HS-2000

Hydraulic Training System

It is well known that “Factory Automation” is an indispensable measure to reduce labor cost, improve production efficiency and achieve higher product quality, which is widely adopted by electronic, semiconductor, LCD and mechanical factories. In factory automation, oil pressuring” plays a very essential and critical role.

The “HS-2000” is launched to offer enriched education from basic oil pressure components, advanced oil-pressure loop design to PLC-based electrical control system. The trainee can be upgraded to high-level automation engineer with the help of the “HS-2000” trainer system.

▶Features

1. Trainees get familiar with the principles and applications of various oil pressure components.
2. Trainees learn oil-pressure loop design.
3. Trainees learn PLC programming, including architecture, instructions and ladder diagram.

UH-001
Hydraulic Workbench

The workbench is flexible in design to meet customer's needs. A complete workbench mainly consists of 3 parts :

- Electro-Modules Frame UE-001
- Working Board UH-001-1 (single or double side)
- Working Table UH-001-2 (single or double side)

Customer can decide which combination of the workbench is the best for lab requirement.

A complete workbench allows customers to carry out all listed hydraulic experiments. In PART I and PART II, hydraulic components are powered by Hydraulic Power Unit (UH-101) and operated on Working Board area through connected Hose Set (UH-814/5).

In PART III and PART IV, the electrical components mounted on Electro-Modules Frame are linked to the hydraulic system through Connecting Lead (UE-501) and powered by Hydraulic Power Unit (UH-101).

End user are also welcome to adopt Programmable Logic Controller (PLC) for implementation of PART III and PART IV. That means trainer PLC-200 is an alternative to Electro-Modules Frame and corresponding electrical devices.

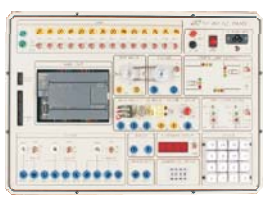
PLC-200
PLC Trainer (Optional)

Specifications:

- PLC main unit : SIEMENS SIMATIC S7-224
- Digital input : 14 points
- Digital output : 10 points

Accessories:

- Power cord
- Experiment manual
- Connecting leads set

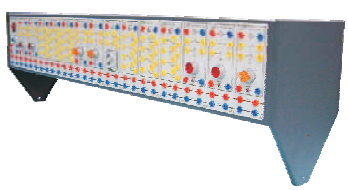


PLC Trainer Requirements

- PC with Pentium II or better CPU
- Windows 98/2000/XP/VISTA
- USB/PPI Multi-Master Cable (optional but necessary)
- S7-200 User’s manual (optional)
- STEP 7-Micro/WIN software CD (optional but necessary)

UE-001
Electro-Modules Frame (Excluding Electrical Components)

A cabinet frame is available for mounting electrical components on either side.
This steel frame can accommodate up to 15 electro-modules at least.
Size : 1260 mm(W) x 250 mm(D) x 360 mm(H)±10%



UH-001-1
Working Board

Aluminum extruded profile panel – 1260 x 750mm
and a working surface up to 1200 x 700mm including :
- UH-801 Pressure Distributor
  4 Quick couplings with 1 pressure gauge
  Connect to Hydraulic Power Unit using 3/8" hose
- UH-803 Return Distributor
  4 Quick couplings
  Connect to Hydraulic Power Unit using 3/8" hose

UH-001-2
Working Table

- Single-side worktable size is 1500mm(W) x 700mm(D) x 850mm(H)±10%,
  oil-catcher setting upon the table
  Drawer units in steel with one flat drawer and four large drawers, load up to 20 kgs per drawer.
- Double-side worktable with 1500mm(W) x 800mm(D) x 850mm(H)±10%,
  two oil-catchers setting upon the table
  Two drawer units in steel with one flat drawer and four large drawers, load up to 20 kgs per drawer.
- The drawers feature an easy-gliding system with differential rollers for quiet running and additional breaking system.
  A cabinet is also available for mounting Hydraulic Power Unit UH-101 on either side.

UH-101
Hydraulic Power Unit

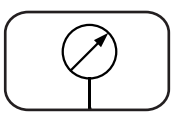
The capacity of single-side tank is 30 liters and that of double-side tank is 58 liters excluding circulation oil.
Recommend circulation oil type : Shell Tellus 32
Circulation oil typical characteristics :
(1) Kinematic viscosity : 31.56 cSt at 40°C
(2) Viscosity index : 102
(3) Pour point : -15°C

The set of equipment includes :
(1) Electric motor : 1 HP 1Ø 220VAC, 50/60Hz, speed 1720 rpm
(2) Coupling
(3) Oil strainer
(4) Oil level indicator
(5) Oil-in and air filter
(6) Pressure relief valve : pressure 150kg/cm^2 max.
(7) Pressure gauge
(8) Oil thermometer
(9) Pressure pump : delivery 1.9cc/rev max.(single-side 1pump, double-side 2pumps)
(10) Distributor : including completed distribution assembly

220VAC power socket, 20 A breaker, over current protection, start switch, stop switch, indicator, and emergency device.

