

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

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-HMI/SCADA Technician

SECTOR: INSTRUMENTATION AUTOMATION SURVEILLANCE & COMMUNICATION

SUB-SECTOR: Automation

OCCUPATION: HMI/SCADA Testing, Installation & commissioning

REFERENCE ID: IAS/Q5602

ALIGNED TO: NCO-2015/ NIL

HMI/SCADA Technician analyses the customers requirements regarding the HMI hardware or SCADA system and provides solution to customers for optimized controlling and monitoring method in Process Industry.

Brief Job Description: The individual is responsible for understanding the customer requirement, examine the controlling and monitoring of field devices, install and commission the HMI/SCADA system onsite.

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

Job Details	Qualification Pack Code	IAS/Q5602		
	Job Role	HMI/SCADA 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	HMI/SCADA Testing, Installation and Comissioning	Next review date	15/09/2019
	NSQC Clearance on*	DD/MM/YYYY		

* only after clearance from NSQC

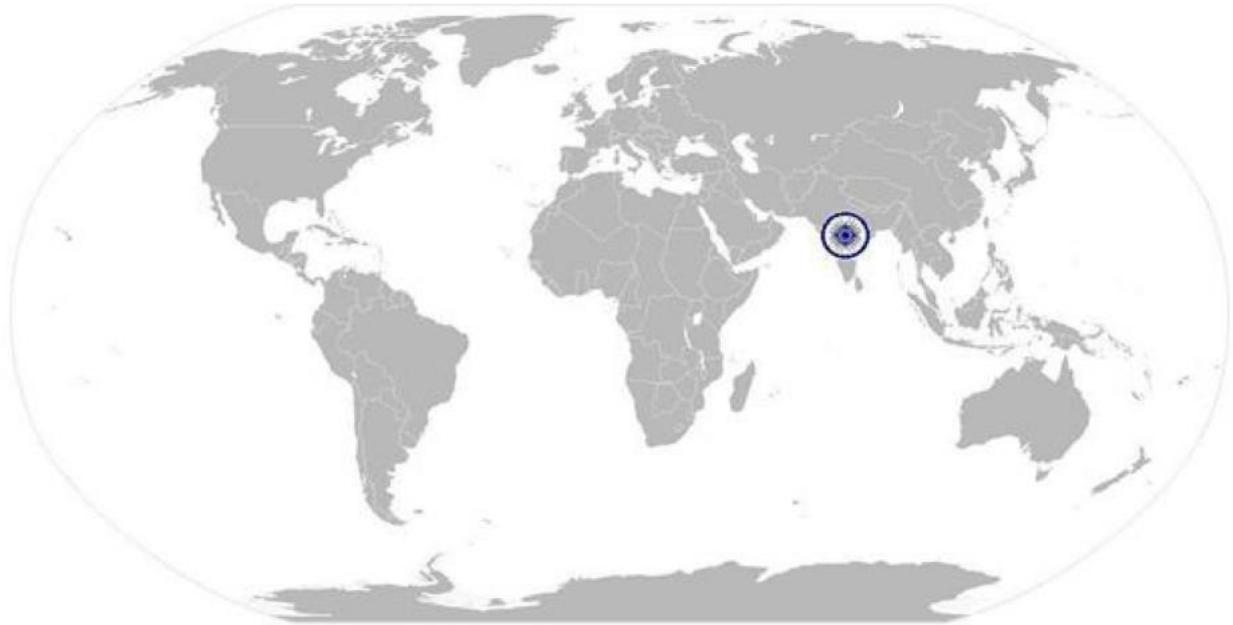
Job Role	HMI/SCADA Technician
Role Description	a. Selection of HMI or SCADA System b. Testing and troubleshooting of HMI/SCADA software c. Install and commission of HMI/SCADA project onsite
NSQF level	3
Minimum Educational Qualifications	Diploma in Electrical/Electronics/Instrumentation B.Sc in Electronics
Maximum Educational Qualifications	NA
Training (Suggested but not mandatory)	Training on Basics HMI/SCADA systems
Minimum Job Entry Age	20 years.
Experience	Experieance of minimum six months of fabrication for HMI hardware, panel wiring, SCADA architectures and networking of PC stations
Applicable National Occupational Standards (NOS)	Compulsory: <ol style="list-style-type: none"> IAS/N6100 Detailing and procurement of accessories used for HMI/SCADA Systems IAS/N6101 Testing the HMI/SCADA Systems IAS/N6102 Dispatch, Installation and Commissioning of HMI/SCADA Systems 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 code is 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	Knowledge and understanding are statements 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.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.

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
DCS	Distributed Control System
HMI	Human Machine Interface
SCADA	Supervisory Control And Data Acquisition
PC	Personal Computer or Desktop
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 collecting detail information related to HMI/SCADA system and procure the accessories required for it.

IAS/N6100

Detailing and procurement of accessories used for HMI/SCADA Systems

National Occupational Standard

Unit Code	IAS/N6100
Unit Title (Task)	Detailing and procurement of accessories used for HMI/SCADA Systems
Description	This unit is about collecting detail information related to HMI/SCADA system and procure the accessories required for it.
Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> • Detailing the HMI/SCADA system functional requirement • Procurement of accessories for HMI/SCADA system • Examine the HMI/SCADA accessories
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Detailing the HMI/SCADA system functional requirement	<p>To be competent, the user/individual on the job must be able to</p> <p>PC1. Identify the customer requirement of HMI or SCADA system for the plant</p> <p>PC2. Identify the number of tags for SCADA system</p> <p>PC3. Identify the operating system to install SCADA system on PC/Laptop</p> <p>PC4. Understand and examine the onsite location where HMI/SCADA system will be placed</p> <p>PC5. Interact with Project engineer or customer & understand number of field equipment's helping to analyze the type of system to be used</p> <p>PC6. Examine the type of HMI hardware and check its cutout size</p> <p>PC7. Interact with project engineer or customer for HMI hardware mounting and then guide fabrication team for the cutouts on panel door</p> <p>PC8. Prepare panel fabrication drawing for HMI mounting</p>
Procurement of accessories for HMI/SCADA system	<p>PC9. Interact with Project engineer and finalize the HMI hardware</p> <p>PC10. Procure required HMI type for mounting on front door of panel</p> <p>PC11. Identify the size of HMI in inches</p> <p>PC12. Procure HMI panel accessories like communication cables and power supply connector</p> <p>PC13. Procure industry grade PC and Network switch in case SCADA system is considered</p> <p>PC14. Procure industry grade PC table for the plant where SCADA system will be placed</p> <p>PC15. Assist draftsman to prepare PC network drawing for the SCADA system with Server-Client architecture</p> <p>PC16. Examine the drawings and get it approved from the Project engineer</p> <p>PC17. Assist and guide wireman for HMI panel wiring or network switch wiring</p>

