

LIMITORQUE INDIA LIMITED

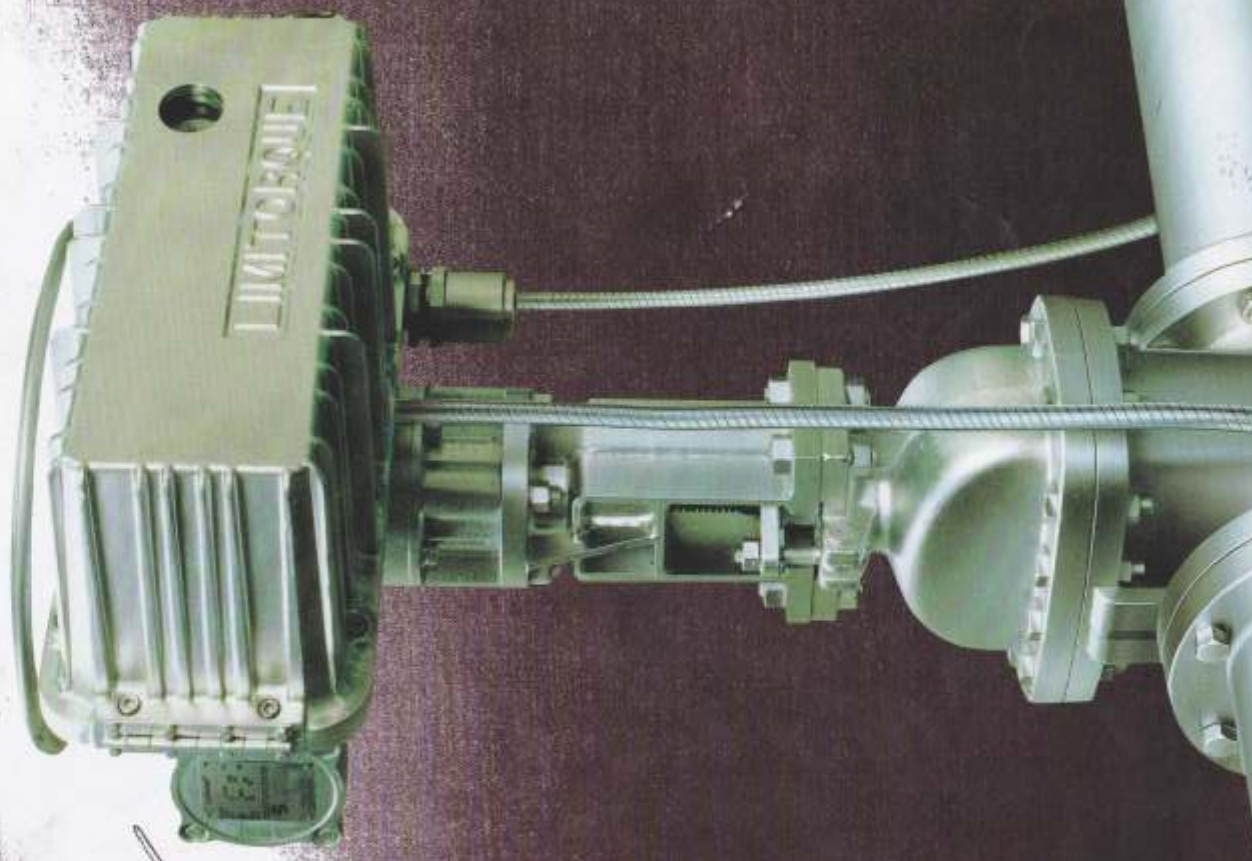


Bharat Limitorque™

The Leaders in Valve Actuation

Limitorque India

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Limitorque India

The Reliable and Technologically Advanced Name in Actuation

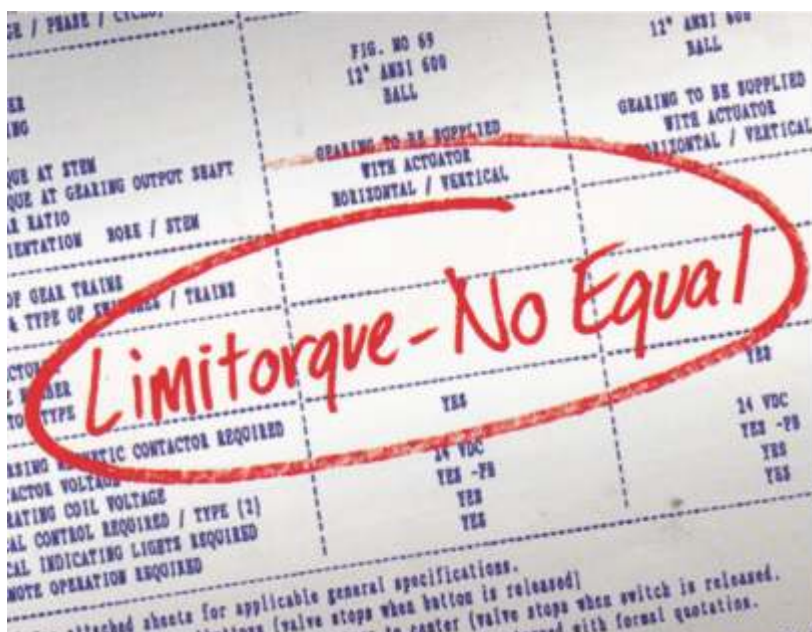
A Joint venture company of LIMITORQUE CORPORATION, USA and NIPPON GEAR COMPANY LTD. JAPAN; Limitorque India Limited manufactures the widest range of Rotary actuators and Gear boxes. With continuous active support from collaborators, Limitorque India has become a leading player in the technological landscape of Valve Actuation and Damper Actuating Systems.

