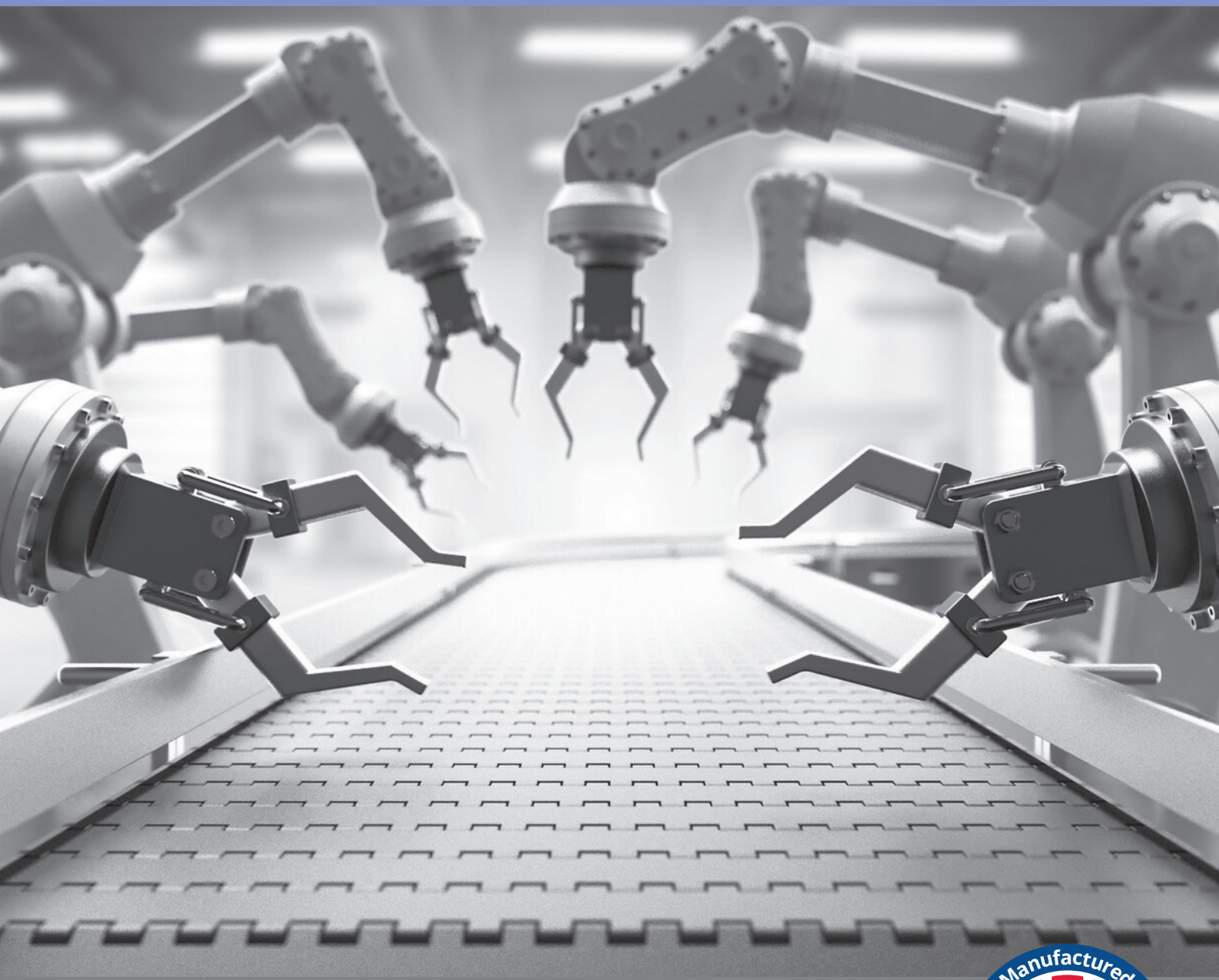
MATRIX

MANUFACTURING ENGINEERING



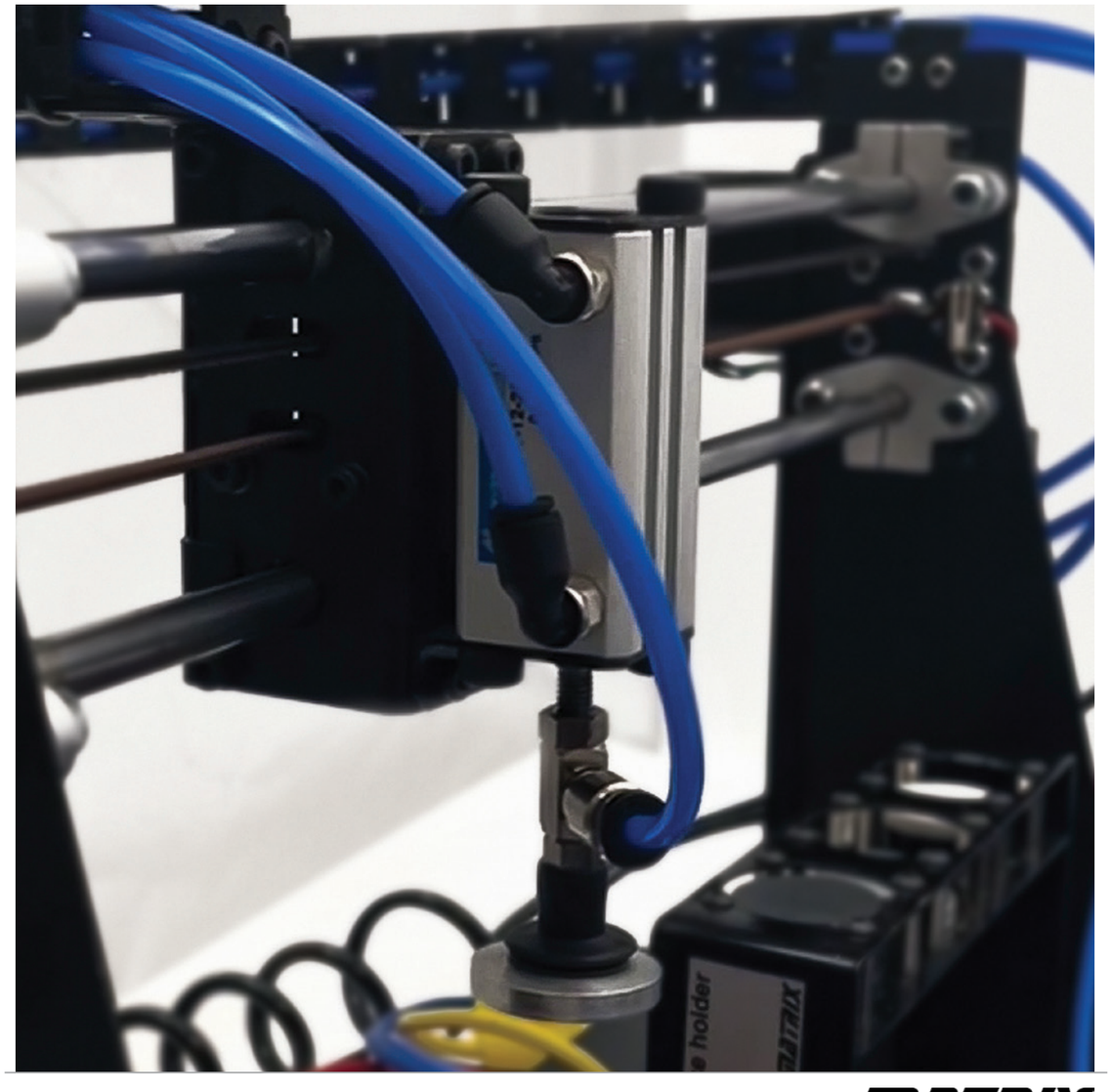
Excellence in education
for over 30 years

Manufactured 19 MATRIX 93 in the UK

www.matrixtsl.com

MANUFACTURING
ENGINEERING

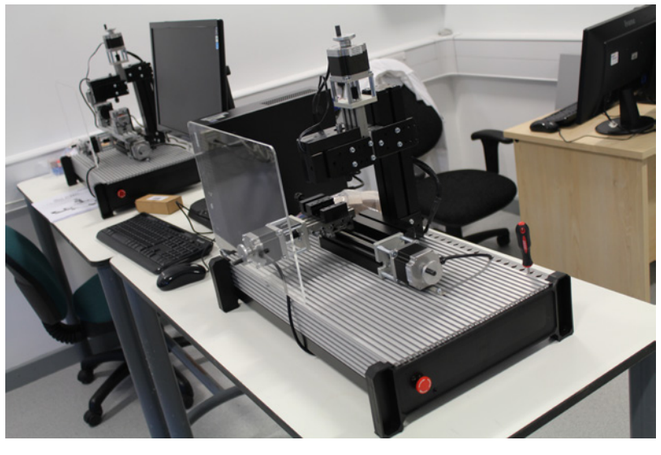
A core area of engineering for Matrix is Manufacturing. This range of products cover key principles of manufacturing in a learning and industrial environment. From automation and pneumatics to CNC machining through our revolutionary MicroCNC product range. We have low voltage solutions to teach key principles, or more advanced learning outcomes for your students. Furthermore, here you will also find our Industry 4.0 Smart Factory and Robotics products, which help students to develop critical thinking for real-world engineering scenarios using intuitive products.



REDCAR & CLEVELAND COLLEGE

"At Redcar and Cleveland College we are investing heavily in our engineering facilities and equipment. The region is seeing a growth in green energy and low carbon initiatives which we are preparing the next generation of engineers for.
Matrix were selected to supply the college with equipment to help our students understand the curriculum content needed for a successful future career in these sectors. Students have been enjoying using the Flowcode and E-blocks2 / AllCode circuits and software to develop understanding of automation and its place in a variety of industrial applications. Students will also be taking their hands-on practical workshop skills to the next level using the Matrix MicroCNC suite we have installed alongside the Electrical Machines equipment. We have been particularly impressed with the ready-made educational training packages that support the use of the equipment just as much as the kit itself."

Mike Reid BSc (Hons) QTS
Subject Lead for Engineering at RCC.



