NATIONAL COUNCIL FOR TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING

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PROPOSED OCCUPATIONAL STANDARDS

OCCUPATION: NEW-ENERGY VEHICLE TECHNICIAN

LEVEL: NTA 6

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ABBREVIATIONS

ABS	Anti-lock Braking System
BMS	Power Battery Management System
CBET	Competency Based Education and Training
CNG	Compressed Natural Gas
DMA	Driving Motor Assemblies
ESP	Electronic Stability Program
EV	Electric Vehicle
HEV	Hybrid Electric Vehicle
LNG	Liquefied Natural Gas
MCU	Motor Control Unit
NACTVET	National Council for Technical and Vocational Education and Training
NOS	National Occupational Standards
OS	Occupational Standards
PHEV	Plug-in Hybrid Electric Vehicle
TET	Technical Education and Training
TVET	Technical and Vocational Education and Training

GLOSSARY OF TERMS

Circumstantial Knowledge:	Detailed knowledge, which allows the decision-making in regard to different circumstances and cross cutting issues.
Competence:	The ability to use knowledge, understanding, practical, and thinking skills to perform effectively to the workplace standards required in employment.
Competency:	A description of the ability one possesses when able to perform a given occupational task effectively and efficiently.
Competency-based Education:	An instructional programme that derives its content from validated tasks and bases assessment on the learner's performance.
Curriculum:	A description or composite of statements about "what is to be learned" by the trainee/student in a particular instructional programme; a product that states the "intended learning outcomes".
Educational/Training Programme:	The complete curriculum and instruction (what and how) that is designed to prepare a person for employment in a job or other particular performance situation.
Occupation:	A specific position requiring the performance of specific tasks – essentially the same tasks are performed by all employees having the same title. (Example: baker)
Occupational Area:	This is a broad grouping of related jobs. (Example: food service)
Occupational Competence:	The application of knowledge and skills that consistently meet the standards required by the work context.
Occupational Standards:	Specific requirements of competences people are expected to demonstrate in a particular occupational area, including knowledge and relevant attitudes. They also act as a performance tool of assessment of the prescribed outcomes.
Occupational/Job Analysis:	A process used to identify the tasks that are important to employees in any given occupation.
Performance Criteria:	Indicate expected end results or outcomes in the form of evaluative statements.
Skills:	The ability to perform occupational tasks with a high degree of proficiency within a given occupation. Skill is conceived of as a composite of three completely interdependent components: cognitive, affective, and psychomotor.

Standards:	A set of statements, which if proved true under working conditions, means that an individual is meeting an expected level and type of performance.
Task Analysis:	The process of analysing each task to determine the steps, circumstantial knowledge, attitudes, performance standards, tools and materials needed, as well as safety concerns required for the employees performing it.
Task:	A work activity that has a definite beginning and ending, is observable or measurable, and consists of two or more definite steps that leads to a product, service, or decision.
Underpinning Knowledge:	Crucial knowledge that an individual must acquire in order to demonstrate competences that are associated in performing a given task.
Verification Process:	The process of having experts review and confirm the importance of the task (competency) statements identified through occupational analysis. Other questions, such as the degree of task learning difficulty are also frequently asked. This process is also sometimes referred to as validation.

1.0. INTRODUCTION

Technical Education and Training (TET) is one of the most important education sub-sectors in Tanzania, responsible for developing a skilled workforce to support the country's industrialization economic agenda. Tanzania's *Development Vision 2025* intends to raise the country's economy to a middle-income status. This requires a skilled workforce that is aligned with the needs of the public and private sectors of the economy. The National Council for Technical Education has begun the job of drafting Occupational Standards that will eventually be adopted as National Occupational Standards for TET in order to ensure that it meets the needs of the labour market and the country's economic agenda.

National Occupational Standards (NOS) are performance criteria that are matched with labour market demands. Each National Occupation Standard describes functions, performance standards, and knowledge/understanding for one important function or task. They combine skills, knowledge, and attitudes to describe best practice. They are useful tools for establishing job roles, personnel recruiting, supervision, and appraisal, as well as TET standards. They're also helpful for benchmarking and harmonizing qualifications on a national and international level. Standards, in general, provide a solid framework for high-quality TET that is labour market-relevant, current, and consistent in delivery across all public and private institutions.

However, it must be noted that, Occupational Standards and Training standards/qualifications standards are different. Occupational standards are defined in terms of activities performed by a person in a selected occupation (e.g., an electrical engineer designs electrical wiring circuits, performs troubleshooting in electrical wiring, etc.) and they are usually defined by employers following procedures agreed upon by all stakeholders. Education and training standards are developed from the activities defined in occupational standards, and they include learning objectives to ensure that the necessary skills and knowledge are developed by a person to enable him or her to function at an agreed level in an occupation. Education and Training standards are used to define curricula in training institutions. It is however critical that there must be a direct link between the occupational standards and the training standards to respond to the demands of the labour market.

In TET delivery, Tanzania adopted the Competence Based Education and Training (CBET) approach. The CBET approach focuses on providing learners with the skills and knowledge required to meet the occupational standards. Occupational standards are thus the starting point for developing competency-based training (CBET) programmes. TET institutions will be required to benchmark their curricula with relevant occupational standards.

Occupational Standards are developed based on a given occupation's current and future demands. As a result, they serve as a means of bridging the gap between the worlds of employment and technical education and training (TET).

The New-Energy Vehicle Technician Occupation has its own set of occupational standards. The document explains how the occupational standards were developed, as well as the scope, the occupational profile in the form of DACUM charts, and the Occupational Standards.

2.0. OCCUPATIONAL STANDARD DEVELOPMENT PROCESS

The Occupational standards development process began with an examination of major documents that guide Tanzanian skill development. The *10-year National Skills Development Strategy (2016-2026)* was one of the documents reviewed, and it outlined six (6) economic sectors that should be prioritized when developing skills development programmes.

These sectors include: Transport and Logistics, Tourism and Hospitality, Agribusiness, Construction, Energy and ICT. NACTE labour market reports were also used in the literature review to determine the skills demand in the Tanzanian labour market as a whole.

After the literature review, a workshop comprised of expert workers and educators with substantial knowledge and experience in the occupation conducted an occupational analysis utilizing the DACUM approach to produce the occupational profile. The analysis resulted in DACUM Charts, which are attached as **Appendix 1** to this document.

The occupational standards were then developed. Experts in Occupational Analysis and the Development of Occupational Standards facilitated the workshop. Interviews, online surveys, and a stakeholder forum were used to validate the Occupational Standards. Engineers, supervisory technicians on the job, and experienced New-Energy Vehicle Technicians were key informants in the survey to discover occupational trends. This information was used to gain insight from the workplaces regarding trends and changes in the profession, including how well graduates are prepared for working in the occupation. A total of ... online surveys were completed by experts from the labour market across the country. Apart from the surveys aiding in defining the scope for the occupational analysis, they also served to engage a wide cross-section of experts in the occupation. Apart from this, the stakeholders' forum was attended by ... participants from different parts of the country representing various companies.

3.0. THE SCOPE AND OVERVIEW OF THE OCCUPATION STANDARDS FOR NEW-ENERGY VEHICLE TECHNICIANS

The standards cover a broad range of duties and tasks that can be performed by an Electrical Equipment Installation and Maintenance Technician. However, the occupational standards are not meant to replace individual job descriptions. Instead, they are to be used for guidance in defining

skill levels and knowledge for the technician in specific settings or positions. The New-Energy Vehicle Technician may perform tasks in a number of key areas of the occupational standards, but not necessarily in all areas. For example, in large operations, other individuals may be employed or designated to perform specific tasks.

The New-Energy Vehicle Technician may work under the supervision of engineers to inspect, repair, and maintain electric vehicles and alternative-fueled internal combustion locomotives. In the workshop, technicians complete a variety of maintenance work, such as high voltage system inspections, as well as dismantling, maintaining and rebuilding work on complete power system and electrical systems of new energy vehicles.

Generally, the New-Energy Vehicle Technician performs the following responsibilities:

a) New energy vehicle high voltage system inspection

b) New energy vehicle body electrical system inspection

c) New energy vehicle chassis system inspection

d) New energy vehicle high voltage power system maintenance

e) New energy vehicle braking system maintenance

f) New energy vehicle suspension system maintenance

g) New energy vehicle steering system maintenance

h) New energy vehicle high voltage power system overhaul

i) New energy vehicle body electrical system inspection

j) New energy vehicle chassis system overhaul

k) Multi-fuel power system overhaul for new energy vehicles

The Occupational Standards have been clustered into NTA qualification levels, i.e. NTA level 4, 5 and 6.

4.0. VALIDITY PERIOD

Due to the rapid development of technology, the validity period of occupational standards is 3-5 years. The review will proceed in the same manner as the one before it, with new occupational standards being developed based on current trends of the labour market.

