

Bharat Heavy Electricals Limited

High Pressure Boiler Plant, Tiruchirappalli 620 014.

TECHNICAL DELIVERY CONDITIONS

FOR SUB - DELIVERY COMPONENTS OF

CONTROLS AND INSTRUMENTATION

Technical Specification For**Remote Control Panel (RCP) &
Local Control Panel (LCP)**

(EMC COMPLIANT)

Gravimetric Feeder Control System

SPECIFICATION NO.: TDC: TCI: 310 (EMC): UPPUR, Rev. 00

UPPUR SUPER CRITICAL THERMAL POWER PROJECT**2 x 800 MW, UNIT-1 & 2, Customer No. 1821 & 1822**

00	10/11/2017	Initial release			
REV NO.	DATE	DESCRIPTION	[AB] PREPARED	[KV] REVIEWED	[TK] APPROVED

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07	10.11.17	General revision	<i>Shava</i>	<i>K. V. [Signature]</i>	<i>T. [Signature]</i>
06	18.04.17	General revision	Sd/-	Sd/-	Sd/-
05	17.01.17	General revision	Sd/-	Sd/-	Sd/-
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GENERAL INSTRUCTIONS

Section — 1 "GENERAL REQUIREMENTS" & "SCOPE OF WORK"
 Section — 2 "TECHNICAL SPECIFICATION REQUIREMENTS"
 Section — 3 "INSPECTION AND PACKING"
 Section — 4 "DOCUMENTS TO BE SUBMITTED"
 Section — 5 "SPECIAL INSTRUCTION TO VENDOR"

SECTION-1**1.0 GENERAL REQUIREMENTS:**

This specification covers general requirements of Remote Control Panel (RCP) and Local Control Panel (LCP) for gravimetric feeder control system.
 All components mounted and wired in RCP & LCP shall be of EMC compliant.
 List of acceptable makes are indicated in annexure BOM.

2.0 SCOPE OF WORK:

2.1 The vendor's base offer shall include the following scope of work:

- 2.1.1 Manufacture and supply of RCP & LCP to BHEL (T) works, after inspection at vendor works.
- 2.1.2 On receipt of panels at BHEL (T) works, vendor to mount and wire BHEL's free issue components in the respective panels at BHEL (T) works.
- 2.1.3 For mounting of BHEL (T) supplied free issue items, panel assembly & wiring works at BHEL (T) premises by vendor, separate price shall be indicated by vendor in the main offer.

SECTION-2**TECHNICAL REQUIREMENTS:**

Clause	Details	Vendor's compliance
3.0	REMOTE CONTROL PANEL (RCP):	
3.1	All Electrical & Electronic components are to be mounted and wired inside a weatherproof cabinet. The electrical components shall include starters for main drive motor, cleanout conveyor motor, power and auxiliary contactors, selector switches, indication lamps, timers etc. as per schematic diagram and BHEL approved bill of material.	
3.2	All interlocks and control hardware required for feeder start, stop/trip and run shall be taken care of in the cabinet as per wiring schematics (will be furnished in the event of PO).	
3.3	The cabinet shall be suitable for mounting in a non-air conditioned room, which is away from the coal feeder.	

Clause	Details	Vendor's compliance
3.4	All the electrical and electronic components provided in the cabinet shall suitable for operating continuously trouble free at an ambient temperature of 50°C.	
3.5	The height, width, depth, color and finish of the cabinet shall be as per BHEL approved general arrangement drawing.	
3.6	All the mating surfaces including cable gland plates etc. on which the gaskets are fixed shall be made electrically conductive surface and then the conductive gaskets shall be fixed by using silver based conductive glue.	
3.7	CABINET FABRICATION & CONSTRUCTION DETAILS:	
3.7.01	The cabinet shall be of professional quality welded modular construction made from CRCA grade-D sheet steel (branded make) as per IS-513 (or) GI Sheet steel and 2mm (min.) thick for door, 1.5mm (min.) thick for sides and shall be rigid freestanding, neat in appearance. Component mounting plate shall be rigidly fixed and made from 3mm thick GI sheet steel (branded make). Necessary stiffeners / supports shall be provided to avoid bowing and bending.	
3.7.02	The cabinet shall be mounted on anti-vibration pad, 15 mm thick suitable for fixing to the ISMC channel/plinth of 100mm height with self-drilling anchor bolts together with all required accessories. Panel dimension: 2200+15+100 mm(H)X1200mm(W)X600mm(D)	
3.7.03	The cabinet construction shall have adequate strength to support mounted components during shipment.	
3.7.04	The finished cabinet surface shall be free from all waves, bellies and other imperfections. All cabinet exterior steel surfaces shall be properly pre-treated by 7-tank process (or) pretreatment (Spray line) & Primer (Dip coat). Surface preparation shall be by power tool cleaning after degreasing and rinsing.	
3.7.05	For routing the cables coming from outside, the cabinet shall have bottom removable cable gland plate of 3mm thick GI (or) CRCA grade-D sheet steel fixed with conductive gasket. The mating surface shall be made conductive surface first and then conductive gasket shall be fixed using silver based conductive glue. EMC compliant cable glands are to be supplied along with each panel as per annexure BOM.	
3.7.06	The cabinet enclosure shall be suitable for IP-32 degree of protection as per IEC 60529 and with double-door arrangement.	

Clause	Details	Vendor's compliance
3. 7.07	For dissipation of heat generated inside the RCP, cooling fan (refer annexure BOM) with EMI compatible louver with honey comb filters and perforated brass mesh screen at the bottom shall be provided. For top, EMI compatible louver with honey comb filters and perforated brass mesh screen shall be provided. GI strip of 1mm thick shall be welded to inner side of door that is mating with the conductive gasket. Enclosure doors should be connected to inside of the side panels at regular intervals using thick braid or metal strips.	
3. 7.08	Power sockets with fuse and surge protection shall be provided (as per annexure BOM) with rigid supporting bracket with protective cover and warning sticker.	
3. 7.09	Wire duct of adequate size shall be provided for better layout and easy maintenance.	
3. 7.10	Grouping and termination of power and control wiring inside the RCP shall be done neatly.	
3. 7.11	Tinned copper earth bus 15x4mm of 1m lengths with mounting base, insulated bush etc shall be provided with 8 termination screws for different cable size varying from 2.5 sq.mm to 16 sq.mm. Separate earth strip to be provided for electronic components earthing.	
3. 7.12	Two numbers brass bolt with nut for connecting customer's GI earth flat shall be provided on back side of the panel.	
3. 7.13	Zinc plated (yellow) wiring accessories such as plate washer, spring washer and serrated washers as required shall be used for fixing of components.	
3. 7.14	Flush type ergo form lock shall be provided for door locking.	
3. 7.15	The locking arrangement shall be such that left side door can be opened only after opening right side door. Also necessary defeat mechanism shall be provided for the power isolation switch (as per annexure BOM) for opening the door without switching OFF the incoming power supply.	
3. 7.16	Four numbers of M16 or M12 lifting hooks shall be provided on top of the panel.	
3. 7.17	Aluminum anodized nameplates shall be provided for all door mounted and inside mounted components. The nameplates provided on the door of the cabinet shall be fixed using screws in addition to pasting. For inside mounted components, the nameplates shall be fixed by using suitable adhesive compound. For inscription details and name plate specification, refer annexure-3.	

Clause	Details	Vendor's compliance
3. 7.18	EMC compatible Indicating lamps, selector switches shall be provided by vendor on the panel front as per schematic diagram. The acceptable makes of components are given in the annexure BOM. The wiring schematics will be furnished in the event of PO.	
3. 7.19	The terminal block used for power wiring shall be as per annexure BOM. The terminals shall be identified with number strip with legible numbering. The terminal blocks shall be rigidly fixed using Zinc plated screws and washers. 20% spare terminals shall be provided over and above the terminal blocks wired. (Quantity as per BOM).	
3. 7.20	The terminal block used for control wiring shall be as per annexure BOM. The terminals shall be identified with number strip with legible numbering. The terminal blocks shall be rigidly fixed using Zinc plated screws and washers. 20% spare terminals shall be provided over and above the terminal blocks wired. (Quantity as per BOM).	
3. 7.21	Wire dressing spiral of polyethylene material of adequate size shall be used for neat dressing of door-mounted components wiring.	
3. 7.22	Adequate space to be provided in the component mounting plate for fixing and wiring of MPGFC electronic modules arranged by BHEL.	
3. 7.23	Painting: Powder coating shall be done for both exterior and interior of the control panel. Thickness of powder coating shall be 50-60 microns. The component mounting plate shall be un-painted 3mm GI Sheet / Zinc passivated to 15-20 microns.	
3. 7.24	POWER SUPPLY, CABINET WIRING AND ACCESSORIES:	
3. 7.24.1	One no. 415V, 3ph, 3 wire 50 Hz and one no. 240V, 1ph, 50 Hz (voltage variation $\pm 10\%$ and frequency variation $\pm 5\%$) and combined variation 10% (absolute sum) power supply given to each Remote control panel. The 240V, 1ph, 50 Hz power supply mentioned above is for illumination/cooling fan purpose. Any other power supply required for controls mounted inside RCP shall be derived from incoming 415V power supply as per the wiring schematics.	
3. 7.24.2	Power cables used in the cabinet shall be of 1100V grade, multicore stranded annealed copper conductor, and FRLS PVC insulated 4.0 sq.mm. Similarly the control cable shall be of 1100V grade, multicore stranded, annealed copper conductor of size 1.5 sq.mm. (Reference standard IS 1554)	
3. 7.24.3	All power and control terminal blocks used in the cabinet shall be of nickel- coated brass (non-ferrous) including fasteners in TB's. Not more than two wires shall be connected to one terminal. The control terminal blocks shall be suitable to receive cables of cross section 0.5 sq.mm to 2.5	

Clause	Details	Vendor's compliance
	sq.mm and power terminal blocks shall be suitable to received cables of cross section 2.5 to 16 sq.mm (refer annexure BOM).	
3. 7.24.4	The terminal blocks (power/control) shall be located at a possible distance from bottom of the cabinet so that easy termination of external cables can be done after panel erection at site. 100mm space between adjacent terminal blocks shall be provided to ensure safe working of the system. The terminal blocks within the cabinet shall be mounted on support brackets fixed to the component mounting plate with round-machined screws. All terminals shall be clearly marked with identification numbers to facilitate connections to external wiring.	
3. 7.24.5	Over voltage (+ 15%) and under voltage (-15%) shall be set in phase failure relay at vendor works itself. However, the phase failure relay shall have facility for adjusting the over voltage and under voltage setting. Two changeover contacts shall be provided in the phase failure relay to meet the circuit-wiring requirement.	
3. 7.25	Contact outputs from the power and auxiliary contactors shall be terminated as per the requirement shown in the schematic diagram. Output contacts of auxiliary contactors shall be rated for minimum 5A at 240V AC and 0.5A at 220V DC and for power contactors the contact rating shall be as indicated in the bill of material.	
3. 7.26	Vendor has to mount and wire the components arranged by BHEL at BHEL's works. Annexure-2 to this specification gives the list of wiring to be done. Vendor shall arrange shielded cable of required quantity for carrying out this wiring. All the required accessories for mounting the BHEL free issue items shall be in vendor scope and shall be dispatched along with panel to BHEL works. The plug-in connectors at module/electronic card (arranged by BHEL) shall be used to terminate one end of the shielded cable and the other end of the shielded cable shall be neatly dressed, ferruled, lugged and terminated in the terminal blocks.	
3. 7.27	All exposed conductive parts of the enclosure shall be connected to ground through low impedance conductor.	
3. 7.28	Sensitive cables like Input/output cables to card rack and modules, CPU module to display unit RS 232 cable etc. should not be routed close to openings of the enclosure.	
3. 7.29	One 3 phase, 2-stage power line filter with adequate rating shall be provided at input of transformer. Separate power line filter shall be	

Clause	Details	Vendor's compliance
	installed for digital input logic card, I/O rack motherboard and keyboard & display unit. Refer annexure BOM for filter details.	
3. 7.30	SS window with toughened glass for HMI cut-out shall be provided.	
4.0	LOCAL CONTROL PANEL (LCP)	
4.1	The LCP shall be fabricated from sheet steel Al-Zinc coated / GI / CRCA grade-D sheet steel (branded makes) as per IS-513 of 2mm (min.) thick for door, 1.5mm (min.) thick for sides and shall be suitable for wall mounting onto the coal feeder. The LCP shall be provided with mounting brackets at the back to facilitate mounting onto the feeder. The LCP shall have continuous hinge/die-cast with stainless steel pin and single door arrangement. LCP GA drawing shall be referred for the overall dimensions, layout of components viz. selector switches, indication lamps, cable entry cut out details on the sides of the panel etc.	
4.2	The construction of the LCP shall meet the enclosure protection class of IP-55 as per IEC 60529 and shall be EMC compliant.	
4.3	The door shall be suitable for opening of 120 deg.	
4.4	CAM type door locking with two keys (multi lever type) (or) Ergo form locking system shall be supplied for door locking to meet IP-55 enclosure protection. SS handle to be provided on the door for opening and closing.	
4.5	The LCP size shall be {600(W) X 750/ 760(H) X 350(D)} mm.	
4.6	Removable un-drilled Gland plate made from 3mm thick GI (or) CRCA grade-D material shall be provided at the bottom of the panel. Drilled gland plate made from 3mm thick GI /CRCA grade-D material shall be provided at the side of the panel. All the mating surfaces for cable gland plates (bottom & side) on which the gaskets are fixed shall be made electrically conductive surface and then the conductive gaskets shall be fixed by using silver based conductive glue.	
4.7	Tinned copper earth bus of size 25x3mm shall be provided with approximately 10 termination screws for different cable sizes varying from 2.5 to 16 sq.mm. with suitable insulated cable lugs and required accessories	
4.8	Zinc passivated / GI component mounting plate of 3mm thick CRCA grade-D material shall be provided for mounting all the electrical and electronic modules. The component mounting plate shall be Zinc passivated to 15-20 microns. Component mounting plate shall not be fixed directly on to the cabinet enclosure.	

