Bid Number/बोली क्रमांक (बिड संख्या):
GEM/2023/B/3346734
Dated/दिनांक : 11-04-2023

Bid Document/ बिड दस्तावेज़

Bid Details/बिड विवरण	
Bid End Date/Time/बिड बंद होने की तारीख/समय	02-05-2023 17:00:00
Bid Opening Date/Time/बिड खुलने की तारीख/समय	02-05-2023 17:30:00
Bid Offer Validity (From End Date)/बिड पेशकश वैधता (बंद होने की तारीख से)	180 (Days)
Ministry/State Name/मंत्रालय/राज्य का नाम	Ministry Of Power
Department Name/विभाग का नाम	Na
Organisation Name/संगठन का नाम	Ntpc Limited
Office Name/कार्यालय का नाम	Cg
Total Quantity/कुल मात्रा	32
Item Category/मद केटेगरी	M8582958850N , Supervision
BOQ Title/बीओक्यू शीर्षक	Procurement of 420 KV Isolators for NTPC Rihand
MSE Exemption for Years of Experience and Turnover/ अनुभव के वर्षों से एमएसई छूट	No
Startup Exemption for Years of Experience and Turnover/ अनुभव के वर्षों से स्टार्टअप छूट	No
Document required from seller/विक्रेता से मांगे गए दस्तावेज़	Experience Criteria,Bidder Turnover,Certificate (Requested in ATC),OEM Authorization Certificate,Additional Doc 1 (Requested in ATC),Additional Doc 2 (Requested in ATC),Compliance of BoQ specification and supporting document *In case any bidder is seeking exemption from Experience / Turnover Criteria, the supporting documents to prove his eligibility for exemption must be uploaded for evaluation by the buyer
Bid to RA enabled/बिड से रिवर्स नीलामी सक्रिय किया	No
Type of Bid/बिड का प्रकार	Two Packet Bid
Primary product category	M8582958850N
Time allowed for Technical Clarifications during technical evaluation/तकनीकी मूल्यांकन के दौरान तकनीकी स्पष्टीकरण हेतु अनुमत समय	3 Days
Evaluation Method/मूल्यांकन पद्धति	Total value wise evaluation

EMD Detail/ईएमडी विवरण

Advisory Bank/एडवाईजरी बैंक	ICICI
EMD Amount/ईएमडी राशि	200000

ePBG Detail/ईपीबीजी विवरण

Advisory Bank/एडवाइजरी बैंक	ICICI
ePBG Percentage(%)/ईपीबीजी प्रतिशत (%)	3.00
Duration of ePBG required (Months)/ईपीबीजी की अपेक्षित अवधि (महीने).	44

(a). EMD EXEMPTION: The bidder seeking EMD exemption, must submit the valid supporting document for the relevant category as per GeM GTC with the bid. Under MSE category, only manufacturers for goods and Service Providers for Services are eligible for exemption from EMD. Traders are excluded from the purview of this Policy./जेम की शर्तों के अनुसार ईएमडी छूट के इच्छुक बिडर को संबंधित केटेगरी के लिए बिड के साथ वैध समर्थित दस्तावेज़ प्रस्तुत करने है। एमएसई केटेगरी के अंतर्गत केवल वस्तुओं के लिए विनिर्माता तथा सेवाओं के लिए सेवा प्रदाता ईएमडी से छूट के पात्र हैं। व्यापारियों को इस नीति के दायरे से बाहर रखा गया है।

(b). EMD & Performance security should be in favour of Beneficiary, wherever it is applicable./ईएमडी और संपादन जमानत राशि, जहां यह लागू होती है, लाभार्थी के पक्ष में होनी चाहिए।

Beneficiary/लाभार्थी :

GM (C&M)
NTPC Limited, Western Region II Headquarters, Plot No-87, Sector-24, Atal Nagar, Naya Raipur, Raipur Chhatisgarh-492018
(Uma Shankar Gupta)

Splitting/विभाजन

Bid splitting not applied/बोली विभाजन लागू नहीं किया गया.

Reserved for Make In India products

Reserved for Make In India products	Yes

MSE Purchase Preference/एमएसई खरीद वरीयता

MSE Purchase Preference/एमएसई खरीद वरीयता	Yes

1. Bid reserved for Make In India products: : Procurement under this bid is reserved for purchase from Class 1 local supplier as defined in public procurement (Preference to Make in India), Order 2017 as amended from time to time and its subsequent Orders/Notifications issued by concerned Nodal Ministry for specific Goods/Products. However, eligible micro and small enterprises will be allowed to participate. The minimum local content to qualify as a class 1 local supplier is denoted in the bid document. All bidders must upload a certificate from the OEM regarding the percentage of the local content and the details of locations at which the local value addition is

made along with their bid, failing which the bid is liable to be rejected. In case the bid value is more than Rs 10 Crore, the declaration relating to percentage of local content shall be certified by the statutory auditor or cost auditor, if the OEM is a company and by a practicing cost accountant or a chartered accountant for OEMs other than companies as per the Public Procurement (preference to Make-in -India) order 2017 dated 04.06.2020 . In case Buyer has selected Purchase preference to Micro and Small Enterprises clause in the bid, the same will get precedence over this clause.
2. Purchase preference to Micro and Small Enterprises (MSEs): Purchase preference will be given to MSEs as defined in Public Procurement Policy for Micro and Small Enterprises (MSEs) Order, 2012 dated 23.03.2012 issued by Ministry of Micro, Small and Medium Enterprises and its subsequent Orders/Notifications issued by concerned Ministry. If the bidder wants to avail the Purchase preference, the bidder must be the manufacturer of the offered product in case of bid for supply of goods. Traders are excluded from the purview of Public Procurement Policy for Micro and Small Enterprises. In respect of bid for Services, the bidder must be the Service provider of the offered Service. Relevant documentary evidence in this regard shall be uploaded along with the bid in respect of the offered product or service. If L-1 is not an MSE and MSE Seller (s) has/have quoted price within L-1+ 15% (Selected by Buyer)of margin of purchase preference /price band defined in relevant policy, such Seller shall be given opportunity to match L-1 price and contract will be awarded for 100%(selected by Buyer) percentage of total QUANTITY.
3. Estimated Bid Value indicated above is being declared solely for the purpose of guidance on EMD amount and for determining the Eligibility Criteria related to Turn Over, Past Performance and Project / Past Experience etc. This has no relevance or bearing on the price to be quoted by the bidders and is also not going to have any impact on bid participation. Also this is not going to be used as a criteria in determining reasonableness of quoted prices which would be determined by the buyer based on its own assessment of reasonableness and based on competitive prices received in Bid / RA process.

M8582958850N

(Minimum 60% Local Content required for qualifying as Class 1 Local Supplier)

Brand Type/ब्रांड का प्रकार	Unbranded

Technical Specifications/तकनीकी विशिष्टियाँ

Specification Document	View File
BOQ Detail Document	View File

Advisory-Please refer attached BOQ document for detailed consignee list and delivery period.

Consignees/Reporting Officer/परेषिती/रिपोर्टिंग अधिकारी and/ तथा Quantity/मात्रा

S.No./क्र. सं.	Consignee Reporting/Officer/ परेषिती/रिपोर्टिंग अधिकारी	Address/पता	Quantity/मात्रा	Delivery Days/डिलीवरी के दिन

S.No./क्र. सं.	Consignee Reporting/Officer/ परेषिती/रिपोर्टिंग अधिकारी	Address/पता	Quantity/मात्रा	Delivery Days/डिलीवरी के दिन
1	Anshul Goel	231223,Rihand Super Thermal Power Station P.O RIHANDNAGAR, DIST. SONEBHADR 231223 SONEBHADRA	12	180

Supervision

(Minimum 60% Local Content required for qualifying as Class 1 Local Supplier)

Brand Type/ब्रांड का प्रकार	Unbranded

Technical Specifications/तकनीकी विशिष्टियाँ

Specification Document	View File
BOQ Detail Document	View File

Advisory-Please refer attached BOQ document for detailed consignee list and delivery period.

Consignees/Reporting Officer/परेषिती/रिपोर्टिंग अधिकारी and/ तथा Quantity/मात्रा

S.No./क्र. सं.	Consignee Reporting/Officer/ परेषिती/रिपोर्टिंग अधिकारी	Address/पता	Quantity/मात्रा	Delivery Days/डिलीवरी के दिन
1	Anshul Goel	231223,Rihand Super Thermal Power Station P.O RIHANDNAGAR, DIST. SONEBHADR 231223 SONEBHADRA	20	730

Buyer Added Bid Specific Terms and Conditions/क्रेता द्वारा जोड़ी गई बिड की विशेष शर्तें

1. **Scope of Supply**

   Scope of supply (Bid price to include all cost components) : Supply Installation Testing and Commissioning of Goods

2. **Certificates**

   Bidder's offer is liable to be rejected if they don't upload any of the certificates / documents sought in the Bid document, ATC and Corrigendum if any.

3. **Buyer Added Bid Specific ATC**

   Buyer uploaded ATC document Click here to view the file.

4. **Inspection**

   Materials shall be guaranteed for 12 months from the date of commissioning or 18 months from the date of supply whichever is earlier.

Disclaimer/अस्वीकरण

The additional terms and conditions have been incorporated by the Buyer after approval of the Competent Authority in Buyer Organization, whereby Buyer organization is solely responsible for the impact of these clauses on the bidding process, its outcome, and consequences thereof including any eccentricity / restriction arising in the bidding process due to these ATCs and due to modification of technical specifications and / or terms and conditions governing the bid. Any clause(s) incorporated by the Buyer regarding following shall be treated as null and void and would not be considered as part of bid:-

1. Definition of Class I and Class II suppliers in the bid not in line with the extant Order / Office Memorandum issued by DPIIT in this regard.
2. Seeking EMD submission from bidder(s), including via Additional Terms & Conditions, in contravention to exemption provided to such sellers under GeM GTC.
3. Publishing Custom / BOQ bids for items for which regular GeM categories are available without any Category item bunched with it.
4. Creating BoQ bid for single item.
5. Mentioning specific Brand or Make or Model or Manufacturer or Dealer name.
6. Mandating submission of documents in physical form as a pre-requisite to qualify bidders.
7. Floating / creation of work contracts as Custom Bids in Services.
8. Seeking sample with bid or approval of samples during bid evaluation process.
9. Mandating foreign / international certifications even in case of existence of Indian Standards without specifying equivalent Indian Certification / standards.
10. Seeking experience from specific organization / department / institute only or from foreign / export experience.
11. Creating bid for items from irrelevant categories.
12. Incorporating any clause against the MSME policy and Preference to Make in India Policy.
13. Reference of conditions published on any external site or reference to external documents/clauses.
14. Asking for any Tender fee / Bid Participation fee / Auction fee in case of Bids / Forward Auction, as the case may be.

Further, if any seller has any objection/grievance against these additional clauses or otherwise on any aspect of this bid, they can raise their representation against the same by using the Representation window provided in the bid details field in Seller dashboard after logging in as a seller within 4 days of bid publication on GeM. Buyer is duty bound to reply to all such representations and would not be allowed to open bids if he fails to reply to such representations.

This Bid is also governed by the General Terms and Conditions/ यह बिड सामान्य शर्तों के अंतर्गत भी शासित है

In terms of GeM GTC clause 26 regarding Restrictions on procurement from a bidder of a country which shares a land border with India, 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. While participating in bid, Bidder has to undertake compliance of this and any false declaration and non-compliance of this would be a ground for immediate termination of the contract and further legal action in accordance with the laws./जेम की सामान्य शर्तों के खंड 26 के संदर्भ में भारत के साथ भूमि सीमा साझा करने वाले देश के बिडर से खरीद

पर प्रतिबंध के संबंध में भारत के साथ भूमि सीमा साझा करने वाले देश का कोई भी बिडर इस निविदा में बिड देने के लिए तभी पात्र होगा जब वह बिड देने वाला सक्षम प्राधिकारी के पास पंजीकृत हो।बिड में भाग लेते समय बिडर को इसका अनुपालन करना होगा और कोई भी गलत घोषणा किए जाने व इसका अनुपालन न करने पर अनुबंध को तत्काल समाप्त करने और कानून के अनुसार आगे की कानूनी कार्रवाई का आधार होगा।

---Thank You/धन्यवाद---

NTPC Limited

(A Government of India Enterprise)

Tender Enquiry No. 9900256632

Bill of Materials

Delivery Address:

Rihand Superthermal Power
P.O RIHANDNAGAR, DIST. SONEBHA
SONEBHADRA
Uttar Pradesh
231223
India
Tel : 05446-242913/243094 Fax: 05446-242010/242110

Item	Material Code	Description	UoM*	Total Quantity	Delivery Date
00010	M8582958850N	420KV ISOLATOR COMPLETE,2000A,40KA,HAPAM	NO	12.000	31.10.2023
00020		Supervision of erection & commg	MD	20.000	30.04.2025

(UOM Legends :- NO - Number , **MD** - Man Days **)**

NTPC Limited

(A Government of India Enterprise)

Tender Enquiry No. 9900256632

TECHNICAL DATA SHEET

00010 - M8582958850N **Specification** SWITCH GEAR ISOLATORS IS:9921 (PT-2) VOLTAGE RATING : 420KV CURRENT RATING : 2000A MAKE/MODEL : HAPAM Drg No : 075S5_YFO_251
00020 - **Specification**

NTPC Limited

(A Government of India Enterprise)

Tender Enquiry No. 9900256632

ITEM DATA SHEET

Material Code	Item Text
M8582958850N	TECHNICAL SPECIFICATIONS DRAWINGS ARE AS PER ATTACHMENT.

