





## Contents

|  |    |
|--|----|
| About AK Training .....  | 2  |
| On site training .....   | 3  |
| CPD for FE colleges .....  | 4  |
| Overview of available courses .....  | 5  |
| Course information:  |    |
| Basic Electrics .....  | 6  |
| Vehicle Electrics Module 1<br>Electrical Principles and Circuit Testing Techniques ..... | 8  |
| Vehicle Electrics Module 2<br>Vehicle Electrical Systems and Diagnostic Principles ..... | 10 |
| CAN bus and Integrated Systems .....   | 12 |
| Electrical Systems and Diagnosis<br>IRTEC Advanced Technician Level module .....         | 14 |
| Intellitec PMC system<br>IRTEC Master Technician level module .....                      | 16 |
| Oscilloscopes and Diagnostics .....  | 18 |
| Petrol Engine Management Systems .....   | 20 |
| Common Rail Diesel Fuel Systems .....  | 22 |
| DEC Superscan II<br>Diagnostic Scan Tool .....   | 24 |
| Useful contacts .....  | 26 |





## About AK Training

AK Training is a Milton Keynes based automotive training provider that supplies professional training and development services to clients in both the light and heavy sectors of the motor industry in the UK and overseas.

Also accredited as an Approved Assessment Centre by IMI Awards Ltd and IRTEC, AK Training offers a programme of courses under the QAA scheme from IMI Awards Ltd and the IRTEC Technician Licensing scheme. Courses run at selective venues or can be delivered on site at clients premises. They are further supported by multi media presentations as well as show casing test tools, diagnostic equipment and PC based technical information systems from industry leading suppliers and manufacturers.

Clients range from independent repair specialists to franchised dealerships and motor manufacturers, and also include emergency services, overseas governments, local authorities, technical colleges and garage equipment suppliers. Services range from technical training delivery to the complete development, writing and presentation of courses tailored to the specific requirements of individual clients.

AK Training was established in 1999 and is the trading name of independent automotive training consultant Tony Kitchen. Tony is an apprentice trained and qualified vehicle technician with almost twenty five years hands on technical experience in both the light and heavy sectors of the motor industry. He has a proven track record as an MOT tester and multi award winning ex Saab master technician.

Since establishing AK Training, Tony has delivered technical training both in the UK and overseas across a variety of vehicle brands and teaching environments. This includes on site training in the Channel Islands, Northern Ireland and as far afield as the island of Bermuda.



Diagnostic equipment training: Bermuda



CAN Bus training (IRTEC): Merseyside Fire Service

Tony Kitchen is well accustomed to the high standards required of vehicle technicians in the modern motor industry due to his premium brand technical background. He has taught motor vehicle students studying towards NVQ at a technical college and carried out workplace assessments as a D32, D33 assessor. As a qualified and accomplished training instructor, Tony takes a dynamic hands-on approach to delivering high quality, professional technical training services to clients both large and small.



## On site training

AK Training has regular training venues in the Milton Keynes, Buckinghamshire and Northampton area. Sending technicians away on technical courses can be costly and inconvenient. AK Training has extensive experience of preparing and delivering training on site at clients premises. Courses can be delivered anywhere in the UK and British Isles including the Channel Islands and Republic of Ireland where suitable facilities are available. Training involving long haul flight destinations can also be arranged for which some additional considerations may apply.



Electrics Module 1: Volvo specialist, London



Engine management diagnostics, Jersey

AK Training will plan, develop, prepare and deliver a comprehensive and complete training package tailored to the specific requirements of individual clients. This includes the supply of course materials, tools and equipment, laptop PC's for training purposes, technical information systems, and where practicable also provide a vehicle; effectively bringing the whole course to the client.



CAN Bus, Merseyside Fire and Rescue Service



Oscilloscope training, High Wycombe



Diagnostic equipment, Island of Bermuda

For further information about AK Training services including on site and overseas training, contact:

**Tony Kitchen MIMI (AK Training)**

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## CPD for FE colleges (new for 2009)

AK Training is working closely in partnership with IMI Automotive Skills (a division of the IMI) to provide a programme of technical courses aimed exclusively at those teaching motor vehicle technology in FE colleges.

This is in response to government legislation passed in April 2008 requiring all teachers, lecturers and tutors in England working in an FE college to join the Institute for Learning and demonstrate evidence of continuing professional development. AK Training is supporting the IMI Automotive Skills initiative by offering a programme of 1 and 2 day courses to enable those working in FE colleges to further develop their knowledge and skills in a way that should be useful to them for their students.



CPD for colleges: December 2008. Delegates from Northampton, Bedford, Thurrock and Basildon and Eastleigh colleges test CAN Bus on live vehicles using PicoScope and Autodata.

CPD events will be scheduled at various times of the year and in response to enquiries from technical colleges. They will run from venues in the Milton Keynes, Buckingham and Northampton area or can be delivered on site at clients premises. Main course subjects include:

- CAN Bus and Integrated Systems (IMI Awards Ltd approved for QAA).
- Oscilloscope diagnostics.
- PicoScope.
- Engine management (petrol and common rail diesel).
- Diagnostic equipment.

All of AK Training's current range of courses is available for CPD. Courses can also be tailored to suit individual clients requirements.

