DMG MORI's New Robot System

MATRIS

The Ultimate Means for Automation
MATRIS

No Programming Required!
New Robot System MATRIS

DMG MORI has developed an all-new robot system MATRIS that requires no special knowledge for its operation based on the wealth of experience and expertise DMG MORI has cultivated over the years. With modularized peripherals, a robot and MAPPSconnected, a dedicated system to connect peripherals and machines, MATRIS eliminates complex program editing and achieves easy system setups on a simple operation screen.

Advantages of MATRIS

- Typical systems available as pre-defined packages
- Standardized peripherals ensure easy customization to meet your specific needs
- Flexibly accommodate system changes even after installation
- Simple and easy programming with MAPPSconnected
- DMG MORI provides the same maintenance and support as machines
- DMG MORI-certified selected peripherals with superior reliability, quality and performance

Integrated system management by MAPPSconnected

MAPPSconnected solves issues that are likely to arise when automation system is introduced, such as connectivity, management and costs of peripherals and machines.

- Whole system monitoring on a simple and easy-to-see screen
- Well-designed screen layout to display all necessary information on one screen
- Flexibly accommodate the addition or changes of peripherals

MATRIS must be operated only by persons who have received robot operation training provided by the robot manufacturer.

MATRIS: Module Automation Transfer Robot Intelligence System
At the time of system installation

System construction lead time reduced by 80%
+ The oil pan and the robot base are of integral construction, so no oil pan setup is necessary
+ Consisting of modularized units, the system requires neither sequence check nor system control check at the installation site

<table>
<thead>
<tr>
<th>Installation items / tasks</th>
<th>Conventional models</th>
<th>MATRIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>① Installation location check, marking</td>
<td>8 hours</td>
<td>3 hours</td>
</tr>
<tr>
<td>② System carry-in, setup</td>
<td>8 hours</td>
<td>3 hours</td>
</tr>
<tr>
<td>③ Installation, leveling, fixing by anchor bolts</td>
<td>12 hours</td>
<td>3 hours</td>
</tr>
<tr>
<td>④ Oil pan</td>
<td>4 hours</td>
<td>0</td>
</tr>
<tr>
<td>⑤ Safety fence</td>
<td>8 hours</td>
<td>2 hours</td>
</tr>
<tr>
<td>⑥ Wiring</td>
<td>8 hours</td>
<td>1.5 hours</td>
</tr>
<tr>
<td>⑦ Piping</td>
<td>4 hours</td>
<td>1.5 hours</td>
</tr>
<tr>
<td>⑧ Robot program check</td>
<td>16 hours</td>
<td>2 hours</td>
</tr>
<tr>
<td>⑨ Sequence check</td>
<td>4 hours</td>
<td>0</td>
</tr>
<tr>
<td>⑩ System control check</td>
<td>8 hours</td>
<td>0</td>
</tr>
<tr>
<td>Total lead time</td>
<td>80 (10 days)</td>
<td>16 (2 days)</td>
</tr>
<tr>
<td>Number of workers required</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Total man-hours</td>
<td>160 (20 man-days)</td>
<td>16 (2 man-days)</td>
</tr>
</tbody>
</table>

System down-time reduced by over 60%
+ The oil pan and the robot base are of integral construction, so no oil pan setup is necessary
+ Consisting of modularized units, the system requires neither sequence check nor system control check at the installation site

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<tr>
<th>Installation items / tasks</th>
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<th>MATRIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>① Safety fence removal</td>
<td>1 hour</td>
<td>1 hour</td>
</tr>
<tr>
<td>② Oil pan removal</td>
<td>1.5 hours</td>
<td>0</td>
</tr>
<tr>
<td>③ System carry-in, setup</td>
<td>1.5 hours</td>
<td>1.5 hours</td>
</tr>
<tr>
<td>④ Installation, leveling, fixing by anchor bolts</td>
<td>1 hour</td>
<td>1 hour</td>
</tr>
<tr>
<td>⑤ Safety fence setup</td>
<td>1 hour</td>
<td>1 hour</td>
</tr>
<tr>
<td>⑥ Oil pan setup</td>
<td>1.5 hours</td>
<td>0</td>
</tr>
<tr>
<td>⑦ Wiring / Piping</td>
<td>4 hours</td>
<td>1.5 hours</td>
</tr>
<tr>
<td>⑧ Robot program check</td>
<td>4 hours</td>
<td>1 hour</td>
</tr>
<tr>
<td>⑨ Sequence check</td>
<td>1 hour</td>
<td>0</td>
</tr>
<tr>
<td>⑩ System control check</td>
<td>2 hours</td>
<td>0</td>
</tr>
<tr>
<td>Total lead time</td>
<td>18.5 (2.3 days)</td>
<td>7 (0.9 days)</td>
</tr>
<tr>
<td>Number of workers required</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Total man-hours</td>
<td>37 (4.6 man-days)</td>
<td>7 (0.9 man-days)</td>
</tr>
</tbody>
</table>

