


Rotary Shafts – D Tolerance h9 (Cold-Drawn) / h7 & g6 (Ground)

One End Stepped, Both Ends Tapped

Select from h9 (Cold-drawn), h7 (Ground) and g6 (Ground) for your applications. Furthermore, h7 or g6 can be selected for P part tolerance of h9 (Cold-drawn).



Rotary Shafts – One End Stepped, Both Ends Tapped

RoHS10

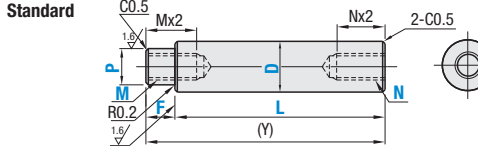
| Type | Standard | | Tolerance | | Material | Surface Treatment |
|------|----------|--------------|-----------------|----|---------------------------------|----------------------------|
| | Standard | Wrench Flats | D | P | | |
| (1) | NSFRMHA | NSFRMHAS | h9 (Cold-Drawn) | h7 | 1045 Carbon Steel or Equivalent | — |
| | SFRMHA | SFRMHAS | | | | Black Oxide |
| | PSFRMHA | PSFRMHAS | | | | Electroless Nickel Plating |
| | SSFRMHA | SSFRMHAS | | | | — |
| (2) | NSFRMGA | NSFRMGAS | g6 | h7 | 1045 Carbon Steel or Equivalent | — |
| | SFRMGA | SFRMGAS | | | | Black Oxide |
| | PSFRMGA | PSFRMGAS | | | | Electroless Nickel Plating |
| | SSFRMGA | SSFRMGAS | | | | — |
| (3) | NSFRHA | NSFRHAS | h7 (Ground) | h7 | 1045 Carbon Steel or Equivalent | — |
| | SFRHA | SFRHAS | | | | Black Oxide |
| | PSFRHA | PSFRHAS | | | | Electroless Nickel Plating |
| | SSFRHA | SSFRHAS | | | | — |
| (4) | NSFRA | NSFRAS | g6 (Ground) | g6 | 1045 Carbon Steel or Equivalent | — |
| | SFRA | SFRAS | | | | Black Oxide |
| | PSFRA | PSFRAS | | | | Electroless Nickel Plating |
| | SSFRA | SSFRAS | | | | — |

Tolerance Table

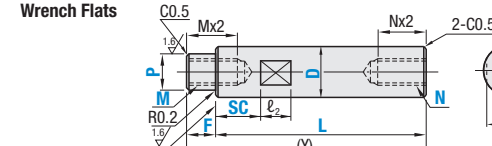
| D / P | h9 (Cold-Drawn) | h7 (Ground) | g6 (Ground) |
|---------|-----------------|-------------|------------------|
| 3.1–6 | 0 -0.030 | 0 -0.012 | -0.004 -0.012 |
| 6.1–10 | 0 -0.036 | 0 -0.015 | -0.005 -0.014 |
| 10.1–18 | 0 -0.043 | 0 -0.018 | -0.006 -0.017 |
| 18.1–30 | 0 -0.052 | 0 -0.021 | -0.007 -0.020 |
| 30.1–50 | 0 -0.062 | 0 -0.025 | -0.009 -0.025 |

Ⓢ Surface roughness of D part for h9 (Cold-Drawn) is $\sqrt{3}$, Surface roughness for h7 (Ground) and g6 (Ground) is $\sqrt{2}$

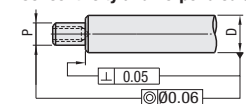
Standard



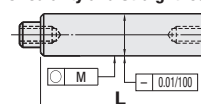
Wrench Flats



Concentricity and Perpendicularity



Circularity and Straightness



Ⓢ Not applicable to h9 (Cold-Drawn).

Circularity of Part D

| D | Over or Less | Circularity M |
|----|--------------|---------------|
| 5 | 13 | 0.004 |
| 13 | 20 | 0.005 |
| 20 | 40 | 0.006 |
| 40 | 50 | 0.007 |

Ⓢ Not applicable to h9 (Cold-Drawn).