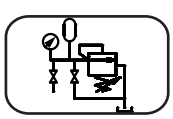
▶ *Hydraulic Components*

UH-111



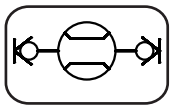
Pressure Gauge
Operating pressure : 0 - 150 kg/cm^2
Quick plug-in locking, safely clamping for mounting on working board
Precision quick connectors located on the top of component for easy access

UH-116



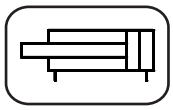
Accumulator
Bladder type
Capacity : 1 liter
Operating pressure : 0 - 100 kg/cm^2
Preset pressure : 30 kg/cm^2
Attached accumulator, pressure regulator valve base
Attached out/inlet valve, pressure gauge

UH-121



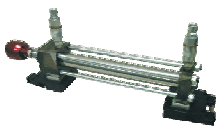
Inline Flow Meter
Material : aluminum AND/OR brass
Measuring range : 1 - 7.5 l/min
Operating pressure : 0 - 245 kg/cm^2

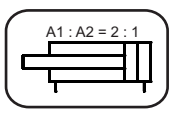
UH-201



Double-Acting Hydraulic Cylinder
Diameter : 30 mm
Stroke length : 200 mm
Surface area ratio : 1.65:1 approx.
Operating pressure : 0 - 140 kg/cm^2
Quick plug-in locking, safely clamping for mounting on working board

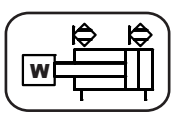
UH-203





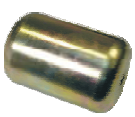
Differential Hydraulic Cylinder
Diameter : 30 mm
Stroke length : 200 mm
Surface area ratio : 2:1 approx.
Operating pressure : 0 - 140 kg/cm^2
Quick plug-in locking, safely clamping for mounting on working board

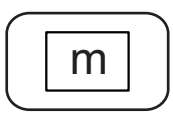
UH-205



Double-Acting Hydraulic Cylinder
With position sensing
Diameter : 30 mm
Stroke length : 200 mm
Surface area ratio : 1.65:1 approx.
Operating pressure : 0 - 140 kg/cm^2
Stainless steel body attaches reed switch 2pcs

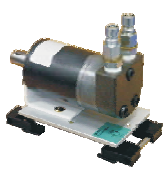
UH-205-1

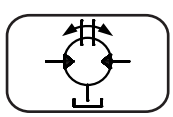




Loading Weight
Material : iron
Weight : 10 kg

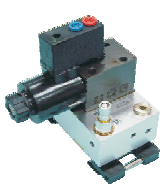
UH-211

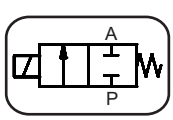




Hydraulic Motor
Min. rotary speed : 40 rev/min
Max. flow rate : 20 l/min
Attached rotary disc
Quick plug-in locking, safely clamping for mounting on working board

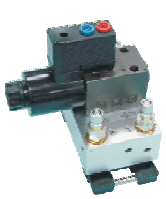
UH-401

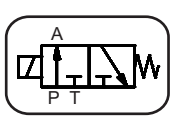




2/2-Way Single-Solenoid Valve
Spring return
Solenoid operating voltage: 24 VDC
Max. flow rate : 50 l/min
Operating pressure : 0 - 210 kg/cm^2
Max. operating frequency : 240 times/min
Quick plug-in locking, safely clamping for mounting on working board
Precision quick connectors located on the top of component for easy access.

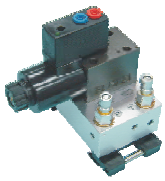
UH-403

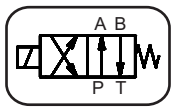




3/2-Way Single-Solenoid Valve
Spring return
Solenoid operating voltage: 24 VDC
Max. flow rate : 50 l/min
Operating pressure : 0 - 210 kg/cm^2
Max. operating frequency : 240 times/min
Quick plug-in locking, safely clamping for mounting on working board
Precision quick connectors are located on the top of component for easy access.

