

PS-1000

Pneumatic 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. It is widely adopted by electronic, semiconductor, LCD and mechanical factories. In factory automation, “air pressuring” plays a very essential and critical role.

The “PS-1000” is launched to offer enriched knowledge from basic air pressure components, advanced air-pressure loop design to PLC-based electrical control system. The trainee can prepare themselves to be a high-level automation engineer with the help of the “PS-1000” trainer system.

● Features

1. Improvement on trainees' familiarization of the principles and applications of various air pressure components.
2. Demonstration of air-pressure loop design.
3. Training of PLC programming, including architecture, instructions and ladder diagram.

UP-001

Pneumatic Workbench

It is designed to be flexible to satisfy individual's needs.

A complete workbench mainly consists of 3 parts :

1. Electro-Modules Frame UE-001
2. Working Board UP-001-1 (double Side)
3. Working Table UP-001-2 (Single or Double Side)

The combinations of the workbench can be modified based on different lab requirement.

A complete workbench allows customers to carry out all listed pneumatic experiments. In PART I and PART II, pneumatic components are powered by Air Supply Unit and operated on Working Board area through connected Air Hose (UP-801).

In PART III, the electrical components mounted on Electro-Modules Frame are linked to the pneumatic system through Connecting Lead (UE-501) and powered by Air Supply Unit.

End user are also welcome to adopt Programmable Logic Controller (PLC) for implementation of PART III. That means trainer PLC-220 is an alternative to Electro-Modules Frame and a corresponding electrical device.

PLC-220

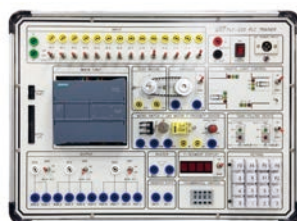
PLC Trainer (Optional)

Specifications :

1. PLC Main Unit : SIEMENS SIMATIC S7-1214C
2. Digital Input : 14
3. Digital Output : 10
4. Analog Input : 2

Accessories :

1. Experiment Manual
2. Connecting Leads Set



PLC Trainer Requirements

1. PC : Intel® Core™ i5-3320M 3.3GHz or better, 8GB RAM, 10GB on system drive
2. OS: Windows 7 (64-bit) SP1 / Windows10 (64-bit) 1703
3. Industrial Ethernet Cable, CAT 6, Length 6M
4. SIMATIC STEP 7 BASIC TIA Portal Software DVD

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(W) x 250(D) x 360(H))mm $\pm 10\%$



UP-001-1

Working Board

Double-side aluminum grooved panel - (1260 x 750)mm and a working surface up to (1200 x 700)mm.



UP-001-2

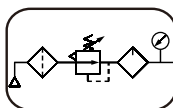
Working Table

1. Single-side worktable in size (1300(W) x 700(D) x 850(H))mm $\pm 10\%$ Drawer units in steel with one flat drawer and four large drawers that can be loaded up to 20kg per drawer.
2. Double-side worktable with (1300(W) x 800(D) x 850(H))mm $\pm 10\%$ Two drawer units in steel with one flat drawer and four large drawers that can be loaded up to 20kg per drawer.
3. The drawers with different rollers that feature an easy-gliding system for smooth running and additional breaking.



● Pneumatic Components

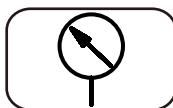
UP-101



Air Service Unit

Filter-Regulator-Lubricator (FRL) assembly
Adjustable pressure : 0 ~ 9.9kg/cm²
Sliding exhaust valve mounted
Filtration : 40 μ m

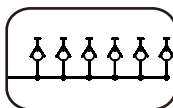
UP-105



Pressure Gauge

Operating pressure : 0 ~ 10kg/cm²
Gauge size : 1.5"

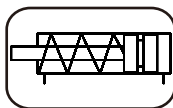
UP-111



Air Manifold

Check connector for $\varnothing$ 4 plastic tubing 6ea
Connector size : 1/4"
Operating pressure : 0 ~ 12kg/cm²

