

Setting Q Variables to Axis Range(s)

January 6, 2010

1.0 Overview

This document explains how you can set any Q-variable to the XYZ axis ranges using the Set Variable command code. This can be used with an L XYZ move in M91 to move to any of the axis minimum or maximum positions.

2.0 Modifying the NC Format

There are two changes required to the NC Format. The first is to add the codes to put the axis range values into a Q-variable. The second, is to use that Q-variable with a Set Machine XYZ position code.

2.1 Setting the Q-Variable

The Q-variable is usually set in the Start Program section of your NC Format:

1. Go to Tools > NC Format Editor
2. Select your Start Program block and click EDIT
3. Locate where you want to put the variable setting and add 5 blank lines:

20	Code Comment	--- Initialize Machine ---	:Comment
21	WP CS Shift	Enable Trans	CYCL DEF 7.0 DATUM SHIFT
22	WP CS Shift	Set X Trans	CYCL DEF 7.1 X
23	WP CS Shift	Set Y Trans	CYCL DEF 7.2 Y
24	WP CS Shift	Set Z Trans	CYCL DEF 7.3 Z
25	WP CS Shift	Set B Trans	CYCL DEF 7.4 B
26	WP CS Shift	Set C Trans	CYCL DEF 7.5 C
27	<input checked="" type="radio"/> Auto Kin Disabled	<input type="radio"/> Auto Kin Enabled	M129
28	<input type="radio"/> Disabled	<input checked="" type="radio"/> Go Shortest Distance	M126
29	WP CS Set Plane	Spatial Reset	PLANE RESET STAY
30			
31			
32			
33			
34			
35	Code Comment		:Comment
36	Code Comment	--- Begin Operations ---	:Comment
37	Code Comment	*****	:Comment

4. Go to the New Codes Window and add the following codes on each line, in order:
 - a. Comment
 - b. A Q# = <Value> code
 - c. A second Q# = <Value> code
 - d. A comment
 - e. A Variable Unit Conversion code
5. It should look like the following:

27	<input checked="" type="radio"/> Auto Kin Disabled	<input type="radio"/> Auto Kin Enabled	M129
28	<input type="radio"/> Disabled	<input checked="" type="radio"/> Go Shortest Distance	M126
29	WP CS Set Plane	Spatial Reset	PLANE RESET STAY
30	Code Comment		:Comment
31	Variable:	-1 Value:	Q-1 =
32	Variable:	-1 Value:	Q-1 =
33	Code Comment		:Comment
34	Variable Unit Conversion		Variable Unit Conversion
35	Code Comment		:Comment
36	Code Comment	--- Begin Operations ---	:Comment
37	Code Comment	*****	:Comment

6. For the first comment add "Set Q99 to Z Max"
7. For the first variable assign code, use 99 as the variable (this is Q99) and then use "[FROM_MP=MP910.2]" as the text. This will essentially be setting Q99 to the 910.2 in the machine parameter file. Remember, at this point, the value is always in MM even if you are running in inches. We will take care of this a few lines later.

Setting Q Variables to Axis Range(s)

January 6, 2010

8. For the second variable assign code, again use 99 as the variable and the text Q99 – 1. This will subtract 1 mm from the Q99 variable (so that you are not on the exact limit)
9. In the second comment set the text to “Convert units”
10. In the Variable Unit Conversion, set the text to “[Q99=MM]”. This tells the post processor that the value of Q99 is in MILLIMETRES. If you are running in INCHES, this will output Q99 = Q99 / 25.4, converting it to inches. If the program is in MM, it will produce no output.
11. When you are done, the format should look like this:

27	<input checked="" type="radio"/> Auto Kin Disabled	<input type="radio"/> Auto Kin Enabled	M129
28	<input type="radio"/> Disabled	<input checked="" type="radio"/> Go Shortest Distance	M126
29	WP CS Set Plane	Spatial Reset	[OPTION-STAY] PLANE RESET STAY
30	Code Comment Set Q99 to Z Max		:Comment
31	Variable: 99	Value: [FROM_MP=MP910.2]	Q-1 =
32	Variable: 99	Value: Q99 - 1	Q-1 =
33	Code Comment Convert units		:Comment
34	Variable Unit Conversion [Q99=MM]		Variable Unit Conversion
35	Code Comment		:Comment
36	Code Comment --- Begin Operations ---		:Comment
37	Code Comment *****		:Comment

