ETEK
TOTAL AUTOMATION SOLUTIONS

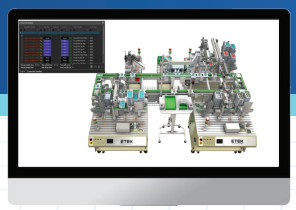
FACTORY AUTOMATION TRAINING SOLUTIONS

AGV/AMR

AI - VISION

MATERIAL FLOW

MES



DIGITAL TWIN

PRACTICAL APPLICATIONS IN FACTORIES

ELECTRONIC ASSEMBLY

AUTO PART ASSEMBLY

TRAINING MODULE

- PRODUCTION MANAGEMENT
- PRODUCTION ENGINEERING (OEE, MES, SOPs)
- AUTOMATION ENGINEERING (PLC, ROBOTS, SENSORS)

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

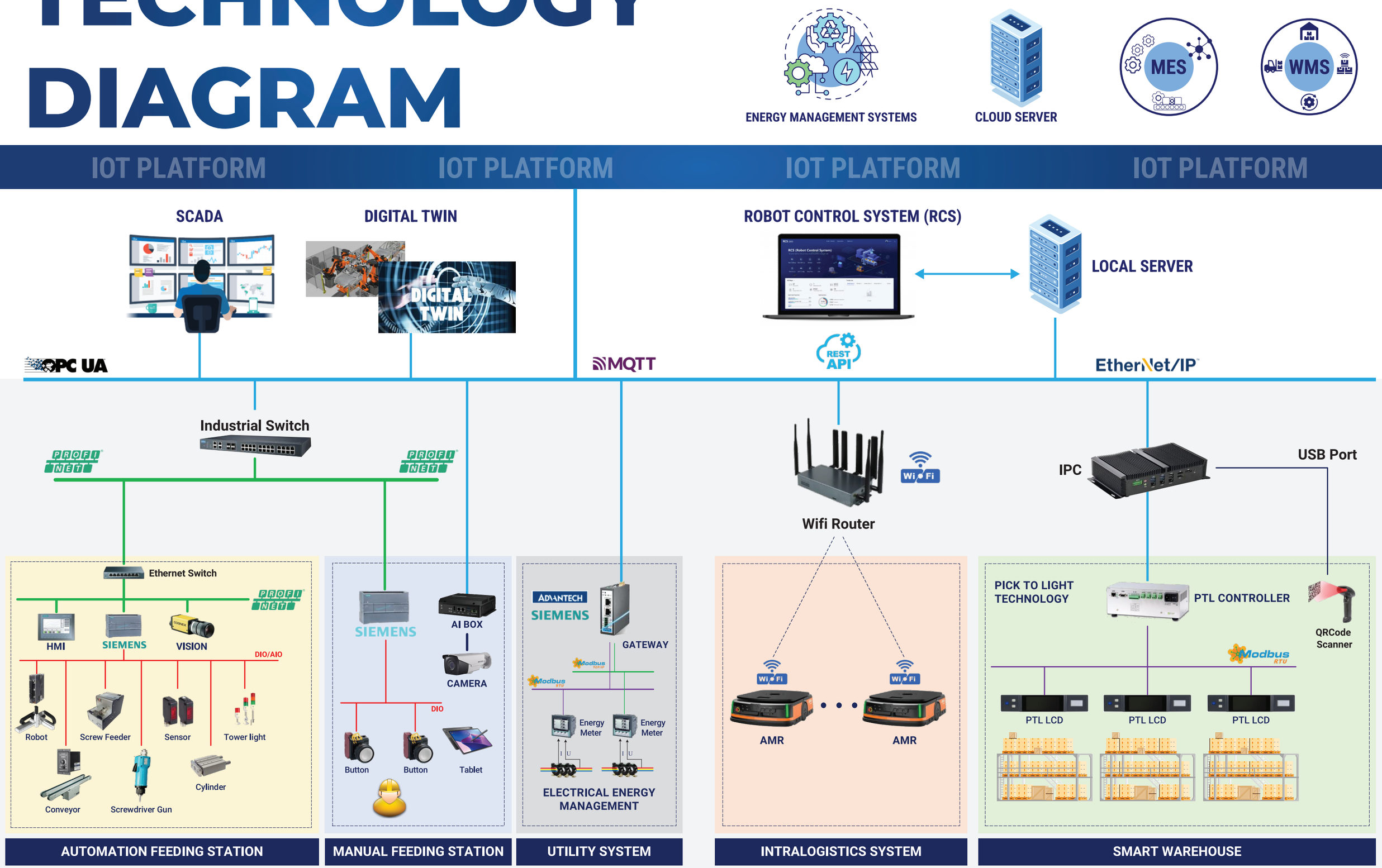
MECHATRONIC SYSTEM

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

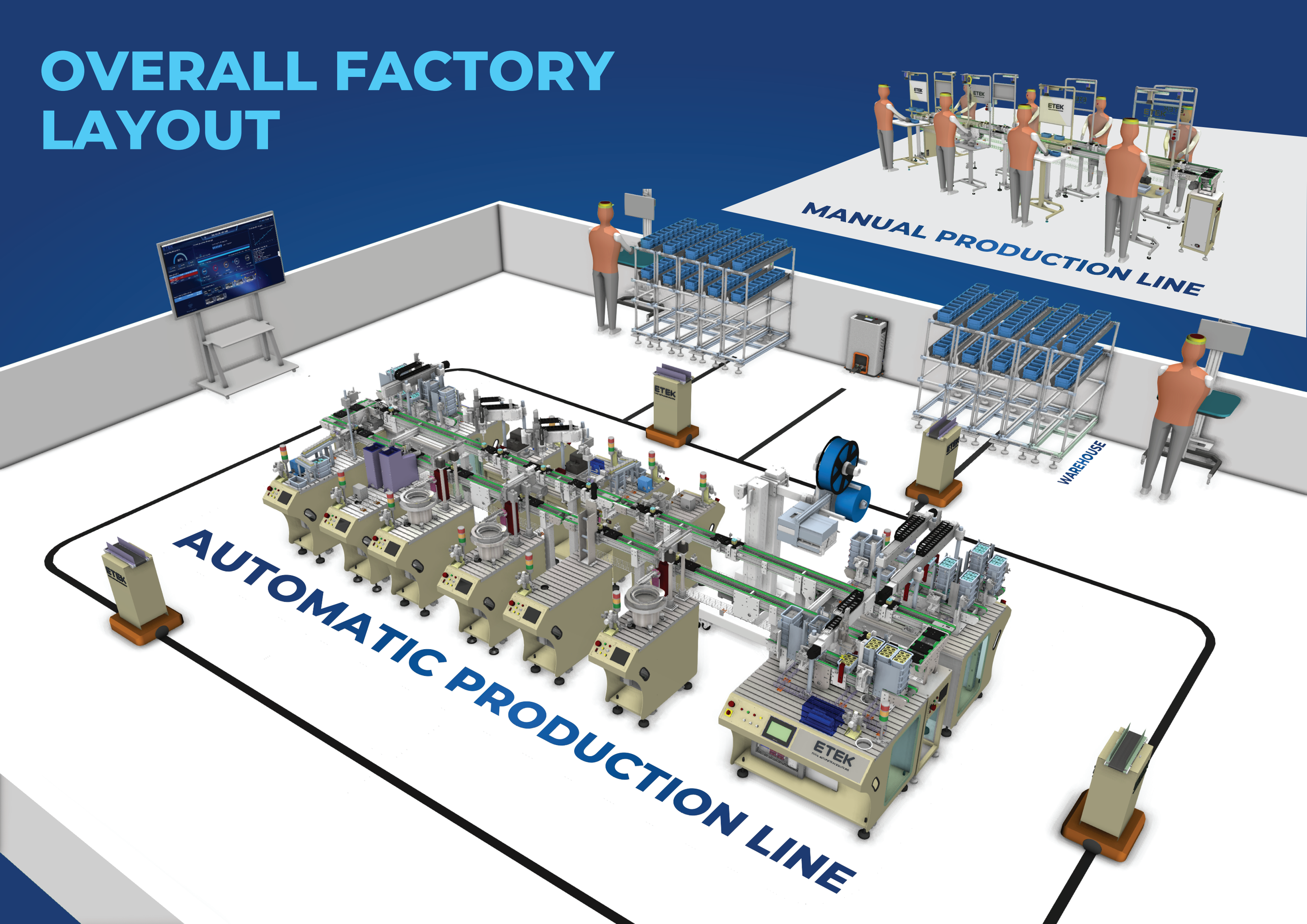
MAPPING TABLE WITH IE/IEM TRAINING

		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** CPS, AI/ML, predictive maintenance, blockchain supply chain.	• Human-AI interaction, AR/VR supporting training, and cognitive ergonomics. • Design of intelligent, user-friendly monitoring systems.	• CPS system for automatic scheduling and optimization. • Digital Twin simulates the entire factory. • Strategic management instead of detailed scheduling.	• AI analyzes big data, predicts faults.	• AI automatically detects waste, suggests Kaizen improvements. • Predictive maintenance using AI.	• 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** e-Kanban, IoT, MES-ERP integration, BI dashboard.	