UH-405

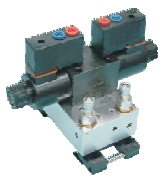


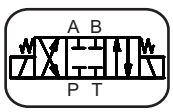


4/2-Way Single-Solenoid Valve

Spring return
Solenoid operating voltage : 24 VDC
Max. flow rate : 50 l/min
Operating pressure : 0 - 210 kg/cm^2
Max. operating frequency : 240 times/min
Quick plug-in locking, safely clamping for mounting on working board
Precision quick connectors are located on the top of component for easy access.

UH-411

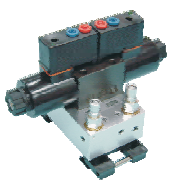


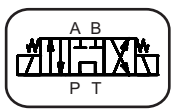


4/3-Way Double-Solenoid Valve

Closed center
Solenoid operating voltage : 24 VDC
Max. flow rate : 50 l/min
Operating pressure : 0 - 210 kg/cm^2
Max. operating frequency : 240 times/min
Quick plug-in locking, safely clamping for mounting on working board
Precision quick connectors are located on the top of component for easy access.

UH-419

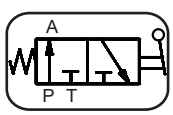




4/3-Way Double-Solenoid Valve

Center PT type
Solenoid operating voltage : 24 VDC
Max. flow rate : 50 l/min
Operating pressure : 0 - 210 kg/cm²
Max. operating frequency : 240 times/min
Quick plug-in locking, safely clamping for mounting on working board
Precision quick connectors are located on the top of component for easy access.

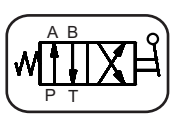
UH-503



3/2-Way Directional Control Valve

NC type
Max. flow rate : 50 l/min
Operating pressure : 0 - 210 kg/cm²
Quick plug-in locking, safely clamping for mounting on working board
Precision quick connectors are located on the top of component for easy access.

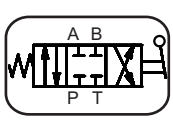
UH-505



4/2-Way Directional Control Valve

Hand lever operated, spring return
Max. flow rate : 50 l/min
Operating pressure : 0 - 210 kg/cm²
Quick plug-in locking, safely clamping for mounting on working board
Precision quick connectors are located on the top of component for easy access.

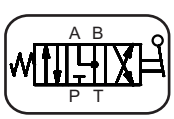
UH-511



4/3-Way Directional Control Valve

Closed center, spring return
Actuation : direct operated
Max. flow rate : 50 l/min
Operating pressure : 0 - 210 kg/cm²
Quick plug-in locking, safely clamping for mounting on working board
Precision quick connectors are located on the top of component for easy access.

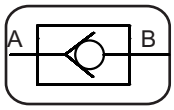
UH-517



4/3-Way Directional Control Valve

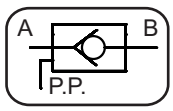
Center ABT type, spring return
Actuation : direct operated
Max. flow rate : 50 l/min
Operating pressure : 0 - 210 kg/cm²
Quick plug-in locking, safely clamping for mounting on working board
Precision quick connectors are located on the top of component for easy access.

UH-601



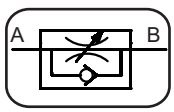
Check Valve
One-way control
Max. flow rate : 30 l/min
Operating pressure : 5 - 210 kg/cm²

UH-603



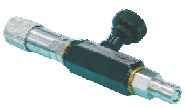
Pilot-Operated Check Valve
Max. flow rate : 30 l/min
Operating pressure : 3.5 - 210 kg/cm²

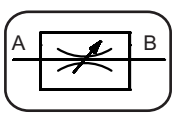
UH-611



Flow Control Valve
Attached non-return, one-way flow control
Max. flow rate : 40 l/min
Operating pressure : 5 - 210 kg/cm²

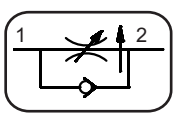
UH-613





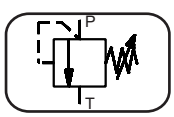
2-Way Throttle Valve
2-way flow control
Max. flow rate : 40 l/min
Operating pressure : 0 - 210 kg/cm²

UH-615



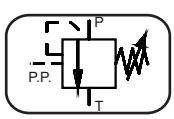
Pressure-Compensated Flow-Control Valve
Scale selector flow control
Max. flow rate : 25 l/min
Operating pressure : 5 - 210 kg/cm²
Quick plug-in locking, safely clamping for mounting on working board
Precision quick connectors are located on the top of component for easy access.

UH-701



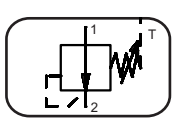
Pressure Relief Valve
Direct-operated, ball-screw adjusting
Pressure adjusting range : 25 - 70 kg/cm²
Operating pressure : 0 - 210 kg/cm²
Quick plug-in locking, safely clamping for mounting on working board
Precision quick connectors are located on the top of component for easy access.

