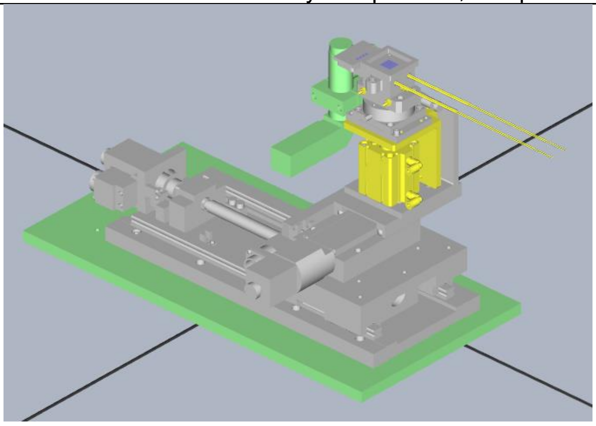
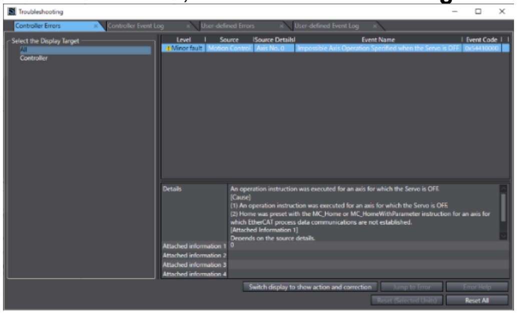
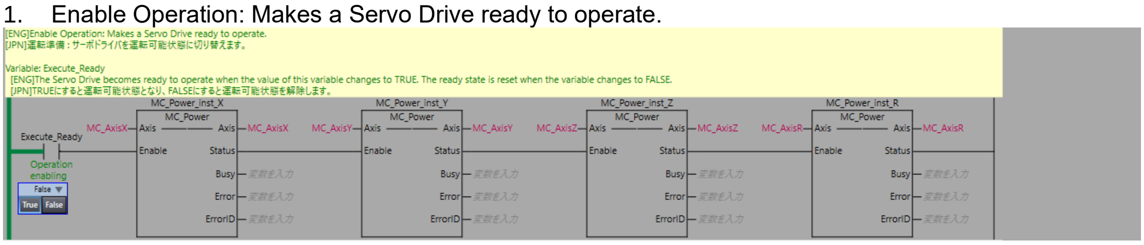
3D Simulation
Sample Program
No.16

X-Y-Z-Theta chip crimp mechanism

Basic function	Makes the device to be ready for operation, and performs homing, jog, and demonstration.	
3D image	 CAD data: MISUMI Corporation inCAD Library No.000794 (*) The CAD data was edited by OMRON. Refer to the Sysmac Studio 3D Simulation Function Operation Manual (W618-E1) for the editing procedures. (*The component name is not listed in the English website of MISUMI Corporation.)	
File name	3DSimulationSample_16_X-Y-Z-Theta_chip_crimp_mechanism_V1_00.smc2	
Applicable model	Sysmac Studio (64-bit version)	SYSMAC-SE2xxx Ver.1.40 or higher
	Sysmac Studio 3D Simulation Option	SYSMAC-SA4xxL-64
Used language	Ladder programming	
Used materials and equipment	OMROM 1S-series Servo System is used as the motor component in this simulation.	
Function description	・ When the Execute_Ready variable (BOOL) changes to TRUE, the Servo Drive becomes ready to operate. ・ When the Execute_Home variable (BOOL) changes to TRUE, the MC_Home instruction is executed to move each axis to its home. ・ While the following variable (BOOL) is TRUE, the jog operation is performed to move the axis in the specified direction. X_Jog_Posi (BOOL): Jogs the Axis X in the positive direction. X_Jog_Nega (BOOL): Jogs the Axis X in the negative direction. Y_Jog_Posi (BOOL): Jogs the Axis Y in the positive direction. Y_Jog_Nega (BOOL): Jogs the Axis Y in the negative direction. Z_Jog_Posi (BOOL): Jogs the Axis Z in the positive direction. Z_Jog_Nega (BOOL): Jogs the Axis Z in the negative direction. R_Jog_Posi (BOOL): Jogs the Axis R(Theta) in the positive direction. R_Jog_Nega (BOOL): Jogs the Axis R(Theta) in the negative direction. ・ When the Excute_Demo variable (BOOL) changes to TRUE, a demonstration is performed.	
Mechanical component types provided on the Sysmac Studio	X-Y-Z Stage + rotation axis (upward direction)	
Precaution for use	・ This sample program is specifically prepared for 3D simulation. Do no use this program in actual machine operation. ・ MISUMI Corporation may not offer all parts in each application design. Available parts can only be purchased separately not as a unit shown in each application design. MISUMI Corporation does not guarantee quality, accuracy, functionality, safety or reliability for the combination of the parts in each application example.	
Restrictions and others	・ Error processing is not included in the sample program. To reset errors, select **Troubleshooting** from the Tools Menu, then click the **Reset** All button.  Troubleshooting Controller Errors Controller Event Log User-defined Errors User-defined Event Log Select the Display Target All Controller Switch display to show action and correction Jump to Error Error Help Reset (Selected Units) Reset All Level: Minor fault / Source: Motion Control / Source Details: Axis No. 0 / Event Name: Impossible Axis Operation Specified when the Servo is OFF / Event Code: 0x54410000 Details: An operation instruction was executed for an axis for which the Servo is OFF. [Cause] (1) An operation instruction was executed for an axis for which the Servo is OFF. (2) Home was preset with the MC_Home or MC_HomeWithParameter instruction for an axis for which EtherCAT process data communications are not established. [Attached Information 1] Depends on the source details. Attached information 1: 0 Attached information 2 Attached information 3 Attached information 4	