• Monitoring via HMI/dashboard; transition to "cognitive ergonomics" • Design intuitive interfaces, reduce cognitive load, ensure data safety.	• Integrated management via MES-ERP • Automatic scheduling • Real-time production monitoring • Decision-making based on KPI dashboard.	• Build integrated quality data. • Analyze big data for early detection of deviations. • Develop automatic warning systems and predictive quality control.	• e-Kanban, e-VSM, automated OEE • Predictive maintenance. Learners analyze data for improvement.	• 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** Fully automated lines with online SPC, sensors for quality control, barcode tracking	• Direct observation and monitoring at the production floor. • Reset/maintenance tasks • Safety when interacting with automated systems	• Synchronize workstations, identify bottlenecks. • Product flow simulation within the factory (Flexsim) • Basic ERP/MES.	• Quality measurement and control with sensors & online SPC • Read SPC charts and intervene if limits are exceeded. • Detailed traceability through each step in the production process.	• TPM • SMED • Improve systems to reduce Six Big Losses.	• JIT • Simulation 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** Integration of semi-automatic lines with SPC online, data view from PLC/SCADA.	• Task allocation between humans and machines. • AI vision analyzes OP's actions. • Safety monitoring • Optimize human-machine coordination. Reduce repetitive tasks.	• Design U-line, Routing, Branching layouts.	• Measure quality with semi-automatic devices. • Manage quality data • Basic SPC to monitor process stability. • Traceability by production phase	• Machine downtime. • Basic JIT. • Basic TPM. • OEE calculations for equipment.	• 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.	Standardize operations, understand the human-machine relationship, and start learning electronic supply chain management.
1	**FATS 1** **Manual** Manual production, basic quality control, checklists, and standard inspection.	• Observation, analysis • Standardize movements, improve posture	• Small batch production management • Manual scheduling with Excel • Optimize production layout	• Manual inspection, checklists, and comparison to standard samples • Maintain quality through 5S	• 5S, eliminate wasteful actions • PDCA and Kaizen • Identify 7 types of waste.	• Manual material and inventory management • FIFO 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



