

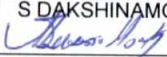


**BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHIRAPPALLI**

**CONTROLS AND INSTRUMENTATION / FB
QUALITY ASSURANCE**

**STANDARD PACKING PROCEDURE
FOR
ELECTRICAL AND ELECTRONIC PANELS
(INCLUDING BOXES, CABINETS, CUBICLES, SYSTEMS AND CHASSIS)**

Rev	Date	Prepared	Checked	Approved	Revision History
00	01.01.96	Sd/-	Sd/-	Sd/-	Initial History
01	28.03.02	A.J.OMPRAKASH Sd/-	R.VARADARAJAN Sd/-	G.MATHIYALAGAN Sd/-	Department name changed
02	26.02.07	RM.VAIRAVAN	N.SRIDHAR	S.SOMASUNDARAM	Revised after discussion with Shipping Dept.
03	07.02.2017	AVINASH V 	RM VAIRAVAN 	S DAKSHINAMOORTHY 	Type of wood for packing changed

1.0 SCOPE

- 1.1 This procedure gives minimum guidelines to be complied with for packing of Electrical, Electronics and Instrumentation panels. This packing shall be suitable for different handling operations and for the adverse conditions during transportation and during indoor / outdoor storage for periods more than one year.

2.0 WOOD SPECIFICATION FOR PACKING

- 2.1 Any seasoned wood or plywood as per relevant international standard
2.2 Sea worthy packing is envisaged for international shipments.

3.0 PACKING

- 3.1 Any seasoned wood or plywood shall be used .It shall be free from knots, etc. and any kind of decay caused by insects and fungus.
- 3.2 The required wood case for the equipment to be packed shall be made out of individual planks of single length and no joint is permissible. Using such planks, the required wood case for the panel shall be made,
- 3.3 Sufficient number horizontal, vertical and diagonal planks (dimension depending upon case size) shall be used for binding and strengthening. Runners have to be provided with metallic sling plates for handling.
- 3.4 Support planks are to be provided such that, no force is acting on the parts of equipment or its parts.
- 3.5 Panels above 1.5 metre shall be bolted at the bottom.
- 3.6 The equipments covered with a polythene sheet shall be kept inside the box, followed by coir, wooden bottoms, thermo coal, etc to prevent vibration effect during loading, transportation, etc.
- 3.7 On all sides of the inner case, black polythene sheet shall be nailed.
- 3.8 Loose items of the equipment, if any, shall be packed separately.
- 3.9 Delicate components likely to be damaged, example PCB – Electronic modules, instrument, etc are to be covered individually in anti-static bags and packed in cartons and filled with fillers like thermo coal, paper cuttings, etc.
- 3.10 Such cartons shall be packed with overall polythene rapping and packed in wooden cases. Mark prominently as "ELECTRONIC COMPONENTS".

4.0 MARKING

- 4.1 After completing the packing, Stencil marking, as per dispatch instructions and symbol marking as per Annexure – I shall be made. Please ensure the box is stenciled with "FRAGILE ITEM", "HANDLE WITH CARE"

5.0 PACKING SLIP

- 5.1 A copy of the packing slip, kept in a polythene cover shall be kept inside the box. Another copy of the packing slip, kept in a polythene cover shall be kept out side the box and covered with a metallic plate to the case.

6.0 CAUTION

Do not pack any other Mechanical items with this case.

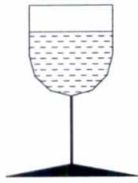
7.0 GENERAL

- 7.1 These packing procedures are the minimum requirements in addition to the standard instructions mentioned in the Purchase Order and Specification.

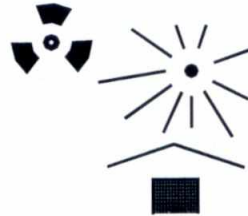
ANNEXURE - 1

TO

PROCEDURE NO:CI:QAC:PR:02/00 ; PR:03/00 ; PR:04/00



FRAGILE, HANDLE WITH CARE



PROTECT FROM HEAT AND RADIOACTIVE SOURCES



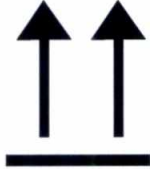
USE NO HOOKS

NOTE: The design of heavy goods packages cannot always resist top lifting by grabhooks.



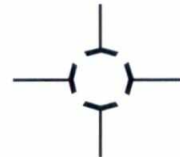
KEEP DRY

NOTE: Not all cases have waterproof internal liners: plywood used in the construction may not have a waterproof glueline.



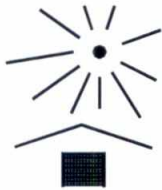
THIS WAY UP

NOTE: Certain designs of small cases make it difficult to distinguish top from bottom.



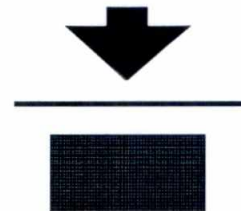
CENTRE OF GRAVITY

NOTE: This should be stencilled as a minimum on the two longest case sides (this information will normally be supplied by the manufacturer of the item(s) packed).



