QUALIFICATION PACK - OCCUPATIONAL STANDARDS FOR INSTRUMENTATION AUTOMATION SURVEILLANCE AND COMMUNICATION INDUSTRY

Contents

What are Occupational Standards(OS)?

➢ OS describe what individuals need to do, know and understand in order to carry out a particular job role or function

➢ OS are performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

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Introduction

Qualification Pack-DCS Technician

SECTOR: INSTRUMENTATION AUTOMATION SURVEILLANCE & COMMUNICATION

SUB-SECTOR: Automation

OCCUPATION: DCS designing, installation and commissioning

REFERENCE ID: IAS/Q5603

ALIGNED TO: NCO-2015/ NIL

DCS Technician analyses the customers requirements regarding the DCS panels, remote IO panels, SCADA architecture and provides solution to customers for optimized design of panel and SCADA to be utilized in Process Industry.

Brief Job Description: The individual is responsible for understanding the panel requirement, design the panel dimensions and mountings, test the equipements by basic programming software and develop communication with SCADA systems.

Personal Attributes: The individual must have knowledge of process industry, field instrumentation and expertise in the following project phases like documentation, detailed design generation, implementation, testing and onsite setup. Planning & coordination of project work within deadlines.

Job Details

Qualification Pack Code	**IAS/Q5603**		
Job Role	**DCS Technician**		
Credits (NSQF)	TBD	**Version number**	**1.0**
Sector	Instrumentation Automation Surveillance & Communication	**Drafted on**	**15/09/2017**
Sub-sector	Automation	**Last reviewed on**	**15/09/2017**
Occupation	DCS designing, installation and commissioning	**Next review date**	**15/09/2019**
NSQC Clearance on*	**DD/MM/YYYY**		

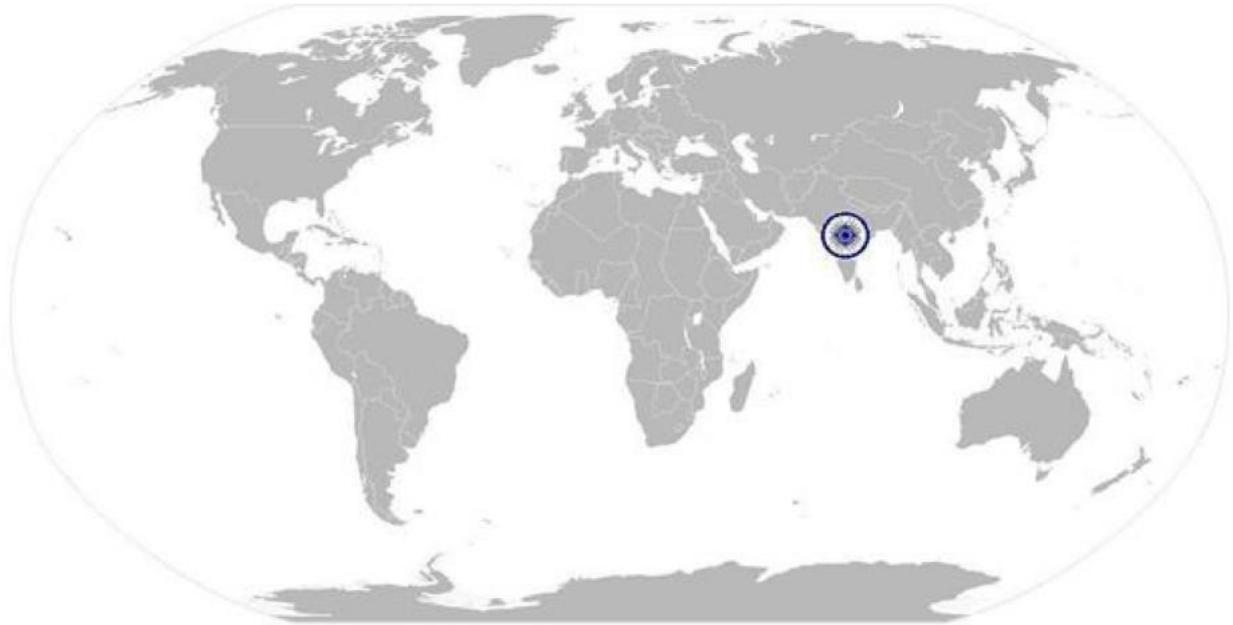*** only after clearance from NSQC**

Job Role	DCS Technician
Role Description	a. Designing of DCS control panel, remote IO panel and SCADA systems b. Fabrication of panels c. Testing & Troubleshooting panels with SCADA projects d. Installation of panels and SCADA architecture onsite
NSQF level	3
Minimum Educational Qualifications	12th Pass, Preferably ITI - Electrical, Electronics, Instrumentation etc.
Maximum Educational Qualifications	NA
Training (Suggested but not mandatory)	Training on Basics DCS.
Minimum Job Entry Age	20 years.
Experience	Experience of minimum one yesr in Panel designing, Fabrication and wiring of the components in a control panel, SCADA architectures and Networking of PC's
Applicable National Occupational Standards (NOS)	**Compulsory:** 1. IAS/N6200 Detailing, procurement and testing of equipment used in DCS Control Panel 2. IAS/N6201 Detailing and procurement of SCADA systems 3. IAS/N6202 Dispatch, Installation and Commissioning of DCS system oniste 4. IAS/N2005 Health and Safety in Workplace **Optional:** N.A.
Performance Criteria	As described in the relevant OS units

Keywords /Terms	Description
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.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation or an area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of OS.
Sub-function	Sub-function are sub-activities essential to fulfil in achieving the objectives of the function.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
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 they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria	Performance criteria 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.
Qualification 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 qualification pack code.
Unit Code	Unit codeis 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 varialbles 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	Knowledge and understanding are statements which together which together specify the technical, generic, professional and organizational specific knowledge that an individual needs in order to perform to the required standard.
Organizational Context	Organizational context includes the way the organization is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Techinical Knowledge	Techinical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.

Definitions

Acronyms	CoreSkills/Generic Skills	Core skills or generic skills 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 the context of the OS, these include communication related skills that are applicable to most job roles.
	Keywords /Terms	**Description**
	FAT	Factory Acceptance Test
	PLC	Programmable Logic Controller
	IO	Inputs and Outputs
	DCS	Distributed Control System
	HMI	Human Machine Interface
	SCADA	Supervisory Control And Data Acquisition
	PC	Personal Computer or Desktop
	LAN	Local Area Network
	NOS	National Occupational Standard(s)
	NVQF	National Vocational Qualifications Framework
	NSQF	National Skill Qualifications Framework
	NVEQF	National Vocational Education Qualifications Framework
	QP	Qualification Pack

National Occupational Standard

Overview

This unit is about gathering the detail information about the DCS control panel, procuring the material for the control panel and later testing the panels.