IAS/N6100

Detailing and procurement of accessories used for HMI/SCADA Systems

<p>Examine the HMI/SCADA accessories</p>	<p>PC18. Examine panel wiring using continuity test PC19. Examine the Mains power supply unit for powering the HMI hardware PC20. Examine the power supply to PC stations in case of SCADA system PC21. Examine the communication cable healthiness to avoid any loss of communication between HMI/SCADA system and PLC</p>
<p>Knowledge & Understanding (K)</p>	
<p>A. Organizational Context (Knowledge of the company / organization and its processes)</p>	<p>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</p>
<p>B. Technical Knowledge</p>	<p>The user/individual on the job needs to know and understand: KB1. Basics of electrical, electronics and instrumentation KB2. Standard operating procedure (SOP) of the organization for HMI/SCADA design and layout KB3. Quality, standards and guidelines to be followed during HMI/SCADA design and layout development KB4. HMI/SCADA Panel and equipments used in the automation process KB5. HMI/SCADA programming software KB6. HMI hardware product list KB7. Instrumentation used in the factory and its layout details KB8. PLC Control panel and wiring knowledge KB9. Sources and methods for obtaining required technical information for the HMI/SCADA being developed KB10. Relevant regulations, standards and codes of practice and their implications on the design KB11. Relevant documents and procedures used in the process</p>
<p>Skills (S)</p>	
<p>A. Core Skills/ Generic Skills</p>	<p>Writing Skills</p> <p>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</p> <p>Reading Skills</p> <p>The individual on the job needs to know and understand how to: SA6. Read user requirements SA7. Read technical specifications and documentation</p>

IAS/N6100

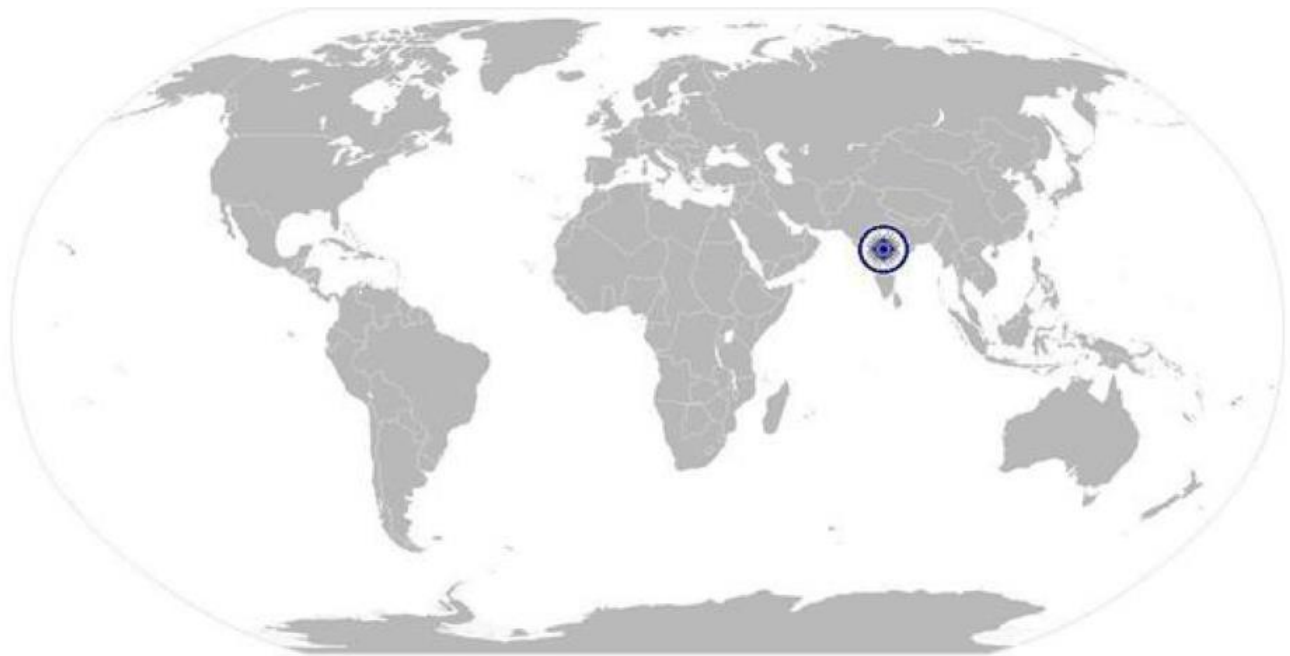
Detailing and procurement of accessories used for HMI/SCADA Systems

	<p>SA8. Read standards and regulatory compliance documents SA9. Read schedules and timelines SA10. Read drawings</p>
	<p>Oral Communication (Listening and Speaking skills)</p> <p>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 of project development SA14. Use simple and clear language when communicating with a customer SA15. Report issues and problems to managers in clear terms</p>
B. Professional Skills	<p>Decision Making</p> <p>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 HMI/SCADA system</p>
	<p>Plan and Organise</p> <p>The user/individual on the job needs to know and understand: SB3. Plan and organize installation - including requirements, procurement and integration, fabrication for HMI hardware SB4. Anticipate issues and have alternate strategy</p>
	<p>Customer Centricity</p> <p>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. Support customer when they need help SB7. Build customer relationships and rapport which promotes two way business</p>
	<p>Problem Solving</p> <p>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 clients lacking the technical background SB10. Identify and implement solutions to resolve delays</p>
	<p>Analytical Thinking</p> <p>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 SB13. Analyze problems and identify causes and possible solutions</p>
	<p>Critical Thinking</p>

