



innovative machine tools



SIEMENS 840D 50/55 TURN TRAINING GUIDE

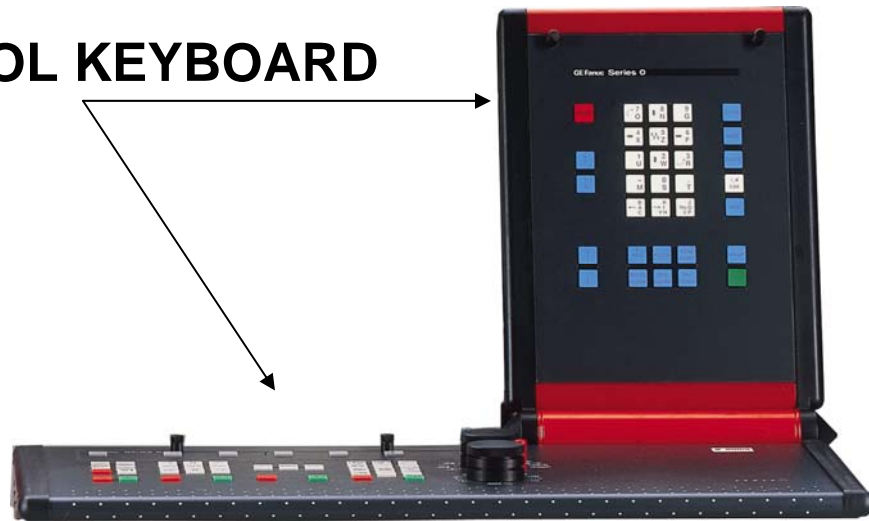
10/07/03 Version 1
Made by EMCO
Authored by Chad Hawk

Training Index

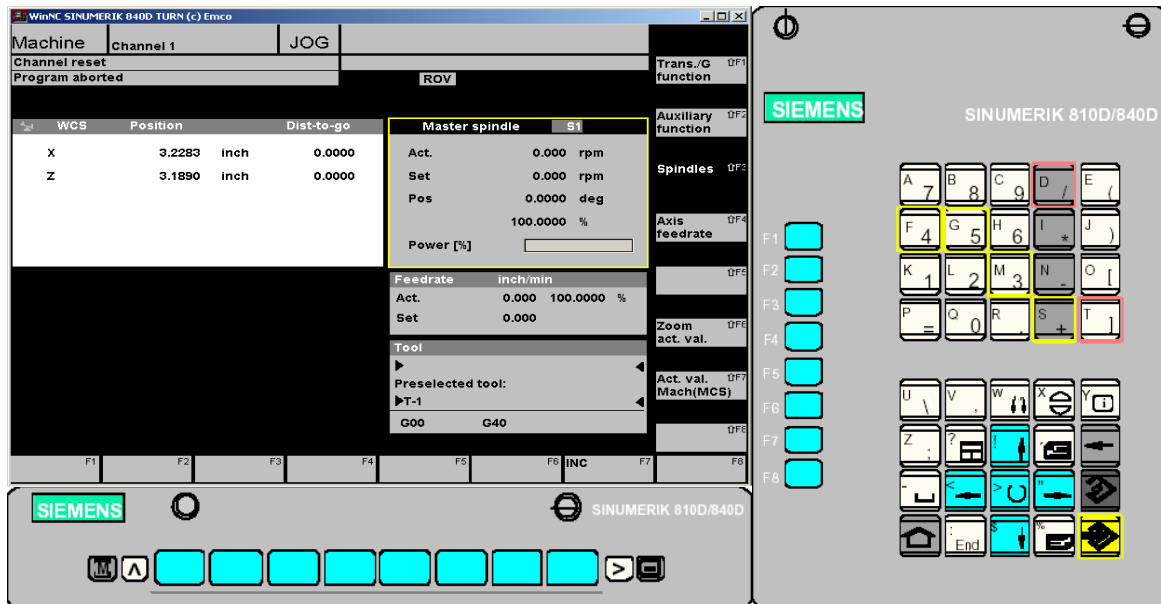
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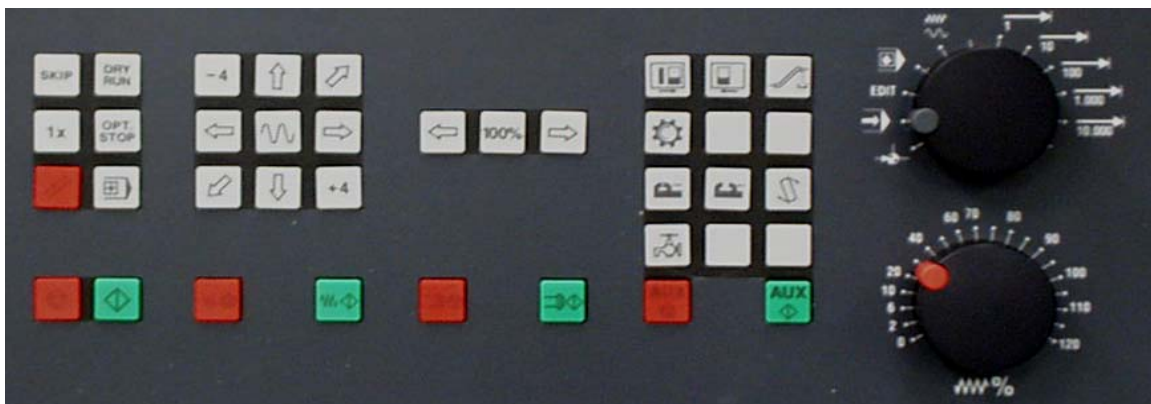
CONTROL KEYBOARD



Siemens 840D CONTROL






MACHINE CONTROL



SIEMENS 840D SCREEN

Machine 1	Channel 1 2	AUTO 3	4		
Channel reset 5		6		Trans./G function	
Program aborted 7		ROV 8			
9					Auxiliary function
WCS		Position		Dist-to-go	Master spindle S1
X	3.2283	inch	0.0000		Act. 0.000 rpm
Z	3.1890	inch	0.0000		Set 0.000 rpm
10					Pos 10 0.0000 deg
					100.0000 %
					Power [%] <input type="text"/>
Actual block		11		Feedrate	inch/min
10				Act. 0.000	100.0000 %
				Set 10	0.000
14				Tool	
13				Preselected tool: 10	
				T-1	
				G00 G40	
15				Program level	
		Program control 16		Block search	Correct program
				Program overview 17	

1. Display of the active Operating Area
2. Display of the active channel
3. Operating mode, when a sub mode is active, it also will be displayed (e.g. REF, INC)
4. Program path and name of the selected program
5. Channel status
6. Channel operating messages
7. Program status
8. Channel status display (SKIP, DRY, SBL)
9. Alarm and message line
10. Working window, NC display the working windows (program editor) and NC displays (feed, tool) available in the active Operating Area are displayed here.
11. The selected window is marked with a border and the headline is displayed inverted. The keyboard inputs are effective here.
12. Vertical soft keys These 8 fields show the functions of the keys right beside. (at the PC: Shift F1..F8)
13. When this symbol is displayed, the key  is active (jump back to superior menu is possible).
14. Dialogue line with operator notes
15. When this symbol is displayed, the key  is active (information available).
16. Horizontal soft keys These 8 fields show the functions of the keys below. (at the PC: F1..F8)
17. When this symbol is displayed, the key  is active (more soft key functions available in this line).

SIEMENS 840D KEYS



= Direct jump to the Operating Area Machine



= Jump back to the superior menu (recall)



= Expanding the soft key line in the same menu



= Show basic menu (selection Operating Areas)

If pressed again jump back to the previous menu



= Confirm alarm



= Show information for the actual operating status - works only when the dialogue line shows an "i".



= Select window (when several windows are on the screen)
Keyboard inputs are valid for the selected window only.



= Cursor down / up



= Cursor left / right



= Leaf backward / forward



= Blank



= Clear (Backspace)



= Selection key / Toggle key

- Selection of predefined input values in input fields and lists, which are marked with this symbol
- Activate / deactivate switch box / radio button



= active



= not active



= Edit key / Undo

- Switch to edit mode in tables and input fields
- Undo function for table elements and input fields (leaving a field with this key does not store the entered value but reestablishes the old value)



= End Jump to line end (list end)

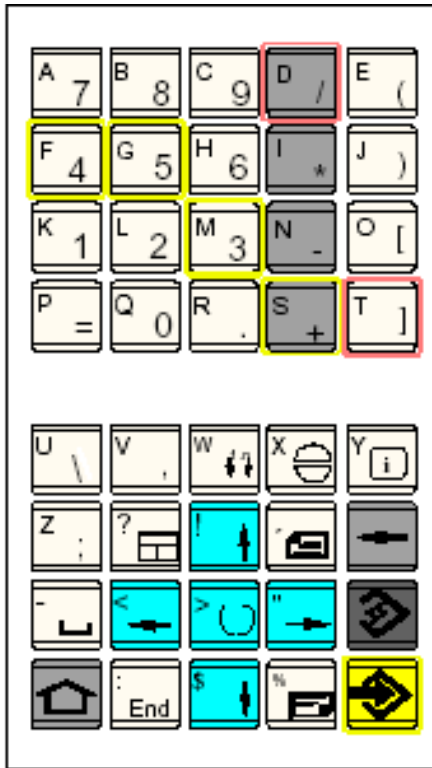


= Input key

- Take over an edited value
- Open / close directory
- Open file



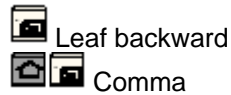
= Shift key



Address and Numeric Keyboard

The shift key bottom left shifts to the second key function (indicated in the left top edge of the keys).

