

### 2.1.6 Tapping with compensating chuck – CYCLE840



#### Programming

CYCLE840 (RTP, RFP, SDIS, DP, DPR, DTB, SDR, SDAC, ENC, MPIT, PIT)



#### Parameters

RTP	real	Retraction plane (absolute)
RFP	real	Reference plane (absolute)
SDIS	real	Safety clearance (enter without sign)
DP	real	Final drilling depth (absolute)
DPR	real	Final drilling depth relative to reference plane (enter without sign)
DTB	real	Dwell time at thread depth
SDR	int	Direction of rotation for retraction Values: 0 (automatic reversal of direction of rotation) 3 or 4 (for M3 or M4)
SDAC	int	Direction of rotation after end of cycle Values: 3, 4 or 5 (for M3, M4 or M5)
ENC	int	Tapping with/without encoder Values: 0 = with encoder 1 = without encoder
MPIT	real	Thread pitch as thread size Value range: 3 (for M3) ... 48 (for M48)
PIT	real	Thread pitch as value Value range: 0.001 ... 2000.000 mm



#### Function

The tool drills at the programmed spindle speed and feedrate to the programmed thread depth.

With this cycle, tapping with compensating chuck can be performed

- without encoder and
- with encoder.



## Sequence of operations

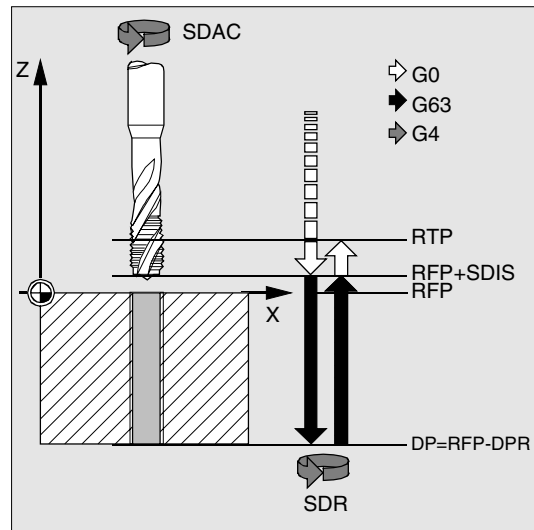
### Tapping with compensating chuck without encoder (ENC=1)

#### Position reached prior to cycle start:

The drilling position is the position in the two axes of the selected plane.

#### The cycle implements the following motion sequence:

- Approach of the reference plane brought forward by the safety clearance with G0
- Tapping to the final drilling depth with G63
- Dwell time at thread depth (parameter DTB)
- Retraction to the reference plane brought forward by the safety clearance with G63
- Retraction to retraction plane with G0



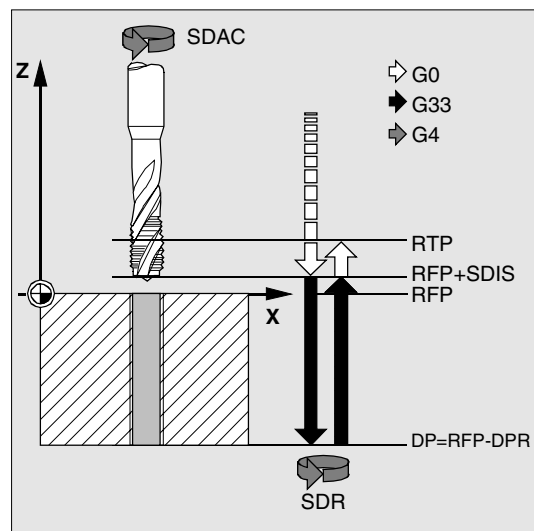
### Tapping with compensating chuck with encoder (ENC=0)

#### Position reached prior to cycle start:

The drilling position is the position in the two axes of the selected plane.