Unit Code	IAS/N6200
Unit Title (Task)	Detailing, procurement and testing of equipment used in DCS Control Panel
Description	This unit is about gathering the detail information about the DCS control panel, procuring the material for the control panel and later testing the panels.
Scope	This unit/task covers the following: • Detailing the DCS Control Panel and remote panel's functional requirements • Procurement of accessories used in the panels • Examine and test panels using DCS programming software

Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Detailing the DCS Control Panel and remote panel's functional requirements	To be competent, the user/individual on the job must be able to PC1. Identify the customer requirement of the DCS Control Panel and remote panel's PC2. Understand and examine the onsite location where panels will be placed PC3. Interact with Project engineer or customer & understand number of field equipment's helping to analyze the size of control panel and remote panel PC4. Prepare the dimension of panels with the help of fabricator PC5. Assist fabricator in mounting of components on the mounting plate inside the control panel PC6. Prepare panel fabrication drawing and internal mounting layout drawings
Procurement of accessories used in the panels	PC7. Interact with Project engineer to collect the material list regarding PLC modules PC8. Identify number of I/O points PC9. Identify the operating system of the PC/Laptop where PLC/DCS software is to be installed PC10. Procure PLC modules and accessories required for mounting in panel PC11. Procure panel accessories like wires, ferrules, sleeves, terminal blocks, fans, tube light etc. PC12. Procure switchgear accessories like push buttons, switches, contactors and relays PC13. Prepare Input Output list and get it approved from Project engineer or customer PC14. Assist draftsman to prepare engineering drawing for the panels and wiring diagrams for field connections PC15. Examine the drawings and get it approved from the Project engineer PC16. Assist and guide wireman for panel wiring

Examine and test panels using DCS programming software	PC17. Examine panel wiring using continuity test PC18. Examine the Mains power supply unit for powering the DCS Control panel and remote panel's PC19. Examine the wiring of the Digital and Analog IO modules with other components like relays, contactors, switches etc. in the panel PC20. Ensure availability of DCS programming software with others software's like Office, Adobe reader, Windows features etc. PC21. Ensure availability of the communication port on engineering PC/Laptop and PLC PC22. Establish communication between programming software and PLC using appropriate protocol and cable PC23. Perform PLC and IO hardware configuration in the software and establish communication between controller and remote panels PC24. Perform basic digital and analog input/output module test using software
Knowledge & Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. Company's code of conduct, organization culture and reporting structure KA2. Company's documentation policy KA3. Company's line of business and production policy KA4. Departments involved with installation and commissioning KA5. Quality and standards system followed in the company
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. Electrical, electronics and instrumentation KB2. Standard operating procedure (SOP) of the organization for control panel development process KB3. Basics of machine safety and normal safety processes KB4. Quality, standards and guidelines to be followed during panel design development KB5. PLC module and equipments used in the automation process KB6. DCS programming software KB7. General arrangement drawing KB8. Electrical load calculations KB9. Basics on industrial process involved (example: oil and gas, refinery, etc) and stages involved in the process KB10. Safety aspects to be inbuilt in the control panel system as per the process requirement KB11. Instrumentation used in the factory and its wiring concept KB12. DCS Control panel and wiring knowledge KB13. Testing process and parameters involved in the panel testing KB14. Electronics indicators, switchgear and panel accessories KB15. Sources and methods for obtaining required technical information for the control panel being developed

|	KB16. IEC Standards KB17. Relevant regulations, standards and codes of practice and their implications on the panel designing KB18. Procurement of various panel accessories from vendors
Skills (S)	
A. Core Skills/ Generic Skills	**Writing Skills**
	The individual on the job needs to know and understand how to: SA1. Compose E-mails, letters and other official documents clearly SA2. Write user requirements SA3. Prepare fabrication and electrical drawings SA4. Write technical documentation SA5. Write schedules and timelines
	Reading Skills
	The individual on the job needs to know and understand how to: SA6. Read user requirements SA7. Read technical specifications and documentation SA8. Read standards and regulatory compliance documents SA9. Read schedules and timelines SA10. Read drawings
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA11. Question customers appropriately in order to understand the application and the requirements SA12. Discuss task lists, schedules and work-loads with co-workers SA13. Keep customers informed about progress SA14. Use simple and clear language when communicating with a customer SA15. Report issues and problems to managers in clear terms
B. Professional Skills	**Decision Making**
	The user/individual on the job needs to know and understand how to: SB1. Make decisions pertaining to the scope of work SB2. Make decisions pertaining to readiness of the panel for supply SB3. Make decisions pertaining to procurement of panel accessories required for panel making
	Plan and Organise
	The user/individual on the job needs to know and understand: SB4. Plan and organize panel manufacturing - including requirements, design and integration SB5. Anticipate issues and have alternate strategy
	Customer Centricity

	The user/individual on the job needs to know and understand how to: SB6. Understand real needs of the customer and suggest most appropriate solution SB7. Support customer when they need help SB8. Build customer relationships and rapport which promotes two way business
	Problem Solving
	The user/individual on the job needs to know and understand how to: SB9. Think through the problem, evaluate the possible solution(s) and suggest an optimum /best possible solution(s) SB10. Solve issues of co-workers lacking the technical background SB11. Identify and implement solutions to resolve delays
	Analytical Thinking
	The user/individual on the job needs to know and understand how to: SB12. Use the existing information to arrive at actionable decision points SB13. Use the existing information for improving the customer satisfaction SB14. Analyze problems and identify causes and possible solutions
	Critical Thinking
	The user/individual on the job needs to know and understand how to: SB15. Apply, analyze and evaluate the information gathered from observation, experience, reasoning or communication, as a guide to think and take action SB16. Anticipate problems, risks and opportunities and utilize these for mitigation and business optimization