Example:



Double-Shift Function

1 x Shift:

For the following key press the second key function will be done, for all following inputs the first key function.

2 x Shift:

For all following key presses the second key function will be done (shift lock).

3 x Shift:

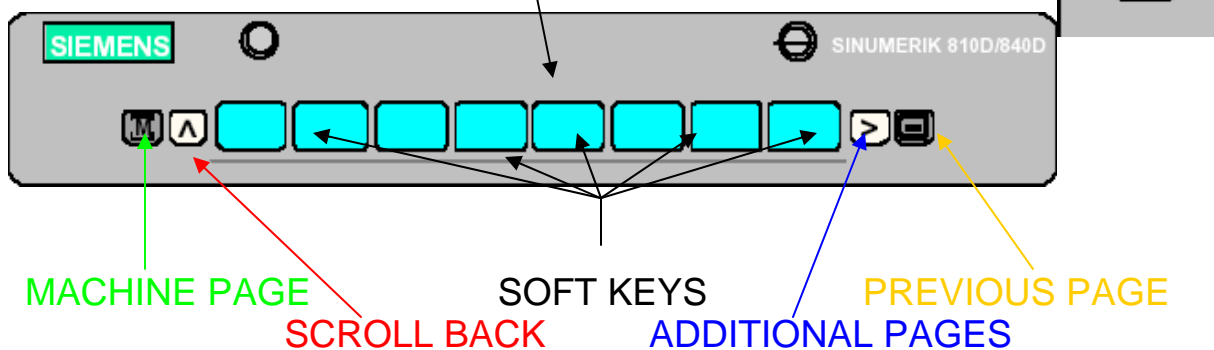
For the following key press the first key function will be done, for all following inputs the second key function.

4 x Shift:

Deselect the 2x or 3x shift function.


VERTICAL SOFT KEY MODULE

HORIZONTAL SOFT KEY MODULE



Work Shift:

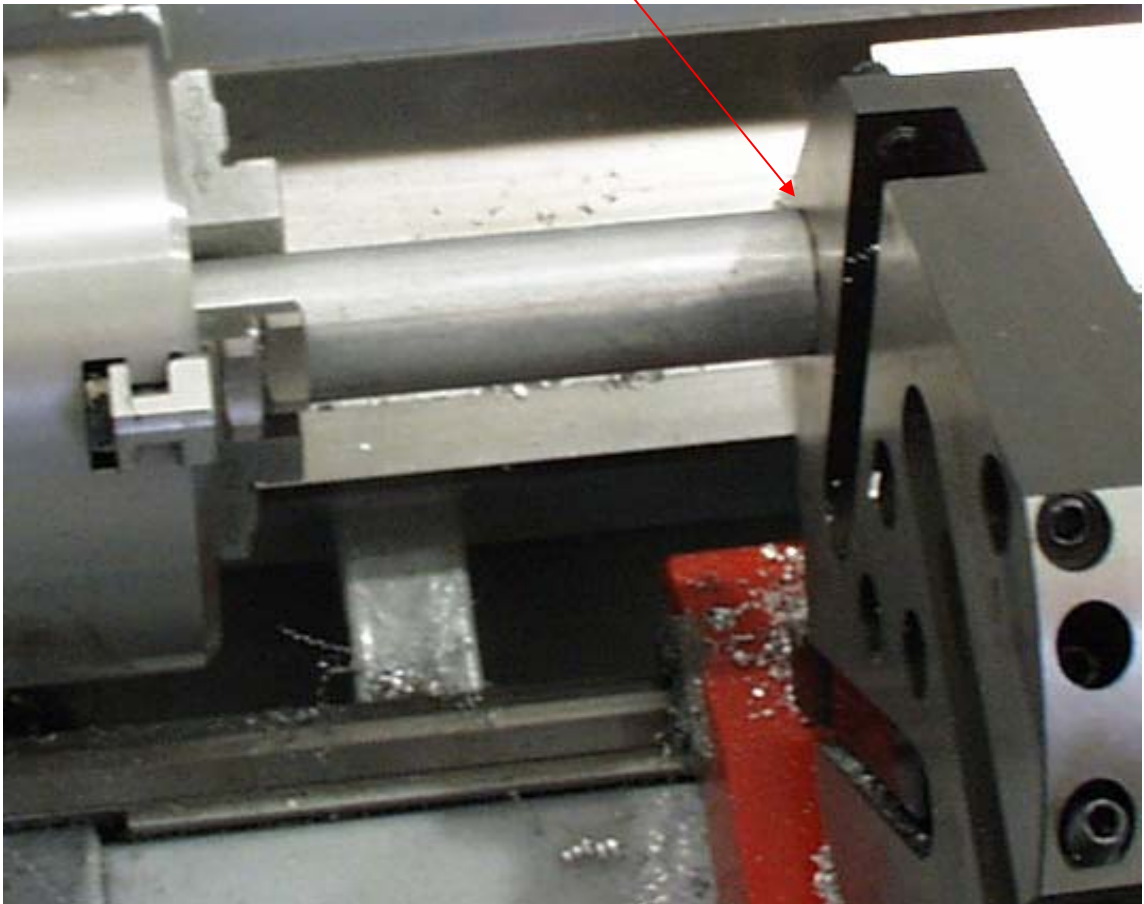
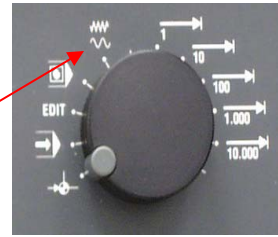
1. Move the MODE dial to JOG position
2. Index to a Empty ID tool position (1, 3, 5)





Press  will index one tool position at a time

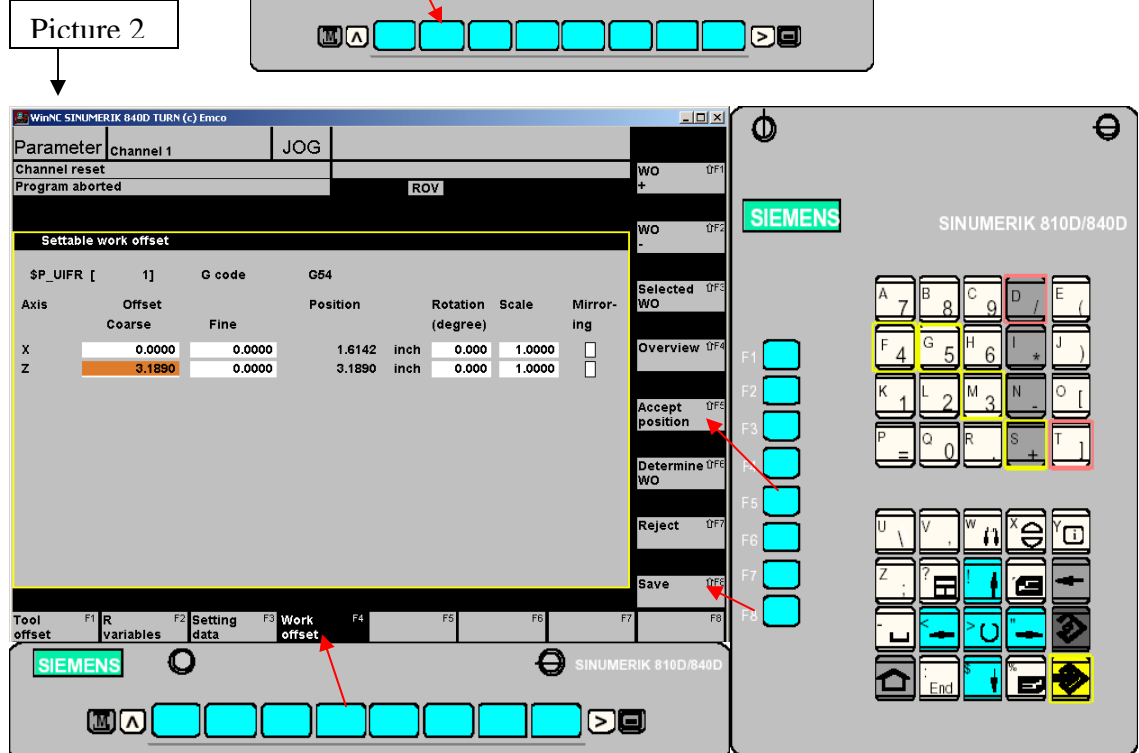
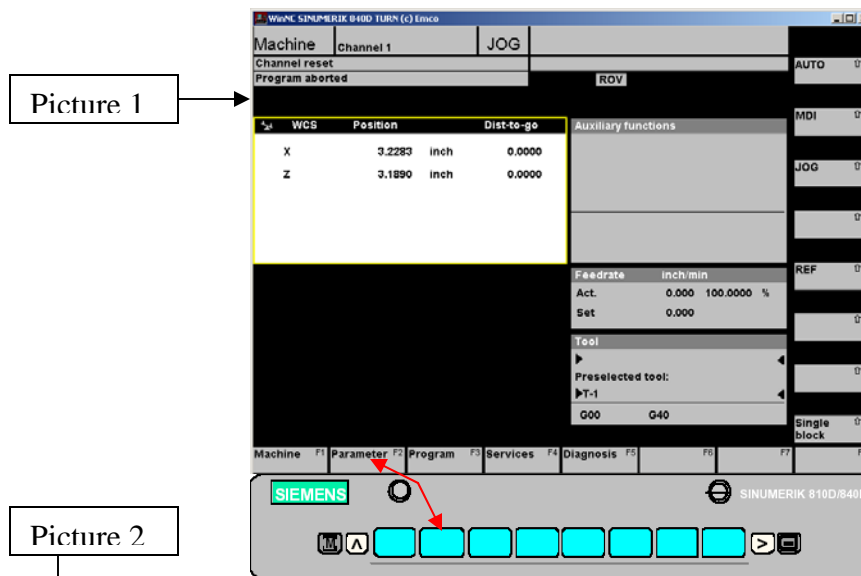
3. Jog the TURRET to the face of the Work Piece & touch using the Direction keys.

