M Series Tutorial_MC_MoveFeed Command

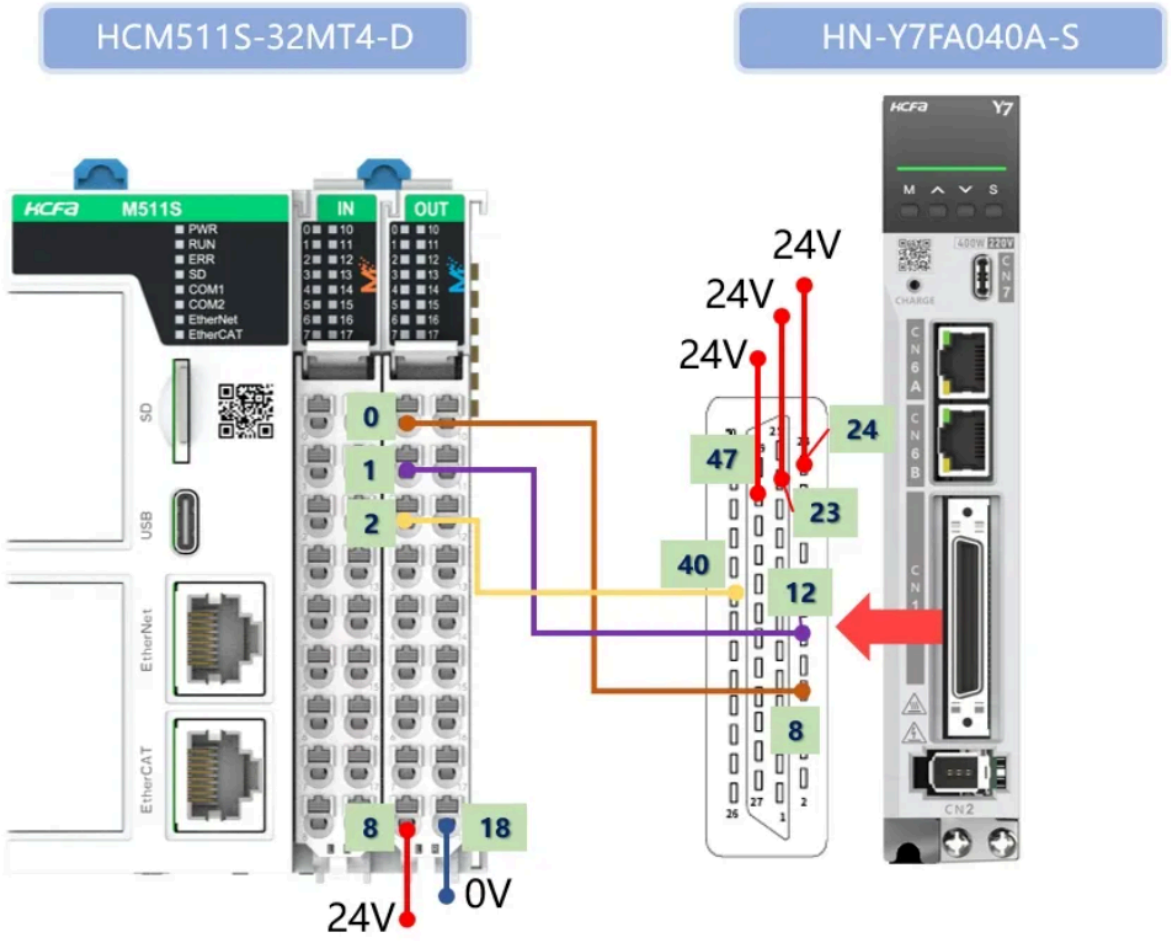
Software: Sysctrl Studio V2.4.0.1705 (PLC programming software)

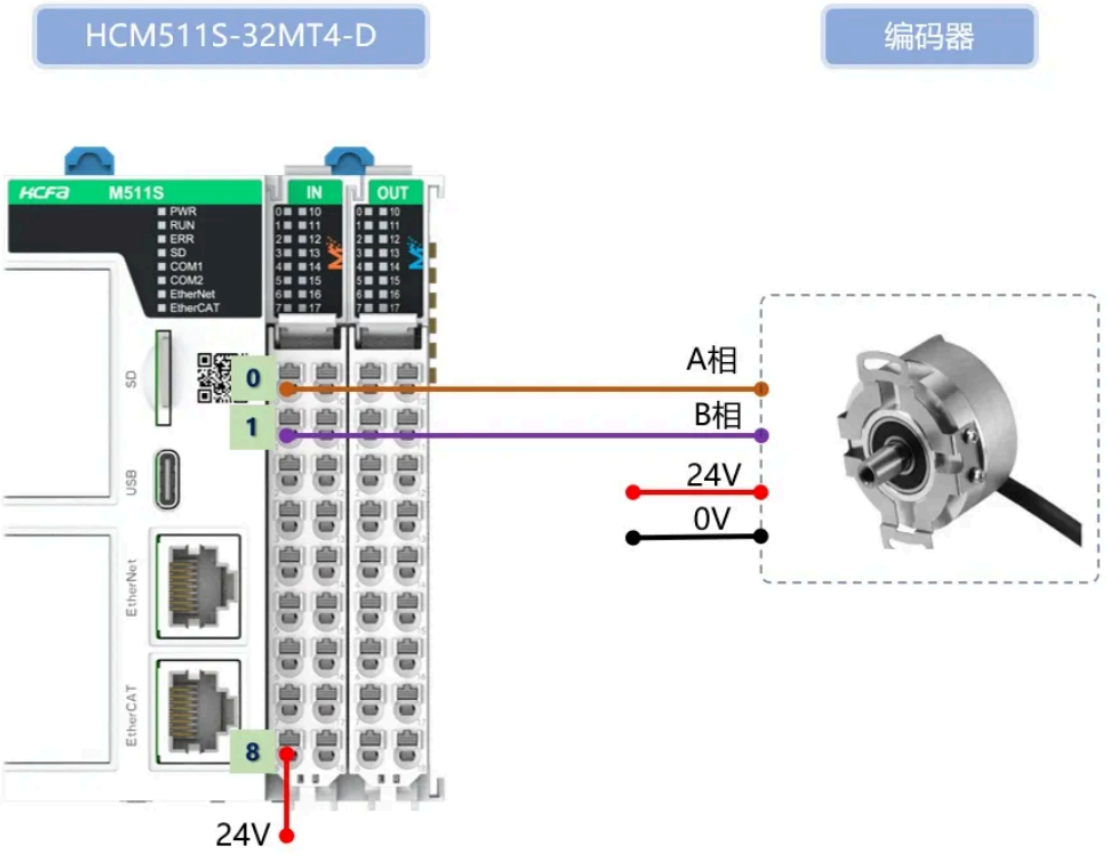
Hardware: M series controller (taking M511S as an example)