5.0. OCCUPATIONAL STANDARDS

5.1 OCCUPATIONAL STANDARDS FOR NEW-ENERGY VEHICLE TECHNICIAN - NTA 6

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	OVERHAUL OF HIGH VOLTAGE POWER SYSTEMS	**DUTY NO.**	601
TASK TITLE	DETECTION AND MAINTENANCE OF THE VEHICLE CONTROL SYSTEMS	**TASK NO.**	6011
PERFORMANCE CRITERIA	The person performing this task must be able to overhaul vehicle control systems in accordance with technical requirements and manufacturer's maintenance manuals.		
RANGE STATEMENT	The task can be performed in a vehicle maintenance workshop under the supervision of Senior Technicians or New-energy Vehicle Engineers. The tools and equipment to be used include: 1. Full set of vehicle toolboxes (including high voltage insulation tools); 2. Protective tool kits (work clothes, safety shoes, helmets, goggles, insulating gloves and other personal protective equipment; quarantine strips, the safety signs, fire extinguishers, insulating mats and other site protection articles; inside and outside protective kits and other vehicle protection articles); 3. Special lifting machines for electric vehicles; 4. New energy vehicles; 5. Diagnostic tool kits (including multimeters, oscilloscopes, diagnostic apparatus and other equipment).		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Comply with safety and health regulations; 2. Wear safety protection equipment; 3. Set up site safety protection equipment; 4. Use diagnostic equipment and instruments; 5. Diagnose online faults; 6. Determine the controller faults of vehicles; 7. Replace the controllers of vehicles; 8. Confirm fault clearance.	**1.0 Methods** The person performing this task must be able to explain how to: 1.1 Use the diagnostic equipment of new energy vehicles; 1.2 Detect the controllers of vehicles; 1.3 Disassemble the controllers of vehicles. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The using principles of safety protection equipment; 2.2 The using principles of field safety protection equipment; 2.3 The using principles of diagnostic equipment of new energy vehicles; 2.4 The principles of online fault diagnosis; 2.5 Controller failure theories of vehicles. **3.0 Theories**

	The person performing this task must be able to explain the following: 3.1 The port definition of the vehicle control systems; 3.2 The control logic of vehicle control systems; 3.3 The structure and working principles of vehicle control systems; 3.4 The disassembly steps of the vehicle control systems; 3.5. The overhaul steps of the vehicle control systems; 3.6 The assembly steps of the vehicle control systems; 3.7 The debugging of the vehicle control systems, and the steps to confirm fault recovery. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The controllers of vehicles are detected and replaced in accordance with technical requirements and manufacturer's manuals.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety; 2. Disposal methods of waste; 3. Safety operations of measuring instruments; 4. Safety operation of operating equipment and tools.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	OVERHAUL OF HIGH VOLTAGE POWER SYSTEMS	**DUTY NO.**	601
TASK TITLE	DETECTION, MAINTENANCE OF DRIVING MOTOR SYSTEMS	**TASK NO.**	6012
PERFORMANCE CRITERIA	The person performing this task must be able to overhaul driving motor systems in accordance with technical requirements and manufacturer's maintenance manuals.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of Senior Technicians or New-energy Vehicle Engineers. The tools and equipment to be used include: 1. Full set of vehicle toolboxes (including high voltage insulation tools); 2. Protective tool kits (work clothes, safety shoes, helmets, goggles, insulating gloves and other personal protective equipment; quarantine strips, the safety signs, fire extinguishers, insulating mats and other site protection articles; inside and outside protective kits and other vehicle protection articles); 3. Special lifting machines for electric vehicles; 4. New energy vehicles; 5. Diagnostic tool kits (including multimeters, oscilloscopes, diagnostic apparatus and other equipment); 6. Lifting vehicles with driving motor systems.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Comply with safety and health regulations; 2. Wear safety protection equipment; 3. Set up site safety protection equipment; 4. Discharge cooling fluid of driving motor systems; 5. Disassemble the driving motor assemblies; 6. Disassemble the driving motors; 7. Disassemble the driving motor control units; 8. Install the driving motors; 9. Install the driving motor assemblies; 10. Install the driving motor managers; 11. Fill cooling fluid for driving	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Discharge cooling fluid of driving motor systems; 1.2 Disassemble the driving motor assemblies; 1.3 Disassemble the driving motors; 1.4 Disassemble the driving motor control units; 1.5 Install the driving motors; 1.6 Install the driving motor assemblies; 1.7 Install the driving motor control units; 1.8 Fill cooling fluid for driving motor systems and extract air; 1.9 Analyze the fault cause of driving motor system. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The using principles of safety protection equipment; 2.2 The using principles of field safety protection

motor systems and extract air; 12. Clean, organize and recover disassemble tools; 13. Clean, organize and recover safety protection equipment and instruments; 14. Store safety protection equipment and instruments.	equipment; 2.3 The using principles of diagnostic equipment of new energy vehicles; 2.4 The disassembly and installation principles of driving motor systems; 2.5 The fault principles of driving motor systems. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 The composition and structure and working principles of driving motor systems; 3.2 Analyze the fault cause of driving motor system; 3.3 Steps to discharge cooling fluid of driving motor systems; 3.4 Steps to disassemble driving motor assemblies; 3.5 Steps to disassemble driving motors; 3.6 Steps to disassemble driving motor control units; 3.7 Steps to install driving motors; 3.8 Steps to install the driving motor assemblies; 3.9 Steps to install driving motor control units; 3.10 Steps to fill cooling fluid for driving motor systems and extract air; 3.11 Steps to complete the installation and debugging of driving motor systems and confirm fault repairing. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Safety protection skills; 4.2 Teamwork skills; 4.3 Report writing skills; 4.4 Disassembly and installation skills of the components of driving motor systems.
DESCRIPTION OF THE END PRODUCT / SERVICE	The driving motor systems are overhauled in accordance with technical requirements and manufacturer's maintenance manuals.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety; 2. Disposal methods of waste; 3. Safety operations of measuring instruments; 4. Safety operation of operating equipment and tools.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	OVERHAUL OF HIGH VOLTAGE POWER SYSTEMS	**DUTY NO.**	601
TASK TITLE	DETECTION AND MAINTENANCE OF POWER BATTERY SYSTEMS	**TASK NO.**	6013
PERFORMANCE CRITERIA	The person performing this task must be able to detect and maintain power battery systems in accordance with technical requirements and manufacturer's maintenance manuals.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of Senior Technicians or New-energy Vehicle Engineers. The tools and equipment to be used include: 1. Full set of vehicle toolboxes (including high voltage insulation tools); 2. Protective tool kits (work clothes, safety shoes, helmets, goggles, insulating gloves and other personal protective equipment; quarantine strips, the safety signs, fire extinguishers, insulating mats and other site protection articles; inside and outside protective kits and other vehicle protection articles); 3. Special lifting machines for electric vehicles; 4. New energy vehicles; 5. Diagnostic tool kits (including multimeters, oscilloscopes, diagnostic apparatus and other equipment); 6. Power battery packs for disassemble lifting vehicles.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Comply with safety and health regulations; 2. Correctly wear safety protection equipment; 3. Set up site safety protection equipment; 4. Analyze the faults of power battery systems; 5. Discharge the cooling fluid for the power battery systems; 6. Disassemble power battery packs; 7. Disassemble power battery managers; 8. Assemble power battery packs; 9. Assemble power battery managers; 10. Fill the cooling fluid for power battery systems and extract air;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Discharge the cooling fluid for the power battery systems; 1.2 Disassemble power battery packs; 1.3 Disassemble power battery managers; 1.4 Assemble power battery packs; 1.5 Assemble power battery managers; 1.6 Fill the cooling fluid for power battery systems and extract air; 1.7 Analyze the fault causes of power battery systems. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The using principles of safety protection equipment; 2.2 The using principles of field safety protection equipment; 2.3 The using principles of diagnostic equipment of new

11. Confirm the remediation of fault systems; 12. Clean, organize and recover disassemble tools; 13. Clean, organize and recover safety protection equipment and instruments; 14. Store safety protection equipment and instruments.	energy vehicles; 2.4 The disassembly and installation principles of power battery systems; 2.5 The fault principles of power battery systems. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 The structure and working principles of power battery systems; 3.2 The fault reasons of power battery systems; 3.3 Steps to discharge cooling fluid of the power battery systems; 3.4 Steps to disassemble power battery packs; 3.5 Steps to disassemble power battery managers; 3.6 Steps to install power battery packs; 3.7 Steps to install power battery managers; 3.8 Steps to fill cooling fluid for power battery systems and extract air; 3.9 Steps to complete the installation and debugging of power battery systems and confirm fault repairing. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Safety protection skills; 4.2 Teamwork skills; 4.3 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The driving motor systems are overhauled in accordance with technical requirements and manufacturer's maintenance manuals.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety protection; 2. Site safety protection equipment; 3. Waste disposal methods; 4. Use of maintenance manuals.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	OVERHAUL OF HIGH VOLTAGE POWER SYSTEMS	**DUTY NO.**	601
TASK TITLE	DETECTION AND MAINTENANCE OF ON-BOARD CHARGING SYSTEMS	**TASK NO.**	6014
PERFORMANCE CRITERIA	The person performing this task must be able to overhaul on-board charging systems in accordance with technical requirements and manufacturer's maintenance manuals.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of Senior Technicians or New-energy Vehicle Engineers. The tools and equipment to be used include: 1. Full set of vehicle toolboxes (including high voltage insulation tools); 2. Protective tool kits (work clothes, safety shoes, helmets, goggles, insulating gloves and other personal protective equipment; quarantine strips, the safety signs, fire extinguishers, insulating mats and other site protection articles; inside and outside protective kits and other vehicle protection articles); 3. Special lifting machines for electric vehicles; 4. New energy vehicles; 5. Diagnostic tool kits (including multimeters, oscilloscopes, diagnostic apparatus and other equipment).		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Comply with safety and health regulations; 2. Correctly wear safety protection equipment; 3. Set up site safety protection equipment; 4. Diagnose and analyze faults; 5. Disassemble and install the protective components of the AC charging interface, AC charging interface and AC charging cables and plugs; 6. Detect and interlock the resistance to ground and energy voltage; 7. Detect the conductivity of the wiring harness in high voltage control boxes; 8. Disassemble, check and detect on-board chargers; 9. Detect resistance and energy voltage of terminals in charging interface;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Detect common fault codes; 1.2 Confirm the measurement methods and standard values of terminals; 1.3 Dissemble on-board charging systems; 1.4 Overhaul on-board charging systems; 1.5 Install on-board charging systems; 1.6 Confirm fault disappearance and function recovery. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The using principles of safety protection equipment; 2.2 The using principles of field safety protection equipment; 2.3 The using principles of diagnostic equipment of new energy vehicles; 2.4 The disassembly and installation principles of on-board charging systems; 2.5 The fault principles of on-board charging systems.