(Use piece of paper between TURRET and Work Piece)

(Use the Feed override dial or Steps to approach at a slower feed)



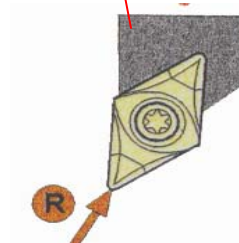
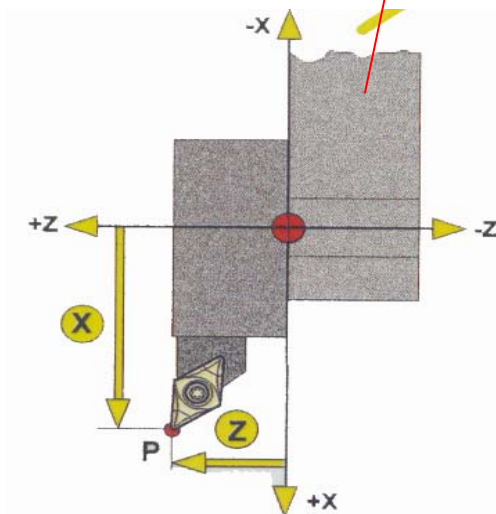
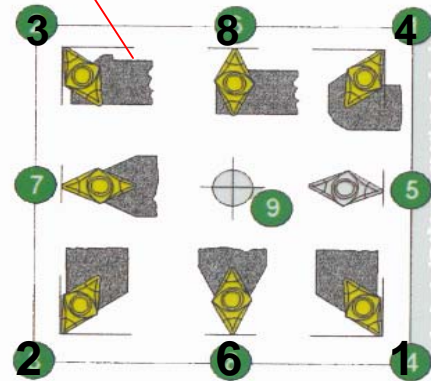
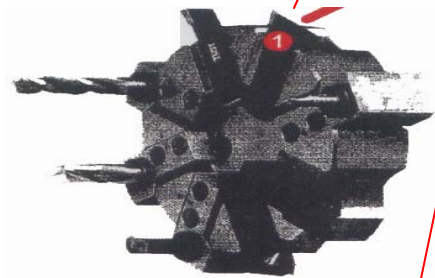
4. Press the  button on the horizontal soft keys
5. Press the **Blue** horizontal soft key for **Parameter** F2 (Picture 1)
6. Press the **Blue** horizontal soft key for **Work offset** F4 (Picture 1)
7. Cursor down to Z using cursor keys 
8. Press the Blue vertical soft key **Accept position**  (Picture 2)
Write the value down
(This value is the distance from the Spindle Nose to the end of the Work Piece)
9. Press the **Blue** vertical soft key for **Save**  (Picture 2)
10. Jog TURRET away from WORK PIECE using Z+



TOOL OFFSETS





T1 D1

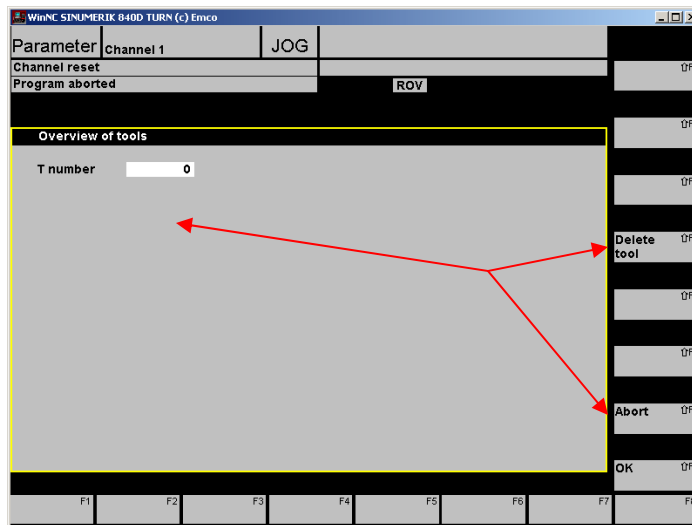
Tool offsets		TO area		1	
T number	1	D number	1	No. of c.edges	1
Tool type	500	Roughing tool			
C. edge pos.	3				
Tool length comp.		Geometry	Wear	Base	
Length 1 :	0.0000	0.0000	0.0000	inch	
Length 2 :	0.0000	0.0000	0.0000	inch	
Radius compensation					
Radius :	0.0000	0.0000	inch		
Technology					
Clear.angle :	0.0000	Deg.			
DP25 res:	0.0000				






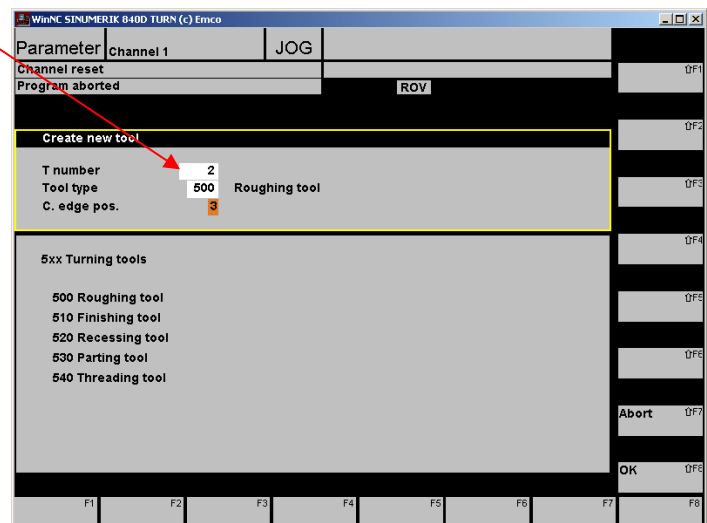
Tool Offsets

When the Software is loaded there will be tools created already

- Press the **Blue** horizontal soft key for **Tool offset** 
- Press the **Blue** vertical soft key for **Overview** 
- Press the **Blue** vertical soft key for **Delete tool**  until there are no tools remaining
- Press the **Blue** vertical soft key for **Abort** 




- Press the **Blue** vertical soft key for **New**  then press the **Blue** vertical soft key for **New tool** 
- Cursor to the T number and type 2 (this is the Location on turret)
- Cursor down to Tool type & type in 500 for Roughing Tool
- Type 3 for the C. edge pos.
This is direction on pg. 13
- Press the **Blue** vertical soft key for **OK** 




6. Index the TURRET to Tool 2 (if tool is in position 2 on the turret)

7. Move the MODE Dial to MDI position

8. Press the  button on the horizontal soft keys
then press **Blue** horizontal soft key for



Program F3



9. Press the  button on the horizontal soft keys for active screen
on MDI program

10. Type tool number and offset then press input button 

Example: T2 D1

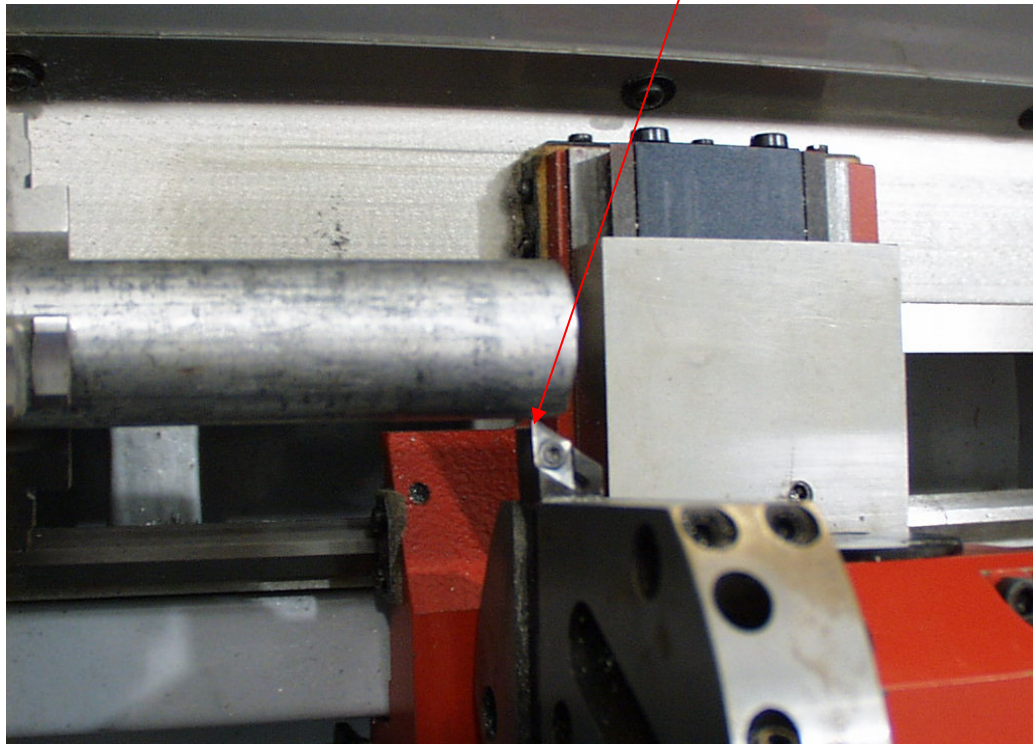
- For **scratching** type S1000  M03 then INPUT button 
S1000 = Spindle speed M03 = spindle on clockwise