Servo (taking HN-Y7FA040A-S as an example)

Wiring configuration

This tutorial uses the M controller HCM511S-32MT4-D and servo HN-Y7FA040A-S. The pulse wiring and encoder wiring are as follows:

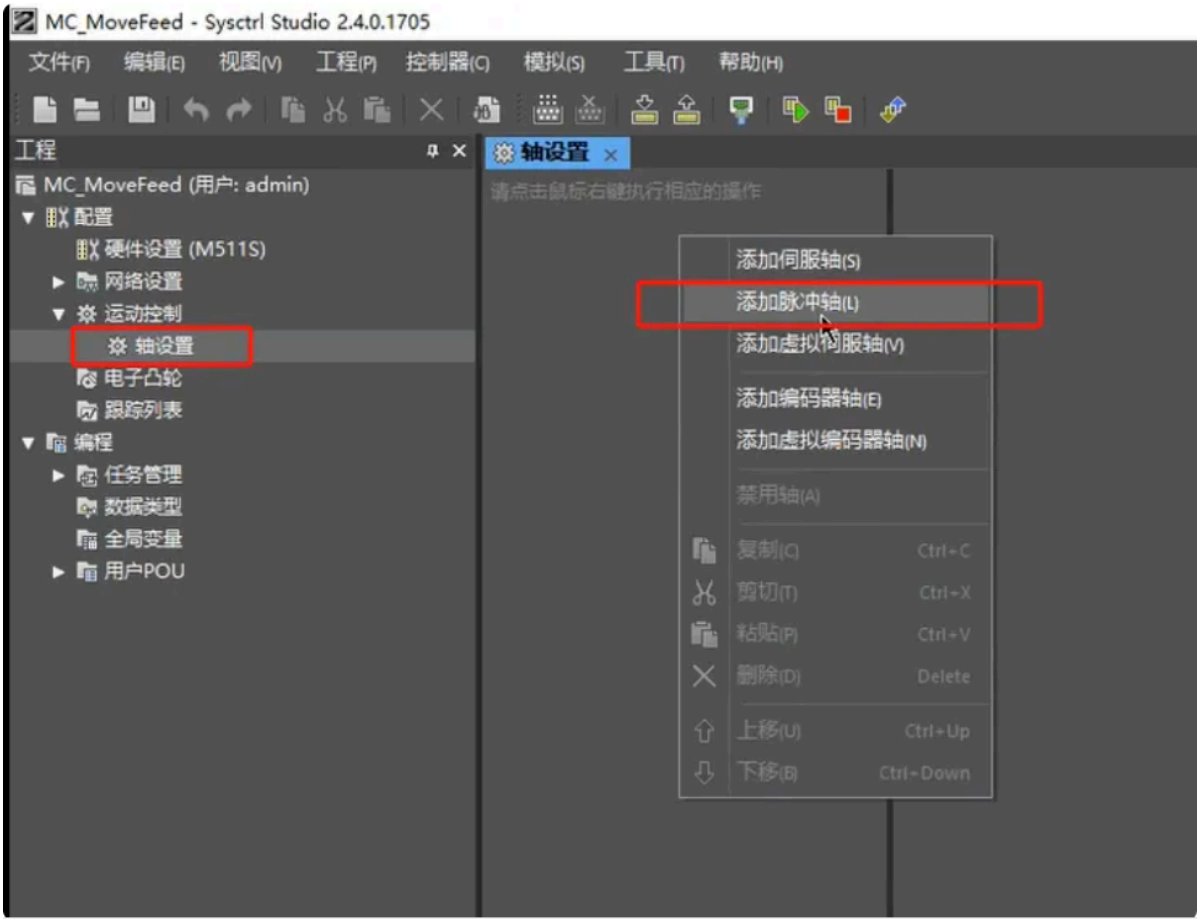


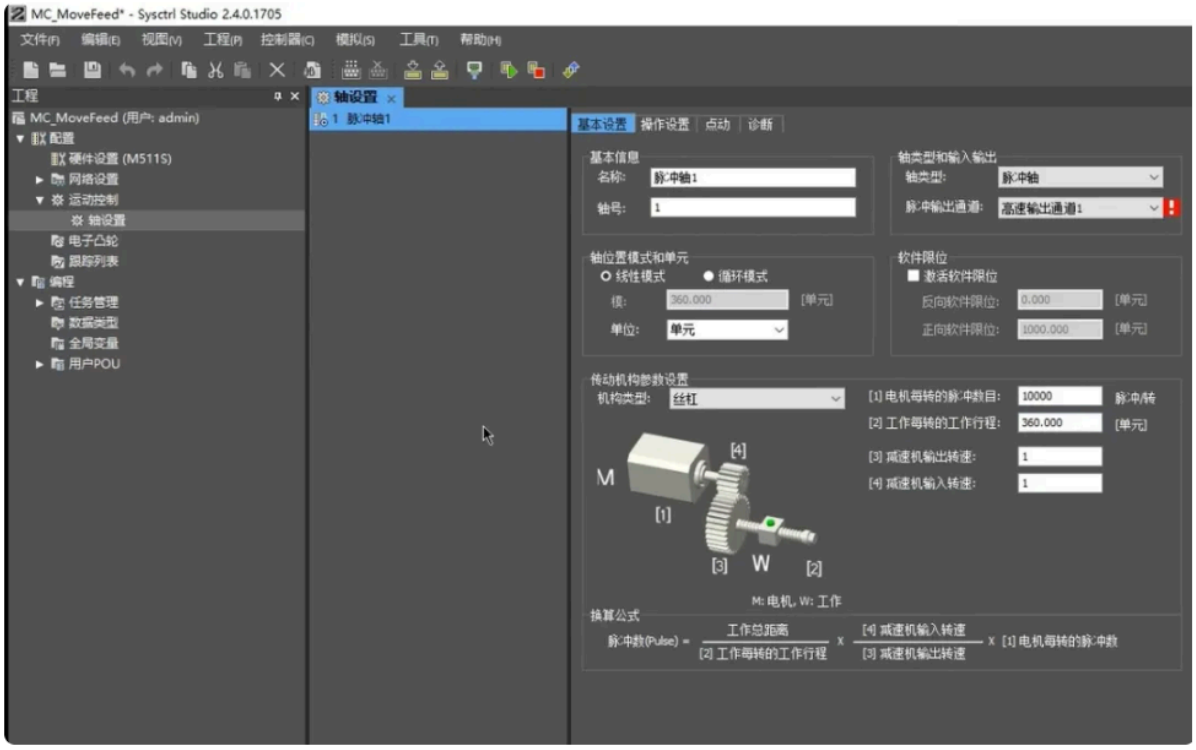


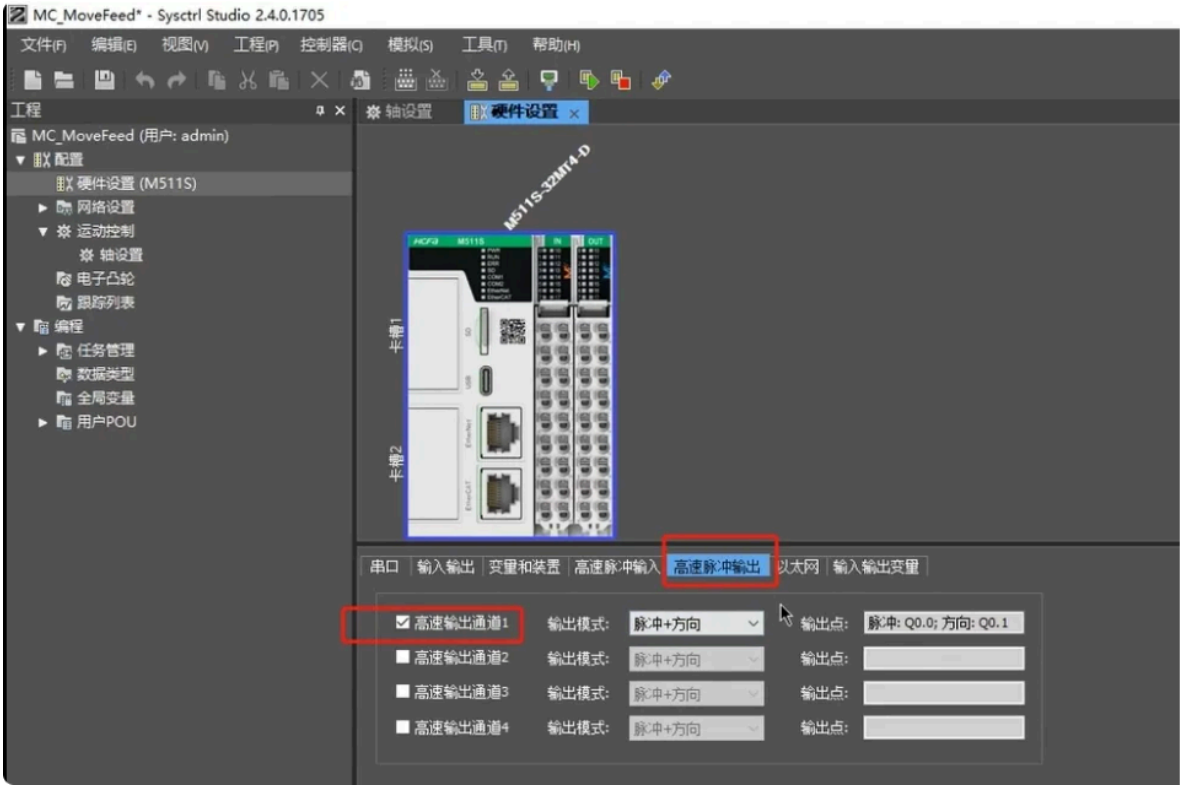
Sysctrl Studio project basic configuration

