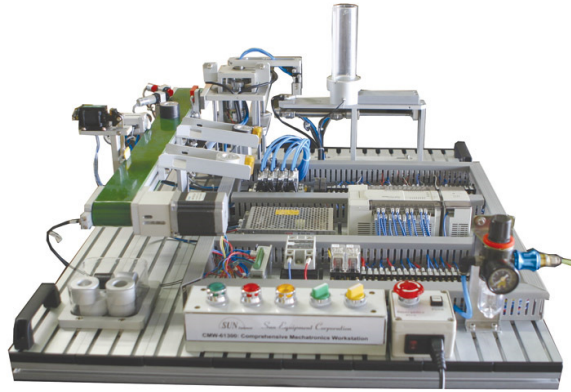


## **Comprehensive Mechatronics Workstation: CMW-61300**



### **Features**

#### **\* Innovation:**

The most comprehensive mechatronics workstation for students to learn all required control concepts.

#### **\* Hands-on Industrial Practice:**

Experience learned from this station is more than 3 traditional mechatronics control stations can provide. An excellent value based on the cost. Sensors come with indicator lamps for faulting and troubleshooting functions.

#### **\* Covered Training Elements:**

Pneumatic Actuator, Electro-pneumatic valves, PLC, Stepper Motor, AC Solenoid, Power supply, Conveyor belt, DC Gear head motor, Pick and Place Arm with gripper, Material hopper, Sensors (proximity, optical, inductive/reductive, microswitch), Control interface devices (Electro-magnetic relays, solid-state relays), faulting, and Troubleshooting

#### **\*The overall operation of this comprehensive mechatronics workstation performs the following tasks:**

1. Material hopper provides a workpiece from a magazine
2. Sensor issues an error signal if no part is present
3. Pick and place arm moves into position to grab workpiece
4. Gripper fingers grab workpiece
5. Arm lifts workpiece from the material hopper
6. Arm rotates
7. Arm places workpiece over conveyor belt
8. Gripper fingers release workpiece on to belt
9. Conveyor belt moves workpiece
10. Sensor determines if the workpiece is of plastic or metal material
11. Sensor determines the color of the workpiece
12. Workpieces are sorted by material type and color
13. One type is diverted off the conveyor belt into the slide #1
14. Second type is diverted off the conveyor into the slide #2
15. The other type runs to the end of belt and drops into the end bin
16. Sensors verify all workpieces have dropped

## **Specifications**

### **A. Control Unit:**

1. Mitsubishi FX 2N-32 MR PLC Controller (Siemens and Allen Bradley PLC's available)
2. Main Unit I/O control points: 24 inputs/ 16 outputs
3. 8K words memory (extensible to 16K words)
4. RS-232/ or RS-422
5. 16 Input LED Indication lights, 16 Output LED Indication lights
6. 2 "25-pin D-Shaped" communication connectors for I/O between PLC and mechanism
7. Power Unit (input : 110/ 220VAC , output: 24VDC), emergency break and fuse protection
8. 3 Control Buttons: Start (Green), Stop (Red), Reset (Yellow)
9. 3 Control Modes: Continue, Single Cycle, Stepping

### **B. Mechanism:**

1. Distribution:
  - a. A magazine (I.D.: 40mm O.D. 50 mm) accomodates 7 work pieces
  - b. Aluminum magazine base has a separate type fiber optical sensor installed at the bottom
  - c. A double-acting pneumatic cylinder ( $\phi$ €16 x 100 ST mm)
  - d. The cylinder comes with 2 speed control valves and 2 reed switches
  - e. A micro switch
  - f. 6 pieces of a work piece made out of plastic and aluminum, 3 different colors
2. Pick & Place Arm:
  - a. €A Vertical 2-rod cylinder ( $\phi$  25 x 50 ST mm) comes with 2 reed switches, 2 speed control valves
  - b. Driven by a DC gear head motor, controlled by an electro-magnetic relay
  - c. Proximity switch )provides the origin index as the reference for the stepper motor)
  - d. Gripper powered by pneumatics
3. Conveyor Belt:
  - a. Stepper motor, 9 kg-cm torque, 0.225 degree/step, DC 24V input
  - b. The width of the conveyor belt: 40 mm ( 1.5 ")
  - c. An inductive proximity switch (DC 24V, 10 mA, NPN)
  - d. A reluctive proximity switch (DC 24 V, NPN)
  - e. AC solenoid mechanism, solid-state relay works as the control interface
  - f. A separate type photo-electric sensor
  - g. Two fixed-focus reflective photo-electric sensors
  - h. A diffuse reflective fiber optical sensor
4. 3-point Assembly:
  - a. Air filter: 40  $\mu$ ,  $\phi$  1/4" connector
  - b. Pressure regulator, 0 ~ 10 kgs/cm2, 15 kgs/cm2 (Max.)
  - c. Air pressure input sliding switch
5. Electro-Pneumatic Valves:
  - a. DC 24 V, 0.55 W, indicator lights, voltage overload protection circuit
  - b. An electronic, 5 ported, 2-way, single-acting valve
  - c. An electronic, 5 ported, 2-way, double-acting valve
  - d. An electronic, 5 ported, 3-way, center closed valve
  - e. 3-in-1 valve housing
6. Aluminum Platform:
  - a. Size: 34" x 30" (86cm x 76 cm)
  - b. Weight: 88 lbs (40 Kgs)
  - b. T shaped slots 30 mm apart, bolt can sustain up to 150 kgs/ cm2