 434-003	<h1>ENQUIRY</h1>	Bharat Heavy Electricals Limited (A Government of India undertaking) HIGH PRESSURE BOILER PLANT PURCHASE DEPARTMENT/VALVES TIRUCHIRAPPALLI-620 014.		Phone: 0431-2577434 FAX : 0431-2520383 Email: npeswar@bheltry.co.in nagarajank@bheltry.co.in	
		ENQUIRY NO.	DATE	DUE DATE FOR QUOTATION	
		EN:SAC- 203	11.01.2013	01.02.2013	
		Please quote Enquiry No., and due date in correspondences This is only a request for quotation and not an order.			
SL.NO.	MATERAIAL CODE DESCRIPTION DRAWING NO TDC NO.	UNIT	QUANTITY	DELIVERY SCHEDULE QUANTITY DATE	
	<p>SUPPLY OF Hi -TORQUE DIRECT MOUNTED ELECTRICAL ACTUATORS.</p> <p><u>(This enquiry is for Hi-Torque Direct mounted Actuator with torque value more than 100KgM.)</u></p> <p>Offer for all the actuators listed in the Annexure-I with various features.</p> <p>Offer is to be furnished for all the actuator spares furnished in the spares list.</p> <p>The Price offered for all items must be on F.O.R –Trichy basis</p> <p><u>Note:</u> Test Certificates are required Motor TC is required Guarantee Certificate is required</p>	<p>AS PER ENCLOSED ANNEXURE-1</p> <p>Annexure:</p> <ol style="list-style-type: none"> 1. General terms & Conditions of Enquiry. 2. Special Conditions of contract. 3. Copy of Technical Delivery Condition. 4. Terms & Conditions for Indigenous/Import 5. Required Delivery: As mentioned in our annexure-1 <p><u>Date , Time & Venue of tender</u> A) Technical Bid opening : 01.02.2013 at 14.30 IST at Valves Purchase Conference Hall , Building No 24,BHEL Tiruchirappalli-620 014,Tamil Nadu State,India. B) Price Bid will be opened for vendors those who's offers are technically suitable alone. The intimation regarding price bid opening will be informed later.</p>			
<p>The rate of Excise Duty and Sales Tax, Prevalent on the date of quotation, should be clearly indicated in the quotation itself. If these particulars are not provided, the quotation is liable for rejection.</p> <p>Please, submit your lowest quotation in duplicate subject to our terms and conditions overleaf, for the above materials, so as to reach us on or before the due date by 2 P.M.</p> <p>Quotation will be opened at 2.30 p.m. on the due date in the presence of tenderers who may like to present .</p> <p>Last tenders are liable to be rejected.</p>				<p>Yours faithfully,</p> <p>For Bharat Heavy Electricals Ltd Manager (Valves Purchase)</p>	



Bharat Heavy Electricals Ltd

(A. Govt. of India Undertaking)

Valves Purchase, Tiruchirappalli- 620 014. INDIA

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Fax: (0431)2520383

Requirements (qty) & List of specification to Enquiry No: EN/SAC/203 dated 11-01-2013

For high torque actuators (Above 100 Kg-M torque)					
Sl.No	Torque Range (Kg-M)	RPM (Approx)	Out put flange details (LD x PCD x Bolt Details.)	Stem Protection Cover in mm (unless other wise specified)	QTY (approx)
1	28-124	22	152.4x254-8NOS M16	250	10
2	70-252	33	177.8x298.5-8NOS M20	300	95
3	180-500	36	215.9x335.6-8 NOS M24	400	20
4	250-600	26	228.6x406.4-8NOS M30	450	100
5	400-790	26	228.6x406.4-8NOS M30	450	135
6	400-1155	24	228.6x406.4-8NOS M30	450	35
7	500-1400	13	400.0x500.0-12NOS M36	500	5

The following specifications are enclosed for which the comments may be furnished in the relevant column provided

Purchase Specification for valve actuator (AC) : VAL/ACT/AC/001 REV-06 Dt: 11.01.2013



Bharat Heavy Electricals Ltd

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Scope of supply & SPECIAL CONDITIONS OF ENQUIRY

EN: SQN-203/RC

Date:11.01.2013

We require the Hi-Torque electrical Direct Mounted Actuators (above 100Kg.M Torque) as per the technical delivery conditions indicated against annexure I for our production. Kindly send your competitive offer immediately for our consideration. The tender will be opened positively **on 01.02.2013 at 14.30 IST.**

1. Kindly quote your rates on firm price basis with the offer validity of minimum 1 year from the date of tender opening since being Rate Contract. The same shall be per unit basis for each item and on FOR, BHEL, Trichy. In case of foreign vendors, the offer shall be on FOB basis only.
2. **Only Manufacturers are eligible to participate in this bid. Traders & Dealers are not eligible to participate in this bid. If authorized dealer of a manufacturer is participating in the bid they have to furnish the mutually signed Agency Agreement.**
3. Kindly quote for enclosed specification or equivalent that meets Technical Delivery Conditions (copy attached).
4. The quantity indicated are approximate only as per last year (2011-12) requirement.
5. The purchase orders will be released based on our production plan periodically based on the delivery requirement in the same. Offers not meeting this delivery will not be considered.
6. Prices shall be firm till entire execution of the Purchase Order. Price variation clause is not acceptable.
7. Lowest prices received against BHEL enquiries need not be the technically acceptable one and in that case, BHEL reserves the right not to consider the same.
8. Supplier's has to submit test reports for each sl nos as per our TDC conditions and packing also to be done for each item separately
9. **For indigenous vendors:-**
100% payment will be made after 45 days on acceptance of material at BHEL Stores. No other Payment term is acceptable to BHEL.
For Foreign vendors:-
100% Payment against this contract will be made to the seller on collection basis. You have to send the documents to our banker M/S. State Bank of India, Kailasapuram, Tiruchirappalli-620014.
The original clean HAWB(in case of Air)/Original Bill of Ladding(In case of Ship) issued by our forwarding agency ,original invoice, Packing list with your signature, Certificate of origin, Test certificates as per respective TDC Etc are to be sent in triplicate to our bankers.
10. One copy of Test certificates/non negotiable documents shall accompany the dispatches.