In, 1985, Limitorque India began technological collaboration with the world renowned Philadelphia Gear company of America & Nippon Gear Company Japan and began manufacturing Limitorque products in India.

Limitorque India has produced over 100,000 Limitorque actuators, the brand offers high precision, durability and reliability in a wide range of industries, including Power Stations, Oil Refineries, Cement, Fertilizer, Chemical, Steel etc. Not only does limitorque contribute to industrial development, it also supports our daily lives in areas closer to home, such as water and sewage services.

Customer Focus being Limitorque India hallmark, it has nurtured a culture of Quality, Reliability, Commitment and After-Sales-Service. Limitorque India with its unmatched technical expertise provides state-of-the-art products and solutions and serves a large and diverse customer-base.

Limitorque India will continually strive to bring you better products through technological development.



Limitorque India
In India continuous progress in Actuation





Thermal Power Plant



Oil Refineries



Water Processing Facilities



Sluice Gate

Advanced Technology

Limitorque quality: Based on excellent advanced technology and state-of-the-art manufacturing facilities.

Limitorque actuators have a compact and durable structure using excellent designs created through many-many years of experience and carefully selected materials. A torque motor with high starting torque and very small inertia is used. Since the inertia is small, there is no need to brake the normal opening and closing speed of the valve. The Limitorque design covers a wide range of applications and interfaces with the latest instrumentation available. Since the position limit switch uses a gear counter structure, once set, the switch can endure high speed operation with absolute repeatability. The use of the rotary method, coupled with its solid design, allow the electrical contacts to be safely operated regardless of humidity levels. Manufactured at facilities equipped with the latest in advanced technology, Limitorque actuators are superior products.

Excellent Performance

Proven durability in the most severe environmental conditions.

Limitorque actuators are designed to meet the strictest industrial standards and withstand the most challenging environmental conditions. Limitorque actuators are durable, explosion-proof, waterproof, fire-proof, corrosion-resistant and used in most severe environmental conditions where reliability of valve control is critical. Various drive sources can be selected, including electronic depending on the intended application.

Impressive Versatility

A wide variety of products to meet the needs of any industry sector.

Limitorque units are used in various fields of industry: nuclear, steam and hydraulic power plants; water and sewage services; the oil, gas, chemical and iron industries; shipbuilding and paper manufacturing. Although the basic model is designed to be completely sealed and used outdoors, a variety of application-driven specifications, such as explosion-proofing, distributed control, are available.

2-Wire Communication System

Modbus Communication system for high capacity, and remote control of Limitorque network.

Limitorque network is made up of 2 wire modbus protocol with next generation communication system that allows remote control and observation. Upto 250 nos. (Maximum), actuators can be connected in a single loop with sealed twisted-pair cable. This is safe and reliable high capacity/ high speed communication system that easily achieves intelligent remote control of the networked actuators.

Excellent Service Network

After-sales service network supporting the technology and quality of Limitorque.

Limitorque actuators are produced under strict quality control and checked using the latest devices, promises operational reliability and extensive product life. Starting in India with the Limitorque Faridabad Service Center, a Limitorque group with locations around the metro cities has been created by networking sales and service location. Once a Limitorque product is purchased, we quickly and reliably respond to any service needs and carry out periodic inspections where ever desired.

Multi-turn Type

The multi-turn type is an actuator for driving gate valves, globe valves, floodgates, etc. by direct operation for rising as well as non rising applications.

This type includes a number of actuators such as the electrical SMB and L120 models, and the manual operators BA & HBC model, to meet the needs of this type of application for high torque requirements.



Electronic Actuators

L120

Compact and Easy

The L120 Series actuator represents the latest design and control features in process actuation today.

Each electronic part is connected in a single compartment cover and the terminal through connectors, making maintenance very easy.

The ability to withstand external impacts, explosions, and various environmental elements are all standard qualities of the L120.

L120 SERIES (415 VAC/ 50 Hz/ 3 Ph)

Type & Size	L120-05	L120-10	L120-20	L120-40	L120-85
Max. Thrust Capacity kN (kgf)	44.5 (4538)	44.5 (4538)	89 (9075)	133.5 (13613)	200 (20394)
Max. Torque Capacity Nm (kgm)	59 (6)	135 (13.7)	270 (27.5)	540 (55)	1153 (117.5)

Electronic Actuators

SMB

Wide Application

The SMB model is durable, can therefore be used under various environmental conditions.