UH-703



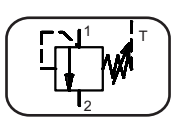
Pilot-Operated Pressure-Relief Valve
Piston balance type, anti-leak, ball-screw adjusting
Pressure adjusting range : 25 - 70 kg/cm²
Operating pressure : 0 - 210 kg/cm²
Quick plug-in locking, safely clamping for mounting on working board
Precision quick connectors are located on the top of component for easy access.

UH-711



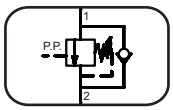
3-Way Pressure Reducing Valve
Pressure adjusting range : 25 - 70 kg/cm²
Operating pressure : 0 - 210 kg/cm²
Quick plug-in locking, safely clamping for mounting on working board
Precision quick connectors are located on the top of component for easy access.

UH-723



Sequence Valve
Internal pilot, ball-screw adjusting
Pressure adjusting range : 15 - 70 kg/cm²
Operating pressure : 0 - 210 kg/cm²
Quick plug-in locking, safely clamping for mounting on working board
Precision quick connectors are located on the top of component for easy access.

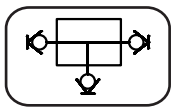
UH-733



Counterbalance Valve

Pressure adjusting range : 20 - 70 kg/cm²
Max. flow rate : 60 l/min
Operating pressure : 5 - 210 kg/cm²
Quick plug-in locking, safely clamping for mounting on working board
Precision quick connectors are located on the top of component for easy access.

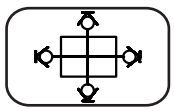
UH-805



3-Way Distributor

Inlet : quick coupling (female) x 1
Outlet : quick coupling (male) x 2

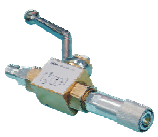
UH-807

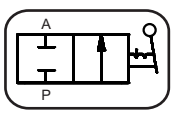


4-Way Distributor

Inlet : quick coupling (female) x 1
Outlet : quick coupling (male) x 3

UH-809





Shut-off Valve

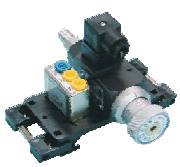
Actuation : Manual
Max. flow rate : 50 l/min

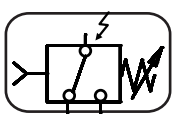
UH-814 UH-815

Hose Set

Hose inside diameter : 1/4”
Operating pressure : 0 - 105 kg/cm²
Attached quick connector (female)
Length: UH-814 (1M), UH-815 (1.5M)

UH-821

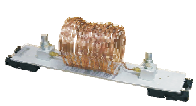


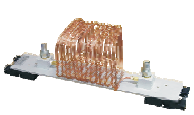


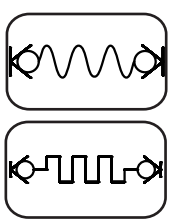
Pressure Switch

Operating pressure : 15 - 100 kg/cm²
Electrical connection via 4mm safety plugs or standard 4mm plugs
Normally open (NO), normally closed (NC) and COM contacts
Continuous load: 5 A

UH-824 UH-825







Flow Resistance Measuring Hose

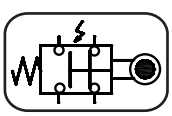
UH824 : diameter 4mm, length 5M, round type
UH825 : diameter 4mm, length 5M, square type

UE-501

Connecting Lead

Lead diameter: 4 mm
Length: 0.25M,0.5M,1M
Color : red, yellow, blue
1set : 60 pcs

UE-907

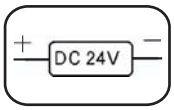


Limit Switch

Roller lever type
Contacts : NO, NC.

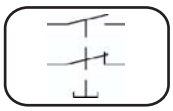
▶ Electrical Components

UE-101



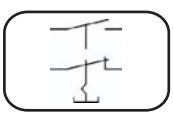
DC Power Supply
Input voltage : 100 - 240VAC/1.7 A
Output voltage : 24 VDC/4.2 A
Terminal : 2 sets for ± DC output
with power I/O indicator
2 terminal sets for power output

UE-201



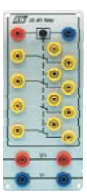
Pushbutton Switch
Spring return
Pushbutton switch with illuminated indicator
Including NC, NO contacts
Operation voltage : 24 VDC
Max. current : 3 A

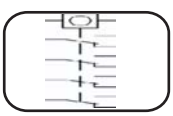
UE-203



Selector Switch
Selector switch with illuminated indicator
Including NC, NO contacts
Operation voltage : 24 VDC
Max. Current : 3 A

