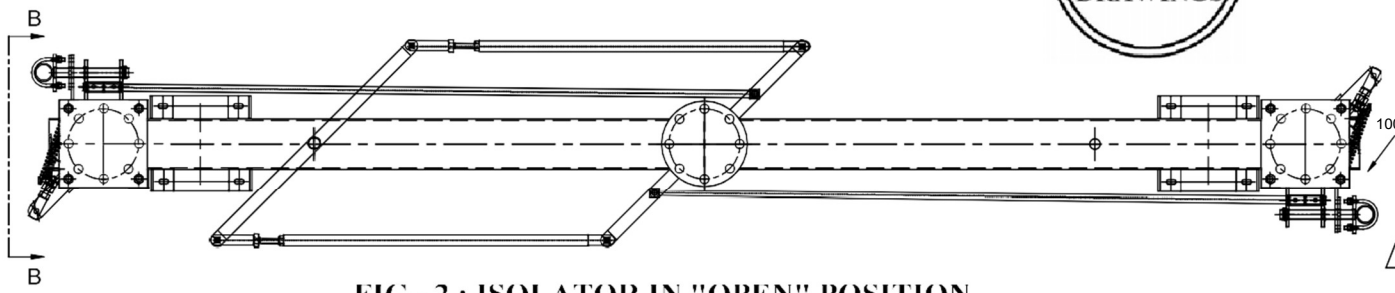
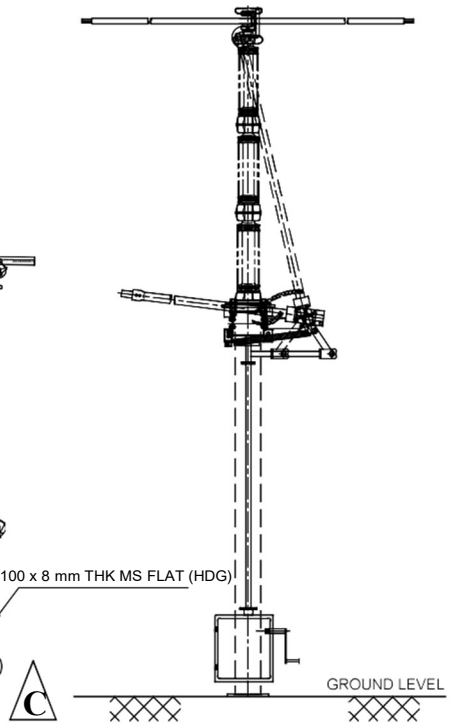


FIG - 2 : ISOLATOR IN "OPEN" POSITION
EARTH SWITCH IN "CLOSE" POSITION



EARTH SWITCH IN "CLOSE" POSITION

CONSTRUCTION :

MECHANICAL INTERLOCK PIPE (6) CONNECTED TO THE ROTATING INSULATOR FLANGE (2)
THE INTERLOCK PIPE MOVES ALONG THE ROTATING INSULATOR FLANGE(2). EARTH SWITCH MOVING CONTACT PIPE(4) MOVES INDIVIDUALY.

FUNCTION :

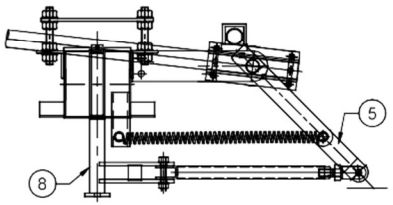
IN FIG. 1: THE ROTATING INSULATOR FLANGE WITH MECHANICAL INTERLOCK PIPE IS POSITIONED ABOVE THE OF EARTH SWITCH MOVING CONTACT, WHICH WILL NOT PERMIT THE EARTH SWITCH MOVING CONTACT TO MOVE TO CLOSE POSITION DURING ISOLATOR IS IN CLOSE POSITION

IN FIG. 2: THE MOVING CONTACT OF EARTH SWITCH IS IN CLOSE POSITION AND IT WILL PREVENT THE ROTATING INSULATOR FLANGE THROUGH MECHANICAL INTERLOCK PIPE FOR TO CLOSE THE ISOLATOR.

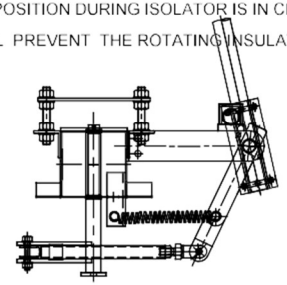
PART LIST

1. BASE CHANNEL
2. ROTATING INSULATOR FLANGE
3. TANDEM PIPE
4. E.S. MOVING CONTACT
5. E.S. OPERATING LEVER
6. MECHANICAL INTERLOCK PIPE (32 NB GI PIPE)
7. LINK BOLT
8. E.S. OPERATING SHAFT
9. SUPPORT GUIDE FOR INTERLOCK PIPE

C



VIEW AT A-A



VIEW AT B-B

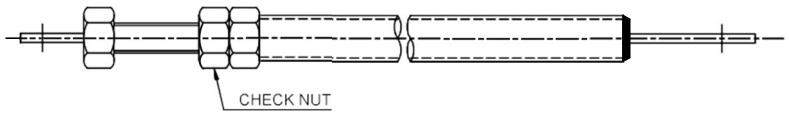
REVISIONS			
D	C	B	A

TITLE:
MECHANICAL INTERLOCK BETWEEN M.S. & E.S. FOR 420 KV ISOLATOR

GR POWER SWITCHGEAR LTD.,
JEEDIMETLA HYDERABAD-500 055 INDIA

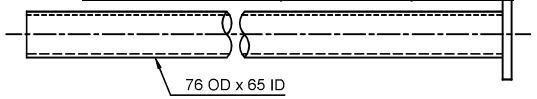
SCALE:N.T.S	
DATE	27 - 12 - 2017
DRAWN	
CHECKED	
APPROVED	
DRG.NO:	4. Z 2006 17
REV	C

B PART NO. 5 & 16 : LINK OPERATING PIPE (TANDEM PIPE)

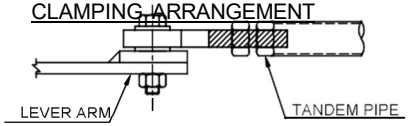


AS BUILT DRAWINGS

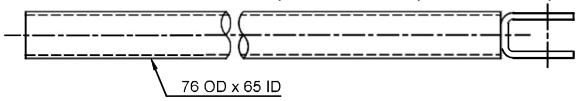
B PART NO. 18 : OPERATING PIPE (DOWN PIPE) FOR E.S



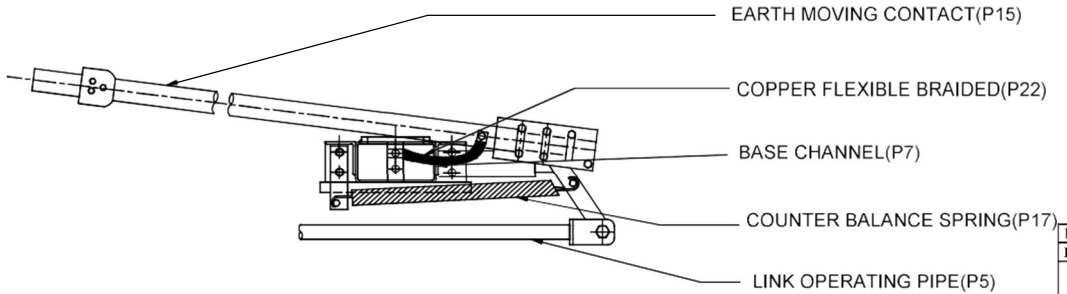
CLAMPING ARRANGEMENT



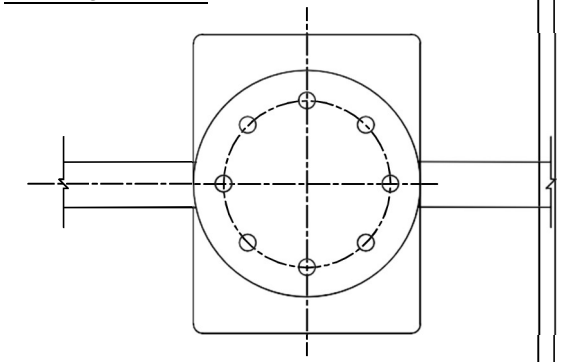
B PART NO. 10 : OPERATING PIPE (DOWN PIPE (DOWN PIPE) FOR M.S.

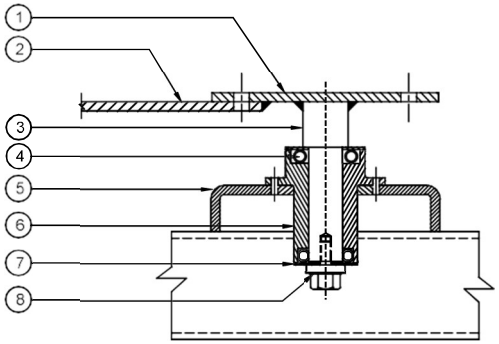


B EARTH SWITCH MOVING CONTACT ASSEMBLY:



BEARING ASSEMLY



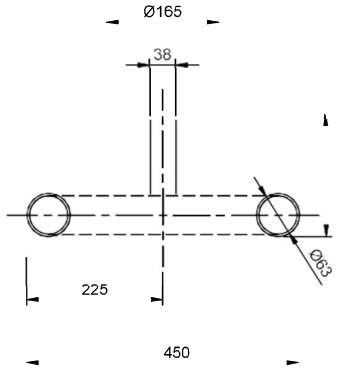


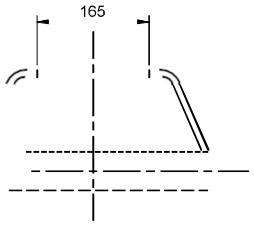
PART LIST :

1. INSULATOR FIXING FLANGE (14 mm THK. PLATE M.S. HDG)
2. LEVER ARM (1Nos. 50 x 10 mm FLAT M.S.HDG)
3. SHAFT (Ø 90) M.S.HDG
4. BALL BEARINGS (75 mm ID OF SKF/NBCL/HMT/TATA)
5. BASE CHANNEL FIXING PLATE (M.S.HDG)
6. BEARING HOUSE (141 OD M.S.HDG)
7. BEARING COVER (2 Nos. 10 SWG. M.S. HDG)
8. LOCKING BOLT

REVISIONS				TITLE:	SCALE:N.T.S	
D	C	B	A	DETAILS OF OTHER PARTS FOR 420 KV ISOLATOR	DATE	27 - 12 - 2017
					DRAWN	
					CHECKED	
					APPROVED	
				GR POWER SWITCHGEAR LTD., JEEDIMETLA HYDERABAD-500 055 INDIA	DRG.NO: 4. Z 2006 75	REV B

CORONA RING ON INSULATOR





PART LIST

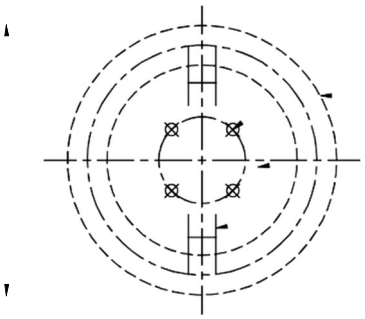
1) FLAT (32 x 6 Thk 250 LG ALU FLAT)

2) FLANGE (8 Thk Ø165 ALU FLAT)

3) CORONA RING (3.18 Thk Ø63 ALU TUBE)

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. REMOVE EXCESS WELDING MATERIAL WITH TUBE DIAMETER
3. MANUFACTURING TOLERANCE FOR TUBE BENDING :
   UP TO 50 mm --- ±9%; 51 TO 100 mm --- ±7%
4. MATERIAL SPECIFICATION CONFIRM TO ALLOY & TIMBER 63401 (E91E) WP AS PER IS : 5082 - 1981



4 Nos. Ø 18 HOLES ON 127 PCD

① ② ③

REVISIONS TITLE:
D C B A

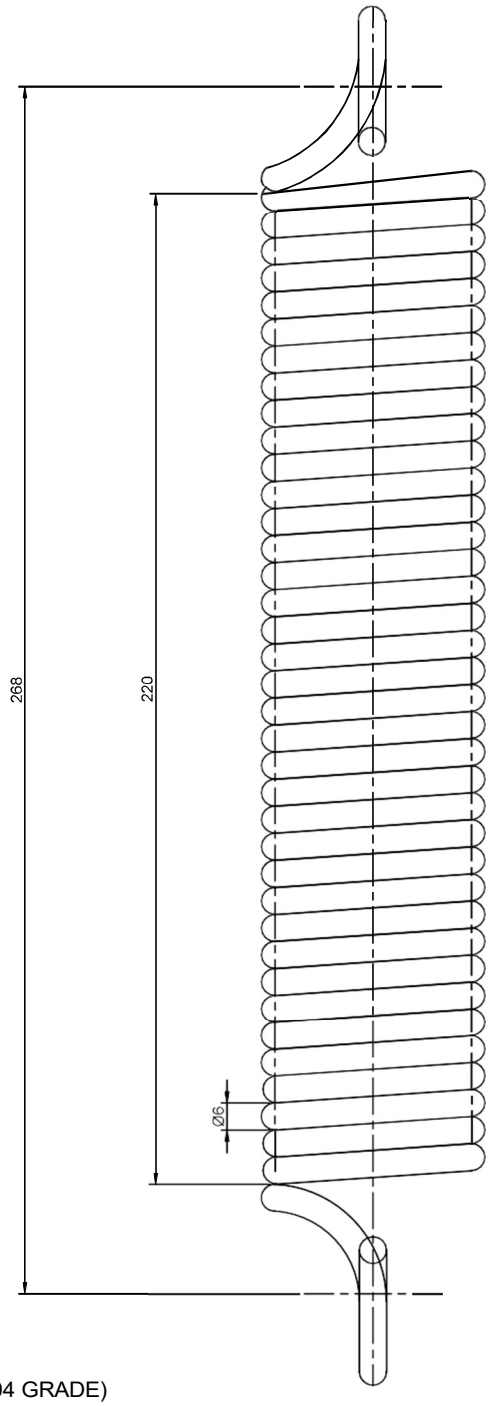
CORONA RING DETAILS FOR 420 KV ISOLATOR D

SCALE:N.T.S
DATE 27 - 12 - 2017
DRAWN
CHECKED
APPROVED
DRG.NO:

REV D

GR POWER SWITCHGEAR LTD.,
JEEDIMETLA HYDERABAD-500 055 INDIA

1406015/2023/TBG-TBG_ENGG



AS BUILT DRAWINGS

NOTE

1. NO. OF COILS : 37
2. WIRE : Ø6
3. MATERIAL STAINLESS ATEEL (ASA304 GRADE)
4. LOAD 125 Kg. MINIMUM AT 100 mm DEFLECTION

SCALE : 2 : 1	REF. DRG. NO :	DATE	27 - 12 - 2017	
TITLE:		DRAWN		
COUNTER WEIGHT SPRING		CHECKED		
GR POWER SWITCHGEAR Ltd. JEEDIMETLA HYDERABAD - 500 055 INDIA		APPROVED DRG.NO: **4. S 2009**	REV	D C B A

REVISIONS

220 KV, 1600 A, HDB ISOLATOR

CLIENT:

POWER GRID CORPORATION OF INDIA LTD. (A Govt of India Enterprise)

PROJECT:

Substation package-SS19: Extension of 765kV Solapur, 765kV Aurangabad, 765kV Wardha, 400kV Khandwa , 400kV Rajgarh, 400kV Champa, 400/220kV Itarsi & 400/220kV Jabalpur substations. Under Western Region System Strengthening Scheme (WRSS-20)

CONTRACTOR :

M/s. BHARAT HEAVY ELECTRICALS LIMITED

S.No.	TITLE	DRAWING No.	REV.	SHEET	REF.NO	CAT
1.	G.A. OF 245 KV, 1600 A,TP, HDB,ISOLATOR WITHOUT E/S. (TANDEM TYPE FOR ELECT. GANG)	3. GR 2006 60A	F	1 OF 1	C/ENGG/CORE/GR POWER/ISO/245KV(REV.11B)02 DATE : 14/02/2019	I
2.	G.A. OF 245 KV, 1600 A,TP, HDB,ISOLATOR WITHOUT E/S.	3. GR 2006 61	C	1 OF 1	C/ENGG/CORE/GR POWER/ISO/245KV(REV.11B)02 DATE : 14/02/2019	I
3.	G.A. OF 245 KV, 1600 A,TP, HDB,ISOLATOR WITH ONE E/S. (E.S. ON RIGHT SIDE CONTACT)	3. GR 2006 62	C	1 OF 1	C/ENGG/CORE/GR POWER/ISO/245KV(REV.11B)02 DATE : 14/02/2019	I
4.	G.A. OF 245 KV, 1600 A,TP, HDB,ISOLATOR WITH ONE E/S. (E.S. ON LEFT SIDE CONTACT)	3. GR 2006 63	C	1 OF 1	C/ENGG/CORE/GR POWER/ISO/245KV(REV.11B)02 DATE : 14/02/2019	I
5.	G.A. OF 245 KV, 1600 A,TP, HDB,ISOLATOR WITH TWO E/S.	3. GR 2006 64	C	1 OF 1	C/ENGG/CORE/GR POWER/ISO/245KV(REV.11B)02 DATE : 14/02/2019	I
6.	MAIN SWITCH CONTACT ASSEMBLY(1600 AMPS)	4. RM 2006 67	E	1 OF 1	C/ENGG/CORE/GR POWER/ISO/245KV(REV.11B)02 DATE : 14/02/2019	I*
7.	EARTH SWITCH CONTACT ASSEMBLY	4. RE 2006 68	E	1 OF 1	C/ENGG/CORE/GR POWER/ISO/245KV(REV.11B)02 DATE : 14/02/2019	I*
8.	G.A.OF MOTOR OPERATING MECHANISM FOR ISOLATOR (MASTER DRIVE FOR 220KV)	3. M 2006 08	E	1 OF 1	C/ENGG/CORE/GR POWER/ISO/245KV(REV.11B)02 DATE : 14/02/2019	I*
9.	G.A.OF MOTOR OPERATING MECHANISM FOR ISOLATOR	3. M 2006 09	E	1 OF 1	C/ENGG/CORE/GR POWER/ISO/245KV(REV.11B)02 DATE : 14/02/2019	I*
10.	SCHEMATIC DIAGRAM FOR MASTER AND FOLLOWER DRIVES OF 220KV ISOLATOR	3. M 3347 06	A	2 OF 2	PROJECT SPECIFIC	
11.	G.A.OF MOTOR OPERATING MECHANISM FOR 220KV ISOLATOR	3. M 2006 81	D	1 OF 1	C/ENGG/CORE/GR POWER/ISO/245KV(REV.11B)02 DATE : 14/02/2019	
12.	SCHEMATIC DIAGRAM FOR MOTOR CONTROL PANEL FOR MAIN SWITCH	3. M 2006 82	C	1 OF 1	C/ENGG/CORE/GR POWER/ISO/245KV(REV.11B)02 DATE : 14/02/2019	IV
13.	G.A.OF MOTOR OPERATING MECHANISM FOR EARTH SWITCH	3. M 2006 84	A	1 OF 1	C/ENGG/CORE/GR POWER/ISO/245KV(REV.11B)02 DATE : 14/02/2019	
14.	SCHEMATIC DIAGRAM FOR MOTOR CONTROL PANEL FOR EARTH SWITCH	3. M 2006 84	A	1 OF 1	C/ENGG/CORE/GR POWER/ISO/245KV(REV.11B)02 DATE : 14/02/2019	IV
15.	AUXILIARY CONTACT TRAVEL DIAGRAM FOR MAIN SWITCH & EARTH SWITCH (245KV)	4. GI 3347 07	0	1 OF 1	PROJECT SPECIFIC	
16.	INTER POLE LOOPING DETAILS FOR ISOLATOR (245 KV)	4. I 2006 80	0	1 OF 1	C/ENGG/CORE/GR POWER/ISO/245KV(REV.11B)02 DATE : 14/02/2019	IV
17.	MECHANICAL INTERLOCK BETWEEN MAIN SWITCH AND EARTH SWITCH	4. Z 2006 69	A	1 OF 1	C/ENGG/CORE/GR POWER/ISO/245KV(REV.11B)02 DATE : 14/02/2019	IV
18.	NAME PLATE DETAILS	3. GZ 3347 01	0	1 OF 1	PROJECT SPECIFIC	

