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PROJECT : FARAKKA STAGE –I (3X200MW)

CUSTOMER : M/s NTPC

EQUIPMENTS: OPERATOR DESK/UCD (7 m) WITH DRAWOUT CONSOLE

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REVISION HISTORY SHEET

REV No.	DATE	NATURE OF CHANGE	REASON	PREPARED BY	CHECKED BY	REVIEWED BY
00	17.10.2018	FIRST ISSUE	---	HN	BNS	DP

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OPERATOR DESK (UCD)

Modular CPU FREE operator desk as per BHEL drawing attached as DRAWING – I. Brief specifications for operator desk/UCD are given below:

Sl. No.	Specification	Supplier's Remark
1	Unit Control Desk (UCD) is required as per drawing enclosed (DRAWING-I). The UCD shall be furnished fully wired with necessary provision for convenience outlets, internal lighting, grounding, ventilation, space heating, anti-vibration pads, internal piping & accessories as required for completeness of the system.	
2	The UCD shall be free standing top type with doors at the back. The UCD should consist of vertical, horizontal and base support with their coverings for work surface, sliding keyboard trays, mouse pads, monitor shelf and concealed cable and wire way management, perforated trays with covers in both horizontal and vertical.	
3	The top surface of control desk shall be 30mm thick with the top 12mm of acrylic solid surface and remaining 18mm of laminated medium density fiber board. Foot, cantilever beams, Cable managers to be made of Extruded/Cast Aluminium/CRCA laminated steel, Support legs and Horizontal supports (if required) below Work surface to be of minimum 2.0 mm thick suitable extruded Aluminum /CRCA laminated steel profile.	
4	Unit Control Desk (UCD) should be arc-shaped and width and depth to be as per Drawing enclosed (DRAWING-I).	
5	Profiled extended support and cantilevered beam of Aluminium / steel with suspension hook (if required) to support legs to be provided which should have powder coated finish in approved color / shade.	
6	Unit Control Desk (UCD) should be arc shape and PA system handsets, telephone sets, PB stations and lamps shall be mounted on the control desk on mosaic grid structure. The CPU of OWS etc. shall be located separately on PC racks. The cabling / wiring between OWS & CPU's, power supply cable shall be aesthetically routed and concealed from view.	
7	As required number of 4 way - 5/15 Amps power socket strip mounted on each section to power monitor, KVM switches etc.	
8	The Desk should have a draw out console on either end of desk sections. Detailed specification is available in **PART-B**	
9	The Desk should have synchroscope console mounted as per drawing enclosed. Detailed specification is available in **PART-B**	
10	The Desk can be designed, manufactured and supplied in separate shipping sections. Indicative drawings attached. The general layout of one section is shown in the drawing.	
11	Emergency Push Button – 2 nos., as indicated in drawing, with protective cover, wired up to TB, power ratting min. 2A each, other details like make etc. will be as mentioned in the draw out section of control desk	
12	The design of the desk should be modular such that it shall be possible to add / remove any section/s of the desk if required.	

NOTE:

1. Dimensions are indicative, detailed component size and specification may be vendor specific within broad specs given above.
2. As required Nos. of 4 ways, 5/15 Amps power socket strip mounted on each of the shelves.

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PART A1 – GENERAL SPECIFICATIONS

Sl. No.	Specification	Supplier's Remark
1	Finished surface to be free from waves, belies or other imperfections. Surface to be Powder Coated or if Spray painted, 2 coats of inhibitive epoxy primer surface to be applied. Paint with Minimum of 2 coats of Primer and 2 sprays of final finish color to be applied OR powder coated with epoxy paint. Exact color and shade of components will be specified at the time of Order placement. Minimum thickness for Aluminum Sheets: is 30 microns. For MS Components: is 65 microns	
2	Along with offer detailed drawings showing sectional view, top view, front view, and rear view of desks and tables, electrical wiring diagram with bill of materials for each item, and images and/or catalogue of computer chairs.	
3	Documents to be submitted for manufacturing approval: ▪ Detailed OGA with front view, top view, rear view, sectional view, and floor cut-out details for desks and tables. ▪ Electrical Wiring Diagram with BOM of HMI operator desk, draw-out consoles, synchroscope, and Two section desk. ▪ Quality Plan ▪ Color Shade options.	
4	Supplier internal Test certificate for dimensions, Visual inspection, paint, HV, IR, electrical functions to be submitted before giving inspection calls to BHEL.	
5	Inspection by BHEL / CUSTOMER at supplier's work.	
6	All items will be directly dispatched to project site from supplier works after obtaining necessary clearance from BHEL. Consignee details will be intimated at the time of placement of PO.	
7	All items shall be packed in complete weather proof packing with sufficient cushioning to avoid transit damage. Suitable pallet shall be provided for handling and transportation	
8	Name Plates with following details are to be provided for each shipping section. ▪ Item: **As per PO** ▪ Project Name / Unit no: **As per PO** ▪ Customer Name: **As per PO** ▪ BHEL Order No.: **As per PO** ▪ Date of dispatch to site: **As per PO**	
9	Assembly, erection and installation, including laying of power cables, keyboard, mouse and monitor extender cables, termination of the cables, at site to be carried out by supplier. Offer to include charges for same along with necessary touch up etc.	
10	Modifications as per site requirements to be done on free of cost to match with floor opening for cables. Site work for aligning and matching the curvature of desk as shown in enclosed drawing is under supplier scope.	
11	Warranty: Offer to include "Two years warranty at site" for all items against manufacturing defects from date of supply. Warranty to include all costs towards material, labor, to & fro, traveling, accommodation and stay etc. Exact location of the project site will be intimated at the time of PO.	

Note: Supplier is required to submit the filled, signed and stamped copy of this specification along with the offer, failing which offer is liable for rejection.

Annexures:

DRAWING I – HMI Operator desk/UCD (7 m) drawing

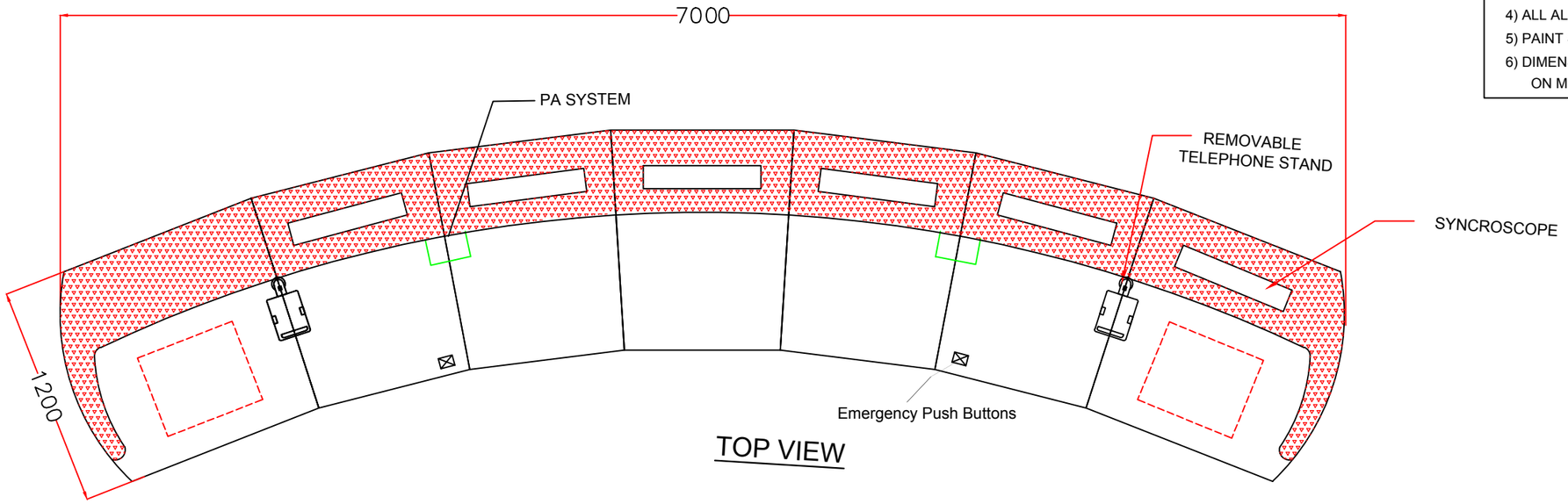
DRG. No. 3 659 44 03662

DRAWING-I

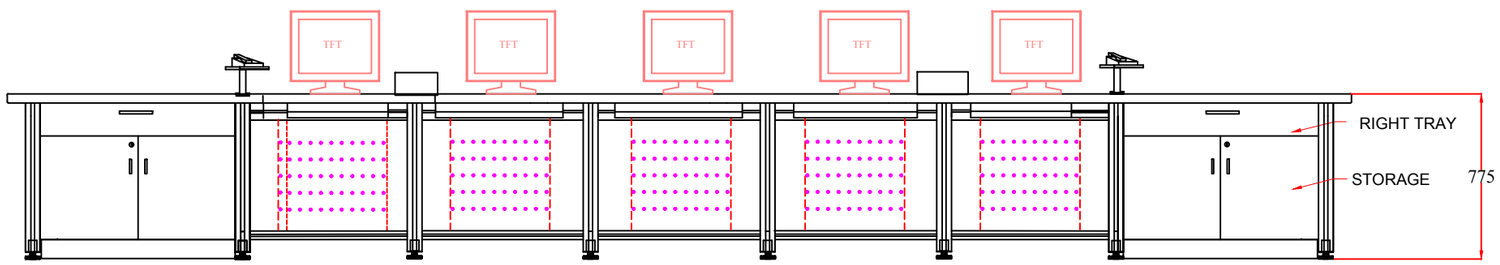
UNIT CONTROL DESK OF 7 METERS

NOTES :

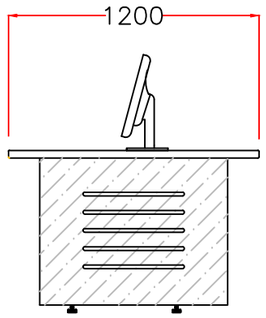
1) THE TOP SURFACE OF CONTROL DESK SHALL BE 30MM THICK WITH THE TOP 12MM OF ACRYLIC SOLID SURFACE AND THE REMAINING 18MM OF LAMINATED MEDIUM DENSITY .
2) COLOR OF TABLE TOP : AS PER APPROVAL.
3) FOOT, CANTILEVER, BEAMS, CABLE MANAGERS TO BE MADE OF EXTRUDE/CAST ALUMINIUM/CRCA LAMINATED STEEL, SUPPORT LEGS & HORIZONTAL SUPPORTS (IF REQUIRED) BELOW WORK SURFACE TO BE OF MINIMUM 2.0MM THICK. SUITABLE DIE/CAST/EXTRUDED ALUMINIUM/CRCA LAMINATED STEEL.
4) ALL ALUMINUM EXTRUSIONS WILL BE POWDER COATED IN ALUMINUM GREY
5) PAINT SHADE : AS PER APPROVAL
6) DIMENSIONS ARE INDICATIVE AND SUBJECT TO CHANGE BASED ON MODEL/SUPPLIER AVAILABILITY.