IAS/N6100

Detailing and procurement of accessories used for HMI/SCADA Systems

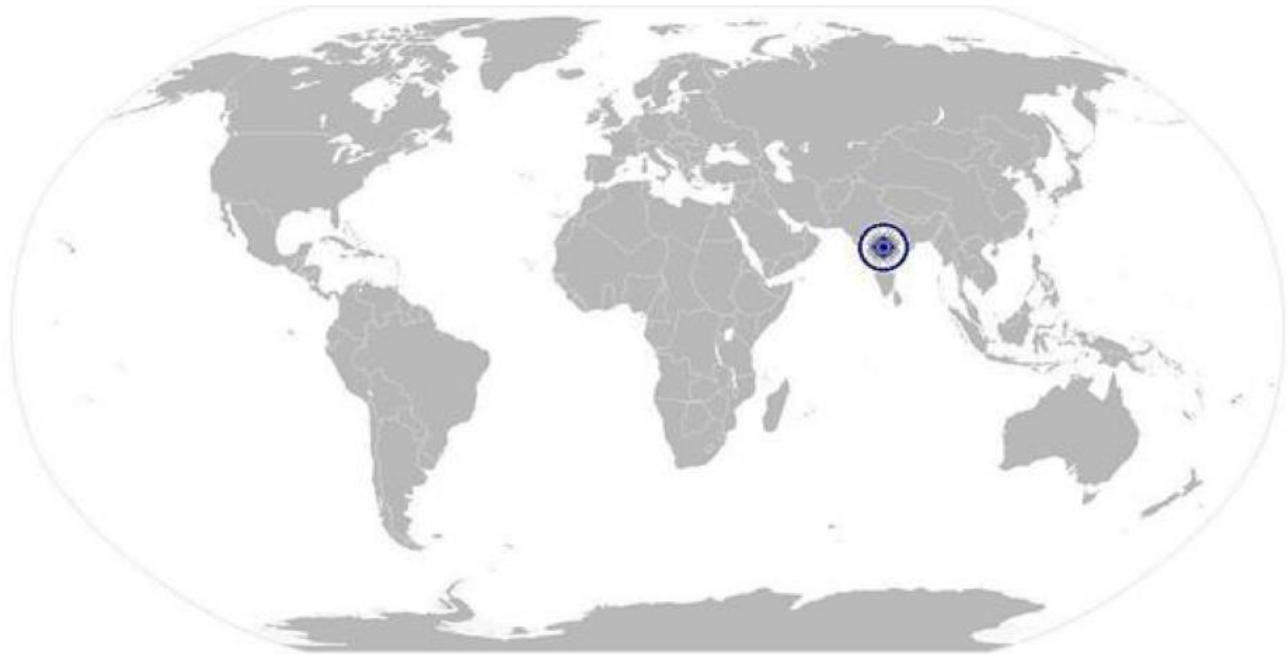
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none">SB14. Apply, analyze and evaluate the information gathered from observation, experience, reasoning or communication, as a guide to think and take actionSB15. Anticipate problems, risks and opportunities and utilize these for mitigation and business optimization
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IAS/N6100 Detailing and procurement of accessories used for HMI/SCADA Systems

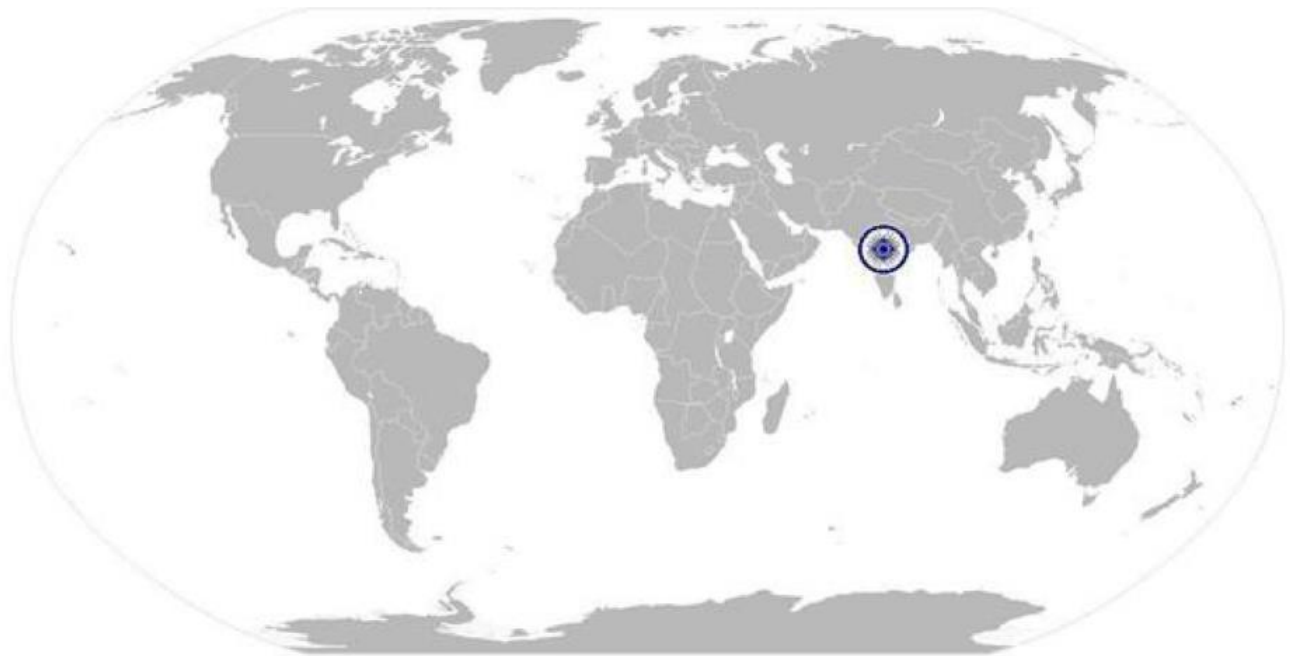
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NOS Code	IAS/N6100		
Credits (NSQF)	TBD	Version number	1.0
Industry	Instrumentation Automation Surveillance & Communication	Drafted on	15/09/2017
Industry Sub-sector	Automation	Last reviewed on	15/09/2017
Occupation	HMI/SCADA Testing, Installation and Comissioning	Next review date	15/09/2019



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National Occupational Standard



Overview

This unit is about testing HMI/SCADA systems before onsite commissioningect using HMI/SCADA programming software.