Tolerances of L, Y & Other Dimensions

| Dimension | Over or Less | Tolerance |
|-----------|--------------|-----------|
| 2 | 6 | ±0.1 |
| 6 | 30 | ±0.2 |
| 30 | 120 | ±0.3 |
| 120 | 400 | ±0.5 |
| 400 | 800 | ±0.8 |

(1) D Tolerance h9 (Cold-Drawn) / P Tolerance h7 (2) D Tolerance h9 (Cold-Drawn) / P Tolerance g6

| Part Number | Type | 0.1 mm Increment | | 1 mm Increment | | M (Coarse) Selection | N (Coarse) Selection | W | ℓ ₂ | (Y) max. |
|---|--------------|------------------|------------|----------------|---|----------------------|----------------------|----|----------------|----------|
| | | D | L | F | P | | | | | |
| (1) D part h9 / P part h7 | Standard | 6 | 15.0–398.0 | | 5 | 2.6 3 | 2.6 3 | 5 | 300 | |
| NSFRMHA SFRMHA PSFRMHA SSFRMHA | Wrench Flats | 8 | 15.0–498.0 | 2≤F≤Px5 | 5 | 2.6 3 4 5 | 2.6 3 4 5 6 | 7 | 400 | |
| | | 10 | 15.0–598.0 | | | 3 4 5 6 | 3 4 5 6 | 8 | 500 | |
| | | 12 | 15.0–698.0 | | | 4 5 6 8 | 4 5 6 8 | 10 | 600 | |
| | | 15 | 15.0–798.0 | | | 4 5 6 8 10 | 4 5 6 8 10 | 13 | 700 | |
| (2) D part h9 / P part g6 | Wrench Flats | 20 | 30.0–998.0 | 2≤F≤Px5 | 5 | 4 5 6 8 10 12 | 4 5 6 8 10 12 16 | 17 | 800 | |
| | | 25 | 50.0–998.0 | | | 4 5 6 8 10 12 16 | 4 5 6 8 10 12 16 | 22 | | |
| | | 30 | 60.0–998.0 | | | 6 8 10 12 16 20 | 6 8 10 12 16 20 | 27 | | |
| | | 35 | 70.0–998.0 | | | 6 8 10 12 16 20 24 | 6 8 10 12 16 20 24 | 30 | | |

(3) h7 (Ground)

| Part Number | Type | 0.1 mm Increment | | 1 mm Increment | | M (Coarse) Selection | N (Coarse) Selection | W | ℓ ₂ | (Y) max. |
|-------------------------------------|--------------|------------------|-------------|----------------|---|----------------------|----------------------|----|----------------|----------|
| | | D | L | F | P | | | | | |
| NSFRHA SFRHA PSFRHA SSFRHA | Wrench Flats | 6 | 15.0–398.0 | 2≤F≤Px5 | 5 | 2.6 3 | 2.6 3 | 5 | 300 | |
| | | 8 | 15.0–498.0 | | | 2.6 3 4 5 | 2.6 3 4 5 6 | 7 | 400 | |
| | | 10 | 15.0–598.0 | | | 3 4 5 6 | 3 4 5 6 | 8 | 500 | |
| | | 12 | 15.0–698.0 | | | 4 5 6 8 | 4 5 6 8 | 10 | 600 | |
| | | 15 | 15.0–798.0 | | | 4 5 6 8 10 | 4 5 6 8 10 | 13 | 700 | |
| | | 17 | 30.0–898.0 | | | 4 5 6 8 10 12 | 4 5 6 8 10 12 | 14 | | |
| | | 20 | 30.0–998.0 | | | 4 5 6 8 10 12 | 4 5 6 8 10 12 16 | 17 | | |
| | | 25 | 50.0–998.0 | | | 4 5 6 8 10 12 16 | 4 5 6 8 10 12 16 | 22 | | |
| | | 30 | 60.0–998.0 | | | 6 8 10 12 16 20 | 6 8 10 12 16 20 | 27 | | |
| | | 35 | 70.0–998.0 | | | 6 8 10 12 16 20 24 | 6 8 10 12 16 20 24 | 30 | | |
| | | 40 | 80.0–998.0 | | | 10 12 16 20 24 30 | 10 12 16 20 24 30 | 36 | | |
| | | 50 | 100.0–998.0 | | | 12 16 20 24 30 | 12 16 20 24 30 | 41 | | |

