

RIGID TAPPING

1. For rigid tapping, the spindle must run with a following error proportional to the following error the axis runs.
- 2) EX. If we program(in metric) a line with G84 Z0R1 F1000 S1000.
If the following error of Z axis (example) is 1mm, the following error of spindle must be approximately 360 degrees (it is displayed on the S value at FOLLOWING ERROR DISPLAY MODE).
- 3) IMPORTANT: To get this, we can increase/decrease the following error of Z axis with PROGAIN and for spindle PROGAIN in the spindle parameter table and also FFGAIN (spindle table)
- 4) Steps to adjusting
 - a) With a simple program in **G71**, move Z axis back and forth (or another axis that will be the longitudinal axis when rigid tapping) to get a following error of 1mm at F1000, when (obviously) running alone.
 - b) Write a program G84 X10 Y10 Z-10 I-100 R1 K1 F1000 S1000
 - c) Check the following error of the spindle to try to get S=360 degrees (approximately). Increase / decrease value of PROGAIN and later FFGAIN in the spindle parameter table.

Note: It is recommended P41=1 (GAINUNIT) in the spindle parameter to have a bigger range in the adjustment of PROGAIN for the spindle.

: ACCTIME (In the spindle parameters table in milliseconds, time to get the maximum rpm)
(In the Z axis parameters table)

It must be borne in mind that when interpolating, the Cnc will apply ACCTIME of the slowest axis, in general and for this job, it will be the spindle.

EXAMPLE:

The following example sets up rigid tapping for the Fagor bench spindle
We have a fagor spindle drive and a SPM 160LE

Cnc spindle parameters:

P2 = 1000rpm (max. gear 1)
P3 = 1000rpm (max. gear 2)
P4 = 1000rpm (max. gear 3)
P5 = 1000rpm (max. gear 4)
P18 =1000ms (acctime)
P19 = .1 (in position width)
P21 = 3000 (max. following error 1)
P22 = 300 (max. following error 2)

P23 = 2772mv (progain)
Calculation: $(9999\text{mv}) \cdot (100) \cdot (2.778) / (1000) = 2772\text{mV}$
9.9V = analog voltage
100 = because of the gain unit =1
2.778 = constant
1000 = rpm for the range

P34 = 9000 (reference feed 1)
P35 = 360 (reference feed 2)
P37 = 9999mv (max. voltage 1)
P38 = 9999mv (max. voltage 2)
P39 = 9999mv (max. voltage 3)
P40 = 9999mv (max. voltage 4)

P41 = 1 (gain unit)
P42 = NO (ac-forward)
P43 = 1 (M19type)
P45 = 3000 (open loop acceleration time)
P52 = YES (indicates when M3,M4,M5 are to be sent)

Digital Drive Parameters:

SP20 = 10 (VoltageRpmVolt)
SP21 = 1000 (RpmRpmVolt)

If you have 2 different ranges, then cnc parameters must be set up using different sets

With this setup, you will need to take the different ranges into account when calculating the program.

If range 1 is 124 rpms: calculation: $(9999\text{mv}) \cdot (100) \cdot (2.778) / (124) = 22400\text{mV}$

If range 2 is 1000rpms: calculation: $(9999\text{mv}) \cdot (100) \cdot (2.778) / (1000) = 2772\text{mV}$

drive parameters

Set2: SP20 = 10, SP21 = 1000

Inorder to use range2, you will need to setup general parameter 108 (activate gain 2) for rigid tapping . This will activate second set of gains.

IMPORTANT NOTE:

Make sure that the second set of gains for the axes are the same for the first because the CNC will take all the axes into account.