for a greener tomorrow

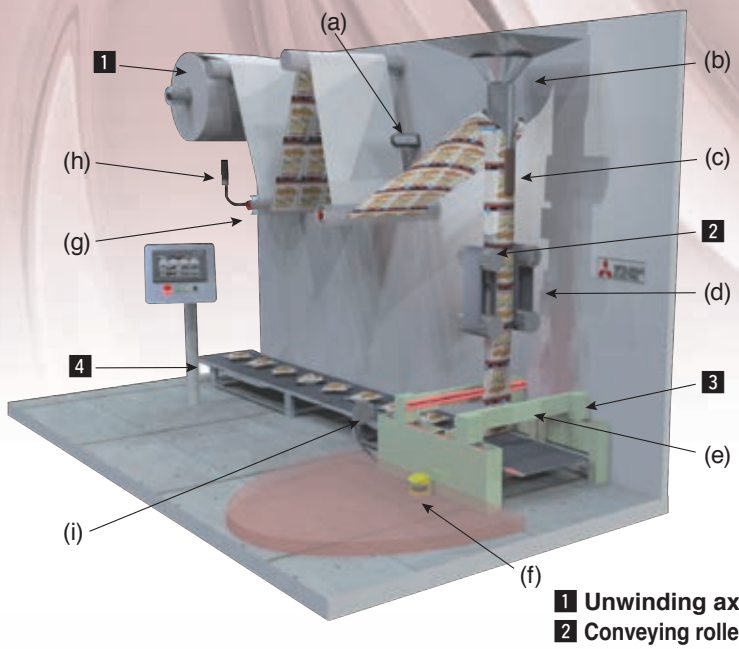
MITSUBISHI ELECTRIC
Changes for the Better

For all of your production needs

MELSERVO Solutions

vol.01-F

Vertical Form, Fill & Seal



Control Flow

Unwinding axis 1	Unwinds a roll of packaging film.
Dancer roll for tension control (g)	Controls tension constant.
Heat sealer (c)	Forms the film into a cylindrical form.
Conveying roller axis 2	Feeds the film at constant rate.
Seal and cut axis 3	Seals and cuts the top of the pillow bag.
Conveyor axis 4	Conveys packaged food to the next process.

1 Unwinding axis
2 Conveying roller axis
3 Seal and cut axis
4 Conveyor axis

(a) Mark sensor
(b) Feeder
(c) Heat sealer
(d) Film feeding
(e) Seal and cut
(f) Safety proximity sensor
(g) Dancer roll for tension control
(h) Roll width detection sensor
(I) Product inspection sensor

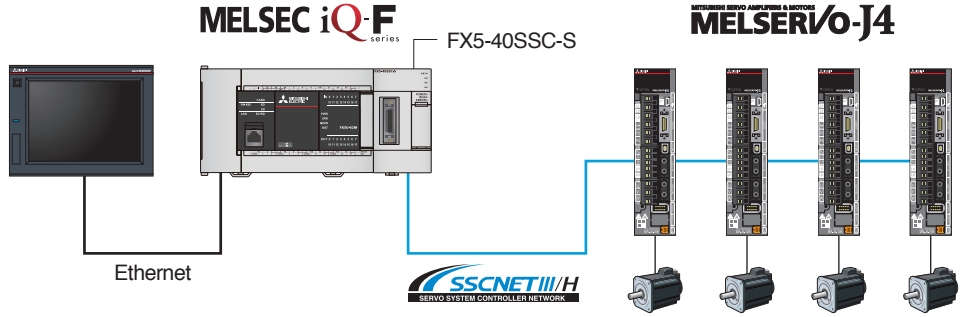
Issues at production sites

Issue 1 Stabilizing the packaging quality
➡ Easy synchronous control

Issue 2 Shorter cycle time without increasing shock to the machine
➡ Cam control

Issue 3 A reliable safety system
➡ Safety signal comparison function

System Example



[Applications]
- Food/Beverage filling machine
- Pouch packaging machine
- Powder filling machine

