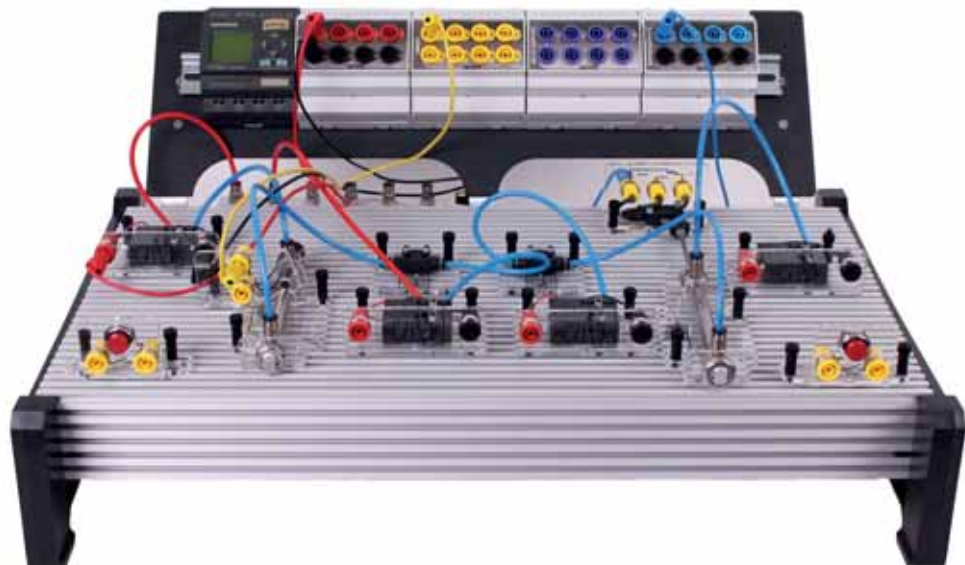


# AUTOMATICS

## Simplifying pneumatics

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*An example of a functioning control pneumatics solution with the Matrix MIAC controller*

# What is Automatics?

## Simplifying pneumatics and automation

Automatics is a range of products that simplifies the process of teaching and learning about pneumatics and automation systems.

The Automatics range consists of separate rugged components that mount onto a stable aluminium platform. Components are clearly marked with the appropriate pneumatic or electrical symbol. Students take the rugged components, mount them to the platform using plastic 'tee' bolts and connect the components together with nylon tubing to build working pneumatic circuits.

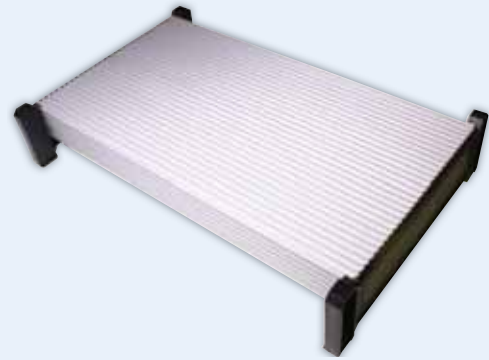
They then use the curriculum provided to carry out experiments in pneumatic and electronic control.

## Disciplines include:

- Pneumatics
- Automation
- Design technology



## The Automatics range includes:



### A rugged aluminium platform

To which students add...



A compressor



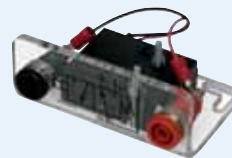
A manifold



Cylinders



Mechanical valves



Electrical valves



Connectors



Switches and sensors



A controller



Pneumatic tubing



Electrical cables

# Why choose Automatics?

## Automatics platform

The extruded aluminium platform provides a solid foundation to which the other components are fixed. It is large enough to provide a comfortable work area for the largest of the circuits in our curriculum worksheets.

## Reliability and robustness

Automatics has been designed from the ground up to suit the classroom environment. The pneumatic components are identical to those used by real engineers, but we have cleverly adapted them so that students can construct automation systems speedily and without requiring any tools.