For further information about CPD for colleges with AK Training including on site training, contact:

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## Overview of available courses

### **Basic Electrics**

A one day introductory course covering electrical theory, circuit construction, relay functions, digital multimeters and basic circuit testing techniques.

### **Electrical Principles and Circuit Testing Techniques (Electrics Module 1)**

A two day practical vehicle electrics course. This course has a Quality Assured Award certificate from IMI Awards Ltd.

### **Vehicle Electrical Systems and Diagnostic Principles (Electrics Module 2)**

A two day higher level vehicle electrical systems and diagnostics course. This course has a Quality Assured Award certificate from IMI Awards Ltd.

### **CAN bus and Integrated Systems (Electrics Module 3)**

A one day advanced level course covering automotive CAN bus and integrated vehicle electrical systems. This course has a Quality Assured Award from IMI Awards Ltd and is also accredited by IRTEC at Master Technician level under the IRTEC Technician Licensing scheme.

### **Electrical Systems and Diagnosis**

A comprehensive two part vehicle electrical systems and diagnostics course. The course is accredited by IRTEC at Advanced Technician level under the IRTEC Technician Licensing scheme.

### **Intellitec PMC system**

A one day advanced level course covering the Intellitec Programmable Multiplex Control system fitted to speciality vehicles. The course is accredited by IRTEC at Master Technician level under the IRTEC licensing scheme.

### **Oscilloscope Diagnostics**

A one day technical course covering diagnostic techniques using an oscilloscope. The course show cases oscilloscopes from Pico Technology and Fluke.

### **Petrol Engine Management Systems**

A one day technical course covering features and functions of modern petrol engine management systems.

### **Common Rail Diesel Fuel Systems**

A one day technical course covering the operation of common rail diesel fuel systems and engine management control functions.

### **DEC Superscan II**

A one day practical course for users of the DEC Superscan II diagnostic scan tool.

For further information about any of the above courses, contact:

### **AK Training**

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or visit the AK Training website at:

**[www.akautomotivetraining.co.uk](http://www.akautomotivetraining.co.uk)**



## Basic Electrics

Electrical theory and circuit  
operating principles  
by AK Training

This is a one day introductory course. It is aimed at those working in the motor industry with little or no electrical knowledge who would like to gain a greater understanding of electricity and circuit operating principles. The course covers the following main subjects:

- Electrical principles
- Circuit operating requirements
- Voltage, Amperage and Ohms
- Digital multi meter features and functions
- Circuit construction
- Series and parallel circuits
- Ohms Law and Watts Law
- NTC and PTC devices
- Relays: functions and operation
- Practical circuit testing techniques
- Course assessment



Delegates investigate circuit operating principles

At the start of the course, delegates each receive a fully illustrated workbook. During the course, they will investigate electrical principles, circuit operating requirements, relay functions and basic circuit testing techniques using a digital multi meter. The course is further supported by presentations and demonstrations. There is an end of course assessment and those who successfully complete the course will receive a certificate from AK Training in recognition of their attendance.

**Test your basic electrical knowledge**  
**Try answering the questions over the page**

### **BASIC ELECTRICS COURSE INFORMATION**

Courses are run from selective venues around the country or can be delivered on site at clients premises. For further information including next available course dates, course fees and to book a place on a course, contact:

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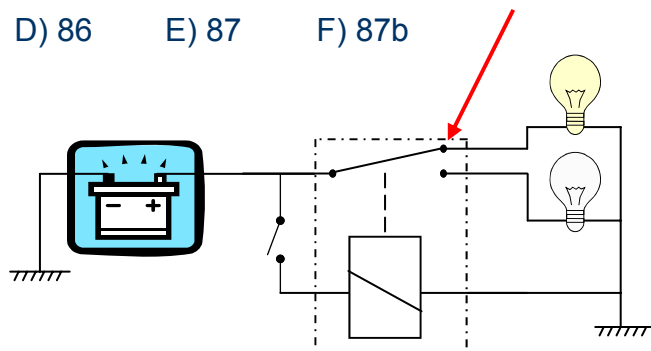
**[www.akautomotivetraining.co.uk](http://www.akautomotivetraining.co.uk)**

# Test your basic electrical knowledge

Try answering the following questions

- 1) What is indicated by a test reading of battery voltage measured at the earth terminal of a component when the circuit is switched on?
  - A) Earth wire short circuit to battery positive
  - B) Open circuit on the earth wire
  - C) Meter leads incorrectly connected
  - D) The circuit is working correctly
- 2) How will a rise in temperature affect the signal voltage from an NTC type engine coolant temperature sensor?
  - A) The signal voltage rises as temperature increases
  - B) The signal voltage remains constant but resistance decreases
  - C) The signal voltage decreases as temperature rises
  - D) None of the above answers are correct
- 3) The maximum acceptable Voltage drop measured at the positive terminal of a component with the circuit switched on and working:
  - A) Should not normally exceed 0.3 Volts.
  - B) Will be the same as the resistance of the component.
  - C) Should not normally exceed 500mV.
  - D) Is equal to the sum of the voltage drops around the circuit.
- 4) Which of the following symbols appearing on the display of a digital multi meter indicates a unit multiplier of 1 thousandth (1/1000th)?
  - A) M
  - B) O.L.
  - C) m
  - D)  $\Omega$
- 5) Which of the following 'DIN' numbers is correct for the relay terminal indicated by the red arrow in the diagram below?