ISOLATOR SPECIFICATIONS

420KV ISOLATOR WITH SINGLE EARTH SWITCH

1.00	**GENERAL**
1.01	The isolators and accessories shall conform in general to IEC 62271-102 (or equivalent Indian standard) except to the extent explicitly modified in specification.
1.02	420KV, 2000A, 50KA HCB Complete isolator with all the necessary items for successful operation shall be supplied.
1.03	**One earth switch shall be provided on isolator against each isolator.**
1.04	The isolators and earth switches shall be motor operated.
1.05	Isolators shall be horizontal centre break type.
1.06	Isolator supplied shall be installed on the existing pipe support structure. Existing pipe support drawing has been attached.
1.07	Height of the isolator from existing pipe structure to connecting stud shall be 4110 mm.
1.08	Bidder may visit the site and take dimensions of the existing support structure before sending offer.
1.09	Base frame and other steel parts to be hot dip galvanized.
1.10	Current carrying parts to be nonferrous and noncorroding material.
1.11	Disconnector base frames will be supplied with all necessary welded fixtures to enable future fitting of earth switches.
2.00	**DUTY REQUIREMENTS**
2.01	Isolators and earth switches shall be capable of withstanding the dynamic and thermal effects of the maximum possible short circuit current of the system in their closed position. They shall be constructed such that they do not open under influence of short circuit current and wind pressure together. The earth switches wherever provided shall be constructional interlocked so that the earth switches can be operated only when the isolator is open and vice-versa.
2.02	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 220V DC supply. The interlock coil shall be provided with adequate contacts for facilitating permissive logic for 'DC' control scheme of the isolator as well as for AC circuit of the motor to prevent opening or closing of isolators when the interlocking coil is not energized.

2.03	The earthing switches shall be capable of discharging trapped charges of the associated lines. Isolator and earth switches shall be able to bear on the terminals the total forces including wind loading and electrodynamic forces on the attached conductor without impairing reliability or current carrying capacity.
2.04	The isolator shall be capable for making / breaking normal currents when no significant change in voltage occurs across the terminals of each pole of the isolator on account of making / breaking operation.
3.00	**CONSTRUCTIONAL FEATURES OF ISOLATOR**
3.01	The isolators shall be provided with high pressure current carrying contacts on the hinge/ jaw ends and all contact surfaces shall be silver plated. The thickness of silver plating should not be less than 25 microns. The contacts shall be accurately machined and self aligned.
3.02	The isolator shall be provided with a galvanised steel base provided with holes and designed for mounting on an existing pipe support structure. The base shall be rigid and self supporting. The position of movable contact system (main blades) of each of the isolator and earthing switch shall be indicated by a mechanical indicator at the lower end of the vertical rod of shaft for the isolator and earthing switch. The indicator shall be of metal and shall be visible from operating level.
3.03	All metal parts shall be of non-rusting and non-corroding metal. Current carrying parts shall be 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 equivalent. The live parts shall be designed to eliminate sharp joints, edges and other corona producing surfaces.
3.04	The isolators shall be so constructed that the switch blade will not fall to the closed position if the operating shaft gets disconnected. Isolators and earthing switches including their operating parts shall be such that they cannot be dislodged from their open or closed positions by gravity, wind pressure, vibrations shocks or accidental touching of the connecting rods of the operating mechanism. The switch shall be designed such that no lubrication of any part is required except at very infrequent intervals.
3.05	The insulator of the isolator shall conform to the requirements stipulated under IS standards and shall have a min. cantilever strength of 800 kg. Pressure due to the contact shall not be transferred to the insulators after the main blades full close. The insulators shall be so arranged that leakage current will pass to earth and not between terminals of the same pole or between phases.
3.06	The post insulators shall conform in general to latest IS standards.
4.00	**CONSTRUCTIONAL FEATURES OF PORCELAIN INSULATOR**
4.01	Post type insulators shall consist of a porcelain part permanently secured in a metal base to be mounted on the supporting structures. They shall be

	capable of being mounted upright. They shall be designed to withstand any shocks to which they may be subjected to by the operation of the associated equipment. Only solid core insulators shall be accepted.
5.00	**TESTS** the post insulators shall conform to type tests and acceptance, sample and routine tests as per latest IS standards
5.01	In addition to acceptance/sample/routine tests as per IS standards, the following tests shall also be carried out. a) Ultrasonic tests on all cut shells as routine check. b) Visual examination and magnaflux test on all flanges prior to fixing. c) Check for uniformity of thickness and weight of zinc coating as a sample test from each lot of flanges prior to fixing. d) Bending load test shall be carried out at 50% minimum failing load in four directions as a routine test. e) Bending load in four directions at 100% minimum bending load guaranteed on samples as per clause-2.3 of IEC. Subsequently this post insulator shall not be used. f) Tests for deflection measurement at 20, 50, 70% of specified minimum failing load on sample.
5.02	**PARAMETERS** **400 kV class Post Insulator** a) Type — Solid core type b) Voltage class (kV) — 400 c) Max. radio interference voltage (μ V) for any frequency between 0.5 MHz to 2 MHz at voltage of 266 kV (rms) between phase to ground. — 1000 d) Corona extinction voltage (kV rms) — 320 e) Total min. cantilever strength (Kg) — 800 f) Min. torsional moment (Kg m) — 600
5.03	Porcelain used shall be homogenous, free from laminations, cavities and other flaws or imperfections that might affect the mechanical or dielectric quality and shall be thoroughly vitrified, tough and impervious to moisture.
5.04	Glazing of the porcelain shall be uniform brown in colour, free form blisters, burns and other similar defects.
5.05	When operating at normal rated voltage there shall be no electric discharge between conductor and insulators which would cause corrosion or injury to conductors or when operating at normal rated voltage.
5.06	The design of the insulator shall be such that stresses due to expansion and contraction in any part of the insulator shall be lead to deterioration. All ferrous parts shall be hot dip galvanized.

5.07	Post type insulators shall consist of a porcelain part permanently secured in metal base to be mounted on supporting structures. They shall be capable of being mounted upright. They shall be designed to withstand all shocks to which they may be subjected to during operation of the associated equipment.
5.08	Porcelain shall be robust and capable of withstanding the internal pressures likely to occur in service. All portions of the assembled porcelain enclosures and supports other than gaskets, which may in any way be exposed to the atmosphere shall be composed of completely non hygroscopic material such as metal or glazed porcelain.
6.00	**CLAMPS AND CONNECTORS**
6.01	The material of clamps and connectors shall be Aluminium alloy casting conforming to designation A6 of IS:617 for connecting to equipment terminals and conductors of aluminium. In case the terminals are of copper, the same clamps/connectors shall be used with 2mm thick bimetallic liner.
6.02	Bolts, nuts and plain washers shall be hot dip galvanised mild steel for sizes M12 and above. For sizes below M12, they shall be electro-galvanised mild steel. The spring washers shall be electro-galvanised mild steel.
6.03	All castings shall be free from blow holes, surface blisters, cracks and cavities. All sharp edges and corners shall be rounded off to meet specified corona and radio interference requirements.
6.04	They shall have same current rating as that of the connected equipment. All current carrying parts shall be at least 10 mm thick. The connectors shall be manufactured to have minimum contact resistance.
6.06	Flexible connectors, braids or laminated strips shall be made up of copper/aluminium.
6.07	Current rating and size of terminal/conductor for which connector is suitable shall be put on a suitable sticker on each component which should last atleast till erection time.
6.08	**7 no**. flexible connectors/clamps suitable for connecting isolator stud to 4" IPS tube should be supplied with each set of isolator.
6.09	**7 no.** connectors suitable for connecting isolator stud to twin moose conductor should be supplied with each set of isolator.
6.10	Price quoted for each isolator shall be inclusive of terminal connectors.
6.11	Drawing of clamps to be enclosed with offer for approval of NTPC.
7.00	**EARTHING SWITCHES** Where earthing switches are specified these shall include the complete operating mechanism and auxiliary contacts. The earthing switches shall form an integral part of the isolator and shall be mounted on the base

	frame of the isolator. Earthing switches shall be suitable for local operation only. The earthing switches shall be constructional interlocked with the isolator so that the earthing switches can be operated only when isolator is open and vice versa.
8.00	**OPERATING MECHANISM AND CONTROL**
8.01	Limit switches for control shall be fitted on the isolator/ earth switch shaft, within the cabinet to sense the open and close positions of the isolators and earth switches.
8.02	It shall not be possible, after final adjustment has been made for any part of the mechanism to be displaced at any point in the travel sufficient enough to allow improper functioning of the isolator when the isolator is opened or closed at any speed.
8.03	Isolator shall be gang operated for main blades and earth switches. The operation of the three poles shall be well synchronised and interlocked.
8.04	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. The length of inter insulator and interpole operating rods shall be capable of adjustments.
8.05	The design of linkages and gears be such so as to allow one man to operate the handle with ease for isolator and earth switch.
9.00	**CONTROL CABINET/OPERATING MECH. BOX**
9.01	They shall be of painted sheet steel or aluminium. The thickness of sheet steel shall be 2mm cold rolled or 2.5mm hot rolled. The thickness of aluminium shall be 3mm and shall provide rigidity. Top of the boxes shall be sloped towards rear of the box. The paint shall be of grey RAL 9002 on the outside and glossy white inside. However, the junction and switch boxes shall be of hot dip galvanized sheet steel of 1.6mm thickness.
9.02	The cabinets/panels shall be free standing or wall mounting or pedestal mounting type. They shall have hinged doors with padlocking arrangement. All doors, removable covers and plates shall be gasketed all around with neoprene gaskets.
9.03	The degree of protection of all the outdoor boxes shall not be less than IP 55.
9.04	The cable entry shall be from bottom, for which removable gasketed cable gland plates shall be provided.
9.05	Suitable 240V, single phase, 50Hz ac heaters with thermostats controlled by switch and fuse shall be provided to maintain inside temperature 10deg. above the ambient.
9.06	The size of enclosure and the layout of equipment inside shall provide

	generous clearances. Each cabinet/panel shall be provided with a 15A, 240V ac, 2 pole, 3 pin industrial grade receptacle with switch. For incoming supply, MCB of suitable rating shall be provided. Illumination of each compartment shall be with door operated incandescent lamp. All control switches shall be of rotary switch type.
9.07	Each cabinet/panel shall be provided with two earthing pads to receive 75mmx12mm GS flat. The connection shall be bolted type with two bolts per pad. The hinged door shall be connected to body using flexible wire. The cabinets/panels shall also be provided with danger plate, and internal wiring diagram pasted on inside of the door. The front label shall be on a 3mm thick plastic plate with white letters engraved on black background.
10.00	**TERMINAL BLOCKS**
10.01	They shall be non-disconnecting stud type of extensible design equivalent to Elmex type CAT-M4.
10.02	The terminal blocks shall be of 1100 V grade, and rated to continuously carry maximum expected current. The conducting part shall be tinned or silver plated.
10.03	They shall be of moulded, non-inflammable thermosetting plastic. The material shall not deteriorate with varied conditions of temperature and humidity. The terminal blocks shall be fully enclosed with removable covers of transparent, nondeteriorating plastic material. Insulating barriers shall be provided between the terminal blocks so that the barriers do not hinder the wiring operation without removing the barriers.
10.04	The terminals shall be provided with marking tags for wiring identification.
10.05	Unless otherwise required (expected current rating) or specified, terminal blocks shall be suitable for connecting the following conductors on each side:
10.06	AC & DC power supply -Two 16 sq.mm. aluminium conductor Circuits
10.07	Other control circuits - Min. two 2.5 sq.mm. copper flexible conductor
11.00	**WIRING**
11.01	All internal wiring shall be securely supported, neatly arranged readily accessible and connected to equipment terminals and terminal blocks.
11.02	Wire terminations shall be made with solderless crimping type of tinned copper lugs which firmly grip the conductor and insulation. Insulated sleeves shall be provided at all the wire terminations. Engraved core identification plastic ferrules marked to correspond with the wiring diagram shall be fitted at both ends of each wire. Ferrules shall fit tightly on the wires and shall not fall off when the wire is disconnected from terminal blocks.
11.03	All terminals including spare terminals of auxiliary equipment shall be wired upto terminal blocks. Each equipment shall have its own central control