NOS Version Control

NOS Code	IAS/N6200		
Credits (NSQF)	TBD	**Version number**	1.0
Industry	Instrumentation Automation Surveillance & Communication	**Drafted on**	15/09/2017
Industry Sub-sector	Automation	**Last reviewed on**	15/09/2017
Occupation	DCS designing, installation and commissioning	**Next review date**	15/09/2019
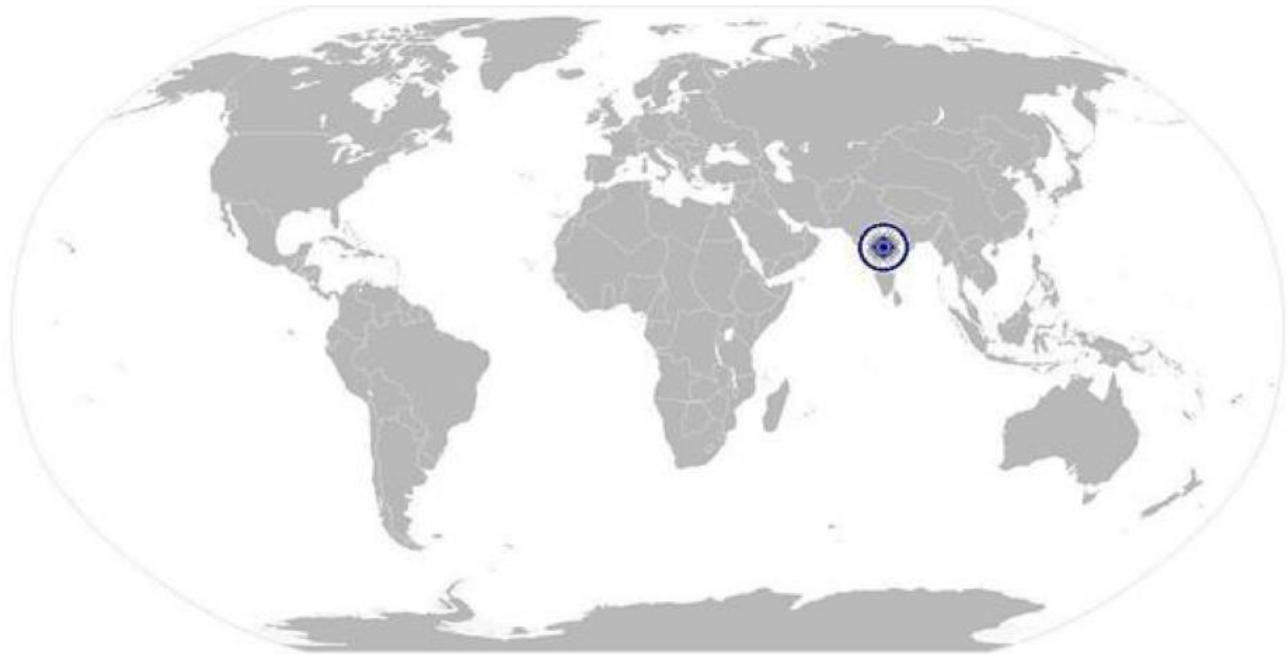
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IAS/N6201   **Detailing and procurement of SCADA systems**

National Occupational Standard

<u>Overview</u>

This unit is about gathering detail information about customer requirement of SCADA system and then later procuring the accessories required for the SCADA system

Unit Code	IAS/N6201
Unit Title (Task)	Detailing and procurement of SCADA systems
Description	This unit is about gathering detail information about customer requirement of SCADA system and then later procuring the accessories required for the SCADA system
Scope	This unit/task covers the following: • Detailing of controlling and monitoring systems • Procure accessories for SCADA systems • Complete Factory Acceptance Test (FAT)

National Occupational Standard (vertical sidebar text)

Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Detailing of controlling and monitoring systems	To be competent, the user/individual on the job must be able to PC1. Collect information from project engineer to know Customer requirement of controlling and monitoring architecture to be used PC2. Interact with project engineer and collect detail information regarding the plant P&ID PC3. Discuss and collect information from project engineer regarding plant hierarchy PC4. Finalize the SCADA architecture and distribution of areas of plant
Procure accessories for SCADA systems	PC5. Prepare material list for the finalized SCADA architecture and get it approved from project engineer or customer PC6. Procure industry grade PC's and LAN (Local Area Network) switches for networking of PC's PC7. Procure industry grade PC tables for the plant where SCADA system will be placed PC8. Assist draftsman to prepare PC network drawing for the SCADA system with Server-Client architecture PC9. Examine the drawings and get it approved from the Project engineer PC10. Assist and guide wireman for PC, monitor and network switch power wiring
Complete Factory Acceptance Test (FAT)	PC11. Prepare a report for control panel and remote IO panel testing and submit it to Project engineer PC12. Invite customer for panel testing at panel manufacturing site PC13. Perform panel testing along with customer and explain him the panel details PC14. Discuss the SCADA architecture and explain the customer about the SCADA material which is procured PC15. After completion of the Factory acceptance test prepare a signed report
Knowledge & Understanding (K)	

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A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. Company's code of conduct, organization culture and reporting structure KA2. Company's documentation policy KA3. Company's line of business and production policy KA4. Departments involved with installation and commissioning KA5. Quality and standards system followed in the company
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. Electrical, electronics and instrumentation KB2. Basics of computer and operating systems KB3. Standard operating procedure (SOP) of the organization for SCADA designs and architectures KB4. Quality, standards and guidelines to be followed during SCADA design and layout development KB5. Control system module and technologies used in the automation process KB6. DCS programming software including SCADA software KB7. Sources and methods for obtaining required technical information for the available SCADA architectures KB8. IEC Standards in DCS programming language used for testing KB9. Relevant documents to be referred for SCADA testing
Skills (S)	
A. Core Skills/ Generic Skills	**Writing Skills**
	The individual on the job needs to know and understand how to: SA1. Compose E-mails, letters and other official documents clearly SA2. Write user requirements SA3. Write test reports SA4. Prepare wiring and network diagrams SA5. Write schedules and timelines
	Reading Skills
	The individual on the job needs to know and understand how to: SA6. Read user requirements SA7. Read technical specifications SA8. Read standards and regulatory compliance documents SA9. Read schedules and timelines SA10. Read drawings
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA11. Question customers appropriately in order to understand the application and the requirements SA12. Discuss task lists, schedules, and work-loads with customers SA13. Keep customers informed about progress of logic development SA14. Use simple and clear language when communicating with a

