

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:310(EMC)

TECHNICAL SPECIFICATION

for

REMOTE & LOCAL CONTROL PANEL

(EMC COMPLIANT)

of

GRAVIMETERIC FEEDER CONTROL SYSTEM

REV.NO.	DATE	DESCRIPTION	PREPARED	REVIEWED	APPROVED
00	19-06-2008	Initial Release	Sd/-	Sd/-	Sd/-
01	05-01-2010	General revision	Sd/-	Sd/-	Sd/-
02	12-07-2013	BOM Updated	Sd/-	Sd/-	Sd/-
03	20-12-2014	General revision	Sd/-	Sd/-	Sd/-
04	23-05-2015	General revision	Sd/-	Sd/-	Sd/-
05	17-01-2017	General revision	Sd/-	Sd/-	Sd/-
06	18-04-2017	General revision	Sd/-	Sd/-	Sd/-
07	10-11-2017	General revision	Sd/-	Sd/-	Sd/-
08	21-06-2018	General revision	Sd/-	Sd/-	Sd/-
09	07-01-2020	BOM updated for TB type, Current isolator quantity & lamp test feature	Sd/- [SKS]	Sd/- [KV]	Sd/- [VMS]

Clause No.	REQUIREMENT
1.	<u>GENERAL REQUIREMENTS:</u>
	<p>a) This specification covers general requirements of Remote Control Panel (RCP) & Local control panel (LCP) for gravimetric feeder control system.</p> <p>b) Bill of Materials shall be as per annexure 1.</p>
2.	<u>SCOPE OF WORK:</u>
2.1	Manufacture and supply of EMC RCP & EMC LCP panel to BHEL (T) works, after inspection at vendor works.
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 shall be indicated by vendor in the main offer.</p>
3.	<u>CONTROL PANEL FABRICATION & CONSTRUCTION DETAILS:</u>
3.1	All Electrical & Electronic components are to be mounted and wired inside a weatherproof EMC cabinet as per schematic diagram and annexure BOM.
3.2	<p>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 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 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.</p>
3.3	The cabinet construction shall have adequate strength to support mounted components during shipment.

Clause No.	REQUIREMENT
3.4	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 conductive glue.
3.5	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 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.
3.8	Self-adhesive poly-carbonate nomenclature labels of thickness 175 microns are provided for both front & rear sides of cabinet. For inscription details and name plate specification, refer annexure-3 (Name plates with inscription to be fixed / supplied by vendor) & annexure-4 (BHELFEED Name Plate details) .
3.9	The terminals 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.
3.11	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) 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 control panel. Thickness of painting for exterior, interior shall be 75 microns.

Clause No.	REQUIREMENT
3.12	All the mating surfaces including cable gland plates etc. shall be made electrically conductive surface and conductive gaskets shall be fixed using conductive glue.
3.13	Power/control/signal cables used in the cabinet shall be as per annexure BOM.
3.14	<p>Vendor has to mount and wire the components supplied by BHEL 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 panel to BHEL works.</p> <p>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.</p>
3.15	All exposed conductive parts like HMI door frame 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.
3.17	One document pocket at suitable location shall be provided. Preferably at back side of the door.
3.18	A caution sticker of anodized aluminium for handling electronic cards shall be fixed at back side of the door at suitable location.
3.19	OGA, IGA & wiring Schematics will be furnished after PO placement.

Clause No.	REQUIREMENT
4.	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.
4.5	The cabinet enclosure shall be suitable for IP-32 degree of protection as per IEC 60529.
4.6	Removable screw type canopy shall be provided on top to prevent ingress dripping of water.
5.	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. Canopy shall be provided on top to prevent ingress dripping of water.
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.

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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 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.
	Bill of material with makes and model number of components, vendor OGA & internal arrangement drawings.
7.	<u>INSPECTION:</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:</u> As per Packing procedure QA:CI:STD:PR:02 /Rev 03
9.	<u>SPECIAL INSTRUCTION TO 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 system a complete one.

