



Bharat Heavy Electricals Limited

(A Government of India Enterprise)
High Pressure Boiler Plant
Tiruchirappalli - 620 014

MATERIALS MANAGEMENT

4th Floor, 24 Bldg. HPBP BHEL, Trichy-620014

Phone: 0431 - 257 8109, 7446; E-mail: kevin@bhel.in, mohann@bhel.in; www.bhel.com

NOTICE INVITING e-TENDER

Ref: Bid No.: GEM/2021/B/1138737

24.03.2021

Subject: Two-part e-Tender inviting techno-commercial and price bid for supply of ERV CONTROLLER BOX for Coal Fired Thermal Power Plant / Bhusawal Unit-6 (660MW) project.

General Instructions

- The tender documents shall be deemed to form an integral part of the purchase order.
- Tender can be cancelled at any stage due to unavoidable circumstances.
- Bidders are advised not to wait till the last minutes w.r.t tender closing time to submit their offer to avoid complications related with internet connectivity / network problem/ power failure etc.
- Bidders are advised take due care while quoting the technical and price bid. Bidders, those who tampers with tendering procedure affecting ordering process or misusing the technical information of the tender document or withdrawing their offer after price bid opening, will be penalized as per BHEL guidelines on suspension of business dealings with suppliers/ contractors. Abridged version of the guideline is available in www.bhel.com.
- It is advised that all the documents to be submitted are kept scanned or converted to PDF format in a separate folder on your computer before starting online submission.
- Prequalification of vendors will be as per the PQR document. It is mandatory to submit the PQR related documents; else the offer is liable, not be evaluated.
- DISCLAIMER CLAUSE: Neither Bharat Heavy Electricals Ltd nor the service provider for e-tendering is responsible for any failure of submission of bids, due to failure of internet or other connectivity problems or reasons thereof.
- Deviations, if any, may be indicated in the Sub-Delivery Enquiry Deviation Format.
- Document Submission after PO: Complete set of valid Documents as per BHEL format viz., Datasheet, GA drawing and QAP / RQP / VQP are to be submitted within 15 days from the date of receipt of PO (e-mail copy). If there is a delay in submission of valid documents within 15 days, the delay will be accounted for the calculation of LD.
- Inspection & testing requirements: Inspection and testing requirements are to be carried out as per the specification and BHEL/customer approved QAP and all test certificates are to be submitted in complete set as indicated in our specification /QAP. In case of Vendor QP the same shall be submitted for approval along with the offer.
- Customer approval of Bidder is applicable. Techno-commercially qualified Bidders will be asked to submit the credentials for customer approval. The Part-2 bids (Price bid) of the Bidder will be opened, subject to fulfilment of Pre-Qualification Requirement, successful techno-commercial (Part-1 bid) evaluation and Customer acceptance, based on the credentials.
- PAYMENT TERM: 100% payment will be released within ten (10) days of issue of consignee receipt-cum-acceptance certificate (CRAC) and on-line submission of bills unless otherwise specified in STC / ATC.

- LIQUIDATED DAMAGES: If the Seller/Service Provider fails to deliver any or all of the Goods/Services within the original/re-fixed delivery period(s) specified in the contract, the Buyer will be entitled to deduct/recover the Liquidated Damages for the delay, unless covered under Force Majeure conditions aforesaid, @ 0.5% of the contract value of delayed quantity per week or part of the week of delayed period as pre-estimated damages not exceeding 10% of the contract value of delayed quantity without any controversy/dispute of any sort whatsoever.
- Any pre-bid query, kindly contact: Mr. Kevin Ark Kumar, Manager/Materials Management/BOI Tel: 0431-2578109, email: kevin@bhel.in; Mr. N Mohan, Asst./Engineer/Materials Management/BOI Tel: 0431-2577446, email: mohann@bhel.in and get your queries cleared before submitting the offer in EPS. Rates once quoted in the BoQ Excel format/online in the E-tendering Portal cannot be changed after due date and shall remain final

For **Bharat Heavy Electricals Limited**

Kevin Ark Kumar

Manager / Materials Management

Fourth floor, 24 Building

B.H.E.L., Tiruchirappalli – 620 014, Tamil Nadu

Phone: 0431-2578109 / Email: kevin@bhel.in

ERV CONTROLLER BOX FOR THERMAL POWER PLANT

Pre - Qualification requirements

- a) Vendor should have the capability for manufacturing, supply & testing of Miniature Electrical Control Boxes, Starter boxes, wired junction boxes made of Sheet Steel materials, similar to the requirement as per BHEL's enquiry (Specification, Drawings and Quality plan) for power plant/industrial applications.

Vendor to confirm.

- b) Vendor should have executed orders and supplied items as indicated in point a within last 5 years from the date of this enquiry. (Experience from BHEL to be supported by executed PO copies; Experience other than BHEL to be supported by executed PO copies and completion certificate issued by the organization).

Vendor to submit PO copies and / or Completion certificate.

- c) Vendor to furnish the details of manufacturing & testing facilities, machineries available with them for reference.

Vendor to submit List of manufacturing & testing facilities, machineries

PART-1 BID

Sl No.	MATLCD	DESCRIPTION	UNIT	QTY	QUOTED / NOT QUOTED
10	L172719757703001	Electromatic Relief Valve (ERV) controller Unit, pressure switch and accessories, for Super Heater application as per the technical specification TDC:TCI:250, Rev. 00. Rated voltage of the system shall be 220V DC. Vendor to select the pressure switch model based on the following values. Set Points - 266.6 KG/SQ.CM. (OPEN), 258.6 KG/SQ.CM. (CLOSE). Maximum Operating Pressure - 300 KG/SQ.CM. Calibration test certificates and Tag plates shall be supplied along with the pressure switches. The Paint shade of the controller box shall be External : RAL 7032 and Interior : Brilliant Glossy White. Inspection & Testing shall be as per the Quality Plan Ref.: QA:CI:STD:QP:60,Rev. 01 Packing Procedure Ref.: QA:CI:STD:PR:02, Rev. 03 Following details shall be inscribed on the name plate of ERV controller box. i) VALVE TAG NO :LBA11AA201(SET PRESSURE 266.6 KG/SQCM(OPEN) & 258.6 KG/SQCM(CLOSE) AND 3% BLOW DOWN). ii) VALVE TAG NO :LBA12AA201(SET PRESSURE 266.6 KG/SQCM(OPEN) & 258.6 KG/SQCM(CLOSE) AND 3% BLOW DOWN).	NO	4.00	
20	L172719757703002	Electromatic Relief Valve (ERV) controller Unit, pressure switch and accessories, for ReHeater application as per the technical specification TDC:TCI:250, Rev. 00. Rated voltage of the system shall be 220V DC. Vendor to select the pressure switch model based on the following values. Set Points - 60.2 KG/SQ.CM. (OPEN), 58.4 KG/SQ.CM. (CLOSE) Maximum Operating Pressure - 64.3 KG/SQ.CM. Calibration test certificates and Tag plates shall be supplied along with the pressure switches. The Paint shade of the controller box shall be External : RAL 7032 and Interior : Brilliant Glossy White. Inspection & Testing shall be as per the Quality Plan Ref.:QA:CI:STD:QP:60,Rev. 01 Packing Procedure Ref.: QA:CI:STD:PR:02, Rev. 03 Following details shall be inscribed on the name plate of ERV controller box. i) VALVE TAG NO :LBB11AA201(SET PRESSURE 60.2 KG/SQCM(OPEN) & 58.4 KG/SQCM(CLOSE) AND 3% BLOW DOWN). ii) VALVE TAG NO :LBB12AA202(SET PRESSURE 60.2 KG/SQCM(OPEN) & 58.4 KG/SQCM(CLOSE) AND 3% BLOW DOWN).	NO	4.00	

