

Ref: RC-SAC-011

List of Documents

Sno	Index sheet	Requirement
1	CTC	to be submitted in Part1 with seal & sign in .pdf format
2	GTC	to be submitted in Part1 with seal & sign in .pdf format
3	LC	to be submitted in Part1 with seal & sign in .pdf format
4	IP	to be submitted in Part1 with seal & sign in .pdf format
5	PQR	to be submitted in Part1 with seal & sign in .pdf format
6	SPEC	to be submitted in Part1 with seal & sign in .pdf format
7	BOQ	to be submitted BoQ1 & BoQ2 in Part2 in .xls format
8	BoQ3 (Price of Operational spares)	to be submitted BoQ3 in Part2 with seal & sign in .pdf format



Bharat Heavy Electricals Ltd.

Valves Purchase
Trichy - 620014. India

CONFIRMATION TO TERMS AND CONDITIONS

BHEL Enquiry: RC-SAC-011

Sl No	BHEL COMMERCIAL TERMS AND CONDITIONS for INDIGENOUS SUPPLIES	Vendor's Confirmation															
1	Only Indigenous suppliers are eligible to participate in this tender																
2	Rate Contract: This is an enquiry for the finalization of a Rate Contract (RC) for a period as mentioned in 'Validity of offer' below The quantities mentioned in the enquiry are indicative for the entire RC period. Purchase Orders will NOT be issued for the entire quantum in one lot, whereas POs will be released on a time to time basis during the RC period, based on actual requirement.																
3	Quotation no. and Date																
4	Vendor should give confirmation to BHEL's Technical Specification. Any deviations from the specification are to be furnished separately as "Schedule of Deviation". If there is no deviation vendor should indicate "No Deviation".																
5	The offer has to be submitted as a Two-part bid (Techno-commercial & Price bid). After technical acceptance only the price bid will be opened.																
6	The offer shall be supported by relevant technical documents like Quality plans, wiring diagrams, catalogues, leaflets, General arrangement drawings etc... for technical evaluation and for getting BHEL/customer approvals.																
7	The tender will be finalized on item wise. Separate L1 finalization will be done for Actuators and Price adders.																
8	Terms of Payment: Indigenous Supplier (Non-MSME): 100% direct EFT Payment after 90 days from the date of receipt and acceptance of materials at BHEL stores. Indigenous Supplier (MSME Medium): 100% direct EFT Payment after 60 days from the date of receipt and acceptance of materials at BHEL stores. Indigenous Supplier (MSE): Payment will be as per MSMED Act, 2006 Suppliers quoting for MSE payment must produce UDYAM registration certificate in part 1 bid documents.																
9	Delivery Terms: Prices shall be quoted on "FIRM PRICE" basis only. For BHEL, TRICHY the quoted prices should be only on FOR BHEL TRICHY basis inclusive of Packing & Forwarding charges if any. GST extra For BHEL, Goindwal the quoted prices should be only on FOR BHEL GOINDWAL basis inclusive of Packing & Forwarding charges if any. GST extra																
10	Validity of offer Prices should be valid for 12 months from the date of part-1 bid opening,																
11	<p>Delivery period should as follows</p> <table border="1"> <thead> <tr> <th>Max Torque (In Kgm)</th> <th>Sl no. (price bid annexure)</th> <th>Delivery Period</th> </tr> </thead> <tbody> <tr> <td>3.5 to 100</td> <td>1 to 8</td> <td>12 weeks from the date of document approval</td> </tr> <tr> <td>200 to 800</td> <td>9 to 11</td> <td>14 weeks from the date of document approval</td> </tr> <tr> <td>1100 to 1600</td> <td>12 to 13</td> <td>16 weeks from the date of document approval</td> </tr> <tr> <td>Spares</td> <td>For above all (1 to 13)</td> <td>12 weeks from the date of document approval</td> </tr> </tbody> </table> <p>Note: The delivery period mentioned above is the minimum delivery period which vendor should comply. While releasing the individual Purchase Orders based on the Rate Contract finalized, the delivery period will be separately specified. The delivery period mentioned in the PO will be based on BHEL's project requirement which vendor shall comply strictly. Separate delivery amendments will be given for 3rd party & Customer inspection delays and BHEL HOLD suitably.</p>	Max Torque (In Kgm)	Sl no. (price bid annexure)	Delivery Period	3.5 to 100	1 to 8	12 weeks from the date of document approval	200 to 800	9 to 11	14 weeks from the date of document approval	1100 to 1600	12 to 13	16 weeks from the date of document approval	Spares	For above all (1 to 13)	12 weeks from the date of document approval	
Max Torque (In Kgm)	Sl no. (price bid annexure)	Delivery Period															
3.5 to 100	1 to 8	12 weeks from the date of document approval															
200 to 800	9 to 11	14 weeks from the date of document approval															
1100 to 1600	12 to 13	16 weeks from the date of document approval															
Spares	For above all (1 to 13)	12 weeks from the date of document approval															

12	Liquidated damages: LD shall be 0.5% of the undelivered portion per week of the delay or part thereof subject to a maximum of 10% of the total order value.	
13	Insurance by : By Supplier	
14	<p>Risk Purchase: In the event of any successful Tenderer's failure to fulfil any of the tender / Contract obligations including supply of whole or any part of the ordered items as per Contract / Agreement, BHEL has the right to terminate the contract and purchase from elsewhere, at the risk and cost of the defaulted supplier, either the whole of the goods or any part which the supplier has failed to deliver or dispatch within the time stipulated in the contract or if the same were not available, the best and nearest available substitute thereof. The supplier shall be liable for the additional expenditure/difference in Cost, if any, including consequential losses which BHEL may sustain by reason of risk purchase in addition to the applicable LD as per the Purchase order/contract.</p> <p>a) The decision of BHEL with regard to the additional expenditure / difference in cost and consequential losses incurred by BHEL shall be final and binding on the supplier.</p> <p>b) The amount recoverable under risk purchase shall be recovered from the defaulted supplier in all or any of the following manners:</p> <ul style="list-style-type: none"> • from dues available in the form of Bills payable to defaulted supplier, SD, BGs against the same contract. • from the dues payable to defaulted supplier against other contracts in the same Region/Unit /any other region/unit <p>c) In-case recoveries are not possible with any of the above available options, Legal action shall be initiated for recovery against defaulted supplier.</p> <p>d) Withdrawal of offer after price bid opening or varying the same in any manner within the validity period, but before the placement of order will be liable for suitable action for suspension of further business with the vendor as per BHEL corporate procedures.</p> <p>e) Abridged version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' has now been uploaded on www.bhel.com on "supplier registration page" at the following link: http://www.bhel.com/vender_registration/vender.php (Guidelines for suspension of business dealings with suppliers/ contractors).</p>	
15	<p>Guarantee Clause: The vendor shall give a guarantee for the performance of his supplies for a period of eighteen months from the date of dispatch or twelve months from the date of commissioning whichever is earlier.</p> <p>Note: For availing Extended Guarantee (by the buyer beyond Guarantee period)- Percentage of additional charges/year on the model offered to be mentioned by supplier in the Technical offer.</p>	
16	<p>Counter-offering Counter-offer is applicable for this enquiry. The item wise contract will be finalized with maximum 3 vendors.</p> <p>The loading pattern for counter offered vendors to the following modification.</p> <ol style="list-style-type: none"> a. Special provisions for MSE, Make in India as per General terms and conditions. b. The vendor will be chosen based on the loading pattern mentioned as per terms conditions. However, when the customer does not approve any vendor those required Electrical Actuators will be ordered as per the booking allocation. However, purchaser will ensure that the total order value placed on each vendor shall not exceed the total value of finalized RC (FOR Trichy & Goindwal). c. As per the special terms and conditions of the RC, L1 vendor in a category will be chosen based on the landed prices for the Actuators. The prices offered for spares will not be a deciding factor for finalizing L1 supplier. <p>Counter-offer is applicable for this enquiry. The item wise contract will be finalized with maximum 3 vendors. The manner of splitting will be as per Table mentioned below</p>	
17	<p>Offers for the actuators are required under the following categories:</p> <ol style="list-style-type: none"> a. CAT1: Standard water tight actuator as per technical spec includes Aluminium bronze drive bush, hand wheel and double compression cable glands. b. CAT2: Standard water tight Actuator with Integral starter as per technical spec includes Aluminium Bronze drive bush, hand wheel and double compression cable glands. c. CAT3: Flame Proof actuator includes Aluminium Bronze drive bush, hand wheel and double compression cable glands. d. CAT4: Flame Proof actuators with Integral starter as per technical spec includes Aluminium Bronze drive bush, hand wheel and double compression cable glands e. CAT5: Actuators with spring loaded adaptor as thrust compensator as per technical spec includes Aluminium Bronze drive bush, hand wheel and double compression cable glands. 	

	f. CAT6: Actuators with Electronic Integral starters, spring loaded adaptor as thrust compensator as per technical spec includes Aluminium Bronze drive bush, hand wheel and double compression cable glands.	
18	Price Adder for additional features of the Actuator of any category: Optional items like Electronic position transmitters (non-contact type / contact type), Plug and Socket, Stem protection cover, providing higher RPM in place of standard RPM, providing nonstandard voltage, nonstandard Frequency, any other items not covered in the annexure may be offered as price adder along with the offer.	
19	Operational Spares: Operational spares required in attached list may be offered in the prescribed format. If any spares apart from the list is found necessary for smooth functioning of actuators the same may also be separately indicated and offered.	
20	The actuators specialities like Integral starter, EPT etc. shall be plug in type/easy to add / remove at shop or site.	
21	Integrity Pact The IP (format given along with this tender)duly signed by authorized signatory has to be sent along with part-1 bid of the offer.	
22	The vendor shall provide necessary drawings, Test Certificates and Operating Maintenance Manuals as called for in the Technical Specifications at no extra cost.	

NOTE:-

- a) All Commercial terms are non- negotiable. Any documents in any form submitted by the seller in this bid, which is not relevant or not requested by the buyer, indicating any deviation from commercial terms, will not be considered and the offer will be evaluated accordingly.
- b) In case it is still envisaged that there could be deviations to the tender terms, bidders should be informed to submit the list of deviations and also submit the cost of withdrawal of deviations, so that the comparison is on an equal footing as per NIT terms. In case any bidder refuses to submit the cost of withdrawal, their bid would be rejected.
- c) It is confirmed that all the terms and conditions stipulated in the Enquiry have been fully understood by us and all clarifications & details have been obtained.

Counter-offering split ratio		
Condition	Split Ratio	
In case of 3 eligible Vendors	L1: L2: L3	50:30:20
In case of 2 eligible Vendors	L1: L2	60:40
In case of only 1 eligible Vendor	L1	100

Signature & Office Seal of the vendor



BHARAT HEAVY ELECTRICALS LTD

VALVES PURCHASE

Trichy - 620 014, India

GENERAL TERMS AND CONDITIONS

Enquiry Reference: RC-SAC-011

1. QUOTATIONS:

- a. **BID system:** Offers are invited in any one of the below formats. The no. of bids to be submitted is mentioned in "Confirmation to the Terms and Conditions" attached.
 - i. **Two part bid:** The offers are invited in Two part bid system (Part I will be Techno-commercial bid and part II will be Price Bid). Techno-commercially suitable vendors alone will be intimated for price bid opening.
- b. **Submission of offer:**
 - i. **Offer called through e-Procurement mode:** The bidder shall submit the bid online in BHEL e-Procurement portal at <https://eprocarebhel.co.in/nicgep/app>
The bidder would be required to register on the above e-procurement portal for submitting their bids. Offers through email and hardcopy are not acceptable.
- c. **Regulations:** Offers should be free from correction and erasures. Corrections if any must be attested. All amounts shall be indicated both in words as well as figures. In case of a difference between the amount quoted in words and figures, the amount quoted in words shall prevail.
- d. **PVC:** Price Variation clause not acceptable. Prices should be firm.
- e. **Catalogue:** Manufacturer's name, Trade Mark or Patent No. if any should be specified. Illustrative leaflets giving technical particulars are required along with quotation.
- f. **Samples:** Samples should be submitted separately, if specially requested in tender, before the due date of the enquiry. They should be clearly marked with the enquiry reference and date on the enclosing cover to facilitate identification.
- g. **GST Number:** GST registration number, HSN number (Item wise) with applicable taxes should be mentioned in the offer. If the vendor is not GST registered the offer is liable for rejection.
- h. **Deviation.** Any deviations from the specification are to be furnished separately as "Schedule of Deviation". If there is no deviation, vendor should indicate "No Deviation" in the offer.
- i. **Confirmation:** Confirmation for compliance is to be given in the offer for all the techno commercial conditions specified in the tender.

