

Revision No: 06
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MECHATRONICS AND FLEXIBLE PRODUCTION TRAINER

MODEL: MCTR-08



FEATURES

- Prepares trainees for demands of industry
- Planning, assembly, programming, troubleshooting of various complexity is taught
- Modular and scope for further expansion
- Electro mechanical system with PLC control

DESCRIPTION

This is one of the most comprehensive Mechatronics training aid available on horizon. The broad spectrum of technology covered makes it one of the best training aid available in the industry today.

There are multiple stations (modules). Each module can be purchased individually with possibility to expand to other module in future. These modules can be used individually or all together.

1. Vessel Feeding Station
2. Vessel Inspection Station
3. Processing Station
4. Sorting And Stacking Station
5. Batch Process Station
6. Linear Transport Station

Entire system is controlled by PLC. Optionally a SCADA system can be integrated with the entire plant. The plant enables students to understand application of PLC and Mechatronics by way of batch process and material handling system. It incorporates various mechanical, pneumatic, electro-pneumatic and electronic components. The entire system is controlled by a PLC.

Two options of control schema are available,

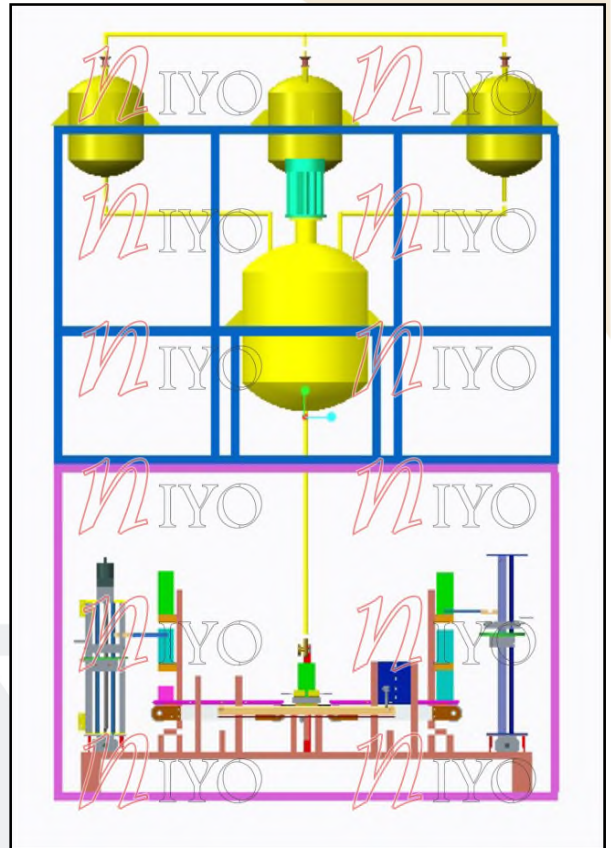
1. Combination of Remote and Local panel
2. Only local panel

VESSEL FEEDING STATION (MCTR08-A)

Here a vessel is randomly picked and placed on a linear transport station using electro pneumatic pick and place arrangement having 5 axis of movements. Different types of vessels are available.

This station consists of,

- Vessel stacking stand
- Sensor kit consisting of,
 - Capacitance type proximity sensors
 - Limit switches
 - Photo interrupt type proximity sensors
 - Inductive type proximity sensors
 - Reed switches
- Pneumatic gripper, pick and place with rotary and linear movement
- Solenoid valves
- Electrical motors with linear movement
- Rod-less pneumatic cylinder
- Vessels: MOC SS and Acrylic
- Electrical connection rack



Vessel INSPECTION STATION (MCTR08-B)