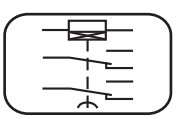
UE-401





Relay
4 sets of NC, NO, COM contacts
With LED indicator
Operation voltage : 24 VDC
Max. current : 5 A

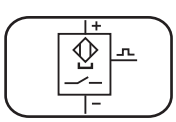
UE-404



Timing Relay
ON-Delay type
Operation voltage : 24 VDC
Max. current : 5 A
Time delay : 0.05sec - 300hour multi switch
2 sets of NC, NO, COM contacts
with LED indicator

▶ Optional Components

UE-911



Reed Switch (Optional)
Operating voltage : 24 VDC
Max. current : 200 mA
Frequency range : 3 - 250 Hz

UH-003

Hose Holder (Optional)
Mobile type, with 5- foot tubular and 5 casters
iron plate suitable for 30 slots
With oil-catcher

EM-3390-1A

Connecting Lead Holder (Optional)
Mobile type, with 5-foot tubular and 5 casters
Height : 1400mm, iron plate suitable
with 20 connecting leads slots

▶ Experiments

PART I : Basic Hydraulic Components

1. Hydraulic Pump
2. Pressure Relief Valve
3. Pressure Reducing Valve
4. Pressure Losses from Hoses
5. Flow Control Valve
6. Line Check Valve
7. Pilot-Operated Check Valve
8. Directional Control Valves
9. Single-Acting Hydraulic Cylinder
10. Double-Acting Hydraulic Cylinder
11. Hydraulic Motor

PART I I: Basic Hydraulic Control Circuits

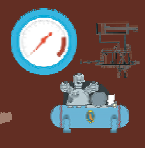
1. Pressure Regulating Circuit
2. Safety Circuit
3. Dual Pressure Regulating Circuit
4. Sequence Control Circuit (1)
5. Sequence Control Circuit (2)
6. Pressure Counterbalancing Circuit
7. Pressure Reducing Circuit
8. Meter-In Flow Control Circuit
9. Meter-Out Flow Control Circuit
10. Bleed-Off Control Circuit
11. Pressure Keeping Circuit
12. Differential Circuit
13. Synchronizing Circuit
14. Accumulator Control Circuit
15. Hydraulic Motor Control Circuit

PART III : Basic Electro-Hydraulic Control Circuits

1. Series Circuit
2. Parallel Circuit
3. Remote Control Circuit
4. Sequence Control Circuit (1)
5. Sequence Control Circuit (2)
6. Cushion Control Circuit
7. Pressure Reducing Control Circuit
8. Meter-In Flow Control Circuit
9. Meter-Out Flow Control Circuit
10. Bleed-Off Control Circuit
11. Two-Speed Control Circuit
12. Differential Control Circuit
13. Synchronous Control Circuit
14. Pressure Keeping Control Circuit
15. Accumulator Control Circuit
16. Hydraulic Motor Control Circuit
17. Pressure Switch Control Circuit

PART IV : Electro-Hydraulic Sequence Control Circuits

1. One-Cycle Cylinder Reciprocation using Pushbutton and Single-Solenoid Valve
2. One-Cycle Cylinder Reciprocation using Pushbuttons and Single-Solenoid Valve
3. One-Cycle Cylinder Reciprocation using Limit Switch and Single-Solenoid Valve
4. Continuous Cylinder Reciprocation using Limit Switches and Single-Solenoid Valve
5. One-Cycle Cylinder Reciprocation using Timer and Single-Solenoid Valve
6. Continuous Cylinder Reciprocation using Timer and Single-Solenoid Valve
7. One-Cycle Cylinder Reciprocation using Pushbuttons and Double-Solenoid Valve
8. One-Cycle Cylinder Reciprocation using Limit Switch and Double-Solenoid Valve
9. Continuous Cylinder Reciprocation using Limit Switches and Double-Solenoid Valve
10. One-Cycle Cylinder Reciprocation using Timer Limit Switch and Double-Solenoid Valve
11. One-Cycle Cylinder Reciprocation using Timer Limit Switches and Double-Solenoid Valve
12. Continuous Cylinder Reciprocation using Timer Limit Switches and Double-Solenoid Valve
13. Two-Cylinder Sequencing (A+B+B-A-) using Single-Solenoid Valves
14. Two-Cylinder Sequencing (A+/ $\frac{B+}{A-}$ / B-) using Single-Solenoid Valves
15. Two-Cylinder Sequencing (A+B+/Timing/A-B-) using Single-Solenoid Valves
16. Two-Cylinder Sequencing (A+B+A-B-) using Double-Solenoid Valves
17. Two-Cylinder Sequencing (A+B+/ $\frac{A-}{B-}$) using Double-Solenoid Valves
18. Two-Cylinder Sequencing (A+B+/Timing/A-B-) using Double-Solenoid Valves