Change-over from electronic to manual operation is accomplished by one-touch operation using a declutch lever, and change-over from manual to electronic operation, is automatic.

In addition to the basic model, there are a variety of models, including integral control models to select from depending on the application.

The actuator can be attached to various types of direct operation devices, such as gate valves, globe valves, and flood-gates to name a few.

The SMB is suitable for a wide range of operations and is therefore readily adaptable for various instrumentation configurations.



SMB SERIES (415 VAC/ 50 Hz/ 3 Ph)

Type & Size	SMB-000	SMB-00	SMB-0	SMB-1	SMB-2	SMB-3	SMB-4	SMB-5
Max. Thrust Capacity kN (kgf)	36 (3670)	62 (6300)	107 (10900)	200 (20400)	310 (31600)	620 (630000)	1100 (110,000)	2224 (224000)
Max. Torque Capacity Nm (kgm)	170 (17)	350 (36)	980 (100)	1500 (152)	2600 (270)	6100 (600)	11000 (1155)	27000 (2760)

Electronic Actuators

LY

Small Worm Gear Type.

The LY model was developed for 90 degree rotation valve and dampers. Since the units is small and light weight, it is easy to upgrade new and existing valves/ dampers to electronic operation.

With corrosion resistant structure, the unit is appropriate for selection in such fields as water processing, garbage processing and the chemical, oil & gas, coal, textile industries.

Since the design is based on double reduction worm gearing, there is no need for a brake motor or complicated locking mechanism.



LY-1001 (415 VAC/ 50 Hz/ 3 Ph)

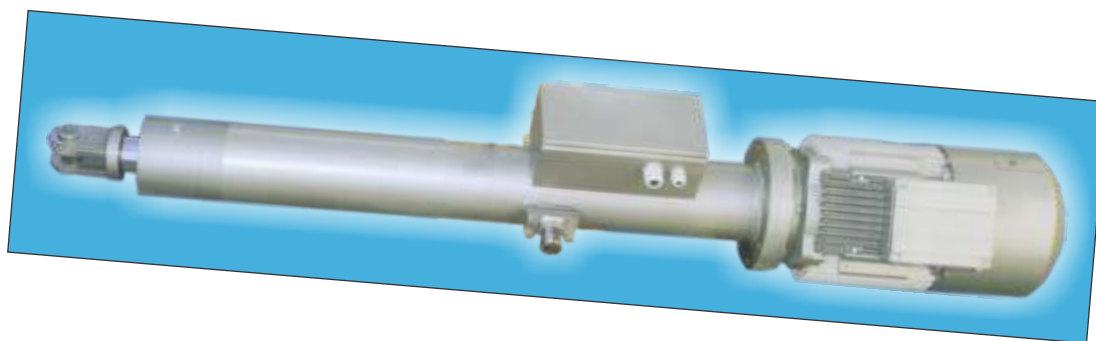
Type	LY 1001	
Operation Time	18 SEC	36 SEC
Max. Torque Capacity NM (kgm)	180 (18)	270 (28)

Linear Actuators

L SERIES

Linear Motion

LIMITORQUE Electro Mechanical Linear Actuator is a packaged system for direct conversion of electrical energy into controlled linear motion. The pneumatic & hydraulic cylinders along with their many accessories are replaced easily by this device with greater operational reliability than its fluid power counter parts. It is ideally suited for applications in remote locations & hostile environments



Type A-D (415 VAC/ 50 Hz/ 3 Ph)

Type & Size	A	B	C	D+SGA2	D+SGA4.9
Max. Thrust Capacity kN (kgf)	1.47 (150)	7.35 (750)	14.7 (1500)	29.4 (3000)	68.7 (7000)
Max. Stroke (mm)	250	750	500	1000	800

Note: for Speed and other stroke values consult Limitorque

Manual Valve Operators

BA

Bevel Gear Type

Type BA bevel gear operators are directly mounted to the gate and globe valve which receive the thrust loads. This results in easy manual opening and closing of the valves. The operators also may be mounted onto existing valves with the use of an adapter. The units are of compact design with integral thrust bearings. Extensive load test have been conducted in order to prove its excellent reliability. With its high cost performance, hundred thousands of BA bevel gear valve actuators operate in industrial fields such as water and waste water works, dams, power stations.

The units may be motorized by replacing the hand wheel with an L120 or SMB type Limatorque Actuators through the use of an adapter

BA Capacities

Type & Size	BA-04	BA-00	BA-0M	BA-O	BA-1	BA-2	BA-3	BA-4
GEAR RATIO	2:1	2.5:1	4:1	3:1	4.11:1	6:1	9:1	10:1
Max. Torque Capacity Nm (kgm)	110 (11)	340 (35)	539 (55)	740 (75)	1500 (150)	2900 (300)	5900 (600)	12000 (1200)
Max. Thrust kN (kgf)	26 (2700)	62 (6300)	181 (18144)	98 (10000)	200 (20000)	340 (35000)	620 (63000)	1200 (120000)



T Series

Large Worm Gear Type.