Contd...2...

11. Delivery schedule shall be strictly as per BHEL requirements only which is indicated in the Enquiry / Purchase Order sheet that will be issued. In case of delay in delivery, beyond the end delivery dates given in the Purchase Order sheet, Liquidated Damage clause will be applicable at the rate of 0.5 % per week and subject to a maximum of 15% of undelivered portion of the item value.
12. The delivery of the item shall be strictly as per BHEL's enquiry/ Purchase orders. In case of urgency, the delivery period have to be altered to meet BHEL's production plan.
13. Confirmation for compliance is to be given in the offer for all the conditions specified in the respective Technical Delivery Conditions.
14. BHEL reserves the right to increase / decrease the enquired quantities or to delete the enquired quantities for any of the items. Also BHEL reserves the right to split the enquired quantity among more than one tenderer and place orders accordingly in any proportion, based on BHEL's requirements and supplier's Capability in terms of delivery and quality.
15. Every dispatch of material shall accompany the packing list, detailing the Numbers of items. An advance Copy of dispatch details shall be furnished to purchase/Valves/BHEL/Tiruchy-14.
16. The materials are to be dispatched with proper packing and binding.
17. BHEL reserves the right to finalize the tender either through **price bid open** or **through Reverse Auction route**. A typical copy of "Business Rules and Conditions" of Reverse Auction is enclosed herewith for information and reference.
18. The offers are invited in two parts.
 - a) Techno commercial bid covering Technical Conditions, Delivery conditions, acceptance of all our commercial conditions and a copy of unpriced price bid. **(Please submit a separate envelope super scribing the enquiry no for techno commercial bid).**
 - b) Price bid covering only unit price each case. **(Please submit a separate envelope super scribing the enquiry no for price bid.)**
19. Techno Commercial bid will be opened first. Price bid of technically suitable vendors only will be opened with prior intimation.
20. If the supply is short the extra cost to BHEL in replenishing the short fall will be debited to the vendor.
21. In addition to all the above conditions, BHEL standard terms & conditions given as a separate annexure shall also be applicable to the extent they are not superseded by the above conditions.
22. **For supply of actuators to NTPC projects Only NTPC approved vendors are eligible.**
23. **Non-adherence to these special conditions of enquiry and BHEL's standard terms and conditions will lead to disqualification of offer.**

EN: SAC-203

Date: 11.01.2013

GENERAL TERMS AND CONDITIONS OF Reverse Auction:-

Against this enquiry for the subject item/system with detailed scope of supply as per enquiry specifications, BHEL may resort to "REVERSE AUCTION PROCEDURE" i.e., ON LINE BIDDING ON INTERNET.

- a. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
- b. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.
- c. BHEL will inform the vendor in writing in case of reverse auction, the details of Service Provider to enable them to contact & get trained.
- d. Business rules like event date, time, and Start price, bid decrement, extensions etc. also will be communicated through service provider for compliance.
- e. Vendors have to fax the Compliance form in the prescribed format (provided by Service provider) before start of Reverse auction. Without this, the vendor will not be eligible to participate in the event.
- f. BHEL will provide the calculation sheet (e.g., EXCEL sheet) which will help to arrive at "Total Cost to BHEL" like Packing & forwarding charges, Taxes and Duties, Freight charges, Insurance, Service Tax for Services and loading factors (for non-compliance to BHEL standard Commercial terms & conditions) for each of the vendor to enable them to fill-in the price and keep it ready for keying in during the Auction.
- g. Reverse auction will be conducted on scheduled date & time.
- h. At the end of Reverse Auction event, the lowest bidder value will be known on the network.
- i. The lowest bidder has to Fax the duly signed Filled-in prescribed format as provided on case-to-case basis to BHEL through Service provider within 24 hours of Auction without fail.
- j. Any variation between the on-line bid value and the signed document will be considered as sabotaging the tender process and will invite disqualification of vendor to conduct business with BHEL as per prevailing procedure.

Note For vendors who are not in our list of approved vendors:-

Vendors who are not in our list of approved vendors are required to full fill the following conditions.

1. The offer must accompany the supply credentials to minimum of 3 years of supply to 2 power plant valves.
2. They offer must also accompany supply credentials to other similar valve manufacturers.
3. Support the technical suitability with endurance Certificates as per IS 9334.
4. The offer must accompany vendor registration forms (duly filled & signed) down loaded from our web WWW.BHEL.COM.

Along with the offer (Technical/Commercial bid and price bid in two seperate sealed covers) you are requested to indicate from whom you are going to source the components also send a typical type Test Certificate for the components from that maker. Without the type Test Certificate, your offer may not be considered for further processing's.

**N.Parameswaran
Manager / Purchase/Valves**



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Annexure – II to Enquiry No: EN/SAC/203 (open tender) dated 11-01-2013

Special Instructions.

1. Kindly go through the enclosed specification Nos: VAL/ACT/AC/001 REV 06 dated 11-01-2013, and submit your competitive offer in duplicate indicating compliance or deviation for each point of the specification in the column provided in the spec itself, with a validity of 1 year for ordering, for the following actuator categories

- a) For standard actuators with al bronze drive bush
- b) For actuators with Electronic Integral starters with al. bronze drive bush.

You may have to submit the tender in two parts i.e. **Technical cum commercial bid in separate sealed cover along with signed integrity pact in one cover and Price bid in another cover separately.** After technical conformance the price bid will be opened.