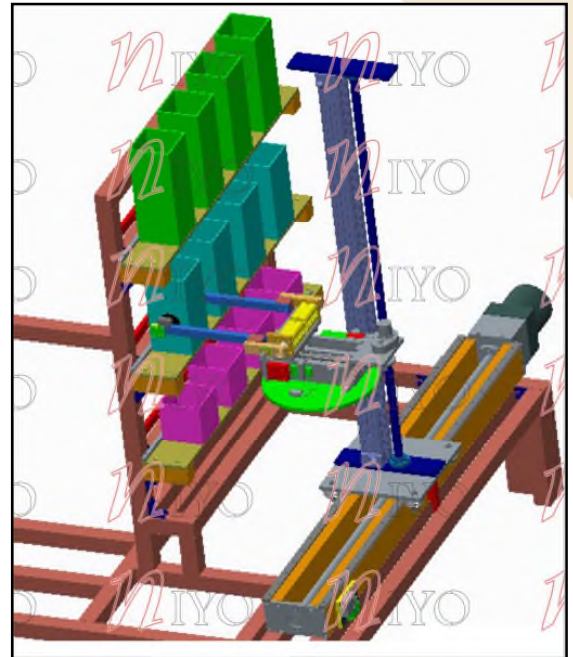
Here the vessels are machine-inspected for various aspects like color, defects, size and material of construction. All this is done on a running linear transport station. Depending on the requirement, the vessels are either rejected or used for further processing.

The vessels are transferred to processing station based on the above inspection. This station consists of,

- Sensor kit consisting of,
 - Capacitance type proximity sensors
 - Photo interrupt type proximity sensors
 - Inductive type proximity sensors
 - Colour Identifier sensor
- Mechanical structure
- Electrical connection rack

PROCESSING STATION (MCTR08-C)

Those vessels that pass through the inspection station are transferred here using electro pneumatic pick and place arrangement having 3 axis of movements. Here the vessels are filled with liquid that is supplied from Batch Process station. The volume of liquid is determined by program based on the results of inspection station.



This station consists of,

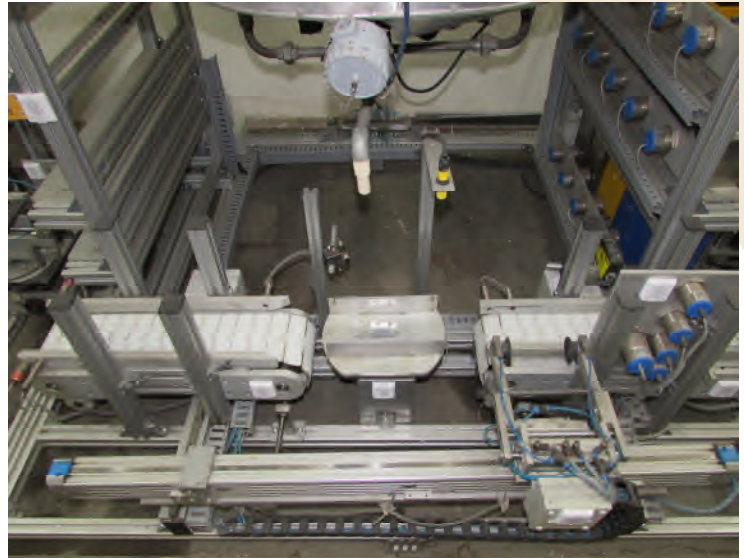
- Sensor kit consisting of,
 - Capacitance type proximity sensors
 - Inductive type proximity sensors
 - Ultrasonic level sensor with analog output
 - Reed switches
- Rotary indexing table
- Pneumatic gripper, pick and place with linear movement
- Rod-less pneumatic cylinder
- Pneumatic cylinders
- Solenoid valves
- Mechanical structure
- Electrical connection rack

SORTING AND STACKING STATION (MCTR08-D)

The processed vessels are picked up from the processing station and transferred to a linear transport station. From here, the vessels are picked and neatly stacked for final dispatch to the customer. This process is carried out by an electro pneumatic pick and place arrangement having 5 axis of movements.

This station consists of,

- Sensor kit consisting of,
 - Capacitance type proximity sensors
 - Photo interrupt type proximity sensors
 - Inductive type proximity sensors
 - Limit switches
- Linear transport station consisting of,
 - Mechanical base made of extruded aluminium
 - Drum, 2 Nos (MOC: Aluminium)
 - Belt
 - Electrical motor and reduction gear box
 - Electrical connection rack
- Pneumatic gripper, pick and place with rotary and linear movement
- Electrical motors with linear movement
- Mechanical structure
- Electrical connection rack
- Electrical motor
- Rod-less pneumatic cylinder
- Storage Rack made of Aluminium



BATCH PROCESS STATION (MCTR08-E)

This consists of a plant to demonstrate a batch process and its control. Liquid is stored in three different tanks. Based on the requirement, different proportion of the liquid is mixed and processed in the reactor. Reactor is a vessel with a stirrer.

