UVT®

Ball Spline Selection Guide

SUPER PRECISION BALL SPLINE · COMPREHENSIVE CATALOG

UVT super precision ball splines combine rotary and linear motion in a single unit, delivering zero backlash in the rotational direction together with high-precision linear travel — engineered for SMT mounters, SCARA Robots , Medical Devices and Semiconductor equipment.

Φ3 mm micro ball spline — one of only two manufacturers worldwide.
400 million reciprocation cycles validated under SMT-mounter conditions (vertical shaft, 860 mm/s, 10G, 15 mm stroke).
Sample orders ship in **5–7 days** · MOQ 1 set · custom (non-standard) specifications available from the sample stage onward.

UVT®

BALL SPLINE SELECTION GUIDE

UVT — founded 2010, Dongguan, China.

Ball screws · Linear guides · Ball splines · Linear modules · Planetary roller screws · Precision modules

Quality system certified to ISO 9001, ISO 14001 and ISO 45001.

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Precision Transmission from UVT

Founded in 2010 and based in Dongguan, UVT is an integrated enterprise combining research and development, manufacturing, sales and service. UVT's principal products are ball screws, linear guides, ball splines, linear modules, planetary roller screws and precision modules.

UVT products are used widely in machine tools, industrial automation, robotics, semiconductor equipment and medical devices. The company operates a production base of 10,000 m^2 with more than 100 sets of precision machining and inspection equipment, and maintains a complete quality management system certified to ISO 9001.

> We're committed to providing our customers with high-precision products as well as services.

Super Precision Ball Spline

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Limited-Stroke Ball Spline — US Series

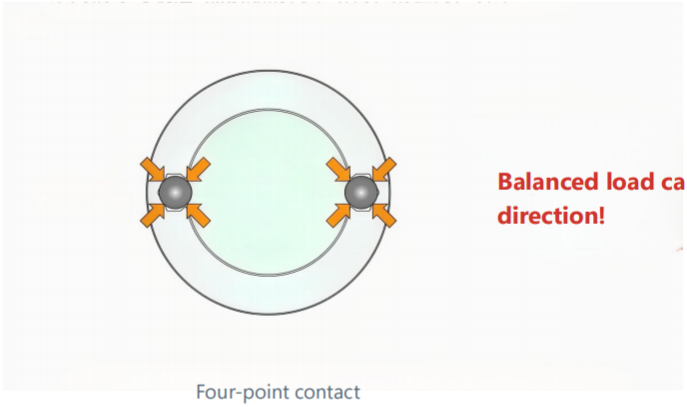
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Outstanding Features of a Compact Ball Spline, Made Possible by a Simple Four-Point-Contact Structure

The UVT Ball Spline is a linear motion guide in which the outer cylinder (or slider) travels along the spline shaft. Because steel balls roll in the spline grooves, it carries radial loads as well as rotational torque — ideal for mechanisms that transmit torque while performing linear motion.

Compact Structure with High Rigidity

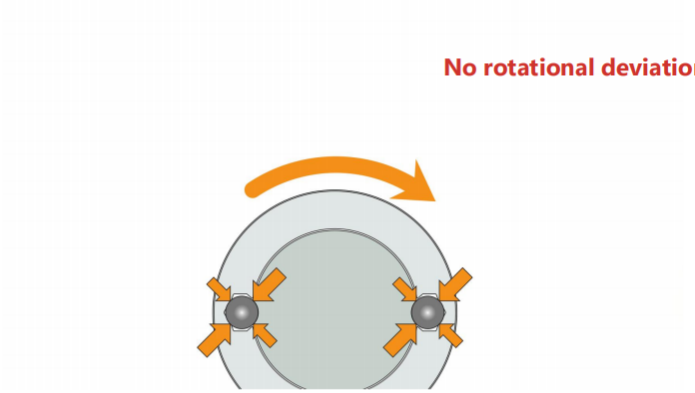
A simple structure in which the steel balls contact the raceways at four points provides high rigidity in a compact design.



Four-point contact

Accurate Positioning with High Precision

Preloading eliminates the backlash in the rotational direction, enabling accurate rotational positioning.



Four-point contact under preload

Smooth Motion with Minimal Friction

The ball retainer is optimally designed for smooth movement, achieving linear motion with extremely low friction.

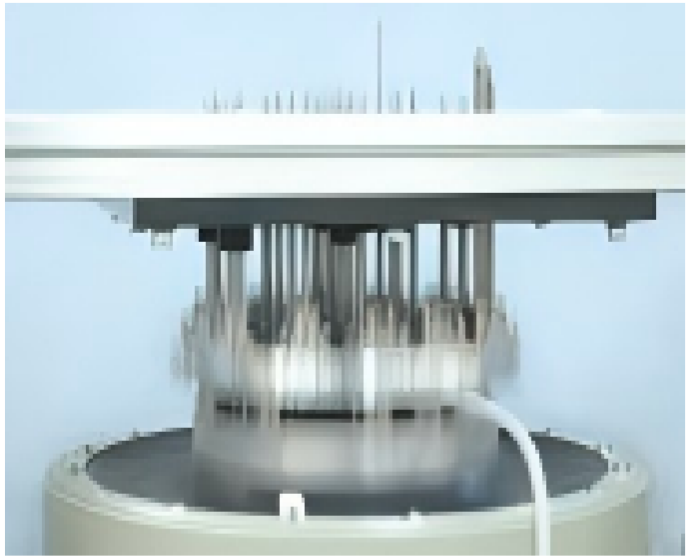


Smooth, low-friction travel

Endurance Test — SMT Mounter Application

Test conditions

Test method	Vibration test machine
Mounting orientation	Vertical shaft
Maximum speed	860 mm/s
Acceleration	10 G
Cycle frequency	18.2 Hz
Stroke length	15 mm



Endurance test rig (UVT)

Test Results

Total reciprocation cycles (100 million cycles)

Model	Total reciprocation cycles
UVT 5	779 million cycles — exceptional durability
UVT 6	743 million cycles — exceptional durability
UVT 8	692 million cycles — exceptional durability
UVT 10	767 million cycles — exceptional durability
UVT 12	880 million cycles — exceptional durability

Even with a vertical shaft at ultra-high beat rates, a total of **400 million reciprocation cycles** was achieved with outstanding durability (validated on the standard Φ3 mm type under SMT-mounter conditions: vertical shaft, 860 mm/s, 10G, 15 mm stroke). Under general SMT-mounter conditions, a service life of **over 5 years** can be expected.

Even under such severe conditions, a total service life of more than **500 million reciprocation cycles** was achieved!

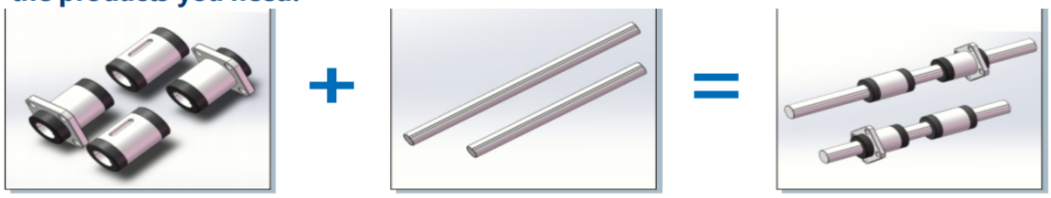
Models, accuracy grades and preload types can be freely combined!!

Based on UVT's proprietary high-precision machining technology and strict dimensional control of the outer cylinder and spline shaft, the free-combination specification achieves an interchangeability level unmatched by other manufacturers. Outer cylinders and spline shafts are supplied as single pieces and can be paired freely — order only the quantity of parts you need, when you need them.

In the following situations — Help!
- When higher machine rigidity and service life are required
- When higher machine accuracy is required
- When an outer cylinder must be replaced immediately
- When more outer cylinders are needed
- When a spline shaft must be replaced immediately
- When the spline shaft length is insufficient
- As a precaution, keep only outer cylinders in stock

With the free-combination system — O.K.!
- No problem even with urgent design changes
- Free pairing of accuracy grades and free choice of preload
- Manage outer cylinders and spline shafts separately
- Outer cylinders and spline shafts can be paired arbitrarily
- Outer cylinders and spline shafts can be stocked separately, saving space

Just select only the products you need.



Outer cylinders + spline shafts = complete set

Interchangeable Outer Cylinders and Sliders

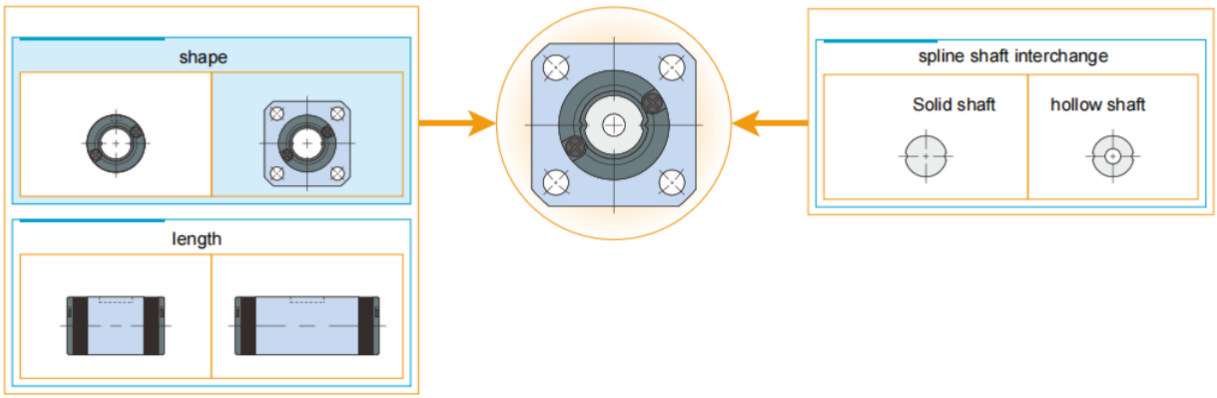
A wide variety of cross-section shapes and lengths is available; any of them can be freely paired on the same spline shaft.

Outer cylinder interchange

Cylinder shape: **Standard** or **Flange** · Cylinder length: **Standard** or **High-rigidity extended**

Spline shaft interchange

Carbon-steel spline shaft, **solid** · Carbon-steel spline shaft, **hollow** · Stainless-steel spline shaft, **solid**



Freely combine outer cylinders and spline shafts!

Accuracy Interchangeability

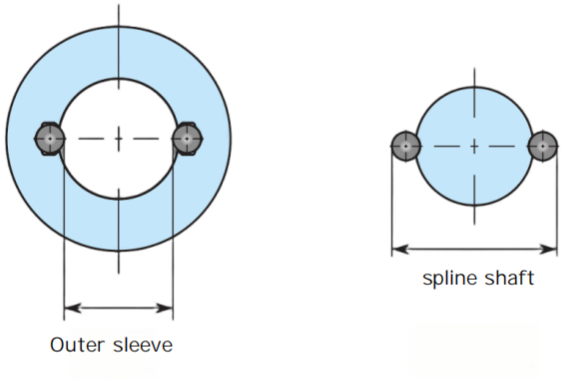
Thanks to the four-point-contact structure, machining errors and accuracy-measurement errors are small, and each raceway maintains tightly controlled dimensional accuracy. Two accuracy grades — **Standard** and **High** — are provided, also covering applications that demand high traveling accuracy.

Rigidity of the equipment can be increased without changing the design!

Preload Interchangeability

Taking full advantage of the simple structure together with high-precision dimensional control, interchangeability between preloaded units has been achieved. This supports applications requiring one grade higher rigidity.

Rigidity of the equipment can be increased without changing the design!



Outer cylinder / spline shaft

Light preload · Standard preload — selected to match the application. **When higher rigidity is required!**



UVT Super Precision Ball Spline (spline shaft + outer cylinder with key slot, steel balls, side plates and seals)

Points

1. Compact Dimensions

A unique ball-retention method that uses no retainer keeps the outer-cylinder OD small relative to the shaft diameter.

2. Ultra-Compact Size Achieved Only by a Simple Structure

The smallest size, UVT 3, achieves a shaft diameter of only 3 mm and an outer-cylinder OD of only 7 mm — an ultra-compact size found nowhere else.

3. Rich Product Line-up to Meet Diverse Needs

External shapes include the standard (cylindrical) type, the flange type and more. Spline shafts are available as solid shafts, or hollow shafts that can be used for piping, wiring, air exhaust, etc. Select the most suitable product according to the specifications of your machine or equipment.

4. Stainless-Steel Shaft with Excellent Corrosion Resistance

The stainless-steel spline shaft offers excellent corrosion resistance and is ideal for clean rooms and other locations where anti-rust oil must be excluded.

Model Number and Specification Designation

Model Number Arrangement Example

Each specification of the UVT Ball Spline is designated by its model number. The type symbol, size and component symbols, preload symbol, grade symbol, interchangeability symbol, and auxiliary symbol of the model number indicate each applicable specification.

Free-Combination Specification / Non-Interchangeable Specification — Model Number Arrangement

Free-combination specification	1	2	3	4	5	6	7	8	9	10
Outer cylinder (single piece)	**UVT**	**L**		**5**	**C1**		**T_1**	**H**	**S1**	**/N**
Spline shaft (single piece) (*)	**LUVT**		**A**	**5**		**R150**		**H**	**S1**	
Complete set	**UVT**	**L**	**A**	**5**	**C1**	**R150**	**T_1**	**H**	**S1**	**/N**
Non-interchangeable specification										
Complete set	**UVT**	**L**	**A**	**5**	**C1**	**R150**	**T_1**	**H**		**/N**

Designation Items

No.	Item	No.	Item
1	Type	**6**	Spline-shaft length
2	Outer-cylinder length	**7**	Preload amount
3	Spline-shaft shape	**8**	Accuracy grade
4	Shaft diameter size	**9**	Free combination
5	Number of outer cylinders	**10**	Special configuration

(*) Regardless of the series or the form of the paired outer cylinder, always designate the type symbol "LUVT" (solid shaft) or "LUVTA" (hollow shaft) for the spline shaft (single piece).