LOA. NO :

CC-CS/901-WR2/SS-3931/3/G3/NOA-I/8864 & 8865 DT. 29.07.19

QTY :	JABALPUR		ITARSI
1) 220 KV, 1600 A WOES -----	02 Nos	+	02 Nos (TANDEM)
2) 220 KV, 1600 A W1ES ----	01 No	+	01 No
3) 220 KV, 1600 A W2ES ----	01 No	+	01 No

AS BUILT DRAWINGS

REVISIONS					
F	E	D	C	B	A
REVISED AS PER CUSTOMER COMMENT ON 13.07.2020	REVISED AS PER CUSTOMER COMMENT ON 17.06.2020	REVISED AS PER CUSTOMER COMMENT ON 30.05.2020	REVISED AS PER CUSTOMER COMMENT ON 07.05.2020	REVISED AS PER CUSTOMER COMMENT ON 17.03.2020	REVISED AS PER CUSTOMER COMMENT ON 07.03.2020

CUSTOMER : **POWER GRID CORPORATION OF INDIA LTD.**

PROJECT : **Substation package-SS19: Extension of 765kV Solapur, 765kV Aurangabad, 765kV Wardha, 400kV Khandwa, 400kV Rajgarh, 400kV Champa, 400/220kV Itarsi & 400/220kV Jabalpur substations. Under Western Region System Strengthening Scheme (WRSS-20)**

CONTRACTOR : **M/s. BHARAT HEAVY ELECTRICALS LIMITED**

LOA. No. CC-CS/901-WR2/SS-3931/3/G3/NOA-I/8864 & 8865 DT. 29.07.19

TITLE:

LIST OF DRAWINGS FOR 220 KV HDB ISOLATOR

SCALE:N.T.S	
DATE	10 - 02 - 2020
DRAWN	
CHECKED	
APPROVED	

GR POWER SWITCHGEAR LTD.,
JEEDIMETLA HYDERABAD-500 055 INDIA

DRG.NO: **3. GR 3347 00** (SHEET 1 OF 3) REV **F**

220 KV, 1600 A, HDB ISOLATOR

S.No.	TITLE	DRAWING No.	REV.	SHEET	REF.NO	CAT
1.	TYPE TEST REPORTS FOR 220 KV HDB ISOLATORS	-------------	----	1 OF 1	C / ENGG / CORE / GR POWER / ISO / 245KV (REV.11B) / TTR DATE : 24 / 07 / 2019	I

CLIENT:

POWER GRID CORPORATION OF INDIA LTD. (A Govt of India Enterprise)

PROJECT:

Substation package-SS19: Extension of 765kV Solapur,

, 400kV Rajgarh, 400kV Champa, 400/220kV Itarsi & 400/220kV Jabalpur substations. Under Western Region System Strengthening Scheme (WRSS-20)

AS BUILT DRAWINGS

CONTRACTOR :

M/s. BHARAT HEAVY ELECTRICALS LIMITED

LOA. NO :

CC-CS/901-WR2/SS-3931/3/G3/NOA-I/8864 & 8865 DT. 29.07.19

QTY :

	JABALPUR		ITARSI
1) 220 KV, 1600 A WOES -----	02 Nos	+	02 Nos (TANDEM)
2) 220 KV, 1600 A W1ES ----	01 No	+	01 No
3) 220 KV, 1600 A W2ES ----	01 No	+	01 No

REVISIONS			
D	C	B	A

CUSTOMER : POWER GRID CORPORATION OF INDIA LTD.

LOA. No. : CC-CS/901-WR2/SS-3931/3/G3/NOA-I/8864 & 8865 DT. 29.07.19

PROJECT : Substation package-SS19: Extension of 765kV Solapur, 765kV Aurangabad, 765kV Wardha, 400kV Khandwa, 400kV Rajgarh, 400kV Champa, 400/220kV Itarsi & 400/220kV Jabalpur substations. Under Western Region System Strengthening Scheme (WRSS-20)

CONTRACTOR : M/s. BHARAT HEAVY ELECTRICALS LIMITED

TITLE:

LIST OF TYPE TEST REPORTS FOR 220 KV HDB ISOLATOR

GR POWER SWITCHGEAR LTD., JEEDIMETLA HYDERABAD-500 055 INDIA

SCALE:N.T.S	
DATE	10 - 02 - 2020
DRAWN	
CHECKED	
APPROVED	
DRG.NO: 3. GR 3347 00 (SHEET 2 OF 3)	REV

220 KV, 1600 A, HDB ISOLATOR

S.No.	TITLE	DRAWING No.	REV.	SHEET	REF.NO	CAT
1.	GUARANTED TECHANICAL PARTICULARS FOR 245 KV HDB ISOLATORS	GTP/245KV HDB/01	D	4 OF 4	C/ENGG/CORE/GR POWER/ISO/245KV(REV.11B)02 DATE : 14/02/2019	I
2.	GUARANTED TECHANICAL PARTICULARS FOR CONTROL CABIENTS	GTP/ CC/ 01	B	2 OF 2	C/ENGG/CORE/GR POWER/ISO/245KV(REV.11B)02 DATE : 14/02/2019	I

CLIENT:

POWER GRID CORPORATION OF INDIA LTD. (A Govt of India Enterprise)

PROJECT:

Substation package-SS19: Extension of 765kV Solapur, 765kV Aurangabad, 765kV Wardha, 400kV Khandwa , 400kV Rajgarh, 400kV Champa, 400/220kV Itarsi & 400/220kV Jabalpur substations. Under Western Region System Strengthening Scheme (WRSS-20)

AS BUILT DRAWINGS

CONTRACTOR :

M/s. BHARAT HEAVY ELECTRICALS LIMITED

LOA. NO :

CC-CS/901-WR2/SS-3931/3/G3/NOA-I/8864 & 8865 DT. 29.07.19

QTY : **JABALPUR** **ITARSI**

1) 220 KV, 1600 A WOES ----- 02 Nos + 02 Nos (TANDEM)
2) 220 KV, 1600 A W1ES ---- 01 No + 01 No
3) 220 KV, 1600 A W2ES ---- 01 No + 01 No

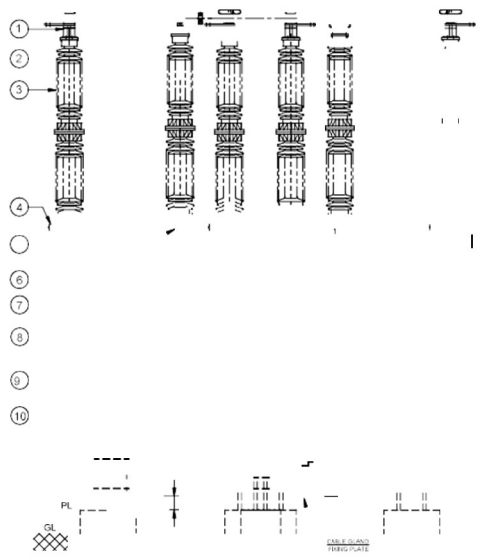
REVISIONS			
D	C	B	A

CUSTOMER : POWER GRID CORPORATION OF INDIA LTD.
PROJECT : Substation package-SS19: Extension of 765kV Solapur, 765kV Aurangabad, 765kV Wardha, 400kV Khandwa, 400kV Rajgarh, 400kV Champa, 400/220kV Itarsi & 400/220kV Jabalpur substations. Under Western Region System Strengthening Scheme (WRSS-20)
CONTRACTOR : M/s. BHARAT HEAVY ELECTRICALS LIMITED
LOA. No.

TITLE: GUARANTED TECHANICAL PARTICULARS FOR 220 KV HDB ISOLATOR

GR POWER SWITCHGEAR LTD., JEEDIMETLA HYDERABAD-500 055 INDIA

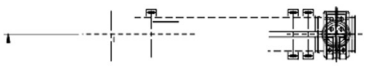
SCALE:N.T.S	
DATE	10 - 02 - 2020
DRAWN	
CHECKED	
APPROVED	
DRG.NO: 3. GR 3347 00 (SHEET 3 OF 3)	REV

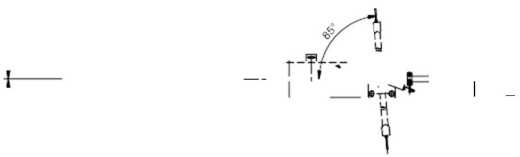


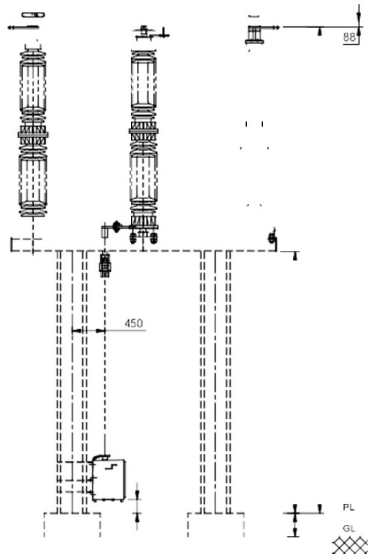
ELEVATION

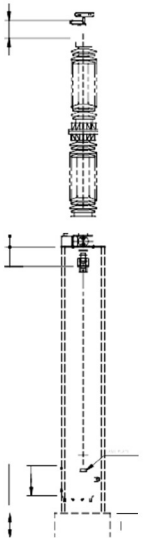
2300 "

5400 "







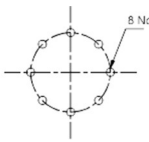


VIEW AT "A - A"

INSULATOR DETAILS

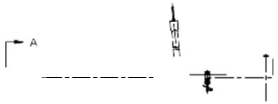
4 Nos. M16 x 22 DEEP ON 127 P.C.D. TYPICAL

TOP FLANGE DETAILS



BOTTOM FLANGE DETAILS

BASE FIXING DETAILS



18 X 50 SLOT HOLES

BOQ

PART LIST:	ASSY	LOOSE
1. FIXED CONTACT ASSEMBLY	6 Nos.	
2. MOVING CONTACT ASSEMBLY	3 Nos.	
3. INSULATOR STACK		9 Nos.
4. ELEVATOR PLATE (10 mm THICK)	6 Nos.	
5. BASE CHANNEL (145 x 80 x 4 mm THICK BOX CHANNEL)	3 Nos.	
6. ROTATING SHAFT WITH LEVER ARM & CLAMP (M.S. HOT DIP GALVANIZED)	3 Nos.	
7. UNIVERSAL JOINT ARRANGEMENT		3 Nos.
8. DOWN OPERATING PIPE (50 NB, CLASS "B", G.I. PIPE)		3 Nos.
9. OPERATING MECHANISM FOR M.S. (MOTOR)		3 Nos.
10. SUPPORTING STRUCTURE		1 SET.
11. COVER FOR FIXED CONTACT		6 Nos.

REFERENCE DRAWINGS:

FOR ISOLATOR CONTACT DETAILS	4. RM 2006 67 REV 'E'
FOR OPERATING MECHANISM DETAILS (M.S.)	3. M 2006 08 REV 'E' & 3. M 2006 09 REV 'E'
FOR SCHEMATIC DIAGRAM DETAILS	3. M 2006 10 REV 'C'
FOR NAME PLATED DETAILS	3. Z 2006 70 REV 'A'

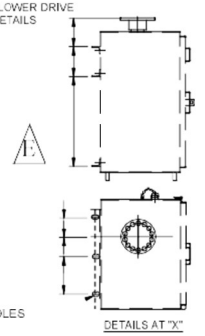
NOTES:

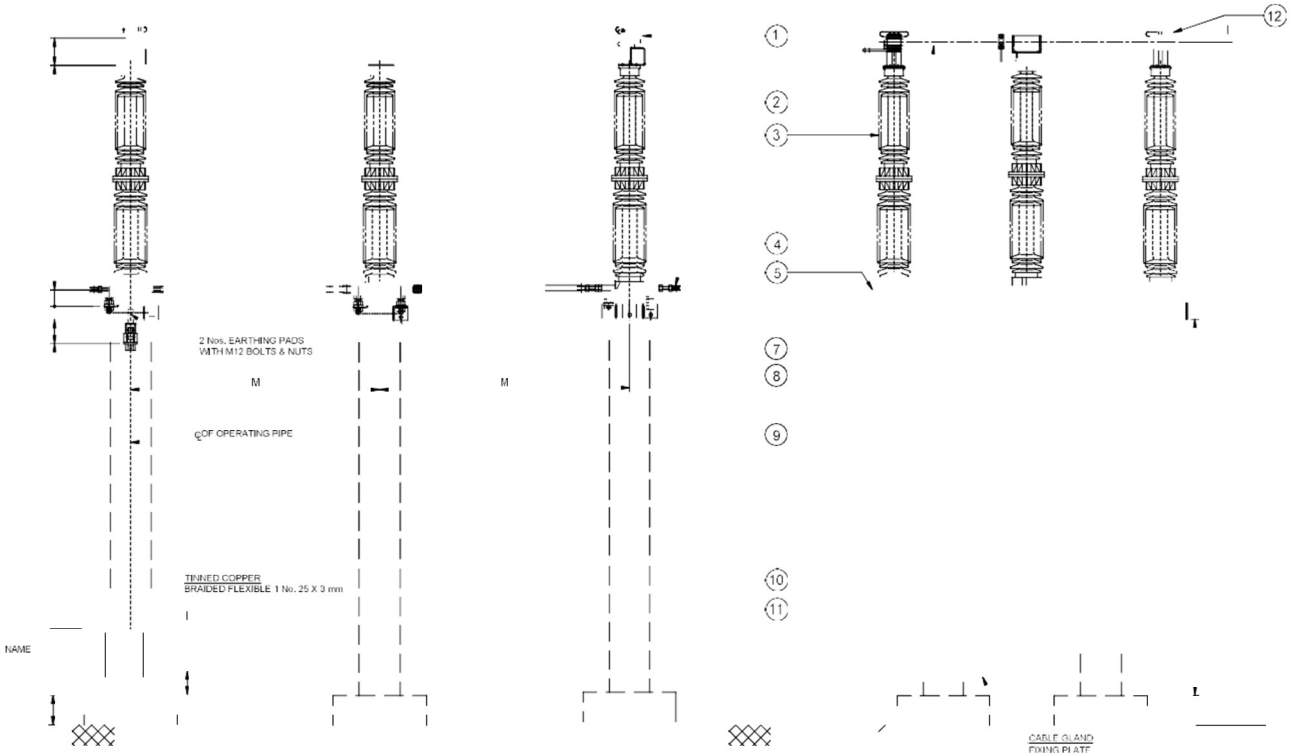
1. ALL DIMENSIONS ARE IN MILLIMETERS
2. ALL FERROUS PARTS ARE HOT DIP GALVANIZED
3. ALL NON-FERROUS CONTACT POINTS ARE SILVER PLATED (25 MICRONS)
4. THE INDICATED DIMENSIONS ARE SUBJECTED TO THE MANUFACTURING TOLERANCE:
   UP TO 50 mm ---±3%. 51 TO 100 mm ---±2%:
   101 TO 300 mm ---±1%. ABOVE 300 mm ---±0.5%.
5. SHORT TIME CURRENT RATING 40 / 50 KA rms. FOR 1 Sec.
6. MIN. CREEPAGE DISTANCE 6125 mm
7. APPLICABLE STANDARD : IEC : 62271 - 102, IEC : 60694 & IS.9921 PART I TO V
8. ROTATING STOOL BASE HAVING 2 Nos. BALL BEARINGS OF ADEQUATE SIZE
9. ALL G.I. PIPES ARE CLASS " B " TYPE AS PER IS : 1239
10. MAX. TERMINAL LOAD SHALL BE AS PER IEC : 62271 - 102.

WEIGHT:

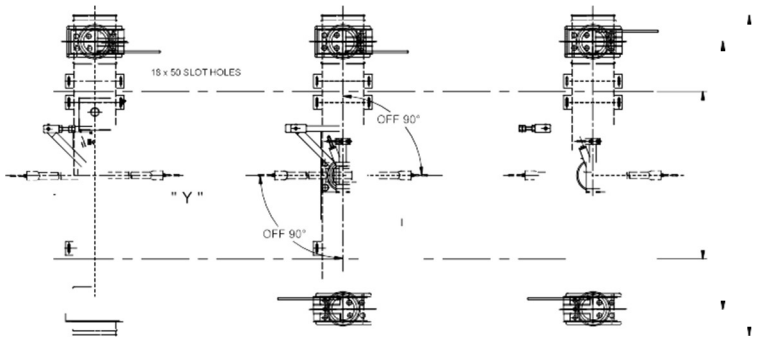
NET WEIGHT OF THE ISOLATOR
EXCLUDING INSULATOR :1050 KGS. (Approx.)

