

FACTORY AUTOMATION TRAINING SOLUTIONS



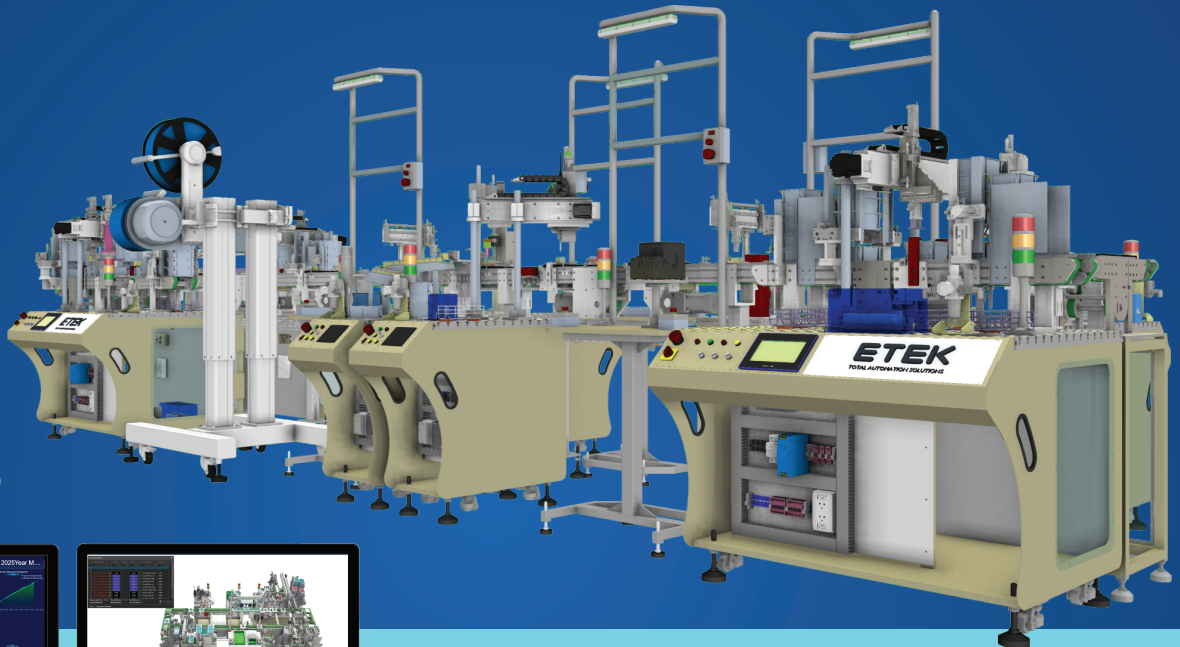
AGV/AMR



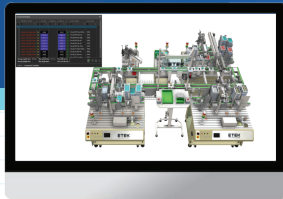
AI - VISION



MATERIAL FLOW

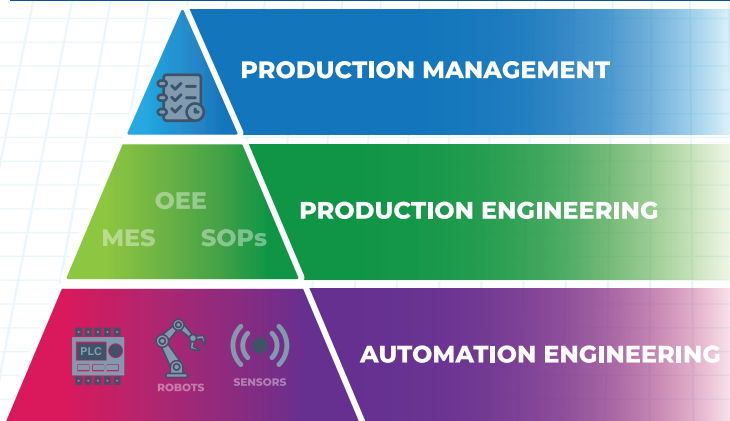


MES



DIGITAL TWIN

TRAINING MODULE



ENGINEERING AND TECHNOLOGY

PRODUCTION MANAGEMENT SOFTWARE

- ▶ **OEE, Andon**
(Realtime Dashboard, Downtime Analysis, Energy Monitoring...)
- ▶ **MES**
(Manufacturing Execution System)
- ▶ Service, PHM, Predictive Maintenance (PdM)

SCADA-HMI MONITORING

- ▶ HMI & SCADA
- ▶ Industrial Communication Network
- ▶ IoT connection
- ▶ AGV Traffic Management
- ▶ Digital Twin

TRAINEES

LEADER	Plan and manage projects, train and mentor staff, integrate MES-ERP systems, manage quality control and focus on process improvements (Lean 4.0) (ATTS-5).
TECHNICIAN	Oversee and manage the process, provide technical support, and work with SPC/SCADA (ATTS2-3).
OPERATOR	Standardize the process, perform 5S checks, and ensure quality control at each step (ATTS-2).

DESIGN THINKING

- ▶ **Safety Machine Design**
• Electrical Safety: EN/IEC 60204/NFPA 79
• Machinery Safety: ISO 13849
- ▶ **Mechatronic Machine Design**
- ▶ **Mechatronic Design**
- ▶ **Electrical Design**
- ▶ **Mechanical Assembly and Alignment Skills**

MECHATRONIC SYSTEM

- ▶ **Electrical Control Cabinet**
- ▶ **PLC**
- ▶ **Smart Sensor**
- ▶ **Industrial Robot**
- ▶ **AGV, AMR**
- ▶ **Pneumatics**
- ▶ **AI Vision**
- ▶ **Servo**
- ▶ **Single-axis Robot**
- ▶ **Fault Simulation I/O**
- ▶ **IoT**