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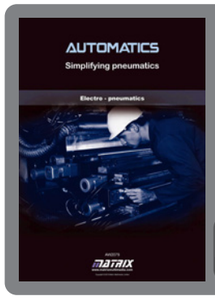
Range Coverage

www.matrixtsl.com/learning

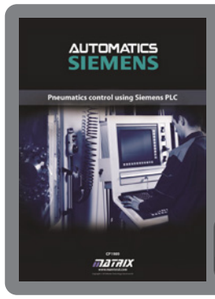
Pneumatics Essentials AW2080

Automatics Essentials Solution
AU9020



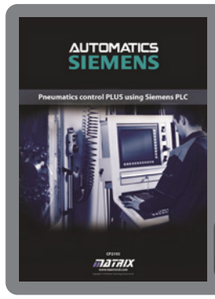
Electro-pneumatics AW2079

Automatics Electro-pneumatics Add-on
AU9015



Pneumatics Control Using Siemens PLC CP1989

Pneumatic Control with S7-1200 Siemens PLC Add-on
AU9077



Pneumatics Control PLUS Using Siemens PLC CP2193

Pneumatic Control with S7-1200 Siemens PLC Add-on
AU9077

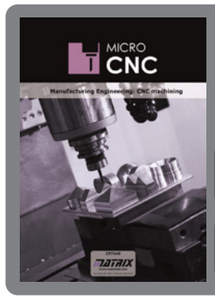
Smart Factory CP7329

Smart Factory
AU4956

Siemens S7 PLC with HMI
AU0205

Robot Arm Development 2 CP5390

Robot Arm Production Cell V2
RB1387



CNC Machining CP7449

MicroCNC System Controller and Base Plate
CN4079-V2

Complete MicroCNC Set
CN3885

Process Control Systems CP3720

Flow Control System
CT0673

Level Control System
CT5971

Temperature Control System
CT1491

Servo/Pendulum Motor Control System
CT9513

Pressure Control System
CT1733

LEARNING CENTRE

Enter the product code on the learning centre to find the curriculum

PRODUCT NAME
PRODUCT CODE

All solutions from Matrix come with a full free curriculum. This is easily accessed from our Learning Centre on the website and includes full student worksheets and teachers notes.

LEARNING CENTRE

SCAN TO VISIT LEARNING CENTRE

Our sales team are available to speak to you

Call or email us now

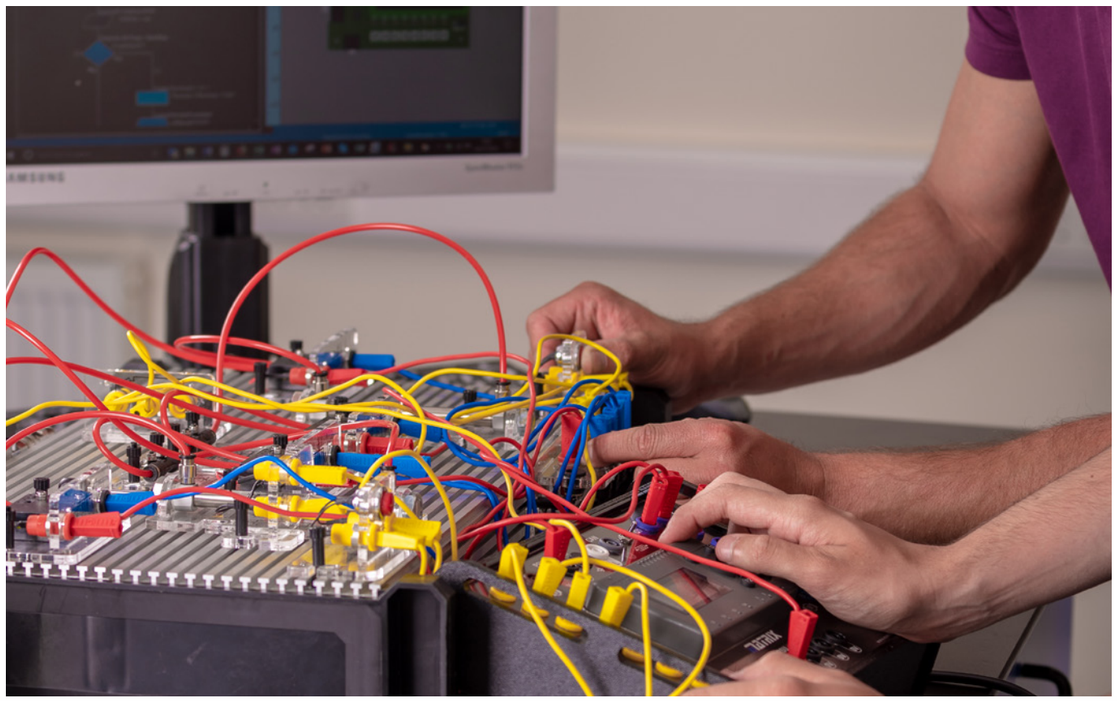
+44 (0) 1422 252 380

sales@matrixtsl.com

www.matrixtsl.com

AUTOMATICS

Automatics is a range of products that simplifies the process of teaching and learning about pneumatic and automation systems. The Automatics range has been designed to suit the classroom environment. The pneumatic components are identical to those used by real engineers, but have been cleverly adapted so that students can construct automation systems speedily and without tools. There are around 30 separate rugged components in the range, each one mounted on a clear acrylic carrier which is marked with the appropriate pneumatic or electrical symbol. Students mount the components on to the stable aluminium platform using plastic 'tee' bolts and connect the components together with nylon tubing to build working pneumatic circuits.



Why choose Automatics:

- Makes learning easier
- Rugged and reliable
- Integrate Pneumatics & Control
- Covers a range of subject areas
- Extensive free curriculum
- Range of individual components
- Sturdy storage for solutions
- Minimal assembly required

Automatics Essentials Solution AU9020

This kit provides a complete introduction to pneumatic circuit design and construction. The curriculum pack includes a comprehensive set of worksheets that allow students to progress from first principles through to circuits of moderate complexity; including reciprocating circuits and generating sequences of movements.

The solution is intended for students in their early teens and older who are learning technology and engineering subjects. Tasks are designed to be suitable for pairs of students sharing a single kit.

Everything you will need to teach the course is included in the solution pack, with the exception of an air compressor.

Requires Compressor **AU1050 (US and EU versions also available)**

LEARNING OBJECTIVES & EXPERIMENTS:

- Understanding the different varieties of valves and where each is appropriate in a system
- Understanding the basic types of cylinder, controlling speed and the factors that influence power output
- Combining valves to produce logic functions
- Semi-automatic and automatic reciprocation
- Creating sequences of movements
- Using reservoirs to create time delays
- Air bleed and pilot operated circuits
- Component symbols and circuit diagrams
- Staying safe when using air at high pressure

SCAN TO VISIT PRODUCT PAGE

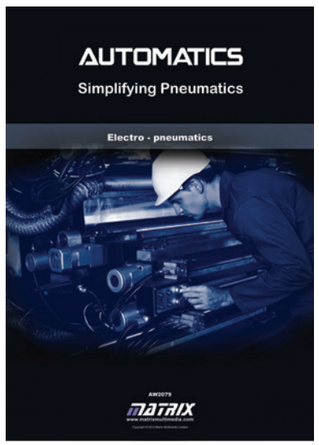
AUTOMATICS | SMART FACTORY | ROBOT ARM | PROCESS CONTROL | MICRO CNC | INDUSTRIAL

Electro-pneumatics add-on kit AU9015

This kit supplements the Automatics essentials solution by adding a selection of electrically operated valves and a range of sensors. By following the curriculum, students will learn how to use these new components to create systems in which pneumatics and electrical circuits are combined into complete systems.

The electrical components are connected together quickly and reliably using 4mm connectors, for which all of the necessary leads and accessories are provided. Electrical components are robustly mounted to the Automatics platform using the same 'tee' bolt system used for the pneumatic parts and are printed with standard circuit symbols.

Working two to a kit, students follow the detailed worksheets to gain a comprehensive understanding of electro-pneumatics. By the end of the course, students will be able to create reciprocating and sequential circuits, and will have an understanding of how these are used to solve real world engineering problems.



LEARNING OBJECTIVES & EXPERIMENTS:

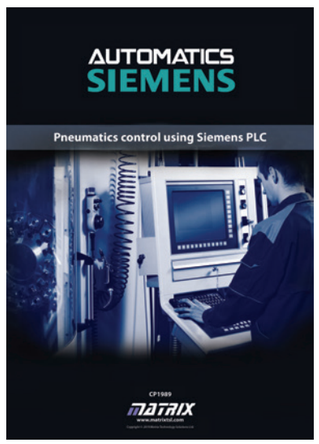
- Understand the operation of electrically controlled pneumatic valves
- Use of electrical switching to control circuit operation
- Using microswitches to sense cylinder position
- Sensing position without physical contact using reed switches
- Expressing electrical circuits using ladder diagrams
- Electrically operated reciprocal circuits
- Sequential control circuits
- Analysing real world problems and formulating solutions

SCAN TO VISIT PRODUCT PAGE

Pneumatics Control with S7-1200 Siemens PLC add-on AU9077

This kit can be added to the Automatics essentials solution to produce learning outcomes for those wishing to study about rugged, industrial PLCs. By following the provided curriculum, students will learn how the combination of a rugged Siemens industrial controller and related software can create powerful and flexible pneumatic systems. Students will learn how to establish the state of a pneumatic machine using sensors, the use of logic to process that data and the issuing of commands to the included solenoid valves.

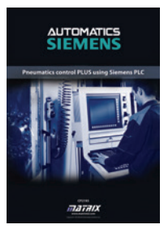
Two versions of the curriculum are supplied. In the first, students use pre-programmed control systems supplied in the Siemens S7-1200's built in memory. A more advanced course, Control plus, teaches students how to write their own programs for the PLC.



SIEMENS

LEARNING OBJECTIVES & EXPERIMENTS:

- Reading sensors and switches
- Issuing commands to the pneumatic circuits
- Learning the difference between digital and analogue signals
- Using flowcharts to visualise programs
- Program flow and decision making
- Programming sequences
- Programming industrially rugged programmable logic controllers PLC
- Using feedback to enhance reliability and improve safety



SCAN TO VISIT PRODUCT PAGE

Pneumatics with your own PLC

We are now able to supply pneumatics training equipment which can be used with any PLC with the Automatics PLC adaptor rail. The Adaptor rail allows students to connect to relay and motor outputs using standard 4mm connectors which connect directly to other Automatics components. This pack combines standard pneumatics components with Control pneumatics components to provide a complete learning platform for pneumatics and PLC programming in one package. A PLC is not included. Any programming language - including ladder logic - can be used. Worksheets are based on flow charts. PLC adaptor modules included: power distribution, inputs (8), motor outputs (8), relays (4). There are several PLC options available

Siemens S7 with Matrix Expansion Boxes

Siemens S7 is a popular choice for industrial control. 4mm connector add-ons for Siemens PLC are available. Siemens input – outputs start numbering from 0. Not all S7's have relays – please see available models.