10. Overhaul typical faults; 11. Install on-board charging systems.	**3.0 Theories** The person performing this task must be able to explain the following: 3.1 The port definition of the AC charging interface; 3.2 Logic methods of AC charging control; 3.3 The structure and working principles of on-board chargers; 3.4 Steps to disassemble on-board charging systems; 3.5 Steps to overhaul on-board charging systems; 3.6 Steps to assemble on-board charging systems; 3.7 The debugging of the on-board charging systems, and the steps to confirm fault recovery. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Safety protection skills; 4.2 Teamwork skills; 4.3 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The information checking of on-board charging systems is conducted in accordance with vehicle maintenance manuals and circuit diagram requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety; 2. Disposal methods of waste; 3. Safety operations of measuring instruments; 4. Safety operation of operating equipment and tools.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	OVERHAUL OF HIGH VOLTAGE POWER SYSTEMS	**DUTY NO.**	601
TASK TITLE	DETECTION AND MAINTENANCE OF HIGH VOLTAGE DISTRIBUTION SYSTEMS	**TASK NO.**	6015
PERFORMANCE CRITERIA	The person performing this task must be able to overhaul high voltage distribution systems in accordance with technical requirements and manufacturer's maintenance manuals.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of Senior Technicians or New-energy Vehicle Engineers. The tools and equipment to be used include: 1. Full set of vehicle toolboxes (including high voltage insulation tools); 2. Protective tool kits (work clothes, safety shoes, helmets, goggles, insulating gloves and other personal protective equipment; quarantine strips, the safety signs, fire extinguishers, insulating mats and other site protection articles; inside and outside protective kits and other vehicle protection articles); 3. Special lifting machines for electric vehicles; 4. New energy vehicles; 5. Diagnostic tool kits (including multimeters, oscilloscopes, diagnostic apparatus and other equipment).		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Comply with safety and health regulations; 2. Correctly wear safety protection equipment; 3. Set up site safety protection equipment; 4. Disassemble high voltage distribution systems and identify the high and low voltage components; 5. Detect the quality of the high and low voltage components in high voltage distribution systems; 6. Detect the conductivity of the wiring harness in high voltage distribution systems; 7. Detect resistance and voltage of the terminals in high voltage distribution systems;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Detect common fault codes; 1.2 Confirm the measurement and standard values of terminals; 1.3 Disassemble high voltage distribution systems; 1.4 Overhaul high voltage distribution systems; 1.5 Install high voltage distribution systems; 1.6 Confirm fault disappearance and function recovery. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The using principles of safety protection equipment; 2.2 The using principles of field safety protection equipment; 2.3 The using principles of diagnostic equipment of new energy vehicles; 2.4 The disassembly and installation principles of high

8. Maintain high voltage distribution systems; 9. Install high voltage distribution system.	voltage distribution systems; 2.5 The fault principles of high voltage distribution systems. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 The port definition of high voltage distribution systems; 3.2 The structure and working principles of high voltage distribution systems; 3.3 Steps to disassemble high voltage distribution systems; 3.4 Steps to overhaul high voltage distribution systems; 3.5 Steps to install high voltage distribution systems; 3.6 The debugging of the high voltage distribution systems, and the steps to confirm fault recovery. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Safety protection skills; 4.2 Teamwork skills; 4.3 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The information checking of high voltage distribution systems is conducted in accordance with vehicle maintenance manuals and circuit diagram requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety; 2. Disposal methods of waste; 3. Safety operations of measuring instruments; 4. Safety operation of operating equipment and tools.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	OVERHAUL OF HIGH VOLTAGE POWER SYSTEMS	**DUTY NO.**	601
TASK TITLE	DETECTION AND MAINTENANCE OF THE GEAR CONTROL SYSTEMS	**TASK NO.**	6016
PERFORMANCE CRITERIA	The person performing this task must be able to overhaul gear control systems in accordance with technical requirements and manufacturer's maintenance manuals.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of Senior Technicians or New-energy Vehicle Engineers. The tools and equipment to be used include: 1. Full set of vehicle toolboxes (including high voltage insulation tools); 2. Protective tool kits (work clothes, safety shoes, helmets, goggles, insulating gloves and other personal protective equipment; quarantine strips, the safety signs, fire extinguishers, insulating mats and other site protection articles; inside and outside protective kits and other vehicle protection articles); 3. Special lifting machines for electric vehicles; 4. New energy vehicles; 5. Diagnostic tool kits (including multimeters, oscilloscopes, diagnostic apparatus and other equipment).		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Comply with safety and health regulations; 2. Correctly wear safety protection equipment; 3. Set up site safety protection equipment; 4. Disassemble gear control systems and identify the definitions of wiring harness and terminals. 5. Detect the quality of components in gear control systems; 6. Detect the conductivity of the wiring harness in gear control systems; 7. Check and detect gear control systems; 8. Detect the resistance, voltage and waveform of terminals in gear control systems.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Detect common fault codes; 1.2 Confirm the measurement and standard values of terminals; 1.3 Disassemble gear control systems; 1.4 Overhaul gear control systems; 1.5 Install gear control systems; 1.6 Confirm fault disappearance and function recovery. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The using principles of safety protection equipment; 2.2 The using principles of field safety protection equipment; 2.3 The using principles of diagnostic equipment of new energy vehicles; 2.4 The disassembly and installation principles of gear control systems;

	2.5 The fault principles of gear control systems. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 The port definition of the gear control systems; 3.2 The control logic of gear control systems; 3.3 The structure and working principles of gear control systems; 3.4 The disassembly steps of the gear control systems; 3.5 The overhaul steps of gear control systems; 3.6 The installation steps of gear control systems; 3.7 The debugging of the gear control systems, and the steps to confirm fault recovery. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Safety protection skills; 4.2 Teamwork skills; 4.3 Report writing skills;
DESCRIPTION OF THE END PRODUCT / SERVICE	The information checking of gear control systems is conducted in accordance with vehicle maintenance manuals and circuit diagram requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety; 2. Disposal methods of waste; 3. Safety operations of measuring instruments; 4. Safety operation of operating equipment and tools.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	DETECTION AND MAINTENANCE OF LIGHTING SYSTEMS	**DUTY NO.**	602
TASK TITLE	DETECTION AND MAINTENANCE OF LIGHTING SYSTEMS	**TASK NO.**	6021
PERFORMANCE CRITERIA	The person performing this task must be able to overhaul lighting systems in accordance with technical requirements and manufacturer's maintenance manuals.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of Senior Technicians or New-energy Vehicle Engineers. The tools and equipment to be used include: 1. Full set of vehicle toolboxes (including high voltage insulation tools); 2. Protective tool kits (work clothes, safety shoes, helmets, goggles, insulating gloves and other personal protective equipment; quarantine strips, the safety signs, fire extinguishers, insulating mats and other site protection articles; inside and outside protective kits and other vehicle protection articles); 3. Special lifting machines for electric vehicles; 4. New energy vehicles; 5. Diagnostic tool kits (including multimeters, oscilloscopes, diagnostic apparatus and other equipment).		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Comply with safety and health regulations; 2. Select safety protection equipment; 3. Wear safety protection equipment; 4. Set up site safety protection equipment; 5. Check the switches and functions of lights; 6. Check, adjust and replace front and rear headlight assemblies, taillight assemblies, gas discharge bulbs and interior lights; 7. Check, adjust and replace the switches, electrical fuses, electric relays, sensors, control units and wire harness of various kinds of control systems; 8. Detect and adjust the height and scope of headlamps.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Check the switches and functions of lights; 1.2 Check, adjust and replace front and rear headlight assemblies, taillight assemblies, gas discharge bulbs and interior lights; 1.3 Check, adjust and replace the switches, electrical fuses, electric relays, sensors, control units and wire harness of various kinds of control systems; 1.4 Detect and adjust the height and scope of headlamps using headlight testers. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The using principles of safety protection equipment; 2.2 The using principles of field safety protection equipment; 2.3 The using principles of diagnostic equipment of new energy vehicles;

