

# CPE-FMS

## Flexible Manufacturing System



### FEATURES

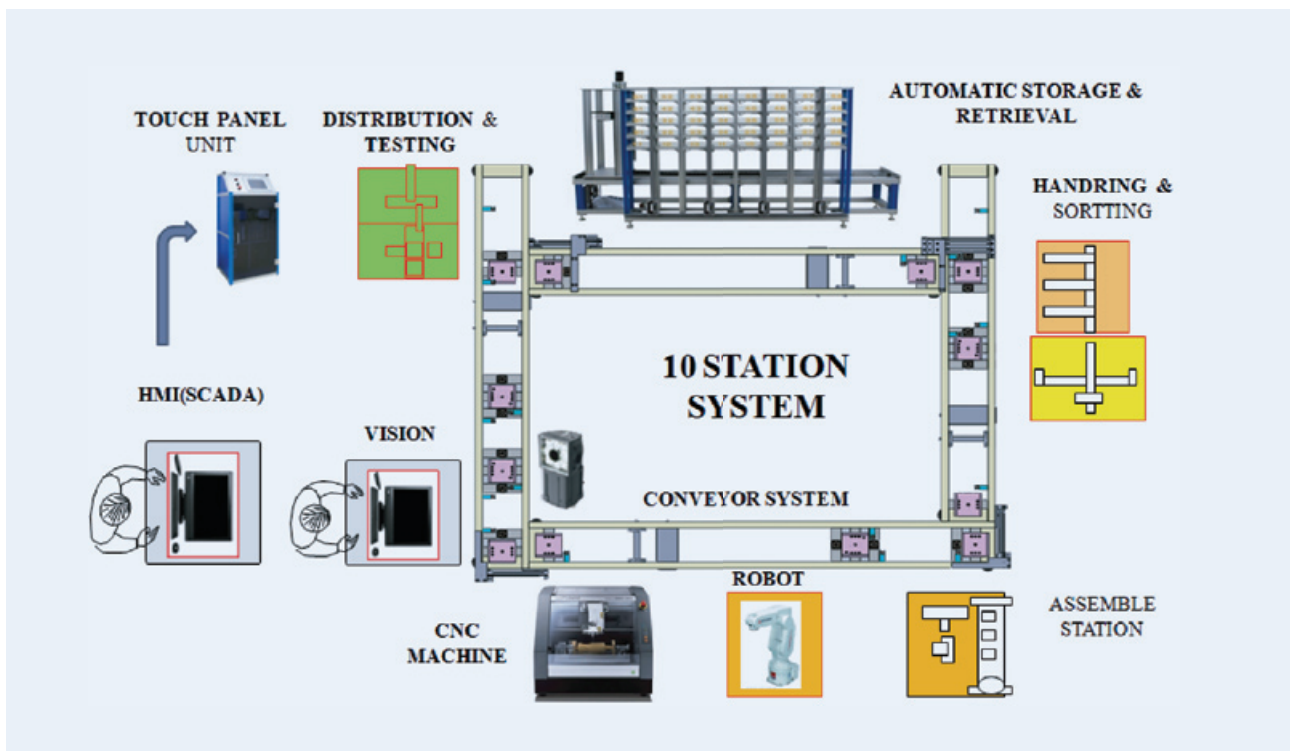
- Flexible modular production system that can adapt to different requirements of the customer through variations in its stations
- Designed to help the user learn the production mechanism and PLC programming
- Supports advanced levels of technical training on sensor, robot, PLC network and pneumatic technologies
- System configuration of each process: Conveyor, Distribution, Testing, Vision, CNC, Robot, Assembly, Automatic Storage & Retrieval, Handling, Sorting and HMI