2. COMMERCIAL TERMS & CONDITIONS:

- a. **Terms of Payment:**

For Indigenous Suppliers:
If the materials are receivable at BHEL Stores, Trichy/Goindwal:
Indigenous Supplier (Non-MSME): 100% direct EFT Payment after 90 days from the date of receipt and acceptance of materials at BHEL stores.
Indigenous Supplier (MSME Medium): 100% direct EFT Payment after 60 days from the date of receipt and acceptance of materials at BHEL stores.
Indigenous Supplier (MSE): Payment will be as per MSMED Act, 2006 Suppliers quoting for MSE payment must produce UDYAM registration certificate in part 1 bid documents.
- b. **Liquidated Damage:** LD shall be 0.5% of the undelivered portion per week of the delay or part thereof subject to a maximum of 10% of the total order value.
Under GST regime, BHEL has to discharge GST liability on LD recovered from suppliers. Hence applicable GST shall also be recoverable from suppliers on LD amount. Debit note will be issued by BHEL for this amount, indicating the respective supply invoice number.
- c. **Delivery Terms:**
For Indigenous Suppliers: FOR BHEL Trichy/Goindwal inclusive of freight and insurance
- d. **Validity of Offer:** Prices should be fixed and should be valid for period as mentioned in the "Confirmation to the Terms and Conditions" attached.
- e. **Delivery period:** Delivery schedule will be as mentioned in the "Confirmation to the Terms and Conditions" attached.
- f. **Guarantee period:** As mentioned in the "Confirmation to the Terms and Conditions" attached.
- g. **Miscellaneous:** Any conditions which might have been quoted by the seller and are in contravention to the terms of PO and which have not been specifically accepted by Purchaser will not be applicable to the contract/PO.
- h. **Counter Offering:** As mentioned in the "Confirmation to the Terms and Conditions" attached.



BHARAT HEAVY ELECTRICALS LTD

VALVES PURCHASE

Trichy - 620 014, India

GENERAL TERMS AND CONDITIONS

Enquiry Reference: RC-SAC-011

3. COMPLIANCE / ACCEPTANCE REQUIRED FOR FOLLOWING POINTS TO ENSURE INPUT TAX CREDIT

- a. Response to Tenders for Indigenous supplier/Vendor will be entertained only if the vendor has a valid GST registration No (GSTIN) which should be clearly mentioned in the offer. If the Vendor is exempted from GST registration, a declaration with due supporting documents need to be furnished for considering the offer. Vendor under composition scheme should declare that he is a composition Vendor supported by the screen shot taken from GST portal. The dealer has to submit necessary documents if there is any change in status under GST.
- b. Supplier shall mention their GSTIN in all their invoices (incl. credit Notes, Debit Notes) and invoices shall be in the format as specified/prescribed under GST laws. Invoices shall necessarily contain Invoice number (in case of multiple numbering system is being followed for billing like SAP invoice no, commercial invoice no etc., then the Invoice No. which is linked/uploaded in GSTN network shall be clearly indicated), Billed to party (with GSTIN) & Shipped to party details, item description as per PO, Quantity, Rate, Value, applicable taxes with nomenclature (like IGST, SGST, CGST & UTGST) separately, HSN/ SAC Code, Place of Supply etc.
- c. Invoices will be processed only upon completion of statutory requirement and further subject to following:
 - i. Vendor declaring such invoice in Form GST ANX-1
 - ii. Receipt of Goods or Services and Tax invoice by BHEL
- d. All invoices shall bear the HSN Code for each item separately (Harmonized System of Nomenclature)/ SAC code (Services Accounting Code).
- e. As the continuous uploading of tax invoices in GSTN portal (in GST ANX-1) is available for all (i.e. both Small & Large) tax payers under proposed new GST Return System, all invoice raised on BHEL may be uploaded immediately in GST portal on despatch of material /rendering of services. The supplier shall ensure availability of Invoice in GST portal before submission of invoice to BHEL. Invoices will be admitted by BHEL only if the invoices are available in GSTN portal (in BHEL's GST ANX-2).
- f. A declaration to the effect that all invoice particulars are/were uploaded in the GSTN network/ portal & all tax liability as per GST rules and regulations have been and will be discharged, shall be mentioned in the invoice. If not mentioned in the invoice, a separate declaration shall be submitted as per the requirement of BHEL.
- g. All documents like Test Certificate, LR copy, any other document mentioned in PO, shall be sent along with the vehicle/consignment. For all consignments received within the calendar month, input credit will be availed within that month in line with monthly returns filing cycle. In case of any discrepancy in the document or non-submission of documents mentioned in the PO, then BHEL will not be able to accept or account the material, in such case availing of tax credit will be deferred to next month or so.
- h. In case of discrepancy in the data uploaded by the supplier in the GSTN portal or in case of any shortages or rejection in the supply, then BHEL will not be able to avail the tax credit and will notify the supplier of the same. Supplier has to rectify the data discrepancy in the GSTN portal or issue credit note or debit note (details also to be uploaded in GSTN portal) for the shortages or rejections in the supplies or additional claims, within the calendar month informed by BHEL.
- i. In cases where invoice details have been uploaded by the vendor but failed to remit the GST amount to GST Department (Form PMT-08 or Form GST RET-01 to be submitted) within stipulated time, then GST paid on the invoices pertaining to the month for which GST return not filed by the vendor will be recovered from the vendor along with the applicable interest (currently 24% p.a) and all subsequent bills of the vendor will not be processed till filing of the GST return by the vendor.
- j. Under GST regime, BHEL has to discharge GST liability on LD recovered from suppliers/contractors. Hence applicable GST shall also be recoverable from suppliers/contractors on LD amount. For this, debit note will be issued by BHEL indicating the respective supply invoice number.
- k. In case any changes in taxes and duties as per Gov. Notification (including GST), the same shall be applicable from time to time.
- l. Duplicate copy of the Invoice meant for the transporter should accompany the material as stipulated under CE Rules 52A and 172C OR 57CE.
- m. TDS on GST shall be applicable as per the GST Act.
- n. In case GST credit is denied to BHEL due to non-receipt or delayed receipt of goods and/ or tax invoice or expiry of timeline prescribed in GST law for availing such ITC, or any other reasons not attributable to BHEL, GST amount claimed in the invoice shall be disallowed to the vendor.



BHARAT HEAVY ELECTRICALS LTD

VALVES PURCHASE

Trichy - 620 014, India

GENERAL TERMS AND CONDITIONS

Enquiry Reference: RC-SAC-011

- o. Where any GST liability arising on BHEL under Reverse Charge (RCM), the vendor has to submit the invoices to BHEL well within the timeline prescribed in GST Law, to enable BHEL to discharge the GST liability. If there is a delay in submission of invoice by the vendor resulting in delayed payment of GST by BHEL along with Interest, then such Interest payable or paid shall be recovered from the vendor.
- p. GST TDS will be deducted as per Section 51 of CGST Act 2017 and in line with Notification 50/2018 – Central Tax dated 13.09.2018. GST TDS certificate which will be generated in GST portal subsequent to vendor accepting the TDS deduction in the GST portal, will be issued to the vendor.

4. SPECIAL PROVISIONS FOR MICRO AND SMALL ENTERPRISES (MSE):

- a. 25% of the tendered quantity is earmarked for MSE suppliers in this tender.
- b. If L1 vendor (or) Counter offer accepted vendor/s is from a Micro / Small enterprise which put together covers 25% of the total tendered quantum, the 25% earmarking provision is not applicable.
- c. Out of the 25% tendered quantity reserved for MSE suppliers, 6.25% shall be earmarked for procurement from MSE owned by SC / ST entrepreneurs. In the event of failure of such Micro and Small enterprises to participate in the tender process or meet the tender requirements and the L1 price, the 6.25% sub-target for procurement ear-marked MSE owned by SC / ST entrepreneurs shall be met with other MSE enterprise/s.
- d. 3% reservation for women owned MSEs within the above mentioned 25% reservation. In the event of failure of such Micro and Small enterprises to participate in the tender process or meet the tender requirements and the L1 price, the 3% sub-target for procurement ear-marked MSE owned by women entrepreneurs shall be met with other MSE enterprise/s. The definition for MSEs owned by Women Entrepreneurs is clarified as:
 - i. In case of proprietary MSE, proprietor shall be woman.
 - ii. In case of partnership MSE, the women partners shall be holding at least 51% share in the unit.
 - iii. In case of private limited companies, at least 51% share shall be held by the women promoters.
- e. In case MSE vendor participating in the tender quotes within the price band of LI +15%, they will be allowed to supply the portion of the requirement subject to acceptance of LI price by MSE vendor. In case of more than one such MSE, the supply shall be shared proportionately, provided the available quantum can be split.
- f. In a tender where both MSE and Non-MSE Vendors have participated and non-MSE Vendor has become the lowest bidder and the quantum envisaged in the tender cannot be split, then the MSE vendor will be given preference for ordering the available quantum provided the MSE vendor quoted price is within L1 + 15%, and if the MSE vendor accepts the L1 rate.
- g. MSE suppliers can avail the intended benefits only if,
The vendor submits along with offer, a copy of the Udhdyog Aadhar and a certificate, as per the format in Annexure-A, issued by a chartered accountant during the financial year of the date of part-1 bid opening, certifying that the quantum of investment in plant and machinery is within the permissible limit as per the act for relevant status (Micro or small).

(or)

The vendor has already submitted the above documents for the financial year of the date of part-1 bid opening and the MSE status has been updated in BHEL Trichy's records.

Non submission of such documents will lead to consideration of their bids at par with other bidders and MSE status of such suppliers shall be shifted to Non MSE supplier till the supplier submits these documents.

- h. Definitions of MSEs owned by SC/ST is under:
 - i. In case of proprietorship firm, proprietor must be SC/ST.
 - ii. In case of partnership firm, the SC/ST partners must be holding at least 51% shares in the unit.
 - iii. In case of private limited companies, at least 51% share must be held by SC/ST promoters.
 - iv. The caste/Tribe/Community certificate issued by the following authorities in the prescribed form for SCs/STs can be considered.
- i. Authorized to Issue SC/ST certificate:
 - i. District Magistrate/Additional District Magistrate/Collector/Deputy commissioner/Additional Deputy Commissioner/Deputy collector/1st class stipendiary magistrate/Sub divisional Magistrate/Taluka Magistrate/Executive magistrate/Extra Assistant commissioner.
 - ii. Chief Presidency magistrate/Additional chief presidency magistrate/Presidency magistrate.
 - iii. Revenue Officer not below the rank of tehsildar.
 - iv. Sub-Divisional officer of the area where the individual and / or his family normally resides.



BHARAT HEAVY ELECTRICALS LTD

VALVES PURCHASE

Trichy - 620 014, India

GENERAL TERMS AND CONDITIONS

Enquiry Reference: RC-SAC-011

- j. To avail the benefits of MSE under SC/ST category, the related documents as stated above should be submitted along with tender documents.
- k. Payment for MSE vendors will be as per MSMED Act, 2006.

5. RISK PURCHASE PENALTIES

- a. In case of delay in delivery beyond PO delivery /mutually agreed delivery, or vendor fails /refuses to complete the PO as per terms, or insufficient facilities at vendor's works to execute a PO, BHEL has the right to get the items ordered elsewhere at the risk and cost of the vendor with notice to the vendor and the additional expenditure / difference in cost, if any, including consequential cost shall be recovered from the defaulted vendor. Also, in such case of withdrawal of orders, BHEL shall recover the additional expenditure / difference from vendor by adjusting against amount due to vendor and/or by invoking the BG and/or by any other suitable means as decided by BHEL. In addition, BHEL may recover from the defaulter vendor any loss to BHEL arising due to withdrawal of orders in such case, and action shall be taken as per latest revision of BHEL Guidelines for Suspension of Business dealings with Suppliers / Contractors.
- b. BHEL has the right to divert/cancel the order if the vendor has not procured minimum 50% of the quantity of raw materials within 60 days from PO date. Purchase order placed on steel mills and with proper payment voucher/proof will be considered for not cancelling the PO by BHEL. The submission of data by vendor for DB clearance by BHEL/QC shall be the proof of procurement. This is to avoid delay in project schedule due to delay in raw material procurement by vendors. In case the vendor fails to procure at least 50% of the quantity of raw materials within 60 days from PO date, BHEL has the right to get the items ordered elsewhere at the risk and cost of the defaulting Vendor and the additional expenditure / difference in cost, if any, including consequential cost shall be recovered from the defaulting Vendor and action shall be taken as per latest revision of BHEL Guidelines for Suspension of Business dealings with Suppliers / Contractors and SEARP.
- c. The defaulted vendor shall be liable for any loss, which BHEL may sustain by reason of such risk purchases in addition to liquidated damages as mentioned under LD clause.
- d. Vendors pending payments shall be withheld to cover the liabilities of BHEL towards risk purchase, if any.
- e. Reasons like power cut, labour issues, machine break down, etc. which are controllable by the sub-contractor shall not be accepted as reason for delay for delivery extension purposes.
- f. If PO delivery needs to be extended for reason attributable to BHEL, vendor may request BHEL in writing for delivery extension with justifications within 15 days from date of PO closure and before invoice.
- g. Process of calculating the risk and cost amount is as follows:

$$\text{Risk \& Cost Amount} = [(A-B) + (A \times H/100)]$$

Where,

A= Value of Balance scope of Work/ Supply (*) as per rates of new contract

B= Value of Balance scope of Work/ Supply (*) as per rates of old contract being paid to the contractor/ supplier at the time of termination of contract i.e. inclusive of PVC & ORC, if any.

H = Overhead Factor to be taken as 5

In case (A-B) is less than 0 (zero), value of (A-B) shall be taken as 0 (zero).