11. Press CYCLE START  (make sure door is closed)

12. Move the MODE Dial to JOG position

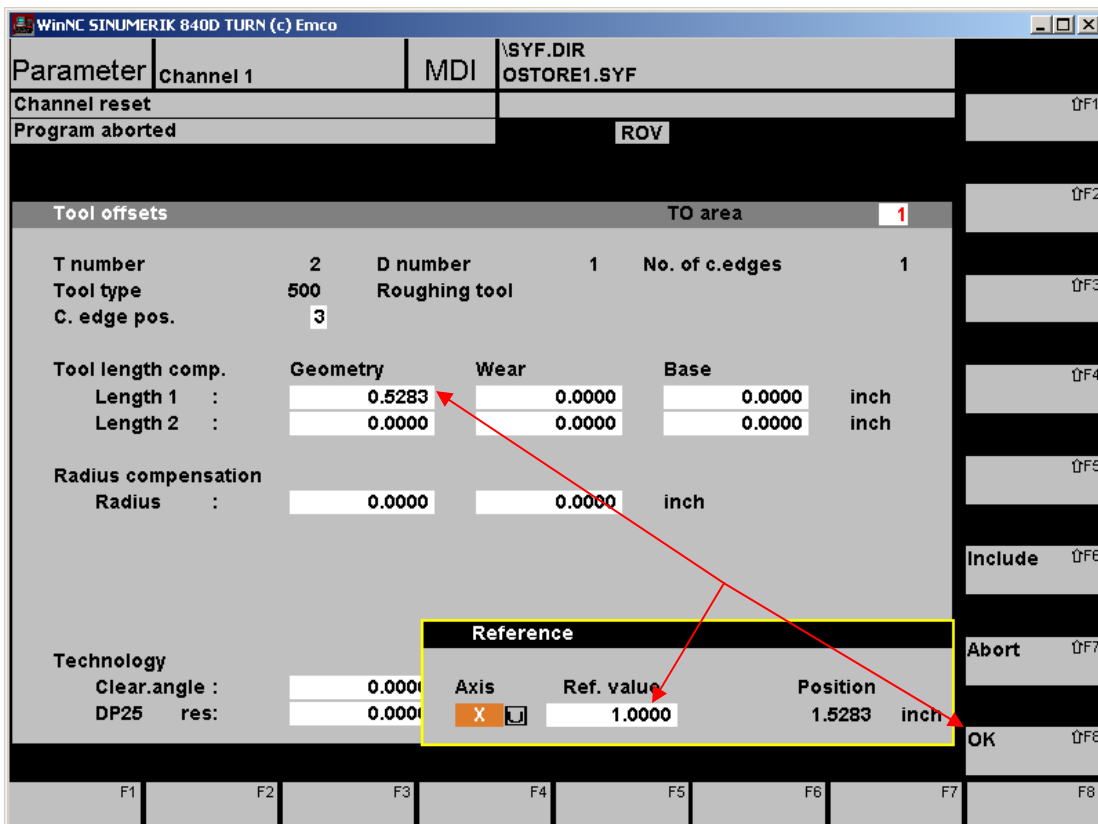
13. Jog TOOL TIP to the WORK PIECE & touch TOOL TIP to the
DIAMETER of the WORK PIECE using the Direction keys.

(Use the Feed override dial or Steps to approach at a slower feed)



14. Press the  button on the horizontal soft keys then press **Blue** horizontal soft key for **Parameter** F2
 15. Press **Blue** horizontal soft key for **Tool offset** F1 (unless Tool offset screen is on)
 16. Cursor to length 1 (This is X offset) then press **Blue** horizontal soft key for **Determine compensa.** F8
 17. Press the  until X appears
 18. Cursor to Ref. value and type the diameter of the stock that is being scratched
 19. Press the **Blue** vertical soft key for **OK** ↑F8
- Example: Ref. value
- Type 1.0000 (if scratching 1"dia.)
20. Jog TURRET away from WORK PIECE using X+

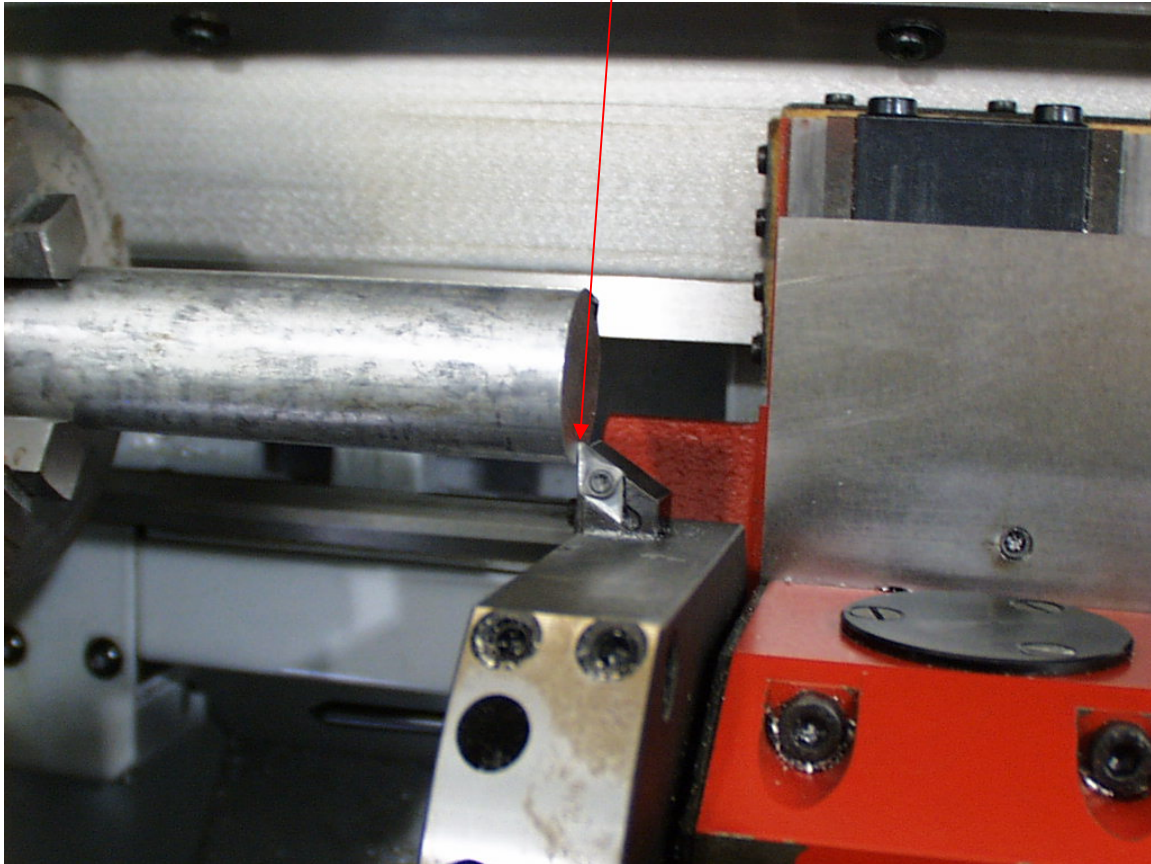
Length 1 is the distance from X zero on the Turret to the Tool Tip




Parameter		Channel 1	MDI	SYF.DIR
Channel reset		OSTORE1.SYF		
Program aborted		ROV		
Tool offsets		TO area 1		
T number	2	D number	1	No. of c.edges 1
Tool type	500	Roughing tool		
C. edge pos.	3			
Tool length comp.		Geometry	Wear	Base
Length 1 :	0.5283	0.0000	0.0000	inch
Length 2 :	0.0000	0.0000	0.0000	inch
Radius compensation				
Radius :	0.0000	0.0000		inch
Technology				
Clear.angle :	0.0000	Axis	Ref. value	Position
DP25 res:	0.0000	X	1.0000	1.5283 inch

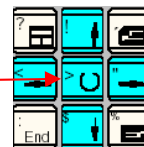
21. Jog TOOL TIP to the end of the WORK PIECE & touch TOOL TIP to the FACE of the WORK PIECE using the Direction keys.

