PLC Applications 8075



LabVolt Series

Datasheet



^{*} The product images shown in this document are for illustration purposes; actual products may vary. Please refer to the Specifications section of each product/item for all details. Festo Didactic reserves the right to change product images and specifications at any time without notice.

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General Description

The PLC Applications, Series 8075, aim to further develop student understanding of PLC programming that was acquired with the Programmable Logic Controller Training Systems, Series 3240. Basic principles are integrated with more advanced concepts in order to design small-scale systems typical of what can be found in the industry. Through practical examples, students gain a strong knowledge of PLCs and of the studied applications. Job sheets are provided with each application. The training capabilities of the systems are enhanced by their modularity and by the ability to use instructor-inserted faults.

Fault switches are included on selected modules to enhance troubleshooting activities by simulating open coils and contacts, defective contacts, shorted connections, and crossed wires.

The modules of the PLC Applications Series can be interconnected with those of other training systems for interdisciplinary training applications. Connections are made using flexible, PVC-insulated connecting leads terminated with 2 mm plugs. The control circuits operate at 24 V dc and are compatible with a variety of PLCs.

The PLC Applications series is divided into seven systems, each system covering a specific topic related to PLC controls.

Courseware

Each manual of the PLC Applications Series concentrates on a specific utilization of a PLC, starting with a familiarzation and evolving into more complex concepts and troubleshooting. With each manual, new components are introduced to create different learning opportunities.

The PLC Applications series courseware consists of one student manual and one instructor guide per application. The student manuals are divided into job sheets detailing relevant information and providing clearly stated objectives and procedure steps. The instructor guides contain ladder programs and answer keys for all exercises and questions in the student manuals.

Please refer to the Table of Contents of the Manual(s) section of this datasheet for a list of the topics covered in each manual.

PLC Compatibility

		Training System						
		8075-1	8075-2	8075-3	8075-4	8075-5	8075-6	8075-7
Model Number	Description	Curriculum Coverage						
3240-3	PLC Allen-Bradley MicroLogix 1500	•	•	•	•	•*	•*	Р
3240-4	PLC Allen-Bradley MicroLogix 1200	•	•	•	•	•*	•*	P [†]
3240-A	PLC Allen-Bradley MicroLogix 1100	Р	•	•	•	•	•*	•
3240-B	PLC Siemens ET200S IM151-8	•	•	•	•	•*	•*	Р
3240-C	PLC Siemens ET200S IM151-8	•	•	•	•	•*	•*	Р
3270-6	PLC Siemens S7-222	Р	•	•	•	Х	Р	Р
3270-7	PLC Allen-Bradley MicroLogix 1100	Р	•	•	•	•	•*	•

^{• :} Complete curriculum coverage

PLC Requirements

		Training System						
		8075-1	8075-2	8075-3	8075-4	8075-5	8075-6	8075-7
	Туре				Quantity	•		
	24 V – DC	3	5	8	5	6	6	5
Inputs	24 V – DC High-Speed	-	-	2*	-	-	i	-
=	0-10 V – DC / 4-20 mA	-	-	-	-	1	1*	-
· ·	24 V – DC	10	4	3	3	2	6	6
Outputs	24 V – DC High-Speed	_	-	-	-	-	-	2*
Ō	0-10 V – DC / 4-20 mA	-	-	-	-1	-	1*	-

^{* :} For the optional exercise only

Topic Coverage

- Traffic Lights
- Electro-Pneumatics
- Electro-Mechanical DC Motor
- Electro-Mechanical Stepper Motor
- Wind Turbine

P: Partial curriculum coverage

X : PLC not recommended for the application

^{*:} Analog I/O Expansion Kit (Model 3244-3, -4, -A, -B, or -C) required to perform all the exercises

 $^{^{\}mbox{\tiny t}}$: Only the optional Job Sheet with PTO function files cannot be completed

Level Process Control

Features & Benefits

- Realistic applications to help students understand PLC principles and concepts
- Safe equipment
- Applications can be interconnected with other equipment for interdisciplinary training
- Tabletop, cost-effective applications integrating realistic components
- Comprehensive curriculum included with each application
- Highly modular systems accessories are available for more complex applications
- Fault-insertion capability for troubleshooting
- PLC sold separately (customers can also use their own)

List of Available Training Systems

Qty	Description	model number
1	Traffic Light Training System	582532 (8075-10)
1	Electro-Pneumatic Training System	588682 (8075-20)
1	Wind Turbine Training System	582542 (8075-50)

Available Training Systems

Traffic Light Training System 582532 (8075-10)



The Traffic Light Training System is a classic PLC training system allowing the implementation of vehicle and pedestrian traffic control at an intersection.

