



DEGEM
SYSTEMS

Industrial
Automation

PN-3400

Pneumatics & Electro-Pneumatics Training Systems

Pneutronics is the hybrid technology, which combines pneumatics, electro-pneumatics, programmable logic controllers (PLC's) and/or computers for the control of complex electro-pneumatic power systems.

PN-3400 is a compact, hands-on, training system designed to provide a clear, comprehensive and efficient teaching facility for this hybrid technology. The training system covers the latest developments in the field, especially as related to the widespread use of advanced electronic control circuits, PLC's and computers in pneumatic power systems.

The expandable and highly flexible PN-3400, in step with all the latest pneutronic developments, has the modular capability to be tailored to a broad population profile including vocational schools, civil and military technical schools, polytechnics, colleges for further education, inter-disciplinary faculties and specially, industrial training centers.

The system features a very high degree of modularity and flexibility. The system can function in a basic standalone workstation configuration with or without PC support, or as a Degem Computer Managed Laboratory (DCML). Addition of a PC (not supplied) and computer assisted courseware, provides the key to an interactive environment and simulation capability to enhance the learning process.

The PN-3400 system's basic unit comprises a compact desktop universal master board (PN-3401), four sets of industrial pneumatics (PN-3410, 3420, 3430, 3440) component boards and comprehensive theory and practice manuals.

PN-3401 - Pneumatics Master Board:

The size of the master board is:
575 x 490 x 455 mm (W x H x D).

The master board incorporates a supply and measurement unit and 4 rack units into which the components boards can be quickly fastened or removed. It includes:

- 12V power supply
- 2 pressure gauges
- 3 pneumatics taps
- Air reservoir regulator
- Power switch
- Power supply outlets
- External power adaptor



Modules

PN-3410 – Basic Pneumatics Experiments

- 3/2 manually operated valve
- Operation of a single acting cylinder
- Double acting cylinder
- 5/2 way double pilot valve
- Control circuit with air spring and check valve
- Flow control operation with a flow meter
- Speed regulation method
- Speed regulation of a double acting cylinder
- Semi-automatic control system
- Automatic control circuit
- Pneumatic control circuit for a grinding machine
- Integrated sensor control
- Automatic double acting cylinder circuit
- Time delay pneumatic circuit with a reservoir
- Integrated delay using pressure discharge
- Operation of a press with two cylinders
- Control circuit for two double acting cylinders
- Operation of two cylinders in parallel
- Double control circuit with two cylinders

PN-3420 – Advanced Pneumatics & Logic Experiments

- Pneumatic control of a punch machine
- Air sliding principle
- Air motor
- Venturi principle
- Pneumatic manipulator
- Logic OR gate
- Pneumatic timer in a heat sealing application
- AND gate
- “Two hands on” safety control
- NOT gate
- NOR gate
- NAND gate
- Logic memory
- Trigger control circuit with a T flip-flop
- Clamping and drill control circuit
- Cascade circuit
- Sliding table and drilling system

PN-3430 – Basic Electro-Pneumatics

- Series connected electrical circuits
- Series and parallel electrical circuits
- Electromagnet and its applications
- Electro-pneumatic stamping press
- “One-by-one” feed system
- Series and parallel control for a double acting cylinder
- Semi automatic actuator circuit
- Reed switch as a contact multiplier
- Using the relay as an electric switch
- Contact inversion using a change-over relay contact
- Use of a relay in an electrical control circuit
- Self-holding relay in an emergency stop circuit
- Relay vibrator circuit

- Automatic control circuit to activate a cylinder
- Automatic control using a relay memory
- Pneumatic elevator
- On-delay timer circuit
- Off-delay timer
- Control circuit with off and on delay timers
- Safety operation circuit

PN-3440 – Advanced Electro-Pneumatics Experiments

- Hall effect sensor
- Optical proximity sensor
- Capacitive proximity sensor
- Inductive proximity sensor
- Pick boring system
- Control circuit with two spring return solenoid valves
- Logic circuit
- Electrical cascade circuit
- Sequence control
- Split control simulation
- Basic timing circuit
- Shortened cascade method
- Cascade counter simulation
- Counting with two cylinders
- Cascade counter design
- Electronic counter
- Stepper motor and control circuit

PN-3451 – Programmable Logic Controller (PLC) Experiments

- Introduction to the PLC ladder diagram
- Series and series-parallel control circuits
- Use of internal PLC coil, self-hold and break priority
- Relay memory, programming a sequence
- On delay and off delay timers and control circuits
- Three piston cascade counter circuits
- Design and programming exercises for applications:
- Cutting machine, manipulator, concrete block machine
- Bottle closing machine, packing cans in boxes
- “Two hands” safety control

PN-3452 USB I/O Unit and manual fault insertion

- Acts as the computer interface for most of the experiments for basic and advanced electro-pneumatic courses including fault insertion
- Supports programming in PLC ladder diagrams (PLSES), logo icons (SES logo), Basic, Pascal, C and C51

PN-3481 – 20 Liter Air Compressor

Air compressor (2.5 HP, 24 liters, 10 bars)

PN-3491 Patch Cord Set

This kit contains all the electrical patch cords for the electro-pneumatic training systems.

PN-3492 Accessories Set

Provides plastic tubing, plastic cover, manifolds and plugs for performing pneumatic connections.