(Use the Feed override dial or Steps to approach at a slower feed)



22. Cursor to length 2 (This is Z offset) then press **Blue** horizontal soft key for **Determine F8 compensa.**

23. Press the  until Z appears



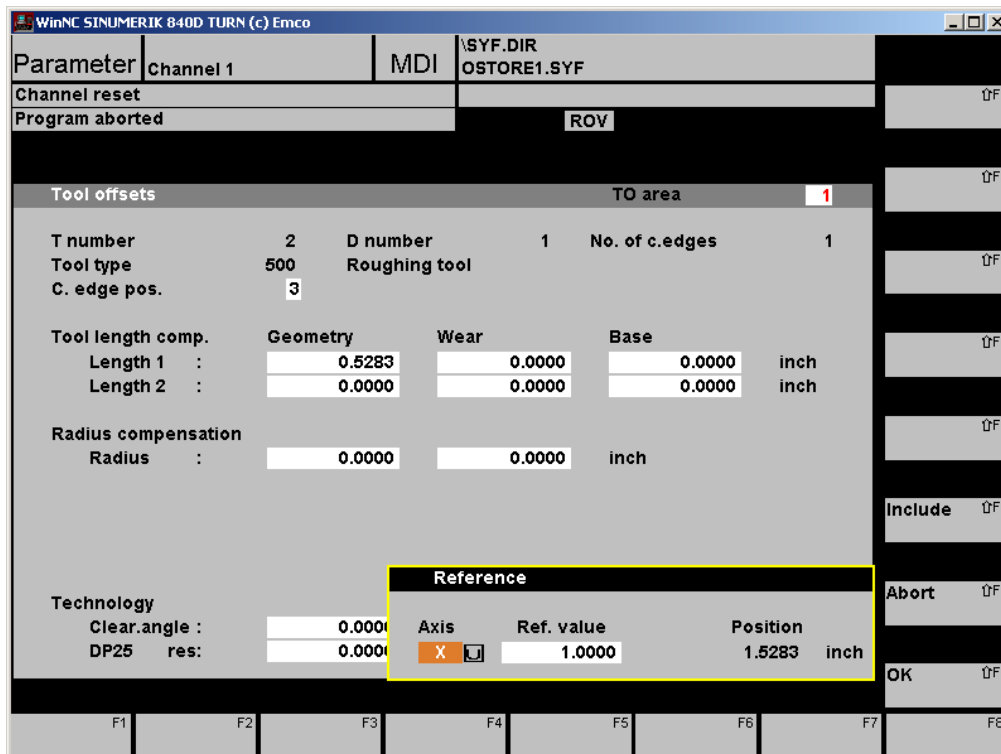
24. Cursor to Ref. value and type the value from numbers written down or on (pg.12 number 8)

25. Press the **Blue** vertical soft key for **OK** 

Example: Ref. value

Type 5.4650 (if this is number written down)

Length 2 is the distance from face of the Turret to the Tool Tip

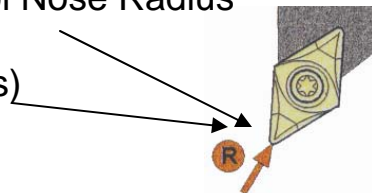


Parameter		Channel 1	MDI	\SYF.DIR OSTORE1.SYF	
Channel reset					
Program aborted		ROV			
Tool offsets				TO area 1	
T number	2	D number	1	No. of c.edges	1
Tool type	500	Roughing tool			
C. edge pos.	3				
Tool length comp.		Geometry	Wear	Base	
Length 1 :	0.5283		0.0000	0.0000	inch
Length 2 :	0.0000		0.0000	0.0000	inch
Radius compensation					
Radius :	0.0000		0.0000	inch	
Technology					
Clear.angle :	0.0000	Axis	Ref. value	Position	
DP25 res:	0.0000	X	1.0000	1.5283	inch

26. Jog TURRET away from WORK PIECE using Z+








27. Cursor to the Radius this will be the Tool Nose Radius

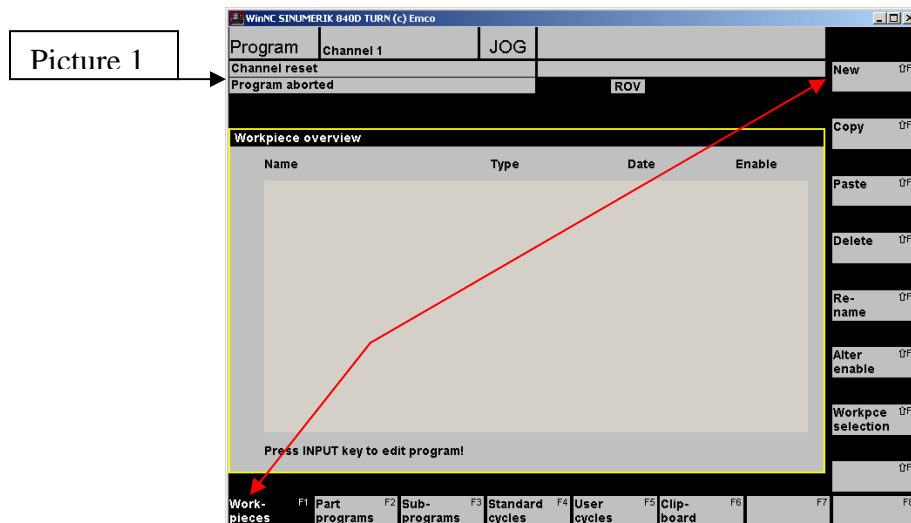
(TOOL TIP Radius)








28. Repeat steps 1-27 for all OD tools needed to be setup

Starting a Work folder




1. Press the  button on the horizontal soft keys (press  again if picture 1 soft key don't appear) now press **Blue** horizontal soft key for 
2. If Work-pieces page is not highlighted press **Blue** horizontal soft keys for 
3. Press the **Blue** vertical soft key for 
4. Type in Demo 1 then press the **Blue** vertical soft key for 
(This is the folder name that holds the main and sub programs)
5. Press the input  button (this is to open / edit the folder to place programs into)

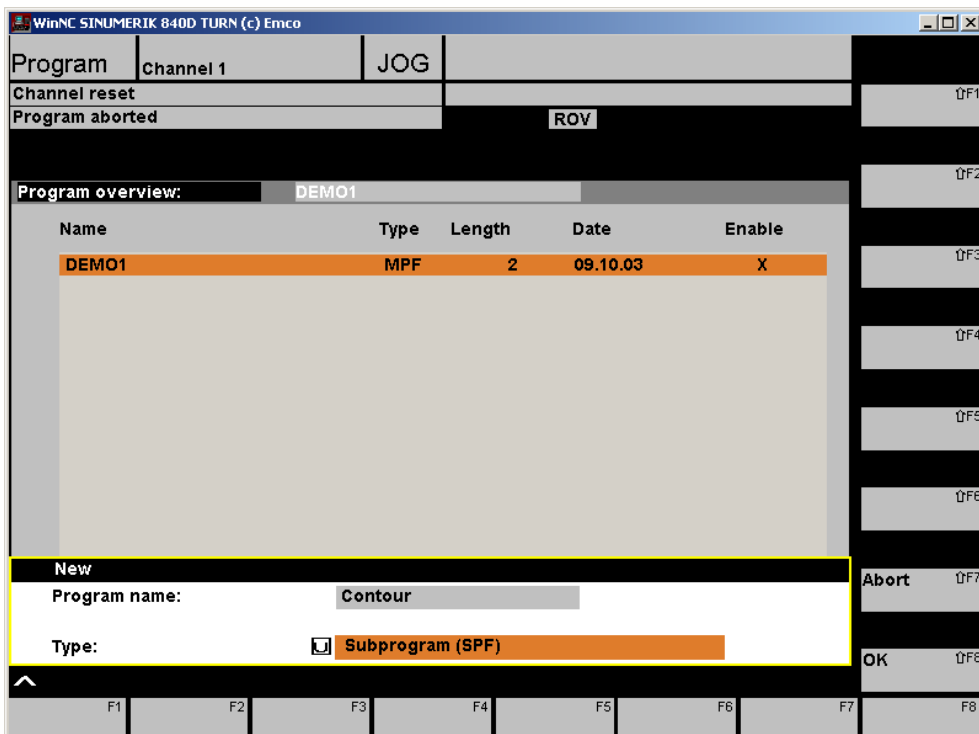


Starting a Main Program File (MPF)

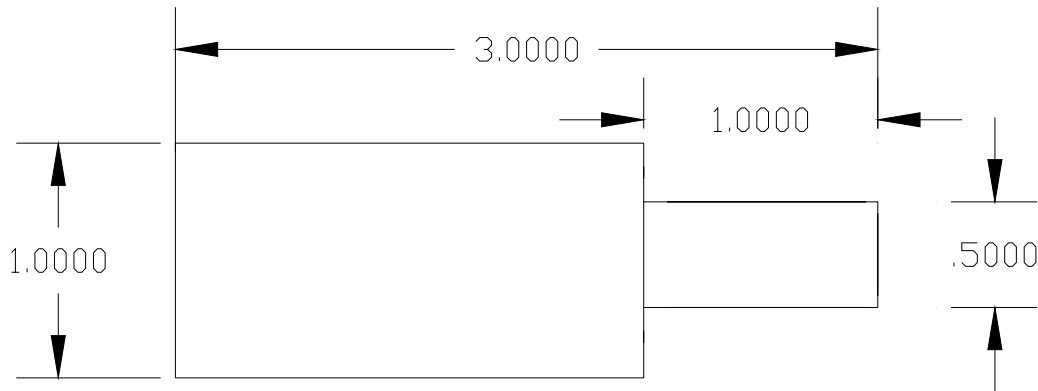
1. Press the **Blue** vertical soft key for  (F1)
2. Highlight Program name and type Demo1
3. Cursor down to Type and press  until part program (MPF) appears (this is the name created for the main program file)
4. Press the **Blue** vertical soft key for  (F6)
5. Press the **Blue** vertical soft key for  (F6)
6. Press the **Blue** vertical soft key for  (F7) (this make the demo 1 as the main program that is active)

