

AZpost

User Guide

to

Vertical Machining Centers

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**Postprocessor vocabulary and syntax is based on and complies with the
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AUTOPS Syntax

APT syntax used as part of and prior to circular interpolation syntax to specify that the part surface is automatically defined at the current tool position.

Effect of the configuration file on the AUTOPS output:

None

Effect of the AUTOPS syntax on the configuration file:

None

APT Syntax:

AUTOPS

APT example

Example machine code

AUTOPS

====> No

output

AUXFUN syntax.

APT syntax used to output an auxiliary machine function using the M0 register. This code is usually output with an “M” letter and a two digit integer code, but depends on the word address and format specification of the predefined M0 register.

Effect of the configuration file on the AUXFUN output:

Word address and format of M0 register

Effect of the AUXFUN syntax on the configuration file:

None

APT Syntax:

AUXFUN / m

APT example

Example machine code
AUXFUN / 5

==> M05

CLAMP Syntax

APT syntax used to clamp a machine tool component.

Effect of the configuration file on the CLAMP output:

Word address and format of M0 register

Effect of the CLAMP syntax on the configuration file:

None

APT Syntax:

CLAMP/ AAXIS, ON
OFF
AUTO

APT example

CLAMP/ AAXIS, ON

Example machine code

==> M10

CIRCLE & CYLNDR syntax.

Defines the

circular interpolation information for output to the machine code file.

Effect of the configuration file on CIRCULAR output:

SET/CIRCLE syntax in section 1

Word address and format of G1,I,J,K,R registers

Values for CLW & CCLW set with G1 register

Effect of CIRCULAR syntaxes on the configuration file:

None

APT Syntax:

MOVARC/ CENTER, x-center, y-center, z-center, \$

AXIS, i-value, j-value, k-value, \$

RADIUS, radius

GOTO/ x-endpnt, y-endpnt, z-endpnt

---- or ----

TLON,GOFWD/(CIRCLE/ x-center,y-center,z-center,radius),\$

ON,(LINE/ x-center,y-center,z-center, \$
x-endpnt,y-endpnt,z-endpnt)

---- or ----

TLON,GOFWD/(CIRCLE/ x-center,y-center,z-center,radius),\$

ON, 2,INTOF,(LINE/ x-center,y-center,z-center, \$
x-endpnt,y-endpnt,z-endpnt)

---- or ----

TLON, GOFWD/ (CYLNDR/ x-center, y-center, z-center,\$

i-value, j-value, k-value, radius),\$

(POINT/ x-center,y-center,z-center),\$

ON,2,INTOF, (PLANE/

(POINT/ x-endpnt, y-endpnt, z-endpnt), \$
(POINT/ x-center, y-center, z-center))

---- or ----

TLON, GOFWD/ (CYLNDR/ x-center, y-center, z-center,\$
i-value, j-value, k-value, radius),TANTO,\$
(PLANE / (POINT/ x-endpnt, y-endpnt, z-endpnt),\$
,PERPTO, (VECTOR/ i-value, j-value, k-value))

where: x-center, y-center, z-

center = arc center point coordinates

x-endpnt, y-endpnt, z-endpnt = arc end point coordinates

x-value, y-value, z-value = direction vector values

Example:

INDIRV/ .00000, 1.00000, .00000

TLON,GOFWD/ (CIRCLE/ 16.00000, 11.00000, .00000, 4.00000),\$
ON,(LINE/ 16.00000, 11.00000, .00000,\$
16.00000, 15.00000, .00000)

Example machine code

G03 X16. Y15. I-4. J0.

CLEARP syntax.

Used to define a clearance plane parallel to the part origin XY Plane for reference by other postprocessor functions such as RETRACT, LOADTL and CYCLE. This statement also sets the value of the macro variable "CLEARP" used in the configuration file.

Effect of the configuration file on CLEARP output:

None

Effect of the CLEARP syntax on the configuration file:

Sets value of CLEARP variable for use in Macro section

Syntax:	NCdata:
-----	-----
CLEARP / d	==> No output
ON	
OFF	

where:

d = distance from the origin of the XY plane

used by RETRACT and CYCLE

Example:	NCdata
-----	-----
CLEARP / 5.5	==> No output
CYCLE/ DRILL, DEPTH, 1.5, CLEAR, .06	==> No output
GOTO/ 4.0, 6.0, 3.0	==> G00 X4. Y6. Z5.5
	==> G81 X4. Y6. Z.5 R3.06

COOLNT syntax.

APT syntax used to specify for output the desired coolant feature to the machine code file. If syntax is specified after LOAD and before GOTO syntax the output will be held for output by RESTAR macro.

Effect of the configuration file on COOLNT output:

Word address and format of M2 register
Values for minor words set with M2 register

Effect of the COOLNT syntax on the configuration file:

Sets value of COOLNT variable for use in Macro section

APT Syntax		Example machine code
-----		-----
COOLNT / ON	==>	M08
FLOOD	==>	M08
MIST	==>	M07
THRU	==>	M20
TAP	==>	M21
AIR	==>	M22
OFF	==>	M09

CUTCOM syntax.

APT syntax used to specify the desired Cutter Radius Compensation function to the machine code file. Syntax should be used before a linear motion (GOTO) is programmed.

Effect of the configuration file on CUTCOM output:

Word address and format of G7 register
Values for minor words set with G7 register

Effect of the CUTCOM syntax on the configuration file:

None

Syntax:	NCData:
-----	-----
CUTCOM / RIGHT [,n]	====> applies to next
LEFT	motion
OFF	

Where n = register number
Register number = tool unless specified

APT Example	Example machine code
-----	-----
LOAD/TOOL,2	====> M6 T3
CUTCOM / RIGHT	====> No output
GOTO / 1, 2, 3	====> G42 X1. Y2. Z3. D3
CUTCOM / OFF	====> No output
GOTO / 2, 3, 3	====> G40 X2. Y3.

Note: applies only to the next motion

CUTTER syntax.

APT syntax used to specify the desired cutting tool dimensions.

Effect of the configuration file on CUTTER output:

None.

Effect of the CUTTER syntax on the configuration file:

None.

