Qualification Pack

Junior Technician- Solar EV charging station

QP Code: SGJ/Q4001

Version: 1.0

NSQF Level: 3

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Qualification Pack

SGJ/Q4001: Junior Technician- Solar EV charging station

Brief Job Description

This Qualification contains National Occupation Standards for performing work related to the Installation along with Operation & Maintenance (O&M) of Solar plus grid based Electric Vehicle (EV) Charging station. The job holder shall perform tasks while ensuring safety, quality and good workmanship for installation, usage along with O&M of solar powered EV charging station as per standard industry practices. He/She may also conduct site surveys and evaluate various parameters to decide the suitability of site for the installation of solar powered EV charging station. Also, the individual performs the regular maintenance for Solar powered charging station. The skilled workforce shall be employed with EV charging stations operators including at Public Charging Stations/ Captive Charging Stations along with EV manufacturers/OEMs or the companies who supply equipment for setting up EV charging infrastructure.

Personal Attributes

This job requires the individual to be diligent, organised, punctual, attentive and accountable to complete the installation along with O&M work at solar based EV charging site in a safe and timely manner. The individual must also demonstrate strong work ethics, good communication skills and should have an ability to properly follow the instructions of supervisor.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. SGJ/N4001: Site feasibility for installation of solar EV charging station
2. SGJ/N4002: Installation of Solar Powered EV charging station
3. SGJ/N4003: Testing and commissioning of Solar EV charging station
4. SGJ/N4004: Operation and Maintenance of Solar EV charging station
5. SGJ/N4005: Maintain Personal Health and Safety at Solar EV charging project site
6. DGT/VSQ/N0101: Employability Skills (30 Hours)

Qualification Pack (QP) Parameters

Sector	Green Jobs
Sub-Sector	Renewable Energy

Qualification Pack

Occupation	Technician, Installation, Operation and Maintenance
Country	India
NSQF Level	3
Credits	11
Aligned to NCO/ISCO/ISIC Code	NCO-2015/3113.0101
Minimum Educational Qualification & Experience	8th grade pass (plus NTC (2 years)) with NA of experience OR 10th grade pass with NA of experience OR Certificate-NSQF (level 2 certified (e.g. Solar PV Project Helper)) with 2 Years of experience relevant
Minimum Level of Education for Training in School	10th Class
Pre-Requisite License or Training	NA
Minimum Job Entry Age	16 Years
Last Reviewed On	NA
Next Review Date	17/11/2025
NSQC Approval Date	17/11/2022
Version	1.0
Reference code on NQR	2022/POW/SCGJ/06461
NQR Version	1

Remarks:

Total 330 Hours of training duration including 270 hours of mandatory NOS with 30 hours of employability skills module and 60 hours of On the Job (OJT) training

SGJ/N4001: Site feasibility for installation of solar EV charging station

Description

This unit outlines the basics of EV and solar powered EV charging, its key elements, along with performing Site survey and discuss other key prerequisites for Solar EV charging station installation as per concerned guidelines.

Scope

The scope covers the following :

- Basics of solar powered EV charging station and evolving opportunities
- Key elements of Solar EV charging station system
- Perform Site survey and discuss key pre-requisites for Solar EV charging station installation as per concerned guidelines

Elements and Performance Criteria

Basics of solar powered EV charging station and evolving job opportunities

To be competent, the user/individual on the job must be able to:

PC1. Discuss the need and importance of solar based EV charging station and the evolving jobs opportunities.

PC2. Explain the concept of EV charging system.

PC3. Explain various types of EV charging system and their functionality.

PC4. Explain categories of electric vehicles, chargers, charging technologies and different batteries types.

PC5. Discuss all the key components of EV charging station and identify their basic functions.

PC6. Discuss and identify all the key components of a Solar powered EV charging station including of Solar Plant and its major components, Charger Types and its role , Battery management system etc and illustrate their functions,

PC7. Discuss the advantage and disadvantage of different types of EV charger.

PC8. Discuss basic skills, knowledge and responsibility of a solar powered EV charging Junior Technician.

Key elements of solar powered EV Charging Station

To be competent, the user/individual on the job must be able to:

PC9. Discuss and outline the detailed prospects, concept and practice of utilisation of solar based EV charging system in India.

PC10. Discuss in brief on key aspects including EV and charging technologies, Types of chargers, types of battery and classification, battery packs assembly, charging/discharging cycles, C rating, State of Charge/State of Health, functions of battery charging protection and management system etc.

PC11. Demonstrate the functions of all key components of the solar based EV charging system including of Chargers, Battery packs,Battery management system, Motor, drivetrain etc

PC12. Discuss how to estimate the load demand and accordingly how to size the capacity of solar power plant for a suitable EV charging station.

PC13. Discuss solar power plant components and its installation and O&M for effective operation

PC14. Show the installation and commissioning of solar power plant for application in EV charging.

PC15. Show how solar plant with or without battery can be effectively integrated with conventional grid based system for charging EVs.

PC16. Discuss key aspects like the functions of inverter, Motor, Drivetrain, concepts of Regenerative Breaking etc

PC17. Discuss key aspects of health and safety for setting up solar plant along with operate and manage solar based EV charging station.

PC18. Discuss how services like Battery Swapping are critical to EV charging business.

Performing Site Survey and other key pre-requisites for Solar EV charging station installation as per concerned guidelines

To be competent, the user/individual on the job must be able to:

PC19. Discuss how to analyse key information like unshaded area requirement, location, insolation etc to identify a suitable site for solar EV charging station installation.