TOP VIEW



FRONT VIEW



SIDE VIEW

PRODUCT : FARAKKA STG-I (3x200 MW)
CUSTOMER: M/s NTPC

BHARAT HEAVY ELECTRICALS LIMITED.
ELECTRONICS DIVISION, BANGALORE

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

	NAME	SIGN	DATE
DRAWN	S.H.K		14-08-2018
CHECKED	H.N		14-08-2018
APPROVED	B.N.S		14-08-2018

DEPT. ENGG | CODE 404

TITLE: OGA OF CONTROL DESK OF 6 mtrs

No. OF SHEETS 08
SHEET No. 03

WBS. No. CE/1430-SH1-56-01
DRG. No. 3 659 44 04257
REV 00

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REF. DRG. No. 36594402806 01
SIGN. & DATE
INVENTORY No.

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PURCHASE SPECIFICATIONS FOR UCD & ECD DRAW-OUT CONSOLES

PROJECT : FARAKKA R&M STAGE-1 (3X200 MW) U-1,2&3

CUSTOMER: M/s NTPC LIMITED

PREP	CHKD	APPVD	ISSUED	DATE
RK	MS	VS	410	10/4/2018

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SPECIFICATION OF DRAW OUT CONSOLES WITH ENCLOSURES OF MAIN PLANT CONTROL DESK

1.0 CONSTRUCTION

1.1 The sections with draw out consoles shall be located on either end of the desk sections meant for operator consoles, and shall, in general, have similar constructional features, including top surface material and colour, as those of the sections meant for operator consoles. These two end section will be aligned and fixed with other desk sections, so that there is perfect match of the top surfaces.

1.2 The left control desk section, will house a mosaic draw-out type console with a mosaic grid for Process console [CWD01] having 16 rows of 24mm and 10 columns of 48mm. Please refer Drg No..: 4120-405-EN-PVI-C-132A.
The profile should be similar to the one provided for monitors in the operator console.

1.3 The right control desk section, will house a mosaic draw-out type console with a mosaic grid for Electrical console [CWD02] having 16 rows of 24mm and 10 columns of 48mm as per Drg No..: 4120-405-EN-PVI-C-056. It will also house a synchronization plaque with a mosaic grid console having 18 rows of 24mm and 11 columns of 48mm as per above documents.
The profile should be similar to the one provided for monitors in the operator consoles,
Synchroscope in the control desk shall remain concealed and come up to the top of the desk through an automatic (electrically operated) carriage management system.
Following Points to be ensured in concealed Synch. Plaque mechanism:
1. Proper closing of Electrical draw-out while Synch. Plaque is in concealed condition.
2. The TB's shall be clearly accessible while Synch. Plaque is in concealed condition.

1.4 **Vendor should ensure that both the draw out consoles should not protrude outside the control desk while the synchronization plaque is under concealed condition. Detailed dimensional drawing indicating all the dimensional details shall be furnished by successful bidder for BHEL review.**

1.5 The metallic mosaic grid and mosaic items to be mounted on the above consoles shall be in the scope of the supplier. These mosaic grids and items [other than what is specified under 'Notes' in the subsequent annexures], shall be from either of the following sources:
i) TEW, Germany.
ii) Pro-plan, Germany.
The overall dimensions along with framework for the required mosaic grids as specified in 1.2 and 1.3 above shall be clearly brought out in the offer.

1.6 The Layout drawings are subject to approval by customer - M/s NTPC. If the item/quantity shown is revised, or any additional items are added in the final approved drawing, the same to be taken care by the supplier without any price & delivery implications.

1.7 An overall general specification of all items is given in Annexure I,II & III. However these has to be taken in conjunction with the Drg No.:4120-405-EN-PVI-C-132A & 4120-405-EN-PVI-C-056

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1.8 Necessary support arrangements as required for the consoles shall be provided by the supplier.

1.9 Below the draw-out consoles, an enclosure shall be provided in each section for housing terminal blocks with 20% spares and such other components as may be required for complete wiring of the consoles.

1.10 The left and right control desk section enclosures will have one double leaf door in the front, below the draw-out portion, and one double leaf door at the rear.

1.11 The left and right control desk sections shall have removable gland plates made of 2.0mm thick CRCA sheet. The gland plates shall be provided along with neoprene gasket. It should be fixed to the top flange of the bottom frame. The size of gland plates for each shipping section shall be suitably selected for easy handling.

1.12 The items to be mounted on draw-out consoles will be terminated on suitable TBs. The no. of connections per section is identified in the subsequent pages. All the wiring has to be done using FRLS cables of 1.5, 0.75 or 0.5 sqmm as required.

1.13 It has to ensured that the cables used for connection to items on the draw-out consoles should have sufficient length to facilitate full drawing out of console; without disturbing any of the terminations or damaging any of the cables or associated equipment.

1.14 Supplier to provide assistance at site for
- erection of the console desk sections.
- any modification or alteration w.r.t addition/deletion/relocation of components and
- any wiring to be done at site.

Separate price to be quoted for site work of these sections. This price shall however be claimed by the vendor only on actual visit to and completion of work at site.

1.15 As part of technical offer Vendor shall submit necessary Overall General Arrangement drawing of these sections along with the OGA drawing for the other sections of the CRT Desk. Vendor shall also furnish the make & model no. of all the items in the BOM.

1.16 The Items shall be arranged as per Customer approved final Layout drawings.
In case of increase in item quantities, specified in subsequent Annexures w.r.t the final approved drawings, the extra items will have to be supplied loose.

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1.17 In the event of P.O., the vendor is required to submit BOM with Console Layout drawings, Internal General Arrangement drawings for the internal arrangement of components & Electrical schematic drawing with wiring of all console items up to the terminal blocks.
BOM to include the following- **All mosaic mounted items with make/part no. , inside mounted item details, datasheets of mosaic mounted items & vendor specific Console layout drawings.**
All documents are required to be submitted to customer M/s NTPC for approval.
Successful bidder shall comply to all the customer comments without any price & delivery implication.

1.18 List of Mandatory Spares to be supplied for these consoles is given in subsequent pages - Annexure III.
However, this list shall be based on final approved layout & subjected to approval by customer - M/s NTPC. If the quantity specified is revised, or any additional items are added in the final approved list, the same to be taken care by the supplier. Hence, a separate lump sum price, along with unit prices, is to be quoted for Mandatory Spares.

1.19 2Nos. of Emergency PBs [for Boiler Trip]with:
- 4 changeover contacts,
- protective cover,
- with min rating of 5A each and
- wired upto TBs

are to be supplied and to be mounted on Unit Control Desk (on TABLE TOP).
These two numbers Emergency push button is in bidder's scope and shall be provided with individual protection cover. All the other details of these two numbers Emergency push button shall be as per below table:

Make of Push Buttons - M/s SCHMERSAL, Germany

DESCRIPTION	PART NO.	QTY/UNIT	TOTAL QTY FOR 3 UNITS
EMERGENCY STOP BUTTON	EDRR 40RT	2	6
MOUNTING BOX FOR CONTROL DEVICE	MBGH 311GB	2	6
CONTACT ELEMENT 2NC	EF220.1	4	12
SPRING ELEMENT MODULE	EFR	2	6
EMERGENCY STOP SIGNS	MDP-8	2	6

1.20 Two numbers Emergency Push buttons with 4 C/O Contacts (for Turbine Trip) shall be mounted on UCD table top.
Wiring, terminal boxes, mounting & fixing arrangement etc. of these Emergency Push buttons will be in Bidder’s scope.

1.21 Seperate Termination Boxes to be provided for Process Draw-out Console and Electrical Draw-out Console & Synchronising Plaque. The TB types and Designation in Terminal Boxes to be kept exactly similar to the Draw-out Console TB Details.
Refer attached Purchase Specification ANNEXURE-IV for for detailed construction features of Termination Boxes.
Qty. Per Unit = 2Nos. [1No. for Process Draw-out and 1No. for Electrical and Sync. Plaque]
Total Qty. Required for 3 Units = 6Nos.