	2.4 The disassembly and installation principles of lighting systems; 2.5 The fault principles of lighting systems. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 The port definition of lighting systems; 3.2 The control logic of lighting systems; 3.3 Structure and working principles of the lighting systems; 3.4 The disassembly steps of lighting systems; 3.5 The overhaul steps of lighting systems; 3.6 The installation steps of lighting systems; 3.7 The debugging of the lighting systems, and the steps to confirm fault recovery. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Safety protection skills; 4.2 Communication skills; 4.3 Customer service skills; 4.4 Teamwork skills; 4.5 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The information checking of lighting systems is conducted in accordance with vehicle maintenance manuals and circuit diagram requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1 Occupational health and safety; 2 Disposal methods of waste; 3 Safety operations of measuring instruments; 4 Safety operation of operating equipment and tools.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	OVERHAUL OF VEHICLE ELECTRICAL SYSTEMS	**DUTY NO.**	602
TASK TITLE	DETECTION AND MAINTENANCE OF COMFORT SYSTEMS	**TASK NO.**	6022
PERFORMANCE CRITERIA	The person performing this task must be able to overhaul comfort systems in accordance with technical requirements and manufacturer's maintenance manuals.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of Senior Technicians or New-energy Vehicle Engineers. The tools and equipment to be used include: 1. Full set of vehicle toolboxes (including high voltage insulation tools); 2. Protective tool kits (work clothes, safety shoes, helmets, goggles, insulating gloves and other personal protective equipment; quarantine strips, the safety signs, fire extinguishers, insulating mats and other site protection articles; inside and outside protective kits and other vehicle protection articles); 3. Special lifting machines for electric vehicles; 4. New energy vehicles; 5. Diagnostic tool kits (including multimeters, oscilloscopes, diagnostic apparatus and other equipment).		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Comply with safety and health regulations; 2. Select safety protection equipment; 3. Wear safety protection equipment; 4. Set up site safety protection equipment; 5. Check, adjust, diagnose, replace and maintain the center-control switches for door locking, fuses, wiring harness, key control switches, trunk door lock control switches, control units, door lock motors, trunk openers; 6. Check, adjust, diagnose, replace and maintain the control switches for the electric seats, control units, position motors and position sensors; 7. Check, adjust, diagnose, replace and maintain the control switches of power mirrors, fuses, wire	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Check, adjust, diagnose, replace and maintain the center-control switches for door locking, fuses, wiring harness, key control switches, trunk door lock control switches, control units, door lock motors, trunk openers; 1.2 Check, adjust, diagnose, replace and maintain the control switches for the electric seats, control units, position motors and position sensors; 1.3 Check, adjust, diagnose, replace and maintain the control switches of power mirrors, fuses, wire harness, adjustable motors and control units; 1.4 Check, adjust, diagnose, replace and maintain the control switches of wiper devices, fuses, wire harness, adjustable motors, washing pumps, washing liquid, pipelines and control units; 1.5 Check, adjust, diagnose, replace and maintain the control switches of air conditionings, fuses, wire harness, air blowers, washing pumps, AC compressors, temperature sensors, condensers,

harness, adjustable motors and control units; 8. Check, adjust, diagnose, replace and maintain the control switches of wiper devices, fuses, wire harness, adjustable motors, washing pumps, washing liquid, pipelines and control units; 9. Check, adjust, diagnose, replace and maintain the control switches of air conditionings, fuses, wire harness, air blowers, washing pumps, AC compressors, temperature sensors, condensers, refrigerant pipelines, refrigerant, refrigeration oil, valve bodies and control units.	refrigerant pipelines, refrigerant, refrigeration oil, valve bodies and control units. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The using principles of safety protection equipment; 2.2 The using principles of field safety protection equipment; 2.3 The using principles of diagnostic equipment of new energy vehicles; 2.4 The composition and functions of comfort systems; 2.5 The control principles of the center-control switches for door locking; 2.6 The control principles of electric seats; 2.7 The control principles of power mirrors; 2.8 The control principles of electric wipers; 2.9 The control principles of air conditionings. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 The port definition of comfort systems; 3.2 The control logic of comfort systems; 3.3 The structure and working steps of comfort systems; 3.4 The disassembly steps of comfort systems; 3.5 The overhaul steps of comfort systems; 3.6 The installation steps of comfort systems; 3.7 The debugging of the comfort systems, and the steps to confirm fault recovery; 3.8 The use of commonly-used tools and air conditioning detection equipment. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Safety protection skills; 4.2 Communication skills; 4.3 Customer service skills; 4.4 Teamwork skills; 4.5 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The information checking of comfort systems is conducted in accordance with vehicle maintenance manuals and circuit diagram requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety;

	2. Disposal methods of waste; 3. Safety operations of measuring instruments; 4. Safety operation of operating equipment and tools.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	OVERHAUL OF VEHICLE ELECTRICAL SYSTEMS	**DUTY NO.**	602
TASK TITLE	DETECTION AND MAINTENANCE OF ON-BOARD NETWORK SYSTEMS	**TASK NO.**	6023
PERFORMANCE CRITERIA	The person performing this task must be able to overhaul on-board network systems in accordance with technical requirements and manufacturer's maintenance manuals.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of Senior Technicians or New-energy Vehicle Engineers. The tools and equipment to be used include: 1. Full set of vehicle toolboxes (including high voltage insulation tools); 2. Protective tool kits (work clothes, safety shoes, helmets, goggles, insulating gloves and other personal protective equipment; quarantine strips, the safety signs, fire extinguishers, insulating mats and other site protection articles; inside and outside protective kits and other vehicle protection articles); 3. Maintenance manuals and circuit diagrams of vehicles; 4. Work lights; 5. Special lifting machines for electric vehicles; 6. New energy vehicles; 7. Diagnostic tool kits (including multimeters, oscilloscopes, diagnostic apparatus and other equipment).		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Comply with safety and health regulations; 2. Choose appropriate operating tools; 3. Overhaul the power control network systems of new energy vehicles; 4. Overhaul the central gateway of new energy vehicles and the control network systems of vehicles; 5. Overhaul the chassis control network systems of new energy vehicles; 6. Overhaul the comfort electronic control network systems of new energy vehicles; 7. Overhaul the information and entertainment control network systems of new energy vehicles; 8. Record the detection results; 9. Clean the tools and work areas;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Implement the safety and health prevention measures; 1.2 Choose appropriate operating tools; 1.3 Overhaul the power control network systems of new energy vehicles; 1.4 Overhaul the central gateway of new energy vehicles and the control network systems of vehicles; 1.5 Overhaul the chassis control network systems of new energy vehicles; 1.6 Overhaul the comfort electronic control network systems of new energy vehicles; 1.7 Overhaul the information and entertainment control network systems of new energy vehicles. **2.0 Principles**

10. Recycle and store tools and equipment.	The person performing this task must be able to explain the following principles: 2.1 The using principles of safety protection equipment; 2.2 The using principles of field safety protection equipment; 2.3 The using principles of diagnostic equipment of new energy vehicles; 2.4 The disassembly and installation principles of on-board network systems; 2.5 The fault principles of on-board network systems. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Queries of maintenance manuals and circuit diagrams; 3.2 Use of commonly-used tools and equipment; 3.3 The system principles and repairing process of the control network of new energy vehicles; 3.4 The system principles and repairing process of the central gateway of new energy vehicles and the control network of vehicles; 3.5 The system principles and repairing process of the chassis control network of new energy vehicles; 3.6 The system principles and repairing process of the comfort electronic control network of new energy vehicles; 3.7 The system principles and repairing process of the information and entertainment control network of new energy vehicles. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Safety protection skills; 4.2 Communication skills; 4.3 Customer service skills; 4.4 Fault overhaul skills; 4.5 Teamwork skills; 4.6 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The on-board network systems are overhauled in accordance with the vehicle maintenance manuals and technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:**

	1. Occupational health and safety; 2. Disposal methods of waste; 3. Safety operations of measuring instruments; 4. Safety operation of operating equipment and tools.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	OVERHAUL OF VEHICLE ELECTRICAL SYSTEMS	**DUTY NO.**	602
TASK TITLE	DETECTION AND MAINTENANCE OF DRIVING AUXILIARY SYSTEMS	**TASK NO.**	6024
PERFORMANCE CRITERIA	The person performing this task must be able to overhaul driving auxiliary systems in accordance with technical requirements and manufacturer's maintenance manuals.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of Senior Technicians or New-energy Vehicle Engineers. The tools and equipment to be used include: 1. Full set of vehicle toolboxes (including high voltage insulation tools); 2. Protective tool kits (work clothes, safety shoes, helmets, goggles, insulating gloves and other personal protective equipment; quarantine strips, the safety signs, fire extinguishers, insulating mats and other site protection articles; inside and outside protective kits and other vehicle protection articles); 3. Maintenance manuals and circuit diagrams of vehicles; 4. Work lights; 5. Special lifting machines for electric vehicles; 6. New energy vehicles; 7. Diagnostic tool kits (including multimeters, oscilloscopes, diagnostic apparatus and other equipment); 8. Special-purpose equipment kits (including equipment for radar correction and radar calibration).		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Comply with safety and health regulations; 2. Choose appropriate operating tools; 3. Overhaul cruise control systems; 4. Overhaul pre-crash safety systems; 5. Overhaul parking auxiliary systems; 6. Overhaul the reverse and panoramic camera systems; 7. Overhaul lane keeping systems; 8. Overhaul blind spot monitoring systems; 9. Overhaul head-up display systems;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Set safety specification reminder signs and make personal protection preparation; 1.2 Choose the proper tools for operation; 1.3 Overhaul circuits in cruise control systems and replace maintenance; 1.4 Overhaul circuits in pre-crash safety systems and replace maintenance; 1.5 Overhaul circuits in parking auxiliary systems and replace maintenance; 1.6 Overhaul circuits in reverse and panoramic camera systems and replace maintenance; 1.7 Overhaul circuits in lane keeping systems and replace maintenance; 1.8 Overhaul circuits in blind spot monitoring systems and

10. Overhaul fatigue detection systems; 11. Overhaul night vision systems; 12. Record the detection results; 13. Clean the tools and work areas; 14. Recycle and store tools and equipment.	replace maintenance; 1.9 Overhaul circuits in head-up display systems and replace maintenance; 1.10 Overhaul circuits in fatigue detection systems and replace maintenance; 1.11 Overhaul circuits in night vision systems and replace maintenance. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The using principles of safety protection equipment; 2.2 The using principles of field safety protection equipment; 2.3 The using principles of diagnostic equipment of new energy vehicles; 2.4 The disassembly and installation principles of driving auxiliary systems; 2.5 The fault principles of driving auxiliary systems. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Queries of maintenance manuals and circuit diagrams; 3.2 Use of commonly-used tools and equipment; 3.3 The system principles and repairing process of cruise control systems; 3.4 The system principles and repairing process of pre-crash safety systems; 3.5 The system principles and repairing process of parking auxiliary systems; 3.6 The system principles and repairing process of reverse and panoramic camera systems; 3.7 The system principles and repairing process of lane keeping systems; 3.8 The system principles and repairing process of blind spot monitoring systems; 3.9 The system principles and repairing process of head-up display systems; 3.10 The system principles and repairing process of night vision systems. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Safety protection skills; 4.2 Communication skills;