PC20. Show how to perform site feasibility assessment including analysing all required data and key info for a suitable site selection for installing solar EV charging station.

PC21. Discuss the various parameters that has influence on location analysis of a solar EV Charging Station.

PC22. Analyse the key considerations for planning the sequence of performing site feasibility analysis.

PC23. Explain how to interpret effect of Site Selection and Shadow on Solar PV Module Output

PC24. Identify the tools required for performing site feasibility and demonstrate their functions and Illustrate Do’s and Don'ts of tools handling

PC25. Show how to also identify the suitable location for installing components like Inverter, Junction Boxes etc.

PC26. Explain the importance of pre-installation checks and procedures and how those activities are carried out.

PC27. Show how to employ practice of inspecting the site for meeting all key requirements for the installation of solar EV charging station.

PC28. List and identify the tools, materials and equipment used for installing the solar powered EV charging station.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. Concerned policies of the company

KU2. Concerned policies of the company

KU3. Concerned policies of the company

KU4. Domain specific policies and sectoral trends driving EV demand

KU5. general terminologies associated with solar power plant and EV charging system

KU6. basic concepts of electricity along with electrical safety

KU7. units and symbols for irradiation, irradiance, current, voltage, storage etc

KU8. simple calculations to derive the power and energy received from solar radiation in a given area and estimate load demand for EV charging

KU9. ffect on array output of current and voltage based on series / parallel connections of modules, tilt angle, orientation and shading

KU10. efficiency, cost and typical specifications, functioning and operating principle of different types of solar photovoltaic plants, commercially available PV modules, inverters, charge controllers, battery, mounting structures, cables, junction boxes and other components

KU11. mechanical and electrical features necessary for the long life of the PV power plant under a wide range of operating conditions

KU12. basics of how to use software like google earth and other tools for site survey etc

KU13. preventive and safety housekeeping measures for eliminating risks and hazard

KU14. Technical skills for installation of Solar PV plant along with operate, maintain, basic repairing and trouble shooting,of solar based electrical charging infrastructure using skills and tools that range from computer diagnostics to basic electrical tools

KU15. Coordinate with third parties and vendors for the smooth implementation of concerned projects

KU16. Manage a detailed plan to monitor and track work progress

KU17. Measure solar based charging infrastructure performance using appropriate tools and techniques

KU18. Ensuring that all services are delivered on-time, within the scope, and within budget of the client and customer

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. read and write vernacular/English language

GS2. read and understand signs, manuals, health and safety instructions, memos, and all other concerned documents of the company

GS3. identify various colour codes as per standard electrical, mechanical and civil nomenclature

GS4. express statements or information clearly so that others can hear and understand

GS5. participate in and understand the main points of simple discussions with clients and customers

GS6. respond appropriately to any queries by customers and other stakeholders

GS7. follow concerned rules and code of conduct

GS8. effectively manage requirements for concerned service delivery

GS9. recognize problems and identify solutions

GS10. choose best methods to complete assigned tasks

GS11. approach relevant authority when required

GS12. apply domain knowledge and evaluate information obtained from customers, supervisor and co-workers

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Basics of solar powered EV charging station and evolving job opportunities	**33**	**16**	**-**	**-**
PC1. Discuss the need and importance of solar based EV charging station and the evolving jobs opportunities.	4	4	-	-
PC2. Explain the concept of EV charging system.	4	-	-	-
PC3. Explain various types of EV charging system and their functionality.	4	4	-	-
PC4. Explain categories of electric vehicles, chargers, charging technologies and different batteries types.	5	-	-	-
PC5. Discuss all the key components of EV charging station and identify their basic functions.	4	4	-	-
PC6. Discuss and identify all the key components of a Solar powered EV charging station including of Solar Plant and its major components, Charger Types and its role , Battery management system etc and illustrate their functions,	4	4	-	-
PC7. Discuss the advantage and disadvantage of different types of EV charger.	4	-	-	-
PC8. Discuss basic skills, knowledge and responsibility of a solar powered EV charging Junior Technician.	4	-	-	-
Key elements of solar powered EV Charging Station	**28**	**24**	**-**	**-**
PC9. Discuss and outline the detailed prospects, concept and practice of utilisation of solar based EV charging system in India.	3	-	-	-
PC10. Discuss in brief on key aspects including EV and charging technologies, Types of chargers, types of battery and classification, battery packs assembly, charging/discharging cycles, C rating, State of Charge/State of Health, functions of battery charging protection and management system etc.	4	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11. Demonstrate the functions of all key components of the solar based EV charging system including of Chargers, Battery packs,Battery management system, Motor, drivetrain etc	4	4	-	-
PC12. Discuss how to estimate the load demand and accordingly how to size the capacity of solar power plant for a suitable EV charging station.	4	4	-	-
PC13. Discuss solar power plant components and its installation and O&M for effective operation	2	2	-	-
PC14. Show the installation and commissioning of solar power plant for application in EV charging.	2	4	-	-
PC15. Show how solar plant with or without battery can be effectively integrated with conventional grid based system for charging EVs.	2	4	-	-
PC16. Discuss key aspects like the functions of inverter, Motor, Drivetrain, concepts of Regenerative Breaking etc	2	2	-	-
PC17. Discuss key aspects of health and safety for setting up solar plant along with operate and manage solar based EV charging station.	2	2	-	-
PC18. Discuss how services like Battery Swapping are critical to EV charging business.	3	2	-	-
Performing Site Survey and other key pre-requisites for Solar EV charging station installation as per concerned guidelines	**23**	**26**	**-**	**-**
PC19. Discuss how to analyse key information like unshaded area requirement, location, insolation etc to identify a suitable site for solar EV charging station installation.	4	4	-	-
PC20. Show how to perform site feasibility assessment including analysing all required data and key info for a suitable site selection for installing solar EV charging station.	2	4	-	-
PC21. Discuss the various parameters that has influence on location analysis of a solar EV Charging Station.	3	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC22. Analyse the key considerations for planning the sequence of performing site feasibility analysis.	3	2	-	-
PC23. Explain how to interpret effect of Site Selection and Shadow on Solar PV Module Output	3	-	-	-
PC24. Identify the tools required for performing site feasibility and demonstrate their functions and Illustrate Do’s and Don'ts of tools handling	3	4	-	-
PC25. Show how to also identify the suitable location for installing components like Inverter, Junction Boxes etc.	-	3	-	-
PC26. Explain the importance of pre-installation checks and procedures and how those activities are carried out.	3	2	-	-
PC27. Show how to employ practice of inspecting the site for meeting all key requirements for the installation of solar EV charging station.	-	3	-	-
PC28. List and identify the tools, materials and equipment used for installing the solar powered EV charging station.	2	4	-	-
NOS Total	**84**	**66**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	SGJ/N4001
NOS Name	Site feasibility for installation of solar EV charging station
Sector	Green Jobs
Sub-Sector	Renewable Energy
Occupation	Technician
NSQF Level	3
Credits	2
Version	1.0
Last Reviewed Date	NA
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

