digital automation training

Industrial Automation Training Courses 2006

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Digital Automation Training Course Index

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www.dat.co.uk

Training Programs

Digital Automation Training Limited is the UK's leading independent specialist for control and automation training courses.

Our quality tailored training programs are available in an ever-increasing range of subjects, as technology develops, so do our training programs.

- **Programmable Logic Controllers.**

- **AC Variable Speed Drives.**

- **DC Variable Speed Drives.**

- **Field bus I/O Systems.**

- **Control and Instrumentation.**

- **SCADA Systems.**

We understand that due to the increasing complexity of control equipment, that companies can become reliant on contractors and software companies for call outs and modifications. We are also aware that reducing downtime is essential to improve your business. Our experience and expertise as specialists in the automation field will allow you and your maintenance staff to take control of your plant.

How Our Training System Works.

From the beginning to the end of the training program you will be allocated an Engineer who will implement the three vital stages which will, reduce breakdowns, create solutions, increase fault finding skills and enable your staff to modify programs and plant control.

1. Training Requirements

The training requirements are developed by reviewing the following areas:

- **Existing skills of your staff.**
- **Breakdowns in which contractors were required.**
- **General breakdowns.**
- **Production processes.**

A training programme will be tailored to meet your requirements, this will be a blend of classroom and plant training, that will provide the essential bridge between the classroom and plant. At this development stage we will present the training programme proposal and discuss any further aspects that may be required.

2. Pre Training.

Digital Automation will collect programs, diagrams and documentation to begin research. From this information the PLC, Drives or SCADA training programme will be tailored to your exact plant. Examples and exercises will therefore mirror your plant process. From these examples and exercises your staff will begin to feel confident on the control equipment, because they understand the process the equipment is controlling. Documentation will be provided to explain how the equipment interfaces and controls the plant.

3. Training Delivery.

All of the training equipment will be provided to ensure a complete practical training program. The students will carry out classroom-based exercises, but more importantly will be introduced to a number of plant-based exercises both on the plant and in the classroom. These will include:

- **Finding plant equipment.**
- **Locating control equipment.**
- **Monitoring PLC programs.**
- **Finding signals in the PLC program.**
- **Monitoring drive parameters.**
- **Monitoring of I/O systems.**

Post course options.

The students will need to continue to practice on the control equipment, this will further their knowledge and understanding. To ensure this we can create a number of exercises that the student can attempt after the course.

After a period of time Digital Automation can return for a short tutorial to ensure that the students are progressing, are following the correct methods and answer any other issues that may arise.

Plant improvements.

At this point some of the students will be confident enough to attempt plant improvements, but may need advice and guidance for the project. Digital Automation can provide this service, which will encourage confidence within the students and will ensure that the next level of knowledge is achieved.

You will typically find that this type of training programme can be provided for a number of students for the price of just one breakdown.

Customer Experience

Typical applications that we have developed tailored training programmes for include:

- **Metal Industries**   Hot Mill Steel Reduction
  Strip Coating Lines

- **Petro-chemical**   Motor sequencing and control

- **Automotive**   Spray Booth
  Phosphate Dipping

- **Water Treatment**   Process Control and Monitoring

- **Cable Laying**   Plough Control
  Vessel positioning

- **Airports**   Baggage Handling
  Runway Lighting

- **Food Industry**   Process Control

Some of the companies already benefiting from Digital Automation Training courses:

Ford Motor Company	**Amerada Hess**
British Steel	**Pirelli Cables Limited**
Thames Water Utilities	**Cegelec Projects Limited**
North West Water	**RHM**
Peugeot Motor Company	**National Grid**
Alstom	**Cable and Wireless**
Vauxhall Motors Limited	**Conoco**
Southern Water	**British Bakeries**
Alcan	**British Energy**
Alcoa	**First Hydro**
BT Marine	**South Staffordshire Water**

Bespoke PLC Application Courses

Our application courses involve research of the PLC controlled process; our PLC Engineers will carry this out. With their experience they will analyse your requirements and develop a PLC application manual specific to the process. This can be used outside the course as a working document to aid fault finding and maintenance of the PLC equipment and attached plant devices.

The objectives of an application course and the accompanying documentation are to increase the students' knowledge of the sequencing involved in the PLC controlled process. Allowing students to understand and implement the procedures required in locating the problem area and investigating in detail the cause of the operation failure.

A typical PLC application manual consists of the following sections.

- Description of the PLC hardware involved in the process.

- I/O addressing and schedules.

- Explanation of critical sequences or conditions in the process.

- Introduction to the PLC software, highlighting monitoring points within the program that can be used to determine if an operation is completed, not initiated or has failed.

- Fault Finding procedures to rectify faults that occur within the PLC controller, plant devices or I/O modules.

Application courses can be designed for any of the following PLC's.

- **Alstom GEM 80**

- **Alstom Alspa 80-35/80-75**

- **Allen Bradley SLC 500**

- **Allen Bradley ControlLogix**

- **Allen Bradley PLC 5**

- **Modicon 984/Quantum/Momenutm**

- **GE Fanuc 90-30/90-70**

- **Mitsubishi Fxo/Fx/A/Q series**

- **Toshiba EX/T series**

- **Siemens S5/S7/Winac**

Course Reference
GMFLM

Course Duration
2 Days

Documentation
GEM 80 Maintenance
Training Manual.

GEM 80 First Line Maintenance Course

This 2 day course has been specifically designed with first line maintenance requirements in mind. It is therefore ideally suited for Electricians and Technicians who may be initially required to diagnose faults associated with GEM 80 PLC systems.

The course will allow students to develop an understanding of what factors to consider when a fault occurs on a GEM 80 system. It will also give Electricians the confidence to discuss faults at a higher technical level. They will gain a broad PLC systems knowledge, including specific GEM 80 PLC terminology. This will be of great benefit when reporting faults either to engineering staff or directly to the equipment manufacturers.

Where possible, application specific exercises, actual drawings and programs listings will be used to allow the students to gain the greatest possible benefit from the course.

Course Content:

- **To gain an insight into PLC controlled systems.**

- **The interfacing of I/O devices to the GEM 80.**

- **Watchdog and safety circuits.**

- **To introduce the concepts and operation of GEM 80 controllers.**

- **To familiarise students with GEM 80 hardware.**

- **To familiarise students with GEM 80 PLC Programmers.**

- **To develop an understanding of basic GEM 80 software.**

- **"Reading" ladder diagrams, the standard relay functions.**

- **"Reading" the rest of the ladder program.**

- **To introduce the routine for the storage and retrieval of ladder programs.**

Course Reference
GM

Course Duration
5 Days

Documentation
GEM 80 Maintenance
Training Manual.

GEM 80 Maintenance Course

This course has been designed to familiarise Maintenance Engineers with the many different aspects associated with the operation and maintenance of GEM 80 programmable controllers.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:
To introduce students to the concepts and operation of GEM 80 programmable controllers, including the following areas:

- Locate and replace faulty modules.

- Reload programs.

- I/O fault finding.

- Basic serial links faults.

- Implement small changes to the program.

- Interpret and understand basic ladder logic.

- Connect online and monitor programs to determine plant problems.