Model Number and Specification Description — Type, Outer-Cylinder Length, Spline-Shaft Shape, Shaft Diameter Size —

1. Type

UVT Ball Spline

Symbol	Description	Page
UVT	Standard type (light)	p.15
UVTF	Flange type (light)	p.17
ULT	Standard type (4-segment)	p.19
ULF	Flange type (4-segment)	p.21
USPT	Trimmed-flange type	p.23
USLT	Cylindrical type	p.25
USLF	Round-flange type	p.27
ULTR A	Light rotary type	p.29
ULTR B	Heavy-duty rotary type	p.31
UBNS	Ball Screw Spline	p.33
UNS		p.35
UBS		p.37
UVTF		p.41
US	Limited-stroke type	p.43

Regardless of the series or the form of the paired outer cylinder, always designate the spline-shaft type symbol: solid shaft or hollow shaft.

2. Outer-Cylinder Length

Standard	: No symbol
High-rigidity extended	: L

3. Spline-Shaft Shape

Solid shaft	: No symbol
Hollow shaft	: A

4. Shaft Diameter Size

3, 4, 5, 6, 8, 10, 12, 15, 20, 25, 30, 40, 50, 60, 80, 100

5. Number of Outer Cylinders

: C○	For a complete set, indicates the number of outer cylinders paired with one spline shaft. For an outer cylinder (single piece), designate "C1" only.

6. Spline-Shaft Length

: R○	The spline-shaft length is expressed in mm. For standard and maximum lengths, refer to the dimension tables.

— Preload Amount —

7. Preload Amount

Clearance	: T_0	Designate when ordering a complete set or an outer cylinder (single piece). For details of preload amounts, refer to Table 1.
Standard	: No symbol	
Light preload	: T_1	

Table 1 — Preload Amount

Preload type	Preload symbol	Preload amount (N)	Applicable conditions
Clearance	T_0	0(1)	· Extremely light movement
Standard	(No symbol)	0(2)	· Slight precision movement
Light preload	T_1	0.02 C_0	· Minimal vibration · Balanced load · Slight precision movement

(1) Zero clearance or a very small clearance.
(2) Zero preload or lightly preloaded state.
Note: C_0 indicates the basic static load rating.

8. Accuracy Grade

Standard grade	: No symbol	For free-combination specifications, pair the outer cylinder and the spline shaft with the same accuracy grade. For the grade to be selected, refer to Table 2. For details of accuracy grades, refer to Tables 3, 4 and 5.
High grade	: H	
Precision grade	: P	

Table 2 — Application of Accuracy Grades

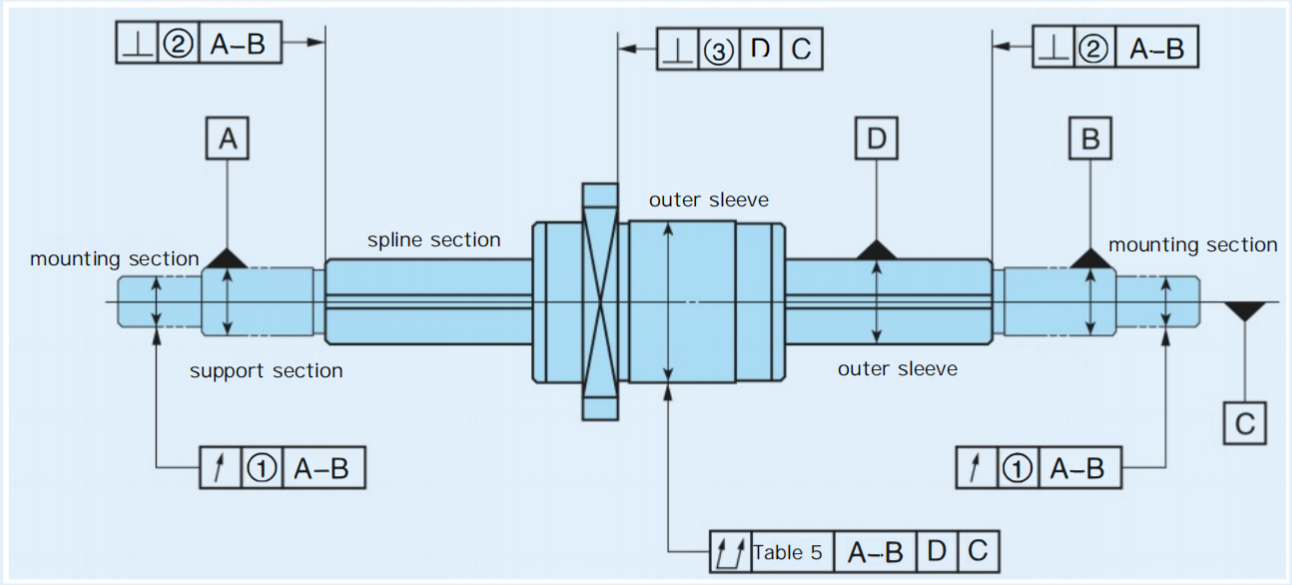
Shaft diameter size	Grade (grade symbol)		
	Standard (No symbol)	High (H)	Precision (P)
2	○	○	○
3	○	○	○
4	○	○	○
5	○	○	○
6	○	○	○
8	○	○	○
10	○	○	○
12	○	○	○
15	○	○	○
20	○	○	○
25	○	○	○
30	○	○	○
40	○	○	○
50	○	○	○

Note: Shaded portions of the table also apply to the free-combination specification.

Table 3 — Permissible Variations of Each Part (μm)

Shaft diameter size	Relative to the spline-shaft support-section axis						Perpendicularity of the flange mounting face relative to the spline shaft axis(2)		
	⑤ Radial circular runout of the component mounting section(1)			⑤ Perpendicularity of spline-section end faces(1)					
	Standard (No symbol)	High (H)	Precision (P)	Standard (No symbol)	High (H)	Precision (P)	Standard (No symbol)	High (H)	Precision (P)
3	33	14	8	22	9	6	27	11	8
4	33	14	8	22	9	6	27	11	8
5	33	14	8	22	9	6	27	11	8
6	33	14	8	22	9	6	27	11	8
8	33	14	8	22	9	6	27	11	8
10	41	17	10	22	9	6	33	13	9
12	41	17	10	22	9	6	33	13	9
15	46	19	12	27	11	8	33	13	9
20	46	19	12	27	11	8	33	13	9
25	53	22	13	33	13	9	39	16	11
30	53	22	13	33	13	9	39	16	11
40	62	15	15	39	16	11	46	19	13
50	62	15	15	39	16	11	–	–	–

(1) Values after machining the shaft end.
(2) Applies to the flange type.



Spline-shaft assembly: component mounting sections, spline section, support sections and outer cylinder, with datum system A–B, C, D

Table 4 — Twist of Groove Relative to the Effective Length of the Spline Section (μm)

Accuracy grade	Standard (No symbol)	High (H)	Precision (P)
Permissible value	33	13	6

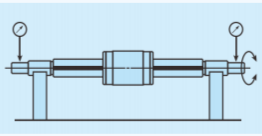
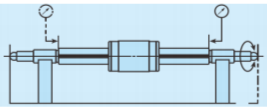
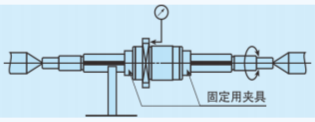
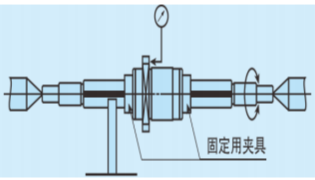
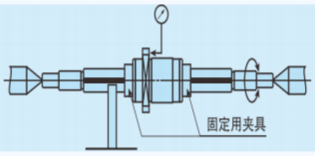
Note: Applies to any position per 100 mm of the effective spline length.

Table 5 — Permissible Values of Radial Total Runout of the Spline-Shaft Axis (μm)

Total spline-shaft length (mm)		Shaft diameter size								
		3, 4, 5, 6, 8			10, 12			15, 20		
		Standard (No symbol)	High (H)	Precision (P)	Standard (No symbol)	High (H)	Precision (P)	Standard (No symbol)	High (H)	Precision (P)
–	**200**	72	46	26	59	36	20	56	34	18
200	**315**	133	89	57	83	54	32	71	45	25
315	**400**	185	126	82	103	68	41	83	53	31
400	**500**	236	163	108	123	82	51	95	62	38
500	**630**	–	–	–	151	102	65	112	75	46
630	**800**	–	–	–	190	130	85	137	92	58
800	**1 000**	–	–	–	–	–	–	170	115	75
1 000	**1 250**	–	–	–	–	–	–	–	–	–

Total spline-shaft length (mm)		Shaft diameter size					
		25, 30			40, 50		
		Standard (No symbol)	High (H)	Precision (P)	Standard (No symbol)	High (H)	Precision (P)
–	**200**	53	32	18	53	32	16
200	**315**	58	39	21	58	36	19
315	**400**	70	44	25	63	39	21
400	**500**	78	50	29	68	43	24
500	**630**	88	57	34	74	47	27
630	**800**	103	68	42	84	54	32
800	**1 000**	124	83	52	97	63	38
1 000	**1 250**	151	102	65	114	76	47

Table 6 — Measuring Methods of Accuracy

Item	Measuring method	Measuring-method diagram
(1) Radial circular runout of the component mounting section relative to the spline-shaft support-section axis (see Table 3 ⑤)	Support the spline shaft at its support sections, place the gauge head on the outer circumference of the component mounting section, and measure the runout during one revolution of the spline shaft.	 Runout measured with the shaft supported on V-blocks
(1) Perpendicularity of the spline-section end faces relative to the spline-shaft support-section axis (see Table 3 ⑥)	Support the spline shaft with the shaft support section and one side of the spline shaft, place the gauge head on the end face of the spline section, and obtain the perpendicularity from the runout during one revolution of the spline shaft.	 End-face perpendicularity measured with the gauge head on the spline-section end face
Perpendicularity of the flange mounting face relative to the spline-shaft axis (see Table 3 ⑦)	Support the spline shaft at its two centers and on the outer circumference of the spline shaft near the outer cylinder, and fix the outer cylinder to the spline shaft. Place the gauge head on the flange mounting face and obtain the perpendicularity from the runout during one revolution of the spline shaft.	 Flange mounting face measured with a clamping fixture
Twist of groove relative to the effective length of the spline section (see Table 4)	Fix and support the spline shaft, and apply an appropriate unidirectional torque to the outer cylinder (or measuring unit). Bring the gauge head into contact with the side face of the countersunk key attached to the outer cylinder, in the direction perpendicular to the spline shaft, and compute the runout while the outer cylinder and the gauge head move axially together by 100 mm at an arbitrary position within the effective spline length. Note that the gauge head should be kept as close as possible to the outer surface of the outer cylinder.	 Groove-twist measurement, 100 mm travel
Radial total runout of the spline-shaft axis (see Table 5)	Support the spline shaft at its support sections or at two centers, place the gauge head on the outer circumference of the outer cylinder (or measuring unit), measure the runout during one revolution at several axial positions, and compute the maximum value.	 Total runout measured at several axial positions

(*) Values after machining the shaft end.

— Free Combination, Special Configuration —

9. Free Combination

S1 specification	: S1	Designate when ordering the free-combination specification. Pair an outer cylinder and a spline shaft carrying the same interchangeability symbol. The performance and accuracy of "S1" and "S2" are identical. For the applicable form and shaft diameter size, refer to Table 1. For the non-interchangeable specification, use "No symbol".
S2 specification	: S2	
Non-interchangeable specification	: No symbol	

10. Special Configuration

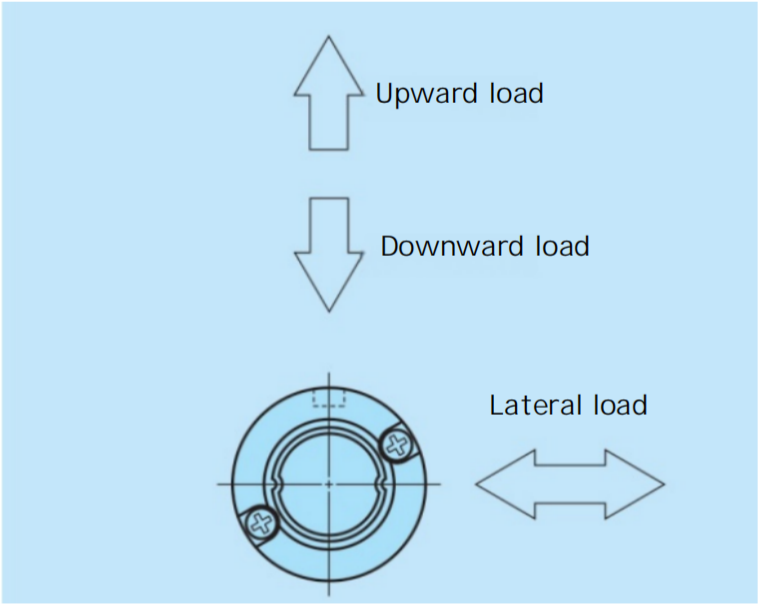
/N	Chrome plating
/N1	Black-chrome plating

Load Direction and Load Ratings

For the UVT series, use the load ratings after correcting them for the load direction. Then use them. Per Table 7, [use] the basic dynamic load rating and the basic static load rating shown in the dimension tables after correction

Table 7 — Load Ratings Corrected for Load Direction

Shaft diameter size	Basic dynamic load rating			Basic static load rating		
	Load direction			Load direction		
	Upper side	Lower side	Lateral	Upper side	Lower side	Lateral
2–12	C	C	1.47 C	C_0	C_0	1.73 C_0
15–50	C	C	1.13 C	C_0	C_0	1.19 C_0



Load directions upward, downward and lateral

Ordering Units

When ordering, specify the number of sets in units of spline-shaft pieces. When ordering outer cylinders or spline shafts as single pieces of the free-combination specification, specify the number of outer cylinders or the number of spline shafts.

Free-Combination Specification

Item	Model number example	Ordering unit
Outer cylinder (single piece) (2 pcs)	**UVTF 10 C1 T_1 H S1 /N** Designate with C1 only.	2 pcs
Spline shaft (single piece) (1 pc)	**LUVT 10 R200 H S1**	1 pc
Complete set (1 set)	**IVTF 10 C2 R200 T_1 H S1 /N**	1 set

Second Moment of Area and Section Modulus of the Spline Shaft

Table 8 — Second Moment of Area and Section Modulus of the Spline Shaft

Shaft diameter size	Second moment of area mm^4		Section modulus mm^3	
	Solid shaft	Hollow shaft	Solid shaft	Hollow shaft
3	3.6	–	2.5	–
4	12	12	6	6
5	29	29	12	12
6	61	61	21	21
8	190	190	49	49
10	470	460	95	94
12	990	960	170	160
15	1 590	–	240	–
20	5 110	–	570	–
25	12 100	–	1 080	–
30	25 400	–	1 890	–
40	91 000	–	4 930	–
50	223 000	–	9 660	–

Lubrication

The UVT series is sealed with a lithium-soap-based grease containing extreme-pressure additives (Alvania EP Grease 2 [Showa Shell Sekiyu K.K.]).

