

Shafts

Standard & Precision Type / Both Ends Threaded with Wrench Flats / Both Ends Threaded with Cross-Drilled Hole

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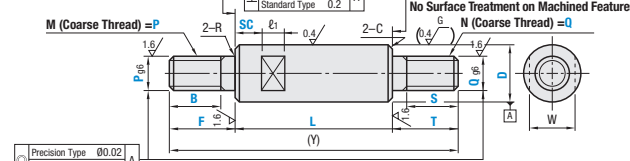
RoHS10

- Annealing caused by machining wrench flats and shaft end threading (effective thread length + approx. 10 mm) may lower hardness. P.199
- Cross-drilled hole areas may be out of O.D. tolerances due to annealing-induced deformation
- Circularity, Straightness, Perpendicularity Concentricity, Changes in Hardness P.198
- Features of Low Temp. Black Chrome Plating P.213.
- For Shafts without wrench flats or cross-drilled holes, please see P.230.

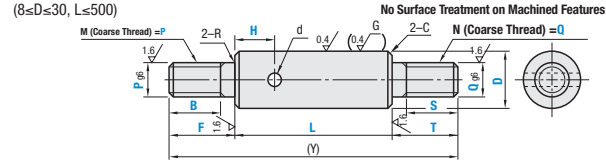
Precision Type	Type						Material	Hardness	Surface Treatment
	With Wrench Flats			With Cross-Drilled Holes					
	D Tol. g6	D Tol. g6	D Tol. h5	D Tol. f8	D Tol. g6	D Tol. f8			
VFBU	SFAU	SFUU	—	SFHM	—	52100 Bearing Steel Equivalent	Effective Hardened Depth of Induction Hardened P.199	—	
VSFBU	SSFAU	SSFUU	—	SSFHM	—	SUS440C (13Cr) Stainless Steel Equivalent			
VPFBU	PSFAU	PSFUU	—	PSFHM	—	52100 Bearing Steel Equivalent	52100 Bearing Steel Equivalent 58 HRC min. SUS440C (13Cr) Stainless Steel Equivalent	Hard Chrome Plating Hardness: HV 750~ Plating Thickness: 5 μ or More	
VPSFBU	PSSFAU	PSSFUU	—	PSSFHM	—	SUS440C (13Cr) Stainless Steel Equivalent			
VRBU	RSFAU	—	—	RSFHM	—	52100 Bearing Steel Equivalent	Equivalent 56 HRC min.	Low Temperature Black Chrome Plating	
—	—	—	—	PSFGU	—	1045 Carbon Steel Equivalent			
—	—	—	—	PSSFGU	—	304 Stainless Steel	—	Hard Chrome Plating Hardness: HV 750~ Plating Thickness: 10 μ or More	

When B=0 or S=0, no thread machining will be performed.

With Wrench Flats



With Cross-Drilled Holes



Features of Precision Shafts

- Concentricity is ± 0.02
- Perpendicularity is ± 0.03
- Precision shafts have grinding undercuts at the bottom ends of threads and center holes on ends faces.

D	g6	h5	f8
6	-0.004	0	-0.010
8	-0.012	-0.005	-0.028
10	-0.005	0	-0.013
12	-0.014	-0.006	-0.035
13	-0.006	0	-0.016
15	-0.017	-0.008	-0.043
16	-0.007	0	-0.020
20	-0.020	-0.009	-0.053
25	-0.009	0	-0.025
30	-0.025	-0.011	-0.064
40	-0.025	-0.011	-0.064
50	-0.025	-0.011	-0.064

Part Number	1 mm Increment				P, Q	Wrench Flats Dimensions			(Y) Max.	R	C	Coarse Thread Dimensions	
	Type	D	L	F, T		B, S	SC	W				ℓ ₁	M / N
Precision Type D Tolerance g6 VFBU VSFBU VPFBU VPSFBU VRBU	6	25-292	2 ≤ F ≤ Px5 2 ≤ T ≤ Qx5	When P ≤ 6 B = F - 2 When P = 8, 10 B = F - 3 When P ≤ 12 B = F - 5 When Q = 6 S = T - 2 When Q = 8, 10 S = T - 3 When Q ≥ 12 S = T - 5 When without threads B = 0 S = 0 Ⓛ B (S) ≥ Pitch x 3	3 4	SC = 1 mm increment Ⓛ SC + ℓ ₁ ≤ L Ⓛ SC ≥ 0 Ⓛ Details of Wrench Flats P.199	5	300	0.5 or Less 0.3 or Less 1.0 or Less			3	0.5
	8	25-292			3 4 5 6		7	300				4	0.7
	10	25-340			4 5 6 8		8	350				5	0.8
	12	25-340			5 6 8 10		10	350				6	1.0
	13	25-340			5 6 8 10		11	350				8	1.25
	15	25-340			5 6 8 10 12		13	350				10	1.5
	16	25-340			5 6 8 10 12		14	350				12	1.75
	18	25-340			5 6 8 10 12 16		16	350				16	2.0
	20	25-440			6 8 10 12 16		17	450				20	2.5
	25	25-440			8 10 12 16 20		22	450				24	3.0
30	25-440	8 10 12 16 20 24	27	450	30	3.5							

Shafts have grinding undercuts at the bottom of threads. Shaft ends may have centering holes.