Course Content:

- **The history and development of programmable controllers.**
- **System I/O interfaces and safety.**
- **I/O Highways and expander units.**
- **The hardware architecture of a GEM 80 controller.**
- **Watchdog and safety circuits.**
- **To introduce the concepts and operation of GEM 80 controllers.**
- **To familiarise students with GEM 80 hardware.**
- **GEM 80 programming devices.**
- **Online monitoring and searching.**
- **The GEM 80 standard instruction set.**
  Relays, timers, counters and obey blocks.
- **Analogue modules and analogue scaling.**
- **Data monitoring using the data table.**
- **Forcing techniques.**
- **Documentation and application of special functions.**
- . **Lincon, Limit and Locate and Move.**
- **GEM 80 ESP serial link configuration and operation.**
- **GEM 80 fault finding principles and procedures.**
- **Documentation, storage and retrieval of ladder programs.**
- **Application exercises on your plant exercises.**

Course Reference GMA	**Advanced GEM 80 Course** 10
Course Duration 4 Days	The advanced modules are aimed at personnel who have gained a thorough basic understanding of GEM 80 controllers. They have been designed to introduce some of the more complex functions and facilities associated with GEM 80 controllers
Documentation GEM 80 Advanced Training Manual.	Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Course Content:

- **Standard GEM 80 Revision.**

- **Advanced word logic.**

- **Alarm packages.**

- **PID and advanced analogue control.**

- **Starnet and advanced ESP comms.**

- **Special Functions:**
    Standard functions.
    Analogue functions.
    Array logic functions.
    Storage functions.

- **Trending and History Recording.**

- **Tactile Keypad Decoding.**

- **Printing Functions.**

Course Reference G400/500 **Course Duration** 1 Day **Documentation** GEM 80 400/500 Training Manual.	**GEM 80 400/500 Series Update Course** 11

The course has been designed to familiarise Maintenance Engineers and Electricians, who are already conversant with GEM 80 controllers of the updates that have been incorporated in the GEM 80 400 and 500 series controllers and the GEM 80 400 VME controller.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

 Course Content:

- **Gem 80 400 processor module details.**

- **The New GEM 80 500 processor module details.**

- **Processor LED's, Alpha numeric display and key switch.**

- **Verification I/O.**

- **GEM 80 400/500 additional standard instruction.**

- **GEM 80 400/500 Special Functions.**

- **Serial Communications and FIP compatibility.**

- **GEM 80 500 processor web server and Ethernet capability.**

- **System Fault codes and the fault log.**

- **The Advanced Gem Programmer (AGP) programming package can also be covered.**

Course Reference ALSM	**Alspa 80-35 PLC Systems & Maintenance**

Course Duration
3 Days

Documentation
Alspa Maintenance
Training Manual.

This course has been designed to familiarise Maintenance Engineers with the many different aspects associated with the operation and maintenance of the Alspa 80-35 programmable controller.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:

To introduce students to the concepts and operation of Alspa programmable controllers, including the following areas:

- Locate and replace faulty modules.
- Reload programs.
- I/O Fault finding.
- Communication faults.

- Implement small changes to the program.
- Connect online and monitor programs to determine plant problems.

Course Content:

- **The history and development of programmable controllers.**
- **The hardware architecture of a Alspa range of controllers.**
- **I/O Modules and wiring.**
- **Hardware configuration.**
- **Addresses used in the Alspa PLC.**
- **Program structure, creating blocks and block declaration.**
- **First steps with the programmer.**
- **Quick keys used on the programmer for:**
  Mode selection, run/stop.
- **Creating a folder.**
- **Loading and saving folders to the PLC.**
- **Online monitoring and searching.**
- **Using and creating program documentation.**
- **Editing and modifying programs.**
- **Instruction set.**
  Relay, maths, move, compare and logic function.
- **Copying and backing up folders.**
- **Analogue modules and analogue scaling.**
- **Introduction to N80 communications.**
- **Concept of System bits.**
- **Data monitoring using the reference tables.**
- **Forcing Facilities.**
- **GEM 80 to Alspa communications.**
- **Faulting tables.**
- **Diagnosis and resetting faults.**
- **Documentation using the variable declaration and rung comments.**
- **Application exercises on your plant programs.**

Course Reference
GD2000

Course Duration
2 Days

Documentation
GD2000
Training Manual.

Alspa GD2000 AC Drives Course

The course has been designed to familiarise Maintenance Engineers with the many different aspects associated with the operation and maintenance of GD2000 AC drives.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:

To introduce students to the concepts and operation of the GD2000 drive, including the following areas:

Course Content:

- **To understand the basic techniques of controlling an AC motor.**
- **AC motor and drive theory.**
- **How a GD2000 is constructed, and how the various protection features work.**
- **Operation of the GD2000.**
- **GD2000 range and specification.**
- **Protection and trip avoidance.**
- **Control connections.**
- **Parameter overview.**
- **Using both keypads. The students will also be able to monitor and diagnose faults.**
- **Commissioning.**
- **The drive parameters and configuration.**
- **Advanced configuration, skip bands fly catching etc.**
- **Digital and analogue I/O wiring and configuration.**
- **Diagnostics, displaying the last 10 trips.**
- **Resetting the drive.**
- **Auto reset facilities.**
- **Serial links.**

Course Reference
ALSGD3

Course Duration
3 Days

Documentation
GD3000e
Training Manual.

Alspa GD3000E AC Drives Course

The course has been designed to familiarise Maintenance Engineers with the many different aspects associated with the operation and maintenance of GD3000 AC drives.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:

To introduce students to the concepts and operation of the GD2000 drive, including the following areas:

Course Content:

- **To understand the basic techniques of controlling an AC motor.**
- **AC motor and drive theory.**
- **Vector control.**
- **How a GD2000 is constructed, and how the various protection features work.**
- **Operation of the GD2000.**
- **GD2000 range and specification.**
- **Protection and trip avoidance.**
- **Control connections.**
- **Parameter overview.**
- **Speed and Torque control.**
- **Using both keypads. The students will also be able to monitor and diagnose faults.**
- **Commissioning.**
- **The drive parameters and configuration.**
- **Advanced configuration, skip bands fly catching etc.**
- **Digital and analogue I/O wiring and configuration.**
- **Position Control.**
- **Diagnostics, displaying the last 10 trips.**
- **Resetting the drive.**
- **Auto reset facilities.**
- **User defined logic.**
- **Serial links.**

Course Reference
AlsMicro2

Course Duration
3 Days

Documentation
Micro 2 Training Manual.

Alspa Micro2 DC Drives Course

The course has been designed to familiarise Maintenance Engineers with the many different aspects associated with the operation and maintenance of Alstom Alspa MICRO 2 DC drives.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:

To introduce students to the concepts and operation of the Micro 2 DC Drive, including the following areas:

- Concepts of DC motor control, and the methods by which a DC servo controls the machine.
- To be able to confidently use the programming tools associated with the drive. The student will be able to modify and save the programs, including how to document any changes fully and correctly.
- The commissioning and fault diagnostic procedures. The students will be able to confidently use the diagnostic facilities.
- To be able to solve programming/application problems to a reasonable level, using the documentation provided on the course.

Course Content:

- **DC motor theory.**
- **Drive connections and inputs and outputs.**
- **Drive commissioning, feedback loops, references and logic.**
- **Investigation of the ramp, speed and current software modules.**
- **The links program, and how the modules are connected.**
- **Editing and monitoring with the keypad.**
- **Using the programmer to edit and monitor.**
- **Logic modules and their application.**
- **Tuning of the current and speed loop.**
- **Programming exercises.**
- **Programming ladder diagram.**
- **Fault diagnostics and insight into Module 32.**
- **Starnet serial links.**
- **Application examples.**

Course Reference SigM3	**Sigma Alspa Micro 3 DC Drives Course**

Course Duration
4 Days

Documentation
Sigma Micro 3 Manual.