Dust Protection

The outer cylinder is already fitted as standard with special rubber seal gaskets for dust protection. However, when large amounts of dirt or dust are floating in the air, or when large foreign matter such as chips or sand adheres to the spline shaft, thorough dust protection is very difficult. Fitting a protective cover on the linear-motion section is therefore recommended.

Sizes 3 and 4 are not supplied with seal gaskets. If seal gaskets are required for sizes 3 and 4, please consult UVT.

Handling Precautions

1. Fitting of the outer cylinder

The fit between the outer cylinder and the housing bore is generally an intermediate fit (J7). Where accuracy and rigidity requirements are not strict, a clearance fit (H7) may also be used.

2. General mounting structure

Examples of outer-cylinder mounting are shown in Fig. 1.

To stop rotation of the outer cylinders of sizes 3 and 4, use the taper pin hole provided in the outer cylinder: for size 3, use an M1.6–2 screw, and for size 4, use an M2–M2.5 screw. Take care that the screw does not deform the outer cylinder.

3. Using several outer cylinders close together

When several outer cylinders are used close together, the actual load may exceed the calculated load value depending on the accuracy of the mounting surface and the mounting datum face of the machine or device. In such cases the load must be estimated as being larger than the calculated value.

When two or more outer cylinders are used on a single spline shaft, or when two or more keys are used to fix the rotation direction of the outer cylinders, the outer cylinders are delivered with their keyway positions aligned. For details, please consult UVT.

4. Additional machining of the spline-shaft end

The surface of the spline shaft is hardened by high-frequency induction hardening. When additional machining of the shaft end is required, the maximum diameter of the machined shaft end must not exceed d_1 in the dimension table.

The shape of the spline-shaft end can be produced to suit the application. Please consult UVT.

5. Operating temperature

The maximum operating temperature is 120°C; the maximum operating temperature for continuous use is 100°C. If the temperature exceeds 100°C, please consult UVT.

6. Arrangement of flange-type (non-interchangeable specification) outer cylinders

The arrangement when a number of flange-type outer cylinders of the non-interchangeable specification are specified is as shown in Table 16. Arrangements other than Table 9 can also be produced; please consult UVT.

Table 9 — Arrangement of Flange-Type (Non-Interchangeable Specification) Outer Cylinders

Number of outer cylinders	Arrangement of outer cylinders
1	1 outer cylinder
2	2 outer cylinders
3	3 outer cylinders
4	4 outer cylinders
5	5 outer cylinders
6	6 outer cylinders

7. Mounting several sets at the same time

For the free-combination specification, mount together an outer cylinder and a spline shaft that carry the same interchangeability symbol (“S1” or “S2”).

When non-interchangeable specification products are used, do not change the combination of outer cylinder and spline shaft as delivered.

8. Assembly of the outer cylinder and the spline shaft

When assembling the outer cylinder onto the spline shaft, align the grooves of the outer cylinder and of the spline shaft correctly and move the outer cylinder parallel and gently. Rough handling may damage the seal gaskets or cause the balls to drop out.

In addition, with non-interchangeable specification products the best accuracy is obtained when the UVT marks on the outer cylinder and on the spline shaft face the same direction (see Fig. 2). Always take care not to change the assembly direction during assembly.

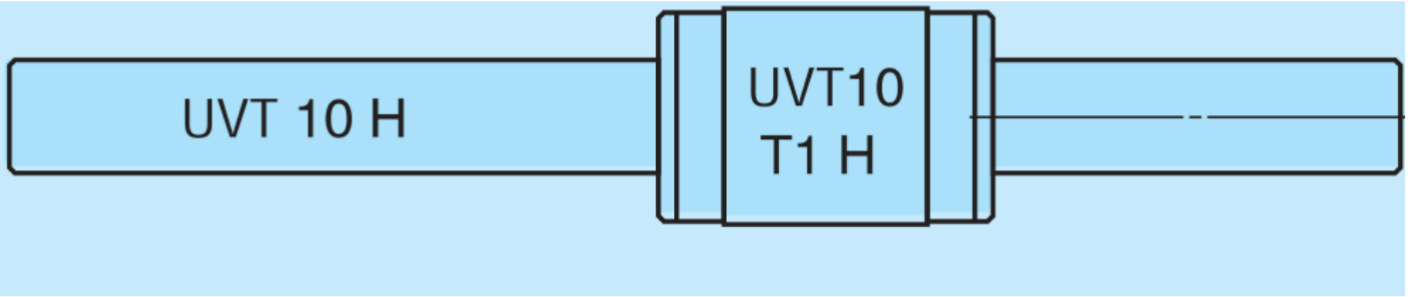


Fig. 2 — Mounting direction of the outer cylinder (UVT 10 H shaft / UVT10 T1 H outer cylinder)

9. Mounting of the outer cylinder

When press-fitting the outer cylinder into the housing, use press-fitting jigs and install it correctly with a press or similar (see Fig. 3).

Standard Product Model Number Arrangement

Type designation			Size	Component designation		Preload designation	Grade designation	Interchangeability designation	Special configuration
UVT	L	A	5	C2	R150	T1	H	S1	/N
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩

Model number designation ①–④

① Type	UVT	Standard type
② Outer-cylinder length	No mark	Standard
	L	High-rigidity extended
③ Spline-shaft shape	No mark	Solid shaft
	A	Hollow shaft
④ Size	3 4 5 6 8	

Model number designation ⑤–⑩

⑤ Number of outer cylinders (2 pcs.)	Code as in the model number example above	
⑥ Spline-shaft length (150 mm)	Code as in the model number example above	
⑦ Preload amount	T_0	Clearance
	No mark	Standard
	T_1	Light preload
⑧ Accuracy grade	No mark	Standard grade
	H	High grade
	P	Precision grade
⑨ Free combination	S1	S1 specification
	S2	S2 specification
	No mark	Non-interchangeable specification
⑩ Special configuration	N	Chrome plating
	N1	Black chrome plating
	No mark	No surface treatment

Model No. UVT series	Free combination	Mass (reference) g		Outer-cylinder dimensions & tolerances mm									Spline-shaft dimensions & tolerances mm				Basic dynamic load rating(4) C N	Basic static load rating(4) C_0 N	Dynamic torque rating(4) T N·m	Static torque rating(4) T_0 N·m	Static moment rating(4) N·m	
		Outer cylinder	Spline shaft (per 100 mm)	D	D tolerance	L_1	L_2	W	W tolerance	t	ℓ	d	d tolerance	d_1(2)	d_2	(L) max length					T_X	T_Y
UVT 3(1)	–	2.1	5.4	7	0 −0.009	10	5.9	–	–	0.8	–	3	0 −0.010	2.2	–	150	251	285	0.45	0.51	0.31 1.9	0.53 3.3
UVT 4(1)	–	2.5	9.6	8	0 −0.009	12	7.9	–	–	1	–	4	0 −0.012	3.2	1.5	200	303	380	0.70	0.87	0.52 2.9	0.90 5.0
UVTL 4(1)	–					15	10.9														0.52 3.8	0.90 6.5
UVTXL 4(1)	–	4.1				21	16.9									200	441	665	1.00	1.50	1.50 8.60	2.60 15.0
UVT 5	○	4.8	14.9	10	0 −0.009	18	9.2	2	+0.014 0	1.2	6	5	0 −0.012	4.2	2	200	587	641	1.8	1.9	1.0 7.9	1.8 13.6
UVTL 5	○	8.1				26	17.2										879	1180	2.6	3.5	3.2 19.3	5.5 33.4
UVT 6	○	8.9	19	12	0 −0.011	21	12.4	2	+0.014 0	1.2	8	6	0 −0.012	5.2	2	300	711	855	2.5	3.0	1.7 11.7	3.0 20.3
UVTL 6	○	14.5				30	21.4										1030	1500	3.6	5.2	5.0 27.6	8.6 47.8
UVT 8	○	15.9	39	15	0 −0.011	25	14.6	2.5	+0.014 0	1.5	8.5	8	0 −0.015	7	3	500	1190	1330	5.5	6.2	3.3 22.0	5.6 38.1
UVTL 8	○	26.5				37	26.6									500	1800	2470	8.4	11.5	10.3 56.3	17.8 97.5
UVT 10	○	31.5	60.5	19	0 −0.013	30	18.2	3	0 −0.014	1.8	11	10	0 −0.015	8.9	4	600	1880	2150	10.9	12.5	7.0 41.5	12.1 71.9

(*1) Without seal gaskets.

(*2) d_1 is the maximum diameter when the shaft end is machined.

(*3) The basic dynamic load rating (C), basic static load rating (C_0), dynamic torque rating (T) and static torque ratings (T_0, T_X, T_Y) are the values for the directions shown in the figure on page 16. In the T_X and T_Y columns the upper value is for one outer cylinder and the lower value is for two outer cylinders mounted close together.

UVT Series — Dimensions and Load Ratings (continued)

Model No. UVT series	Free combination	Mass (reference) g		Outer-cylinder dimensions & tolerances mm								Spline-shaft dimensions & tolerances mm				Basic dynamic load rating[4] C N	Basic static load rating[4] C_0 N	Dynamic torque rating[4] T N·m	Static torque rating[4] T_0 N·m	Static moment rating[4] N·m	
		Outer cylinder	Spline shaft (per 100 mm)	D	D tolerance	L_1	L_2	W	W tolerance	t	ℓ	d	d tolerance	d_1[2]	d_2	(L) max length					T_X	T_Y
UVTL 10	○	56.5	47	34.9	2850	4040	16.6	23.4	22.7 115	39.3 200												
UVT 12	○	44	87.5	21	0 −0.013	35	23	3	0 −0.014	1.8	15	12	0 −0.018	10.9	6	800	2180	2690	14.8	18.3	10.6 59.1	18.3 102
UVTL 12	○	76.8				54	42										3220	4850	21.9	33.0	32.2 157	55.7 272
UVT 15	○	59.5	111	23	0 −0.013	40	27	3.5	0 −0.018	2	20	13.6	0 −0.018	11.6	–	1000	4180	6070	31.3	45.6	27.8 152	33.2 181
UVTL 15	○	110				65	52								–		6400	11500	48.0	86.5	94.0 449	112 535
UVT 20	○	130	202	30	0 −0.016	50	33	4	0 −0.018	2.5	26	18.2	0 −0.021	15.7	–	1000	6600	9040	66.0	90.4	48.6 288	58.0 343
UVTL 20	○	198				71	54								–		9270	15100	92.7	151	127 650	151 774
UVT 25	○	220	310	37	0 −0.016	60	39.2	5	0 −0.018	3	29	22.6	0 −0.021	19.4	–	1200	11200	14300	139	178	92.8 551	111 656
UVTL 25	○	336				84	63.2								–		15400	23200	193	290	229 1190	273 1420
UVT 30	○	430	450	45	0 −0.016	70	43	7	0 −0.022	4	35	27.2	0 −0.021	23.5	–	1200	15400	19400	231	292	147 874	176 1040
UVTL 30	○	634				98	71								–		21300	31600	320	474	364 1900	434 2260

Hollow-shaft option (UVT(L) 4)

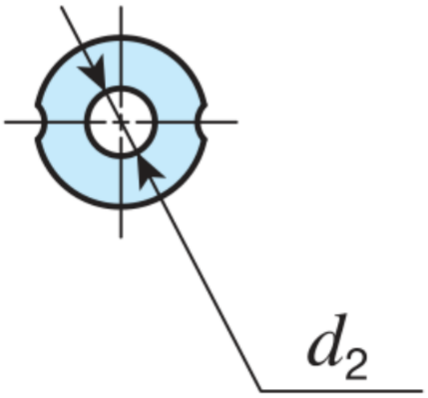


Fig. 1 — Hollow shaft, d_2

End view (120°) and side view

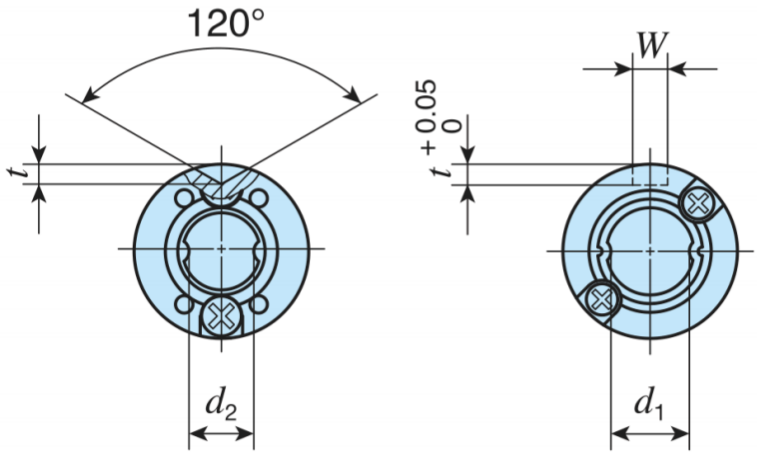
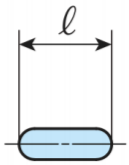


Fig. 2 — End view: 120° ball arrangement, t, d_2; side view: W, $t^{+0.05}_{0}$, d_1 (UVT 3 / UVT(L) 4)

Lateral section: outer cylinder on spline shaft



Standard Product Model Number Arrangement

Type designation			Size	Component designation		Preload designation	Grade designation	Interchangeability designation	Special configuration
UVTF	L	A	5	C2	R150	T1	H	S1	/N
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩

Model number designation ①–⑩

① Type	UVTF	Flange type
② Outer-cylinder length	No mark	Standard
	L	High-rigidity extended
③ Spline-shaft shape	No mark	Solid shaft
	A	Hollow shaft
④ Size	3 4 5 6 8	
⑤ Number of outer cylinders (2 pcs.)	C2	Two outer cylinders
⑥ Spline-shaft length (150 mm)	R150	Spline-shaft length 150 mm
⑦ Preload amount	T0	Clearance
	No mark	Standard
	T1	Light preload
⑧ Accuracy grade	No mark	Standard grade
	H	High grade
	P	Precision grade
⑨ Free combination	S1	S1 specification
	S2	S2 specification
	No mark	Non-interchangeable specification
⑩ Special configuration	N	Chrome plating
	N1	Black chrome plating
	No mark	No surface treatment