Clause	Details	Vendor's compliance
4.9	The panel shall have cabinet illumination lamp suitable for 240V, 1Phase AC along with door-operated switch (refer annexure BOM).	
4.10	Two number of M16 or M12 lifting eye bolts with washer and nut shall be provided on top of the cabinet.	
4.11	Fixing clamp with spring loaded nuts (6 Nos./ panel) for mounting the panel onto the feeder shall be supplied along with each LCP.	
4.12	Necessary stiffeners for door shall be provided by the vendor to avoid bowing and bending. The mating part of the door shall be provided with GI strip of 1mm thick to ensure conductive path. Also braided wire of adequate size shall be provided between the door and the panel.	
4.13	2 way power socket of industrial grade 15A, 240V AC shall be provided (refer annexure BOM) with rigid supporting bracket and covering all sides with warning sticker shall be provided.	
4.14	Two numbers M8 brass bolt with nut and washer for connecting GI earth flat shall be provided.	
4.15	All component-fixing screws shall be Zinc passivated and provided with spring washers.	
4.16	Aluminum anodized nameplates shall be provided for all door mounted and inside mounted components. The nameplates provided on the door of the cabinet shall be fixed using screws in addition to pasting. For inside mounted components, the nameplates shall be fixed by using suitable adhesive compound. For inscription details and name plate specification refer annexure-3.	
4.17	The terminal block used for power wiring shall be as per annexure BOM. The terminals shall be identified with number strip with legible numbering. The terminal blocks shall be DIN rail mountable and be rigidly fixed using Zinc plated screws and washers. 20% spare terminals shall be provided over and above the terminal blocks wired. (Quantity as per BOM).	
4.18	The terminal blocks shall be located at a possible minimum distance from the base of the cabinet for easy accessibility of termination of external cables. The space between adjacent terminal blocks shall be 150 mm minimum.	
4.19	Fasteners of power and control terminal blocks shall be nickel- coated brass (non-ferrous). Not more than two wires shall be connected to one	

Clause	Details	Vendor's compliance
	terminal. The terminal blocks shall be suitable to receive cables of cross section 0.5 sq.mm to 10 sq.mm.	
4.20	Wire dressing spiral of polyethylene material shall be used for neat dressing of door-mounted components wiring.	
4.21	Space to be provided in the component mounting plate for fixing and wiring of electronic module arranged by BHEL. Vendor to carryout necessary wiring / shielded type cable for interconnecting the electronic module up to the terminal block neatly dressed, ferruled and lugged at both sides as per details provided.	
4.22	For connecting the electronic module to control terminal block, COMBICON plugs MSTB2.5/3-ST-5.08 -1 No, MSTB2.5/6-ST-5.08 – 2 Nos., MSTB2.5/8-ST-5.08 – 1 No. with one metre length 0.5 sq.mm-shielded cable shall be supplied. One end of this cable shall be neatly dressed, ferruled and lugged and terminated in the terminal block and the connector plug shall be left loose for connecting to the electronic module.	
4.23	Painting: The finished cabinet surfaces shall be free from all waves, bellies and other imperfections. All cabinet exterior steel surfaces shall be pre-treated by 7-tank process (or) pretreatment (Spray line) & Primer (Dip coat). Surface preparation shall be done by power tool cleaning after degreasing and rinsing. Powder coating shall be done for both exterior and interior of the control panel. Thickness of painting for exterior, interior shall be 50-60 microns.	
4.24	The control wiring shall be done with cables of 1100V grade, stranded, annealed tinned copper conductor of size 1.5 sq.mm FRLS insulation. (Reference standard IS-1554). The make and colour of the cable shall be as per details given in the BOM.	
4.25	The components to be assembled in the local control panel shall be as per schematic diagram. Acceptable make of components are given in the BOM. Vendor shall select EMI compatible components and furnish the details to BHEL for approval. For neat layout of components, vendor shall adopt aesthetic wiring practices.	
4.26	A caution sticker of anodized aluminium for handling electronic cards as per details that will be given during drawing approval shall be fixed inside the door at suitable location.	
4.27	Aluminum anodized nameplates shall be provided for all door mounted and inside mounted components. The nameplates provided on the door of the cabinet shall be fixed using screws in addition to by pasting. For inside mounted components, the nameplates shall be fixed by using	

Clause	Details	Vendor's compliance
	suitable adhesive compound. The size, inscription details and specification of nameplate shall be as per Annexure-3&4	
4.28	Zinc plated (yellow) mounting fasteners such as plate washer, spring washer and serrated washers as required shall be used for fixing of components.	
4.29	The mating surface shall be made conductive surface first and then conductive gasket shall be fixed using silver based conductive glue. EMC compliant cable glands are to be supplied along with each panel for which cable size details will be provided after purchase order.	

SECTION-3

INSPECTION AND PACKING

5.0 QUALITY PLAN AND INSPECTION:

Inspection will be carried out by BHEL (T) at vendor works. Advance information of one week shall be given to BHEL for arranging inspection. Vendor shall submit VQP in BHEL format.

6.0 PACKING:

Panels shall be packed as per packing procedure QA: CI: STD: PR: 02.

SECTION-4

7.0 DOCUMENTATION:

7.1 Documents to be submitted along with the offer:

7.1.01 Compliance to Bill of material shall be submitted along with the offer. The make of the Components shall be strictly as per annexure-1.

7.1.02 Clause wise compliance to this specification.

7.1.03 Compliance for applicable clauses of quality plan.

7.2 Documents to be submitted in the event of order for BHEL's approval within 15 days from PO.

7.2.01 Bill of material with makes and model number of components.

SECTION-5

8.0 SPECIAL INSTRUCTION TO VENDOR:

8.1 Nothing in this specification shall be construed to relieve the vendor from his responsibility. This specification covers briefly the requirements of the system. It is the responsibility of the vendor to take care of other basic and essential requirement.

8.2 In case discrepancy in the contents expressed in the specification and annexure-1, component description given in annexure shall be referred.

- 8.3 Vendor shall include all items required for completeness of wiring of remote control panel (except for items arranged by BHEL) even if it is not explicitly specified in this specification.
- 8.4 In case of any discrepancy in the model number of components, vendor shall submit samples for prior approval.
- 8.5 Any other requirement to meet EMI/EMC compliance shall be taken care of by the vendor and the same shall be highlighted in the offer.

Annexure-1

Bill of Material – EMC - Remote Control Panel (RCP)

SR. NO	SCH.REF.	DESCRIPTION	RATING	MAKE	CAT./TYPE NO	QTY./ PANEL
1	DS	DPN SWITCH DISCONNECTOR FUSE UNIT TYPE SP32-NS WITH OPERATING HANDLE SUITABLE FOR 415V AC WITH SUITABLE SHROUDING AND DEFEAT MECHANISM SUITABLE FOR SIDE PANEL MOUNTING WITH 4NOS. M4X15mm SCREW,8NOS. PLATE WASHER, 4 NO.SPRING WASHER.	32A	KAYCEE/ SIEMENS/L&T/GE/ /SCHNEIDER ELECTRIC	(SP-32-NS-SDF) BGG8359144+	1
2		AUX.CONTACT BLOCK FOR ABOVE SWITCH 1NO + 1NC			BGG8900029	1
3	F1,F2,F3	CLIP ON TYPE HBC FUSE LINKS FOR ABOVE DISCONNECT SWITCH	32A	SIEMENS/L&T/C&S/ GE	NS32	3
4	F4,F5,F6	HBC FUSE BASE NSH32 WITH 4A FUSE LINK TYPE NS4(415V AC)		SIEMENS/L&T /C&S/GE/ESSEN DEINKI	NS4+NSH32 NS4	3
5	MCB1	MINIATURE CIRCUIT BREAKER,415V AC,DOUBLE POLE,SUITABLE FOR DIN RAIL MOUNTING	2A	MDS/INDOASIAN/ SIEMENS/L&T- HAGER/INDOKOPP/ SCHNEIDER ELECTRIC	LEXIC 603261	1
6	MCB3 MCB4	MINIATURE CIRCUIT BREAKER,415V AC,SINGLE POLE,SUITABLE FOR DIN RAIL MOUNTINGMINIATURE CIRCUIT BREAKER,415V AC,DOUBLE POLE,SUITABLE FOR DIN RAIL MOUNTING	6A 6A	MDS/INDOASIAN/ SIEMENS/L&T- HAGER/INDOKOPP/ SCHNEIDER ELECTRIC	LEXIC 603231 LEXIC 603265	1 1
7	MCB5	MOUNTINGMINIATURE CIRCUIT BREAKER,415V AC,DOUBLE POLE,SUITABLE FOR DIN RAIL MOUNTING	4A	MDS/INDOASIAN/ SIEMENS/L&T- HAGER/INDOKOPP/ SCHNEIDER ELECTRIC	LEXIC 603263	1
8	T1	CONTROL TRANSFORMER, WITH PROTECTIVE SHROUDING OF SUITABLE SIZE AND WARNING STICKER. PRIMARY 230V (or) 240V, SECONDARY 2X110V AC,50HZ. SECONDARY RATED FOR 2X375VA. MOUNTING ACCESSORIES 8NOS. MOUNTING SCREW M6X20 WITH NUT PLATE WASHER 8NOS. SERRATED WASHER 8NOS.	2X375VA	AE //KAPPA // INDCOIL PRECISE / PRAGATI/ JYOTHI		1
9	EMI-1	EMI/RFI FILTER SUITABLE FOR 110V AC,50HZ,3A	3A	EMI SOLUTION	MF420	1
10	CSS	SELECTOR SWITCH 16A,250V AC, 50HZ, 2 POLE,2-POS.(ON-OFF) FRONT LEGEND PLATE ENGRAVED PFF-RUN	16A	SALZER	61198	1

Annexure-1

SR. NO	SCH.REF.	DESCRIPTION	RATING	MAKE	CAT./TYPE NO	QTY./ PANEL
11	TFS	PNEUMATIC TYPE ON DELAY TIMER, 110V AC,50HZ,WITH 1NO+1NC TIME DELAY CONTACT AND 2NO+2NC INSTANTANEOUS CONTACT AND RC SNUBBER ACROSS THE COIL RELAY ON ENERGISATION (DOE) 0.1-30 SEC.	0.1-30 SEC	C&S	TCA2DN22+TA2DT2+LA9-D09980	1
12	TPM	PNEUMATIC TYPE OFF DELAY TIMER, 110V AC,50HZ,WITH 1NO+1NC TIME DELAY CONTACT AND 2NO+2NC INSTANTANEOUS CONTACT AND RC SNUBBER ACROSS THE COIL RELAY ON ENERGISATION (DOE) 0.1-30 SEC.	0.1-30 SEC	C&S	TCA2DN32+TA3DR2+LA9-D09980	1
13	PFM	PHASE FAILURE MONITORING RELAY SUITABLE FOR 415V AC, 3PH WITH 2 CHANGE OVER OUTPUT CONTACTS (3A @ 600V AC) WITH PHASE SEQUENCE OF R,Y,B	415V,3PH	MINILEC	S2VMR3	1
14	FFS,FRS	AUXILIARY CONTACTOR SUITABLE FOR 110V AC, 50HZ. COIL VOLTAGE, WITH RC SNUBBER ACROSS COIL WITH 4NO+4NC CONTACTS (FFS)(FRS).	10A	C&S	TCA2DN22+TA1-DN22+LA9-D09980 (FOR FFS & FRS)	2
15	CMS	POWER CONTACTOR SUITABLE FOR 110V AC, 50HZ. COIL VOLTAGE, WITH RC SNUBBER ACROSS COIL WITH 3NO MAIN CONTACTS, 2NO+4NC AUX. CONTACTS.	9A	C&S	TC1D0910+TA1-DN22+LA9-D09980	1
16	FMOL	INDEPENDENT MOUNTING OVERLOAD RELAY FOR FORWARD/REVERSE OPERATION OF MAIN DRIVE MOTOR	9-13A	C&S	TR2-D12316+TA7-D0964	1
17	CMOL	INDEPENDENT MOUNTING OVERLOAD RELAY FOR 0.25KW MOTOR	0.63-1A	C&S	TR2-D09305+TA7-D0964	1
18	RM,LM,CR,FR,R3A,R6A,MRS,C OB,FDP,PFMA,BCFM	AUXILIARY CONTACTOR SUITABLE FOR 110V AC, 50HZ. COIL VOLTAGE, WITH RC SNUBBER ACROSS COIL WITH 4NO+4NC CONTACTS.	110V AC	C&S	TCA2DN22+TA1-DN22+LA9-D09980	11
19	LR1-LR8	INDICATING LIGHTS OF HI-BRIGHT CLUSTER LED TYPE, SUPPLIED WITH LENS ASSEMBLY FIXING FLANGE LAMP HOLDER WITH INTEGRAL LED SUITABLE FOR 110V AC, 50HZ.	110V AC	BCH	HFB2XRE (RED) HFB2XGE (GREEN) HFB2XAE (AMBER)	5 1 2
20	LRPB	ILLUMINATED PUSH BUTTON WITH 2NO+2NC CONTACT, LED TYPE SUITABLE FOR 110V AC, 50HZ., RED COLOUR FLUSH TYPE	110V AC	BCH	HEB11RM+HLSURE+HCBO1+HCB10	1

Annexure-1

SR. NO	SCH.REF.	DESCRIPTION	RATING	MAKE	CAT./TYPE NO	QTY./ PANEL
21	FAN	COOLING FAN WITH ACCESSORIES, SUITABLE FOR 240V AC SIZE 6 INCH WITH WIRE MESS	240V AC	REXNORD-RITTAL/RALLI-WOLF/KAITON/USHA	6 INCH (REC21725A2) AIR FLOW-CFM-173	1
22	TBRP,TBRPA, TBRU	TERMINAL BLOCKS WITH REQUIRED ACCESSORIES FOR POWER CIRCUIT WIRING WITH SCREW TYPE END STOPPER (TERMINAL&FASTENERS SHALL BE BRASS WITH NICKEL CADMIUM PLATED)		ELMEX /ESSEN DEINKI /PHOENIX/ WAGO/ CONNECT WELL	KUT35(POWER)/Equivalent in other makes	TBRP-15 TBRPA-12 TBRU-8
23	TBR1,TBR2,TBR3,TBR4,TBR5 TBR0	TERMINAL BLOCKS WITH REQUIRED ACCESSORIES FOR POWER CIRCUIT WIRING WITH SCREW TYPE END STOPPER (TERMINAL&FASTENERS SHALL BE BRASS WITH NICKEL CADMIUM PLATED)		ELMEX /ESSEN DEINKI /PHOENIX/ WAGO/ CONNECT WELL	KUT10 (CONTROL)/Equivalent in other makes KUT6 (FOR TBR0)	TBR1-45 TBR2-45 TBR3-45 TBR4-45 TBR5-45 TBR0-12
24		PLUG IN CONNECTOR FOR ELECTRONIC MODULE TB'S		PHOENIX PHOENIX PHOENIX	MSTB-2.5/3-ST5.08 (3-WAY) - 3 NOS. MSTB-2.5/8-ST5.08 (8-WAY) - 1 NOS. MSTB-2.5/9-ST5.08 (9-WAY) - 4 NOS.	3 1(SPARE) 4
25	DOS	DOOR OPERATING LIMIT SWITCH	5A	ESSEN/IEC		1
26	CFL	FLOURSCENT LIGHT SUITABLE FOR 240V AC WITH FIXTURE		PHILIPS/BAJAJ/CROMPTION GREAVES/ MYSORE LAMPS/ HMT		1
27	RCPR	5-PIN, 15/5A SWITCH SOCKET SUITABLE,240V AC WITH SURGE PROTECTION, SWITCH AND FUSE	15/5A	ELCOM	EP-15/S3 EXT	1
28		1.5 SQ.MM, SINGLE CORE CABLE, 1100V GRADE MULTI STRANDED ANNEALED TINNED COPPER,FRLS PVC INSULATED AS PER IS-1554 (BIS APPROVED VENDORS)COLOUR-GREY (CONTROL WIRING), YELLOW (OUTPUT CONTACTS), GREEN (EARTHING)		BIS APPROVED VENDORS		AS REQD
29		4 SQ.MM, SINGLE CORE CABLE, 1100V GRADE MULTI STRANDED ANNEALED TINNED COPPER,FRLS PVC INSULATED AS PER IS-1554 (BIS APPROVED VENDORS)COLOUR-RED,YELLOW,BLUE (POWER WIRING)		BIS APPROVED VENDORS		AS REQD.

