

3.6 Circumferential slot - SLOT2



Programming

SLOT2 (RTP, RFP, SDIS, DP, DPR, NUM, AFSL, WID, CPA, CPO, RAD, STA1, INDA, FFD, FFP1, MID, CDIR, FAL, VARI, MIDF, FFP2, SSF)



Parameters

RTP	real	Retraction plane (absolute)
RFP	real	Reference plane (absolute)
SDIS	real	Safety clearance (enter without sign)
DP	real	Slot depth (absolute)
DPR	real	Slot depth relative to the reference plane (enter without sign)
NUM	int	Number of slots
AFSL	real	Angle for the slot length (enter without sign)
WID	real	Circumferential slot width (enter without sign)
CPA	real	Center point of circle, abscissa (absolute)
CPO	real	Center point of circle, ordinate (absolute)
RAD	real	Radius of circle (enter without sign)
STA1	real	Initial angle
INDA	real	Indexing angle
FFD	real	Feedrate for depth infeed
FFP1	real	Feedrate for surface machining
MID	real	Maximum infeed depth for infeed (enter without sign)
CDIR	int	Milling direction for machining the circumferential slot Value: 2 (for G2) 3 (for G3)
FAL	real	Final machining allowance on slot edge (enter without sign)
VARI	int	Type of machining Value: 0=Complete machining 1=Roughing 2=Finishing
MIDF	real	Maximum infeed depth for finishing
FFP2	real	Feedrate for finishing
SSF	real	Speed for finishing

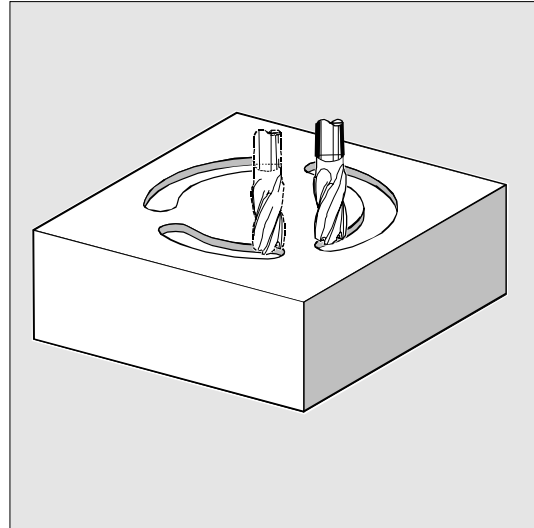


The cycle requires a milling cutter with an "end tooth cutting over center" (DIN 844).



Function

Cycle SLOT2 is a combined roughing-finishing cycle. With this cycle you can machine circumferential slots arranged on a circle.



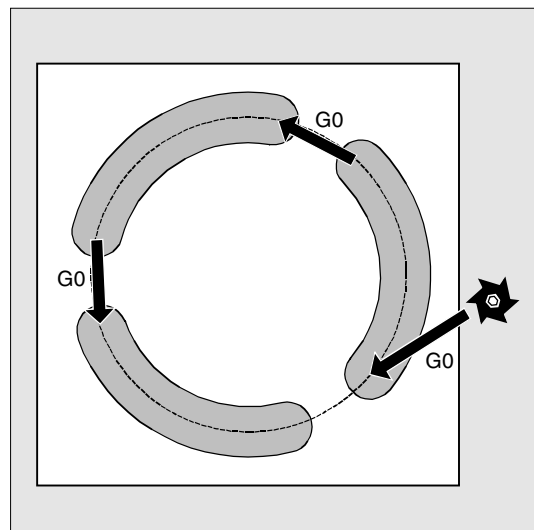
Sequence of operations

Position reached prior to cycle start:

The starting position can be any position from which each of the slots can be approached without collision.

The cycle implements the following motion sequence:

- Travel to the position marked in the figure on the right at the beginning of the cycle with G0.
- The circumferential slot is machined in the same steps as a longitudinal slot.
- When a circumferential slot has been machined, the tool is retracted to the retraction plane and then moves to the next slot with G0.
- When the last slot has been machined, the tool is traversed to the end position reached in the machining plane specified in the display to the retraction plane with G0 and the cycle is terminated.





Description of parameters



See Section 2.1.2. (Drilling, Centering – CYCLE81) for a description of parameters RTP, RFP, SDIS.



See Section 3.5 (SLOT1) for a description of parameters DP, DPR, FFD, FFP1, MID, CDIR, FAL, VARI, MIDF, FFP2, SSF.

See Section 3.2 for cycle setting data _ZSD[1].

NUM (number)

The number of slots is determined with the parameter NUM.

AFSL and WID (angle and circumferential slot width)

With parameters AFSL and WID you define the shape of a slot in the plane. The cycle checks whether the slot width is violated with the active tool. If this is the case, alarm 61105 "Cutter radius too large" is output and the cycle is aborted.

CPA, CPO and RAD (center point and radius)

The position of the circle in the machining plane is defined by the center point (parameters CPA and CPO) and the radius (parameter RAD). Only positive values are permissible for the radius.

