



PURCHASE SPECIFICATION

Doc No: PS/415/2413

Rev No: 00

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PURCHASE SPECIFICATION

FOR

SUPPLY OF DCS PANELS

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Issued By

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Date

10.08.2024



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REVISION HISTORY SHEET

Rev No	Date	Nature of Change	Reason	Prepared By	Checked By	Approved By
01	10.8.24	FIRST ISSUE		JOTHISH/RAKHI PRIYADHARSINI V Priyadharsini	T. Sreedhar T SREEDHAR	D. Prakash D PRAKASH

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1.0 SCOPE:

Scope of this specification covers the design, manufacture, assembly, testing & supply of control cubicles.

2.0 MATERIALS AND WORKMANSHIP

Materials: Components, materials and standard parts which are necessary to meet this specification shall be of first class quality and in accordance with best engineering practice and conform to latest issue of applicable standards subject to approval of purchaser. Design, materials used and fabrication methods shall be such that the equipment is fungus and corrosion resistant.

2.1 Workmanship

Design, manufacturing and workmanship shall be of high quality to ensure the product to be uniform in quality and free from all defects so as to perform its required function satisfactorily in the specified environment as mentioned in this specification.

2.2 Environmental Conditions

Normal operating conditions: Ambient temperature from 0°C to 50°C and relative humidity up to 90 % non-condensing.

Occasional/Storage conditions: Ambient temperature from -25°C to 80°C and relative humidity up to 95 % non-condensing.

3.0 MECHANICAL DETAILS:

General Space economy is also of prime consideration. Therefore, the bidder is requested to offer an arrangement which achieves such an economy in the best possible manner while maintaining all other requirements e.g. easy maintenance and replacement of components, ample cable space, logical equipment distribution and compartmentalization, unrestricted air flow, segregation of control and power wiring etc. All materials used for construction shall be such that they do not independently support combustion.

3.1 Empty Enclosures:

3.1.1 Overall Dimensions:

Width, depth and height of all panels shall be 800 mm X 800 mm X 2065mm respectively. Double outward opening doors shall be provided. After assembling, panels shall be provided with side covers at the extreme ends.

3.1.2 Material:

Enclosures shall be fabricated from CRCS as per IS-513-D/Aluzinc as per AZ150 Grade/GI sheets as per IS 277 having a minimum thickness of 1.6 mm for frame & 2mm thickness for all doors, side/end covers & other mounting arrangements. Frames shall be of multi fold construction, if 1.6mm thick sheet is used frame shall be of minimum seven folds. Doors & End/Side Covers shall be of folded construction. Enclosure shall be indoor type, floor mounting and shall be completely dust and vermin proof. In its proposed location, panel shall have access from its front as well as rear.



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3.1.3 Mechanical Construction & Fabrication:

Multi fold design shall be used for the making of cabinet structure for providing required rigidity & firmness. Sheets used for doors and side panels shall be properly braced to prevent wobbling. Panels shall be provided with removable lifting hooks on the top for ease of handling. Enclosures shall be of welded construction/riveted type. Construction shall be in such a way that more than single enclosure shall be bayed together as per requirement.

3.1.4 Base Channel:

Base Channel of the enclosure shall be made up of 3mm thick CRC Sheets with 50mm Height. Enclosures shall be suitable for bottom cable entry. Removable Gland plates of minimum dimension (300mmX600mm) shall be provided at the front & rear bottom of the enclosures. Both side of the base channel of single enclosure or bayed enclosures shall be provided with grounding terminals.

3.1.5 Pallet:

Base Channel of the enclosure shall be fixed to wooden pallet. Wooden pallets shall be suitably provided to withstand a load of 400Kgs/enclosure & also suitable for using standard fork lifts. Enclosure shall be designed in such a way that more than one enclosure shall be bayed to maximum of four. Pallets shall also be provided accordingly for bayed enclosures. In case of bayed enclosures side covers shall be provided only to the extreme ends of the bayed enclosures.

3.1.6 Doors & Side Covers:

All doors shall be provided with good quality industrial locks and handles with three point locking system. Hinges shall be concealed type. Doors shall be provided with gaskets for effective dust proofing. Doors shall open up to a maximum of 120 degrees. All locks of doors of panels shall have a common key. Each LH door shall be provided with suitable self-adhesive drawing pocket suitable for A4 size papers/files/CD's.

3.1.7 Assembly of Empty Enclosures:

Fabrication and design of the enclosure shall be such as to make the complete assembly rigid, self-supporting and free from mechanical vibration, twist and weave. All steel parts including walls, doors and roof shall be adequately supported and stiffened to prevent flexing. All removable panels supplied for access to the interior of the housing shall be equipped with suitable captive fastenings and shall be of a size that can be conveniently handled by one man. Enclosure shall conform to protection class of IP-54.

3.1.8 Hardware's: All the hardware's used for fixing shall be as per IS Standards. All the hardware's shall be of MS with Zinc Electro Plating.



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4.0 Safety Ground Bus Bar & Signal Ground Bus Bar

A safety ground bus bar of copper with 150 sq.(25mmX6mmX530mm) minimum cross section shall be provided to run along the panel at the bottom. Bus bar shall be permanently brazed to the sheet steel frame work. The safety ground bus bar shall have tapped holes at regular intervals along its length to enable cable termination of grounding wires from individual devices. A 15mm diameter hole is to be provided at each end of the bus bar. Safety ground bus bar shall be provided on the front side of the enclosure.

Each cabinet shall be provided with 25mm x 6mm thick electrolytic copper bus bar conforming to IS-1897. The bus bar shall be of Electrolytic Tough Pitch (ETP) or Fire Refined High Conductivity (FRHC) grade. The safety ground bus bar shall be suitably isolated from the main frame using insulators.

Safety ground bus bar shall be provided at the front side of the cabinet & the Signal Ground Bus bar shall be provided at the rear side of the cabinet. (Refer Annexure-1)

All the copper bus bars shall be electro tinned to minimum thickness of 13 Microns.

5.0 Enclosure ventilation and illumination

Enclosure shall be natural cooled for heat dissipation. Each door of the enclosure shall be provided with louvers at top & bottom. Louvers shall be located in the compartment doors and bolt-on panels. The louvers shall be suitably screened or filtered to prevent entrance of vermin etc. The filter should be accessible from outside the panel for better maintenance. Air Circulating fans shall be provided on the rear side of the top louvers for air circulation.

5.1 Pre-treatment & Powder Coating.

Enclosure frames, doors & all other mounting arrangement shall be pre-treated by seven tank process or by suitable abrasive blasting before powder coating.

Thickness of the powder coating shall be of minimum 70 microns.

Color & Finish of the enclosures shall be as mentioned in General Arrangement (Annexure-1) of each cubicle.

6.0 Assembly of Enclosures:

In order to facilitate the mounting of the all the active components like electronic bins, cards, power supplies inside the cabinet a gap of 300 mm from the bottom of the cabinet shall be provided for facilitating the cable bending, glanding and wire terminations for the panels having bottom cable entry.

General Arrangement of the enclosure shall be as per Annexure-1. For cable routing & sizes of cable channels refer notes mentioned in GA.

Dimensions mentioned in GA's are indicative only. Mounting Arrangements of the components shall be of supplier's design. Supplier shall submit the actual GA drawings as per their mounting arrangement for approval before assembling.

Any changes in the drawings after approval shall be informed appropriately before implementation.

Supplier has to ensure the rigidity & accessibility of the mounting arrangements & components with suitable support. Components shall be placed in such a way that the maintenance shall be at ease.



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7.0 Bill of Material:

Detailed list of components & quantities shall be as per Annexure-2. Supplier shall procure components with prescribed Part no's from BHEL approved Make as mentioned in Annexure-2. Any change in Make/Part no. of components requires appropriate justification & approval from BHEL –EDN.

Each component shall be identified by device reference mentioned in BOM. This device reference labels shall be fixed on the component & at the location of the component. In case of any component is not mounted still the location shall have label corresponding to that device references. Device Reference shall be printed on the labels of polyester material (suggested dimension of label is 10mmX26mm or any dimension of the label as per the size of the component). Labels shall have clear legibility & shall have strong adhesive to withstand temperature up to 105°C.

Nomenclature label shall be provided as mentioned in GA. Labels shall be of Self Adhesive GE-Polycarbonate/Acrylic/SS Plates as mentioned in GA. Label shall be of MATT Finish. All the letters shall be centralized location. Background Color of the label shall be natural & Color of Monogram; letters & lines shall be Black. BHEL Monogram shall be as per SIZE 40 of BHEL Standard AA0401121

8.0 Wiring Details:

Wiring Termination details shall be as per Annexure-3. Grouping of the wiring terminals are already done, & shall be wired as per Annexure-3. Color & size of the cables shall be as per Annexure-3. Make & type of cables shall be as per Annexure-2. Consumables such as copper terminal lugs, Copper tubular sealing ferrules, Cable marker Ferrules etc. used for printing shall be of reputed make & as per industry standards. Annexure-3 for each enclosure shall be provided during detailed Engineering.

8.1 Ferruling:

Cross Ferruling shall be followed for all the terminals. Ferrules used shall withstand temperature range of -65°C to +105°C. Color of the ferrules shall be of Yellow & printing shall be in Black. Printing on the ferrules shall be of good quality & long lasting & shall be clearly legible while rubbing or wiping with hands or any cloth. Philosophy of cross ferruling shall be provided during the execution of order.

9.0 GA, BOM & Wiring Testing:

Assembled enclosures shall be inspected as per approved GA & BOM. Continuity check, HV & Insulation Resistance check shall be carried out at supplier's premises & corresponding test report for each enclosure shall be submitted during inspection.

Warranty shall be provided for a period of 12 months from the date of supply, Warranty of all BOM items shall be transferred to EDN along with supplies for period of 12 months.

Detailed Engineering:

There are two types of DCS system involved such as maxDNA & Valmet DNA. Both varieties of systems shall be provided. During detailed Engineering GA of each panel, BOM, wiring details, Nomenclature details of respective enclosures shall be provided separately.

10.0 Quality Requirements:

Inspection of the Mechanical, Electrical & Process shall be carried out as per sample QAP shown in Annexure-4. Comprehensive QAP is attached & however Bought out Components as per Annexure-4 (BOM) only shall be inspected as per QAP requirements.



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11.0 Packing Instructions:

Packing shall be in such a way to avoid any ingress of moisture, dirt or any foreign material. Enclosures shall be wrapped with a polyethylene sheet all around & each enclosure (or suites) shall be wooden packed. Packing method shall be adequate to withstand a period in transit for more than two months and storage at site under a tropical climate for a minimum period of one year without suffering any damage or deterioration.

Each package shall be properly labelled to indicate the type and quantity of material it contains, purchase order number, Enclosure Name, Weight and any other necessary data to identify the equipment and relate it to the contract. Supplier shall not ship the material without the prior approval of the purchaser or his authorized representative and subsequent instruction to do so. The panel shall be shipped by truck direct from contractor's works to the EDN.

12.0 Documents to be submitted along with offer: Supplier shall provide total cost along with split up of the bid as mentioned below,

- Unit Rate of Empty enclosure along with mechanical mounting arrangements as per GA (for Suite of 2)*
- Unit Rate for components mentioned in supplier's scope along with mounting charges (As mentioned in GA & BOM)*
- Unit Rate for each type of wiring connection as per type of cables mentioned in BOM (eg unit price for 0.5sqm termination, 0.75 Sqmm termination) shall be given separately.*
- Lumpsum Rate for other miscellaneous charges such as testing, packing & forwarding, services etc as per GA & BOM (for suite of 2)*

L1 price shall be finalized based on the cumulative pricing of the above three unit prices quoted by vendors as per below.

Sl No	Description	Rate
1	Unit Rate of Empty enclosure along with mechanical mounting arrangements	'a' - Rate quoted as per GA
2	Summation of Total value of BOM items as per GA & BOM	'b'
3	Termination charges	
	0.5sqmm	'c.1'*2500
	0.75sqmm	'c.2'*300
	1.5sqmm	'c.3'*500
	2.5 sqmm	'c.4'*300
	4 sqmm	'c.5'*200
	16 sqmm	'c.6'*100
4	Miscellaneous Lumpsum	'd'
	L1 price	a+b+[c.1*2500+c.2*300+c.3*500+c.4*300+c.5*200+c.6*100]+d



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In BOM (Annexure-2) wherever the scope of item is mentioned as EDN, unit price shall be considered as Rs 0.0/-

BHEL will enter into Rate Contract with Successful bidder arrived based on above evaluation. Subsequently, PO will be placed based on the requirement of panels for a project during the RC validity period.

The computation of PO value will be done as below:

- Price for empty enclosures of various bayed enclosures such as suite of three & four shall be calculated from unit price of empty enclosure quoted above. (eg. Unit price of empty enclosure for single, suite of three & four shall be calculated as $a/2$, $(a/2)*3$ & $(a/2)*4$ respectively)
- Actual BOM charges will be based on quoted unit Price of BOM items along with mounting charges as per GA & BOM.
- Termination charges will be based on actual no. of wires as per wiring chart based on c.1 to c.6 rates.
- Miscellaneous lumpsum price for enclosures such as single, suite of three & four shall be calculated from the quoted lumpsum price for suite of two. (eg Lumpsum price for single, suite of three & four shall be calculated as $(d/2)$, $(d/2)*3$, $(d/2)*4$ respectively)

13.0 Supplier shall accommodate 10% of any changes during the execution without any price implications. Supplier shall take care of all the expenses towards repair/rework done at EDN for the supplies completed including travel, accommodation etc., if any.

14.0 One set of typical GA drawing in line with supplier design and mounting arrangement along with components shall be submitted.

15.0 Free Supply Items:

maxDNA Racks & Valmet DNA racks shall be given to supplier as free supplies from EDN. Free supplies shall be given to supplier against bank guarantee provided by the supplier. Bank Guarantee for 100 nos of racks shall be provided. The same shall be mounted on the cubicles as shown in GA (Annexure-1) & connectors shall be wired as per wiring details (Annexure-4).

PRE-QUALIFICATION CRITERIA:

- Supplier should have supplied completely system integrated enclosures to power plants/process plants. Supplier shall provide proof of documents such as PO copy with invoice for the same along with offer.
- Supplier should have successfully supplied a minimum of 500 panels in the last three years. Proof of supplies shall be attached along with offer.
- Supplier shall possess a record of capability for supplying minimum 25 numbers of enclosures per month. The proof for the same shall be provided along with offer.
- Supplier shall possess suitable infrastructure for fabrication, Welding, Assembly, Integration, Wiring, pre-treatment & Powder coating facilities. Proof for the same shall be provided along with offer. Offers from supplier Sub-contracting of any process shall not be considered.
- Supplier shall provide valid ISO-9001 Certifications.
- Supplier shall provide all the valid calibration certificates for machineries & testing equipment's along with offer.

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COPYRIGHT AND CONFIDENTIAL The information contained in this document is the property of BHARAT HEAVY ELECTRICALS LIMITED This must not be used directly or indirectly, in any manner detrimental to the interest of the company		• Supplier shall possess testing facilities to offer a minimum of 25 enclosures in a lot for inspection. Facility for testing a minimum of 25 enclosures at same time shall be available. Proof for area of testing shall be attached along with offer. • Onsite service support shall be provided at purchaser’s works within 6 working days, if is observed the items supplied requires any rework/rectification.		

GENERAL ARRANGEMENT FOR MAX PANEL (ANNEXURE-1)