IAS/N6101

Testing the HMI/SCADA Systems

National Occupational Standard

Unit Code	IAS/N6101
Unit Title (Task)	Testing the HMI/SCADA Systems
Description	This unit is about testing HMI/SCADA systems before onsite commissioning using HMI/SCADA programming software.
Scope	This unit/task covers the following: <ul style="list-style-type: none"> • Testing HMI hardware using HMI programming software • Testing SCADA system using SCADA software • Complete Factory Acceptance Test (FAT)
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Testing HMI hardware using HMI programming software	To be competent, the user/individual on the job must be able to <ul style="list-style-type: none"> PC1. Collect information from project engineer to know Customer approved Software and use it for preliminary testing of HMI hardware PC2. Ensure availability of others software's like Office, Adobe reader, Windows features etc. which are required for the HMI programming software. PC3. Ensure availability of the communication port on PC/Laptop and HMI hardware PC4. Establish communication between programming software and HMI using appropriate protocol and cable PC5. Create a HMI Test project with communication objects on HMI screens PC6. Perform tests by controlling and monitoring PLC data on HMI screens
Testing SCADA system using SCADA software	<ul style="list-style-type: none"> PC7. Collect information from project engineer for type of SCADA architecture PC8. Ensure availability of PC stations for the type of architecture selected PC9. Ensure availability of SCADA software with necessary licenses on the PC stations PC10. Ensure availability of the communication port on PC/Laptop and PLC and establish communication using appropriate protocol and cable PC11. Prepare test screens on SCADA project with basic objects PC12. Activate inputs and outputs from PLC programming software and monitor the status on SCADA project screens
Complete Factory Acceptance Test (FAT)	<ul style="list-style-type: none"> PC13. Prepare a report for HMI hardware or SCADA system testing and submit it to Project engineer PC14. Invite customer for HMI/SCADA testing at project manufacturing site PC15. Perform HMI/SCADA testing along with customer and explain him the details

IAS/N6101

Testing the HMI/SCADA Systems

	PC16. After completion of the Factory acceptance test prepare a signed report
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. Basics of computer and operating systems KB2. Standard operating procedure (SOP) of the organization for HMI/SCADA pictures required for testing purpose KB3. Quality, standards and guidelines to be followed during testing process KB4. Detailed information about HMI hardwares and PC stations used in the HMI/SCADA project KB5. HMI/SCADA programming software KB6. Application software, Installation and debugging 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. Sources and methods for obtaining required technical information for the HMI/SCADA pilot project to be tested KB11. Relevant documents to be referred for optimized testing procedures
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 HMI hardware 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

IAS/N6101

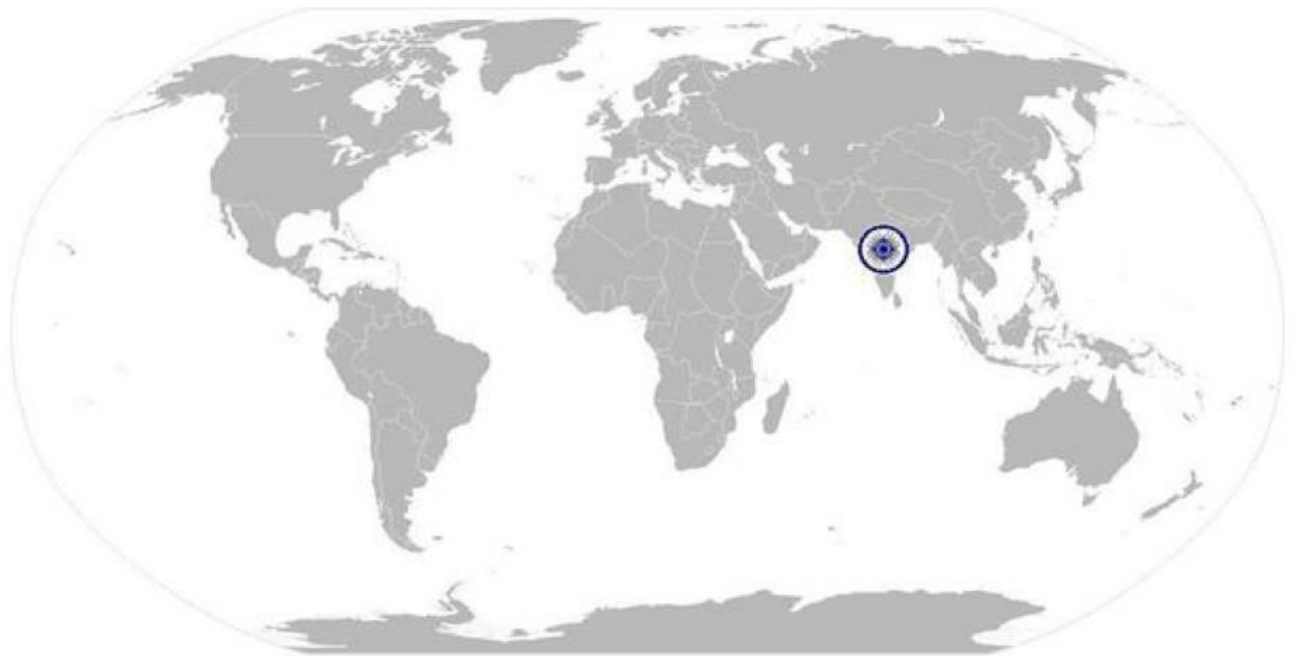
Testing the HMI/SCADA Systems

	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 project 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 to use of relevant HMI/SCADA programming software SB3. Make decisions pertaining to optimize testing process
	Plan and Organise
	The user/individual on the job needs to know and understand: SB4. Plan and organize project - including requirements, design and integration, testing, Customer Acceptance Test 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. Make customer happy and make them want to work with the company SB8. Manage relationships and maintain good rapport with customers to get detail inputs on logic
	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 know how SB11. Identify immediate or temporary 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 project SB14. Use the existing information to optimize the project SB15. Analyze problems and identify causes and possible solutions

IAS/N6101

Testing the HMI/SCADA Systems

	Critical Thinking
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB16. Apply, analyze and evaluate the information gathered from observation, experience, reasoning or communication, as a guide to think and take action</p> <p>SB17. Anticipate problems, risks and opportunities and utilize these for optimization of testing process</p>