The course has been designed to familiarise Maintenance Engineers with the many different aspects associated with the operation and maintenance of MICRO 3 DC drives.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:

To introduce students to the concepts and operation of the Micro 3 DC Drive, including the following areas:

- Concepts of DC motor control, and the methods by which a DC servo controls the machine.
- To be able to confidently use the programming tools associated with the drive. The student will be able to modify and save the programs, including how to document any changes fully and correctly.
- The commissioning and fault diagnostic procedures. The students will be able to confidently use the diagnostic facilities.
- To be able to solve programming/application problems to a reasonable level, using the documentation provided on the course.

Course Content:

- **DC motor theory.**
- **Drive connections and inputs and outputs.**
- **Drive commissioning, feedback loops, references and logic.**
- **Investigation of the ramp, speed and current software modules.**
- **The links program, and how the modules are connected.**
- **Editing and monitoring with the keypad.**
- **Using the sigma programmer to edit and monitor.**
- **How ladder diagram is integrated with the link program.**
- **Tuning of the current and speed loop.**
- **Programming exercises.**
- **Programming ladder diagram.**
- **Fault diagnostics and insight into Module 32.**
- **Starnet serial links.**
- **Application examples.**

Course Reference
FIPCOM

Course Duration
2 Days

Documentation
FIP Communications
Manual.

Alspa / GEM 80 FIP Communications Course

This course has been designed to give Engineers, Technicians and Electricians who are already familiar with Alstom products, practical experience and a working knowledge of FIP communication networks between GEM 80 400 controllers, DI100 Gateway and Alspa DC and GD3000 drives. The course is designed to increase the students understanding and confidence when dealing with FIP communication networks.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:
To introduce students to the concepts and operation of FIP communications. Including the following areas.

- **Defining hardware connections.**
- **Configuring a GEM 400 to communicate on FIP.**
- **Configuring an Alspa 80-35 to communicate on FIP.**
- **Using statistics.**
- **Locate and diagnosis fault faults.**

Course Content:

- **FIP network hardware.**
- **FIP network operation and terminology.**
- **The configuration of the FIPCFG Special Function software instruction and setting up VCOM's.**
- **Data transfer configuration.**
- **Special function used for statistics.**
- **FIP communication statistics and fault finding.**
- **FIP communication options:**
    GEM 80 400 FIP.
    Alspa GD & DC Drives FIP.
    DI100 Gateway.
    Alspa 80-35/75.
    Other manufacturers World FIP modules.
- **Alspa GD and DC 3000 drives FIP communications.**
    The procedure to configure the drives to transfer and receive data on the FIP network.

- **DI100 Gateway module.**
    Operational overview of the DI100 Gateway Module.

Course Reference CCU2 **Course Duration** 2 Days **Documentation** GEMSTART 2 Manual.	**Gemstart 2 Contactor Control Unit** The course is essentially directed at Maintenance Engineers, but it is also useful as an appreciation course for other personnel involved in CCU systems. It covers all aspects of a CCU system, from the LV cubicle mounting, to GEM 80 serial links and the set up of the CCU initialisation data. .Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:
To introduce students to the concepts and operation of GEMSTART 2. CCU systems. Including the following areas:

- **Resetting the Gemstart unit.**
- **Replacing the Gemstart unit.**
- **Configuration of a Gemstart 2 with the hand held programmer.**
- **Understanding how the GEM 80, controls and monitors the Gemstart units.**

Course Content:

- **Introduction to the CCU concept.**
- **The hardware and wiring associated with a CCU system.**
- **CCU Indicators.**
- **CCU Programming and monitoring devices.**
- **CCU Configuration procedures.**
  Overload curves and trip protection and many other features.
- **GEM80 serial link connections and configuration.**
  Serial link interfaces to GEM 80 controllers. The communication highway options available.

- **CCU/GEM 80 data exchange.**
  The format for data exchange to and from the GEM 80 controller.

- **CCU System configuration.**
  Configuration of the complete control system incorporating the CCU, controller and associated hardware.

- **Fault finding.**
  Fault finding on the complete system, replacement of a faulty module, and routine maintenance procedures.

Course Reference AB500M **Course Duration** 5 Days **Documentation** Allen Bradley SLC-500 Maintenance Training Manual.	# Allen Bradley SLC-500 Maintenance Course

The course has been designed to familiarise Maintenance Engineers and Electricians with the many different aspects associated with the operation and maintenance of Allen Bradley SLC-500 controllers. Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:
The students will be able to perform the following:

- Locate and replace faulty modules.
- Reload programs.
- I/O Fault finding.
- Interpret and understand basic ladder logic.

- Implement small changes to the program.
- Using RSLogix to connect online and monitor programs to determine plant problems.

Course Content:

- **Introduction to the SLC-500 range.**
- **I/O module and interfaces.**
- **Addressing and file types.**
- **Program Structure, ladder files and the JSR function.**
- **Creating a project with RSLogix.**
- **Hardware configuration.**
- **Select the drivers for communications via RSLinx.**
- **Downloading the project.**
- **Online monitoring and searching with RSLogix.**
- **The Basic instruction set.**
  Relays, timers & counters.
- **Maths functions.**
- **Customised data monitoring.**
- **Analogue modules and analogue scaling.**
- **Data monitoring using the data table.**
- **Forcing techniques.**
- **Further in instruction.**
  Compare, moves and limits.
- **Program documentation and database.**
- **Searching the comment database.**
- **Introduction to communications with DH485, DH+ and Ethernet.**
- **Introduction to the MSG function for communications.**
- **Histograms.**
- **fault finding principles and procedures.**
- **Application exercises on your plant programs.**
- **Trending.**

Course Reference
AB500adv

Course Duration
4 Days

Documentation
Allen Bradley
SLC500 Advanced
Training Manual.

Allen Bradley Advanced SLC-500 Course

The advanced course is aimed at personnel who have gained a thorough basic understanding of the SLC-500. The course has been designed to introduce some of the more complex functions and facilities associated with the SLC-500. It would be an advantage if the student has already completed an SLC-500 4 day maintenance course.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Course Content:

Instruction Set

An investigation into the more complex instructions including:

Introduction to files.
File arithmetic and logic instructions.
File search and compare functions.
Program control instructions including subroutine programming.
Fault routines and selectable timed instructions.
Block transfer instructions.

Remote I/O

Description and demonstration of remote I/O.

Analogue PID control.

Revision of analogue modules and an introduction to the PID function. Illustrating how to program and configure a closed loop system.

Alarm Handling.

Demonstration of how to sort signals and incorporate them into an alarm section of a program, explaining the operation.

Message Printing.

An introduction to the message instruction and how to interface it with the alarm package from the previous module to print alarm messages.

Data Highway Plus, Communications.

Demonstration of the hardware involved in a DH+ communication system. As well as the software configuration required to initialise communications and fault finding procedures.

