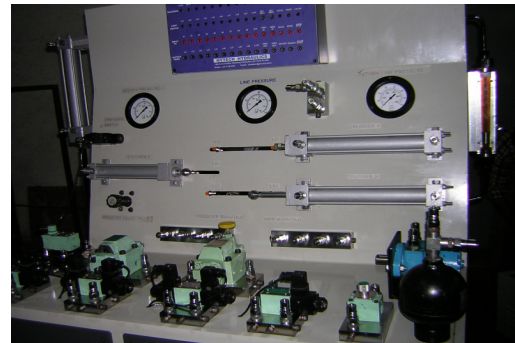


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**COMPUTER CONTROLLED
ELECTRO- HYDRAULIC TRAINER WITH PLC**



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Salient Features Of Electro-Hydraulic Trainer

:-

- Mobile and self contained unit , only electrical connections are required.
 - Simplicity of operation and designed for amateur use.
 - Built in safety valve is fitted.
 - Distribution blocks are fitted at four corners.
 - Modern Industrial components from reputed manufacturers are used operating at realistic working pressure i.e. (40 bar).
 - Realistic Industrial circuits are demonstrated.
 - Equispaced drilled holes and electric pin arrangement for mounting of valve and base plates. No tools or spanner is required for mounting.
 - Tried and tested equipment and circuits.
 - Special fixture used for pipe bending and ferrule fitting arrangement.
-
- System is flushed with very high velocity (4 times the working) by separate oil which maintains class A cleanliness of system.
 - All valves , cylinder are tested at 150% working pressure.
 - Cylinder from precision honed tube, hardened ground, hard chrome plated piston rod and imported quality seals.
 - Cylinder loading facility provided.
 - Flow measurement is possible in different lines.
 - Two years performance guarantee for any manufacturing defect.
 - Potential free contacts for limit switches
 - Specially developed Servo-Control System
 - SMPS with short circuit protection

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- Specially designed Hydraulic Servo system (Linear & Rotary)
- 24 V DC supply with all safety measurement.

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List of Experiments Electro-Hydraulic Trainer :-

1. Study of pressure built up in hydraulic system.
2. Positive displacement pump characteristic.
3. Introduction of control valves.
4. Study of double acting cylinder and cushioning effect.
5. Study of 4/2 way dcv.
6. Study of 4/3 way dcv.
7. Pressure adjustment/setting of relief valve.
8. Study of 2/2 way dcv..
9. Throttle valve pressure flow characteristics.
- 10.Characteristic of direct operated relief valve.
- 11.Control of double acting cylinder 4/3 way dcv.
- 12.Control of double acting cylinder 4/2 way dcv.
- 13.Speed control of double acting cylinder.
- 14.Hydraulic motor operation.
- 15.Study of aeration phenomenon
- 16.. Hydraulic motor operation at different speeds.
- 17.Flow characteristics of pressure compensated flow control valve.
- 18.Press -flow characteristics of pressure compensated flow control valve.
- 19.Meter-in speed control circuit.
- 20.Meter-out speed control circuit.
- 21.Bleed-Off speed control unit.
- 22.Over running characteristic of Hydraulic cylinder.
- 23.Study of pilot operated check valve.
- 24.Operation of double acting cylinder with operated check valve.
- 25.Study of pressure reducing valve.
- 26.Study of sequence valve.
- 27.Sequencing of two cylinders.
- 28.Sequencing and speed control of cylinders.
- 29.Regenerative circuit.
- 30.Study of counter balance valve.
- 31.Sequencing of two cylinders with reduced pressure for one of them.
- 32.Rapid traverse and feed control circuit.
- 33.Study of pressure switch and it's pressure settings.
- 34.Operation of Double acting cylinder with 4/3 solenoid operated DCV.
- 35.Use of Counter Valve to control Double Acting cylinder
- 36Automatic return of Double Acting cylinder (using pressure switch).
- 37.Sequencing of cylinder and Motor using pressure switch.
38. Automatic Position Control of Hydraulic Cylinder with Remote Operation
39. Servo-positioning of Hydraulic Cylinder
- 40.Operation of Double acting cylinder using proximity switches.

