

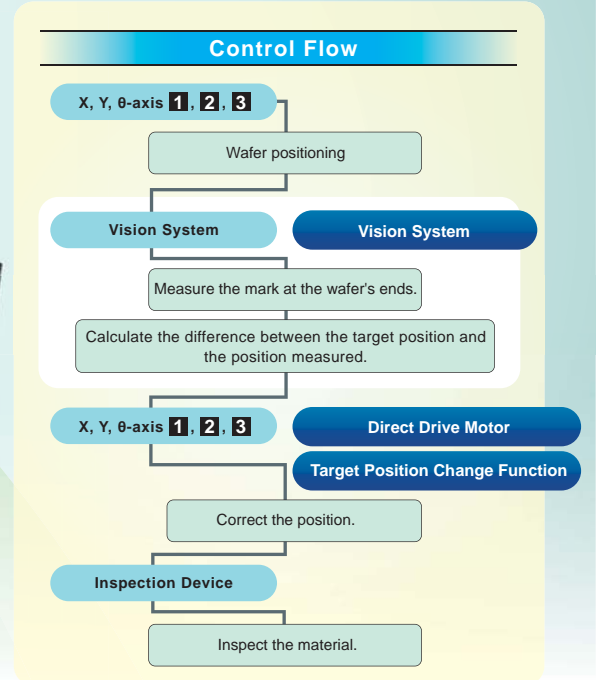
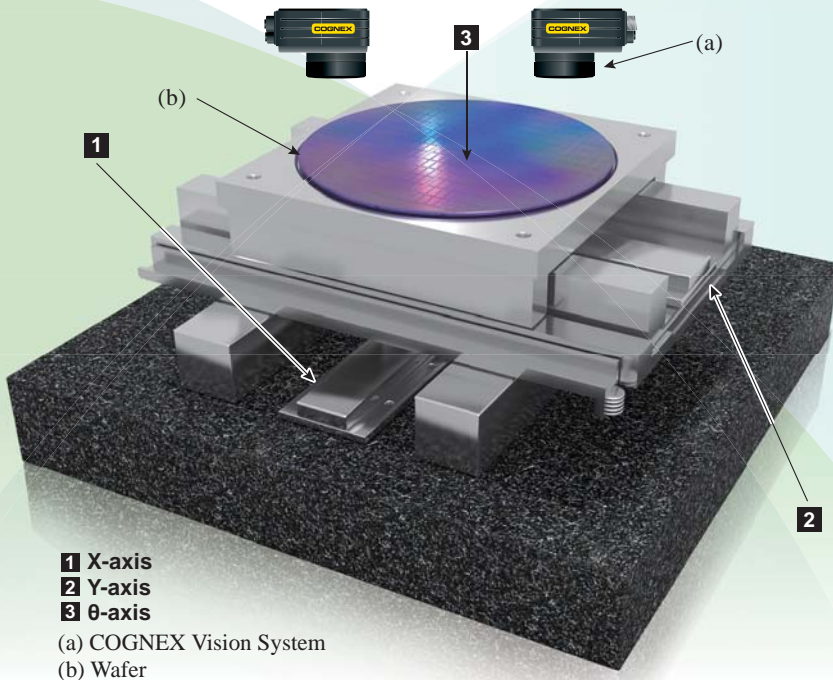
For your all production needs

MELSERVO-J4 Solutions

MITSUBISHI SERVO AMPLIFIERS & MOTORS
MELSERVO-

J4

vol.03 Motion Alignment (X-Y-θ)