Course Reference ABCLGX **Course Duration** 5 Days **Documentation** Allen Bradley ControlLogix Maintenance and Programming Training Manual.	**Allen Bradley ControlLogix Maintenance Course** The course has been designed to familiarise Maintenance Engineers and Electricians with no or little experience of Allen Bradley ControlLogix systems. The course demonstrates the many different aspects associated with the operation, programming and maintenance of ControlLogix controllers. Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:

The student will be able to perform the following:

- Locate hardware and replacing faulty modules.
- Reload programs.
- I/O Fault finding.
- Fault finding on the communication links.

- Implement small changes to the program.
- Interpret and understand basic ladder logic.
- Using RSLogix 5000 to connect online and monitor programs to determine plant problems.

Course Content:

- **Introduction to the ControlLogix range.**
- **ControlLogix architecture and LED indication.**
- **Addressing, tags and data formats.**
- **Project Structure, programs, tasks & subroutines.**
- **Tags types, Local and global.**
- **Creating a project with RSLogix 5000.**
- **Hardware configuration.**
- **Select the driver for communications via RSLinx.**
- **Downloading the project.**
- **Online monitoring and searching with RSLogix 5000.**
- **The Basic instruction set.**
  Relays, timers, counters.
- **Maths functions.**
- **Data monitoring using the data table.**
- **Forcing techniques.**
- **Further instructions .**
  Compare, moves and limits.
- **Program documentation and database.**
- **User defined data formats.**
- **Searching the comment database.**
- **Introduction to communications demonstrating produce and consumer tags.**
- **Trending.**
- **Fault finding principles and software routines.**
- **Application exercises on your plant exercises.**

Course Reference AB5M **Course Duration** 5 Days **Documentation** Allen Bradley PLC5 Maintenance Training Manual.	**Allen Bradley PLC 5 Maintenance Course** The course has been designed to familiarise Maintenance Engineers and Electricians with the many different aspects associated with the operation and maintenance of Allen Bradley PLC 5 controllers. Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:
The student will be able to perform the following:

- Locate and replace faulty modules.
- Reload programs.
- I/O Fault finding.
- Fault finding on PLC-5 communication links.
- Implement small changes to the program.
- Interpret and understand basic ladder logic.
- Using RSLogix or 6200, to connect online and monitor programs to determine plant problems.

Course Content:

- **Introduction to the PLC5 range.**
- **Processor indication and connections.**
- **I/O module and interfaces.**
- **Addressing and file types.**
- **Program Structure, ladder files the JSR function.**
- **Creating a project with RSLogix.**
- **Hardware configuration.**
- **Select the drives for communications via RSLinx.**
- **Downloading the project.**
- **Online monitoring and searching with RSLogix.**
- **The Basic instruction set.**
  Relays, timers & counters.
- **Maths functions.**
- **Customised data monitoring.**
- **Analogue modules and block transfers.**
- **Data monitoring using the data table.**
- **Forcing techniques.**
- **Further in instruction.**
  Compare, moves and limits.
- **Program documentation and database.**
- **Searching the comment database.**
- **Introduction to DH+ communications.**
- **Introduction to the MSG function for communications.**
- **Histograms.**
- **fault finding principles and procedures.**
- **Application exercises on your plant programs.**
- **Trending.**

Course Reference
AB5ADV

Course Duration
4 Days

Documentation
Allen Bradley
PLC5 Advanced
Training Manual.

Allen Bradley Advanced PLC5 Course

The advanced course is aimed at personnel who have gained a thorough basic understanding of the PLC-5. The course has been designed to introduce some of the more complex functions and facilities associated with the PLC-5. It would be an advantage if the student has already completed a PLC-5 4 day maintenance course.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Course Content:

Instruction Set.

An investigation into the more complex instructions including:

Introduction to files.
File arithmetic and logic instructions.
File search and compare functions.
Program control instructions including subroutine programming.
Fault routines and selectable timed instructions.
Block transfer instructions.

Remote I/O.

Description and demonstration of remote I/O and Block Transfer functions.

Analogue PID control.

Revision of analogue modules and an introduction to the PID function. Illustrating how to program and configure a closed loop system.

Alarm Handling.

Demonstration of how to sort signals and incorporate them into an alarm section of a program, explaining the operation.

Message Printing.

An introduction to the message instruction and how to interface it with the alarm package from the previous module to print alarm messages.

Data Highway Plus, Communications.

Demonstration of the hardware involved in a DH+ communication system. As well as the software configuration required to initialise communications and fault finding procedures.

Course Reference ABRSLG **Course Duration** 1 Day **Documentation** RSLOGIX Training Manual	**Allen Bradley RSLogix Programmer Course** This course is aimed at Electricians, Technicians and Engineers who are already familiar with Allen Bradley PLC's and either 6200, APS or A.I programming packages and have a working knowledge of Microsoft Windows, to allow the students to gain practical experience and a working knowledge of RSLogix programming software.

Course Content:

The RSLogix update course includes the following topics:

- Online monitoring.

- Searching.

- Data monitoring.

- Editing rungs On-line and Off-line.

- Communications between the programmer and PLC.

- Uploading and downloading PLC programs.

- Processor status, monitoring for faults and fault resets.

- Forcing.

- Comments and documentation database.

- Histogram functions.

- Passwords and Privileges.

- Printing.

- Help and shortcut keys.

- The RSLOGIX courses can be conducted using the RSLogix programmer for PLC-5 and SLC-500.

Course Reference
GEFCM

Course Duration
4 Days

Documentation
90-30 and 90-70
Programming
Maintenance
Training Manual.

GE-Fanuc 90-30/70 PLC Systems & Maintenance

This course has been designed to familiarise Maintenance Engineers with the many different aspects associated with the operation and maintenance of the GE Fanuc programmable controller.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:
To introduce students to the concepts and operation of GE Fanuc programmable controllers, including the following areas:

- Locate and replace faulty modules.
- Reload programs.
- I/O Fault finding.
- Fault finding on Genius communication links.

- Implement small changes to the program.
- Using Logicmaster or VersaPro or Cimplicity machine edition to connect online and monitor programs to determine plant problems.

Course Content:

- **The hardware architecture of the series 90 controllers.**
- **I/O Modules and wiring.**
- **Hardware configuration.**
- **Addresses used in the series 90 controllers.**
- **Program structure, creating blocks and block declaration.**
- **First steps with the programmer.**
- **Quick keys used on the programmer for:**
  Mode selection, run/stop.
- **Creating a Folder.**
- **Loading and save Folders to the PLC.**
- **Online monitoring and searching.**
- **Using and creating program documentation.**
- **Editing and modifying programs.**
- **Instruction set:**
  Relay, maths, move, compare and logic functions.
- **Copying and backing up folders.**
- **Analogue modules and analogue scaling.**
- **Introduction to Genius communications.**
- **Concept of System bits.**
- **Data monitoring using the reference tables.**
- **Forcing Facilities.**
- **Other communication options.**
- **Faulting tables.**
- **Diagnosis and resetting faults.**
- **Documentation using the variable declaration and rung comments.**
- **Application exercises on your plant exercises.**

Course Reference FXMC **Course Duration** 3 Days **Documentation** FX Series Programming Maintenance Training Manual.	**Mitsubishi FX Series Maintenance Course** The course has been designed to familiarise Maintenance Engineers and Electricians with the many different aspects associated with the operation and maintenance of the FX series controllers. Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:

To introduce students to the concepts and operation of FX series programmable controllers, including the following areas:

- Locate and replace faulty modules.
- Reload programs.
- I/O Fault finding.

