

**-SQA- SCOTTISH QUALIFICATIONS AUTHORITY**

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**NATIONAL CERTIFICATE MODULE DESCRIPTOR**

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**-Module Number- 2210801  
-Superclass- XS**

**-Session-1991-92**

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**-Title- POWER ASSISTED STEERING SYSTEMS**

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**-DESCRIPTION-**

**Purpose** This module is designed to develop the knowledge and skills required to remove, replace, diagnose and repair faults in motor vehicle, hydraulic power assisted steering systems.

It is intended for those pursuing a career in the vehicle repair industry as light or heavy vehicle repairers and should be supported by appropriate industrial experience.

The standards contained in the module cover the work and Transkill Assessments for RTITB Skills Tests LV2108B steering Systems - Power Assisted: Removal, Replacement and Adjustment of Components and LV211C Steering Systems - Power Assisted; Condition Assessment and Fault Finding.

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**Preferred Entry Level** No formal entry requirements.

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**Outcomes** The student should:

1. identify the components of a hydraulic power assisted steering system;
2. outline the operation of a power assisted steering system;
3. remove and replace power assisted steering components;
4. assess the condition of a power assisted steering system.

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Assessment Procedures Acceptable performance in this module will be satisfactory achievement of all the Performance Criteria specified for each Outcome.

The following abbreviations are used below:

PC Performance Criteria  
IA Instrument of Assessment

**Note:** The Outcomes and PCs are mandatory and cannot be altered. The IA may be altered by arrangement with SQA. (Where a range of performance is indicated, this should be regarded as an extension of the PCs and is therefore mandatory.)

## OUTCOME 1 IDENTIFY THE COMPONENTS OF A HYDRAULIC POWER ASSISTED STEERING SYSTEM

- PCs
- (a) The location of the components is correct for an integral ram type power assisted steering system.
  - (b) The location of the components is correct for an external ram type power assisted steering system.
  - (c) The naming of the components is correct for a specified power assisted steering system.
  - (d) The identification of the functions of the components is correct for a specified power assisted steering system.

IA Objective Items

The student will be presented with an exercise consisting of objective items to test knowledge relating to the identification and function of components.

The test will take the form of 34 short answer questions allocated as follows:

(i) Location for an integral ram type system of:

pump	1
ram	1
reservoir	1
control valve	1
filter	1
regulating valves	1
flow control valve	1
pipe lines	1

(ii) Location for an external ram type system of the components in (i) above 8

(iii) Naming of the components in (i) above 8

(iv) Function of:

- Fluid system:
- reservoir, filter,  
pipelines 2
- Pumping system:
- pump drive,  
pump, flow control valve,  
pressure control valve 3
- Steering control valve 3
- Assisting rams and  
- Mountings 1
- Modified steering  
geometry 1

Satisfactory achievement of the Outcome will be based on all Performance Criteria being met. This will be based on the student producing correct responses as follows:

- (i) 8 correct answers
- (ii) 8 correct answers
- (iii) 8 correct answers
- (iv) 8 correct answers

## OUTCOME 2

### OUTLINE THE OPERATION OF A POWER ASSISTED STEERING SYSTEM

PCs

- (a) The explanation of the requirements of a power assisted steering system is comprehensive in terms of:
  - (i) reducing driver effort;
  - (ii) retaining steering "feel";
  - (iii) remaining "fail safe";
  - (iv) providing full assistance at low, parking speeds.
- (b) The explanation of the operation of the system is correct in terms of:
  - (i) low engine speeds;
  - (ii) high engine speeds;
  - (iii) steering not being operated, engine running;
  - (iv) light and heavy steering loads;
  - (v) full lock operation;
  - (vi) engine not running, steering operated.

IA Objective Items

The student will be presented with an exercise consisting of objective items to test knowledge relating to the operation of a power assisted steering system.