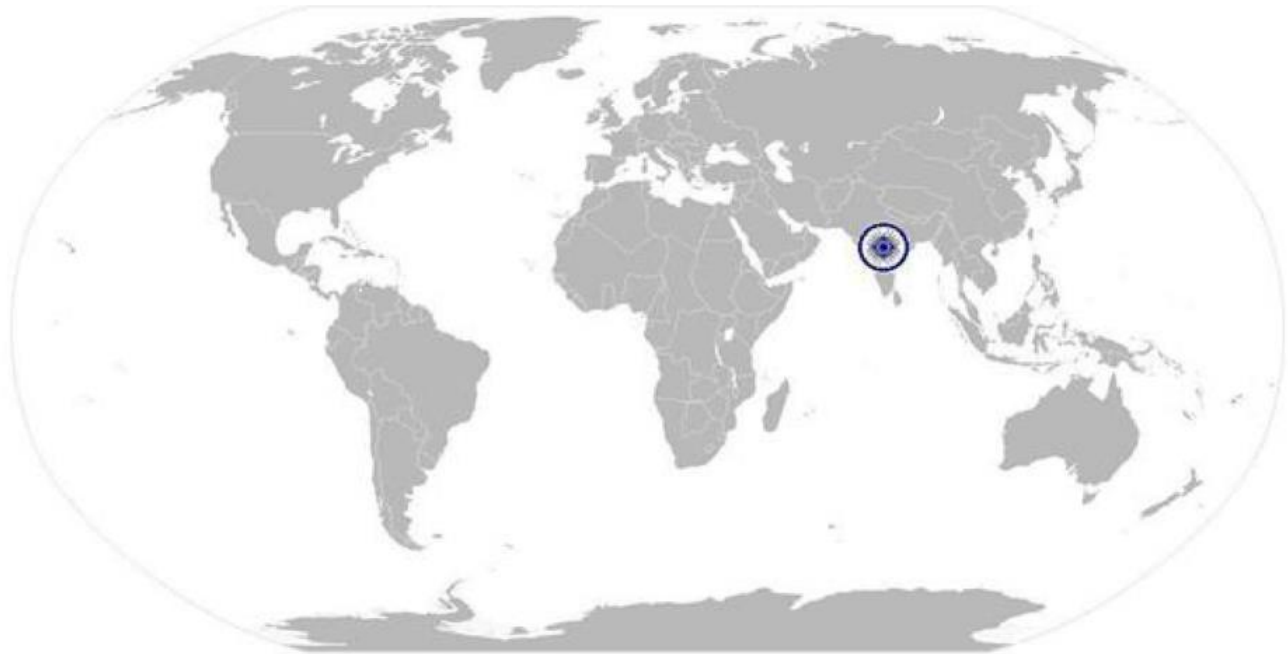


IAS/N6101

Testing the HMI/SCADA Systems

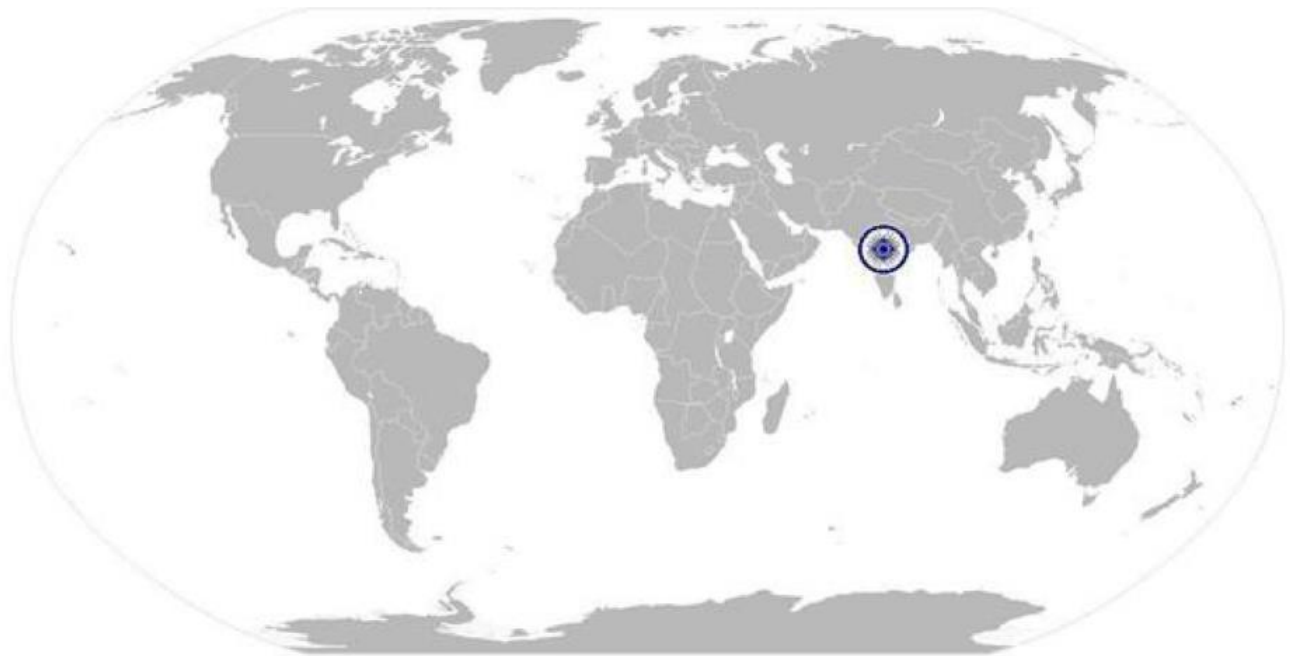
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NOS Code	IAS/N6101		
Credits (NSQF)	TBD	Version number	1.0
Industry	Instrumentation Automation Surveillance & Communication	Drafted on	15/09/2017
Industry Sub-sector	Automation	Last reviewed on	15/09/2017
Occupation	HMI/SCADA Testing, Installation and Comissioning	Next review date	15/09/2019



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National Occupational Standard



Overview

This unit is about dispatching the systems to site location, installation and commissioning of HMI/SCADA systems onsite.

IAS/N6102

Dispatch, Installation and Commissioning of HMI/SCADA Systems

National Occupational Standard

Unit Code	IAS/N6102
Unit Title (Task)	Dispatch, Installation and Commissioning of HMI/SCADA Systems
Description	This unit is about dispatching the systems to site location, installation and commissioning of HMI/SCADA systems onsite.
Scope	This unit/task covers the following: <ul style="list-style-type: none"> • Dispatch HMI/SCADA system to site • Installation of HMI/SCADA onsite • HMI/SCADA testing with actual field devices
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Dispatch HMI/SCADA system to site	To be competent, the user/individual on the job must be able to <ul style="list-style-type: none"> PC1. After FAT ensure that the HMI hardware or SCADA architecture drawings are finalized PC2. Assist in packing the equipment's like HMI hardware or PC stations using bubble wrap or wooden box PC3. Gather detail information from project engineer or customer about the location/address for equipment dispatch PC4. Dispatch the panel using a special courier service
Installation of HMI/SCADA onsite	<ul style="list-style-type: none"> PC5. Place the HMI hardware on a proper panel cutout area PC6. Ensure that proper supply is given to the HMI hardware PC7. Assist and guide onsite wireman to connect communication cable between the PLC and HMI hardware PC8. Ensure if PC stations are properly power on and network cables are connected PC9. Ensure communication cable between PC stations and PLC is connected
HMI/SCADA testing with actual field devices	<ul style="list-style-type: none"> PC10. Power on the HMI hardware or the PC stations PC11. Perform input test between field devices and HMI/SCADA screens by activating field sensors PC12. Activate the field outputs using HMI/SCADA objects PC13. Inform project engineer and customer regarding completeness of field device check through HMI/SCADA system PC14. Prepare a signed report with the customer for commissioning HMI/SCADA system 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: <ul style="list-style-type: none"> 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