KEEP AWAY FROM HEAT

... kg max



STACKING LIMITATION

NOTE: The maximum load in kilograms should be marked above the arrow.



INTERNATIONAL "SLING HERE" SYMBOL

Bharat Heavy Electricals Limited




High Pressure Boiler Plant, Tiruchirappalli-620 014.

Technical Delivery Conditions For Sub - Delivery Components of Controls and Instrumentation / FB

SPECIFICATION NO:TCI:RB:BHU:310/Rev 00

TECHNICAL SPECIFICATION
for
REFURBISHMENT
of
BHEL FREE-SUPPLY NON-EMC PANELS
(REMOTE & LOCAL CONTROL PANEL)

GRAVIMETERIC FEEDER CONTROL SYSTEM

REV.NO.	DATE	DESCRIPTION	PREPARED	REVIEWED	APPROVED
00	01/01/2022	Initial release	 [SKS]	 [KV]	 [DK]

Clause No.	REQUIREMENT
1.	<u>GENERAL REQUIREMENTS:</u>
	This specification covers general requirements of Refurbishment of BHEL free supply Non-EMC Remote Control Panel (RCP) & Local control panel (LCP) for gravimetric feeder control system.
2.	<u>SCOPE OF WORK:</u>
2.1	Refurbishment of BHEL free supply Non-EMC Remote Control Panel (RCP) & Local control panel (LCP) and supply of refurbished panels to BHEL (T) works, after inspection at vendor works.
2.1.1	Vendor to collect the allocated BHEL free supply Non-EMC panels from BHEL stores in as is where is condition.
2.1.2	Packing of panels while collecting from BHEL stores is in vendor scope.
2.1.3	Whatever required to be done to make BHEL free supply Non-EMC control panels into fully functional EMC control panel everything is in vendor scope only.
2.1.4	Vendor shall change the colour shade of BHEL free supply Non-EMC control panel as per colour shade specified in enquiry-if required .
2.1.5	Refurbished panel shall meet, a.) All the EMC/EMI requirements compatible to a new EMC panel b.) Construction & fabrication aspects of clauses 3, 4 & 5 of this specification.
2.1.6	Vendor shall replace all applicable Non EMC BOM components to EMC components as per Annexure BOM-1 of this specification and ensure all the line items of Annexure BOM-1 are mounted.

Clause No.	REQUIREMENT
2.1.7	Vendor to mount HMI door (EMC window) for existing HMI cut-out area.
2.1.8	Any components/loose items/BOM components if found missing/defective/not working in existing BHEL free supply Non-EMC panels, vendor shall procure and mount the same to make the system complete in all respects. Final populated BOM line items shall match Annexure BOM-1 of this specification.
2.1.9	Vendor shall maintain the uniformity of component layout of all the refurbished panels. Vendor shall remove the non-applicable items of BHEL free supply ECC panels and to match the uniformity of component layout of required VFD type layout.
2.1.10	Transportation of BHEL free supply Non-EMC panels To & Fro from BHEL trichy works is in vendor scope only.
2.2	<p>On receipt of panels at BHEL (T) works, vendor to mount and wire BHEL's free issue components as per annexure-2 (BHEL free issue items to be mounted by vendor at BHEL works).</p> <p>For mounting of BHEL (T) supplied free issue items, panel assembly & wiring works at BHEL (T) premises by vendor, separate price breakup shall be indicated by vendor in the main offer.</p>
2.3	Guarantee & Warranty of refurbished panels shall be 18 months from date of Supply and 12 months from date of commissioning whichever is earlier or as per PO terms.
3.	<u>REFURBISHED BHEL FREE SUPPLY CONTROL PANEL SHALL HAVE THE FOLLOWING FEATURES:</u>
3.1	All Electrical & Electronic components in the refurbished BHEL free supply control panel are to be mounted and wired inside a weatherproof EMC cabinet as per schematic diagram and annexure BOM.

Clause No.	REQUIREMENT
3.2	The refurbished BHEL free supply control panel shall be of professional quality welded / modular /FeCOSY construction made from CRCA Grade-D sheet steel (branded make) as per IS-513 (or) GI Sheet steel 2mm (min.) thick for door, 2mm (min.) thick for sides and shall be rigid freestanding, neat in appearance. Component mounting plate shall be rigidly fixed and made from 3mm thick CRCA sheet / GI sheet steel (branded make) or Zinc passivated to 15-20 microns. Necessary stiffeners / supports shall be provided to avoid bowing and bending. Component mounting plate shall not be fixed directly on to the cabinet enclosure.
3.3	The refurbished BHEL free supply control panel construction shall have adequate strength to support mounted components during shipment.
3.4	For routing the cables coming from outside, the refurbished BHEL free supply control panel 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 conductive glue.
3.5	In the refurbished BHEL free supply control panel , 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.
3.6	Two numbers brass bolt size M8x25mm / M6x20mm with nut for connecting customer's GI earth flat shall be provided on back side of the refurbished BHEL free supply control panel .
3.7	SS wiring accessories such as plate screws, washer, spring washer and serrated washers as required shall be used for fixing of all components in the refurbished BHEL free supply control panel.
3.8	Self-adhesive poly-carbonate nomenclature labels of thickness 175 microns are provided for both front & rear sides of refurbished BHEL free supply control panel. For inscription details and name plate specification, refer annexure-3 (Name plates with inscription