SGJ/N4002: Installation of Solar Powered EV charging station

Description

This unit captures key attributes for installation of solar power plant for utilisation of solar energy in EV charging station

Scope

The scope covers the following :

- Installation of Solar Plant for solar plus grid based EV Charging station

Elements and Performance Criteria

Installation of Solar Plant for EV Charging station

To be competent, the user/individual on the job must be able to:

PC1. Discuss and outline key technical details including specifications and system design for both Grid based, and Solar charging EV station.

PC2. Explain how to Install the major components of solar power plant including Solar module mounting structure; Solar Module; Solar Inverter; Energy Meter; Electrical Interconnection etc

PC3. Demonstrate how to use various tools and tackles including for concerned electrical along with civil and mechanical installation

PC4. Explain the process of installing the mounting structure along with structural support and accessories for safe & weatherproof installation, as per various site conditions.

PC5. Demonstrate how to install electrical components of solar PV system; including inverter, batteries, junction boxes, energy meters, cables and conduits other electrical components.

PC6. Describe the process of installing the electrical components including inverter, batteries, junction boxes, energy meters, cables, etc

PC7. Describe Do's and Don'ts of installing the electrical components, DC wiring etc

PC8. Identify various tools & tackles used for cable and conduit installation.

PC9. Demonstrate the application of tools & tackles used for cable and conduit installation

PC10. Describe the importance of Earthing for the protection of solar PV system.

PC11. Describe the importance of conducting testing of all solar PV components and performing fault finding and analysis, continuity checks, polarity check and other commissioning activities.

PC12. Demonstrate how to perform earthing for the protection of solar PV system

PC13. Identify opportunities for material and energy conservation, along with use of environmentally friendly materials in electrical, civil and mechanical installation.

PC14. Explain the concerned regulations & standards for grid interconnection.

PC15. Describe the commissioning process for the solar PV system.

Installation of key components of EV charging station.

To be competent, the user/individual on the job must be able to:

PC16. Explain concerned requirements including any permit requirement to setup the EV charging Station

PC17. Discuss the relevant standards and guidelines applicable to the EV charging station installation.

PC18. State all the key elements of installation and commissioning of EV charging stations.

PC19. Discuss the key considerations for planning the sequence of operations.

PC20. Explain the pre-installation checklist and procedures to be carried out.

PC21. List and identify the tools, materials and equipment used for installing solar based EV charging station.

PC22. Explain the importance of components specifications and how to assess those for meeting system performance requirement

PC23. Explain the various types of protection to be provided to the charging such as weather protection, protection against voltage fluctuations, safety tests etc.

PC24. Discuss appropriate protocol for EV charging, such as Combined Charging System (CCS), GB/T, CHAdeMO (CHArge de Move), AC & DC /Slow & Fast Charging etc.

PC25. Explain how to analyse the EV charging machine for desired functionalities and perform concerned functions as per manufacturer's specifications

PC26. Demonstrate how to employ proper procedure of connections from the electrical facility to the charging installation site.

PC27. Demonstrate the installation of earth protection system and AC/DC power modules in the EV charging station in line with relevant standards and guidelines.

PC28. Demonstrate the process of installing conduits for carrying electrical wires, cables from nearest source/facility to the charging station.

PC29. Show how to assign markings on civil foundation for charging station erection after taking measurements and Demonstrate the fixing of the EV machine on the civil foundation while ensuring a firm grip.

PC30. Show how to use appropriate tools and equipment such as drilling machine, screwdriver, wrench, various types of mounting and insertion tools etc. as per the type of task to be performed pertaining to EV charging station installation.

PC31. Demonstrate the use of appropriate protocol for EV charging, such as Combined Charging System (CCS), GB/T, CHAdeMO (CHArge de Move), AC Charging etc.