IAS/N6102

Dispatch, Installation and Commissioning of HMI/SCADA Systems

<p>B. Technical Knowledge</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. Basics of electrical, electronics and instrumentation</p> <p>KB2. Basics of computer and operating systems</p> <p>KB3. Standard operating procedure (SOP) of the organization for process automation HMI/SCADA installation and commissioning</p> <p>KB4. HMI/SCADA system and technologies used in the automation process</p> <p>KB5. Application software, Installation, testing and debugging</p> <p>KB6. General arrangement drawing</p> <p>KB7. Piping and instrumentation diagram (P&ID)</p> <p>KB8. Basics on industrial process involved (example: oil and gas, refinery, etc) and stages involved in the process</p> <p>KB9. Basics on infrastructure process involved in the industry (example: water treatment plant, chilling units etc.)</p> <p>KB10. Testing process and parameters involved in the testing</p> <p>KB11. Sources and methods for obtaining required technical information for the HMI/SCADA project to be commissioned</p>
<p>Skills (S)</p>	
<p>A. Core Skills/ Generic Skills</p>	<p>Writing Skills</p> <p>The individual on the job needs to know and understand how to:</p> <p>SA1. Compose E-mails, letters and other official documents clearly</p> <p>SA2. Write technical documentation</p> <p>SA3. Write reports</p> <p>SA4. Write schedules and timelines</p> <p>Reading Skills</p> <p>The individual on the job needs to know and understand how to:</p> <p>SA5. Read user requirements</p> <p>SA6. Read technical specifications</p> <p>SA7. Read standards and regulatory compliance documents</p> <p>SA8. Read schedules and timelines</p> <p>SA9. Read drawings</p> <p>Oral Communication (Listening and Speaking skills)</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA10. Discuss task lists, schedules and work-loads with colleagues</p> <p>SA11. Keep colleagues informed about progress of logic testing</p> <p>SA12. Discuss with colleagues appropriately in order to understand the nature of the problem and make a diagnosis</p> <p>SA13. Report issues and problems to managers in clear terms</p>
<p>B. Professional Skills</p>	<p>Decision Making</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. Make decisions pertaining to the scope of work</p> <p>SB2. Make decisions pertaining to the appropriate solution to faults in</p>

IAS/N6102

Dispatch, Installation and Commissioning of HMI/SCADA Systems

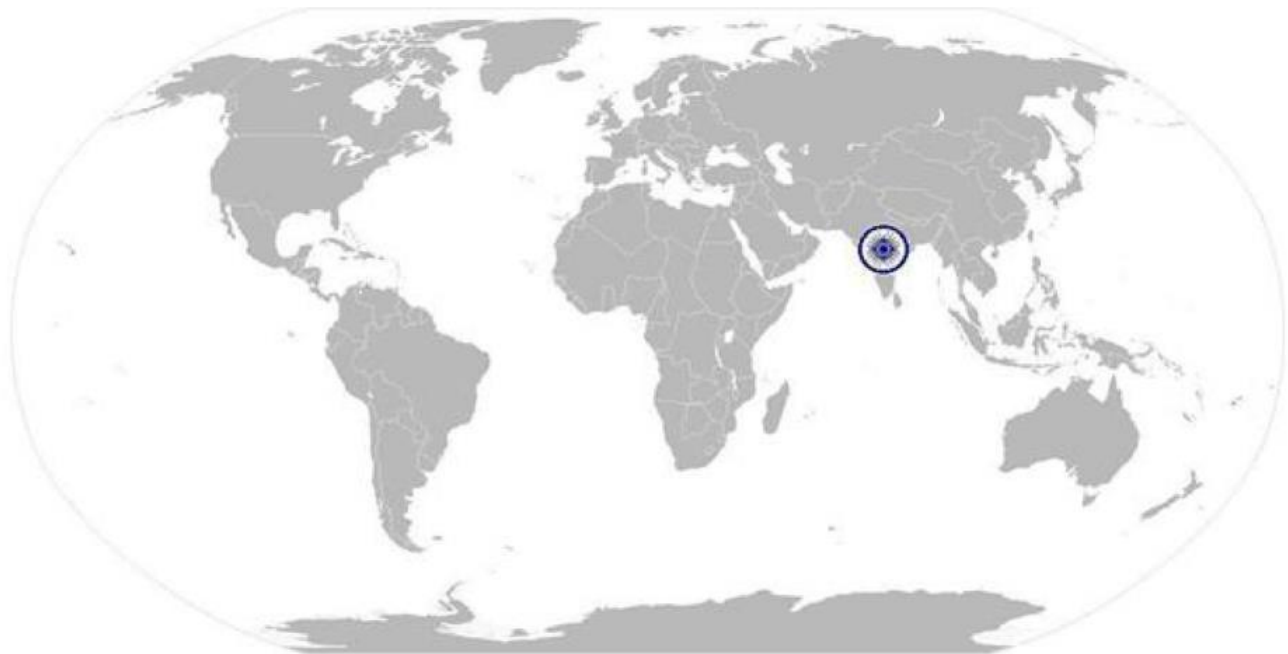
	programming
	SB3. Make decisions pertaining to readiness of HMI/SCADA project for installation
	SB4. Make decisions pertaining to installation of HMI/SCADA project onsite
	Plan and Organise
	The user/individual on the job needs to know and understand:
	SB5. Plan and organize project - including requirements, 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 program testing
	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 optimize HMI/SCADA systems	
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 optimizing HMI/SCADA installation	

