

**BHARAT HEAVY ELECTRICALS LIMITED**CORPORATE RESEARCH & DEVELOPMENT DIVISION
VIKASNAGAR, HYDERABAD - 500 093, INDIA

PHONES: 23774494 (EXCHANGE)

DIRECT: 23882104/23882204/

23778474/23776772

FAX : 91 40 23770698

ENQUIRY

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PLEASE GIVE REFERENCE OF ENQ NUMBER , ENQ .DATE AND DUE DATE IN ALL YOUR
CORRESPONDENCE FOR PROMPT ACTION. IN CASE IF YOU ARE NOT MAKING THE OFFER
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SL NO	DESCRIPTION / SPECIFICATION	UNIT	QTY
1	HYDRAULICS HARDWARE & SOFTWARE. DETAILED TECHNICAL SPECIFICATIONS AS PER ANNEXURE A. NIL OF MATERIAL AS PER ANNEXURE B.	NO.	1

NOTE: PLEASE SUBMIT YOUR OFFER IN TWO PARTS AS PER THE ENCLOSED ANNEXURE
"AA" IN SEPARATE SEALED COVERS AS DETAILED BELOW:

- 1) FIRST COVER CONTAINING TECHNICAL, COMMERCIAL AND UNPRICED PRICE BID ALONG
WITH COMPLIANCE STATEMENT, MENTIONING APPLICABLE DUTIES, TAXES ETC., AND
DELIVERY TIME CLEARLY.
- 2) SECOND COVER CONTAINING PRICE BID.
- 3) COMBINED BID OFFERS WILL BE REJECTED SUMMARILY.

AS WE ARE ENGAGED IN R&D ACTIVITY "C" FORM
WILL NOT BE ISSUED

Yours faithfully
for

PLEASE FILL UP THE ENCLOSED VENDOR
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YOUR QUOTATION. OTHERWISE YOUR QUOTATION
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HAVE ALREADY SUBMITTED THIS FORM)

BHARAT HEAVY ELECTRICALS LTD

PK Kakkar
Manager

Email: pkkakk@bhelrnd.co.in

ANNEXURE-A

Specifications for Hydraulics Hardware & Software

I. Hydraulics Training Kit Basic Level:

The Hydraulic Training Kit (Basic Level) shall be capable of being used to demonstrate the design, construction and application of Hydraulic components and circuits.

The kit should be capable of being used to demonstrate the following:

- Design and function of a Hydraulic System – Basic
- Design and Function of Valves
- Symbols in accordance to ISO 1219
- Basic Circuit Diagrams on practical applications
- Hydraulic controls with pilot operated valves
- Hydraulic reservoirs, flow distributors etc

The components shall be capable of being mounted on an appropriate profile plate with grooves for secure and flexible positioning so that the components can be clamped firmly, quickly & safely through quick fix adapters. This should ensure flexibility in conducting experiments through various exercises.

All Hydraulic connections shall be with self-closing, quick connector, safety clamping and quick plug in locking system for profile panels (unless specified against individual item). The couplings should be leak proof, which is self-sealing when decoupled and when coupled, should ensure a tight hydraulic connection. During the coupling process only the face of the coupling should be coated with oil.

Industrial components shall be used in the kit so that the students get hands on practical training in using Industrial components.

The kit shall be modular and upgradeable so that future investments to higher levels of training are reduced.

The operating pressures in general shall be as given below unless otherwise specified against individual item:

1. Operation Pressure P : 6 MPa (60 Bar)
2. Max. Permissible pressure P_{max} : 12 Mpa (120 Bar)

The kit shall contain components as per the attached list.

1. Profile Plate

All of the components fit securely and safely onto the profile plate.

Both sides have s have grooves and, if required, both sides can be used.

The grooves are compatible with the ITEM profile system. Side caps are included.

Grid dimensions _____ 50 mm

Size _____ 1100 x 700 mm

2. Hydraulic Power Pack

The power pack is of the external gear pump type with a single pump. The motor with the hydraulic power pack is AC, single phase, 230 V, 0.65 W power rating, frequency 50 Hz, actuation is manual via ON/OFF switch, the delivery rate at nominal speed is 2.2 lpm at 1320 min^{-1} , operating pressure is 6 Mpa (60 Bar), oil tank capacity is 5 liters, duty cycle is 50%, dimensions are 580 x 300 x 180 mm, weight should be around 20 kg.

3. Equipment trays

The required no. of equipment trays should be supplied. The tray design is such that the supplied components can be kept in the tray. Also the trays have space for each individual component.

4. Pressure gauge

The pressure gauge is protected by a glycerin filling against pressure peaks, condensed water and the ingress of water during cleaning.

Measurement range _____ 0 – 10 MPa (0 – 100 bar)

Accuracy _____ 1.6 % of full-scale value

Operating pressure, static _____ $3/4$ of full-scale value

Operating pressure, dynamic _____ $2/3$ of full-scale value

Actuation _____ Hydraulic

5. Double-acting cylinder

Double-acting cylinder is with control cam and two barbed fittings

Piston diameter _____ 16 mm

Piston rod diameter _____ 10 mm, with M8 thread

Stroke _____ 200 mm

Operating pressure p _____ 6 MPa (60 bar)

Max. permissible pressure pmax _____ 12 MPa (120 bar)

6. Hydraulic motor

Design _____ Orbit

Geometric displacement _____ 8.2 cm^3

Max. permissible pressure

in return line _____ Pr max 5 MPa (50 bar)

Max. rotary speed Nmax _____ 1950 min^{-1}

Output shaft with spring _____ Ø 16 x 28, A5 x 5 DIN 6885

Operating pressure p _____ 6 MPa (60 bar)

Max. permissible pressure pmax _____ 12 MPa (120 bar)

7. 4/2-way hand lever valve

Operating pressure p _____ 6 MPa (60 bar)
Max. permissible pressure p_{max} _____ 12 MPa (120 bar)
Actuation _____ Manual

8. 4/3 way hand lever valve

Operating pressure p _____ 6 Mpa (60 bar)
Max. permissible pressure P_{max} _____ 12 Mpa (120 bar)
Actuation _____ Manual

9. Pressure sequence valve, pressure relief valve

The valve is capable of being used as a pressure relief valve if port T is connected to the tank and as a pressure sequence valve if port T is connected to another power component, such as a cylinder.