(4) g6 (Ground) Type

| Part Number | Type | 0.1 mm Increment | | 1 mm Increment | | M (Coarse) Selection | N (Coarse) Selection | W | ℓ ₂ | (Y) max. |
|---------------------------------|--------------|------------------|----------------|----------------|---|----------------------|----------------------|----|----------------|----------|
| | | D | L | F | P | | | | | |
| NSFRA SFRA PSFRA SSFRA | Wrench Flats | 6 | 15.0–398.0 | 2≤F≤Px5 | 5 | 2.6 3 | 2.6 3 | 5 | 300 | |
| | | 8 | 15.0–498.0 | | | 2.6 3 4 5 | 2.6 3 4 5 6 | 7 | 400 | |
| | | 10 | 15.0–598.0 | | | 3 4 5 6 | 3 4 5 6 | 8 | 500 | |
| | | 12 | 15.0–698.0 | | | 5 6 8 | 5 6 8 | 10 | 600 | |
| | | 13 | 15.0–698.0 | | | 5 6 8 10 | 5 6 8 10 | 11 | 700 | |
| | | 15 | 15.0–798.0 | | | 5 6 8 10 | 5 6 8 10 | 13 | | |
| | | 16 | 15.0–898.0 | | | 5 6 8 10 12 | 5 6 8 10 12 | 14 | | |
| | | 17 | 30.0–898.0 | | | 5 6 8 10 12 | 5 6 8 10 12 | 15 | | |
| | | 18 | 30.0–898.0 | | | 5 6 8 10 12 | 5 6 8 10 12 16 | 17 | | |
| | | 20 | 50.0–998.0 | | | 5 6 8 10 12 16 | 5 6 8 10 12 16 | 19 | | |
| | | 22 | 50.0–998.0 | | | 8 10 12 16 20 | 8 10 12 16 20 | 22 | | |
| | | 25 | 50.0–998.0 | | | 8 10 12 16 20 24 | 8 10 12 16 20 24 | 27 | | |
| 30 | 60.0–998.0 | 12 16 20 24 30 | 12 16 20 24 30 | 36 | | | | | | |
| 35 | 70.0–998.0 | 16 20 24 30 | 16 20 24 30 | 41 | | | | | | |

Ⓢ When D-P≤2, chamfer C at the step is 0.2 or less. Ⓢ Overall length requires Nx3=L. Ⓢ Mx2+Nx2≤(Y) is required for (Y).

Rotary Shafts – D Tolerance h9 (Cold-Drawn) / h7 & g6 (Ground)

One End Stepped, Both Ends Tapped, continued

Available Types

(1) D tolerance h9 (Cold-drawn) / P tolerance h7 (2) D tolerance h9 (Cold-drawn) / P tolerance g6

| Type | NSFRMHA, NSFRMGA, NSFRMHAS, NSFRMGAS, SFRMHA, SFRMGAS, PSFRMHA, PSFRMGAS, SSFRMHA, SSFRMGAS | | | | | | | | | | SSFRMHA, SSFRMGA, SSFRMHAS, SSFRMGAS | | | | | | | | | | |
|------|---|-------|--------|--------|--------|--------|--------|--------|--------|-------|--------------------------------------|-------|--------|--------|--------|--------|--------|--------|--------|-------|---|
| | Min. L | L50.1 | L100.1 | L150.1 | L200.1 | L300.1 | L400.1 | L600.1 | L800.1 | 998.0 | Min. L | L50.1 | L100.1 | L150.1 | L200.1 | L300.1 | L400.1 | L600.1 | L800.1 | 998.0 | |
| 6 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 8 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 10 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 12 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 15 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 20 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 25 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 30 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 35 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 50 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |

(3) h7 (Ground) (4) g6 (Ground)

| Type | NSFRHA, NSFRA, NSFRHAS, NSFRHAS, PSFRHA, PSFRHAS, PSFRAS | | | | | | | | | | SSFRHA, SSFRA, SSFRHAS, SSFRHAS | | | | | | | | | | |
|------|--|-------|--------|--------|--------|--------|--------|--------|--------|-------|---------------------------------|-------|--------|--------|--------|--------|--------|--------|--------|-------|---|
| | Min. L | L50.1 | L100.1 | L150.1 | L200.1 | L300.1 | L400.1 | L600.1 | L800.1 | 998.0 | Min. L | L50.1 | L100.1 | L150.1 | L200.1 | L300.1 | L400.1 | L600.1 | L800.1 | 998.0 | |
| 6 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 8 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 10 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 12 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 13 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 15 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 16 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 17 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 18 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 20 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 22 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 25 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 30 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 35 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 40 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| 50 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |

Part Number Alterations Part Number - L - F - P - M - N - SC - (KC, WKC, FC...etc.) - LKC

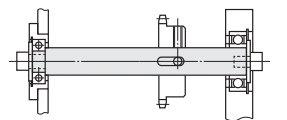
Example: SSFRHAS8 - 150 - F20 - P7 - M5 - N5 - SC20 - LKC

Part Number Example Part Number - L - F - P - M - N - SC

Example: SFRMHA30 - 250 - F30 - P16 - M10 - N10 - SC30

Application Example

Select from h9 (Cold-drawn), h7 (Ground) and g6 (Ground) for your applications. Furthermore, h7 or g6 can be selected for P part tolerance of h9 (Cold-drawn).



| Alterations | Keyway | Set Screw Flat | 2 Set Screw Flats (Angle Specified) | Slit Cam Groove | L Dimension Tolerance | Concentricity | 2 Set Screw Flats (Angle Specified) |
|-------------|---|--|---|--|---|--|-------------------------------------|
| Code | KC, WKC, KZ | FC, WFC | KFC | UC | LKC | CKC | |
| Spec. | KC: Adds a keyway. Ordering Code: KC50-A10 WKC: Adds two keyways. Ordering Code: WKC50-C8-K40-E10 KZ: Adds a keyway. Ordering Code: KZ100-Z10 Ⓢ KC, A, WKC, C, E, K, KZ, Z = 0.1 mm increment Ⓢ A, C, E, Z ≤ 100 Ⓢ For keyway details refer to P.853. Ⓢ If 3 keyways are required use both KC and WKC. If 4th keyway is required use KZ only as addition to KC and WKC. Ⓢ When keyway position is less than 1 mm away from the end face, R is not applied. Ex. Ⓢ Keyways and set screw flats are added in the same plane. When the distance of the alterations are over 500 mm, ±2 degree phase differential may occur. | FC: Adds 1 set screw flat. Ordering Code: FC10-G3 WFC: Adds 2 set screw flats. Ordering Code: WFC10-J3-W10-V3 D H 6-17 1 18-40 2 50 3 Ⓢ FC, G, WFC, J, W, V = 1 mm increment Ⓢ G, J, V ≤ 50 | Adds a set screw flat at any designated angle besides the datum plane (0°). KFC, G = 1 mm Increment AG = 15° Increment Ⓢ G ≤ 50 Ordering Code: KFC10-G3-AG90 D H 6-17 1 18-40 2 50 3 Ⓢ When combined with other alterations, ±2 degree phase differential may occur. | Adds a slit cam groove. UC = 1 mm Increment Ordering Code: UC10 Ⓢ UC+ℓ ₁ ≤ L Ⓢ UC ≥ 1 Ⓢ Not applicable to D13 or more. | Changes L Dimension Tolerance. Ordering Code: LKC Ⓢ L < 500 → L ± 0.05 Ⓢ L ≥ 500 → L ± 0.1 Ⓢ Not applicable to L = 800 or more. | Changes the concentricity to 0.02. Ordering Code: CKC Ⓢ SFC, SG = 1 mm Increment Ⓢ AG = 15° Increment Ⓢ SG ≤ 50 Ordering Code: SFC10-SG3-AG90 D H 6-17 1 18-40 2 50 3 | |