Clause No.	REQUIREMENT
	to be fixed / supplied by vendor) & annexure-4 (BHELFEED Name Plate details) .
3.9	The terminals of refurbished BHEL free supply control panel shall be identified with number strip with legible numbering as per schematics.
3.10	Wire dressing spiral of polyethylene material of adequate size shall be used for neat dressing of door-mounted components wiring in the refurbished BHEL free supply control panel.
3.11	Painting: The finished surfaces of the refurbished BHEL free supply control panel shall be free from all waves, bellies and other imperfections. All cabinet exterior steel surfaces shall be pre-treated by 7-tank process (or) pre-treatment (Spray line) & Primer (Dip coat). Surface preparation shall be done by power tool cleaning after degreasing and rinsing. Powder coating (Epoxy based powder) shall be done for both exterior and interior of the refurbished BHEL free supply control panel. Thickness of painting for exterior, interior shall be 75 microns.
3.12	All the mating surfaces including cable gland plates etc. in the refurbished BHEL free supply control panel shall be made electrically conductive surface and conductive gaskets shall be fixed using conductive glue.
3.13	Power/control/signal cables used in the refurbished BHEL free supply control panel shall be as per annexure BOM.
3.14	<p>Vendor has to mount and wire the loose supply components in the refurbished BHEL free supply control panel supplied at BHEL's works. Annexure-2 (BHEL free issue item to be mounted by vendor at BHEL works) to this specification gives the list of wiring to be done. Vendor shall arrange required cable for carrying out this wiring.</p> <p>All the required accessories for mounting the BHEL free issue items shall be in vendor scope and shall be dispatched along with refurbished BHEL free supply control panel to BHEL works.</p>

Clause No.	REQUIREMENT
	The plug-in connectors at module/electronic card (arranged by BHEL) shall be connected to one end of the shielded cable and the other end shall be neatly dressed, ferruled, lugged and terminated in the terminal blocks.
3.15	All exposed conductive parts like HMI door frame in the refurbished BHEL free supply control panel shall be connected to ground through low impedance conductor.
3.16	Shielded type cables for interconnecting the electronic module up to the terminal block shall be neatly dressed, ferruled and lugged at both sides in the refurbished BHEL free supply control panel.
3.17	One document pocket at suitable location shall be provided. Preferably at back side of the door of the refurbished BHEL free supply control panel.
3.18	A caution sticker of anodized aluminium for handling electronic cards shall be fixed at back side of the door at suitable location in the refurbished BHEL free supply control panel.
3.19	OGA, IGA & wiring Schematics will be furnished after PO placement.
4.	Refurbished BHEL free supply REMOTE CONTROL PANEL SPECIFIC POINTS
4.1	Panel dimension: {2200+15+100(H)x1200(W)x600(D)}mm
4.2	The cabinet shall be with double door type on front.
4.3	The cabinet shall be mounted on anti-vibration pad, 15 mm thick suitable for fixing to the ISMC channel/plinth of 50mm height with self-drilling anchor bolts together with all required accessories.
4.4	Flush type ergo form lock shall be provided for door locking.

Clause No.	REQUIREMENT
4.5	The cabinet enclosure shall be suitable for IP-32 degree of protection as per IEC 60529.
5.	Refurbished BHEL free supply LOCAL CONTROL PANEL SPECIFIC POINTS
5.1	The LCP size shall be {600(W) X 750/ 760(H) X 350(D)} mm.
5.2	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.
5.3	The cabinet enclosure shall be suitable for IP-55 degree of protection as per IEC 60529.
5.4	The door shall be suitable for opening of 120 deg.
5.5	CAM type door locking with two keys (multi lever type) with SS handle on the door for opening and closing (or) Ergo form locking system shall be supplied for door locking to meet IP-55 enclosure protection.
5.6	Fixing clamp with spring loaded nuts (6 Nos./ panel) for mounting the panel onto the feeder shall be supplied along with each LCP.
5.7	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.
6.	<u>DOCUMENTATION:</u>
6.1	Documents to be submitted along with the refurbishment offer:
	Signed No deviation this specification. No deviation format shall address this specification reference, Quality Plan reference and packing procedure reference.
6.2	Documents to be submitted for BHEL's approval within 15 days from PO.