Note: The tender is floated as a single package. Partial offer will be rejected. Do not mention the prices here.

		PURCHASE / MM / BOI ENQUIRY DEVIATION	
429-024		PAGE 1 OF 1	
SCHEDULE OF DEVIATION TO BOI ENQUIRY NO:		GEM/2021/B/1138737	DATE 24.03.2021
DESCRIPTION	ELECTROMATIC RELIEF VALVE (ERV) CONTROLLER UNIT FOR COAL FIRED THERMAL POWER PLANT		
SPECIFICATION	TDC:TCI:250, Rev. 00.		
QUALITY PLAN	QA:CI:STD:QP:60,Rev. 01 & QA:CI:STD:QP:34,Rev. 04		
PACKING PROCEDURE	QA:CI:STD:PR:02 REV 03		
DRAWINGS	Drg No. 3-97-577-09565 R04 Drg No. 3-97-577-09562 R07 Drg No. 4-97-577-10225 R02 Drg No. 4-97-577-10226 R03		
DOCUMENT REFERENCE	BHEL ENQ. CALLED FOR	FIRM'S ALTERNATIVE OFFER	
CERTIFIED THAT OTHER THAN THE ABOVE DEVIATIONS, WE ARE ACCEPTING ALL THE OTHER SPECIFICATIONS AND REQUIREMENTS IN FULL TO YOUR ENQUIRY.			
STATION:			
DATE:		SIGNATURE OF FIRM'S REPRESENTATIVE	FIRM SEAL
NOTE 1. Deviations should be taken only in the extreme case. 2. If necessary, use additional sheets with page control number.			

/ On Bidder's office letter pad /

Self-Declaration

Enquiry No.	
Enquiry Date	

In line with Government public procurement order Number P-45021/2/2017-B.E-II dated 15.06.2017, and further modified order dt.04.06.2020 issued by DPIIT,

I / We hereby declare that I / We are a "Local Supplier" meeting the requirement of minimum local content (.....%) defined in the above government notification for the goods against above mentioned enquiry Number.

Details of location at which local value addition will be made is as follows:

Door No.	
Street / Address 1	
Street / Address 2	
District	
State	
Country	
PIN Code	

We also understand that the false declarations will be considered as breach of Integrity and liable for action.

For Company Name:

Seal:

Signature:

Date:

Place:

(Please fill all the yellow color field)

TECHNICAL DETAILS

MATL CODE:

L172719757703001

ITEM NAME:

ELECTROMATIC RELIEF VALVE (ERV) CONTROLLER UNIT FOR COAL FIRED THERMAL POWER PLANT

ITEM DESCRIPTION:

Electromatic Relief Valve (ERV) controller Unit, pressure switch and accessories, for Super Heater application as per the technical specification TDC:TCI:250, Rev. 00.

Rated voltage of the system shall be 220V DC.

Vendor to select the pressure switch model based on the following values. Set Points - 266.6 KG/SQ.CM. (OPEN), 258.6 KG/SQ.CM. (CLOSE). Maximum Operating Pressure - 300 KG/SQ.CM. Calibration test certificates and Tag plates shall be supplied along with the pressure switches. The Paint shade of the controller box shall be External : RAL 7032 and Interior : Brilliant Glossy White.

Inspection & Testing shall be as per the Quality Plan Ref.: QA:CI:STD:QP:60,Rev. 01

Packing Procedure Ref.: QA:CI:STD:PR:02,Rev. 03

Following details shall be inscribed on the name plate of ERV controller box.

- i) VALVE TAG NO: LBA11AA201(SET PRESSURE 266.6 KG/SQCM(OPEN) & 258.6 KG/SQCM (CLOSE) AND 3% BLOW DOWN).
- ii) VALVE TAG NO: LBA12AA201(SET PRESSURE 266.6 KG/SQCM(OPEN) & 258.6 KG/SQCM (CLOSE) AND 3% BLOW DOWN).

Deviations, if any, may be indicated in the Sub-Delivery Enquiry Deviation Format.

Bharat Heavy Electricals Limited
High Pressure Boiler Plant, Tiruchirappalli-620 014.

TECHNICAL DELIVERY CONDITIONS
FOR SUB - DELIVERY COMPONENTS OF
CONTROLS AND INSTRUMENTATION

Specification No. TCI: 250

Page 01 of 05

Technical specification
Of
ELECTRO MATIC RELIEF VALVE (ERV)
CONTROL UNIT & PRESSURE SWITCH

Rev. No.	Date	Description	Prepared & Reviewed	Approved
00	09-03-2021	Initial Release		

Sl. No	Technical Description/Requirement	
1.	General	This technical specification covers the requirements of the Electro - Matic relief valve Controller box, for Super Heater/Re Heater Steam relief applications of thermal power boilers.
2.	SITE CONDITIONS: - Altitude above Sea Level Atmosphere Relative humidity Operating temperature	500 Meters Tropical, Dusty, Windy & Heavily polluted atmosphere 100 % 50 degree Celsius
3.	Input Documents to be followed	• Operational Logic & Wiring Drawing: As per the drawing 3-97-577-09565, Rev. 04 • General Arrangement as per the drawing 3-97-577-09562, Rev. 07 • Name Plate & Instruction Plate details: As per the drawing 4-97-577-10225, Rev. 02 & 4-97-577-10226, Rev. 03
4.	Construction Details	• ERV Controller Box - Material of construction: CRCA Sheet Steel, Grade D as per IS 513 of thickness - 2 mm. • Component Mounting plate and Cable gland plate – Material of Construction: Galvanized, CRCA Sheet Steel, Grade D of thickness – 3 mm, Galvanization thickness - 15 to 25 microns. • The mounting plate shall be mounted on the studs (4 nos.). The studs shall be welded in the inside of the box. • Suitable Slot shall be provided in the cable gland plate matching the pressure switch dimensions for tight fit. • Neoprene Gasket of thickness 3 mm shall be provided for the Gland plate and Door.
5.	Enclosure protection	Protection Class : IP 65
6.	Electrical and Pneumatic Entries	2 nos. of ¾" and 1 no. of 1" hole shall be provided in the Gland plate for the entry of Cables and Impulse line for pressure switch. Dummy plugs shall be provided on the holes to avoid water entry.