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Annexure-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

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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 230V (or) 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-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.	LTR	Auxiliary contactor suitable for 110V AC, 50Hz. coil voltage, with RC snubber across coil with 4NO+4NO contacts.	110V AC	C&S	TCA2DN40+TA1-DN40+LA9-D09980	2

Annexure-1

20.	LR1-LR8	Flush mounted pilot lights with integral led for \varnothing 30 mm	110VAC	SCHNEIDER	<p align="center">XB5FVG4C0 (ZB5AVG4 + ZB5FV043C0) (RED)</p> <p align="center">XB5FVG3C0 (ZB5AVG3 + ZB5FV033C0) (GREEN)</p> <p align="center">XB5FVG5C0 (ZB5AVG5 + ZB5FV053C0) (ORANGE)</p>	<p align="center">6</p> <p align="center">1</p> <p align="center">2</p>
21.	MRS	Flush mounted illuminated pushbuttons with flush push for \varnothing 30 mm (RED)	110VAC	SCHNEIDER	<p align="center">XB5FW34G5C0 (ZB5AW0G45 + ZB5FW343C0)</p>	1
22.	LTPBR	Flush mounted illuminated pushbuttons with flush push for \varnothing 30 mm (WHITE)	110VAC	SCHNEIDER	<p align="center">XB5FW31G5C0 (ZB5AW0G15 + ZB5FW313C0)</p>	1
23.	FAN	Cooling fan with accessories, suitable for 240VAC size 6 inch with wire mess	240V AC	REXNORD-RITTAL/RALLI-WOLF/KAITON/USHA	<p align="center">6 INCH (REC21725A2) AIR FLOW-CFM-173</p>	1
24.	LOUVER	EMI compatible louver with honey comb filters and perforated brass mesh screen at the bottom at top & bottom of single door		REPUTED		2
25.	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	<p align="center">KUT25(POWER)</p>	<p align="center">TBRP-15 (RED -3 NOS.) (YELLOW -3 NOS.) (BLUE -3 NOS.) (GREEN - 2 NOS.) (RED - 2 NOS.)</p>

Annexure-1

						(BLACK - 2 NOS.)	
26.	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	
27.	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.)	
28.	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)		WAGO		TBR1-1(5Nos.with short links 280-483)	
						280-641 (grey)	TBR1-2(5Nos.with short links 280-483)
							TBR1-3 to 50
						280-651 (Blue)	TBR2-45
					280-313 (Orange)	SEPARATOR-1	
					280-651(Blue)	TBR3-45	

Annexure-1

					280-654 (Orange)	TBR4-45
					280-355 (light grey)	SEPARATOR-1
					280-654 (Orange)	TBR5-45
					280-641(grey)	TBR0-1to5(5 Nos. with short links 280-483)
						TBR0-6to10(5 Nos. with short links 280-483)
29.		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
30.	DOS	Door operating limit switches for front & rear	5A	ESSEN/IEC		1
31.	LED	LED cubicle illumination light suitable for 240VAC with fixture		PHILIPS/ BAJAJ/CROMPTION GREAVES/ MYSORE LAMPS/ HMT		1
32.	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
33.		1.5 sq.mm, single core cable, 1100V grade multi stranded annealed tinned copper, FRLS PVC insulated (BIS approved vendors)colour-grey		BIS APPROVED VENDORS		As required

Annexure-1

		(control wiring), yellow (output contacts), green (earthing)				
34.		1.5sq.mm,two pair shielded cable {individually and collectively shielded}with multi stranded annealed tinned copper, FRLS PVC insulated[BIS approved vendors 1100V grade.		BIS APPROVED VENDORS		As required
35.		2.5sq.mm, single core cable, 1100V grade, multi-stranded annealed tinned copper, FRLS with PVC insulation Earthing (green)	---	BIS APPROVED VENDORS		As required
36.		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
37.		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
38.		Wire duct 60(W) x 80(H) mm & 25(W) x 25(H)mm		SALZER		As required
39.		Wire tie length 100mm material: PVC		MAYFAIR	MCT-100	As required
40.		Wire tie mount 25x25mm material: PVC		MAYFAIR	MCTA-25	As required

Annexure-1

41.		Wire dressing materials spiral, material-polyethylene internal diameter-8mm		MICROSIGN/ CONNECTWELL	EFC-8G	As required
42.		Ferrules		MICROSIGN/ MAYFAIR/OESER/ SMV		As required
43.		Lugs		DOWELL/3D/ CHETNA		As required
44.		“L” clamp with 4.5mm hole for terminal block suitable for NS35 TB		MANUFACTURER STANDARD		15
45.		Mounting clamp for double euro rack		MANUFACTURER STANDARD		2
46.		Mounting rail-NS35 x 7.5mm steel, yellow chromate, perforated		MANUFACTURER STANDARD		As required
47.		Mounting bush for CPU		MANUFACTURER STANDARD	INTERNAL THREAD DIA 5mm	2
48.		Disconnect switch mounting Bracket		MANUFACTURER STANDARD		1
49.		BHEL FEED name plate & name plates for panel mounted sub items as per annexure 3 & 4 in technical specification.		MANUFACTURER STANDARD		1 SET
50.	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
51.	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