Operating pressure p _____ 6 MPa (60 bar)
Max. permissible pressure p_{max} _____ 12 MPa (120 bar)
Adjustment _____ Manual
Actuation _____ Hydraulic

10. 3-way pressure reducing valve

Operating pressure p _____ 6 MPa (60 bar)
Max. permissible pressure p_{max} _____ 12 MPa (120 bar)
Adjustment _____ Manual
Actuation _____ Hydraulic

11. 2-way pressure reducing valve

Operating pressure p _____ 6 MPa (60 bar)
Max. permissible pressure p_{max} _____ 12 MPa (120 bar)
Adjustment _____ Manual
Actuation _____ Hydraulic

12. One-way flow control valve

Nominal flow rate _____ 9 l/min
Opening pressure _____ 70 kPa (0.7 bar)
Operating pressure p _____ 6 MPa (60 bar)
Max. permissible pressure p_{max} _____ 12 MPa (120 bar)
Actuation _____ Manual

13. One way flow control valve

Nominal Flow rate _____ 9 l/min
Operating pressure _____ 6 MPa (60 bar)
Max permissible pressure _____ 12 MPa (120 bar)
Actuation _____ Manual

14. Non-return valves

Operating pressure p _____ 6 MPa (60 bar)
Max. permissible pressure p_{max} _____ 12 MPa (120 bar)
Actuation _____ Hydraulic
Opening pressure of one valve _____ 0.1 MPa (1 bar)
Opening pressure of other valve _____ 0.5 MPa (5 bar)

15. Shut-off valve

Shut-off valve is with two ports. The valve is capable of being inserted at any point to enable shutoff of flow.

Operating pressure p _____ 6 MPa (60 bar)
Max. permissible pressure p_{max} _____ 12 MPa (120 bar)
Actuation _____ Manual

16. Diaphragm accumulator with shut-off block

The filling and testing device (included in the scope of supply) is compatible with the diaphragm accumulator. This device can measure the gas filling pressure of the accumulator. The pressure relief valve being supplied along with the kit is capable of protecting the accumulator from overpressure.

Gas _____ Nitrogen
Gas filling pressure as supplied p₀ _____ 1 MPa (10 bar)
Max. permissible pressure p_{max} _____ 12 MPa (120 bar)
Nominal volume _____ 0.32 dm³
Adjustment _____ Manual
Actuation _____ Hydraulic

17. Weight

The weight is for loading of the cylinder and can simulate a driving or tractive load. The weight is capable of being used vertically with a double-acting cylinder. A cover for safety is included in the scope of supply. All the necessary accessories for using the weight with the cylinder will be supplied.

Mass _____ 9 kg
Dimensions, L x W x H _____ 150 x 100 x 80 mm

18. 2 way pressure reducing valve

Operating pressure p _____ 6 MPa (60 bar)
Max. permissible pressure p_{max} _____ 12 MPa (120 bar)
Adjustment _____ Manual
Actuation _____ Hydraulic

19. Standard hoses with quick connectors

The high-pressure hose is made of three layers. The innermost layer is of Synthetic rubber, followed by a wire mesh and sheath of abrasion-resistant synthetic rubber. The two coupling sockets are self-sealing when decoupled. When used with a coupling nipple, the coupling sockets form a highly sealed connection. The arrangement is such that only when the hoses are unpressurised, coupling and decoupling is possible.

Nominal size _____ 6 mm

Operating pressure p _____ 6 MPa (60 bar)
Max. permissible pressure p_{max} _____ 12 MPa (120 bar)
Temperature range _____ -40 – +125 °C
Bending radius, minimal _____ 100 mm
Hose length _____ 600 mm
Hose length _____ 1000 mm
Hose length _____ 1500 mm

The appropriate no. of hoses/hose lengths as per the above specifications are quoted.

20. Non Return Valve – Delockable Piloted:

The valve body shall be a single + double pilot operated non-return valve or check valve. By screwing in a coupling nipple, the function shall be changeable to a single pilot delockable double non –return valve.

Surface ratio of pilot piston

To non-return valve seat _____ 3.3:1
Operating pressure p _____ 6 MPa (60 bar)
Max.permissible pressure P_{max} _____ 12 MPa (120 bar)

21. Tee Connector:

Branch Tee with three connections (1 socket, 2 nipples).The branch tee can be inserted at any point to create a branch.

Operating pressure : 6 MPa (60 bar)

Max.permissible pressure P_{max}: _____ 12 MPa (120 bar)

22. Mounting Profile:

Required when the weight is to be mounted directly on the hydraulic cylinder. Scope of delivery includes connecting kit.

Profile dimensions _____ 32 x 32 x 816 mm

23. Mounting kit for hydraulic cylinder:

Along with the mounting parts, for inclined profile plate mount.

24. Pressure Relief Unit:

The pressure relief unit allows you to remove hydraulic clamping pressures without great expenditure of force.

25. Hydraulic distributor plate:

The hydraulic distributor plate accommodates 5 P or T outlets. The distributor plate is also equipped with a pressure gauge. The distributor plate is firmly mounted on the profile plate.

Measurement range _____ 0-10 MPa (0-100 bar)
Accuracy _____ 1.6% of full-scale value
Operating pressure, static _____ $\frac{3}{4}$ of full-scale value
Operating pressure, dynamic _____ $\frac{2}{3}$ of full-scale value
Actuation _____ Hydraulic

26. Hydraulic Oil (HLP 22):

This shall meet DIN 51524 standards. This shall be supplied in a 20 litre can.

27. Drip Tray:

The drip tray being supplied shall be made of steel.

28. Profile plate frame for inclined profile plate mount:

2 per profile plate to be supplied & shall be with mounting parts.

29. Holder for storage of Hydraulic hoses:

Each holder shall be able to accommodate upto 9 hydraulic hoses.

II. Electro Hydraulics Training Kit Basic Level:

The Electro Hydraulic Training Kit (Basic Level) shall be capable of being used to demonstrate the design, construction and application of Electro Hydraulic components and circuits.