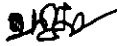
Sl. No	Technical Description/Requirement	
7.	Door & Locking Arrangement	• Continuous Hinged Door suitable for 180° opening shall be fitted on left side of the box. Door shall also be earthed by using flexible Copper Braid. • Rider Clamp arrangement shall be provided for locking. • Padlocking arrangement with 1 no. lock and 3 nos. key shall be provided.
8.	BOM & Accessories	All the accessories shall be rated for either 220 V DC or 110 V DC, as per the voltage (project specific) indicated in the purchase enquiry. Following are the BOM to be followed. 1) Dual Set point, Bourdon tube pressure switch of electrical rating 0.25 A, 220 V DC. Pressure switch model shall be selected, as per the Open & Close set points, Maximum operating pressure furnished in the enquiry. Test/Calibration certificates and tag plates shall be supplied. Make: M/s. Barksdale, GmbH. Set point shall be indicated on the pressure switch in kg/cm². 2) 2 pole, DC Coil, Contactor of current rating 32 A (Make SIEMENS, Model: 3TC-44-170A or equivalent model from any of the makes as indicated in QA:CI: STD: QP:34). 2 nos. of power contacts, 2 NO + 2 NC Auxiliary Contacts shall be provided. 3) 1 No. of Red colored, LED type indicating lamp. 4) Terminal blocks suitable for current rating 32 A. 5) 2 nos. of Metal Oxide Varistor. For items 3 and 4, any of the Makes as indicated in the document QA:CI: STD: QP: 34 shall be followed.
9.	Mounting & Earthing	• The box shall be provided with 4 Nos. of Mounting brackets with 50 mm wide, 6 mm thick plates. Galvanized Mounting bolts (M10 x 40 mm), Spring washers and Nuts shall be supplied.

Sl. No	Technical Description/Requirement	
		• Earthing Bolts – MS with Chromium plate (Plating thickness – 10 to 15 microns).
10.	Wiring & Ferruling	• All internal wiring shall be done by us using 2.5 Sq. mm. stranded, single core copper PVC insulated wire. • Suitable type crimping lugs, shall be used for wiring. • Yellow ferrule with black lettering shall be used Over the insulation for wire identification.
11.	Painting	• Powder coating shall be done for both exterior and interior surface of the controller box. Paint shade will be furnished in the enquiry. • Exterior: Semi-glossy finish, minimum thickness - 60-70 microns. • Interior: Glossy finish, minimum thickness - 50 – 60 microns.
12.	Name plate & Instruction Plate Drawings	• Name plate as per the drawing 4-97-577-10225, Rev. 02 shall be provided at the front side of the box. • Instruction Plate as per the drawing 4-97-577- 10226, Rev. 03 shall be fixed at the backside of the door.
13.	Wiring	All the electrical accessories and the pressure switch shall be wired in the ERV control box as per the wiring drawing. Pressure switch will be supplied by BHEL as a free supply to the vendor.
14.	Inspection & Testing	a) Inspection and testing of the ERV controller box will be as per the quality plan QA:CI: STD: QP:60 (latest revision). b) For each pressure switch, vendor has to submit the Calibration test certificates from the OEM for BHEL's verification.
15.	Packing procedure	Packing procedure QA:CI: STD:PR:02 (Latest Revision) shall be followed.
16.	Documents to be submitted during the offer	a) The Sub-Delivery Enquiry Deviation format shall be filled in with the details of BHEL's enquiry number, project name, technical specification of the ERV, General Arrangement, wiring drawing, Name Plate

Sl. No	Technical Description/Requirement	
		drawing, instruction plate drawing, Quality plan & Packing procedure. b) Conforming to all the requirements, vendor to indicate "No deviation" in the sub-delivery enquiry deviation format. c) Vendor to note that Any deviation/clarification/alternate offer to the BHEL's enquiry requirements, shall only be indicated in the Sub-Delivery Enquiry Deviation form. Deviations indicated elsewhere in the offer will not be considered.
17.	Documents to be submitted on placement of purchase order	a) General arrangement drawing, wiring drawing, terminal block drawing. b) Bill of material with make, model no., rating and quantity of components. c) Operation & Maintenance manuals containing the catalogues of various accessories.

**BHARAT HEAVY ELECTRICALS LIMITED / TIRUCHIRAPPALLI
CONTROLS AND INSTRUMENTATION/QA/FB**

**STANDARD QUALITY PLAN
FOR
ELECTRICAL PANEL ACCESSORIES**

REV	DATE	PREPARED	REVIEWED	APPROVED		REVISION HISTORY
				ENGG.	QUALITY	
00	16.06.97	-Sd-	-Sd-	-Sd-	-Sd-	Initial release
01	22.02.99	-Sd-	-Sd-	-Sd-	-Sd-	New Vendors Added
02	21.03.02	-Sd-	-Sd-	-Sd-	-Sd-	Dept. name changed & General revision-Based on Engg. discussion.
03	08.01.04	-Sd-	-Sd-	-Sd-	-Sd-	Revised to include the comments /Feedback of internal discussion
04	07.12.07	RM.VAIRAVAN 	N.SRIDHAR 	L.A.E.Fernandez 	S.SOMASUNDARAM 	Vendor list updated. Inputs considered are: • TCE approved List for Jojobera • NTPC approved list for BAP(Sipat). • NTPC approved list for Korba-III. • NTPC approved list for Barh STPP. • Feedbacks obtained during discussion