	customer
B. Professional Skills	**Decision Making**
	The user/individual on the job needs to know and understand how to: SB1. Make decisions pertaining to the scope of work SB2. Make decisions pertaining rediness of procurement of SCADA accessories
	Plan and Organise
	The user/individual on the job needs to know and understand: SB3. Plan and organize project - including requirements, design and integration, testing and customer feedback SB4. Anticipate issues and have alternate strategy
	Customer Centricity
	The user/individual on the job needs to know and understand how to: SB5. Understand real needs of the customer and suggest most appropriate solution SB6. Make customer happy by fulfilling their requirements SB7. Manage relationships and maintain good rapport with customers to get detail inputs on their requirements
	Problem Solving
	The user/individual on the job needs to know and understand how to: SB8. Think through the problem, evaluate the possible solution(s) and suggest an optimum /best possible solution(s) SB9. Solve issues of co-workers, lacking the technical know how SB10. Identify immediate or temporary solutions to resolve delays
	Analytical Thinking
	The user/individual on the job needs to know and understand how to: SB11. Use the existing information to arrive at actionable decision points SB12. Use the existing information for improving the customer satisfaction
	Critical Thinking
	The user/individual on the job needs to know and understand how to: SB13. Apply, analyze and evaluate the information gathered from observation, experience, reasoning or communication, as a guide to think and take action SB14. Anticipate problems, risks and opportunities and utilize these for resolving any issues during testing of panels
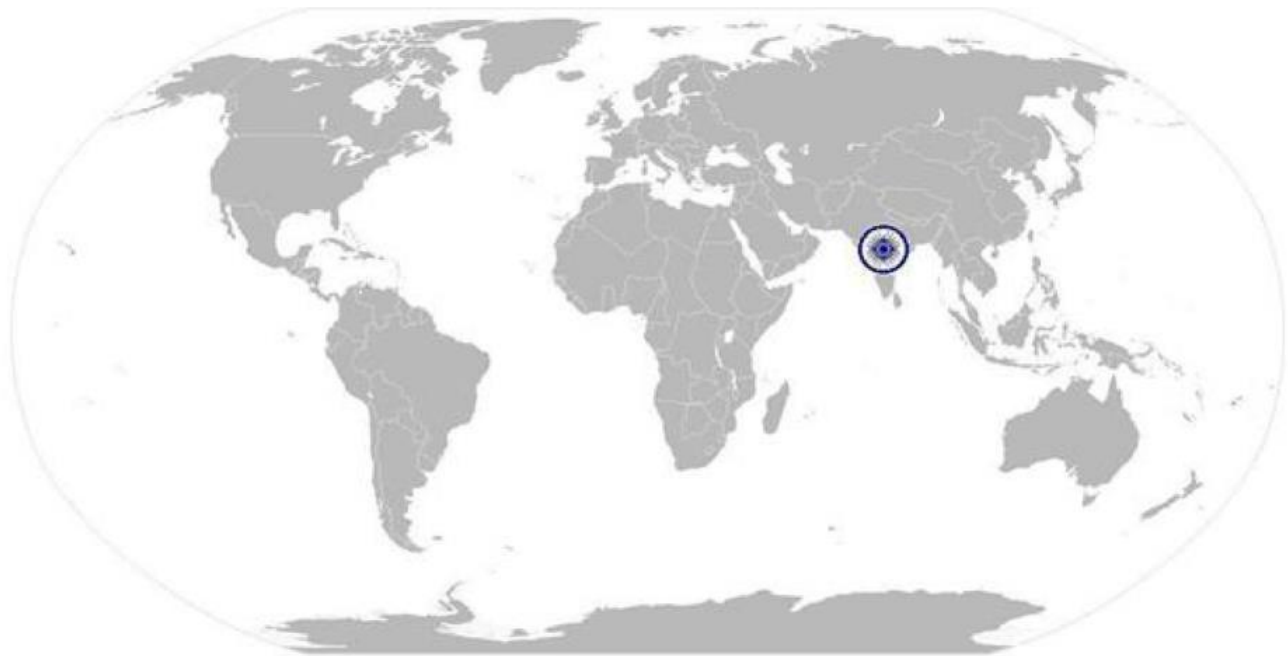
NOS Version Control

NOS Code	IAS/N6201		
Credits (NSQF)	TBD	**Version number**	1.0
Industry	Instrumentation Automation Surveillance & Communication	**Drafted on**	15/09/2017
Industry Sub-sector	Automation	**Last reviewed on**	15/09/2017
Occupation	DCS designing, installation and commissioning	**Next review date**	15/09/2019

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IAS/N6202   **Dispatch, Installation and Commissioning of DCS system onsite**
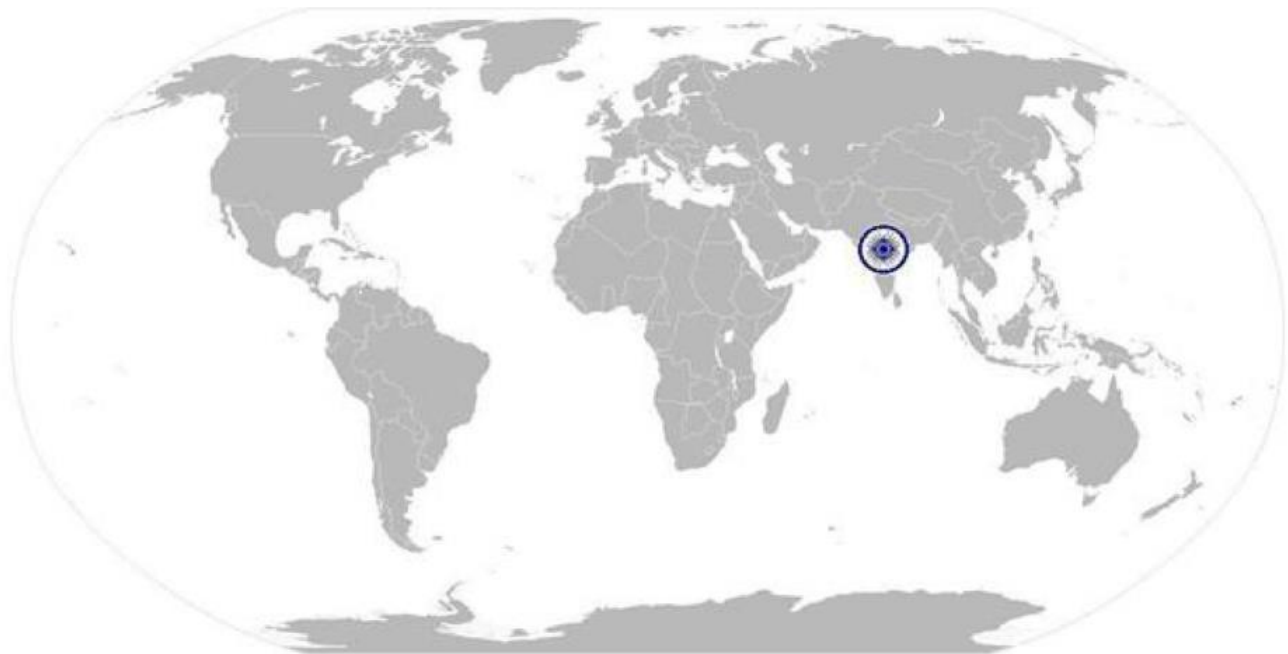
National Occupational Standard

<u>**Overview**</u>

This unit is about dispatching the control panel and later perform onsite installation and commissioning of the panels along with the SCADA systems.

Unit Code	IAS/N6202
Unit Title (Task)	Dispatch, Installation and Commissioning of DCS system onsite
Description	This unit is about dispatching the control panel and later perform onsite installation and commissioning of the panel along with the SCADA systems
Scope	This unit/task covers the following: • Dispatch DCS control panel, remote IO panel and SCADA accessories to site • Installation of panels and SCADA accessories onsite • Panel testing with actual field devices and SCADA systems