Basic Settings

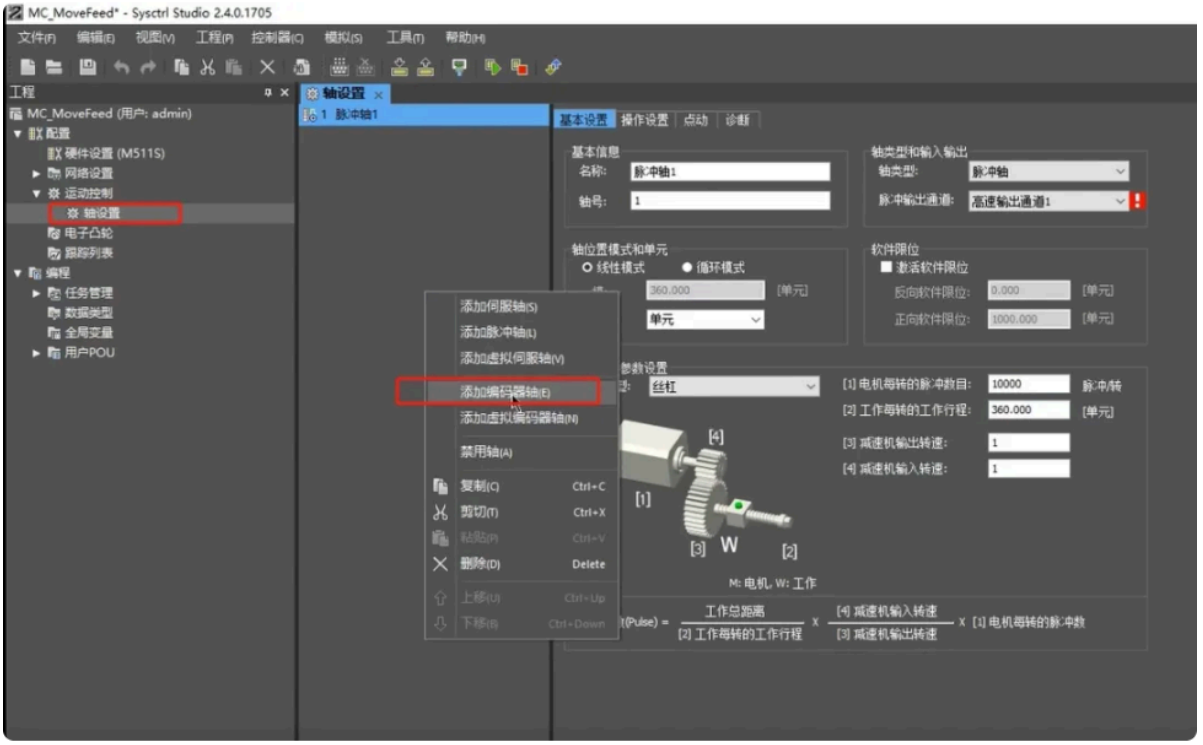
Pulse axis configuration

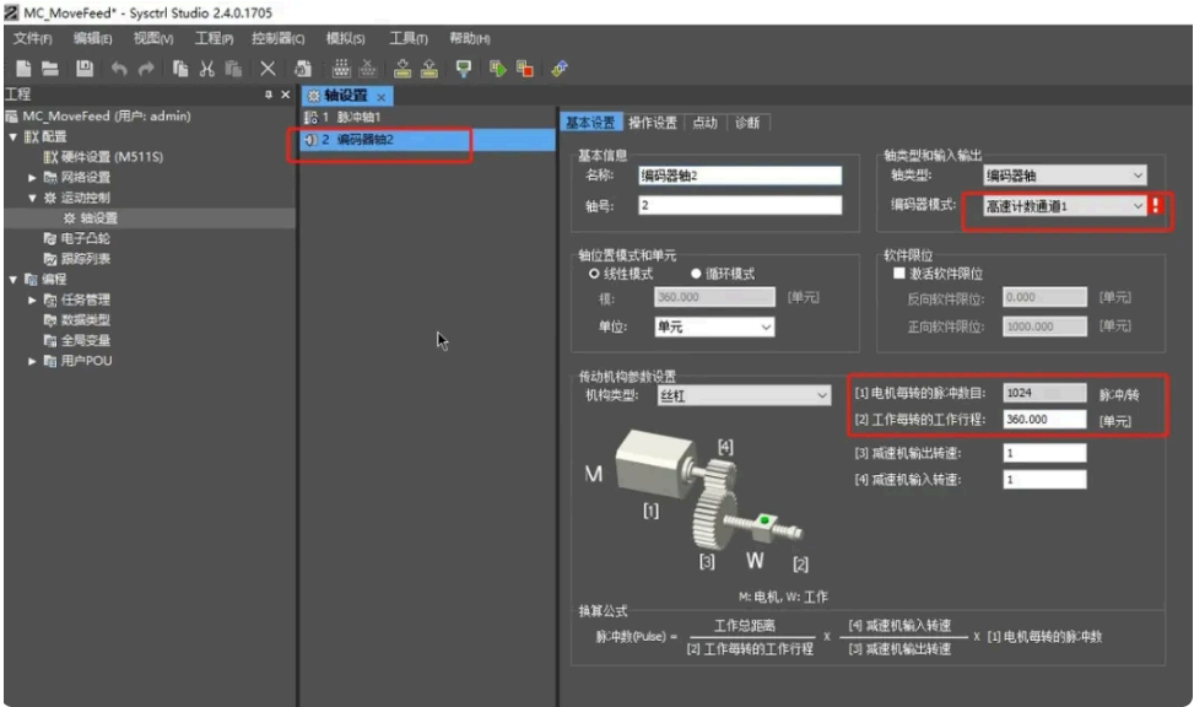


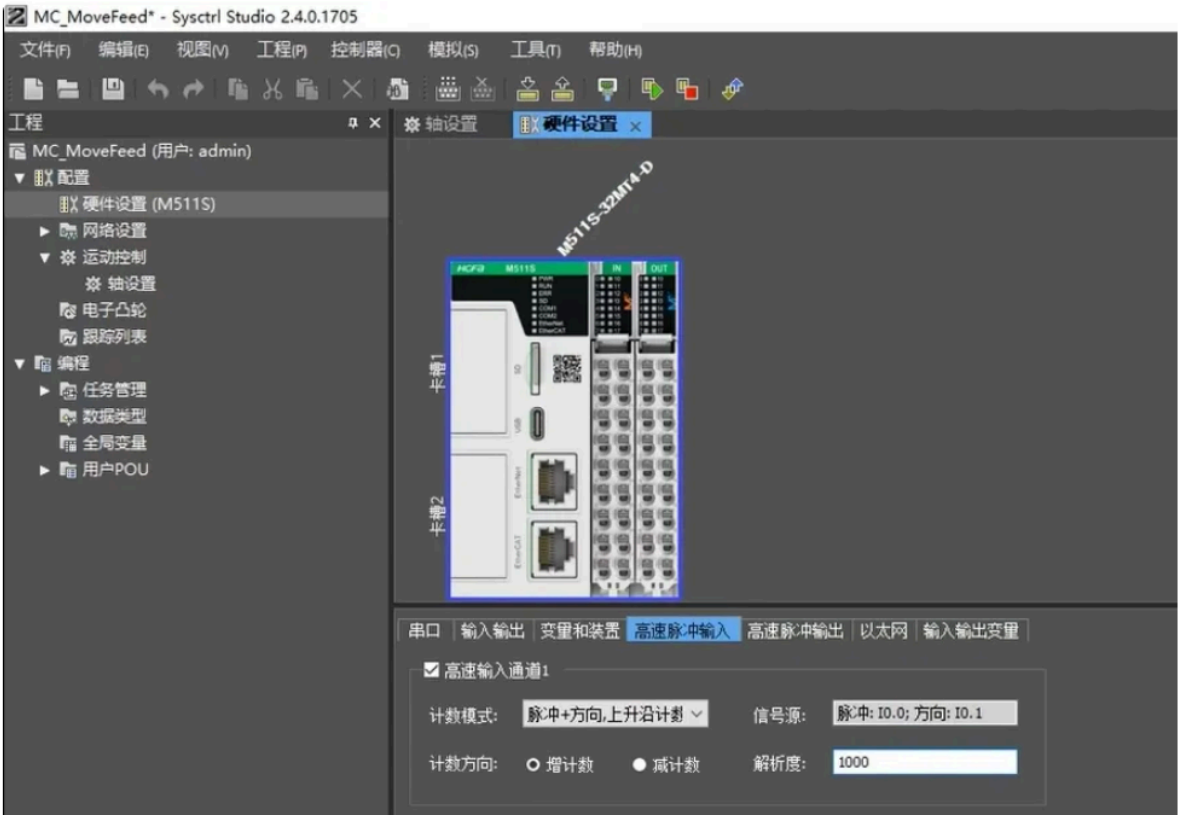




Encoder shaft configuration

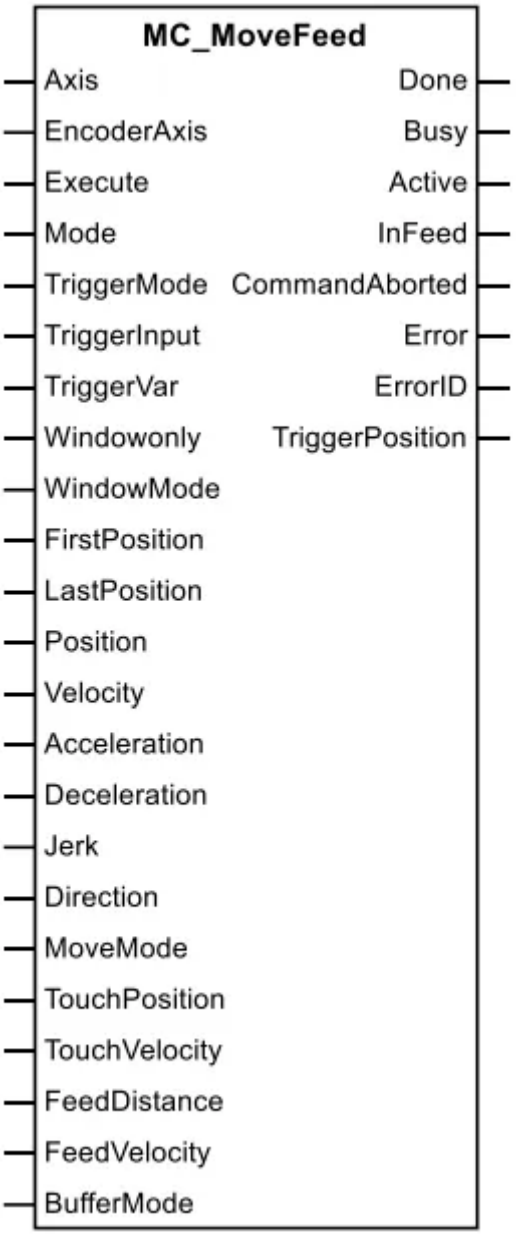

MC_MoveFeed* - Sysctrl Studio 2.4.0.1705
文件(F) 编辑(E) 视图(V) 工程(P) 控制器(C) 模拟(S) 工具(T) 帮助(H)
工程
MC_MoveFeed (用户: admin)
配置
硬件设置 (M511S)
网络设置
运动控制
轴设置
电子凸轮
跟踪列表
编程
任务管理
数据类型
全局变量
用户POU
轴设置
1 脉冲轴1
基本设置 操作设置 点动 诊断
基本信息
名称: 脉冲轴1
轴号: 1
轴类型和输入输出
轴类型: 脉冲轴
脉冲输出通道: 高速输出通道1
轴位置模式和单元
线性模式 循环模式
360.000 [单元]
单元
软件限位
激活软件限位
反向软件限位: 0.000 [单元]
正向软件限位: 1000.000 [单元]
参数设置
丝杠
[1] 电机每转的脉冲数目: 10000 脉冲/转
[2] 工作每转的工作行程: 360.000 [单元]
[3] 减速机输出转速: 1
[4] 减速机输入转速: 1
[4]
[1]
[3] W [2]
M: 电机, W: 工作
添加伺服轴(S)
添加脉冲轴(L)
添加虚拟伺服轴(V)
添加编码器轴(E)
添加虚拟编码器轴(N)
禁用轴(A)
复制(C) Ctrl+C
剪切(T) Ctrl+X
粘贴(P) Ctrl+V
删除(D) Delete
上移(U) Ctrl+Up
下移(B) Ctrl+Down
(Pulse) = 工作总距离 / [2] 工作每转的工作行程 x [4] 减速机输入转速 / [3] 减速机输出转速 x [1] 电机每转的脉冲数


MC_MoveFeed* - Sysctrl Studio 2.4.0.1705
文件(F) 编辑(E) 视图(V) 工程(P) 控制器(C) 模拟(S) 工具(T) 帮助(H)
工程
MC_MoveFeed (用户: admin)
配置
硬件设置 (M511S)
网络设置
运动控制
轴设置
电子凸轮
跟踪列表
编程
任务管理
数据类型
全局变量
用户POU
轴设置
1 脉冲轴1
2 编码器轴2
基本设置 操作设置 点动 诊断
基本信息
名称: 编码器轴2
轴号: 2
轴类型和输入输出
轴类型: 编码器轴
编码器模式: 高速计数通道1
轴位置模式和单元
线性模式 循环模式
360.000 [单元]
单元
软件限位
激活软件限位
反向软件限位: 0.000 [单元]
正向软件限位: 1000.000 [单元]
传动机构参数设置
机构类型: 丝杠
[1] 电机每转的脉冲数目: 1024 脉冲/转
[2] 工作每转的工作行程: 360.000 [单元]
[3] 减速机输出转速: 1
[4] 减速机输入转速: 1
M
[4]
[1]
[3] W [2]
M: 电机, W: 工作
换算公式
脉冲数(Pulse) = 工作总距离 / [2] 工作每转的工作行程 x [4] 减速机输入转速 / [3] 减速机输出转速 x [1] 电机每转的脉冲数



Interrupt fixed-length instructions

MC_MoveFeed (interrupt fixed-length instruction)



① Functional description