Profitability
+ Bring shortest system installation / change time, faster production startup and greater productivity
+ Faster startup and easier setup with standardized robot programs
+ Advanced training on robot programming and operation not required*

* Completion of basic training required by law is necessary
Modularized Peripherals for Shortest Robot System Installation / Change Time

All units (peripherals) that make up the robot system, including a transfer unit, workpiece stocker and on-machine measuring system, have been modularized to standardize their sizes. This allows system installation in the shortest time as well as flexible layout change according to changes in production requirements, which used to be difficult to achieve.
### Modules

<table>
<thead>
<tr>
<th>Transfer</th>
<th>Material table</th>
<th>Workpiece quality check</th>
<th>NG chute</th>
<th>Workpiece turnover</th>
<th>Workpiece phase positioning</th>
<th>IN / OUT conveyor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stock</td>
<td>Workpiece stocker</td>
<td>Tray changer</td>
<td>Hand changer</td>
<td>Buffer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Measurement

<table>
<thead>
<tr>
<th>1-point measurement</th>
<th>2-point measurement</th>
<th>3-point measurement</th>
<th>3D measurement</th>
<th>External checking</th>
</tr>
</thead>
</table>

### Other

<table>
<thead>
<tr>
<th>Deburring</th>
<th>Washing</th>
<th>Air blowing</th>
<th>Marking</th>
</tr>
</thead>
</table>

### Applicable models

<table>
<thead>
<tr>
<th>CMX 800 V</th>
<th>CMX 400 V</th>
<th>CMX 1100 V</th>
<th>NVX 5060 2nd Generation</th>
<th>NVX 5080 2nd Generation</th>
<th>NVX 5100 2nd Generation</th>
<th>NLX 2000</th>
<th>NLX 2500</th>
<th>NZX 1500</th>
<th>NZX 2000</th>
<th>NZX 2500</th>
<th>NZX 600</th>
</tr>
</thead>
<tbody>
<tr>
<td>NVX 5000 3rd Generation</td>
<td>NHX 4000 3rd Generation</td>
<td>NHX 5000 3rd Generation</td>
<td>NVX 5550 2nd Generation</td>
<td>NLX 1500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
MATRIS

Standard Package

MATRIS offers the five most popular packages. If the prepared packages are not suitable for your shop floor due to space restrictions, or if you wish to customize the package, it is possible to change system layout or add new peripherals* to meet your needs.

* For details, please consult our sales representative.

01 Handling package Workpiece stocker

- 10-station / 14-station workpiece stockers suitable for flange workpieces
- Highly reliable workpiece stockers now available for MATRIS
- Workpieces rejected by on-machine measurement are discharged to the NG chute to allow for continuous machining without stopping system operation

Equipment

- Robot hand
- Workpiece stocker
- Material table
- NG chute
- Safety fence
- Floor oil pan
- Maintenance door
- MAPPSconnected

02 Handling package IN / OUT conveyor

- Automatic workpiece transfer from the preceding process to the post process
- Workpieces rejected by on-machine measurement are discharged to the NG chute, preventing defective workpieces from going to the next process

Equipment

- Robot hand
- IN / OUT conveyor
- Material table
- NG chute
- Safety fence
- Floor oil pan
- Maintenance door
- MAPPSconnected
03 Handling package
Tray changer

+ Large amount of workpiece stock possible by the tray stacking method
+ Choices of tray thickness available according to workpiece sizes
+ Shorter setup time because materials and finished products are transferrable on a tray

<table>
<thead>
<tr>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>■ Robot hand  ■ Tray changer  ■ Material table  ■ NG chute  ■ Safety fence  ■ Floor oil pan  ■ Maintenance door  ■ MAPPSconnected</td>
</tr>
</tbody>
</table>

CUSTOM DESIGN is available according to workpiece shapes.
For details, please consult our sales representative.

04 Measuring package
External workpiece measuring system

+ High-accuracy measurement and acceptance / rejection judgment of workpieces with an external measuring system
+ Measuring results to be fed back to a machine
+ Set multiple measuring points at different levels on a cylindrical workpiece

<table>
<thead>
<tr>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>■ Robot hand  ■ Measuring system (inner diameter)  ■ Workpiece stocker  ■ Material table  ■ NG chute  ■ Safety fence  ■ Floor oil pan  ■ Maintenance door  ■ MAPPSconnected</td>
</tr>
</tbody>
</table>

CUSTOM DESIGN is available according to workpiece shapes.
For details, please consult our sales representative.