Clause No.	REQUIREMENT
	Bill of material with makes and model number of components, vendor OGA & internal arrangement drawings.
7.	<u>INSPECTION of the refurbished BHEL free supply control panel:</u>
7.1	Applicable quality plan: QA:CI:STD:QP: 71 /Rev.00
7.2	Inspection will be carried out by BHEL (T) at vendor works. Advance information of one week shall be given to BHEL for arranging inspection.
8.	<u>PACKING of the refurbished BHEL free supply control panel:</u> As per Packing procedure QA:CI:STD:PR:02 /Rev 03
9.	<u>SPECIAL INSTRUCTION TO REFURBISHMENT VENDOR:</u>
	Nothing in this specification shall be construed to relieve the vendor from their 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, to make the refurbished system panel complete, fully functional & fit to be integrated to a BHEL make Gravimetric raw coal feeder.

Annexure BOM-1

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

SL. NO	SCHEMATIC REFERENCE	Description	RATING	MAKE	CAT./TYPE NO	QTY./ PANEL
1.	DS	DPN switch disconnecter 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 + 1 NC			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,240VAC, double pole, suitable for din rail mounting	2A	MDS/INDOASIAN/ SIEMENS/L&T- HAGER/INDOKOPP/ SCHNEIDER ELECTRIC	LEXIC 603261/ SIEMENS 5SL4202-7RC	1
6.	MCB3	Miniature circuit breaker,240VAC, single pole, suitable for din rail mounting	6A	MDS/INDOASIAN/ SIEMENS/L&T- HAGER/INDOKOPP/ SCHNEIDER ELECTRIC	LEXIC 603231 / SIEMENS 5SL41067RC	1
7.	MCB4	Miniature circuit breaker,240VAC, double pole, suitable for din rail mounting	6A	MDS/INDOASIAN/ SIEMENS/L&T- HAGER/INDOKOPP/ SCHNEIDER ELECTRIC	LEXIC 603265	1 1

Annexure BOM-1

8.	MCB5	Miniature circuit breaker,240VAC , double pole, suitable for din rail mounting	4A	MDS/INDOASIAN/ SIEMENS/L&T- HAGER/INDOKOPP/ SCHNEIDER ELECTRIC ELECTRIC	LEXIC 603263	1
9.	TR	Control transformer, with protective shrouding of suitable size and warning sticker. Primary 240V, secondary 2x110VAC,50Hz. Secondary rated for 2x375 VA. Mounting accessories 8nos. Mounting screw M6x20 with nut Plate washer 8nos. Serrated washer 8nos. Mounting "L" clamps to support transformer at bottom.	2X375VA	AE /KAPPA / INDCOIL PRECISE / PRAGATI/JYOTHI		1
10.	CSS	Selector switch 16A,250V AC, 50Hz, 2 pole,2-pos.(ON-OFF) front legend plate engraved OFF-RUN	16A	SALZER	61198	1
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, Delay 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, Delay on de-energisation (DOD) 0.1-30 sec.	0.1-30 SEC	C&S	TCA2DN32+TA3DR2 +LA9-D09980	1

Annexure BOM-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 6NO+2NC contacts (FFS)(FRS).	10A	C&S	TCA2DN40+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-DN24+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,FR R,MRS, COB,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.	110VAC	BCH	HFB2XRE (RED) HFB2XGE (GREEN) HFB2XAE (AMBER)	5 1 2

Annexure BOM-1

20.	MRS	Illuminated push button with 2NO+2NC contact, led type suitable For 110v ac, 50hz., red colour flush Type	110VAC	BCH	HEB11RM+HLSURE+ HCBO1+HCB10	1
21.	FAN	Cooling fan with accessories, suitable for 240VAC size 6 inch with wire mess	240V AC	REXNORD-RITTAL/RALLI-WOLF/KAITON/USHA	6 INCH (REC21725A2) AIR FLOW-CFM-173	1
22.	LOUVER	EMI compatible louver with honey comb filters and perforated brass mesh screen at the bottom at top & bottom of single door		REPUTED		2
23.	TBRP	Terminal blocks with required accessories for power circuit wiring with screw type end stopper (terminal & fasteners shall be SS)		ELMEX /ESSEN DEINKI /PHOENIX/ WAGO/ CONNECT WELL	KUT25(POWER)	TBRP-15 (RED -3 NOS.) (YELLOW -3 NOS.) (BLUE -3 NOS.) (GREEN - 2 NOS.) (RED - 2 NOS.) (BLACK - 2 NOS.)
24.	TBRPA	Terminal blocks with required accessories for power circuit wiring with screw type end stopper (terminal & fasteners shall be SS)		ELMEX /ESSEN DEINKI /PHOENIX/ WAGO/ CONNECT WELL	KUT25(POWER)	TBRPA-12 (RED -4 NOS.) (YELLOW -4 NOS.) (BLUE -4 NOS.) WITH SHORT LINKS
25.	TBRU	Terminal blocks with required accessories for power circuit wiring with screw type end stopper (terminal & fasteners shall be SS)		ELMEX /ESSEN DEINKI /PHOENIX/ WAGO/ CONNECT WELL	KUT25(POWER)	TBRU-8 (RED -4 NOS.) (BLACK -4 NOS.)