The exercise will take the form of 10 short answer questions based on the PC and allocated as follows:

PC (a)	(i)	1
	(ii)	1
	(iii)	1
	(iv)	1
PC (b)	(i)	1
	(ii)	1
	(iii)	1
	(iv)	1
	(v)	1
	(vi)	1

Satisfactory achievement of the Outcome will be based on all Performance Criteria being met. This will be based on the student producing correct responses as follows:

PC (a)	4
PC (b)	6

### **OUTCOME 3 REMOVE AND REPLACE POWER ASSISTED STEERING SYSTEM COMPONENTS**

- PCs
- (a) The removal of power assisted steering components is in accordance with the manufacturers' recommended procedures.
  - (b) The replacement of power assisted steering components is in accordance with the manufacturers' recommended procedures.
  - (c) The selection and use of tools is appropriate to the given task.
  - (d) Working practices followed are in accordance with current safety regulations.

#### **IA Practical Exercise**

The student will be given a practical exercise to test the application of skills and knowledge related to the removal and replacement of a range of power assisted steering components.

The practical exercise will consist of the student removing and replacing all the items listed below:

- (i) pump drive belt;
- (ii) pump unit;
- (iii) filter and reservoir;
- (iv) pipes;
- (v) ram/rack assembly.

Satisfactory achievement of the Outcome will be based on all Performance Criteria being met. This will be demonstrated by the student removing and replacing all the components listed above and completing the exercise so that all the following are in accordance with the manufacturers' instructions:

- (i) adjustment of pump drive belts;
- (ii) selection of fluid/lubricant;
- (iii) cleanliness of filters;
- (iv) bleeding of air from the system;
- (v) routing and securing of hoses;
- (vi) security of mountings and linkages.

#### **OUTCOME 4                    ASSESS THE CONDITION OF A POWER ASSISTED STEERING SYSTEM**

- PCs
- (a) The assessment of the operation of a power assisted steering system is in accordance with the procedures recommended in appropriate technical publications.
  - (b) The assessment of the serviceability of power steering components is in accordance with the procedures recommended in appropriate technical publications.
  - (b) The assessment of the serviceability of power steering components is in accordance with the procedures recommended in appropriate technical publications.
  - (c) The selection and use of tools is appropriate to the task.
  - (d) Working practices followed are in accordance with current safety regulations.
  - (e) The identification of probable causes for given faults is correct in terms of relevance to the fault and procedures for rectification of the given fault.

#### **IA    Assignment**

The student will be given an assignment to test the application of knowledge and skills related to the operation and the condition of the components of a power assisted steering system.

The assignment will consist of 2 parts as follows:

Part (I): A practical exercise relating to PCs (a) to (c) involving the following:

- (i) visual examination for fluid leakage;
- (ii) dynamic test procedures;
- (iii) analysis of test results to identify faults.

Part (II): Restricted response questions relating to PC (d) whereby the student states the possible causes and appropriate rectification for the following:

- (i) loss of hydraulic fluid;
- (ii) abnormal noise in the hydraulic circuit;
- (iii) abnormal mechanical noise;
- (iv) loss of power assistance;
- (v) intermittent power assistance;
- (vi) unequal power assistance to left and right;
- (vii) excessive free play at the steering wheel;
- (viii) inadequate self centring.

Satisfactory achievement of the Outcome will be based on all Performance Criteria being met. This will be demonstrated by the student for:

Part (I): completing the 3 practical tasks in accordance with PC (a) to (c) and;

Part (II): stating possible causes and appropriate rectification which are in accordance with information recommended for each of the 8 faults listed.

**The following sections of the descriptor are offered as guidance.  
They are not mandatory.**

CONTENT/CONTEXT

Safety regulations and safe working practices must be observed at all times.

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SUGGESTED LEARNING AND TEACHING APPROACHES

This module should be taught and assessed in a workshop environment with a suitable range of light or heavy vehicles fitted with power assisted steering.

The student must have full access to relevant technical literature, test equipment and special tools.

The assessments for more than one Outcome could be integrated into a number of larger, practical assignments similar to common work situations.

The requirements of any Industry Body such as the RTITB Transkill scheme should be monitored and included in the assessment where appropriate.

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