OKUMA

IGF LATHE

TRAINING MANUAL

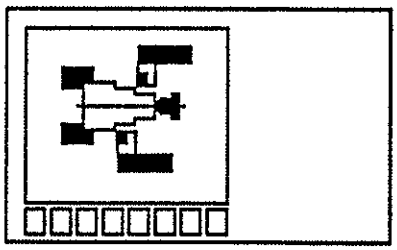
INDEX

Introduction :

The Interactive Graphic Function (IGF) , has been developed as an extension of the OKUMA OSP control. IGF allows programming at the OSP control, through a set of interactive operations with the N/C. The operator can program parts with complicated or simple contours, by keying-in responses to the prompts displayed on the controls CRT screen.

Features :

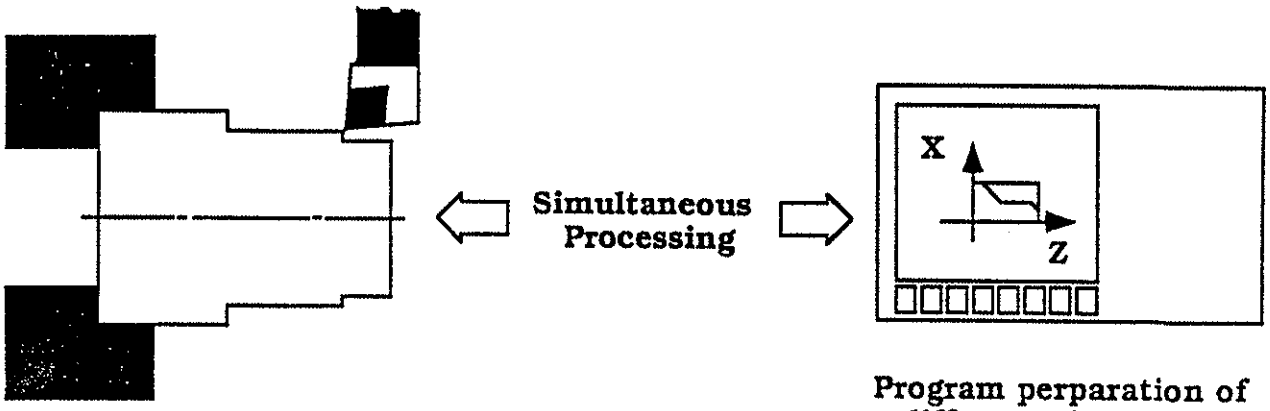
1) Completed programs can be checked, using the animated display.



2) Control generated, computer assist programming for 4-axis machining, and editing of 4-axis simultaneous programs.

3) Automatic selection of machining conditions and cutting tools.

4) Background programming, machine can be cutting a piece part while control is being used to prepare another part program.

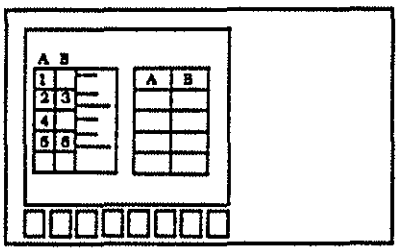


Machining of one piece part.

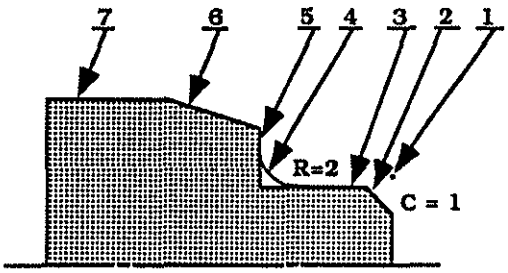
Program perparation of a different piece part.

Features : (continued)

5) Effortless editing of machining order and conditions.



6) Simplified shape definition.



1. START PT X= , Z=
2. CHF SIZE C C=
3. OD ← Z=
4. RADIUS R R=
5. FACE ↑ X=
6. TAPER X= , Z=
7. OD ← Z=

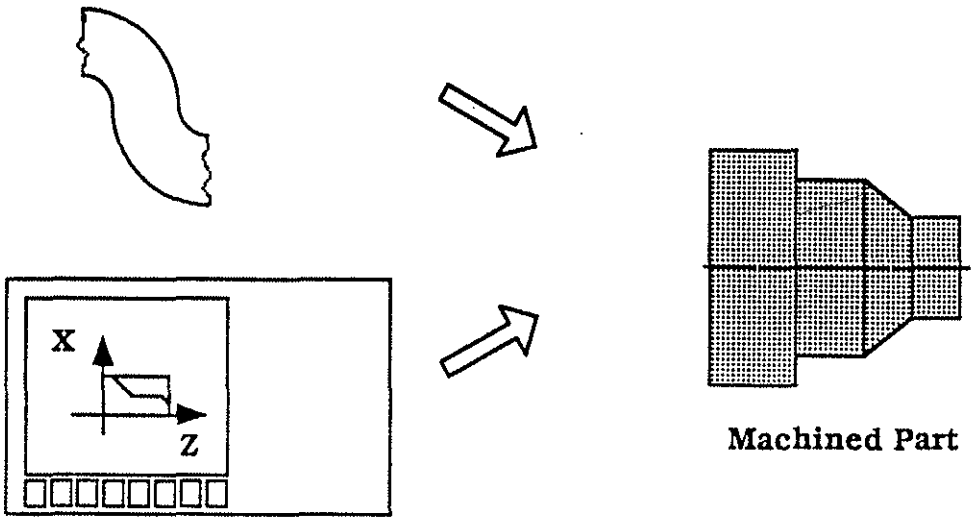
7) Input data is saved on a large capacity bubble memory.

Standard : Capacity equivalent to 60 meters (197 feet) tape length

Optional : OSP5000L-G ... Capacity equivalent to 10,240 meters (33,600 feet) tape length

OSP500L-G ... Capacity equivalent to 3,840 meters (12,600 feet) tape length

8) Existing programs, stored in menory, that were not prepared using IGF may be exceuted or run, as well as programs prepared using IGF.



Machined Part

Programs prepared with IGF or without IGF , may be run

IGF Outline :

IGF executes the graphic display of the machining status, when the data for, tooling, material condition, parameters and shape are entered using the graphic editing functions. The data from the machining order and cutting conditions is then converted into a NC program after verification and editing.

Tool data, material data and parameters are automatically called, when the entry of them is required during the programming of a part. This data is entered, by responding to the guides (guide drawings and messages), displayed on the control CRT. The data is then transfered into the NC part program. The data (tool, material and pararmeter) can be separately entered and registered.

Definitions :

Tool data : Is all data related to tools, such as, tool type, tool shape, turret number, etc.

Material data : Part material can be identified and stored, consisting of; data for Constant Surface Footage, depth of cut and feedrate.

Parameters : This refers to data that is a requisite for NC program generation. The data includes :

- Standard tailstock center dimensions
- Chuck barrier geometry
- Upper and lower turret RPM's limit
- Program zero designation
- Nominal diameter for threading

IGF data : This refers to the data entered using the graphic editing function, such as, blank shape, cutting conditions, tools, work shape and parameters.

NOTE :

IGF data, prepared using the IGF function, can be stored on floppy disk media storage. This should be done to insure sufficient control storage memory or to provide back-up and protection to on-going work.

This IGF data, however, cannot be used with OSP controls that do not have the feature of IGF programming. The correctness of the program data, on these controls, cannot be guaranteed.

Data Setting Procedures :

Tool, material and parameter data are factory set by OKUMA , for general turning operations. They can, however, be edited, as needed, to reflect the USER'S knowledge of machining for their product line.

Tool data :

Cutting tools used for a specific part, can be registered (or input) prior to begining the IGF programming session. The IGF system allows the USER to register (or define) the tool data for up to 104 different tools. OKUMA provides the data for 13 standard tools with the system.

The tool data consists of three parameters, they are ;

DATA NO. , TOOL CODE , and TOOL FORM CODE

1) DATA NO. (NO)

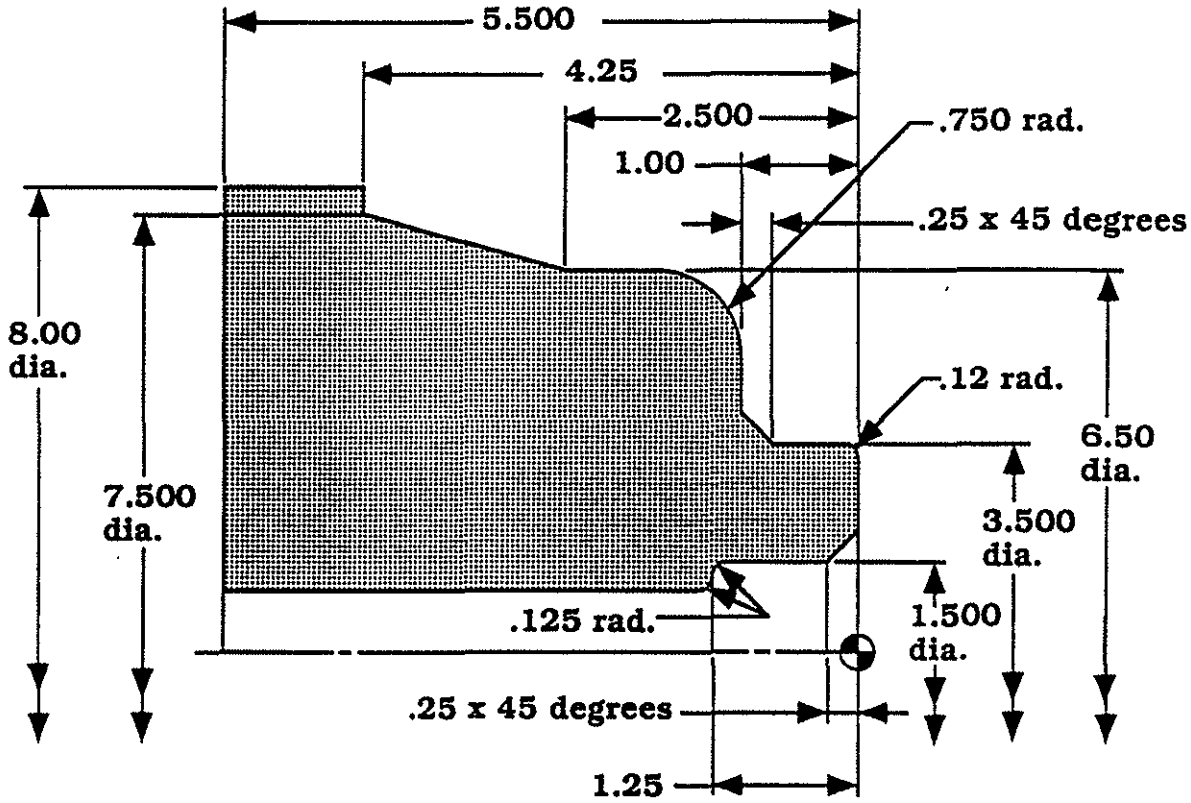
This page, in the control, allows the programmer to identify up to 104 individual tools. A further restriction, is that only 38 tools may be assigned to the upper turret (A) , at one time and a like number may be assigned to the lower turret (B) , at the same time.

2) TOOL CODE (CD)

At this page, in the control, the programmer must select (from the DATA NO. page) , tools that match the cutting type needed and the correct cutting direction. The IGF system allows 38 combinations of these parameters and one code number is assigned to one tool number.

3) TOOL FORM CODE (FC)

The IGF system now displays a page, showing several possible tools, in accordance with the previously entered TOOL CODE. The operator/ programmer has to select the correct tool to use, based on the intended cutting, mounting direction of the tool and the tool shape. Only one tool number can be assigned to one tool form code number.



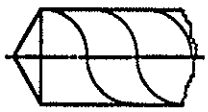
The above sample part would require six cutting tools, they are :

Tool number one - 80 degree diamond x .031 nose radius
Rough O/D of part.

Tool number two - 80 degree diamond x .015 nose radius
Finish O/D of part

Tool number three - Centerdrill

Tool number four - .750 dia. drill - thru



Tool number five - 80 degree diamond x .031 nose radius
Rough I/D of part.

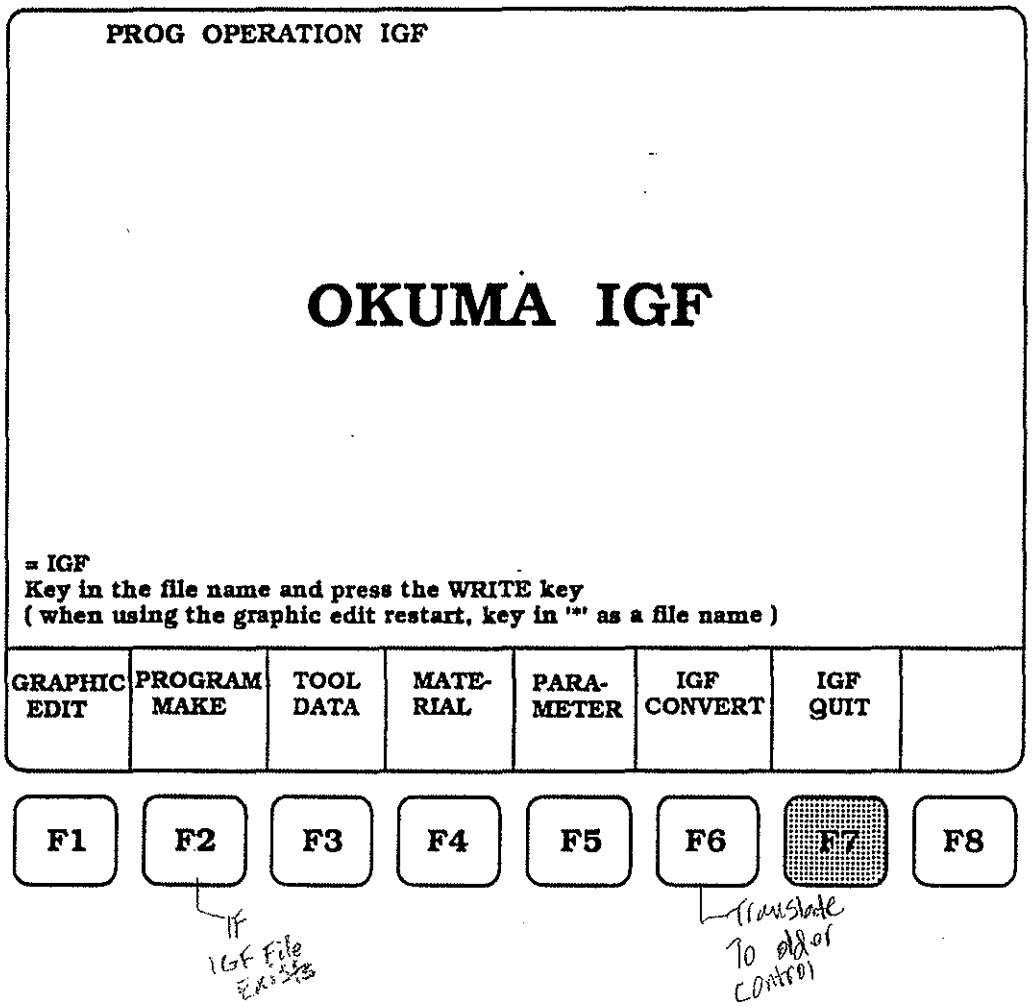
Tool number six - 80 degree diamond x .015 nose radius
Finish I/D of part.

IGF Procedure for Tool Data Entry :

Step One

From the normal machine operation mode, press the EDIT AUX key 

, then press the function key F7 , the CRT should display the IGF start-up page.



At any time the IGF session, for Tool Data Entry, may be terminated by pressing function key F7 . There will be no loss of input data.

Step Two - For Four-axis machines only

From the Function keys, located at botton of the CRT , select 

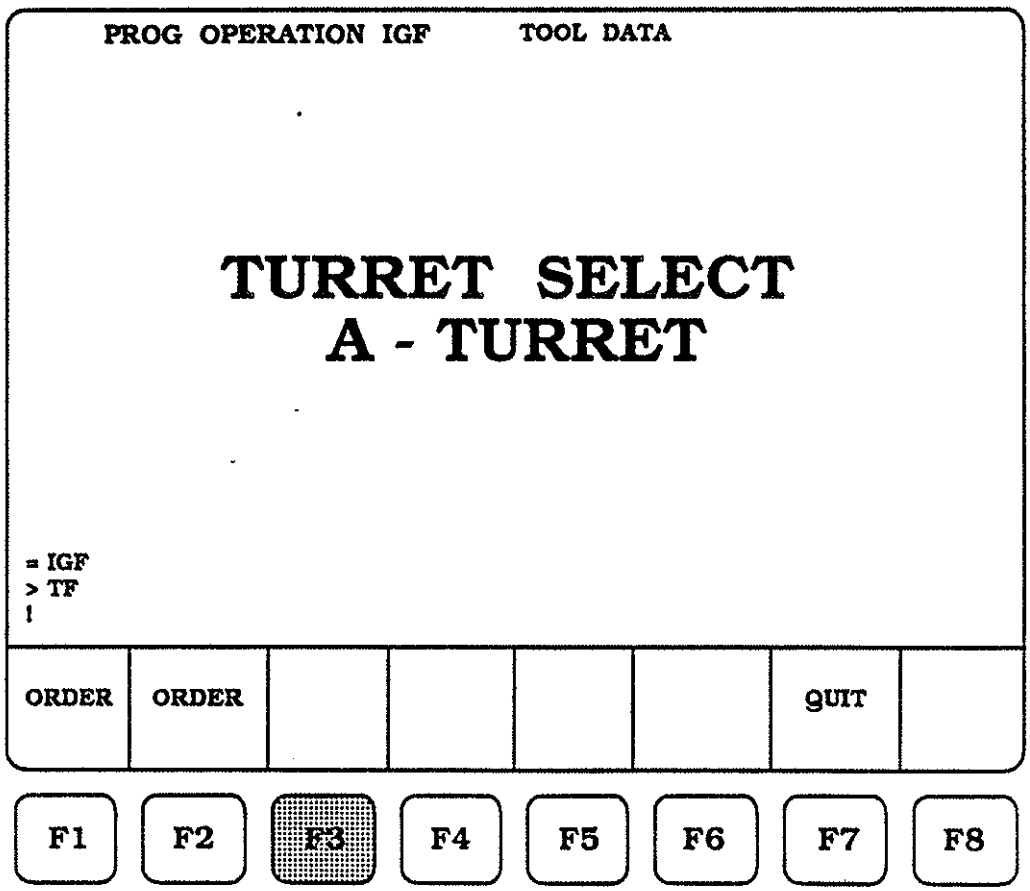
TOOL DATA.

Now select which turret, by selecting one of the TURRET SELECTION KEYS,

A for upper turret,

B for lower turret.

The CRT screen display should be as shown below, if turret A was selected.

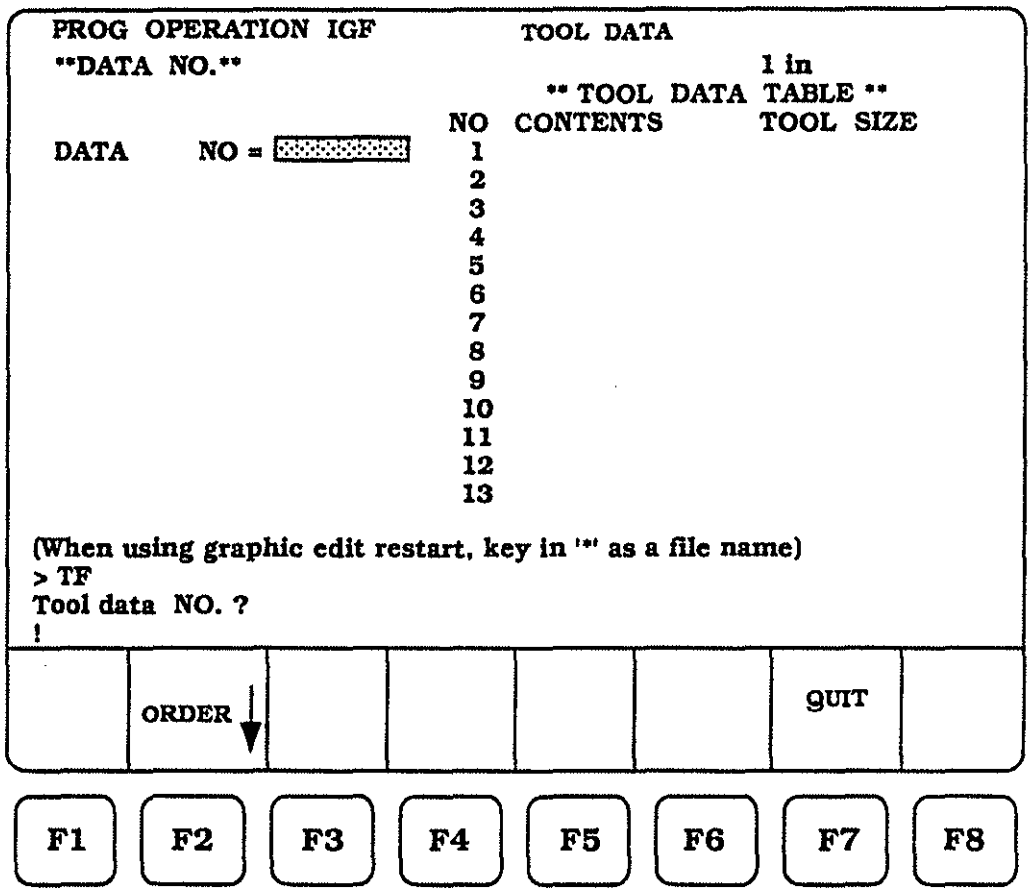


Step Two - For Two-axis machines only

From the tooling information, given on page 5, let's enter the first tool.

From the Function keys, select [F3] TOOL DATA.

The CRT screen should be as displayed below.



To establish our first tool, we must do the following :

From the TOOL DATA TABLE select tool NO. 1, press [1] from the ten key pad and then press [WRITE] .

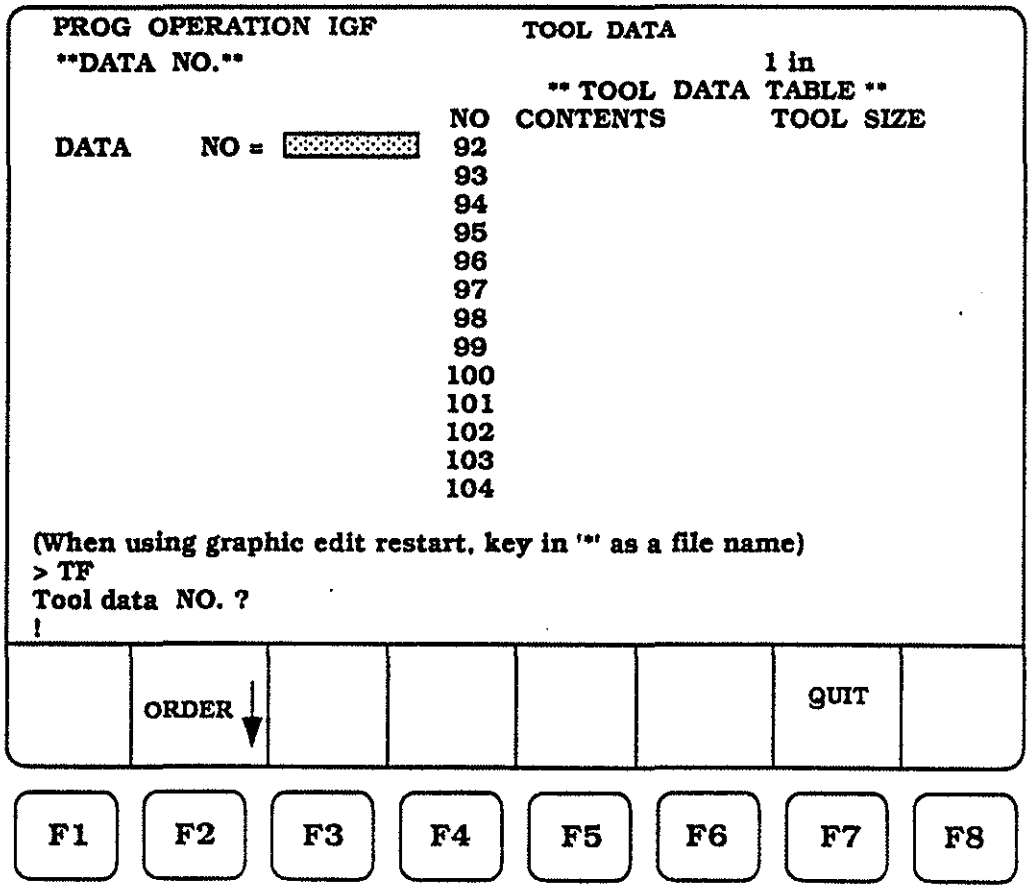
To verify the input, check the highlight area on this page, it should look like this :

Step Two - (continued)

Within the TOOL DATA TABLE , up to 104 tools can be registered for the upper A turret. For machines with two turrets (Four-axis) up to 38 tools can be registered for the lower B turret.

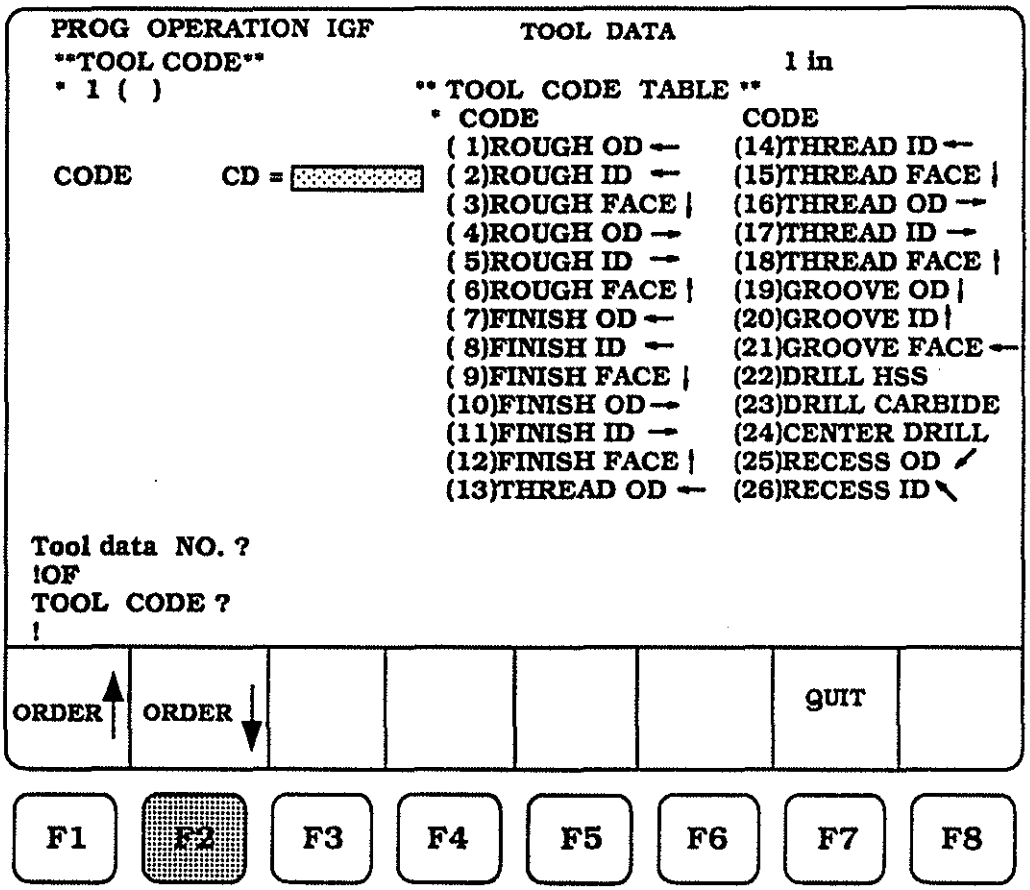
To view the multiple pages of the TOOL DATA TABLE , use the page up button or the page down button.

Pressing the page down button, several times, will yield the CRT screen display shown below. To return to the first page, press the page down button once.



Step Three

From the Function keys, select [F2] ORDER ↓, for the next page of TOOL DATA ENTRY. The CRT screen should be as displayed below.



A tool must now be selected, from page 5 we know the shape  and that the tool is to rough the O/D of the part.

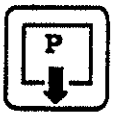
From the TOOL CODE TABLE select tool NO. 1, press [1] from the ten key pad and then press [WRITE].

To verify the input, check the highlight area on this page, it should look like this : 1

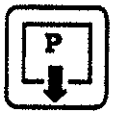
Step Three - (continued)

Within the TOOL CODE TABLE are 38 tools, classified by, the particular tools cutting type and direction of cutting. One tool code is assigned to one cutting type and direction.

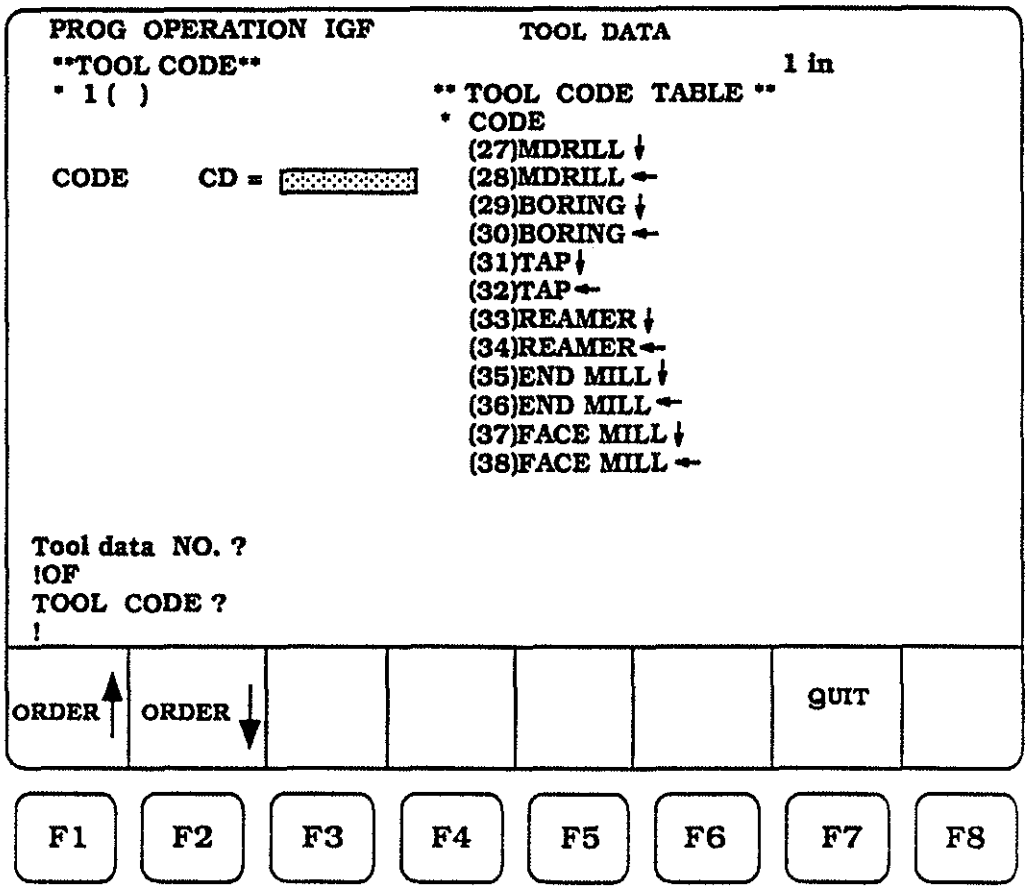
To view the two pages of the TOOL CODE TABLE , use the 

page up button or the 

page down button.

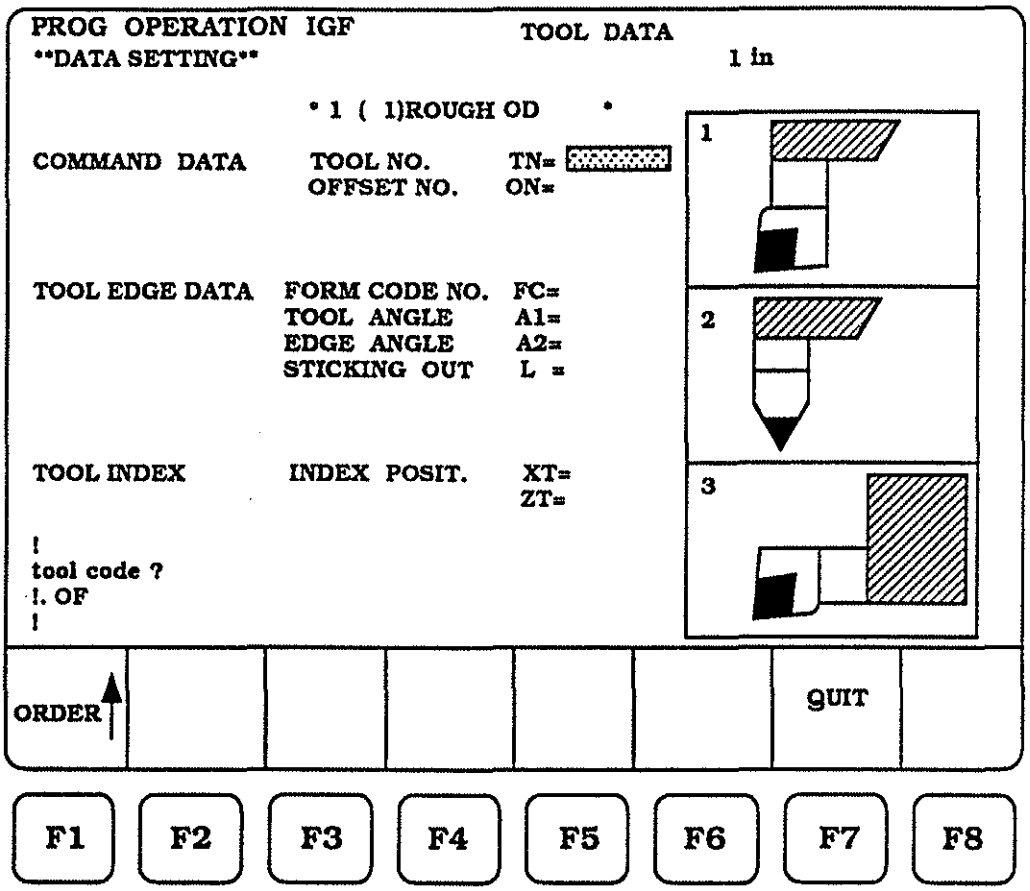
Pressing the 

page down button, one time, will yield the CRT screen display shown below. To return to the first page, of the TOOL CODE TABLE, press the page up button once.



Step Four

From the Function keys, select [F2] ORDER ↓, for the last page of TOOL DATA ENTRY. The CRT screen should be as displayed below.



The DATA SETTING page appears, with the "highlight" area at TOOL NO. (TN). Our first tool is located in turret position one, using tool offset one. To enter the tool or turret number :

Press (1) , from the ten key pad and [WRITE] .

The COMMAND DATA area now looks like this :

COMMAND DATA TOOL NO. TN= 1
OFFSET NO. ON=

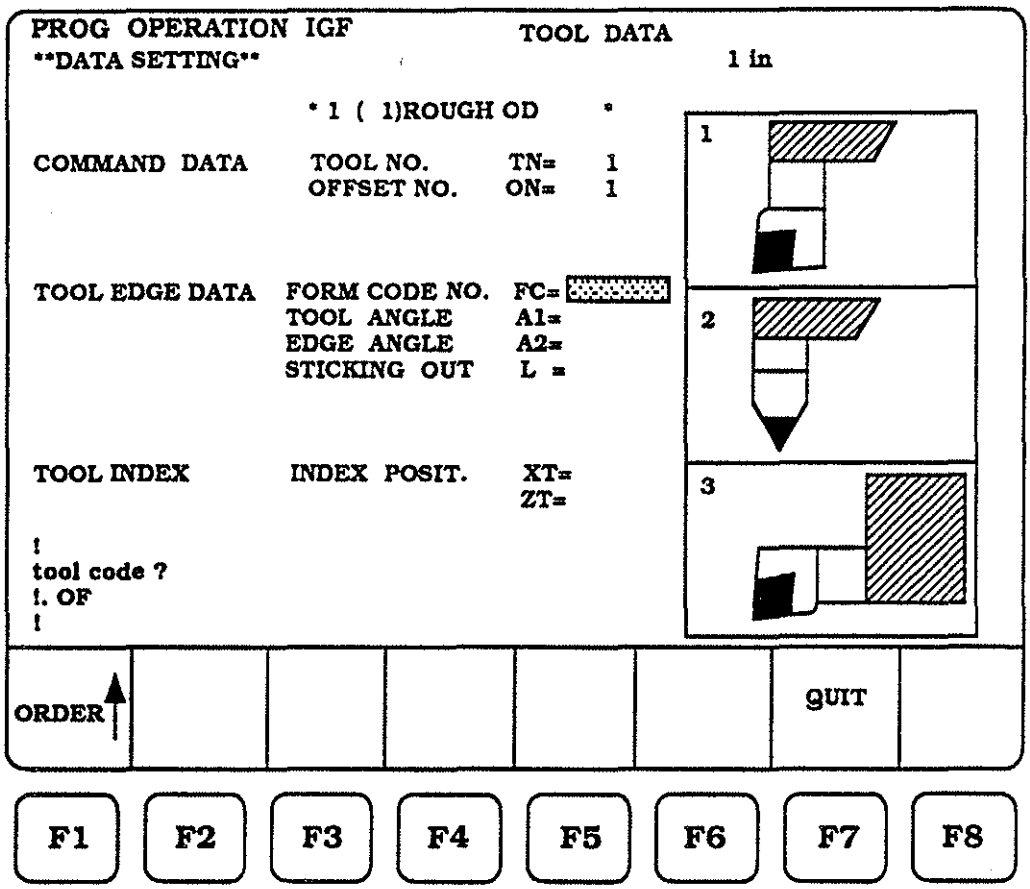
The "highlight" cursor area, automatically drops down to the OFFSET NO. (ON) data entry area. To enter the tool offset number :

Press (1) , from the ten key pad and [WRITE] .

The COMMAND DATA area should now look like this :

COMMAND DATA TOOL NO. TN= 1
OFFSET NO. ON= 1

The COMMAND DATA area is now completed, it should appear on the CRT screen as shown below.



The "highlight" area is now at FORM CODE NO. (FC). From the right hand side of the screen, graphics area, one of the three displayed tools must be chosen, that matches our tooling needs. The first tool should be our choice, to enter :

Press (1) , from the ten key pad and [WRITE] .

Entering the remainder of the TOOL EDGE DATA , would be as follows :

Press (8) (0) , from the ten key pad and [WRITE] .

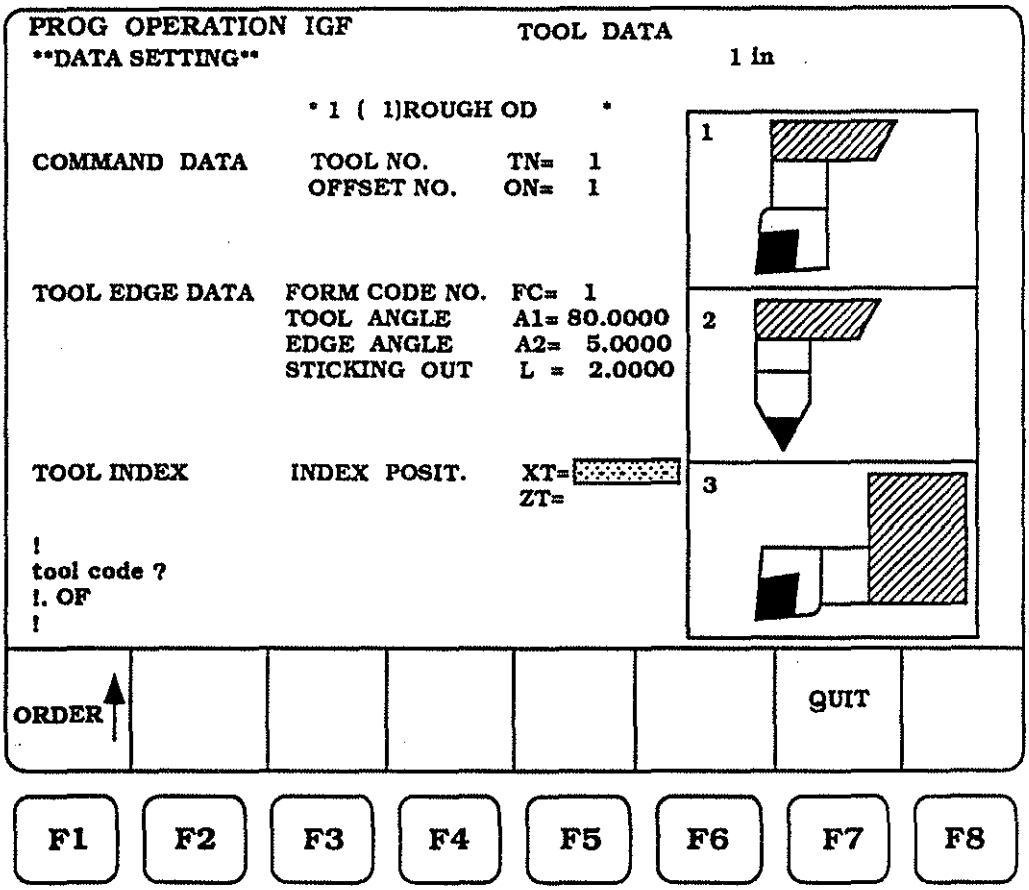
Press (5) , from the ten key pad and [WRITE] .

Press (2) , from the ten key pad and [WRITE] .

The EDGE TOOL DATA area should now look like this :

TOOL EDGE DATA	FORM CODE NO.	FC=	1
	TOOL ANGLE	A1=	80.0000
	EDGE ANGLE	A2=	5.0000
	STICKING OUT	L =	2.0000

The COMMAND DATA and TOOL EDGE DATA areas are now completed, they should appear on the CRT screen as shown below.



The "highlight" area is now at INDEX POSIT. (XT). This value and the (ZT) value, should be input as the "soft" limits used for tool change.

To enter the values, the following steps must be taken, they are :

Press (2) (0) , from the ten key pad and [WRITE] .

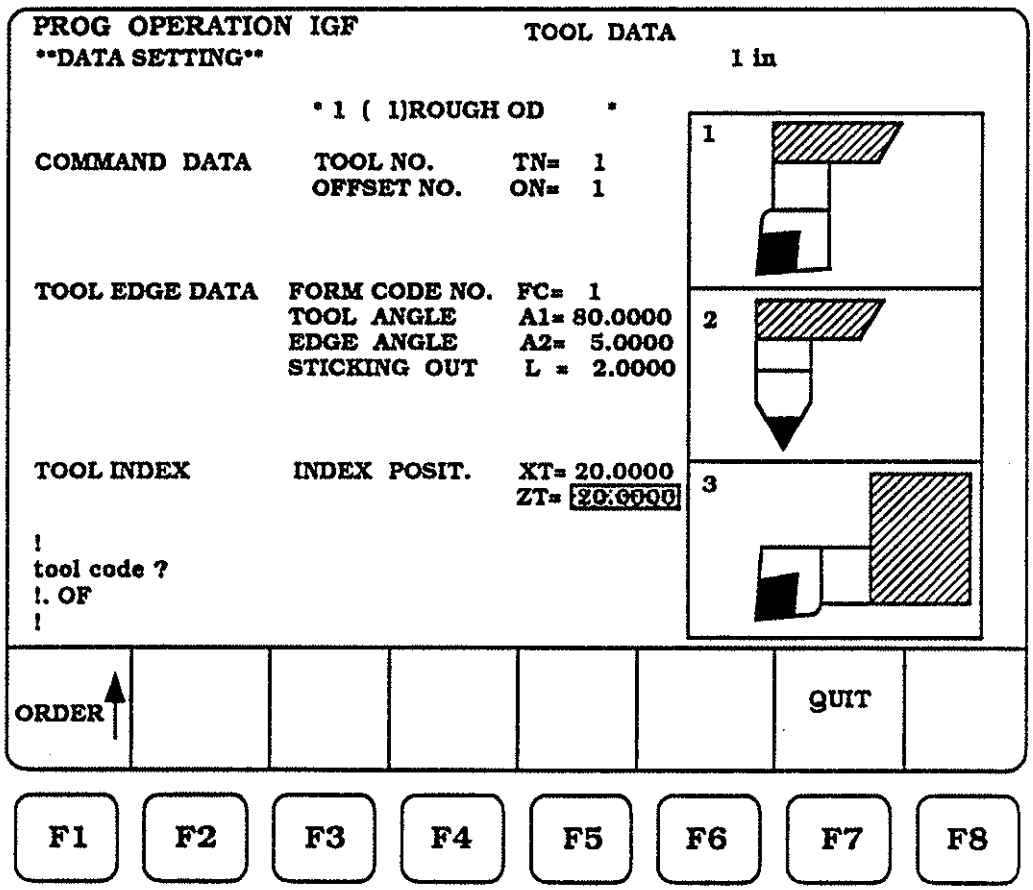
Press (2) (0) , from the ten key pad and [WRITE] .

The TOOL INDEX area should now look like this :

TOOL INDEX INDEX POSIT. XT= 20.0000
ZT= -20.0000

Completed entries of all data for tool number one.

