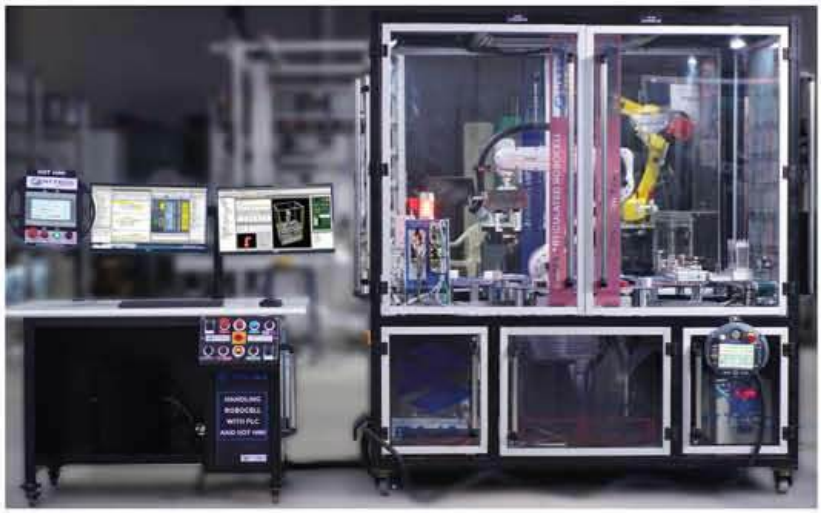
HANDLING ROBOCELL WITH PLC AND IIOT



Hytech Didactic Advance Robocell is an industrial robotic training cell with PLC and IIOT. Mounted on a mobile structure of mild steel, the robocell is equipped with castor wheels and antivibration mounts for high speed applications. Worksurface is made up of aluminum extrusions covered from all four sides with polycarbonate based doors for maximum visibility. Separate Central Control Unit with PLC and IIOT is provided with the training cell with Profinet communication.

Robot in Hytech Didactic Advance Robocell is an industrial 6 Axes articulated robot with minimum reach of 700mm and payload capacity of 7 KG. End effector is electrically actuated. Communication between Robot Controller and machine control panel is via profinet. Various sensors such as colour sensor, photo sensor communicate with PLC through io link protocol.

Smart Light through i-o link communication provides industrial experience to users. Central Control Unit is equipped with PLC, IIOT HMI, Workstation and Robot Simulation software. Communication between Central Control Unit and Robot is via profinet and i-o link.