This set shall upgrade from the basic & advanced hydraulic kits.

The kit shall be capable of being used to demonstrate the following:

- Design and function of a Electro Hydraulic System – Basic
- Design and Function of Valves
- Symbols in accordance to ISO 1219
- Basic Electro Hydraulic Circuit Diagrams on practical applications
- Electro Hydraulic controls with pilot operated valves, Hydraulic reservoirs, flow distributors etc

The components shall be capable of being mounted on an appropriate profile plate with grooves for secure and flexible positioning so that the components can be clamped firmly, quickly & safely through quick fix adapters. This should ensure flexibility in conducting experiments through varies exercises.

All Hydraulic connections shall be with self-closing, quick connector, safety clamping and quick plug in locking system for profile panels (unless specified against individual item). The couplings should be leak proof, which is self-sealing when decoupled and when coupled, should ensure a tight hydraulic connection. During the coupling process only the face of the coupling should be coated with oil.

Industrial components shall be used in the kit so that the students get hands on practical training in using Industrial components. The kit shall be modular and upgradeable so that future investments to higher levels of training are reduced.

The operating pressures in general shall be as given below unless otherwise specified against individual item:

3. Operation Pressure P : 6 MPa (60 Bar)
4. Max. Permissible pressure Pmax : 12 Mpa (120 Bar)

The kit shall contain components as per the attached list.

1. 4/2-way solenoid operated (24 V DC) valve

Power rating _____ 6,5 W
Operating pressure p _____ 6 MPa (60 bar)
Max. permissible pressure pmax _____ 12 MPa (120 bar)
Actuation _____ Electrical

2. 4/3-way solenoid valve

Power rating _____ 6, 5 W
Operating pressure p _____ 6 MPa (60 bar)
Max. permissible pressure pmax _____ 12 MPa (120 bar)
Actuation _____ Electrical

3. 24 V DC regulated power supply for the above kit

Input voltage _____ 230/115 V AC (47 – 63 Hz)
Output voltage _____ 24 V DC, short-circuit-proof
Output current _____ Maximum 4.5 A
Connection cable _____ 1.3 m
Dimensions _____ 115 x 155 x 200 mm

I/O Box

Inputs _____ 3 safety sockets each for 8 three-wire sensors
Outputs _____ 2 safety sockets each for 8 actuators
Interfaces _____ 4 mm safety sockets for 24 V DC connector
I/O status display _____ via LEDs

4. Relay

The device has three relays with terminals and two buses for power supply.

Contact set _____ 4 changeover switches
Contact load _____ Maximum 5 A
Cut-off load _____ Maximum 90 W
Pick-up time _____ 10 ms
Drop-off time _____ 8 ms

5. Indicator unit and distributor, electrical

The device contains an acoustic indicator and four lamps with terminals and three buses for power supply. Through contact socket pairs per lamp it also allows the element to also be used as a distributor.

Power consumption acoustic indicator _____ 0.04 W
Power consumption indicator lamps _____ 1.2 W
Frequency acoustic indicator _____ 420 Hz

6. Limit switch, electrical, left actuated

The electrical limit switch comprises of a mechanically operated micro switch. When the roller lever is pressed by the control cam of a cylinder, the micro switch is actuated. The circuit is capable of being closed or opened via the contacts. The micro switch is capable of being wired as a normally open, normally closed or changeover contact.

Contact load _____ Maximum 5 A
Switching frequency _____ Maximum 200 Hz
Reproducible accuracy _____ 0.2 mm
Switch travel _____ 2.7 mm
Actuator force _____ 5 N

7. Limit switch, electrical, right actuated

The electrical limit switch comprises of a mechanically operated micro switch. When the roller lever is pressed by the control cam of a cylinder, the micro switch is actuated. The circuit is capable of being closed or opened via the contacts. The micro switch is capable of being wired as a normally open, normally closed or changeover contact.

Contact load _____ Maximum 5 A
Switching frequency _____ Maximum 200 Hz
Reproducible accuracy _____ 0.2 mm
Switch travel _____ 2.7 mm

8. Signal Input, electrical:

The device shall contain a release – delay and a pickup-delay time relay. Both relays are infinitely variable, using the rotary knob of the potentiometer..

Contact set _____ 2 makes, 2 breaks
Contact load _____ Maximum 5 A
Cut-off load _____ Maximum 100 W
Delay _____ 0.5 – 10 s adjustable

9. Set of Cables:

Color	Quantity	Length[mm]	With 4 mm safety plugs
Red	1	1500	376 941
Red	3	1000	376 939
Red	21	500	376 937
Red	26	300	376 935
Red	10	50	376 932
Blue	1	1500	376 940
Blue	3	1000	376 938
Blue	12	500	376 936
Blue	11	300	376 934
Blue	10	50	376 931

10. Plug in adapters:

For mounting of components with plug-in foot on the aluminum plate.

III. Electro Hydraulics Training Kit with PLC (Basic level):

The Electro Hydraulic PLC Training Kit (Basic Level) shall be capable of being used to demonstrate the design, construction and application of Electro Hydraulic components and circuits. This kit should upgrade from the Electro Hydraulic Basic level kit.

The kit shall be capable of being used to demonstrate the following:

- Design and function of a Electro Hydraulic PLC system – Basic
- Function and identification of Electro hydraulic components and their symbols
- Direct and indirect manual controls, stroke dependant controls, time dependant with time delay valves and pressure dependant controls with pressure sequence valves.
- Logic AND / OR function to start signals
- Application and fault findings of Electro Hydraulic controls with PLC
- Functional diagrams
- Systematic design of Electro Hydraulic with PLC Sequence Controls
- Methods for the drafting of circuit diagrams for Electro Hydraulic with PLC controls
- Pneumatic Power Section – Electric Control Section

The components shall be capable of being mounted on an appropriate profile plate with grooves for secure and flexible positioning so that the components can be clamped firmly, quickly & safely through quick fix adapters. This shall ensure flexibility in conducting experiments through varies exercises.

