SMC
INTERNATIONAL TRAINING

SMC Path to Industrial Certification

The industrial certification provided by the global leader in industrial automation. Different paths and levels


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SMC – Worldwide leading expert in industrial automation

Founded in April 1959 in Tokyo, Japan, SMC Corporation today employs over 20,800 talented employees in more than 80 countries worldwide.

Since its establishment, SMC has been a leader in pneumatic technology, providing industry with technology and products to support automation based on the guiding principle of “contributing to automation labor savings in industry.”

Over the past 60+ years, SMC’s products have become established as a recognized international brand through sales, technical, supply and after sale services in world markets. Sales have grown to achieve over the 30% global market share.

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SMC Path to Industrial Certification

As a global leader in industrial automation and control products, SMC has developed the Industrial Path to Certification program. This certification program is a comprehensive credentialing mechanism for delivering and verifying the competency level of individuals, covering the most common technologies used throughout modern industry.

This industry recognized path includes six unique Specialist Certifications, each consisting of four tier Levels of technician credentials.

Note: Individuals may select Technician level credentials from either path at any time, without completing a complete path. However, these must be completed in order.

Certification Benefits

Who are the beneficiaries of this certification:

PARTNER SCHOOLS

- They can validate the program of study and instructor knowledge through certification and skills verification.

- Certified instructors can provide a transportable credential which is recognized across industry, adding value to the student portfolio.

STUDENTS

- Students participating in this program will receive an industry recognized credential, indicating the successful completion of training and verification of skill development in the different competency areas.

- Being an industry relevant certification, these transportable credentials will provide a valuable tool indicating adequate skill level to potential employers in addition to the local certificate or degree.

EMPLOYERS

- Employers can be assured of candidates capabilities by recognized certifications in addition to certificate or degree.

- Employers can utilize the credentialing process as a means for providing advancement within their company based on individual skills development and work force development activities.

How does this certification work?

This is the process to follow:

1. Determine the desired level(s) of certification.
2. Define the instructor(s) which will act as the certifying agent.
3. Select an option for instructor credentialing:
   - Onsite at the institution.
   - Remote at SMC Certification Site.
4. The training equipment in the institution will be assessed to ensure it is at or above the level required for the selected credentialing.
5. Instructor credentialing training and assessement.
6. Once the instructor has successfully completed the certification requirements, and the institution training equipment has been verified to meet the requirements, the instructor will be approved to provide technicain level credentials up to the highest level achieved by the instructor.
7. Provide training and credentials to students at the available agreed upon levels.

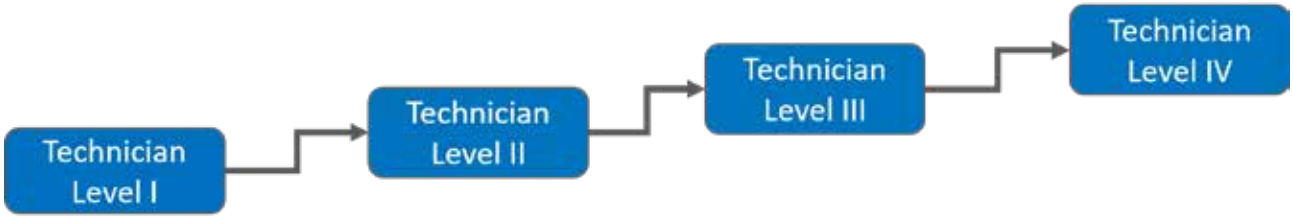
**All credentials are issued to an individual and are not transferrable.*

SMC Certification Credentials

These are the available Specialist Certificates:

- AUTOMATION
- FLUID POWER
- MECHANICAL
- ROBOTIC
- PROCESS
- INDUSTRY 4.0

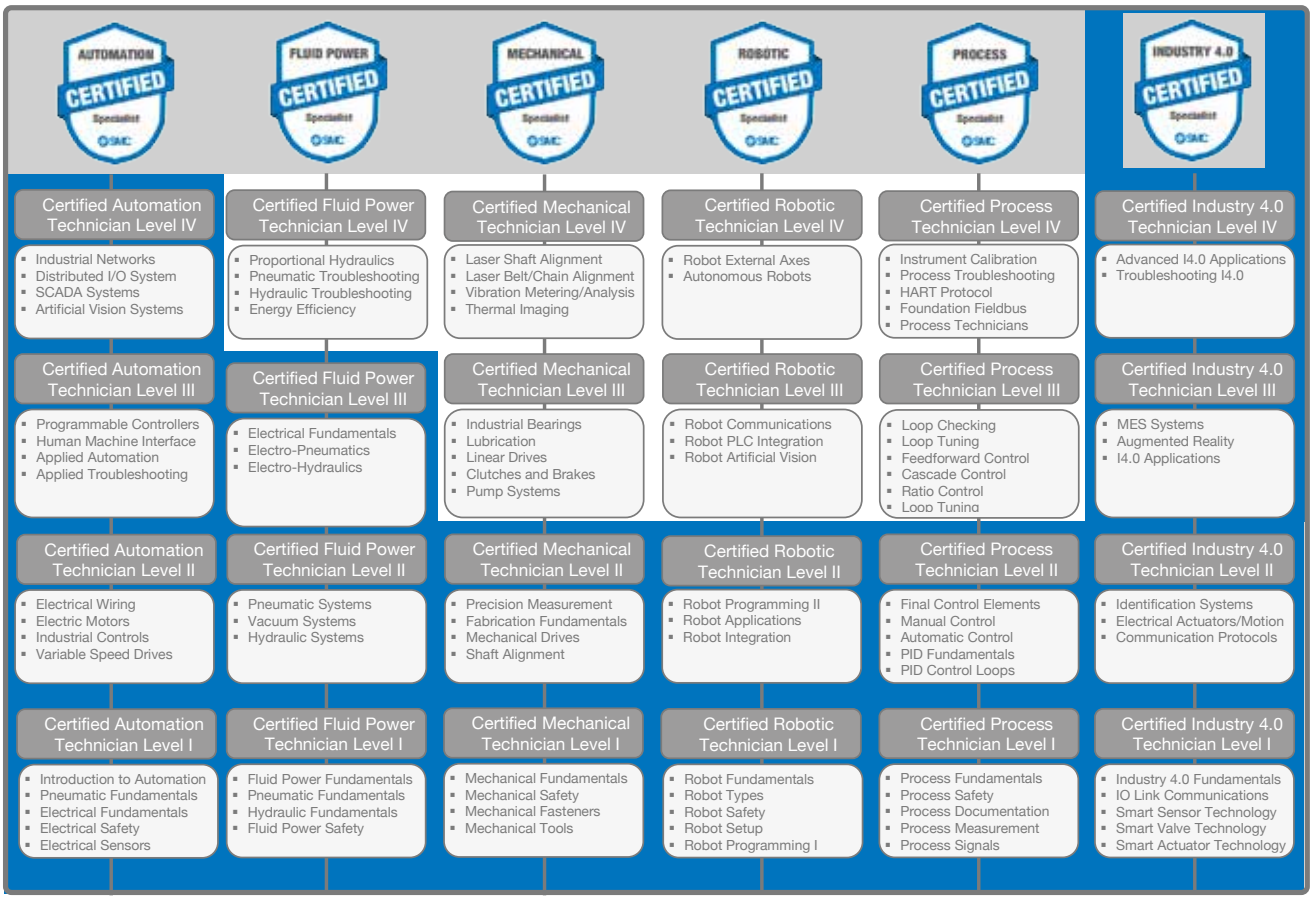
Each of these includes four stand alone Technician Level Credentials (Level I to Level IV). The Technician certificates are pre-requisites to the Specialist and must be completed in sequenctial order to achieve the Specialist credential.



TECHNICIAN LEVEL - Partner institutions may provide any of the Technician level certifications which they have been authorized to deliver.

