

CHAPTER

11

VARIABLE MECHATRONICS SYSTEM (VMS)

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Variable Mechatronics System (VMS)

What does VMS stand for?

Variable Mechatronics System

VMS is a training system designed to teach the advanced technologies of the FMS and to further develop mechatronics experts. VMS consists of modules for easy assembly/disassembly.

The system is expandable, and allows trainees to realistically simulate situations in an increasingly complicated industry.

VMS allows a simple or complicated configuration of process and system to suit the ability of the trainees. A variety of workplace practices including design, assembly, programming, operation, maintenance, and repair, are available in VMS. In addition to teaching mechatronics, VMS provides an environment which integrates and develops project-based personal skills such as teamwork, cooperation, unique design and comprehensive analysis.

Training purpose

- Work Plan
- Assembling Machines and Systems
- Programming
- Control and Operation
- Maintenance
- Troubleshooting

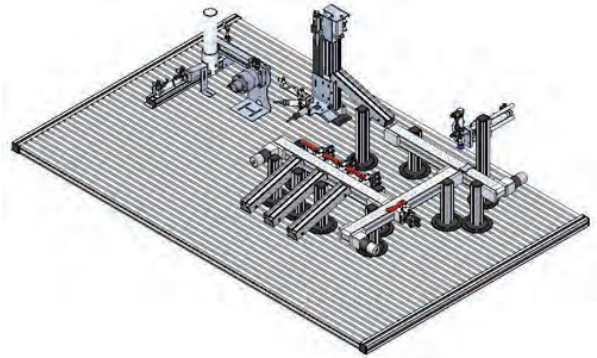
Training purpose

VMS includes processes with different operating conditions and scenarios. A variety of configurations and combinations of processes are available to meet the user's needs. It is possible to customize the practice equipment from module and a single process to the integrated processes.

Distribution process	Sequentially distributes the workpieces stored in a magazine.
Testing process	Determines the material, color and height of workpieces.
Processing process	Uses a rotary index table to process the workpieces, and test the processing condition.
Handling process	Pneumatic actuators arranged on orthogonal axis delivers the workpieces to the next process.
Buffer process	Controls the flow of workpieces for a flexible operation between the stations based on the waiting time and operating time.
Sorting and storing process	Sorts and stores the workpieces into slider or warehouse based on the information of workpieces.

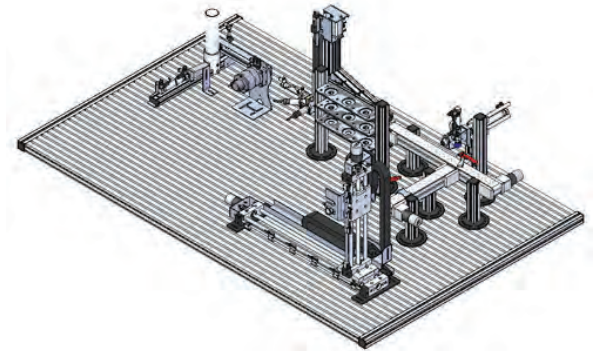
VMS Scenario 1

Distribute work piece → Rotary cylinder transfer → Test lifter → Slider → Conveyor → PTP → Conveyor → Sorting (3 type)



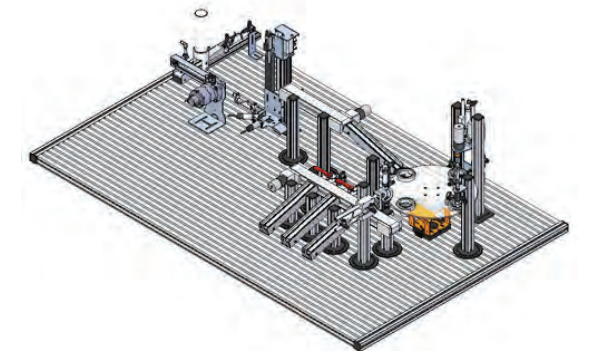
VMS Scenario 2

Distribute work piece → Rotary cylinder transfer → Test lifter → Slider → PTP → Conveyor → Stacker crane → AS/RS (3 type)