Annexure-1

52.		Three point lock		DIRAK/RITTAL		1
53.		M6 x 20 bolt, nut and star washers m4 x 10 screws		REPUTED		20
54.		Loop powered current isolator		PHOENIX	PHOENIX Model No. MINI MCR-SL-1CP-I-I-2864419)	9
55.		Panel identification sticker		MANUFACTURER STANDARD	As per drawing BHELFEED:RCP:STICKER	1
56.		Shrouding plate with danger sticker for power TB & door limit switch		MANUFACTURER STANDARD		1
57.	EMI 240	EMI/RFI filter suitable for 240VAC,50Hz,10A		EMI SOLUTION	MF420,10A	2
58.	EMI 110	EMI/RFI filter suitable for 110VAC,50Hz,10A		EMI SOLUTION	MF420	1
59.	EMI 110	EMI/RFI filter suitable for 110VAC,50Hz,3A		EMI SOLUTION	MF420	1
60.	EMI415	EMI/RFI filter suitable for 415V AC,50Hz,32A along with 3 phase With surge suppressor		EMI SOLUTION	MF423-3-2D & RCS-3	1
61.		Brass earth bolts with nut at panel back	M8X25M M	REPUTED	---	2
62.		M12 or m16 lifting eye bolts with washer and unit	---	MANUFACTURER STANDARD	---	4

Annexure-1

63.	HMI WINDOW	SS window with toughened glass for HMI cut-out. Mating surface of window and panel is with conductive gasket		MANUFACTURER STANDARD		1
64.		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
65.		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
66.		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
67.		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
68.		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-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 as spare per PO.
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 + 2 as spare per PO.
3.	WSL	1pole ON/OFF rotary selector switch (feeder work light selector switch)	16A, 240VAC, 50HZ	SALZER	61002	1 + 2 as spare per PO.
4.	LL1-LL8	Flush mounted pilot lights with integral led for ø 30 mm	110VAC	SCHNEIDER	XB5FVG4C0 (ZB5AVG4 + ZB5FV043C0) (RED) XB5FVG3C0 (ZB5AVG3 + ZB5FV033C0) (GREEN) XB5FVG5C0 (ZB5AVG5 + ZB5FV053C0) (ORANGE)	3 2 3

Annexure-1

5.	LTL	Auxiliary contactor suitable for 110V AC, 50Hz. coil voltage, with RC snubber across coil with 4NO+4NO contacts.	110V AC	C&S	TCA2DN40+TA1-DN40+LA9-D09980	2
6.	LTPBL	Flush mounted illuminated pushbuttons with flush push for Ø 30 mm (WHITE)	110VAC	SCHNEIDER	XB5FW31G5C0 (ZB5AW0G15 + ZB5FW313C0)	1
7.	LED	LED cubicle illumination light suitable for 240VAC with fixture	240V AC	PHILIPS/ BAJAJ/CROMPTION GREAVES/ MYSORE LAMPS/ HMT	---	1
8.	DOS	Door operated switch	2A	ESSEN		1
9.	---	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
10.	TBL1	Terminal block		WAGO	280-641 (grey)	34
11.	TBL2	Terminal block		WAGO	280-651 (Blue)	30
12.	TBLU	Terminal block (with shrouding and		ELMEX/ESSEN DEINKI/ /PHOENIX/	KUT10	10

Annexure-1

		warning sticker)		WAGO/ CONNECT WELL		
13.	TBLP	Terminal block (with shrouding and warning sticker)		ELMEX/ESSEN DEINKI/ /PHOENIX/ WAGO/ CONNECT WELL	KUT25	12
14.	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
15.	---	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
16.	---	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
17.	---	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
18.	---	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
19.	---	Wire duct	45X45m m	SALZER	PVC	As required
20.	---	Wire dressing material spiral	---	CONNECTWELL	MATERIAL-POLYETHYLENE INTERNAL DIA. 8MM	As required

Annexure-1

21.	---	Wire tie	LENGTH - 100mm MATERIA L - PVC	MAYFAIR	MCT-100	As required
22.	---	Wire tie mount	25X25m m	MAYFAIR	MCTA-25	As required
23.	---	Ferrules	---	MICROSIGN/ MAYFAIR/ DESER	---	As required
24.	---	Lugs	---	DOWELL/ 3D/DIVYA JOTHI/ CHETNA / AINSONS	---	As required
25.	---	Brass earth bolts with nut at panel side	M8X25M M	REPUTED	---	2
26.	---	Cam lock with lever key	--	REPUTED	---	2
27.	---	Spring loaded fixing clamp (bolts, nuts, springs, washers)	---	MANUFACTURER STANDARD	---	6
28.	---	Mounting rail	---	PHOENIX	NS35 X 7.5 mm STEEL YELLOW CHROMATE	AS REQD.
29.	---	SS handle for door	---	MANUFACTURER STANDARD	---	1
30.	---	M12 or m16 lifting eye bolts with washer and unit	---	MANUFACTURER STANDARD	---	2
31.	---	Aluminium anodised name plates	---	MANUFACTURER STANDARD	AS PER ANNEXTURE	AS REQD.
32.		Neoprene /EPDM conductive gaskets		REPUTED		AS REQD.