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

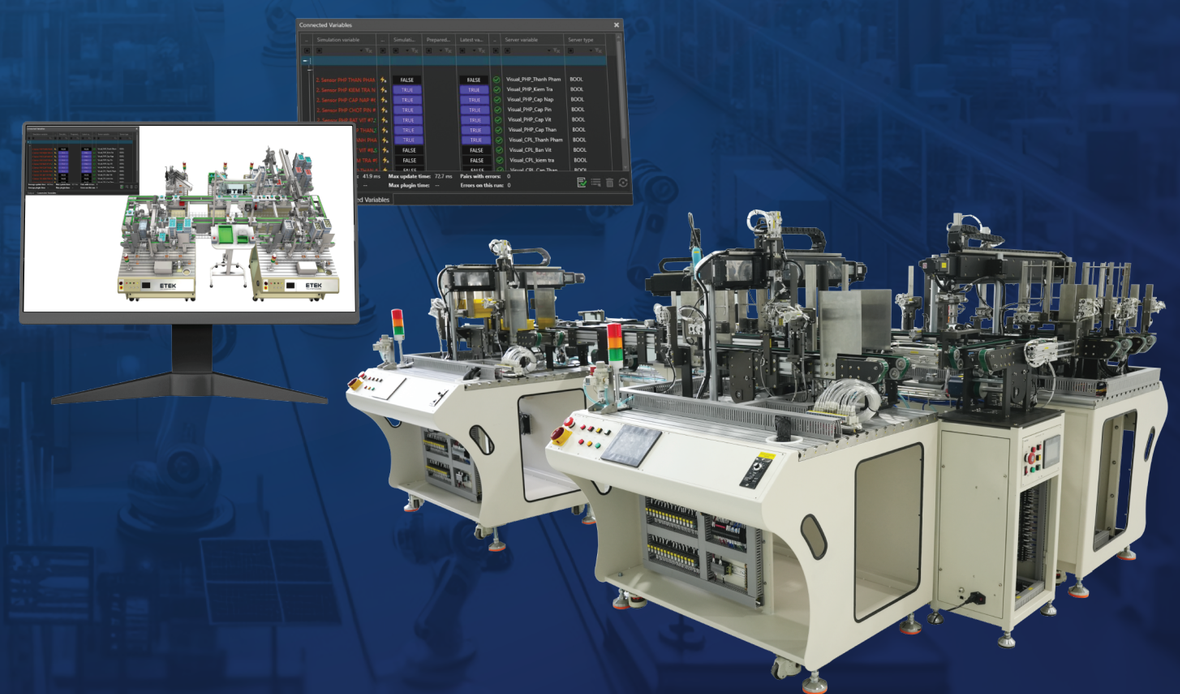
MAIN FUNCTIONS OF SCADA

- 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

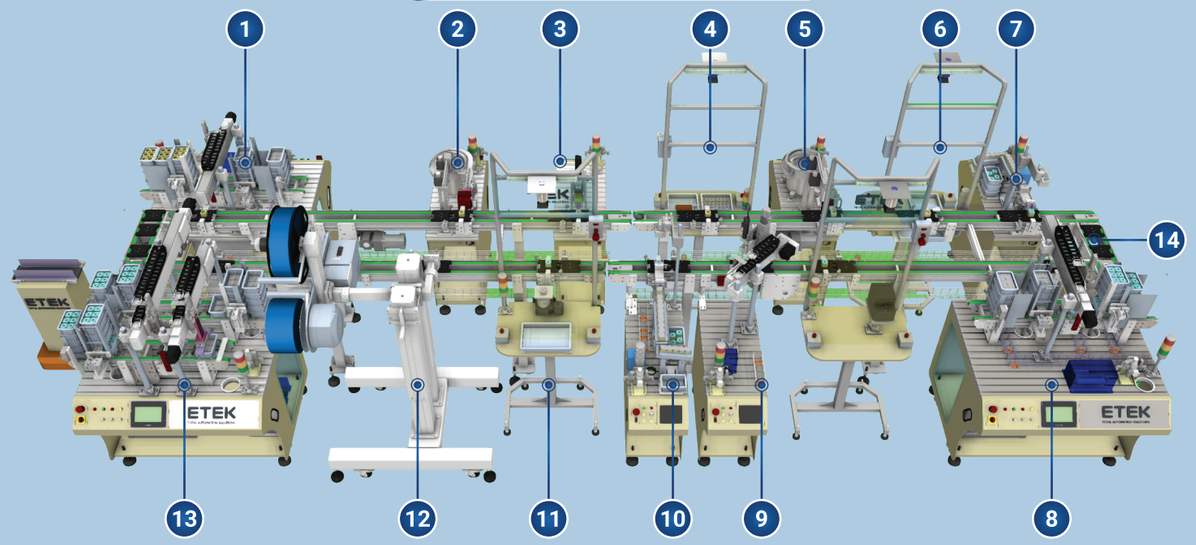
MAIN FUNCTIONS OF DIGITAL TWIN

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.