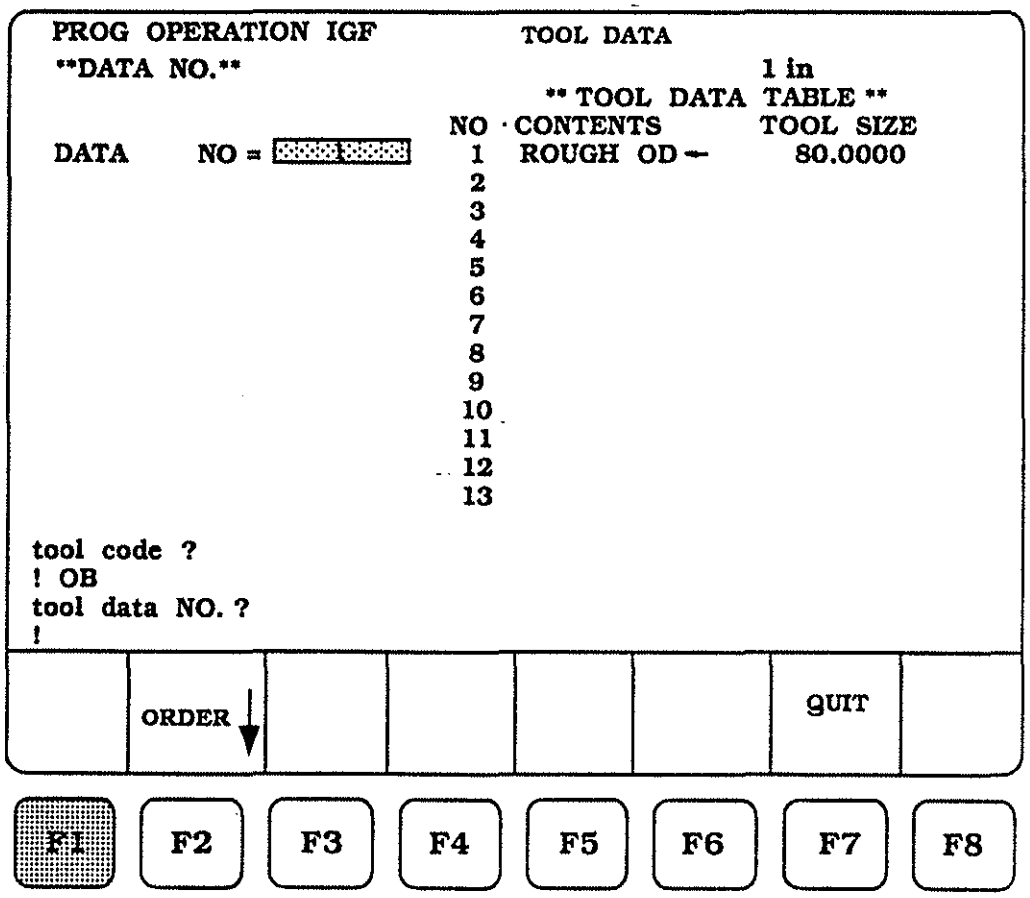
With the COMMAMD DATA, TOOL EDGE DATA and the TOOL INDEX areas of the DATA SETTING screen now complete, the CRT screen should be as displayed below.



To check our work we must return to the first page of the TOOL DATA section or to the DATA NO. page

From the Function keys (bottom of CRT screen) select F1 ORDER ↑ and press twice.

If we compare this current page to page number eight, of this book, note that the TOOL DATA TABLE reflects what kind of tool we created, listed under (CONTENTS) and the current TOOL SIZE , listed under the columm for TOOL SIZE.



Without showing all the steps, screen by screen, to input the second tool from page five, let's enter the values working from this format,

TOOL NUMBER TWO - 

DATA NO. screen :

Press (2) ,from the ten key pad and [WRITE] . (tool register no.)

Press [F2] ORDER ↓ once, from the function keys at bottom of CRT.

TOOL CODE screen :

Press (7) ,from the ten key pad and [WRITE] . (tool code no.)

Press [F2] ORDER ↓ once, from the function keys at bottom of CRT.

DATA SETTING screen :

Press (2) , from the ten key pad and [WRITE] . (turret tool position no.)

Press (2) , from the ten key pad and [WRITE] . (turret offset no.)

Press (1) , from the ten key pad and [WRITE] . (form code no.)

Press (8) (0) , from the ten key pad and [WRITE] . (tool angle)

Press (5) , from the ten key pad and [WRITE] . (edge angle)

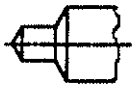
Press (2) , from the ten key pad and [WRITE] . (sticking out)

Press (2) (0) , from the ten key pad and [WRITE] . ("X" index pos.)

Press (2) (0) , from the ten key pad and [WRITE] . ("Z" index pos.)

To return to the **DATA NO.** screen : Press [F1] ORDER ↑ twice.

Without showing all the steps, screen by screen, to input the third tool from page five, let's enter the values working from this format,

TOOL NUMBER THREE - 

DATA NO. screen :

Press (3), from the ten key pad and WRITE . (tool register no.)

Press F2 ORDER ↓ once, from the function keys at bottom of CRT.

TOOL CODE screen :

Press (24), from the ten key pad and WRITE . (tool code no.)

Press F2 ORDER ↓ once, from the function keys at bottom of CRT.

DATA SETTING screen :

Press (3), from the ten key pad and WRITE . (turret tool position no.)

Press (3), from the ten key pad and WRITE . (turret offset no.)

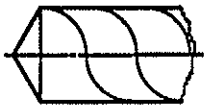
Press (1), from the ten key pad and WRITE . (form code no.)

Press (2) (0), from the ten key pad and WRITE . ("X" index pos.)

Press (2) (0), from the ten key pad and WRITE . ("Z" index pos.)

To return to the **DATA NO.** screen : Press F1 ORDER ↑ twice.

Without showing all the steps, screen by screen, to input the fourth tool from page five, let's enter the values working from this format,

TOOL NUMBER FOUR - 

DATA NO. screen :

Press (4) ,from the ten key pad and WRITE . (tool register no.)

Press F2 ORDER ↓ once, from the function keys at bottom of CRT.

TOOL CODE screen :

Press (23) ,from the ten key pad and WRITE . (tool code no.)

Press F2 ORDER ↓ once, from the function keys at bottom of CRT.

DATA SETTING screen :

Press (4) , from the ten key pad and WRITE . (turret tool position no.)

Press (4) , from the ten key pad and WRITE . (turret offset no.)

Press (1) , from the ten key pad and WRITE . (form code no.)

Press (1) (1) (8) , from the ten key pad and WRITE . (tool angle)

Press (6) , from the ten key pad and WRITE . (drill length)

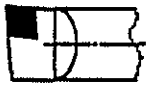
Press (.) (7) (5) , from the ten key pad and WRITE . (drill dia.)

Press (2) (0) , from the ten key pad and WRITE . ("X" index pos.)

Press (2) (0) , from the ten key pad and WRITE . ("Z" index pos.)

To return to the **DATA NO.** screen : Press F1 ORDER ↑ twice.

Without showing all the steps, screen by screen, to input the fifth tool from page five, let's enter the values working from this format.

TOOL NUMBER FIVE - 

DATA NO. screen :

Press (5) ,from the ten key pad and WRITE . (tool register no.)

Press F2 ORDER ↓ once, from the function keys at bottom of CRT.

TOOL CODE screen :

Press (2) ,from the ten key pad and WRITE . (tool code no.)

Press F2 ORDER ↓ once, from the function keys at bottom of CRT.

DATA SETTING screen :

Press (5) , from the ten key pad and WRITE . (turret tool position no.)

Press (5) , from the ten key pad and WRITE . (turret offset no.)

Press (1) , from the ten key pad and WRITE . (form code no.)

Press (8) (0) , from the ten key pad and WRITE . (tool angle)

Press (5) , from the ten key pad and WRITE . (edge angle)

Press (6) , from the ten key pad and WRITE . (holder length)

Press (.) (7) (5) , from the ten key pad and WRITE . (holder dia.)

Press (2) (0) , from the ten key pad and WRITE . ("X" index pos.)

Press (2) (0) , from the ten key pad and WRITE . ("Z" index pos.)

To return to the **DATA NO.** screen : Press F1 ORDER ↑ twice.

Without showing all the steps, screen by screen, to input the fifth tool from page five, let's enter the values working from this format.

TOOL NUMBER SIX - 

DATA NO. screen :

Press (6) ,from the ten key pad and WRITE . (tool register no.)

Press F2 ORDER ↓ once, from the function keys at bottom of CRT.

TOOL CODE screen :

Press (8) ,from the ten key pad and WRITE . (tool code no.)

Press F2 ORDER ↓ once, from the function keys at bottom of CRT.

DATA SETTING screen :

Press (6) , from the ten key pad and WRITE . (turret tool position no.)

Press (6) , from the ten key pad and WRITE . (turret offset no.)

Press (1) , from the ten key pad and WRITE . (form code no.)

Press (8) (0) , from the ten key pad and WRITE . (tool angle)

Press (5) , from the ten key pad and WRITE . (edge angle)

Press (6) , from the ten key pad and WRITE . (holder length)

Press (.) (7) (5) , from the ten key pad and WRITE . (holder dia.)

Press (2) (0) , from the ten key pad and WRITE . ("X" index pos.)

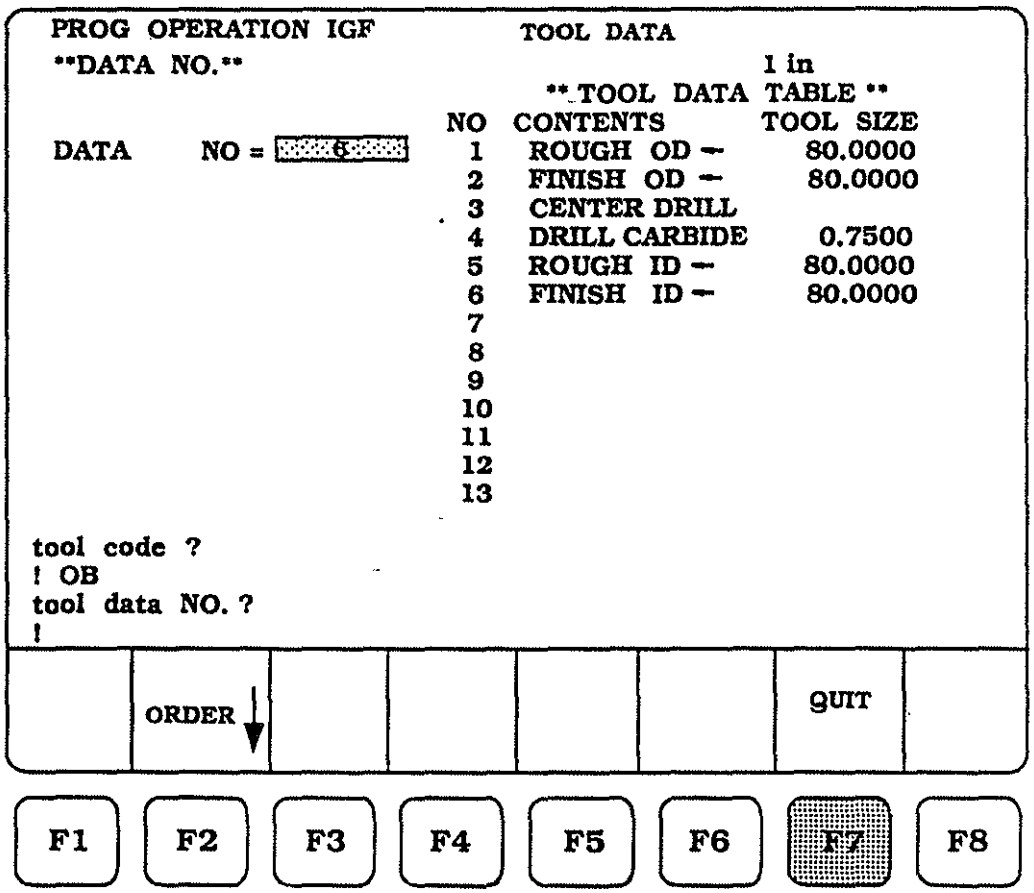
Press (2) (0) , from the ten key pad and WRITE . ("Z" index pos.)

To return to the **DATA NO.** screen : Press F1 ORDER ↑ twice.

To check our completed input we must return to the first page of the TOOL DATA section or to the DATA NO. page

From the Function keys (bottom of CRT screen) select [F1] ORDER ↑ and press twice.

If we compare this current page to page number sixteen, of this book, note that the TOOL DATA TABLE reflects what kinds of tool we created, listed under (CONTENTS) and the current TOOL SIZE , listed under the columm for TOOL SIZE, for all the identified tools needed for our sample part.



When we have completed all our inputs for TOOL DATA , we can exit this section by pressing [F7] function key and return to normal machine operation mode.

Material data :

Material cutting conditions, used for a specific part, can be registered (or input) individually prior to begining the IGF programming session. The IGF system allows the USER to register (or define) the material cutting conditions (feed, speed, depth of cut) for 13 different types of material. This allows the user to capture and re-use specific material cutting knowledge, based on the users own product knowledge.

The material data consists of three parameters, they are ;

NAME NO. , MATERIAL NAME , CUTTING CONDITIONS

1) NAME NO.

This page, in the control, allows the programmer to assign up to 13 individual material numbers. From these numbers the control is able to select the proper cutting values for the required material.

2) MATERIAL NAME

At this page, in the control, the programmer must now assign the material name, which the control stores against the selected material number, defined in step number one. The material name can be up to eight alpha-numeric characters in length, provided that the first character is an alpha.

EXAMPLE : Material is to be 303 Stainless Stell

INPUT : SS303

3) CUTTING CONDITIONS

The IGF system now expects the programmer to input values for feed, speed and depth of cut, for several types of cutting conditions, eleven types to be exact. They are stored against the assigned material number and name. They are :

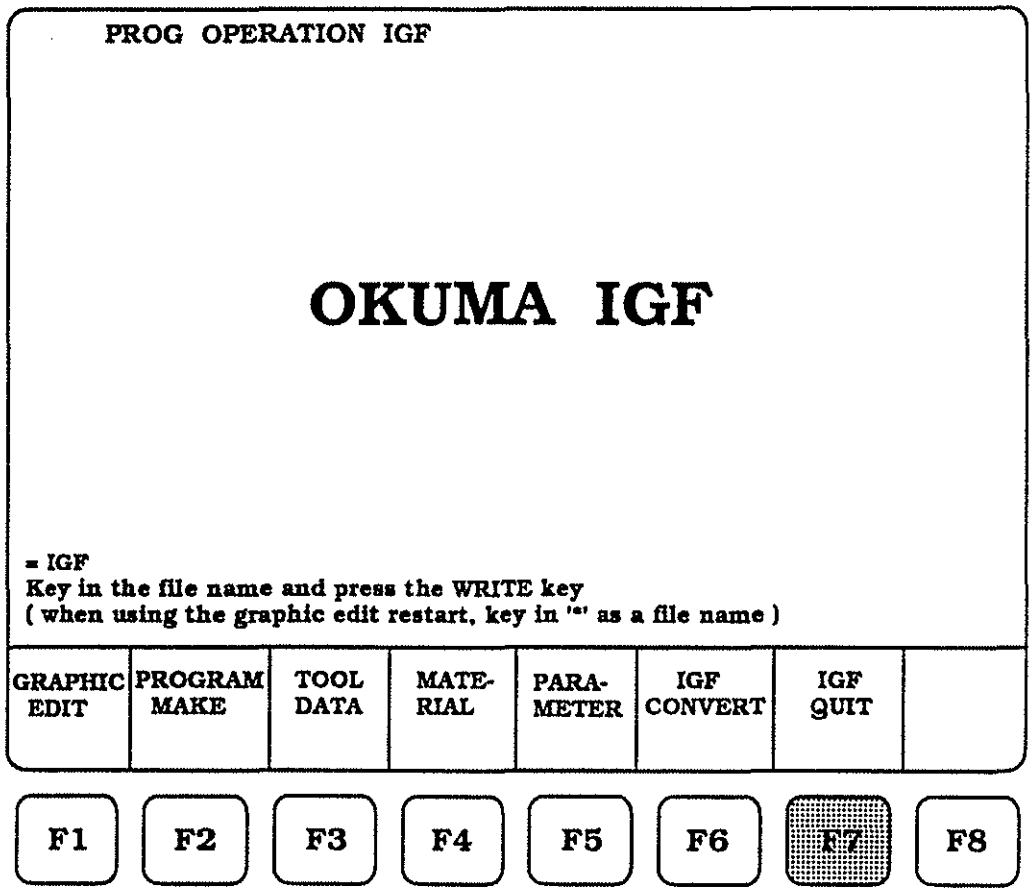
ROUGH COPY TURNING
FINISHING
THREAD CUTTING
THREAD TAPPING
GROOVING
GROOVE FINISHING
DRILLING (HSS)
DRILLING (CARBIDE)
DRILLING (CENTERING)
CENTERING
RECESSING

IGF Procedure for Material Data Entry :

Step One

From the normal machine operation mode, press the EDIT AUX key 

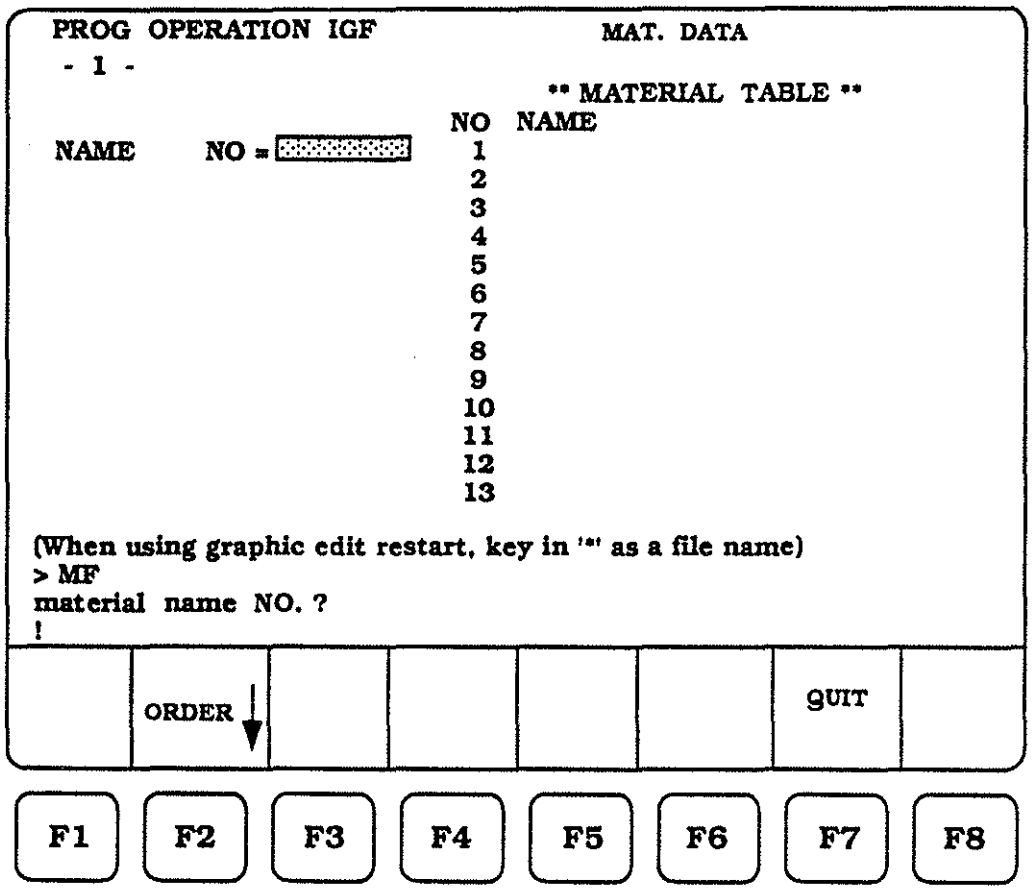
, then press the function key F7 , the CRT should display the IGF start-up page.



At any time the IGF session, for Material Data Entry, may be terminated by pressing function key F7 . There will be no loss of input data.

Step Two

For our sample part, on page 5, we can enter the material specifications in this section. The material is, FREE MACHINING STAINLESS STEEL WROUGHT, (austenitic) 303, bhn 135 - 185 annealed. To start entering the material data, press function key [F4] . The CRT screen should be as displayed below.



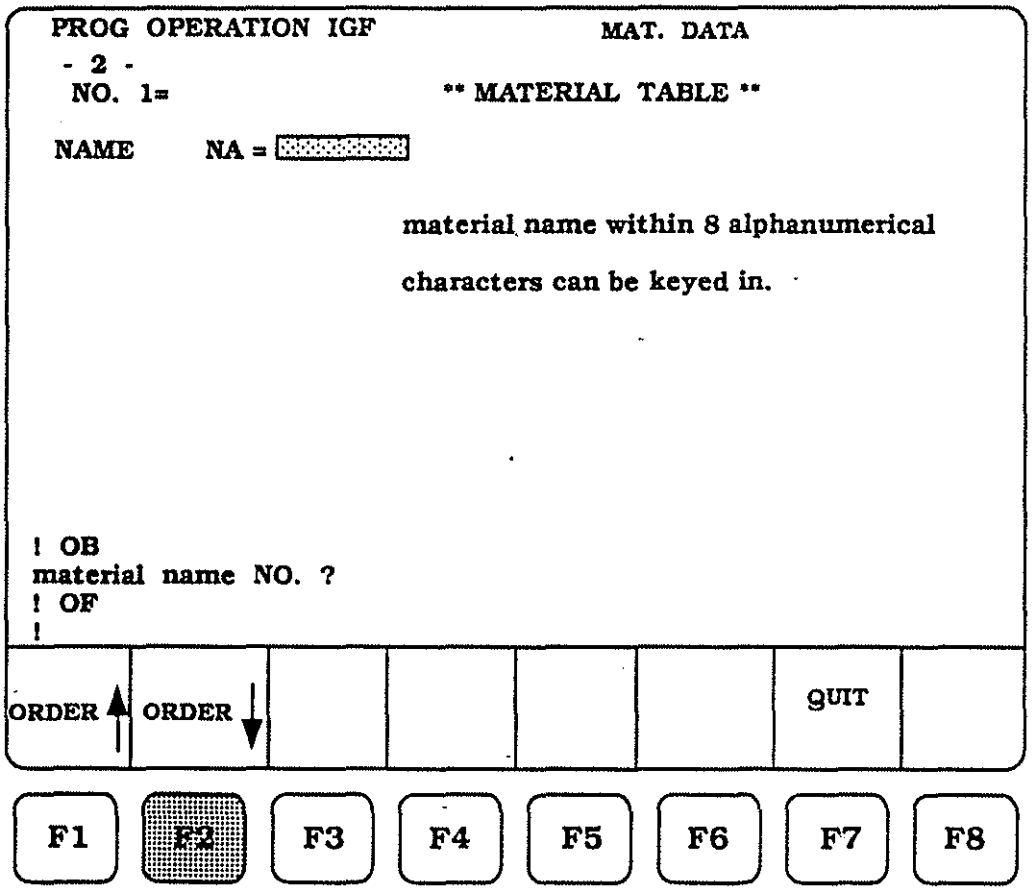
To establish our first material, we must do the following :

From the MATERIAL TABLE select material NO. 1, press [1] from the ten key pad and then press [WRITE] .

To verify the input, check the highlight area on this page, it should look like this : 1

Step Three

At step two we gave the material a number. To advance the control to the next screen (step three), we must press F2 ORDER ↓, the CRT screen should be as displayed below. This screen allows us to give a formal name to the material, the name can be eight characters long and must start with an alpha.



Our material is Stainless Steel - 303, which we will input as : SS303

To input the material, we must use the alpha character keyboard and the ten key pad. The entries would be :

Press S S 3 0 3 and WRITE .

To verify the input, check the highlight area on this page, it should look this : SS303

Step Four

At step three we defined the material type, based against an assigned number, to the control. To advance the control to the next screen (step four), we must press F2 ORDER ↓ , the CRT screen should be as displayed below. This screen allow us to input constant surface footage, feedrate and depth of cut for six different types of cutting conditions.

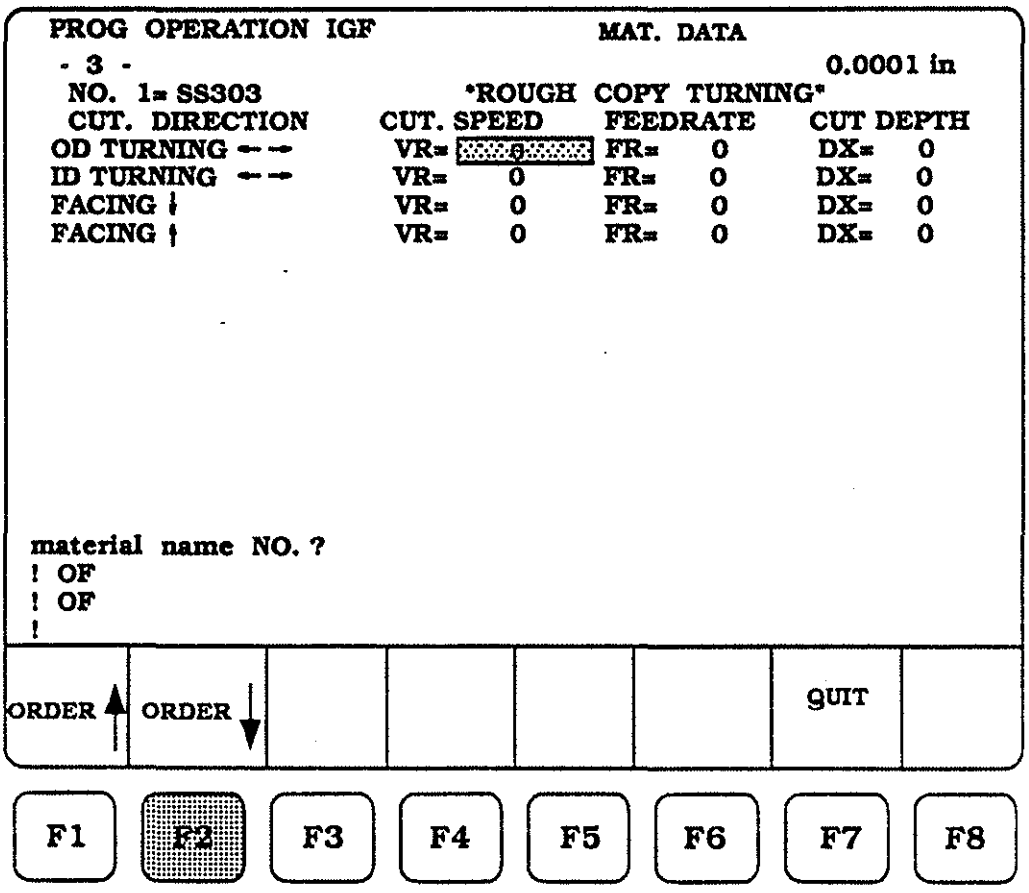
Definitions of screen variables :

VR = Constant Surface Footage

FR = Feedrate (expressed as IPR)

DX = Depth of cut, expressed as diameter value

No decimal points are allowed on this page, so a .2000 depth of cut per side, must be input as 4000



Step Four - (continued)

To input the values for CUT. SPEED, the following steps must be taken, they are :

For VR

OD TURNING press (6) (0) (0) and [WRITE], then cursor down [↓]

ID TURNING press (6) (0) (0) and [WRITE], then cursor down [↓]

FACING press (4) (0) (0) and [WRITE], then cursor down [↓]

FACING press (4) (0) (0) and [WRITE]

The cursor must now be returned to the top of the FEEDRATE column for entering of the values. This is accomplished by pressing the up cursor [↑] arrow three times and the right cursor [→] arrow once.

For FR

OD TURNING press (1) (5) (0) and [WRITE], then cursor down [↓]

ID TURNING press (1) (5) (0) and [WRITE], then cursor down [↓]

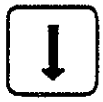
FACING press (1) (0) (0) and [WRITE], then cursor down [↓]

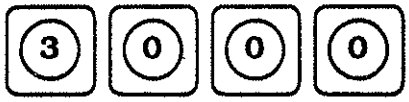
FACING press (1) (0) (0) and [WRITE]

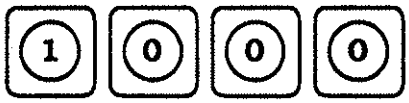
Step Four - (continued)

The cursor must now be returned to the top of the CUT. SPEED columm for entering of the values. This is accomplished by pressing the up cursor  arrow three times and the right cursor  arrow once.

For DX

OD TURNING press  and  , then cursor down 

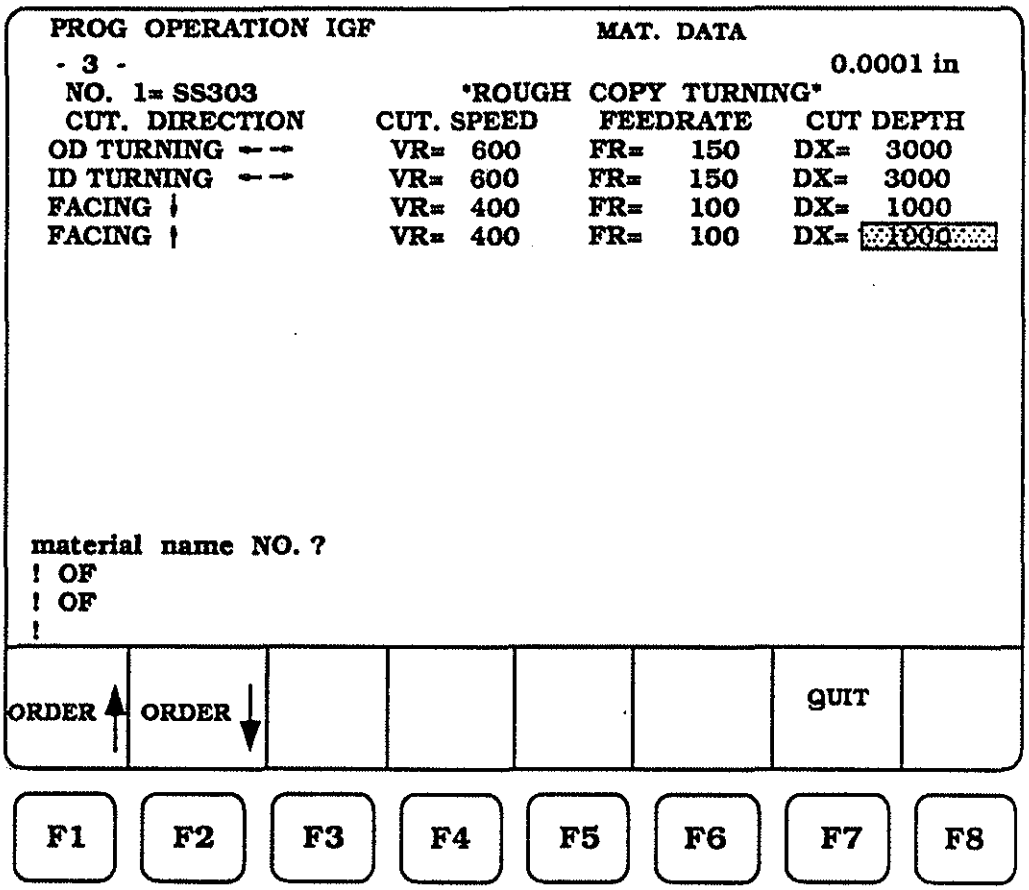
ID TURNING press  and  , then cursor down 

FACING press  and  , then cursor down 

FACING press  and 

Step Four - (continued)

Upon completion of the inputs, from page 28 & 29, the CRT screen should be as displayed below.

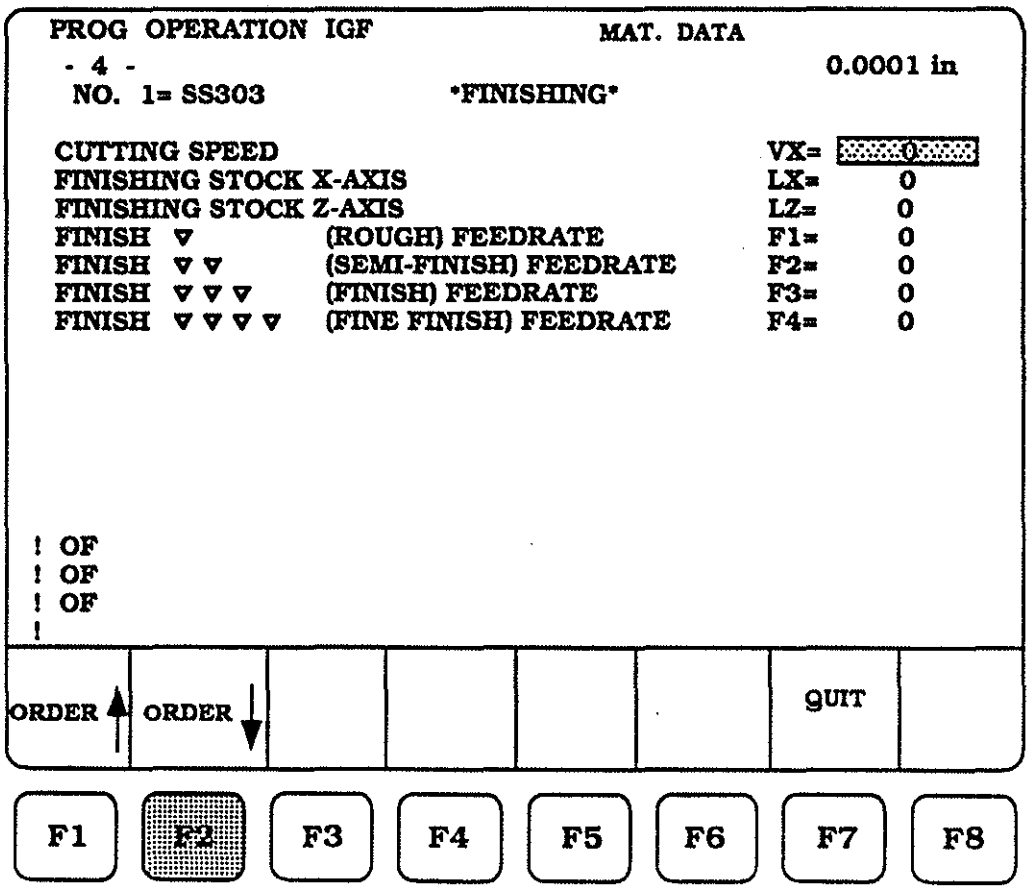


Step Five

At step four we defined values for the CUTTING DIRECTION to accommodate, speed, feed and depth of cut for ROUGH COPY TURNING. To advance the control to the next screen (step five), we must press F2 ORDER ↓ , the CRT screen should be as displayed below.

This screen allows us to input values for FINISH constant surface footage, X and Z-axis Finish stock allowance and up to four choices of FINISH feedrate.

No decimal points are allowed on this page, so a decimal value of .0020, must be input as 20



Step Five - (continued)

To input the values for VF, LX, LZ, F1, F2, F3 and F4, the following steps must be taken, they are :

For VF press 7 0 0 and WRITE , then cursor down ↓

For LX press 1 0 0 and WRITE , then cursor down ↓

For LZ press 2 0 and WRITE , then cursor down ↓

For F1 press 7 0 and WRITE , then cursor down ↓

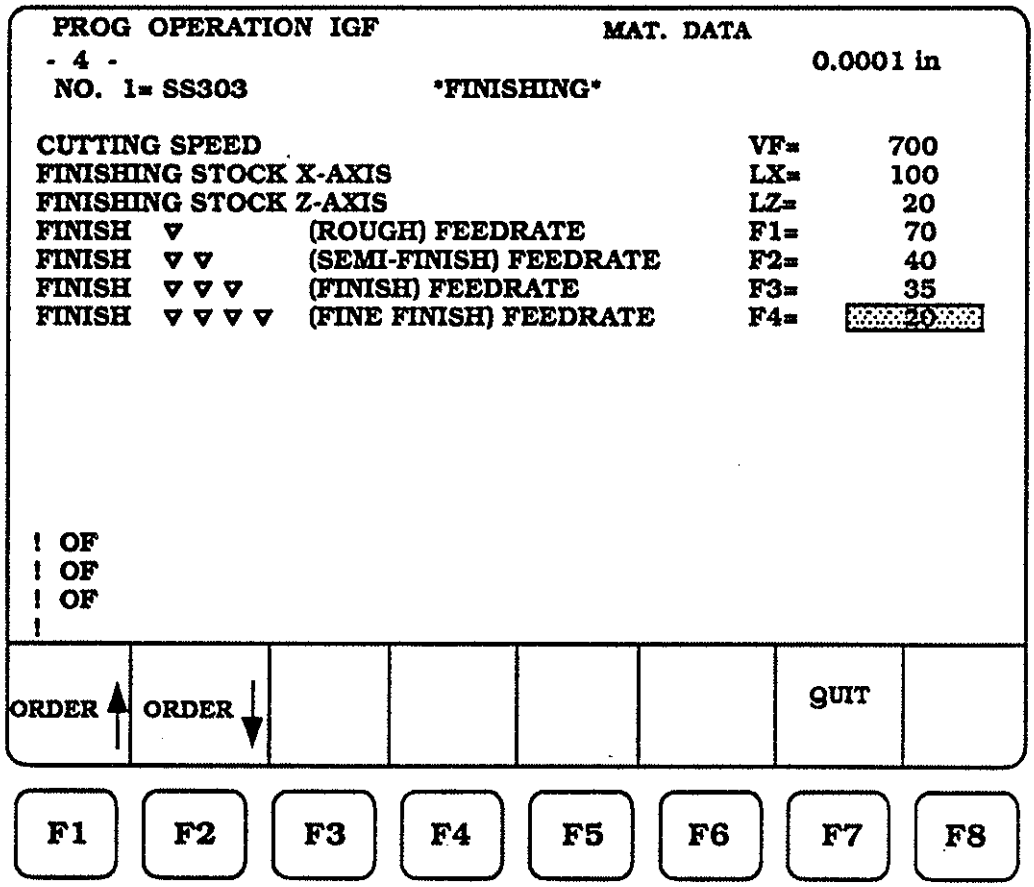
For F2 press 4 0 and WRITE , then cursor down ↓

For F3 press 3 5 and WRITE , then cursor down ↓

For F4 press 2 0 and WRITE

Step Five - (continued)

Upon completion of the inputs, from page 32, the CRT screen should be as displayed below.



Step Six

At step five we defined values for FINISHING to accommodate, finish constant surface footage, finish stock allowance and four finish feedrates. To advance the control to the next screen (step six), we must press F2 ORDER ↓ , the CRT screen should be as displayed below.

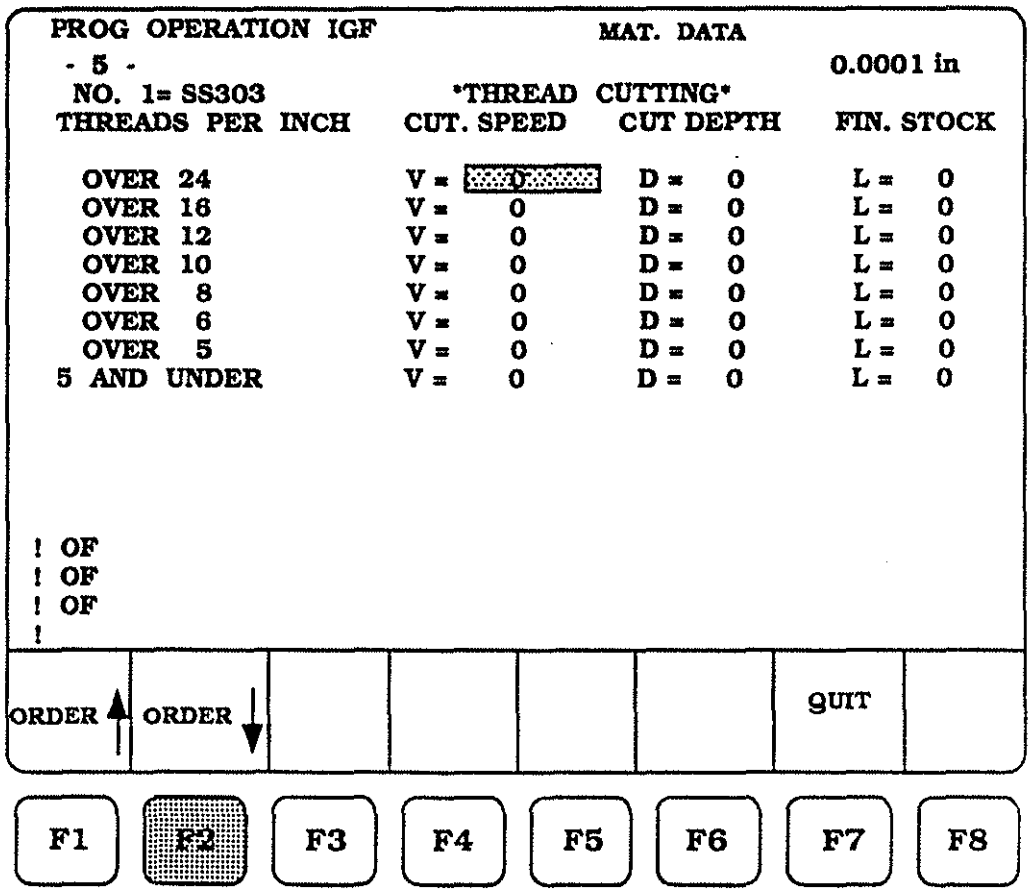
This screen allows us to input values for THREADING , which include values for constant surface footage, depth of cut and stock allowance for "spring" or semi-finish pass.

No decimal points are allowed on this page, so a decimal value of .0020, must be input as 20

V = Constant Surface Footage

D = Depth of cut (first pass)

L = Finish stock allowance



Step Six - (continued)

To input the values for CUT. SPEED (SFM) the following steps must be taken, they are :

For over 24, press (2) (6) (0) and [WRITE], then cursor down [↓]

For over 16, press (2) (6) (0) and [WRITE], then cursor down [↓]

For over 12, press (2) (6) (0) and [WRITE], then cursor down [↓]

For over 10, press (2) (6) (0) and [WRITE], then cursor down [↓]

For over 8, press (2) (6) (0) and [WRITE], then cursor down [↓]

For over 6, press (2) (6) (0) and [WRITE], then cursor down [↓]

For over 5, press (2) (6) (0) and [WRITE], then cursor down [↓]

5 AND UNDER, press (2) (6) (0) and [WRITE], then cursor down

Normally, the SFM values for threading will all be input as the same value, there is no means of doing a global input, so each value must be entered seperately.

The cursor must be returned to the top of the CUT. DEPTH columm for entering of the values. This is accomplished by pressing the up cursor  arrow seven times and the right cursor  arrow once. To input the values for CUT. DEPTH the following steps must be taken, they are :

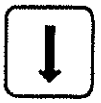
For over 24, press (1) (2) (0) and WRITE , then cursor down 

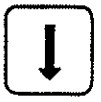
For over 16, press (1) (6) (3) and WRITE , then cursor down 

For over 12, press (1) (8) (9) and WRITE , then cursor down 

For over 10, press (2) (0) (9) and WRITE , then cursor down 

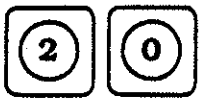
For over 8, press (2) (1) (0) and WRITE , then cursor down 

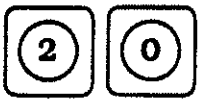
For over 6, press (2) (3) (3) and WRITE , then cursor down 

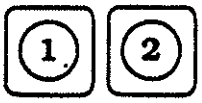
For over 5, press (2) (5) (9) and WRITE , then cursor down 

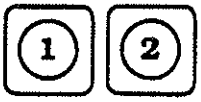
5 AND UNDER, press (2) (8) (3) and WRITE , then cursor down

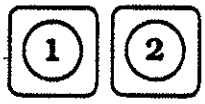
The cursor must be returned to the top of the FIN. STOCK columm for entering of the values. This is accomplished by pressing the up cursor  arrow seven times and the right cursor  arrow once. To input the values for FIN. STOCK the following steps must be taken, they are :

For over 24, press  and  , then cursor down 

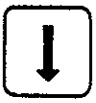
For over 16, press  and  , then cursor down 

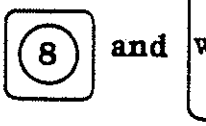
For over 12, press  and  , then cursor down 

For over 10, press  and  , then cursor down 

For over 8, press  and  , then cursor down 

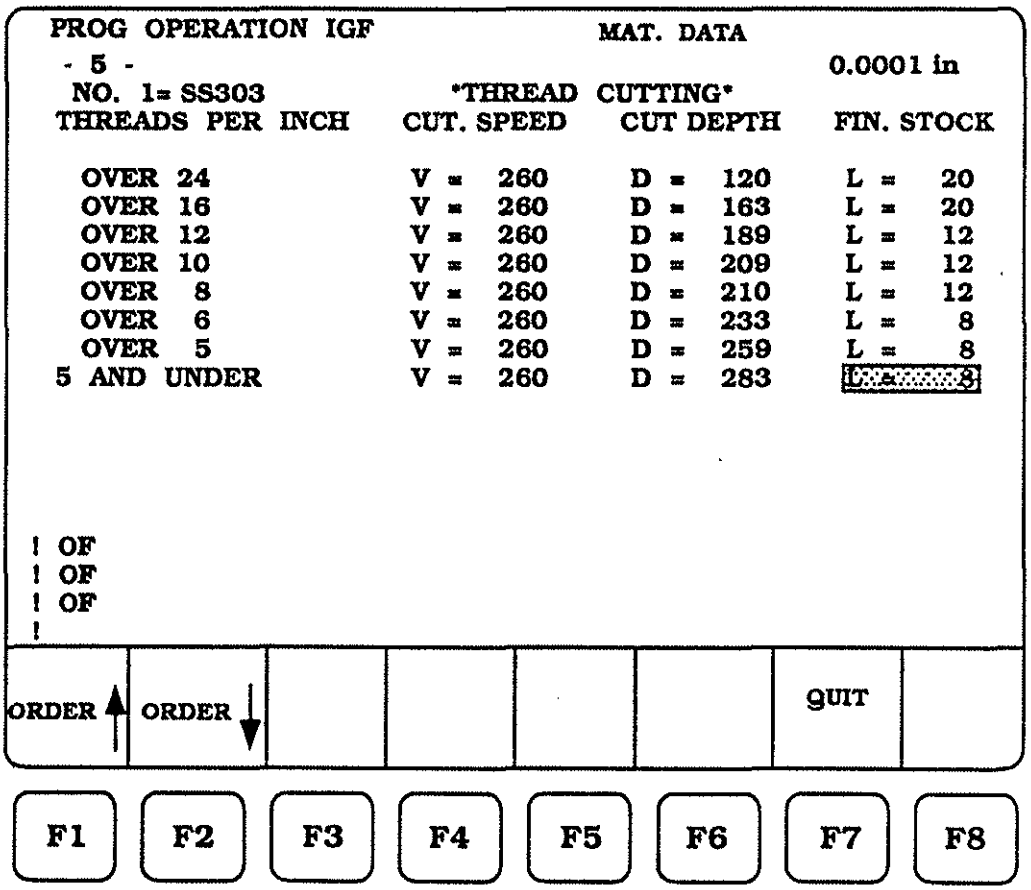
For over 6, press  and  , then cursor down 

For over 5, press  and  , then cursor down 

5 AND UNDER, press  and  , then cursor down

Step Six

Upon completion of the inputs, from pages 35 - 37, the CRT screen should be as displayed below.