Hydraulic Plug in type flexible connectors should be safe & airtight, usage for multiple applications. These should be with precision quick connector for plastic tubing 4 mm x 0.75 and for internal or external diameter calibrated tubes (unless specified against individual item)

Voltage 24 V DC

Multifunctional Electro – connectors for 4 mm laboratory plugs and jack plugs

Industrial components shall be used in the kit so that the students get hands on practical training in using Industrial components.

The kit shall contain components as per the attached list.

1. Proximity Sensor, Inductive:

Proximity switch that detects the proximity of electrically conducting objects through a change in inductance and emits a signal. The proximity switch has a PNP output and is designed as a normally-open contact. A yellow LED indicates the status. The switch is protected against polarity reversal, overload and short-circuit.

Switching voltage _____ 10 – 30 VDC
Nominal switching distance _____ 4 mm (material S 235 JR)
Switching frequency _____ Maximum 800 Hz
Output function _____ Normally open contact,
positive switching
Output current _____ Maximum 400 mA

2. Proximity Sensor, Capacitive:

Proximity sensor that detects the presence of any object by a change in capacitance and emits a signal. The proximity switch has a PNP output and is designed as a normally-open contact. A yellow LED indicates the status. The switch is protected against polarity reversal, overload and short-circuit.

Switching voltage _____ 10 – 30 VDC
Nominal switching distance _____ 4 mm
Switching frequency _____ Maximum 100 Hz
Output function _____ Normally open contact,
positive switching
Output current _____ Maximum 200 mA

3. Proximity Sensors, Optical:

Proximity switch that responds to light signals and delivers an electrical signal. The switching distance can be adjusted by means of a potentiometer. The proximity switch has a PNP output and is designed as a normally-open contact. A yellow LED indicates the status. The switch is protected against polarity reversal, overload and short-circuit.

Switching voltage _____ 10 – 30 VDC
Nominal switching distance _____ 0 – 100 mm (adjustable)
Switching frequency _____ Maximum 200 Hz
Output function _____ Normally open contact,
positive switching
Output current _____ Maximum 100 mA

4. PLC:

Power Supply: 24V DC

12 input (min.)

8 outputs (relay) (min.)

Programming language - ladder/ statement
Programming cable between PLC & PC.
Software (CD) for programming PLC.

5. Plug in adapter:

For mounting of components with plug-in foot on the aluminum profile plate.

6. T- piece with Quick Push Pull fitting:

Sufficient numbers shall be supplied for branching of the tubing for making of the circuitry.

IV. Software for simulation of Hydraulic circuits:

The simulation software shall be available in separate hydraulic version for simulation of Hydraulics / Electro-Hydraulic circuits and should be suitable for teaching the fundamentals of automation. It must have the following general capabilities:

- Built-in educational videos on at least 10 to 12 different topics, which help to understand the fundamentals of Hydraulics and explain how different components work.
- Animations of internal working of different Hydraulic components.
- Facility to create presentations based on built-in templates, or to include slides from other Windows applications.
- Facility to connect and control external Electro-Hydraulic hardware components, with the help of hardware (see specification V below).
- Built-in software PLC, to construct complex controls, to control internal circuits or external hardware components, without using any programming language.
- Component photographs to help identify and explain every component in the library.

Circuit Simulation:

The following simulation features should be available as standard:

- Simulation of circuit symbols should be possible, so that even complex circuits can be drawn and simulated.
- The Hydraulics version must include Check valve with pilot control, Hydro-motor, 3-Way pressure reducing valve, Flow dividing valve, Diaphragm accumulator with shut-off block, Shut off / counteracting valve and Pressure relief valve with pilot control, all of which should be possible to simulate.
- Symbols of direction control valves should be customizable so that they can be converted into a 2, 3 or 4 position valve, with any combination of actuation on either side.
- Pressurized lines and electrical connections carrying supply should be possible to highlight automatically with a choice of colors.

- The software should have the capability of automatically summarizing the bill of material of any circuit, with a drag and drop control. Similarly the software should provide a drag and drop control that automatically draws a timeline showing the relative motion of each selected component on a time scale for easier calculation of air / oil consumption in circuits.
- Step by step simulation of any circuit should be possible for easier understanding of component state changes and circuit function.

V. Hardware for controlling external Electro-Hydraulic devices:

Hardware necessary for controlling external electro-hydraulic circuits using the hydraulic simulation software, along with necessary data cables has to be supplied. A detailed diagram indicating how the hardware interfaces with the software running on PC and the electro-Hydraulic circuit should be enclosed along with the technical offer.

VI. Work Station :

The workstation will be used for storing & mounting, hydraulic components used for designing hydraulic circuits. It shall be a stationary workstation with powder-coated steel frame and a sturdy 25 mm work surface. Workstation substructure with one or two drawer units having 4 or 5 steel drawers.

Useful depth: 700 mm, useful width: 375 mm, load up to 20 kg per drawer. Easy-gliding drawer system with differential rollers for quiet running and additional braking system, lockable, front lock, drawer fronts can be labeled. Suitable space for placement & mounting of hydraulic power pack shall be available in the workstation

ANNEXURE-B

Bill of Material for Hydraulics Hardware & Software

I. Hydraulics Training Kit Basic Level:

Sl No.	Name of Component	Quantity
1.	Profile Plate	1
2.	Hydraulic Power Pack	1
3.	Equipment trays	1
4.	Pressure gauge	3
5.	Double-acting cylinder	1
6.	Hydraulic motor	1
7.	4/2-way hand lever valve	1
8.	4 /3 way hand lever valve	1
9.	Pressure sequence valve, pressure relief valve	1
10.	3-way pressure reducing valve	1
11.	2-way pressure reducing valve	1
12.	One-way flow control valve	1
13.	One way flow control valve	1
14.	Non-return valves	1
15.	Shut-off valve	1
16.	Diaphragm accumulator with shut-off block	1
17.	Weight	1
18.	2 way pressure reducing valve	1
19.	Standard hoses with quick connectors (Set)	1
20.	Non Return Valve – De-lockable Piloted	1
21.	Tee Connector	7
22.	Mounting Profile	1
23.	Mounting kit for hydraulic cylinder	1
24.	Pressure Relief Unit	1
25.	Hydraulic distributor plate	1
26.	Hydraulic Oil (HLP 22)	20 Ltrs
27.	Drip Tray	1
28.	Profile plate frame for inclined profile	2
29.	Holder for storage of Hydraulic hoses	1