- A) 85a    B) 87a    C) 85    D) 86    E) 87    F) 87b



**Did you know the answers? Would you like to know more? To book a place on the course and find out, contact AK Training.**



## Electrical Principles and Circuit Testing Techniques

Vehicle Electrics Module 1  
by AK Training

This is a two day practical vehicle electrics course. It is aimed at technicians working in the motor industry and those with relevant technical background who would like to gain the essential knowledge and skills required for carrying out effective testing and diagnosis of modern vehicle electrical systems. Experienced technicians would also find this course to be a useful refresher. The course covers the following main subjects:

- Review of electrical principles
- Digital multi meter functions and accessories
- Practical circuit testing techniques
- ISO relays and electronic relays
- Workshop information systems and wiring diagrams
- Batteries, charging and starting systems diagnosis
- Technical overview of vehicle electrical systems and standard equipment
- Fault finding and diagnostic routines
- Course assessment



Delegates carry out circuit testing and analysis of digital multi meter test data

During the course, delegates carry out a range of practical tasks on live vehicles using digital multi meters, diagnostic equipment and available technical information sources including PC based wiring diagrams. These are further supported by presentations, demonstrations and technical discussions. Assessment is carried out throughout the course and those who successfully complete the course will receive a Quality Assured Award certificate from IMI Awards Ltd.

**See over the page for further details about this course**

### **ELECTRICS MODULE 1 COURSE INFORMATION**

Courses are run from selective venues around the country or can be delivered on site at clients premises. For further information including next available course dates, course fees and to book a place on a course, contact:

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## Further information

Electrical Principles and Circuit Testing Techniques



### Pre requisites

Those attending this course should either be working in the motor industry or have a relevant technical background and prior awareness of electrical theory. Basic PC skills would also be useful. At the start of the course, delegates each receive a fully illustrated workbook. The course begins with a review of electrical principles and circuit operating requirements.

### Digital multi meter and fault finding techniques

Course practical activities involve extensive use of digital multi meter applications, test accessories (including Amps clamps) and advanced user functions. Delegates will appreciate the importance of taking accurate test measurements, recording test results and interpreting and evaluating test readings.

### ISO relays

The course explains the functions and operation of ISO relays including mini relays, micro relays and super relays. This session also covers relay types, DIN numbers, terminal configurations, current ratings and a technical overview of electronic relays.

### Wiring diagrams and electrical systems

This part of the course explains wiring diagram layouts in detail and show cases the PC based wiring diagrams and CD3 workshop information system from Autodata. Delegates use wiring diagrams to analyze electrical systems and circuit faults. There will be a technical overview of vehicle electrical systems and standard equipment to include lighting and signalling systems, windscreen wipers, horn circuits, dash instrumentation and vehicle voltage distribution on the modern vehicle.

### Batteries, charging and starting systems diagnosis

This session covers modern testing and diagnostic techniques of batteries, charging and starting systems and show cases state of the art equipment from Midtronics, CTEK and Pico Technology. Delegates will become familiar with use of digital battery testers, smart battery chargers and analysis of alternator charge ripple using an oscilloscope. The session also highlights health and safety and includes a technical overview of alternator digital field monitoring.



### Assessment

Course assessment comprises of multiple choice questionnaires and a practical task. To successfully complete the course, delegates must achieve 80% in each assessment as well as an overall test result of 80% at the end of the course. After successfully completing the course, delegates will receive a Quality Assured Award certificate from the Institute of the Motor Industry.



## Vehicle Electrical Systems and Diagnostic Principles

Vehicle Electrics Module 2  
by AK Training

This is a two day higher level course. It is aimed at technicians working in the motor industry and those with relevant technical background who would like to further develop their knowledge of electrical systems and diagnostic skills and the course builds upon the subjects covered in module 1. The course covers the following main subjects:

- Review of module 1
- Introduction to Oscilloscopes
- Sensors and actuators testing and diagnosis
- Semi conductors and solid state components
- Electronic system functions and controls
- Technical overview of multi function control modules
- Technical overview of body electrical systems and components
- Course assessment



Testing sensors and actuators using PC based oscilloscope from Pico Technology

At the start of the course, delegates each receive a fully illustrated workbook. The course is further supported by a range of practical tasks including testing sensors and actuators using an oscilloscope. There will also be a technical overview of multi function control modules and selective body electrical systems. Assessment is carried out throughout the course and those who successfully complete the course will receive a Quality Assured Award certificate from IMI Awards Ltd.

**See over the page for further details about this course**

### **ELECTRICS MODULE 2 COURSE INFORMATION**

Courses are run from selective venues around the country or can be delivered on site at clients premises. For further information including next available course dates, course fees and to book a place on a course, contact:

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## Further information

Vehicle Electrical Systems and Diagnostic Principles



### Pre requisites

Those attending this course should have either successfully completed vehicle electrics module 1 with AK Training, or alternatively have a thorough understanding of electrical principles and circuit testing techniques, be fully competent using a digital multi meter and be able to read wiring diagrams. At the start of the course, there will be a test to assess this basic knowledge. PC skills would also be useful.