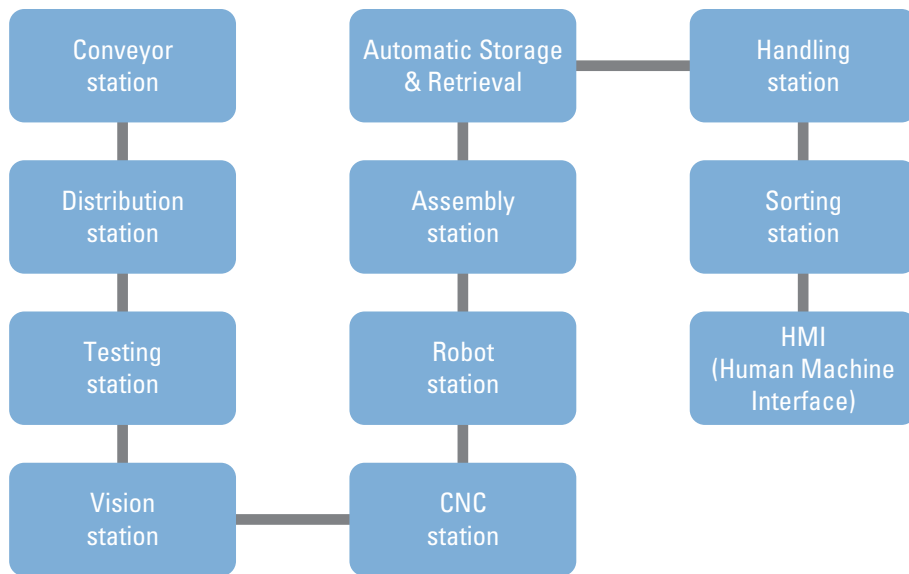
### INTRODUCTION

A flexible manufacturing system (FMS) is a method for producing goods that is readily adaptable to changes in the product being manufactured, in which machines are able to manufacture parts and in the ability to handle varying levels of production.

The CPE-FMS Factory Manufacturing System comprises a total of 10 stations and consists of a robot, PLC system, vision system, numerical controlled machine (CNC), HMI, and SCADA software.

### PRODUCT COMPOSITION





## EXPERIMENTAL CONTENTS

Handling & Sorting System	Vision System	AS/RS Control	Conveyor System
<ul style="list-style-type: none"> <li>• Pneumatic control</li> <li>• Electro-pneumatic control</li> <li>• Sensor</li> <li>• PLC control</li> <li>• Ethernet communication</li> </ul>	<ul style="list-style-type: none"> <li>• Vision camera control</li> <li>• Data collection and transmission</li> <li>• External I/O interface</li> <li>• Ethernet communication</li> </ul>	<ul style="list-style-type: none"> <li>• 3-axis servo motor control</li> <li>• Servo drive control</li> <li>• Encoder application</li> <li>• PLC programming</li> <li>• MRP</li> </ul>	<ul style="list-style-type: none"> <li>• Conveyor mechanism</li> <li>• Conveyor application</li> <li>• Pallet stopper and cylinders</li> <li>• Pallet identification system</li> <li>• PLC interface</li> <li>• PLC programming</li> </ul>

## SPECIFICATIONS

### Conveyor system (CS-100)

#### Training Techniques

- Electro-pneumatic technology
- Motor control
- Sensor technology
- PLC control

#### Training Contents

- Conveyor system mechanism
- Conveyor and buffer control
- Pallet stopper & cylinders
- Pallet identification system
- PLC programming
- PLC interface

#### Specifications

- 1) Conveyor
  - One-way direction conveyor
  - DC motor
  - Aluminum profile support
  - Pallet (160 x 160mm)
- 2) Controller
  - Pallet identification
  - PLC
  - Fieldbus or Ethernet TCP/IP interface

### Distribution Station (DS-101)

#### Training techniques

- Pneumatic control
- Electro-pneumatic control
- Motor control
- Sensor technology
- Communication technology

#### Training Contents

- Pneumatic & electro-pneumatic components
- Magnetic sensor and optical sensor applications
- PLC programming
- Ethernet communication

#### Specifications

- The work pieces, through the feeding tube, will be distributed to the next station by the rotary cylinder and vacuum suction.
- Dimension: 500(W) × 500(D) × 1000(H) mm
- Weight: 40 kg
- Main power supply: AC 220V 60Hz
- Operating voltage: DC 24V 3A
- Operating pressure: 5 ~ 6 bar
- Logic: PNP

### Testing Station (TS-107)

#### Training techniques

- Pneumatic control
- Electro-pneumatic control
- Sensor technology
- PLC control
- Communication technology

#### Training contents

- Pneumatic & electro-pneumatic components
- Magnetic sensor, optical sensor, capacitive sensor and inductive sensor
- Analogue sensor control
- PLC programming
- Pneumatic cylinder control
- Ethernet communication

#### Specifications

- The material of work piece is detected and identified by the sensors. After testing the height of the work piece, the failed will be rejected where as the passed will be transferred through the conveyor.
- Dimension: 500(W) × 500(D) × 1300(H) mm
- Weight: 43 kg
- Main power supply: AC 220V 60Hz
- Operating voltage: DC 24V 3A
- Operating pressure: 5 ~ 6 bar
- Logic: PNP

### Vision Station (VS-104)

#### Training techniques

- Measurement technology
- Sensor technology
- Communication technology

#### Training contents

- Vision camera components
- Data acquisition & transmission
- External I/O interface
- Ethernet communication