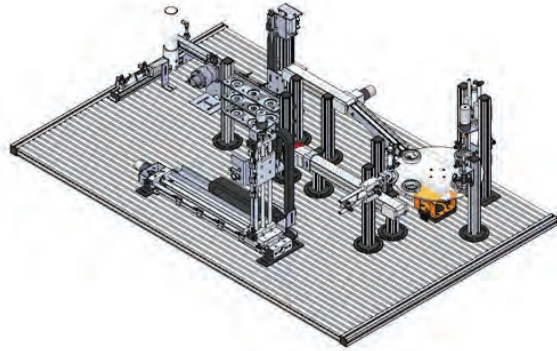
VMS Scenario 3

Distribute work piece → Rotary cylinder transfer → Test lifter → Conveyor → Slider → Indexing (Drilling + hole testing) → PTP → Storing (3 type)



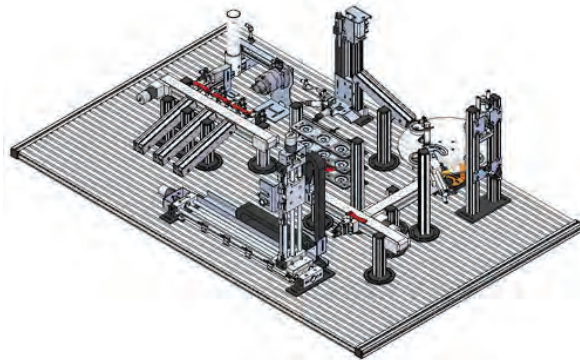
VMS Scenario 4

Distribute work piece → Rotary cylinder transfer → Test lifter → Conveyor → Slider → Indexing (Drilling + hole testing) → PTP → Conveyor → Stacker crane → AS/RS



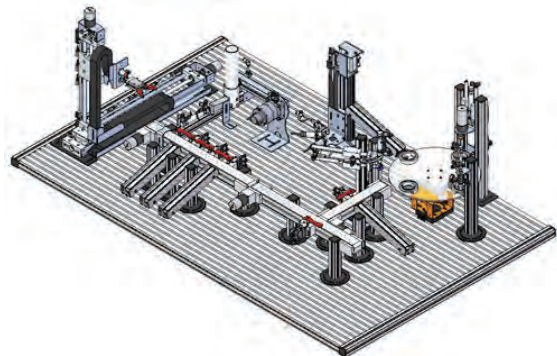
VMS Scenario 5

Distribute work piece → Rotary cylinder transfer → Test lifter → Slider → Indexing (Drilling + hole testing) → PTP → Conveyor → Stacker crane → AS/RS (storing) → Sorting conveyor (unstoring)

