M Series Tutorial_Soft Limit Setting and Mechanism Parameter Setting Instructions

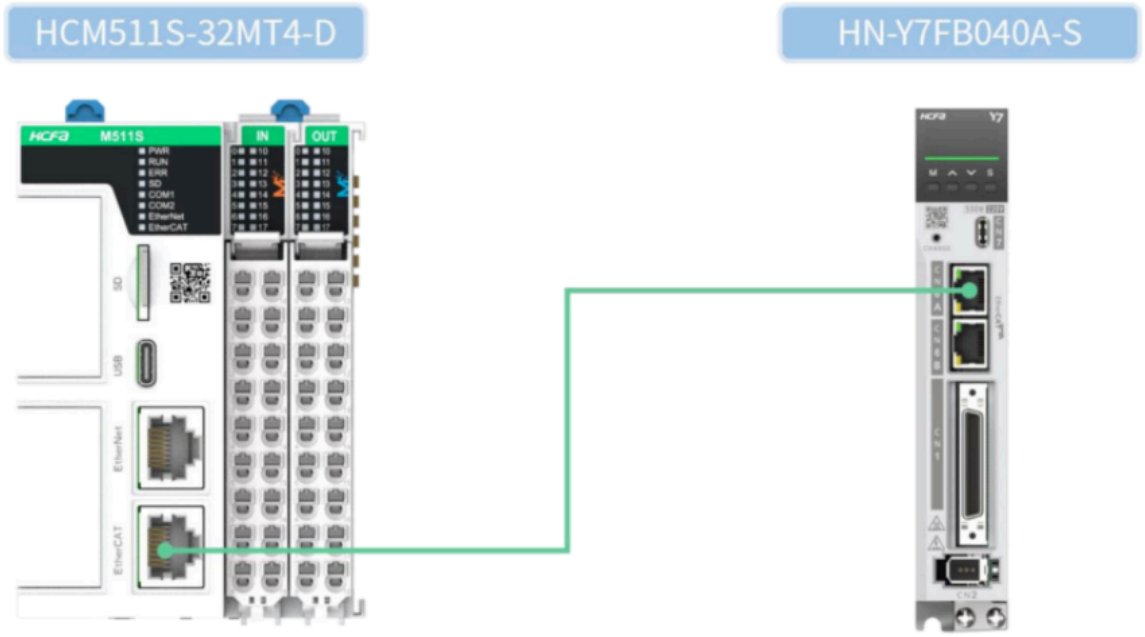
Software: Sysctrl Studio (PLC programming software)

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

Servo (taking HN-Y7FB040A-S as an example)