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ANNEXURE - I
LIST OF ITEMS FOR CONTROL DESK SECTION
CWD01 [PROCESS DRAW OUT CONSOLE]

Sl. No.	DESCRIPTION	Qty/unit
01	Emergency OFF PB with red colour protective cover. Size: 48X48mm. Contacts: 4. Changeover suitable for 24V DC. Connection with Plug-in connector. Module colour RAL7035.	04
02	Recessed PB module. PB colour: Grey. Size: 48X24mm. Contacts: 2 NO. Suitable for 24V DC. Connection with Plug-in connector. Module colour RAL7035.	06
03	PB module with 2 PB and 3 LEDs. Size 48X24 mm. Button colour: Red, Green LED colour : Green, Yellow, Red PB's with 2 NO contacts LED's suitable for 24 V DC Connection with Plug-in connector, Module colour RAL7035	15
04	PB module with 2 PB and 0 LEDs. Size 48X24 mm. Button colour: Grey, Grey PB's with 2 NO contacts LED's suitable for 24 V DC	04
05	2 LED signal module. LED colour: Red, Green Size: 48X24mm. LEDs suitable for 24V DC. Connection with rear Plug-in connector. Module colour RAL7035.	02
06	6 LED signal module. LED colour: column 1 -Red , column 2- Green Size: 48X24mm. LEDs suitable for 24V DC. Connection with rear Plug-in connector. Module colour RAL7035.	06
07	Plug-in connectors suitable for above modules. [If connectors are different for different type of items, actual quantity of each type of connector shall be accordingly split and quoted].	As required
08	Blank modules. Size: 48X24mm. Module colour RAL7035.	As required
09	Blank modules with engravings as per drawings. Size: 48X24mm. Module colour RAL7035.	As per Layout

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Sl. No.	DESCRIPTION	Qty/unit
10	Digital Display module. 3 1/2 digit or 4 digit Display colour: Green. Seven segment display. Power Supply: 24V DC. Screw type connector. Input- 4-20mA. Size: 48X24mm. Programmable type Ranges as given below:	06

Digital Indicator service		Range
STARTING DEVICE		0-100%
SPEED REF		0-3600 RPM
ACTUAL SPEED		0-3600 RPM
SPEEDER GEAR		0-100%
ACTUAL POWER		0-250 MW
LOAD REFERENCE		0-250 MW

11	Mosaic Grid along with frame to house the above items 16 rows of 24mm and 10 columns of 48mm Module colour RAL 7035	01
12	Crimping tool for mosaic items for making connections. [To be supplied loose].	01
13	Removal tool for mosaic items from mosaic items. [To be supplied loose].	01

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Sl. No.	DESCRIPTION [INSIDE MOUNTED ITEMS]	Qty/unit
01	Crimp contacts suitable for inserting into connectors for wiring	As reqd
02	Cage clamp 8level TBs with 2 input and 2 outputs with shorting links and accessories	As reqd +20% spare
03	Clip-on TB 10 sqmm with accessories.	As reqd +20% spare
04	Door switch.	2
05	LED Lamp.	1
06	Fuse 4A with fuse base.	1
07	HRC Link.	1
08	Power socket 5/15A.	1
09	MCB 6A Double Pole	1
10	Diodes [Rating as reqd.] with heat sink.	2
11	Fuse TB [KUDF] or equivalent along with Fuse Cartridges	As per Wiring

NOTES:

1. Orientation of LEDs are as per console layout drawing.
2. Inscriptions on the mosaic tiles shall be provided as per final approved Layout drawing.
3. Internally mounted items and their quantities will be as per requirement in final approved layout.
4. Internally mounted items & their quantities are subjected to change, based on the final approved schematic diagram.
5. Total no. of connections will be approximately:
   CWD01: 300 connections.
6. Digital Indicators shall be from one of the following sources:
   Weigell Messgerate, Germany
   Gossen, Germany
   Metrowatt, Germany
   Camille Bauer, Germany
   ABB, Germany
   Yokogowa, Japan
   Foxbro, UK
   Siemens,Germany
   Chino, Japan
7. The quantities as indicated above are applicable for one unit. Similar quantity shall be followed for other unit also.

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ANNEXURE - II
LIST OF ITEMS FOR CONTROL DESK SECTION
CWD02 [ELECTRICAL DRAW OUT CONSOLE]

Sl. No.	DESCRIPTION	Qty/unit
01	PB module with 3 PB and 4 LEDs. Size 48X24 mm. Button colour: Red, Grey, Green LED colour : Green, Yellow, Blue, Red PB's with 2 NO contacts LED's suitable for 24 V DC Connection with Plug-in connector, Module colour RAL7035	11
02	PB module with 3 PB and 3 LEDs. Size 48X24 mm. Button colour: Red, Green, Blue LED colour : All Red PB's with 2 NO contacts LED's suitable for 24 V DC Connection with Plug-in connector, Module colour RAL7035	01
03	Anlaog Indicator single scale : -15 -0- 15V Input:4-20mA, Size 48X48 mm Angle of deflection:90Deg Accuracy Class: 1.5 or better Bezel colour: RAL 7035 Suitable for mounting on mosaic grid	01
04	PB module with 2 PB and 3 LEDs. Size 48X24 mm. Button colour: Red, Green LED colour : Green, Yellow, Red PB's with 2 NO contacts LED's suitable for 24 V DC Connection with Plug-in connector, Module colour RAL7035	6
05	PB module with 2 PB and 2 LEDs. Size 48X24 mm. Button colour: Red, Green LED colour : Green, Red PB's with 2 NO contacts LED's suitable for 24 V DC Connection with Plug-in connector, Module colour RAL7035	03
06	1 LED Symbol module Size 48X24 mm LED colour: Red, Located in the center of module LED's suitable for 24V DC Connection with Plug-in connector Module colour RAL 7035	01
07	1 LED Symbol module Size 48X24 mm LED colour: Green Located in the center of module LED's suitable for 24V DC Connection with Plug-in connector Module colour RAL 7035	01

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Sl. No.	DESCRIPTION	Qty/unit
08	Recessed PB module. PB colour: Grey. Size: 48X24mm. Contacts: 2 NO. Suitable for 24V DC. Connection with Plug-in connector. Module colour RAL7035.	03
09	Plug-in connectors suitable for above modules. [If connectors are different for different type of items, actual quantity of each type of connector shall be accordingly split and quoted].	As required
10	Key operated Switch. 2position Size: 48X24mm. Module colour RAL7035. Configuration: 2 pole 2 position stay put Key removable in both positions Contacts rating: 24V DC, 10A	03
11	Key operated Switch. 3position Size: 48X24mm. Module colour RAL7035. Configuration: 2 pole 3 position stay put with center OFF Key removable in OFF position Contacts rating: 24V DC, 10A	01
19	Blank modules. Size: 48X24mm. Module colour RAL7035.	As required
20	Blank modules with engravings as per drawings. Size: 48X24mm. Module colour RAL7035.	As per Layout
21	Mosaic Grid along with frame to house the above items having 16 rows of 24mm and 10 columns of 48mm Module colour RAL 7035	01
23	Crimping tool for mosaic items for making connections. [To be supplied loose].	01
24	Removal tool for mosaic items from mosaic items. [To be supplied loose].	01
	Note:	
01	The quantities as indicated above are applicable for one unit. Similar quantity shall be followed for other unit also.	

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LIST OF ITEMS FOR CONTROL DESK SECTION
CWD02 [SYNCHROSCOPE PLAQUE]

Sl. No.	DESCRIPTION	Qty/unit
01	1 LED Symbol module Size 48X24 mm LED colour: Red, Located in the center of module LED's suitable for 24V DC Connection with Plug-in connector Module colour RAL 7035	01
02	1 LED Symbol module Size 48X24 mm LED colour: Green, Located in the center of module LED's suitable for 24V DC Connection with Plug-in connector Module colour RAL 7035	01
03	Moving coil Voltmeter. Scale: 0-150V. Input: 110V AC. Size: 48X48mm. Angle of deflection: 90Deg. Accuracy class: ± 1.5% of full scale or better. Bezel colour: Black. Dial Colour: White. Suitable for mounting on mosaic grid.	02
04	Moving coil Voltmeter. Scale: 45-55Hz. Input: 110V AC. Size: 48X48mm. Angle of deflection: 90Deg. Accuracy class: ± 1.5% of full scale or better. Bezel colour: Black. Dial Colour: White. Suitable for mounting on mosaic grid.	02
05	Synchroscope Rotating Iron. Size: 96X96mm. Dial: Radial arc approx. 360Deg. Accuracy class: 0.5 or better Input: 110V AC. Bezel colour: Black. Dial Colour: White. Suitable for mounting on mosaic grid.	01
06	Mimic and Engraving on Blank Tiles as per drawing.	1 Lot [As per drg]
07	Blank modules as per drawing. Size: 48X24mm / 48x48mm. Module colour RAL7035.	As required
08	Mosaic Grid along with frame to house the above items 18 rows of 24mm and 11 columns of 48mm Module colour RAL 7035	1

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Sl. No.	DESCRIPTION	Qty/unit
9	Crimp contacts suitable for inserting into connectors for wiring	As reqd
10	Cage clamp 8level TBs with 2 input and 2 outputs with shorting links and accessories	As reqd +20% spare
11	Clip-on TB 10 sqmm with accessories.	As reqd +20% spare
12	Door switch.	2
13	CFL Lamp.	1
14	Fuse 4A with fuse base.	1
15	HRC Link.	1
16	Power socket 5/15A.	1

NOTES:

1. Engravings on the mosaic tiles, shall be as per final approved Layout drawings.

2. Inscriptions/colour shade etc on the Mimics, shall be as per approved Layout drawings.

3 Quantity of Blank tiles , shall be as per final approved Layout drawings.

4 Internally mounted items and quantities are subject to change as per requirement in final approved Scheme.

5 Total no. of connections will be approximately:
CWD02: 600 connections.

6 Moving Coil Indicators shall be from one of the following sources:
Weigel Messgerate, Germany
Gossen, Germany
Siemens, Germany
Ganz, Germany

7 Synchroscope shall be from one of the following sources:
AE, Mumbai
Alstom, Chennai
Reyrolle, UK
ABB, Germany

08 The quantities as indicated above are applicable for one unit. Similar quantity shall be followed for other unit also.

