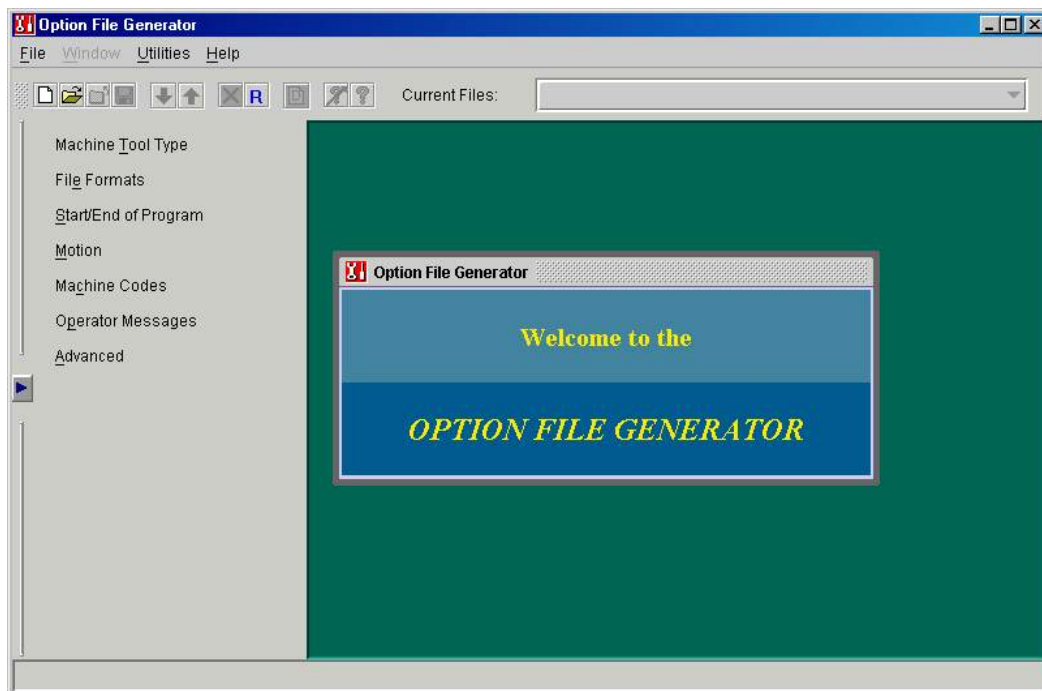


G-Post



Generalized Postprocessor

G-Post *Version 6.0*

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G-Post™ Reference Manual Version 6.0

August 31, 2005

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MAN-GP

Read This First!

Chapter 1 Begins with an overview of how this manual is set up.

Chapter 2 Explains the configuration of the G-Post. You really need to read this chapter. (It's short, and won't take you long.)

Chapter 3 Explains the Option File Generator in detail. This is another chapter that you should read.

Chapter 4 Explains the G-Post command language, the syntax and the commands that are available to you as a programmer.

Chapter 5 Lists the Lathe Common Variables. This is a reference chapter and can assist you while writing FIL routines.

Chapter 6 Lists the Mill Common Variables. This is a reference chapter and can assist you while writing FIL routines.

Chapter 7 Lists the default setting of the G-Post, both Lathe and Mill. This is a reference section.

Chapter 8 Explains the UNCMRG merging postprocessor. If you need to merge output from several postprocessors please read this chapter.

Chapter 9 Explains the 4-Axis Merging Lathe options in the Lathe G-Post.

Chapter 10 Explains the ARC / NURBS fitting options.

Chapter 11 This Appendix contains an ASCII character chart and Alpha character chart for your reference.

Chapter 12 This Appendix discusses some additional features of the G-Post that were added to satisfy particular machine tools.

We have put a detailed index at the end of the manual so you can find what you need, quickly.

We hope that after you read the manual, you will let us know what you liked or disliked about it. We encourage your comments as they help us to improve our products. (Besides, how often do you get a chance to tell *us* what to do?)

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1 Overview

Introduction to G-Post

Figure 1-1 shows how you get from an APT program to a MCD (Machine Control Data) punch file (.PU1) using the G-Post (generalized postprocessor).

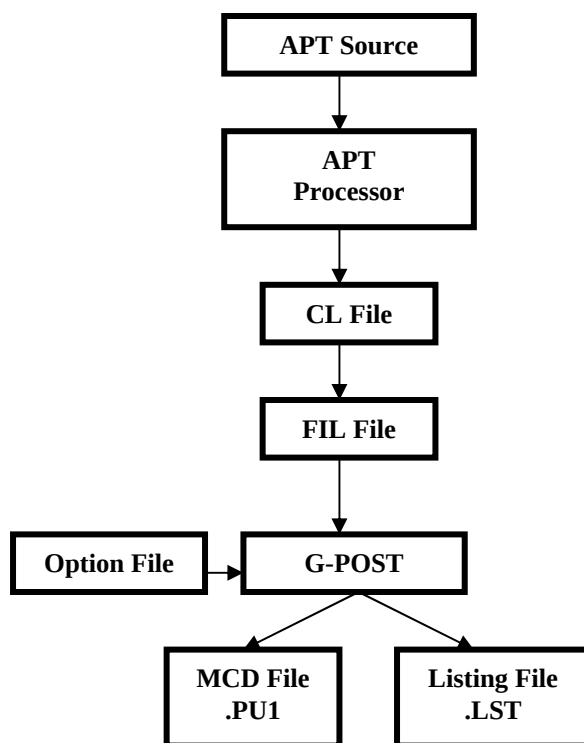


Figure 1 APT-G-POST System Flow Chart

Figure 1-2 shows how you get from a CAD/CAM NC tool path to a MCD (Machine Control Data) punch file (.PU1) using the G-Post (generalized postprocessor).

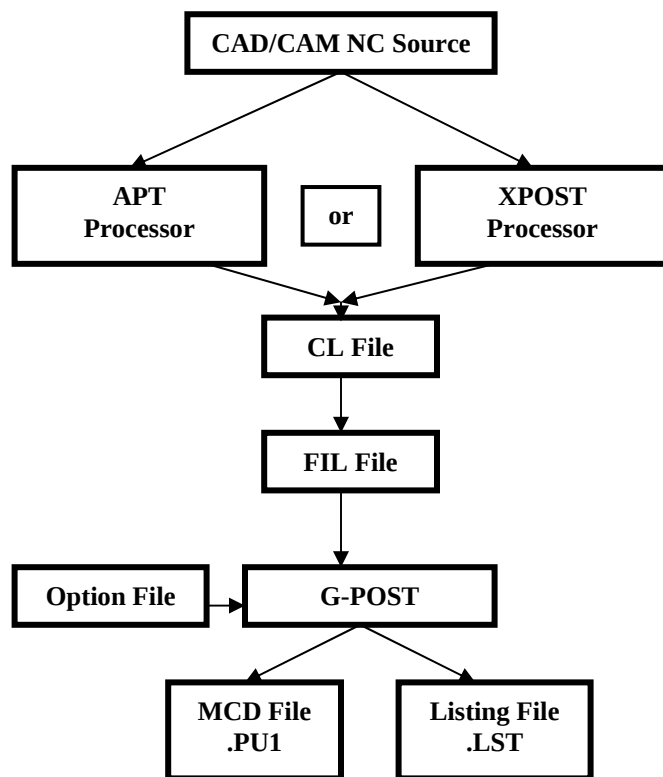


Figure 2 CAD/CAM – G-POST System Flow Chart

G-Post Summary

The post processor reads the **CL File** as input. In addition, it reads machine information from an option file you create using the **Option File Generator**. The post processor converts the input **CL** into a format the machine understands and outputs it as a **MCD** (Machine Control Data) punch file (**.PU1**).

UNCL01 is a generalized post processor for Turning machines or Lathes. **UNCX01** is a generalized post processor for Milling machines, Wire EDMs, Lasers, Punch Presses, etc.

There are three ways to customize a post processor for a particular machine tool control unit:

1. **Option File:** The **Option File Generator** enables you to set machine control parameters. When creating a Lathe Option file, the Option File created is named **UNCL01.Pnn**, where **nn** is the machine number you assigned. When creating a Mill, Wire-EDM, Laser or Punch Press Option file, the Option File created is named **UNCX01.Pnn**, where **nn** is the machine number you assigned. The post processor reads the option file to override the default values of G-Post to generate customized output. See Chapter 3 of this manual for more information.
2. **FIL File:** The **FIL (Factory Interface Language)** is used to customize the post processor output. FIL is a text based MACRO language. Using the Option File Generator a template FIL file is automatically created when you select **Edit FIL** in the Option File Generator **Advanced** menu. When creating a Lathe Option File the FIL File is named **UNCL01.Fnn**, where **nn** is the machine number you assigned. When creating a Mill, Wire-EDM, Laser or Punch Press Option file, the FIL File is named **UNCX01.Fnn**, where **nn** is the machine number you assigned. The post processor reads the FIL file after reading the option file. See the FIL Manual for more information.
3. **PLABEL:** For minor changes, you can use the **PLABEL** commands in a part program to override the default values. This is considered an obsolete feature but it is still fully supported by the G-Post. See **PLABEL** in Chapter 4 of this manual for more information.

This manual explains in detail the options and commands provided in the post processor, with examples to process part programs. The examples assume you are using the post processor defaults.

Some of the commands in this manual may not apply to your particular machine tool.

1.1 Manual Conventions

This manual uses certain conventions to present information. You will find it helpful to review this section before going any further in the manual.

1.1.1 Notes, Cautions, and Warnings

A **Note** is information that is of interest or importance. The following is an example of a **Note**:

Note:	Some CNC controllers require that sequence numbers begin with 1 and increment by 1.
--------------	--

A **Caution** contains very important information that you need to know to avoid losing or corrupting data or accidentally causing minor damage. The following shows an example of a **Caution**:

Caution:	If you answer No to this prompt, you will lose all data that you entered during this session.
-----------------	--

A **Warning** contains extremely important information that that you need to know to avoid causing major damage to person or property. The following is an example of a **Warning**:

Warning:	Changing the machine's axis limits may cause the machine to overtravel and damage the machine.
-----------------	---

Examples:

The manual frequently contains **Examples** to aid in the explanation of various commands. Those **Examples** are shown in the following typeface:

GOTO/0,0,0

Examples of text or data that you are to enter is shown in boldface type, as shown: Type **YES** at the prompt.

2 Configurations

Introduction

This chapter describes how the Mill and Lathe post processors handle various machine tool configurations. These sections are titled Lathe Configurations, Mill Configurations, Units of Measure and Mill Motion Analysis.

2.1 Lathe G-Post - UNCL01

The **UNCL01** Lathe Generalized Post Processor uses an Option file and FIL file to describe the particular codes required by your machine tool for a specific function. The post processor passes this information into memory through **COMMON** variables.

The post processor uses the following two types of memory locations:

- Non-fractional numbers or integers. The manual refers to these as **INTCOM** variables. There are ~5000 **INTCOM** variables, see Chapter 5 for a full description of these common variables.
- Double precision fractional numbers or numbers that contain a decimal point. The manual refers to these as **DBLCOM** variables. There are ~2000 **DBLCOM** variables, see Chapter 5 for a full description of these common variables.

The variable type (**INTCOM** or **DBLCOM**) is identified by its subscript location within the post processor. If you assign a number with a decimal portion to an **INTCOM**, the decimal portion of the number will be truncated. If you assign an integer number to a **DBLCOM** variable, the decimal portion will contain zeroes and the value of the number will be unchanged.

The following example demonstrates this concept:

ICYCLG(12) 0470 THE G CODE FOR THE ABOVE CYCLES

The above variable is in the **INTCOM** variable section and starts at location 470 in memory. It is twelve locations long and contains twelve separate values.

You can see that the next variable location on that list starts at 482. So the **ICYCLG** variable occupies locations 470 through 481. These numbers, or locations, have significance when applied to the following commands:

- **DEBUGG/**. This post processor command examines the contents of an **INTCOM** or **DBLCOM** location. See Chapter 4 for a complete description of the **DEBUGG** command.
- **PLABEL/MODIFY**. This post processor command changes the contents of an **INTCOM** or **DBLCOM** location. See Chapter 5 for a description of common variables and their locations. Chapter 4 also describes the **PLABEL** command in detail.

You can use these two commands within a part program or CL File to change the output of the post processor. Use of these commands will override the variables set by the option file for the length of the run only. They will not permanently change the option file or the post processor, so feel free to experiment with these commands.

Not all variables stay the same value for the duration of post processor execution. Some will change when motion is processed, and others may change when a post processor word is used. Some are used as flags by the post processor and should never be changed. The maximum amount of damage that can occur on an in-house system is abnormal termination of the run, which may require clearing of the scratch files used by the system..

These features are available for changing post processor output when the default output does not fit the machine's required format.

See Chapter 5 for a list of all the **COMMON** locations used in the post processor. See Chapter 4 for a list of post processor commands, shown in reference format. Chapter 7 contains a list of default settings.

2.2 Mill G-Post – UNCX01

The **UNCX01** Mill Generalized Post Processor uses an Option file and FIL file to describe the particular codes required by your machine tool for a specific function. The post processor passes this information into memory through **COMMON** variables.

The post processor uses the following three types of memory locations:

- Non-fractional numbers or integers. The manual refers to these as **INTCOM** variables. There are ~5000 **INTCOM** variables, see chapter 6 for a full description of these common variables.
- Single precision fractional numbers or numbers that contain a decimal point. The manual refers to these as **RELCOM** variables. There are ~902 **RELCOM** variables, see chapter 6 for a full description of these common variables.
- Double precision fractional numbers or numbers that contain a decimal point. The manual refers to these as **DBLCOM** variables. There are ~2000 **DBLCOM** variables, see chapter 6 for a full description of these common variables.

The variable type (**INTCOM**, **RELCOM**, or **DBLCOM**) is identified by its subscript location within the post processor. If you assign a number with a decimal portion to an **INTCOM**, the decimal portion of the number will be truncated. If you assign an integer number to a **RELCOM** variable, the decimal portion will contain zeroes and the value of the number will be unchanged.

The following example demonstrates this concept:

ICYCLG(12) 0470 THE G CODE FOR THE ABOVE CYCLES

The above variable is in the **INTCOM** variable section and starts at location 470 in memory. It is twelve locations long and contains twelve separate values.

You can see that the next variable location on that list starts at 482. So the **ICYCLG** variable occupies locations 470 through 481. These numbers, or locations, have significance when applied to the following commands:

- **DEBUGG/**. This post processor command examines the contents of an **INTCOM**, **RELCOM**, or **DBLCOM** location. See Chapter 4 for a complete description of the **DEBUGG** command.
- **PLABEL/MODIFY**. This post processor command changes the contents of an **INTCOM**, **RELCOM**, or **DBLCOM** location. See Chapter 5 for a description of common variables and their locations. Chapter 4 describes the **PLABEL** command in detail.

Use these two commands within a part program or CL File to examine or override the variables set by the option file. Use of these commands will override the variables set by the option file for the length of the run

only. They will not permanently change the option file or the postprocessor, so feel free to experiment with these commands.

Not all variables stay the same value for the duration of post processor execution. Some will change when motion is processed, and others may change when a post processor word is used. Some are used as flags by the post processor and should never be changed. The maximum amount of damage that can occur on an in-house system is abnormal termination of the run, which may require clearing of the scratch files used by the system.

These features are available for changing post processor output when the default output does not fit the machine's required format.

See Chapter 6 for a list of all the **COMMON** locations used in the post processor. See Chapter 4 for a list of post processor commands, shown in reference format. Chapter 7 contains a list of default settings.

2.3 Units of Measure

In the following discussion of units, the minor words **IPM-MMPM** and **IPR-MMPR** cause no conversion of units. The conversion from metric to inch is handled by the **MACHIN/** statement. The post processor assumes that CL coordinates and the unit related values in post processor commands are expressed in inches for inch input and in millimeters for metric input.

The unit related minor words are assumed to be as follows:

<u>Word</u>	<u>Inch Input</u>
IPM	inches per minute
IPR	inches per revolution
SFM	surface feet per minute
<u>Word</u>	<u>Metric Input</u>
MMPM	millimeters per minute
MMPR	millimeters per revolution
SMM	surface meters per minute

See also **PLABEL/OPTION,3**.

Note: The default values and examples in this manual denote inch units unless specified otherwise.

2.3.1 Switchable Inch/Metric Machine

The G-Post post processors accept inch or metric CL data and generates inch or metric output. When the input and output units are the same, the post processor performs no conversion. When they are different, it performs the appropriate conversion from metric to inch or inch to metric.

The post processor assumes that CL coordinates and the unit related values in post processor commands are expressed in inches for inch input and in millimeters for metric input.

2.3.2 Inch Only Machine

The post processor accepts inch or metric CL data and generates inch output. When the input and output units are the same, the post processor performs no conversion. When they are different, it performs the conversion from metric to inch.

The post processor assumes that CL coordinates and the unit related values in post processor commands are expressed in inches for inch input and in millimeters for metric input.

2.3.3 Metric Only Machine

The post processor accepts inch or metric CL data and generates metric output. When the input and output units are the same, the post processor performs no conversion. When they are different, it performs the conversion from inch to metric.

The post processor assumes that CL coordinates and the unit related values in post processor commands are expressed in inches for inch input and in millimeters for metric input

2.4 Machine Tool Configurations

This section shows you how the G-Post handles some common machine tool configurations.

2.4.1 Lathe Configurations

This section shows you how the Lathe G-Post handles some common lathe configurations.

2.4.1.1 First Quadrant Lathe

The post processor converts CL X to Lathe Z and CL Y to Lathe X.

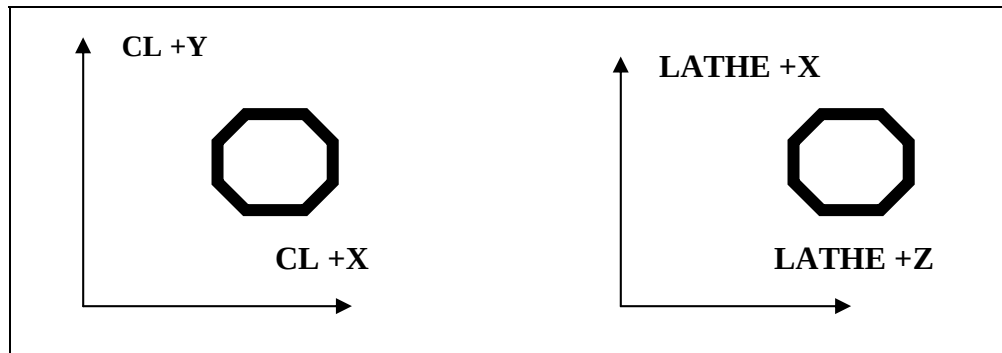


Figure 1 First Quadrant Lathe

The turret is positioned in the first quadrant. You must define the part in the same quadrant.

See also **PLABEL/OPTION,53**

2.4.1.2 Fourth Quadrant Lathe

The post processor converts CL X to Lathe Z and CL Y to Lathe X.

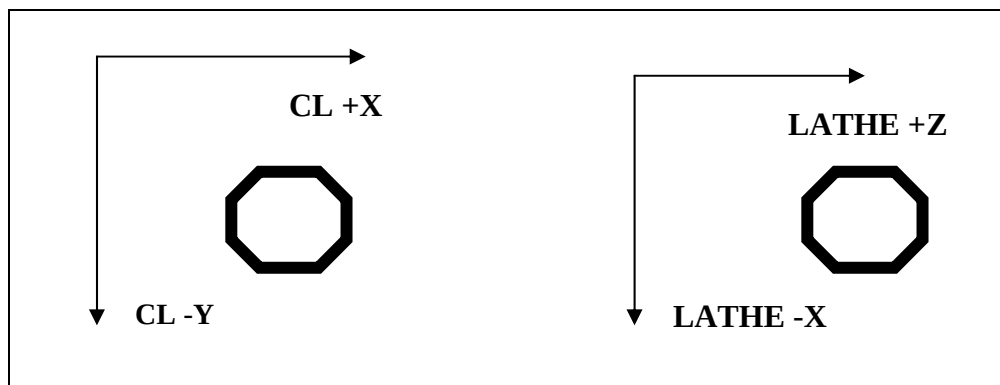


Figure 2 Fourth Quadrant Lathe

The turret is positioned in the fourth quadrant; the part must be defined in the same quadrant.

See also **PLABEL/OPTION,53**.

2.4.1.3 Vertical Lathe VTL

The post processor converts CL X to VTL X and CL Y to VTL Z.

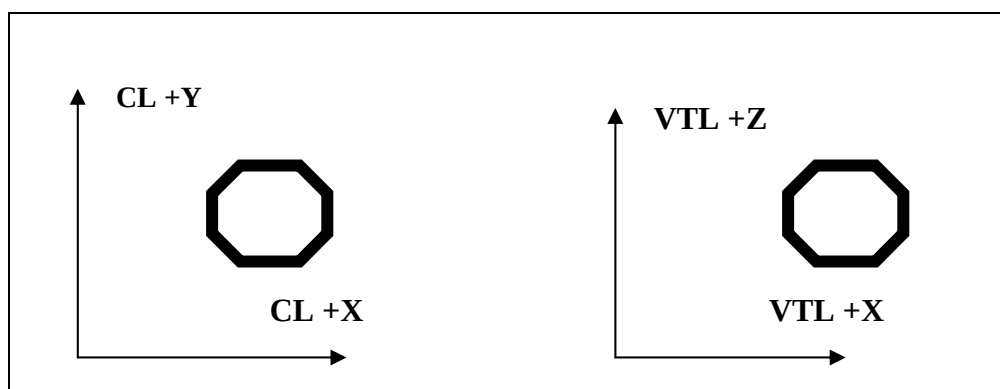


Figure 3 VTL

The turret is positioned in the first quadrant; you must define the part in the same quadrant.

See also **PLABEL/OPTION,53**.

2.4.1.4 Multiple Turret Lathe - Same Slide (Fixed X)

The post processor converts CL X to Lathe Z and CL Y to Lathe X. When using the secondary turret, axes output reflects the primary turret position, adjusted by the fixed distances measured along the CL Y axis and the CL X axis..

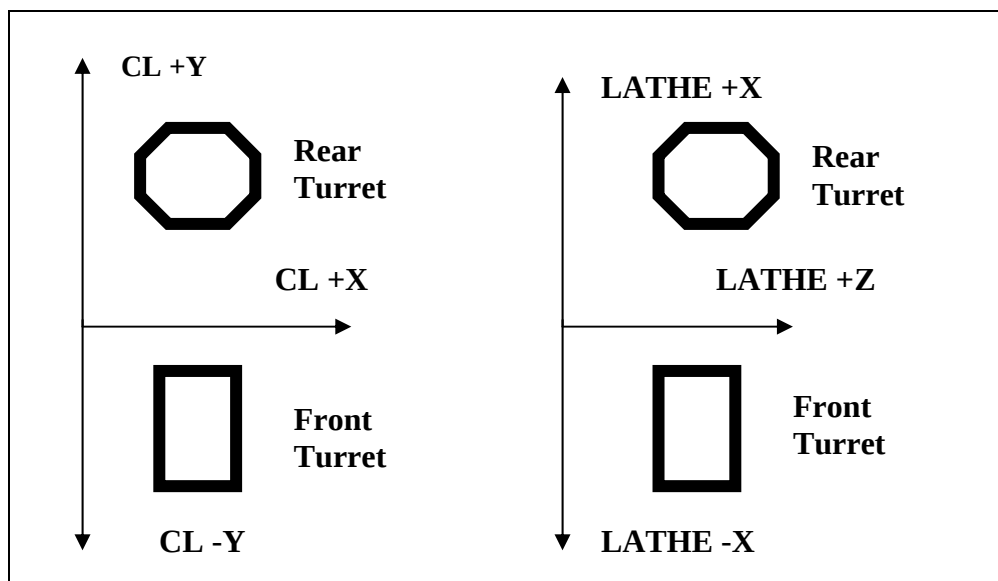


Figure 4 Multiple Turret Lathe (Fixed X)

The primary turret is the front turret. The default distance from the primary turret to the secondary turret in the CL coordinate system is CL Y=+15.0 and CL X is not adjustable (CL X=0.0). When using the front turret, you must define the part in the fourth quadrant. When using the rear turret, define the part in the first quadrant.

See also **PLABEL/OPTION,52**; **PLABEL/OPTION,53**; and **HEAD/**.

2.4.1.5 Multiple Turret Lathe - Separate Slide (Adjustable X)

The post processor converts CL X to Lathe Z and CL Y to Lathe X. When using the secondary turret, axes output reflects the primary turret position, adjusted by the fixed distances measured along the CL Y axis and the CL X axis.

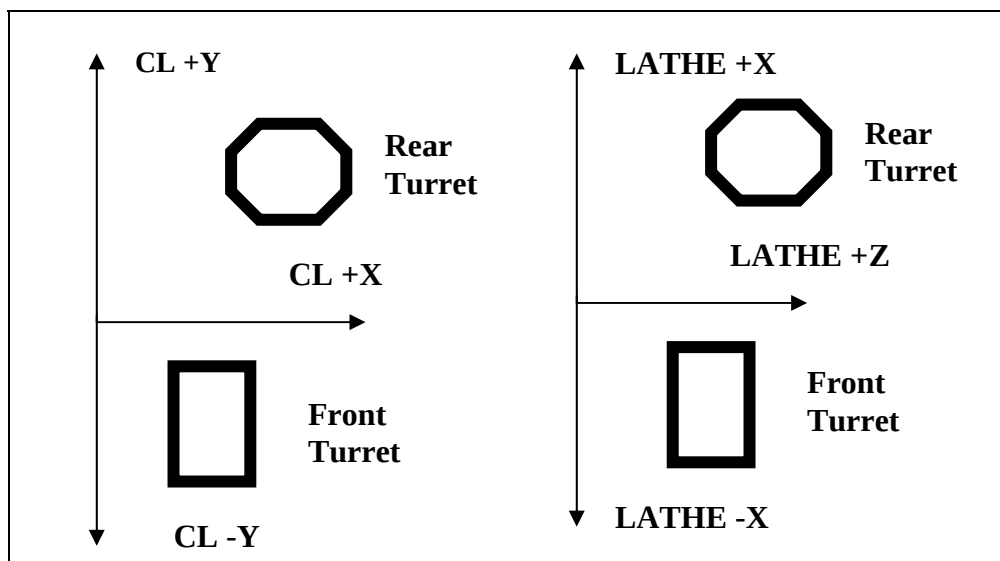


Figure 5 Multiple Turret Lathe (Adjustable X)

The primary turret is the front turret. The default distance from the primary turret to the secondary turret in the CL coordinate system is CL Y=+15.0 and CL X=10.0. When using the front turret, you must define the part in the fourth quadrant. When using the rear turret, define the part in the first quadrant.

See also **PLABEL/OPTION,52**; **PLABEL/OPTION,53**; and **HEAD/**.

2.4.1.6 2+2 Lathes

The post processor converts CL X to Lathe Z and CL Y to Lathe X. When using the secondary turret, axes output reflects the turret selected.

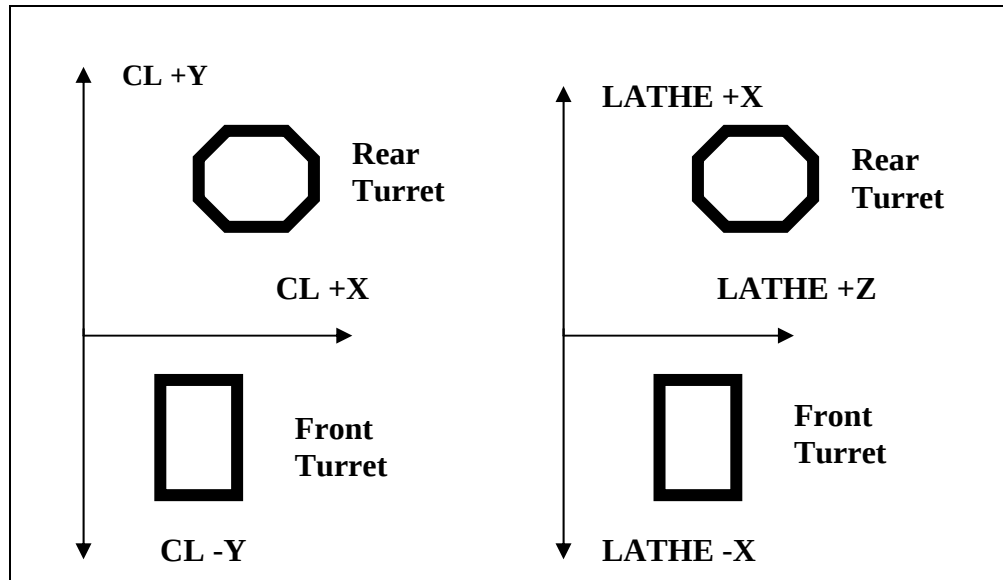


Figure 6 2 + 2 Lathes

The primary turret is the front turret controlled by XZ axes. The secondary turret is the rear turret controlled by UW axes.

When using the front turret, define the part in the fourth quadrant. When using the rear turret, define the part in the first quadrant.

See also **PLABEL/OPTION,52**; **PLABEL/OPTION,53**; and **HEAD**.

2.4.2 Mill, Wire EDM, Live Tooling Lathe Configurations

Milling machines with contouring rotary axes have two basic configurations: a part-moving axis, a tool-moving axis and a live tooling lathe. If the part moves when the table rotates, the machine has a part-moving axis. If the machine moves when the head rotates, the machine has a tool-moving axis.

Wire EDMs can be configured as tilt wire or fixed axis machines.

Live Tooling Lathes can be configured with the tool axis parallel to the Lathe Z axis or perpendicular to the Lathe Z axis.

There are eight common machine tool types:

1. Mills without contouring rotary axes.
2. Four-axis rotary table. The machine has three linear axes of tool motion. The part rotates about one rotary axis.
3. Four-axis rotary head. The machine has three linear axes of tool motion. There is one rotary axis of tool motion.
4. Five-axis dual rotary table. The machine has three axes of linear motion. The part has two axes of rotation.
5. Five-axis rotary table with rotary head. The machine has three axes of linear motion. The machine rotates on one axis, and the part rotates on one axis.
6. Five-axis dual rotary head. The machine has three linear axes and two rotary axes.
7. Live tooling Lathe-XZ and C, R Theta machine.
8. Wire EDM machines

You describe the machine tool type to the postprocessor when you select the **Machine Tool Type** panel in the Option File Generator. You can change the physical address of the axes at any time after you have defined the axis.

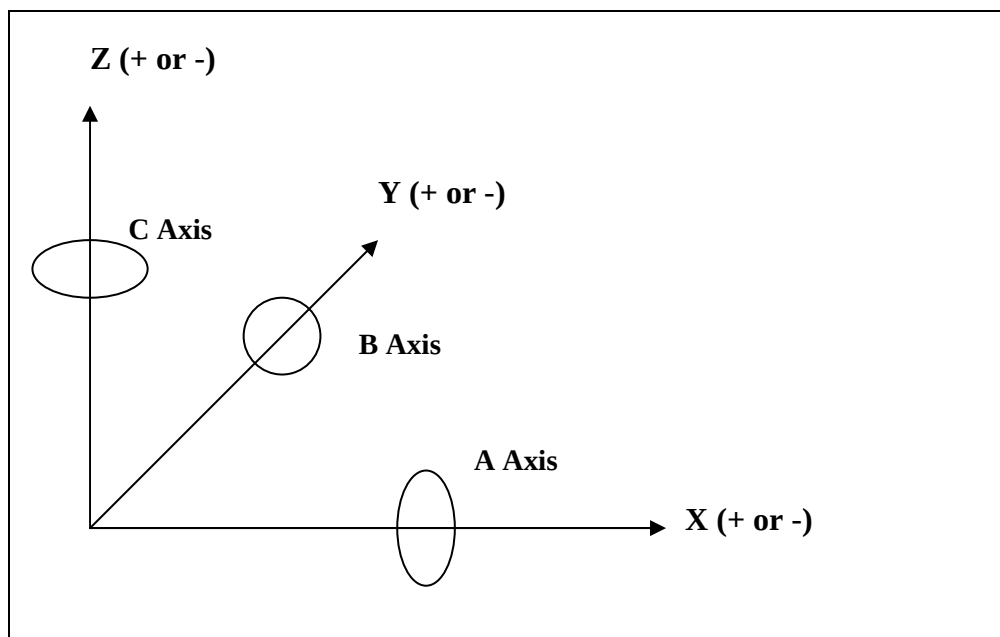


Figure 7 Machine Tool Axis Configuration

2.4.3 Mill-Turn Configurations

For a Mill-Turn machine, the Mill G-Post can now support both milling and turning modes. Before you had to use the UNCMRG/Merge option with multiple post processor executions. We recommend you use this new method. You can set the various mill-turn modes in the option file generator panels.

Note: You can continue to use UNCMRG/Merge option if you choose, it is fully supported. If you choose to use this method do not select the Mill-Turn mode check box on the Machine Tool Type screen. Set the Merging Post option (INTCOM(1868)=1) in the Start/End of Program screen as before.

Mill mode:

The G-Post has two new commands, MODE/MILL and SPINDL/PARLEL,[ZAXIS-XAXIS] to specify the desired tool axis condition. You can freely switch between these in your input program.

You must specify the input coordinates to be in the Machine coordinates as (X,Y,Z) for both spindle configurations. If your input file is in any other format, you can convert via the transformation panel or use TRANS/matrix,OPTION,11 command in your input file.

When SPINDL/PARLEL,ZAXIS is in effect, you would be doing "end work" with XC and Z-axis output to profile or drill at the end of the part.

When SPINDL/PARLEL,XAXIS is in effect, you would be doing "side work" with XC and Z-axis output to profile or drill at the side of the part.

In either of these conditions, some machines support a Y-axis stroke instead of the combined ZC or XC output. In this case, the command MODE/YAXIS,[ON-OFF-AUTO] is supplied to be used in your input program to enable or disable the Y axis output.

When the AUTO mode is set, make sure you set the Y-stroke limits on your machine. The G-Post will automatically output either the machine Y or XC and ZC when programmed Y-axis is within the set limits.

Turn mode:

You can set the G-Post in the turning mode instead of the milling mode at start of the program. The new command MODE/TURN can also be given in your input program to switch between the MILL and TURN modes.

Optionally you can specify the input coordinates to be in the Machine or APT like part system. The default is similar to the Mill mode as in (X,0,Z), where X is the lathe radius and Z is along the centerline.

Turret section:

For turning mode, the tool changes should be done using the TURRET command to get the G92 pre-set blocks etc instead of the LOADTL command as in the milling mode. You can also set options like X output in diameters and G92 pre-set for tool tip programming conditions.

Spindle section:

Here you can specify options for CSFM programming and the R-output for the control to determine the initial RPM value.

Thread section:

Single point G33 type threading is supported and the options for Lead register and modality are set in this section. The input program will supply THREAD/ON command followed by the GOTO to enable threading motion as before.

CAM systems can generate a complete threading cycle with THREAD/AUTO or THRDSQ commands. You can let the G-Post convert this into multiple G33 blocks. If you prefer to handle this in FIL, then select the option "Do not expand" and write your FIL code to parse THREAD/AUTO command and output the desired blocks.

Note: This option must be set in the option file and cannot be set/reset using FIL.

New G-POST commands added:

MODE/MILL Specifies milling mode.

Note: there is no option file number with this command. This indicates the use of new mill-turn mode instead of the merge method using UNCMRG.

Under **MODE/MILL**, there are three new commands to further control milling operations.

SPINDL/PARLEL,ZAXIS specifies milling at the end of the part.

SPINDL/PARLEL,XAXIS for milling at the side of the part.

MODE/YAXIS,[ON-OFF-AUTO] can be given to use the Y-axis or output ZC or XC coordinates. The limits of the Y-axis will be set in the option file.

MODE/TURN Specifies turning mode. With this, you can specify normal turning/facing operations with GOTO/commands. Also the commands PITCH and THREAD/ON are now enabled for threading.

In addition, the complete CYCLE/commands and circular motion are fully supported for all configurations in milling and turning modes.

Sample program:

```
PARTNO TEST
MACHIN/UNCX01,1    $$ SET UP A LIVE TOOLING MACHINE IN OPTFILE
MODE/TURN          $$ TURNING MODE
TURRET/1,1
SPINDL/300
FEDRAT/10
FROM/10,10,0
GOTO/10,1,0        $$ TURNING OPERATION
GOTO/1,1,0
RAPID
GOTO/10,10,0
GOTO/10,1,0        $$ THREADING OPERATION
PITCH/8
THREAD/ON
GOTO/1,1,0
RAPID
GOTO/10,10,0
MODE/MILL          $$ MILLING MODE SPINDL PARLEL TO Z-AXIS
SPINDL/PARLEL,ZAXIS
```

```
FROM/10,10,10
GOTO/10,1,5
MODE/YAXIS,ON          $$ USE Y OUTPUT INSTEAD OF XZC
GOTO/10,-1,5
RAPID
GOTO/10,10,10
MODE/MILL               $$ MILLING MODE SPINDL PARLEL TO X-AXIS
SPINDL/PARLEL,XAXIS
MODE/YAXIS,AUTO        $$ AUTOMATIC Y OUTPUT INSTEAD OF XZC IF IN LIMITS
GOTO/10,1,5
GOTO/10,-1,5
RAPID
GOTO/10,10,5
END
FINI
```

2.5 Mill Motion Analysis

Under rapid traverse mode, the Mill post processor optional can be setup to splits a given move into two blocks. **PLABEL/OPTION,40** should be set to control the exact motion analysis desired. The default motion analysis is a follows:

- When the spindle is advancing, the post processor outputs XY and ROTARY as one block and then outputs Z as a separate block.
- When the spindle is retracting, the post processor outputs Z as one block and then outputs XY and ROTARY as a separate block.

3 The Option File Generator

Introduction

The Option File Generator (OFG) is an application that is used to create and/or modify an Option File. Option Files are used to configure a post processor to the user's specifications. The Option File is read by the G-Post at execution time and pre-configures the post processor's internal variable table prior to reading the toolpath or CL file.

The OFG has gone through many changes since it was first introduced back in the early 1980's. Most of those changes were refinements and enhancements introduced as a result of the experience gained from having the application out in "real world" manufacturing environments. This is where we had to make it do the job for our customers. As a result the OFG has evolved to have many new features that make it easier for a user to create a post processor for their NC/CNC machine tools.

This latest version of the OFG has been updated to take advantage of the many advancements that Graphical User Interface (GUI) technology offers. These interface enhancements have dramatically improved the application's presentation of complex concepts by the use of graphical tools such as spin buttons, bitmap images and special widgets. In addition, the OFG provides a constant environment where both the Option File and it's associated FIL file (see the FIL Manual for more information) are presented as a complete package for the user.

Finally, the OFG has a complete and context sensitive help feature that takes advantage of the help presentation features of today's modern GUI interfaces. The full details of the process of creating a postprocessor for your machine are documented on-line where you can get immediate help on any feature or concept about which you might be unclear.

First, a Few Words...

Before we explain the Option File Generator (OFG), you need to know what assumptions we are making about you and the experience you have.

What You Need to Know

The Option File Generator (OFG) is an application that is much easier to use and understand than any of its predecessors but you will be much more successful if you possess the following skills and/or knowledge:

- A basic understanding of NC programming
- Understanding of the Post Processor functional requirements
- Knowledge of your machine/controller requirements

What You Need to Have

You must have the following to use the Option File Generator (OFG) and the resulting files produced.

- Lathe G-Post *or* Mill G-Post software.
- XPOST (post processor only) CAD/CAM Interface.
- Option File Generator JAVA software

This manual refers to other Austin N.C., Inc. manuals in several places. You will need the following manuals:

- *Factory Interface Language (FIL) Manual*
- *CimPRO NC System Guide*

3.1 How To Use the Option File Generator

This section provides a broad overview of the Option File Generator (OFG). We explain the basics of how to use the OFG and tell you where to look for specific reference information.

3.1.1 Overview of the Option File Generator

The Option File Generator enables you to do the following tasks:

- Interactively create an Option File that will configure a post processor for your NC/CNC machine/control requirements.
- Provide an interface for creating/editing a FIL file for any specialized post processor requirements.
- Create your post processor from existing templates or post processors you may have already created.

You do this by writing an Option File called **UNCL01.Pnn** (if you are using the Lathe G-Post) or **UNCX01.Pnn** (if you are using the Mill G-Post). The **nn** in the file name represents the machine number you assigned to when you initialized the Option File Generator. If you choose to utilize the advanced features of FIL, an additional file will be created using the same file naming convention but the file extension will begin with **F**. For example, to use FIL with the Lathe G-Post, you would have an Option File **UNCL01.Pnn** and a FIL file **UNCL01.Fnn**. If you need help creating a FIL file, see the *Factory Interface Language (FIL)* manual.

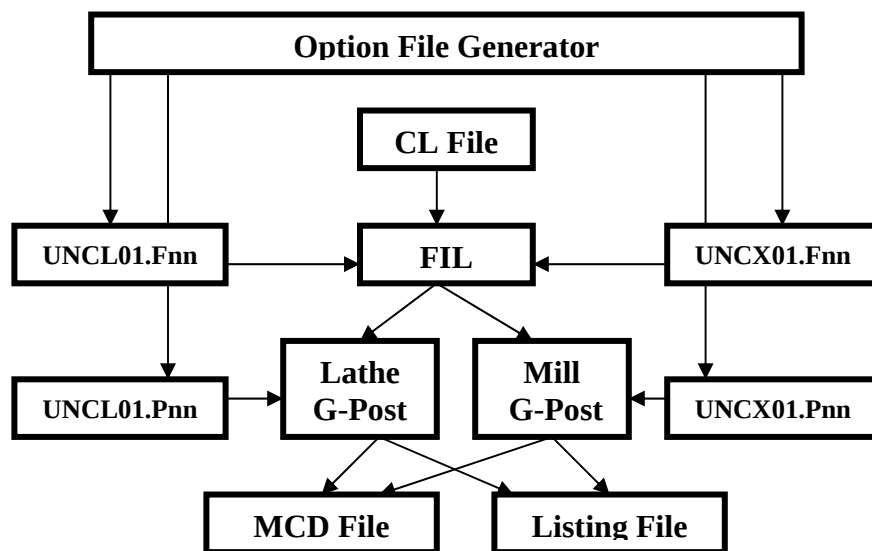


Figure 8 Postprocessing Model

3.1.2 First Things First: Plan

Before you begin the process of creating a post processor you will want to gather some information about your machine and its controller. The following list is an example of the information you will be required to know in order to build your post processor.

Machine tool manuals

- Axis travel limits and (optional) home position
- Axis feed rate limits
- Spindle limits and ranges

Machine Controller and/or programmer's manuals

- Machine preparatory (G) and auxiliary (M) codes
- Address register formats and limits
- Circular motion requirements

3.2 Starting the Option File Generator

3.2.1 Introduction

The Option File Generator and the G-Post are intrinsic components of Austin N.C., Inc.'s programming systems: CimPRO and AutoPRO. In addition, they can be purchased separately for use with many of the popular CAD/CAM systems that are capable of producing tool path (CL) data files. This chapter discusses the methods used to start the Option File Generator in each of those environments.

3.2.2 Starting from AutoPRO

AutoPRO is a programming system module that runs inside of AutoCAD. The user must start AutoCAD, create or open a drawing, then invoke AutoPRO. When the user starts AutoPRO they have the option to do one of the following:

- Configure the machine tools for AutoPRO using the Configuration Manager
- Create tool paths using the Toolpath Manager
- Post process jobs using the Output Manager



Figure 9 – AutoPRO Control Panel

Select the Configuration Manager to Add or Modify a machine.

From the Configuration Manager:

If you are creating a new machine then select the desired folder for the machine type you want to create and then select **New**.

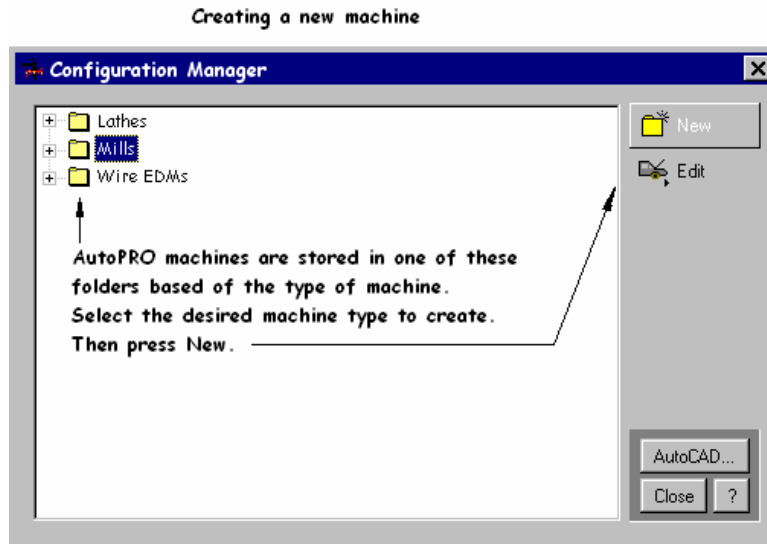


Figure 10 – Creating a new machine

If the machine already exist or you just created the machine then expand the desired machine's folder and **Edit** the Option File.

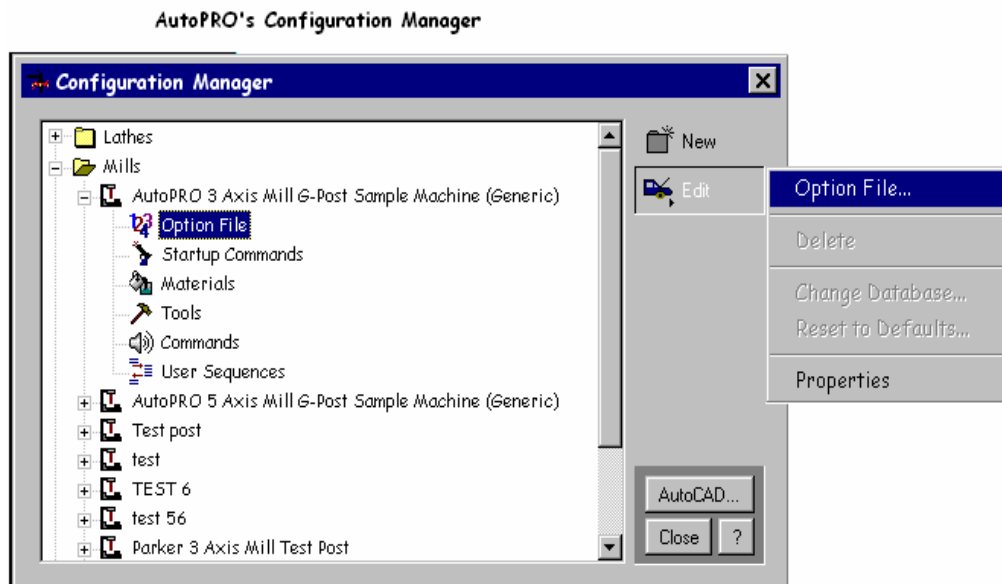


Figure 11 – AutoPRO Configuration Manager

The Option File Generator will startup.

3.2.3 Starting from CimPRO

CimPRO is the Graphical User Interface that provides the user with easy accessibility to the APT and G-Post Systems. These software packages have been the core of Austin N.C., Inc.'s NC business for over 30 years.

CimPRO is a GUI application shell that provides easy access to the applications and files a user works with to create machine data. Starting the Option File Generator from CimPRO is simply a matter of picking the appropriate icon as shown below:

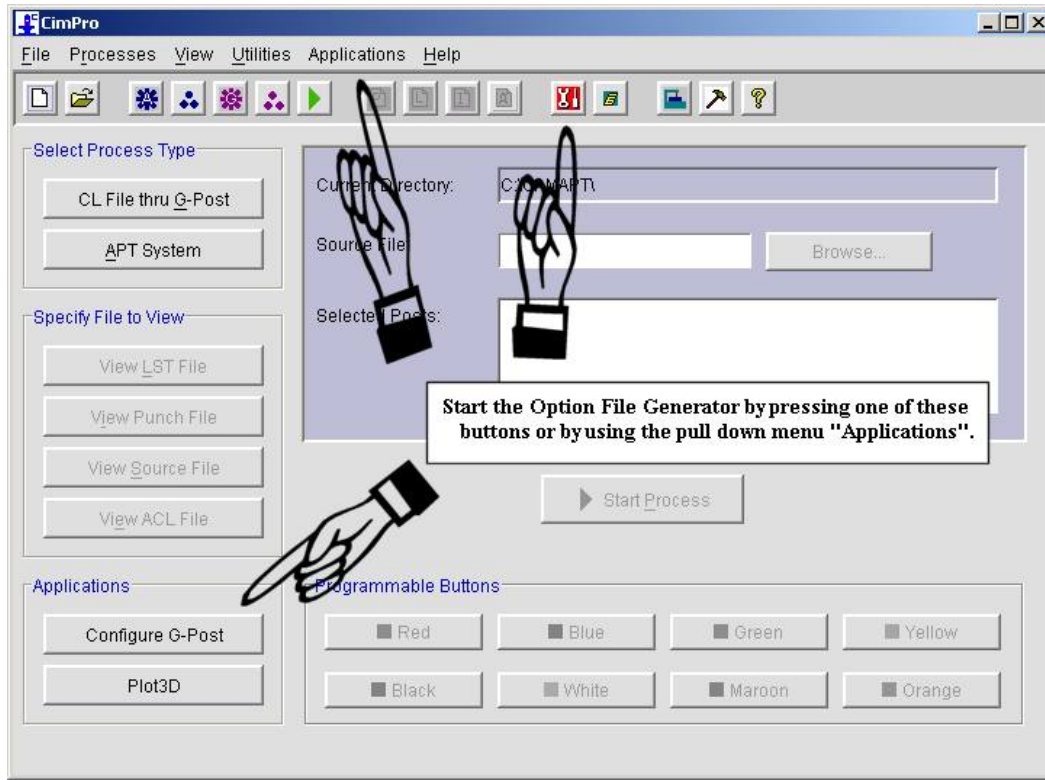


Figure 12 – CimPRO Main Screen

3.2.4 Stand Alone Operation

You may also create a shortcut or icon to start the Option File Generator in stand alone mode if you desire.

The following is a description of the procedure to set up a shortcut for MicroSoft Windows. For any further assistance with Windows please consult your Windows documentation.

3.2.4.1 Setting up a Windows Shortcut:

1. Position the cursor on the Windows desktop area so that it is not on an active application, an icon or any task bar.
2. Click the right mouse button once.
3. A small menu will appear. From this menu click the left mouse button on "New".
4. Another menu will appear. From this menu click the left mouse button on "Shortcut".

5. An application screen will appear titled “**Create Shortcut**”. There is a field where you will need to enter the full path to the application for the Option File Generator . The path will consist of the disk on which you installed the system with the following directory/file information. If you installed the CimPRO system on the C: drive, your entry would look like this.

C:\CAMSYS\OPTFILE.EXE

Click the “**Next**” button.

6. Complete this process by assigning your new icon a name and clicking the “**Finish**” button.
7. When you do you should end up seeing the following icon.



Figure 13 – Option File Generator Icon

3.3 Using the Option File Generator

After you have started the Option File Generator by one of the methods covered in the previous section, the Option File Generator main menu will appear as follows:

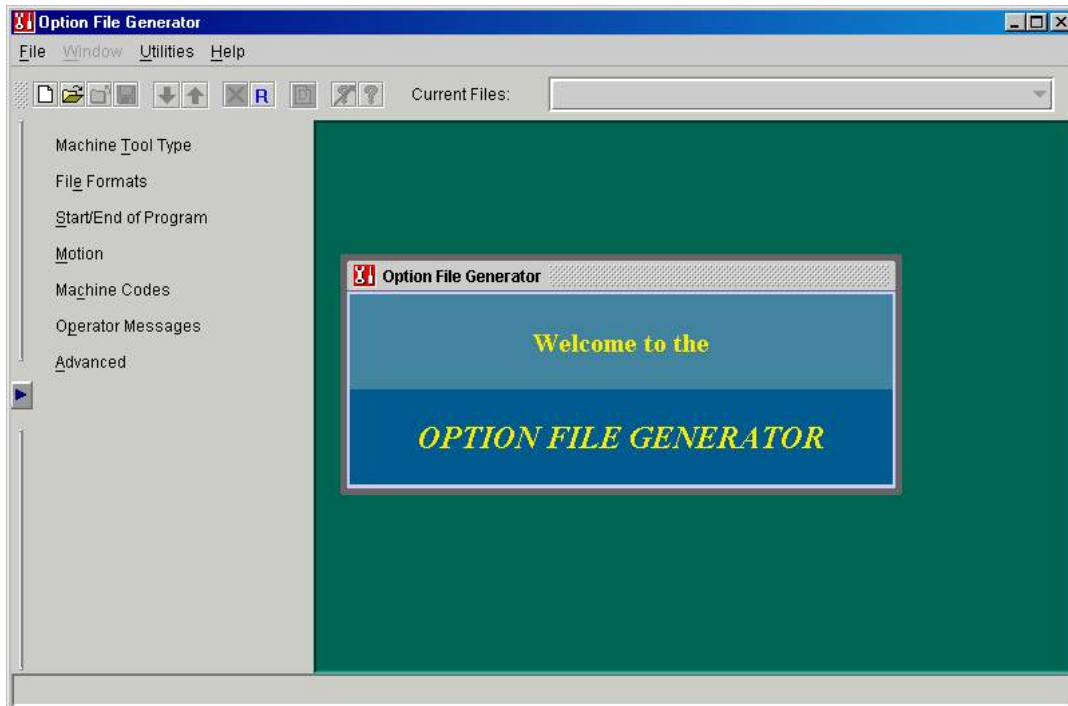


Figure 14 - Start Up Screen

At this point you must either create a new option file or open an existing option file.

3.3.1 Creating a New Post Processor Option File

To create a new option file you can select “**File**” from the pull down menu.

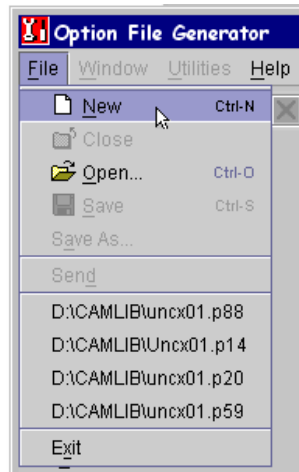


Figure 15 – Creating a New Option File

or select the new file icon:

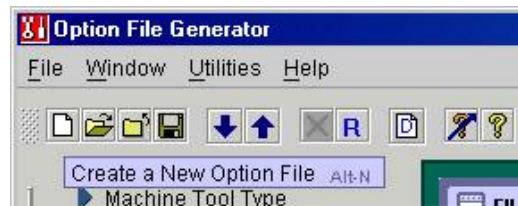


Figure 16 – Creating a New Option File

After selecting “**New**” you must specify the type of option file you are creating from the following dialog box:

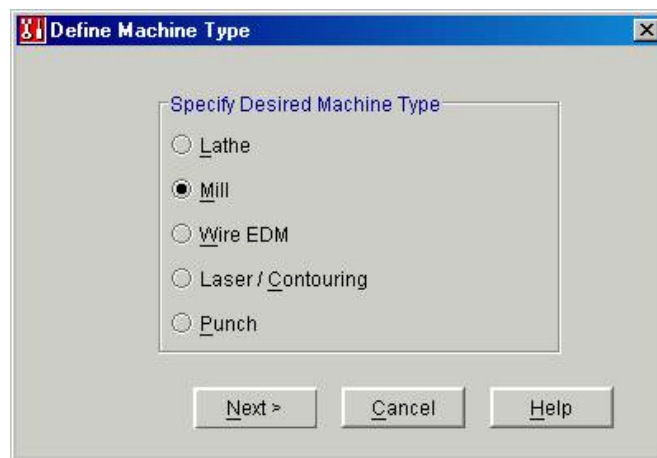


Figure 17 – Selecting the Machine Type

Select the desired type and click the “**Next**” button.

Next you must specify the machine number for this option file using the following dialog box:

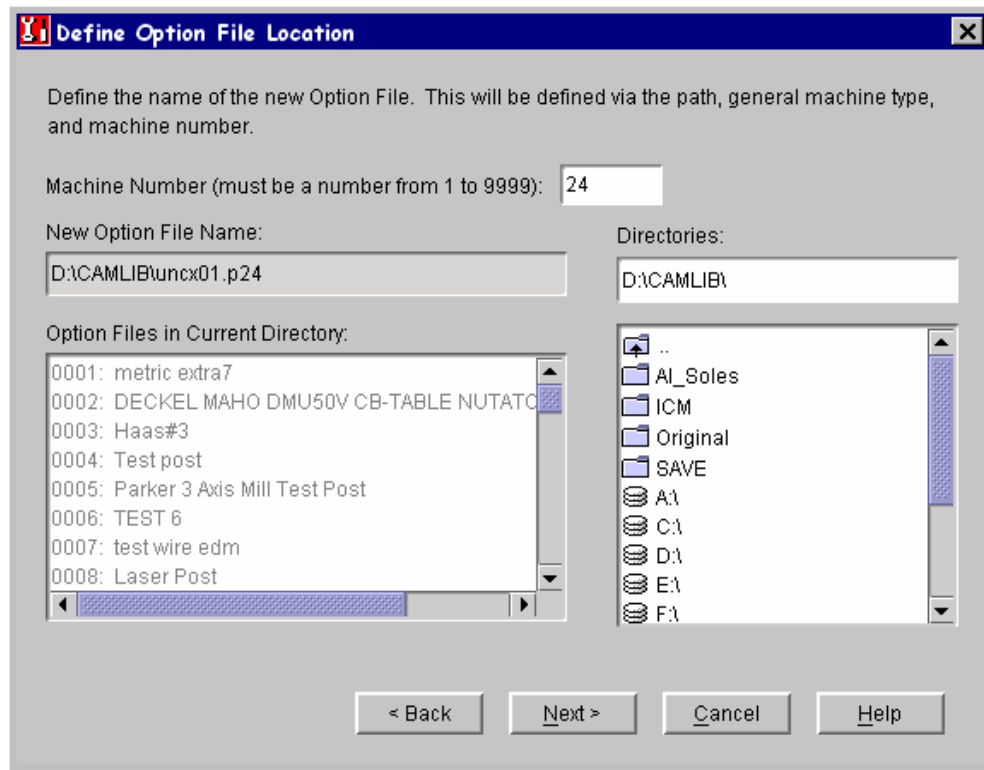


Figure 18 - Specifying the postprocessor number

The Option File Generator will find the next available option file number and automatically fill in the **Machine Number** box. You can either accept the recommended machine number or you can type in a new number in the **Machine Number** box. If you want to store the option file on another disk or in a different directory you can use the **Drives** and **Directory** area to change these locations. A list of existing option files will be grayed out as it is a reference. Once the option file number is selected, select the **"Next"** button.

Next you must select the **"Method of Initialization"** from the following dialog box.

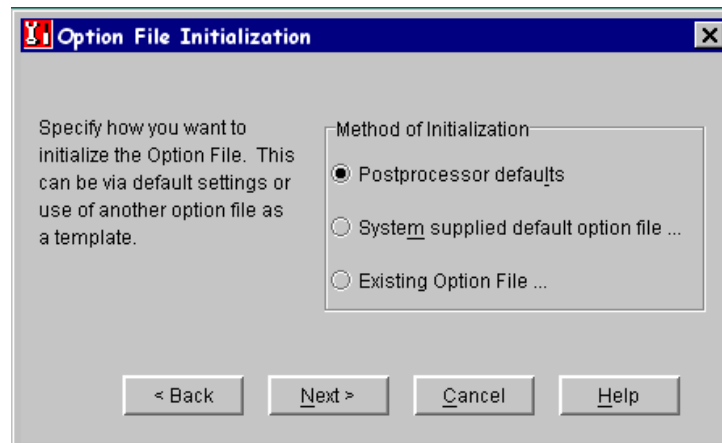


Figure 19 - Method of Initialization

You can choose one of the three following initialization options:

1. You can use the default settings of the post processor.
2. You can select one of the supplied default post processors.
3. You can select any existing post processor option file.

To make your selection pick the method and click the **“Next”** button.

If you select option 1, **“Use the post processor defaults”** you will be prompted to specify the title for the new option file. (Skip the next paragraph and Figure 20)

If you select option 2, **“Select a system supplied default option file”** or option 3, **“Select an existing option file”** the following dialog box will appear. Option 2: You must select one of the option file templates from the library directory (Normally CAMLIB). Option 3: You can select any option file that you have access rights to. You can navigate to the drive/directory of your choice using the window on the right of this dialog box.

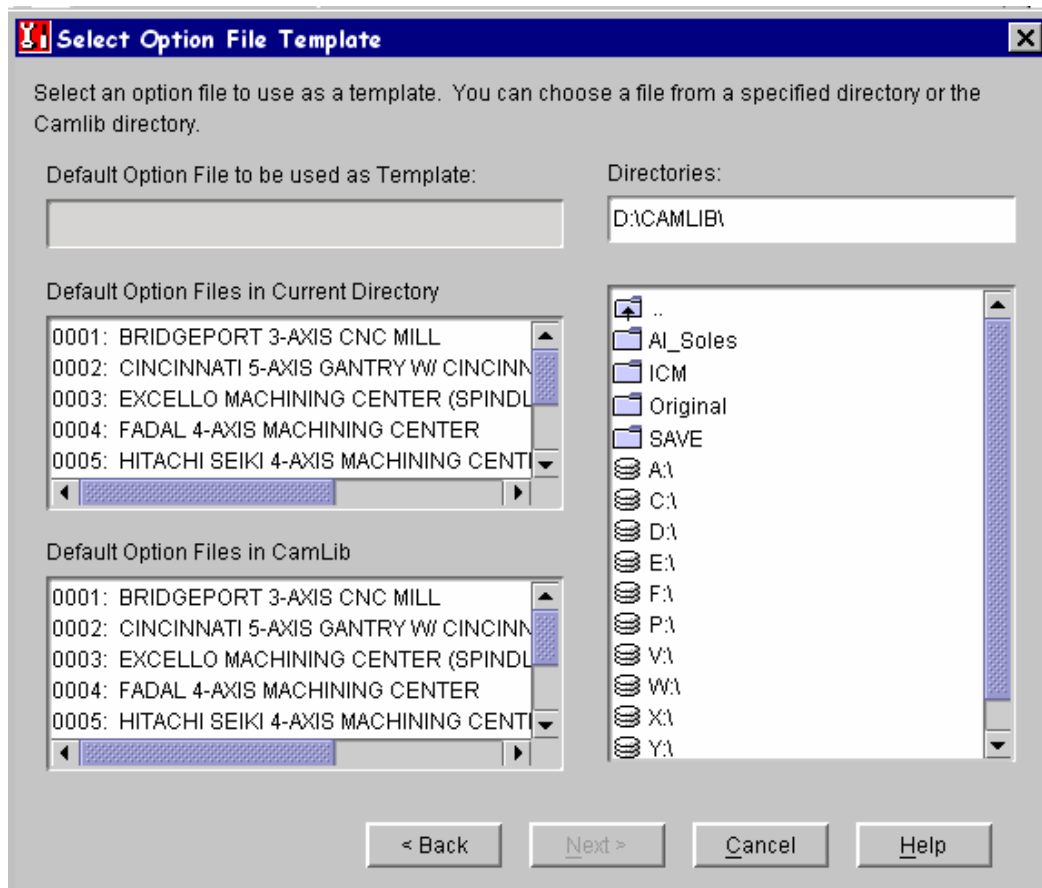


Figure 20 – Initializing from a system supplied default option file

Once a template option file or existing option file has been selected click the **“Next”** button.

You will then be prompted to specify the title for the new option file in the following dialog box.

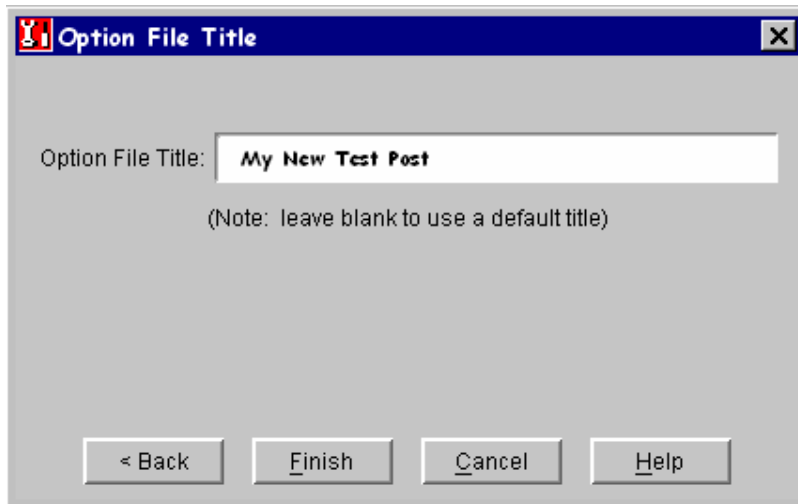


Figure 21 - Specify the title for the new option file

Enter the desired post processor title then select the **“Finish”** button.

3.3.2 Opening an Existing Post Processor Option File

To open an existing option file you can select **“File”** from the pull down menu then select **“Open”**.

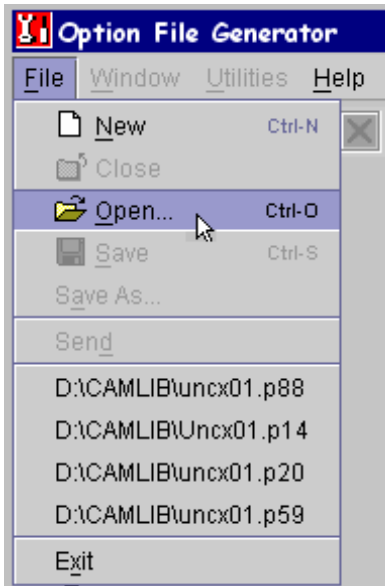


Figure 22 – Open an Existing Option File

Or select the **“Open”** file icon.

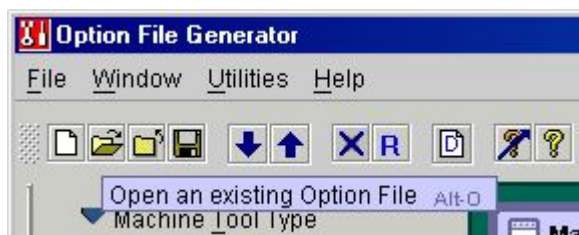


Figure 23 - Open an Existing Option File

After selecting **“Open”** you must select the option file to open from the following dialog box.