IAS/N6102

Dispatch, Installation and Commissioning of HMI/SCADA Systems

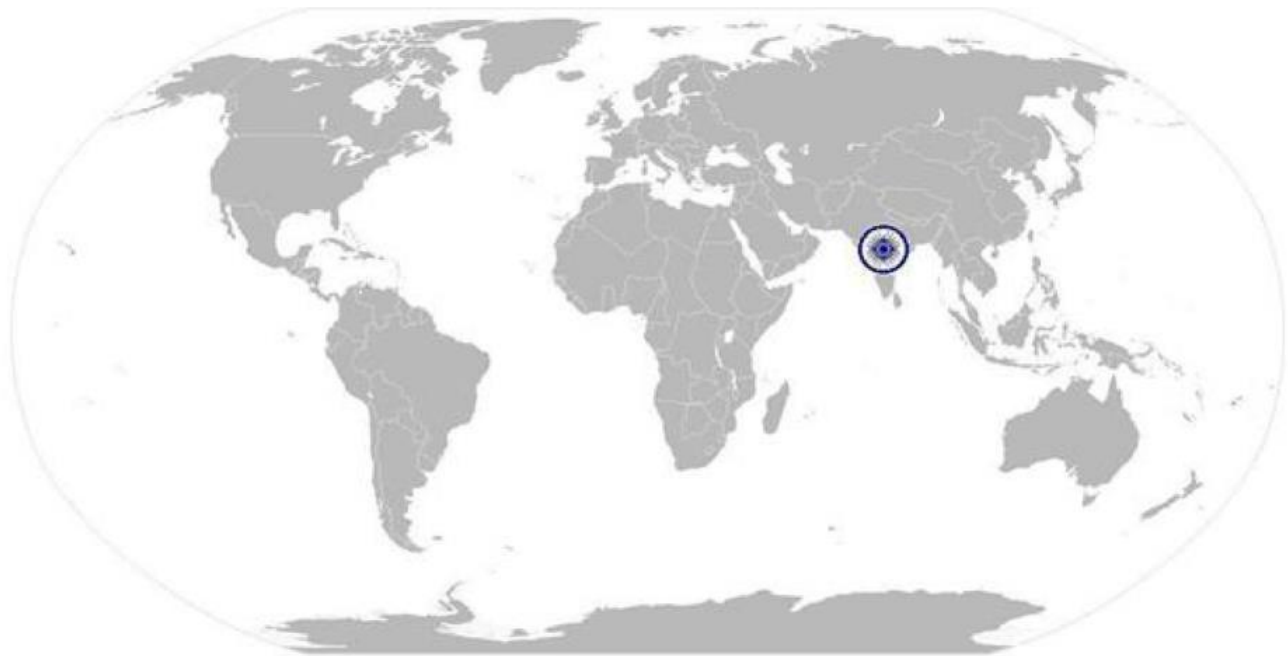
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NOS Code	IAS/N6102		
Credits (NSQF)	TBD	Version number	1.0
Industry	Instrumentation Automation Surveillance & Communication	Drafted on	15/09/2017
Industry Sub-sector	Automation	Last reviewed on	15/09/2017
Occupation	HMI/SCADA Testing, Installation and Comissioning	Next review date	15/09/2019



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National Occupational Standard



Overview

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

IAS/N2005

Health and Safety in Workplace

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: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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

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

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	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	

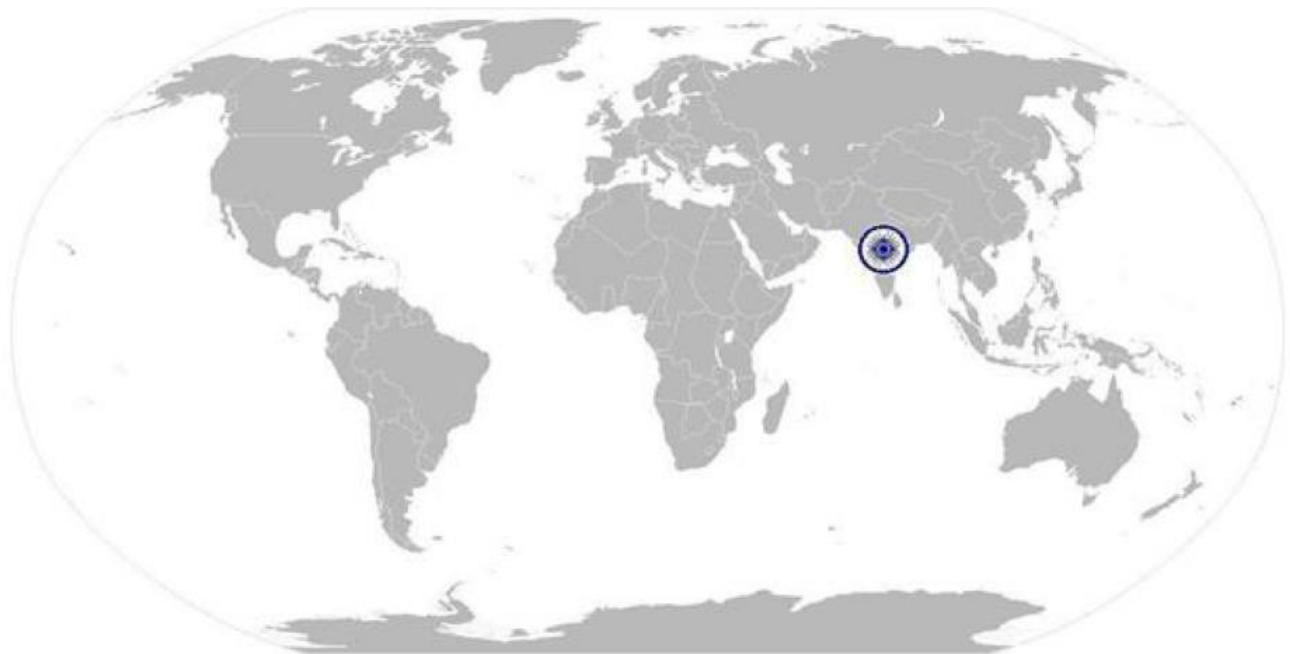


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NOS Version Control

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	HMI/SCADA Testing, Installation and Comissioning	Next review date	15/09/2019