MAPPING TABLE WITH IE/IEM TRAINING

Major Topics (IEM)						Tools, competencies	Core Knowledge	Target			
Work Study & Ergonomics	Operations and production system	Quality management	Lean and productivity	Supply chain							
5	FATS 5 Smart Factory	<ul style="list-style-type: none">Human-AI interaction, AR/VR supporting training, and cognitive ergonomics.Design of intelligent, user-friendly monitoring systems.	<ul style="list-style-type: none">CPS system for automatic scheduling and optimization.Digital Twin simulates the entire factory.Strategic management instead of detailed scheduling.	<ul style="list-style-type: none">AI analyzes big data, predicts faults.	<ul style="list-style-type: none">AI automatically detects waste, suggests Kaizen improvements.Predictive maintenance using AI.	<ul style="list-style-type: none">Blockchain & AI logistics.Digital supply network management.	AI/ML for fault prediction, AR/VR training, Digital Twin, Autonomous Decision Making.	Lean 4.0 (AI for waste detection), Predictive maintenance, managing the innovation ecosystem.	Train senior managers and IE/IEM engineers with the ability to operate and design Smart Factories.		
	4	FATS 4 Digital Integration	<ul style="list-style-type: none">Monitoring via HMI/dashboard; transition to "cognitive ergonomics"Design intuitive interfaces, reduce cognitive load, ensure data safety.	<ul style="list-style-type: none">Integrated management via MES-ERPAutomatic schedulingReal-time production monitoringDecision-making based on KPI dashboard.	<ul style="list-style-type: none">Build integrated quality data.Analyze big data for early detection of deviations.Develop automatic warning systems and predictive quality control.	<ul style="list-style-type: none">e-Kanban, e-VSM, automated OEEPredictive maintenance. Learners analyze data for improvement.	<ul style="list-style-type: none">IoT, RFID, WMS integration for warehouse – production – logistics.Real-time supply chain management via MES/ERP.	IoT, RFID, WMS, BI dashboard, Predictive Analytics.	Integrated data management, automatic OEE, BI-based quality analysis, Smart scheduling.	Train digital production management capabilities, connecting the entire supply chain – production – logistics.	
		3	FATS 3 Automation Line	<ul style="list-style-type: none">Direct observation and monitoring at the production floor.Reset/maintenance tasksSafety when interacting with automated systems	<ul style="list-style-type: none">Synchronize workstations, identify bottlenecks.Product flow simulation within the factory (Flexsim)Basic ERP/MES.	<ul style="list-style-type: none">Quality measurement and control with sensors & online SPCRead SPC charts and intervene if limits are exceeded.Detailed traceability through each step in the production process.	<ul style="list-style-type: none">TPMSMEDImprove systems to reduce Six Big Losses.	<ul style="list-style-type: none">JITSimulation of material flow within the factory (Flexsim)	SPC Online, OEE, Basic TPM, ANDON System	Material synchronization with production lines, Lean Six Sigma projects, Real-time data quality analysis from sensors.	Operate automated production lines, manage productivity and quality at the system level.
			2	FATS 2 Semi-Automation	<ul style="list-style-type: none">Task allocation between humans and machines.AI vision analyzes OP's actions.Safety monitoringOptimize human-machine coordination. Reduce repetitive tasks.	<ul style="list-style-type: none">Design U-line, Routing, Branching layouts.	<ul style="list-style-type: none">Measure quality with semi-automatic devices.Manage quality dataBasic SPC to monitor process stability.Traceability by production phase	<ul style="list-style-type: none">Machine downtime.Basic JIT.Basic TPM.OEE calculations for equipment.	<ul style="list-style-type: none">Barcode and WMS software.Calculate material flow and finished goods (Material Flow).	Balance chart, line layout, Kanban board, Barcode/RFID	Conveyor balancing, Machine downtime, Semi-automatic quality control.
1	FATS 1 Manual	<ul style="list-style-type: none">Observation, analysisStandardize movements, improve posture		<ul style="list-style-type: none">Small batch production managementManual scheduling with ExcelOptimize production layout	<ul style="list-style-type: none">Manual inspection, checklists, and comparison to standard samplesMaintain quality through 5S	<ul style="list-style-type: none">5S, eliminate wasteful actionsPDCA and KaizenIdentify 7 types of waste.	<ul style="list-style-type: none">Manual material and inventory managementFIFO card	Stopwatch, Process Chart, SIPOC, Layout, Check sheet, 5S, Spaghetti Diagram	Standard time, Takt vs. Cycle, 7 types of waste, FIFO, Manual inventory management.	Establish a foundation for Lean thinking and basic management.	

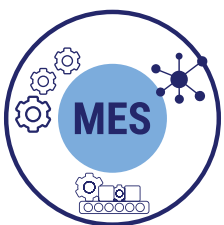
TECHNOLOGY DIAGRAM



ENERGY MANAGEMENT SYSTEMS



CLOUD SERVER



IOT PLATFORM

IOT PLATFORM

IOT PLATFORM

IOT PLATFORM

SCADA



DIGITAL TWIN



ROBOT CONTROL SYSTEM (RCS)