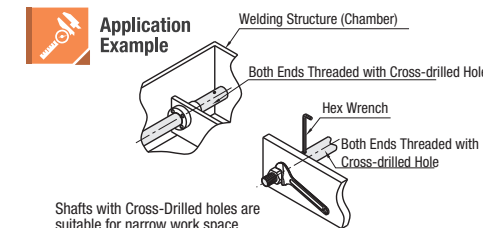
Part Number	1 mm Increment				P, Q	Wrench Flats Dimensions			Cross-Drilled Hole Dimensions		(Y) Max.	R	C	
	Type	D	L	F, T		B, S	SC	W	ℓ ₁	H				d
Standard Type Shafts with Wrench Flats D Tol. g6 SFAU SSFAU PSFAU PSSFAU RSFAU D ≤ 30, L ≤ 500, Ymax ≤ 800 D Tol. f8 PSFGU PSSFGU	Shafts with Cross-Drilled Holes 6 ≤ D ≤ 30, L ≤ 500 D Tol. g6 SFUU SFHM SSFUU SSFHM PSFUU PSFHM PSSFUU PSSFHM RSFHM	6	25-796	2 ≤ F ≤ Px5 2 ≤ T ≤ Qx5	When P ≤ 6 B = F - 2 When P = 8, 10 B = F - 3 When P ≤ 12 B = F - 5 When Q = 6 S = T - 2 When Q = 8, 10 S = T - 3 When Q ≥ 12 S = T - 5 When without threads B = 0 S = 0 Ⓛ B (S) ≥ Pitch x 3	3 4 5	SC = 1 mm Inc. Ⓛ SC + ℓ ₁ ≤ L Ⓛ SC = 0 Ⓛ Details of Wrench Flats P.199	5	H = Specified in 1 mm Inc. Ⓛ L ≥ H + d / 2 + 2 Ⓛ H = d / 2 + 2	—	600	0.5 or Less 0.3 or Less 1.0 or Less 0.5 or Less		
		8	25-996			3 4 5 6		7		800	3			800
		10	25-996			4 5 6 8		8		1000	4			1000
		12	25-1196			5 6 8 10		10		1000	6			1200
		13	25-1196			5 6 8 10		11		1000	7			1200
		15	25-1196			5 6 8 10 12		13		1200	8			1200
		16	25-1196			5 6 8 10 12		14		1200	9			1200
		18	25-1196			5 6 8 10 12 16		16		1200	10			1200
		20	25-1196			6 8 10 12 16		17		1200	11			1200
		25	25-1196			8 10 12 16 20 24		22		1200	12			1200
		30	25-1496			8 10 12 16 20 24		27		1500	13			1500
		35	25-1496			10 12 16 20 24 30		30		1500	14			1500
		40	25-1496			12 16 20 24 30		36		1500	15			1500
		50	25-1496			16 20 24 30		41		1500	16			1500

Shafts

Standard & Precision Type / Both Ends Threaded with Wrench Flats / Both Ends Threaded with Cross-Drilled Hole, continued

Part Number Example

Part Number	L	F	B	P	T	S	Q	SC	H
VFBU15	- 200	- F28	- B16	- P6	- T17	- S12	- Q12	- SC8	- H
SFHM15	- 300	- F28	- B16	- P6	- T17	- S12	- Q12	- SC8	- H8



Shafts with Cross-Drilled holes are suitable for narrow work space.

Part Number Alterations

Part Number	L	F	B	P (PMC / PSC)	T	S	Q (QMC / QMS)	SC	H	(LKC...etc.)
SFAU30	- 300	- F40	- B30	- P20	- T50	- S40	- Q16	- SC10	- H	- LKC

Alteration Details P.200

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 (Q) ≥ 2 L dimensions can be specified in 0.1 increment 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: Only applicable for Shafts with Wrench Flats. SX = 1 mm increment Ⓛ SC + SX + ℓ ₁ × 2 < L Ⓛ SX = 0 Ⓛ Orientation between wrench flat features 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 increment Ⓛ WFC ≤ 3xD Ⓛ When 1.5xD < WFC, 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	Add 90° Set Screw Flat at one location Ordering Code: RC10 Application Notes: Applicable to D=10-30 Ⓛ Not applicable to precision shaft. Ⓛ 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: Applicable to D=10-30 Ⓛ Not applicable to precision shaft. Ⓛ Not available in combination with RC. Ⓛ Orientation between set screw features is random. Ⓛ For details, see Shaft Alteration Overview P.200.
	PMC PMS QMC QMS	Change to fine threads. Ordering Code: PMC14 (P is changed to PMC) PMS14 (P is changed to PMS) QMC14 (Q is changed to QMC) QMS14 (Q is changed to QMS) Ⓛ For details, see Shaft Alteration Overview 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 2 mm. P.201
- Alterations may lower hardness. P.199