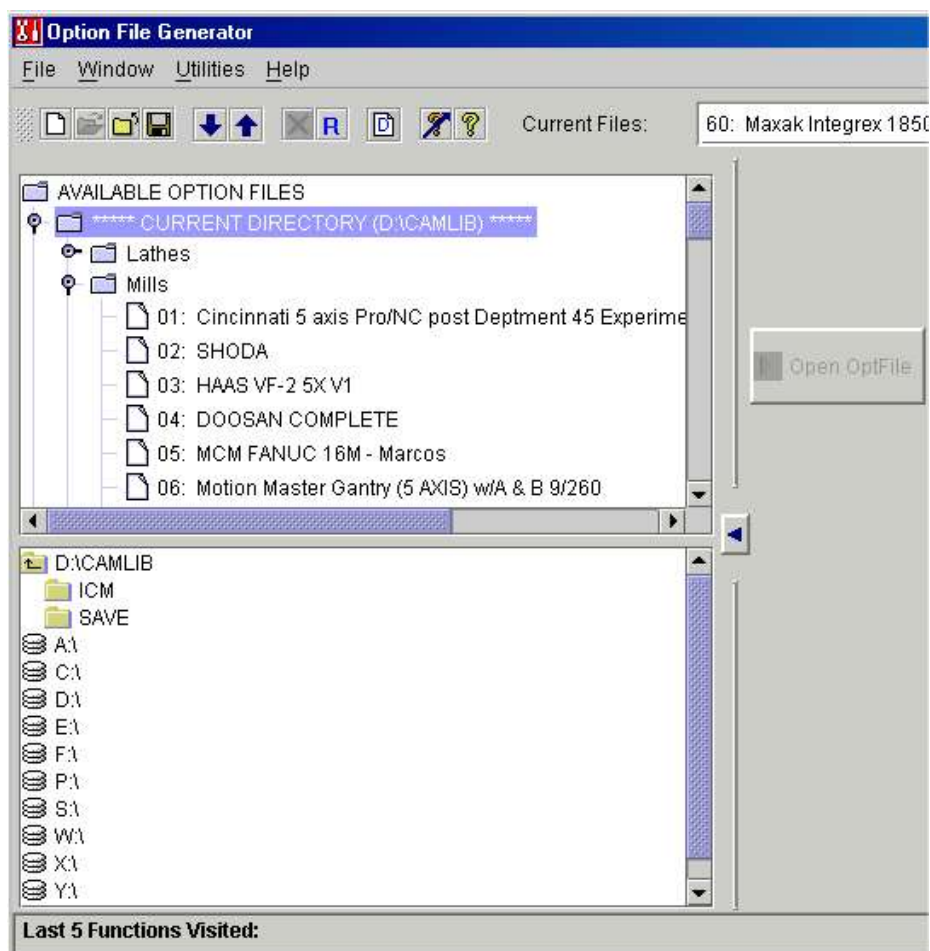


Figure 24 - Opening Existing Option files

Select the desired option file by clicking on it and clicking the **“OK”** button or by double clicking the option file name.

The **“Option File Generator Main Menu”** will appear.

3.3.3 Option File Generator Main Menu

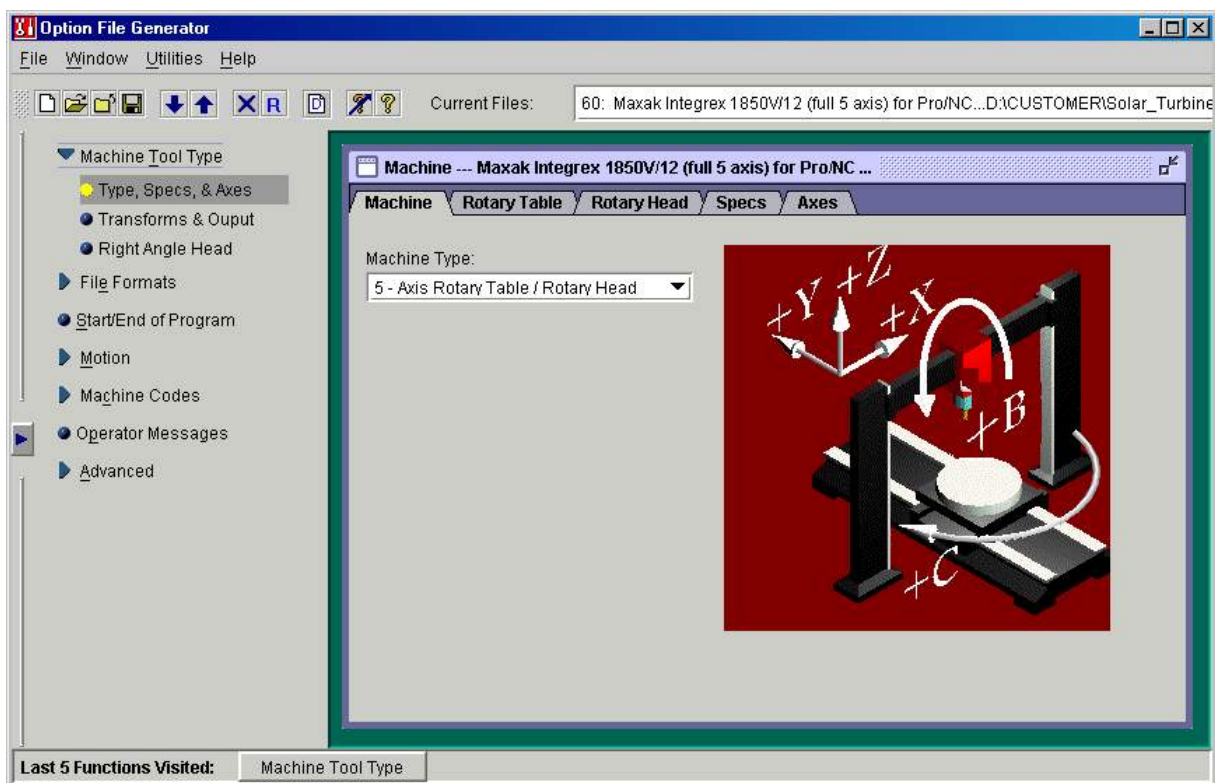


Figure 25 - Option File Generator Main Menu Screen

Once the Option File Generator Main Menu appears you are ready to start customizing the option file.

The following will discuss how to move around throughout the Option File Generator and how to make changes to the different features of G-Post.

To start the Option File Generator screen is divided into several sections as follows.

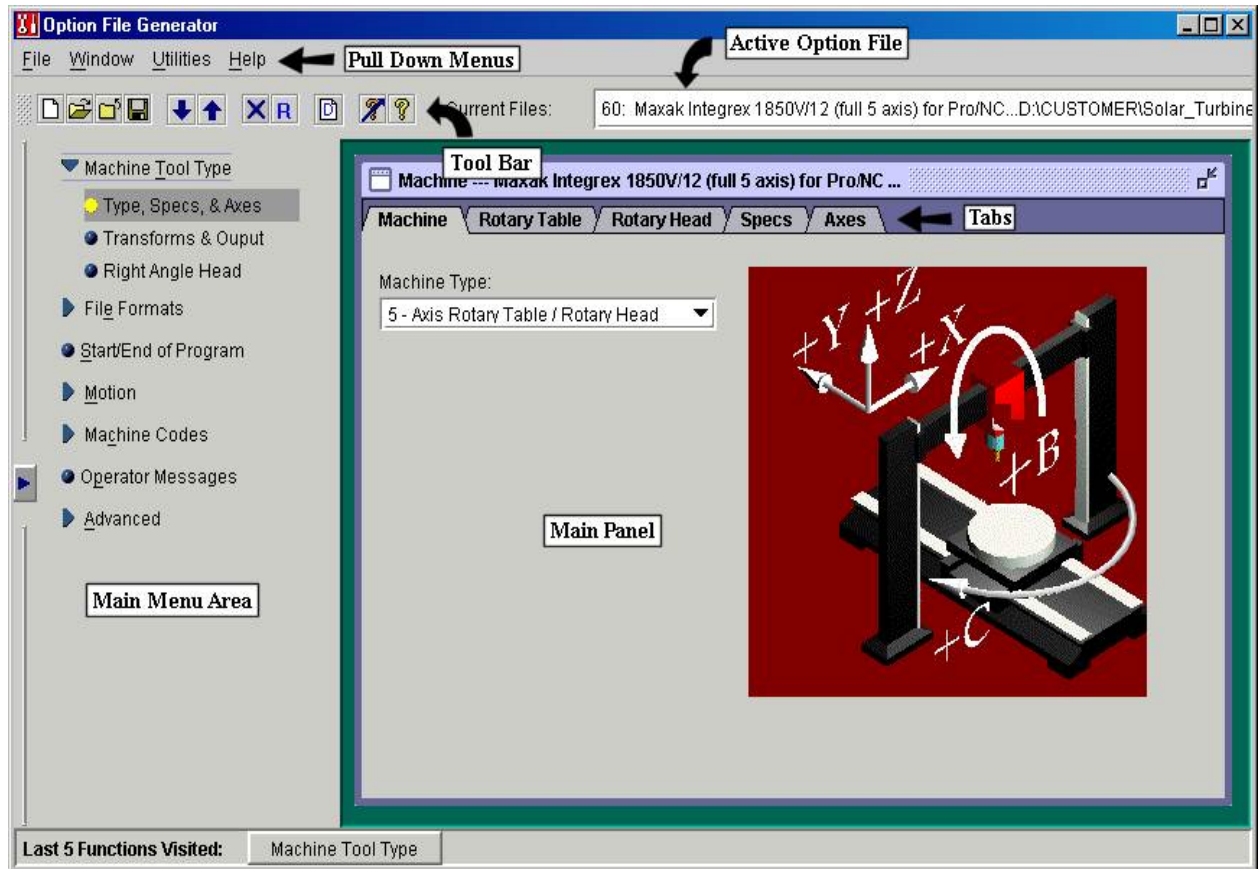


Figure 26 - Option File Generator Layout

3.3.3.1 Main Menu Area

The area of the Option File Generator pointed out by the “Main Menu Area” caption above is a vertical menu used for selecting the different post processor function categories to modify. To select a different category just click on the category title and the information in the “Main Panel “ will change to activate selection features associated with the chosen category.

3.3.3.2 Main Panel

This area will dynamically change according to the current category selected. In some categories this section will have multiple tabs (or sub-panels, see figure 27) available for selection at the top of the main panel. To select different sub-panels just click on it's tab.

To modify or change information on these pages there are several different methods employed. To activate the modification mechanism you must typically position the cursor onto the subject area or field and click the left mouse button. The different mechanisms are as follows:

- A selection box presents the current function selection and can be modified by clicking the left mouse button in the selection box. A list of choices will appear where the current selection will be

highlighted. Move to the desired choice and click the left mouse button again. Your selection will be activated and the list will disappear leaving your selection displayed.

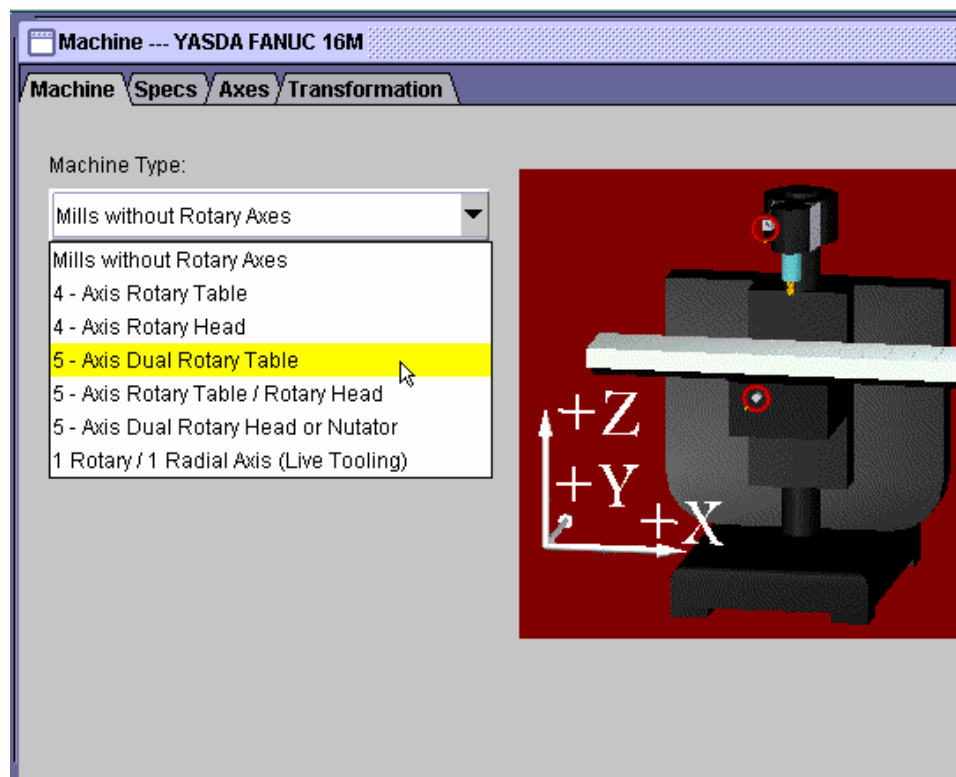


Figure 27 – Multiple Choice Selection Box

- A “Register Box” or “Letter Address box” can be modified by clicking the left mouse button on the register or letter address. A list of addresses will appear where the current selection will be highlighted. Move the cursor to the desired letter address and click the left mouse button again. The choice will be activated and the list will disappear leaving your selection displayed.



Figure 28 - Address Register Selection Box

To set the format of a letter address register. The following dialog box will appear:

Register Settings

Register: Sequence Nbr

Address: N

Alias (before): none Example:

Alias (after): none (8 chars max, UPPERcase)

Number of Digits

Metric

Before decimal: 5

After decimal: 0

Inch

Before decimal: 5

After decimal: 0

Output

☐ Leading 0's ☐ + Sign

☒ Trailing 0's ☐ Decimal point

To copy the above "Digits" and "Output" settings to other register addresses, 1) click the Copy button, 2) select another address from Address field above, 3) click the Paste button.

Copy Paste OK Cancel

Figure 29 - Address Register Format Box

Use the “**Spin Buttons**” to adjust the “**Before decimal**” and “**After decimal**” output for inch and metric modes. Use the check boxes in the “**Output**” section to specify the output state of leading zeros, trailing zeros, plus sign and the decimal point. To set the format on a different letter address register, click the left mouse button on the on the letter address in the upper left hand corner of this dialog box and the register address selection box will allow you to select another letter address. When you have finished formatting the letter addresses select the “**Close**” button.

Changing Multiple Register Addresses Simultaneously

You can apply format settings to multiple register addresses through use of the “**Copy**” and “**Paste**” buttons. A typical circumstance where this is handy is a change to the format for motion registers. Normally if one of the XYZIJK register addresses change, the requirements is for all of those addresses must change.

Assume you have set the X-axis register address to the desired format. Simply position the cursor on the **“Copy”** button and click the left mouse button, the **“Register”** area will now say **“Copy & Paste”**. Now position the cursor on the **“Address”** area and click with the left mouse button. A list of the active letter addresses will appear, select the letter you wish to copy this format to. The selected letter address will now appear in the **“Address”** area. Click the **“Paste”** button, and the current format will be applied to the new letter address. You can repeat this process with as many letter addresses as you wish. To complete the **“Copy & Paste”** operation click on the **“OK”** button.

- To rearrange the order of the “registers” or “letter addresses” the “MCD File Format” menu has a reposition feature. To use this position the cursor over the text area to the left of the “ADDR” column. Press and hold down the left mouse button and drag the register and drop it into the desired location. The red line will indicate the new location of the address when the mouse button is released.

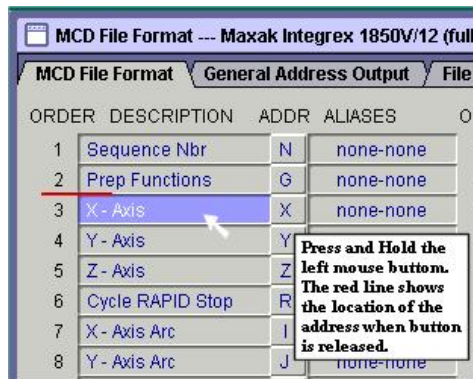


Figure 30 - Register Address Ordering

- An “Edit Box” can be updated by positioning the cursor in the edit box, clicking the left mouse button and typing in the desired information. Clicking on the symbol to the right of the “Edit Box” brings up a calculator (See Figure 32).

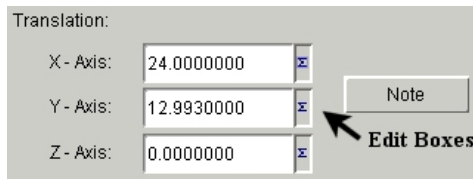


Figure 31 – Edit Box

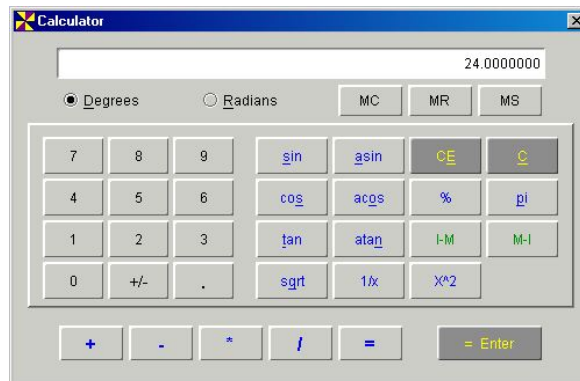


Figure 32 – Calculator

- An “ASCII Character Box” can be modified by positioning the cursor on the ASCII character box and clicking the left mouse button. An ASCII character table will appear where the current selection will be highlighted. Move the cursor to the desired character and click the left mouse button. The character will be selected, the table will disappear and the selected character will be displayed in the “ASCII Character Box”. If you wish to use an ASCII character not shown in the table, select “**enter value...**”. You will be prompted to enter the decimal value for the ASCII character desired. Enter the decimal value and click the “**OK**” button. Any ASCII character can be selected, even non-printable characters.

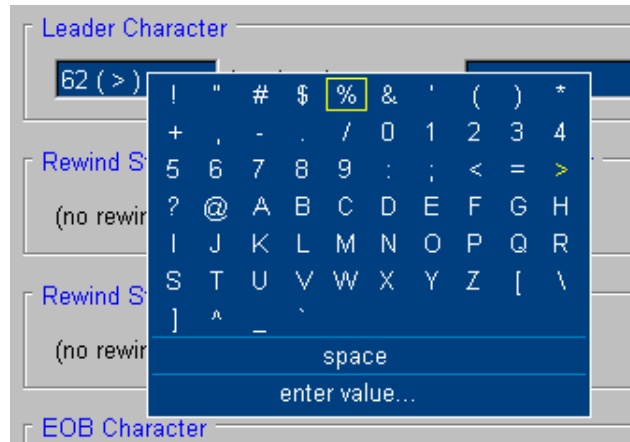


Figure 33 - ASCII Character Box/Table

- A “Function Code Box” is used to allow specifying the decimal value to be output for preparatory (typically G) and auxiliary (typically M) function codes. These codes can be modified by positioning the cursor on the selection function’s “edit box” then clicking the left mouse button. The “Function Code Box” will appear with a list of available codes where the current selection is highlighted. Move the cursor to the desired code and click the left mouse button. The code will be selected, the list will disappear and the selected value will be displayed.

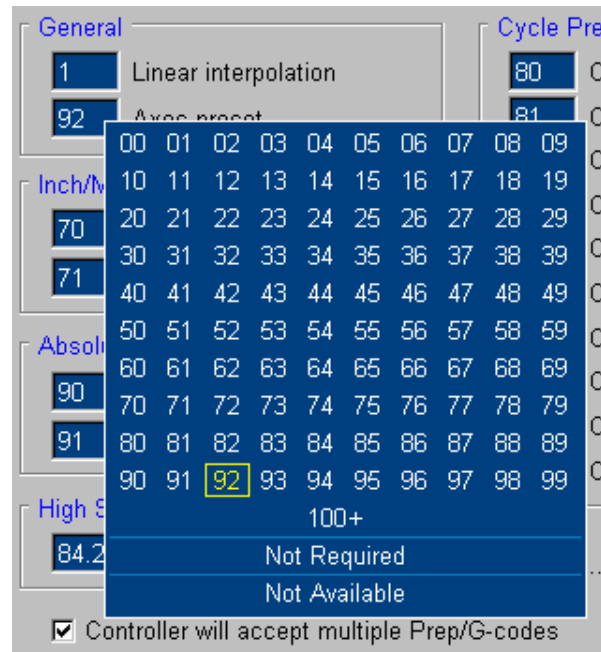


Figure 34 - Function Code Box

If you select **+100**, you will be prompted to enter the code value. Type in any value between 0-999 and either press the **“Enter”** key or use the mouse to select the **“OK”** button. The entered value will then be displayed in the **“Edit Box”**.

Selecting **“Not Required”** will instruct the post processor that no code (G or M) is to be output for the post processor command represented by the function. The post processor command will still be processed as if it functions normally, just no code will be output.

Selecting **“Not Available”** will instruct the post processor that this particular function does not exist in the post processor. Subsequent use of the post processor command the function represents will invoke a warning message from the post processor or cause unintended output. **“USE WITH CAUTION”!**

- An **“Edit Box”** with a **“Spin Button”** can be updated by either clicking on the up arrow and down arrow to change the value in the box or by selecting the box with the left mouse button and typing in the value directly.

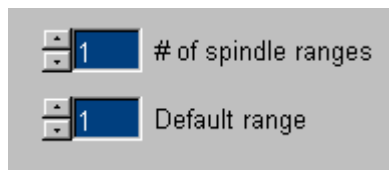


Figure 35 - Edit Box with Spin Buttons

- A special search engine in the post processor menu category **“Advanced -> Search”** is used to search through the post processor common list for desired information. To use this search engine, enter a string in the search box located in the lower left corner of the window. To execute the search click the left mouse button on the **“Forward Search”** or **“Reverse Search”** button.

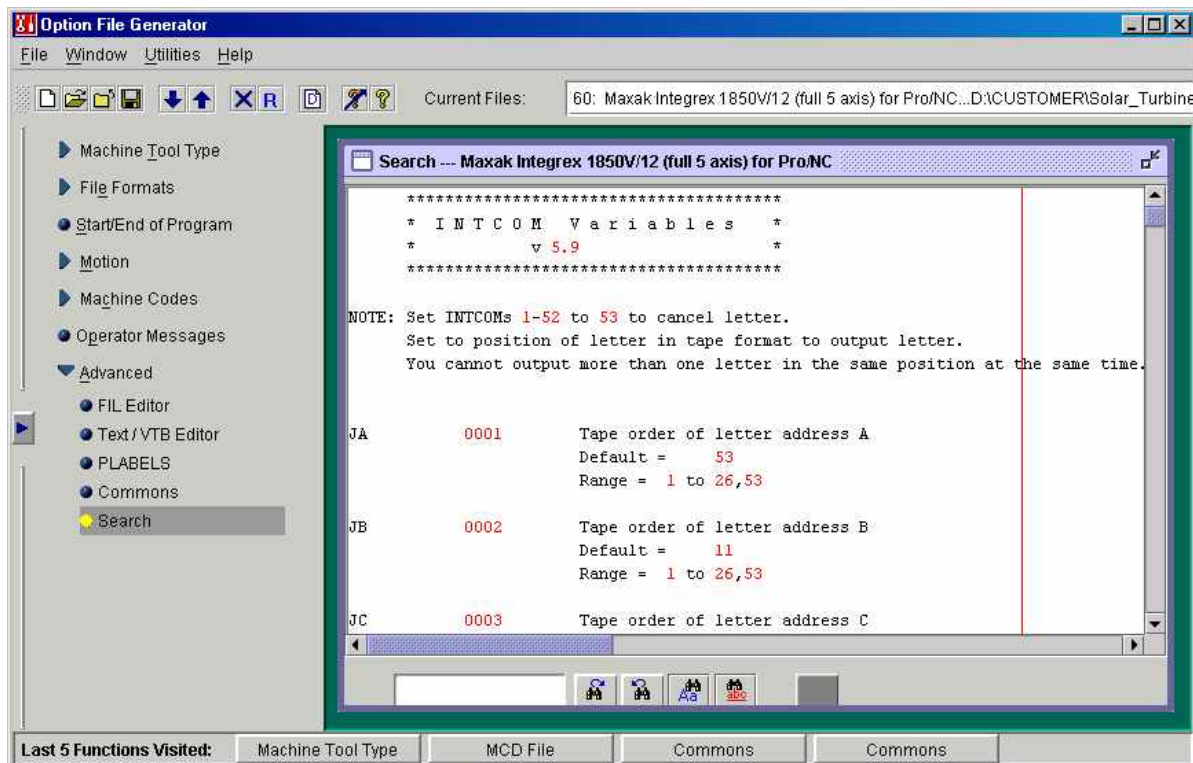


Figure 36 - Common Variable Document Search Engine

Note: To fully understand and appreciate the value of this feature you will be required to acquire a functional knowledge of FIL (Factory Interface Language). The engine is used to search for variables used internal to the post processor so that the user can more fully utilize the power of FIL. (See the Factory Interface Language (FIL) manual)

3.3.3.3 Tool Bar

The following is a description of each icon on the toolbar from left to right:

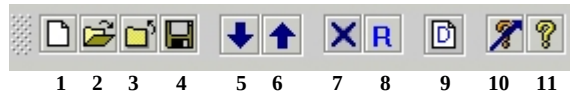


Figure 37 - Tool Bar Icons

1. File New – Start the create a new option file process.
2. File Open – Open an existing option file.
3. File Close – Close the current option file. If the current option file has not been saved the Option File Generator will prompt you to save this option file.
4. File Save – Save the current option file without exiting the Option File Generator.
5. Decrease Main Panel Size – Decrease the screen size of the Main Panel Area.
6. Increase Main Panel Size – Increase the screen size of the Main Panel Area.
7. Cancel Edits to Current Panel – Set the current menu selection back to it's original values
8. Refresh – Refresh the File Open dialog boxes. Used when new posts are added to directories.
9. Specification Document – Creates a post processor specification document for the current option file.
10. Help –Opens the help file with information about the current panel.
11. Component Help –Opens the help file with information about the current panel item, displayed at the bottom of the current option file.

3.3.3.4 Pull Down Menus

Following is a description of each of the Pull Down Menu functions:

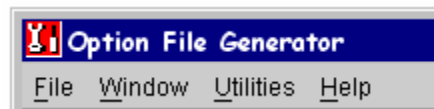


Figure 38 - Pull Down Menu

3.3.3.4.1 File Menu

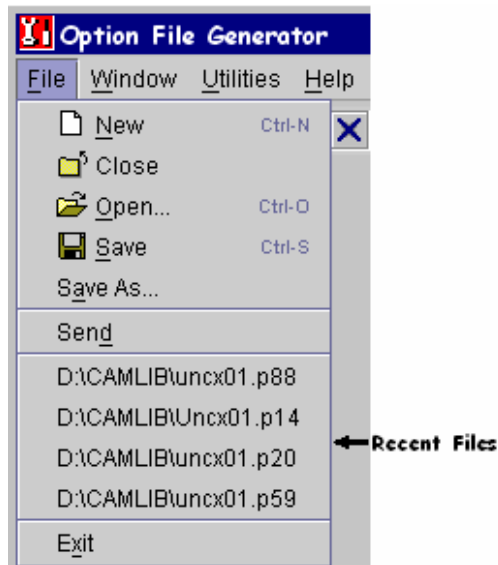


Figure 39 - File Menu

1. File New – Create a new option file.
2. File Open – Open an existing option file.
3. File Close – Close the current option file. If the current option file has not been saved the Option File Generator will prompt you to save this option file.
4. File Save – Save the current option file without exiting the Option File Generator.
5. File Save As – Save the current option file with a new machine number.
6. Send –Email the current Option File and FIL file. You must have your email system setup on you workstation for this command to work..
7. Recent Files List - Up to the last five option files opened will be listed here.
8. Exit – Close the Option File Generator and prompt you to save any opened Option files.

3.3.3.4.2 Window Menu

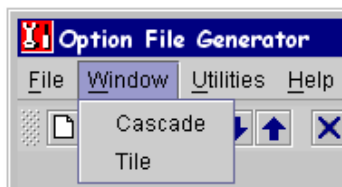


Figure 40 - Window Menu

The Option File Generator is a multiple document interface, that means you can have more than one option file opened at any time. When more than one option file is opened you can uses these menu commands to manipulate the viewing of these option files.

1. Cascade – Cascade all windows in the Main Panel Area.
2. Tile – Tile all windows in the Main Panel Area.

3.3.3.4.3 Utilities Menu

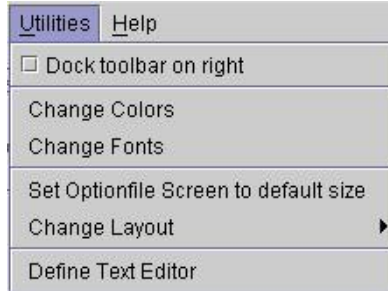


Figure 41 - Options Menu

1. Dock Toolbar on Right - Move the toolbar to the right side of the window.
2. Change Color - Change the current colors.
3. Change Font - Change the current screen fonts.
4. Set Option File Screen to default size.
5. Change Layout.
6. Define Text Editor.

3.3.3.4.4 Help Menu

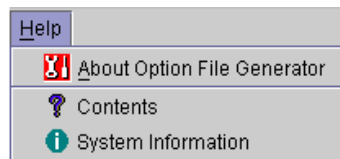


Figure 42 - Help Menu

1. About Option File Generator – Get the current software release and copyright information.
2. Contents - The standard windows help screen for the Option File Generator.
3. System Information – Get the current system type, build number, directory locations.

3.3.3.5 Current Files

The Option File Generator is a multiple document interface, that means you can have more than one option file opened at any time. The “**Current Files**” box is how you can tell which option file is actively being modified. To change the active file just click in the “**Current Files**” box” with the left mouse button. A list of the currently opened option files will appear with the active option file highlighted, select the desired option file to modify by clicking on it with the left mouse button, the list of option files will disappear and the one selected will become the active option file for modification.

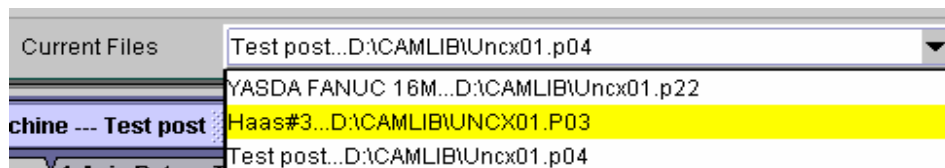


Figure 43 – Current Files Box

4 Command Reference

Introduction to Commands

This chapter describes the G-Post vocabulary commands in alphabetical order by major word. If the command is only for the Mill G-Post an **(M)** follows the command name. If the command is only for the Lathe G-Post, an **(L)** follows the command name. No letter indicates the command applies for both Mill and Lathe. The post processors interpret the vocabulary as commands. This chapter explains the function of each command and it's associated minor words, using the following conventions:

Postprocessor command:	Major word with or without Minor entry
Minor entry:	Minor word or <i>Scalar</i> or both
Minor word:	W1-W2 or [,W1-W2] or ([W1][,W2])
W1-...Wn	One entry is required
[,W1-W2]	W1 or W2 is optional
([W1][,W2])	W1 or W2 is required or both can be used
<i>Scalar</i>	Lower case letter requiring a numerical value

Example: COOLNT/ON-OFF

The following combinations may be used:

COOLNT/ON
COOLNT/OFF

Example: FEDRAT/f[,IPM-IPR][,RAPTO,d]

The following combinations may be used:

FEDRAT/f
FEDRAT/f,IPM
FEDRAT/f,IPR
FEDRAT/f,RAPTO,d
FEDRAT/f,IPM,RAPTO,d
FEDRAT/f,IPM,RAPTO
FEDRAT/f,IPR,RAPTO

Example: CHECK/([XAXIS,x1,x2][,YAXIS,y1,y2])

The following combinations may be used:

CHECK/XAXIS,x1,x2
CHECK/YAXIS,y1,y2
CHECK/XAXIS,x1,x2,YAXIS,y1,y2

4.1 ARCDAT

ARCDAT/*x,y,z,i,j,k,r*

This command defines the circle for a circular move. This is the TYPE 3000 CL record.

x,y,z Specifies the center coordinates of the circle.

i,j,k Specifies the circle axis, same as the tool axis.

r Specifies the circle radius.

The **ARCDAT** command will appear before the **ARCMOV** command line to define the arc. Radius is the true radius of the arc, not the offset by the cutter radius.

Example:

Input:

```
GOTO/0,5,0
ARCDAT/0,0,0,0,0,1,5
ARCMOV/CLW,5,0,0,90
GOTO/5,10,0
```

Punch File Output:

```
N0006G01X0Y-00500Z0F01$
N0007G02X00500Y0Z0I0500J0K0$
N0008G01Y0010000F10$
```

Note: The start angle, total angle and arc direction are stored in the post processor COMMONs after the circle is processed.

Start Angle DBLCOM(926)
Total Angle DBLCOM(910)
ARC Direction INTCOM(538)

4.2 ARCMOV

ARCMOV/CCLW-CLW,xe,ye,ze,a

This command is the arc motion command and follows all **ARCDAT** commands.

CCLW-CLW Specifies the direction of the arc move.

xe,ye,ze Specifies the end point of the arc move. The start point is assumed to be the prior point.

a Specifies the total angle in degrees, used only when the arc move is greater than 360 degrees.

Example:

Input:

```
GOTO/0,5,0
ARCDAT/0,0,0,0,0,1,5
ARCMOV/CLW,5,0,0,90
GOTO/5,10,0
```

Punch File Output:

```
N0006G01X0Y-00500Z0F01$
N0007G02X00500Y0Z0I0500J0K0$
N0008G01Y0010000F10$
```

Note: The start angle, total angle and arc direction are stored in the post processor COMMONs after the circle is processed.

```
Start Angle DBLCOM(926)
Total Angle DBLCOM(910)
ARC Direction INTCOM(538)
```

4.3 ARCSLP (M)

ARCSLP/ON,*d*

All circular motion following this statement will be output as helical arc blocks, if helical interpolation is available.

d Specifies the linear lead for the third axis. The sign of ***d*** determines positive or negative motion of this axis in the part coordinate system.

ARCSLP/OFF

Turns off the option.

Note: To disable the K lead in the ARCSLP output set INTCOM(3435) to 1.

Example:

Input:

```
FROM/-1,-4  
ARCSLP/ON,(1/8)  
GO/C1  
TLLFT,GOLFT/C1,ON,3,INTOF,L1  
ARCSLP/OFF  
GOTO/P1
```

Punch File Output:

```
N6G1X-7.579Y-3.0317Z.0F10.$  
N7G2X-3.125Y.0Z.264I.579J3.031K.199$  
N8X.0Y3.125Z.576I3.125J.0$  
N9X3.125Y.0Z.888I.0J3.125$  
N10X.0Y-3.125Z1.2I3.125J0$  
N11X-3.125Y.0Z1.512I.0J3.125$  
N12X.0Y3.125Z1.824I3.125J.0$  
N13G1Y-4.Z.0$
```

Related Commands:

```
PLABEL/OPTION,47
```

4.4 AUXFUN

AUXFUN/*m*[,NEXT]

m Generates a M-code with the value ***m***.

NEXT Generates this M-code with the next output block. If you omit **NEXT**, the post processor outputs the M-code in a block by itself. If you select the multiple M-code option, you can program a maximum of four **AUXFUN/*m*,NEXTs** per block.

Use this command only when a post processor command is not available for this M-code. The post processor does not verify the validity of the M-code.

Example:

Input:

**AUXFUN/33,NEXT
AUXFUN/22**

Punch File Output:

N4M22M33\$

Related Commands:

PLABEL/OPTION,35

4.5 BREAK

BREAK

This statement indicates the end of a section in the part program. The punch output ends with trailer.

BREAK reinitializes the postprocessor to default conditions.

The **MACHIN** statement and the current options are retained. Remember to restate all applicable postprocessor commands (such as **FROM**, **COOLNT**, and **TRANS**) after the **BREAK** command.

Example:

Input:

```
PARTNO SECTION ONE
MACHIN/UNCL01,1
PLABEL/OPTION,n,TO,v
SPINDL/200
COOLNT/ON
—
—
END
BREAK
PARTNO SECTION TWO
SPINDL/300
COOLNT/ON
—
—
FINI
```

4.6 CHECK (L)

CHECK/([XAXIS,x1,x2][,YAXIS,y1,y2])

This command modifies the axes limit values assumed for limit checking.

x1,x2 specify the minimum and maximum for Lathe Z axis.

y1,y2 specify the minimum and maximum for Lathe X-axis.

These values must be given in machine coordinates.

Example:

Input:

PLABEL/OPTION,19,TO,1	\$\$ LIMIT CHECK ON
CHECK/XAXIS,0,50,YAXIS,0,20	\$\$ MODIFY LIMIT VALUES
GOTO/P1	

Related Commands:

PLABEL/OPTION,19

4.7 CHECK (M)

CHECK/([XAXIS,*x1*,*x2*][,YAXIS,*y1*,*y2*][,ZAXIS,*z1*,*z2*][,AAXIS,*a1*,*a2*][,BAXIS,*b1*,*b2*][,CAXIS,*c1*,*c2*][,TABLE,*w1*,*w2*])

This command modifies the axes limit values assumed for limit checking.

x1*,*x2 specify the minimum and maximum for X-axis.

y1*,*y2 specify the minimum and maximum for Y-axis.

z1*,*z2 specify the minimum and maximum for Z-axis.

a1*,*a2 specify the minimum and maximum for A axis.

b1*,*b2 specify the minimum and maximum for B axis.

c1*,*c2 specify the minimum and maximum for C axis.

w1*,*w2 specify the minimum and maximum for W axis.

These values must be given in machine coordinates.

Example:

PLABEL/OPTION,19,TO,1	\$\$ LIMIT CHECK ON
CHECK/XAXIS,0,50,YAXIS,0,20	\$\$ MODIFY LIMIT VALUES
GOTO/P1	

Related Commands:

PLABEL/OPTION,19

4.8 CIRCLE

CIRCLE/*x,y,z,i,j,k,r*

This command defines the circle for a circular move. This is the TYPE 3000 CL record.

x,y,z Specifies the center coordinates of the circle.

i,j,k Specifies the direction of the circular move. If the IJK are identical to the tool axis then the circular move is in the clockwise direction. If the IJK are exactly opposite the tool axis then the circular move is counter-clockwise. If the IJK does not match tool axis vector (standard or opposed) then the circle will be iterated with G01 moves.

r Specifies the circle radius.

The **CIRCLE** command will be followed by a **GOTO** command line to define the end point of the circular move.

Example:

Input:

```
GOTO / 2.0, 0.0, 0.0
CIRCLE / 0.0, 0.0, 0.0, 0.0, 0.0, 1.0, 2.0
GOTO / 0.0, 2.0, 0.0
```

Note: **CIRCLE/cmd** is valid only with ACL input and not APT input.

4.9 CLEARP (M)

4.9.1 CLEARP/XYPLAN,*d*-OFF

CLEARP/XYPLAN,*d*-OFF

XYPLAN,<i>d</i>	This statement establishes a clearance plane parallel to the XY plane at a distance <i>d</i> . Subsequent RETRCT statements will retrace the tool tip at rapid rate to this plane.
OFF	This statement cancels a previously-established clearance plane. Subsequent RETRCT statements will retract the spindle to the Z-axis home point, disregarding the tool length. This is the default condition assumed.

Example:

Input:

```
CLEARP/XYPLAN,5
GOTO/3,3,0
GOTO/6,6,0
RETRCT
GOTO/10,10
CLEARP/OFF
RETRCT
```

Punch File Output:

```
N0004G01X003Y003Z0F001$
N0005X006Y006$
N0006G00Z0005F0$
N0007G01X01Y01Z0F001$
N0008G00Z03F0$
```

4.9.2 CLEARP/ZAXIS,*z1*-OFF, TABLE,*w1*-OFF

CLEARP/ZAXIS,*z1*-OFF, TABLE,*w1*-OFF

ZAXIS,<i>z1</i>	This statement establishes a clearance plane parallel to the XY plane at a distance <i>z1</i> for the Z-axis. Subsequent RETRCT statements will retrace the tool tip at rapid rate to this plane.
ZAXIS,OFF	This statement cancels a previously-established Z-axis clearance plane. Subsequent RETRCT statements will retract the spindle to the W axis clearance plane only.
TABLE,<i>w1</i>	This statement establishes a clearance plane parallel to the XY plane at a distance <i>w1</i> for the W axis. Subsequent RETRCT statements will retrace the tool tip at rapid rate to this plane.
TABLE,OFF	This statement cancels a previously-established W axis clearance plane. Subsequent RETRCT statements will retract the spindle to the Z axis clearance plane only.

Example:

Input:

```
CLEARP/ZAXIS,10,TABLE,20  
GOTO/3,3,0  
GOTO/6,6,0  
RETRCT  
GOTO/10,10  
CLEARP/OFF  
RETRCT
```

Punch File Output:

```
N0004G01X003Y003Z0F001$  
N0005X006Y006$  
N0006G00Z0005F0$  
N0007G01X01Y01Z0F001$  
N0008G00Z10W20F0$
```

4.10 CLRSRF (M)

CLRSRF/[*plane*-NOW]

This statement defines a clearance surface *plane*, which must be a symbolic or nested definition of the APT geometry for a **PLANE**. Subsequent **CLRSRF/NOW** commands will move the tool tip at rapid rate onto this plane.

The direction and distance of this move are calculated from the current position along the normal to the plane.

Example:

Input:

```
PL1=PLANE/0,0,1,5
CLRSRF/PL1
P1=POINT/5,8,0
GOTO/P1
CLRSRF/NOW
```

Punch File Output:

```
N0004G01X005Y008Z0F000001$
N0005G00Z005F0$
```

4.11 COOLNT (L)

COOLNT/MIST-FLOOD[,HIGH-LOW]-OFF-ON[,NEXT]

MIST Generates a **COOLNT/MIST** M-code.

FLOOD Generates a **COOLNT/FLOOD** M-code. Initially **FLOOD** is assumed.

FLOOD,HIGH Generates a **COOLNT/FLOOD,HIGH** M-code.

FLOOD,LOW Generates a **COOLNT/FLOOD,LOW** M-code.

OFF Generates a **COOLNT/OFF** M-code.

ON Reinstates the **last** coolant condition.

NEXT Generates this M-code with the next output block. If you omit **NEXT**, the post processor outputs the M-code in a block by itself.

Note: A switch in the Option File Generator will instruct the post processor to automatically output the COOLNT M-codes with the next XY or Z motion block.

4.12 COOLNT (M)

COOLNT/AUTO-MIST-FLOOD[,HIGH-LOW]-OFF-ON[,NEXT]

AUTO	Causes the COOLNT M-code to be output as a function of the M-code for spindle direction. COOLNT/AUTO,OFF deactivates the above function.
MIST	Generates a COOLNT/MIST M-code.
FLOOD	Generates a COOLNT/FLOOD M-code. Initially FLOOD is assumed.
FLOOD,HIGH	Generates a COOLNT/FLOOD,HIGH M-code.
FLOOD,LOW	Generates a COOLNT/FLOOD,LOW M-code.
OFF	Generates a COOLNT/OFF M-code.
ON	Reinstates the last coolant condition.
NEXT	Generates this M-code with the next output block. If you omit NEXT , the post processor outputs the M-code in a block by itself.

Note: A switch in the Option File Generator will instruct the post processor to automatically output the COOLNT M-codes with the next XY or Z motion block.

4.13 CUTCOM (L)

CUTCOM/OFF-LEFT-RIGHT,t

This command generates the cutter radius compensation blocks.

OFF Generates a **CUTCOM/OFF** G-code.

LEFT Generates a **CUTCOM/LEFT** G-code.

RIGHT Generates a **CUTCOM/RIGHT** G-code.

t Is the radius offset register number which serves as a reference and is ignored. The diameter offset will be output the same as the tool number if the switch is set in the Option File Generator and the diameter offset number is no specified in the CUTCOM command.

Note: A switch in the Option File Generator will instruct the post processor to automatically output the CUTCOM M-codes with the next XY or Z motion block.

4.14 CUTCOM (M)

CUTCOM/OFF-LEFT-RIGHT,t[,XYPLAN-ZXPLAN-YZPLAN]

This command generates the cutter radius compensation blocks.

OFF	Generates a CUTCOM/OFF G-code.
LEFT	Generates a CUTCOM/LEFT G-code.
RIGHT	Generates a CUTCOM/RIGHT G-code.
t	Is the radius offset register number which serves as a reference and is ignored. The diameter offset will be output the same as the tool number if the switch is set in the Option File Generator and the diameter offset number is no specified in the CUTCOM command.

The cutter compensation plane is selected by the word **XYPLAN**, **ZXPLAN**, or **YZPLAN** to generate a plane select G-code. If you omit the plane selection, the current plane in effect will be assumed. **XYPLAN** is the initial default plane.

CUTCOM/ZAXIS,h

This statement generates an offset register code to initiate the tool length compensation.

h	Is the offset register number output in the address selected by the Option File Generator.
----------	--

CUTCOM with PQ Vector

If your option file is set up for Cincinnati **PQ** type cutter compensation, the following **CUTCOM** commands are used to control activation of this feature.

CUTCOM/OFF-LEFT-RIGHT

This command may be used to turn **PQ CUTCOM** on and off.

Note: Since PQ cutter compensation uses the last motion and next motion to determine the vector size, it is mandatory to program a motion following termination of PQ cutter compensation. The only exception to this is when the following PQ cutter compensation termination commands are used.

CUTCOM/IN-OUT

This command may be used to cause **PQ CUTCOM** to compensate away from a circle. **IN** would be used when machining a bore. **OUT** is for machining a cylinder or boss. A vector will be output to offset the cutter away from the surface. This command should be used only with line/circle, circle/circle, or circle/line combinations. If this command is used with a line/line combination, incorrect vectors will be output.

CUTCOM/OFF,PERPTO-PLUS-MINUS

PERPTO - Causes **PQ** cutter compensation to terminate with a vector that points perpendicularly in the direction of compensation, to the last motion prior to turning **PQ** cutter compensation off.

PLUS - Causes a vector to be output in the same direction as the last motion prior to turning **PQ** cutter compensation off. This feature is handy to use when you wish to terminate cutter compensation by driving a cutter past an edge.

MINUS - Causes a vector to be output in the opposite direction as the last motion prior to turning **PQ** cutter compensation off. This feature is handy to use when you wish to terminate cutter compensation by driving a cutter to an edge.

With all three of the above couplets on a **CUTCOM/OFF** command, a motion following the **CUTCOM/OFF** is not required.

Note: A switch in the Option File Generator will instruct the post processor to automatically output the CUTCOM M-codes with the next XY or Z motion block.

4.15 CYCLE

The G-Post generates two types of cycle output, **Hardware** and **Software**. A **Hardware** cycle generates a G-code machine controller cycle, such as a **G81** drilling cycle. A **Software** cycle generates **G00**, **G01** tool motion and is calculated by the post processor. All lathe cycles are **Software** cycles.

In the following cycle command definitions, cycle types that are identified by a hyphen followed by the G-code in the command, such as **CYCLE/BORE-85** are **Hardware** cycles. The G-codes are post processor defaults and may be changed in the Option file Generator.

For canned cycles, the options **LOCK,*l*** and **CAM,*n*** will be output in the cycle **DWELL** and **CAM** registers.

The **PULBAC,*g*** option will output an additional G-code with the cycle G-code.

The cycle command is modal and remains in effect for subsequent CL points until turned off by **CYCLE/OFF** or a new **CYCLE/*type*** command.

It is assumed that the CL points following the cycle statement will be defined at the work surface. Therefore, rapid positioning will occur to each CL point plus clearance **c**. This is output as the rapid stop point. The feed distance will be the sum of the values **c** and **z**, which is output as the feed stop point. The values **c** and **z** must be positive and relative to the CL point as follows:

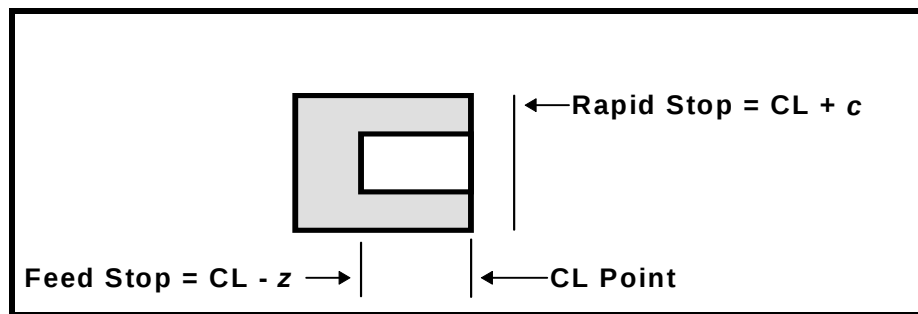


Figure 4-1 CL Points and the CYCLE Statement - Lathe

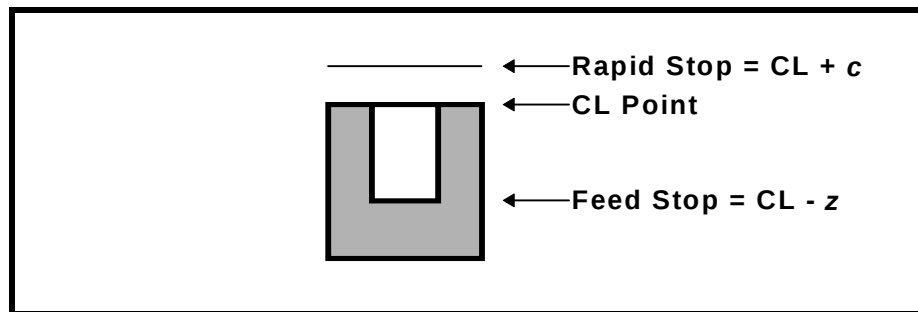


Figure 4-2 CL Points and the CYCLE Statement - Mill

The following is an overview of the “**STANDARD**” cycle command structure.

CYCLE/type,z,f,unit,c,optn

- type** A minor entry to indicate the cycle type.
- z** The z depth of the desired cycle could be z1 through z20 for certain cycles.
- f** The feedrate value for the cycle Z-axis feed.
- unit** **IPM-IPR** to specify the type of feed rate **f**.

 INCH or **METRIC** mode is selected on the **MACHIN/** statement. No conversion or validity checking is done.
- c** The clearance value for rapid stop.
- optn** Optional parameters given in couplet form for certain cycles. For example, **LOCK,1** where 1 states the dwell time for **TAP** cycle. These optional values are modal.

CYCLE/type,z,f,unit,c[,sc][,optn]

CYCLE with Secondary Clearance Value

- sc** The secondary clearance value required by some machines, which can be used on all the canned cycles in the Mill G-Post.

All other parameters have the same meaning as previously explained.

Note: An automatic clearance plane value can be set using the Option File Generator to compensate for the Cincinnati type cycles which automatically set the cycle clearance plane to 1.

The following is an overview of the “**COUPLET**” cycle command structure.

**CYCLE/type,FEDTO,z,IPM-IPR,f,RAPTO,c,
RTRCTO,c2,DWELL,d**

type A minor entry to indicate the cycle type.

FEDTO,z The **z** depth of the desired cycle could be **z1** through **z20** for certain cycles.

IPM-IPR,f The feedrate value for the cycle Z-axis feed.

INCH or **METRIC** mode is selected on the **MACHIN/** statement. No conversion or validity checking is done.

RAPTO,c The clearance value for rapid stop.

CYCLE/CSINK only.

HOLDIA,d The calculated **z** depth with **TLANGL**

TLANGL,a The calculated **z** depth with **HOLDIA**

CYCLE/DEEP only.

INCR,k The DEEP cycle step increment.

CYCLE with Secondary Clearance Value

RTRCTO,c2 The secondary clearance value required by some machines, which can be used on all the canned cycles in the Mill G-Post. In addition, the **CYCLE/cmd** also will allow **c2** as the minor words **LAST** or **AUTO** to retract to the position before the cycle command

DWELL,d Optional parameters given in couplet form for certain cycles. For example, **DWELL,1** where **1** states the dwell time for **TAP** cycle. These optional values are modal.

The following is an overview of the “**UG Double-COUPLET**” cycle command structure. This format is generated by Unigraphics. It is considered a **Double-COUPLET** as the cycle **type** is preceded with the word **DRILL**. INTCOM(4660) must be set to 1 to use these UG cycles.

**CYCLE/DRILL,type,FEDTO,z,IPM-IPR,f,RAPTO,c,
RTRCTO,c2,DWELL,d**

type A minor entry to indicate the cycle type.

FEDTO,z The **z** depth of the desired cycle could be z1 through z20 for certain cycles.

IPM-IPR,f The feedrate value for the cycle Z-axis feed.

INCH or **METRIC** mode is selected on the **MACHIN/** statement. No conversion or validity checking is done.

RAPTO,c The clearance value for rapid stop.

CYCLE/CSINK only.

HOLDIA,d The calculated **z** depth with **TLANGL**

TLANGL,a The calculated **z** depth with **HOLDIA**

CYCLE/DEEP only.

INCR,k The DEEP cycle step increment.

CYCLE with Secondary Clearance Value

RTRCTO,c2 The secondary clearance value required by some machines, which can be used on all the canned cycles in the Mill G-Post. In addition, the CYCLE/cmd also will allow c2 as the minor words LAST or AUTO to retract to the position before the cycle command

DWELL,d Optional parameters given in couplet form for certain cycles. For example, **DWELL,1** where 1 states the dwell time for **TAP** cycle. These optional values are modal.

4.15.1 CYCLE/ON-OFF

CYCLE/ON-OFF

ON Reinstates the **last known** cycle type.

OFF Terminates the current cycle type.

4.15.2 CYCLE/AVOID (M)

CYCLE/AVOID

1. Outputs a G-code to cancel the cycle (G80) and an M-code (M26) to cause a full retract.
2. Reinstates the previous cycle G-code.

Example:

Input:

```
$$ Z DEPTH=1.0,FEED=7.5,IPM,CLEARANCE=.1  
CYCLE/BORE,1.0,7.5,IPM,.1  
GOTO/0,0  
CYCLE/AVOID  
GOTO/1,0  
GOTO/2,0
```

Punch File Output:

```
N4G85X.0Y.0R.1Z-1.0F7.5$  
N5G80M26$  
N6G85X1.0Y.0R.1Z-1.0F7.5$  
N7X2.0$
```

4.16 CYCLE/BORE (L)

(Hardware Cycle)

CYCLE/BORE,*z*,*f*,IPM-IPR,*c*[,LOCK,*l*][,CAM,*n*][,PULBAC,*g*]
 CYCLE/BORE,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*[,DWELL,*d*]
 CYCLE/DRILL,BORE,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*[,DWELL,*d*]

Advance at rapid rate to clearance ***c***.

Advance at feedrate ***f*** to depth ***z***.

Retract at feedrate ***f*** to clearance ***c***.

Example:

Input:

```
$$ Z DEPTH=1.0,FEED=7.5,IPM CLEARANCE=.1
CYCLE/BORE,1.0,7.5,IPM,.1
GOTO/0,0
```

Punch File Output:

```
N4G85X0.0.0R.1Z-.1F7.5$
```

4.17 CYCLE/BORE (L)

(Software Cycle)

CYCLE/BORE,z,f,IPM-IPR,c[,LOCK,]

CYCLE/BORE,FEDTO,z,IPM-IPR,f,RAPTO,c[,DWELL,d]

CYCLE/DRILL,BORE,FEDTO,z,IPM-IPR,f,RAPTO,c[,DWELL,d]

Advance at rapid rate to clearance **c**.

Advance at feedrate **f** to depth **z**.

Output spindle stop M-code with dwell.

Retract at rapid rate to clearance **c**.

Output original spindle direction M-code.

LOCK,I Specifies the dwell time for spindle stop. Initially a value of 2 seconds is assumed.

Example:

Input:

\$\$ Z DEPTH=1.0,FEED=7.5,IPM CLEARANCE=.1

CYCLE/BORE,1.0,7.5,IPM,.1

GOTO/0,0

Punch File Output:

N5G00X0.0Z.1\$

N6G01Z-.1F7.5\$

N7G04X2.0M05\$

N8G00X0.0Z.1\$

N9M01\$

4.18 CYCLE/BORE (M)

(Hardware Cycle)

CYCLE/BORE-85,*z*,*f*,IPM-IPR,*c*[,LOCK,*l*][,CAM,*n*][,PULBAC,*g*]
 CYCLE/BORE,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*[,DWELL,*d*]
 CYCLE/DRILL,BORE,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*[,DWELL,*d*]

1. Advance at rapid rate to clearance *c*.
2. Advance at feedrate *f* to depth *z*.
3. Retract at feedrate *f* to clearance *c*.

Example:

Input:

```
$$ Z DEPTH=1.0,FEED=7.5,IPM CLEARANCE=.1
CYCLE/BORE,1.0,7.5,IPM,.1
GOTO/0,0
```

Punch File Output:

```
N4G85X0.0Y0.0R.1Z-.1F7.5$
```

4.19 CYCLE/BORE (M)

(Software Cycle)

CYCLE/BORE,z,f,IPM-IPR,c[,LOCK,ℓ][,ORIENT,y]

CYCLE/BORE,FEDTO,z,IPM-IPR,f,RAPTO,c[,DWELL,d]

CYCLE/DRILL,BORE,FEDTO,z,IPM-IPR,f,RAPTO,c[,DWELL,d]

1. Advance at rapid rate to clearance **c**.
2. Advance at feedrate **f** to depth **z**.
3. Output spindle stop M-code with dwell.
4. Retract at rapid rate to clearance **c**.
5. Output original spindle direction M-code.

LOCK,ℓ Specifies the dwell time for spindle stop. Initially a value of 2 seconds is assumed.

ORIENT,y Specifies the shift distance along the **y**-axis before retracting. The sign of **y** states the direction of this move. Initially it is assumed that y equals 0.

Example:

Input:

**CYCLE/BORE,1.0,7.5,IPM,.1
GOTO/0,0**

Punch File Output:

**N4G00Z.1\$
N5G01X0.0Y0Z-1.0F7.5\$
N6G04F2.0M19\$
N7G00Z.1\$
N8M01\$**

4.20 CYCLE/BRKCHP (L)

(Hardware Cycle)

CYCLE/DEEP,*z*,*f*,IPM-IPR,*c*,INCR,*z1* [,PULBAC,*g*]
 CYCLE/DEEP,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*,INCR,*k*
 CYCLE/DRILL,DEEP,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*,INCR,*k*

1. Rapid to clearance ***c***.
2. Advance at feedrate ***f*** to depth ***z1***.
3. Retract at rapid rate to clearance ***c***.
4. Advance at rapid rate to depth ***z1*** less ***c***.

Repeat steps 2, 3, and 4 until depth ***z*** is reached.

Note: ***z1*** is the G73 peck depth value which is output with the address designated in the Option File Generator.

PULBAC,*g* is used to generate an optional G-code in the **G73** block.

Example:

Input:

CYCLE/ BRKCHP,3.0,7.0,IPM,.2,INCR,.5
 GOTO/0,0

Punch File Output:

N4G73X0.0Z3.0K.5F7.0\$

Note: PPWORD/BRKCHP,216 is required to use this command.

4.21 CYCLE/BRKCHP (L)

(Software Cycle)

CYCLE/BRKCHP,*z1,z2,z3,z4*.....*z20,f,IPM-IPR,c*
CYCLE/ BRKCHP,FEDTO,*z,IPM-IPR,f,RAPTO,c,INCR,k*
CYCLE/ DRILL,BRKCHP,FEDTO,*z,IPM-IPR,f,RAPTO,c,INCR,k*

1. Rapid to clearance ***c***.
2. Advance at feedrate ***f*** to depth ***z1***.
3. Retract at rapid rate to clearance ***z1 + c***.
4. Advance at rapid rate to depth ***z1*** less ***c***.

Repeat steps 2, 3, and 4 for each successive ***z***.

Example:

Input:

CYCLE/ BRKCHP ,1.0,2.0,3.0,4.0,7.0,IPM,.2
GOTO/0,0

Punch File Output:

N004G00X0Z002\$
N005G01Z-01F007\$
N006G00Z002\$
N007Z-008\$
N008G01Z-02F007\$
N009G00Z002\$
N010Z-018\$
N011G01Z-03F007\$
N012G00Z002\$
N013Z-028\$
N014G01Z-04F007\$
N015G00Z002\$

Note: PPWORD/BRKCHP,216 is required to use this command.

4.22 CYCLE/BRKCHP (M)

(Hardware Cycle)

CYCLE/ BRKCHP,*z*,*f*,IPM-IPR,*c*,INCR,*z1* [,PULBAC,*g*]
 CYCLE/ BRKCHP,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*,INCR,*k*
 CYCLE/ DRILL,BRKCHP,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*,INCR,*k*

1. Rapid to clearance ***c***.
2. Advance at feedrate ***f*** to depth ***z1***.
3. Retract at rapid rate to clearance ***z1* + *c***.
4. Advance at rapid rate to depth ***z1*** less ***c***.

Repeat steps 2, 3, and 4 until depth ***z*** is reached.

Note: ***z1*** is the G73 peck depth value which is output with the address designated in the Option File Generator.

PULBAC,*g* is used to generate an optional G-code in the **G73** block.

Example:

Input:

CYCLE/ BRKCHP,3.0,7.0,IPM,.2,INCR,.5
 GOTO/0,0

Punch File Output:

N4G73X0.0Y0.0Z3.0K.5F7.0\$

Note: PPWORD/BRKCHP,216 is required to use this command.

4.23 CYCLE/BRKCHP (M)

(Software Cycle)

CYCLE/ BRKCHP,*z1*,*z2*,*z3*,*z4*.....*z20*,*f*,IPM-IPR,*c*
CYCLE/ BRKCHP,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*,INCR,*k*
CYCLE/ DRILL,BRKCHP,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*,INCR,*k*

1. Rapid to clearance *c*.
2. Advance at feedrate *f* to depth *z1*.
3. Retract at rapid rate to clearance *z1 + c*.
4. Advance at rapid rate to depth *z1* less *c*.

Repeat steps 2, 3, and 4 for each successive *z*.

Example:

Input:

CYCLE/ BRKCHP,1.0,2.0,3.0,4.0,7.0,IPM,.2
GOTO/0,0

Punch File Output:

N0004G00Z0002F0\$
N0005G01X0Y0Z-001F007\$
N0006G00Z0002F0\$
N0007Z-0008F0\$
N0008G01Z-002F007\$
N0009G00Z0002F0\$
N0010Z-0018F0\$
N0011G01Z-003F007\$
N0012G00Z0002F0\$
N0013Z-0028F0\$
N0014G01Z-004F007\$
N0015G00Z0002F0\$

Note: PPWORD/BRKCHP,216 is required to use this command.

4.24 CYCLE/CSINK (L)

(Hardware Cycle)

CYCLE/CSINK,*d*,*a*,*f*,IPM-IPR,*c*[,LOCK,*l*][,CAM,*n*][,PULBAC,*g*]
 CYCLE/CSINK,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*[,DWELL,*d*]
 CYCLE/DRILL,CSINK,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*[,DWELL,*d*]

1. Rapid to clearance ***c***.
2. Advance at feedrate ***f*** to depth ***z***. The depth ***z*** is calculated from the required diameter ***d*** and included angle ***a***.
3. Dwell.
4. Retract at rapid rate to clearance ***c***.

Example:

Input:

CYCLE/DRILL,1.0,6.0,IPM,.1
 GOTO/0,0

Punch File Output:

N4G81X.0R.1Z-1.F6.0\$

4.25 CYCLE/CSINK (L)

(Software Cycle)

CYCLE/CSINK,*d*,*a*,*f*,IPM-IPR,*c*[,LOCK,*l*]

CYCLE/CSINK,HOLDIA,*d*,TLANGL,*a*,IPM-IPR,*f*,RAPTO,*c*[,DWELL,*d*]

CYCLE/DRILL,CSINK,HOLDIA,*d*,TLANGL,*a*,IPM-IPR,*f*,RAPTO,*c*[,DWELL,*d*]

1. Rapid to clearance ***c***.
2. Advance at feedrate ***f*** to depth ***z***. The depth ***z*** is calculated from the required diameter ***d*** and included angle ***a***.
3. Dwell.
4. Retract at rapid rate to clearance ***c***.

LOCK,*l* specifies the dwell time. Initially a value of 2 seconds is assumed.

Example:

Input:

```
$$ DIAMETER = .5, ANGLE = 90
CYCLE/CSINK,0.5,90.0,10.0,IPM,.1
GOTO/0,0
```

Punch File Output:

```
N5G00X0.0Z.1$
N6G01Z-.25F10.$    $$ (Calculated Z depth)
N7G04X2.0$
N8G00X0.0Z.1$
```

4.26 CYCLE/CSINK (M)

(Hardware Cycle)

CYCLE/CSINK,*d*,*a*,*f*,IPM-IPR,*c*[,LOCK,*l*][,CAM,*n*][,PULBAC,*g*]
 CYCLE/CSINK,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*[,DWELL,*d*]
 CYCLE/DRILL,CSINK,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*[,DWELL,*d*]

1. Rapid to clearance ***c***.
2. Advance at feedrate ***f*** to depth ***z***. The depth ***z*** is calculated from the required diameter ***d*** and included angle ***a***.
3. Dwell.
4. Retract at rapid rate to clearance ***c***.

Example:

Input:

CYCLE/DRILL,1.0,6.0,IPM,.1
 GOTO/0,0

Punch File Output:

N4G81X.0Y.0R.1Z-1.F6.0\$

4.27 CYCLE/CSINK (M)

(Software Cycle)

CYCLE/CSINK,*d*,*a*,*f*,IPM-IPR,*c*[,LOCK,*l*]

CYCLE/CSINK,HOLDIA,*d*,TLANGL,*a*,IPM-IPR,*f*,RAPTO,*c*[,DWELL,*d*]

CYCLE/DRILL,CSINK,HOLDIA,*d*,TLANGL,*a*,IPM-IPR,*f*,RAPTO,*c*[,DWELL,*d*]

1. Rapid to clearance ***c***.
2. Advance at feedrate ***f*** to depth ***z***.
3. Depth ***z*** is calculated from the required diameter ***d*** and included angle ***a***.
4. Dwell.
5. Retract at rapid rate to clearance ***c***.

LOCK,*l* specifies the dwell time. Initially a value of 2 seconds is assumed.

Example:

Input:

```
$$ DIAMETER = .5, ANGLE = 90
CYCLE/CSINK,0.5,90.0,10.0,IPM,.1
GOTO/0,0
```

Punch File Output:

```
N4G00Z.1$
N5G01X0.0Y0.0Z-.25F10.$    $$ (Calculated Z depth)
N6G04F2.0$
N7G00Z.1$
```

4.28 CYCLE/DEEP (L)

(Hardware Cycle)

CYCLE/DEEP,*z*,*f*,IPM-IPR,*c*,INCR,*z1* [,PULBAC,*g*]
 CYCLE/DEEP,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*,INCR,*k*
 CYCLE/DRILL,DEEP,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*,INCR,*k*

1. Rapid to clearance *c*.
2. Advance at feedrate *f* to depth *z1*.
3. Retract at rapid rate to clearance *c*.
4. Advance at rapid rate to depth *z1* less *c*.

Repeat steps 2, 3, and 4 until depth *z* is reached.

Note: *z1* is the G83 peck depth value which is output with the address designated in the Option File Generator.