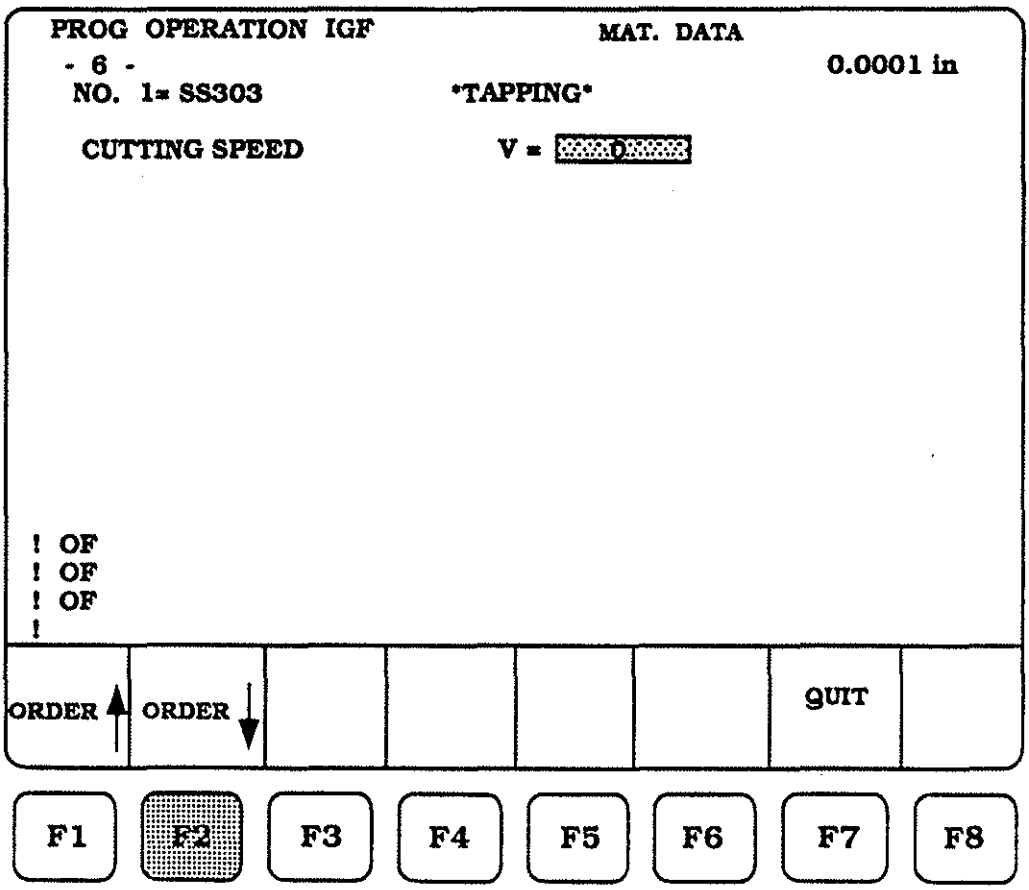
Step Seven

At step six we defined values for THREADING to accommodate, constant surface footage, first pass depth of cut and finish stock allowance. To advance the control to the next screen (step seven), we must press F2 ORDER ↓ , the CRT screen should be as displayed below.

This screen allows us to input a value for TAPPING , this value is for constant surface footage.

No decimal points are allowed on this page, so a decimal value of .0020, must be input as 20

V = Constant Surface Footage

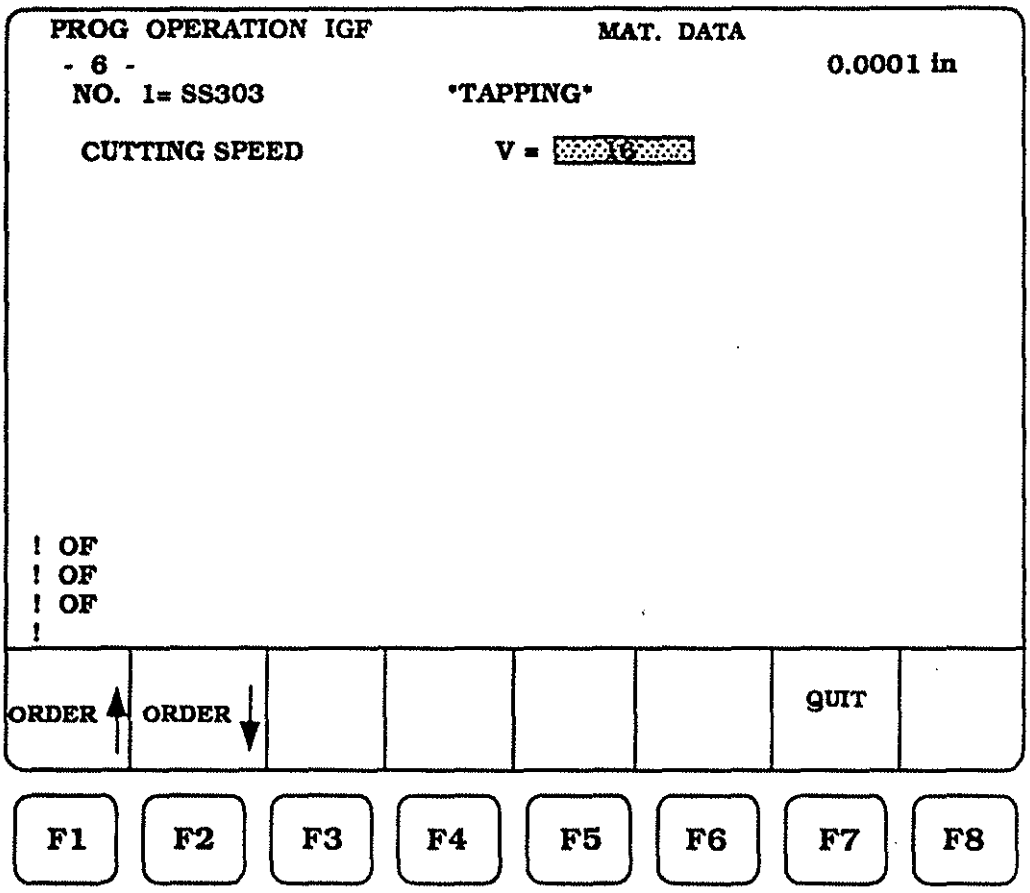


Step Seven - (continued)

To input the values for CUTTING SPEED (SFM) the following steps must be taken, they are :

Press (1) (6) **and** [WRITE]

Upon completion of the inputs, from the top of this page, the CRT screen should be as displayed below.



Step Eight

At step seven we defined a value for TAPPING to accommodate, constant surface footage. To advance the control to the next screen (step eight), we must press F2 ORDER ↓ , the CRT screen should be as displayed below.

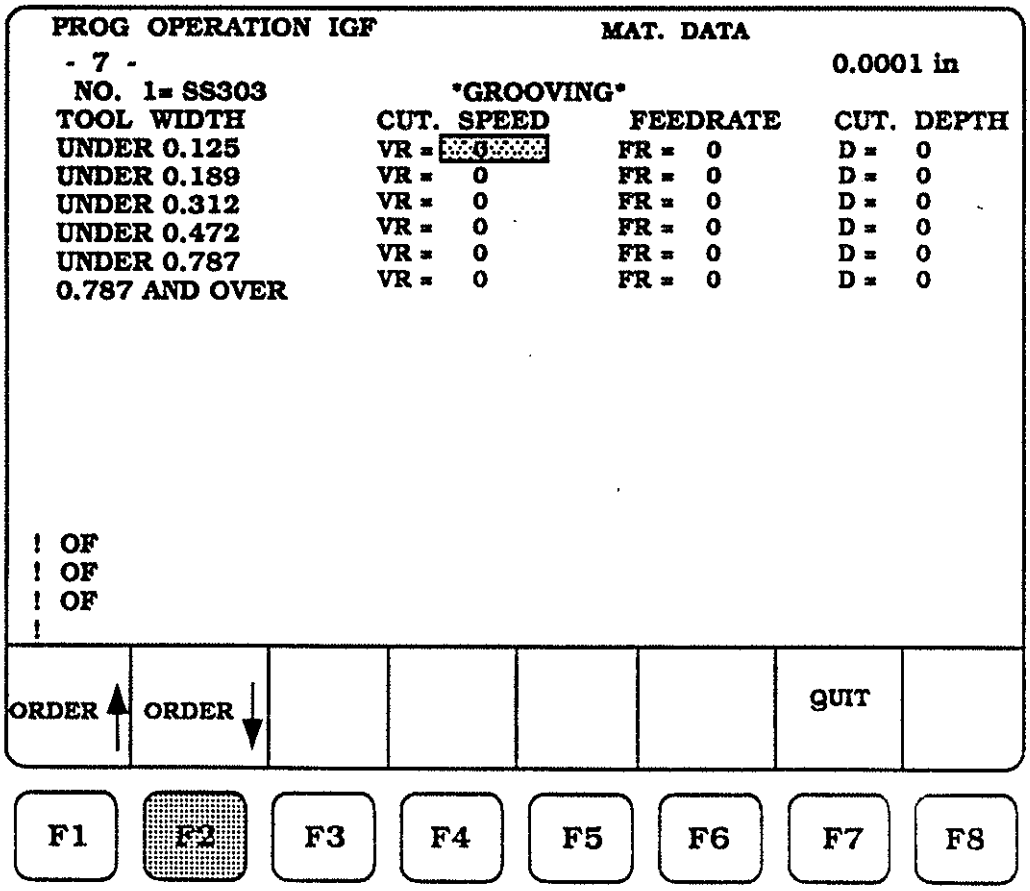
This screen allows us to input values for GROOVING , which include values for constant surface footage, feedrates and depths of cut.

No decimal points are allowed on this page, so a decimal value of .0020, must be input as 20

V = Constant Surface Footage

FR = Feedrate (when in cut)

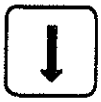
D = Depth of cut per peck (a " D " of .08 equals .040 on a side)

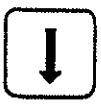


Step Eight - (continued)

To input the values for the CUT. SPEED (SFM) the following steps must be taken, they are :

TOOL WIDTH

Under 0.125 press  and  , then cursor down 

Under 0.189 press  and  , then cursor down 

Under 0.312 press  and  , then cursor down 

Under 0.472 press  and  , then cursor down 

Under 0.787 press  and  , then cursor down 

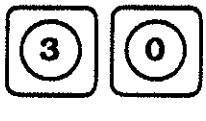
0.787 and over press  and  , then cursor down

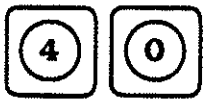
Step Eight - (continued)

The cursor must be returned to the top of the FEEDRATE columm for entering of the values. This is accomplished by pressing the up cursor  arrow five times and the right cursor  arrow once.

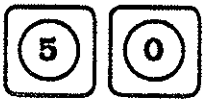
To input the values for the FEEDRATE (IPR) the following steps must be taken, they are :

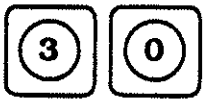
TOOL WIDTH

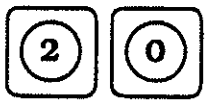
Under 0.125 press  and  , then cursor down 

Under 0.189 press  and  , then cursor down 

Under 0.312 press  and  , then cursor down 

Under 0.472 press  and  , then cursor down 

Under 0.787 press  and  , then cursor down 

0.787 and over press  and  , then cursor down

Step Eight - (continued)

The cursor must be returned to the top of the CUT. DEPTH columm for entering of the values. This is accomplished by pressing the up cursor  arrow five times and the right cursor  arrow once.

To input the values for the CUT. DEPTH the following steps must be taken , they are :

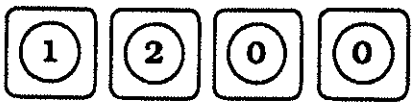
TOOL WIDTH

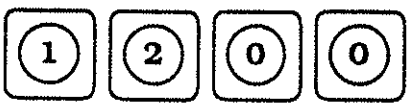
Under 0.125 press  and  , then cursor down 

Under 0.189 press  and  , then cursor down 

Under 0.312 press  and  , then cursor down 

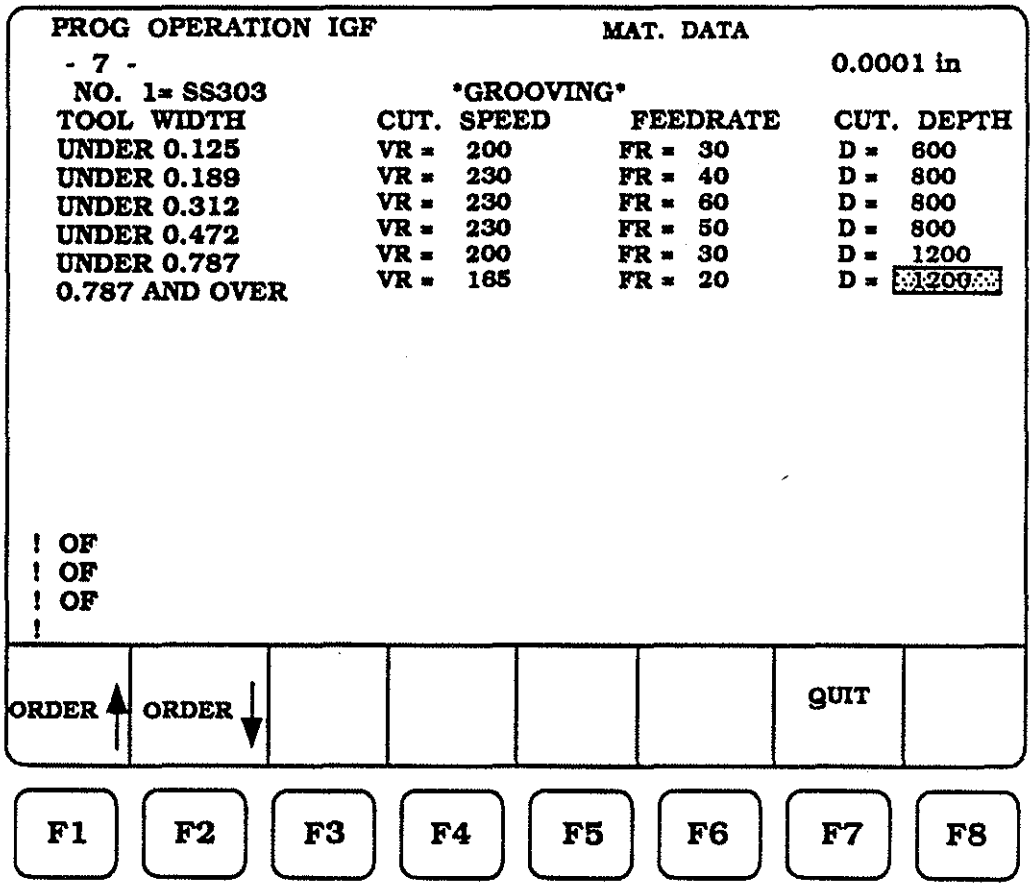
Under 0.472 press  and  , then cursor down 

Under 0.787 press  and  ,then cursor down 

0.787 and over press  and  ,then cursor down

Step Eight

Upon completion of the inputs, from pages 42 - 44, the CRT screen should be as displayed below.

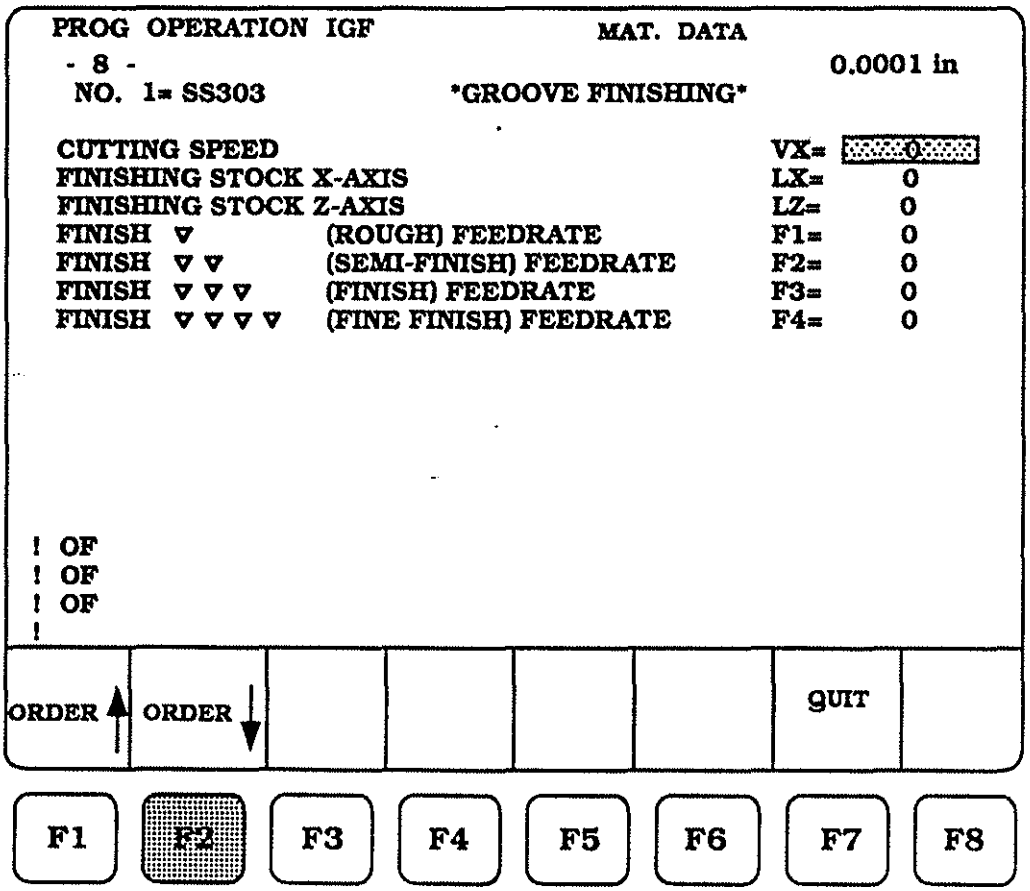


Step Nine

At step eight we defined values for GROOVING to accommodate, constant surface footage, feedrate and depth of cut. To advance the control to the next screen (step nine), we must press F2 ORDER ↓ , the CRT screen should be as displayed below.

This screen allows us to input values for FINISH constant surface footage, X and Z-axis FINISH stock allowance and up to four choices of FINISH feedrate, for GROOVING FINISHING.

No decimal points are allowed on this page, so a decimal value of .0020, must be input as 20



Step Nine - (continued)

To input the values for VF, LX, LZ, F1, F2, F3 and F4, the following steps must be taken, they are :

For VF press 3 3 0 and WRITE , then cursor down ↓

For LX press 8 0 and WRITE , then cursor down ↓

For LZ press 4 0 and WRITE , then cursor down ↓

For F1 press 1 2 0 and WRITE , then cursor down ↓

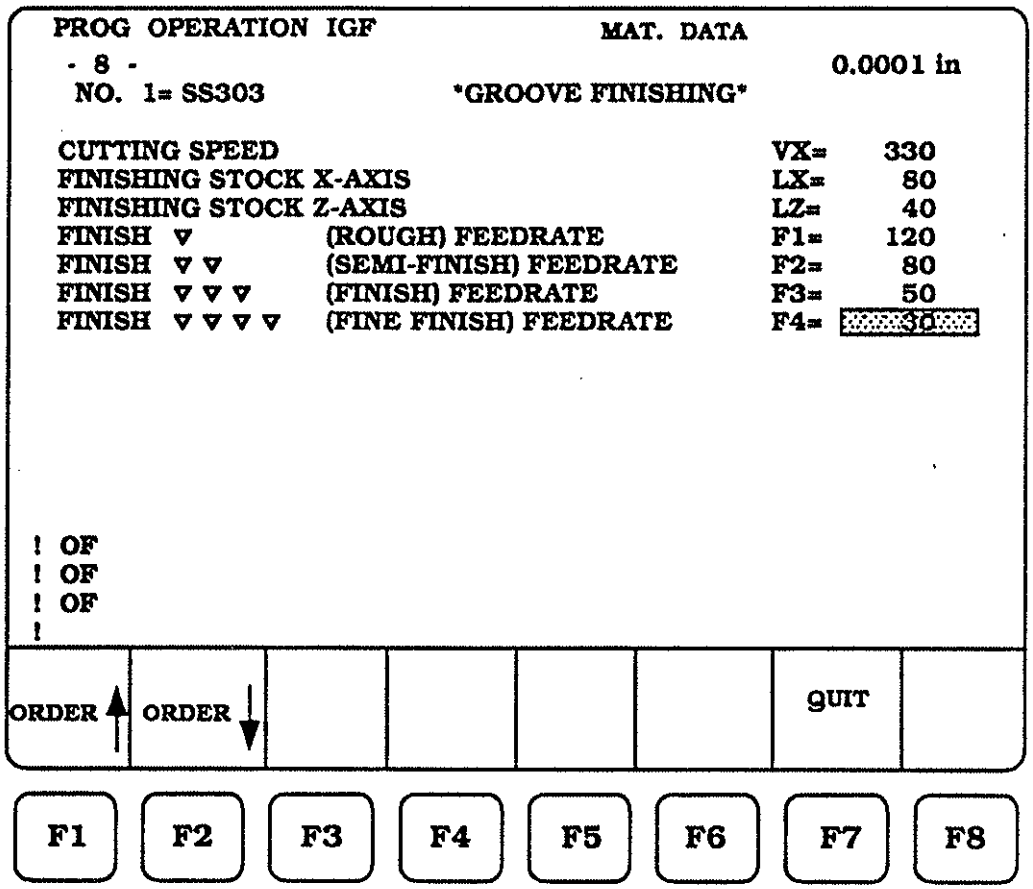
For F2 press 8 0 and WRITE , then cursor down ↓

For F3 press 5 0 and WRITE , then cursor down ↓

For F4 press 3 0 and WRITE

Step Nine

Upon completion of the inputs, from page 47, the CRT screen should be as displayed below.



Step Ten

At step nine we defined values for GROOVE FINISHING to accommodate, finish constant surface footage, finish stock allowance and four finish feedrates. To advance the control to the next screen (step ten), we must press F2 ORDER ↓, the CRT screen should be as displayed below.

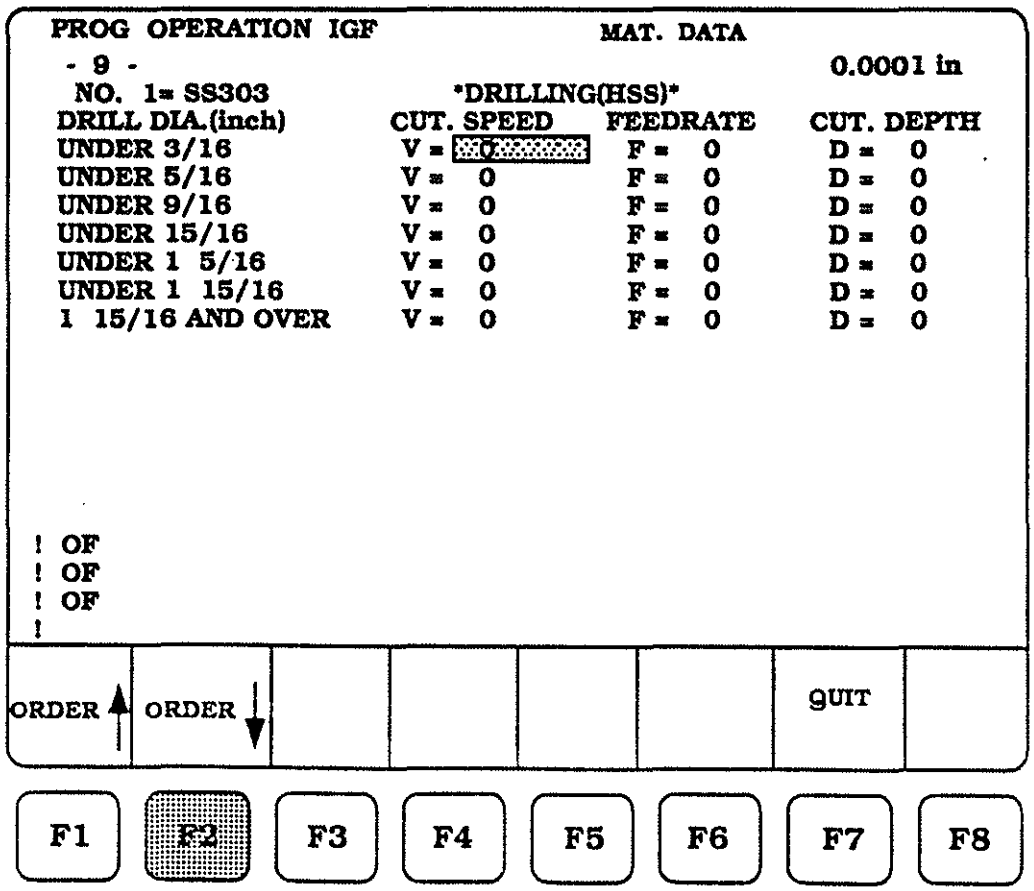
This screen allows us to input values for DRILLING(HSS) , which include values for constant surface footage, feedrate and depth of cut per "peck", all based against the current size drill you need to use.

No decimal points are allowed on this page, so a decimal value of .0020, must be input as 20

V = Constant Surface Footage

F = Feedrate expressed as (IPR)

D = Depth of cut per "peck"



Step Ten - (continued)

To input the values for CUT. SPEED (SFM) the following steps must be taken, they are :

DRILL DIA.(inch)

Under 3/16, press (3) (3) and WRITE , then cursor down ↓

Under 5/16, press (3) (3) and WRITE , then cursor down ↓

Under 9/16, press (3) (3) and WRITE , then cursor down ↓

Under 15/16, press (3) (3) and WRITE , then cursor down ↓

Under 1 5/16, press (3) (3) and WRITE , then cursor down ↓

Under 1 15/16, press (3) (3) and WRITE , then cursor down ↓

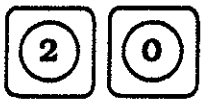
1 15/16 and over, press (3) (3) and WRITE

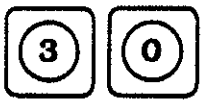
Step Ten - (continued)

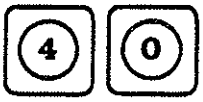
The cursor must be returned to the top of the FEEDRATE columm for entering of the values. This is accomplished by pressing the up cursor  **arrow six times and the right cursor**  **arrow once.**

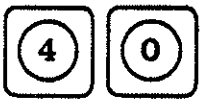
To input the values for FEEDRATE (IPR) the following steps must be taken, they are :

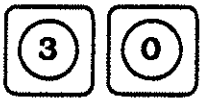
DRILL DIA.(inch)

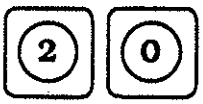
Under 3/16, press  and  , then cursor down 

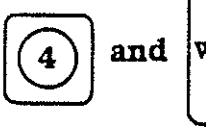
Under 5/16, press  and  , then cursor down 

Under 9/16, press  and  , then cursor down 

Under 15/16, press  and  , then cursor down 

Under 1 5/16, press  and  , then cursor down 

Under 1 15/16, press  and  , then cursor down 

1 15/16 and over, press  and 

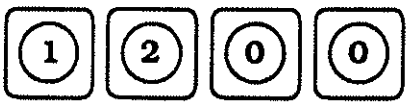
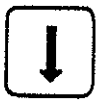
Step Ten - (continued)

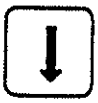
The cursor must be returned to the top of the CUT. DEPTH columm for entering of the values. This is accomplished by pressing the up cursor  **arrow six times and the right cursor**  **arrow once.**

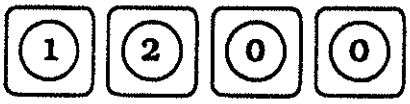
To input the values for CUT. DEPTH the following steps must be taken, they are :

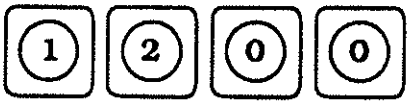
DRILL DIA.(inch)

Under 3/16, press  and  , then cursor down 

Under 5/16, press  and  , then cursor down 

Under 9/16, press  and  , then cursor down 

Under 15/16, press  and  , then cursor down 

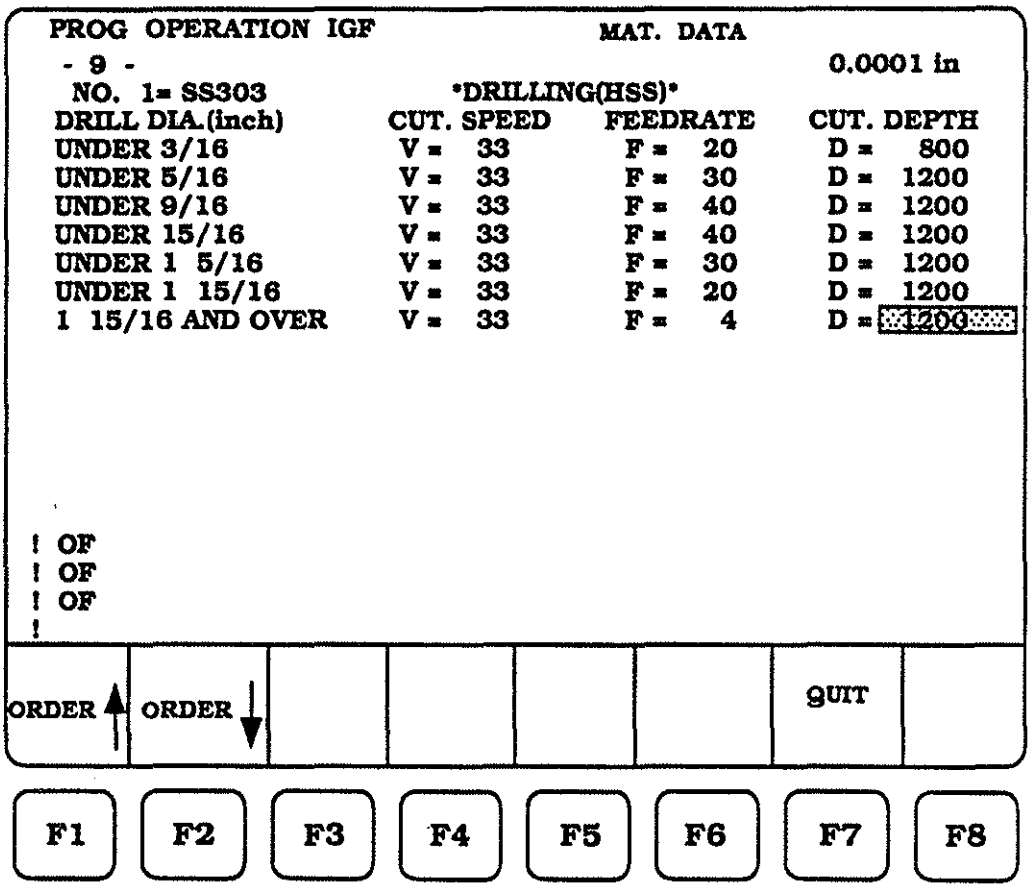
Under 1 5/16, press  and  , then cursor down 

Jnder 1 15/16, press  and  , then cursor down 

l 15/16 and over, press  and 

Step Ten - (continued)

Upon completion of the inputs, from pages 50 - 52, the CRT screen should be as displayed below.



Step Eleven

At step ten we defined values for DRILLING(HSS) to accommodate, constant surface footage, feedrate and depth of cut per peck, based on the size of drill used. To advance the control to the next screen (step eleven), we must press F2 ORDER ↓ **, the CRT screen should be as displayed below.**

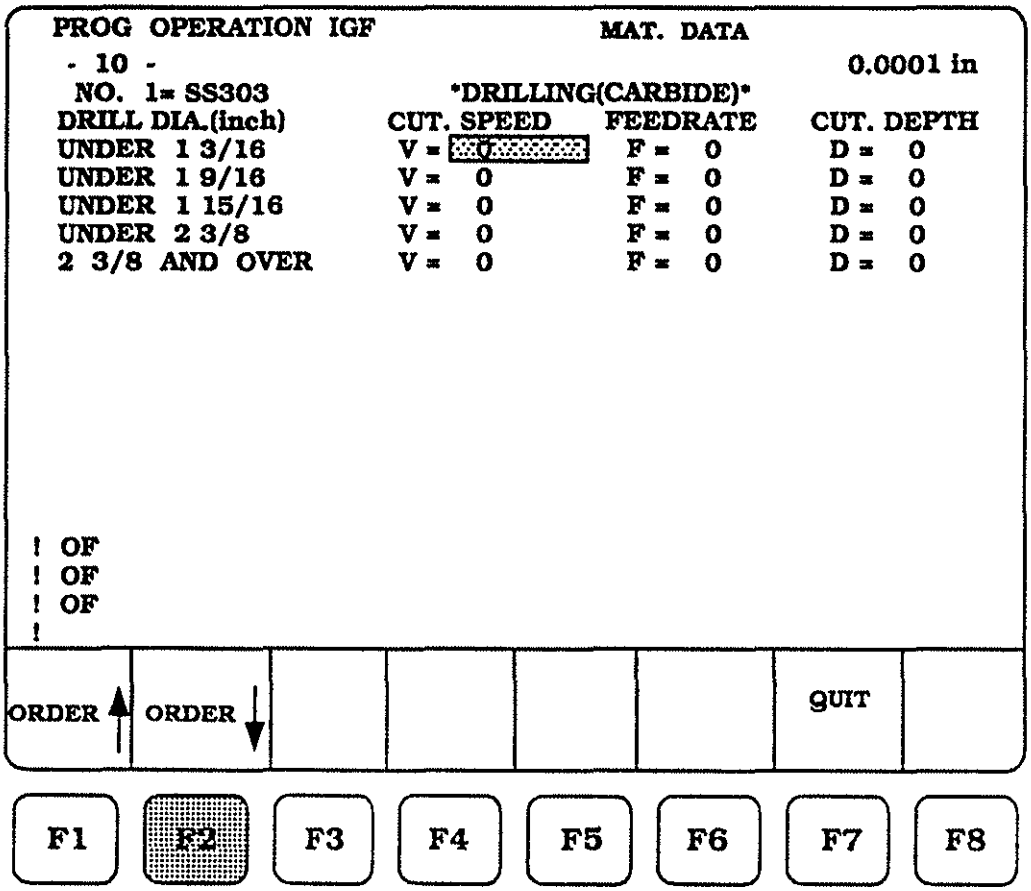
This screen allows us to input values for DRILLING(CARBIDE) , which include values for constant surface footage, feedrate and depth of cut per "peck", all based against the current size drill you need to use.

No decimal points are allowed on this page, so a decimal value of .0020, must be input as 20

V = Constant Surface Footage

F = Feedrate expressed as (IPR)

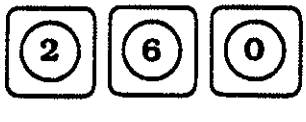
D = Depth of cut per "peck"



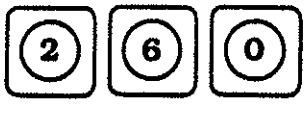
Step Eleven - (continued)

To input the values for CUT. SPEED (SFM) the following steps must be taken, they are :

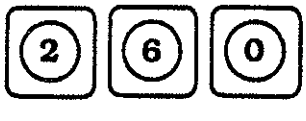
DRILL DIA.(inch)

Under 1 3/16, press 

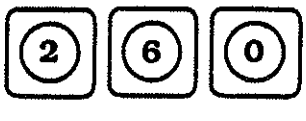
and WRITE , then cursor down ↓

Under 1 9/16, press 

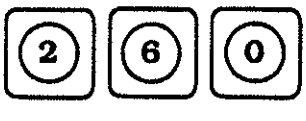
and WRITE , then cursor down ↓

Under 1 15/16, press 

and WRITE , then cursor down ↓

Under 2 3/8, press 

and WRITE , then cursor down ↓

2 3/8 and over, press 

and WRITE

Step Eleven - (continued)

The cursor must be returned to the top of the FEEDRATE columm for entering of the values. This is accomplished by pressing the up cursor  **arrow four times and the right cursor**  **arrow once.**

To input the values for FEEDRATE (IPR) the following steps must be taken, they are :

DRILL DIA.(inch)

Under 1 3/16, press (3) (0) and WRITE , then cursor down 

Under 1 9/16, press (2) (0) and WRITE , then cursor down 

Under 1 15/16, press (2) (0) and WRITE , then cursor down 

Under 2 3/8, press (2) (0) and WRITE , then cursor down 

2 3/8 and over, press (2) (0) and WRITE

Step Eleven - (continued)

The cursor must be returned to the top of the CUT. DEPTH columm for entering of the values. This is accomplished by pressing the up cursor  arrow four times and the right cursor  arrow once.

To input the values for CUT. DEPTH the following steps must be taken, they are :

DRILL DIA.(inch)

Under 1 3/16, press  and  , then cursor down 

Under 1 9/16, press  and  , then cursor down 

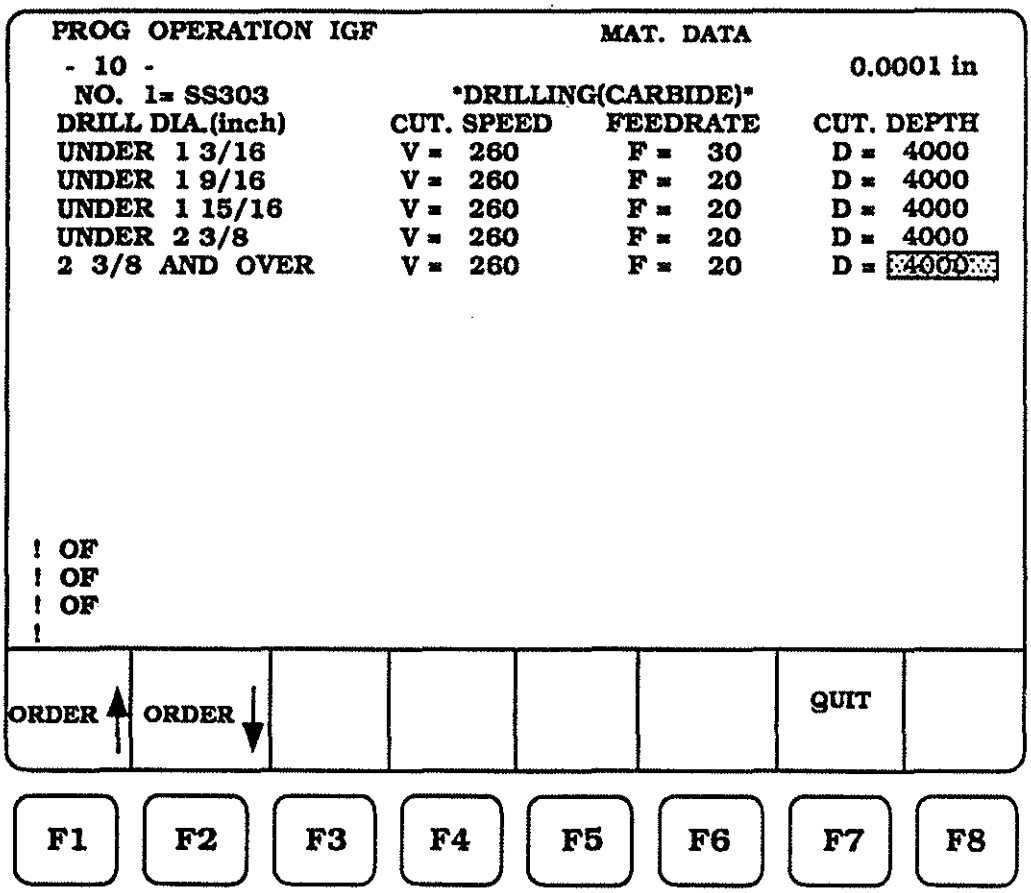
Under 1 15/16, press  and  , then cursor down 

Under 2 3/8, press  and  , then cursor down 

2 3/8 and over, press  and 

Step Eleven - (continued)

Upon completion of the inputs, from pages 55 - 57, the CRT screen should be as displayed below.



Step Twelve

At step eleven we defined values for DRILLING(CARBIDE) to accommodate, constan surface footage, feedrate and depth of cut per peck, based on the size of drill used. To advance the control to the next screen (step twelve), we must press F2 ORDEF , the CRT screen should be as displayed below.

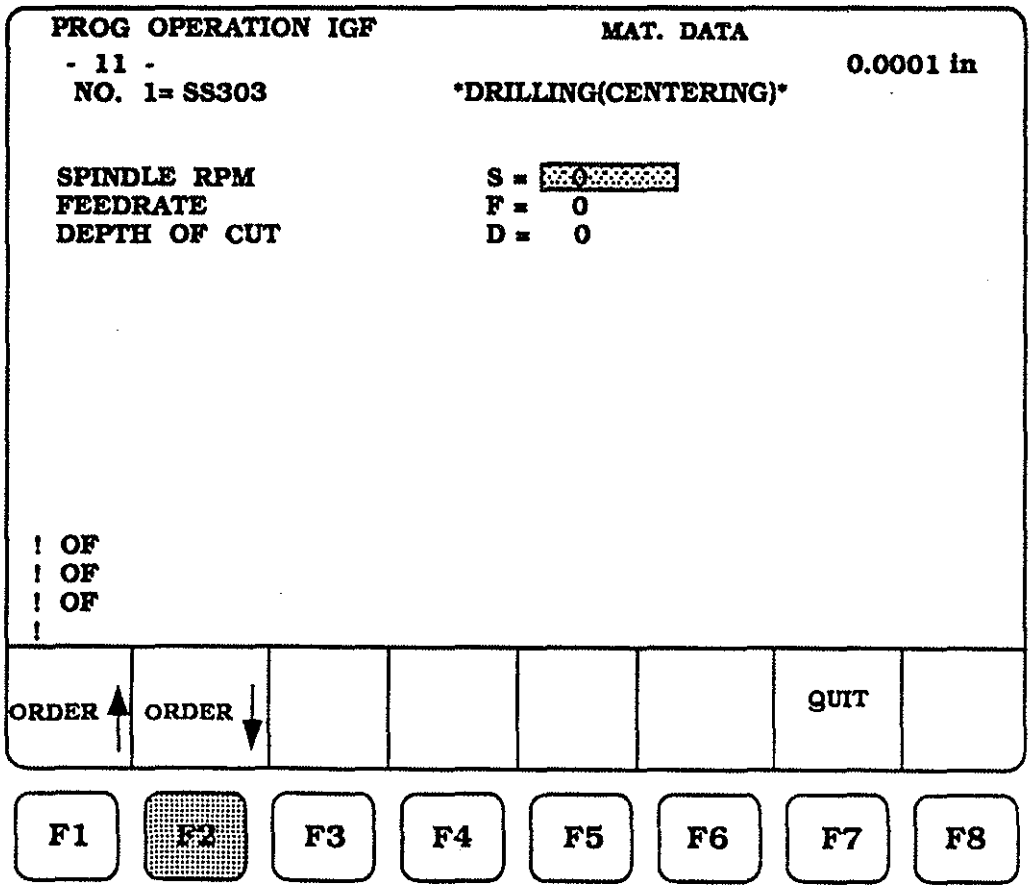
This screen allows us to input values for DRILLING(CENTERING) , which include values for revolution per minute (RPM), feedrate and depth of cut per "peck".