Annexure-1

SR. NO	SCH.REF.	DESCRIPTION	RATING	MAKE	CAT./TYPE NO	QTY./ PANEL
30		4SQ.mm, SINGLE CORE SHIELDED CABLE WITH MULTI STRANDED ANNEALED TINNED COPPER,FRLS PVC INSULATED AS PER IS-1554 [BIS APPROVED VENDORS] COLOUR- RED,YELLOW,BLUE(INPUT FILTER CHOKE-----VFD-----OUTPUT FILTER CHOKE)1100V GRADE.		BIS APPROVED VENDORS		AS REQD.
31		1.5SQ.mm,TWO PAIR SHIELDED CABLE {INDIVIDUALLY AND COLLECTIVELY SHIEDED}WITH MULTI STRANDED ANNEALED TINNED COPPER,FRLS PVC INSULATED[BIS APPROVED VENDORS]1100V GRADE.		BIS APPROVED VENDORS		AS REQD
32		2.5Sq.mm, SINGLE CORE CABLE, 1.1KV GRADE, MULTI-STRANDED ANNEALED TINNED COPPER, FRLS WITH PVC INSULATION AS PER IS-1554 EARTHING (GREEN)	---	BIS APPROVED VENDORS		AS REQD.
33		WIRE DUCT 60(W) X 60(H) mm & 25(W) X 25(H)mm		SALZER		AS REQD
34		WIRE TIE LENGTH 100mm MATERIAL:PVC		MAYFAIR	MCT-100	AS REQD
35		WIRE TIE MOUNT 25X25mm MATERIAL:PVC		MAYFAIR	MCTA-25	AS REQD
36		WIRE DRESSING MATERIALS SPIRAL,MATERIAL-POLYETHYLENE INTERNAL DIAMETER-8MM		MICROSIGN/ CONNECTWELL	EFC-8G	AS REQD
37		FERRULES		MICROSIGN/ MAYFAIR/OESER/ SMV		AS REQD
38		LUGS		DOWELL/3D/ CHETNA		AS REQD
39		"L"CLAMP WITH 4.5mm HOLE FOR TERMINAL BLOCK SUITABLE FOR NS35 TB		MANUFACTURER		15
40		MOUNTING CLAMP FOR DOUBLE EURO RACK		MANUFACTURER		2
41		MOUNTING RAIL-NS35 X 7.5mm STEEL, YELLOW CHROMATE, PERFORATED		MANUFACTURER		AS REQD

Annexure-1

42		MOUNTING BUSH FOR CPU		REPUTED	INTERNAL THREAD DIA 5mm	2
43		DISCONNECT SWITCH MOUNTING BRACKET		MANUFACTURER		1
44		BHEL FEED NAME PLATE & NAME PLATES FOR PANEL MOUNTED SUB ITEMS AS PER ANNEXURE 3 & 4 IN TECHNICAL SPECIFICATION FOR REMOTE CONTROL PANEL NO:TCI:310/(EMC), REV06		MANUFACTURER		1 SET
45	EE-BUS	EARTH BUS BAR 25 X 3MM, TINNED CU		MANUFACTURER		2
46		THREE POINT LOCK		DIRAK/RITTAL		1
47		M6 X 20 BOLT,NUT AND STAR WASHERS M4 X 10 SCREWS		REPUTED		20
48		LOOP POWERED CURRENT ISOLATOR		PHOENIX/P&F	PHOENIX Model No. MINI MCR-SL-1CP-I- I-2864419)	5 + 40% OF TOTAL PANEL COUNT FOR SUBJECT P.O
49		PANEL IDENTIFICATION STICKER		MANUFACTURER	As per drawing BHELFEED:RCP:STICKER	1
50		SHROUDING PLATE WITH DANGER STICKER FOR POWER TB & DOOR LIMIT SWITCH		MANUFACTURER		1
51		EMI/RFI FILTER SUITABLE FOR 240VAC,50HZ,10A		EMI SOLUTION	MF420,10A	1
52		EMI/RFI FILTER SUITABLE FOR 415V AC,50HZ,32A ALONHWITH 3 PHASE WITH SURGE SUPPRESSOR		EMI SOLUTION	MF423-3-2D & RCS-3	1
53		EMI/RFI FILTER SUITABLE FOR 110V AC,50HZ,10A		EMI SOLUTION		1
54		METAL OXIDE VARISTOR RDN:275/14mm		CEDICOM		30

Annexure-1

55		EMC BRASS CABLE GLAND WITH LONG THREAD WITH SUITABLE EMC BRASS LOCK NUTS FOR 2PX1.5 SQ.MM PAIR AND OVERALL SHIELDED CABLE. UNARMoured OD SIZE-16mm		CONTROLWELL		4
56		EMC BRASS CABLE GLAND WITH LONG THREAD WITH SUITABLE EMC BRASS LOCK NUTS FOR 19CX1.5 SQ.MM PAIR AND OVERALL SHIELDED CABLE. UNARMoured OD SIZE-22.5mm		CONTROLWELL		2
57		EMC BRASS CABLE GLAND WITH LONG THREAD WITH SUITABLE EMC BRASS LOCK NUTS FOR 2CX2.5 SQ.MM PAIR AND OVERALL SHIELDED CABLE. UNARMoured OD SIZE-14mm		CONTROLWELL		3
58		EMC BRASS CABLE GLAND WITH LONG THREAD WITH SUITABLE EMC BRASS LOCK NUTS FOR 3CX16SQ.MM PAIR AND OVERALL SHIELDED CABLE. UNARMoured OD SIZE-19mm		CONTROLWELL		1
59		EMC BRASS CABLE GLAND WITH LONG THREAD WITH SUITABLE EMC BRASS LOCK NUTS FOR 3CX2.5 SQ.MM PAIR AND OVERALL SHIELDED CABLE. UNARMoured OD SIZE-14.5mm		CONTROLWELL		1
Note: The above cable glands shall be mounted on to the cable gland plate.						

Annexure-1

Bill of Material – EMC - Local Control Panel (LCP)

S. N O	SCH.REFERENCE	DESCRIPTION	RATING	MAKE	CAT.NO/TYPE.NO	QTY/ PANEL
1.	2POLE 2 WAY WITH OFF – 3POSITION ROTARY SELECTOR SWITCH (LOCKABLE & REMOVABLE IN FORWARD POSITION) WITH FRONT LEGEND PLATE ENGRAVED WITH REV – OFF – FWD	FRSL	16A, 240VAC, 50HZ	SALZER	61152	1 + 2 as spare per PO.
2.	3POLE 3 WAY WITH OFF – 4POSITION ROTARY SELECTOR SWITCH WITH FRONT LEGEND PLATE ENGRAVED WITH REMOTE – OFF – LOCAL – CAL	MSL	16A, 240VAC, 50HZ	SALZER	61100	1 + 2 as spare per PO.
3.	1POLE ON/OFF ROTARY SELECTOR SWITCH (FEEDER WORK LIGHT SELECTOR SWITCH)	WSL	16A, 240VAC, 50HZ	SALZER	61002	1 + 2 as spare per PO.
4.	INDICATING LIGHTS OF HI-BRIGHT CLUSTER LED TYPE SUPPLIED WITH LENS ASSEMBLY FIXING FLANGE LAMP HOLDER WITH INTERGRAL LED	LL1-LL8	110VAC, 50HZ	BCH	HFB2XAE (AMBER) LL1,LL2,LL8 HFB2XRE (RED) LL3,LL4,LL6 HFB2XGE (GREEN) LL5,LL7	3 3 2
5.	CFL LAMP WITH FIXURE	CFL	11W, 240V AC	PHILIPS/ BAJAJ/CROMPTION GREAVES/ MYSORE LAMPS/ HMT	---	1
6.	DOOR OPERATED SWITCH	DOS	2A	ESSEN		1
7.	POWER SOCKET	PS	5/15A	ELCOM	EP5/S1	1
8.	TERMINAL BLOCK	TBL1, TBL2		ELMEX/ESSEN DEINKI/ /PHOENIX/ WAGO/ CONNECT WELL	KUT6	60
9.	TERMINAL BLOCK (WITH SHROUDING AND WARNING STICKER)	TBLU, TBLP		ELMEX/ESSEN DEINKI/ /PHOENIX/ WAGO/ CONNECT WELL	KUT10	22
10.	EARTH BUS BAR	E-BUS	25X3mm	MANUFACTURER	LENGTH – 250mm	1
11.	1.5Sq.mm, SINGLE CORE CABLE, 1.1KV GRADE, MULTI-STRANDED ANNEALED TINNED COPPER, FRLS WITH PVC INSULATION AS PER IS-1554	---	---	BIS APPROVED VENDORS	COLOUR GREY(CONTROL WIRING)	AS REQD.

Annexure-1

12.	2.5Sq.mm, SINGLE CORE CABLE, 1.1KV GRADE, MULTI-STRANDED ANNEALED TINNED COPPER, FRLS WITH PVC INSULATION AS PER IS-1554 GREEN (EARTHING)	---	---	BIS APPROVED VENDORS	COLOUR RED,BLACK FOR ENERGISING ELECTRONIC CARD IN LCP	AS REQD.
13.	4Sq.mm, SINGLE CORE CABLE, 1.1KV GRADE, MULTI-STRANDED ANNEALED TINNED COPPER, FRLS WITH PVC INSULATION AS PER IS-1554	---	---	BIS APPROVED VENDORS	COLOUR YELLOW,BLUE FOR POWER WIRING	AS REQD.
14.	1.5Sq.mm, 2PAIR TWISTED SHIELED WITH ALUMINIUM FOIL {INDIVIDUALLY AND COLLECTIVELY SHIEDED}, 1.1KV GRADE, ANNEALED TINNED COPPER, FRLS WITH PVS INSULATION AS PER IS-1554	---	---	BIS APPROVED VENDORS	---	AS REQD.
15.	WIRE DUCT	---	45X45mm	SALZER	PVC	AS REQD.
16.	WIRE DRESSING MATERIAL SPIRAL	---	---	CONNECTWELL	MATERIAL- POLYETHYLENE INTERNAL DIA. 8MM	AS REQD.
17.	WIRE TIE	---	LENGTH - 100mm MATERIAL - PVC	MAYFAIR	MCT-100	AS REQD.
18.	WIRE TIE MOUNT	---	25X25mm	MAYFAIR	MCTA-25	AS REQD.
19.	FERRULES	---	---	MICROSIGN/ MAYFAIR/ DESER	---	AS REQD.
20.	LUGS	---	---	DOWELL/ 3D/DIVYA JOTHI/ CHETNA / AINSONS	---	AS REQD.
21.	BRASS EARTH BOLT	---	---	REPUTED	---	AS REQD.
22.	CAM LOCK WITH LEVER KEY	---	--	REPUTED	---	2
23.	SPRING LOADED FIXING CLAMP (BOLTS, NUTS, SPRINGS, WASHERS)	---	---	MANUFACTURER	---	6
24.	MOUNTING RAIL	---	---	PHOENIX	NS35 X 7.5 mm STEELYELLOW CHROMATE	AS REQD.
25.	SS HANDLE FOR DOOR	---	---	MANUFACTURER	---	1
26.	M12 LIFTING EYE BOLTS WITH WASHER AND UNIT	---	---	MANUFACTURER	---	2

Annexure-1

27.	ALUMINIUM ANODISED NAME PLATES	---	---	MANUFACTURER	AS PER ANNEXTURE	AS REQD.
28.	NEOPRENE GASKET/EPDM GASKET A.) CLIP ON TYPE GASKET B.) FLAT GASKET 20X8MM			REPUTED		AS REQD.
29.	CONNECTORS FOR SCM A.) 3WAY B.) 6WAY C.) 8WAY	---	---	PHOENIX	MSTB-2.5/3-ST5.08 MSTB-2.5/6-ST5.08 MSTB-2.5/8-ST5.08	1 2 1
30.	"L" CLAMP WITH 4.5mm HOLE FOR TERMINIAL BLOCK SUITABLE FOR NS35 TB as per Annexure -5 drawing 4-95-485-05819	---	---	MANUFACTURER		AS REQD.
31.	PANEL IDENTIFICATION STICKER	---	---	MANUFACTURER	AS PER DRAWING NO. BHELFEED:LCP: STICKER	1

ANNEXURE – 2

BHEL FREE ISSUE ITEM TO BE MOUNTED BY VENDOR AT BHEL WORKS

- 1.) CPU (MOUNTING BUSH TO BE SUPPLIED BY VENODR)
- 2.) ELECTRONIC MODULES FOR I/O RACK
- 3.) SINGAL INTERFACE MODULE
- 4.) VFD WITH CHOKES
- 5.) CPU TO I/O RACK INTERFACE MODULE
- 6.) PULES RELAY MODULE
- 7.) RELAY INTERFACE MODULE
- 8.) POWER SUPPLY - 12V DC
- 9.) POWER SUPPLY - 24V DC
- 10.) KEYBOARD ASSEMBLY