	4.3 Customer service skills; 4.4 Fault overhaul skills; 4.5 Teamwork skills; 4.6 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The driving auxiliary systems are overhauled in accordance with the vehicle maintenance manuals and technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety; 2. Disposal methods of waste; 3. Safety operations of measuring instruments; 4. Safety operation of operating equipment and tools.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	OVERHAUL OF CHASSIS SYSTEMS	**DUTY NO.**	603
TASK TITLE	DETECTION AND MAINTENANCE OF TRANSMISSION SYSTEMS	**TASK NO.**	6031
PERFORMANCE CRITERIA	The person performing this task must be able to overhaul transmission systems in accordance with technical requirements and manufacturer's maintenance manuals.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of Senior Technicians or New-energy Vehicle Engineers. The tools and equipment to be used include: 1. Full set of vehicle toolboxes (including high voltage insulation tools); 2. Protective tool kits (work clothes, safety shoes, helmets, goggles, insulating gloves and other personal protective equipment; quarantine strips, the safety signs, fire extinguishers, insulating mats and other site protection articles; inside and outside protective kits and other vehicle protection articles); 3. Special lifting machines for electric vehicles; 4. New energy vehicles; 5. Diagnostic tool kits (including multimeters, oscilloscopes, diagnostic apparatus and other equipment).		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Comply with safety and health regulations; 2. Select safety protection equipment; 3. Wear safety protection equipment; 4. Set up site safety protection equipment; 5. Check, adjust and replace vacuum regulators, vacuum valves and vacuum lines; 6. Check, adjust, maintain and replace the hydraulic regulators, seals, orifices, valves, counterweights, spring energy, gears, retaining rings; 7. Inspect and replace external seals and gaskets; 8. Inspect, repair, and replace housings, bushings, and universal joints of drive shafts; 9. Check the condition of the	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Implement the safety and health prevention measures; 1.2 Check and prepare operations of high voltage systems; 1.3 Check, adjust and replace vacuum regulators, vacuum valves and vacuum lines; 1.4 Check, adjust, maintain and replace the hydraulic regulators, seals, orifices, valves, counterweights, spring energy, gears, retaining rings; 1.5 Inspect and replace external seals and gaskets; 1.6 Inspect, repair, and replace housings, bushings, and universal joints of drive shafts; 1.7 Check the condition of the engine cooling systems and inspect energy, test, clean or replace the coolers, lines and fittings of transmissions; 1.8 Check or replace the speed odometer's active and enabling slave gears, speed sensors and fixings; 1.9 Check the mating surfaces of valve bodies, oil passages, check valves, springs, bushings, and retaining rings; 1.10 Check and adjust the torque of the valve body bolts;

engine cooling systems and inspect energy, test, clean or replace the coolers, lines and fittings of transmissions; 10. Check or replace the speed odometer's active and enabling slave gears, speed sensors and fixings; 11. Check the mating surfaces of valve bodies, oil passages, check valves, springs, bushings, and retaining rings; 12. Check and adjust the torque of the valve body bolts; 13. Check the servo cylinders, pistons, seals, pin energy, spring and retaining rings and maintain or replace as needed; 14. Check the energy storage devices, pistons, seals, pin energy, spring and retaining rings and maintain or replace as needed; 15. Check the parking gear, inspect and replace the parking energy locking wheels, axles, spring, and supports; 16. Inspect, test, adjust, repair, or replace electrical or electronic components and circuits, including computers, solenoids, sensors, relays, wiring pins, connectors, switches and wire harnesses; 17. Inspect, replace, and adjust the fixed supports of the drive mechanism; 18. Clean protective equipment; 19. Recycle safety protection equipment; 20. Store safety protection equipment and instruments.	1.11 Check the servo cylinders, pistons, seals, pin energy, spring and retaining rings and maintain or replace as needed; 1.12 Check the energy storage devices, pistons, seals, pin energy, spring and retaining rings and maintain or replace as needed; 1.13 Check the parking gear, inspect and replace the parking energy locking wheels, axles, spring, and supports; 1.14 Inspect, test, adjust, repair, or replace electrical or electronic components and circuits, including computers, solenoids, sensors, relays, wiring pins, connectors, switches and wire harnesses; 1.15 Inspect, replace, and adjust the fixed supports of the drive mechanism; 1.16 Clean protective equipment; 1.17 Recycle safety protection appliances. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The using principles of safety protection equipment; 2.2 The using principles of field safety protection equipment; 2.3 The using principles of diagnostic equipment of new energy vehicles; 2.4 The disassembly and installation principles of transmission systems; 2.5 The fault principles of transmission systems. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Procedures of transmission system detection and maintenance; 3.2 Use of commonly-used tools and equipment. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Safety protection skills; 4.2 Communication skills; 4.3 Customer service skills; 4.4 Teamwork skills; 4.5 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Transmission systems are overhauled in accordance with vehicle maintenance manual and technical requirements.

CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety; 2. Disposal methods of waste; 3. Safety operations of measuring instruments; 4. Safety operation of operating equipment and tools.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	OVERHAUL OF DRIVING SYSTEMS	**DUTY NO.**	603
TASK TITLE	DETECTION AND MAINTENANCE OF DRIVING SYSTEMS	**TASK NO.**	6032
PERFORMANCE CRITERIA	The person performing this task must be able to overhaul driving systems in accordance with technical requirements and manufacturer's maintenance manuals.		
RANGE STATEMENT	The task can be performed in a vehicle workshop under the supervision of Senior Technicians or New-energy Vehicle Engineers. The tools and equipment to be used include: 1. Full set of vehicle toolboxes (including high voltage insulation tools); 2. Protective tool kits (work clothes, safety shoes, helmets, goggles, insulating gloves and other personal protective equipment; quarantine strips, the safety signs, fire extinguishers, insulating mats and other site protection articles; inside and outside protective kits and other vehicle protection articles); 3. Special lifting machines for electric vehicles; 4. New energy vehicles; 5. Diagnostic tool kits (including multimeters, oscilloscopes, diagnostic apparatus and other equipment).		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Comply with safety and health regulations; 2. Select safety protection equipment; 3. Wear safety protection equipment; 4. Set up site safety protection equipment; 5. Check and maintain steering systems; 6. Check and maintain suspension systems; 7. Check and maintain wheels and tires; 8. Check and maintain bearings of wheels; 9. Locate and adjust wheels; 10. Clean protective equipment; 11. Recycle safety protection equipment; 12. Store safety protection	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Implement the safety and health prevention measures; 1.2 Conduct the inspection and preparation operations of high voltage systems; 1.3 Check and maintain steering systems; 1.4 Check and maintain suspension systems; 1.5 Check and maintain wheels and tires; 1.6 Check and maintain bearings of wheels; 1.7 Locate and adjust wheels; 1.8 Clean protective equipment; 1.9 Recycle safety protection appliances. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The structural principles of driving systems; 2.2 Structural principles of the suspension systems; 2.3 Principles of wheel and tire inspection points; 2.4 Principles of locating and adjusting wheels.

equipment and instruments.	**3.0 Theories** The person performing this task must be able to explain the following: 3.1 Procedures of suspension system detection and maintenance; 3.2 Procedures of wheels and tires detection and maintenance; 3.3 Procedures of locating and adjusting wheels; 3.4 Use of commonly-used tools and equipment. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Safety protection skills; 4.2 Communication skills; 4.3 Customer service skills; 4.4 Teamwork skills; 4.5 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Driving systems are overhauled in accordance with vehicle maintenance manual and technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety; 2. Disposal methods of waste; 3. Safety operations of measuring instruments; 4. Safety operation of operating equipment and tools.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	OVERHAUL OF CHASSIS SYSTEMS	**DUTY NO.**	603
TASK TITLE	DETECTION AND MAINTENANCE OF STEERING SYSTEMS	**TASK NO.**	6033
PERFORMANCE CRITERIA	The person performing this task must be able to overhaul steering systems in accordance with technical requirements and manufacturer's maintenance manuals.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of Senior Technicians or New-energy Vehicle Engineers. The tools and equipment to be used include: 1. Full set of vehicle toolboxes (including high voltage insulation tools); 2. Protective tool kits (work clothes, safety shoes, helmets, goggles, insulating gloves and other personal protective equipment; quarantine strips, the safety signs, fire extinguishers, insulating mats and other site protection articles; inside and outside protective kits and other vehicle protection articles); 3. Special lifting machines for electric vehicles; 4. New energy vehicles; 5. Diagnostic tool kits (including multimeters, oscilloscopes, diagnostic apparatus and other equipment); 6. Vehicle user manuals and maintenance manuals.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Use decoders to read relevant data flow of electric power steering systems, decide whether it is abnormal, and record the abnormal data. Read relevant fault codes of system control modules and analyze the possible causes of the faults by checking the maintenance materials; 2. Check relevant diagnosis strategies of electric power steering system fault codes, and eliminate them in accordance with strategies; 3. Check relevant diagrams of electric power steering systems, and interpret the circuit information such as number, color and cabling harnesses of the sensors, controllers and actuators, and detect them;	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Use decoders to read relevant data flow of electric power steering systems, decide whether it is abnormal, and record the abnormal data. Read relevant fault codes of system control modules and analyze the possible causes of the faults by checking the maintenance materials. Detect and replace the steering angle sensors, steering torque sensors and rotor speed sensors; 1.2 Check relevant diagnosis strategies of electric power steering system fault codes, and eliminate them in accordance with strategies; 1.3 Check relevant diagrams of electric power steering system, and interpret the circuit information such as number, color and cabling harnesses of the sensors, controllers and actuators, and detect them; 1.4 Detect and replace the steering angle sensors, steering torque sensors and rotor speed sensors; 1.5 Detect, disassemble and replace the electric power steering gears;