A

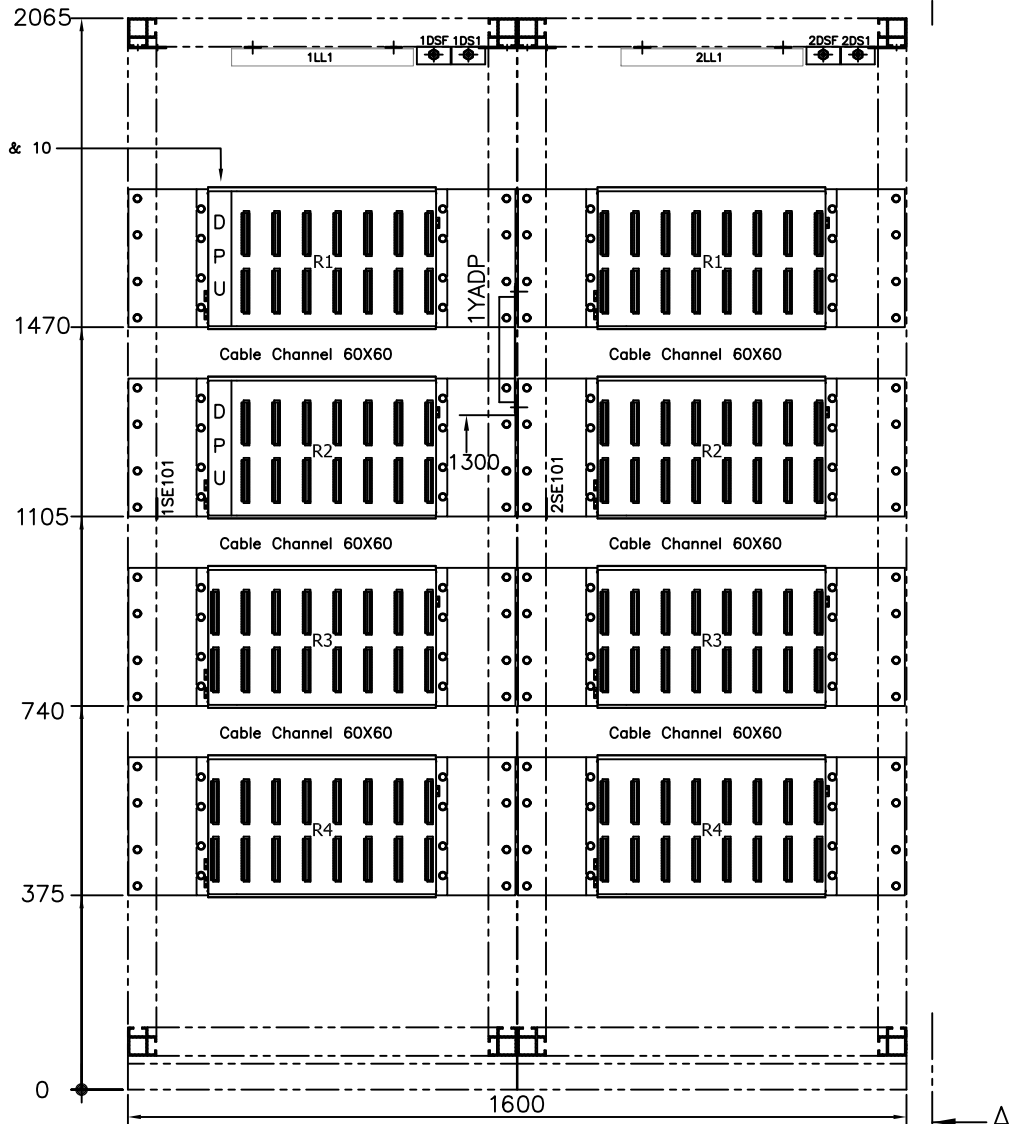
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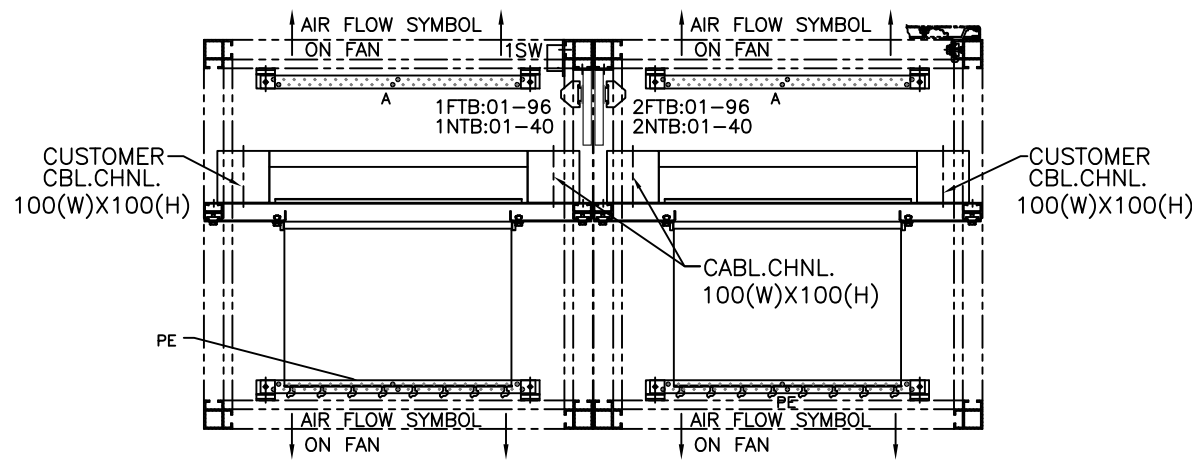
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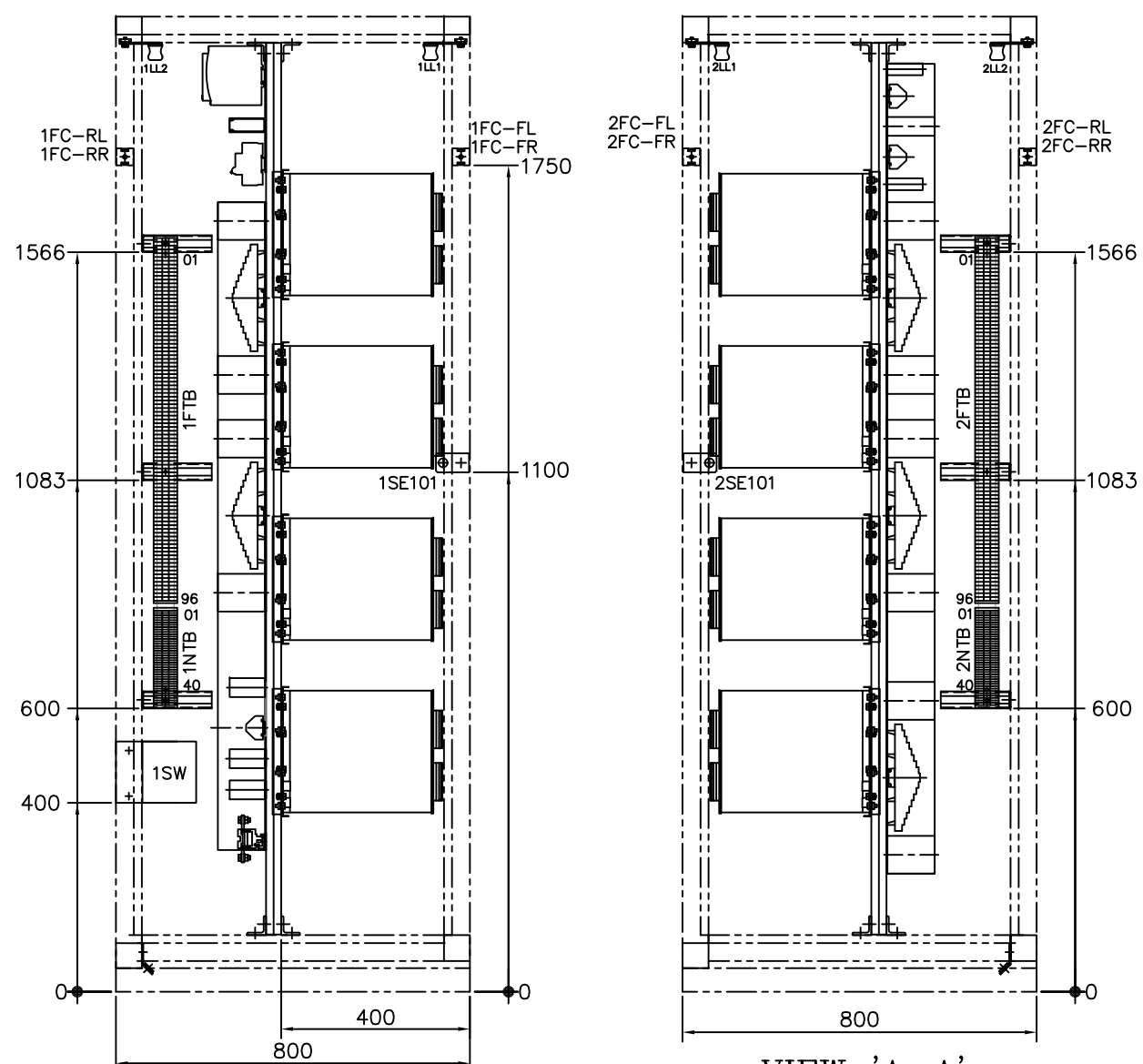
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ELEVATION



PLAN



SIDE VIEW(WITHOUT DOOR)

VIEW 'A-A'

A

B

C

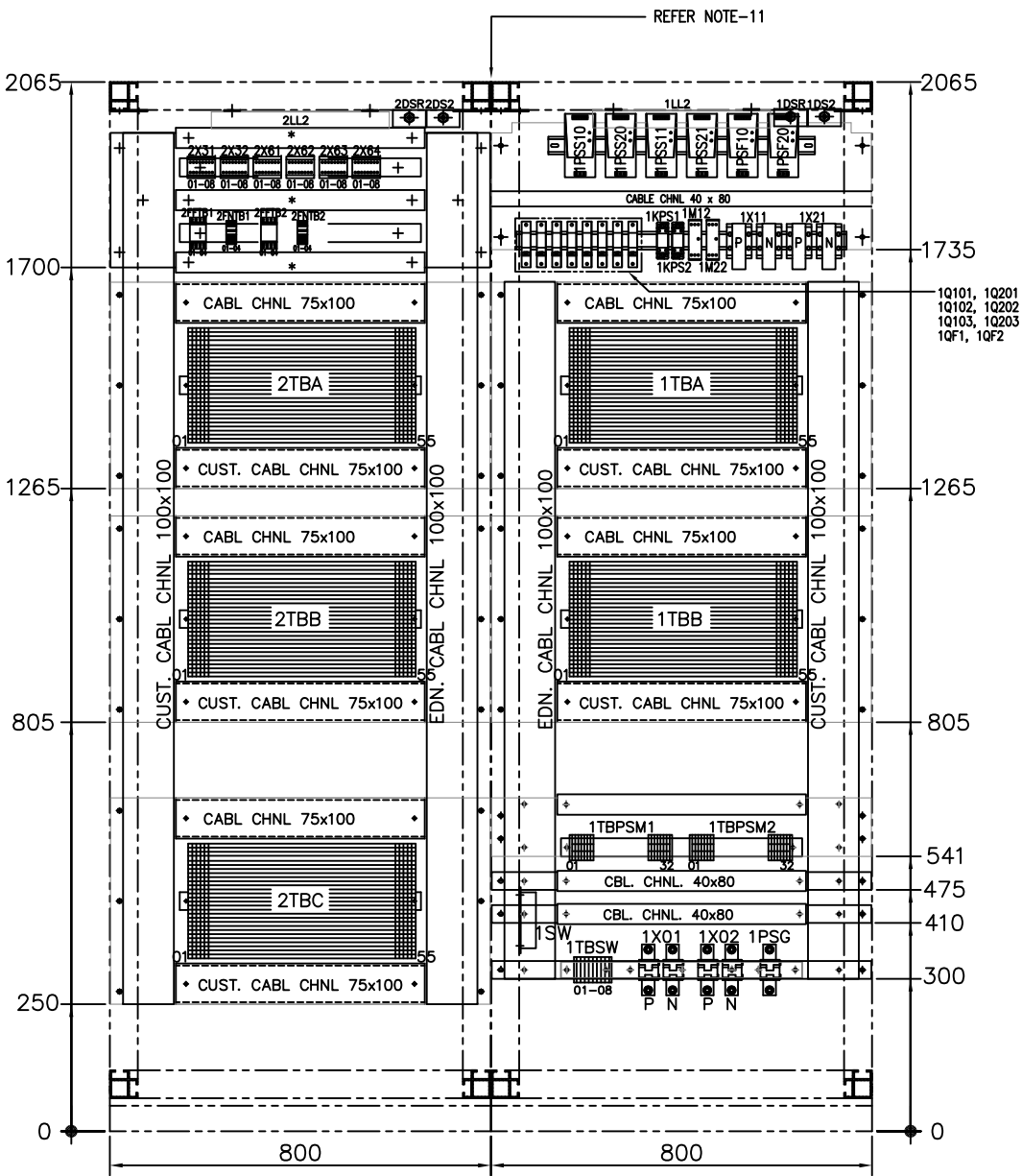
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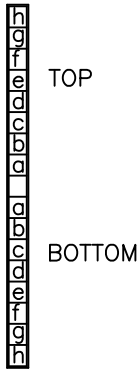
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									TITLE TYPICAL GA FOR DCS SYSTEM (MAX & VALMET)		DRAWING NO. PS 415 2413-GA		REV. 00		
											SHEET NO. 01 NO. OF SHEETS 06				

GENERAL ARRANGEMENT FOR MAX PANEL (ANNEXURE-1)



REAR VIEW(WITH SIDE CORNER)

- NOTES:-
1. EARTHING ARRANGEMENT TO BE ASSEMBLED AT THE FRONT OF THE CUBICLE.
 2. DOUBLE TERMINATION FACE OF TBS SHALL BE TOWARDS EDN CABLE CHANNEL.
 3. * CABLE CHANNEL SIZE 40x80 OR 40x100.
 4. \$\$ CABLE CHANNEL SIZE 40x100.
 5. THIS DRG. SHOWS TYPICAL ARRANGEMENT OF VARIOUS COMPONENTS THAT CAN BE MOUNTED, HOWEVER ACTUAL COMPONENTS SHALL BE AS CALLED ON DL.
 6. FTB's SHALL BE MOUNTED IN SUCH A WAY THAT HINGE SIDE IS ON TOP FOR ELMEX AND WEGO FTB's AND HINGE SIDE ON BOTTOM FOR PHOENIX FTB's.
 7. 8 LEVEL TB's DESIGNATION TO BE FOLLOWED AS SHOWN IN THE DRG.
 8. FAN SHOULD BE MOUNTED ON THE DOOR IN SUCH A WAY THAT THE FAN DIRECTION OF AIR FLOW SHOULD BLOW FROM INSIDE CUBICLE TO OUTSIDE.
 9. R1,R2,R3,R4 SHALL BE PROVIDED BY EDN
 10. PROVISION FOR R1,R2,R3,R4 SHALL BE PROVIDED R1-R4 ARE 19" RACK MOUNTABLE
 11. IN BETWEEN BAYING OF CABINETS, SIDE COVERS SHALL NOT BE PROVIDED.
 12. DIMENSIONS & ARRANGEMENTS SHOWN IN GA ARE INDICATIVE, SUPPLIER SHALL PROVIDE ARRANGEMENT FOR EASE OF ACCESSIBLTY



8 LEVEL TB DETAILS

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	FOR UNSPECIFIED-TOLERANCES REFER ED 0230499		SCALE 1 : 15	WEIGHT(Kg)	REF. TO ASSY. DRG.	ITEM NO.	N	
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G									TITLE TYPICAL GA FOR DCS SYSTEM (MAX & VALMET)				DRAWING NO. PS 415 2413-GA			F
													1		2	

GENERAL ARRANGEMENT FOR VALMET (ANNEXURE-1)

A

B

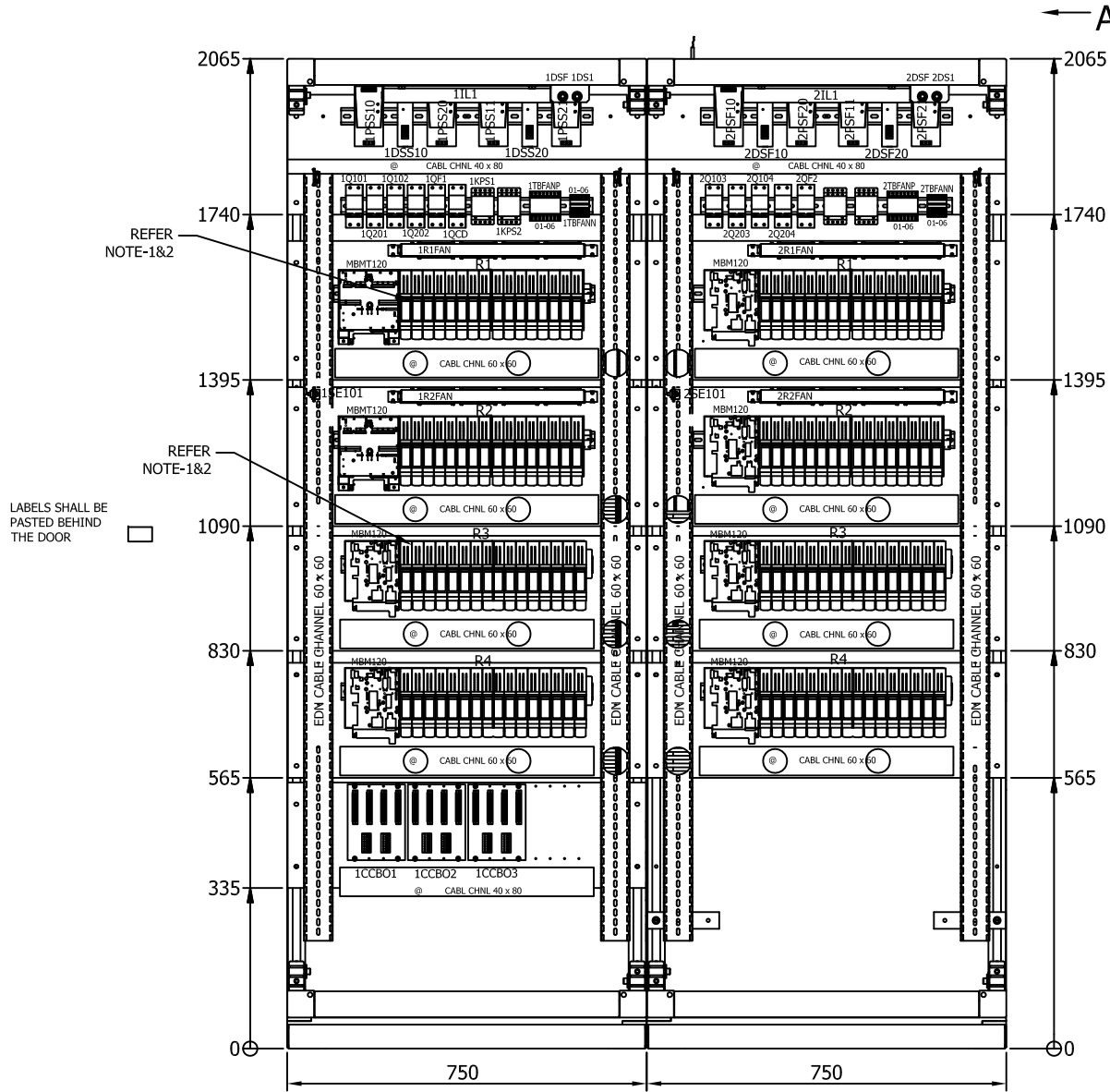
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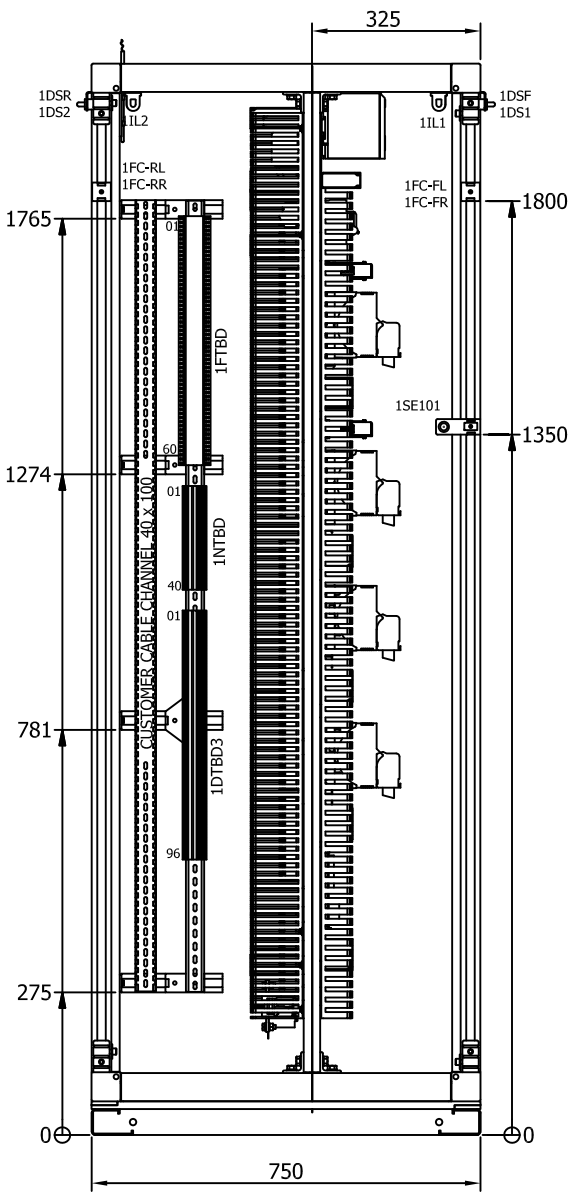
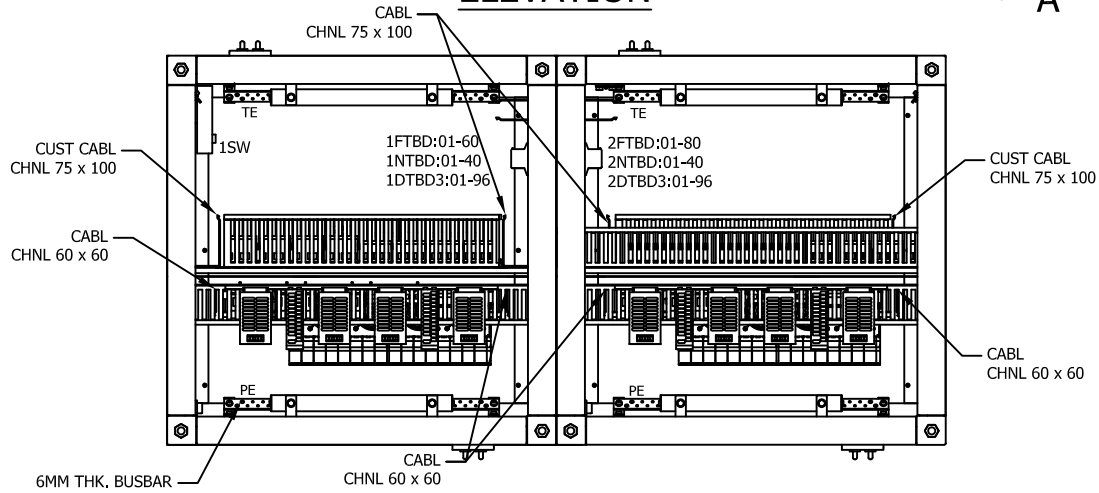
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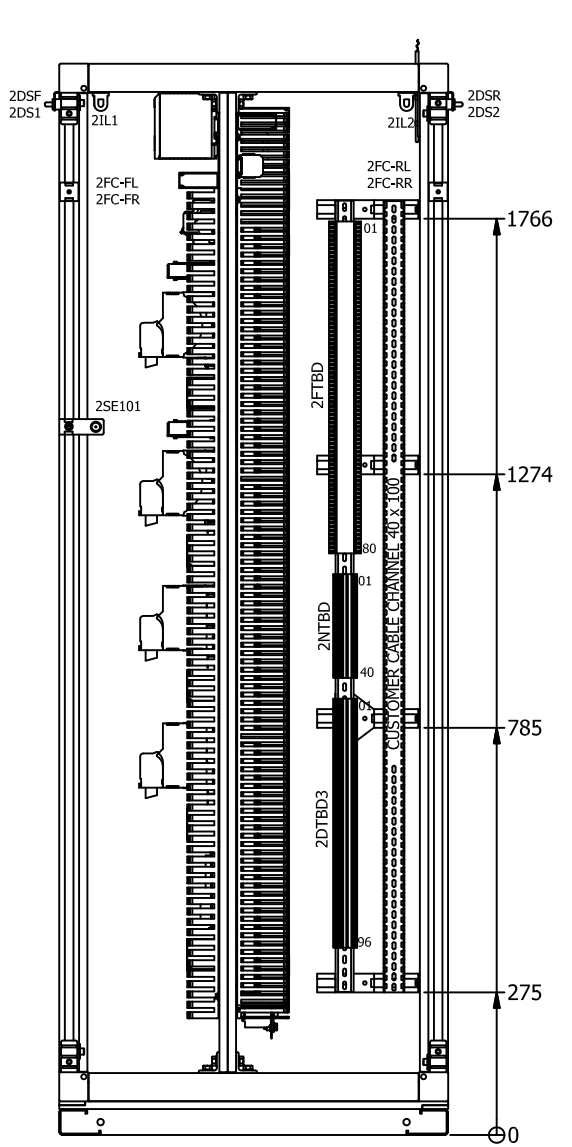
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ELEVATION



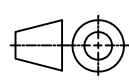
SIDE VIEW



VIEW 'A-A'

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FOR UNSPECIFIED-TOLERANCES
REFER ED 0230499



SCALE
1 : 15

WEIGHT(Kg)

REF. TO ASSY. DRG.