The T Series operators have been designed for any valve or mechanism which requires 90 degree rotation. Uses are : Butterfly, plug and ball valves, louver dampers and flap gates .

These operators are used successfully throughout industry in all sectors such as water and waste treatment plants, power plants, petrochemical facilities ,marine service, chemical processing and power transmission areas. All components used in T series operators are made from the highest quality of materials in order to ensure maximum reliability . All standard units are built for outdoor service are weatherproof and are factory lubricated. Each unit size is furnished with mechanical stops which are externally adjustable for 90 degree of travel with plus or minus 5 degree adjustability. All worm gears are self-locking and have been manufactured with minimum backlash to limit the possibility of chatter or vibration caused by fluctuating or reversing loads.

T Series

Type & Size	T050	T100	T140	T150	T160	T200	T250	T300	T325	T350	T400	T425	T450	
Gear Ratio	34:1	50:1	59:1	72:1	36:1	45:1	57:1	70:1	71:1	55:1	72:1	60:1	68:1	
Max. Torque Capacity Nm (kgm)	E	600 (61)	1000 (101)	1220 (124)	1491 (150)	1952 (198)	2440 (248)	3051 (311)	3661 (373)	5694 (580)	8813 (900)	11931 (1216)	13558 (1382)	28472 (2902)
	M	813 (82)	1356 (138)	1763 (179)	2034 (207)	2386 (243)	2982 (303)	3728 (280)	4474 (456)	8677 (884)	13287 (1354)	18303 (1865)	20337 (2073)	43386 (4422)



Heavy Duty Valve Operators

HBC

Worm Gear Type

The hand operated type HBC unit is a worm gear drive which may be used for any valve or device requiring 90 Degree as well as 360 Degree (Guillotine Dampers and Rack and pinion) movement.

This actuator is used as the manual operator attached with a hand wheel. It also can be remotely controlled combined with motorized Limatorque Actuators. HBC unit is furnished with spur gear and bevel gear attachments to reduce manual operating force. All components used in HBC series operators are made from the highest quality of materials, therefore the HBC unit is very compact and strong. All worm gears are self-locking and have been manufactured with minimum backlash to limit the possibility of chatter or vibration caused by fluctuating or reversing loads.

HBC units are provided with double sleeve, relation with the key way position of valve/ damper shaft can be taken freely.

HBC Series

Type & Size	H0BC	H1BC	H2BC	H3BC	H4BC	H5BC	H5 _{1/2} BC	H6BC	H7BC	H8BC	H10BC	
Gear Ratio	71:1	70:1	70:1	70:1	60:1	65:1	67:1	66:1	69:1	64:1	61:1	
Max. Torque Capacity Nm (kgm)	E	600 (61)	1775 (181)	3000 (306)	7650 (780)	17325 (1766)	26500 (2700)	40000 (4077)	62300 (6350)	85950 (8761)	132450 (13500)	196200 (20000)
	M	900 (92)	2660 (271)	4500 (459)	11475 (1170)	25988 (2649)	39750 (4050)	60000 (6116)	93450 (9525)	128925 (13142)	198675 (20252)	294300 (30000)



E - Electrical

M - Manual

Features/Electronics Controls

A Complete line of Feature and electronic part accessories are available in order to utilize the maximum capabilities of Limitorque. These make construction of a high-level control system possible.

Standard Features:

1. Position Limit Switches : For Open and Close Direction, heavy duty, Silver Inlaid rated for 600 Volts.
Specialty of the Limitorque Design are:
(A) Gearing is fully enclosed all metallic, gears are grease lubricated for life
(B) Customer oriented freedom of arranging all or any contact as NO or NC
2. Torque Switches : With Micro Switches having 2NO + 2NC contacts providing complete protection for Open and Close directions.
3. Motors : Suitable for 3 Phase 415 Volts, 50Hz, 3 phase power supply; specially designed High Torque, Low Inertia, Short-time rated S2-15 minutes Duty, Totally Enclosed Non-Ventilated, Class F Insulated with Temperature Rise limited to Class B, Thermostats provided in all the 3 phase windings of motors.
4. Mountings: are Provided as per IS: 9334
5. Enclosures: Actuators are suitable for indoor and outdoor environment. These are duly certified by Govt. Approved agency for IP-68 Class of Enclosure protection.
6. Manual Operation: A Declutch Lever permits manual Hand wheel operation. When motor is energised, the actuator returns automatically to motor operation without imparting any motion to the hand wheel; thereby ensuring personnel safety.
7. Wide Speed Range: Limitorque Offers widest choice of output speeds making selection of operation times nearer to process requirements.
8. Hammer blow: In order to overcome inertia during unseating of torque seated valves, hammer blow effect is provided in the actuators.
9. Ease Of Maintenance: All electrical components i.e. Position Limit Switch, Torque Switch, Motor terminals, Space Heater are provided in single compartment allowing easier maintenance and field modifications.
10. Actuators are suitable for 50°C ambient. Other ambient are available on request.
11. Local Position Indicator