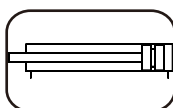
UP-202



Single-Acting Air Cylinder

Cylinder internal diameter : 32mm
Stroke length : 150mm
Operating pressure : 1.6kg/cm² ~ 9.0kg/cm²

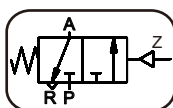
UP-206



Double-Acting Air Cylinder

Cylinder internal diameter : 32mm
Stroke length : 150mm
Operating pressure : 0.4kg/cm² ~ 9.0kg/cm²
Air cushion

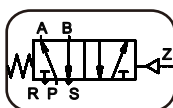
UP-302



3/2-Way Directional Control Valve

Single air operated, spring return
NC type
Flow rate : 200L/min
Operating pressure : 1.5kg/cm² ~ 8.0kg/cm²
Max. pressure : 10.5kg/cm²

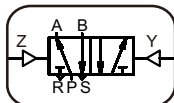
UP-308



5/2-Way Directional Control Valve

Single air operated, spring return
Flow rate : 200L/min
Operating pressure : 1.5kg/cm² ~ 8.0kg/cm²
Max. pressure : 10.5kg/cm²

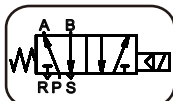
UP-309



5/2-Way Directional Control Valve

Double air operated, air return
Flow rate : 200L/min
Operating pressure : 1.5kg/cm² ~ 8.0kg/cm²
Max. pressure : 10.5kg/cm²

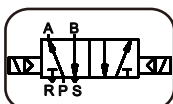
UP-408



5/2-Way Single-Solenoid Valve

Solenoid voltage : 24V DC
Single solenoid operated, spring return, with LED
Operating pressure : 1.5kg/cm² ~ 8.0kg/cm²
Max. pressure : 10kg/cm²

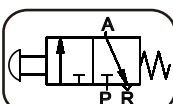
UP-409



5/2-Way Double-Solenoid Valve

Solenoid voltage : 24V DC
Double solenoid operated, with LED
Operating pressure : 1.5kg/cm² ~ 8.0kg/cm²
Max. pressure : 10kg/cm²

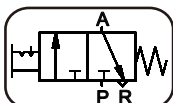
UP-503



3/2-Way Pushbutton Valve

Spring return, flat type, NC type
Operating pressure : 0 ~ 8kg/cm²
Max. pressure : 10kg/cm²

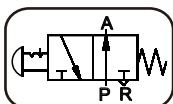
UP-505



3/2-Way Manual Valve

Spring return, 2-position selector
Operating pressure : 0 ~ 8kg/cm²
Max. pressure : 10kg/cm²

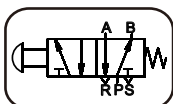
UP-506



3/2-Way Manual Valve

Spring return, push & lock, NO type
Operating pressure : 0 ~ 8kg/cm²
Max. pressure : 10kg/cm²

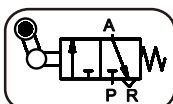
UP-507



5/2-Way Pushbutton Valve

Spring return, flat type
Operating pressure : 1.5kg/cm² ~ 8.5kg/cm²
Max. pressure : 10kg/cm²

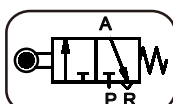
UP-511



3/2-Way Roller Valve

Unidirectional
Operating pressure : 0 ~ 8kg/cm²
Max. pressure : 10kg/cm²

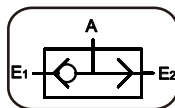
UP-512



3/2-Way Roller Valve

Bi-directional
Operating pressure : 0 ~ 8kg/cm²
Max. pressure : 10kg/cm²

UP-601

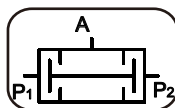


OR Valve (Shuttle)