MASTER/FOLLOWER DRIVE FIXING DETAILS

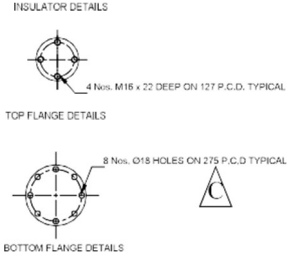




ELEVATION



END VIEW



BASE CHANNEL FIXING DETAILS

18 x 50 SLOT HOLES

BOQ

PART LIST:	ASSY	LOOSE
1. FIXED CONTACT ASSEMBLY	6 Nos.	
2. MOVING CONTACT ASSEMBLY	3 Nos.	
3. INSULATOR STACK		9 Nos.
4. TANDEM PIPE (32 NB, CLASS "B", G.I. PIPE)		2 Nos.
5. ELEVATOR PLATE (10 mm THICK)	6 Nos.	
6. BASE CHANNEL (145 x 60 x 4mm THICK BOX CHANNEL)	3 Nos.	
7. ROTATING STOOL BASE WITH LEVER ARM & CLAMP (M.S. HOT DIP GALVANIZED)	3 Nos.	
8. UNIVERSAL JOINT ARRANGEMENT		1 No.
9. DOWN OPERATING PIPE (50 NB, CLASS "B", G.I. PIPE)		1 No.
10. OPERATING MECHANISM FOR MAIN SWITCH (MOTOR)		1 No.
11. SUPPORTING STRUCTURE		1 SET
12. COVER ON FIXED CONTACT		6 Nos.

C

REFERENCE DRAWINGS:

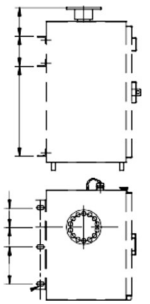
FOR ISOLATOR CONTACT DETAILS ----------4. RM 2006 67
FOR OPERATING MECHANISM DETAILS (M.S.) ---------3. M 2006 81
FOR SCHEMATIC DIAGRAM DETAILS ----------3. M 2006 82
FOR NAME PLATE DETAILS ----------3. Z 2006 70

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. ALL FERROUS PARTS ARE HOT DIP GALVANIZED
3. ALL NON-FERROUS CONTACT POINTS ARE SILVER PLATED (25 MICRONS)
4. THE INDICATED DIMENSIONS ARE SUBJECTED TO THE MANUFACTURING TOLERANCE:
   UP TO 50 mm ---±3%; 51 TO 100 mm ---±2%;
   101 TO 300 mm ---+1%; ABOVE 300 mm ---+0.5%.
5. SHORT TIME CURRENT RATING 40 / 50 KA rms. FOR 1 Sec.
6. MIN. CREEPAGE DISTANCE 6125 mm
7. APPLICABLE STANDARD : IEC : 62271 - 102,IEC : 60694 & IS:9921 PART I TO V
8. ROTATING STOOL BASE HAVING 2 Nos. BALL BEARINGS OF ADEQUATE SIZE
9. ALL G.I. PIPES ARE CLASS " B" TYPE AS PER IS : 1239
10. MAX. TERMINAL LOAD SHALL BE AS PER IEC : 62271 - 102

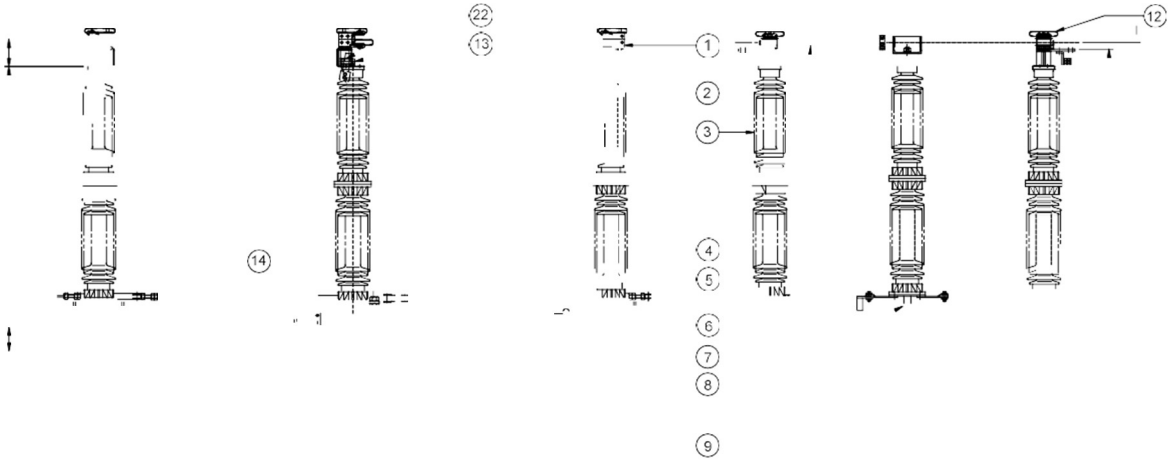
WEIGHT:

NET WEIGHT OF THE ISOLATOR
EXCLUDING INSULATOR : 900 KGS (Approx.)



18X36 SLOT HOLES

DETAILS AT "X"



BOQ

PART LIST	ASSY	LOOSE
1. FIXED CONTACT ASSEMBLY	6 Nos.	
2. MOVING CONTACT ASSEMBLY	3 Nos.	
3. INSULATOR STACK		9 Nos.
4. TANDEM PIPE (32 NB, CLASS 'B', G.I. PIPE)		2 Nos.
5. ELEVATOR PLATE (10 mm THICK)	6 Nos	
6. BASE CHANNEL (145 x 80 x 4 mm THICK BOX CHANNEL)	3 Nos	
7. ROTATING STOOL BASE WITH LEVER ARM & CLAMP (M.S. HOT DIP GALVANIZED)	3 Nos.	
8. UNIVERSAL JOINT ARRANGEMENT		1 No.
9. DOWN OPERATING PIPE (50 NB, CLASS "B", G.I. PIPE)		1 No.
10. OPERATING MECHANISM FOR MAIN SWITCH (MOTOR)		1 No.
11. SUPPORTING STRUCTURE		1 SET
12. COVER ON FIXED CONTACT		6 Nos.
13. EARTH SWITCH FIXED CONTACT ASSEMBLY	3 Nos.	
14. EARTH SWITCH MOVING CONTACT ASSEMBLY	3 Nos.	
15. EARTH SWITCH TANDEM PIPE (32 NB, CLASS 'B' G.I. PIPE)		1 No.
16. COUNTER WEIGHT		3 Nos.
17. TOP OPERATING MECHANISM FOR E.S.		1 No.
18. EARTH SWITCH DOWN OPERATING PIPE (50 NB, CLASS 'B' G.I. PIPE)		1 No.
19. OPERATING MECHANISM FOR EARTH SWITCH (MOTOR)		1 No.
20. MECHANICAL INTERLOCK BETWEEN MAIN SWITCH & EARTH SWITCH	1 No.	
21. AUX. TANDEM PIPE (32 NB, CLASS "B", G.I. PIPE)		1 No.
22. COVER ON EARTH SWITCH		3 Nos.

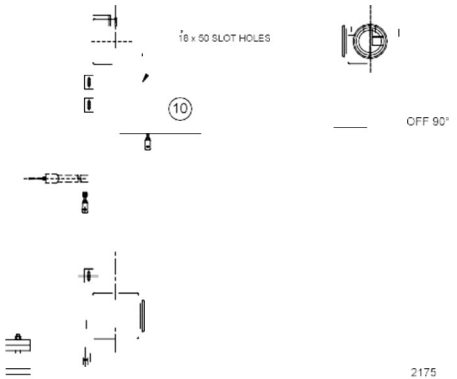
REFERENCE DRAWINGS:

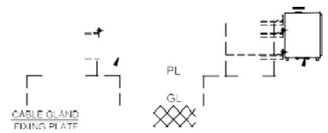
FOR ISOLATOR CONTACT DETAILS	4. RM 2006 67
FOR EARTH SWITCH CONTACT DETAILS	4. RE 2006 68
FOR OPERATING MECHANISM DETAILS (M.S.)	3. M 2006 81
FOR SCHEMATIC DIAGRAM DETAILS	3. M 2006 82
FOR OPERATING MECHANISM DETAILS (E.S.)	3. M 2006 83
FOR SCHEMATIC DIAGRAM DETAILS	3. M 2006 84
FOR MECHANICAL INTERLOCK DETAILS	4. Z 2006 69
FOR NAME PLATE DETAILS	3. Z 2006 70

NOTES:

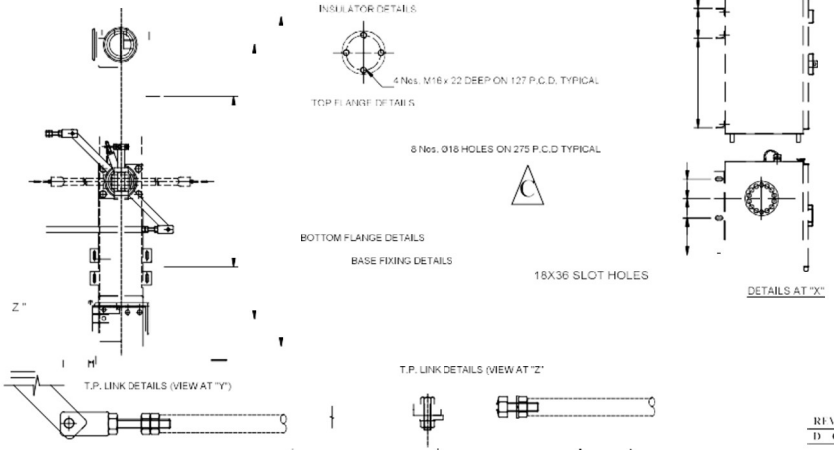
1. ALL DIMENSIONS ARE IN MILLIMETERS
2. ALL FERROUS PARTS ARE HOT DIP GALVANIZED
3. ALL NON-FERROUS CONTACT POINTS ARE SILVER PLATED (25 MICRONS)
4. THE INDICATED DIMENSIONS ARE SUBJECTED TO THE MANUFACTURING TOLERANCE.
   UP TO 50 mm ---±3%; 51 TO 100 mm ---±2%;
   101 TO 300 mm ---+1%; ABOVE 300 mm ---+0.5%.
5. SHORT TIME CURRENT RATING 40 / 50 KA rms. FOR 1 Sec.
6. MIN. CREEPAGE DISTANCE 6125 mm
7. APPLICABLE STANDARD : IEC : 62271 - 102,IEC : 60694 & IS:9921 PART I TO V
8. ROTATING STOOL BASE HAVING 2 Nos. BALL BEARINGS OF ADEQUATE SIZE
9. ALL G.I. PIPES ARE CLASS " B " TYPE AS PER IS : 1239
10. MAX. TERMINAL LOAD SHALL BE AS PER IEC : 62271 - 102

ELEVATION





END VIEW



PLAN

BASE CHANNEL FIXING DETAILS

WEIGHT:

NET WEIGHT OF THE ISOLATOR
EXCLUDING INSULATOR : 1150 KGS (Approx.)

DIMENSIONS

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
190	2300	90	80	205	1725	125	1400	300	535	440	NA	4000	225	3200	3600	2500	NA	5900	3330	80	NA	1850	740	NA	NA

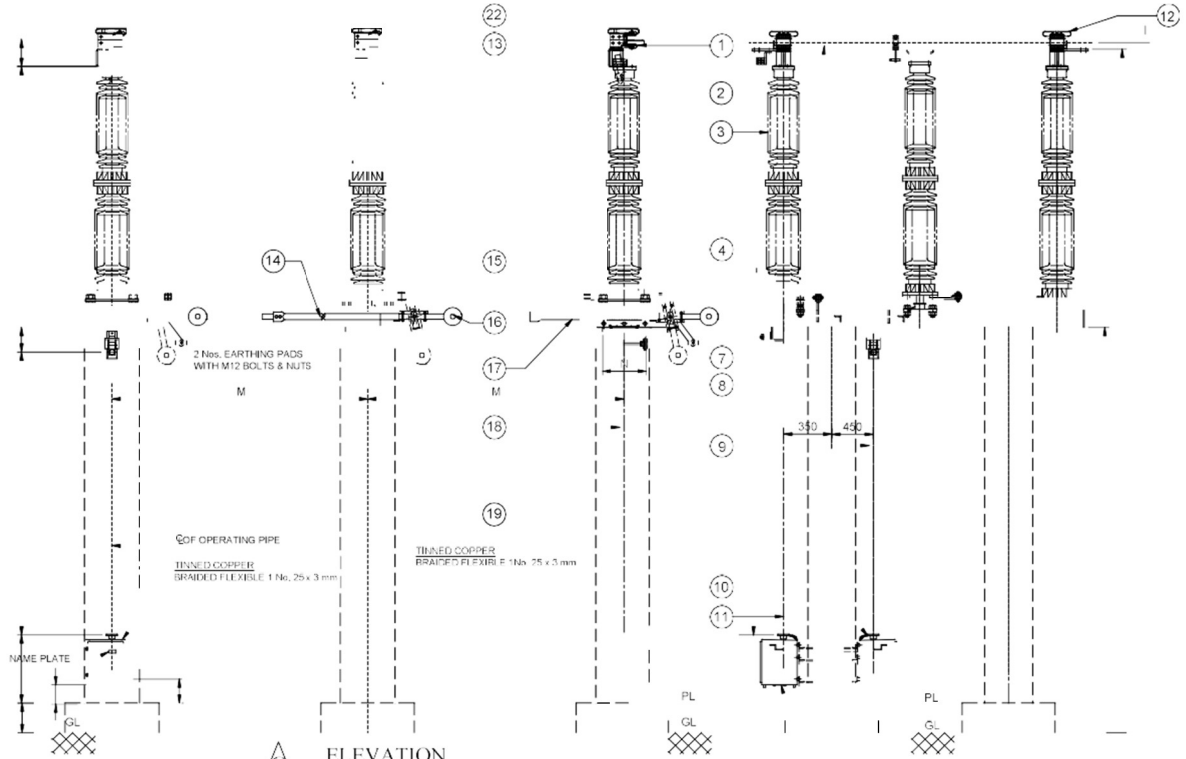
REVISIONS: D C B A

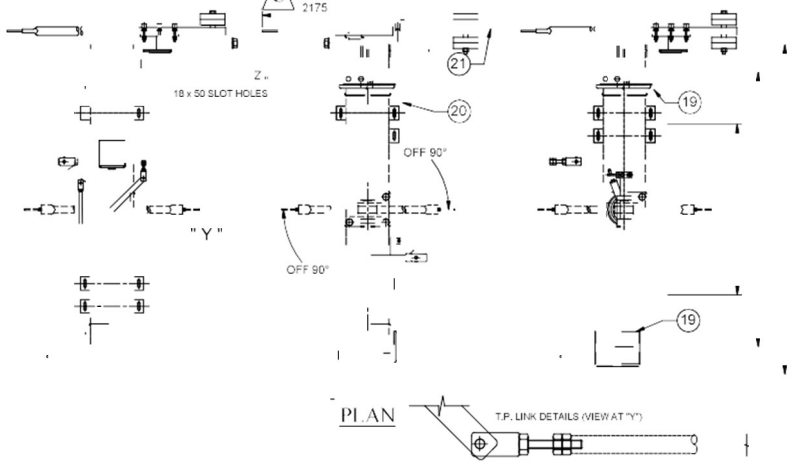
TITLE

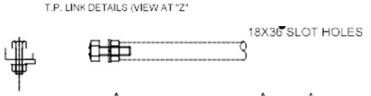
245 kV , 1600 A , TP , HDB, ISOLATOR WITH ONE EARTH SWITCH
(E.S. ON RIGHT SIDE CONTACT)

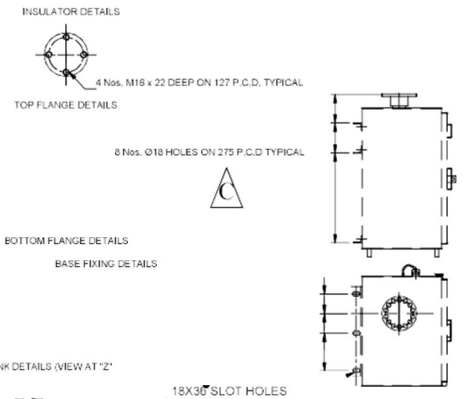
SCALE: NTS
DATE: 27-12-2007
DRAWN
CHECKED
APPROVED
DRG.NO: **3. GR 2006 62**
REV: **B**

GR POWER SWITCHGEAR LTD.,
JEEDIMETLA HYDERABAD-500 055 INDIA









DIMENSIONS

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
190	2300	90	80	205	1725	125	1400	300	535	440	NA	4000	225	3200	3600	2500	NA	5900	3330	80	NA	1850	740	NA	NA