- Implement changes to the program.
- Using MEDOC, GPP, FX WIN or GX Developer to connect online and monitor programs to determine plant problems.

Course Content:

- **The hardware architecture of the FX range of controllers.**
- **I/O Modules and wiring.**
- **Addresses used in the Mitsubishi FX controllers.**
- **Program structure.**
- **Creating a project.**
- **Convert the program edits.**
- **Loading and save projects to and from the PLC.**
- **Online monitoring and searching.**
- **Demonstrating read and write mode.**
- **Using and creating program documentation.**
- **Editing and modifying programs, inserting, editing lines, inserting steps and converting.**
- **Instruction set.**
  Relay, maths, move, compare and logic function.
- **Copying and backing up folders.**
- **Analogue modules and analogue scaling.**
- **Concept of Special devices and registers.**
- **Forcing Facilities.**
- **Using debug for device monitoring.**
- **Diagnosis and resetting faults.**
- **Documentation using the Device comments and rung comments.**
- **Sampling tracing.**
- **Application exercises on your plant programs.**

Course Reference
MITAMC

Course Duration
3 Days

Documentation
A Series
Programming
Maintenance
Training Manual.

Mitsubishi A Series Maintenance Course

The course has been designed to familiarise Maintenance Engineers and Electricians with the many different aspects associated with the operation and maintenance of the A series controllers.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:
To introduce students to the concepts and operation of A series programmable controllers, including the following areas:

- Locate and replace faulty modules.
- Reload programs.
- I/O Fault finding.

- Implement changes to the program.
- Using MEDOC, GPP Win, FX WIN or GX Developer to Connect online and monitor programs to determine plant problems.

Course Content:

- **The hardware architecture of the A series range of controllers.**
- **I/O modules and wiring.**
- **Addresses used in the Mitsubishi A series controllers.**
- **Program structure.**
- **Creating a Project.**
- **Convert the program edits.**
- **Loading and save projects to and from the PLC.**
- **Online monitoring and searching.**
- **Demonstrating read and write mode.**
- **Using and creating program documentation.**
- **Editing and modifying programs, inserting, editing lines, inserting steps and converting.**
- **Instruction set.**
  Relay, maths, move, compare and logic function.
- **Copying and backing up folders.**
- **Analogue modules and analogue scaling.**
- **Concept of Special devices and registers.**
- **Forcing facilities.**
- **Using debug for device monitoring.**
- **Diagnosis and resetting faults.**
- **Documentation using the Device comments and rung comments.**
- **Introduction to Melsecnet communications.**
- **Sampling tracing.**
- **Application exercises on your plant programs.**

Course Reference
MITQMC

Course Duration
4 Days

Documentation
Q Series
Programming
Maintenance
Training Manual.

Mitsubishi Q series Maintenance Course

The course has been designed to familiarise Maintenance Engineers and Electricians with the many different aspects associated with the operation and maintenance of the Q Series controllers.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:
To introduce students to the concepts and operation of Mitsubishi Q series programmable controllers, including the following areas:

- Locate and replace faulty modules.
- Reload programs.
- I/O Fault finding.

- Implement changes to the program.
- Using MEDOC, GPP WIN, FX WIN, GX Developer, or GX IEC Developer to Connect online and monitor programs to determine plant problems.

Course Content:

- **The hardware architecture of the Q Series controllers.**
- **I/O Modules and wiring.**
- **Hardware configuration.**
- **Format for a project for IEC or standard Mitsubishi.**
- **Addresses used in the Q series if using Mitsubishi format.**
- **Tag formats and data types if using the IEC format.**
- **The PLC Program structure.**
- **First steps with the program.**
- **Creating a Project.**
- **Loading and save projects to the PLC.**
- **Online monitoring and searching.**
- **Using and creating program documentation.**
- **Editing and modifying programs.**
- **Instruction set.**
  Relay, maths, move, compare and logic functions.
- **Copying and backing up project.**
- **Analogue modules and analogue scaling.**
- **Introduction to communications.**
- **Concept of special devices.**
- **Forcing facilities.**
- **Faulting tables.**
- **Using debug for device monitoring.**
- **Diagnosis and resetting faults.**
- **Documentation using the tag, device and rung comments.**
- **Application exercises on your plant programs.**

Course Reference
GEFCM

Course Duration
2 Days

Documentation
Modicon 984/Quantum
Maintenance
Training Manual With
*MODSOFT, ProWORX,
Proworx NXT or 32.*

Modicon 984/Quantum First Line Maintenance Course

This 2-day course has been specifically designed with first line maintenance requirements in mind. It is therefore ideally suited for Electricians, Technicians and mechanical staff who may be initially required to diagnose faults associated with Modicon 984 controllers.

The course will allow students to develop an understanding of what factors to consider when a fault occurs on a 984 controller. It will also give Electricians the confidence to discuss faults at a higher technical level. They will gain a broad PLC systems knowledge, including specific 984 controller PLC terminology. This will be of great benefit when reporting faults either to engineering staff or directly to the equipment manufacturers. Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:
To introduce students to the concepts and operation of Modicon programmable controllers, including the following areas:

- Locate and replace faulty modules.
- Reload programs.
- I/O Fault finding.
- Basic Modbus plus faults.

- Implement small changes to the program.
- Using any of the group Schneider programmers to Connect online and monitor programs to determine plant problems.

Course Content:
- **The hardware architecture of Modicon controllers.**
- **I/O Modules and wiring.**
- **Traffic cop configuration.**
- **Addresses used in the Modicon range of controllers.**
- **Program structure, viewing and creating segments.**
- **First steps with the program.**
- **Quick keys used on the programmer.**
- **Creating a Project.**
- **Loading and save projects to the PLC.**
- **Online monitoring, searching, tracing and retracing.**
- **Using and creating program documentation.**
- **Editing and modifying programs.**
- **Instruction set.**
  Relay, maths, move, compare and logic functions.
- **Copying and backing up folders.**
- **Analogue modules and analogue scaling.**
- **Introduction to Modbus Plus communications.**
- **Concept of system bits.**
- **Data monitoring using the reference tables.**
- **Forcing facilities.**
- **Diagnosis and resetting faults.**
- **Application exercises on your plant exercises.**

Course Reference
MODMC

Course Duration
5 Days

Documentation
Modicon 984/Quantum
Programming and
Maintenance
Training Manual with
*Modsoft, ProWORX,
ProWORX NXT or 32.*

Modicon 984/Quantum Maintenance Course

The course has been designed to familiarise Maintenance Engineers and Technicians with the many different aspects associated with the operation and maintenance of Modicon 984 programmable controllers, using Modsoft, Modsoft Lite, Taylor Proworx Plus or Proworx NXT programming packages.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:
To introduce students to the concepts and operation of Modicon programmable controllers, including the following areas:

- Locate and replace faulty modules.
- Reload programs.
- I/O Fault finding.
- Modbus plus faults.

- Implement changes to the program.
- Using any of the group Schneider programmers to connect online and monitor programs to determine plant problems.

