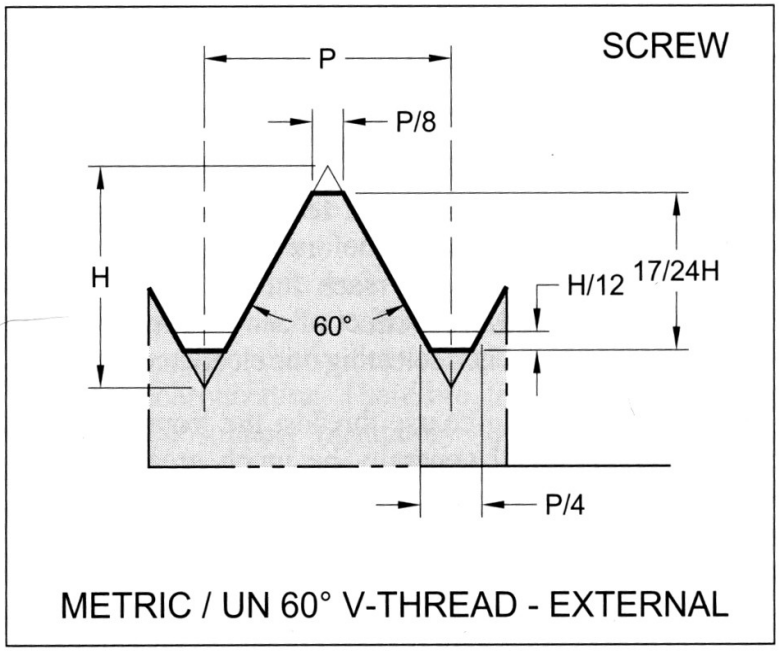
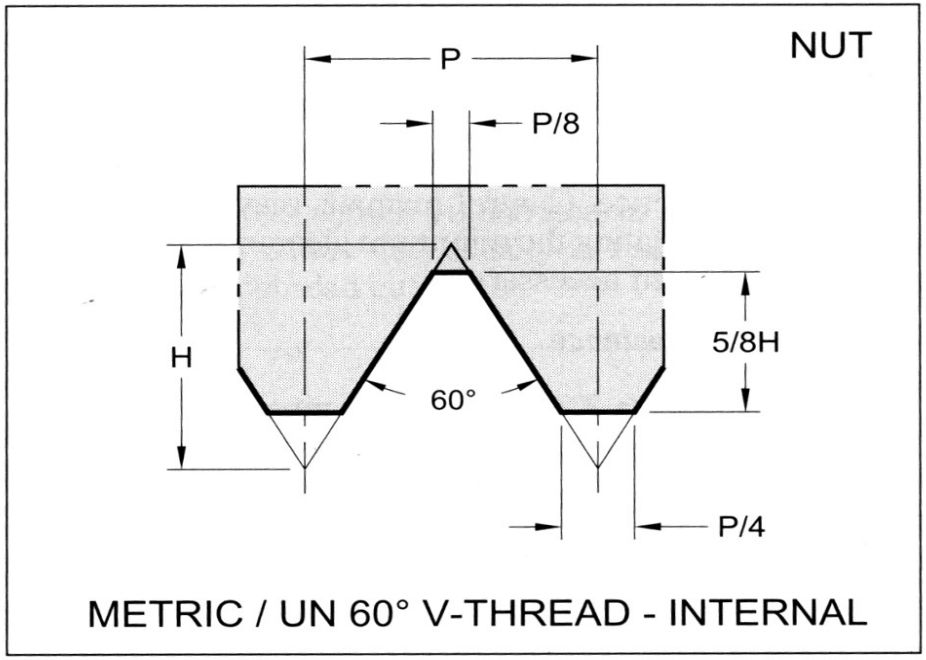
Computing Thread Parameters