SL.NO	PRODUCT	APPROVED VENDORS
01	Air Circuit Breaker.	L&T / GEPC / SIEMENS / CONTROLS & SWITCHGEAR Co.LTD / SCHNEIDER-MERLIN GERIN ENERPACT
02	Miniature circuit breaker (MCB).	MDS / CROMPTON GREAVES / INDO - ASIAN / IM / LUPUS / SCHNEIDER ELECTRIC / SIEMENS / L&T – HAGER /INDOKOPP/COOPER BUSMANN /STANDARD
03	Moulded case circuit breaker (MCCB).	L&T / GEPC./ CROMPTON GREAVES / BCH / ABB / SIEMENS / CONTROLS & SWITCHGEAR Co.LTD/ SCHNEIDER ELECTRIC / ANDREW YULE /AREVA
04	Power contactors – AC.	L&T / SIEMENS / CONTROLS & SWITCHGEAR CONTACTORS LTD (TC) / SPRECHER & SCHUH / ANDREW YULE / BCH / GEPC / CROMPTON GREAVES / SCHNEIDER ELECTRIC
05	Power & Auxiliary Contactors – DC.	GEPC / BCH / CONTROLS & SWITCHGEAR CONTACTORS LTD(TC) / SIEMENS / SPRECHER & SCHUH / L&T / SCHNEIDER ELECTRIC/ANDREW YULE.
06	Auxiliary Contactors – AC.	L&T / SIEMENS / ABB / BCH / CONTROLS & SWITCHGEAR CONTACTORS LTD(TC) / CROMPTON GREAVES / GEPC/ SPRECHUR & SCHUH / SCHNEIDER ELECTRIC / ANDREW YULE.
07	Indicating lamp.	SIEMENS / VAISHNAO / GEPC / BCH / L&T - ESBEE / CANDS / TEKNIC / CONCORD / ESSEN / CONTROLS & SWITCHGEAR CONTACTORS LTD(TC)-RASS Series
08	Push Button.	SIEMENS / BCH / TEKNIC / CANDS / L&T - ESBEE / VAISHNAO / GEPC / CONTROLS & SWITCHGEAR CONTACTORS LTD(TC)-RASS Series / SCHNEIDER ELECTRIC/CONCORD.
09	Illuminated Push button	PARAMOUNT / BCH
10	Indicating Instruments.	AE / IMP / MECO / L&T-RISHAB / SIETEX / MASSIBUS/ALSTOM.
11	Switches (Power / Control).	KAYCEE / SIEMENS / L&T / SALZAR/ GEPC / CONTROLS & SWITCHGEAR Co. LTD / SCHNEIDER ELECTRIC / SWITRON (For Control switch only)

SL.NO	PRODUCT	APPROVED VENDORS
12	Thermal Overload Relays.	L&T / SIEMENS / CONTROLS & SWITCHGEAR CONTACTORS LTD (TC) / BCH / GEPC / SPRECHER & SCHUH / CROMPTON GREAVES / SCHNEIDER ELECTRIC/ ANDREW YULE.
13	Protective Relays(Electromechanical).	AREVA / EASUN REYROLLE / ABB / SEG & CONTROLS / SIEMENS.
14	Protective Relays(Microprocessor).	AREVA / ABB / L&T
14	Timers - Electronic.	SIEMENS / ABB / CONTROLS & SWITCHGEAR CONTACTORS LTD((TC) / GEPC / OMRON / SPRECHER & SCHUH / SELECTRON. / BCH
15	Timers - Electro – Pneumatic.	BCH / CONTROLS & SWITCHGEAR CONTACTORS LTD(TC)/ SPRECHER & SCHUH
16	Timers - Synchronous.	L&T - G I C.
17	Annunciators.	IIC / L&T / PROCON / ADVANI OERLIKON / OMRON / PIRI / PECON / SIEMENS/MINILEC
18	Current & Potential transformers.	AE / KAPPA / INDCOIL / PRAYOG / CONTROLS & SWITCHGEAR CONTACTORS LTD(TC) / SIEMENS / APPOLO / PRAGATI / PRECISE / JYOTI / SILKAANS/G&M(For PT only) .
19	Control supply transformers.	AE / KAPPA / INDCOIL / SOUTHERN ELECTRIC / SIEMENS / APPOLO / CONTROLS & SWITCHGEAR / PRECISE / LOGICSTAT/PRAGATI/PRAYOG
20	Terminal block - screw type (terminals & fasteners shall be brass with nickel cadmium plated).	ESSEN / ELMEX (THERMO –PLASTIC TYPE) / TOSHA / ASIA ELECTRIC (IEC MAKE) / CONNECT WELL / TECHNOPLAST / VEECON / PHOENIX/WAGO
21	Terminal Block – Cage Clamp type.	WAGO / PHOENIX / ELMEX
22	Fuse Carriers.	SIEMENS / L&T / S&S / CROMPTON GREAVES / CONTROLS & SWITCHGEAR Co. LTD / GEPC / COOPER BUSSMAN.
23	Fuse Links/Neutral Links.	SIEMENS / L&T / CROMPTON GREAVES / CONTROLS & SWITCHGEAR Co.LTD/ GEPC / CANDS / COOPER BUSSMAN.

SL.NO	PRODUCT	APPROVED VENDORS
24	Panel Wires	BIS APPROVED
25	Cable Glands – (weather proof).	COMET / POWER ENGG / SUNIL & CO / SMI / BRACCO / ARUP ENGG. WORKS / QPIE / GLANDMECH / CONTROLS & SWITCHGEAR Co. LTD / QUALITY PRECISION
26	Ferrules	MICROSIGN/MAY FAIR/OESER
27	Lugs.	DOWELL / 3D / DIVYA JYOTHI / CHETNA / JAINSONS
28	Space Heater.	SOPHIA / CANDS / CROMPTON GREAVES / PYRO SYSTEM / VELCO / CONTROLS & SWITCHGEAR Co.LTD.
29	15/5 A Power Supply Switch With Plug & Socket (Metal Clad Type With Spring Loaded Cap).	CROMPTON GREAVES/ AJMERA / BCH / BEST & CROMPTON./GEWIS INDIA
30	Cubicle Illumination Lamp.	PHILIPS / BAJAJ / CROMPTON GREAVES / MYSORE LAMPS / HMT.
31	Door Switch.	ESSEN / IEC.
32	Cooling Fan.	RALLI-WOLF / KHAITAN / USHA.
33	Interposing Relay (Low Burden).	JYOTHI / OMRON / ABIL / ABB / SIEMENS / GEPC / OEN / L&T/OWN MAKES OF APPROVED PLC VENDORS.
34	Cable Glands - Flame Proof.	BALIGA / SUDHIR / CEAG / PROMPT / COMET
35	Indicating Lamp – LED.	SRISHYLA / TEKNIC / PARAMOUNT / BINAY / KWALITY / HEWLETT PACKARD
36	Motor Protection Circuit Breaker	L&T / GEPC / SIEMENS / SCHNEIDER ELELCTRIC / SPRECHER & SCHUH .
37	Cable Dressing Material.	MICROSIGN.
38	Wire Duct.	SALZAR.