PART I Basic Hydraulic Components													
Equipment		EX.1	EX.2	EX.3	EX.4	EX.5	EX.6	EX.7	EX.8	EX.9	EX.10	EX.11	Q'ty
UH-001	Hydraulic Workbench	1	1	1	1	1	1	1	1	1	1	1	**1**
UH-101	Hydraulic Power Unit	1	1	1	1	1	1	1	1	1	1	1	**1**
UH-111	Pressure Gauge	1	1	2	3	3	1	1	2	1	2	2	**3**
UH-121	Inline Flow Meter	1	2	2	1	1	2	1	2	2			**2**
UH-201	Double-Acting Hydraulic Cylinder										1		**1**
UH-205	Double-Acting Hydraulic Cylinder									1			**1**
UH-205-1	Loading Weight									1			**1**
UH-211	Hydraulic Motor											1	**1**
UH-503	3/2-Way Directional Control Valve								1	1			**1**
UH-505	4/2-Way Directional Control Valve							1	1		1	1	**1**
UH-511	4/3-Way Directional Control Valve								1		1		**1**
UH-601	Check Valve						1						**1**
UH-603	Pilot-Operated Check Valve							1					**1**
UH-613	2-Way Throttle Valve					1							**1**
UH-615	Pressure-Compensated Flow-Control Valve				1	1							**1**
UH-701	Pressure Relief Valve	1	1	1	1	2							**2**
UH-703	Pilot-Operated Pressure-Relief Valve		1										**1**
UH-711	3-Way Pressure Reducing Valve			1				1					**1**
UH-733	Counterbalance Valve											1	**1**
UH-805	3-Way Distributor		1	1	1	1	1	1					**1**
UH-809	Shut-Off Valve		1	1	1		1	1	1	1	1	1	**1**
UH-814	Hose, 1M	5	9	10	10	9	6	9	8	7	5	8	**10**
UH-815	Hose, 1.5M	2	2	3	2	2	2	2	2	2	2	2	**3**
UH-824	Flow Resistance Measuring Hose, Round Type				1								**1**
UH-825	Flow Resistance Measuring Hose, Square Type				1								**1**

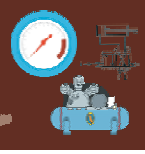
PART II Basic Hydraulic Control Circuits																	
Equipment		EX.1	EX.2	EX.3	EX.4	EX.5	EX.6	EX.7	EX.8	EX.9	EX.10	EX.11	EX.12	EX.13	EX.14	EX.15	Q'ty
UH-001	Hydraulic Workbench	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**
UH-101	Hydraulic Power Unit	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**
UH-111	Pressure Gauge	2	2	1	2	1	1	2	2	2	2	2	2	2		2	**2**
UH-116	Accumulator														1		**1**
UH-121	Inline Flow Meter	1															**1**
UH-201	Double-Acting Hydraulic Cylinder	1			1	2		2			1		1	2	1		**2**
UH-203	Differential Hydraulic Cylinder												1				**1**
UH-205	Double-Acting Hydraulic Cylinder		1	1	1		1		1	1		1					**1**
UH-211	Hydraulic Motor															1	**1**
UH-503	3/2-Way Directional Control Valve												1				**1**

PART II Basic Hydraulic Control Circuits

Equipment		EX.1	EX.2	EX.3	EX.4	EX.5	EX.6	EX.7	EX.8	EX.9	EX.10	EX.11	EX.12	EX.13	EX.14	EX.15	Q'ty
UH-505	4/2-Way Directional Control Valve			1		1						1	1				**1**
UH-511	4/3-Way Directional Control Valve	1	1		1	1	1	1	1	1	1			1	1	1	**1**
UH-517	4/3-Way Directional Control Valve											1					**1**
UH-601	Check Valve		1		1			1								4	**4**
UH-603	Pilot-Operated Check Valve											1					**1**
UH-611	Flow Control Valve								1	1			1	2		2	**2**
UH-615	Pressure-Compensated Flow-Control Valve										1						**1**
UH-701	Pressure Relief Valve		1	1													**1**
UH-703	Pilot-Operated Pressure-Relief Valve															2	**2**
UH-711	3-Way Pressure Reducing Valve							1									**1**
UH-723	Sequence Valve				1	1											**1**
UH-733	Counterbalance Valve						1		1		1						**1**
UH-805	3-Way Distributor		3	1	3	1	1	3	1		1	2	1	2	1	3	**3**
UH-807	4-Way Distributor							1								3	**3**
UH-809	Shut-Off Valve					1						1			1		**1**
UH-814	Hose, 1M	5	10	6	10	10	7	10	8	5	10	7	6	10	6	10	**10**
UH-815	Hose, 1.5M	2	3	2	2	2	2	2	2	2	2	2	2	2	2	5	**5**