Metal Base
MET1122 (Includes Gromets)

Input Module
HP8042

Motor Module
HP7035

Relay Module
HP4237

Power Module
HP6711

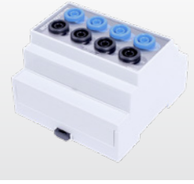
Other PLC's with Matrix Expansion Boxes

There are many other PLC's with input – output numbering starting at 0 or 1, with different numbers of onboard motor outputs, relays etc. Make sure that you have the correct input – output modules for your PLC. 4mm interfaces are also available.

Metal Base
MET1122 (Includes Gromets)

Input Module
HP6700

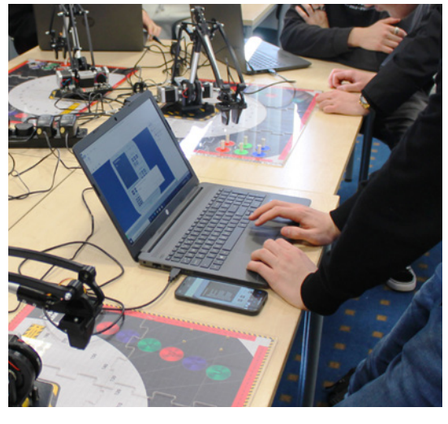
Motor Module
HP6723



Relay Module
HP6752

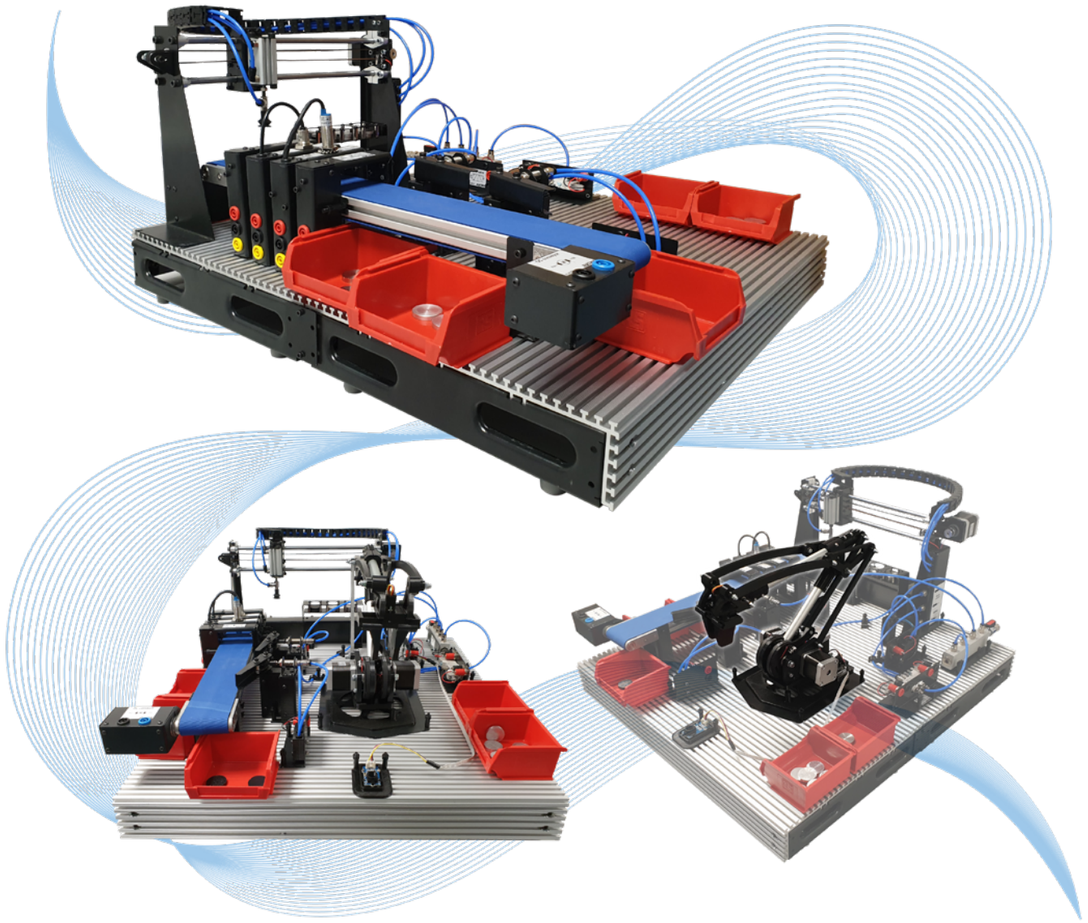
Power Module
HP6711

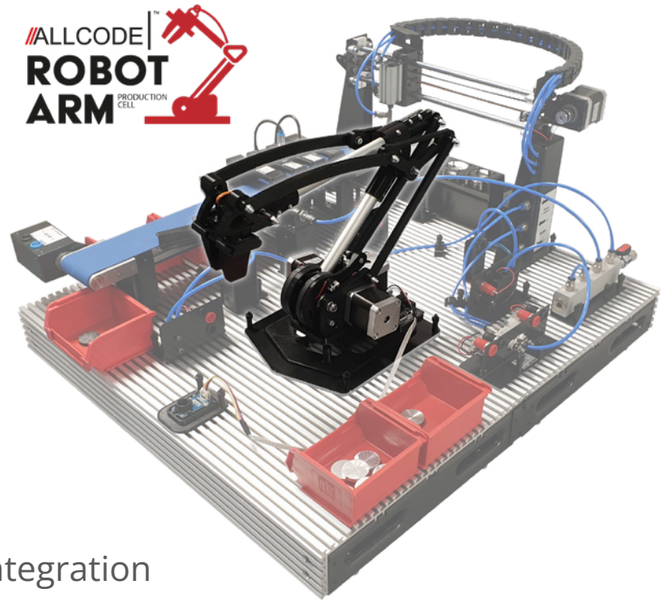
> " At York College we invested in various equipment across many ranges. The Matrix Allcode Robot Arm is the perfect tool to compliment our new Institute of Technology Manufacturing Centre. Students obtain first hand experience in controlling the movements and activities of a robot arm similar to those widely used at manufacturing companies across Yorkshire. Starting with the simplest method of control using G code and a virtual pendant, each student develops a programming sequence as required in Industrial Robot Technology within the Advanced Manufacturing Engineering qualification. Our students then take this knowledge and progress on to level 4 / 5 qualifications, and of course, learn more about robotic control using other programming languages, in which they will be attempting to control an industrial robot arm on our new manufacturing line simulation. The Matrix Allcode Robot Arm provides the perfect solution to understanding robot control within a very enjoyable learning experience whilst in a very safe environment."
>
> *Tony Pollard, York College, United Kingdom*



SMART FACTORY

The Automatics Smart Factory allows students to get the experience of a number of processes and technologies commonly used in manufacturing and modern-day industry 4.0 principles. This includes conveyor systems, sensing systems, pneumatic pick and place technology, DC motor drivers and stepper motor drivers. The factory includes coloured discs made from plastic and other materials. A conveyor belt moves these pieces into the factory, where user programmed sensors sort the discs into multiple rejection bins. Some are picked off the conveyor by a suction device and a stepper motor controlled gantry sorts the discs into appropriately coloured containers. The smart factory can be used with Siemens (or other brand) 12V or 24V PLC.

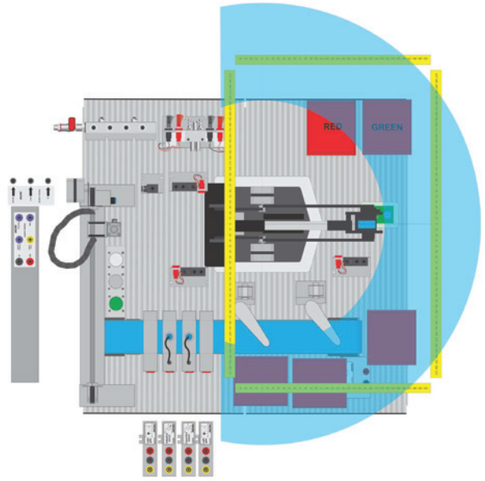




Robot Arm Integration

The Smart Factory is compatible with the AllCode robot arm production cell. This can be added to provide a powerful Industry 4.0 learning solution. By introducing a programmable robot arm, that acts in the same way as an industrial robot, users can take their learning a step further.

The robot arm production cell can be programmed from any Bluetooth or Wi-Fi supporting programming language including Flowcode, MATLAB or LabVIEW and many others. Flowcode allows users to use G codes and a pendant as though in a real factory environment.

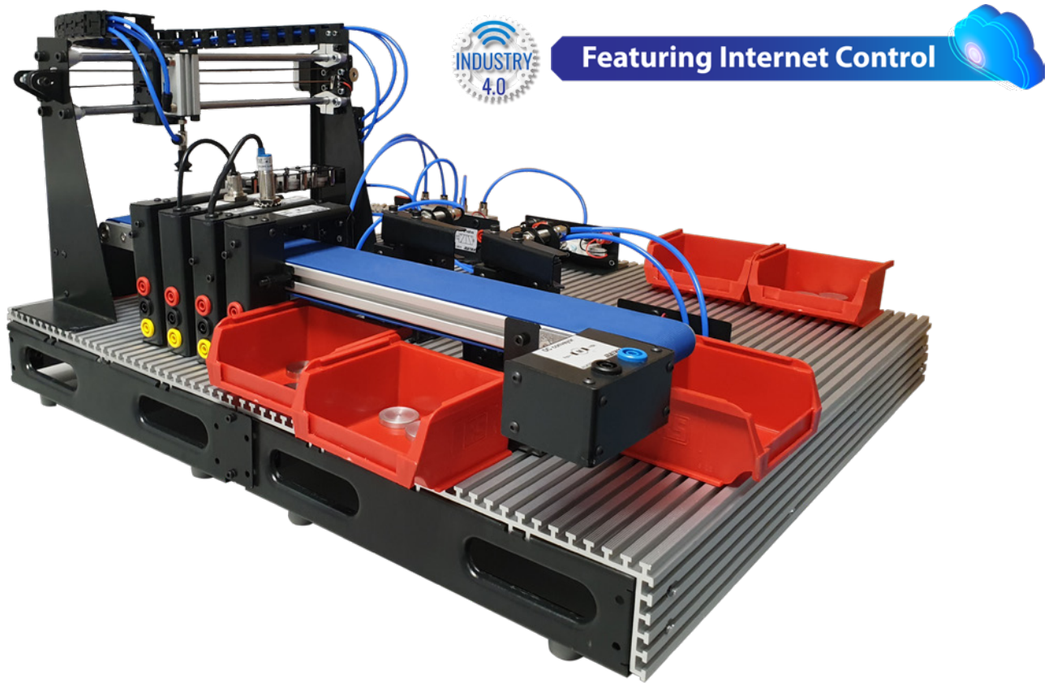


Students create a counter sorting program in which the Robot Arm will collect plastic counters and using the colour sensor, they are sorted into appropriate collection bins. The system can be operated manually or using internet communications, students can implement a handshaking system to automate the process.