ITEM NO.

No. OF
ITEM

TITLE
TYPICAL GA FOR DCS SYSTEM
(MAX & VALMET)

DRAWING NO.

PS 415 2413-GA

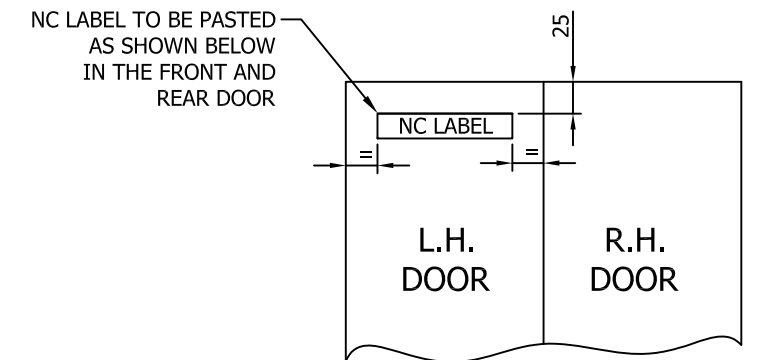
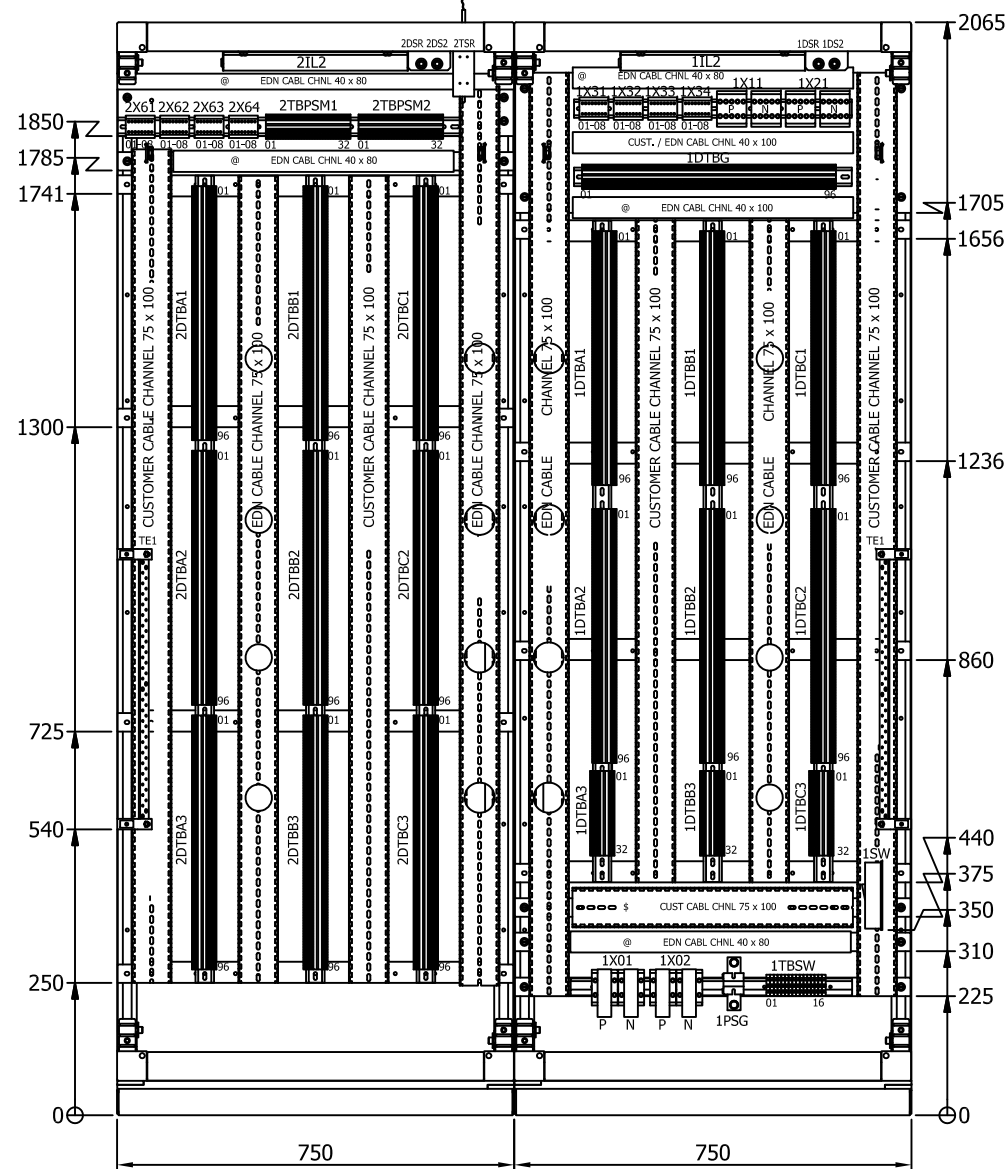
REV.

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SHEET NO. 03

NO. OF SHEETS 06

GENERAL ARRANGEMENT FOR VALMET (ANNEXURE-1)



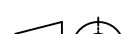
NC LABEL INFORMATION

NOTES:-

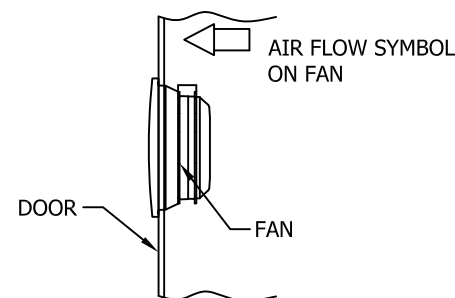
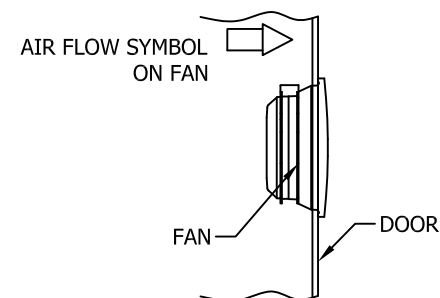
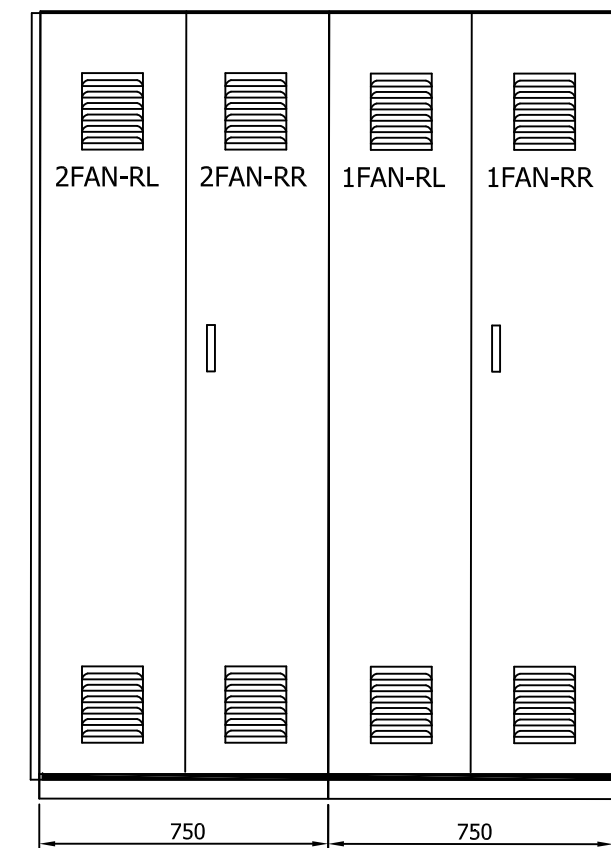
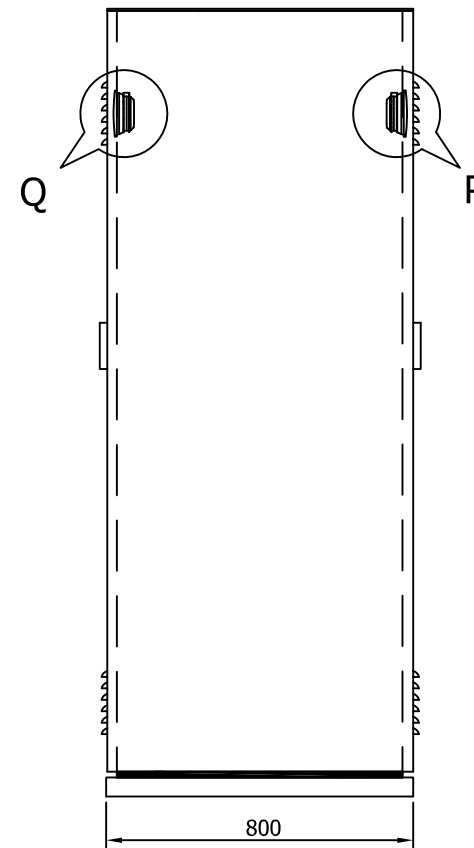
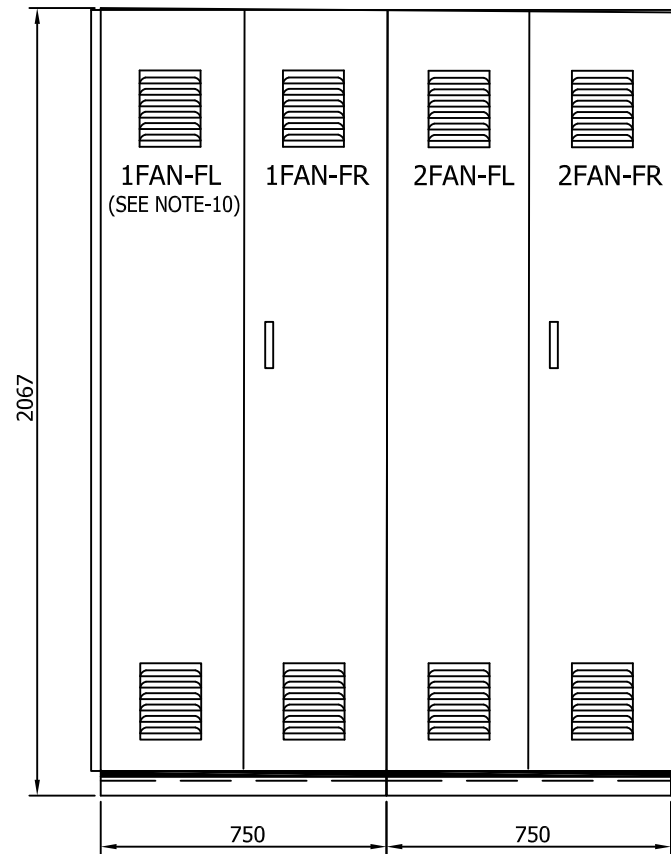
1. R1,R2,R3,R4 MBM'S ARE IN SCOPE OF EDN.
2. PROVISION FOR MOUNTING FOR ABOVE ITEMS SHALL BE PROVIDED AS PER BHEL DRG NO. 36594301662 & 36594302235(for top rackfan & module fixing).
3. EARTHING ARRANGEMENT TO BE ASSEMBLED AT THE FRONT OF THE CUBICLE.
4. \$ CABLE CHANNEL SIZE 40x100 OR 60x60.
5. FTB'S SHALL BE MOUNTED SUCH THAT SHORTING LINKS TO BE PROVIDED TOWARDS CUSTOMER CABL CHNL.
6. POWER SUPPLY WIRING FROM X01-P,N AND X02-P,N TO X11-P,N AND X21-P,N RESPECTIVELY ARE TO BE BUNCHED AND SPIRAL WOUND AND TO BE ROUTED IN BETWEEN VERTICAL CABLE CHANNELS.
7. ANTI-STATIC CAUTION LABEL SHALL BE PASTED ON INSIDE OF LH DOOR AT A HEIGHT OF 1500mm.
8. DIMENSIONS MAY VARY TO SUIT SLOT ON DIN RAIL.
9. FAN SHOULD BE MOUNTED ON THE DOOR IN SUCH A WAY THAT THE FAN DIRECTION OF FLOW SHOULD BLOW FROM INSIDE CUBICLE TO OUSIDE.
10. ALL POWER SUPPLY WIRING EDN CABLES, ROUTED IN CUST. / EDN CABLE CHANNEL TO BE BUNCHED AND SPIRAL WOUND.

IMPORTANT NOTE:-

FOR TERMINAL BLOCK(TB) ARRANGEMENT REFER RELEVANT DL FOR MOUNTING FTB's AND DTB's.

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	FOR UNSPECIFIED-- TOLERANCES REFER ED 0230499		SCALE	WEIGHT(Kg)	REF. TO ASSY. DRG.	ITEM NO.	No. OF ITEM								
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												SHEET NO. 04		NO. OF SHEETS 06									
1			2			3			4			5			6			7			8		

GENERAL ARRANGEMENT FOR MAX & VALMET PANEL (ANNEXURE-1)



REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	FOR UNSPECIFIED-TOLERANCES REFER ED 0230499		SCALE	WEIGHT(Kg)	REF. TO ASSY. DRG.	ITEM NO.	No. OF ITEM								
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1			2			3			4			5			6			7			8		

GENERAL ARRANGEMENT FOR MAX & VALMET (ANNEXURE-1)

A

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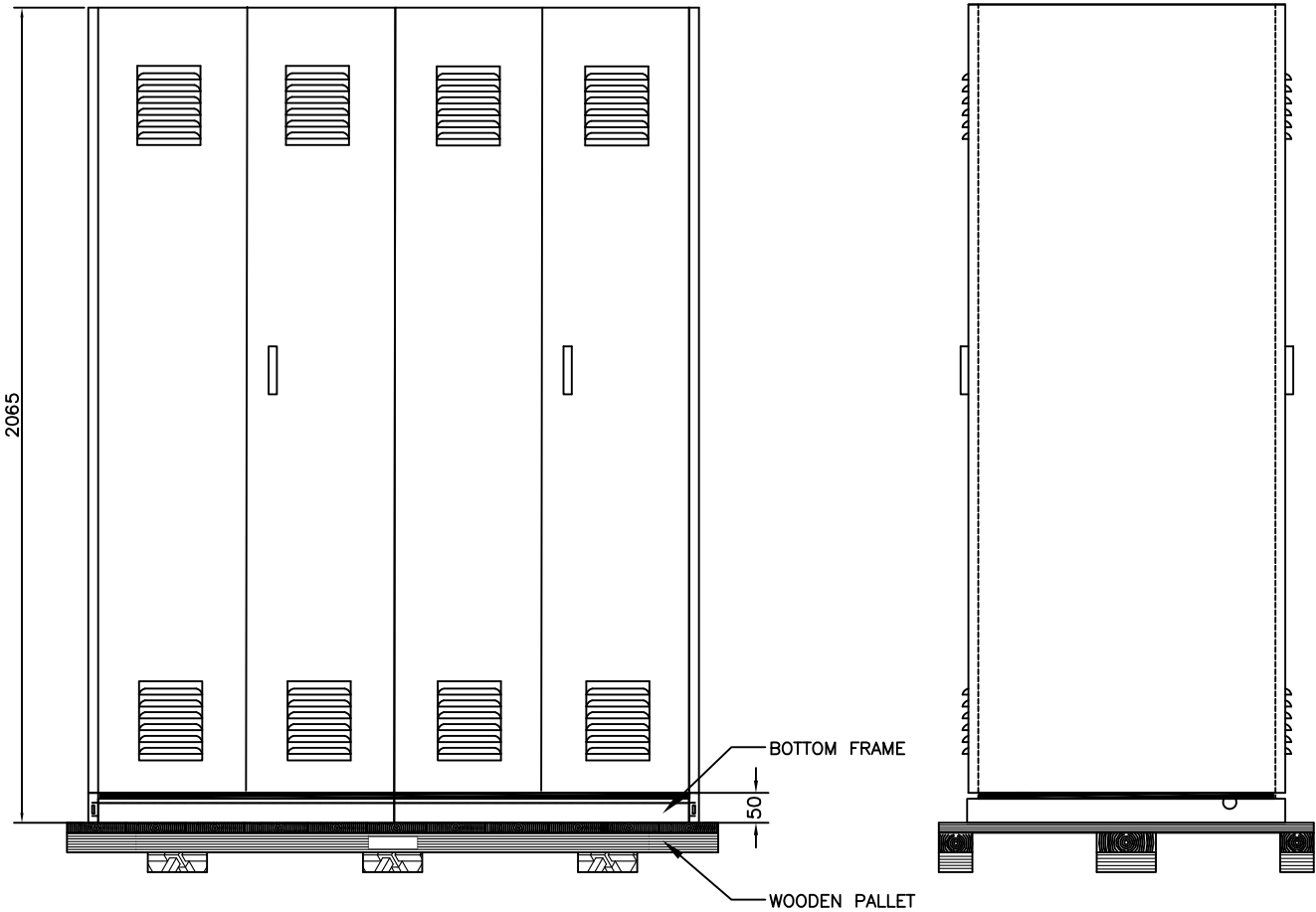
A