OR logic

Operating pressure : 0.2kg/cm² ~ 9.9kg/cm²

UP-602

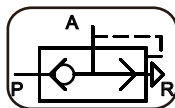


AND Valve (Dual-Pressure)

AND logic

Operating pressure : 0.2kg/cm² ~ 9.9kg/cm²

UP-603

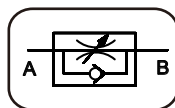


Quick-Exhaust Valve

Pilot type

Operating pressure : 0 ~ 9.9kg/cm²

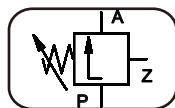
UP-611



One-Way Flow-Control Valve

Adjust : 10-turn, with speed controller

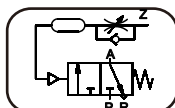
UP-621



Sequence Valve

Operating pressure : 1.5kg/cm² ~ 8kg/cm²

UP-701



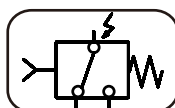
Time Delay Valve

Operating pressure : 2kg/cm² ~ 8kg/cm²

Time delay : 0.1sec ~ 30sec

Min. reset time < 0.1sec

UP-711



Pressure Switch

Operating pressure : 1.5kg/cm²

Max. voltage/current : 250V DC / 0.25A

125V DC / 0.5A

UP-801



Air Hose

Inner/outer diameter : 2mm/4mm

Length : 25M

UE-501



Connecting Lead

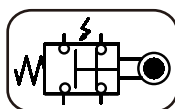
Lead diameter : 4mm

Length : 0.25M, 0.5M, 1M

Color : red, yellow, blue

1set : 60pcs

UE-907



Limit Switch

Roller lever type

Contacts : NO, NC.

UP-TC4



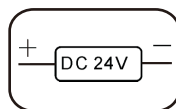
3-Way Distributor

Connector for Ø 4 plastic tubing 6ea

Connector size : 1/4"

● Electrical Components

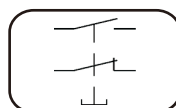
UE-101



DC Power Supply

Input voltage : 100V ~ 240V AC / 1.7A
 Output voltage : 24V DC / 4.2A
 Terminal : 2sets for $\pm$ DC output
 with power I/O indicator
 2 Terminal sets for power output

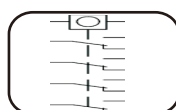
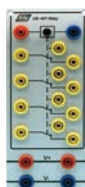
UE-201



Pushbutton Switch

Spring return
 Pushbutton switch with illuminated indicator
 including NC, NO contacts
 Operation voltage : 24V DC
 Max. current : 3A

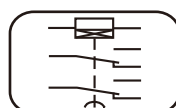
UE-401



Relay

4sets of NC, NO, COM contacts
 With LED Indicator
 Operation voltage : 24V DC
 Max. current : 5A

UE-404

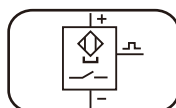


Timing Relay

ON-Delay type
 Operation voltage : 24V DC
 Max. current : 5A
 Time delay : 0.05sec ~ 300 hour multi switch
 2sets of NC, NO, COM contacts
 With LED indicator

● Optional Components

UE-912



Reed Switch (Optional)

Operating voltage : 24V DC
 Max. current : 100mA
 Frequency range : 3Hz ~ 250Hz

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

**Air Supply Unit
 (Necessary but Optional)**

1HP 1 ϕ 220V AC, with 88L $\pm$ 10% air tank
 Flow rate : 185L/min $\pm$ 10%
 Max. pressure : 10kg/cm²
 Include air hose diameter (5x8)mm connect to
 air service unit (UP-101)



● List of Experiments

PART I : Basic Pneumatic Components

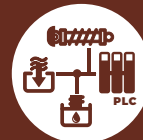
1. Single-Acting Air Cylinder
2. Double-Acting Air Cylinder
3. OR Valve
4. Flow Control Valve
5. Quick-Exhaust Valve
6. AND Valve
7. Directional Control Valves
8. Sequence Valve
9. Time-Delay Valve

