

Shafts

Standard & Precision Type / One End Stepped & Tapped with Wrench Flats

Ⓜ For Shafts without wrench flats, see P.246. Ⓜ Shafts not intended for use with Linear Ball Bushings.

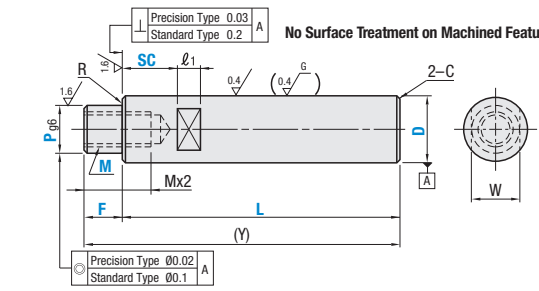
Shafts – Standard & Precision Type / One End Stepped & Tapped with Wrench Flats



RoHS10

- Ⓜ Annealing required for wrench flats machining and shaft end threading (thread effective length + approx. 10 mm) may lower hardness. P.199
- Ⓜ Circularity, Straightness, Perpendicularity, Concentricity and Changes in Hardness. P.198
- Ⓜ Features of Low Temp. Black Chrome Plating. P.213

Type				Material	Hardness	Surface Treatment	D Tolerance			
With Wrench Flats							D	g6	h5	f8
Precision Type	Standard						8	10	12	13
VFPG	SFPG	SFPU	—	52100 Bearing Steel Equivalent	-0.005	0	-0.013	-0.013		
VSFPG	SSFPG	SSFPU	—	SUS440C (13Cr) Stainless Steel Equivalent	-0.014	-0.006	-0.028	-0.028		
VPPFG	PSFPG	PSFPU	—	52100 Bearing Steel Equivalent	-0.006	0	-0.016	-0.016		
VPSFPG	PSSFPG	PSSFPU	—	SUS440C (13Cr) Stainless Steel Equivalent	-0.017	-0.008	-0.043	-0.043		
VRPG	RSFPG	—	—	52100 Bearing Steel Equivalent	-0.007	0	-0.020	-0.020		
VSRPG	—	—	—	SUS440C (13Cr) Stainless Steel Equivalent	-0.020	-0.009	-0.053	-0.053		
—	—	—	PFPGG	1045 Carbon Steel Equivalent	-0.009	0	-0.025	-0.025		
—	—	—	PSFPGG	304 Stainless Steel	-0.025	-0.011	-0.064	-0.064		



$$6.3 / \left(\sqrt[3]{1.6 / \sqrt[3]{0.4 / \sqrt[3]{0.4}}} \right)^G$$

Features of Precision Shafts
Concentricity is $\square \phi 0.02$
Perpendicularity is $\square \perp 0.03$

Ⓜ Precision shafts have grinding undercuts at stepped sections (max. width: 1 mm, max. depth: 0.1 mm) and centering holes on end faces.

Part Number	1 mm Increments				M (Coarse Threads)	Wrench Flats Dimensions			(Y) Max.	R	C
	Type	D	L	F		SC	W	l ₁			
Precision Type (D Tolerance g6)	8	25-298	2≤F≤Px4	6	3	SC=1 mm Increment Ⓜ SC+l ₁ ≤L Ⓜ SC≥0 Ⓜ Details of Wrench Flats P.199	7	8	300	0.5 or Less	0.2 or Less
	10	25-348		6-8	3 4 5		8	8	350		
	12	25-348		6-10	3 4 5 6		10	10	350		
	13	25-348		6-11	3 4 5 6 8		11	11	350		
	VFPG	25-348		6-13	3 4 5 6 8 10		13	13	350		
	VSFPG	25-348		6-14	3 4 5 6 8 10		14	10	350		
	VPPFG	25-348		8-16	4 5 6 8 10 12		16	16	350		
	VPSFPG	25-348		8-17	4 5 6 8 10 12		17	17	450		
	VRPG	25-448		8-22	4 5 6 8 10 12 16		22	22	450		
	VSRPG	25-448		9-27	5 6 8 10 12 16 20 24		27	15	450		

- Ⓜ P dimensions require M+3≤P.
- Ⓜ Total length (Y) needs to be Mx2≤(Y). When Mx2.5+4≥(Y), tap pilot holes may go through.
- Ⓜ Shafts may have centering holes at end faces.