B

C

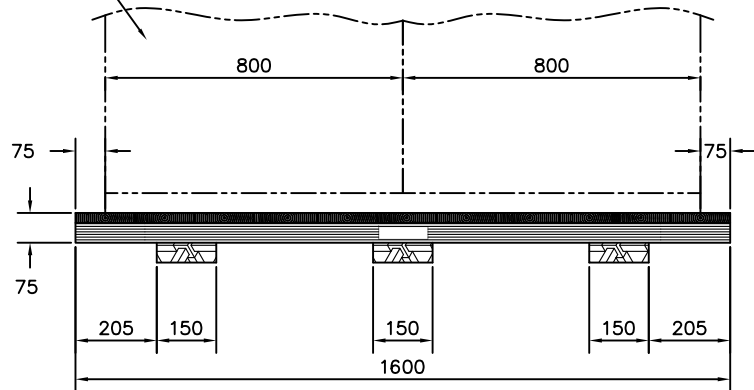
D

E

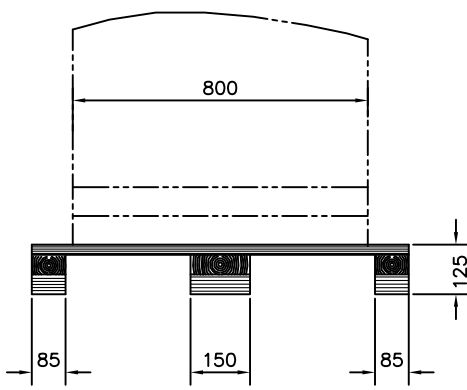


FRONT VIEW

SIDE VIEW



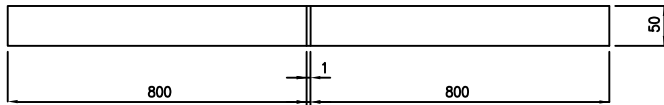
FRONT VIEW



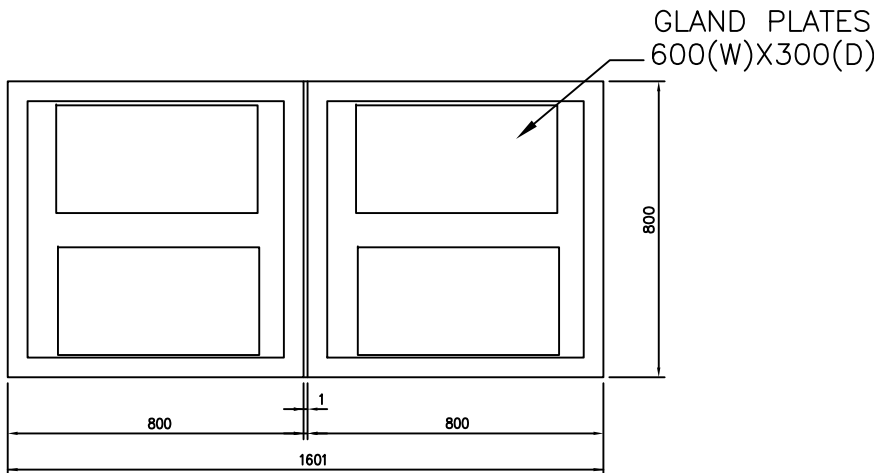
SIDE VIEW

WOODEN PALLET DETAILS

BOTTOM FRAME DETAILS



BOTTOM FRAME (FRONT VIEW)



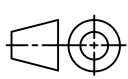
BOTTOM FRAME (PLAN)

NOTE:

1. EARTHING TERMINALS TO BE PROVIDED ON BOTH SIDES OF THE BOTTOM FRAMES.
2. EARTHING TERMINALS SHALL NOT BE EXTENDED BEYOND BOTTOM FRAME TO AVOID TOUCHING/OVERLAPPING OTHER ENCLOSURES WHILE STACKED TOGETHER.

REV.	DATE	ALTERED	CHECKED	APPROVED	REV.	DATE	ALTERED	CHECKED	APPROVED	REV.	DATE	ALTERED	CHECKED	APPROVED

FOR UNSPECIFIED-TOLERANCES
REFER ED 0230499



SCALE
1 : 15

WEIGHT(Kg)

REF. TO ASSY. DRG.

ITEM NO. No. OF ITEM

TITLE
TYPICAL GA FOR DCS SYSTEM
(MAX & VALMET)

DRAWING NO.
PS 415 2413-GA

REV.
00

SHEET NO. 06

NO. OF SHEETS 06

CONSOLIDATED BOM LIST (ANNEXURE-2)

Sl No	Material Code (BHEL Reference)	Description	Qty	Unit	Device Reference	Vendor	Part No	Scope	Remarks	Cubicle Name	Type	Unit Price (Rs)	Total Value (Rs) (Qty*Unit price)
1	AA7419711011	SWITCH DOOR Panel door Switch single pole NC Contact Rating: 240V AC & 0.25 Amps (Minimum) IEC make PB 901 Series. Push to off	8	NO	1DSF,1DSR,1DS1,1DS2 2DSF,2DSR,2DS1,2DS2	ELEKTRIKALS & CERAMICS MAHENDRA INDUSTRIAL SUPPLIERS M. K. ELECTRIC COMPANY	TVS CHERRY/ANY REPUTED MAKE	Supplier		CRE13-CRE14	Common		
2	CN9068369130	SPLIT PIN FOR BRICK RED CONNECTOR	32	NO		BENSTAR ELECTRONICS PRIVATE LIMITED TE CONNECTIVITY INDIA PRIVATE LIMITED TYCO ELECTRONICS MIDDLE EAST FZE BAECK AND CO HAMBURG	350707-7 TYCO ELECTRONICS MIDDLE EAST FZE	Supplier		CRE13-CRE14	MAX		
3	BC0501516130	METAL FINGER GUARD FOR 120X120 FAN	8	NO		HITECH MAGNETICS & ELECTRONICS PVT LTD HICOOL ELECTRONIC INDUSTRIES AMAR RADIO CORPORATION	FG-120CP HICOOL ELECTRONIC INDUSTRIES 12038 SAI COMPONENTS FG-12 (B-5) AMAR RADIO CORPORATION	Supplier		CRE13/CRE14	COMMON		
4	BC0501516149	24VDC BUSHLESS AXIAL FAN BALL BEARING- 120X120 MM WITH QTY.1 NO. "2 WAY PVC CONNECTOR" Minimum Airflow 105CFM @ 2700 RPM. Current : 250mA	8	NO	1FAN-FL,1FAN-RL,1FAN-FR,1FAN- RR,2FAN-FL,2FAN-RL,2FAN- FR,2FAN-RR	HICOOL ELECTRONIC INDUSTRIES AMAR RADIO CORPORATION	12P24HBDC HICOOL ELECTRONIC INDUSTRIES 12038 B24 M W SAI COMPONENTS EEC038282-0000-A99 AMAR RADIO CORPORATION	Supplier		CRE13-CRE14	COMMON		
5	CN9073167183	FUSE FAST ACTING 200mA 250V Certification & Standard Conformity to IEC 60127-2 Sheet 2: Yes Generic Specification Leads Material: Tin plated Copper Cap Material: Nickel Plated Brass Fuse Type: Fast Acting Body Material: Glass Leads provided: No Electrical Parameters: Current,Ampere: 200mA Voltage (VAC): 250V Interrupt Rating: 35A at 250VAC Dimensions and Size: Size: 5mm X 20mm	192	NO		AMAR RADIO CORPORATION SOURCE TECHNOLOGI SYSCO-TECH SYSTEMS (INDIA) PVT. LTD. PROTECTRON ELECTROMECH (P) LTD.	As per Material Description	Supplier	FOR 1FTB & 2FTB	CRE13-CRE14	Common		
6	CN9073167256	FUSE FAST ACTING,1.25A ,250V ,PSF-1.25A	8	NO		PROTECTRON ELECTROMECH (P) LTD.	PSF-0109 ROH 2002	Supplier	FOR 1TBFANP:01- 08	CRE14	COMMON		

CONSOLIDATED BOM LIST (ANNEXURE-2)

Sl No	Material Code (BHEL Reference)	Description	Qty	Unit	Device Reference	Vendor	Part No	Scope	Remarks	Cubicle Name	Type	Unit Price (Rs)	Total Value (Rs) (Qty*Unit price)
7	CN9751116694	CONDUCTV WRIST STRAP NON TOXIC ELASTIC TYPE. MOLDED CONTACT BUTTON CROCODILE CLIP, BANANA PLUG. BANANA PLUG DIA: 4MM RESISTANCE:1 MEG OH INSULATION: POLYURETHINE EXTRUDED INSULATION BRK DWN OF CORD: > 2 KV STATIC DISCHARGE PATH THRU METALIC PATH TOESD GROUND. COIL DIA: 8MM,+/-10% SNAP DISCONNECTED FORCE BETWEEN 5 TO 10 NEWTONS.	2	NO	1SE101, 2SE101	PB STATCLEAN SOLUTIONS PRIVATE LIMITED SRINIDHI ENTERPRISES ELECTROTEK STATIC CONTROLS PRIVATE LTD.	As per Material Description	Supplier		CRE13-CRE14	MAX/METSO		
8	CT7420596077	Miniature Circuit Breaker 10A, 1P, 24 VDC Tripping Characteristic - C Type of connection - Screw type Test Certificates to be provided.	6	NO	1Q101,1Q103,1Q201,1Q203,1Q102,1Q202	C&S ELECTRIC LTD. MICRONOVA IMPEX PVT. LTD. K. DHANDAPANI & CO.(ENGRS.) PVT.	As per Material Description Any reputed make/Schneider/ABB/Legrand	Supplier	FOR DC/DC	CRE13	COMMON		
9	CU7420596140	MCB 1POLE, 3A 24V TO 60VDC S201M-C3 240/415V GeM Category - Miniature Circuit Breakers-IS 60898-1:2002. Parameters are: Rated current (Amp) - 3A Instantaneous tripping range -C <i>Rated voltage (Volt) - 60V DC</i>	3	NO	1QF1,1QF2, QCD	K.H TRADERS C&S ELECTRIC LTD. RAHUL BROTHERS POOJA POWER PRODUCTS MICRONOVA IMPEX PVT. LTD.	GCSPO003 INDO ASIAN FUSEGEAR LTD. A9N1P03C SCHNEIDER ELECTRIC INDIA PVT. LTD. CSMB1C3 OR CSMB51C3 C&S ELECTRIC LTD. XX1039 ROH Z001	Supplier		CRE13	COMMON		
10	CU7433396489	MAX MODULE PCB FRONT CONNECTOR COLOUR: BLACK	64	NO		PHOENIX CONTACT INDIA PVT. LTD. WEIDMULLER ELECTRONICS INDIA PRIVATE LTD AMAR RADIO CORPORATION MICRONOVA IMPEX PVT. LTD.	174201 WEIDMULLER INTERFACE GMBH CO SMSTB 2,5/16-ST-5.08 BK(1875276) PHOENIX CONTACT INDIA PVT. LTD.	Supplier		CRE14	MAX		
11	CU7433397795	SOCKET TEST BS5 GREEN	2	NO		ELCOM INTERNATIONAL PVT. LTD.	na	Supplier		CRE13-CRE14	Common		
12	CU7433480510	DISTRIBUTION BLOCK SWAY, COLOUR:KHAKI TYPE NO: FDBK-5 (WITH MARKING 1-5)	4	NO	1X11-P, 1X11-N, 1X21-P, 1X21-N	CONNECTWELL INDUSTRIES PVT LTD ELMEX CONTROLS PVT LTD		Supplier	FOR AC/DC		COMMON		
13	CU7433480641	END STOP FOR MOUNTING ON DIN	16	NO		CONNECTWELL INDUSTRIES PVT LTD ELMEX CONTROLS PVT LTD WAGO PRIVATE LIMITED PHOENIX CONTACT INDIA PVT. LTD.	249-116, 249-119 WAGO PRIVATE LIMITED CA103, GMH8 CONNECTWELL INDUSTRIES PVT LTD	Supplier		CRE13	COMMON		
14	CU7433480650, CU7433480633, CU7433599061 CU7433599100, CU7433599096, CU7433599088 CU7433599070, CU7433599118	8 level cage clamp terminal block for DIN rail mounting (35 x 7.5) Colour: Grey, Each level to cater to 2 connection points (Total 32 connection points), Dimensions shall be Width: 7.5 mm (min), 7.7 mm (max) Length: 224 mm (min), 227 mm (max) Height: 55 mm (min), 85 mm (max) with accessories such as end plate, end clamp, TB Marker, Group Marker & Holder End Plate shall be provided at both ends of 8 level TB Row	165	NO	2TBA:01-55,2TBB:01-55,2TBC:01-55,1TBA:01-55,1TBB:01-55	UL ELECTRODEVICES PRIVATE LIMITED ELMEX CONTROLS PVT LTD PHOENIX CONTACT INDIA PVT. LTD. WAGO PRIVATE LIMITED	As per Material Description	Supplier		CRE13-CRE14	MAX		

CONSOLIDATED BOM LIST (ANNEXURE-2)

Sl No	Material Code (BHEL Reference)	Description	Qty	Unit	Device Reference	Vendor	Part No	Scope	Remarks	Cubicle Name	Type	Unit Price (Rs)	Total Value (Rs) (Qty*Unit price)
15	CU7433480676	DISTRIBUTION TBS INCOMING:25 SQ MM; OUTGOING:4 SQ MM FDBK 1X2 OR EQUIVALENT PART NUMBER	4	NO	1X11-P,1X11-N,1X21-P,1X21-N	CONNECTWELL INDUSTRIES PVT LTD ELMEX CONTROLS PVT LTD	As per Material Description	Supplier	FOR DC/DC	CRE13	Common		
16	CU7433480706	DISTRIBUTION TB'S RED; MARKING:1-8 RED DISTRIBUTION TB'S SUITABLE FOR 2.5 TO 4 SQ MM RED COLOUR: RED MARKING: 1-8 PRINTED ON BOTH SIDES. 8TBS STACKED TOGETHER & POTENTIALLY CONNECTED. VOLTAGE GRADE 800V. DIN/G RAIL UNIVERSAL MOUNTED.	3	NO	2X31,2X61,2X63	CONNECTWELL INDUSTRIES PVT LTD ELMEX CONTROLS PVT LTD	As per Material Description	Supplier		CRE14	Common		
17	CU7433480714	DISTRIBUTION TB BLACK; MARKING:1-8 BLAC DISTRIBUTION TB'S SUITABLE FOR 2.5 TO 4 SQ MM BLACK COLOUR: BLACK MARKING: 1-8 PRINTED ON BOTH SIDES. 8TBS STACKED TOGETHER & POTENTIALLY CONNECTED. VOLTAGE GRADE 800V. DIN/G RAIL UNIVERSAL MOUNTED.	3	NO	2X32,2X62,2X64	CONNECTWELL INDUSTRIES PVT LTD ELMEX CONTROLS PVT LTD	As per Material Description	Supplier		CRE14	Common		
18	CU7433480722	SHORTING LINK INSULATION	44	NO		CONNECTWELL INDUSTRIES PVT LTD ELMEX CONTROLS PVT LTD PHOENIX CONTACT INDIA PVT. LTD. WAGO PRIVATE LIMITED UL ELECTRODEVICES PRIVATE LIMITED	FBSR 2.5 PHOENIX CONTACT INDIA PVT. LTD. 280-402 WAGO PRIVATE LIMITED ZQV 2.5/2 WEIDMULLER ELECTRONICS INDIA PRIVAT FBS 2.5 PHOENIX CONTACT INDIA PVT. LTD. CA801/1 CONNECTWELL INDUSTRIES PVT LTD	Supplier		CRE13	COMMON		
19	CU7433396489	MAX MODULE PCB FRONT CONNECTOR	46	NO		PHOENIX CONTACT INDIA PVT. LTD. WEIDMULLER ELECTRONICS INDIA PRIVATE LTD AMAR RADIO CORPORATION MICRONOVA IMPEX PVT. LTD.	174201 WEIDMULLER INTERFACE GMBH CO SMSTB 2,5/16-ST-5.08 BK(1875276) PHOENIX CONTACT INDIA PVT. LTD.	Supplier		CRE13	MAX		

CONSOLIDATED BOM LIST (ANNEXURE-2)

SI No	Material Code (BHEL Reference)	Description	Qty	Unit	Device Reference	Vendor	Part No	Scope	Remarks	Cubicle Name	Type	Unit Price (Rs)	Total Value (Rs) (Qty*Unit price)
20	CU7433480749, CU7433480730,CU743348076 51 to 655	SPRING CAGE FEED THROUGH TB, CHANNEL MOUNTING TERMINAL ANGULAR TYPE, CABLE ENTRY FRONT, SIZE:0.5 TO 2.5 SQ MM NO OF CONDUCTORS: 3 COLOUR: GREY / DARK BIEGE, MAKE: PHOENIX, CONNECTWELL, WAGO, ELMEX, WEIDMULLER DIMENSION: PITCH: 5 MM WIDTH: 50.5 MM HEIGHT: 36.5 MM with accessories such as end clamp, end plate, TB Marker. Group Marker with Holders	1024	NO	2NTB:1-40,2FNTB1:01- 04,2FNTB2:01-04, 11NTB:1- 40,1TBSW:01-08,1TBPSM1:01- 32,1TBPSM2:01-32 1DTBA1:01-72, 1DTBA2:01-72, 1DTBA3:01-72, 1DTBA4:01-72, 1DTBB1:01-72, 1DTBB2:01-72, 1DTBB3:01-72, 1DTBB4:01-72, 1DTBC1:01-72, 1DTBC2:01-72, 1DTBC3:01-72, 1DTBC4:01-72, 1DTBD3:01-72 ,1PTBD:01-40,	CONNECTWELL INDUSTRIES PVT LTD ELMEX CONTROLS PVT LTD PHOENIX CONTACT INDIA PVT. LTD. WAGO PRIVATE LIMITED WEIDMULLER INTERFACE GMBH CO UL ELECTRODEVICES PRIVATE LIMITED 8(1024)+4.2(18)+4.2(30)+3(4)	280-641 WAGO PRIVATE LIMITED ZDU2.5-2/3AN WEIDMULLER ELECTRONICS INDIA PRIVAT ST52.5 TWIN PHOENIX CONTACT INDIA PVT. LTD. DC72.5-1 X 2 ELMEX CONTROLS PVT LTD AS2.5/3 CONNECTWELL INDUSTRIES PVT LTD	Supplier	Vertical TBs applicable for Valmet Panel	CRE13-CRE14	COMMON		
21	CU7433498508, CE7433498192, CN9075001207	Terminal Blocks with Locking nut with accessories such as end plate, end clamps, TB markers	5	NO	1X01-P,1X01-N,1X02-P,1X02- N,1PSG	CONNECTWELL INDUSTRIES PVT LTD ELMEX CONTROLS PVT LTD 155(5)+38(4)+3(4)	Terminal Blocks with Locking nut Part No: CBT 250(Elemex) Part No: CTS95L (Connectwell)	Supplier		CRE13	COMMON		
22	CU9095005294	Multi Stranded Single core 0.5 Sqmm FRLS PVC Instrumentation Cable as per ED28600 Insulation Colour Grey	3,500	M		Paras Wires Private Limited SHREE GOPAL INDUSTRIES BMI CABLES PVT. LTD. SBEE CABLES (INDIA) LIMITED ADVANCE CABLE TECHNOLOGIES (P) LTD. R.J.INDUSTRIAL CORPORATION RALLISON ELECTRICALS PVT. LTD.	As per ED28600	Supplier	Quantity of cables are tentative & actuals shall be as per suppliers routing	CRE13-CRE14	Common		
23	CU9095005296	Multi Stranded Single core 0.75 Sqmm FRLS PVC Instrumentation Cable as per ED28600 Insulation Colour Grey	50	M		SHREE GOPAL INDUSTRIES SBEE CABLES (INDIA) LIMITED ADVANCE CABLE TECHNOLOGIES (P) LTD. R.J.INDUSTRIAL CORPORATION MANSFIELD CABLES COMPANY LTD. RALLISON ELECTRICALS PVT. LTD.	As per ED28600	Supplier	Quantity of cables are tentative & actuals shall be as per suppliers routing	CRE13-CRE14	Common		
24	CU9095005298	Multi Stranded Single core 1.5 Sqmm FRLS PVC Instrumentation Cable as per ED28600 Insulation Colour Black	75	M		SHREE GOPAL INDUSTRIES SBEE CABLES (INDIA) LIMITED ADVANCE CABLE TECHNOLOGIES (P) LTD. R.J.INDUSTRIAL CORPORATION MANSFIELD CABLES COMPANY LTD.	As per ED28600	Supplier	Quantity of cables are tentative & actuals shall be as per suppliers routing	CRE13-CRE14	Common		
25	CU9095005303	Multi Stranded Single core 1.5 Sqmm FRLS PVC Instrumentation Cable as per ED28600 Insulation Colour Grey	25	M		SHREE GOPAL INDUSTRIES SBEE CABLES (INDIA) LIMITED ADVANCE CABLE TECHNOLOGIES (P) LTD. R.J.INDUSTRIAL CORPORATION RAVICAB CABLES PRIVATE LIMITED DELTON CABLES LIMITED	As per ED28600	Supplier	Quantity of cables are tentative & actuals shall be as per suppliers routing	CRE13-CRE14	Common		
26	CU9095005305	Multi Stranded Single core 1.5 Sqmm FRLS PVC Instrumentation Cable as per ED28600 Insulation Colour Red	75	M		SHREE GOPAL INDUSTRIES SBEE CABLES (INDIA) LIMITED ADVANCE CABLE TECHNOLOGIES (P) LTD. R.J.INDUSTRIAL CORPORATION MANSFIELD CABLES COMPANY LTD.	As per ED28600	Supplier	Quantity of cables are tentative & actuals shall be as per suppliers routing	CRE13-CRE14	Common		