Communication connection

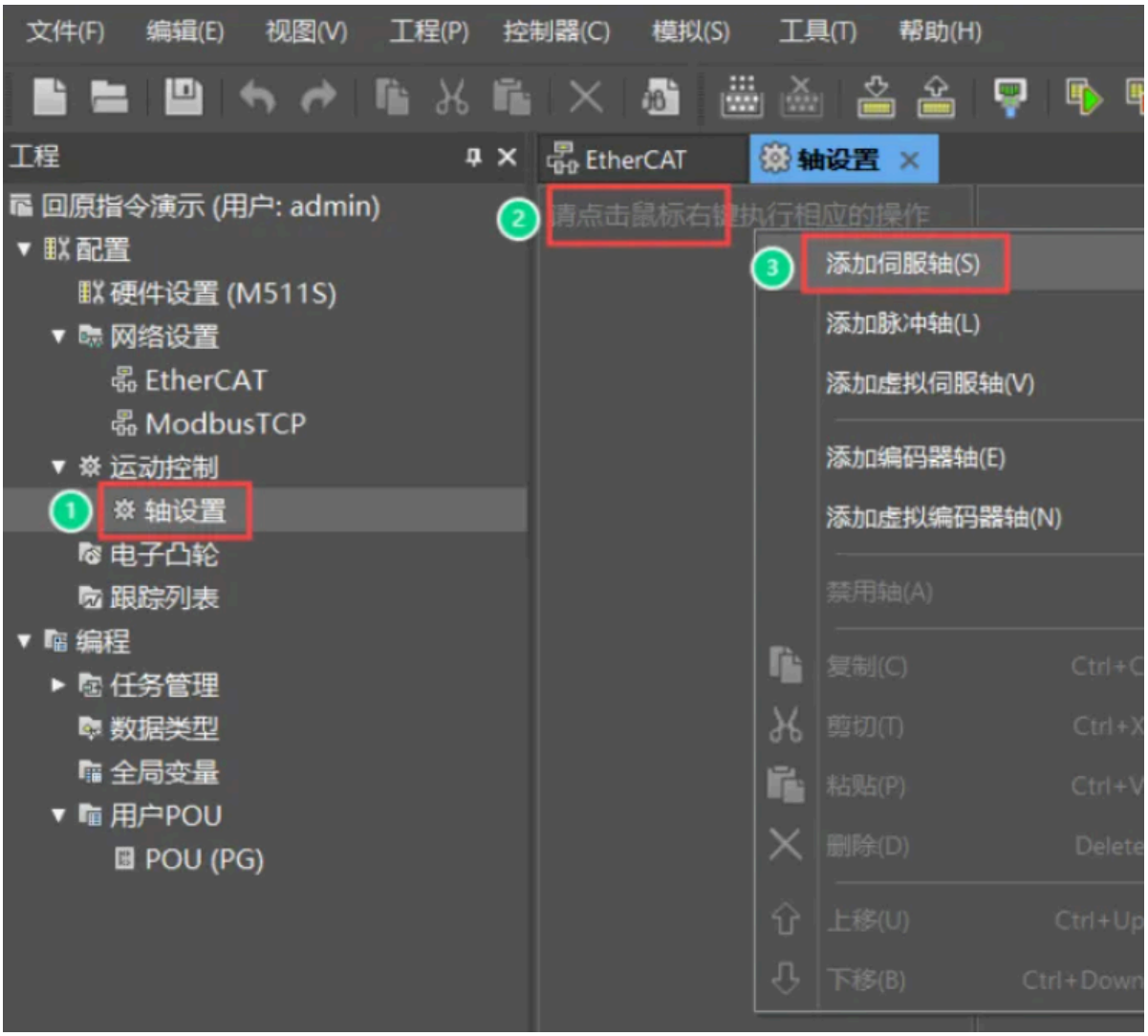
This tutorial uses the M controller HCM511S-32MT4-D and servo HN-Y7FB040A-S. The connection method is shown in the figure below.



Sysctrl Studio project basic configuration

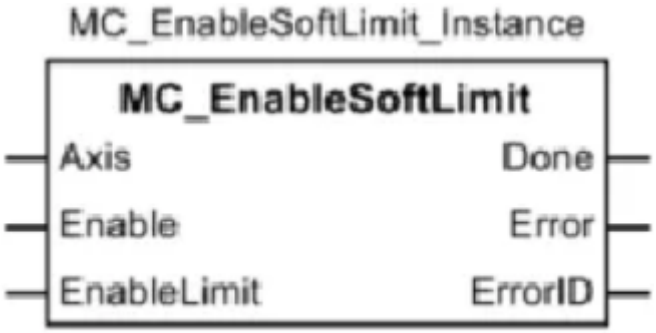
Basic Settings

[Add slave station] >> [Add servo axis] >> [Related equipment] >> [Mechanism parameter setting]


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
回原指令演示 (用户: admin)
配置
硬件设置 (M511S)
网络设置
EtherCAT
ModbusTCP
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
POU (PG)
EtherCAT
轴设置
请点击鼠标右键执行相应的操作
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)
剪切(T)
粘贴(P)
删除(D)
上移(U)
下移(B)
1
2
3


基本设置
原点返回设置
操作设置
点动
诊断
基本信息
名称:
伺服轴1
轴号:
1
轴类型和输入输出
轴类型:
伺服轴
关联到设备...
[节点1001] HCFA Y7 Servo Dri
轴位置模式和单元
线性模式
循环模式
模:
360.000
[单元]
单位:
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:
8388608
脉冲/转
[2] 工作每转的工作行程:
10.000
[单元]
[3] 减速机输出转速:
1
[4] 减速机输入转速:
1
M
[4]
[1]

MC_EnableSoftLimit (set soft limit on or off instruction)



① Functional description

This command is used to set whether to activate software limits. Software limits can be set through software or can be set and changed using this command. If this command is not used, the software settings will prevail. After activating software limits, if the axis position exceeds the positive or negative software limit, the axis will enter the ErrorStop state and need to be reset by executing MC_Reset.

After the controller is powered on, this instruction must be executed again before the state set by this instruction can be used for operation ; after the controller is powered on, this instruction is not executed and the parameters in " Software Limit " in "Axis Settings" of the software are executed .