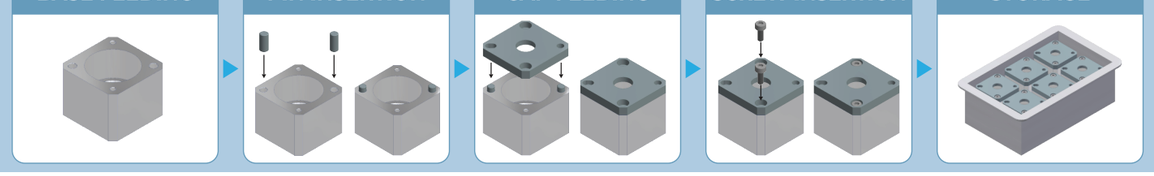
FACTORY AUTOMATION TRAINING SOLUTIONS - ST.ME.A8030

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

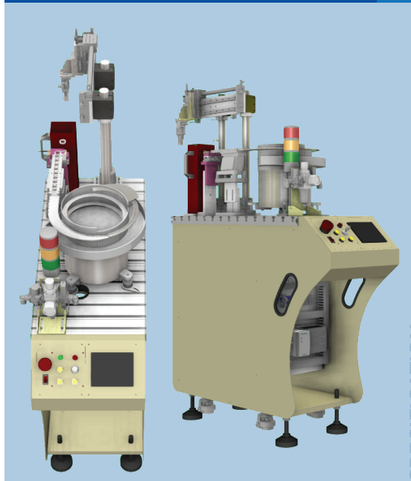


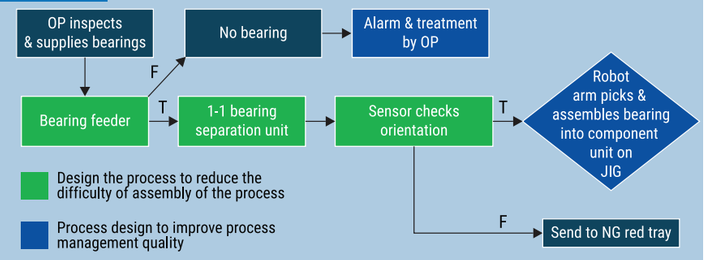
8. Cap Feeding Station
9. Screw Feeding & Fastening Station
10. Finished Product Inspection Station
11. Shaft Jamming Inspection Station
12. Markem label printing & applying station
13. Finished Product Storage Station
14. Conveyor

BASE FEEDING ▶ **PIN INSERTION** ▶ **CAP FEEDING** ▶ **SCREW INSERTION** ▶ **STORAGE**



BEARING FEEDING STATION TPAM.C8130





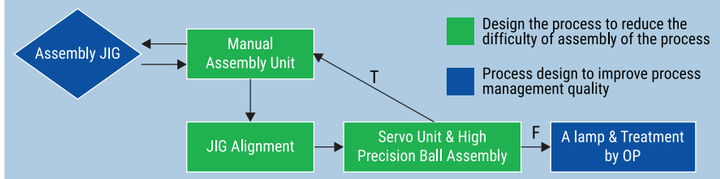
STATION 2 – BEARING FEEDING

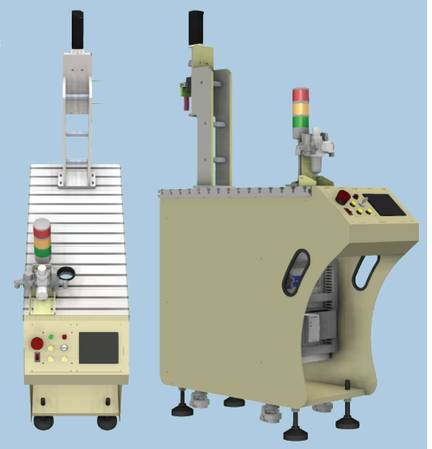
SPECIFICATION

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 bearings/min, bearings classified and supplied in one assembly orientation

TPAM.C8140 HIGH PRECISION BALL ASSEMBLY AND INSPECTION STATION





STATION 3 – BEARING ASSEMBLY

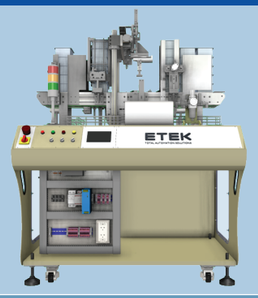
SPECIFICATION

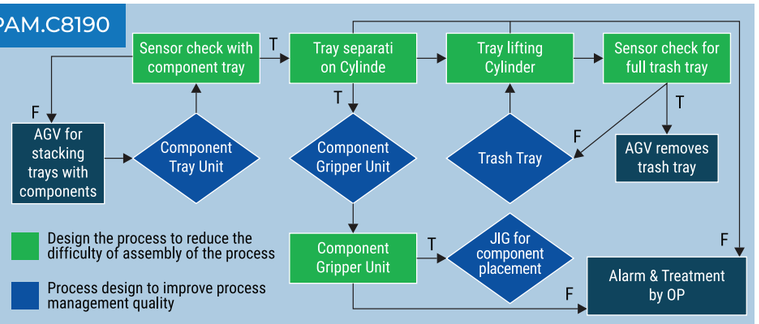
Cycle time 6s	**Number of products per Tray** 1/1

