

**CAROUSEL TOOL HOLDER POSITION  
FOR TOOL CHANGE**

<b>Pos.</b>	<b>Angle</b>	<b>Y position</b>	<b>Z position</b>
1	0		
2	20		
3	40		
4	60		
5	80		
6	100		
7	120		
8	140		
9	160		
10	180		
11	200		
12	220		
13	240		
14	260		
15	280		
16	300		
17	320		
18	340		

## PROCEDURE TO SET TOOL POSITIONS

The carousel has 18 positions; each position has a Y & Z location.

The locations are stored in subroutine 1515 located in OEM Subroutines.

To set the locations use a setting ring as shown in drawing RTC-21044

In JOG mode move the spindle to it's Z max position and X max position.

In MDI mode enter M22 to open the tool door and then M24 to extend the tool carousel.

Then enter A0 to move to position 1.

In JOG mode place the setting ring on a tool holder and place in position 1.

Using the handwheel move the spindle (with no holder in place) above the tool in the holder.

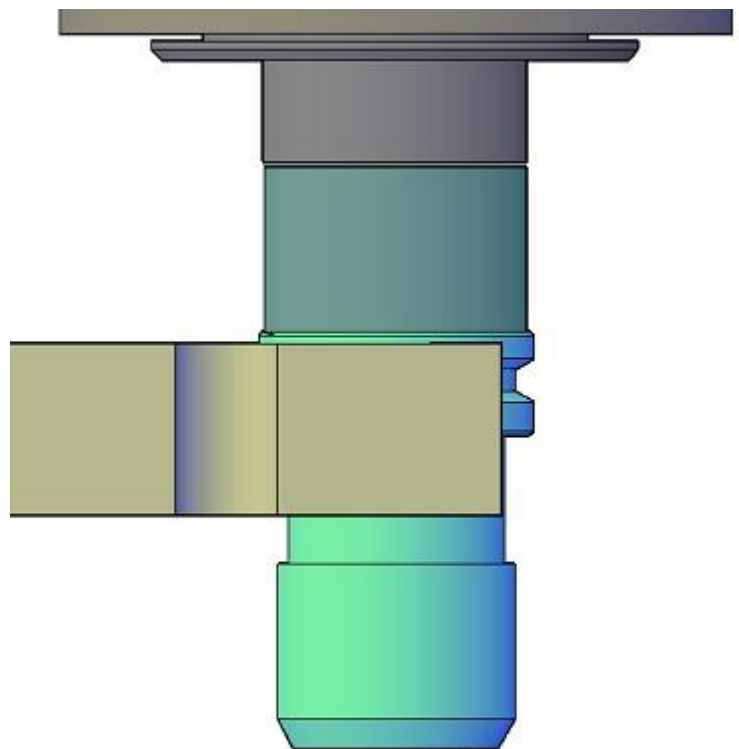
Carefully align the spindle in Y & Z until the Spindle nose is aligned to the tool holder set ring.

Ensure that G53 is active with D0 (no tool offset)

Write down the Y & Z screen values in the attached table.

Repeat for all 18 positions.

Make sure you include if the number is positive or negative (+ / -).



## TOOL SUBROUTINE 1515

Edit the highlighted code to match your tool location table.