Table 1 — UVTF / UVTFL series: dimensions and load ratings

Model No. UVTF series	Free combination	Mass (reference) g		Outer-cylinder dimensions & tolerances mm										Spline-shaft dimensions & tolerances mm					C N	C_0 N	T N·m	T_0 N·m	T_X N·m	T_Y N·m
		Outer cylinder	Spline shaft (per 100 mm)	D	D tolerance	L_1	L_2	D_1	B	E	T	pcd	d_3	d	d tolerance	d_1(*2)	d_2	(L) max length						
UVTF 3(1)	–	3.7	5.4	7	0 −0.009	10	5.9	18	9	4	1.9	13	2.9	3	0 −0.010	2.2	–	150	251	285	0.45	0.51	0.31 1.9	0.53 3.3
UVTF 4(1)	–	5.1	9.6	8	0 −0.009	12	7.9	20	10	4.6	2.5	15	3.4	4	0 −0.012	3.2	1.5	200	303	380	0.70	0.87	0.52 2.9	0.90 5.0
UVTF 5	○	8.9	14.9	10	0 −0.009	18	9.2	23	18	7	2.7	17	3.4	5	0 −0.012	4.2	2	200	587	641	1.8	1.9	1.0 7.9	1.8 13.6
UVTFL 5	○	12				26	17.2												879	1180	2.6	3.5	3.2 19.3	5.5 33.4
UVTF 6	○	13.9	19	12	0 −0.011	21	12.4	25	20	7	2.7	19	3.4	6	0 −0.012	5.2	2	300	711	855	2.5	3.0	1.7 11.7	3.0 20.3
UVTFL 6	○	19.5				30	21.4												1030	1500	3.6	5.2	5.0 27.6	8.6 47.8
UVTF 8	○	23.5	39	15	0 −0.011	25	14.6	28	22	9	3.8	22	3.4	8	0 −0.015	7	3	500	1190	1330	5.5	6.2	3.3 22.0	5.6 38.1
UVTFL 8	○	34.1				37	26.6												1800	2470	8.4	11.5	10.3 56.3	17.8 97.5
UVTF 10	–	45	60.5	19	0 −0.013	30	18.2	36	28	10	4	28	4.5	10	0 −0.015	8.9	4	600	1880	2150	10.9	12.5	7.0 41.5	12.1 71.9
UVTFL 10	○	70.1				47	34.9												2850	4040	16.6	23.4	22.7 115	39.3 200
UVTF 12	○	59	87.5	21	0 −0.01	35	23	38	30	10	4.1	30	4.5	12	0 −0.01	10.9	6	800	2180	2690	14.8	18.3	10.6 59.1	18.3 102

UVTF Series — Dimension Symbols

Flange end view: UVTF 3, UVTF(A) 4

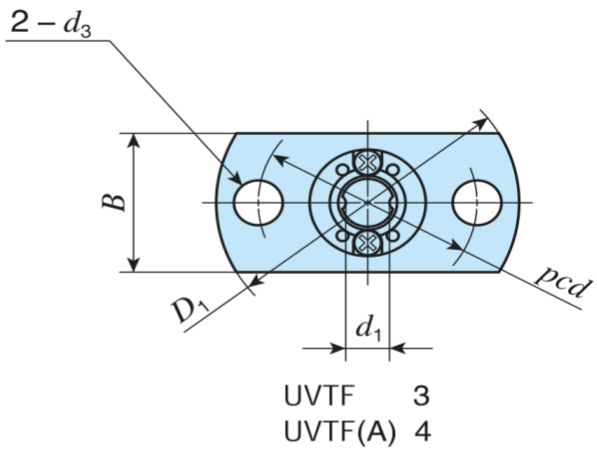


Fig. 1 — Flange outline, 2–d_3 bolt holes (UVTF 3, UVTF(A) 4)

Flange end view: UVTF 5 to 30

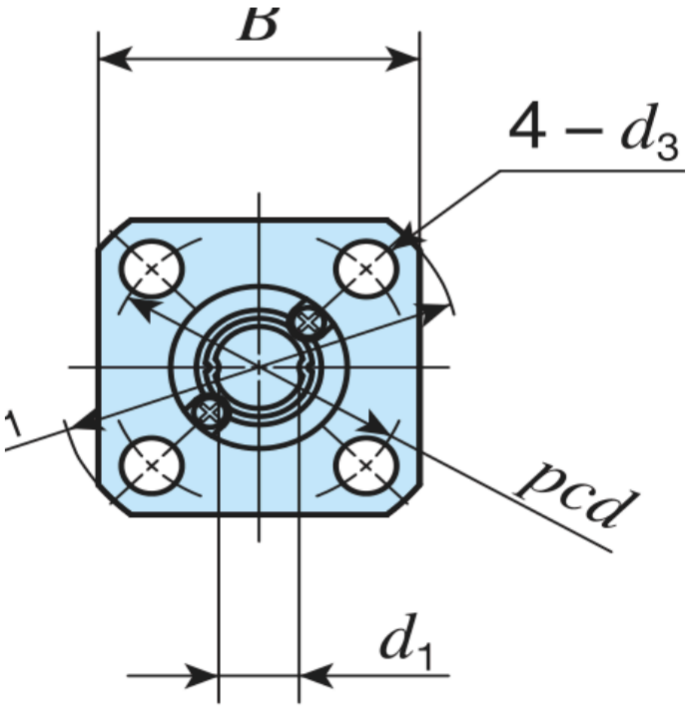


Fig. 2 — Flange outline, 4–d_3 bolt holes

Lateral section: outer cylinder on spline shaft

Hollow-shaft option

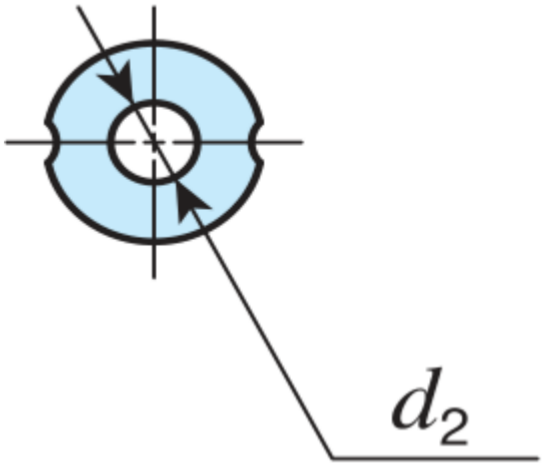


Fig. 3 — Hollow shaft, d_2

Standard Product Model Number Arrangement

Type designation	Spline-shaft shape	Size	Number of outer cylinders	Spline-shaft length	Preload designation	Accuracy grade	Free combination	Special configuration
ULT	A	6	C2	R150	T1	H	S1	/N
①	②	③	④	⑤	⑥	⑦	⑧	⑨

Model number designation ①–⑨

① Type	ULT	Standard type
② Spline-shaft shape	No mark	Solid shaft
	A	Hollow shaft
③ Size	4 5 6 8 10 13 16 20 25 30 40 50	
④ Number of outer cylinders (2 pcs.)	—	
⑤ Spline-shaft length (150 mm)	—	
⑥ Preload amount	T0	Clearance
	No mark	Standard
	T1	Light preload
⑦ Accuracy grade	No mark	Standard grade
	H	High grade
	P	Precision grade
⑧ Free combination	S1	S1 specification
	S2	S2 specification
	No mark	Non-interchangeable specification
⑨ Special configuration	N	Chrome plating
	N1	Black chrome plating
	No mark	No surface treatment

Table 1 — ULT series: dimensions and load ratings

Model No. ULT series	Number of ball rows	Mass (reference) g		Outer-cylinder dimensions & tolerances mm								Spline-shaft dimensions & tolerances mm			Basic dynamic load rating C N	Basic static load rating C_0 N	Dynamic torque rating T N·m	Static torque rating T_0 N·m	Static moment rating N·m	
		Outer cylinder	Spline shaft (per 100 mm)	D	D tolerance	L	W	W tolerance	t	e	Oil hole d_0	d	d tolerance	d_2					T_X	T_Y
ULT 4	4	4.7	10.0	10	0 −0.009	16	2	+0.014 0	1.2	6	–	4	0 −0.012	1.5	860	1220	0.74	1.05	1.97	10.3
ULT 5	4	9.1	15.0	12	0 −0.011	20	2.5	+0.014 0	1.2	8	–	5	0 −0.012	2.0	1075	1525	0.93	1.31	2.46	12.88
ULT 6	4	19.0	21.0	14	0 −0.011	25	2.5	+0.014 0	1.2	10.5	1	6	0 −0.012	2.0	1220	2280	1.5	2.4	5.1	40
ULT 8	4	23.0	38.0	16	0 −0.011	25	2.5	+0.014 0	1.2	10.5	1.5	8	0 −0.015	3.0	1450	2870	2.1	3.7	7.4	50
ULT 10	4	54.0	60.0	21	0 −0.013	33	3	+0.014 0	1.5	13	1.5	10	0 −0.015	4.0	2670	4890	4.4	8.20	13.7	109
ULT 13	4	70.0	100.0	24	0 −0.013	36	3	+0.014 0	1.5	15	1.5	13	0 −0.018	7.0	2730	50700	21	39.2	18	116
ULT 16	4	150.0	150.0	31	0 −0.013	50	3.5	+0.018 0	2	17.5	2	16	0 −0.018	8.0	6120	11200	60	110.0	46	299
ULT 20	4	220.0	238.0	35	0 −0.016	63	4	+0.018 0	2.5	29	2	20	0 −0.021	10.0	8900	16300	105	194.0	110	560
ULT 25	4	330.0	370.0	42	0 −0.016	71	4	+0.018 0	2.5	36	3	25	0 −0.021	15.0	12800	23200	189	346.0	171	1020
ULT 30	4	360.0	536.0	47	0 −0.016	80	4	+0.022 0	2.5	42	3	30	0 −0.021	17.0	18600	23400	307	439.0	181	1470
ULT 40	4	950.0	955.0	64	0 −0.019	100	6	+0.022 0	3.5	52	4	40	0 −0.025	20.0	30800	37500	674	934.0	358	2940
ULT 50	4	1900.0	1500.0	80	0 −0.019	125	8	+0.027 0	4	58	4	50	0 −0.025	26.0	40300	64900	1290	2950.0	690	4080
ULT 60	4	2300.0	2160.0	90	0 −0.022	140	12	+0.032 0	5	67	5	60	0 −0.03	–	47700	79500	1570	3420.0	881	5470
ULT 80	4	6400.0	3900.0	120	0	160	16	+0.04	6	76	5	80	0		92800	108000	4500	6460.0	1900	10500

Hollow-shaft section

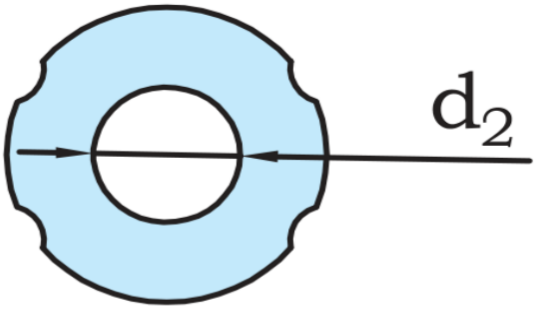


Fig. 1 — Hollow shaft, d_2

Section *e*



Fig. 2 — Dimension *e*

End view

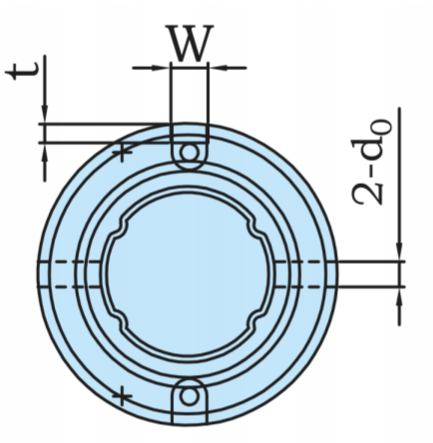


Fig. 3 — End view: *W* (groove width), *t*, and the two oil holes 2-d_0

Side view: outer cylinder on spline shaft

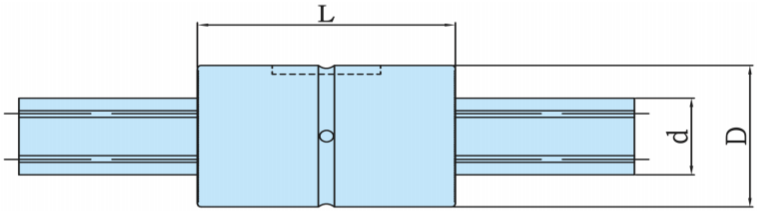


Fig. 4 — Side view: *L* (outer-cylinder length), *d* (spline-shaft diameter), *D* (outer-cylinder diameter)

Directions of the Load Ratings

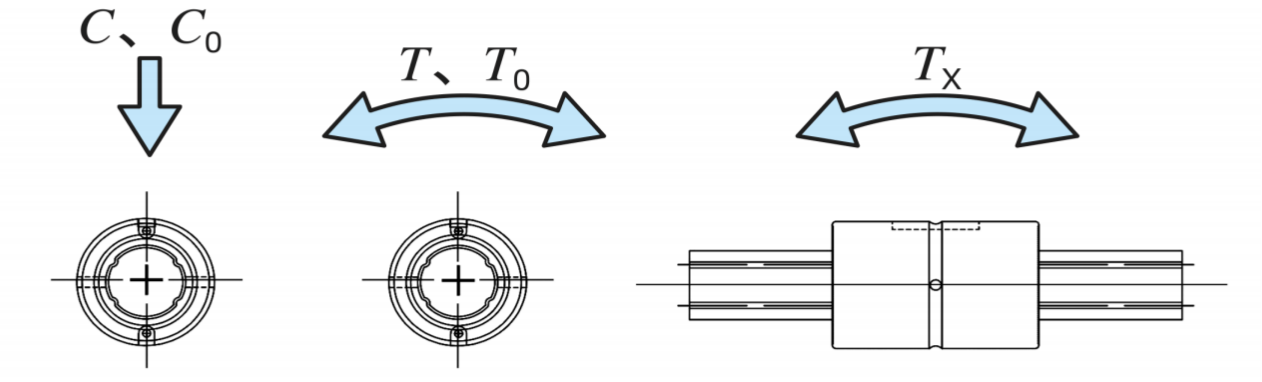


Fig. 5 — Load directions for *C*, C_0 (radial load), *T*, T_0 (torque) and T_X (moment)