PULBAC,*g* is used to generate an optional G-code in the **G83** block.

Example:

Input:

CYCLE/DEEP,3.0,7.0,IPM,,2,INCR,,5
 GOTO/0,0

Punch File Output:

N4G83X0.0Z3.0K.5F7.0\$

4.29 CYCLE/DEEP (L)

(Software Cycle)

CYCLE/DEEP,***z1***,***z2***,***z3***,***z4***.....***z20***,***f***,IPM-IPR,***c***
CYCLE/DEEP,FEDTO,***z***,IPM-IPR,***f***,RAPTO,***c***,INCR,***k***
CYCLE/DRILL,DEEP,FEDTO,***z***,IPM-IPR,***f***,RAPTO,***c***,INCR,***k***

1. Rapid to clearance ***c***.
2. Advance at feedrate ***f*** to depth ***z1***.
3. Retract at rapid rate to clearance ***c***.
4. Advance at rapid rate to depth ***z1*** less ***c***.

Repeat steps 2, 3, and 4 for each successive ***z***.

Example:

Input:

CYCLE/DEEP,1.0,2.0,3.0,4.0,7.0,IPM,.2
GOTO/0,0

Punch File Output:

N004G00X0Z002\$
N005G01Z-01F007\$
N006G00Z002\$
N007Z-008\$
N008G01Z-02F007\$
N009G00Z002\$
N010Z-018\$
N011G01Z-03F007\$
N012G00Z002\$
N013Z-028\$
N014G01Z-04F007\$
N015G00Z002\$

4.30 CYCLE/DEEP (M)

(Hardware Cycle)

CYCLE/DEEP-83,z,f,IPM-IPR,c,INCR,z1 [,PULBAC,g]

CYCLE/DEEP,FEDTO,z,IPM-IPR,f,RAPTO,c,INCR,k

CYCLE/DRILL,DEEP,FEDTO,z,IPM-IPR,f,RAPTO,c,INCR,k

1. Rapid to clearance **c**.
2. Advance at feedrate **f** to depth **z1**.
3. Retract at rapid rate to clearance **c**.
4. Advance at rapid rate to depth **z1** less **c**.

Repeat steps 2, 3, and 4 until depth **z** is reached.

Note: **z1** is the G83 peck depth value which is output with the address designated in the Option File Generator.

PULBAC,g is used to generate an optional G-code in the **G83** block.

Example:

Input:

CYCLE/DEEP,3.0,7.0,IPM,.2,INCR,.5

GOTO/0,0

Punch File Output:

N4G83X0.0Y0.0Z3.0K.5F7.0\$

4.31 CYCLE/DEEP (M)

(Software Cycle)

CYCLE/DEEP,*z1*,*z2*,*z3*,*z4*.....*z20*,*f*,IPM-IPR,*c*
CYCLE/DEEP,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*,INCR,*k*
CYCLE/DRILL,DEEP,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*,INCR,*k*

1. Rapid to clearance *c*.
2. Advance at feedrate *f* to depth *z1*.
3. Retract at rapid rate to clearance *c*.
4. Advance at rapid rate to depth *z1* less *c*.

Repeat steps 2, 3, and 4 for each successive *z*.

Example:

Input:

CYCLE/DEEP,1.0,2.0,3.0,4.0,7.0,IPM,.2
GOTO/0,0

Punch File Output:

N0004G00Z0002F0\$
N0005G01X0Y0Z-001F007\$
N0006G00Z0002F0\$
N0007Z-0008F0\$
N0008G01Z-002F007\$
N0009G00Z0002F0\$
N0010Z-0018F0\$
N0011G01Z-003F007\$
N0012G00Z0002F0\$
N0013Z-0028F0\$
N0014G01Z-004F007\$
N0015G00Z0002F0\$

4.32 CYCLE/DEEPCL (M)

(Hardware Cycle)

CYCLE/DEEPCL,*z,f,IPM-IPR,c* [,START,*s*] [,DECR,*d*] [,LAST,*l*] [,DIAMTR,*dia*]

CYCLE/DRILL,DEEPCL,*z,f,IPM-IPR,c* [,START,*s*] [,DECR,*d*] [,LAST,*l*] [,DIAMTR,*dia*]

1. Rapid to clearance ***c***.
2. Advance at feedrate ***f*** the incremental distance of ***s*dia***
3. Retract at rapid rate to clearance ***c***.
4. Advance at rapid rate to feed ***depth*** less ***c***.
5. Decrement the value of ***s*** by the value of ***d***.

Repeat steps 2, 3, 4, and 5 until the value of ***s*** equals the value of 1. Then repeat steps 2, 3, and 4 until final depth is reached. Cycle will always end when final depth is reached, regardless of any other parameter value.

The following is a list of the default values for this cycle. You need enter only those values that are to be changed.

START,*s* Default is 2.5

DECR,*d* Default is .5

LAST,*l* Default is 1.0

DIAMTR,*dia* Default is the programmed cutter diameter

Example:

Input:

```
CUTTER/.5
CYCLE/DEEPCL,5,10,IPM,.1
GOTO/0,0,10
CYCLE/OFF
```

Punch File Output:

```
N0001G81X0Y0R010Z00875F01$
N0002G80$
N0003G81R00885Z00775$
N0004G80R0101$
N0005G81R00785Z007$
N0006G80R0101$
N0007G81R0071Z0065$
N0008G80R010$
N0009G81R0066Z006$
N0010G80R0101$
N0011G81R0061Z0055$
N0012G80R0101$
N0013G81R0056Z005$
N0014G80R0101$
```

4.33 CYCLE/DRILL (L)

(Hardware Cycle)

**CYCLE/DRILL,*z*,*f*,IPM-IPR,*c*[,LOCK,*l*][,CAM,*n*][,PULBAC,*g*]
CYCLE/DRILL,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c***

1. Rapid to clearance ***c***.
2. Advance at feedrate ***f*** to depth ***z***.
3. Retract at rapid rate to clearance ***c***.

Example:

Input:

**CYCLE/DRILL,1.0,6.0,IPM,.1
GOTO/0,0**

Punch File Output:

N4G81X.0R.1Z-1.F6.0\$

4.34 CYCLE/DRILL (L)

(Software Cycle)

CYCLE/DRILL,*z*,*f*,IPM-IPR,*c*

CYCLE/DRILL,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*

1. Rapid to clearance ***c***.
2. Advance at feedrate ***f*** to depth ***z***.
3. Retract at rapid rate to clearance ***c***.

Example:

Input:

**CYCLE/DRILL,1.0,6.0,IPM,.1
GOTO/0,0**

Punch File Output:

**N004G00X0Z001\$
N005G01Z-01F006\$
N006G00Z001\$**

4.35 CYCLE/DRILL (M)

(Hardware Cycle)

**CYCLE/DRILL-81,z,f,IPM-IPR,c[,LOCK,l][,CAM,n][,PULBAC,g]
CYCLE/DRILL-81,FEDTO,z,IPM-IPR,f,RAPTO,c**

1. Rapid to clearance **c**.
2. Advance at feedrate **f** to depth **z**.
3. Retract at rapid rate to clearance **c**.

Example:

Input:

**CYCLE/DRILL,1.0,6.0,IPM,.1
GOTO/0,0**

Punch File Output:

N4G81X.0Y.0R.1Z-1.F6.0\$

4.36 CYCLE/DRILL (M)

(Software Cycle)

CYCLE/DRILL,*z*,*f*,IPM-IPR,*c*

CYCLE/DRILL,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*

1. Rapid to clearance ***c***.
2. Advance at feedrate ***f*** to depth ***z***.
3. Retract at rapid rate to clearance ***c***.

Example:

Input:

**CYCLE/DRILL,1.0,6.0,IPM,.1
GOTO/0,0**

Punch File Output:

**N4G00Z.1\$
N5G01X.0Y.0Z-.1F6.0\$**

4.37 CYCLE/FACE (L)

(Hardware Cycle)

CYCLE/FACE,z,f,IPM-IPR,c[,LOCK,l][,CAM,n][,PULBAC,g]

CYCLE/FACE,FEDTO,z,IPM-IPR,f,RAPTO,c[,DWELL,d]

CYCLE/DRILL,FACE,FEDTO,z,IPM-IPR,f,RAPTO,c[,DWELL,d]

1. Rapid to clearance **c**.
2. Advance at feedrate **f** to depth **z**.
3. Dwell.
4. Retract at rapid rate to clearance **c**.

LOCK,l specifies the dwell time. Initially a value of 2 seconds is assumed.

Example:

Input:

**CYCLE/FACE,1.0,4.5,IPM,.1
GOTO/0,0**

Punch File Output:

N4G82X.0R.1Z-.1F4.5\$

4.38 CYCLE/FACE (L)

(Software Cycle)

CYCLE/FACE,*z*,*f*,IPM-IPR,*c*[,LOCK**,*l*]**

CYCLE/FACE,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*[,DWELL,*d*]

CYCLE/DRILL,FACE,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*[,DWELL,*d*]

1. Rapid to clearance ***c***.
2. Advance at feedrate ***f*** to depth ***z***.
3. Dwell.
4. Retract at rapid rate to clearance ***c***.

LOCK,*l* specifies the dwell time. Initially a value of 2 seconds is assumed.

Example:

Input:

**CYCLE/FACE,1.0,4.5,IPM,.1
GOTO/0,0**

Punch File Output:

**N004G00X0Z001\$
N005G01Z-01F0045\$
N006G04X02\$
N007G00X0Z001\$**

4.39 CYCLE/FACE (M)

(Hardware Cycle)

CYCLE/FACE-82,z,f,IPM-IPR,c[,LOCK,l][,CAM,n][,PULBAC,g]

CYCLE/FACE,FEDTO,z,IPM-IPR,f,RAPTO,c[,DWELL,d]

CYCLE/DRILL,FACE,FEDTO,z,IPM-IPR,f,RAPTO,c[,DWELL,d]

1. Rapid to clearance **c**.
2. Advance at feedrate **f** to depth **z**.
3. Dwell.
4. Retract at rapid rate to clearance **c**.

LOCK,l specifies the dwell time. Initially a value of 2 seconds is assumed.

Example:

Input:

**CYCLE/FACE,1.0,4.5,IPM,.1
GOTO/0,0**

Punch File Output:

N4G82X.0Y.0R.1Z-.1F4.5\$

4.40 CYCLE/FACE (M)

(Software Cycle)

CYCLE/FACE,*z*,*f*,IPM-IPR,*c*[,LOCK**,*l*]**

CYCLE/FACE,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*[,DWELL**,*d*]**

CYCLE/DRILL,FACE,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*[,DWELL**,*d*]**

1. Rapid to clearance ***c***.
2. Advance at feedrate ***f*** to depth ***z***.
3. Dwell.
4. Retract at rapid rate to clearance ***c***.

LOCK,*l* specifies the dwell time. Initially a value of 2 seconds is assumed.

Example:

Input:

**CYCLE/FACE,1.0,4.5,IPM,.1
GOTO/0,0**

Punch File Output:

**N4G00Z.1\$
N5G01X.0Y.0Z-.1F4.5\$
N6G04F2.\$
N7G00Z.1\$**

4.41 CYCLE/MILL (M)

(Hardware Cycle)

CYCLE/MILL-86,z,f,IPM-IPR,c[,CAM,n]

CYCLE/MILL-86,FEDTO,z,IPM-IPR,f,RAPTO,c

The first CL point and all the subsequent **RAPID** CL points will be output as follows:

1. Rapid to clearance **c**.
2. Advance at feedrate **f** to depth **z**.

The subsequent non-**RAPID** CL points will be output as follows:

1. Adjust the CL **z** value by the depth parameter **z**.
2. Output xyz with proper interpolation mode with the milling feedrate from the last **FEDRAT/f** statement.

Example:

Input:

```
CYCLE/MILL,1.0,10,IPM,.2
GOTO/0,0
FEDRAT/15,IPM
GOTO/1,1
CYCLE/OFF
```

Punch File Output:

```
N4G86X.0Y.0R.2Z-.1F10.$
N5G01X1.Y1.F15.$
N7G80$
N8G00Z3.$
```

4.42 CYCLE/MILL (M)

(Software Cycle)

CYCLE/MILL,z,f,IPM-IPR,c

CYCLE/MILL,FEDTO,z,IPM-IPR,f,RAPTO,c

The first CL point and all subsequent **RAPID** CL points are output as follows:

1. Rapid to clearance **c**.
2. Advance at feedrate **f** to depth **z**.

The subsequent non **RAPID** CL points are output as follows:

1. Adjust the CL z value by the depth parameter **z**.
2. Output xyz with proper interpolation mode with the milling feedrate from the last **FEDRAT/f** statement.

Example:

Input:

```
CYCLE/MILL,1.0,10,IPM,.2
GOTO/0,0
FEDRAT/15,IPM
GOTO/1,1
GOTO/2,3
CYCLE/OFF
RETRCT
```

Punch File Output:

```
N0004G00X0Y0F0$
N0005Z0002F0$
N0006G01Z-001F01$
N0007X001Y001F015$
N0008X002Y003$
N0009G00Z03F0$
```

4.43 CYCLE/REAM (L)

(Hardware Cycle)

CYCLE/REAM-88,*z*,*f*,IPM-IPR,*c*[,LOCK,*l*][,CAM,*n*][,PULBAC,*g*]

CYCLE/REAM,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*[,DWELL,*d*]

CYCLE/DRILL,REAM,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*[,DWELL,*d*]

1. Rapid to clearance ***c***.
2. Advance at feedrate ***f*** to depth ***z***.
3. Retract at feedrate ***f*** to clearance ***c***.

Example:

Input:

CYCLE/REAM,1.0,8.0,IPM,.1
GOTO/0,0

Punch File Output:

N0004G88X0R0001Z-001F008\$

4.44 CYCLE/REAM (L)

(Software Cycle)

CYCLE/REAM,*z*,*f*,IPM-IPR,*c*

CYCLE/REAM,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*[,DWELL,*d*]

CYCLE/DRILL,REAM,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*[,DWELL,*d*]

1. Rapid to clearance ***c***.
2. Advance at feedrate ***f*** to depth ***z***.
3. Retract at feedrate ***f*** to clearance ***c***.

Example:

Input:

**CYCLE/REAM,1.0,8.0,IPM,.1
GOTO/0,0**

Punch File Output:

**N005G00X0Z001\$
N006G01Z-01F008\$
N007Z001\$**

4.45 CYCLE/REAM (M)

(Hardware Cycle)

CYCLE/REAM-88,*z*,*f*,IPM-IPR,*c*[,LOCK,*l*][,CAM,*n*][,PULBAC,*g*]

CYCLE/REAM,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*[,DWELL,*d*]

CYCLE/DRILL,REAM,FEDTO,*z*,IPM-IPR,*f*,RAPTO,*c*[,DWELL,*d*]

1. Rapid to clearance ***c***.
2. Advance at feedrate ***f*** to depth ***z***.
3. Retract at feedrate ***f*** to clearance ***c***.

Example:

Input:

CYCLE/REAM,1.0,8.0,IPM,.1
GOTO/0,0

Punch File Output:

N0004G88X0Y0R0001Z-001F008\$

4.46 CYCLE/REAM (M)

(Software Cycle)

CYCLE/REAM,z,f,IPM-IPR,c

CYCLE/REAM,FEDTO,z,IPM-IPR,f,RAPTO,c[,DWELL,d]

CYCLE/DRILL,REAM,FEDTO,z,IPM-IPR,f,RAPTO,c[,DWELL,d]

1. Rapid to clearance **c**.
2. Advance at feedrate **f** to depth **z**.
3. Retract at feedrate **f** to clearance **c**.

Example:

Input:

**CYCLE/REAM,1.0,8.0,IPM,.1
GOTO/0,0**

Punch File Output:

**N0004G00Z0001F0\$
N0005G01X0Y0Z-001F008\$
N0006Z0001\$**

4.47 CYCLE/TAP (L)

(Hardware Cycle)

CYCLE/TAP-84,z,f,IPM-IPR,c[,LOCK,l][,CAM,n][,PULBAC,g]

CYCLE/TAP-84,FEDTO,z,IPM-IPR,f,RAPTO,c

1. Rapid to clearance **c**.
2. Advance at feedrate **f** to depth **z**.
3. Reverse spindle direction.
4. Retract at feedrate **f** to clearance **c**.
5. Reverse to original spindle direction.

LOCK,l Specifies the dwell time for spindle reverse. Initially a value of 2 seconds is assumed.

Example:

Input:

**SPINDL/150
CYCLE/TAP,1.0,(1/13),IPR,.2
GOTO/0,0**

Punch File Output:

N0006G84X0R0002Z-001F011538\$

4.48 CYCLE/TAP (L)

(Software Cycle)

**CYCLE/TAP,z,f,IPM-IPR,c[,LOCK,/]
CYCLE/TAP,FEDTO,z,IPM-IPR,f,RAPTO,c**

1. Rapid to clearance **c**.
2. Output M-code to disable feed override.
3. Advance at feedrate **f** to depth **z**.
4. Reverse spindle direction M-code with dwell.
5. Retract at feedrate **f** to clearance **c**.
6. Output original spindle direction M-code.
7. Output M-code to enable feed override.

LOCK,/ specifies the dwell time for spindle reverse. Initially a value of 2 seconds is assumed.

Example:

Input:

**SPINDL/300,RPM,CLW
CYCLE/TAP,1.0,(1/13),IPR,.2
GOTO/0,0**

Punch File Output:

**N004S03M03\$
N005G95\$
N006G00X0Z002\$
N007M51\$
N008G01Z-01F00769\$ (Feedrate calculated from spindle RPM)
N009M05\$
N010G04X101M04\$
N011G01X0Z002\$
N012M03\$
N013M50\$**

4.49 CYCLE/TAP (M)

(Hardware Cycle)

CYCLE/TAP-84,z,f,IPM-IPR,c[,LOCK,l][,CAM,n][,PULBAC,g]

CYCLE/TAP-84,FEDTO,z,IPM-IPR,f,RAPTO,c

1. Rapid to clearance **c**.
2. Advance at feedrate **f** to depth **z**.
3. Reverse spindle direction.
4. Retract at feedrate **f** to clearance **c**.
5. Reverse to original spindle direction.

LOCK,l Specifies the dwell time for spindle reverse. Initially a value of 2 seconds is assumed.

Example:

Input:

SPINDL/150

CYCLE/TAP,1.0,(1/13),IPR,.2

GOTO/0,0

Punch File Output:

N0006G84X0Y0R0002Z-001F011538\$

4.50 CYCLE/TAP (M)

(Software Cycle)

**CYCLE/TAP,z,f,IPM-IPR,c[,LOCK,/]
CYCLE/TAP,FEDTO,z,IPM-IPR,f,RAPTO,c**

1. Rapid to clearance **c**.
2. Output M-code to disable feed override.
3. Advance at feedrate **f** to depth **z**.
4. Reverse spindle direction M-code with dwell.
5. Retract at feedrate **f** to clearance **c**.
6. Output original spindle direction M-code.
7. Output M-code to enable feed override.

LOCK,/ Specifies the dwell time for spindle reverse. Initially a value of 2 seconds is assumed.

Example:

Input:

**CYCLE/TAP,1.0,(1/13),IPR,.2
GOTO/0,0**

Punch File Output:

**N0006G00Z0002F0\$
N0007M51\$
N0008G01X0Y0Z-001F\$
N0009M05\$
N0010G04FM04\$
N0011G01Z0002F\$
N0012M03\$
N0013M50\$**

4.51 CYCLE/TAP-RIGID (M)

(Hardware Cycle)

CYCLE/TAP-84,z,f,IPM-IPR,c,HIGH,ON-OFF

CYCLE/TAP-84,FEDTO,z,IPM-IPR,f,RAPTO,c,HIGH,ON-OFF

The rigid tap cycle allows you to output a cycle G-code with a decimal point such as G84.2.

1. Rapid to clearance **c**.
2. Advance at feedrate **f** to depth **z**.
3. Reverse spindle direction.
4. Retract at feedrate **f** to clearance **c**.
5. Reverse to original spindle direction.

LOCK,I Specifies the dwell time for spindle reverse. Initially a value of 2 seconds is assumed.

Example:

Input:

**SPINDL/150
CYCLE/TAP,1.0,(1/13),IPR,.2,HIGH,ON
GOTO/0,0**

Punch File Output:

N0006G84.1X0Y0R0002Z-001F011538\$

4.52 CYCLE/THRU (L)

(Hardware Cycle)

CYCLE/THRU-87,*z1,z2,z3,z4,...z19,f,IPM-IPR,c[,PULBAC,g]*

1. Rapid to clearance **c**.
2. Advance at feedrate **f** to depth **z1**.
3. Advance at rapid rate to depth **z2** less **c**.
4. Advance at feedrate **f** to depth **z3**.

Repeat steps 3 and 4 for each successive pair of z values, after which, retract at rapid rate to clearance **c**.

Note: The number of **z** parameters must be odd.

Example:

Input:

**CYCLE/THRU,0.5,0.7,1.0,1.2,2.0,2.2,3.0,.0085,IPR,.1
GOTO/0,0**

Punch File Output:

**N0006G87X0R0001Z-0005F0085\$
N0007R-0006Z-001\$
N0008R-0011Z-002\$
N0009R-0021Z-003\$
N0010R0001Z0001\$**

4.53 CYCLE/THRU (L)

(Software Cycle)

CYCLE/THRU,*z1,z2,z3,...z19,f,IPM-IPR,c*

1. Rapid to clearance ***c***.
2. Advance at feedrate ***f*** to depth ***z1***.
3. Advance at rapid rate to depth ***z2*** less ***c***.
4. Advance at feedrate ***f*** to depth ***z3***.

Repeat the steps 3 and 4 for each successive pair of *z* values, after which, retract at rapid rate to clearance ***c***.

Note: The number of *z* parameters must be odd.

Example:

Input:

```
SPINDL/1000,RPM,CLW  
CYCLE/THRU,0.5,0.7,1.0,1.2,2.0,2.2,3.0,.0085,IPR,.1  
GOTO/0,0
```

Punch File Output:

```
N004S51M03$  
N005G95$  
N006G00X0Z001$  
N007G01Z-005F001$  
N008G00Z-007$  
N009G01Z-01F001$  
N010G00Z-012$  
N011G01Z-02F001$  
N012G00Z-022$  
N013G01Z-03F001$  
N014G00Z001$
```

4.54 CYCLE/THRU (M)

(Hardware Cycle)

CYCLE/THRU-87,z1,z2,z3,z4,...z19,f,IPM-IPR,c[,PULBAC,g]

1. Rapid to clearance **c**.
2. Advance at feedrate **f** to depth **z1**.
3. Advance at rapid rate to depth **z2** less **c**.
4. Advance at feedrate **f** to depth **z3**.

Repeat steps 3 and 4 for each successive pair of z values, after which, retract at rapid rate to clearance **c**.

Note: The number of **z** parameters must be odd.

Example:

Input:

**CYCLE/THRU,0.5,0.7,1.0,1.2,2.0,2.2,3.0,.0085,IPR,.1
GOTO/0,0**

Punch File Output:

**N0006G87X0Y0R0001Z-0005F0085\$
N0007R-0006Z-001\$
N0008R-0011Z-002\$
N0009R-0021Z-003\$
N0010R0001Z0001\$**

4.55 CYCLE/THRU (M)

(Software Cycle)

CYCLE/THRU,z1,z2,z3,z4,...z19,f,IPM-IPR,c

1. Rapid to clearance **c**.
2. Advance at feedrate **f** to depth **z1**.
3. Advance at rapid rate to depth **z2** less **c**.
4. Advance at feedrate **f** to depth **z3**.

Repeat steps 3 and 4 for each successive pair of z values, after which, retract at rapid rate to clearance **c**.

Note: The number of **z** parameters must be odd.

Example:

Input:

**CYCLE/THRU,0.5,0.7,1.0,1.2,2.0,2.2,3.0,.0085,IPR,.1
GOTO/0,0**

Punch File Output:

**N0006G00Z0001F0\$
N0007G01X0Y0Z-0005F\$
N0008G00Z-0007F0\$
N0009G01Z-001F\$
N0010G00Z-0012F0\$
N0011G01Z-002F\$
N0012G00Z-0022F0\$
N0013G01Z-003F\$
N0014G00Z0001F0\$**

4.56 DEBUGG

The **DEBUGG** statements are not intended for part programming. It is intended for use during the development stage of a post processor. Use **DEBUGG** to analyze the **COMMON** variable locations in the post processor. Use **DEBUGG** with discretion since they generate a large volume of print output.

4.56.1 DEBUGG/FRONT

DEBUGG/FRONT

Prints the post processor register address locations, alphabetical addresses, formats, and the contents of the **WORD** buffer.

4.56.2 DEBUGG/OFF

DEBUGG/OFF

Turns off the **DEBUGG** print option.

4.56.3 DEBUGG/ON,CLW

DEBUGG/ON,CLW

Prints the CL file records as they are read.

4.56.4 DEBUGG/ON,n,TO,m,TYPE,1-3 (L)

DEBUGG/ON,n,TO,m,TYPE,1-3

Prints the common variables from location **n** to location **m**, after reading every CL record.

TYPE,1	Specifies INTCOM locations.
TYPE,3	Specifies DBLCOM locations.

4.56.5 DEBUGG/ON,n,TO,m,TYPE,1-3 (M)

DEBUGG/ON,n,TO,m,TYPE,1-3

Prints the common variables from location **n** to location **m**, after reading every CL record.

TYPE,1	Specifies INTCOM locations.
TYPE,2	Specifies RELCOM locations.
TYPE,3	Specifies DBLCOM locations.

4.57 DELAY

DELAY/*n*[,REV]

This statement produces a dwell block. The value of *n* is in seconds or in revolutions if **REV** is given.

If in **IPR** mode, the dwell time is output in revolutions.

If in **IPM** mode, the dwell time is output in seconds.

When the **IPM/IPR** switchable option is not available in the control, the dwell time will be converted to the available units.

The dwell time in seconds will be printed for verification.

Note: If the DWELL register is one of the axis registers, the verification DWELL time will appear in that axis column.

Examples (L):

Input: IPM Mode

```
FEDRAT/10,IPM
GOTO/0,0
DELAY/5 $$OUTPUTS DWELL CODE & DWELL IN SECONDS
GOTO/5,5
```

Punch File Output:

```
N005G01X0Z0F01$
N006G04X05$
N007G01X05Z05$
```

Example (L):

Input: IPR Mode

```
FEDRAT/.010,IPR
GOTO/0,0
DELAY/5 $$OUTPUTS DWELL CODE & DWELL IN REVS
GOTO/0,0
```

Punch File Output:

```
N005G95$
N006G01X0Z0F001$
N007G04X5425
N008G01X0Z0$
```

Examples (M):

Input:

```
SPINDL/1000,RPM,CLW
FEDRAT/10,IPM
GOTO/0,0
DELAY/5      $$OUTPUTS DWELL CODE & DWELL IN SECONDS
GOTO/5,5
```

Punch File Output:

```
N0004M4A$
N0005S1000M03$
N0006G01X0Y0Z0F01$
N0007G04F005$
N0008G01X005Y005F01$
```

Example (M):

Input:

```
SPINDL/1000,RPM,CLW
FEDRAT/.010,IPR
GOTO/0,0
DELAY/5,REV  $$DWELL CODE IN REVS (.3 SEC.)
GOTO/5,5
```

Punch File Output:

```
N004M41$
N005S100M03$
N006G01X0Z0F01$
N007G04F0003$
N008G01X005Y005F01$
```

4.58 DISPLY

4.58.1 DISPLY/ON-OFF

DISPLAY/ON-OFF

This statement allows the operator comments to be displayed at the Machine/Control unit.

ON Enables the [text], which is column 7 through 72 of the subsequent **PPRINT** commands to be punched. Trailing blanks in [text] will be ignored. The [text] will be enclosed in parentheses () and punched with sequence number and the current **OPSKIP** condition.

OFF Disables the above option.

Example:

Input:

```
GOTO/5,5
DISPLY/ON
PPRINT THIS STATEMENT IS FOR OPERATOR COMMENTS
DISPLY/OFF
PPRINT THIS STATEMENT WILL NOT BE PUNCHED
GOTO/0,0
```

Punch File Output (L):

```
N004G01X05Z05$
N005(THIS STATEMENT IS FOR OPERATOR COMMENTS)$
N006X0Z0$
```

Punch File Output (M):

```
N004G01X05Y05Z05$
N005(THIS STATEMENT IS FOR OPERATOR COMMENTS)$
N006X0Z0$
```

Related Commands:

```
PLABEL/OPTION,14
PLABEL/OPTION,15
PLABEL/OPTION,30
```

4.58.2 DISPLY/NEXT

DISPLY/NEXT

This command is similar to **DISPLY/ON**, except that it punches the text from the next **PPRINT** statement, regardless of the current setting of **DISPLY/ON-OFF** condition.

Example:

```
DISPLY/NEXT  
PPRINT THIS IS A TEST
```

The above commands are equivalent to the following:

```
DISPLY/ON  
PPRINT THIS IS A TEST  
DISPLY/OFF
```

4.59 END

END

Generates an end-of-tape M-code. Normally **M02**

4.60 FEDRAT

4.60.1 FEDRAT/*f*[,IPM-IPR][,RAPTO[,*d*]]

FEDRAT/*f*[,IPM-IPR][,RAPTO[,*d*]]

f Is the feedrate value to be used for subsequent non-rapid motion.

IPM Specifies units per minute feed.

IPR Specifies units per revolution feed.

IPM and **IPR** are modal; initially **IPM** is assumed.

Note: The mode (inch or metric) is selected in the **MACHIN/** statement and no number conversions are done to the **FEDRAT** values.

RAPTO Is a non-modal option which causes the next motion to be split into two blocks. The first block is a rapid move to within a distance ***d***, from the end point. The second block is at the feedrate ***f*** for the remaining distance ***d***.

d The value *d* remains in effect for subsequent **RAPTO** options until changed. Initially 0.3 is assumed for ***d***.

4.60.2 FEDRAT/LOCK,ON-OFF

FEDRAT/LOCK,ON-OFF

This command generates the M-codes to control feedrate override options.

ON Generates an M-code to enable feedrate override.

OFF Generates an M-code to disable feedrate override.

4.61 FINI

This statement indicates the end of the CL file. The post processor will output all pending blocks and stop execution.

Using the Option File Generator you can define up to 10 blocks of NC code to be output at the end of the MCD file. Tape trailer and the Rewind stop code are the only pieces of data that will follow this output.

4.62 FROM (L)

FROM/x,y

The initial axes position is given by this command.

x,y Are the coordinates of the axes position in the part coordinate system. Any effective translation will be applied to x and y to obtain the machine coordinates.

The coordinates of x and y are assumed to be the tool tip, unless **TURRET/CENTER** is in effect, and indicate the turret reference point.

4.63 FROM (M)

FROM/x,y,z

The initial axes position is given by this command.

x,y,z Are the coordinates of the axes position in the part coordinate system. Any effective translation will be applied to x, y, and z to obtain the machine coordinates.

Related Commands:

PLABEL/OPTION,45

4.64 GOHOME

GOHOME

Sends the axes to the home point at rapid rate.

Example (M):

Input:

```
GOTO/5,2,.5  
GOTO/6,5,1  
GOHOME
```

Punch File Output:

```
N004G01X005Y002Z0005F001$  
N005X006Y005Z001$  
N006G00Z03F0  
N007X01Y01F0
```

Example (L):

Input:

```
GOTO/5,5  
GOHOME
```

Punch File Output:

```
N004G01X05Z05F01$  
N005G00X1Z1$
```

4.65 GOTO

GOTO/x,y,z

Sends the axes to an absolute position.

Example (M):

Input:

GOTO/5,2,.5

GOTO/6,5,1

Punch File Output:

N004G01X005Y002Z0005F001\$

N005X006Y005Z001\$

Example (L):

Input:

GOTO/5,5,0

Punch File Output:

N004G01X05Z05F01\$

Related Commands:

ARCDAT - ARCMOV

4.66 HEAD (L)

HEAD/FRONT-REAR([,**XCOORD**,*xd*][,**YCOORD**,*yd*])

This statement modifies the default turret separation distance for multiple turret lathes.

FRONT Specifies the primary turret type.

REAR Specifies the secondary turret type.

XCOORD,*xd* Specifies the direction and distance of this secondary turret, measured along the CL X axis from the primary turret.

YCOORD,*yd* Specifies the direction and distance of this secondary turret, measured along the CL Y-axis from the primary turret.

4.67 INCLUDE

INCLUDE/Filename

This statement is used to include the contents of the specified ASCII source file, **Filename**, into the current file. Once the contents of **Filename** are included the process will continue on the line following the **INCLUDE** statement.

Filename can be any valid ASCII text file on your system. If the file extension is not specified, **.INC** is used. If the **Filename** does not include the path the system will locate the file as follows:

1. Search the current working directory where the source file is located.
 2. Search the directory specified by the **UNC\$INCLUDE** path from the **Config.tbl** file. It is recommended that the **UNC\$INCLUDE** and the **UNC\$LIBRARY** paths be the same in the **Config.tbl** file.
 3. Search the directory specified by the **UNC\$LIBRARY** from the **Config.tbl** file.
- If the specified **Filename** is not located in one of these locations the system will generate an error message.
 - The **INCLUDE/Filename** statement must start in column one on any line of your source file. Shift this command to the right out of column one and the system will generate an error message.
 - Comments are not allowed in the **INCLUDE/Filename** statement.
 - Four levels of **INCLUDE** are permitted.

Examples:

The following **INCLUDE** statements are **INVALID**:

```

$$ No comments allowed on the INCLUDE line
INCLUDE/TEST1.INC      $$ THIS COMMENT WILL CAUSE AN ERROR!

$$ INCLUDE statement must start in column one
INCLUDE/TEST2.INC
```

The following **INCLUDE** statements are **VALID**:

```

$$ Including TEST1.DAT, looks through the defined search paths
INCLUDE/TEST1.DAT

$$ Exact location of file is specified
INCLUDE/C:\TEST\SOURCE\MACHINE1\TEST1.INC

$$ Including TEST3.INC, looks through the defined search paths
INCLUDE/TEST3
```

4.68 INSERT

INSERT[*text*]

This statement allows the part programmer to directly output control information to the punch file.

The [*text*] from column 7 through 72 of the input statement is punched.

Blanks in the [*text*] will be ignored. The [*text*] is punched with sequence number and the current **OPSKIP** condition. End of block code is not generated by the post processor and should appear in [*text*], if needed.

This command should be used only when a post processor command is not available for the control information. When used, the post processor does not verify the validity of this block.

A continuation character can be used to output long tape blocks.

Set **INTCOM(1951)** to the ASCII value of the continuation character.

You can combine **INSERT** commands into long tape blocks as follows:

Assume **INTCOM(1951)** is set to 92 (the \ backslash)

Example:

Input:

```
INSERT/'N001 G01 '$  
INSERT/' X15.0 '$  
INSERT/' Y10.0 '$  
INSERT/' Z100.0 '$  
INSERT/' F10.0 '$
```

Output:

```
N001 G01 X15.0 Y10.0 Z100.0 F10.0 $
```

Related Commands:

```
PLABEL/OPTION,9  
PLABEL/OPTION,30
```

4.69 LEADER

LEADER/*n*

This statement causes ***n*** units of space codes to be punched.

Related Commands:

PLABEL/OPTION,10

4.70 LINTOL (M)

LINTOL/[*t*,]ON-OFF

This statement is used to test a **MULTAX** cutting path (at least one linear axis and a rotary axis) against a given tolerance ***t*** for linearization. If the deviation of this path exceeds the tolerance, it is segmented into smaller moves.

t The tolerance that will be used for testing. If omitted, the previously established value is used. The default value for ***t*** is .005 inch.

ON Enables testing for all subsequent MULTAX feed moves until **OFF** is programmed.

4.71 LOADTL (M)

LOADTL/t [,LENGTH,/][ADJUST,h][,OMIT]

This command generates a tool change block consisting of an M-code, a tool number T-code, and an offset code.

t	The tool number desired.
LENGTH,/	Specifies the tool length, which is used to adjust Z -axis output. If you omit LENGTH,/ , zero tool length is assumed.
ADJUST,h	Generates the offset register number h in the address designated in the Option File Generator. This value will be output the same as the tool number if the switch is set in the Option File Generator and the ADJUST value is not specified.
OMIT	Does not generate an M-code. You can use this option if the tool is already resident in the spindle, such as the first LOADTL statement to indicate tool length.

Note: Automatic tool preselect will be performed if the switch is set in the Option File Generator . There would be no reason to use the SELCTL command if automatic tool preselects are being used. If automatic tool preselects are performed the post processor will generate a tool list file using the same name as the input file with the .TL1 extension.

The tool list file is formatted as follows:

3								
8	1	1.00	.000	.000	.000	.000	0	0
16	1	1.00	.000	.000	.000	.000	0	0
24	1	1.00	.000	.000	.000	.000	0	0

The first number is the number of tool changes in this program. In this case 3 tool changes.

Each line there after is as follows:

First value is the CL record number of the tool change

Second value is the type of tool change, 1=LOADTL 2=TURRET

Third value is the tool number

Fourth value is the offset number

Fifth value is the Z LENGTH from LOADTL, Set to 0 if TURRET

Sixth value is the X gage length from TURRET, Set to 0 if LOADTL

Seventh value is the Y gage length from TURRET, Set to 0 if LOADTL

Eighth value is the CLW-CCLW from the TURRET, Set to 0 if LOADTL

Ninth value is the TURRET being used, 1=FRONT, 2=REAR, 3=SADDLE, 4=MAIN, 5=RAIL and 0=LOADTL

Note: A switch in the Option File Generator will instruct the post processor to automatically output the T code and M code on separate blocks.

4.72 LPRINT

LPRINT/NEXT

This statement causes the post processor print output (the .LST file) to start on a new page at this point.

4.73 MACHIN

(M)

MACHIN/UNCX01,*n* [,ON-OFF] [,CIRCUL-LINEAR]
 [,OPTION,*n1,v1,n2,v2,..*] (M)

(L)

MACHIN/UNCL01,*n* [,ON-OFF] [,CIRCUL-LINEAR]
 [,OPTION,*n1,v1,n2,v2,..*] (L)

UNCL01

or **UNCX01** The name of the post processor (**UNCL01** is Lathe and **UNCX01** is Mill).

n The required machine number.

ON Causes the post processing to begin, which is the default.

OFF Terminates post processing of all following CL records until **ON** is programmed.

CIRCUL Causes circular interpolation blocks to be output for the circular motion in the CL file, which is the default.

LINEAR Generates linear interpolation blocks for the circular motion in the CL file.

OPTION Specifies the option number ***n1*** to be set to the value ***v1***.

The options are described in the **PLABEL/OPTION** section, since these two commands are synonymous.

Examples (M):

PARTNO USE DEFAULT OPTION

MACHIN/UNCX01,1

—

—

FINI

PARTNO USE OPTION IN MACHIN STATEMENT

MACHIN/UNCX01,1,OPTION,5,1 \$\$ PACK PUNCH OUTPUT

—

—

FINI

PARTNO USE OPTION IN PLABEL STATEMENT

MACHIN/UNCX01,1

PLABEL/OPTION,5,TO,1 \$\$ PACK PUNCH OUTPUT

—

—

FINI

Examples (L):

PARTNO USE DEFAULT OPTION
MACHIN/UNCL01,1

—

—

FINI

PARTNO USE OPTION IN MACHIN STATEMENT
MACHIN/UNCL01,1,OPTION,5,1 \$\$ PACK PUNCH OUTPUT

—

—

FINI

PARTNO USE OPTION IN PLABEL STATEMENT
MACHIN/UNCL01,1
PLABEL/OPTION,5,TO,1 \$\$ PACK PUNCH OUTPUT

—

—

FINI

4.74 MACHIN Statement for Automatic Tape Break

(M)

```
MACHIN/UNCX01,n[,ON-OFF][,CIRCUL-LINEAR]
    [LENGTH,min,max,TYPE,t[,MODIFY,c1,c2]
    [,PULBAC,dx,dy,dz]][,OPTION,n1,v1,n2,v2,...]
```

(L)

```
MACHIN/UNCL01,n[,ON-OFF][,CIRCUL-LINEAR]
    [LENGTH,min,max,TYPE,t[,MODIFY,c1,c2]
    [,PULBAC,dx,dy]][,OPTION,n1,v1,n2,v2,...]
```

The Auto Break feature is activated if you enter values for **LENGTH**, **TYPE**, **MODIFY**, and **PULBAC**. The post processor automatically generates a **BREAK** sequence once the minimum tape footage is exceeded. If **TYPE** has a non-zero value associated with it, the **BREAK** sequence is generated on the next occurrence of the major word indicated by **TYPE**. If the maximum footage is exceeded, a warning message is output.

LENGTH Specifies the minimum and maximum footage desired when using the Auto Break feature.

TYPE Specifies the major word or words on which the Auto Break feature is to act.

t Is a composite number containing any and all of the digits 1, 2, 3, or 4, where the following conditions are true:

is **BREAK** on length minimum
 is **GOHOME**
 is **LOADTL** (M) or **TURRET** (L)
 is **OPSTOP**
 is **STOP**

MODIFY Allows the **PARTNO** to be altered for each break.

c1 Is the **PARTNO** to be altered for each break.

c2 Is the starting character increment in the **ASCII** array. See **PLABEL/OPTION 9** through **16** for the character locations. **c2** must be between 32 and 96; it is incremented by one for each auto break. If **c2** increments to 96, it remains at 96.

PULBAC During Auto Break, a pull-back move can be generated to clear the part.

dx,dy,dz (M) Are the delta values along each axis desired for the move. All three values must be specified. Use zero if you do not want a move along an axis.

dx,dy (L) Are the delta values along each axis desired for the move. Both values must be specified. Use zero if you do not want a move along an axis.

4.75 MCHTOL

MCHTOL/t[,ON] or MCHTOL/ON-OFF

This command will segment a linear move into smaller steps for tolerance requirements.

t The required step size. All the subsequent moves that exceed this value will be segmented. The minimum allowable t that you can program is 0.1.

ON-OFF Will set or reset this option.

Example:

Input:

```
FROM/10,0
MCHTOL/.5,ON
GOTO/15,0
MCHTOL/OFF
GOTO/10,0
```

Punch File Output (M):

```
N0004G01X0104545Y0051818Z0F001$
N0005X0109091Y0053636$
N0006X0113636Y0055455$
N0007X0118182Y0057273$
N0008X0122727Y0059091$
N0009X0127273Y0060909$
N0010X0131818Y0062727$
N0011X0136364Y0064545$
N0012X0140909Y0066364$
N0013X0145455Y0068182$
N0014X015Y007$
N0015X01Y0$
```

Punch File Output (L):

```
N004G01X0Z104545F001$
N005Z109091$
N006Z113636$
N007Z118182$
N008Z122727$
N009Z127273$
N010Z131818$
N011Z136364$
N012Z140909$
N013Z145455$
N014Z15$
N015Z1$
```

4.76 MODE

4.76.1 MODE/INCR[,OFF]

MODE/INCR[,OFF]

INCR Generates an incremental G-code and incremental output.

INCR,OFF Generates an absolute G-code and absolute output, which is the default mode assumed.

4.76.2 MODE/90-91

MODE/90-91

90 Generates the absolute G-code G90 and absolute output.

91 Generates the incremental G-code G91 and incremental output.

4.76.3 MODE/INVERS,AUTO-ON-OFF

MODE/INVERS,AUTO-ON-OFF

AUTO Generates inverse time feed rate codes for subsequent rotary motion.

ON Generates inverse time feed rate codes for subsequent motion.

OFF Turns off the above option.

Example (L):

Input:

```
GOTO/6,6
MODE/INCR  $$INCREMENTAL OUTPUT, NEXT BLOCKS
GOTO/3,3
GOTO/2,2
MODE/INCR,OFF  $$REVERTS BACK TO ABSOLUTE
GOTO/6,6
GOTO/10,10
```

Punch File Output:

```
N004G01X06Z06$
N005G91$
N006G01X-03Z-03$
N007X-01Z-01$
N008G90$
N009G01X06Z06$
N010X1Z1$
```

4.76.4 MODE/TABLE-ZAXIS[,ADJUST,d]

MODE/TABLE-ZAXIS[,ADJUST,d]

TABLE	For colinear machines TABLE activates the W axis movements.
ZAXIS	For colinear machines ZAXIS activates the Z axis movements.
ADJUST,d	Set the axis offset for the TABLE or ZAXIS in effect.

4.76.5 MODE/MILL-TURN,v[,nnnn] (UNCMRG)

MODE/MILL-TURN,v[,nnnn]

The **MODE/MILL,v** and **MODE/TURN,v** commands are used for merging post processors. See the **UNCMRG** chapter of this manual.

MILL,v	Activates the MILL post processor UNCX01,v where v is the option file number.
TURN,v	Activates the TURN post processor UNCL01,v where v is the option file number.
nnnn	Optional, adding nnnn to the MODE/ commands sets the sequence number for this section of the merged code.

4.76.6 MODE/MILL-TURN (MILL-TURN Configuration)

MODE/MILL-TURN

The **MODE/MILL** and **MODE/TURN** commands are used for a MILL-TURN configured post processors.

MILL	Activates the MILL options for the MILL-TURN configuration. The MILL configuration used is determined by the current SPINDL/PARLEL command.
TURN	Activates the TURN options for the MILL-TURN configuration.

4.76.7 MODE/YAXIS,ON-OFF-AUTO (MILL-TURN Configuration)

MODE/YAXIS,ON-OFF-AUTO

The **MODE/YAXIS** commands are used for the XZC-XYZ output, in the milling operations, with a MILL-TURN configured post processor.

OFF	Output XYZ axis moves instead of XZC (RTHETA).
ON	Output XZC (RTHETA) axis moves instead of XYZ.
AUTO	Outputs XYZ within the defined Y axis travel limits, but switches to XZC (RTHETA) with the Y axis travel limits are exceeded.

4.77 MULTAX (M)

MULTAX/[ON-OFF]

This statement causes the G-Post to read tool axis vector components for all points in the CL file. The post processor converts these vector components to rotary axis coordinates.

If you use **MULTAX**, it must appear after the **MACHIN** statement, but before the first motion command. If the **MULTAX** command is not given, three-axis machine processing is assumed.

ON Activates this command

OFF Disables this command

Example:

```
PARTNO THIS IS A MULTAX TEST
MACHIN/UNCX01,1
MULTAX/ON
FROM/10,10,10,0,0,1
GOTO/5,5,10,0,1,0
GOTO/3,2,10,1,0,0
MULTAX/OFF
GOTO/10,10,10
FINI
```

4.78 OP/THREAD (L)

**OP/THREAD,TURN-FACE,DEPTH,d,TPI-IPR-MMPR, pf, CUTS,c,FINCUT,fc, \$
 CUTANG,a[,MULTRD,s]
 GOTO/-----
 GOTO/-----
 OP/THREAD,NOMORE**

The **OP/THREAD** command is a standard, PTC Pro/E generated, lathe threading command. G-Post will automatically read ahead in the CL file to retrieve the 2 GOTO points that follow this command. The entire threading operation will be generated by the G-Post using this format.

You can specify a variable number of data items, according to the options you desire, and you can specify them in any order. Each item consist of either a vocabulary word only or a vocabulary word followed by one or more entities in a fixed order.

You must always specify the following data items:

**TURN-FACE
 DEPTH
 TPI-IPR-MMPR
 CUTS
 FINCUT
 CUTANG
 GOTO/--- \$\$ START POINT OF THE THREAD
 GOTO/--- \$\$ END POINT OF THE THREAD**

The **OP/THREAD** command assumes a point tip cutter and hence ignores the **CUTTER** statement in effect.

The **OP/THREAD** process generates a series of passes, cutting into the part a specified amount on each pass until the specified total depth has been reached.

Each pass is composed of four moves:

1. The Step-in move, which moves the cutter into the part an amount specified by **INCR**. This move is perpendicular to the centerline unless specified otherwise by **ATANGL**.
2. The actual threading move, which is parallel to the centerline..
3. The Pull-back move, which moves the cutter away from the part
4. The Return move, which moves the cutter back to a position from which the step-in move for the next pass can be made. This move is always parallel to the centerline.

Following are descriptions of the various **OP/THREAD** data items:

TURN-FACE

TURN Specifies a thread moving along the axis of rotation.

FACE Specifies a thread moving perpendicular to the axis of rotation.

TPI,pf	Specifies the threads per inch.
IPR,pf	Specifies the thread lead 1/pitch in inches.
MMPR,pf	Specifies the thread lead 1/pitch in millimeters.
CUTS,c	Specifies the total number of threading passes.
FINCUT,fc	Specify the number of finish passes to make. Finish passes have no depth of cut. These passes are also called "Spring Passes".
CUTANG,a	Specifies the angle between the step-in move and a line perpendicular to the centerline. It is positive if the step-in move is in the same general direction as the thread move; negative if opposite. The angle must be less than 90 degrees in absolute value.
MULTRD,s	[Optional] You can program a multiple start thread by using this couplet. s specifies the number of threads to be cut. The first thread is started at the start point and each additional thread is offset in the direction opposite the threading direction a distance equal to the lead divided by n , where the lead is the reciprocal of the pitch. If MULTRD,n is not specified it is assumed to be 1, with the result that only one thread is cut.

Example: (PTC .NCL File)

```

OP / THREAD , TURN, DEPTH, 0.135000, TPI, 4.000000, CUTS, 35,$
  FINCUT, 1,CUTANG, 180.000000
GOTO / 5.2775000000, 0.0000000000, -57.4032504052
GOTO / 5.2775000000, 0.0000000000, -49.2867788005
OP / THREAD, NOMORE

```

4.79 OPSKIP

4.79.1 OPSKIP/ON-OFF

OPSKIP/ON-OFF

ON Generates block delete (/) codes for all subsequent punch blocks.

OFF Terminates the above.

Example (L):

Input:

```
GOTO/6,6
OPSKIP/ON
GOTO/3,3
GOTO/2,2
OPSKIP/OFF
GOTO/0,0
GOTO/10,10
```

Punch File Output:

```
N004G01X06Z06$
/N005G01X03Z03$
/N006X02Z02$
N007G01X0Z0$
N008X1Z1$
```

Related Commands:

```
PLABEL/OPTION,12
PLABEL/OPTION,30
```

4.79.2 OPSKIP/n1,n2,n3,...,ON-OFF

OPSKIP/n1,n2,n3,...,ON-OFF

Generates multiple block delete codes for all subsequent punch blocks. ***n1***, ***n2***, ***n3***, ... are the numerical codes to be output with the block deletes. Up to nine block deletes may be used at one time. These block deletes may be selectively turned on and off, based upon **ON** and **OFF**.

Example (L):

Input:

OPSKIP/4,5,ON
GOTO/3,3
GOTO/2,2
OPSKIP/4,OFF
GOTO/0,0
GOTO/10,10

Punch File Output:

N004G01X06Z06\$
/4/5N005G01X03Z03\$
/4/5N006X02Z02\$
/5N007G01X0Z0\$
/5N008X1Z1\$

Related Commands:

PLABEL/OPTION,12
PLABEL/OPTION,30

4.80 OPSTOP

OPSTOP

Produces the machine optional stop M-code. Normally **M01**.

4.81 ORIGIN (L)

ORIGIN/*x,y*

This statement relates the CL coordinate system to the machine coordinate system, when the two are not coincidental. All the CL coordinates after the **ORIGIN** statement are modified by the **ORIGIN** values.

x and y Specify the distance and direction along the CL X and Y-axes measured from the part origin to the machine origin.

Initially **ORIGIN/0** is assumed.

Example:

Input:

```
ORIGIN/-10,-10  
GOTO/0,0  
ORIGIN/0  
GOTO/10,10
```

Punch File Output:

```
N004G01X1Z1$  
N005X1Z1$
```

Related Commands:

TRANS

4.82 ORIGIN (M)

ORIGIN/*x,y,z*[*a*]

This statement relates the CL coordinate system to the machine coordinate system, when the two are not coincidental. All the CL coordinates after the **ORIGIN** statement are modified by the **ORIGIN** values.

x, y, and z Specify the distance and direction along the CL X, Y, and Z axes measured from the part origin to the machine origin. Initially **ORIGIN/0** is assumed.

a An angular value denoting an absolute rotary table position for future reference. Do not use in **MULTAX** mode.

The **x**, **y**, and **z** values are stored until the rotary table is rotated to that angle by **ROTABL**. At that time the **x**, **y**, and **z** values are used for the **ORIGIN**. The number of **ORIGIN** statements with different angular values is limited to 36.

Note: In **MULTAX** mode an **ORIGIN** command using the **a** Parameter is invalid and ignored.

Example:

Input:

```
PARTNO ORIGIN WITH ANGLE
MACHINE/UNCX01,1
ORIGIN/2,2,0,45      $$ FOR 45 TABLE POSITION
ORIGIN/4,4,0,45      $$ FOR 90 TABLE POSITION
--
GOTO/P00      $$ TABLE AT 00, NO ORIGIN
--
ROTABL/ATANGL,45
--
GOTO/P45      $$TABLE AT 45, 1ST ORIGIN
--
ROTABL/ATANGL,90
--
GOTO/P90      $$TABLE AT 90, 2ND ORIGIN
--
ROTABL/ATANGL,0
--
GOTO/SP      $$TABLE AT 00, NO ORIGIN
--
FINI
```

Related Commands:

TRANS

4.83 PARTNO

PARTNO[*text*]

[*text*] is column 7 through 72 of the **PARTNO** statement, which is punched in man readable form.

This is the only statement which is processed prior to the **MACHIN** statement in a part program.

Related Commands:

PLABEL/OPTION,7

4.84 PITCH (L)

PITCH/*t* [,INCR-DECR,*t1*]

Establishes the lead for subsequent **THREAD** commands.

t Is the number of threads per unit.

INCR-DECR For variable lead threading, **INCR** states increasing lead and **DECR** states decreasing lead, with *t1* as the ending threads per unit.

The **PITCH** command is modal and the established lead remains in effect for all subsequent **THREAD** commands, until changed by a new **PITCH** statement.

Related Commands:

PLABEL/OPTION,50

4.85 PLABEL

4.85.1 PLABEL/OPTION,n,TO,v

This command allows the part programmer to choose certain options provided by the post processor. To access the PLABEL/OPTION values directly from COMMON add 1830 to the option number and this value will be the INTCOM location used by the desired PLABEL/OPTION. PLABEL/OPTION,1 = INTCOM(1831), PLABEL/OPTION,2 = INTCOM(1832), PLABEL/OPTION,3 = INTCOM(1833)...

n Denotes the option number, which will be set to value ***v***.

<i>n</i>	<i>v</i>	<u>Function</u>
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01	00	Do not output tab characters in the MCD file. (<i>default</i>)
	01	Output tab characters in the MCD file.
	02	Add a blank space before each letter address in the MCD file.

Option 02 controls the verification print, which is the auxiliary information in the .LST file. It contains for example, spindle speed, velocity, etc.

02	01	Generate verification print. (<i>default</i>)
	00	Do not generate verification print.
	02	Generate non-modal verification print.
	11	Generate modal verification print and CL point (xyzijk) print.
	12	Generate non-modal verification print and CL point (xyzijk) print.

03	01	Inch input / inch output. (<i>default</i>)
	02	Metric input / inch output.
	03	Metric input / metric output.
	04	Inch input / metric output.
	05	Values 01 through 04 indicate that all dimensions in the option file are in inches.

03	11	Inch input / inch output.
	12	Metric input / inch output.
	13	Metric input / metric output.
	14	Inch input / metric output.
Values 11 through 14 indicate that all dimensions in the option file are in millimeters.		

04	01	Print page heading. (<i>default</i>)
	00	Do not print page heading.

05	00	Unpack MCD file output with one block per line. (<i>default</i>)
	01	Pack MCD file output into 72 columns.

06	00	Do not suppress warning messages. (<i>default</i>)
	01	Suppress all warning messages.
	02	Write warnings to a file.

07	01	Output man readable PARTNO. (<i>default</i>)
	00	Do not output man readable PARTNO.

<u><i>n</i></u>	<u><i>v</i></u>	<u>Function</u>
08	01	Output a rewind stop code at the start of the MCD file.
	00	Do not output any rewind stop codes. (<i>default</i>)
	02	Output a rewind stop code at start and end of the MCD file.
	03	Output a rewind stop code at end of the MCD file.

Options 9 through 16 use numerical codes to represent characters.

The following chart defines the decimal values for ASCII characters. The G-Post requires the use of ASCII decimal values where specified.

. = 32	! = 33	" = 34	# = 35	\$ = 36	% = 37	& = 38	' = 39
(= 40	) = 41	* = 42	+ = 43	, = 44	- = 45	. = 46	/ = 47
0 = 48	1 = 49	2 = 50	3 = 51	4 = 52	5 = 53	6 = 54	7 = 55
8 = 56	9 = 57	: = 58	; = 59	< = 60	= = 61	> = 62	? = 63
@ = 64	A = 65	B = 66	C = 67	D = 68	E = 69	F = 70	G = 71
H = 72	I = 73	J = 74	K = 75	L = 76	M = 77	N = 78	O = 79
P = 80	Q = 81	R = 82	S = 83	T = 84	U = 85	V = 86	W = 87
X = 88	Y = 89	Z = 90	[= 91	\ = 92	] = 93	^ = 95	_ = 96

Example: To change Rewind Stop code from = to %, you would enter:

PLABEL/OPTION,11,TO,37

09	36	End of block character \$. (<i>default</i>)
10	62	LEADER character. (<i>default</i>)
11	61	Rewind stop code =. (<i>default</i>)
12	47	OPSKIP character /. (<i>default</i>)
13	42	Tab character *. (<i>default</i>)
14	40	Control out character (. (<i>default</i>)
15	41	Control in character). (<i>default</i>)
16	78	Alignment block address N. (<i>default</i>)
17	00	Output the EOB character to the MCD file. (<i>default</i>)
	01	Suppress output of the EOB character to the MCD file.
18	00	Output F-CODE after RAPID move. (<i>default</i>)
	01	Suppress F-CODE after RAPID move.

<u>n</u>	<u>v</u>	<u>Function</u>
19	00	Do not check axes limit. (<i>default</i>)
	01	Check axes limit.
	02	MULTAX axis limits will call the _REPOS macro from FIL.

Option 20 applies only when option 6 is set to 0.

20	00	Output warning for illegal major words. (<i>default</i>)
	01	Do not output warning for illegal major words.

Option 21 controls the format of the integer registers (N,G...) for punch output. The 4 digits correspond to leading zeros, trailing zeros, plus sign, and decimal point. Any combination of the digits is acceptable. For example, 1100 will punch leading and trailing zeros.

21	0000	Punch per postprocessor specification. (<i>default</i>)
	0100	Punch trailing zeros.
	1000	Punch leading zeros.

Option 22 controls the format of the decimal registers (X,Y...) for punch output. Any combination of the digits is acceptable. For example, 1101 will punch leading and trailing zeros with decimal point.

22	0000	Punch per post processor specification. (<i>default</i>)
	0001	Punch decimal point.
	0010	Punch sign.
	0100	Punch trailing zeros.
	1000	Punch leading zeros.

Option 23 specifies the contents of I,J and K registers for a circle block in absolute mode.

23	01	Absolute arc distances. (<i>default</i>)
	02	Distance from center to start point.
	03	Distance from start point to center.
	04	Center coordinates.

Option 24 specifies the contents of I,J and K registers for a circle block in incremental mode.

24	01	Absolute arc distances. (<i>default</i>)
	02	Distance from center to start point.
	03	Distance from start point to center.
	04	Center coordinates.

25	00	Do not accept MULTAX CL file. (<i>default</i>)
	01	Accept MULTAX CL file, ignore tool axis vector.

Option 26 controls the output of those points in the CL file, which have identical coordinates and appear in succession.

26	01	Output the repeat point. (<i>default</i>)
	00	Do not output repeat point.
	02	Output zero length move during MULTAX .

<u><i>n</i></u>	<u><i>v</i></u>	<u>Function</u>
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Option 27 controls the output of I,J and K registers in a circle block, when their value is zero.

27	01	Output IJK when zero. (<i>default</i>) Do not output IJK when zero.
29	00	Do not adjust feedrate for circles. (<i>default</i>)
	01	Adjust feedrate for circles by cutter radius.
30	00	Output SEQNO,OPSKIP condition for INSERT,DISPLY . (<i>default</i>)
	01	Ignore SEQNO,OPSKIP condition for INSERT,DISPLY .
	02	Ignore SEQNO,OPSKIP condition for DISPLY .
	03	Ignore SEQNO,OPSKIP condition for INSERT .

Option 31 controls the print output of the tape information which appears to the left of the verification print. This can be the tape image or optionally edited for readability. The editing places a decimal point for decimal registers (X,Y..) and does not suppress zeros for integer registers (N,G..).

31	00	Print the exact MCD image to the .LST file. (<i>default</i>)
	01	Print the edited MCD image to the .LST file.

For some machine tools, the Rapid feedrate is required to be in **IPM** or **IPR** mode. Option 32 selects this appropriate mode before the output of a rapid block. Assume the current feed mode in the part program is **IPR** and your machine tool requires that rapid must be in **IPM** mode. The post processor will automatically switch to **IPM** to output the rapid block and then switch back to **IPR** mode for the next move.

32	00	Output Rapid in current mode. (<i>default</i>)
	nn	Switch to mode (nn) to output Rapid.
33	00	Use departure distance for circular INVERS time feedrate calculations. (<i>default</i>)
	01	Use circle radius for circular INVERS time feedrate calculations.
34	00	PREFUN/—,NEXT outputs only one G-code per block. (<i>default</i>)
	01	PREFUN/—,NEXT outputs multiple G-codes per block.
35	00	AUXFUN/—,NEXT outputs only one M-code per block. (<i>default</i>)
	01	AUXFUN/—,NEXT outputs multiple M-codes per block.
36	00	Do not output tool times to list. (<i>default</i>)
	01	Output tool times to list.
	02	Output block cycle times to list file.

When the post is in simulation mode, no output is created for the print and punch files. All processing takes place so that all common locations within the post are updated. This option is normally set within FIL programs.

37	00	Simulation mode is turned off. (<i>default</i>)
	01	Simulation mode is turned on.
38	00	Do not allow option file to be used by UNCMRG . (<i>default</i>)
	01	Allow option file to be used by UNCMRG . See chapter 8 for details of using UNCMRG .

<u>n</u>	<u>v</u>	<u>Function</u>
39	00	Suppress blanks from INSERT statement. (<i>default</i>)
	01	Allow blanks from INSERT statement to be output.

Note: Options 40 through 48 are for the MILL G-Post only.

Option 40 controls the motion analysis of rapid moves. This option applies only to non-cycle **RAPID** moves.

		<u>Advancing Spindle</u>	<u>Retracting Spindle</u>
40	00	XY & ROTARY then Z (<i>default</i>)	Z then XY and ROTARY
	01	XYZ & ROTARY	XYZ & ROTARY
	02	XY then ROTARY then Z	Z then XY then ROTARY
	03	XY then ROTARY then Z	Z then ROTARY then XY
	04	ROTARY then XY then Z	Z then ROTARY then XY
	05	ROTARY then XY then Z	Z then XY then ROTARY

Option 41 applies to machines with canned cycles. The Z value can be output as an absolute coordinate in a cycle block or as an incremental value measured from the rapid stop point.

41	00	Output Z as absolute value. (<i>default</i>)
	01	Output Z as incremental value.
	02	Output Z as absolute incremental value.

Option 42 controls the output of a positioning block after each tool change. This positioning block will contain the tool change coordinates for automatic tool change machines or the current axes position for manual tool change machines. It is output after each tool change for alignment.

42	01	Generate XYZ positioning block. (<i>default</i>)
	00	Do not generate positioning block.
	02	Generate XYZABC positioning block.

Option 43 controls the output of motion in linear interpolation. Some machines will not allow XYZ in the same block.

43	00	XYZ in one block. (<i>default</i>)
	01	XY block followed by Z.
	-1	Z block followed by XY.

Some controllers have a built-in retract with G80 series cycles that causes a crash condition when the post processor performs motion analysis in cycle mode. Option 44 will force the post processor to always output cycle motion in one block.

44	00	Default CYCLE motion analysis. (<i>default</i>)
	01	CYCLE motion in one block.

<u><i>n</i></u>	<u><i>v</i></u>	<u>Function</u>
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Option 45 controls how the post processor processes a FROM statement.

45	00	Ignore any FROM statement encountered in the part program.
	01	Process only the first FROM statement encountered in the part program.
	02	Process all FROM statements encountered in the part program. (<i>default</i>)
	03	Process only the first FROM statement and output it as a motion block.

Option 46 controls the M-code to be output when the Auto Break feature generates a break sequence.

46	30	Default M-code is 30 for Auto Break. (default)
	nn	Output Mnn on Auto Break.

Option 47 is for register (IJK) value generated by the ARCSLP command.

47	00	Absolute value of lead in radians. (<i>default</i>)
	-1	Disable ARCSLP, linearize the helical interpolation moves with G01.
	01	Lead in radians.
	02	Absolute value of lead in inch or metric units.
48	03	Lead in inch or metric units.
	00	Inverse time feedrate uses iterative method. (default)
	01	Inverse time feedrate uses analytical method.
	02	Inverse time feedrate uses analytical method and disregard the tool length.
	03	Inverse time: $L = x^2 + y^2 + z^2$; $R = a^2 + b^2 + c^2$; $D = \sqrt{L+R}$
	04	Use ½ cutter height to shift tool tip along the tool axis to calculate span length

Inverse time feedrate always uses analytical method and disregards tool length with rotary tables, for the inverse feedrate arc length $D = \sqrt{LIN^{**2} + ROT^{**2}}$. Use ½ cutter height to shift tool-tip along the tool-axis to find the current span length

49	00	Do not check for last point on circle. (default)
	01	Output linear move if last point is not on the circle.
	02	Make end point correction but do not output the linear move.

Note: Options 50 through 58 are for the Lathe G-Post only:

50	00	PITCH/t is threads per unit. (<i>default</i>)
		PITCH/t is direct lead.
51	00	Print verification X in radius. (<i>default</i>)
	01	Print verification X in diameter.
52	00	Primary turret default per specification. (default)
	148	FRONT - Use the front turret as primary.
	149	REAR - Use the rear turret as primary.

Option 53 relates the CL coordinate axes to the Lathe coordinate axes, which can be interchanged for the ease of programming.

53	01	Horizontal: CL X=Lathe Z, CL Y=Lathe X. (default)
	02	Vertical: CL X=Lathe X, CL Y=Lathe Z.

<u><i>n</i></u>	<u><i>v</i></u>	<u>Function</u>
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Option 54 specifies the sequence of output for the axis preset blocks under **SET/START,AUTO** mode.

54	00	Output axis preset block after T-code. (default)
	01	Output axis preset block before T-code.

55	00	Indicates this is not a 2 + 2 lathe.
	01	Indicates this is a 2 + 2 lathe.

Option 56 controls the output of the thread lead registers when the thread lead is equal to zero.

56	00	Output zero in thread register. (default)
	01	Do not output zero in thread register.
57	00	Output absolute registers as modified by the axis multipliers. (default)
	01	Output absolute registers the same as the input is programmed.
58	00	Thread lead registers are non-modal. (default)
	01	Thread registers are modal.