<Components>

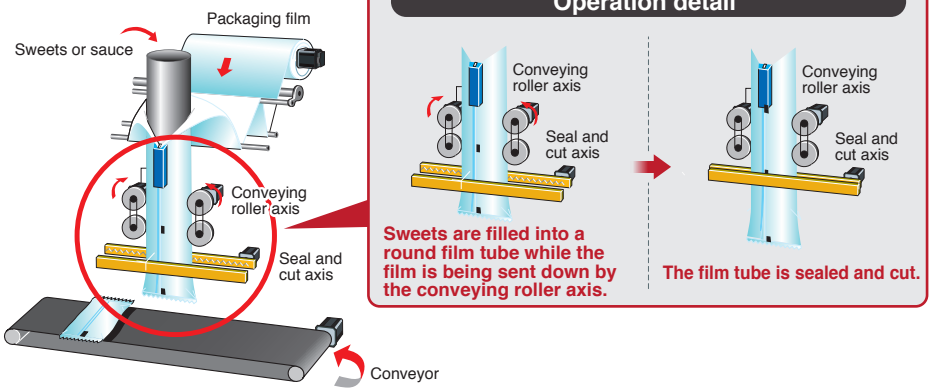
PLC CPU module ····· FX5U-32MT/ES	Simple Motion module ····· FX5-40SSC-S	Servo amplifier ·····MR-J4-B
GOT ····· GOT2000 series	Engineering environment ···· MELSOFT GX Works3	Servo motor ·····HG-KR, HG-SR

Offering Exceptional Solutions

Solution 1 Easy synchronous control

High quality and shorter cycle time

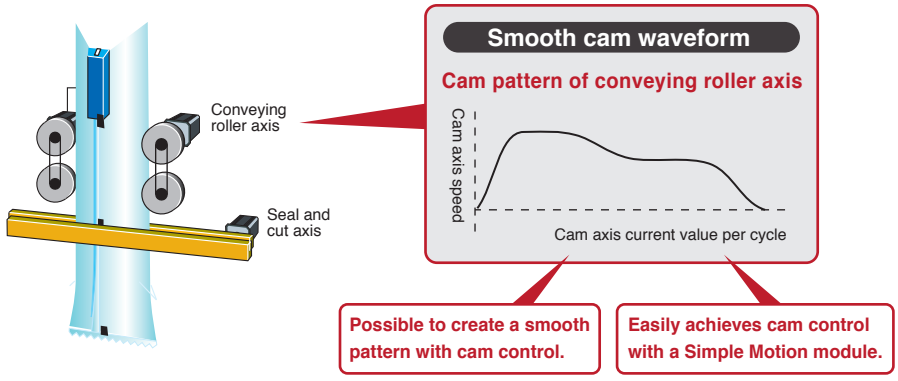
Driving the unwinding axis and the conveying roller axis by advanced synchronous control can improve process accuracy and achieve high-quality production. Eliminating an interlock also enables a shorter cycle time.



Solution 2 Cam control

Smooth sending and stopping of packaging film

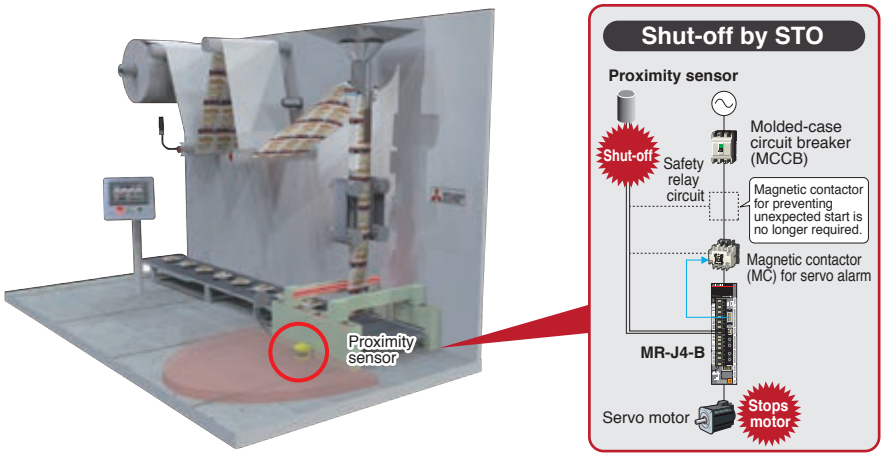
Cam control enables high-speed operation with smooth sending and stopping of the packaging film, achieving a shorter cycle time.



