MITSUBISHI ELECTRIC

Changes for the Better

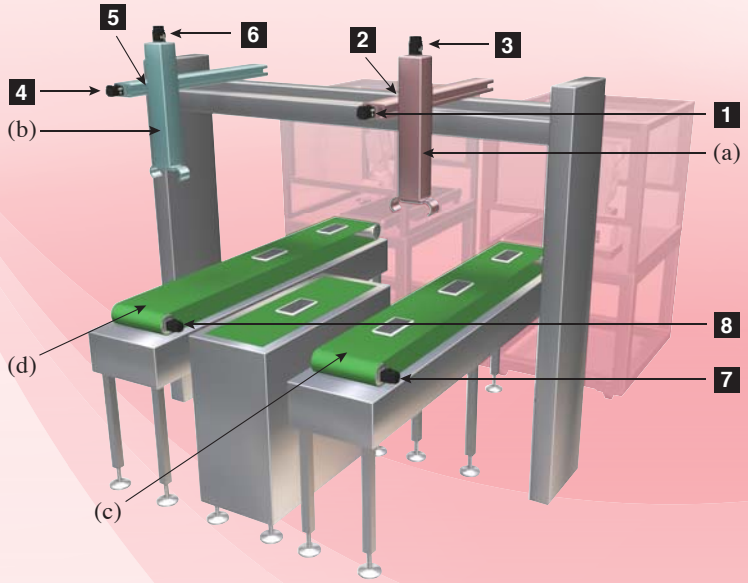
SERVO AMPLIFIERS & MOTORS

For your all production needs

MELSERVO-J4 Solutions

MELSERVO-J4

vol.08 Eco-friendly Conveyors and Product Handling Equipment



1 Robot 1 X-axis
2 Robot 1 Y-axis (Linear)
3 Robot 1 Z-axis
4 Robot 2 X-axis
5 Robot 2 Y-axis (Linear)
6 Robot 2 Z-axis
7 Line 1 Belt Conveyor Drive Axis
8 Line 2 Belt Conveyor Drive Axis

(a) Robot 1
(b) Robot 2
(c) Line 1
(d) Line 2

Control Flow

All axes

Robot 1 (X, Y, Z-axis) moves to its wait position.

Robot 2 (X, Y, Z-axis) moves to its wait position.

Robot 1 (X, Y, Z-axis)

Robot 1 grabs a workpiece and place it on the pallet.

Robot 2 (X, Y, Z-axis)

Robot 2 grabs the workpiece in the pallet and move it to Line 2.

Operation is then repeated.

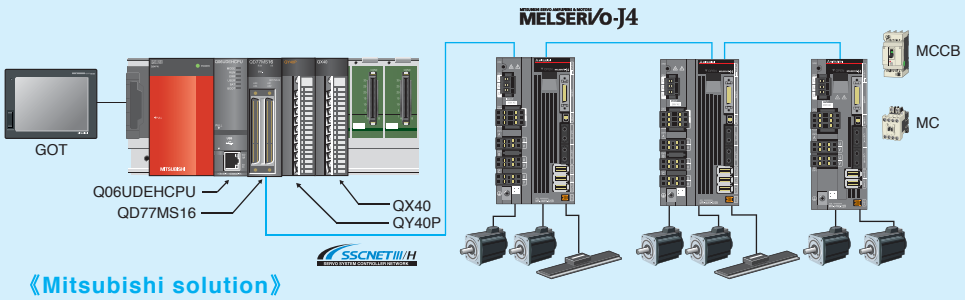
Issues at production sites

Issue 1 Managing of total power consumption
→ **Power Monitor Function**

Issue 2 Reduction of power consumption
→ **Multi-axis Servo Amplifier**

Issue 3 Minimizing waste of power
→ **Capacity Selection Software**

System Example



《Mitsubishi solution》

PLC CPU	:Q06UDEHCPU	Simple Motion	:QD77MS16	Servo amplifier	: MR-J4W3-B,MR-J4W2-B
GOT	:GOT 1000 series	I/O module	:QX40,QY40P	Servo motor	: HG-KR
Main base unit	:Q35DB			Linear servo motor	: LM-H3

《Application》

- Conveyors and handling equipment
- Packing machine
- Motion alignment
- Pick and place robot

Setup Procedure

Step1 System Configuration Settings

Step2 Settings for Optional Data Monitor

Step3 Creation of a Sequence Program for GOT Display

MELSERVO-J4 Offering the Best Solution

Solution 1 Power Monitor Function

Managing Power Consumption with a Visualization System

The MR-J4 series servo amplifiers can calculate power consumption itself without a power measuring instrument, and can send the data to controllers for monitoring.