2. **Signed integrity pact (IP) should be furnished along with the offer. IP should be signed by authorized official of the Bidder/Vendor/Contractor. Offer without IP will not be considered.**

3. **This Tender will be monitored by Independent External monitor (IEM) by name Shri. D.P.BAGCHI, IAS (Retd)**

4. Your offer shall be supported by relevant technical documents like Quality plans, wiring diagrams, actuator data sheets catalogues, leaflet, General arrangement drawings etc for technical evaluation and for getting customer approvals.

5. All actuators shall be fitted with double compression nickel coated brass cable glands and price shall be included in the actuator base price itself, for water tight applications.

6. Optional items like Electronic position transmitters(non contact type & contact type), Al Bronze stem Nuts, Stem protection Covers 250 mm to 900 mm long, providing higher RPM in place of standard RPM , providing plug and sockets for NTPC contracts, any other items not covered by us, as applicable to specification may be offered as a price adder.

7. Operational spares required as per the Spares list may be offered in the prescribed format enclosed. If any spares apart from the list is found necessary for smooth functioning of actuators the same may also be separately indicated and offered.

N.Parameswaran
Manager/ Purchase/ Valves



Bharat Heavy Electricals Ltd.
(A Govt. of India Undertaking)

VALVES PURCHASE,
TIRUCHIRAPPALLI- 620 014. INDIA



PHONE: 91-0431-257 7434

EMAIL: npeswar@bheltry.co.in

FAX: 91-0431-2520 383

INDIGENOUS ENQUIRY

TERMS AND CONDITIONS

1. QUOTATIONS :

- a. Each tender should be sent in double cover, should be sealed and super scribed with correct Tender No., item of supply and due date of opening. The outer cover should only bear the address of this office and should not have any indication that a tender is within. Two or more quotations should not be sent in one cover but the quotation against each tender should be sent separately to avoid confusion. Tender should not be addressed to any individual's name but only by designation.
- b. Tenders 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. Where there is difference between amount quoted in words and figures, amount quoted in words shall prevail.
- c. Price should be F.O.R. dispatching station inclusive of risk in transit and remain valid for 120 days from. The due date.
- d. If any Sales Tax is payable as extra to the quoted price, it should be specifically stated in quotation along with CST & T.N.G.S.T No. failing which the purchaser will not be liable for payment of Sales Tax. Our T.N.G.S.T No. 3550005 Dated 01-04-1995 C.S.T. No. 259383 Dt. 11.06.1991.
- e. No revision of prices will be entertained after tenders are opened.
- f. Manufacturer's name, Trade Mark or Patent No. if any should be specified. Illustrative leaflets giving technical particulars are required along with quotation wherever necessary.
- g. Products with I.S.I. certification marks will be preferred.
- h. The purchaser shall be under no obligation to accept the lowest or any other tender and shall be entitled to accept or reject any tender in part or full without assigning any reason whatsoever.

2 SAMPLES :

Wherever possible samples should be submitted separately whether specifically requested or not so as to reach the purchaser on or before its due date of the enquiry. They should be clearly marked with the enquiry No. and the date on the outside cover to facilitate identification.

3 PACKING AND MARKING:

The supplier shall arrange for securely protecting and packing the stores to avoid lose or damages during transit.

4 TERMS OF PAYMENT :

100% Payment will be made after 45 days on acceptance & satisfactory receipt of materials. Where required by the purchaser, the successful tenderer must send the operation and maintenance manuals, test certificates, drawings, etc., for the materials should be sent immediately after dispatch of the materials and a statement to that effect should be made in the Invoice. Failure to comply with this provision will result in delay in payment of the bills. Goods dispatched either by V.P.P. or by thro' document presented through bank will not be accepted unless agreed to by the Purchaser.

The Original Excise Duty Gate Pass or certified extract form Excise Duty Ledger should accompany the material. A Photostat copy of the above gate pass for each delivery challan should be submitted along with the original bills submitted directly to BHEL Department.

5 SECURITY DEPOSIT:

For purchase over Rs.5000/- the successful tender/s may be requested to furnish a Bank Guarantee/Security Deposit for an appropriate value as may be determined by BHEL.

6 LIQUIDATED DAMAGES:

It is clearly understood among the parties to the contract that 'Time is the essence of the Contract. Therefore, the delivery of the goods specified in the purchase order should be made within the time prescribed. Where the seller supplies or despatches the goods beyond the delivery period specified the purchaser will have no obligation to accept the goods. If accepted liquidated damages at the rate of ½ % of the value of goods delayed for each week of delay to the maximum of 15% or part thereof will be levied without prejudice to any other relief of compensation due to the purchaser under any other condition of this contract.

7 RISK PURCHASE:

Alternatively the purchaser at his option will be entitled to terminate the contract and to purchase elsewhere at the risk and cost of the seller either the whole of the goods or any part which the supplier has failed to deliver or dispatch within the time stipulated as aforesaid or if the same were not available, the best and the nearest available substitute therefore. The supplier shall be liable for any loss, which the purchaser may sustain by reason for such risk purchases in addition to penalty at the rate mentioned in clause 6 above.

8 PREFERENTIAL DELIVERY :

It should be noted if a contract is placed on a higher tender as a result of this invitation to tender in preference to the lowest acceptable offer in consideration of the earlier delivery, the seller will be liable to pay to the purchaser the difference between the contract rate and that of the lowest acceptable tender on the basis of final price F.O.R. destination, including all elements of freights, sales tax, duties and other incidents, incidental in case of failure to complete supplies in terms of such contract within the date of delivery specified in the tender and incorporated in the contract.

9 MODVAT / CREDIT:

If any Excise Duty is payable, the chapter head/sub-head reference and the rate of the duty should be quoted. If the tender is availing MODVAT credit for his input materials, the effect of proforma invoice should be passed on to the purchaser; Tenderer under MODVAT shall be preferred.

10 GENERAL :

The Purchaser reserves the right to split up the tender and place order for individual items with different tenders and also increase or decrease the quantity.