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ANNEXURE - III
LIST OF MANDATORY SPARES [Common for U#1,2&3]

Sl. No.	DESCRIPTION	QTY
01	Console mounted mosaic devices. [PB&LED modules-to be classified based on LED/PB colour, LED modules-to be classified based on LED colour, Emergency PB, Recessed PBs, Digital Indicator, Analog Indicators, Switches [all varieties to be individually listed], Voltmeters, Frequency Meters, Synchroscope, etc.]	10% of each type to max. 5 nos. of each type.
02	Replacement Lamps / LEDs for each type of lamp / LED	100%
03	Blank Tiles	10% of total no. of tiles.
04	MCBs	10% of each type & rating
05	Fuses	100% of each type & rating

NOTE:

1. The required mandatory spares as per contract are as above. [% to be calculated based on total quantity of 3 units]

2. Detailed list in subsequent sheets is subject to approval by customer & will be based on final approved layouts

3. Bidder to quote separately for mandatory spares as a line item

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[LIST OF MANDATORY SPARES -DETAILED LIST]

Sl. No.	DESCRIPTION	QTY
01	Emergency OFF PB with red colour protective cover. Size: 48X48mm. Contacts: 4. Changeover suitable for 24V DC. Connection with Plug-in connector. Module colour RAL7035.	04
02	Recessed PB module. PB colour: Grey. Size: 48X24mm. Contacts: 2 NO. Suitable for 24V DC. Connection with Plug-in connector. Module colour RAL7035.	03
03	PB module with 3 PB and 4 LEDs. Size 48X24 mm. Button colour: Red, Grey, Green LED colour : Green, Yellow, Blue, Red PB's with 2 NO contacts LED's suitable for 24 V DC Connection with Plug-in connector, Module colour RAL7035	04
04	PB module with 3 PB and 3 LEDs. Size 48X24 mm. Button colour: Red, Green, Blue LED colour : All Red PB's with 2 NO contacts LED's suitable for 24 V DC Connection with Plug-in connector, Module colour RAL7035	01
05	PB module with 2 PB and 3 LEDs. Size 48X24 mm. Button colour: Red, Green LED colour : Green, Yellow, Red PB's with 2 NO contacts ; LED's suitable for 24 V DC Connection with Plug-in connector, Module colour RAL7035	05
06	PB module with 2 PB and 2 LEDs. Size 48X24 mm. Button colour: Red, Green LED colour : Green, Red PB's with 2 NO contacts LED's suitable for 24 V DC Connection with Plug-in connector, Module colour RAL7035	01
07	PB module with 2 PB and 0 LEDs. Size 48X24 mm. Button colour: Grey, Grey. PB's with 2 NO contacts LED's suitable for 24 V DC	02
08	2 LED signal module. LED colour: Red, Green Size: 48X24mm. LEDs suitable for 24V DC. Connection with rear Plug-in connector. Module colour RAL7035.	01

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[LIST OF MANDATORY SPARES -DETAILED LIST]

Sl. No.	DESCRIPTION	QTY
09	Anlaog Indicator single scale : -15 -0- 15V Input:4-20mA, Size 48X48 mm Angle of deflection:90Deg Accuracy Class: 1.5 or better Bezel colour: RAL 7035 Suitable for mounting on mosaic grid	01
10	6 LED signal module. LED colour: column 1 -Red , column 2- Green Size: 48X24mm. LEDs suitable for 24V DC. Connection with rear Plug-in connector. Module colour RAL7035.	02
11	1 LED Symbol module Size 48X24 mm LED colour: Red, Located in the center of module LED's suitable for 24V DC Connection with Plug-in connector Module colour RAL 7035	01
12	1 LED Symbol module Size 48X24 mm LED colour: Green Located in the center of module LED's suitable for 24V DC Connection with Plug-in connector Module colour RAL 7035	01
13	Key operated Switch. 2position Size: 48X24mm. Module colour RAL7035. Configuration: 2 pole 2 position stay put Key removable in both positions Contacts rating: 24V DC, 10A	01
14	Key operated Switch. 3position Size: 48X24mm. Module colour RAL7035. Configuration: 2 pole 3 position stay put with center OFF Key removable in OFF position Contacts rating: 24V DC, 10A	01
15	Moving coil Voltmeter. Scale: 0-150V. Input: 110V AC. Size: 48X48mm. Angle of deflection: 90Deg. Accuracy class: ± 1.5% of full scale or better. Bezel colour: Black. Dial Colour: White. Suitable for mounting on mosaic grid.	01

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[LIST OF MANDATORY SPARES -DETAILED LIST]

Sl. No.	DESCRIPTION	QTY
16	Moving coil Voltmeter. Scale: 45-55Hz. Input: 110V AC. Size: 48X48mm. Angle of deflection: 90Deg. Accuracy class: ± 1.5% of full scale or better. Bezel colour: Black. Dial Colour: White. Suitable for mounting on mosaic grid.	01
17	Synchroscope Rotating Iron. Size: 96X96mm. Dial: Radial arc approx. 360Deg. Accuracy class: 0.5 or better Input: 110V AC. Bezel colour: Black. Dial Colour: White. Suitable for mounting on mosaic grid.	01
18	Digital Display module. 3 1/2 digit or 4 digit Display colour: Green. Seven segment display. Power Supply: 24V DC. Screw type connector. Input- 4-20mA. Size: 48X24mm. Programmable type	02
19	Emergency OFF PB with red colour protective cover (Mushroom type). Along with all required accessories as defined at Cl. No. 1.19 at page no. 04 of 04. Size: 48X48mm. Contacts: 4CO suitable for 24V DC. Minimum contact rating-5A Connection with Plug-in connector. Module colour RAL7035.	02
20	LED Red	174
21	LED Green	174
22	LED Yellow	96
23	LED Blue	36
24	Blank modules. Module colour RAL7035. [10% of total qty]	As reqd.
25	MCB[10% of each type & rating]	As reqd.
26	Fuses [100% of each type & rating]	As reqd.

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. No. 3 659 41 00907

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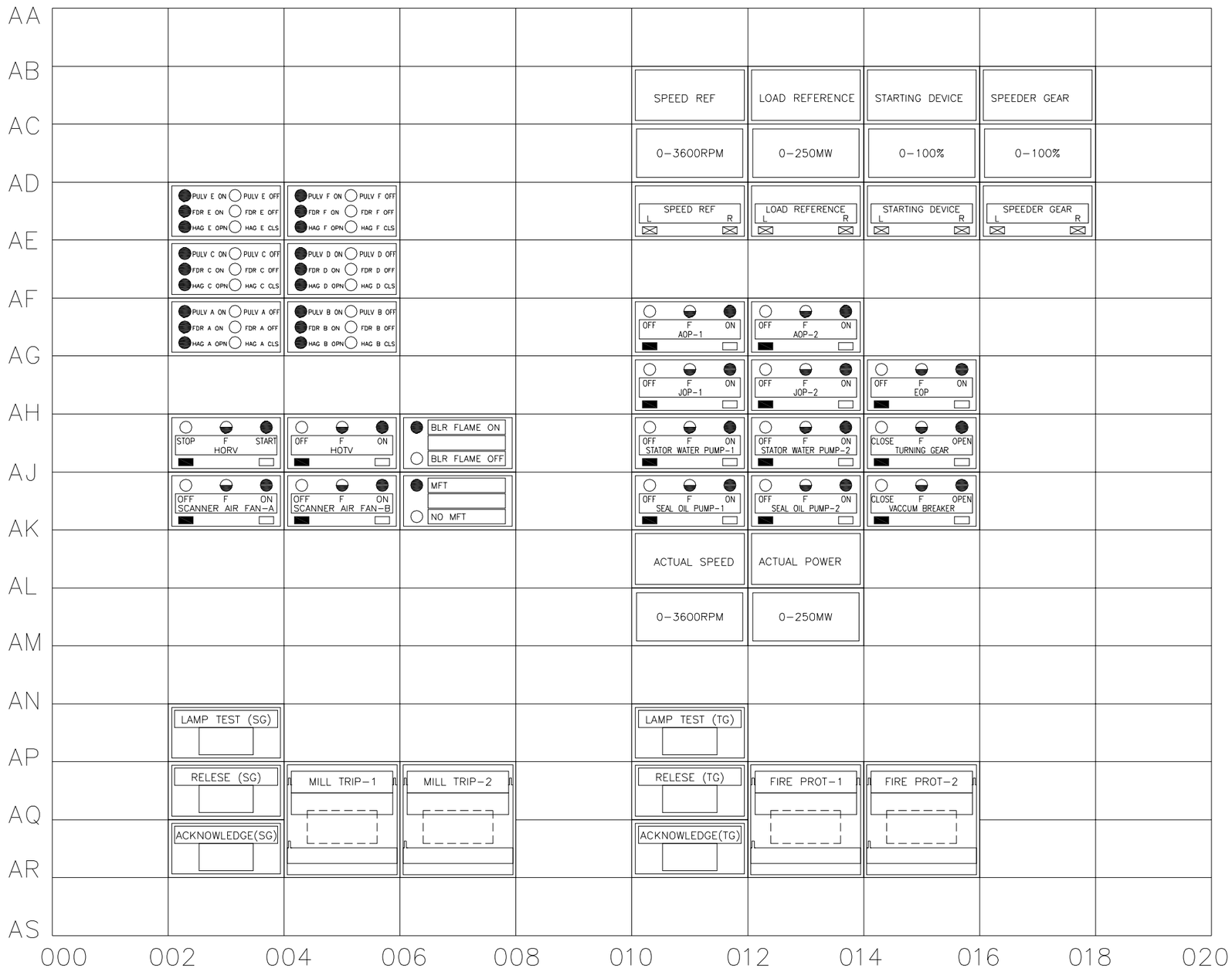
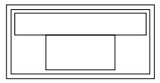
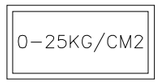


LEGEND

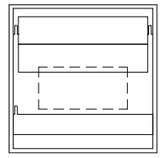
- LED YELLOW
- LED GREEN
- LED RED
- PUSH BUTTON GREY
- PUSH BUTTON RED
- PUSH BUTTON GREEN



RECESSED PB GREY



31/2 DIGIT DIGITAL DISPLAY GREEN
SEVEN SEGMENT LED DISPLAY



EMERGENCY OFF PB RED
WITH PROTECTIVE FLAP

BLANK TILE

NOTE:-

1. OVERALL DIMENSIONS: 554MM(W) X 458 MM(H)
2. DIMENSIONS ARE INDICATIVE AND SUBJECT TO CHANGE BASED ON SUPPLIER OF MOSAIC ITEMS
3. EMERGENCY PB (2 NO CONTACT) FOR TURBINE TRIP (2Nos.) TO BE PROVIDED ON THE UCD.
4. EMERGENCY PB (4 NC CONTACT) FOR BOILER TRIP (2Nos.) TO BE PROVIDED ON THE UCD.

