

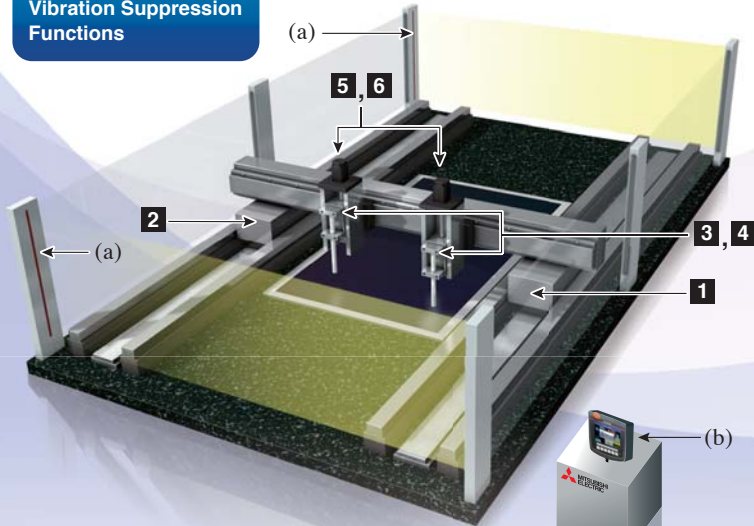
For your all production needs

# MELSERVO-J4 Solutions

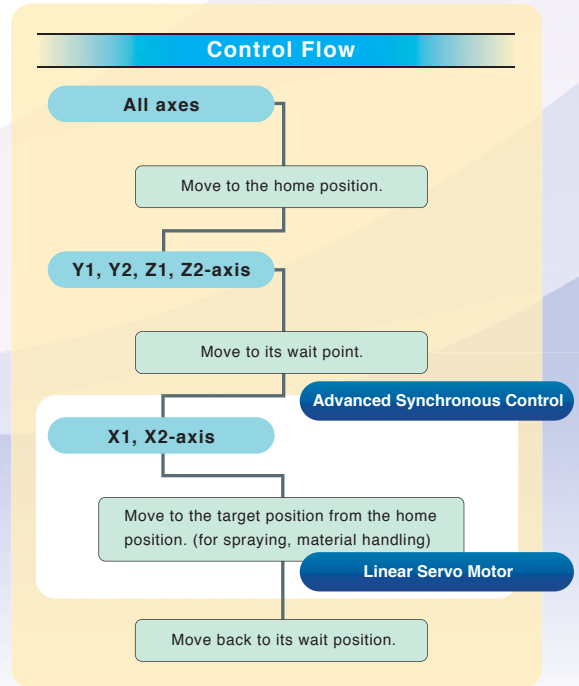
MELSERVO-**J4**

## vol.04 Gantry Application

Vibration Suppression Functions



- 1** X1-axis (Linear Servo Motor)
  - 2** X2-axis (Linear Servo Motor)
  - 3** Y1-axis (Linear Servo Motor)
  - 4** Y2-axis (Linear Servo Motor)
  - 5** Z1-axis (Vertical axis)
  - 6** Z2-axis (Vertical axis)
- (a) Light Curtain  
(b) GOT (Graphical Operation Terminal)



Issues at production sites

**Issue 1** Less machine vibration

➔ Vibration Suppression Functions

**Issue 2** Simpler construction for a multi-head.

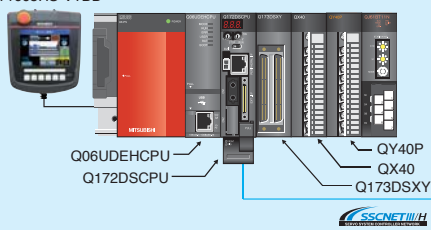
➔ Linear Servo Motor

**Issue 3** Axis 1 and 2 synchronized movement

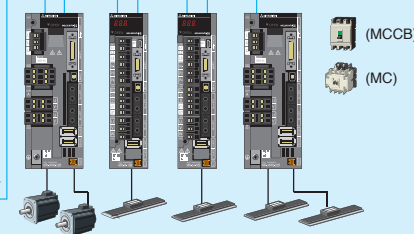
➔ Tandem Configuration

### System Example

GT1665HS-VTBD



**MELSERVO-J4**



#### 《Application》

- General material handling
- Automotive assembly
- Machine tool loading
- Aircraft assembly
- Scanning device

