

Rapid Broken Tool Cycle for NC2 – Siemens 840/810/802D

Subroutine List

This Rapid Broken Tool Cycle kit uses two subroutines.

L9000	R Parameter Clear
L9001	Rapid Broken Tool Cycle

Number of R Parameters used

The Rapid Broken Tool Cycle uses 4 of the standard R parameters for inputs. Local variables are used for internal calculations and storage whilst the cycle is running.

Standard R Parameters **R0, R1, R2 and R3** are used. These may be modified if required.

Inputs used

The R Parameter inputs are used as follows: -

R1 = h	h= Broken Tool tolerance, measured from the bottom of the tool. Default value 0.5mm
R2 = z	z= Clearance Plane. This defines the first move in the Z-axis, relative to the ACTIVE WORK OFFSET, before moving to the laser beam measuring position. The tool also returns to this position after the cycle has finished. If the laser beam is positioned higher than the defined clearance position then the Clearance Plane value is modified to position the end of the tool above the NC2 prior to moving to the laser beam measuring position. The tool also returns to this position after the cycle has finished. If the R2=z input is not used then the first and last moves will be to the Z-axis reference position.
R3 = m	m= Alarm Flag. No input then machine stops with alarm. R3=1 then no alarm is generated and parameter R0 is set to 1.

All input parameters are optional

Call line: -

L9000 will set R parameters R0 to R3 to a value of 9999

Call line: -

R1=h R2=z R3=m

L9001 will load input parameters and run Rapid Broken Tool cycle

Edits required before cycle L9001 is used.

The **Machine Co-ordinates** of the measuring position of the NC2 laser needs to be found and then edited into the header of subroutine L9001 BEFORE the cycle is run. Relevant M codes and Probe Input (1 or 2 on 840/810D, will usually be 1 on an 802D) also need to be entered.

```
%_N_L9001_SPF
;$PATH=/_N_SPF_DIR
;40140322.00
; HS BROKEN TOOL NC2
DEF REAL RENL[16]
;-----
RENL[1]=100 ; EDIT X AXIS BEAM POSITION
RENL[2]=200 ; EDIT Y AXIS BEAM POSITION
RENL[3]=-300 ; EDIT Z AXIS BEAM POSITION
RENL[4]=1 ; EDIT PROBE OR I/O INPUT
RENL[5]=61 ; EDIT*M*CODE*BROKEN TOOL
RENL[6]=62 ; EDIT*M*CODE*CANCEL BROKEN TOOL
;-----
```

NOTE: The standard software is written to read the default Probe Status flag (\$A_PROBE[x]). If you need to set up and use a machine INPUT then the software should be edited as shown.

Change
IF \$A_PROBE[ABS(RENL[4])]==0 GOTO LN7
To
IF \$A_IN[x]==0 GOTO LN7 (where x is the I/O number)
&
IF \$A_PROBE[ABS(RENL[4])]==0 GOTO LN9
To
IF \$A_IN[x]==0 GOTO LN9 (where x is the I/O number)

Program examples

Example 1

```
N10
T1 M6
G0 G54 X0. Y0.
D1
Z10.0
Machining program here
End of cutting routine
```

L9000	Clear input parameters to 9999
R1=0.25 R3=1	Set input parameters
L9001	Tool will return to machine home position in Z axis, then position above the XY axis measuring position, position the end of the tool 0.25mm into the laser beam and then returns to machine home position in the Z axis. If the tool is broken or worn out of tolerance, no alarm is generated but the Flag R0 is set to a 1.
IF R0<>1 GOTOF LN100	Escape routine if tool is within tolerance
M00	Stop program if tool is broken
LN100:	Program label

Example 2

```

N10
T1 M6
G0 G54 X0. Y0.
D1
Z10.0
Machining program here
End of cutting routine
L9000          Clear input parameters to 9999
R2=50.        Set input parameters
L9001          Tool will return to 50mm above the current Work Offset zero point
               in the Z axis, position above the XY axis measuring position, then
               position the tool point into the laser beam by the 0.5mm default
               distance to check the tool. It will then return to a position 50mm.
               Above the Work Offset zero point. If the laser beam is above the
               Clearance Plane then the program will adjust the Clearance Plane
               value to a suitable value above the beam to prevent any collisions
               during the cycle.

G0 Z100.      Continue with cutting program.

```