Solution 3 Safety signal comparison function

Safety signal comparison function with MR-J4 standard servo amplifiers

The MR-J4-B servo amplifier is equipped with STO (Safe torque off) as standard. Using STO enables the machine to stop safely without turning off the main circuit power supply, resulting in a shorter restart time.

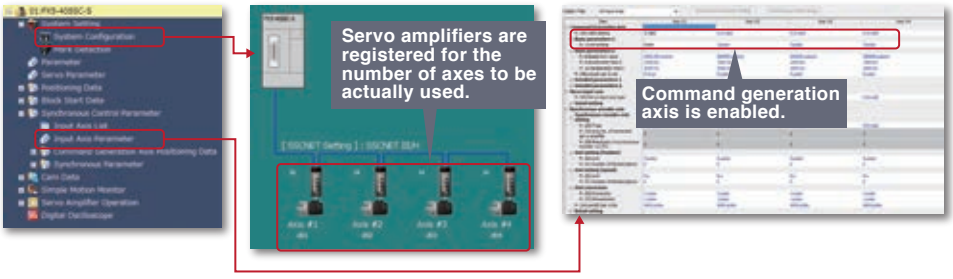


Setup Procedure

Step 1 System configuration settings

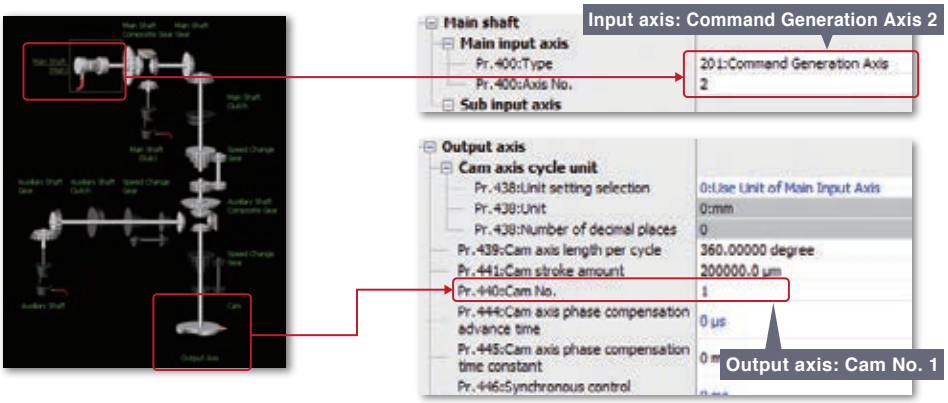
Set a servo amplifier in [System structure].
Set a command generation axis with input axis parameters.

[Simple Motion module setting tool]



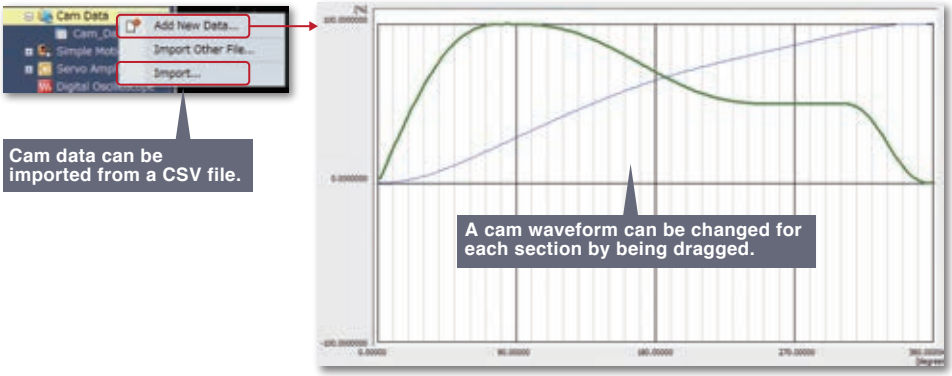
Step 2 Synchronous parameter settings

Set synchronous parameters so that Axis 2 (conveying roller axis) can synchronize with Command Generation Axis 2.