PC32. Show how to analyse the EV charging machine for desired functionalities and perform concerned functions as per manufacturer's specifications.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. government/corporate policies and guidelines on: workplace safety, identification and mitigation of safety hazards, work procedures and guidelines

KU2. legislative, organizational, site requirements and procedures for system installation

KU3. tools and tackles required for system installation

KU4. effect on array output of current and voltage based on multiple factors

KU5. basic functioning and operation of different types of mechanical and electrical components of a solar plus grid based EV charging system

KU6. installation work on a solar power system in accordance with relevant standards and regulations

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. complete documentation work applicable to the role

GS2. read English and/or vernacular language

GS3. read and understand manuals, health and safety instructions, memos, other documents related to system installation and O&M

GS4. read from different sources- books screens in machines and signage

GS5. read various color codes, as per standard electrical, mechanical and civil nomenclature

GS6. express statements or information clearly so that others can hear and understand

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Installation of Solar Plant for EV Charging station	**26**	**22**	**-**	**-**
PC1. Discuss and outline key technical details including specifications and system design for both Grid based, and Solar charging EV station.	2	2	-	-
PC2. Explain how to Install the major components of solar power plant including Solar module mounting structure; Solar Module; Solar Inverter; Energy Meter; Electrical Interconnection etc	2	1	-	-
PC3. Demonstrate how to use various tools and tackles including for concerned electrical along with civil and mechanical installation	2	4	-	-
PC4. Explain the process of installing the mounting structure along with structural support and accessories for safe & weatherproof installation, as per various site conditions.	2	1	-	-
PC5. Demonstrate how to install electrical components of solar PV system; including inverter, batteries, junction boxes, energy meters, cables and conduits other electrical components.	2	2	-	-
PC6. Describe the process of installing the electrical components including inverter, batteries, junction boxes, energy meters, cables, etc	2	1	-	-
PC7. Describe Do's and Don'ts of installing the electrical components, DC wiring etc	2	2	-	-
PC8. Identify various tools & tackles used for cable and conduit installation.	2	2	-	-
PC9. Demonstrate the application of tools & tackles used for cable and conduit installation	-	2	-	-
PC10. Describe the importance of Earthing for the protection of solar PV system.	2	1	-	-
PC11. Describe the importance of conducting testing of all solar PV components and performing fault finding and analysis, continuity checks, polarity check and other commissioning activities.	2	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. Demonstrate how to perform earthing for the protection of solar PV system	1	1	-	-
PC13. Identify opportunities for material and energy conservation, along with use of environmentally friendly materials in electrical, civil and mechanical installation.	1	1	-	-
PC14. Explain the concerned regulations & standards for grid interconnection.	2	-	-	-
PC15. Describe the commissioning process for the solar PV system.	2	2	-	-
Installation of key components of EV charging station.	**27**	**25**	**-**	**-**
PC16. Explain concerned requirements including any permit requirement to setup the EV charging Station	1	-	-	-
PC17. Discuss the relevant standards and guidelines applicable to the EV charging station installation.	2	-	-	-
PC18. State all the key elements of installation and commissioning of EV charging stations.	2	1	-	-
PC19. Discuss the key considerations for planning the sequence of operations.	1	1	-	-
PC20. Explain the pre-installation checklist and procedures to be carried out.	2	1	-	-
PC21. List and identify the tools, materials and equipment used for installing solar based EV charging station.	1	2	-	-
PC22. Explain the importance of components specifications and how to assess those for meeting system performance requirement	1	2	-	-
PC23. Explain the various types of protection to be provided to the charging such as weather protection, protection against voltage fluctuations, safety tests etc.	2	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC24. Discuss appropriate protocol for EV charging, such as Combined Charging System (CCS), GB/T, CHAdeMO (CHArge de Move), AC & DC /Slow & Fast Charging etc.	2	2	-	-
PC25. Explain how to analyse the EV charging machine for desired functionalities and perform concerned functions as per manufacturer's specifications	2	1	-	-
PC26. Demonstrate how to employ proper procedure of connections from the electrical facility to the charging installation site.	1	2	-	-
PC27. Demonstrate the installation of earth protection system and AC/DC power modules in the EV charging station in line with relevant standards and guidelines.	1	2	-	-
PC28. Demonstrate the process of installing conduits for carrying electrical wires, cables from nearest source/facility to the charging station.	1	2	-	-
PC29. Show how to assign markings on civil foundation for charging station erection after taking measurements and Demonstrate the fixing of the EV machine on the civil foundation while ensuring a firm grip.	2	2	-	-
PC30. Show how to use appropriate tools and equipment such as drilling machine, screwdriver, wrench, various types of mounting and insertion tools etc. as per the type of task to be performed pertaining to EV charging station installation.	2	2	-	-
PC31. Demonstrate the use of appropriate protocol for EV charging, such as Combined Charging System (CCS), GB/T, CHAdeMO (CHArge de Move), AC Charging etc.	2	2	-	-
PC32. Show how to analyse the EV charging machine for desired functionalities and perform concerned functions as per manufacturer's specifications.	2	2	-	-
NOS Total	**53**	**47**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	SGJ/N4002
NOS Name	Installation of Solar Powered EV charging station
Sector	Green Jobs
Sub-Sector	Renewable Energy
Occupation	Technician
NSQF Level	3
Credits	3
Version	1.0
Last Reviewed Date	NA
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

SGJ/N4003: Testing and commissioning of Solar EV charging station

Description

This unit outlines all activities which are to be performed for testing and commissioning of a solar based EV charging station.