## Simple to connect

The compressed air supply is distributed using plastic tubing that is easily cut to length. This simply pushes into the component connectors. To release the tube, simply depress the connector collar and pull out the tube.

## Carriers and symbols

Each component is secured to a clear acrylic carrier. The carrier is printed with a product code for easy identification and the industry standard symbol for the part. Slots in the carrier allow for easy positioning in any orientation on the platform.

## Tee-bolt fixings

Components are attached to the slots on the sturdy aluminium platform using plastic tee-bolts. These are easily secured and released without requiring any tools, allowing components to be quickly positioned and held firmly in place.

## 4mm connectors

For components which require electrical connections, we have used standard 4mm single pole connectors which are suitable for 'safety' shrouded plugs. Suitable leads are provided when you purchase any kit of components.

## Full curriculum support and courseware

Our Automatics courseware CD ROM contains a complete student-centred interactive course on pneumatic system design. High quality worksheets for each kit are supplied free of charge in electronic format – downloadable from our web site. Worksheets are all free of charge and contain clear well written instructions for each experiment. Teachers can hand students a full manual, or can print just the worksheets required.

## Software and control system support

Students learn to design control pneumatics systems using Matrix's Flowcode software which is based on flow charts. Control systems are based on our MIAC controller which is designed with education in mind.



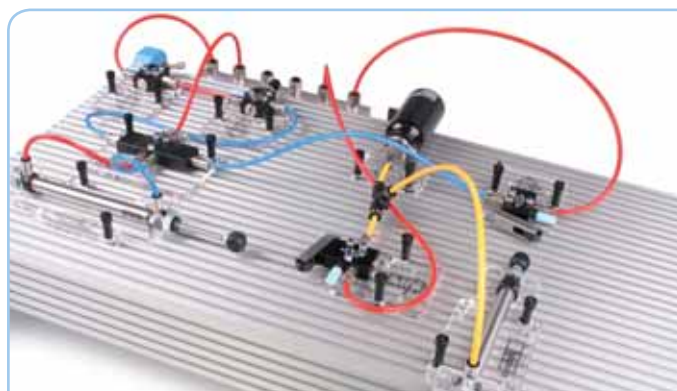
All pneumatic fittings are quick release



Circuit symbol clearly printed on each carrier



Quick release tee-bolts



A typical Automatics project



Standard 4mm cables used for all electrical connections

# Automatics curriculum

Automatics is more than just a range of hardware - it also offers a suite of learning resources that assist both students and educators to maximise the educational value of the equipment.

## The worksheets

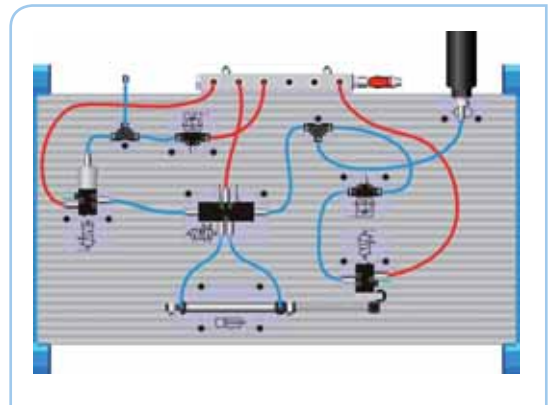


Our web site includes a set of .pdf workbooks that provide lesson plans, student worksheets and teacher's notes for a variety of courses that can be used individually or as a coherent series.

Each workbook is professionally written by experienced teachers who have used the Automatics hardware in a real learning environment.