APT syntax

CUTTER / dia, radius, e, f, alpha, beta, height

where: dia = diameter of cutting tool at the tool end.

radius = corner radius at the tool end.

e = radius center distance from tool center line.

f = radius center distance from end of tool.

alpha = angle at tool end.

beta = angle along tool side.

APT example:

Example machine code

CUTTER /.5,.0625,.1875,.0625,0,0,5.0 ==> No output

CYCLE syntax.

APT syntax used to specify for output the desired CYCLE type to the machine code file.

Effect of the configuration file on CYCLE output:

Word address and format of G9,Z1,RR & QQ register.

Values for CYCLE type set with G9 register.

Contents of the CYCLE Macro will be output.

Effect of the CYCLE syntax on the configuration file:

None

Syntax:

CYCLE/ ON	- Turns ON last cycle	
OFF	- Turns OFF cycle mode	(G80)
CYCLE/ DRILL, CLEAR, c, DEPTH, d, UPM, f		(G81)
RAPTO FEDTO UPR		
CYCLE/ CSINK, CLEAR, c, DIAMTR, d UPM, f [,TLANGL,a]		(G81)
RAPTO UPR		
CYCLE/ TAP, CLEAR, c, DEPTH, d, LEAD, f		(G84)
RAPTO FEDTO TPI		(G74)
CYCLE/ CBORE, CLEAR, c, DEPTH, d, UPM, f [,DWELL,p]		(G82)
RAPTO FEDTO UPR REV, p		
CYCLE/ DEEP, STEP, q, CLEAR, c, DEPTH, d, UPM, f		(G83)
DECR RAPTO FEDTO UPR		
CYCLE/ BRKCHP, STEP, q, CLEAR, c, DEPTH, d, UPM, f		(G73)
DECR RAPTO FEDTO UPR		
CYCLE/ FBORE, CLEAR, c, DEPTH, d, UPM, f , OFFSET,q		(G76)
RAPTO FEDTO UPR NODRAG		

CYCLE/ BORE, CLEAR, c, DEPTH, d, UPM, f [,DWELL,p] (G85)
REAM RAPTO UPR REV, p

CYCLE/ BORE6, CLEAR, c, DEPTH, d, UPM, f , DRAG (G86)
BORE RAPTO UPR

CYCLE/ BORE7, CLEAR, c, DEPTH, d, OFFSET,q, UPM,f, MANOP (G87)
PULBOR RAPTO NODRAG UPR

CYCLE/ BORE8, CLEAR, c, DEPTH, d, UPM, f ,DWELL,p , MANOP (G88)
BORE RAPTO UPR REV

CYCLE/ BORE9, CLEAR, c, DEPTH, d, UPM, f ,DWELL,p (G89)
BORE RAPTO UPR REV

CYCLE/ MILL, DIAMTR, c, DEPTH, d, PITCH, k, UPM, f
UPR
[NPASS, n, STEP, s]

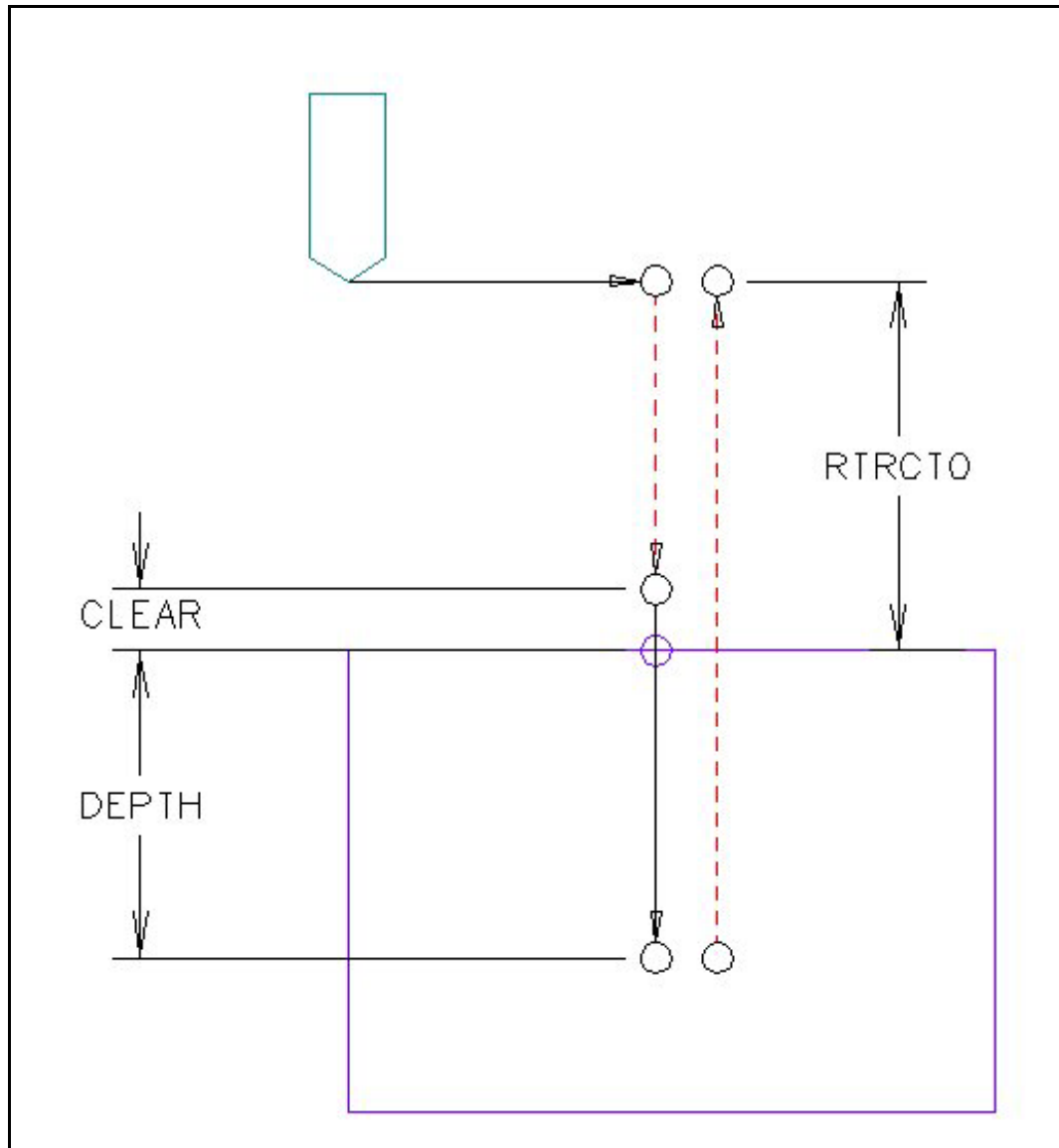
CYCLE/ THREAD, DIAMTR, c, DEPTH, d, PITCH, k, UPM, f
UPR