Application example

1. Enable Operation: Makes a Servo Drive ready to operate.

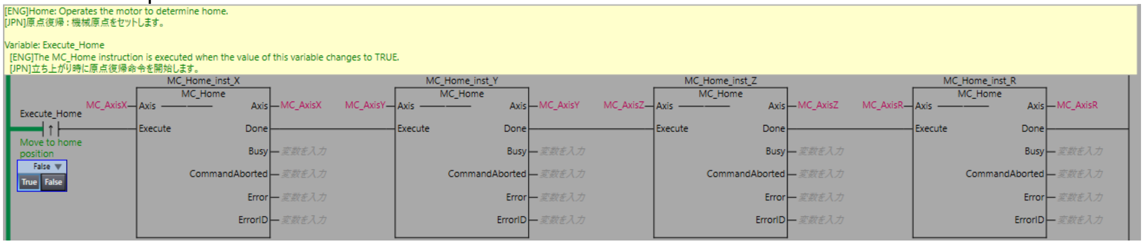


[ENG]Enable Operation: Makes a Servo Drive ready to operate.
[JPN]運転準備：サーボドライバを運転可能状態に切り替えます。

Variable: Execute_Ready
[ENG]The Servo Drive becomes ready to operate when the value of this variable changes to TRUE. The ready state is reset when the variable changes to FALSE.
[JPN]TRUEにすると運転可能状態となり、FALSEにすると運転可能状態を解除します。

Execute_Ready
Operation enabling
False
True
False
MC_Power_inst_X
MC_Power_inst_Y
MC_Power_inst_Z
MC_Power_inst_R
MC_Power
MC_AxisX
MC_AxisY
MC_AxisZ
MC_AxisR
Axis
Enable
Status
Busy
Error
ErrorID
変数を入力