After this instruction is started, the specified axis is controlled to perform displacement or speed movement. After the axis moves beyond the specified relative position, the axis movement speed is switched to low speed, and the external interrupt signal is searched at low speed. After the external interrupt input is detected, the actual position of the axis is captured as the reference point using the interrupt input signal, and then the axis is moved the specified relative distance.

The MC_MoveFeed instruction is widely used in scenarios requiring precise interrupt control. For example, in packaging and labeling equipment, it can be triggered by an external signal to stop an axis at a specific position or perform a relative motion, thus achieving high-precision positioning control.

■ Input variable

Name	Meaning	Data types	Valid range	Default	Description
Axis	Axis number	USINT	Depends on model	Required field	Specify the axis number of the control axis
EncoderAxis	Encoder axis number	USINT	Depends on model	Required field	Specify the axis number of the encoder axis
Exexute	Execute	BOOL	TRUE or FALSE	FALSE	When the rising edge of this parameter is detected, relative displacement motion or velocity motion is performed according to the value of MoveMode
Mode	Mode	INT	0、1	0	Specify the mode of the input signal 0: After an external interrupt is input to record the axis position, the axis is then moved by the specified relative distance. 1.After detecting the rising edge of the input variable TriggerVar, the axis then

					moves the specified relative distance
TriggerMode	Trigger mode	INT	0、1、5、6	0	This input variable is used to set the mode for triggering the recording of the axis position. 