4. Detect, replace and adjust components of steering systems.	1.6 Check and replace the steering columns, steering shaft universal joints, flexible couplings, telescopic columns and steering wheels (including the steering wheel equipped with airbags, controllers and components); 1.7 Check and adjust the front and rear steering linkages (including parallelism and ride height); 1.8 Check, replace and adjust tie rods, sleeve chucks and ball joints; 1.9 Check/replace steering columns and steering gears for noise and mechanical interference. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Structures and working principles of steering columns and steering gears; 2.2 Structures and working principles of steering transmission mechanism. **3.0 Theories** The person performing this task must be able to explain: 3.1 Structures and working principles of steering systems; 3.2 Procedures of steering system detection and maintenance; 3.3 Pricedures of steering system debugging 3.4 Application of commonly-used tools and equipment. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Safety protection skills; 4.2 Communication skills; 4.3 Customer service skills; 4.4 Teamwork skills; 4.5 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Steering systems are overhauled in accordance with vehicle maintenance manual and technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety; 2. Disposal methods of waste; 3. Safety operations of measuring instruments; 4. Safety operation of operating equipment and tools.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	OVERHAUL OF CHASSIS SYSTEMS	**DUTY NO.**	603
TASK TITLE	DETECTION AND MAINTENANCE OF BRAKING SYSTEMS	**TASK NO.**	6034
PERFORMANCE CRITERIA	The person performing this task must be able to overhaul braking systems in accordance with technical requirements and manufacturer's maintenance manuals;		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of senior technicians or new-energy vehicle engineers; The tools and equipment to be used include: 1. Full set of vehicle toolboxes (including high voltage insulation tools); 2. Protective tool kits (work clothes, safety shoes, helmets, goggles, insulating gloves and other personal protective equipment; quarantine strips, the safety signs, fire extinguishers, insulating mats and other site protection articles; inside and outside protective kits and other vehicle protection articles); 3. Special lifting machines for electric vehicles; 4. New energy vehicles; 5. Diagnostic tool kits (including multimeters, oscilloscopes, diagnostic apparatus and other equipment); 6. Vehicle user manuals and maintenance manuals.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Check the abnormal situations of brake pipes and pipe joints; Fabricate and install brake pipes, and replace hoses, pipe joints and supports; Check routes of brake pipes and hoses; 2. Select, dispose, store and fill suitable brake fluid energy (including silicon brake fluid) and check the system for leaks in accordance with the maintenance manual; 3. Disassemble, clean, detect and measure the drum brake, and decide whether it is necessary for machining or replacing in accordance with the maintenance manual; 4. Disassemble, clean, detect relevant parts of the drum brake in accordance with the steps and specifications of the maintenance manual, and lubricate and assemble,	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Check are there any leaks, indentations, kinks, rusts, ruptures or wearing and looseness in brake lines and couplings, and are there any leaks, kinks, ruptures, expansions or wearing and looseness of flexible brake hoses; 1.2 Fabricate and install brake pipes, and replace hoses, pipe joints and supports; Check routes of brake pipes and hoses; 1.3 Select, dispose, store and fill suitable brake fluid energy (including silicon brake fluid) and check the system for leaks in accordance with the maintenance manual; 1.4 Disassemble, clean, detect and measure the drum brake, and decide whether it is necessary for machining or replacing in accordance with the maintenance manual; 1.5 Machine the drum brake in accordance with the steps and specifications of the maintenance manual;

and machine if necessary; 5. Disassemble and clean the disc brake assembly, and check whether the brake caliper cover is leaking and damaged; Overhaul the disc brake by using disc brake grinders on the vehicle, and measure the thickness of the overhauled disc brake and make comparison in accordance with the specifications; 6. Make the pedal free stroke test under the circumstances of operation and out-of-operation of the engine, and check the working condition of the booster; 7. Check the conditions of vacuum supply (manifold or auxiliary pump) of vacuum boosters; Be able to check whether vacuum booster devices have vacuum leakage and whether they work normally; 8. Detect whether electric boosters work in normal; 9. Disassemble, clean, detect, maintain or replace parking brake parts; Install the gap between hubs and bearings; 10. Check, detect, replace and adjust the parking brake and cable; 11. Check, detect, replace and adjust the electric parking brake; 12. Measure service reminder indicators, parking brake indicator lights, alarm lights, switches and traverses to determine whether maintenance is needed; 13. Check, detect and overhaul ABS hydraulic transmission devices and electronic and mechanical components, specify the dismantlement and installation of ABS components; 14. Release the ABS system; 15. Diagnose, overhaul and adjust ABS wheel speed sensors and circuits; Detect and fix wiring harness and connectors in accordance with the steps stipulated by the maintenance manual.	1.6 Disassemble, clean, detect relevant parts in accordance with correct safety procedures, and ubricate and assemble them; 1.7 Lubricate the block, automatic adjustment mechanism and other related parts of bottom plates (support plates); 1.8 Install brake shoes and related parts; 1.9 Adjust brake shoes and parking brakes before installing drum brakes, drum brake and wheel hub assemblies and wheel bearings; 1.10 Shrink the integral parking caliper pistons in accordance with advises in the maintenance manual; 1.11 Disassemble and clean the disc brake assembly, and check whether the brake caliper cover is leaking and damaged; 1.12 Overhaul the disc brake by using disc brake grinders on the vehicle, and measure the thickness of the overhauled disc brake and make comparison in accordance with the specifications; 1.13 Make the pedal free stroke test under the circumstances of operation and out-of-operation of the engine, and check the working condition of the booster; 1.14 Check the conditions of vacuum supply (manifold or auxiliary pump) of vacuum boosters; Check whether vacuum booster devices have vacuum leakage and whether they work normally; 1.15 Check whether the check valves work in normal, and overhaul, adjust or replace parts as needed; 1.16 Check and test whether there are any leaks in the hydraulic booster systems and accumulators and whether they work normally, and overhaul, adjust or replace components as needed; 1.17 Detect whether electric boosters work in normal; 1.18 Disassemble, clean, detect and overhaul wheel bearings or replace wheel bearings, seat rings, seals and guide rails in accordance with the specifications of the maintenance manual, and adjust wheel bearings; 1.19 Disassemble, clean, detect and install wheel bearings; 1.20 Replace seals of wheel hub bearings, install wheel hubs and adjust gaps between bearings; 1.21 Check, detect, replace and adjust the parking brake and cable; 1.22 Check, detect, replace and adjust the electric parking brake; 1.23 Measure service reminder indicators, parking

	brake indicator lights, alarm lights, switches and traverses; 1.24 Check, detect and overhaul ABS hydraulic transmission devices and electronic and mechanical components in accordance with correct measures of maintenance and safety, and specify the dismantlement and installation of ABS components; 1.25 Release the ABS system in accordance with safety procedures recommended by the maintenance manual; Bleed the circuits of ABS systems in accordance with steps stipulated by the maintenance manual; Test the ABS hydraulic; 1.26 Diagnose, overhaul and adjust ABS wheel speed sensors and circuits in accordance with specifications in the maintenance manual; Detect and fix wiring harness and connectors in accordance with the steps stipulated by the maintenance manual. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 Structures and working principles of drum brakes; 2.2 Structures and working principles of disc brakes; 2.3 Structures and working principles of brake booster devices; 2.4 Structures and working principles of parking brakes; 2.5 Structures and working principles of anti-lock braking systems. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Structures and working principles of braking systems; 3.2 Procedures of the faults overhaul of braking systems; 3.3 Procedures of the functional debugging of braking systems; 3.4 Application of commonly-used equipment and tools of braking systems maintenance. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Safety protection skills;

	4.2 Communication skills; 4.3 Customer service skills; 4.4 Teamwork skills; 4.5 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Braking systems are overhauled in accordance with vehicle maintenance manual and technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety; 2. Disposal methods of waste; 3. Safety operations of measuring instruments; 4. Safety operation of operating equipment and tools;

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	OVERHAUL OF MULTI-FUEL POWER SYSTEMS	**DUTY NO.**	604
TASK TITLE	DETECTION AND MAINTENANCE OF COMPRESSED NATURAL GAS (CNG) POWERTRAINS	**TASK NO.**	6041
PERFORMANCE CRITERIA	The person performing this task must be able to overhaul multi-fuel driving power systems in accordance with technical requirements and manufacturer's maintenance manuals.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of senior technicians or new-energy vehicle engineers; The tools and equipment to be used include: 1. Full set of vehicle toolboxes (including high voltage insulation tools); 2. Protective tool kits (work clothes, safety shoes, helmets, goggles, insulating gloves and other personal protective equipment; quarantine strips, the safety signs, fire extinguishers, insulating mats and other site protection articles; inside and outside protective kits and other vehicle protection articles); 3. Special lifting machines for electric vehicles; 4. Powertrain plates of new energy vehicle (CNG); 5. Diagnostic tool kits (including multimeters, oscilloscopes, diagnostic apparatus and other equipment).		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Comply with safety and health regulations; 2. Select safety protection equipment; 3. Set up equipment of site safety protection; 4. Detect, maintain or replace energy storage and supply devices of compressed natural gas: gas cylinders, high voltage solenoid valves, pressure gauges, gas nozzles and high voltage pipelines; 5. Detect, maintain or replace the shields, fixtures and components of gas cylinders; 6. Measure the size, weight and capacity of compressed natural gas cylinders, and remove and clean the energy fuel of the	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Detect, maintain or replace storage and supply devices of compressed natural gas: gas cylinders, high voltage solenoid valves, pressure gauges, gas nozzles and high voltage pipelines; 1.2 Detect, maintain or replace the shields, fixtures and components of gas cylinders; 1.3 Measure the size, weight and capacity of compressed natural gas cylinders, and remove and clean the energy fuel of the cylinders; 1.4 Check and read the information of cylinder labels to decide whether any maintenance is needed; 1.5 Dispose, store or deactivate gas cylinders; 1.6 Check the operating state of the gas cylinder valve to decide whether any maintenance is needed; 1.7 Detect, maintain or replace energy pressure relief devices of compressed natural gas: pressure reducers, pressure reducer pipelines; 1.8 Detect, maintain or replace energy control devices of