PART II : Basic Pneumatic Control Circuits

1. Two-Hand Safety Circuit
2. Single-Acting Air Cylinder Remote Control
3. Double-Acting Air Cylinder Remote Control
4. Air Cylinder Manual Control Advance and Pressure Control Reverse
5. Air Cylinder Manual Control Advance and Delayed Reverse
6. Air Cylinder Two-Hand Control Advance and Automatic Reverse
7. Air Cylinder Slow Advance and Rapid Reverse
8. One-Cycle Reciprocation of Double-Acting Air Cylinder
9. Emergency Stop Circuit
10. Interlocking Start Switch Circuit
11. Two Air Cylinders used in Parts Bending Process
12. Sequence Control of Two Air Cylinders
13. Air Cylinder used in Machining Process
14. Three Air Cylinders used in Material Loading and Drilling
15. Sequence Control of Three Air Cylinders

PART III : Electro-Pneumatic Sequence Control Circuits

1. One-Cycle Cylinder Reciprocation using a 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. Cylinder Advance/Reverse Control using a Pushbutton and Single-Solenoid Valve
8. One-Cycle Cylinder Reciprocation using Pushbuttons and Double-Solenoid Valve
9. One-Cycle Cylinder Reciprocation using Limit Switch and Double-Solenoid Valve
10. Continuous Cylinder Reciprocation using Limit Switches and Double-Solenoid Valve
11. One-Cycle Cylinder Reciprocation using Timer and Double-Solenoid Valve
12. One-Cycle Cylinder Reciprocation using Timer, Limit Switch and Double-Solenoid Valve
13. Continuous Cylinder Reciprocation using Timer, Limit Switches and Double-Solenoid Valve
14. Cylinder Advance/Reverse Control using a Pushbutton and Double-Solenoid Valve
15. Two-Cylinder Sequencing (A+B+B-A-) using Single-Solenoid Valves
16. Two-Cylinder Sequencing (A+A-B+B-) using Single-Solenoid Valves
17. Two-Cylinder Sequencing (A+A-B+B-) using Double-Solenoid Valves
18. Two-Cylinder Sequencing (A+B+/Timing/A-B-) using Single-Solenoid Valves
19. Two-Cylinder Sequencing (A+B+/Timing/A-B-) using Double-Solenoid Valves
20. Three-Cylinder Sequencing (A+B+C+C-B-A-) using Single-Solenoid Valves
21. Three-Cylinder Sequencing (A+A-B+C+B-C-) using Single-Solenoid Valves
22. Pressure Switch Uses

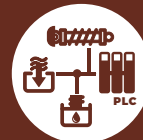


PART I Basic Pneumatic Components

Equipment		EX.1	EX.2	EX.3	EX.4	EX.5	EX.6	EX.7	EX.8	EX.9	Q'ty
UP-001	Pneumatic Workbench	1	1	1	1	1	1	1	1	1	1
UP-101	Air Service Unit	1	1	1	1	1	1	1	1	1	1
UP-105	Pressure Gauge	1			2				1	1	2
UP-111	Air Manifold	1	1	1	1	1	1	1	1	1	1
UP-202	Single-Acting Air Cylinder	1		1	1	1	1				1
UP-206	Double-Acting Air Cylinder		1					1	2	1	2
UP-308	5/2-Way Directional Control Valve								1		1
UP-309	5/2-Way Directional Control Valve							1		1	1
UP-503	3/2-Way Pushbutton Valve	1		2	1	1	2	1		1	2
UP-507	5/2-Way Pushbutton Valve		1						1		1
UP-512	3/2-Way Roller Valve							1			1
UP-601	OR Valve (Shuttle)			1							1
UP-602	AND Valve (Dual-Pressure)						1				1
UP-603	Quick-Exhaust Valve					1			1		1
UP-611	One-Way Flow-Control Valve				1	1			1	1	1
UP-621	Sequence Valve								1		1
UP-701	Time Delay Valve									1	1
UP-801	Air Hose	1	1	1	1	1	1	1	1	1	1
UP-TC4	3-Way Distributor	1			2				2	2	2
	Air Supply Unit (Necessary but Optional)	1	1	1	1	1	1	1	1	1	1