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PLC Compatibility

Listed below are the PLC compatibilities with the Traffic Light Training System, Model 8075-1.

- Advanced PLC Training System (Rockwell Automation), Models 3355-0
- Advanced PLC Training System (Siemens), Models 3355-A
- PLC Allen-Bradley MicroLogix 1500, Model 3240-3: Full compatibility
- PLC Allen-Bradley MicroLogix 1200, Model 3240-4: Full compatibility
- PLC Allen-Bradley MicroLogix 1100, Model 3240-A: Partial compatibility only
- PLC Siemens ET200S IM151-8, Model 3240-B: Full compatibility
- PLC Siemens ET200S IM151-8 (with Case), Model 3240-C: Full compatibility
- PLC Siemens S7-222, Model 3270-6: Partial compatibility only
- PLC Allen-Bradley MicroLogix 1100, Model 3270-7: Partial compatibility only

Features & Benefits

A well-known classic training system

- N-S/E-W traffic control with pedestrian crossing
- Another unit can be added to create a full, four-directions traffic light
- Flow management with proximity detectors (optional)
- Traffic light synchronization
- Fault-insertion capability for troubleshooting
- LEDs (long life)
- Fitted with ten 24 V dc control inputs
- Includes job sheets

List of Equipment

Qty	Description	model number
1	PLC Applications (Job Sheets - Student) _	580490 (85249-20)
1	PLC Applications (Job Sheets - Instructor)	580491 (85249-30)
1	Traffic Light Module	582185 (3291-00)

List of Manuals

Description	number
PLC Applications (Workbook)	580490 (85249-20)
PLC Applications (Workbook (Instructor))	580491 (85249-30)

Table of Contents of the Manual(s)

PLC Applications (Workbook) (580490 (85249-20))

- 1 Basic Traffic Light System
- 2 Sequencer Operation
- 3 Proximity Detector and Pushbutton
- 4 Troubleshooting
- 5 Optional Project

System Specifications

Parameter	Value
PLC Requirements - Inputs	
24 V dc	3
PLC Requirements - Outputs	
24 V dc	10
Physical Characteristics	
Intended Location	On a table
Dimensions (H x W x D)	480 x 730 x 390 mm (18.9 x 28.7 x 15.4 in)
Net Weight	TBE

Electro-Pneumatic Training System 588682 (8075-20)



The Electro-Pneumatic Training System uses a PLC to control a variety of pneumatic industrial applications.

PLC Compatibility

Listed below are the PLC compatibilities with the Electro-Pneumatic Training System, Model 8075-2.

- PLC Allen-Bradley MicroLogix 1500, Model 3240-3: Full compatibility
- PLC Allen-Bradley MicroLogix 1200, Model 3240-4: Full compatibility
- PLC Allen-Bradley MicroLogix 1100, Model 3240-A: Full compatibility
- PLC Siemens ET200S IM151-8, Model 3240-B: Full compatibility
- PLC Siemens ET200S IM151-8 (with Case), Model 3240-C: Full compatibility
- PLC Siemens S7-222, Model 3270-6: Full compatibility
- PLC Allen-Bradley MicroLogix 1100, Model 3270-7: Full compatibility

Features & Benefits

- Two double-acting cylinders
- Two reed switches and mechanical limit switch for PLC feedback
- Perforated work surface
- Control valve station featuring single- and double-solenoid valves
- Applications: stamping, hold and punch, filling process, etc.
- Fault-insertion capability for troubleshooting
- Accepts three 24 V dc control signals from the PLC
- Includes job sheets