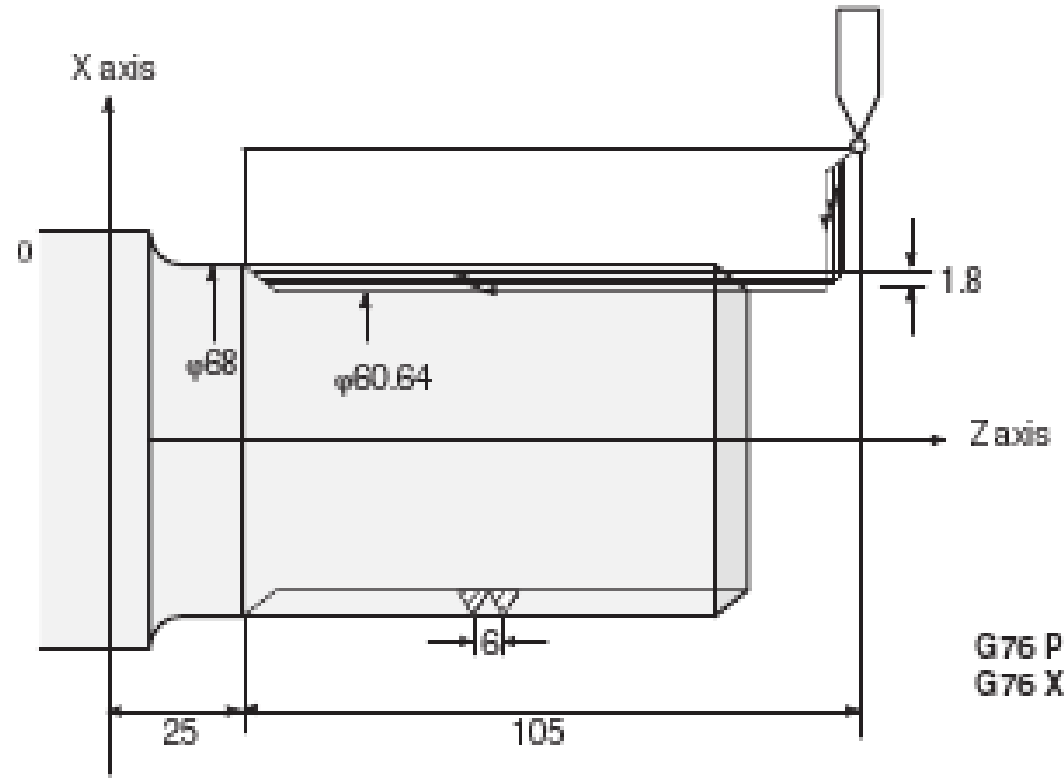
- Overall thread height
  - H = Pitch*(0.5 / tan 30deg) = 0.866025*Pitch
  - Ext thread depth = (17/24)*H = 0.613435*Pitch
  - Int thread depth = (5/8)*H = 0.541266*Pitch

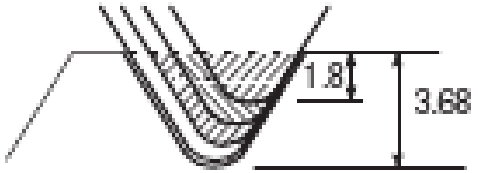




Threading - G76

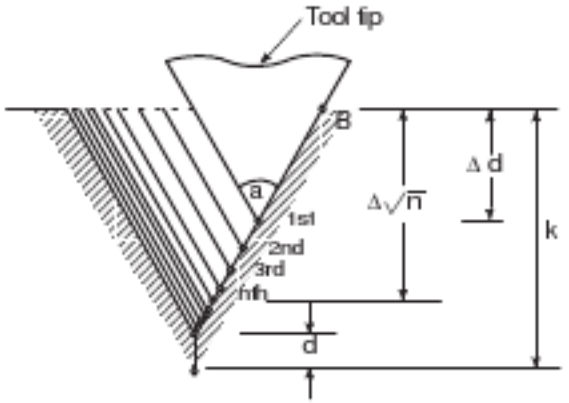
Multiple repetitive cycle (G76)