Annexure BOM-1

26.	TBR1, TBR2, TBR3, TBR4, TBR5 TBR0	Terminal blocks with required Accessories for power circuit Wiring with cage clamp type end Stopper (terminal&fasteners Shall be SS) (Shot links shall be provided for TBR0 to short +/- seperately)		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
27.		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
28.	DOS	Door operating limit switches for front & rear	5A	ESSEN/IEC		1
29.	LED	LED cubicle illumination light suitable for 240VAC with fixture		PHILIPS/ BAJAJ/CROMPTON GREAVES/ MYSORE LAMPS/ HMT		1
30.	RCPR	5-pin, 15/5a switch socket suitable,240v ac with surge protection, switch and fuse. With warning sticker.	15/5A	ELCOM	EP-15/S3 EXT	1
31.		1.5 sq.mm, single core cable, 1100V grade multi stranded annealed tinned copper, FRLS PVC insulated (BIS approved vendors)colour-grey (control wiring), yellow (output contacts), green (earthing)		BIS APPROVED VENDORS		As required
32.		1.5sq.mm,two pair shielded cable {individually and collectively shielded}with multi stranded		BIS APPROVED VENDORS		As required

Annexure BOM-1

			annealed tinned copper, FRLS PVC insulated [BIS approved vendors 1100V grade.				
33.		---	2.5sq.mm, single core cable, 1100V grade, multi-stranded annealed tinned copper, FRLS with PVC insulation Earthing (green)	BIS APPROVED VENDORS			As required
34.			4 sq.mm, single core cable, 1100V grade multi stranded annealed tinned copper, FRLS PVC insulated (BIS approved vendors) coloured, yellow, blue (power wiring)	BIS APPROVED VENDORS			As required
35.			4sq.mm, three core shielded cable with multi stranded annealed tinned copper, FRLS PVC insulated [BIS approved vendors] coloured, yellow, blue (TBRPA----input filter choke-----VFD-----output filter choke----TBRP) 1100V GRADE.	BIS APPROVED VENDORS			As required
36.			Wire duct 60(W) x 80(H) mm & 25(W) x 25(H)mm	SALZER			As required
37.			Wire tie length 100mm material: PVC	MAYFAIR	MCT-100		As required
38.			Wire tie mount 25x25mm material: PVC	MAYFAIR	MCTA-25		As required
39.			Wire dressing materials spiral, material-polyethylene internal diameter-8mm	MICROSIGN/ CONNECTWELL	EFC-8G		As required
40.			Ferrules	MICROSIGN/ MAYFAIR/OESER/ SMV			As required

Annexure BOM-1

41.	Lugs				DOWELL/3D/ CHETNA		As required
42.	"L" clamp with 4.5mm hole for terminal block suitable for NS35 TB				MANUFACTURER STANDARD		15
43.	Unpainted Zinc Passivated conductive Mounting clamps for double euro rack				MANUFACTURER STANDARD		2
44.	Mounting rail-NS35 x 7.5mm steel, yellow chromate, perforated				MANUFACTURER STANDARD		As required
45.	Mounting bush for CPU				MANUFACTURER STANDARD		2
46.	Disconnect switch mounting Bracket				MANUFACTURER STANDARD		1
47.	BHEL FEED name plate & name plates for panel mounted sub items as per annexure 3 & 4 in technical specification.				MANUFACTURER STANDARD		1 SET
48.	EL-BUS Electrical earth bus bar 25 x 3 x 350 mm, tinned cu with 8 termination screws for different cable size varying from 2.5 sq.mm to 16 sq.mm				MANUFACTURER STANDARD		1
49.	EN-BUS Electronic earth bus bar 25 x 3 x 300 mm, tinned cu with mounting insulated bush. Termination screws for different cable size up to 2.5 sq.mm.				MANUFACTURER STANDARD		1
50.	Three point lock				DIRAK/RITTAL		1
51.	M6 x 20 bolt, nut and star washers m4 x 10 screws				REPUTED		20

Annexure BOM-1

52.	Loop powered current isolator		PHOENIX /P&F	PHOENIX Model No. MINI MCR-SL-1CP-1-I-2864419) P&F Model No. KFD0-CS-1.50	9
53.	Panel identification sticker		MANUFACTURER STANDARD	As per drawing BHELFEED:RCP:STICKER	1
54.	Shrouding plate with danger sticker for power TB & door limit switch		MANUFACTURER STANDARD		1
55.	EMI/RFI filter suitable for 240VAC,50Hz,10A		EMI SOLUTION	MF420,10A	2
56.	EMI/RFI filter suitable for 110VAC,50Hz,10A		EMI SOLUTION	MF420	1
57.	EMI/RFI filter suitable for 110VAC,50Hz,3A		EMI SOLUTION	MF420	1
58.	EMI/RFI filter suitable for 415V AC,50Hz,32A along with 3 phase With surge suppressor		EMI SOLUTION	MF423-3-2D & RCS-3	1
59.	Brass earth bolts with nut at panel back	M8X25M M	REPUTED	---	2
60.	M12 or m16 lifting eye bolts with washer and unit	---	MANUFACTURER STANDARD	---	4
61.	HMI WINDOW SS window with toughened glass for HMI cut-out. Mating surface of window and panel is with conductive gasket		MANUFACTURER STANDARD		1