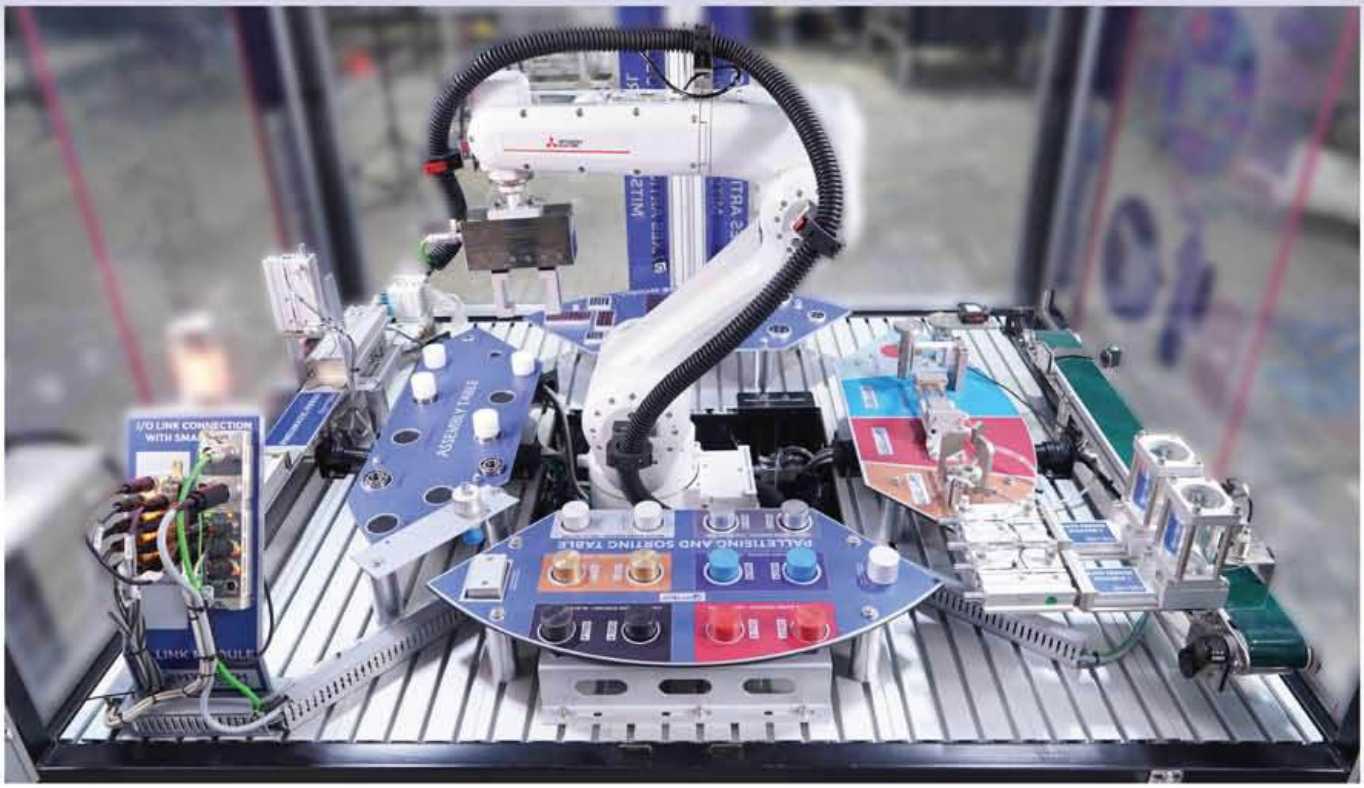
i/o Link Communication and Smart Light

Various sensors used in Robocell such as colour sensor and Photo sensors are with i/o link communication. i/o link master and hub provide ease of expansion as well as integration of additional sensors as well as other automation basedcomponents.

Smart light with i/o link communication can provide industrial experience and users can utilise various colours to represent various processes of handling robot.

Conveyor and Auto Feeder:

Conveyor with a speed control mechanism is equipped with two separate auto feeder systems. User can utilize pneumatically actuated auto feeders for colour based and load based sorting applications. User can also utilize conveyors for vision based and palletizing applications.



KEY PARAMETERS OF HANDLING ROBOCELL:

Industrial Handling Robot	PLC Based remote operation of a Robot
Industrial Vision Sensor	Integration of Robot – PLC and IIOT BHMI
Industrial Gripper	Color based sorting
Bearing Assembly Application	Weight based sorting
Palletising application with photosensors	Conveyor with auto feeders
Pneumatic Solenoid Valve Bank	Smart light with i/o link connectivity

Central Control Unit:

Central Control Unit with PLC and IIOT HMI along with Computer Workstation is provided with Advance Robocell. User can operate the entire training cell directly from PLC and IIOT.

This architecture provides necessary industrial exposure to users where most of the Robots operate with PLC integration.

IIOT interface can be utilised for data collection as well as remote operation and diagnosis.

Offline Programming software installed on the workstation can be utilised as a digital dynamic twin as well as for creating offline robotic programs.

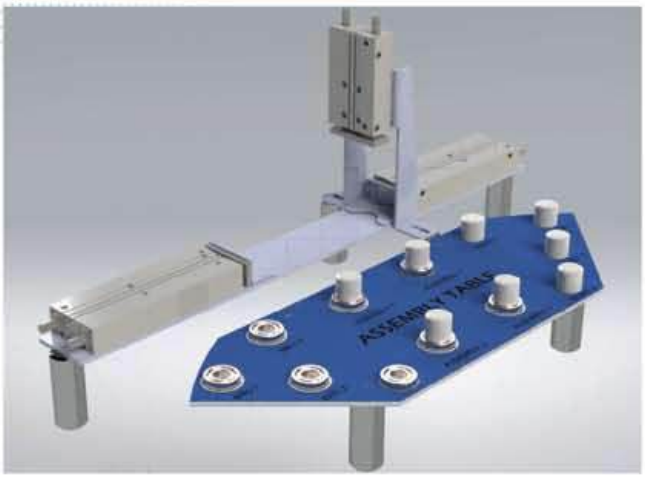
MAJOR COMPONENTS:	MAJOR TRAINING EXERCISES:
Robot: Mitsubishi 8 CRL / Fanuc LR Mate	Operation of Industrial 6 Axes Robot through Teach Pendant
PLC: Siemens S7 1200 / Mitsubishi FX5	Simulation of Industrial 6 Axes Robot in ROBOT Simulation software
IIOT: 7 inch touch screen HMI with IIOT Gateway	Integration of PLC – IIOT HMI and Robot
Vision System: COGNEX / BALLUFF	Colour based sorting with PLC and Robot
End Effector: SCHUNK (Electrical Gripper)	Weight based sorting with PLC and Robot
Communication: i/o Link and Profinet	Vision Sensing operation in integration with PLC and IIOT
Colour Sensor: i/o Link Based Teachable Color Sensor - 3 Colours	Vision based sorting applications
Load Cell: Load Cell with Analog Output	Assembly application with PLC and Robot
Conveyor: Conveyor with minimum 600 mm travel	Palletising operations
Auto Feeder: Pneumatic Auto Feeder	Palletising with Colour based sorting
	Machine tending applications with machine vice and machine chuck