#### 《Mitsubishi solution》

Motion CPU : Q172DSCPU	Servo amplifier : MR-J4-B, MR-J4-W2-B	Servo motor : HG-KR
Linear servo motor : LM-H3	Safety signal module : Q173DSXY	Main base unit : Q35DB
PLC CPU : Q06UDEHCPU	GOT : GT1665HS-VTBD	I/O module : QX40, QY40P

Setup Procedure

**Step1** System Configuration Setting

**Step2** Parameter Settings for Linear Control

**Step3** Parameter Settings for Vibration Suppression Control

**Step4** Program Edit

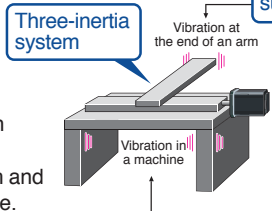
Solution  
1

## Vibration Suppression Functions

## Advanced Servo Gain Adjustment Enables Precise Vibration Suppression Control with One-touch Ease

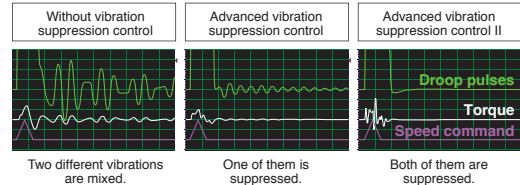
### Advanced Vibration Suppression Control II

Due to vibration suppression algorithm which supports three-inertia system, two types of low frequency vibrations are suppressed at the same time. Adjustment is performed with one-touch operation. This function is effective in suppressing vibration at the end of an arm and in reducing residual vibration in a machine.



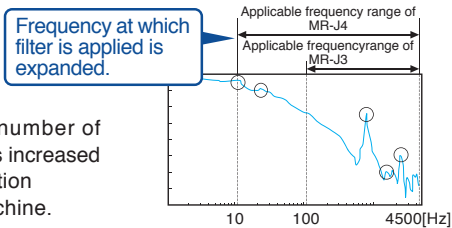
Two types of the vibrations are suppressed at the same time.

Patent Pending



### Machine Resonance Suppression Filter

With advanced filter structure, applicable frequency range is expanded from between 100Hz and 4500Hz to between 10Hz and 4500Hz. Additionally, the number of simultaneously applicable filters is increased from two to five, improving vibration suppression performance of machine.

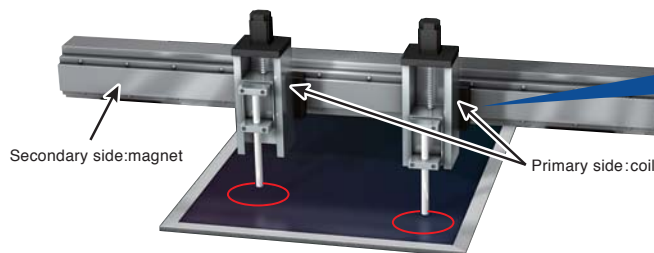


Solution  
2

## Linear Servo Motor

## Controlling the Multi-head Freely and Dynamically

The multi-head system can be structured with the linear servo motor. (maximum speed: 3m/s (LM-H3 series), max. thrust: 150N to 7200N, compatible with a variety of serial interface linear encoders with resolution range from 0.005 $\mu$ m and up.)



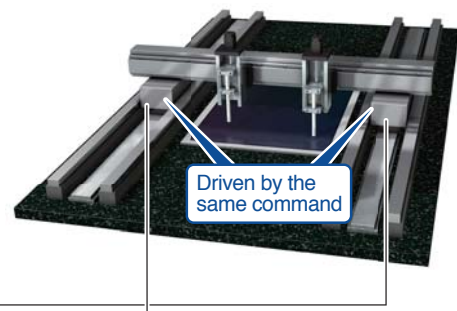
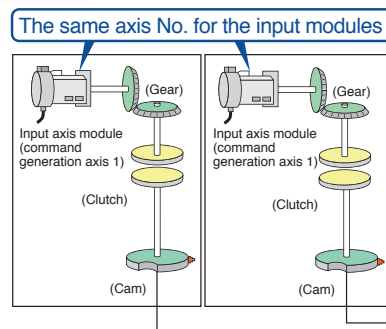
Each of the motor coils can be controlled individually by different commands. This simple structure is suitable best for the machines requiring shorter tact time.