LOCAL SERVER



OPC UA

MQTT

REST API

EtherNet/IP

Industrial Switch



PROFINET

PROFINET

Ethernet Switch



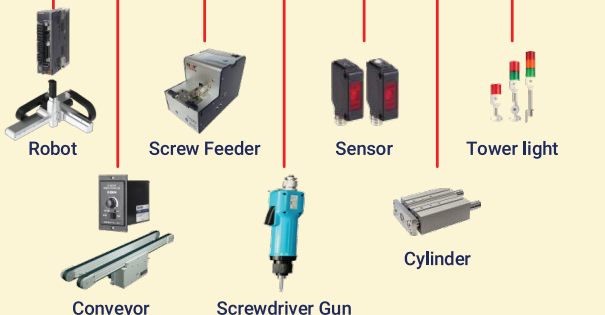
PROFINET

HMI

SIEMENS

VISION

DIO/AIO



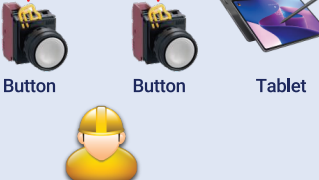
AUTOMATION FEEDING STATION

SIEMENS

AI BOX

CAMERA

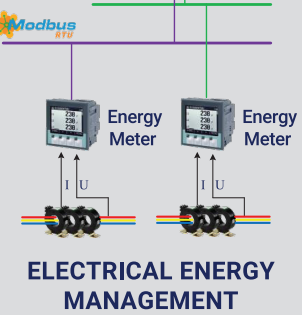
DIO



MANUAL FEEDING STATION

ADVANTECH
SIEMENS

GATEWAY



UTILITY SYSTEM

Wifi Router



Wi-Fi



INTRALOGISTICS SYSTEM

IPC



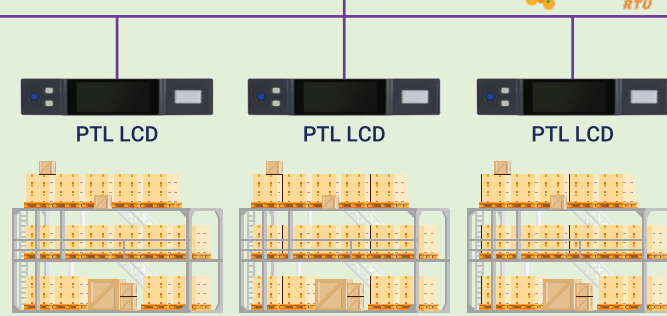
USB Port

PICK TO LIGHT
TECHNOLOGY

PTL CONTROLLER

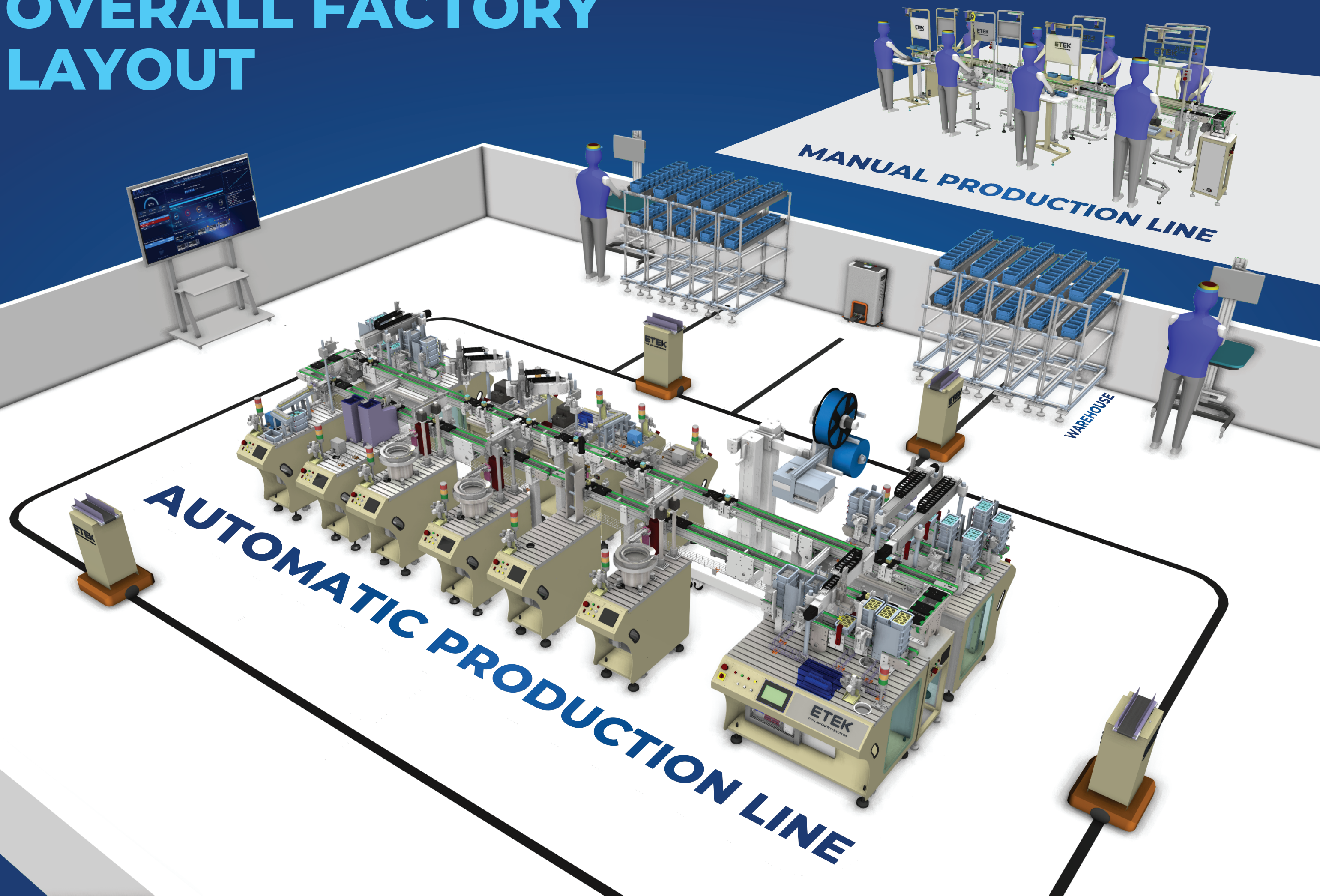


QRCode
Scanner



SMART WAREHOUSE

OVERALL FACTORY LAYOUT



MES



MAIN FUNCTIONS OF MES

Real-time management

Production task management

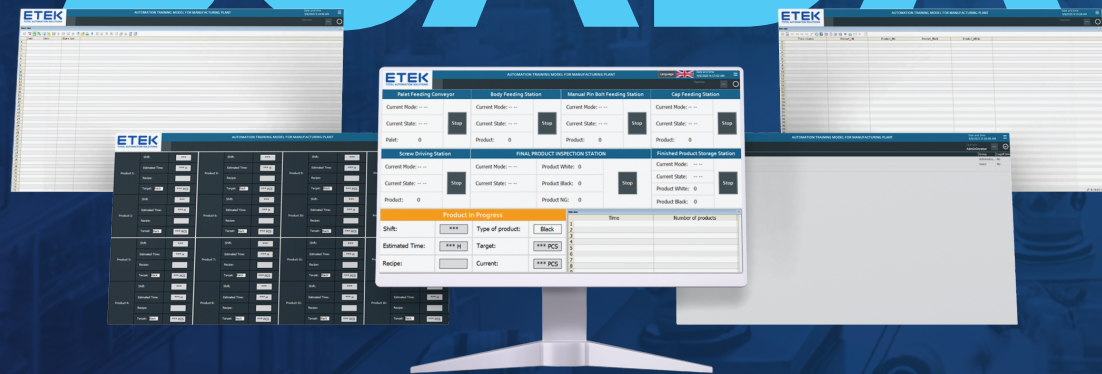
Equipment health management

Equipment control panel

Energy management

Digital Boardroom

SCADA



MAIN FUNCTIONS OF SCADA

Plan production and send directly to machines

Timely error and fault alerts

Detailed production reports

User and password management

Monitor the operational status of machines and compare actual production output with target output

DIGITAL TWIN

MAIN FUNCTIONS OF DIGITAL TWIN

Data Collection

Sensors attached to physical devices record real-time status, location and operating parameters.

Connection & Processing

Data is sent to PLC for processing and transmitted to the digital system.

Create Virtual Model

Based on collected data, an accurate digital model of the system is created.

Simulation

The virtual model allows for running various scenarios to forecast system response and performance.

