

**-SQA-SCOTTISH QUALIFICATIONS AUTHORITY**

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**NATIONAL CERTIFICATE MODULE DESCRIPTOR**

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**-Module Number- 0094382 -Session-1989-90**  
**-Superclass- XS**

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**-Title- STEERING SYSTEMS (UNASSISTED): REMOVAL,  
REPLACEMENT AND ADJUSTMENT OF  
COMPONENTS**

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**-DESCRIPTION-**

**Purpose** This module is designed to develop knowledge and skills required to carry out the removal replacement and adjustment of light vehicle unassisted steering systems.

It is aimed at those intending to pursue a career in the motor vehicle repair industry. The module is also designed to complement RTITB module LV207B Steering Systems (Unassisted): Removal, Replacement and Adjustment of Components and will provide the student with the necessary knowledge and skills to prepare for the RTITB Skills Test. It should be noted however that adequate supporting industrial experience will also be necessary.

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**Preferred Entry Level** Modules numbered 94370 through 94378 inclusive.

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**Learning Outcomes** The student should:

1. identify steering components by name, function and location;
2. identify the purposes of steering geometry;
3. remove and replace steering components;
4. dismantle, assemble and adjust a steering rack assembly;
5. measure and adjust steering geometry.

Content/ Context	<p>Safety regulations, safe working practices and procedures should be observed at all times.</p> <p><u>Corresponding to Learning Outcomes 1-5:</u></p> <p>This module should be taught in the context most suited to the students' particular needs.</p> <p>This module is intended to give students an understanding of the reasons for servicing of vehicle steering systems, as a means of promoting vehicle safety, prolonging operational life and maintaining to original specification.</p>
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Suggested Learning and Teaching Approaches	<p>This module should be undertaken in a service workshop with an adequate range of vehicles and components to be covered. Students should have full access to relevant service publications, special tools and test equipment for the satisfactory performance of the tasks.</p> <p>Where a training programme includes Module 94388 Suspension Systems (Mechanical), it is suggested that it should be taught in conjunction with this module.</p>
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Assessment Procedures	<p>Acceptable performance in the module will be satisfactory achievement of all the performance criteria specified for each Learning Outcome.</p> <p>The following abbreviations are used below:</p> <p>LO Learning Outcome IA Instrument of Assessment PC Performance Criteria</p>
LO1	<p>IDENTIFY STEERING COMPONENTS BY NAME, FUNCTION AND LOCATION</p> <p>PC The student:</p> <ol style="list-style-type: none"> <li>(a) names the components of a rack and pinion layout;</li> <li>(b) names the components of a beam axle steering layout;</li> <li>(c) names the components of a three piece track rod steering layout;</li> <li>(d) states the function and location of components used in a steering system.</li> </ol>

## IA Objective Test

The student will be presented with an objective test to test the recall of knowledge relating to the identification of steering system components.

The test could take the form of short answer or multiple choice questions.

The test will consist of 12 items allocated as follows:

- (a) rack and pinion - 3
- (b) beam axle - 3
- (c) three-piece track rod - 3
- (d) function and location - 3

Satisfactory achievement of the learning outcome will be based on all performance criteria being met. This will be demonstrated by the student producing two correct responses for (a), (b) and (c); and 3 correct responses for (d) above.

## LO2

## IDENTIFY THE PURPOSES OF STEERING GEOMETRY

PC The student:

- (a) outlines the "Ackerman" principle;
- (b) outlines the importance of front wheel alignment;
- (c) defines the terms centre point steering, self centring steering and steering offset;
- (d) outlines the methods by which centre point steering/steering offset is obtained;
- (e) outlines the methods by which self-centring steering is obtained.

## IA Restricted Response Questions

The student will be presented with a test consisting of questions to test the recall of knowledge of the purposes of steering geometry.

The questions will be allocated as follows:

- (i) Ackerman principle 2 questions
- (ii) front wheel alignment 2 questions
- (iii) centre point steering/ 1 question  
steering offset
- (iv) camber 1 question
- (v) King Pin Inclination (KPI) 1 question
- (vi) castor 1 question
- (vii) dished wheel 1 question
- (viii) self-centring steering 1 question

Satisfactory achievement of the learning outcome will be based on all performance criteria being met. This will be demonstrated by the student producing correct responses to all ten questions.

LO3

**REMOVE AND REPLACE STEERING COMPONENTS**

PC The student:

- (a) follows recommended procedures outlined in technical data for carrying out each task;
- (b) follows all safe working practices relevant to the task;
- (c) uses vehicle protection as appropriate to the task;
- (d) uses tools appropriate to the task.

IA Practical Exercise

The student will be presented with a series of practical exercises in a workshop environment to test the application of knowledge and skills involved in removing and replacing a range of steering components in accordance with recommended procedures. These procedures may be found in a variety of technical publications including manufacturers' workshop manuals, service bulletins. Each student should undertake the following tasks:

- (i) remove and replace rack and pinion assembly
- (ii) remove and replace track rod ends
- (iii) remove and replace column bushes
- (iv) remove and replace swivel ball joints

Satisfactory achievement of the learning outcome will be based on all performance criteria being met for all tasks undertaken. Suitable checklists may be used to record student performance.

LO4

**DISMANTLE, ASSEMBLE AND ADJUST A STEERING RACK ASSEMBLY**

PC The student:

- (a) follows the recommended procedures outlined in appropriate technical data;
- (b) uses tools appropriate to the task;
- (c) adjusts the steering rack assembly to within the tolerances stated in the appropriate technical data.

## IA Practical Exercise

The student will be presented with a practical exercise in a workshop environment to test the application of knowledge and skills involved in dismantling, assembling and adjusting a steering rack assembly. The exercise will be undertaken on one assembly.

Satisfactory achievement of the Learning Outcome will be based on all performance criteria being met. A suitable checklist may be used to record student performance.

## LO5

## MEASURE AND ADJUST STEERING GEOMETRY

PC The student:

- (a) follows recommended procedures outlined in technical data for carrying out each task;
- (b) prepares vehicle and equipment for carrying out checks;
- (c) follows all safe working practices relevant to the task;
- (d) uses tools appropriate to the task in order to obtain accurate results.

## IA Assignment

The student will be presented with an assignment in a workshop environment to test the application of knowledge and skills required to measure steering angles and adjust front wheel alignment. The student will be presented with a pro forma for completion with the following information:

- (i) manufacturers specified settings
- (ii) actual measurements taken
- (iii) errors, if any, for each of the following:
  - (a) wheel alignment
  - (b) toe-out on turns
  - (c) camber
  - (d) castor
  - (e) K P I

The student will also be required to adjust the wheel alignment to a setting pre-determined by the lecturer.

Satisfactory achievement of the Learning Outcome will be based on all performance criteria being met. This will be demonstrated by accurate completion of the pro-forma and correct adjustment of the wheel alignment.