

Custom Macro B and Extended Custom Macro Common Variables

Option Codes		
S16/18/21	S15	S0
J873	J883	J821

Custom Macro B extends the standard G-code part programming language to include the features of an easy-to-use, yet powerful computer programming language, enabling the part programmer to improve productivity by developing tools and subroutines that are specific to a company's part geometries or to their standard shop practices.

With the additional BASIC-like programming tools, and with read and write access to a wide range of CNC system information you can:

- ◆ Reduce part programming time by developing parametric programs for families of parts
- ◆ Simplify part programs by developing powerful new canned cycles for any geometry
- ◆ Automate tool and fixture offset settings by interfacing with a host of external devices, including tool and part probe systems
- ◆ Develop automated, standardized procedures to reduce setup time and improve quality
- ◆ Enhance Continuous Improvement and Total Quality Maintenance programs by collecting and recording production and status information
- ◆ Improve communications and reduce operator errors by displaying messages and printing data to serial devices

GE Fanuc's custom macro is the most popular CNC macro language and powerful examples may be downloaded from a host of third-party web sites. Instructor, video, computer-based and web-based training is available from GE Fanuc and several third party sources.

Call 1-800-GEFanuc for more information on a wide range of productivity enhancing options and upgrades, or visit www.gefanuc.com.

Language Features

- ◆ Local Variables for passing parameters and for intermediate calculations within a macro
- ◆ Common Variables shared by all macros
- ◆ Permanent Common Variables that keep their values even when power is turned off
- ◆ System Variables to read and write a variety of CNC data items and generate alarm messages
- ◆ Standard operations (add, subtract, multiply and divide)
- ◆ Trig Functions (Sin, Cosine, Tangent and their inverse)
- ◆ Math Functions (SQRT, ABS, ROUND, FIX, FUP, LN, EXP)
- ◆ Logical Bitwise Operators (AND, OR, XOR)
- ◆ Conversion Functions (BCD to BIN, BIN to BCD)
- ◆ Branching (IF-THEN and GOTO)
- ◆ Conditional Operators (equals, not equals, less than, less than or equal to, greater than, greater than or equal to)
- ◆ Loops (WHILE-DO-END)
- ◆ Variety of calling formats with parameters including defining custom G-codes and M-codes
- ◆ Printing of values to a serial port

Extended Common Variables (J887/J891/J883)

This option increases the number of common variables from 50 to 100, and the number of permanent common variables from 32 to 500 for most control series. The 15i-MA J883 option includes these 600 variables, but option J905 increases the number of permanent common variables to 800.

Bolt Hole Circle Example

A macro is created which drills H holes at intervals of B degrees after a start angle of A degrees on the circumference of a circle with radius I. The center of the circle is (X,Y). Commands can be specified in either the absolute or incremental mode. To drill in the clockwise direction, a negative value for B is specified.

Parameters are passed in the local variable equal to the ordinal value of the letter address (i.e. A=#1, B=#2...Z=#26).

G65 P9100 Xx Yy Zz Rr Ff Ii Aa Bb Hh

X: X coordinate of the center of the circle (#24)

Y: Y coordinate of the center of the circle (#25)

Z: Hole depth (#26)

R: Coordinates of an approach point (#18)

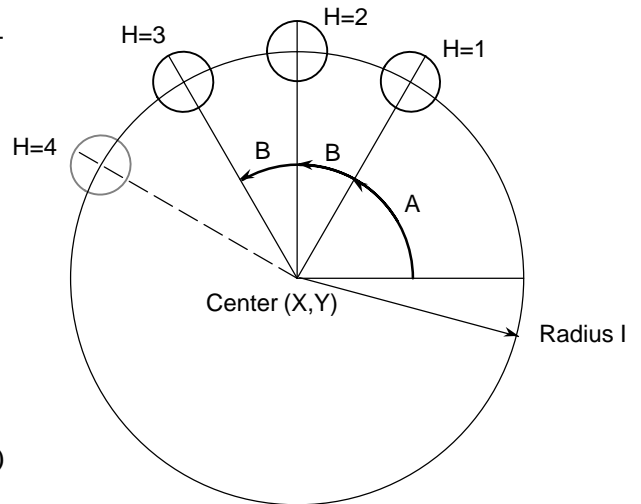
F: Cutting feedrate (#9)

I: Radius of the circle (#4)

A: Drilling start angle (#1)

B: Incremental angle (Clockwise when negative value) (#2)

H: Number of holes (#11)



Defining the Macro

O9100	(Define macro O9100)
#3=#4003	(Stores current group-3 G code, G90/G91, in local variable #3)
G81 Z#26 R#18 F#9 K0	(Selects drilling cycle, setting hole depth, approach point and feedrate)
IF[#3 EQ 90]GOTO 1	(Jumps to N1 if in G90 absolute mode)
#24=#5001+#24	(Calculates the absolute X coordinate of the center, if in G91)
#25=#5002+#25	(Calculates the absolute Y coordinate of the center, if in G91)
N1 WHILE[#11 GT 0]DO 1	(Loop until the number of remaining holes reaches zero)
#5=#24+#4*COS[#1]	(Calculates a drilling position on the X-axis, store in local variable #5)
#6=#25+#4*SIN[#1]	(Calculates a drilling position on the Y-axis, store in local variable #6)
G90 X#5 Y#6	(Performs drilling after moving to the target position, in G90 mode)
#1=#1+#2	(Updates the angle)
#11=#11-1	(Decrement the number of holes)
END 1	(End of loop construct)
G#3 G80	(Restores group-3 G code, G90/G91, to it's original state)
M99	(End of Macro definition)

Calling the Macro

In this example call the macro drills 5 holes at intervals of 45 degrees after a start angle of 0 degrees on the circumference of a circle with radius 4". The absolute center of the circle is (10", 5").

```
O0002
G90 G92 X0 Y0 Z4.0
G65 P9100 X10.0 Y5.0 R1.0 Z-2.0 F20 I4.0 A0 B45.0 H5
M30
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GE Fanuc Automation

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GFT-321