Performance Criteria(PC) w.r.t. the Scope

Element	Performance Criteria
Dispatch DCS control panel, remote IO panel and SCADA accessories to site	To be competent, the user/individual on the job must be able to PC1. After FAT ensure that the panel drawings are finalized and panel detail label is fixed on all the panels PC2. Assist in packing the panels and SCADA accessories using bubble wrap or wooden box PC3. Gather detail information from project engineer or customer about the location/address for panel dispatch PC4. Dispatch the panel and accessories using a special courier service
Installation of panels and SCADA accessories onsite	PC5. Place the panels on a proper panel mounting plate PC6. Ensure that there is a cable trench below each panel to allow entry of cables from the cable duct below the panel PC7. Assist and guide onsite wireman to connect field cables between respective terminal base in the panel and field device PC8. Perform continuity test between terminal base and field devices before powering the panel PC9. Arrange and install the PC tables in the respective control rooms along with the procured PC systems PC10. Perform the networking of PC's using LAN switches and Ethernet cables
Panel testing with actual field devices and SCADA systems	PC11. Connect necessary panel supply to the mains and Power on the panel PC12. Provide Power supply to PC stations and activate the SCADA project PC13. Establish a communication between controller and the SCADA system PC14. Test field devices by activating them and monitor their status on digital input modules and SCADA project screens PC15. Activate the field outputs using DCS software or from SCADA screens PC16. Inform project engineer and customer regarding completeness of field wiring, panel testing and SCADA testing PC17. Prepare a signed report with the customer for panel and SCADA commissioning onsite

Knowledge & Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. Company's reporting structure KA2. Company's documentation policy KA3. Company's line of business and product offerings KA4. Company's departments involved with installation and commissioning KA5. Quality and standards followed in the company
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. Electrical, electronics and instrumentation KB2. Basics of computer and operating systems KB3. Standard operating procedure (SOP) of the organization for control panel installation and commissioning KB4. Module and equipments used in the automation process KB5. Application software, Installation, commissioning and testing KB6. General arrangement drawing KB7. Piping and instrumentation diagram (P&ID) KB8. Basics on industrial process involved (example: oil and gas, refinery, etc) and stages involved in the process KB9. Basics on infrastructure process involved in the industry (example: water treatment plant, chilling units etc.) KB10. Safety aspects to be inbuilt in the Panel as per the process requirement KB11. Sources and methods for obtaining required technical information for the panel installation and commissioning KB12. IEC Standards in panel installation onsite

| Skills (S)	
A. Core Skills/ Generic Skills	**Writing Skills**
	The individual on the job needs to know and understand how to: SA1. Compose E-mails, letters and other official documents clearly SA2. Write technical documentation SA3. Write installation and commissioning reports SA4. Write schedules and timelines
	Reading Skills
	The individual on the job needs to know and understand how to: SA5. Read user requirements SA6. Read technical specifications SA7. Read standards and regulatory compliance documents SA8. Read schedules and timelines SA9. Read drawings
	Oral Communication (Listening and Speaking skills)

	The user/individual on the job needs to know and understand how to: SA10. Discuss task lists, schedules and work-loads with colleagues SA11. Keep colleagues informed about progress of panel installation and testing SA12. Discuss with colleagues appropriately in order to understand the nature of the problem and make a diagnosis SA13. Report issues and problems to managers in clear terms
B. Professional Skills	**Decision Making**
	The user/individual on the job needs to know and understand how to: SB1. Make decisions pertaining to the scope of work SB2. Make decisions pertaining to use appropriate vendor for panel packing and dispatching SB3. Make decisions pertaining to readiness of site for panel installation SB4. Make decisions pertaining to commissioning of panel onsite
	Plan and Organise
	The user/individual on the job needs to know and understand: SB5. Plan and organize project - including requirements, design and integration, testing, installation and commissioning, Customer Acceptance Test and customer feedback SB6. Anticipate issues and have alternate strategy
	Customer Centricity
	The user/individual on the job needs to know and understand how to: SB7. Understand real needs of the customer and deliver most appropriate solution SB8. Build good relationships and rapport with customers which will help in inputs related to panel testing with actual field devices
	Problem Solving
	The user/individual on the job needs to know and understand how to: SB9. Think through the problem, evaluate the possible solution(s) and suggest an optimum /best possible solution(s) SB10. Solve problems of colleagues lacking the technical background SB11. Identify immediate or temporary solutions to resolve faults and implement the proper solution immediately
	Analytical Thinking
	The user/individual on the job needs to know and understand how to: SB12. Use the existing information to arrive at actionable decision points SB13. Use the existing information to complete the job in time SB14. Analyze problems and identify causes and possible solutions
	Critical Thinking

	The user/individual on the job needs to know and understand how to:
	SB15. Apply, analyze and evaluate the information gathered from observation, experience, reasoning or communication, as a guide to think and take action
	SB16. Anticipate problems, risks and opportunities and utilize these for solving issues in panel installation and commissing
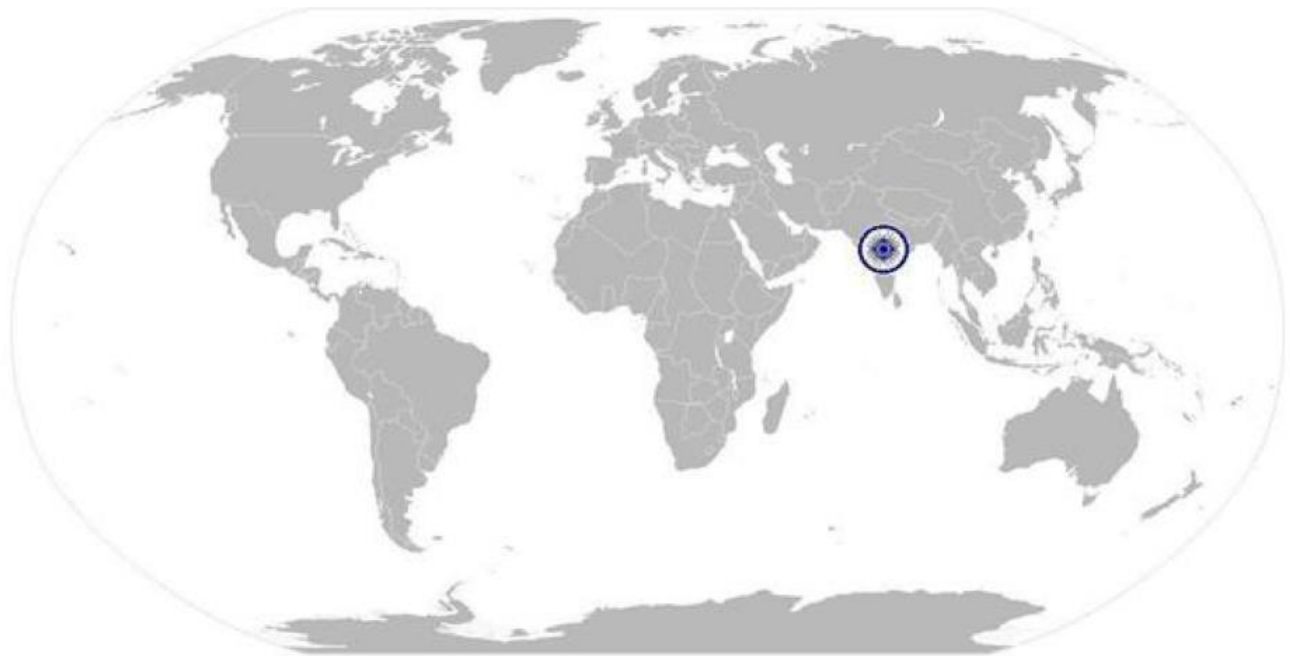
NOS Version Control