②Pin Description

■ **Input variable**

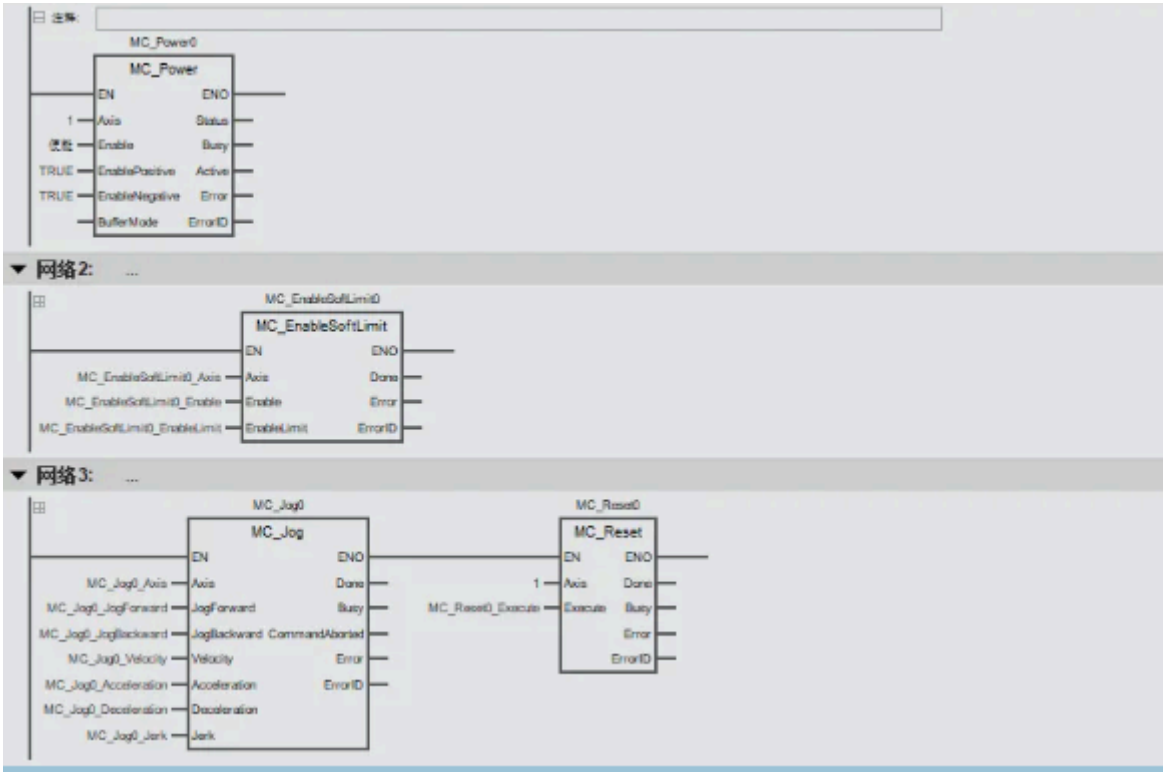
Name	Meaning	Data types	Valid range	Default	Description
Axis	Axis number	USINT	Depends on model	Required field	Specify the axis number of the control axis
Enable	Enable	BOOL	TRUE or FALSE	FALSE	TRUE: Instruction execution FALSE: instruction is not executed.
EnableLimit	Enable software limit	LREAL	TRUE or FALSE	FALSE	TRUE: Enable software limit FALSE: disable software limit

■ **Output variable**

Name	Meaning	Data types	Valid range	Description
Done	Done	BOOL	TRUE or FALSE	TRUE when the instruction is completed
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*"

Instruction Test

Project Settings



MC_EnableSoftLimit function block test

a. Enable, set EnableLimit to True, trigger MC_EnableSoftLimit function block, and jog forward

Result: When the axis position is close to 1000, it decelerates and stops. After stopping, the axis state enters ErrorStop (error stop), proving that the software limit is turned on.

b. Trigger the MC_Reset function block to reset the axis error

Result: The axis status returns to Standstill.

c. Jog the axis in the reverse direction

Result: The axis decelerates and stops when the position approaches 0. After stopping, the axis state enters ErrorStop (error stop)

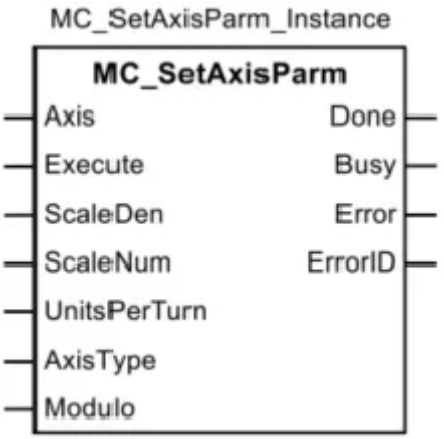
d. Set EnableLimit to False, trigger the MC_EnableSoftLimit function block, and jog forward.