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Scope of Supply for Electro-Hydraulic Trainer with PLC

Sr. No.	Components	Qty.
1.	Trolley with frame & caster wheels	1
2.	Hydraulic Tank with Filter & Breather	1
3.	3 Phase Foot & Flange mounted Electric Motor	1
4.	Bell Housing	1
5.	Flexible coupling	1
6.	Pressure Gauges	3
7.	Vane Pump	1
8.	Relief Valve	1
9.	4/3 way Direction control valve.	1
10.	Valve mounting plate	1
11.	Throttle valve Pressure compensated Flow control valve	1
12.	Check valve	1
13.	Single Acting cylinder	1
14.	Double acting cylinder	2
15.	Hydraulic motor	1
16.	4/2 way Direction control valve	1
17.	Valve mounting Block	1
18.	Pilot operated check valve	1
19.	Sequence valve	1
20.	Pressure Reducing valve	1
21.	Flowmeter	1
22.	Pressure switch	1
23.	4/3 way Double Solenoid operated Direction control valve	1
24.	4/2 way Single solenoid operated Direction control valve	1
25.	Limit Switches	2
26.	Proximity sensor	2
27.	Electro Hydraulic controller	1
28.	Proportional Valve	1
29.	SIEMENS PLC	1
30.	Servo Cylinder Controller for Hydraulic Cylinder	1
31.	Servo Motor Controller for Hydraulic Motor	1
32.	Hydraulic High Pressure Hose	14
33.	Quick coupling	16

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SCOPE OF SUPPLY FOR HYDRAULIC TRAINER

1) Trolley with Frame

Make : Hytech
No.of Wheels : 4 Nos., Two fixed & two Swivel type
Valve Mounting : Holes with 100 mm Central Distance are drilled for mounting of valve plate.
Load mounting capacity : 500 Kg.

2) HYDRULIC Tank

Make : Hytech, At most cleanliness maintenance
Capacity : 70 Liters
Operating Oil volume : 50 Liters
Baffle Plate : Provided, which suppresses oil waves
Magnetic Drain Plug : Provided, supported magnetic particle
Suction Strainer (50 micron) : Provided, safe grounds pumps
Return Line Filter (10 micron) : Provided
Motor mounting Plate : Provided

3) Electrical motor

Make : ISI Mark
HP : 2 HP, 1440 rpm
Type : Squirrel cage induction motor,
3 Phase 50 Hz
Mounting : Foot & Flange mounting
Make : Hindustan / Kirloskar / Crompton

4) Bell Housing

Location : One side motor flange & other side Pump Flange Location diameter, Alignment of motor & pump is safeguarded.
Permissible Runout : 0.020 mm max.
Make : Hytech

5) FLEXIBLE COUPLING

Function : Flexible coupling between motor & pump
Make : Lovejoy
Model : L099

6) VANE PUMP

Type : Vane Pump
Make : Vickers, / Yuken
Flow rate : 6 LPM at 70 Bar
Operating Pressure : 40 Bar
Max Pump Pressure : 140 Bar (140 Kg/cm²)
Pump Efficiency : 85% minimum

7) Relief Valve :

Type : Direct operated Relief valve Guided poppet design cushion arrangement for greater stability
Port connection : 1/2" BSP
Max Permissible flowrate : 30 LPM
Pressure Adjustment : With hand knob
Make : Yuken, Vickers, Rexroth Polyhydron
Pressure Range : Upto 70 Bar

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8) 4/3 Way Manually Operated direction control valve

Type of Spool : Tendon centre
No. of ports : 4 Nos.
No. of position : 3 Nos.
Spool position at centre : P to T & A, B Blocked
Type of Operation : Lever Operated
Mounting : Sub plate mounting interface
Nomination flow Rate : 32 LPM
Make : Vickers, Yuken, Polyhydron, Rexroth

9) Direction Control Valve Mounting Plate :

Make : Hytech
Type : Precisely ground & Port connection of pipe at the top.
Max. Test Pressure : 210 Bar

10) Throttle valve :

Max Operating Pressure : 140 Bar
Port connection : 3/8" BSP
Make : Hydrain, Max pressure 210 Bar

11) Pressure Compensated Flow control valve

Type : Pressure compensated with check valve
Construction : Pressure compensated spool type
Mounting type : Threaded body subplate mounting
Flowrate : 2 to 25 LPM
Max. Operating Pressure : 315 Bar
Pressure drop across valve : 7 Bar max
Make : Vickers, Yuken, Polyhydron, Rexroth

12) Check Valve

Port connection : 1/2" BSP
Max. Operating Pressure : 210 Bar
Make : Hytech, Polyhydron

13) Single Acting Cylinder

Type : SINGLE ACTING
RAM : ϕ 28 mm
Qty : One No.