Waiting for material supply by AGV
No

Servo pressing force (compared to bearing's rated load)
Less than 1350N

BODY FEEDING STATION TPAM.C8190



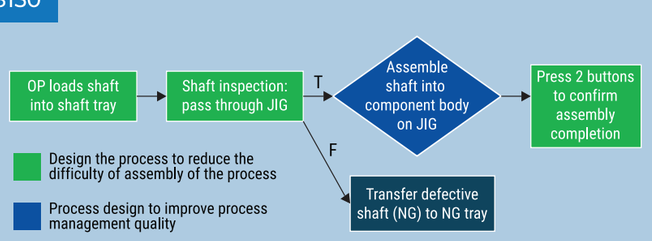


STATION 1– BODY FEEDING

SPECIFICATION

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

SHAFT FEEDING STATION TPAM.C8150



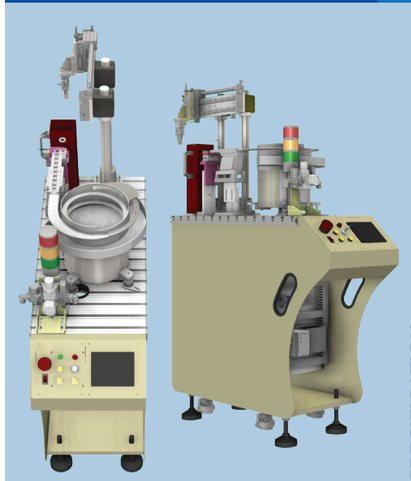
AI vision technology analyzes user operations

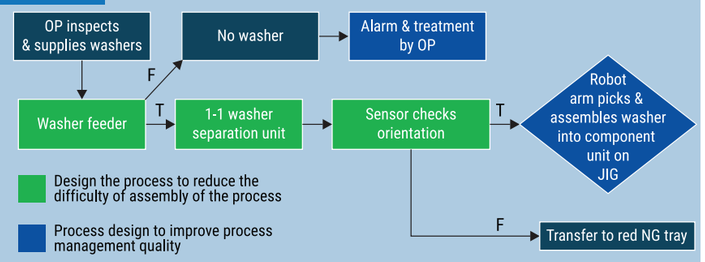
STATION 4 – SHAFT ASSEMBLY

SPECIFICATION

Cycle time 6s	**Number of products per Tray** 1/1
Feeding method Manual	**Waiting for material supply by AGV** No