No decimal points are allowed on this page, so a decimal value of .0020, must be input as 20

S = Revolution per minute (RPM)

F = Feedrate expressed as (IPR)

D = Depth of cut per "peck"



Step Twelve - (continued)

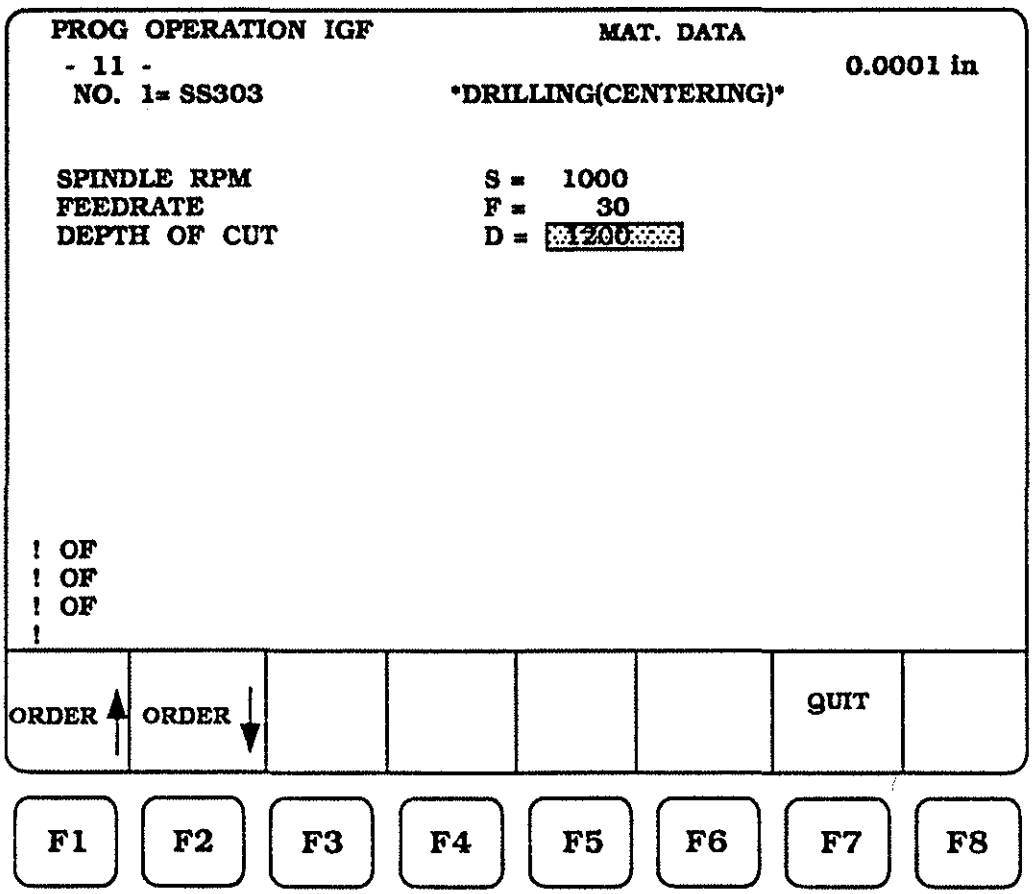
To input the values for SPINDLE RPM (S), FEEDRATE (F) and DEPTH OF CUT (D), the following steps must be taken, they are :

For (S), press (1) (0) (0) (0) **and** WRITE **, then cursor down** ↓

For (F), press (3) (0) **and** WRITE **, then cursor down** ↓

For (D), press (1) (2) (0) (0) **and** WRITE

Upon completion of the inputs, from above on this page, the CRT screen should be as displayed below.



Step Thirteen

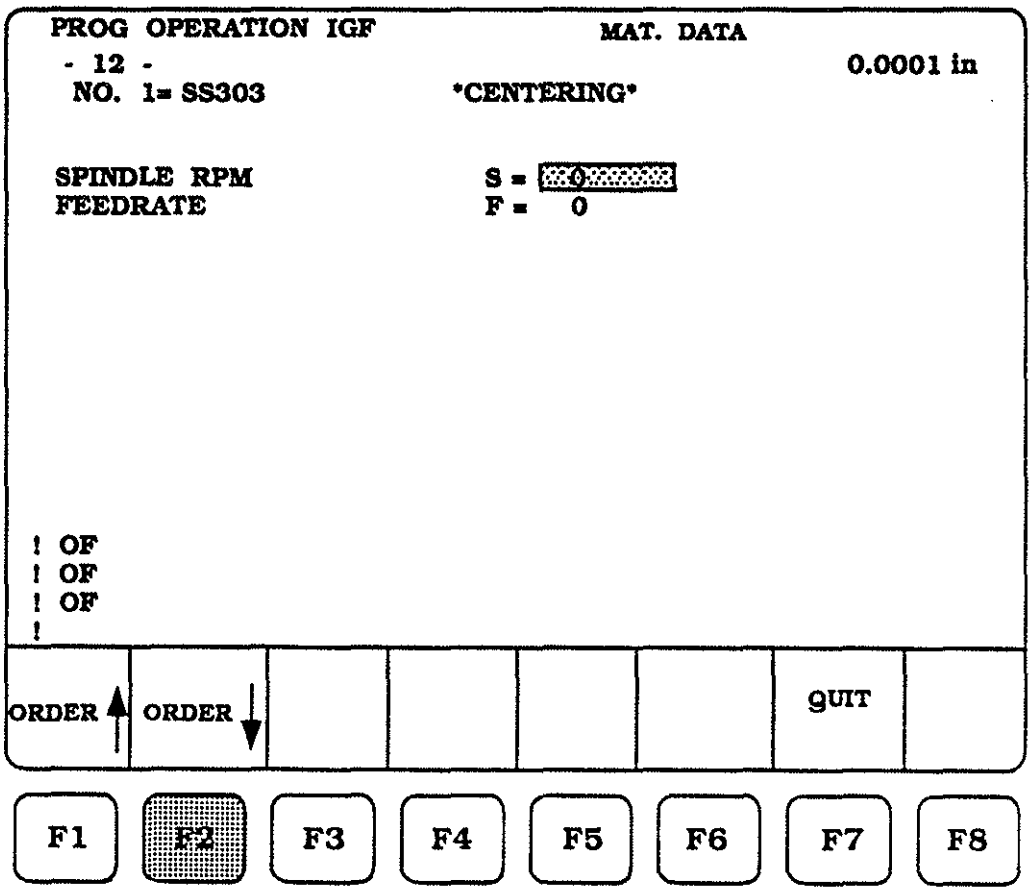
At step twelve we defined values for DRILLING(CENTERING) to accommodate, RPM , feedrate and depth of cut per "peck". To advance the control to the next screen (step thirteen), we must press F2 ORDER ↓ , The CRT screen should be as displayed below.

This screen allows us to input values for CENTERING , which include values for revolutions per minute and feedrate.

No decimal points are allowed on this page, so a decimal value of .0020, must be input as 20

S = Revolutions per minute (RPM)

F = Feedrate expressed as (IPR)



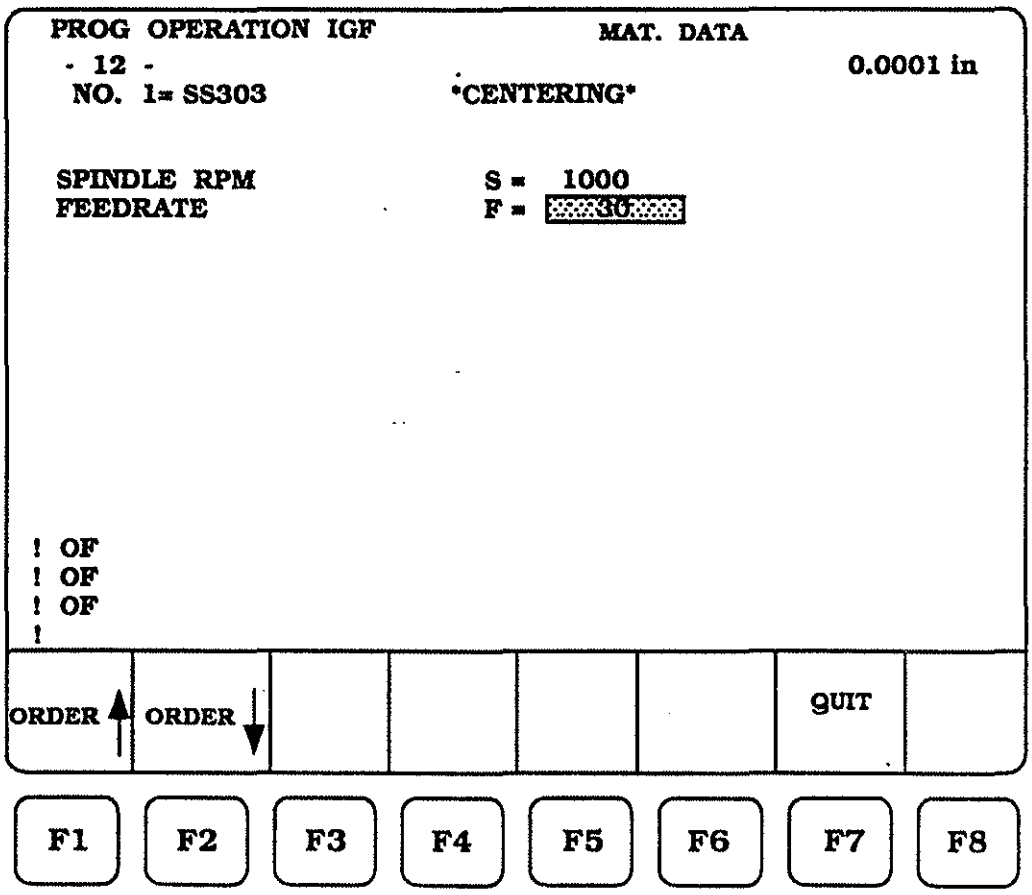
Step Thirteen - (continued)

To input the values for SPINDLE RPM (S) and FEEDRATE (F), the following steps must be taken, they are :

For (S), press (1) (0) (0) (0) and WRITE , then cursor down ↓

For (F), press (3) (0) and WRITE

Upon completion of the inputs, from above on this page, the CRT screen should be as displayed below.



Step Fourteen

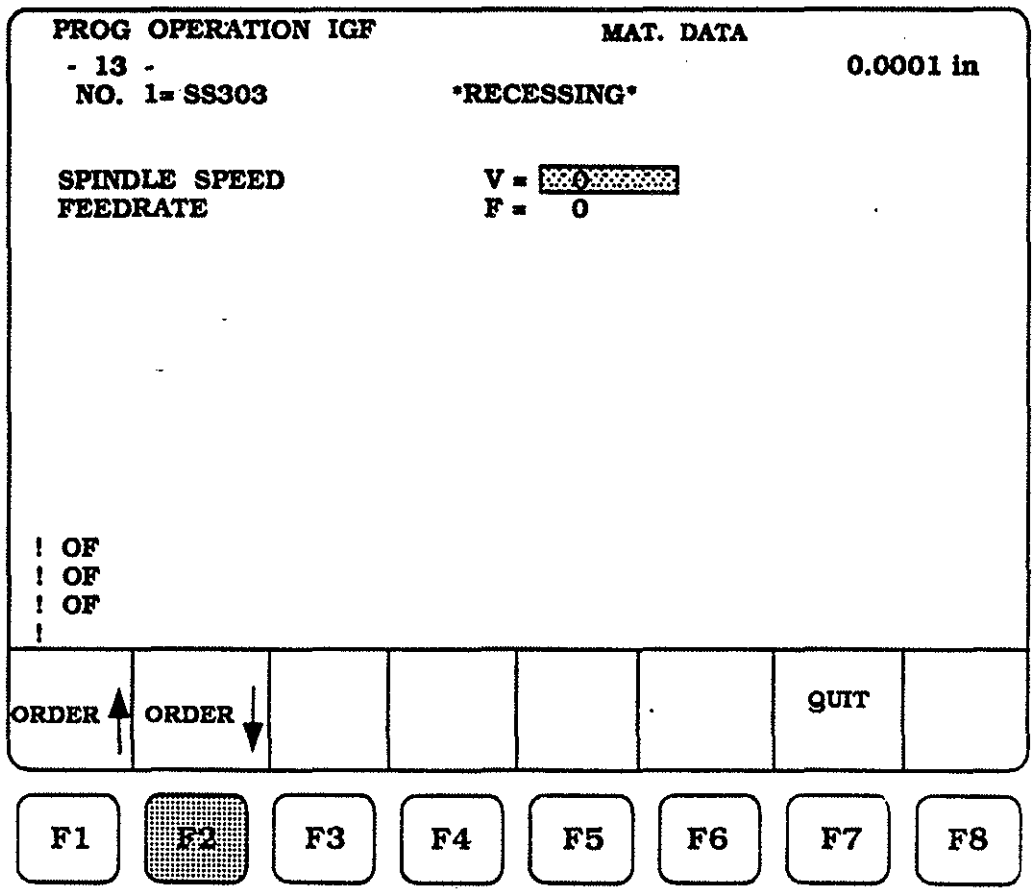
At step thirteen we defined values for CENTERING to accommodate, revolutions per minute (RPM) and feedrate (IPR). To advance the control to the next screen (step fourteen), we must press F2 ORDER ↓, The CRT screen should be as displayed below.

This screen allows us to input values for RECESSING , which include values for constant surface footage and feedrate.

No decimal points are allowed on this page, so a decimal value of .0020, must be input as 20

V = Constant surface footage (SFM)

F = Feedrate expressed as (IPR)



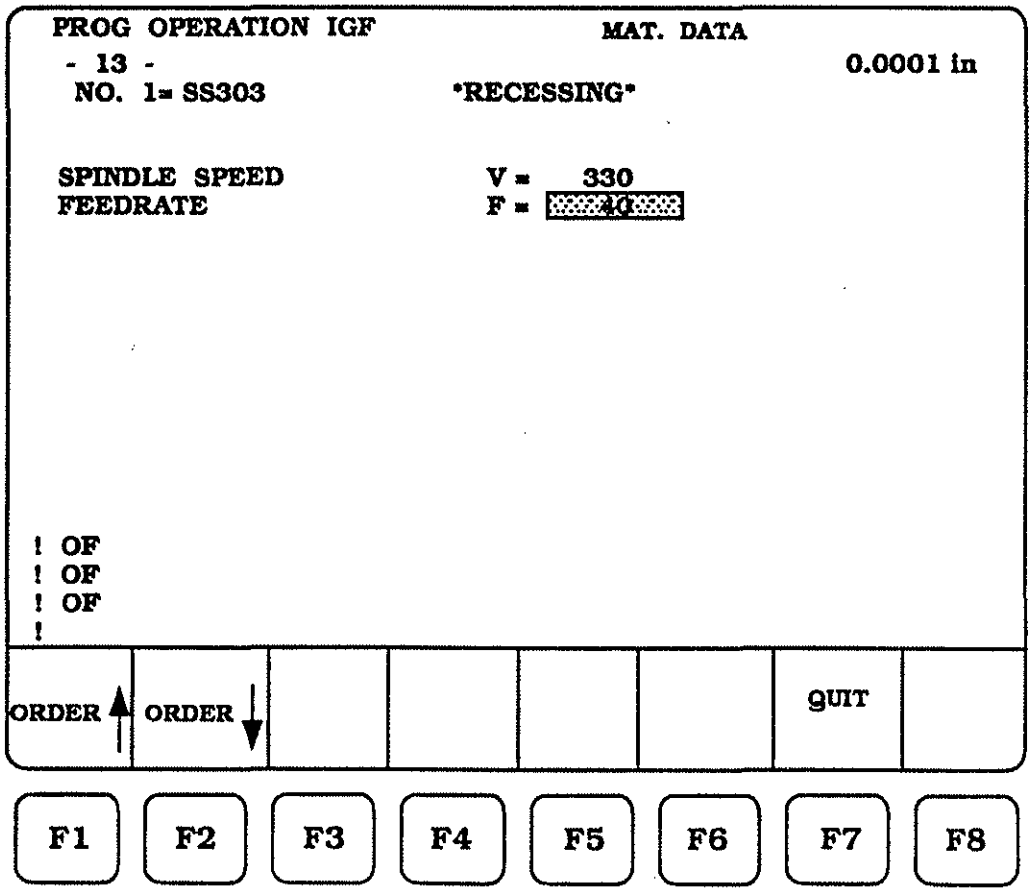
Step Thirteen - (continued)

To input the values for CONSTANT SURFACE FOOTAGE (V) and FEEDRATE (F) , the following steps must be taken, they are :

For (V), press (3) (3) (0) **and** [WRITE] **, then cursor down** [↓]

For (F), press (4) (0) **and** [WRITE]

Upon completion of the inputs, from above on this page, the CRT screen should be as displayed below.



PARAMETER DATA

Parameters are used to establish constant conditions for the OKUMA control. These parameters can include conditions as diverse as cutting tool constant clearance approach points, to setting the minimum and maximum RPM values for each gear range available on your machine tool.

Within the IGF parameters are eleven pages, that will allow you to pre-set the values for a job, or to set values once for conditions that will never change from piece-part run to piece-part run.

The parameter pages are :

PAGE NO.	DESCRIPTION
- 1 -	*DIMENSION PARAMETER*
- 2 -	*INTEGER PARAMETER*
- 3 -	*INTEGER PARAMETER*
- 4 -	*INTEGER PARAMETER*
- 5 -	*PERCENT PARAMETER*
- 6 -	*PERCENT PARAMETER*
- 7 -	*PERCENT PARAMETER*
- 8 -	*SPINDLE ROT* *CONST SPEED* *RETRACT* *APPROACH*
- 9 -	*DRILLING* *GROOVING* *COOLANT*
- 10 -	*BAR FEEDER/BAR PULLER PARAMETER*
- 11 -	*BAR FEEDER/BAR PULLER PARAMETER*

For the next several pages each of these pages will be discussed in great detail, as to HOW the values can be input, WHY they should be input or changed, and WHAT effect the values will have on the machine, or the IGF program.

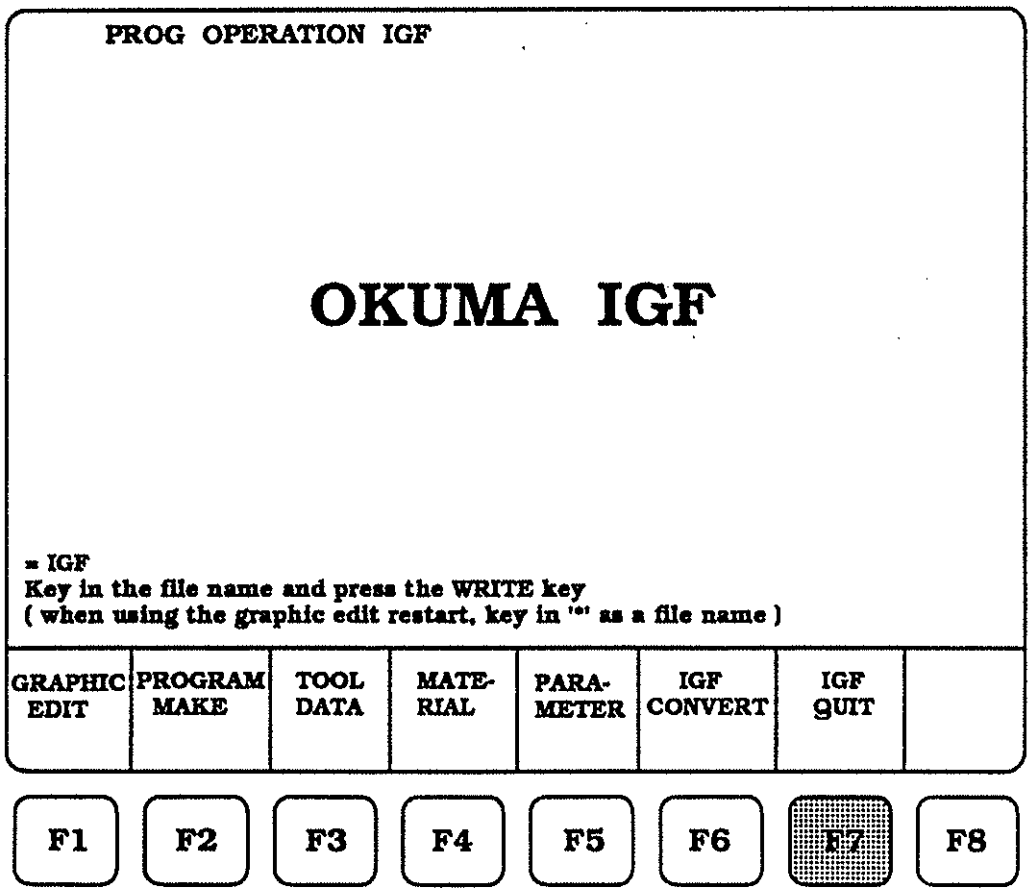
IGF Procedure for Parameter Data Entry :

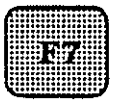
Step One

From the normal machine operation mode, press the EDIT AUX key 

, then press the function key 

, the CRT should display the IGF start-up page.



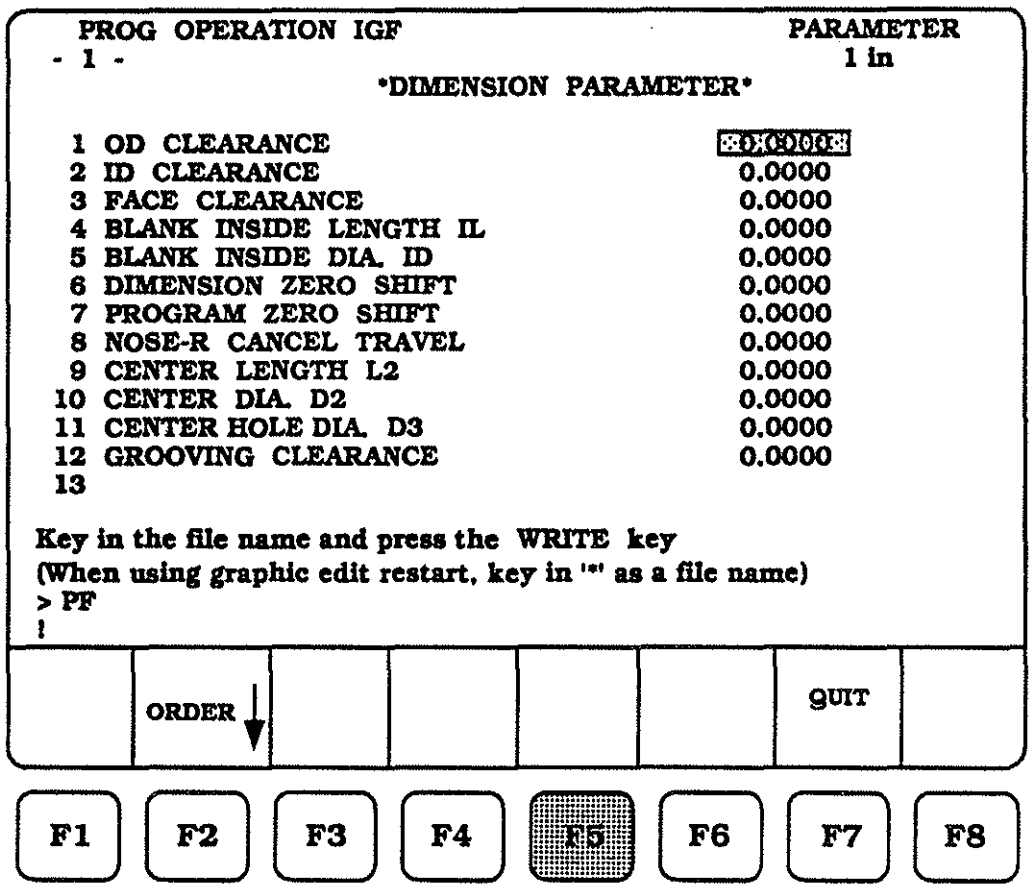
At any time the IGF session, for Parameter Data Entry, may be terminated by pressing function key 

. There will be no loss of input data.

Step Two

To access the IGF parameter section press function key F5 located below the CRT screen.

The CRT csreen should be as displayed below.



The first parameter page (DIMENSION PARAMETER) contains thirteen parameter lines. As you can see, only twelve are now being used at this time.

Starting on page 68 and continuing for the next several pages, each parameter will be shown graphically as to it's function, and a brief description will be given as to how the value is entered into the control.

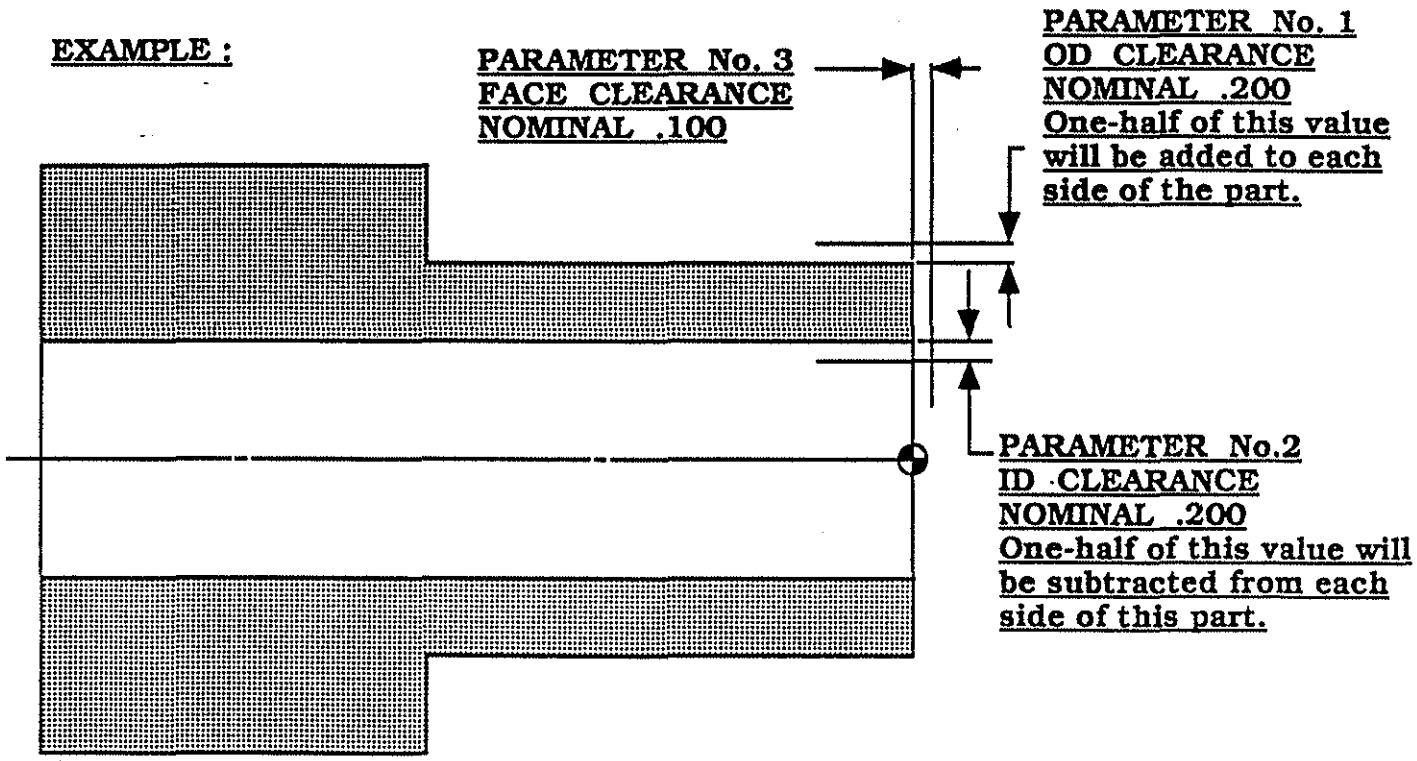
Step Two : (continued)

The first three parameters are used to establish rapid clearance points from the piece part geometry. Once established, they are modal for all jobs until you, the programmer need to change them.

```
 PROG OPERATION IGF                                   PARAMETER
 - 1 -                                                  1 in
                      *DIMENSION PARAMETER*

  1 OD CLEARANCE                                    0.0000
  2 ID CLEARANCE                                    0.0000
  3 FACE CLEARANCE                                  0.0000
  4 BLANK INSIDE LENGTH IL                          0.0000
  5 BLANK INSIDE DIA. ID                            0.0000
  6 DIMENSION ZERO SHIFT                            0.0000
  7 PROGRAM ZERO SHIFT                              0.0000
  8 NOSE-R CANCEL TRAVEL                            0.0000
  9 CENTER LENGTH L2                                0.0000
 10 CENTER DIA. D2                                  0.0000
 11 CENTER HOLE DIA. D3                             0.0000
 12 GROOVING CLEARANCE                              0.0000
 13

Key in the file name and press the WRITE key
(When using graphic edit restart, key in '*' as a file name)
> PF
!
```

	ORDER ↓					QUIT	
F1	F2	F3	F4	F5	F6	F7	F8

EXAMPLE :



Step Two : (continued)

To enter the parameter values for numbers 1, 2 and 3, the following steps must be taken :

Make sure the cursor highlight is at the top of the column, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

For parameter number 1 - press [.] [2] and [WRITE] , then cursor down [↓]

For parameter number 2 - press [.] [2] and [WRITE] , then cursor down [↓]

For parameter number 3 - press [.] [1] and [WRITE]

If entered correctly, the CRT screen should be as displayed below.

```
PROG OPERATION IGF                                  PARAMETER
- 1 -                                                 1 in
                      *DIMENSION PARAMETER*

 1 OD CLEARANCE                                    0.2000
 2 ID CLEARANCE                                    0.2000
 3 FACE CLEARANCE                                  0.1000
 4 BLANK INSIDE LENGTH IL                          0.0000
 5 BLANK INSIDE DIA. ID                            0.0000
 6 DIMENSION ZERO SHIFT                            0.0000
 7 PROGRAM ZERO SHIFT                              0.0000
 8 NOSE-R CANCEL TRAVEL                            0.0000
 9 CENTER LENGTH L2                                0.0000
10 CENTER DIA. D2                                  0.0000
11 CENTER HOLE DIA. D3                             0.0000
12 GROOVING CLEARANCE                              0.0000
13

! .2
! .2
! .1
!

          ORDER ↓                                   QUIT

  F1      F2      F3      F4      F5      F6      F7      F8
```

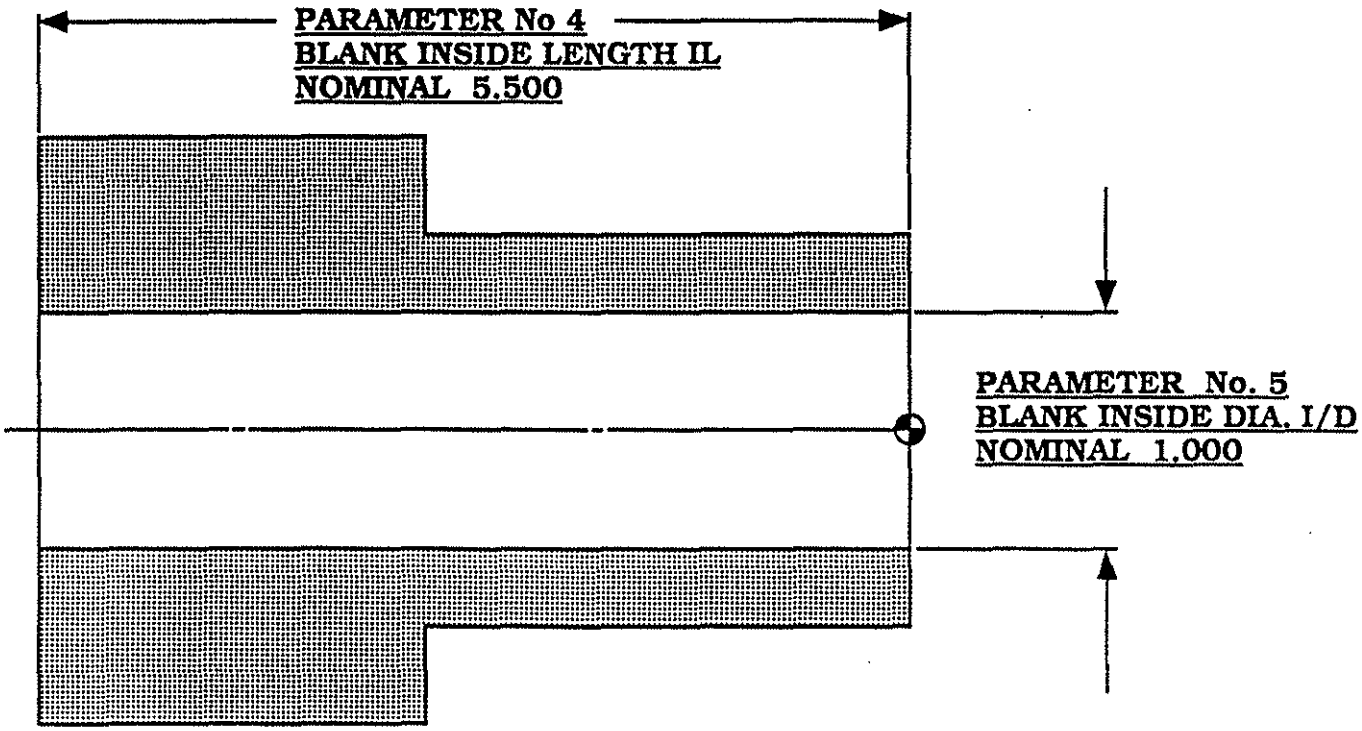
Step Two : (continued)

Parameters number 4 and 5 are used to establish constant dimensions for length and inside diameter. This is useful if a series of piece parts all have the same length and I/D.

```
PROG OPERATION IGF                                   PARAMETER
- 1 -                                                  1 in
                      *DIMENSION PARAMETER*

 1 OD CLEARANCE                                0.2000
 2 ID CLEARANCE                                0.2000
 3 FACE CLEARANCE                              0.1000
 4 BLANK INSIDE LENGTH IL                      0.0000
 5 BLANK INSIDE DIA. ID                        0.0000
 6 DIMENSION ZERO SHIFT                        0.0000
 7 PROGRAM ZERO SHIFT                          0.0000
 8 NOSE-R CANCEL TRAVEL                        0.0000
 9 CENTER LENGTH L2                            0.0000
10 CENTER DIA. D2                              0.0000
11 CENTER HOLE DIA. D3                         0.0000
12 GROOVING CLEARANCE                          0.0000
13

! .2
! .2
! .1
!
```

	ORDER ↓					QUIT	
F1	F2	F3	F4	F5	F6	F7	F8

EXAMPLE :



Step Two : (continued)

To enter the parameter values for numbers 4 and 5, the following steps must be taken :

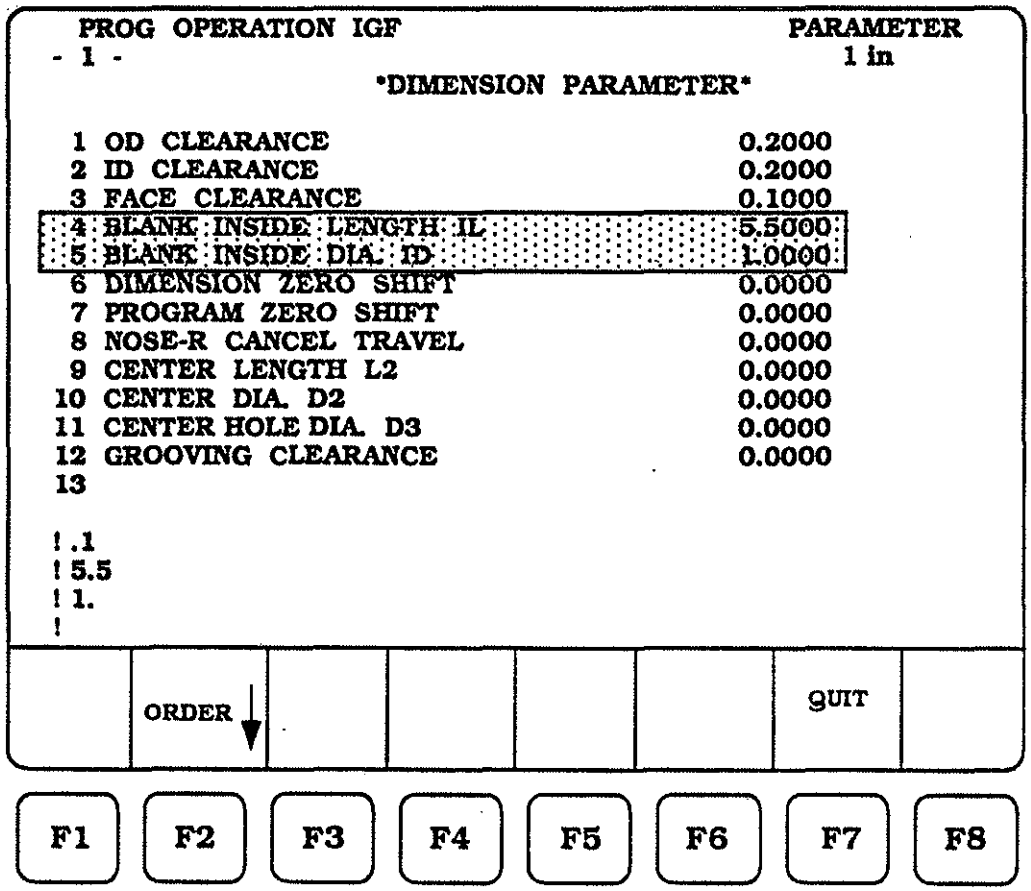
Make sure the cursor highlight is located at parameter number 4, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

For parameter number 4 - press [5] [.] [5] and [WRITE] , then cursor down [↓]

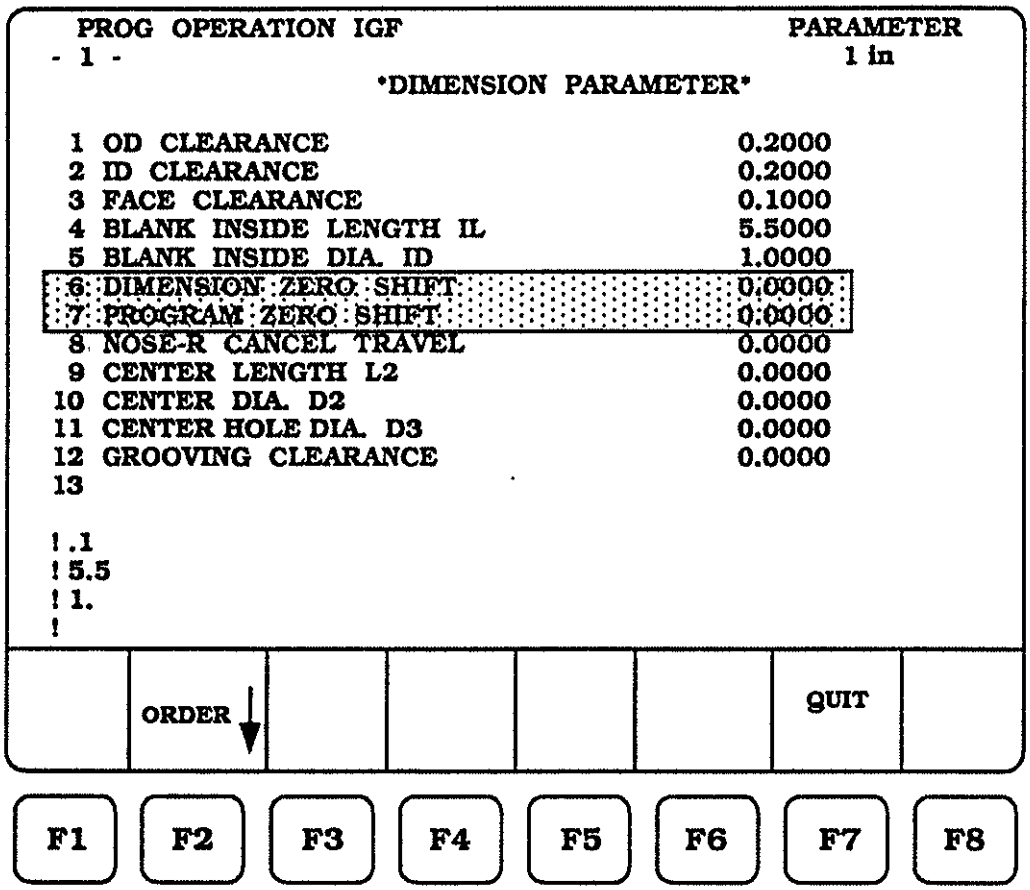
For parameter number 5 - press [1] [.] and [WRITE]

If entered correctly, the CRT screen should be as displayed below.

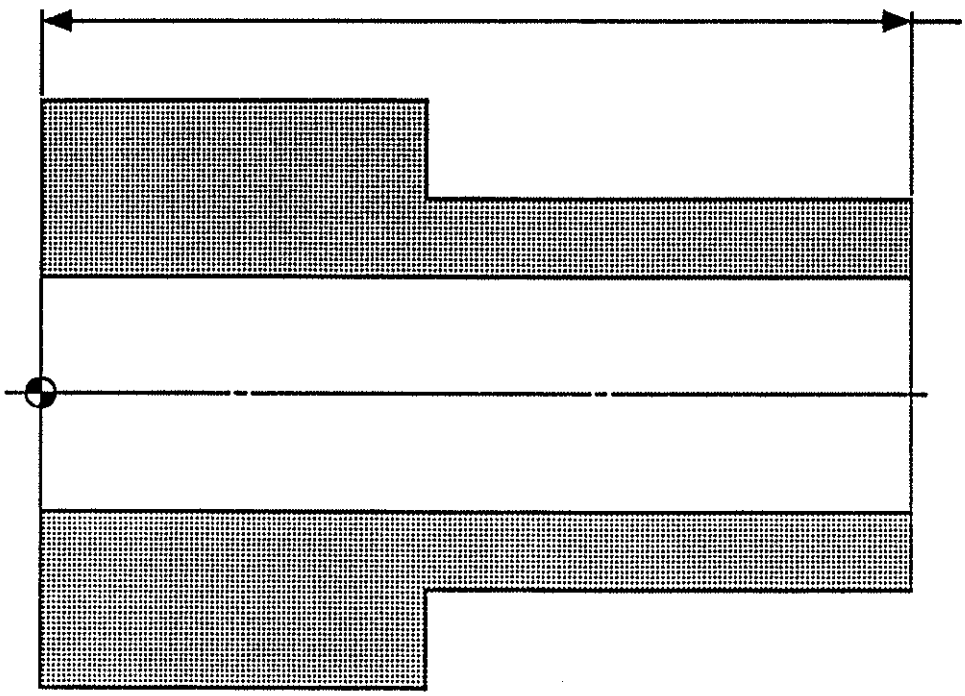


Step Two : (continued)

The IGF graphics allows for the moving of program zero from the rear of the part to the front of the part. This is accomplished by using parameters 6 and 7. If you decide to move program zero, remember to change dimension zero also.



EXAMPLE :



PARAMETER No. 6
DIMENSION ZERO SHIFT
NOMINAL 5.500

PARAMETER No. 7
PROGRAM ZERO SHIFT
NOMINAL 5.500

Step Two : (continued)

To enter the parameter values for numbers 6 and 7, the following steps must be taken :

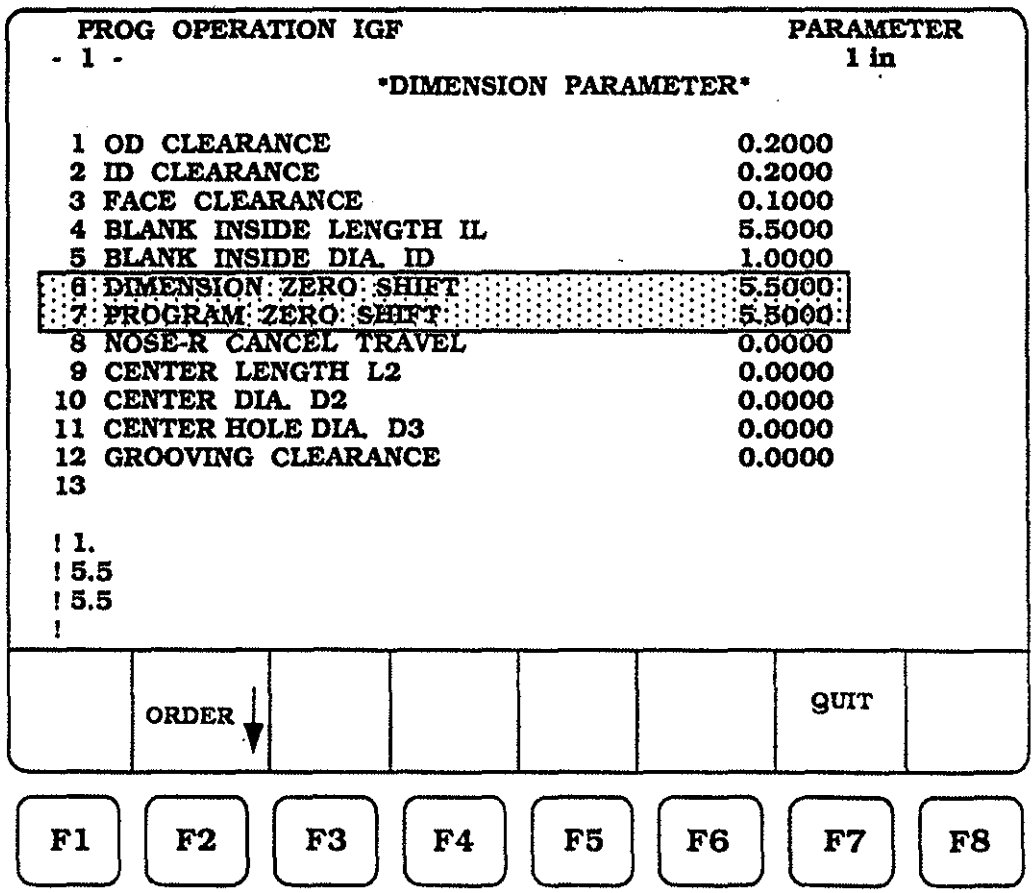
Make sure the cursor highlight is located at parameter number 6, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

For parameter number 6 - press [5] [.] [5] and [WRITE] , then cursor down [↓]

For parameter number 7 - press [5] [.] [5] and [WRITE]

If entered correctly, the CRT screen should be as displayed below.



Step Two : (continued)

Parameter number 8 allows the IGF function to calculate a distance past the end-point, or to over-travel the last end-point, for cancelling of tool nose radius compensation. With this in effect, cancelling is not done on the piece part.