There will follow a technical introduction to oscilloscopes. The course show cases the PC based automotive oscilloscope from Pico Technology and the Fluke 123 hand held scope meter. Delegates will use an oscilloscopes in conjunction with wiring diagrams and technical information to test electrical sensors and actuators.

The course also covers semi conductive materials and solid state components in motor vehicle electronic systems. It explains system functions and controls including voltage divider circuits and circuit monitoring features highlighting examples on the vehicle.

There will be a technical overview of the features and functions of multi function control modules. The course show cases the Saab DICE and TWICE modules and also covers examples of multi function control modules from other vehicle brands. Delegates carry out a series of practical tasks to investigate the following body electrical systems:

- central door locking with radio remote control
- electric window lifters with one touch operation, comfort closing and pinch guard protection
- electrically operated heated seats and mirrors with programmable memory function
- driver information displays
- trip computers
- multi function steering wheel controls



### Assessment

Course assessment comprises of multiple choice questionnaires and a practical task. To successfully complete the course, delegates must achieve 80% in each assessment as well as an overall test result of 80% at the end of the course. After successfully completing the course, delegates will receive a Quality Assured Award certificate from the Institute of the Motor Industry.

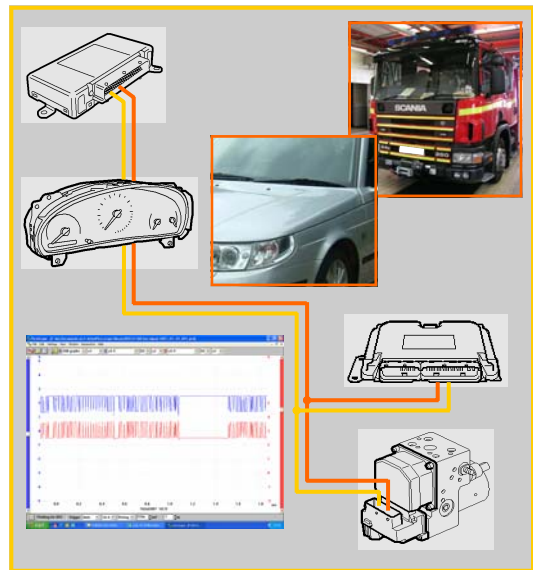


## CAN Bus and Integrated Systems

Vehicle Electrics Module 3 (IMI Awards QAA)  
IRTEC Master Technician level supplementary  
module by AK Training

CAN Bus and Integrated Systems is a one day advanced level technical course. It is aimed at both light and heavy vehicle technicians who would like to learn more about automotive CAN bus networks and the integration of modern vehicle electrical systems. Course content includes the following main subjects:

- Bus communication system developments
- Parallel and serial data transfer
- Introduction to CAN bus
- CAN hardware and terminating resistors
- Testing CAN bus voltage levels and resistance
- ISO standards for CAN bus
- The CAN protocol explained
- Physical properties of CAN bus networks
- CAN baud rates
- The CAN gateway and diagnostic interface
- CAN network topology
- Function communication chains
- Diagnosis of CAN bus related system faults
- Course assessment and feedback



The aim of this course is to give a detailed technical overview of automotive CAN bus and integrated vehicle electrical systems. At the start of the course, delegates each receive a fully illustrated colour workbook. The course comprises of a variety of classroom and workshop based activities using oscilloscopes and test equipment on live vehicles. There is an end of course assessment and the course is accredited by IMI Awards Ltd and IRTEC.

**See over the page for further details about this course**

### CAN BUS COURSE INFORMATION

Courses are run from selective venues around the country or can be delivered on site at clients premises. For further information including next available course dates, course fees and to book a place on a course, contact:

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## Further information

CAN Bus and Integrated Systems



### Pre requisites

Delegates attending this course should have either successfully completed vehicle electrics module 1 and module 2 with AK Training or be accredited by IRTEC at Advanced Technician level, or alternatively have at least three years experience in the motor industry with an in depth knowledge, background and experience of vehicle electrical systems and diagnostic procedures. Basic PC skills would also be useful.

### Course content

The course begins with a technical overview of system developments and data transfer around the vehicle. It explains the difference between hardwired and CAN signals and defines serial and parallel communication. There will be a detailed technical overview of CAN protocol, CAN hardware requirements and testing voltage and resistance levels on the bus. Different applications of bus networks will be explained including powertrain and body related CAN bus systems. The course explains the CAN gateway, the scan tool diagnostic interface and CAN ISO standards including terminal configurations at the vehicle data link connector.

### Practical activities

Delegates will test the voltage levels and resistance of the CAN bus on live vehicles using an oscilloscope and digital multimeter. They will study the CAN network topology and functionality of CAN bus systems for selective vehicles using wiring diagrams and available technical information sources.

By the end of the course, delegates will be able to define CAN bus and understand how CAN bus influences the functions of vehicle electronic systems. They will appreciate the different approach to diagnosis that is required for CAN Bus related faults and be able to apply what they have learnt when carrying out diagnosis and testing of modern integrated vehicle electrical systems.