2. Home: Operates the motor to determine home.

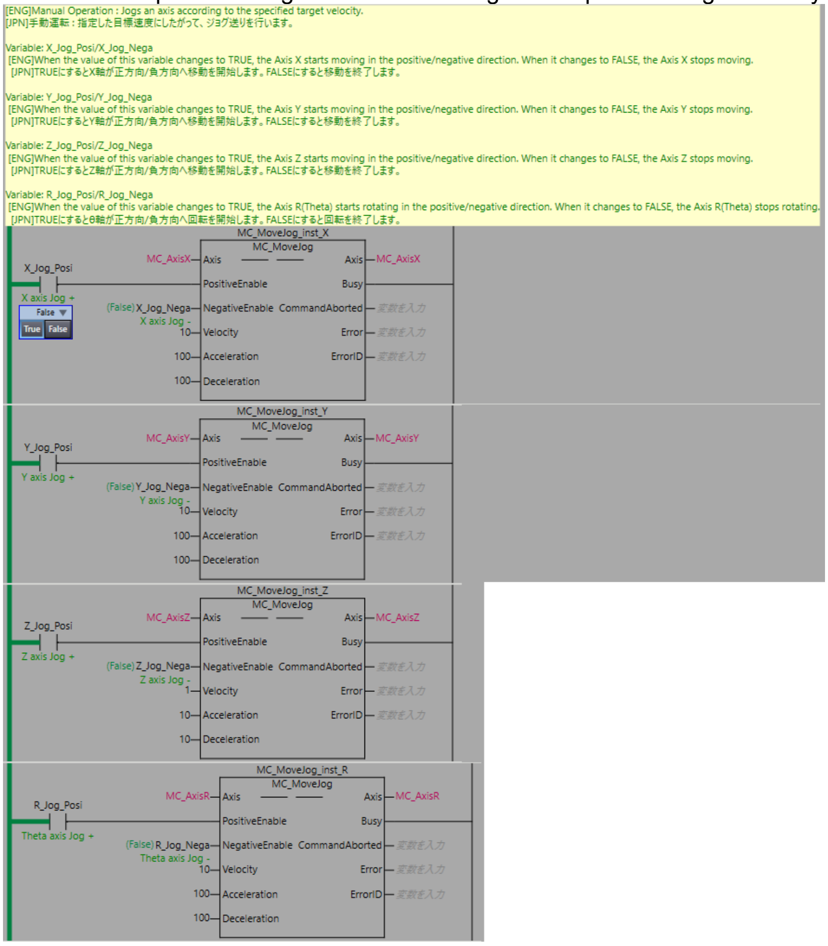


[ENG]Home: Operates the motor to determine home.
[JPN]原点復帰：機械原点をセットします。

Variable: Execute_Home
[ENG]The MC_Home instruction is executed when the value of this variable changes to TRUE.
[JPN]立ち上がり時に原点復帰命令を開始します。

Execute_Home
Move to home position
False
True
False
MC_Home_inst_X
MC_Home_inst_Y
MC_Home_inst_Z
MC_Home_inst_R
MC_Home
MC_AxisX
MC_AxisY
MC_AxisZ
MC_AxisR
Axis
Execute
Done
Busy
CommandAborted
Error
ErrorID
変数を入力

3. Manual Operation: Jogs an axis according to the specified target velocity.



[ENG]Manual Operation : Jogs an axis according to the specified target velocity.
[JPN]手動運転：指定した目標速度にしたがって、ジョグ送りを行います。