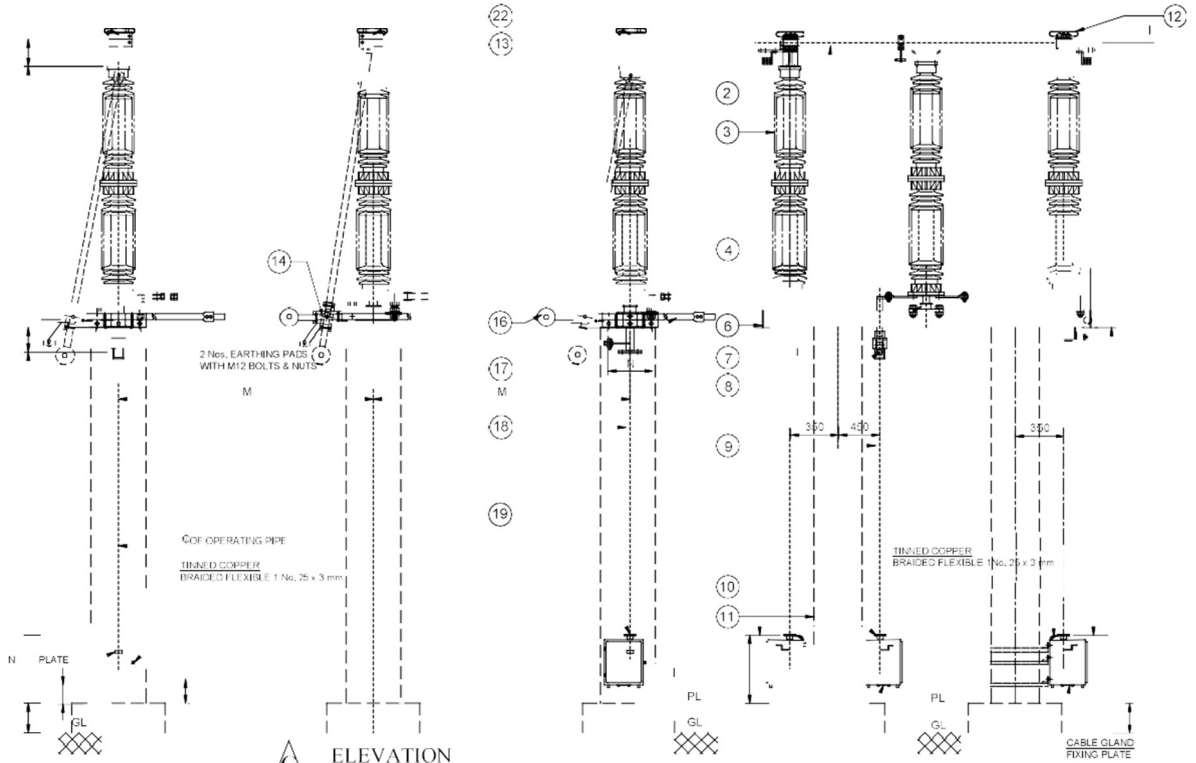
REVISIONS D C B A

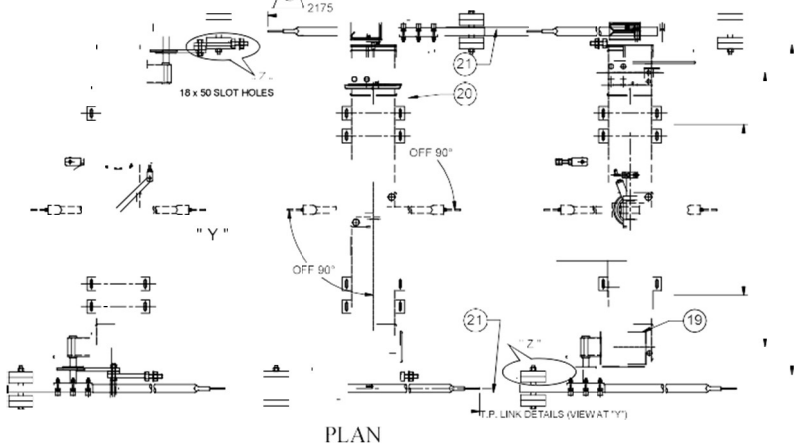
TITLE

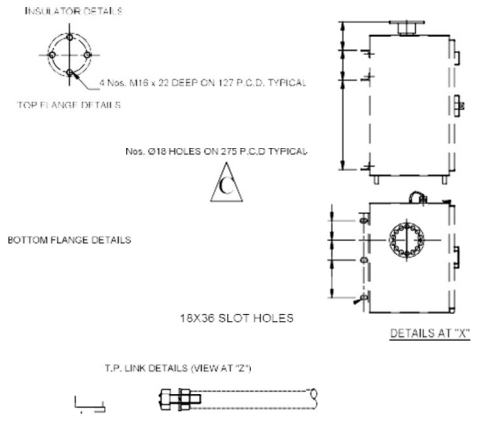
245 kV , 1600 A , TP , HDB, ISOLATOR WITH ONE EARTH SWITCH
(E.S. ON LEFT SIDE CONTACT)

SCALE: NTS
DATE 27 - 12 - 2017
DRAWN
CHECKED
APPROVED
DRG. NO: 3. GR 2006 63
REV C

GR POWER SWITCHGEAR LTD.,
JEEDIMETLA HYDERABAD-500 055 INDIA







PART LIST:	BOQ ASSY	BOQ LOOSE
1. FIXED CONTACT ASSEMBLY	6 Nos.	
2. MOVING CONTACT ASSEMBLY	3 Nos.	
3. INSULATOR STACK		9 Nos.
4. TANDEM PIPE (32 NB, CLASS "B", G.I. PIPE)		2 Nos.
5. ELEVATOR PLATE (10 mm THICK)	6 Nos.	
6. BASE CHANNEL (145 x 60 x 4 mm THICK BOX CHANNEL)	3 Nos.	
7. ROTATING STOOL BASE WITH LEVER ARM & CLAMP (M.S. HOT DIP GALVANIZED)	3 Nos.	
8. UNIVERSAL JOINT ARRANGEMENT		1 No.
9. DOWN OPERATING PIPE (50 NB, CLASS "B", G.I. PIPE)		1 No.
10. OPERATING MECHANISM FOR MAIN SWITCH (MOTOR)		1 No.
11. SUPPORTING STRUCTURE		1 SET
12. COVER ON FIXED CONTACT		6 Nos.
13. EARTH SWITCH FIXED CONTACT ASSEMBLY	6 Nos.	
14. EARTH SWITCH MOVING CONTACT ASSEMBLY	6 Nos.	
15. EARTH SWITCH TANDEM PIPE (32 NB, CLASS 'B' G.I. PIPE)		2 Nos.
16. COUNTER WEIGHT		6 Nos.
17. TOP OPERATING MECHANISM FOR E.S.		2 Nos.
18. EARTH SWITCH DOWN OPERATING PIPE (50 NB, CLASS "B" G.I. PIPE)		2 Nos.
19. OPERATING MECHANISM FOR EARTH SWITCH (MOTOR)		2 Nos.
20. MECHANICAL INTERLOCK BETWEEN MAIN SWITCH & EARTH SWITCH	2 Nos.	
21. AUX. TANDEM PIPE (32 NB, CLASS "B", G.I. PIPE)		2 Nos.
22. COVER ON EARTH SWITCH		6 Nos.

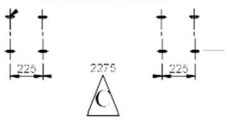
REFERENCE DRAWINGS:

FOR ISOLATOR CONTACT DETAILS	4. RM 2006 67
FOR EARTH SWITCH CONTACT DETAILS	4. RE 2006 68
FOR OPERATING MECHANISM DETAILS (M.S.)	3. M 2006 81
FOR SCHEMATIC DIAGRAM DETAILS	3. M 2006 82
FOR OPERATING MECHANISM DETAILS (E.S.)	3. M 2006 83
FOR SCHEMATIC DIAGRAM DETAILS	3. M 2006 84
FOR MECHANICAL INTERLOCK DETAILS	4. Z 2006 69
FOR NAME PLATE DETAILS	3. Z 2006 70

NOTES:

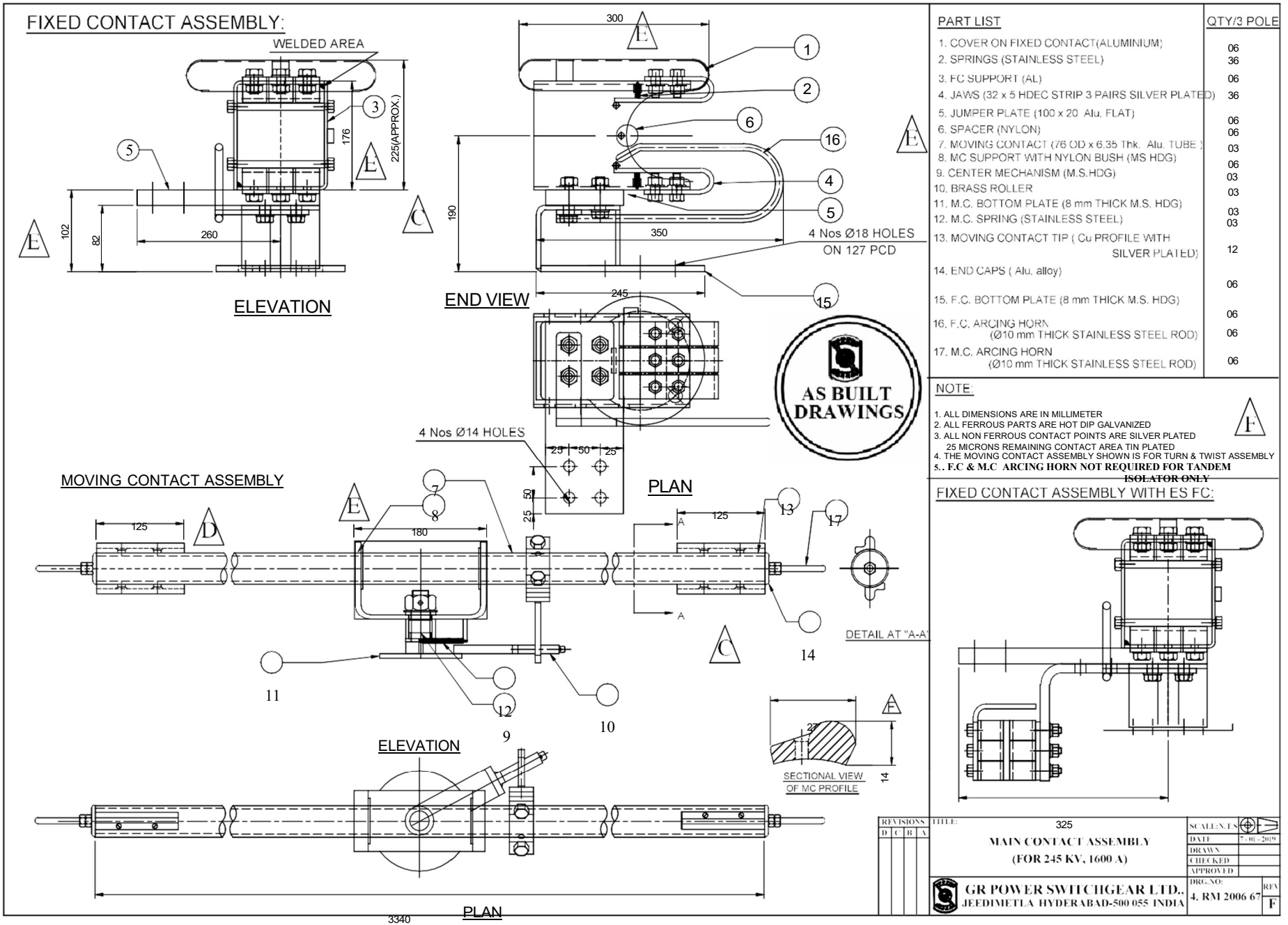
1. ALL DIMENSIONS ARE IN MILLIMETERS
2. ALL FERROUS PARTS ARE HOT DIP GALVANIZED
3. ALL NON-FERROUS CONTACT POINTS ARE SILVER PLATED (25 MICRONS)
4. THE INDICATED DIMENSIONS ARE SUBJECTED TO THE MANUFACTURING TOLERANCE:
   UP TO 50 mm ---±3%; 51 TO 100 mm ---±2%;
   101 TO 300 mm ---+1%; ABOVE 300 mm ---+0.5%.
5. SHORT TIME CURRENT RATING 40 / 50 KA rms. FOR 1 Sec.
6. MIN. CREEPAGE DISTANCE 6125 mm
7. APPLICABLE STANDARD : IEC : 62271 - 102,IEC : 60694 & IS 9921 PART I TO V
8. ROTATING STOOL BASE HAVING 2 Nos. BALL BEARINGS OF ADEQUATE SIZE
9. ALL G.I. PIPES ARE CLASS " B" TYPE AS PER IS : 1239
10. MAX. TERMINAL LOAD SHALL BE AS PER IEC : 62271 - 102

BASE CHANNEL FIXING DETAILS



WEIGHT:

NET WEIGHT OF THE ISOLATOR
EXCLUDING INSULATOR : 1350 KGS (Approx.)



PART LIST	QTY/3 POLE
1. COVER ON FIXED CONTACT(ALUMINIUM)	06
2. SPRINGS (STAINLESS STEEL)	36
3. FC SUPPORT (AL)	06
4. JAWS (32 x 5 HDEC STRIP 3 PAIRS SILVER PLATED)	36
5. JUMPER PLATE (100 x 20 Alu. FLAT)	06
6. SPACER (NYLON)	06
7. MOVING CONTACT (76 OD x 6.35 Thk. Alu. TUBE)	03
8. MC SUPPORT WITH NYLON BUSH (MS HDG)	06
9. CENTER MECHANISM (M.S.HDG)	03
10. BRASS ROLLER	03
11. M.C. BOTTOM PLATE (8 mm THICK M.S. HDG)	03
12. M.C. SPRING (STAINLESS STEEL)	03
13. MOVING CONTACT TIP (Cu PROFILE WITH SILVER PLATED)	12
14. END CAPS (Alu. alloy)	06
15. F.C. BOTTOM PLATE (8 mm THICK M.S. HDG)	06
16. F.C. ARCING HORN (Ø10 mm THICK STAINLESS STEEL ROD)	06
17. M.C. ARCING HORN (Ø10 mm THICK STAINLESS STEEL ROD)	06

NOTE:

1. ALL DIMENSIONS ARE IN MILLIMETER
2. ALL FERROUS PARTS ARE HOT DIP GALVANIZED
3. ALL NON FERROUS CONTACT POINTS ARE SILVER PLATED
   25 MICRONS REMAINING CONTACT AREA TIN PLATED
4. THE MOVING CONTACT ASSEMBLY SHOWN IS FOR TURN & TWIST ASSEMBLY
5. **F.C & M.C ARCING HORN NOT REQUIRED FOR TANDEM ISOLATOR ONLY**

FIXED CONTACT ASSEMBLY WITH ES FC:

REVISIONS				
D	C	B	A	

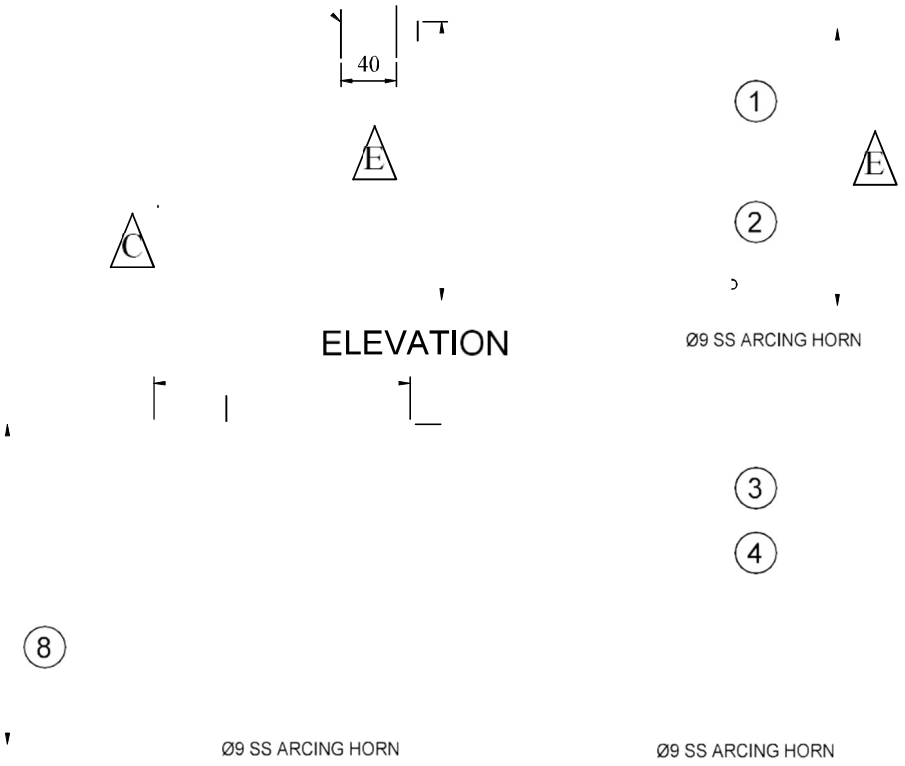
TITLE: 325
MAIN CONTACT ASSEMBLY
(FOR 245 KV, 1600 A)

SCALE:NTS	
DATE	7-01-2019
DRAWN	
CHECKED	
APPROVED	

GR POWER SWITCHGEAR LTD.,
JEEDIMETLA HYDERABAD-500 055 INDIA

DRG NO: 4. RM 2006 67 REV F

FIXED CONTACT ASSEMBLY :



MOVING CONTACT ASSEMBLY :

	BOQ/SET
1. CONTACT HOLDER (75 x 12 Alu. FLAT)	03 Nos
2. CONTACT FINGER (25 x 4 Cu. FLAT 3 PAIRS SILVER PLATED)	18 Nos
3. SPACER (PROFILE, NYLON)	03 Nos
4. SPRING (STAINLESS STEEL)	18 Nos
5. MOVING CONTACT (50 x 10 Cu. FLAT, SILVER PLATED)	03 Nos
6. CONTACT ARM (50 OD x 3.15 THK Alu. TUBE)	03 Nos
7. TINNED COPPER BRAIDED FLEXIBLE (25 x 3 mm, 4 Nos.)	12 Nos
8. COVER FOR EARTH SWITCH FIXED CONTACT	03 Nos

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. ALL COPPER CONTACT POINTS ARE SILVER PLATED (25 MICRONS) REMAINING AREA TIN PLATED
3. ALL FERROUS PARTS ARE HOT DIP GALVANIZED
4. THE INDICATED DIMENSIONS ARE SUBJECTED TO THE MANUFACTURING TOLERANCES :

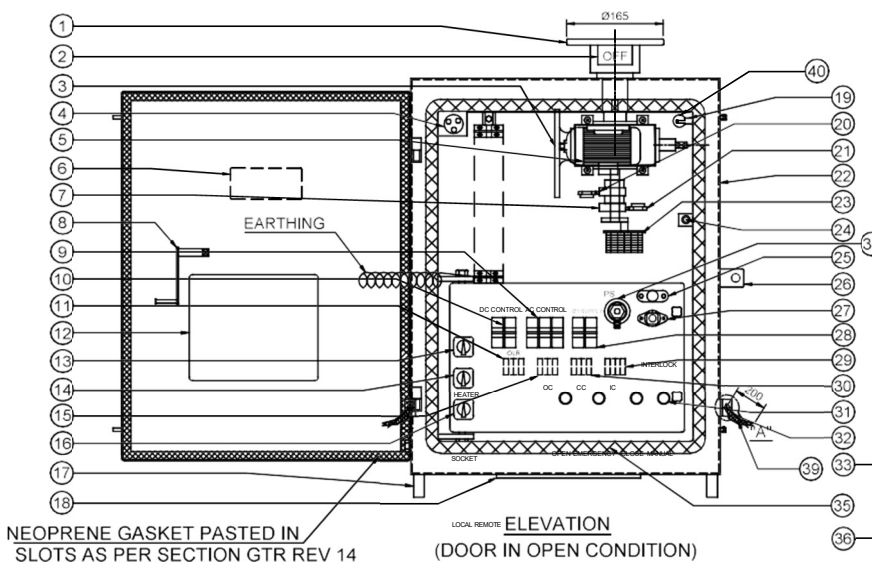
UPTO 50 mm	---------- ±3%	51 TO 100 mm	---------- ±2%
101 TO 300 mm	---------- ±1%	ABOVE 300 mm	---------- ±0.5%