Annexure BOM-1

62.	VFD MOUNTING FRAME	Provision to mount VFDs of different sizes inside VFD layout in component layout. Mounting frames consists of 2 vertical C-channels bolted to component mounting plate and 2 horizontal channels/steel frames movable along vertical channels with fixing bolts & accessories.	MANUFACTURER STANDARD	1 Set
63.		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
64.		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	3
65.		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
66.		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
67.		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 to Vendor: Any technical equivalent make of above part numbers are acceptable provided, equivalents proposed by vendor shall match technical data & approvals (certifications) of item datasheet in all respect. Vendor shall get BHEL approval before proceeding with equivalent makes.

Annexure BOM-1

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

SL. NO	SCHEMATIC REFERENCE	Description	RATING	MAKE	CAT./TYPE NO	QTY./ PANEL
1.	FRSL	2pole 2 way with OFF – 3position rotary selector switch (lockable & removable in forward position) with front legend plate engraved with REV – OFF – FWD	16A, 240VAC, 50HZ	SALZER	61152	1
2.	MSL	3pole 3 way with OFF – 4position rotary selector switch with front legend plate engraved WITH REMOTE – OFF – LOCAL – CAL	16A, 240VAC, 50HZ	SALZER	61100	1
3.	WSL	1pole ON/OFF rotary selector switch (feeder work light selector switch)	16A, 240VAC, 50HZ	SALZER	61002	1
4.	LL1-LL8	Indicating lights of hi-bright Cluster led type, supplied with Lens assembly fixing flange lamp Holder with integral led suitable For 110v ac, 50hz.	110VAC	BCH	HFB2XRE (RED) HFB2XGE (GREEN) HFB2XAE (AMBER)	3 2 3
5.	LED	LED cubicle illumination light suitable for 240VAC with fixture	240V AC	PHILIPS/ BAJAJ/CROMPTION GREAVES/ MYSORE LAMPS/ HMT	---	1

Annexure BOM-1

	DOS	Door operated switch	2A	ESSEN		1
6.	---	Door operated switch		ESSEN		1
7.	---	5-pin, 15/5A switch socket suitable,240VAC with surge protection, switch and fuse. with warning sticker.	15/5A	ELCOM	EP-15/S1 EXT	1
8.	TBL1	Terminal block		ELMEX/ESSEN DEINKI/ /PHOENIX/ WAGO/ CONNECT WELL	KUT6	34
9.	TBL2	Terminal block		ELMEX/ESSEN DEINKI/ /PHOENIX/ WAGO/ CONNECT WELL	KUT6	30
10.	TBLU	Terminal block (with shrouding and warning sticker)		ELMEX/ESSEN DEINKI/ /PHOENIX/ WAGO/ CONNECT WELL	KUT10	10
11.	TBLP	Terminal block (with shrouding and warning sticker)		ELMEX/ESSEN DEINKI/ /PHOENIX/ WAGO/ CONNECT WELL	KUT25	12
12.	EL-BUS	Electrical earth bus bar with 8 termination screws for different cable size varying from 2.5 sq.mm to 16 sq.mm	25X3mm	MANUFACTURER STANDARD	LENGTH - 250mm	1
13.	---	1.5sq.mm, single core cable, 1.1kv grade, multi-stranded annealed tinned copper, FRLS with PVC insulation	---	BIS APPROVED VENDORS	COLOUR GREY (CONTROL WIRING)	As required
14.	---	2.5sq.mm, single core cable, 1.1kv grade, multi-stranded annealed tinned copper, FRLS with PVC insulation green (earthing)	---	BIS APPROVED VENDORS	COLOUR RED, BLACK FOR ENERGISING ELECTRONIC CARD IN LCP	As required