PART II Basic Pneumatic 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
UP-001	Pneumatic Workbench	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
UP-101	Air Service Unit	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
UP-105	Pressure Gauge				1												1
UP-111	Air Manifold	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
UP-202	Single-Acting Air Cylinder	1	1												1		1
UP-206	Double-Acting Air Cylinder			1	1	1	1	1	1	2	2	2	1	2	3	3	3
UP-302	3/2-Way Directional Control Valve		1											1			1
UP-309	5/2-Way Directional Control Valve			1	1	1	1	1	1	2	2	3	1	3	5	5	5
UP-503	3/2-Way Pushbutton Valve	2	1	1	1	1	2	1		2	1	1		1	1	1	2
UP-505	3/2-Way Manual Valve								1				1	1	1	1	1
UP-506	3/2-Way Manual Valve									1							1
UP-511	3/2-Way Roller Valve										2	1		1	4		4
UP-512	3/2-Way Roller Valve			1	1	1	1	1	2	1	1	2	4	1	5	6	6
UP-601	OR Valve (Shuttle)						1							1	1	1	1
UP-602	AND Valve (Dual-Pressure)						1			1							1
UP-603	Quick-Exhaust Valve							1		1				1			1
UP-611	One-Way Flow-Control Valve						1	1		1				1	5		5
UP-621	Sequence Valve				1												1
UP-701	Time Delay Valve					1	1										1
UP-801	Air Hose	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
UP-TC4	3-Way Distributor												6		8	6	8
	Air Supply Unit (Necessary but Optional)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

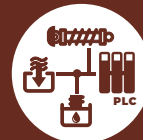


PART III Electro-Pneumatic Sequence Control Circuits with Electro-Modules Frame

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
UP-001 Pneumatic Workbench	1	1	1	1	1	1	1	1	1	1	1	1
UP-101 Air Service Unit	1	1	1	1	1	1	1	1	1	1	1	1
UP-105 Pressure Gauge												
UP-111 Air Manifold	1	1	1	1	1	1	1	1	1	1	1	1
UP-206 Double-Acting Air Cylinder	1	1	1	1	1	1	1	1	1	1	1	1
UP-408 5/2-Way Single-Solenoid Valve	1	1	1	1	1	1	1					
UP-409 5/2-Way Double-Solenoid Valve								1	1	1	1	1
UP-711 Pressure Switch												
UP-801 Air Hose	1	1	1	1	1	1	1	1	1	1	1	1
UE-101 DC Power Supply Module	1	1	1	1	1	1	1	1	1	1	1	1
UE-201 Pushbutton Switch Module	1	2	1	2	1	2	1	2	1	2	1	1
UE-401 Relay Module	1	1	1	2	1	2	3	2	2	1	1	1
UE-404 Timing Relay Module					1	1					1	1
UE-501 Connecting Lead	1	1	1	1	1	1	1	1	1	1	1	1
UE-907 Limit Switch			1	2	1	2			1	2		1
UP-TC4 3-Way Distributor												
Air Supply Unit (Necessary but Optional)	1	1	1	1	1	1	1	1	1	1	1	1