Annexure-1

33.	---	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
34.	---	"L" clamp with 4.5mm hole for terminal block suitable for NS35 TB	---	MANUFACTURER STANDARD		AS REQD.
35.	---	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.

ANNEXURE-3

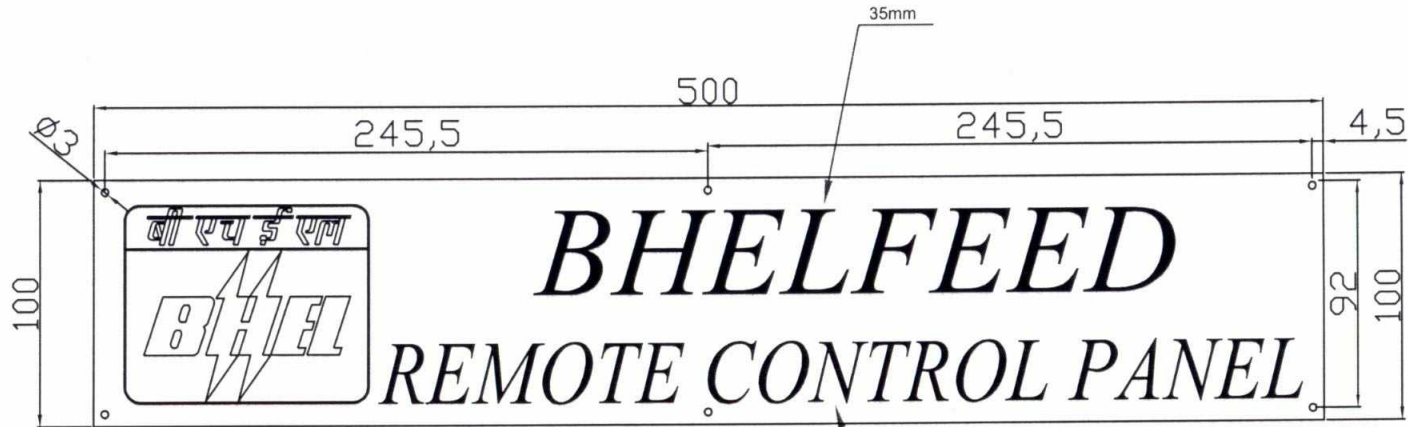
NAME PLATES WITH INSCRIPTION TO BE FIXED / SUPPLIED BY VEDOR

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

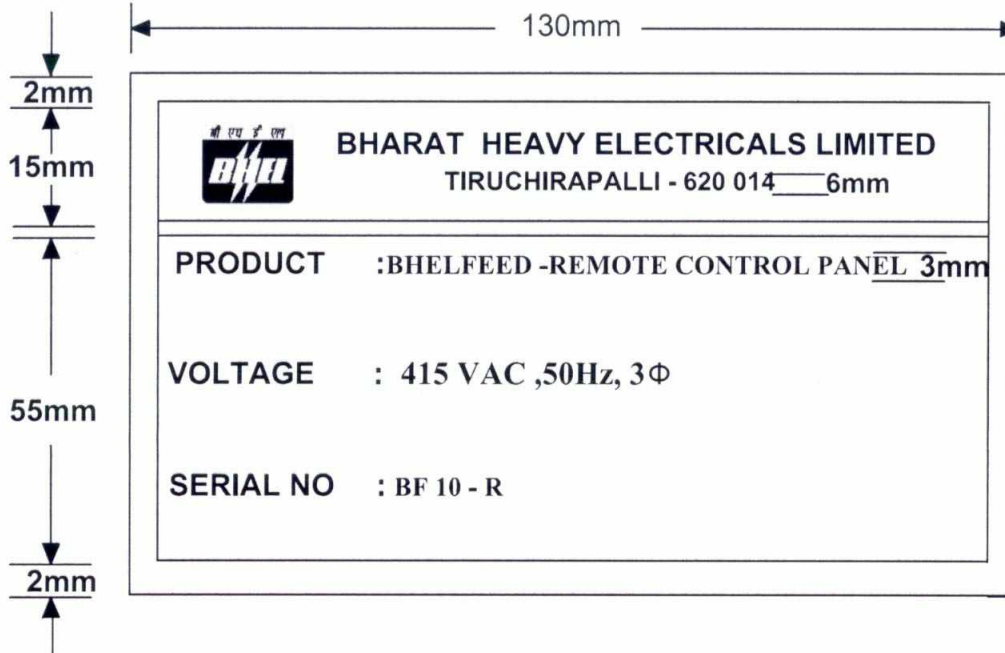
SLANTING ANGLE OF TEXT : 10°

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



COLOUR ; RED BACKGROUND WITH WHITE LETTERS

ANNEXURE - 4
BHELFEED NAME PLATE DETAILS