PROG OPERATION IGF — PARAMETER
- 1 - — 1 in

DIMENSION PARAMETER

1	OD CLEARANCE	0.2000
2	ID CLEARANCE	0.2000
3	FACE CLEARANCE	0.1000
4	BLANK INSIDE LENGTH IL	5.5000
5	BLANK INSIDE DIA. ID	1.0000
6	DIMENSION ZERO SHIFT	5.5000
7	PROGRAM ZERO SHIFT	5.5000
8	NOSE-R CANCEL TRAVEL	0.0000
9	CENTER LENGTH L2	0.0000
10	CENTER DIA. D2	0.0000
11	CENTER HOLE DIA. D3	0.0000
12	GROOVING CLEARANCE	0.0000
13		

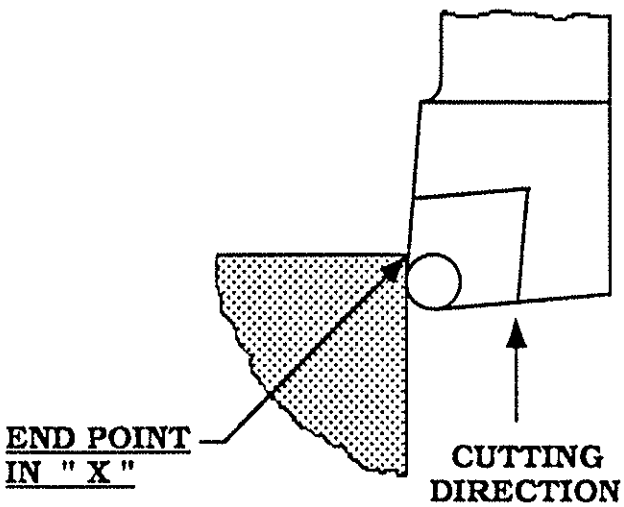
! 1.
! 5.5
! 5.5
!

ORDER ↓ | QUIT

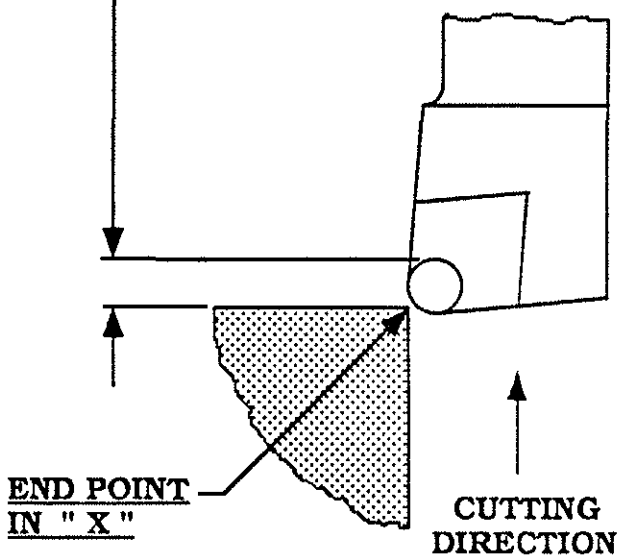
F1 F2 F3 F4 F5 F6 F7 F8

EXAMPLE :

If PARAMETER No. 8 is left at zero and cutter compensation is used within IGF , the tool will stop at the end point.



PARAMETER No. 8
NOSE-R CANCEL TRAVEL
NOMINAL CANNOT EXCEED
.0393



Step Two : (continued)

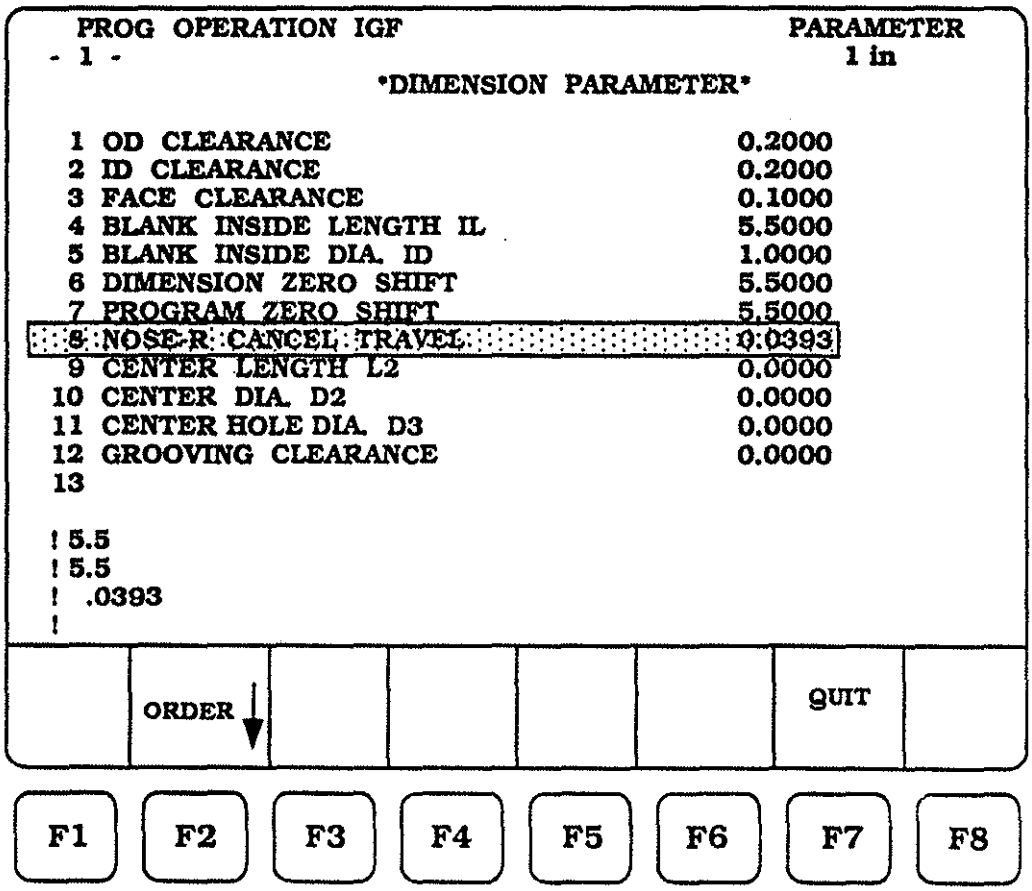
To enter the parameter values for number 8 , the following steps must be taken :

Make sure the cursor highlight is located at parameter number 8, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

For parameter number 8 - press [.] [0] [3] [9] [3] and [WRITE]

If entered correctly, the CRT screen should be as displayed below.



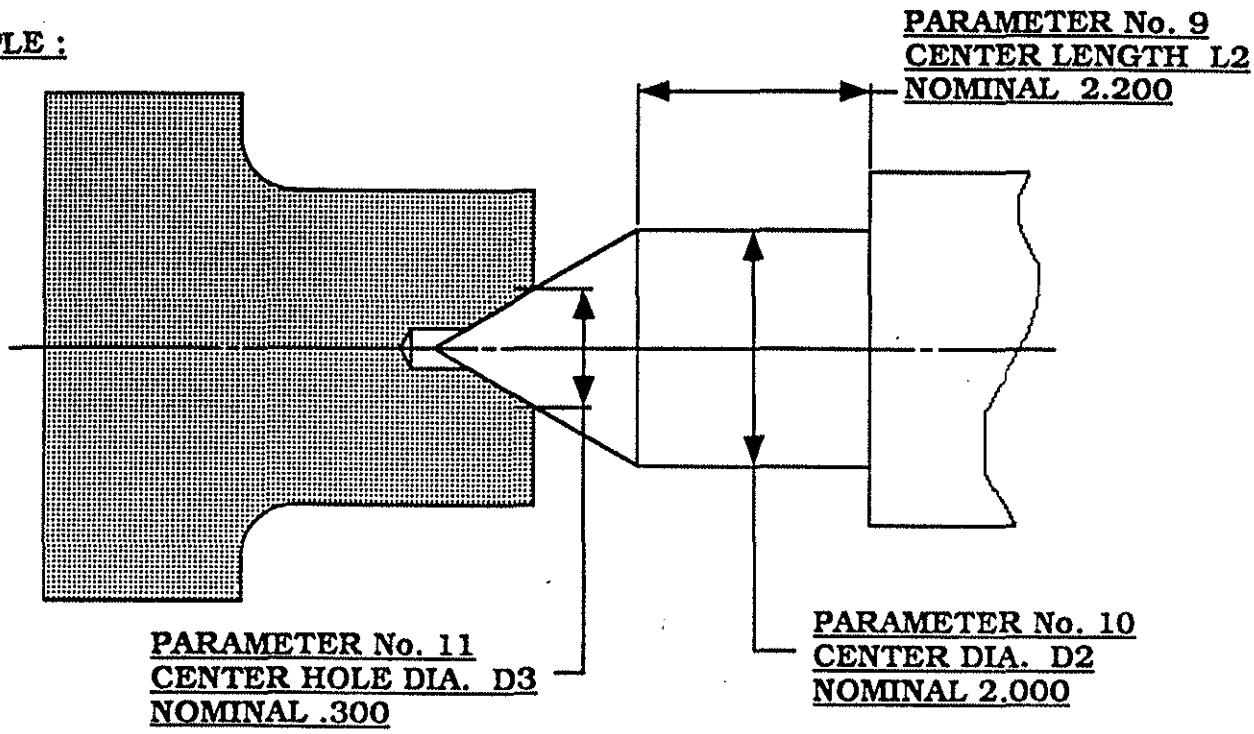
Step Two : (continued)

Parameter numbers 9, 10 and 11 are used to define the length the center is extended from the tailstock (L2), the actual physical diameter of the center (D2) , and the diameter in the part that the center will engage (D3)

```
PROG OPERATION IGF                                   PARAMETER
- 1 -                                                  1 in
                      *DIMENSION PARAMETER*

 1 OD CLEARANCE                                  0.2000
 2 ID CLEARANCE                                  0.2000
 3 FACE CLEARANCE                                0.1000
 4 BLANK INSIDE LENGTH IL                        5.5000
 5 BLANK INSIDE DIA. ID                          1.0000
 6 DIMENSION ZERO SHIFT                          5.5000
 7 PROGRAM ZERO SHIFT                            5.5000
 8 NOSE-R CANCEL TRAVEL                          0.0393
 9 CENTER LENGTH L2                              0.0000
10 CENTER DIA. D2                                0.0000
11 CENTER HOLE DIA. D3                           0.0000
12 GROOVING CLEARANCE                            0.0000
13

! 5.5
! 5.5
!  .0393
!
```

	ORDER ↓					QUIT	
F1	F2	F3	F4	F5	F6	F7	F8

EXAMPLE :



Step Two : (continued)

To enter the parameter values for numbers 9, 10 and 11, the following steps must be taken :

Make sure the cursor highlight is located at parameter number 9, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

For parameter number 9 - press [2] [.] [2] and [WRITE], then cursor down [↓]

For parameter number 10 - press [2] [.] and [WRITE], then cursor down [↓]

For parameter number 11 - press [.] [3] and [WRITE]

If entered correctly, the CRT screen should be as displayed below.

```
  PROG OPERATION IGF                                  PARAMETER
- 1 -                                                   1 in
                      *DIMENSION PARAMETER*

  1 OD CLEARANCE                                  0.2000
  2 ID CLEARANCE                                  0.2000
  3 FACE CLEARANCE                                0.1000
  4 BLANK INSIDE LENGTH IL                        5.5000
  5 BLANK INSIDE DIA. ID                          1.0000
  6 DIMENSION ZERO SHIFT                          5.5000
  7 PROGRAM ZERO SHIFT                            5.5000
  8 NOSE-R CANCEL TRAVEL                          0.0393
  9 CENTER LENGTH L2                              2.2000
 10 CENTER DIA. D2                                2.0000
 11 CENTER HOLE DIA. D3                           0.3000
 12 GROOVING CLEARANCE                           0.0000
 13

 ! 2.2
 ! 2.
 !  .3
 !
|        | ORDER ↓ |        |        |        |        | QUIT   |        |
|  F1    |  F2     |  F3    |  F4    |  F5    |  F6    |  F7    |  F8    |
```

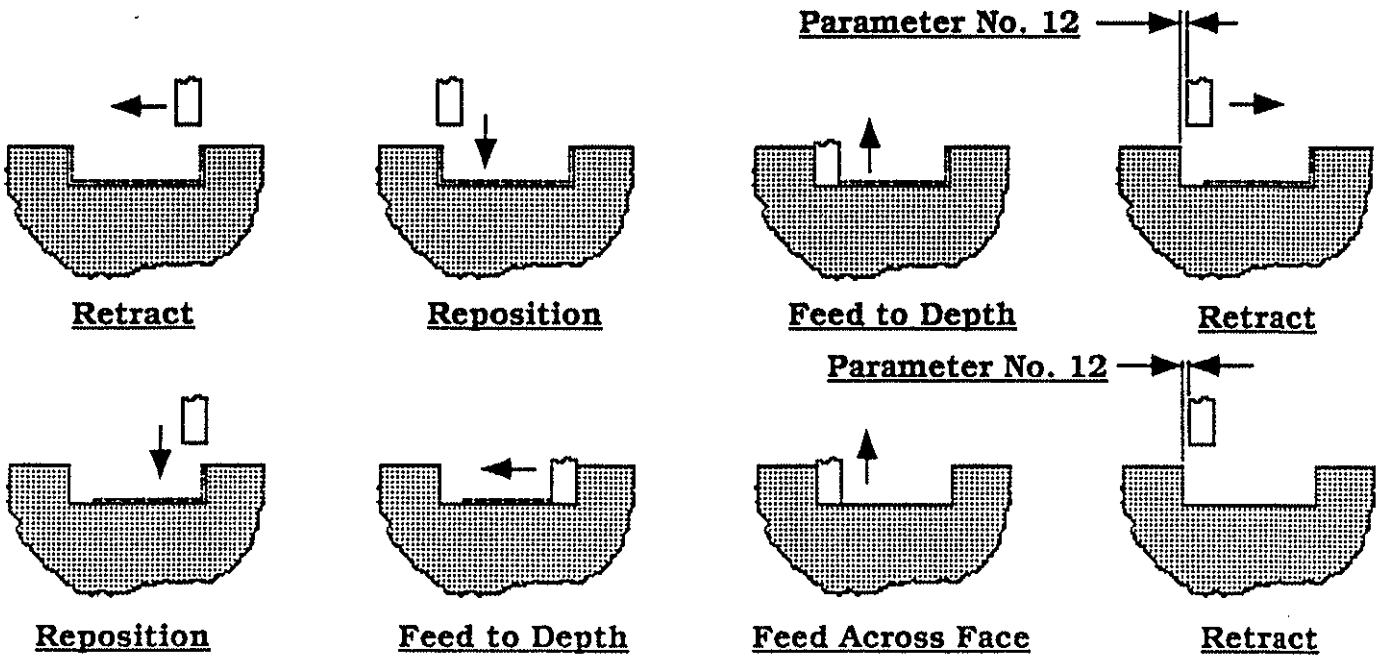
Step Two : (continued)

As you will see in IGF graphics, grooves wider then the width of the groove tool may be roughed and finished. The parameter number 12 allows a clearance value to be established for the " Z "-axis on the rapid retract move back to the start point. The physical value of this parameter cannot exceed .0390 for the stand-off value.

```
 PROG OPERATION IGF                                  PARAMETER
- 1 -                                                  1 in
                      *DIMENSION PARAMETER*

 1 OD CLEARANCE                                  0.2000
 2 ID CLEARANCE                                  0.2000
 3 FACE CLEARANCE                                0.1000
 4 BLANK INSIDE LENGTH IL                        5.5000
 5 BLANK INSIDE DIA. ID                          1.0000
 6 DIMENSION ZERO SHIFT                          5.5000
 7 PROGRAM ZERO SHIFT                            5.5000
 8 NOSE-R CANCEL TRAVEL                          0.1000
 9 CENTER LENGTH L2                              2.2000
10 CENTER DIA. D2                                2.0000
11 CENTER HOLE DIA. D3                           0.3000
12 GROOVING CLEARANCE                            0.0000
13

! 2.2
! 2.
!  .3
!
```

	ORDER ↓					QUIT	
F1	F2	F3	F4	F5	F6	F7	F8

EXAMPLE :



Step Two : (continued)

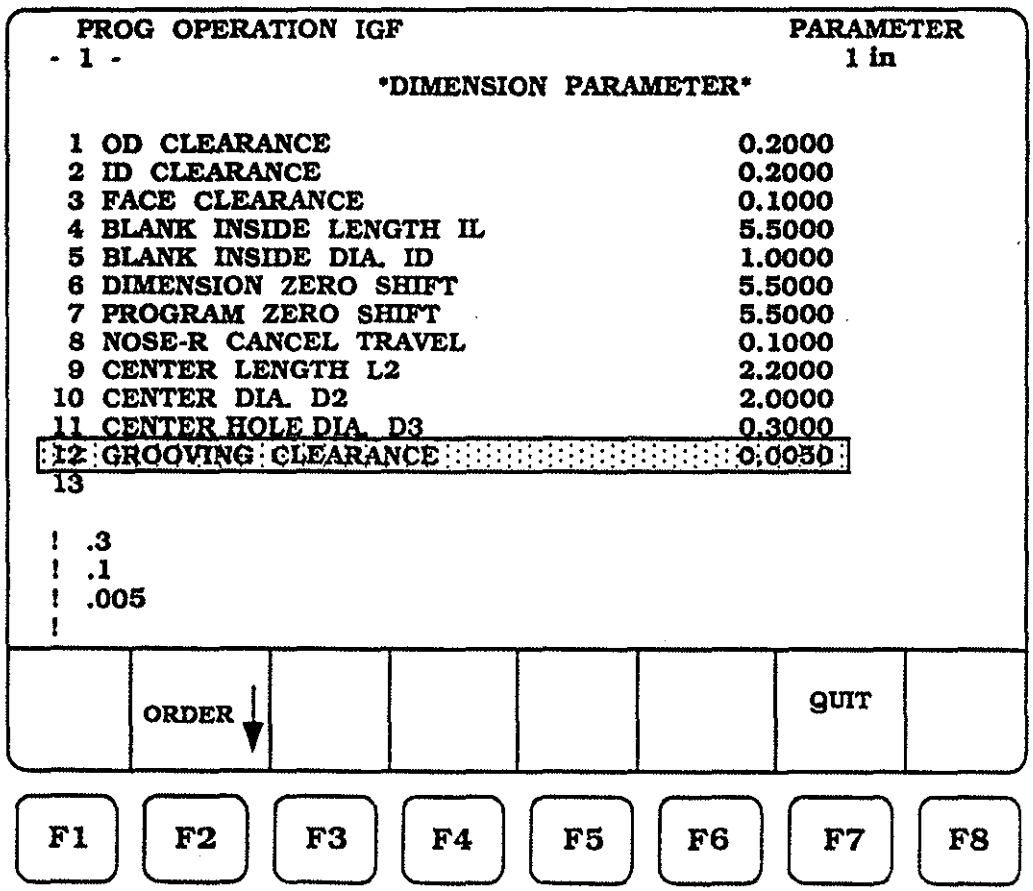
To enter the parameter values for number 12 , the following steps must be taken :

Make sure the cursor highlight is located at parameter number 12, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

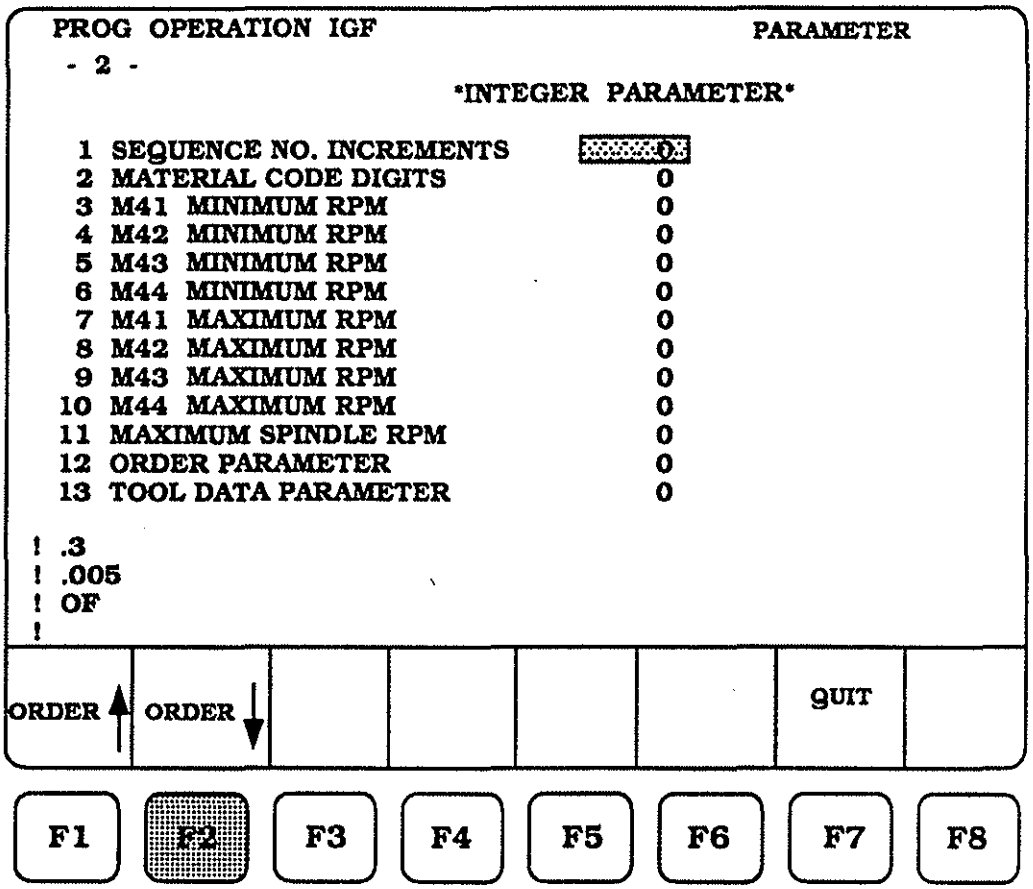
For parameter number 12 - press [.] [0] [0] [5] and [WRITE]

If entered correctly, the CRT screen should be as displayed below.



Step Three

At step two we defined values for the *DIMENSION PARAMETER* page. To advance the control to the next screen (step three), we must press F2 ORDER ↓ , the CRT screen should be as displayed below.



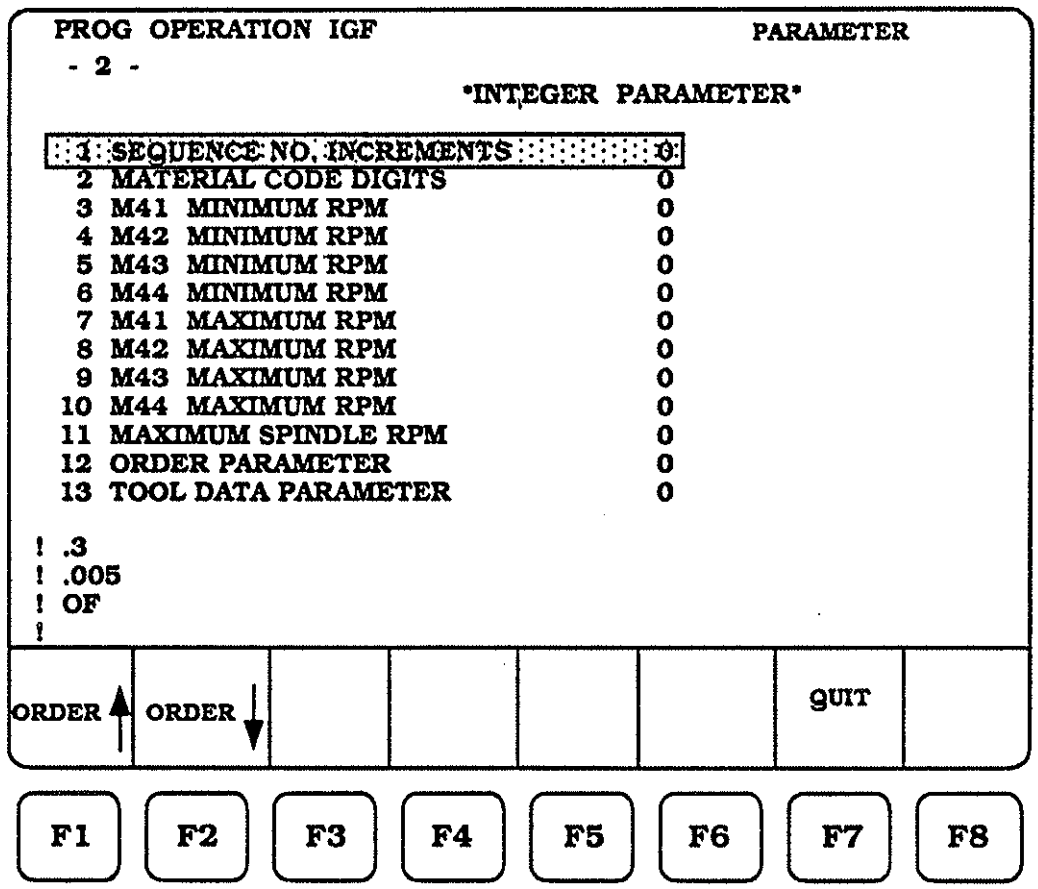
The second parameter page (INTEGER PARAMETER) contains thirteen parameter lines.

Starting on page 81 and continuning for the next several pages, each parameter will receive a brief description as to it's function and how to enter it into the control.

Step Three

The first parameter, number one, allows us to set the sequence number increments This value should normally be entered as " 0 " (zero) and it will number the IGF output by increments of one starting with sequence number N0001.

If you wish to assign special sequence numbers to each cutting tool, then enter a value starting with " 1 " (one). The output program will start with N0001 and at the first tool will change to N0010, next (or second) tool will be N0020, and so on to the end of the program.



EXAMPLE :

IF PARAMETER IS " 0 "

```
N0001 G00 X20 Z20
N0002 G50 S3500
N0003 G97 S429 M41 M03 M08
N0004 G00 X3.6 Z0.3 T070707
```

IF PARAMETER IS " 1 "

```
N0001 G00 X20 Z20
N0002 G50 S3500
N0010 G97 S429 M41 M03 M08
N0011 G00 X3.6 Z0.3 T070707
```

IF PARAMETER IS " 2 "

```
N0001 G00 X20 Z20
N0002 G50 S3500
N0020 G97 S429 M41 M03 M08
N0021 G00 X3.6 Z0.3 T070707
```

Step Three

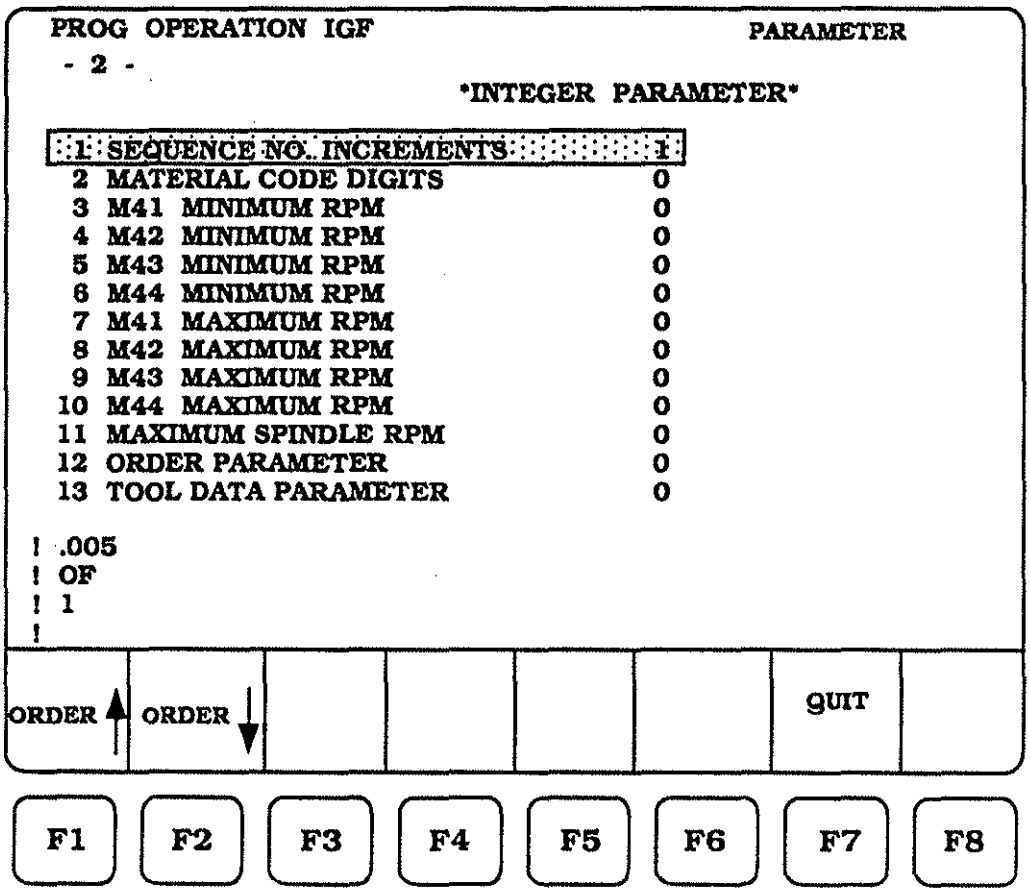
To enter the parameter values for number 1, the following steps must be taken :

Make sure the cursor highlight is at the top of the column, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

For parameter number 1 - press [1] and [WRITE]

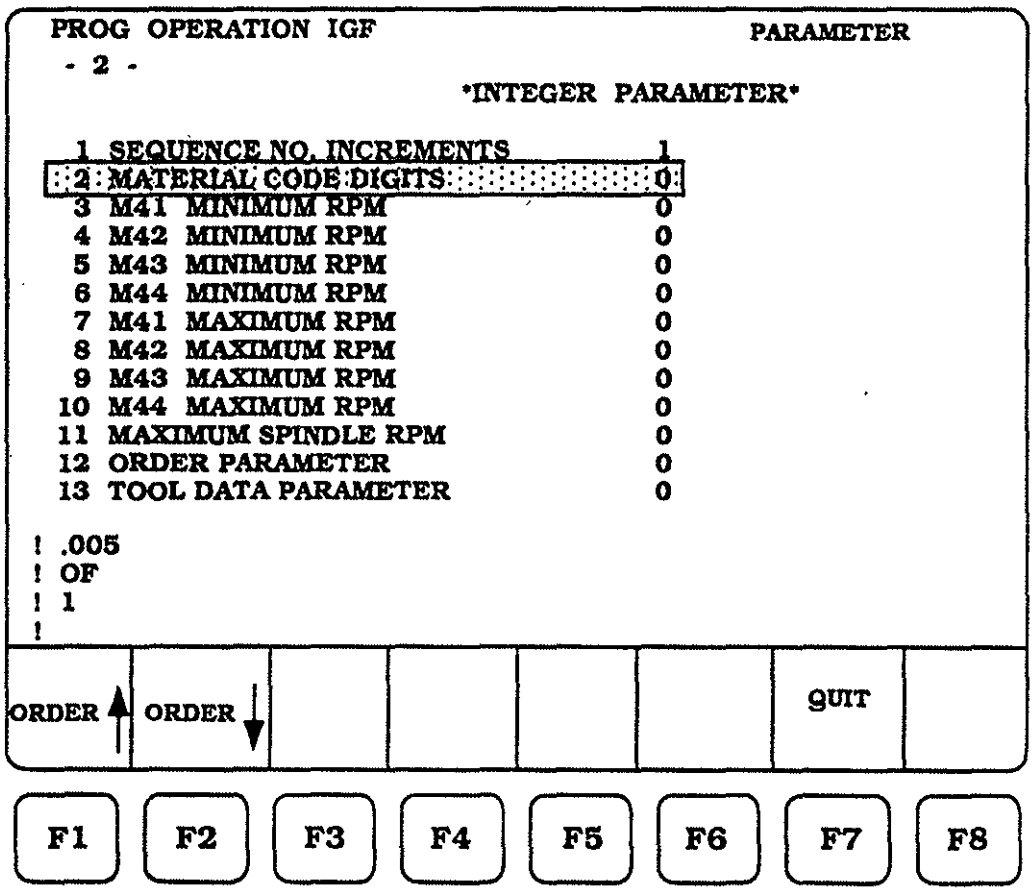
If entered correctly, the CRT screen should be as displayed below.



Step Three

If you turn back to page 25 (**MATERIAL TABLE**) , there are thirteen choices for material input. If the normal flow of material, that you must machine, is nearly always the same material and you do not need to identify material every time an IGF session is started, then entering a material value (1 - 13) will insure that the same MATERIAL values be chosen every time.

This also insures that the required spindle speeds (RPM) , feeds (IPR), and depths of cut are specified only once, in the MATERIAL section.



Step Three

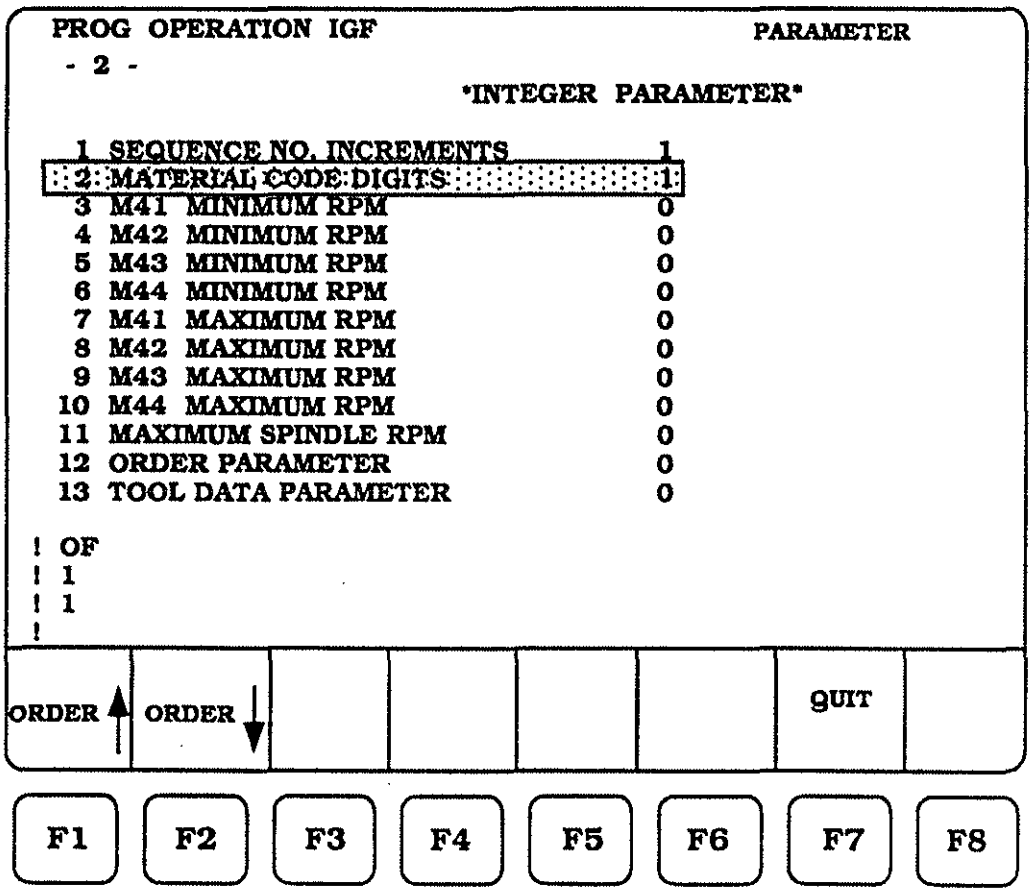
To enter the parameter values for number 2, the following steps must be taken :

Make sure the cursor highlight is located at parameter number 2, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

For parameter number 2 - press [1] and [WRITE]

If entered correctly, the CRT screen should be as displayed below.



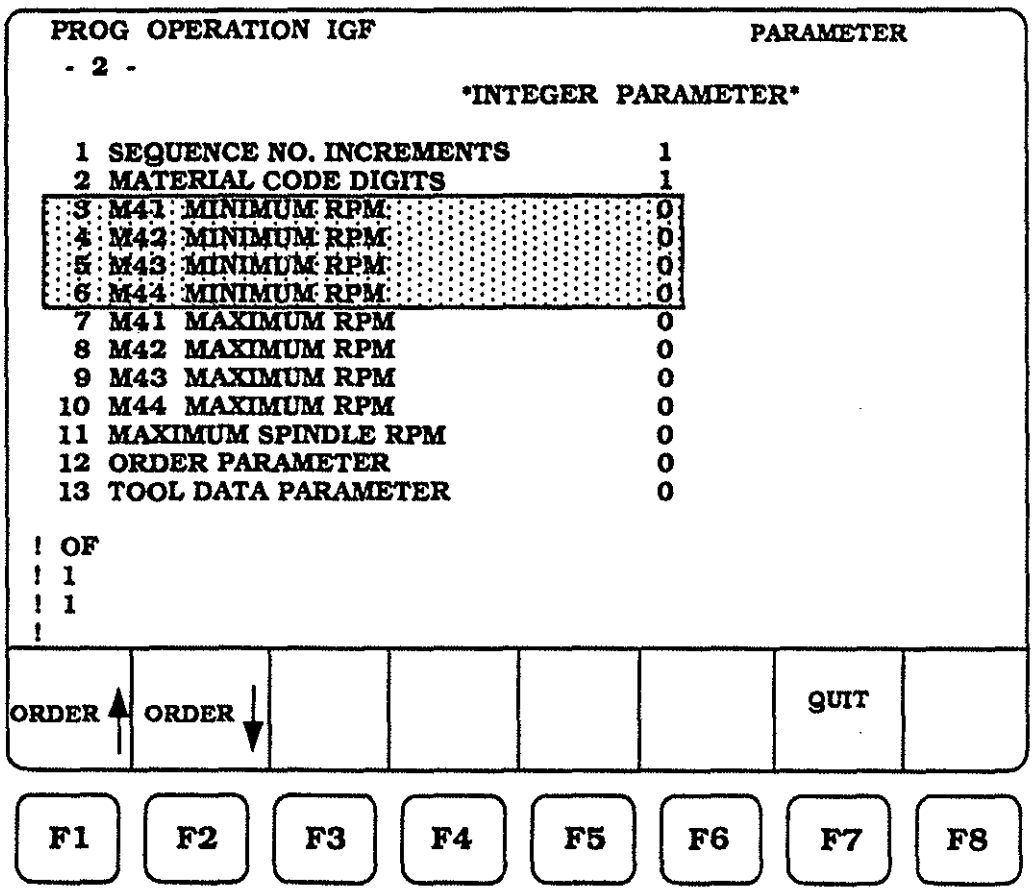
Step Three

Spindle Revolutions Per Minute (RPM) are calculated by the IGF graphics function. The control will then assign the calculated RPM to a machine gear range. Some OKUMA lathes have two gear ranges and others have up to four gear ranges. The *INTEGER PARAMETER* page provides for both.

Parameters 3, 4, 5 and 6, allows you to specify the MINIMUM spindle RPM for every gear range. If the machine tool we are considering is the OKUMA LB-15, it has two gear ranges, the MINIMUM spindle RPM's are :

M41 - 70 RPM
M42 - 283 RPM

The control can now generate the proper " M " function into the IGF output.



Step Three

To enter the parameter values for numbers 3 and 4, the following steps must be taken :

Make sure the cursor highlight is located at parameter number 3, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

For parameter number 3 - press [7] [0] and [WRITE], then cursor down [↓]

For parameter number 4 - press [2] [8] [3] and [WRITE]

If entered correctly, the CRT screen should be as displayed below.

```
PROG OPERATION IGF                                    PARAMETER
 - 2 -
                              *INTEGER PARAMETER*

  1 SEQUENCE NO. INCREMENTS                    1
  2 MATERIAL CODE DIGITS                       1
  3 M41 MINIMUM RPM                           70
  4 M42 MINIMUM RPM                          283
  5 M43 MINIMUM RPM                            0
  6 M44 MINIMUM RPM                            0
  7 M41 MAXIMUM RPM                            0
  8 M42 MAXIMUM RPM                            0
  9 M43 MAXIMUM RPM                            0
 10 M44 MAXIMUM RPM                            0
 11 MAXIMUM SPINDLE RPM                        0
 12 ORDER PARAMETER                            0
 13 TOOL DATA PARAMETER                        0

! 1
! 70
! 283
!
```

ORDER ↑	ORDER ↓					QUIT	
F1	F2	F3	F4	F5	F6	F7	F8

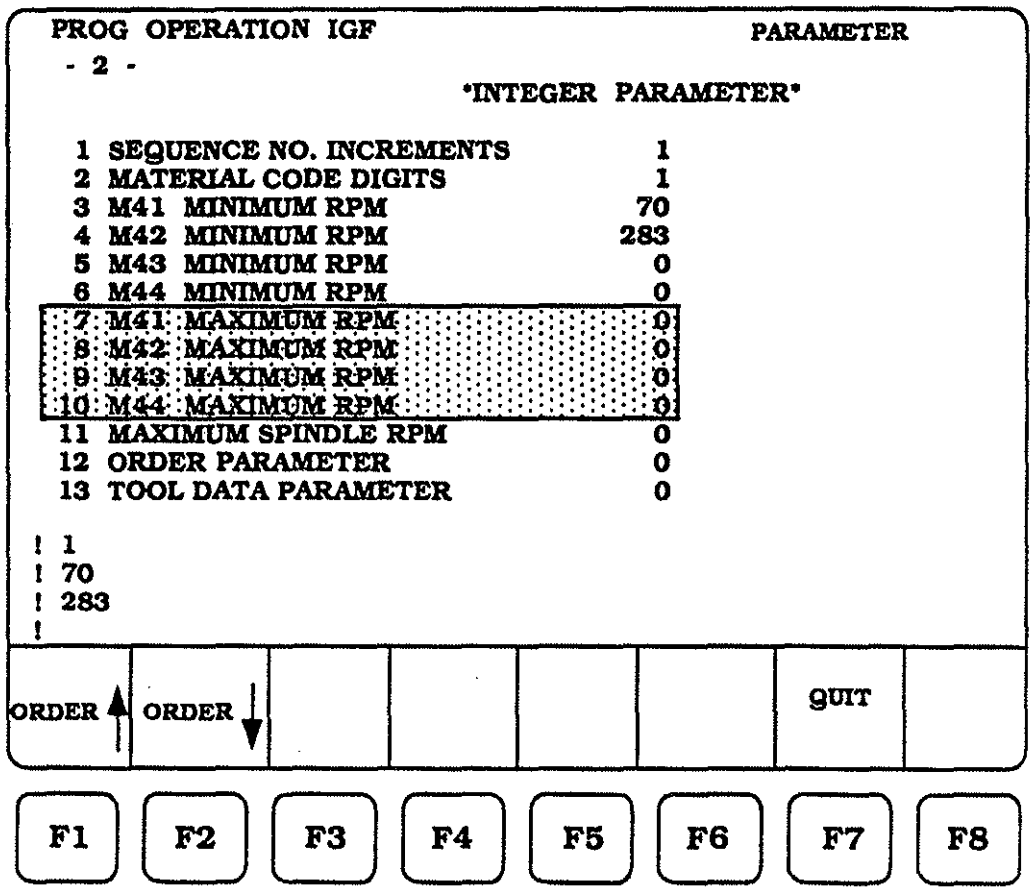
Step Three

Spindle Revolutions Per Minute (RPM) are calculated by the IGF graphics function. The control will then assign the calculated RPM to a machine gear range. Some OKUMA lathes have two gear ranges and others have up to four gear ranges. The *INTEGER PARAMETER* page provides for both.

Parameters 7, 8, 9 and 10, allows you to specify the MAXIMUM spindle RPM for every gear range. If the machine tool we are considering is the OKUMA LB-15, it has two gear ranges, the MAXIMUM spindle RPM's are :

M41 - 939 RPM
M42 - 3800 RPM

The control can now generate the proper " M " function into the IGF output.



Step Three

To enter the parameter values for numbers 7 and 8, the following steps must be taken :

Make sure the cursor highlight is located at parameter number 7, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

For parameter number 7 - press [9] [3] [9] and [WRITE], then cursor down [↓]

For parameter number 4 - press [3] [8] [0] [0] and [WRITE]

If entered correctly, the CRT screen should be as displayed below.