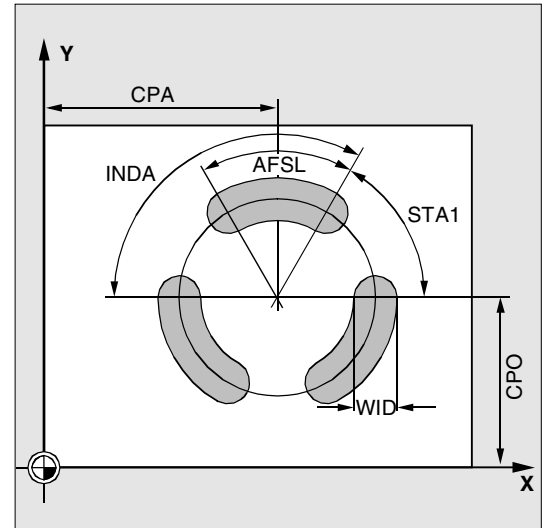
STA1 and INDA (start angle and indexing angle)

The arrangement of circumferential slots on the circle is defined by these parameters.

STA1 defines the angle between the positive direction of the abscissa of the workpiece coordinate system active before the cycle was called and the first circumferential slot.

The INDA parameter contains the angle from one circumferential slot to the next.

If INDA=0, the indexing angle is calculated from the number of circumferential slots so that they are arranged equally around the circle.





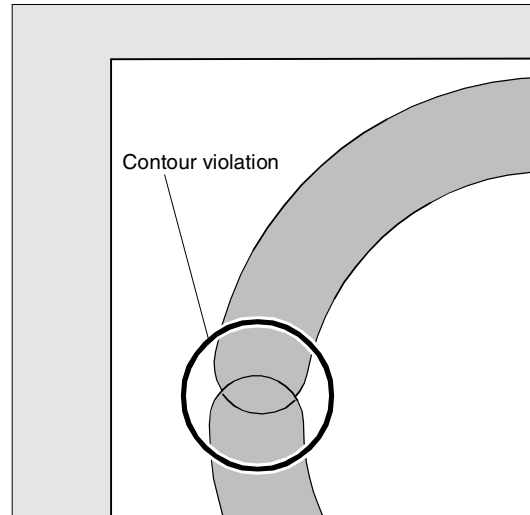
Further notes

A tool offset must be activated before the cycle is called. Otherwise the cycle is aborted and alarm 61000 "No tool offset active" is output.

If incorrect values are assigned to the parameters that determine the arrangement and size of the slots and thus cause mutual contour violation of the slots, the cycle is not started.

The cycle is aborted after the error message 61104 "Contour violation of slots/elongated holes" is output.

During the cycle, the workpiece coordinate system is shifted and rotated. The actual-value display in the workpiece coordinate system is always displayed such that the circumferential slot currently being machined on the 1st axis of the current processing level starts and the zero point of the workpiece coordinate system lies in the center of the circle. When the cycle is completed, the workpiece coordinate system is again in the same position as it was before the cycle was called.

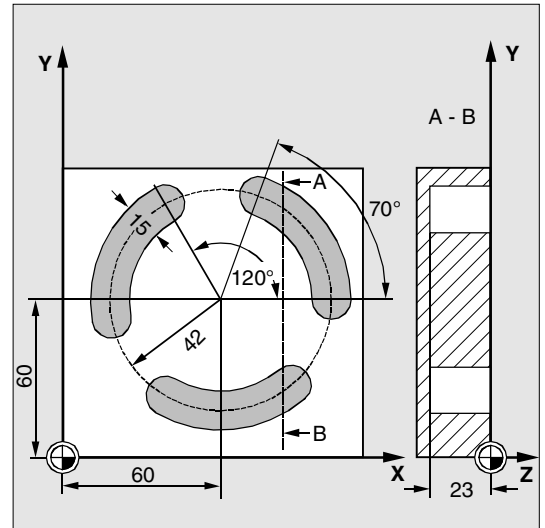




Programming example

Slots2

With this program you can machine 3 circumferential slots arranged on a circle whose center point is X60 Y60 and radius 42 mm in the XY plane. The circumferential slots have the following dimensions: Width 15 mm, angle for slot length 70 degrees, depth 23 mm. The initial angle is 0 degrees, the indexing angle is 120 degrees. The slot contours are machined to a final machining allowance of 0.5 mm, the safety clearance in infeed axis Z is 2 mm, the maximum depth infeed is 6 mm. The slots are to be completely machined. The same speed and feedrate are used for finishing. Infeed during finishing is performed straight to the base of the slot.



```
DEF REAL FFD=100
```

Definition of variables with value assignment

```
N10 G17 G90 D1 T10 S600 M3
```

Specification of technology values

```
N20 G0 X60 Y60 Z5
```

Approach starting position

```
N30 SLOT2 (2, 0, 2, -23, , 3, 70, ->
-> 15, 60, 60, 42, , 120, FFD, ->
-> FFD+200, 6, 2, 0.5)
```

Cycle call

Reference plane+SDIS=retraction plane means: Lower in infeed axis with G0 to reference plane+SDIS no longer applicable, parameters VAR, MIDF, FFP2 and SSF omitted

```
N40 M30
```

End of program

-> Must be programmed in a single block