*(Balance scope of work/ supply)

Difference of Contract Quantities and Executed Quantities as on the date of issue of Letter for 'Termination of Contract', shall be taken as balance scope of Work/ Supply for calculating risk & cost amount. Contract quantities are the quantities as per original contract. If, Contract has been amended, quantities as per amended Contract shall be considered as Contract Quantities. Items for which total quantities to be executed have exceeded the Contract Quantities based on drawings issued to contractor from time to time till issue of Termination letter, then for these items total Quantities as per issued drawings would be deemed to be contract quantities. Substitute/ extra items whose rates have already been approved would form part of contract quantities for this purpose. Substitute/ extra items which have been executed but rates have not been approved, would also form part of contract quantities for this purpose and rates of such items shall be determined in line with contractual provisions. In-case portion of work is being withdrawn, contract quantities pertaining to portion of work withdrawn shall be considered as 'Balance scope of work/supply' for calculating Risk & Cost amount.



BHARAT HEAVY ELECTRICALS LTD

VALVES PURCHASE

Trichy - 620 014, India

GENERAL TERMS AND CONDITIONS

Enquiry Reference: RC-SAC-011

- h. Vendors are cautioned that, withdrawal after price bid opening or after contract signing or PO/LOI acceptance will be construed as tampering with BHEL's tender process. Suitable action for suspension of further business with the vendor may be taken as per BHEL corporate procedures.
- i. Abridged version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' has now been uploaded on www.bhel.com on "supplier registration page" at the following link: http://www.bhel.com/vender_registration/vender.php (Guidelines for suspension of business dealings with suppliers/ contractors).

6. GENERAL CONDITIONS

- a. The manner of finalization will be as mentioned in the "Confirmation to the Terms and Conditions" attached. Separate orders will be released for each project and documents should be supplied for each order separately.
- b. BHEL reserves the right to reduce the tender quantity and to NOT to order for some or all material based on the changes in project.
- c. BHEL shall have the right to visit vendor works during the execution of contract along with end customer for verifying status, inspection and testing of the material.
- d. BHEL reserves the right to negotiate or re-float the tender in case the quoted prices are not acceptable.
- e. Supplier shall arrange packing to avoid lose or damages during Road Transport, Site handling & Storage.
- f. BHEL reserves the right to reject the offer of a particular bidder due to unsatisfactory past performance in the execution of a contract at any of BHEL projects / units.
- g. The Drawings and Technical documents given in this enquiry are the sole property of BHEL. This should not be misused in any form.
- h. Purchase Order, PO Item serial number, Material code, Quantity should be clearly marked on the packing
- i. Confirmation for compliance is to be given in the offer for all the conditions specified above and to the respective Purchase Specification.
- j. The bidder along with its associate/collaborators/sub-contractors/sub-vendors/consultants/service providers shall strictly adhere to BHEL fraud prevention policy (refer www.bhel.com) and shall immediately bring to the notice of the BHEL management about any fraud or suspected fraud as soon as it comes to their notice.
- k. For this procurement, Public Procurement (Preference to Make in India), Order 2017 dated 15.06.2017, 28.05.2018, 29.05.2019 and 04.06.2020, issued by DPIIT, Ministry of Commerce and Industry .If any subsequent Orders issued by the respective Nodal Ministry shall be applicable even if issued after issue of this NIT but before finalization of contract / PO / WO against this NIT. In the event of any Nodal Ministry prescribing higher or lower percentage of purchase and / or local content in respect of this procurement, same shall be applicable. Default purchase preference shall be 20% to local suppliers with default minimum local content of 50%.

7. DOCUMENTATION:

- a. **With Consignment:** Duplicate for transporter copy, Original Invoice, Packing List, Delivery Challan, O&M manual (if applicable) Material Test Certificate, Test Certificates, Compliance Certificate, Guarantee/Warranty Certificate and other documents mentioned in PO/TDC/Drawing.
- b. **To Purchase:**
 - i. FOR BHEL TRICHY/GOINDWAL case: Original Invoice, duplicate for transporter copy, packing list, LWB and Delivery challan, GST declaration as mentioned in point 3c.
- c. **Identification:** Material code, Purchase Order, PO item serial number, Unique serial number if any should be provided in all despatch documents, materials and packing clearly.

8. TENDER EVALUATION:

- a. **Techno-commercial Bid.**
 - i. All vendors should submit General arrangement drawing, datasheet and C&I diagram (if any) of the offered product
 - ii. Point by point technical confirmation of all pages of our technical specifications and commercial conditions are required with your sign and seal along with techno commercial offer.
 - iii. Offers from supplier not having technical capability or not agreed for commercial terms, will be rejected.
- b. **Price Bid.**



BHARAT HEAVY ELECTRICALS LTD

VALVES PURCHASE

Trichy - 620 014, India

GENERAL TERMS AND CONDITIONS

Enquiry Reference: RC-SAC-011

- i. Bidders qualified for part I will be intimated for participating in priced bid opening.
- ii. L1 bidder will be decided based on landed cost for the equipment to BHEL.

Indigenous Vendors

Total Landed cost/rate for each item = FOR Rate in INR (A) + Applicable Taxes (B) + Loading non-acceptance of commercial terms (C) – Applicable input tax credit (D)

A - Indigenous vendors submit offers on Free on Road (FOR), Stores, HPBP BHEL Trichy/Goindwal in INR.

B - Applicable GST and any other charges quoted by indigenous vendors will be added to the base price.

C - Loading for non-acceptance of payment terms, delivery schedule & liquidated damages (LD) will be added to the F.O.R. value for arriving the landed rate.

D - However, input tax credit shall be availed for GST, hence the same is excluded for arriving at the landed cost.

- iii. In case of tie for the L1 positions,
 - a. In the course of evaluation, if more than one bidder happens to occupy L1 status, effective L1 will be decided by soliciting discounts from respective L1 bidders.
 - b. In case more than one bidder happens to occupy the L1 status even after soliciting discounts, the L1 bidder shall be decided by a toss/draw of lots, in the presence of the respective L1 bidders(s) or their representative(s).
 - c. Ranking will be done accordingly, BHEL's decision in such situation shall be final and binding.
- iv. If counter-offer is applicable and before counter offer process, if there is tie for ranking position other than L1 in respective enquiry items, then Lot shall be done to break the tie. Based on the outcome of LOT, subsequent tender ranking will be revised. Load distribution shall be based on revised ranking. The LOT process to break tie in tender ranking will be based on random number generation in MS-Excel sheet.

Tie breaking procedure has been explained below with an example:

There is an item (item sl. no. 210) for which tie breaking has to be conducted. Hence, the lot will be based on random number generation in MS-Excel sheet.

1. Item wise excel sheet in which all ranks for which tie is present shall be opened.
2. Random number shall be generated against each entry in the excel sheet. Once random number is generated, the values will be frozen against each entry.
3. The rank order shall be sorted in the following manner.
Sorting -> 1. Item -> 2. Actual rank -> 3. Random number wise (from lowest to highest).
Once sorting is done, each vendor shall be ranked as per the sorting order.

• Illustration:

Step-1: Before Sorting:

Item No.	Vendor code	ORIGINAL Rank before CO
210	A	L01
210	B	L02
210	C	L03
210	D	L03
210	E	L04
210	F	L05
210	G	L05
210	H	L06

Step-2: After random number generation

Item No.	Vendor code	ORIGINAL Rank before CO	Random Number
210	A	L01	0.639156
210	B	L02	0.931402



BHARAT HEAVY ELECTRICALS LTD

VALVES PURCHASE

Trichy - 620 014, India

GENERAL TERMS AND CONDITIONS

Enquiry Reference: RC-SAC-011

210	C	L03	0.560449
210	D	L03	0.507298
210	E	L04	0.621819
210	F	L05	0.620683
210	G	L05	0.504936
210	H	L06	0.793407

Step-3: Final sorting and revised ranking:

Item No.	Vendor code	ORIGINAL Rank before CO	Random Number	Final Revised Rank
210	A	L01	0.639156	L01
210	B	L02	0.931402	L02
210	D	L03	0.507298	L03
210	C	L03	0.560449	L04
210	E	L04	0.621819	L05
210	G	L05	0.504936	L06
210	F	L05	0.620683	L07
210	H	L06	0.793407	L08

Final revised ranking shall be intimated to vendors. Final revised ranking shall be worked out based on the result of tie-breaking and counter offering process shall be based on the final revised ranking.

L1 rate shall be counter offered to eligible Vendors in respective enquiry items in order of the distinct ranking arrived after tie-breaking process has been concluded.

9. INTEGRITY PACT (IP)

- a. IP is a tool to ensure that activities and transactions between Company and its Bidders/Contractors are handled in a fair, transparent and corruption free manner. Following Independent External Monitors (IEMs) on the present panel have been appointed by BHEL with the approval of CVC to oversee implementation of IP in BHEL.

Sl.	IEM	Email
1	Shri Otem Dai, IAS (Retd.)	iem1@bhel.in
2	Shri Bishwamitra Pandey, IRAS (Retd.)	iem2@bhel.in
3	Shri Mukesh Mittal, IRS (Retd.)	iem3@bhel.in

- b. If IP is applicable for the enquiry, the IP as enclosed with the tender is to be submitted (duly signed by authorized signatory) along with the techno-commercial bid (Part-I, in case of two/three part bid). Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this pact would be a preliminary qualification.
- c. Please refer Section-8 of the IP for Roles and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to any of the above IEM(s). All correspondence with the IEMs shall be done through email only.



Maharatna Company

BHARAT HEAVY ELECTRICALS LTD

VALVES PURCHASE

Trichy - 620 014, India

GENERAL TERMS AND CONDITIONS

Enquiry Reference: RC-SAC-011

Note:

No routine correspondence shall be addressed to the IEM (phone/post/email) regarding the clarifications, time extensions or any other administrative queries etc. on the tender issued. All such clarifications / issues shall be addressed directly to the tender issuing (procurement) department's officials whose contact details are provided below

(1)

Avinash V

Dy. Manager

Valves Purchase

24 Building, 3rd Floor,

BHEL, Trichy-620014

+91 431 2574797

vavinash@bhel.in

(2)

Ajay Kumar Gupta

Addl General Manager

Valves Purchase

24 Building, 3rd Floor,

BHEL, Trichy-620014

+91 431 2578156

ajaykumar.gupta@bhel.in

Certificate by Chartered Accountant on letter head

This is to Certify that M/s
 (hereinafter referred to as 'company') having its registered office at
 is registered under MSMED Act 2006, (Enterprise
 Memorandum No (Part-II) dtd:.....,
 Category: (Micro/Small), (Copy enclosed).

Further verified from the Books of Accounts that the Investment of the company as per the latest audited financial year as per MSMED Act 2006 is as follows:

1. **For Manufacturing Enterprises:** Investment in plant and machinery (i.e. original cost excluding land and building and the items specified by the Ministry of Small Scale Industries vide its notification No.S.O.1722(E) dated October 5,2006:
 Rs. Lacs
2. **For Service Enterprises:** Invest in equipment (i.e. original cost excluding land and building and furniture, fittings and other items not directly related to the service rendered or as may be notified under the MSMED Act, 2006:
 Rs. Lacs

(Strike off whichever is not applicable)

The above investment of Rs.....Lacs is within permissible limit of Rs.....Lacs for..... Micro/Small (Strike off which is not applicable) Category under MSMED Act 2006.

Or

The company has been graduated from its original category (Micro/Small) (Strike off which is not applicable) and the date of graduation of such enterprise from its original category is (dd/mm/yyyy) which is within the period of 3 years from the date of graduation of such enterprise from its original category as notified vide S.O.No. 3322(E) dated 01.11.2013 published in the gazette notification dated 04.11.2013 by the Ministry of MSME.

Date:

(Signature)

Name -

Membership number -

Seal of Chartered Accountant

Annexure-A

CERTIFICATE to be provided on vendor letterhead LOCAL CONTENT DECLARATION

In line with the Government Public Procurement, Order No. P-45021/2/2017-PP (BE-II) dated 28.05.2018 and its revisions/amendments, we hereby certify that we,

Supplier Name:

with Vendor Code, are local supplier meeting requirement of minimum local content (.....%) defined in as above orders for the following items in Bid Number:
(e.g. GEM/2021/B/XXXXXXXX or ENSSB0XXXX)

- Mention Applicable Schedule Nos -

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

.....
.....

By issuing this declaration, we understand and are in acceptance to the following-

- False declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the General Financial Rules along with such other actions as may be permissible under law.
- In case of debarment by any procuring entity for violation of the provisions of the Public Procurement (Preference to Make in India), Order 2017 we shall not be eligible for preference for procurement by any other procuring entity for the duration of the debarment. The debarment for such other procuring entities shall take effect prospectively from the date on which it comes to the notice of other procurement entities, the debarment takes effect prospectively from the date of uploading on the website(s) of The Department of Expenditure, GOI in such a manner that ongoing procurements are not disrupted.
- We undertake the onus of responsibility of submission of appropriately certified documents. We understand that BHEL is not at liability to verify the contents and will not be responsible for the declaration made by us. However, in case BHEL has any reason to doubt the authenticity of the local content, BHEL reserves the right to obtain the complete back up calculations before award of contract and we are liable to submit the same if requested by BHEL. We also understand that our bid is liable for rejection in case we fail to submit the details as requested by BHEL.

