New Features of
MITSUBISHI SERVO AMPLIFIERS & MOTORS
MELSERVO-J4
A complete system lineup to meet your production and manufacturing needs

**Programmable controller**
- MELSEC iQ-R series
- MELSEC-Q series
- MELSEC-QS/WS series
- MELSEC-L series
- MELSEC iQ-F series
- MELSEC-F series

**Graphic operation terminal**
- GOT2000

**Controller**
- Master/local module
  - CC-Link IE Field Network
- Simple Motion module
- SSCNET III/H
- Power regeneration converter unit + SSCNET III/H compatible drive unit
- SSCNET III/H compatible 2-axis servo amplifier
- SSCNET III/H compatible 3-axis servo amplifier
- SSCNET III/H compatible 2-axis servo amplifier
- Ultra-small capacity
- Ultra-small capacity
- Ultra-small capacity
- Ultra-small capacity

**Servo amplifier**
- CC-Link IE Field Network compatible servo amplifier
- MR-J4-GF(-RJ)
- MR-J4-BI(-RJ/-LL)
- MR-CV+
- MR-J4 QU_B(-RJ)
- MR-J4W2-B
- MR-J4W3-B
- MR-J4W2-0303B6
- MR-J4-A(-RJ)
- MR-J4-03A6(-RJ)

**Solution**
- e-F@ctory is the Mitsubishi Electric solution for improving the performance of any manufacturing enterprise by enhancing productivity, and reducing the maintenance and operation costs together with seamless information flow throughout the plant.
To respond to an expanding range of applications including semiconductor and FPD manufacturing, robots, and food processing machines, MELSERVO-J4 combines with other Mitsubishi Electric product lines such as Motion controllers, networks, graphic operation terminals, programmable controllers and more. This gives you the freedom and flexibility to create a more advanced servo system.

**Functions**

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**Man, machine and environment in perfect harmony**

MELSERVO-J4 and our servo products come with a wide selection of functions to solve the challenges in production. Our newest functions are easier to use, and safer than ever before.

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**SOFTWARE**

- MELSOFT GX Works3
- MELSOFT MT Works2
- MELSOFT MR Configurator2
- Capacity selection software

**SENSING MODULE**

- MR-EM340GF
- MR-MC2
- MR-MT2000 series

**LOW-VOLTAGE SWITCHGEAR**

- WS-V
- MS-T

**LOW-PROFILE FLANGE TYPE**

- TM-RG2M series
  - Rating: 2.2 to 9 N·m

- TM-RU2M series
  - Rating: 2 to 240 N·m

**Low-profile table type**

- TM-RFM series
  - Rating: 2.2 to 9 N·m

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**Related catalogs**

- MELSERVO-J4 Catalog
- MELSERVO-J4 Catalog L(NA)03058
- GOT2000 Series Drive Control Interactive Solutions
- L(NA)RCS3EENG
Failure Prediction

Supported by: GF GF-RJ

Optimal solution with MELSERVO-J4

1. Predictive maintenance of mechanical drive components
2. Improvement of operation rate

Failure prediction for improved operation rates

Predictive maintenance is a key to avoid unplanned production downtime. With the failure prediction functions, failures can be easily predicted in advance. By utilizing failure prediction data to schedule maintenance at optimal times, unplanned downtime is avoided, improving operation rates for the entire production line.

Friction failure prediction function
Predicts failure based on changes in the coulomb and viscous friction of guides and ball screws.

Vibration failure prediction function
Predicts failure based on aging in guides, ball screws, and belts from the vibration and frequency changes.

Total distance failure prediction function
Predicts failure based on the total travel distance of the servo motor to determine when ball screws and bearings are approaching product life.

* The failure prediction function is available with MR-J4-GF(-RJ) servo amplifiers with software version A3 or later.
* Note that this function does not guarantee the prediction of all failures.