0: Mode 0*1 The position of the encoder axis is recorded by the rising edge of the controller's input channel, which input channel is specified by the input variable TriggerInput. RecordedPosition is the position of the controller's encoder interface after receiving the number of pulses converted by the axis. parameters. 1: Mode 1*1 The position of the encoder axis is recorded by the falling edge of the controller's input channel, which input channel is specified by the input variable TriggerInput. RecordedPosition is the position of the controller's encoder interface after receiving the number of pulses converted by the axis 5: Mode 5*2 The position of the servo axis is locked by the rising edge of the input channel of the drive, the actual position of the servo axis is determined by the probe function of the drive. RecordedPosition is the motor's actual position converted by the axis parameters. 6: Mode 6*2 The position of the servo axis is recorded by the falling edge of the input channel of the drive, the actual position of the servo axis is determined by the probe function of the drive. RecordedPosition is the motor's actual position converted by the axis parameters.
TriggerInput	Trigger input	MC_TriggerInput	0:mcTriggerInput_I0 1:mcTriggerInput_I1 ... 7: mcTriggerInput_I7 8:mcTriggerInputI_I10 9:mcTriggerInputI_I11 ... 15:mcTriggerInputI_17	0	This input variable is only valid when the encoder axis position is recorded, i.e., when Mode is set to 0 and 1. If this input variable is set to 0, the controller input channel %IX0.0 is used to record the encoder axis position; if this input variable is set to 1, the controller input channel %IX0.1 is used to lock the encoder axis position
TriggerVar	Trigger variable	BOOL	TRUE or FALSE	FALSE	When Mode is set to 1, the axis moves the specified relative distance after the rising edge of this input variable is detected.