Standard Product Model Number Arrangement

Type designation	Spline-shaft shape	Size	Number of outer cylinders	Spline-shaft length	Preload designation	Accuracy grade	Free combination	Special configuration
ULF	A	6	C2	R150	T1	H	S1	/N
①	②	③	④	⑤	⑥	⑦	⑧	⑨

Model number designation ①–⑨

① Type	ULF	Round-flange type
② Spline-shaft shape	No mark	Solid shaft
	A	Hollow shaft
③ Size	6 8 10 13 16 20 25 30 40 50	
④ Number of outer cylinders (2 pcs.)	—	
⑤ Spline-shaft length (150 mm)	—	
⑥ Preload amount	T0	Clearance
	No mark	Standard
	T1	Light preload
⑦ Accuracy grade	No mark	Standard grade
	H	High grade
	P	Precision grade
⑧ Free combination	S1	S1 specification
	S2	S2 specification
	No mark	Non-interchangeable specification
⑨ Special configuration	N	Chrome plating
	N1	Black chrome plating
	No mark	No surface treatment

Table 1 — ULF series: dimensions and load ratings

Model No. ULF series	Number of ball rows	Mass (reference) g		Outer-cylinder dimensions & tolerances mm											Spline-shaft dimensions & tolerances mm			Basic dynamic load rating C N	Basic static load rating C_0 N	Dynamic torque rating T N·m	Static torque rating T_0 N·m	Static moment rating N·m	
		Outer cylinder	Spline shaft (per 100 mm)	D	D tolerance	L	L tolerance	D_1	D_1 tolerance	H	F	Oil hole d_0	PCD	Mounting hole $d_1 \times d_2 \times h$	d	d tolerance	d_3					T_X	T_{X-2}
ULF 6	4	37.0	21.0	14	0 −0.011	25	0 −0.2	30	0 −0.2	5	7.5	1.5	22	3.4×6.5×3.3	6	0 −0.012	2	1220	2280	1.5	2.4	5.1	40
ULF 8	4	42.0	38.0	16	0 −0.011	25	0 −0.2	32	0 −0.2	5	7.5	1.5	24	3.4×6.5×3.3	8	0 −0.015	3	1450	2870	2.1	3.7	7.4	50
ULF 10	4	94.0	60.0	21	0 −0.013	33	0 −0.2	42	0 −0.2	6	10.5	1.5	32	4.5×8×4.4	10	0 −0.015	4	2670	4890	4.4	8.20	13.7	109
ULF 13	4	100.0	100.0	24	0 −0.013	36	0 −0.2	44	0 −0.2	7	11	1.5	33	4.5×8×4.4	13	0 −0.018	7	2730	50700	21	39.2	18	116
ULF 16	4	200.0	150.0	31	0 −0.013	50	0 −0.2	51	0 −0.2	7	18	2	40	4.5×8×4.4	16	0 −0.018	8	6120	11200	60	110.0	46	299
ULF 20	4	330.0	238.0	35	0 −0.016	63	0 −0.3	58	0 −0.2	9	22.5	2	45	5.5×9.5×5.4	20	0 −0.021	10	8900	16300	105	194.0	110	560
ULF 25	4	450.0	370.0	42	0 −0.016	71	0 −0.3	65	0 −0.2	9	26.5	3	52	5.5×9.5×5.4	25	0 −0.021	15	12800	23200	189	346.0	171	1020
ULF 30	4	550.0	536.0	47	0 −0.016	80	0 −0.3	75	0 −0.2	10	30	3	60	6.6×11×6.5	30	0 −0.021	17	18600	23400	307	439.0	181	1470
ULF 4			955.0	64	0 −0.019	100	0 −0.3	100	0 −0.2	14	36	4	82	9×14×8.6	40	0 −0.025	20	30800	37500	674	934.0	358	2940
					0		0		0					11×17		0							

Hollow-shaft section

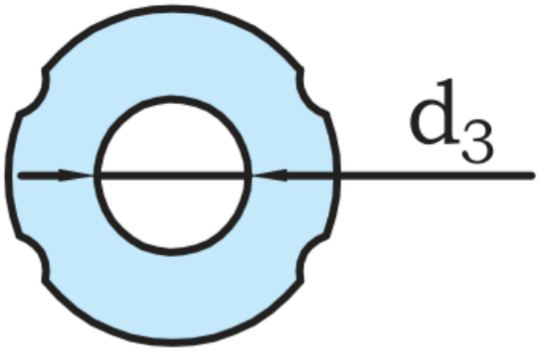


Fig. 1 — Hollow shaft, d_2

Flange end view

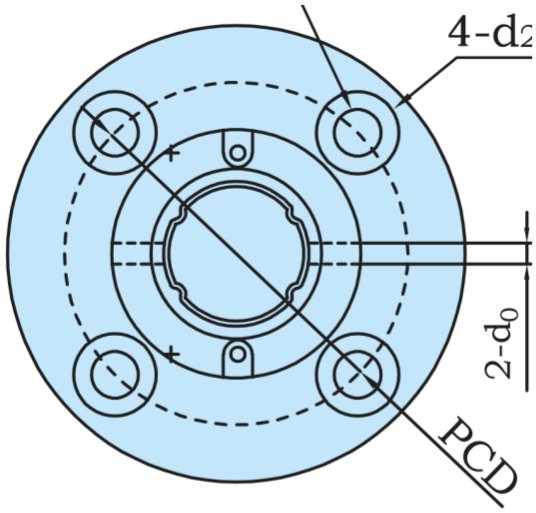


Fig. 2 — Flange end view: *PCD* (mounting-hole pitch circle), 2-d_0 oil holes, 4-d_1 through holes and 4-d_2 counterbores of depth *h*

Side view: outer cylinder with flange on spline shaft

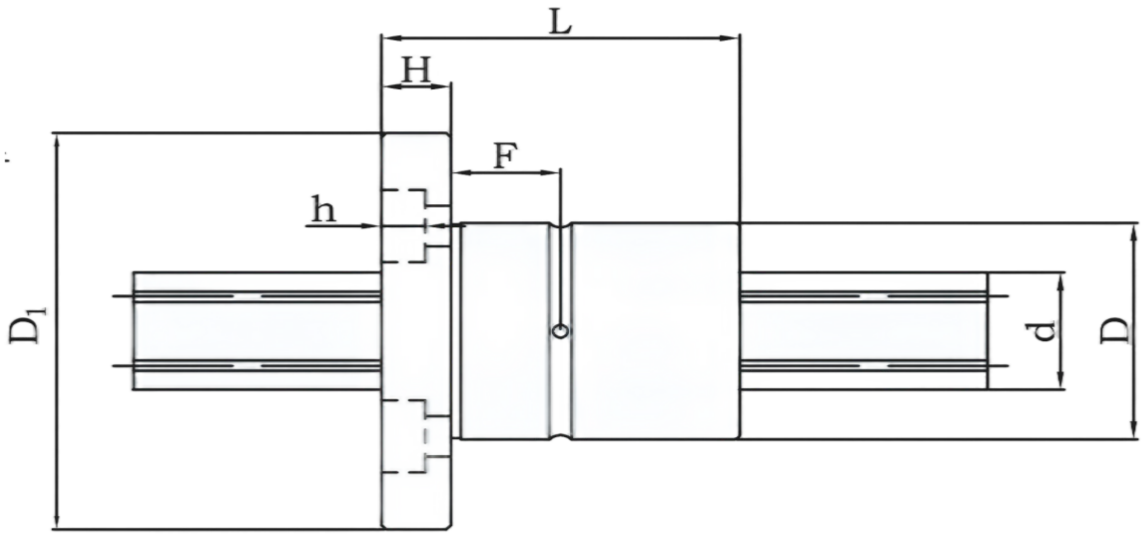
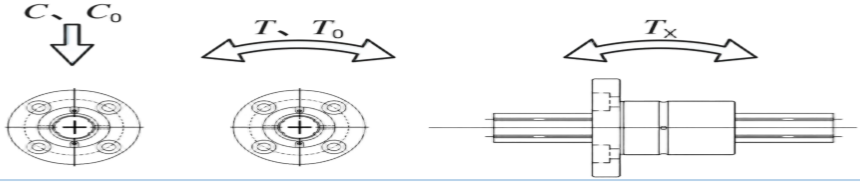


Fig. 3 — Side view: *L* (outer-cylinder length), D_1 (flange outside diameter), *H* (flange thickness), *F*, *h* (counterbore depth), *d*, *D*

Directions of the Load Ratings



Standard Product Model Number Arrangement

Type designation	Number of ball rows	Spline-shaft shape	Size	Number of outer cylinders	Spline-shaft length	Preload designation	Accuracy grade	Free combination	Special configuration
USPT	D	A	8	C2	R300	T1	H	S1	/N
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩

Model number designation ①–⑩

① Type	USPT	Trimmed-flange type
② Number of ball rows	No mark	2-row ball grooves
	D	4-row ball grooves
③ Spline-shaft shape	No mark	Solid shaft
	A	Hollow shaft
④ Size	6 8 10	
⑤ Number of outer cylinders (2 pcs.)	—	
⑥ Spline-shaft length (300 mm)	—	
⑦ Preload amount	T0	Clearance
	No mark	Standard
	T1	Light preload
⑧ Accuracy grade	No mark	Standard grade
	H	High grade
	P	Precision grade
⑨ Free combination	S1	S1 specification
	S2	S2 specification
	No mark	Non-interchangeable specification
⑩ Special configuration	N	Chrome plating
	N1	Black chrome plating
	No mark	No surface treatment

Table 1 — USPT / USPTD series: dimensions and load ratings

Model No. USPT series	Number of ball rows	Mass (reference) g		Outer-cylinder dimensions & tolerances mm											Spline-shaft dimensions & tolerances mm			Basic dynamic load rating C N	Basic static load rating C_0 N	Dynamic torque rating T N·m	Static torque rating T_0 N·m	Static moment rating N·m	
		Outer cylinder	Spline shaft (per 100 mm)	D	D tolerance	L	L tolerance	D_1	B	H	F	Oil hole d_0	PCD	Mounting hole $d_1 \times d_2 \times h$	d	d tolerance	d_3					T_X	T_{X-2}
USPT 6	2	19.3	22.0	14	0 −0.011	25	0 −0.2	30	18	5	7.5	1.5	22	3.4×6.5×3.3	6	0 −0.012	2	746.55	897.75	0.97	1.56	3.9	34.8
USPTD 6	4	19.0	21.0															1220	2280	1.5	2.4	5.1	40
USPT 8	2	23.5	39.0	16	0 −0.011	25	0 −0.2	32	21	5	7.5	1.5	24	3.4×6.5×3.3	8	0 −0.015	3	1249.5	1396.5	1.37	2.4	3.46	23.1
USPTD 8	4	23.0	38.0															1450	2870	2.1	3.7	7.4	50
USPT 10	2	55.0	62.0	21	0 −0.013	33	0 −0.2	42	25	6	10.5	1.5	32	4.5×8×4.4	10	0 −0.015	4	1974	2257.5	2.86	5.33	7.35	43.57
USPTD 10	4	54.0	60.0															2670	4890	4.4	8.20	13.7	109

Note: the basic dynamic load rating (C), basic static load rating (C_0), dynamic torque rating (T) and static torque rating (T, T_{X-2}) are the values for the directions shown in the figure below.

The value in the T_X column is for use with one outer cylinder; the value in the T_{X-2} column is for use with two outer cylinders mounted close together.

USPT(A) — 2-row ball grooves

Spline-shaft section

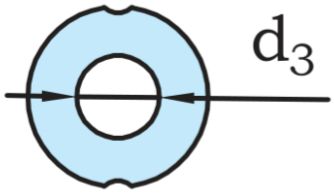


Fig. 1 — Spline-shaft section, d_3

Flange end view

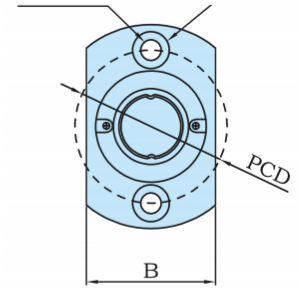


Fig. 2 — Flange end view: *B* (flange width), *PCD* (mounting-hole pitch circle), 2-d_1 through holes, 2-d_2 counterbores of depth *h*

Side view

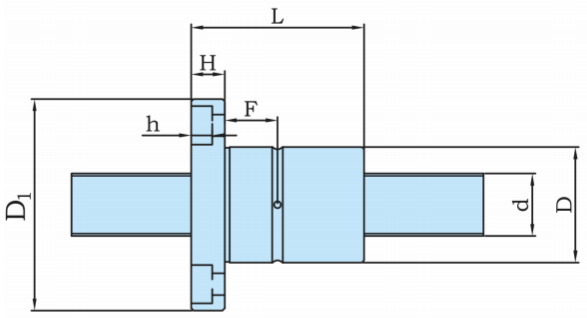


Fig. 3 — Side view: *L*, *H*, *F*, *h*, D_1, *d*, *D*

USPTD(A) — 4-row ball grooves

Spline-shaft section

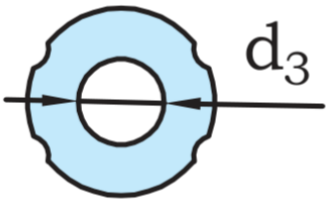


Fig. 4 — Spline-shaft section, d_3

Flange end view

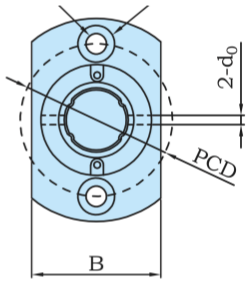


Fig. 5 — Flange end view: *B*, *PCD*, 2-d_1 through holes, 2-d_2 counterbores of depth *h*, 2-d_0 oil holes