#### Specifications:

- Image processing: True color
- Light: Pulse light (white)
- Number of items for inspection: 5ea
- Power source: 24V DC, 2.4A
- Operating temperature: 0 ~ 50°C
- Image Sensor: 1/3" CMOS (752 x 480 pixel resolution)
- Full frame rate: 75fps
- Electronic shuttering: 1/250 - 1/30,000 sec.
- External port: RJ-45 for Ethernet communication (10/100Mbps)
- Digital I/O: 24V DC

### CNC Station (CS-102)

#### Training techniques

- Servo control technology
- Position control
- Mechanical tool control
- Communication technology

#### Training contents

- CNC programming
- Flow chart and drawing
- Ethernet communication

#### Specifications

- Worktable: 270(W) × 280(D) mm
- Operating limit: 200 (X) × 240 (Y) × 90 (Z) mm
- Operating speed: 0.1 ~ 70 mm/sec
- Motor: Micro step motor
- Spindle motor speed: DC Motor 12000 RPM
- Operating voltage: AC 220V±10%, 50/60 Hz
- Power consumption: 2.1A 210W
- Communication: USB 1.1
- Dimension: 700(W) × 730(D) × 750(H) mm
- Operating temperature: 5 ~ 40°C, RH 35 ~ 80%

## Robot Station (RS-105)

### Training techniques

- Servo technology
- Position control
- Multi axes control
- Communication technology

### Training contents

- Robotics programming
- Teaching pendant operation
- Axis-coordination control
- Gripper control
- External I/O interface

### Specifications

- The assembly station is designed to assemble the cover case for the work piece.
- Main power supply: AC 220V 60Hz
- Operating voltage: DC 24V 3A
- Operating pressure: 5 ~ 6 bar
- Logic: PNP

## Assembly Station (AS-108)

### Training techniques

- Sensor technology
- Pneumatic control
- PLC programming
- Communication technology
- Robotics control

### Training contents

- Distribution of work piece
- Robot position control
- Servo drive
- Encoder application
- Sensor application
- PLC-to-robot interface
- Data transfer

### Specifications

- The assembly station is designed to assemble the cover case for the work piece.
- Dimension: 500(W) × 500(D) × 1000(H) mm
- Weight: 60 kg
- Main power supply: AC 220V 60Hz
- Operating voltage: DC 24V 3A
- Operating pressure: 5 ~ 6 bar

## Automatic Storage & Retrieval (RS-109)

### Training techniques

- Sensor technology
- PLC
- Servo control
- Interface technology

### Training contents

- Warehouse structure
- 3-axis servo motor control
- Servo drive control
- Encoder application
- Sensor application
- PLC programming
- MRP
- Data interface

### Specifications

- Weight: 55 kg
- Input: AC 220V 60Hz
- Output: DC 24V 3A
- Operating pressure: 5 ~ 6 bar
- Logic: PNP

## Handling Station (HS-106)

### Training techniques

- Pneumatic control
- Electro-pneumatic control
- Sensor technology
- PLC control
- Communication technology

### Training contents

- Pneumatic & electro-pneumatic components
- Magnetic sensor, optical sensor and limit switch
- Pneumatic cylinder control
- PLC programming
- Ethernet communication

### Specifications

- The 2-axis handling device performs pick & place task.
- Weight: 43 kg
- Main power supply: AC 220V 60Hz
- Operating voltage: DC 24V 3A
- Operating pressure: 5 ~ 6 bar

## Sorting Station (SS-103)

### Training techniques

- Sensor technology
- Pneumatic control
- PLC
- Interface technology

### Training contents

- Speed control of the conveyor
- Application of optical fiber sensor
- PLC programming
- Data interface

### Specifications

- A work piece being transferred is sorted by the classification cylinder by the type of its material.
- Dimension: 750(W) × 750(D) × 950(H) mm
- Weight: 45 kg
- Main power supply: AC 220V 60Hz
- Operating voltage: DC 24V 3A
- Operating pressure: 5 ~ 6 bar

## HMI (Human Machine Interface)

### Basic function

- Real-time database management
- Alarm
- Trend analysis
- Making a report
- Data logging
- Scheduler
- Network
- Creating monitoring/control screen
- Graphic effect
- I/O device

### PC environment

- CPU: Intel compatible
- Interface: Ethernet, USB
- HDD: 300G or more
- Windows 7 and Windows XP

## STANDARD ACCESSORIES

- Power cord: 1ea
- User's guide manual: 1ea