Scope

The scope covers the following :

- Testing and commissioning of Solar EV Charger and BESS system

Elements and Performance Criteria

Testing and commissioning of Solar EV Charger and BESS system

To be competent, the user/individual on the job must be able to:

PC1. List the various types of tests that are performed to test the solar based EV charging station.

PC2. Explain the process to be followed to conduct various types of tests pertaining to the commissioning of a solar based EV charging station.

PC3. State the key considerations to check the electrical connections for the EV charging station

PC4. Perform earthing tests in accordance with industry rules and regulations and standard work practices.

PC5. Test the connections of the conductive parts with the supply voltage source as per standard practice.

PC6. Conduct tests to check for electrical continuity between exposed conductive parts and the earth circuit.

PC7. Elaborate the technique for measurement of the voltage drop between various parts of the charging station.

PC8. Demonstrate how to measure the earth resistance and voltage drop between the exposed conductive part and the earthing terminal of the charging station.

PC9. Explain the procedure to perform Ingress Protection (IP) testing and discuss relevant IS and IEC standards to perform IP testing.

PC10. Describe the start-up procedures to be performed for the solar based EV charging station

PC11. State the importance of conducting a trial run of the solar based EV charging station.

PC12. Demonstrate how to Evaluate the charging capabilities of the station by testing the communication protocol to as per desired standards.

PC13. Explain the procedure to rectify faults and equipment malfunction pertaining to the commissioning of the charging station

PC14. Demonstrate how to deal with equipment malfunction and rectify faults during the commissioning process.

PC15. Describe the need for modifications in the existing systems and installed devices.

PC16. Show how to employ the process of modifying the existing systems and installing electrical devices as per requirements and test results.

PC17. State the importance of the installation and commissioning certificate in the work process.

PC18. Demonstrate the process to document backups, manuals, logs, etc. as per the work requirement

PC19. Demonstrate how to perform testing of all components, along with fault finding & analysis, continuity checks, polarity check and other commissioning activities.

PC20. Explain the importance of ensuring that the site is safely cleared after performing all electrical work

PC21. Describe the importance of conducting testing of all solar PV components and performing fault finding and analysis, continuity checks, polarity check and other commissioning activities.

PC22. Discuss and examine the concerned regulations & standards for grid interconnection.

PC23. Describe and demonstrate the commissioning process for the solar PV system installed for solar based EV charging station

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. tools and tackles required for system installation, testing and commissioning

KU2. legislative, organizational, site requirements along with system testing and commissioning procedures

KU3. how to work in varying weather conditions while meeting various environmental requirements

KU4. isolation procedures and diagnostic/fault finding techniques

KU5. basic functioning and operation of different types of electrical and mechanical components of solar based EV charging system

KU6. do's and don'ts of system installation, testing and commissioning

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. prepare and maintain proper documentation

GS2. respond appropriately to any queries and meet customers requirement on system installation

GS3. follow code of conduct

GS4. understand the various color codes, as per standard electrical, mechanical and civil nomenclature.

GS5. apply domain knowledge, observations and data to select course of action to perform tasks

GS6. complete documentation work applicable to the role

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Testing and commissioning of Solar EV Charger and BESS system	**25**	**25**	**-**	**-**
PC1. List the various types of tests that are performed to test the solar based EV charging station.	1	-	-	-
PC2. Explain the process to be followed to conduct various types of tests pertaining to the commissioning of a solar based EV charging station.	1	1	-	-
PC3. State the key considerations to check the electrical connections for the EV charging station	1	1	-	-
PC4. Perform earthing tests in accordance with industry rules and regulations and standard work practices.	1	2	-	-
PC5. Test the connections of the conductive parts with the supply voltage source as per standard practice.	-	2	-	-
PC6. Conduct tests to check for electrical continuity between exposed conductive parts and the earth circuit.	-	2	-	-
PC7. Elaborate the technique for measurement of the voltage drop between various parts of the charging station.	1	2	-	-
PC8. Demonstrate how to measure the earth resistance and voltage drop between the exposed conductive part and the earthing terminal of the charging station.	-	2	-	-
PC9. Explain the procedure to perform Ingress Protection (IP) testing and discuss relevant IS and IEC standards to perform IP testing.	2	-	-	-
PC10. Describe the start-up procedures to be performed for the solar based EV charging station	2	-	-	-
PC11. State the importance of conducting a trial run of the solar based EV charging station.	1	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. Demonstrate how to Evaluate the charging capabilities of the station by testing the communication protocol to as per desired standards.	1	2	-	-
PC13. Explain the procedure to rectify faults and equipment malfunction pertaining to the commissioning of the charging station	1	-	-	-
PC14. Demonstrate how to deal with equipment malfunction and rectify faults during the commissioning process.	-	2	-	-
PC15. Describe the need for modifications in the existing systems and installed devices.	2	-	-	-
PC16. Show how to employ the process of modifying the existing systems and installing electrical devices as per requirements and test results.	1	2	-	-
PC17. State the importance of the installation and commissioning certificate in the work process.	2	-	-	-
PC18. Demonstrate the process to document backups, manuals, logs, etc. as per the work requirement	-	2	-	-
PC19. Demonstrate how to perform testing of all components, along with fault finding & analysis, continuity checks, polarity check and other commissioning activities.	-	2	-	-
PC20. Explain the importance of ensuring that the site is safely cleared after performing all electrical work	2	-	-	-
PC21. Describe the importance of conducting testing of all solar PV components and performing fault finding and analysis, continuity checks, polarity check and other commissioning activities.	2	-	-	-
PC22. Discuss and examine the concerned regulations & standards for grid interconnection.	2	-	-	-
PC23. Describe and demonstrate the commissioning process for the solar PV system installed for solar based EV charging station	2	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
NOS Total	**25**	**25**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	SGJ/N4003
NOS Name	Testing and commissioning of Solar EV charging station
Sector	Green Jobs
Sub-Sector	Renewable Energy
Occupation	Technician
NSQF Level	3
Credits	1
Version	1.0
Last Reviewed Date	NA
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