12. Click Finish to commit the format changes
13. Next, open the NC Format block where you want to use the new Q99 value. For this example, open the TOOL CHANGE block.
14. Find the line with the Set Z
15. Set the value to +Q99
16. It should look like the following:

Tool Change Lines:		
Index	Default Settings	Code Layout
1	Code Comment --- Perform Tool Change ---	:Comment
2	<input checked="" type="radio"/> Rapid <input type="radio"/> Linear (Cutting) <input type="radio"/> Circular Interp <input type="radio"/> Circular Interp <input type="checkbox"/> Set X 0.000000 <input type="checkbox"/> Set Y 0.000000 <input checked="" type="checkbox"/> Set Z +Q99 <input checked="" type="radio"/> Ref Coord Sys 1 <input type="radio"/> Ref Coord Sys 2 <input type="radio"/> Ref Coord Sys 3	L Machine Pos XYZ M91
3	Optional Stop Code	M01
4	Auto Tool Description:	:Auto Comment: Tool Info
5	<input checked="" type="checkbox"/> Change the cutting tool <input type="checkbox"/> Over-ride Select Tool <input type="radio"/> Z <input type="radio"/> Y <input type="radio"/> X <input type="radio"/> Other Spindle Speed 0 Tool Length Adjust	TOOL CALL 1 Z S0 Tool Length Adjust
6	<input checked="" type="radio"/> Rapid <input type="radio"/> Linear (Cutting) <input type="radio"/> Circular Interp <input type="radio"/> Circular Interp <input type="checkbox"/> Set X 0.000000 <input type="checkbox"/> Set Y 0.000000 <input checked="" type="checkbox"/> Set Z +Q99 <input checked="" type="radio"/> Ref Coord Sys 1 <input type="radio"/> Ref Coord Sys 2 <input type="radio"/> Ref Coord Sys 3	L Machine Pos XYZ M91
7	WP CS Set Origin Enable Set Origin	Work Piece Coord System Set Origin
8	WP CS Set Origin Select Origin	Work Piece Coord System Set Origin
9	Line Number Control <input checked="" type="checkbox"/> Over-ride [SKIP]	Line Number Control
10	<input type="radio"/> Stop <input checked="" type="radio"/> Clockwise <input type="radio"/> Counter Clockwise	M03
11	<input type="checkbox"/> Coolant <input checked="" type="checkbox"/> Flood <input type="checkbox"/> Mist <input type="checkbox"/> Throug <input type="checkbox"/> Custom <input type="checkbox"/> Custom <input type="checkbox"/> Custom	Coolant
12	Path Tolerance Enable Path Tolera	CYCL DEF 32.0 TOLERANCE
13	Path Tolerance Path Tolerance Lin	[DEF_LINEAR_TOL=C CYCL DEF 32.1 T0]
14	Path Tolerance Path Tolerance Ro	[DEF_ROTARY_TOL=C CYCL DEF 32.2 HSC-MODE:0 TA0]

17. Close the Format editor to commit the change

Setting Q Variables to Axis Range(s)

January 6, 2010

Now when you use this format you should see the following G-Code posted and simulated:

```

BEGIN PGM Cube MM
1 ;*****
2 ; --- Program Information ---
3 ;Generation Date = Thursday January 06, 2011 (Time = 01:05:56 PM)
...
...
40 ;Set Q99 to Z Max
41 FN 18: SYSREAD Q99 = ID1000 NR910 IDX2
42 Q99 = Q99 - 1
43 ;Convert units
44
45 ;*****
46 ; --- Begin Operations ---
47 ;*****
...
...
54 L Z+Q99 M91
55 M01
56 ;Cutting Tool = T10: (Imported) Bullnose (50-5 mm) - Bullnose (50-5 mm)
57 TOOL CALL 10 Z S2500
58 L Z+Q99 M91
...
...

```