Recommended applications

Automotive production lines/Semiconductor manufacturing lines/FPD manufacturing lines/Surface mounting lines, etc.
Surface mounting line

Predictive maintenance is essential for minimizing risks of machine failure and maximizing productivity. The servo amplifier predicts a machine failure based on the changes in a machine from aging. In case of failure, you can check the operation status recorded by the drive recorder function to analyze the cause of the alarm, and quickly get machinery running again.

Drive Recorder

Supported by: GF GF-RJ B B-RJ B-LL WB A A-RJ

Optimal solution with MELSERVO-J4

1. Reduction of downtime by quick recovery
2. Simple configuration without data logger

Monitoring and recording for failure analysis

In case of machine failure, operators need to analyze the operation status and the cause of failure for quick recovery. The drive recorder function monitors operations 24/7 and stores the status data when an alarm occurs. The waveforms of past 16-time alarms are stored, and operators can check the data on MR Configurator2 or GOT.

Recommended applications

Surface mounting lines/Semiconductor manufacturing lines/FPD manufacturing lines/Processing machines/Food processing machines/Material handling systems, etc.
Master-Slave Operation

**Optimal solution with MELSERVO-J4**

1. Easy configuration of torque-assist system
2. Space utilization with distributed arrangement of slave axes

**Torque-coordination of multiple axes**

While the master axis is operated in position or speed control mode, the slave axes are operated in torque control mode with the same torque as the master axis. Since multiple smaller-capacity servo motors are used for sharing load instead of a large-capacity servo motor, minimal space can be effectively used. The torque command is transmitted from the master axis to the slave axes via SSCNET III/H with a parameter setting, and no additional wiring is required for this function. Each SSCNET III/H line can have up to eight master axes.

**Recommended applications**

Press machines/Molding machines/Material handling systems, etc.

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Guided vehicle

The stable operation and simple configuration of a guided vehicle is possible when multiple servo motors in a distributed arrangement all operate with the same torque as the master axis.
Super Trace Control

Optimal solution with MELSEROV-J4

1. Actual path exactly as commanded
2. Reduction of deviation errors on arc motion

Increasing path accuracy

In normal control, a position deviation occurs in response to the position command from the controller, causing a deviation error between the machine axis’ target path and the actual path. The super trace control function reduces this deviation error close to zero, enabling actual movement almost exactly as commanded, resulting in improved processing.

* This function is applicable only for high-rigidity machines because the feed forward gain needs to be set high.

Recommended applications

Processing machines/Mounters/Bonders, etc.

Increasing path accuracy

Just set the parameter to enable the super trace control function.

Simplified machine tools

Super trace control enables high-precision machining and improves quality of curved surfaces with minimal deviation from the command.
Simple Cam

Optimal solution with MELSERVO-J4

1. Cam control with multiple synchronized axes
2. Compensation of position errors
3. Cost-effective configuration without a Positioning module

New functions for positioning

A wider variety of applications with the additional new functions

Simple cam function

Smooth conveyance and stoppage by cam control based on the cam data

Rotary Knife

Save time by having cam data automatically generated to suit the sheet length, radius of the rotary knife, and synchronous section of the sheet. The mark sensor input compensation function ensures that the cutting position is accurate by correcting position deviations that occur from the sheet stretching/contracting.

Create various cam data patterns with MR Configurator2.

Supported by: A-RJ
A/B-phase pulse

The mark sensor input compensation function corrects the position of the knife axis.

The encoder signals are inputted with the encoder following function.

The mark sensor input compensation function
The servo amplifier compensates a position error between the reference position and the position detected by a sensor, allowing the workpiece to be cut correctly on a registration mark.

Additional function

Communication function (MODBUS® RTU)
MR-J4-A-RJ supports not only RS-422/RS-485 communication (Mitsubishi Electric AC Servo Protocol) but also RS-485 communication (MODBUS® RTU protocol). MODBUS® RTU protocol is compatible with function code 03h (Read holding registers), etc. The cam data can be set through MODBUS® RTU.