SL.NO	PRODUCT	APPROVED VENDORS
39	Electrical Transducer	ABB / AE / SOUTHERN TRANSDUCER/ELSTER/RISHAB.
40	Thermostat	APT / TEMPTROL / VIKAS ELECTRIC / AI / RENUTROL / ANCO
41`	Trivector Meter	ALSTOM / BHEL/AREVA/IMP



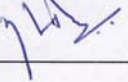
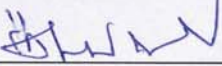
BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHIRAPPALLI - 620014

QA:CI:STD:QP:60
Rev: 01 Page: 1 of 3

CONTROLS AND INSTRUMENTATION/QA/FB

STANDARD QUALITY PLAN FOR

ERV CONTROLLER BOX

REV	DATE	PREPARED	REVIEWED	APPROVED	REVISION HISTORY
00	10/02/2004	Sd/-	Sd/-	Sd/-	Initial release.
01	23/06/2009	RM.VAIRAVAN 	N.SRIDHAR 	S.SOMASUNDARAM 	QP revised to modify with the practice followed in NTPC projects and inspection feedback.

	BHARAT HEAVY ELECTRICALS LIMITED TIRUCHIRAPPALLI - 620014	QUALITY PLAN FOR ERV CONTROLLER BOX	QA:CI:STD:QP:60 Rev: 01 Page: 2 of 3
--	--	--	--

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	FINISHED PRODUCT INSPECTION											
01	Routine tests	a. Visual (Name plate Details)	PHYS	Major	100%	30%	PO Spec.	TR	P	W	-	
		b. Dimension, including sheet steel thickness	MEAS	Major	100%	30%	PO Spec, Drg.	TR	P	W	-	
		c. Painting: Shade, thickness, finish	VISU	Major	100%	30%	PO Spec, Drg. IS 5, RAL	TR	P	W	-	
		d. Make, rating of components mounted.	PHYS	Major	100%	30%	PO Spec, Drg.	TR	P	W	-	
		e. Wiring: Ferruling & crimping	ELEC	Major	100%	30%	PO Spec, Drg.	TR	P	W	-	
		f. Availability of pressure switch, type and number of contacts	PHYS	Major	100%	30%	PO Spec, Drg.	TR	P	W	-	
		g. Functional check for pressure switch actuation for both increasing and decreasing pressure settings	ELEC	Critical	100%	100%	PO Spec, Drg.	TR	P	V	-	Verification of TC of pressure switch
		h. Insulation resistance test both before and after HV test	ELEC	Major	100%	100%	PO Spec, Drg.	TR	P	W	-	
		i. High voltage test for wiring at 1.5KV for 1 minute	ELEC	Major	100%	100%	PO Spec, Drg.	TR	P	W	-	
		j. Verification of accessories as per PO	PHYS	Major	100%	30%	PO Spec, Drg.	TR	P	W	-	
02	Type test											
		a. Enclosure Protection test for box	Major	ENVI	One of sample	One of sample	PO Spec. IS 13947	TC	V	V	-	

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



B.NOTES:

1.LEGENDS:

MECH	:	Mechanical	MEAS	:	Measurement
ELEC	:	Electrical	ENVI	:	Environmental
TR	:	Test Report	TC	:	Test certificate
VISU	:	Visual			

- The vendor shall arrange all testing facilities at their works. Tests for which facilities are not available are to be carried out at recognized National Test Houses like ETDC/CIL/NPL/ERTL etc., 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.

- Test certificates for routine type tests are to be furnished by the vendor.
- 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.

C. REFERENCE STANDARDS:

(For Indicated Standards Refer the Latest Version)

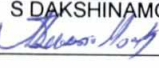
IS5	:	Colours for ready mixed paints and enamels
IS13947	:	General rules for low voltage switchgear (Degrees of enclosure protection offered by enclosures)

SQP60R1.DOC

**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.

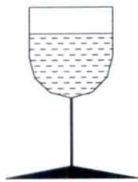
7.0 **GENERAL**

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

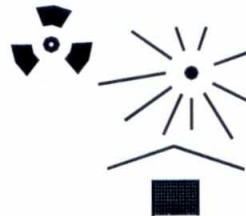
ANNEXURE - 1

TO

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



FRAGILE, HANDLE WITH CARE



PROTECT FROM HEAT AND RADIOACTIVE SOURCES



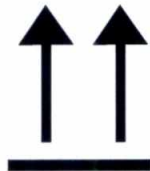
USE NO HOOKS

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



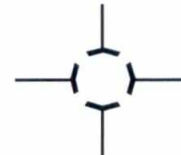
KEEP DRY

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



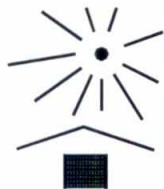
THIS WAY UP

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



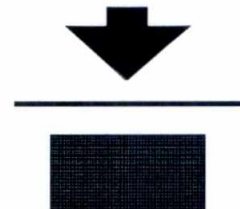
CENTRE OF GRAVITY

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

TECHNICAL DETAILS

MATL CODE:

L172719757703002

ITEM NAME:

ELECTROMATIC RELIEF VALVE (ERV) CONTROLLER UNIT FOR COAL FIRED THERMAL POWER PLANT

ITEM DESCRIPTION:

Electromatic Relief Valve (ERV) controller Unit, pressure switch and accessories, for ReHeater application as per the technical specification TDC:TCI:250, Rev. 00.

Rated voltage of the system shall be 220V DC.

Vendor to select the pressure switch model based on the following values. Set Points - 60.2 KG/SQ.CM. (OPEN), 58.4 KG/SQ.CM. (CLOSE) Maximum Operating Pressure - 64.3 KG/SQ.CM.

Calibration test certificates and Tag plates shall be supplied along with the pressure switches. The Paint shade of the controller box shall be External : RAL 7032 and Interior : Brilliant Glossy White.

Inspection & Testing shall be as per the Quality Plan Ref.:QA:CI:STD:QP:60,Rev. 01

Packing Procedure Ref.: QA:CI:STD:PR:02,Rev. 03

Following details shall be inscribed on the name plate of ERV controller box.

- i) VALVE TAG NO :LBB11AA201(SET PRESSURE 60.2 KG/SQCM(OPEN) & 58.4 KG/SQCM(CLOSE) AND 3% BLOW DOWN).
- ii) VALVE TAG NO :LBB12AA202(SET PRESSURE 60.2 KG/SQCM(OPEN) & 58.4 KG/SQCM(CLOSE) AND 3% BLOW DOWN).

Deviations, if any, may be indicated in the Sub-Delivery Enquiry Deviation Format.

Bharat Heavy Electricals Limited
High Pressure Boiler Plant, Tiruchirappalli-620 014.