Side view

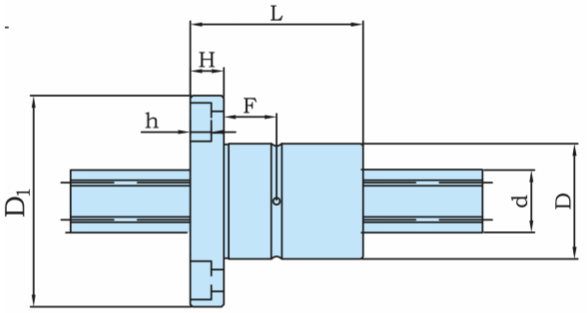


Fig. 6 — Side view: *L*, *H*, *F*, *h*, D_1, *d*, *D*

Directions of the Load Ratings

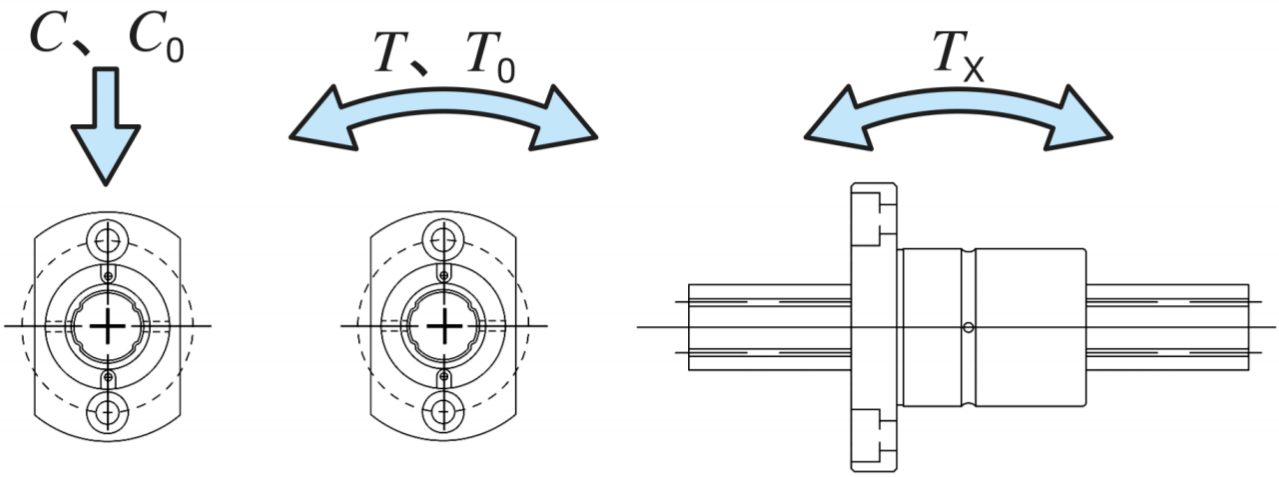


Fig. 7 — Load directions for *C*, C_0 (radial load), *T*, T_0 (torque) and T_X (moment)

Standard Product Model Number Arrangement

Type designation	Spline-shaft shape	Size	Number of outer cylinders	Spline-shaft length	Preload designation	Accuracy grade	Free combination	Special configuration
USLT	A	25	C2	R300	T1	H	S1	/N
①	②	③	④	⑤	⑥	⑦	⑧	⑨

Model number designation ①–⑨

① Type	USLT	Cylindrical type
② Spline-shaft shape	No mark	Solid shaft
	A	Hollow shaft
③ Size	6 8 10 13 16 20 25 30 40 50	
④ Number of outer cylinders (2 pcs.)	—	
⑤ Spline-shaft length (300 mm)	—	
⑥ Preload amount	T0	Clearance
	No mark	Standard
	T1	Light preload
⑦ Accuracy grade	No mark	Standard grade
	H	High grade
	P	Precision grade
⑧ Free combination	S1	S1 specification
	S2	S2 specification
	No mark	Non-interchangeable specification
⑨ Special configuration	N	Chrome plating
	N1	Black chrome plating
	No mark	No surface treatment

Table 1 — USLT series: dimensions and load ratings

Model No. USLT series	Number of ball rows	Mass (reference) g		Outer-cylinder dimensions & tolerances mm								Spline-shaft dimensions & tolerances mm			Basic dynamic load rating C N	Basic static load rating C_0 N	Dynamic torque rating T N·m	Static torque rating T_0 N·m	Static moment rating N·m	
		Outer cylinder	Spline shaft (per 100 mm)	D	D tolerance	L	W	W tolerance	t	e	Oil hole d_0	d	d tolerance	d_2					T_X	T_{X-2}
USLT 6	2	19.3	22.0	14	0 −0.011	25	2.5	+0.014 0	1.2	10.5	1	6	0 −0.012	2.0	746.55	897.75	0.97	1.56	3.9	34.8
USLT 8	2	23.5	39.0	16	0 −0.011	27	2.5	+0.014 0	1.2	10.5	1.5	8	0 −0.015	3.0	1249.5	1396.5	1.37	2.4	3.46	23.1
USLT 10	2	55.0	62.0	21	0 −0.013	33	3	+0.014 0	1.5	13	1.5	10	0 −0.015	4.0	1974	2257.5	2.86	5.33	7.35	43.57
USLT 13	2	71.6	103.0	24	0 −0.013	36	3	+0.014 0	1.5	15	1.5	13	0 −0.018	7.0	2289	2824.5	15.54	19.215	11.13	62.05
USLT 16	2	152.0	154.0	31	0 −0.013	50	3.5	+0.018 0	2	17.5	2	16	0 −0.018	8.0	4389	6373.5	32.86	47.88	29.19	159.6
USLT 20	2	223.0	244.0	35	0 −0.016	56	4	+0.018 0	2.5	29	2	20	0 −0.021	10.0	6930	9492	69.3	94.92	51.03	302.40
USLT 25	4	330.0	370.0	42	0 −0.016	71	4	+0.018 0	2.5	36	3	25	0 −0.021	15.0	12800	23200	189	346.0	171	1020
USLT 30	4	360.0	536.0	47	0 −0.016	80	4	+0.022 0	2.5	42	3	30	0 −0.021	17.0	18600	23400	307	439.0	181	1470
USLT 40	4	950.0	955.0	64	0 −0.019	100	6	+0.022 0	3.5	52	4	40	0 −0.025	20.0	30800	37500	674	934.0	358	2940
USLT 50	4	1900.0	1500.0	80	0 −0.019	125	8	+0.027 0	4	58	4	50	0 −0.025	26.0	40300	64900	1290	2950.0	690	4080

Note: the basic dynamic load rating (C), basic static load rating (C_0), dynamic torque rating (T) and static torque rating (T, T_{X-2}) are the values for the directions shown in the figure below.

The value in the T_X column is for use with one outer cylinder; the value in the T_{X-2} column is for use with two outer cylinders mounted close together.

USLT(A) — drawing 1

Spline-shaft section

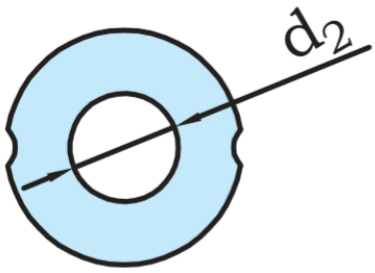


Fig. 1 — Hollow shaft, d_2

End view

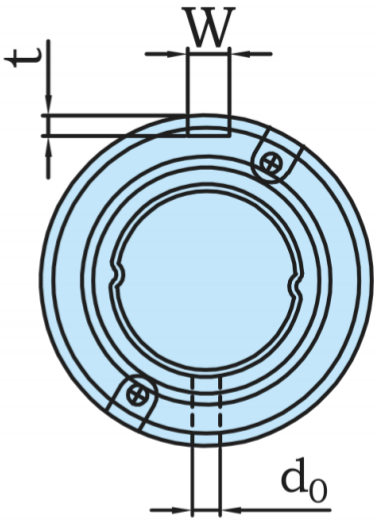


Fig. 2 — End view: *W* (groove width), *t*, and the oil hole d_0

Section *e*

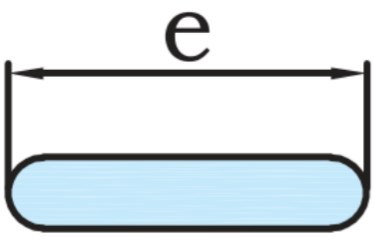


Fig. 3 — Dimension *e*

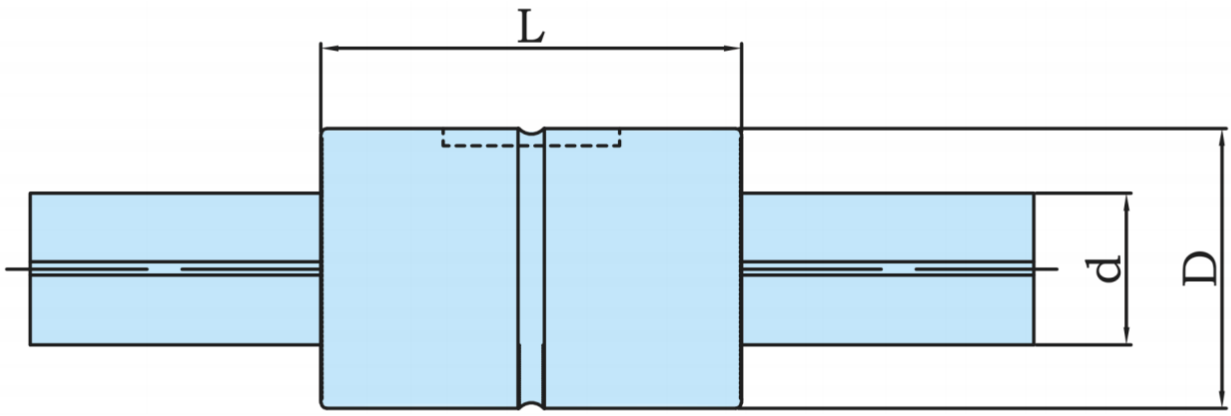


Fig. 4 — Side view: *L* (outer-cylinder length), *d*, *D*

USLT(A) — drawing 2

Spline-shaft section

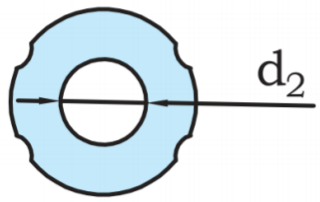


Fig. 5 — Hollow shaft, d_2

End view

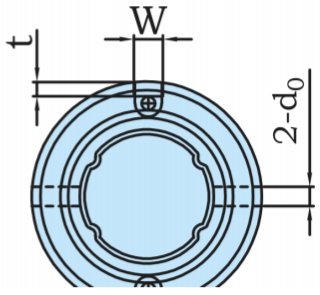


Fig. 6 — End view: *W*, *t*, and the two oil holes 2-d_0

Side view

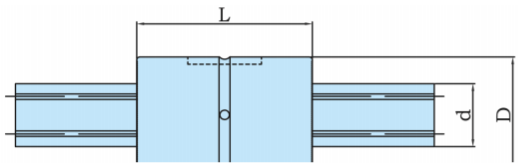


Fig. 7 — Side view: *L*, *d*, *D*

Directions of the Load Ratings

Standard Product Model Number Arrangement

Type designation		Size	Component designation		Preload designation	Grade designation	Interchangeability designation	Special configuration
USLF	A	25	C2	R300	T_1	H	S1	/N
①	②	③	④	⑤	⑥	⑦	⑧	⑨

Model number designation ①–④

① Type	USLT	Round-flange type
② Spline-shaft shape	No mark	Solid shaft
	A	Hollow shaft
③ Size	6 8 10 13 16 20 25 30 40 50	
④ Number of outer cylinders (2 pcs.)	Code as in the model number example above	
⑤ Spline-shaft length (300 mm)	Code as in the model number example above	

Model number designation ⑥–⑨

⑥ Preload amount	T_0	Clearance
	No mark	Standard
	T_1	Light preload
⑦ Accuracy grade	No mark	Standard grade
	H	High grade
	P	Precision grade
⑧ Free combination	S1	S1 specification
	S2	S2 specification
	No mark	Non-interchangeable specification
⑨ Special configuration	N	Chrome plating
	N1	Black chrome plating
	No mark	No surface treatment

USLF Series — Dimensions and Load Ratings

Model No. USLF series	Number of ball rows	Mass (reference) g		Outer-cylinder dimensions & tolerances mm											Spline-shaft dimensions & tolerances mm			Basic dynamic load rating C N	Basic static load rating C_0 N	Dynamic torque rating T N·m	Static torque rating T_0 N·m	Static moment rating N·m	
		Outer cylinder	Spline shaft (per 100 mm)	D	D tolerance	L	L tolerance	D_1	D_1 tolerance	H	F	Oil hole d_0	PCD	Mounting hole $d_1 \times d_2 \times h$	d	d tolerance	d_3					T_X	T_{X-2}
USLF 6	2	19.3	22.0	14	0 −0.011	25	0 −0.2	30	0 −0.2	6	7.5	1	22	3.4×6.5×3.5	6	0 −0.012	2	746.55	897.75	0.97	1.56	3.9	34.8
USLF 8	2	23.5	39.0	16	0 −0.011	27	0 −0.2	32	0 −0.2	8	7.5	1.5	24	3.4×6.5×4.5	8	0 −0.015	3	1249.5	1396.5	1.37	2.4	3.46	23.1
USLF 10	2	55.0	62.0	21	0 −0.013	33	0 −0.2	42	0 −0.2	9	10.5	1.5	32	4.5×8×4.5	10	0 −0.015	4	1974	2257.5	2.86	5.33	7.35	43.57
USLF 13	2	71.6	103.0	24	0 −0.013	36	0 −0.2	44	0 −0.2	9	11	1.5	33	4.5×8×4.5	13	0 −0.018	7	2289	2824.5	15.54	19.215	11.13	62.05
USLF 16	2	152.0	154.0	31	0 −0.013	50	0 −0.2	51	0 −0.2	10	18	2	40	4.5×8×5.4	16	0 −0.018	8	4389	6373.5	32.86	47.88	29.19	159.6
USLF 20	2	223.0	244.0	35	0 −0.016	56	0 −0.3	58	0 −0.2	10	18	2	45	5.5×9.5×5.4	20	0 −0.021	10	6930	9492	69.3	94.92	51.03	302.40
USLF 25	4	330.0	370.0	42	0 −0.016	71	0 −0.3	65	0 −0.2	13	26.5	3	52	5.5×9.5×8	25	0 −0.021	15	12800	23200	189	346.0	171	1020
USLF 30	4	360.0	536.0	47	0 −0.016	80	0 −0.3	75	0 −0.2	13	30	3	60	6.6×11×8	30	0 −0.021	17	18600	23400	307	439.0	181	1470
USLF 40	4	950.0	955.0	64	0 −0.019	100	0 −0.3	100	0 −0.2	18	36	4	82	9×14×12	40	0 −0.025	20	30800	37500	674	934.0	358	2940
USLF 50	4	1900.0	1500.0	80	0 −0.019	125	0 −0.3	124	0 −0.2	20	46.5	4	102	11×17.5×12	50	0 −0.025	26	40300	64900	1290	2950.0	690	4080

Note: The basic dynamic load rating (C), basic static load rating (C_0), dynamic torque rating (T) and static torque rating (T_0, T_X, T_{X-2}) are the values for the directions shown in the figure below. The T_X column gives the values for one outer cylinder, and the T_{X-2} column the values for two outer cylinders mounted close together.