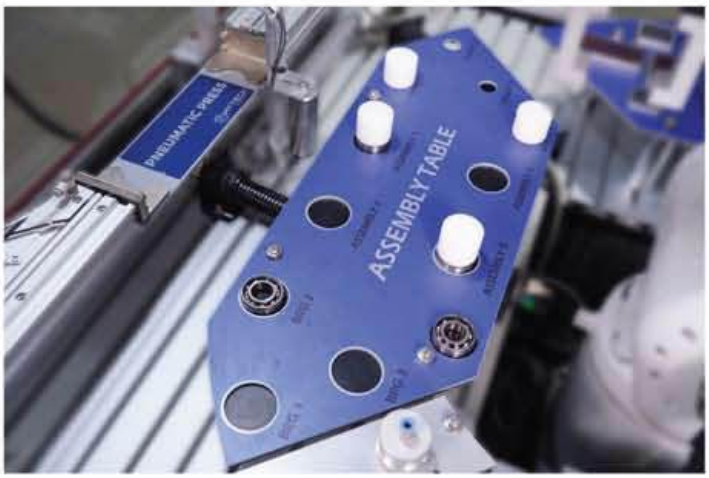
PALLETISING AND SORTING TABLE:

Palletising and Sorting table is provided with 16 round cells which can be utilised to pick and place round jobs which are provided along with the robocell. Each of the pocket is equipped with photo-sensor which gives dynamic feedback about the occupancy status of each cell.

This table can be utilised for sorting and palletising based on the weight as well as colours of the jobs. Pockets for machine tending jobs are also provided on this table.

ASSEMBLY TABLE:

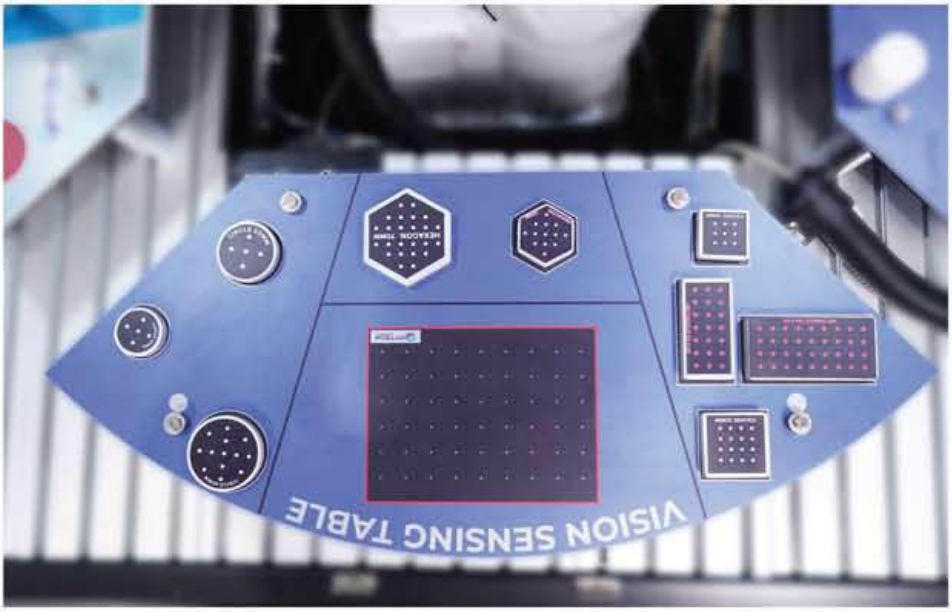




Assembly table is provided with an assembly module which can assemble bearings and shafts. Robot is supposed to pick up a bearing and place it in the press station. Then, robot should pick up the shaft and place it on the top of bearing. Bearing and shaft then should be transported under the press cylinder with slide cylinders. Press cylinder should carry out the assembly and the slide cylinder should transport the assembled piece back to Robot pick up position. Robot should then pick up the assembled job and place it on the table.

Solenoid valves which are provided for this table are operated through PLC. User should integrate PLC output to operate the press module cylinders and take feedback from reed switches to carry out the robotic press applications efficiently.