List of Equipment

Qty	Description	Model number
1	PLC Applications (Job Sheets - Student)	585088 (85250-20)
1	PLC Applications (Job Sheets - Instructor)	585089 (85250-30)
1	Pressure Regulator	587527 (3216-00)
1	Electro-Pneumatic Valve Island	587528 (3217-00)
1	Electro-Pneumatic Module	587572 (3292-00)
1	Storage/Work Surface	582357 (6309-00)

List of Manuals

Description	manuat number
PLC Applications (Workbook)	585088 (85250-20)
PLC Applications (Workbook (Instructor))	585089 (85250-30)

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Table of Contents of the Manual(s)

PLC Applications (Workbook) (585088 (85250-20))

- 1 Familiarization with the Electro-Pneumatic System
- 2 Single Cylinder Control
- 3 Clamp and Work Operation
- 4 Troubleshooting
- 5 Optional Project (Optimization)

Qty	Description	Model number
1	Compressor	
1	Conditioning Unit (Single Port)	
Add	itional Equipment Required to Perform the Exercises (Purchased separately)	
Qty	Description	Model number
1	Compressor	588108 (6410-C0) ²
1	Conditioning Unit (Single Port)	588111 (6411-A0)
Add	itional Equipment Required to Perform the Exercises (Purchased separately)	
Qty	Description	Model number
1	Compressor	588108 (6410-C0) ³
1	Conditioning Unit (Single Port)	588111 (6411-A0)
Add	itional Equipment Required to Perform the Exercises (Purchased separately)	
Qty	Description	Model number
1	Compressor	588108 (6410-C0) ⁴
1	Conditioning Unit (Single Port)	588111 (6411-A0)
Add	itional Equipment Required to Perform the Exercises (Purchased separately)	
Qty	Description	Model number
1	Compressor	588108 (6410-C0) ⁵
1	Conditioning Unit (Single Port)	588111 (6411-A0)
Add	itional Equipment Required to Perform the Exercises (Purchased separately)	
Qty	Description	Model number
1	Compressor	588108 (6410-C0) ⁶
1	Conditioning Unit (Single Port)	
Add	itional Equipment Required to Perform the Exercises (Purchased separately)	
Qty	Description	Model number
1	Compressor	
1	Conditioning Unit (Single Port)	588111 (6411-A0)

¹ 60 l/minute.

² 60 l/minute.

 $^{^3}$ 60 l/minute.

⁴ 60 l/minute.

⁵ 60 l/minute.

⁶ 60 l/minute.

⁷ 60 l/minute.

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Qty	Description	Model number
1	Compressor	588108 (6410-C0) ⁸
1	Conditioning Unit (Single Port)	
Addi	itional Equipment Required to Perform the Exercises (Purchased separately)	
Qty	Description	Model number
1	Compressor	
1	Conditioning Unit (Single Port)	
Addi	itional Equipment Required to Perform the Exercises (Purchased separately)	
	Description	Model
	·	number
1	CompressorConditioning Unit (Single Port)	
1	Conditioning only (Single Port)	588111 (6411-AU)
Addi	itional Equipment Required to Perform the Exercises (Purchased separately)	
Qty	Description	Model number
1	Compressor	588108 (6410-C0) ¹¹
1	Conditioning Unit (Single Port)	
Addi	itional Equipment Required to Perform the Exercises (Purchased separately)	
Qty	Description	Model number
1	Compressor	
1	Conditioning Unit (Single Port)	
Addi	itional Equipment Required to Perform the Exercises (Purchased separately)	
		Model
Qty	Description	number
1	Compressor	588108 (6410-C0) ¹³
1	Conditioning Unit (Single Port)	588111 (6411-A0)
Addi	itional Equipment Required to Perform the Exercises (Purchased separately)	
Qty	Description	Model number
1	Compressor	
1	Conditioning Unit (Single Port)	588111 (6411-A0)
		. ,

⁸ 60 l/minute.

⁹ 60 l/minute.

 $^{^{10}}$ 60 l/minute.

¹¹ 60 l/minute.