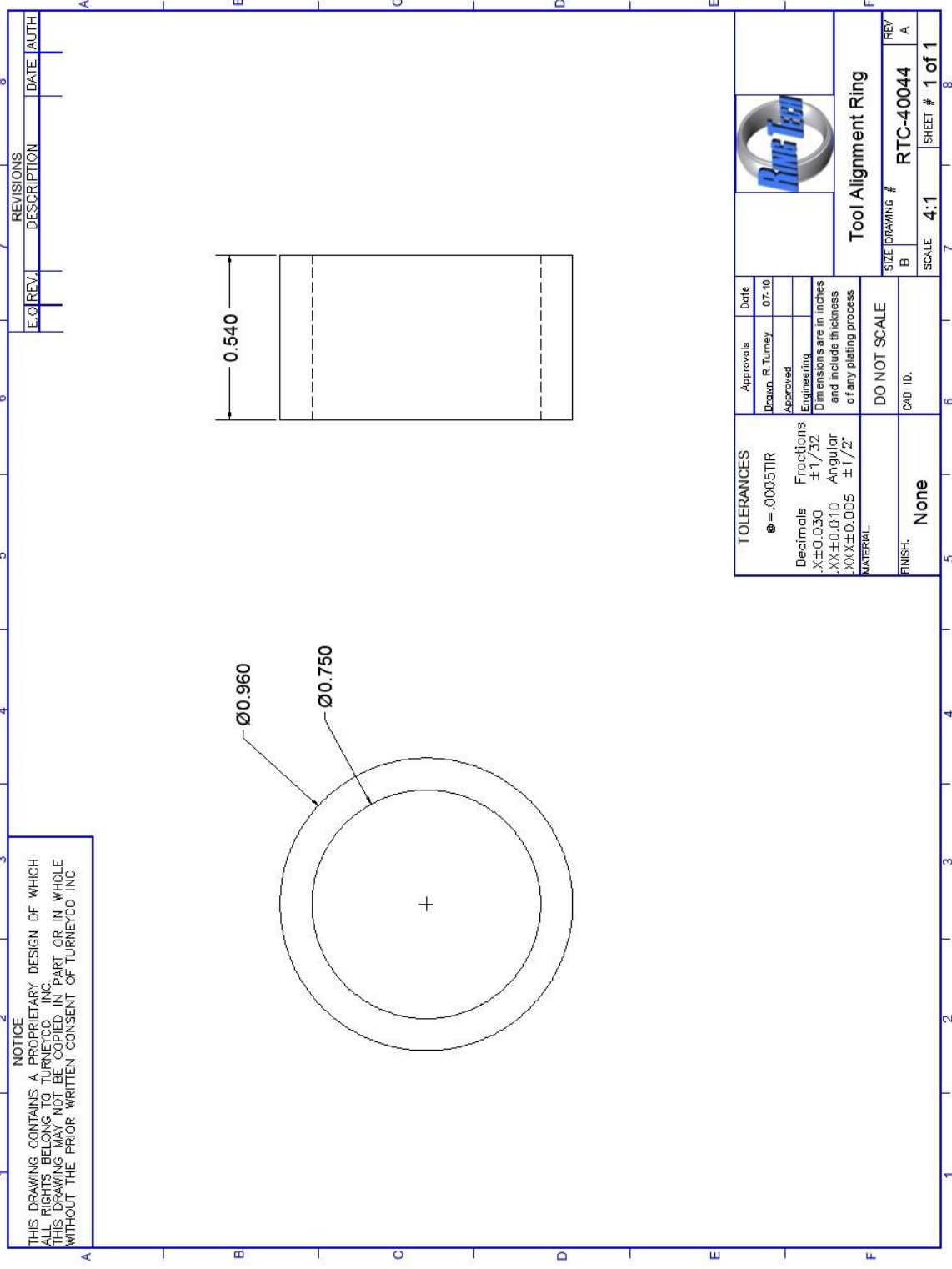
```
(SUB1515) ; TOOLCHANGER POSITIONS
;          POSITION          Y POS          Z POS
(IF P2181 EQ 01 P2187 = 3.15,P2188=-17.33) ; Position 1
(IF P2181 EQ 02 P2187 = 2.30,P2188=-16.33) ; Position 2
(IF P2181 EQ 03 P2187 =-0.95,P2188=-16.63) ; Position 3
(IF P2181 EQ 04 P2187 =-0.35,P2188=-16.63) ; Position 4
(IF P2181 EQ 05 P2187 = 0.05,P2188=-16.93) ; Position 5
(IF P2181 EQ 06 P2187 =-0.75,P2188=-16.83) ; Position 6
(IF P2181 EQ 07 P2187 =-1.75,P2188=-16.93) ; Position 7
(IF P2181 EQ 08 P2187 = 0.15,P2188=-16.93) ; Position 8
(IF P2181 EQ 09 P2187 =-0.25,P2188=-17.33) ; Position 9
(IF P2181 EQ 10 P2187 =-0.65,P2188=-17.43) ; Position 10
(IF P2181 EQ 11 P2187 =-0.22,P2188=-17.19) ; Position 11
(IF P2181 EQ 12 P2187 = 2.68,P2188=-17.19) ; Position 12
(IF P2181 EQ 13 P2187 = 2.78,P2188=-17.19) ; Position 13
(IF P2181 EQ 14 P2187 = 0.38,P2188=-17.19) ; Position 14
(IF P2181 EQ 15 P2187 = 1.38,P2188=-17.09) ; Position 15
(IF P2181 EQ 16 P2187 = 1.88,P2188=-17.09) ; Position 16
(IF P2181 EQ 17 P2187 = 2.88,P2188=-16.99) ; Position 17
(IF P2181 EQ 18 P2187 = 2.08,P2188=-16.99) ; Position 18
(RET)
```

## TOOL CHANGE SUBROUTINE 9002

The lines in red may need to be modified to match this program

```
(SUB 9002) ; ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** CAROUSEL SUB
(IF (OPMODE EQ 20) OR (OPMODE EQ 21) RET) ; Skip if in simulation mode
(IF NBTOOL EQ P2180 MSG "TOOL IST IN SPINDEL") ; Tool called is in spindle
(IF NBTOOL EQ P2180 RET) ; Exit Cycle
; P2180 = REGISTER TO TRACK LAST TOOL #
; P2181 = NBTOOL ; Next Tool in Spindle
; P2182 = New Tool Position A
(P2184 = 34.00) ; X Safe up Position
(P2186 = -19.18) ; X Load Position
; (P2187 = -3.000) ; Y Axis position Use 1515
; (P2188 = -16.5) ; Z Load Position Use 1515
(P2181 = NBTOOL)
(P2182 = ((P2181-1)*20)) ; New Angle pos
M5
G10
M45 S0
G0 G53 M9
D0
G0 G94 XP2186 YP2187 ZP2188 ; Tool Load Position
M22 ; Open Door
(MSG "PLACE TOOL ?P2180 IN CAROUSEL") ; Message
M24 ; Advance carousel
M21 ; Open Tool Collet
G4 K50 ; Delay for collet open
G1 G53 XP2184 F6000. ; Move Spindle up
(MSG "INDEX TO NEW TOOL ?P2181 IN CAROUSEL") ; Message
(CALL 1515) ; Tool Positions
G0 G7 YP2187 ZP2188 AP2182 ; Index to position
G1 XP2186 F500. ; Move spindle down
M20 ; Clamp spindle
G4 K25 ; 250 milli-second dwell
M25 ; Retract Carousel
M23 ; Close Door
(P2180=P2181) ; Set Last Tool #
(MSG "") ; Clear messages
G54 ; set G54
DP2180 ; Set tool number
(RET) ; end subroutine
```

# TOOL ALIGNMENT RING DRAWING



Tool Alignment Ring