SPECIALIST CREDENTIAL - All Specialist credentials can only be provided by SMC or an approved SMC certifying body.

MICRO CREDENTIALS - Each Technicial Level is comprised of several individual topics which are available as Micro Credentials. If a partner institution would only like to offer a single topic from a Technician Level, this can be provided as a Micro Level Credential. Individuals may receive a Micro Credential for any topics while completing the Technician or Specialist Level Paths.



Certified Automation Specialist (CAS)

The Certified Automation Specialist certification prepares and documents an individual's skill proficiency in competences related to automated systems found in modern industrial facilities. Completion of this credential indicates satisfactory skill verification required to install, maintain, troubleshoot, and repair integrated systems that include pneumatic, electrical, industrial control, networked components, PLC's, HMI's, distributed I/O and SCADA.

The CAS Certificate is achieved by completing the underlying technician credentials and demonstrating mastery via written and hands-on skills assessments. The following list indicates the technician level credentials along with a description of each.

- Certified Automation Technician Level I

Introduces individuals to automated systems and provides a study of the fundamentals core competencies of pneumatics, electricity, sensors, and safety.

- Introduction to Automation
- Pneumatic Fundamentals
- Electrical Fundamentals
- Electrical Safety
- Electrical Sensors

- Certified Automation Technician Level II

Expands on the topics of level I to include the operation, installation and troubleshooting procedures for electrical circuits, industrial controls, and variable speed drives.

- Electrical Wiring
- Electrical Motors
- Industrial Controls
- Variable Speed Drives

- Certified Automation Technician Level III

Continues skills development of previous topics from Level I and II by introducing programmable controllers and operator interface. With a focus on how these devices integrate with the previously covered components to create a complete automation system. This allows for application activities for development and troubleshooting of automation systems.

- Programmable Controllers
- Human Machine Interface
- Applied Automation
- Applied Troubleshooting

- Certified Automation Technician Level IV

Further expands on the study of automation by covering advanced technologies that are often used with modern systems. These include networking and communication of control devices, operator control and data acquisition and artificial vision systems.

- Industrial Networks
- Distributed I/O Systems
- SCADA Systems
- Artificial Vision Systems

Certified Fluid Power Specialist (CFPS)

The Certified Fluid Power Specialist certification prepares and documents an individual's skill proficiency in competencies related to fluid power systems found in modern industrial facilities. Completion of this credential indicates satisfactory skill verification required to install, maintain, troubleshoot, and repair fluid power systems that include pneumatic, electro-pneumatic, hydraulic and electro-hydraulic equipment and systems.

The CFPS Certificate is achieved by completing the underlying technician credentials and demonstrating mastery via written and hands-on skills assessments. The following list indicates the technician level credentials along with a description of each.

- Certified Fluid Power Technician Level I

Introduces individuals to the fundamentals of fluid power common to both hydraulics and pneumatics, followed by further study of components and circuit characteristics specific to pneumatic and hydraulics.

- Fluid Power Fundamentals
- Pneumatic Fundamentals
- Hydraulic Fundamentals
- Fluid Power Safety

- Certified Fluid Power Technician Level II

Expands on the topics of level I to include vacuum technology and components along with the operation and features of complete pneumatic and hydraulic systems.

- Vacuum Systems
- Pneumatic Systems
- Hydraulic Systems

- Certified Fluid Power Technician Level III

Continues the skills development of previous topics from Level I and II by introducing electro-pneumatic and electro-hydraulic components. Further expands on the use of electrical controls to provide automatic operation of fluid power systems.

- Electrical Fundamentals
- Electro-Pneumatics
- Electro-Hydraulics

- Certified Fluid Power Technician Level IV

Further expands on the study electrical control of fluid power by introducing Proportional Hydraulics. of troubleshooting as it relates to pneumatic, electro-pneumatic, hydraulic, and electro-hydraulic systems. Additionally, this level includes coverage of energy efficiency as it relates to fluid power systems.