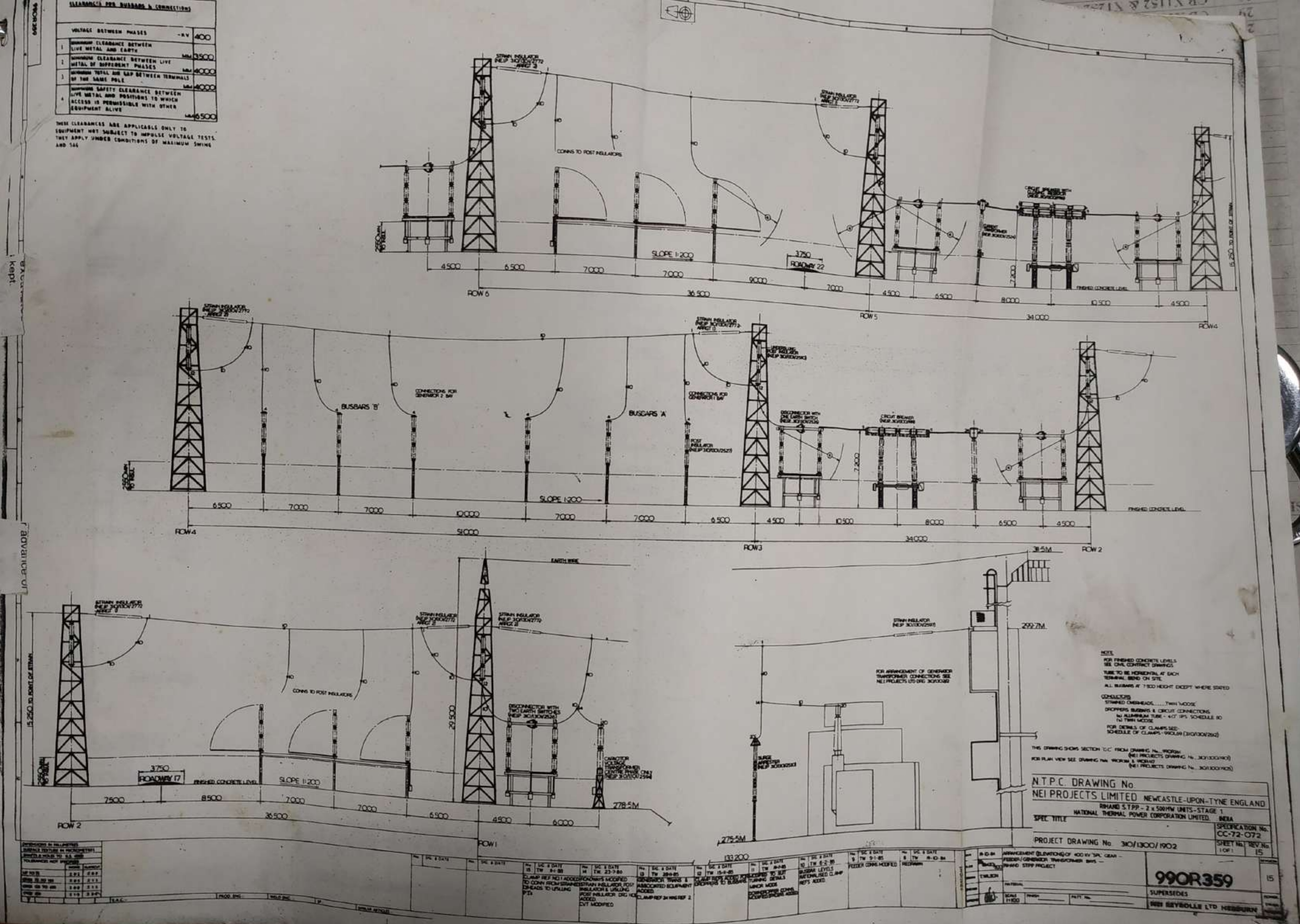
	cabinet in which all contacts including spare contacts from all poles shall be wired out. Interpole cabling for all equipment's shall be carried out by the Contractor.
12.00	**CABLE LUGS** Cables lugs shall be tinned copper solder less crimping type conforming to IS:8309 and 8394 suitable for aluminum or copper conductor (as applicable). The cable lugs shall suit the type of terminals provided. The cable lugs shall be of Dowell make or equivalent.
13.00	**Fuses** All fuses shall be of the HRC cartridge type, conforming to IS and suitable to mount on plugin type of fuse bases. Fuses shall be provided with visible operation indicators to show that they have operated. All accessible live connections shall be adequately shrouded, and it shall be possible to change fuses with the circuit alive, without danger of contact with live conductor. Insulated fuse pulling handle shall be supplied with each control cabinet.
14.00	**MOTORS** Motors shall be "Squirrel Cage" three phase induction motors of sufficient size capable of satisfactory operation for the application and duty as required for the driven equipment and shall conform to type tests and shall be subjected to routine tests as per applicable standards. Enclosures For motors to be installed outdoor, the motor enclosure shall have degree of protection IP:55. For motors to be installed indoor, i.e. inside a box, the motor enclosure shall be dust proof equivalent to IP:44. Operational Features : a) Continuous motor ratings (name plate rating) shall be at least suitable for the driven equipment at design duty operating point of driven equipment that will arise in service. b) Motors shall be capable of giving rated output without reduction in the expected life span when operated continuously in the given system. Starting Requirements a) All induction motors shall be suitable for full voltage direct on-line starting. These shall be capable of starting and accelerating to the rated speed alongwith the driven equipment without exceeding the acceptable winding temperature even when the supply voltage drops. b) Motors shall be capable of withstanding the electrodynamic stresses and heating imposed if it is started at a voltage of 110% of the rated value. c) The locked rotor current shall not exceed six(6) times the rated full load current for all motors subject to tolerance given in IS:325. d) Motors when started with driven equipment imposing full staring torque and supply voltage conditions specified shall be capable of withstanding at

	least two successive starts from cold condition at room temperature and one start from hot condition without injurious heating of winding. The motors shall also be suitable for three equally spread starts per hour under the above referred supply condition. e) The locked rotor withstand time under hot condition at 110% of rated voltage shall be more than starting time with the driven equipment of minimum permissible voltage by a least two seconds or 15% of the accelerating time whichever is greater. In case it is not possible to meet the above requirement, the Contractor shall offer centrifugal type speed switch mounted on the motor shaft which shall remain closed for speeds lower than 20% and open for speeds above 20% of the rated. The speed switch shall be capable of withstanding 120% of the rated speed in either directions of rotation. The maximum permissible temperature rise over the ambient temperature shall be within the limits specified in IS:325 (for 3 phase induction motors) after adjustment due to increased ambient temperature specified. The double amplitude of motor vibration shall be within the limits specified in IS:729. Vibration shall also be within the limits specified by the relevant standard for the driven equipment when measured at the motor bearings. All the induction motors shall be capable of running at 80% of rated voltage for a period of 5 minutes.
15.00	**AUXILIARY SWITCH** The auxiliary switch shall conform of following type tests: a) Electrical endurance test - A minimum of 1000 operations for 2A. D.C. with a time constant greater than or equal to 20 milliseconds with a subsequent examination of mV drop/ visual defects/ temperature rise test. b) Mechanical endurance test - A minimum of 5000 operations with a subsequent checking of contact pressure test/ visual examination c) Heat run test on contacts d) IR/HV test, etc.
16.00	**TESTS** The isolator along with operating mechanism shall conform to the type tests and shall be subjected to routine tests and acceptance tests in accordance with IEC 62271-102. Minimum 50 nos. mechanical operations will be carried out on 1 (one) isolator assembled completely with all accessories as acceptance test. During final testing of isolator sequential closing/ opening of earth switch shall also be checked only after isolator is fully open/close. Acceptance test shall be carried out with operating box. The insulator shall conform to all the type tests as per IEC 168. In addition to all type, routine and acceptance tests, as per IEC-168, the following additional routine/ acceptance tests shall also be carried out: a) Bending load test in four directions at 50% min. bending load guaranteed in all insulators. b) Bending load test in four directions at 100% min. bending load guaranteed on sample insulators in a lot. c) Torsional test on sample insulator of a lot.

	All equipments to be supplied shall be of type tested design. During detail engineering, the contractor shall submit for Owner's approval the reports of all the type tests as listed in this specification and carried out within last ten years from the date of bid opening. These reports should be for the test conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a Client. However if contractor is not able to submit report of the type test(s) conducted within last ten years from the date of bid opening, or in the case of type test report(s) are not found to be meeting the specification requirements, the contractor shall conduct all such tests under this contract at no additional cost to the owner either at third party lab or in presence of client owners representative and submit the reports for approval. All acceptance and routine tests as per the specification and relevant IS/IEC standards shall be carried out. Charges for these shall be deemed to be included in the equipment price The type test reports once approved for any projects of NTPC shall be treated as reference. In such a case an endorsement sheet will be furnished by the manufacturer confirming similarity and "No design Change". Minor changes if any shall be highlighted on the endorsement sheet.
17.00	**PARAMETERS**
	a) Type of isolator — Outdoor type b) Rated frequency — 50 Hz c) Number of poles — Three (3) d) Operating time — Not more than 12 sec. e) Control voltage — 220V DC f) Auxiliary contacts on Isolator — As required plus 8NO and 8NC contacts per pole/isolator as spare. The contacts shall have continuous rating of 10A and breaking capacity of 2A with circuit time constant of minimum 20 millisecond at 220V dc. g) Auxiliary contacts on earth switch — Total 6NO and 6NC h) Rated mechanical terminal load $F_{straight}$ — 1.6KN F_{cross} — 0.53KN i) Temperature rise over ambient — As per IEC:62271-102 j) Minimum creepage distance — 10000mm

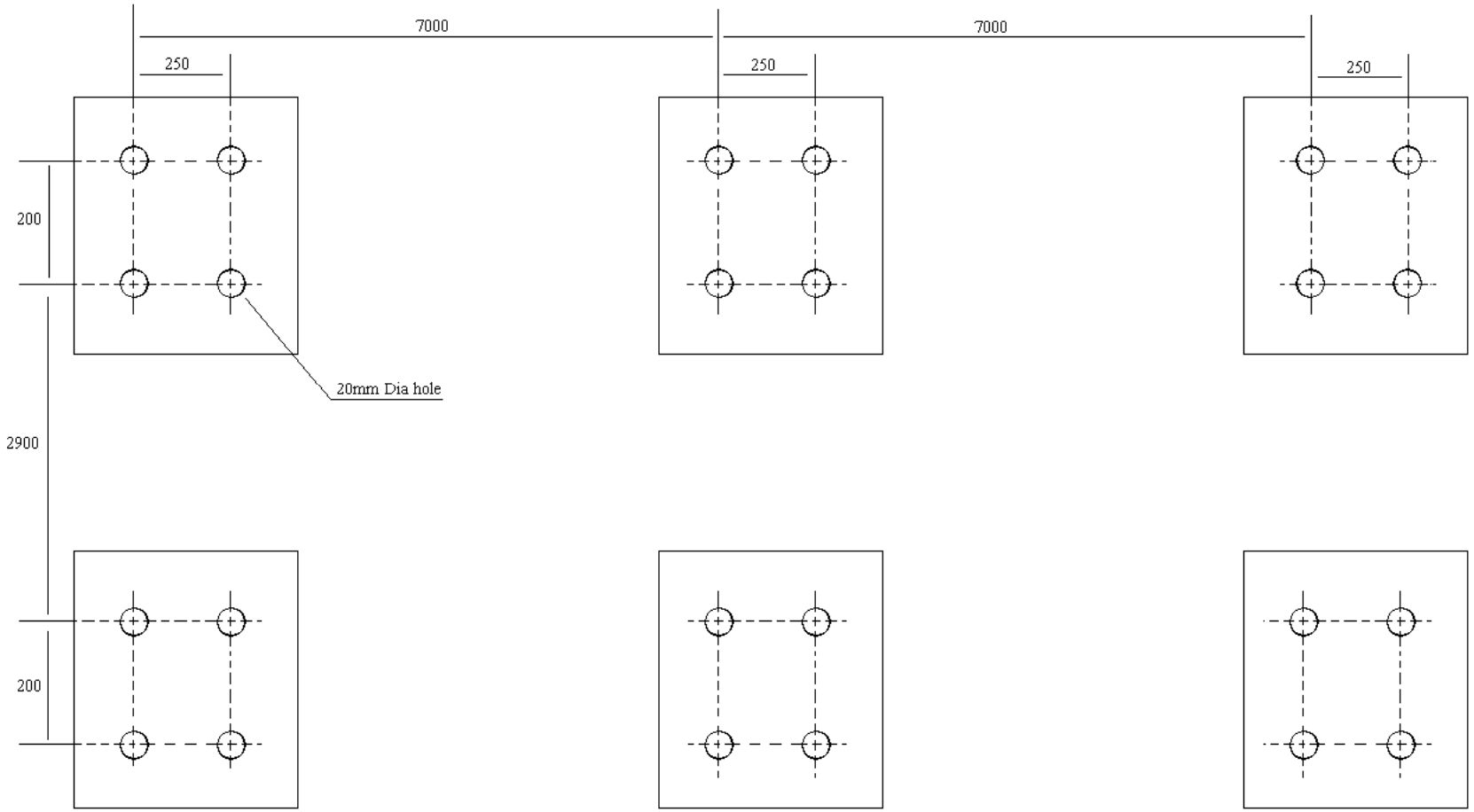
	k) Rated ambient temperature	50-degree Celcius
	l) System neutral earthing	Effectively earthed
	m) Seismic acceleration	0.3 g horizontal
	p) Operating mechanism of Isolator and Earth Switch	A. C. Motor operated
	q) Temperature rise .	As per table V of IEC 60694 for an ambient of 50 deg. C
	a) Rated voltage	420 kV rms
	b) Rated continuous current	Minimum 2000A at rated ambient temperature
	c) Rated short time withstand current of isolator and earthswitch	50 kA rms for One (1) second
	d) Rated dynamic short circuit withstand current of isolator and earthswitch	125 kAp
	e) Rated Insulation levels	
	i. Rated one minute power Frequency withstand voltage	i) 520 kV rms between live terminals and earth. ii) 610 kV rms across isolating distance.
	ii. Rated lightning impulse Withstand voltage	i) ±1425 kVp between live terminals and earth. ii) ± 1425 kVp impulse on one terminal and 240 kVp power freq. Voltage of opposite polarity on other terminal (across isolating distance).
	iii. Rated switching impulse Withstand voltage	i) ± 1050 kVp between live terminals and earth. ii) ± 900 kVp impulse on one terminal and 345 kVp power freq.voltage of opposite polarity on terminal (across isolating distance).
	f) Max. Radio interference voltage	1000 micro volts for freq. between 0.5 MHz and 2.0 MHz at voltage 266 kV rms.
	g) Corona extinction voltage	Not less than 320 kV rms
	h) Phase to phase spacing	7000 mm
	i) Height of the isolator from the pipe structure	4110 mm
18.00	**supervision:** One representative has to be deputed for supervision of erection and commissioning of the isolators. **Bidder shall quote for total 20 mandays of deputing their engineer to site for this job, separately.**	