SGJ/N4004: Operation and Maintenance of Solar EV charging station

Description

This unit captures key aspects related to performing O&M activities along with monitoring of solar based EV charging system

Scope

The scope covers the following :

- Perform Operation & Maintenance along with system monitoring of Solar integrated EV charging station

Elements and Performance Criteria

Perform Operation & Maintenance along with Monitoring of Solar integrated EV charging station

To be competent, the user/individual on the job must be able to:

PC1. Discuss how to perform various activities for operation and maintenance (O&M) of the Solar powered Charging stations.

PC2. Discuss and show how to Check the physical condition of the Charger

PC3. Discuss how to observe for the over- heating during the normal charging operation.

PC4. Explain and show how preventive maintenance of Solar Powered Charging station is carried out.

PC5. Demonstrate how various maintenance activities are to be performed to ensure smooth operation of the Solar integrated EV charging station.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. legislative, organizational, site requirements and related procedures.

KU2. Single Line Diagram, Civil / Mechanical drawings, Electrical drawings and how to read and interpret a Bill of Material for a rooftop solar PV power plant

KU3. preparation of preventive maintenance schedule for different components

KU4. tools to be utilised in performing system operation and maintenance

KU5. knowledge of waste segregation categories

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. prepare and maintain proper documentation.

GS2. ability to read and correctly interpret information from different sources including books, screens, and signage.

GS3. • understand the various color codes, as per standard electrical, mechanical and civil
• nomenclature and industry practice

GS4. clearly communicate installation and design instructions to team.

GS5. clearly communicate customers' requirements and concerns.

GS6. respond timely and appropriately to customers' queries.

GS7. communicate the constraints and quality requirements to team.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Perform Operation & Maintenance along with Monitoring of Solar integrated EV charging station	**25**	**25**	**-**	**-**
PC1. Discuss how to perform various activities for operation and maintenance (O&M) of the Solar powered Charging stations.	6	4	-	-
PC2. Discuss and show how to Check the physical condition of the Charger	4	5	-	-
PC3. Discuss how to observe for the over-heating during the normal charging operation.	4	4	-	-
PC4. Explain and show how preventive maintenance of Solar Powered Charging station is carried out.	5	6	-	-
PC5. Demonstrate how various maintenance activities are to be performed to ensure smooth operation of the Solar integrated EV charging station.	6	6	-	-
NOS Total	**25**	**25**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	SGJ/N4004
NOS Name	Operation and Maintenance of Solar EV charging station
Sector	Green Jobs
Sub-Sector	Renewable Energy
Occupation	Technician
NSQF Level	3
Credits	1
Version	1.0
Last Reviewed Date	NA
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

SGJ/N4005: Maintain Personal Health and Safety at Solar EV charging project site

Description

This unit outlines the personal, health and safety requirements for performing concerned work at Solar EV charging project sites

Scope

The scope covers the following :

- Maintain Personal Health and Safety at Solar EV charging station

Elements and Performance Criteria

Maintain Personal Health and Safety at Solar EV charging station

To be competent, the user/individual on the job must be able to:

PC1. Explain the requirement and importance of ensuring personal cleanliness and hygiene at project site

PC2. Identify steps to be followed to maintain personal cleanliness while working at the project site.

PC3. Explain the requirements for a safe work area/project site.

PC4. Identify and show how to properly use personal health and safety tools including gloves and masks.

PC5. Identify the risks and hazards associated with solar powered EV charging system installations and their O&M (e.g. fire, electric shocks etc)

PC6. Show how to mitigate the risks and hazards associated with solar powered EV charging system installations and O&M (e.g. fire, electric shocks etc);

PC7. Explain and demonstrate standard operating procedures of ensuring safety for installation of Solar powered EV charging system in accordance with industry practice

PC8. Explain how to identify the first aid materials and administer first-aid at project site, in case of an incident at project site

PC9. Explain how to report immediately to concerned authorities regarding sign and symptoms of illness/accidents etc.

PC10. Discuss specified norms for waste collection and segregation for all waste categories as applicable.

PC11. Demonstrate standard operating procedures of safety for installation of solar powered EV charging system in accordance with industry practice

PC12. Demonstrate the proper use of Gloves and Masks and other PPE along with good housekeeping practices and all other infection control guidelines at project site

PC13. Demonstrate good housekeeping practices and infection control guidelines at project site

PC14. Demonstrate how to identify the location of first aid materials and administer first-aid.