ANNEXURE-3

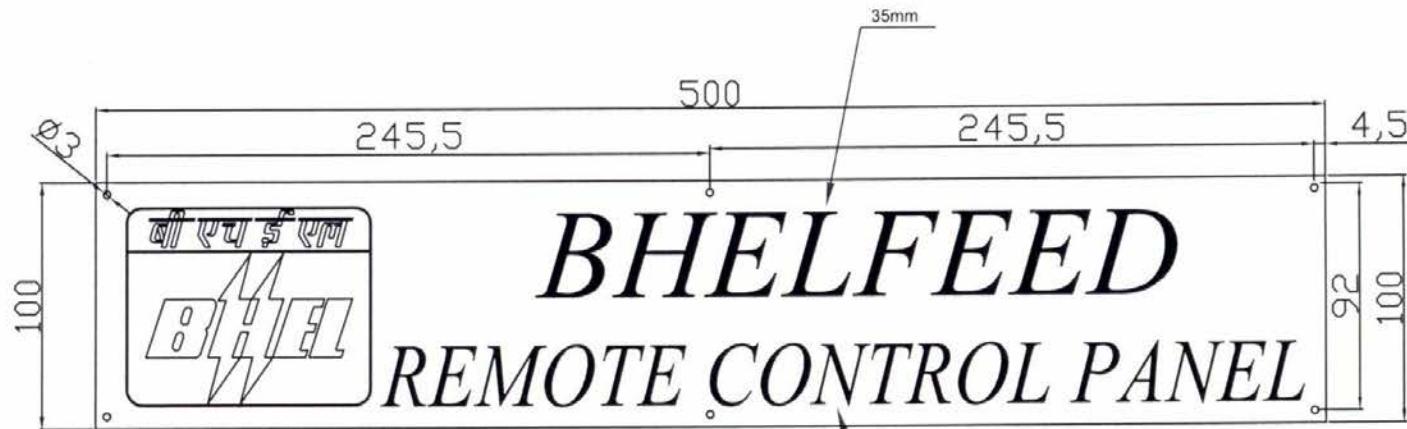
NAME PLATES WITH INSCRIPTION TO BE FIXED / SUPPLIED BY VEDOR

SL.	TAG / INSCRIPTION	DESCRIPTION
1	DS	DISCONNECT SWITCH
2	F4,F5,F6	FUSE
3	MCB1,MCB2,MCB3,MCB4,MCB5	MINIATURE CIRCUIT BRAKER
4	T1	TRANSFORMER-1
5	T2	TRANSFORMER-2
6	CMS	CLEANOUT CONVEYOR MOTOR STARTER
7	CMS O/L	CMS OVERLOAD RELAY
8	PFM	PHASE FAILURE MONITOR RELAY
9	FFS	FEEDER FORWARD STARTER RELAY
10	FRS	FEEDER REVERSE STARTER RELAY
11	FFS O/L	FFS OVERLOAD RELAY
12	TFS	TIME DELAY FEEDER STARTER
13	TPM	TIME DELAY CONTROL POWER MONITOR
14	RM	REMOTE MODE
15	LM	LOCAL MODE
16	CR	CALIBRATION RELAY
17	FR	FEEDER RUN
18	R3A	FEEDER IN REMOTE
19	FRR	FEEDER RUNNING REMOTE
20	MRS	MASTER RESET RELAY
21	COB	COAL ON BELT RELAY
22	FDP	FEEDER DISCHARGE PLUGGED RELAY
23	PFMA	PHASE FAILURE MONITOR AUX. RELAY
24	BCFM	BUNKER COAL FLOW MONITOR RELAY
25	PS1	24V DC POWER SUPPLY
26	PS2	12V DC POWER SUPPLY
27	EMI	EMI FILTER
28	SIM	SIGNAL INTERFACE MODULE
29	MCM	MOTOR CONTROL MODULE
30	VFD	VARIABLE FREQUENCY DRIVE CONTR.
31	INPUT CHOKE	INPUT CHOKE FOR VFD
32	OUTPUT CHOKE	OUTPUT CHOKE FOR VFD
31	I/O RACK	EURO RACK
32	CPU	CENTRAL PROCESSING UNIT
33	I/F CARD	CPU TO I/ORACK INTERFACE MODULE
34	PR	PULSE RELAY MODULE
35	RIM	RELAY INTERFACE MODULE
36	R1,R2,R3,R4A,R4B,R5,R6,R7,R9,R10,R11 & R12	RELAYS IN RIM
37	CFL	COMPACT FLOURESCENT LAMP
38	DOS1	DOOR OPERATING SWITCH
39	RCPL	REMOTE CONTROL PANEL RECEPTACLE
40	LR1	COC MOTOR OVERLOAD(A)
41	LR2	FEEDER MOTOR OVERLOAD (A)
42	LR3	NO COAL FLOW (R)
43	LR4	FEEDER DISCHARGE PLUGGED (R)
44	LR5	PHASE FAILURE (R)
45	LR6	COC RUN (R)
46	LR7	COC OFF (G)
47	LR8	BUNKER NO COAL FLOW (R)
48	RPB	RESET PUSH BUTTON (ILLUMINATED) (R)
49	CSS	COC OFF/RUN SELECTOR SWITCH
50	COC O/L	LR1
51	FEEDER MOTOR O/L	LR2
52	NO COAL FLOW	LR3
53	FEEDER DISCHARGE PLUGGED	LR4
54	PHASE FAILURE	LR5
55	COC RUN	LR6
56	COC OFF	LR7
57	BUNKER NO COAL FLOW	LR8
58	RESET PUSH BUTTON	RPB
59	REVERSE ENABLE	RPB
55	COC OFF/RUN	CSS

56	MS WITH DEFEAT MECHANISM	MAIN SWITCH WITH DEFEAT MECHANISM
57	FAN	INLET FAN WITH FILTER
58	TBR-0, TBR-1, TBR-2, TBR-3, TBR-4, TBR-5, TBR-P, TBR-A, TBR-U	TERMINAL BLOCKS
59	KEYBOARD & DISPLAY UNIT	Keyboard & Display unit
60	LOUVER	FAN LOUVER
61	Earth Symbol	Earth
62	ELECTRONIC EARTH BUS	
63	ELECTRICAL EARTH BUS	
64	CBS	CONVEYOR MOTOR STARTER (For dual belt feeder)
65	CBSOL	CBS OVERLOAD RELAY (For dual belt feeder)
66	TCB	TIME DELAY CONVEYOR MOTOR STARTER (For dual belt feeder)
67	F7,F8,F9	FUSE (For dual belt feeder)
68	TBR-P	TERMINAL BLOCKS (For dual belt feeder)

NOTES:-

1. NAME PLATES WILL BE ANODIZED ALUMINIUM IN BLACK BACKGROUND WITH WHITE LETTERS.
2. INSCRIPTION DETAILS IN THE NAME PLATE WILL BE LIMITED TO MAXIMUM 2 ROWS.
3. THE LETTER FONT WILL BE ARIAL FONT.



3mm HOLES (TYPICAL) FOR FIXING
NAMEPLATE USING ALLEN KEYS SCREWS.

NOTE:-

MATERIAL OF NAMEPLATE : ANODISED ALUMINIUM

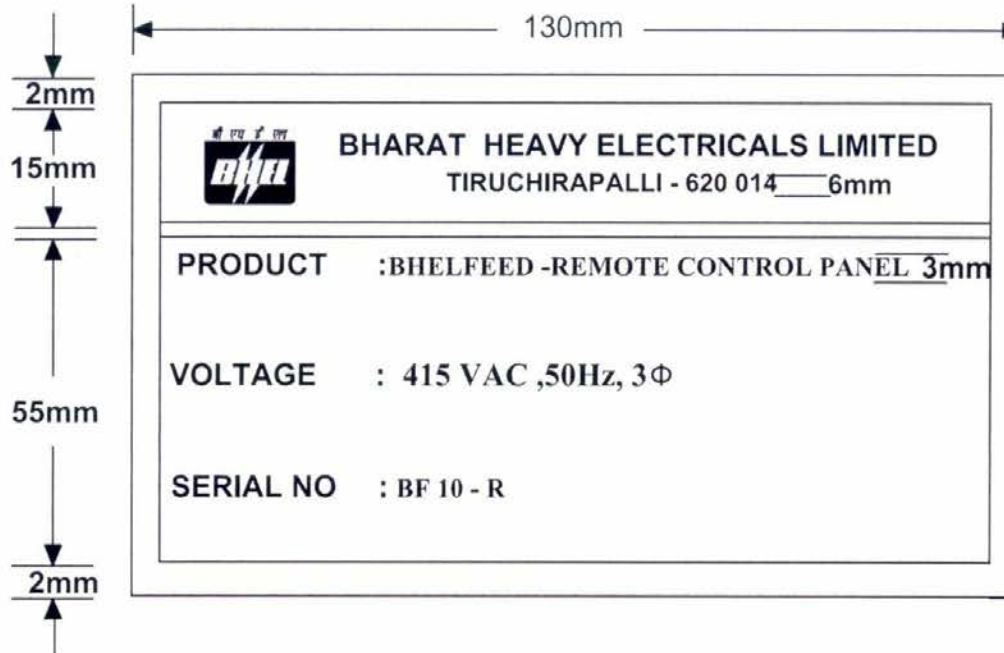
FONT : TIMES NEW ROMAN

SLANTING ANGLE OF TEXT : 10°

FIXING OF NAME PLATE : THREE SCREW ON TOP AND THREE SCREW ON BOTTOM

COLOUR ; RED BACKGROUND WITH WHITE LETTERS

DRAWING NO:



MATERIAL: RETRO REFLECTIVE TAPE WITH MATERIAL SHEETING PHOTO ELECTRIC GRADE

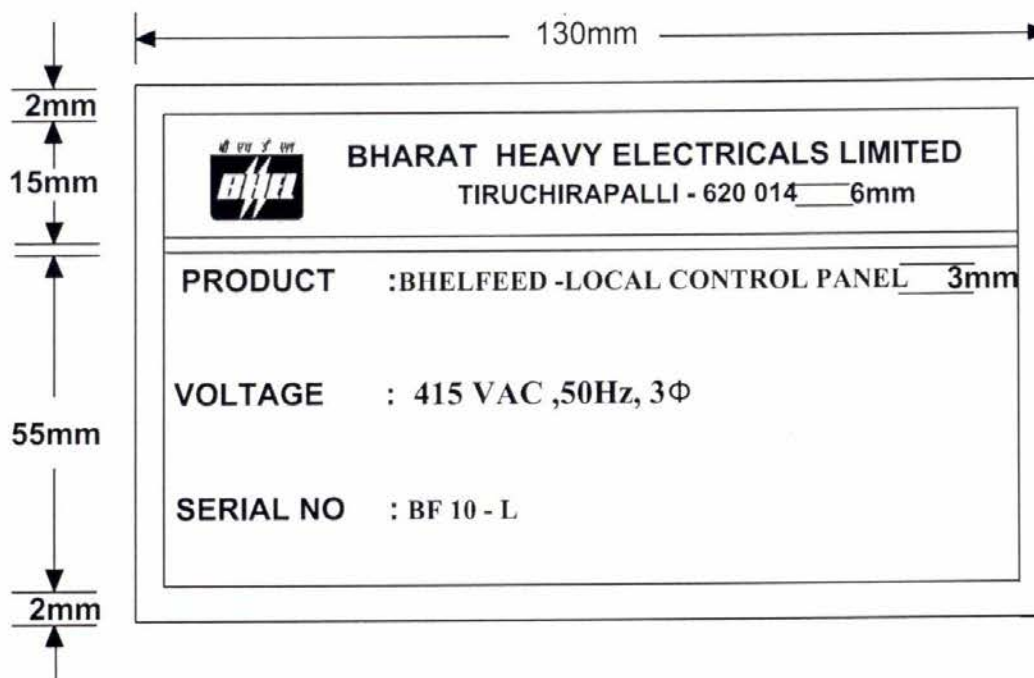
NOTE : DOUBLE STICKER , RED BASE WHITE LETTER

NOTE: INSIDE BOADER LINE 1mm THICK

CAUTION: The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD. It must not be used directly or indirectly in any way detrimental to the interest of the company.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		STANDARD		
 Bharat Heavy Electricals Ltd UNIT: HIGH PRESSURE BOILER PLANT TIRUCHIRAPALLI - 620014 355-055		DRN P. DHARMARAJ 03-06-2010	SIGNATURE K. VEERAMANI 03-06-2010	DATE D. MAHENDRABABU 03-06-2010
DEPT	ALL DIMENSIONS ARE IN MM	PROJECTION	SCALE	WEIGHT (Kg)
CODE				
TITLE		DRAWING NO :		
STICKER SPECIFICATION REMOTE CONTROL PANEL		BHELFEED:RCP:STICKER		
		REV 00		

DRAWING NO:



MATERIAL: RETRO REFLECTIVE TAPE WITH MATERIAL SHEETING PHOTO ELECTRIC GRADE

NOTE : DOUBLE STICKER , RED BASE WHITE LETTER

NOTE: INSIDE BOADER LINE 1mm THICK

CAUTION: The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD. It must not be used directly or indirectly in any way detrimental to the interest of the company.		TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		STANDARD			
		 355-055 Bharat Heavy Electricals Ltd UNIT: HIGH PRESSURE BOILER PLANT TIRUCHIRAPALLI - 620014		DRN	NAME	SIGNATURE	DATE
				CHD	K. VEERAMANI		03-06-2010
				APPD	D. MAHENDRABABU		03-06-2010
DEPT	ALL DIMENSIONS ARE IN MM	PROJECTION	SCALE	WEIGHT (Kg)	REF TO ASSY / OLD DWG		
CODE							
TITLE					DRAWING NO :		REV
STICKER SPECIFICATION LOCAL CONTROL PANEL					BHSELFED:LCP:STICKER		00

GENERAL INSTRUCTIONS

Section — 1 "GENERAL REQUIREMENTS" & "SCOPE OF WORK"

Section — 2 "TECHNICAL SPECIFICATION REQUIREMENTS"

Section — 3 "TESTING, INSPECTION AND PACKING"

Section — 4 "DOCUMENTS TO BE SUBMITTED"

Section — 5 "SPECIAL INSTRUCTION TO VENDOR"

SECTION-1**1.0 GENERAL REQUIREMENTS:**

This specification covers general requirements of Remote Control Panel (RCP) and Local Control Panel (LCP) for gravimetric feeder control system.

All components mounted and wired in RCP & LCP shall be of EMC compliant.

List of acceptable makes are indicated in annexure BOM.

2.0 SCOPE OF WORK:

2.1 The vendor's base offer shall include the following scope of work:

2.1.1 Manufacture and supply of RCP & LCP to BHEL (T) works, after inspection at vendor works.

2.1.2 On receipt of panels at BHEL (T) works, vendor to mount and wire BHEL's free issue components in the respective panels at BHEL (T) works.

2.1.3 For mounting of BHEL (T) supplied free issue items, panel assembly & wiring works at BHEL (T) premises by vendor, separate price shall be indicated by vendor in the main offer.

TYPE TESTS

2.2.1 One no. RCP and one no. LCP after integrating with BHEL's free issue components at BHEL (T) works shall be type tested as per test requirements indicated in this specification Clause no. 5.0. To carry out the same, the vendor to consider the following points.

2.2.1.1 Vendor to indicate separate charges for conducting type tests listed in clause no.5.0 of this specification i.e. at CPRI / Bangalore (for conducting type tests indicated sl. nos. 1 to 4 of clause no. 5.0) & SAMEER/Chennai (for conducting type tests indicated sl. nos. 5 to 12 of clause no. 5.0).