NTPC DWG NO. : 4120-405-EN-PVI-C-132A

PRODUCT : FARAKKA STAGE 1 UNIT-1,2,3 (3x200MW) R&M

CUSTOMER: M/S NTPC

REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED NST / CHECKED RK / APPROVED MS
			01	12.09.18	

REVISED AS PER ENGINEER COMMENTS

	NAME	SIGN	DATE
DRAWN	NST		11.08.18
CHECKED	RK		11.08.18
APPROVED	MS		11.08.18

DEPT. ENGG — CODE 410

BHARAT HEAVY ELECTRICALS LIMITED.
ELECTRONICS DIVISION, BANGALORE

CARD CODE

TITLE: LAYOUT OF C&I DRAWOUT CONSOLE

No. OF SHEETS: 01

SHEET No.: 01

M.O. No.

DRG. No. 3 659 41 00907

REV 01

REF. DRG. No.

SIGN. & DATE

INVENTORY No.

FORM No. A3-03

A3 SIZE

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. No. 3 659 41 00908

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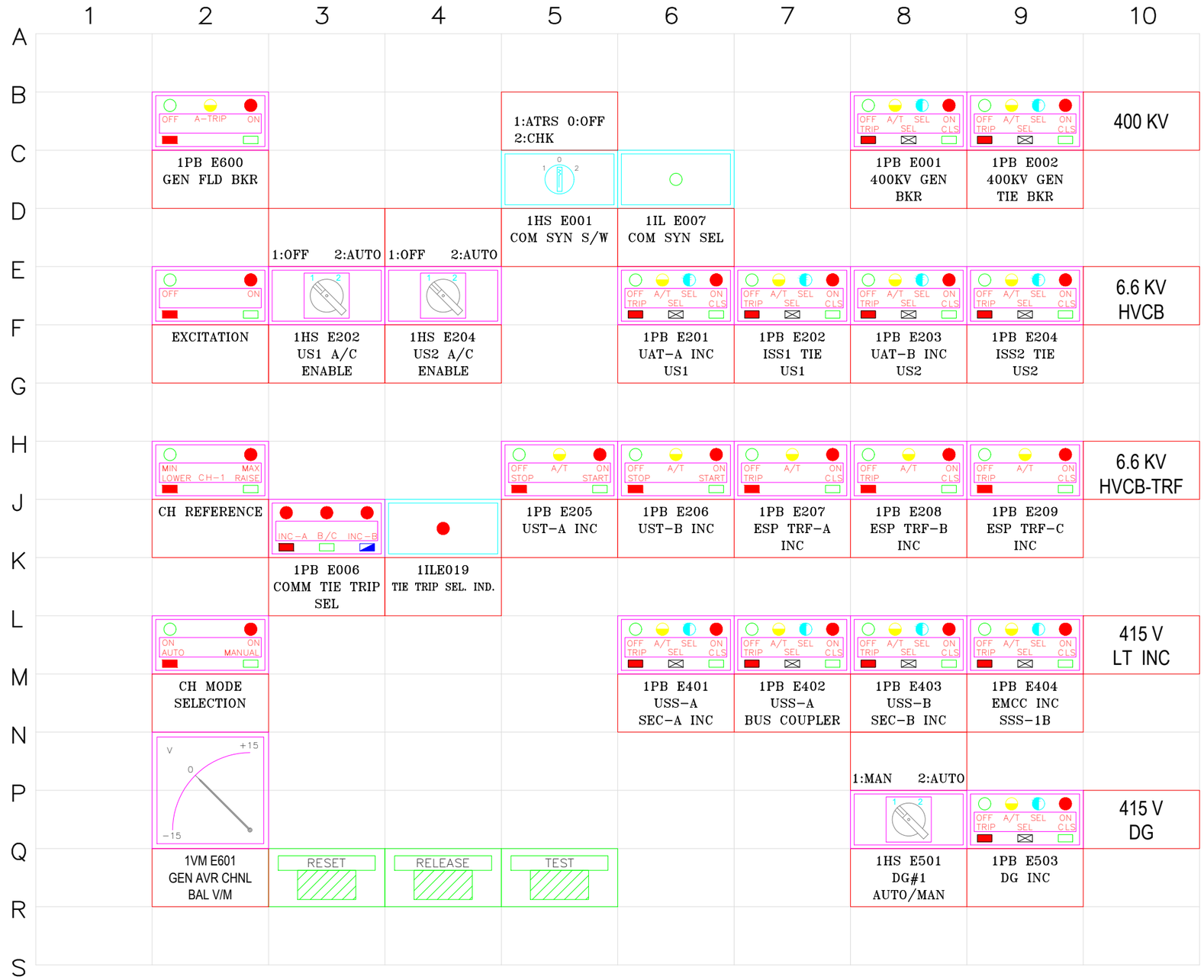
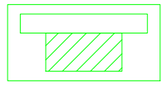
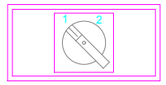


LEGEND:-

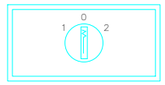
- LED GREEN
- LED YELLOW
- LED RED
- LED BLUE
- PUSH BUTTON GREEN
- PUSH BUTTON GREY
- PUSH BUTTON RED
- PUSH BUTTON BLUE



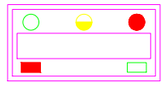
RECESSED PUSH BUTTON



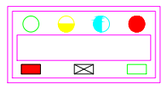
STAYPUT 2 POSITION KEY SWITCH



KEY OPERATED 3 POSITION SWITCH



2PB + 3LED MODULE



3PB + 4LED MODULE

2PB + 2LED MODULE

NOTES:-

1. OVERALL DIMENSIONS: 480MM(W) X 384MM(H).
2. DIMENSIONS ARE INDICATIVE AND SUBJECT TO CHANGE BASED ON SUPPLIER OF MOSAIC ITEMS.

UNIT-1

NTPC DWG NO. : 4120-405-EN-PVI-C-056

PRODUCT : FARAKKA STAGE 1 UNIT-1,2,3 (3x200MW) R&M

CUSTOMER: M/S NTPC

REV.	DATE	ALTERED	REV.	DATE	ALTERED NST
		CHECKED	01	28.09.18	CHECKED RK
		APPROVED			APPROVED MS

REVISED INLINE WITH CUSTOMER COMMENTS

	NAME	SIGN	DATE
DRAWN	NST		13.08.18
CHECKED	RK		13.08.18
APPROVED	MS		13.08.18

DEPT. ENGG | CODE 410

BHARAT HEAVY ELECTRICALS LIMITED.
ELECTRONICS DIVISION, BANGALORE

CARD CODE

TITLE: LAYOUT OF ELECTRICAL DRAWOUT CONSOLE

No. OF SHEETS 06

SHEET No. 01

WBS No.

DRG. No. 3 659 41 00908

REV 01

REF. DRG. No.

SIGN. & DATE

INVENTORY No.

FORM No. A3-03

A3 SIZE

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. No. 3 659 41 00908

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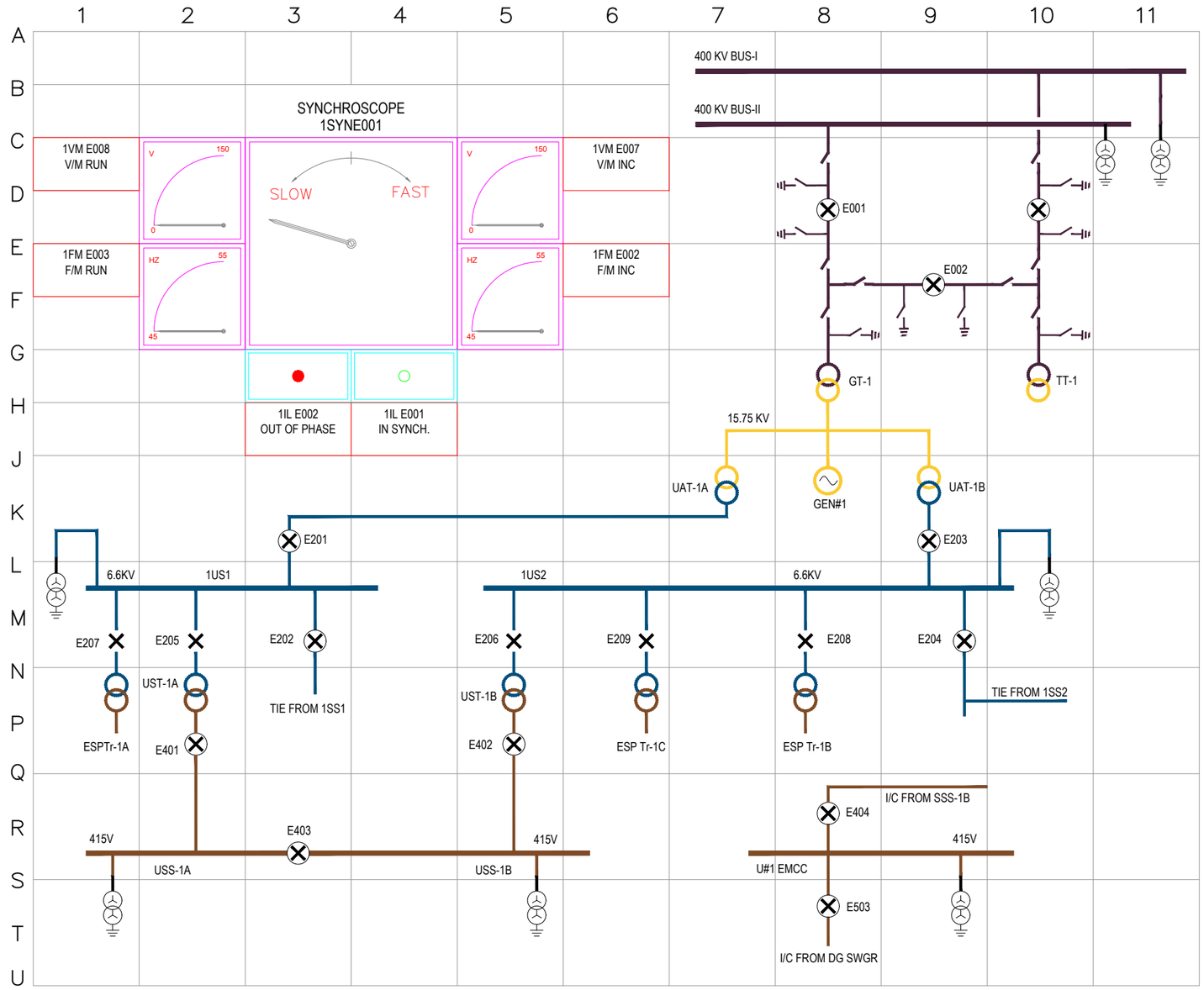