### Assessment

Course assessment comprises of multiple choice questionnaires and a practical task. To successfully complete the course, delegates must achieve 80% in each assessment as well as an overall test result of 80% at the end of the course. After successfully completing the course, delegates will receive either a Quality Assured Award certificate from IMI Awards Ltd or a Certificate of Professional Competence from the Institute of Road Transport Engineers. The course is also accredited by IRTEC at Master Technician level under the IRTEC Technician Licensing scheme.

CAN Bus and Integrated Systems  
by AK Training





## Electrical Systems and Diagnosis

IRTEC Advanced Technician level supplementary module by AK Training

This is a comprehensive, two part vehicle electrical course. Originally developed for Merseyside Fire and Rescue Service, it is aimed at technicians working in the heavy to medium sector of the motor industry including public service vehicles and emergency services. The course covers the following main subjects:

### Part 1 (three days)

- Health and Safety
- Review of electrical principles
- Digital multi meter functions and accessories
- Practical circuit testing techniques
- ISO relays and electronic relays
- Batteries, charging and starting systems diagnosis
- Workshop information systems and wiring diagrams
- Course assessment

### Part 2 (three days)

- Review of part 1
- Oscilloscope features and functions
- Sensors and actuators testing and diagnosis
- Semi conductors and solid state components
- Electronic system functions and controls
- Technical overview of electrical systems and components
- Practical fault finding and diagnostic routines
- Course assessment



See over the page for further details about this course

## ELECTRICAL SYSTEMS COURSE INFORMATION

This course can be delivered on site at clients premises or from Merseyside Fire and Rescue Service Safety Training Centre at Croxeth, Liverpool. It is accredited by IRTEC at Advanced Technician level under the IRTEC Technician Licensing scheme. For further information, contact:

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## Further information

### Electrical Systems and Diagnosis

Delegates must successfully complete part 1 of the course before attending part 2. The course comprises of a range of practical activities to develop the knowledge and skills required to carry out effective testing and diagnosis of modern vehicle electrical systems. This includes the use of test instruments and oscilloscopes, wiring diagrams and technical information sources, and the implementation of logical fault finding routines and disciplines. Assessment is ongoing throughout the course via a series of multiple choice questionnaires and assessment of practical activities. To successfully complete the course, participants must achieve 80% in each of the assessments and also 80% overall at the end of the course.

#### IRTEC Accreditation

Upon successful completion of the course, delegates will receive a certificate of professional competence from the Institute of Road Transport Engineers in recognition of their achievement. For those working towards gaining an IRTEC license, the course is also accredited as a supplementary module at Advanced Technician level under the IRTEC Technician Licensing scheme.

#### Merseyside Fire and Rescue Service

Vehicle technicians from the Merseyside Fire and Rescue Service successfully completed the Electrical Systems and Diagnosis course with AK Training. The course was delivered as part of an ongoing staff training and development programme undertaken by Merseyside Fire Service to have their technicians licensed under the IRTEC licensing scheme. The technicians are now accredited with a supplementary module at Advanced Level towards obtaining their IRTEC licence.





## Intellitec Programmable Multiplex Control System

IRTEC Master Technician level supplementary module by AK Training

This is a one day advanced level course. Originally developed for Merseyside Fire and Rescue Service, it is aimed at vehicle technicians working on speciality vehicles such as those used by fire and rescue and public services equipped with the Intellitec Programmable Multiplex Control (PMC) system.

The course covers the following main subjects:

- Introduction to Intellitec
- Main features of Intellitec PMC
- Overview of available PMC modules
- Technical overview of selective PMC modules
- Operation of the Intellitec PMC system
- Overview of Boolean Logic
- Fault diagnosis and test equipment
- Test Intellitec PMC signals
- Practical use of Intellitec module simulator
- Course assessment and feedback



The aim of the course is to give a detailed technical overview of the Intellitec PMC system. The course comprises of a variety of classroom and workshop based activities and has an end of course assessment. Those who successfully complete the course will receive a Certificate of Professional Competence from the Institute of Road Transport Engineers. The course is also accredited by IRTEC as a supplementary module at Master Technician level under the IRTEC licensing scheme.

See over the page for further details about this course



### INTELLITEC COURSE INFORMATION

This course can be delivered on site at clients premises or from Merseyside Fire and Rescue Service Safety Training Centre at Croxteth, Liverpool. It is accredited by IRTEC at Master Technician level under the IRTEC Technician Licensing scheme. For further information, contact:

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## Further information

### Intellitec Programmable Multiplex Control

Delegates attending this course should have an in depth knowledge, background and experience of vehicle electrical systems, electrical principles, fault finding and diagnosis or be accredited by IRTEC at Advanced Technician level.

The course begins with an introduction to multiplexing and explains the main features and functions of the Intellitec PMC system, including an overview of the Intellitec PMC communication protocol and comparison with CAN (note that knowledge of CAN bus is useful but not essential as the two systems are fundamentally different). There follows a detailed technical overview of a selection of the most common control modules used in the design and construction of a purpose built Intellitec PMC system. The main features and functions of each module are explained along with additional optional programmable features.

During the course, delegates also learn about the clock/time process of the Intellitec PMC system, data signal loops, module address codes and channel numbers. The multiplex module simulator from Intellitec will be explained and a data signal will be tested on a live vehicle using an oscilloscope. By the end of the course, delegates will understand the operation of the Intellitec PMC system, be able to identify and explain the features and functions of individual modules and carry out diagnosis and testing using dedicated test equipment as well as conventional test instruments.