Option 60 determines which of the previous registers a **MODE/INCR** or **MODE/INCR,OFF** empties.

60	00	MODE/INCR empties PREV A to Z. (default)
	01	MODE/INCR empties PREV XYZABC only.

Option 61 controls loading the verification registers with the **POSTN** statement. Verification is **INTCOM** locations 27 through 52. Verify A=27, Verify Z=52.

61	00	POSTN load A-Z and verification (A-Z) (non-modal). (default)
	01	POSTN loads A-Z only; verification registers are not loaded (non-modal).
	10	POSTN load A-Z and verification (A-Z). (modal)
	11	POSTN loads A-Z only; verification registers are not loaded (modal).

Option 62 suppresses the output of dwell times in the verification column for the **DELAY** statement.

62	00	DELAY outputs verification. (default)
	01	Suppress DELAY verification.

Option 63 has been added to allow blanks to be output with the multiple address string. Setting this option to an **ASCII** pointer value will allow spaces to replace the character that is designated.

63	00	Suppress blanks from punch file. (default)
	<i>n</i>	ASCII (<i>n</i>) is used to output blanks to punch file.
64	00	G and M codes cannot be longer than 2 digits. (default)
	01	G and M codes can be longer than 2 digits.
65	00	Use normal FEDRAT (default)
	01	Use FEDRAT table codes.
	02	Use a FEDRAT formula for FEDRAT, the formula is stored in DBLCOM(88)

<u>n</u>	<u>v</u>	<u>Function</u>
70	00	User Generated Blocks (OBSOLETE)
71	00	User Generated Blocks (OBSOLETE)
72	00	User Generated Blocks (OBSOLETE)
73	00	User Generated Blocks (OBSOLETE)
74	00	User Generated Blocks (OBSOLETE)
75	00	User Generated Blocks (OBSOLETE)
76	00	User Generated Blocks (OBSOLETE)
77	00	User Generated Blocks (OBSOLETE)
81	00	Do not output F code with G94-G95-G93 FEDRAT codes. (<i>default</i>)
	01	Output F code with G94-G95-G93 FEDRAT codes.
82	00	In MULTAX if no tool axis is present retain the previous tool axis. (<i>default</i>)
	02	In MULTAX if no tool axis is present set tool axis to 0,0,1
87	00	Do not print input statements in list file. (<i>default</i>)
	01	Print input statements in list file.
88	00	Motion registers XYZIJKABC are modal.. (<i>default</i>)
	01	Motion registers GXYZIJKABCF are non-modal.
	02	Motion registers XYZIJKABC are non-modal.
89	01	Do not output raw CL, no translation, to the verification area of the list file. (<i>default</i>)
	01	Output raw CL, no translation, to the verification area of the list file.
90	01	OBSOLETE Print IAPT CL input statement. (<i>default</i>)
91	00	Word address MCD file format. (<i>default</i>)
	01	Fixed field MCD file format.
	02	Tab sequential MCD file format.
	03	Fixed filed with word address format in MCD file.
92	71	Rapid G-code is modal. (<i>default</i>)
	72	Rapid G-code is non-modal.
93	00	Default circular interpolation. Circle records break at every quadrant crossing (<i>default</i>)
	nn	Number of degrees from the circle start point for a circle record to break.. Number of degrees per circular block (1-360).
94	00	Output IJK with circular G-codes. (<i>default</i>)
	01	Output R with circular G-codes.
	02	Output +R if angle is < 180, output -R if angle > 180.
	03	Same as 2 except if angle is = 360 output IJK.

<u><i>n</i></u>	<u><i>v</i></u>	<u>Function</u>
------------------------	------------------------	------------------------

Option 95 controls the information output at the beginning of the punch file.

95	00	Startup information. Output G-codes and PARTNO . (<i>default</i>)
	01	Suppress startup G-codes.
	02	Suppress PARTNO at startup.
	03	Suppress G-codes and PARTNO at startup.

Option 96 determines whether or not the header line is inserted into the punch file (VMS systems only).

96	00	OBSOLETE (VAX/VMS) Insert header line into punch file. (<i>default</i>)
	01	OBSOLETE (VAX/VMS) Omit header line from punch file.

Option 97 controls the input verification print.

97	00	Print input line number and CL record number. (<i>default</i>)
	01	Suppress CL and input line number.
	02	Suppress CL verification.
	03	Suppress input verification.

Option 98 controls the axis, spindle, and feedrate verification print.

98	00	Use default formats for verification. (<i>default</i>)
	01	Use formats (number of digits) from tape addresses for verification output.
	02	Use formats reserved for verification, pointers, and addresses from the option file.

Note: Alteration of these formats etc. will require manual manipulation of the option file.

1nn	Same as 1, except start the verification in column nn .
2nn	Same as 2, except start the verification in column nn .

Note: If new columns are designated and the length of the tape image overruns the verification, the verification will be suppressed.

Option 99 may be used to designate a different rewind stop code at the end of the tape.

99	00	Use PLABEL (11) as end of tape rewind stop. (<i>default</i>)
	nn	Use IASCII (nn) as end of tape rewind stop code.

PLABEL/OPTION Examples:**Example (M):****Input:**

```

PARTNO CHANGE OPTION
MACHIN/UNCX01,1
PLABEL/OPTION,01,TO,01
PLABEL/OPTION,07,TO,01
FROM/10,10
GOTO/10,10
--
--
FINI

```

Example (L):**Input:**

```

PLABEL/OPTION,03,TO,04  $$ INCH INPUT / METRIC OUTPUT
FROM/10,10
GOTO/5,7
GOTO/2,4

```

Punch File Output:

```

N001G71$
N002G90$
N003G94$
N004G01X1778Z127F00003$
N005X1016Z0508$

```

4.85.2 PLABEL/MODIFY,n,TO,v,TYPE,t

PLABEL/MODIFY,n,TO,v,TYPE,t

This command is used to change the value of a common variable at location **n** to a value of **v**.

TYPE,t as noted below

- 1) $\text{INTCOM}(n) = v$
- 2) $\text{RELCOM}(n) = v$
- 3) $\text{DBLCOM}(n) = v$
- 4) $\text{INTCOM}(n) = \text{ASCII}(v)$
- 5) $\text{INTCOM}(v) = \text{INTCOM}(n)$
- 6) $\text{RELCOM}(v) = \text{RELCOM}(n)$
- 7) $\text{DBLCOM}(v) = \text{DBLCOM}(n)$
- 8) $\text{INTCOM}(v) = \text{RELCOM}(n)$
- 9) $\text{INTCOM}(v) = \text{DBLCOM}(n)$
- 10) $\text{RELCOM}(v) = \text{INTCOM}(n)$
- 11) $\text{RELCOM}(v) = \text{DBLCOM}(n)$
- 12) $\text{DBLCOM}(v) = \text{INTCOM}(n)$
- 13) $\text{DBLCOM}(v) = \text{RELCOM}(n)$
- 14) $\text{INTCOM}(v) = \text{INTCOM}(v) + n$
- 15) $\text{INTCOM}(v) = \text{INTCOM}(v) * n$
- 16) $\text{RELCOM}(v) = \text{RELCOM}(v) + n$
- 17) $\text{RELCOM}(v) = \text{RELCOM}(v) * n$
- 18) $\text{DBLCOM}(v) = \text{DBLCOM}(v) + n$
- 19) $\text{DBLCOM}(v) = \text{DBLCOM}(v) * n$
- 20) $\text{INTCOM}(v) = \text{INTCOM}(v) + \text{INTCOM}(n)$
- 21) $\text{INTCOM}(v) = \text{INTCOM}(v) * \text{INTCOM}(n)$
- 22) $\text{RELCOM}(v) = \text{RELCOM}(v) + \text{RELCOM}(n)$
- 23) $\text{RELCOM}(v) = \text{RELCOM}(v) * \text{RELCOM}(n)$
- 24) $\text{DBLCOM}(v) = \text{DBLCOM}(v) + \text{DBLCOM}(n)$
- 25) $\text{DBLCOM}(v) = \text{DBLCOM}(v) * \text{DBLCOM}(n)$
- 26) $\text{DBLCOM}(v) = \text{DBLCOM}(v) / \text{DBLCOM}(n)$

Example: To set CYCLE/DRILL G-Code to G81

PLABEL/MODIFY,470,TO,81,TYPE,1

4.86 POSTN

4.86.1 POSTN/[XAXIS,xh][,YAXIS,yh] (L)

POSTN/[XAXIS,xh][,YAXIS,yh]

This command modifies the home coordinates, used by the **GOHOME** statement.

xh Specifies the home coordinate for the Lathe Z-axis.

yh Specifies the home coordinate for the Lathe X-axis.

These values must be given in the machine coordinate system.

Example:

Input:

```
POSTN/XAXIS,15,YAXIS,10
GOTO/P1
GOHOME
```

4.86.2 POSTN/[XAXIS,xh][,YAXIS,yh][,ZAXIS,zh][,AAXIS,ah]... (M) [,BAXIS,bh][,CAXIS,ch][,TABLE,wh]

POSTN/[XAXIS,xh][,YAXIS,yh][,ZAXIS,zh][,AAXIS,ah][,BAXIS,bh][,CAXIS,ch][,TABLE,wh]

This command modifies the home coordinates, used by the **GOHOME** statement.

xh Specifies the home coordinate for the mill X-axis.

yh Specifies the home coordinate for the mill Y-axis.

zh Specifies the home coordinate for the mill Z-axis.

ah Specifies the home coordinate for the mill A axis.

bh Specifies the home coordinate for the mill B axis.

ch Specifies the home coordinate for the mill C axis.

wh Specifies the home coordinate for the mill W axis.

These values must be given in the machine coordinate system.

Example:

Input:

```
POSTN/XAXIS,15,ZAXIS,10
GOTO/P1
GOHOME
```

4.86.3 POSTN/IN-OUT,a1,v1,a2,v2...,an,vn[,NEXT]**POSTN/IN-OUT,a1,v1,a2,v2...,an,vn[,NEXT]**

This command provides a variable insert to output selected tape codes to the punch file. This is a structured INSERT statement and the post processor only validates the letter address. If you want to output a P value then the post must have a P letter address.

a1-an Are the required letter addresses and must be 1 through 26 to indicate the alpha characters A through Z.

v1-vn Are the required values to be output with a1-an.

NEXT Will output these codes with the next block.

If some data already exists for output, the **IN** option will combine the **POSTN** codes with the existing block and the **OUT** option will clear the current block and start a new block for **POSTN**.

Example (M):

The following command generates a **G40** block with the current X and Y coordinates:

Input:

```
G=7
X=24
Y=25
P1=POINT/10,10
—
GOTO/P1
POSTN/OUT,G,40,X,(CANF(P1,1)),Y,(CANF(P1,2))
—
FINI
```

Example (L):

The following command generates a **G73** block with the current X and Z coordinates:

Input:

```
G=7
X=24
Z=26
P1=POINT/10,10
GOTO/P1
POSTN/OUT,G,73,X,(CANF(P1,2)),Z,(CANF(P1,1))
FINI
```

4.86.4 POSTN/ALL,OUT**POSTN/ALL,OUT**

This command will output all the registers in the tape format with their current values in one block. Since the codes are output in one block, any validity for the combination of the codes is not checked.

Example:

Input:

```

PARTNO
—
SEQNO/NEXT
POSTN/ALL,OUT
—
FINI

```

4.86.5 POSTN/ALL**POSTN/ALL**

This command will clear all the registers in the tape format without generating any output. This command can be used to repeat any modal tape codes.

Example:

Input:

```

PARTNO
—
COOLNT/MIST
POSTN/ALL
COOLNT/MIST $$ MODAL M-CODE FOR MIST WILL BE
                $$ REPEATED BECAUSE OF POSTN
FINI

```

4.87 PPRINT

PPRINT[*text*]

This statement allows the programmer comments and operator messages to appear in the post processor print file and optionally in the punch file using the **DISPLY/ON** command..

[*text*] The characters from column 7 through 72 of the input statement, which is printed.

If **DISPLY/ON** is in effect, **[*text*]** is also punched to the punch file.

Related Commands:

DISPLY

4.88 PREFUN

PREFUN/g[,NEXT]

Generates a G-code with the value ***g***.

NEXT Generates this G-code with the next output block. If **NEXT** is omitted, the G-code will be output in a block by itself.

If the multiple G-code option is selected, a maximum of four **PREFUN/g,NEXT's** may be programmed per block.

This command should be used only when a post processor command is not available for this G-code. When used, the post processor does not verify the validity of the G-code.

Example:

Input:

```

$$ NEXT OPTION WHEN MULTIPLE G-CODES
$$ ARE AVAILABLE.
PREFUN/33,NEXT
PREFUN/22

```

Punch File Output:

```
N004G22G33$
```

Related Commands:

```
PLABEL/OPTION,34
```

4.89 RAPID

RAPID

Initiates rapid traverse feed for the next motion only. Subsequent motion will be at the programmed feedrate.

Example (M):

Input:

```
PARTNO RAPID EXAMPLE
MACHIN/UNCX01,1
P1=POINT/10,10,0
P2=POINT/20,20,0
P3=POINT/30,30,0
—
FEDRAT/10,IPM
—
RAPID
GOTO/P1      $$ RAPID TRAVERSE
GOTO/P2      $$ FEED AT 10 IPM
GOTO/P3      $$ FEED AT 10 IPM
—
FINI
```

Example (L):

Input:

```
PARTNO RAPID EXAMPLE
MACHIN/UNCL01,1
P1=POINT/10,10,0
P2=POINT/20,20,0
P3=POINT/30,30,0
—
FEDRAT/10,IPM
—
RAPID
GOTO/P1      $$ RAPID TRAVERSE
GOTO/P2      $$ FEED AT 10 IPM
GOTO/P3      $$ FEED AT 10 IPM
—
FINI
```

4.90 REMARK

REMARK

REMARK is a programmer message and is not written to the listing or MCD files. It is basically ignored and is thrown in the trash.

REMARK is a fixed field text string that is limited to 72 characters.

4.91 REPEAT

4.91.1 REPEAT/a1,a2,v[,ON-OFF]

REPEAT/a1,a2,v[,ON-OFF]

This command is used to output an extra address and value automatically whenever a specific address is output.

a1	1-26 representing A to Z. This is the address that is used to force output of the extra address and value.
a2	1-26 representing the extra address to be output.
v	The value that is to be output with a2 .
ON	Specifies that a2 and v will be output every time a1 is output. The default condition is that a2 and v will be output only the next time a1 is output.
OFF	Stops a2 and v from being output with a1 .

4.91.2 REPEAT/a1,a2,a3,...,a26,t1,v1,ALL

REPEAT/a1,a2,a3,...,a26,t1,v1,ALL

This command is similar to the above **REPEAT**, except that any one number of addresses, **a1,a2,a3,...,a25**, may force the output of the address **t1** with the value of **v1**. This command does not have the **ON-OFF** option like the above command.

used to output an extra address and value automatically whenever a specific address is output.

a1,a2,a3,...,a25 1-26 representing A to Z. These addresses are used as triggers to force output of the extra address **t1** and value **v1**.

t1	1-26 representing the extra address to be output.
v1	The value that is to be output with a2 .
ALL	Specifies that any address a1,a2,a3,...,a25 will force the output of t1 and v1 .

4.91.3 REPEAT/a1,v1

REPEAT/a1,v1

This command will output the address **a1** with a value of **v1** on every block until **REPEAT/OFF** is encountered.

a1	1-26 (A-Z) representing the extra address to be output.
v1	The value that is to be output with a1 .

4.91.4 REPEAT/OFF

REPEAT/OFF

Turns off all **REPEAT** commands and clears all stored **REPEAT** values.

Caution: **REPEAT** commands may be turned on and off at any time. It is important to remember that it is possible to fill up all of the **REPEAT** locations. **REPEAT/OFF** clears all of these locations.

Example:

Input:

```
REPEAT/26,7,43
REPEAT/26,8,2
RAPID,GOTO/4,5,6
```

Output:

```
N008X4.Y5.$
N0090G00G43Z6.H02$
```

Example:

Input:

```
REPEAT/24,25,26,8,99,ALL
RAPID,GOTO/10,10,10
```

Output:

```
N008X10.Y10.H99$
N009Z10.$
```

4.92 RESET

RESET

This command generates a restart sequence, which contains the current speed, feed rate and coolant conditions, with a motion block to the current axes position in absolute mode.

4.93 RETRACT (M)

RETRACT

This command retracts the tool tip at rapid rate to the last **CLEARP/XYPLAN,*d*** value.

Advancing moves are diagnosed and ignored.

If **CLEARP/OFF** is in effect, the spindle is retracted to the home coordinate at rapid rate, disregarding the tool length.

Related Commands:

CLEARP

4.94 REWIND

REWIND/[*n*]

Generates a rewind M-code, normally **M30**. Some CAM systems require *n* to satisfy the syntax. It is ignored by the post processor.

Related Commands:

PLABEL/OPTION,8
PLABEL/OPTION,11

4.95 ROTABL (M)

4.95.1 ROTABL/AAXIS-BAXIS-CAXIS,ATANGL-INCR,a[,CLW-CCLW][,NEXT-NOW]

ROTABL/AAXIS-BAXIS-CAXIS,ATANGL-INCR,a[,CLW-CCLW][,NEXT-NOW]

(5 Axis Machine Only)

This statement generates the rotary table motion block.

AAXIS-BAXIS-CAXIS Specifies which rotary table is to be moved.

ATANGL Specifies an absolute table location a in degrees from 0 to 360.

INCR Specifies an incremental value of a in degrees from the current table position. The value of a can be from -360 to +360.

CLW-CCLW Specifies the direction of table rotation to be clockwise or counterclockwise. This option is modal; initially **CLW** is assumed.

NEXT Causes the table motion to be output with the next linear motion.

NOW Causes table motion to be output in a block by itself, initially **NOW** is assumed.

4.95.2 ROTABL/ATANGL-INCR,a[,CLW-CCLW][,NEXT-NOW]

ROTABL/ATANGL-INCR,a[,CLW-CCLW][,NEXT-NOW]

(4 Axis Machine Only)

This statement generates the rotary table motion block.

ATANGL Specifies an absolute table location a in degrees from 0 to 360.

INCR Specifies an incremental value of a in degrees from the current table position. The value of a can be from -360 to +360.

CLW-CCLW Specifies the direction of table rotation to be clockwise or counterclockwise. This option is modal; initially **CLW** is assumed.

NEXT Causes the table motion to be output with the next linear motion.

NOW Causes table motion to be output in a block by itself, initially **NOW** is assumed.

4.96 ROTATE (M)

4.96.1 ROTATE/AAXIS-BAXIS-CAXIS,ATANGL-INCR,a,[CLW-CCLW][,NEXT][,OUT]

ROTATE/AAXIS-BAXIS-CAXIS,ATANGL-INCR,a,[CLW-CCLW][,NEXT-NOW][,OUT]

This statement generates the rotary table motion block.

AAXIS-BAXIS-CAXIS Specifies which rotary table is to be moved.

ATANGL Specifies an absolute table location *a* in degrees from 0 to 360.

INCR Specifies an incremental value of *a* in degrees from the current table position. The value of *a* can be from -360 to +360.

CLW-CCLW Specifies the direction of table rotation to be clockwise or counterclockwise. This option is modal; initially **CLW** is assumed.

NEXT Causes the table motion to be output with the next linear motion.

OUT Causes the **a** angle to be output in machine coordinates. **OUT** must be the last entry specified on the ROTATE command or it will be ignored.

4.97 ROTHED (M)

4.97.1 ROTHED/AAXIS-BAXIS-CAXIS,ATANGL-INCR,a[,CLW-CCLW][,NEXT-NOW]

ROTHED/AAXIS-BAXIS-CAXIS,ATANGL-INCR,a[,CLW-CCLW][,NEXT-NOW]

(5 Axis Machine Only)

This statement generates the rotary head motion block.

AAXIS-BAXIS-CAXIS Specifies which rotary head axis is to be moved.

ATANGL Specifies an absolute head location a in degrees from 0 to 360.

INCR Specifies an incremental value of a in degrees from the current head position. The value of a can be from -360 to +360.

CLW-CCLW Specifies the direction of head rotation to be clockwise or counterclockwise. This option is modal; initially **CLW** is assumed.

NEXT Causes the head motion to be output with the next linear motion.

NOW Causes head motion to be output in a block by itself, initially **NOW** is assumed.

4.97.2 ROTHED/ATANGL-INCR,a[,CLW-CCLW][,NEXT-NOW]

ROTHED/ATANGL-INCR,a[,CLW-CCLW][,NEXT-NOW]

(4 Axis Machine Only)

This statement generates the rotary head motion block.

ATANGL Specifies an absolute head location a in degrees from 0 to 360.

INCR Specifies an incremental value of a in degrees from the current head position. The value of a can be from -360 to +360.

CLW-CCLW Specifies the direction of head rotation to be clockwise or counterclockwise. This option is modal; initially **CLW** is assumed.

NEXT Causes the head motion to be output with the next linear motion.

NOW Causes head motion to be output in a block by itself, initially **NOW** is assumed.

4.98 SELCTL

4.98.1 SELCTL/t (M)

SELCTL/t

Generates a T code for the tool number **t** to be preselected.

Note: Automatic tool preselect will be performed if the switch is set in the Option File Generator. There would be no reason to use the SELCTL command if automatic tool preselects are being used. If automatic tool preselects are performed the post processor will generate a tool list file using the same name as the input file with the .TL1 extension.

The tool list file is formatted as follows:

```

3
8      1      1.00  .000  .000  .000  .000  0      0
16     1      1.00  .000  .000  .000  .000  0      0
24     1      1.00  .000  .000  .000  .000  0      0

```

The first number is the number of tool changes in this program. In this case 3 tool changes.

Each line there after is as follows:

First value is the CL record number of the tool change

Second value is the type of tool change, 1=LOADTL 2=TURRET

Third value is the tool number

Fourth value is the offset number

Fifth value is the Z LENGTH from LOADTL, Set to 0 if TURRET

Sixth value is the X gage length from TURRET, Set to 0 if LOADTL

Seventh value is the Y gage length from TURRET, Set to 0 if LOADTL

Eighth value is the CLW-CCLW from the TURRET, Set to 0 if LOADTL

Ninth value is the TURRET being used, 1=FRONT, 2=REAR, 3=SADDLE, 4=MAIN, 5=RAIL and 0=LOADTL

4.98.2 SELCTL/t (L)

SELCTL/t

Generates a T-code to change the offset register number to **t** without indexing the turret.

4.99 SELECT (M)

4.99.1 SELECT/h

SELECT/h

This statement generates a fixture offset code to initiate the X-Y fixture offsets, with the offset register number ***h***. The address is selected by the Option File Generator.

4.99.2 SELECT/gg,ADJUST,dd

SELECT/gg,ADJUST,dd

This statement generates a fixture offset ***gg*** G-code to initiate the X-Y fixture offsets, with the offset register number ***dd***. The address is selected by the Option File Generator.

4.99.3 SELECT/AUTO

SELECT/AUTO

(5 axis rotary head - rotary table machine)

A head rotation range that will position on either side of the vertical axis presents two possible machine positions that will satisfy the geometry of a given location. The following vocabulary is provided so the programmer can control which condition is satisfied.

This statement allows the A-axis to position between the front and rear positions.

4.99.4 SELECT/BOTH,START[,FRONT-REAR]

SELECT/BOTH,START[,FRONT-REAR]

(5 axis rotary head - rotary table machine)

A head rotation range that will position on either side of the vertical axis presents two possible machine positions that will satisfy the geometry of a given location. The following vocabulary is provided so the programmer can control which condition is satisfied.

This statement allows the A-axis to position to the front or the rear position initially and then change to the opposite condition for the remainder of the CL points.

4.99.5 SELECT/FRONT

SELECT/FRONT

(5 axis rotary head - rotary table machine)

A head rotation range that will position on either side of the vertical axis presents two possible machine positions that will satisfy the geometry of a given location. The following vocabulary is provided so the programmer can control which condition is satisfied.

This is the default modal head condition which confines the A-axis to the front position (1st and 4th quadrants).

4.99.6 SELECT/REAR

SELECT/REAR

(5 axis rotary head - rotary table machine)

A head rotation range that will position on either side of the vertical axis presents two possible machine positions that will satisfy the geometry of a given location. The following vocabulary is provided so the programmer can control which condition is satisfied.

This statement confines the A-axis to the rear position (2nd and 3rd quadrants).

4.100 SEQNO

4.100.1 SEQNO/*k*,INCR[,*m*[,*n*]]

SEQNO/*k*,INCR[,*m*[,*n*]]

k Is the starting sequence number. Default condition **k**=1

m Is the incremental value. Default condition **m**=1

n Causes sequence number output every *n*th block. Default condition **n**=1

4.100.2 SEQNO/*k*

SEQNO/*k*

Generates a sequence number *k* for the next block only.

4.100.3 SEQNO/0

SEQNO/0

Causes sequence numbers to be same as CL record numbers.

4.100.4 SEQNO/OFF

SEQNO/OFF

Terminates sequence number output.

4.100.5 SEQNO/ON

SEQNO/ON

Reinstates the sequence number output to its **last** condition after a **SEQNO/OFF** or **SEQNO/0** request.

4.100.6 SEQNO/NEXT

SEQNO/NEXT

Generates the next block as an alignment block with the address selected by the Option File Generator.

Related Commands:

PLABEL/OPTION,30

4.101 SET (L)

4.101.1 SET/START,AUTO[,OFF]

SET/START,AUTO[,OFF]

AUTO Causes the subsequent **TURRET** statements to generate preset blocks to adjust for the gage lengths in the absolute mode. This is the default condition assumed.

OFF Terminates the above option.

4.101.2 SET/START

SET/START

Generates a block to preset the axes registers with the next CL coordinates.

4.101.3 SET/START,x,z

SET/START,x,z

Generates a block to preset the axes registers.

x,z The values output for the X and Z axes in machine coordinates.

4.102 SET (M)

4.102.1 SET/START[,XAXIS,x][,YAXIS,y][,ZAXIS,z][,AAXIS,a][,BAXIS,b][,CAXIS,c]

SET/START[,XAXIS,x][,YAXIS,y][,ZAXIS,z][,AAXIS,a][,BAXIS,b][,CAXIS,c]

This statement generates a preset block to preset the axes registers.

XAXIS,x Specifies the machine coordinate for the X-axis.

YAXIS,y Specifies the machine coordinate for the Y-axis.

ZAXIS,z Specifies the machine coordinate for the Z-axis.

AAXIS,a Specifies the machine coordinate for the A-axis.

BAXIS,b Specifies the machine coordinate for the B-axis.

CAXIS,c Specifies the machine coordinate for the C-axis.

Only the specified axes will be preset. They may appear in any order in the above statement.

Example:

Input:

```
SET/START,XAXIS,-1,BAXIS,90
GOTO/0,0,-.5
```

Punch File Output:

```
N0004G92X-1.Y-1.B90.$
N0005G01X0.Y0.Z-5.F10.$
```

4.102.2 SET/WAXIS,ATANGL,a

SET/WAXIS,ATANGL,a

This statement sets the constant draft angle '**a**' used by the wire EDM 4-axis post configuration..

4.102.3 SET/WAXIS,LENGTH,w

SET/WAXIS,LENGTH,w

This statement sets the wire length '**w**' used by the wire EDM 4-axis post configuration..

4.102.4 SET/WAXIS,ADJUST,z)

SET/WAXIS,ADJUST,z

This statement sets the z-offset '**z**' used by the wire EDM 4 axis post configuration..

4.102.5 SET/HED-HOLDER,n,x,y,z[,POSX-POSY-POSZ-NEGX-NEGY-NEGZ]**SET/HED-HOLDER,n,x,y,z[,POSX-POSY-POSZ-NEGX-NEGY-NEGZ]**

This statement specifies a 90 degree attachment or a right angle head control for a 3-5 axis mill.

HED-HOLDER,n	Specifies the holder number (n) that will generate the desired code (M, H etc) as specified in the Option File Generator. You must specify n even if your controller does not require the code to be output.
x,y,z	Specifies the offset value measured from the normal spindle control point along the original machine axis to the holder control point. These values must be specified even if zero.
POSX	Specifies the tool orientation or axis direction as pointing in the positive X direction.
POSY	Specifies the tool orientation or axis direction as pointing in the positive Y direction.
POSZ	Specifies the tool orientation or axis direction as pointing in the positive Z direction.
NEGX	Specifies the tool orientation or axis direction as pointing in the negative X direction.
NEGY	Specifies the tool orientation or axis direction as pointing in the negative Y direction.
NEGZ	Specifies the tool orientation or axis direction as pointing in the negative Z direction.

Example:

SET/HOLDER,1,0,0,0,NEGX	\$\$ TOOL POINTS ALONG -X
SET/HOLDER,1,0,0,0,NEGY	\$\$ TOOL POINTS ALONG -Y
SET/HOLDER,1,0,0,0,NEGZ	\$\$ TOOL POINTS ALONG -Z
SET/HOLDER,1,0,0,0,POSX	\$\$ TOOL POINTS ALONG +X
SET/HOLDER,1,0,0,0,POSY	\$\$ TOOL POINTS ALONG +Y
SET/HOLDER,1,0,0,0,POSZ	\$\$ TOOL POINTS ALONG +Z
SET/HOLDER,1,0,0,0,NEGZ	\$\$ Default

4.102.6 SET/HOLDER,n,SETOOL,x,y,z,ATANGL,a,SETANG,s (PTC Format)**SET/HOLDER,n,SETOOL,x,y,z,ATANGL,a,SETANG,s**

This statement specifies a 90 degree attachment or a right angle head control for a 3-5 axis mill.

HOLDER,n	Specifies the holder number (n) that will generate the desired code (M, H etc) as specified in the Option File Generator. You must specify n even if your controller does not require the code to be output.
SETOOL,x,y,z	Specifies the offset value measured from the normal spindle control point along the original machine axis to the holder control point. These values must be specified even if zero.
ATANGL,a	Specifies the angle of the tool in the ZX plane as measured from +X to +Z axis. For ease of use this angle will only vary from 0 to -180.
SETANG,s	Specifies the angle of the tool in the XY plane as measured from +X to +Y axis.

Example:

SET/HOLDER,1,SETOOL,0,0,0,ATANGL,-90,SETANG,0	\$\$ TOOL POINTS ALONG -X
SET/HOLDER,1,SETOOL,0,0,0,ATANGL,-90,SETANG,90	\$\$ TOOL POINTS ALONG -Y
SET/HOLDER,1,SETOOL,0,0,0,ATANGL,0,SETANG,0	\$\$ TOOL POINTS ALONG -Z
SET/HOLDER,1,SETOOL,0,0,0,ATANGL,-90,SETANG,180	\$\$ TOOL POINTS ALONG +X
SET/HOLDER,1,SETOOL,0,0,0,ATANGL,-90,SETANG,270	\$\$ TOOL POINTS ALONG +Y
SET/HOLDER,1,SETOOL,0,0,0,ATANGL,-180,SETANG,0	\$\$ TOOL POINTS ALONG +Z
SET/HOLDER,1,SETOOL,0,0,0,ATANGL,0,SETANG,0	\$\$ Default

4.103 SPINDL (L)

4.103.1 SPINDL Non CSFM Machine:

4.103.1.1 SPINDL/s,RPM[,CLW-CCLW][,RANGE,n]

SPINDL/s,RPM[,CLW-CCLW][,RANGE,n]

Causes an S-code block to be output for spindle condition.

s	Is the required units of speed.
RPM	States the value of s in revolutions per minute.
CLW	Generates an M-code for clockwise spindle direction.
CCLW	Generates an M-code for counter clockwise spindle direction.
RANGE,n	Selects the spindle range number <i>n</i> .

4.103.1.2 SPINDL/ON-OFF

SPINDL/ON-OFF

ON	Reinstates the last spindle condition.
OFF	Generates an M-code to turn off spindle.

4.103.2 SPINDL CSFM Machine:

4.103.2.1 SPINDL/s[,RPM-SFM][,CLW-CCLW][,RANGE,n][,MAXRPM,m][,RADIUS,r]

SPINDL/s[,RPM-SFM][,CLW-CCLW][,RANGE,n][,MAXRPM,m][,RADIUS,r]

Causes an S-code block to be output for spindle condition.

s	Is the required units of speed.
RPM	States the value of s in revolutions per minute.
SFM	States the value of s in surface units per minute.
CLW	Generates an M-code for clockwise spindle direction.
CCLW	Generates an M-code for counter clockwise spindle direction.
RANGE,n	Selects the spindle range number <i>n</i> .

MAXRPM,*m* States the maximum **RPM**, *m*, to be used in **SFM** mode.

RADIUS,*r* States the initial radius, *r*, for **SFM** mode.

MAXRPM, **RADIUS**, and **LINEAR** are non-modal options. Initially **RPM,RANGE,1** and **CLW** are assumed.

The **SFM** default options are:

MAXRPM The maximum limit in current range.

RADIUS The current Machine X axis position. If the machine X axis (CL Y) is at 0.0 (startup default) and a **RADIUS** value is not programmed, an R0.0 will be output.

4.103.2.2 SPINDL/ON-OFF

SPINDL/ON-OFF

ON Reinstates the last spindle condition.

OFF Generates an M-code to turn off spindle.

4.103.2.3 SPINDL/LOCK,AUTO-ON-OFF SPINDL/LOCK,AUTO,LAST

SPINDL/LOCK,AUTO-ON-OFF

For **SFM** mode, this statement provides speed change control.

AUTO Inhibits speed changes for rapid moves and allows speed changes for feed moves automatically. This is the default condition assumed.

AUTO,LAST Will cause the inhibit/permit M-codes to be output on a block by themselves.

ON Generates an M-code to inhibit speed changes.

OFF Generates an M-code to permit speed changes.

4.104 SPINDL (M)

4.104.1 SPINDL/s[,CLW-CCLW][,RANGE,n]

SPINDL/s[,CLW-CCLW][,RANGE,n]

Causes an S-code block to be output for spindle condition.

s Is the required revolutions per minute.

CLW Generates an M-code for clockwise spindle direction.

CCLW Generates an M-code for counterclockwise spindle direction.

RANGE,n Selects the spindle range number *n*.

Initially **RANGE,1** and **CLW** are assumed.

4.104.2 SPINDL/ON-OFF

SPINDL/ON-OFF

ON Reinstates the last spindle condition.

OFF Generates an M-code to turn off spindle.

4.104.3 SPINDL/LOCK

SPINDL/LOCK

This statement generates an M-code for spindle key lock.

4.104.4 SPINDL/PARLEL,XAXIS-YAXIS-ZAXIS (MILL-TURN Configuration)

SPINDL/PARLEL,XAXIS-YAXIS-ZAXIS

This statement is used for a MILL-TURN configured post processor to determine the current tool orientation in effect when **MODE/MILL** is active.

XAXIS The tool axis is aligned with the X axis for **MODE/MILL**

YAXIS The tool axis is aligned with the Y axis for **MODE/MILL**

ZAXIS The tool axis is aligned with the Z axis for **MODE/MILL**

4.105 STARTUP Sequence

NOT A POST PROCESSOR COMMAND

Caution: This is not a post processor command or CL record but it is the first thing that happens when the post processor starts processing. Using the Option File Generator you can specify the initial data in the MCD file. Following is a list of possible output blocks for the start of each MCD file. Each output sequence may be turned on or off using the Option File Generator. You cannot change the order of these output blocks.

1. Man Readable PARTNO
2. Tape Readable PARTNO
3. Rewind stop code will be generated.
4. Program number
5. Time Stamp
6. Up to 10 blocks of NC code to be output to the MCD file.

4.106 STOP

STOP

Generates a stop M-code. Normally **M00**.

4.107 THREAD (L)

4.107.1 THREAD/ON-TURN-FACE

THREAD/ON-TURN-FACE

Causes the next motion block to be output as a thread block. The thread chasing axis is stated to be **TURN** for CL X or **FACE** for CL Y.

If **ON** is given, the post processor determines the thread chasing axis as follows:

If the machine Z-axis departure is greater **TURN** is chosen.

If the machine X-axis departure is greater **FACE** is chosen.

Note: A **PITCH** statement must have been specified prior to the **THREAD** commands to establish the required lead.

4.107.2 THREAD/OUT[,XAXIS,x][,YAXIS,y][,INCR]

THREAD/OUT[,XAXIS,x][,YAXIS,y][,INCR]

The **THREAD/OUT** command is used to enable automatic pullout.

XAXIS	Specifies that the value given applies to CL X.
x	Value to be output in the Z register in the next G33 block. If INCR is specified, the value will be added to the register.
YAXIS	Specifies that the value given applies to CL Y.
y	Value to be output in the X register in the next G33 block. If INCR is specified, the value will be added to the register.
INCR	The values specified are added to the current axis position for output in the G33 block.

Example:

Input:

```
THREAD/OUT,YAXIS,0.125,INCR
PITCH/8
GOTO/10,3.875
THREAD/ON
GOTO/5,3.875
```

Punch File Output:

```
N0090G01X3.875Z10.$
N0100G33X4Z5.K125$
```

4.107.3 THREAD/AUTO

THREAD/AUTO[,LEFT-RIGHT][,IN-OUT],**START**,s,**LENGTH**,l,**DIAMTR**,d1,d2,**INCR**,s1[,s2]
[,**ATANGL**,a][,**PULBAC**,d,a][,**BOTH**][,**PITCH**,p][,**REPEAT**,r][,**OPSTOP**][,**OPSTOP**]
[,**SELECT**,s][,**CLEARP**,x,y] [,**FEDRAT**,f1,f2,f3,f4,f5] [,**START**,s,n][,**TAPER**,x,y,a

The **THREAD/AUTO** command allows you to program an entire threading operation by means of a single statement.

You can specify a variable number of data items, according to the options you desire, and you can specify them in any order. Each item consist of either a vocabulary word only or a vocabulary word followed by one or more entities in a fixed order.

You must always specify the following data items:

START
LENGTH
DIAMTR
INCR

The **THREAD/AUTO** command assumes a point tip cutter and hence ignores the **CUTTER** statement in effect.

The **THREAD/AUTO** process generates a series of passes, cutting into the part a specified amount on each pass until the specified total depth has been reached.

Each pass is composed of four moves:

5. The Step-in move, which moves the cutter into the part an amount specified by **INCR**. This move is perpendicular to the centerline unless specified otherwise by **ATANGL**.
6. The actual threading move, which is parallel to the centerline unless specified otherwise by **TAPER**.
7. The Pull-Back move, which moves the cutter away from the part. This move is perpendicular to the centerline unless otherwise specified by **PULBAC**.
8. The Return move, which moves the cutter back to a position from which the step-in move for the next pass can be made. This move is always parallel to the centerline.

Following are descriptions of the various **THREAD/AUTO** data items:

RIGHT or **LEFT**

- | | |
|--------------|---|
| RIGHT | Specifies a right hand thread. Threading moves are made in the direction of decreasing centerline dimension, from tailstock towards the headstock. RIGHT is the default condition. |
| LEFT | Specifies a left hand thread. Threading moves are made in the direction of increasing centerline dimension, from headstock towards the tailstock. |
| OUT | Specifies an external thread. The stepover from one pass to the next is made in the direction toward the centerline. OUT is the default condition. |

IN	Specifies an internal thread. The stepover from one pass to the next is made in the direction away from the centerline.
START,s	Specifies the centerline dimension of the point where the thread move is to start.
LENGTH,l	Specifies the length of the thread move, measured parallel to the centerline. The length is measured from the centerline dimension specified by START,s in the threading direction specified by RIGHT or LEFT .
DIAMTR,d1,d2	Specifies the major and minor diameters of the thread. The order in which the two diameters are given is immaterial; the larger is used as the major diameter and the smaller as the minor. External threads are cut from major diameter to minor; internal threads from minor to the major.
INCR,s1	Specifies a constant incremental distance to cut into the part on each pass. The distance is measured perpendicular to the centerline.
INCR,s1,s2	When you specify two values following INCR , the larger is used as the depth of cut for the first pass and the smaller as the depth of cut for the final pass. Intermediate passes are made at proportionately smaller depths to provide a smooth transition from the starting depth to the final depth. If you specify two equal depth values, the result is the same as if you specified a single value.
ATANGL,a	Specifies the angle between the step-in move and a line perpendicular to the centerline. It is positive if the step-in move is in the same general direction as the thread move; negative if opposite. The angle must be less than 90 degrees in absolute value. ATANGL,0 is assumed.
PULBAC,d,a	Specifies the distance and angle of the pull-back move. The distance is measured from the end of the threading move in a direction perpendicular to the centerline. The angle is measured between the pull-back line and a line perpendicular to the centerline. It is positive if the pull-back move is in the same general direction as the threading move; negative if opposite. The angle must be less than 90 degrees in absolute value. PULBAC,.5,0 is assumed.
BOTH	Specifies that both the treading move and the pull-back move are to be made in threading mode. By default the pull-back move is NOT made in threading mode.
PITCH,p	Specifies the number of threads per inch. For multiple start threading you must specify PITCH in the THREAD/AUTO command. Otherwise, you may specify PITCH either in the THREAD/AUTO statement or as a regular post processor statement preceding the THREAD/AUTO statement.
REPEAT,r	Specifies the number of time the final pass should be repeated. The final pass is made at least once; the REPEAT count specifies the number of additional times it should be made. If you do not specify the REPEAT , REPEAT,0 is assumed; that is the final pass is made only once.

The **THREAD/AUTO** Clearance Point

The **THREAD/AUTO** data items **SELECT**, **CLEARP**, **OPSTOP**, and **OPSKIP** provide various options relative to a move to a clearance point that is made on each repetition of the final pass except the last. These words are ignored if **REPEAT,0** is given or implied since the final pass is made only once in this case.

SELECT,s	Designates the point at which the optional operations are to be performed. SELECT,1 selects the intersection of the pull-back move and the return move and is assumed if SELECT is not specified. SELECT,2 selects the intersection of the return move and the step-in move.
CLEARP,x,y	Designates the x and y coordinate of the clearance point. After the cutter reaches the selected point, it then moves to the clearance point, an OPSTOP command is output, and the cutter then moves back to the selected point, after which the regular path is resumed. If you do not specify CLEARP , no clearance move is generated.
OPSTOP	Is not necessary and is ignored if you specify CLEARP since an OPSTOP command is automatically output at the clearance point. If you specify OPSTOP without CLEARP , an OPTSOP command is output at the SELECT point.
OPSKIP	generates a post processor OPSKIP/ON command preceding the move to the clearance point and an OPSKIP/OFF following the move from the clearance point back to the SELECT point. This causes block delete codes to be output with the moves to and from the clearance point. OPSKIP is ignored if you do not also specify CLEARP .

FEDRAT,f1,f2,f3,f4,f5

The **FEDRAT** data item can be used to specify the feed rate for each of the four moves of a regular pass as well as the move to and from the clearance point.

Each feed rate may be specified in one of these ways:

1. A non-zero scalar **f** causes the postprocessor command **FEDRAT/f** to be output preceding the move.
2. The word **RAPID** causes the postprocessor command **RAPID** to be output preceding the move.
3. A scalar zero causes no feed rate command, neither **FEDRAT** nor **RAPID** to be output preceding the move with the result that the previous established **FEDRAT** command remains in effect.

If no **FEDRAT** command is specified the following is assumed:

FEDRAT,RAPID,0,RAPID,RAPID,RAPID

Multiple Start Threading

START,s,n You can program a multiple start thread by using this alternate form of the **START** data item. The entry **s** specifies the centerline dimension of the point where the thread move is to start. The entry **n** specifies the number of threads to be cut. The first thread is started at the dimension **s** and each additional thread is offset in the direction opposite the threading direction a distance equal to the lead divided by **n**, where the lead is the reciprocal of the pitch. You must specify **PITCH** in the **THREAD/AUTO** statement when you program multiple start threading. If **n** is not specified it is assumed to be 1, with the result that only one thread is cut.

Tapered Threading

TAPER,x,y,a You should specify **TAPER** only if the thread is not parallel to the centerline. The entries **x** and **y** are the centerline and cross slide dimensions, respectively, of any point on the major diameter of the thread, if external or minor diameter, if internal. The angle of taper, **a**, is measured between the tapered line and the centerline and is positive if movement along the taper is in the general direction opposite the stepover direction; negative if in the same general direction.

The thread move is started at the point where the tapered line intersects the line perpendicular to the centerline at the **START** dimension.

With a non-tapered thread, the position of the thread relative to the centerline is established by the **DIAMTR** information, but with a tapered thread, the position is established by the tapered line. The only purpose of the **DIAMTR** information is for specifying the thread depth. In the expression **DIAMTR,d1,d2** the values of **d1** and **d2** individually are not important – only their difference. The thread depth is calculated as follows:

$$\text{depth} = (\text{major diameter} - \text{minor diameter}) / 2$$

4.108 TLSPEC (L)

4.108.1 TLSPEC/CENTER,RIGHT-LEFT,IN-OUT

TLSPEC/CENTER,RIGHT-LEFT,IN-OUT

This command is used by the post processor to determine the direction for drilling CYCLES.

RIGHT	Specifies the tool is traveling from right to left. (INTCOM(3444) = 1
LEFT	Specifies the tool is traveling from left to right. (INTCOM(3444) = -1
IN	Specifies the tool is traveling from ID to OD. (INTCOM(3445) = -1
OUT	Specifies the tool is traveling from OD to ID. (INTCOM(3445) = 1

4.108.2 TLSPEC/OFFSET,RIGHT-LEFT-ON,DIAMTR,IN-OUT-ON

TLSPEC/OFFSET,RIGHT-LEFT-ON,DIAMTR,IN-OUT-ON

This command is NOT used by the post processor but it does set the internal flags in the post and is used by NC Verify to determine the tool orientation to the part.

OFFSET,RIGHT	Specifies the tool is offset to the right of a vertical line. (INTCOM(3450) = 1
OFFSET,LEFT	Specifies the tool is offset to the left of a vertical line. (INTCOM(3450) = -1
OFFSET,ON	Specifies the tool centerline is on a vertical line. (INTCOM(3450) = 0
DIAMTR,OUT	Specifies the tool is offset above a horizontal line. (INTCOM(3451) = 1
DIAMTR,IN	Specifies the tool is offset below a horizontal line. (INTCOM(3451) = -1
DIAMTR,ON	Specifies the tool centerline is on a horizontal line. (INTCOM(3451) = 0

4.109 TMARK

TMARK/[*n*]

Causes a rewind stop code to be output. Certain CAM systems require ***n*** to satisfy the syntax. It is ignored by the post processor.

The default rewind stop code (**=**) is set in the Option File Generator.

Note: To change the default rewind stop code from the equal sign (=) to the percent sign (%) set **PLABEL/OPTION,11,TO,37** using the Option File Generator.

Related Commands:

PLABEL/OPTION,8
PLABEL/OPTION,11

4.110 TRANS (L)

TRANS/x,y

This statement relates the machine coordinate system to the CL coordinate system, when the two are not coincidental.

All the CL coordinates after the **TRANS** statement are modified by the **TRANS** values.

x , y Specify the distance and direction along the machine X and Y-axes measured from the machine origin to the part origin. Initially **TRANS/0** is assumed.

Example:

Input:

```
TRANS/10,10
P1=POINT/5,5,0
P2=POINT/3,3,0
GOTO/P1
GOTO/P2
TRANS/0
GOTO/10,10
```

Punch File Output:

```
N004G01X15Z15$
N005X13Z13$
N006X1Z1$
```

Related Command:

ORIGIN

4.111 TRANS (M)

4.111.1 TRANS/x,y,z

TRANS/x,y,z

This statement relates the machine coordinate system to the CL coordinate system, when the two are not coincidental.

All the CL coordinates after the **TRANS** statement are modified by the **TRANS** values.

x, y, z Specify the distance and direction along the machine X, Y, and Z-axes measured from the machine origin to the part origin. Initially **TRANS/0** is assumed.

Example:

Input:

```
GOTO/3,3,0
TRANS/10,10,1
P1=POINT/4,6,.5
P2=POINT/5,5,2
TRANS/0
GOTO/7,7,4
```

Punch File Output:

```
N0004G01X003Y003Z0$
N0005X014Y016Z0015$
N0006X015Y015Z003$
N0007X007Y007Z004$
```

Related Command:

ORIGIN

4.111.2 TRANS/xi,xj,xk,xd,yi,yj,yk,yd,zi,zj,zk,zd

TRANS/xi,,xj,xk,xd,yi,yj,yk,yd,zi,zj,zk,zd

This statement relates the machine coordinate system to the CL coordinate system, when the two are not coincidental. All the CL coordinates after the **TRANS** statement are modified by the **TRANS** values. A rotation can be included with translation for the CL coordinates.

xi through *zd* are the canonical values of a mathematical matrix. A graph of the matrix follows:

	X Input	Y Input	Z Input		
X axis	<i>xi</i>	<i>xj</i>	<i>xk</i>	<i>xd</i>	X Output
Y axis	<i>yi</i>	<i>yj</i>	<i>yk</i>	<i>yd</i>	Y Output
Z axis	<i>zi</i>	<i>zj</i>	<i>zk</i>	<i>zd</i>	Z Output

A CL point is processed through this matrix as follows:

Input Coordinates: X= 6, Y=3, Z=7

TRANS/0,1,0,2 ,-1,0,0,5 ,0,0,1,1

X Output = X Input * *xi* + Y Input * *xj* + Z Input * *xk* + *xd* 6*0+3*1+7*0+2=5

**Y Output = X Input * *yi* + Y Input * *yj* + Z Input * *yk* + *yd*
6*-1+3*0+7*0+5=-1**

Z Output = X Input * *zi* + Y Input * *zj* + Z Input * *zk* + *zd* 6*0+3*0+7*1+1=8

Output Coordinates: X= 5, Y=-1, Z=9

These values determine the combined rotation and translation desired.

To cancel the translation matrix, use **TRANS/0**. Initially **TRANS/0** is assumed.

4.111.3 TRANS/xi,xj,xk,xd,yi,yj,yk,yd,zi,zj,zk,zd[,OPTION,00-01-10]

TRANS/xi,,xj,xk,xd,yi,yj,yk,yd,zi,zj,zk,zd[,OPTION,00-01-10]

This **TRANS** statement is used to translate just the point or the vector.

OPTION Allows you to apply the translation to only the point or vector CL coordinates. In other words, you can apply a separate matrix for point and another for the vector. If you want the same matrix to be applied to both the point and vector, use the regular **TRANS/(12 parameter)** without the word **OPTION**.

00 Turn off point or vector **ONLY** translation.

10 Translate point **ONLY**.

01 Translate vector **ONLY**.

11 Translate point and vector.

4.112 TURRET (L)

4.112.1 Single Turret Lathe

4.112.1.1 TURRET/p,f,x,y[,CLW-CCLW]

TURRET/p,f,,x,y[,CLW-CCLW]

Generates a T-code for turret indexing. Assumes the subsequent CL coordinates refer to the tool tip.

<i>p</i>	Is the turret face position number.
<i>f</i>	Is the offset register number.
<i>x,y</i>	Are the gauge lengths measured from the turret reference point along CL axes.
CLW	Generates an M-code for clockwise indexing.
CCLW	Generates an M-code for counter clockwise indexing.

4.112.1.2 TURRET/CENTER[,OFF]

TURRET/CENTER[,OFF]

Specifies that the subsequent CL coordinates refer to the turret reference point instead of the tool tip.

OFF	Specifies that the CL coordinates refer to tool tip, which is the initial default condition.
------------	--

4.112.1.3 TURRET/0

TURRET/0

Generates a **T00** code and assumes that the subsequent CL coordinates refer to the turret reference point.

Related Command:

FROM

Example:**First Quadrant Lathe:**

Assuming that the tool is on turret face 1 and that offset register number 1 is to be used, the complete Turret command is:

TURRET/1,1,-2.5,-4.5

The value of the gauge length along the CL X axis is -2.5, since the distance from the reference point to the tool tip center is 2.5 in the negative direction. Similarly, the value of the gauge length along CL Y-axis is -4.5 as shown in .

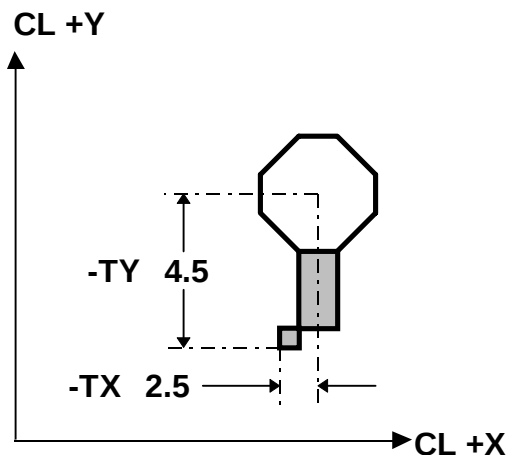


Figure 4-3 First Quadrant Lathe Gauge Lengths

Example:**Fourth Quadrant Lathe:**

Assuming that the tool is on turret face 1 and that offset register number 1 is to be used, the complete Turret command is:

TURRET/1,1,-2.5,4.5

The value of the gauge length along the CL X axis is -2.5, since the distance from the reference point to the tool tip center is 2.5 in the negative direction. Similarly, the value of the gauge length along CL Y-axis is 4.5 as shown in .

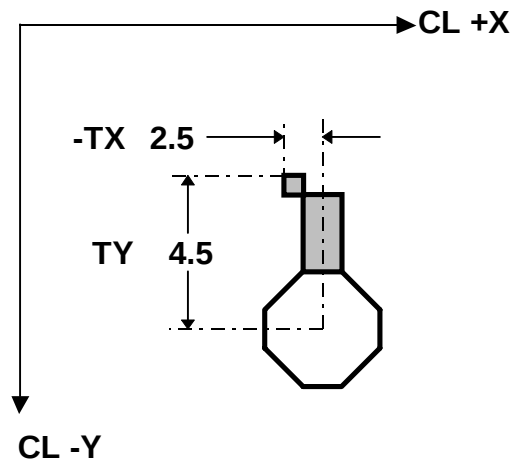


Figure 4-4 Fourth Quadrant Lathe Gauge Lengths

Example:

VTL:

Assuming that the tool is on turret face 1 and that offset register number 1 is to be used, the complete Turret command is:

TURRET/1,1,-2.5,-4.5

The value of the gauge length along the CL X axis is -2.5, since the distance from the reference point to the tool tip center is 2.5 in the negative direction. Similarly, the value of the gauge length along CL Y-axis is -4.5 as shown in .

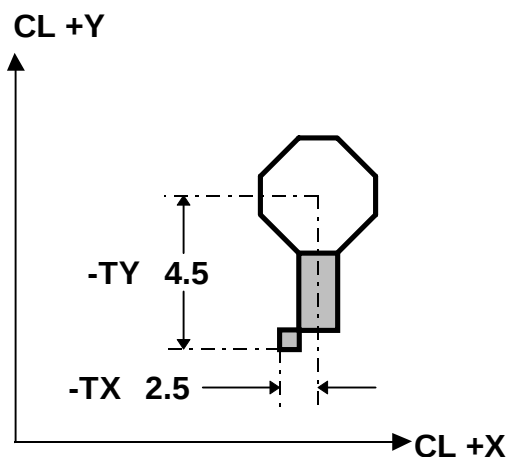


Figure 4-5 VTL Gauge Lengths

4.112.2 Multiple Turret Lathe:

4.112.2.1 TURRET/p,f,x,y[,CLW-CCLW][,FRONT-REAR]

TURRET/p,f,,x,y[,CLW-CCLW][,FRONT-REAR]

Generates a T-code for turret indexing and assumes that the subsequent CL coordinates refer the tool tip.

<i>p</i>	Is the turret face position number.
<i>f</i>	Is the offset register number.
<i>x,y</i>	Are the gage lengths measured from the turret reference point along CL XY axes.
CLW	Generates an M-code for clockwise indexing.
CCLW	Generates an M-code for counter clockwise indexing.
FRONT REAR	Specifies the turret type. This is a modal option and initially the primary turret is assumed.

4.112.2.2 TURRET/CENTER[,OFF]

TURRET/CENTER[,OFF]

Specifies that the subsequent CL coordinates refer to the turret reference point instead of the tool tip.

OFF Specifies that the CL coordinates refer to tool tip, which is the initial default condition.

4.112.2.3 TURRET/0

TURRET/0

Generates a **T00** code and assumes that the subsequent CL coordinates refer to the turret reference point.

4.112.2.4 TURRET/FRONT-REAR

TURRET/FRONT-REAR

This command switches turret type without indexing the turret. Subsequent CL points should refer to the turret selected. This command is recommended for use with zero gauge lengths.

Related Commands:

FROM

Example:**Secondary Turret:**

Assuming that the tool is on **REAR** turret face 1 and that offset register number 1 is to be used, the complete Turret command is:

TURRET/1,1,-2.5,-4.5,REAR

The value of the gauge length along the CL X axis is -2.5, since the distance from the reference point to the tool tip center is 2.5 in the negative direction. Similarly, the value of the gauge length along CL Y-axis is -4.5 as shown in .

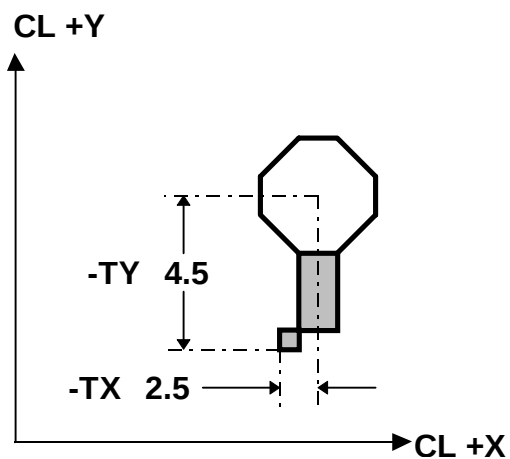


Figure 4-6 Secondary Turret Gauge Lengths

Example:**Primary Turret:**

Assuming that the tool is on **FRONT** turret face 1 and that offset register number 1 is to be used, the complete Turret command is:

TURRET/1,1,-2.5,4.5,FRONT

The value of the gauge length along the CL X axis is -2.5, since the distance from the reference point to the tool tip center is 2.5 in the negative direction. Similarly, the value of the gauge length along CL Y-axis is 4.5 as shown in .

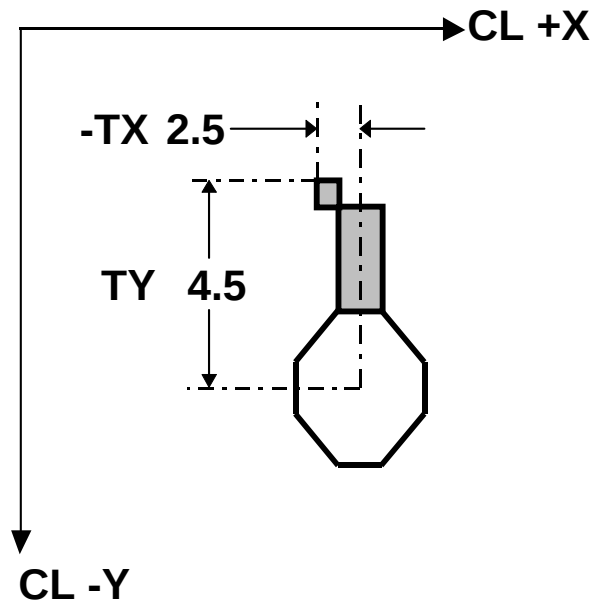


Figure 4-7 Primary Turret Gauge Length

5 Lathe - Common Variables

Introduction

This chapter contains a reference list of the Lathe G-Post **COMMON** variables.

5.1 Lathe INTCOM Variables

<i>Name</i>	<i>Location</i>	<i>Description</i>
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Note: Set INTCOMs 1-52 to 53 to disable the letter. Set to position of letter in tape order to enable the letter for output. You cannot enable more than one letter in the same position at the same time.

JA	0001	Tape order of extra address Default = 53 Range = 1 to 26 , 53
JB	0002	Tape order of extra address Default = 53 Range = 1 to 26,53
JC	0003	Tape order of extra address Default = 53 Range = 1 to 26,53
JD	0004	Tape order of extra address Default = 53 Range = 1 to 26,53
JE	0005	Tape order of extra address Default = 53 Range = 1 to 26,53
JF	0006	Tape order of letter address F Default = 8 Range = 1 to 26,53
JG	0007	Tape order of letter address G Default = 2 Range = 1 to 26,53
JH	0008	Tape order of extra address Default = 53 Range = 1 to 26,53
JI	0009	Tape order of letter address K Default = 6 Range = 1 to 26,53

Name	Location	Description
JJ	0010	Tape order of letter address I Default = 5 Range = 1 to 26,53
JK	0011	Tape order of extra address Default = 53 Range = 1 to 26,53
JL	0012	Tape order of extra address Default = 53 Range = 1 to 26,53
JM	0013	Tape order of letter address M Default = 11 Range = 1 to 26,53
JN	0014	Tape order of letter address N Default = 1 Range = 1 to 26,53
JO	0015	Tape order of extra address Default = 53 Range = 1 to 26,53
JP	0016	Tape order of extra address Default = 53 Range = 1 to 26,53
JQ	0017	Tape order of extra address Default = 53 Range = 1 to 26,53
JR	0018	Tape order of letter address R Default = 53 Range = 1 to 26,53
JS	0019	Tape order of letter address S Default = 9 Range = 1 to 26,53
JT	0020	Tape order of letter address T Default = 10 Range = 1 to 26,53
JU	0021	Tape order of extra address Default = 53 Range = 1 to 26,53
JV	0022	Tape order of extra address Default = 53 Range = 1 to 26,53

<i>Name</i>	<i>Location</i>	<i>Description</i>
JW	0023	Tape order of extra address Default = 53 Range = 1 to 26,53
JX	0024	Tape order of letter address Z Default = 4 Range = 1 to 26,53
JY	0025	Tape order of letter address X Default = 3 Range = 1 to 26,53
JZ	0026	Tape order of extra address Default = 53 Range = 1 to 26,53
JABSA	0027	Order of verification letter address A Default = 53 Range = 1 to 53
JABSB	0028	Order of verification letter address B Default = 53 Range = 1 to 53
JABSC	0029	Order of verification letter address C Default = 53 Range = 1 to 53
JABSD	0030	Order of verification letter address D Default = 53 Range = 1 to 53
JABSE	0031	Order of verification letter address E Default = 53 Range = 1 to 53
JABSF	0032	Order of verification letter address F Default = 16 Range = 1 to 53
JABSG	0033	Order of verification letter address G Default = 53 Range = 1 to 53
JABSH	0034	Order of verification letter address H Default = 53 Range = 1 to 53
JABSI	0035	Order of verification letter address I Default = 53 Range = 1 to 53

<i>Name</i>	<i>Location</i>	<i>Description</i>
JABSJ	0036	Order of verification letter address J Default = 53 Range = 1 to 53
JABSK	0037	Order of verification letter address K Default = 53 Range = 1 to 53
JABSL	0038	Order of verification letter address L Default = 53 Range = 1 to 53
JABSM	0039	Order of verification letter address M Default = 53 Range = 1 to 53
JABSN	0040	Order of verification letter address N Default = 53 Range = 1 to 53
JABSO	0041	Order of verification letter address O Default = 53 Range = 1 to 53
JABSP	0042	Order of verification letter address P Default = 53 Range = 1 to 53
JABSQ	0043	Order of verification letter address Q Default = 53 Range = 1 to 53
JABSR	0044	Order of verification letter address R Default = 53 Range = 1 to 53
JABSS	0045	Order of verification letter address S Default = 17 Range = 1 to 53
JABST	0046	Order of verification letter address T Default = 53 Range = 1 to 53
JABSU	0047	Order of verification letter address U Default = 15 Range = 1 to 53
JABSV	0048	Order of verification letter address V Default = 14 Range = 1 to 53

<i>Name</i>	<i>Location</i>	<i>Description</i>
JABSW	0049	Order of verification letter address W Default = 53 Range = 1 to 53
JABSX	0050	Order of verification letter address X Default = 13 Range = 1 to 53
JABSY	0051	Order of verification letter address Y Default = 12 Range = 1 to 53
JABSZ	0052	Order of verification letter address Z Default = 53 Range = 1 to 53
JADDR(1)	0053	Address 1 in tape Default = 78 Range = 32 to 96
JADDR(2)	0054	Address 2 in tape Default = 71 Range = 32 to 96
JADDR(3)	0055	Address 3 in tape Default = 88 Range = 32 to 96
JADDR(4)	0056	Address 4 in tape Default = 90 Range = 32 to 96
JADDR(5)	0057	Address 5 in tape Default = 73 Range = 32 to 96
JADDR(6)	0058	Address 6 in tape Default = 75 Range = 32 to 96
JADDR(7)	0059	Address 7 in tape Default = Not used Range = 32 to 96
JADDR(8)	0060	Address 8 in tape Default = 70 Range = 32 to 96

<i>Name</i>	<i>Location</i>	<i>Description</i>
JADDR(9)	0061	Address 9 in tape Default = 83 Range = 32 to 96
JADDR(10)	0062	Address 10 in tape Default = 84 Range = 32 to 96
JADDR(11)	0063	Address 11 in tape Default = 77 Range = 32 to 96
JADDR(12)	0064	Address 12 in tape Default = 88 Range = 32 to 96
JADDR(13)	0065	Address 13 in tape Default = 90 Range = 32 to 96
JADDR(14)	0066	Address 14 in tape Default = 88 Range = 32 to 96
JADDR(15)	0067	Address 15 in tape Default = 90 Range = 32 to 96
JADDR(16)	0068	Address 16 in tape Default = 70 Range = 32 to 96
JADDR(17)	0069	Address 17 in tape Default = 83 Range = 32 to 96
JADDR(nn)	0xxx	Nth letter in tape. Add 0052+nn to get the location number (xxx).
JADDR(53)	0105	Fifty-third letter in tape
JFMT(53)	0106	EIA format of the letter address

Note: The next 53 locations represent the EIA format of the letter address. This is a two-digit value that indicates the size of the register. The first digit represents the number of whole numbers (the numbers in front of the decimal place). The second digit represents the number of fractional numbers (the numbers behind the decimal point). A value of 34 means there are 3 digits in front of the decimal place and 4 digits behind the decimal place: 000.0000. A value of 40 means the number is a 4-digit whole number. Before the first executable post statement, JFMT(n) contains four digits in the option file. The first two are for inch and the second two are for metric. After the first executable post statement, this section contains only two digits.

Example: 34 40 etc.