CONSOLIDATED BOM LIST (ANNEXURE-2)

Sl No	Material Code (BHEL Reference)	Description	Qty	Unit	Device Reference	Vendor	Part No	Scope	Remarks	Cubicle Name	Type	Unit Price (Rs)	Total Value (Rs) (Qty*Unit price)
27	CU9095005307	Multi Stranded Single core 2.5 Sqmm FRLS PVC Instrumentation Cable as per ED28600 Insulation Colour Black	50	M		SHREE GOPAL INDUSTRIES SBEE CABLES (INDIA) LIMITED ADVANCE CABLE TECHNOLOGIES (P) LTD. R.J.INDUSTRIAL CORPORATION	As per ED28600	Supplier	Quantity of cables are tentative & actuals shall be as per suppliers routing	CRE13-CRE14	Common		
28	CU9095005309	Multi Stranded Single core 2.5 Sqmm FRLS PVC Instrumentation Cable as per ED28600 Insulation Colour Green/Yellow	20	M		SHREE GOPAL INDUSTRIES SBEE CABLES (INDIA) LIMITED ADVANCE CABLE TECHNOLOGIES (P) LTD. R.J.INDUSTRIAL CORPORATION MANSFIELD CABLES COMPANY LTD.	As per ED28600	Supplier	Quantity of cables are tentative & actuals shall be as per suppliers routing	CRE13-CRE14	Common		
29	CU9095005313	Multi Stranded Single core 2.5 Sqmm FRLS PVC Instrumentation Cable as per ED28600 Insulation Colour Red	50	M		SHREE GOPAL INDUSTRIES SBEE CABLES (INDIA) LIMITED ADVANCE CABLE TECHNOLOGIES (P) LTD. R.J.INDUSTRIAL CORPORATION DELTON CABLES LIMITED	As per ED28600	Supplier	Quantity of cables are tentative & actuals shall be as per suppliers routing	CRE13-CRE14	Common		
30	CU9095005322	CABLE SIZE:16 SQ.MM STRANDS:0.41 CNDTR:TINNED CU CORES:1 VOLTAGE:1100V INSULATN:frls PVC COLOR OF INSULATION:GREY	12	M		SHREE GOPAL INDUSTRIES SBEE CABLES (INDIA) LIMITED ADVANCE CABLE TECHNOLOGIES (P) LTD. MANSFIELD CABLES COMPANY LTD.	As per ED28600	Supplier	Quantity of cables are tentative & actuals shall be as per suppliers routing for DC/DC	CRE13-CRE14	Common		
31	D59430055901	LABEL FOR MAX MODULE AND CONNECTOR LABEL FOR MAX MODULE AND CONNECTOR 100 X 60 DRG:36594300559_01	2	NO		EXCEL PROCESS (BANGALORE) PVT. LTD. SRINIVASA GRAPHICS INTEGRAL LABELS PVT. LTD.	As per Drawing no. 36594300559 Item No.01	Supplier		CRE13-CRE14	MAX		
32	D59430055902	LABEL FOR MAX MODULE AND CONNECTOR LABEL FOR MAX MODULE AND CONNECTOR 200 X 80 DRG:36594300559_02	1	NO		EXCEL PROCESS (BANGALORE) PVT. LTD. SRINIVASA GRAPHICS INTEGRAL LABELS PVT. LTD.	As per Drawing no. 36594300559 Item No.02	Supplier		CRE13-CRE14	MAX		
33	D59430055903	LABEL FOR MAX MODULE AND CONNECTOR LABEL FOR MAX MODULE AND CONNECTOR SIZE 75 X 48 DRG:36594300559_03	2	NO		EXCEL PROCESS (BANGALORE) PVT. LTD. SRINIVASA GRAPHICS INTEGRAL LABELS PVT. LTD.	As per Drawing no. 36594300559 Item No.03	Supplier		CRE13-CRE14	MAX		
34	D59450003201	MAXPAC TO MAXPAC I/O REDUNDANT BACKUP CABLE ASSEMBLY DRG:36594500032_01	1	NO	R1 TO R2	HITECH MAGNETICS & ELECTRONICS PVT LTD 3M ELECTRO & COMMUNICATION INDIA PVT LTD	As per Drawing 36594500032 Item no.01	Supplier		CRE13	MAX		
35	D59450003300	MAXPAC 37 COND. RIBBON CABLE ASSY. 18" DRG:36594500033_00	5	NO	R3 TO R4, R1-R2, R2-R3,R3-R4,PNL2-R4-PNL1-R4	HITECH MAGNETICS & ELECTRONICS PVT LTD FCI OEN CONNECTORS LTD. DELCO ELECTRONICS K.S.INSTRUMENTS PVT LTD	As per drawing 36594500033 Item No. 00	Supplier		CRE13-CRE14	MAX		

CONSOLIDATED BOM LIST (ANNEXURE-2)

Sl No	Material Code (BHEL Reference)	Description	Qty	Unit	Device Reference	Vendor	Part No	Scope	Remarks	Cubicle Name	Type	Unit Price (Rs)	Total Value (Rs) (Qty*Unit price)
36	SN0659384319	INTERPOSING RELAY WITH LED,FREE WHEELING DIODE AND MANUAL TEST BUTTON,MOUNTING: PROJECTION PLUG IN BASE TYPE, NO.OF CONTACTS: 2 C/O, CONTACT RATING: 5Amp 240VAC & 0.2 Amp 220 V AC, COIL VOLTAGE: 24VDC RELAY	2	NO	1KPS1,1KPS2	PARAMOUNT INDUSTRIES DIGITAL INSTRUMENTS & CONTROL SYSTEMS OEN INDIA LTD CONTROL AND AUTOMATION SYSTEMS	As per Material Description	Supplier	FOR DC/DC	CRE13	COMMON		
37	DV0692307729	HOUSING CAP FOR POWER CONNECTOR 50-84-1035 (Colour Resin : White)	16	NO		HICOTRONICS DEVICES PVT. LTD. AVNET ASIA PTE LTD. TYCO ELECTRONICS MIDDLE EAST FZE VISWAS TRADING CORPORATION	50-84-1035 MOLEX SINGAPORE PTE LTD 350766-1 TYCO ELECTRONICS MIDDLE EAST FZE	Supplier		CRE13-CRE14	MAX		
38	ES9430027701	ATTENTION LABEL as per 46594300277	2	NO		SRINIVASA GRAPHICS	As per Drawing 46594300277	Supplier		CRE13-CRE14	MAX		
39	ED7419599033	SW 20A, 6A/16A SOCKET,FUSE CARRIER &BULB	1	NO	1SW	INDUSTRIAL ASSOCIATES MEENAKSHI ELECTRIC CORPN MAHENDRA INDUSTRIAL SUPPLIERS CAUVERY ELECTRICALS	MAKE : CONA, TYPE: 2356 COLOUR: WHITE MAKE : CONA, TYPE: Equivalent COLOUR: IVORY MAKE : ANCHOR, TYPE: 39984 COLOUR: WHITE MAKE : ANCHOR, TYPE: 50984 COLOUR: IVORY	Supplier		CRE13	COMMON		
40	ED7433497064, ED7433480528, CU7433480641 CU74334807651E to 659E	FUSED DISCONNECT TERMINAL BLOCK WITH BLOWN FUSE INDICATION BY LED FOR MINIATURE FUSE 5x20mm AND 24V DC SUPPLY. GREY COLOUR, SUITABLE FOR 4mm SQ. with accessories such as Shorting link, End plate, End Clamp, TB Markers, Group marker with holders	104	NO	1FTB-01-96, 1TBFANP-01-08	ELMEX CONTROLS PVT LTD WAGO PRIVATE LIMITED PHOENIX CONTACT INDIA PVT. LTD. 38.5(104)+5(2)+15(4)+4.2(20)	WAGO PART NO: (With + Sign For Input (Shorted Side) and - Sign For Output.) 281-611 / 281-541(S) PHOENIX PART NO: ST4 - HESILED 24-I/GY/GY Elmex Part No: DCF4D1 (Grey)	Supplier		CRE13	COMMON		
41	ED7433480536	SHORTING LINK WITH INSULATION (FTB)	196	NO		ELMEX CONTROLS PVT LTD WAGO PRIVATE LIMITED PHOENIX CONTACT INDIA PVT. LTD.	SSL4 ELMEX CONTROLS PVT LTD 281-402 WAGO PRIVATE LIMITED FBS 2-6 PHOENIX CONTACT INDIA PVT. LTD.	Supplier	FOR 2FTB(95),2FFTB1(3 ,2FFTB2(3)	CRE13-CRE14	COMMON		
42	EN7470106006	24V 10A DC/DC CONVERTER 24VDC/24VDC CONVERTER; I/P=24VDC (18-32VDC) WITH REVERSE PROTECTION. O/P=24VDC +/-1%,10A; LOAD SHARING >90% WHEN PARALLELING UPTO 4 UNITS; SUITABLE FOR PLATE/DIN RAIL MOUNTING; ENCLOSURE:VENTILATED; OPERATING TEMP:0-60DEG C; CONTACT:1 C/O FOR FAULT MONITORING:INDICATION:DC I/P (GREEN),DC OK(YELLOW);DC LOW(RED); I/P PROTECTION:FUSE; INRUSH CURRENT:<15A TYPICAL; EFFICIENCY: >85% OVER THE RANGE 10% TO FULL	6	NO	1PSS10,1PSS11,1PSS20,1PSS21,1P SF10,1PSF20	PHOENIX CONTACT INDIA PVT. LTD. WEIDMULLER ELECTRONICS INDIA PRIVATE LTD PARAMOUNT INDUSTRIES	PHOENIX CONTACTS- MODEL NO-QUINT PS/24DC/24DC/10, Part NO: 2320092) (WEIDMULLER ELECTRONICS INDIA PRIVATE LTD Part NO: 2001810000, DC/DC converter, PRO DCDC 240W 24V 10A)	Supplier	FOR DC/DC	CRE13	COMMON		

CONSOLIDATED BOM LIST (ANNEXURE-2)

Sl No	Material Code (BHEL Reference)	Description	Qty	Unit	Device Reference	Vendor	Part No	Scope	Remarks	Cubicle Name	Type	Unit Price (Rs)	Total Value (Rs) (Qty*Unit price)
43	SN0659389231	VOLTAGE MONITORING RELAY RELAY SUPPLY VOLTAGE (IF SEPARATE RELAY SUPPLY VOLTAGE IS REQUIRED) : 24V DC (-15% TO +10%); MONITORING FUNCTION : OVER VOLTAGE (OV) / UNDER VOLTAGE (UV); MEASURING VOLTAGE RANGE : 18-36V DC; UNDER VOLTAGE SETTING RANGE : 18-23V DC; OVER VOLTAGE SETTING RANGE : 25-30V DC; OPERATING TEMPERATURE : 0 TO 55 DEG; HYSTERESIS (RESET VALUE) OF OVER VOLTAGE/UNDER VOLTAGE SETTING : 5-30% OF MEASURING VOLTAGE OR FIXED VOLTAGE OF APPROX 1V DC; OUTPUT CONTACT : RELAY POTENTIAL FREE CONTACT (IF THE OFFERED COMPONENT HAS FACILITY OF BOTH UV & OV DETECTION SIMULTANEOUSLY THEN SEPARATE CONTACT IS REQUIRED FOR UV & OV); MOUNTING : DIN RAIL;	2	NO	1M12,1M22	NANDI POWERTRONICS PVT. LTD.	As per Material Description Nandi Model Name: NAYIL-LHFVT	Supplier	FOR DC/DC	CRE13	Common		
44	SN0659419801	LED LUMINAIRE ASSY 230V AC,50HZ,1PH,10 WATTS	4	NO	1LL1,1LL2, 2LL1, 2LL2	POOJA ASSOCIATES HITECH MAGNETICS & ELECTRONICS PVT LTD Lokozo Technologies Private Ltd.	MAKE: ANCHOR/SURYA ANY REPUTED MAKE	Supplier		CRE13-CRE14	COMMON		
45	SN0659386623	Switched Mode Power Supply Unit: AC-DC 10A, 24VDC Input Range: i) AC I/P range: 93-264 VAC (or) as a suitably split range(s) of 110VAC ± 15% and 230VAC ± 15%. Input operating voltage selection: Auto Select As per PS/415/2239 and PQC/415/0001	4	NO		PARAMOUNT INDUSTRIES PHOENIX CONTACT INDIA PVT. LTD. WEIDMULLER ELECTRONICS INDIA PRIVATE LTD MICRONOVA IMPEX PVT. LTD.	Equivalent Part nos: PHOENIX: TRIO-PS-2G/1AC/24DC/10 - 2903149 or UNO2-PS/1AC/24DC/240W - 1096432 WEIDMULLER: PRO ECO 240W 24V 10A	Supplier			RELAY		
46	AA7431401019	FUSE HRC LINK # NS2 TYPE: NS Type Type of Construction: British standard fuse links, BS 88-2 Technical Specifications: Rated current: 2A Rated voltage: 440VAC Breaking capacity: 80KA Operating Class: gG Construction: Type of fuse: Blade Style-LV Fuse Terminals: F type- Blade tag connection Material of Fuse Body: Ceramic Size: F1, Total fuse length # 62mm Contact / Terminal Material: Silver-plated copper Additional Parameter: Suitable for use in RoHS compliant applications: Yes Conformity to Standards: BS88 INDUSTRIAL FUSE LINKS REF STD: IEC 60269-1 and 2, IS 13703-1 and 2, BS 88 PART 2	2	NO	1F01 & 1F02	GE POWER CONTROLS INDIA PVT LTD COOPER BUSSMANN INDIA PVT LTD K.DHANDAPANI & CO (ENGRS.) PVT LTD REGENCY ELECTRICALS PVT LTD SRINIDHI ENTERPRISES M.K.ELECTRIC COMPANY SIEMENS LIMITED ASSOCIATED INDUSTRIAL ENETERPRISES ARIHANT ELECTRICALS EATON POWER QUALITY PVT LTD Kreatronix Electyric Private Limited MERSEN INDIA PRIVATE LIMITED	GE Part No: NS2, 415V AC COOPER PART NO: NSD2	Supplier	FOR TRANSFORMER		Common		

CONSOLIDATED BOM LIST (ANNEXURE-2)

Sl No	Material Code (BHEL Reference)	Description	Qty	Unit	Device Reference	Vendor	Part No	Scope	Remarks	Cubicle Name	Type	Unit Price (Rs)	Total Value (Rs) (Qty*Unit price)
47	AA7431401027	FUSE HRC LINK # NS4 TYPE: NS Type Type of Construction: British standard fuse links, BS 88-2 Technical Specifications: Rated current: 4A Rated voltage: 440VAC Breaking capacity: 80KA Operating Class: gG Construction: Type of fuse: Blade Style-LV Fuse Terminals: F type- Blade tag connection Material of Fuse Body: Ceramic Size: F1, Total fuse length # 62mm Contact / Terminal Material: Silver-plated copper Additional Parameter: Suitable for use in RoHS compliant applications: Yes Conformity to Standards: BS88 INDUSTRIAL FUSE LINKS REF STD: IEC 60269-1 and 2, IS 13703-1 and 2, BS 88 PART 2	2	NO	1F03 & 1F04	GE POWER CONTROLS INDIA PVT LTD COOPER BUSSMANN INDIA PVT LTD K.DHANDAPANI & CO (ENGRS.) PVT LTD REGENCY ELECTRICALS PVT LTD SRINIDHI ENTERPRISES M.K.ELECTRIC COMPANY SIEMENS LIMITED ASSOCIATED INDUSTRIAL ENTERPRISES ARIHANT ELECTRICALS EATON POWER QUALITY PVT LTD Kreatronix Electyric Private Limited MERSEN INDIA PRIVATE LIMITED	GE Part No: NS4, 415V AC COOPER PART NO: NSD4/B1 or 4F06, 550V AC	Supplier	FOR TRANSFORMER		Common		
48	AA7432121010	FUSE BASE AND CARRIER FOR gG BLADE TAG BS FUSE RATING: 32A,550VAC Type of construction Constructional Parameter: Fuse base-British Standard Fuse Link Performance Parameter: Auxiliary Microswitch: No Fuse Holder material: Thermo-Plastic Location of Top and Bottom Connection-BS88: Front-Front Rated Voltage, AC(Volt): 550 Ambient Temperature: 50 Deg C Contact / Terminal Material: Silver Plated Copper Rated Current, Ampere: 32A Fuse Holder Terminal Connection-DIN: Screw Compatible fuse Size-BS 88: F1, Total fuse length # 62mm Degree of Protection: IP 20 Mounting/Fixing: Screw Breaking Capacity, KA: 80 No. of poles: 1 Compatible fuse Size-DIN Industrial Fuse Link: NA Rated Voltage, DC(Volt):NA Certification and Standard: Conformity to standard - IEC 60269-1 and 2, IS 13703-1 and 2, BS 88 PART 2 Conformity to RoHS Compliant: Yes CATNO:MFG/2A REF STD:IS9224 MERSEN PART NO: A230138 GE Part No: NSH32	4	NO	1F01 TO 1F04	GE POWER CONTROLS INDIA PVT LTD COOPER BUSSMANN INDIA PVT LTD K.DHANDAPANI & CO (ENGRS.) PVT LTD REGENCY ELECTRICALS PVT LTD SRINIDHI ENTERPRISES M.K.ELECTRIC COMPANY SIEMENS LIMITED ASSOCIATED INDUSTRIAL ENTERPRISES ARIHANT ELECTRICALS EATON POWER QUALITY PVT LTD Kreatronix Electyric Private Limited MERSEN INDIA PRIVATE LIMITED	MERSEN PART NO: A230138 GE Part No: NSH32	Supplier	FOR TRANSFORMER		Common		