TECHNICAL DELIVERY CONDITIONS
FOR SUB - DELIVERY COMPONENTS OF
CONTROLS AND INSTRUMENTATION

Specification No. TCI: 250

Page 01 of 05

Technical specification
Of
ELECTRO MATIC RELIEF VALVE (ERV)
CONTROL UNIT & PRESSURE SWITCH

Rev. No.	Date	Description	Prepared & Reviewed	Approved
00	09-03-2021	Initial Release		

Sl. No	Technical Description/Requirement	
1.	General	This technical specification covers the requirements of the Electro - Matic relief valve Controller box, for Super Heater/Re Heater Steam relief applications of thermal power boilers.
2.	SITE CONDITIONS: - Altitude above Sea Level Atmosphere Relative humidity Operating temperature	500 Meters Tropical, Dusty, Windy & Heavily polluted atmosphere 100 % 50 degree Celsius
3.	Input Documents to be followed	• Operational Logic & Wiring Drawing: As per the drawing 3-97-577-09565, Rev. 04 • General Arrangement as per the drawing 3-97-577-09562, Rev. 07 • Name Plate & Instruction Plate details: As per the drawing 4-97-577-10225, Rev. 02 & 4-97-577-10226, Rev. 03
4.	Construction Details	• ERV Controller Box - Material of construction: CRCA Sheet Steel, Grade D as per IS 513 of thickness - 2 mm. • Component Mounting plate and Cable gland plate – Material of Construction: Galvanized, CRCA Sheet Steel, Grade D of thickness – 3 mm, Galvanization thickness - 15 to 25 microns. • The mounting plate shall be mounted on the studs (4 nos.). The studs shall be welded in the inside of the box. • Suitable Slot shall be provided in the cable gland plate matching the pressure switch dimensions for tight fit. • Neoprene Gasket of thickness 3 mm shall be provided for the Gland plate and Door.
5.	Enclosure protection	Protection Class : IP 65
6.	Electrical and Pneumatic Entries	2 nos. of ¾" and 1 no. of 1" hole shall be provided in the Gland plate for the entry of Cables and Impulse line for pressure switch. Dummy plugs shall be provided on the holes to avoid water entry.

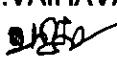
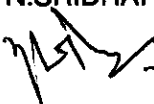
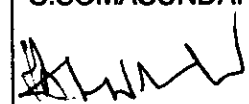
Sl. No	Technical Description/Requirement	
7.	Door & Locking Arrangement	• Continuous Hinged Door suitable for 180° opening shall be fitted on left side of the box. Door shall also be earthed by using flexible Copper Braid. • Rider Clamp arrangement shall be provided for locking. • Padlocking arrangement with 1 no. lock and 3 nos. key shall be provided.
8.	BOM & Accessories	All the accessories shall be rated for either 220 V DC or 110 V DC, as per the voltage (project specific) indicated in the purchase enquiry. Following are the BOM to be followed. 1) Dual Set point, Bourdon tube pressure switch of electrical rating 0.25 A, 220 V DC. Pressure switch model shall be selected, as per the Open & Close set points, Maximum operating pressure furnished in the enquiry. Test/Calibration certificates and tag plates shall be supplied. Make: M/s. Barksdale, GmbH. Set point shall be indicated on the pressure switch in kg/cm². 2) 2 pole, DC Coil, Contactor of current rating 32 A (Make SIEMENS, Model: 3TC-44-170A or equivalent model from any of the makes as indicated in QA:CI: STD: QP:34). 2 nos. of power contacts, 2 NO + 2 NC Auxiliary Contacts shall be provided. 3) 1 No. of Red colored, LED type indicating lamp. 4) Terminal blocks suitable for current rating 32 A. 5) 2 nos. of Metal Oxide Varistor. For items 3 and 4, any of the Makes as indicated in the document QA:CI: STD: QP: 34 shall be followed.
9.	Mounting & Earthing	• The box shall be provided with 4 Nos. of Mounting brackets with 50 mm wide, 6 mm thick plates. Galvanized Mounting bolts (M10 x 40 mm), Spring washers and Nuts shall be supplied.

Sl. No	Technical Description/Requirement	
		• Earthing Bolts – MS with Chromium plate (Plating thickness – 10 to 15 microns).
10.	Wiring & Ferruling	• All internal wiring shall be done by us using 2.5 Sq. mm. stranded, single core copper PVC insulated wire. • Suitable type crimping lugs, shall be used for wiring. • Yellow ferrule with black lettering shall be used Over the insulation for wire identification.
11.	Painting	• Powder coating shall be done for both exterior and interior surface of the controller box. Paint shade will be furnished in the enquiry. • Exterior: Semi-glossy finish, minimum thickness - 60-70 microns. • Interior: Glossy finish, minimum thickness - 50 – 60 microns.
12.	Name plate & Instruction Plate Drawings	• Name plate as per the drawing 4-97-577-10225, Rev. 02 shall be provided at the front side of the box. • Instruction Plate as per the drawing 4-97-577- 10226, Rev. 03 shall be fixed at the backside of the door.
13.	Wiring	All the electrical accessories and the pressure switch shall be wired in the ERV control box as per the wiring drawing. Pressure switch will be supplied by BHEL as a free supply to the vendor.
14.	Inspection & Testing	a) Inspection and testing of the ERV controller box will be as per the quality plan QA:CI: STD: QP:60 (latest revision). b) For each pressure switch, vendor has to submit the Calibration test certificates from the OEM for BHEL's verification.
15.	Packing procedure	Packing procedure QA:CI: STD:PR:02 (Latest Revision) shall be followed.
16.	Documents to be submitted during the offer	a) The Sub-Delivery Enquiry Deviation format shall be filled in with the details of BHEL's enquiry number, project name, technical specification of the ERV, General Arrangement, wiring drawing, Name Plate

Sl. No	Technical Description/Requirement	
		drawing, instruction plate drawing, Quality plan & Packing procedure. b) Conforming to all the requirements, vendor to indicate "No deviation" in the sub-delivery enquiry deviation format. c) Vendor to note that Any deviation/clarification/alternate offer to the BHEL's enquiry requirements, shall only be indicated in the Sub-Delivery Enquiry Deviation form. Deviations indicated elsewhere in the offer will not be considered.
17.	Documents to be submitted on placement of purchase order	a) General arrangement drawing, wiring drawing, terminal block drawing. b) Bill of material with make, model no., rating and quantity of components. c) Operation & Maintenance manuals containing the catalogues of various accessories.