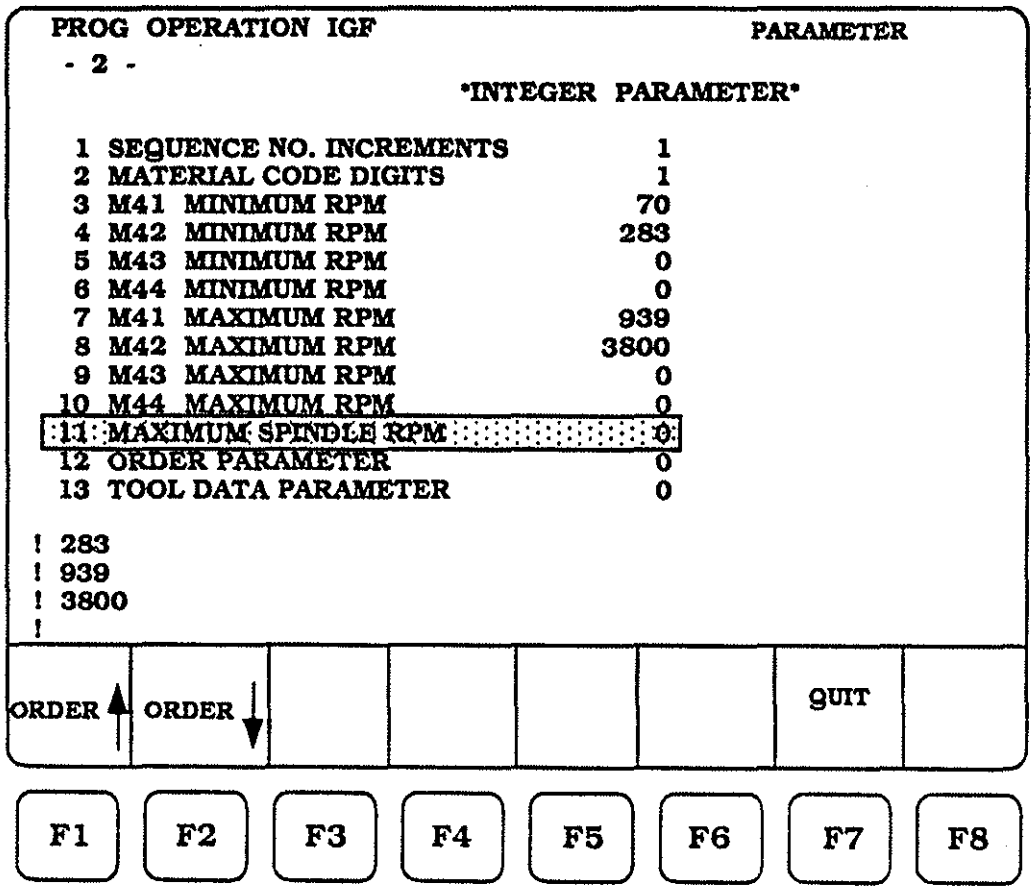
```
PROG OPERATION IGF                                    PARAMETER
 - 2 -
                              *INTEGER PARAMETER*

  1 SEQUENCE NO. INCREMENTS                    1
  2 MATERIAL CODE DIGITS                       1
  3 M41  MINIMUM RPM                          70
  4 M42  MINIMUM RPM                         283
  5 M43  MINIMUM RPM                           0
  6 M44  MINIMUM RPM                           0
  7 M41  MAXIMUM RPM                         939
  8 M42  MAXIMUM RPM                        3800
  9 M43  MAXIMUM RPM                           0
 10 M44  MAXIMUM RPM                           0
 11 MAXIMUM SPINDLE RPM                        0
 12 ORDER PARAMETER                            0
 13 TOOL DATA PARAMETER                        0

! 283
! 939
! 3800
!

ORDER ↑ | ORDER ↓ |  |  |  |  | QUIT |

F1  F2  F3  F4  F5  F6  F7  F8
```

Step Three

Spindle speed, on any CNC lathe, is limited by the maximum permissable speed of the power chuck. The effect of centrifugal force on its gripping force, unbalanced condition of the wprkpiece, and so on, can be constrained by programming a G50 code at the start of the program.

By entering a value into parameter number 11, any calculated RPM from the IGF graphic function will be compared with the stored parameter. If that calculated RPM is greater then the parameter RPM , the IGF graphic function will substitute the parameter RPM , or the lower RPM.

The IGF graphics function output will generate a G50 code to control the RPM.

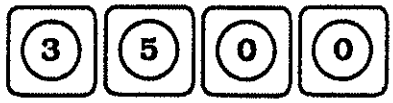


Step Three

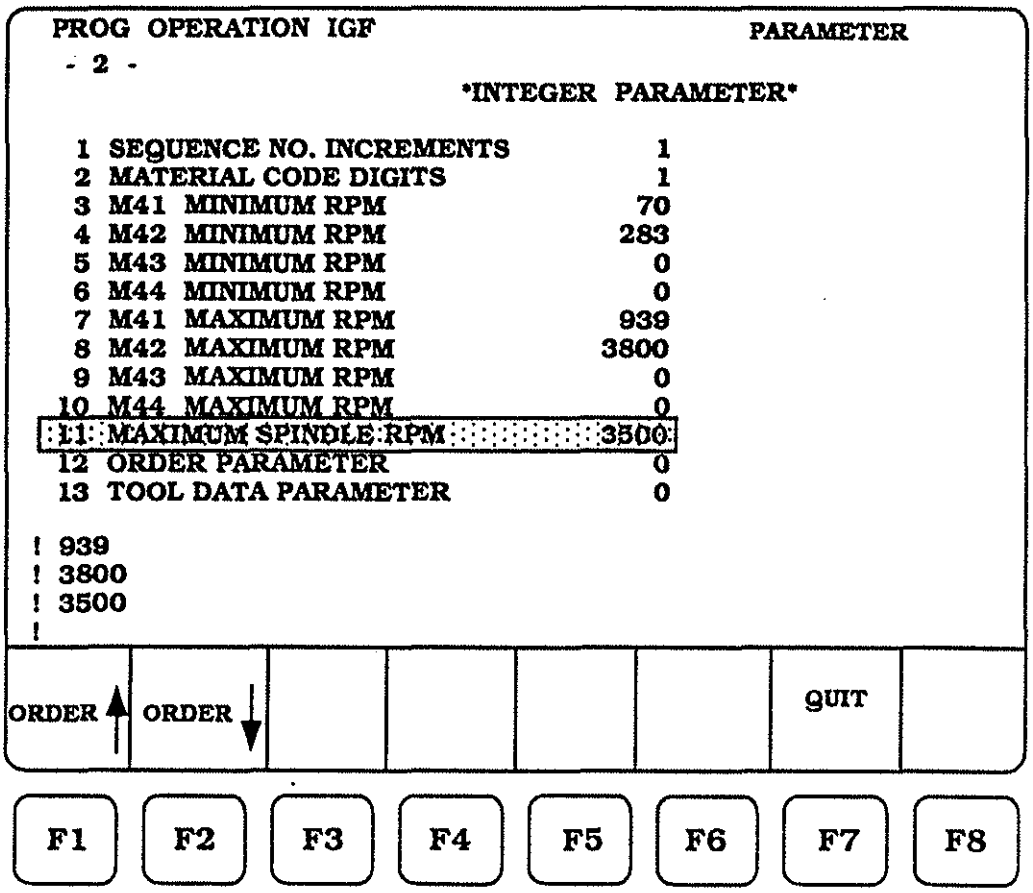
To enter the parameter values for number 11, the following steps must be taken :

Make sure the cursor highlight is located at parameter number 11, use the cursor keys up  **and down**  **to accomplish this task.**

Enter the values :

For parameter number 11 - press  **and** 

If entered correctly, the CRT screen should be as displayed below.



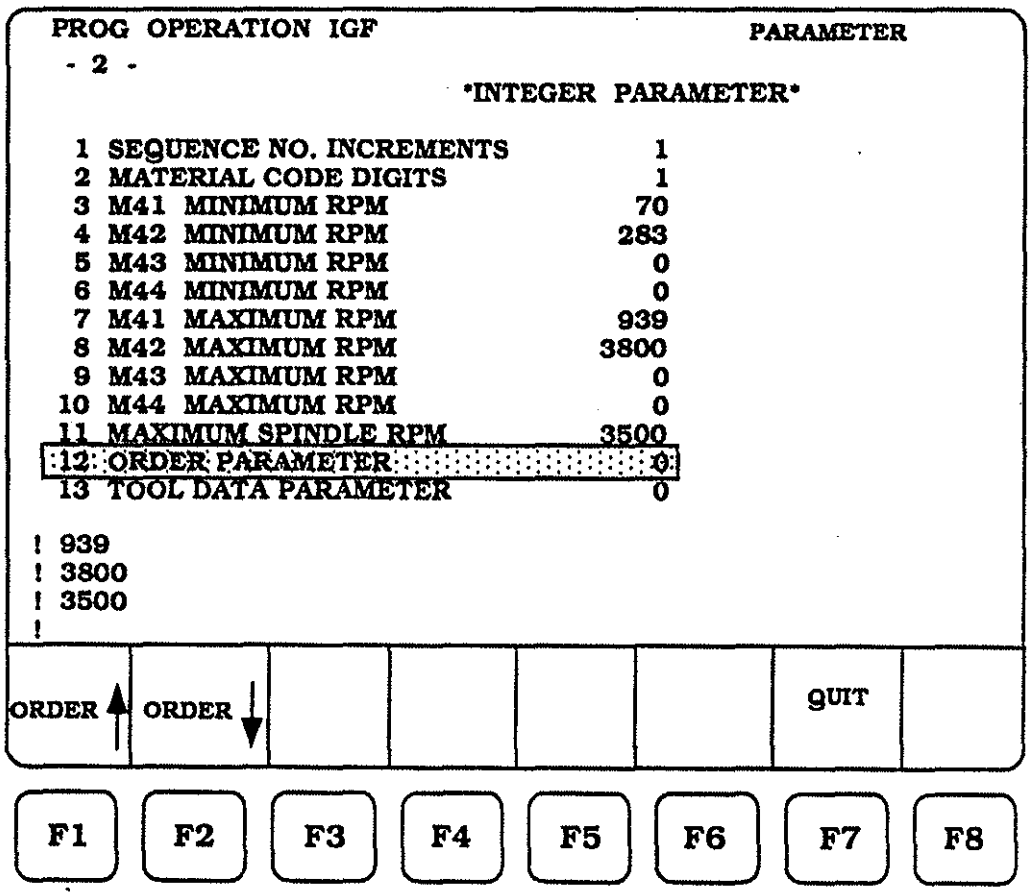
Step Three

As you will see, when we enter the discussion for Graphic Edit Process, there are several pages that will have limited data input. Setting of this parameter allows for " no " automatic advance, once the data has been input, or for automatic advance of the current page upon completion of data input.

If the parameter is entered as -1 then no automatic advance is available and the soft-keys F1 ORDER ↑ **and** F2 ORDER ↓ **must be used to change the pages.**

If. however, the value is input as being between 0 and 10 , automatic page advancement will occur. In fact the speed of the screen change will be controled by this parameter.

Input of 5 is 5/100 of a second



Step Three

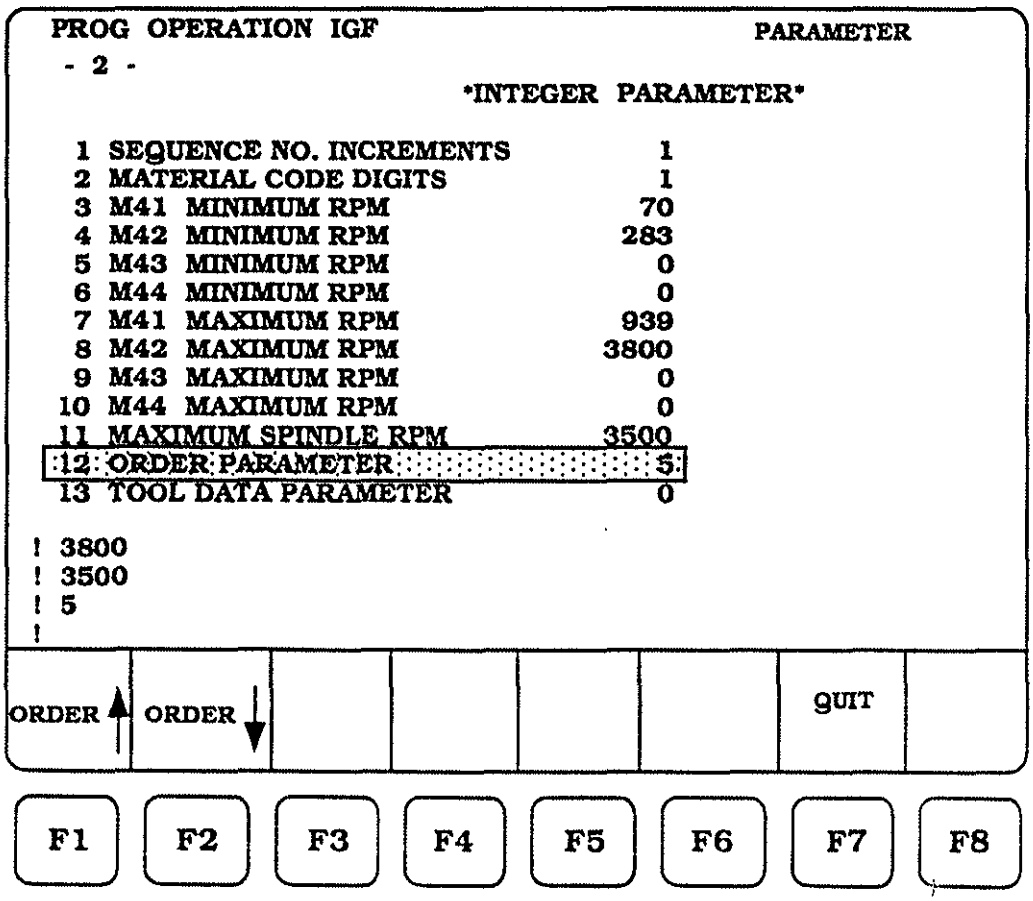
To enter the parameter values for number 12, the following steps must be taken :

Make sure the cursor highlight is located at parameter number 12, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

For parameter number 12 - press [5] and [WRITE]

If entered correctly, the CRT screen should be as displayed below.



Step Three

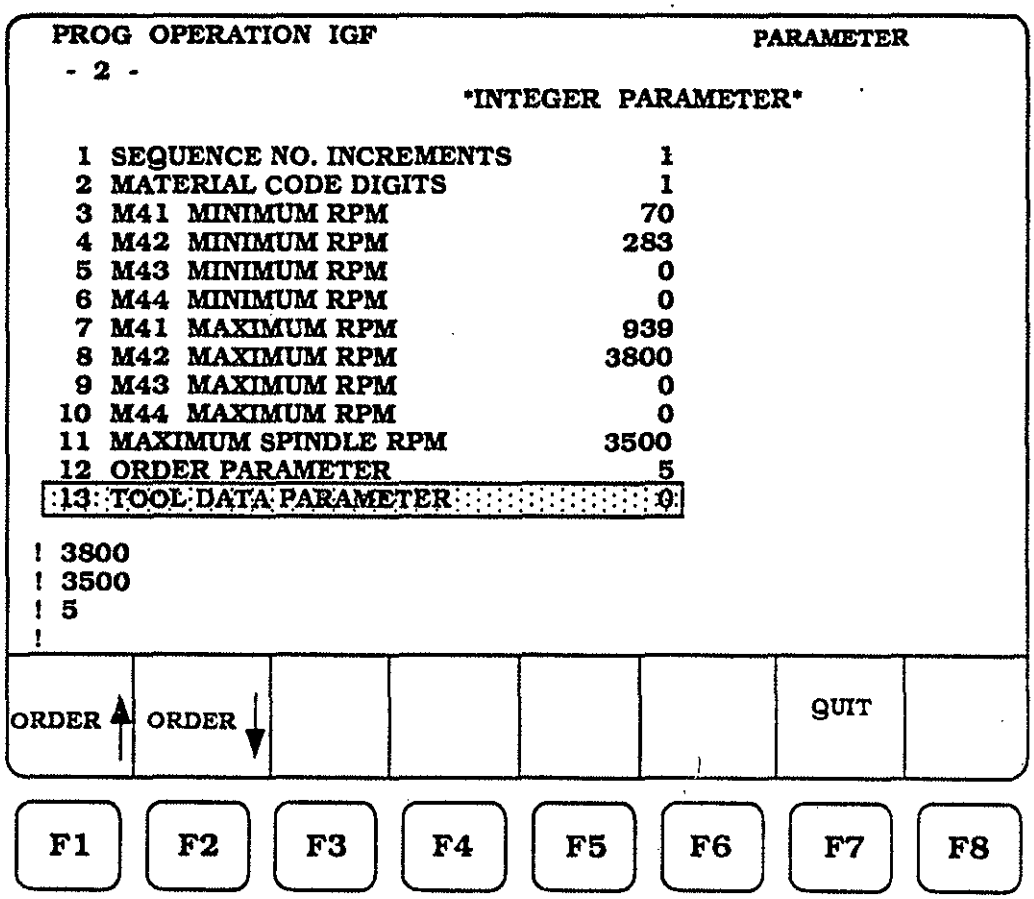
Prior to defining the part graphically and creating tool motion, in the Graphic Edit Process, you must define the cutting tools to the control. If you glance back to pages 8 - 15, we did a lot of work to capture tooling infromation for one specific cutting tool.

This parameter (number 13) allows us three choices as to how we wish to display the cutting tool information in the Graphic Edit Process. The three choices are, ZERO (0), ONE (1) , or TWO (2), their function is :

0 - If this parameter is chosen, the identified tooling information is used for the graphic program construction but not displayed for your review.

1 - If this parameter is chosen, the identified tooling information is used for the graphic program and displayed exactly the way the way it was input and stored using the TOOL DATA TABLE section (see page 15 for an example).

2 - If this parameter is chosen, the identified tooling information is used for the graphic program and shows the same display as parameter number 1, with one big difference. The data for the cutting tool is left blank and must now be input before you can continue with the graphics program.



Step Three

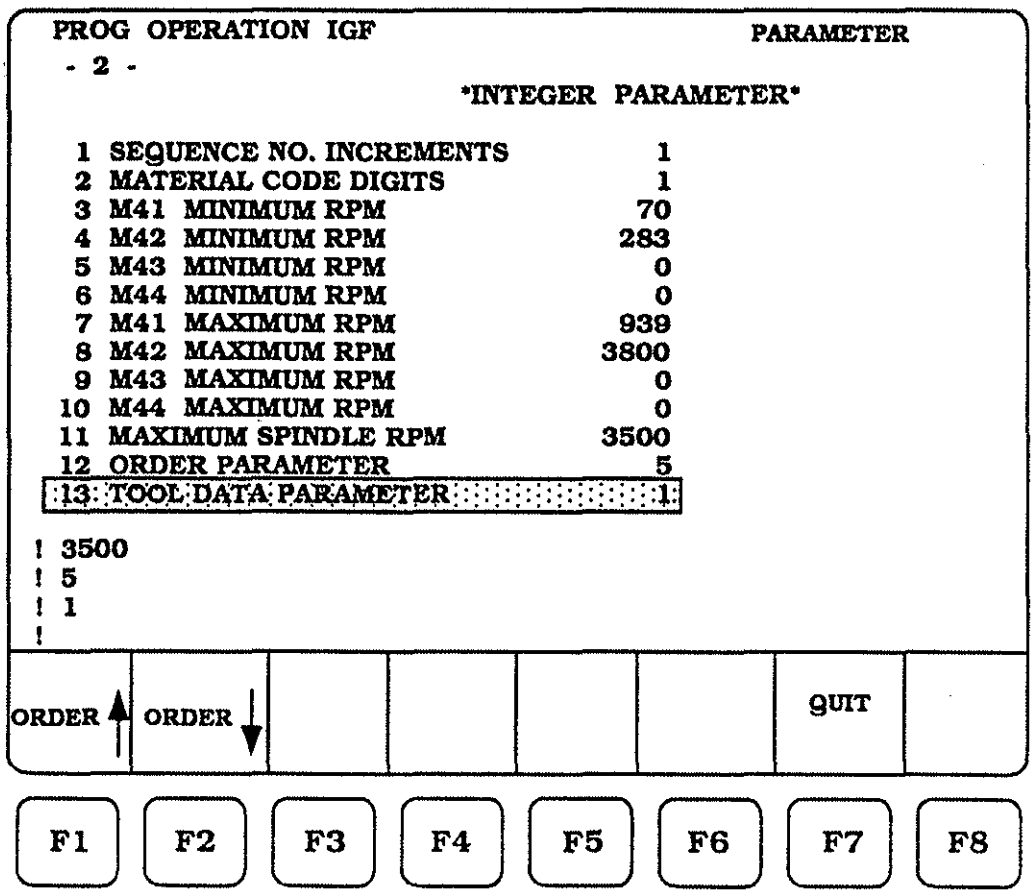
To enter the parameter values for number 13, the following steps must be taken :

Make sure the cursor highlight is located at parameter number 13, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

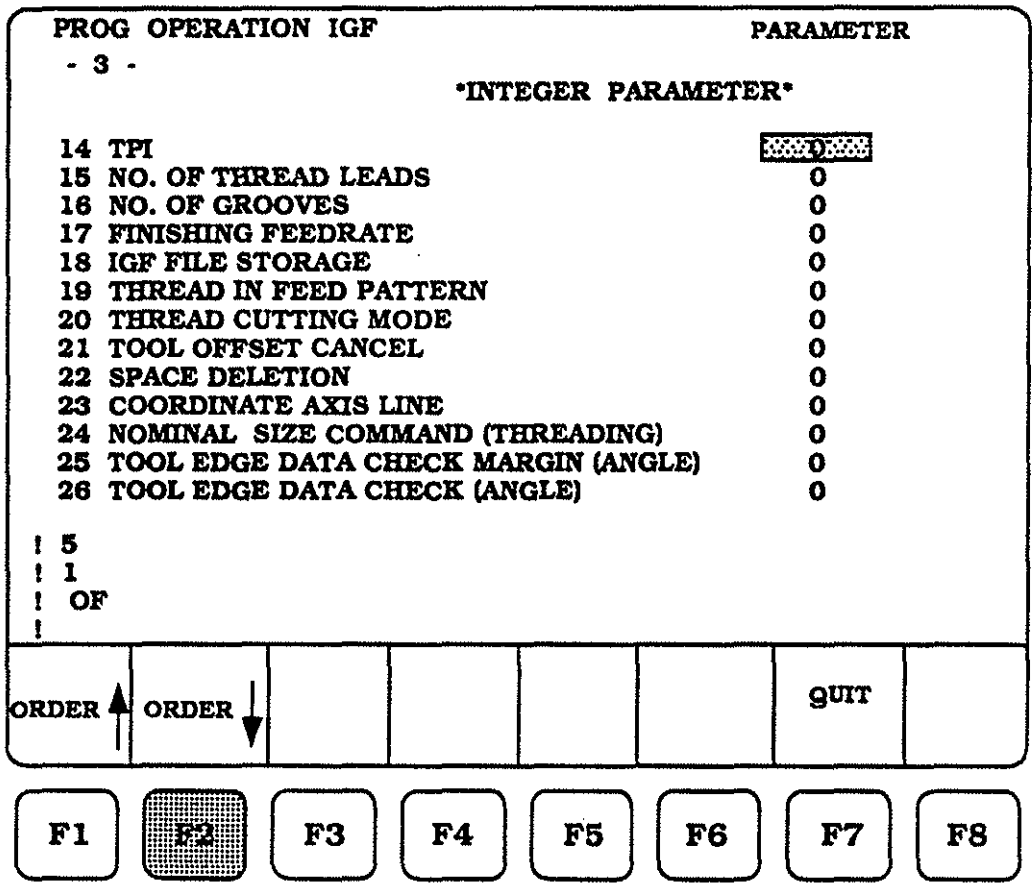
For parameter number 13 - press [1] and [WRITE]

If entered correctly, the CRT screen should be as displayed below.



Step Four

At step three we defined values for the *INTEGER PARAMETER* page. To advance the control to the next screen (step four), we must press [F2] ORDER , , the CRT screen should be as displayed below.



The third parameter page (INTEGER PARAMETER) contains thirteen parameter lines.

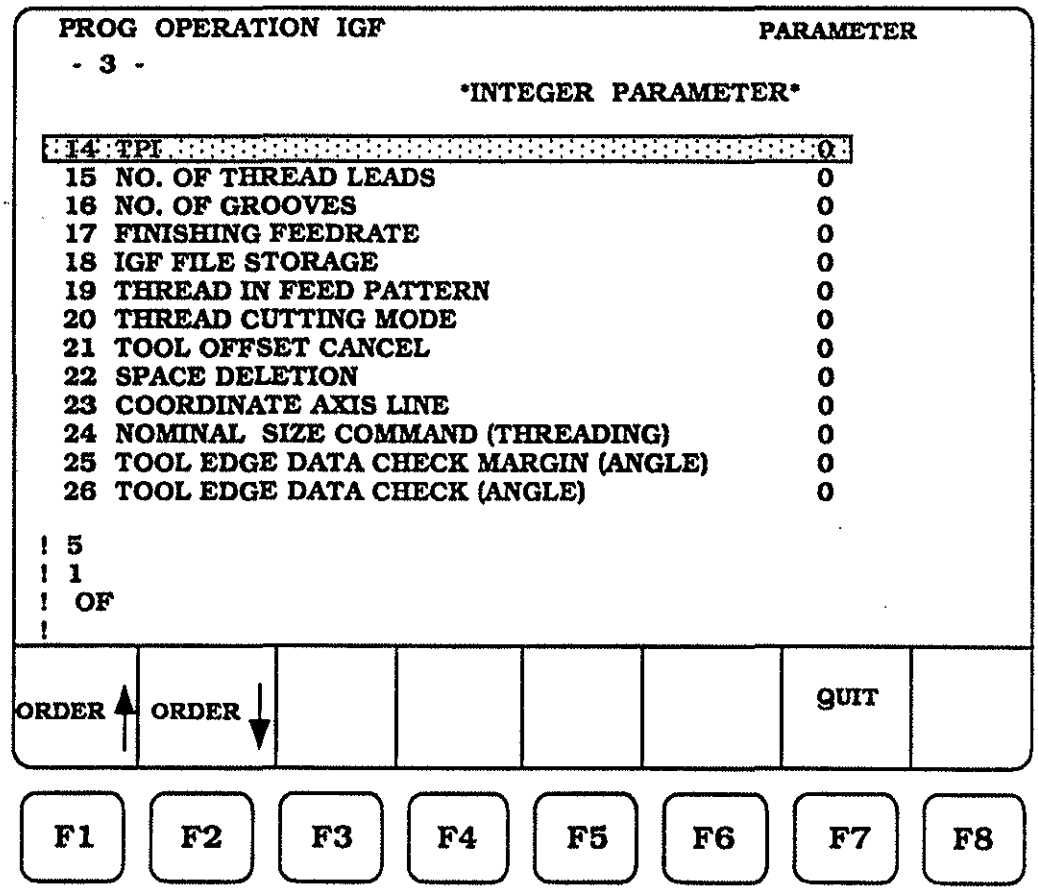
Starting on page 96 and continuning for the next several pages, each parameter will receive a brief description as to it's function and how to enter it into the control.

Step Four

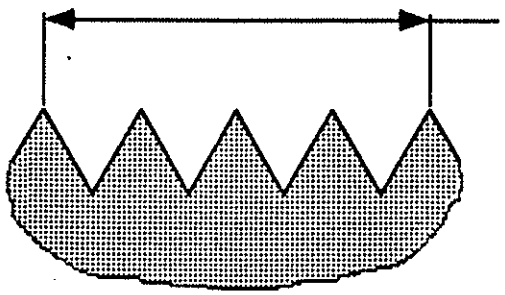
As you will remember, from using the threading fixed cycles (G71 AND G72), the lead or pitch can be input using the just the " F " variable input, which is equal to (1 / number of threads per inch) or the same value could be specified by using a combination of " F " and " J " variables. Where " F " has a value of one and " J " is equal to the number of threads per inch.

In the latter case of " F " and " J " we know the control will do the dividing for us or it will calculated the lead.

Parameter number 1 allows the setting of the " J " value to be a constant, and makes good sense if all of your threads per inch are the same.



EXAMPLE :



1.00 - four threads per inch
parameter input is 4

Step Four

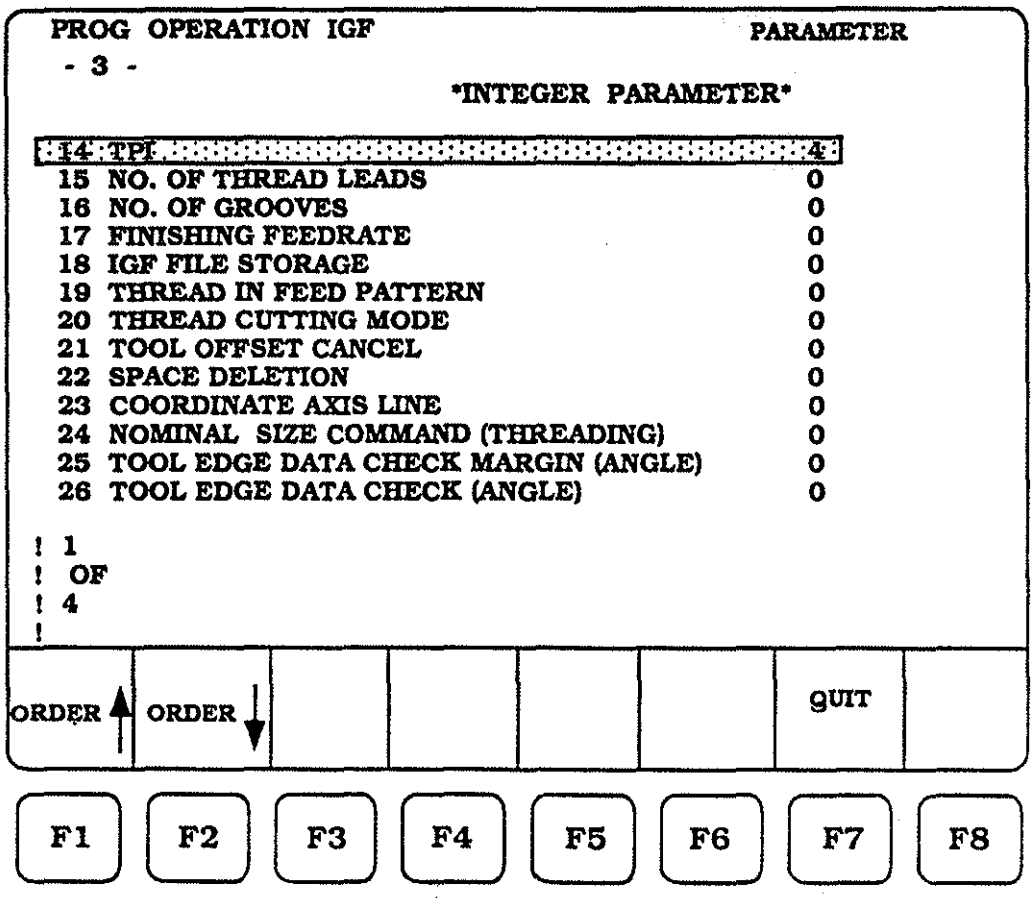
To enter the parameter value for number 14, the following steps must be taken :

Make sure the cursor highlight is at the top of the column, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

For parameter number 14 - press [4] and [WRITE]

If entered correctly, the CRT screen should be as displayed below.



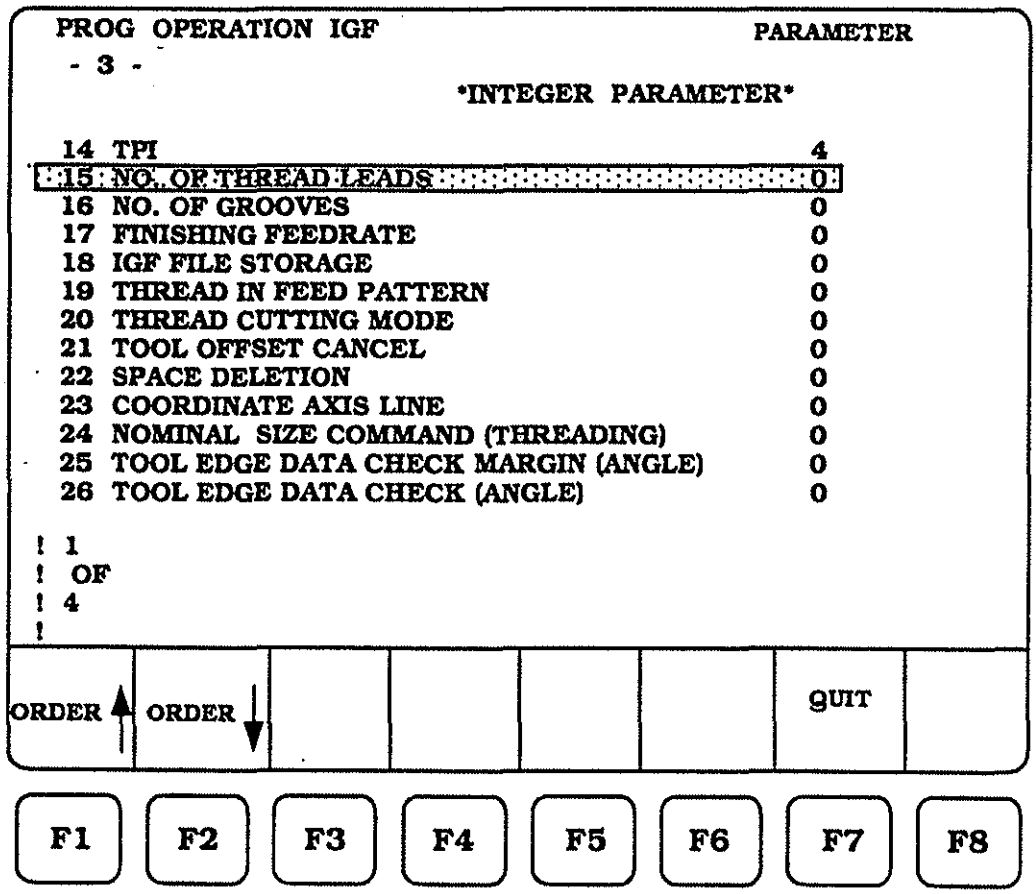
Step Four

From time to time it is sometimes necessary to machine multiple start threads. These will be threads that have all the same thread lead, root diameter, etc.

Parameter number 15 allows us to set how many multiple thread starts any particular job needs.

As you will see in the graphics section, the threading tool will position to the start point for the first thread and machine that thread to finish depth. The graphics will now show the tool backing up or moving to the right to position itself for the next set of threading passes. It will continue to do this set of motion until the number of multiple starts called for in parameter number 15 is satisfied.

The amount or distance that the tool will back up is exactly equal to the current registered lead or thread pitch.



Step Four

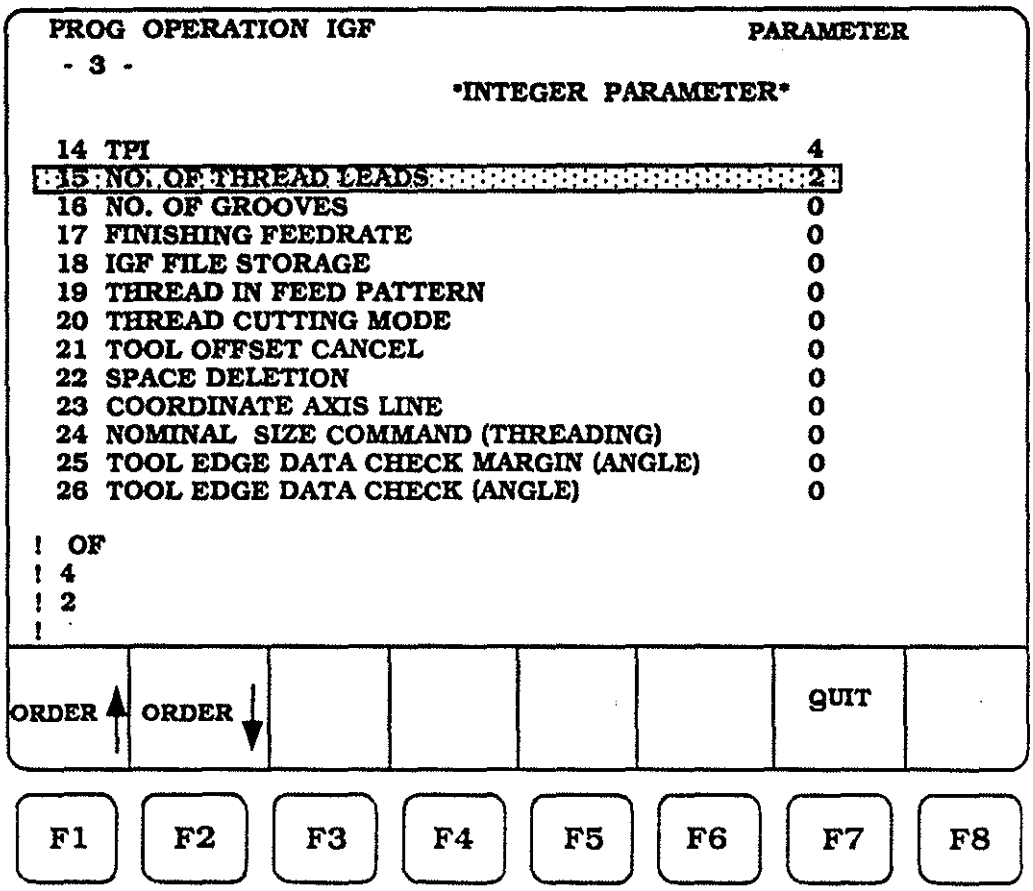
To enter the parameter value for number 15, the following steps must be taken :

Make sure the cursor highlight is located at parameter number 15, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

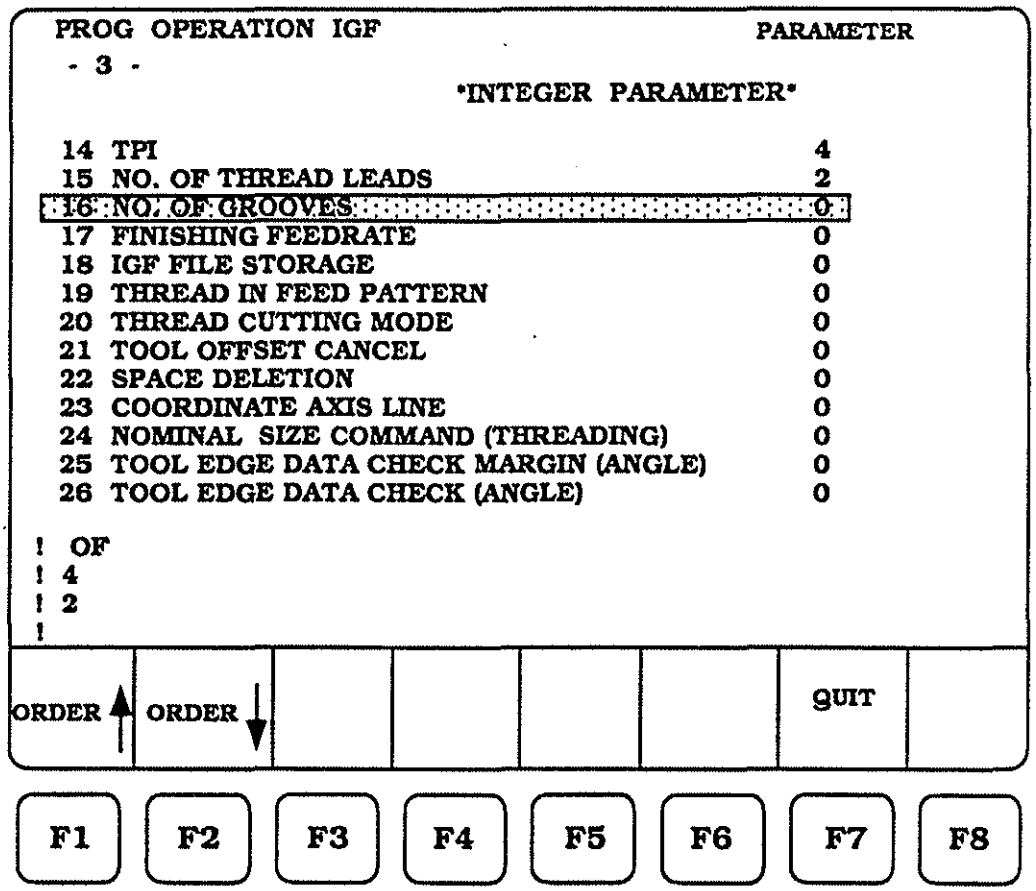
For parameter number 15 - press [2] and [WRITE]

If entered correctly, the CRT screen should be as displayed below.

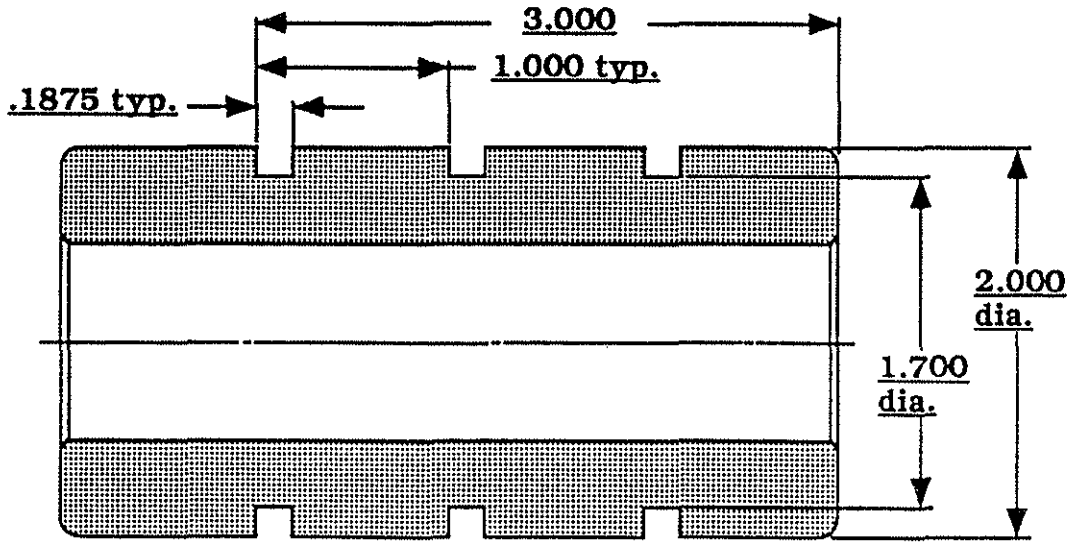


Step Four

This parameter (number 16) provides a constant for any piece part that has multiple grooves (I/D or O/D) , that are all the same size for depth and are equally spaced one from another. The parameter input is to tell the control how many of these grooves there are total.



EXAMPLE : The parameter number 16 value, for this example would be 3.



Step Four

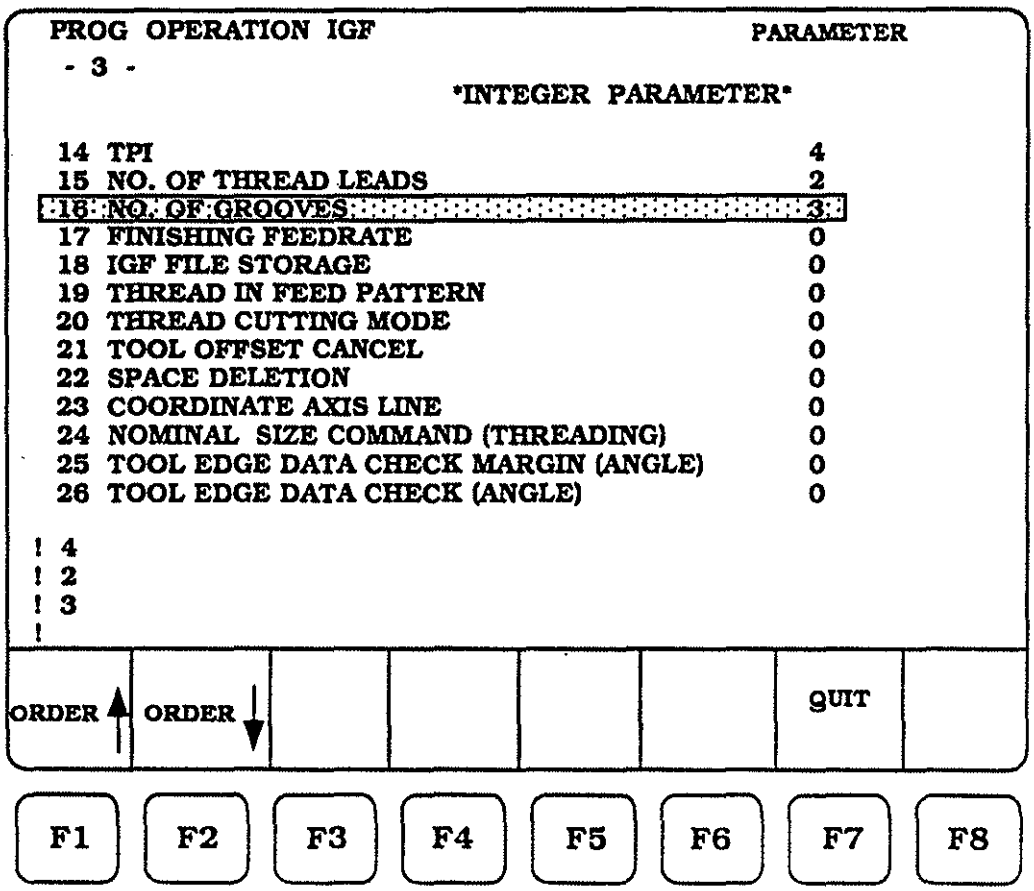
To enter the parameter value for number 16, the following steps must be taken :

Make sure the cursor highlight is located at parameter number 16, use the cursor keys up [↑] **and down** [↓] **to accomplish this task.**

Enter the values :

For parameter number 16 - press [3] **and** [WRITE]

If entered correctly, the CRT screen should be as displayed below.