Issues at
production
sites

Issue 1 Accurate Positioning



→ **COGNEX Vision System**

Issue 2 Precise Drive Operation

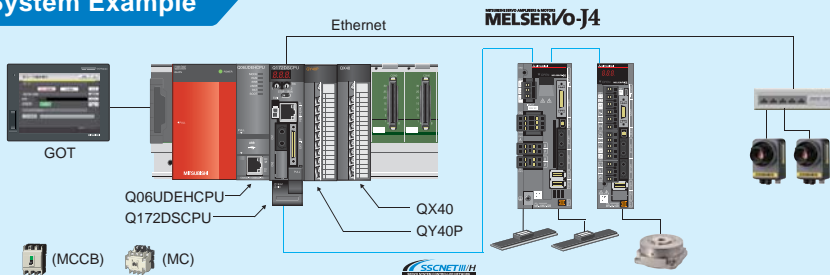


→ **Direct Drive Motor**

Issue 3 Shorter Tact Time

→ **Target Position Change Function**

System Example



《Mitsubishi solution》

Motion CPU : Q172DSCPU Servo amplifier: MR-J4-B, MR-J4W2-B Servo motor: TM-RFM, LM-H3
PLC CPU : Q06UDEHCPU GOT : GOT1000 series I/O module : QX40, QY40P
Main base unit: Q35DB

《Application》

- Pre/Post inspection system imaging
- Solar panel production
- FPD manufacturing
- 3D LCD manufacturing
- SEMI logic inspection

Setup
Procedure

Step1

System
Configuration
Settings

Step2

Parameter
Settings for
Ethernet Connection

Step3

Vision System
Connection Settings

Step4

Motion SFC
Program Creation

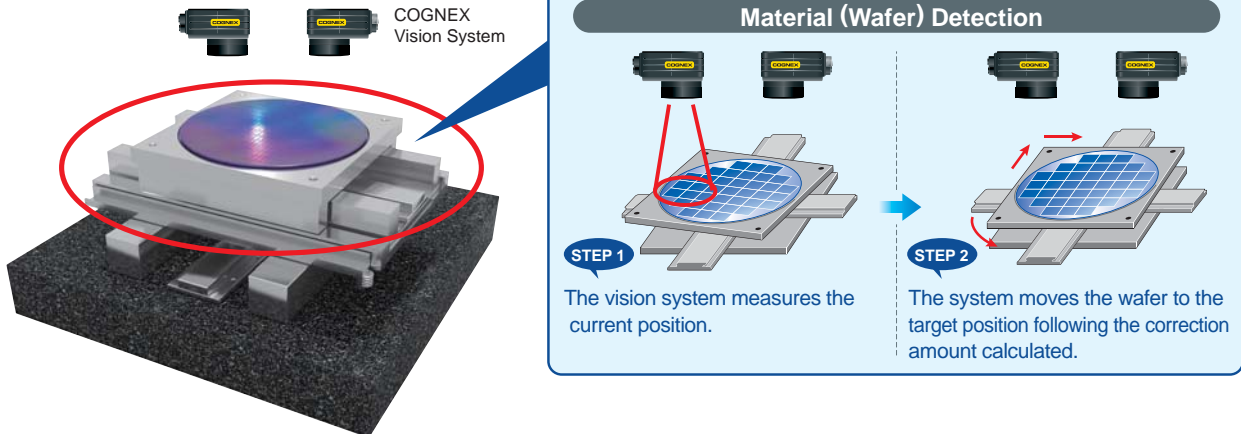
Solution 1 COGNEX Vision System

Accurate Position Reading and Quick Location Readjustment

Quick position detection

The vision system can easily read the current position, and quickly moves the material (wafer) to the target position, calculating the correction amount.

[Example of using wafer (material)]



Solution 2 Direct Drive Motor

Direct Connection to Drive Parts for High Response and Accuracy

High-response, high-accuracy, and stabilized positioning are achieved by using the direct drive motor for rotary axes. This motor is also suitable for a low-speed and high-torque operation.

[Direct Drive Motor Example]

This hollow construction enables cables and wires to go through inside.

Elimination of transmission mechanical parts



Suitable for a low-speed and high-torque operation.

Smooth operation with low noise

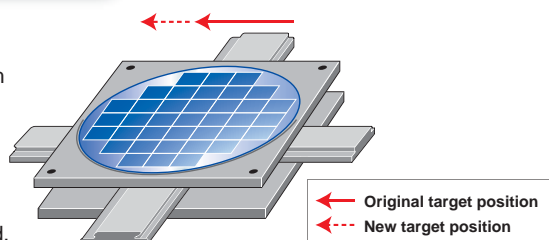
Clean system without dust coming from worn out

Solution 3 Target Position Change Function

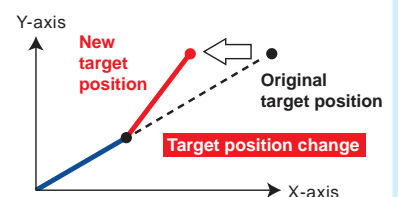
Flexibly Responding to Changes in the Target Position

Shorter tact time

When performing a position correction using the vision system data during positioning operation, the system can move the wafer to a new target position directly without starting positioning again. Thus shorter tact time is achieved.