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	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 REMOTE CONTROL PANEL				BHELFEED:RCP:STICKER	00

ANNEXURE-3

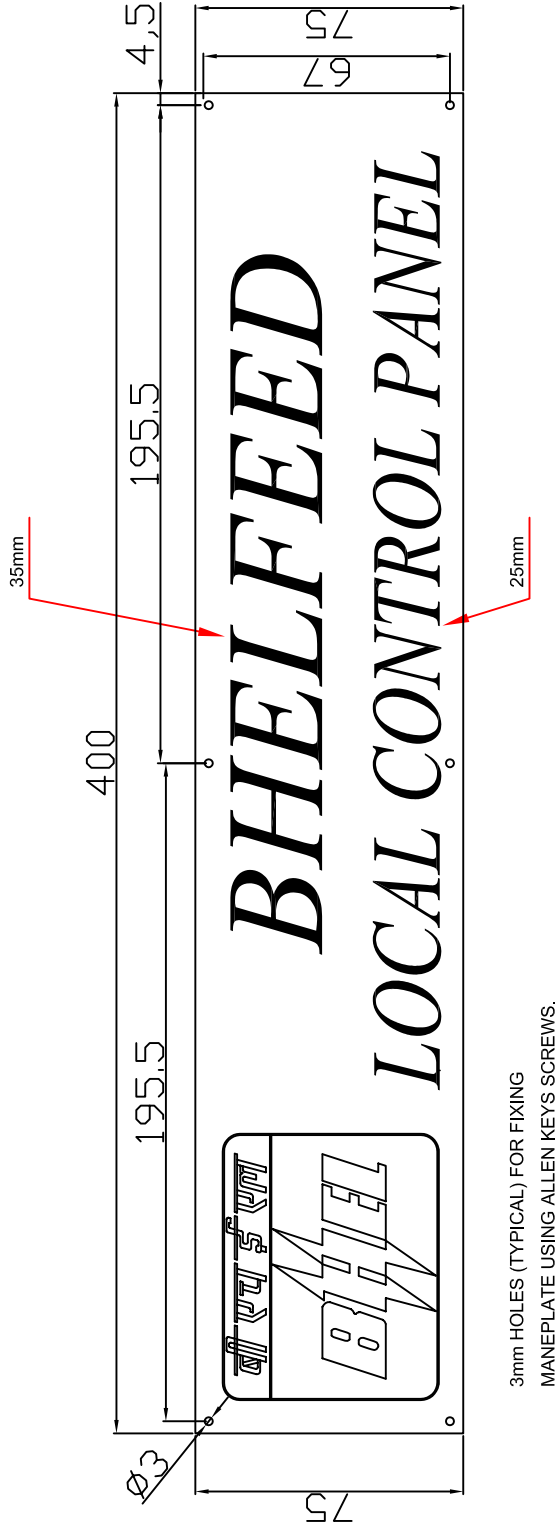
NAME PLATES WITH INSCRIPTION TO BE FIXED / SUPPLIED BY VEDOR

SL.	TAG / INSCRIPTION	DESCRIPTION
1	FRSL	REV-OFF-FWD SELECTOR
2	MSL	MODE SELECTOR
3	WLS	FEEDER WORKLIGHT SWITCH
4	PS1	POWER SOCKET
5	ES	EARTH STRIP
6	TBL1, TBL2, TBLU & TBLP	TERMINAL BLOCKS
7	LL1	LOCAL
8	LL2	REMOTE
9	LL3	FEEDER RUN FORWARD
10	LL4	FEEDER RUN REVERSE
11	LL5	FEEDER OFF
12	LL6	CLEANOUT CONVEYOR RUN
13	LL7	CLEANOUT CONVEYOR OFF
14	LL8	CALIBRATING

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.

ANNEXURE - 4
BHELFEED NAME PLATE DETAILS



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**