Any other conditions which might have been quoted by the seller and are in contravention to the terms prescribed in the order and which have not been specifically accepted in by Purchaser will not be applicable to the contract.

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Bharat Heavy Electricals Ltd.

(A Govt. of India Undertaking)

**Valves purchase,
Tiruchirappalli - 620 014. India**

PHONE: 91-0431-257 7434
FAX: 91-0431-2520 383

EMAIL: npeswar@bheltrv.co.in

IMPORT ENQUIRY TERMS AND CONDITIONS

1 OFFER

Offer in ENGLISH LANGUAGE and in TRIPLICATE in a SEALED COVER SUPERSCRIBING the Enquiry Number and the due date shall be submitted addressed to

THE SR. MANAGER
PURCHASE VALVES
BHARAT HEAVY ELECTRICALS LIMITED
HIGH PRESSURE BOILER PLANT
TIRUCHIRAPPALLI - 620 014
TAMIL NADU, INDIA

Offers should be firm for net FOB Nearest AIR / SEA Port price and C & F Madras Port price, indicating the shipping specifications and the earliest delivery in respect of offers from overseas suppliers. Offers from indigenous sources shall be firm for FOR / TIRUCHIRAPPALLI.

11: DOCUMENTS

- (i) Offers should be accompanied by detailed technical literature, Catalogue and detailed dimensional drawings in ENGLISH and in TRIPLICATE, or otherwise, the offers will not be considered.
- (ii) In case overseas suppliers route their offer through their accredited selling agents, a letter of authority should be furnished mentioning the name and address of their selling agents who are authorised to bid, negotiate and conclude a Contract on their behalf.

III AGENCY COMMISSION:

- (i) In respect of offers from overseas suppliers, agency commission, if any, payable to their agents in India, shall invariably be shown separately in the proforma invoice and this will be paid by us in India, in Indian Rupees, on satisfactory completion of the Contract.
- (ii) If Overseas Principal has any tie up with any third party in respect of Agency Commission it should be declared while submitting the offers.
- (iii) Copies of current Agency Agreement / Authorization Letter in respect of Agency Commission shall be furnished along with order, if not made available earlier.
- (iv) For calculation of Rupee equivalent of Agency Commission, exchange rate as prevailing on the date of order will be taken.

Continued... 2

IV SPARES:

The tenderer should quote separately for spares that are required for two years trouble free operation. The spares offer should accompany the offer of main equipment; otherwise the quotation will be overlooked.

V VALIDITY:

The offers for main equipment and spares shall be kept open for acceptance for 120 days (one hundred and twenty days) from the date of opening of the tender.

VI TEST CERTIFICATES, OPERATING AND MAINTENANCE MANUALS:

The tenderer shall clearly mention in their offer, that the Test Certificate and Operating and Maintenance Manuals, etc., as called for in the technical specification, in the required number of copies will be provided at no extra cost. If any amount is payable as extra, the same shall be indicated separately in the offer.

VII TERMS OF PAYMENT:

In the event of an order, the purchaser will arrange for 100% payment against presentation of documents through Bank.

VIII GENERAL:

- (i) Preference will be given to suitable indigenous or ex-stock imported offers failing which imported offers from incoming consignment against the indigenous supplies "Stock and sale licence" will be accepted. If "stock and sale licence" is not available with the indigenous suppliers, the same shall be indicated in their offer.
- (ii) **Bank Guarantee:** The supplier in the event of an order should furnish a Bank Guarantee from an approved Bank at no extra cost in a proforma which will be Supplied to the Supplier, along with the order, for an amount equivalent to 10% of the value of the contract. The Bank Guarantee should remain in full force and effect during the period that would be taken for successful completion of the contract and shall continue to be enforceable till 12 months from the date of receipt of consignment at purchaser's site or 18months from the date of last shipment at the Port of Delivery whichever is earlier.

IX LD / PENALTY AND INTEREST ON ADVANCES FOR DELAY IN DELIVERY:

"If the supplier fails to deliver the Raw Materials / equipment / components within the period specified in the contract the Purchaser shall deduct Liquidated Damages a sum equivalent to 0.5% of the price for each week of delay upto a maximum of 15% of the price of the delayed / undelivered goods, in addition to the recovery of interest at normal cash credit rate plus 2% for the unadjusted portion of the advances. If the delay in delivery of a part contributes to delay in execution of total system, LD and interest on advances will be recovered on the total contract price / total advance paid"

1.0 Technical Requirements

Clause_ No	Specification requirement
2.G.0	GENERAL
2.G.1.0	ENCLOSURE:
2.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.
2.G.2.0	VOLTAGE:
2.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.
2.G.3.0	CONSTRUCTION:
2.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.
2.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.
2.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.
2.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
2.G.3.5	The dimension drawing of the blank adopter bush shall be furnished in the enclosed drawing.
2.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 handwheel 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.

PRODUCT ENGINEERING / VALVES: BHEL / TIRUCHIRAPPALLI-14**VAL/ACT/AC/001 REV.06 DT: 11.01.2013**

2.G.3.7	Actuators offered shall be with self-locking worm.
2.G.4.0	REVOLUTIONS:
2.G.4.1	Desired output shaft speeds are given below for different torque ranges. Actual speeds actuators offered shall be clearly indicated.