<i>Name</i>	<i>Location</i>	<i>Description</i>
JFMT(1)	0106	Format 1 in tape Default = 3030 Range = 0 to 9999
JFMT(2)	0107	Format 2 in tape Default = 2020 Range = 0 to 9999
JFMT(3)	0108	Format 3 in tape Default = 2433 Range = 0 to 9999
JFMT(4)	0109	Format 4 in tape Default = 2433 Range = 0 to 9999
JFMT(5)	0110	Format 5 in tape Default = 2433 Range = 0 to 9999
JFMT(6)	0111	Format 6 in tape Default = 2433 Range = 0 to 9999
JFMT(7)	0112	Format 7 in tape Default = 0 (Not used) Range = 0 to 9999
JFMT(8)	0113	Format 8 in tape Default = 3241 Range = 0 to 9999
JFMT(9)	0114	Format 9 in tape Default = 2020 Range = 0 to 9999
JFMT(10)	0115	Format 10 in tape Default = 4040 Range = 0 to 9999
JFMT(11)	0116	Format 11 in tape Default = 2020 Range = 0 to 9999
JFMT(nn)	0xxx	Nth letter in tape. Add 0105+nn to get the location number (xxx). Default = 0 Range = 0 to 9999

<i>Name</i>	<i>Location</i>	<i>Description</i>
JSPC(53)	0159	Four-digit number for zero and sign of output. 0=not required;1=means required. First digit is for leading zeros; Second digit is for trailing zeros; Third digit is for sign; Fourth digit is for decimal point.

Example: 1010 suppresses trailing zeros and output sign without decimal point.

Note: INTCOM(1851) and (1852) must be set to zero for the JSPC variables to be activated.

JSPC(1)	0159	Output specification 1 in tape Default = 1100 Range = 1 to 1111
JSPC(2)	0160	Output specification 2 in tape Default = 1100 Range = 1 to 1111
JSPC(3)	0161	Output specification 3 in tape Default = 1000 Range = 1 to 1111
JSPC(4)	0162	Output specification 4 in tape Default = 1000 Range = 1 to 1111
JSPC(5)	0163	Output specification 5 in tape Default = 1000 Range = 1 to 1111
JSPC(6)	0164	Output specification 6 in tape Default = 1000 Range = 1 to 1111
JSPC(7)	0165	Output specification 7 in tape Default = 1000 Range = 1 to 1111
JSPC(8)	0166	Output specification 8 in tape Default = 1000 Range = 1 to 1111
JSPC(9)	0167	Output specification 9 in tape Default = 1100 Range = 1 to 1111
JSPC(10)	0168	Output specification 10 in tape Default = 1100 Range = 1 to 1111
JSPC(11)	0169	Output specification 11 in tape Default = 1100 Range = 1 to 1111

<i>Name</i>	<i>Location</i>	<i>Description</i>
JSPC(nn)	0xxx	Nth letter in tape. Add 0158+nn to get the location number (xxx). Default = 0 Range = 0 to 1111
IAUXFN(1)	0212	M-code for M01 or AUXFUN/1 Default = 1 Range = 0 to 32766
IAUXFN(2)	0213	M-code for M02 or AUXFUN/2 Default = 2 Range = 0 to 32766
IAUXFN(nn)	0nnn	M-code for Mnn or AUXFUN/nn. Add 0211+n to get the location number. Default = nn Range = 0 to 32766
IAUXFN(100)	0311	M-code for M00 or AUXFUN/0 Default = 0 Range = 0 to 32766

Note: To get M-codes of more than 2 digits, set the M-code between 0 and 99, then set the matching IAUXFN location to the desired M-code

Example: COOLNT/FLOOD requires an M108. Set MCLFLD to 8, then set IAUXFN(8) to 108.

IBANER(131)	0312	Post banner containing post name, version, and date. Cannot be set manually.
IBGVI1	0443	INTCOM DEBUGG starting location. Default = 0 Range = 0 to 2500
IBGVI2	0444	INTCOM DEBUGG ending location Default = 0 Range = 0 to 2500
IBGVR1	0445	RELCOM DEBUGG starting location Default = 0 Range = 0 to 1700
IBGVR2	0446	RELCOM DEBUGG ending location Default = 0 Range = 0 to 1700
IBLKLK	0447	Number of characters in the current block. Cannot be reset.
IBRKSW	0448	Break statement flag, to reinitialize common variables from CONTRL. Default = 72 (OFF) Range = 71 (ON), 72 (OFF)

<i>Name</i>	<i>Location</i>	<i>Description</i>
IBUGCL	0449	DEBUGG switch for CL dump. Default = 72 (OFF) Range = 71 (ON), 72 (OFF)
IBUGSW	0450	DEBUGG switch to print one or more common blocks. Default = 72 (OFF) Range = 71 (ON), 72 (OFF)
IBUGVI	0451	DEBUGG switch for INTCOM dump. Default = 72 (OFF) Range = 71 (ON), 72 (OFF)
IBUGVR	0452	DEBUGG switch for RELCOM dump. Default = 72 (OFF) Range = 71 (ON), 72 (OFF)
ICARD	0453	Line count of packed punch files; column 77-80 of each line.***Cannot be reset.
ICFDSW	0454	Switch to indicate the CYCLE Z feed mode. Default = 73 (IPM) Range = 73 (IPM), 74 (IPR)
ICIRSW	0455	Circular interpolation switch for Type 5000 element. MACHIN/UNCX01,--,LINEAR sets this to empty. Default = 0 Range = 0: Linear motion 1: Successful Type 3 record 2: Circle in process -32767: (IEMPTY) No circular interpolation
	0450	Not used
ICLRED	0457	Switch to indicate whether a circle reads a CL record. Default = 1 Range = 1: Read CL record 2: Do not read CL record; circle read the record
ICYCLE(1)	0458	Minor word integer code for CYCLE/DRILL Default = 163 (DRILL) Range = Any minor word integer code
ICYCLE(2)	0459	Minor word integer code for CYCLE/CSINK Default = 256 (CSINK) Range = Any minor word integer code
ICYCLE(3)	0460	Minor word integer code for CYCLE/DEEP Default = 153 (DEEP) Range = Any minor word integer code
ICYCLE(4)	0461	Minor word integer code for CYCLE/TAP Default = 168 (TAP) Range = Any minor word integer code

<i>Name</i>	<i>Location</i>	<i>Description</i>
ICYCLE(5)	0462	Minor word integer code for CYCLE/BORE Default = 82 (BORE) Range = Any minor word integer code
ICYCLE(6)	0463	Minor word integer code for CYCLE/REAM Default = 262 (REAM) Range = Any minor word integer code
ICYCLE(7)	0464	Minor word integer code for CYCLE/THRU Default = 152 (THRU) Range = Any minor word integer code
ICYCLE(8)	0465	Minor word integer code for CYCLE/FACE Default = 81 (FACE) Range = Any minor word integer code
ICYCLE(9)	0466	Not used Default = 163 Range = Any minor word integer code
ICYCLE(10)	0467	Not used Default = 163 Range = Any minor word integer code
ICYCLE(11)	0468	Not used Default = 163 Range = Any minor word integer code
ICYCLE(12)	0469	Not used Default = 163 Range = Any minor word integer code
ICYCLG(1)	0470	G-code for ICYCLE(1) Default = 81 Range = Any legal G-code (see IPREFN) or if IEMPTY (-32767), a software cycle will be generated
ICYCLG(2)	0471	G-code for ICYCLE(2) Default = -32767 (IEMPTY) Range = Any legal G-code (see IPREFN) or if IEMPTY (-32767), a software cycle will be generated
ICYCLG(3)	0472	G-code for ICYCLE(3) Default = 83 Range = Any legal G-code (see IPREFN) or if IEMPTY (-32767), a software cycle will be generated
ICYCLG(4)	0473	G-code for ICYCLE(4) Default = 84 Range = Any legal G-code (see IPREFN) or if IEMPTY (-32767), a software cycle will be generated

Name	Location	Description
ICYCLG(5)	0474	G-code for ICYCLE(5) Default = 85 Range = Any legal G-code (see IPREFN) or if IEMPTY (-32767), a software cycle will be generated
ICYCLG(6)	0475	G-code for ICYCLE(6) Default = 89 Range = Any legal G-code (see IPREFN) or if IEMPTY (-32767), a software cycle will be generated
ICYCLG(7)	0476	G-code for ICYCLE(7) Default = 87 Range = Any legal G-code (see IPREFN) or if IEMPTY (-32767), a software cycle will be generated
ICYCLG(8)	0477	G-code for ICYCLE(8) Default = 82 Range = Any legal G-code (see IPREFN) or if IEMPTY (-32767), a software cycle will be generated
ICYCLG(9)	0478	G-code for ICYCLE(9) Default = 86 Range = Any legal G-code (see IPREFN) or if IEMPTY (-32767), a software cycle will be generated
ICYCLG(10)	0479	Not used
ICYCLG(11)	0480	Not used
ICYCLG(12)	0481	Not used
ICYCSW	0482	Current CYCLE flag. Default = 72 (OFF) Range = 72 (OFF): CYCLE is not in effect. 1: First GOTO point after CYCLE/ 2: Indicate Z move for feedrates 53 (NOMORE): for CYCLE/NOMORE.
IDIRPM	0483	Type of SPINDL output Default = 71 (ON) Range = 71 (ON): Direct RPM. 72 (OFF): Spindle code table.
IDSPLY	0484	Switch for punching PPRINT in punch file. Default = 72 (OFF) Range = ON (71): Punch PPRINT. OFF (72): Do not punch PPRINT.
IDWFMR	0485	EIA DWELL format in IPR mode. Default = 2222 Range is a 1- or 2-digit number at runtime. Range is a 3- or 4-digit number in option file.

<i>Name</i>	<i>Location</i>	<i>Description</i>
IDWFMS	0486	EIA DWELL format in IPM mode. Default = 2424 Range is a 1- or 2-digit number at runtime. Range is a 3- or 4-digit number in option file.
IDWLTR	0487	DWELL letter address A-Z. Default = 25 Range = 1-26, where A=1, B=2, and so forth.
IEMPTY	0488	Integer empty flag -32767. *** DO NOT CHANGE!!
IFACSW	0489	Switch for inch/metric factor conversion. Default = 72 (OFF) Range = 71 (ON): Calculate output using FACTO (DBLCOM(101)) 72 (OFF): Do not use FACTOR.
IFDCHG	0490	Switch to indicate a new FEDRAT statement Default = 71 (ON) Range = 71 (ON): New FEDRAT. 72 (OFF): Old FEDRAT.
IFEDSW	0491	Switch to indicate the linear feedrate mode Default = 73 (IPM) Range = 73 (IPM) or 74 (IPR)
IFMODE	0492	Current FEDRAT mode Default = 94 (IGIPM INTCOM(508)) Range = IGIPM INTCOM(508) Default = 94 INTCOM(509)/95 INTCOM(507)/-32767 (IEMPTY)
IFMODL	0493	Previous FEDRAT mode Default = -32767 (IEMPTY) Range = IGIPM INTCOM(508) Default = 93 INTCOM(508)/94 INTCOM(509)/-32767 (IEMPTY)
IFRMSW	0494	Switch to indicate if a FROM statement has been read Default = 72 (OFF) Range = 71 (ON): FROM has been processed. 72 (OFF): FROM has not been processed.
IFTRDW	0495	Flag to specify the turret dwell to be output in IPM or IPR mode Default = 73 (IPM) Range = 73 (IPM) or 74 (IPR)
	0496	Not used

Note: All G-code entries must be between 0 and 99. To get more than two-digit G-codes, set the appropriate IPREFN location to the desired G-code.

Example: If the dwell code was G104, set IGDWL to 4, and then set IPREFN(4) to 104.

<i>Name</i>	<i>Location</i>	<i>Description</i>
IGABS	0497	G-code for absolute mode (MODE/INCR,OFF) Default = 90 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist.
IGCCLW	0498	G-code CCLW circular interpolation. Default = 3 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGCLW	0499	G-code CLW circular interpolation. Default = 2 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGCOFF	0500	G-code for CYCLE/OFF Default = 80 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGCOMF	0501	G-code for CUTCOM/OFF Default = 40 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGCOML	0502	G-code for CUTCOM/LEFT Default = 41 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGCOMR	0503	G-code for CUTCOM/RIGHT Default = 42 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGDWL	0504	G-code for DWELL (DELAY/). Default = 4 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist

<i>Name</i>	<i>Location</i>	<i>Description</i>
IGINC	0505	G-code for incremental mode. Default = 91 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGINCH	0506	G-code for inch output. Default = 70 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGINV	0507	G-code for INVERS time feedrates Default = -32767 (IEMPTY) Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGIPM	0508	G-code for IPM FEDRAT. Default = 94 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGIPR	0509	G-code for IPR FEDRAT. Default = 95 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGLIN	0510	G-code for linear interpolation. Default = 1 Range = 0-99 if the feature requires a G-code 1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGMTRC	0511	G-code for metric output. Default = 71 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGPOS	0512	G-code for RAPID positioning. Default = 0 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
	0513 – 0515	Not used

<i>Name</i>	<i>Location</i>	<i>Description</i>
IGRPM	0516	G-code for RPM mode in lathes Default = 97 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGSET	0517	G-code for axis preset. Default = 92 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
	0518	Not used
IGSFM	0519	G-code for CSFM In Lathes Default = 96 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGTHD(3)	0520	G-codes for threading in lathes
IGTHD(1)	0520	Constant thread Default = 33 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGTHD(2)	0521	Increase variable thread Default = 34 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGTHD(3)	0522	Decrease variable thread Default = 35 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
	0523 – 0531	Not used
ILOKSW	0532	For lathes to automatically lock and unlock spindle under SFM mode. Default = 80 (MLOKOF) Range = MLOKOF INTCOM(1967) Default = 80 MLOKON INTCOM(1968) Default = 81
IMANRD	0533	Flag to PNCHIT routine for punching man-readable PARTNO. Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)

<i>Name</i>	<i>Location</i>	<i>Description</i>
IMODE	0534	Current mode as absolute/incremental Default = 90 (IGABS) Range = IGABS INTCOM(497) Default = 90 IGINC INTCOM(505) Default = 91
IMODL	0535	Last mode in effect Default = -32767 (IEMPTY) Range = IGABS INTCOM(497) Default = 90 IGINC INTCOM(505) Default = 91 -32767 will force output of IMODE INTCOM(534)
	0536	Not used
INITSW	0537	Flag to call REINIT routine. Default = 72 (OFF) Range = 71 (ON): Do not call REINIT
INTERP	0538	Current interpolation mode. Default = 0 Range = IGPOS INTCOM(512) Default = 0 IGLIN INTCOM(510) Default = 1 IGCLW INTCOM(499) Default = 2 IGCCLW INTCOM(498) Default = 3
	0539	Not used
INVFMF	0540	F format for INVERS mode. Default = 0 (Not used) Range is a 1- or 2-digit number at runtime. Range is a 3- or 4-digit number in option file.
INVMOD	0541	Flag to specify that INVERS mode FEED is required. Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
IOUTSW	0542	Flag to specify that output of a block is pending. Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
IPAGE	0543	Current page number of print output. Default = 0 Range = 0 to 32766
IPCHBF(72)	0544	Punch buffer
IPCHCT	0615	Number of characters in punch line. Do not reset
IPCHNX	0616	Pointer into punch buffer for last character stored. Do not reset.

<i>Name</i>	<i>Location</i>	<i>Description</i>
IPGWRN	0617	Number of warnings in current page Default = 0 Range = 0 to 32766
	0618 – 0619	Not used
IPMFMT	0620	Format for IPM FEED. Default = 3241 Range is a 1- or 2-digit number at runtime. Range is a 3- or 4-digit number in option file.
IPREFN(1)	0621	G-code for G01 or PREFUN/1 Default = 1 Range = 0 to 32766
IPREFN(2)	0622	G-code for G02 or PREFUN/2 Default = 2 Range = 0 to 32766
IPREFN(n)	0nnn	G-code for Gnn or PREFUN/nn. Add 0620+n to get the location number. Default = nnn Range = 0 to 32766
IPREFN(100)	0720	G-code for G00 or PREFUN/0 Default = 0 Range = 0 to 32766

Note: To get G-codes of more than 2 digits, set the G-code between 0 and 99, then set the matching IPREFN location to the desired G-code.

Example: If the dwell code was G104, set IGDWL to 4, then set IPREFN(4) to 104.

IPRFMT	0721	Format for IPR FEED. Default = 1423 Range is a 1- or 2-digit number at runtime. Range is a 3- or 4-digit number in option file.
IPRNBF(131)	0722	Print buffer. Cannot be reset.
IPX	0853	Pointer into CL for lathe Z axis Default = 1 for horizontal Range = 1 for horizontal 2 for vertical
IPY	0854	Pointer into CL For lathe X axis Default = 2 for horizontal Range = 2 for horizontal 1 for vertical
	0855	Not used

<i>Name</i>	<i>Location</i>	<i>Description</i>
IRAPSW	0856	RAPID flag Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
IRAPTO	0857	Segmentation flag for FEDRAT/RAPTO Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
	0858	Not used
IROTSW	0859	Flag to specify rotation of CL using the trans matrix. Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
IRPFMT	0860	Format for rapid traverse, (other than G-code) Default = 0 (Not used) Range is a 1- or 2-digit number at runtime. Range is a 3- or 4-digit number in option file.
IRPTWD(26,2)	0861	Storage area to combine two registers when using RPTWRD routine. IRPTWD(A,B), Load 1-26 (A) to be the "trigger" address for combining output. Where A=1, B=2, and so forth. Default = 72 (OFF) Range of (A,1) = 1-26, where A=1, B=2, and so forth. This is the address to be output by the "trigger". Range of (A,2) = 71 (ON): Output on each block until it is set to 72 (OFF). 162 (NEXT): Output one time only.
ISCDTP	0913	Flag to indicate spindle code table or equation. Default = 0 Range = 0: Spindle code table 1: Equation
ISCODE(6,99)	0914	S-code table Default = 0 Range = 0 to 32766

Note: The feed rate code tables overlay the last 3 ranges of the spindle code common locations. If you use the code tables, only three spindle ranges are available!

IFCXPM(50)	1301	IPM feed rate codes for X motion Default = 0 (See Note 1 above!) Range = +-32766
IFCXPR(50)	1351	IPR feedrate codes for X motion Default = 0 (See Note 1 above!) Range = +-32766
IFCZPM(50)	1401	IPM feedrate codes for Z motion Default = 0 (See Note 1 above!) Range = +-32766

Name	Location	Description
IFCZPR(50)	1451	IPR feedrate codes for Z motion Default = 0 (See Note 1 above!) Range = +-32766
ISEQSW(2)	1508	SEQNO command option flags. (1) is the option to be processed. (2) is the saved current option. Default (1) = 66 (INCR) (2) = 66 (INCR) Range = 72 (OFF) - No sequence number 66 (INCR) Sequence number increment (See RELCOM SEQINC) 60 (CLW) Current CL record number
ISETSW	1510	Flag to specify set options Default = 88 (AUTO) Range = 72 (OFF) G92 not in effect 162 (NEXT) Next GOTO is G92 88 (AUTO) Do G92 with TURRET 71 (ON) G92 not in effect
ISKPSW	1511	Flag set for OPSKIP condition. Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
	1512	Not used
ISPDIR	1513	Current spindle direction. Default = MSPCLW INTCOM(1982) Range = MSPCLW INTCOM(1982); CLW Default = 3 MSPCCW INTCOM(1981); CCLW Spindle M-code Default = 4
ISPDRL	1514	Last spindle direction. Default = 0 Range = 0 Force out new spindle direction M-code ISPDIR INTCOM(1513); Current spindle direction. Default = 3
ISPLCK	1515	Flag to indicate if the spindle is in lock position Default = 88 (AUTO) Range = 72 (OFF) Spindle lock not in effect 88 (AUTO) Spindle locks in RAPID, unlocks for linear 71 (ON) Spindle lock in effect
ISPMDL	1516	Last spindle mode to be RPM or SFM Default = 78 (RPM) Range = 78 (RPM) 115 (SFM)
ISPMOD	1517	Current spindle mode to be RPM or SFM Default = 78 (RPM) Range = 78 (RPM) 115 (SFM)

Name	Location	Description
ISPNHI	1518	Highest spindle speed location in SPTABL for current range. Default = 25 (NSPDHI(1)) Range = NSPDHI(1-6) INTCOM(1994-1999) 2 - 99 allowed for each range.
ISPNLW	1519	Lowest spindle speed location in SPTABL for current range. Default = 1 (NSPDLW(1)) Range = NSPDLW(1-6) INTCOM(2000-2005) 1 - 98 allowed for each range.
ISPNRW	1520	Current spindle speed location in SPTABL for current range. Default = 0 Range = 1 to 99
ISPNSW	1521	Flag to indicate spindle ON/OFF condition. Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
ISPRGL	1522	Last spindle range in effect. Default = 0 Range = 0 to 6 - 0 will force out new spindle range M-code
ISPRNG	1523	Current spindle range in effect Default = 1 Range = 1 to 6
ISTBLK	1524	Switch to indicate if XZ is to be adjusted by gage lengths. Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
ITHDSW	1525	Switch to indicate type of thread move requested Default = 72 (OFF) Range = 71 (ON) or 72 (OFF) 81 (FACE) 80 (TURN)
ITHFMT	1526	Thread format for IK registers Default = 1524 Range is a 1- or 2-digit number at runtime. Range is a 3- or 4-digit number in option file.
ITHTYP1527		Thread type requested Default = 0 (off) Range = 0 (off) 1 Constant lead 2 Increasing lead 3 Decreasing lead
ITLTBL(99,3)	1528	Tool table to contain the integer values ISOURC, IRECRD and offset number of the tool list Default = 0 Range = 0 to 32766

<i>Name</i>	<i>Location</i>	<i>Description</i>
ITOLSW	1825	Flag to indicate MCHTOL option. Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
ITRCNT	1826	Flag for TURRET/CENTER option Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
ITRDIR	1827	Current turret indexing direction Default = 23 (MTRCLW INTCOM(1986)) Range = MTRCLW INTCOM(1986) MTRCCW INTCOM(1985)
ITRDRL	1828	Last turret indexing direction in effect Default = -32767 (IEMPTY) Range = ITRDIR INTCOM(1827) -32767 (IEMPTY) will force out ITRDIR
ITRTPL	1829	For multiple turret lathes, specifies the last turret selected as 1-5 Default = 1 ITRTYP INTCOM(1830) Range = 1 - 5 ITRTYP INTCOM(1830)
ITRTYP	1830	For multiple turret lathes, specifies the current turret in effect as 1-5 Default = 1 - FRONT Range = 1 - FRONT 2 - REAR 3 - SADDLE 4 - MAIN
ITSBIT(100)	1831	User option area for PLABEL/Option Default = See PLABEL/Option section Range = See PLABEL/Option section
IVIEW	1931	EIA view flag for circular interpolation -1 = APT +X to APT +Y will be IGCCLW +1 = APT +X to APT +Y will be IGCLW Default = -1 Range = 1, -1
IWARN	1932	Total warnings in the current program Default = 0 Range = 0 to 32766
IXA	1933	Letter address of ZAXIS for circular interpolation. Default = 24 (X) Range = 24 ZAXIS may be XAXIS with VTL
IYA	1934	Letter address of XAXIS for circular interpolation. Default = 25 (Y) Range = 25 XAXIS may be ZAXIS with VTL
	1935 – 1941	Not used

<i>Name</i>	<i>Location</i>	<i>Description</i>
KOMREG	1942	Offset number for tool offset Default = 0 Range = 0 to 32767
KSYM(10)	1943	Array to contain the special characters for punch output. (1) \$ End of block(2) > Leader(3) = Rewind stop code (4) / Block delete(5) * Tab(6) (- Control out(7)) - Control in (8)- Not used(9)- Not used(10)- Not used Default = (1) 36, (2) 62, (3) 61, (4) 47, (5) 42, (6) 40, (7) 41, (8) 0, (9) 0, (10) 0 Range = 32 to 96
	1953	Not used
LINCT	1954	Line count of the current page for the print output. Default = 0 Range = 0 to 32766
LINSFM	1955	Flag to indicate for skipping SFM output for circular interpolation Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
MACHNO	1956	Current machine number of the part program. Default = 0 Range = 0 to 99
MACHSW	1957	Flag to indicate MACHIN/ --,ON or OFF condition to skip processing CL information. Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
MCHCRD	1958	Flag to tell if MACHIN statement is in the part program. Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
MCLFLD	1959	M-code for COOLNT/FLOOD. Default = 8 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MCLMST	1960	M-code for COOLNT/MIST. Default = 7 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MCLOFF	1961	M-code for COOLNT/OFF. Default = 9 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist

<i>Name</i>	<i>Location</i>	<i>Description</i>
MCLON	1962	Last M-code for COOLNT. Default = MCLFLD INTCOM(1959) Range = MCLFLD INTCOM(1959) COOLNT/FLOOD M-code Default = 8 MCLMST INTCOM(1960); COOLNT/MIST M-code Default = 7
MEND	1963	M-code for END. Default = 2 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MFDOFF	1964	M-code for FEDRAT/LOCK,OFF. Default = 50 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MFDON	1965	M-code for FEDRAT/LOCK,ON Default = 51 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MLOKOF	1967	M-code for SPINDL/LOCK,OFF Default = 80 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MLOKON	1968	M-code for SPINDL/LOCK,ON Default = 81 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MOPSTP	1969	M-code for OPSTOP. Default = 1 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MORINT	1970	M-code for SPINDL/ORIENT used in BORE/--ORIENT cycle. Default = 5 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MOVE	1971	Flag to indicate the type of move for the current GOTO point. Default = 0 Range = 0 No move, 1 Z, 2 X, 3 ZX

<i>Name</i>	<i>Location</i>	<i>Description</i>
	1972	Not used
MRANGE(6)	1973	M-code for range select 1-6. Default = (1) & (2) -32767 (IEMPTY) Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MROTAT	1979	Combine Spindle G-Code with S-code output block. Default = 0, No output spindle G-Code on separate line 1, Yes, combine spindle G-Code with S-Code block
MRWIND	1980	M-code for REWIND. Default = 30 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MSPCCW	1981	M-code for SPINDL/CCLW. Default = 4 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MSPCLW	1982	M-code for SPINDL/CLW. Default = 3 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MSPOFF	1983	M-code for SPINDL/OFF Default = 5 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MSTOP	1984	M-code for STOP. Default = 0 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MTRCCW	1985	M-code for turret CCLW index Default = 24 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MTRCLW	1986	M-code for turret CLW index Default = 23 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist

<i>Name</i>	<i>Location</i>	<i>Description</i>
MULTAX	1987	Flag to mark CL file type as MULTAX or non-MULTAX Default = 3 Range = 3 (Not MULTAX, any other setting will cause post to abort.)
MXLINE	1988	Maximum number of lines per page for the print output file Default = 51 Range = 1 to 32766
NAXIS	1989	Number of axes in the post. Default = 2 Range = 2 (Any other setting may cause post to abort.)
NBLOCK	1990	Number of the punch output block. Default = 0 Range = 0 to 32767
NCYCLE	1991	Current cycle requested by a CYCLE/ command. Pointer into ICYCLE or ICYCLG array. Default = 0 Range = 0 to 12 (After first CYCLE, will not return to 0)
NODIAG	1992	Flag to indicate if a Type 2000 command was processed. Default = 0 Range = 0 - Off 1 - Type 2000 processed
MCRANG	1993	SP-RANGEM-code in lathe Default = 0 Range = MRANGE(1-6) INTCOM(1973-1978)
NSPDHI(6)	1994	Highest location in each range for the spindle table. Default = (1) 25, (2) 25, (3) 0, (4) 0, (5) 0, (6) 0 Range = 2 to 99
NSPDLW(6)	2000	Lowest location in each range for the spindle table. Default = (1) 1, (2) 1, (3) 0, (4) 0, (5) 0, (6) 0 Range = 1 to 98
NSR	2006	Number of spindle ranges. Default = 2 Range = 1 to 6
NTHBLK	2007	SEQNO option to output sequence number every nth block. Default = 1 Range = 1 to 32766
NTOOL	2008	Pointer into the tool table for last tool stored. Default = 0 Range = 0 to 99
NTTL	2009	Maximum number of tools allowed. Default = 99 Range = 1 to 99

<i>Name</i>	<i>Location</i>	<i>Description</i>
NTW	2010	Number of tape words for output. Default = 11 Range = 1 to 26
NVW	2011	Total number of words for output. Tape words plus verification words. Default = 17 Range = NTW (INTCOM(2010) + 1 to 6)
NXTSEQ	2012	Next sequence number to be output. Default = 0 Range = 0 to 32766
NXTWRD	2013	Internal switch. Do not change.
NZDATA	2014	Counter for the number of Z parameters stored from CYCLE command Default = 0 Range = 1 to 20 (After a CYCLE command)
	2015 – 2018	Not used
ITITLE(33) manually.	2019	Array for user title. Set within the Option File Generator; cannot be set manually.
IOBLOK	2052	Flag for alignment block code. Default = 0 Range = 0 - Off 1 - Output alignment code on next block.
IRPTYP	2053	Flag for RAPID in IPR or IPM. Default = 0 (off) Range = 0 (off) 1 rapid feed mode G-code was output
IRPFED	2054	Flag to save current FEED mode. Default = 0 Range = IFMODE INTCOM (492) IGIPM INTCOM(508) Default = 94 IGIPR INTCOM(509) Default = -32767 (IEMPTY) IGINV INTCOM(507) Default = 93
	2055	Not used
MULTG(4)	2056	Array to hold multiple G-codes. Default = (1-4) -32767 (IEMPTY) Range = Any G-code that fits the format
MULTM(4)	2060	Array to hold multiple M-codes. Default = (1-4) -32767 (IEMPTY) Range = Any M-code that fits the format
KCIRSW(3)	2064	Three way switch to indicate modal CIRCLE codes: 1 = G-code, 2 = XY Code, 3 = IJK code Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)

Name	Location	Description
LETRAD	2067	Letter address for RADIUS register with circular interpolation. Default = 0 (Unused) Range = 0 to 26 (A-Z)
LOKTYP	2068	Switch to indicate location of SPINDL/LOCK code. Default = 0 (off) Range = 83 (BOTH) or 0 - Combine M-code with next block 52 (LAST) M-code in a block by itself
ITAPSW	2069	Switch to indicate location of SPINDL/OFF code in TAP CYCLE. Default = 72 (OFF) Range = 71 (ON) Spindle off M-code with Z move. 72 (OFF) Spindle off M-code after Z move.
IACSW	2070	Switch to indicate motion from Type 2000 command. Do not change.
IRPSAV	2071	Saves RAPID switch for Type 2000 motion. Default = 0 (Off) Range = 0, (IRAPSW INTCOM(0856)) Default = 72 (OFF) 71 (ON) 72 (OFF)
ICYCSV	2072	Saves CYCLE switch for Type 2000 motion. Default = 0 (Off) Range = 0, (ICYCSW INTCOM(0482)) See ICYCSW for settings
JRAPAD	2073	RAPID address. Default = 0 (Unused) Range = 0 to 26 (A-Z)
IGINMT	2074	Current inch/metric G-code. Default = IGINCH INTCOM(0506) Range = IGINCH INTCOM(0506) Default = 70 IGMTRC INTCOM(0511) Default = 71
	2075 – 2078	Not used
	2079	Internal switch, do not reset
	2080 – 2209	Not used
IBRKFL	2210	Flag to indicate an auto break point has been reached on tape length. Default = 0 (off) Range = 0 - off 1 - Maximum on GOHOME 2 - Maximum on TURRET 3 - Maximum on OPSTOP 4 - Maximum on STOP 5 - Maximum no KEYWORD

<i>Name</i>	<i>Location</i>	<i>Description</i>
IBRKWD(5)	2211	Flags used in automatic break to indicate which words (GOHOME, TURRET, OPSTOP, STOP) to break on. Default = 0 (off) Range = (1) - 1 Break on GOHOME (2) - 1 Break on TURRET (3) - 1 Break on OPSTOP (4) - 1 Break on STOP (5) - 1 Break on length of tape
JPARAD(26,9)	2216	Array containing the para-macro strings to be substituted for letter addresses. Strings are in the same sequence as JADDR. The first eight positions contain the string. The ninth position contains the ON/OFF switch. Default = -32767: (IEMPTY) Range = (n,1-8) - 32 to 96 (n,9) - -32767 (IEMPTY) (off) - 71 (ON)
ITY5SW	2450	Obsolete
IDCNTR(2)	2451	PARTNO increment option for multiple punch files. (1): PARTNO Column to be incremented (2): Starting increment number Default = (1) 0 (not used) (2) 0 Range = (1) 1-66 (2) 0-9
JADTHD	2453	Threading address (when not I K) Default = 0 (Unused) Range = 0 to 26 (A-Z)
IERFIN	2454	If greater than 0, processing terminates when warning count exceeds this number. Default = 0 (off) Range = 1 - 32766
IDSFMT	2455	Flag to indicate CSFM available Default = 0 (no) Range = 0 (no) 1 (yes)
ITIRET	2456	Threading retract flag for I (APT X) Default = 0 (off) Range = 0 (off) 1 - couplet is absolute 2 - couplet is incremental
JTIRET	2457	Threading retract flag for J (APT Y) Default = 0 (off) Range = 0 (off) 1 - couplet is absolute 2 - couplet is incremental

<i>Name</i>	<i>Location</i>	<i>Description</i>
IRPTSW	2458	Switch to indicate a REPEAT command has been programmed. Default = 0 (off) Range = 71 (ON) or 72 (OFF)
IOPSKN(9)	2459	Multiple OPSKIP numbers, output with the multiple OPSKIP option. Default = -32767 (IEMPTY) (off) Range = 1 - 32766
MSKPSW	2468	Multiple OPSKIP switch. Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
KALISW	2495	Switch to indicate if KSYM alias is on Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
KSALIS(8,8)	2496	ASCII pointers for KSYM alias (1,1-8) - KSYM(1) (2,1-8) Default = 0 (unused) Range = 0, 32 - 96
MCLTHH	3421	COOLNT/THRU,HIGH M-code Default = 18 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MCLTHL	3422	COOLNT/THRU,LOW M-code Default = 17 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MCLFLH	3423	COOLNT/FLOOD,HIGH M-code Default = 28 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MCLFLL	3424	COOLNT/FLOOD,LOW M-code Default = 27 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
ICLXYZSW	3425	COOLNT output with next XY block. Default = 0 (off) Range = 0 (off) , 1 (on)
ICLOUTSW	3426	Internal switch used with COOLNT. Do not reset.
ISELSW	3427	Switch for G code output with SELECT. Default = 0 (off) Range = 0 (off) , 1 (on)

<i>Name</i>	<i>Location</i>	<i>Description</i>
ISELGDEF	3428	Default G-code for SELECT Default = 54 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
ISELGMIN	3429	Minimum G-code for SELECT Default = 54 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
ISELGMAX	3430	Maximum G-code for SELECT Default = 59 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
ISELXYZSW	3431	SELECT output with next XY block. Default = 0 (off) Range = 0 (off) , 1 (on)
ISELEQZERO	3432	Output SELECT if equal to zero. Default = 0 (yes) Range = 0 (yes) , 1 (no)
ISELOUTSW	3433	Internal switch used with SELECT. ***Do not reset.
ISELG	3434	Internal switch used with SELECT. ***Do not reset.
ICIRFDN	3436	Output redundant F-code with quadrant crossing circle output. Default = 0 (off) Range = 0 (off) , 1 (on)
MCLSW	3439	COOLNT/ON switch. Default = 0 (off) Range = 0 (off) , 1 (on)
KKDOFF	3440	Internal switch used with CUTCOM, ***Do not reset.
KKXYSW	3441	Output CUTCOM with next XY block. Default = 0 (off) Range = 0 (off) , 1 (on)
KKRSW	3442	Output CUTCOM offset address (D) with G-code. Default = 0 (off) Range = 0 (off) , 1 (on)

<i>Name</i>	<i>Location</i>	<i>Description</i>
IGSPMX	3443	SPINDL MAXRPM G-code. Default = 92 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
ITLSPC(2)	3444	The current turning condition TLSPEC/RIGHT-LEFT,OUT-IN Default = (1) 1 Range = 1(Right), -1 (Left) Default = (2) 1 Range = 1(Out), -1 (In)
IGTAPF	3446	CYCLE/TAP,---,HIGH Flag Default = 0 (off) Range = 0 (off) , 1 (on)
IGTAPH	3447	CYCLE/TAP,---,HIGH G-code. Default = 841 Range = 0-32767 if the feature requires a M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
IGTAPD	3448	CYCLE/TAP,---,HIGH G-code decimal point location. Default = 1 Range = 0-32767
JSCPAD	3449	CYCLE/--- Secondary clearance plane address. Default = 0 No secondary clearance plane. Range = 1-26 Alpha A-Z or 0 for No secondary Clearance Plane.
ITLOFF(2)	3450	The current tool offset condition TLSPEC/OFFSET,RIGHT-LEFT-ON,OUT-IN-ON Default = (1) 0 Range = 1(Right), 0 (On), -1 (Left) Default = (2) 0 Range = 1(Out), 0 (On), -1 (In)
ITHD76	3452	G76 Threading cycle switch Default = 0 (off) Range = 0 (off) , 1 (on)
ITHRDS(10)	3453	G76 Threading parameters, after parsing the command. Default = 0 (all)
ITHRDS(1)	3453	G76 Threading parameters, -1 (LEFT) or 1 (RIGHT) Switch Internal setting.
ITHRDS(2)	3454	G76 Threading parameters, -1 (IN) or 1 (OUT) Switch Internal setting.
ITHRDS(3)	3455	G76 Threading parameters, BOTH Switch 1=ON, 0=OFF Internal setting.

<i>Name</i>	<i>Location</i>	<i>Description</i>
ITHRDS(4)	3456	G76 Threading parameters, OPSKIP Switch 1=ON, 0=OFF Internal setting.
ITHRDS(5)	3457	G76 Threading parameters, OPSTOP Switch 1=ON, 0=OFF Internal setting.
ITHRDS(6)	3458	G76 Threading parameters, REPEAT Switch 1=ON, 0=OFF Internal setting.
ITHRDS(7)	3459	G76 Threading parameters, TAPER Switch 1=ON, 0=OFF Internal setting.
ITHRDS(8)	3460	G76 Threading parameters, Not used Internal setting.
ITHRDS(9)	3461	G76 Threading parameters, Not used Internal setting.
ITHRDS(10)	3462	G76 Threading parameters, Not used Internal setting.
ITHG1	3463	G76 Threading cycle 1st line G-code. Default = 76 Range = 0-32767
ITHG2	3464	G76 Threading cycle 2nd line G-code. Default = 76 Range = 0-32767
ITHP1	3465	G76 Threading cycle, 1st line P-code format Default = 60 Range = 0-32767
ITHQ1	3466	G76 Threading cycle, 1st line Q-code format Default = 40 Range = 0-32767
ITHR1	3467	G76 Threading cycle, 1st line R-code format Default = 31 Range = 0-32767
ITHP2	3468	G76 Threading cycle, 2nd line P-code format Default = 40 Range = 0-32767
ITHQ2	3469	G76 Threading cycle, 2nd line Q-code format Default = 40 Range = 0-32767
ITHR2	3470	G76 Threading cycle, 2nd line R-code format Default = 31 Range = 0-32767

<i>Name</i>	<i>Location</i>	<i>Description</i>
ITHF2	3471	G76 Threading cycle, 2nd line F-code format Default = 31 Range = 0-32767
ITHDP	3472	G76 Threading cycle, P-code address Default = 16 Range = 1-26 Alpha A-Z
ITHDQ	3473	G76 Threading cycle, Q-code address Default = 17 Range = 1-26 Alpha A-Z
ITHDP	3474	G76 Threading cycle, R-code address Default = 18 Range = 1-26 Alpha A-Z
ITHP1S	3475	G76 Threading cycle, 1st line P-code specification Default = 1100 1 or 0 1 or 0 1 or 0 1 or 0 Range = leading zero, trailing zero ,plus sign, decimal point
ITHQ1S	3476	G76 Threading cycle, 1st line Q-code specification Default = 1100 1 or 0 1 or 0 1 or 0 1 or 0 Range = leading zero, trailing zero ,plus sign, decimal point
ITHR1S	3477	G76 Threading cycle, 1st line R-code specification Default = 0001 1 or 0 1 or 0 1 or 0 1 or 0 Range = leading zero, trailing zero ,plus sign, decimal point
ITHP2S	3478	G76 Threading cycle, 2nd line P-code specification Default = 1100 1 or 0 1 or 0 1 or 0 1 or 0 Range = leading zero, trailing zero ,plus sign, decimal point
ITHQ2S	3479	G76 Threading cycle, 2nd line Q-code specification Default = 1100 1 or 0 1 or 0 1 or 0 1 or 0 Range = leading zero, trailing zero ,plus sign, decimal point
ITHR2S	3480	G76 Threading cycle, 2nd line R-code specification Default = 0001 1 or 0 1 or 0 1 or 0 1 or 0 Range = leading zero, trailing zero ,plus sign, decimal point
ITHF2S	3481	G76 Threading cycle, 2nd line F-code specification Default = 0001 1 or 0 1 or 0 1 or 0 1 or 0 Range = leading zero, trailing zero ,plus sign, decimal point

<i>Name</i>	<i>Location</i>	<i>Description</i>
ITHDF	3482	G76 Threading cycle, F-code address Default = 6 Range = 1-26 Alpha A-Z
ISTART10SW	3483	Output 10 lines of user defined output at startup switch. Default = 0 (off) Range = 0 (off) , 1 (on)
ISTART10LN	3485	Number of lines to be output at startup. Default = 0 Range = 0 -10
ISTART10(330)	3485	10 lines, 66 characters per line, of user defined output. This array can only be loaded by the OFG. Do not change.
IPGMNUMSW	3815	Output a program number at the start switch. Default = 0 (off) Range = 0 (off) , 1 (on)
IPGMPROSW	3816	Prompt for the program number at the start switch. Default = 0 (off) Range = 0 (off) , 1 (on)
IPGMPROMPT(33)	3817	The program number prompt string, 66 characters. This array can only be loaded by the OFG. Do not change.
IPGMPRE(5)	3850	The program number prefix string 10 characters. This array can only be loaded by the OFG. Do not change.
IPGMPOST(5)	3855	The program number suffix string, 10 characters. This array can only be loaded by the OFG. Do not change.
IPGMNCH	3860	Maximum number of characters in program number. Default = 1 Range = 1-33
IPGMALPHASW	3861	Allow Alpha-Numeric program numbers. Default = 0 (off) Numeric only Range = 0 (off) , 1 (on) Alpha-Numeric
IPGMNUMBER(23)	3862	The program number string, 46 characters. This array is set internally. Do not change.
IPGMBLOCK(33)	3885	The program number output block, 66 characters. This array is set internally. Do not change.
IPGMNUMBERDEF(23)	3918	The program number default, 46 characters. This array can only be loaded by the OFG. ***Do not change.

<i>Name</i>	<i>Location</i>	<i>Description</i>
ITIMESTAMP	3941	Output a CPU time stamp at startup switch. Default = 0 (off) Range = 0 (off) , 1 (on)
ITIMESTAMP(33)	3942	The time stamp string, 66 characters. This array is set internally. Do not change.
ICYCAMLTR	3975	CYCLE/---,CAM letter address Default = 0 Range = 1-26 Alpha A-Z
ICYDWELTR	3976	CYCLE/---,LOCK letter address Default = 0 Range = 1-26 Alpha A-Z
	3977	Not used for lathe
	3978	Not used for lathe
	3979	Not used for lathe
IFINI10SW	3980	Output 10 lines of user defined output at end switch. Default = 0 (off) Range = 0 (off) , 1 (on)
IFINI10LN	3981	Number of lines to be output at end. Default = 0 Range = 0 -10
IFINI10(330)	3982	10 lines, 66 characters per line, of user defined end output. This array can only be loaded by the OFG. ***Do not change.
	4312	Not used for lathe
ITLADJ	4313	Output the tool length compensation number the same as the tool number when not specified in the LOADTL statement. Default = 0 = Off Range = 0 = Off 1 = On
ICCAdj	4314	Output the cutter compensation diameter offset number the same as the tool number when not specified in the CUTCOM statement.
ITLPRE	4315	Create the tool list file .TL1. Default = 0 Off, No tool list file is created Range = 0 Off, No tool list file is created. = 1 Tool list file .TL1 is created
IG98G99	4316	Switch to ignore PULBAC in CYCLE commands. Default = 0, Use the PULBAC commands Range = 0, Use the PULBAC commands = 1 Ignore the PULBAC commands in CYLCE

Name	Location	Description
	4317-4333	Not used for lathe
IG9899CODE	4336	G-Code for the PULBAC command in CYCLE. Default = 0, Use the specified value in the PULBAC command. = 1-999, Use this value for the G-Code always, ignore specified value.
ICYOUTABC	4337	Output the current ABC values in the CYCLE block. Default = 0, Always output the current ABC values in the CYCLE block. = 1, Do not output ABC in the CYCLE block.
IPTCUNITFG	4338	PTC UNITS command flag. Default = 0, Evaluate the UNITS commands as normal. = 1, Evaluate the UNITS commands per PTC specification.
IG1MODALFG	4339	Linear G-Code modal flag. Default = 0, linear G-Code in non-modal = 1, Linear G-Code is modal
ICRCTCOMFG	4340	Output G02/G03 when the circular and CUTCOM plane do not match. Default = 0, Do not output G02/G03 = 1, Output G02/G03 when the CUTCOM plane does not match.
	4341-4352	Not used
ISIMTIMCTR	4353	Add cycle time during simulation mode. Default = 0, Do not add cycle times for simulation mode = 1, Add cycle time for simulation mode.
JAFTRAD(26,9)	4359	Array containing the para-macro strings to be added following The letter address values. Strings are in the same sequence as JADDR. The first eight positions contain the string. The ninth position contains the ON/OFF switch. Default = -32767: (IEMPTY) Range = (n,1-8) - 32 to 96 (n,9) - -32767 (IEMPTY) (off) - 71 (ON)
JDECONT	4983	Decimal output option. Default = 0, Normal output X12. = 1, Output X12 = 2, Output X12.0 or X0.12
	4594-4599	Not used
ITAPFLEXT(7)	4600	Optional tape file extension set by user in Optfile I4600=0/1 and Up to 6-characters stored in I4601-4606 similar to Alias ASCII index. Only valid filename characters (0-9,A-Z and Underscore) are valid. Default = 0, default file extension = 1, Use file extension define in Optfile
IG9899COD1	4607	G98/G99 initial retract G code Default = 98 Range = 0-32767

<i>Name</i>	<i>Location</i>	<i>Description</i>
IG9899COD2	4608	G98/G99 full retract G code Default = 99 Range = 0-32767
	4609-4635	Not used
ICYCSAMPT	4635	Repeat CYCLE identical point. Default = 0, Do not repeat CYCLE identical point = 1, Repeat CYCLE identical point.
	4536-4640	Not used
ICYSCPLTYP	4641	CYCLE secondary clearance plane output. Default 0 = Output incremental from Z 1 = Output absolute value
ISPNMOTGLF	4642	SPINDL code output flag. Default 0 = Output SPINDL code on a block by itself 1 = Output SPINDL code with the next XY block 2 = Output SPINDL code with the next Z block
ICVBINFLG	4643	Reading a CV binary CL file flag. Default 0 = No 1 = Yes
	4644-4647	Not Used
IGHMPVUPFLG	4648	Automatically update PREVMP when GOHOME is used.. Default 0 = No 1 = Yes
	4649-4650	Not Used
IFLGRPINS	4651	REPLAC will insert a new block. Default 0 = No 1 = Yes
JNSV	4652	Flag to output SEQNO with REPLAC insert.. Default 0 = No 1 = Yes
IDPLTRNEG	4653	Option will output CYCLE/DEEP INCR values as negative. Default 0 = No (INCR always positive) 1 = Yes (output as programmed, negative or positive)
	4654-4657	Not Used.

<i>Name</i>	<i>Location</i>	<i>Description</i>
IPRNCMDOPT	4658	When PLABEL/OPTION,87=1,a new flag INTCOM(4658) will provide further control of print/input statement. It is a 4-digit field to be set as no=0 or yes=1 for each option below: Skip printing of FIL generated commands (1st digit) Skip printing of PPRINT text commands (2nd digit) Skip printing of INSERT text commands (3rd digit) Skip printing of PARTNO text commands (4th digit) For example, INTCOM(4658)=1000 will suppress printing of FIL generated input commands. Note: You must still set PLABEL/OPTION,87=1 Default = 0000 to print all commands as before.
IPRNFCDOPT	4659	Option to print Verify-F in IPM/IPR. Default 0 = Print Verify-F in IPM 1 = Print Verify-F in IPR 2 = Print Verify-F in IPM or IPR per current feed rate mode
ICYCUGCMD	4660	Option to process UG CYCLE commands. Default 0 = FIL will process UG CYCLE commands 1 = G-Post to process UG CYCLE commands
	4661-4666	Not Used
IMOUTPTFG	4667	_OUTPT Macro flag. Set this flag to enable or disable the _OUTPT macro. Default 0 = Disabled _OUTPT tape block editor macro. 1 = Enabled _OUTPT tape block editor macro.
	4668	Not Used
IPGMLDBLK	4669	Skip the leading blanks and leading slash (/) character in the PARTNO statement. Default 0 = Use the 1st character in PARTNO. 1 = Skip leading blanks and slash (/) in count
	4670-4672	Not Used
ITSQSTPIN	4673	THREAD/AUTO step-in move thread mode Default 0 = Step-in move is at feed/rapid 1 = Step-in move is in thread/on mode
IG9899MODL	4674	G98/G99 Modal flag, to be repeated after G80 z-retract (Cycle Motion Analysis) Default 0 = G98/G99 code is modal, output for new CYCLE/cmd 1 = G98/G99 code is non-modal, also output after G80 z-retract
IG94CYCG00	4675	Skip G94/G95 prep code output with G00 blocks inside CYCLE output Default 0 = Output G94/G95 for any RAPID block if set by ITSBIT(32) 1 = Skip G94/G95 for RAPID if inside CYCLE output

<i>Name</i>	<i>Location</i>	<i>Description</i>
	4676	Not Used
ISM840DCYF	4677	Option to output Siemens 840D cycle format Default 0 = Siemens CYCLE81() format not required 1 = Output Siemens CYCLE81() format, non-modal 2 = Output Siemens CYCLE81() format, modal

5.2 Lathe DBLCOM Variables

<i>Name</i>	<i>Location</i>	<i>Description</i>
	0001 – 0003	Not used
CANON(6)	0004	XYZIJK of the circle center from the Type 3000 command Default = 0.0 Range = (1-3) +-99999.0, (4-6) +-1.0
CIRCEN(6)	0010	XYZ of the circle center translated by ORIGIN and TRANS Default = 0.0 Range = (1-3) +-99999.0, (4-6) Unused
CIRRAD	0016	Current circle radius Default = 0.0 Range = 0.0 to 99999.0
CLPT(6)	0017	Last XYZ values from CL record Default = 0.0 Range = (1-3) +-99999.0, (4-6) +-1.0
CNVMM	0023	Conversion factor from inches to millimeters Default = 25.4 Range = (1/25.4) or 25.4
CNVSM	0024	Conversion factor from seconds to minutes Default = .0167 Range = Do not change
CPRUNT	0025	Conversion factor to find length of tape unit from character count that is 10 characters per inch Default = 10.0 Range = 10.0 or .39370079
CPS	0026	Tape reader speed in chars/sec Default = 300.0 Range = 1 to 99999.0
	0027 – 0030	Not used
CYCLTM	0031	Current cycle time of tape Default = 0.0 Range = .01 to 99999.0
	0032 – 0043	Not used
CYDWEL(12)	0044	Array to store cycle dwell values
CYDWEL(1)	0044	Dwell value for CYCLE/DRILL Default = 0.0 Range = 0.0 to 99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
CYDWEL(2)	0045	Dwell value for CYCLE/CSINK Default = 2.0 Range = 0.0 to 99999.0
CYDWEL(3)	0046	Dwell value for CYCLE/DEEP Default = 0.0 Range = 0.0 to 99999.0
CYDWEL(4)	0047	Dwell value for CYCLE/TAP Default = 2.0 Range = 0.0 to 99999.0
CYDWEL(5)	0048	Dwell value for CYCLE/BORE Default = 2.0 Range = 0.0 to 99999.0
CYDWEL(6)	0049	Dwell value for CYCLE/REAM Default = 0.0 Range = 0.0 to 99999.0
CYDWEL(7)	0050	Dwell value for CYCLE/THRU Default = 0.0 Range = 0.0 to 99999.0
CYDWEL(8)	0051	Dwell value for CYCLE/FACE Default = 2.0 Range = 0.0 to 99999.0
	0052 – 0055	Not used
DELTA(6)	0056	XY delta moves Default = 0.0 Range = (1-2) +-99999.0
DELTA(3-6)	0058	Not used
	0062 – 0067	Not used
DEPMAX	0068	Maximum linear departure that can be output in one block Default = 99.9999 Range = +-99999.0
DIST	0069	Amount of distance traveled per move. Default = 0.0 Range = 0.0 to 99999.0
	0070 – 0071	Not used
DRAPTO	0072	Segmentation distance for FEDRAT/RAPTO Default = 0.3 Range = 0.0 to 99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
DWELMN(1)	0073	Minimum dwell in IPM mode Default = 0.0001 Range = .00001 to 99999.0
DWELMN(2)	0074	Minimum dwell in IPR mode Default = 0.01 Range = .00001 to 99999.0
DWELMX(1)	0075	Maximum dwell in IPM mode Default = 99.9999 Range = .00001 to 99999.0
DWELMX(2)	0076	Maximum dwell in IPR mode Default = 99.99 Range = .00001 to 99999.0
DWELS(10)	0077	Array to store automatic dwell time for certain functions. For example, the T-code output for turret. Default = (1) 2.0, (2-10) 0.0 Range = 0.0 to 99999.0
DWELTM	0087	Contains the dwell time required and output by dwell routine Default = 0.0 Range = 0.0 to 99999.0
EMPTY	0088	Real empty flag 999999.0; *** Do not change!
EPSLN	0089	A small real value 0.0000001; ***Do not change!
FACTOR	0090	Conversion factor for inch/metric Default = 1.0 Range = (1/25.4), 25.4, 1.0
FCPM	0091	Cycle feed value requested in IPM Default = 0.0 Range = 0.0 to 99999.0
FCPR	0092	Cycle feed value requested in IPR Default = 0.0 Range = 0.0 to 99999.0
FDVALU	0093	Current feed code value Default = 0.0 Range = 0.0 to 99999.0
FINVMN	0094	Minimum inverse feed number Default = 0.0 Range = 0.00001 to 99999.0
FINVMX	0095	Maximum inverse feed number Default = 0.0 Range = 0.00001 to 99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
FRAPID(6)	0096	Rapid rate value in units per minute for XY axes
FRAPID(1)	0096	Rapid APT XAXIS Default = 300.0 Range = 0.00001 to 99999.0
FRAPID(2)	0097	Rapid APT YAXIS Default = 300.0 Range = 0.00001 to 99999.0
FRAPID(3-6)	0098	Not used
FUPM	0102	Linear feed value requested in Default = 0.0 Range = 0.0 to 99999.0
FUPMMN(6)	0103	Minimum feed in units per minute for XY axes
FUPMMN(1)	0103	Minimum feed APT XAXIS Default = 0.01 Range = 0.0 to 99999.0
FUPMMN(2)	0104	Minimum feed APT YAXIS Default = 0.01 Range = 0.0 to 99999.0
FUPMMN(3-6)		Not used
FUPMMX(6)	0109	Maximum feed in units per minute for XY axes
FUPMMX(1)	0109	Maximum feed APT XAXIS Default = 300.0 Range = 0.0 to 99999.0
FUPMMX(2)	0110	Maximum feed APT YAXIS Default = 300.0 Range = 0.0 to 99999.0
FUPMMX(3-6)		Not used
FUPR	0115	LINEAR feed value requested in IPR Default = 0.0 Range = 0.0 to 99999.0
FUPRMN	0116	Minimum feedrate in IPR mode Default = 0.01 Range = 0.0 to 99999.0
FUPRMX	0117	Maximum feedrate in IPR mode Default = 9.9999 Range = 0.0 to 99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
	0118	Not used
HOMEPT(6)	0119	Machine XZUW axes home point
HOMEPT(1)	0119	Machine Z axes home point Default = 10.0 Range = +-99999.0
HOMEPT(2)	0120	Machine X axes home point Default = 10.0 Range = +-99999.0
HOMEPT(3)	0121	Not used
HOMEPT(4)	0122	Machine W axes home point Default = 10.0 Range = +-99999.0
HOMEPT(5)	0123	Machine U axes home point Default = 10.0 Range = +-99999.0
HOMEPT(6)	0124	Not used
	0125 – 0268	Not used
PGELNG	0269	Tape length for the current page Default = 0.0 Range = 0.0 to 99999.0
PGETIM	0270	Machine time for the current page Default = 0.0 Range = 0.0 to 99999.0
PIVALU	0271	Value of PI (3.14159...); ***Do not change!
PPORGN(3)	0272	Current origin in effect for XY
PPORGN(1)	0272	Current origin in effect for APT X Default = 0.0 Range = +-99999.0
PPORGN(2)	0273	Current origin in effect for APT Y Default = 0.0 Range = +-99999.0
PPORGN(3)	0274	Not used
PPREFS(3)	0275	Fixed translation along XY
PPREFS(1)	0275	Fixed translation along APT X Default = 0.0 Range = +-99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
PPREFS(2)	0276	Fixed translation along APT Y Default = 0.0 Range = +-99999.0
PPREFS(3)	0277	Not used
PPTRNS(3)	0278	Current translation in effect for XY
PPTRNS(1)	0278	Current translation in effect for Z Default = 0.0 Range = +-99999.0
PPTRNS(2)	0279	Current translation in effect for X Default = 0.0 Range = +-99999.0
PPTRNS(3)	0280	Not used
PRES(52)	0281	Contents to be output for the letter address A through verify(Z) Default = EMPTY Range = +-99999.0, EMPTY
	0333 – 0338	Not used
PRESPT(6)	0339	Current XY point
PRESPT(1)	0339	APT X turret center Default = 0.0 Range = +-99999.0
PRESPT(2)	0340	APT Y turret center Default = 0.0 Range = +-99999.0
PRESPT(3)	0341	Not used
PRESPT(4)	0342	APT X tool center Default = 0.0 Range = +-99999.0
PRESPT(5)	0343	APT Y tool center Default = 0.0 Range = +-99999.0
PRESPT(6)	0344	Not used
PREV(52)	0345	Last contents output for the letter address A through verify(Z) Default = EMPTY Range = +-99999.0, EMPTY
	0397 - 0400	Not used

<i>Name</i>	<i>Location</i>	<i>Description</i>
TFDXPM(50)	0401	IPM feedrate values for X motion Default = 0.0 (See Note 1 above!) Range = +-99999.0
PREVPT(6)	0403	Last XY point
PREVPT(1)	0403	APT X turret center Default = 0.0 Range = +-99999.0
PREVPT(2)	0404	APT Y turret center Default = 0.0 Range = +-99999.0
PREVPT(3)	0405	Not used
PREVPT(4)	0406	APT X tool center Default = 0.0 Range = +-99999.0
PREVPT(5)	0407	APT Y tool center Default = 0.0 Range = +-99999.0
PREVPT(6)	0408	Not used
PULSE	0409	Machine pulse value Default = 0.0001 Range = 0.00001 to 1.0
	0410	Not used
RADIMX	0411	Maximum circle radius allowed Default = 999.9999 Range = 0.0 to 99999.0
RAPCOD	0412	Rapid traverse code Default = 999999.0 (EMPTY) Range = +-99999.0, EMPTY
RAPMIN	0413	Minimum distance for rapid Default = 0.0 Range = 0.0 to 99999.0
RAPMNF	0414	Feed value to be used in unit per minute, when rapid traverse distance is smaller than RAPMIN Default = 0.0 Range = 0.0 to 99999.0
	0415 – 0416	Not used
RLAGER	0417	Terminating leader length Default = 36.0 Range = 0.0 to 99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
RLEDER(3)	0418	Leader length for START, STOP and TOOL CHANGE Default = (1) 14.0, (2) 0.0, (3) 0.0 Range = 0.0 to 99999.0
RMTRX(3,4)	0421	TRANS matrix canonical form Default = 0.0 Range = +-99999.0
	0433 – 0435	Not used
RPDEG	0436	Conversion factor for degrees to radian measure (PI/180.0) Do not change
RPMMAX	0437	SPINDL/MAXRPM value Default = 0.0 Range = 0.0 - 99999.0
RPOINT	0438	Rapid stop point for cycles Default = 0.0 Range = +-99999.0
	0439	Not used
SEQINC	0440	SEQNO option INCR value Default = 1.0 Range = 1.0 to 99999.0
SEQMX	0441	Maximum sequence number allowed Default = 999.0 Range = What ever fits JFMT(JN)
SEQNUM	0442	Current sequence number Default = 0.0 Range = 1.0 to 99999.0
SFMCON	0443	SFM to RPM constant Default = 1.9098593 Range = 1.9098593 (inch) 159.15494 (metric)
SFMFCT	0444	SFM to output unit factor Default = 1.0 Range = 1.0 (inch/inch) (metric/metric) 3.2808399 (metric/inch) 0.3048 (inch/metric)
SFMRAD	0445	SPINDL/RADIUS value for SFM Default = EMPTY Range = 0.0 to 99999.0, EMPTY
SFMREQ	0446	SPINDL/S,SFM the required S Default = 0.0 Range = 0.0 to 99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
SFMTIM	0447	Time spent in SFM move Default = 0.0 Range = 0.0 to 99999.0
SPDREQ	0448	SPINDL/S,RPM the required S Default = 0.0 Range = 0.0 to 99999.0
SPINCR	0449	SPINDL/INCR value for SFM mode Default = 0.1 Range = 0.0 to 99999.0
SPNCOD	0450	Current spindle S-code Default = 0.0 Range = 0.0 - 99999.0
SPNSPD	0451	Current spindle speed in RPM Default = 0.0 Range = 0.0 - 99999.0
SPTABL(6,99)	0452	Spindle table Default = (1,1-25) and (2,1-25) are loaded. Range = > 0.0 - 99999.0

Note: The feedrate code tables overlay the last 3 ranges of the spindle code common locations. If you use feedrate code tables, only three spindle ranges are available!

TFDXPR(50)	0451	IPR feedrate values for X motion Default = 0.0 (See Note 2 above!) Range = +-99999.0
TFDZPM(50)	0501	IPM feedrate values for Z motion Default = 0.0 (See Note 2 above!) Range = +-99999.0
TFDZPR(50)	0551	IPR feedrate values for Z motion Default = 0.0 (See Note 2 above!) Range = +-99999.0
TAPFCT	1046	Conversion factor of tape length to feet or meters Default = 0.0083334 Range = 0.0083334 or 0.0254
	1047	Not used
THDPUL	1048	Thread axis pulse value Default = 0.00001 Range = 0.00001 to 1.0
THLEAD	1049	Constant thread lead Default = 0.0 Range = 0.0 to 99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
THLED1	1050	Variable ending lead for INCR Default = 0.0 Range = 0.0 to 99999.0
THLED2	1051	Variable ending lead for DECR Default = 0.0 Range = 0.0 to 99999.0
TLTABL(99,3)	1052	Gauge length X,Y and tool number stored for each tool in lathes Default = 0.0 Range = +-99999.0
TMATRX(6)	1349	Axes inversion for XY
TMATRX(1)	1349	Axes inversion for APT X Default = 1.0 Range = +-99999.0
TMATRX(2)	1350	Axes inversion for APT Y Default = 1.0 Range = +-99999.0
TMATRX(3-6)		Not used
TOLER	1355	MCHTOL tolerance value Default = 0.0 Range = +-99999.0
TOTLNG	1356	Total tape length Default = 0.0 Range = 0.0 to 99999.0
TOTLTM	1357	Total machine time Default = 0.0 Range = 0.0 to 99999.0
TULNML	1358	Last tool number Default = 0.0 Range = 0.0 to eight digits maximum
TULNUM	1359	Current tool number Default = 0.0 Range = 0.0 to eight digits maximum
TURDST(5,2)	1360	For multiple turret lathes, storage area for separation distances. They are measured from the primary turret to each additional turret 1-5. 1; FRONT, 2:REAR, 3:SADDLE, 4:MAIN, and 5:RAIL
TURDST(1,1)	1360	X distance to FRONT turret Default = 0.0 Range = +-99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
TURDST(2,1)	1361	X distance to REAR turret Default = 0.0 Range = +-99999.0
TURDST(3,1)	1362	X distance to SADDLE turret Default = 0.0 Range = +-99999.0
TURDST(4,1)	1363	X distance to MAIN turret Default = 0.0 Range = +-99999.0
TURDST(5,1)	1364	X distance to RAIL turret Default = 0.0 Range = +-99999.0
TURDST(1,2)	1365	Y distance to FRONT turret Default = 0.0 Range = +-99999.0
TURDST(2,2)	1366	Y distance to REAR turret Default = 0.0 Range = +-99999.0
TURDST(3,2)	1367	Y distance to SADDLE turret Default = 0.0 Range = +-99999.0
TURDST(4,2)	1368	Y distance to MAIN turret Default = 0.0 Range = +-99999.0
TURDST(5,2)	1369	Y distance to RAIL turret Default = 0.0 Range = +-99999.0
USRTM1	1370	Percentage of current CYCLTM added, CYCLTM*USRTM1 Default = 0.0 Range = +-99999.0
USRTM2	1371	Constant time added to CYCLTM CYCLTM+USRTM2 Default = 0.0 Range = +-99999.0
VALUEN	1372	Flag to indicate output of letter address and sign only (888888.0) Do not change
VELOC	1373	Current velocity in units per minute for machine time calculations Default = 0.0 Range = 0.0 to 99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
WORD(52)	1374	Output word buffer Default = EMPTY Range = +-99999.0, EMPTY
XOFFSET	1426	Arc offset along X axis for circle interpolation Default = 0.0 Range = +-99999.0
XYZMN(6)	1427	Minimum XY values for limit check
XYZMN(1)	1427	Minimum APT X for limit check Default = 0.0 Range = +-99999.0
XYZMN(2)	1428	Minimum APT Y for limit check Default = 0.0 Range = +-99999.0
XYZMN(3)	1429	Not used
XYZMN(4)	1430	Minimum APT X for limit check W axis Default = 0.0 Range = +-99999.0
XYZMN(5)	1431	Minimum APT Y for limit check U axis Default = 0.0 Range = +-99999.0
XYZMN(6)	1432	Not used
XYZMX(6)	1433	Maximum XY values for limit check
XYZMX(1)	1433	Maximum APT X for limit check Default = 10.0 Range = +-99999.0
XYZMX(2)	1434	Maximum APT Y for limit check Default = 10.0 Range = +-99999.0
XYZMX(3)	1435	Not used
XYZMX(4)	1436	Maximum APT X for limit check W axis Default = 10.0 Range = +-99999.0
XYZMX(5)	1437	Maximum APT Y for limit check U axis Default = 10.0 Range = +-99999.0
XYZMX(6)	1438	Not used
	1439 - 1444	Not used

<i>Name</i>	<i>Location</i>	<i>Description</i>
YOFSET	1445	Arc offset along Y axis for circle interpolation Default = 0.0 Range = +-99999.0
ZDATA(21)	1446	Z parameters storage from CYCLE command Default = 0.0 Range = +-99999.0
ZDEPTH	1467	Feed stop point cycles Default = 0.0 Range = +-99999.0
RPMAX	1468	MAXRPM couplet Default = 0.0 Range = 0.0 to 99999.0
TLTRAD	1469	TL TIP/RAD. Couplet in lathe Default = 0.0 Range = 0.0 to 99999.0
RPTVAL(26)	1470	REPEAT command to be output for letter address A through Z Default = 0.0 Range = +-99999.0
WORDSV(26)	1496	Flag used for fixed field format Default = VALUEN (RELCOM(1372)) Range = +-99999.0, empty, VALUEN
TCODE	1522	Combined FACE and OFFSET code Default = 0.0 Range = 0.0 to 99999.0
TMUL	1523	Multiplier for combined T-code Default = 0.0 (Unused) Range = 0.0, 1.0 to 99999.0
CRCLWD(10)	1524	Ten CLWRD locations following a Type 2000 command Default = 0.0 Range = +-99999.0
TULTIM	1534	Cycle time between tool changes Default = 0.0 Range = 0.0 to 99999.0
PRVTIM	1535	Total cycle time through previous tool Default = 0.0 Range = 0.0 to 99999.0
TILEAD	1536	Thread lead (default K value) Default = 0.0 Range = 0.0 to 99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
TJLEAD	1537	Thread lead (default I value) Default = 0.0 Range = 0.0 to 99999.0
CLWRDL(45)	1538	45 CLWRD locations from last Type 2000 record Default = 0.0 Range = +-99999.0
BRKLNG	1583	Length of tape required to activate an auto break Default = 0.0 Range = 0.0 to 99999.0
FEDMUL(3)	1584	Feedrate multipliers. 1: IPM, 2:IPR, 3:INVERS Default = (1-3) 1.0 Range = +-99999.0
BRKDLT(4)	1587	XZUW retract deltas for auto break. Default = EMPTY Range = +-99999.0, EMPTY
VWRDSV(10)	1591	Last verification words that were output Default = EMPTY Range = +-99999.0, EMPTY
TIRETR	1601	Amount of APT X retract required with a threading move. Default = 0.0 Range = 0.0 to 99999.0
TJRETR	1602	Amount of APT Y retract required with a threading move. Default = 0.0 Range = 0.0 to 99999.0
PSTREV	1603	Postprocessor Revision Number This value is set internally. Do not reset
PSTBLD	1604	Postprocessor Build Number This value is set internally. Do not reset
SELG	1605	Used internally to create the SELECT G-code. Do not reset.
SELH	1606	Used internally to create the SELECT H-code. Do not reset.
SELHMIN	1607	SELECT offset H-code minimum value Default = 0.0 Range = +-99999.0
SELHMAX	1608	SELECT offset H-code maximum value Default = 0.0 Range = +-99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
SELHDEF	1609	SELECT offset H-code default value Default = 0.0 Range = +-99999.0
OUTMUL(52)	1610	Output multipliers for each letter address A – Verify Z Default = 0.0 Range = +-99999.0
DWLMUL(2)	1662	Dwell output multipliers for each letter address Default = 0.0 Range = +-99999.0
SELCPT	1664	Secondary clearance plane value for cycles. Default = 0.0 Range = +-99999.0
CYRAUTO	1665	Automatic R plane reduction value for cycles. Default = 0.0 Range = +-99999.0
DEGSTR	1666	Beginning angle for the current circle. Internally set. Do not reset
DEGANG	1667	Total angular move for the current circle in degrees Internally set. Do not reset
TTHRDS(30)	1668	Stores the parsed values from THREAD/AUTO.
TTHRDS(1)	1668	Start point X (Lathe Z) of thread.
TTHRDS(2)	1669	Number of thread starts.
TTHRDS(3)	1670	Length of thread.
TTHRDS(4)	1671	Depth of cut per pass or starting depth of cut per pass.
TTHRDS(5)	1672	Depth of cut for the final pass if used
TTHRDS(6)	1673	OD of thread if it is an OD thread ID of thread if it is an ID thread.
TTHRDS(7)	1674	ID of thread if it is an OD thread OD of thread if it is an ID thread.
TTHRDS(8)	1675	Pitch of thread.
TTHRDS(9)	1676	Feed rate for the step-in move of the thread.
TTHRDS(10)	1677	Feed rate for the thread move of the thread.
TTHRDS(11)	1678	Feed rate for the retract move of the thread.
TTHRDS(12)	1679	Feed rate for the return move of the thread.