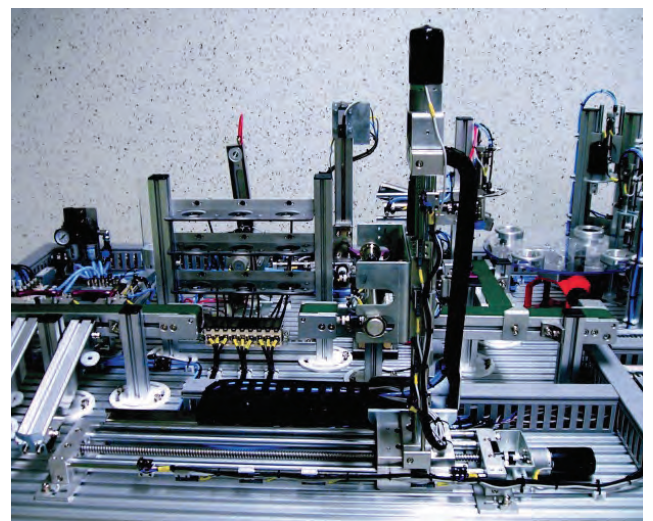
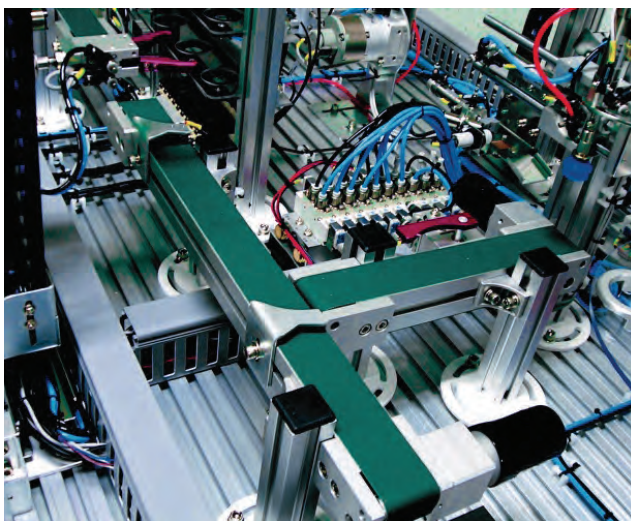


VMS Scenario 6

Distribute work piece → Rotary cylinder transfer → Test lifter → Conveyor → Slider → Indexing → PTP → Conveyor → Storage → Stacker crane → Distribute work piece



VMS training room in HYUNDAI and KIA Motors



Components

Working table

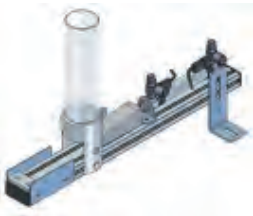
Order number : 11003



- Table Size : 1500(L)×750(W)×800(H)mm
- Profile panel Size : 1500(W)×750(D) mm
- Groove : 25 mm
- Composition : Table frame : 1EA
cabinet(4 drawers) : 1EA
Caster with brake : 4EA

Distribution module

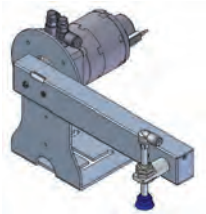
Order number : 32001



- Work piece magazine : tower type, transparent
- Double-acting cylinder (flow control valve, reed switch attached)
- Optical fiber sensor
- Module fix bracket

Rotary transfer module

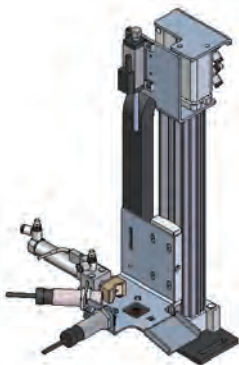
Order number : 32002



- Distribution/ take work piece with 180 ° rotary transferring
- Magnetic reed switch for cylinder attachment
- Level spring (vacuum pad attached)
- Vacuum valve
- Moving angle : 180 °

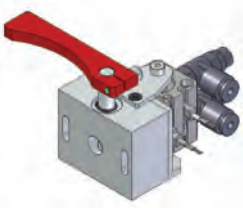

Testing module

Order number : 32003








- Height of work piece
- Extraction cylinder ($\varnothing 16-60$) : reed switch attached
- Rodless cylinder ($\varnothing 10$) : twin-rod type (rotary protection)
- Leaner potentiometer (inductive sensor)
- Photo sensor : M18
- Capacitive sensor : M18

