
FMC4030 Automatic control instruction list

Function Description

The FMC4030 controller supports running script files. The script commands are defined by our company. The script running mode is to run from the first line to the bottom. It supports command line jumps and loops, and nested loops. Using this instruction system, the automatic control of the controller can be realized. The instructions have included all the basic functions of the controller, and different functions can be realized according to different instruction combinations.

The instruction format is: instruction parameter 1 parameter 2 parameter 3 parameter 4 remarks.

Each instruction has 4 parameters at most, and at least 0 parameters. The remarks are not downloaded to the controller.

The specific instructions are shown in the table below. The unit of speed parameter in the table is mm/s, and the unit of acceleration and deceleration is mm/s².

Instruction	Parameter 1	Parameter 2	Parameter 3	Parameter 4	Remark
Set single-axis motion parameters	Axis number (0, 1, 2) corresponds to X, Y, Z	speed	Acceleration	Deceleration	
Set homing motion parameters	Axis number (0, 1, 2) corresponds to X, Y, Z	Zero speed	Zero return acceleration and	The zero return direction (1,	

			deceleration	2) corresponds to the positive and negative return to zero	
Set linear interpolation parameters	speed	Acceleration	Deceleration	null	
Set circular interpolation parameters	The axis numbers (3, 5, 6) respectively represent the XY, XZ, YZ axes	speed	Acceleration	Deceleration	
Start single-axis relative motion	The axis numbers (1, 2, 4) respectively represent the X, Y, and Z axes. Multiple axes can be activated at the same time. At this time, the axis numbers can be added together. For example, to activate the XY axis, just fill in 3	X axis moving distance	Y axis movement distance	Z axis moving distance	
Start single axis absolute movement	Same as above	X axis target position	Y axis target position	Z axis target position	

Start single-axis home movement	Axis number (0, 1, 2) corresponds to X, Y, Z	The distance of the origin falling off, if it is 0, it will not be far away from the limit switch after returning to zero	null	null	
Start two-axis linear interpolation (starting at the current point position)	The axis numbers (3, 5, 6) respectively represent the XY, XZ, YZ axes	X target position	Y target position		
Start three-axis linear interpolation (take the current point as the starting point)	X target position	Y target position	Z target position		
Start two-axis circular interpolation	X target position	Y target position	Center X position	Center Y position	
Start two-axis reverse arc interpolation	X target position	Y target position	Center X position	Center Y position	
Pause Run	null	null	null	null	
Resume Run	null	null	null	null	
Stop Run	null	null	null	null	

WairAxisDone	Axis number (0, 1, 2)	Axis number (0, 1, 2)	Axis number (0, 1, 2)	null	
Sleep	Sleep time (ms)	null	null	null	
Wait	null	null	null	null	
Jump	Line	null	null	null	
Cycle	Line	count	null	null	
Local Input Jump	Local IO numbers (0, 1, 2, 3) are used for IO0- IO3 respectively	trigger event (0、 1)	Target line	null	
External input jump	Extended IO station number	Expansion IO input port number	trigger event (0、 1)	Target line	
Exit	null	null	null	null	
Local output port operation	Local IO numbers (0, 1, 2, 3) correspond to OUT0-OUT3 respectively	Output state (0、 1)	null	null	
External output port operation	Extended IO station number	Expansion IO output port number	Output state (0、 1)	null	
Wait for the return to zero to complete	Axis number (0, 1, 2)	Axis number (0, 1, 2)	Axis number (0, 1, 2)	null	

Detailed instructions\

The basic operation of the script is: set a certain operating mode parameter, and then start a certain operating mode.

1、 Set single-axis motion parameters

This instruction contains 4 parameters, which are used to set the operating parameters during single-axis motion, such as axis number, speed, acceleration, deceleration, etc. The unit is mm/s. The parameters set by this instruction will not be saved after power off, so you need to use this instruction to reset each time before executing the command.

Among them, the axis number parameter is one of the fixed values 0, 1, and 2, which respectively represent the X, Y, and Z axes. Only one axis can be set by one command.

2、 Set homing motion parameters

This command contains 4 parameters

Parameter 1: Axis number (0, 1, 2 correspond to X, Y, Z)

Parameter 2: Return to zero speed (mm/s)

Parameter 3: Return to zero acceleration and deceleration (mm/s²)

Parameter 4: Return to zero direction (1, 2) corresponds to positive limit return to zero, negative limit return to zero

3、 Set linear interpolation parameters

This command contains 3 parameters. Both two-axis linear interpolation and three-axis linear interpolation use this parameter

Parameter 1: Linear interpolation speed (mm/s)

Parameter 2: Linear interpolation acceleration (mm/s²)

Parameter 3: Linear interpolation deceleration (mm/s²)

4、 Set circular interpolation parameters

This command contains 4 parameters

Parameter 1: Axis number, 3, 5, 6 correspond to XY, XZ, YZ axis respectively, this axis number is a combination of 1, 2, and 4.

Parameter 2: Circular interpolation speed

Parameter 3: Arc interpolation acceleration

Parameter 4: Arc interpolation deceleration

5、 Start single-axis relative motion

This command contains 4 parameters, which can start 1-3 axes at the same time. The coordinates filled in are all relative positions, so it is a relative motion.

Parameter 1: Axis number, 3, 5, 6 correspond to XY, XZ, YZ axis respectively, this axis number is a combination of 1, 2, 4

Parameter 2: The position of the X axis movement relative to the current point

Parameter 3: The position of the Y axis relative to the current point

Parameter 4: The position of the Z axis movement relative to the current point

6、 Start single axis absolute movement

This command contains 4 parameters, which can start 1-3 axes at the same time. The coordinates are all absolute positions, so it is an absolute motion.