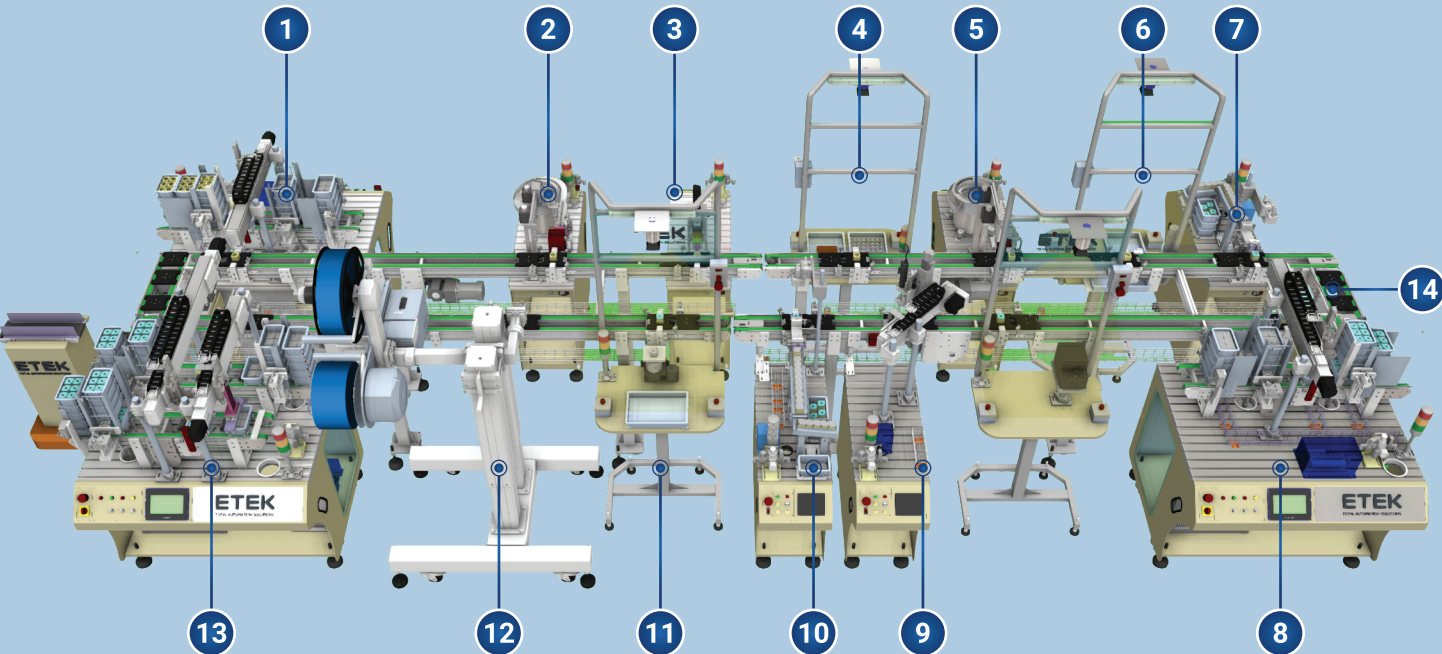
Data Collection

Simulation data helps detect risks early, optimize performance, and make appropriate improvement decisions.