Date:

Seal and Signature of authorized signatory

INTEGRITY PACT

Between

Bharat Heavy Electricals Ltd. (BHEL), a company registered under the Companies Act 1956 and having its registered office at "BHEL House", Siri Fort, New Delhi - 110049 (India) hereinafter referred to as "The Principal", which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the ONE PART

and

_____, (description of the party along with address), hereinafter referred to as "The Bidder/ Contractor" which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART

Preamble

The Principal intends to award, under laid-down organizational procedures, contract/s for

_____. The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

In order to achieve these goals, the Principal will appoint Independent External Monitor(s), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1- Commitments of the Principal

1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-

1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.

1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/ additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.

1.1.3 The Principal will exclude from the process all known prejudiced persons.

1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions:

Section 2 - Commitments of the Bidder(s)/ Contractor(s)

- 2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.
- 2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he/ she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
- 2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
- 2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant Indian Penal Code (IPC) and Prevention of Corruption Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
- 2.1.4 Foreign Bidder(s)/ Contractor(s) shall disclose the name and address of agents and representatives in India and Indian Bidder(s)/ Contractor(s) to disclose their foreign principals or associates. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
- 2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.
- 2.3 The Bidder(s)/ Contractor(s) shall not approach the Courts while representing the matters to IEMs and will await their decision in the matter.

Section 3 - Disqualification from tender process and exclusion from future contracts

If the Bidder(s)/ Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/ Contractor(s) from the tender process or take action as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

Section 4 - Compensation for Damages

- 4.1 If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent Earnest Money Deposit/ Bid Security.
- 4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to section 3, the Principal shall be entitled to

demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher.

Section 5 - Previous Transgression

- 5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.
- 5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

Section 6 - Equal treatment of all Bidders/ Contractors / Sub-contractors

- 6.1 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors. In case of sub-contracting, the Principal contractor shall be responsible for the adoption of IP by his sub-contractors and shall continue to remain responsible for any default by his sub-contractors.
- 6.2 The Principal will disqualify from the tender process all bidders who do not sign this pact or violate its provisions.

Section 7 - Criminal Charges against violating Bidders/ Contractors /Subcontractors

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

Section 8 - Independent External Monitor(s)

- 8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.
- 8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.
- 8.3 The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/ Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s) / Sub-contractor(s) with confidentiality in line with Non- disclosure agreement.
- 8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

- 8.5 The role of IEMs is advisory, would not be legally binding and it is restricted to resolving issues raised by an intending bidder regarding any aspect of the tender which allegedly restricts competition or bias towards some bidders. At the same time, it must be understood that IEMs are not consultants to the Management. Their role is independent in nature and the advice once tendered would not be subject to review at the request of the organization.
- 8.6 For ensuring the desired transparency and objectivity in dealing with the complaints arising out of any tendering process, the matter should be examined by the full panel of IEMs jointly as far as possible, who would look into the records, conduct an investigation, and submit their joint recommendations to the Management.
- 8.7 The IEMs would examine all complaints received by them and give their recommendations/ views to CMD, BHEL, at the earliest. They may also send their report directly to the CVO and the Commission, in case of suspicion of serious irregularities requiring legal/ administrative action. IEMs will tender their advice on the complaints within 10 days as far as possible.
- 8.8 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.
- 8.9 IEM should examine the process integrity, they are not expected to concern themselves with fixing of responsibility of officers. Complaints alleging mala fide on the part of any officer of the organization should be looked into by the CVO of the concerned organisation.
- 8.10 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant Indian Penal Code/ Prevention of Corruption Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- 8.11 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.
- 8.12 The word 'Monitor' would include both singular and plural.

Section 9 - Pact Duration

- 9.1 This Pact shall be operative from the date IP is signed by both the parties till the final completion of contract for successful bidder and for all other bidders 6 months after the contract has been awarded. Issues like warranty / guarantee etc. should be outside the purview of IEMs.
- 9.2 If any claim is made/ lodged during currency of IP, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/ determined by the CMD, BHEL.

Section 10 - Other Provisions

- 10.1 This agreement is subject to Indian Laws and jurisdiction shall be registered office of the Principal, i.e. New Delhi.

10.2 Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

10.3 If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.

10.4 Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

10.5 Only those bidders / contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

For & On behalf of the Principal

(Office Seal)

Place-----

Date-----

Witness:_____

(Name & Address) _____

For & On behalf of the Bidder/

Contractor

(Office Seal)

Witness:_____

(Name & Address) _____

PART - A
QUALIFYING CRITERIA FOR MULTI TURN ELECTRICAL ACTUATOR

S.No.	BHEL Specification	Vendor's Offer
1.0	QUALIFYING CRITERIA	
1.1	<p>Only those vendors who have designed, manufactured and supplied Multi turn Electrical Actuator meeting the following requirements shall quote:</p> <ol style="list-style-type: none"> 1. a) Multi turn Electrical Actuator should have been supplied to minimum two power plants in India and working satisfactorily for more than one year after commissioning (as on date of opening of Tender). At least one Performance Certificate from their customers, for satisfactory performance of supplied Multi turn Electrical actuator quoted against this enquiry, for a minimum period of one year (as on date of opening tender), shall be furnished. Or b) Suppliers who have executed supplies of multi turn electrical actuators to BHEL shall furnish copy of PO and proof of supply and acceptance at BHEL. The PO copy and documentary proof shall be atleast two years prior to the date of tender opening. 2. Vendor shall furnish Endurance Type test reports of each of the offered actuator models. 3. Actuator shall have minimum Two numbers adjustable torque switches (one for open and one for close) each with 2 NO and 2 NC potential free contacts. 4. Actuator shall have minimum Two numbers of position limit switches (one for open and one for close) each with 2 NO and 2 NC potential free contacts and Two Auxiliary limit switches (one for open and one for close) each with 2 NO and 2 NC potential free contacts. 5. Use of additional gear boxes for achieving the specified torque indicated in our specification is not acceptable 	
1.2	BHEL reserves the right to verify the information provided by the vendor. In case the information provided by the vendor is found to be false/ incorrect, the offer shall be rejected.	

PART - A
QUALIFYING CRITERIA FOR MULTI TURN ELECTRICAL ACTUATOR

2.0	INFORMATION TO BE PROVIDED BY VENDOR	
	The following details shall be provided for the Multi turn Electrical actuator for which the performance certificate has been furnished	
2.1	Name and address of the customer along with contact details of the concerned person	
2.2	Name and location of the power plant	
2.3	No. of units and MW rating of the power plant	
2.4	Name of the system in which these Multi turn Electrical actuators are used	
2.5	Maximum Rating of Multi turn Electrical actuators provided	
2.6	Model No. of the Multi turn Electrical actuator supplied	



365-147/B
31.08.16

BHEL – Tiruchirappalli – 620014,
India

Valves Engineering and R&D

PURCHASE SPECIFICATION

DOC No: **SPEC:AC:001** Rev: **08**

Effective Date: **23/06/2022**

Page: **1** of **19**

Product: Specification for Electrical Actuator

Revision Record:

Rev. No	Date	Details of Revision
04	01 January 2005	Specification updated for Rate contract
05	21 December 2005	High torque actuator requirement included
06	01 November 2013	Specification updated for Rate contract. Std. wiring diagrams added
07	20 August 2020	Specification format changed. Updated to take care Spring loaded type actuator.
08	27 May 2022	Packing procedure and Test requirements for Actuators, Cable Lugs requirement included.

IMPORTANT INSTRUCTIONS:

- Vendor shall furnish point-to-point confirmation / deviation to each clause of this specification explicitly.**
- The offer shall be submitted along with all the documents required in this specification. Offer without all supporting documents requested in this specification will not be considered.**

Clause. No	Specification requirement	Vendor confirmation / comments / deviation
G.0	G E N E R A L	
G.1.0	ENCLOSURE:	
G.1.1	Actuators shall be of totally enclosed weather proof and dust proof construction with min. IP 68 enclosure and shall be suitable for outdoor applications. The actuator should be capable of operating in ambient temperature of -20 deg.C to +70 deg.C.	
G.2.0	VOLTAGE:	
G.2.1	The unit shall be suitable for operation on a 415V, 3 phases, 50Hz. -3 wire system for actuator with integral starters. -4 wire system for actuator without integral starters.	
G.3.0	CONSTRUCTION:	
G.3.1	Actuators shall have provision to accommodate raising spindle of the valve and the hole shall be properly covered with a removable lid. The actuator shall be supplied with stem protection tube to accommodate larger spindle travel as indicated elsewhere in this specification. All the above parts, i.e. The threaded portion of actuator, removable lids and stem protection tubes shall be able to withstand the prolonged outdoor storage without getting rusted or damaged.	
G.3.2	The actuator shall be suitable for mounting directly on the valve. The actuator shall be capable of giving the required torque, rpm and thrust. The actuator shall be suitable for mounting in any position. Indicate the adjustable range of torque and starting torque of actuator in kgm/Nm for each actuator offered. The maximum thrust capability of the actuators shall also be furnished. The actuators shall be designed to take the full thrust. All Gears used shall be metallic. Fiber gears are not acceptable. Metallic gear trains used shall be self-locking to prevent drift under torque switch (wherever applicable) spring pressure when motor is de energised.	



365-147/B
31.08.16

BHEL – Tiruchirappalli – 620014,
India

Valves Engineering and R&D

PURCHASE SPECIFICATION

DOC No: **SPEC:AC:001 Rev: 08**

Effective Date: **23/ 06/ 2022**

Page: **2 of 19**

Product: Specification for Electrical Actuator

Clause No	Specification requirement	Vendor confirmation / comments / deviation
G.3.3	Actuator shall have thrust base with blank removable adaptor bush of aluminum bronze, which can be threaded to accommodate raising spindles of valve. NI-Resist material shall be supplied as optional if required.	
G.3.4	The exact mounting arrangement with dimensions shall be clearly furnished in the enclosed drawing. The flange dimension shall be as per DIN/ISO standard. For high torque actuator mounting dimensions shall be as per the BHEL approved dimensions.	
G.3.5	The dimension drawing of the blank adopter bush shall be furnished in the enclosed drawing.	
G.3.6	Each actuator shall have a hand wheel fitted on it for manual operation in case of power failure. It shall be possible to fully open /close the valve with the hand wheel. The hand wheel shall be designed such that its engaging lever declutches automatically when the power supply to the motor is restored. The material of the hand wheel shall be either malleable iron or steel. The hand wheel-engaging lever shall give trouble free performance under repeated operations. Side mounted hand wheel with gear can be offered as optional. The hand wheel construction shall be strong enough to withstand the impacts of normal handling and storage of actuator without any damage. The hand wheel shall be able support the weight of the actuator, without any damage to actuator or hand wheel, when actuator is rested on the hand wheel.	
G.3.7	Actuators offered shall be with self-locking worm.	
G.3.8	Actuators shall have provision to set the Torque value from 40% of the maximum Torque mentioned in the below Table 1 .	
G.4.0	SPRING LOADED / THRUST COMPENSATOR ASSEMBLY OUTPUT DRIVE	
G.4.1	Spring loaded (or) thrust compensator drive assembly shall be provided wherever " AF " indicated in the actuator requirement Ref (Table 2). This drive assembly is required to take care of high dynamic thrust, which will be developed during multistage reduction process.	
G.5.0	REVOLUTIONS:	
G.5.1	Desired output shaft speeds are given below for different torque ranges. Actual speeds of actuators offered shall be clearly indicated.	
G.6.0	WEIGHT:	
G.6.1	Furnish weight of actuator including all accessories.	
G.7.0	LUBRICANT:	
G.7.1	Oil plugs shall be provided for filling and draining.	