REVISIONS TITLE:
D C B A

EARTH SWITCH CONTACT ASSEMBLY
(FOR 220 kV DB ISOLATOR)
(FOR STC : 40 / 50 KA/1Sec)

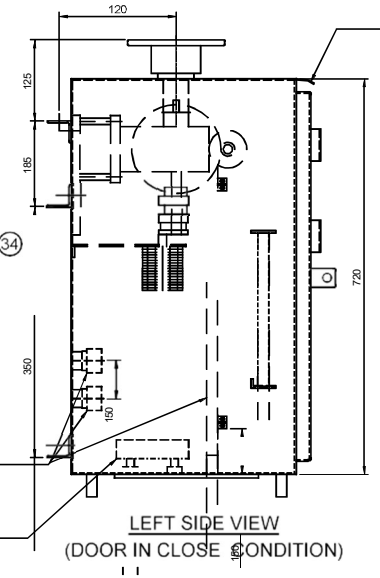
GR POWER SWITCHGEAR LTD.,
JEEDIMETLA HYDERABAD-500 055 INDIA

SCALE:N.T.S
DATE 07 - 01 - 2019
DRAWN
CHECKED
APPROVED
DRG.NO: 4. RE 2006 68
REV



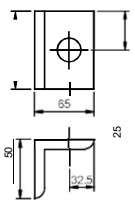
NEOPRENE GASKET PASTED IN SLOTS AS PER SECTION GTR REV 14

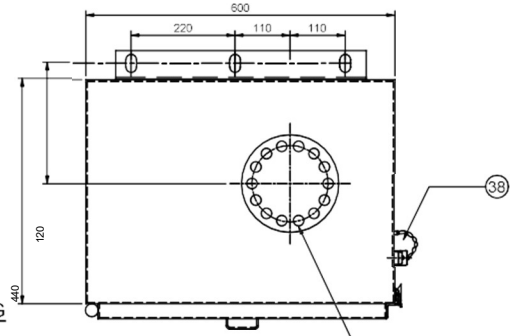
ELEVATION (DOOR IN OPEN CONDITION)



LEFT SIDE VIEW (DOOR IN CLOSE CONDITION)

DETA L "A"

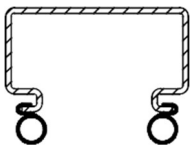




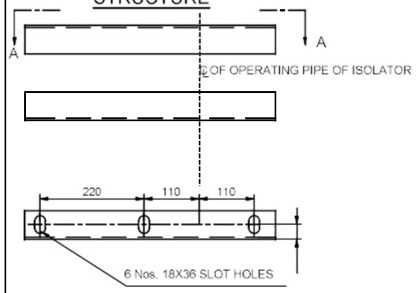
PLAN

14 Nos. Ø18 HOLES ON 127 P.C.D.

GASKET DETAILS



FIXING DETAILS FOR SUPPORTING STRUCTURE



VIEW AT 'A - A'

AS BUILT DRAWINGS

PART LIST:

	BOQ
1. OUTPUT FLANGE (10 mm THICK, 14 HOLES)	01 No.
2. ON/OFF INDICATOR	01 No.
3. GEAR BOX (SPUR / WORM & WORM SHAFT, RATIO 1 : 630)	01 No.
4. THERMOSTAT (30 TO 85°C RECOMMENDED SETTING 40°)	01 No.
5. MOTOR (Ø3, 415 Volts, 0.5 HP MOTOR)	01 No.
6. NAME PLATE	01 No.
7. LIMIT SWITCH OPERATING CAMS	02 Nos.
8. OPERATING HANDLE FIXED TO DOOR	01 No.
9. AC CONTROL SWITCH (3 POLE MCB) WITH AC FAILURE INDICATION	01 No.
10. DC CONTROL SWITCH (2 POLE MCB)	01 No.
11. OVER LOAD RELAY CUM SINGLE PHASE PREVENTOR (OLR)	01 No.
12. SCHEMATIC DIAGRAM PLATE	01 No.
13. HEATER SWITCH (HS)	01 No.
14. POWER SOCKET SWITCH (PSS)	01 No.
15. OPENING CONTACTOR (OC)	01 No.
16. LOCAL / REMOTE SELECTOR SWITCH (S3)	01 No.
17. SUPPORTING PIPE (Alu. WELDED TO BOX)	04 Nos.
18. DETACHABLE CABLE GLANDS FIXING PLATE WITH OUT GLANDS	01 No.
19. CUBICLE LAMP HOLDER (SUITABLE FOR LED BASED ILLUMINATION)	01 No.
20. LIMIT SWICH (LSO)	01 No.
21. LIMIT SWITCH (LSC)	01 No.
22. CUBICLE WITH DOOR (3 mm THICK Alu. SHEET)	01 No.
23. AUX. SWITCH (12 NO + 12 NC + 2 MBB)	01 No.
24. DOOR OPERATED LIGHT SWITCH (LS)	01 No.
25. PUSH CAP (FOR HIL)	01 No.
26. DOOR LOACK AND PAD LOCK	01 No.
27. HANDLE INTERLOCK (HIL)	01 No.
28. Ø1 AC SUPPLY SWITCH (2 POLE MCB)	01 No.
29. INTERLOCK CONTACTOR (IC)	01 No.
30. CLOSING CONTACTOR (CC)	01 No.
31. OPEN / CLOSE PUSH BUTTON (PBO / PBC)	01 No. Each
32. EARTHING TERMINAL (2 Nos. 65 x 65 x 5 Alu. ANGLE (WELDED TO BOX) WITH 1/2" x 2" BOLT WITH CHECK NUT AND WASHERS)	02 Nos. △
33. TERMINAL BLOCK (CAT-M4 TYPE FOR MAIN CIRCUIT AND UBT - 4 TYPE FOR AUX. CIRCUIT	02 Nos.
34. POWER SOCKET (PSS, 15 A) / INDUSTRIAL TYPE	01 No.
35. RUBBER GASKET (EPDM)	01 No.
36. HEATER, 80 WATTS, 240 V	01 No.
37. RAIN SHADE	01 No. A
38. MANUAL OPERATING CAP/COVER(AL)	01 No.
40 LED LAMP △	02 Nos
39. COPPER BRAIDED FLEXIBLE FOR EARTHING (155 Sq.mm X 200 mm long)	01 No.

NOTE :

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. CUBICLE WILL BE POWDER COATED AS PER IS : 11232, RAL 7032 FOR OUTSIDE AND GLOSSY WHITE FOR INSIDE
3. DEGREE OF PROTECTION IP : 55 AS PER IS : 13947
4. 20% SPARE TERMINALS WILL BE PROVIDED
5. WIRING WILL BE DONE WITH 1100 V, GRADE 1.5 Sq.MM Cu. STRANDED P.V.C. INSULATED CONDUCTOR
6. WEIGHT OF THE BOX : 125 Kg (Approx.)
7. MAKE OF ALL COMPONENTS SHALL BE AS PER POWER GRID QA & I APPROVAL
8. GASKET DETAILS SHALL BE AS PER GTR, REV. 14

B

CUSTOMER	: POWER GRID CORPORATION OF INDIA LTD.
PROJECT	: Substation package-SS19: Extension of 765kV Solapur, 765kV Aurangabad, 765kV Wardha, 400kV Khandwa, 400kV Rajgarh, 400kV Champa, 400/220kV Itarsi & 400/220kV Jabalpur substations, Under Western Region System Strengthening Scheme (WRSS-20)
CONTRACTOR	: M/s. BHARAT HEAVY ELECTRICALS LIMITED
LOA. No.	: CC/CS/901-WR2/SS-3931/3/G3/NOA-I/8864 & 8865 DT. 29.07.19

MOTOR OPERATING MECHANISM FOR 245 kV FOR ISOLATOR (MECHANICAL GANG OPERATION)

09 , 03 ,2020

REVISIONS: D C B A

GR POWER SWITCHGEAR LTD., JEEDIMETLA HYDERABAD-500 055 INDIA

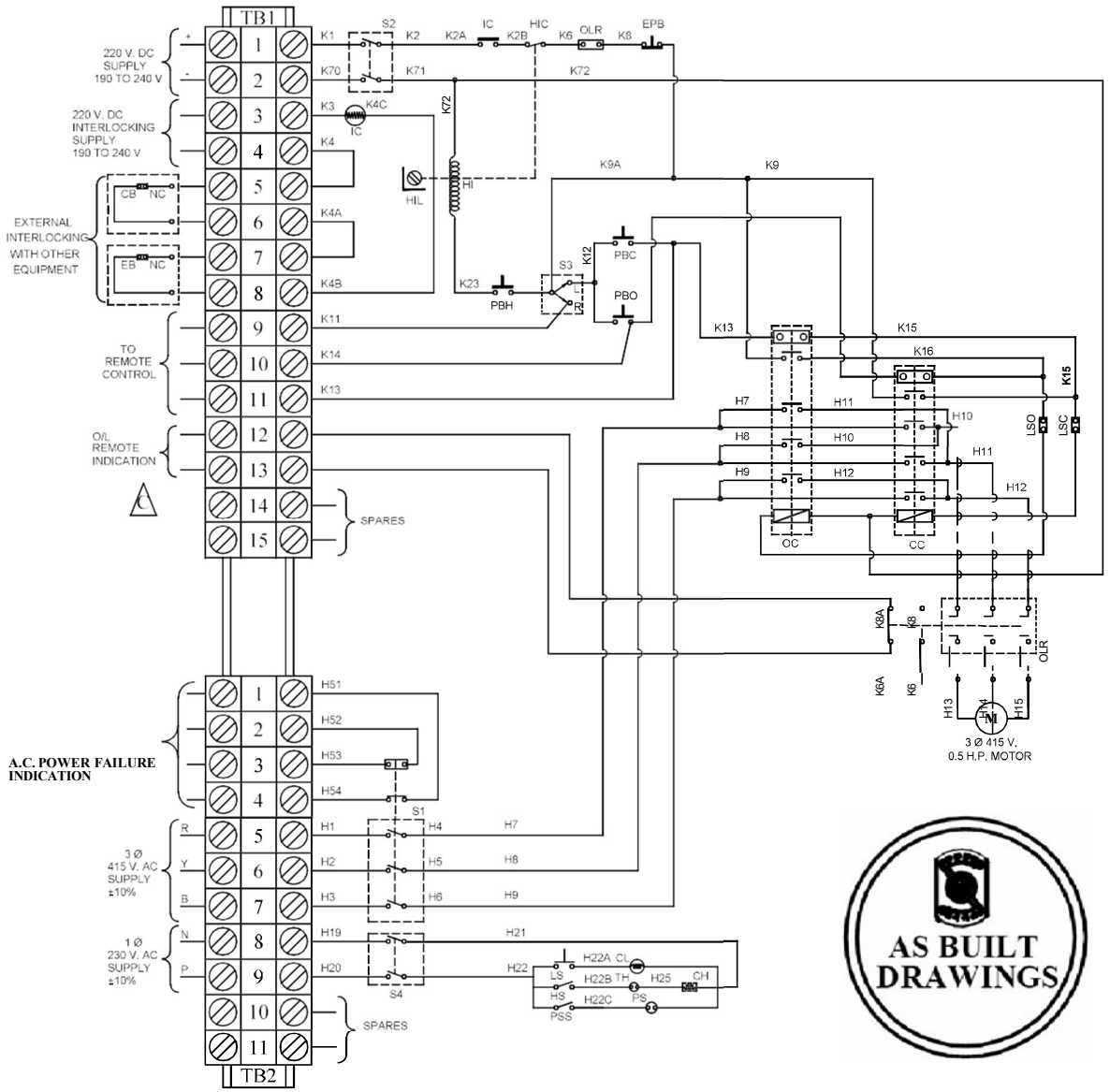
SCALE:N.T.S

3. M 3347 02 B

DATE
DRAWN
CHECKED
APPROVED
DRG.NO:
REV

REVISED AS PER CUTOMER COMMENTS ON 17.06.2020
REVISED AS PER CUTOMER COMMENT ON 30.03.2020

37



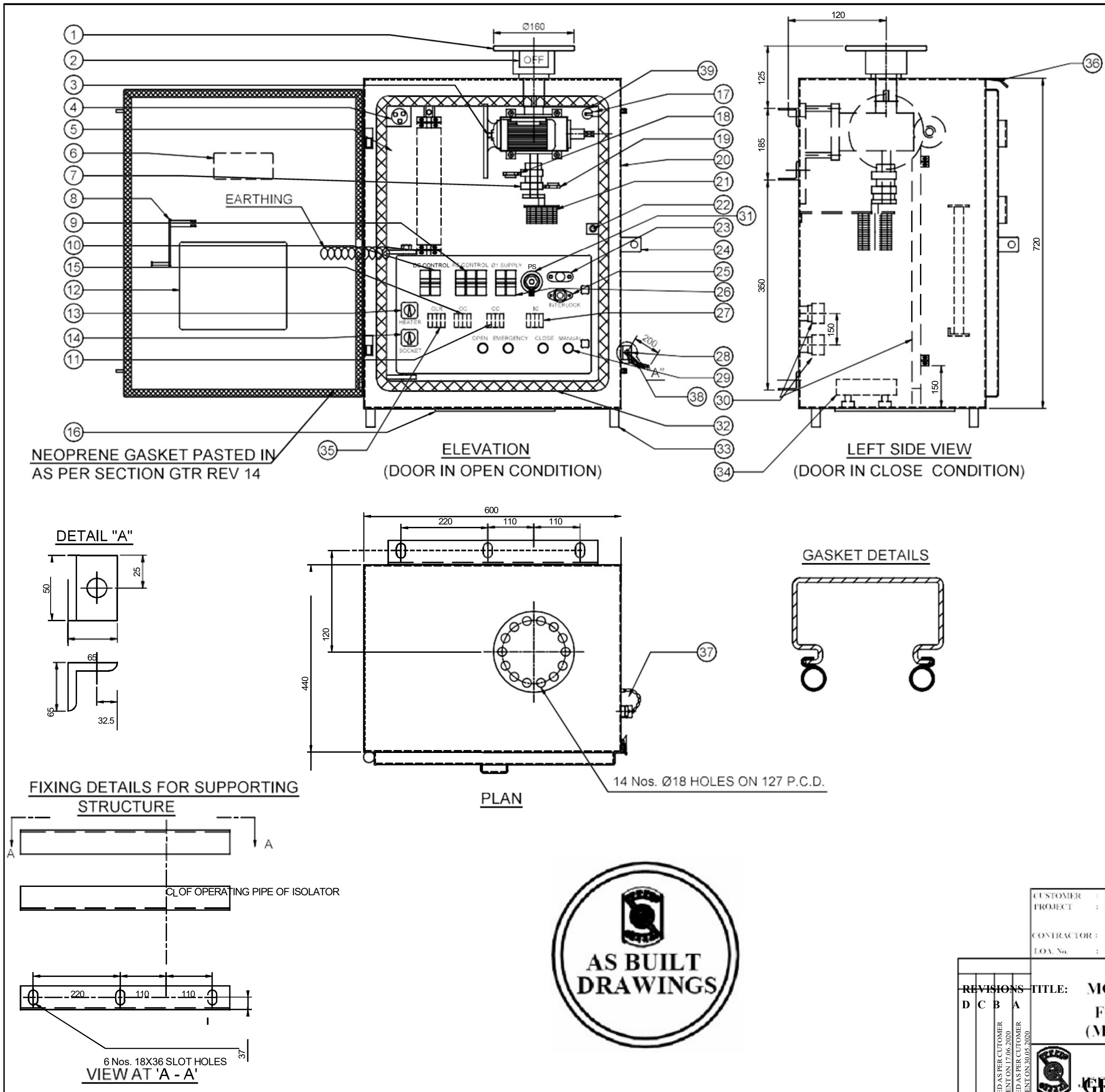
LEGEND	DESCRIPTION
HIC	HANDLE INTERLOCK CONTACT
M	MOTOR 3Ø 415 V. 0.5 HP. 50 Hz
CH	CUBICLE HEATER 80 WATTS, 240 V
S1	A.C. SUPPLY CONTROL SWITCH, 16 A, 415 V MCB
S2	D.C. SUPPLY CONTROL SWITCH, 10 A MCB
S3	LOCAL/REMOTE SELECTOR SWITCH 16 A, ROTARY TYPE
OC,CC	OPENING/CLOSING CONTACTORS, 9 A, 220 V D.C., 7W
OLR	OVER LOAD RELAY WITH SPP 1.0 TO 1.6 A
PBO,PBC	OPEN/CLOSE PUSH BUTTONS, 10A
LSO,LSC	OPEN/CLOSE LIMIT SWITCHES, 10A, 1NC
PBH	MANUAL HANDLE PUSH BUTTONS, 10A
EPB	EMERGENCY PUSH BUTTON, 10A
HI	HANDLE INTERLOCK COIL, 20 W
HIL	MANUAL HANDLE KEY INTERLOCK
CL	CUBICLE LAMP HOLDER, 5A
PS	POWER SOCKET, 15 A 1 Ø 3 PIN, 250 V
TH	THERMOSTAT (30° TO 85°)
PSS	POWER SOCKET SWITCH, 10 A, 230 V, CAM TYPE
IC	INTERLOCKING CONTACTOR, 9A, 220 V, 7W
LS	DOOR OPERATED SWITCH
HS	HEATER SWITCH, 10 A, 230 V, CAM TYPE
S4	Ø1 A.C. SUPPLY CONTROL SWITCH, 10 A. 230 V MCB
ACF	A.C. POWER FAILURE CONTACTOR 415 V, AC

OPERATING INSTRUCTIONS:

1. DON'T OPERATE THE ISOLATOR WHEN THE 'CIRCUIT BREAKER' IS IN 'ON'
2. ISOLATOR OPERATION IS POSSIBLE ONLY WHEN THE INTERLOCK CONDITIONS ARE SATISFIED.
3. FOR MANUAL OPERATION FOLLOW THE FOLLOWING INSTRUCTIONS:-
   a) BY PRESSING THE PUSH BUTTON (PBH) REMOVE THE CASTLE KEY AND KEEP THE KEY IN HANDLE LOCK AND ROTATE FOR GETTING WAY TO INSERT THE OPERATINGHANDLE.
   b) INSERT THE OPERATING HANDLE AND ROTATE IN CLOCK / ANTI CLOCK WISE DIRECTION FOR OPEN / CLOSE THE ISOLATOR.
   c) IF MANUAL OPERATION IS NOT NEEDED RESTORE THE CASTLE KEY IN THE HANDLE INTERLOCK AND ROTATE.
4. MAKE OF ALL COMPONENTS SHALL BE AS PER POWER GRID QA & I APPROVAL