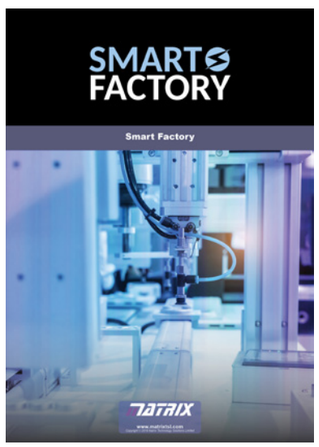
The full working smart factory system, including the robot arm takes all parts of the system and combines them in to a powerful learning tool for Industry 4.0 study. At this point, the students are able to see the PLC controlling the gantry, conveyor and the robot arm system all working in cohesion.

Smart Factory AU4956

The Smart Factory curriculum is split into four key areas: the conveyor system, the gantry system, the robot arm system and the overall system integration. The benefits of our modular system are that students can work in small groups on each section of the curriculum before then bringing the whole system together. To complete the tasks students are expected to have an understanding of Siemens software and programming PLC's. The Smart Factory can also be programmed in unison with other Smart Factories, off loading counters between multiple set ups



Requires Compressor **AU1050 (US and EU versions also available)**



LEARNING OBJECTIVES & EXPERIMENTS:

- Factory control and automation systems
- Software design for automation
- DC motor and stepper drives
- Conveyor and gantry systems
- Vacuum pick and place systems
- Component sensing and sorting
- System design with more than one controller (some systems)
- Robot arm workspace planning
- Robot arm workcells
- Robot arm pendant programming
- Robot arm G code programming
- Robot arm programming – other languages

SCAN TO VISIT PRODUCT PAGE

Siemens S7 PLC with HMI and 4mm Connectors AU0205

The Siemens S7 PLC with HMI unit provides a 4mm connected interface between the S7 and your PC in a rugged plastic case. The S7 is fitted with a S7-1214C PLC which provides 10 inputs and 10 transistor outputs and a Siemens KTP 400 Series Touch Screen HMI - 4.3 in, TFT Display, 480 x 272pixels. The S7 is programmed from your PC using either a CAT 5 cable (provided) or Wi-Fi. A Telonika RUT950 high-performance industrial 4G LTE Wi-Fi router is included in the box – this allows you to program the unit by Wi-Fi and interface to other IP connected systems as part of Industry 4.0.

KEY FEATURES

- Siemens S7 PLC
- Wi-Fi router
- 4mm connector inputs outputs
- 24V power supply included **HP9113**

Requires **Siemens SIMATIC Step 7 software**

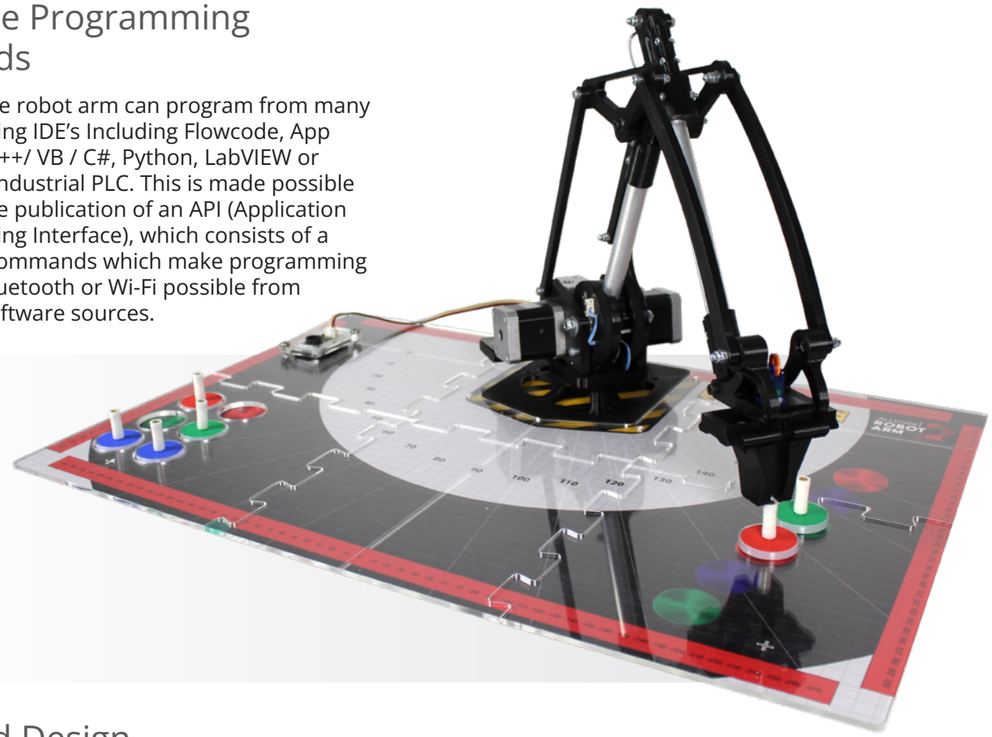
ALLCODE™ ROBOT ARM PRODUCTION CELL

Robot Arm

The robot arm production cell consists of a rugged stepper motor controlled 3 degrees of freedom arm bolted to a base plate and supplied with an activity mat that provides a range of exercises to replicate an industrial robot arm. The free instructional guide includes worksheets in pendant, G code, API and microcontroller programming, sensors and actuators, kinematics and more. The user can connect the robot arm production cell to their hardware platform – Windows PC, Android mobile, Raspberry Pi/Linux device using USB, Bluetooth or Wi-Fi technology.

Multiple Programming Methods

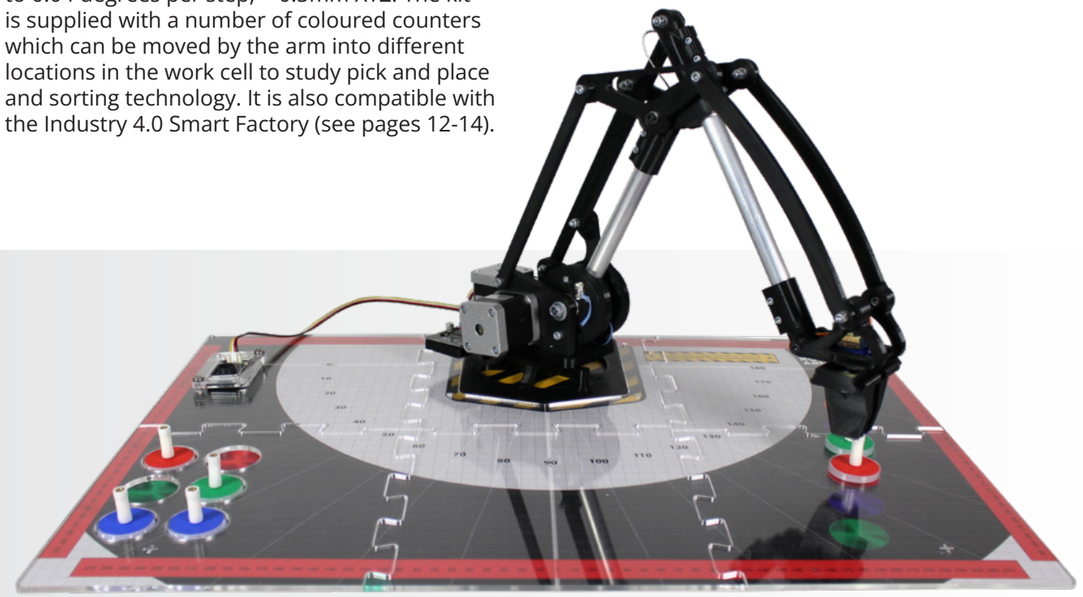
Users of the robot arm can program from many programming IDE's Including Flowcode, App Inventor, C++/ VB / C#, Python, LabVIEW or their own industrial PLC. This is made possible through the publication of an API (Application Programming Interface), which consists of a library of commands which make programming via USB, Bluetooth or Wi-Fi possible from multiple software sources.

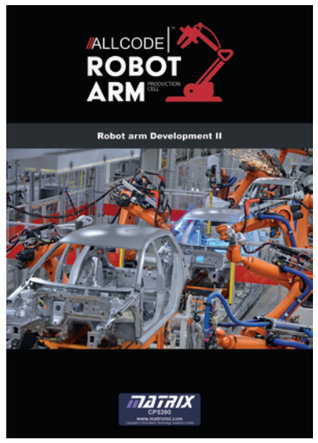


Refined Design

The mechanics of the arm are designed to maximise the payload (the amount the arm can lift). This is achieved by placing the heavy motors on the base platform and by using a system of levers and cogs to allow the arm to move with great precision within its range of motion.

With base, shoulder and elbow rotation and functional gripper, the arm itself delivers fast, accurate and repeatable movement. The stepper motor driven arm delivers an accuracy to 0.04 degrees per step, < 0.5mm XYZ. The kit is supplied with a number of coloured counters which can be moved by the arm into different locations in the work cell to study pick and place and sorting technology. It is also compatible with the Industry 4.0 Smart Factory (see pages 12-14).





LEARNING OBJECTIVES & EXPERIMENTS:

- Robot cell designing and programming
- Robot arm pendant programming
- Robot arm G code programming
- Robot arm programming – microcontrolelrs
- Sensors and actuators in robotics
- Kinematics: 3D movement in robotic systems
- Web based control
- Programming in many languages

Siemens compatible with Siemens focussed curriculum available

SCAN TO VISIT PRODUCT PAGE

PROCESS CONTROL

The Modern Process Control system from Matrix, allows students to investigate the principles of industrial process control, using independent Temperature, Pressure, Flow, Level based and Servo Pendulum systems.
With a common controller for all applications, the advanced 16 bit dsPIC processor with operating system, comes equipped with USB, Wi-Fi Bluetooth and LAN communications. Once set up the system can run independently and does not require a PC connection. Data can be viewed on the internal graph or saved to a file for later analysis and comes ready to plug in for 110 – 240V operation.
Full documentation is supplied with the units, including a manual for the equipment and a curriculum workbook, which guides students through the use of Process control systems and the Control function. Transfer functions can be studied using MATLAB or equivalent software.