Recommended applications
Rotary knife devices/Simple packaging machines/Sheet pasting machines, etc.

Encoder following function
This function allows the synchronous encoder signals to be used as command pulses.

Command pulse input through function
The first servo amplifier axis outputs command pulses to the subsequent axes, enabling a synchronous system of multiple axes.

Mark sensor input compensation function
The servo amplifier compensates a position error between the reference position and the position detected by a sensor, allowing the workpiece to be cut correctly on a registration mark.

Master device such as programmable controller
MODBUS® RTU
Slave device
HMI
Inverter
Temperature control module
Measuring device

* RJ-45 junction connector terminal block and RJ-45 compatible cable designed for MR-J4-A-RJ are required.
Functional Safety

Supported by: GF-RJ  B-RJ  A-RJ

Optimal solution with MELSERVO-J4

1. High-level functional safety
2. Less-wiring safety monitoring system

For the maximum level of safety required by FA systems

A system using both MR-D30 functional safety unit and the servo motors with functional safety is Category 4 PL e, SIL 3 compliant. Using the servo motors with functional safety eliminates the need for an external encoder on the machine end, creating a simple system with less wiring. Using a safety network eliminates the need to send safety signals to MR-D30, further reducing the need for wiring.

<table>
<thead>
<tr>
<th>IEC/EN 61800-5-2:2007 function</th>
<th>Safety level</th>
</tr>
</thead>
<tbody>
<tr>
<td>STO (Safe torque off)</td>
<td></td>
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<tr>
<td>SS1 (Safe stop 1)</td>
<td></td>
</tr>
<tr>
<td>SS2 (Safe stop 2)*</td>
<td>Category 4 PL e, SIL 3</td>
</tr>
<tr>
<td>SOS (Safe operating stop)*</td>
<td></td>
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<tr>
<td>SLS (Safety-limited speed)*</td>
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<tr>
<td>SBC (Safe brake control)</td>
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<tr>
<td>SSM (Safe speed monitor)*</td>
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</tbody>
</table>

*1. Requires the use of a servo motor with functional safety.
2. Safety level is Category 3 PL d, SIL 2 when the servo motor with functional safety is not used.

Recommended applications

Automotive production lines/Press machines/Material processing equipment/Material handling systems/X-Y crane equipment/Filling machines/Cardboard manufacturing equipment, etc.

For the maximum level of safety required by FA systems
Automobile production line

A Category 4 PL e compliant safety system can be constructed with simple wiring. By using the safety integrated MR-J4 and MR-D30, machinery turns off when the light curtain is obstructed, and the unintended restart of machinery is prevented. The monitoring function also allows the centralized control of servo and mechanical drive components, helping save energy and schedule maintenance, and enabling quick recovery from machinery failures.

Monitoring

**Optimal solution with MELSERVO-J4**

1. Reduction of machine downtime caused by failure
2. Monitoring power consumption for energy saving
3. Integrated management of line operation information

**TCO*1 reduction with effective use of servo information**

Integrated information management is necessary for manufacturers to seek solutions for reducing cost and improving systems. The servo amplifier offers constant monitoring of power consumption and operation status of the servo amplifiers and servo motors, and the data is transmitted from the servo amplifier to a controller via CC-Link IE Field Network or SSCNET III/H for more cost-effective information management, helping optimize the production site.

**Recommended applications**

Semiconductor manufacturing lines/FPD manufacturing lines/Automobile production lines/Gear grinding machines/Bearing insertion machines, etc.

*1. TCO: Total Cost of Ownership
*2. When using motion mode, a dedicated hub for CC-Link IE Field Network is necessary. Refer to “MELSERVO-J4 catalog (L(NA)03058)” for details.
One-touch Tuning

Supported by: [GF"1 GF-RJ"1 B B-RJ B-LL"2 WB A A-RJ]

*1. The amplifier command method will be supported by MR-J4-GF(-RJ) in the future.
*2. MR-J4-B-LL does not support the amplifier command method. One-touch tuning is not available when the MR-J4-B-LL is used in the pressure control mode.