II. Electro Hydraulics Training Kit Basic Level:

Sl No.	Name of Component	Quantity
1.	4/2-way solenoid operated (24 V DC) valve	1
2.	4/3-way solenoid valve, closed position	1
3.	24 V DC regulated power supply.	1
4.	Relay, 3 fold	2
5.	Indicator unit and distributor, electrical	1
6.	Limit switch, electrical, left actuated	2
7.	Limit switch, electrical, right actuated	2
8.	Signal Input, electrical	1
9.	Set of Cables	1
10.	Set of Plug in adapters	1

III. Electro Hydraulic Training Kit with PLC (Basic level):

Sl No.	Name of Component	Quantity
1.	Proximity Sensor, Inductive	1
2.	Proximity Sensor, Capacitive	1
3.	Proximity Sensors, Optical	1
4.	PLC	1
5.	Software (CD) for programming PLC	1
6.	Programming cable between PC & PLC	1
7.	Plug in adapter	8
8.	T- piece with Quick Push Pull fitting	10

IV. Software for simulation of Hydraulic circuits:

Sl No.	Name of Component	Quantity
1.	Software for simulation of Hydraulic circuits	1

V. Hardware for controlling external Electro-Hydraulic devices:

Sl No.	Name of Component	Quantity
1.	Hardware for controlling external electro hydraulic devices using hydraulic simulation software.	1 Set

VI. Work Station:

Sl No.	Name of Component	Quantity
1.	Stationary Workstation	1



BHARAT HEAVY ELECTRICALS LIMITED

CORPORATE R&D DIVISION, VIKAS NAGAR, HYDERABAD – 500 093, AP, India

Ph: 0091-40 – 23778474, FAX: 0091-40 – 23770698

General Terms and Conditions of Enquiry & Contract for the Purchase of Goods/ Services

1. The quotation and any order resulting from this enquiry shall be governed by these General Terms and Conditions of enquiry and contract for the supply of goods and the supplier quoting against this enquiry shall, unless specifically stipulates any different terms or conditions, be deemed to have read and agreed to the same.
2. Sealed quotations in double cover with tenderer's distinctive seal, superscribing enquiry number, date and due date are to be submitted so as to reach on or before due date & time, addressed to **Additional General Manager(MM), Bharat Heavy Electricals Limited, Corporate Research & Development Division, Vikasnagar, Hyderabad, Andhra Pradesh, India – PIN-500 093, India.**

In the case of **Two-part bid**, each inner cover shall clearly be labeled as a) **Technical & Commercial Bid** containing technical data/ drawings/ catalogues/ quality plans along with commercial terms and conditions & copy of the price bid with the price columns left blank (unpriced price bid), b) **Price bid** containing prices quotes. Installation and/or Commissioning charges shall be spelt out in absolutely lucid terms, taking into account total charges, rather than quoting vaguely, such as charges per man-day or charges per engineer per day etc. **If the price bid was found later to be different from the unpriced price bid in any way, the offer will be rejected summarily.**

3. **Tender/ Technical bid Opening:** Unless specified otherwise, tenders/ technical bids will be opened on appointed date and time as mentioned in the enquiry or as communicated changed date/time, if any, in the presence of such of those tenderers who may be present.
4. **Delayed/ Late Tender:** Tenders, which have been posted by registered post through the postal department in time before opening date but received after tender opening, shall be treated as regular tenders. Other tenders received after tender opening time shall be treated as late tenders and normally they may be rejected.
5. The Quotation should be free from overwriting and erasures. Corrections and additions, if any, must be attested. Supplier should indicate in the quotation dimensions (Size), weight, rate etc., in the metric system unless the enquiry calls for different unit.
6. **Validity of Quotation:** All quotations shall be kept open for acceptance for a period of ninety days from the date of opening of Tenders/ Technical bid and this shall be deemed to be an express condition of all quotations. The rate shall be quoted in both figures and in words.
7. In the case of Two-part bid, the vendor should furnish technical clarifications, if any, within stipulated time mentioned, failing which, it will be construed that the vendor is not interested in the tender and BHEL shall not consider the offer for further evaluation.
8. **Revision of Pricebid:** In the event of any bidder, after finalizing the technical specifications and scope of supply, opting to revise and submit their latest price bid, then BHEL reserves the right to open their original / previous price bid also while evaluating revised bid.
9. **Pricebid Opening:** Unless specified otherwise in the enquiry, the Price bids of technically qualified vendors shall be opened with prior intimation in the presence of such of those tenderers who may be present.
10. **Conformity to Specifications:** The material should be of the best quality and shall be conforming to our specification given in our enquiry. Unless otherwise agreed upon by BHEL, no payment shall be due by BHEL in respect of any sample. Offers without details of specifications/ applicable catalogues will not be considered and are liable to be rejected.
11. **Terms of Delivery:** All suppliers shall quote the lowest prices on ex-works and FOB/FCA basis. Foreign suppliers will also indicate their Indian agent's name and address with percentage of agency commission out of the quoted price, if any. Name and Address of the supplier's Bankers address should also be given. Indian suppliers for the indigenously manufactured/ imported stock shall quote on Ex-works /Free-on-Rail/Road /FOR-destination basis, indicating packing & forwarding charges, if any, separately.
12. **Taxes and Duties:** Unless specified otherwise in the enquiry, BHEL do not provide "C" or "D" Form as it is engaged in R&D. All Indian suppliers shall clearly mention Sales Tax/ VAT, Excise Duty, and Service Tax etc, if any, payable in addition to the quoted price and indicate applicable rates/ percentage, item-wise. It will be paid

only if Registration Number under State(TIN)/ Central Sales Tax or Service Tax is specifically mentioned in the Bill/Invoice. Vendors without a Sales Tax/VAT registration and applicable Service Tax registration will not be considered.