Why choose Process Control:

- Portable solution with carry handles
- Integrated digital electronics
- MATLAB / LabVIEW compatibility
- Internet control integrated
- Safe, low voltage
- Free curriculum worksheets and instructor guide

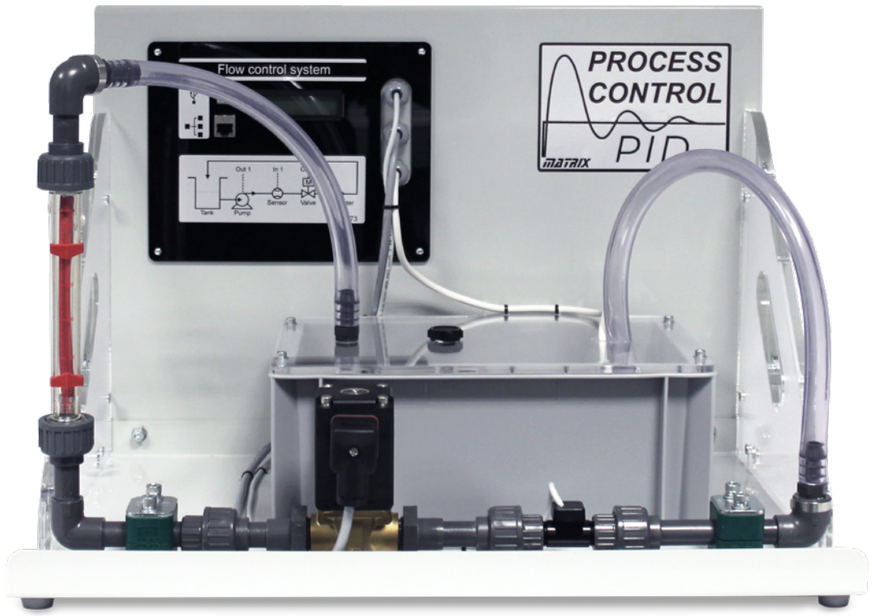
> "The design of the instruments, as well as the software, were easy to understand and work with. I like the idea of providing standalone units for each process variable, which enables the instructor and students to work on multiple activities simultaneously. Moreover, providing individual software for on/off and automatic control helps with understanding the instrument control for freshman students with little to no experience in instrumentation. We will definitely use the Matrix products in the Instrumentation course in upcoming semesters."
> *Dr Atashbari*
> *Program Coordinator at the Southern University at Shreveport (SUSLA)*

> "I feel that the MPC has prepared me for the future by allowing me to use instruments that I normally wouldn't get to use until I'm in the workforce. I would describe my overall experience as adventurous. I have learned many new things that I would have never imagined. Both my professor and the MPC have helped me grow tremendously in one semester."
> *Student*

> "My experience using the Matrix Process Controls for the first time was very informative. The control systems gave me a better hands-on understanding of how process equipment works instead of just a visual aid from a textbook. I was able to conduct several labs with the equipment, and it taught me a lot of things dealing with pressure, flow, temperature, and level. I feel I am better prepared to move on to other courses dealing with process technology and later in my professional career."
> *Julius*
> *Student*

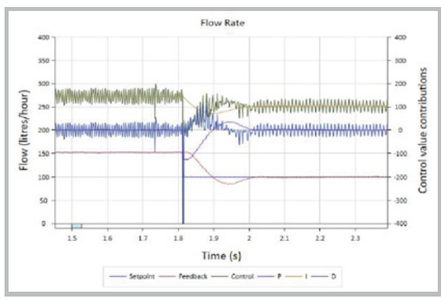
Flow Control CT0673

The Flow system consists of a water tank, variable speed pump, a turbine type flow sensor, an electrically operated proportional valve and a variable area flow meter (rotameter). This allows students to adjust the flow rate via the pump speed and the valve opening to develop a PID based control system.



LEARNING OBJECTIVES & EXPERIMENTS:

- Understanding the drive
- Understanding the sensors
- On/Off control systems
- System time constant
- PI controller
- PID controller
- Zeigler Nichols algorithm
- Integral wind up
- Derivative filter
- Manual tuning

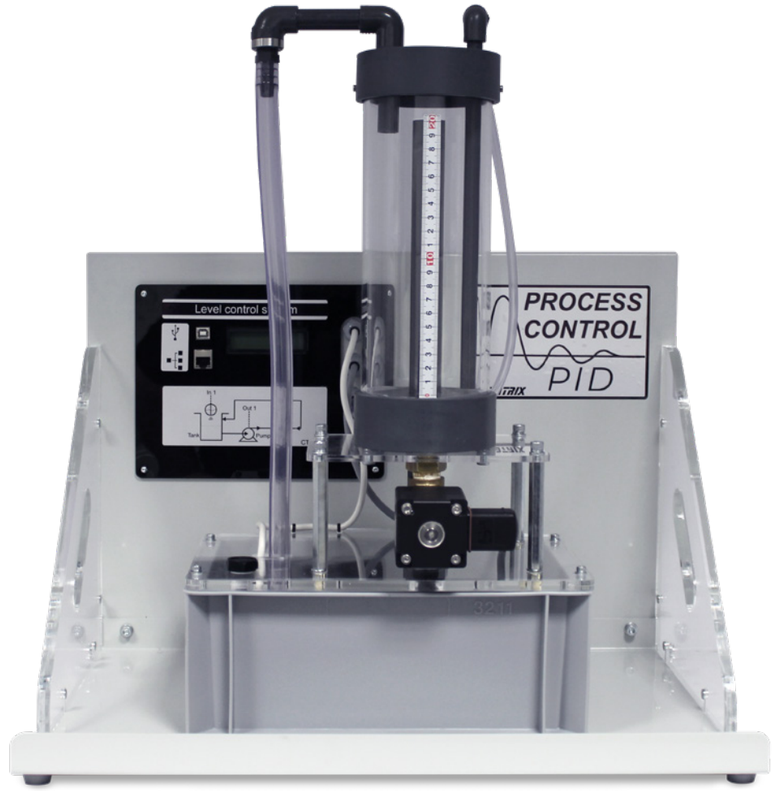


Zeigler Nichols PID Classic Setting

SCAN TO VISIT PRODUCT PAGE

Level Control CT5971

The Level system consists of a reservoir water tank, a variable speed pump, a pressure-based level sensor, and clear process vessel with a scale. A proportional valve provides the process vessel drain. An overflow pipe in the process vessel prevents it being overfilled and the system allows students to adjust the pump speed and valve opening.



LEARNING OBJECTIVES & EXPERIMENTS:

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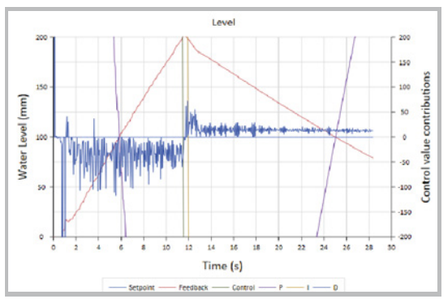
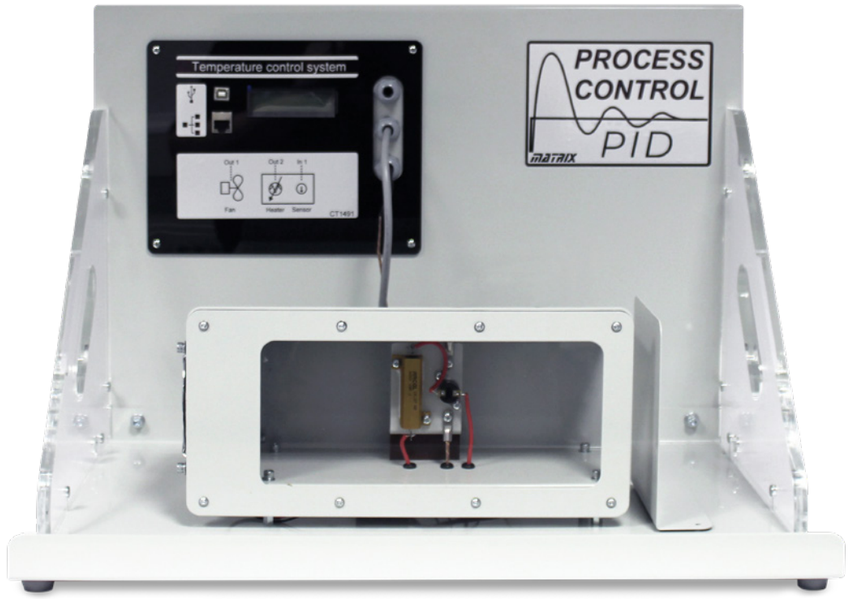


Zeigler Nichols PID Classic Setting

SCAN TO VISIT PRODUCT PAGE

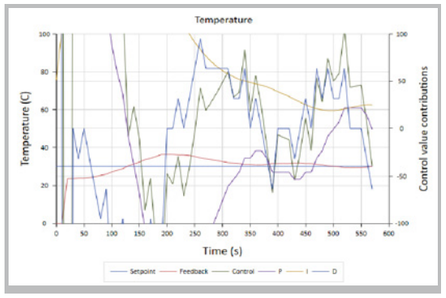
Temperature Control CT1491

The temperature process control system includes a heated plate within a duct and a thermocouple. A fan at one end of the duct blows ambient air over the block, to change the control conditions and provide a disturbance to the system. The system allows students to adjust the heater power and the air flow rate to develop a PID based control system then adjust these parameters to achieve the required time/temperature change profile for the system in response to step changes in system requirements.