Windwonly	Window only	BOOL	TRUE or FALSE	FALSE	Specify whether to enable or disable the window FALSE: Invalid TRUE: Valid
WindowMode	Window mode	BOOL	TRUE or FALSE	FALSE	Specify the mode of the wWndowonly FALSE: Absolute mode TRUE: Relative mode
FirstPosition	First position	LREAL	Positive number、Negative number、0	0	Specify the position where latching is enabled Linear mode: First position of Window Cycle mode: 0≤FirstPosition<Cycle
LastPosition	Last position	LREAL	Positive number、Negative number、0	0	Specify the position where latching is disabled Linear mode: Last position of Window Cycle mode: 0≤LastPosition<Cycle
Position	Target position	LREAL	Positive number、Negative number、0	0	The meaning of the target position is determined by the value of the input variable MoveMode. When the value of MoveMode is 1, the value of Position is the relative position, using the command position when Execute changed from FALSE to TRUE as the reference point. When the value of MoveMode is 0, the value of Position is the absolute position. Linear mode: Limitless Cycle mode: 0≤Position<Cycle The axis position mode can be set in "Axis Settings" → "Basic Settings" in the software. When the value of MoveMode is 2, the value of Position is meaningless.
Velocity	Target velocity	LREAL	Positive number	Required field	Specify the target velocity *2 (Unit: Travel units/s)*3
Acceleration	Acceleration rate	LREAL	Positive number	Required field	Specify the acceleration rate *2 (Unit: Travel units /s²)*3
Deceleration	Deceleration rate	LREAL	Positive number	Required field	Specify the deceleration rate *2 (Unit: Travel units /s²)*3
Jerk	Jerk	LREAL	Positive number	Required field	Specify the jerk*2 (Unit: Travel units /s³)*3
Direction	Direction	MC_Direction	1: mcPositiveDirection 2: mcShortestWay 3: mcNegativeDirection 4: mcCurrentDirection	1	Specify the direction of rotation 1: Positive direction 2: Shortest way 3: Negative direction 4: Current direction, If the axis is at standstill, it moves in the positive direction
MoveMode	Move mode	MC_MoveMode	0: mcAbsolute 1: mcRelative 2: mcVelocity		Select the travel method. 0: Absolute positioning 1: Relative positioning 2: Velocity control

TouchPosition	Switch to relative position at low velocity	LREAL	Positive number、Negative number、0	0	This parameter calculates the relative position from the start of instruction execution. When the relative position exceeds the position set by this parameter, the target velocity of the axis changes to the velocity set by TouchVelocity from the velocity set by Velocity. If the position is a relative position, the initial reference position is the commanded position of the axis at the time the instruction is executed.
TouchVelocity	Target velocity after exceeding TouchPosition	LREAL	Positive number、Negative number、0	0	When the actual position exceeds the position set by the TouchPosition parameter, the target velocity of the axis changes to the velocity set by TouchVelocity from the velocity set by Velocity.
FeedDistance	The relative distance that needs to be moved after detecting an external interrupt	LREAL	Positive number、Negative number、0	0	Relative distance to be moved after external interrupt input is detected*2 (Unit: Travel units/s)*3
FeedVelocity	Target speed during relative positioning after detecting external interrupts	LREAL	Positive number	Required field	Specify the target velocity when moving relative to the distance after detecting an external interrupt input *2 (Unit: Travel units/s)*3
BufferMode	Buffer mode	MC_Buffer_Mode	0: mcAborting 1: mcBuffered 2: mcBlendingLow 3: mcBlendingPrevious 4: mcBlendingNext 5: mcBlendingHigh	0	Setting the bufferMode between two instructions*4 0: Aborting 1: Buffered 2: BlendingLow 3: BlendingPrevious 4: BlendingNext 5: BlendingHigh

*1: When multiple MC_TouchProbe instructions use both mode 0 and mode 1, mode 0 and mode 1 cannot be specified as the same input point.

*2: For the relation among Velocity, Acceleration, Deceleration and Jerk, please refer to "*Parameter description of motion control instructions*".

*3:For details of the instruction units, please refer to "*Parameter unit of motion control instructions*".