VISION INSPECTION TABLE:

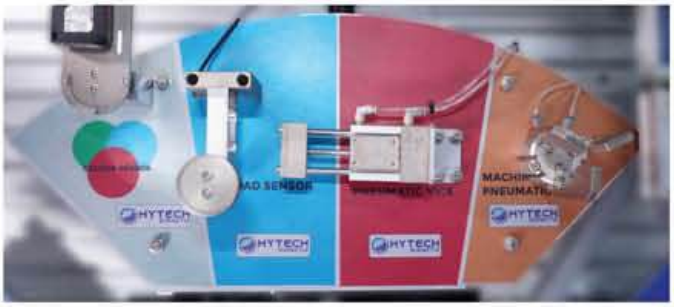


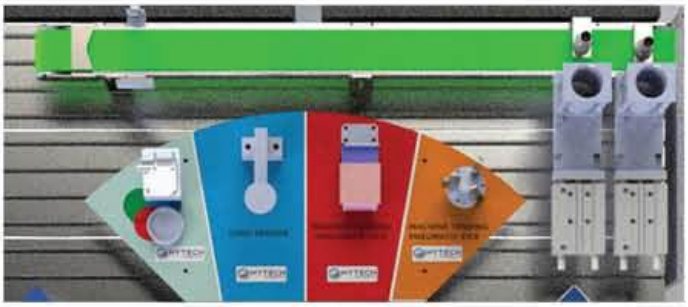
Vision Inspection table is equipped with Cognex vision sensor which can be taught to sense different shapes and provide feedback to Robot Controller / PLC.

Vacuum clamp with vacuum generator is provided which can be utilised as an end effector to pick different shapes.

User is expected to program a robot to pick up different shapes from vision sensing zone and place these shapes in their respective slots automatically.

MACHINE TENDING AND COLOUR BASED – WEIGHT BASED SORTING TABLE:





Machine Tending and Sorting Table is equipped with Pneumatic Vice, Pneumatic Chuck, Colour sensor and load cell with amplifier. User can carry out machine tending application with chuck and vice.

Colour sensor as well as load cell coupled with a conveyor can provide automation experience in palletizing and sorting applications based on colour and weight of the job.

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Conveyor module with 2 auto feeder systems:

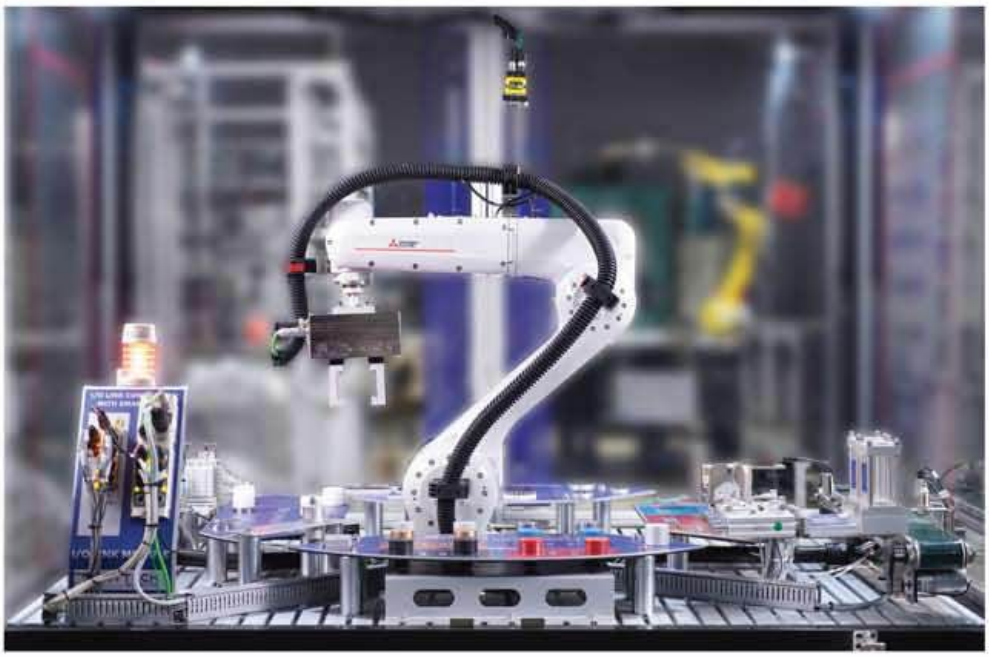
Conveyor module can be utilised for palletising, colour sensing as well as load based sensing applications. User can utilise auto feeder stations for various applications depending upon the requirements.

Colour Sensing Modules:

Colour sensor can be taught to sense three different colours and provide three different digital outputs to PLC. Raw jobs of three different colours are provided which can be utilised to carry out colour based sorting experiments along with palletising.

Weight based / load based sorting module:

Load cell with load cell amplifier can be utilised to provide analog signal to PLC depending upon the weight of the job. Jobs of three different weights are provided which can be utilised to carry out load based sorting applications.



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