USLF(A) — Flange and spline-shaft dimensions (1)

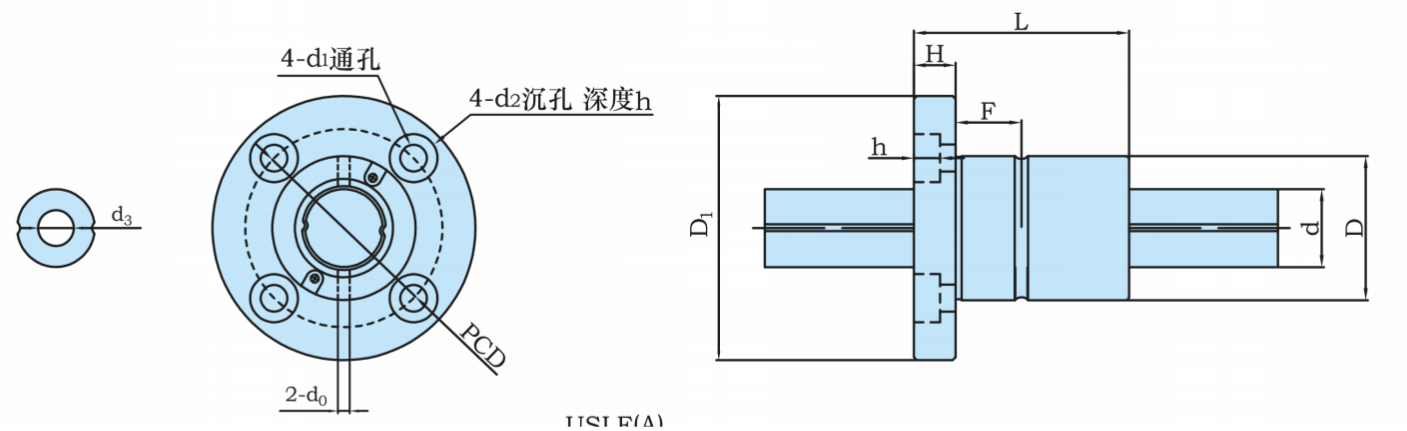


Fig. 1 — USLF(A): end view with 4×d_1 through holes, 4×d_2 counterbores (depth h), 2×d_0 oil holes and PCD; side view: D_1, L, H, F, h, d, D

USLF(A) — Flange and spline-shaft dimensions (2)

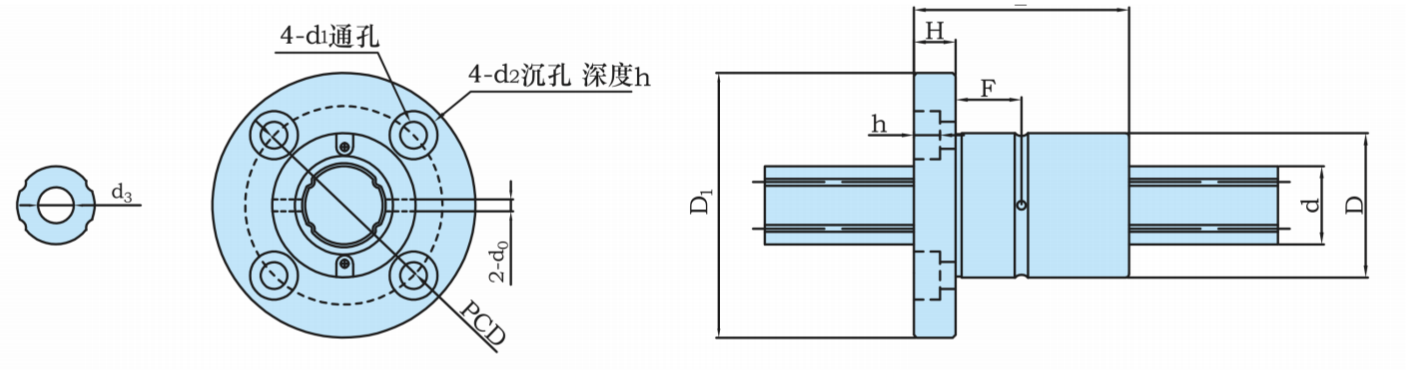


Fig. 2 — USLF(A): end view with 4×d_1 through holes, 4×d_2 counterbores (depth h), 2×d_0, PCD, d_3; side view: D_1, L, H, F, h, d, D

Directions of the Load Ratings

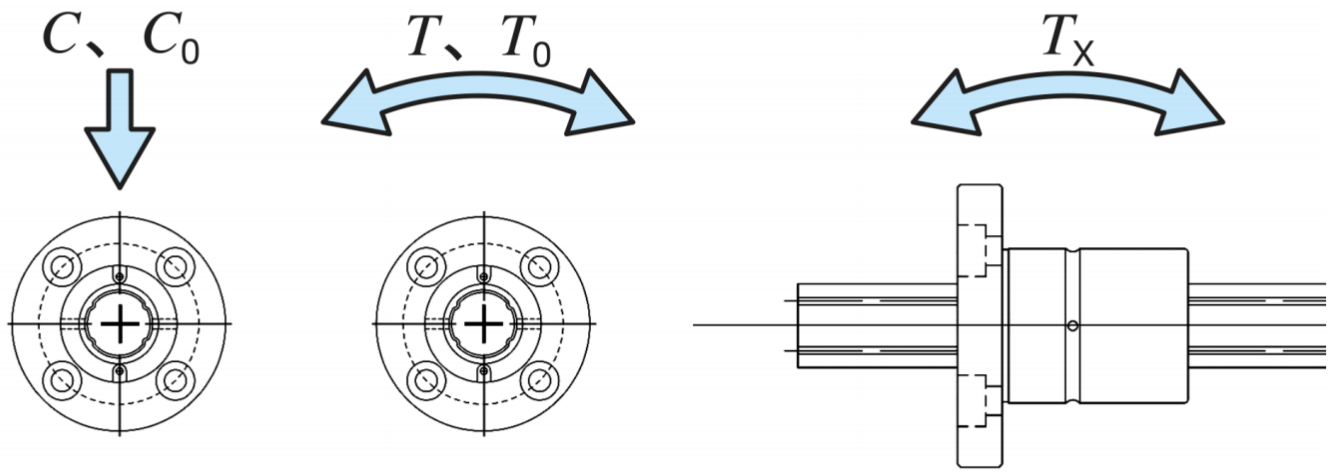


Fig. 3 — Load directions for C, C_0 (radial), T, T_0 (torque) and T_X (static moment)

Model Number Arrangement for Complete Sets

Model number arrangement — example: ULTR A K 10 C2 R300 T1 H S1 /N

Type code			Size	Component code		Preload code	Accuracy grade code	Interchangeability code	Special configuration
ULTR	**A**	**K**	**10**	**C2**	**R300**	**T_1**	**H**	**S1**	**/N**
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

(1) Type

ULTR	Light rotary type

(2) Spline-shaft shape

No mark	Solid shaft
A	Hollow shaft

(3) Flange direction

No mark	Standard
K	Reverse direction

(4) Size

8	10	13	16	20	25	32	40

(5) Number of outer cylinders

C2	2 outer cylinders

(6) Spline-shaft length

R300	300 mm

(7) Preload amount

T_0	Clearance
No mark	Standard
T_1	Light preload

(8) Accuracy grade

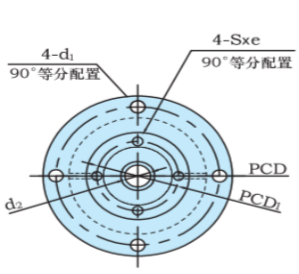
No mark	Standard grade
H	High grade
P	Precision grade

(9) Free combination

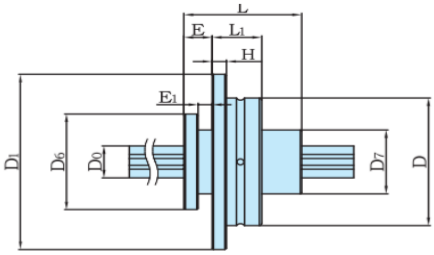
S1	S1 specification
S2	S2 specification
No mark	Non-interchangeable specification

(10) Special configuration

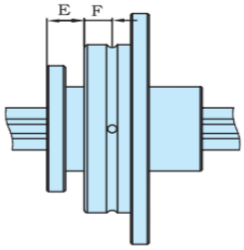
N	Chrome plating
N1	Black chrome plating
No mark	No surface treatment



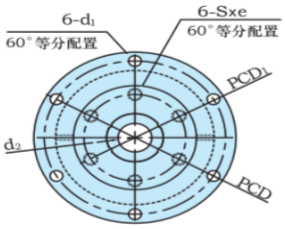
ULTR8
ULTR10



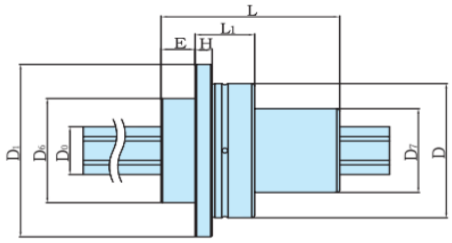
标准型



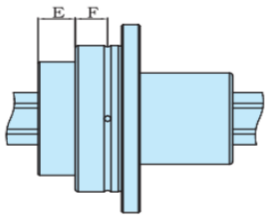
ULTR8 K型法兰反向



ULTR13以上



标准型 ULTR10 ULTR13以上



K型法兰反向

Table 1 — ULTR A series: outer-cylinder dimensions and tolerances (mm)

Model No. ULTR A series	No. of ball rows	Mass (reference) (g)		Outer-cylinder dimensions and tolerances (mm)											
		Outer cylinder	Spline shaft (per 100 mm)	D	Size tolerance	L	D_1	D_6 h7	D_2	H	L_1	E	E F (K type)	Oil-hole position	E_1
ULTR 8	4 rows	80	38.0	32	0 –0.025	25	44	24	16	3	10.5	6	8.5	4	3
ULTR 10	4 rows	130	60.0	36	0 –0.025	33	48	28	21	3	10.5	9	11.5	4	–
ULTR 13	4 rows	190	100.0	44	0 –0.025	36	56	30	24	4	18	9	9	9	–
ULTR 16	4 rows	350	150.0	48	0 –0.025	50	64	36	31	6	21	10	10	10.5	–
ULTR 20	4 rows	510	238.0	56	0 –0.029	63	72	43.5	35	6	21	12	12	10.5	–
ULTR 25	4 rows	790	370.0	66	0 –0.029	71	86	52	42	7	25	13	13	12.5	–
ULTR 32	4 rows	1250	560.0	78	0 –0.029	80	103	63	52	8	25	17	17	12.5	–
ULTR 40	4 rows	2510	955.0	100	0 –0.034	100	130	79.5	64	10	33	20	20	16.5	–

Table 2 — ULTR A series: spline-shaft dimensions, load and torque ratings, support-bearing ratings

PCD	PCD_1	*sxe*	d_1	D_0	尺寸公差	d_2	*C* N	C_0 N	*T* N·m	T_0 N·m	T_X N·m	$T_{X\text{-}2}$ N·m	*C* N	C_0 N
38	19	M2.6×3	3.4	8	$^{0}_{-0.015}$	3	1450	2870	2.1	3.7	7.4	50	690	240
42	23	M3×4	3.4	10	$^{0}_{-0.015}$	4	2670	4890	4.4	8.20	13.7	109	770	300
50	25	M3×4	3.4	13	$^{0}_{-0.018}$	7	2730	50700	21	39.2	18	116	2600	2200
56	30	M4×6	4.5	16	$^{0}_{-0.018}$	8	6120	11200	60	110.0	46	299	6700	6400
64	36	M5×8	4.5	20	$^{0}_{-0.021}$	10	8900	16300	105	194.0	110	560	7400	7800
75	44	M5×8	5.5	25	$^{0}_{-0.021}$	15	12800	23200	189	346.0	171	1020	9700	10600
89	54	M6×10	6.5	32	$^{0}_{-0.021}$	-	18600	23400	307	439.0	181	1470	10500	12500
113	68	M6×10	9	40	$^{0}_{-0.025}$	-	30800	37500	674	934.0	358	2940	16500	20700

Model Number Arrangement for Complete Sets

Model number arrangement — example: ULTR A 16B C2 R300 T1 H S1 /N

Type code		Size	Component code		Preload code	Accuracy grade code	Interchangeability code	Special configuration
ULTR	**A**	**16B**	**C2**	**R300**	**T_1**	**H**	**S1**	**/N**
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

(1) Type

ULTR B	Heavy-duty rotary type

(2) Spline-shaft shape

No mark	Solid shaft
A	Hollow shaft

(3) Size

16	20	25	32	40	50	60

(4) Number of outer cylinders

C2	2 outer cylinders

(5) Spline-shaft length

R300	300 mm

(6) Preload amount

T_0	Clearance
No mark	Standard
T_1	Light preload

(7) Accuracy grade

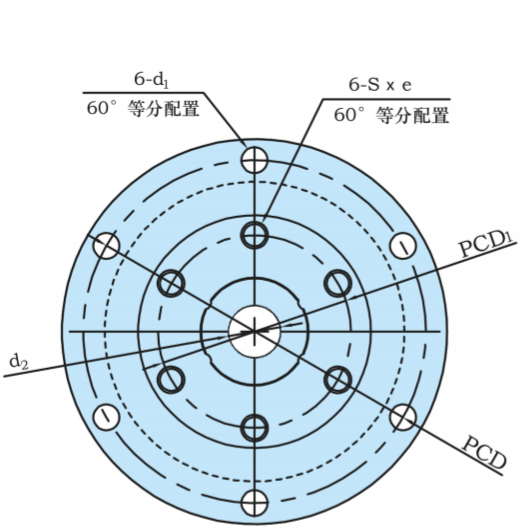
No mark	Standard grade
H	High grade
P	Precision grade