2.2.1.2 Transportation & handling of packed assembled panels from BHEL(T)'s works to SAMEER/Chennai (for conducting type tests indicated sl. nos. 5 to 12 of clause no. 5.0) & then to CPRI / Bangalore (for conducting type tests indicated sl. nos. 1 to 4 of clause no. 5.0)

2.2.1.3 Co-ordination with test centers for carrying out the above tests and obtaining test reports on behalf of BHEL (T). These type tests will be witnessed by BHEL (T) at the respective Test Houses.

2.2.1.4 Vendor to consider contingency charges for carrying out re-testing of panels in case of any problem / failure encountered during testing.

2.2.1.5 After successful testing of panels, re-packing of panels, transportation and delivery to BHEL (T) works.

2.2.1.6 Vendor shall quote with break-up price for 1) Test charges at SAMEER, 2) Test charges at CPRI, 3) Logistics & 4) Handling.

NOTE: The responsibility of conducting type tests (as per clause No.5.0 of this specification) successfully rest with the vendor and in this respect, the vendor may contact BHEL (T) for getting clarifications if any.

SECTION-2

TECHNICAL REQUIREMENTS:

Clause	Details	Vendor's compliance
3.0	REMOTE CONTROL PANEL (RCP):	
3.1	All Electrical & Electronic components are to be mounted and wired inside a weatherproof cabinet. The electrical components shall include starters for main drive motor, cleanout conveyor motor, power and auxiliary contactors, selector switches, indication lamps, timers etc. as per schematic diagram and BHEL approved bill of material.	
3.2	All interlocks and control hardware required for feeder start, stop/trip and run shall be taken care of in the cabinet as per wiring schematics (will be furnished in the event of PO).	
3.3	The cabinet shall be suitable for mounting in a non-air conditioned room, which is away from the coal feeder.	
3.4	All the electrical and electronic components provided in the cabinet shall suitable for operating continuously trouble free at an ambient temperature of 50°C.	
3.5	The height, width, depth, color and finish of the cabinet shall be as per BHEL approved general arrangement drawing.	
3.6	All the mating surfaces including cable gland plates etc. on which the gaskets are fixed shall be made electrically conductive surface and then the conductive gaskets shall be fixed by using silver based conductive glue.	
3.7	CABINET FABRICATION & CONSTRUCTION DETAILS:	
3.7.01	The cabinet shall be of professional quality welded modular construction made from CRCA grade-D sheet steel (branded make) as per IS-513 (or) GI Sheet steel and 2mm (min.) thick for door, 1.5mm (min.) thick for sides and shall be rigid freestanding, neat in appearance. Component mounting plate shall be rigidly fixed and made from 3mm thick GI sheet steel (branded make). Necessary stiffeners / supports shall be provided to avoid bowing and bending.	
3.7.02	The cabinet shall be mounted on anti-vibration pad, 15 mm thick suitable for fixing to the ISMC channel/plinth of 100mm height with self-drilling anchor bolts together with all required accessories. Panel dimension: 2200+15+100 mm(H)X1200mm(W)X600mm(D)	
3.7.03	The cabinet construction shall have adequate strength to support mounted components during shipment.	

Clause	Details	Vendor's compliance
3. 7.04	The finished cabinet surface shall be free from all waves, bellies and other imperfections. All cabinet exterior steel surfaces shall be properly pre-treated by 7-tank process (or) pretreatment (Spray line) & Primer (Dip coat). Surface preparation shall be by power tool cleaning after degreasing and rinsing.	
3. 7.05	For routing the cables coming from outside, the cabinet shall have bottom removable cable gland plate of 3mm thick GI (or) CRCA grade-D sheet steel fixed with conductive gasket. The mating surface shall be made conductive surface first and then conductive gasket shall be fixed using silver based conductive glue. EMC compliant cable glands are to be supplied along with each panel as per annexure BOM.	
3. 7.06	The cabinet enclosure shall be suitable for IP-32 degree of protection as per IEC 60529 and with double-door arrangement.	
3. 7.07	For dissipation of heat generated inside the RCP, cooling fan (refer annexure BOM) with EMI compatible louver with honey comb filters and perforated brass mesh screen at the bottom shall be provided. For top, EMI compatible louver with honey comb filters and perforated brass mesh screen shall be provided. GI strip of 1mm thick shall be welded to inner side of door that is mating with the conductive gasket. Enclosure doors should be connected to inside of the side panels at regular intervals using thick braid or metal strips.	
3. 7.08	Power sockets with fuse and surge protection shall be provided (as per annexure BOM) with rigid supporting bracket with protective cover and warning sticker.	
3. 7.09	Wire duct of adequate size shall be provided for better layout and easy maintenance.	
3. 7.10	Grouping and termination of power and control wiring inside the RCP shall be done neatly.	
3. 7.11	Tinned copper earth bus 15x4mm of 1m lengths with mounting base, insulated bush etc shall be provided with 8 termination screws for different cable size varying from 2.5 sq.mm to 16 sq.mm. Separate earth strip to be provided for electronic components earthing.	
3. 7.12	Two numbers brass bolt with nut for connecting customer's GI earth flat shall be provided on back side of the panel.	
3. 7.13	Zinc plated (yellow) wiring accessories such as plate washer, spring washer and serrated washers as required shall be used for fixing of components.	
3. 7.14	Flush type ergo form lock shall be provided for door locking.	

Clause	Details	Vendor's compliance
3. 7.15	The locking arrangement shall be such that left side door can be opened only after opening right side door. Also necessary defeat mechanism shall be provided for the power isolation switch (as per annexure BOM) for opening the door without switching OFF the incoming power supply.	
3. 7.16	Four numbers of M16 or M12 lifting hooks shall be provided on top of the panel.	
3. 7.17	Aluminum anodized nameplates shall be provided for all door mounted and inside mounted components. The nameplates provided on the door of the cabinet shall be fixed using screws in addition to pasting. For inside mounted components, the nameplates shall be fixed by using suitable adhesive compound. For inscription details and name plate specification, refer annexure-3.	
3. 7.18	EMC compatible Indicating lamps, selector switches shall be provided by vendor on the panel front as per schematic diagram. The acceptable makes of components are given in the annexure BOM. The wiring schematics will be furnished in the event of PO.	
3. 7.19	The terminal block used for power wiring shall be as per annexure BOM. The terminals shall be identified with number strip with legible numbering. The terminal blocks shall be rigidly fixed using Zinc plated screws and washers. 20% spare terminals shall be provided over and above the terminal blocks wired. (Quantity as per BOM).	
3. 7.20	The terminal block used for control wiring shall be as per annexure BOM. The terminals shall be identified with number strip with legible numbering. The terminal blocks shall be rigidly fixed using Zinc plated screws and washers. 20% spare terminals shall be provided over and above the terminal blocks wired. (Quantity as per BOM).	
3. 7.21	Wire dressing spiral of polyethylene material of adequate size shall be used for neat dressing of door-mounted components wiring.	
3. 7.22	Adequate space to be provided in the component mounting plate for fixing and wiring of MPGFC electronic modules arranged by BHEL.	
3. 7.23	Painting: Powder coating shall be done for both exterior and interior of the control panel. Thickness of powder coating shall be 50-60 microns. The component mounting plate shall be un-painted 3mm GI Sheet / Zinc passivated to 15-20 microns.	
3. 7.24	POWER SUPPLY, CABINET WIRING AND ACCESSORIES:	
3. 7.24.1	One no. 415V, 3ph, 3 wire 50 Hz and one no. 240V, 1ph, 50 Hz (voltage variation $\pm 10\%$ and frequency variation $\pm 5\%$) and combined variation 10% (absolute sum) power supply given to each Remote control panel. The 240V, 1ph, 50 Hz power supply mentioned above is for illumination/cooling fan purpose. Any other power supply required for	

Clause	Details	Vendor's compliance
	controls mounted inside RCP shall be derived from incoming 415V power supply as per the wiring schematics.	
3. 7.24.2	Power cables used in the cabinet shall be of 1100V grade, multicore stranded annealed copper conductor, and FRLS PVC insulated 4.0 sq.mm. Similarly the control cable shall be of 1100V grade, multicore stranded, annealed copper conductor of size 1.5 sq.mm. (Reference standard IS 1554)	
3. 7.24.3	All power and control terminal blocks used in the cabinet shall be of nickel coated brass (non-ferrous) including fasteners in TBs. Not more than two wires shall be connected to one terminal. The control terminal blocks shall be suitable to receive cables of cross section 0.5 sq.mm to 2.5 sq.mm and power terminal blocks shall be suitable to received cables of cross section 2.5 to 16 sq.mm (refer annexure BOM).	
3. 7.24.4	The terminal blocks (power/control) shall be located at a possible distance from bottom of the cabinet so that easy termination of external cables can be done after panel erection at site. 100mm space between adjacent terminal blocks shall be provided to ensure safe working of the system. The terminal blocks within the cabinet shall be mounted on support brackets fixed to the component mounting plate with round-machined screws. All terminals shall be clearly marked with identification numbers to facilitate connections to external wiring.	
3. 7.24.5	Over voltage (+ 15%) and under voltage (-15%) shall be set in phase failure relay at vendor works itself. However, the phase failure relay shall have facility for adjusting the over voltage and under voltage setting. Two changeover contacts shall be provided in the phase failure relay to meet the circuit-wiring requirement.	
3. 7.25	Contact outputs from the power and auxiliary contactors shall be terminated as per the requirement shown in the schematic diagram. Output contacts of auxiliary contactors shall be rated for minimum 5A at 240V AC and 0.5A at 220V DC and for power contactors the contact rating shall be as indicated in the bill of material.	
3. 7.26	Vendor has to mount and wire the components arranged by BHEL at BHEL's works. Annexure-2 to this specification gives the list of wiring to be done. Vendor shall arrange shielded cable of required quantity for carrying out this wiring. All the required accessories for mounting the BHEL free issue items shall be in vendor scope and shall be dispatched along with panel to BHEL works. The plug-in connectors at module/electronic card (arranged by BHEL) shall be used to terminate one end of the shielded cable and the other end of the shielded cable shall be neatly dressed, ferruled, lugged and terminated in the terminal blocks.	

Clause	Details	Vendor's compliance
3.7.27	All exposed conductive parts of the enclosure shall be connected to ground through low impedance conductor.	
3.7.28	Sensitive cables like Input/output cables to card rack and modules, CPU module to display unit RS 232 cable etc. should not be routed close to openings of the enclosure.	
3.7.29	One 3 phase, 2-stage power line filter with adequate rating shall be provided at input of transformer. Separate power line filter shall be installed for digital input logic card, I/O rack motherboard and keyboard & display unit. Refer annexure BOM for filter details.	
3.7.30	SS window with toughened glass for HMI cut-out shall be provided.	
4.0	LOCAL CONTROL PANEL (LCP)	
4.1	The LCP shall be fabricated from sheet steel Al-Zinc coated / GI / CRCA grade-D sheet steel (branded makes) as per IS-513 of 2mm (min.) thick for door, 1.5mm (min.) thick for sides and shall be suitable for wall mounting onto the coal feeder. The LCP shall be provided with mounting brackets at the back to facilitate mounting onto the feeder. The LCP shall have continuous hinge/die-cast with stainless steel pin and single door arrangement. LCP GA drawing shall be referred for the overall dimensions, layout of components viz. selector switches, indication lamps, cable entry cut out details on the sides of the panel etc.	
4.2	The construction of the LCP shall meet the enclosure protection class of IP-55 as per IEC 60529 and shall be EMC compliant.	
4.3	The door shall be suitable for opening of 120 deg.	
4.4	CAM type door locking with two keys (multi lever type) (or) Ergo form locking system shall be supplied for door locking to meet IP-55 enclosure protection. SS handle to be provided on the door for opening and closing.	
4.5	The LCP size shall be {600(W) X 750/ 760(H) X 350(D)} mm.	
4.6	Removable un-drilled Gland plate made from 3mm thick GI (or) CRCA grade-D material shall be provided at the bottom of the panel. Drilled gland plate made from 3mm thick GI /CRCA grade-D material shall be provided at the side of the panel. All the mating surfaces for cable gland plates (bottom & side) on which the gaskets are fixed shall be made electrically conductive surface and then the conductive gaskets shall be fixed by using silver based conductive glue.	
4.7	Tinned copper earth bus of size 25x3mm shall be provided with approximately 10 termination screws for different cable sizes varying from 2.5 to 16 sq.mm. with suitable insulated cable lugs and required accessories	

Clause	Details	Vendor's compliance
4.8	Zinc passivated / GI component mounting plate of 3mm thick CRCA grade-D material shall be provided for mounting all the electrical and electronic modules. The component mounting plate shall be Zinc passivated to 15-20 microns. Component mounting plate shall not be fixed directly on to the cabinet enclosure.	
4.9	The panel shall have cabinet illumination lamp suitable for 240V, 1Phase AC along with door-operated switch (refer annexure BOM).	
4.10	Two number of M16 or M12 lifting eye bolts with washer and nut shall be provided on top of the cabinet.	
4.11	Fixing clamp with spring loaded nuts (6 Nos./ panel) for mounting the panel onto the feeder shall be supplied along with each LCP.	
4.12	Necessary stiffeners for door shall be provided by the vendor to avoid bowing and bending. The mating part of the door shall be provided with GI strip of 1mm thick to ensure conductive path. Also braided wire of adequate size shall be provided between the door and the panel.	
4.13	2 way power socket of industrial grade 15A, 240V AC shall be provided (refer annexure BOM) with rigid supporting bracket and covering all sides with warning sticker shall be provided.	
4.14	Two numbers M8 brass bolt with nut and washer for connecting GI earth flat shall be provided.	
4.15	All component-fixing screws shall be Zinc passivated and provided with spring washers.	
4.16	Aluminum anodized nameplates shall be provided for all door mounted and inside mounted components. The nameplates provided on the door of the cabinet shall be fixed using screws in addition to pasting. For inside mounted components, the nameplates shall be fixed by using suitable adhesive compound. For inscription details and name plate specification refer annexure-3.	
4.17	The terminal block used for power wiring shall be as per annexure BOM. The terminals shall be identified with number strip with legible numbering. The terminal blocks shall be DIN rail mountable and be rigidly fixed using Zinc plated screws and washers. 20% spare terminals shall be provided over and above the terminal blocks wired. (Quantity as per BOM).	
4.18	The terminal blocks shall be located at a possible minimum distance from the base of the cabinet for easy accessibility of termination of external cables. The space between adjacent terminal blocks shall be 150 mm minimum.	

