Do you know this function?

A reliable process for the milling of fits

Reliably manufacturing fits in series production

Klartext presents a method for the precise and reliable manufacture of fits—particularly in mid-size and large series runs. The challenge is the fact that cutting conditions change continuously. Particularly the cutting pressure changes during milling as the result of increasing tool wear. The values for the tool dimensions must continuously be adapted because of this. Along with the usual tool measurement, the method presented here also takes into account the current cutting conditions, since the actual dimensions of the workpiece are measured. This is done automatically, without repeatedly needing to manually adapt the tool's compensation values.

The recommendation is to use touch-probe cycles 421 through 430. This is very convenient, since tool monitoring can be activated in these cycles. The control then performs continuous tool compensation automatically. How often should the measurement be repeated? You decide this individually, depending on the machining task.

Details about the method

First the milled fit is measured with a touch probe. It is important that the fit is roughed and pre-finished (same finishing allowance as for actual finishing). Based on the values measured, the control corrects the tool compensation values in the tool table—meaning the oversize DR for the tool radius or DL for the length. The cutting pressure has already been accounted for in this compensation, since the actually machined workpiece was measured.

Now you call the tool again and the fit is completed. The control takes the compensation values previously determined into account.

How is it ensured that this compensation is reliable? The recommendation here is to find an appropriate number of workpieces after which the touch-probe cycle is called again, e.g. after every fifth workpiece. The program section with the touch-probe cycle is simply controlled by a counter, for example by incrementing in QR parameters.

With each new measuring process the tool compensation values are adapted to the current situation.

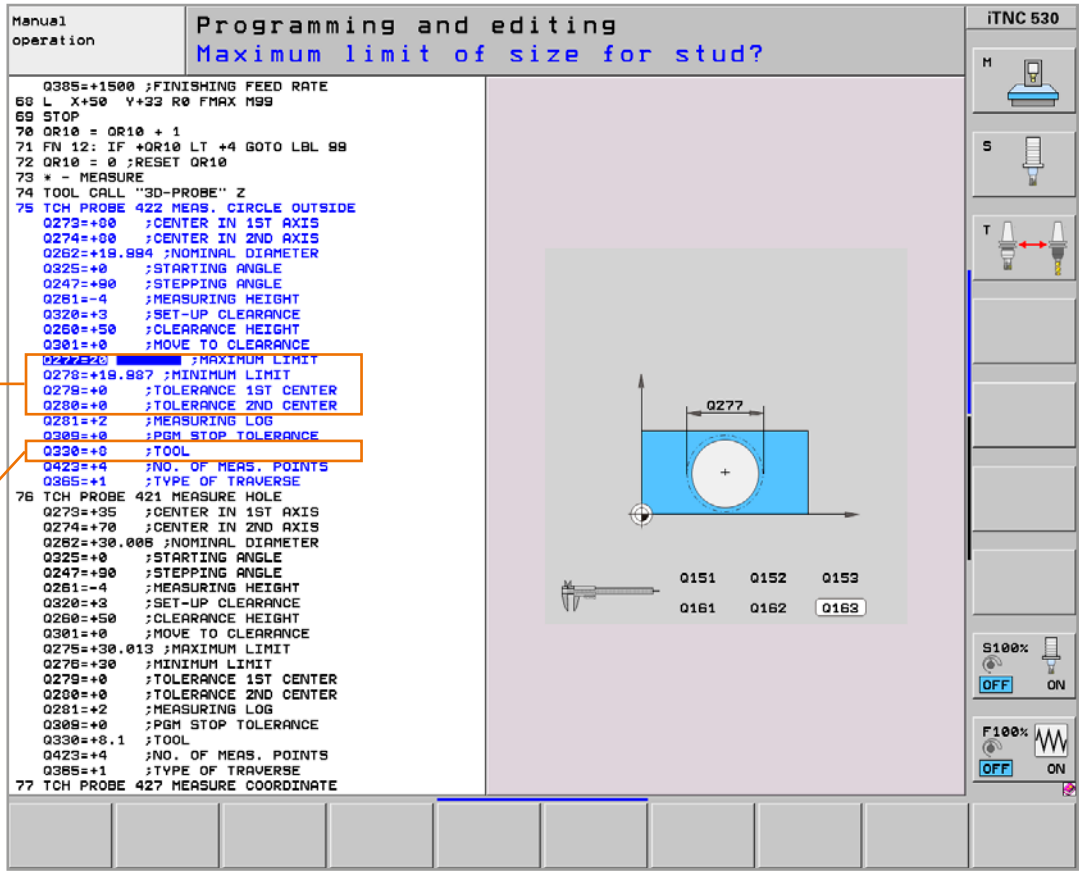
Reliably producing the first workpiece

This strategy also includes the first fit, so that the first workpiece doesn't end up as scrap. For the first measuring cut you simply enter a greater oversize for the milling tool: Choose such a large value that the next finishing cut encounters similar cutting conditions.

Avoiding tool breakage

By the way, this method also monitors the tool. The cutting pressure continuously increases, theoretically until the tool breaks. Here the control lets you enter maximum delta values. When this value is reached, the control locks the tool and activates a replacement tool, if desired.

+ You can find example programs and other information in our NC database at http://applications.heidenhain.de/ncdb



It doesn't get any more exact than this: In the probe cycle you define the maximum and minimum limits as well as the tolerance values for the fit (Q277 through Q280). If tool monitoring is activated (Q330), the TNC corrects the tool radius in the tool table, depending on the deviation from the nominal value.