NOS Code	IAS/N6202		
Credits (NSQF)	TBD	Version number	1.0
Industry	Instrumentation Automation Surveillance & Communication	Drafted on	15/09/2017
Industry Sub-sector	Automation	Last reviewed on	15/09/2017
Occupation	DCS designing, installation and commissioning	Next review date	15/09/2019
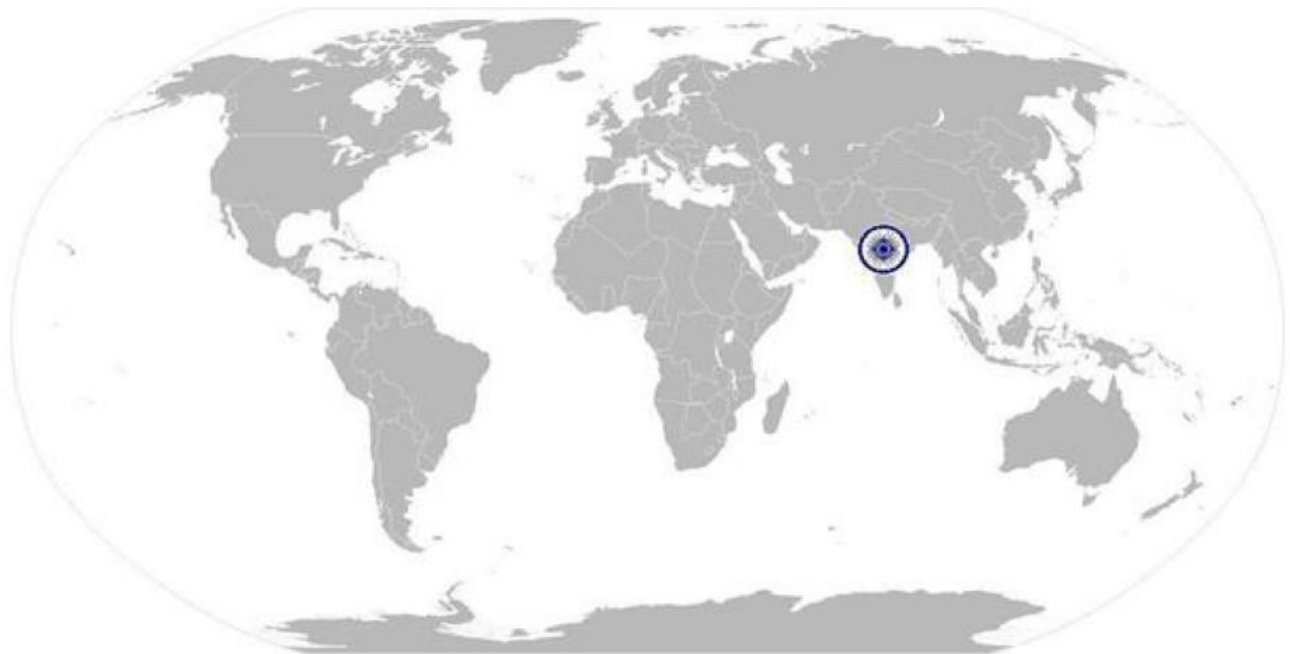
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National Occupational Standard

<u>**Overview**</u>

This unit is about the individual's responsibility to maintain a safe, healthy and secure working environment.

National Occupational Standard

Unit Code	IAS/N2005
Unit Title (Task)	Health and Safety in Workplace
Description	This unit is about following adequate safety procedures to make work environment safe and healthy.
Scope	This unit/task covers the following: • Following safety measures and standards • Maintaining good health and posture

Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Following safety measures and standards	To be competent, the individual must be able to: PC1. Comply with general and special safety procedures followed in the Company PC2. Follow specified safety procedures while handling an equipment, hazardous material or tool PC3. Remove ties, finger rings, or any other metal objects which may interfere with the work PC4. Use safety materials such as goggles, gloves, ear plugs, caps, ESD pins, covers, shoes, etc. PC5. Escalate about any hazardous materials or things found in the premises PC6. Report about any breach of safety procedure in the company PC7. Ensure zero accidents at work PC8. Avoid damage of components due to negligence in ESD procedures PC9. Regularly participate in fire drills or other safety related workshops organized by the company PC10. Ensure no loss for company due to safety negligence
Maintaining good health and posture	PC11. Maintain appropriate posture, especially in long hours of sitting or standing position and in handling heavy materials PC12. Participate in company organized health sessions such as yoga, physiotherapy or games PC13. Handle heavy and hazardous materials with care and using appropriate tools and handling equipment such as trolleys, jacks and ladders

Knowledge & Understanding (K)	
A. **Organizational Context** (Knowledge of the company / organization and its processes)	The individual on the job needs to know and understand: KA1. Company's policies on: incentives, delivery standards, and personnel management KA2. Company occupational safety and health policies KA3. Company emergency evacuation procedure KA4. Company's medical policy

B. **Technical Knowledge**	The individual on the job needs to know and understand: KB1. How to maintain the work area safe and secure KB2. How to handle hazardous materials, tools and equipment KB3. Emergency procedures to be followed such as fire accidents, electrocution etc. KB4. Long term value of good posture and use of appropriate handling equipment KB5. Safety regulations and standards and how to apply these KB6. Electrical grounding practices
Skills (S)	
A. **Core Skills/ Generic Skills**	**Writing Skills**
	The individual on the job needs to know and understand: SA1. Compose E-mails, letters, memos, reminders, and other documents clearly SA2. Share knowledge, issues, problems and resolutions relating to safety and health
	Reading Skills
	The individual on the job needs to know and understand: SA3. Read mails, messages, alerts SA4. Read pictures, drawings, notes relating to safety and health
	Oral Communication (Listening and Speaking skills)
	The individual on the job needs to know and understand: SA5. Question co-workers in order to understand the safety and health issues SA6. Inform co-workers about safety and health issues SA7. Report issues and problems relating to safety and health to managers in clear terms
B. **Professional Skills**	**Decision Making**
	The user/individual on the job needs to know and understand how to: SB1. Make decisions pertaining to safety and health issues at workplace SB2. Make decisions about escalating safety and health issues at workplace to managers
	Plan and Organise
	The user/individual on the job needs to know and understand: SB3. Plan and organize work conforming to the safety and health norms of the company
	Customer Centricity
	The user/individual on the job needs to know and understand how to: SB4. Discuss customer needs with co-workers and identify most appropriate solution make customer happy and make them want

	to work with the company
	Problem Solving
	The user/individual on the job needs to know and understand how to: SB5. Discuss problems relating to the safety and health, evaluate the possible solution(s) and arrive at optimum /best possible solution(s)in consultation with concerned people
	Analytical Thinking
	The user/individual on the job needs to know and understand how to: SB6. Discuss use the available information with co-workers to arrive at actionable decision points SB7. Analyze problems in team and identify causes and possible solutions
	Critical Thinking
	The user/individual on the job needs to know and understand how to: SB8. Collaborate with co-workers to analyze, and evaluate the information gathered from collective observation, experience, reasoning, or communication, as a guide to teamwork