EXISTING HAPAM ISOLATOR DRAWING


CLEARANCES FOR BUSBARS & CONNECTIONS
VOLTAGE BETWEEN PHASES -KV 400
1 MINIMUM CLEARANCE BETWEEN LIVE METAL AND EARTH MM 3500
2 MINIMUM CLEARANCE BETWEEN LIVE METAL OF DIFFERENT PHASES MM 4000
3 MINIMUM TOTAL AIR GAP BETWEEN TERMINALS OF THE SAME POLE MM 4000
4 MINIMUM SAFETY CLEARANCE BETWEEN LIVE METAL AND POSITIONS TO WHICH ACCESS IS PERMISSIBLE WITH OTHER EQUIPMENT ALIVE MM 6500
THESE CLEARANCES ARE APPLICABLE ONLY TO EQUIPMENT NOT SUBJECT TO IMPULSE VOLTAGE TESTS. THEY APPLY UNDER CONDITIONS OF MAXIMUM SWING AND SAG
CONNS TO POST INSULATORS
SLOPE 1:200
ROADWAY 22
ROW 6
ROW 5
ROW 4
ROW 3
ROW 2
ROW 1
BUSBARS 'B'
BUSBARS 'A'
CONNECTIONS FOR GENERATOR 2 BAY
CONNECTIONS FOR GENERATOR 1 BAY
FINISHED CONCRETE LEVEL
ROADWAY 17
EARTH WIRE
299·7M
278·5M
275·5M
FOR ARRANGEMENT OF GENERATOR TRANSFORMER CONNECTIONS SEE NEI PROJECTS LTD DRG 310/1300/1912
NOTE
FOR FINISHED CONCRETE LEVELS SEE CIVIL CONTRACT DRAWINGS
TUBE TO BE HORIZONTAL AT EACH TERMINAL. BEND ON SITE.
ALL BUSBARS AT 7500 HEIGHT EXCEPT WHERE STATED
CONDUCTORS
STRAINED OVERHEADS......TWIN 'MOOSE'
DROPPERS BUSBARS & CIRCUIT CONNECTIONS
(a) ALUMINIUM TUBE - 4.0" IPS SCHEDULE 80
(b) TWIN MOOSE
N.T.P.C. DRAWING No.
NEI PROJECTS LIMITED NEWCASTLE-UPON-TYNE ENGLAND
RIHAND S.T.P.P. - 2 x 500MW UNITS-STAGE 1
NATIONAL THERMAL POWER CORPORATION LIMITED. INDIA
SPEC. TITLE
SPECIFICATION No. CC-72-072
PROJECT DRAWING No. 310/1300/1902
SHEET No. 1 OF 1
REV. No. 15
ARRANGEMENT (ELEVATIONS) OF 400 KV 'SPL' GEAR - FEEDER/GENERATOR TRANSFORMER BAYS - RIHAND STPP PROJECT
990R359
SUPERSEDES
NEI REYROLLE LTD HEBBURN

400KV ISOLATOR SUPPORT STRUCTURE

STAGE-1 400KV ISOLATOR SUPPORT STRUCTURE



NOTE:

1. All dimensions are in mm
2. Not to Scale
3. Height of Insulator stack from support structure including stud - 4110 mm

NEI WRITE UP & DRAWINGS OF EXISTING 420KV ISOLATOR

3.3.2 Operation of the Closing Resistor Unit (cont)

When the circuit breaker is in the open position the main lever is connected to the shaft by means of two roller bearings that fit in groves in the shaft and in the slots in the main lever hub. A stop bolt controls the initial position of the main lever.

As the circuit breaker closes and the resistor shaft rotates, the shaft drives the main lever clockwise, extending the moving contacts until they engage with the stationary contacts. During initial rotation of the shaft and main lever, the ring lever rotates with the main lever.Just prior to the engagement of the moving and stationary contact, the ring lever is stopped by its stop bolt. As the main lever continues to rotate, the slots in the main lever hub align with the grooves in the ring lever. This allows the two roller bearings to move away from the shaft. After the main lever is released, accelerating springs in the resistor sub-assembly and the spring in the resistor-mechanism return the lever and moving contacts to their initial position.

When the circuit breaker is opened, the shaft rotates to its original position, and the two roller bearings re-set to connect the shaft and the main resistor lever. The ring lever is then returned to its original position via a spring and thus holds the roller bearings in position ready for another closing operation.

3.4 Disconnector and Earth Switch

3.4.1 Introduction

The disconnectors where required, are fitted with earth switches. The designation of the equipment is SSB-IIR-(AM)-420, the AM being omitted if the disconnector is not provided with an earthing switch. The SSB-IIR-(AM)-420 is a central break disconnector designed for use in outdoor high voltage stations. The disconnector consists of three separate poles, interconnected by means of two interphase rods which transmit the drive.

The disconnector is driven by a geared electric motor whilst the earth switch is operated by a handle. The earth switches are fitted so as to swing in a plane at right angles to the single phase.

3.4.2 General

The construction of the SSB-IIR-(AM)-420 is shown in Fig. 27.

3.4.3 Base (Fig. 28)

Each disconnector has three bases, successively numbered 1,2 and 3, number one being the pole to which the bearing plate (Item 7) is welded.

The base consists of a hot dipped galvanised steel box girder (Item 1) with two turntable assemblies (Item 2) to support the insulators. The two turntables are interconnected with the turntable coupling rod (Item 14).

At both sides, the box girder is closed by an aluminium antibird shield (item 10).

The base is shipped with the turntables completely mounted and aligned. The turntable coupling rods and eccentric stops are factory-adjusted.

3.4.4 Turntable Assembly (Fig. 29)

The bearing housing is a highly corrosion resistant aluminium casting (Item 1) in which the cast iron main shaft (Item 15) rotates in two radial needle bearings (Item 4 and 9) and one axial needle bearing (Item 8).

The housing is provided with a grease nipple (item 3) and is factory-filled with Shell Alvania 3 grease.

At the top side, the bearing is protected against the ingress of liquid and dirt by a nylon sealing ring (Item 6) and a zinc cap (Item 5).

At the underside, the bearing housing is closed by a cover (Item 10) which also limits the vertical clearance of the shaft.

The bearings are tightly fitted in the bearing housing. At the top side the bearing housing is secured to the box girder by four M12 bolts. The bolts are screwed into two nut plates at the inside of the box girder.

At the underside, the bearing housing is tightly fitted into the box girder.

3.4.5 Insulators

Each pole of the SSB-II-(AM)-420 is equipped with two post insulators. The insulators are made of high strength hard porcelain with a brown glazing.

The cap castings are made of hot, dipped, galvanised, pearlitic, malleable, cast iron. The castings are mounted on the insulators by means of Portland cement.

The top casting is provided with four M16 threaded holes at a pitch circle diameter of 127mm. The bottom casting is provided with a flange with four 18mm holes.

3.4.6 Rotating Contact (Fig. 30)

The rotating contact is mounted on top of the insulators to transfer the current from the conductor to the main blades.

The main parts of the rotating contact are the housing (Item 3) and the rotating terminal (Item 1) made of silver-plated copper. The current is transferred from the terminal to the housing by means of two rows of spring loaded balls (Item 4).

The ingress of liquid and dirt is prevented at the top by a nylon cap (Item 2). At the underside the housing is sealed by a cover (Item 7). The housing is factory filled with graphite grease.

The housing is mounted on top of the insulator by three M16 bolts (Item 6). The main blades are fixed to the housing by means of five M10 bolts.

3.4.7 Main Blade (Fig. 31)

Each main blade is divided in two sections (Item 3 and 7), one with a female main contact (Item 6), the other with a male main contact (Item 5).

Each main blade section consists of a copper U-beam with built-in main contacts. Each section is fixed to a rotating contact housing (Item 2) by means of five M10 bolts (Item 8).

When an earthing switch is provided, the blade section with the female main contact is equipped with an earthing switch receiving contact (Item 9).

3.4.8 Main Contacts (Fig. 32)

The main contact consists of two parts; the female contact assembly (Item 3) and the male contact assembly (Item 6).

(a) Male Contact Assembly

The male main contact assembly consists of two parts of special shaped silver-plated copper, fixed together by means of an M5 bolt. The assembly itself is secured to the main blade section by means of four M8 bolts (Item 2) of which the lower bolts are screwed into a spacer (Item 7).

b) Female contact Assembly

The female contact assembly consists of two parts of special shaped silver-plated copper, each forming two contact fingers. The parts are pressed together by means of four stainless steel springs.

The assembly itself is secured to the main blade section by means of four M8 bolts, of which the lower bolts are screwed into a spacer.

If an earthing switch is provided, the fixing bolts of the female main contact are also used to secure the earthing switch receiving

b) Female contact Assembly (Continued)

contact to the main blade.

3.4.9 Coupling Rods (Fig. 33)

The SSB-IIR-420 (without earthing switch) is equipped with six coupling rods (Item 1 to 6).

The SSB-IIR-AM-420 (with earthing switch) is equipped with nine coupling rods (Item 1 to 9).

The turntable coupling rods (Item 4, 5 and 6) are factory mounted and adjusted.

All coupling rods are shipped with both clamp plates mounted; however, adjustments at site can be necessary.

Coupling rods 2, 3, 8 and 9 are identical and fully interchangeable.

3.4.10 Auxiliary Switches (Fig. 34)

The operating mechanisms can be equipped with 16 auxiliary switches, divided in two sets of 8 switches. Each set consists of 4 normally open switches (make contacts) and 4 normally closed switches (break contacts).

All contacts are wired up to terminals.

The auxiliary switches are driven by a mechanism to get a quick switching action. The switching sequence of the auxiliary switches is shown in Fig.11

Technical data auxiliary switches:

(a) Current Carrying Capacity : 10A continuously

(b) Breaking Capacity : 2A
(at 220V dc with a circuit time constant of not less than 20ms).

3.4.11 Disconnector Motor (Fig. 35)

The disconnector is driven by an electric motor. It consists of an aluminium enclosure in which the drive mechanisms and control circuit are housed.

The motor operated drive mechanism consists of a reversible ~~D.C.~~ A.C motor (Item 1) which drives the main shaft (Item 2) by means of a 325 : 1 chain and sprocket wheel transmission (Item 3) an adjustable slip coupling (Item 4).

The hinged door and removable side panels guarantee an easy access to all components.

A removable gland plate (Item 5) is located on the bottom of each cabinet.

3.4.11 Disconnector Motor (Fig. 35)(cont)

The drive can also be actuated by hand in case the supply should fail.

To actuate the drive by hand, the motor/manual selector switch must be placed in position 'Manual'. The motor and control circuit are now switched 'off' and the hole in which the crank for manual operation must be inserted will be opened.

The control circuit, see (Fig. 2) consists of:-

- thermal overload relay
- two contactors
- push buttons
- heater

The mechanism can be controlled locally or remote depending on the position of the local/remote selector switch.

When an operation cycle is initiated it is not possible to stop it before the end position has been reached.

Each motor operated drive mechanism is equipped with 16 auxiliary contacts.

These contacts are rated 10 Amp. continuously, 50 amp. making and 10 Amp. breaking capacity.

The switching sequence of the contacts is as follows:-

1. At the moment the motor drive is actuated, the auxiliary contacts are switched from the initial position to the neutral position.

2. At the end of the rotation, the auxiliary contacts are switched from the neutral position into the end position.

Electrical bolt interlock is located inside aluminium cover (see Fig. 1). For manual operation, the handle inside the cabinet (see Fig. 1) must be pulled.

3.4.12 Earthing Switch

The earthing switch consists of an aluminium blade which makes a double movement.

First the blade rotates over an angle of 90°C around the shaft (Fig. 36, Item 3).

When the blade is in a vertical position, the guide plate (Fig. 37, Item 6) reaches the nylon cap (Fig. 13, Item 4) and the rotating movement is transferred to a vertical movement.

During this vertical movement, the male contact (Fig. 37, Item 5).

In closed position the contacts are mechanically locked by a nylon cap so that the contacts cannot be opened due to mechanical forces.

3.5 Current Transformer Type FMJL

The type FMJL oil-filled current transformers have been installed. Detailed information is given in Part 4 Chapter 2. The positions of the current transformers are shown on the arrangement plan of the 400kV switchyard, Project drawing No. 310/1300/1901.