Ordering information	
Automatics essentials	AW2080
Electro-pneumatics	AW2079
Control pneumatics	AW4956
Control pneumatics plus	AW4957

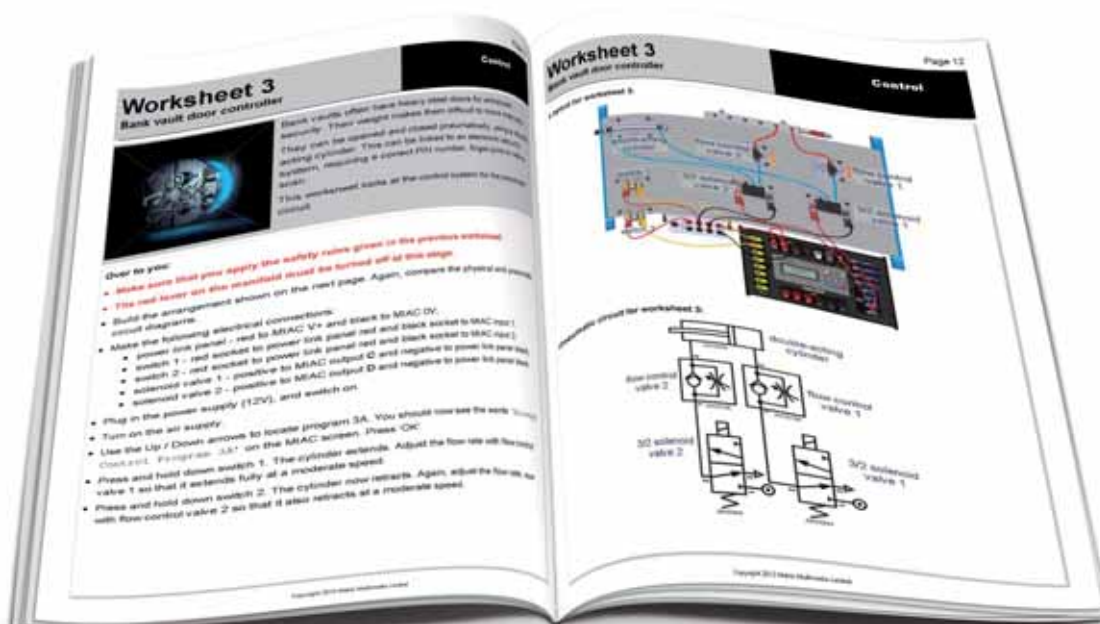
Students are guided through each subject in a logical sequence with clear, concise learning objectives at each stage, complete with quizzes and short tests by which their progress can be assessed.



For each curriculum objective, there is a worksheet designed to be printed and handed out to students, with areas set aside for them to enter the results and conclusions of their experiments.

Throughout each worksheet, pictures and diagrams of the Automatics hardware are used to make setting up the experiments easy. Examples from real world applications help students to understand the context of what they are learning, helped by our use of internationally recognised symbols for all of the components.

For up to date curriculum, please visit our website: [www.matrixtsl.com/automatics/resources](http://www.matrixtsl.com/automatics/resources)



# Automatics component guide



## Cylinders

Cylinders provide the motive power of your pneumatic circuit. Single acting cylinders use a spring to return the piston to its rest position. All cylinders are a standard 10 mm diameter, the second figure represents the range of motion of the piston.

Description	Part number
Cylinder, single acting, 10 x 40 mm	AU2140
Cylinder, double acting, 10 x 80 mm	AU2280



## Tubing & connectors

Tubing is available in several colours, in bulk reels which are easily trimmed to length using the custom cutting tool. The connectors allow you to join lengths of tubing and create junctions.