Part Number	1 mm Increments				M (Coarse Threads)	Wrench Flats Dimensions			(Y) Max.	R	C	
	Type	D	L	F		SC	W	l ₁				
Standard Type	8	25-1098	D Tol. g6 8≤D≤30 2≤F≤Px5 D Tol. g6 D≥35 D Tol. f8/h5 2≤F≤Px4	6	3	SC=1 mm Increment Ⓜ SC+l ₁ ≤L Ⓜ SC≥0 Ⓜ Details of Wrench Flats P.199	7	8	1100	0.5 or Less	0.3 or Less	
	10	25-1198		6-8	3 4 5		8	8	1200			
	(D Tolerance g6)	12		25-1398	6-10		3 4 5 6	10	10			1400
	SFPG	13		25-1398	6-11		3 4 5 6 8	11	11			1400
	SSFPG	15		25-1398	6-13		3 4 5 6 8 10	13	13			1400
	PSFPG	16		25-1398	6-14		3 4 5 6 8 10	14	10			1400
	PSSFPG	18		25-1398	8(7)-16		4 5 6 8 10 12	16	16			1400
	RSPFG	20		25-1398	8(7)-17		4 5 6 8 10 12	17	17			1400
	(D≤30, L≤500)	25		25-1398	8(7)-22		4 5 6 8 10 12 16	22	22			1400
	(D Tolerance f8)	30		25-1498	9(8)-27		5 6 8 10 12 16 20 24	27	15			1500
PFPGG	35	25-1498	9-32	5 6 8 10 12 16 20 24	30	30	1500					
PSFPGG	40	25-1498	11-37	6 8 10 12 16 20 24 30	36	20	1500					
	50	25-1498	11-47	6 8 10 12 16 20 24 30	41	20	1500					

- Ⓜ P () dimensions are applicable only for D diameter tolerance with g6.
- Ⓜ P dimensions require M+3≤P.
- Ⓜ Total length (Y) requires Mx2≤(Y).
- Ⓜ When Mx2.5+4≥(Y), tap pilot hole may go through.

Shafts

Standard & Precision Type / One End Stepped & Tapped with Wrench Flats, *continued*

Part Number Example

Part Number	L	F	P	M	SC
VFPG20	- 400	- F25	- P16	- M10	- SC10
SFPG20	- 500	- F25	- P16	- M10	- SC10

Part Number Alterations

Part Number	L	F	P	M	SC	(LKC/FC...etc.)
SFPG30	- 400	- F25	- P16	- M10	- SC10	- LKC

Alterations	Code	Spec.
	LKC	Alteration to L Dimension Tolerance Ordering Code: LKC Application Notes: Applicable when L=200 or less for precision type Ⓜ Not applicable when D-P≤2 L dimensions can be specified in 0.1 increments for LKC. Ⓜ L<200 → L±0.03 200≤L<500 → L±0.05 L≥500 → L±0.1
	SX	Second Set of Wrench Flats. Ordering Code: SX15 Application Notes: Applicable to SX in 1 mm increments Ⓜ SC+SX+l ₁ x2<L Ⓜ SX=0 or SX≥1 Ⓜ Orientation between set screw flats is random.
	FC	Set Screw Flat at One Location Ordering Code: FC10-E8 Application Notes: Ⓜ Not applicable to precision shafts FC, E=1 mm Increment Ⓜ FC≤3xD Ⓜ When 1.5xD<FC, FC≤L/2 Ⓜ E=0 or E≥2 Ⓜ Not available in combination with WFC.
	WFC	Set Screw Flats at Two Locations Ordering Code: WFC8-A8-E4 Application Notes: Ⓜ Not applicable to precision shafts WFC, A, E=1 mm increments Ⓜ WFC≤3xD Ⓜ When 1.5xD<FC, 2WFC≤L/2 Ⓜ A (E)=0 or A (E)≥2 Ⓜ Orientation between set screw flats is random. Not available in combination with FC.

Alterations	Code	Spec.
	RC	90° Set Screw Flat at One Location Ordering Code: RC10 Application Notes: Only applicable for D=10-30 Ⓜ Not applicable to precision shafts Ⓜ Not available in combination with WRC For details, see Shaft Alteration Overview, P.200.
	WRC	90° Set Screw Flats at Two Locations Ordering Code: WRC10-Y10 Application Notes: Only applicable to D=10-30 Ⓜ Not applicable to precision shafts Ⓜ Not available in combination with RC. Ⓜ Orientation between set screw flats is random. For details, see Shaft Alteration Overview, P.200.
	KC	Keyway at one location: KC
	WKC	Keyway at two locations: WKC
	MD	Change the effective length of tapped part to Mx3. Ordering Code: MD6 (M is changed to MD) Application Notes: Only applicable to D=10-30 and M=6-20 Ⓜ One End Tapped: MDx3.5+4≤L Ⓜ Not available in combination with KC, WSC.
	LFC	Set Screw Flat at Step Parts Ordering Code: LFC10-A0 Application Notes: LFC+A≤F Ⓜ D-M≥1

- Alteration Details P.200
- Ⓜ Please see Shaft Alteration Overview for details if provided. P.200
 - Ⓜ When selecting multiple alteration additions, the distance between machined areas should be greater than 2mm. P.201
 - Ⓜ Alterations may lower hardness. P.199