cylinders; 7. Check and read the information of cylinder labels to decide whether any maintenance is needed; 8. Dispose, store or deactivate gas cylinders; 9. Check the operating state of the gas cylinder valve to decide whether any maintenance is needed; 10. Detect, maintain or replace pressure relief devices of compressed natural gas: pressure reducers, pressure reducer pipelines; 11. Detect, maintain or replace energy control devices of compressed natural gas: Shift switches, energy electronic control units, fuel and CNG solenoid valves, common rail injection valves and relevant energy wiring harnesses; 12. Detect the engine performance of compressed natural gas, and decide whether any maintenance is needed; 13. Disassemble and hoist engine assemblies of compressed natural gas; 14. Detect, maintain or replace mechanical components of compressed natural gas engines; 15. Detect, maintain or replace relevant electronic control components of compressed natural gas engines; 16. Detect, maintain, clean or replace fuel system assemblies, piping and dense energy seals of compressed natural gas engines; 17. Detect, maintain, clean or replace intake system components, lines and tight energy seals of compressed natural gas engines; 18. Detect, maintain, clean or replace ignition system components of compressed natural gas engines; 19. Detect, maintain or replace exhaust system components, lines and seals of compressed natural gas engines;	compressed natural gas: Shift switches, energy electronic control units, fuel and CNG solenoid valves, common rail injection valves and relevant energy wiring harnesses; 1.9 Detect the engine performance of compressed natural gas, and decide whether any maintenance is needed; 1.10 Disassemble and hoist engine energy assemblies of compressed natural gas; 1.11 Detect, maintain or replace mechanical components of compressed natural gas energy engines; 1.12 Detect, maintain or replace relevant electronic control components of compressed natural gas energy engines; 1.13 Detect, maintain, clean or replace fuel system assemblies, piping and dense energy seals of compressed natural gas engines; 1.14 Detect, maintain, clean or replace intake system components, lines and tight energy seals of compressed energy natural gas engines; 1.15 Detect, maintain, clean or replace ignition system components of compressed energy natural gas engines; 1.16 Detect, maintain or replace exhaust system components, lines and seals of compressed natural gas engines; 1.17 Check and replace compressed natural gas engines; 1.18 Detect the leakage of compressed natural gas, and confirm items for maintenance; 1.19 Detect the exhaust energy emission of compressed natural gas engines, and confirm items for maintenance; 1.20 Detect the blockage and corrosion of fuel energy pipelines of compressed natural gas engines, and confirm items for maintenance; 1.21 Check manual and automatic fuel switching operations (dual-fuel vehicles), and determine whether any maintenance is needed; 1.22 Detect components of compressed natural gas, analyse whether it is polluted and determine items for maintenance; 1.23 Interpret the fault light, read the engine fault codes and data flows, and analyze whether they are normal. **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 The using principles of safety protection equipment; 2.2 The using principles of field safety protection

20. Check and replace compressed natural gas engines; 21. Detect the leakage of compressed natural gas, and confirm items for maintenance; 22. Detect the exhaust emission of compressed natural gas engines, and confirm items for maintenance; 23. Detect the blockage and corrosion of fuel pipelines of compressed natural gas engines, and confirm items for maintenance; 24. Check manual and automatic fuel switching operations (dual-fuel vehicles), and determine whether any maintenance is needed; 25. Detect components of compressed natural gas, analyse whether it is polluted and determine items for maintenance; 26. Interpret the fault light, read the engine fault codes and data flows, and analyze whether they are normal; 27. Clean protective equipment; 28. Recycle safety protection equipment; 29. Store safety protection equipment and instruments.	equipment; 2.3 The using principles of diagnostic equipment of new energy vehicles; 2.4 The disassembling principles of compressed natural gas (CNG) powertrains; 2.5 The fault principles of compressed natural gas (CNG) powertrains. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Structures and working principles of compressed natural gas (CNG) powertrains; 3.2 Procedures of the fault overhaul of compressed natural gas (CNG) powertrains; 3.3 Procedures of the functional debugging of compressed natural gas (CNG) powertrains; 3.4 Application of commonly-used equipment and tools of compressed natural gas (CNG) powertrains. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Safety protection skills; 4.2 Communication skills; 4.3 Customer service skills; 4.4 Teamwork skills; 4.5 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Compressed natural gas (CNG) powertrains are overhauled in accordance with vehicle maintenance manual and technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety; 2. Site safety protection equipment; 3. Waste disposal methods.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	OVERHAUL OF MULTI-FUEL POWER SYSTEMS	**DUTY NO.**	604
TASK TITLE	DETECTION AND MAINTENANCE OF LIQUEFIED NATURAL GAS (LNG) POWERTRAINS	**TASK NO.**	6042
PERFORMANCE CRITERIA	The person performing this task must be able to overhaul multi-fuel driving power systems in accordance with technical requirements and manufacturer's maintenance manuals.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of senior technicians or new-energy vehicle engineers; The tools and equipment to be used include: 1. Full set of vehicle toolboxes (including high voltage insulation tools); 2. Protective tool kits (work clothes, safety shoes, helmets, goggles, insulating gloves and other personal protective equipment; quarantine strips, the safety signs, fire extinguishers, insulating mats and other site protection articles; inside and outside protective kits and other vehicle protection articles); 3. Special lifting machines for electric vehicles; 4. Powertrain plates of new energy vehicle (CNG); 5. Diagnostic tool kits (including multimeters, oscilloscopes, diagnostic apparatus and other equipment).		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Comply with safety and health regulations; 2. Select safety protection equipment; 3. Set up equipment of site safety protection; 4. Detect, maintain or replace storage and supply devices of liquefied natural gas: gas cylinders, water bath carburetors, safety valves, combined pressure regulating valves, pressure stabilizing tanks, electric magnetic valves, filters, etc.; 5. Detect, maintain or replace the shields, fixtures and components of gas cylinders; 6. Measure the size, weight and capacity of liquefied natural gas cylinders, and remove and clean	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Detect and maintain energy storage and supply devices of liquefied natural gas: 1.2 Detect and maintain energy pressurization devices of liquefied natural gas: 1.3 Analyze the composition and structural principles of liquefied natural gas engines; 1.4 Analyze structural principles relevant electronic control components of liquefied natural gas engines; **2.0 Principle** The person performing this task must be able to explain the detection and maintenance of liquefied natural gas; 2.1 The using principles of safety protection equipment; 2.2 The using principles of field safety protection equipment; 2.3 The using principles of diagnostic equipment of new energy vehicles;

the energy fuel of the cylinders; 7. Check and read the information of cylinder labels to decide whether any maintenance is needed; 8. Dispose, store or deactivate gas cylinders; 9. Check the operating state of the gas cylinder valve to decide whether any maintenance is needed; 10. Detect, maintain or replace the pressurization device of liquefied natural gas: pressurized globe valves, pressurized pressure regulating valves, pressurized coils and pressurized pipelines; 11. Detect the engine performance of liquefied natural gas, and decide whether any maintenance is needed; 12. Disassemble and hoist engine assemblies of liquefied natural gas; 13. Detect, maintain or replace mechanical components of liquefied natural gas engines; 14. Detect, maintain or replace relevant electronic control components of liquefied natural gas engines; 15. Detect, maintain, clean or replace fuel system assemblies, piping and dense energy seals of liquefied natural gas engines; 16. Detect, maintain, clean or replace fuel system assemblies, piping and dense energy seals of liquefied natural gas engines; 17. Detect, maintain, clean or replace ignition system components of liquefied natural gas engines; 18. Detect, maintain or replace exhaust system components, lines and seals of liquefied natural gas engines; 19. Detect and replace the oil and filters of liquefied natural gas engines; 20. Detect the leakage of liquefied natural gas, and confirm items for	2.4 The disassembling principles of liquefied natural gas (LNG) powertrains; 2.5 The fault principles of liquefied natural gas (LNG) powertrains. **3.0 Theories** The person performing this task must be able to expalin the following: 3.1 Significance of each component of liquefied natural gas (LNG); 3.2 The fault mechanism of liquefied natural gas (LNG) powertrains; 3.3 Processes of engine combustion. **4.0 Essential Skills** The person performing this task must have the following skills: 4.1 Safety protection skills; 4.2 Teamwork skills; 4.3 Report writing skills.

maintenance; 21. Detect the exhaust emission of liquefied natural gas engines, and confirm items for maintenance; 22. Detect the blockage and corrosion of fuel pipelines of liquefied natural gas engines, and confirm items for maintenance; 23. Check manual and automatic fuel switching operations (dual-fuel vehicles), and determine whether any maintenance is needed; 24. Overhaul components of liquefied natural gas, analyse whether it is polluted and determine items for maintenance; 25. Interpret the fault light, read the engine fault codes and data flows, and analyze whether they are normal; 26. Clean protective equipment; 27. Recycle equipment of safety protection; 28. Store safety protection equipment and instruments.	
DESCRIPTION OF THE END PRODUCT / SERVICE	Liquefied natural gas (LNG) powertrains are overhauled in accordance with vehicle maintenance manual and technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety; 2. Site safety protection equipment; 3. Waste disposal methods.