Starting a Sub Program File

1. Press the **Blue** vertical soft key for  (F1)
2. Highlight Program name and type Contour
3. Cursor down to Type and press  until subprogram (SPF) appears (this is the name created for the sub program file)
4. Press the **Blue** vertical soft key for  (F6)



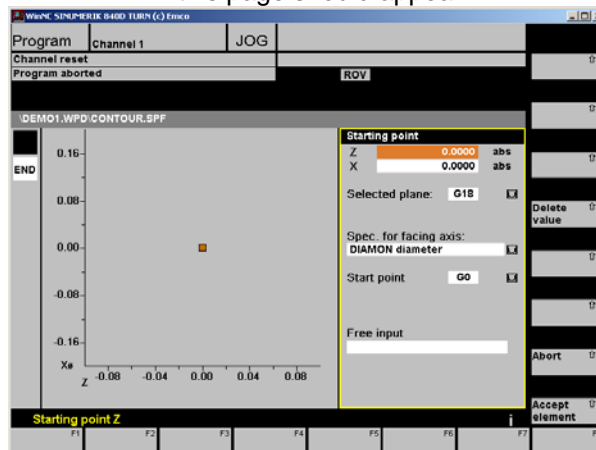
Demo 1




Inside the subprogram file will hold the contour of the Drawing






1. Press **Blue** horizontal soft key for **Support** F4
2. Press **Blue** vertical soft key for **New contour >** ↑F1

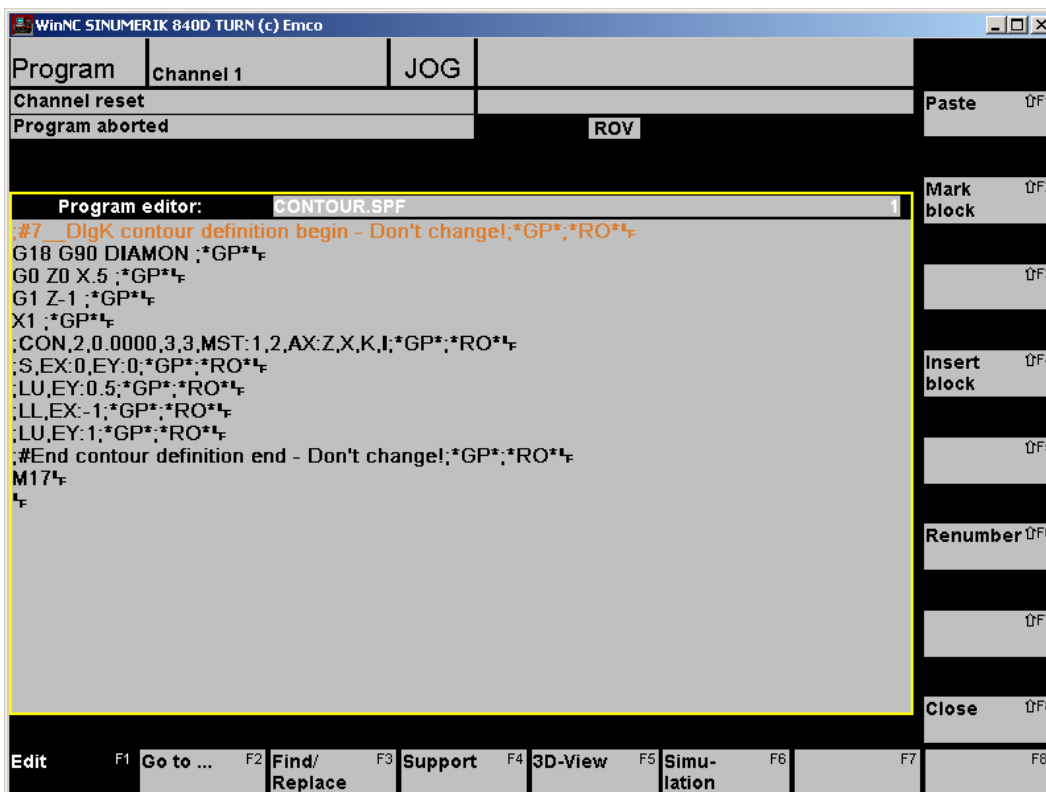
this page should appear






3. Make sure Z is 0 and then cursor to X and type .5, then look down and make sure **Selected plane: G18** for (ZX) is selected, make sure **Spec. for facing axis: DIAMON diameter** for (DIA values) is selected, & make sure G0 for Rapid movements is selected if not use the  button to switch until these are selected
4. Press the **Blue** vertical soft key for **Accept element** ↑F6



Note: This will start at X.5 and Z0 when contour begins

5. Press the **Blue** vertical soft key for  (movement in Z)
6. Type in -1.0 (this is the 1st Z length on the print on pg. 31)
7. Press the **Blue** vertical soft key for  (movement in X)
8. Type in 1.0 (this is the Dia. of the part on the print on pg. 31)
9. Press the **Blue** vertical soft key for 
10. Press the **Blue** vertical soft key for  (This accept and confirms the contour is done)
11. Press the **Blue** vertical soft key for 



These next steps will be for the Main program file

1. Cursor down to DEMO1 and press the input  button
2. Type in G0 Space  button then Z2 then input  button

This should take you to the next line and place a  at the end of the line. Spaces will need to be placed in between each command and input  at the end of each line. If a semicolon (;) is use any thing written to the right of this is ignored by the 840D control (Operator Messages or Tool descriptions normally are done like this)

Below is the Main program with line 2. from pg. 32

G0 Z2 ----- Safe move for Indexing
 T2 D1; **Right Hand Tool / w 55 degree inserts**
 SETMS[1] ----- Set main spindle to main 1
 S550 M3 ----- Spindle speed & spindle on clockwise
 G96 X1.1 Z0 ----- Surface footage & start position facing
 G1 X-.02 F.002 ----- Facing below center in X
 G0 X1 Z.1 ----- Start point for roughing cycle

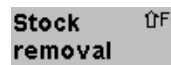
3. Press the **Blue** horizontal soft key for



4. Press the **Blue** vertical soft key for



5. Press the **Blue** vertical soft key for



6. Follow the steps next to the picture below then go to next step

Cycle params: CYCLE95		
Name	NPP	Contour
Infeed depth	MID	0.03
Fin. allow.	FALZ	0.
Fin. allow.	FALX	0.
Fin. allow.	FAL	0.
Feed roughing	FF1	0.003
Feed plunging	FF2	0.001
Feed finish	FF3	0.001
Operation	VARI	9
Dwell time	DT	0.
Path length	DAM	0.
Retract. path	_VRT	0.015

Where Name NPP is type Contour

(This is the subprogram for the contour)

Cursor to Infeed depth MID and type .03

(This is the amount of stock being removed per pass)

Cursor to Feed roughing FF1 and type .003

(This is .003 feed per revolution during roughing cuts)

Cursor to Feed plunging FF2 and type .002

(This is .003 feed per revolution during diving cuts)

Cursor to Operation VARI & press  for 9


(This is the variant: 1 = is roughing 5 = is finishing 9 = is both)

Cursor to Retract. path _VRT and type .015

(This is the retract after the infeed depth pass is made)

7. Press the **Blue** vertical soft key for



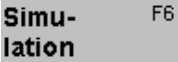




8. Cursor right to end of line press input  button

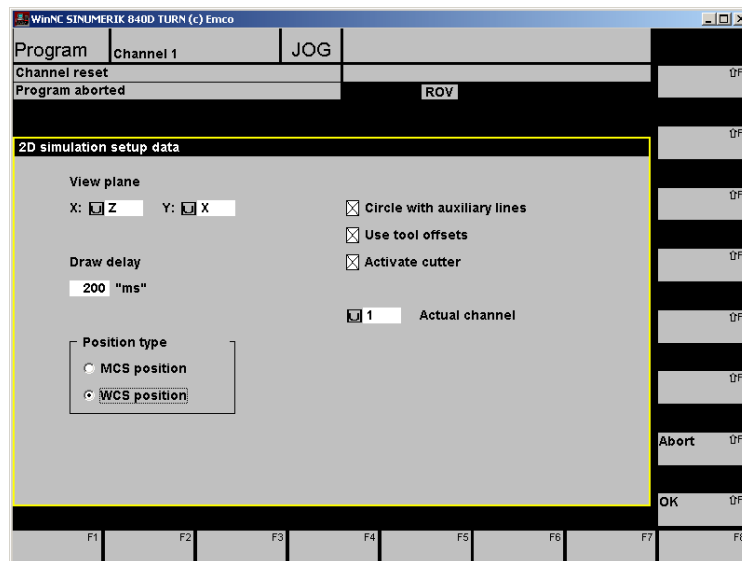
9. Below is the end of the program finish these 2 lines then follow the next steps for 2-D simulation