Step 3 Cam data creation

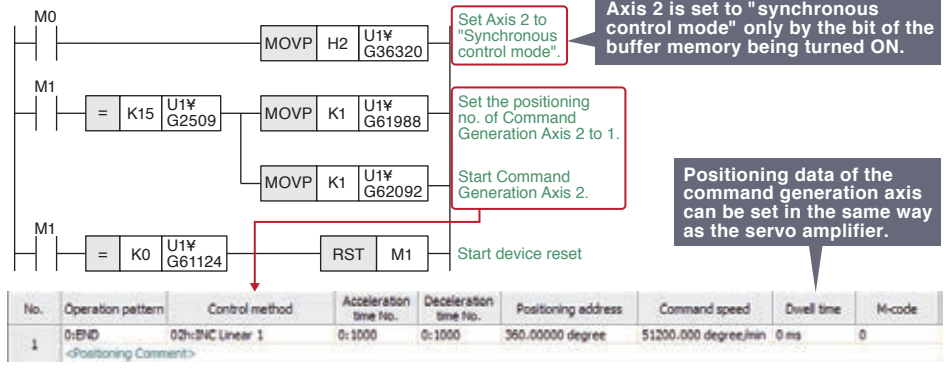
Create cam data of Axis 2 (conveying roller axis).



Step 4 Creation of sequence program and positioning data

Set Axis 2 to "synchronous control mode" and start Command Generation Axis 2.

[Program example]



Servo System Features

Advanced synchronous control

Synchronous control with FX series for the first time!

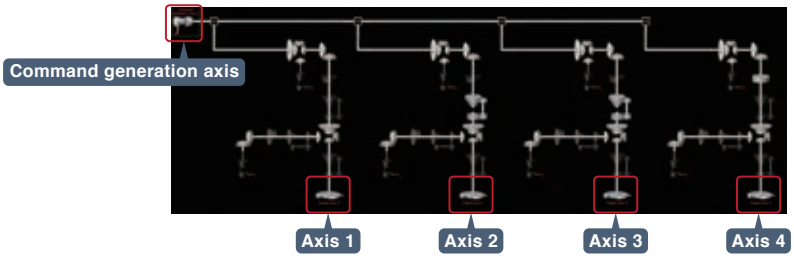
FX5-40SSC-S supports synchronous control for the first time among the FX series. Even without complicated programming, simply setting [synchronous parameters] and starting synchronous control for each output axis, can control an output axis in synchronization with an input axis.

[Synchronous parameter] setting screen

Command generation axis

Output axis available for the no. of control axes!

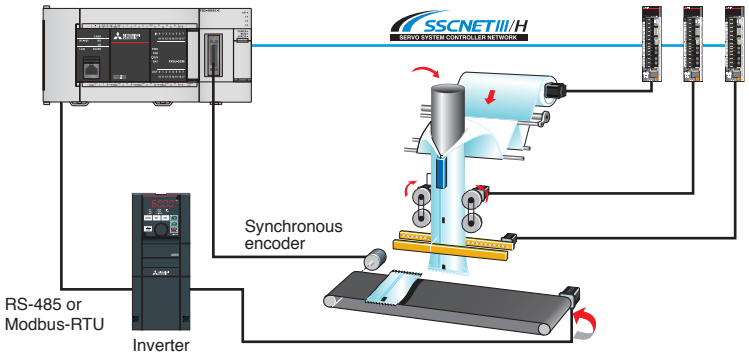
A command generation axis only generates a command, and can be controlled independently of the axis to which the servo amplifier is connected. This axis can be programmed regardless of the number of control axes because it is not counted as a control axis.



RS-485 communication by FX5 PLC

Synchronization with the axis driven by an inverter!

The FX5 PLC is equipped with the RS-485 communication function as standard.
Driving an inverter with the RS-485 communication and connecting a synchronous encoder to a Simple Motion module can drive a servo motor in synchronization with the axis driven by the inverter. The RS-485 communication function also can be used as Modbus-RTU communication.



Safety Warning

To ensure proper use of the products listed in this catalog, please be sure to read the instruction manual prior to use.

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