365-147/B
31.08.16

BHEL – Tiruchirappalli – 620014,
India

Valves Engineering and R&D

PURCHASE SPECIFICATION

DOC No: **SPEC:AC:001 Rev: 08**

Effective Date: **23/ 06/ 2022**

Page: **3 of 19**

Product: Specification for Electrical Actuator

Clause No	Specification requirement	Vendor confirmation / comments / deviation
G.7.2	<p>The gearbox of the actuator shall be oil filled or grease filled. The oil/grease must be suitable for operation for 80 Deg. above ambient temperature. Furnish detail of lubricant used with Indian oil Company's BPCL , IOCL & HPCL's equivalent. The actuator shall have proper seals to prevent leakage of oil at all installation positions.</p> <p>The actuator construction shall be such that the oil/grease does not leak to other compartments or outside. In case of any complaint of such leakage, the complaint shall be attended free of cost within one week and root cause of the problem shall be eliminated within one month.</p>	

TABLE 1

Sl.no	Max.Torque (Kg-M)	RPM (Approx)	Output flange details in mm (LD x PCD x Bolt details)	Stem Protection Cover in mm
1	3	18	F10 (60 x 102 x 4Nos M10)*	100
2	6	24	F10 (60 x 102 x 4Nos M10)*	100
3	6	36	F10 (60 x 102 x 4Nos M10)*	150
4	15	36	F10 (60 x 102 x 4Nos M10)*	150
5	30	36	F14 (100 x 140 x 4Nos M16)*	250
6	30	96	F14 (100 x 140 x 4Nos M16)*	300
7	50	36	F16 (127 x 165 x 4Nos M20)*	300
8	60	96	F14 (100 x 140 x 4Nos M16)*	450
9	60	72	F14 (100 x 140 x 4Nos M16)*	450
10	80	36	F25 (152x254 x 8Nos M16)*	400
11	100	36	F25 (152x254 x 8Nos M16)*	500
12	100	96	F16 (130 x 165 x 4Nos M20)*	500
13	200	24	F25 (152x254 x 8Nos M16)*	500
14	300	24	F30 (177.8x298.5-8NOS M20)*	400
15	400	32	F30 (177.8x298.5-8NOS M20)*	400
16	800	22	F35 (215.9x355.6-8 NOS M24)*	450
17	1100	22	F40 (228.6x406.4-8 NOS M30)*	500
18	1600	22	F40 (228.6x406.4-8NOS M30)*	500

TABLE 2

Sl.No	Max.Torque (Kg-M)	RPM (Approx)	Out put flange details in mm (LD x PCD x Bolt Details.)	Stem Protection Cover in mm	Output drive type
1	15	36	F14 (100 x 140 x 4Nos M16)*	250	Spring loaded/ Thrust compensator assembly
2	25	36	F14 (100 x 140 x 4Nos M16)*	300	

***-Vendor has to adhere this BHEL's specific requirement**



365-147/B
31.08.16

BHEL – Tiruchirappalli – 620014,
India

Valves Engineering and R&D

PURCHASE SPECIFICATION

DOC No: **SPEC:AC:001 Rev: 08**

Effective Date: **23/06/2022**

Page: **4 of 19**

Product: Specification for Electrical Actuator

Clause No	Specification requirement	Vendor confirmation / comments / deviation
G.8.0	DIMENSIONAL CATALOGUES (In English language)	
G.8.1	Three copies of catalogues of the actuators describing the constructional details, over all dimensions of the actuators, maximum spindle acceptance diameters and other details called for in the specification.	
G.9.0	O & M INSTRUCTION MANUALS: (In English language)	
G.9.1	O&M manual should have the procedure for safe disposal of items of failed actuator components along with O & M instruction. i) One Hard copy of Operating and Maintenance Instruction Manual along with wiring diagram shall accompany each actuator ordered. ii) One set soft copy O&M along with wiring diagram should be submitted before actuator dispatch.	
A.0	ACCESSORIES	
A.1.0	TORQUE SWITCHES:	
A.1.1	Two numbers adjustable torque switches (one for open and one for close) each with 2 NO and 2 NC potential free contacts. The type of torque switch like rotary/cam shall be mentioned in the data sheet.	
A.1.2	The torque switches shall have accuracy of plus or minus 5% of set value.	
A.1.3	A scale shall be provided for each torque switch to set required torque. Each division shall indicate actual value of torque. The scale-setting knob shall have locking screw to avoid any setting disturbance at site due to line vibration.	
A.1.4	Actuators shall have provision for bypassing the torque switch during initial 5% opening of valves. Details for this must be indicated in the wiring diagram.	
A.1.5	The wiring diagram shall include details of changes to be done for making the actuator suitable for torque seating or position seating valves.	
A.2.0	LIMIT SWITCHES:	
A.2.1	Two numbers of position limit switches (one for open and one for close) each with 2 NO and 2 NC potential free contacts. The type of limit switch like rotary/drum/cam type shall be mentioned in the data sheet.	
A.2.2	Two Auxiliary limit switches (one for open and one for close) each with 2 NO and 2 NC potential free contacts.	
A.2.3	Each limit switch shall be capable of being set to trip at any position independently between fully open and fully closed position.	
A.2.4	Limit switches and torque switches shall be weather proof suitable for damp atmospheres, and shall not cause any trouble during commissioning and operation. Further the operating mechanism of the switches (like shafts, gears, cams, metallic parts etc) shall be able with stand exposure to damp atmosphere for long time without getting rusting or damaged. If any such damage is reported it shall be attended free of cost within one week and root cause of the problem shall be eliminated within one month.	
A.2.5	The torque and position limit switches shall be suitable for the following ratings, both 240 volts, AC, 5 amps and 220 volts DC, 0.5 amps. The insulation level between each set of contacts shall be minimum of 1.2KV for 1min.	



365-147/B
31.08.16

BHEL – Tiruchirappalli – 620014,
India

Valves Engineering and R&D

PURCHASE SPECIFICATION

DOC No: **SPEC:AC:001 Rev: 08**

Effective Date: **23/06/2022**

Page: **5 of 19**

Product: Specification for Electrical Actuator

Clause No	Specification requirement	Vendor confirmation / comments / deviation
A.3.0	LOCAL POSITION INDICATORS:	
A.3.1	Each actuator shall have a local position indicator to indicate 0 to 100% of valve travel.	
A.3.2	The actuator shall be suitable for operating different valve size with varying lifts. The actuators shall have adjustable gear for the local position indicator so that accurate indication of valve position can be obtained for all valve lifts by adjusting the gears. The gears selection chart for setting of local position indicator and mechanical transmitter for different valve lifts (output shaft revolutions) shall be furnished. Also one set of change gears shall be supplied along with each actuator, alternately the change gears/spacers shall be supplied in sufficient quantities whenever required.	
A.4.0	ANTI-CONDENSATION HEATER (SPACE HEATER):	
A.4.1	Each actuator shall have an anti-condensation heater in the limit switch compartment. In case of integral starter actuator, the space heater supply shall be derived internally, if integral starter is not available it shall be suitable for 240V AC 50 Hz single phase supply. The wattage of the heater shall be specified in the data sheet and wiring diagram.	
A.5.0	REMOTE POSITION TRANSMITTER:	
A.5.1	Open/Close actuator shall have two Nos. of resistance type position transmitter for remote indication. Rating of position transmitter 100ohms, 50 Volts, AC/DC. A suitable fixed dropping resistor must be put in series for limiting the power consumption.	
A.5.2	For regulating and inching duty applications, actuators shall have one electronic position transmitter (EPT), suitable for 24V DC with an output of 4-20mA and 2 wire. LVDT type transmitter shall be supplied wherever indicated.	
M.0	MOTORS	
M.1.0	POWER SUPPLY:	
M.1.1	Motor shall be suitable for operation on a 415V, 3 phase, 3 wire ungrounded supply system.	
M.1.2	Motor shall operate without any trouble under the following conditions. a. If the voltage varies within plus or minus 10% of the rated value of 415 Volts. b. If the frequency of the power source varies within plus or minus 5% of 50 Hz. c. If the voltage and frequency of the source vary simultaneously and the sum of the absolute percentage values in variation does not exceed 10%.	
M.2.0	CONSTRUCTION:	
M.2.1	Motor shall be totally enclosed with min IP68 weatherproof enclosure and shall be suitable for outdoor installation without canopy. In case of any water leakage due to enclosure failure it shall be attended free of cost within one week and root cause of the problem shall be eliminated within one month.	
M.2.2	Motor shall be conforming to BS 2613-70, IS 325 or any other equivalent international standard for all requirements unless otherwise specified herein.	



365-147/B
31.08.16

BHEL – Tiruchirappalli – 620014,
India

Valves Engineering and R&D

PURCHASE SPECIFICATION

DOC No: **SPEC:AC:001 Rev: 08**

Effective Date: **23/06/2022**

Page: **6 of 19**

Product: Specification for Electrical Actuator

Clause No	Specification requirement	Vendor confirmation / comments / deviation
M.2.3	Motor shall be painted with corrosion proof & weather proof paint. Painting colour scheme shall be as per BHEL's requirement, which will be informed after placement of order.	
M.3.0	INSULATION:	
M.3.1	Motor shall have class F non-hygroscopic insulation with tropicalisation suitable for polluted dusty and corrosion atmospheres of relative humidity 100%. Motor shall be designed for the design ambient temp. However, the temperature rise of the motor winding shall be limited to the maximum temperature allowed for class 'B' insulation. It shall also be possible to rewind the motor in case the windings and insulation get burnt out.	
M.4.0	RATING:	
M.4.1	Motors shall be S2-15 min. rating. This shall not be less than the highest of the following: 1) Fifteen minutes. 2) As required for three successive open/close operations. 3) As required for the service. The motor shall be suitable for min 60 starts/hr. for on/off and 150 starts/hr. for inching duty application. 600 and 1200 starts/hour shall be given as optional.	
M.5.0	STARTING:	
M.5.1	Motor shall be suitable for direct on-line starting.	
M.5.2	Starting current shall be limited to 6 times the full load current.	
M.5.3	Motor shall be capable of 1. Starting at 85% of rated voltage. 2. Running at 80% of rated voltage for a period of 5 minutes, at 1/3 load. 3. The torque at reduced supply voltage shall be mentioned for 75% voltage, 80% voltage, 85% voltage & 90% voltage.	
M.6.0	BEARINGS:	
M.6.1	Bearing shall be of double shielded, grease lubricated antifriction type. The anticipated bearing life shall be indicated for all models.	
M.7.0	EARTHING TERMINALS:	
M.7.1	Two earthing terminals shall be provided on either side of the motor.	
M.8.0	MOTORS:	
M.8.1	Motors shall be provided with three numbers of Thermostats, one in each winding, for over load protection.	
M.9.0	MOTOR DATA:	
M.9.1	One set of hard and soft copies of motor data sheets for each type of actuators ordered shall be furnished as per format furnished.	
M.10.0	WEIGHT	
M.10.1	Weight of the actuator with and without starter shall be furnished separately along with the offer.	
M.11.0	TESTS:	
M.11.1	Tests shall be carried out as per approved QP.	



365-147/B
31.08.16

BHEL – Tiruchirappalli – 620014,
India

Valves Engineering and R&D

PURCHASE SPECIFICATION

DOC No: **SPEC:AC:001 Rev: 08**

Effective Date: **23/06/2022**

Page: **7 of 19**

Product: Specification for Electrical Actuator

Clause No	Specification requirement	Vendor confirmation / comments / deviation
C.0	CONTROLS	
C.1.0	INTERNAL WIRING:	
C.1.1	Internal wiring diagram shall be neatly pasted on cover of terminal box.	
C.1.2	Internal wiring shall be done with 1.5 sq.mm PVC insulated copper wires. Ferrules should be provided on both ends of the wire for easy identification.	
C.2.0	FEATURES APPLICABLE TO INTEGRAL STARTER	
C.2.1	Control supply shall be derived with step down transformer from 415V, 3 PH, 50Hz incoming supply (For AC actuator only). Necessary primary and secondary fuses shall be provided. All the PCBs shall be protected against moisture by suitable coating and treatment - in case of failure of PCBs due to moisture entry it shall be attended free of cost within one week and root cause of the problem shall be eliminated within one month.	
C.2.2	Automatic phase correction facility and single phasing prevention shall be available.	
C.2.3	Pad lockable Selector switch for LOCAL-OFF-REMOTE selection with OPEN-STOP-CLOSE push buttons (for local operation) shall be provided.	
C.2.4	It should also be possible to reverse the direction of travel for inching valves (in LOCAL and REMOTE) without giving stop command.	
C.2.5	In addition to mechanical dial position indicator, lamp indication for full open, full close and in-travel positions shall be provided.	
C.2.6	Electrically and mechanically interlocked contactors shall be provided for forward and reverse operation. Contactor rating shall be sufficient to withstand the extreme conditions like valve jamming and instantaneous reversal of motor.	
C.2.7	Potential free contacts for LOCAL-OFF-REMOTE positions shall be wired to terminals and available for customer connections.	
C.2.8	Open/Close command termination logic with position and torque limit switches shall be suitably built in the PCB inside the actuator.	
C.2.9	The selection of the following mode shall be available locally on actuator through suitable switch programming. It shall also be clearly described in wiring diagram. a) Valve seating by torque switch (close) or limit switch (close) shall be available. b) Inching (non self-retaining) or non-inching (self-retaining) for remote command and local mode shall be field configurable.	
C.2.10	Provision shall be there for bypassing the torque switch during initial 5% opening and closing of valves. Details for this must be indicated in the wiring diagram. This shall be done through electronic circuit or through one 'NC' contact of 'limit switch'.	
C.2.11	A minimum of '1NO+1NC' contact of Main limit switches and torque switches shall be available for customer use. All the contacts of aux. Limit switches shall also be available for customer use.	