Optimal solution with MELSERVO-J4

1. Gain adjustment in less time
2. Easy-to-use advanced vibration suppression control

Easy gain adjustment

Gain adjustment has never been easier. With the one-touch tuning, machine resonance filters, advanced vibration suppression control II, and robust filters are automatically adjusted, enabling high-response yet stable operations and shorter settling time.

Shorter adjustment time with "amplifier command method" [NEW]

All you need is to set the servo motor permissible travel distance in the amplifier command method, and appropriate commands for the one-touch tuning will be created to adjust the gains.

[Amplifier command method]

With the user command method, the one-touch tuning is enabled also with a command inputted from outside the servo amplifier.

[User command method]

Recommended applications

Screen printers/Material handling systems/Filling machines/Mounters/Take-out Robots/Automatic assembly equipment/Motion alignment/Polishing systems, etc.
Adjustment time can be reduced by minimum of 50%!

One-touch tuning for a wide variety of machines
- Material handling systems
- Filling machines
- Coater
- Screen printers

Multi-axis Adjustment

Optimal solution with MELSERVO-J4
1. Simultaneous gain adjustment for parallel drive axes
2. Simultaneous test operation on multiple axes

Quick startup by simultaneous gain adjustment

When multiple axes are used in equipment, adjusting gain is time-consuming work even for experienced personnel. Now, the gain adjustment time can be cut to half with the multi-axis adjustment function. This function simultaneously adjusts parallel drive axes which make the same motion and also executes test operation and gain adjustment for up to four axes at the same time. The target axes can be selected with a simple operation on the engineering software.

Recommended applications
- Material handling systems
- Automatic assembly equipment
- Mounters
- Servo press machines
- Coaters, etc.
Pressure Control

Supported by: MR-J4-B-LL
* The pressure control function is enabled when the servo amplifier and RnMTCPU are combined.

Optimal solution with MELSERVO-J4

1. High-response pressure control
2. Smooth switching between pressure and position control
3. Easy adjustment

High-response pressure control

- Pressure sensor signals are inputted directly to the servo amplifier, enabling high-response feedback control.
- Pressure commands (applying/holding/releasing pressure) can be created easily on the profile setting window of the engineering software.
- Optimal pressure commands and gains can be adjusted in the test operation of the engineering software.

Profile setting window

Recommended applications

Press machines/Molding machines/FPD bonding equipment/Bonders, etc.

Recommended applications

Press machines

High-response pressure control is achieved by inputting pressure sensor signals for pressure feedback control directly to the servo amplifier. Furthermore, the smooth switching between position and pressure control in press machines contributes to high-speed, high-response processing, and a higher productivity.
YOUR SOLUTION PARTNER

A NAME TO TRUST
Since its beginnings in 1870, some 45 companies use the Mitsubishi name, covering a spectrum of finance, commerce and industry.

The Mitsubishi brand name is recognized around the world as a symbol of premium quality.

Mitsubishi Electric Corporation is active in space development, transportation, semi-conductors, energy systems, communications and information processing, audio visual equipment and home electronics, building and energy management and automation systems, and has 237 factories and laboratories worldwide in over 121 countries.

This is why you can rely on Mitsubishi Electric automation solution - because we know first hand about the need for reliable, efficient, easy-to-use automation and control in our own factories.

As one of the world’s leading companies with a global turnover of over 4 trillion Yen (over $40 billion), employing over 100,000 people, Mitsubishi Electric has the resource and the commitment to deliver the ultimate in service and support as well as the best products.

Mitsubishi Electric offers a wide range of automation equipment from PLCs and HMIs to CNC and EDM machines.

* Not all products are available in all countries.
To ensure proper use of the products listed in this catalog, please be sure to read the instruction manual prior to use.

Safety Warning

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