- Proportional Hydraulics
- Pneumatic System Troubleshooting
- Hydraulic System Troubleshooting
- Energy Efficiency

Certified Mechanical Specialist (CMS)

The Certified Mechanical Specialist certification prepares and documents an individual's skill proficiency in competencies related to mechanical systems found in modern industrial facilities. Completion of this credential indicates satisfactory skill verification required to install, maintain, troubleshoot, and repair mechanical systems that include mechanical fasteners, hand tools, measurement devices and power transmission systems including belts, chains, gears, bearings.

The CMS Certificate is achieved by completing the underlying technician credentials and demonstrating mastery via written and hands-on skills assessments. The following list indicates the technician level credentials along with a description of each.

- Certified Mechanical Technician Level I

Introduces individuals to the fundamentals of mechanical systems including basic mechanical theory, fastening devices, common mechanical tools, and safety procedures.

- Mechanical Fundamentals
- Mechanical Safety
- Mechanical Fasteners
- Mechanical Tools

- Certified Mechanical Technician Level II

Expands on the topics of level I to include precision measurement devices and introduction to fabrication. This is followed by the study of mechanical drive systems to include belt, chain, and gear drives along with basic alignment and shaft alignment procedures.

- Precision Measurement
- Fabrication Fundamentals
- Mechanical Drives
- Shaft Alignment

- Certified Mechanical Technician Level III

Continues the skills development of previous topics from Level I and II by introducing additional topics related to mechanical applications, power transmission, precision motion and pumping systems.

- Industrial Bearings
- Lubrication
- Linear Drives
- Clutches and Brakes
- Pump Systems

- Certified Mechanical Technician Level IV

Further expands on the study of mechanical installation using precision laser alignment tools and procedures. Additionally, this level includes coverage of vibration and temperature as it relates to maintenance of mechanical systems, along with measurement procedures.

- Laser Shaft Alignment
- Laser Belt/Chain Alignment
- Vibration Metering/Analysis
- Temperature and Thermal Imaging

Certified Robotic Specialist (CRS)

The Certified Robotic Specialist certification prepares and documents an individual's skill proficiency in competencies related to robotic systems found in modern industrial facilities. Completion of this credential indicates satisfactory skill verification required to install, maintain, troubleshoot, and repair robotic systems and associated integrated components.

The CRS Certificate is achieved by completing the underlying technician credentials and demonstrating mastery via written and hands-on skills assessments. The following list indicates the technician level credentials along with a description of each.

- Certified Robotic Technician Level I

Introduces individuals to the fundamentals of robotic systems including operational theory, coordinate systems, robot types, motion, basic programming, and safety as it applies to robotic solutions.

- Robot Fundamentals
- Robot Types
- Robot Safety
- Robot Setup
- Robot Programming I

- Certified Robotic Technician Level II

Expands on the topics of level I to include higher level programming activities and external IO control. This covers the integration of different robotic applications to include electrical and pneumatic control of external applications via a robot controller.

- Robot Programming II
- Robot Applications
- Robot Integration

- Certified Robotic Technician Level III

Continues the skills development of previous topics from Level I and II by introducing advanced integration of common automation components. This includes connectivity and configuration of robot communications with PLC's and vision systems.

- Robot Communications
- Robot PLC Integration
- Robot Artificial Vision

- Certified Robotic Technician Level IV

Further expands on the study of robotic systems and expanding those to include additional external axis such as indexing tables or horizontal/vertical slides. Additionally, coverage is included on the types and function autonomous robots and their operation.

- Robot External Axes
- Autonomous Robots

Completers of the SMC Robotics Level 1 and Level 2 Technician Credentials will also receive UR certification.

**When the training equipment used includes UR robot.*

Certified Process Specialist (CPS)

The Certified Process Specialist certification prepares and documents an individual's skill proficiency in competencies related to process control systems found in modern industrial facilities. Completion of this credential indicates satisfactory skill verification required to install, maintain, troubleshoot, and repair process control systems and associated integrated components.