<i>Name</i>	<i>Location</i>	<i>Description</i>
TTHRDS(13)	1680	Feed rate for the clearance point move of the thread.
TTHRDS(14)	1681	Retract distance for the retract move of the thread.
TTHRDS(15)	1682	Retract angle for the retract move of the thread.
TTHRDS(16)	1683	Approach angle of the step-in move of the thread.
TTHRDS(17)	1684	Number of final spring passes for the thread.
TTHRDS(18)	1685	Select point used prior to the clearance point move for the thread.
TTHRDS(19)	1686	Clearance move X (Lathe Z) coordinate for the thread.
TTHRDS(20)	1687	Clearance move Y (Lathe X) coordinate for the thread.
TTHRDS(21)	1688	Tapered thread X (Lathe Z) coordinate for the thread.
TTHRDS(22)	1689	Tapered thread Y (Lathe X) coordinate for the thread.
TTHRDS(23)	1690	Tapered thread angle in degrees for the thread.
TTHRDS(24)	1691	End point X (Lathe Z) coordinate for the thread.
TTHRDS(25)	1692	End point Y (Lathe X) coordinate for the thread.
TTHRDS(26)	1693	Start point X (Lathe Z) coordinate for the thread.
TTHRDS(27)	1694	Start point Y (Lathe X) coordinate for the thread.
TTHRDS(28)	1695	Total depth of thread.
TTHRDS(29)	1696	Not used.
TTHRDS(30)	1697	Not used.
PGMNUMMIN	1698	Program Number Minimum. Default = 0.0 Range = +-99999.0
PGMNUMMAX	1699	Program Number Maximum Default = 0.0 Range = +-99999.0
TIMEFEED	1700	Total machine time while in feed rate mode. Do not reset Default = 0.0 Range = +-99999.0
TIMERAPD	1701	Total machine time while in rapid mode. Do not reset Default = 0.0 Range = +-99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
TIMEDWEL	1702	Total machine time while in dwell mode. Do not reset Default = 0.0 Range = +-99999.0
TIMETLCH	1703	Total machine time while in tool change mode. Do not reset Default = 0.0 Range = +-99999.0
TIMEMISC	1704	Total machine time for miscellaneous commands. Do not reset Default = 0.0 Range = +-99999.0

6 Mill - Common Variables

Introduction

This chapter contains a reference list of the Mill G-Post **COMMON** variables.

6.1 Mill INTCOM Variables

Note: Set INTCOMs 1-52 to 53 to disable the letter. Set to position of letter in tape order to enable the letter for output. You cannot enable more than one letter in the same position at the same time.

<i>Name</i>	<i>Location</i>	<i>Description</i>
JA	0001	Tape order of letter address A Default = 53 Range = 1 to 26,53
JB	0002	Tape order of letter address B Default = 11 Range = 1 to 26,53
JC	0003	Tape order of letter address C Default = 53 Range = 1 to 26,53
JD	0004	Tape order of letter address D Default = 16 Range = 1 to 26,53
JE	0005	Tape order of letter address E Default = 53 Range = 1 to 26,53
JF	0006	Tape order of letter address F Default = 13 Range = 1 to 26,53
JG	0007	Tape order of letter address G Default = 2 Range = 1 to 26,53
JH	0008	Tape order of letter address H Default = 17 Range = 1 to 26,53
JI	0009	Tape order of letter address I Default = 7 Range = 1 to 26,53

<i>Name</i>	<i>Location</i>	<i>Description</i>
JJ	0010	Tape order of letter address J Default = 8 Range = 1 to 26,53
JK	0011	Tape order of letter address K Default = 9 Range = 1 to 26,53
JL	0012	Tape order of cam address L Default = 53 Range = 1 to 26,53
JM	0013	Tape order of letter address M Default = 18 Range = 1 to 26,53
JN	0014	Tape order of letter address N Default = 1 Range = 1 to 26,53
JO	0015	Tape order of letter address O Default = 53 Range = 1 to 26,53
JP	0016	Tape order of extra address Default = 53 Range = 1 to 26,53
JQ	0017	Tape order of CYCLE DWELL letter Default = 53 Range = 1 to 26,53
JR	0018	Tape order of letter address R Default = 5 Range = 1 to 26,53
JS	0019	Tape order of letter address S Default = 14 Range = 1 to 26,53
JT	0020	Tape order of letter address T Default = 15 Range = 1 to 26,53
JU	0021	Tape order of extra address Default = 53 Range = 1 to 26,53
JV	0022	Tape order of extra address Default = 53 Range = 1 to 26,53

<i>Name</i>	<i>Location</i>	<i>Description</i>
JW	0023	Tape order of extra address Default = 53 Range = 1 to 26,53
JX	0024	Tape order of letter address X Default = 3 Range = 1 to 26,53
JY	0025	Tape order of letter address Y Default = 4 Range = 1 to 26,53
JZ	0026	Tape order of letter address Z Default = 6 Range = 1 to 26,53
JABSA	0027	Order of verification letter address A Default = 53 Range = 1 to 53
JABSB	0028	Order of verification letter address B Default = 25 Range = 1 to 53
JABSC	0029	Order of verification letter address C Default = 53 Range = 1 to 53
JABSD	0030	Order of verification letter address D Default = 53 Range = 1 to 53
JABSE	0031	Order of verification letter address E Default = 53 Range = 1 to 53
JABSF	0032	Order of verification letter address F Default = 27 Range = 1 to 53
JABSG	0033	Order of verification letter address G Default = 53 Range = 1 to 53
JABSH	0034	Order of verification letter address H Default = 53 Range = 1 to 53
JABSI	0035	Order of verification letter address I Default = 53 Range = 1 to 53

<i>Name</i>	<i>Location</i>	<i>Description</i>
JABSJ	0036	Order of verification letter address J Default = 53 Range = 1 to 53
JABSK	0037	Order of verification letter address K Default = 53 Range = 1 to 53
JABSL	0038	Order of verification letter address L Default = 53 Range = 1 to 53
JABSM	0039	Order of verification letter address M Default = 53 Range = 1 to 53
JABSN	0040	Order of verification letter address N Default = 53 Range = 1 to 53
JABSO	0041	Order of verification letter address O Default = 53 Range = 1 to 53
JABSP	0042	Order of verification letter address P Default = 53 Range = 1 to 53
JABSQ	0043	Order of verification letter address Q Default = 53 Range = 1 to 53
JABSR	0044	Order of verification letter address R Default = 53 Range = 1 to 53
JABSS	0045	Order of verification letter address S Default = 28 Range = 1 to 53
JABST	0046	Order of verification letter address T Default = 53 Range = 1 to 53
JABSU	0047	Order of verification letter address U Default = 53 Range = 1 to 53

<i>Name</i>	<i>Location</i>	<i>Description</i>
JABSV	0048	Order of verification letter address V Default = 53 Range = 1 to 53
JABSW	0049	Order of verification letter address W Default = 53 Range = 1 to 53
JABSX	0050	Order of verification letter address X Default = 21 Range = 1 to 53
JABSY	0051	Order of verification letter address Y Default = 22 Range = 1 to 53
JABSZ	0052	Order of verification letter address Z Default = 53 Range = 1 to 53
JADDR(001)	0053	Address 1 in tape Default = 78 Range = 32 to 96
JADDR(002)	0054	Address 2 in tape Default = 71 Range = 32 to 9678
JADDR(003)	0055	Address 3 in tape Default = 88 Range = 32 to 96
JADDR(004)	0056	Address 4 in tape Default = 89 Range = 32 to 96
JADDR(005)	0057	Address 5 in tape Default = 82 Range = 32 to 96
JADDR(006)	0058	Address 6 in tape Default = 90 Range = 32 to 96
JADDR(007)	0059	Address 7 in tape Default = 73 Range = 32 to 96

<i>Name</i>	<i>Location</i>	<i>Description</i>
JADDR(008)	0060	Address 8 in tape Default = 74 Range = 32 to 96
JADDR(009)	0061	Address 9 in tape Default = 75 Range = 32 to 96
JADDR(010)	0062	Address 10 in tape Default = unused Range = 32 to 96
JADDR(011)	0063	Address 11 in tape Default = 66 Range = 32 to 96
JADDR(012)	0064	Address 12 in tape Default = unused Range = 32 to 96
JADDR(013)	0065	Address 13 in tape Default = 70 Range = 32 to 96
JADDR(014)	0066	Address 14 in tape Default = 83 Range = 32 to 96
JADDR(015)	0067	Address 15 in tape Default = 84 Range = 32 to 96
JADDR(016)	0068	Address 16 in tape Default = 68 Range = 32 to 96
JADDR(017)	0069	Address 17 in tape Default = 72 Range = 32 to 96
JADDR(018)	0070	Address 18 in tape Default = 77 Range = 32 to 96
JADDR(019)	0071	Address 19 in tape Default = unused Range = 32 to 96
JADDR(020)	0072	Address 20 in tape Default = unused Range = 32 to 96

<i>Name</i>	<i>Location</i>	<i>Description</i>
JADDR(021)	0073	Address 21 in tape Default = 88 Range = 32 to 96
JADDR(022)	0074	Address 22 in tape Default = 89 Range = 32 to 96
JADDR(023)	0075	Address 23 in tape Default = 90 Range = 32 to 96
JADDR(024)	0076	Address 24 in tape Default = unused Range = 32 to 96
JADDR(025)	0077	Address 25 in tape Default = 66 Range = 32 to 96
JADDR(0nn)	0nnn	nth letter in tape. Add 0052+n to get the location number Default = unused Range = 32-96
JADDR(53)	0105	Fifty-third letter in tape Default = unused Range = 32-96

Note: The next 53 locations represent the EIA format of the letter address. This is a two-digit value that indicates the size of the register. The first digit represents the number of whole numbers (the numbers in front of the decimal place). The second digit represents the number of fractional numbers (the numbers behind the decimal point). A value of 34 means there are 3 digits in front of the decimal place and 4 digits behind the decimal place: 000.0000. A value of 40 means the number is a 4-digit whole number. Before the first executable post statement, JFMT(n) contains four digits in the option file. The first two are for inch and the second two are for metric. After the first executable post statement, this section contains only two digits.

JFMT(01)	0106	Format 1 in tape Default = 4040 Range = 0 to 9999
JFMT(02)	0107	Format 2 in tape Default = 2020 Range = 0 to 9999
JFMT(03)	0108	Format 3 in tape Default = 3443 Range = 0 to 9999

<i>Name</i>	<i>Location</i>	<i>Description</i>
JFMT(04)	0109	Format 4 in tape Default = 3443 Range = 0 to 9999
JFMT(05)	0110	Format 5 in tape Default = 3443 Range = 0 to 9999
JFMT(06)	0111	Format 6 in tape Default = 3443 Range = 0 to 9999
JFMT(07)	0112	Format 7 in tape Default = 3443 Range = 0 to 9999
JFMT(08)	0113	Format 8 in tape Default = 3443 Range = 0 to 9999
JFMT(09)	0114	Format 9 in tape Default = 3443 Range = 0 to 9999
JFMT(10)	0115	Format 10 in tape Default = 0 (unused) Range = 0 to 9999
JFMT(11)	0116	Format 11 in tape Default = 3333 Range = 0 to 9999
JFMT(12)	0117	Format 12 in tape Default = 0 (unused) Range = 0 to 9999
JFMT(13)	0118	Format 13 in tape Default = 3342 Range = 0 to 9999
JFMT(14)	0119	Format 14 in tape Default = 4040 Range = 0 to 9999
JFMT(15)	0120	Format 15 in tape Default = 5050 Range = 0 to 9999
JFMT(16)	0121	Format 16 in tape Default = 2020 Range = 0 to 9999

<i>Name</i>	<i>Location</i>	<i>Description</i>
JFMT(17)	0122	Format 17 in tape Default = 2020 Range = 0 to 9999
JFMT(18)	0123	Format 18 in tape Default = 2020 Range = 0 to 9999
JFMT(19)	0124	Format 19 in tape Default = 0 (unused) Range = 0 to 9999
JFMT(20)	0125	Format 20 in tape Default = 0 (unused) Range = 0 to 9999
JFMT(21)	0126	Format 21 in tape Default = 3443 Range = 0 to 9999
JFMT(22)	0127	Format 22 in tape Default = 3443 Range = 0 to 9999
JFMT(23)	0128	Format 23 in tape Default = 3443 Range = 0 to 9999
JFMT(24)	0129	Format 24 in tape Default = 0 (unused) Range = 0 to 9999
JFMT(25)	0130	Format 25 in tape Default = 4343 Range = 0 to 9999
JFMT(nn)	01nn	nth letter in tape. Add 0105+nn to get the location number Default = 0 (unused) Range = 0 to 9999
JFMT(53)	0158	Fifty-third letter Default = 0 (unused) Range = 0 to 9999

Note: The next 53 locations set the register specifications, using a 4-digit number that consists of 1's and/or 0's
0 = no 1 = yes . First digit: Leading zeros, Second digit: Trailing zeros, Third digit: Plus sign, Fourth digit:
Decimal point.

<i>Name</i>	<i>Location</i>	<i>Description</i>
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Example: 1010 turns off trailing zeros, outputs a plus sign, and does not print a decimal point

JSPC(01)	0159	Output specification 1 in tape Default = 1100 Range = 1 to 1111
JSPC(02)	0160	Output specification 2 in tape Default = 1100 Range = 1 to 1111
JSPC(03)	0161	Output specification 3 in tape Default = 1000 Range = 1 to 1111
JSPC(04)	0162	Output specification 4 in tape Default = 1000 Range = 1 to 1111
JSPC(05)	0163	Output specification 5 in tape Default = 1000 Range = 1 to 1111
JSPC(06)	0164	Output specification 6 in tape Default = 1000 Range = 1 to 1111
JSPC(07)	0165	Output specification 7 in tape Default = 1000 Range = 1 to 1111
JSPC(08)	0166	Output specification 8 in tape Default = 1000 Range = 1 to 1111
JSPC(09)	0167	Output specification 9 in tape Default = 1000 Range = 1 to 1111
JSPC(10)	0168	Output specification 10 in tape Default = 0 Range = 1 to 1111
JSPC(11)	0169	Output specification 11 in tape Default = 1000 Range = 1 to 1111

<i>Name</i>	<i>Location</i>	<i>Description</i>
JSPC(12)	0170	Output specification 12 in tape Default = 0 Range = 1 to 1111 (0 = unused)
JSPC(13)	0171	Output specification 13 in tape Default = 1000 Range = 1 to 1111 (0 = unused)
JSPC(14)	0172	Output specification 14 in tape Default = 1100 Range = 1 to 1111 (0 = unused)
JSPC(15)	0173	Output specification 15 in tape Default = 1100 Range = 1 to 1111 (0 = unused)
JSPC(16)	0174	Output specification 16 in tape Default = 1100 Range = 1 to 1111 (0 = unused)
JSPC(17)	0175	Output specification 17 in tape Default = 1100 Range = 1 to 1111 (0 = unused)
JSPC(18)	0176	Output specification 18 in tape Default = 1100 Range = 1 to 1111 (0 = unused)
JSPC(nn)	0nnn	nth letter in the series. Add 0158+n for the location number Default = 0 Range = 0 to 1111 (0 = unused)
JSPC(53)	0211	Fifty-third letter Default = 0 Range = 1 to 1111 (0 = unused)
IAUXFN(1)	0212	M-code for M01 or AUXFUN/1 Default = 1 Range = 0 to 32766
IAUXFN(2)	0213	M-code for M02 or AUXFUN/2 Default = 2 Range = 0 to 32766
IAUXFN(nn)	0nnn	M-code for Mnn or AUXFUN/nn. Add 0211+n for the location number Default = nn Range = 0 to 32766
IAUXFN(100)	0311	M-code for M00 or AUXFUN/0 Default = 0 Range = 0 to 32766

<i>Name</i>	<i>Location</i>	<i>Description</i>
IBANER(131)	0312	Post banner containing post name, version, and date. Cannot be set manually.
IBGVI1	0443	INTCOM DEBUGG starting location Default = 0 Range = 0 to 2500
IBGVI2	0444	INTCOM DEBUGG ending location Default = 0 Range = 0 to 2500
IBGVR1	0445	RELCOM DEBUGG starting location Default = 0 Range = 0 to 902
IBGVR2	0446	RELCOM DEBUGG ending location Default = 0 Range = 0 to 902
IBLKLG	0447	Number of characters in the current block. Cannot be reset.
IBRKSW	0448	Break flag, to reinitialize common variables from CONTRL Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
IBUGCL	0449	DEBUGG switch for CL dump Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
IBUGSW	0450	DEBUGG switch to print one or more common blocks Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
IBUGVI	0451	DEBUGG switch for INTCOM dump Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
IBUGVR	0452	DEBUGG switch for RELCOM dump Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
ICARD	0453	Line count of packed output punch files; column 77-80 of each line. Cannot be reset.
ICFDSW	0454	Switch to indicate the CYCLE Z feed mode Default = 73 (IPM) Range = 73 (IPM) 74 (IPR)

<i>Name</i>	<i>Location</i>	<i>Description</i>
ICIRSW	0455	Circular interpolation switch for Type 5000 element MACHIN/UNCX01,--,LINEAR sets this to empty Default = 0 Range = 0: Linear motion 1: Successful Type 3 record 2: Circle in process –32767 (IEMPTY) No circular interpolation
ICLPLN	0456	The current circular plane: Default = 1 Range = 1: XY plane 2: ZX plane 3: YZ plane
ICLRED	0457	Switch to indicate whether a circle reads a CL record Default = 1 Range = 1: Read CL record 2: Do not read CL record; circle read the record
ICYCLE(1)	0458	Minor word integer code for CYCLE/DRILL Default = 163 (DRILL) Range = Any minor word integer code
ICYCLE(2)	0459	Minor word integer code for CYCLE/CSINK Default = 256 (CSINK) Range = Any minor word integer code
ICYCLE(3)	0460	Minor word integer code for CYCLE/DEEP Default = 153 (DEEP) Range = Any minor word integer code
ICYCLE(4)	0461	Minor word integer code for CYCLE/TAP Default = 168 (TAP) Range = Any minor word integer code
ICYCLE(5)	0462	Minor word integer code for CYCLE/BORE Default = 82 (BORE) Range = Any minor word integer code
ICYCLE(6)	0463	Minor word integer code for CYCLE/REAM Default = 262 (REAM) Range = Any minor word integer code
ICYCLE(7)	0464	Minor word integer code for CYCLE/THRU Default = 152 (THRU) Range = Any minor word integer code
ICYCLE(8)	0465	Minor word integer code for CYCLE/FACE Default = 81 (FACE) Range = Any minor word integer code

<i>Name</i>	<i>Location</i>	<i>Description</i>
ICYCLE(9)	0466	Minor word integer code for CYCLE/MILL Default = 151 (MILL) Range = Any minor word integer code
ICYCLE(10)	0467	Minor word integer code for CYCLE/DEEPCL Default = 208 (DEEPCL) Range = Any minor word integer code
ICYCLE(11)	0468	Not used Default = 163 Range = Any minor word integer code
ICYCLE(12)	0469	Not used Default = 163 Range = Any minor word integer code
ICYCLG(1)	0470	G-code for ICYCLE(1) Default = 81 Range = Any legal G-code (see IPREFN) or if IEMPTY (-32767), a software cycle will be generated
ICYCLG(2)	0471	G-code for ICYCLE(2) Default = -32767 (IEMPTY) Range = Any legal G-code (see IPREFN) or if IEMPTY (-32767), a software cycle will be generated
ICYCLG(3)	0472	G-code for ICYCLE(3) Default = 83 Range = Any legal G-code (see IPREFN) or if IEMPTY (-32767), a software cycle will be generated
ICYCLG(4)	0473	G-code for ICYCLE(4) Default = 84 Range = Any legal G-code (see IPREFN) or if IEMPTY (-32767), a software cycle will be generated
ICYCLG(5)	0474	G-code for ICYCLE(5) Default = 85 Range = Any legal G-code (see IPREFN) or if IEMPTY (-32767), a software cycle will be generated
ICYCLG(6)	0475	G-code for ICYCLE(6) Default = 89 Range = Any legal G-code (see IPREFN) or if IEMPTY (-32767), a software cycle will be generated

Name	Location	Description
ICYCLG(7)	0476	G-code for ICYCLE(7) Default = 87 Range = Any legal G-code (see IPREFN) or if IEMPTY (-32767), a software cycle will be generated
ICYCLG(8)	0477	G-code for ICYCLE(8) Default = 82 Range = Any legal G-code (see IPREFN) or if IEMPTY (-32767), a software cycle will be generated
ICYCLG(9)	0478	G-code for ICYCLE(9) Default = 86 Range = Any legal G-code (see IPREFN) or if IEMPTY (-32767), a software cycle will be generated
ICYCLG(10)	0479	Not used
ICYCLG(11)	0480	Not used
ICYCLG(12)	0481	Not used
ICYCSW	0482	Current CYCLE flag Default = 72 (OFF) Range = 72 (OFF): CYCLE is not in effect 1: First GOTO point after CYCLE 2: Indicate Z move for feedrates 53 (NOMORE): for CYCLE/NOMORE
IDIRPM	0483	Type of SPINDL output Default = 71 (ON) Range = 71 (ON): Direct RPM 72 (OFF): Spindle code table
IDSPLY	0484	Switch for punching PPRINT in punch file Default = 72 (OFF) Range = ON (71): Punch PPRINT OFF (72): Do not punch PPRINT
IDWFMR	0485	EIA DWELL format in IPR mode Default = 0 Range is a 1- or 2-digit number at runtime Range is a 3- or 4-digit number in option file
IDWFMS	0486	EIA DWELL format in IPM mode Default = 3333 Range is a 1- or 2-digit number at runtime Range is a 3- or 4-digit number in option file

<i>Name</i>	<i>Location</i>	<i>Description</i>
IDWLTR	0487	DWELL letter address A-Z Default = 6 Range = 1-26, where A=1, B=2, and so forth
IEMPTY	0488	Integer empty flag -32767 *** DO NOT CHANGE!! ***
IFACSW	0489	Switch for inch/metric factor conversion Default = 72 (OFF) Range = 71 (ON): Calculate output using FACTOR (DBLCOM(101)) 72 (OFF): Do not use FACTOR
IFDCHG	0490	Switch to indicate a new FEDRAT statement Default = 71 (ON) Range = 71 (ON): New FEDRAT 72 (OFF): Old FEDRAT
IFEDSW	0491	Switch to indicate the linear feedrate mode Default = 73 (IPM) Range = 73 (IPM) 74 (IPR)
IFMODE	0492	Current FEDRAT mode Default = 94 (IGIPM INTCOM(508)) Range = IGIPM INTCOM(508) Default = 94 IGIPR INTCOM(509) Default = -32767 (IEMPTY) IGINV INTCOM(507) Default = 93
IFMODL	0493	Previous FEDRAT mode Default = 94 (IBIPM INTCOM(508)) Range = IGIPM INTCOM(508) Default = 94 IGIPR INTCOM(509) Default = -32767 (IEMPTY) IGINV INTCOM(507) Default = 93
IFRMSW	0494	Switch to indicate if a FROM statement has been read Default = 72 (OFF) Range = 71 (ON): FROM has been processed 72 (OFF): FROM has not been processed
IFRMOV	0495	Switch to force out XYZABC after FROM Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
IFXOLT	0496	Letter address for fixture offset used in SELECT statement Default = 8 (H) Range = 1-26, where A=1, B=2, and so forth

<i>Name</i>	<i>Location</i>	<i>Description</i>
IGABS	0497	G-code for absolute mode (MODE/INCR,OFF) Default = 90 Range = 0-99 if feature requires a G-code -1 to -99 if feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGCCLW	0498	G-code CCLW circular interpolation Default = 3 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGCLW	0499	G-code CLW circular interpolation Default = 2 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGCOFF	0500	G-code for CYCLE/OFF Default = 80 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGCOMF	0501	G-code for CUTCOM/OFF Default = 40 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGCOML	0502	G-code for CUTCOM/LEFT Default = 41 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGCOMR	0503	G-code for CUTCOM/RIGHT Default = 42 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGDWL	0504	G-code for DWELL (DELAY/) Default = 4 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist

<i>Name</i>	<i>Location</i>	<i>Description</i>
IGINC	0505	G-code for incremental mode Default = 91 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGINCH	0506	G-code for inch output Default = 70 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGINV	0507	G-code for INVERS time feedrates Default = -32767 (IEMPTY) Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGIPM	0508	G-code for IPM FEDRAT Default = 94 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGIPR	0509	G-code for IPR FEDRAT Default = -32767 (IEMPTY) Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGLIN	0510	G-code for linear interpolation Default = 1 Range = 0-99 if the feature requires a G-code 1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGMTRC	0511	G-code for metric output Default = 71 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGPOS	0512	G-code for RAPID positioning Default = 0 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist

<i>Name</i>	<i>Location</i>	<i>Description</i>
IGPOSZ	0513	G-code for Z axis positioning under MOTION Default = 0 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGROT	0514	G-code for ROTARY table Default = 0 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) If feature does not exist
IGROTM	0515	SETWRD flag to specify if the indexer G-code IGROT is modal or not, when using ROTATE command Default = 0 (off) Range = 71 (ON): G-code is modal 72 (OFF): G-code is not modal
IGTLNG	0516	G-code for tool length offset Default = IEMPTY Range = Any G-code that fits the format
IGSET	0517	G-code for axis preset Default = 92 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
	518-522	Not used
IGXYP	0523	G-code for XY circular interpolation Default = 17 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if the feature does not exist
IGYZP	0524	G-code for YZ circular interpolation Default = 19 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
IGZXP	0525	G-code for ZX circular interpolation Default = 18 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
	0526 - 0527	Not used

<i>Name</i>	<i>Location</i>	<i>Description</i>
IHELIX	0528	Flag for helical interpolation Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
IIA	0529	Letter address of I register for circular interpolation Default = 9 (I) Range = 1-26, where A=1, B=2, and so forth
IJA	0530	Letter address of J register for circular interpolation Default = 10 (J) Range = 1-26, where A=1, B=2, and so forth
IKA	0531	Letter address of K register for circular interpolation Default = 11 (K) Range = 1-26, where A=1, B=2, and so forth
MULFGC	0532	Switch to output FEDRAT G-code with next block Default = 0 (off) Range = 0 (off) 1 (on)
IMANRD	0533	Flag to PNCHIT routine for punching man-readable PARTNO Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
IMODE	0534	Current mode as absolute/incremental Default = 90 (IGABS) Range = IGABS INTCOM(497) Default = 90 IGINC INTCOM(505) Default = 91
IMODL	0535	Last mode in effect Default = -32767 (IEMPTY) Range = IGABS INTCOM(497) Default = 90 IGINC INTCOM(505) Default = 91 -32767 will force output of IMODE INTCOM(534)
INDXOR	0536	Pointer to the next available location in the ORIGIN table for four-parameter ORIGIN statement Default = 1 Range = 0: Ignore four parameter ORIGIN 1-36: Accept four parameter ORIGIN
INITSW	0537	Flag to call REINIT routine Default = 72 (OFF) Range = 71 (ON): Do not call REINIT
INTERP	0538	Current interpolation mode Default = 0 Range = IGPOS INTCOM(512) Default = 0 IGLIN INTCOM(510) Default = 1 IGCLW INTCOM(499) Default = 2 IGCCLW INTCOM(498) Default = 3

<i>Name</i>	<i>Location</i>	<i>Description</i>
INTRPC	0539	Current G-code for CYCLE Default = 80 (IGCOFF) Range = IGCOFF INTCOM(500)
INVFMT	0540	F format for INVERS mode Default = 0 (Not used) Range is a 1- or 2-digit number at runtime Range is a 3- or 4-digit number in option file
INVMOD	0541	Flag to specify that INVERS mode FEED is required Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
IOUTSW	0542	Flag to specify that output of a block is pending Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
IPAGE	0543	Current page number of print output Default = 0 Range = 0 to 32766
IZWSWT	0544	Switch to indicate ZW machine ON or OFF Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
IZWMOD	0545	Switch to indicate if Z or W is active Default = Z (26) Range = W (23) or Z (26)
JZSVZW(2)	0546	JW and JZ save locations
JADRZW(2)	0548	JADDR save for Z and W
JFMTZW(2)	0550	JFMT save for Z and W
JSPCZW(2)	0552	JSPEC save for Z and W
LASTZW(2)	0554	Switch for order of inversion and offset Default = 72 (OFF) Range = 71 (ON) - Reverse inversion order 72 (OFF) - Inversion same as TRANS and TMATRIX
IZWMUV	0556	Type of ZW move Default = 0 (off) Range = 0 (off) 1 = GOHOME 2 = RETRCT
	0557 – 0614	Not used

<i>Name</i>	<i>Location</i>	<i>Description</i>
IPCHCT	0615	Number of characters in punch line; do not reset
IPCHNX	0616	Pointer into punch buffer for last character stored; do not reset
IPGWRN	0617	Number of warnings in current page Default = 0 Range = 0 to 32766
IPLANE	0618	Current plane in effect for circular interpolation Default = 17 (IGXYP INTCOM(0523)) Range = IGXYP INTCOM(0523): XY Plane Default = 17 IGYZP INTCOM(0524): YZ Plane Default = 19 IGZXP INTCOM(0525): ZX Plane Default = 18
IPLANL	0619	Last plane in effect for circular interpolation Default = -32767 IEMPTY Range = -32767 IEMPTY: Force out plane G-code IGXYP INTCOM(0523): XY Plane Default = 17 IGYZP INTCOM(0524): YZ Plane Default = 19 IGZXP INTCOM(0525): ZX Plane Default = 18
IPMFMT	0620	Format for IPM FEED Default = 3342 Range is a 1- or 2-digit number at runtime Range is a 3- or 4-digit number in option file
IPREFN(1)	0621	G-code for G01 or PREFUN/1 Default = 1 Range = 0 to 32766
IPREFN(2)	0622	G-code for G02 or PREFUN/2 Default = 2 Range = 0 to 32766
IPREFN(n)	0nnn	G-code for Gnn or PREFUN/nn Add 0620+n to get the location number Default = nnn Range = 0 to 32766
IPREFN(100)	0720	G-code for G00 or PREFUN/0 Default = 0 Range = 0 to 32766

Note: To get G-codes of more than 2 digits, set the G-code between 0 and 99, then set the matching IPREFN location to the desired G-code.

Example: If the dwell code was G104, set IGDWL to 4, then set IPREFN(4) to 104

<i>Name</i>	<i>Location</i>	<i>Description</i>
IPRFMT	0721	Format for IPR FEED Default = 0 (unused) Range is a 1- or 2-digit number at runtime Range is a 3- or 4-digit number in option file
IPRNB(131)	0722	Print buffer; Cannot be reset
IPX	0853	Pointer into PRESPT for multiple plane circular interpolation Default = 1 for XY plane Range = 1 to 3
IPY	0854	Pointer into PRESPT for multiple plane circular interpolation; will not be used for XY plane Default = 3 Range = 1 to 3
IPZ	0855	Pointer into PRESPT for multiple plane circular interpolation; will not be used for XY plane Default = 3 Range = 1 to 3
IRAPSW	0856	RAPID flag Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
IRAPTO	0857	Segmentation flag for FEDRAT/RAPTO Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
IRCMLT	0858	Letter address for CUTCOM Default = 4 (D) Range = 1-26, where A=1, B=2, and so forth
IROTSW	0859	Flag to specify rotation of CL using the trans matrix Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
IRPFMT	0860	Format for RAPID traverse Default = 1010 Range is a 1- or 2-digit number at runtime Range is a 3- or 4-digit number in option file
IRPTWD(26,2)	0861	Storage area to combine two registers when using RPTWRD routine. IRPTWD(A,B). Load 1-26 (A) to be the "trigger" address for combining output where A=1, B=2, and so forth. Default = 72 (OFF) Range of (A,1)= 1-26, where A=1, B=2, and so forth. This is the address to be output by the "trigger". Range of (A,2)= 71 (ON): Output on each block until it is set to OFF(72) 162 (NEXT): Output one time only

<i>Name</i>	<i>Location</i>	<i>Description</i>
ISCDTP	0913	Flag to indicate spindle code table or equation Default = 0 Range = 0: Spindle code table 1: Equation
ISCODE(6,99)	0914	S-code table Default = 0 Range = 0 to 32766
Note: The feedrate code tables overlay the last 3 ranges of the spindle code common locations. If you use the code tables, only three spindle ranges are available!		
IFCXPM(50)	1301	IPM feedrate codes for XY motion Default = 0 (see note 1 above!) Range = +-32766
IFCXPR(50)	1351	IPR feedrate codes for XY motion Default = 0 (see note 1 above!) Range = +-32766
IFCZPM(50)	1401	IPM feedrate codes for Z motion Default = 0 (see note 1 above!) Range = +-32766
IFCZPR(50)	1451	IPR feedrate codes for Z motion Default = 0 (see note 1 above!) Range = +-32766
ISEQSW(2)	1508	SEQNO command option flags. (1) is the option to be processed. (2) is the saved current option Default (1) = 66 (INCR) (2) = 66 (INCR) Range = 72 (OFF) - No sequence number 66 (INCR) Sequence number increment (See DBLCOM SEQINC) 60 (CLW) Current CL record number

Name	Location	Description
ISETSW	1510	For a 5 Axis Head/Head machine, output the XYZ coordinate at the spindle face or the pivot point. For other, non-head/head, 5 axis machines this location can be set to 200+ as noted below. Default = 0, output at pivot point Range = 1, output at spindle face = 2mn, Where (m,n) denotes the tool tip programming for the combination of tool length and any pivot distance. m = 0-1-2 to control the adjustment for the tool length 0 = do not adjust for tool length 1 = adjust for the tool length – positive direction 2 = adjust for the tool length – negative direction n = 0-1-2 to control the adjustment for the pivot distance 0 = do not adjust for pivot distance 1 = adjust for the pivot distance – positive direction 2 = adjust for the pivot distance – negative direction
ISKPSW	1511	Flag set for OPSKIP condition Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
ISPADV	1512	Flag to indicate spindle motion under motion analysis Default = 0 Range = -1 Spindle retracting 0 No spindle move +1 Spindle advancing
ISPDIR	1513	Current spindle direction Default = MSPCLW INTCOM(1982) Range = MSPCLW INTCOM(1982): CLW Spindle M-code MSPCCW INTCOM(1981): CCLW Spindle M-code KULCLW INTCOM(2208): CLW SP/CO M-code KULCCW INTCOM(1981): CCLW SP/CO M-code
ISPDRL	1514	Last spindle direction Default = 0 Range = 0 Force out new spindle direction M-code ISPDIR INTCOM(1513): Current spindle direction.
	1515 – 1517	Not used
ISPNHI	1518	Highest spindle speed location in SPTABL for current range Default = 2 (NSPDHI(1)) Range = NSPDHI(1-6) INTCOM(1994-1999) 2 - 99 allowed for each range
ISPNLW	1519	Lowest spindle speed location in SPTABL for current range Default = 1 (NSPDLW(1)) Range = NSPDLW(1-6) INTCOM(2000-2005) 1 - 98 allowed for each range

<i>Name</i>	<i>Location</i>	<i>Description</i>
ISPNRW	1520	Current spindle speed location in SPTABL for current range Default = 0 Range = 1 to 99
ISPNSW	1521	Flag to indicate spindle ON/OFF condition Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
ISPRGL	1522	Last spindle range in effect Default = 0 Range = 0 to 6 - 0 will force out new spindle range M-code
ISPRNG	1523	Current spindle range in effect Default = 1 Range = 1 to 6
	1524 – 1527	Not used
ITLTBL(99,3)	1528	Tool table to contain the integer values ISOURC, IRECRD and offset number of the tool list Default = 0 Range = 0 to 32766
ITOLSW	1825	Flag to indicate MCHTOL option Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
	1826	Not used
MSPRNG	1827	SPINDL/RANGE M-code Default = 0 Range = MRANGE(1-6) INTCOM(1973-1978) Default = (1) 41, (2) 42, (3) 43
	1828 – 1830	Not used
ITSBIT(100)	1831	User option area for PLABEL/Option Default = See PLABEL/Option section Range = See PLABEL/Option section
IVIEW	1931	EIA view flag for circular interpolation -1 = APT +X to APT +Y will be IGCCLW +1 = APT +X to APT +Y will be IGCLW Default = IVWXYZ(1) (-1) Range = IVWXYZ(1-3) INTCOM(2016-2018)
IWARN	1932	Total warnings in the current program Default = 0 Range = 0 to 32766

<i>Name</i>	<i>Location</i>	<i>Description</i>
IXA	1933	Letter address of XAXIS for circular interpolation Default = 24 (X) Range = 24 to 26 This value changes based on circular plane selection
IYA	1934	Letter address of YAXIS for circular interpolation Default = 25 (Y) Range = 24 to 26 This value changes based on circular plane selection
IZA	1935	Letter address of ZAXIS for circular interpolation Default = 26 (Z) Range = 24 to 26 This value changes based on circular plane selection
IZCMLT	1936	Letter address for tool length compensation Default = 8 (H) Range = 1 to 26 (A - Z)
	1937	Not used
KOMON	1938	Flag to indicate the current radius compensation mode Default = IGCORF INTCOM(0501) Range = IGCORF INTCOM(0501):CUTCOM/OFF G-code IGCOML INTCOM(0502): CUTCOM/LEFT G-code IGCOMR INTCOM(0503): CUTCOM/RIGHT G-code
KOMRAD	1939	Radius offset number for CUTCOM Default = 0 Range = 0 to 32766
KOMROT	1940	Flag to indicate combined rotation of the rotary and linear axis. Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
KOMVCT	1941	Flag to indicate if a CUTCOM vector is to be output with the next GOTO point. Default = 1 Range = 1 - Non-PQ CUTCOM is off 2 - Non-PQ CUTCOM is on 72 (OFF) PQ CUTCOM is off 71 (ON) PQ CUTCOM is on
KOMZAX	1942	Offset number for tool length compensation Default = 0 Range = 0 to 32766

Name	Location	Description
KSYM(10)	1943	Array to contain the special characters for punch output (1) \$ End of block (6) (- Control out (2) > Leader (7)) - Control in (3) = Rewind stop code (8)- Not used (4) / Block delete (9)- Not used (5) * Tab (10)- Not used Default = (1) 36, (2) 62, (3) 61, (4) 47, (5) 42 (6) 40, (7) 41, (8) 0, (9) 0, (10) 0 Range = 32 to 96
LETROT	1953	Letter address of the rotary axis Default = 2 Range = 1 to 3 (AAXIS=1,BAXIS=2,CAXIS=3)
LINCT	1954	Line count of the current page for the print output Default = 0 Range = 0 to 32766
	1955	Not used
MACHNO	1956	Current machine number of the part program Default = 0 Range = 0 to 99
MACHSW	1957	Flag to indicate MACHIN/ --,ON or OFF condition to skip processing CL information Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
MCHCRD	1958	Flag to tell if MACHIN statement is in the part program Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
MCLFLD	1959	M-code for COOLNT/FLOOD Default = 8 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MCLMST	1960	M-code for COOLNT/MIST Default = 7 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MCLOFF	1961	M-code for COOLNT/OFF Default = 9 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist

<i>Name</i>	<i>Location</i>	<i>Description</i>
MCLON	1962	Last M-code for COOLNT Default = MCLFLD INTCOM(1959) Range = MCLFLD INTCOM(1959) COOLNT/FLOOD M-code MCLMST INTCOM(1960) COOLNT/MIST M-code
MEND	1963	M-code for END Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MFDOFF	1964	M-code for FEDRAT/LOCK,OFF Default = 50 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MFDON	1965	M-code for FEDRAT/LOCK,ON Default = 51 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
	1967 – 1968	Not used
MOPSTP	1969	M-code for OPSTOP Default = 1 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MORINT	1970	M-code for SPINDL/ORIENT used in BORE/--ORIENT cycle Default = 5 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MOVE	1971	Flag to indicate the type of move for the current GOTO point Default = 0 Range = 0 No move, 1 X, 2 Y, 3 XY, 4 Z, 5 XZ, 6 YZ, 7 XYZ
MOVR	1972	Flag to indicate the type of rotary move Default = 0 Range = 0 No move, 4 A, 5 B, 6 C, 9 AB, 10 AC, 11 BC, 15 ABC
MRANGE(6)	1973	M-code for range select 1-6 Default = (1) 41, (2) 42, (3) 43, (4) 0, (5) 0, (6) 0 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
	1979 1980	Not used

<i>Name</i>	<i>Location</i>	<i>Description</i>
MRWIND	1980	M-code for REWIND Default = 30 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MSPCCW	1981	M-code for SPINDL/CCLW Default = 4 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MSPCLW	1982	M-code for SPINDL/CLW Default = 3 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MSPOFF	1983	M-code for SPINDL/OFF Default = 5 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MSTOP	1984	M-code for STOP Default = 0 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
	1985 – 1986	Not used
MULTAX	1987	Flag to mark CL file type as MULTAX or non-MULTAX Default = 3 Range = 3 (Not MULTAX), 6 (MULTAX)
MXLINE	1988	Maximum number of lines output per page for the print output file Default = 51 Range = 1 to 32766
NAXIS	1989	Number of axes in the post Default = 3 Range = 3 (non-MULTAX), 6 (MULTAX)
NBLOCK	1990	Number of the punch output block Default = 0 Range = 0 to 32766

<i>Name</i>	<i>Location</i>	<i>Description</i>
NCYCLE	1991	Current cycle requested by a CYCLE/ command Pointer into ICYCLE or ICYCLG array Default = 0 Range = 0 to 12 (After first CYCLE, will not return to 0)
NODIAG	1992	Flag to indicate if a type 2000 command was processed Default = 0 Range = 0 - Off 1 - Type 2000 processed
NORMAX	1993	Axis normal to the rotary table Default = 3 Range = 1 - X 2 - Y 3 - Z
NSPDHI(6)	1994	Highest location in each range for the spindle table Default = (1) 2, (2) 2, (3) 2, (4) 0, (5) 0, (6) 0 Range = 2 to 99
NSPDLW(6)	2000	Lowest location in each range for the spindle table Default = (1) 1, (2) 1, (3) 1, (4) 0, (5) 0, (6) 0 Range = 1 to 98
NSR	2006	Number of spindle ranges Default = 3 Range = 1 to 6
NTHBLK	2007	SEQNO option to output sequence number every nth block Default = 1 Range = 1 to 32766
NTOOL	2008	Pointer into the tool table for last tool stored Default = 0 Range = 0 to 99
NTTL	2009	Maximum number of tools allowed Default = 99 Range = 1 to 99
NTW	2010	Number of tape words for output Default = 20 Range = 1 to 26
NVW	2011	Total number of words for output: tape words plus verification words Default = 27 Range = NTW (INTCOM(2010)) + 1 to 5

<i>Name</i>	<i>Location</i>	<i>Description</i>
NXTSEQ	2012	Next sequence number to be output Default = 0 Range = 0 to 32766
NXTWRD	2013	Internal switch; do not change
NZDATA	2014	Counter for the number of Z parameters stored from CYCLE command Default = 0 Range = 1 to 20 (after a CYCLE command)
IDPLTR	2015	DEEP CYCLE increment address Default = 11 (K) Range = 1 to 26 (A-Z)
IVWXYZ(3)	2016	EIA view flag for XYZ circular interpolation 1 = XY plane 2 = ZX plane 3 = YZ plane Default = (1) -1, (2) -1, (3) -1 Range = -1 - APT +X to APT +Y will be IGCCLW +1 - APT +X to APT +Y will be IGCLW
ITITLE(33)	2019	Array for user title; must be set from within the Option File Generator; cannot be set externally
IOBLOK	2052	Flag for alignment block code Default = 0 Range = 0 - Off 1 - Output alignment code on next block
IRPTYP	2053	Flag for RAPID in IPR or IPM Default = 0 (off) Range = 0 (off) 1 Rapid feed mode G-code was output
IRPFED	2054	Flag to save current FEED mode Default = 0 Range = IFMODE INTCOM (492) IGIPM INTCOM(508) IGIPR INTCOM(509) IGINV INTCOM(507)
	2055	Not used
MULTG(4)	2056	Array to hold multiple G-codes Default = (1-4) -32767 (IEMPTY) Range = Any G-code that fits the format
MULTM(4)	2060	Array to hold multiple M-codes Default = (1-4) -32767 (IEMPTY) Range = Any M-code that fits the format

<i>Name</i>	<i>Location</i>	<i>Description</i>
KCIRSW(3)	2064	Three-way switch to indicate modal CIRCLE codes: 1 = G-code, 2 = XYZ code, 3 = IJK code Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
LETRAD	2067	Letter address for RADIUS register with circular interpolation Default = 0 (Unused) Range = 0 to 26 (A-Z)
	2068	Not used
ITAPSW	2069	Switch to indicate location of SPINDL/OFF code in TAP CYCLE Default = 72 (OFF) Range = 71 (ON) Spindle off M-code with Z move 72 (OFF) Spindle off M-code after Z move
IACSW	2070	Switch to indicate motion from Type 2000 command; do not change
IRPSAV	2071	Saves RAPID switch for Type 2000 motion Default = 0 (Off) Range = 0, (IRAPSW INTCOM(0856)) Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
ICYCSV	2072	Saves CYCLE switch for Type 2000 motion Default = 0 (Off) Range = 0, (ICYCSW INTCOM(0482)) See ICYCSW for settings
JRAPAD	2073	RAPID address Default = 0 (Unused) Range = 0 to 26 (A-Z)
IGINMT	2074	Current inch/metric G-code Default = IGINCH INTCOM(0506) Range = IGINCH INTCOM(0506) Default = 70 IGMTRC INTCOM(0511) Default = 71
IBGVD1	2075	DBLCOM DEBUGG starting location Default = 0 (Off) Range = 0 to 1000
IBGVD2	2076	DBLCOM DEBUGG ending location Default = 0 (Off) Range = 0 to 1000
IBUGVD	2077	DEBUGG switch for DBLCOM dump Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)

<i>Name</i>	<i>Location</i>	<i>Description</i>
IAX1	2078	CLWRD pointer for transformation formula Default = 2 Range = 1 to 6
IAX2	2079	CLWRD pointer for transformation formula Default = 1 Range = 1 to 6
IAX3	2080	CLWRD pointer for transformation formula Default = 3 Range = 1 to 6
IAX4	2081	CLWRD pointer for transformation formula Default = 5 Range = 0 (not used), 1 to 6
IAX5	2082	CLWRD pointer for transformation formula Default = 0 (not used) Range = 0 (not used), 1 to 6
IAX6	2083	CLWRD pointer for transformation formula Default = 0 (not used) Range = 0 (not used), 1 to 6
IVC1	2084	CLWRD pointer for transformation formula Default = 5 Range = 1 to 6
IVC2	2085	CLWRD pointer for transformation formula Default = 4 Range = 1 to 6
IVC3	2086	CLWRD pointer for transformation formula Default = 6 Range = 0 to 32766
IRTCAX	2087	Designates the retracted axis Default = 3 Range = 1 = X axis 2 = Y axis 3 = Z axis
ITY3SW	2088	Flag to indicate correct Type 3000 record Default = 0 (off) Range = 0 (off or incorrect Type 3000) 1 (correct Type 3000)

<i>Name</i>	<i>Location</i>	<i>Description</i>
IROTYP	2089	Switch to designate the machine configuration Default = 1 Range = 0 - Mill without rotary axis 1 - 4-axis rotary table 2 - 4-axis rotary head 3 - 5-axis dual rotary table 4 - 5-axis rotary table & rotary head 5 - 4-axis dual rotary head 6 - Live tooling machine
IPRDX(3)	2090	ROTARY AXIS type switch 1 = A axis 2 = B axis 3 = C axis Default = 0 Range = 0 - Table rotates +/- 360 degrees 1 - Table rotates more than +/- 360 degrees
JROTSW	2093	Flag to specify rotation of CL point using built-in matrix Default = 0 (Off) Range = 1 Rotate vector 10 Rotate point 11 Rotate point and vector
IBQUAD	2094	Switch to force secondary rotary axis angles into the first and fourth quadrants Default = 0 (Off) Range = 0 Off 1 Force into other quadrant 12 Select positive A or B position only 13 Select negative A or B position only
INAUTO	2095	Switch for automatic inverse time feed rates for ROTARY moves Default = 0 (Off) Range = 0 Off = 1 Output inverse for rotary = 9394 IPM mode needed for GOTO with rotary

Note: 9394 is only valid when inverse time (G93) is not available on your machine and set to NA

LETHED	2096	Letter address of the rotary head Default = 0 (Unused) Range = 0 Unused 1 A axis 2 B axis 3 C axis
JKSW	2097	Flag to indicate A axis zero location Default = 0 Range = 0 - A axis remains at zero 1 - A axis 90 degrees off

Name	Location	Description
IANGSW	2098	Switch to set the quadrants where the head will position Default = 148 (FRONT) Range = 148 (FRONT) 149 (REAR) 88 (AUTO) 231 (BOTH + FRONT) 232 (BOTH + REAR)
ISLAVE	2099	Switch to indicate a slave rotary table is present Default = 0 (No) Range = 0 (No) or 1 (Yes)
LETSLV	2100	Letter address of the slave rotary axis Default = 1 (A) Range = 1 to 26 (A-Z)
IPCHBF(80)	2101	Punch buffer (cannot be reset)
	2181 – 2204	These locations are used to save register specifications during execution of a CL record and cannot be altered or used
IMAVOD	2205	M-code output with CYCLE/AVOID Default = 26 Range = Any M-code that fits the format
LETRTR	2206	Letter address for RETRACT AXIS Default = 26 (Z) Range = 1 to 26 (A-Z)
IRTRCT	2207	Switch to indicate RETRACT pending Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
KULCCW	2208	M-code to indicate CCLW SPINDL with COOLNT/ON Default = 14 Range = Any M-code that fits the format
KULCLW	2209	M-code to indicate CLW SPINDL with COOLNT/ON Default = 13 Range = Any M-code that fits the format
IBRKFL	2210	Flag to indicate if automatic break is pending Default = 0 Range = 0 - Process normally 1 - Max. on GOHOME 2 - Max. on LOADTL 3 - Max. on OPSTOP 4 - Max. on STOP 5 - Max. on length of tape -1 - BREAK

Name	Location	Description
IBRKWD(5)	2211	Flags used in automatic break to indicate which words (GOHOME, LOADTL, OPSTOP, STOP) to break on Default = 0 (off) Range = (1) - 1 Break on GOHOME (2) - 1 Break on LOADTL (3) - 1 Break on OPSTOP (4) - 1 Break on STOP (5) - 1 Break on length of tape
JPARAD(26,9)	2216	Array containing the para-macro to be substituted for letter addresses. Strings are in the same sequence as JADDR. The first eight positions contain the string. The ninth position contains the ON/OFF switch. Default = -32767: (IEMPTY) Range = (n,1-8) - 32 to 96 (n,9)- -32767 (IEMPTY), 72 (OFF) - 71 (ON)
ICYAVD	2451	Flag indicating CYCLE/AVOID has been read Default = 0 (off) Range = 71 (ON) or 72 (OFF)
IRADAX	2452	Radial axis pointer for live tooling machines Default = 0 (unused) Range = 1: X axis 2: Y axis 3: Z axis
IROTAX	2453	Rotary axis pointer for live tooling machines Default = 0 (unused) Range = 4: A axis 5: B axis 6: C axis
IWCSW	2454	Use version 4.2 of ROTABL. It was not correct but programmers had fixed there programs to work with this problem. Default = 0 5.3 version of ROTABL, corrected Range = 1 4.2 version of ROTABL, incorrect
KOMADR(3)	2455	Address pointers for vector P & Q type cutter compensation Default = (1): X axis address - 16 (P) (2): Y axis address - 17 (Q) (3): Z axis address 0 (unused) Range = 1 to 26 (A to Z)
KOMCSW	2458	Switch to indicate circular interpolation with vector cutter compensation Default = 71 (ON) Range = 71 (ON) -32767 (IEMPTY) (off)

<i>Name</i>	<i>Location</i>	<i>Description</i>
MODVSW	2459	Switch to indicate how vector output is performed Default = 1 Range = 0: Modal vectors 1: Non-modal vectors 2: Modal, output only when axis moves 3: Non-modal, output only when axis moves
NXTCIR	2460	Switch to indicate that the next CL record is a circle (used only with vector cutter compensation) Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
NXTCLR	2461	Switch to indicate that the next CL record has been read (used only with vector cutter compensation) Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
	2462	Not used
MULRSW	2463	Switch to indicate that the current TY5000 record is a multiple point record (used only with vector cutter compensation) Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
	2464	Not used
KKSTUP	2465	Switch to indicate that this is the first move after cutter compensation startup (used only with vector cutter compensation) Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
KKMANL	2466	Switch to indicate that a manual vector input is in effect (used only with vector cutter compensation) Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
	2467 – 2474	Not used
KOMTYP	2475	Type of vector cutter compensation Default = 1 Range = 1: Unit surface type 2: Unit vector type 3: 8 direction type
KKPQSW	2476	Switch to indicate that vector cutter compensation is available Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)

<i>Name</i>	<i>Location</i>	<i>Description</i>
IDCNTR(2)	2477	PARTNO increment option for multiple punch files (1): PARTNO Column to be incremented (2): Starting increment number Default = (1) 0 (not used) (2) 0 Range = (1) 1-66 (2) 0-9
	2479	Internal switch; do not reset
	2480	Not used
IERFIN	2481	Error count option will terminate processing when the number of errors and warnings exceed this number Default = 0 (off) Range = 1 - 32766
JSCPAD	2482	Secondary clearance address with G80 series cycles Default = 0 (off) Range = 1-26 (A-Z)
KOMRT2	2483	Flag to indicate a secondary rotary axis has been programmed from ROTABL or ROTHED Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
IOPSKN(9)	2484	Multiple OPSKIP numbers, to be output with the multiple OPSKIP option Default = -32767 (IEMPTY) (off) Range = 1 - 32766
MSKPSW	2493	Multiple OPSKIP switch Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
IRPTSW	2494	Switch to indicate a REPEAT command has been programmed Default = 0 (off) Range = 71 (ON) or 72 (OFF)
KALISW	2495	Switch to indicate if KSYM alias is on Default = 72 (OFF) Range = 71 (ON) or 72 (OFF)
KSALIS(8,8)	2496	ASCII pointers for KSYM alias (1,1-8) - KSYM(1) (2,1-8) - KSYM(2), etc. Default = 0 (unused) Range = 0, 32 - 96
ILNBLK	2701	Flag to identify LINTOL block in listing (nutator only) Default = 0 (off) Range = 0 (off) or 1 (on)

Name	Location	Description
ILNMOV	2702	Internal flag to indicate linearization block Do not change (nutator only) Default = 0 (off) Range = 0 (off) or 1 (on)
ITMLBK	2703	Internal flag to identify feed reduction block in listing; do not change (nutator only) Default = 0 (off) Range = 0 (off) or 1 (on)
ITMLFD	2704	Switch to indicate feed reduction option is off/on (nutator only) Default = 0 (off) Range = 0 (off) or 1 (on)
ITOLVC	2705	Switch to keep constant alpha XY-angle (nutator only) Default = 0 (off) Range = 0 (off) or 1 (on)
IZRANG	2706	Switch to output -0 or -360 for rotary motion Default = 0 Range = 0 Output -0 for rotary motion 1 Output -360 instead of -0
KKHOFF	2707	Switch to output Zlength (G43) CUTCOM with next Z Block Default = 72 (off) Range = 71 (on) Output CUTCOM with next Z block 72 (off) Do not output CUTCOM with next Z block
KKDOFF	2708	Switch to output Diameter CUTCOM (G41/G42) with next XY block Default = -32767 (EMPTY) Range = 71 (on) CUTCOM pending with next XY block 72 (off) CUTCOM not pending with next XY move
IZRABC	2709	Switch for TRANS to check 6 o'clock or 12 o'clock position Default = 0 , 12 o'clock position
IUGWRE	2710	Tilt Wire EDM switch Default = 0 Range = 0 Non Tilt Wire EDM 1 Tilt Wire EDM
IUGADX	2711	Upper Wire Guide X Address Default = 21 (U) Range = 1-26 Alpha A-Z
IUGADY	2712	Upper Wire Guide Y Address Default = 22 (V) Range = 1-26 Alpha A-Z

<i>Name</i>	<i>Location</i>	<i>Description</i>
IUGTYP	2713	Output method for upper wire guide coordinates Default = 2 Incremental Range = 1 Absolute 2 Incremental distance from lower guide position 3 Incremental distance from last upper guide position 4 Angle from lower guide 5 Incremental angle from previous lower guide position
ITAPH	2714	CYCLE/TAP,---HIGH G-code Default = 841 Range = +- 32767
ITAPD	2715	CYCLE/TAP,---HIGH G-code decimal point location Default = 1 Range = +- 32767
IHLNXT	2717	Internal Switch, Do not reset.
IOPSKT	2718	Internal switch, Do not reset.
	2719-3300	Not used
IPCHBF(120)	3301	Punch Buffer. Do not reset.
MCLTHH	3421	COOLNT/THRU,HIGH M-code Default = 18 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MCLTHL	3422	COOLNT/THRU,LOW M-code Default = 17 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MCLFLH	3423	COOLNT/FLOOD,HIGH M-code Default = 28 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist
MCLFLL	3424	COOLNT/FLOOD,LOW M-code Default = 27 Range = 0-99 if the feature requires an M-code -1 to -99 if the feature exists, but does not require an M-code -32767 (IEMPTY) if feature does not exist

<i>Name</i>	<i>Location</i>	<i>Description</i>
ICLXYZSW	3425	COOLNT output with next XYZ block. Default = 0 (off) Range = 0 (off) , 1 (with XY block), 2 (with Z block)
ICLOUTSW	3426	Internal switch used with COOLNT. Do not reset.
ISELSW	3427	Switch for G code output with SELECT. Default = 0 (off) Range = 0 (off) , 1 (on)
ISELGDEF	3428	Default G-code for SELECT Default = 54 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
ISELGMIN	3429	Minimum G-code for SELECT Default = 54 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
ISELGMAX	3430	Maximum G-code for SELECT Default = 59 Range = 0-99 if the feature requires a G-code -1 to -99 if the feature exists, but does not require a G-code -32767 (IEMPTY) if feature does not exist
ISELXYZSW	3431	SELECT output with next XYZ block. Default = 0 (off) Range = 0 (off) , 1 (with XY block), 2 (with Z block)
ISELEQZERO	3432	Output SELECT if equal to zero. Default = 0 (yes) Range = 0 (yes) , 1 (no)
ISELOUTSW	3433	Internal switch used with SELECT. Do not reset.
ISELG	3434	Internal switch used with SELECT. Do not reset.
IHELIXK	3435	Output K with helical interpolation blocks. Default = 0 (on) Range = 0 (K is output) , 1 (K output is suppressed).
ICIRFDN	3436	Output redundant F-code with quadrant crossing circle output. Default = 0 (off) Range = 0 (off) , 1 (on)

<i>Name</i>	<i>Location</i>	<i>Description</i>
ILTSPT	3437	LOADTL T-code and M-code are output on the same line Default = 0 Range = 0 (T & M are output on same line) 1 (T & M are output on separate lines).
MCLSW	3439	COOLNT/ON switch. Default = 0 (off) Range = 0 (off) , 1 (on)
	3440-3451	Not used
MCLSW	3452	Expand THRDSQ commands to output THREAD/ON commands. Default = 0 Do not expand the THRDSQ and THREAD/AUTO = 1 Expand the thread commands
	3453-3482	Not used
ISTART10SW	3483	Output 10 lines of user defined output at startup switch. Default = 0 (off) Range = 0 (off) , 1 (on)
ISTART10LN	3485	Number of lines to be output at startup. Default = 0 Range = 0 -10
ISTART10(330)	3485	10 lines, 66 characters per line, of user defined output. This array can only be loaded by the OFG. Do not change.
IPGMNUMSW	3815	Output a program number at the start switch. Default = 0 (off) Range = 0 (off) , 1 (on)
IPGMPROSW	3816	Prompt for the program number at the start switch. Default = 0 (off) Range = 0 (off) , 1 (on)
IPGMPROMPT(33)	3817	The program number prompt string, 66 characters. This array can only be loaded by the OFG. Do not change.
IPGMPRE(5)	3850	The program number prefix string 10 characters. This array can only be loaded by the OFG. Do not change.
IPGMPOST(5)	3855	The program number suffix string, 10 characters. This array can only be loaded by the OFG. Do not change.