where: c = Clearance from part surface
d = Depth from part surface
f = Feed rate in either IPM,IPR,MMPM,MMPR
(thread LEAD or Threads Per Inch for TAP)
p = Dwell at bottom of operation in either
seconds or REVolutions
q = Delta step depth for DEEP or BRKCHP drill
k = Pitch value for helical milling cycle
s = Radial pass depth of cut

Note: TAP or Counter TAP cycle is selected based on
programmed spindle direction G84 for (CLW) or
G74 for (CCLW)

CYCLE/ CBORE, DEPTH, d, CLEAR, c, **RTRCTO** [, value]

RTRCTO modifier can be added to all cycle types
to output G98 vs G99 on cycle activation. The
value following the RTRCTO specifies the initial
Z value above the reference plane. If no value is
programmed the initial Z will be at the CLEARP
height (See CLEARP syntax)



APT Syntax

CYCLE / DRILL, DEPTH, 1.0, CLEAR,.06, IPM, 10,

Example machine code

GOTO / 5.0, 7.5, 0.0 ==> G81 G99 X5. Y7.5 Z-1. R.06 F10

DEBUG Syntax

Postprocessor syntax used to display internal information during postprocessing.

Effect of the configuration file on the DEBUG output:

None

Effect of the DEBUG syntax on the configuration file:

None

APT Syntax:

DEBUG/ SEC4, n

Where: n = An integer number specifying the level of displayed information

DISPLY syntax.

APT syntax used to specify comments in the output listing file and the machine code file.

Effect of the configuration file on DISPLY output:

None.

Effect of DISPLY syntax on the configuration file:

None.

APT Syntax

DISPLY character text

Where: character_text = alpha-numeric character string will be
included in machine code file.

APT Example

Example machine code

DISPLY THIS IS A MESSAGE ==> (THIS IS A MESSAGE)

DELAY syntax.

APT syntax used to specify the desired program dwell to the machine code file.

Effect of the configuration file on DELAY output:

Word address and format of PP register

Effect of DELAY syntax on the configuration file:

None

APT Syntax

DELAY / REV, r
s

where: s = Dwell in (SEConds or REVolutions)

APT Example:

DELAY / 2, SEC

Example machine code

====> G04 P2.0

END syntax.

APT syntax used to specify the end of the program. Mostly used for continuous loop to the program start type of programs.

Effect of the configuration file on END output:

Word address and format of M5 register.
Values set with M5 register in configuration file.
Contents of the PRGEND macro.

Effect of END syntax on the configuration file:

None

Syntax

END

APT Example

END

====>

Example machine code

M09

G0 G53 H0 Z0.

X0. Y0.

M2

FEDRAT syntax.

APT syntax used to specify the desired feed rate to the machine code file. If syntax is specified after LOAD and before GOTO syntax the output will be held for output by RESTAR macro.

Effect of the configuration file on FEDRAT output:

Word address and format of FF register

Effect of FEDRAT syntax on the configuration file:

Sets value of FEED variable for use in Macro section

Syntax:

FEDRAT / (UPM), f
 UPR
 IPM
 IPR
 MMPM
 MMPR

where: f = feed rate value in the specified units

APT Example:	Example machine code
-----	-----
FEDRAT / 8, IPM	===>
GOTO / 5.0, 6.0, 0.0	===> G01 X5. Y6. Z0. F8.

FINI syntax.

APT syntax used to specify the end of the program input. This syntax causes the postprocessor to produce reports in specific output files and close all input and output files.

Effect of the configuration file on FINI output:

SET/ FOOTER in section one of configuration file.

Effect of FINI syntax on the configuration file:

None

APT Syntax

FINI

FROM syntax.

APT syntax used to specify the initial machine position at program start. The values of X,Y & Z axis specified set the postprocessor HOME positions. This syntax must be specified prior to first LOAD and GOTO syntax. This syntax output the initial machine code block.

Effect of the configuration file on FROM output:

Contents of the FROM Macro in section three.

Effect of FROM syntax on the configuration file:

None.

APT Syntax:

FROM / x, y, z [,i ,j ,k]

APT Example

FROM / 0, 0, 0

Example machine code

==> G90 G20 G80 G40

GODLTA syntax.

APT syntax used to specify an incremental machine position relative to the previous motion. The values of X,Y & Z axis specified are the incremental values. The I J & K values are the vector components of the unit tool axis.

Effect of the configuration file on GODLTA output:

None.

Effect of the FROM syntax on the configuration file:

None.

APT Syntax:

GODLTA / x, y, z [,i ,j ,k]

APT Example

GOTO / 1.0, 2.0, 3.0, 0.0, 0.0, 1.0

GODLTA / 0.0, 0.0, .50, 0.0, 0.0, 1.0 ==> X1.0 Y2.0, Z3.5

Example machine code

GOHOME syntax.

APT syntax used to specify machine motion to the machine home position.

Effect of the configuration file on GOHOME output:

Contents of GOHOME macro in section three of configuration file.

Effect of the GOHOME syntax on the configuration file:

Sets value of HOMEX, HOMEY and HOMEZ variables for use in Macro section.

APT Syntax:

GOHOME [/ XAXIS][, YAXIS][,ZAXIS]

Example:

FROM / 0, 0, 0

GOHOME/ ZAXIS

Example machine code

==> G90 G20 G80 G40

==> G91 G28 Z0.

GOTO syntax.

APT syntax used to specify the desired linear machine motion. The first GOTO syntax after LOAD/TOOL syntax causes the RESTAR macro activation.