365-147/B
31.08.16

BHEL – Tiruchirappalli – 620014,
India

Valves Engineering and R&D

PURCHASE SPECIFICATION

DOC No: **SPEC:AC:001** Rev: **08**

Effective Date: **23/06/2022**

Page: **8** of **19**

Product: Specification for Electrical Actuator

Clause No	Specification requirement	Vendor confirmation / comments / deviation
C.2.12	Actuator shall be suitable for remote operation by potential free contacts for open / close and stop, the necessary 24V DC power supply shall be derived internally. Also It shall be possible to energize the interposing relays provided (with coil burden $\leq 2.5VA$, one for open and one for close) to initiate opening and closing by 24V DC signal from the external control system.	
C.2.13	24V Power supply for EPT shall be derived internally.	
C.2.14	Thermal overload relay shall be provided in addition to thermostats embedded in motor winding. Overload relay and thermostats shall be connected in control circuit to trip actuator in case of overload. OLR set value shall be mentioned in wiring diagram / Data sheets .	
C.2.15	A common potential free contact (monitoring relay) shall be available to annunciate the following faults. a) Thermostat trip b) OLR trip c) Valve jammed in mid-travel. d) Motor single phasing. e) Power failure. f) Local stop or local/remote selector switch in local mode.	
C.2.16	The following status annunciation shall be made available locally (integral to actuator) a) Actuator running in OPEN b) Actuator running in CLOSE c) Internal 24V DC Control voltage healthy d) 24V DC availability for customers use healthy.	
C.2.17	The following individual fault annunciation shall be made available locally (integral to Actuator) for easy trouble shooting a) Torque switch OPEN b) Torque switch CLOSE c) Thermostat trip d) Thermal overload relay trip e) Motor single phasing	
C.2.18	BLINKER RELAY: Blinker relay contact for remote indication of 'actuator running' is to be provided as a standard part of integral starter actuator.	
C.3.0	TERMINAL BOX:	
C.3.1	All terminals of position limit switches, torque limit switches, space heaters and position transmitters shall be brought to a common terminal board. The terminals shall be clip-on type/screw type with sufficient insulation between 2 adjacent terminals. All terminals must be suitable for 2 nos. of 2.5 sq.mm wires. All the Actuators are to be provided with one set of copper lugs ring type (03 nos) in terminal box with suitable power rating and cable size for power cable termination at actuator end Power cable size is given below Ref (Table 03).	



365-147/B
31.08.16

BHEL – Tiruchirappalli – 620014,
India

Valves Engineering and R&D

PURCHASE SPECIFICATION

DOC No: **SPEC:AC:001 Rev: 08**

Effective Date: **23/ 06/ 2022**

Page: **9 of 19**

Product: Specification for Electrical Actuator

Clause No	Specification requirement	Vendor confirmation / comments / deviation
C.3.2	Minimum 10 numbers of terminals shall be available in the terminal board as spare terminals.	
C.3.3	Terminal box of actuator shall be weather proof and have enough space for connecting three numbers of PVC insulated unarmoured copper conductor control cable 19-pair / 1.5 sq.mm. One Number PVC insulated unarmoured copper / aluminium conductor power cable with sizes as indicated in clause C.3.1. Motor terminals shall be of stud type, screw type and press fit type depending on the power rating. Terminal box shall be fitted with a removable front cover plate.	
C.3.4	DEFAULT SETTING OF TORQUE SWITCH, DIAL INDICATOR ON AND TORQUE/LIMIT CLOSING. The requirement of the default setting of torque switch, dial indicator and torque closing/limit closing selections are already provided by BHEL for all models. The same has to be followed. The list of default setting to be included in the documents.	
C.4.0	CABLE GLAND:	
C.4.1	Actuators are to be provided as a standard with one cable gland for power and minimum 3 cable gland for control (or) two plug & sockets for control to be provided (In case of flameproof actuator 3 cable glands for control to be provided). The cable gland details along with the cable OD that can be accommodated is indicated below. If any other cable size is envisaged this will be informed during order stage. However for actuators with plug and socket, minimum necessary cable glands shall be provided. All the cable glands shall be of double compression type. Power cable size is given below. The cable entries shall be closed with metallic gland plug with suitable sealing (like 'o' ring) to ensure IP68 protection.	
C.4.2	Preferably all the cable glands shall be provided on one direction (face) only. Wherever this is not technically feasible, the cable gland on the second side shall be provided with necessary elbows, so that all glands will be facing at one side.	

TABLE 3

KW	DESC	OD
UPTO 3 KW	3 Core x 2.5Sq.mm Copper unarmored PVC insulated	14±2mm
Above 3 to 7 KW	3 Core x 6Sq.mm Aluminum unarmored PVC insulated	17±2mm
Above 7 to 13 KW	3 Core x 16Sq.mm Aluminum unarmored PVC insulated	20±2mm
Above 13 to 24 KW	3 Core x 35Sq.mm Aluminum unarmored PVC insulated	25±2mm
Above 24 to 37 KW	3 Core x 70Sq.mm Aluminum unarmored PVC insulated	31±2mm



365-147/B
31.08.16

BHEL – Tiruchirappalli – 620014,
India

Valves Engineering and R&D

PURCHASE SPECIFICATION

DOC No: **SPEC:AC:001** Rev: **08**

Effective Date: **23/06/2022**

Page: **10** of **19**

Product: Specification for Electrical Actuator

Clause No	Specification requirement	Vendor confirmation / comments / deviation
C.5.0	FEATURES APPLICABLE TO FLAME PROOF ACTUATORS	
C.5.1	STANDARDS	
C.5.1.1	Actuators meant for hazardous area shall meet the requirements of latest IS 2148/IEC60079, IEC – 79 or equivalent International Standards.	
C.5.1.2	Indigenous equipment shall be certified by CIMFR and approved by PESO and DGFASLI and shall carry the BIS License Marking. All the certification shall be valid at the time of delivery.	
C.5.1.3	Imported equipment shall be tested and certified by an independent certifying agency of country of equipment origin.	
C.5.2	ENVIRONMENT:	
C.5.2.1	Area Classification: Class 1, Division 1, Zone 1	
C.5.2.2	Gas Group: IIA & IIB. - IIC if specified	
C.5.2.3	Temperature Class (As per IEC-79): T3 (200 Deg. C) T4 if specified	
C.5.2.4	Construction: Flame Proof Ex (d) as per IS 2148/IEC60079	
C.5.3	CABLE GLANDS: Flame proof, double compression Nickel plated brass cable glands shall be provided for conduit entries. Unused entries shall be plugged with flame proof plugs.	
D.0	DOCUMENTATION REQUIREMENTS	
D.1.0	The following documents are to be furnished along with offer and after ordering	
	a. GA drawings for all models including dismantling clearances.	
	b. The dimension drawing of the blank adopter bush	
	c. Data sheet for all models. Along with weight of the actuator	
	d. Dimensional catalogue with maximum spindle acceptance details	
	e. Wiring diagram for all models.	
	f. Gear selection chart for setting of local position indicator	
	g. Outline dimension of assembled motor.	
	h. Outline dimension of actuator.	
	i. Dimensional drawing of terminal showing the method of terminating incoming cables.	
	j. CIMFR Test Certificates for Flame proof Actuator	
	k. Approvals of PESO and DGFASLI for Flame proof Actuator	
	l. BIS License for Flame proof Actuator	
	m. General arrangement drawing of actuator consisting following as minimum.	



365-147/B
31.08.16

BHEL – Tiruchirappalli – 620014,
India

Valves Engineering and R&D

PURCHASE SPECIFICATION

DOC No: **SPEC:AC:001 Rev: 08**

Effective Date: **23/ 06/ 2022**

Page: **11 of 19**

Product: Specification for Electrical Actuator

Clause No	Specification requirement	Vendor confirmation / comments / deviation
	i) Identification of critical component with its material composition.	
	ii) Mounting flange dimension	
	iii) Hand wheel dimensions	
	iv) Actuator cover removal clearances	
	v) Weight of actuator with and without integral starter	
	vi) Stem protection cover length, thread size and type	
	vii) Double compression cable gland	
	viii) Separate drawing for details of cable gland cross section, min/ max.	
	ix) Cable OD that can be accommodated, critical dimension etc.	
	n. Quality plan.	
	o. Type test certificates	
	p. Default settings of torque, dial indicator and torque/limit closing for all models.	
Q.0	QUALITY REQUIREMENTS	
Q.1.0	INSPECTION AND TEST REQUIREMENTS	
Q.1.1	All equipment's shall be subject to inspection by BHEL/ Client and/or their nominated inspecting authority. Vendor shall make all provisions in his shop/sub-vendors shops for complete inspection and test of actuator as per BHEL approved vendor's QP.	
Q.2.0	TESTS& INSPECTION:	
Q.2.1	During fabrication/testing, the actuator shall be subject to inspection by BHEL/CUTOMER or by any agency authorized by them. Manufacturer shall furnish all necessary information concerning the supply to BHEL/CUTOMER inspectors.	
Q.2.2	All routine tests as specified by the applicable standards shall be conducted.	
Q.2.3	Shop tests shall be witnessed by an inspector of BHEL/CUTOMER or of an agency authorized by customer.	
Q.2.4	Quality plan for the actuator to be followed.	
Q.3.0	PAINTING,PROTECTION,PACKING,SUPPLY & IDENTIFICATION:	
Q.3.1	SURFACE PREPARATION: Weld slag & spatter shall be removed and the surfaces to be coated shall be free from contamination. Surface defects shall be removed by suitable methods. Sharp edges shall be smoothed by grinding. Prior to surface preparation oil, grease, drilling emulsions, cutting emulsions and preservative agents shall be carefully removed by suitable solvents. The surface shall be carefully dried with clean clothes to prevent the dissolved impurities from spreading over the entire surface. The surface shall be cleaned by wire brush and shot blasting if required. Proper adhesiveness of paint to the surface shall be ensured.	



365-147/B
31.08.16

BHEL – Tiruchirappalli – 620014,
India

Valves Engineering and R&D

PURCHASE SPECIFICATION

DOC No: **SPEC:AC:001 Rev: 08**

Effective Date: **23/ 06/ 2022**

Page: **12 of 19**

Product: Specification for Electrical Actuator

Clause No	Specification requirement	Vendor confirmation / comments / deviation
Q.4.0	PAINT SHADE	
Q.4.1	The enclosures shall be treated and prepared for painting with suitable painting system for withstanding 500Hrs of salt spray as per ASTM B-117/ ISO9227 standard. Paint shade shall 'shade 692 of IS 5 (Smoke Grey)'. For NTPC projects the paint shade shall be as per the NTPC approved shade.	
Q.5.0	PACKING & TRANSPORT:	
Q.5.1	The actuator shall be supplied to site packed in wooden crates / Carton boxes. They shall be wrapped with polythene sheets. They shall have skid bottoms for handling. All spares shall be packed separately in boxes marked SPARE Special precaution notations such as Fragile. This side up, centre of gravity, weight, Owner's particulars. Purchase number etc. shall be clearly marked on the package together with other details as per purchase order. The equipment may be stored in a covered shed for long periods before installation. The packing should be suitable for such storage.	
S.0	SPARES	
S.0.1	Supplier shall specify a list of recommended spares for 2/5 years trouble free operation. An exploded view of the actuator shall be furnished with part numbers for identifying the spares.	
T.0	TEST REQUIREMENTS FOR ACTUATORS	
T.1.0	ROUTINE TEST:	
T.1.1	Dimensions: Overall and mounting	
T.1.2	Details of painting as per specification and vendor practice: Anti-corrosiveness Epoxy.	
	i. Shade.	
	ii. Finish	
	iii. Paint thickness	
T.1.3	Manual operation through hand wheel.	
T.1.4	Testing of position and torque limit switches for accuracy and repeatability.	
T.1.5	Hand-Auto switching function.	
T.1.6	For motors, all routine tests as called in IS: 325 / BS 4999 from motor manufacturer.	
T.1.7	Output shaft speed and torque of actuator and corresponding current.	
T.1.8	Stall current and stall torque for the actuator assembly.	
T.1.9	a. Position indicator and transmitter: Calibration check for accuracy, linearity and repeatability.	
	b. Functional test for electronic position transmitter.	
T.1.10	Leakage test for gear case (visual).	
T.1.11	HV test at 1.6 KV (80% of 2 KV) for the assembled actuator.	
T.1.12	Operation of actuator under variation in supply voltage (plus or minus 10%) for verifying rated torque and speed.	



365-147/B
31.08.16

BHEL – Tiruchirappalli – 620014,
India

Valves Engineering and R&D

PURCHASE SPECIFICATION

DOC No: **SPEC:AC:001 Rev: 08**

Effective Date: **23/ 06/ 2022**

Page: **13 of 19**

Product: Specification for Electrical Actuator

Clause No	Specification requirement	Vendor confirmation / comments / deviation
T.1.13	Checking of wiring as per approved wiring diagram (Typical WD for actuators without starters is attached).	
T.1.14	The following tests are applicable for integral starter actuators a. Functional test for local / remote / off selection b. Open/close/stop operation in local and remote mode. c. OLR tripping d. Functional test, temperature cyclic test and Screening and burning Test & HV test on PCB (Ref standard BS 4584 & BS 6221). 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. Test certificates for routine type tests are to be furnished by the vendor.	
T.2.0	TYPE TEST certificates shall be provided for the following tests.	
T.2.1	Type test for motor as per IS:325/BS 4999 part 60.	
T.2.2	Noise and vibration test for total assembly IS: 4729/BS 4999.	
T.2.3	Temperature rise test during: a. Operation of actuator at 90% voltage. b. Operation of actuator at 50 degree C ambient.	
T.2.4	Operation with variation in frequency (plus or minus 5%) for verifying rated torque and speed.	
T.2.5	Enclosure protection for the total assembly.	
T.2.6	Endurance test for actuator.	
T.2.7	Endurance test for limit switches.	
T.2.8	Damp heat cycle test as per IS:9000/IEC 68-30.	
T.2.9	Following test are applicable for integral starter actuators a. Type test on bare PCB b. Life cycle test C. Dry heat test, D Temperature rise test for PCB (Ref standard BS 4584 & BS 6221)	
N.0	NOTES:	
N.0.1	These quality plans shall be approved by BHEL.	
N.0.2	All testing facilities shall be arranged by the vendor, at his works before calling BHEL representative for inspection.	
N.0.3	Approved drgs., PO specification and relevant standards if any shall be made available during testing / inspection.	
N.0.4	All measuring and testing instruments shall be periodically calibrated from National test house and certificates made available during inspection.	
N.0.5	All relevant GA drawings, data sheets & wiring diagrams shall be submitted as controlled copy and approval shall be obtained from BHEL. All supply shall be as per these documents.	