For low torque actuators (Up to 100 Kg-M torque)				
Sl.No	Torque Range (Kg-M)	RPM (Approx)	Out put flange details (LD x PCD x Bolt Details.)	Stem Protection Cover in mm (unless other wise specified)
1	1-3.5	18	60 x 102 x 4Nos M10	100
2	2-6	24	60 x 102 x 4Nos M10	100
3	6-15	36	60 x 102 x 4Nos M10	150
4	15-30	36	100 x 140 x 4Nos M16	250
5	30-50	36	127 x 165 x 4Nos M20	300
6	30-60	96	100 x 140 x 4Nos M16	400
7	50-80	36	152 x 254 x 8Nos M16	400
8	80-100	96	127 x 165 x 4Nos M16	500

For high torque actuators (Above 100 Kg-M torque)				
Sl.No	Torque Range (Kg-M)	RPM (Approx)	Out put flange details (LD x PCD x Bolt Details.)	Stem Protection Cover in mm (unless other wise specified)
1	28-124	22	152.4x254-8NOS M16	250
2	70-252	33	177.8x298.5-8NOS M20	300
3	180-500	36	215.9x355.6-8 NOS M24	400
4	250-600	26	228.6x406.4-8NOS M30	450
5	400-790	26	228.6x406.4-8NOS M30	450
6	400-1155	24	228.6x406.4-8NOS M30	450
7	500-1400	13	400.0x500.0-12NOS M36	500

2.G.5.0	WEIGHT:
2.G.5.1	Furnish weight of actuator including all accessories.
2.G.6.0	LUBRICANT:
2.G.6.1	Oil plugs shall be provided for filling and draining
2.G.6.2	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. 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.
2.G.7.0	DIMENSIONAL CATALOGUES:
2.G.7.1	Three copies of catalogues of the actuators in English language describing the constructional details shall be enclosed. The catalogues shall also provide over all dimensions of the actuators, maximum spindle acceptance diameters and other details called for in the specification.

PRODUCT ENGINEERING / VALVES: BHEL / TIRUCHIRAPPALLI-14

VAL/ACT/AC/001 REV.06 DT: 11.01.2013

2.G.8.0	O & M INSTRUCTION MANUALS:
2.G.8.1	One copy of Operating and Maintenance Instruction Manual shall accompany each actuator ordered.
2.A.0	ACCESSORIES
2.A.1.0	TORQUE SWITCHES:
2.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.
2.A.1.2	The torque switches shall have accuracy of plus or minus 5% of set value.
2.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.
2.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.
2.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.
2.A.2.0	LIMIT SWITCHES:
2.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
2.A.2.2	Two Auxiliary limit switches (one for open and one for close) each with 2 NO and 2 NC potential free contacts.
2.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.
2.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.
2.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.
2.A.3.0	LOCAL POSITION INDICATORS:
2.A.3.1	Each actuator shall have a local position indicator to indicate 0 to 100% of valve travel.
2.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 supplies along with each actuator, alternately the change gears/spacers shall be supplied in sufficient quantities whenever required.
2.A.4.0	ANTI-CONDENSATION HEATER (SPACE HEATER):
2.A.4.1	Each actuator shall have a 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 c/s single phase supply. The wattage of the heater shall be specified in the data sheet and wiring diagram.
2.A.5.0	REMOTE POSITION TRANSMITTER:
2.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.
2.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 / 4 wire system. LVDT type transmitter shall be supplied wherever indicated.

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2.M.0	MOTORS
2.M.1.0	POWER SUPPLY:
2.M.1.1	Motor shall be suitable for operation on a 415V, 3 phase, 3 wire ungrounded supply system
2.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 c/s.
	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%.
2.M.2.0	CONSTRUCTION:
2.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
2.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.
2.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.
2.M.3.0	INSULATION:
2.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.
2.M.4.0	RATING:
2.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 120 starts/hr. for on/off and 150 starts/hr. for inching duty application. 600 and 1200 starts/hour shall be given as optional.
2.M.5.0	STARTING:
2.M.5.1	Motor shall be suitable for direct on-line starting.
2.M.5.2	Starting current shall be limited to 6 times the full load current.
2.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.
2.M.6.0	BEARINGS:
2.M.6.1	Bearing shall be of double shielded, grease lubricated antifriction type. The anticipated bearing life shall be indicated for all models.
2.M.7.0	EARTHING TERMINALS:
2.M.7.1	Two earthing terminals shall be provided on either side of the motor.
2.M.8.0	MOTORS:
2.M.8.1	Motors shall be provided with three numbers of Thermostats, one in each winding, for over load protection.
2.M.9.0	MOTOR DATA:
2.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.
2.M.10.0	WEIGHT
2.M.10.1	Weight of the actuator with and without starter shall be furnished separately along with the offer.

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2.M.11.0.	TESTS:
2.M.10.1	Tests shall be carried out as per approved QP.
2.C.0	CONTROLS
2.C.1.0	INTERNAL WIRING:
2.C.1.1	Internal wiring diagram shall be neatly pasted on cover of terminal box.
2.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.
2.C.2	FEATURES APPLICABLE TO INTEGRAL STARTER
2.C.2.1	Control supply shall be derived with step down transformer from 415V, 3 PH 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
2.C.2.2	Automatic phase correction facility and single phasing prevention shall be available.
2.C.2.3	Pad lockable Selector switch for LOCAL-OFF-REMOTE selection with OPEN-STOP-CLOSE push buttons (for local operation) shall be provided.
2.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.
2.C.2.5	In addition to mechanical dial position indicator, lamp indication for full open, full close and in-travel positions shall be provided.
2.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.
2.C.2.7	Potential free contacts for LOCAL-OFF-REMOTE positions shall be wired to terminals and available for customer connections.
2.C.2.8	Open/Close command termination logic with position and torque limit switches shall be suitably built in the PCB inside the actuator.
2.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.
2.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'.
2.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.
2.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 energise 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.
2.C.2.13	24V Power supply for EPT shall be derived internally.
2.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.
2.C.2.15	A common potential free contact (monitoring relay) shall be available to annunciate the following faults. a) Thermostat trip