^{12 60} l/minute.

 $^{^{13}}$ 60 l/minute.

¹⁴ 60 l/minute.

Qty	Description	Model number
1	Compressor	
1	Conditioning Unit (Single Port)	588111 (6411-A0)
Add	itional Equipment Required to Perform the Exercises (Purchased separately)	
Qty	Description	Model number
1	Compressor	
1	Conditioning Unit (Single Port)	588111 (6411-A0)
Add	itional Equipment Required to Perform the Exercises (Purchased separately)	
Qty	Description	Model number
1	Compressor	588108 (6410-C0) ¹⁷
1	Conditioning Unit (Single Port)	
Add	itional Equipment Required to Perform the Exercises (Purchased separately)	
Qty	Description	Model number
1	Compressor	588108 (6410-C0) ¹⁸
1	Conditioning Unit (Single Port)	588111 (6411-A0)
Add	itional Equipment Required to Perform the Exercises (Purchased separately)	
Qty	Description	Model
1	Compressor	number 588108 (6410-CO) ¹⁹
1	Conditioning Unit (Single Port)	
Add	itional Equipment Required to Perform the Exercises (Purchased separately)	
Otv	Description	Model
•		number
1 1		588108 (6410-C0) ²⁰ 588111 (6411-A0)
		500111 (0411 //0)
Add	itional Equipment Required to Perform the Exercises (Purchased separately)	
Qty	Description	Model
1		number
1	CompressorConditioning Unit (Single Port)	588108 (6410-C0) 27 588111 (6411-An)
-		566111 (64117(6)

¹⁵ 60 l/minute.

 $^{^{16}}$ 60 l/minute.

¹⁷ 60 l/minute.

¹⁸ 60 l/minute.

¹⁹ 60 l/minute.

 $^{^{20}}$ 60 l/minute.

 $^{^{21}}$ 60 l/minute.

Qty	Description		Model number
1	Compressor		588108 (6410-C0) ²²
1			
Add	itional Equipment Required to	Perform the Exercises (Purchased separately)	
Qty	Description		Model number
1	Compressor		
1			
Add	itional Equipment Required to	Perform the Exercises (Purchased separately)	
Qty	Description		Model number
1	Compressor		
1			
Add	itional Equipment Required to	Perform the Exercises (Purchased separately)	
Qty	Description		Model number
1	Compressor		
1			
Syst	tem Specifications		
	Parameter	Value	
PLC R	equirements - Inputs		

Parameter	Value
PLC Requirements - Inputs	
24 V dc	5
PLC Requirements - Outputs	
24 V dc	4
Physical Characteristics	
Intended Location	On a table
Dimensions (H x W x D)	370 x 1160 x 590 mm (14.6 x 45.7 x 23.2 in)
Net Weight	TBE

²² 60 l/minute.

²³ 60 l/minute.

 $^{^{24}}$ 60 l/minute.

²⁵ 60 l/minute.

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Wind Turbine Training System 582542 (8075-50)



The Wind Turbine Training System uses a PLC to monitor the speed and direction of the wind and control the position of the wind turbine nacelle.

PLC Compatibility

Listed below are the PLC compatibilities with the Wind Turbine Training System, Model 8075-5.

- PLC Allen-Bradley MicroLogix 1500, Model 3240-3: Full compatibility, but requires the Analog I/O Expansion Kit, Model 3244-3
- PLC Allen-Bradley MicroLogix 1200, Model 3240-4: Full compatibility, but requires the Analog I/O Expansion Kit, Model 3244-4
- PLC Allen-Bradley MicroLogix 1100, Model 3240-A: Full compatibility
- PLC Siemens ET200S IM151-8, Model 3240-B: Full compatibility, but requires the Analog I/O Expansion Kit, Model 3244-B
- PLC Siemens ET200S IM151-8 (with Case), Model 3240-C: Full compatibility, but requires the Analog I/ O Expansion Kit, Model 3244-C
- PLC Siemens S7-222, Model 3270-6: Not recommended
- PLC Allen-Bradley MicroLogix 1100, Model 3270-7: Full compatibility