Result: The axis position can pass through the position of 1000 normally, proving that the software limit is closed

【Explanation】

After the controller is powered on, the command must be executed again before it can run in the state set by the command ;

MC_SetAxisParm (Change Mechanism Parameters Command)



① Functional description

This instruction is used to change the terminal mechanism parameters. When the linkage mechanism of the axis changes, such as when the reducer changes, this instruction can be used to change the axis parameters to be consistent with the actual mechanism parameters, which is convenient for users.

②Pin Description

■ **Input variable**

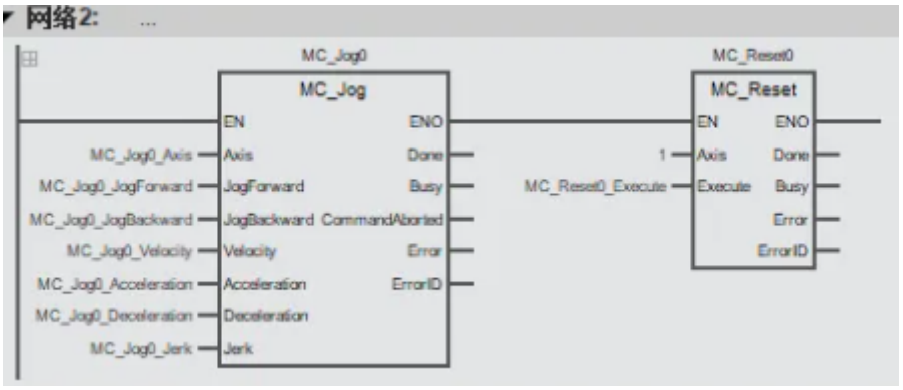
Name	Meaning	Data types	Valid range	Default	Description
Axis	Axis number	USINT	Depends on model	Required field	Specify the axis number of the control axis
Execute	Execute	BOOL	TRUE or FALSE	FALSE	Execute this instruction when the rising edge of this parameter is detected
ScaleDen	Gear ratio numerator	LREAL	Positive integer	Required field	Gear ratio numerator
ScaleNum	Gear ratio denominator	LREAL	Positive integer	Required field	Gear ratio denominator
UnitsPerTurn	Working stroke per revolution	LREAL	Positive number	Required field	Number of travel units moved by one revolution of the working mechanism (Unit: Travel units)
AxisType	Axis type	USINT	0、1	0	Axis type 0: Rotary mode 1: Linear mode
Modulo	Modulo	LREAL	Positive number	Required field	Modulo value

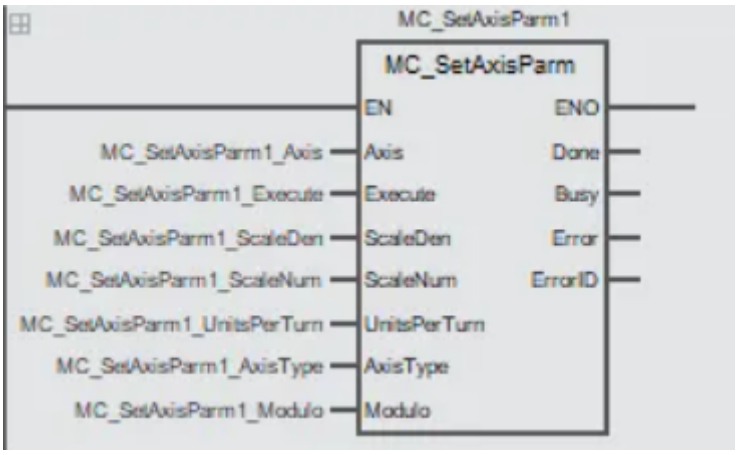
■ **Output variable**

Name	Meaning	Data types	Valid range	Description
Done	Done	BOOL	TRUE or FALSE	TRUE when the instruction is completed
Busy	Executing	BOOL	TRUE or FALSE	TRUE when the instruction is acknowledged
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"

Instruction Test

Project Settings





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a. Enable the axis , execute MC_Jog with Velocity =100, and observe the axis speed

Result: The shaft moves at 600 rpm

b. Stop the jog, trigger MC_ SetAxisParm to modify the mechanism parameters (ScaleDen=1, ScaleNum=2), and then trigger the jog

Result: The shaft moves at 300 rpm

[Note]

When using this instruction, you need to be familiar with the meaning of each parameter of the instruction. Otherwise, the axis speed may not be consistent with the expectation, causing accidents or dangers.