PART III Basic Electro-Hydraulic Control Circuits with Electro-Modules Frame

Equipment		EX.1	EX.2	EX.3	EX.4	EX.5	EX.6	EX.7	EX.8	EX.9	EX.10	EX.11	EX.12	EX.13	EX.14	EX.15	EX.16	EX.17	Q'ty
UH-001	Hydraulic Workbench	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**
UH-101	Hydraulic Power Unit	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**
UH-111	Pressure Gauge	1	1			1	1	1	1	1		1	1			1	2	1	**2**
UH-116	Accumulator															1			**1**
UH-201	Double-Acting Hydraulic Cylinder	1	1	1	1	1		1	1	1		1	1			1		1	**1**
UH-203	Differential Hydraulic Cylinder	1	1		1	1		1						1					**1**
UH-205	Double-Acting Hydraulic Cylinder						1		1	1	1			1	1				**1**
UH-211	Hydraulic Motor																1		**1**
UH-401	2/2-Way Single-Solenoid Valve			1								1							**1**
UH-403	3/2-Way Single-Solenoid Valve												1		1				**1**
UH-405	4/2-Way Single-Solenoid Valve					1								1	1	1		1	**1**
UH-411	4/3-Way Double-Solenoid Valve	1	1	1			1		1	1	1	1					1	1	**1**
UH-419	4/3-Way Double-Solenoid Valve	1	1		1	1		1											**1**
UH-601	Check Valve				1	2		1					1				4		**4**
UH-603	Pilot-Operated Check Valve	1													1				**1**
UH-611	Flow Control Valve								2	2		1		2			2		**2**
UH-613	2-Way Throttle Valve										1		1						**1**
UH-701	Pressure Relief Valve	1	1	1		1													**1**

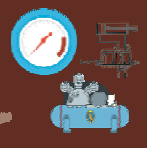


PART III Basic Electro-Hydraulic Control Circuits with Electro-Modules Frame																			
Equipment		EX.1	EX.2	EX.3	EX.4	EX.5	EX.6	EX.7	EX.8	EX.9	EX.10	EX.11	EX.12	EX.13	EX.14	EX.15	EX.16	EX.17	Q'ty
UH-703	Pilot-Operated Pressure-Relief Valve																2		**2**
UH-711	3-Way Pressure Reducing Valve							1											**1**
UH-723	Sequence Valve				1	1													**1**
UH-733	Counterbalance Valve						1		1										**1**
UH-805	3-Way Distributor	3	2	1	4	3	1	2	1		1	2	1	2	1	1	3	1	**4**
UH-807	4-Way Distributor																3	1	**3**
UH-809	Shut-Off Valve	1	1		1			1								1			**1**
UH-814	Hose, 1M	10	10	8	10	10	7	10	9	6	6	9	7	10	10	7	10	7	**10**
UH-815	Hose, 1.5M	3	3	2	3	5	2	2	2	2	2	2	2	2	2	2	5	2	**5**
UH-821	Pressure Switch																	1	**1**
UE-101	DC Power Supply Module	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**
UE-201	Pushbutton Switch Module	3	2	2	2	1	2	1	2	2	2	2	2	1	6	2	4	2	**6**
UE-203	Selector Switch Module			1			1		2	2	2							1	**2**
UE-401	Relay Module	2	2	2	3	2	2	2	3	3	2	4	2	2	4	2	2	3	**4**
UE-404	Timing Relay Module					1		1		1		1	1	1					**1**
UE-501	Connecting Lead	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**
UE-907	Limit Switch	2	4	2	4	3		4	2	2		3	2	1		2		1	**4**

PART IV Electro-Hydraulic Sequence Control Circuits with Electro-Modules Frame																				
Equipment		EX.1	EX.2	EX.3	EX.4	EX.5	EX.6	EX.7	EX.8	EX.9	EX.10	EX.11	EX.12	EX.13	EX.14	EX.15	EX.16	EX.17	EX.18	Q'ty
UH-001	Hydraulic Workbench	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**
UH-101	Hydraulic Power Unit	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**
UH-201	Double-Acting Hydraulic Cylinder	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**
UH-203	Differential Hydraulic Cylinder													1	1	1	1	1	1	**1**
UH-405	4/2-Way Single-Solenoid Valve	1	1	1	1	1	1							2	2	2				**2**
UH-411	4/3-Way Double-Solenoid Valve							1	1	1	1	1	1				2	2	2	**2**
UH-805	3-Way Distributor													1	1	1	1	1	1	**1**
UH-814	Hose, 1M	4	4	4	4	4	4	4	4	4	4	4	4	9	9	9	9	9	9	**9**
UE-101	DC Power Supply Module	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**
UE-201	Pushbutton Switch Module	1	2	1	2	1	2	2	1		1	1	2	1	1	1	2	2	2	**2**
UE-203	Selector Switch Module							1	1	1			1							**1**
UE-401	Relay Module	1	1	1	2	1	3	2	2	2	2	2	3	3	2	3	4	2	1	**4**
UE-404	Timing Relay Module					1	1				1	1	1			1			1	**1**
UE-501	Connecting Lead	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**
UE-907	Limit Switch			1	2	1	2		1	2	1	2	2	4	4	2	4	4	4	**4**