PC15. Demonstrate all safety operating procedures for installation of solar powered EV charging system

PC16. Demonstrate how to follow processes specified for disposal of hazardous waste, if any.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. importance of conducting safety drills and working in safe environment
KU2. record data on waste generation and disposal at workplace
KU3. complete statutory documents relevant to maintaining safety and hygiene
KU4. fill safety formats for near miss, unsafe condition
KU5. identify potential safety risk and accordingly report to appropriate authority
KU6. communicate and collaborate with others to incorporate sustainable practices
KU7. interpret general safety guidelines, labels, charts and signage

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. present information particularly on Health and safety aspects in a logical and organized way
GS2. correctly interpret manuals on health and safety, concerned instructions, memos, other company documents
GS3. read and interpret data from various sources
GS4. take decision with systematic course of actions and/or response
GS5. plan to manage time and equipment utilisation effectively
GS6. use reasoning skills to identify and resolve basic problems

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Maintain Personal Health and Safety at Solar EV charging station	**24**	**26**	**-**	**-**
PC1. Explain the requirement and importance of ensuring personal cleanliness and hygiene at project site	2	-	-	-
PC2. Identify steps to be followed to maintain personal cleanliness while working at the project site.	2	-	-	-
PC3. Explain the requirements for a safe work area/project site.	2	2	-	-
PC4. Identify and show how to properly use personal health and safety tools including gloves and masks.	2	2	-	-
PC5. Identify the risks and hazards associated with solar powered EV charging system installations and their O&M (e.g. fire, electric shocks etc)	2	2	-	-
PC6. Show how to mitigate the risks and hazards associated with solar powered EV charging system installations and O&M (e.g. fire, electric shocks etc);	1	2	-	-
PC7. Explain and demonstrate standard operating procedures of ensuring safety for installation of Solar powered EV charging system in accordance with industry practice	2	2	-	-
PC8. Explain how to identify the first aid materials and administer first-aid at project site, in case of an incident at project site	2	2	-	-
PC9. Explain how to report immediately to concerned authorities regarding sign and symptoms of illness/accidents etc.	1	2	-	-
PC10. Discuss specified norms for waste collection and segregation for all waste categories as applicable.	1	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11. Demonstrate standard operating procedures of safety for installation of solar powered EV charging system in accordance with industry practice	1	2	-	-
PC12. Demonstrate the proper use of Gloves and Masks and other PPE along with good housekeeping practices and all other infection control guidelines at project site	1	2	-	-
PC13. Demonstrate good housekeeping practices and infection control guidelines at project site	2	2	-	-
PC14. Demonstrate how to identify the location of first aid materials and administer first-aid.	1	2	-	-
PC15. Demonstrate all safety operating procedures for installation of solar powered EV charging system	1	2	-	-
PC16. Demonstrate how to follow processes specified for disposal of hazardous waste, if any.	1	1	-	-
NOS Total	**24**	**26**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	SGJ/N4005
NOS Name	Maintain Personal Health and Safety at Solar EV charging project site
Sector	Green Jobs
Sub-Sector	Renewable Energy
Occupation	Technician
NSQF Level	3
Credits	1
Version	1.0
Last Reviewed Date	NA
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

DGT/VSQ/N0101: Employability Skills (30 Hours)

Description

This unit is about employability skills, Constitutional values, becoming a professional in the 21st Century, digital, financial, and legal literacy, diversity and Inclusion, English and communication skills, customer service, entrepreneurship, and apprenticeship, getting ready for jobs and career development.

Scope

The scope covers the following :

- Introduction to Employability Skills
- Constitutional values - Citizenship
- Becoming a Professional in the 21st Century
- Basic English Skills
- Communication Skills
- Diversity & Inclusion
- Financial and Legal Literacy
- Essential Digital Skills
- Entrepreneurship
- Customer Service
- Getting ready for Apprenticeship & Jobs

Elements and Performance Criteria

Introduction to Employability Skills

To be competent, the user/individual on the job must be able to:

PC1. understand the significance of employability skills in meeting the job requirements

Constitutional values – Citizenship

To be competent, the user/individual on the job must be able to:

PC2. identify constitutional values, civic rights, duties, personal values and ethics and environmentally sustainable practices

Becoming a Professional in the 21st Century

To be competent, the user/individual on the job must be able to:

PC3. explain 21st Century Skills such as Self-Awareness, Behavior Skills, Positive attitude, self-motivation, problem-solving, creative thinking, time management, social and cultural awareness, emotional awareness, continuous learning mindset etc.

Basic English Skills

To be competent, the user/individual on the job must be able to:

PC4. speak with others using some basic English phrases or sentences

Communication Skills

To be competent, the user/individual on the job must be able to:

PC5. follow good manners while communicating with others

PC6. work with others in a team

Diversity & Inclusion

To be competent, the user/individual on the job must be able to:

PC7. communicate and behave appropriately with all genders and PwD

PC8. report any issues related to sexual harassment

Financial and Legal Literacy

To be competent, the user/individual on the job must be able to:

PC9. use various financial products and services safely and securely

PC10. calculate income, expenses, savings etc.