<i>Name</i>	<i>Location</i>	<i>Description</i>
IPGMNCH	3860	Maximum number of characters in program number. Default = 1 Range = 1-33
IPGMALPHASW	3861	Allow Alpha-Numeric program numbers. Default = 0 (off) Numeric only Range = 0 (off) , 1 (on) Alpha-Numeric
IPGMNUMBER(23)	3862	The program number string, 46 characters. This array is set internally. Do not change.
IPGMBLOCK(33)	3885	The program number output block, 66 characters. This array is set internally. Do not change.
IPGMNUMBERDEF(23)	3918	The program number default, 46 characters. This array can only be loaded by the OFG. Do not change.
ITIMESTAMP	3941	Output a CPU time stamp at startup switch. Default = 0 (off) Range = 0 (off) , 1 (on)
ITIMESTAMP(33)	3942	The time stamp string, 66 characters. This array is set internally. Do not change.
	3975-3976	Not used
IKULSPIN	3977	Switch to output the SPINDL-COOLNT ON M-code Default = 0 (off) Range = 0 (off), 1 (on)
IKULSPINOF	3978	Internal Flag. Do not reset
IPNTVCT	3979	Internal Flag. Point / Vector Type for the OFG Do Not Reset Default = 0 = 12 parameter matrix Range = 0 = 12 parameter matrix 1 = XY 2 = YZ 3 = ZX
IFINI10SW	3980	Output 10 lines of user defined output at end switch. Default = 0 (off) Range = 0 (off) , 1 (on)
IFINI10LN	3981	Number of lines to be output at end. Default = 0 Range = 0 -10

Name	Location	Description
IFINI10(330)	3982	10 lines, 66 characters per line, of user defined end output. This array can only be loaded by the OFG. *** Do not change.
ILASERPUNCH	4312	Flag to indicated machine type as Mill, Laser or Punch Default = 0 = Mill Range = 0 = Mill 1 = Laser 2 = Punch
ITLADJ	4313	Output the tool length compensation number the same as the tool number when not specified in the LOADTL statement. Default = 0 = Off Range = 0 = Off 1 = On
ICCADJ	4314	Output the cutter compensation diameter offset number the same as the tool number when not specified in the CUTCOM statement. Default = 0 = Off Range = 0 = Off 1 = On
ITLPRE	4315	Preselect the next tool and create the tool list file .TL1. Default = 0 Off, No tool preselects Range = 0 Off, No tool preselects. = 1 Tool preselects and preselect the 1 st tool following the last tool. = 2 Tool preselects and preselect T00 following the last tool. = 3 Tool preselects and do not preselect a tool following the last tool
IG98G99	4316	Switch to ignore PULBAC in CYCLE commands. Default = 0, Use the PULBAC commands Range = 0, Use the PULBAC commands = 1 Ignore the PULBAC commands in CYLCE
IVRFYXYZ	4317	Switch to output CL point XYZ in verification print. Default = 0, Verification print is machine XYZ Range = 0, Verification print is machine XYZ = 1 Verification XYZ is CL XYZ = 2 Verification XYZ is PRESPT(XYZ) after TRANS/ORIGIN
ITULSAME	4318	Flag to indicate modal T-code output. Default = 0, Always output the T-Code Range = 0, Always output the T-Code = 1 Only output T-Code if different from previous T-Code
IAXISCLAMP	4319	Flag to indicate axis clamping with M-Codes. Default = 0, Axis Clamping disabled. Range = 0, Axis Clamping disabled. = 1 Axis Clamping with M-Code enabled

<i>Name</i>	<i>Location</i>	<i>Description</i>
IALCLAMPON	4320	Clamp all axis with this M-CODE. Default = 0, Each axis is clamped individually. Range = 1-999,M-Code for clamping all axis.
IAXCLAMPON	4321	Clamp X axis with this M-CODE. Default = 0, X axis clamping disabled. Range = 1-999,M-Code for clamping X axis.
IAYCLAMPON	4322	Clamp Y axis with this M-CODE. Default = 0, Y axis clamping disabled. Range = 1-999,M-Code for clamping Y axis.
IAZCLAMPON	4323	Clamp Z axis with this M-CODE. Default = 0, Z axis clamping disabled. Range = 1-999,M-Code for clamping Z axis.
IAACLAMPON	4324	Clamp A axis with this M-CODE. Default = 0, A axis clamping disabled. Range = 1-999,M-Code for clamping A axis.
IABCLAMPON	4325	Clamp B axis with this M-CODE. Default = 0, B axis clamping disabled. Range = 1-999,M-Code for clamping B axis.
IACCLAMPOF	4326	Clamp C axis with this M-CODE. Default = 0, C axis clamping disabled. Range = 1-999,M-Code for clamping C axis.
IALCLAMPOF	4327	Unclamp all axis with this M-CODE. Default = 0, Each axis is unclamped individually. Range = 1-999,M-Code for unclamping all axis.
IAXCLAMPOF	4328	Unclamp X axis with this M-CODE. Default = 0, X axis unclamping disabled. Range = 1-999,M-Code for unclamping X axis.
IAYCLAMPOF	4329	Unclamp Y axis with this M-CODE. Default = 0, Y axis unclamping disabled. Range = 1-999,M-Code for unclamping Y axis.
IAZCLAMPOF	4330	Unclamp Z axis with this M-CODE. Default = 0, Z axis unclamping disabled. Range = 1-999,M-Code for unclamping Z axis.
IAACLAMPOF	4331	Unclamp A axis with this M-CODE. Default = 0, A axis unclamping disabled. Range = 1-999,M-Code for unclamping A axis.
IABCLAMPOF	4332	Unclamp B axis with this M-CODE. Default = 0, B axis unclamping disabled. Range = 1-999,M-Code for unclamping B axis.

<i>Name</i>	<i>Location</i>	<i>Description</i>
IACCLAMPOF	4333	Unclamp C axis with this M-CODE. Default = 0, C axis unclamping disabled. Range = 1-999,M-Code for unclamping C axis.
IWCRVFITFG	4334	ARC Fitting flag. Default = 0, Deactivate ARC fitting. = 1, Activate ARC fitting.
IWCRVFITMC	4335	NURBS Fitting flag. Default = 0, Deactivate NURBS fitting. = 1, Activate NURBS fitting.
IG9899CODE	4336	G-Code for the PULBAC command in CYCLE. Default = 0, Use the specified value in the PULBAC command. = 1-999, Use this value for the G-Code always, ignore specified value.
ICYOUTABC	4337	Output the current ABC values in the CYCLE block. Default = 0, Always output the current ABC values in the CYCLE block. = 1, Do not output ABC in the CYCLE block.
IPTCUNITFG	4338	PTC UNITS command flag. Default = 0,Evaluate the UNITS commands as normal. = 1, Evaluate the UNITS commands per PTC specification.
IG1MODALFG	4339	Linear G-Code modal flag. Default = 0,linear G-Code in non-modal = 1,. Linear G-Code is modal
ICRCTCOMFG	4340	Output G02/G03 when the circular and CUTCOM plane do not match. Default = 0, Do not output G02/G03 = 1, Output G02/G03 when the CUTCOM plane does not match.
IRPSRPMOTF	4341	Apply automatic REPOS to RAPID moves switch. Default = 0, CALL/_REPOS Macro from FIL = 1, Automatically select opposite solution.
IRPSRPWRNF	4342	Output WARNING message for automatic _REPOS (RAPID moves). Default = 0, Do not output = 1, Output to LST file only = 2, Output to MCD file only = 3, Output to both MCD and Listing files.
IRPSRPRETF	4343	Apply feedrates to retract and approach moves (_REPOS moves). Default = 0, Use current feed rate for both retract and advance moves = 1, Use feed rates per DBLCOM(1026) and DBLCOM(1027).
IRPSFDMOTF	4344	Apply automatic REPOS to feed rate moves switch. Default = 0, CALL/_REPOS Macro from FIL = 1, Automatically select opposite solution.

<i>Name</i>	<i>Location</i>	<i>Description</i>
IRPSFDWRNF	4345	Output WARNING message for automatic _REPOS (Feed rate moves). Default = 0, Do not output = 1, Output to LST file only = 2, Output to MCD file only = 3, Output to both MCD and Listing files.
IRPSFDSPOF	4346	Output SPINDL/OFF after automatic retract move in _REPOS. Default = 0, Do not output SPINDL/OFF = 1, Output SPINDL/OFF
IRPSFDCLOF	4347	Output COOLNT/OFF after automatic retract move in _REPOS. Default = 0, Do not output COLNT/OFF = 1, Output COOLNT/OFF
IRPSFDOPSF	4348	Output OPSTOP after automatic retract move in _REPOS. Default = 0, Do not output OPSTOP = 1, Output OPSTOP
IRPSFDSTPF	4349	Output STOP after automatic retract move in _REPOS. Default = 0, Do not output STOP = 1, Output STOP
IRPSFDSPNF	4350	Output SPINDL/ON prior to automatic advance move in _REPOS. Default = 0, Do not output SPINDL/ON = 1, Output SPINDL/ON
IRPSFDCLNF	4351	Output COOLNT/ON prior to automatic advance move in _REPOS. Default = 0, Do not output COLNT/ON = 1, Output COOLNT/ON
IRPSGMCHPF	4352	Automatic _REPOS require with this motion record. DO NOT RESET. Default = 0, No = 1, Yes
ISIMTIMCTR	4353	Add cycle time during simulation mode. Default = 0, Do not add cycle times for simulation mode = 1, Add cycle time for simulation mode.
ICIRMINPNT	4354	Minimum number of point for CIRCLE test with PTC. Default = 3, Range = 3 - 999999.
IMULSCFRET	4355	MULTAX software cycle feed rate in G00/G01 mode. Default = 0, G00 Range = 1, G01
KOMPQRF	4356	PQR CUTCOM in effect Default = 0, Off Range = 1, On

Name	Location	Description
KOMPQRM	4357	PQR CUTCOM/XYZ in effect Default = 0, Off Range = 1, On
KOMPG40B	4358	Output PQR CUTCOM G40 by itself. Default = 0, Off Range = 1, On
JAFTRAD(26,9)	4359	Array containing the para-macro strings to be added following The letter address values. Strings are in the same sequence as JADDR. The first eight positions contain the string. The ninth position contains the ON/OFF switch. Default = -32767: (IEMPTY) Range = (n,1-8) - 32 to 96 (n,9) - -32767 (IEMPTY) (off) - 71 (ON)
JDECONT	4983	Decimal output option. Default = 0, Normal output X12. = 1, Output X12 = 2, Output X12.0 or X0.12
IMLXCYFL(6)	4594	Most machine tools support hardware cycles (G81 etc) only in the XY-plane or in 3-axes mode as set in the cycle panel G-code section. If your machine is a 4/5-axes machine with rotary table, the G-Post will rotate into XY-plane automatically for any tool axis. In this case, leave the 1st setting to "Same as 3-axes mode". If your machine has rotary head or you want to switch to a Software cycle in MULTAX/ON mode, then you can select the "Mixed mode" and then set the desired option for various tool axis input. If your machine tool supports hardware cycles (G81 etc) in YZ and ZX plane cycles, you can also set them in this panel.
	4594	= 0, Same as 3-axes mode and as set in cycle panel = 1, Use Software cycles for any tool axis = 2, Use Hardware cycles for any tool axis = 3, Mixed mode Software and Hardware cycles
	4595	XY-PLANE (0,0,1 tool axis) = 0, Software cycle = 1, Hardware as in G17 G81 ZR
	4596	ZX-PLANE (0,1,0 tool axis) = 0, Software cycle = 1, Hardware as in G18 G81 YR
	4597	YZ-PLANE (1,0,0 tool axis) = 0, Software cycle = 1, Hardware as in G19 G81 XR

<i>Name</i>	<i>Location</i>	<i>Description</i>
	4598	XYZ-PLANE (any tool axis) = 0, Software cycle = 1, Hardware cycle
	4599	Internal switch, DO NOT RESET
ITAPFLEXT(7)	4600	Optional tape file extension set by user in Optfile I4600=0/1 and Up to 6-characters stored in I4601-4606 similar to Alias ASCII index. Only valid filename characters (0-9,A-Z and Underscore) are valid. Default = 0, default file extension = 1, Use file extension define in Optfile
IG9899COD1	4607	G98/G99 initial retract G code Default = 98 Range = 0-32767
IG9899COD2	4608	G98/G99 full retract G code Default = 99 Range = 0-32767
IMILLTURN(20)	4609	MILL-TURN support
	4609	Mill - Turn switch Default = 0, OFF = 1, On
	4610	Mill – Turn, TURN mode switch Default = 0, OFF = 1, On
	4611	Mill - Turn mode Mill SPINDL switch Default = 0, SPINDL/PARLEL,ZAXIS = 1, SPINDL/PARLEL,XAXIS
	4612	Mill – Turn mode, THREAD/ON flag Default = 0, Off = 1, On
	4613	Mill – Turn mode, THREAD lead address Default = 6. F = 1-26, A-Z
	4614	Mill – Turn mode, THREAD Mode G Code Default = 33 = 0-99
	4615	Mill – Turn mode, SPINDL SFM G Code Default = 96 = 0-99

<i>Name</i>	<i>Location</i>	<i>Description</i>
	4616	Mill – Turn mode, SPINDL RPM G Code Default = 97 = 0-99
	4617	Mill – Turn mode, SPINDL MAXRPM G Code Default = 92 = 0-99
	4618	Mill – Turn mode, SPINDL SFM Radius output flag Default = 0, Off = 1, On
	4619	Mill – Turn mode, YAXIS output mode Default = 0, Off = 1, On
	4620	Mill – Turn mode, TURRET/CENTER flag Default = 0, Off = 1, On
	4621	Mill – Turn mode, CL file input for MODE/TURN Default = 0, CL = Z,X,0 = 1, CL = X,0,Z
	4622	Mill – Turn mode, Expand THEAD/AUTO or THRDSQ Default = 0, Yes = 1, No
	4623-4628	Not used
IABCLMTYP(3)	4629	Rotary axes ABC Min-Max limit value type: (linear/rotary 360degrees scale) Default 0 = Linear range like XYZ axes (Min=-15, Max=+90) 1 = 360 Degree range ignore sign (Min=270, Max=90) 2 = 360 Degree range check sign (Min=-270,Max=90)
IABCTZTYP(3)	4632	Rotary axes ABC Min-Max travel zone limit Default 0 = None 1 = Yes Degree range set in dblcom (Min=90, Max=270) 2 = Yes Also output intermediate point for Rapid 3 = Yes Also output intermediate point for Feed 4 = Yes Also output intermediate point for Rapid and Feed
ICYCSAMPT	4635	Repeat CYCLE identical point. Default = 0, Do not repeat CYCLE identical point = 1, Repeat CYCLE identical point.
IABCLNGRT(3)	4636	Rotary axes ABC take long route flag for ANALYZ Default 0 = No 1 = Yes set by RPCHEK3

Name	Location	Description
IMLXCPFLG	4639	Auto plane select for CUTCOM/LEFT-RIGHT when XY-YZ-ZXPLAN is not given Default 0 = No 1 = Yes
IMECOFHED	4640	Horizontal A/B Type Nutating Head flag and rotation direction for +90. Default 0=No (Vertical C/A Nutator) 1=Yes (Horizontal Nutator, CCLW for +90) 2=Yes, (Horizontal Nutator, CLW for +90)
ICYSCPLTYP	4641	CYCLE secondary clearance plane output. Default 0 = Output incremental from Z 1 = Output absolute value
ISPNMOTGLF	4642	SPINDL code output flag. Default 0 = Output SPINDL code on a block by itself 1 = Output SPINDL code with the next XY block 2 = Output SPINDL code with the next Z block
ICVBINFLG	4643	Reading a CV binary CL file flag. Default 0 = No 1 = Yes
IABCOVTYP(3)	4644	Check for overlapped ABC axis travel zones. Default 0 = Do not check for overlapping travel zone. 1 = check for overlapping travel zone
IG93CLAMPF	4647	Unclamp rotary axis when G93 is active. Default 0 = No 1 = Yes, for feed rate and rapid moves. 2 = Yes, for feed rate moves only.
IGHMPVUPFLG	4648	Automatically update PREVMP when GOHOME is used.. Default 0 = No 1 = Yes
ILM3PSCHR	4649	Flag to look for 3 rd solution when automatic _REPOS is called.. Default 0 = No 1 = Yes
ILM3PSAXS	4650	Axis that forced automatic _REPOS to be called. (Internally set, do not reset). Default 1 = A Axis 2 = B Axis 3 = C Axis
IFLGRPINS	4651	REPLAC will insert a new block. Default 0 = No 1 = Yes
JNSV	4652	Flag to output SEQNO with REPLAC insert.. Default 0 = No 1 = Yes

<i>Name</i>	<i>Location</i>	<i>Description</i>
IDPLTRNEG	4653	Option will output CYCLE/DEEP INCR values as negative. Default 0 = No (INCR always positive) 1 = Yes (output as programmed, negative or positive)
ICYFSTXYFG	4654	1 st CYCLE point output option. Default 0 = Output XY with G81 RZ block 1 = Output XY then G81 RZ block
IRPSXYZCHK	4655	Flag to check for XYZ limits with auto REPOS mode. This check is done only if the rotary axes ABC are in limits. In other words, the order of test is ABC first then if ABC are OK, then check YXZ next. Default 0 = Do not check XYZ limits after ABC 1 = Check XYZ limits after ABC
IRPSXYZAXS	4656	When IRPSXYZCHK (INTCOM(4655)) is active and one of the linear axes is out of limits. This location is set to specify the axis out of limits.. Default 0 = no axis out of limits 24 = X axis is out of limits 25 = Y axis is out of limits 26 = Z axis is out of limits
IROTGCDOU	4657	Flag to output G00/G01 codes with ROTATE/cmds. Default 0 = No 1 = Yes
IPRNCMDOPT	4658	When PLABEL/OPTION,87=1,a new flag INTCOM(4658) will provide further control of print/input statement. It is a 4-digit field to be set as no=0 or yes=1 for each option below: Skip printing of FIL generated commands (1st digit) Skip printing of PPRINT text commands (2nd digit) Skip printing of INSERT text commands (3rd digit) Skip printing of PARTNO text commands (4th digit) For example, INTCOM(4658)=1000 will suppress printing of FIL generated input commands.
Note: You must still set PLABEL/OPTION,87=1		
Default = 0000 to print all commands as before.		
IPRNFCDOPT	4659	Option to print Verify-F in IPM/IPR. Default 0 = Print Verify-F in IPM 1 = Print Verify-F in IPR 2 = Print Verify-F in IPM or IPR per current feed rate mode
ICYCUGCMD	4660	Option to process UG CYCLE commands. Default 0 = FIL will process UG CYCLE commands 1 = G-Post to process UG CYCLE commands

<i>Name</i>	<i>Location</i>	<i>Description</i>
ICIRUGWRN	4661	Option to output a warning when a circle is ignored and G01 moves are generated by the G-Post. Default 0 = No Warning is output 1 = Output a warning if GOTO/xyz after the CIRCLE/cmd is output as G01. 2 = Output a warning is the CIRCLE/cmd or GOTO/xyz is output as G01.
ICLXYZSO	4662	Option to output the COOLNT/OFF M-Code in a block by itself. Default 0 = Use COOLNT/ON settings for COOLNT/OFF. 1 = Output COOLNT/OFF M-Code in a block by itself.
ITLXYZRPF	4663	By default, the G-Post uses the tool change location to determine if the RAPID move immediately after a tool change is an advance or retract motion using the standard motion analysis. Some machines move the tool to a safe position for M06 or G28 codes and the actual tool change position may vary and thus can not be set in the Optfile to a static location. This location has been added to always output XY and then a Z-move for the RAPID motion that immediately follows a tool change or LOADTL/cmd. Default 0 = Use tool change location for motion analysis (default) 1 = Output XY and then Z-move, ie: assume an advance move
IRTANGSW	4664	Support of right-angled head in Mill G-Post. SET/HED-HOLDER,1,XO,YO,ZO,[POSX,NEGX,...for tool direction] (G-Post) SET/HOLDER,1,SETOOL,XO,YO,ZO,ATANGL,a,SETANG,s (PTC format) This command will set the following flags Default 0 = No right angle head support needed 1 = Right angle head support needed
IRTANGAX	4665	Alignment axis and direction for right angled head. SET/cmd Axis Flag (0=NONE,1=NEGX,2=POSX,3=NEGY,4=POSY,5=NEGZ,6=POSZ) Default 0 = None 1 = NEGX 2 = POSX 3 = NEGY 4 = POSY 5 = NEGZ 6 = POSZ
IRTANGLT Generator.	4666	Right angled head holder address to be output. Set by the Option File Default 53 = NA Range 1-25,53 (A-Z or NA)

Name	Location	Description
IMOUTPTFG	4667	_OUTPT Macro flag. Set this flag to enable or disable the _OUTPT macro. Default 0 = Disabled _OUTPT tape block editor macro. 1 = Enabled _OUTPT tape block editor macro.
IHELIXVD	4668	Accept ARCSLP/ON,z as actual z-change instead of the lead per 360 degree revolution for Mastercam input files. Default 0 = ARCSLP/ON,z is true lead/360 degrees. 1 = ARCSLP/ON,z is actual z-change for Mastercam.
IPGMLDBLK	4669	Skip the leading blanks and leading slash (/) character in the PARTNO statement. Default 0 = Use the 1st character in PARTNO. 1 = Skip leading blanks and slash (/) in count
IRTABCSP(3)	4670	ABC axes address suppression flag with H90 support in 5 axis only. Default 0 = No, do not suppress the axis address. 1 = Yes, suppress the axis address.
	4671	Not Used
	4672	Not Used
ITSQSTPIN	4673	THREAD/AUTO step-in move thread mode Default 0 = Step-in move is at feed/rapid 1 = Step-in move is in thread/on mode
IG9899MODL	4674	G98/G99 Modal flag, to be repeated after G80 z-retract (Cycle Motion Analysis) Default 0 = G98/G99 code is modal, output for new CYCLE/cmd 1 = G98/G99 code is non-modal, also output after G80 z-retract
IG94CYCG00	4675	Skip G94/G95 prep code output with G00 blocks inside CYCLE output Default 0 = Output G94/G95 for any RAPID block if set by ITSBIT(32) 1 = Skip G94/G95 for RAPID if inside CYCLE output
	4676	Not Used
ISM840DCYF	4677	Option to output Siemens 840D cycle format Default 0 = Siemens CYCLE81() format not required 1 = Output Siemens CYCLE81() format, non-modal 2 = Output Siemens CYCLE81() format, modal

6.2 Mill RELCOM Variables

<i>Name</i>	<i>Location</i>	<i>Description</i>
RPMMAX	0001	SPINDL/MAXRPM value Default = 0.0 Range = 0.0 - 99999.0
	0002 – 0008	Not used
SPNCOD	0009	Current spindle S-code Default = 0.0 Range = 0.0 - 99999.0
SPNSPD	0010	Current spindle speed in RPM Default = 0.0 Range = 0.0 - 99999.0
SPTABL(6,99)	0011	Spindle table Default = (1,1) - 1.0 (1,2) - 3000.0 (2,1) - 1.0 (2,2) - 3000.01 (3,1) - 1.0 (3,2) - 3000.0 Range = > 0.0 - 99999.0

Note: The feedrate code tables overlay the last 3 ranges of the spindle code common locations. If you use feedrate code tables, only three spindle ranges are available!

TFDXPM(50)	0401	IPM feedrate values for XY motion Default = 0.0 (see note 2 above!) Range = +-99999.0
TFDXPR(50)	0451	IPR feedrate values for XY motion Default = 0.0 (see note 2 above!) Range = +-99999.0
TFDZPM(50)	0501	IPM feedrate values for Z motion Default = 0.0 (see note 2 above!) Range = +-99999.0
TFDZPR(50)	0551	IPR feedrate values for Z motion Default = 0.0 (see note 2 above!) Range = +-99999.0
TLTABL(99,3)	0605	Tool length and tool number stored for each tool Default = 0.0 Range = +-99999.0

6.3 Mill DBLCOM Variables

<i>Name</i>	<i>Location</i>	<i>Description</i>
ANGINC	0001	Rotary axis incremental angle from the last angular position Default = 0.0 Range = +-99999.0
ANGLE	0002	Rotary axis current angular position Default = 0.0 Range = 0.0 to 360.0
ANGLST	0003	Rotary axis last angular position Default = 0.0 Range = 0.0 to 360.0
CAMVAL	0004	Cam couplet value for canned CYCLES Default = 999999.0 (EMPTY) Range = +-99999.0
CANON(6)	0005	XYZIJK of the circle center from the Type 3000 command Default = 0.0 Range = (1-3) +-99999.0, (4-6) +-1.0
CIRCEN(6)	0011	XYZ of the circle center translated by ORIGIN and TRANS Default = 0.0 Range = (1-3) +-99999.0, (4-6) Unused
CIRRAD	0017	Current circle radius Default = 0.0 Range = 0.0 to 99999.0
CLPT(6)	0018	Last XYZIJK values from CL record Default = 0.0 Range = (1-3) +-99999.0, (4-6) +-1.0
CNVMM	0024	Conversion factor from inches to millimeters Default = 25.4 Range = (1/25.4) or 25.4
CNVSM	0025	Conversion factor from seconds to minutes Default = .0167 Range = Do not change
CPRUNT	0026	Conversion factor to find length of tape unit from character count that is 10 characters per inch Default = 10.0 Range = 10.0 or .39370079
CPS	0027	Tape reader speed in characters/seconds Default = 300.0 Range = 1 to 99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
CRCLWD(10)	0028	Ten CLWRD locations following a Type 2000 command Default = 0.0 Range = +-99999.0
CSFPLN(4)	0038	Canonical form of the CLRSRF/PL1 definition as AX+BY+CZ-D=0 Default = EMPTY Range = +-99999.0
CYCLTM	0042	Machine time for current motion Default = 0.0 Range = .01 to 99999.0
CYDATA(12)	0043	Array to store CYCLE option values. Default = 0.0 Range = 0.0 to 99999.0

Example: CYCLE/DEEP INCR value can be stored in this array to output a K register for hardware cycle

CYDWEL(12)	0055	Array to store CYCLE DWELL values Default = 0.0 Range = 0.0 to 99999.0
CYDWEL(01)	0055	Array to store CYCLE DWELL value for DRILL Default = 0.0 Range = 0.0 to 99999.0
CYDWEL(02)	0056	Array to store CYCLE DWELL value for CSINK Default = 2.0 Range = 0.0 to 99999.0
CYDWEL(03)	0057	Array to store CYCLE DWELL value for DEEP Default = 0.0 Range = 0.0 to 99999.0
CYDWEL(04)	0058	Array to store CYCLE DWELL value for TAP Default = 2.0 Range = 0.0 to 99999.0
CYDWEL(05)	0059	Array to store CYCLE DWELL value for BORE Default = 2.0 Range = 0.0 to 99999.0
CYDWEL(06)	0060	Array to store CYCLE DWELL value for REAM Default = 0.0 Range = 0.0 to 99999.0
CYDWEL(07)	0061	Array to store CYCLE DWELL value for THRU Default = 0.0 Range = 0.0 to 99999.0

Name	Location	Description
CYDWEL(08)	0062	Array to store CYCLE DWELL value for FACE Default = 2.0 Range = 0.0 to 99999.0
CYDWEL(9-12)		Extra CYCLE DWELL locations for unused cycles. Default = 0.0 Range = 0.0 to 99999.0
DELTA(6)	0067	XYZIJK DELTA departures of current GOTO point Default = 0.0 Range = (1-3) +-99999.0, (4-6) +-1.0
DELTAM(6)	0073	XYZABC DELTA departures of the current GOTO point for MULTAX mill Default = 0.0 Range = (1-3) +-99999.0, (4-6) +-360.0
DEPMAX	0079	Maximum linear departure that can be output in one block Default = 999.9999 Range = +-99999.0
DIST	0080	Current linear distance Default = 0.0 Range = 0.0 to 99999.0
DISTL	0081	Current linear distance for MULTAX Default = 0.0 Range = 0.0 to 99999.0
DISTR	0082	Current rotary distance for MULTAX Default = 0.0 Range = 0.0 to 99999.0
DRAPTO	0083	Segmentation distance for FEDRAT/RAPTO Default = 0.3 Range = 0.0 to 99999.0
DWELMN(2)	0084	Minimum DWELL in IPM (1) and IPR (2) modes Default = (1) - 0.1, (2) - 0.0 Range = .00001 to 99999.0
DWELMX(2)	0086	Maximum DWELL in IPM (1) and IPR (2) modes Default = (1) - 99.99, (2) - 0.0 Range = .00001 to 99999.0
FEDFOR	0088	Mazak feed rate formula (multiplier), PLABEL/OPTION,65,TO,2 must be set to use this value. Range = +- .00001 to 99999.0
	0089 – 0097	Not used

<i>Name</i>	<i>Location</i>	<i>Description</i>
DWELTM	0098	Contains the DWELL time and output by DWELL routine Default = 0.0 Range = 0.0 to 99999.0
EMPTY	0099	Real empty flag 999999.0 NEVER CHANGE THIS LOCATION!
EPSLN	0100	A small real value 0.0000001 Do not change
FACTOR	0101	Conversion factor for inch/metric Default = 1.0 Range = (1/25.4), 25.4, 1.0
FCPM	0102	CYCLE FEED value requested in IPM Default = 0.0 Range = 0.0 to 99999.0
FCPR	0103	CYCLE FEED value requested in IPR Default = 0.0 Range = 0.0 to 99999.0
FDVALU	0104	Current feed code value Default = 0.0 Range = 0.0 to 99999.0
FINVMN	0105	Minimum inverse feed number Default = 0.001 Range = 0.00001 to 99999.0
FINVMX	0106	Maximum inverse feed number Default = 200.0 Range = 0.00001 to 99999.0
FRAPID(6)	0107	Rapid rate value in units per minute for XYZABC axes Default = (1-3) - 200.0, (4-6) - 1400.0 Range = 0.00001 to 99999.0
FUPM	0113	Linear feed value requested in IPM Default = 0.0 Range = 0.0 to 99999.0
FUPMMN(6)	0114	Minimum feed in units per minute for XYZABC axes Default = (1-6) 0.001 Range = 0.0 to 99999.0
FUPMMX(6)	0120	Maximum feed in units per minute for XYZABC axes Default = (1-6) 200.0 Range = 0.0 to 99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
FUPR	0126	Linear feed value requested in IPR Default = 0.0 Range = 0.0 to 99999.0
FUPRMN	0127	Minimum feedrate in IPR mode Default = 0.0 Range = 0.0 to 99999.0
FUPRMX	0128	Maximum feedrate in IPR mode Default = 0.0 Range = 0.0 to 99999.0
HELIXD	0129	Third linear axis feed per revolution for helical interpolation Default = 0.0 Range = 0.0 to 99999.0
HOMEPT(6)	0130	Machine XYZABC axes home point Default = (1) 10.0, (2) 10.0, (3) 30.0, (4-6) 0.0 Range = +-99999.0
ORTBL(36,4)	0136	ORIGIN XYZ values table for t four parameter origin command Default = 0.0 Range = (1-3) +-99999.0, (4) 0.0 to 360.0
PGELNG	0280	Tape length for the current page Default = 0.0 Range = 0.0 to 99999.0
PGETIM	0281	Machine time for the current page Default = 0.0 Range = 0.0 to 99999.0
PIVALU	0282	Value of PI (3.14159...) Do not change
PPORGN(3)	0283	Current origin in effect for XYZ Default = 0.0 Range = +-99999.0
PPREFS(3)	0286	Fixed translation along XYZ Default = 0.0 Range = +-99999.0
PPTRNS(3)	0289	Current translation in effect for XYZ Default = 0.0 Range = +-99999.0
PRES(52)	0292	Contents to be output for the letter address A through verify Z Default = EMPTY Range = +-99999.0, EMPTY

<i>Name</i>	<i>Location</i>	<i>Description</i>
PRESMP(6)	0344	Current XYZABC point for MULTAX Default = 0.0 Range = +-99999.0
PRESPT(6)	0350	Current XYZIJK point Default = (1-5) 0.0, (6) 1.0 Range = (1-3) +-99999.0, (4-6) +-1.0
PREV(52)	0356	Last contents output for the letter address A through verify Z Default = EMPTY Range = +-99999.0, EMPTY
PREVMP(6)	0408	Last XYZABC point for MULTAX Default = 0.0 Range = +-99999.0
PREVPT(6)	0414	Last XYZIJK point Default = 0.0 Range = (1-3) +-99999.0, (4-6) +-1.0
PRVTIM	0420	Total cycle time from last tool change Default = 0.0 Range = 0.0 to 99999.0
PULSE	0421	Machine pulse value Default = 0.0001 Range = 0.00001 to 1.0
RADARC	0422	Rotational radius calculated by ROTABL routine Default = 0.0 Range = 0.0 to 99999.0
RADIMX	0423	Maximum circle radius allowed Default = 999.9999 Range = 0.0 to 99999.0
RAPCOD	0424	Rapid traverse code Default = 0.0 Range = +-99999.0
RAPMIN	0425	Minimum distance for rapid Default = 0.0 Range = 0.0 to 99999.0
RAPMNF	0426	Feed value to be used in unit per minute, when rapid traverse distance is smaller than RAPMIN Default = 0.0 Range = 0.0 to 99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
RETPLN	0427	CLEARP/Z value for RETRCT Default = EMPTY Range = +-99999.0
	0428	Not used
RLAGER	0429	Terminating leader length Default = 36.0 Range = 0.0 to 99999.0
RLEDER(3)	0430	Leader length for START, STOP, and tool change Default = (1) 14.0, (2) 0.0, (3) 0.0 Range = 0.0 to 99999.0
RMTRX(3,4)	0433	Trans matrix canonical form Default = 1,0,0,0,0,1,0,0,0,0,1,0 Range = +-99999.0
ROTDIR	0445	Current rotary axis direction Default = 1.0 Range = 1.0 or -1.0
ROTPUL	0446	Rotary axis pulse value Default = 0.001 Range = .000001 to 10.0
ROTSGN	0447	Rotary axis CCLW directional sign Default = -1.0 Range = 1.0 or -1.0
RPDEG	0448	Conversion factor for degrees to radian measure (PI/180.0) Do not change
RPOINT	0449	Rapid stop point for cycles Default = 0.0 Range = +-99999.0
RPTVAL(26)	0450	RPTWRD contents to be output for letter address A through Z Default = 0.0 Range = +-99999.0
RTBRAD	0476	Fixed rotary table radius modify variables Default = 0.0 Range = 0.0 to 99999.0
SEQINC	0477	SEQNO option incr value Default = 1.0 Range = 1.0 to 99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
SEQMX	0478	Maximum sequence number allowed Default = 9999.0 Range = What ever fits JFMT(JN)
SEQNUM	0479	Current sequence number Default = 0.0 Range = 1.0 to 99999.0
TAPFCT	0480	Conversion factor of tape length to feet or meters Default = 0.0083334 Range = 0.0083334 or 0.0254
TCHGTM	0481	Tool change time in seconds Default = 3.0 Range = 0.0 to 99999.0
	0482 – 0485	Not used
TMATRX(6)	0486	Axes inversion for XYZABC Default = (1-6) 1.0 Range = +-99999.0
	0492	Not used
TOLER	0493	MCHTOL tolerance value Default = 0.0 Range = +-99999.0
TOTLNG	0494	Total tape length Default = 0.0 Range = 0.0 to 99999.0
TOTLTM	0495	Total machine time Default = 0.0 Range = 0.0 to 99999.0
TULNML	0496	Last tool number Default = 0.0 Range = 0.0 to eight digits max.
TULNUM	0497	Current tool number Default = 0.0 Range = 0.0 to eight digits max.
TULTIM	0498	Cycle time between tool changes Default = 0.0 Range = 0.0 to 99999.0
	0499 – 0508	Not used

<i>Name</i>	<i>Location</i>	<i>Description</i>
USRTM1	0509	Percentage of current CYCLTM added, CYCLTM*USRTM1 Default = 0.0 Range = +-99999.0
USRTM2	0510	Constant time added to CYCLTM: CYCLTM+USRTM2 Default = 0.0 Range = +-99999.0
VALUEN	0511	Flag to indicate output of letter address and sign (888888.0) Do not change
VELOC	0512	Current velocity in units per minute for machine time calculations Default = 0.0 Range = 0.0 to 99999.0
WORD(52)	0513	Output word buffer Default = EMPTY Range = +-99999.0, empty
WORDSV(26)	0565	Flag used for fixed field format Default = VALUEN (DBLCOM(511)) Range = +-99999.0, empty, VALUEN
XOFFSET	0591	Arc offset along X axis for circular interpolation Default = 0.0 Range = +-99999.0
XYZMN(6)	0592	Minimum XYZABC values for limit check Default = (1) -20.0, (2) -20.0, (3) -10.0, (4-6) 0.0 Range = +-99999.0
XYZMX(6)	0598	Maximum XYZABC values for limit check Default = (1) 10.0, (2) 10.0, (3) 30.0, (4-6) 0.0 Range = +-99999.0
XYZTCP(6)	0604	XYZABC coordinates for tool change Default = (1) 10.0, (2) 10.0, (3) 30.0, (4-6) 0.0 Range = +-99999.0
YOFFSET	0610	Arc offset along Y axis for circular interpolation Default = 0.0 Range = +-99999.0
ZDATA(21)	0611	Z parameters storage from CYCLE command Default = 0.0 Range = +-99999.0
ZDEPTH	0632	Feed stop point cycles Default = 0.0 Range = +-99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
	0633 - 0634	Not used
PVTDST	0635	Distance from the pivot point of a tool moving rotary axis to the tool gauge point Default = 0.0 Range = +-99999.0
TOLIN	0636	LINTOL tolerance value Default = -0.005 Range = +-99999.0 (- is off, + is on)
HIPRDX(3)	0637	Used to store the non-rollover location of a rotary axis Default = 0.0 Range = +-99999.0
SMATRIX(3,4)	0640	Rotation matrix canonical form Default = 1,0,0,0,0,1,0,0,0,1,0 Range = +-99999.0
PRMDIR	0652	Flag to indicate if primary rotary axis rotates per EIA standard Default = 1.0 Range = 1.0 or -1.0
PVTDS2	0653	Pivot distance for rotary axes Default = 0.0 Range = +-99999.0
ROREFS(3)	0654	Fixed angular displacement for rotary axes Default = 0.0 Range = +-99999.0
SECDIR	0657	Flag to indicate if secondary rotary axis rotates per EIA standard Default = 1.0 Range = 1.0 or -1.0
ROTRF(3)	0658	Rotary offset for ROTREF Default = 0.0 Range = +-99999.0
CUTDIA	0661	Cutter diameter for CYCLE/DEEPCL Default = 0.0 Range = +-99999.0
DPDECR	0662	Depth decrement for CYCLE/DEEPCL Default = 0.5 Range = 0.0 to 99999.0
DPEND	0663	Ending depth for CYCLE/DEEPCL Default = 1.0 Range = 0.0 to 99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
DPSTRT	0664	Starting depth for CYCLE/DEEPCL Default = 2.5 Range = 0.0 to 99999.0
XTRVMN	0665	Stores minimum travel for X axis Default = 0.0 Range = +-99999.0
XTRVMX	0666	Stores maximum travel for X axis Default = 0.0 Range = +-99999.0
YTRVMN	0667	Stores minimum travel for Y axis Default = 0.0 Range = +-99999.0
YTRVMX	0668	Stores maximum travel for Y axis Default = 0.0 Range = +-99999.0
ZTRVMN	0669	Stores minimum travel for Z axis Default = 0.0 Range = +-99999.0
ZTRVMX	0670	Stores maximum travel for Z axis Default = 0.0 Range = +-99999.0
BRKLNG	0671	Maximum tape footage for auto break Default = 0.0 Range = 0.0 to 99999.0
BRKLOK	0672	Minimum tape footage for auto break Default = 0.0 Range = 0.0 to 99999.0
CTRDIA	0673	Cutter diameter from CUTTER statement Default = 0.0 Range = 0.0 to 99999.0
CLWRDL(45)	0674	45 CLWRD locations from last Type 2000 record Default = 0.0 Range = +-99999.0
FUTCNT(3)	0719	XYZ circle center of the next CL circle record. (Only used with vector cutter compensation) Default = 0.0 Range = +-99999.0

Name	Location	Description
FUTCPT(2,2)	0722	First pair of XY coordinates of the next CL circle record (used only with vector cutter compensation) Default = 0.0 Range = +-99999.0
FUTRAD	0726	Radius value of the next CL circle record (used only with vector cutter compensation) Default = 0.0 Range = 0.0 to 99999.0
FUTRPT(3)	0727	XYZ values of the next linear CL record (used only with vector cutter compensation) Default = 0.0 Range = +-99999.0
VEKTOR(3)	0730	PQ vector values calculated from past, present and future move (used only with vector cutter compensation) Default = 0.0 Range = +-99999.0
PRVCPT(2,2)	0733	Last pair of XY coordinates of the last CL circle record (used only with vector cutter compensation) Default = 0.0 Range = +-99999.0
VECMAX(3)	0737	Maximum vector allowed (used only with vector cutcom) Default = (1-2) 3.2767, (3) 0.0 Range = +-99999.0
VECMIN(3)	0740	Minimum vector allowed (used only with vector cutcom) Default = (1-2) 3.2767, (3) 0.0 Range = +-99999.0
FEDMUL(3)	0743	Feedrate multipliers. 1: IPM, 2:IPR, 3:INVERS Default = (1-3) 1.0 Range = +-99999.0
GAGLEN	0746	Current tool gage length. Default = 0.0 Range = 0.0 to 99999.0
BRKDLT(3)	0747	XYZ retract deltas for auto break. Default = EMPTY Range = +-99999.0, EMPTY
SECLPT	0750	Secondary clearance point value with hardware cycles. Default = 0.0 Range = +-99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
PMATRIX(3,4)	0751	Optional input matrix for manipulating XYZ Default = 1,0,0,0,0,1,0,0,0,1,0 Range = +-99999.0
VMTRX(3,4)	0763	Optional input matrix for manipulating IJK Default = 1,0,0,0,0,1,0,0,0,1,0 Range = +-99999.0
OTRANS(6)	0775	Optional output fixed translation for XYZABC Default = 0.0 Range = +-99999.0
VWRDSV(10)	0781	Last verification word that was output Default = EMPTY Range = +-99999.0, EMPTY
ZWMTRX(2)	0791	"TMATRIX" or axis inversion for W and Z Default = 1.0 Range = 1.0 or -1.0
PRVMZW(2)	0793	PREVMP for W and Z Default = 0.0 Range = +-99999.0
ZWHOME(2)	0795	GOHOME values for W and Z Default = 30.0, 30.0 Range = +-99999.0
ZWFDMN(2)	0797	Min feedrate for W and Z Default = 0.001, 0.001 Range = +-99999.0
ZWFDMX(2)	0799	Max feedrate for W and Z Default = 200.0, 200.0 Range = +-99999.0
ZWLMIN(2)	0801	Min limits for W and Z Default = -10.0, -10.0 Range = +-99999.0
ZWLMAX(2)	0803	Max limits for W and Z Default = 30.0, 30.0 Range = +-99999.0
ZWADJS(2)	0805	ADJUST values for W and Z Default = 0.0 Range = +-99999.0
ZWCLRP(2)	0807	RETRCT values for W and Z Default = EMPTY, EMPTY Range = +-99999.0, EMPTY

<i>Name</i>	<i>Location</i>	<i>Description</i>
ZWRAPD(2)	0809	RAPID velocities for W and Z Default = 200.0, 200.0 Range = .00001 to 99999.0
	0810 – 0880	Not used
ANUTAT	0881	Nutating head angle Default = 0.0 Range = +-360.0
ANGIN2	0882	Secondary ROTABL-ROTHED angle increment. Default = 0.0 Range = +-99999.0
ANGLE2	0883	Secondary ROTABL-ROTHED absolute angle. Default = 0.0 Range = 0.0 to 360.0
AGLST2	0884	Secondary ROTABL-ROTHED last angle. Default = 0.0 Range = 0.0 to 360.0
ROTDR2	0885	Secondary ROTABL-ROTHED direction. Default = 1.0 Range = 1.0 or -1.0
TOLVC	0886	Vector tolerance angle for LINTOL (nutator only) Default = 0.0 (off) Range = .00001 to 99999.0
TMLFED	0887	Feedrate reduction in seconds for minimum time (nutator only) Default = 0.0 (off) Range = .00001 to 99999.0
UGZOFF	0888	Tilt Wire EDM lower guide Z offset value Default = 0.0 Range = +- 99999.0
UGWHGT	0889	Tilt Wire EDM upper guide Z height value Default = 0.0 Range = +- 99999.0
UGCONA	0890	Tilt Wire EDM constant angle value Default = 0.0 Range = +- 99999.0
VECTOL	0891	Multi Axis vector tolerance value. If a vector component Is less than this value it will be ignored. This is used to reduce Vector wiggle. Default = 0.0 (Do not check vectors) Range = .00001 - 99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
TRVABC(6)	0892	Total XYZABC axis travel calculated by the postprocessor. Do not reset
TRVTMN(6)	0898	Minimum XYZABC axis travel calculated by the postprocessor. Do not reset
TRVTMX(6)	0904	Maximum XYZABC axis travel calculated by the postprocessor. Do not reset
DEGARC	0910	Total degrees of ARC for the current last circle move. This is set internally. Do not reset
PVCLPT(6)	0911	Internal array to store the previous CL point during circle testing. Do not reset.
CRCPUL	0917	Circle pulse value. Default = 0.0001 Range = .0001- 99999.0
OTRANV	0918	TRANS along tool axis Default = 0 (no tool tip TRANS) Range = 0 No tool tip TRANS 1 Gantry tool tip TRANS 2 TRANS along tool axis
PSTREV	0919	Postprocessor revision number. Do not reset
PSTBLD	0920	Postprocessor build number. Do not reset
SELG	0921	Used internally to create the SELECT G-code. Do not reset.
SELH	0922	Used internally to create the SELECT H-code. Do not reset.
SELHMIN	0923	SELECT H-code minimum value. Default = 0.0 Range = +- 999999.0
SELHMAX	0924	SELECT H-code maximum value. Default = 0.0 Range = +- 999999.0
SELHDEF	0925	SELECT H-code default value. Default = 0.0 Range = +- 999999.0
DEGSTR	0926	Beginning angle for the current circle. Internally set. Do not reset

Name	Location	Description
CYRAUTO	0927	Automatic R plane reduction value for cycles. Default = 0.0 Range = +-99999.0
OUTMUL(52)	0928	Output multipliers for each letter address A – Verify Z Default = 0.0 Range = +-99999.0
DWLMUL(2)	0980	Dwell output multipliers for each letter address Default = 0.0 Range = +-99999.0
PGMNUMMIN	0982	Program Number Minimum. Default = 0.0 Range = +-99999.0
PGMNUMMAX	0983	Program Number Maximum Default = 0.0 Range = +-99999.0
PNTVCTANG	0984	Internal Flag. Point / Vector Angle for OFG Do Not Reset Default = 0 Range = +-360
R40ABCFG	0985	A40= B40= C40= output for radius of rotation to adjust inverse time feedrates. The A40/B40/C40 address is obtained from KOMRAD(1-3), (INTCOM(2455-2457)). They will refer to the PQ CUTCOM address and can be aliased to A40 B40 C40. Default = 0 Do not output A40/B40/G40 = 1 Use machine coordinates and output non-modal A40/B40/C40 for each ABC in a G01 block. = 2 Use part coordinates and output non-modal A40/B40/C40 for each ABC in a G01 block. = 3 Use machine coordinates and output modal A40/B40/C40 for each ABC in a G01 block. Test for modality using EPSLN. = 4 Use part coordinates and output modal A40/B40/C40 for each ABC in a G01 block. Test for modality using EPSLN. = 5 Use machine coordinates and output modal A40/B40/C40 for each ABC in a G01 block. Test for modality using address resolution. = 6 Use part coordinates and output modal A40/B40/C40 for each ABC in a G01 block. Test for modality using address resolution.
R40XSHFT	0986	A40= B40= C40=. X axis shift for the radius calculation. Default = 0.0 Range = +-99999.0
R40YSHFT	0987	A40= B40= C40=. Y axis shift for the radius calculation. Default = 0.0 Range = +-99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
R40ZSHFT	0988	A40= B40= C40=. Z axis shift for the radius calculation. Default = 0.0 Range = +-99999.0
TIMEFEED	0989	Total machine time while in feed rate mode. Do not reset Default = 0.0 Range = +-99999.0
TIMERAPD	0990	Total machine time while in rapid mode. Do not reset Default = 0.0 Range = +-99999.0
TIMEDWEL	0991	Total machine time while in dwell mode. Do not reset Default = 0.0 Range = +-99999.0
TIMETLCH	0992	Total machine time while in tool change mode. Do not reset Default = 0.0 Range = +-99999.0
TIMEMISC	0993	Total machine time for miscellaneous commands. Do not reset Default = 0.0 Range = +-99999.0
DWCRVDAT(30)	0994	Array for Curve Fit routine. DO NOT CHANGE.
DRPSFDRETZ	1025	Distance along tool axis to retract for automatic REPOS. Default = 0.0 Range = +-99999.0
Note: -9999.000; This indicates a special condition to the Automatic Reposition (_REPOS) function. This will output the opposite point that is in limit without any intermediate motion.		
Warning: <u>***This may cause a crash on the machine tool since the G-Post will take the longer route.</u>		
DRPSFDRETF	1026	Feed rate for retract move along tool axis during automatic REPOS. Default = 0.0 = use current feed rate Range = +-99999.0
DRPSFDAPRF	1027	Feed rate for advance move along tool axis during automatic REPOS. Default = 0.0 = use current feed rate Range = +-99999.0
DRPSGMCHPA	1028	Alternate A Axis position used by Automatic REPOS. DO NOT CHANGE.
DRPSGMCHPB	1029	Alternate B Axis position used by Automatic REPOS. DO NOT CHANGE.
DRPSGMCHPC	1030	Alternate C Axis position used by Automatic REPOS. DO NOT CHANGE.

Name	Location	Description
PVTDSX	1031	5 Axis Head/Head off center distance along X. Default = 0.0 Range = +-99999.0
PVTDSY	1032	5 Axis Head/Head off center distance along Y. Default = 0.0 Range = +-99999.0
PVTDSZ	1033	5 Axis Head/Head off center distance along Z. Default = 0.0 Range = +-99999.0
ADISTINV	1034	Distance to fudge distance calculation for move length. Default = 0.0 Range = +-99999.0
PVECTOL	1035	tolerance testing for previous tool vector, same as VECTOL. Default = 0.0 (Do not check vectors) Range = .00001 - 99999.0
DMILLTURN(10)	1036	Mill-Turn Support
	1036	Thread lead Default = 0.0 Range = +-99999.0
	1037	TURRET gage length - X Default = 0.0 Range = +-99999.0
	1038	TURRET gage length - Y Default = 0.0 Range = +-99999.0
	1039	Minimum Y for MODE/YAXIS,AUTO Default = 0.0 Range = +-99999.0
	1040	Maximum Y for MODE/YAXIS,AUTO Default = 0.0 Range = +-99999.0
	1041-1045	not used
DABCMNGR1(3)	1046	ABC Rotary Range 1, Minimum Default = 0.0 Range = +-99999.0
DABCMXGR1(3)	1049	ABC Rotary Range 1, Maximum Default = 0.0 Range = +-99999.0

<i>Name</i>	<i>Location</i>	<i>Description</i>
DABCMNGR2(3)	1052	ABC Rotary Range 2, Minimum Default = 0.0 Range = +-99999.0
DABCMXGR2(3)	1055	ABC Rotary Range 2, Maximum Default = 0.0 Range = +-99999.0
DABCMNTZD(3)	1058	ABC Travel Zone Minimum Default = 0.0 Range = +-99999.0
DABCMXGR2(3)	1061	ABC Travel Zone Maximum Default = 0.0 Range = +-99999.0
DRPSFDAP2Z	1064	REPOS Secondary approach distance Default = 0.0 Range = +-99999.0
DRPSFDAP2F	1065	REPOS Secondary approach feed rate Default = 0.0 Range = +-99999.0
PVDELTAM(6)	1066	_REPOS axis deltas, saved via TY5000 for travel zone checks. Default = 0.0 Range = +-99999.0
DRTANGOF (3)	1072	Holder offset values from SET/cmd subtracted from current XYZ points. Default = 0.0 Range = +-99999.0
DRTANGAR (3) Post.	1075	Rotary axis adjust angle values for ABC set by the SET/cmd by G- Post. Default = 0.0 Range = +-99999.0

7 Default Settings

The Lathe and Mill G-Post come with the default settings listed in this chapter. Defaults include tape format, output codes and relative post processor statements, and machine/control parameters.

7.1 Default Tape Format

7.1.1 Lathe Defaults

Inch **N30 G20 X24 Z24 I24 K24 F32 S20 T40 M20**

Metric **N30 G20 X33 Z33 I33 K33 F41 S20 T40 M20**

Example:

N30 means the **N** letter address will be output with three places to the left of the decimal point and no places to the right as follows:

Nnnn or **N001** Where **nnn** is a numeric value.

X24 means the **X** letter address will be output with two places to the left of the decimal point and four places to the right as follows:

Xnn.nnnn or **X01.0000** Where **nnn** is a numeric value.

Machine Statement **MACHIN/UNCL01,1**

7.1.2 Mill Defaults

Inch **N30 G20 X34 Y34 R34 Z34 I34 J34 K34 F33 S40 T50 B33 D20 H20 M20**

Metric **N30 G20 X43 Y43 R43 Z43 I43 J43 K43 F42 S40 T50 B33 D20 H20 M20**

Machine Statement **MACHIN/UNCX01,1**

7.2 Default Output Codes and Relative Commands

7.2.1 Lathe Default Codes

```

=      TMARK/--
N      SEQNO/--
G00    RAPID, Motion commands
G01    GOTO/--, Linear motion commands
G02    ARCMOV/--, Circular motion commands CLW
G03    ARCMOV/--, Circular motion commands CCLW
G04    DELAY/--
G33    THREAD/--
G34    THREAD/--
G35    THREAD/--
G90    MODE/90
G91    MODE/91
G92    SET/START,--
G94    FEDRAT/--,IPM
G95    FEDRAT/--,IPR
XZ     GOTO, Motion commands
IK     ARCMOV/--, THREAD/--, Circular and threading motion
F      FEDRAT/--
S      SPINDL/--
T      TURRET/--;SELECT/--
M00    STOP
M01    OPSTOP
M02    END
M03    SPINDL/--,CLW
M04    SPINDL/--,CCLW
M05    SPINDL/OFF
M07    COOLNT/MIST
M08    COOLNT/FLOOD

M09    COOLNT/OFF
M23    TURRET/--,CLW
M24    TURRET/--,CCLW
M30    REWIND/--
M50    FEDRAT/LOCK,OFF
M51    FEDRAT/LOCK,ON
/      OPSKIP/-- , Delete blocks
>>>> LEADER/--, Spaces

```

7.2.2 Mill Default Codes

```

=      TMARK/--
N      SEQNO/--
G00    RAPID, GOTO/-- , Motion Commands
G01    GOTO/--, Linear motion commands
G02    ARCMOV/--, Circular motion commands CLW
G03    ARCMOV/--, Circular motion commands CCLW
G04    DELAY/--

```

G17 XY circular motion; **CUTCOM/--,XYPLAN**
G18 ZX circular motions; **CUTCOM/--,ZXPLAN**
G19 YZ circular motions; **CUTCOM/--,YZPLAN**
G40 **CUTCOM/OFF**
G41 **CUTCOM/LEFT**
G42 **CUTCOM/RIGHT**
G80 **CYCLE/OFF**
G81 **CYCLE/DRILL,--**
G82 **CYCLE/FACE,--**
G83 **CYCLE/DEEP,--**
G84 **CYCLE/TAP,--**
G85 **CYCLE/BORE,--**
G86 **CYCLE/MILL,--**
G87 **CYCLE/THRU,--**
G88 **CYCLE/REAM,--**
G90 **MODE/90, MODE/INCR,OFF**
G91 **MODE/91. MODE/INCR**
G92 **SET/START--**
G93 **MODE/INVERS,ON**
G94 **FEDRAT/--,IPM**
XYZ **GOTO/--, Motion commands**
ABC **GOTO/--, Motion commands**
IJK **ARCMOV/--, Circular motion**
F **FEDRAT/--**
S **SPINDL/--**
T **LOADTL/--;SELECTL/--**
B **ROTABL/--**
D **CUTCOM/--**
H **LOADTL/--;SELECT/--;CUTCOM/ZAXIS,--**
M00 **STOP**
M01 **OPSTOP**
M02 **END**
M03 **SPINDL/--,CLW**
M04 **SPINDL/--,CCLW**
M05 **SPINDL/OFF**
M06 **LOADTL/--**
M07 **COOLNT/MIST**
M08 **COOLNT/FLOOD**
M09 **COOLNT/OFF**
M19 **SPINDL/LOCK**
M30 **REWIND/--**
M41 **SPINDL/--,RANGE,1**
M42 **SPINDL/--,RANGE,2**
M43 **SPINDL/--,RANGE,3**
M50 **FEDRAT/LOCK,OFF**
M51 **FEDRAT/LOCK,ON**
/ **OPSKIP/--, Block delete**
>>>> **LEADER/--, Spaces**

7.3 Default Machine/Control Parameters

7.3.1 Lathe Default Parameters

<i>Number of axes</i>	2 XZ
<i>Built in translation</i>	0, 0
<i>Axes inversion</i>	+1, +1
<i>Axes limit minimum</i>	0.0, 0.0
<i>Axes limit maximum</i>	10.0, 10.0
<i>Home point</i>	10.0, 10.0
<i>Rapid feedrate</i>	300.0, 300.0
<i>Feedrate minimum</i>	0.01, 0.01
<i>Feedrate maximum</i>	300.0, 300.0
<i>Feedrate minimum in revolutions</i>	0.01
<i>Feedrate maximum in revolutions</i>	9.9999
<i>Rapid F-code</i>	Not applicable
<i>Machine resolution</i>	0.0001
<i>Maximum linear departure</i>	99.9999
<i>Maximum circle radius</i>	99.9999
<i>Minimum rapid distance</i>	0.0
<i>Feedrate for above distance</i>	Not applicable
<i>Spindle type</i>	Spindle table
<i>Spindle speed minimum</i>	84.0, 262.0
<i>Spindle speed maximum</i>	651.0, 2014.0
<i>Dwell minimum in seconds</i>	0.0001
<i>Dwell maximum in seconds</i>	99.9999
<i>Dwell minimum in revolutions</i>	0.01
<i>Dwell maximum in revolutions</i>	99.99
<i>Dwell time output with TURRET</i>	2.0
<i>Leader for start, STOP, TURRET</i>	14.0, 0.0, 0.0
<i>Leader at the end of program</i>	36.0
<i>Reader speed CPS</i>	300.0
<i>Maximum sequence number</i>	999

7.3.2 Mill Default Parameters

<i>Number of axes</i>	4 XYZB
<i>Built in translation</i>	0.0, 0.0, 0.0
<i>Axes inversion</i>	+1, +1, +1, +1
<i>Axes limit minimum</i>	-20.0, -20.0, -10.0
<i>Axes limit maximum</i>	10.0, 10.0, 30.0
<i>Home point</i>	10.0, 10.0, 30.0, 0.0
<i>Rapid feedrate</i>	200.0, 200.0, 20.0
<i>Feedrate minimum</i>	0.001, 0.001, 0.001
<i>Feedrate maximum</i>	200.0, 200.0, 200.0
<i>Feedrate minimum in revolutions</i>	Not applicable
<i>Feedrate maximum in revolutions</i>	Not applicable
<i>Inverse time feedrate minimum code</i>	.001
<i>Inverse time feedrate maximum code</i>	00.0
<i>Rapid F-code</i>	0
<i>Machine resolution</i>	0.0001
<i>Maximum linear departure</i>	999.9999
<i>Maximum circle radius</i>	999.9999
<i>Minimum rapid distance</i>	0.0
<i>Feedrate for above distance</i>	Not applicable
<i>Spindle type</i>	Direct RPM
<i>Spindle speed minimum</i>	1.0
<i>Spindle speed maximum</i>	3000.0
<i>Dwell minimum in seconds</i>	0.1
<i>Dwell maximum in seconds</i>	99.99
<i>Dwell minimum in revolutions</i>	Not applicable
<i>Dwell maximum in revolutions</i>	Not applicable
<i>Leader for start, STOP, TURRET</i>	14.0, 0.0, 0.0
<i>Leader at the end of program</i>	36.0
<i>Reader speed CPS</i>	300.0
<i>Rotary table feedrate minimum</i>	0.001
<i>Rotary table feedrate maximum</i>	200.0
<i>Rotary table resolution</i>	0.001

8 UNCMRG Post Processor

Introduction

The **UNCMRG** post processor is used to merge multiple punch files to accommodate machine tools that require a new configuration when certain secondary tool operations are required. The main reason for using merging post processors is for live tooling lathes. When milling, the machine takes on the characteristics of a machining center. When turning, the machine takes on the characteristics of a lathe.

The method used by **UNCMRG** requires that multiple option files have been generated. The maximum number of option files allowed to be merged at one time is eight (8).

As a safety feature for non-merging G-Post users, each option file must have **INTCOM(1868) (PLABEL OPTION #38)** set to 1. This is accomplished by checking the **Merging post** option on the **General** tab of the **Start/End of Program** menu. This must be done for each post used in the merging process.

The part program is required to have a **MACHIN** statement for each option file and the merging utility. The first **MACHIN** statement in the part program will be that of the post responsible for creating the start-up tape data. This may include man-readable **PARTNO**, leader, **TMARK** or G-codes.

The statement used to control which option file is to be executed by each section of the program is:

8.1 MODE/MILL-TURN,o1,s1 Command

The **MILL** option will allow the Mill G-Post (**UNCX01**) to be executed and the **TURN** option will allow the Lathe G-Post (**UNCL01**) to be executed. The o1 designates the option file number of the post to be used. The s1 is *optional* and may be used to designate the starting sequence (N-code) number for this section of the program. Failure to find an option file number specified will cause an error and stop G-Post process.

The command required to execute the merge post processor is:

MACHIN/UNCMRG,1

The **UNCMRG** post processor **MACHIN** statement must be the last in the **MACHIN** section of the part program. It will always have option number **1** as its argument.

8.2 Programming Example:

```
PARTNO LIVE TOOLING TEST
MACHINE/UNCL01,11
MACHINE/UNCX01,12
MACHINE/UNCMRG,1
PPRINT TURNING WITH LATHE POST #11 STARTS HERE
SPINDL/200,SFM
FEDRAT/.010,IPR
TURRET/2,2,-1.5,.875
CUTTER/.032
FROM/8.5,6
GOTO/1.5,1
```

```
--  
PPRINT END OF LATHE OPERATION  
MODE/MILL,12  
PPRINT MILLING WITH MILL POST #12 STARTS HERE  
SPINDL/500,RPM  
FEDRAT/8,IPM  
LOADTL/3,LENGTH,1.75  
CUTTER/.5  
FROM/2,2,6  
GOTO/3,3,1.5  
--  
PPRINT END OF MILLING OPERATION  
MODE/TURN,11  
PPRINT TURING WITH LATHE POST #11 STARTS HERE  
SPINDL/350,SFM  
FEDRAT/.008,IPR  
TURRET/3,3,-1.1,3  
CUTTER/.062  
FROM/8.5,6  
GOTO/1.2,2  
GOTO/--  
--  
FINI
```

8.3 Conclusion

Note that when a **MODE** statement is programmed, all of the required machine information is put in effect. If the **SPINDL** or **FEDRAT** had not been programmed in the **MODE/MILL** section, a warning would have been output cautioning that the minimums would be used.

If the **SPINDL** or **FEDRAT** had not been programmed in the **MODE/TURN** section, the last value programmed in the start-up would have been in effect since .

One of the functions of the **MODE** statement is to turn the **MACHIN** switch **ON** and **OFF**

9 4-Axis Merging Lathes

The 4 Axis Merging Option in the Lathe G-Post - “UNCL01”

4 Axis merging in UNCL01 is accomplished by pre-processing the CL file before processing it through the post processor and FIL (Factory Interface Language) normally.

9.1 The Two Type of 4 Axis Merging:

Merging with XZ-UW codes

Merging with P-Codes

PLABEL/OPTION,55 controls the type of merging and merged CL file printing. This option **MUST** be set in the **Option File** to process properly.

PLABEL/OPTION,55,TO,2	XZ-UW merging, do not print the merged CL file.
PLABEL/OPTION,55,TO,12	XZ-UW merging, print the merged CL file.
PLABEL/OPTION,55,TO,3	P-Code merging, do not print the merged CL file.
PLABEL/OPTION,55,TO,13	P-Code merging, print the merged CL file.

Commands:

OP/*n1*[,HED,*n2*]

The **OP** command is used to designate an operation number ***n1***. **HED,*n2*** is used to designate the primary (**HED,1**) or secondary axis (**HED,2**). If **HED** is omitted, **HED,1** is assumed.

An **OP** command is terminated by another **OP** command with a different operation number or **HED** number.

Processing order:

The **OP** commands are sent to the CL file.

The merging section of the post processor converts these to **COMBIN** and **HEAD** commands and creates the merged CL file.

The **FIL** (Factory Interface Language) filters the **COMBIN** and **HEAD** commands to generate the proper post processor commands to create the desired output.