Step Four

If you remember, back in the MATERIAL DATA section we established finish feedrates for general machining (page 33) and specific feedrates for grooving (page 48). Each consisted of four finish feedrates and they looked like this :

Page 33

NO. 1= SS303 *FINISHING*

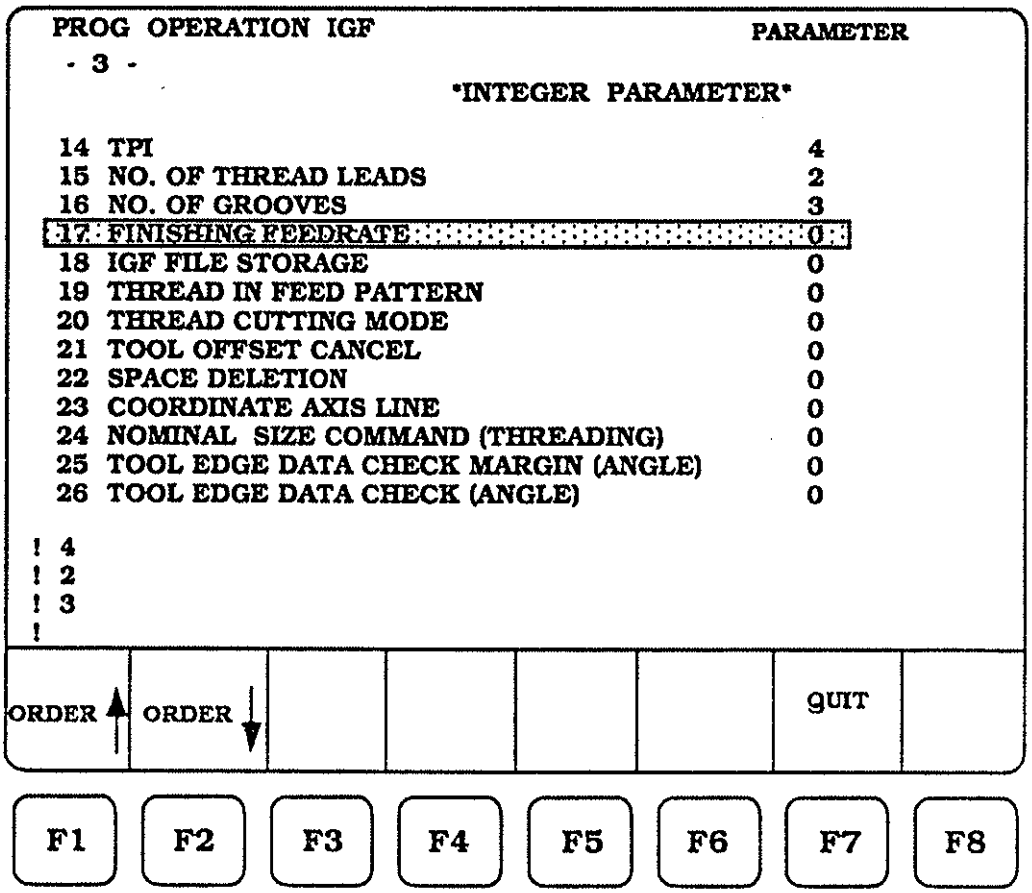
CUTTING SPEED		VF=	700
FINISHING STOCK X-AXIS		LX=	100
FINISHING STOCK Z-AXIS		LZ=	20
FINISH ▽	(ROUGH) FEEDRATE	F1=	70
FINISH ▽ ▽	(SEMI-FINISH) FEEDRATE	F2=	40
FINISH ▽ ▽ ▽	(FINISH) FEEDRATE	F3=	35
FINISH ▽ ▽ ▽ ▽	(FINE FINISH) FEEDRATE	F4=	20

Page 48

NO. 1= SS303 *GROOVE FINISHING*

CUTTING SPEED		VX=	330
FINISHING STOCK X-AXIS		LX=	80
FINISHING STOCK Z-AXIS		LZ=	40
FINISH ▽	(ROUGH) FEEDRATE	F1=	120
FINISH ▽ ▽	(SEMI-FINISH) FEEDRATE	F2=	80
FINISH ▽ ▽ ▽	(FINISH) FEEDRATE	F3=	50
FINISH ▽ ▽ ▽ ▽	(FINE FINISH) FEEDRATE	F4=	30

If we now select and input a parameter value from (1 - 4) , which match up with feedrates (F1 - F4) , the control will use that feedrate, when generating a output program from the IGF feature for the finish cutting.



Step Four

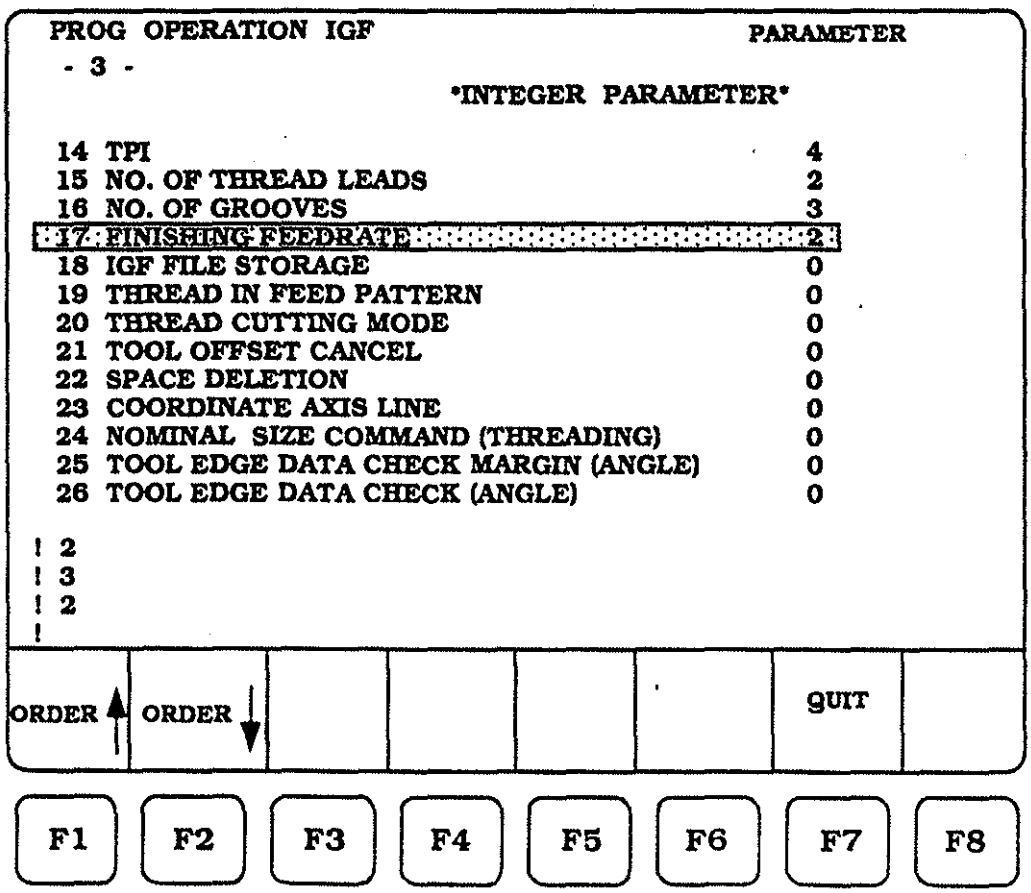
To enter the parameter value for number 17, the following steps must be taken :

Make sure the cursor highlight is located at parameter number 17, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

For parameter number 17 - press [2] and [WRITE]

If entered correctly, the CRT screen should be as displayed below.



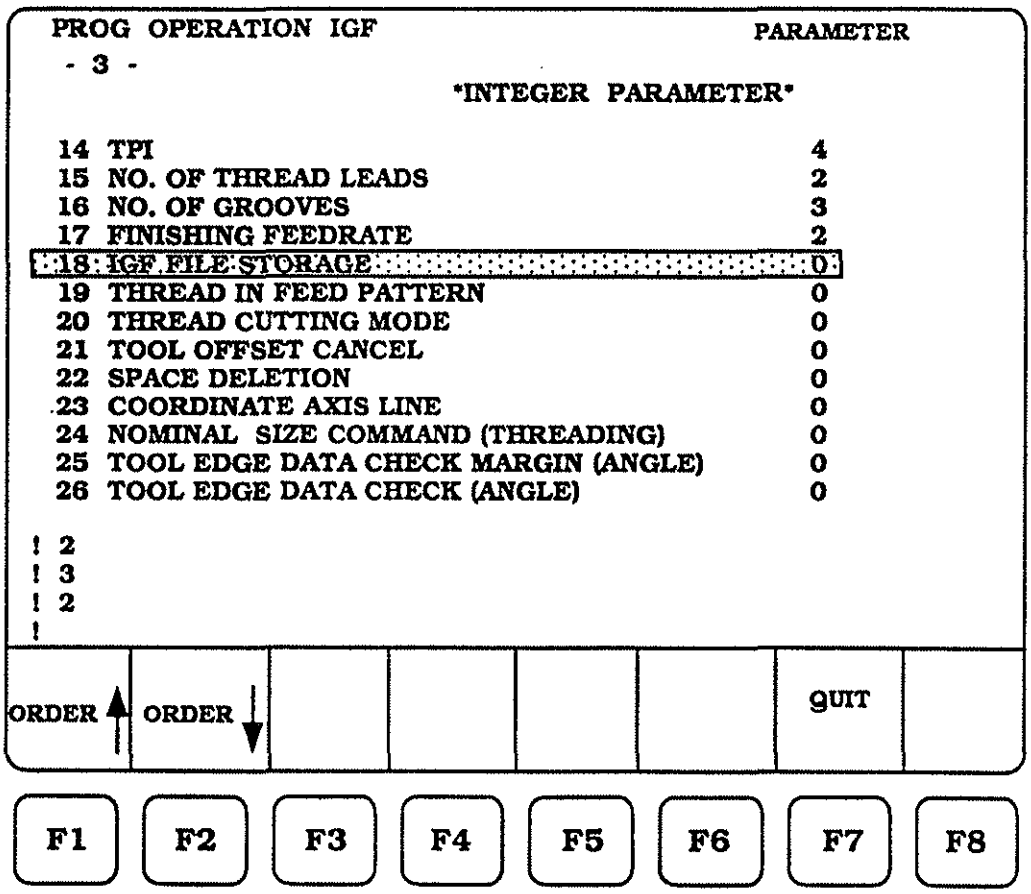
Step Four

This parameter (number 18) allows us to create a IGF file, make all the necessary steps within IGF and view our program thru to finish. It (the IGF) can now be forced to automaticaly save the IGF session, or to ask if we wish to save the program before leaving the IGF session.

This save, no save condition is controlled thru parameter number 18, using one of two parameters.

A parameter input of 0 (zero) will force the control to ask if we wish to save the session (Y/N) Yes or No.

A parameter input of 1 (one) directs the control to automaticaly save the session.



Step Four

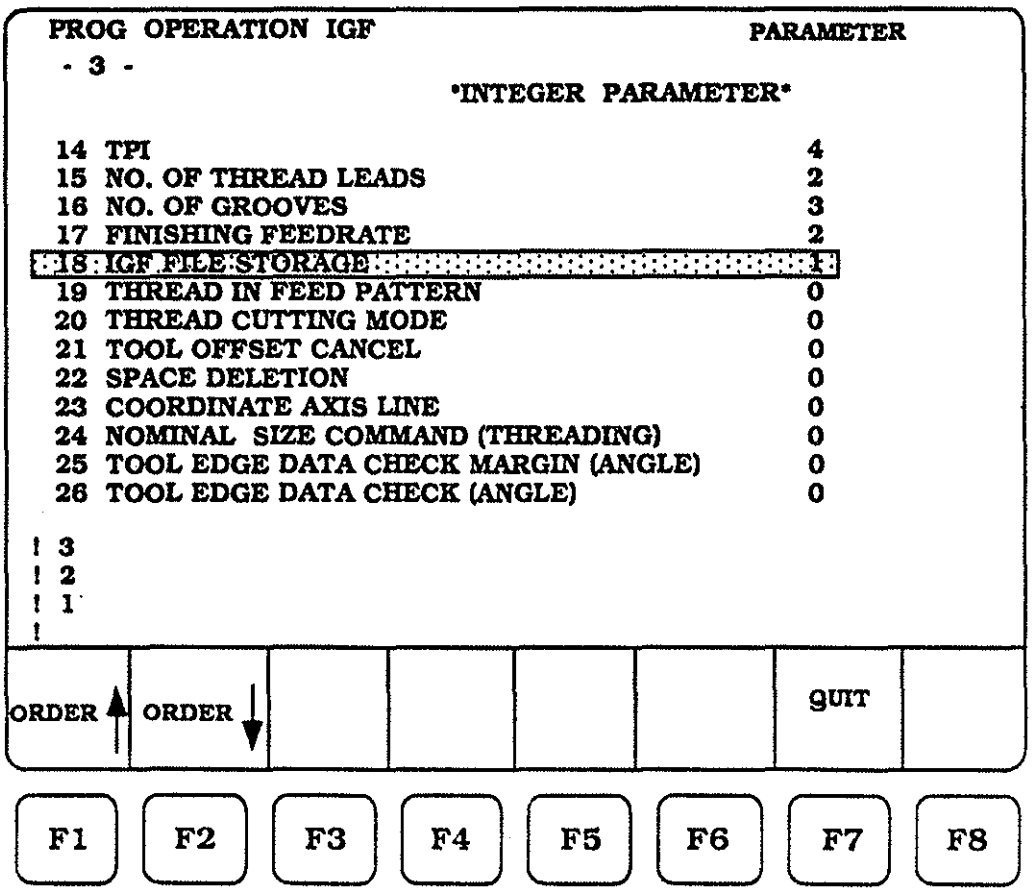
To enter the parameter value for number 18, the following steps must be taken :

Make sure the cursor highlight is located at parameter number 18, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

For parameter number 18 - press [1] and [WRITE]

If entered correctly, the CRT screen should be as displayed below.



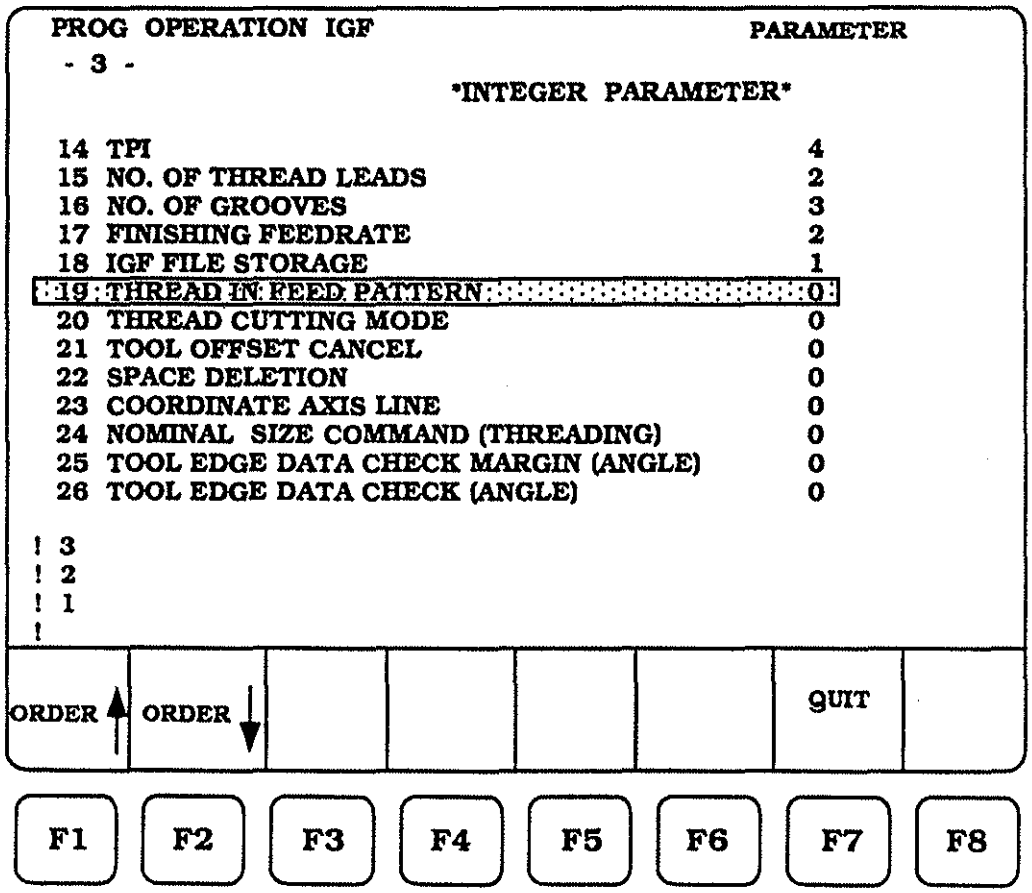
Step Four

Parameter number 19 is used to establish depth of cut, for each pass, for the threading routines. Depth is based on the " D " variable assigned within the IGF graphics section. The IGF output, from this parameter will be a " M " code : M73 , M74 , or M75

73 - This input will yield an output of M73 for depth of cut.
The depth of cut will be calculated as D/2, D/4, D/8, D/8, Etc...

74 - This input will yield an output of M74 for depth of cut.
The depth of cut will be at a constant of " D ".

75 - This input will yield an output of M75 for depth of cut.
The depth of cut will be calculated as $\sqrt{2D}$, $\sqrt{3D}$, $\sqrt{4D}$, Etc...



Step Four

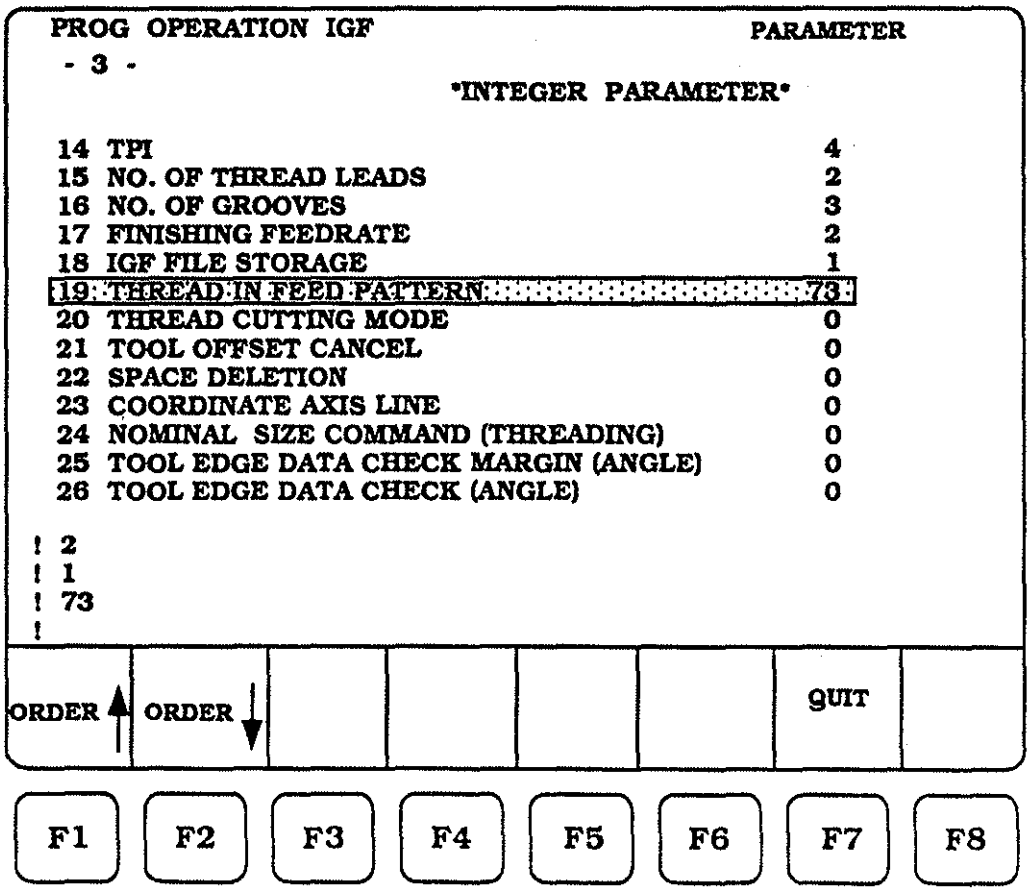
To enter the parameter values for number 19, the following steps must be taken :

Make sure the cursor highlight is located at parameter number 19, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

For parameter number 19 - press [7] [3] and [WRITE]

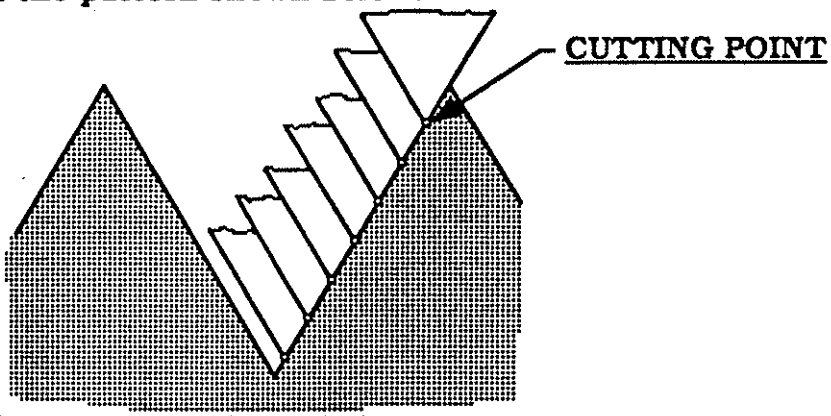
If entered correctly, the CRT screen should be as displayed below.



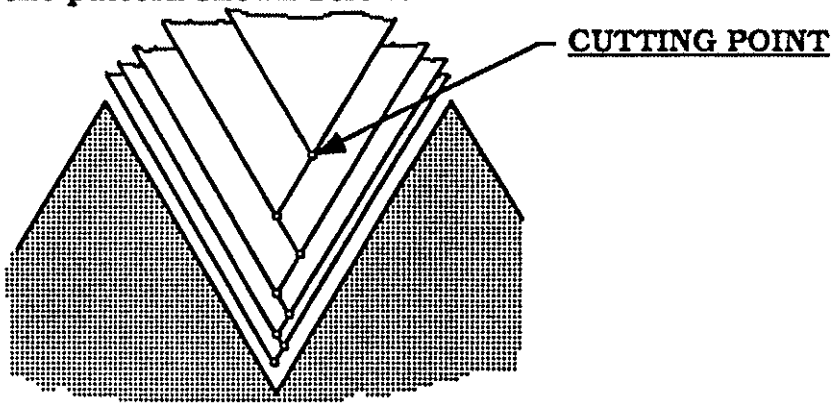
Step Four

Parameter number 20 is used to establish the infeed cutting pattern, for the threading routines. The IGF output, from this parameter will be a " M " code: M32 or M33.

32 - Will yield the pattern shown below.



33 - Will yield the pattern shown below.



PROG OPERATION IGF PARAMETER

- 3 -

INTEGER PARAMETER

14	TPI	4
15	NO. OF THREAD LEADS	2
16	NO. OF GROOVES	3
17	FINISHING FEEDRATE	2
18	IGF FILE STORAGE	1
19	THREAD IN FEED PATTERN	73
20	THREAD CUTTING MODE	0
21	TOOL OFFSET CANCEL	0
22	SPACE DELETION	0
23	COORDINATE AXIS LINE	0
24	NOMINAL SIZE COMMAND (THREADING)	0
25	TOOL EDGE DATA CHECK MARGIN (ANGLE)	0
26	TOOL EDGE DATA CHECK (ANGLE)	0

! 2
! 1
! 73
!

ORDER ↑ | ORDER ↓ | | | | | QUIT |

F1 F2 F3 F4 F5 F6 F7 F8

Step Four

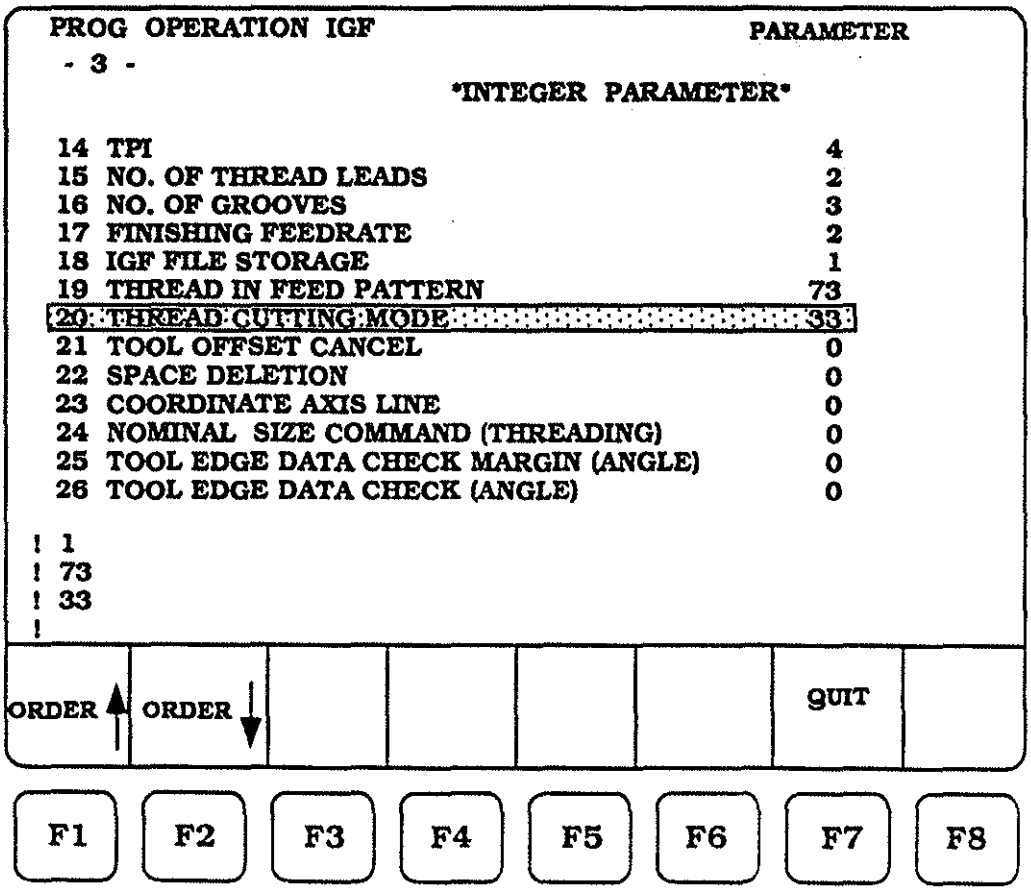
To enter the parameter values for number 20, the following steps must be taken :

Make sure the cursor highlight is located at parameter number 20, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

For parameter number 20 - press [3] [3] and [WRITE]

If entered correctly, the CRT screen should be as displayed below.



Step Four

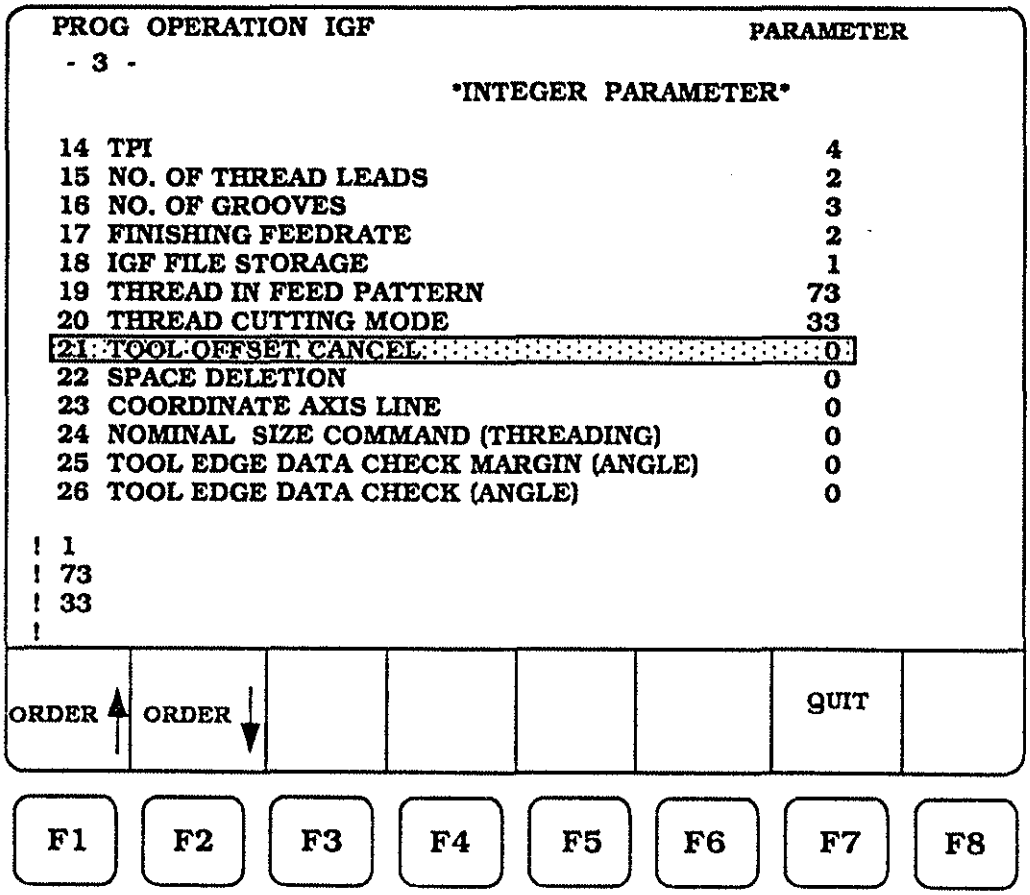
In our normal (longhand) method of programming, we normally do not program a tool offset cancel upon completion of a tool usage, just a rapid move to the tool index position. Parameter number 21 allows to keep this programming style, or to have the IGF output a current cutting tool offset cancel at the rapid move to the index position.

With parameter number 21 set at " 0 " (zero) :

```
N0001 G00 X20 Z20
N0002 G50 S3500
N0010 G97 S429 M41 M03 M08
N0011 G00 X3.6 Z0.3 T070707
        ↑
   PART PROGRAM
        ↓
N0013 M05 M09
N0014 G00 X20 Z20 T0700
N0015 M02
```

With parameter number 21 set at " 1 " (one) :

```
N0001 G00 X20 Z20
N0002 G50 S3500
N0010 G97 S429 M41 M03 M08
N0011 G00 X3.6 Z0.3 T070707
        ↑
   PART PROGRAM
        ↓
N0013 M05 M09
N0014 G00 X20 Z20
N0015 M02
```



Step Four

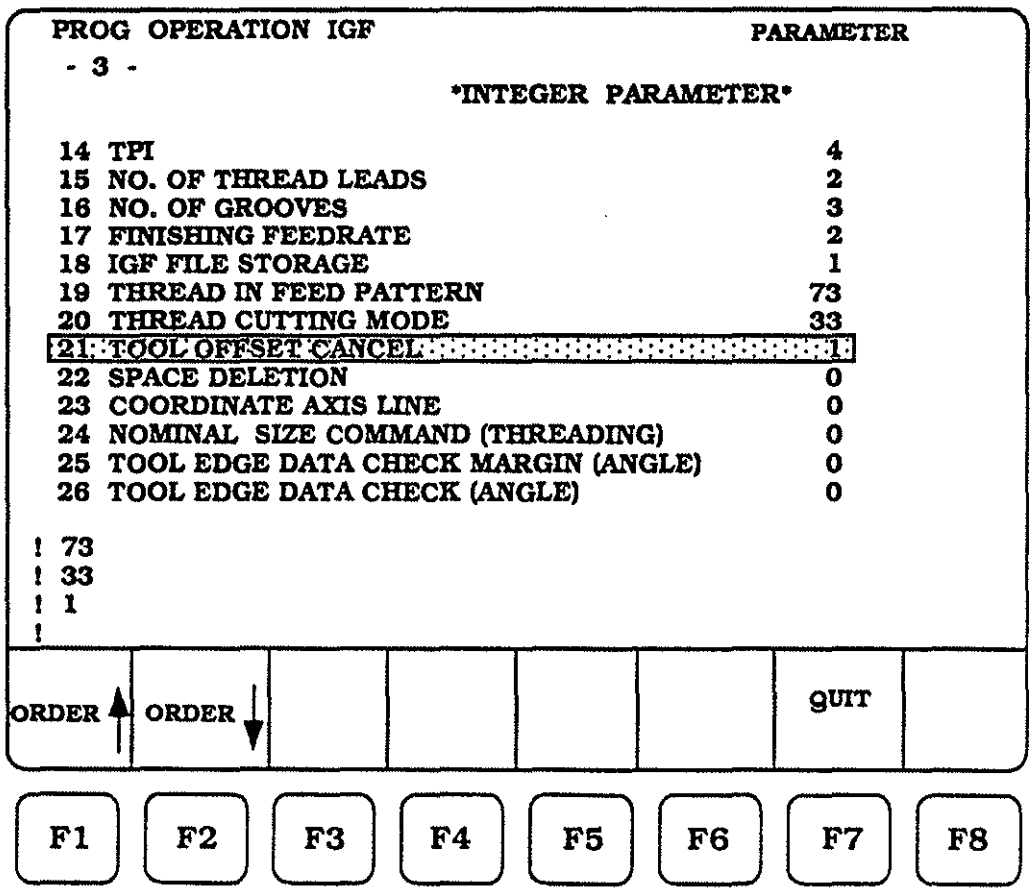
To enter the parameter value for number 21, the following steps must be taken :

Make sure the cursor highlight is located at parameter number 21, use the cursor keys up  **and down**  **to accomplish this task.**

Enter the values :

For parameter number 21 - press  **and** 

If entered correctly, the CRT screen should be as displayed below.



Step Four

Output format can be controlled with parameter number 22. The program can be displayed with wide spaces between words using a value of " 0 " (zero), with no spaces between words using a value of " 1 " (one), or with one space between words using a value of " 2 " (two).

With parameter 22 set at " 0 " (zero) :

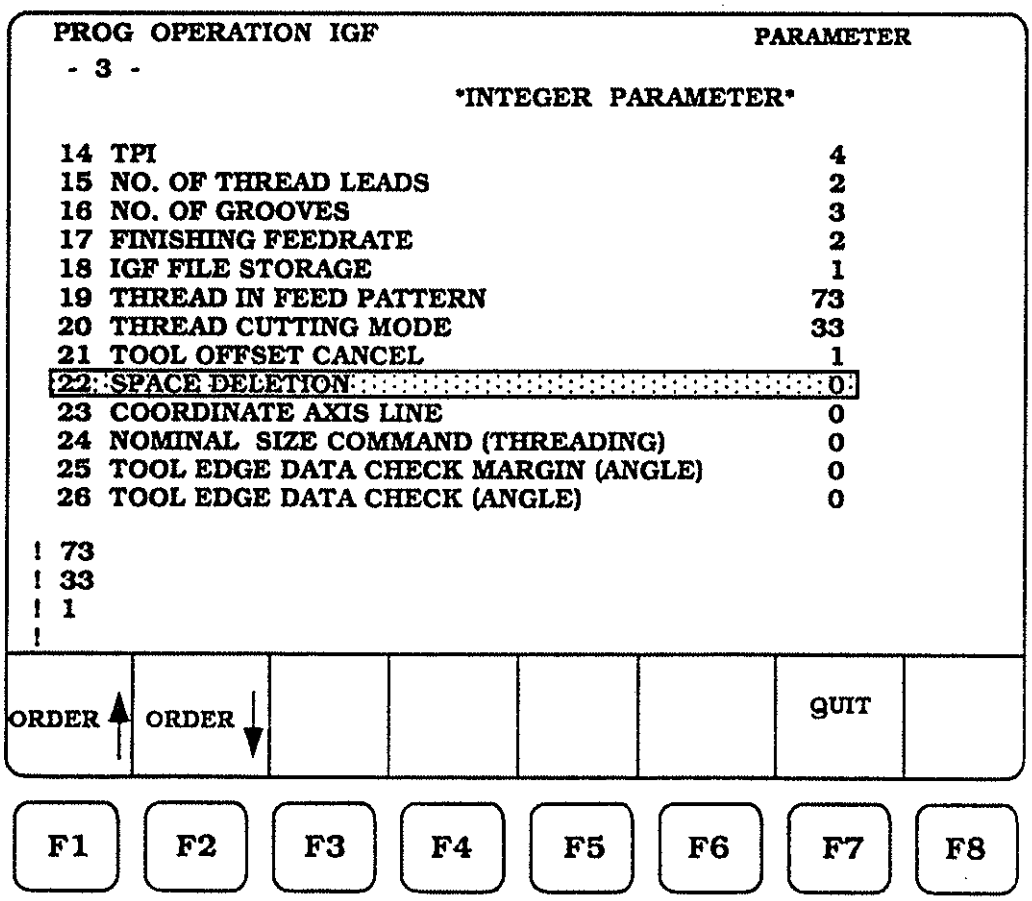
```
N0001 G00 X  20    Z  20
N0002 G50                    S3500
N0010 G97                          S 429 M41 M03 M08
N0011 G00 X  3.6   Z  0.3          T070707
```

With parameter 22 set at " 1 " (one) :

```
N0001G00X20Z20
N0002G50S3500
N0010G97S429M41M03M08
N0011G00X3.6Z0.3T070707
```

With parameter 22 set at " 2 " (two) :

```
N0001 G00 X20 Z20
N0002 G50 S3500
N0010 G97 S429 M41 M03 M08
N0011 G00 X3.6 Z0.3 T0707078
```



Step Four

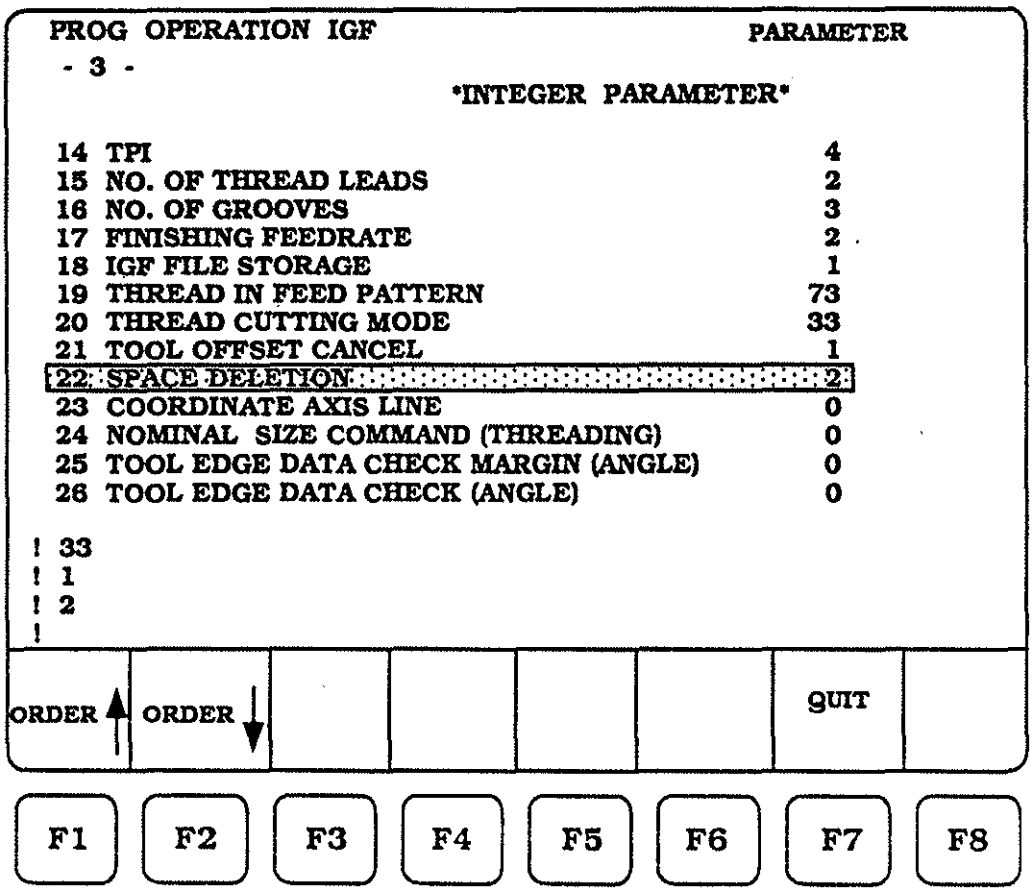
To enter the parameter value for number 22, the following steps must be taken :

Make sure the cursor highlight is located at parameter number 22, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

For parameter number 22 - press [2] and [WRITE]

If entered correctly, the CRT screen should be as displayed below.



Step Four

Within IGF are several graphics pages, each of these pages show the part and the " X " and " Z " axis. This parameter (number 23) allows you to fix the coordinate line display for the " X " and " Z " axis to one of seven choices.

With parameter 23 set at " 0 " (zero)
The coordinate lines will be solid. _____

With parameter 23 set at " 1 " (one)
The coordinate lines will be dotted. _ _ _ _ _ _ _ _ _

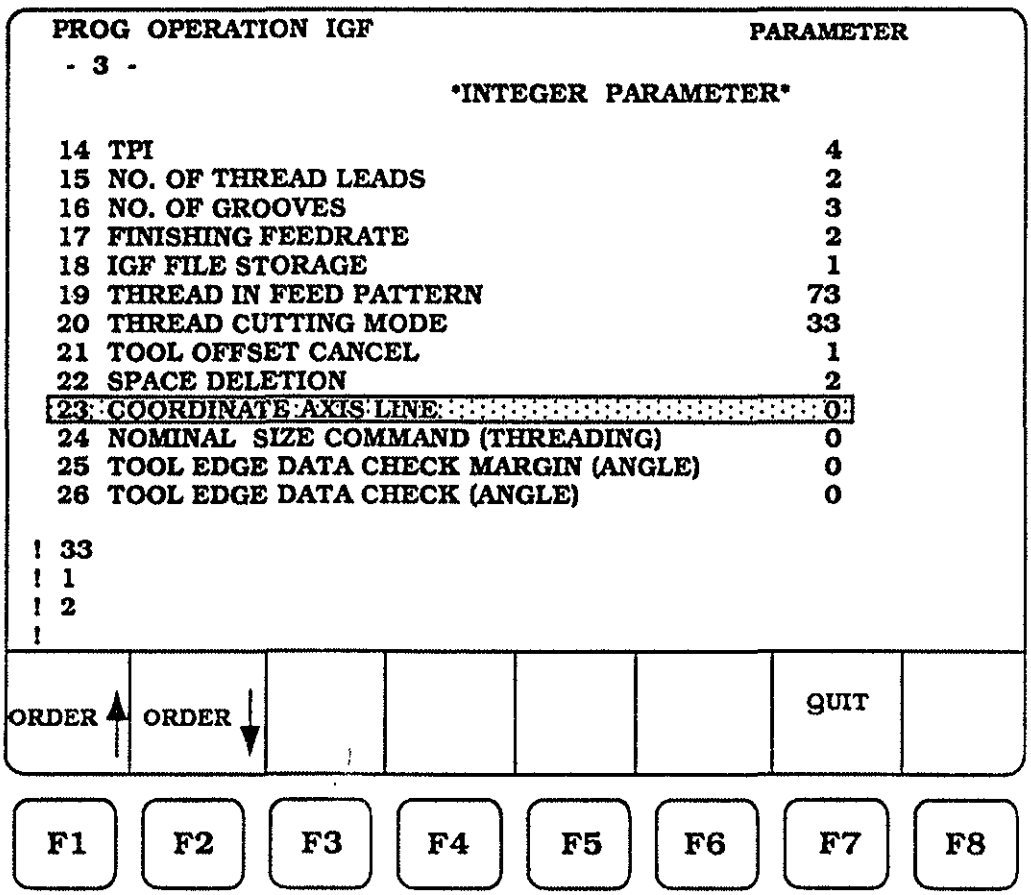
With parameter 23 set at " 2 " (two) :
The coordinate lines will be short dashes. _ _ _ _ _ _ _

With parameter 23 set at " 3 " (three) :
The coordinate lines will be long dashes. _ _ _ _ _ _ _

With parameter 23 set at " 4 " (four) :
The coordinate lines will be alternate long and short dashes. _ _ _ . _ _ _ . _ _ _

With parameter 23 set at " 5 " (five) :
The coordinate lines will be alternate one long and two short dashes. _ _ _ _ . _ .

With parameter 23 set at " 6 " (six)
There will be no coordinate lines displayed.



Step Four

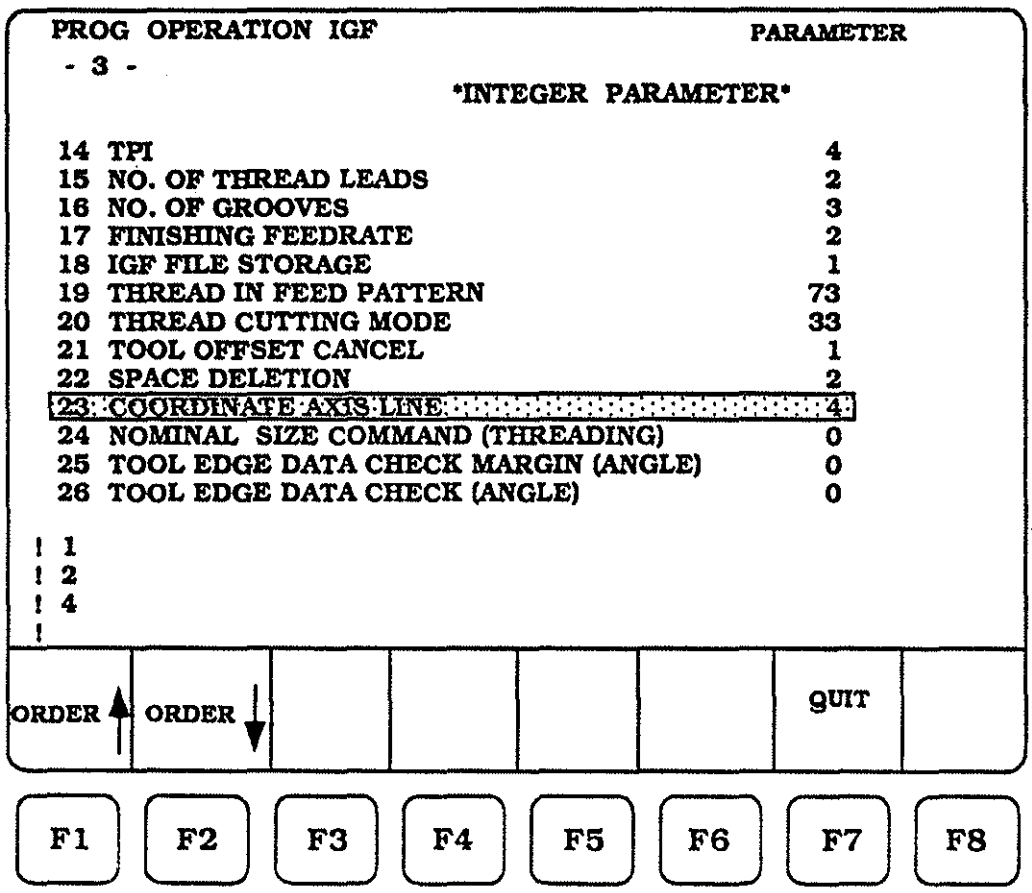
To enter the parameter value for number 23, the following steps must be taken :

Make sure the cursor highlight is located at parameter number 23, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

For parameter number 23 - press [4] and [WRITE]

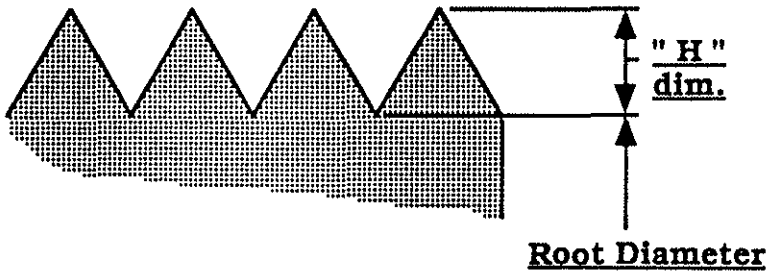
If entered correctly, the CRT screen should be as displayed below.