[Operation Example of Target Position Change Function]



Setup procedure

Step 1 System Configuration Settings

Set the servo amplifier.

The screenshot shows the MR Configurator2 interface. On the left, the 'Project' tree has 'SSCNET Structure' highlighted with a red circle and 'Double click' text. In the center, the 'SSCNET Structure' diagram shows a servo motor and amplifier connected to a PLC, with a red box around the amplifier and 'Double click' text. On the right, the 'Amplifier Settings' dialog box is open, with 'Servo Parameter Setting' selected in the 'Input Filter Setting' section. A red starburst callout at the bottom right says 'Easy settings for DD motor'.

Step 2 Parameter Settings for Ethernet Connection

Set the IP address of the Motion controller.

The screenshot shows two dialog boxes. The left one is 'Built-in Ethernet Port Setting' with 'IP Address' set to '192.168.3.100' and 'Subnet Mask' set to '255.255.255.0'. A callout points to the IP address with the text 'IP Address Setting Default:192.168.3.39'. The right dialog box is 'Built-in Ethernet port Open Setting' showing a table of connections:

Port No.	Protocol	Open System	Host Station Port No.
1	TCP	MELSOFT Connection	
2	TCP	MELSOFT Connection	
3	TCP	MELSOFT Connection	
4	TCP	MELSOFT Connection	
5	TCP	MELSOFT Connection	
6	TCP	MELSOFT Connection	
7	TCP	MELSOFT Connection	
8	TCP	MELSOFT Connection	
9	TCP	MELSOFT Connection	
10	TCP	MELSOFT Connection	
11	TCP	MELSOFT Connection	
12	TCP	MELSOFT Connection	
13	TCP	MELSOFT Connection	
14	TCP	MELSOFT Connection	
15	TCP	MELSOFT Connection	
16	TCP	MELSOFT Connection	
17	TCP	MELSOFT Connection	
18	TCP	MELSOFT Connection	
19	TCP	MELSOFT Connection	
20	TCP	MELSOFT Connection	

A callout points to the 'MELSOFT Connection' entries with the text 'Select from "MELSOFT Connection" or "MC Protocol" for protocol.'

Step 3 Vision System Connection Settings

Set the parameter concerning the Ethernet communication and the vision program operation.

The screenshot shows the 'Project' tree with 'Ethernet Communication Line' and 'Vision Program Operation' highlighted with red circles and 'Double click' text. The 'Convert' dialog box is open, showing 'Ethernet Communication Line' settings:

Item	1	2	3
Vision System No.	1	2	3
IP Address	192.168.3.100	192.168.3.101	
Port No.	23	23	
For Telnet Communication			
For TCP/IP Communication	3001	3001	
User Name	mitsubishi	mitsubishi	
Password	mitsubishi	mitsubishi	
Status Storage Device	D2000		

The 'Vision Program Operation' dialog box is also open, showing 'Vision Program Operation' settings:

Item	1	2
Program No.	1	2
Vision System No.	1	2
Vision Program Name	Worksearch1	Worksearch2
Status Storage Device	D3000	D3100
Read Value Cell		
Read Value Storage Device	D3010F	D3110F
Image Data Storage Device	D3010F	D3110F

Step 4 Motion SFC Program Creation

Describe the vision system dedicated instructions, and then the positioning data from the vision system is possible to be read.