PART III Basic Electro-Hydraulic Control Circuits with PLC-200

Equipment		EX.1	EX.2	EX.3	EX.4	EX.5	EX.6	EX.7	EX.8	EX.9	EX.10	EX.11	EX.12	EX.13	EX.14	EX.15	EX.16	EX.17	Q'ty
UH-001-01	Working Board	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**
UH-001-02	Working Table	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**
UH-101	Hydraulic Power Unit	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**
UH-111	Pressure Gauge	1	1			1	1	1	1	1		1	1			1	2	1	**2**
UH-116	Accumulator															1			**1**
UH-201	Double-Acting Hydraulic Cylinder	1	1	1	1	1		1	1	1		1	1			1		1	**1**
UH-203	Differential Hydraulic Cylinder	1	1		1	1		1						1					**1**
UH-205	Double-Acting Hydraulic Cylinder						1		1	1	1			1	1				**1**
UH-211	Hydraulic Motor																1		**1**
UH-401	2/2-Way Single-Solenoid Valve			1								1							**1**
UH-403	3/2-Way Single-Solenoid Valve												1		1				**1**
UH-405	4/2-Way Single-Solenoid Valve					1								1	1	1		1	**1**
UH-411	4/3-Way Double-Solenoid Valve	1	1	1			1		1	1	1	1					1	1	**1**
UH-419	4/3-Way Double-Solenoid Valve	1	1		1	1		1											**1**
UH-601	Check Valve				1	1		1					1				4		**4**
UH-603	Pilot-Operated Check Valve	1													1				**1**
UH-611	Flow Control Valve								2	2		1		2			2		**2**
UH-613	2-Way Throttle Valve										1		1						**1**
UH-701	Pressure Relief Valve	1	1	1		1													**1**
UH-703	Pilot-Operated Pressure-Relief Valve																2		**2**
UH-711	3-Way Pressure Reducing Valve							1											**1**
UH-723	Sequence Valve				1	1													**1**
UH-733	Counterbalance Valve						1		1										**1**
UH-805	3-Way Distributor	3	2	1	4	3	1	2	1		1	2	1	2	1	1	3	1	**4**
UH-807	4-Way Distributor																3	1	**3**
UH-809	Shut-Off Valve	1	1		1			1								1			**1**
UH-814	Hose, 1M	10	10	8	10	10	7	10	9	6	6	9	7	10	10	7	10	7	**10**
UH-815	Hose, 1.5M	3	3	2	3	5	2	2	2	2	2	2	2	2	2	2	5	2	**5**
UH-821	Pressure Switch																	1	**1**
UE-501	Connecting Lead	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**
UE-907	Limit Switch	2	4	2	4	3		4	2	2		3	2	1		2		1	**4**
PLC-200	PLC Trainer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**



PART IV Electro-Hydraulic Sequence Control Circuits with PLC-200																			
Equipment		EX.1	EX.2	EX.3	EX.4	EX.5	EX.6	EX.7	EX.8	EX.9	EX.10	EX.11	EX.12	EX.13	EX.14	EX.15	EX.16	EX.17	EX.18	Q'ty
UH-001-01	Working Board	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**
UH-001-02	Working Table	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**
UH-101	Hydraulic Power Unit	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**
UH-201	Double-Acting Hydraulic Cylinder	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**
UH-203	Differential Hydraulic Cylinder													1	1	1	1	1	1	**1**
UH-405	4/2-Way Single-Solenoid Valve	1	1	1	1	1	1							2	2	2				**2**
UH-411	4/3-Way Double-Solenoid Valve							1	1	1	1	1	1				2	2	2	**2**
UH-805	3-Way Distributor													1	1	1	1	1	1	**1**
UH-814	Hose, 1M	4	4	4	4	4	4	4	4	4	4	4	4	9	9	9	9	9	9	**9**
UE-501	Connecting Lead	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**
UE-907	Limit Switch			1	2	1	2		1	2	1	2	2	4	4	2	4	4	4	**4**
PLC-200	PLC Trainer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**1**