G0 X1 Z2 ----- Safe move away from stock

M30 ----- End of program

2-D SIMULATION




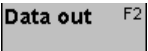



1. Press the Blue horizontal soft key for **Simulation**  F6
2. Press the Blue vertical soft key for **Settings**  ↑F6
3. Change View plane so it shows X: Z and Y: X use  button to change each one
4. Cursor down to Draw delay type 200 (higher the # slower simulation moves)
5. Cursor down to Position type WCS position then press  (This is for Work coordinates instead of Machine coordinates MCS)
6. Cursor down to Circle with auxiliary lines press  to place a X in the box, then do the same for Use tool offsets, and Activate cutter





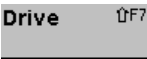



7. Press the Blue vertical soft key for **OK**  ↑F6
8. Press the Blue vertical soft key for **Zoom Auto**  ↑F1
9. Press the Blue horizontal soft key for **Start**  F5
10. When the simulation is done press the Blue vertical soft key for **Edit**  F1 (this will take you back to the program)
11. Press the Blue vertical soft key for **Close**  ↑F6

Saving & Reading programs to drive units

Send programs out to floppy drive (A)




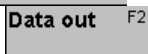





1. Press the  button on the horizontal soft keys; then press the Blue horizontal soft key for 
2. Place floppy disk into drive A
3. Press the Blue vertical soft key for 
4. Press the Blue horizontal soft key for 
5. Cursor down to Work pieces press input  button
6. Press the Blue vertical soft key for 
7. Verify the name of the folder then press Blue vertical soft key for 

Read programs in from floppy drive (A)




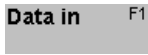




1. Press the  button on the horizontal soft keys; then press the Blue horizontal soft key for 
2. Place floppy disk into drive A
3. Press the Blue vertical soft key for 
4. Press the Blue horizontal soft key for 
5. If there are more than one work folders saved cursor to the work folder needed to be read
6. Press the Blue vertical soft key for 
7. Press Blue vertical soft key for 

Saving & Reading offsets to drive units







Send offsets out to floppy drive (A)

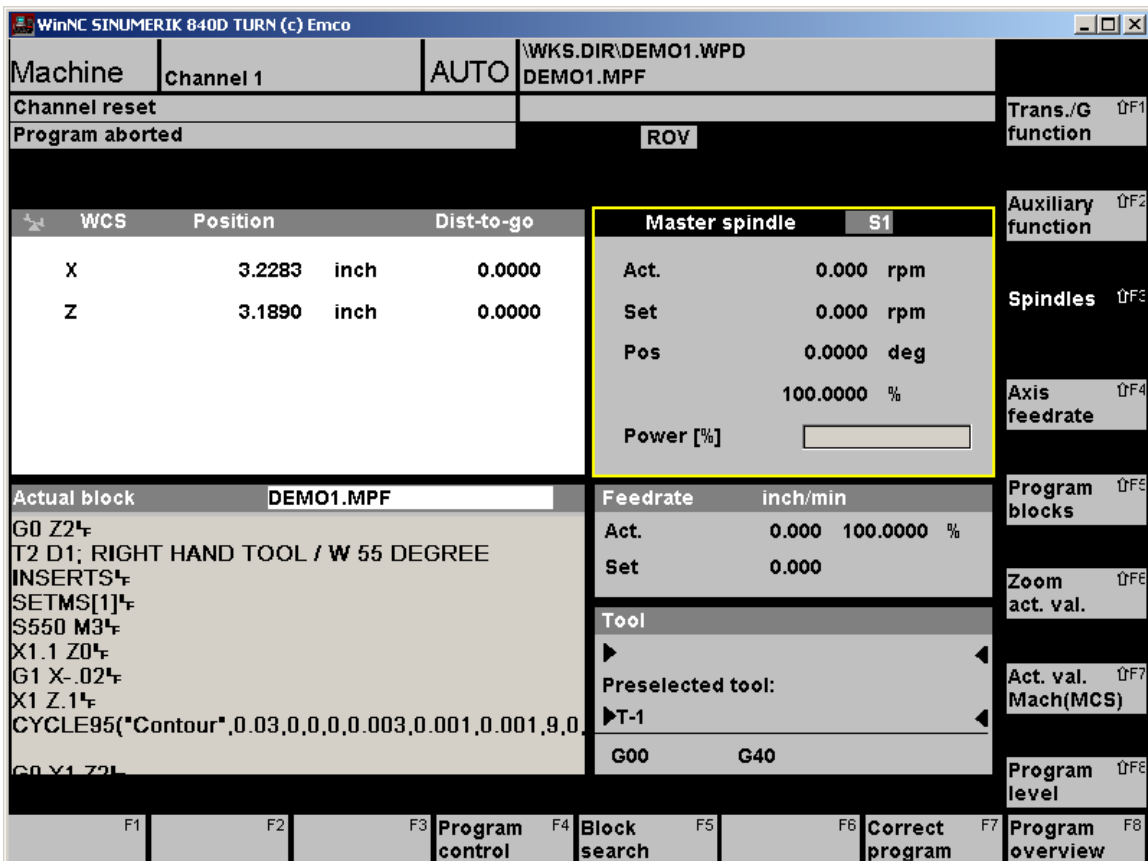
1. Press the  button on the horizontal soft keys; then press the Blue horizontal soft key for 
2. Place floppy in drive A
3. Press the Blue vertical soft key for 
4. Press the Blue horizontal soft key for 
5. Cursor to DATA then press input  button
6. Cursor to TOOL DATA then press the Blue vertical soft key for 
7. Verify the name TO then press Blue vertical soft key for 
8. Cursor to Work offset then press the Blue vertical soft key for 
9. Verify the name UFR then press Blue vertical soft key for 

Read offsets in from floppy drive (A)

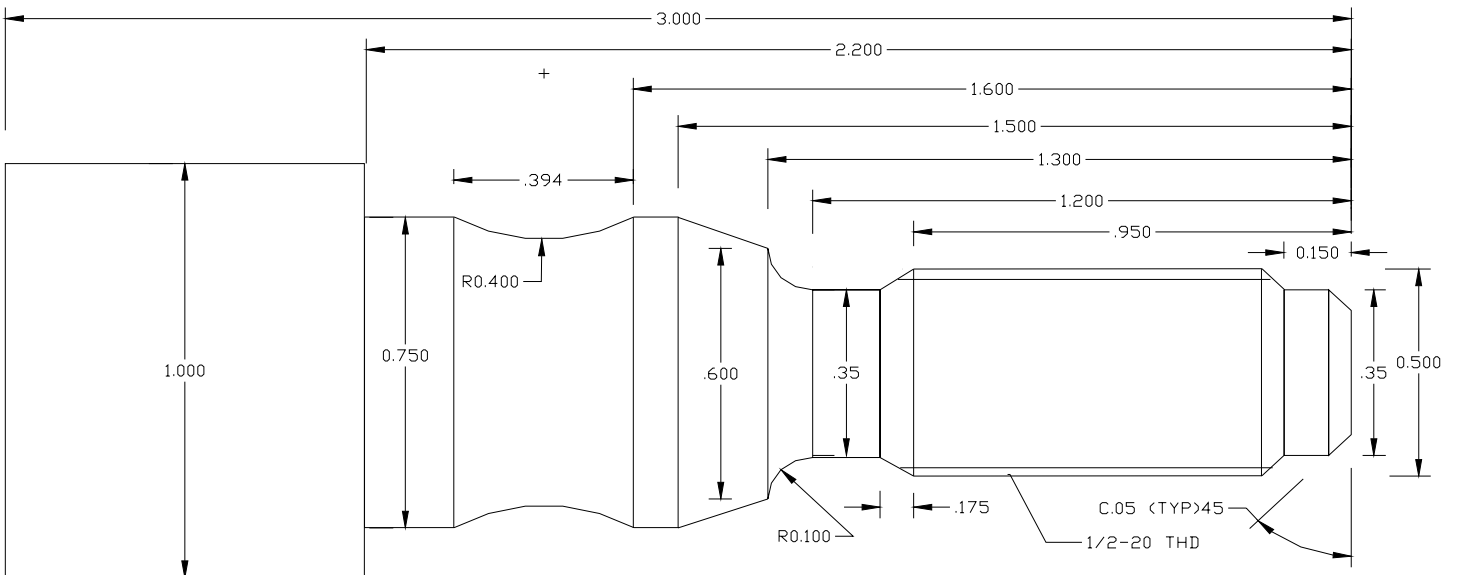
1. Press the  button on the horizontal soft keys; then press the Blue horizontal soft key for 
2. Place floppy disk into drive A
3. Press the Blue vertical soft key for 
4. Press the Blue horizontal soft key for 
5. Cursor to TO then press Blue vertical soft key for 
6. Press Blue vertical soft key for 
7. Cursor to UFR then press Blue vertical soft key for 
8. Press Blue vertical soft key for 