14) Double Acting cylinders

Type : Double acting cylinder with Piston rod
Base Diameter : 40 or 50 mm
Rod Diameter : 22 mm or 28 mm
Stroke : 250 mm
Seals : Canvas based nit rile Piston & rod seals.
Max operating Pressure : 140 Bar
Normal operating Pressure : 30 Bar

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15) HYDRAULIC MOTOR

Type : Gear Motor
Direction of Rotation : Unidirectional.
Port connection : 1/2" BSP
Operating Pressure : Max 100 Bar
Max Pressure : 140 Bar (140 Kg/cm²)
Motor Efficiency : 85% minimum

16) 4/2 Way Manually Operated direction control valve

Make : Vickers, Yuken, Polyhydron, Rexroth
Type of Spool : Tendon centre
No. of ports : 4 Nos.
No. of position : 2 Nos.
Type of Operation : Lever Operated
Mounting : Sub plate mounting interface
Nomination flow capacity : 32 LPM

17) DC Valve Mounting Plate

Make : Hytech
Type : Precisely ground & Port connection of pipe at the top.
Max Test Pressure : 210 Bar

18) Pilot Operated Check Valve

Type : Single Pilot Operated , internal drain
Port connection : 1/2" BSP
Max. Operating Pressure : 210 Bar
Make : Hytech , Polyhydron

19) Sequence Valve

Type : Pressure controlled Direct operated sequence valve
Port connection : 3/8 " BSP
Mounting : Base plate mounting
Make : Hytech , Polyhydron, Vickers

20) Pressure Reducing Valve

Type : Pressure controlled Direct operated Pr Reducing Valve
Port connection : 3/8 " BSP
Mounting : Base plate mounting
Make : Hytech, Polyhydron, Vickers

21) Flow Meter

Type : Acrylic hone type flow meter with scale
Valve : 3/2 Way valve for draining flow meter.
Pressure : 5 Bar

22) Pressure Switch

Type : Pilot signal with Hydraulic Pressure
Output Signal : One NO / NC contactor
Make : Polyhydron or equivalent
Port Connections : 1/4" Connections

23) 4/3 Way Double Solenoid Operated Valve.

Type of Spool : Tendon centre

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No. of ports : 4 Nos.
No. of position : 3 Nos.
Spool position at centre : P to T & A, B Blocked
Type of Operation : Double Solenoid operated, with spring centre.
Operating Voltage : 24 VDC.
Mounting : Sub plate mounting interface
Max. Operating Pressure : 210 Bar.
Nomination flow handling : 16 LPM capacity
Make : Vickers, Yuken, Polyhydron, Rexroth

24) 4/2 Way Single Solenoid Operated Direction Control Valve.

Type of Spool : Tendon centre
No. of ports : 4 Nos.
No. of position : 2 Nos.
Type of Operation : Single Solenoid operated one side & spring return.
Operating Voltage : 24 VDC.
Mounting : Sub plate mounting interface
Max. Operating Pressure : 210 Bar.
Nomination flow : 16 LPM
Make : Vickers, Yuken, Polyhydron, Rexroth

25) Limit switch

Type : Roller type Limit switch
Make : Teknik
Qty. : 1 No.

26) Proximity sensor

Type : Contact less Proximity sensor PNP type
Operating Voltage : 10 to 24 V DC
Sensing Distance : 2 mm min.

27) Electro Hydraulic Controller

Make : Hytech
Function : To connect various electric circuits
Qty. : 1 No.
Operating Voltage : 24 V DC

28) Counterbalance Valve.

Make : Bosch / Vickers / REXROTH/ Polyhydron
Construction : Spool type Valve.
Actuation : Pilot Pressure
Control Connection : Sub plate mounting hole.
Isolation of Controller : provided.

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29) SIEMENS PLC

Make :- Siemens
No. Of I/O lines :- 8 /6 or 6/8 Digital

30) Servo Cylinder Controller for Hydraulic Cylinder

Make :- Hytech
Function : Feedback Loop for Cylinder position

31) Servo Motor Controller for Hydraulic Cylinder

Make :- Hytech
Function : Feedback Loop for Cylinder position

32) Hoses :

Type : High Pressure Hoses
Max Operating Pressure : 88 Bar SAE R3
Nos. : As required

33) Quick coupling arrangement

Type : Ball type Quick coupling
Max. Operating Pressure : 210 Bar
Quantity : As required.