05 Measuring package
3D measuring instruments

+ Measure arbitrary points on a workpiece with the 3D CMM
+ Flexible use for various types of workpieces
+ Measuring results to be fed back to a machine

<table>
<thead>
<tr>
<th>Equipment</th>
</tr>
</thead>
</table>

CUSTOM DESIGN is available according to workpiece shapes.
For details, please consult our sales representative.
### Layout Examples

#### Handling package (workpiece stocker)

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>NLX 1500 / NLX 2000</td>
<td>5600 (220.5)</td>
<td>2000 (78.7)</td>
</tr>
<tr>
<td>NZX 1500 / NZX 2000</td>
<td>5860 (198.4)</td>
<td>1300 (51.2)</td>
</tr>
<tr>
<td>CMX 600 V</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Handling package (tray changer)

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMX 600 V</td>
<td>5720 (225.9)</td>
<td>2000 (78.7)</td>
</tr>
</tbody>
</table>

#### Measuring package (external workpiece measuring system)

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMX 1100 V</td>
<td>5650 (222.4)</td>
<td>1100 (43.3)</td>
</tr>
</tbody>
</table>

*Please consult our representative for layouts other than the above.*
MATRIS’s Flexible Layout Design

Every machine has its unique installation area on the matrix with a robot placed in the center. The DMG MORI’s standard peripherals can be flexibly laid out according to your production lines.

Example of layout change

For details, please consult our sales representative.

Module construction simulation

Select necessary devices (modules), and make your own layout simulation.

- Material table
- Workpiece turnover
- Buffer
- Air blowing

- Workpiece quality check
- Workpiece phase positioning
- External checking
- Marking

- NG chute
- Hand changer
- Deburring

- 3D vision
- 14-station workpiece stocker

- Oil pan
- Oil pan
- Oil pan
- Oil pan
- Oil pan
- Oil pan

1. For details, please consult our sales representative.
2. 1 × 1 module=710 × 710 mm (28.0 × 28.0 in.)
MATRIS

MAPPSconnected – Perfect Solution for Automation Systems

MAPPSconnected is a system that connects machines with various peripherals and robots via network to integrate monitoring, scheduling and production management. The system solves issues about installation of automated systems, such as connections with peripherals and the system management and costs.

- Easy-to-see screen to monitor operation status of the entire system
- Easy-to-see screen layout enables operators to view all necessary information at a time
- Compact design contributes to space saving
- Provide common user interface with CELOS / MAPPS V for smooth and efficient operation
- Employ the MAPPS operation panel to offer the same long-term maintenance support as the machine

CELOS: Control Efficiency Lead Operation System
MAPPS: Mori Advanced Programming Production System

Innovative job management

MAPPSconnected has the function for managing the operation on a job order basis, so you can change the settings and operation on your own.

Job screen
Check and edit existing jobs / create new jobs

Set up job names, comments and pictures

Select and set equipment to be used for machining
[Effective use of accumulated data]

MAPPScnected is able to output the information below to USB in CSV format as operation history.

**History of measuring results**
Output the information recorded as workpiece measuring results.

**Manual operation**
Output the operation history of the operation mode switch (on line, off line) and the manual operation button.

**Transfer command**
Output the history of transfer operation by MAPPScnected.

**Operation history by workpiece**
Information about workpiece transfer and status (in progress, finished or being machined).

**Operation history by order**
Output the number of finished / poor-quality / status unknown products by order.

**History of measuring results**
[CSV-formatted data]

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**[Flow for creating new jobs]**

**Step 01**
Press the **New Device** button to set a workpiece destination from a tray changer.

**Step 02**
Open the combo box.

**Step 03**
Select a destination equipment (Example: Material Table).

**Step 04**
Press the **Add** button to add equipment.

**Step 05**
Equipment set in Step 04 added on the screen.

**Step 06**
For addition of another equipment, press the **New Device** button.
<Precautions for Machine Relocation>

**EXPORTATION:**
All contracts are subject to export permit by the Government of Japan. Customer shall comply with the laws and regulations of the exporting country governing the exportation or re-exportation of the Equipment, including but not limited to the Export Administration Regulations. The Equipment is subject to export restrictions imposed by Japan and other exporting countries and the Customer will not export or permit the export of the Equipment anywhere outside the exporting country without proper government authorization.

To prevent the illegal diversion of the Equipment to individuals or nations that threaten international security, it may include a “Relocation Machine Security Function” that automatically disables the Equipment if it is moved following installation.

If the Equipment is so-disabled, it can only be re-enabled by contacting DMG MORI or its distributor representative. DMG MORI and its distributor representative may refuse to re-enable the Equipment if it determines that doing so would be an unauthorized export of technology or otherwise violates applicable export restrictions.

DMG MORI and its distributor representatives shall have no obligation to re-enable such Equipment. DMG MORI and its distributor representatives shall have no liability (including for lost profits or business interruption or under the limited service warranty included herein) as a result of the Equipment being disabled.

+ For any functions not featured in the MAPPS system you are currently using, software updates are required. For details, please consult our sales representative. (There will be a charge for the software update)
+ Some functions are not supported by some models.
+ The actual screens may differ from those shown in this catalog.
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+ If you have any questions regarding the content, please consult our sales representative.
+ The information in this catalog is valid as of March 2018. Designs and specifications are subject to changes without notice.
+ The machines shown in the catalog may differ from the actual machines. The location and the size of the nameplates may also differ from the actual machines, or the nameplates may not be attached to some machines.
+ DMG MORI is not responsible for differences between the information in the catalog and the actual machine.