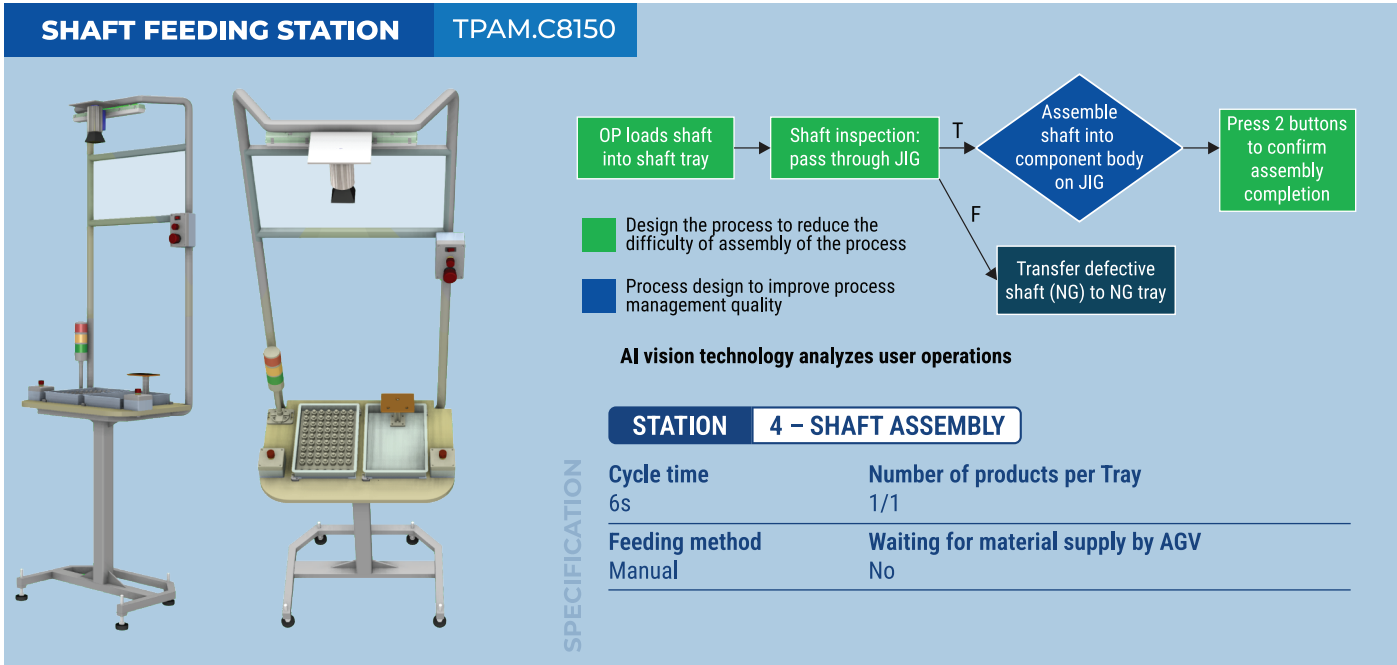
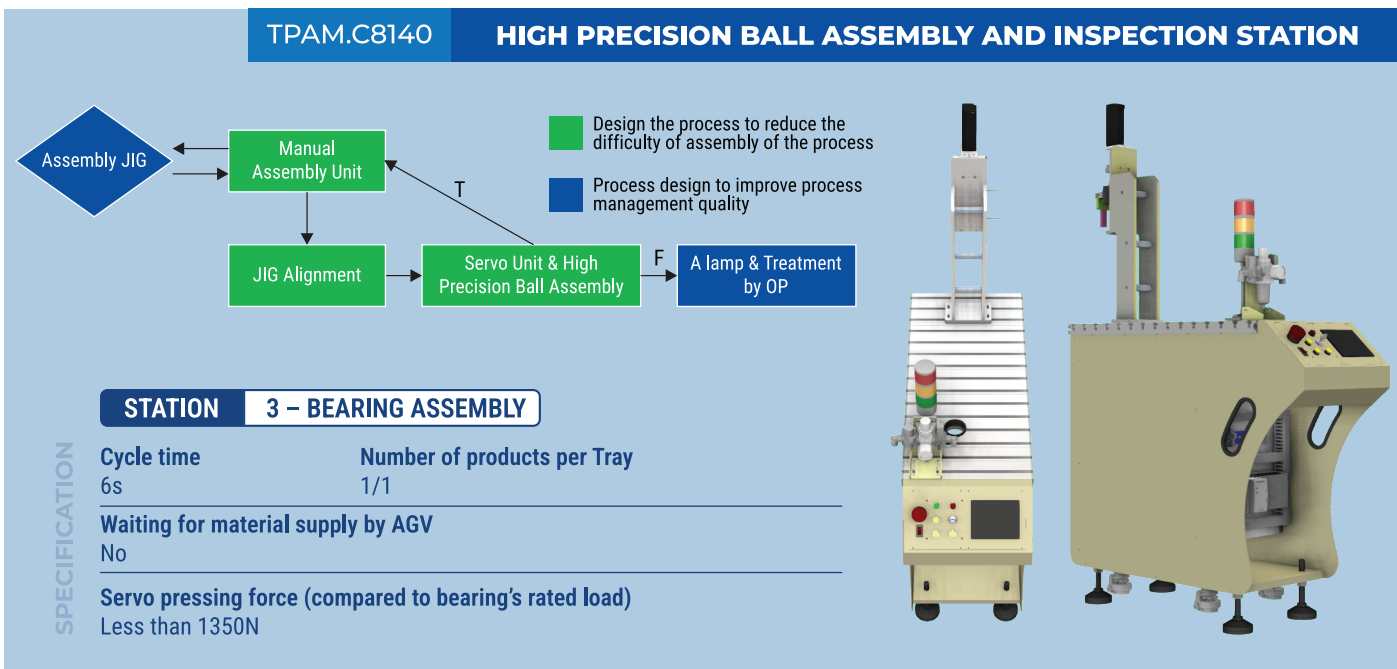
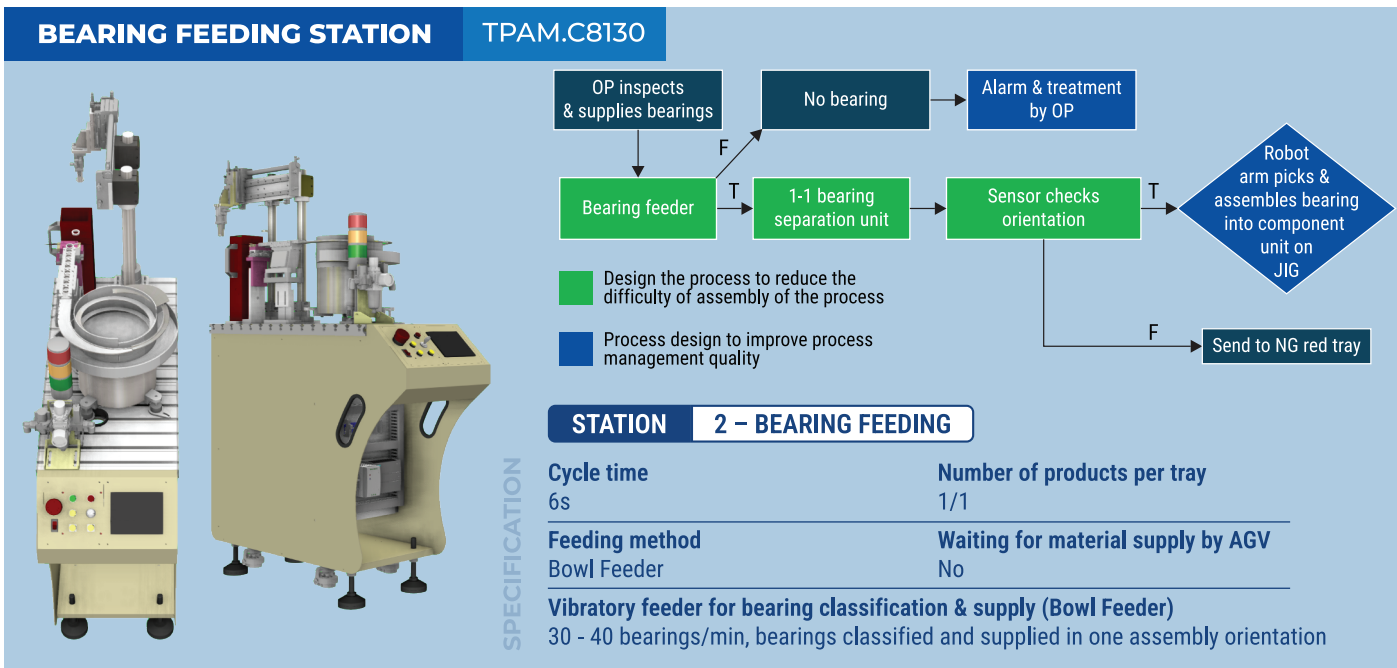
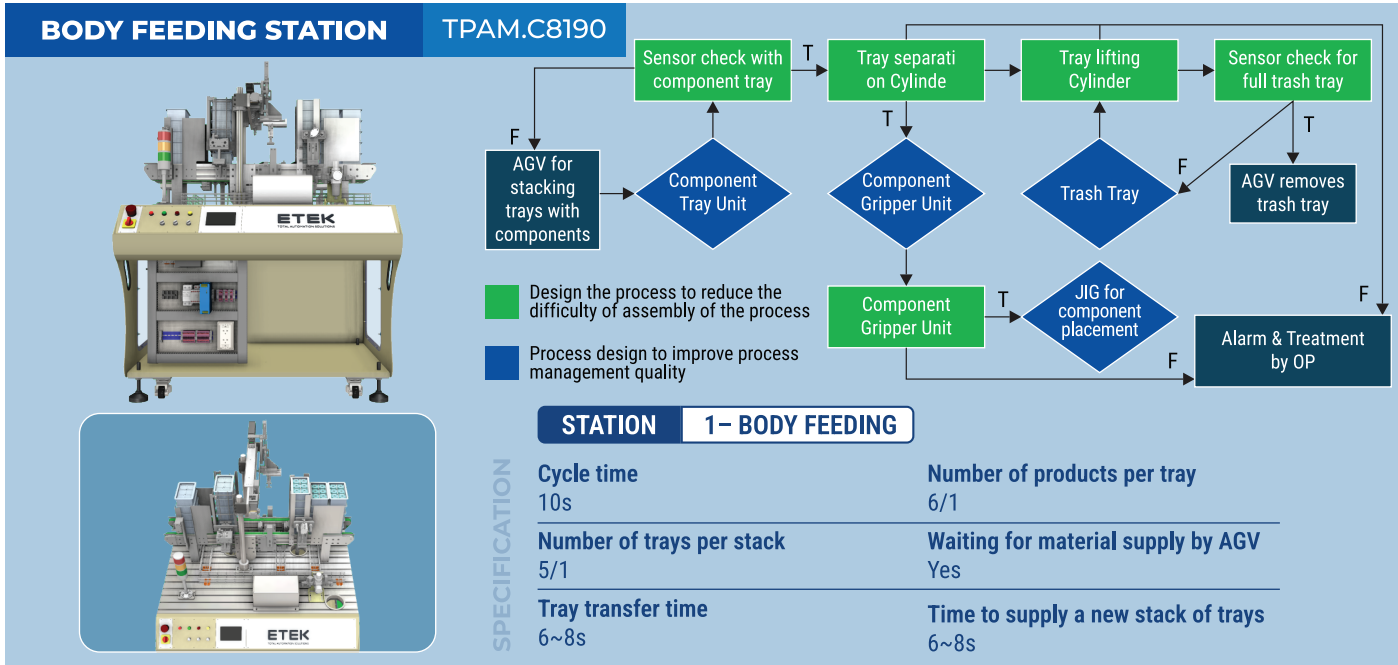
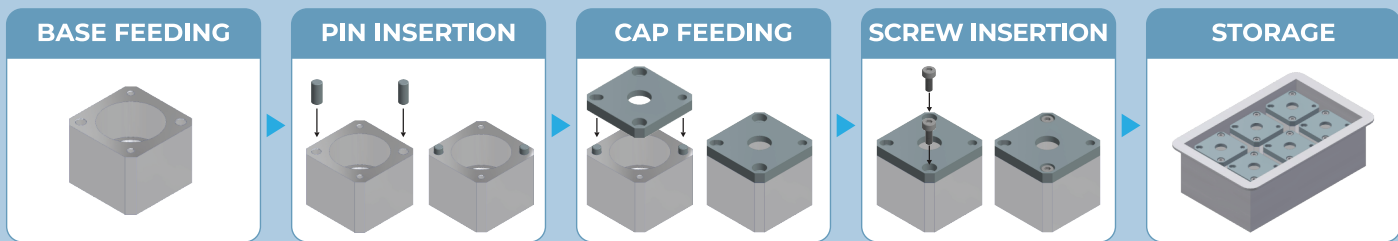