Effect of the configuration file on GOTO output:

SET/ CLIPZ, value is used to ignore GOTO if Z-axis is over value.
Word address and format of G1, XX, YY, & ZZ registers.
First GOTO after LOAD/TOOL syntax activates RESTAR macro.

Effect of the GOTO syntax on the configuration file:

None.

Syntax:

GOTO / x, y, z [,i ,j ,k]

where: x, y, z = coordinate position
i, j, k = tool axis vector components

if RAPID and x = 0 and y = 0 and z > CLIPZ value then motion is ignored

APT Example: Example machine code

GOTO / 1, 2, 3 ==> G01 X1. Y2. Z3.

INDIRV syntax.

APT syntax used before a CIRCLE or CYLNDR syntax to indicate the direction of travel on the circle by using unit vector components as a direction vector from the current position.

Effect of the configuration file on INDIRV output:

None.

Effect of the INDIRV syntax on the configuration file:

None.

APT Syntax:

INDIRV/ X-Component, Y-Component, Z-Component

Example:

INDIRV / 1, 0, 0 direction in plus X-axis

INSERT syntax.

APT syntax used to specify a literal output machine block. This syntax is not checked for correctness or completeness. This syntax is mostly used to output blocks of special characters. Use of '/' immediately following INSERT causes sequence numbers to be added immediately before character text.

Effect of the configuration file on INSERT output:

None.

Effect of the INSERT syntax on configuration file usage:

None.

APT Syntax:

INSERTcharacter text

or

INSERT/character text

APT Example:

Example machine code

INSERTG80G49

====> G80G49

INSERT/G80G49

====> N12G80G49

INTOL Syntax.

This APT syntax specifies the tolerance used when creating linear tool path points inside the part drive surface CIRCLE or CYLNDR.

Effect of the configuration file on INTOL output:

None.

Effect of the INTOL syntax on configuration file usage:

None.

APT Syntax

INTOL / value

Where: value = The distance from the circle allowed.

LIMITS Syntax.

APT syntax used to specify the axis limits for the machining envelope of the part to be machined.

Effect of the configuration file on LIMITS output:

None.

Effect of LIMITS syntax on configuration file useage:

Limits (XAXIS,YAXIS,ZAXIS,AAXIS & BAXIS) can be specified in the program using the LIMITS syntax overriding limit values in the configuration file and MACHIN syntax.

Syntax:

LIMITS/ [XAXIS,min,max][,YAXIS,min,max][,ZAXIS,min,max][,AAXIS,min,max] \$
[,BAXIS,min,max]

OFF

ON

Example:

LIMITS/ XAXIS,-20,20, YAXIS,-10,10, ZAXIZ,0,20

LOAD or LOADTL syntax.

APT syntax used to specify the desired TOOL change to the machine code file. If syntax is used in conjunction with the CUTTER syntax to completely define the tool.

Effect of the configuration file on LOAD output:

- Use of SELECT/TOOL,AUTO in section one
- Use of SET/TOOL,MAX,value in section one
- Use of SET/TOOL,LIST,ON in section one
- Word address and format of TT & M1 register
- Contents of RETRCT, TLCHG, TLCHG1 & RESTAR macros

Effect of LOAD syntax on configuration file useage:

Sets value of CURTL, NEXTL & GAGEZ variables for use in Macro section

Syntax:

LOAD/ type, t [, LENGTH, z][, ADJUST, h][, MANUAL]
LOADTL/

where: type = tool type (Tool, MILL or DRILL)

t = tool number

z = set length of tool

h = length compensation register

Example:

----- -----
LOAD/ TOOL, 1 ===> T01 M06

MACHIN syntax.

APT syntax used to specify the desired postprocessor, configuration file, UNITS, and Axis limits. The MACHIN syntax should be programmed in the beginning of the program.

Effect of the configuration file on MACHIN output:

None.

Effect of the MACHIN syntax on configuration file usage:

Specifies the name of the configuration file (.cfg) for the required machine tool. If configuration file name is not specified or file is not found the postprocessor will prompt the user for the configuration file name.

UNITS and limits (XAXIS,YAXIS & ZAXIS) can be specified in the program using the MACHIN syntax overriding UNITS and LIMITS in the configuration file.

Syntax:

```
MACHIN/ vmc4x, mchtool [,UNITS,INCHES,OUT,MM]  [,ON ]
          MM      INCHES  OFF
                      [,XAXIS,min,max][,YAXIS,min,max]
                      [,ZAXIS,min,max]
```

vmc4x - specifies the postprocessor executable (example)

mchtool - specifies the machine tool configuration (example)

Example:

```
MACHIN / NEXUS, FUS410, UNITS,INCHES, OUT,INCHES, OFF
```

MODE syntax.

APT syntax used to specify the desired machining mode to the machine code file.

Effect of the the configuration file on MODE output:

None.

Effect of the MODE syntax on configuration file use:

None.

Syntax:

MODE/ INCHES

MM

XYPLAN

YZPLAN

ZXPLAN

APT Example:

Example machine code

MODE / INCH ==> G20

MODE / MM ==> G21

NOCYCL syntax.

APT syntax used to specify no output of CYCLE on next motion (GOTO syntax)..

Effect of the configuration file on FEDRAT output:

None.

Effect of the FEDRAT syntax on configuration file use:

None.

APT Syntax

NOCYCL

APT Example

NOCYCL

GOTO/ 1.0, 2.0, 0.0

Example machine code

==> X1. Y2. L0

OPSKIP syntax.

APT syntax used to specify a block delete code to the machine code file.

Effect of the configuration file on OPSKIP output:

None.

Effect of the OPSKIP syntax on configuration file use:

None.

AP Syntax:

OPSKIP [/ ON]
/ OFF

APT Example:

OPSKIP ===>
GOTO/ 1,2,3 ===>

Example machine code

No output
/N1234 G01 X1. Y2. Z3.

OPSTOP syntax.

APT syntax used to specify an optional stop code to the machine code file.

Effect of the configuration file on OPSTOP output:

Word address and format of M5 register.
Values specified with M5 register.

Effect of the OPSTOP syntax on configuration file use:

None.

APT Syntax:

OPSTOP

APT Example: Example machine code

----- -----
OPSTOP ==> M01

ORIGIN syntax

APT syntax used to specify the desired coordinate system origin. If syntax is specified after LOAD and before GOTO syntax the output will be held for output by RESTAR macro.