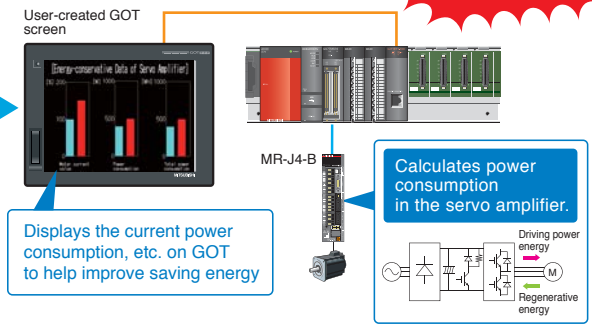
Calculating the data without a power measuring instrument

● **Parameter setting (Optional data selection)**

Data that can be Monitored		
The following are some examples of the data.		
· Effective load ratio · Load to motor inertia ratio	· Regenerative load ratio · Position loop gain 1	· Peak load ratio · Equivalent disturbance torque · Bus voltage
· Module power consumption	· Module integral power consumption	

Optional data monitor: Data type setting with GX Works2
· **Module power consumption (W)**
· **Module integral power consumption (Wh)**

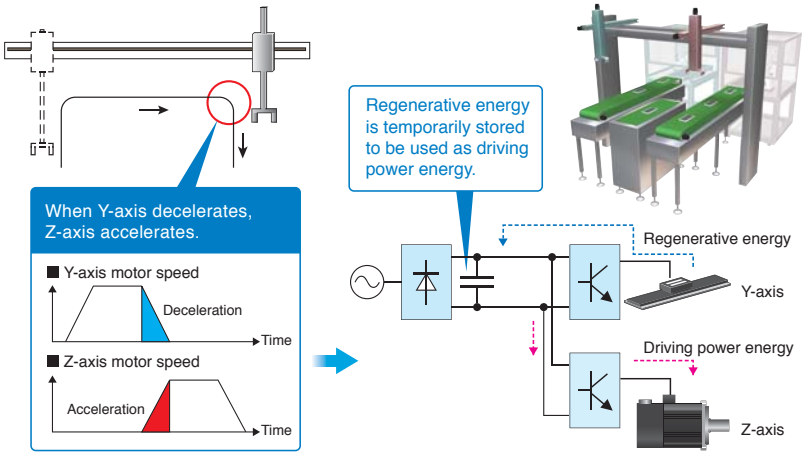
● **Displaying power consumption**



Solution 2 Multi-axis Servo Amplifier

Contributing Energy Conservation Using Regenerative Energy

The multi-axis servo amplifier can store regenerative energy when motors decelerate.
Those regenerative energy is used to drive another motor, contributing to energy conservation of the machine.
In this system, the regenerative energy from the Y-axis is used to accelerate the Z-axis.

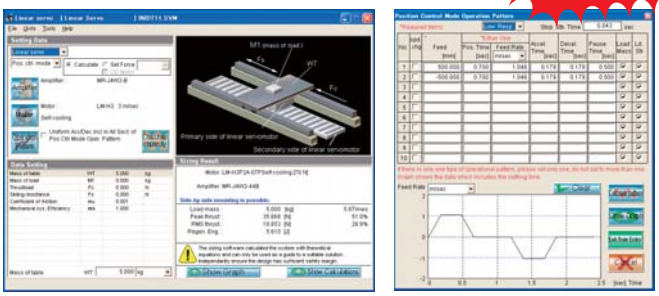


Solution 3 Capacity Selection Software

Easy Selection of a Suitable Motor for Your Machine

Selecting motors easily

The "Capacity selection software" (free software) selects a suitable rotary servo motor, linear servo motor, and direct drive motor for your machine using various data, such as mass of the table and the load, the operation pattern, etc.
After the selection, it shows the calculation process and results.