Clause	Details	Vendor's compliance
4.19	Fasteners of power and control terminal blocks shall be nickel- coated brass (non-ferrous). Not more than two wires shall be connected to one terminal. The terminal blocks shall be suitable to receive cables of cross section 0.5 sq.mm to 10 sq.mm.	
4.20	Wire dressing spiral of polyethylene material shall be used for neat dressing of door-mounted components wiring.	
4.21	Space to be provided in the component mounting plate for fixing and wiring of electronic module arranged by BHEL. Vendor to carryout necessary wiring / shielded type cable for interconnecting the electronic module up to the terminal block neatly dressed, ferruled and lugged at both sides as per details provided.	
4.22	For connecting the electronic module to control terminal block, COMBICON plugs MSTB2.5/3-ST-5.08 -1 No, MSTB2.5/6-ST-5.08 – 2 Nos., MSTB2.5/8-ST-5.08 – 1 No. with one metre length 0.5 sq.mm-shielded cable shall be supplied. One end of this cable shall be neatly dressed, ferruled and lugged and terminated in the terminal block and the connector plug shall be left loose for connecting to the electronic module.	
4.23	Painting: The finished cabinet surfaces shall be free from all waves, bellies and other imperfections. All cabinet exterior steel surfaces shall be pre-treated by 7-tank process (or) pretreatment (Spray line) & Primer (Dip coat). Surface preparation shall be done by power tool cleaning after degreasing and rinsing. Powder coating shall be done for both exterior and interior of the control panel. Thickness of painting for exterior, interior shall be 50-60 microns.	
4.24	The control wiring shall be done with cables of 1100V grade, stranded, annealed tinned copper conductor of size 1.5 sq.mm FRLS insulation. (Reference standard IS-1554). The make and colour of the cable shall be as per details given in the BOM.	
4.25	The components to be assembled in the local control panel shall be as per schematic diagram. Acceptable make of components are given in the BOM. Vendor shall select EMI compatible components and furnish the details to BHEL for approval. For neat layout of components, vendor shall adopt aesthetic wiring practices.	
4.26	A caution sticker of anodized aluminium for handling electronic cards as per details that will be given during drawing approval shall be fixed inside the door at suitable location.	
4.27	Aluminum anodized nameplates shall be provided for all door mounted and inside mounted components. The nameplates provided on the door of the cabinet shall be fixed using screws in addition to by pasting. For inside mounted components, the nameplates shall be fixed by using	

Clause	Details	Vendor's compliance
	suitable adhesive compound. The size, inscription details and specification of nameplate shall be as per Annexure-3&4	
4.28	Zinc plated (yellow) mounting fasteners such as plate washer, spring washer and serrated washers as required shall be used for fixing of components.	
4.29	The mating surface shall be made conductive surface first and then conductive gasket shall be fixed using silver based conductive glue. EMC compliant cable glands are to be supplied along with each panel for which cable size details will be provided after purchase order.	

SECTION-3

TESTING, INSPECTION AND PACKING

5.0 TESTING REQUIREMENTS:

The complete RCP and LCP shall be designed suitable for the following type test requirements.

1. Dry heat test as per IEC 60068-2-2, Type Bd
2. Damp heat test as per IEC 60068-2-30, Type Db
3. Vibration test as per IEC 60068-2-6, Type Fc
4. Cold Test IEC 60068-2-1 Ad
5. Electrostatic discharge test as per IEC 61000-4-2
6. Radiated Susceptibility as per IEC 61000-4-3
7. Conducted RF immunity test as per IEC 61000-4-6
8. Damped Oscillatory Wave test as per IEC 61000-4-12
9. Electrical fast Transient test IEC 61000-4-4
10. High Energy Surge Immunity Test IEC 61000-4-5
11. Conducted Emission Test IEC 61000-6-4
12. Radiated Emission Test IEC 61000-6-4

Test levels for type tests to be conducted for above tests are indicated below for reference.

Dry heat test as per IEC 60068-2-2, Type Bd

Temperature: 55°C

Duration: 2 Hrs.

Damp heat test as per IEC 60068-2-30, Type Db (Variant-1)

Temperature: 55°C

No. of cycles: 1

Cold Test IEC 60068-2-1 Ad

Temperature -5°C

Duration: 2Hrs.

Vibration Test as per IEC 60068-2-6, Test Fc

Frequency Range: 10HZ to 55HZ

Displacement: 0.35 mm

No. of sweeps: 20

No. of axis: 3

Electrostatic discharge test as per IEC 61000-4-2

ESD amplitude: ± 2 kV to ± 4 kV on Contact Discharge
 ± 2 kV to ± 8 kV on Air Discharge

Radiated Susceptibility as per IEC 61000-4-3

Frequency range: 80 MHz - 1000 MHz; 1400 MHz-2000MHz
 Field strength: 10 V/m

Conducted RF immunity test as per IEC 61000-4-6, Level-3

Frequency range: 0.15 - 80 MHz
 Field strength: 10 Vrms
 Applicable to 1 No. of 3 $\emptyset$ AC Power Line & 1 No. of 1 $\emptyset$ AC Power Line

Damped Oscillatory Wave test as per IEC 61000-4-12

Amplitude: ± 2.5 kV in common mode; ± 1.25 kV in differential mode
 Applicable to 1 No. of 3 $\emptyset$ AC Power Line, 1 No. of 1 $\emptyset$ AC Power Line
 & 3 Channels of signal line.

Electrical fast Transient test IEC 61000-4-4, Level-2

Applicable to 1 No. of 3 $\emptyset$ AC Power Line & 1 No. of 1 $\emptyset$ AC Power Line

High Energy Surge Immunity Test IEC 61000-4-5, Level-4

Applicable to 1 No. of 3 $\emptyset$ AC Power Line & 1 No. of 1 $\emptyset$ AC Power Line

Conducted & Radiated Emission Test IEC 61000-6-4

Applicable to 1 No. of 3 $\emptyset$ AC Power Line, 1 No. of 1 $\emptyset$ AC Power Line
 & 3 Channels of signal line.

6.0 QUALITY PLAN AND INSPECTION:

Inspection will be carried out by BHEL (T) at vendor works. Advance information of one week shall be given to BHEL for arranging inspection. Vendor shall submit VQP in BHEL format.

7.0 PACKING:

Panels shall be packed as per packing procedure QA: CI: STD: PR: 02.

SECTION-4**8.0 DOCUMENTATION:****8.1 Documents to be submitted along with the offer:**

- 7.1.01 Compliance to Bill of material shall be submitted along with the offer. The make of the Components shall be strictly as per annexure-1.
- 7.1.02 Clause wise compliance to this specification.
- 7.1.03 Compliance for applicable clauses of quality plan.

8.2 Documents to be submitted in the event of order for BHEL's approval within 15 days from PO.

- 7.2.01 Bill of material with makes and model number of components.

SECTION-5**9.0 SPECIAL INSTRUCTION TO VENDOR:**

- 9.1 Nothing in this specification shall be construed to relieve the vendor from his responsibility. This specification covers briefly the requirements of the system. It is the responsibility of the vendor to take care of other basic and essential requirement.
- 9.2 In case discrepancy in the contents expressed in the specification and annexure-1, component description given in annexure shall be referred.
- 9.3 Vendor shall include all items required for completeness of wiring of remote control panel (except for items arranged by BHEL) even if it is not explicitly specified in this specification.
- 9.4 In case of any discrepancy in the model number of components, vendor shall submit samples for prior approval.
- 9.5 Any other requirement to meet EMI/EMC compliance shall be taken care of by the vendor and the same shall be highlighted in the offer.
- 9.6 Type tests shall be conducted after removing the canopy for projects if canopy is applicable.

Annexure-1

Bill of Material – EMC - Remote Control Panel (RCP)

SR. NO	SCH.REF.	DESCRIPTION	RATING	MAKE	CAT./TYPE NO	QTY./ PANEL
1	DS	DPN SWITCH DISCONNECTOR FUSE UNIT TYPE SP32-NS WITH OPERATING HANDLE SUITABLE FOR 415V AC WITH SUITABLE SHROUDING AND DEFEAT MECHANISM SUITABLE FOR SIDE PANEL MOUNTING WITH 4NOS. M4X15mm SCREW,8NOS. PLATE WASHER, 4 NO.SPRING WASHER.	32A	KAYCEE/ SIEMENS/L&T/GE/ /SCHNEIDER ELECTRIC	(SP-32-NS-SDF) BGG8359144+	1
2		AUX.CONTACT BLOCK FOR ABOVE SWITCH 1NO + 1NC			BGG8900029	1
3	F1,F2,F3	CLIP ON TYPE HBC FUSE LINKS FOR ABOVE DISCONNECT SWITCH	32A	SIEMENS/L&T/C&S/ GE	NS32	3
4	F4,F5,F6	HBC FUSE BASE NSH32 WITH 4A FUSE LINK TYPE NS4(415V AC)		SIEMENS/L&T /C&S/GE/ESSEN DEINKI	NS4+NSH32 NS4	3
5	MCB1	MINIATURE CIRCUIT BREAKER,415V AC,DOUBLE POLE,SUITABLE FOR DIN RAIL MOUNTING	2A	MDS/INDOASIAN/ SIEMENS/L&T- HAGER/INDOKOPP/ SCHNEIDER ELECTRIC	LEXIC 603261	1
6	MCB3 MCB4	MINIATURE CIRCUIT BREAKER,415V AC,SINGLE POLE,SUITABLE FOR DIN RAIL MOUNTINGMINIATURE CIRCUIT BREAKER,415V AC,DOUBLE POLE,SUITABLE FOR DIN RAIL MOUNTING	6A 6A	MDS/INDOASIAN/ SIEMENS/L&T- HAGER/INDOKOPP/ SCHNEIDER ELECTRIC	LEXIC 603231 LEXIC 603265	1 1
7	MCB5	MOUNTINGMINIATURE CIRCUIT BREAKER,415V AC,DOUBLE POLE,SUITABLE FOR DIN RAIL MOUNTING	4A	MDS/INDOASIAN/ SIEMENS/L&T- HAGER/INDOKOPP/ SCHNEIDER ELECTRIC	LEXIC 603263	1
8	T1	CONTROL TRANSFORMER, WITH PROTECTIVE SHROUDING OF SUITABLE SIZE AND WARNING STICKER. PRIMARY 230V (or) 240V, SECONDARY 2X110V AC,50HZ. SECONDARY RATED FOR 2X375VA. MOUNTING ACCESSORIES 8NOS. MOUNTING SCREW M6X20 WITH NUT PLATE WASHER 8NOS. SERRATED WASHER 8NOS.	2X375VA	AE //KAPPA // INDCOIL PRECISE / PRAGATI/ JYOTHI		1
9	EMI-1	EMI/RFI FILTER SUITABLE FOR 110V AC,50HZ,3A	3A	EMI SOLUTION	MF420	1
10	CSS	SELECTOR SWITCH 16A,250V AC, 50HZ, 2 POLE,2-POS.(ON-OFF) FRONT LEGEND PLATE ENGRAVED PFF-RUN	16A	SALZER	61198	1

Annexure-1

SR. NO	SCH.REF.	DESCRIPTION	RATING	MAKE	CAT./TYPE NO	QTY./ PANEL
11	TFS	PNEUMATIC TYPE ON DELAY TIMER, 110V AC,50HZ,WITH 1NO+1NC TIME DELAY CONTACT AND 2NO+2NC INSTANTANEOUS CONTACT AND RC SNUBBER ACROSS THE COIL RELAY ON ENERGISATION (DOE) 0.1-30 SEC.	0.1-30 SEC	C&S	TCA2DN22+TA2DT2+LA9-D09980	1
12	TPM	PNEUMATIC TYPE OFF DELAY TIMER, 110V AC,50HZ,WITH 1NO+1NC TIME DELAY CONTACT AND 2NO+2NC INSTANTANEOUS CONTACT AND RC SNUBBER ACROSS THE COIL RELAY ON ENERGISATION (DOE) 0.1-30 SEC.	0.1-30 SEC	C&S	TCA2DN32+TA3DR2+LA9-D09980	1
13	PFM	PHASE FAILURE MONITORING RELAY SUITABLE FOR 415V AC, 3PH WITH 2 CHANGE OVER OUTPUT CONTACTS (3A @ 600V AC) WITH PHASE SEQUENCE OF R,Y,B	415V,3PH	MINILEC	S2VMR3	1
14	FFS,FRS	AUXILIARY CONTACTOR SUITABLE FOR 110V AC, 50HZ. COIL VOLTAGE, WITH RC SNUBBER ACROSS COIL WITH 4NO+4NC CONTACTS (FFS)(FRS).	10A	C&S	TCA2DN22+TA1-DN22+LA9-D09980 (FOR FFS & FRS)	2
15	CMS	POWER CONTACTOR SUITABLE FOR 110V AC, 50HZ. COIL VOLTAGE, WITH RC SNUBBER ACROSS COIL WITH 3NO MAIN CONTACTS, 2NO+4NC AUX. CONTACTS.	9A	C&S	TC1D0910+TA1-DN22+LA9-D09980	1
16	FMOL	INDEPENDENT MOUNTING OVERLOAD RELAY FOR FORWARD/REVERSE OPERATION OF MAIN DRIVE MOTOR	9-13A	C&S	TR2-D12316+TA7-D0964	1
17	CMOL	INDEPENDENT MOUNTING OVERLOAD RELAY FOR 0.25KW MOTOR	0.63-1A	C&S	TR2-D09305+TA7-D0964	1
18	RM,LM,CR,FR,R 3A,R6A,MRS,C OB,FDP,PFMA, BCFM	AUXILIARY CONTACTOR SUITABLE FOR 110V AC, 50HZ. COIL VOLTAGE, WITH RC SNUBBER ACROSS COIL WITH 4NO+4NC CONTACTS.	110V AC	C&S	TCA2DN22+TA1-DN22+LA9-D09980	11
19	LR1-LR8	INDICATING LIGHTS OF HI-BRIGHT CLUSTER LED TYPE, SUPPLIED WITH LENS ASSEMBLY FIXING FLANGE LAMP HOLDER WITH INTEGRAL LED SUITABLE FOR 110V AC, 50HZ.	110V AC	BCH	HFB2XRE (RED) HFB2XGE (GREEN) HFB2XAE (AMBER)	5 1 2
20	LRPB	ILLUMINATED PUSH BUTTON WITH 2NO+2NC CONTACT, LED TYPE SUITABLE FOR 110V AC, 50HZ., RED COLOUR FLUSH TYPE	110V AC	BCH	HEB11RM+HLSURE+HCBO1+HCB10	1