Course Content:
- **The hardware architecture of Modicon controllers.**
- **I/O Modules and wiring.**
- **Traffic cop configuration.**
- **Addresses used in the Modicon range of controllers.**
- **Program structure, viewing and creating segments.**
- **First steps with the program.**
- **Quick keys used on the programmer.**
- **Creating a Project.**
- **Loading and save projects to the PLC.**
- **Online monitoring, searching, tracing and retracing.**
- **Using and creating program documentation.**
- **Editing and modifying programs.**
- **Instruction set.**
  Relay, maths, move, compare and logic functions.
- **Copying and backing up folders.**
- **Advanced functions.**
  Extended Maths, move, block moves and compares.
- **Analogue modules and analogue scaling.**
- **Modbus Plus communications.**
- **Concept of System bits.**
- **Data monitoring using the reference tables.**
- **Forcing facilities.**
- **Diagnosis and resetting faults.**
- **Application exercises on your plant exercises.**

Course Reference MODAD **Course Duration** 4 Days **Documentation** Modicon 984/Quantum Programming and Maintenance Training Manual With *Modsoft, ProWORX, ProWORX NXT or ProWORX32.*	**Modicon 984/Quantum Advanced Course** This course is aimed at Engineers and Technicians who find that making modifications is within the scope of their work and have gained a thorough basic understanding of 984/Quantum controllers. This would be the equivalent of attending a 5 day maintenance course or having relevant plant experience. The course has been designed to introduce some of the more complex functions and facilities associated with 984/Quantum controllers. Any of the Group Schneider programming software packages can be used. Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Course Content:

- **984 Instruction Set Revision.**
  Brief revision of the basic 984 instruction set.

- **Data transfer functions.**
  A detailed look at data transfer functions explaining why they are required and the number of functions that are available including:

Register to Table	Table to Register
Table to Table	Block move
Table to Block	Block to Table
FIFO operations	Table search

- **Matrix Functions.**
  Students will be introduced to logic, compare, bit shift and rotation functions.

- **Skipping Segments and Subroutines.**
  Students will be shown the advantages of using the SKIP command, but also warned of the consequences of using this function. Examples will be used to illustrate the operation of Subroutines and how they are implemented with the Jump, Label and Return functions.

- **Sweep Functions.**
  Instruction regarding the operation of the Sweep function, outlining instances where they can be applied.

- **Status words.**
  The format of the Status table will be demonstrated with an explanation of how the STAT function can be used to interrogate the system information.

- **Modbus Plus.**
  Introduction to the operation of Modbus Plus, as well as an explanation of the operation of the MSTR function. Students will be given a series of exercises to structure their understanding of the Modbus Plus hardware and software.

- **Student Exercise.**
  An exercise will be set that will involve using examples of software from all of the modules covered by the course.

Course Reference MMTMC **Course Duration** 4 Days **Documentation** Momentum Programming and Maintenance Training Manual With *ProWORX NXT or ProWORX 32.*	**Momentum PLC Maintenance Course**

Momentum PLC Maintenance Course

The course has been designed to familiarise Maintenance Engineers and Technicians with the many different aspects associated with the operation and maintenance of Momentum programmable controllers, using the Proworx NXT or 32 programming packages.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:

To introduce students to the concepts and operation of Modicon programmable controllers, including the following areas:

- Locate and replace faulty modules.
- Reload programs.
- I/O Fault finding.
- Communication faults.

- Implement changes to the program.
- Using any the group Schneider programmers to connect online and monitor programs to determine plant problems.

Course Content:

- **The hardware architecture of the Momentum range of controllers and I/O Bases.**
- **I/O Modules and wiring.**
- **Traffic cop configuration and I/O Drops.**
- **Addresses used in the momentum range of controllers.**
- **Program structure, viewing and creating segments.**
- **First steps with the program.**
- **Quick keys used on the programmer.**
- **Creating a Project.**
- **Loading and save projects to the PLC.**
- **Online monitoring, searching, tracing and retracing.**
- **Using and creating program documentation.**
- **Editing and modifying programs.**
- **Instruction set.**
  Relay, maths, move, compare and logic functions.
- **Copying and backing up folders.**
- **Advanced functions.**
  Extended Maths, move, block moves and compares.
- **Analogue modules and analogue scaling.**
- **Modbus Plus communications.**
- **Concept of System bits.**
- **Data monitoring using the reference tables.**
- **Forcing facilities.**
- **Diagnosis and resetting faults.**
- **Application exercises on your plant programs.**

Course Reference MBPC **Course Duration** 2 Days **Documentation** Modbus Plus programming and Maintenance Training Manual With *MODSOFT, ProWORX or ProWORX NXT or 32.*	## Modbus Plus Communications This 2 day course has been specifically designed to introduce students to the hardware and software configuration, installation and operation of the Modbus Plus communications network. It is therefore ideally suited for Electricians and Technicians who may be required to diagnose faults associated with Modbus Plus communication networks. The course will allow students to develop an understanding of Modbus Plus communication networks and what factors to consider when a fault occurs on the network. It will also give Electricians the confidence to discuss faults at a higher technical level. They will gain an understanding of both the hardware equipment and the physical network connections and software usage within the ladder program. **Course Content:** • **To introduce Modbus Plus network communications.** • **To familiarise students with the physical network connections.** • **To demonstrate the ease of hardware configuration.** An introduction to Modbus Plus communications, system description, performance, network architecture, terminology and general serial communication principles. • **Modbus Plus System Components.** Description of the equipment that is used to construct a Modbus Plus network. This will include descriptions of the Modbus Plus compatible PLC's, Bridge Plus, Repeater, and Multiplexer units and the Modconnect range of adapter cards. • **To demonstrate the tasks performed by the MSTR command.** Modbus Plus software configuration using the MSTR Block in ladder logic. Including, the transfer of data using the Read and Write functions and Global data exchange. Using the MSTR to allow both local and remote statistics to be accessed and reset. • **To highlight fault finding principles, the LED indicators on the network.** The use of the MBPSTAT programs as an indication of system performance and as a means of fault finding. A description of the Modbus Plus LED indicators and general system fault finding procedures. • **To demonstrate the operation of the MBPSTAT program as a fault finding tool.** • **To introduce remote programming and network bridging.** • **Modbus Plus addressing and hardware configuration.** Physical configuration requirements, Modbus Plus node addressing and cabling, configuring the network connection between devices. • **MSTR Software the Modbus Master Instruction.** • **MBPSTAT - Modbus Plus Statistics and Fault Identification.**

Course Reference S5MNT **Course Duration** 5 Days **Documentation** Siemens S5 Programming and Maintenance Training Manual.	**Siemens S5 Maintenance course**

The course has been designed to familiarise Electricians, Technicians and Maintenance Engineers with little or no experience of S5 to the many different aspects associated with the operation and maintenance of Siemens S5 controllers.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:

To introduce students to the concepts and operation of S5 programmable controllers, including the following areas:

- Locate and replace faulty modules.
- Reload programs.
- I/O Fault finding.
- Introduction to communications.

- Implement changes to the program.
- Using the programmer to connect online and monitor programs to determine plant problems.