Effect of the configuration file on ORIGIN output:

Word address and format of G10 register.
Values defined for G10 register.

Effect of the ORIGIN syntax on configuration file use:

Sets value of FIXTUR variable for use in Macro section

Syntax:

ORIGIN / FIXTUR, m

ORIGIN / DATUM, x, y, z

ORIGIN / x, y, z

where: m = work coordinate system select (FIXTUR)

0 = 1st value (G53)

1 = 2nd value (G54)

2 = 3rd value (G55)

3 = 4th value (G56)

4 = 5th value (G57)

5 = 6th value (G58)

6 = 7th value (G59)

ORIGIN/ DATUM x, y & z = values output with 7th value of G10 (G92)

ORIGIN/ x, y & z = values are subtracted from following GOTO x, y, z
(translation)

APT Example

Example machine code

ORIGIN / FIXTUR, 2 ==> G55

ORIGIN / DATUM, 1, 2, 3 ==> G92 X1, Y2. Z3.

ORIGIN / 10, 5, 2 ===> No output
GOTO/ 1, 2, 3 ===> G00 X-9. Y-3. Z1.

OUTTOL Syntax

This APT syntax specifies the tolerance used when creating linear tool path points outside the part drive surface CIRCLE or CYLNDR.

Effect of the configuration file on OUTTOL output:

None.

Effect of the OUTTOL syntax on configuration file use:

None.

APT Syntax

OUTTOL / value

Where: value = Distance from the circle allowed.

Example:

OUTTOL/ .010

PARTNO syntax

APT syntax used to specify the desired Program ID and part information to the machine code file. The PARTNO syntax should be programmed in the beginning of the part program.

Effect of the configuration file on PARTNO output:

Contents of START macro in configuration file

Effect of the PARTNO syntax on configuration file use:

Sets value of PROGID variable for use in Macro section.

Sets value of PARTNO variable for use in Macro section.

APT Syntax

PARTNO numeric_id character_text

Where: numeric_id = numeric value specifying Program ID (PROGID).

character_text = text string specifying the Part
Information (PARTNO).

APT Example

Example machine code

PARTNO 1234 OPERATION A ====> %
O1234 (OPERATION A)

PIVOTZ syntax

APT syntax used to specify the distance from part zero to center of rotation of A-axis. The PIVOTZ syntax should be programmed before any tool motion resulting in A-axis rotation. This syntax is not required for 3-axis programs

Effect of the configuration file on PIVOTZ output:

PIVOTZ/ n can be used in section one to set default value.

Effect of the PIVOTZ syntax on configuration file use:

Sets value of PIVOTZ variable for use in Macro section

Syntax:

PIVOTZ/ n

where: n = distance from part zero to center-line of a-axis

APT Example

Example machine code

PIVOTZ / 6.75

====> None

PLABEL syntax

APT syntax used to specify blocks of machine code ISO data to the NCData file. The format of this data is specified the same as in the configuration file macros. This format contains machine code sequences constructed using the predefined registers and their values enclosed in parentheses. The syntax for these records is shown and is described in the following examples:

Example:

```
PLABEL/M2(9)$          $$ Coolant Off
PLABEL/G0(28) G3(91) YY(5.25) ZZ(CLEARP)$  $$ Machine Zero Y & Z-axis
PLABEL/"(REMOVE ALL CLAMPS)"
```

The \$\$ can be used for documentation as shown and is ignored by the postprocessor. Each record must end with a single \$ representing the end of block character. Each record can contain registers followed by a pair of parentheses () or text enclosed in a pair of double quotes "". Parentheses and quotes can not be mixed in a record. Key words representing postprocessor variable can also be used inside the register parentheses as follows:

() - Empty parentheses specifies that the current value of the register will be output.

(9) – A numeric value specifies that the register is to be output with the given numeric value according to the REGDEF format in section two of the configuration file. The value can be specified with or without a decimal point.

(CLEARP) – A single key word that represents a postprocessor numeric value can be specified.

Each register and parentheses pair must be separated from the next by a space character. The end of block (\$ character) is not separated by a space and can be then followed by a comment beginning with a \$\$.

PPRINT syntax

APT syntax used to specify comments in the output listing file and conditionally to the machine code file. If the PPRINT syntax is specified before the first CUTTER syntax and SET/PPRINT,LIST,ON is used in the configuration file the output will be displayed in the machine code file as comments.

Effect of the configuration file on PPRINT output:

SET/PPRINT,LIST,ON in section one of the configuration file

Effect of the PPRINT syntax on configuration file use:

None.

APT Syntax

PPRINT character text

PPRINT(character text)

Where: character_text = alpha-numeric character string and
(character_text) = character text enclosed in () will also be
included in machine code file.

APT Example

Example machine code

PPRINT(THIS IS A MESSAGE) ==> (THIS IS A MESSAGE)

PPLIST syntax

APT syntax used to specify the format of the output for the NC listing (.NCL) file.

Effect of the configuration file on PPLIST output:

None.

Effect of the PPLIST syntax on configuration file use:

None.

APT Syntax

PPLIST/ OFF - Turns off output to listing file.
MIXED - MIXED APT and Machine Code in listing.
FORMAT - Classic column formatted listing.

PREFUN syntax

Output an preparatory machine function using the G0 register. This code is usually output with a “G” letter and a two digit integer code, but depends on the word address and format specification of the predefined G0 register.

Effect of the configuration file on PREFUN output:

Word address and format of G0 register

Effect of the PREFUN syntax on configuration file use:

None

APT Syntax

PREFUN / g

where: g = G-code

APT example

PREFUN / 98

Example machine code

==> G98

RAPID syntax

APT syntax used to specify a rapid motion to the next cutter path point (GOTO syntax).
This syntax is not modal and must be specified for each GOTO syntax

Effect of the configuration file on RAPID output:

Defines the G1 register code used for RAPID motion G1(0).

Effect of the RAPID syntax on configuration file use:

None.

APT Syntax

RAPID

APT example

RAPID

GOTO/ 1.0, 2.0, 3.0

Example machine code

GO X1. Y2. Z3.