13. **Insurance:** Insurance will be arranged by BHEL in case of Ex-Works as well as FOB basis supplies.
14. **Terms of Payment:** Full payment will be made within 30 days after receipt, inspection and acceptance of the material (and where involved, Erection and commissioning of the material/ equipment at BHEL/Destination) by Crossed cheque and no Bank commission charges are admissible. The Cheque will be sent by registered post and BHEL is in no way responsible if loss occurs due to delay by postal authorities and cheques falling into improper hands or through forgery or fraud. Suppliers having RBI-SEFT-enabled accounts can seek payment through Electronic Fund transfer. For foreign suppliers, the preferred payment term will be on Sight Draft basis and bank charges inside India will be to BHEL account and outside India will be to supplier's account.
15. Suppliers shall quote competitive price and best delivery for all the items mentioned in the enquiry. BHEL reserves the right to reject partial quotations and to place order on overall landed cost basis. Correct date of effecting supplies in the event of an order should be indicated in the offer. If the supplier's quoted terms are different from BHEL standard payment terms, interest @10.5% per annum (or as indicated in the enquiry) will be loaded to the quoted prices for difference of payment period.
16. **Packing:** The supplier shall be responsible for the goods being properly and adequately packed so as to prevent any loss, damage or deterioration during transit and indicate packing charges, if any, separately.
17. **Part/ Split Ordering:** BHEL reserves right to Order part of the item/ quantity of the enquiry and split the order among qualified vendors.
18. In case the goods enquired are on Rate Contract basis with any other unit of BHEL, such fact should be clearly indicated in the quotation giving full particulars of Rate Contract number, validity and price and also your willingness to comply with order if placed against such Rate Contract. A true copy of Rate contract signed by the supplier should be sent with the quotation.
19. **Inspection:** On receipt, the goods shall be subjected to inspection and also test, if necessary, and our decision regarding the acceptability of the goods shall be final and binding on the suppliers.
20. **Consequences of Failure To Deliver:** The time stipulated for delivery of goods shall be deemed to be the essence of the contract and delivery must be completed within the stipulated date/s. In the event of supplier's failure to supply the goods by the stipulated date/s, BHEL shall be entitled to levy a penalty of ½% per week for the delayed no of weeks or part thereof for the undelivered portion of PO subject to a maximum of 10% total order value.
21. **Withdrawal from the Contract:** In case the supplier withdraws the quotation after its acceptance by BHEL or fails to supply the goods as per the terms and conditions of contract, or at any time repudiated the contract wholly or in part, BHEL shall be at liberty to cancel the Purchase Order and to recover from the supplier the extra cost and other loss incidental to the breach of contract on the part of the supplier.
22. **Guarantee/ Warranty certificate and Manufacturer's Test report:** Invariably in all cases where it is so stipulated, the supplier should furnish Guarantee/ Warranty certificate valid for a period of 18 months from date of supply or 1 year from the date of receipt, acceptance and commissioning(or more, if provide by oem) whichever earlier and manufacturer's Test report along with the goods, failing which, BHEL shall have the right to reject the goods.
23. All ferrous/ non-ferrous items shall be colour coded as per bureau of Indian standards/ or IS standards/ BHEL Standards.
24. **Recovery of Dues:** BHEL shall recover any amount due from the supplier or any amount outstanding to the credit of the supplier with BHEL R&D unit or any other BHEL unit(s) and/or by legal action.
25. **Arbitration & Forum for Legal Proceedings:** All disputes arising in connection with indigenous/ foreign supplies shall be settled through arbitration held at Hyderabad, AP, India and arbitration shall be appointed by Arbitration Tribunal of the Federation of Andhra Pradesh Chambers of Commerce and Industry, Hyderabad, AP, India. The Courts at Secunderabad/ Hyderabad, AP, India shall have jurisdiction in respect of any suit or other legal proceeding arising from or relating to this contract

The rights and remedies of BHEL stated in these General terms and conditions shall be in addition and supplemental to its rights and remedies under law and custom or usage of trade or business and shall in no way be deemed to limit, curtail, supercede or derogate from its said rights and remedies.



ANNEXURE “AA
BHARAT HEAVY ELECTRICALS LIMITED
CORPORATE RESEARCH & DEVELOPMENT DIVISION
VIKASNAGAR, HYDERABAD – 500 093. INDIA

MATERIALS MANAGEMENT DEPARTMENT
(Information for Technical & Commercial bids with general terms)

ENCLOSURE TO ENQ No:

DATE:

- a) Please indicate(_/) for applicable or (X) for not applicable against each clause of the enquiry
- b) Vendor shall confirm their compliance for applicable clauses (_/) in their offer without deviation.

1) Technical offer:-

- a) Vendors to confirm compliance to all points of specifications, attached if any. Deviations if any should be specified in the offer.
- b) Vendors shall furnish relevant technical Documents / Catalogues. Drawings and Quality plan duly taking care of Purchase Specification and Quality requirements along with their offer in duplicate for Purchaser’s review / Verification.

2) Two Part Bid:-

Vendor shall submit their offer in 2 parts.

2.1 Technical Bid:- Containing relevant technical data, drawings, catalogues, Quality Plan etc, along with Commercial Terms and Conditions and a copy of the price bid with the price columns left blank (unpriced price bid). If the price bid was found later to be different from the unpriced price bid in any way, the offer will be rejected.

2.2 Price Bid:- Containing the Price(s) quoted. Installation and or commissioning charges shall be spelt out in absolutely lucid terms taking into account the total charges rather than quoting vaguely such as charges as per man day or charges per Engineer per day etc.,

Technical bids will be opened on the due date of the enquiry or any other date fixed by BHEL. Further, vendor should furnish clarifications, if any, required within seven days after the same is sought by Purchaser. If no clarifications/reply received within 7 days, it will be construed that vendor is not interested in the tender and Purchaser will finalise tender accordingly. Price bids received on due date along with technical offers will be recorded and opened subsequently with due intimation to vendors after finalising of technical scope of supply.

These bids shall be submitted in separate sealed covers superscribing the nature of the offer (technical bid or price bid). BHEL Enq No. Due date etc.

Note: In case of non-compliance with the TWO_-PART-BID ie.. clause number 2 and subclauses 2.1 and 2.2. Purchaser reserves the right to summarily reject all such offers.

3) Delivery:-

Vendor shall confirm supply of materials as per the delivery schedule indicated in the enquiry.