Parameter 1: Axis number, 3, 5, 6 correspond to XY, XZ, YZ axis respectively, this axis number is a combination of 1, 2, 4

Parameter 2: X axis movement absolute position

Parameter 3: Y-axis movement absolute position

Parameter 4: Absolute position of Z axis movement

7、 Start single-axis home movement

This command contains 2 parameters, only one axis can be started at a time.

Parameter 1: Axis number (0, 1, 2 correspond to X, Y, Z axis respectively)

Parameter 2: The distance to fall off the limit switch after returning to zero, which can be greater than or equal to 0

8、 Start two-axis linear interpolation

This instruction is used to start two-axis linear interpolation. It can start linear interpolation of XY, XZ, YZ and other planes. It needs to fill in the combined axis number. Since the parameter only has the target position, it is an absolute motion.

Parameter 1: Axis number, 3, 5, 6 correspond to XY, XZ, YZ axis respectively, this axis number is a combination of 1, 2, 4

Parameter 2: Target X-axis position, this X is a virtual coordinate system, which has nothing to do with the selected axis

Parameter 3: Target Y-axis position, this Y is a virtual coordinate system, which has nothing to do with the selected axis

9、 Start three-axis linear interpolation

This instruction contains 3 parameters, which are used to start three-axis linear interpolation. The coordinate values are all target positions, which are absolute motions.

Parameter 1: Target X position

Parameter 2: Target Y position

Parameter 3: Target Z position

10、 Start two-axis circular interpolation

This instruction contains 4 parameters. The axis number that needs to be started is set in the setting parameters. This instruction is clockwise circular interpolation.

Parameter 1: Target X position

Parameter 2: Target Y position

Parameter 3: Center X position

Parameter 4: Y position of the center of the circle

11、 Start two-axis reverse arc interpolation

This instruction is the same as above, but the difference is counterclockwise circular interpolation, and the parameters are the same as above

12、 Pause Run

This instruction has no parameters and is used to suspend the current movement. Can pause single axis movement, interpolation movement。

13、 Resume Run

This command has no parameters and is used to resume the suspended motion。

14、 Stop Run

This instruction has no parameters and is used to stop the current movement

15、 Wait for the axis to complete

This instruction contains 3 parameters, which can detect whether the 3 axes are in operation. If the axis is in operation, the script program will wait at the line where this instruction is located, and run the next line until the axis is completed.

Parameter 1: Axis No. 0, 1, 2

Parameter 2: Axis No. 0, 1, 2

Parameter 3: Axis No. 0, 1, 2

16、 Sleep

This instruction is used to delay the script program. The script program will wait on this line until the delay time ends. The delay time unit is ms.

Parameter 1: Delay waiting time

17、 Wait

This instruction is used to block the current program from continuing to execute downwards, and can be used in conjunction with the input jump instruction, without parameters.

18、 Jump

This instruction contains 1 parameter, which is used to change the execution order of the script and can jump to the specified line for execution.

Parameter 1: Target line number (greater than 0, less than or equal to the maximum line number of the program)

19、 Cycle

This instruction contains 2 parameters for the loop of the program.

Parameter 1: The target line number of the jump

Parameter 2: The number of cycles

20、 Local input jump

This instruction contains 3 parameters, which are used to detect external input. When the external input triggers the corresponding event, the script program can jump to the specified line.

Parameter 1: IO number to be detected (0, 1, 2, 3)

Parameter 2: Need to detect the event of the IO port (0: rising edge event, 1: falling edge event)

Parameter 3: The line number to jump after the event occurs

21、 External input jump

This instruction contains 4 parameters, and the usage is always the same as the local input of the upper speed. However, since there are only 4 local IOs, the IO module needs to be expanded when it is not enough. At this time, this instruction can take effect.

Parameter 1: The station number of the externally expanded IO module

Parameter 2: The IO slogan that the external expansion IO module needs to detect

Parameter 3: External expansion IO module IO port event (0: rising edge event, 1: falling edge event)

Parameter 4: The line number to jump after the event occurs

22、 Exit

This command has no parameters and is used to exit the current script program operation and change the device operation mode to manual mode.

23、 Local output port operation

This command contains 2 parameters, which are used to set the state of the local output port.

Parameter 1: IO number to be set (0, 1, 2, 3 correspond to OUT0-3)

Parameter 2: IO port status to be set (1: on, 0: off)

24、 External output port operation

This command contains 3 parameters, which are used to set the state of the output port of the external IO module.

Parameter 1: External IO module station number

Parameter 2: The number of the external IO port that needs to be set, which is determined by the number of IOs of the external expansion IO module

Parameter 3: IO port status of external IO module (1: on, 0: off)

25、 Wait for the return to zero to complete

This instruction contains 3 parameters, which are used to detect whether the zero return of each axis is completed. When each axis is in the zero return state, this instruction will continue to wait. The zero return is completed or the zero return timeout state, etc., this instruction will be executed Next step.

Parameter 1: Axis number (0, 1, 2)

Parameter 2: Axis number (0, 1, 2)

Parameter 3: Axis number (0, 1, 2)

26、 Start two-axis relative linear interpolation

This command contains 3 parameters, which are used for two-axis linear interpolation, and the coordinates are relative positions.

Parameter 1: Axis number (3, 5, 6 correspond to XY, XZ, YZ respectively)

Parameter 2: Relative position of X axis

Parameter 3: Relative position of Y axis

27、 Start three-axis relative linear interpolation

This command contains 3 parameters, which are used for three-axis linear interpolation, and the coordinates are relative positions.

Parameter 1: Relative position of X axis

Parameter 2: Relative position of Y axis

Parameter 3: Relative position of Z axis