Assessment is on going throughout the course and comprises of multiple choice questionnaires and assessment of practical activities. To successfully complete the course, delegates must achieve 80% in each assessment as well as 80% overall at the end of the course.

### IRTEC Accreditation

Those who successfully complete the course will receive a certificate of professional competence from the Institute of Road Transport Engineers in recognition of their achievement. The course is also accredited by IRTEC as a supplementary module at Master Technician level under the IRTEC licensing scheme.



Intellitec Programmable Multiplex Control  
by AK Training





## Oscilloscope Diagnostics

by AK Training

This is a one day practical course. It is aimed at vehicle technicians who would like to learn more about diagnostic techniques using an oscilloscope. Those who are either new to oscilloscopes or are considering purchasing a scope would also find this course to be very useful. The course covers the following main subjects:

- Appreciation of Oscilloscope compared to digital multimeter
- Features and functions of oscilloscopes
- Waveforms and scope traces explained
- PicoScope
- Diagnostic techniques
- Engine management diagnosis
- CAN bus diagnosis
- Additional functions of oscilloscopes
- Course assessment



Course aims and objectives are to give a detailed practical overview of an oscilloscope and how to use a scope for carrying out testing and diagnosis of modern vehicle systems. Basic test measurements will be covered as well as analysis of complex electrical signals and waveforms. The course is further supported by presentations, demonstrations and practical activities using live vehicles.

**See over the page for further details about this course**

### **OSCILLOSCOPE DIAGNOSTICS COURSE INFORMATION**

Courses are run from selective venues around the country or can be delivered on site at clients premises. For further information including next available course dates, course fees and to book a place on a course, contact:

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# Further information

## Oscilloscope Diagnostics

### PicoScope

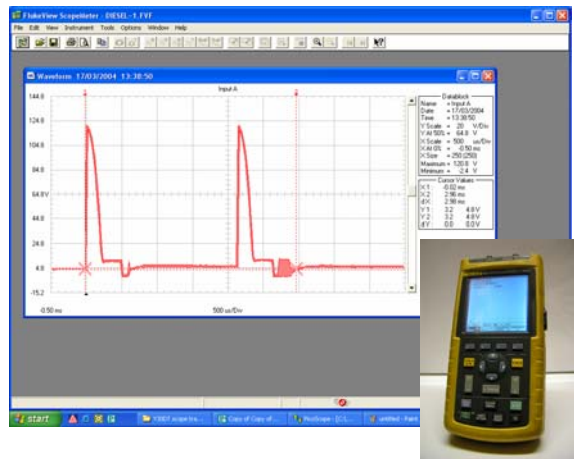
The course specifically showcases PicoScope (latest version 6). AK Training has also developed a full colour technical booklet which explains the various features of PicoScope. A copy of the booklet is included with the course notes for delegates to take away with them at the end of the course. For those considering purchasing a PicoScope, this is an ideal opportunity to gain valuable hands on experience and an unbiased opinion of the PicoScope from an experienced users perspective.

Practical activities during the course include testing and diagnosis of engine management and body related systems and components, sensors and actuators, digital signals and CAN bus. Delegates will learn how to adjust and manipulate the scope settings to optimize viewing of waveforms.

The course explains additional features of an oscilloscope including saving scope traces onto PC, use of oscilloscopes with workshop information systems, and use of accessories such as amps clamps and ignition probes.

Also shown on the course is the hand held Fluke 123 scope meter. This tool (used by Vauxhall under the name of Tech 32), is compatible for use with the GM workshop information system TIS.

Delegates are welcome to bring their own scope for use on the course if they wish.



By the end of the course, delegates will be able to apply what they have learnt to assist with carrying out effective testing and diagnosis of vehicle electronic systems using an oscilloscope. There is an end of course assessment comprising of a short multiple choice questionnaire. Those who successfully complete the course will receive a certificate from AK Training in recognition of their attendance.



## Petrol Engine Management Systems

by AK Training

This is a one day technical course. It is aimed at vehicle technicians who would like to learn more about the function and operation of integrated petrol engine management systems. The course covers the following main subjects:

- Engine ECM functions and operation
- Ignition and fuel system diagnosis
- Sensor signal utilization
- Actuator control functions
- Fuel trim and adaptation
- EOBD and diagnostic trouble codes
- Live data analysis and actuator diagnosis
- Turbo boost control systems
- Emission control systems
- Diagnosis and fault finding
- Course assessment



The aim of the course is to give a technical overview of petrol engine management systems and diagnostic techniques. At the start of the course, delegates each receive a fully illustrated workbook. The course is further supported by technical presentations, demonstrations and a variety of practical tasks on live vehicles using test instruments, diagnostic equipment and available technical information.