3.6 Capacitor voltage transformer type WE-420-FS/2

Micafil (BBC) type WE-420-FS/2 voltage transformers have been installed. Detailed information is given in Part 4 Chapter 2. The positions of the capacitor voltage transformers are shown on the arrangement plan of the 400kV switchyard, Project Drawing No. 310/1300/1901

3.7 Lightning Arrester type HMX360

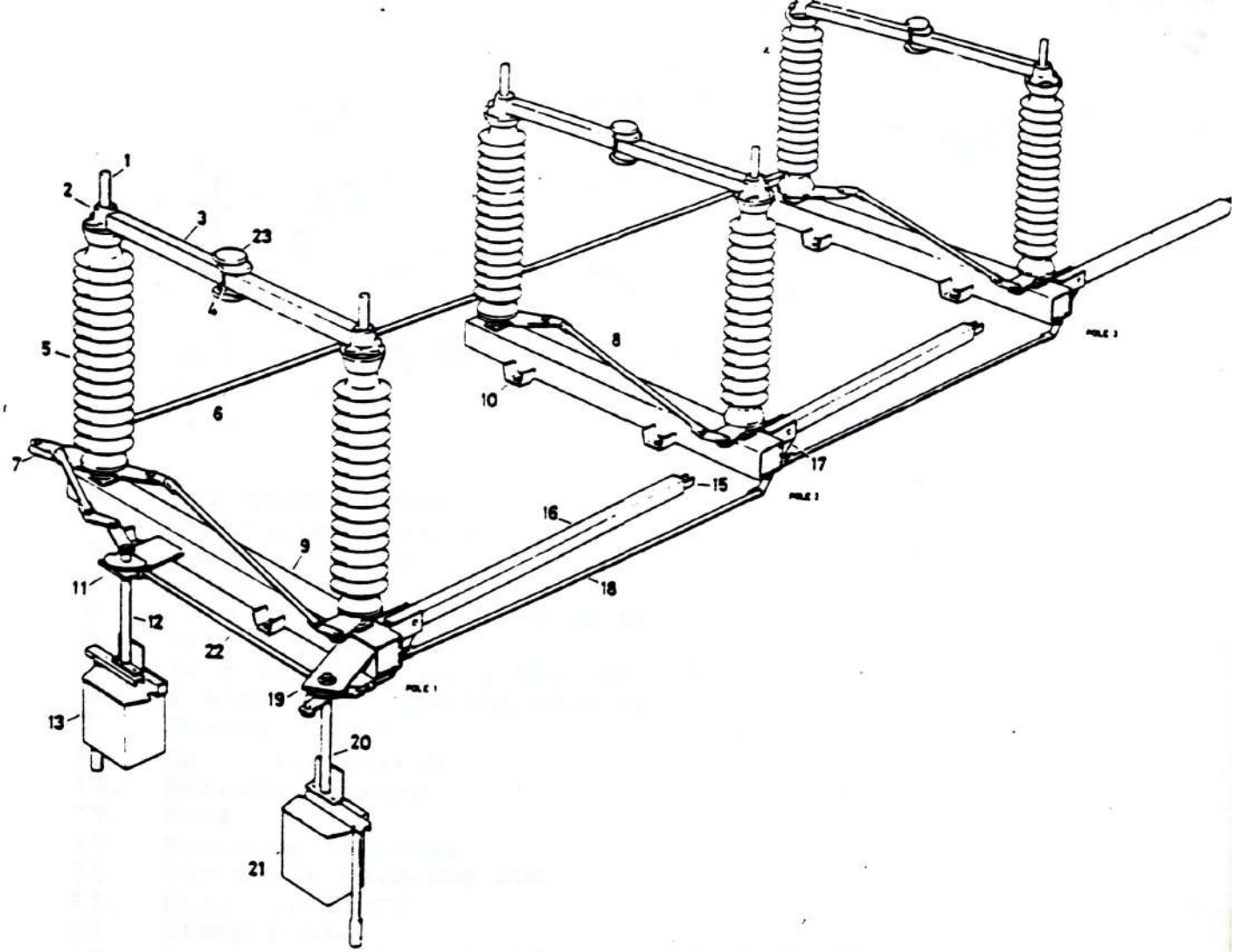
Brown Boveri type HMX360 lightning arresters have been installed. Detailed information is given in Part 4 Chapter 3. The position of the lightning arresters are shown on the arrangement plan of the 400kv Switchyard, Project Drawing No. 310/1300/1901

3.8 Line Traps Type DLTA 2000/1.0 and 2000/0.5

Brown Boveri type DLTA line traps have been installed. detailed information is given in Part 4 Chapter 4. The position of the line traps are shown on the arrangement plan of the 400kV Switchyard, Project drawing No. 310/1300/1901

3.9 132 kV Bus Post Insulators

The bus post insulators are manufactured by Doulton. Detailed information is given in Part 4 Chapter 5. The bus post insulators are used to support and insulate the busbars from earthed structures.

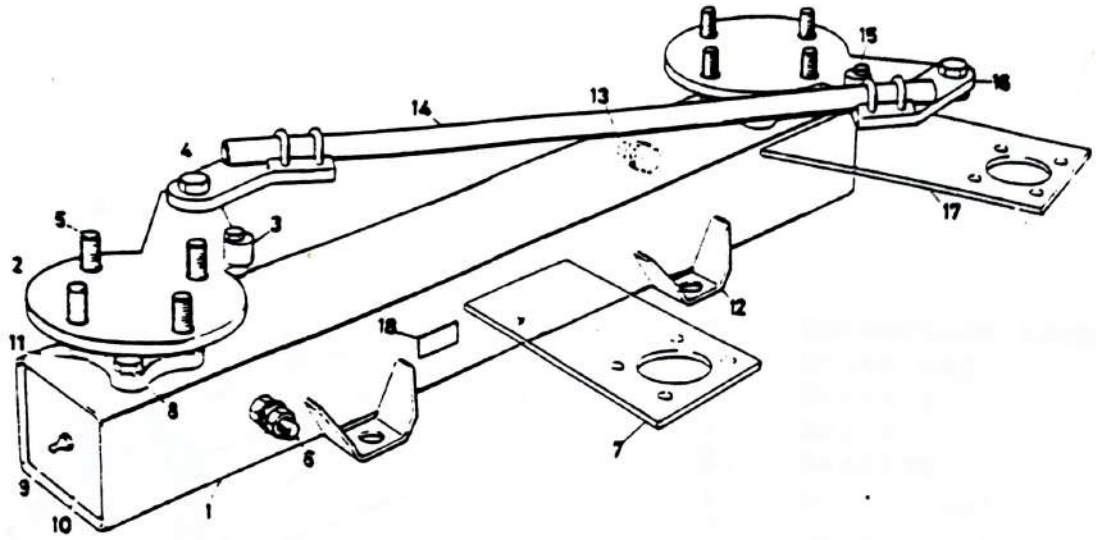


1. Connection terminal
2. Rotating contact
3. Main blade
4. Main contacts
5. Insulator
6. Interphase rods
7. Lever
8. Turntable coupling rod
9. Base
10. Foot
11. Bearing plate disconnector
12. Vertical drive rod disconnector
13. Manual operating mechanism disconnector

15. Earthing switch contact fingers
16. Earthing blade
17. Lever
18. Interphase rods earthing switch
19. Bearing plate earthing switch
20. Vertical drive rod earthing switch
21. Manual operating mechanism earthing switch
22. Mechanical interlocking rod
23. Corona shield

THREE PHASE DISCONNECTOR
GENERAL VIEW

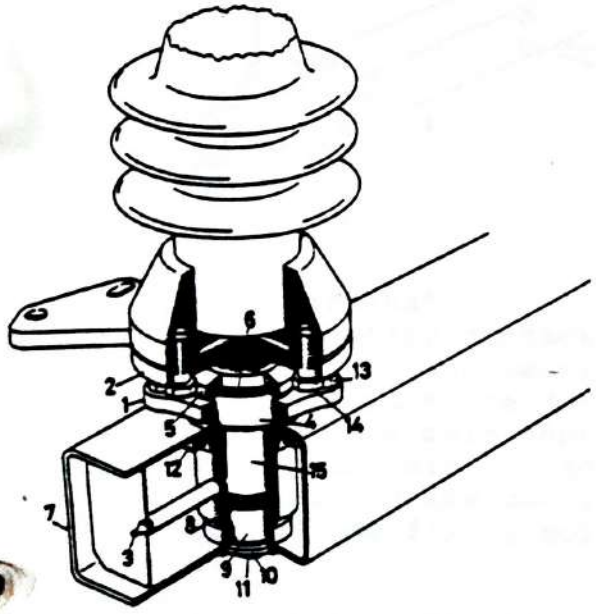
FIG 27



1. Box girder frame
2. Turntable assembly
3. Eccentric stop
4. Clamp plate
5. Insulator fixing bolts (M16)
6. Earthing terminal
7. Bearing plate (only base nr. 1)
8. Fixing bolts bearing housing
9. Grease nipple
10. Anti-bird shield
11. Bearing housing
12. Foot
13. Earthing terminal
14. Turntable coupling rod
15. Eccentric stop
16. Clamp plate
17. Bearing plate (only if an earthing switch is provided)
18. Name plate

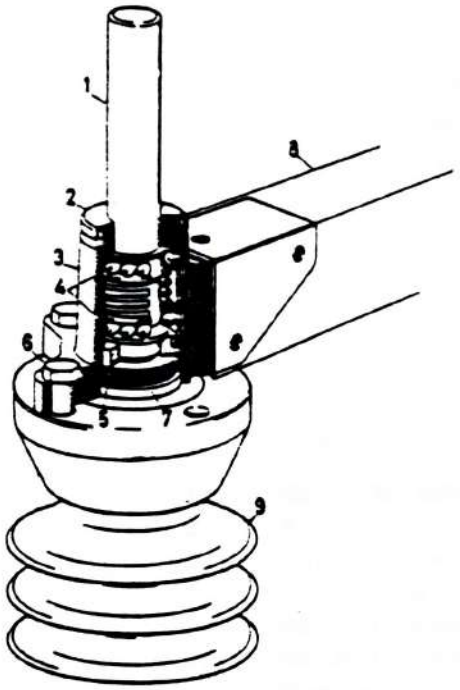
DISCONNECTOR: BASE ASSEMBLY

FIG 28



1. Bearing housing
2. Turntable
3. Grease nipple
4. Radial needle bearing
5. Zinc cap
6. Nylon sealing ring
7. Base
8. Axial needle bearing
9. Radial needle bearing
10. Cover
11. Bolt
12. Nutplate
13. Fixing bolt bearing housing
14. Fixing bolt insulator
15. Main shaft

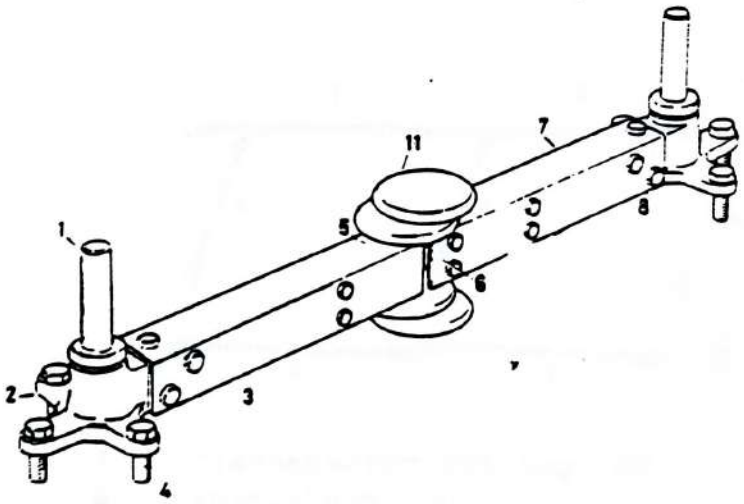
ROTATING POST BEARING ASSEMBLY



1. Connection terminal
2. Nylon cap
3. Housing
4. Balls
5. Bearing
6. Fixing bolt
7. Cover
8. Main blade
9. Insulator

ROTATING CONTACT ASSEMBLY

FIG 30

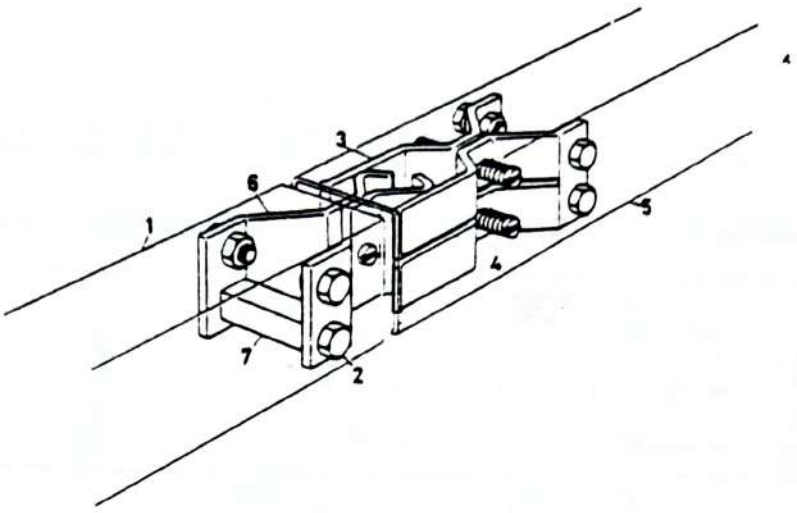


1. Terminal
2. Rotating contact
3. Main blade section
4. Fixing bolts (M16)
5. Female main contact
6. Male main contact
7. Main blade section
8. Blade fixing bolts