RETRCT syntax

APT syntax used to specify a retract Z-axis motion to the predefined clearance plane.

Effect of the configuration file on RETRCT output:

Uses the value of CLEARP for clearance plane.

Effect of the RETRCT syntax on configuration file use:

None.

APT Syntax

RETRCT [/ON]

OFF

APT example

RETRCT/ON

GOTO/ 1.0, 2.0, 0.0 ==> G98 X1. Y2.

RETRCT/OFF

GOTO/ 4.0, 5.0, 0.0 ==> G99 X4. Y5.

CLEARP/ 6.0

RETRCT ==> G0 Z6.

Example machine code

REWIND syntax

APT syntax used at the end of the program (before FINI) to output a program (tape) rewind code (M30 typically).

Effect of the configuration file on REWIND output:

Uses the value of M2 register code M2(30).

Effect of the REWIND syntax on configuration file use:

None.

APT Syntax

REWIND

APT example

REWIND

Example machine code

M30

ROTATE syntax

APT syntax used to specify for output the desired coolant feature to the machine code file. If syntax is specified after LOAD and before GOTO syntax the output will be held for output by RESTAR macro.

Effect of the configuration file on ROTATE output:

None.

Effect of the ROTATE syntax on configuration file use:

None.

APT Syntax

ROTATE / AAXIS, ATANGL, a (,CLW)
INCR CCLW

where: a = angle of rotation

ATANGL = Absolute angle

INCR = Incremental angle

APT example

RAPID

ROTATE / AAXIS, ATANGL, 30 ==> G00 A30.

ROTATE / AAXIS, INCR, -45, 10 ==> G01 A-15 F10.

Example machine code

SEQNO syntax

APT syntax used to specify the sequence numbers (N) assigned to the machine code records (blocks).

Effect of the configuration file on SEQNO output:

Uses the value of NN register.

Effect of the SEQNO syntax on configuration file use:

None.

APT Syntax

SEQNO/ n, INCR, I	Specifies sequence start and increment values.
ON	Turns sequence numbering off.
OFF	Turns sequence numbering on.

Where:

n = Start number

I = Increment number

APT example

SEQNO/ 10, INCR, 5

Example machine code

N10...

N15...

N20...

SPINDL syntax

APT syntax used to specify spindle speed for output to the machine code file. If syntax is specified after LOAD and before GOTO syntax the output will be held for output by RESTAR macro.

Effect of the configuration file on SPINDL output:

Word address and format of SS & M3 register
Values for minor words set with M3 register

Effect of the SPINDL syntax on configuration file use:

Sets value of RPM variable for use in Macro section

APT Syntax

SPINDL / (RPM) ,s (,CLW)
SFM CCLW
MAXRPM, s

SPINDL / s (,RPM)(,CLW)
CCLW

where: s = Spindle speed in RPM or SFM

APT example Example machine code

----- -----
SPINDL / RPM, 600, CLW ==> S600 M03

STOP syntax

APT syntax used to specify a program machine stop to the machine code file. The first motion after STOP will be output by RESTAR macro.

Effect of the configuration file on STOP output:

Word address and format of M5 register.
Values for minor words set with M5 register.
The first motion after STOP will be output by RESTAR macro.

Effect of the STOP syntax on configuration file use:

None.

APT syntax

STOP

APT example

STOP

====>

Example machine code

M00

TLAXIS syntax

APT syntax used to define the desired tool axis for 3-axis machining by specifying a 3D unit vector.

Effect of the configuration file on TLAXIS output:

None.

Effect of the TLAXIS syntax on configuration file use:

None.

APT syntax

TLAXIS / i, j, k

where: i, j, k = values of 3D unit vector components

APT example

Example machine code

TLAXIS / .00000, .00000, 1.00000 ==> No output

TPRINT syntax

APT syntax used to specify tool comments in the output listing file and to the machine code file. The TPRINT syntax must be used prior to each LOAD /TOOL syntax. The postprocessor will collect all the TPRINTs in the part program and output them as comments at the beginning of the machine code file if SET/TOOL,LIST,ON is specified in section one of the configuration file.

Effect of the configuration file on PPRINT output:

SET/TOOL,LIST,ON in section one of the configuration file

Effect of the PPRINT syntax on configuration file use:

None.

APT Syntax

TPRINT character text

Where: character_text = alpha-numeric character string and

APT Example

Example machine code

TPRINT 1/2-13 TAP 6.500 LGH ==> (1/2-13 TAP 6.500 LGH)
LOAD/TOOL,4,LENGTH,6.5

TRANS syntax

APT syntax used to specify a desired translation on the part coordinate system.

Effect of the configuration file on TRANS output:

None.

Effect of the TRANS syntax on configuration file use:

None.