**BHARAT HEAVY ELECTRICALS LIMITED / TIRUCHIRAPPALLI
CONTROLS AND INSTRUMENTATION/QA/FB**

**STANDARD QUALITY PLAN
FOR
ELECTRICAL PANEL ACCESSORIES**

REV	DATE	PREPARED	REVIEWED	APPROVED		REVISION HISTORY
				ENGG.	QUALITY	
00	16.06.97	-Sd-	-Sd-	-Sd-	-Sd-	Initial release
01	22.02.99	-Sd-	-Sd-	-Sd-	-Sd-	New Vendors Added
02	21.03.02	-Sd-	-Sd-	-Sd-	-Sd-	Dept. name changed & General revision-Based on Engg. discussion.
03	08.01.04	-Sd-	-Sd-	-Sd-	-Sd-	Revised to include the comments /Feedback of internal discussion
04	07.12.07	RM.VAIRAVAN 	N.SRIDHAR 	L.A.E.Fernandez 	S.SOMASUNDARAM 	Vendor list updated. Inputs considered are: • TCE approved List for Jojobera • NTPC approved list for BAP(Sipat). • NTPC approved list for Korba-III. • NTPC approved list for Barh STPP. • Feedbacks obtained during discussion

SL.NO	PRODUCT	APPROVED VENDORS
01	Air Circuit Breaker.	L&T / GEPC / SIEMENS / CONTROLS & SWITCHGEAR Co.LTD / SCHNEIDER-MERLIN GERIN ENERPACT
02	Miniature circuit breaker (MCB).	MDS / CROMPTON GREAVES / INDO - ASIAN / IM / LUPUS / SCHNEIDER ELECTRIC / SIEMENS / L&T – HAGER /INDOKOPP/COOPER BUSMANN /STANDARD
03	Moulded case circuit breaker (MCCB).	L&T / GEPC/ CROMPTON GREAVES / BCH / ABB / SIEMENS / CONTROLS & SWITCHGEAR Co.LTD/ SCHNEIDER ELECTRIC / ANDREW YULE /AREVA
04	Power contactors – AC.	L&T / SIEMENS / CONTROLS & SWITCHGEAR CONTACTORS LTD (TC) / SPRECHER & SCHUH / ANDREW YULE / BCH / GEPC / CROMPTON GREAVES / SCHNEIDER ELECTRIC
05	Power & Auxiliary Contactors – DC.	GEPC / BCH / CONTROLS & SWITCHGEAR CONTACTORS LTD(TC) / SIEMENS / SPRECHER & SCHUH / L&T / SCHNEIDER ELECTRIC/ANDREW YULE.
06	Auxiliary Contactors – AC.	L&T / SIEMENS / ABB / BCH / CONTROLS & SWITCHGEAR CONTACTORS LTD(TC) / CROMPTON GREAVES / GEPC/ SPRECHUR & SCHUH / SCHNEIDER ELECTRIC / ANDREW YULE.
07	Indicating lamp.	SIEMENS / VAISHNAO / GEPC / BCH / L&T - ESBEE / CANDS / TEKNIC / CONCORD / ESSEN / CONTROLS & SWITCHGEAR CONTACTORS LTD(TC)-RASS Series
08	Push Button.	SIEMENS / BCH / TEKNIC / CANDS / L&T - ESBEE / VAISHNAO / GEPC / CONTROLS & SWITCHGEAR CONTACTORS LTD(TC)-RASS Series / SCHNEIDER ELECTRIC/CONCORD.
09	Illuminated Push button	PARAMOUNT / BCH
10	Indicating Instruments.	AE / IMP / MECO / L&T-RISHAB / SIETEX / MASSIBUS/ALSTOM.
11	Switches (Power / Control).	KAYCEE / SIEMENS / L&T / SALZAR/ GEPC / CONTROLS & SWITCHGEAR Co. LTD / SCHNEIDER ELECTRIC / SWITRON (For Control switch only)

SL.NO	PRODUCT	APPROVED VENDORS
12	Thermal Overload Relays.	L&T / SIEMENS / CONTROLS & SWITCHGEAR CONTACTORS LTD (TC) / BCH / GEPC / SPRECHER & SCHUH / CROMPTON GREAVES / SCHNEIDER ELECTRIC/ ANDREW YULE.
13	Protective Relays(Electromechanical).	AREVA / EASUN REYROLLE / ABB / SEG & CONTROLS / SIEMENS.
14	Protective Relays(Microprocessor).	AREVA / ABB / L&T
14	Timers - Electronic.	SIEMENS / ABB / CONTROLS & SWITCHGEAR CONTACTORS LTD((TC) / GEPC / OMRON / SPRECHER & SCHUH / SELECTRON. / BCH
15	Timers - Electro – Pneumatic.	BCH / CONTROLS & SWITCHGEAR CONTACTORS LTD(TC)/ SPRECHER & SCHUH
16	Timers - Synchronous.	L&T - G I C.
17	Annunciators.	IIC / L&T / PROCON / ADVANI OERLIKON / OMRON / PIRI / PECON / SIEMENS/MINILEC
18	Current & Potential transformers.	AE / KAPPA / INDCOIL / PRAYOG / CONTROLS & SWITCHGEAR CONTACTORS LTD(TC) / SIEMENS / APPOLO / PRAGATI / PRECISE / JYOTI / SILKAANS/G&M(For PT only) .
19	Control supply transformers.	AE / KAPPA / INDCOIL / SOUTHERN ELECTRIC / SIEMENS / APPOLO / CONTROLS & SWITCHGEAR / PRECISE / LOGICSTAT/PRAGATI/PRAYOG
20	Terminal block - screw type (terminals & fasteners shall be brass with nickel cadmium plated).	ESSEN / ELMEX (THERMO –PLASTIC TYPE) / TOSHA / ASIA ELECTRIC (IEC MAKE) / CONNECT WELL / TECHNOPLAST / VEECON / PHOENIX/WAGO
21	Terminal Block – Cage Clamp type.	WAGO / PHOENIX / ELMEX
22	Fuse Carriers.	SIEMENS / L&T / S&S / CROMPTON GREAVES / CONTROLS & SWITCHGEAR Co. LTD / GEPC / COOPER BUSSMAN.
23	Fuse Links/Neutral Links.	SIEMENS / L&T / CROMPTON GREAVES / CONTROLS & SWITCHGEAR Co.LTD/ GEPC / CANDS / COOPER BUSSMAN.