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	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.
2.C.2.16	The following status annunciation shall be made available locally (integral to actuator) (Diagnostic tool in place of indication is acceptable provided one diagnostic tool for 15 actuator is supplied free of cost , and local indication is developed within one year of this MOU.)
	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.
2.C.2.17	The following individual fault annunciation shall be made available locally (integral to Actuator) for easy trouble shooting (Diagnostic tool in place of indication is acceptable provided one diagnostic tool for 15 actuator is supplied free of cost , and local indication is developed within one year of this MOU.)
	a) Torque switch OPEN
	b) Torque switch CLOSE
	c) Thermostat trip
	d) Thermal overload relay trip
	e) Motor single phasing
2.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.
2.C.3.0	TERMINAL BOX:
2.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.
2.C.3.2	Minimum 10 numbers of terminals shall be available in the terminal board as spare terminals.
2.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.
2.C.3.4	DEFAULT SETTING OF TORQUE SWICTH, 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.
2.C.4.0	CABLE GLAND:
2.C.4.1	Actuators are to be provided as a standard with one cable gland for power and minimum 1 cable gland and 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

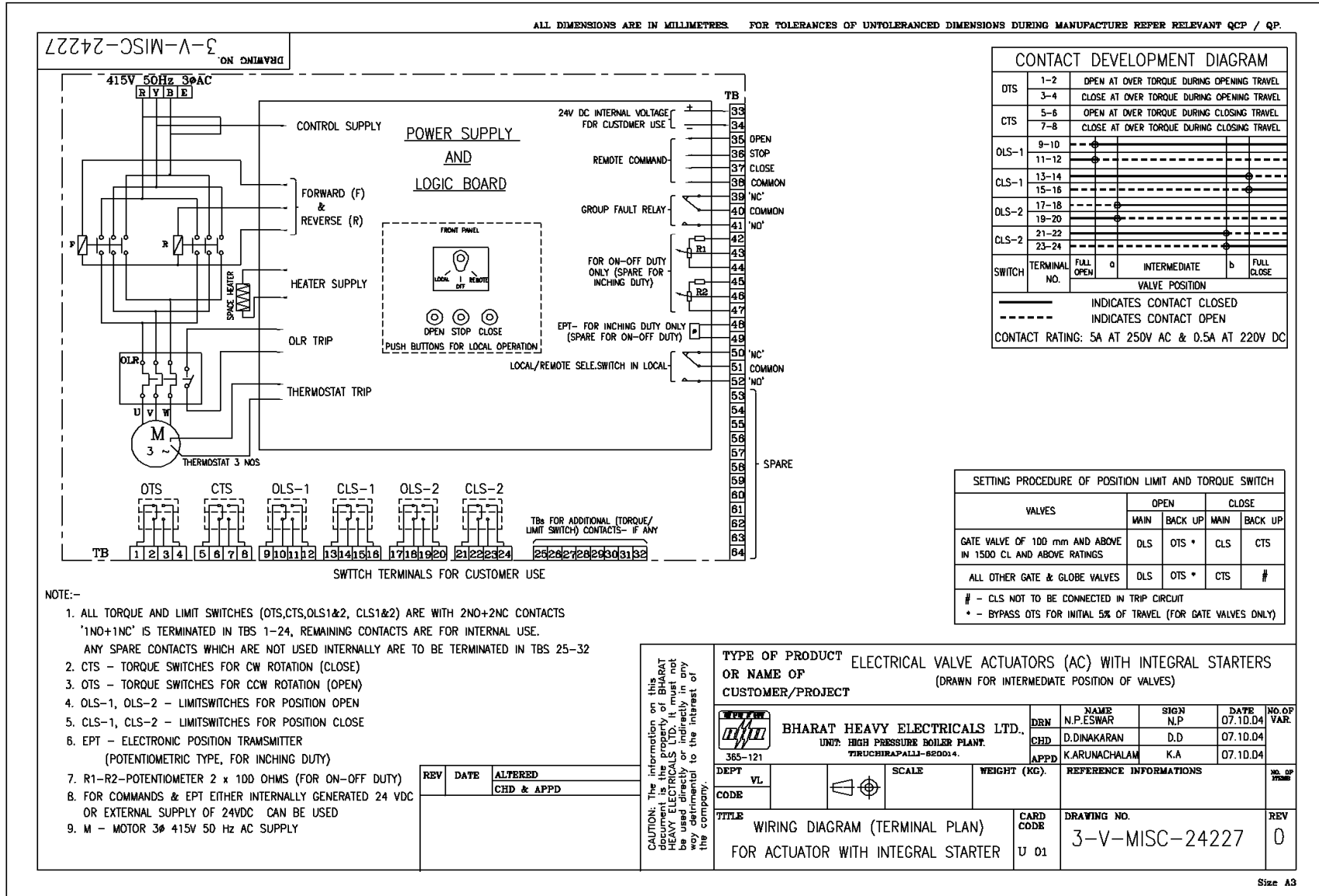
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KW	DESC	<u>OD</u>
UPTO 3 KW	3 Core x 2.5Sq.mm Copper unarmored PVC insulated	14±2mm
3 – 7 KW	3 Core x 6Sq.mm Aluminum unarmored PVC insulated	17±2mm
7 – 13 KW	3 Core x 16Sq.mm Aluminum unarmored PVC insulated	20±2mm
13 – 24 KW	3 Core x 35Sq.mm Aluminum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