APT syntax

TRANS / x, y, z

where: x, y, z = values are added to all following motions

APT example:	Example machine code
--------------	----------------------

TRANS / .5, .5, 0	==> No output
-------------------	---------------

GOTO / 1, 2, 3	==> G00 X1.5 Y2.5 Z3.
----------------	-----------------------

Example APT source Part Program file.

```
$$ -----
$$      Generated on Wednesday, November 05, 2003 11:31:57 AM
$$      CATIA APT VERSION 1.0
$$ -----
$$ MANUFACTURING OPERATION A
PPRINT MANUFACTURING PROGRAM DESCRIPTION
$$ 12345 PART OPERATION A TEST
$$*CATIA0
$$ MANUFACTURING OPERATION A
$$      1.00000      0.00000      0.00000      0.00000
$$      0.00000      1.00000      0.00000      0.00000
$$      0.00000      0.00000      1.00000      0.00000
MACHIN/VMC4X,HAAS,UNITS,INCHES,OUT,INCHES,OFF
PARTNO 12345 PART OPERATION A TEST GENERIC FANUC VMC4X
$$ OPERATION NAME : DEFINE PART SETUP
$$ Start generation of : DEFINE PART SETUP
PPRINT MAKE FROM 8.5" X 4.5" X .5" ALUMINUM STOCK
PPRINT LOCATE PART ZERO AT:
PPRINT      X = IN FROM LEFT EDGE OF STOCK .5"
PPRINT      Y = IN FROM FRONT EDGE OF STOCK .5"
PPRINT      Z = BOTTOM OF STOCK
CLEARP/1.0
$$ End of generation of : DEFINE PART SETUP
$$ OPERATION NAME : Tool Change.2
$$ Start generation of : Tool Change.2
TLAXIS/ 0.000000, 0.000000, 1.000000
FROM /      0.00000,      0.00000,      6.00000
$$ TOOLCHANGEBEGINNING
CUTTER/  1.000000,  0.000000,  0.500000,  0.000000, 45.000000,$
        0.000000,  1.500000
TPRINT/T2 - SPOT DRILL 90 DEG
LOAD/TOOL,2,LENGTH,      4.528000
$$ TOOLCHANGEEND
$$ End of generation of : Tool Change.2
$$ OPERATION NAME : SPOT DRILL 4 PLACES
$$ Start generation of : SPOT DRILL 4 PLACES
SPINDL/RPM, 1050.0000,CLW
RAPID
GOTO /      0.50000,      0.50000,      0.60000
CYCLE/DRILL,DEPTH,      0.125000,CLEAR,      0.100000,DWELL,      2.000000,$
IPM,      5.000000,RTRCTO,      0.000000
GOTO /      0.50000,      0.50000,      0.50000
GOTO /      0.50000,      3.50000,      0.50000
GOTO /      7.50000,      3.50000,      0.50000
GOTO /      7.50000,      0.50000,      0.50000
CYCLE/OFF
$$ End of generation of : SPOT DRILL 4 PLACES
$$ OPERATION NAME : Tool Change.7
$$ Start generation of : Tool Change.7
$$ TOOLCHANGEBEGINNING
CUTTER/  0.500000,  0.005000,  0.245000,  0.005000,  0.000000,$
```

```

0.000000, 2.000000
TPRINT/T3 - END MILL .50 DIA
LOAD/TOOL,3,LENGTH, 4.000000
COOLNT/ON
$$ TOOLCHANGEEND
$$ End of generation of : Tool Change.7
$$ OPERATION NAME : DRILL 4 HOLES
$$ Start generation of : DRILL 4 HOLES
SPINDL/RPM, 1200.0000,CLW
RAPID
GOTO / 7.50000, 3.50000, 0.70000
CYCLE/DRILL,DEPTH, 0.500000,CLEAR, 0.200000,IPM, 12.000000,$
RTRCTO, 0.000000
GOTO / 7.50000, 3.50000, 0.50000
GOTO / 7.50000, 0.50000, 0.50000
GOTO / 0.50000, 3.50000, 0.50000
CYCLE/OFF
$$ End of generation of : DRILL 4 HOLES
$$ OPERATION NAME : Tool Change.3
$$ Start generation of : Tool Change.3
$$ TOOLCHANGEBEGINNING
CUTTER/ 0.375000, 0.000000, 0.187500, 0.108253, 30.000000,$
0.000000, 2.000000
TPRINT/T4 - TWIST DRILL .375 DIA
LOAD/TOOL,4,LENGTH, 4.000000
COOLNT/ON
$$ TOOLCHANGEEND
$$ End of generation of : Tool Change.3
$$ OPERATION NAME : DEEP DRILL 4 HOLES
$$ Start generation of : DEEP DRILL 4 HOLES
SPINDL/RPM, 1250.0000,CLW
RAPID
GOTO / 0.50000, 0.50000, 0.60000
CYCLE/DEEP,DEPTH, 0.500000,CLEAR, 0.100000,STEP, 0.250000,IPM,$
12.000000,RTRCTO, 0.000000
GOTO / 0.50000, 0.50000, 0.50000
GOTO / 0.50000, 3.50000, 0.50000
GOTO / 7.50000, 3.50000, 0.50000
GOTO / 7.50000, 0.50000, 0.50000
CYCLE/OFF
$$ End of generation of : DEEP DRILL 4 HOLES
$$ OPERATION NAME : Tool Change.5
$$ Start generation of : Tool Change.5
$$ TOOLCHANGEBEGINNING
CUTTER/ 0.500000, 0.000000, 0.250000, 0.000000, 0.000000,$
0.000000, 0.625000
TPRINT/T6 - COUNTER BORE DIA .50
LOAD/TOOL,6,LENGTH, 4.000000
COOLNT/ON
$$ TOOLCHANGEEND
$$ End of generation of : Tool Change.5
$$ OPERATION NAME : COUNTER BORE 4 HOLES
$$ Start generation of : COUNTER BORE 4 HOLES
SPINDL/RPM, 950.0000,CLW
RAPID
GOTO / 0.50000, 0.50000, 0.78750
CYCLE/CBORE,DEPTH, 0.100000,CLEAR, 0.100000,DWELL, 2.000000,$