Solution  
3

## Tandem Configuration

## Highly Synchronized Operation Between Two Axes

The parallel drive (tandem configuration) is achieved by outputting the same data to the cams using the advanced synchronous control.



# Setup Procedure

## Step 1 System Configuration Setting

Set the servo amplifier and servo motor.

**SSCNET Structure**

**Amplifier Setting**

Amplifier Operation Mode:  
 "Standard" for the rotary motor  
 "Linear" for the linear motor  
 "DD motor" for the direct drive motor

## Step 2 Parameter Settings for Linear Control

Set just the Basic and Extension settings for linear control.

Parameter Setting

Operation mode: Linear control

Easy parameter setting

## Step 3 Parameter Settings for Vibration Suppression Control

Select "3 inertia mode" in the "Vibration suppression control mode selection" to enable the "Advanced Vibration Suppression Control II".

Parameter Setting

Servo adjustments - Vibration control

Vibration suppression control mode selection: Standard mode

Vib. sup. ctrl: 3 inertia mode

Easy parameter setting

## Step 4 Program Edit

Create the Motion SFC program and the servo program.

**Motion SFC**

```

[G 20]
// STOP check
M2001*M2002*M2003*M2004*M2005*M2006

[K 31:Real Axis]
1 ABS-1
Axis 5
->Address 10000.0 μm
Speed 10000.00 mm/min

[G 1]
// Start accept flag OFF check
M2005*M2006

END
    
```

**Servo program list**

Program No.	Program Name	Axis	Address	Speed	Vector Speed
[K 1: Real 1] Axis 1 HPR	1 2000	Axis	10000.0 μm	10000.00 mm/min	10000.00 mm/min
[K 2: Real 2] Axis 2 HPR	1 2000	Axis	10000.0 μm	10000.00 mm/min	10000.00 mm/min
[K 3: Real 3] Axis 3 HPR	1 2000	Axis	10000.0 μm	10000.00 mm/min	10000.00 mm/min
[K 4: Real 4] Axis 4 HPR	1 2000	Axis	10000.0 μm	10000.00 mm/min	10000.00 mm/min
[K 5: Real 5] Axis 5 HPR	1 2000	Axis	10000.0 μm	10000.00 mm/min	10000.00 mm/min
[K 6: Real 6] Axis 6 HPR	1 2000	Axis	10000.0 μm	10000.00 mm/min	10000.00 mm/min
[K 7: Real 7] Axis 7 HPR	1 2000	Axis	10000.0 μm	10000.00 mm/min	10000.00 mm/min
[K 8: Real 8] Axis 8 HPR	1 2000	Axis	10000.0 μm	10000.00 mm/min	10000.00 mm/min
[K 9: Real 9] Axis 9 HPR	1 2000	Axis	10000.0 μm	10000.00 mm/min	10000.00 mm/min
[K 10: Real 10] Axis 10 HPR	1 2000	Axis	10000.0 μm	10000.00 mm/min	10000.00 mm/min
[K 11: Real 11] Axis 11 HPR	1 2000	Axis	10000.0 μm	10000.00 mm/min	10000.00 mm/min
[K 12: Real 12] Axis 12 HPR	1 2000	Axis	10000.0 μm	10000.00 mm/min	10000.00 mm/min
[K 13: Real 13] Axis 13 HPR	1 2000	Axis	10000.0 μm	10000.00 mm/min	10000.00 mm/min
[K 14: Real 14] Axis 14 HPR	1 2000	Axis	10000.0 μm	10000.00 mm/min	10000.00 mm/min
[K 15: Real 15] Axis 15 HPR	1 2000	Axis	10000.0 μm	10000.00 mm/min	10000.00 mm/min
[K 16: Real 16] Axis 16 HPR	1 2000	Axis	10000.0 μm	10000.00 mm/min	10000.00 mm/min
[K 17: Real 17] Axis 17 HPR	1 2000	Axis	10000.0 μm	10000.00 mm/min	10000.00 mm/min
[K 18: Real 18] Axis 18 HPR	1 2000	Axis	10000.0 μm	10000.00 mm/min	10000.00 mm/min
[K 19: Real 19] Axis 19 HPR	1 2000	Axis	10000.0 μm	10000.00 mm/min	10000.00 mm/min
[K 20: Real 20] Axis 20 HPR	1 2000	Axis	10000.0 μm	10000.00 mm/min	10000.00 mm/min