LEARNING OBJECTIVES & EXPERIMENTS:

- Understanding the drive
- Understanding the sensors
- On/Off control systems
- System time constant
- PI controller
- PID controller
- Zeigler Nichols algorithm
- Integral wind up
- Derivative filter
- Manual tuning

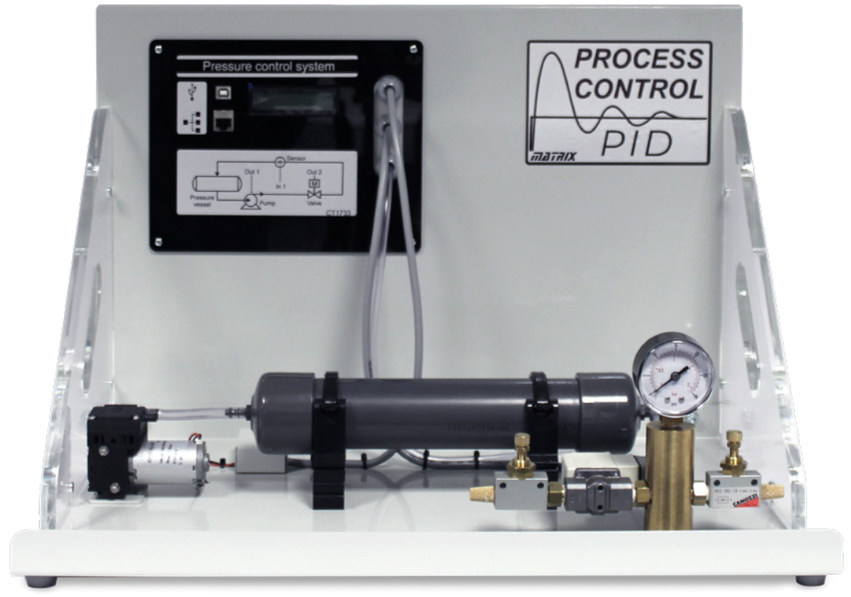


Zeigler Nichols PID Classic Setting

SCAN TO VISIT PRODUCT PAGE

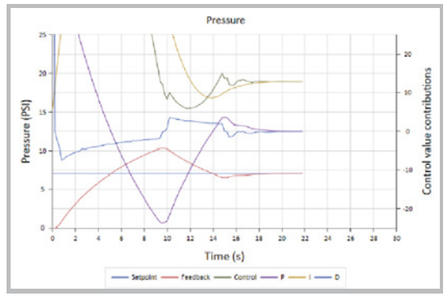
Pressure Control CT1733

The Pressure system consists of a variable speed reciprocating air pump (compressor), the speed of which can be adjusted by students, a pressure vessel and an outflow system. The outflow system allows the air to escape via either a manually operated needle valve - providing an ongoing outflow, or via a solenoid valve and second needle valve - providing a step change in outflow. The vessel pressure is measured by a Bourdon type mechanical gauge along with a pressure sensor. The Bourdon gauge provides a visual indication of the pressure in the vessel and a means for students to check and calibrate the controller input from the pressure sensor.



LEARNING OBJECTIVES & EXPERIMENTS:

- Understanding the drive
- Understanding the sensors
- On/Off control systems
- System time constant
- PI controller
- PID controller
- Zeigler Nichols algorithm
- Integral wind up
- Derivative filter
- Manual tuning



Zeigler Nichols PID Classic Setting

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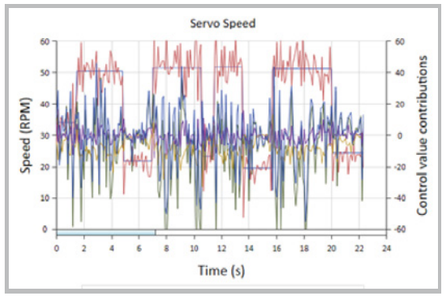
Motor Control

CT9513

The system consists of a powerful DC motor mounted on a rugged frame. A disc with captive nuts is attached to the DC motor and students are able to screw in 100-gram weights to different parts of the disc to alter the characteristics of the system. A single weight at 0 degrees forms an inverting pendulum.

LEARNING OBJECTIVES & EXPERIMENTS:

- Understanding the drive
- Understanding the sensors
- On/Off control systems
- System time constant
- PI controller
- PID controller
- Zeigler Nichols algorithm
- Integral wind up
- Derivative filter
- Manual tuning
- Servo pendulum - angle control



Zeigler Nichols PID Classic Setting

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MICRO CNC

Our MicroCNC range of machines are low voltage, easy to store and cost-effective, allowing students to work in small groups to prototype their designs and learn key machining concepts. The robust range is a great introduction to manufacturing engineering principles. The MicroCNC system controller and base plate allows the user to control our machines using a variety of software packages. After creating designs using CAD software, including Solidworks, the user converts their design into G code. The machine components are secured to the base plate quickly and easily, to provide a solid and tidy machine which can easily be put away for storage.
The complete MicroCNC set enables users to easily create any one of the three machines in our range, meaning teaching of manufacturing engineering technologies is made easier than ever.

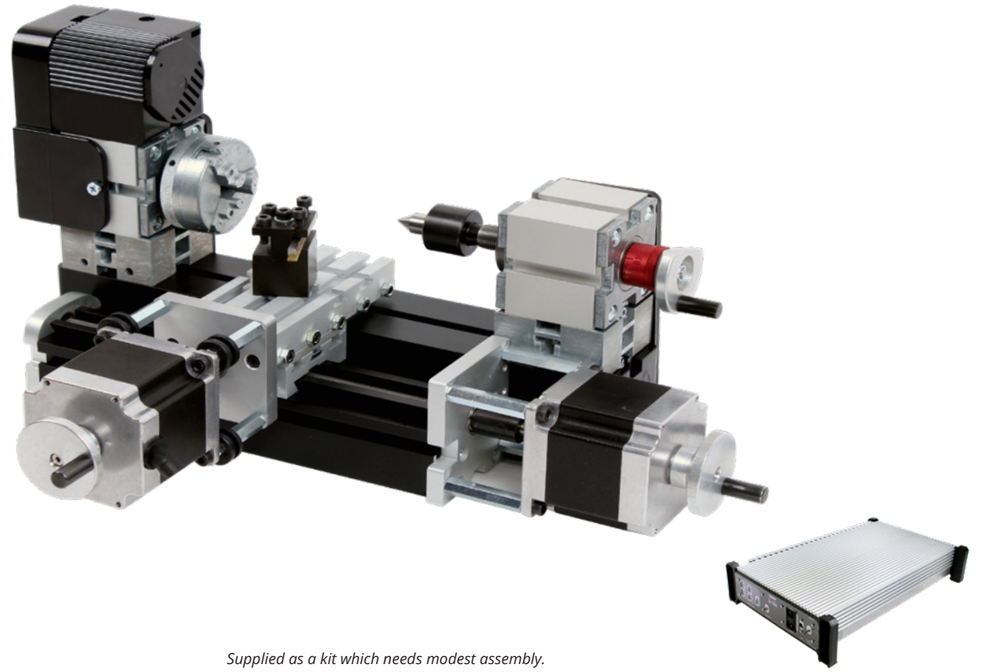
Why choose MicroCNC:

- Compact and easily stored
- Designed for students to work in small groups
- Learn key principles of CNC machining and prototype easily
- 2-axis lathe and 3 and 4-axis milling machines
- Construction of a range of CNC machines
- Includes software to easily convert your CAD designs

2-axis MicroCNC Lathe CN2668

The 2-axis MicroCNC lathe allows students to understand how G codes are used to control a CNC lathe. The two stepper motors and DC motor connect to our CNC system controller hardware to allow full control of the lathe using the G code file host software. Students can use the hardware and lathe to see how each G code command affects the lathe operation and they can create complex work pieces from wax cylinders.

This kit is stored in our standard plastic storage tray and can be assembled in minutes.



Supplied as a kit which needs modest assembly.
You will also need: MicroCNC system controller and base plate

Requires Baseplate **CN4079-V2**

LEARNING OBJECTIVES & EXPERIMENTS:

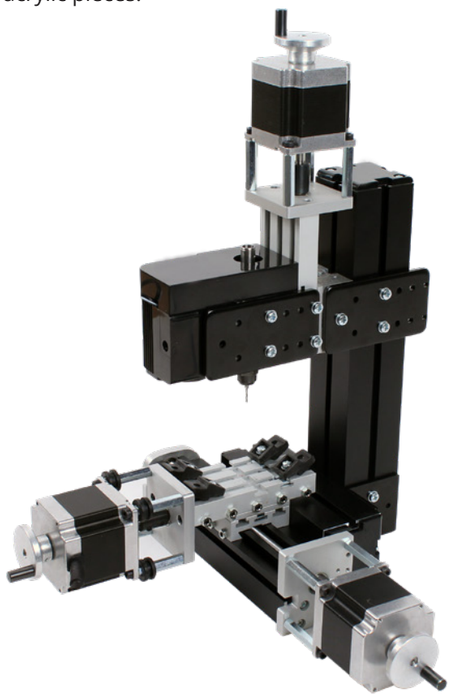
- Lathe construction and operation
- Simple G and M code protocol
- CNC machine operation using G codes
- Creation of milled parts using CNC technology

SCAN TO VISIT PRODUCT PAGE

AUTOMATICS | SMART FACTORY | ROBOT ARM | PROCESS CONTROL | MICRO CNC | INDUSTRIAL

3-axis MicroCNC Milling Machine CN4234

The 3-axis MicroCNC milling machine allows students to understand how G codes are used to control a CNC operated milling machine. The three stepper motors and DC motor connect to our CNC system controller hardware to allow full control of the miller using the G code file host software. Students can use the hardware and software to see how each G code command affects the machine operation and create complex work pieces from polyurethane blocks or acrylic pieces.



Supplied as a kit which needs modest assembly.
You will also need: MicroCNC system controller and base plate

Requires Baseplate **CN4079-V2**

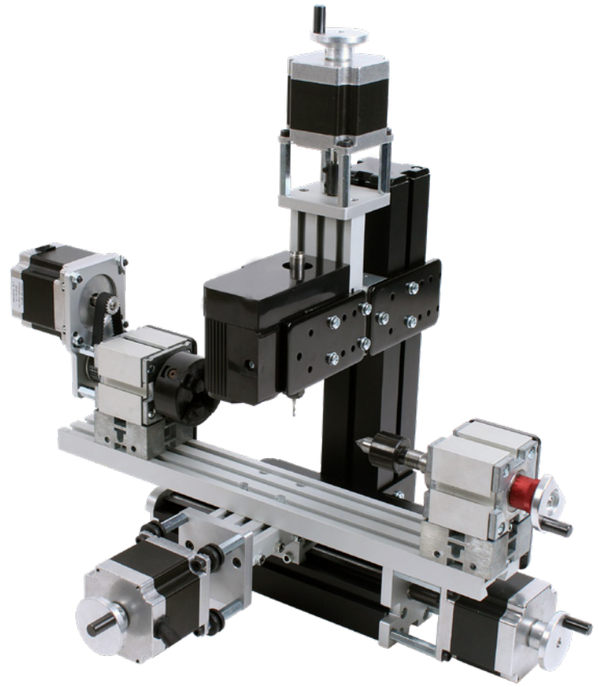
LEARNING OBJECTIVES & EXPERIMENTS:

- 3-axis CNC machine construction
- Simple G and M code protocol
- CNC machine operation using G codes
- Creation of milled parts using CNC technology

SCAN TO VISIT PRODUCT PAGE

4-axis MicroCNC Milling Machine CN8285

The 4-axis MicroCNC milling machine allows students to understand how G codes are used to control a CNC operated milling machine. The four stepper motors and DC motor connect to our CNC system controller hardware to allow full control of the miller using the G code file host software. Students can use the hardware and software to see how each G code command affects the machine operation and create complex work pieces from polyurethane blocks or acrylic pieces.