Optional Features (Available on request) :

1. 24 Contacts for position (Open, Close, Intermediate)
2. Motors: H class of Insulation, Single phase / D.C. Motor, Non Standard Power supply Motors. S4 duty motors are also available on request.
3. Mountings: Special adaptors to suit site application requirement or as per ISO, DIN can also be offered.
4. Enclosures: Actuators suitable for use in hazardous areas as defined in IS / IEC –60074, IIB duly Certified by CIMFR Dhanbad, PESO Nagpur and BIS.
5. Actuators with DGMS Approval for OIL mines can also be supplied.
6. No Lost Motion Drives: For Regulating duty services no lost motion feature is provided.
7. Side Mounted Hand wheel: To reduce RIM PULL force effort.
8. Actuators Mounted with secondary gear boxes making them suitable for part turn, multi turn, slow speed, high torque applications.
9. Rotary actuators mounted with linear adaptors, where application required linear motion.
10. Special Floating stem nut design for high speed, high temperature services.

Optional Controls / Protections :

- A. Remote Position Transmitter
 - A.1 Potentiometer to provide varying resistance values in proportion to Valve Position.
 - A.2 CPT (Current Position Transmitter), when used in conjunction with A.1, provides 4-20 mA output signal. Two Wire, Four Wire, with Galvanic Isolation.
 - A.3 Non-Contact/ LVDT Type Position Transmitters to provide 4-20 mA output signal.
- B. Remote Position Indicators : Analog / Digital (supplied loose).
- C. Power Supply : Inbuilt power supply unit for Indications, Integral Controls and Push Button Station.
- D. Push Button Station : With Open, Close, Stop Push Buttons and Local/Remote/Off Selector Switch.
- E. Indicating Lights : Open/Close Indicating Lights are supplied with (D) above.
- F. Blinker Switch : Provides contact output, which gives running blinking indication when connected to an Indication Lamp.
- G. Selector Switch Padlock : Local / Remote / off Selector Switch can be padlocked in three positions.
- H. Integral Controls : Microphone based controller have electro-mechanical Reversing Contactors, Control Transformer, Fuses etc.
- I. Monitor Relay : For indication of Actuator Ready to start (RTS) for remote control.
- J. D.C. Interposing relays: To control actuator with remote D.C. Signal.
- K. Electronic Positioners To Control the actuator with 4-20mA process command signal.

Actuators with Add-on features and for Special Applications are available as given below :

Controller features : Single Phase Protection; Auto-Phase Correction; Anti-Hammer Protection; Emergency Shut Down; Output Drive Direction Selection; Jammed Valve Protection/Auto Retry

Special Applications :

- (I) Regulating Duty Modutronic Positioner - MOD -20 II.
- (II) UEC-3-Microprocessor based Control System.
- (III) UEC-3-MPC – Modulating Position Controller.
- (IV) UEC-3-DDC - Distributed Digital Controller in conjunction with UEC-3.
- (V) MJ-70 Controller with solid state reversal type starter for 1200 Starts/Hr. modulating applications.
- (VI) Special control/ Protection features as per customer/ application demands can also be given for specific requirement.

UEC-3 Universal Electronic Controller

The UEC-3 is a microprocessor based controller for the complete range of Limatorque actuators. It provides many protection and control features which are designed to optimize valve control for your facility. The basic UEC-3 model provides control, indication, alarm, and protection features. It is intended for use with open / close or pushbutton throttling valves.



(II) MJ-70 : Modutronic Device

The MJ-70, an analog type positioned, ties the positions of remote electronic valves to the setting signal value for the valve position, that has been designated by the central control room. The unit is made up of a simple circuit using a potentiometer or 4-20mA current in the feedback section, and a magnetic switch or a solid state switch in the motor drive section.



It's linearity is $\pm 5\%$ with sensitivity $\pm 1\%$. Temperature error of MJ-70 is $0.2\%/10^\circ\text{C}$.

UEC-3-DDC Distributed Digital Controller

Digital control via Limatorque's DDC-100 Network is provided by this model. The communication protocol is Modbus and up to 250 Limatorque actuators may be controlled and monitored in a DDC-100# Network.



Pushbutton Pushbutton Lamp Station

This is a device for operating the Limatorque Valve actuator at the valve side. The unit has a heavy duty, high-reliability structure with a unique three-button, three-way switch selection method and a three-lamp display section, all contained in a durable case.



UEC-3-MPC Modulating Position Controller

This model is designed to position valves in accordance with a 4-20mA command signal, thereby controlling level, flow, pressure, etc. All the indication, alarm, and protection features of the UEC-3 are retained in this model.