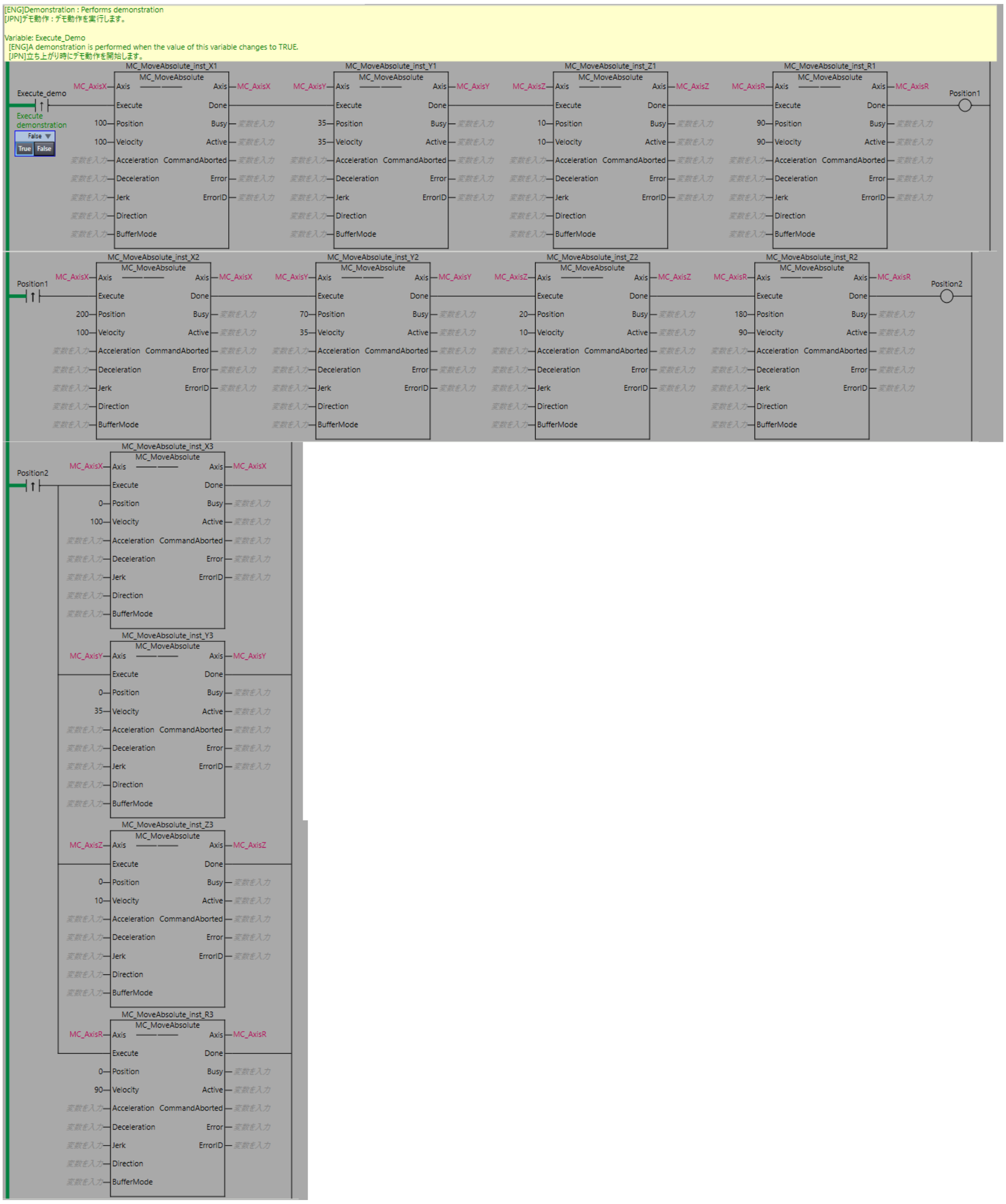
Variable: X_Jog_Posi/X_Jog_Nega
[ENG]When the value of this variable changes to TRUE, the Axis X starts moving in the positive/negative direction. When it changes to FALSE, the Axis X stops moving.
[JPN]TRUEにするとX軸が正方向/負方向へ移動を開始します。FALSEにすると移動を終了します。

Variable: Y_Jog_Posi/Y_Jog_Nega
[ENG]When the value of this variable changes to TRUE, the Axis Y starts moving in the positive/negative direction. When it changes to FALSE, the Axis Y stops moving.
[JPN]TRUEにするとY軸が正方向/負方向へ移動を開始します。FALSEにすると移動を終了します。

Variable: Z_Jog_Posi/Z_Jog_Nega
[ENG]When the value of this variable changes to TRUE, the Axis Z starts moving in the positive/negative direction. When it changes to FALSE, the Axis Z stops moving.
[JPN]TRUEにするとZ軸が正方向/負方向へ移動を開始します。FALSEにすると移動を終了します。

Variable: R_Jog_Posi/R_Jog_Nega
[ENG]When the value of this variable changes to TRUE, the Axis R(Theta) starts rotating in the positive/negative direction. When it changes to FALSE, the Axis R(Theta) stops rotating.
[JPN]TRUEにするとθ軸が正方向/負方向へ回転を開始します。FALSEにすると回転を終了します。

MC_MoveJog_inst_X
MC_MoveJog
X_Jog_Posi
X axis Jog +
False
True
False
MC_AxisX
(False) X_Jog_Nega
X axis Jog -
10 Velocity
100 Acceleration
100 Deceleration
MC_MoveJog_inst_Y
Y_Jog_Posi
Y axis Jog +
MC_AxisY
(False) Y_Jog_Nega
Y axis Jog -
10 Velocity
100 Acceleration
100 Deceleration
MC_MoveJog_inst_Z
Z_Jog_Posi
Z axis Jog +
MC_AxisZ
(False) Z_Jog_Nega
Z axis Jog -
1 Velocity
10 Acceleration
10 Deceleration
MC_MoveJog_inst_R
R_Jog_Posi
Theta axis Jog +
MC_AxisR
(False) R_Jog_Nega
Theta axis Jog -
10 Velocity
100 Acceleration
100 Deceleration
Axis
PositiveEnable
NegativeEnable
Busy
CommandAborted
Error
ErrorID
変数を入力