AS BUILT DRAWINGS

REVISIONS	TITLE: SCHEMATIC DIAGRAM FOR MOTOR CONTROL PANEL FOR MAIN SWITCH (MECHANICAL GANG OPERATION)	27-12-2017
D C B A		SCALE: N.T.S
		DATE
		DRAWN
	GR POWER SWITCHGEAR LTD., JEEDIMETLA HYDERABAD-500 055 INDIA	CHECKED APPROVED
		SO: 2006 82 DRG.NO: C REV



PART LIST:

PART LIST	BOQ
1. OUTPUT FLANGE (10 mm THICK, 14 HOLES)	01 No.
2. ON/OFF INDICATOR	01 No.
3. GEAR BOX (SPUR / WORM & WORM SHAFT, RATIO 1 : 630)	01 No.
4. THERMOSTAT (30 TO 85°C RECOMMENDED SETTING 40°)	01 No.
5. MOTOR (Ø3, 415 Volts, 0.5 HP MOTOR)	01 No.
6. NAME PLATE	01 No.
7. LIMIT SWITCH OPERATING CAMS	02 Nos.
8. OPERATING HANDLE FIXED TO DOOR	01 No.
9. AC CONTROL SWITCH (3 POLE MCB) WITH AC FAILURE INDICATION	01 No.
10. DC CONTROL SWITCH (2 POLE MCB)	01 No.
11. CLOSING CONTACTOR (CC)	01 No.
12. SCHEMATIC DIAGRAM PLATE	01 No.
13. HEATER SWITCH (HS)	01 No.
14. POWER SOCKET SWITCH (PSS)	01 No.
15. OPENING CONTACTOR (OC)	01 No.
16. DETACHABLE CABLE GLANDS FIXING PLATE WITH CUT GLANDS	01 No.
17. CUBICLE LAMP HOLDER (SUITABLE FOR LED BASED ILLUMINATION)	01 No.
18. LIMIT SWICH (LSO)	01 No.
19. LIMIT SWITCH (LSC)	01 No.
20. CUBICLE WITH DOOR (3 mm THICK Alu. SHEET)	01 No.
21. AUX. SWITCH (8 NO + 8 NC)	01 No.
22. DOOR OPERATED LIGHT SWITCH (LS)	01 No.
23. PUSH CAP (FOR HIL)	01 No.
24. DOOR LOACK AND PAD LOCK	01 No.
25. HANDLE INTERLOCK (HIL)	01 No.
26. Ø1 AC SUPPLY SWITCH (2 POLE MCB)	01 No.
27. INTERLOCK CONTACTOR (IC)	01 No.
28. EARTHING TERMINAL (2 Nos. 65 x 65 x 5 Alu. ANGLE (WELDED TO BOX WITH 1/2" x 2" BOLT WITH CHECK NUT AND WASHERS)	02 Nos. A
29. OPEN / CLOSE PUSH BUTTON (PBO / PBC)	02 Nos. Each
30. TERMINAL BLOCK (CAT-M4 TYPE FOR MAIN CIRCUIT AND UBT - 4 TYPE FOR AUX. CIRCUIT	01 No. / 01 No.
31. POWER SOCKET (PSS, 15 A) / INDUSTRIAL TYPE	01 No.
32. RUBBER GASKET (EPDM)	01 No.
33. SUPPORTING PIPE (Alu. WELDED TO BOX)	04 Nos.
34. HEATER, 80 WATTS, 240 V (SOFIA / PYRO)	01 No.
35. OVER LOAD RELAY CUM SINGLE PHASE PREVENTOR (OLR)	01 No.
36. RAIN SHADE	01 No.
37. MANUAL OPERATING CAP/COVER(AL)	01 No.
38. COPPER BRAIDED FLEXIBLE FOR EARTHING (155 Sq.mm X 200 mm long)	02 Nos
39. LED LAMP B	01 No.

NOTE :

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. CUBICLE WILL BE POWDER COATED AS PER IS : 11232, RAL 7032 FOR OUTSIDE AND GLOSSY WHITE FOR INSIDE
3. DEGREE OF PROTECTION IP : 55 AS PER IS : 13947
4. 20% SPARE TERMINALS WILL BE PROVIDED
5. WIRING WILL BE DONE WITH 1100 V. GRADE 1.5 Sq.MM Cu. STRANDED P.V.C. INSULATED CONDUCTOR
6. WEIGHT OF THE BOX : 125 Kg (Approx.)
7. MAKE OF ALL COMPONENTS SHALL BE AS PER POWER GRID QA & I APPROVAL
8. GASKET DETAILS SHALL BE AS PER GTR, REV. 14.

CUSTOMER : POWER GRID CORPORATION OF INDIA LTD.

PROJECT : Substation package-SS19: Extension of 765kV Solapur, 765kV Aurangabad, 765kV Wardha, 400kV Khandwa, 400kV Rajgarh, 400kV Champa, 400/220kV Itarsi & 400/220kV Jabalpur substations, Under Western Region System Strengthening Scheme (WRSS-20)

CONTRACTOR : M/s. BHARAT HEAVY ELECTRICALS LIMITED

LOA. No. : CC-CS/901-WR2/SS-3931/3/G3/NOA-I/8864 & 8865 DT. 29.07.19

REVISIONS: D C B A

B: REVISED AS PER CUTOMER COMMENT ON 17.06.2020

A: REVISED AS PER CUTOMER COMMENT ON 30.05.2020

TITLE: MOTOR OPERATING MECHANISM FOR 245 kV FOR EARTH SWITCH (MECHANICAL GANG OPERATION)

SCALE:N.T.S

DATE 09 . 03 . 2020

DRAWN

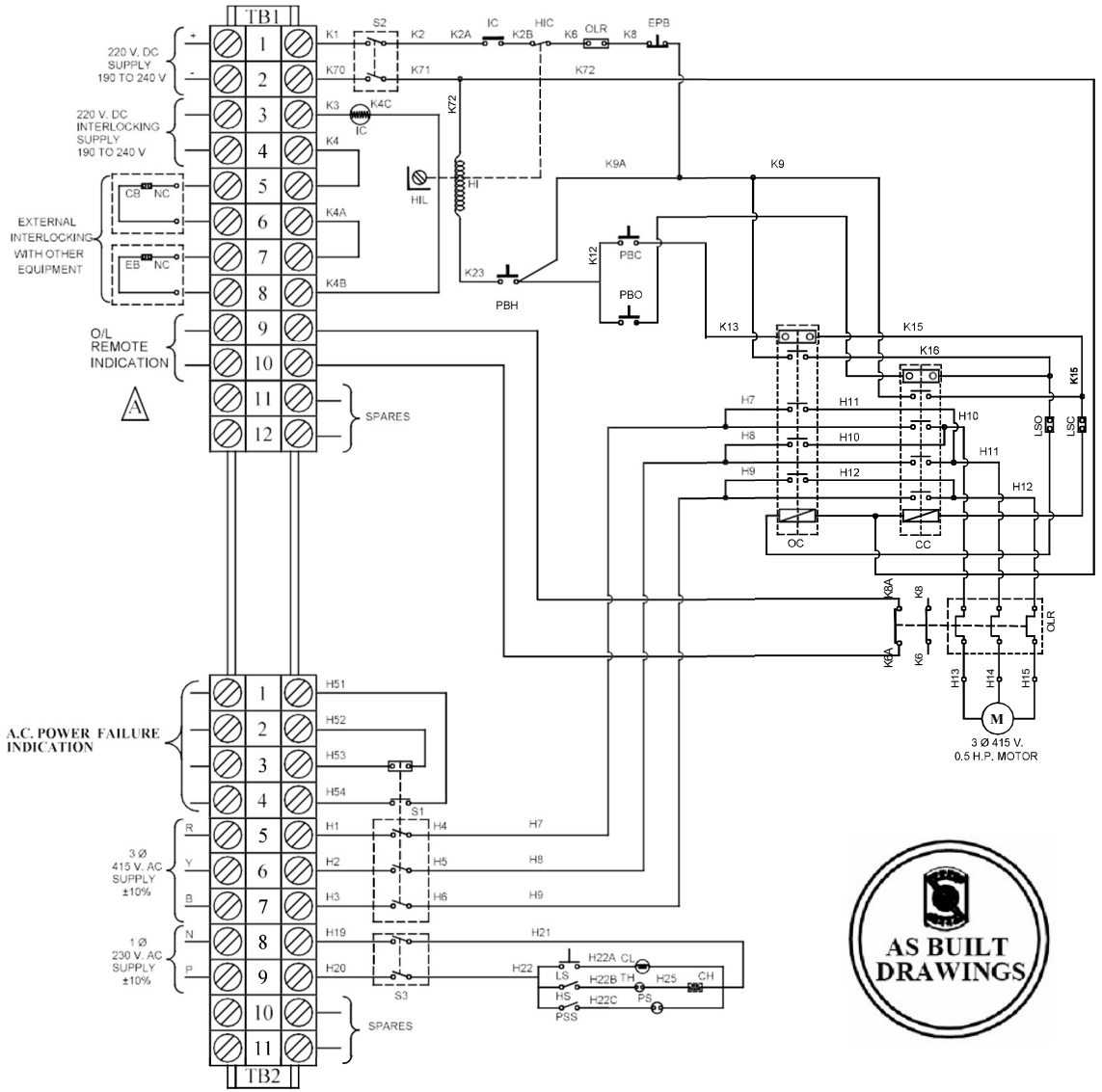
CHECKED

APPROVED

DRG.NO: 3 AM 3347 03

REV B

GR POWER SWITCHGEAR LTD.,



AS BUILT DRAWINGS

LEGEND	DESCRIPTION
HIC	HANDLE INTERLOCK CONTACT
M	MOTOR 3Ø 415 V, 0.5 HP, 50 Hz
CH	CUBICLE HEATER 80 WATTS, 240 V
S1	A.C. SUPPLY CONTROL SWITCH, 16 A, 415 V MCB
S2	D.C. SUPPLY CONTROL SWITCH, 10 A MCB
OC,CC	OPENING/CLOSING CONTACTORS, 9 A, 220 V D.C., 7W
OLR	OVER LOAD RELAY WITH SPP 1.0 TO 1.6 A
PBO,PBC	OPEN/CLOSE PUSH BUTTONS, 10A
LSO,LSC	OPEN/CLOSE LIMIT SWITCHES, 10A, 1NC
PBH	MANUAL HANDLE PUSH BUTTONS, 10A
EPB	EMERGENCY PUSH BUTTON, 10A
HI	HANDLE INTERLOCK COIL, 20 W
HIL	MANUAL HANDLE KEY INTERLOCK
CL	CUBICLE LAMP HOLDER, 5A
PS	POWER SOCKET, 15 A, 1 Ø 3 PIN, 250 V
TH	THERMOSTAT (30° TO 85°)
PSS	POWER SOCKET SWITCH, 10 A, 230 V, CAM TYPE
IC	INTERLOCKING CONTACTOR, 9A, 220 V, 7W
LS	DOOR OPERATED SWITCH
HS	HEATER SWITCH, 10 A, 230 V, CAM TYPE
S3	Ø1 A.C. SUPPLY CONTROL SWITCH, 10 A, 230 V MCB

OPERATING INSTRUCTIONS:

1. DON'T OPERATE THE ISOLATOR/ E/S WHEN THE 'CIRCUIT BREAKER' IS IN 'ON'
2. ISOLATOR/ E/S OPERATION IS POSSIBLE ONLY WHEN THE INTERLOCK CONDITIONS ARE SATISFIED.
3. FOR MANUAL OPERATION FOLLOW THE FOLLOWING INSTRUCTIONS.-
   a) BY PRESSING THE PUSH BUTTON (PBH) REMOVE THE CASTLE KEY AND KEEP THE KEY IN HANDLE LOCK AND ROTATE FOR GETTING WAY TO INSERT THE OPERATINGHANDLE.
   b) INSERT THE OPERATING HANDLE AND ROTATE IN CLOCK / ANTI CLOCK WISE DIRECTION FOR OPEN / CLOSE THE EARTH SWITCH.
   c) IF MANUAL OPERATION IS NOT NEEDED RESTORE THE CASTLE KEY IN THE HANDLE INTERLOCK AND ROTATE.
4. MAKE OF ALL COMPONENTS SHALL BE AS PER POWER GRID QA & I APPROVAL

REVISIONS			
D	C	B	A

TITLE:

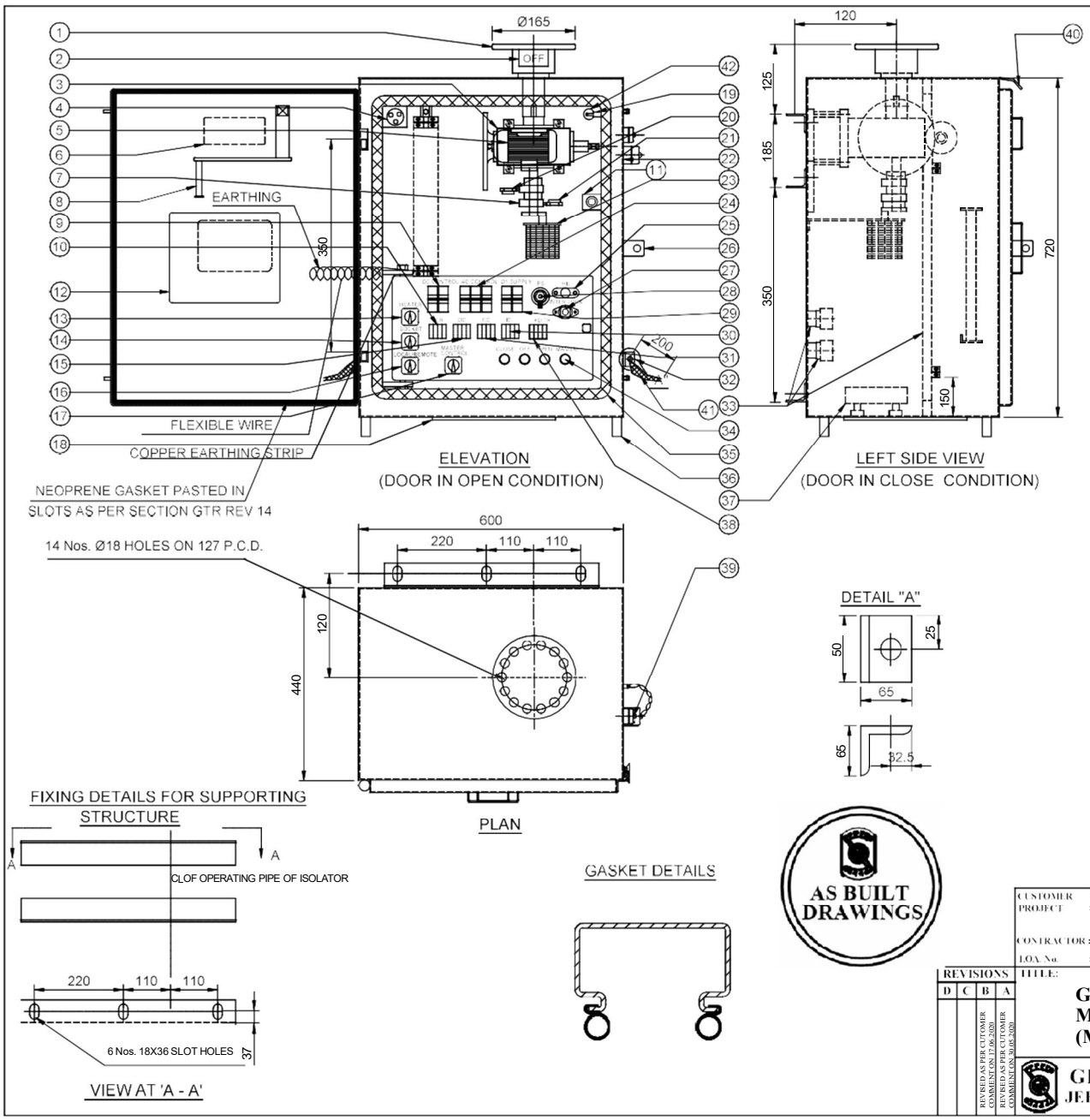
SCHEMATIC DIAGRAM FOR MOTOR CONTROL PANEL FOR EARTH SWITCH (MECHANICAL GANG OPERATION)

SCALE:N.T.S	
DATE	27 - 12 - 2017
DRAWN	
CHECKED	
APPROVED	

GR POWER SWITCHGEAR LTD.,
JEEDIMETLA HYDERABAD-500 055 INDIA

DRG.NO: 3. M 2006 84

REV: A



PART LIST:

1. OUTPUT FLANGE (10 mm TH
2. ON/OFF INDICATOR
3. GEAR BOX (SPUR / WORM &
4. THERMOSTAT (30 TO 85°C
5. MOTOR (Ø3, 415 Volts, 0.5 H
6. CAUTION NAME PLATE
7. LIMIT SWITCH OPERATING
8. OPERATING HANDLE FIXED
9. DC CONTROL SWITCH (2 PO
10. OVER LOAD RELAY CUM SI
11. DOOR OPERATD LIGHT SW
12. SCHEMATIC DIAGRAM PLAT
13. HEATER SWITCH (HS)
14. POWER SOCKET SWITCH (P
15. OPENING CONTACTOR (OC
16. LOCAL/REMOTE SELECTOR
17. MASTER CONTROL SWITCH
18. DETACHABLE CABLE GLAN
19. CUBICLE LAMP HOLDER
20. LIMIT SWICH (LSO)
21. LIMIT SWITCH (LSC)
22. CUBICLE WITH DOOR (3 mm
23. AUX. SWITCH (12 NO + 12 N
24. AC CONTROL SWITCH (3 PO
25. PUSH CAP (FOR HIL)
26. PROVISION FOR PAD LOCK
27. HANDLE INTERLOCK (HIL)
28. POWER SOCKET (PSS, 15A)
29. Ø1 AC SUPPLY SWITCH (2 P
30. INTERLOCK CONTACTOR (I
31. CLOSING CONTACTOR (CC)
32. EARTHING TERMINAL (2 No
WITH 1/2" x 2" BOLT WITH C
33. TERMINAL BLOCK (CAT-M4
34. OPEN / CLOSE / MANUAL / C
35. RUBBER GASKET (EPDM)
36. SUPPORTING PIPE (Alu. WE
37. HEATER, 80 WATTS, 240 V
38. POLE DISCREPANCY TIMER
39. MANUAL OPERATING CAP /
40. RAIN SHADE
41. COPPER BRAIDED FLEXIBL
42. LED LAMP

NOTE :