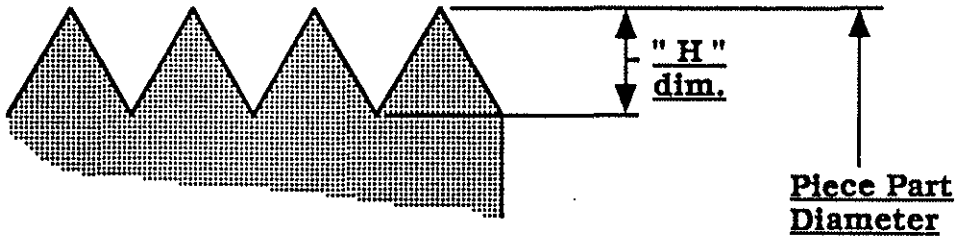
Step Four

When threading with IGF ,the system needs to know if the thread height " H " should be calculated from the piece part diameter or from the thread root diameter. Parameter number 24 allows a choice of " 0 " (zero) for root diameter and " 1 " (one) for piece part diameter.

With parameter 24 set at " 0 " (zero) :



With parameter 24 set at " 1 " (one) :



PROG OPERATION IGF PARAMETER

- 3 -

INTEGER PARAMETER

14	TPI	4
15	NO. OF THREAD LEADS	2
16	NO. OF GROOVES	3
17	FINISHING FEEDRATE	2
18	IGF FILE STORAGE	1
19	THREAD IN FEED PATTERN	73
20	THREAD CUTTING MODE	33
21	TOOL OFFSET CANCEL	1
22	SPACE DELETION	2
23	COORDINATE AXIS LINE	4
24	NOMINAL SIZE COMMAND (THREADING)	0
25	TOOL EDGE DATA CHECK MARGIN (ANGLE)	0
26	TOOL EDGE DATA CHECK (ANGLE)	0

! 1
! 2
! 4
!

ORDER ▲ | ORDER ▼ | | | | | QUIT | |

F1 F2 F3 F4 F5 F6 F7 F8

Step Four

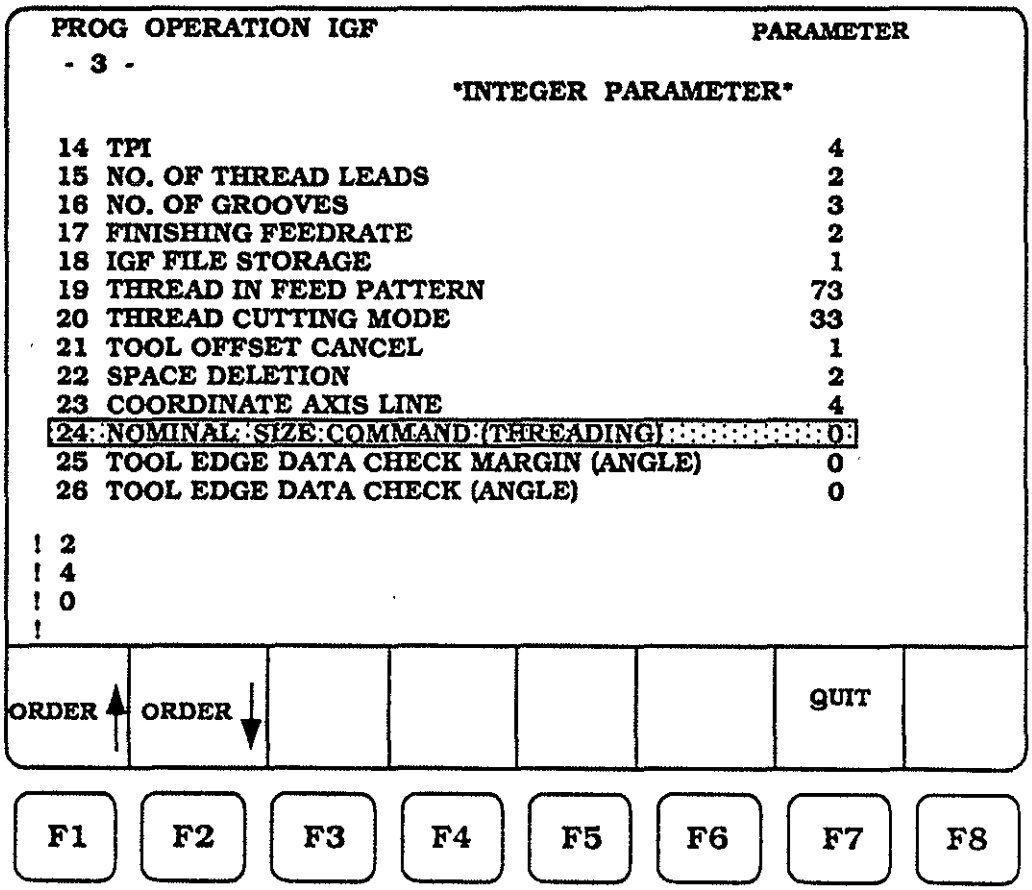
To enter the parameter value for number 24, the following steps must be taken :

Make sure the cursor highlight is located at parameter number 24, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

For parameter number 24 - press [0] and [WRITE]

If entered correctly, the CRT screen should be as displayed below.

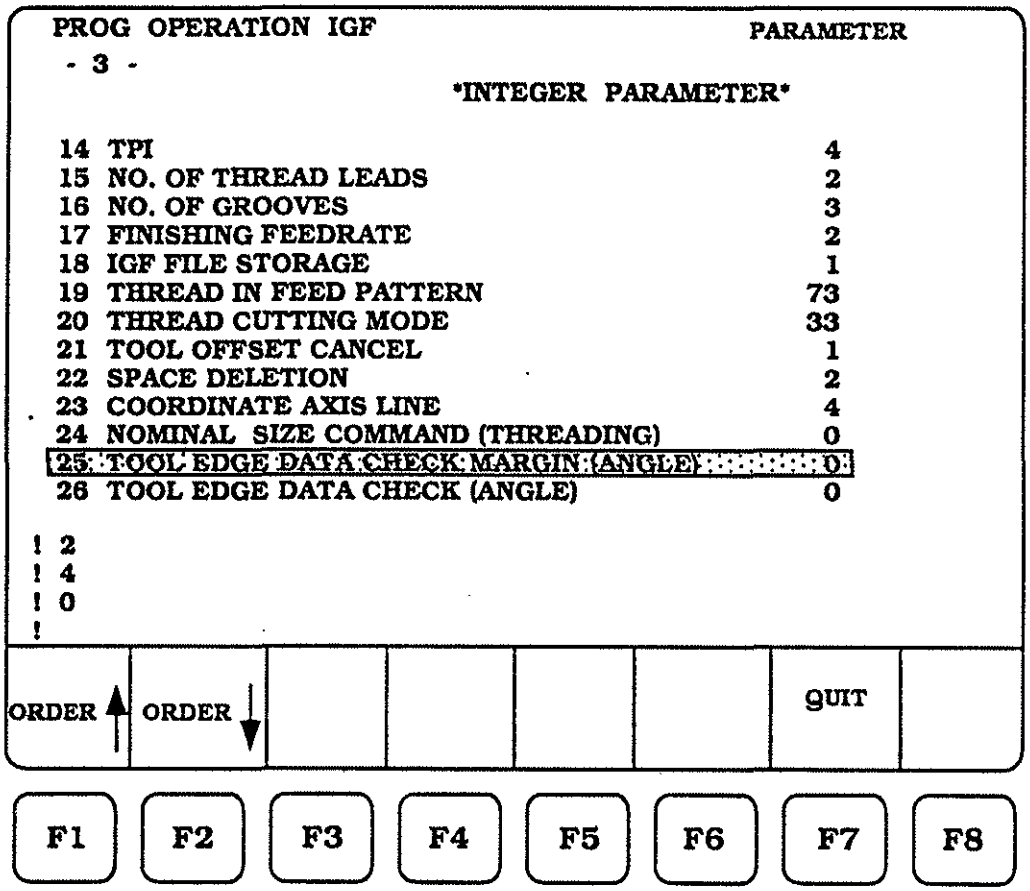


Step Four

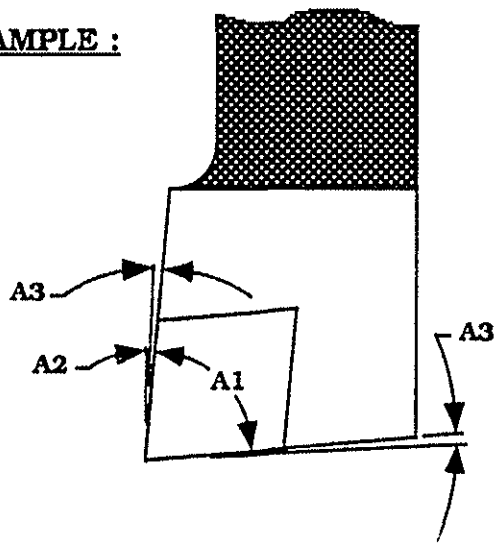
As we have seen in the TOOL DATA section, the tool geometry for front clearance and total insert angle can be specified as A1 and A2 (see page 12).

This parameter (number 25) allows us to define any geometry considerations we need to make to the control, reguarding the back-side of the cutting tool geometry (see example sketch below). This parameter also would apply to the front side of the cutting tool. This parameter is refered to as " A3 ", but does not have a call-out on the screen.

The parameter is entered as an angle and can be from 0 - 360 degrees.



EXAMPLE :



Step Four

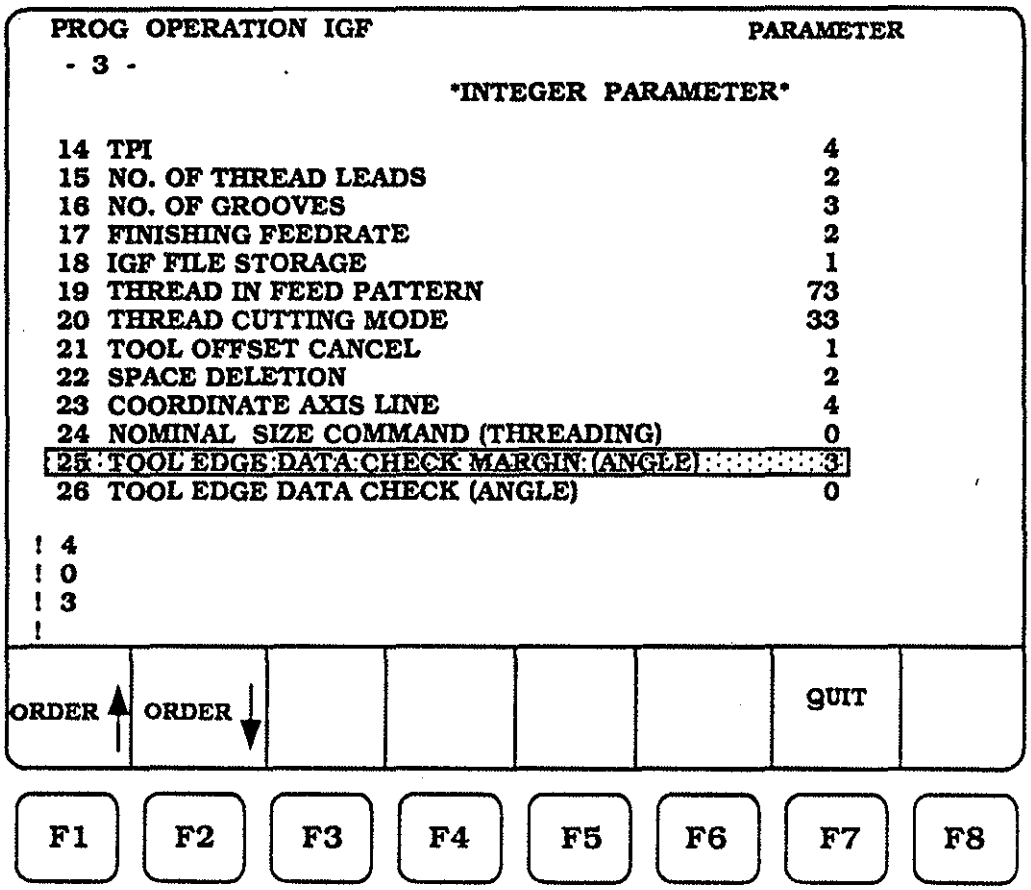
To enter the parameter value for number 25, the following steps must be taken :

Make sure the cursor highlight is located at parameter number 25, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

For parameter number 25 - press [3] and [WRITE]

If entered correctly, the CRT screen should be as displayed below.



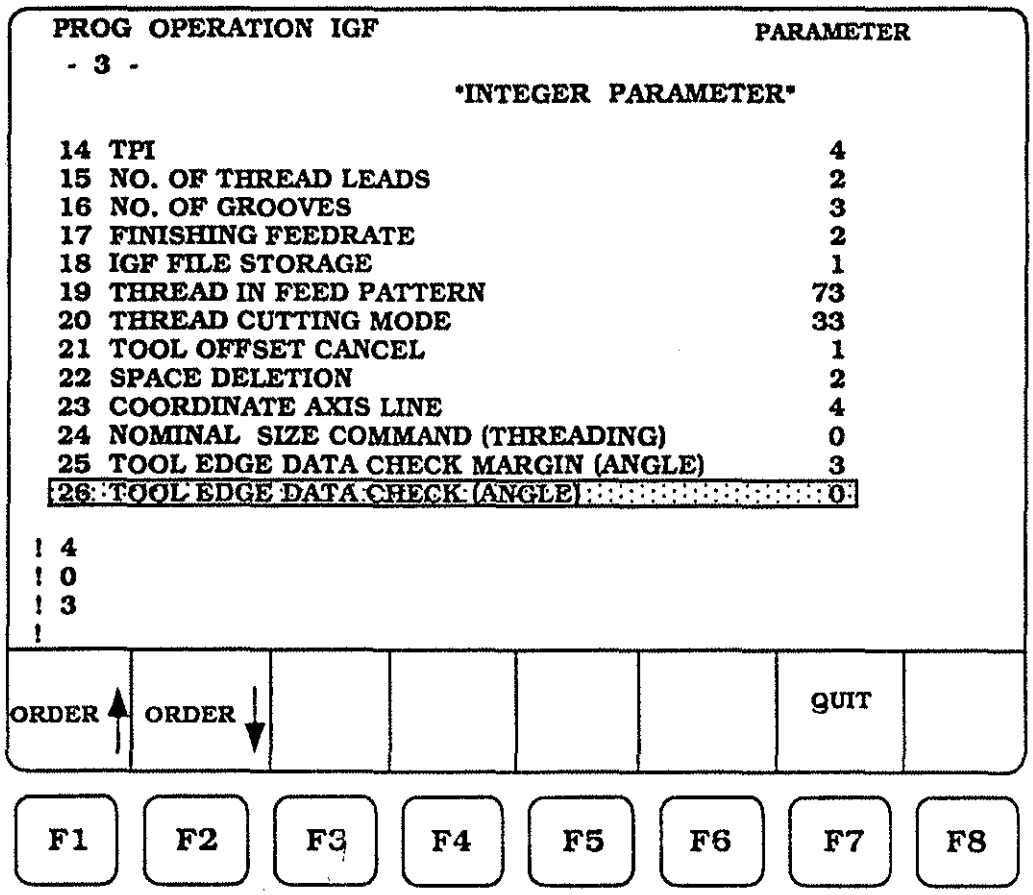
Step Four

Parameter number 26 pulls in or makes active the angle specified at parameter number 25. This is done by inputting parameter number 26 as either a " 0 " (zero) for " off " , or a " 1 " (one) for " on ".

For either of these parameters (25 or 26) to now be in effect for our IGF programming, the next parameter (number 27 on the next page) must also be active.

Parameter number 27 is normally thought of as the check for clearance between the backside of the tool and the tailstock center. It then stands to reason that the geometery checking needed, to insure that cutting motion can not be requested that would " crash " the tool into the piece part and that geometery checking needed to insure that the backside of the tool will not ' crash ' into the tailstock center, are both triggered by the same parameter.

It must be remembered, that inputting values to parameters 25 and 26 , does not insure part geometry checking. In fact, failure to input the correct value to parameter number 27 will result in a non-checking of clearance, as geometery is entered at the IGF process. So that, incorrect cutting moves are now incorporated into your tape. Correct entry of parameter number 27 will result in geometry to tool clearance checking and an error message will be delivered as soon as the control detects a " crash " condition.



Step Four

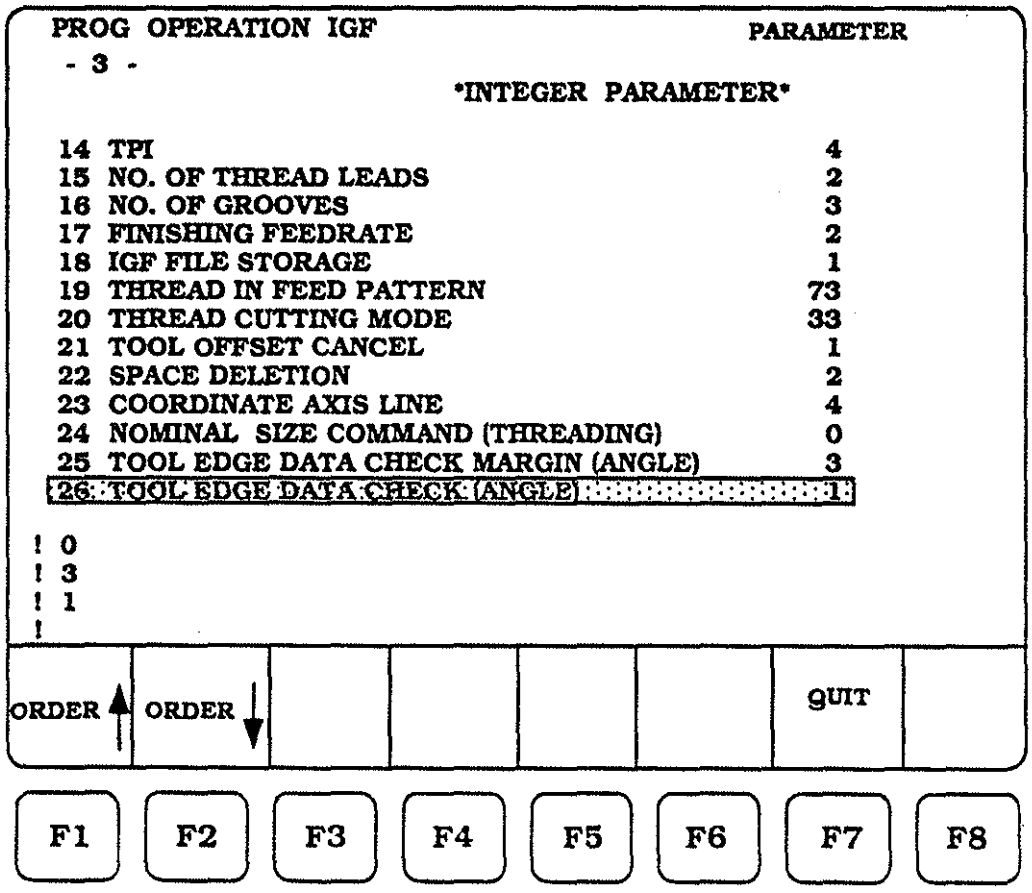
To enter the parameter value for number 26, the following steps must be taken :

Make sure the cursor highlight is located at parameter number 26, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

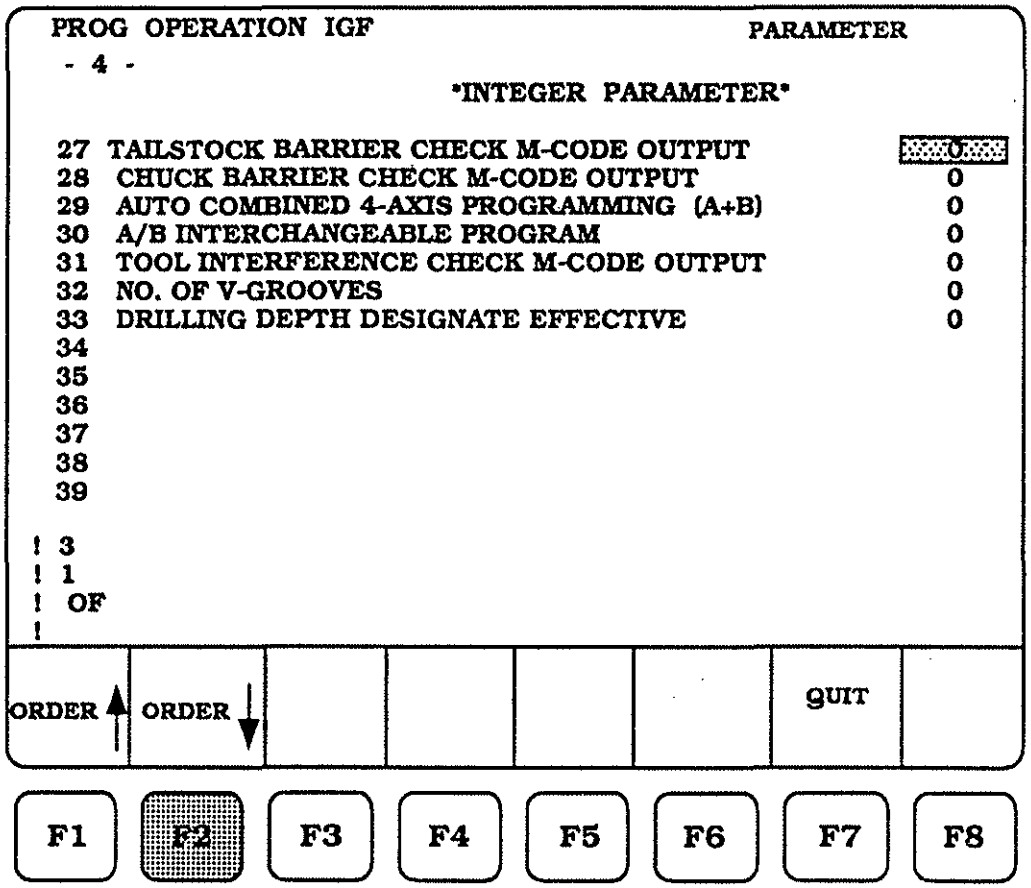
For parameter number 26 - press [1] and [WRITE]

If entered correctly, the CRT screen should be as displayed below.



Step Five

At step four we defined values for the *INTEGER PARAMETER* page. To advance the control to the next screen (step five), we must press F2 ORDER ↓, the CRT screen should be as displayed below.



The fourth parameter page (INTEGER PARAMETER) contains thirteen parameter lines. Parameters 34 - 39 are not currently assigned.

Starting on page 120 and continuning for the next several pages, each parameter will receive a brief description as to it's function and how to enter it into the control.

Step Five

As mentioned on page 120, this parameter (number 27) has several uses, chief among the uses, is to check for clearance between the backside of the cutting tool and the tailstock center. Shown below is an example of a cutting tool and tailstock live center, that will cause the control to issuse an error alarm and cease processing the IGF file. This parameter has two values that can be entered, " 0 " (zero) for " off " and " 1 " (one) for " on ".

PROG OPERATION IGF PARAMETER

- 4 -

INTEGER PARAMETER

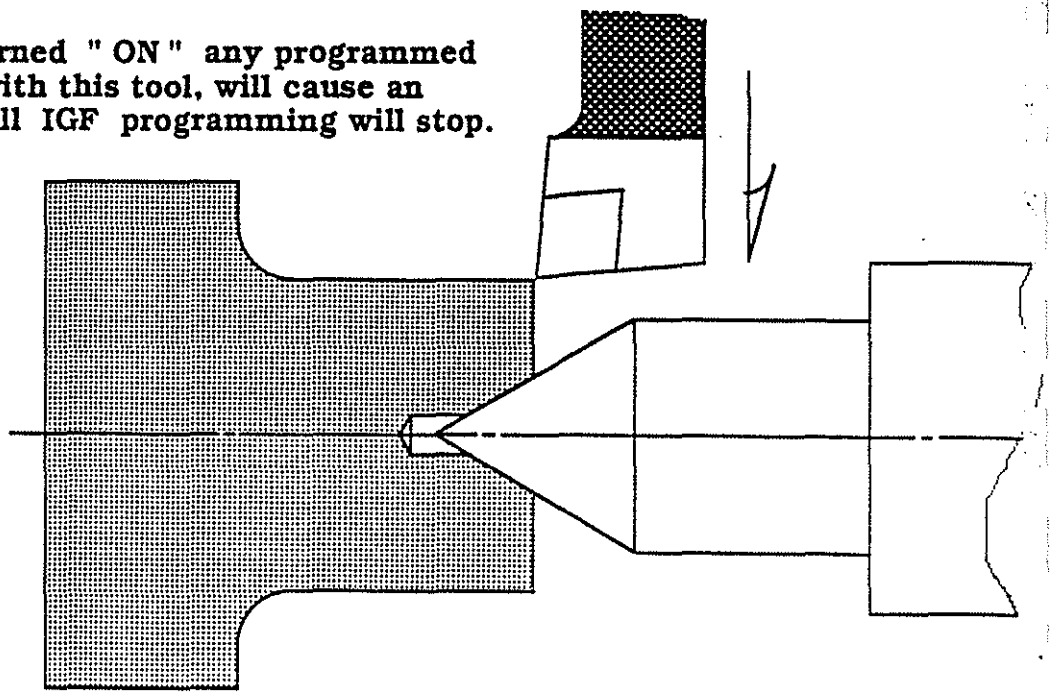
27	TAILSTOCK BARRIER CHECK M-CODE OUTPUT	0
28	CHUCK BARRIER CHECK M-CODE OUTPUT	0
29	AUTO COMBINED 4-AXIS PROGRAMMING (A+B)	0
30	A/B INTERCHANGEABLE PROGRAM	0
31	TOOL INTERFERENCE CHECK M-CODE OUTPUT	0
32	NO. OF V-GROOVES	0
33	DRILLING DEPTH DESIGNATE EFFECTIVE	0
34		
35		
36		
37		
38		
39		

! 3
! 1
! OF
!

ORDER ↑ ORDER ↓ QUIT

F1 F2 F3 F4 F5 F6 F7 F8

With the parameter turned " ON " any programmed move toward center, with this tool, will cause an alarm condition and all IGF programming will stop.



Step Five

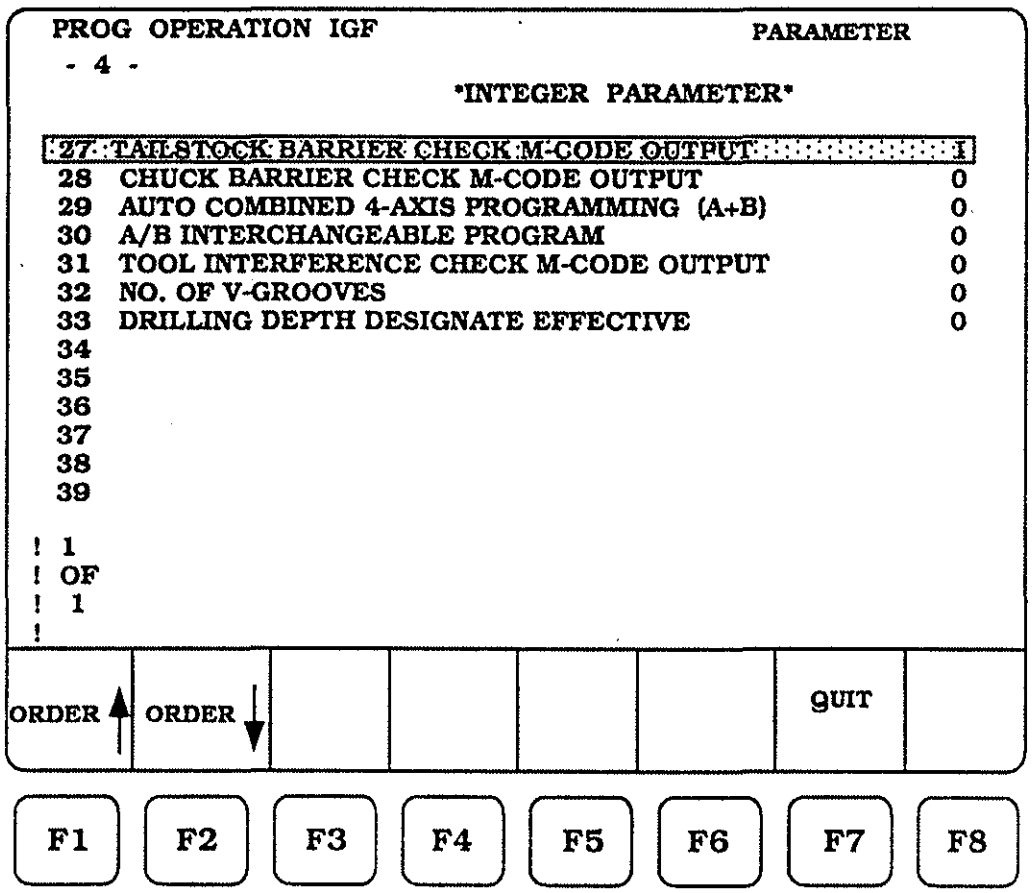
To enter the parameter value for number 27, the following steps must be taken :

Make sure the cursor highlight is located at parameter number 27, use the cursor keys up [↑] and down [↓] to accomplish this task.

Enter the values :

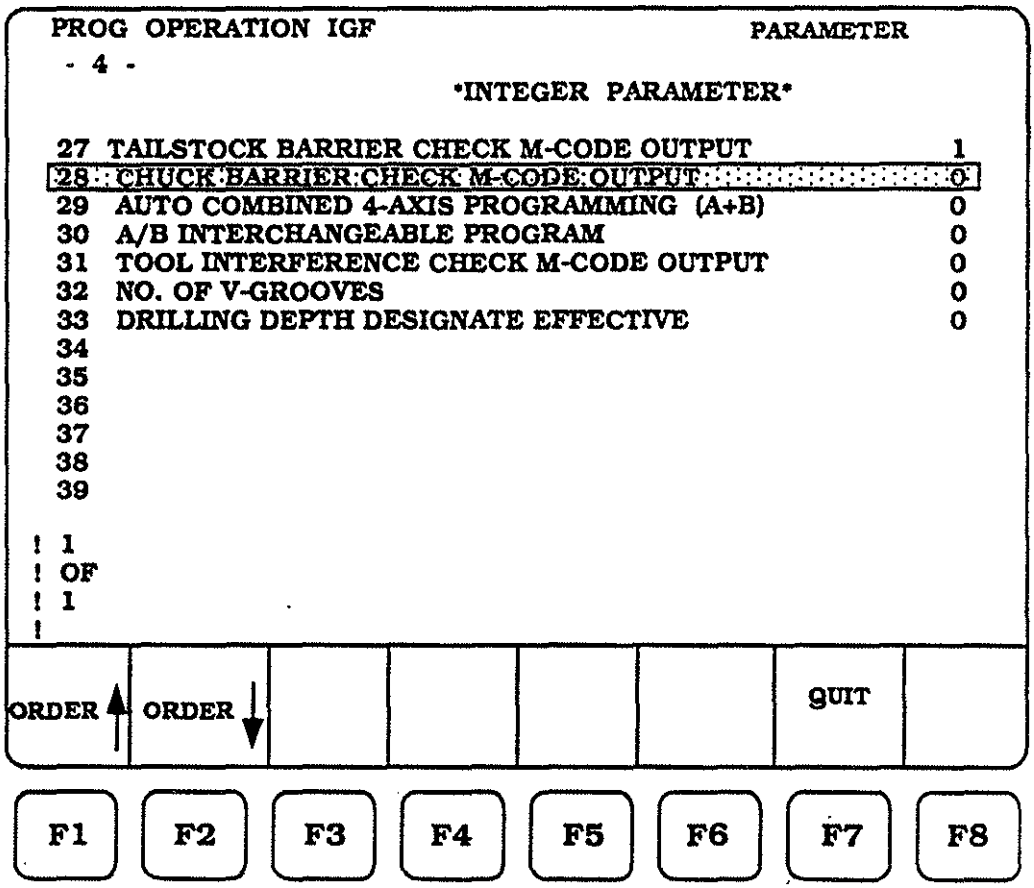
For parameter number 27 - press [1] and [WRITE]

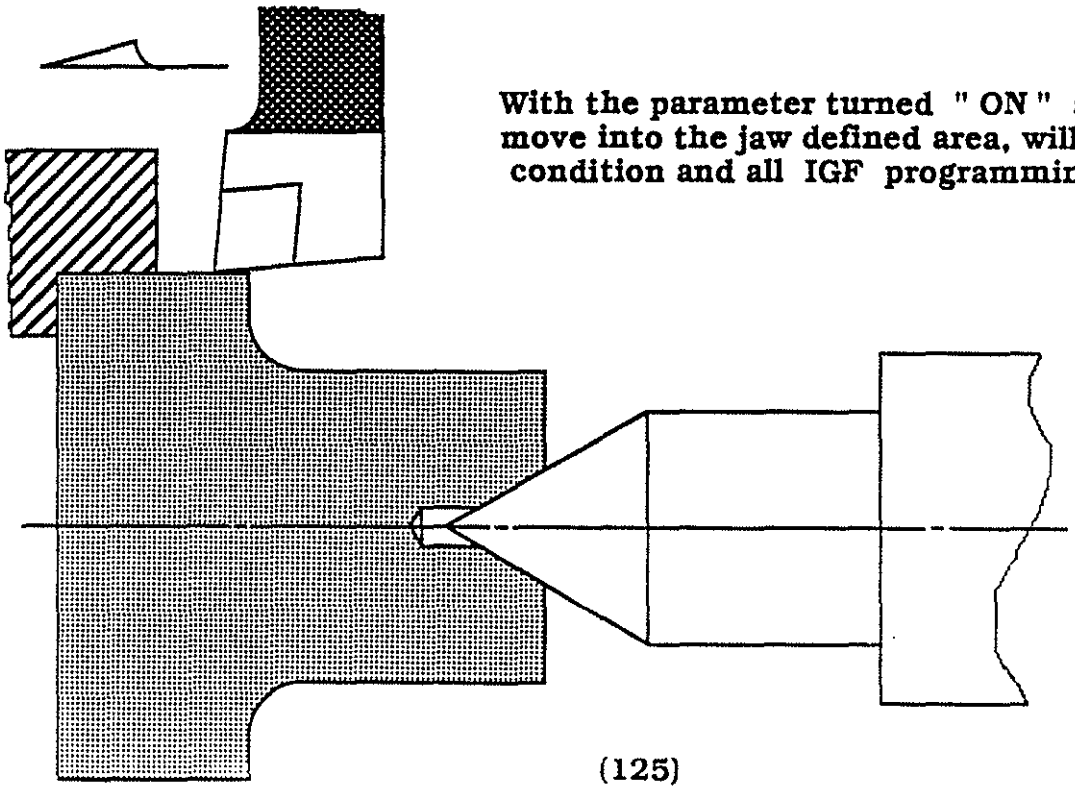
If entered correctly, the CRT screen should be as displayed below.



Step Five

Parameter number 28 is used to check for programmed moves of the cutting tool into jaw defined BARRIER areas. Shown below is an example of a cutting tool and jaws, that will cause the control to issuse an error alarm and cease processing, if the cutting tool is programmed into the jaws while using the IGF file. This parameter has two values that can be entered, " 0 " (zero) for " off " and " 1 " (one) for " on ".





With the parameter turned " ON " any programmed move into the jaw defined area, will cause an alarm condition and all IGF programming will stop.

Step Five

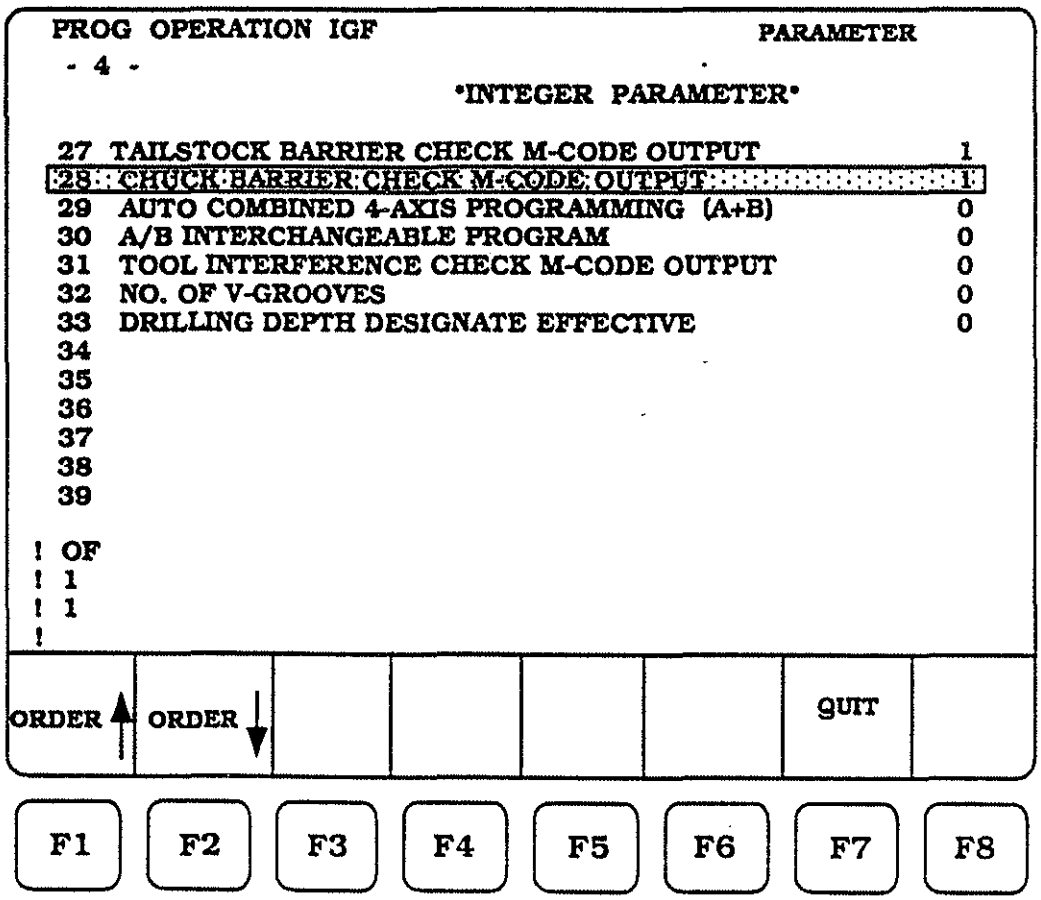
To enter the parameter value for number 28, the following steps must be taken :

Make sure the cursor highlight is located at parameter number 28, use the cursor keys up [↑] and down [↓] to accomplish this task.

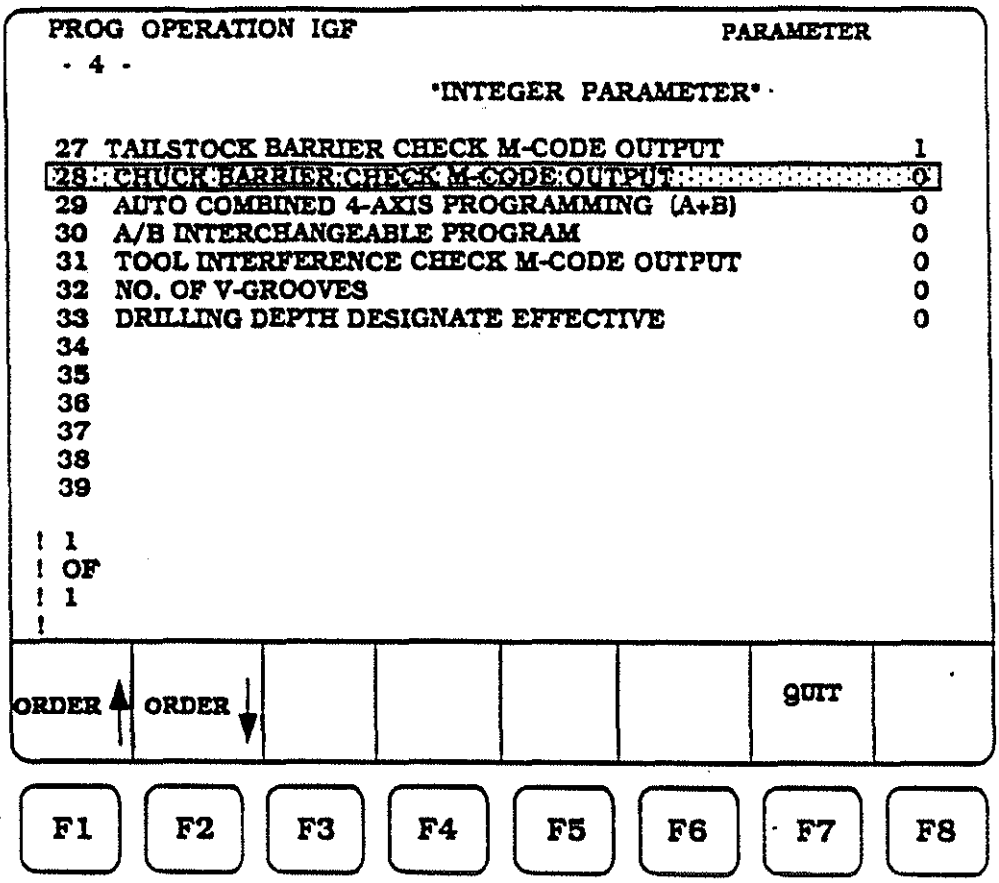
Enter the values :

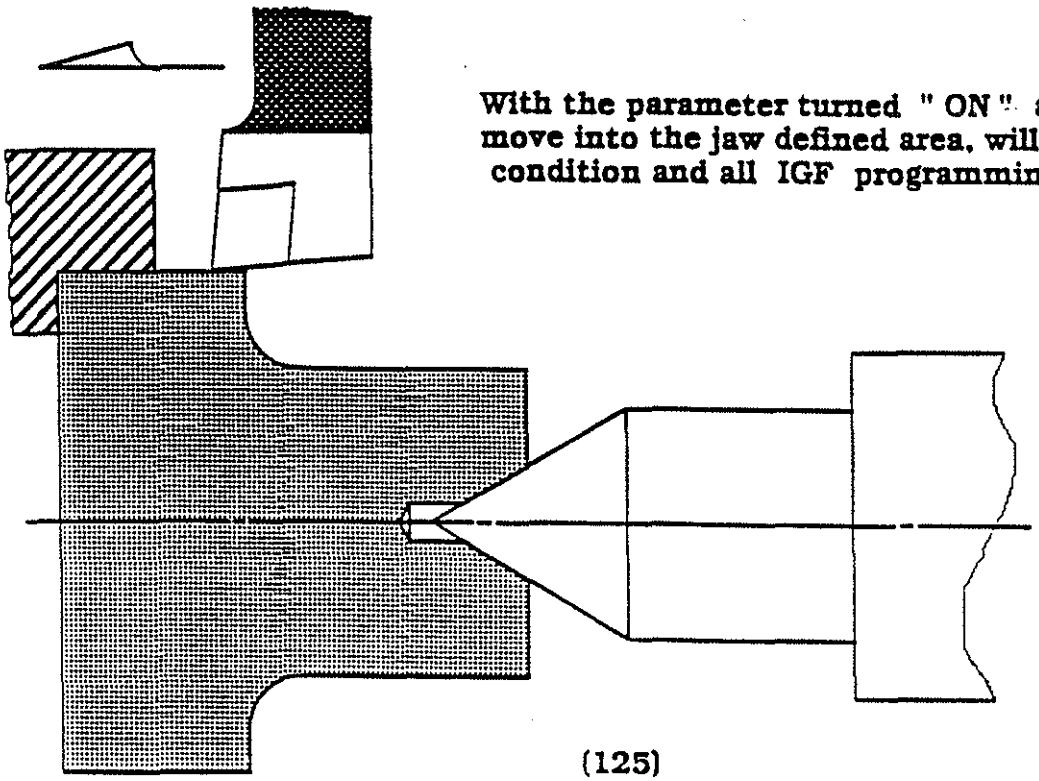
For parameter number 28 - press [1] and [WRITE]

If entered correctly, the CRT screen should be as displayed below.



Parameter number 28 is used to check for programmed moves of the cutting tool into jaw defined BARRIER areas. Shown below is an example of a cutting tool and jaws, that will cause the control to issuse an error alarm and cease processing, if the cutting tool is programmed into the jaws while using the IGF file. This parameter has two values that can be entered, " 0 " (zero) for " off " and " 1 " (one) for " on ".





With the parameter turned " ON " any programmed move into the jaw defined area, will cause an alarm condition and all IGF programming will stop.