PC11. approach the concerned authorities for any exploitation as per legal rights and laws

Essential Digital Skills

To be competent, the user/individual on the job must be able to:

PC12. operate digital devices and use its features and applications securely and safely

PC13. use internet and social media platforms securely and safely

Entrepreneurship

To be competent, the user/individual on the job must be able to:

PC14. identify and assess opportunities for potential business

PC15. identify sources for arranging money and associated financial and legal challenges

Customer Service

To be competent, the user/individual on the job must be able to:

PC16. identify different types of customers

PC17. identify customer needs and address them appropriately

PC18. follow appropriate hygiene and grooming standards

Getting ready for apprenticeship & Jobs

To be competent, the user/individual on the job must be able to:

PC19. create a basic biodata

PC20. search for suitable jobs and apply

PC21. identify and register apprenticeship opportunities as per requirement

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. need for employability skills

KU2. various constitutional and personal values

KU3. different environmentally sustainable practices and their importance

KU4. Twenty first (21st) century skills and their importance

KU5. how to use basic spoken English language

KU6. Do and dont of effective communication

KU7. inclusivity and its importance

KU8. different types of disabilities and appropriate communication and behaviour towards PwD

KU9. different types of financial products and services

KU10. how to compute income and expenses
KU11. importance of maintaining safety and security in financial transactions
KU12. different legal rights and laws
KU13. how to operate digital devices and applications safely and securely
KU14. ways to identify business opportunities
KU15. types of customers and their needs
KU16. how to apply for a job and prepare for an interview
KU17. apprenticeship scheme and the process of registering on apprenticeship portal

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. communicate effectively using appropriate language
GS2. behave politely and appropriately with all
GS3. perform basic calculations
GS4. solve problems effectively
GS5. be careful and attentive at work
GS6. use time effectively
GS7. maintain hygiene and sanitisation to avoid infection

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Introduction to Employability Skills	**1**	**1**	**-**	**-**
PC1. understand the significance of employability skills in meeting the job requirements	-	-	-	-
Constitutional values – Citizenship	**1**	**1**	**-**	**-**
PC2. identify constitutional values, civic rights, duties, personal values and ethics and environmentally sustainable practices	-	-	-	-
Becoming a Professional in the 21st Century	**1**	**3**	**-**	**-**
PC3. explain 21st Century Skills such as Self-Awareness, Behavior Skills, Positive attitude, self-motivation, problem-solving, creative thinking, time management, social and cultural awareness, emotional awareness, continuous learning mindset etc.	-	-	-	-
Basic English Skills	**2**	**3**	**-**	**-**
PC4. speak with others using some basic English phrases or sentences	-	-	-	-
Communication Skills	**1**	**1**	**-**	**-**
PC5. follow good manners while communicating with others	-	-	-	-
PC6. work with others in a team	-	-	-	-
Diversity & Inclusion	**1**	**1**	**-**	**-**
PC7. communicate and behave appropriately with all genders and PwD	-	-	-	-
PC8. report any issues related to sexual harassment	-	-	-	-
Financial and Legal Literacy	**3**	**4**	**-**	**-**
PC9. use various financial products and services safely and securely	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. calculate income, expenses, savings etc.	-	-	-	-
PC11. approach the concerned authorities for any exploitation as per legal rights and laws	-	-	-	-
Essential Digital Skills	**4**	**6**	**-**	**-**
PC12. operate digital devices and use its features and applications securely and safely	-	-	-	-
PC13. use internet and social media platforms securely and safely	-	-	-	-
Entrepreneurship	**3**	**5**	**-**	**-**
PC14. identify and assess opportunities for potential business	-	-	-	-
PC15. identify sources for arranging money and associated financial and legal challenges	-	-	-	-
Customer Service	**2**	**2**	**-**	**-**
PC16. identify different types of customers	-	-	-	-
PC17. identify customer needs and address them appropriately	-	-	-	-
PC18. follow appropriate hygiene and grooming standards	-	-	-	-
Getting ready for apprenticeship & Jobs	**1**	**3**	**-**	**-**
PC19. create a basic biodata	-	-	-	-
PC20. search for suitable jobs and apply	-	-	-	-
PC21. identify and register apprenticeship opportunities as per requirement	-	-	-	-
NOS Total	**20**	**30**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	DGT/VSQ/N0101
NOS Name	Employability Skills (30 Hours)
Sector	Cross Sectoral
Sub-Sector	Professional Skills
Occupation	Employability
NSQF Level	2
Credits	1
Version	1.0
Last Reviewed Date	24/02/2022
Next Review Date	23/02/2027
NSQC Clearance Date	24/02/2022

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for each Qualification will be created by the Sector Skill Council/Awarding Body. Each Element/ Performance Criteria (PC) will be assigned marks proportional to its importance in NOS.SSC/AB will also lay down proportion of marks for Theory and Skills Practical for each Element/ PC.

2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC/AB.

3. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.

4. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below).

5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/ training center based on these criteria.

6. To pass the assessment,every trainee should score the Recommended Pass % aggregate for the Qualification.

7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification.

Minimum Aggregate Passing % at QP Level : 70

(**Please note**: Every Trainee should score a minimum aggregate passing percentage as specified above, to successfully clear the Qualification Pack assessment.)

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
SGJ/N4001.Site feasibility for installation of solar EV charging station	84	66	0	0	150	33
SGJ/N4002.Installation of Solar Powered EV charging station	53	47	0	0	100	22
SGJ/N4003.Testing and commissioning of Solar EV charging station	25	25	0	0	50	11
SGJ/N4004.Operation and Maintenance of Solar EV charging station	25	25	0	0	50	11
SGJ/N4005.Maintain Personal Health and Safety at Solar EV charging project site	24	26	0	0	50	11
DGT/VSQ/N0101.Employability Skills (30 Hours)	20	30	-	-	50	12
Total	**231**	**219**	**-**	**-**	**450**	**100**

Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training

Glossary

Sector	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.

Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.