Applicable terminal plans for actuator with integral starter (3-V-MISC-24227),

Actuator without integral starter ((4-V-MISC-90271) and

For NTPC projects integral starter with Plug Socket (3-V-MISC-24283) enclosed



365-147/B
31.08.16

**BHEL – Tiruchirappalli – 620014,
India**
Valves Engineering and R&D
PURCHASE SPECIFICATION

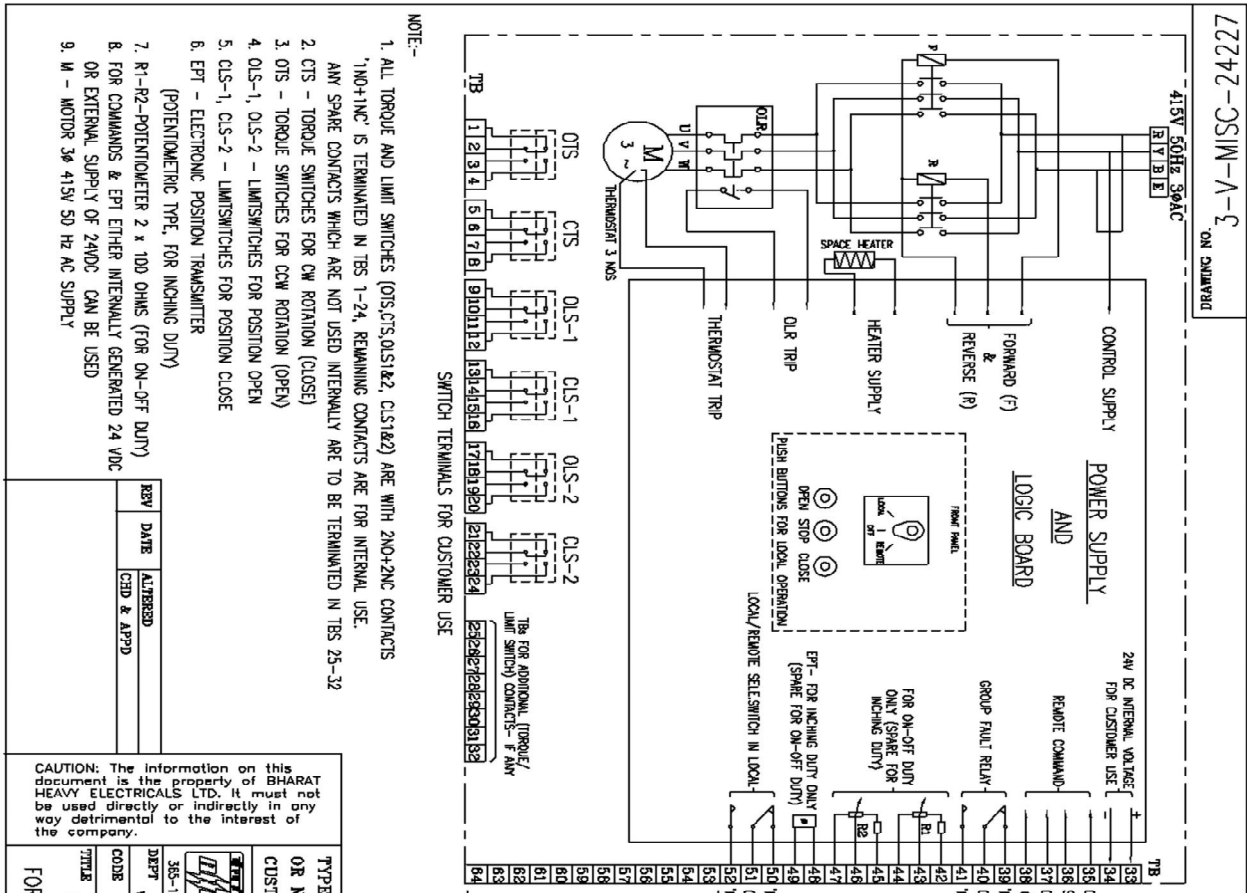
DOC No: **SPEC:AC:001 Rev: 08**

Effective Date: **23/ 06/ 2022**

Page: **14 of 19**

Product: Specification for Electrical Actuator

ALL DIMENSIONS ARE IN MILLIMETERS FOR TOLERANCES OF UNDIMENSIONED DIMENSIONS DURING MANUFACTURE REFER ISIRI/IS: 2875 PART 1 / QP.



CONTACT DEVELOPMENT DIAGRAM

OTS	1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	17-18	19-20	21-22	23-24
OTS	OPEN AT OVER TORQUE DURING OPENING TRAVEL	CLOSE AT OVER TORQUE DURING OPENING TRAVEL	OPEN AT OVER TORQUE DURING CLOSING TRAVEL	CLOSE AT OVER TORQUE DURING CLOSING TRAVEL								
C/S												
O/S-1												
O/S-2												
C/S-1												
C/S-2												
SWITCH												

INDICATES CONTACT CLOSED
INDICATES CONTACT OPEN
CONTACT RATING: 5A AT 250V AC & 0.5A AT 220V DC

SETTING PROCEDURE OF POSITION LIMIT AND TORQUE SWITCH

WAVES	OPEN	CLOSE
GATE VALVE OF 100 mm AND ABOVE IN 1500 CL AND ABOVE RATINGS	MAIN	BACK UP
ALL OTHER GATE & GLOBE VALVES	O/S *	C/S

* - C/S NOT TO BE CONNECTED IN TRIP CIRCUIT
* - BRINGS O/S FOR INTNL. 5% OF TRAVEL (FOR GATE VALVES ONLY)

TYPE OF PRODUCT ELECTRICAL VALVE ACTUATORS (AC) WITH INTEGRAL STARTERS
OR NAME OF CUSTOMER/PROJECT (DRAWN FOR INTERMEDIATE POSITION OF WAVES)

DESIGN CODE	SCALE	WEIGHT (KG)	CARD CODE	DRAWING NO.	REV
305-121			U 01	3-V-MISC-24227	0

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.

DEPT	DATE	ALTERED
VL		CHD & APPD

APPD	CHKD	DATE	NO. OF
K. ARUNACHALAN	N. P. ESWAR	07.10.04	VAR
	D. DINKARAN	07.10.04	
	D. D	07.10.04	

REVISIONS

NO.	DATE	DESCRIPTION
1	07.10.04	



365-147/B
31.08.16

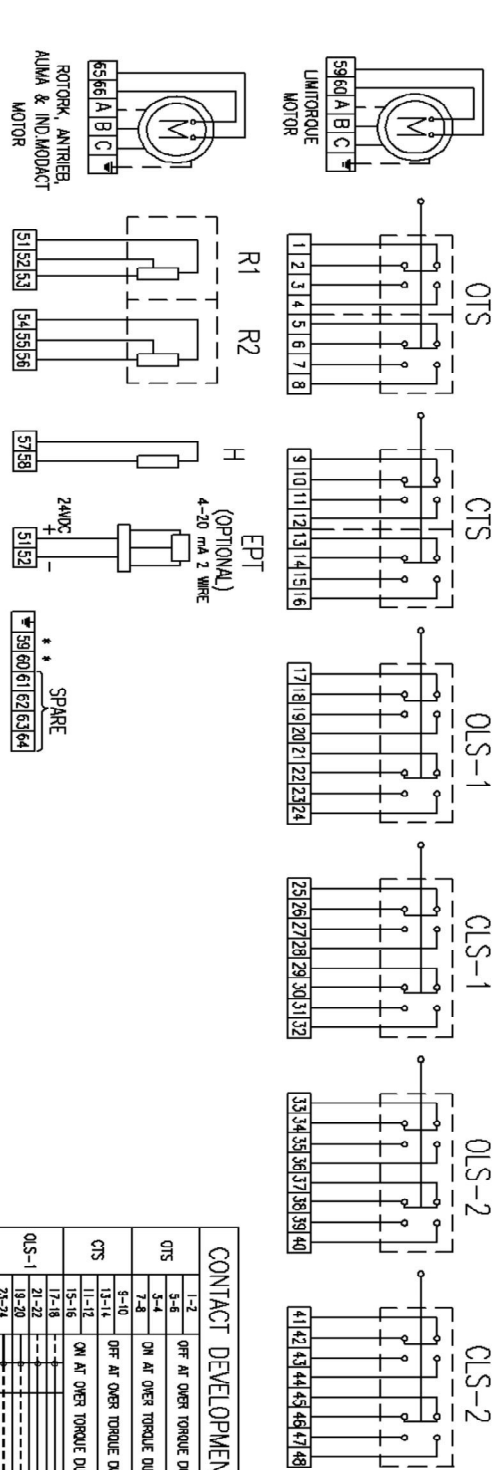
**BHEL – Tiruchirappalli – 620014,
India**
Valves Engineering and R&D
PURCHASE SPECIFICATION

DOC No: **SPEC:AC:001 Rev: 08**

Effective Date: **23/ 06/ 2022**

Page: **15 of 19**

Product: Specification for Electrical Actuator



* - SPARE FOR ROTORK, AUMA ANTRIEB & IND.MODACT
SWITCHES - ALL ARE POTENTIAL FREE AND TWO PAIR OF CONTACTS CAN BE USED FOR DIFFERENT SUPPLY
THERMOSTAT - 65-66 (ROTORK, AUMA, ANTRIEB & IND.MODACT), 59-60 (LIMTORQUE),
EPT - ELECTRONIC POSITION TRANSMITTER (POTENTIOMETRIC TYPE, FOR INCHING DUTY)
THERMOSTAT TERMINALS - TERMINATED IN MOTOR TB IN ANTRIEB & IND.MODACT AND IN MAIN TB IN OTHER MACHES
CTS - TORQUE SWITCHES FOR CW ROTATION (CLOSE) - 2 NO+2 NC
OTS - TORQUE SWITCHES FOR CCW ROTATION (OPEN) - 2 NO+2 NC
OLS-1, OLS-2 - LIMITSWITCHES FOR POSITION OPEN - 2 NO+2 NC
OLS-1, OLS-2 - LIMITSWITCHES FOR POSITION CLOSE - 2 NO+2 NC
OTS, CTS - TWO INDEPENDENT SWITCHES IN ANTRIEB & LIMTORQUE
OLS-2 & CTS-2 - CAM DISC IN ROTORK & ANTRIEB
R1-R2 - POTENTIOMETER 2 x 100 OHMS
H - SPACE HEATER 1ø 240V AC SUPPLY
M - MOTOR 3ø 415V 50 Hz AC SUPPLY

SETTING PROCEDURE OF POSITION LIMIT AND TORQUE SWITCH

VALUES	OPEN		CLOSE	
	MAIN	BACK UP	MAIN	BACK UP
GATE VALVE OF 100 mm AND ABOVE IN 1500 CL AND ABOVE RATINGS	OLS	OTS	OLS	CTS
ALL OTHER GATE & GLOBE VALVES	OLS	OTS	CTS	CTS

- ⊕ - OLS NOT TO BE CONNECTED IN TRIP CIRCUIT
- 1. BYPASS OTS FOR INITIAL 5% OF TRAVEL (FOR GATE VALVES ONLY)
- 2. CONNECT THERMOSTAT WITHOUT FAIL IN THE STARTER CIRCUIT

CONTACT DEVELOPMENT DIAGRAM

CONTACT	1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	17-18	19-20	21-22	23-24	25-26	27-28	29-30	31-32	33-34	35-36	37-38	39-40	41-42	43-44	45-46	47-48	49-50	51-52	53-54	55-56	57-58	59-60	61-62	63-64
OTS	OFF AT OVER TORQUE DURING OPENING TRAVEL	ON AT OVER TORQUE DURING OPENING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	ON AT OVER TORQUE DURING CLOSING TRAVEL	ON AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL
CTS	OFF AT OVER TORQUE DURING OPENING TRAVEL	ON AT OVER TORQUE DURING OPENING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	ON AT OVER TORQUE DURING CLOSING TRAVEL	ON AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL
OLS-1	OFF AT OVER TORQUE DURING OPENING TRAVEL	ON AT OVER TORQUE DURING OPENING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	ON AT OVER TORQUE DURING CLOSING TRAVEL	ON AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL
OLS-2	OFF AT OVER TORQUE DURING OPENING TRAVEL	ON AT OVER TORQUE DURING OPENING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	ON AT OVER TORQUE DURING CLOSING TRAVEL	ON AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL	OFF AT OVER TORQUE DURING CLOSING TRAVEL

CONTACT RATING: 5A AT 250V AC & 0.5A AT 220V DC

REV	DATE	CHD	APPD	DESCRIPTION	DRAWING NO.	REV
11	09.09.2000			CONTACT DEV. RE-DESIGN.	4-V-MISC-90271	11

DRWN	CHECKD	APPROVD	DATE
N.PESWAR	KARUNICHANDAN	P.UGAKANTHAN	09.09.2000

BHARAT HEAVY ELECTRICALS LTD.
UNIT: HIGH PRESSURE BOILER PLANT,
TIRUCHIRAPPALLI 600014.