CONSOLIDATED BOM LIST (ANNEXURE-2)

Sl No	Material Code (BHEL Reference)	Description	Qty	Unit	Device Reference	Vendor	Part No	Scope	Remarks	Cubicle Name	Type	Unit Price (Rs)	Total Value (Rs) (Qty*Unit price)
49	BC0501516157	FAN TIER RACK FOR VALMET (TOP MOUNTING) As per PS/410/2031	4	NO	1R1FAN, 1R2FAN, 1R3FAN, 1R4FAN	KAY FABS PRIVATE LTD SRI GAYATHRI SYNERGIC SYSTEMS HICOOL ELECTRONIC INDUSTRIES SIGMA PUNCH FORMS PVT LTD DRIVE TECH PRODUCTS HITECH MAGNETICS & ELECTRONICS PVT LTD MODULAR RACK SYSTEMS PVT LTD PRECISION RACKS MANUFACTURING CO	As per Purchase Specification: PS/410/2031	Supplier	RACK-1, RACK-2, RACK-3, RACK-4		METSO		
50	BC0501516165	Voltmeter Input 0-50V DC, display 0-50VDC, 3½ Digit, 7-Segment LED display, 48x96mm flush mounting, Accuracy +1% of full scale or better. Aux: 24V DC.	1	NO	1VM	RISHABH INSTRUMENTS LIMITED MECO INSTRUMENTS PRIVATE LTD AUTOMATIC ELECTRIC LTD		Supplier	FOR VOLTMETER		METSO		
51	BC06959530180	TRANSFORMER CONTROL 100VA SINGLE PHASE, 50HZ LV1: 24V HV1: 240V HV TAP: ±2.5%, ±5% IMPEDANCE: 4% INSULATION CLASS: B INSULATION LEVEL: (50HZ 1MIN): 2.5 KV TRANSPARENT POLY- CARBONATE 8MM SHEET ABOVE TERMINALS NO LOAD CURRENT TOB ELESS THAN 20% OF FULL LOAD CURRENT IS2026 & IS11171 & CN74500-5	1	NO	1CTF1	TRANSPORER INDUSTRIES KALPA ELECTRICAL PVT LTD ANU ELECTRICALS KALHARE ENTERPRISES	As per material Description	Supplier	FOR TRANSFORMER		Common		
52	CC0695012592	End Clamp for Terminal Blocks(TB) with Cross sections 1.5sqmm to 10sqmm(Mountable on DIN 35 Channel).	4	NO		CONNECTWELL INDUSTRIES PVT LTD ELMEX CONTROLS PVT LTD PHOENIX CONTACT INDIA PVT. LTD ELMEX ELECTRIC PRIVATE LIMITED	CONNECTWELL PART NO: CA702 ELMEX PART NO: SCUN PHOENIX PART NO: E/UK	Supplier	1 PER RACK		METSO		
53	CC0695014455	Connectwell Make Support Plate mountable on 35mm DIN Rail Channel for holding Protective Cover over Terminal Blocks. Connectwell Part No. is CSP1. Four copies of datasheets and test certificates to be furnished to BHEL for NPCIL approval.	2	NO		CONNECTWELL INDUSTRIES PVT LTD	Connectwell Part No. is CSP1 .	Supplier	POLYCARBONATEE SHEET TO BE MOUNTED ON END PLATE		COMMON		
54	CN9068414178	THERMOPLASTIC SOCKET OPEN END RED COLOR 4MM DIA BS-5	1	NO	1B55R	ELCOM INTERNATIONAL PVT. LTD.		Supplier	To be mounted on the left side of the plate. For Voltmeter		METSO		
55	CN9068414208	THERMOPLASTIC SOCKET OPEN END BLACK COLOR 4MM DIA BS-5	1	NO	1B55B	ELCOM INTERNATIONAL PVT. LTD.		Supplier	To be mounted on the right side of the plate. For Voltmeter		METSO		

CONSOLIDATED BOM LIST (ANNEXURE-2)

Sl No	Material Code (BHEL Reference)	Description	Qty	Unit	Device Reference	Vendor	Part No	Scope	Remarks	Cubicle Name	Type	Unit Price (Rs)	Total Value (Rs) (Qty*Unit price)
56	CN9070330024	CKT BKR MINIATURE 380 VAC/110V DC RTG 6A 2P AUX CONTACTS 1 NO + 1 NC RATED SHORT CKT CAPACITY 10KA MFR PART NO S202MC6+S2C-H11L VENDOR- MICRONOVA IMPEX MFR PART NO S202MC6+S2C-H11L VENDOR- ABB LIMITED MFR PART NO 55L42067RC + 55T3010 VENDOR- SIEMENS LIMITED MFR PART NO CSMB2C6AX VENDORC<(>&<)>S ELECTRIC LIMITED	4	NO	1Q101, 1Q102,1Q201, 1Q202	ABB INDIA LIMITED MICRONOVA IMPEX PVT LTD C&S ELECTRIC LTD K.DHANDAPANI & CO (ENGRS) PVT LTD REGENCY ELECTRICALS PVT LTD MOHAN EXIM INDIA PVT LTD MANI SALES (BANGALORE) POOJA POWER PRODUCTS LEGRAND (INDIA) PVT LTD SIEMENS LIMITED NOVATEUR ELECTRICAL & DIGITAL SYS PVT LTD INDO ASIAN FUSEGEAR LTD RAHUL BROTHERS SCHNEIDER ELECTRIC INDIA PVT LTD CAUVERY ELECTRICALS	ABB PART NO: S202M-K6UC+S2C-H11L MICRONOVA PART NO: S202M-K6UC+S2C-H11L C&S PART NO: CSMB2C6AX	Supplier	FOR AC/DC		COMMON		
57	CN9070335158	CB MINI 250V AC 3A 1NO+1NC CKT BKR MINIATURE 250VAC(60VDC) RTG:3A 2P AUX CONTS:1NO+1NC SC RLS:(7 - 10) * IN MOUNTING: 35MM DIN RAIL ISC DC = 1.4 * ISCA CURVE CHARACTERISTIC: D GeM Category - Miniature Circuit Breakers-IS 60898- 1:2002. Parameters are: Rated current (Amp) - 3A Instantaneous tripping range - D Rated voltage (Volt) - 230V AC/60V DC No. of poles - 2P Auxiliary contact - With 1NO+1NC Mounting arrangement - Din rail mounted	1	NO	1QCTF	SIEMENS LIMITED K.DHANDAPA & CO (ENGRS) PVT LTD REGENCY ELECTRICALS PVT LTD ABB INDIA LTD MICRONOVA IMPEX PVT LTD SCHNEIDER ELECTRIC INDIA PVT LTD POOJA POWER PRODUCTS PAVAN TECHNIQUES LEGRAND (INDIA) PVT LTD MANI SALES (BANGALORE) RAHUL BROTHERS C&S ELECTRIC LTD NOVATEUR ELECTRICAL & DIGITAL SYS PVT LTD MOHAN EXIM INDIA PVT LTD CAUVERY ELECTRICALS	As per material Description	Supplier	FOR TRANSFORMER		COMMON		
58	CN9075001010	CLIP ON TERMINAL BLOCK CST2.5	28	NO	1TBSW-01-16, 1TBSD-01-12	CONNECTWELL INDUSTRIES PVT LTD ELMEX CONTROLS PVT LTD ELECTRIKALS & CERAMICS MODEL ELECTRICALS SRINIDHI ENTERPRISES	CONNECTWELL PART NO: CTS 2.5 ELMEX PART NO: CST 2.5	Supplier			COMMON		
59	CN9075001037	CLIP-ON SWITCHGEAR TERMINAL SUITABLE FOR 10SQ.MM CABLE 650V AC/DC	4	NO	1X01-P,N,1X02-P,N	CONNECTWELL INDUSTRIES PVT LTD ELMEX CONTROLS PVT LTD ELECTRIKALS & CERAMICS MODEL ELECTRICALS	CONNECTWELL PART NO: CTS-10 CR ELMEX PART NO: CST-10 BS ELECTRIKALS PART NO: CST-10 BS MODEL ELECTRICALS PART NO: CST-10 BS	Supplier	FOR AC/DC		COMMON		
60	CN9075001100	END PLATE FOR TERMINAL SIZE 2.5-10	10	NO		CONNECTWELL INDUSTRIES PVT LTD ELMEX CONTROLS PVT LTD ELECTRIKALS & CERAMICS MODEL ELECTRICALS SRINIDHI ENTERPRISES	CONNECTWELL PART NO: CTS EP 1 ELMEX PART NO: EPX	Supplier	TO BE PLACED AFTER 1TBSW: (07,14,16), X01- P/N, X02-P/N		COMMON		
61	CN9075001207	CLMP SIDE	10	NO		CONNECTWELL INDUSTRIES PVT LTD ELMEX CONTROLS PVT LTD ELECTRIKALS & CERAMICS MODEL ELECTRICALS	CONNECTWELL PART NO: CA502 ELMEX PART NO: SCS	Supplier			COMMON		
62	CN9075001215	STUD SHRT FOR SHRTG WITH SCREW 2.5-6	16	NO		CONNECTWELL INDUSTRIES PVT LTD ELMEX CONTROLS PVT LTD ELECTRIKALS & CERAMICS MODEL ELECTRICALS SRINIDHI ENTERPRISES	CONNECTWELL PART NO: CA507/5/1 ELMEX PART NO: SSP-2.5-6	Supplier	STUDS FOR 1TBSW		COMMON		

CONSOLIDATED BOM LIST (ANNEXURE-2)

Sl No	Material Code (BHEL Reference)	Description	Qty	Unit	Device Reference	Vendor	Part No	Scope	Remarks	Cubicle Name	Type	Unit Price (Rs)	Total Value (Rs) (Qty*Unit price)
63	CN9075001240	SHORTING LINK FOR CST2.5	13	NO		CONNECTWELL INDUSTRIES PVT LTD ELMEX CONTROLS PVT LTD ELEKTRIKALS & CERAMICS MODEL ELECTRICALS SRINIDHI ENTERPRISES	CONNECTWELL PART NO: CA503/1 ELMEX PART NO: PSL-2.5-2 WAY	Supplier	SHORT 1TBSW(01-07) (08-14) (15-16)		COMMON		
64	CU7341795905	VOLTAGE MONITOR TIME DELAY TYPE SUPPLY=24V +/-4V DC CM-ESS.2S 15VR730830R0400 ISOLATION BETWEEN MEASURING,O/P AND SUPPLY VOLTAGE CKTS. CONTACTS : 2 C/O	4			ABB INDIA LIMITED MICRONOVA IMPEX PVT LTD	CM-ESS.2S	Supplier			RELAY		
65	CU7419099014	ELECTRONIC HOOTER 24 V DC,35 MILLIAMPS 90dB AT A DISTANCE OF 1 METER FROM SOURCE THREE DIFFERENT TONES WITH SITE ADJUSTMENT	1	NO	1HOOTER	PYROTECH ELECTRONICS (P) LTD INDUSTRIAL INSTRUMENTS AND CONTROLS PROCON INSTRUMENTATION (P) LTD CANDS ELECTRICALS PVT LTD ENCORE INDUSTRIES		Supplier			Common		
66	CU7422337022	AUXILIARY RELAY, COIL VOLTAGE :240V AC, NO.OF CONTACTS: 4 C/O, WITH LED INDICATOR, FRONT CONNECTION BASE AND RETAINING CLIP. SUITABLE FOR DIN RAIL MOUNTING, PSPEC: PS4152387	2			GUARDIAN CONTROLS LIMITED ELEKTRIKALS & CERAMICS	RE-300/302	Supplier			RELAY		
67	CU7422337990	FRONT CONNECTION BASE ALONG WITH RETAINING CLIP, WITH DIN RAIL MOUNTING ARRANGEMENT	2	NO		JYOTI LIMITED GUARDIAN CONTROLS LIMITED	JYOTI PART NO: EVV-310 GUARDIAN PART NO: MSD 9K5 114	Supplier			COMMON		
68	CU7422399023	RELAY AUXILIARY WITH LED INDICATOR, TYPE NO.: RE- 300 COIL VOLTAGE:240V,AC NO.OF CONTACTS: 4 C/O MOUNTING :PROJECTION PLUG IN BASE TYPE, MANUAL TESTER WITH FREE WHEELING DIODE	2	NO	1KPS1,1KPS2	JYOTI LIMITED GUARDIAN CONTROLS LIMITED	JYOTI PART NO: RE-300(240V AC) GUARDIAN PART NO: 111-4-20	Supplier	FOR AC/DC		COMMON		
69	CU7433480730	END PLATE FOR ANGULA R SPRING CAGE FEED	18			CONNECTWELL INDUSTRIES PVT LTD ELMEX CONTROLS PVT LTD PHOENIX CONTACT INDIA PVT. LTD. WAGO PRIVATE LIMITED WEIDMULLER INTERFACE GMBH CO	280-313 - WAGO PRIVATE LIMITED ZAP/TW7 - WEIDMULLER ELECTRONICS INDIA PRIVAT DSTS 2.5 - PHOENIX CONTACT INDIA PVT. LTD. EPA S2.50 - CONNECTWELL INDUSTRIES PVT LTD DMP 2.5 - ELMEX CONTROLS PVT LTD	Supplier	280-641 ZDU2.5-2/3AN STS2.5 TWIN		RELAY		
70	D59260001501	MODULE END CONNECTOR 16-PIN AS PER DRG 36592600015 ITEM-01	4	NO		INTEGRAL LABELS PVT LTD SAHARA LABELS PRIVATE LIMITED SHIVA CREATIONS PARVATHI LABLES ELITE LABELS PVT LTD	AS PER DRG 36592600015 ITEM-01	Supplier			METSO		
71	D59260001503	MODULE/CCB END CONNECTOR 8-PIN AS PER DRG 36592600015 ITEM-03	1	NO		INTEGRAL LABELS PVT LTD SAHARA LABELS PRIVATE LIMITED SHIVA CREATIONS PARVATHI LABLES ELITE LABELS PVT LTD	AS PER DRG 36592600015 ITEM-03	Supplier			METSO		

CONSOLIDATED BOM LIST (ANNEXURE-2)

Sl No	Material Code (BHEL Reference)	Description	Qty	Unit	Device Reference	Vendor	Part No	Scope	Remarks	Cubicle Name	Type	Unit Price (Rs)	Total Value (Rs) (Qty*Unit price)
72	D59260001505	MODULE CONNECTOR HOOD LABEL AS PER DRG 365926000015 ITEM-05	2	NO		INTEGRAL LABELS PVT LTD SAHARA LABELS PRIVATE LIMITED SHIVA CREATIONS PARVATHI LABELS ELITE LABELS PVT LTD	AS PER DRG 365926000015 ITEM-05	Supplier			METSO		
73	D59260001506	MODULE CONNECTOR HOOD LABEL AS PER DRG 365926000015 ITEM-06	2	NO		INTEGRAL LABELS PVT LTD SAHARA LABELS PRIVATE LIMITED SHIVA CREATIONS PARVATHI LABELS ELITE LABELS PVT LTD	AS PER DRG 365926000015 ITEM-06	Supplier			METSO		
74	D59260001508	LABEL FOR MODULE LOCATION (METSO)AS PER DRG 365926000015IT08 (M00 TO M07)	4	NO		INTEGRAL LABELS PVT LTD SAHARA LABELS PRIVATE LIMITED SHIVA CREATIONS PARVATHI LABELS ELITE LABELS PVT LTD	AS PER DRG 365926000015IT08 (M00 TO M07)	Supplier	FOR ALL MB18-1		METSO		
75	D59260001509	LABEL FOR MODULE LOCATION (METSO)AS PER DRG 365926000015IT09 (M08 TO M15)	4	NO		INTEGRAL LABELS PVT LTD SAHARA LABELS PRIVATE LIMITED SHIVA CREATIONS PARVATHI LABELS ELITE LABELS PVT LTD	AS PER DRG 365926000015IT09 (M08 TO M15)	Supplier	FOR ALL MB18-2		METSO		
76	D59260001800	Inter Link Cable Assy for metsoDNA	2	NO		DELCO ELECTRONICS FARCOM CABLE SYSTEM PVT LTD FCI OEN CONNECTORS LTD HITECH MAGNETICS & ELECTRONICS PVT LTD 3M ELECTRO & COMMUNICATION INDIA PVT LTD		Supplier	MBMT120:X13(R1 to R2) or MBM120:X13(R1 to R2); MBM120:X13(R3 to R4)		METSO		
77	D99260010500	UNIVERSAL DUMMY TB AS PER DRG NO: 3 699 26 00105	15	NO		LATHA PLASTRONICS T.V.PLASTICS	AS PER DRG NO: 3 699 26 00105	Supplier			COMMON		
78	DA0659446270	Patch Cord Cat.6A / Cat.7 MP8 FS 600 LSZH-5 m, green-cable/ hood color green / color identification markers on the cable ,specification as per sl no 5 of PSPEC PS4042696 reference PSPSEC : PS4042696	1	NO		D-LINK (INDIA) LTD. MOLEX (INDIA) LIMITED TE CONNECTIVITY INDIA PRIVATE LIMITED SCHNEIDER ELECTRIC INDIA PVT LTD BELDEN INTERNATIONAL INC INTERFACE CONNECTRONICS PVT. LTD WEIDMULLER ELECTRONICS INDIA PRIVATE LIMITED. BINARY SYSTEMS PVT.LTD. AKASH SOLAR ALTERNATIVE ENERGY PVT. LTD. FCI OEN CONNECTORS LTD TEXONIC INSTRUMENTS PRISHA SYSTEMS & NETWORKS PVT. LTD. HARTING (INDIA) PVT. LTD.	As per Purchase Spec PS4042696	EDN	PNL1:R1ACN(M) TO PNL2:R4IBC.		METSO		

CONSOLIDATED BOM LIST (ANNEXURE-2)

