

2.9.4 CIRCULAR INTERPOLATION (G02, G03) (CONT'D)

G17 G02(G03) I... J... F... Ln ;

With this command, complete circular interpolations are repeated n times. Without an L designation, the interpolation is executed only once.

When a linear 4th axis option is used, circular interpolation is possible in the $X\alpha$, $Z\alpha$, and $Y\alpha$ planes in addition to the XY, YX, and ZY planes (where $\alpha = U, V, \text{ or } W$)

$X\alpha$ plane G17 $\left\{ \begin{matrix} G02 \\ G03 \end{matrix} \right\} X... \alpha... \left\{ \begin{matrix} R... \\ I... J... \end{matrix} \right\} F... ;$
 $Z\alpha$ plane G18 $\left\{ \begin{matrix} G02 \\ G03 \end{matrix} \right\} Z... \alpha... \left\{ \begin{matrix} R... \\ K... I... \end{matrix} \right\} F... ;$
 $Y\alpha$ plane G19 $\left\{ \begin{matrix} G02 \\ G03 \end{matrix} \right\} Y... \alpha... \left\{ \begin{matrix} R... \\ J... K... \end{matrix} \right\} F... ;$

NOTE:

G17 G02 X... $\left\{ \begin{matrix} R... \\ I... J... \end{matrix} \right\} F... ;$

Where address characters for the 4th axis is missing as in the above command, the XY plane is automatically selected. Circular interpolation cannot be performed on the axes including rotary 4th axis.

Circular paths covering two or more quadrants can be programmed in a single block. A complete closed circle can also be programmed.

EXAMPLE

G00 X0 Y0 ;
 G02 X0 Y0 I1000 J0 F100 ;
 ... complete circle

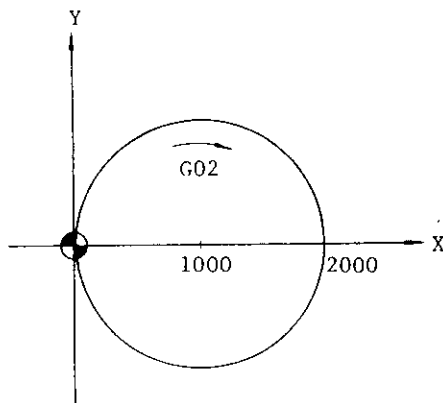


Fig. 2.16

When the coordinate values of the end point of a circular path is not exactly on the correct circular path due to calculation errors, etc., correction is made as shown below. Points 0 are commanded as end point. (See the figure below.)

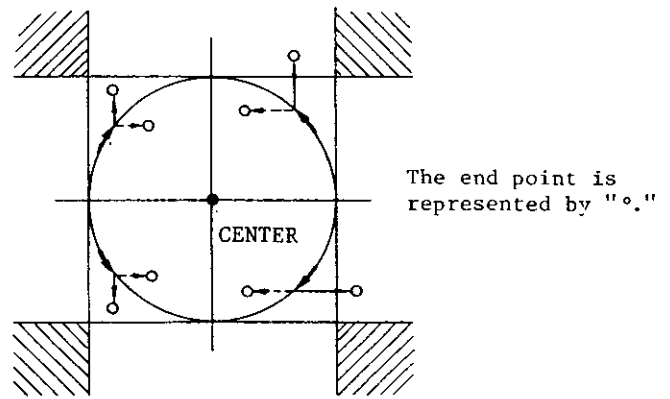


Fig. 2.17

When the end point is programmed in the hatched areas shown above, no alarm state is created, but the tool will keep on rotating. Especially when tool compensation is applied, coordinate values of the point and the center must be programmed accurately.

2.9.5 HELICAL INTERPOLATION (G02, G03)[†]

A circular interpolation on a certain plane, and a linear interpolation along an axis not included in that plane can be executed in synchronization, and this combined interpolation is called helical interpolation.