	4. Demonstration: Performs demonstration.  [ENG]Demonstration : Performs demonstration [JPN]デモ動作：デモ動作を実行します。 Variable: Execute_Demo [ENG]A demonstration is performed when the value of this variable changes to TRUE. [JPN]立ち上がり時にデモ動作を開始します。 Execute_demo Execute demonstration False True False MC_MoveAbsolute_inst_X1 MC_MoveAbsolute_inst_Y1 MC_MoveAbsolute_inst_Z1 MC_MoveAbsolute_inst_R1 Position1 MC_MoveAbsolute_inst_X2 MC_MoveAbsolute_inst_Y2 MC_MoveAbsolute_inst_Z2 MC_MoveAbsolute_inst_R2 Position2 MC_MoveAbsolute_inst_X3 MC_MoveAbsolute_inst_Y3 MC_MoveAbsolute_inst_Z3 MC_MoveAbsolute_inst_R3 MC_MoveAbsolute MC_AxisX MC_AxisY MC_AxisZ MC_AxisR Axis Execute Position Velocity Acceleration Deceleration Jerk Direction BufferMode Done Busy Active CommandAborted Error ErrorID 変数を入力 (Additional information) To confirm 3D operation, select **3D Visualizer** from the View menu. You can confirm the operation on the 3D Visualizer.
Related manuals	Sysmac Studio Version 1 Operation Manual (W504-E1) Sysmac Studio 3D Simulation Function Operation Manual (W618-E1)

■ Variable Tables

Input Variables

Meaning	Name	Data type	Default	Range	Description
Enable Operation	Execute_Ready	BOOL		TRUE or FALSE	The Servo Drive becomes ready to operate when the value of this variable changes to TRUE. The ready state is reset when the variable changes to FALSE.
Home	Execute_Home	BOOL		TRUE or FALSE	The MC_Home instruction is executed when the value of this variable changes to TRUE.
Jog Axis X in Positive Direction	X_Jog_Posi	BOOL		TRUE or FALSE	When the value of this variable changes to TRUE, the Axis X starts moving in the positive direction. When it changes to FALSE, the Axis X stops moving.
Jog Axis X in Negative Direction	X_Jog_Nega	BOOL		TRUE or FALSE	When the value of this variable changes to TRUE, the Axis X starts moving in the negative direction. When it changes to FALSE, the Axis X stops moving.
Jog Axis Y in Positive Direction	Y_Jog_Posi	BOOL		TRUE or FALSE	When the value of this variable changes to TRUE, the Axis Y starts moving in the positive direction. When it changes to FALSE, the Axis Y stops moving.
Jog Axis Y in Negative Direction	Y_Jog_Nega	BOOL		TRUE or FALSE	When the value of this variable changes to TRUE, the Axis Y starts moving in the negative direction. When it changes to FALSE, the Axis Y stops moving.
Jog Axis Z in Positive Direction	Z_Jog_Posi	BOOL		TRUE or FALSE	When the value of this variable changes to TRUE, the Axis Z starts moving in the positive direction. When it changes to FALSE, the Axis Z stops moving.
Jog Axis Z in Negative Direction	Z_Jog_Nega	BOOL		TRUE or FALSE	When the value of this variable changes to TRUE, the Axis Z starts moving in the negative direction. When it changes to FALSE, the Axis Z stops moving.
Jog Axis R(Theta) in Positive Direction	R_Jog_Posi	BOOL		TRUE or FALSE	When the value of this variable changes to TRUE, the Axis R starts rotating in the positive direction. When it changes to FALSE, the Axis R stops rotating.
Jog Axis R(Theta) in Negative Direction	R_Jog_Nega	BOOL		TRUE or FALSE	When the value of this variable changes to TRUE, the Axis R starts rotating in the negative direction. When it changes to FALSE, the Axis R stops rotating.
Demonstration	Execute_Demo	BOOL		TRUE or FALSE	A demonstration is performed when the value of this variable changes to TRUE.

Output Variables

Meaning	Name	Data type	Range	Description

■ Version History

Version	Date	Contents
1.00	March 2021	Original production.

■ Note

This document explains the function of the sample programs specifically prepared for 3D simulation.
It does not provide information of restrictions on the use of Units and Components or combination of them. For actual applications, make sure to read the operation manuals of the applicable product.

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