Features & Benefits

- System comprised of a Nacelle Simulator, Model 3297, and a Wind Generator, Model 3213
- Small blower for generating air flow
- Nacelle equipped with dc motor and mechanical clutch
- Two limit switches with NO and NC contacts
- Analog position sensor for determining wind direction (0-10 V)
- Variable-frequency pulse-train signal for measuring wind speed (24 V dc)
- Requires an external 24 V power supply
- Accepts two 24 V dc control signals from the PLC for motor operation
- Includes job sheets

List of Equipment

Qty	Description	model number
1	PLC Applications (Job Sheets - Student)	580499 (85303-20)
1	PLC Applications (Job Sheets - Instructor)	580501 (85303-30)
1	Wind Generator	582179 (3213-00)
1	Nacelle Simulator	582189 (3297-00)

List of Manuals

Description	Manual	
b costripcion	number	
PLC Applications (Workbook)	580499 (85303-20)	
PLC Applications (Workbook (Instructor))	580501 (85303-30)	

Table of Contents of the Manual(s)

PLC Applications (Workbook) (580499 (85303-20))

- 1 Familiarization with the Wind Turbine
- 2 Wind Tracking
- 3 Full Nacelle Operation
- 4 Troubleshooting

System Specifications

Parameter	Value
PLC Requirements - Inputs	
24 V dc	6
0-10 V dc / 4-20 mA	1
PLC Requirements - Outputs	
24 V dc	2
Physical Characteristics	
Intended Location	On a table
Dimensions (H x W x D)	310 x 870 x 210 mm (12.2 x 34.3 x 8.3 in)
Net Weight	TBE

Equipment Description

Wind Generator 582179 (3213-00)



The Wind Generator includes a small blower producing a constant air flow. This sturdy and reliable device is designed to be used with the Wind Turbine Training System, Model 8075-5.

Specifications

Parameter	Value
Power Requirements	24 V dc - 1.1 A
Nominal Speed	2500 r/min
Maximum Air Flow	28.3 L/s (60 CFM)
Physical Characteristics	
Dimensions (H x W x D)	207 x 186 x 230 mm (8.1 x 7.3 x 9.1 in)

Parameter	Value
Net Weight	3.0 kg (6.6 lb)

Pressure Regulator 587527 (3216-00)



The Pressure Regulator offers two different air flow paths: one not regulated and one limited in pressure. A rotary knob and an air gauge make it simple to regulate the pressure to the desired value, thus limiting the pressure sent to the Electro-Pneumatic Training System, Model 8075-2.

Specifications

Parameter	Value
Pressure Range	0-830 kPa (0-120 psi)
Gauge Range	0-1100 kPa (0-160 psi)
Physical Characteristics	
Dimensions (H x W x D)	95 x 120 x 120 mm (3.7 x 4.7 x 4.7 in)
Net Weight	0.5 kg (1.1 lb)

Electro-Pneumatic Valve Island 587528 (3217-00)



The Electro-Pneumatic Valve Island comprises two 4-way/2-position valves with common input and exhaust ports. One valve is operated by two solenoids and the other by a single solenoid and a spring return. The solenoids are actuated by 24 V dc signals.

Specifications

Parameter	Value
Valves	
	1 double solenoid
	1 single solenoid with spring return
Operating Pressure	Up to 830 kPa (120 psi)
Piloting Pressure	300-830 kPa (43-120 psi)
Coil Voltage	24 V dc
Fault Switches	4
Physical Characteristics	

Parameter	Value
Dimensions (H x W x D)	85 x 220 x 170 mm (3.3 x 8.7 x 6.7 in)
Net Weight	1.7 kg (3.7 lb)

Traffic Light Module 582185 (3291-00)



The Traffic Light Module reproduces a two-way traffic light, complete with pedestrian signals and the possibility to simulate broken lights. Its realistic appearance and functionalities help make the Traffic Light Training System, Model 8075-1, vivid and compelling to students. The addition of a second unit creates a full, four-direction traffic light.