The CPS Certificate is achieved by completing the underlying technician credentials and demonstrating mastery via written and hands-on skills assessments. The following list indicates the technician level credentials along with a description of each.

- Certified Process Technician Level I

Introduces individuals to the fundamentals of process control systems and their role in industrial operations. A study of process theory, along with symbols, diagrams and control fundamentals is followed by safety procedures and considerations.

- Process Fundamentals
- Process Safety
- Process Documentation
- Process Measurement
- Process Signals

- Certified Process Technician Level II

Expands on the topics of level I to discuss digital and analog measurement devices and signals along with control methods and fundamentals. This is followed by an introduction of automatic control using PID along with loop tuning activities for flow, level, pressure, and temperature applications.

- Final Control Elements
- Manual Control
- Automatic Control
- PID Fundamentals
- PID Control Loops

- Certified Process Technician Level III

Continues the skills development of previous topics from Level I and II by introducing loop checking/ tuning principals along with advanced control methods including cascade, ratio, and feedforward control systems.

- Loop Checking
- Loop Tuning
- Feedforward Control
- Cascade Control
- Ratio Control

- Certified Process Technician Level IV

Further expands on the study of process control to include advanced communication protocols used with common process instruments. Additionally, this includes a study of instrument calibration and the procedures for verifying instrument signals, along with an introduction of process technicians.

- Instrument Calibration
- Process Troubleshooting
- HART Protocol
- Foundation Fieldbus
- Process Technicians

The Control Systems Technician, CST, Associate Certificate is based on key domains from the Certified Control Systems Technician® (CCST®) Body of Knowledge. To earn the certificate, one must pass **CST Associate Exam** from International Society of Automation, ISA.

CST Associate Exam Eligibility:

- A 4-year technical degree; or
- A 2-year technical degree and one (1) year of work experience in the automation field; or
- Five years of work experience in the automation.

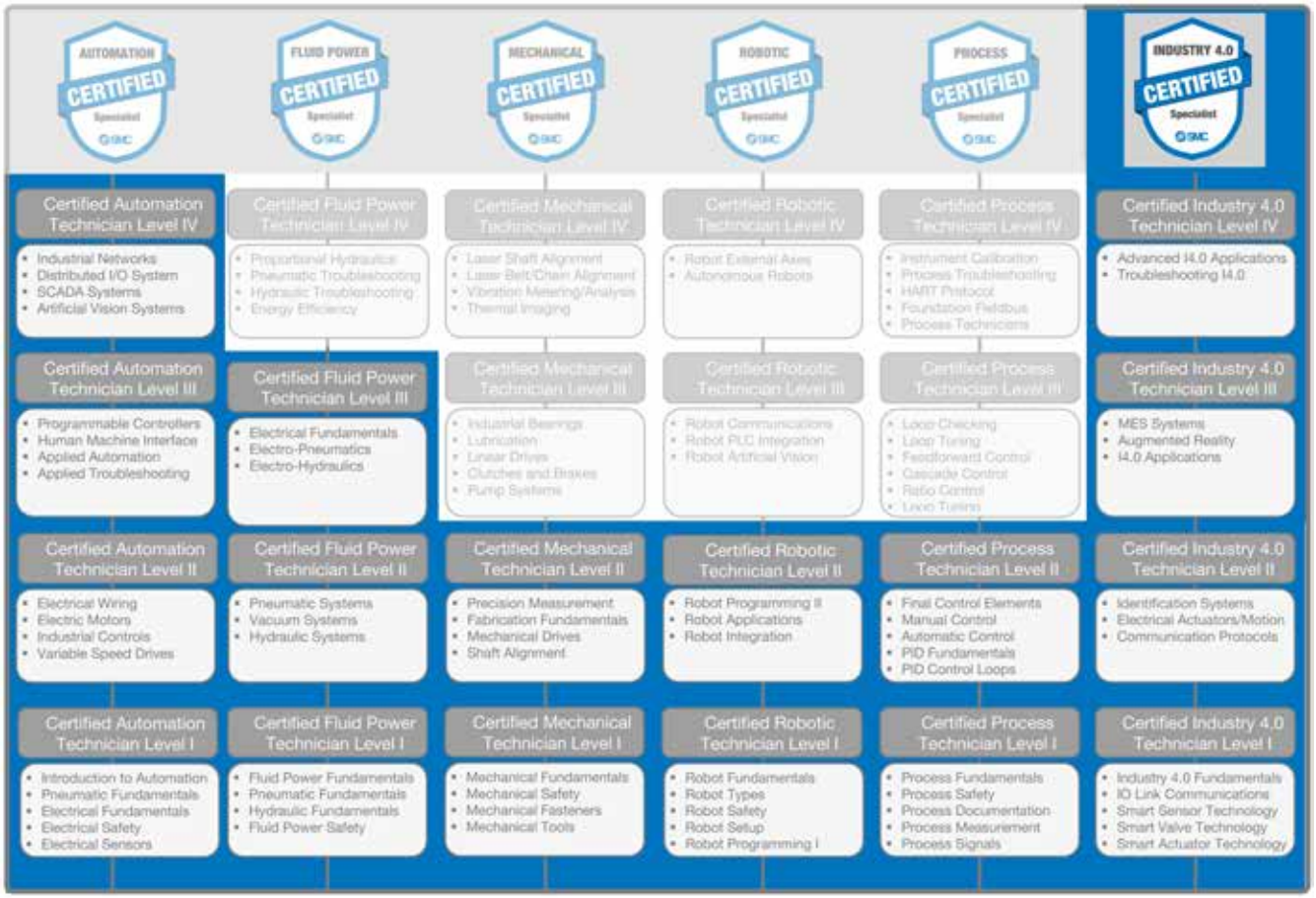
Participants who complete this full Certified Process path and meet the other requirement for eligibility, will be able to apply for the CCST certification.

