

Constant Surface feet spindle speeds - G96, G97, G77, G76

To use the following codes the OmniTurn must be equipped with a spindle control package. There are two types of spindle speed control modes that the OmniTurn control can use:

Spindle speed in RPM - (G97). In this mode the S value will set the spindle speed in turns per minute, 'RPM'. The speed will stay at this value until it is changed. If the spindle is turned off and then back on in the program the speed will still be the previously set value.

This mode is good for drilling and fixed spindle speed operations.

Constant Surface Feet - G96. In this mode the S value will set the amount of surface feet the tool will see. The speed of the material passing the tool will stay constant, no matter what the tool's distance from center is. As the tool gets closer to center the speed of the spindle will increase. Many tool and material suppliers give suggested feeds and speeds in terms of surface feet. This mode is good for turning and facing operations. (*See notes on use below*)

Minimum spindle speed - G76: Sets the minimum spindle speed, G76Sn.

Maximum spindle speed - G77: Sets the Maximum spindle speed, G77Sn

Notes:

- The default spindle speed mode is G97, RPM mode.
- M03, M04, and M05 operate the same for both modes of spindle control

Important Note

Notes on use:

The constant surface speed control is *not intended* to be turned on at the beginning of the program and then left on. If you do this the spindle speeds will vary greatly every time the machine moves! This will create excessive wear on the spindle motor and drive. Turn the constant surface feet mode on just after the tool has been positioned for the cut. Estimate the spindle speed that the CSF mode will start at and have the spindle turned on before you make the positioning moves. After the cut has been finished turn the constant surface feet mode off. Then use RPM commands. **DO NOT LEAVE THE G96 ACTIVE FOR TOOL CHANGES.**

Simple formulas to convert these values are:

$$\text{SFM} = \frac{(\text{RPM})(2)(3.14)(\text{distance from center})}{12}$$

$$\text{RPM} = \frac{\text{SFM} \times 12}{2(3.14)(\text{distance from center})}$$

----- Sample program showing constant surface feet: -----

G90G94F300	
M03S1500	Turn spindle speed on
T1(LH TURN TOOL .008 RADIUS)	
X.25Z.2	
G96S250	Set spindle to SFM mode @250sfm
G76S500	Establish minimum spindle speed at 500 rpm
G77S2500	Establish maximum spindle speed at 2500 rpm
Z0	
G95F.002X0	
G94F300Z2	
G97	Switch to RPM mode



Constant Surface feet spindle speeds - G96, G97, G77, G76



S2000

Set spindle speed at 2000 rpm

T2(DRILL)

X0Z.2

G95F.003Z-.5

G94F300Z2

M30