SL.NO	PRODUCT	APPROVED VENDORS
24	Panel Wires	BIS APPROVED
25	Cable Glands – (weather proof).	COMET / POWER ENGG / SUNIL & CO / SMI / BRACCO / ARUP ENGG. WORKS / QPIE / GLANDMECH / CONTROLS & SWITCHGEAR Co. LTD / QUALITY PRECISION
26	Ferrules	MICROSIGN/MAY FAIR/OESER
27	Lugs.	DOWELL / 3D / DIVYA JYOTHI / CHETNA / JAINSONS
28	Space Heater.	SOPHIA / CANDS / CROMPTON GREAVES / PYRO SYSTEM / VELCO / CONTROLS & SWITCHGEAR Co.LTD.
29	15/5 A Power Supply Switch With Plug & Socket (Metal Clad Type With Spring Loaded Cap).	CROMPTON GREAVES/ AJMERA / BCH / BEST & CROMPTON./GEWIS INDIA
30	Cubicle Illumination Lamp.	PHILIPS / BAJAJ / CROMPTON GREAVES / MYSORE LAMPS / HMT.
31	Door Switch.	ESSEN / IEC.
32	Cooling Fan.	RALLI-WOLF / KHAITAN / USHA.
33	Interposing Relay (Low Burden).	JYOTHI / OMRON / ABIL / ABB / SIEMENS / GEPC / OEN / L&T/OWN MAKES OF APPROVED PLC VENDORS.
34	Cable Glands - Flame Proof.	BALIGA / SUDHIR / CEAG / PROMPT / COMET
35	Indicating Lamp – LED.	SRISHYLA / TEKNIC / PARAMOUNT / BINAY / KWALITY / HEWLETT PACKARD
36	Motor Protection Circuit Breaker	L&T / GEPC / SIEMENS / SCHNEIDER ELELCTRIC / SPRECHER & SCHUH .
37	Cable Dressing Material.	MICROSIGN.
38	Wire Duct.	SALZAR.

SL.NO	PRODUCT	APPROVED VENDORS
39	Electrical Transducer	ABB / AE / SOUTHERN TRANSDUCER/ELSTER/RISHAB.
40	Thermostat	APT / TEMPTROL / VIKAS ELECTRIC / AI / RENUTROL / ANCO
41`	Trivector Meter	ALSTOM / BHEL/AREVA/IMP



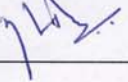
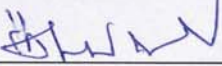
BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHIRAPPALLI - 620014

QA:CI:STD:QP:60
Rev: 01 Page: 1 of 3

CONTROLS AND INSTRUMENTATION/QA/FB

STANDARD QUALITY PLAN FOR

ERV CONTROLLER BOX

REV	DATE	PREPARED	REVIEWED	APPROVED	REVISION HISTORY
00	10/02/2004	Sd/-	Sd/-	Sd/-	Initial release.
01	23/06/2009	RM.VAIRAVAN 	N.SRIDHAR 	S.SOMASUNDARAM 	QP revised to modify with the practice followed in NTPC projects and inspection feedback.

	BHARAT HEAVY ELECTRICALS LIMITED TIRUCHIRAPPALLI - 620014	QUALITY PLAN FOR ERV CONTROLLER BOX	QA:CI:STD:QP:60 Rev: 01 Page: 2 of 3
--	--	--	--

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	FINISHED PRODUCT INSPECTION											
01	Routine tests	a. Visual (Name plate Details)	PHYS	Major	100%	30%	PO Spec.	TR	P	W	-	
		b. Dimension, including sheet steel thickness	MEAS	Major	100%	30%	PO Spec, Drg.	TR	P	W	-	
		c. Painting: Shade, thickness, finish	VISU	Major	100%	30%	PO Spec, Drg. IS 5, RAL	TR	P	W	-	
		d. Make, rating of components mounted.	PHYS	Major	100%	30%	PO Spec, Drg.	TR	P	W	-	
		e. Wiring: Ferruling & crimping	ELEC	Major	100%	30%	PO Spec, Drg.	TR	P	W	-	
		f. Availability of pressure switch, type and number of contacts	PHYS	Major	100%	30%	PO Spec, Drg.	TR	P	W	-	
		g. Functional check for pressure switch actuation for both increasing and decreasing pressure settings	ELEC	Critical	100%	100%	PO Spec, Drg.	TR	P	V	-	Verification of TC of pressure switch
		h. Insulation resistance test both before and after HV test	ELEC	Major	100%	100%	PO Spec, Drg.	TR	P	W	-	
		i. High voltage test for wiring at 1.5KV for 1 minute	ELEC	Major	100%	100%	PO Spec, Drg.	TR	P	W	-	
		j. Verification of accessories as per PO	PHYS	Major	100%	30%	PO Spec, Drg.	TR	P	W	-	
02	Type test											
		a. Enclosure Protection test for box	Major	ENVI	One of sample	One of sample	PO Spec. IS 13947	TC	V	V	-	

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



B.NOTES:

1.LEGENDS:

MECH	:	Mechanical	MEAS	:	Measurement
ELEC	:	Electrical	ENVI	:	Environmental
TR	:	Test Report	TC	:	Test certificate
VISU	:	Visual			

- The vendor shall arrange all testing facilities at their works. Tests for which facilities are not available are to be carried out at recognized National Test Houses like ETDC/CIL/NPL/ERTL etc., 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.

- Test certificates for routine type tests are to be furnished by the vendor.
- 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.

C. REFERENCE STANDARDS:

(For Indicated Standards Refer the Latest Version)

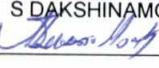
IS5	:	Colours for ready mixed paints and enamels
IS13947	:	General rules for low voltage switchgear (Degrees of enclosure protection offered by enclosures)

SQP60R1.DOC

**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.

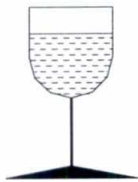
7.0 **GENERAL**

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

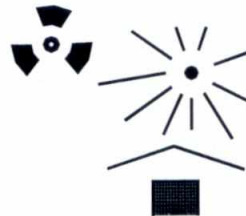
ANNEXURE - 1

TO

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



FRAGILE, HANDLE WITH CARE



PROTECT FROM HEAT AND RADIOACTIVE SOURCES



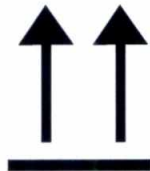
USE NO HOOKS

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



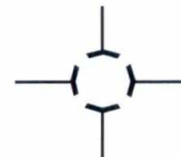
KEEP DRY

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



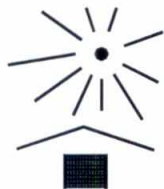
THIS WAY UP

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



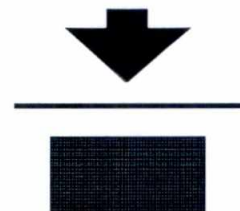
CENTRE OF GRAVITY

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



INTERNATIONAL "SLING HERE" SYMBOL

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