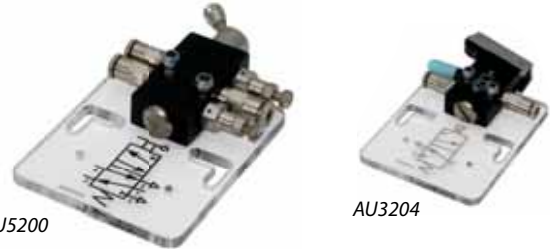
Description	Part number
Tubing, 4mm, blue, 30 m length	AU1072
Tubing, 4mm, yellow, 30 m length	AU1071
Tubing, 4mm, clear, 30 m length	AU1073
Tubing, 4mm, red, 30 m length	AU1070
Tube cutting tool	AU1080
Junction, equal tee	AU1030



## Essentials

These are the basic components needed to supply pressurised air to your pneumatic circuits - and a sturdy physical platform to anchor everything in place.

Description	Part number
Compressor	AU1050
Manifold	AU1010
Platform	AU1040
Tee-bolts and sleeves (pack of 50)	AU1060



## Valves - mechanical

These valves are operated mechanically by buttons, levers, rollers or air pressure. 3/2 valves control the flow from the source to a single destination. 5/2 valves allow the source to be switched between two destinations.

Description	Part number
Valve, flow control	AU3022
Valve, mini shuttle	AU3203
Valve, 3/2, button-spring	AU3200
Valve, 3/2, roller-spring	AU3204
Valve, 3/2, lever-spring	AU3202
Valve, 3/2, diaphragm-spring	AU3201
Valve, 5/2, lever-spring	AU5200
Valve, 5/2, pilot-pilot	AU5201



## Valves - electrical

These valves are operated by solenoids for control by discrete electrical circuits, or by the MIAC microcontroller unit.

Description	Part number
Valve, 3/2 solenoid-spring	AU6010
Valve, 5/2, double-solenoid	AU6015



## Reservoir

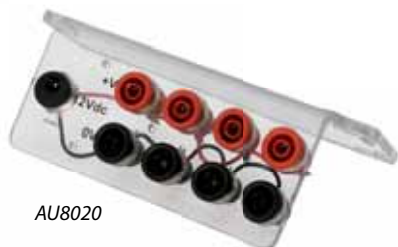
Create time delays in your pneumatic circuits by allowing pressure to gradually build up inside the reservoir.

Description	Part number
Reservoir 45cc	AU1020

# Automatics component guide



AU8030



AU8020

## Electrical

Everything you need to integrate electrical and electronic control into your pneumatic systems.

Description	Part number
Reed switch and holder	AU8025
Switch, push to make	AU8030
Microswitch	AU8015
Light sensor	AU8010
Power supply	HP2666
Power panel	AU8020
Lead, 4mm to 4mm, red	LK5603
Lead, 4mm to 4mm, black	LK5604
Lead, 4mm to 4mm, yellow	LK5607



MI0245

## MIAC

The Matrix Industrial Automation Controller (MIAC) is an integrated programmable microcontroller unit. Its features include :-

- 8 analogue or digital inputs
- 4 high current relay outputs
- 4 powerful transistor outputs (2 with PWM)
- 4 line, 16 column LCD display
- Keypad
- User programmable via USB
- Expandable via CAN communication bus
- Rugged ABS casing and shrouded 4mm sockets

You can design and upload your own custom programs for the MIAC using our Flowcode software.

Description	Part number
Cased MIAC with 4mm shrouded sockets	MI0245
MIAC controller	MI0235



HP6700



HP6785

## PLC adaptor modules

These adaptor modules fit onto a standard 50mm DIN rail and allow you to convert your own PLC to work easily with standard 4mm connectors and leads.

Description	Part number
PLC adaptor – input module	HP6700
PLC adaptor – power module	HP6711
PLC adaptor – motor module	HP6723
PLC adaptor – relay module	HP6752
PLC adaptor – mounting bracket	HP6785



AU9020

AU9010

## Solutions

Our starter kit provides sufficient kit and teaching materials to learn the fundamental principles of pneumatic systems. As your students become more confident, you can then supplement this with the electro-pneumatics and/or control add-ons.

Description	Part number
Automatics essentials solution	AU9020
Automatics electro-pneumatics add-on kit	AU9015
Automatics control add-on kit	AU9010