CONNECTORS Easy Wiring Connection

Pin connectors are made so that cable connections to Limatorque units that are placed outside can be made with one touch. There are a variety of sizes and pin numbers available. Special connector, for use in environments with dangerous gas atmospheres are also available.



(I) MOD-20 II Positioner

The Modutronic 20 II is a solid state-integrated circuit-based controller. It is used to operate electric valve actuators in wastewater, petrochemical, and other industry applications requiring accurate modulation positioning. The standard input consists of a 4-20 mA signal generated by a process controller; the resulting output is used to accurately and repeatably position a valve actuator through conventional or solid state switching of either single or three-phase AC power.

Accuracy and repeatability of positioning within 1% of full-scale for actuator stroke times > 30 seconds

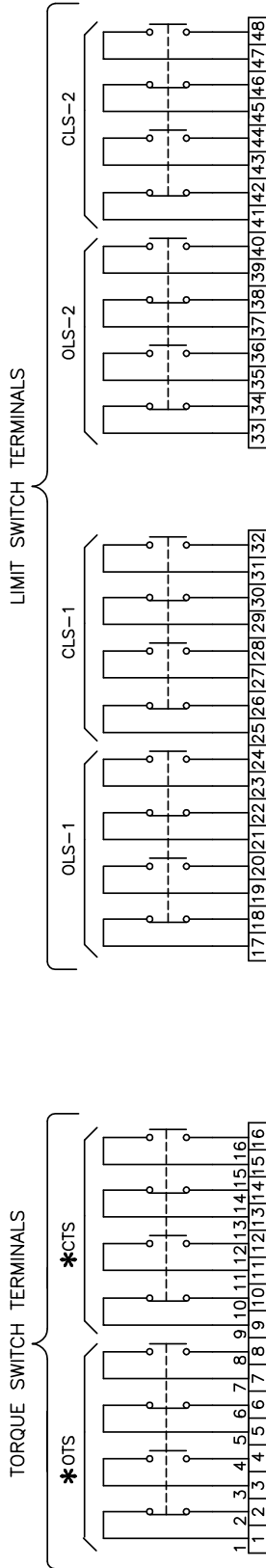


EPT Electronic Position Transmitters

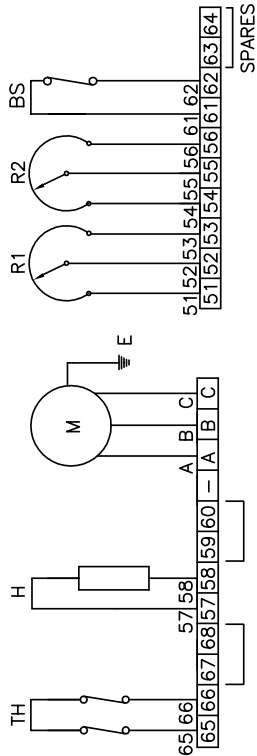
The transmitter is a heavy duty, precision, resistance/current converter. There are variety of transmitters available with Limatorque depends on the application i.e. two wire type, four wire type, Galvanically Isolated, DC/AC power supply etc. Non Contact type (LVDT) is also available



No Control Unit



T.B.-2



T.B.-1

T.B.-3

LEGEND:-

- CTS-TORQUE SWITCH FOR CW ROTATION (CLOSE)-2NO+2NC.
- OTS-TORQUE SWITCH FOR CCW ROTATION (OPEN)-2NO+2NC.
- OLS-1 ,OLS-2-LIMIT SWITCHES FOR POSITION OPEN-2NO+2NC
- CLS-1,CLS-2-LIMIT SWITCHES FOR POSITION CLOSE-2NO+2NC.
- TH-MOTOR THERMOSTAT(INBUILT IN STATOR WDG.)
- R-1,R-2-POTENTIOMETER 2x100 OHMS.
- HTR-SPACE HEATER 1ϕ 220 AC SUPPLY.
- M-MOTOR 3ϕ 415.50 HZ, AC SUPPLY.
- TB-TERMINAL BLOCKS
- BS-BLINKER SWITCH

NOTES:-

- 1- BY PASS OTS INITIAL 5% OF TRAVEL (FOR GATE VALVES ONLY)
- 2- CONNECT THERMOSTAT WITHOUT FAIL IN THE STARTER CIRCUIT
- * 3- FOR ACTUATOR ANTICLOCKWISE TO OPEN,TORQUE SWITCH STICKERS (OTS & CTS) WOULD BE AS SHOWN IN WIRING DIAGRAM
- * 4- FOR ACTUATOR CLOCKWISE TO OPEN,TORQUE SWITCH STICKERS (OTS & CTS) WILL BE INTER CHANGED