PART III Electro-Pneumatic Sequence Control Circuits with Electro-Modules Frame

Equipment	EX.13	EX.14	EX.15	EX.16	EX.17	EX.18	EX.19	EX.20	EX.21	EX.22	Q'ty
UP-001 Pneumatic Workbench	1	1	1	1	1	1	1	1	1	1	1
UP-101 Air Service Unit	1	1	1	1	1	1	1	1	1	1	1
UP-105 Pressure Gauge										1	1
UP-111 Air Manifold	1	1	1	1	1	1	1	1	1	1	1
UP-206 Double-Acting Air Cylinder	1	1	2	2	2	2	2	3	3	1	3
UP-408 5/2-Way Single-Solenoid Valve			2	2		2		3	3	1	3
UP-409 5/2-Way Double-Solenoid Valve	1	1			2		2			1	2
UP-711 Pressure Switch										1	1
UP-801 Air Hose	1	1	1	1	1	1	1	1	1	1	1
UE-101 DC Power Supply Module	1	1	1	1	1	1	1	1	1	1	1
UE-201 Pushbutton Switch Module	2	1	1	1	1	2	1	1	1	2	2
UE-401 Relay Module	1	3	4	2	4	2	2	2	6	2	6
UE-404 Timing Relay Module	1					1	1				1
UE-501 Connecting Lead	1	1	1	1	1	1	1	1	1	1	1
UE-907 Limit Switch	2		4	4	4	2	3	6	6		6
UP-TC4 3-Way Distributor										2	2
Air Supply Unit (Necessary but Optional)	1	1	1	1	1	1	1	1	1	1	1



PART III Electro-Pneumatic Sequence Control Circuits with PLC-220

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
UP-001-1	Working Board	1	1	1	1	1	1	1	1	1	1	1	1
UP-001-2	Working Table	1	1	1	1	1	1	1	1	1	1	1	1
UP-101	Air Service Unit	1	1	1	1	1	1	1	1	1	1	1	1
UP-105	Pressure Gauge												
UP-111	Air Manifold	1	1	1	1	1	1	1	1	1	1	1	1
UP-206	Double-Acting Air Cylinder	1	1	1	1	1	1	1	1	1	1	1	1
UP-408	5/2-Way Single-Solenoid Valve	1	1	1	1	1	1	1					
UP-409	5/2-Way Double-Solenoid Valve								1	1	1	1	1
UP-711	Pressure Switch												
UP-801	Air Hose	1	1	1	1	1	1	1	1	1	1	1	1
UE-501	Connecting Lead	1	1	1	1	1	1	1	1	1	1	1	1
UE-907	Limit Switch			1	2	1	2			1	2		1
UP-TC4	3-Way Distributor												
	Air Supply Unit (Necessary but Optional)	1	1	1	1	1	1	1	1	1	1	1	1
PLC-220	PLC Trainer	1	1	1	1	1	1	1	1	1	1	1	1

PART III Electro-Pneumatic Sequence Control Circuits with PLC-220

Equipment		EX.13	EX.14	EX.15	EX.16	EX.17	EX.18	EX.19	EX.20	EX.21	EX.22	Q'ty
UP-001-1	Working Board	1	1	1	1	1	1	1	1	1	1	1
UP-001-2	Working Table	1	1	1	1	1	1	1	1	1	1	1
UP-101	Air Service Unit	1	1	1	1	1	1	1	1	1	1	1
UP-105	Pressure Gauge										1	1
UP-111	Air Manifold	1	1	1	1	1	1	1	1	1	1	1
UP-206	Double-Acting Air Cylinder	1	1	2	2	2	2	2	3	3	1	3
UP-408	5/2-Way Single-Solenoid Valve			2	2		2		3	3	1	3
UP-409	5/2-Way Double-Solenoid Valve	1	1			2		2			1	2
UP-711	Pressure Switch										1	1
UP-801	Air Hose	1	1	1	1	1	1	1	1	1	1	1
UE-501	Connecting Lead	1	1	1	1	1	1	1	1	1	1	1
UE-907	Limit Switch	2		4	4	4	2	3	6	6		6
UP-TC4	3-Way Distributor										2	2
	Air Supply Unit (Necessary but Optional)	1	1	1	1	1	1	1	1	1	1	1
PLC-220	PLC Trainer	1	1	1	1	1	1	1	1	1	1	1