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The Ultimate  
Driving Machine



**BMW** Young Academy

## **ZKE Systems**

Lesson 3:  
System Diagnosis

# Student Workbook

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## About Young Academy

Discover the skills needed to work in the automotive industry and learn about the science and technology behind the cars with Young Academy, BMW Education's online resource for 14 to 16 year olds.

**Young Academy** is a series of lessons based on BMW Academy's own award-winning apprenticeship programme. By working through the lessons, you will take a journey from learning about the principles of electrical theory, to developing an understanding of the skills and knowledge needed to become a motor industry technician.

The Young Academy lessons are available from the BMW Education website at: [www.bmweducation.co.uk/YoungAcademy](http://www.bmweducation.co.uk/YoungAcademy).

## About ZKE Systems Lesson 3: System Diagnosis

In the third lesson of the ZKE Systems lessons you will find out what processes a technician working at a BMW dealership undertakes when a customer takes their car in because the windscreen wipers are not working.

With the following information you will be able to understand why the windscreen wipers are not working and understand how to fix the fault.

# Lesson 3: Systems Diagnosis

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## **Lesson 3: Systems Diagnosis**

### **Objectives**

At the end of this lesson you should be able to:

- Know how diagnostic equipment is used to diagnose a customer concern
- State the correct order of diagnostic steps.

## **Lesson 3: Systems Diagnosis**

### **Setting the Scene**

A customer has stated to the service advisor that their car's windscreen wipers are not working.

The vehicle is a 2006 BMW 3 series (E90).

It is the technician's task to diagnose the concern.

## Lesson 3: Systems Diagnosis

### Options Menu

For the technicians, there are five options to choose from in the menu  
These are:



**1.** Within a dealership you will normally find that jobs are given to a technician in the form of job cards. These contain lots of important information that the technician requires in order to work on the vehicle. It can contain information such as vehicle colour, registration number and a description of what the customer would like carried out i.e. a service. Any further details such as the incorrect functioning of components will also be recorded here.



**2.** All motor vehicle manufacturers have standard diagnostic connections. At present, these have 16 pin connectors and allow communication between the vehicle and diagnostic machines. These diagnostic machines can either be manufacturer specific or not. Computers on vehicles have the capability to store faults in order to point the technician in the right direction. These machines can also activate components.



**3.** Nearly all diagnostic machines have two main functions. These are normally split into two providing technical information, i.e. torque settings and diagnosis. BMW systems are combined in one unit called GT1 (at present), which is essentially a touch screen laptop.



4. Nearly all diagnostic machines have two main functions. These are normally split into providing technical information i.e. torque settings and diagnosis. BMW systems are combined in one unit called GT1 (at present), which is essentially a touch screen laptop.



5. Multimeters are very useful pieces of equipment for the modern day vehicle technician. They are invaluable to aid diagnosis of electrical faults and can measure:

- Volts AC/DC
- Amps
- Resistance
- Diodes.

## **Lesson 3: Systems Diagnosis**

### **Diagnostic Process**

Technicians follow a 6 step diagnosis process. The order of the 6 step diagnostic is as follows:

1. Collect evidence
2. Analyse the evidence
3. Locate the fault
4. Determine and remove the cause
5. Rectify the fault
6. Check the system.

## **Lesson 3: Systems Diagnosis**

### **Summary**

In this lesson you have learnt about the 6 step diagnostic procedure that is used by all of BMW technicians to solve a customer concern.