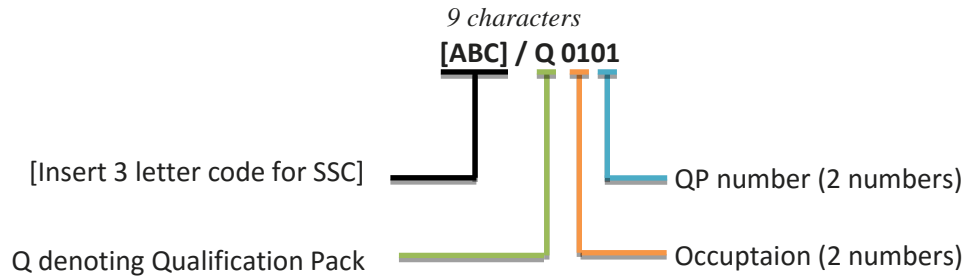


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Annexure

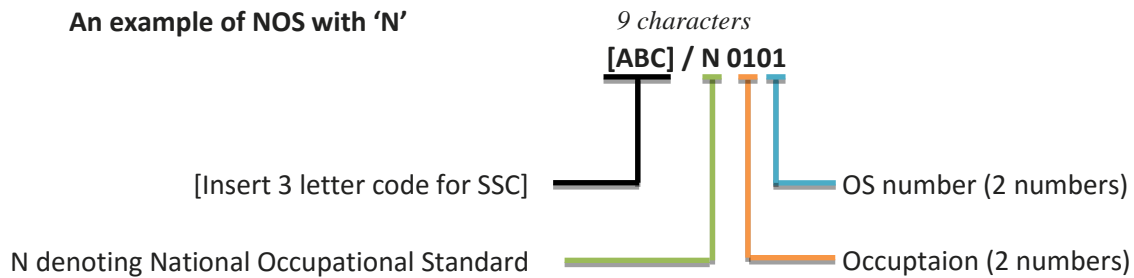
Nomenclature for QP and NOS

Qualification Pack



Occupational Standard

An example of NOS with 'N'



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 QP or NOS	N
Next two numbers	Occupation code	01
Next two numbers	OS number	01

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CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role HMI/SCADA Technician

Qualification Pack IAS/Q5602

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 evaluations 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	Marks Allocation			
		Total Mark (360)	Out Of	Theory	Skills Practical
1.IAS/N6100 Detailing and procurement of accessories used for HMI/SCADA systems	PC1. Identify the customer requirement of HMI or SCADA system for the plant	130	10	10	0
	PC2. Identify the number of tags for SCADA system		10	10	0
	PC3. Identify the operating system to install SCADA system on PC/Laptop		5	5	0
	PC4. Understand and examine the onsite location where HMI/SCADA system will be placed		10	5	5
	PC5. Interact with Project engineer or customer & understand number of field equipment's helping to analyze the type of system to be used		10	10	0
	PC6. Examine the type of HMI hardware and check its cutout size		10	5	5
	PC7. Interact with project engineer or customer for HMI hardware mounting and then guide fabrication team for the cutouts on panel door		5	5	0
	PC8. Prepare panel fabrication drawing for HMI mounting		5	5	0
	PC9. Interact with Project engineer and finalize the HMI hardware		5	5	0

	PC10. Procure required HMI type for mounting on front door of panel	5	5	0	
	PC11. Identify the size of HMI in inches	5	5	0	
	PC12. Procure HMI panel accessories like communication cables and power supply connector	5	5	0	
	PC13. Procure industry grade PC and Network switch in case SCADA system is considered	5	5	0	
	PC14. Procure industry grade PC table for the plant where SCADA system will be placed	5	5	0	
	PC15. Assist draftsman to prepare PC network drawing for the SCADA system with Server-Client architecture	5	0	5	
	PC16. Examine the drawings and get it approved from the Project engineer	5	0	5	
	PC17. Assist and guide wireman for HMI panel wiring or network switch wiring	5	0	5	
	PC18. Examine panel wiring using continuity test	5	0	5	
	PC19. Examine the Mains power supply unit for powering the HMI hardware	5	0	5	
	PC20. Examine the power supply to PC stations in case of SCADA system	5	0	5	
	PC21. Examine the communication cable healthiness to avoid any loss of communication between HMI/SCADA system and PLC	5	0	5	
	Total	130	85	45	
2.IAS/N6101 Testing the HMI/SCADA Systems	PC1. Collect information from project engineer to know Customer approved Software and use it for preliminary testing of HMI hardware	90	5	5	0
	PC2. Ensure availability of others software's like Office, Adobe reader, Windows features etc. which are required for the HMI programming software.		5	5	0
	PC3. Ensure availability of the communication port on PC/Laptop and HMI hardware		5	5	0
	PC4. Establish communication between programming software and HMI using appropriate protocol and cable		5	0	5
	PC5. Create a HMI Test project with communication objects on HMI screens		10	0	10
	PC6. Perform tests by controlling and monitoring PLC data on HMI screens		5	0	5
	PC7. Collect information from project engineer for type of SCADA architecture		5	5	0

	PC8. Ensure availability of PC stations for the type of architecture selected	5	5	0
	PC9. Ensure availability of SCADA software with necessary licenses on the PC stations	5	5	0
	PC10. Ensure availability of the communication port on PC/Laptop and PLC and establish communication using appropriate protocol and cable	5	5	0
	PC11. Prepare test screens on SCADA project with basic objects	10	0	10
	PC12. Activate inputs and outputs from PLC programming software and monitor the status on SCADA project screens	5	0	5
	PC13. Prepare a report for HMI hardware or SCADA system testing and submit it to Project engineer	5	0	5
	PC14. Invite customer for HMI/SCADA testing at project manufacturing site	5	5	0
	PC15. Perform HMI/SCADA testing along with customer and explain him the details	5	0	5
	PC16. After completion of the Factory acceptance test prepare a signed report	5	0	5
	Total	90	40	50
3. IAS/N6102 Dispatch, Installation and Commissioning of HMI/SCADA Systems	PC1. After FAT ensure that the HMI hardware or SCADA architecture drawings are finalized	5	5	0
	PC2. Assist in packing the equipment's like HMI hardware or PC stations using bubble wrap or wooden box	5	0	5
	PC3. Gather detail information from project engineer or customer about the location/address for equipment dispatch	5	5	0
	PC4. Dispatch the panel using a special courier service	5	5	0
	PC5. Place the HMI hardware on a proper panel cutout area	5	0	5
	PC6. Ensure that proper supply is given to the HMI hardware	5	0	5
	PC7. Assist and guide onsite wireman to connect communication cable between the PLC and HMI hardware	5	0	5
	PC8. Ensure if PC stations are properly power on and network cables are connected	5	0	5
	PC9. Ensure communication cable between PC stations and PLC is connected	5	0	5
	PC10. Power on the HMI hardware or the PC	5	0	5
	70			

	stations				
	PC11. Perform input test between field devices and HMI/SCADA screens by activating field sensors		5	0	5
	PC12. Activate the field outputs using HMI/SCADA objects		5	0	5
	PC13. Inform project engineer and customer regarding completeness of field device check through HMI/SCADA system		5	5	0
	PC14. Prepare a signed report with the customer for commissioning HMI/SCADA system onsite.		5	5	0
		Total	70	25	45
4. IAS/N2005 Health and Safety in Workplace	PC1. Comply with general and special safety procedures followed in the Company	70	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
	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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