FACTORY AUTOMATION TRAINING SOLUTIONS - ST.ME.A8030

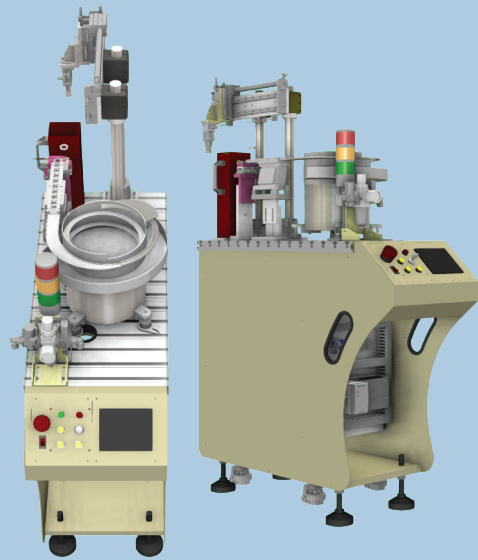
- 1 Body Feeding Station
- 2 Bearing Feeding Station
- 3 High precision ball assembly and inspection station
- 4 Shaft Feeding Station
- 5 Washer Feeding Station
- 6 Manual Pin Bolt Feeding Station
- 7 Component Presence Checking Station



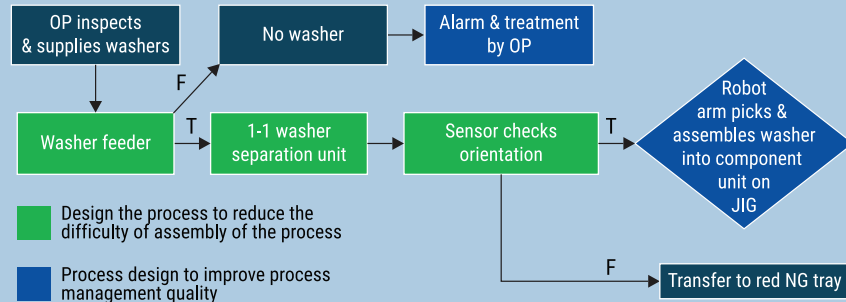
- 8 Cap Feeding Station
- 9 Screw Feeding & Fastening Station
- 10 Finished Product Inspection Station
- 11 Shaft Jamming Inspection Station
- 12 Markem Label printing & applying station
- 13 Finished Product Storage Station
- 14 Conveyor



WASHER FEEDING STATION TPAM.C8160



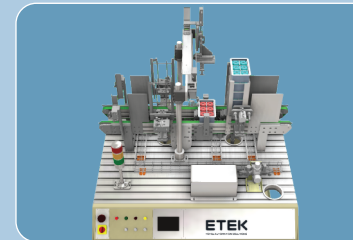
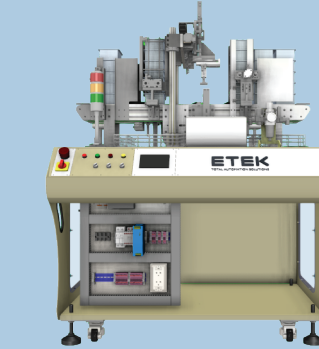
SPECIFICATION



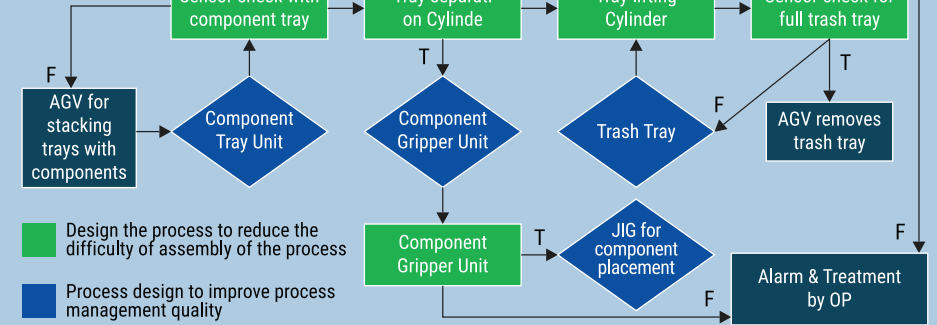
STATION 5 – WASHER FEEDING

Cycle time	6s	Number of products per tray	1/1
Feeding method	Bowl Feeder	Waiting for material supply by AGV	No
Vibratory feeder for bearing classification & supply (Bowl Feeder)			
30 - 40 washers/min, classified and supplied in one assembly orientation			

CAP FEEDING STATION TPAM.C8190



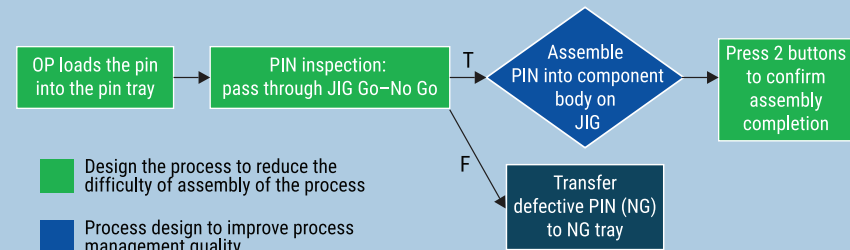
SPECIFICATION



STATION 8 – CAP FEEDING

Cycle time	6s	Number of products per tray	6/1
Number of trays per stack	5/1	Waiting for material supply by AGV	Yes
Tray transfer time	5s	Time to supply a new stack of trays	8~10s

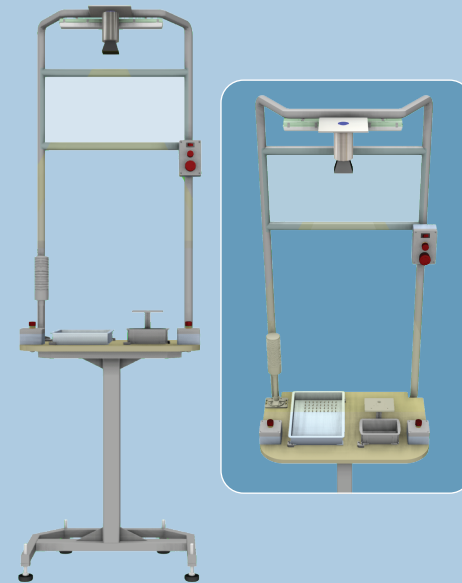
TPAM.C8170 MANUAL PIN BOLT FEEDING STATION



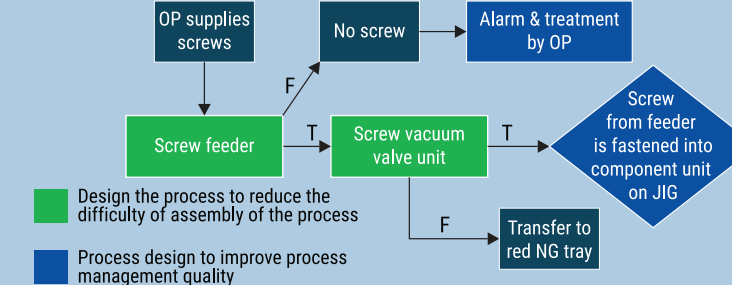
AI vision technology analyzes user operations

STATION 6 – PIN BOLT FEEDING

Cycle time	6s	Number of products per component body	2/1
Feeding method	Manual	Waiting for material supply by AGV	No
Tray to prevent PINs from falling during assembly			
Yes			