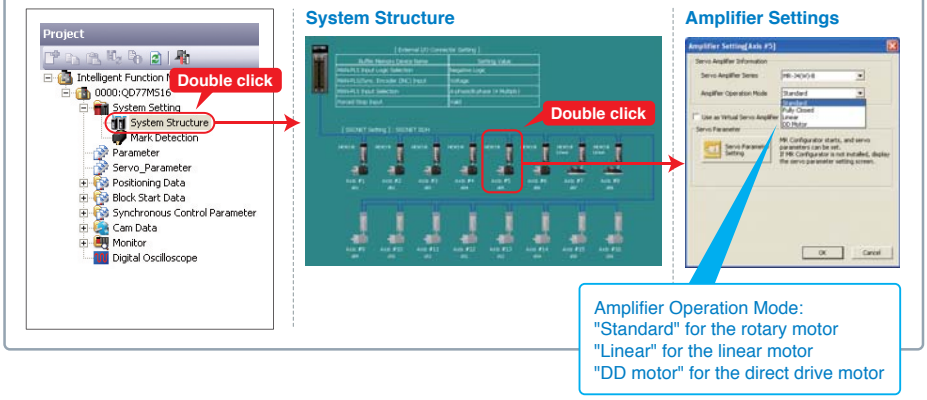


Setup Procedure

Step1

System Configuration Settings

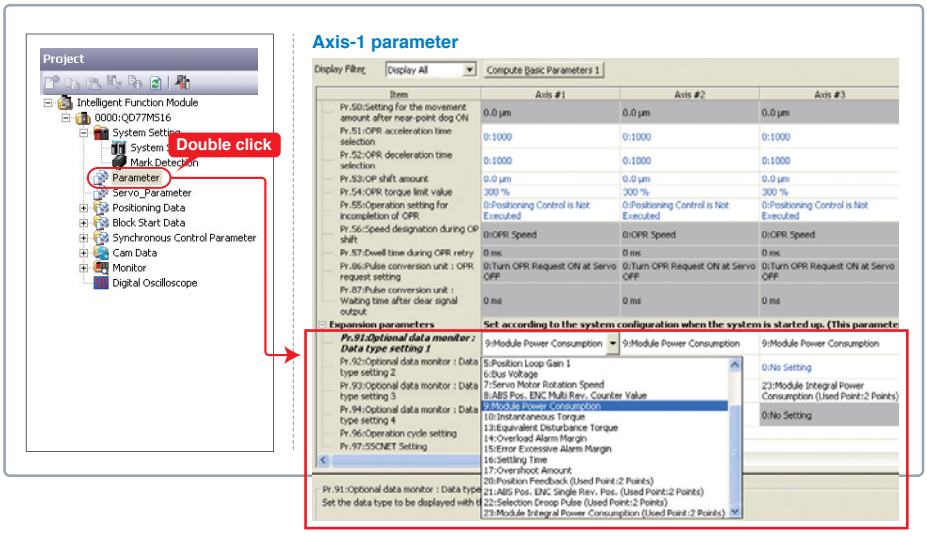
Set servo amplifier.



Step2

Settings for Optional Data Monitor

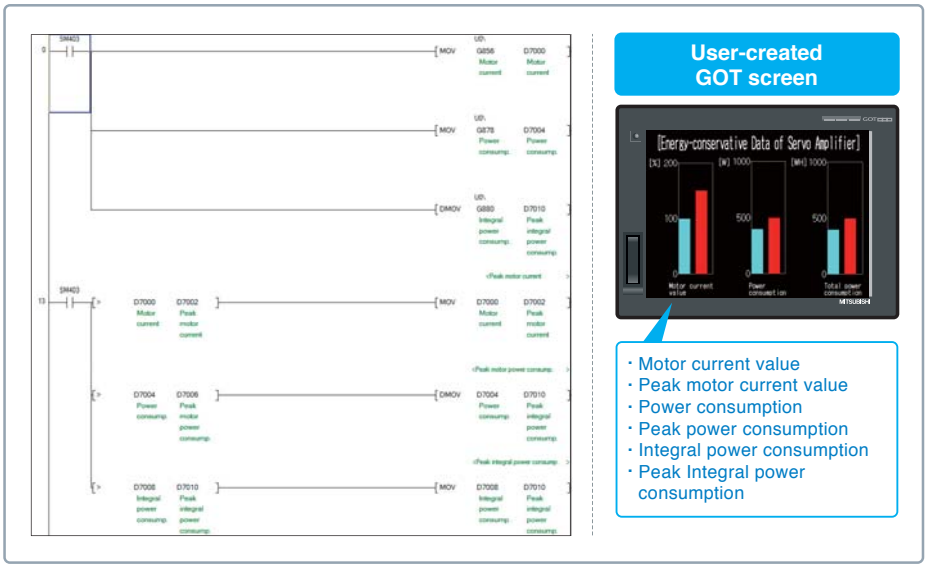
Set the "Optional data monitor" with the parameter. If you select "Module power consumption" or "Module integral power consumption", the amplifier power consumption is monitored.