OCCUPATION	NEW-ENERGY VEHICLE TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	OVERHAUL OF MULTI-FUEL POWER SYSTEMS	**DUTY NO.**	604
TASK TITLE	DETECTION AND MAINTENANCE OF OIL-ELECTRIC HYBRID POWERTRAINS	**TASK NO.**	6043
PERFORMANCE CRITERIA	The person performing this task must be able to overhaul the oil-electric hybrid powertrains in accordance with technical requirements and the manufacturer's maintenance manual.		
RANGE STATEMENT	The task can be performed in an automotive maintenance workshop under the supervision of senior technicians or new-energy vehicle engineers. The tools and equipment to be used include: 1. Full set of vehicle toolboxes (including high voltage insulation tools); 2. Protective tool kits (work clothes, safety shoes, helmets, goggles, insulating gloves and other personal protective equipment; quarantine strips, the safety signs, fire extinguishers, insulating mats and other site protection articles; inside and outside protective kits and other vehicle protection articles); 3. Special lifting machines for electric vehicles; 4. New energy vehicles; 5. Diagnostic tool kits (including multimeters, oscilloscopes, diagnostic apparatus and other equipment).		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Comply with safety and health regulations; 2. Select safety protection equipment; 3. Set up equipment of site safety protection; 4. Detect and maintain cylinder heads and valve mechanism of hybrid engines; 5. Detect and maintain cylinder blocks and crankshaft piston assemblies of hybrid engines; 6. Detect and maintain the lubricating system of hybrid engines; 7. Detect and maintain the cooling system of hybrid engines; 8. Detect and maintain the fuel supply system of hybrid	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Detect and maintain cylinder heads and valve mechanism of hybrid engines; 1.2 Detect and maintain cylinder blocks and crankshaft piston assemblies of hybrid engines; 1.3 Detect and maintain the lubricating system of hybrid engines; 1.4 Detect and maintain the cooling system of hybrid engines; 1.5 Detect and maintain the fuel supply system of hybrid engines; 1.6 Detect and maintain the intake system of hybrid engines; 1.7 Detect and maintain the exhaust system of hybrid engines; 1.8 Detect and maintain the start-up system of hybrid BSG; 1.9 Detect and maintain the ignition system of hybrid engines; 1.10 Detect and maintain the forced ventilation system of

engines; 9. Detect and maintain the intake system of hybrid engines; 10. Detect and maintain the exhaust system of hybrid engines; 11. Detect and maintain the start-up system of hybrid BSG; 12. Detect and maintain the ignition system of hybrid engines; 13. Detect and maintain the forced ventilation system of crankshafts; 14. Detect and maintain the circulating system of waste gas; 15. Detect and maintain the secondary air injection system; 16. Detect and maintain catalytic converters; 17. Detect and maintain the control system of evaporative emission; 18. Detect and maintain hybrid transmission assemblies on the vehicle; 19. Detect and maintain hybrid transmission assemblies under the vehicle; 20. Detect and maintain torque converters; 21. Clean protective equipment; 22. Recycle safety protection equipment; 23. Store safety protection equipment and instruments.	crankshafts; 1.11 Detect and maintain the circulating system of waste gas; 1.12 Detect and maintain the secondary air injection system; 1.13 Detect and maintain catalytic converters; 1.14 Detect and maintain the control system of evaporative emission; 1.15 Detect and maintain hybrid transmission assemblies on the vehicle; 1.16 Detect and maintain hybrid transmission assemblies under the vehicle; 1.17 Detect and maintain torque converters; **2.0 Principle** The person performing this task must be able to explain the following principles: 2.1 The using principles of safety protection equipment; 2.2 The using principles of field safety protection equipment; 2.3 The using principles of diagnostic equipment of new energy vehicles; 2.4 The disassembling principles of oil-electric hybrid powertrains; 2.5 The fault principles of oil-electric hybrid powertrains. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Cylinder heads and valve mechanism of hybrid engines; 3.2 Cylinder blocks and crankshaft piston assemblies of hybrid engines; 3.3 The lubricating system of hybrid engines; 3.4 The cooling system of hybrid engines; 3.5 The fuel supply system of hybrid engines; 3.6 The intake system of hybrid engines; 3.7 The exhaust system of hybrid engines; 3.8 The start-up system of hybrid BSG; 3.9 The ignition system of hybrid engines; 3.10 The forced ventilation system of crankshafts; 3.11 The circulating system of waste gas; 3.12 The secondary air injection system; 3.13 Catalytic converters; 3.14 The control system of evaporative emission; 3.15 Hybrid transmission assemblies on the vehicle; 3.16 Hybrid transmission assemblies under the vehicle; 3.17 Torque converters.

	4.0 Essential Skills The person performing this task must have the following skills: 4.1 Safety protection skills; 4.2 Instrument chassis system information inspection skills; 4.3 Teamwork skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The oil-electric hybrid systems are overhauled in accordance with the vehicle maintenance manuals and technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety; 2. Site safety protection equipment; 3. Waste disposal methods; 4. Application of vehicle maintenance manual.

TABLE 1: DACUM CHARTS FOR NEW-ENERGY VEHICLE TECHNICIAN - NTA 6

DUTIES	TASKS	ENABLERS
1.0 High voltage power systems overhaul	1.1 Detection and maintenance of the vehicle control systems. 1.2 Detection and maintenance of driving motor systems. 1.3 Detection and maintenance of power battery systems. 1.4 Detection and maintenance of on-board charging systems. 1.5 Detection and maintenance of high voltage distribution systems. 1.6 Detection and maintenance of gear control systems.	**General skills and knowledge** · Cooperation with others using communication skills and submission of reports to the superiors · Utilization of vehicle maintenance manuals · Skills and knowledge of vehicle high voltage power systems · High voltage system components and elements · Recognition of circuit diagrams of vehicle high voltage systems · High voltage safety protection **Tools and equipment** · New energy vehicle toolboxes · Insulation detectors · Insulating mats · Isolation barriers · High voltage safety warning signs · Multimeters · Lifting machines · Driving motors and power battery lifting brackets · Vehicle blockers · Fault diagnostic apparatus · Personal protective equipment for high voltage, such as insulating boots, goggle and insulating gloves **Materials** · Key components of vehicle control systems, driving motor systems, power battery systems, on-board charging systems, high voltage distribution systems and gear control systems **Requirements for employees** · Pursuit of excellence, teamwork spirit, time management competence, honesty and trustworthiness
2.0 Body electrical systems overhaul	2.1 Detection and maintenance of lighting systems. 2.2 Detection and maintenance of comfort systems.	**General skills and knowledge** · Cooperation with others using communication skills and submission of reports to the superiors

	2.3 Detection and maintenance of on-board network systems. 2.4 Detection and maintenance of driving auxiliary systems.	· Utilization of vehicle maintenance manuals · Skills and knowledge of vehicle body electrical systems · Identification of body electrical system components · Recognition of electric circuit diagrams of vehicle body · High voltage safety protection **Tools and equipment** · New energy vehicle toolboxes · Insulation detectors · Insulating mats · Isolation barriers · High voltage safety warning signs · Multimeters · Lifting machines · Vehicle blockers · Fault diagnostic apparatus · Personal protective equipment for high voltage, such as insulating boots, goggle and insulating gloves **Materials** · Key components of lighting systems, comfort systems, on-board network systems and driving auxiliary systems **Requirements for workers** · Pursuit of excellence, teamwork spirit, time management competence, honesty and trustworthiness
3.0 Chassis systems overhaul	3.1 Detection and maintenance of transmission systems. 3.2 Detection and maintenance of driving systems. 3.3 Detection and maintenance of steering systems. 3.4 Detection and maintenance of braking systems.	**General skills and knowledge** · Cooperation with others using communication skills and submission of reports to the superiors · Utilization of vehicle maintenance manuals · Skills and knowledge in automotive chassis systems · Identification of chassis system components · Recognition of circuit diagrams of vehicle chassis systems · High voltage safety protection

		Tools and equipment · New energy vehicle toolboxes · Insulation detectors · Insulating mats · Isolation barrieres · High voltage safety warning signs · Multimeters · Lifting machines · Vehicle blockers · Fault diagnostic apparatus · Four-wheel positioning machines and dynamic balancing instruments · Personal protective equipment for high voltage, such as insulating boots, goggle and insulating gloves **Materials** · Key components of driving systems, steering systems, transmission systems **Requirements for employees** · Pursuit of excellence, teamwork spirit, time management competence, honesty and trustworthiness
4.0 Multi-fuel power systems overhaul	4.1 Detection and maintenance of compressed natural gas (CNG) powertrains. 4.2 Detection and maintenance of the liquefied natural gas (LNG) powertrains. 4.3 Detection and maintenance of oil-electric hybrid powertrains.	**General skills and knowledge** · Cooperation with others using communication skills and submission of reports to the superiors · Application of the manufacturer's manual · Skills and knowledge in vehicle steering systems · Steering component · Interpretation of technical drawings · Basic materials science · Basic automotive electrician **Tools and equipment** · New energy vehicle toolboxes · Insulation detectors · Insulating mats · Isolation barriers · High voltage safety warning signs · Multimeters · Lifting machines · Vehicle blockers · Fault diagnostic apparatus

		· Personal protective equipment for high voltage, such as insulating boots, goggle and insulating gloves **Materials** · Key system components of compressed natural gas (CNG) powertrains, liquefied natural gas (LNG) powertrains and oil-electric hybrid powertrains **Requirements for employees** · Pursuit of excellence, teamwork spirit, time management competence, honesty and trustworthiness