NOS Version Control

NOS Code	IAS/N2005		
Credits (NSQF)	TBD	Version number	1.0
Industry	Instrumentation Automation Surveillance & Communication	Drafted on	15/09/2017
Industry Sub-sector	Automation	Last reviewed on	15/09/2017
Occupation	DCS designing, installation and commissioning	Next review date	15/09/2019
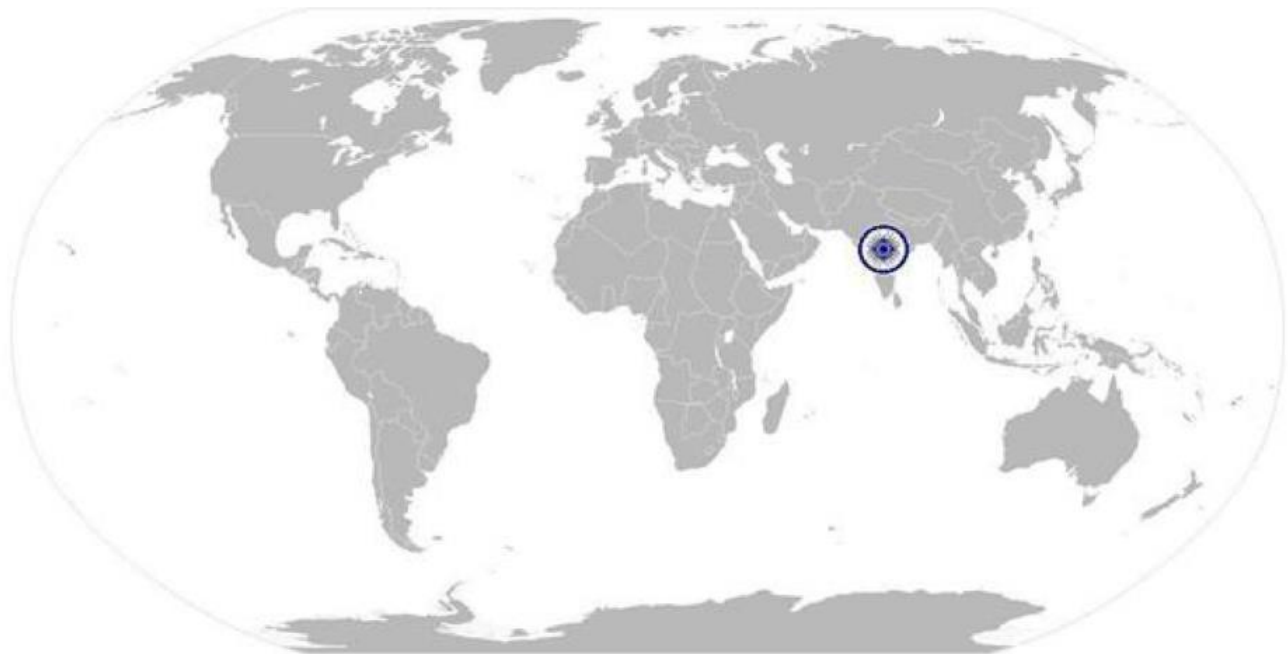
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Annexure

Nomenclature for QP and NOS

Qualification Pack

9 characters

[ABC] / Q 0101

[Insert 3 letter code for SSC]

Q denoting Qualification Pack

QP number (2 numbers)

Occuptaion (2 numbers)
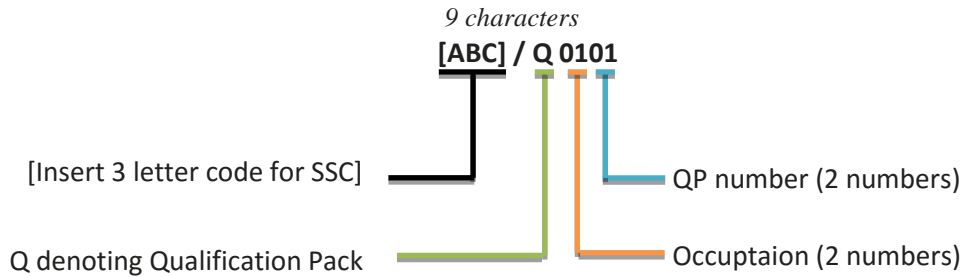
Occupational Standard

An example of NOS with 'N'

9 characters

[ABC] / N 0101

[Insert 3 letter code for SSC]

N denoting National Occupational Standard

OS number (2 numbers)

Occuptaion (2 numbers)
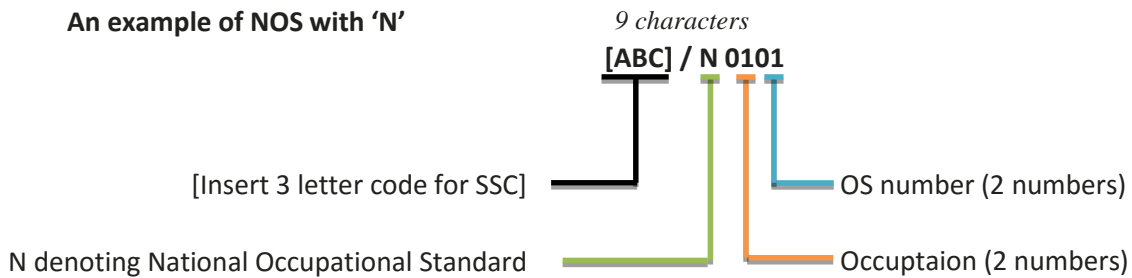
The following acronyms/codes have been used in the nomenclature above:

Sub-sector	Range of Occupation numbers
Installation & Commissioning	00-29
Operation & Maintenance	30-49
Calibration	50-55
Design, Fabrication / Manufacturing	56-79
Design, Fabrication, Installation & commissioning	80-89
General	90-99

Sequence	Description	Example
Three letters	Industry name	[ABC, Font: Calibri (Body), size 11]
Slash	/	/
Next letter	Whether **Q**P or **N**OS	N
Next two numbers	Occupation code	01
Next two numbers	OS number	01

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CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role DCS Technician
Qualification Pack IAS/Q5603
Sector Skill Council Instrumentation Automation Surveillance & Communication

Guidelines for Assessment

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC
3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below).
4. Individual assessment agencies will create unique evaulations for skill practical for every student at each examination/training center based on this criteria.
5. To pass the Qualification Pack , every trainee should score a minimum of 70% in every NOS. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack.