Step3

Creation of a Sequence Program for GOT Display

Create a sequence program to calculate the data to be displayed on GOT, such as, "Peak power consumption", "Peak integral power consumption", and "Peak motor current".



MELSERVO-J4 Features

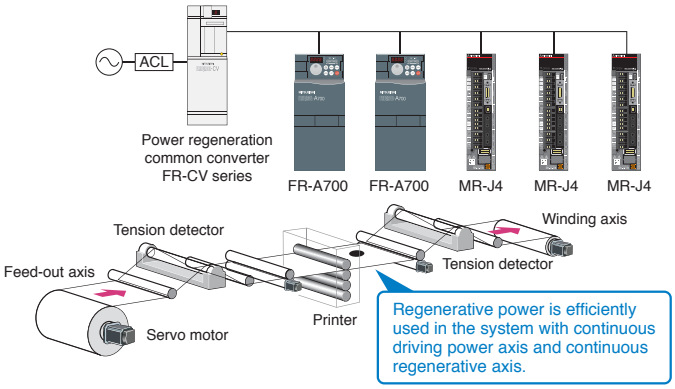
Saving Total Power Consumption with Various Functions for Energy-conservation

Energy Saving Optimal Energy-conservative Machine System

PN Bus Voltage Connection + Power Regeneration Common Converter

Regenerative energy is used efficiently when multiple servo amplifiers and inverters are connected through common PN bus to the power regeneration common converter.

* System only with common PN bus connection is also possible to be configured without using the power regeneration common converter. However, there are restrictions depending on the system. Contact your local sales office for more details.
* Refer to MR-J4-B(-RJ)/A(-RJ) Servo Amplifier Instruction Manual for selection of power regeneration common converter FR-CV series.

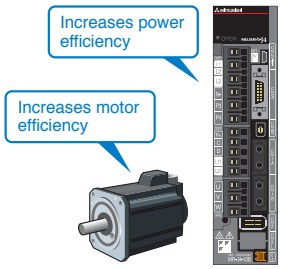


Energy Saving Advanced Function and Performance for More Energy-conservation

Reduced Energy Loss of Servo Amplifier and Servo Motor

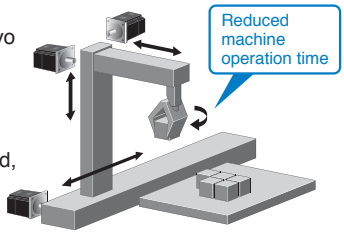
< Servo amplifier >
Efficiency is increased by the use of a new power module.

< Servo motor >
Motor efficiency is increased by optimized design of magnetic circuit.



Energy-conservation Due to the Improved Machine Performance

Thanks to the driving system configured by servo amplifier and servo motor with industry-leading level of high performance, machine tact time and operation time are reduced, achieving energy-conservation.

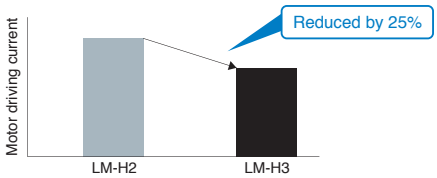


Energy Saving Energy-conservation Achieved by LM-H3 Linear Servo Motor Series NEW

Reduced Motor Driving Power

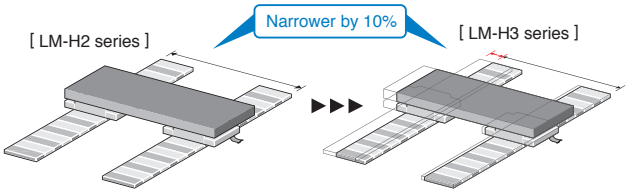
LM-H3 has achieved a reduction of 25% in motor driving current due to a new magnetic design with optimized magnet form, contributing to power conservation for machines. The motor coil is lighter as compared to the prior model, which also contributes to saving energy for driving the moving part.

* 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).



Man, machine and environment in perfect harmony

Solution

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