Click the box to change the value

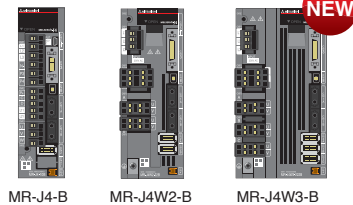
MITSUBISHI SERVO AMPLIFIERS & MOTORS  
**MELSERVO-J4**  
Features

Not Only limited to Rotary Servo Motors,  
but Linear Servo Motors, and Direct Drive Motors Can Be Driven

**Flexible** Applicable for Various Control and Driving Systems

**1-axis/2-axis/3-axis Servo Amplifiers**

For SSCNET III/H compatible servo amplifiers, 2-axis and 3-axis types are available in addition to 1-axis type. Flexible system is configured accordingly with the number of control axes.



**Linear Servo Motor**

Four series are available depending on applications.



**LM-H3 series**  
(Core type)  
Material handlings  
Rated thrust: 70N to 960N  
Max. thrust: 175N to 2400N



**LM-U2 series**  
(Coreless type)  
Screen printing systems  
Scanning exposure systems  
Rated thrust: 50N to 800N  
Max. thrust: 150N to 3200N

**Compatible Servo Motors**

MR-J4 series servo amplifier operates rotary servo motors, linear servo motors\*, and direct drive motors\* as standard.

\*MR-J4-A will be compatible in the future.



Rotary servo motor



Linear servo motor



Direct drive motor



**LM-F series**  
(Core type (natural/liquid cooling))  
Material handlings  
Press feeders  
Rated thrust:  
300N to 1200N (natural cooling)  
600N to 2400N (liquid cooling)  
Max. thrust:  
1800N to 7200N (natural/liquid cooling)



**LM-K2 series**  
(Core type with magnetic attraction counter-force)  
LCD assembly systems  
Semiconductor mounting systems  
Rated thrust: 120N to 2400N  
Max. thrust: 300N to 6000N

**Energy Saving** Energy-conservation Achieved by LM-H3 Linear Servo Motor Series

**Reduced Motor Driving Power**

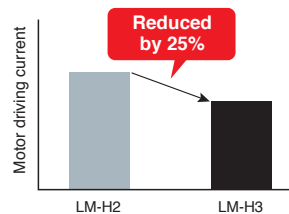
LM-H3 series achieves reduction of motor driving power due to optimized magnet form and new magnetic design by 25%\*.

Conservation of power is achieved for machine.

As compared to the prior model, the motor coil is lighter by approximately 12%\*.

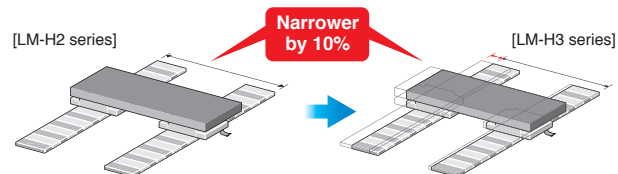
The energy required to drive the moving part is reduced.

\* For 720 N rated linear servo motor.



**Space Saving**

For LM-H3, widths of the motor coil and the magnet are reduced by 10% from the prior model. Increased thrust to current ratio results in using the servo amplifier in smaller capacity, contributing to more compact machine (the reduction of materials).



**Maintenance** Easier Troubleshooting with 3-digit Alarm Display

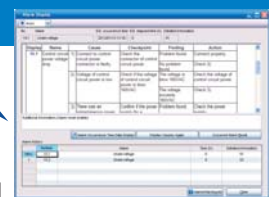
In MR-J4 series, servo alarms are displayed in 3 digits. Troubleshooting at alarm occurrence is easy.

[3-digit alarm display]



For the undervoltage alarm, whether the alarm occurred in the main or the control circuit is identified by the alarm No.

[Alarm window example]



Man, machine and environment in perfect harmony

Solution

**MITSUBISHI ELECTRIC CORPORATION**

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