Components

<p>Conveyor module 1</p>	<p>Order number : 32008</p>
	<ul style="list-style-type: none"> ● DC geared Motor : DC 24V/ 2000 RPM ● Belt type conveyor : width 50mm ● Profile frame
<p>Conveyor module 2</p>	<p>Order number : 32009</p>
	<ul style="list-style-type: none"> ● DC geared Motor : DC 24V/ 2000 RPM ● Belt conveyor : width 50mm ● Profile frame
<p>Branch cylinder module</p>	<p>Order number : 32011</p>
	<ul style="list-style-type: none"> ● Double-acting cylinder with flow control valve ● Magnetic reed switch ● Linear to rotate switching device
<p>Slider module</p>	<p>Order number : 32010</p>
	<ul style="list-style-type: none"> ● Aluminum profile : END CAP included ● Profile fixer : $\Phi 100 \times 5t$ ● L-bracket for position control ● Slider : Aluminum, 30×30×200 mm ● Slider cover

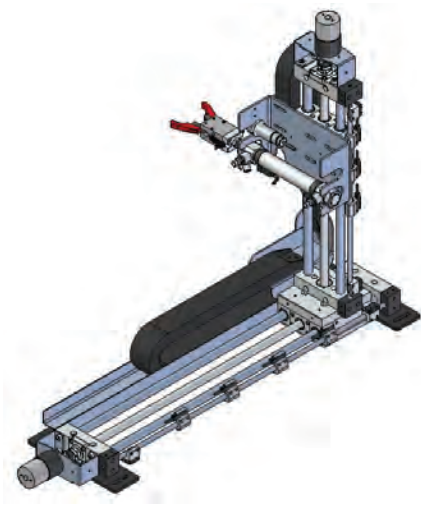
Components

<p>Indexing module</p>	<p>Order number : 32004</p>
 <p>A circular indexing table with four ports around its perimeter, mounted on a yellow and black base.</p>	<ul style="list-style-type: none"> ● Indexing table motor : DC24V geared motor ● Motor protection circuit included ● Index : 4 divided gear ● Type : Geneva gear ● Inductive sensor, photo sensor
<p>Drilling module</p>	<p>Order number : 32005</p>
 <p>A vertical drilling mechanism with a clamping cylinder and an up-down cylinder, mounted on a black base.</p>	<ul style="list-style-type: none"> ● Drill Motor : DC24V motor ● Clamping cylinder : $\Phi 10 \times 20$, reed switch (2ea) ● Up-down cylinder : rotate protection type ● Frame : 30×30mm Aluminum profile
<p>Hole testing module</p>	<p>Order number : 32006</p>
 <p>A vertical testing mechanism with a double-acting cylinder and a sliding type, mounted on a black base.</p>	<ul style="list-style-type: none"> ● Double-acting cylinder : $\Phi 10 \times 30$ ● Sliding type (height adjustable) ● Detecting drilled work piece ● Frame : 30×30mm Aluminum profile
<p>PTP handling module</p>	<p>Order number : 32007</p>
 <p>A PTP (Pick and Place) handling mechanism with horizontal and vertical transfer cylinders, mounted on a black base.</p>	<ul style="list-style-type: none"> ● Horizontal transfer cylinder : twin rod $\Phi 10 \times 75$ ● Vertical transfer cylinder : $\Phi 16 \times 50$ ● Reed switch attached (movement detecting) ● Level spring (vacuum pad attached)
<p>Conveyor sorting module (3 type)</p>	<p>Order number : 32106</p>
 <p>A conveyor sorting mechanism with a belt conveyor, cylinder, aluminum profile, profile fixer, L-bracket, slider, and slider cover.</p>	<ul style="list-style-type: none"> ● Belt conveyor included ● Cylinder : $\Phi 16 \times 10$ ● Aluminum profile : END CAP included ● Profile fixer : $\Phi 100 \times 5t$ ● L-bracket : for position control ● Slider : Aluminum, 30×30×200 mm ● Slider cover

Components

Stacker crane module

Order number : 32012



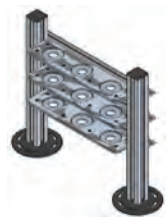
- X-axis
 - Type : ball screw type
 - Movement : 600mm, speed : 1200 mm
 - Position detection sensor : 7 ea
 - Photo sensor : DC24V, 30 mA
 - T type detection distance : 5 mm, detection type : transmission
 - Motor : DC24V 15W, 3000 rpm