Specifications

Parameter	Value
Lights	
Number	10 (2 green, 2 yellow, 2 red, 2 walk, 2 don't walk)
Туре	LED
Voltage	24 V dc
Fault Switches	8
Physical Characteristics	
Dimensions (H x W x D)	495 x 370 x 326 mm (19.5 x 14.6 x 12.8 in)
Net Weight	5.6 kg (12.4 lb)

Electro-Pneumatic Module 587572 (3292-00)



The Electro-Pneumatic Module and the associated equipment enable stamping, hold-and-punch, and filling operations. The module features two pneumatic cylinders arranged so as to distribute a programmed number of marbles from two tubes (feed lines) into a container. A second configuration allows students to perform a clamp-and-work operation on a plane material, such a sheet of paper. Two reed switches and one limit switch are installed to provide feedback on the cylinders' positions.

Specifications

Parameter	Value
Reed Switches (2)	
Contact Type	NO
Contact Rating	30 mA - 24 V dc
Limit Switch	
Contact Type	NO
Contact Rating	1 A - 24 V dc
Cylinders (2)	
Max Pressure	1700 kPa (250 psi)
Physical Characteristics	
Dimensions (H x W x D)	410 x 320 x 120 mm (16.1 x 12.6 x 4.7 in)
Net Weight	3.1 kg (6.8 lb)

Nacelle Simulator 582189 (3297-00)

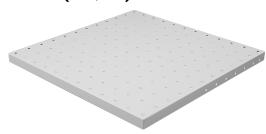


The Nacelle Simulator replicates the main functionalities of a wind turbine. It is designed to measure the speed and direction of the wind so that a PLC can control the position of the nacelle to optimize its operation. Two limit switches with NO and NC contacts allow monitoring of the number of rotations of the nacelle.

Specifications

Parameter	Value
Power Requirements	24 V dc - 0.6 A
Motor Ratings	
Power	3.04 W
Max Speed	4.2 r/min
Analog Wind Direction Output	0-10 V dc
Wind Speed Output	24 V dc
Turn Counter Switch Ratings	2 A - 24 V dc
Turn Limit Switch Ratings	0.1 A - 24 V dc
Physical Characteristics	
Dimensions (H x W x D)	397 x 235 x 140 mm (15.6 x 9.3 x 5.5 in)
Net Weight	2.9 kg (6.4 lb)

Storage/Work Surface 582357 (6309-00)



The Storage/Work Surface is a perforated metal plate on which the equipment is placed. Two work surfaces can be joined using Spacers.

Specifications

Parameter	Value
Physical Characteristics	
Dimensions (H x W x D)	30 x 590 x 590 mm (1 x 23 x 23 in)
Net Weight	5 kg (11 lb)

Optional Equipment Description

Compressor (Optional) 588108 (6410-C0)



The Air Compressor is a quiet device well suited for classroom and school laboratories. The Air Compressor can be used to provide compressed air to different components. A conditioning unit, Model 6411-A, must be connected to the compressor for certain applications.

The Circulator Pump is available in different variants depending on ac power network voltages and frequencies. Because of this, the actual module may vary from the one shown in the picture.

Conditioning Unit (Single Port) (Optional) 588111 (6411-A0)



The Conditioning Unit (Single Port) conditions and regulates the pressure of the air supplied to the pneumatic circuits. It consists of a main shutoff valve, filter, a pressure regulator, pressure gauge, sleeve valve, and a muffler. The Conditioning Unit (Single Port) requires compressed air from a central air supply or a portable unit.

Specifications

Parameter	Value
Recommended Compressed Air Supply	
Flow Rate	28 L/min (1 SCFM)
Pressure	207 kPa (30 psi)
Filter Regulator	
Maximum Air Flow Rate	550 L/min (19 SCFM)
Operating Pressure	48-690 kPa (7-100 psi)
Filtration	5 μm (0002 in)
Pressure Gauge	
Diameter	50 mm (2 in)
Operating Pressure	0-690 kPa (0-100 psi)
Physical Characteristics	
Dimensions (H x W x D)	75 x 170 x 120 mm (3 x 6.7 x 4.7 in)
Net Weight	1.6 kg (3.6 lb)

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