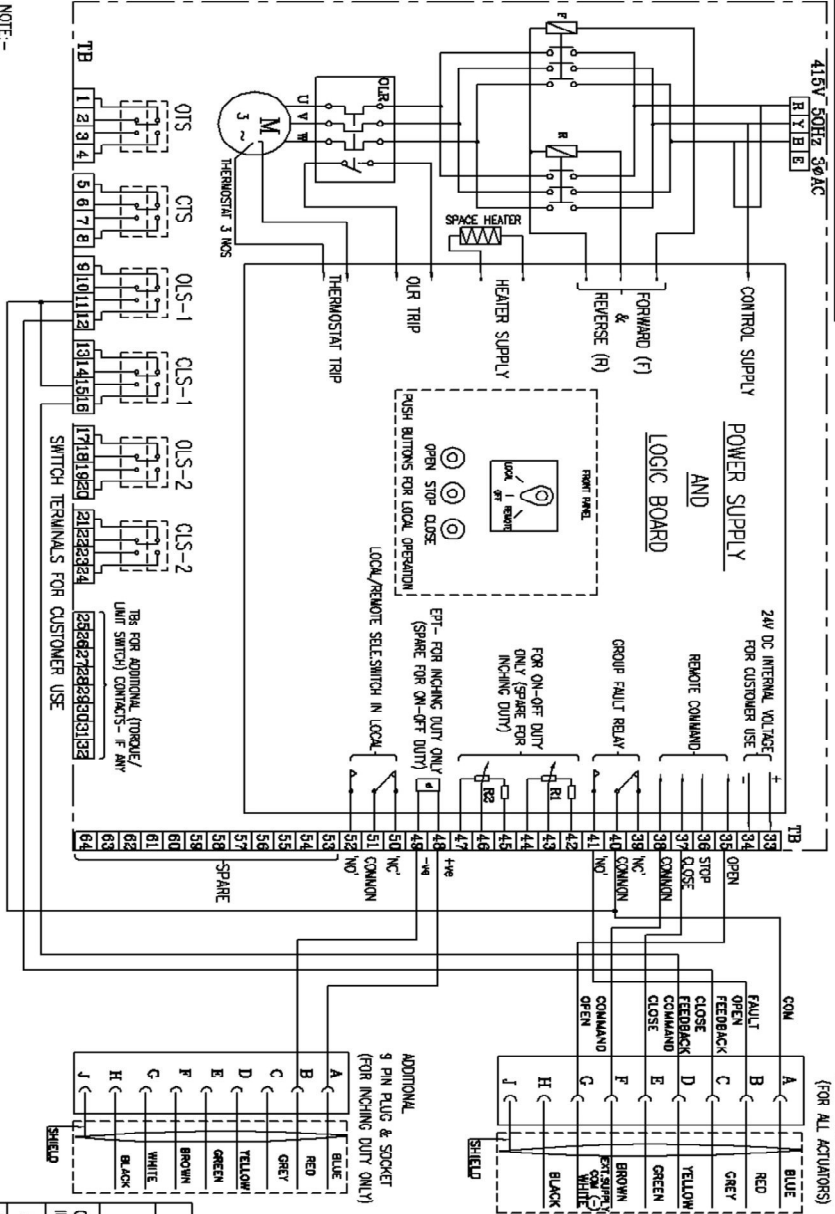
INTERNAL WIRING DIAGRAM
FOR
ELECTRICAL VALVE ACTUATORS (AC)
(DRAWN FOR INTERMEDIATE POSITION OF VALVES)

RETRACTED WITH REVISION 11

Product: Specification for Electrical Actuator

3-V-MISC-V-C
ON DRAWING

ALL DIMENSIONS ARE IN MILLIMETERS. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP



NOTE:-

1. ALL TORQUE AND LIMIT SWITCHES (OTS,CTS,OLSA&Z, CLSA&Z) ARE WITH ZNO+ZNC CONTACTS. 'INO+INC' IS TERMINATED IN TBS 1-24, REMAINING CONTACTS ARE FOR INTERNAL USE. ANY SPARE CONTACTS WHICH ARE NOT USED INTERNALLY ARE TO BE TERMINATED IN TBS 25-32
2. OTS - TORQUE SWITCHES FOR CW ROTATION (CLOSE)
3. OTS - TORQUE SWITCHES FOR CCW ROTATION (OPEN)
4. OLS-1, OLS-2 - LIMITSWITCHES FOR POSITION OPEN
5. OLS-1, OLS-2 - LIMITSWITCHES FOR POSITION CLOSE
6. EPT - ELECTRONIC POSITION TRANSMITTER (CONTACTLESS TYPE, FOR INCHING DUTY)
7. RI-R2-POTENTIOMETER 2 x 100 OHMS (FOR ON-OFF DUTY) OR EXTERNAL SUPPLY OF 24VDC CAN BE USED
8. FOR COMMANDS & EPT EITHER INTERNALLY GENERATED 24 VDC OR EXTERNAL SUPPLY OF 24VDC CAN BE USED
9. M - MOTOR 3Φ 415V 50 Hz AC SUPPLY
10. TORQUE SWITCH BYPASS WITH LIMITSWITCH BOTH ON OPEN & CLOSE DIRECTION TO BE DONE INTERNALLY.

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

CONTACT DEVELOPMENT DIAGRAM

CONTACT NO.	FUNCTION	VALVE POSITION
1-2	OPEN AT OVER TORQUE DURING OPENING TRAVEL	
3-4	CLOSE AT OVER TORQUE DURING OPENING TRAVEL	
5-6	OPEN AT OVER TORQUE DURING CLOSING TRAVEL	
7-8	CLOSE AT OVER TORQUE DURING CLOSING TRAVEL	
9-10		
11-12		
13-14		
15-16		
17-18		
19-20		
21-22		
23-24		

INDICATES CONTACT CLOSED
- - - - - INDICATES CONTACT OPEN

CONTACT RATING: 5A AT 250V AC & 0.5A AT 220V DC

SETTING PROCEDURE OF POSITION LIMIT AND TORQUE SWITCH

VALUES	OPEN		CLOSE	
	MAIN	BACK UP	MAIN	BACK UP
GATE VALVE 07:00 mm AND ABOVE IN 1500 Q AND ABOVE RAINING	OTS	OTS *	CLS	CLS
ALL OTHER GATE & GLOBE VALVES	OTS	OTS *	CTS	CTS

- CLS NOT TO BE CONNECTED IN THE CIRCUIT
* - BYPASS OTS FOR INITIAL 5% OF TRAVEL (FOR GATE VALVES ONLY)

TYPE OF PRODUCT		ELECTRICAL VALVE ACTUATORS (AV) WITH INTEGRAL STARTERS	
OR NAME OF CUSTOMER/PROJECT		(DRAWN FOR INTERMEDIATE POSITION OF VALVES) FOR NTPC PROJECTS	
BHARAT HEAVY ELECTRICALS LTD., UNIT: HIGH PRESSURE BOLLER PLANT, TIRUCHIRAPPALLI-620014.		K.AJINMATHAN	
DEPT. NO.	365-121	SCALE	N/S
CODE		WEIGHT (KG)	
TITLE	WIRING DIAGRAM (TERMINAL PLAN) FOR ACTUATOR WITH INTEGRAL STARTER WITH PLUG & SOCKET FOR NTPC PROJECTS	DRAWING NO.	3-V-MISC-24283
CARD CODE	U 01	REV	0



**BHEL – Tiruchirappalli – 620014,
India**

Valves Engineering and R&D

PURCHASE SPECIFICATION

DOC No: **SPEC:AC:001 Rev: 08**

Effective Date: **23/ 06/ 2022**

Page: **17 of 19**

Product: Specification for Electrical Actuator

ANNEXURE-A : Instruction for packing of Actuator/ Bevel Gearboxes

Packing box :

- 1.1) The Actuator/Gearbox shall be supplied packed in any seasoned wood or plywood as wooden box as per relevant international standard. Sea worthy packing is envisaged for international shipments.
- 1.2) The box shall have inner lining of polythene sheet (minimum of 250G polythene sheet)/waxed paper/water proof paper or similar protection against water entry.
- 1.3) Use fillers like thermocol / loose fill or air-cellular cushioning material such as Bubble Wrap to fill void spaces and prevent movement inside the box during shipping.

Actuator/Gearbox Covering:

- 1.4) Further the Actuator/Gearbox shall be completely covered with a water-proof barrier highly resistance to the passage of water-vapour - like thick polythene bag (Minimum of 500G thickness). Sharp corners, edges and projects of the Actuator/Gearbox should be covered to prevent abrasion or puncture of the water proof barrier with anti-abrasive material like felt. Extra length and projections of the polythene bags are to be wrapped and secured by strips of self-adhesive tapes.
- 1.5) After opening the box, the water-proof barrier shall be intact and it is intended to store Actuator/Gearbox for long time with this water-proof barrier.
- 1.6) Suitable desiccants shall be provided in to the sealed water proof barrier. The desiccant shall be in small bags and disposed uniformly. They shall be secured in position to minimize chances of desiccant dust escaping. The amount of total desiccant shall be such to limit the relative humidity within the cover to a maximum value of 50 percent – for a long time of storage.
- 1.7) The equipment's covered with a polythene sheet shall be kept inside the box, followed by coir, wooden bottoms, loose fill or air-cellular cushioning material such as Bubble Wrap to fill void spaces, thermocol, etc. to prevent vibration effect during loading, transportation, etc.
- 1.8) On all sides of the inner case, black polythene sheet shall be nailed.
- 1.9) Loose items of the equipment if any shall be packed separately.

Marking on the box:

- 2.1) All spares shall be packed separately in boxes marked SPARE. Spare components are also to be covered separately with water-proof packing.
- 2.2) Actuator/Gearbox model and material code shall be prominently marked on the box.
- 2.3) Special precaution notations such as 'Fragile', 'This side up', 'center of gravity', 'weight', 'Owner's particulars', 'Purchase Order No.', 'Order item No.' etc. shall be clearly marked on the package together with other details as per purchase order.
- 2.4) After completing the packing, Stencil marking, as per dispatch instructions and symbol marking as per **Annexure — 1** shall be made.

Packing slip

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. ...



365-147/B
31.08.16

BHEL – Tiruchirappalli – 620014,
India

Valves Engineering and R&D

PURCHASE SPECIFICATION

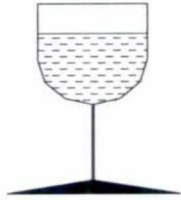
DOC No: **SPEC:AC:001 Rev: 08**

Effective Date: **23/06/2022**

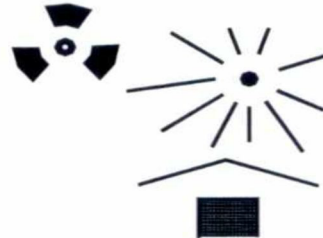
Page: **18 of 19**

Product: Specification for Electrical Actuator

ANNEXURE — 1



FRAGILE, HANDLE WITH CARE



PROTECT FROM HEAT AND RADIOACTIVE SOURCES



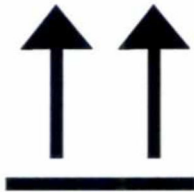
USE NO HOOKS

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



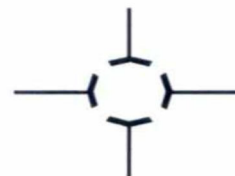
KEEP DRY

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



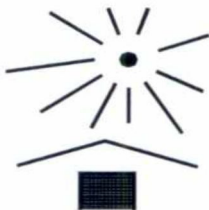
THIS WAY UP

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



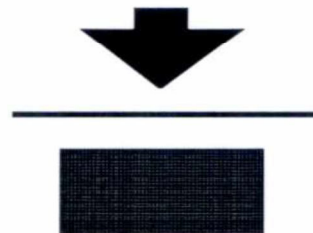
CENTRE OF GRAVITY

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



365-147/B
31.08.16

BHEL – Tiruchirappalli – 620014,
India

Valves Engineering and R&D

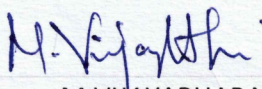


PURCHASE SPECIFICATION

DOC No: **SPEC:AC:001** Rev: **08**

Effective Date: **23/06/2022**

Page: **19** of **19**

Product: Specification for Electrical Actuator

Signature			
Name	M.VIJAYABHARATHI	MD.IMRAN	D.RAMACHANDRAN
Designation	ENGINEER	DY.MANAGER	SR.MANAGER
Date	23 June 2022	23 June 2022	23 June 2022
Action	Prepared By	Checked & Reviewed By	Approved By