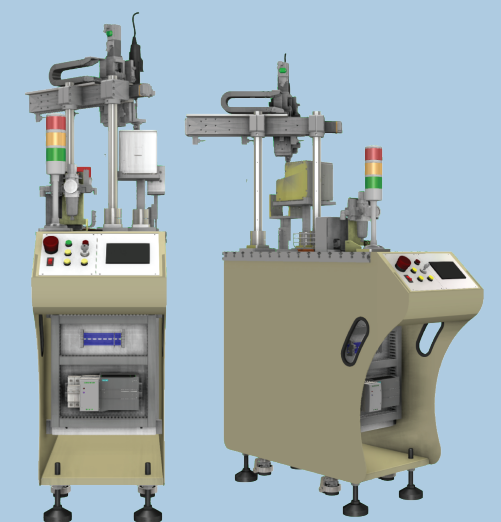


TPAM.C8210 SCREW FEEDING & FASTENING STATION



STATION 9 – SCREW FEEDING & FASTENING

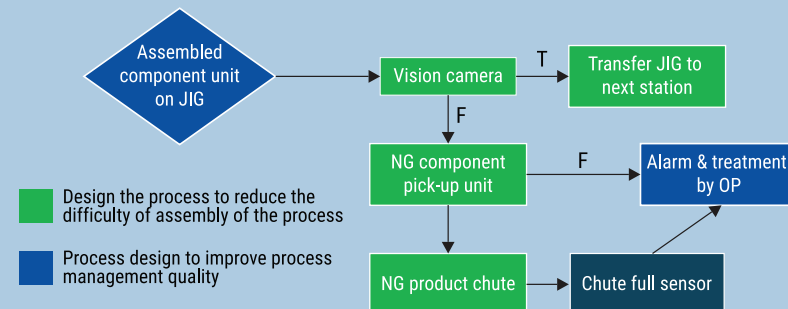
Cycle time	12s	Number of products per component unit	2/1
Feeding method	Screw Feeder	Waiting for material supply by AGV	No
Screwdriver (Kilews SKD-BN830PF)			
Adjustable torque from 0.98 ~ 2.94 Nm (select torque according to M3 screw fastening)			



COMPONENT PRESENCE INSPECTION STATION TPAM.C8180



SPECIFICATION



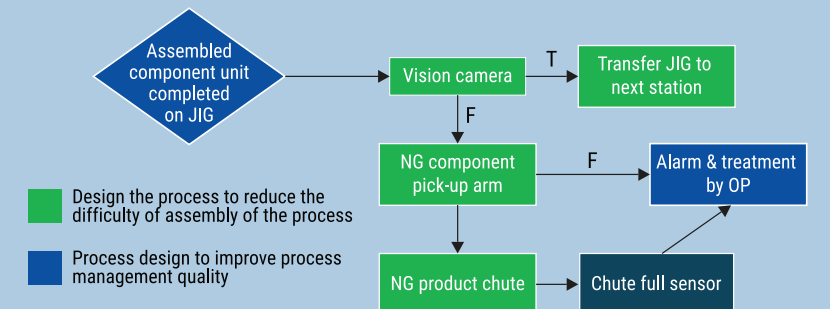
STATION 7 – COMPONENT PRESENCE CHECKING

Cycle time	6s	Number of products per Tray	1/1
Vision camera specifications			
- Check number of components on product (base, bearing, shaft, pin)			
- Detect abnormal/foreign objects (appearance check)			