LEGEND:-

- ⊗ SYNC. TYPE BREAKER
- × NON-SYNC. TYPE BREAKER

MIMIC COLOUR SHADES:-

400KV – PURPLE VIOLET (RAL 4007)
15.75KV – ZINC YELLOW (RAL 1018)
6.6KV – AIRCRAFT BLUE (RAL 5010)
415V – CLAY BROWN (RAL 8003)

NOTES:-

1. THE COLOUR OF MIMIC FOR TRANSFORMER WINDINGS SHALL BE AS PER COLOUR CODE AS SPECIFIED ABOVE CORRESPONDING TO THE VOLTAGE OF THE WINDING.
2. THE MIMIC WILL BE PRINTED ON 48 X 48 MM/48 X 24 MM SIZE MOSAIC TILES OF RAL 7035 SHADE.
3. THE TEXT WILL BE PRINTED IN BLACK COLOUR [LETTER SIZE: 4MM, TEXT STYLE: ARIEL NARROW]
4. OVERALL DIMENSIONS: 528MM(W) X 432MM(H).
5. DIMENSIONS ARE INDICATIVE AND SUBJECT TO CHANGE BASED ON SUPPLIER OF MOSAIC ITEMS.

UNIT-1

NTPC DWG NO. : 4120-405-EN-PVI-C-056

PRODUCT : FARAKKA STAGE 1 UNIT-1,2,3 (3x200MW) R&M

CUSTOMER: M/S NTPC

REV.	DATE	ALTERED / CHECKED / APPROVED
01	28.09.18	ALTERED NST; CHECKED RK; APPROVED MS

REVISED INLINE WITH CUSTOMER COMMENTS

	NAME	SIGN	DATE
DRAWN	NST		14.08.18
CHECKED	RK		14.08.18
APPROVED	MS		14.08.18

DEPT. ENGG — CODE 410

BHARAT HEAVY ELECTRICALS LIMITED.
ELECTRONICS DIVISION, BANGALORE

CARD CODE

TITLE: LAYOUT OF ELECTRICAL DRAWOUT CONSOLE

No. OF SHEETS 06

SHEET No. 02

WBS No.

DRG. No. 3 659 41 00908

REV 01

REF. DRG. No.

SIGN. & DATE

INVENTORY No.

FORM No. A3-03

A3 SIZE

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. No. 3 659 41 00908

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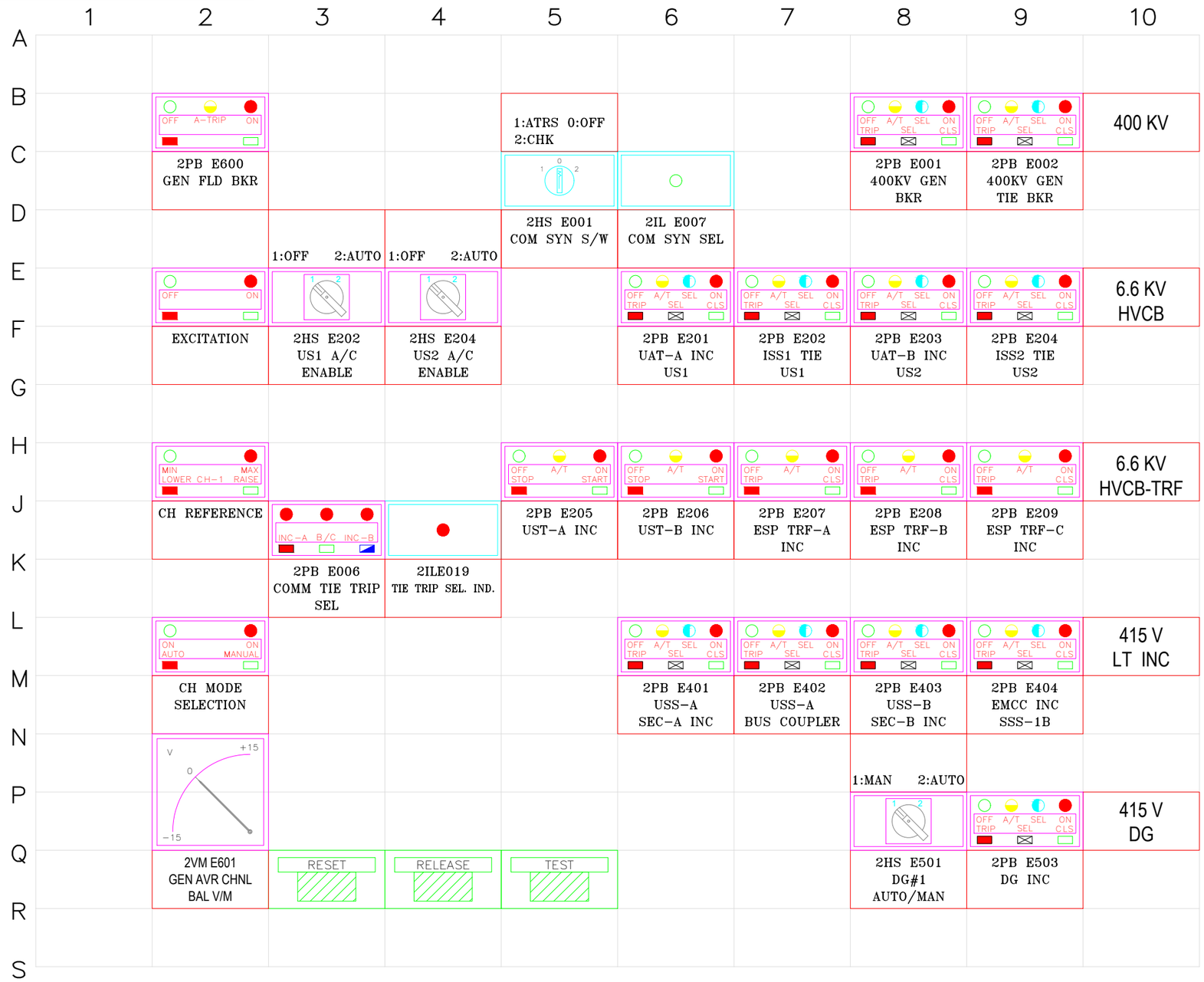

LEGEND:-

- LED GREEN
- LED YELLOW
- LED RED
- LED BLUE
- PUSH BUTTON GREEN
- PUSH BUTTON GREY
- PUSH BUTTON RED
- PUSH BUTTON BLUE
- RECESSED PUSH BUTTON
- STAYPUT 2 POSITION KEY SWITCH
- KEY OPERATED 3 POSITION SWITCH
- 2PB + 3LED MODULE
- 3PB + 4LED MODULE
- 2PB + 2LED MODULE

NOTES:-

1. OVERALL DIMENSIONS: 480MM(W) X 384MM(H).
2. DIMENSIONS ARE INDICATIVE AND SUBJECT TO CHANGE BASED ON SUPPLIER OF MOSAIC ITEMS.

UNIT-2

NTPC DWG NO. : 4120-405-EN-PVI-C-056

PRODUCT : FARAKKA STAGE 1 UNIT-1,2,3 (3x200MW) R&M

CUSTOMER: M/S NTPC

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

	NAME	SIGN	DATE
DRAWN	NST		30.09.18
CHECKED	RK		30.09.18
APPROVED	MS		30.09.18

DEPT. ENGG — CODE 410

BHARAT HEAVY ELECTRICALS LIMITED.
ELECTRONICS DIVISION, BANGALORE

CARD CODE

TITLE: LAYOUT OF ELECTRICAL DRAWOUT CONSOLE

No. OF SHEETS: 06

SHEET No.: 03

WBS No.

DRG. No. 3 659 41 00908

REV 00

REF. DRG. No.

SIGN. & DATE

INVENTORY No.