```

```

IPM, 12.000000,RTRCTO, 0.000000
GOTO / 0.50000, 0.50000, 0.50000
GOTO / 0.50000, 3.50000, 0.50000
GOTO / 7.50000, 3.50000, 0.50000
GOTO / 7.50000, 0.50000, 0.50000
CYCLE/OFF
$$ End of generation of : COUNTER BORE 4 HOLES
$$ OPERATION NAME : Tool Change.4
$$ Start generation of : Tool Change.4
$$ TOOLCHANGEBEGINNING
CUTTER/ 0.50000, 0.005000, 0.245000, 0.005000, 0.000000,$
0.000000, 2.000000
TPRINT/T3 - END MILL .50 DIA
LOAD/TOOL,3,LENGTH, 4.000000
COOLNT/ON
$$ TOOLCHANGEEND
$$ End of generation of : Tool Change.4
$$ OPERATION NAME : PROFILE CONTOUR OUTSIDE
$$ Start generation of : PROFILE CONTOUR OUTSIDE
FEDRAT/IPM, 30.0000
SPINDL/RPM, 1050.0000,CLW
GOTO / 1.00000, -1.00000, 0.50000
GOTO / 1.00000, -1.00000, 0.00000
CUTCOM/LEFT
GOTO / 1.00000, -0.75000, 0.00000
INTOL / 0.00394
OUTTOL/ 0.00000
AUTOPS
INDIRV/ 0.00000, 1.00000, 0.00000
TLON,GOFWD/ (CIRCLE/ 0.50000, -0.75000, 0.00000,$
0.50000),ON,(LINE/ 0.50000, -0.75000, 0.00000,$
0.50000, -0.25000, 0.00000)
FEDRAT/IPM, 5.0000
INDIRV/ -1.00000, 0.00000, 0.00000
TLON,GOFWD/ (CIRCLE/ 0.50000, 0.50000, 0.00000,$
0.75000),ON,(LINE/ 0.50000, 0.50000, 0.00000,$
-0.25000, 0.50000, 0.00000)
GOTO / -0.25000, 3.50000, 0.00000
INDIRV/ 0.00000, 1.00000, 0.00000
TLON,GOFWD/ (CIRCLE/ 0.50000, 3.50000, 0.00000,$
0.75000),ON,(LINE/ 0.50000, 3.50000, 0.00000,$
0.50000, 4.25000, 0.00000)
GOTO / 7.50000, 4.25000, 0.00000
INDIRV/ 1.00000, 0.00000, 0.00000
TLON,GOFWD/ (CIRCLE/ 7.50000, 3.50000, 0.00000,$
0.75000),ON,(LINE/ 7.50000, 3.50000, 0.00000,$
8.25000, 3.50000, 0.00000)
GOTO / 8.25000, 0.50000, 0.00000
INDIRV/ 0.00000, -1.00000, 0.00000
TLON,GOFWD/ (CIRCLE/ 7.50000, 0.50000, 0.00000,$
0.75000),ON,(LINE/ 7.50000, 0.50000, 0.00000,$
7.50000, -0.25000, 0.00000)
GOTO / 0.50000, -0.25000, 0.00000
FEDRAT/IPM, 50.0000
INDIRV/ -1.00000, 0.00000, 0.00000
TLON,GOFWD/ (CIRCLE/ 0.50000, -0.75000, 0.00000,$
0.50000),ON,(LINE/ 0.50000, -0.75000, 0.00000,$

```

```

                                0.00000,      -0.75000,      0.00000)
CUTCOM/OFF
GOTO /      0.00000,      -1.00000,      0.00000
GOTO /      0.00000,      -1.00000,      0.50000
$$ End of generation of : PROFILE CONTOUR OUTSIDE
$$ OPERATION NAME : PROFILE CONTOUR INSIDE
$$ Start generation of : PROFILE CONTOUR INSIDE
FEDRAT/IPM,      30.0000
SPINDL/RPM, 1050.0000,CLW
GOTO /      4.99103,      1.03349,      0.75000
GOTO /      4.99103,      1.03349,      0.25000
CUTCOM/LEFT
GOTO /      5.20753,      1.15849,      0.25000
AUTOPS
INDIRV/      0.86603,      0.50000,      0.00000
TLON,GOFWD/      (CIRCLE/      5.08253,      1.37500,      0.25000,$
      0.25000),ON,(LINE/      5.08253,      1.37500,      0.25000,$
                                5.29904,      1.50000,      0.25000)

FEDRAT/IPM,      5.0000
GOTO /      4.43301,      3.00000,      0.25000
INDIRV/      -0.50000,      0.86603,      0.00000
TLON,GOFWD/      (CIRCLE/      4.00000,      2.75000,      0.25000,$
      0.50000),ON,(LINE/      4.00000,      2.75000,      0.25000,$
                                3.56699,      3.00000,      0.25000)

GOTO /      2.70096,      1.50000,      0.25000
INDIRV/      -0.50000,      -0.86603,      0.00000
TLON,GOFWD/      (CIRCLE/      3.13397,      1.25000,      0.25000,$
      0.50000),ON,(LINE/      3.13397,      1.25000,      0.25000,$
                                3.13397,      0.75000,      0.25000)

GOTO /      4.86603,      0.75000,      0.25000
INDIRV/      1.00000,      0.00000,      0.00000
TLON,GOFWD/      (CIRCLE/      4.86603,      1.25000,      0.25000,$
      0.50000),ON,(LINE/      4.86603,      1.25000,      0.25000,$
                                5.29904,      1.50000,      0.25000)

FEDRAT/IPM,      50.0000
INDIRV/      -0.50000,      0.86603,      0.00000
TLON,GOFWD/      (CIRCLE/      5.08253,      1.37500,      0.25000,$
      0.25000),ON,(LINE/      5.08253,      1.37500,      0.25000,$
                                4.95753,      1.59151,      0.25000)

CUTCOM/OFF
GOTO /      4.74103,      1.46651,      0.25000
GOTO /      4.74103,      1.46651,      0.75000
$$ End of generation of : PROFILE CONTOUR INSIDE
$$ OPERATION NAME : HELICAL MILL CENTER HOLE
$$ Start generation of : HELICAL MILL CENTER HOLE
SPINDL/RPM, 1200.0000,CLW
RAPID
GOTO /      4.00000,      1.75000,      0.35000
CYCLE/MILL,1,DIAMTR,      2.000000,PITCH,      0.125000,DEPTH,      0.350000,$
NPASS,2,STEP,      0.200000,IPM,      12.000000
GOTO /      4.00000,      1.75000,      0.25000
CYCLE/OFF
$$ End of generation of : HELICAL MILL CENTER HOLE
$$ OPERATION NAME : Tool Change.6
$$ Start generation of : Tool Change.6
$$ TOOLCHANGEBEGINNING
CUTTER/      0.921260,      0.000000,      0.460630,      0.000000,      0.000000,$

```

```

      0.000000,  1.969000
TPRINT/T11 - THREAD MILL 1.0 DIA
LOAD/TOOL,11,LENGTH,    3.937000
COOLNT/ON
$$ TOOLCHANGEEND
$$ End of generation of : Tool Change.6
$$ OPERATION NAME : THREAD MILL CENTER HOLE
$$ Start generation of : THREAD MILL CENTER HOLE
SPINDL/RPM, 1200.0000,CLW
RAPID
GOTO /    4.00000,    1.75000,    0.45000
CYCLE/THREAD,2,DIAMTR,    2.000000,PITCH,    0.083300,DEPTH,$
      0.450000,IPM,    12.000000
GOTO /    4.00000,    1.75000,    0.25000
CYCLE/OFF
$$ End of generation of : THREAD MILL CENTER HOLE
SPINDL/OFF
END
FINI

```