FINISHED PRODUCT INSPECTION STATION TPAM.C8220

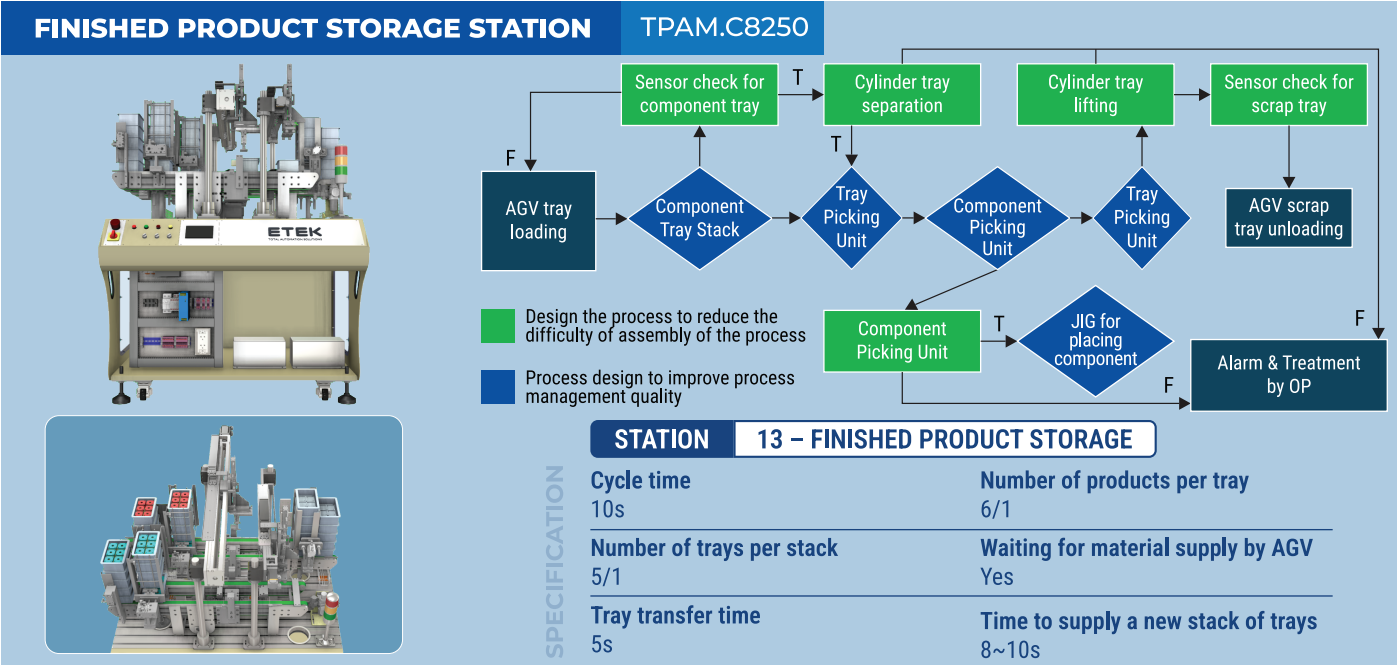
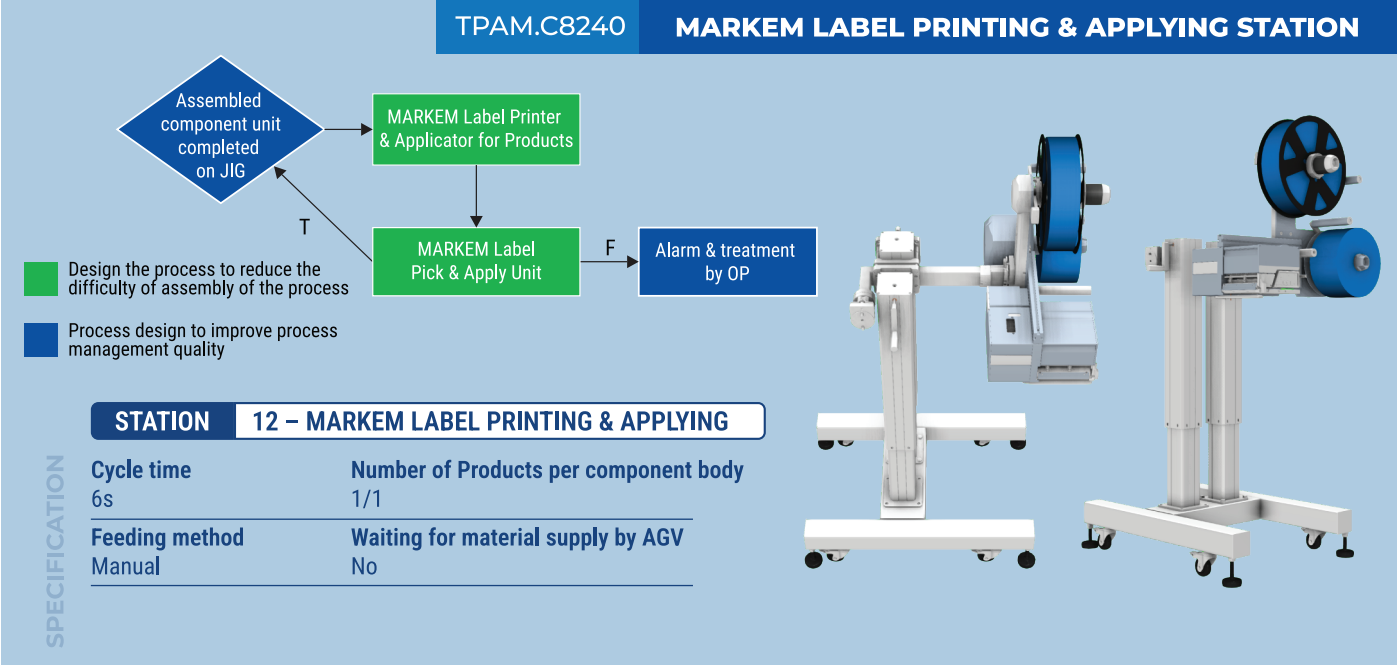
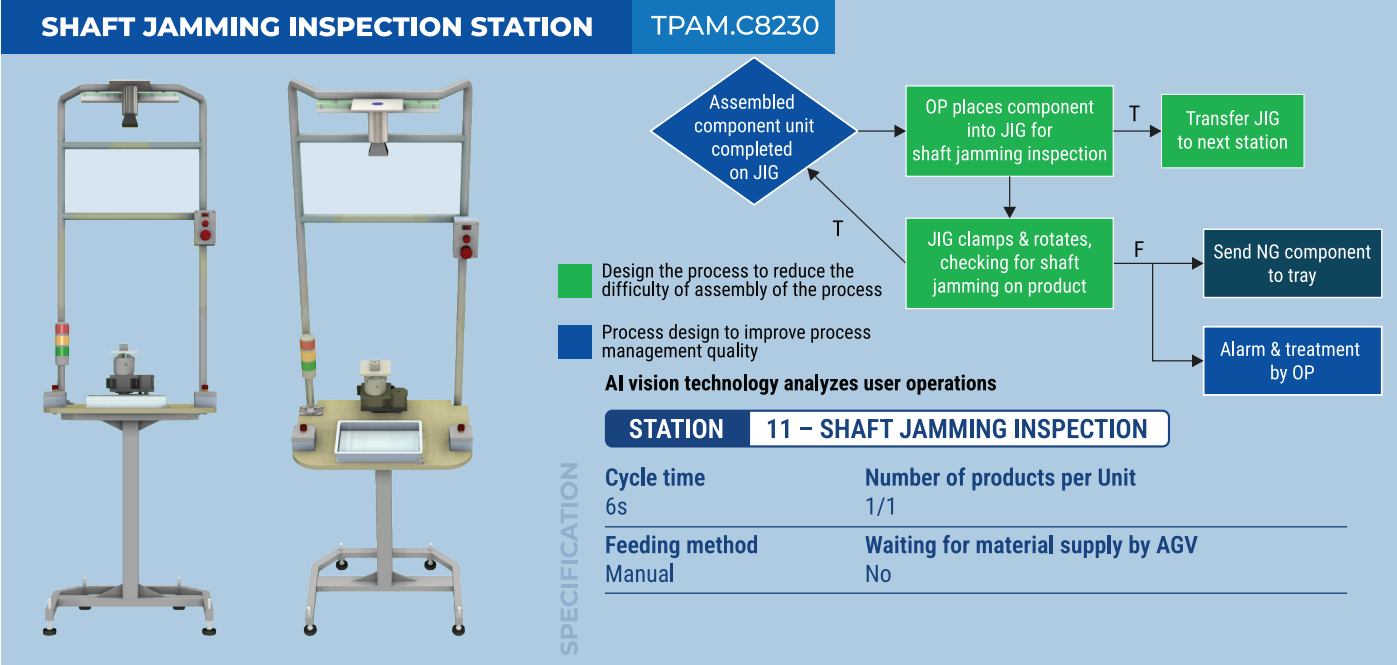


SPECIFICATION



STATION 10 – COMPONENT PRESENCE CHECKING

Cycle time	6s	Number of products	1/1
Vision camera specifications			
- Dimensional measurement			
- Foreign object/appearance abnormality detection			
- Character / QR code reading			



STATION CONFIGURATION

AUTOMATION LEVEL

PROCESS	STATION	OPTION 1	OPTION 2	OPTION 3	OPTION 4	OPTION 5
MATERIAL FEEDING	BODY FEEDING					
	SHAFT FEEDING					
	CAP FEEDING					
	MANUAL PIN BOLT FEEDING					
	WASHER FEEDING					
	BEARING FEEDING					
ASSEMBLY	SCREWING					
	BEARING PRESSING					
	MANUAL SCREWING					
INSPECTION	COMPONENT PRESENCE INSPECTION					
	FINISHED PRODUCT INSPECTION					
	SHAFT JAMMING INSPECTION					
PACKAGING	LABEL PRINTING					
STORAGE	STORAGE					
CONVEYOR	CONVEYOR					

The options are configurable station configurations

CUSTOMIZE LIST

STANDARD CONTROLLERS

SIEMENS

Schneider
Electric

MITSUBISHI
ELECTRIC

OMRON

Allen-Bradley
a ROCKWELL AUTOMATION

ABB

SMART CONTROLLERS

ctrlX
AUTOMATION

BECKHOFF

Schneider
Electric

ROBOT



ABB

MITSUBISHI
ELECTRIC

rexroth
A Bosch Company

UNIVERSAL
ROBOTS

YASKAWA

KUKA

PNEUMATIC



SMC

FESTO

CKD

AIRTAC

VISION



COGNEX

HIKVISION

KEYENCE

OMRON

SICK
Sensor Intelligence.

BASLER

SENSOR



Autonics
Sensors & Controllers

OMRON

KEYENCE

Panasonic

SICK
Sensor Intelligence.

Honeywell

AGV



HIKROBOT

KUKA

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