#### The cycle implements the following motion sequence:

- Approach of the reference plane brought forward by the safety clearance with G0
- Tapping to the final drilling depth with G33
- Dwell time at thread depth (parameter DTB)
- Retraction to the reference plane brought forward by the safety clearance with G33
- Retraction to retraction plane with G0





### Description of parameters



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

#### **DTB (dwell time)**

You program the dwell time in seconds. It is only active with tapping without encoder.

#### **SDR (direction of rotation for retraction)**

SDR=0 must be set if the spindle direction is to reverse automatically.

If the machine data are defined so that no encoder is set (machine data NUM\_ENCS then has the value 0), the parameter must be assigned the value 3 or 4 for the direction of rotation, otherwise alarm 61202 "No spindle direction programmed" is issued and the cycle is aborted.

#### **SDAC (direction of rotation)**

As the cycle can also be called modally (see Section 2.2), it requires a direction of rotation for tapping further threads. This is programmed in parameter SDAC and corresponds to the direction of rotation programmed before the first call in the higher-level program. If SDR=0, the value assigned to SDAC is of no significance in the cycle and can be omitted from the parameterization.

#### **ENC (tapping)**

If tapping is to be performed without encoder although an encoder exists, parameter ENC must be assigned the value 1.

However, if no encoder exists and the parameter is assigned the value 0, it is ignored in the cycle.

## 2.1 Drilling cycles

### MPIT and PIT (as thread size and as value)

The parameter for the spindle pitch only has a meaning if tapping is performed with encoder. The cycle calculates the feedrate from the spindle speed and the pitch.

The value for the thread pitch can either be defined as the thread size (for metric threads between M3 and M48 only) or as a value (distance from one thread turn to the next as a numerical value). The parameter not required in each case is omitted from the call or assigned the value zero.

If the two thread pitch parameters have conflicting values, alarm 61001 "Thread pitch wrong" is generated by the cycle and cycle execution is aborted.



### Further notes

Depending on the setting in machine data NUM\_ENCS, the cycle selects whether tapping is to be performed with or without encoder.

The direction of rotation for the spindle must be programmed with M3 or M4 before the cycle is called.

In thread blocks with G63, the values of the feedrate override switch and spindle speed override switch are frozen at 100%.

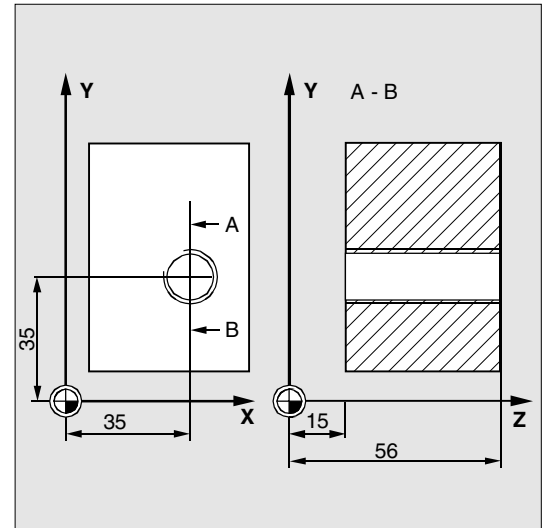
A longer compensating chuck is usually required for tapping without encoder.



### Programming example

#### Thread without encoder

In this program a thread is tapped without encoder at position X35 Y35 in the XY plane, the drilling axis is the Z axis. Parameters SDR and SDAC for the direction of rotation must be assigned, parameter ENC is assigned the value 1, the value for the depth is absolute. Pitch parameter PIT can be omitted. A compensating chuck is used in machining.



N10 G90 G0 D2 T2 S500 M3	Specification of technology values
N20 G17 X35 Y35 Z60	Traverse to drilling position
N30 G1 F200	Specification of path feedrate
N40 CYCLE840 (59, 56, , 15, , 1, 4, 3, 1)	Cycle call, dwell time 1 s, SDR=4, SDAC=3, no safety clearance, parameters MPIT, PIT are omitted (i.e. both are assigned the value 0)
N50 M30	End of program