Annexure BOM-1

15.	---	6sq.mm, single core cable, 1.1kv grade, multi-stranded annealed tinned copper, FRLS with PVC insulation	---	BIS APPROVED VENDORS	COLOUR YELLOW,BLUE FOR POWER WIRING	As required
16.	---	1.5sq.mm, 2pair twisted shielded with aluminium foil {individually and collectively shielded}, 1.1kv grade, annealed tinned copper, FRLS with PVC insulation	---	BIS APPROVED VENDORS	---	As required
17.	---	Wire duct	45X45m m	SALZER	PVC	As required
18.	---	Wire dressing material spiral	---	CONNECTWELL	MATERIAL-POLYETHYLENE INTERNAL DIA. 8MM	As required
19.	---	Wire tie	LENGTH - 100mm MATERIA L - PVC	MAYFAIR	MCT-100	As required
20.	---	Wire tie mount	25X25m m	MAYFAIR	MCTA-25	As required
21.	---	Ferrules	---	MICROSIGN/ MAYFAIR/ DESER	---	As required
22.	---	Lugs	---	DOWELL/ 3D/DIVYA JOTHI/ CHETNA / AINSONS	---	As required
23.	---	Brass earth bolts with nut at panel side	M8X25M M	REPUTED	---	2
24.	---	Cam lock with lever key	--	REPUTED	---	2

Annexure BOM-1


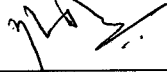

25.	---	Spring loaded fixing clamp (bolts, nuts, springs, washers)	---	MANUFACTURER STANDARD	---	6
26.	---	Mounting rail	---	PHOENIX	NS35 X 7.5 mm STEEL YELLOW CHROMATE	AS REQD.
27.	---	SS handle for door	---	MANUFACTURER STANDARD	---	1
28.	---	M12 or m16 lifting eye bolts with washer and unit	---	MANUFACTURER STANDARD	---	2
29.	---	Aluminium anodised name plates	---	MANUFACTURER STANDARD	AS PER ANNEXTURE	AS REQD.
30.		Neoprene /EPDM conductive gaskets		REPUTED		AS REQD.
31.	---	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
32.	---	"L" clamp with 4.5mm hole for terminal block suitable for NS35 TB	---	MANUFACTURER STANDARD		AS REQD.
33.	---	Panel identification sticker	---	MANUFACTURER STANDARD	AS PER DRAWING NO. BHELFEED-LCP- STICKER	1

Note to Vendor: Any technical equivalent make of above part numbers are acceptable provided, equivalents proposed by vendor shall match technical data & approvals of item datasheet in all respect. Vendor shall get BHEL approval before proceeding with equivalent makes.



CONTROLS AND INSTRUMENTATION/QA/FB

STANDARD QUALITY PLAN FOR WIRED REMOTE AND LOCAL CONTROL PANEL

REV	DATE	PREPARED	REVIEWED	APPROVED	REVISION HISTORY
00	21/02/2013	RM.VAIRAVAN 	N.SRISHAR 	K.PALANIVEL 	Initial release.



Sl. No	Component & Operation	Characteristics	Class	Type of Check	Quantum of check		Ref Doc. & Acceptance STD	Format of record	AGENCY			Remarks
					M	B/C			M	B	C	
A	Raw materials & Brought Out items inspection											
1	CRCA Sheet	a. Material	Major	CHEM	Sample	-	IS-513 BHEL Appd.Drg.	TC	V	V	-	
		b. Thickness	Major	MEAS	100%	-	BHEL Appd. Drg.	LGB	P	-	-	
2	Gasket	a. Dimension	Major	MEAS	Sample	-	BHEL Appd. Drg.	TC/ LGB	P	-	-	EMC Compatible if mentioned in PO
		b. Hardness	Major	MEAS	Sample	-	BHEL Appd. Drg.	TC/ LGB	V	-	-	
3	Terminals	a. Type, Size & Make	Major	VISU	100%	-	BHEL Appd. Drg.	TR	V	-	-	
4	Indication Lamps/ MCB/ Switches Contactors, Transformers	a. Type, Size, Make & Ratings	Major	VISU	100%	-	BHEL Appd. Drg.	TR	V	-	-	
		b. Functional	Major	MEAS	100%	-	Mfr. Std.	TR	V	-	-	
B	In-Process Inspection											
1	Fabrication	a. Dimension	Critical	MEAS	100%	-	BHEL Appd. Drg.	TR	P	-	-	
		b. Cutout Dimension	Critical	MEAS	100%	-	BHEL Appd. Drg.	TR	P	-	-	
		c. Cable Gland Plate	Critical	VISU	100%	-	BHEL Appd. Drg.	TR	P	-	-	
		d. Gasket arrangement	Critical	VISU	100%	-	BHEL Appd. Drg.	TR	P	-	-	
2	Pre Treatment	a. 7 Tank process	Critical	VISU	100%	-	Mfr. Std.	TR	P	-	-	
3	Inner & Outer Paint/ Powder Coating	a. Shade	Major	VISU	Sample	-	BHEL Appd. Drg. IS 5/RAL	TR	V	-	-	
		b. Finish	Major	VISU	Sample	-	BHEL Appd. Drg.	TR	V	-	-	
		c. Thickness	Major	MEAS	Sample	-	BHEL Appd. Drg.	TR	P	-	-	
4	Assembly	a. Termination/ Wiring	Major	PHYS	100%	-	BHEL Appd. Drg.	TR	P	-	-	
		b. Gasketting	Major	VISU	100%	-	BHEL Appd. Drg.	TR	P	-	-	
		c. Earthing	Major	PHYS	100%	-	BHEL Appd. Drg.	TR	P	-	-	
		d. Check Arrangement/ Layout of Components & Mountings	Major	VISU	100%	-	BHEL Appd. Drg.	TR	P	-	-	
		e. Wire Size/ Colour Code/ Ferruling	Major	VISU	100%	-	BHEL Appd. Drg.	TR	P	-	-	
		f. Name Plates & Labels	Major	VISU	100%	-	BHEL Appd. Drg.	TR	P	-	-	