FORM No. A3-03

A3 SIZE

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. No. 3 659 41 00908

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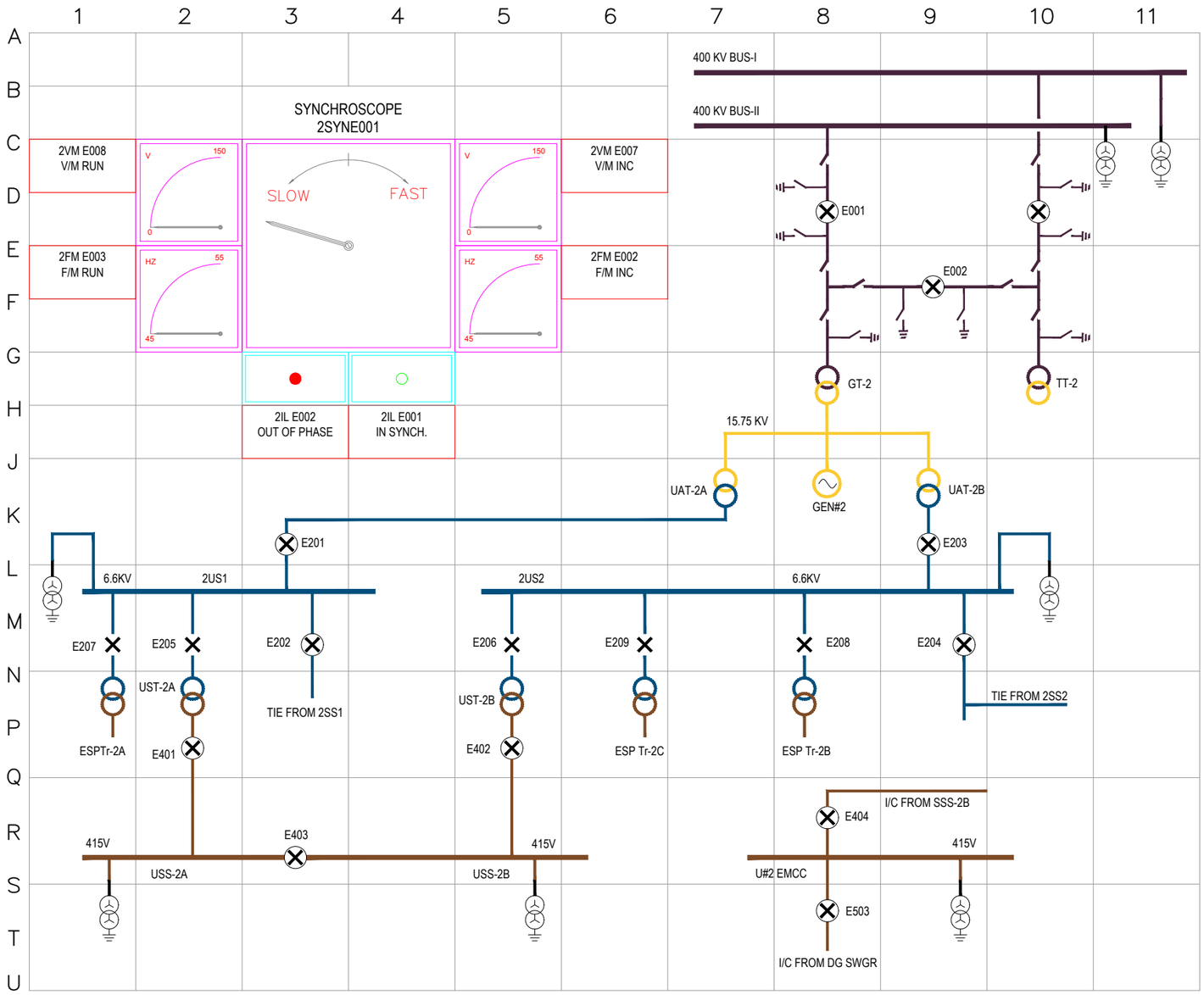

UNIT-2

LEGEND:-

- ⊗ SYNC. TYPE BREAKER
- × NON-SYNC. TYPE BREAKER

MIMIC COLOUR SHADES:-

400KV – PURPLE VIOLET (RAL 4007)
15.75KV – ZINC YELLOW (RAL 1018)
6.6KV – AIRCRAFT BLUE (RAL 5010)
415V – CLAY BROWN (RAL 8003)

NOTES:-

1. THE COLOUR OF MIMIC FOR TRANSFORMER WINDINGS SHALL BE AS PER COLOUR CODE AS SPECIFIED ABOVE CORRESPONDING TO THE VOLTAGE OF THE WINDING.
2. THE MIMIC WILL BE PRINTED ON 48 X 48 MM/48 X 24 MM SIZE MOSAIC TILES OF RAL 7035 SHADE.
3. THE TEXT WILL BE PRINTED IN BLACK COLOUR [LETTER SIZE: 4MM, TEXT STYLE: ARIEL NARROW]
4. OVERALL DIMENSIONS: 528MM(W) X 432MM(H).
5. DIMENSIONS ARE INDICATIVE AND SUBJECT TO CHANGE BASED ON SUPPLIER OF MOSAIC ITEMS.

NTPC DWG NO. : 4120-405-EN-PVI-C-056

PRODUCT : FARAKKA STAGE 1 UNIT-1,2,3 (3x200MW) R&M

CUSTOMER: M/S NTPC

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

	NAME	SIGN	DATE
DRAWN	NST		30.09.18
CHECKED	RK		30.09.18
APPROVED	MS		30.09.18

DEPT. ENGG | CODE 410

BHARAT HEAVY ELECTRICALS LIMITED.
ELECTRONICS DIVISION, BANGALORE

CARD CODE

TITLE: LAYOUT OF ELECTRICAL DRAWOUT CONSOLE

No. OF SHEETS 06

SHEET No. 04

WBS No.

DRG. No. 3 659 41 00908

REV 00

REF. DRG. No.

SIGN. & DATE

INVENTORY No.

FORM No. A3-03

A3 SIZE

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. No. 3 659 41 00908

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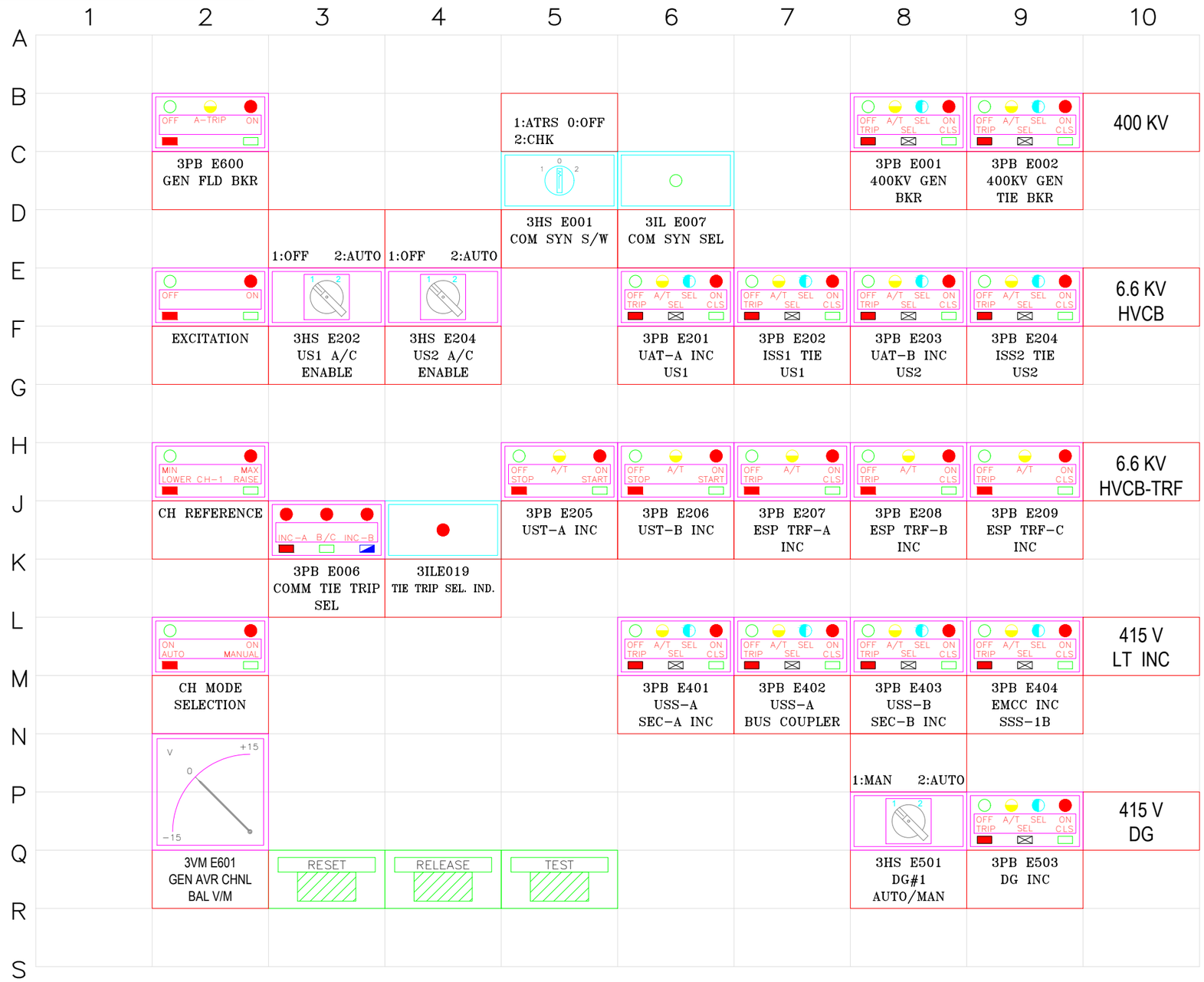

LEGEND:-

- LED GREEN
- LED YELLOW
- LED RED
- LED BLUE
- PUSH BUTTON GREEN
- PUSH BUTTON GREY
- PUSH BUTTON RED
- PUSH BUTTON BLUE
- RECESSED PUSH BUTTON
- STAYPUT 2 POSITION KEY SWITCH
- KEY OPERATED 3 POSITION SWITCH
- 2PB + 3LED MODULE
- 3PB + 4LED MODULE
- 2PB + 2LED MODULE

NOTES:-

1. OVERALL DIMENSIONS: 480MM(W) X 384MM(H).
2. DIMENSIONS ARE INDICATIVE AND SUBJECT TO CHANGE BASED ON SUPPLIER OF MOSAIC ITEMS.

UNIT-3

NTPC DWG NO. : 4120-405-EN-PVI-C-056

PRODUCT : FARAKKA STAGE 1 UNIT-1,2,3 (3x200MW) R&M

CUSTOMER: M/S NTPC

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

	NAME	SIGN	DATE
DRAWN	NST		30.09.18
CHECKED	RK		30.09.18
APPROVED	MS		30.09.18

DEPT. ENGG — CODE 410

BHARAT HEAVY ELECTRICALS LIMITED.
ELECTRONICS DIVISION, BANGALORE

CARD CODE

TITLE: LAYOUT OF ELECTRICAL DRAWOUT CONSOLE

No. OF SHEETS 06

SHEET No. 05

WBS No.