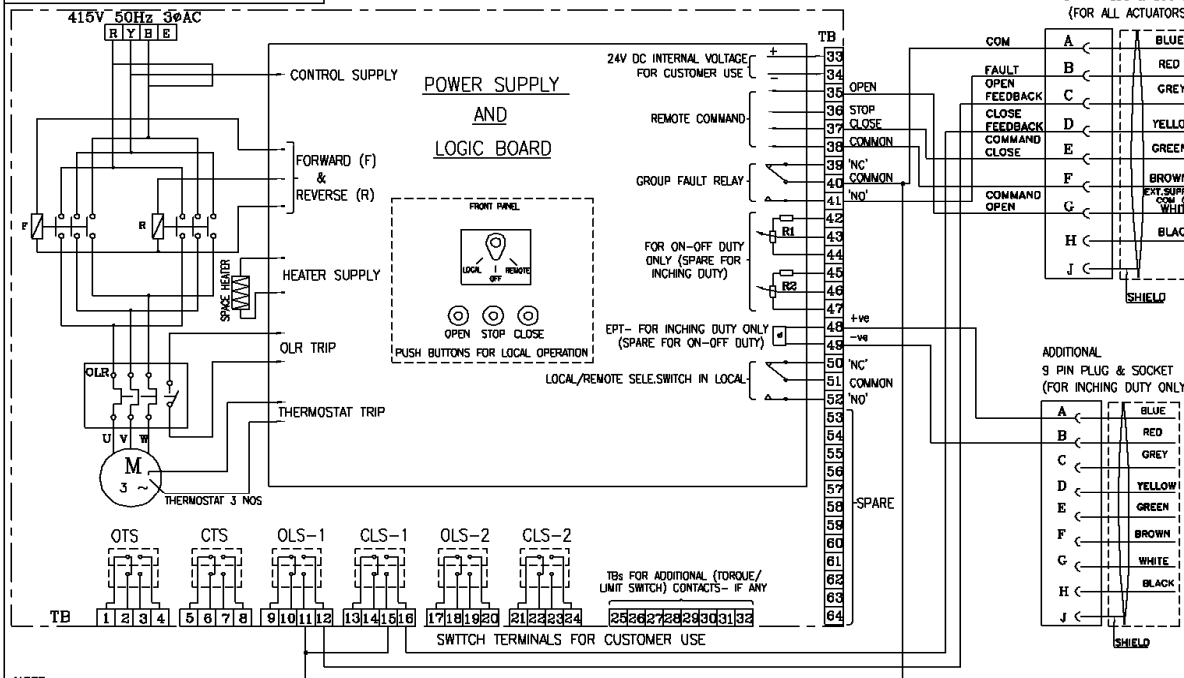
2.C.4.2	Preferably all the cable glands shall be provided on one direction (face) only. Wherever this is not technically feasible, the cable gland on the second side shall be provided with necessary elbows, so that all glands will be facing at one side.
2.C.5	FEATURES APPLICABLE TO FLAME PROOF ACTUATORS
2.C.5.1.	STANDARDS
2.C.5.1.1	Actuators meant for hazardous area shall meet the requirements of latest IS 2148/IEC60079 , IEC – 79 or equivalent International Standards.
2.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.
2.C.5.1.3	Imported equipment shall be tested and certified by an independent certifying agency of country of equipment origin.
2.C.5.2	ENVIRONMENT:
2.C.5.2.1.	Area Classification: Class 1, Division 1, Zone 1
2.C.5.2.2.	Gas Group: IIA & IIB. - IIC if specified
2.C.5.2.3.	Temperature Class (As per IEC-79): T3 (200 Deg. C) T4 if specified
2.C.5.2.4.	Construction: Flame Proof Ex (d) as per IS 2148/IEC60079
2.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.
2.C.5.4	Document required: CIMFR Test Certificates. Approvals of PESO and DGFASLI. BIS License
2.S.0	SPARES
2.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.

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.



3-V-MISC-24283
DRAWING NO.

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



OTS	1-2	OPEN AT OVER TORQUE DURING OPENING TRAVEL
	3-4	CLOSE AT OVER TORQUE DURING OPENING TRAVEL
CTS	5-6	OPEN AT OVER TORQUE DURING TRAVEL
	7-8	CLOSE AT OVER TORQUE DURING CLOSING TRAVEL
OLS-1	9-10	
	11-12	
CLS-1	13-14	
	15-16	
OLS-2	17-18	
	19-20	
CLS-2	21-22	
	23-24	
SWITCH	TERMINAL NO.	VALVE POSITION
	0	INTERMEDIATE
	a	FULL OPEN
	b	FULL CLOSE

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

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

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

- NOTE:-
- ALL TORQUE AND LIMIT SWITCHES (OTS, CTS, OLS1&2, CLS1&2) ARE WITH 2NO+2NC CONTACTS 'INO+1NC' 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
 - CTS - TORQUE SWITCHES FOR CW ROTATION (CLOSE)
 - OTS - TORQUE SWITCHES FOR CCW ROTATION (OPEN)
 - OLS-1, OLS-2 - LIMITSWITCHES FOR POSITION OPEN
 - CLS-1, CLS-2 - LIMITSWITCHES FOR POSITION CLOSE
 - EPT - ELECTRONIC POSITION TRANSMITTER (CONTACTLESS TYPE, FOR INCHING DUTY)
 - R1-R2-POTENTIOMETER 2 x 100 OHMS (FOR ON-OFF DUTY)
 - FOR COMMANDS & EPT EITHER INTERNALLY GENERATED 24 VDC OR EXTERNAL SUPPLY OF 24VDC CAN BE USED
 - M - MOTOR 3Φ 415V 50 Hz AC SUPPLY
 - TORQUE SWITCH BYPASS WITH LIMITSWITCH BOTH ON OPEN & CLOSE DIRECTION TO BE DONE INTERNALLY.

REV	DATE	ALTERED
		CHD & APPD

CAUTION: The information on this drawing is the property of Bharat Heavy Electricals Ltd. It must not be used directly or indirectly in any way detrimental to the interest of the company.