11. Corona shield

MAIN BLADE ASSEMBLY

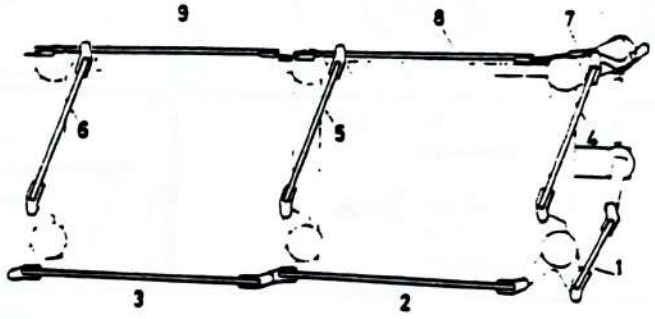
FIG 31



1. Main blade section
2. Fixing bolts
3. Female contact
4. Stainless steel spring
5. Main blade section
6. Male contact
7. Spacer

MAIN CONTACTS

FIG 32



1. Disconnector driving rod
2. Interphase rod
3. Interphase rod
4. Turntable coupling rod pole 1
5. Turntable coupling rod pole 2
6. Turntable coupling rod pole 3

When an earthing switch is provided:

7. Driving rod earthing switch
8. Interphase rod earthing switch
9. Interphase rod earthing switch

COUPLING RODS

FIG 33

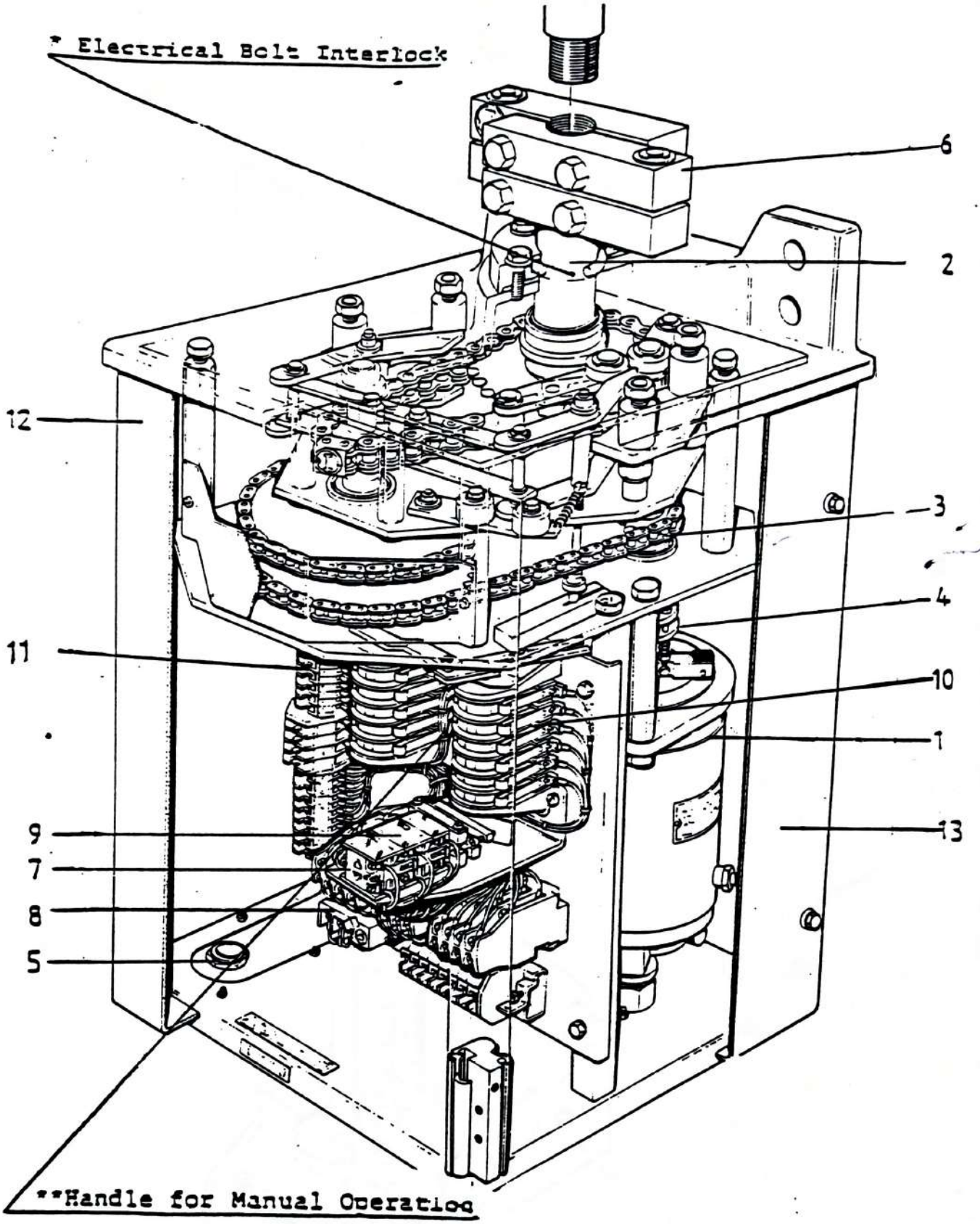
Positions of auxiliary contacts when disconnector moves from closed to open position.

Handle of manual operating mechanism.		Normally open contact (make contact).		Normally closed contact (break contact).	
Disconnector closed.		Contact closed.	0°	90°	Contact open.
Disconnector still capable to carry nominal current, peak withstand current and shortime withstand current.	11°	Contact open.	25°	65°	Contact open.
Disconnector opens	37°	Contact open (contact remains in this position till angle of handle is 147°)	45°	45°	Contact open (contact remains in this position till angle of handle is 147°)
Disconnector opens	147°	Contact going to move to full open position.	45°	45°	Contact going to move to close position.
Disconnector opens isolating distance more than 80% of open gap distance.	173°	Contact moving to full open position.	65°	25°	Contact closes.
Disconnector fully open.	184°	Contact fully opened.	90°	0°	Contact fully closed.

When disconnector moves from open to close position switching sequence is reversed.

AUXILIARY SWITCH POSITIONS

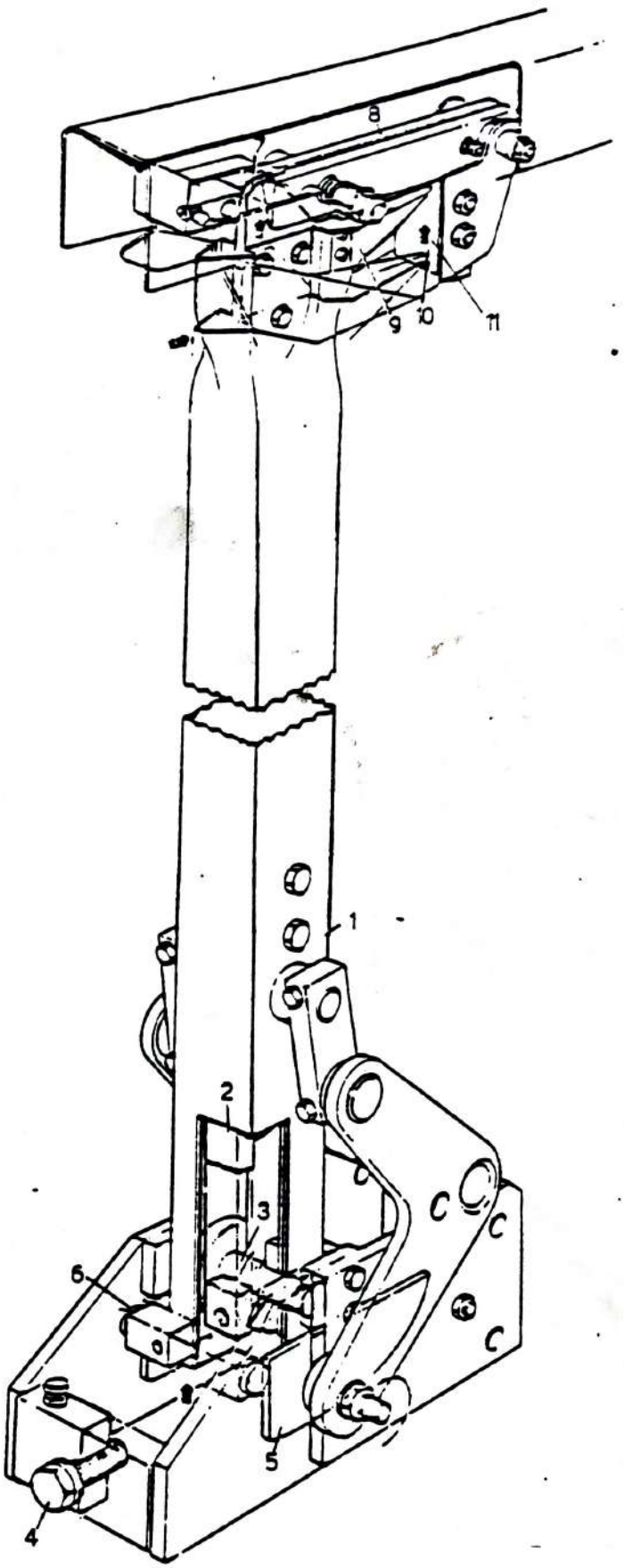
FIG 34



1. Electrical motor
2. Main shaft
3. Chain and sprocket wheel transmission
4. Slip coupling
5. Removable gland-plate
6. Clamp blocks
7. Contactors
8. Thermal overload relay
9. Limit switches
10. Auxil iary contacts
11. Terminals
12. Front door
13. Removable side panels.

OPERATING MECHANISM

FIG 35



1. Blade
2. Contact finger
3. Contact shaft
4. Earthing terminal
5. Guide plate
6. Guide roller
7. Male contact
8. Female contact
9. Guide
10. Stud

EARTHING BLADE - PIVOT ASSEMBLY AND CONTACT ASSEMBLY.

FIG 36

STANDARD QUALITY PLAN

USSC-CPG1 PPG-QA

Standardised Quality Plan	
Item	Central Break Isolator upto 420KV 3150A
SQP No.	CPG-QA-SQP- E-045
Rev	00

JAI PRAKASH MAURYA

Digitally signed by JAI PRAKASH MAURYA

	MANUFACTURER'S NAME & ADDRESS	REFERENCE QUALITY PLAN												TO BE FILLED IN BY NTPC
		ITEM : CENTRE BREAK ISOLATOR WITH MOTOR OPERATED E/S					QP NO.:							
SL. NO.	COMPONENT & OPERATIONS	CHARACTERSTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
					M	C/N					M	C	N	
1	2	3	4	5	6		7	8	9	D*	**	10		11
A	**RAW MATERIAL:**													
1.0	M.S.Structural Steel Bars Plates, Sheets, Round, Flats and Squares (Weldable)	a) Visual Examination	Major	Visual	100%	-	Drg.	Drg.	TC		P	-	-	
		b) Dimensional checks	"	Measure	10%	-	"	"	"		P	-	-	
		c) Chemical Composition	"	Test	1 Sample / lot	-	IS:2062-1999	IS:2062-1999	TC		V	-	-	
		d) Mechanical properties i) Tensile Strength ii) Elongation	"	"	"	-	"	"	"		V	-	-	
2.0	Alumnium Ingots for Castings	a) Chemical Composition	Major	Test	1 Sample / lot	-	IS:617-1994	IS:617-1994	TC		V	-	-	
		b) Mechanical properties i) Tensile Strength ii) Elongation iii) Hardness	"	"	"	-	"	"	"		V	-	-	
3.0	Aluminium Castings	a) Visual Examination & Surface defects	Major	Visual	100%	-	Drg.	Drg.	TC		P	-	-	
		b) Dimensional checks	"	Measure	10%	-	"	"	"		P	-	-	
		c) Chemical Composition	"	Test	1 Sample / lot	-	IS:617-1994	IS:617-1994	TC		V	-	-	
		d) Mechanical properties i) Tensile Strength ii) Elongation iii) Hardness	"	"	"	-	"	"	"		V	-	-	
		e) Radio Graphical Test	"	"	"	1 Sample / lot	"	"	"		V	V	V	
		f) Ultra Sonic Inspection	"	"	"	"	"	"	"		V	V	V	

LEGEND: * RECORDS IDENTIFIED WITH "TICK" SHALL BE ESSENTAILLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. **M: MANUFACTURER/SUB-CONTRACTOR C: MAIN SUUPLIER, N:NTPC TO INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION AS APPROPRIATE "CHP" NTPC SHALL IDENTIFY IN COLUMN "N" AS "W".