WASHER FEEDING STATION TPAM.C8160





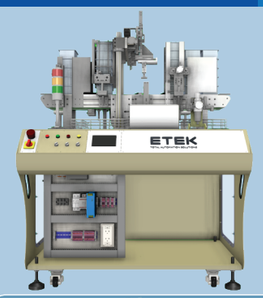
STATION 5 – WASHER FEEDING

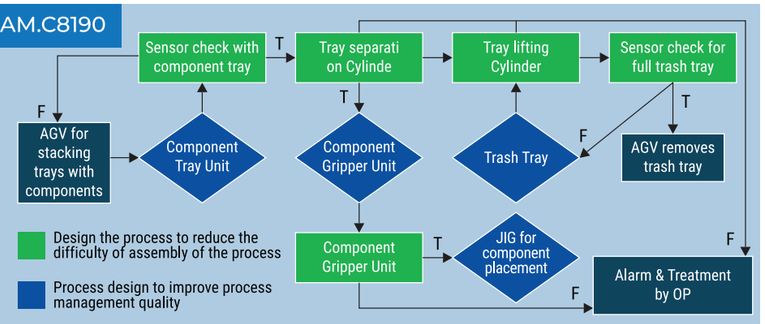
SPECIFICATION

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



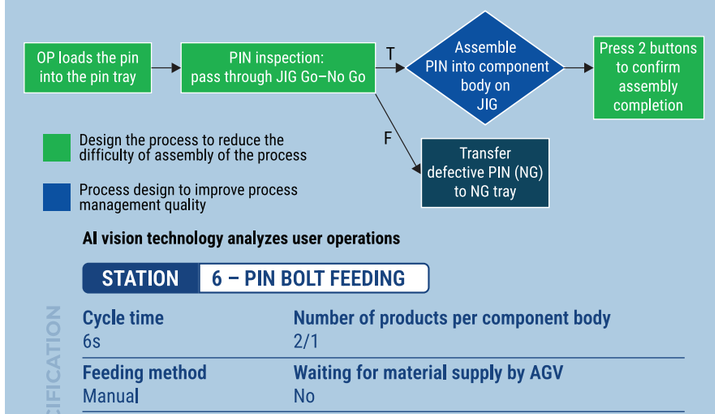


STATION 8 – CAP FEEDING

SPECIFICATION

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

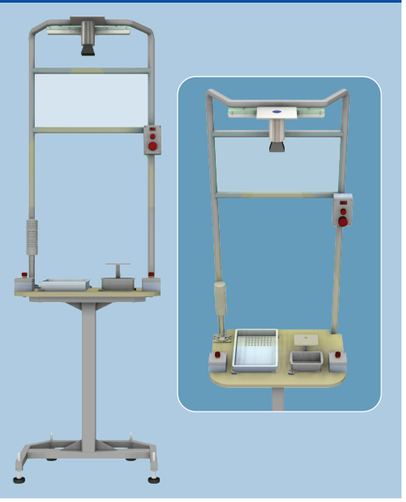


AI vision technology analyzes user operations

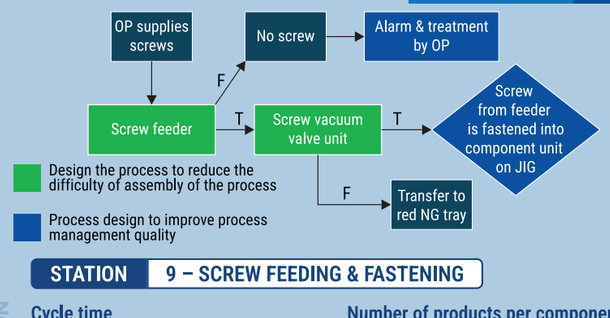
STATION 6 – PIN BOLT FEEDING

SPECIFICATION

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



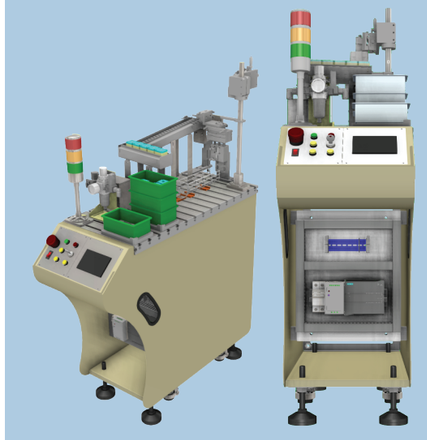
STATION 9 – SCREW FEEDING & FASTENING

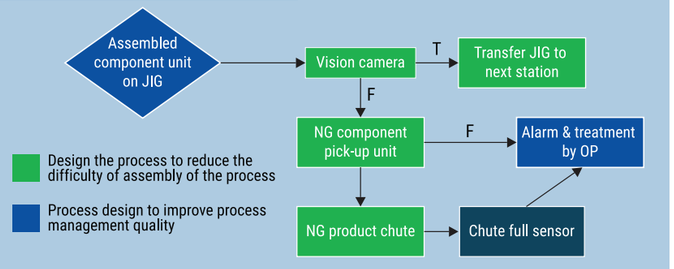
SPECIFICATION

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





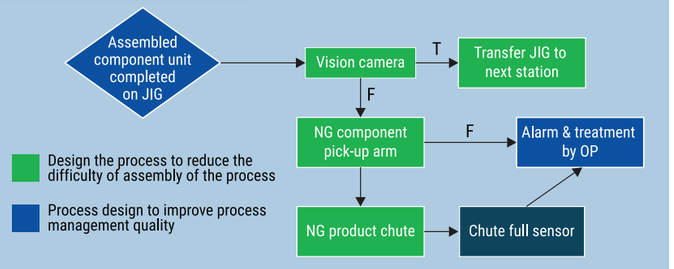
STATION 7 – COMPONENT PRESENCE CHECKING

SPECIFICATION

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



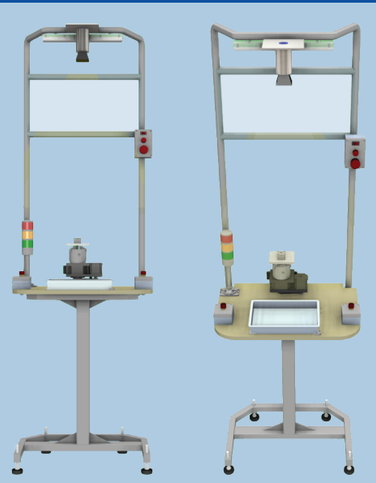
STATION 10 – COMPONENT PRESENCE CHECKING