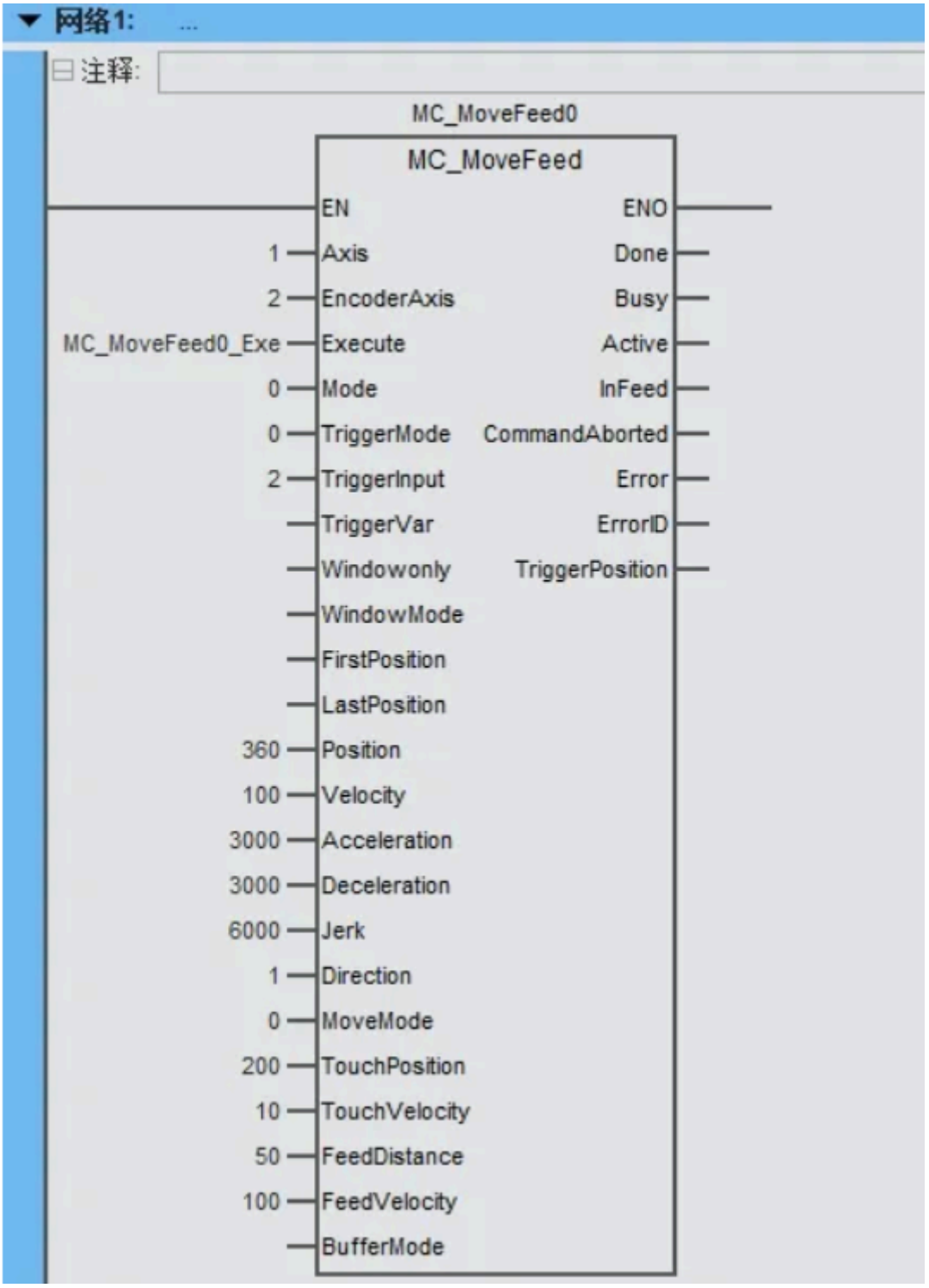
*4:For details of BufferMode, please refer to "*Buffer mode during multi-starting of the same axis*".

*5:Mode 5 and Mode 6 are only supported by M500S series and M500 series controllers.

■ Output variable

Name	Meaning	Data types	Valid range	Description
Done	Done	BOOL	TRUE or FALSE	TRUE when relative positioning completion triggered by an external interrupt; TRUE when positioning completion by MoveMode
Busy	Executing	BOOL	TRUE or FALSE	TRUE when the instruction is acknowledged
Active	Controlling	BOOL	TRUE or FALSE	TRUE when the axis is being controlled
InFeed	Feeding	BOOL	TRUE or FALSE	TRUE when specified signal be interrupted
CommandAborted	Command Aborted	BOOL	TRUE or FALSE	TRUE when the instruction is aborted
Error	Error	BOOL	TRUE or FALSE	TRUE while there is an error
ErrorID	Error Code	WORD	0~65535	Contains the error code when an error occurs For the meaning of the value, please refer to "*Instruction error code*"
TriggerPosition	Recorded trigger position	LREAL	Positive number、Negative number、0	Record the position of the axis when the signal is triggered

MC_MoveFeed instruction parameter configuration



④MC_MoveFeed instruction run test

【Key parameter configuration】

Mode is set to 0: After the external interrupt input locks the axis position, it moves the specified relative distance.

TriggerMode is set to 0: the encoder axis position is locked by the rising edge of the controller input point.

Set TriggerInput to 2: Specify the controller input point IX0.2 to lock the encoder shaft position.

【Command running effect】

a. Trigger the MC_MoveFeed0_Exe variable, and the instruction begins running. Axis 1 begins running at the set Velocity speed of 100.

b. After running to the set TouchPosition position 200, the axis speed automatically switches to the set TouchVelocity speed 10 low speed operation.

c. When the axis is running at a low speed of TouchVelocity and an external interrupt signal is detected, the instruction will automatically latch the position of the encoder axis (EncoderAxis) and save it to the instruction's TriggerPosition output variable.

d. Finally, axis 1 continues to move the relative distance (FeedDistance) set by the instruction based on the locked encoder axis position TriggerPosition, and the instruction operation ends.

【Operation effect waveform】