G76 P011060 Q100 R200 ;
G76 X60640 Z25000 P3680 Q1800 F6.0 ;

Threading - G76



G76P (m) (r) (a) Q (Δd min) R(d);
G76X (u) _ Z(W) _ R(i) P(k) Q(Δd) F(L) ;

m : Repetitive count in finishing (1 to 99)
This designation is modal and is not changed until the other value is designated. Also this value can be specified by the parameter No. 5142, and the parameter is changed by the program command.

r : Chamfering amount
When the thread lead is expressed by L, the value of L can be set from 0.0L to 9.9L in 0.1L increment (2-digit number from 00 to 90).
This designation is modal and is not changed until the other value is designated. Also this value can be specified by the parameter No. 5130, and the parameter is changed by the program command.

a : Angle of tool tip
One of six kinds of angle, 80°, 60°, 55°, 30°, 29°, and 0°, can be selected, and specified by 2-digit number.
This designation is modal and is not changed until the other value is designated. Also this value can be specified by the parameter No. 5143, and the parameter is changed by the program command.

m, r, and a are specified by address P at the same time.

(Example)
When m=2, r=1.2L, a=60°, specify as shown below (L is lead of thread).

$$P\ \frac{02}{m}\ \frac{12}{r}\ \frac{60}{a}$$

Δdmin : Minimum cutting depth (specified by the radius value)
When the cutting depth of one cycle operation (Δd−Δd−1) becomes smaller than this limit, the cutting depth is clamped at this value. This designation is modal and is not changed until the other value is designated. Also this value can be specified by parameter No. 5140, and the parameter is changed by the program command.

d : Finishing allowance
This designation is modal and is not changed until the other value is designated. Also this value can be specified by parameter No. 5141, and the parameter is changed by the program command.

i : Difference of thread radius If i = 0, ordinary straight thread cutting can be made.

k : Height of thread
This value is specified by the radius value.

Δd : Depth of cut in 1st cut (radius value)

L : Lead of thread (same as G32).

Threading - G76

- G76 Pffppaa Qddd Rfff (first line of G76)
  - ff = # of finish passes (01-99)
  - pp = # revolutions for gradual pull-out (0.0-9.9=00-99)
  - aa = angle (60 degrees for us)
  - ddd = last depth of cut (min.cutting depth) (positive radial value, no decimal point – microns)
  - fff = finish allowance (mm, dec.point allowed)

Threading - G76

- G76 Xxx Zzz Ppp Qqq Fff (2nd line)
  - xx = last thread pass diameter
  - zz = Z endpoint of thread
  - pp = height of thread (pos.radial value, microns)
  - qq = 1st threading pass depth (max.cutting depth, pos.radial value, microns)
  - ff = feedrate (same as thread lead)

Threading - G76

- Example: M24x2 external thread
  - G00 X30.032 Z[#501 + 6.0]
  - G76 P010060 Q005 R0.0
  - G76 X24.43 Z[#501-10.0] P1360 Q0544 F2.0

Multistart Threading

- Example: M24x2 three start external thread
  - #1=2.0 (PITCH - MM)
  - #2=0.5/TAN[30.0] * #1 (H)
  - #3=#2 * 17.0/24.0 (THREAD DEPTH)
  - #4=3 (NUMBER OF STARTS)
  - #5=0 (START NUMBER)
  - G00 X32.0 Z[#501 + 3 * #1 * #4] (START 3x LEAD AWAY)
  - WHILE [#5 LT #4] DO 1
  - G00 X30.032 Z[#501 + #1 * #5 + 3 * #1 * #4]
  - G76 P100060 Q005 R0.0
  - G76 X23.39 Z[#501-10.0] P[FIX[#3*1000]] Q0544 F[#1 * #4]
  - #5 = #5 + 1
  - END 1