Certified Industry 4.0 Specialist (CI4S)

The Certified Industry 4.0 Specialist certification prepares and documents an individual's skill proficiency in competencies related to advanced industry 4.0 system found in modern industrial facilities. Completion of this credential indicates satisfactory skill verification required to install, maintain, troubleshoot, and repair industry 4.0 and associated integrated systems.

The CI4S Certificate is achieved by completing the underlying technician credentials and demonstrating mastery via written and hands-on skills assessments. The following list indicates the technician level credentials along with a description of each.

- PRE-REQUISITE PATH CREDENTIAL REQUIREMENTS
  - Certified Automation Technician Levels I, II, III & IV
  - Certified Fluid Power Technician Levels I, II & III
  - Certified Mechanical Technician Levels I & II
  - Certified Robotics Technician Levels I & II
  - Certified Process Technician Levels I & II



- Certified Industry 4.0 Level I

Introduces individuals to the fundamentals of industry 4.0 concepts and its role in present day industrial operations. This includes a study of IO Link protocol along with its use for smart sensors, valves, and actuators.

- Industry 4.0 Fundamentals
- IO Link Communications
- Smart Sensor Technology
- Smart Valve Technology
- Smart Actuator Technology

- Certified Industry 4.0 Level II

Expands on the topics of level I to discuss identification systems such as bar code, near field and RFID technologies. The study continues with an overview of electrical actuators and motion systems along with communication protocols to provide advanced functionality and connectivity between systems.

- Identification Systems
- Electrical Actuators and Motion
- Communication Protocols

- Certified Industry 4.0 Level III

Continues the skills development of previous topics from Level I and II by introducing a fully functional basic I4.0 system and associated components. It explores manufacturing execution systems and augmented reality concepts as it relates to I4.0

- MES Systems
- Augmented Reality
- I4.0 Applications

- Certified Industry 4.0 Level IV

Further expands on the study of I4.0 to include an advanced I4.0 system and applications containing various integrated technologies. Additionally, this includes a study of troubleshooting and diagnostic procedures for maintaining these advanced technologies.

- Advanced I4.0 Applications
- Troubleshooting I4.0 Systems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