M- MANUFACTURER/ SUB-VENDOR; **B** - BHEL / TPI ; **C** - CUSTOMER / TPI
P - PERFORM; **W** - WITNESS **V** - VERIFICATION;



BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHIRAPPALLI - 620014

QUALITY PLAN FOR
WIRED REMOTE AND LOCAL CONTROL PANEL

QA:CI:STD:QP:71
 Rev: 00 Page: 3 of 4

Sl. No	Component & Operation	Characteristics	Class	Type of Check	Quantum of check		Ref Doc. & Acceptance STD	Format of record	AGENCY			Remarks
					M	B/C			M	B	C	
		g. Verification of components/ Rating/ Arrangements/ Location for easy accessibility and maintenance	Major	VISU	100%	-	BHEL Appd. Drg.	TR	P	-	-	
		h. Door Alignment	Major	VISU	100%	-	BHEL Appd. Drg.	TR	P	-	-	
C	Finished Product Inspection											
01	Routine Tests	a. Overall dimension including Sheet steel thickness	Major	MEAS	100%	10% or min. 1 panel	BHEL Appd. Drg.	TR	P	W	-	
		b. Paint Shade, Thickness & Peel Off Test	Critical	MEAS	Sample	At random places	BHEL Appd. Drg. IS 5/RAL	TR	P	W	-	
		c. Verification of Bill of Material for make, Type, Ratings	Major	VISU	100%	10% or min. 1 panel	BHEL Appd. Drg.	TR	P	W	-	
		d. Functional test for Door limit switch and illumination lamp	Major	ELEC	100%	100%	BHEL Appd. Drg.	TR	P	W	-	
		e. Terminal Arrangement & verification of terminal nos. for external connection	Major	VISU	100%	100%	BHEL Appd. Drg.	TR	P	W	-	
		f. Shrouding of power terminals/ Warning stickers	Major	VISU	100%	100%	BHEL Appd. Drg.	TR	P	W	-	
		g. Door Alignment/ Door Locking	Major	VISU	100%	100%	BHEL Appd. Drg.	TR	P	W	-	
		h. Provision of name plates and labels	Major	VISU	100%	100%	BHEL Appd. Drg.	TR	P	W	-	
		i. Layout of components	Critical	VISU	100%	100%	BHEL Appd. Drg.	TR	P	W	-	
		j. Functional check	Major	ELEC	100%	100%	BHEL Appd. Drg.	TR	P	W	-	
		k. IR-HV-IR Test	Major	MEAS	100%	100%	Mfr. Std.	TR	P	W	-	
02	Type Test	Degree of enclosure protection	Major	ENVI	One of design	One of design	BHEL Appd. Drg. IS/ IEC 60947	TC	P	V	-	

M- MANUFACTURER/ SUB-VENDOR; **B** - BHEL / TPI ; **C** - CUSTOMER / TPI
P - PERFORM; **W** - WITNESS **V** - VERIFICATION;



D.NOTES:

1.LEGENDS:

ELEC	:	Electrical	MEAS	:	Measurement
PHYS	:	Physical	TC	:	Test certificate
VISU	:	Visual	CHEM	:	Chemical
LGB	:	Log Book	IIR	:	Internal Inspection Report
TR	:	Test Report	Mfr. Std.	:	Manufacturer Standard

- The vendor shall arrange all testing facilities at their works. Tests for which facilities are not available are to be carried out at Govt. / NABL Accredited Lab at vendor cost.
- Through Log Book / any other documents available at the vendor's works, it shall be possible to correlate the finished products with raw material and in process stage checks / inspection carried out.
- All Measuring and Testing Instruments shall be periodically calibrated from recognized test houses & certificates made available during inspection for verification.

- Type test certificate shall not be earlier than 5 years from the date of Purchase enquiry.
- Vendor to give tentative inspection program in advance and confirm exact date two weeks in advance for arranging BHEL's inspection.
- Packing shall be as per the "PACKING PROCEDURE" indicated in the specification.
- BHEL Approved Drawings shall be used for Inspection.

C. REFERENCE STANDARDS:

(For Indicated Standards Refer the Latest Version)

IS 5	:	Colours for ready mixed paints and enamels
IS/IEC 60947	:	General rules for low voltage switchgear (Degrees of enclosure protection offered by enclosures)
IS 513	:	Cold Reduced Low Carbon Steel Sheet and Strip

SQP71R0.DOC