This station consists of,

- Storage tanks, MOC: SS, 3 nos.
- Batch reactor, NOC: SS
- Stirrer
- VFD
- Temperature sensors
- Solenoid valves
- Piping
- Mechanical stand structure

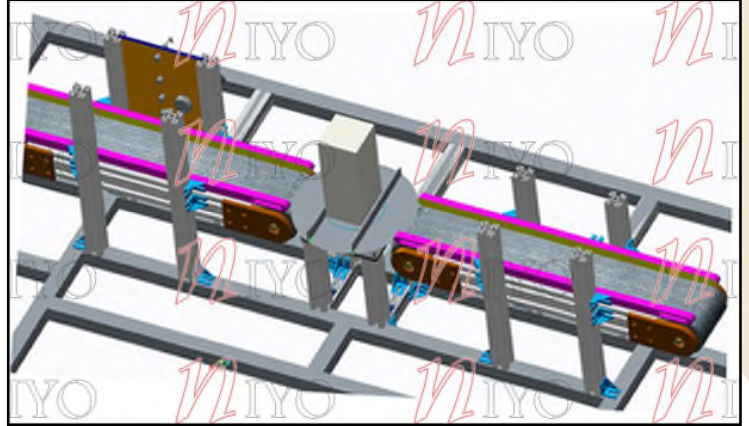


LINEAR TRANSPORT STATION (MCTR08-F)

Linear transport station transports vessels from feeding station to processing station. Inspection station is mounted on this station.

This station consists of,

- Mechanical base made of extruded aluminium
- Drum, 2 Nos (MOC: Aluminium)
- Belt
- Sensor kit
- Electrical motor and reduction gear box
- Electrical connection rack



CONTROL PANEL

The entire plant is operated using a PLC. There is an option of placing the panel in a remote location. In that case a local panel is also supplied. If only one panel configuration is selected, the control panel is placed near the plant.

- Local Control Panel
- Remote Control Panel with SCADA

The control panels are made of MS CRCA Sheet, powder coated with Siemens Gray shade. The panel has facility to keep PC with Monitor and keyboard. A Mimic depicting entire system is fixed on the panel. Live status of important parameters are indicated on the Mimic.

Selector switches are provided on the panel to select Local/Remote mode, Auto/Manual mode, etc.

PLC

PLC supplied has sufficient number of digital as well as analog input and output to operate all the supplied stations. PLC has Ethernet port and operates on 24 V DC. Software (single license) for PLC programming is also supplied.

SCADA SYSTEM

User has an option of a SCADA system to be integrated with the above system. This is supplied with monitor, necessary software and control panel.



OPTIONAL ADDITIONAL

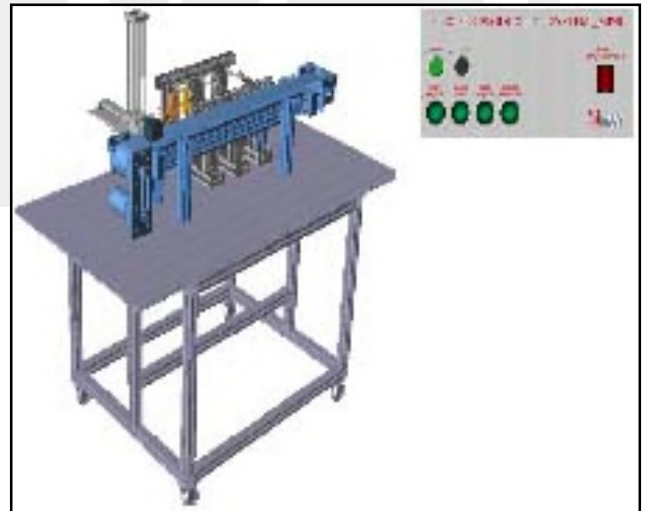
- SCADA system
- Computer
- Air compressor
- Standalone software
- Hardware to interface software with physical system

INSTRUCTION MANUAL

Self explanatory operating manuals are provided with each system. Detailed theory as well as practical exercises are also included in the manual.

SERVICES REQUIRED

- Pneumatic Air Supply
- Power Supply
- Water supply



(1) Since research and development is an on-going activity, the specifications mentioned herein are subject to change without notice
(2) Photographs are indicative only.

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