Assessment outcomes	Assessment Criteria for outcomes	Total Mark (390)	Out Of	Theory	Skills Practical
				Marks Allocation	
1.IAS/N6200 Detailing, procurement of equipment used in DCS Control Panel	PC1. Identify the customer requirement of the DCS Control Panel and remote panel's	**150**	10	10	0
	PC2. Understand and examine the onsite location where panels will be placed		10	5	5
	PC3. Interact with Project engineer or customer & understand number of field equipment's helping to analyze the size of control panel and remote panel		10	10	0
	PC4. Prepare the dimension of panels with the help of fabricator		5	5	0
	PC5. Assist fabricator in mounting of components on the mounting plate inside the control panel		5	5	0
	PC6. Prepare panel fabrication drawing and internal mounting layout drawings		5	0	5
	PC7. Interact with Project engineer to collect the material list regarding PLC modules		5	5	0
	PC8. Identify number of I/O points		10	5	5
	PC9. Identify the operating system of the PC/Laptop where PLC/DCS software is to be installed		10	10	0

	PC10. Procure PLC modules and accessories required for mounting in panel	5	5	0
	PC11. Procure panel accessories like wires, ferrules, sleeves, terminal blocks, fans, tube light etc.	5	5	0
	PC12. Procure switchgear accessories like push buttons, switches, contactors and relays	5	5	0
	PC13. Prepare Input Output list and get it approved from Project engineer or customer	5	5	0
	PC14. Assist draftsman to prepare engineering drawing for the panels and wiring diagrams for field connections	5	0	5
	PC15. Examine the drawings and get it approved from the Project engineer	10	5	5
	PC16. Assist and guide wireman for panel wiring	5	0	5
	PC17. Examine panel wiring using continuity test	5	0	5
	PC18. Examine the Mains power supply unit for powering the DCS Control panel and remote panel's	5	0	5
	PC19. Examine the wiring of the Digital and Analog IO modules with other components like relays, contactors, switches etc. in the panel	5	0	5
	PC20. Ensure availability of DCS programming software with others software's like Office, Adobe reader, Windows features etc.	5	0	5
	PC21. Ensure availability of the communication port on engineering PC/Laptop and PLC	5	5	0
	PC22. Establish communication between programming software and PLC using appropriate protocol and cable	5	0	5
	PC23. Perform PLC and IO hardware configuration in the software and establish communication between controller and remote panels	5	0	5
	PC24. Perform basic digital and analog input/output module test using software	5	0	5
	Total	150	85	65
2.IAS/N6201 Detailing and procurement of SCADA systems	PC1. Collect information from project engineer to know Customer requirement of controlling and monitoring architecture to be used	10	10	0
	PC2. Interact with project engineer and collect detail information regarding the plant P&ID	5	5	0
	PC3. Discuss and collect information from project engineer regarding plant hierarchy	5	5	0
	PC4. Finalize the SCADA architecture and distribution of areas of plant	5	5	0

Note: the "80" value appears in the row spanning for module 2 (IAS/N6201).

	PC5. Prepare material list for the finalized SCADA architecture and get it approved from project engineer or customer	5	0	5
	PC6. Procure industry grade PC's and LAN switches for networking of PC's	5	5	0
	PC7. Procure industry grade PC tables for the plant where SCADA system will be placed	5	5	0
	PC8. Assist draftsman to prepare PC network drawing for the SCADA system with Server-Client architecture	5	0	5
	PC9. Examine the drawings and get it approved from the Project engineer	5	5	0
	PC10. Assist and guide wireman for PC, monitor and network switch power wiring	5	0	5
	PC11. Prepare a report for control panel and remote IO panel testing and submit it to Project engineer	5	0	5
	PC12. Invite customer for panel testing at panel manufacturing site	5	5	0
	PC13. Perform panel testing along with customer and explain him the panel details	5	0	5
	PC14. Discuss the SCADA architecture and explain the customer about the SCADA material which is procured	5	5	0
	PC15. After completion of the Factory acceptance test prepare a signed report	5	5	0
	Total	80	55	25
3.IAS/N6202 Dispatch, Installation and Commissioning of DCS system onsite	PC1. After FAT ensure that the panel drawings are finalized and panel detail label is fixed on all the panels	5	5	0
	PC2. Assist in packing the panels and SCADA accessories using bubble wrap or wooden box	5	0	5
	PC3. Gather detail information from project engineer or customer about the location/address for panel dispatch	5	5	0
	PC4. Dispatch the panel and accessories using a special courier service	5	5	0
	PC5. Place the panels on a proper panel mounting plate	5	0	5
	PC6. Ensure that there is a cable trench below each panel to allow entry of cables from the cable duct below the panel	5	5	0
	PC7. Assist and guide onsite wireman to connect field cables between respective terminal base in the panel and field device	5	0	5
	PC8. Perform continuity test between terminal	5	0	5

(Note: "90" appears in the Total column spanning the IAS/N6202 section rows.)

	base and field devices before powering the panel			
	PC9. Arrange and install the PC tables in the respective control rooms along with the procured PC systems	5	0	5
	PC10. Perform the networking of PC's using LAN switches and Ethernet cables	5	0	5
	PC11. Connect necessary panel supply to the mains and Power on the panel	5	0	5
	PC12. Provide Power supply to PC stations and activate the SCADA project	5	0	5
	PC13. Establish a communication between controller and the SCADA system	5	0	5
	PC14. Test field devices by activating them and monitor their status on digital input modules and SCADA project screens	10	0	10
	PC15. Activate the field outputs using DCS software or from SCADA screens	5	0	5
	PC16. Inform project engineer and customer regarding completeness of field wiring, panel testing and SCADA testing	5	5	0
	PC17. Prepare a signed report with the customer for panel and SCADA commissioning onsite	5	5	0
	Total	90	30	60
4.IAS/N2005 Health and Safety in Workplace	PC1. Comply with general and special safety procedures followed in the Company	10	10	0
	PC2. Follow specified safety procedures while handling an equipment, hazardous material or tool	5	0	5
	PC3. Remove ties, finger rings, or any other metal objects which may interfere with the work	5	0	5
	PC4. Use safety materials such as goggles, gloves, ear plugs, caps, ESD pins, covers, shoes, etc.	5	5	5
	PC5. Escalate about any hazardous materials or things found in the premises	5	5	0
	PC6. Report about any breach of safety procedure in the company	5	5	0
	PC7. Ensure zero accidents at work	5	5	0
	PC8. Avoid damage of components due to negligence in ESD procedures	5	0	5
	PC9. Regularly participate in fire drills or other safety related workshops organized by the company	5	0	5
	PC10. Ensure no loss for company due to safety negligence	5	5	0
	PC11. Maintain appropriate posture, especially in long hours of sitting or standing position and in handling heavy materials	5	0	5

Note: the **70** value spans the rows from PC1 to PC11 in the column before the numeric columns.

	PC12. Participate in company organized health sessions such as yoga, physiotherapy or games		5	0	5
	PC13. Handle heavy and hazardous materials with care and using appropriate tools and handling equipment such as trolleys, jacks and ladders		5	0	5
		Total	70	30	40

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