TYPE OF PRODUCT ELECTRICAL VALVE ACTUATORS (AC) WITH INTEGRAL STARTERS		OR NAME OF FOR NTPC PROJECTS	
CUSTOMER/PROJECT (DRAWN FOR INTERMEDIATE POSITION OF VALVES)		DRN N.P.ESWAR	SIGN N.P
BHEL 365-121		CHD D.DINAKARAN	DATE 17.03.05
BHARAT HEAVY ELECTRICALS LTD., UNIT: HIGH PRESSURE BOILER PLANT, TIRUCHIRAPPALLI-620014.		APPD K.ARUNACHALAM	NO. OF VAR. -
DEPT VL	SCALE NTS	WEIGHT (KG). -	REFERENCE INFORMATIONS
CODE -	TITLE WIRING DIAGRAM (TERMINAL PLAN)	CARD U 01	DRAWING NO. 3-V-MISC-24283
FOR ACTUATOR WITH INTEGRAL STARTER WITH PLUG & SOCKET FOR NTPC PROJECTS			REV 0

Size A3

3.0 Documentation Requirements

The following documents are to be attached with MOU
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. General arrangement drawing of actuator consisting following as minimum
k. Identification of critical component with its material composition.
l. Mounting flange dimension
m. Hand wheel dimensions
n. Actuator cover removal clearances
o. Weight of actuator with and without integral starter
p. Stem protection cover length, thread size and type
q. Double compression cable gland
r. Separate drawing for details of cable gland cross section, min/ max.
s. cable OD that can be accommodated, critical dimension etc.
t. Quality plan.
u. Type test certificates
v. Default settings of torque, dial indicator and torque/limit closing for all models.

3.0 Quality requirements

4.1 INSPECTION AND TEST REQUIREMENTS

All equipments 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 soot blowers.

4.2 Tests & Inspection:

- 4.2.1 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.
- 4.2.2 All routine tests as specified by the applicable standards shall be conducted.
- 4.2.3 Shop tests shall be witnessed by an inspector of BHEL/CUTOMER or of an agency authorized by customer.
- 4.2.4 Quality plan for the actuator to be followed.

4.3 Painting, Protection, Packing, Supply and Identification:

4.3.1 **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 cloths 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.

4.3.2 Paint Shade

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

4.4 Packing & Transport:

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.

4.T.0	TEST REQUIREMENTS FOR ACTUATORS
4.T.1.0	ROUTINE TEST:
4.T.1.1	Dimensions: Overall and mounting
4.T.1.2	Details of painting as per specification and vendor practice: Anti-corrosiveness Epoxy.
	i. Shade.
	ii. Finish
	iii. Paint thickness
4.T.1.3.	Manual operation through hand wheel.
4.T.1.4.	Testing of position and torque limit switches for accuracy and repeatability.
4.T.1.5.	Hand-Auto switching function.
4.T.1.6	For motors, all routine tests as called in IS: 325 / BS 4999 from motor manufacturer.
4.T.1.7	Output shaft speed and torque of actuator and corresponding current.
4.T.1.8	Stall current and stall torque for the actuator assembly.
4.T.1.9	a. Position indicator and transmitter: Calibration check for accuracy, linearity and repeatability.
	b. Functional test for electronic position transmitter.
4.T.1.10	T.1.10 Leakage test for gear case (visual).
4.T.1.11	HV test at 1.6 KV (80% of 2 KV) for the assembled actuator.
4.T.1.12	Operation of actuator under variation in supply voltage (plus or minus 10%) for verifying rated torque and speed.
4.T.1.13	Checking of wiring as per approved wiring diagram (Typical WD for actuators with out starters is attached)
4.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 raise test and burn-in test on PCB
4.T.2.0	TYPE TEST certificates shall be provided for the following tests.
4.T.2.1.	Type test for motor as per IS:325/BS 4999 part 60.
4.T.2.2.	Noise and vibration test for total assembly IS: 4729/BS 4999.
4.T.2.3.	Temperature rise test during:
	a. Operation of actuator at 90% voltage.
	b. Operation of actuator at 50 degree C ambient.

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4.T.2.4.	Operation with variation in frequency (plus or minus 5%) for verifying rated torque and speed.
4.T.2.5.	Enclosure protection for the total assembly.
4.T.2.6.	Endurance test for actuator.
4.T.2.7.	Endurance test for limit switches.
4.T.2.8	Damp heat cycle test as per IS:9000/IEC 68-30.
4.T.2.9	Following test are applicable for integral starter actuators
	a. Type test on bare PCB
	b. Life cycle test

4.N.0.	NOTES:
4.N.0.1.	These quality plans shall be approved by BHEL.
4.N.0.2.	All testing facilities shall be arranged by the vendor, at his works before calling BHEL representative for inspection.
4.N.0.3.	Approved drgs., PO specification and relevant standards if any shall be made available during testing / inspection.
4.N.0.4.	All measuring and testing instruments shall be periodically calibrated from National test house and certificates made available during inspection.
4.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.

PREPARED: M.VB	REVIEWED: R.M	APPROVED: D.D	DATE: 11.01.2013
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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 IPC/ PC 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 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.

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 Bidder(s)/ Contractor(s) undertake(s) to obtain from all subcontractors a commitment consistent with this Integrity Pact and report Compliance to the Principal. This commitment shall be taken only from those sub-contractors whose contract value is more than 20 % of Bidder's/ Contractor's contract value with the Principal. The Bidder(s)/ Contractor(s) shall continue to remain responsible for any default by his Sub-contractor(s).
- 6.2 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors.
- 6.3 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 /Sub-contractors

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.
- 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 As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or heal the situation, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.
- 8.6 The Monitor will submit a written report to the CMD, BHEL within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.
- 8.7 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.
- 8.8 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant IPC / PC 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.

8.9 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.

8.10 The word 'Monitor' would include both singular and plural.

Section 9 – Pact Duration

9.1 This Pact begins and shall be binding on and from the submission of bid(s) by bidder(s). It expires for the Contractor 12 months after the last payment under the respective contract and for all other Bidders 6 months after the contract has been awarded.

9.2 If any claim is made / lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified as 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

For & On behalf of the Bidder/ Contractor

(Office Seal)

(Office Seal)

Place-----

Date-----

Witness: _____

Witness: _____

(Name & Address) _____

(Name & Address) _____