1. ALL DIMENSIONS ARE IN MI
2. CUBICLE WILL BE POWDER C
FOR OUTSIDE AND GLOSSY
3. DEGREE OF PROTECTION IF
4. 20% SPARE TERMINALS WIL
5. WIRING WILL BE DONE WITH
P.V.C. INSULATED CONDUC
6. WEIGHT OF THE BOX : 100 K
7. MAKE OF ALL COMPONENTS
8. GASKET DETAILS SHALL BE

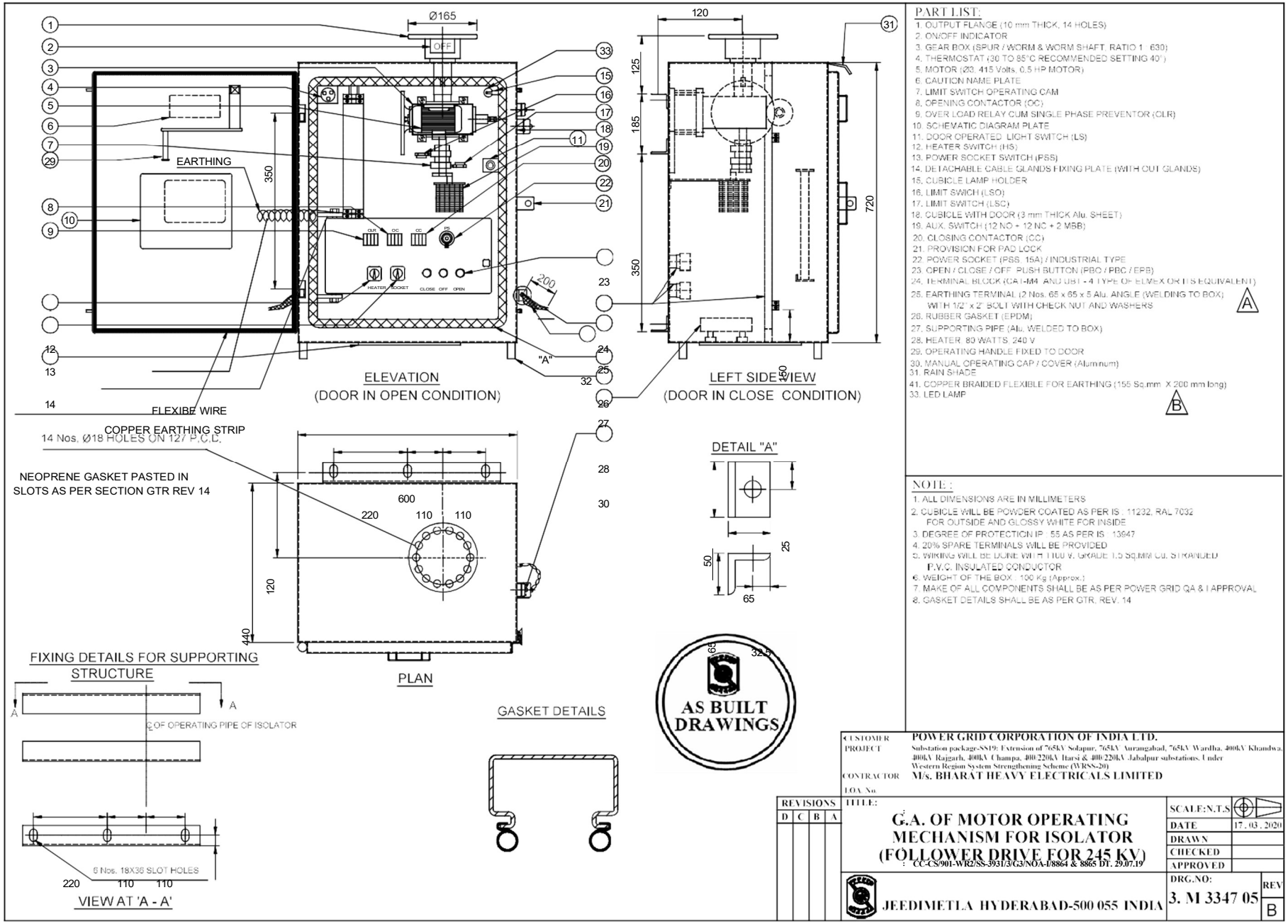
CUSTOMER	:	POWER GRID CORPORA
PROJECT	:	Substation package-SS19: Extension o 400kV Rajgarh, 400kV Champa, 400 Western Region System Strengthenin
CONTRACTOR	:	M/s. BHARAT HEAVY EL
LOA No.	:	CC-CS/901-WR2/SS-5951/3/G.S/NC

REVISIONS			
D	C	B	A
		REVISED AS PER CUTOMER COMMENT ON 17.06.2020	REVISED AS PER CUTOMER COMMENT ON 30.05.2020

TITLE:

G.A. OF MOTOR C MECHANISM FOR (MASTER DRIVE F

GR POWER SWITC
JEEDIMETLA HYDERA



PART LIST:

1. OUTPUT FLANGE (10 mm THICK, 14 HOLES)
2. ON/OFF INDICATOR
3. GEAR BOX (SPUR / WORM & WORM SHAFT, RATIO 1 : 630)
4. THERMOSTAT (30 TO 85°C RECOMMENDED SETTING 40°)
5. MOTOR (Ø3, 415 Volts, 0.5 HP MOTOR)
6. CAUTION NAME PLATE
7. LIMIT SWITCH OPERATING CAM
8. OPENING CONTACTOR (OC)
9. OVER LOAD RELAY CUM SINGLE PHASE PREVENTOR (OLR)
10. SCHEMATIC DIAGRAM PLATE
11. DOOR OPERATED LIGHT SWITCH (LS)
12. HEATER SWITCH (HS)
13. POWER SOCKET SWITCH (PSS)
14. DETACHABLE CABLE GLANDS FIXING PLATE (WITH OUT GLANDS)
15. CUBICLE LAMP HOLDER
16. LIMIT SWICH (LSO)
17. LIMIT SWITCH (LSC)
18. CUBICLE WITH DOOR (3 mm THICK Alu. SHEET)
19. AUX. SWITCH (12 NO + 12 NC + 2 MSB)
20. CLOSING CONTACTOR (CC)
21. PROVISION FOR PAD LOCK
22. POWER SOCKET (PSS, 15A) / INDUSTRIAL TYPE
23. OPEN / CLOSE / OFF PUSH BUTTON (PBO / PBC / EPB)
24. TERMINAL BLOCK (CATI-M4 ANU UBT - 4 TYPE OF ELMEX OR IT'S EQUIVALENT)
25. EARTHING TERMINAL (2 Nos. 65 x 65 x 5 Alu. ANGLE (WELDING TO BOX) WITH 1/2" x 2" BOLT WITH CHECK NUT AND WASHERS — A
26. RUBBER GASKET (EPDM)
27. SUPPORTING PIPE (Alu. WELDED TO BOX)
28. HEATER, 80 WATTS, 240 V
29. OPERATING HANDLE FIXED TO DOOR
30. MANUAL OPERATING CAP / COVER (Aluminum)
31. RAIN SHADE
41. COPPER BRAIDED FLEXIBLE FOR EARTHING (155 Sq.mm X 200 mm long)
33. LED LAMP — B

NOTE :

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. CUBICLE WILL BE POWDER COATED AS PER IS : 11232, RAL 7032 FOR OUTSIDE AND GLOSSY WHITE FOR INSIDE
3. DEGREE OF PROTECTION IP : 55 AS PER IS : 13947
4. 20% SPARE TERMINALS WILL BE PROVIDED
5. WIRING WILL BE DONE WITH 1100 V, GRADE 1.5 Sq.MM Cu. STRANDED P.V.C. INSULATED CONDUCTOR
6. WEIGHT OF THE BOX : 100 Kg (Approx.)
7. MAKE OF ALL COMPONENTS SHALL BE AS PER POWER GRID QA & I APPROVAL
8. GASKET DETAILS SHALL BE AS PER GTR, REV. 14

CUSTOMER	POWER GRID CORPORATION OF INDIA LTD.
PROJECT	Substation package-SNP: Extension of 765kV Solapur, 765kV Aurangabad, 765kV Wardha, 400kV Khandwa, 400kV Rajgarh, 400kV Champa, 400/220kV Itarsi & 400/220kV Jabalpur substations. Under Western Region System Strengthening Scheme (WRSS-20)
CONTRACTOR	M/s. BHARAT HEAVY ELECTRICALS LIMITED
LOA No.	

REVISIONS			
D	C	B	A

TITLE:

G.A. OF MOTOR OPERATING MECHANISM FOR ISOLATOR (FOLLOWER DRIVE FOR 245 KV)

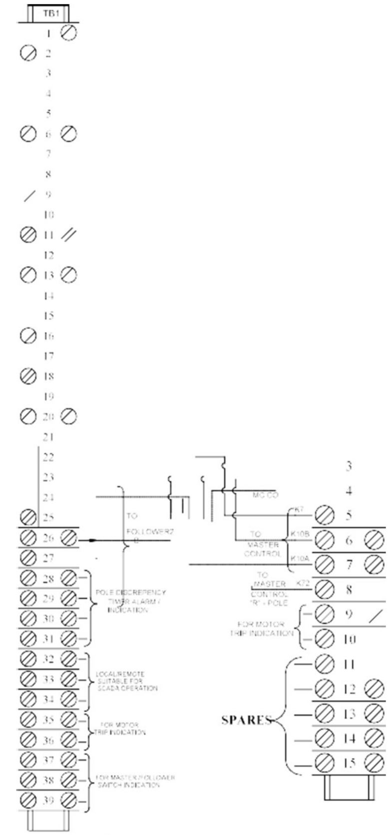
CC-CS/901-WR2/SS-3931/3/G3/NOA-1/8864 & 8865 DT. 29.07.19

JEEDIMETLA HYDERABAD-500 055 INDIA

SCALE: N.T.S	
DATE	17. 03. 2020
DRAWN	
CHECKED	
APPROVED	
DRG.NO:	3. M 3347 05
REV	B

REVISED AS PER CUTOMER COMMENT ON 17/06/2020
REVISED AS PER CUTOMER COMMENT ON 30/05/2020

GR POWER SWITCHGEAR LTD.,

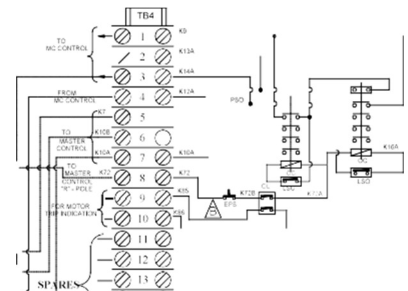


*

D.C. CONTROL CIRCUIT
"Y" - POLE

* - SPARE TERMINALS SHIFTED FROM
TB1 TO TB3

RIVES



D.C. CONTROL CIRCUIT
"R & B" - POLES

DRIVES

LEGEND	DESCRIPTION	MAKE
HIC	HANDLE INTERLOCK CONTACT	RECOM/SWITRON
CH	CUBICLE HEATER (230 V, 80 WATTS)	KONTACT/RAMANA ELECT.
S1	A.C. SUPPLY CONTROL SWITCH, 16 A (3 POLE MCB) WITH AC FAILURE INDICATION	C & S/HPL/SCHNEIDER
S2	D.C. SUPPLY CONTROL SWITCH, 10 A, (2 POLE MCB)	C & S/HPL/SCHNEIDER
S3	LOCAL/REMOTE SELECTOR SWITCH 10 A	RECOM/SWITRON
S4	MASTER CONTROL SWITCH 10 A	RECOM/SWITRON
S5	Ø1 A.C. SUPPLY SWITCH (2 POLE MCB)	C & S/HPL/SCHNEIDER
OC,CC,IC	OPEN/CLOSE&INTERLOCK CONTACTORS 220 V, DC 7W	C&S/HPL/ABB
OL	OVER LOAD RELAY WITH SPP 1 TO 1.6 A	C&S/HPL/ABB
PSO,PSC	OPEN/CLOSE PUSH BUTTONS 4A	C&S/HPL/TEKNIC/JAI BALAJI
LSO,LSC	OPEN/CLOSE LIMIT SWITCHES 10 A	JAI BALAJI
PBH	HANDLE INTERLOCK PUSH BUTTONS 4 A	C&S/HPL/TEKNIC/JAI BALAJI
EPB	EMERGENCY OFF	C&S/HPL/TEKNIC/JAI BALAJI
HI	HANDLE INTERLOCK COIL 20 W	GRPSL/RK ENGG
HIL	CASTLE KEY INTERLOCK FOR HANDLE OPERATION	PS POWER CONTROL
LS,PSS,HS	LIGHT SOCKET, HEATER SWITCHES, 10 A	RECOM/SWITRON
CL	CUBICLE LAMP HOLDER	ANCHOR/PLAZA OR EQUIV.
PS	POWER SOCKET 16 A, 250 V	CG / B & C/C&S
PDTR	POLE DISCREPANCY TIMER (0.05 TO 30 SEC.)	C&S/HPL/ABB
M	MOTOR Ø3, 415V, 0.5 H.P.	REMI / CGL/ELCEN/BBL
TH	THERMOSTAT 30 TO 85	RESI/GIRISH ECO

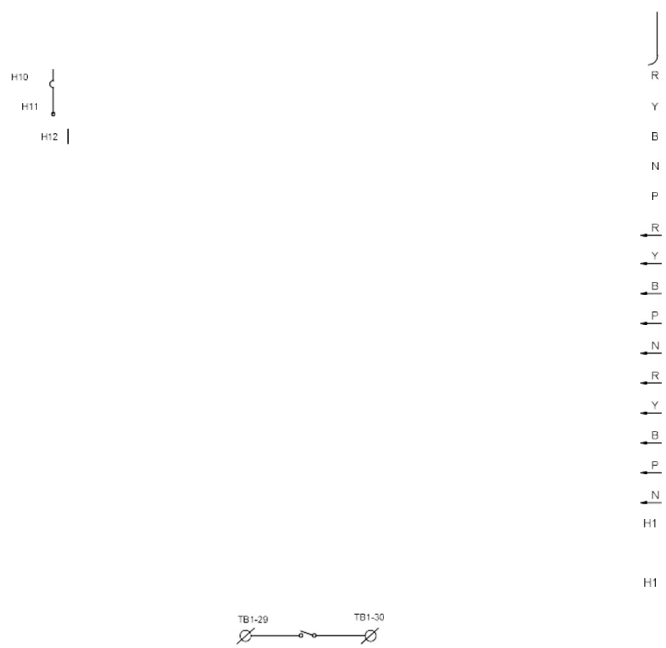
OPERATING INSTRUCTIONS:

1. DON'T OPERATE THE ISOLATOR WHEN THE 'CIRCUIT BREAKER' IS IN 'ON'
2. ISOLATOR OPERATION IS POSSIBLE ONLY WHEN THE INTERLOCK CONDITIONS ARE SATISFIED.
3. FOR MANUAL OPERATION FOLLOW THE FOLLOWING INSTRUCTIONS -
   a) BY PRESSING THE PUSH BUTTON (PBH) REMOVE THE CASTLE KEY AND KEEP THE KEY IN HANDLE LOCK AND ROTATE FOR GETTING WAY TO INSERT THE OPERATING HANDLE.
   b) INSERT THE OPERATING HANDLE AND ROTATE IN CLOCK / ANTI CLOCK WISE DIRECTIONS FOR TO OPEN / CLOSE THE ISOLATOR RESPECTIVELY.
   c) IF MANUAL OPERATION IS NOT NEEDED RESTORE THE CASTLE KEY IN THE HANDLE INTERLOCK AND ROTATE.
4. HANDLE INTERLOCK CONTACT (HIC) FOR PREVENTING ELECTRICAL CLOSING WHILE OPERATING ISOLATOR THROUGH HANDLE.
5. a). FOR GANG OPERATION ENSURE THAT THE MASTERCONTROL SWITCH "MC" (S4) IS IN MASTER MODE. REMOTE / LOCAL GANG OPERATION IS POSSIBLE IN THE MODE
   b). FOR INDIVIDUAL POLE ELECTRICAL OPERATION SET MASTER CONTROL SWITCH IN INDIVIDUAL MODE.
   c) DO NOT OPERATE FROM REMOTE / LOCAL FOR GANG OPERATION WHEN THE MASTER CONTROL SWITCH IS IN INDIVIDUAL MODE.