- Y-axis
 - Type : ball screw type
 - Movement : 250 mm, speed : 600 mm
 - Position detection sensor : 6 ea
 - Photo sensor : DC 24V 30 mA
 - T type detection distance : 5 mm, detection type : transmission
 - Motor : DC 24V 15W, 3000 rpm

- Z-axis
 - Type : pneumatic type
 - Double rod cylinder : $\phi 10 \times 50$
 - Flow control valve : M5 \times $\phi 4$
 - Air chuck : parallel open type, auto switch ($\phi 4$) 2ea
 - Gripper : Aluminum 6061, white anodized

AS/RS module (3 type)

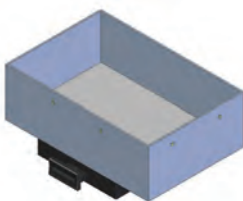
Order number : 32014



- 3x3 cell aluminum profile (20×20)
- Photo sensor : DC 24V 9 ea (checking storing)
- Storage cover : blue-black smog transparent acrylic
- Panel : transparent acrylic 9 ea


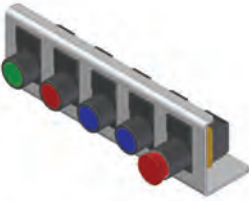
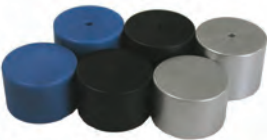
Work piece storage box

Order number : 32110



- Storage box
- Size : 150×100×50mm

Components

<p>Tower lamp module</p>	<p>Order number : 32016</p>
	<ul style="list-style-type: none"> • Red, yellow, green lamp • DC 24V
<p>Switch module</p>	<p>Order number : 32015</p>
	<ul style="list-style-type: none"> • Push button switch • Select switch • Emergency switch
<p>Solenoid valve block</p>	<p>Order number : 32018</p>
	<ul style="list-style-type: none"> • 5/2-way single solenoid valve • 5/2-way double solenoid valve • Power : DC24V
<p>Work piece set</p>	<p>Order number : 32112</p>
	<ul style="list-style-type: none"> • Good work piece : aluminum, blue, black • Faulty work piece : aluminum, blue, black
<p>Simulation box</p>	<p>Order number : 32017</p>
	<ul style="list-style-type: none"> • Toggle switch : 16 ea • Mounting clamp attached

Components

Motor controller (2 channel) Order number :



- DC motor driven function
- Motor protection circuit current
- Speed control function
- Lowest voltage control function

REMOTE I/O Order number : 32019



- DeviceNet
- Profibus
- Ethernet
- Digital Input
- Digital output

etc Order number :

- NFB : AC22V, 2 pole
- Power supply : DC24V, 5A
- Relay module(6-fold) : DC24V, 4C
- Air service unit
- Air distributor
- Air pressure sensor
- Cable duct
- I/O Terminal module
- PLC(option)

생산자동화 시스템
VARIABLE MECHATRONICS SYSTEM

조기화면 | 공극공정 | 검사공정 | 기공공정 | PTP 공정 | 입출고공정 | 입출화면

MANUAL 출력

▶ 입고 공정(스테커 크레인)

운전모드 **자동**

입고 제품

포크클램프단 RS7B10 (X0030)

RS7B9 (X003C)

RS7B8 (X003B)

X축후진 O/RUN LSX001 (X0037)

Y축상승 O/RUN LSX003 (X0039)

RS7B7 (X0036)

RS7B6 (X0035)

RS7B5 (X0034)

Y축하강 O/RUN LSX004 (X003A)

X축전진 O/RUN LSX002 (X0038)

RS7B4 (X0033)

RS7B3 (X0032)

RS7B2 (X0031)

RS7B1 (X0030)