Sl No	Material Code (BHEL Reference)	Description	Qty	Unit	Device Reference	Vendor	Part No	Scope	Remarks	Cubicle Name	Type	Unit Price (Rs)	Total Value (Rs) (Qty*Unit price)
79	DA0659446289	Patch Cord Cat.6A / Cat.7 MP8 FS 600 LSZH-2 m, red-cable/ hood color red / color identification markers on the cable ,specification as per sl no 3 of PSPEC PS4042696 reference PSPSEC : PS4042696	3	NO		D-LINK (INDIA) LTD. MOLEX (INDIA) LIMITED TE CONNECTIVITY INDIA PRIVATE LIMITED SCHNEIDER ELECTRIC INDIA PVT LTD BELDEN INTERNATIONAL INC INTERFACE CONNECTRONICS PVT. LTD WEIDMULLER ELECTRONICS INDIA PRIVATE LIMITED. BINARY SYSTEMS PVT.LTD. AKASH SOLAR ALTERNATIVE ENERGY PVT. LTD. FCI OEN CONNECTORS LTD TEXONIC INSTRUMENTS PRISHA SYSTEMS & NETWORKS PVT. LTD. HARTING (INDIA) PVT. LTD.	As per Purchase Spec PS4042696 Drawing based	EDN	R1/MBMT123:X2-IN TO R2/MBMT123:X2-OUT. PNL1:R1ACN(M) TO R3IBC. PNL1:R3IBC TO PNL2:R1IBC.		METSO		
80	DA0659446297	Patch Cord Cat.6A / Cat.7 MP8 FS 600 LSZH-2 m, green-cable/ hood color green / color identification markers on the cable ,specification as per sl no 2 of PSPEC PS4042696 reference PSPSEC : PS4042696	3	NO		D-LINK (INDIA) LTD. MOLEX (INDIA) LIMITED TE CONNECTIVITY INDIA PRIVATE LIMITED SCHNEIDER ELECTRIC INDIA PVT LTD BELDEN INTERNATIONAL INC INTERFACE CONNECTRONICS PVT. LTD WEIDMULLER ELECTRONICS INDIA PRIVATE LIMITED. BINARY SYSTEMS PVT.LTD. AKASH SOLAR ALTERNATIVE ENERGY PVT. LTD. FCI OEN CONNECTORS LTD TEXONIC INSTRUMENTS PRISHA SYSTEMS & NETWORKS PVT. LTD.	As per Purchase Spec PS4042696 Drawing based	EDN	R1/MBMT123:X2-OUT TO R2/MBMT123:X2-IN. PNL1:R2ACN(R) TO R4IBC. PNL1:R4IBC TO PNL2:R2IBC.		METSO		
81	DA0659446305	Patch cable S-FTP Cat.6A / Cat.7, 1 m cable boot yellow, LSZH grey Cross-Over ,specification as per sl no 1 of PSPEC PS4042696 reference PSPEC : PS4042696	2	NO		D-LINK (INDIA) LTD. MOLEX (INDIA) LIMITED TE CONNECTIVITY INDIA PRIVATE LIMITED SCHNEIDER ELECTRIC INDIA PVT LTD BELDEN INTERNATIONAL INC INTERFACE CONNECTRONICS PVT. LTD WEIDMULLER ELECTRONICS INDIA PRIVATE LIMITED. BINARY SYSTEMS PVT.LTD. AKASH SOLAR ALTERNATIVE ENERGY PVT. LTD. FCI OEN CONNECTORS LTD TEXONIC INSTRUMENTS PRISHA SYSTEMS & NETWORKS PVT. LTD.	As per Purchase Spec PS4042696 Drawing based	EDN	MBM120:X12(R1 to R2), MBM120:X12(R3 to R4)		METSO		

CONSOLIDATED BOM LIST (ANNEXURE-2)

Sl No	Material Code (BHEL Reference)	Description	Qty	Unit	Device Reference	Vendor	Part No	Scope	Remarks	Cubicle Name	Type	Unit Price (Rs)	Total Value (Rs) (Qty*Unit price)
82	DA0659557894	Patch Cord Cat.6A / Cat.7 MP8 FS 600 LSZH-5 m, red-cable/ hood color red / color identification markers on the cable ,specification as per sl no 4 of PSPEC PS4042696 reference PSPSEC : PS4042696	1	NO		D-LINK (INDIA) LTD. MOLEX (INDIA) LIMITED TE CONNECTIVITY INDIA PRIVATE LIMITED SCHNEIDER ELECTRIC INDIA PVT LTD BELDEN INTERNATIONAL INC INTERFACE CONNECTRONICS PVT. LTD WEIDMULLER ELECTRONICS INDIA PRIVATE LIMITED. BINARY SYSTEMS PVT.LTD. AKASH SOLAR ALTERNATIVE ENERGY PVT. LTD. FCI OEN CONNECTORS LTD TEXONIC INSTRUMENTS PRISHA SYSTEMS & NETWORKS PVT. LTD. HARTING (INDIA) PVT. LTD.	As per Purchase Spec PS4042696 Drawing based	EDN	PNL1:R2ACN(R) TO PNL2:R3IBC.		METSO		
83	DR0671010026	END CLAMPS, 6MM WIDE FOR DIN 35MM CHANNEL WAGO: 249-116 ELMEX: DCKN CONNECTWELL: CA103	18			WAGO: 249-116 ELMEX: DCKN CONNECTWELL: CA103	WAGO: 249-116 ELMEX: DCKN CONNECTWELL: CA103	Supplier			RELAY		
84	EA0656564480	DIN STOPPER FOR VALMET DNA MODULE AS PER DRG. 4 656 21 00407	4	NO		SRI INDUSTRIES T.V.PLASTICS SWETHA ENGINEERING WORKS GARGI ENTERPRISES LAKSHMI TOOLS & COMPONENTS POOJA ASSOCIATES SRI M INDUSTRIES	AS PER DRG. 4 656 21 00407	Supplier	1 PER RACK		METSO		
85	ED7388109889	RTD-PT100, SIMPLEX, 4-WIRE, CLASS-A ACC.	1	NO	1TSR	Instrument Research Associates Pvt Ltd CREATIVE INSTRMNTS AND CONTROLS SERTEL ELECTRONICS PVT LTD	As per Purchase Spec PS/415/2403	Supplier			METSO		
86	ED7433480528	END PLATE FOR FUSE TERMINAL BLOCK	2			ELMEX CONTROLS PVT LTD WAGO PRIVATE LIMITED	DFEP ELMEX CONTROLS PVT LTD 281-311 WAGO PRIVATE LIMITED	Supplier			RELAY		
87	ED7470103996	DIODE ORING MODULE SHOULD BE SUITABLE FOR DIN RAIL MOUNTING, INPUT = 2 NO'S SMPS SUPPLY 24V ,DC 10A (CONTINUOUS), OUTPUT = 20A 24 V,DC (CONTINUOUS), DIODES SUITABLE FOR INRUSH CURRENT WITH TWICE THE CONTINUOUS RATING, REQUIRED LED INDICATION FOR INPUT1,INPUT2,OUTPUT AND PFC CONTACT FOR REMOTE FAULT MONITORING As per PS/415/2385	2	NO	1DSS10,1DSS20 OR 2DSF10,2DSF20	MICRONOVA IMPEX PVT LTD PHOENIX CONTACT INDIA PVT LTD MAGNUM MULTITECH PTE LTD PARAMOUNT INDUSTRIES ABB INDIA LTD XP POWER LIMITED WAGO PRIVATE LIMITED ARIHANT ELECTRICALS WEIDMULLER ELECTRONICS INDIA PRIVATE LIMITED SM ELECTRONIC TECHNOLOGIES PVT LTD NANDI POWERTRONICS PVT LTD	As per Purchase Spec PS/415/2385 Equivalent Part nos: PHOENIX: TRIO-DIODE/12- 24DC/2X10/1X20 WEIDMULLER: PRO- M CP M DM20 PARAMOUNT: P-OR-24-20	Supplier	FOR AC/DC		COMMON		
88	ED7499001340	IT - I/O BUS TERMINATOR FOR METSO DNA M120 SERIES Doc. No. - PS4062165 Rev.00	4	NO	R1/IT,R2/IT,R3/IT,R4/IT	KARNATAKA HYBRID MICRO DEVICES LTD HITECH MAGNETICS & ELECTRONICS PVT LTD	As per Purchase Spec PS4062165	EDN	ONE AT END OF EACH MB18-2		METSO		

CONSOLIDATED BOM LIST (ANNEXURE-2)

Sl No	Material Code (BHEL Reference)	Description	Qty	Unit	Device Reference	Vendor	Part No	Scope	Remarks	Cubicle Name	Type	Unit Price (Rs)	Total Value (Rs) (Qty*Unit price)
89	SA0653944268	CABLE SIZE:4 SQ.MM STRANDS:0.31 CNDTR:TINNED CU CORES:1 VOLTAGE:1100V INSULATN:FRLS PVC COLOR OF INSULATION :YELLOW STD: ED28588	24	m		CORDS CABLE INDUSTRIES LTD ADVANCE CABLE TECHNOLOGIES (P) LTD DELTON CABLES LIMITED THERMO CABLES LIMITED R.J.INDUSTRIAL CORPORATION SBEE CABLES (INDIA) LIMITED Paras Wires Private Limited	As per ED28588	Supplier	Quantity of cables are tentative & actuals shall be as per suppliers routing		COMMON		
90	SA0653944276	CABLE SIZE:1.5 SQ.MM STRANDS:0.26 CORES:1 VOLTAGE:1100V INSULATN:FRLS PVC COLOR OF INSULATION:YELLOW STD: ED28588	24	m		MANSFIELD CABLES COMPANY LTD DELTON CABLES LIMITED R.J.INDUSTRIAL CORPORATION CORDS CABLE INDUSTRIES LTD THERMO CABLES LIMITED ADVANCE CABLE TECHNOLOGIES (P) LTD SBEE CABLES (INDIA) LIMITED VARSHA CABLES PVT LTD Paras Wires Private Limited	As per ED28588	Supplier	Quantity of cables are tentative & actuals shall be as per suppliers routing		COMMON		
91	SN0580332049	Mating Connector for Field Power to MB18.	8	NO		PHOENIX CONTACT INDIA PVT. LTD.	Phoenix Type no - FKC 2 5/3-ST-5.08 ARTICLE NO - 1873061	EDN	TO X23: 2 FOR EACH RACK FP OF MB18-1 AND MB18-2.		METSO		
92	SN0580332057	"Mating Connector for X8 of MBM120 for 24V DC Power supply."	4	NO		PHOENIX CONTACT INDIA PVT. LTD.	PHOENIX TYPE NO - FKC 2 5/4-ST-5.08 ARTICLE NO - 1873074	EDN	To X8 OF EACH MBM120 , MBMT120		METSO		
93	SN0659129194	CKT BKR MINIATURE 380 V AC/110V DC RTG 6A 2P RATED SHORT CKT CAPACITY 10KA MFR PART NO S202MC6 VENDOR- MICRONOVA IMPEX MFR PART NO S202MC6 VENDOR- ABB LIMITED MFR PART NO 5SL42067RC VENDOR- SIEMENS LIMITED MFR PART NO CSMB52C6 VENDOR- C&S ELECTRIC LIMITED GeM Category - Miniature Circuit Breakers-IS 60898-1:2002. Parameters are: Rated current (Amp) - 6A Instantaneous tripping range - C Rated voltage (Volt) - 380V AC/110V DC No. of poles - 2P Auxiliary contact - Without Mounting arrangement - Din rail mounted	4	NO	1Q101, 1Q102,1Q201, 1Q202	ABB INDIA LIMITED MICRONOVA IMPEX PVT LTD C&S ELECTRIC LTD K.DHANDAPANI & CO (ENGRS) PVT LTD REGENCY ELECTRICALS PVT LTD MOHAN EXIM INDIA PVT LTD MANI SALES (BANGALORE) POOJA POWER PRODUCTS LEGRAND (INDIA) PVT LTD SIEMENS LIMITED NOVATEUR ELECTRICAL & DIGITAL SYS PVT LTD INDO ASIAN FUSEGEAR LTD RAHUL BROTHERS SCHNEIDER ELECTRIC INDIA PVT LTD CAUVERY ELECTRICALS	MFR PART NO S202MC6 VENDOR- ABB LIMITED MFR PART NO 5SL42067RC VENDOR- SIEMENS LIMITED MFR PART NO CSMB52C6 VENDOR- C&S ELECTRIC LIMITED	Supplier	FOR AC/DC		MAX/METSO		
94	SN0659386623	Switched Mode Power Supply Unit: AC-DC 10A, 24VDC Input Range: AC I/P range: 93-264 VAC (or) as a suitably split range(s) of 110VAC ± 15% and 230VAC ± 15%. Input operating voltage selection: Auto Select As per PS/415/2239	4	NO	1PSS10 , 1PSS11, 1PSS20 , 1PSS21 OR 2PSF10, 2SF12, 2PSF20, 2PSF21	PHOENIX CONTACT INDIA PVT. LTD. ABB INDIA LTD XP POWER LIMITED COSEL CO LTD MAGNUM MULTITECH PTE. LTD MICRONOVA IMPEX PVT LTD. PARAMOUNT INDUSTRIES WAGO PRIVATE LIMITED ARIHANT ELECTRICALS SM ELECTRONIC TECHNOLOGIES PVT LTD VARITURN ELECTRO PRODUCTS (P) LTD WEIDMULLER ELECTRONICS INDIA PRIVATE LIMITED	As per Purchase Spec PS/415/2239 Equivalent Part nos: PHOENIX: TRIO-PS-2G/1AC/24DC/10 - 2903149 or UNO2-PS/1AC/24DC/240W - 1096432 WEIDMULLER: PRO ECO 240W 24V 10A	Supplier	FOR AC/DC		COMMON		

CONSOLIDATED BOM LIST (ANNEXURE-2)

Sl No	Material Code (BHEL Reference)	Description	Qty	Unit	Device Reference	Vendor	Part No	Scope	Remarks	Cubicle Name	Type	Unit Price (Rs)	Total Value (Rs) (Qty*Unit price)
95	SN0659384319	INTERPOSING RELAY WITH LED,FREE WHEELING DIODE AND MANUAL TEST BUTTON,MOUNTING: PROJECTION PLUG IN BASE TYPE, NO.OF CONTACTS: 2 C/O, CONTACT RATING: 5Amp 240VAC & 0.2 Amp 220 V DC,COIL VOLTAGE: 24VDC,RELAY BURDEN LESS THAN 2.5 VA. TO BE SUPPLIED WITH ALL ACCESSORIES AS COMPLETE FUNCTIONAL UNIT i.e INCLUDING MOUNTING BASE,RETAINING CLIP etc.	154	NO		PARAMOUNT INDUSTRIES DIGITAL INSTRUMENTS & CONTROL SYSTEMS OEN INDIA LTD CONTROL AND AUTOMATION SYSTEMS		Supplier			RELAY		
96	46562100425VA01	PATCH CARD ASSEMBLY	1	NO			As per Drawing 46562100425VA01	EDN	FOR VOLTMETER		METSO		
97	DV0692332439	CABLE CAT6 DPU-MR BACKUP	1	NO	R1 TO R2	BHEL make		EDN		CRE13	MAX		
98		MDL 69230I382A	4	NO	R1,R2,R3,R4			EDN		CRE14	MAX		
99		MDL 69230I301BB	7	NO		BHEL make		EDN		CRE14	MAX		
100		MDL 69230I330C	5	NO		BHEL make		EDN		CRE14	MAX		
101		MDL 69230I351B	3	NO		BHEL make		EDN		CRE14	MAX		
102		MDL 69230I304A	2	NO		BHEL make		EDN		CRE14	MAX		
103		MDL 69230S303A	9	NO		BHEL make		EDN		CRE14	MAX		
104		MDL 69230C402A	1	NO	R1-P11	BHEL make		EDN		CRE14	MAX		
105	ED69230C401A	MDL 69230C401A	1	NO	1YADP	BHEL make		EDN		CRE13	MAX		
106		MDL 69230C402A	2	NO	R1-P10,R2-P10	BHEL make		EDN		CRE13	MAX		
107	ED69230D611A	MDL 69230D611A DPU MR V2 PDP611A	2	NO		BHEL make		EDN		CRE13	MAX		
108		MDL 69230I301BB	1	NO		BHEL make		EDN		CRE13	MAX		
109	ED69230I321A	MDL 69230I321A	4	NO		BHEL make		EDN		CRE13	MAX		
110		MDL 69230I330C	17	NO		BHEL make		EDN		CRE13	MAX		
111		MDL 69230I351B	4	NO		BHEL make		EDN		CRE13	MAX		
112		MDL 69230I382A	4	NO	R1,R2,R3,R4	BHEL make	na	EDN		CRE13	MAX		
113	36592600024VA01	CBL ASSY 8PIN MOD CONN TO TB L Lg (FRLS)		NO			As per Drawing 36592600024VA01	EDN			METSO		
114	36592600025VA01	CBL ASSY 16PIN MOD CONN TO TB L Lg (FRLS)		NO			As per Drawing 36592600025VA01	EDN			METSO		
115	36592600026VA01	CBL ASSY 10PIN MOD CONN TO TB L Lg(FRLS)		NO			As per Drawing 36592600026VA01	EDN			METSO		
116	36592600027VA01	CBL ASSY 16PIN MOD CON-CCB CON L LG(FRLS)		NO			As per Drawing 36592600027VA01	EDN			METSO		
117	46562100425VA01	PATCH CARD ASSEMBLY	1	NO			As per Drawing 46562100425VA00	EDN	FOR VOLTMETER		METSO		
118	ED69235AI51A	MDL 69235AI51A AIIBC		NO		BHEL make		EDN			METSO		
119	ED69235AI53A	MDL 69235AI53A AIH4H		NO		BHEL make		EDN			METSO		
120	ED69235AI54A	MDL 69235AI54A AIIBC		NO		BHEL make		EDN			METSO		
121	ED69235AO51A	MDL 69235AO51A AOI4C ISO O/P 20mA		NO		BHEL make		EDN			METSO		
122	ED69235AO52A	MDL 69235AO52A AOI4H ISO H O/P 20mA		NO		BHEL make		EDN			METSO		
123	ED69235BC51B	IBC - I/O BUS CONTROLLER	4	NO	R1/IBC, R2/IBC, R3/IBC, R4/IBC	BHEL make		EDN	ONE ON EACH MBM120		METSO		
124	ED69235BL51A	MDL 69235BL51A RESI		NO		BHEL make		EDN			METSO		
125	ED69235CX58A	MDL 69235CX58A YXR16AO	2	NO	1CCBO1,1CCBO2	BHEL make		EDN			METSO		
126	ED69235CX59A	MDL 69235CX59A YXR16AI	2	NO	1CCBI1, 1CCBI2	BHEL make		EDN			METSO		
127	ED69235DI51A	MDL 69235DI51A DIIBP24		NO		BHEL make		EDN			METSO		
128	ED69235DO51A	MDL 69235DO51A DOI4RO		NO		BHEL make		EDN			METSO		
129	ED69235DO52A	MDL 69235DO52A DOI8RO		NO		BHEL make		EDN			METSO		
130	ED69235MB51A	MDL 69235MB51A MBIB	8	NO	R1/MBIB-1,R1/MBIB-2, R2/MBIB- 1,R2/MBIB-2, R3/MBIB-1,R3/MBIB- 2, R4/MBIB-1,R4/MBIB-2	BHEL make		EDN	TWO PER RACK		METSO		
131	ED69235MB54A	MDL 69235MB54A MBM120 MBM120-MOUNTING BOARD FOR IBC AND IPSP	4	NO	R1/MBM120, R2/MBM120, R3/MBM120, R4/MBM120	BHEL make		EDN	ONE IN EACH RACK BASE FOR IPSP AND IBC		METSO		
132	ED69235MB63A	MBMT120 : Mounting Board for ACN MR and IPSP with Profi Bus	2	NO	R1/MBMT,R2/MBMT	BHEL make		EDN	ONE IN EACH RACK. BASE FOR IPSP AND ACN MR.		METSO		

CONSOLIDATED BOM LIST (ANNEXURE-2)

Sl No	Material Code (BHEL Reference)	Description	Qty	Unit	Device Reference	Vendor	Part No	Scope	Remarks	Cubicle Name	Type	Unit Price (Rs)	Total Value (Rs) (Qty*Unit price)
133	ED69235PR55A	ACN MR GEN2	2	NO		BHEL make		EDN			METSO		
134	ED69235PS51B	MDL 69235PS51B IPSP	4	NO	R1/IPSP, R2/IPSP, R3/IPSP, R4/IPSP	BHEL make		EDN	ONE ON EACH MBM120 / MBMT120		METSO		
135	ED69235TI51B	MDL 69235TI51B TI4W3		NO		BHEL make		EDN			METSO		
136	ED69235TI52B	MDL 69235TI52B TI4W4		NO		BHEL make		EDN			METSO		
137	ED69235TI53B	MDL 69235TI53B TC18		NO		BHEL make		EDN			METSO		

QAP FOR CONTROL EQUIPMENT – ANNEXURE–4

REF NO : CE–QAP

REV NO : 00

DATE : 01.07.24

SHEET NO : 01 OF 09

I) OBJECTIVE

The Quality Plan (Inspection & Test Plan) describes the Inspection and Testing activities performed at key control points in the manufacturing cycle.