9.1.1 XZ-UW Merging:

Example:

APT program:

```
PARTNO TEST 4-AXIS MERGE (XZ-UW MERGING)
MACHIN/UNCL01,1
CLPRNT
OP/10
```

```

SPINDL/200
FEDRAT/10
FROM/10,5
GOTO/10,2.002
GOTO/1,2.002
RAPID
GOTO/10,5.002
OP/20
SPINDL/100
FEDRAT/5
GOTO/10,1.003
GOTO/10,5.003
OP/10,HED,2
FROM/12,-5
GOTO/12,-4.004
GOTO/11,-4.004
GOTO/12,-4.004
GOTO/12,-5.004
FINI

```

CL File created:

```

2    PARTNO TEST 4-AXIS MERGE (XZ-UW MERGING)
4    MACHIN UNCL01 1
6    OP          10
8    SPINDL      200
10   FEDRAT      10
12   FROM        10.000 5.000 0.000
14   GOTO        10.000 2.002 0.000
16   GOTO        1.000 2.002 0.000
18   RAPID
20   GOTO        10.000 5.002 0.000
22   OP          20
24   SPINDL      100
26   FEDRAT      5
28   GOTO        10.000 1.003 0.000
30   GOTO        10.000 5.003 0.000
32   OP          10    HED  2
34   FROM        12.000 -5.000 0.000
36   GOTO        12.000 -4.004 0.000
38   GOTO        11.000 -4.004 0.000
40   GOTO        12.000 -4.004 0.000
42   GOTO        12.000 -5.004 0.000
44   FINI

```

4-Axis Merged CL File created:

```

1    PARTNO TEST 4-AXIS MERGE (XZ-UW MERGING)
2    MACHIN/UNCL01 1
2    COMBIN/10,START
5    HEAD/101
5    SPINDL/200
6    FEDRAT/10
7    SPINDL/200,RPM
7    FROM/ 10.000,5.000,0.000
8    GOTO/ 10.000,2.002,0.000

```

```

17 HEAD/102
17 FROM/ 12.000, -5.000, 0.000
18 GOTO/ 12.000, -4.004, 0.000
19 GOTO/ 11.000, -4.004, 0.000
20 GOTO/ 12.000, -4.004, 0.000
9 HEAD/101
9 GOTO/ 1.000,2.002,0.000
21 HEAD/102
21 GOTO/12.000, -5.004, 0.000
21 HEAD/102,NOMORE
10 HEAD/101
10 RAPID
10 GOTO/ 10.000, 5.002,0.000
10 COMBIN/10,NOMORE
11 OP/20
12 SPINDL/100
13 FEDRAT/5
14 GOTO/ 10.000, 1.003,0.000
15 GOTO/ 10.000, 5.003,0.000
15 FINI

```

NUMBER OF LINES IN 4-AXIS MERGED CL FILE = 29

FIL for XZ-UW merged CL file:

\$\$ CREATED FOR 4-AXIS MERGING (XZ-UW MERGING)
 \$\$ THIS FIL FILE CAN BE USED TO GENERATE XZ-UW MERGING (XZ-UW)
 \$\$ WHEN PLABEL/OPTION,55,TO,2 IS SET, THE POST WILL REARRANGE THE
 \$\$ CL FILE BY TIMING THE MOTION AND CREATES THE COMBIN,HEAD COMMANDS.

```

CIMFIL/ON,COMBIN                                $$ CATCH THE COMBIN COMMANDS
      OPN = POSTF(7,4)                            $$ GET THE OPERATION NUMBER
      I5 = POSTF(7,5)                            $$ GET THE 5TH CL WORD
      IF( I5 .EQ. (ICODEF(START))) THEN
        PPRINT/'***** START OF MERGING OP=',OPN
      ELSE
        PPRINT/'***** END OF MERGING OP=',OPN
      ENDIF
CIMFIL/OFF

```

```

CIMFIL/ON,HEAD                                $$ CATCH THE HEAD COMMANDS
      HN = POSTF(7,4)                            $$ GET THE HEAD NUMBER
      I5 = POSTF(7,5)                            $$ GET THE TURRET NUMBER
      IF( HN .EQ. 101) THEN
        TURRET/REAR
      ELSE
        TURRET/FRONT
      ENDIF
      IF( I5 .EQ. (ICODEF(NOMORE)))THEN
        PPRINT/'***** PARK THE TURRET '
      ENDIF
CIMFIL/OFF

```

```

CIMFIL/ON,OP                                $$ CATCH THE TURRET AND SKIP IT.
CIMFIL/OFF
FINI

```

MCD Output:

```
N5 G70$
N10 G90$
N15 G94$
N20 ( *****START OF MERGING OP=10 )$
N25 G97 S200 M3$
N30 G1 X2.002 Z10. F10. $
N35 U-4.004 W12. $
N40 W11. $
N45 W12. $
N50 X2.002 Z1. $
N55 U-5.004 W12. $
N60 G0 X5.002 Z10. $
N65 ( *****END OF MERGING OP=10 )$
N70 S100 $
N75 G1 X1.003 F5. $
N80 X5.003 $
N85 M02 $
```

9.1.2 P-Code Merging: – P Code

Example:

APT program:

```
PARTNO TEST 4-AXIS MERGE (P-CODE MERGING)
MACHIN/UNCL01,1
CLPRNT
OP/10
SPINDL/200
FEDRAT/10
FROM/10,5
GOTO/10,2.00
GOTO/1,2.00
RAPID
GOTO/10,5.00
OP/20
SPINDL/100
FEDRAT/5
GOTO/10,1.00
GOTO/10,5.00
OP/10,HED,2
FROM/12,-5.0
GOTO/12,-4.0
GOTO/11,-4.0
GOTO/12,-4.0
GOTO/12,-5.0
FINI
```

CL File created:

```
2    PARTNO TEST 4-AXIS MERGE (P-CODE MERGING)
4    MACHIN UNCL01 1
```

```

6      OP          10
8      SPINDL      200
10     FEDRAT      10
12     FROM        10.000 5.000 0.000
14     GOTO        10.000 2.000 0.000
16     GOTO        1.000 2.000 0.000
18     RAPID
20     GOTO        10.000 5.000 0.000
22     OP          20
24     SPINDL      100
26     FEDRAT      5
28     GOTO        10.000 1.000 0.000
30     GOTO        10.000 5.000 0.000
32     OP          10      HED 2
34     FROM        12.000 -5.000 0.000
36     GOTO        12.000 -4.000 0.000
38     GOTO        11.000 -4.000 0.000
40     GOTO        12.000 -4.000 0.000
42     GOTO        12.000 -5.000 0.000
44     FINI

```

4-Axis Merged CL File created:

```

1      PARTNO TEST 4-AXIS MERGE (P-CODE MERGING)
2      MACHIN/UNCL01 1
2      COMBIN/10,START
5      HEAD/101
5      SPINDL/200
6      FEDRAT/10
7      FROM/ 10.000,5.000,0.000
8      GOTO/ 10.000,2.000,0.000
9      GOTO/ 1.000,2.000,0.000
10     RAPID
10     GOTO/10.000,5.000, 0.000
10     HEAD/101,NOMORE
17     HEAD/102
17     FROM/ 12.000, -5.000, 0.000
18     GOTO/ 12.000, -4.000, 0.000
19     GOTO/ 11.000, -4.000, 0.000
20     GOTO/ 12.000, -4.000, 0.000
21     GOTO/12.000, -5.000, 0.000
21     COMBIN/10,NOMORE
21     HEAD/101
22     OP/20
12     SPINDL/100
13     FEDRAT/5
14     GOTO/ 10.000, 1.000,0.000
15     GOTO/ 10.000, 5.000,0.000
15     FINI

```

NUMBER OF LINES IN 4-AXIS MERGED CL FILE = 26

FIL for P-CODE merged CL file:

```

$$ CREATED FOR 4-AXIS MERGING (P-CODE MERGING)
$$ THIS FIL FILE CAN BE USED TO GENERATE 4 AXIS MERGING (P-CODE)

```

\$\$ WHEN PLABEL/OPTION,55,TO,3 IS SET, THE POST WILL REARRANGE THE
 \$\$ CL FILE BY OP-NUMBERS AND CREATES THE COMBIN,HEAD COMMANDS.

```

CIMFIL/ON,COMBIN                                $$ CATCH THE COMBIN COMMANDS
      OPN = POSTF(7,4)                            $$ GET THE OPERATION NUMBER
      I5 = POSTF(7,5)                            $$ GET THE 5TH CL WORD
      IF( I5 .EQ. (ICODEF(START))) THEN
        PPRINT/'***** START OF MERGING OP=',OPN
        SQN = OPN*10+1
        INSERT/'P',SQN,'$'                        $$ SET THE P NUMBER FLAG
      ELSE
        PPRINT/'***** END OF MERGING OP=',OPN
        SQN = 0                                    $$ CLEAR THE P NUMBER FLAG
      ENDIF
CIMFIL/OFF

CIMFIL/ON,HEAD                                  $$ CATCH THE HEAD COMMANDS
      HN = POSTF(7,4)                            $$ GET THE HEAD NUMBER
      I5 = POSTF(7,5)                            $$ GET THE TURRET NUMBER
      IF( HN .EQ. 101) THEN
        TURRET/REAR
      ENDIF
      IF( HN .EQ. 102) THEN
        TURRET/FRONT
      ENDIF
      IF( I5 .EQ. (ICODEF(NOMORE)))THEN
        SEQNO/SQN,INCR
      ENDIF
CIMFIL/OFF

CIMFIL/ON,OP                                    $$ CATCH THE TURRET AND SKIP IT.
CIMFIL/OFF
FINI
  
```

MCD Output:

```

N5 G70$
N10 G90$
N15 G94$
N20 ( *****START OF MERGING OP=10 )$
N25 P101 $
N30 G97 S200 M3$
N35 G1 X2. Z10. F10. $
N40 Z1. $
N45 G0 X5. Z10. $
N50 G1 U-4. W12. F10. $
N55 W11. $
N60 W12. $
N65 U-5. $
N70 ( *****END OF MERGING OP=10 )$
N75 S100 $
N80 G1 X1. Z10. F5. $
N85 X5. $
N90 M02 $
  
```

10 ARC / NURBS Fitting

The Curve Fitting (CRVFIT) process converts a set of linear input points (GOTO/x,y,z(i,j,k)) into an arc or NURBS motion that fits the tolerance and other given options. This may reduce the MCD (Machine Code Data) file size and/or generate a smoother machining operation.

The Curve Fitting (CRVFIT) process has been implemented in both the APT and G-Post systems. The difference being, it is optional with the APT system and must be purchased to be used with your custom posts. It is a standard feature of the G-Post and no additional purchase is needed.

10.1 APT setup requirements:

The **CRVFIT/---** commands must be specified in the input APT source to turn on this feature. This will inform the APT processor to examine the subsequent CL records and convert the proper **GOTO/x,y,z(i,j,k)** points into circular **ARC/SPLINE** motion. All Curve Fitting (CRVFIT) options must be controlled via the **CRVFIT/---** commands for APT. Also, you can place these commands in your **UNCAPT.INI** file. This will allow site specific tolerance, etc. to be stated for curve fit.

10.2 G-Post setup requirements:

When using the G-Post to perform the Curve Fitting (CRVFIT) routine you must set **INTCOM(4334) = 1** in the option file using the Option File Generator, from the “**Common/PLABELs**” panel. Setting **INTCOM(4334) = 1** instructs the G-Post to pre-scan the input CL file and convert the proper **GOTO/x,y,z(i,j,k)** into an arc or NURBS motion data.

The Option File Generator has a separate panel which allows you to activate (i.e. Set **INTCOM(4334) = 1**) and set all of the default parameters for the Curve Fitting (CRVFIT) routines. You can use this panel to set the values or use the **CRVFIT/---** commands in the input CLfile.

Note: You can **NOT** use **CRVFIT/---** commands in a FIL file as the curve fitting process is completed prior to FIL being executed. Again, you can set the **CRVFIT/---** options globally in option file or in the input file.

10.3 Curve Fitting Vocabulary Words:

Two new words have been added to the system vocabulary table to provide curve fitting control in any program. You need not specify these PPWORDS since they are built-in.

PPWORD/CRVFIT,1093
PPWORD/MOVNRB,1094

10.4 The CRVFIT Command:

10.4.1 CRVFIT/ARC,ON

This command initiates the "arc fit" process of the CL file. The next non-RAPID **GOTO/x,y,z(i,j,k)** will start the arc fitting process and it will continue until a non-GOTO CL record or the maximum number of points is encountered.

Sets DBLCOM(994) = 71

10.4.2 CRVFIT/ARC,OFF

This command disables the "arc fit" process of the CL file. No arc fitting will be executed until **CRVFIT/ARC,ON** is encountered.

Sets DBLCOM(994) = 72

During the arc fitting process a set of linear **GOTO/x,y,z(i,j,k)** points are converted into circular motion that fit the tolerance and other options specified. This may reduce the MCD file size or generate a smooth machining operation.

The following commands specify various options for arc fitting:

10.4.3 CRVFIT/ARCSLP,ON-OFF

Allows helical motion with arc fitting. The default is OFF.

Sets DBLCOM(995) = 71 (ON) or 72 (OFF)

10.4.4 CRVFIT/XYZ,0-1

Specifies a condition to output arc data as **MOVNRB/---** to support circular interpolation in any plane, such as Siemens CIP format.

0 = no 3D arc. Default
1 = output 3D arc data

Sets DBLCOM(1009)

10.4.5 CRVFIT/RADIUS,1,r1

This command specifies the minimum radius allowed.

r1 = minimum radius allowed. Default = 0.0001

Sets DBLCOM(0999)

10.4.6 CRVFIT/RADIUS,2,r2

This command specifies the maximum radius allowed.

r2 = maximum radius allowed. Default = 99999.0

Sets DBLCOM(1000)

Note: It is suggested not to change these values, since the G-Post has a maximum radius and will switch into linear interpolation for any large radius automatically.

10.4.7 CRVFIT/SPLINE,ON

This command initiates the "spline/NURBS fit" process of the CL file.

Sets DBLCOM(996) = 71 or ON

10.4.8 CRVFIT/SPLINE,OFF

This command terminates the "spline/NURBS fit" process of the CL file.

Sets DBLCOM(996) = 72 or OFF, Default

The NURBS fitting process is to convert a set of linear **GOTO/x,y,z(i,j,k)** into NURBS curve motion that fit the tolerance and other options specified. This may reduce the MCD file size or generate a smooth machining operation. The output of NURBS parameters and the points of the NURBS curve will be output as **MOVNRB/---** command as explained later in this document.

10.4.9 CRVFIT/TYPE,e1

e1 = specifies the type of spline required, 0= NURBS, 1=Cubic spline. Default is 0

Sets DBLCOM(997)

10.4.10 CRVFIT/PLANE,YXPLAN-YZPLAN-ZXPLAN-ALL

Specifies the desired plane, Default = ALL

Sets DBLCOM(998)

10.4.11 CRVFIT/TOLER,1,t1

t1 = General curve fit tolerance. Default = 0.005

Sets DBLCOM(1001)

10.4.12 CRVFIT/TOLER,2,t2

t2 = Z-change tolerance. Default = 0.005

Sets DBLCOM(1002)

10.4.13 CRVFIT/TOLER,3,t3

t3 = Tool axis vector change tolerance. Default = 0.005

Sets DBLCOM(1003)

10.4.14 CRVFIT/TOLER,4,t4

t4 = Direction change tolerance in degrees. Default = 60

Sets DBLCOM(1004)

10.4.15 CRVFIT/TOLER,5,t5

t5 = Distance length tolerance. Default = .5

Sets DBLCOM(1005)

10.4.16 CRVFIT/TOLER,6,t6

t6 = Z-change tolerance with ARCSLP=ON. Default = .015

Sets DBLCOM(1006)

10.4.17 CRVFIT/TOLER,7,t7

t7 = Arc fitting ratio tolerance (arcs to GOTO points) in percentage. Default = 10

Sets DBLCOM(1007)

10.4.18 CRVFIT/TOLER,8,t8

t8 = Chordal tolerance for adjacent points. Default = .025

Sets DBLCOM(1008)

10.4.19 CRVFIT/POINT,1,p1

p1 = Minimum number of points allowed. Default = 5

Sets DBLCOM(1010)

10.4.20 CRVFIT/POINT,2,p2

p2 = Maximum number of points allowed. Default = 500

Sets DBLCOM(1011)

10.5 CL Data generated from CRVFIT/--- Commands:

When the curve fitting process is successful, the CL file will be augmented with **CIRCLE/---** and/or **MOVNRB/---** commands. The **CIRCLE/---** command is the standard G-Post format therefore it will be converted into G02/G03 blocks.

The **MOVNRB/---** command represents a spline motion and will have to be formatted for the proper controller (FANUC, Siemens, etc.) Also a **MOVNRB/---** will be generated by the optional **CRVFIT/XYZ,1** option to output a Siemens CIP block.

10.5.1 MOVNRB/--- for a regular NURBS

The sequence of a **MOVNRB/---** for a regular NURBS, **CRVFIT/TYPE,0**, is as follows

1. **MOVNRB/ON,o,k,w,n,s**
2. **MOVNRB/1,k1..kk**
3. **MOVNRB/2,cp1...cpn**
4. **MOVNRB/NEXT**
 GOTO/p1,p2...pn
5. **MOVNRB/OFF**

The 1st line specifies the (*o* = order of the curve, *k* = number of knots, *w* = number of weights as always 0, *n* = number of control points, *s* = curve length).

The 2nd line specifies the actual knot values as scalars. The maximum number of knot values will be 24 in one command. If there are more knots, then there will be another **MOVNRB/1** command and so on.

The 3rd line specifies the actual control points as xyz data. The maximum number of xyz values will be 24 in one command. If there are more points, then there will be another **MOVNRB/2** command and so on.

The 4th line specifies the start of the original points that were converted into spline data. This is given, in case the machine does not have a certain NURBS function and can output G01 motion, ignoring the **MOVNRB** command.

The 5th line indicates the end of **MOVNRB** sequence.

10.5.2 MOVNRB/--- for a cubic spline .

The sequence of a **MOVNRB/---** command for a cubic spline, **CRVFIT/TYPE,1** is as follows: There will not be any knot values and only control points

1. MOVNRB/ON,*o,k=0,w,n,s*
2. MOVNRB/2,*cp1...cpn*
3. MOVNRB/NEXT
GOTO/*p1,p2...pn*
4. MOVNRB/OFF

The control points actually represent the polynomial coefficients for a cubic spline. These are the three vector data along xyz axes and the start point. The parameter space t is from 0 to 1, to satisfy the equation $d + at + bt^2 + ct^3$. For each curve segment, there will be 12-scalar values (1-3 = d start xyz, 4-6 = a(xyz), 7-9 = b(xyz), 10-12 = c(xyz)).

To compute the end point of a curve segment: set $t = 1$ and compute:

$$\begin{aligned} x_e &= x_s + at + bt^2 + ct^3 \text{ (with abc(x))} \\ y_e &= y_s + at + bt^2 + ct^3 \text{ (with abc(y))} \\ z_e &= z_s + at + bt^2 + ct^3 \text{ (with abc(z))} \end{aligned}$$

10.5.3 MOVNRB/--- for an arc

The sequence of a **MOVNRB/---** for an arc, **CRVFIT/XYZ,1**, is as follows: There will be 7 knot values and 2 control points

1. MOVNRB/ON,*o=3,k=7,w,n=2,s*
2. MOVNRB/1,*xyz,ijk,r*
3. MOVNRB/2,*cp1,cp2*
4. MOVNRB/NEXT
CIRCLE/*xyz,ijk,r*
GOTO/*p1,p2,...,pn*
5. MOVNRB/OFF

The knot values represent the circle center (*xyz*), axis (*ijk*) and radius (*r*). The 1st control point is the mid point of the arc and the 2nd control point is the end point of the arc. This can be used to output the Siemens CIP block and skip the **CIRCLE/---** and original **GOTO/x,y,z(i,j,k)** for the arc.

10.6 ARC / NURBS Fitting - FAQ

Q: When will linear moves, G01's, be replaced with circular moves, G02's and/or G03's?

A: When a set of **GOTO/x,y,z(i,j,k)** records appear together in the CL file.

Q: When will the curve fitting take place?

A: At the start of APT/G-Post run, a separate pass of the CL file will be made to scan and convert linear move, G01, commands into circular moves, G02/G03, commands.

Q: How is curve fitting setup and activated?

A: Use the previously described **CRVFIT/---** commands to control curve fit option within the CL file.

Q: Will the programmed feed rates be used?

A: Curve fit will not span across a **FEDRAT/---** or any other G-Post command, only **GOTO/x,y,z(i,j,k)** within the span will be qualified. The minimum and maximum number of points stated control the point set selected. It is suggested that you do not set the maximum points more than 500 due to performance.

Q: Will the arc fitting substitute helical motion for linear motion, G01's?

A: Yes – using the **CRVFIT/ARCSLP,ON** option. This will check the Z-change along the tool axis to be constant and be within the stated tolerance, as specified by the **CRVFIT/TOLER,6,t6** command. When this is satisfied, an **ARCSLP/ON,---** command will be output before the circular motion. This will instruct the G-Post to perform helical interpolation motion for the circular records in the MCD file (G02/G03 blocks will contain I, J, K lead values).

Q: Will arc fitting produce circular motion, G02 and G03's, when the tool axis is not fixed (constant)?

A: No - the tool axis must remain constant for both arc and NURBS fitting.

Q: How does the **CUTCOM/---** command work with curve fitting?

A: Linear moves, G01, before and after **CUTCOM/---** will be left alone since the point set will not span a post processor command as stated before.

Note: The **CUTCOM/plane** must be in the same plane as the circular plane, G02/G03. this condition is tested by G-Post.

Q: When a square corner is wanted, how will curve fitting be avoided?

A: Use the tolerance parameter **CRVFIT/TOLER,4,t4** to control the maximum degrees or turn off arc fitting using the **CRVFIT/ARC,OFF** command.

Q: What about **GOTO/x,y,z(I,j,k)** motion inside **CYCLE/---** routine?

A: **CYCLE/points** between **CYCLE/ON-OFF** pair will not qualify for curve fit.

Q: What kind of added center-line records does arc fitting generate?

A: An **ARCDAT/---** or type 3000 circle record followed by **ARCMOV/---**. The G-Post will not know if the arcs were generated by the arc fitting routine and they will look the same as if they were generated by APT or a CAD system.

Q: Will arc fitting generate G18/G19 circular interpolation?

A: Yes - unless the **XYPLAN** is specified in the **CRVFIT/PLANE** command.

Q: What happens to the original ISN or Input statement numbers in APT?

A: If we select 100 points from the CL file as a set and fit one arc, the arc motion (the **CIRCLE/---** and **GOTO/---**) records will have the ISN of the first **GOTO/x,y,z(I,j,k)** of this selected set.

Arc / NURBS Fitting – FAQ...Continued

Q: What are the tolerances (**CRVFIT/TOLER,--,--**) commands used for?

A: Start and end points of the arc will be from the input CL file and are not interpolated. Interim points can be discarded by the arc fitting routine using the given tolerance *t1* specified by the **CRVFIT/TOLER,1,t1** command.

The general curve fitting tolerance *t1* is used for all arc fitting and NURBS curves creation and interpolation etc.

The chordal tolerance *t8*, specified by the **CRVFIT/TOLER,8,t8** command, is used to accept adjacent points and to determine if they are on the circle or spline.

The z-tolerance *t2*, specified by the **CRVFIT/TOLER,2,t2** command, is used to test if the input points, when rotated into the XY-plane, have the same z-value. Only points that are in the same plane will be selected for curve fitting.

If **ARCSLP/ON** is programmed, two adjacent points must have a z-change but can not exceed the second z by tolerance *t6*, specified by the **CRVFIT/TOLER,6,t6** command. This will prevent a desired delta-z move from being converted into an helical motion.

The tool axis vector tolerance *t3*, specified by the **CRVFIT/TOLER,3,t3** command, is used to test if the input tool axis is a constant. Only points with the same tool axis vector will be selected for curve fitting.

The direction tolerance *t4*, specified by the **CRVFIT/TOLER,4,t4** command, is used to accept adjacent points and to determine if there is a reversal in direction or steep angular change. Note this values is given in degrees.

The distance tolerance *t5*, specified by the **CRVFIT/TOLER,5,t5** command, is used to accept adjacent points and to determine if the points are too far apart from each other, such as a long linear move.

The ratio tolerance *t7*, specified by the **CRVFIT/TOLER,7,t7** command, is tested after the arc fitting. If the number of arcs fit exceed this ratio to the original points, then the arc fitting for this region is skipped and the original **GOTO/x,y,z(I,j,k)** points will be used. For instance, if we selected 100 points for a region and we converted those to 90 or less arcs, the tolerance must $\leq 10\%$ to accept the arc fitting.

Q: What about **GOTO/x,y,z(I,j,k)** motion inside a **PROBE/---** sequence?

A: **PROBE/---** points between **PROBE/ON-OFF** pair will not qualify for curve fitting.

Q: What about **GOTO/x,y,z(I,j,k)** motion with the **RAPID** command?

A: **RAPID** motion points will not qualify for curve fitting.

Q: What about **FROM/x,y,z(I,j,k)** motion command?

A: **FROM** motion points will not qualify for curve fitting.

10.7 Examples

There are several test files available for both APT and G-Post for **CRVFIT** implementation. You can obtain these test files from Austin N.C., Inc. free of charge. Visit our WEB Site at <http://www.austinnc.com> and go to the Support page to download the Curve Fitting test files. Look at the FIL files to get an understanding of the various formats from **CRVFIT**. This will help you to implement the MCD format in your custom post.

For G-Post, you can simply select the desired format FANUC, Siemens, etc. in the option file generator and the MCD is automatically formatted.

10.7.1 A simple example of Arc fit in APT and output:

AUSTIN N.C., Inc. Cimpro/Win32 APT version 6.0 P11

Input file=T1.APT Date=06-23-2005 Time=18:43:55

13:43:55 Scheduled Section 1-1

Isn ** APT Input Data **

```

1 PARTNO ARCFIT
2 MACHIN/UNCX01,1
3 MULTAX/ON
4 CLPRNT
5 CUTTER/0,0,0,0,0,5
6 SPINDL/300
7 FEDRAT/10
8 CRVFIT/ARC,ON
9 FROM /.70710678,0,-.70710678,.70710678,0,.70710678
10 GOTO /.70699909,.01745241,-.70699908,.70710678,0,.70710678
11 GOTO /.70667603,.0348995,-.70667603,.70710678,0,.70710678
12 GOTO /.70613772,.05233596,-.70613772,.70710678,0,.70710678
13 GOTO /.70538431,.06975647,-.7053843,.70710678,0,.70710678
14 GOTO /.70441603,.08715574,-.70441603,.70710678,0,.70710678
15 GOTO /.70323318,.10452846,-.70323318,.70710678,0,.70710678
16 GOTO /.70183612,.12186934,-.70183611,.70710678,0,.70710678
17 GOTO /.70022527,.1391731,-.70022527,.70710678,0,.70710678
18 GOTO /.69840112,.15643446,-.69840112,.70710678,0,.70710678
19 GOTO /.69636424,.17364818,-.69636424,.70710678,0,.70710678
20 GOTO /.69411524,.190809,-.69411524,.70710678,0,.70710678
21 GOTO /.6916548,.20791169,-.6916548,.70710678,0,.70710678
22 GOTO /.68898368,.22495105,-.68898368,.70710678,0,.70710678
23 GOTO /.68610269,.2419219,-.68610269,.70710678,0,.70710678
24 GOTO /.6830127,.25881904,-.6830127,.70710678,0,.70710678
25 GOTO /.67971466,.27563736,-.67971466,.70710678,0,.70710678
26 GOTO /.67620958,.2923717,-.67620958,.70710678,0,.70710678
27 GOTO /.67249851,.30901699,-.67249851,.70710678,0,.70710678
28 GOTO /.6685826,.32556815,-.6685826,.70710678,0,.70710678
29 GOTO /.66446303,.34202014,-.66446302,.70710678,0,.70710678
30 GOTO /.66014105,.35836795,-.66014105,.70710678,0,.70710678
31 GOTO /.65561799,.37460659,-.65561799,.70710678,0,.70710678
32 GOTO /.65089522,.39073113,-.65089522,.70710678,0,.70710678
33 GOTO /.64597419,.40673664,-.64597419,.70710678,0,.70710678
34 GOTO /.64085638,.42261826,-.64085638,.70710678,0,.70710678
35 GOTO /.63554337,.43837115,-.63554336,.70710678,0,.70710678
36 GOTO /.63003676,.4539905,-.63003675,.70710678,0,.70710678
37 GOTO /.62433823,.46947156,-.62433823,.70710678,0,.70710678
38 GOTO /.61844953,.48480962,-.61844953,.70710678,0,.70710678
39 GOTO /.61237244,.5,-.61237244,.70710678,0,.70710678
40 GOTO /.60610881,.51503807,-.60610881,.70710678,0,.70710678
41 GOTO /.59966056,.52991926,-.59966056,.70710678,0,.70710678
42 GOTO /.59302965,.54463903,-.59302965,.70710678,0,.70710678
43 GOTO /.58621809,.5591929,-.58621809,.70710678,0,.70710678
44 GOTO /.57922797,.57357644,-.57922797,.70710678,0,.70710678

```

45 GOTO /.5720614,.58778525,-.5720614,.70710678,0,.70710678
 46 GOTO /.56472059,.60181502,-.56472058,.70710678,0,.70710678
 47 GOTO /.55720775,.61566147,-.55720775,.70710678,0,.70710678
 48 GOTO /.54952518,.62932039,-.54952518,.70710678,0,.70710678
 49 GOTO /.54167522,.64278761,-.54167522,.70710678,0,.70710678
 50 GOTO /.53366026,.65605903,-.53366026,.70710678,0,.70710678
 51 GOTO /.52548275,.66913061,-.52548275,.70710678,0,.70710678
 52 GOTO /.51714516,.68199836,-.51714516,.70710678,0,.70710678
 53 GOTO /.50865005,.69465837,-.50865005,.70710678,0,.70710678
 54 GOTO /.5,.70710678,-.5,.70710678,0,.70710678
 55 GOTO /.49119765,.7193398,-.49119764,.70710678,0,.70710678
 56 GOTO /.48224567,.7313537,-.48224567,.70710678,0,.70710678
 57 GOTO /.47314679,.74314482,-.47314679,.70710678,0,.70710678
 58 GOTO /.46390379,.75470958,-.46390379,.70710678,0,.70710678
 59 GOTO /.45451948,.76604444,-.45451948,.70710678,0,.70710678
 60 GOTO /.44499672,.77714596,-.44499672,.70710678,0,.70710678
 61 GOTO /.43533841,.78801075,-.4353384,.70710678,0,.70710678
 62 GOTO /.42554748,.79863551,-.42554748,.70710678,0,.70710678
 63 GOTO /.41562694,.80901699,-.41562694,.70710678,0,.70710678
 64 GOTO /.40557979,.81915204,-.40557979,.70710678,0,.70710678
 65 GOTO /.3954091,.82903757,-.39540909,.70710678,0,.70710678
 66 GOTO /.38511796,.83867057,-.38511796,.70710678,0,.70710678
 67 GOTO /.37470951,.8480481,-.37470951,.70710678,0,.70710678
 68 GOTO /.36418692,.8571673,-.36418692,.70710678,0,.70710678
 69 GOTO /.35355339,.8660254,-.35355339,.70710678,0,.70710678
 70 GOTO /.34281217,.87461971,-.34281217,.70710678,0,.70710678
 71 GOTO /.33196653,.88294759,-.33196653,.70710678,0,.70710678
 72 GOTO /.32101976,.89100652,-.32101976,.70710678,0,.70710678
 73 GOTO /.30997521,.89879405,-.30997521,.70710678,0,.70710678
 74 GOTO /.29883624,.90630779,-.29883624,.70710678,0,.70710678
 75 GOTO /.28760624,.91354546,-.28760624,.70710678,0,.70710678
 76 GOTO /.27628863,.92050485,-.27628863,.70710678,0,.70710678
 77 GOTO /.26488686,.92718385,-.26488686,.70710678,0,.70710678
 78 GOTO /.25340441,.93358043,-.25340441,.70710678,0,.70710678
 79 GOTO /.24184476,.93969262,-.24184476,.70710678,0,.70710678
 80 GOTO /.23021145,.94551858,-.23021145,.70710678,0,.70710678
 81 GOTO /.21850801,.95105652,-.21850801,.70710678,0,.70710678
 82 GOTO /.20673802,.95630476,-.20673802,.70710678,0,.70710678
 83 GOTO /.19490504,.9612617,-.19490504,.70710678,0,.70710678
 84 GOTO /.1830127,.96592583,-.1830127,.70710678,0,.70710678
 85 GOTO /.17106461,.97029573,-.17106461,.70710678,0,.70710678
 86 GOTO /.15906442,.97437006,-.15906442,.70710678,0,.70710678
 87 GOTO /.14701577,.9781476,-.14701577,.70710678,0,.70710678
 88 GOTO /.13492234,.98162718,-.13492234,.70710678,0,.70710678
 89 GOTO /.12278781,.98480775,-.1227878,.70710678,0,.70710678
 90 GOTO /.11061587,.98768834,-.11061587,.70710678,0,.70710678
 91 GOTO /.09841024,.99026807,-.09841024,.70710678,0,.70710678
 92 GOTO /.08617464,.99254615,-.08617464,.70710678,0,.70710678
 93 GOTO /.07391279,.9945219,-.07391279,.70710678,0,.70710678
 94 GOTO /.06162842,.9961947,-.06162842,.70710678,0,.70710678
 95 GOTO /.04932528,.99756405,-.04932528,.70710678,0,.70710678
 96 GOTO /.03700711,.99862953,-.03700711,.70710678,0,.70710678
 97 GOTO /.02467767,.99939083,-.02467767,.70710678,0,.70710678
 98 GOTO /.01234072,.9998477,-.01234072,.70710678,0,.70710678
 99 GOTO /0,1,0,.70710678,0,.70710678
 100 GOTO /.70710678,0,-.70710678,.70710678,0,.70710678

```

101 END
101 FINI$$
13:43:55 Scheduled Section 1-2
13:43:56 Scheduled Section 2
13:43:56 Scheduled Section 3
Rec Isn  ** Cutter Location File Data **

 2  1 PARTNO ARCFIT
 4  2 MACHIN UNCX01 1
 6  3 MULTAX/ON
 8  5 CUTTER 0 0 0 0 0 5
10  6 SPINDL 300
12  7 FEDRAT 10
15  9 FROM      .7071068 .0000000 -.7071068 .7071068 .0000000 .7071068
18 10 GOTO      .7069991 .0174524 -.7069991 .7071068 .0000000 .7071068
19 10 CIRCLE    .0054700 .0001347 -.0054374 .7071232 .0000010 .7070904 .9922861

20 10 GOTO      .7004799 .1361827 -.7004798 .7071068 .0000000 .7071068
      .6839504 .2529534 -.6839496 .7071068 .0000000 .7071068
      .6576485 .3660827 -.6576467 .7071068 .0000000 .7071068
21 10 CIRCLE    -.0002480 -.0030738 .0002808 .7071232 .0000010 .7070904 1.0009860

22 10 GOTO      .6219964 .4739587 -.6219931 .7071068 .0000000 .7071068
      .5775386 .5750840 -.5775333 .7071068 .0000000 .7071068
      .5249042 .6680274 -.5248966 .7071068 .0000000 .7071068
23 10 CIRCLE    -.0069309 -.0116140 .0069641 .7071232 .0000010 .7070904 1.0137242

24 10 GOTO      .4604853 .7569298 -.4604749 .7071068 .0000000 .7071068
      .3886963 .8337140 -.3886827 .7071068 .0000000 .7071068
      .3106692 .8971692 -.3106520 .7071068 .0000000 .7071068
      .2873530 .9127354 -.2873348 .7071068 .0000000 .7071068
25 10 CIRCLE    .0000173 .0102103 .0000155 .7071232 .0000010 .7070904 .9897897

26 10 GOTO      .2041001 .9569836 -.2040781 .7071068 .0000000 .7071068
      .1175515 .9859426 -.1175255 .7071068 .0000000 .7071068
      .0291048 .9991447 -.0290748 .7071068 .0000000 .7071068
      .0000157 1.0000000 .0000157 .7071068 .0000000 .7071068
27 10 GOTO      .7071068 .0000000 -.7071068 .7071068 .0000000 .7071068
29 101 END
31 101 FINI
13:43:56 Scheduled Post UNCASC
13:43:56 Completed OK
13:43:56 Scheduled Post UNCX01
  ***NOTICE*** Using option file 1 from default directory.
  ***NOTICE*** Using filter file 1 from default directory.
1 AUSTIN N.C. FIL 06.000.WN00
  -1 FINI
1
1 AUSTIN N.C. UNCX01 6.0.WN00 B- 3.0 MACHIN/UNCX01, 1 DATE: 6/23/2005 PAGE 1
FANUC 5-AXIS NURB
ARCFIT (INCH)
INPUT CLREC N4G2Q24P5X34Y34R34Z34A43B33I34J34K34F32S5T2D2H2M2E2L4W32

 3  6 $ ARCFIT
 6 10 N1 M41$
 6 10 N2 S00300 M03$

```

G-Post Reference Manual

```

10 18 N3 G1 X.9998 Y.0175 Z0. A90. B45. F10.$ .9998 .0175 .0000 90.000 45.000
10 21 N4 G3 X.9301 Y.3661 I-.9921 J-.0174$ .9301 .3661
10 23 N5 G3 X.7423 Y.668 I-.9305 J-.3692$ .7423 .6680
10 25 N6 G3 X.4064 Y.9127 I-.7521 J-.6796$ .4064 .9127
10 27 N7 G3 X0. Y1. I-.4064 J-.9025$ .0000 1.0000
10 27 N8 G1 X1. Y0.$ 1.0000 .0000
101 29 N9 M02$
101 31 %$
0 TAPE TIME WARNING
PAGE 1.56 .30 0
TOTAL 1.56 .30 0
1 AUSTIN N.C. UNCX01 6.0.WN00 B- 3.0 MACHIN/UNCX01, 1 DATE: 6/23/2005 PAGE 2
FANUC 5-AXIS NURB
ARCFIT (INCH)
INPUT CLREC N4G2Q24P5X34Y34R34Z34A43B33I34J34K34F32S5T2D2H2M2E2L4W32

```

	X-AXIS	Y-AXIS	Z-AXIS
POST-MINIMUM	.0000	.0000	.0000
POST-MAXIMUM	10.0000	10.0000	30.0000
TAPE-MINIMUM	.0000	.0000	.0000
TAPE-MAXIMUM	1.0000	1.0000	.0000

	A-AXIS	B-AXIS	C-AXIS
POST-MINIMUM	90.0000	45.0000	.0000
POST-MAXIMUM	90.0000	45.0000	.0000
TAPE-MINIMUM	90.0000	45.0000	.0000
TAPE-MAXIMUM	90.0000	45.0000	.0000

13:43:56 Completed Post UNCX01 ok

10.7.2 A simple example of NURBS fit in APT and output: (same program as above)

```

1AUSTIN N.C. Cimpro/Win32 APT version 6.0 P11
Input file=T11.APT Date=06-28-2005 Time=08:25:09
08:25:09 Scheduled Section 1-1
Isn  ** APT Input Data **

1 PARTNO NURB FIT
2 MACHIN/UNCX01,11
3 MULTAX/ON
4 CLPRNT
5 CUTTER/0,0,0,0,0,5
6 SPINDL/300
7 FEDRAT/10
8 CRVFIT/SPLINE,ON
9 FROM /.70710678,0,-.70710678,.70710678,0,.70710678
10 GOTO /.70699909,.01745241,-.70699908,.70710678,0,.70710678
11 GOTO /.70667603,.0348995,-.70667603,.70710678,0,.70710678
12 GOTO /.70613772,.05233596,-.70613772,.70710678,0,.70710678
13 GOTO /.70538431,.06975647,-.7053843,.70710678,0,.70710678
14 GOTO /.70441603,.08715574,-.70441603,.70710678,0,.70710678
15 GOTO /.70323318,.10452846,-.70323318,.70710678,0,.70710678
16 GOTO /.70183612,.12186934,-.70183611,.70710678,0,.70710678
17 GOTO /.70022527,.1391731,-.70022527,.70710678,0,.70710678
18 GOTO /.69840112,.15643446,-.69840112,.70710678,0,.70710678
19 GOTO /.69636424,.17364818,-.69636424,.70710678,0,.70710678
20 GOTO /.69411524,.190809,-.69411524,.70710678,0,.70710678
21 GOTO /.6916548,.20791169,-.6916548,.70710678,0,.70710678
22 GOTO /.68898368,.22495105,-.68898368,.70710678,0,.70710678
23 GOTO /.68610269,.2419219,-.68610269,.70710678,0,.70710678
24 GOTO /.6830127,.25881904,-.6830127,.70710678,0,.70710678
25 GOTO /.67971466,.27563736,-.67971466,.70710678,0,.70710678
26 GOTO /.67620958,.2923717,-.67620958,.70710678,0,.70710678
27 GOTO /.67249851,.30901699,-.67249851,.70710678,0,.70710678
28 GOTO /.6685826,.32556815,-.6685826,.70710678,0,.70710678
29 GOTO /.66446303,.34202014,-.66446302,.70710678,0,.70710678
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31 GOTO /.65561799,.37460659,-.65561799,.70710678,0,.70710678
32 GOTO /.65089522,.39073113,-.65089522,.70710678,0,.70710678
33 GOTO /.64597419,.40673664,-.64597419,.70710678,0,.70710678
34 GOTO /.64085638,.42261826,-.64085638,.70710678,0,.70710678
35 GOTO /.63554337,.43837115,-.63554336,.70710678,0,.70710678
36 GOTO /.63003676,.4539905,-.63003675,.70710678,0,.70710678
37 GOTO /.62433823,.46947156,-.62433823,.70710678,0,.70710678
38 GOTO /.61844953,.48480962,-.61844953,.70710678,0,.70710678
39 GOTO /.61237244,.5,-.61237244,.70710678,0,.70710678
40 GOTO /.60610881,.51503807,-.60610881,.70710678,0,.70710678
41 GOTO /.59966056,.52991926,-.59966056,.70710678,0,.70710678
42 GOTO /.59302965,.54463903,-.59302965,.70710678,0,.70710678
43 GOTO /.58621809,.5591929,-.58621809,.70710678,0,.70710678
44 GOTO /.57922797,.57357644,-.57922797,.70710678,0,.70710678
45 GOTO /.5720614,.58778525,-.5720614,.70710678,0,.70710678
46 GOTO /.56472059,.60181502,-.56472058,.70710678,0,.70710678

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```

47 GOTO /55720775,.61566147,-.55720775,.70710678,0,.70710678
48 GOTO /54952518,.62932039,-.54952518,.70710678,0,.70710678
49 GOTO /54167522,.64278761,-.54167522,.70710678,0,.70710678
50 GOTO /53366026,.65605903,-.53366026,.70710678,0,.70710678
51 GOTO /52548275,.66913061,-.52548275,.70710678,0,.70710678
52 GOTO /51714516,.68199836,-.51714516,.70710678,0,.70710678
53 GOTO /50865005,.69465837,-.50865005,.70710678,0,.70710678
54 GOTO /5,.70710678,-.5,.70710678,0,.70710678
55 GOTO /49119765,.7193398,-.49119764,.70710678,0,.70710678
56 GOTO /48224567,.7313537,-.48224567,.70710678,0,.70710678
57 GOTO /47314679,.74314482,-.47314679,.70710678,0,.70710678
58 GOTO /46390379,.75470958,-.46390379,.70710678,0,.70710678
59 GOTO /45451948,.76604444,-.45451948,.70710678,0,.70710678
60 GOTO /44499672,.77714596,-.44499672,.70710678,0,.70710678
61 GOTO /43533841,.78801075,-.4353384,.70710678,0,.70710678
62 GOTO /42554748,.79863551,-.42554748,.70710678,0,.70710678
63 GOTO /41562694,.80901699,-.41562694,.70710678,0,.70710678
64 GOTO /40557979,.81915204,-.40557979,.70710678,0,.70710678
65 GOTO /3954091,.82903757,-.39540909,.70710678,0,.70710678
66 GOTO /38511796,.83867057,-.38511796,.70710678,0,.70710678
67 GOTO /37470951,.8480481,-.37470951,.70710678,0,.70710678
68 GOTO /36418692,.8571673,-.36418692,.70710678,0,.70710678
69 GOTO /35355339,.8660254,-.35355339,.70710678,0,.70710678
70 GOTO /34281217,.87461971,-.34281217,.70710678,0,.70710678
71 GOTO /33196653,.88294759,-.33196653,.70710678,0,.70710678
72 GOTO /32101976,.89100652,-.32101976,.70710678,0,.70710678
73 GOTO /30997521,.89879405,-.30997521,.70710678,0,.70710678
74 GOTO /29883624,.90630779,-.29883624,.70710678,0,.70710678
75 GOTO /28760624,.91354546,-.28760624,.70710678,0,.70710678
76 GOTO /27628863,.92050485,-.27628863,.70710678,0,.70710678
77 GOTO /26488686,.92718385,-.26488686,.70710678,0,.70710678
78 GOTO /25340441,.93358043,-.25340441,.70710678,0,.70710678
79 GOTO /24184476,.93969262,-.24184476,.70710678,0,.70710678
80 GOTO /23021145,.94551858,-.23021145,.70710678,0,.70710678
81 GOTO /21850801,.95105652,-.21850801,.70710678,0,.70710678
82 GOTO /20673802,.95630476,-.20673802,.70710678,0,.70710678
83 GOTO /19490504,.9612617,-.19490504,.70710678,0,.70710678
84 GOTO /1830127,.96592583,-.1830127,.70710678,0,.70710678
85 GOTO /17106461,.97029573,-.17106461,.70710678,0,.70710678
86 GOTO /15906442,.97437006,-.15906442,.70710678,0,.70710678
87 GOTO /14701577,.9781476,-.14701577,.70710678,0,.70710678
88 GOTO /13492234,.98162718,-.13492234,.70710678,0,.70710678
89 GOTO /12278781,.98480775,-.1227878,.70710678,0,.70710678
90 GOTO /11061587,.98768834,-.11061587,.70710678,0,.70710678
91 GOTO /09841024,.99026807,-.09841024,.70710678,0,.70710678
92 GOTO /08617464,.99254615,-.08617464,.70710678,0,.70710678
93 GOTO /07391279,.9945219,-.07391279,.70710678,0,.70710678
94 GOTO /06162842,.9961947,-.06162842,.70710678,0,.70710678
95 GOTO /04932528,.99756405,-.04932528,.70710678,0,.70710678
96 GOTO /03700711,.99862953,-.03700711,.70710678,0,.70710678
97 GOTO /02467767,.99939083,-.02467767,.70710678,0,.70710678
98 GOTO /01234072,.9998477,-.01234072,.70710678,0,.70710678
99 GOTO /0,1,0,.70710678,0,.70710678
100 GOTO /70710678,0,-.70710678,.70710678,0,.70710678
101 END
101 FINI$$

```

08:25:09 Scheduled Section 1-2

08:25:09 Scheduled Section 2

08:25:09 Scheduled Section 3

Rec Isn ** Cutter Location File Data **

```

2  1 PARTNO NURB FIT
4  2 MACHIN UNCX01 11
6  3 MULTAX/ON
8  5 CUTTER 0 0 0 0 0 0 5
10 6 SPINDL 300
12 7 FEDRAT 10
15 9 FROM .7071068 .0000000 -.7071068 .7071068 .0000000
.7071068
18 10 MOVNRB ON
      0000000 9.0000000 .0000000 5.0000000 1.5514108
19 10 MOVNRB 1
      000000 .0000000 .0000000 .0000000 .4606742 1.0000000
      1.0000000
      1.0000000 1.0000000
20 10 MOVNRB 2
      .7069991 .0174524 -.7069991 .7040554 .2559444 -.7040556
      .5598757 .7674666 -.5598699 .1974726 1.0000004 -.1974503
      .0000157 1.0000000 .0000157
21 10 MOVNRB NEXT
22 10 GOTO .7069991 .0174524 -.7069991 .7071068 .0000000 .7071068
      .7066760 .0348995 -.7066760 .7071068 .0000000 .7071068
      .7061377 .0523360 -.7061377 .7071068 .0000000 .7071068
      .7053843 .0697565 -.7053843 .7071068 .0000000 .7071068
      .7044160 .0871557 -.7044160 .7071068 .0000000 .7071068
      .7032332 .1045285 -.7032332 .7071068 .0000000 .7071068
      .7018361 .1218693 -.7018361 .7071068 .0000000 .7071068
      .7002253 .1391731 -.7002253 .7071068 .0000000 .7071068
      .6984011 .1564345 -.6984011 .7071068 .0000000 .7071068
      .6963642 .1736482 -.6963642 .7071068 .0000000 .7071068
      .6941152 .1908090 -.6941152 .7071068 .0000000 .7071068
      .6916548 .2079117 -.6916548 .7071068 .0000000 .7071068
      .6889837 .2249511 -.6889837 .7071068 .0000000 .7071068
      .6861027 .2419219 -.6861027 .7071068 .0000000 .7071068
      .6830127 .2588190 -.6830127 .7071068 .0000000 .7071068
      .6797147 .2756374 -.6797147 .7071068 .0000000 .7071068
      .6762096 .2923717 -.6762096 .7071068 .0000000 .7071068
      .6724985 .3090170 -.6724985 .7071068 .0000000 .7071068
      .6685826 .3255682 -.6685826 .7071068 .0000000 .7071068
      .6644630 .3420201 -.6644630 .7071068 .0000000 .7071068
      .6601411 .3583679 -.6601411 .7071068 .0000000 .7071068
      .6556180 .3746066 -.6556180 .7071068 .0000000 .7071068
      .6508952 .3907311 -.6508952 .7071068 .0000000 .7071068
      .6459742 .4067366 -.6459742 .7071068 .0000000 .7071068
      .6408564 .4226183 -.6408564 .7071068 .0000000 .7071068
      .6355434 .4383711 -.6355434 .7071068 .0000000 .7071068
      .6300368 .4539905 -.6300368 .7071068 .0000000 .7071068
      .6243382 .4694716 -.6243382 .7071068 .0000000 .7071068
      .6184495 .4848096 -.6184495 .7071068 .0000000 .7071068
      .6123724 .5000000 -.6123724 .7071068 .0000000 .7071068
      .6061088 .5150381 -.6061088 .7071068 .0000000 .7071068
      .5996606 .5299193 -.5996606 .7071068 .0000000 .7071068

```

23 10 CONT.

.5930297	.5446390	-.5930297	.7071068	.0000000	.7071068
.5862181	.5591929	-.5862181	.7071068	.0000000	.7071068
.5792280	.5735764	-.5792280	.7071068	.0000000	.7071068
.5720614	.5877853	-.5720614	.7071068	.0000000	.7071068
.5647206	.6018150	-.5647206	.7071068	.0000000	.7071068
.5572078	.6156615	-.5572077	.7071068	.0000000	.7071068
.5495252	.6293204	-.5495252	.7071068	.0000000	.7071068
.5416752	.6427876	-.5416752	.7071068	.0000000	.7071068
.5336603	.6560590	-.5336603	.7071068	.0000000	.7071068
.5254828	.6691306	-.5254828	.7071068	.0000000	.7071068
.5171452	.6819984	-.5171452	.7071068	.0000000	.7071068
.5086500	.6946584	-.5086500	.7071068	.0000000	.7071068
.5000000	.7071068	-.5000000	.7071068	.0000000	.7071068
.4911977	.7193398	-.4911976	.7071068	.0000000	.7071068
.4822457	.7313537	-.4822457	.7071068	.0000000	.7071068
.4731468	.7431448	-.4731468	.7071068	.0000000	.7071068
.4639038	.7547096	-.4639038	.7071068	.0000000	.7071068
.4545195	.7660444	-.4545195	.7071068	.0000000	.7071068
.4449967	.7771460	-.4449967	.7071068	.0000000	.7071068
.4353384	.7880107	-.4353384	.7071068	.0000000	.7071068
.4255475	.7986355	-.4255475	.7071068	.0000000	.7071068
.4156269	.8090170	-.4156269	.7071068	.0000000	.7071068
.4055798	.8191520	-.4055798	.7071068	.0000000	.7071068
.3954091	.8290376	-.3954091	.7071068	.0000000	.7071068
.3851180	.8386706	-.3851180	.7071068	.0000000	.7071068
.3747095	.8480481	-.3747095	.7071068	.0000000	.7071068
.3641869	.8571673	-.3641869	.7071068	.0000000	.7071068
.3535534	.8660254	-.3535534	.7071068	.0000000	.7071068
.3428122	.8746197	-.3428122	.7071068	.0000000	.7071068
.3319665	.8829476	-.3319665	.7071068	.0000000	.7071068
.3210198	.8910065	-.3210198	.7071068	.0000000	.7071068
.3099752	.8987941	-.3099752	.7071068	.0000000	.7071068
.2988362	.9063078	-.2988362	.7071068	.0000000	.7071068
.2876062	.9135455	-.2876062	.7071068	.0000000	.7071068
.2762886	.9205049	-.2762886	.7071068	.0000000	.7071068
.2648869	.9271839	-.2648869	.7071068	.0000000	.7071068
.2534044	.9335804	-.2534044	.7071068	.0000000	.7071068
.2418448	.9396926	-.2418448	.7071068	.0000000	.7071068
.2302115	.9455186	-.2302115	.7071068	.0000000	.7071068
.2185080	.9510565	-.2185080	.7071068	.0000000	.7071068
.2067380	.9563048	-.2067380	.7071068	.0000000	.7071068
.1949050	.9612617	-.1949050	.7071068	.0000000	.7071068
.1830127	.9659258	-.1830127	.7071068	.0000000	.7071068
.1710646	.9702957	-.1710646	.7071068	.0000000	.7071068
.1590644	.9743701	-.1590644	.7071068	.0000000	.7071068
.1470158	.9781476	-.1470158	.7071068	.0000000	.7071068
.1349223	.9816272	-.1349223	.7071068	.0000000	.7071068
.1227878	.9848077	-.1227878	.7071068	.0000000	.7071068
.1106159	.9876883	-.1106159	.7071068	.0000000	.7071068
.0984102	.9902681	-.0984102	.7071068	.0000000	.7071068
.0861746	.9925462	-.0861746	.7071068	.0000000	.7071068
.0739128	.9945219	-.0739128	.7071068	.0000000	.7071068
.0616284	.9961947	-.0616284	.7071068	.0000000	.7071068
.0493253	.9975641	-.0493253	.7071068	.0000000	.7071068
.0370071	.9986295	-.0370071	.7071068	.0000000	.7071068
.0246777	.9993908	-.0246777	.7071068	.0000000	.7071068

24 10 CONT.

```

                .0123407  .9998477  -.0123407  .7071068  .0000000  .7071068
                .0000000  1.0000000  .0000000  .7071068  .0000000  .7071068
25  10 MOVNRB OFF
26  10 GOTO      .7071068  .0000000  -.7071068  .7071068  .0000000  .7071068
28  101 END
30  101 FINI
08:25:09 Scheduled Post UNCASC
08:25:09 Completed OK
08:25:10 Scheduled Post UNCX01
        ***NOTICE*** Using option file 11 from default directory.
        ***NOTICE*** Using filter file 11 from default directory.
1AUSITN N.C. FIL 06.000.WN00
-1 $$ 02-22-00 VNS; SAMPLE FANUC NURB
-2 PPWORD/MOVNRB,1094
-3 $$
-4 $$ CRVFIT/SPLINE,ON
-5 $$ GOTO/PTS
-6 $$ CRVFIT/OFF
-7 $$
-8 $$ THE ABOVE SEQUENCE WILL GENERATE ADDITIONAL RECORDS AS
-9 $$ MOVNRB/ON,ORDER,#KNOTS,#WEIGHTS,#CONTROL PTS
-10 $$ MOVNRB/1,KNOTS...
-11 $$ MOVNRB/2,CPT-XYZ...
-12 $$ MOVNRB/NEXT
-13 $$ GOTO/PTS
-14 $$ MOVNRB/OFF
-15 $$
-16 MXP=200
-17 RESERV/PKN,MXP,PCX,MXP,PCY,MXP,PCZ,MXP
-18 MXWD2=24+4
-19 CIMFIL/ON,MOVNRB
-20 DMY=POSTF(20)
-21 IW4=POSTF(7,4)
-22 IF(IW4 .NE. (ICODEF(ON)))JUMPTO/LB80
-23 KRD=POSTF(7,5)
-24 KNT=POSTF(7,6)
-25 KWT=POSTF(7,7)
-26 KCP=POSTF(7,8)
-27 IF(KNT.LT.2 .OR. KNT .GT. MXP) THEN
-28   DMY=POSTF(13)
-29   JUMPTO/LB90
-30   ENDIF
-31 $$ GET KNOTS
-32 DMY=POSTF(14)
-33 J1=4
-34 DO/LB10,I1=1,KNT
-35   IF(J1 .GE. MXWD2) THEN
-36     DMY=POSTF(14)
-37     J1=4
-38   ENDIF
-39   PKN(I1)=POSTF(7,(J1+1))
-40   J1=J1+1
-41   LB10)CONTIN
-42 $$ NO WEIGHTS
-43 $$ GET CONTRL POINTS
-44   DMY=POSTF(14)

```

```

-45 J1=4
-46 DO/LB20,I1=1,KCP
-47 IF(J1 .GE. MXWD2) THEN
-48   DMY=POSTF(14)
-49   J1=4
-50 ENDIF
-51 PCX(I1)=POSTF(7,(J1+1))
-52 PCY(I1)=POSTF(7,(J1+2))
-53 PCZ(I1)=POSTF(7,(J1+3))
-54 J1=J1+3
-55 LB20)CONTIN
-56 $$ FANUC FORMAT FOR A 4TH ORDER NURB IS:
-57 $$ G05 P10000
-58 $$ G06.2 P4 K1 CPX CPY CPZ
-59 $$ K2 CPX CPY CPZ
-60 $$ ...
-61 $$ KN-3
-62 $$ KN-2
-63 $$ KN-1
-64 $$ KN
-65 POSTN/ALL
-66 GOTO/PCX(1),PCY(1),PCZ(1)
-67 POSTN/OUT,7,5,16,10000
-68 POSTN/OUT,17,6.2,16,KRD,11,PKN(1),24,PCX(1),25,PCY(1),26,PCZ(1)
-69 PLABEL/OPTION,61,TO,10
-70 DO/LB30,I1=2,KCP
-71   DMY=POSTF(3,3,(355+11))
-72   POSTN/OUT,11,PKN(I1),24,PCX(I1),25,PCY(I1),26,PCZ(I1)
-73 LB30)CONTIN
-74 PLABEL/OPTION,61,TO,0
-75 I1=I1+1
-76 DO/LB30,J1=I1,KNT
-77   POSTN/OUT,11,PKN(J1)
-78 LB30)CONTIN
-79 POSTN/OUT,7,5,16,0
-80 $$ SKIP THE GOTO/PTS UNTIL MOVNRB/OFF
-81 DMY=POSTF(14)
-82 DMY=POSTF(20)
-83 IW4=POSTF(7,4)
-84 IF(IW4 .NE. (ICODEF(NEXT)))JUMPTO/LB80
-85 DO/LB40,I1=1,2
-86   I1=1
-87   DMY=POSTF(14)
-88   IW2=POSTF(7,2)
-89   IW3=POSTF(7,3)
-90   IF(IW2.EQ.2000 .AND. IW3.EQ.(ICODEF(MOVNRB)))I1=3
-91 LB40)CONTIN
-92 JUMPTO/LB90
-93 $$ MOVNRB/BAD
-94 LB80)CONTIN
-95 DMY=POSTF(21)
-96 DMY=POSTF(13)
-97 JUMPTO/LB90
-98 LB90)CONTIN
-99 CIMFIL/OFF
-100 FINI

```

1

1 AUSTIN N.C. UNCX01 6.0.WN00 B- 3.0 MACHIN/UNCX01,11 DATE: 6/28/2000 PAGE 1
FANUC 5-AXIS NURB

NURB FIT (INCH)

INPUT CLREC N4G2Q24P5X34Y34R34Z34A43B33I34J34K34F32S5T2D2H2M2E2L4W32

```

3  6 $ NURB FIT
6  10 N1 M41$
6  10 N2 S00300 M03$
10 18 N3 G1 X.707 Y.0175 Z-.707 A90. B-0. F10.$ .7070 .0175 -.7070 90.000
.000
10 18 N4 G5 P10000$
10 18 N5 G6.2 P4 X.707 Y.0175 Z-.707 K0.$ .7070 .0175 -.7070
10 18 N6 X.7041 Y.2559 Z-.7041 K0.$ .7041 .2559 -.7041
10 18 N7 X.5599 Y.7675 Z-.5599 K0.$ .5599 .7675 -.5599
10 18 N8 X.1975 Y1. Z-.1975 K0.$ .1975 1.0000 -.1975
10 18 N9 X0. Y1. Z0. K.4607$ .0000 1.0000 .0000
10 18 N10 K1.$
10 18 N11 K1.$
10 18 N12 K1.$
10 18 N13 K1.$
10 18 N14 G5 P0$
10 26 N15 G1 X1. Y0. Z0. B45.$ 1.0000 .0000 .0000 45.000
101 28 N16 M02$
101 30 %$

```

0 TAPE TIME WARNING

PAGE 2.06 .04 0

TOTAL 2.06 .04 0

1 AUSTIN N.C. UNCX01 5.4.WN00 B- 3.0 MACHIN/UNCX01,11 DATE: 6/28/2000 PAGE 2
FANUC 5-AXIS NURB

NURB FIT (INCH)

INPUT CLREC N4G2Q24P5X34Y34R34Z34A43B33I34J34K34F32S5T2D2H2M2E2L4W32

08:25:10 Completed Post UNCX01 ok

11 Appendix A - Alpha Characters

11.1 ASCII Character Table

The following chart defines the decimal values for ASCII characters. The G-Post requires the use of ASCII decimal values where specified.

∴ = 32	! = 33	" = 34	# = 35	\$ = 36	% = 37	& = 38	' = 39
(= 40	) = 41	* = 42	+ = 43	, = 44	- = 45	. = 46	/ = 47
0 = 48	1 = 49	2 = 50	3 = 51	4 = 52	5 = 53	6 = 54	7 = 55
8 = 56	9 = 57	: = 58	; = 59	< = 60	= = 61	> = 62	? = 63
@ = 64	A = 65	B = 66	C = 67	D = 68	E = 69	F = 70	G = 71
H = 72	I = 73	J = 74	K = 75	L = 76	M = 77	N = 78	O = 79
P = 80	Q = 81	R = 82	S = 83	T = 84	U = 85	V = 86	W = 87
X = 88	Y = 89	Z = 90	[= 91	\ = 92	] = 93	^ = 94	_ = 95
							= 96

Table 11-1 ASCII Character Table

11.2 Alphabet Numbering Table

This table defines the numeric value for each character of the alphabet. This information will be handy when using some G-Post commands.

A = 1	B = 2	C = 3	D = 4	E = 5	F = 6	G = 7	H = 8
I = 9	J = 10	K = 11	L = 12	M = 13	N = 14	O = 15	P = 16
Q = 17	R = 18	S = 19	T = 20	U = 21	V = 22	W = 23	X = 24
Y = 25	Z = 26						

Table 11-2 Alphabet Numbering Table

12 Appendix B - Additional Functions

This appendix describes some additional functions in the G-Post that have been added at different times to meet the needs of different machine tools but are not generic enough to be added to the Option File Generator. To activate these functions you will be required to set some of the post processor common variables. To set the commons variables in the G-Post you can use the “Common Variable” panel in the Option File Generator or use FIL.

These functions are listed randomly.

⇒ To output the radius of rotation used by some controllers to adjust the feed rates has been added. Some MAHO 5 axis machines use **A40radius B40radius C40radius** to update the feed rates.

New variable,

R40ABCFG DBLCOM (0985)

= 0 Default, do not output A40 / B40 / C40

= 1 or 2 Output A40 / B40 / C40 for each ABC in a motion block, this is NON-MODAL.

= 3 or 4 Output A40 / B40 / C40 for each ABC in a motion block, this is MODAL.

If = 1 or 3 Use Machine coordinates to calculate the radius.

If = 2 or 4 Use Part coordinates to calculate the radius.

The A40/B40/C40 address is obtained from **KOMADR(1-3) INTCOM (2455-2457)**. These locations refer to the PQ **CUTCOM** addresses P and Q and you can use the alias to get the strings A40, B40 and C40.

You can specify a shift of XYZ for the radius calculation such as the pivot distance for Z axis etc.

New variable,

R40XSHFT DBLCOM(0986) specifies the X shift. Default is 0

R40YSHFT DBLCOM(0987) specifies the Y shift. Default is 0

R40ZSHFT DBLCOM(0988) specifies the Z shift. Default is 0

Example:

\$\$ FIL to set A40 and C40 with a pivot distance:

\$\$ Enable A40-C40

CIMFIL/ON,MACHIN

DMY = POSTF(13)

DMY = POSTF(2,3,985,1)

DMY = POSTF(2,3,988,3.1)

DMY = POSTF(2,1,2455,16)

DMY = POSTF(2,1,2456,0)

DMY = POSTF(2,1,2457,17)

CIMFIL/OFF

\$\$ OUTPUT NON-MODAL A40-C40

\$\$ SHIFT Z 3.1

\$\$ A AXIS ADDRESS = P

\$\$ NO B AXIS ADDRESS

\$\$ C AXIS ADDRESS = Q

⇒ To adjust the output XYZ coordinates along the tool axis for a dual rotary head machine you need to set the **OTRANV** common variable, it is **DBLCOM (918)**. Initially this value is set to Zero and if this is set to a value, the XYZ will be modified by this distance along the current tool axis.

⇒ The current CIRCLE information can be retrieved from the following common locations:

Mill, Laser, Wire-EDM, Punch Press

circle start angle (DBLCOM (926))

total angle (DBLCOM(910))

circle direction (INTCOM (538)).

Lathe

circle start angle (DBLCOM (1666))

total angle (DBLCOM(1667))

circle direction (INTCOM (538)).

⇒ An output **address multiplier** has been added for each output address. Setting these locations will force the post to multiply the current output value by this multiplier prior to it being output.

Mill, Laser, Wire-EDM, Punch Press

DBLCOM (928) – DBLCOM(979) a through verify z. Dwell IPM is DBLCOM(980) and DWELL IPR is DBLCOM(981).

Lathe

DBLCOM (1610) – DBLCOM(1661) a through verify z. Dwell IPM is DBLCOM(1662) and DWELL IPR is DBLCOM(1663).

⇒ G93 F# to match the Cincinnati hi-speed machines. Using 1/2 cutter height to shift tool-tip along the tool-axis to find the current span length.

PLABEL/OPTION,48,TO,4 enables this option.

DBLCOM (484) THLED1 = Minimum height, if **CUTTER/0** in APT

DBLCOM (485) THLED2 = Current cutter height stored.

⇒ **INTCOM (1510)** has been added for dual rotary head machines (HEAD/HEAD) to output tool tip programming instead of pivot point programming. Set INTCOM(1510) as follows:

INTCOM(1510) = 0 for pivot point programming.

INTCOM(1510) = 1 for tool tip programming.

⇒ The **Postprocessor Revision and Build** numbers are now stored in DBLCOM.

Revision number is in DBLCOM(919) and Build number is in DBLCOM(920)

⇒ Added DBLCOM (917) as a tolerance to test the circle X, Y, Z, I, J, and K value for small deviations from there normal plane (G17, G18, G19). By default no deviation is permitted. Setting DBLCOM(917) to a value other then Zero, say .001, will allow for noisy points and tool axis vectors. Default = 0

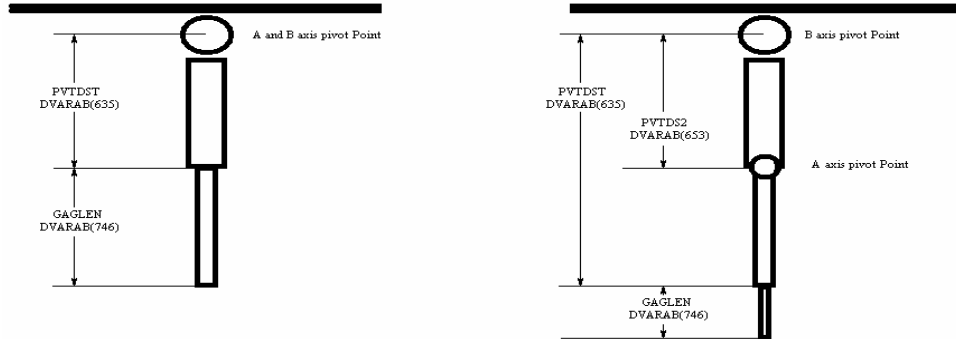
⇒ **ICLRED** - INTCOM (457) The switch to indicate whether a circle automatically reads the next CL Record. has been updated to accept the following values:

0 = Read the next CL record

1 = Do not read the next CL Record, as CIRCLE has already the next CL record.

2 = Do not read the next CL Record and return to FIL for processing.

- ⇒ INTCOM (615) **IPCHCT** can be set to 80 or 120 to generate longer MCD/Punch lines.
- ⇒ INTCOM(3301) has been added to allow up to 120 characters in the tape output line.
- ⇒ Added a check for IBQUAD INTCOM (2094). When IBQUAD is equal to two (2) the post will not reposition the C Axis to zero when a tool axis of 0,0,1 is encountered.
- ⇒ On a dual rotary head machine (HEAD/HEAD), a check has been added for the **PVTDS2** DBLCOM (653) being greater than zero. If PVTDS2 is greater than zero the **PVTDS2** DBLCOM(635) is recalculated to be (PVTDS2-PVTDS2) and the machine points are modified.



- ⇒ OPSKIP/ON,n and OPSKIP/n,ON can be set with different output formats as follows:
 if INTCOM (2718) = 0 The output is /2
 if INTCOM (2718) = 1 The output is //
 if INTCOM (2718) = -1 There is no output (multiple opskip is not available.)
- ⇒ **VECTOL** DBLCOM (891) can be set with a vector tolerance resolution. Then the post will test all vector components and set them to zero if less than VECTOL.
- ⇒ **IBQUAD** INTCOM (2094) can be set to 0, 1 or 2. When set to 0 the nutator will resolve the shortest direction. When set to 1 the nutator will resolve in the plus direction. When set to 2 the nutator will resolve in the negative direction.. The default is 0, which is recommended.
- ⇒ **IZRANG** DBLCOM (2706) can be set to 0, 1, 2 or 3. When set to 0 the rotary axis will output +-0 for +-0 and +-360 for +-360. When set to 1 the rotary axis will output -360 for -0. When set to 2 the rotary axis will output +360 for +0. When set to 3 the rotary axis will output +-0 as +-360. The default is 0
- ⇒ Complete axis travel limits are now printed to the listing file.
- ⇒ TRVABC(6) DBLCOM (892-897); Stores internal ABC axis min-max.
- ⇒ TRVTMN(6) DBLCOM (898-903); Stores XYZABC minimum tape travel values.
- ⇒ TRVTMX(6) DBLCOM (904-909); Stores XYZABC maximum tape travel values.
- ⇒ INTCOM (2717) can be set to 1 to skip the Z test for one circle move following the ARCSLP/OFF command.
- ⇒ When using a tilt wire EDM post (INTCOM (2713) = 0) the default wire height is set in DBLCOM (889) and is 1.00 by default.

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