VALVE SHOWN IN MIDDLE POSITION

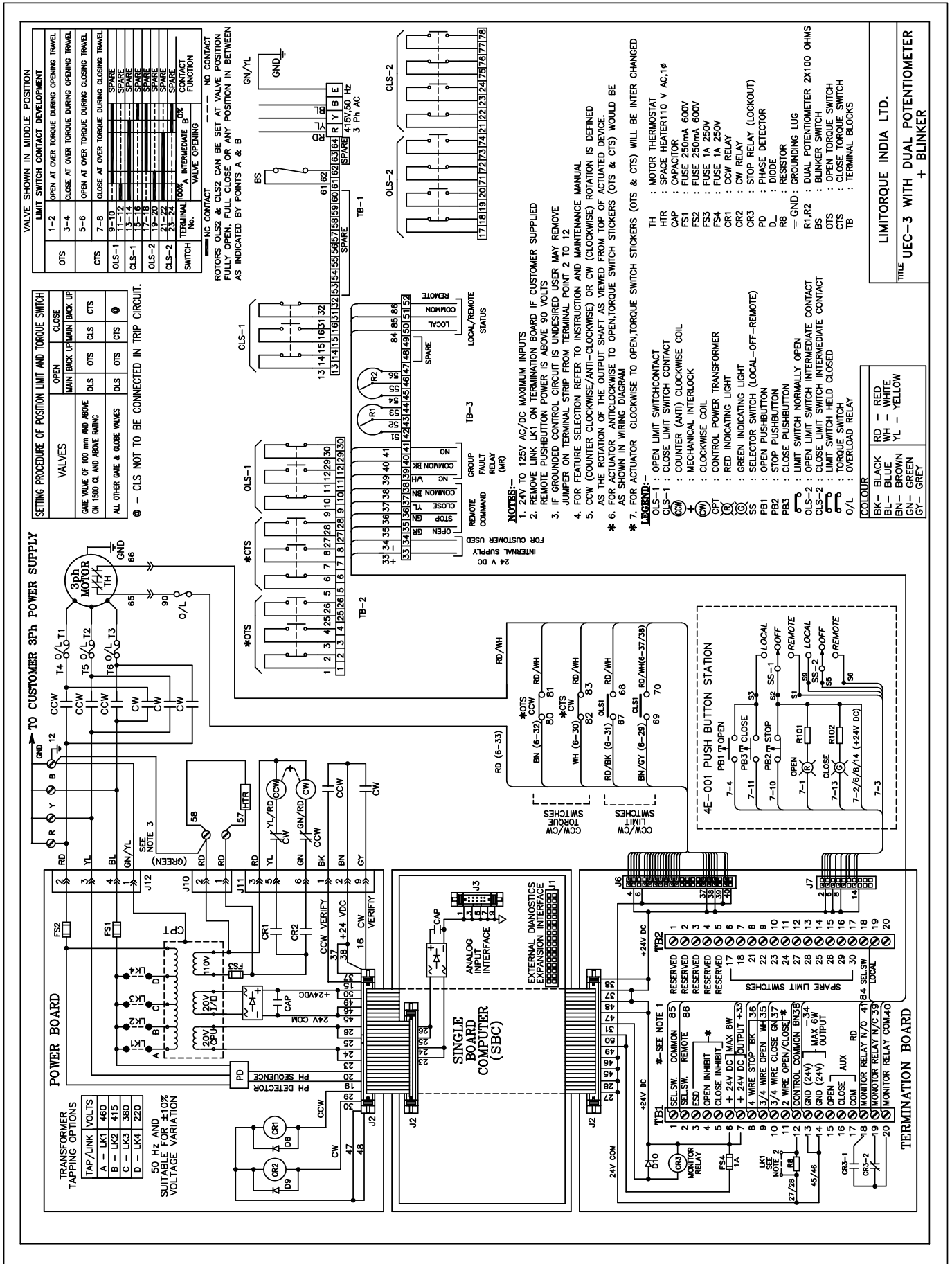
CONTACT DEVELOPMENT DIAGRAM	
1-2	OFF AT OVER TORQUE DURING OPENING TRAVEL
5-6	ON AT OVER TORQUE DURING OPENING TRAVEL
3-4	ON AT OVER TORQUE DURING CLOSING TRAVEL
7-8	OFF AT OVER TORQUE DURING CLOSING TRAVEL
9-10	ON AT OVER TORQUE DURING OPENING TRAVEL
13-14	ON AT OVER TORQUE DURING CLOSING TRAVEL
11-12	OFF AT OVER TORQUE DURING OPENING TRAVEL
15-16	ON AT OVER TORQUE DURING CLOSING TRAVEL
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	---
switch	Terminal No. 100% a INTERMEDIATE b 0%

--- NC CONTACT
 --- NO CONTACT
 CONTACT RATING: 5A AT 250VAC & 0.5A AT 220V DC

VALVES	SETTING PROCEDURE OF POSITION LIMIT AND TORQUE SWITCH	
	OPEN	CLOSE
GATE VALVE OF 100 mm AND ABOVE	MAIN BACK UP	BACK UP
ON 1500 CL AND ABOVE RATING	OLS	OTS
ALL OTHER GATE & GLOBE VALVES	OLS	OTS

⊙ - CLS NOT TO BE CONNECTED IN TRIP CIRCUIT.