Course Content:

- **The hardware architecture of a S5 range of controllers.**
- **I/O Modules and wiring.**
- **Addresses used in the S5 range of controllers.**
- **Data Formats.**
- **Data blocks.**
- **Program structure, introduction to blocks; OB's, PB's FB's , SB's and DB's.**
- **Introduction to LAD, CSF and STL programming formats.**
- **Introduction to project settings and file types ST.S5D etc.**
- **First steps with the program.**
- **Loading and save projects to the PLC.**
- **Online monitoring and the cross-reference XRF.**
- **Programming using LAD, CSF and STL.**
- **Editing and modifying programs.**
- **Instruction set.**
  Relay, maths, move, compare and logic functions.
- **Using and creating program documentation.**
- **Copying and backing up folders.**
- **Introduction to function blocks and their uses.**
- **Using the assignment list.**
- **Advanced functions.**
  Load, transfer, Maths and compares.
- **Analogue modules and analogue scaling.**
- **Concept of ISTACK and BSTACK.**
- **Data monitoring using the Status Variable.**
- **Forcing facilities.**
- **Application exercises on your plant programs.**

Course Reference S5INT **Course Duration** 5 Days **Documentation** Siemens S5 Programming and Maintenance Training Manual.	**Siemens S5 Intermediate Course** The course has been designed to familiarise Electricians, Technicians and Maintenance Engineers with previous experience of S5 or who have attended the 5 day maintenance course to advanced facilities and functions of the S5. Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:

To introduce students to the concepts and operation of S5 programmable controllers, including the following areas:

- Write and understand STL and CSF.
- Use and program data moving functions.
- Using PID software.
- Sinec L1 communications.
- 525 comms module.
- Program and use FB'S.
- Understand OB's further.

Course Content:

- **Brief refresher on the maintenance course topics.**
- **Using and programming STL and CSF.**
- **Creating an assignment list.**
- **Using pre programmed function blocks.**
- **Creating and programming function blocks.**
- **Creating a project and configuring DB1.**
- **Data formats.**
- **Creating data blocks.**
- **Introductions to the special OB's.**
- **PID Control.**
- **Introduction to Sinec L1.**
- **Introduction to the 525 Comms module.**
- **Rewire Functions.**
- **Advanced functions.**
  Load, transfer, Maths, compares, DO, TIR, LIR functions.
- **Analogue modules and analogue scaling.**
- **Accessing system data.**

Course Reference S7MNT **Course Duration** 5 Days **Documentation** Siemens S7 Programming and Maintenance Training Manual.	**Siemens S7 300/400 Maintenance Course**

The course has been designed to familiarise Electricians, Technicians and Maintenance Engineers with little or no experience of S7 to the many different aspects associated with the operation and maintenance of Siemens S7 controllers.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:

To introduce students to the concepts and operation of S7 programmable controllers, including the following areas:

- Locate and replace faulty modules.
- Reload programs.
- I/O Fault finding.
- Introduction to communications.

- Implement changes to the program.
- Using the Simatic S7 programmer to connect online and monitor programs to determine plant problems.

Course Content:

- **The hardware architecture of the S7 range of controllers.**
- **I/O Modules and wiring.**
- **Addresses used in the S7 range of controllers.**
- **Data Formats.**
- **Data blocks.**
- **Program structure, introduction to blocks; OB's, FC's FB's , SFC's, SFB's and DB's.**
- **Introduction to LAD, FDB and STL programming formats.**
- **Introduction to Project Structure.**
- **First steps with the program.**
- **Hardware Configuration.**
- **Downloading projects to the PLC.**
- **Creating an online connection.**
- **Online monitoring and the cross-reference XRF.**
- **Programming using LAD, FDB and STL.**
- **Editing and modifying programs.**
- **Instruction set.**
  Relay, maths, move, compare and logic functions.
- **Using and creating program documentation.**
- **Copying and backing up folders.**
- **Introduction to function blocks and their uses.**
- **Using the symbols list.**
- **Advanced functions.**
  Load, transfer, maths and compares.
- **Analogue modules and analogue scaling.**
- **Diagnostic information and module information used for fault finding.**
- **Data monitoring and modifying variables.**
- **Forcing facilities.**
- **Archiving and retrieving projects.**
- **Application exercises on your plant programs.**

Course Reference
S7INT

Course Duration
5 Days

Documentation
Siemens S7
Programming and
Maintenance
Training Manual.

Siemens S7 Intermediate Course

The course has been designed to familiarise Electricians, Technicians and Maintenance Engineers with previous experience of S7 or who have attended the 5 day maintenance course to the advanced facilities and functions of the S7 range of controllers.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:
To introduce students to the concepts and operation of S7 programmable controllers, including the following areas:

- Write and understand STL and FBD.
- Use and program data moving functions.
- Using PID software.

- MPI communications.
- Profibus DP communication.
- Using SFC's and SFB's.
- Programming and using FB's and FC's.
- Understand OB's further.

Course Content:

- **Brief refresher on the maintenance course topics.**
- **Using and programming STL and CSF.**
- **Creating an assignment list.**
- **Using pre-programmed function blocks.**
- **Advanced data types.**
- **Create and programming functions and function blocks.**
- **Creating a project and configuring DB1.**
- **Creating data blocks and instance data blocks.**
- **Local bits.**
- **Advanced CPU facilities.**
- **Memory cards.**
- **Introductions to all the special OB's.**
- **PID Control.**
- **MPI Communications.**
- **Profibus DP networks and fault finding.**
- **Advanced functions SFC's and SFB's.**
- **Analogue modules and analogue scaling.**
- **Access system data.**
- **Global data sharing.**
- **Password protection.**
- **Assignments lists.**

Course Reference
S7200MNT

Course Duration
3 Days

Documentation
Siemens S7
Programming and
Maintenance
Training Manual.

Siemens S7 200 Maintenance Course

The course has been designed to familiarise Electricians, Technicians and Maintenance Engineers with no or little experience of PLC's to the many different aspects associated with the operation and maintenance of Siemens S7 200 controllers.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:

To introduce students to the concepts and operation of Siemens S7 200 programmable controllers, including the following areas:

- Locate and replace faulty modules.
- Reload programs.
- I/O Fault finding.
- Introduction to communications.

- Implement changes to the program.
- Using the Simatic S7 200 programmer to connect online and monitor programs to determine plant problems.

Course Content:

- **The hardware architecture of the Siemens S7 200 range of controllers.**
- **I/O Modules and wiring.**
- **Addresses used in the S7 200 range of controllers.**
- **Data Formats.**
- **Data blocks.**
- **Program structure, introduction to blocks; OB's and subroutines.**
- **First steps with the programmer.**
- **Downloading projects to the PLC.**
- **Creating an online connection.**
- **Debug, online monitoring and the cross-reference XRF.**
- **Programming using LAD.**
- **Editing and modifying programs.**
- **Instruction set.**
  Relay, maths, move, compare and logic functions.
- **Using and creating program documentation.**
- **Introduction to function blocks and their uses.**
- **Using the symbols list.**
- **Advanced functions.**
  Load, transfer, maths and compares.
- **Analogue modules and analogue scaling.**
- **Diagnostic information and module information used for fault finding.**
- **Data monitoring and modifying variables.**
- **Forcing facilities.**

Course Reference
TOSTMN

Course Duration
4 Days

Documentation
Toshiba T series
Programming and
Maintenance
Training Manual.

Toshiba T Series programming & Maintenance Course

The course has been designed to familiarise Electricians, Technicians and Maintenance Engineers with the many different aspects associated with the operation and maintenance of Toshiba T series controllers.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:
To introduce students to the concepts and operation of T Series programmable controllers, including the following areas:

- Locate and replace faulty modules.
- Reload programs.
- I/O Fault finding.
- Introduction to communications.

- Implement changes to the program.
- Using the TPDS programmer to connect online and monitor programs to determine plant problems.