**See over the page for further details about this course**

### **PETROL ENGINE MANAGEMENT COURSE INFORMATION**

Courses are run from selective venues around the country or can be delivered on site at clients premises. For further information including next available course dates, course fees and to book a place on a course, contact:

**Tony Kitchen** MIMI (AK Training)

**TELEPHONE:** 01908 579309      **MOBILE:** 07968 842274

**E-MAIL:** [info@akautomotivetraining.co.uk](mailto:info@akautomotivetraining.co.uk)

**[www.akautomotivetraining.co.uk](http://www.akautomotivetraining.co.uk)**

## Further information

### Petrol Engine Management Systems

The course begins with a review of technical developments and the main functions of the engine ECM. There will be a practical overview of ignition and fuel delivery systems diagnosis to include use of fuel pressure test equipment, vacuum gauges and four gas exhaust emissions analyser. Misfire detection and catalytic converter diagnosis will also be covered. There will follow a more detailed technical overview of ECM critical input requirements and how sensor signals are utilized by the ECM for controlling the various actuators and engine management sub systems.

The course includes a technical overview of electronic throttle, engine torque control, turbo boost pressure and emission control systems.

The course also explains EOBD, diagnostic trouble codes, drive cycles, warm up cycles, trips and generation of readiness codes.

Short term fuel trim and adaptive learning will be explained along with emergency operating modes of the engine ECM.



Practical activities during the course include analysis of fuel and ignition system related faults using all available diagnostic tools and test equipment, wiring diagrams and technical information.

By the end of the course, delegates will understand the function and operation of the petrol engine management system and be able to identify factors (both mechanical and electronic) which can affect the smooth running of the engine.

Those attending this course should have a thorough understanding of electrical principles and circuit testing techniques, be fully competent with use of a digital multi meter and be able to read wiring diagrams.

There is an assessment at the end of the course comprising of a short multiple choice questionnaire. Those who successfully complete the course will receive a certificate from AK Training in recognition of their attendance.



## Common Rail Diesel Fuel Systems

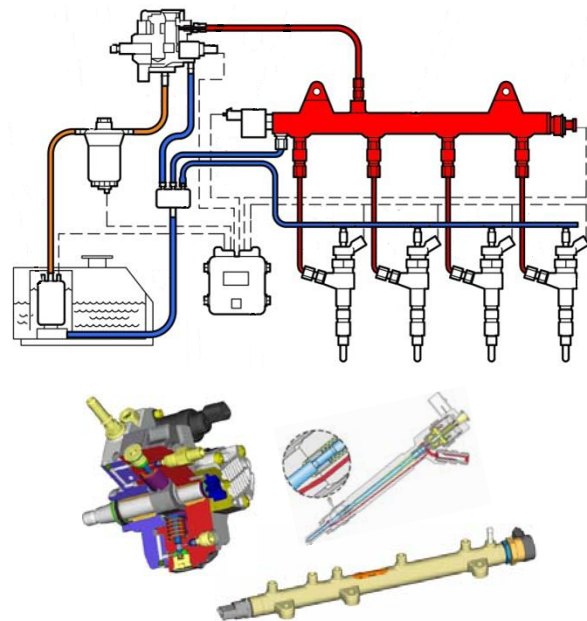
NEW for 2009

by AK Training

This is a one day technical course. It is aimed at vehicle technicians who would like to gain a greater understanding of the operation of common rail diesel fuel systems and associated engine management control functions.

The course covers the following main subjects:

- Developments in electronic diesel control
- Introduction to common rail
- Overview of common rail fuel system main components
- Low and high pressure fuel delivery
- High pressure fuel pumps
- Fuel metering and pressure control
- Injectors, types, operation and testing
- Control functions of the engine ECM
- EOBD
- Fault diagnosis and system testing
- Practical tasks
- Course assessment



The aim of the course is to give a technical overview of common rail diesel fuel systems and diagnostic techniques. At the start of the course, delegates each receive a fully illustrated colour workbook. The course is supported by technical presentations, demonstrations and a variety of practical tasks on live vehicles using test instruments, diagnostic equipment and available technical information.

**See over the page for further details about this course**

### COMMON RAIL DIESEL COURSE INFORMATION

Courses are run from selective venues or can be delivered on site at clients premises. For further information including next available course dates, course fees and to book a place on a course, contact:

**Tony Kitchen MIMI (AK Training)**

**TELEPHONE:** 01908 579309      **MOBILE:** 07968 842274

**E-MAIL:** [info@akautomotivetraining.co.uk](mailto:info@akautomotivetraining.co.uk)

**[www.akautomotivetraining.co.uk](http://www.akautomotivetraining.co.uk)**

## Further information

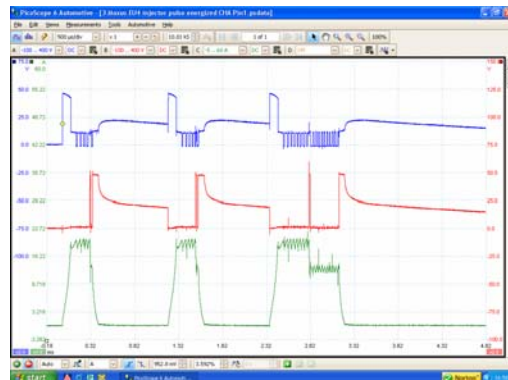
### Common Rail Diesel Fuel Systems

The course begins with a review of developments in electronic diesel control systems and compares past with present. There follows an introduction to common rail, highlighting the advantages and benefits with respect to emission legislation and performance. This includes familiarization with the fuel system layout and an explanation of the function of the main system components. Health and safety considerations are also covered with particular regard to fuel system pressures.