Integral Type Wiring Diagram with UEC-3



INTELLIGENT ACTUATOR SYSTEMS



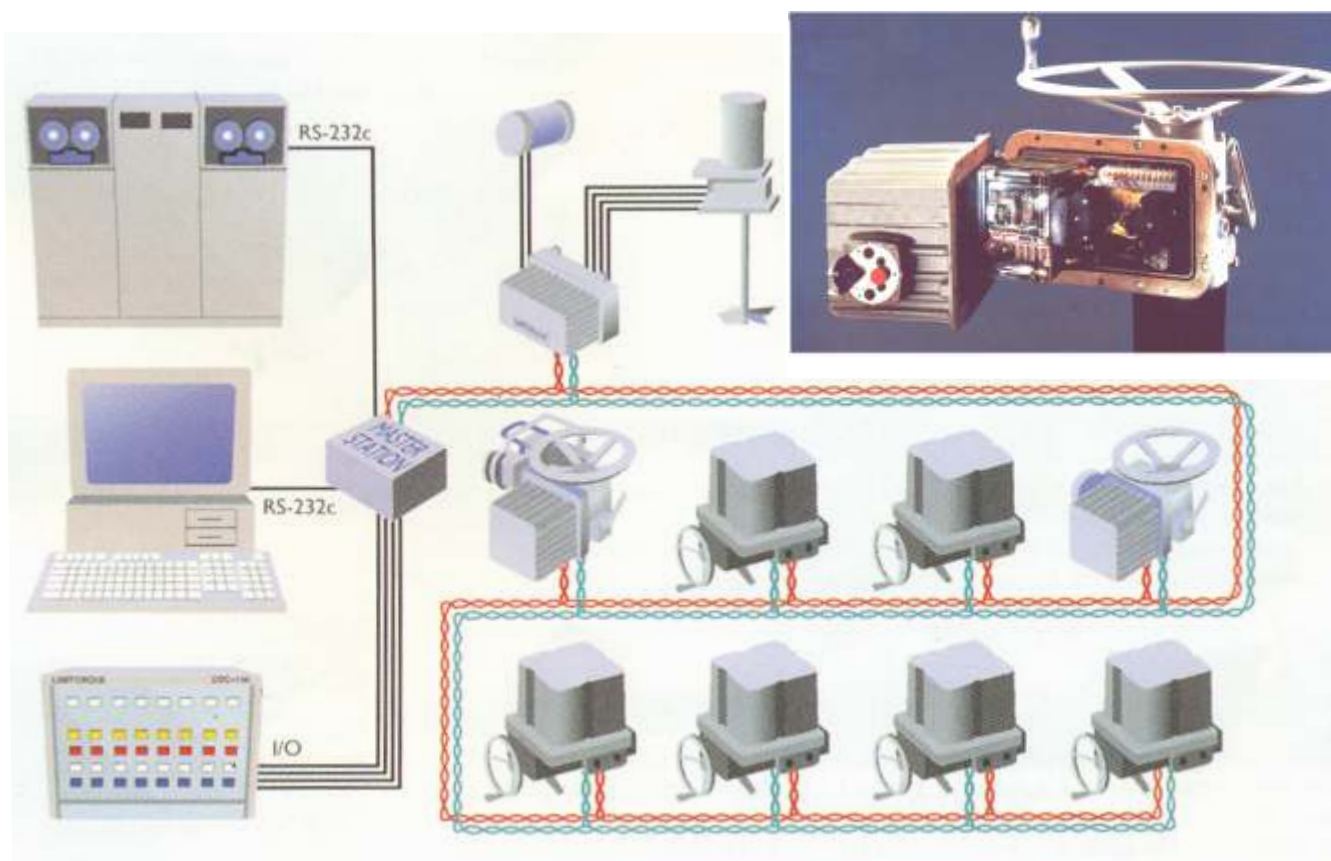
Intelligent System

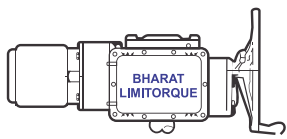
The valve control system allows observation, and centralized control, of actuators set up in the field, from a central master station.

Not only does the system simultaneously control large capacity valves, it also has intelligent functions to count flow rates and volumes remaining in tanks, and display the results digitally. Overall plant automation and rationalization is attainable using this high-level management system.

DDC-100 Digital Control System

Up to 250 actuators (maximum) can be controlled and observed using a loop with sealed twisted-pair cables or a multi-drop type connection, and field units containing microprocessors combined with each actuator. The master station is highly reliable, with high-speed scanning of each actuator, a loop back function to assure continued communication even when a cable is cut, surge protection, etc.. With all of these functions, the DDC 100 is still a low-cost valve control communication system. It can also be connected directly with out master station i.e. with PLC/DCS.





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