Annexure-1

SR. NO	SCH.REF.	DESCRIPTION	RATING	MAKE	CAT./TYPE NO	QTY./ PANEL
21	FAN	COOLING FAN WITH ACCESSORIES, SUITABLE FOR 240V AC SIZE 6 INCH WITH WIRE MESS	240V AC	REXNORD-RITTAL/RALLI-WOLF/KAITON/USHA	6 INCH (REC21725A2) AIR FLOW-CFM-173	1
22	TBRP,TBRPA, TBRU	TERMINAL BLOCKS WITH REQUIRED ACCESSORIES FOR POWER CIRCUIT WIRING WITH SCREW TYPE END STOPPER (TERMINAL&FASTENERS SHALL BE BRASS WITH NICKEL CADMIUM PLATED)		ELMEX /ESSEN DEINKI /PHOENIX/ WAGO/ CONNECT WELL	KUT35(POWER)/Equivalent in other makes	TBRP-15 TBRPA-12 TBRU-8
23	TBR1,TBR2,TBR3,TBR4,TBR5 TBR0	TERMINAL BLOCKS WITH REQUIRED ACCESSORIES FOR POWER CIRCUIT WIRING WITH SCREW TYPE END STOPPER (TERMINAL&FASTENERS SHALL BE BRASS WITH NICKEL CADMIUM PLATED)		ELMEX /ESSEN DEINKI /PHOENIX/ WAGO/ CONNECT WELL	KUT10 (CONTROL)/Equivalent in other makes KUT6 (FOR TBR0)	TBR1-45 TBR2-45 TBR3-45 TBR4-45 TBR5-45 TBR0-12
24		PLUG IN CONNECTOR FOR ELECTRONIC MODULE TB'S		PHOENIX PHOENIX PHOENIX	MSTB-2.5/3-ST5.08 (3-WAY) - 3 NOS. MSTB-2.5/8-ST5.08 (8-WAY) - 1 NOS. MSTB-2.5/9-ST5.08 (9-WAY) - 4 NOS.	3 1(SPARE) 4
25	DOS	DOOR OPERATING LIMIT SWITCH	5A	ESSEN/IEC		1
26	CFL	FLOURSCENT LIGHT SUITABLE FOR 240V AC WITH FIXTURE		PHILIPS/BAJAJ/CROMPTION GREAVES/ MYSORE LAMPS/ HMT		1
27	RCPR	5-PIN, 15/5A SWITCH SOCKET SUITABLE,240V AC WITH SURGE PROTECTION, SWITCH AND FUSE	15/5A	ELCOM	EP-15/S3 EXT	1
28		1.5 SQ.MM, SINGLE CORE CABLE, 1100V GRADE MULTI STRANDED ANNEALED TINNED COPPER,FRLS PVC INSULATED AS PER IS-1554 (BIS APPROVED VENDORS)COLOUR-GREY (CONTROL WIRING), YELLOW (OUTPUT CONTACTS), GREEN (EARTHING)		BIS APPROVED VENDORS		AS REQD
29		4 SQ.MM, SINGLE CORE CABLE, 1100V GRADE MULTI STRANDED ANNEALED TINNED COPPER,FRLS PVC INSULATED AS PER IS-1554 (BIS APPROVED VENDORS)COLOUR-RED,YELLOW,BLUE (POWER WIRING)		BIS APPROVED VENDORS		AS REQD.

Annexure-1

SR. NO	SCH.REF.	DESCRIPTION	RATING	MAKE	CAT./TYPE NO	QTY./ PANEL
30		4SQ.mm, SINGLE CORE SHIELDED CABLE WITH MULTI STRANDED ANNEALED TINNED COPPER,FRLS PVC INSULATED AS PER IS-1554 [BIS APPROVED VENDORS] COLOUR- RED,YELLOW,BLUE(INPUT FILTER CHOKE-----VFD-----OUTPUT FILTER CHOKE)1100V GRADE.		BIS APPROVED VENDORS		AS REQD.
31		1.5SQ.mm,TWO PAIR SHIELDED CABLE {INDIVIDUALLY AND COLLECTIVELY SHIEDED}WITH MULTI STRANDED ANNEALED TINNED COPPER,FRLS PVC INSULATED[BIS APPROVED VENDORS]1100V GRADE.		BIS APPROVED VENDORS		AS REQD
32		2.5Sq.mm, SINGLE CORE CABLE, 1.1KV GRADE, MULTI-STRANDED ANNEALED TINNED COPPER, FRLS WITH PVC INSULATION AS PER IS-1554 EARTHING (GREEN)	---	BIS APPROVED VENDORS		AS REQD.
33		WIRE DUCT 60(W) X 60(H) mm & 25(W) X 25(H)mm		SALZER		AS REQD
34		WIRE TIE LENGTH 100mm MATERIAL:PVC		MAYFAIR	MCT-100	AS REQD
35		WIRE TIE MOUNT 25X25mm MATERIAL:PVC		MAYFAIR	MCTA-25	AS REQD
36		WIRE DRESSING MATERIALS SPIRAL,MATERIAL-POLYETHYLENE INTERNAL DIAMETER-8MM		MICROSIGN/ CONNECTWELL	EFC-8G	AS REQD
37		FERRULES		MICROSIGN/ MAYFAIR/OESER/ SMV		AS REQD
38		LUGS		DOWELL/3D/ CHETNA		AS REQD
39		"L"CLAMP WITH 4.5mm HOLE FOR TERMINAL BLOCK SUITABLE FOR NS35 TB		MANUFACTURER		15
40		MOUNTING CLAMP FOR DOUBLE EURO RACK		MANUFACTURER		2
41		MOUNTING RAIL-NS35 X 7.5mm STEEL, YELLOW CHROMATE, PERFORATED		MANUFACTURER		AS REQD

Annexure-1

42		MOUNTING BUSH FOR CPU		REPUTED	INTERNAL THREAD DIA 5mm	2
43		DISCONNECT SWITCH MOUNTING BRACKET		MANUFACTURER		1
44		BHEL FEED NAME PLATE & NAME PLATES FOR PANEL MOUNTED SUB ITEMS AS PER ANNEXURE 3 & 4 IN TECHNICAL SPECIFICATION FOR REMOTE CONTROL PANEL NO:TCI:310/(EMC), REV06		MANUFACTURER		1 SET
45	EE-BUS	EARTH BUS BAR 25 X 3MM, TINNED CU		MANUFACTURER		2
46		THREE POINT LOCK		DIRAK/RITTAL		1
47		M6 X 20 BOLT,NUT AND STAR WASHERS M4 X 10 SCREWS		REPUTED		20
48		LOOP POWERED CURRENT ISOLATOR		PHOENIX/P&F	PHOENIX Model No. MINI MCR-SL-1CP-I- I-2864419)	5 + 40% OF TOTAL PANEL COUNT FOR SUBJECT P.O
49		PANEL IDENTIFICATION STICKER		MANUFACTURER	As per drawing BHELFEED:RCP:STICKER	1
50		SHROUDING PLATE WITH DANGER STICKER FOR POWER TB & DOOR LIMIT SWITCH		MANUFACTURER		1
51		EMI/RFI FILTER SUITABLE FOR 240VAC,50HZ,10A		EMI SOLUTION	MF420,10A	1
52		EMI/RFI FILTER SUITABLE FOR 415V AC,50HZ,32A ALONHWITH 3 PHASE WITH SURGE SUPPRESSOR		EMI SOLUTION	MF423-3-2D & RCS-3	1
53		EMI/RFI FILTER SUITABLE FOR 110V AC,50HZ,10A		EMI SOLUTION		1
54		METAL OXIDE VARISTOR RDN:275/14mm		CEDICOM		30

Annexure-1

55		EMC BRASS CABLE GLAND WITH LONG THREAD WITH SUITABLE EMC BRASS LOCK NUTS FOR 2PX1.5 SQ.MM PAIR AND OVERALL SHIELDED CABLE. UNARMoured OD SIZE-16mm		CONTROLWELL		4
56		EMC BRASS CABLE GLAND WITH LONG THREAD WITH SUITABLE EMC BRASS LOCK NUTS FOR 19CX1.5 SQ.MM PAIR AND OVERALL SHIELDED CABLE. UNARMoured OD SIZE-22.5mm		CONTROLWELL		2
57		EMC BRASS CABLE GLAND WITH LONG THREAD WITH SUITABLE EMC BRASS LOCK NUTS FOR 2CX2.5 SQ.MM PAIR AND OVERALL SHIELDED CABLE. UNARMoured OD SIZE-14mm		CONTROLWELL		3
58		EMC BRASS CABLE GLAND WITH LONG THREAD WITH SUITABLE EMC BRASS LOCK NUTS FOR 3CX16SQ.MM PAIR AND OVERALL SHIELDED CABLE. UNARMoured OD SIZE-19mm		CONTROLWELL		1
59		EMC BRASS CABLE GLAND WITH LONG THREAD WITH SUITABLE EMC BRASS LOCK NUTS FOR 3CX2.5 SQ.MM PAIR AND OVERALL SHIELDED CABLE. UNARMoured OD SIZE-14.5mm		CONTROLWELL		1
Note: The above cable glands shall be mounted on to the cable gland plate.						

Annexure-1

Bill of Material – EMC - Local Control Panel (LCP)

S. N O	SCH.REFERENCE	DESCRIPTION	RATING	MAKE	CAT.NO/TYPE.NO	QTY/ PANEL
1.	2POLE 2 WAY WITH OFF – 3POSITION ROTARY SELECTOR SWITCH (LOCKABLE & REMOVABLE IN FORWARD POSITION) WITH FRONT LEGEND PLATE ENGRAVED WITH REV – OFF – FWD	FRSL	16A, 240VAC, 50HZ	SALZER	61152	1 + 2 as spare per PO.
2.	3POLE 3 WAY WITH OFF – 4POSITION ROTARY SELECTOR SWITCH WITH FRONT LEGEND PLATE ENGRAVED WITH REMOTE – OFF – LOCAL – CAL	MSL	16A, 240VAC, 50HZ	SALZER	61100	1 + 2 as spare per PO.
3.	1POLE ON/OFF ROTARY SELECTOR SWITCH (FEEDER WORK LIGHT SELECTOR SWITCH)	WSL	16A, 240VAC, 50HZ	SALZER	61002	1 + 2 as spare per PO.
4.	INDICATING LIGHTS OF HI-BRIGHT CLUSTER LED TYPE SUPPLIED WITH LENS ASSEMBLY FIXING FLANGE LAMP HOLDER WITH INTERGRAL LED	LL1-LL8	110VAC, 50HZ	BCH	HFB2XAE (AMBER) LL1,LL2,LL8 HFB2XRE (RED) LL3,LL4,LL6 HFB2XGE (GREEN) LL5,LL7	3 3 2
5.	CFL LAMP WITH FIXURE	CFL	11W, 240V AC	PHILIPS/ BAJAJ/CROMPTION GREAVES/ MYSORE LAMPS/ HMT	---	1
6.	DOOR OPERATED SWITCH	DOS	2A	ESSEN		1
7.	POWER SOCKET	PS	5/15A	ELCOM	EP5/S1	1
8.	TERMINAL BLOCK	TBL1, TBL2		ELMEX/ESSEN DEINKI/ /PHOENIX/ WAGO/ CONNECT WELL	KUT6	60
9.	TERMINAL BLOCK (WITH SHROUDING AND WARNING STICKER)	TBLU, TBLP		ELMEX/ESSEN DEINKI/ /PHOENIX/ WAGO/ CONNECT WELL	KUT10	22
10.	EARTH BUS BAR	E-BUS	25X3mm	MANUFACTURER	LENGTH – 250mm	1
11.	1.5Sq.mm, SINGLE CORE CABLE, 1.1KV GRADE, MULTI-STRANDED ANNEALED TINNED COPPER, FRLS WITH PVC INSULATION AS PER IS-1554	---	---	BIS APPROVED VENDORS	COLOUR GREY(CONTROL WIRING)	AS REQD.

Annexure-1

12.	2.5Sq.mm, SINGLE CORE CABLE, 1.1KV GRADE, MULTI-STRANDED ANNEALED TINNED COPPER, FRLS WITH PVC INSULATION AS PER IS-1554 GREEN (EARTHING)	---	---	BIS APPROVED VENDORS	COLOUR RED,BLACK FOR ENERGISING ELECTRONIC CARD IN LCP	AS REQD.
13.	4Sq.mm, SINGLE CORE CABLE, 1.1KV GRADE, MULTI-STRANDED ANNEALED TINNED COPPER, FRLS WITH PVC INSULATION AS PER IS-1554	---	---	BIS APPROVED VENDORS	COLOUR YELLOW,BLUE FOR POWER WIRING	AS REQD.
14.	1.5Sq.mm, 2PAIR TWISTED SHIELED WITH ALUMINIUM FOIL {INDIVIDUALLY AND COLLECTIVELY SHIEDED}, 1.1KV GRADE, ANNEALED TINNED COPPER, FRLS WITH PVS INSULATION AS PER IS-1554	---	---	BIS APPROVED VENDORS	---	AS REQD.
15.	WIRE DUCT	---	45X45mm	SALZER	PVC	AS REQD.
16.	WIRE DRESSING MATERIAL SPIRAL	---	---	CONNECTWELL	MATERIAL- POLYETHYLENE INTERNAL DIA. 8MM	AS REQD.
17.	WIRE TIE	---	LENGTH - 100mm MATERIAL - PVC	MAYFAIR	MCT-100	AS REQD.
18.	WIRE TIE MOUNT	---	25X25mm	MAYFAIR	MCTA-25	AS REQD.
19.	FERRULES	---	---	MICROSIGN/ MAYFAIR/ DESER	---	AS REQD.
20.	LUGS	---	---	DOWELL/ 3D/DIVYA JOTHI/ CHETNA / AINSONS	---	AS REQD.
21.	BRASS EARTH BOLT	---	---	REPUTED	---	AS REQD.
22.	CAM LOCK WITH LEVER KEY	---	--	REPUTED	---	2
23.	SPRING LOADED FIXING CLAMP (BOLTS, NUTS, SPRINGS, WASHERS)	---	---	MANUFACTURER	---	6
24.	MOUNTING RAIL	---	---	PHOENIX	NS35 X 7.5 mm STEELYELLOW CHROMATE	AS REQD.
25.	SS HANDLE FOR DOOR	---	---	MANUFACTURER	---	1
26.	M12 LIFTING EYE BOLTS WITH WASHER AND UNIT	---	---	MANUFACTURER	---	2

Annexure-1

27.	ALUMINIUM ANODISED NAME PLATES	---	---	MANUFACTURER	AS PER ANNEXTURE	AS REQD.
28.	NEOPRENE GASKET/EPDM GASKET A.) CLIP ON TYPE GASKET B.) FLAT GASKET 20X8MM			REPUTED		AS REQD.
29.	CONNECTORS FOR SCM A.) 3WAY B.) 6WAY C.) 8WAY	---	---	PHOENIX	MSTB-2.5/3-ST5.08 MSTB-2.5/6-ST5.08 MSTB-2.5/8-ST5.08	1 2 1
30.	"L" CLAMP WITH 4.5mm HOLE FOR TERMINIAL BLOCK SUITABLE FOR NS35 TB as per Annexure -5 drawing 4-95-485-05819	---	---	MANUFACTURER		AS REQD.
31.	PANEL IDENTIFICATION STICKER	---	---	MANUFACTURER	AS PER DRAWING NO. BHELFEED:LCP: STICKER	1