Note: # NTPC Inspection Engineer to Check, approval dat#/revision of reference documentat the time of inspection

	MANUFACTURER'S NAME & ADDRESS	REFERENCE QUALITY PLAN								TO BE FILLED IN BY NTPC				
		ITEM : CENTRE BREAK ISOLATOR WITH MOTOR OPERATED E/S					QP NO.:							
SL. NO.	COMPONENT & OPERATIONS	CHARACTERSTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
					M	C/N					M	C	N	
1	2	3	4	5	6		7	8	9	D*	**	10		11
4.0	Aluminum Tubes, Flats & Sheets	a) Visual Examination & Surface defects	Major	Visual	100%	-	Drg.	Drg.	TC		P	-	-	
		b) Dimensional checks	"	Measure	10%	-	"	"	"		P	-	-	
		c) Chemical Composition	"	Test	1 Sample / lot	-	IS:5082-1981 &	IS:5082-1981 &	TC		V	-	-	
		d) Mechanical properties	"	"	"	-	IS:733-1983	IS:733-1983	"		V	-	-	
		i) Tensile Strength					IS:737-1986	IS:737-1986						
		ii) Elongation												
		iii) 0.2% Proof Stress												
		iv) Hardness												
		e) Conductivity	"	"	"	1 Sample / lot	"	"	"		V	V	V	
5.0	Copper Flats & Tubes	a) Visual Examination & Surface defects	Major	Visual	100%	-	Drg.	Drg.	TC		P	-	-	
		b) Dimensional checks	"	Measure	10%	-	"	"	"		P	-	-	
		c) Chemical Composition	"	Test	1 Sample / lot	-	IS:2501-1995 &	IS:2501-1995 &	TC		V	-	-	
		d) Mechanical properties	"	"	"	-	IS:191-1980 &	IS:191-1980 &	"		V	-	-	
		i) Tensile Strength					IS:1897-1983	IS:1897-1983						
		ii) Elongation												
		e) Conductivity	"	"	"	1 Sample / lot	"	"	"		V	V	V	
6.0	Stainless Steel, Wire for Contacts Springs	a) Visual Examiration	Major	Visual	100%	-	Drg.	Drg.	TC		V	-	-	
		b) Dimensional checks	"	Measure	10%	-	"	"	"		V	-	-	
		c) Load rate test	"	Test	"	-	"	"	"		V	-	-	
		d) Magnetic Check	"	5%	"	-	IS:4454-P-IV-2001	IS:4454-P-IV-2001	"		V	-	-	

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Note: # NTPC Inspection Engineer to Check, approval date/revision of reference documentat the time of inspection

	MANUFACTURER'S NAME & ADDRESS	REFERENCE QUALITY PLAN								TO BE FILLED IN BY NTPC				
		ITEM : CENTRE BREAK ISOLATOR WITH MOTOR OPERATED E/S					QP NO.:							

SL. NO.	COMPONENT & OPERATIONS	CHARACTERSTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
					M	C/N					M	C	N	
1	2	3	4	5	6		7	8	9	D*	**	10		11
6.0	Stainless Steel, Wire for Contacts Springs	e) Mechanical properties i) Tensile Strength ii) Elongation	Major	Test	1 Sample / lot	-	IS:4454-P-IV-2001	IS:4454-P-IV-2001	TC		V	-	-	
		f) Chemical Composition	"	"	"	-	"	"	"		V	-	-	
7.0	Ball Bearings	a) Visual Examination & Surface finish	Major	Visual	100%	-	Drg.	Drg.	TC		V	-	-	
		b) Dimensional checks	"	Measure	10%	-	"	"	"		V	-	-	
		c) Endurance Check	"	Test	1 Sample / Lot	-	"	"	"	√	V	-	-	
8.0	GI Pipes	a) Visual Check	Major	Visual	100%	-	Drg.	Drg./ Datasheet	TC		V	-	-	
		b) Dimensional checks	"	Measure	10%	-	"	"	"		V	-	-	
		c) Chemical Composition	"	"	1 Sample / lot	-	IS:1239-P-I-1995 / IS:1161-1998	"	"		V	-	-	
		d) Mechanical Properties i) Tensile Strength ii) Elongation	"	"	1 Sample / lot	-	"	"	"		V	-	-	
		e) Galvanising on Pipe i) Uniformity of zinc coating ii) Thickness of zinc Coating iii) Weight of zinc coating	"	Test	1 Sample / lot	-	IS:4736-1998	IS:4736-1998	TC		V	-	-	

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	MANUFACTURER'S NAME & ADDRESS	REFERENCE QUALITY PLAN		TO BE FILLED IN BY NTPC
		ITEM : CENTRE BREAK ISOLATOR WITH MOTOR OPERATED E/S	QP NO.:	

SL. NO.	COMPONENT & OPERATIONS	CHARACTERSTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK M	QUANTUM OF CHECK C/N	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	D*	AGENCY M	AGENCY C	AGENCY N	REMARKS
1	2	3	4	5	6		7	8	9		**	10		11
9.0	Nylon Washers & Bushes	a) Dimensional Checks	Major	Measure	10%	-	Drg./ Datasheet	Drg./ Datasheet	IR		P	-	-	
		b) Hardness	"	Test	1 Sample / Lot	-	"	"	"		P	-	-	
10.0	Stainless Steel Hardware (Fastners of Current Carrying Part)	a) Visual Check	Major	Visual	100%	-	Drg.	Drg.	TC		P	-	-	
		b) Dimensional checks	"	Measure	10%	-	"	"	"		P	-	-	
		c) Chemical Composition	"	Test	1 Sample / lot	-	IS:1367-P-III-1996	IS:1367-P-III-1996	TC/ Third Party Lab		V	-	-	
		d) Physical Properties i) Tensile Strength ii) Elongation iii) Hardness	"	"	"	-	"	"	"		V	-	-	
		e) Magnetic Check	"	"	10%	-	Mfr's Std	Mfr's Std	"	√	V	-	-	
11.0	G.I.Hardware (For Non-Current Carrying Parts) Bolts, Nuts & Washers	a) Visual Check	Major	Visual	10%	-	Drg.	Drg.	TC		P	-	-	
		b) Dimensional checks	"	Measure	10%	-	"	"	"		P	-	-	
		c) Chemical Composition	"	Test	1 Sample / lot	-	IS:1367-P-III-1996	IS:1367-P-III-1996	TC/ Third Party Lab		V	-	-	
		d) Physical properties i) Tensile Strength ii) Elongation	"	Test	"	-	"	"	"		V	-	-	

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	MANUFACTURER'S NAME & ADDRESS	REFERENCE QUALITY PLAN ITEM : CENTRE BREAK ISOLATOR WITH MOTOR OPERATED E/S	QP NO.:	TO BE FILLED IN BY NTPC

SL. NO.	COMPONENT & OPERATIONS	CHARACTERSTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
					M	C/N					M	C	N	
1	2	3	4	5	6		7	8	9	D*	**	10		11
11.0	G.I.Hardware (For Non-Current Carrying Parts) Bolts, Nuts & Washers	d) iii) Hardness	Major	Test	1 Sample / lot	-	IS:1367-P-III-1996	IS:1367-P-III-1996	TC/ Third Party Lab		V	-	-	
		e) Galvanising on H.W. i) Uniformity of zinc coating ii) Thickness of zinc Coating iii) Weight of zinc coating	"	Test	1 Sample / lot	-	IS:2633-1998	IS:2633-1998	"		V	-	-	
12.0	Corona Rings / Shields	a) Visual Check	Major	Visual	10%	-	Drg.	Drg.	TC		P	-	-	
		b) Dimensional checks	"	Measure	10%	-	"	"	"		P	-	-	
13.0	BOUGHT OUT ITEMS FOR MOM BOXES													
13.a	Contactors	a) Visual examination	Major	Visual	100%	-	IS:13947-P-IV Sec-I-1993	IS:13947-P-IV Sec-I-1993	TC		V	-	-	
		b) Operation at rated Voltage	"	Elect	1 Sample / lot	-	"	"	"		V	-	-	
		c) Operation test at +10%, -15% of rated voltage	"	"	"	-	"	"	"		V	-	-	
		d) H.V.Test	"	"	"	-	"	"	"		V	-	-	
13.b	Overload Relay	a) Visual examination	Major	Visual	100%	-	IS:13947-P-IV Sec-I-1993	IS:13947-P-IV Sec-I-1993	TC		V	-	-	
		b) H.V.Test	"	Test	1 Sample / lot	-	"	"	"		V	-	-	

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	MANUFACTURER'S NAME & ADDRESS	REFERENCE QUALITY PLAN		TO BE FILLED IN BY NTPC
		ITEM : CENTRE BREAK ISOLATOR WITH MOTOR OPERATED E/S	QP NO.:	

SL. NO.	COMPONENT & OPERATIONS	CHARACTERSTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK M	QUANTUM OF CHECK C/N	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	D*	AGENCY M	AGENCY C	AGENCY N	REMARKS
1	2	3	4	5	6		7	8	9		**	10		11
13.c	Motor	a) Visual examination	Major	Visual	100%	-	IS:325-1996 & Appvd Data Sheet	IS:325-1996 & Appvd Data Sheet	TC		V	-	-	
		b) Routine Test	"	Test	1 Sample/Lot	-	"	"	"		V	-	-	
13.d	Spur/Worm Gear (Forged)	a) Visual examination / Surafce defects	Major	Visual	As per Pl Std	-	Drg.	Drg.	TC					
		b) Dimensional checks	"	Measure	10%	-	Marufacturers Drg	Manufacturers Drg						
		c) Run Test	"	Test	1 Sample/Lot	-	Mfr's Std	Mfr's Std						
13.e	Push Button	a) Visual examination	Major	Visual	100%	-	IS:13947-P-IV-Sec-I -1998	IS:13947-P-IV-Sec-I -1998	TC		V	-	-	
		b) H.V Test	"	Test	1 Sample/Lot	-	"	"	"		V	-	-	
		c) I.R.Value	"	"	"	-	"	"	"		V	-	-	
13.f	Terminal Blocks	a) Visual examination	Major	Visual	100%	-	IS:3669-1994	IS:3669-1994	TC		V	-	-	
		b) I.R.Value	"	Test	1 Sample/Lot	-	"	"	"		V	-	-	
		c) H.V Test	"	"	"	-	"	"	"		V	-	-	
		d) Wire grip	"	"	"	-	"	"	"		V	-	-	
13.g	Control & Rotary Switches	a) Visual Examination	Major	Visual	As per IS	-	IS:13947-P-V-Sec-I -1998	IS:13947-P-V-Sec-I -1998	TC		V	-	-	
		b) H.V.Test	"	Test	"	-	"	"	"		V	-	-	
		c) Mechanical Operation	"	"	"	-	"	"	"		V	-	-	
		d) Electricla continuity	"	"	"	-	"	"	"		V	-	-	
		e) IR Value	"	"	"	-	"	"	"		V	-	-	

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SL. NO.	COMPONENT & OPERATIONS	CHARACTERSTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK M	QUANTUM OF CHECK C/N	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	D*	AGENCY M	AGENCY C	AGENCY N	REMARKS
1	2	3	4	5	6		7	8	9	**	10			11
13.h	Limit/Auxiliary Switch & Assemblies	a) Visual Examination	Major	Visual	100%	-	IS:13947-P-V-Sec-I -1998	IS:13947-P-V-Sec-I -1998	TC		V	-	-	
		b) H.V.Test	"	Test	1 Sample/Lot	-	"	"	"		V	-	-	
		c) IR Value Measurement	"	Measure	"	-	"	"	"		V	-	-	
		d) Electrical continuity	"	Test	"	-	"	"	"		V	-	-	
13.i	Solenoid Coil (Interlock Coil).	a) Visual Examination	Major	Visual	100%	-	Drg./ Datasheet	Drg./ Datasheet	TC		V	-	-	
		b) Function Test	"	Test	10%	-	"	"	"		V	-	-	
		c) IR Value	"	"	"	-	"	"	"		V	-	-	
		d) H.V.Test	"	"	"	-	"	"	"		V	-	-	
		e) Pick Up Dropout Voltage	"	"	"	-	"	"	"		V	-	-	
		f) Continuous Rating (5 minutes)	"	"	"	-	"	"	"		V	-	-	
13.j	Wires (2.5 mm^2 Copper)	a) Visual Examination	Major	Visual	100%	-	IS:694-1990	IS:694-1990	TC		V	-	-	
		b) Dimensional check	"	Measure	1 Sample/Lot	-	"	"	"		V	-	-	
		c) IR Value	"	"	"	-	"	"	"		V	-	-	
		d) H.V.Test	"	"	"	-	"	"	"		V	-	-	
13.k	Heaters	a) Visual, Voltage & Wattage Rating	Major	Visual	100%	-	IS:694-1990/ NTPC Appd Data Sheet	IS:694-1990/ NTPC Appd Data Sheet	TC		V	-	-	
		b) H.V.Test	"	"	1 Sample/Lot	-	"	"	"		V	-	-	

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					M	C/N					M	C	N	
1	2	3	4	5	6		7	8	9	D*	**	10		11
13.k	Heaters	c) IR Value	Major	Measure	1 Sample/Lot	-	IS:3725-1966/ NTPC Appd Data Sheet	IS:3725-1966/ NTPC Appd Data Sheet	TC		V	-	-	
		d) Resistance Measurement	"	"	"	-	"	"	"		V	-	-	
		e) Functional check	"	Test	"	-	"	"	"		V	-	-	
13.l	Power Socket	a) Visual Check	Major	Visual	100%	-	IS:1293-1988	IS:1293-1988	TC		V	-	-	
		b) IR Value	"	"	1 Sample/Lot	-	"	"	"		V	-	-	
		c) H.V.Test	"	"	"	-	"	"	"		V	-	-	
13.m	Thermostat	a) Visual check/Make, Rating	Major	Measure	100%	-	IS:3017-1985	IS:3017-1985	TC		V	-	-	
		b) IR Value	"	"	1 Sample/Lot	-	"	"	"		V	-	-	
		c) H.V.Test	"	"	"	-	"	"	"		V	-	-	
13.n	HRC Fuses Links	a) Make, Rating	Major	Visual	100%	-	IS:13703-P-II/ Sec2-1998	IS:13703-P-II/ Sec2-1998	TC		V	-	-	
		b) Continiuity check	"	Test	1 Sample/Lot	-	"	"	"		V	-	-	
		c) Resistance	"	Measure	"	-	"	"	"		V	-	-	
13.o	Fuse Base & Top	a) Make, Rating.	Major	Visual	100%	-	IS:13703-P-II/ Sec2-1998	IS:13703-P-II/ Sec2-1998	TC		V	-	-	
		b) H.V.Test	"	"	1 Sample/Lot	-	"	"	"		V	-	-	
13.p	Castle Lock	a) Make, Rating	Major	Visual	100%	-	Drg./ Datasheet	Drg./ Datasheet	TC		V	-	-	
		b) Functional check	"	Test	10%	-	"	"	"		V	-	-	