The screenshot shows the 'Motion SFC Program Manager' tree with '010:Alignment' highlighted with a red circle and 'Double click' text. The 'Ladder Logic' editor shows the following instructions:

```

[F100] M0PCEN-K1
// Start the vision system 1.

[G100] // Check the log on completion.
(D2000=K20) *IM0

[F101] M0PCEN-K2
// Start the vision system 2.

[G101] // Check the log completion.
(D2000=K40) *IM0

[F102] // Calculate the command position using the image data.
D4000=LONG(D3010F*10000.0)
D4002=LONG(D3014F*10000.0)

[R30/Read]
1 ABS-2(Vector speed)
axis 1
  Movement amount D4000 μm
axis 2
  Movement amount D4002 μm
Vector speed 1000.00 mm/s
  
```

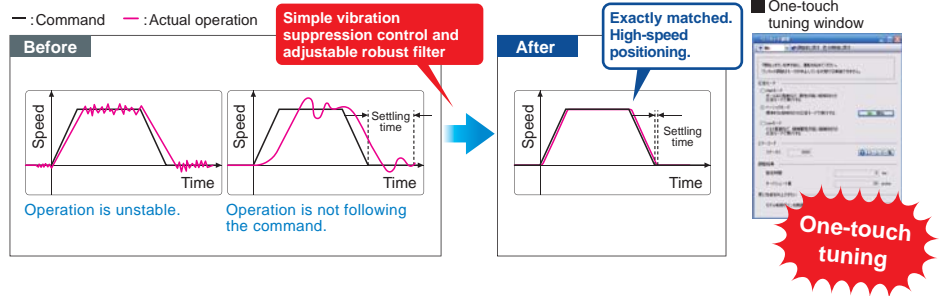
A callout points to the 'M0PCEN-K1' and 'M0PCEN-K2' instructions with the text 'These simple instructions enable to read the data from the vision system.'

MELSERVO-J4
Features

The Servo Amplifiers, Servo Motors, and Optical Networks Linked in Symphonic Productivity

Advanced One-touch Tuning Quick Setting by Just One Click

Servo gains including machine resonance suppression filter, advanced vibration suppression control II, and robust filter are adjusted just by turning on the one-touch tuning function. Machine performance is utilized to the fullest using the advanced vibration suppression control function.



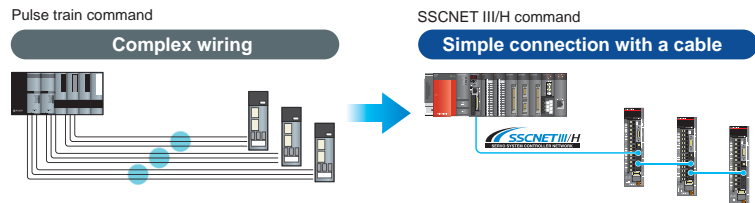
Flexibility Applicable for Various Control and Driving Systems

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



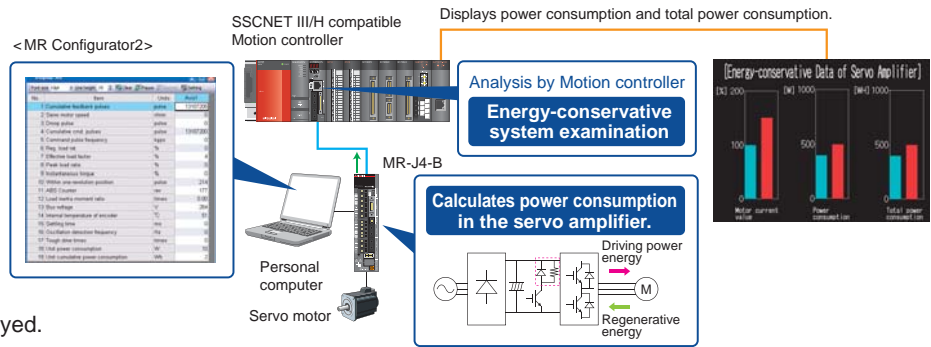
Reduced Wiring Dramatically Reduced Wiring

Simple connections with dedicated cables reduce both wiring time and chances of wiring errors. No more complicated wiring.



Power Saving Power Monitor Function

Driving power and regenerative energy are calculated from the data in the servo amplifier such as speed and current. Motor current value, power consumption, and total power consumption are monitored with MR Configurator2. In SSCNET III/H system, data are transmitted to a Motion controller, and the power consumption is analyzed and displayed.



Man, machine and environment in perfect harmony

Solution

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