Supplied as a kit which needs modest assembly.
You will also need: MicroCNC system controller and base plate

Requires Baseplate **CN4079-V2**

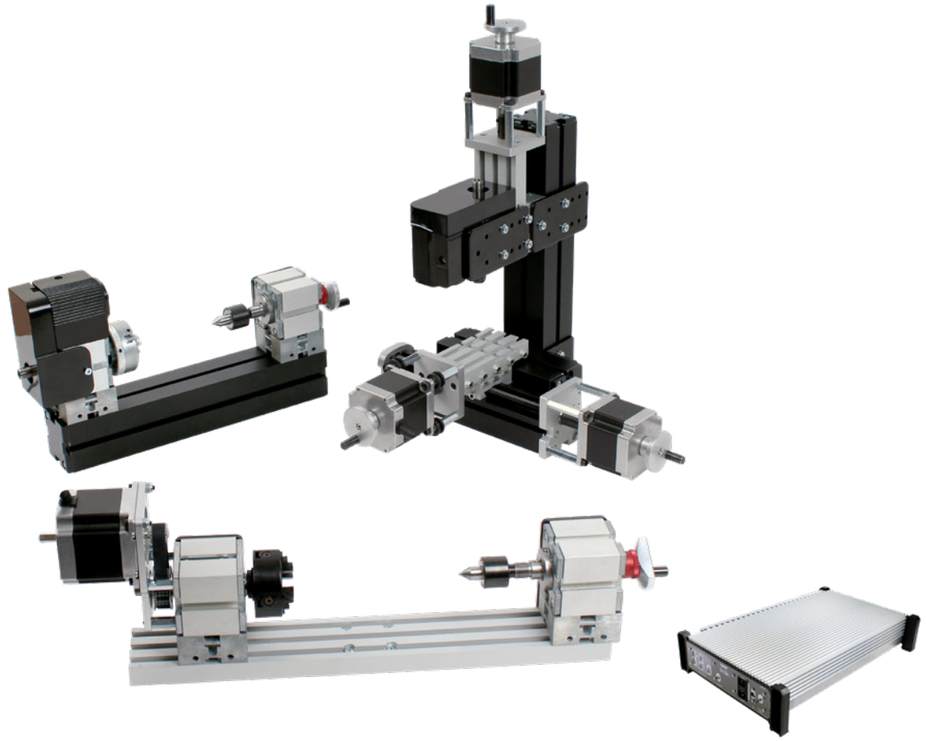
LEARNING OBJECTIVES & EXPERIMENTS:

- 4-axis CNC machine construction
- Simple G and M code protocol
- CNC machine operation using G codes
- Creation of milled parts using CNC technology

SCAN TO VISIT PRODUCT PAGE

Complete MicroCNC Set CN3885

This kit of parts allows students to assembly all four of our MicroCNC machines (only one at any one time). The kit is supplied with all necessary parts and is shipped with a full manual describing how each machine can be assembled. When combined with our system controller and base plate, students can then program each machine to manufacture parts in wax, acrylic and polyurethane blocks using G code editor supplier.



Requires Baseplate **CN4079-V2**

LEARNING OBJECTIVES & EXPERIMENTS:

- Construction of a range of CNC machines
- G and M code commands and CNC programming
- Manufacturing a part using a G code editor
- Design of parts using a 3D package
- Manufacture of parts using a CAD

CAM tool chain

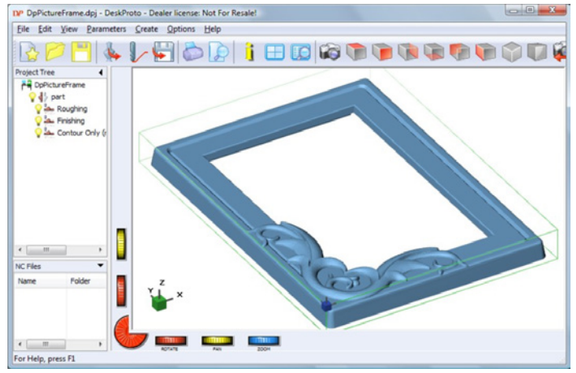
SCAN TO VISIT PRODUCT PAGE

Deskproto CAM Software CN3075

Whilst our CAD/CAM simulation software can produce G code files from very simple shapes, the Deskproto software takes this function to the next level. Deskproto can import STL files from any 3D CAD program, calculate CNC toolpaths and then write a G code program file for any brand of CNC milling machine - 3-axis, 4-axis or 5-axis. Deskproto is used by a wide variety of industrial companies as well as educational institutions.

This software is compatible with Solidworks, AutoCAD and other CAD packages.

Compatible with 3-axis milling machine, 4-axis milling machine and the complete MicroCNC set



Deskproto site also available **CN2498**

SCAN TO VISIT PRODUCT PAGE

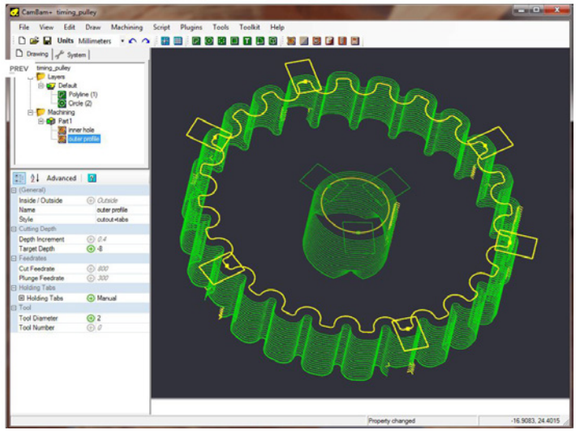
CamBam Software CN8332

CamBam is an application to create CAM files, G code, from CAD source files or its own internal geometry editor and has many users worldwide from CNC hobbyists to professional machinists and engineers.

CAMBAM CURRENTLY SUPPORTS

- Reading from and writing to 2D DXF files
- 2.5D profiling machine operations with auto-tab support
- 2.5D pocketing operations with auto island detection
- Drilling (Normal, Peck, Spiral Milling and Custom Scripts)
- Engraving
- True Type Font (TTF) text manipulation and outline (glyph) extraction
- Conversion of bitmaps to heightmaps
- 3D geometry import from STL, 3DS and RAW files
- 3D surfacing operations
- Extendable through user written plugins and scripts

Compatible with 2-axis lathe and the complete MicroCNC



CamBam site also available **CN2171**

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Advanced CNC Machines and Lasers

Whilst our MicroCNC trainers are perfect for teaching the fundamental principles of CNC machining, we understand that they can be effectively complimented by higher level, industrial machines for CNC training and other manufacturing techniques. This allows students to not only gain understanding of the fundamentals, but go more in depth with training on the use of other, more industrial materials and more. The range on the following pages features CNC routers, CNC lathes, CNC Machining centres and laser cutters. This allows students who have moved on from an intermediate level to explore their subject on a more industrial scale.

CNC Routers

This range of 3-axis CNC high performance routers are ideally suited to fulfil all levels of education and training requirements, as well as a host of design and commercial applications. Manufactured in the UK, the rigid machine construction, incorporating high quality precision components, facilitates the use of high material removal strategies, giving a component throughput that lower quality machines of lighter construction cannot match.

CNC Router A3HSRmi2

CNC Router A3HSRmi2 Ex

Bench top CNC routers suitable for machining hardwood, softwood, manufactured boards, plastics, other synthetic materials, aluminium alloys and brass.

Extended capacity versions are also available, offering 350mm extra machining area to accommodate a larger variety of work.

AVAILABLE OPTIONS

Product Code	Specification	Standard/Advanced
CN8328	CNC Router A3HSRmi2	Advanced
CN8742	CNC Router A3HSRmi2	Standard
CN3770	CNC Router A3HSRmi2Ex	Advanced
CN9489	CNC Router A3HSRmi2Ex	Standard

Standard packages include basic tooling, 3D Tooling, Vice and Off-centre clamps.

Advanced also includes basic extraction and manual 4th axes.

CNC Lathes

This range of CNC lathes offer users unrivalled performance and ease of use. Within a matter of minutes, components incorporating external and internal profiles, including screw threads, can be designed, simulated and manufactured to close tolerances in a variety of materials. These lathes utilise industrial level programming codes and are ideal for vocational engineering training. Each machine can also be integrated into FMS/CIM systems, when fitted with optional factory fitted automated equipment.

CNC Lathe 160TCLi

Fully enclosed bench top PC controlled CNC lathe with 160mm swing over bed, spindle bored to pass Ø20mm, Ø80mm precision 3-jaw self centering chuck & precision dovetail slide construction.

CNC Lathe 250PCi

Floor standing PC controlled CNC lathe, with removable laptop shelf and integrated locking cupboards. Features include: 250mm swing over bed, spindle bored to pass Ø35mm and Ø125mm precision 3 jaw self-centring chuck. 1-shot integrated lubrication system and flood coolant fitted as standard.

AVAILABLE OPTIONS

Product Code	Specification	Standard/Advanced
CN5597	CNC Lathe 250PCi	Advanced
CN8559	CNC Lathe 250PCi	Standard
CN3020	CNC Lathe 160TCLi	Advanced
CN4580	CNC Lathe 160TCLi	Standard

Standard packages includes comprehensive tooling, automatic 8 station turret and 3 jaw chuck.

Advanced also includes tailstock.

CNC Machining Centres

This range of 3-axis CNC Machining centres offer unrivalled performance and ease of use. Within a matter of minutes 2½D components incorporating pockets, slots, holes and text can be designed, simulated and manufactured in a variety of materials. Amazing 3D hologram photos can also be produced using the included 'image relief' software wizard. Utilising the included '3DGeoCAM' software wizard, complex 3D solid models created in virtually any CAD package, can be imported and again, machined in a variety of materials.

CNC Vertical Machining Centre 190VMCxi

Bench top PC controlled vertical machining centre, capable of machining precision components from mild steel, alloys, plastics and other synthetic materials. Automated accessories and robot interface port available, for FMS/CIM system integration.