The function and operating principles of the high pressure fuel pump will be explained. There will be an overview of different fuel pump types and the course show cases examples of fuel pump variants.

Fuel metering, rail pressure control and two point fuel pressure control will be explained along with the operation of the fuel control solenoids. A technical overview of fuel injectors includes the Piezo stack actuator as well as solenoid type injectors.

The course explains the principles of torque orientated control of modern diesel fuel systems and also covers EOBD (mandatory for diesel passenger cars since 2004).



Practical activities during the course include familiarization of high pressure fuel pump components, testing and diagnosis of the fuel and engine management systems, analysis of diagnostic trouble codes and live data, and testing and diagnosis of components using dedicated tools and equipment, test instruments, oscilloscope, diagnostic scan tool, wiring diagrams and available technical information.

By the end of the course, delegates will have gained knowledge and understanding of the common rail diesel fuel system. This should be useful to them in carrying out servicing and repairs to their customers vehicles.

There is an assessment at the end of the course comprising of a short multiple choice questionnaire. Those who successfully complete the course will receive a certificate from AK Training in recognition of their attendance.



## DEC Superscan II Diagnostic Scan Tool

Practical overview of features and functions  
by AK Training



This is a one day technical course for the DEC Superscan II diagnostic scan tool. The course is aimed at existing users as well as those who are either considering purchasing a DEC Superscan II or have just taken delivery and would like to learn more about how to get the best from its extensive features and functions.

The course covers the following main subjects:

- Overview of main features and functions
- Registration, set up and configuration
- Software updates and downloads
- Generating technical reports
- Obtaining technical support
- Diagnostic functions and applications
- Advanced features and special functions
- EOBD
- Oscilloscope testing
- CAN bus analysis
- Practical tasks
- End of course questionnaire



Course aims and objectives are to give a detailed technical overview of all of the features and functions of the DEC Superscan II diagnostic tool. The course comprises of a range of practical activities supported by presentations, demonstrations and technical discussions.

See over the page for further details about this course

### DEC SUPERSCAN II COURSE INFORMATION

Courses are run from selective venues around the country or can be delivered on site at clients premises. For further information including next available course dates, course fees and to book a place on a course, contact:

**Tony Kitchen** MIMI (AK Training)

**TELEPHONE:** 01908 579309      **MOBILE:** 07968 842274

**E-MAIL:** [info@akautomotivetraining.co.uk](mailto:info@akautomotivetraining.co.uk)

**[www.akautomotivetraining.co.uk](http://www.akautomotivetraining.co.uk)**

## Further information

### DEC Superscan II



The DEC Superscan II course has been developed by AK Training in partnership with Buckingham based company Maverick Technology (sole UK importer of the DEC Superscan II) in response to technical support enquiries and requests for training from existing users and prospective purchasers.

The course begins by explaining all aspects of installation and set up of the DEC Superscan II, including procedures for downloading of software and firmware updates from the DEC Automotive website, and generating technical report files.

There will follow a detailed technical overview covering all of the features and functions of the DEC Superscan II. Delegates will carry out a range of practical activities on live vehicles and test rigs designed to enable them to make best use of the extensive features and functions of the tool when working on customer's vehicles. This will include analysis of CAN bus, use of the integrated dual channel oscilloscope, and capturing live data snapshots for future reference and fault diagnosis.

Delegates will also learn how to access and make best use of the comprehensive library of help files contained within the software of the DEC Superscan II. These are useful when carrying out advanced procedures such as BSI configuration on Peugeot/Citroen vehicles and programming of immobilizer transponders and airbag control modules.

Existing users are invited to bring their own DEC Superscan II and laptop PC along to the course. Fully functioning demonstration models are also available for use during the course. By the end of the course, delegates will have gained in depth knowledge and understanding of the features and functions of the DEC Superscan II and will be able to apply what they have learnt when carrying out work on customer's vehicles. There is an end of course test comprising of a short multiple choice questionnaire and those who successfully complete the course will receive a certificate from AK Training and Maverick Technology in recognition of their attendance.



## Useful contacts



Pico Technology is a worldwide leader in the design, development and manufacture of high performance PC Oscilloscopes and Data Loggers. Products include the award winning Automotive Diagnostic kit.

Pico Technology Ltd  
James House  
Marlborough Road  
Colmworth Business Park  
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**Email:** sales@autodata.ltd.uk  
**Website:** www.autodata.ltd.uk

### Maverick Technology



Buckingham based company Maverick Technology supplies state of the art diagnostic tools and test equipment to the motor industry. Products range from diagnostic scan tools to exhaust gas analysers and oscilloscopes. For further information, contact:

Maverick Technology (UK) Ltd  
Unit 9 Swan Business Centre  
Osier Way  
Buckingham  
MK18 1TB

**Telephone:** 00 44 (0)1280 816 333  
**Fax:** 00 44 (0)1280 816 111  
**E-mail:** sales@MaverickTechnology.co.uk  
**Website:** www.mavericktechnology.co.uk



Rozone Ltd provides a comprehensive range of environmentally friendly industrial cleaning and servicing equipment. The company is also a leading UK supplier for the Midtronics range of battery testing and diagnostic and charging equipment.

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