4) Negotiations:-

Vendor shall quote competitive price and best delivery to avoid negotiations.

5) Commercial Terms & Conditions:-

Terms of Delivery:

- a) Vendors shall clearly indicate terms of delivery Viz: Ex-Works/FOR Despatching station/FOR Despatching station FOR Destination/FOB port of loading/FAS Port of loading in their offer. If the terms of delivery is Ex-Works, then vendors shall clearly indicate the following:
 - 1. Packing and forwarding charges.
 - 2. Documentation / Handling charges if any
 - 3. FOB FAS charges (Inland Freight & Insurance charges from vendor works to port of Loading).
- b) All Indian Vendors shall clearly specify the Excise Duty in percentage applicable for their supplies. Offers containing expressions such as “Extra as applicable” or “As applicable at the time of Delivery” will be summarily rejected.
- c) CST/Local Sales Tax in percentage shall be clearly indicated.

6) Validity of Quotation:-

Validity of offer should be 90 days after the opening of price bid.

7) Part or split ordering:-

Purchaser reserves the right to order part of item / quantity of the enquiry.

8) For clauses not mentioned in this document see the enclosed “GENERAL TERMS AND CONDITIONS OF ENQUIRY AND CONTRACT FOR THE PURCHASE OF GOODS”

- 9) In case your terms of payment are different from our standard payment terms, interest at the rate of 10.5% per annum (or BHEL’s standard rate of interest) will be loaded to your prices for the difference of period of payment.**



BHARAT HEAVY ELECTRICALS LIMITED
CORPORATE R&D Division
Vikasnagar, Hyderabad – 500093, India.

Suppliers' compliance statement to basic conditions of enquiry

(In case Order to be placed on Indian supplier in Indian currency)

Condition	BHEL R& D's terms	Supplier's compliance (indicate Yes/No. if 'No', state terms desired)
1) Validity of offer	90 days from the tender opening date	
2) Delivery requirements	Free delivery at our stores or FOR destination (as indicated in the enquiry)	
3) Warranty	Unless specifically mentioned in the enquiry, all supplied items to be provided with warrantee for one year (or more, if provided by the OEM) from the date of acceptance/commissioning. In case of equipment involving erection and commissioning, warrantee shall be for 18 months from the date of dispatch or 12 months from the date of commissioning, whichever is earlier	
4) Terms of payment	Full payment will be made within thirty days after receipt, inspection and acceptance of the material at BHEL R&D (and where involved, erection and commissioning of the material/equipment at BHEL/destination), by Crossed Cheque and no Bank commission charges are admissible.	
5) Taxes & Duties	Unless specifically mentioned in the enquiry, we do not provide 'C' or 'D' form. Supplier to specify rates of taxes and duties element wise and related percentages.	
6) Penalty for late delivery	0.5% per week beyond the delivery date as mentioned in the Purchase order on undelivered portion subject to a maximum of 10% of the total order value	

* BHEL R&D reserves the right to reject any offer due to non-compliance with the above conditions and/or non-receipt of this form in duly filled condition

* Any other elements of cost in addition to the above may please be specified in detail

(Signature and Stamp/Seal of Vendor)



BHARAT HEAVY ELECTRICALS LIMITED
CORPORATE R&D Division
Vikasnagar, Hyderabad – 500093.

IMPORTED

Suppliers' compliance statement to basic conditions of enquiry

(In case Order to be placed on the Principal and foreign currency)

Condition	BHEL R& D's terms	Supplier's compliance (indicate Yes/No. if 'No', state terms desired)
01) Validity of offer	90 days from the tender opening date (or as per enquiry)	
02) Delivery requirements	FCA – Nearest International Airport (or as indicated in the enquiry)	
03) Warranty	Unless specifically mentioned in the enquiry, all supplied items to be provided with warrantee for one year (or more, if provided by the OEM) from the date of acceptance/ commissioning. In case of equipment involving erection and commissioning, warrantee shall be for 18 months from the date of dispatch or 12 months from the date of commissioning, whichever is earlier	
04) Terms of payment	Sight draft. All bank charges inside India will be to BHEL R&D account and out side India will be to suppliers account. Documents through State Bank of India, HAL Complex, Balanagar, Hyderabad, AP, India-500 042.	
05) Agency commission	Pl specify percentage charges, if any. Indian agency/agent commission will be in Indian Currency only.	
06) Erection/ Commission	As per enquiry	
07) Documentation	As per enquiry	
08) Insurance	BHEL will arrange Insurance based on intimation to our Insurance agency, United India Insurance Co., DO-2, Secunderabad, AP, India.	
09) Penalty for late delivery	0.5% per week beyond the delivery date as mentioned in the Purchase order on undelivered portion subject to a maximum of 10% of the total order value	

* BHEL R&D reserves the right to reject any offer due to non-compliance with the above conditions and/or non-receipt of this form in duly filled condition

* Any other elements of cost in addition to the above may please be specified in detail

(Signature and Stamp/ Seal of Vendor)



BHARAT HEAVY ELECTRICALS LTD.
Corp. R&D DIVISION
VIKAS NAGAR,
HYDERABAD-500 093 (INDIA)

VENDOR REGISTRATION FORM

[FORM TO BE SUBMITTED* BY THE BIDDER ALONG WITH TECHNICAL-BID]

Before filling please refer to instructions on page-4

1.0 VENDOR PROFILE:

1.1 & 1.2 Name and address of the vender:

Phone Nos.:

Fax No.:

Email:

1.4 Local representative of the vender in India/ Hyderabad:

Phone Nos.:

Fax No.:

Email:

Contact person:

Mobile No.:

2.0 & 2.1 Type of Organisation:

PROPRIETORSHIP	COMPANY	SISTER CONCERN	ANY OTHER (Please specify)
PARTNERSHIP	CORPORATION	Small Scale Industry	

3.0 Annual Turn Over:

Name and address of the Banker:

Sr.No.	Bank	Address

4.0 REGISTRATION PARTICULARS

4.1 IT Permanent Account No.(PAN):

4.2 & 4.3 State and central sales tax Registration No.:

4.4 ED/ Service Tax Registration No.:

PF Account No.:

Labour Licence No.:

ESI Account No.:

5.2 Contact person:

Mobile No. :

5.3 Total Number of employees:

Graduates (Engr./Scientists/Mgmt/Fin.)	Consultants	Workers		
		Sup./Skilled	Semiskilled	Unskilled

6.0 Wish to register for supplies/ services other than one bidding for :

<u>Sr.No.</u>	<u>Service/Supplies</u>	<u>Capacity</u>
<u>1</u>		
<u>2</u>		
<u>3</u>		
<u>4</u>		
<u>5</u>		
<u>6</u>		
<u>7</u>		

6.1 Reference list :

(Only recognized public and private sector companies, attach if printed copy available)

<u>Sr.No.</u>	<u>Customer</u>	<u>Volume / Year</u>
<u>1</u>		
<u>2</u>		
<u>3</u>		
<u>4</u>		
<u>5</u>		
<u>6</u>		
<u>7</u>		

7.0 & 8.0 Infrastructure / facilities :

<u>Sr.No.</u>	<u>Facility (with specifications)</u>	<u>Age/ Year procured</u>
<u>1</u>		
<u>2</u>		
<u>3</u>		
<u>4</u>		
<u>5</u>		
<u>6</u>		
<u>7</u>		
<u>8</u>		
<u>9</u>		
<u>10</u>		

9.0 Registration with other BHEL Unit/Units:

<u>Sr.No.</u>	<u>9.1.1 Unit</u>	<u>9.1.2 Registration No.</u>
<u>1</u>		
<u>2</u>		
<u>3</u>		
<u>4</u>		

Any Other information :

Declaration:

The information furnished above is true and authentic.

(CEO / Proprietor)

SEAL:

Date:

The competent authority reserves the right to accept or reject the registration. Registered vendors will be informed by mail / email, as convenient. Contact Sr.DGM (MM) for clarification/ additional information on registration.
A separate communication will be sent to you in case of non-registration, citing reasons thereof.

Instructions

1. Answer all items, use NA for items not applicable.
2. BHEL units do not require this registration.
3. Submit the form in duplicate.
4. Use additional sheets for want of space if required.
5. Attach copies of latest documents in respect of items 4.0 (Registration no.s)
6. Photographs of registered office and the chief executive/proprietor shall be furnished.
7. Use A4 sheets for this document and the enclosures.

* REGISTERED BIDDERS, HAVING BHEL (R&D) REGISTRATION NO./ HAVE SUBMITTED THIS FORMAT EARLIER, NEED NOT FURNISH THIS INFORMATION SECOND TIME (UNLESS DESIRE TO UPDATE IT).



BHEL CORPORATE R & D
VIKAS NAGAR- HYDERABAD - 500 093
ANDHRA PRADESH – INDIA
SUPPLIER REGISTRATION FORM

(FOREIGN SUPPLIER)

ALL COLUMNS SHOULD BE PROPERLY FILLED IN THE SPACE PROVIDED FOR. WHEREVER IT IS NOT APPLICABLE PLEASE WRITE “NOT APPLICABLE”. INCOMPLETE OR INCORRECT FORMS MAY NOT BE CONSIDERED.

1.0 GENERAL INFORMATION:

1.1....NAME OF COMPANY

1.2....DETAILS OF HEAD OFFICE:

ADDRESS :
TELEPHONE :
FAX :
.EMAIL :
.WEB SITE :

1.3....DETAILS OF FACTORY/WORKS:

ADDRESS :
TELEPHONE :
FAX :
.EMAIL :
.WEB SITE :

1.4....DETAILS OF MARKETING AGENT

ADDRESS :
TELEPHONE :
.FAX :
.EMAIL :
.WEB SITE :

1.5 CHIEF EXECUTIVE

NOTE: PLEASE ATTACH SEPARATE SHEETS, IF SPACE FOUND IS INADEQUATE

AUTHORISED SIGNATORY



BHEL CORPORATE R & D
VIKAS NAGAR – HYDERABAD – 500 093
ANDHRA PRADESH – INDIA

SUPPLIER REGISTRATION FORM

(FOREIGN SUPPLIER)

- 1.6 CONTACT PERSON(S)
FOR PRODUCT OFFERED
NAME(S)
OFFICIAL CAPACITY
ADDRESS:
TELEPHONE
FAX
E-MAIL
- 1.7 YEAR OF ESTABLISHMENT
- 1.8 PRODUCTION CAPACITY PER ANNUM
- 1.9 PARTICULARS OF PRODUCT INCLUDING
SPECIFICATION AND RANGE OFFERED
FOR REGISTRATION
(ATTACH BROCHERS AND CATALOGUE)
- 1.10 NAME(S) OF BANKERS
- 1.11 BANKER’S CERTIFICATE
- 1.12 PORT OF LOADING
- 1.13 NEAREST AIRPORT
- 1.14 NAME OF THE INDIAN AGENT, IF ANY
WITH AUTHORISATION LETTER
- 1.15 ANY OTHER INFORMATION:

AUTHORISED SIGNATORY



BHEL CORPORATE R & D
VIKAS NAGAR – HYDERABAD – 500 093
ANDHRA PRADESH – INDIA

SUPPLIER REGISTRATION FORM

(FOREIGN SUPPLIER)

2.0 FINANCIAL INFORMATION

2.1...TOTAL CAPACITY

2.2...ANNUAL TURN OVER FOR LAST 3 YEARS

2.3...WHEHER CREDIT LICENSE ACCEPTABLE YES/NO

3.0 QUALITY MANAGEMENT SYSTEMS
ENCLOSED FORMAT PART-B

3.1 EXPERIENCE LIST FOR SAME/SIMILAR ITEMS
TO BE ENCLOSED

4.0.....FUTURE EXPANSION PLANS:
(GIVE DETAILS)

5.0 LIST OF ENCLOSURES:
INCLUDING BROUCHERS, CATALOGUES, TECHNICAL
LITERATURE etc...

6.0 ANY OTHER INFORMATION

SIGNATURE OF SUPPLIER
NAME
DESIGNATION
DATE
.....OFFICIAL SEAL

AUTHORISED SIGNATORY