Run Program on the machine

1. Move Mode Dial to AUTO and press the  on the horizontal soft key (should look like picture below)
2. Now the program is ready to run on the machine. Use Single block  button for checking first runs.
3. Press cycle start  button (this will execute the program)
4. While in single block; cycle start will be need to be press after every line that is executed
5. After program is finished press the  button on the horizontal soft keys then press the Blue horizontal soft key for **Program** 
6. Now press the **Blue** vertical soft key for **Back**  (this closes the work folder; now new folder can be created for other projects)

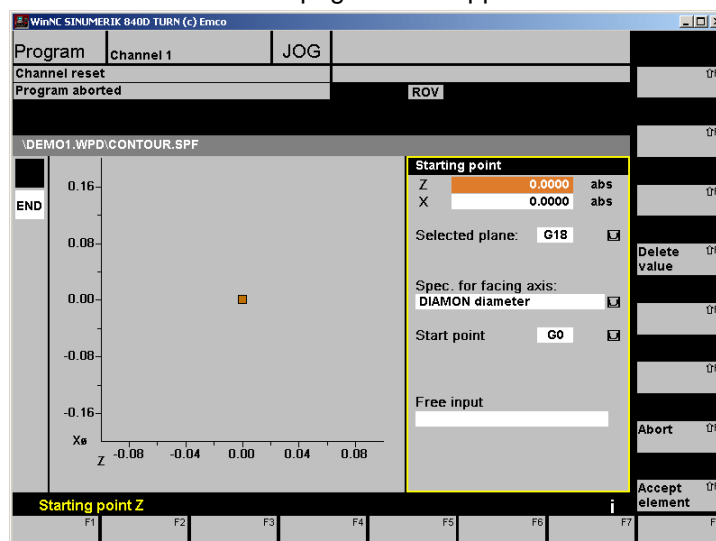


Demo 2



1. Follow steps 1 thru 5 on pg. 21 for Starting a Work folder but call the folder Demo 2
2. Follow steps on 1 thru 6 pg. 22 for Starting a main program file but call program Demo 2
3. Follow steps on 1 thru 4 pg. 22 for Starting a sub program file
4. Now press **Blue** horizontal soft key for **Support** F4
5. Press **Blue** vertical soft key for **New contour >** \uparrow F1

this page should appear



6. Make sure Z is 0 and then cursor to X and type .2, then look down and make sure **Selected plane: G18** , **Spec. for facing axis: DIAMON diameter** and G0 is selected

7. Cursor down to Free input and type in G42

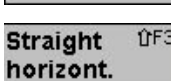
8. Press the **Blue** vertical soft key for **Accept element** 

Note: This will start at X.2 and Z0 when contour begins

9. Press the **Blue** vertical soft key for **Straight vertical**  (movement in X)

10. Type in .35 then cursor down to FS this is chamfer and type .05

11. Press the **Blue** vertical soft key for **Accept element** 

12. Press the **Blue** vertical soft key for **Straight horizont.**  (movement in Z)

13. Type in -.15 then press the **Blue** vertical soft key for **Accept element** 

14. Press the **Blue** vertical soft key for **Straight vertical** 

15. Type in .5 then cursor down to FS this is chamfer and type .05

16. Press the **Blue** vertical soft key for **Accept element** 

17. Press the **Blue** vertical soft key for **Straight horizont.** 

18. Type in -.950

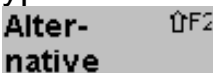
19. Press the **Blue** vertical soft key for **Accept element** 

20. Press the **Blue** vertical soft key for **Straight any** 

21. Type in for Z -1.125 and for X .35

22. Press the **Blue** vertical soft key for **Accept element** 

23. Press the **Blue** vertical soft key for **Straight horizont.** 

24. Type in -1.3 then cursor to FS press the **Blue** vertical soft key for **Alter-native**  until R appears then type .1

25. Press the **Blue** vertical soft key for **Accept element** 

26. Press the **Blue** vertical soft key for **Straight vertical** 

27. Type in .6

28. Press the **Blue** vertical soft key for

Accept element 

29. Press the **Blue** vertical soft key for

Straight any 

30. Type in for Z -1.5 and for X .75

31. Press the **Blue** vertical soft key for

Accept element 

32. Press the **Blue** vertical soft key for


Straight horizont. 



33. Type in -1.6

34. Press the **Blue** vertical soft key for

Accept element 


35. Press the **Blue** vertical soft key for

Circle 

36. Press the  until symbol shows  for G2

- Cursor down to R type in .4 for the radius
- Cursor down to Z type in -1.994 for the finish length
- Cursor down to X type in .75 for the finish Dia.

37. Press the **Blue** vertical soft key for

Dialog accept 

38. Press the **Blue** vertical soft key for

Accept element 

39. Press the **Blue** vertical soft key for

Straight horizont. 

40. Type in -2.2

41. Press the **Blue** vertical soft key for

Accept element 

42. Press the **Blue** vertical soft key for

Straight vertical 

43. Type in 1.0

44. Press the **Blue** vertical soft key for

Accept element 

45. Press the **Blue** vertical soft key for

Straight vertical 

46. Type in 1.1 cursor to free input type in G40

47. Press the **Blue** vertical soft key for

Accept element 

48. Press the **Blue** vertical soft key for


Accept 

(This accept and confirms the contour is done)

49. Press the **Blue** vertical soft key for

Close 

These next steps will be for the Main program file (Demo 2)

10. Cursor down to DEMO2 and press the input  button

11. Now type in the codes below and follow the steps

G0 Z2 ----- Safe move for Indexing
T2 D1; **Right Hand Tool / w 55 degree inserts**
SETMS[1] ----- Set main spindle to main 1
S550 M3 ----- Spindle speed & spindle on clockwise
G96 X1.1 Z0 ----- Surface footage & start position facing
G1 X-.02 F.002 ----- Facing below center in X
G0 X1 Z.1 ----- Start point for roughing cycle

12. Press the **Blue** horizontal soft key for

Support F4


13. Press the **Blue** vertical soft key for

Turning  F2

14. Press the **Blue** vertical soft key for

Stock removal  F4

15. Follow the steps next to the picture below then go to next step

Cycle params: CYCLE95		
Name	NPP	Contour
Infeed depth	MID	0.03
Fin. allow.	FALZ	0.
Fin. allow.	FALX	0.
Fin. allow.	FAL	0.
Feed roughing	FF1	0.003
Feed plunging	FF2	0.001
Feed finish	FF3	0.001
Operation	VARI 	9
Dwell time	DT	0.
Path length	DAM	0.
Retract. path	_VRT	0.015

Where Name NPP is type **Contour**

(This is the subprogram for the contour)

Cursor to Infeed depth MID and type .03

(This is the amount of stock being removed per pass)

Cursor to FIN. allow depth FALZ and type .003

(This is the amount of stock in Z for a finish cut)

Cursor to FIN. allow depth FALX and type .010

(This is the amount of stock in X for a finish cut)

Cursor to Feed roughing FF1 and type .004

(This is .003 feed per revolution during roughing cuts)

Cursor to Feed plunging FF2 and type .002

(This is .003 feed per revolution during diving cuts)

Cursor to Feed finish FF3 and type .002

(This is .003 feed per revolution during finish cuts)

Cursor to Operation VARI & press  for 9


(This is the variant: 1 = is roughing 5 = is finishing 9 = is both)

Cursor to Retract. path _VRT and type .015

(This is the retract after the infeed depth pass is made)

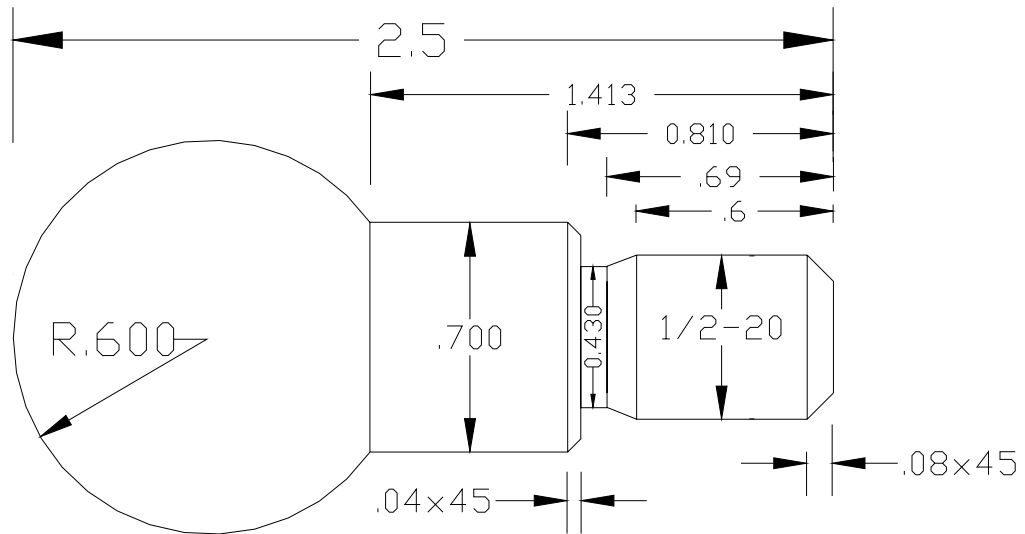
16. Press the **Blue** vertical soft key for

OK  F6

17. Cursor right to end of line press input  button

G0 X1 Z2 ----- Safe move away from stock
M30 ----- End of program

Ball Hitch



This is for a trial program.