CNC Vertical Machining Centre 300VMCi

Floor standing PC controlled vertical machining centre, capable of machining precision components from mild steel, alloys, plastics and other synthetic materials. Includes flood coolant, integrated lockable storage cupboards and removable laptop shelf as standard. Automated accessories and robot interface port also available, for FMS/CIM system integration.

AVAILABLE OPTIONS

Product Code	Specification	Standard/Advanced
CN6704	CNC Vertical Machining Centre 300VMCi	Advanced
CN2148	CNC Vertical Machining Centre 300VMCi	Standard
CN5844	CNC Vertical Machining Centre 190VMCxi	Advanced
CN7211	CNC Vertical Machining Centre 190VMCxi	Standard

Standard packages includes Comprehensive tooling and tool holders, 3D tooling, off-centre clamps and vice. Advanced also includes automatic 8 station tool changer.

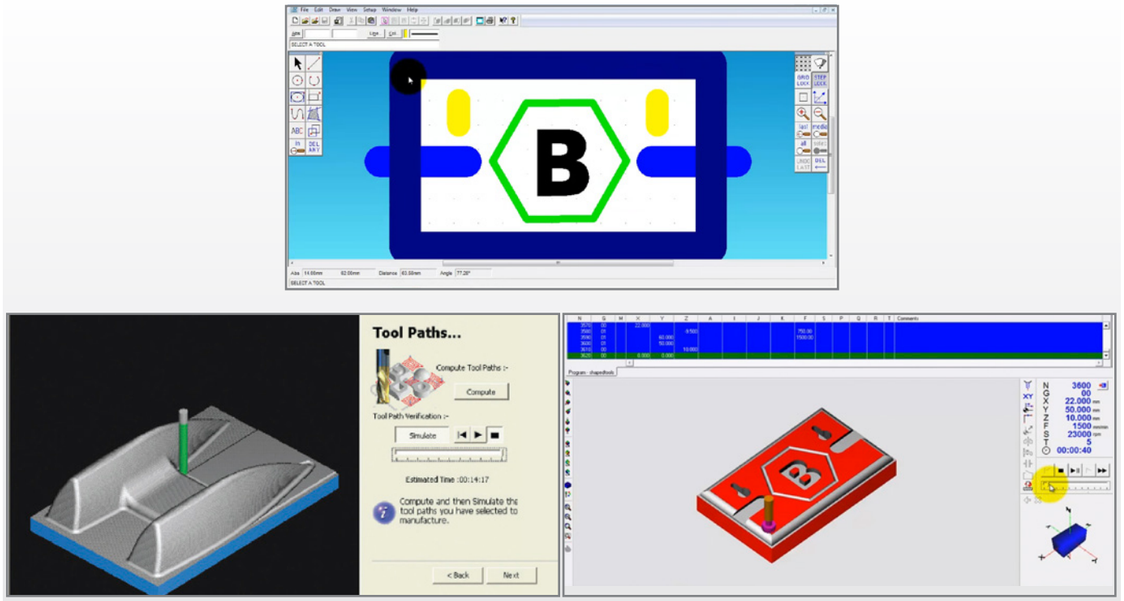
Software

CN8841

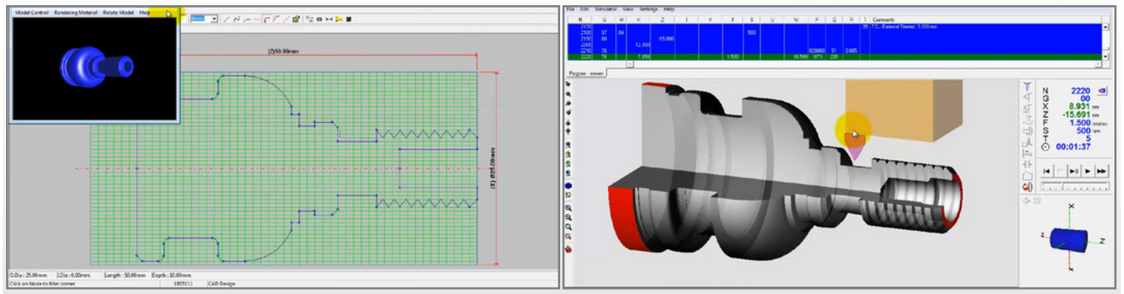
The CAD/CAM Design Tools software is a unique suite of integrated CAD and CAM tools designed specifically to satisfy all educational, training and prototyping requirements, across the full spectrum of age and ability levels.

Main features include:

- 2D Design packages for turning and milling
- CAM Routines to machine 2D CAD drawings, 3D CAD drawings, 3D engraved photographs and printed circuit boards
- For industrial training, sophisticated conversational programming and a CNC program editor are also available



CADCAM Design Tools Milling and Routing Software



CADCAM Design Tools Lathe Software

Metal Laser Cutters

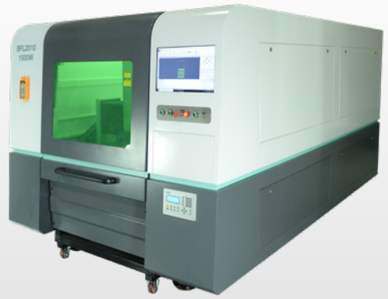
Laser cutters are controlled with the software Lighburn – a 2 user license is included with all sales. These high precision metal cutting fibre lasers are ideally suited to all kinds of training, prototyping and low to medium volume manufacturing applications.

All lasers within this range include:

- Fully enclosed system for optimal fume and debris management
- Rigid construction and motion system incorporating high quality Taiwanese linear guide rails and racks, together with Japanese servo drives, allowing speeds of up to 40 metres per minute to be achieved
- Integrated PC control system
- Automatic head focus system for automatically adjusting focal length (1.5KW models and upwards)
- Automatic capacitive height control system for optimal cutting
- Integrated red dot beam pointer for plate location/ orientation and program dry run
- Superior fibre laser with up to 100,000 hours life span
- Integrated cutting table with removable slats and material recovery tray

Laser Cutter BFL1390 - 1300mm x 900mm

Laser Cutter BFL2010 - 2000mm x 1000mm



AVAILABLE OPTIONS

Product Code	Specification	Standard/Advanced
CN6438	Laser cutter BFL2010 - 2000mm x 1000mm - 3000W	Advanced
CN7942	Laser cutter BFL2010 - 2000mm x 1000mm - 3000W	Standard
CN1682	Laser cutter BFL2010 - 2000mm x 1000mm - 2000W	Advanced
CN8130	Laser cutter BFL2010 - 2000mm x 1000mm - 2000W	Standard
CN1373	Laser cutter BFL2010 - 2000mm x 1000mm - 1500W	Advanced
CN7522	Laser cutter BFL2010 - 2000mm x 1000mm - 1500W	Standard
CN0344	Laser cutter BFL1390 - 1300mm x 900mm - 3000W	Advanced
CN8834	Laser cutter BFL1390 - 1300mm x 900mm - 3000W	Standard
CN6763	Laser cutter BFL1390 - 1300mm x 900mm - 2000W	Advanced
CN1974	Laser cutter BFL1390 - 1300mm x 900mm - 2000W	Standard
CN3533	Laser cutter BFL1390 - 1300mm x 900mm - 1500W	Advanced
CN3339	Laser cutter BFL1390 - 1300mm x 900mm - 1500W	Standard
CN6543	Laser cutter BFL1390 - 1300mm x 900mm - 1000W	Advanced
CN9502	Laser cutter BFL1390 - 1300mm x 900mm - 1000W	Standard

Standard packages includes on site training.
Advanced also includes extraction.

Mixed Material Laser Cutters

The BML1390 is a mixed metal and non-metal cutting CO2 laser. This is a powerful, multi-purpose machine, suitable for customers looking to add entry level metal cutting and professional non-metal cutting to their capabilities.

Mixed material laser cutters all include:

- Integrated water cooling system for CO2 laser source
- Air assist including integrated compressor
- Oxygen air inlet and pressure gauge for use when metal cutting
- Digital automatic height adjustment and
- capacitance calibration (metal cutting only)
- Windows software supporting DXF, JPEG, BMP,
- AI, and more...
- Pre-configured & fully editable parameter library
- 12 months machine warranty
- UK after sales and support

Laser cutter BML1390 - 1300mm x 900mm

AVAILABLE OPTIONS

Product Code	Specification	Standard/Advanced
CN4912	Laser Cutter BML1390 - 1300mm x 900mm - 150W	Advanced
CN4256	Laser Cutter BML1390 - 1300mm x 900mm - 150W	Standard

Standard packages includes on site training and commissioning.
Advanced also includes extraction and rotary fixture.

Non-Metal Laser Cutters

This range of non-metal laser cutting and engraving machines are built to high specifications, giving customers easy to use and fully integrated laser cutting capabilities, to produce work of the highest standards. All machines in our BGL laser range include Lightburn laser software and a Lightburn ready 4K camera for design positioning, image tracing and monitoring.

All lasers include:

- Lightburn laser software (with 12 months of updates)
- Integrated 4K camera for design positiong & tracing
- Pre-configured & fully editable parameter library
- Auto-focus
- Red dot pointer
- Honeycomb and knife material bed
- Full motorised Z axis
- Integrated water cooling system for CO2 laser source
- Integrated compressor for air assist
- Auto start/stop extraction (when used with optional
- filtered extraction system)

Laser Cutter BGL350 - 500mm x 300mm - 50W

Laser Cutter BGL460 - 600mm x 400mm - 80W

Laser Cutter BGL690 - 900mm x 600mm - 80W

Laser Cutter BGL1390 - 1300mm x 900mm - 100W

AVAILABLE OPTIONS

Product Code	Specification	Standard/Advanced
CN4395	Laser Cutter BGL1390 - 1300mm x 900mm - 100W	Advanced
CN9083	Laser Cutter BGL1390 - 1300mm x 900mm - 100W	Standard
CN0009	Laser Cutter BGL690 - 900mm x 600mm - 80W	Advanced
CN4686	Laser Cutter BGL690 - 900mm x 600mm - 80W	Standard
CN1975	Laser Cutter BGL460 - 600mm x 400mm - 80W	Advanced
CN3293	Laser Cutter BGL460 - 600mm x 400mm - 80W	Standard
CN9982	Laser Cutter BGL350 - 500mm x 300mm - 50W	Advanced
CN1548	Laser Cutter BGL350 - 500mm x 300mm - 50W	Standard

Standard packages includes on site training and commissioning.
Advanced also includes extraction and rotary fixture.

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MANUFACTURING
ENGINEERING

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