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SL. NO.	COMPONENT & OPERATIONS	CHARACTERSTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK M	QUANTUM OF CHECK C/N	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	D*	AGENCY M	AGENCY C	AGENCY N	REMARKS
1	2	3	4	5	6		7	8	9	D*	**	10		11
13.q	Gasket	a) Visual Examination	Major	Visual	100%	-	IS:11149-1999	IS:11149-1999	TC		V	-	-	
		b) Hardness	"	Test	1 Sample/Lot	-	"	"	"		V	-	-	
		c) Tensile Strength	"	"	"	-	"	"	"		V	-	-	
		d) Ultimate Elongation	"	"	"	-	"	"	"		V	-	-	
		e) Compression test	"	"	"	-	"	"	"		V	-	-	
		f) Ozone Resistance	"	"	"	-	ASTM D-1149	ASTM D-1149						
B	**IN-PROCESS CHECKS**													
1.0	WELDING REQUIREMENT	a) WPS approval	Major	Verify	100%	100%	ASME Sec-IX	ASME Sec-IX	QW-482		P	V	V	
		b) PQR & Welder Qualification	"	Test	"	"	"	"	QW-483/ QW-484		P	V	V	
2.0	Fabrication of MOM Box	a) Visual Examination	Major	Visual	100%	-	IS:737-1986	IS:737-1986	IR		P	-	-	
		b) Dimensional check	"	Measure	1 Sample/Lot	-	"	"	"		P	-	-	
		c) DP Test on Welding of Sheet	"	Test	"	-	IS:3658-1999 / ASTM D-165	IS:3658-1999 / ASTM D-165	"		P	-	-	
3.0	Fabrication of Base Frame Rotary Shaft of Isolator	a) Dimensional Check	Major	Measure	100%	-	NTPC Appd Drgs	NTPC Appd Drgs	IR		P	-	-	
		b) Surface defects	"	Visual	10%	-	"	"	"		P	-	-	
		c) Fitup for Weld	"	"	"	-	"	"	"		P	-	-	
		d) D.P.Test	"	Test	1 Sample/Lot	-	ASTM D-165	ASTM D-165	"		P	-	-	

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Note: # NTPC Inspection Engineer to Check, approval date/revision of reference documentat the time of inspection

	MANUFACTURER'S NAME & ADDRESS	REFERENCE QUALITY PLAN								TO BE FILLED IN BY NTPC				
		ITEM : CENTRE BREAK ISOLATOR WITH MOTOR OPERATED E/S					QP NO.:							
SL. NO.	COMPONENT & OPERATIONS	CHARACTERSTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
					M	C/N					M	C	N	
1	2	3	4	5	6		7	8	9	D*	**	10		11
4.0	Painting of Aluminium Sheet(if applicable)	a) Surface preparation	Major	Physical	100%	10%	IS:2525-P-I-1968	IS:2525-P-I-1968	IR		V	V	-	
		b) Type & Grade of Paint	"	Visual	10%	"	"	"	"		V	V	-	
		c) Thickness	"	Measure	1Sample/lot	"	NTFC Specification	NTPC Specification	"		V	V	-	
		d) Adhesion test	"	Test	ASTM	"	ASTM D-3359	ASTM D-3359	"		V	V	-	
5.0	Galvanising Check on Base Frame & Rotating Shaft	a) Visual Examination & Surface defects	Major	Visual	100%	10%			IR		W	W	V	
		b) Thickness of Zinc Coating	"	Measure	1Sample/lot	"	IS:2629-1998/ IS:2633-1986/	IS:2629-1998/ IS:2633-1986/	"		W	W	W	
		c) Mass of Zinc Coating	"	"	"	"	IS:4759-1996/	IS:4759-1996/	"		W	W	W	
		d) Uniformity of Zinc Coating	"	"	"	"	NTPC Specification	NTPC Specification	"		W	W	W	
		e) Adhesion test	"	"	"	"	"	"	"		W	W	W	
6.0	Silver Plating on Male & Female & Earth Switch Assembly	a) Pretreatment	Major	Physical	As per IS	As per IS	IS:5925-1970	IS:5925-1970	IR		V	V	-	
		b) Electroplating	"	"	"	"	"	"	"		V	V	-	
		c) Plating Thickness	"	Measure	1 Sample/ each type	1 Sample/ each type	IS: 1771-1986	25 Microns	"		W	W	W	
		d) Adhesion check	"	"	"	"	Mfr's Std	Mfr's Std	"		W	W	V	
7.0	Terminal Stud Assembly	a) Visual Examination/ Dimensional Check	Major	Visual/ Measure	100%	10%	NTPC Appd Drgs	NTPC Appd Drgs	IR		P	W	V	
		b) Check for 90^0 Rotation	"	Physical	"	"	"	"	IR		P	W	V	

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	MANUFACTURER'S NAME & ADDRESS	REFERENCE QUALITY PLAN	TO BE FILLED IN BY NTPC
		ITEM : CENTRE BREAK ISOLATOR WITH MOTOR OPERATED E/S	QP NO.:

SL. NO.	COMPONENT & OPERATIONS	CHARACTERSTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK M	QUANTUM OF CHECK C/N	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	D*	AGENCY M	AGENCY C	AGENCY N	REMARKS
1	2	3	4	5	6		7	8	9		**	10		11
8.0	Rotor Shaft Assembly	a) Fitment, Alignment	Major	Visual	100%	-	NTPC Appd Drgs	NTPC Appd Drgs	IR		P	-	-	
		b) Dimensional check	"	Measure	1 Sample/ Lot	-	"	"	"		P	-	-	
		c) Check for 90° Rotation	"	Physical	100%	-	"	"	"		P	-	-	
9.0	Male, Female & Earth Switch Assembly on Dummy Structure	a) Fitment, Alignment	Major	Visual	100%	-	NTPC Appd Drgs	NTPC Appd Drgs	IR		P	-	-	
		b) Dimensional check	"	Measure	1 Sample/ Lot	-	"	"	"		P	-	-	
		c) Contact Resistance	"	"	100%	-	"	"	"		P	-	-	
10.0	Main Gang/Earth Switch Gang tandem Pipe Assembly	a) Fitment, Alignment	Major	Visual	100%	-	NTPC Appd Drgs	NTPC Appd Drgs	IR		P	-	-	
		b) Dimensional check	"	Measure	1 Sample/ Lot	-	"	"	"		P	-	-	
		c) Check for direction of operations	"	Visual	"	-	"	"	"		P	-	-	
C	**FINAL INSPECTION**													
1.0	**TYPE TEST**						Tech Spec	Tech Spec						*NTPC RIO To verify the type test clearance from NTPC* site (If applicable)

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	MANUFACTURER'S NAME & ADDRESS	REFERENCE QUALITY PLAN ITEM : CENTRE BREAK ISOLATOR WITH MOTOR OPERATED E/S	QP NO.:	TO BE FILLED IN BY NTPC

SL. NO.	COMPONENT & OPERATIONS	CHARACTERSTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK M	QUANTUM OF CHECK C/N	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY M	AGENCY C	AGENCY N	REMARKS
1	2	3	4	5	6		7	8	9	D*	**	10		11
2.0	**ROUTINE TEST**													
2.1	Motor Operating Mechanism Box	a) Dimensional check	Critical	Measure	10%	10%	NTPC Appd Drgs Data Sheet	NTPC Appd Drgs Data Sheet	IR	√	P	W	W	Mfr's *routine test inspection reports of MOM Box will be shown to NTPC RIO representative during final inspection of isolator.*
		b) Operation Test including inter lock under no load test(Rated,+10%&-15%)	"	Test	"	"			"	√	P	W	W	
		c) Current Measurment of Motor	"	"	"	"	"	"	"	√	P	W	W	
		d) H.V. Test on Wiring(2KV)	"	"	10%	10%	NTPC Appd Drgs Data Sheet	NTPC Appd Drgs Data Sheet	IR	√	P	W	W	
		e) Verification of compone-nent make & rating.	"	Verify	"	"			"	√	P	W	W	
		f) Wiring & Ferruling	"	"	"	"	"	"	"	√	P	W	W	
		g) Pick Up & Drop Out Voltage(70% & 40%)	Critical	Test	"	"	"	"	"	√	P	W	W	
		h) Degree of protection	Critical	Test	"	1 Sample / Lot	IS:13947-P-I-1993	IS:13947-P-I-1993	"	√	P	W	W	*By Thin Paper insertion Method*
		i) Painting thickness check Color,shade,Adhesion (if applicable)	"	"	"	"	NTPC Specification	NTPC Specification	"	√	P	W	W	

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Note: ¶ NTPC Inspection Engineer to Check, approval date/revision of reference documentat the time of inspection

	MANUFACTURER'S NAME & ADDRESS	REFERENCE QUALITY PLAN			TO BE FILLED IN BY NTPC
		ITEM : CENTRE BREAK ISOLATOR WITH MOTOR OPERATED E/S		QP NO.:	

SL. NO.	COMPONENT & OPERATIONS	CHARACTERSTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
					M	C/N				M	C	N	
1	2	3	4	5	6		7	8	9	D*	**	10	11
2.2	Testing on Complete Isolator Assembly	a) Mechanical Operation Test (70 open/Close operations)-syne&interlock											
		i) Check for closing & opening time.	Critical	Test	1 Sample/Lot	1 Sample / Lot	IEC-62271-102-200 IS:9921-1985 / IEC:129-1996	IEC-62271-102-200 IS:9921-1985 IEC:129-1996	IR	√	P	W	W
		ii) Check for current drawn by motor	"	"	"	"	"	"	"	√	P	W	W
		iii) Function of Auxiliary & Limit Switch	"	"	"	"	"	"	"	√	P	W	W
		b) Contact Resistance (Main Circuit) Before & After Mechanical Operation test	"	"	"	"	"	"	"	√	P	W	W
		c) H.V. Test (2 kV) on Auxiliary & Control Circuits	"	"	"	"	"	"	"	√	P	W	W
		d) Bending Load Test in four Directions @ 50% Min. bending load	"	"	100%	100%	Technical Specification	Technical Specification	"	✓	P	W	W
		e) Bending Load Test in four Directions @ 100% Min. bending load	"	"	1 Sample/lot	1 Sample/ Lot	"	"	"	✓	P	W	W
		f) Torsional test	"	"	"	"	"	"	"	✓	P	W	W

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Note: # NTPC Inspection Engineer to Check, approval date/revision of reference documentat the time of inspection

	MANUFACTURER'S NAME & ADDRESS	REFERENCE QUALITY PLAN							TO BE FILLED IN BY NTPC					
		ITEM : CENTRE BREAK ISOLATOR WITH MOTOR OPERATED E/S			QP NO.:									

SL. NO.	COMPONENT & OPERATIONS	CHARACTERSTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
					M	C/N				M	C	N	
1	2	3	4	5	6		7	8	9	D*	**	10	11
2.2	Testing on Complete Isolator Assembly	g) Manual Operation of Isolator / Earth Switch	Critical	Test	1 Sample/Lot	1 Sample / Lot	EC-62271-102-200 IS:9921-1985	EC-62271-102-200 IS:9921-1985	IR	√	P	W	W	
		h) Interlock Operation of Isolator Earth Switch	"	"	"	"	"	"	"	√	P	W	W	
		i) Functinal check for local, remote & othe accessories	"	"	"	"	"	"	"	√	P	W	W	
		j) Tightness test of hardw-are after mechanincal op-eration test	"	"	"	"	"	"	"	√	P	W	W	
		k) Power Frequency Test on Main Circuit	"	"	"	"	"	"	"	√	P	V	V	*If this meets the requirement of 6-7.1 of IEC-129 (which are part of the typetest report of the particular disconnector and earthing switch), this test may be omitted based on the checking of dimensions & dimensional outline*
		l) Verification of Dimensio-ns	"	"	"	"	NTPC Appd Drgs	NTPC Appd Drgs	"	√	P	W	W	
3.0	**PACKING & DESPATCH**	a) Completeness,Sturdiness & Marking	Major	Physical	100%	-	Packing Instructions	Packing Instructions	Log Record		P	-	-	

Note:
1) Reference and Acceptance norms shall be derived from following in the same sequence-
a) NTPC Approved drawing / data sheet, b) NTPC tech specs, c) Purchase Order , d) Relevant national standard e) Relevant International standard, f) Manufacturer's standard, g) Good Engineering practices.
2) Main Contractor Column may please be ignored.
3) Type test clearance from NTPC site shall be reviewed during final inspection as envisaged by tender/PO specification.
4) Witness by NTPC/authorized representative (wherever applicable) shall be on randomly chosen sample/s. NTPC shall review MFRs test report for balance Qty.