NOTE :

1. HANDLE INTER LOCK CONTACT (HIC) SHALL NOT BE OPERATED DIRECTLY BY OPERATING HANDLE WHILE INSERTION
2. THE MANUAL HANDLE KEY INTERLOCK (HIL) SHALL OPERATE A FLAP WHICH IN TURN SHOULD ACTUATE THE HIC IN 'R' POLE
3. COMMON CASTLE KEY PROVIDED FOR R, Y, B POLE SHALL OPERATE A FLAP
4. TB1(1To 4) SHALL EB SUITABLE FOR 16 Sq mm(AL)
   TB2 (1 To 10), TB5 (4 To 5) ARE OF CAT M4 REMAINING ARE UBT.4

FOR MASTER DRIVE
"Y" - POLE

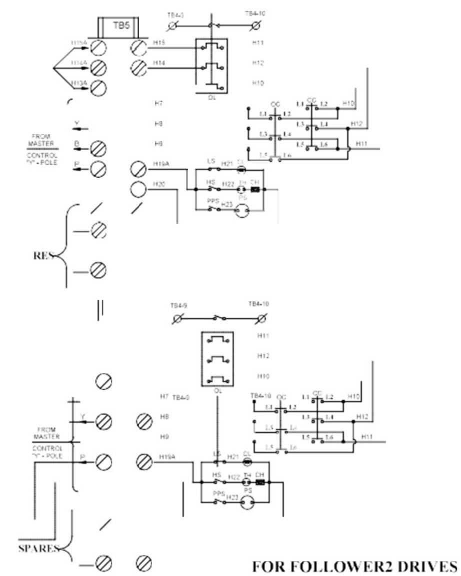


A.C. CONTROL CIRCUIT
"Y" - POLE

* - SPARE TERMINALS SHIFTED FROM
TB2 TO TB3

FOR FOLLOWER1 DRIVES
(R POLES)

OL CIRCUIT



FOR FOLLOWER2 DRIVES
(B POLES)

RCUIT

LEGEND	DESCRIPTION	MAKE
HIC	HANDLE INTERLOCK CONTACT	RECOM/SWITRON
CH	CUBICLE HEATER (230 V, 80 WATTS)	KONTACT/RAMANA ELECT.
S1	A.C. SUPPLY CONTROL SWITCH, 16 A (3 POLE MCB) WITH AC FAILURE INDICATION	C & S/HPL/SCHNEIDER
S2	D.C. SUPPLY CONTROL SWITCH, 10 A, (2 POLE MCB)	C & S/HPL/SCHNEIDER
S3	LOCAL/REMOTE SELECTOR SWITCH 10 A	RECOM/SWITRON
S4	MASTER CONTROL SWITCH 10 A	RECOM/SWITRON
S5	Ø1 A.C. SUPPLY SWITCH (2 POLE MCB)	C & S/HPL/SCHNEIDER
OC,CC	OPEN/CLOSE CONTACTORS 220 V, DC 7W	C&S/HPL/ABB
OL	OVER LOAD RELAY WITH SPP 1 TO 1.6 A	C&S/HPL/ABB
PBO,PBC	OPEN/CLOSE PUSH BUTTONS 4A	C&S/HPL/TEKNIC/JAI BALAJI
LSO,LSC	OPEN/CLOSE LIMIT SWITCHES 10 A	JAI BALAJI
PBH	HANDLE INTERLOCK PUSH BUTTONS 4 A	C&S/HPL/TEKNIC/JAI BALAJI
EPB	EMERGENCY OFF	C&S/HPL/TEKNIC/JAI BALAJI
HI	HANDLE INTERLOCK COIL 20 W	ORP/SL/RK ENGG
HIL	CASTLE KEY INTERLOCK FOR HANDLE OPERATION	PS POWER CONTROL
LS,PSS,HS	LIGHT,SOCKET, HEATER SWITCHES, 10 A	RECOM/SWITRON
CL	CUBICLE LAMP HOLDER	ANCHOR/PLAZA OR EQUIV.
PS	POWER SOCKET 16 A, 250 V	CG / B & C/C&S
PDTR	POLE DISCREPANCY TIMER (0.05 TO 30 SEC)	C&S/HPL/ABB
M	MOTOR Ø3, 415V, 0.5 H.P.	REMI / CGL/ELCEN/BBL
TH	THERMOSTAT 30 TO 85°	BESL/GIRISH EGG

B

OPERATING INSTRUCTIONS:

1. DON'T OPERATE THE ISOLATOR WHEN THE 'CIRCUIT BREAKER' IS IN 'ON'
2. ISOLATOR OPERATION IS POSSIBLE ONLY WHEN THE INTERLOCK CONDITIONS ARE SATISFIED.
3. FOR MANUAL OPERATION FOLLOW THE FOLLOWING INSTRUCTIONS:-
   a) BY PRESSING THE PUSH BUTTON (PBH) REMOVE THE CASTLE KEY AND KEEP THE KEY IN HANDLE LOCK AND ROTATE FOR GETTING WAY TO INSERT THE OPERATING HANDLE.
   b) INSERT THE OPERATING HANDLE AND ROTATE IN CLOCK / ANTI CLOCK WISE DIRECTIONS FOR TO OPEN / CLOSE THE ISOLATOR RESPECTIVELY.
   c) IF MANUAL OPERATION IS NOT NEEDED RESTORE THE CASTLE KEY IN THE HANDLE INTERLOCK AND ROTATE.
4. HANDLE INTERLOCK CONTACT (HIC) FOR PREVENTING ELECTRICAL CLOSING WHILE OPERATING ISOLATOR THROUGH HANDLE
5. a) FOR GANG OPERATION ENSURE THAT THE MASTERCONTROL SWITCH "MC" (S4) IS IN MASTER MODE. REMOTE / LOCAL GANG OPERATION IS POSSIBLE IN THE MODE
   b) FOR INDIVIDUAL POLE ELECTRICAL OPERATION SET MASTER CONTROL SWITCH IN INDIVIDUAL MODE.
   c) DO NOT OPERATE FROM REMOTE / LOCAL FOR GANG OPERATION WHEN THE MASTER CONTROL SWITCH IS IN INDIVIDUAL MODE.

NOTE :

1. HANDLE INTER LOCK CONTACT (HIC) SHALL NOT BE OPERATED DIRECTLY BY OPERATING HANDLE WHILE INSERTION
2. THE MANUAL HANDLE KEY INTERLOCK (HIL) SHALL OPERATE A FLAP WHICH IN TURN SHOULD ACTUATE THE HIC IN "R" POLE
3. COMMON CASTLE KEY PROVIDED FOR R, Y, B POLE SHALL OPERATE A FLAP
4. TB1(1To 4) SHALL EB SUITABLE FOR 16 Sq mm(AL)
   TB2 (1 To 10) TB5 (4 To 5) ARE OF CAT M4 REMAINING ARE UBT.4

CUSTOMER : POWER GRID CORPORATION OF INDIA LTD.
PROJECT : Substation package-SS19: Extension of 765kV Solapur, 765kV Aurangabad, 765kV Wardha, 400kV Khandwa, 400kV Rajgarh, 400kV Champa, 400/220kV Itarsi & 400/220kV Jabalpur substations, Under Western Region System Strengthening Scheme (WRSS-20)
CONTRACTOR : M/s. BHARAT HEAVY ELECTRICALS LIMITED
LOA. No. : CC-CS/901-WR2/SS-3931/3/G3/NOA-I/8864 & 8865 DT. 29.07.19

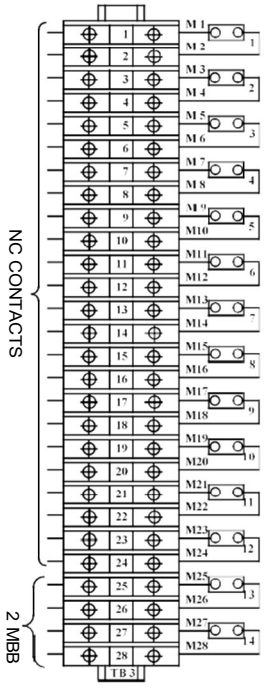
REVISIONS			
D	C	B	A

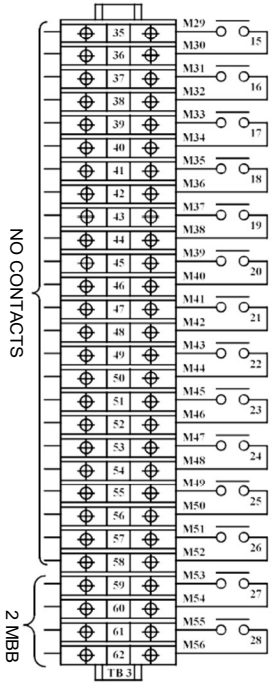
TITLE:

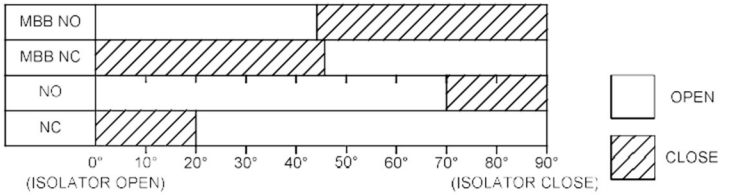
SCHEMATIC DIAGRAM FOR MASTER AND FOLLOWER(A.C CIRCUIT) DRIVES OF 220 KV ISOLATOR

SCALE:N.T.S
DATE 06 . 03 . 2020
DRAWN
CHECKED
APPROVED
DRG.NO: 3. M 3347 06
REV B

GR POWER SWITCHGEAR LTD.,
JEEDIMETLA HYDERABAD-500 055 INDIA

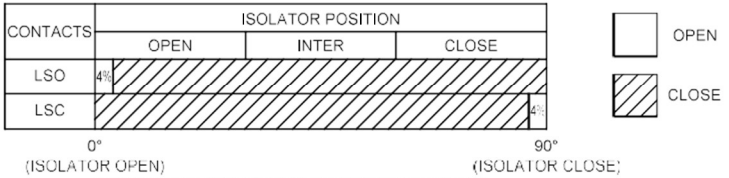




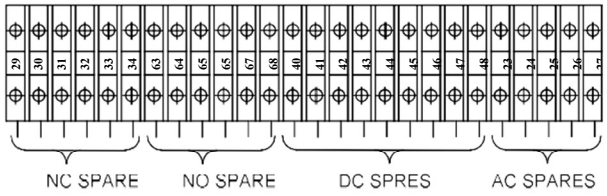


CONTACT TRAVEL DIAGRAM OF AUX. SWITCH

AS BUILT DRAWINGS



LIMIT SWITCH CONTACT DEVELOPMENT DIAGRAM

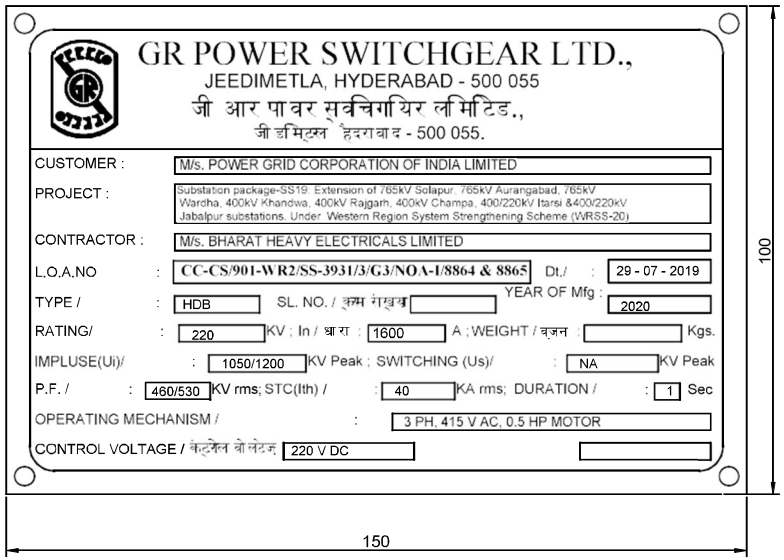


FOR ISOLATOR
(12 NO + 12 NC + 2 MBB)

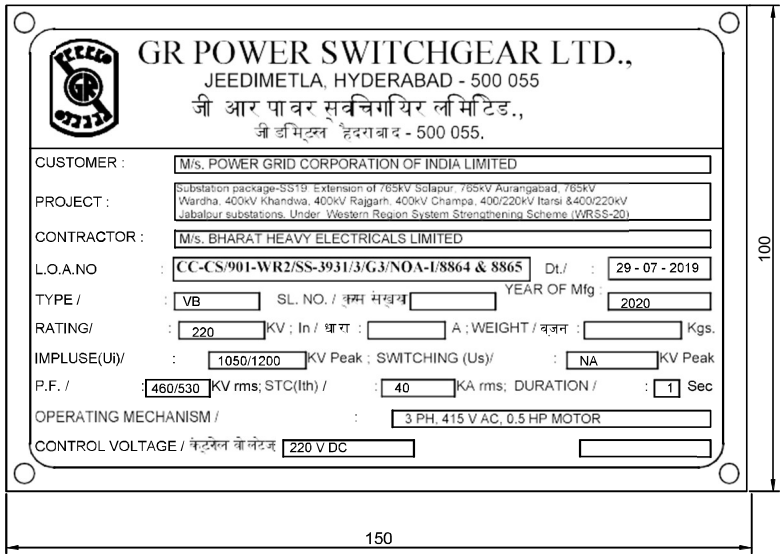
CUSTOMER	: POWER GRID CORPORATION OF INDIA LTD.
PROJECT	: Substation package-SS19: Extension of 765kV Solapur, 765kV Aurangabad, 765kV Wardha, 400kV Khandwa, 400kV Rajgarh, 400kV Champa, 400/220kV Itarsi & 400/220kV Jabalpur substations Under Western Region System Strengthening Scheme (WRSS-20)
CONTRACTOR	: M/s. BHARAT HEAVY ELECTRICALS LIMITED
LOA. No.	: CC-CS/901-WR2/SS-3931/3/G3/NOA-1/8864 & 8865 DT. 29.07.19

REVISIONS				TITLE:	SCALE:N.T.S	
D	C	B	A	AUXILIARY CONTACT TRAVEL DIAGRAM MAIN SWITCH & EARTH SWITCH (220 KV)	DATE 16 - 01 - 2019	
					DRAWN	
					CHECKED	
					APPROVED	
				GR POWER SWITCHGEAR LTD., JEEDIMETLA HYDERABAD-500 055 INDIA	DRG.NO. GC-3347 07	REV

ISOLATOR RATING NAME PLATE FOR 220 KV



EARTH SWITCH RATING NAME PLATE



NOTES :

1. ENGRAVED LETTER SIZE : 3 mm
2. LETTER ETCHED WHITE ON BLACK BACKGROUND
3. MATERIAL : STAINLESS STEEL
4. THICKNESS : 2 mm

AS BUILT DRAWINGS

CUSTOMER	: POWER GRID CORPORATION OF INDIA LTD.
PROJECT	: Substation package-SS19: Extension of 765kV Solapur, 765kV Aurangabad, 765kV Wardha, 400kV Khandwa, 400kV Rajgarh, 400kV Champa, 400/220kV Itarsi & 400/220kV Jabalpur substations. Under Western Region System Strengthening Scheme (WRSS-20)
CONTRACTOR	: M/s. BHARAT HEAVY ELECTRICALS LIMITED
LOA. No.	: CC-CS/901-WR2/SS-3931/3/G3/NOA-I/8864 & 8865 DT. 29.07.19

REVISIONS			
D	C	B	A

TITLE:

NAME PLATE DETAILS (FOR 220 kV DB ISOLATOR)

SCALE:N.T.S	
DATE	10 - 02 - 2020
DRAWN	
CHECKED	
APPROVED	

GR POWER SWITCHGEAR LTD.,
JEEDIMETLA HYDERABAD-500 055 INDIA

DRG.NO: 3. GZ 3347 01

REV

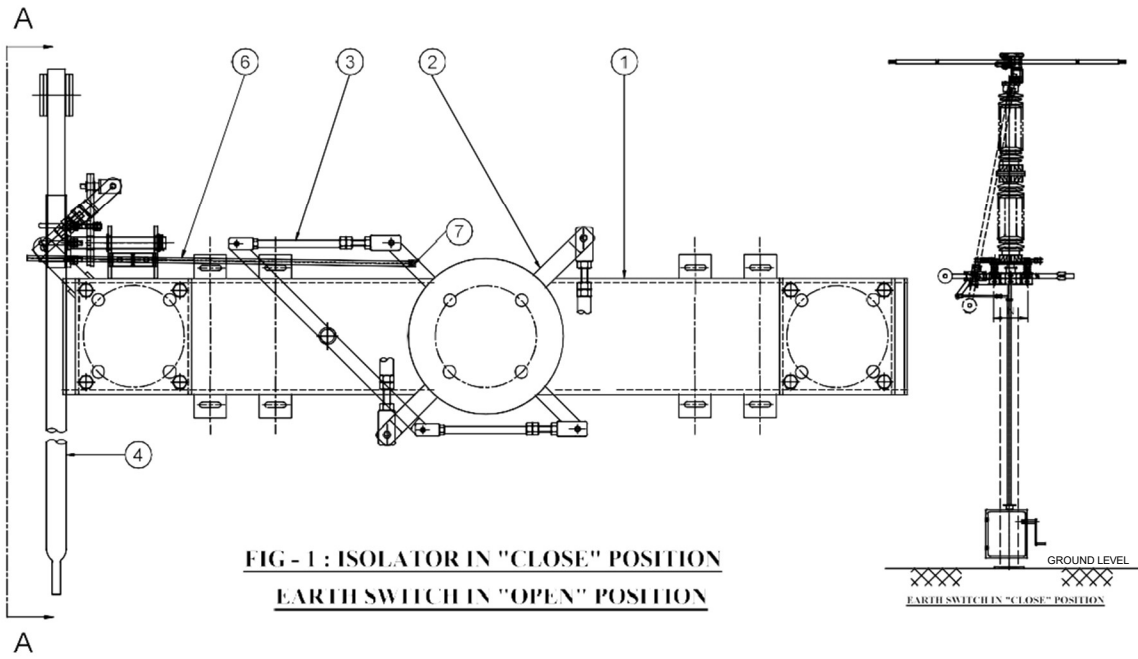


FIG - 1 : ISOLATOR IN "CLOSE" POSITION
EARTH SWITCH IN "OPEN" POSITION

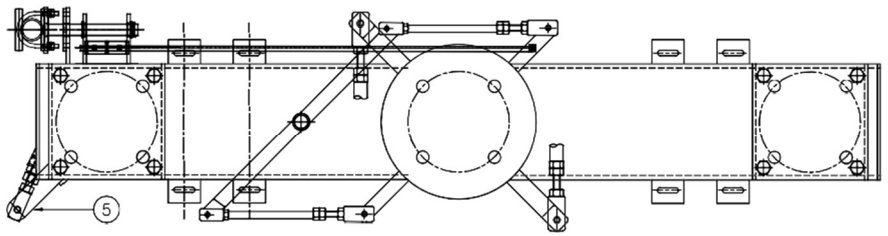


FIG - 2 : ISOLATOR IN "OPEN" POSITION
EARTH SWITCH IN "CLOSE" POSITION

CONSTRUCTION :

MECHANICAL INTERLOCK PIPE (6) CONNECTED TO THE ROTATING INSULATOR FLANGE (2) THE INTERLOCK PIPE MOVES ALONG THE ROTATING INSULATOR FLANGE(2). EARTH SWITCH MOVING CONTACT PIPE(4) MOVES INDIVIDUALY.

FUNCTION :

IN FIG. 1: THE ROTATING INSULATOR FLANGE WITH MECHANICAL INTERLOCK PIPE IS POSITIONED ABOVE THE OF EARTH SWITCH MOVING CONTACT, WHICH WILL NOT PERMIT THE EARTH SWITCH MOVING CONTACT TO MOVE TO CLOSE POSITION DURING ISOLATOR IS IN CLOSE POSITION

IN FIG. 2: THE MOVING CONTACT OF EARTH SWITCH IS IN CLOSE POSITION AND IT WILL PREVENT THE ROTATING INSULATOR FLANGE THROUGH MECHANICAL INTERLOCK PIPE FOR TO CLOSE THE ISOLATOR.

NOTES :

A

1. BASE CHANNEL 145 x 80 mm BOX MS CHANNEL (HDG)
2. ROTATING INSULATOR FLANGE
3. TANDEM PIPE
4. E.S. MOVING CONTACT
5. E.S. OPERATING LEVER
6. MECHANICAL INTERLOCK PIPE (32 NB GI PIPE)
7. LINK BOLT

AS BUILT DRAWINGS

REVISIONS				TITLE:	SCALE: N.T.S	
D	C	B	A	MECHANICAL INTERLOCK BETWEEN MAIN SWITCH AND EARTH SWITCH FOR 245 KV	DATE	27 - 12 - 2017
					DRAWN	
					CHECKED	
					APPROVED	
				GR POWER SWITCHGEAR LTD., JEEDIMETLA HYDERABAD-500 055 INDIA	DRG.NO: 4 Z 2006 69	REV A