Course Content:

- **The hardware architecture of the Toshiba T series range of controllers.**
- **Processor LED's and indication.**
- **I/O Modules and wiring including sinking and sourcing.**
- **Addresses used in the T Series range of controllers.**
- **Data Formats.**
- **Program structure, introduction to blocks.**
- **First steps with the program.**
- **Downloading projects to the PLC.**
- **Creating an online connection.**
- **Debug online monitoring and searching.**
- **Editing and modifying programs.**
- **Instruction set.**
  Relay, maths, move, compare and logic function.
- **Using and creating program documentation.**
- **Using the symbols list.**
- **Advanced functions.**
  Load, transfer, maths and compares.
- **Analogue modules and analogue scaling.**
- **Introduction to S20 and T10 communications.**
- **Introduction to special system devices.**
- **Diagnostic information and fault finding.**
- **Data monitoring and setting variables.**
- **Forcing facilities.**

Course Reference SCADAMN **Course Duration** 4 Days **Documentation** SCADA Programming and Maintenance Training Manual.	**SCADA Courses** These 4 day courses have been designed to give Engineers an insight into the configuration and operation of the following SCADA packages:

SCADA Courses

These 4 day courses have been designed to give Engineers an insight into the configuration and operation of the following SCADA packages:

- **Wonderware Intouch.**
- **Intellution Fix / iFIX.**
- **AFE IC2000.**

- **GE-Fanuc Cimplicity.**
- **Siemens WINCC.**
- **Alspa P1200 NT.**

The courses will allow students to develop an understanding of what factors to consider when designing, developing and using SCADA systems in the field. They will gain knowledge of the system, including specific system terminology.

Where possible, application specific mimics, plant related exercises and Window development exercises will be used to allow the students to gain the greatest possible benefit from the course.

Course Content:

- **To gain an insight into the SCADA/HMI System.**
- **Windows and SCADA terminology and standards.**
- **To introduce the development of mimic window creation.**
- **To familiarise students with the basic drawing instructions.**
- **To develop an understanding of animation configuration.**
- **To develop an understanding of drivers and data transfers to a PLC.**
- **To introduce some of the systems advanced features including:**

.   **Alarms**
      Real time trending.
      Historical trending.
      Script development.
      Wizards.
      Log on priorities.

- **To introduce the runtime viewer operation.**

Course Reference
INTBUSM

Course Duration
3 Days

Documentation
Interbus Training Manual

Phoenix Contact INTERBUS Course

The course has been designed to familiarise Maintenance Engineers with the many different aspects associated with the operation, maintenance and fault finding of the Interbus field bus system.

The interface can be to either of the following PLC manufacturers Allen Bradley PLC-5 or Siemens, others by special request.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:

To introduce students to the concepts and operation of Interbus I/O systems, including the following areas:

- Locate faulty modules.
- Reload configuration into the control board.
- I/O Fault finding.
- Using the CMD software to configure and fault find.

- Understanding the Interbus modules RT and ST.
- Control board indicators and their meanings.

Course Content:

- **The hardware architecture of an Interbus system.**
- **I/O wiring of RT and ST modules.**
- **Loop wiring.**
- **Addressing.**
- **The CMD software package.**
- **The PLC or PC interface control module and indication.**
- **Configuration of the network with the CMD package.**
- **Analogue modules.**
- **Monitoring the network with the CMD software.**
- **Pre-processing of signals.**
- **Troubling shooting the Interbus control board, and network.**
- **The Interbus configuration and the control board.**
- **Transfer functions that are used in the PLC to transfer data to and from the INTERBUS controller board.**

Course Reference
Euro590+

Course Duration
2 Days

Documentation
590+ and ConfigEd Lite.

Eurotherm 590+ DC Drives Course

The course has been designed to familiarise Electricians, Technicians and Engineers with the many different aspects associated with the operation and maintenance of Eurotherm 590+ Drives.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:
To introduce students to the concepts and operation of 590+ drives, including the following areas:

- Determine the drive fault.
- Reset the drive.
- Use the keypad.
- Use ConfigEd Lite to reload the configuration.

- Understanding the configuration parameters and facilities.
- Understanding the connections to the drive.

Course Content:

- **DC motor theory.**
- **Drive connections and inputs and outputs.**
- **Drive commissioning, feedback loops, references and logic.**
- **Investigation of the ramp, speed and current software modules.**
- **Auto tuning.**
- **Creating user logic.**
- **Advanced facilities including diameter calculations.**
- **Monitoring and configuring the drive with the keypad.**
- **Using ConfigEd Lite.**
- **Configuring and monitoring the drive using ConfigEd Lite.**
- **Tuning of the current and speed loop.**
- **Programming exercises.**
- **Fault diagnostics.**
- **Introduction to serial links.**

Course Reference
Euro690+

Course Duration
2 Days

Documentation
690+ and ConfigEd Lite

Eurotherm 690+ AC Drives Course

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The course has been designed to familiarise Electricians, Technicians and Engineers with the many different aspects associated with the operation and maintenance of Eurotherm 690+ drives.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:
To introduce students to the concepts and operation of 690+ Drive, including the following areas:

- Determine the drive fault
- Reset the drive
- Use the Keypad
- Use ConfigEd Lite to reload the configuration.

- Understanding the configuration parameter and facilities.
- Understanding the connections to the drive.

Course Content:

- **AC motor theory and vector control.**
- **Drive connections and inputs and outputs.**
- **Drive commissioning, feedback loops, references and logic.**
- **Investigation of the ramp, speed and current software modules.**
- **Auto tuning.**
- **Creating user logic.**
- **Advanced facilities including diameter calculations.**
- **Monitoring and configuring the drive with the keypad.**
- **Using ConfigEd Lite.**
- **Configuring and monitoring the drive using ConfigEd Lite.**
- **Tuning of the current and speed loop.**
- **Programming exercises.**
- **Fault diagnostics.**
- **Introduction to serial links.**

Course Reference
Eurolink2

Course Duration
2 Days

Documentation
Link2 Network
Training Manual.

Eurotherm Link2 Network Course

The course has been designed to familiarise Electricians, Technicians and Engineers with the many different aspects associated with the operation and maintenance of the LINK2 network with Eurotherm drives. The course will also demonstrate how the LINK2 network connects to Profibus.

Where possible, application specific exercises, actual drawings and programs listings are used to allow the students to gain the greatest possible benefit from the course.

Objectives:
To introduce students to the concepts and operation of Link2 network and system, including the following areas:

- Use the DSD to monitor.
- Downloading a drive configuration.
- Locate link faults via the DSD software and LED indication.
- Chasing addresses from the link processors to the configuration.

Course Content:
- **concepts of LINK2 network.**
- **hardware involved in a LINK2 network.**
- **Insight into the DSD programmer introducing macros and demonstrating the communication between the drives and the LINK2 processor.**
- **Links project structure.**
- **Monitoring and downloading configurations.**
- **Editing configurations.**
- **Introduction to the communications between the processor and a Devicenet module.**
- **Communications between drives and the Link2 processor**
- **Insight into logic circuits.**
- **Advanced functions including the ramp and coiler function.**
- **Explanation of system fault finding procedures.**
- **Downloading configurations.**
- **Archiving and copying projects.**
- **Fault diagnostics and trending.**
- **Introduction to the signal path from a PLC through the Devicenet and to the Link2 processor.**