DRG. No. 3 659 41 00908

REV 00

REF. DRG. No.

SIGN. & DATE

INVENTORY No.

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. No. 3 659 41 00908

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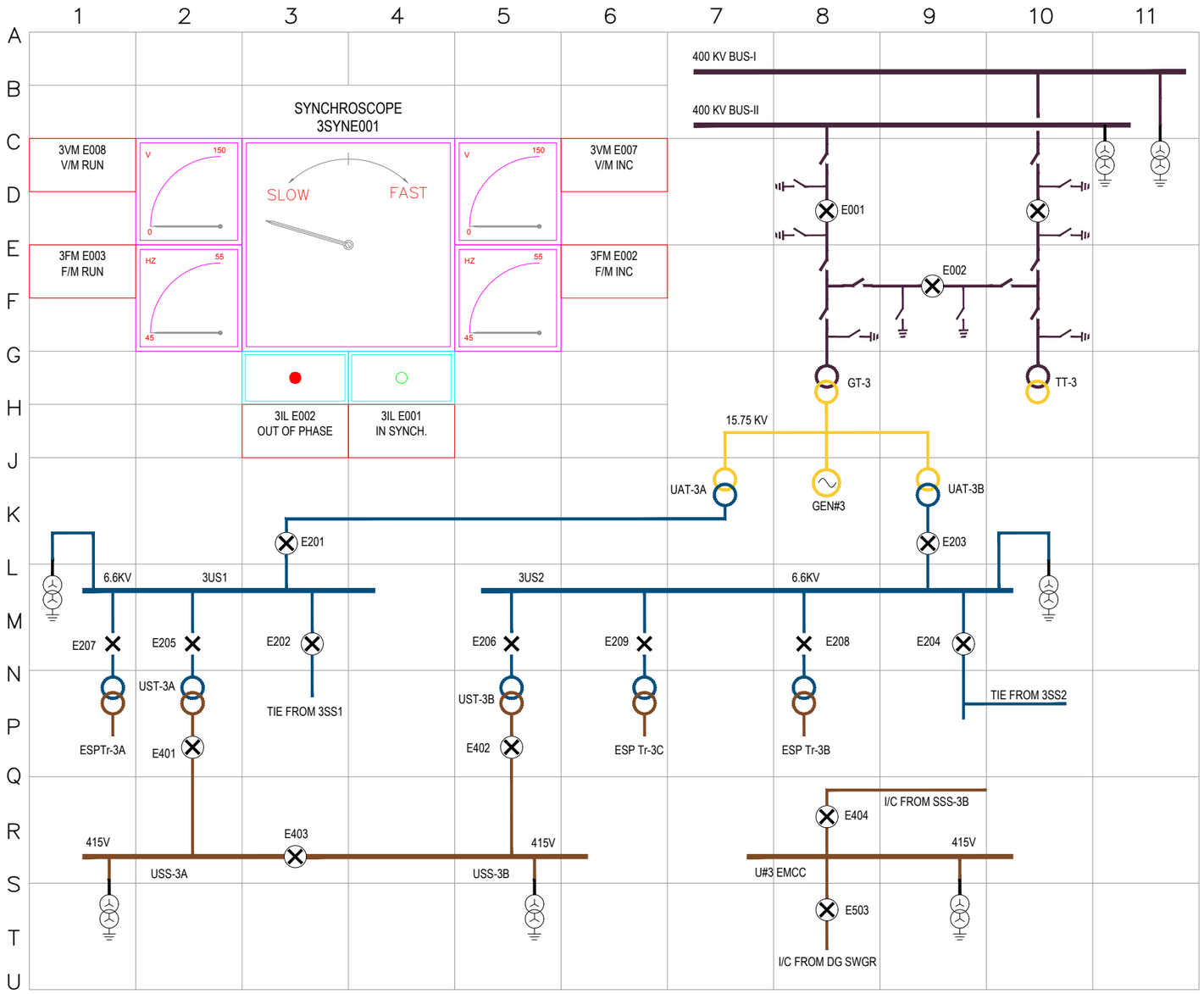

UNIT-3

LEGEND:-

- ⊗ SYNC. TYPE BREAKER
- × NON-SYNC. TYPE BREAKER

MIMIC COLOUR SHADES:-

400KV – PURPLE VIOLET (RAL 4007)
15.75KV – ZINC YELLOW (RAL 1018)
6.6KV – AIRCRAFT BLUE (RAL 5010)
415V – CLAY BROWN (RAL 8003)

NOTES:-

1. THE COLOUR OF MIMIC FOR TRANSFORMER WINDINGS SHALL BE AS PER COLOUR CODE AS SPECIFIED ABOVE CORRESPONDING TO THE VOLTAGE OF THE WINDING.
2. THE MIMIC WILL BE PRINTED ON 48 X 48 MM/48 X 24 MM SIZE MOSAIC TILES OF RAL 7035 SHADE.
3. THE TEXT WILL BE PRINTED IN BLACK COLOUR [LETTER SIZE: 4MM, TEXT STYLE: ARIEL NARROW]
4. OVERALL DIMENSIONS: 528MM(W) X 432MM(H).
5. DIMENSIONS ARE INDICATIVE AND SUBJECT TO CHANGE BASED ON SUPPLIER OF MOSAIC ITEMS.

NTPC DWG NO. : 4120-405-EN-PVI-C-056

PRODUCT : FARAKKA STAGE 1 UNIT-1,2,3 (3x200MW) R&M

CUSTOMER: M/S NTPC

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

	NAME	SIGN	DATE
DRAWN	NST		30.09.18
CHECKED	RK		30.09.18
APPROVED	MS		30.09.18

DEPT. ENGG | CODE 410

BHARAT HEAVY ELECTRICALS LIMITED.
ELECTRONICS DIVISION, BANGALORE

CARD CODE

TITLE: LAYOUT OF ELECTRICAL DRAWOUT CONSOLE

No. OF SHEETS 06

SHEET No. 06

WBS No.

DRG. No. 3 659 41 00908

REV 00

REF. DRG. No.

SIGN. & DATE

INVENTORY No.

FORM No. A3-03

A3 SIZE

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ANNEXURE-IV

PURCHASE SPECIFICATION
FOR
TERMINATION BOX
[FOR INTERFACING UCD TO DCS/MARSHALLING PANELS]

	PREP	CHKD	APPVD	ISSUED	DATE
	RK	MS	VS	410	01.10.18

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SPECIFICATION OF TERMINATION BOXES FOR INTERFACING UCD TO DCS/MARSHALLING PANELS

1.0 REQUIREMENT

Seperate Termination Boxes to be provided for Process Draw-out Console and Electrical Draw-out Console & Synchronising Plaque. The TB types and Designation in Terminal Boxes to be kept exactly similar to the Draw-out Console TB Details.
Qty. Per Unit = 2Nos. [1No. for Process Draw-out and 1No. for Electrical and Sync. Plaque]
Total Qty. Required for 3 Units = 6Nos.

2.0 CONSTRUCTION

2.1 The Termination Box shall be wall mountable type and also suitable for upright floor mounting, confirming to protection class of IP42.

2.2 It shall be constructed using CRCA sheet of minimum 2mm thick and shall be of welded construction.

2.3 Removable gland plates shall be of 3mm thick. Size shall be selected for easy removing. Gland plates shall be provided both in the top & Bottom.

2.4 It should be ensured that the terminal blocks are placed at a minimum height of 150mm from the bottom of the panel for ease of accessibility. Indicative drawing titled “Reference Termination Box” is attached with this specification. However this drawing is only for reference. Dimensions of the termination Boxes to be worked out by the vendor ensuring compact design. Vendor to submit detailed drawing of the termination box, engineered as per this specification, mentioning all dimensions.

2.5 Door shall be single double leaf doors in the front with 3 point locking arrangement.

2.6 Final finish colour (epoxy based powder coating) shall be applied to all surfaces. The final finished thickness of paint film on sheet shall not be less than 60 micron. The colours for exterior and interior surfaces shall be RAL:9006 (Structure Finish) . However if there is any change in colour based on customer comments, the same shall be communicated to the vendor. There shall be no change in price due to this.

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3.0 DESIGN BASIS

3.1 Terminal blocks shall be 8level type, suitable for termination of upto 2.5sqmm cross section cable. TBs & its accessories shall be of reputed make [Wago,Phoenix or Elmex]. They shall be mounted as shown in the attached indicative drawing. TBs to be properly identified and differentiated

3.2 PVC cable tray/duct of sufficient size shall be provided to accommodate incoming & outgoing cables

3.3 One no. 5A, 240V single phase AC, 3pin socket with switch to be provided in each termination Box.

3.4 One number LED lamp for suitable illumination to be provided with one number door switch.

3.5 Suitable MCB of reputed make to be provided.

3.6 Miscellaneous hardwares & accessories as required.

3.7 Copper earth bus bar of 25x6mm shall be provided and mounted as shown in the indicative drawing. M8 earth studs to be provided for cubicle earthing connection on both sides outside.

3.8 Wiring inside the Termination Box to include CFL, Doorswitch, 3pin socket, interconnection between earth bus bar & M8 studs and any such other components as may be required for completeness.

3.9 Documents to be submitted along with the technical offer
a. Overall General Arrangement drawing
b. Internal General Arrangement drawing with front view, side view etc.
c. Detailed BOM with make & model
d. Quality Plan
All above documents are subject to approval by customer - M/s NTPC.

3.10 Suppliers internal test certificates for dimensions,visual,paint,HV,IR, electrical functions etc. to be submitted to BHEL before giving inspection call.

3.11 Inspection by BHEL/Customer at the vendors works. Items will be directly despatched to project site. Details shall be intimated at the time of PO

3.12 Modification if necessitated as per site requirement, to be done at no additional cost.