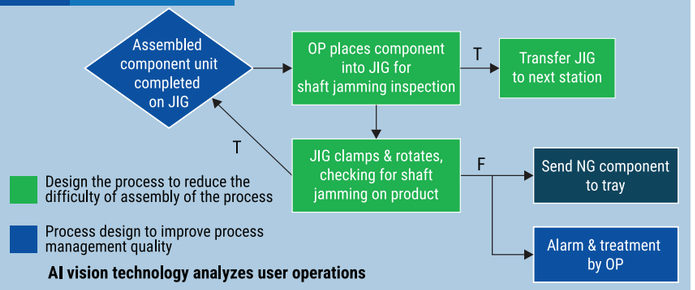
SPECIFICATION

Cycle time 6s	**Number of products** 1/1

Vision camera specifications
- Dimensional measurement
- Foreign object/appearance abnormality detection
- Character / QR code reading

SHAFT JAMMING INSPECTION STATION — TPAM.C8230





Design the process to reduce the difficulty of assembly of the process

Process design to improve process management quality

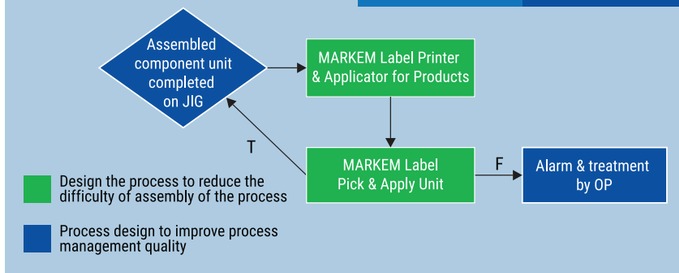
AI vision technology analyzes user operations

STATION 11 – SHAFT JAMMING INSPECTION

SPECIFICATION

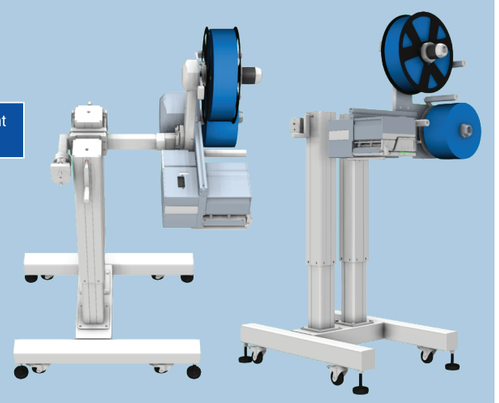
Cycle time 6s	**Number of products per Unit** 1/1
Feeding method Manual	**Waiting for material supply by AGV** No

TPAM.C8240 — MARKEM LABEL PRINTING & APPLYING STATION



Design the process to reduce the difficulty of assembly of the process

Process design to improve process management quality

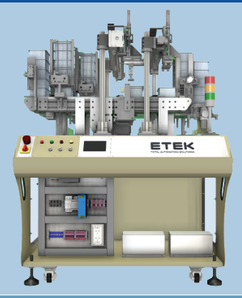


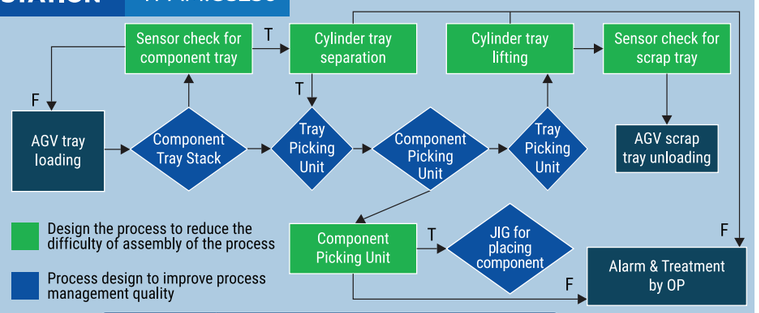
STATION 12 – MARKEM LABEL PRINTING & APPLYING

SPECIFICATION

Cycle time 6s	**Number of Products per component body** 1/1
Feeding method Manual	**Waiting for material supply by AGV** No

FINISHED PRODUCT STORAGE STATION — TPAM.C8250





Design the process to reduce the difficulty of assembly of the process

Process design to improve process management quality

STATION 13 – FINISHED PRODUCT STORAGE

SPECIFICATION

Cycle time 10s	**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

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, 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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