ANNEXURE – 2

BHEL FREE ISSUE ITEM TO BE MOUNTED BY VENDOR AT BHEL WORKS

- 1.) CPU (MOUNTING BUSH TO BE SUPPLIED BY VENODR)
- 2.) ELECTRONIC MODULES FOR I/O RACK
- 3.) SINGAL INTERFACE MODULE
- 4.) VFD WITH CHOKES
- 5.) CPU TO I/O RACK INTERFACE MODULE
- 6.) PULES RELAY MODULE
- 7.) RELAY INTERFACE MODULE
- 8.) POWER SUPPLY - 12V DC
- 9.) POWER SUPPLY - 24V DC
- 10.) KEYBOARD ASSEMBLY

ANNEXURE-3

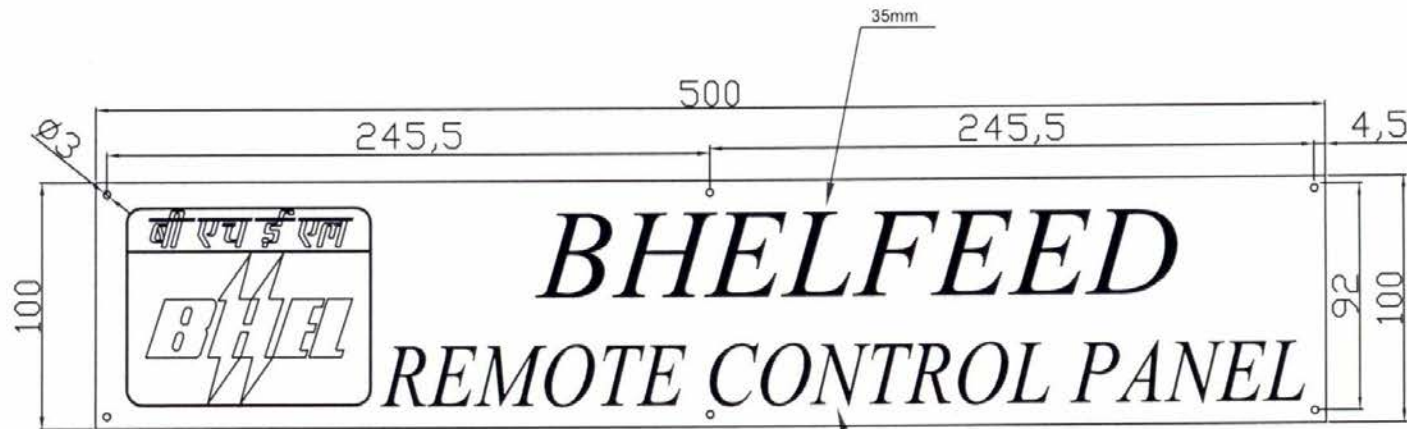
NAME PLATES WITH INSCRIPTION TO BE FIXED / SUPPLIED BY VEDOR

SL.	TAG / INSCRIPTION	DESCRIPTION
1	DS	DISCONNECT SWITCH
2	F4,F5,F6	FUSE
3	MCB1,MCB2,MCB3,MCB4,MCB5	MINIATURE CIRCUIT BRAKER
4	T1	TRANSFORMER-1
5	T2	TRANSFORMER-2
6	CMS	CLEANOUT CONVEYOR MOTOR STARTER
7	CMS O/L	CMS OVERLOAD RELAY
8	PFM	PHASE FAILURE MONITOR RELAY
9	FFS	FEEDER FORWARD STARTER RELAY
10	FRS	FEEDER REVERSE STARTER RELAY
11	FFS O/L	FFS OVERLOAD RELAY
12	TFS	TIME DELAY FEEDER STARTER
13	TPM	TIME DELAY CONTROL POWER MONITOR
14	RM	REMOTE MODE
15	LM	LOCAL MODE
16	CR	CALIBRATION RELAY
17	FR	FEEDER RUN
18	R3A	FEEDER IN REMOTE
19	FRR	FEEDER RUNNING REMOTE
20	MRS	MASTER RESET RELAY
21	COB	COAL ON BELT RELAY
22	FDP	FEEDER DISCHARGE PLUGGED RELAY
23	PFMA	PHASE FAILURE MONITOR AUX. RELAY
24	BCFM	BUNKER COAL FLOW MONITOR RELAY
25	PS1	24V DC POWER SUPPLY
26	PS2	12V DC POWER SUPPLY
27	EMI	EMI FILTER
28	SIM	SIGNAL INTERFACE MODULE
29	MCM	MOTOR CONTROL MODULE
30	VFD	VARIABLE FREQUENCY DRIVE CONTR.
31	INPUT CHOKE	INPUT CHOKE FOR VFD
32	OUTPUT CHOKE	OUTPUT CHOKE FOR VFD
31	I/O RACK	EURO RACK
32	CPU	CENTRAL PROCESSING UNIT
33	I/F CARD	CPU TO I/ORACK INTERFACE MODULE
34	PR	PULSE RELAY MODULE
35	RIM	RELAY INTERFACE MODULE
36	R1,R2,R3,R4A,R4B,R5,R6,R7,R9,R10,R11 & R12	RELAYS IN RIM
37	CFL	COMPACT FLOURESCENT LAMP
38	DOS1	DOOR OPERATING SWITCH
39	RCPL	REMOTE CONTROL PANEL RECEPTACLE
40	LR1	COC MOTOR OVERLOAD(A)
41	LR2	FEEDER MOTOR OVERLOAD (A)
42	LR3	NO COAL FLOW (R)
43	LR4	FEEDER DISCHARGE PLUGGED (R)
44	LR5	PHASE FAILURE (R)
45	LR6	COC RUN (R)
46	LR7	COC OFF (G)
47	LR8	BUNKER NO COAL FLOW (R)
48	RPB	RESET PUSH BUTTON (ILLUMINATED) (R)
49	CSS	COC OFF/RUN SELECTOR SWITCH
50	COC O/L	LR1
51	FEEDER MOTOR O/L	LR2
52	NO COAL FLOW	LR3
53	FEEDER DISCHARGE PLUGGED	LR4
54	PHASE FAILURE	LR5
55	COC RUN	LR6
56	COC OFF	LR7
57	BUNKER NO COAL FLOW	LR8
58	RESET PUSH BUTTON	RPB
59	REVERSE ENABLE	RPB
55	COC OFF/RUN	CSS

56	MS WITH DEFEAT MECHANISM	MAIN SWITCH WITH DEFEAT MECHANISM
57	FAN	INLET FAN WITH FILTER
58	TBR-0, TBR-1, TBR-2, TBR-3, TBR-4, TBR-5, TBR-P, TBR-A, TBR-U	TERMINAL BLOCKS
59	KEYBOARD & DISPLAY UNIT	Keyboard & Display unit
60	LOUVER	FAN LOUVER
61	Earth Symbol	Earth
62	ELECTRONIC EARTH BUS	
63	ELECTRICAL EARTH BUS	
64	CBS	CONVEYOR MOTOR STARTER (For dual belt feeder)
65	CBSOL	CBS OVERLOAD RELAY (For dual belt feeder)
66	TCB	TIME DELAY CONVEYOR MOTOR STARTER (For dual belt feeder)
67	F7,F8,F9	FUSE (For dual belt feeder)
68	TBR-P	TERMINAL BLOCKS (For dual belt feeder)

NOTES:-

1. NAME PLATES WILL BE ANODIZED ALUMINIUM IN BLACK BACKGROUND WITH WHITE LETTERS.
2. INSCRIPTION DETAILS IN THE NAME PLATE WILL BE LIMITED TO MAXIMUM 2 ROWS.
3. THE LETTER FONT WILL BE ARIAL FONT.



3mm HOLES (TYPICAL) FOR FIXING
MANEPLATE USING ALLEN KEYS SCREWS.

NOTE:-

MATERIAL OF NAMEPLATE : ANODISED ALUMINIUM

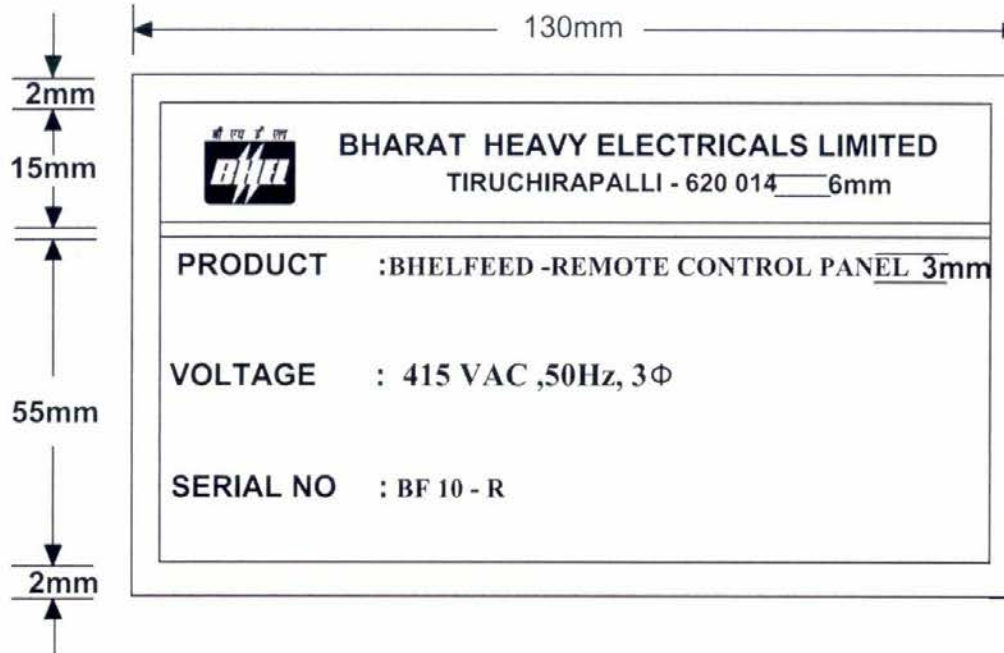
FONT : TIMES NEW ROMAN

SLANTING ANGLE OF TEXT : 10°

FIXING OF NAME PLATE : THREE SCREW ON TOP AND THREE SCREW ON BOTTOM

COLOUR ; RED BACKGROUND WITH WHITE LETTERS

DRAWING NO:



MATERIAL: RETRO REFLECTIVE TAPE WITH MATERIAL SHEETING PHOTO ELECTRIC GRADE

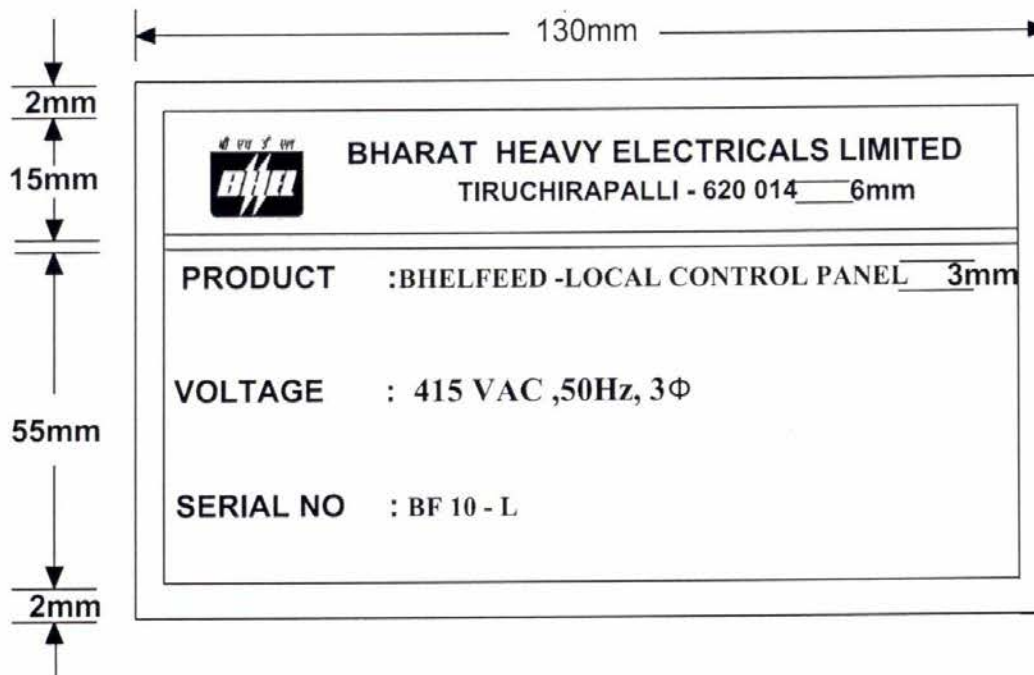
NOTE : DOUBLE STICKER , RED BASE WHITE LETTER

NOTE: INSIDE BOADER LINE 1mm THICK

CAUTION: The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD. It must not be used directly or indirectly in any way detrimental to the interest of the company.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		STANDARD		
 Bharat Heavy Electricals Ltd UNIT: HIGH PRESSURE BOILER PLANT TIRUCHIRAPALLI - 620014 355-055		DRN P. DHARMARAJ	SIGNATURE	DATE 03-06-2010
CHD K. VEERAMANI	APPD D. MAHENDRABABU	REF TO ASSY / OLD DWG		
DEPT CODE	ALL DIMENSIONS ARE IN MM	PROJECTION 	SCALE	WEIGHT (Kg)
TITLE STICKER SPECIFICATION REMOTE CONTROL PANEL		DRAWING NO : BHELFEED:RCP:STICKER		REV 00

DRAWING NO:



MATERIAL: RETRO REFLECTIVE TAPE WITH MATERIAL SHEETING PHOTO ELECTRIC GRADE

NOTE : DOUBLE STICKER , RED BASE WHITE LETTER

NOTE: INSIDE BOADER LINE 1mm THICK

CAUTION: The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD. It must not be used directly or indirectly in any way detrimental to the interest of the company.		TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		STANDARD			
		 355-055 Bharat Heavy Electricals Ltd UNIT: HIGH PRESSURE BOILER PLANT TIRUCHIRAPALLI - 620014		DRN	NAME	SIGNATURE	DATE
				CHD	K. VEERAMANI		03-06-2010
				APPD	D. MAHENDRABABU		03-06-2010
DEPT	ALL DIMENSIONS ARE IN MM	PROJECTION	SCALE	WEIGHT (Kg)	REF TO ASSY / OLD DWG		
CODE							
TITLE					DRAWING NO :		REV
STICKER SPECIFICATION LOCAL CONTROL PANEL					BHSELFEEED:LCP:STICKER		00