II) SCOPE

The Quality Plan covers the Control Equipment Manufactured at Vendors Works against manufacturing order issued at there on.

III) CONTENTS

The Quality Plan describes the control exercised at key stages of manufacturing namely incoming material inspection, in process and final inspection and testing.

IV) IMPLEMENTATION

Implementation of this Quality Plan is mandatory for all the Manufacturing orders of Control Equipments.

IV) ABBREVIATIONS

The abbreviations used in this Quality Plan and the expression are given below:

TP	– Test Protocol	M	– Manufacturer/ Sub vendor
BOM	– Bill of Material	OGA	– Overall General Arrangement
C	– Contractor/Nominated Agency (By Customer / Consultant)	P	– Perform
B	– BHEL EDN	PCB	– Printed Circuit Board
DOC	– Document	QS–GI	– Quality Services–Goods Inwards (Receiving Inspection)
ECP	– Electrical Control Panel.	QS–SHOP	– Quality services of shop
GA	– General Arrangement	SMD	– Surface Mounted Device.
HMI	– Human Machine Interface	STD	– Standard
HV	– High Voltage	UCP	– Unit Control Panel.
ICs	– Integrated Circuits	V	– Verification
I.R*	– Inspection Record(Hard Copy)	V/W	– Verification/Witness
I.R.E.M*	– I.R.in Electronic media	VFD	– Variable Frequency Drive
DDC	– Digital Distributed Controls	ASC	– Auto Sequence Control
AVR	– Automatic Voltage Regulator	SCADA	– Supervisory Control and Data Acquisition
SEE	– Static Excitation Equipment	ETDC	– Electronic Test & Development Center
		GT	– Gas Turbine Controls

*Basis of this selection is with BHEL

NOTES:

- 1) CALIBRATION OF GAUGES, MEASURING AND TEST EQUIPMENTS USED FOR MEASUREMENT AND TEST
It is ensured that every instrument guage used for measurement is calibrated either at Internal Calibration Laboratories or at the Required Government Laboratories, such as ETDC. This also ensures traceability to National Standards.
- 2) Control panels includes DDC Panel,AVR/SEE,VFD,Hydro Control, GT, SCADA Control Panels & SCADA Backup Panels...Etc

QAP FOR CONTROL EQUIPMENT – ANNEXURE–4

REF NO : CE-QAP	REV NO : 00	DATE : 01.07.24	SHEET NO : 02 OF 09
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SL.NO	COMPONENT/ OPERATIONS/TEST	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY		REMARKS
									M	B	
1.	BOUGHT OUT ITEMS										
1.1	MECHANICAL ITEMS										
1.1.1	GI Sheets / Aluzinc Sheets	–Visual, Dimension, Property check as applicable. ie, Deformation, Tensile test,chemical composition	Major	–Visual, Dimension, Property check as applicable.	Sample as per IS2500	Purchase spec- ification, Draw- ing, Documents. IS 277	Purchase spec- ification, Draw- ing, Documents. IS 277	IR/I.R.E.M /TC	P	V	
1.1.2	CRC Steel Sheets	–Visual, Dimension, Property check as applicable.ie, Tensile Bend & chemical composition	Major	–Visual, Dimension, Property check as applicable.	Sample as per IS2500	Purchase spec- ification, Draw- ing, Documents. IS 513–D	Purchase spec- ification, Draw- ing, Documents. IS 513–D	IR/I.R.E.M /TC	P	V	
1.1.3	Insulating Material	–Visual, Dimension, Property check as applicable.	Major	–Visual, Dimension, Property check as applicable.	Sample as per IS2500	Purchase spec- ification, Draw- ing, Documents.	Purchase spec- ification, Draw- ing, Documents.	IR/I.R.E.M	P	V	
1.1.4	Copper Busbars	–Visual, Dimension, Property check as applicable. Hardness,bend Elec.Conductivity, Mech.Propertyty, Chemical Composition, Tinning thickness	Major	–Visual, Dimension, Property check as applicable.	Sample as per IS2500	Purchase spec- ification, Draw- ing, Documents. IS 1897	Purchase spec- ification, Draw- ing, Documents. IS 1897	IR/I.R.E.M	P	V	
1.1.5	Fastners	Visual, Dimension. Threading, Coating / Plating	Major	Visual, Dimension.	Sample as per IS2500	Purchase spec- ification, Draw- ing, Documents.	Purchase spec- ification, Draw- ing, Documents.	IR/I.R.E.M /COC	P	V	

QAP FOR CONTROL EQUIPMENT – ANNEXURE-4

REF NO : CE-QAP	REV NO : 00	DATE : 01.07.24	SHEET NO : 03 OF 09
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SL.NO	COMPONENT/ OPERATIONS/TEST	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY		REMARKS
									M	B	
1.1.6	Name Plates/ Nomen Clature Label	Visual, dimension.	Major	Visual, dimension.	Sample as per IS2500	Purchase spec- ification,Drawing, Documents.	Purchase spec- ification,Drawing, Documents.	IR/I.R.E.M /TC	P	V	
1.1.7	Crimping Lugs	Visual, dimension.	Major	Visual, dimension.	Sample as per IS2500	Purchase spec- ification,Drawing, Documents.	Purchase spec- ification,Drawing, Documents.	IR/I.R.E.M /TC	P	V	
1.1.8	Gaskets	Visual, dimension. Hardness	Major	Visual, dimension.	Sample as per IS2500	Purchase spec- ification,Drawing. Documents/ Data sheet	Purchase spec- ification,Drawing. Documents. Data sheet	IR/I.R.E.M /TC	P	V	
1.1.9	Bushes	Visual, dimension.	Major	Visual, dimension.	Sample as per IS2500	Purchase spec- ification,Drawing, Documents.	Purchase spec- ification,Drawing, Documents.	IR/I.R.E.M /TC	P	V	
1.2	<u>ELECTRICAL ITEMS</u>										
1.2.1	Cables/Wires	Visual, Dimensional, Property check as applicable.	Major	Visual, Dimensional, Property check as applicable.	Sample as per IS1554 Part 1/ IS 694	Purchase Spe- cification, Dra- wings, Supplie- rs Catalogue.	Purchase Spe- cification, Dra- wings, Supplie- rs Catalogue.	I.R	P	V	
1.2.2	Panel Meter/ Multi function Meters and shunts	Visual, Dimensional, Functional as applicable.	Major	Visual, Dimensional, Functional as applicable.	100%	Purchase Spe- cification, Dra- wings, Supplie- rs Catalogue. IS 1248	Purchase Spe- cification, Dra- wings, Supplie- rs Catalogue. IS 1248	I.R	P	V	

QAP FOR CONTROL EQUIPMENT – ANNEXURE-4

REF NO : CE-QAP	REV NO : 00	DATE : 01.07.24	SHEET NO : 04 OF 09
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SL.NO	COMPONENT/ OPERATIONS/TEST	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY		REMARKS
									M	B	
1.2.3	Fans	Visual, Dimensional, functional as applicable Direction of rotation speed,voltage power rating,noise level & Terminal Marking	Major	Visual, Dimensional, functional as applicable	Sample as per IS2500	Purchase Spe- cification, Dra- wings, Supplie- rs Catalogue.(*)	Purchase Spe- cification, Dra- wings, Supplie- rs Catalogue.(*)	I.R.E.M	P	V	
1.2.4	Lamps	Visual, Dimensional, functional,ratings as applicable	Major	Visual, Dimensional, functional as applicable	Sample as per IS2500	Purchase Spe- cification, Dra- wings, Supplie- rs Catalogue.	Purchase Spe- cification, Dra- wings, Supplie- rs Catalogue.	I.R.E.M	P	V	
1.2.5	Transformers	Visual, Dimensional, functional name plate details Routine tests as applicable,	Major	Visual, Dimensional, functional as applicable	100%	Purchase Spe- cification, Dra- wings, Supplie- rs Catalogue. IS2026,IS11171	Purchase Spe- cification, Dra- wings, Supplie- rs Catalogue. IS2026,IS11171	I.R	P	V	
1.2.6	Transducers/ Mulfunction transducers	Visual, Dimensional, functional as applicable	Major	Visual, Dimensional, functional as applicable	100%	Purchase Spe- cification, Dra- wings, Supplie- rs Catalogue.	Purchase Spe- cification, Dra- wings, Supplie- rs Catalogue.(*)	I.R	P	V	
1.2.7	Terminal blocks	Visual, Dimensional, functional as applicable	Major	Visual, Dimensional, functional as applicable	Sample as per IS2500	Purchase Spe- cification, Dra- wings, Supplie- rs Catalogue.	Purchase Spe- cification, Dra- wings, Supplie- rs Catalogue.(*)	I.R.E.M	P	V	
Timer not incorporated as component as same is implemented in Software.											

(*)BASED ON VERIFICATION OF TC FROM SUPPLIERS

QAP FOR CONTROL EQUIPMENT – ANNEXURE-4

REF NO : CE-QAP	REV NO : 00	DATE : 01.07.24	SHEET NO : 05 OF 09
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SL.NO	COMPONENT/ OPERATIONS/TEST	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY		REMARKS
									M	B	
1.2.8	Pushbuttons/ indicators	Visual, Dimensional, functional as applicable.	Major	Visual, Dimensional, functional as applicable.	Sample as per IS2500	rs Catalogue. Purchase Spe- cification, Dra- wings, Supplie- rs Catalogue.	rs Catalogue. Purchase Spe- cification, Dra- wings, Supplie- rs Catalogue.	I.R.E.M	P	V	
1.2.9	Contactors	Visual, Dimensional, functional, voltage,current rating,Type no/main poles,Aux. contacts, contact operation, as applicable.	Major	Visual, Dimensional, functional as applicable.	100%	Purchase Spe- cification, Dra- wings, Supplie- rs Catalogue.	Purchase Spe- cification, Dra- wings, Supplie- rs Catalogue.	I.R/I.R.E.M	P	V	
1.2.10	PCB Connectors	Visual, Dimensional, functional as applicable.	Major	Visual, Dimensional, functional as applicable.	Sample as per IS2500	Purchase Spe- cification, Dra- wings, Supplie- rs Catalogue.	Purchase Spe- cification, Dra- wings, Supplie- rs Catalogue.	I.R.E.M	P	V	
1.2.11	Miniature Circuit Breakers	Visual, Dimensional, functional, voltage,current rating,Type no/main poles,Aux. contacts, contact operation, as applicable.	Major	Visual, Dimensional, functional as applicable.	Sample as per IS2500	Purchase Spe- cification, Dra- wings, Supplie- rs Catalogue.	Purchase Spe- cification, Dra- wings, Supplie- rs Catalogue.	I.R.E.M	P	V	

QAP FOR CONTROL EQUIPMENT – ANNEXURE-4

REF NO : CE-QAP	REV NO : 00	DATE : 01.07.24	SHEET NO : 06 OF 09
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SL.NO	COMPONENT/ OPERATIONS/TEST	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY		REMARKS
									M	B	
1.2.13	Module Front Connectors	Visual, Dimensional, Functional as applicable	Major	Visual, Dimensional, Functional as applicable	Sample as per IS2500 AQL 2.5%	Purchase specifications, Drawings, Suppliers Catalogue.	Purchase specifications, Drawings, Suppliers Catalogue.	I.R.E.M	P	V	
1.2.14	Power Supplies	Visual, Dimensional, Functional as applicable	Major	Visual, Dimensional, Functional as applicable	Sample as per IS2500 AQL 2.5%	Purchase specifications, Drawings, Suppliers Catalogue.	Purchase specifications, Drawings, Suppliers Catalogue.	I.R.E.M	P	V	
1.2.15	Mosaic Indicator Anlog and Digital	Visual, Dimensional, Functional as applicable	Major	Visual, Dimensional, Functional as applicable	100%	Purchase specifications, Suppliers Catalogue.	Purchase specifications, Suppliers Catalogue.	I.R/I.R.E.M	P	V	
1.2.16	Mosaic Components	Visual, Dimensional, Functional as applicable	Major	Visual, Dimensional, Functional as applicable	Sample as per IS2500 AQL 2.5%	Purchase specifications, Suppliers Catalogue.	Purchase specifications, Suppliers Catalogue.	I.R.E.M	P	V	
1.2.17	Isolators	Visual, Dimensional, Functional as applicable	Major	Visual, Dimensional, Functional as applicable	Sample as per IS2500 AQL 2.5%	Purchase specifications, Suppliers Catalogue.	Purchase specifications, Suppliers Catalogue.	I.R.E.M	P	V	
1.2.18	Barriers	Visual, Dimensional, Functional as applicable	Major	Visual, Dimensional, Functional as applicable	Sample as per IS2500 AQL 2.5%	Purchase specifications, Suppliers Catalogue.	Purchase specifications, Suppliers Catalogue.	I.R.E.M	P	V	
1.2.19	Fuses	Visual, Dimensional,	Major	Visual, Dimensional,	Sample as per IS2500 AQL 2.5%	Purchase specifications, Suppliers Catalogue.	Purchase specifications, Suppliers Catalogue.	I.R.E.M	P	V	
1.2.20	Field Circuit Breaker	Visual, Dimensional,	Major	Visual, Dimensional,	100%	Purchase specifications, Suppliers Catalogue.	Purchase specifications, Suppliers Catalogue.	I.R.E.M	P	V	
1.2.21	Current Transformers	Visual, Dimensional, Functional, Ratio Error, Magnetisation Curve HV Test	Major	Visual, Dimensional, Functional	100%	Purchase specifications, Suppliers Catalogue.	Purchase specifications, Suppliers Catalogue.	I.R.E.M	P	V	
1.2.22	Reactor	Visual, Dimensional, Functional	Major	Visual, Dimensional, Functional	Sample as per IS2500 AQL 2.5%	Purchase specifications, Suppliers Catalogue.	Purchase specifications, Suppliers Catalogue.	I.R.E.M	P	V	
1.2.23	Discharge Resistor	Visual, Dimensional,	Major	Visual, Dimensional, Resistance Value	100%	Purchase specifications, Suppliers Catalogue.	Purchase specifications, Suppliers Catalogue.	I.R.E.M	P	V	

QAP FOR CONTROL EQUIPMENT – ANNEXURE-4

REF NO : CE-QAP	REV NO : 00	DATE : 01.07.24	SHEET NO : 07 OF 09
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SL.NO	COMPONENT/ OPERATIONS/TEST	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY		REMARKS
									M	B	
1.3.9	Auto Synchroniser System	Visual, Functional as applicable.	Major	Type no., Make	100%	Purchase Specif- cations,Drawings, Documents,Sup- pliers Catalogue	Purchase Specif- cations,Drawings, Documents,Sup- pliers Catalogue	I.R.E.M	P	V	
2	<u>FABRICATION</u>								B	C	
2.1	Doors/ Side Covers/ Control Desk/Panel	Visual, Dimensional	Major	Visual, Dimensional	100% inhouse & sample for bought out	Drawings,Documents for inhouse & purchase specification Dcom for bought out	Drawings,Documents for inhouse & purchase specification Dcom for bought out	I.R	P	–	

QAP FOR CONTROL EQUIPMENT – ANNEXURE–4

REF NO : CE–QAP	REV NO : 00	DATE : 01.07.24	SHEET NO : 08 OF 09
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SL.NO	COMPONENT/ OPERATIONS/TEST	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY		REMARKS
									B	C	
3.	<u>CUBICLE ASSEMBLY</u>										
3.1	Empty Cubicle assembly and Mounting assemblies	Visual, Dimension, Layout, BoM, Labels	Major	Visual, Dimension, Layout, BoM, Labels	100%	Engg drawings and documents	Engg drawings and documents	I.R. / I.R.E.M COC / TC	P	W/V	
3.2	Pallet	Visual / Dimensions	Major	Visual / Dimensions	100%	Purchase specification	Purchase specification	I.R. / I.R.E.M	P	W/V	
4.	<u>PAINTING</u>										
4.1	Doors and Side Covers,Backup Panels, Control Panels.	Visual, Paint Shade, Finish Measur- ment, of thickness.	Major	Visual, Paint Shade, Finish Measur- ment, Coating thickness.	100%	Purchase Spec- ification & Do- cuments for Boughtout(As per approved OGA).	Purchase Spec- ification & Do- cuments for Boughtout.	I.R.E.M.	P	W/V	
4.2		Scratch hardness Bend(Flexibility) Pull of allusion Protection against Corrosion (salt mist test)	Major	Physical	Sample, test Coupon	As per IS101:part-3 :sec 2:1989	Purchase specification/ Drawing	Test report	P	W/V	
5.	<u>SYSTEM TESTING</u>										
5.1	Control panels and accessories if any, Backup panels (Control Desk / UPC ECP etc)	Electrical continuity, IR & Voltage withstand test (as applicable)	Major	Electrical continuity, IR & Voltage withstand test (as applicable)	100%	Purchase specification/ Engg.Document/ Test Instruction	Purchase specification/ Engg.Document/ Test Instruction	Test Report	P	W/V	

QAP FOR CONTROL EQUIPMENT – ANNEXURE–4

REF NO : CE–QAP

REV NO : 00

DATE : 01.07.24

SHEET NO : 09 OF 09

SL.NO	COMPONENT/ OPERATIONS/TEST	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY		REMARKS
									B	C	
6.	FINAL INSPECTION										
6.1	Control panels and accessories if any, Backup panels (Control Desk/UPC ECP etc)	GA, fitment of doors, Dimensions labeling, BoM, Hardware	Major	Visual, Dimensional	100%	Purchase specification GA / BOM	Purchase specification GA / BOM	I.R.	P	V/W	
6.2	Packing of panels, Loose Items	Visual	Major	Visual	100%	BHEL EDN STD	BHEL EDN STD	I.R. / I.R.E.M.	P	–	
6.3	Spares	Visual	Major	Visual	100%	Purchase specification	Purchase specification	I.R. / I.R.E.M.	P	–	

Note : QAP is Applicable for Component Mentioned in Bill of Material (Annexure–2) and in GA (Annexure–1)