(8) Free combination

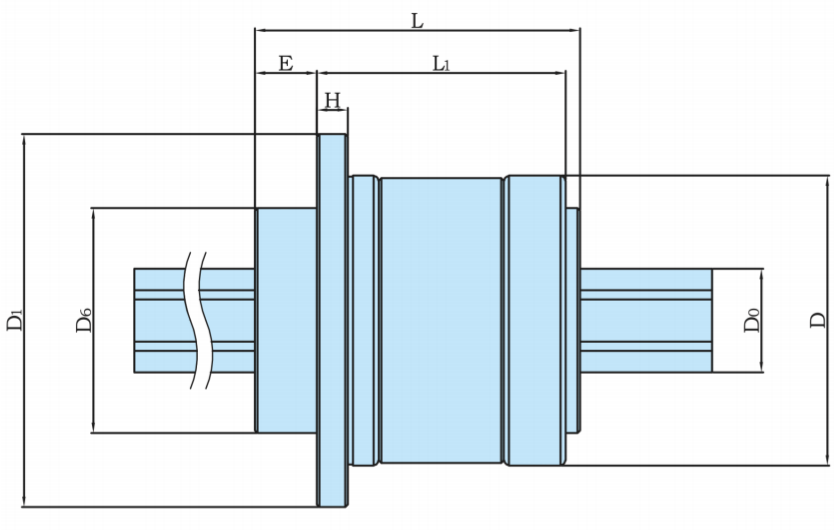
S1	S1 specification
S2	S2 specification
No mark	Non-interchangeable specification

(9) Special configuration

N	Chrome plating
N1	Black chrome plating
No mark	No surface treatment



End-face view (6-d1, 6-S×e, 60° equally spaced)



Side view

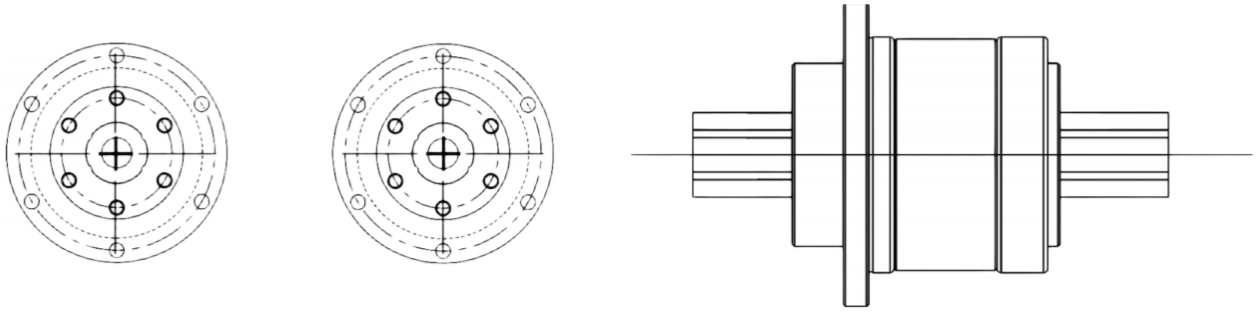
Table 1 — ULTR B series: outer-cylinder dimensions and tolerances (mm)

Model No. ULTR B series	No. of ball rows	Mass (reference) (g)		Outer-cylinder dimensions and tolerances (mm)										
		Outer cylinder	Spline shaft (per 100 mm)	D	Size tolerance	L	D_1	D_6 h7	H	L_1	E	PCD	PCD_1	sxe
ULTR 16B	4 rows	510	150.0	52	0 −0.007	50	68	39.5	5	37	10	60	32	M5×8
ULTR 20B	4 rows	700	238.0	56	0 −0.007	63	72	43.5	6	48	12	64	36	M5×8
ULTR 25B	4 rows	930	370.0	62	0 −0.007	71	78	53	6	55	13	70	45	M6×8
ULTR 32B	4 rows	1800	560.0	80	0 −0.007	80	105	65.5	9	60	17	91	55	M6×10
ULTR 40B	4 rows	3900	955.0	100	0 −0.008	100	130	79.5	11	74	23	113	68	M6×10
ULTR 50B	4 rows	6700	1500.0	120	0 −0.008	125	156	100	12	97	25	136	85	M10×15
ULTR 60B	4 rows	8800	2160.0	134	0 −0.009	140	170	115	12	112	25	150	100	M10×15

Table 2 — ULTR B series: spline-shaft dimensions, load and torque ratings, support-bearing ratings

Model No. ULTR B series	Spline-shaft dimensions and tolerances (mm)				Basic dynamic load rating C (N)	Basic static load rating C_0 (N)	Dynamic torque rating T (N·m)	Static torque rating T_0 (N·m)	Static torque rating (N·m)		Support-bearing basic load rating (N)	
	d_1	D_0	Size tolerance	d_2					T_X	T_{X-2}	C	C_0
ULTR 16B	4.5	16	0 −0.018	8	6120	11200	60	110.0	46	299	12700	11800
ULTR 20B	4.5	20	0 −0.021	10	8900	16300	105	194.0	110	560	16300	15500
ULTR 25B	4.5	25	0 −0.021	15	12800	23200	189	346.0	171	1020	17600	18000
ULTR 32B	6.6	32	0 −0.021	–	18600	23400	307	439.0	181	1470	20100	24000
ULTR 40B	9	40	0 −0.025	–	30800	37500	674	934.0	358	2940	37200	42500
ULTR 50B	11	50	0 −0.025	–	40300	64900	1290	2950.0	690	4080	41700	54100
ULTR 60B	11	60	0 −0.03	–	47700	79500	1570	3420.0	881	5470	53100	68400

Note: C, C_0, T, T_0 and T_{X-2} are the values in the directions shown in the figure below. The values in the T_X column apply when one outer cylinder is used; the values in the T_{X-2} column apply when two outer cylinders are placed directly adjacent to each other.



Model Number Arrangement for Complete Sets

Model number arrangement — example: UBNS2020 R430 C5 H A /N

Type code	Component code	Screw accuracy code	Spline accuracy code	Type code	Special configuration
UBNS2020	**R430**	**C5**	**H**	**A**	**/N**
(1)	(2)	(3)	(4)	(5)	(6)

(1) Type

UBNS2020	Ball screw ball spline

(2) Screw-shaft overall length (mm)

(3) Screw lead accuracy C5

(4) Accuracy grade

No mark	Standard grade
H	High grade
P	Precision grade

(5) Shaft type

No mark	Solid shaft
A	A hollow (standard)
K	K hollow

(6) Special configuration

N	Chrome plating
N1	Black chrome plating
No mark	No surface treatment

Ball Screw Section

Unit: mm

Table 1 — Ball screw section (part 1)

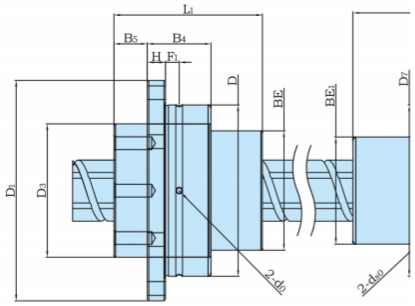
Model No.	Hollow A (standard)		Hollow K screw-shaft I.D. d_b	Lead P_h	Basic rated load (kN)		Ball-center dia. d_p	Groove-root dia. d_c	Ball screw nut dimensions			
	Screw-shaft O.D. d	Screw-shaft I.D. d_b			C_a kN	C_{0a} kN			O.D. D g6	Flange dia. D_1	Overall length L_1	D_3 h7
UBNS 1616	16	11	8	16	3.9	7.2	16.65	13.7	48	64	40	36
UBNS 2020	20	14	10	20	6.1	12.3	20.75	17.5	56	72	49	43.5
UBNS 2525	25	18	15	25	9.1	19.3	26	21.9	66	86	56.9	52
UBNS 3232	32	23	–	32	13	29.8	33.25	28.3	78	103	73.5	63

Ball Spline Section

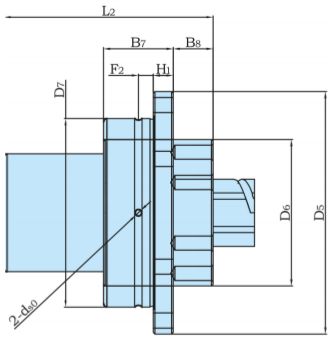
Unit: mm

Table 2 — Ball spline section (part 1)

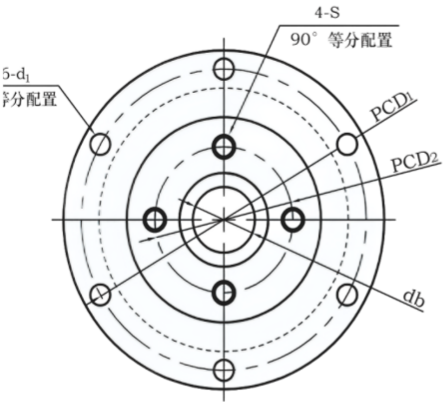
Model No.	Basic rated load (kN)		Static permissible torque M_A N·m	Basic rated torque		Ball spline nut dimensions				
	C kN	C_0 kN		C_T N·m	C_{0T} N·m	O.D. D g6	Flange dia. D_3	Overall length L_2	D_6 h7	B E_1
UBNS 1616	7.1	12.6	67.6	31.4	34.3	48	64	50	36	31
UBNS 2020	10.2	17.8	118	56.8	55.8	56	72	63	43.5	35
UBNS 2525	15.2	25.8	210	105	103	66	86	71	52	42
UBNS 3232	20.5	34	290	180	157	78	103	80	63	52



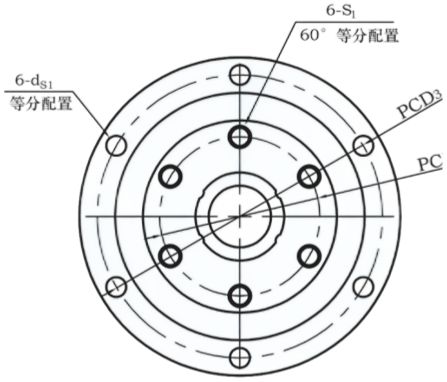
Ball screw nut — side view



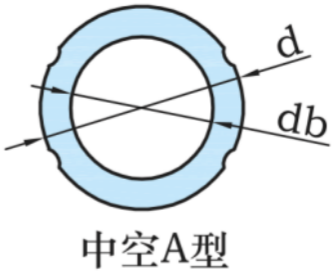
Ball spline nut — side view

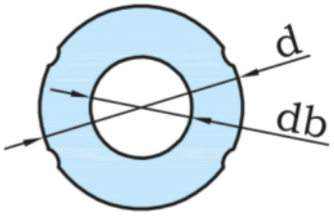


End-face view — ball screw section



End-face view — ball spline section





Hollow-shaft cross-sections — A type (standard) / K type

Table 3 — Ball screw section (part 2)

Model No.									Support-bearing basic rated load (kN)		Nut moment of inertia kg·m²	Screw-shaft moment of inertia kg·m²/mm	Nut mass kg	Shaft mass kg/m	Permissible speed min⁻¹
	B E	H	B_4	B_5	PCD1	PCD2	S	d_1	C_a kN	C_{0a} kN					
UBNS 1616	31	6	21	10	56	25	M4	4.5	8.7	10.5	3.50×10^{-5}	3.92×10^{-8}	0.31	0.8	4200
UBNS 2020	39	6	21	11	64	31	M5	4.5	9.7	13.4	8.50×10^{-5}	9.37×10^{-8}	0.54	1.21	3370
UBNS 2525	42	7	25	13	75	38	M6	5.5	12.7	18.2	2.12×10^{-5}	2.20×10^{-7}	0.88	1.79	2690
UBNS 3232	58	8	25	14	89	48	M6	6.6	13.6	22.3	5.42×10^{-5}	5.92×10^{-7}	1.39	2.96	2100

Table 4 — Ball spline section (part 2)

Model No.								Support-bearing basic rated load (kN)		Nut moment of inertia kg·m²	Nut mass kg
	H_1	B_7	B_8	PCD3	PCD4	S_1Xt_1	ds_1	C kN	C_0 kN		
UBNS 1616	6	21	10	56	30	M4x6	4.5	6.7	6.4	4.40×10^{-5}	0.35
UBNS 2020	6	21	12	64	36	M5X8	4.5	7.4	7.8	9.90×10^{-5}	0.51
UBNS 2525	7	25	13	75	44	M5X8	5.5	9.7	10.6	2.20×10^{-4}	0.79
UBNS 3232	8	25	17	89	54	M6X10	6.6	10.5	12.5	5.17×10^{-4}	1.25

Model Number Arrangement for Complete Sets

Model number arrangement — example: UNS2020 R430 C5 H A /N

Type code	Component code	Screw accuracy code	Spline accuracy code	Type code	Special configuration
UNS2020	**R430**	**C5**	**H**	**A**	**/N**
(1)	(2)	(3)	(4)	(5)	(6)

(1) Type

UNS2020	Ball screw ball spline

(2) Screw-shaft overall length (mm)

(3) Screw lead accuracy C5

(4) Accuracy grade

No mark	Standard grade
H	High grade
P	Precision grade

(5) Shaft type

No mark	Solid shaft
A	A hollow (standard)
K	K hollow

(6) Special configuration

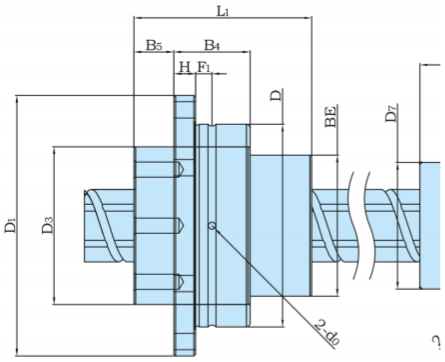
N	Chrome plating
N1	Black chrome plating
No mark	No surface treatment

Ball Screw Section

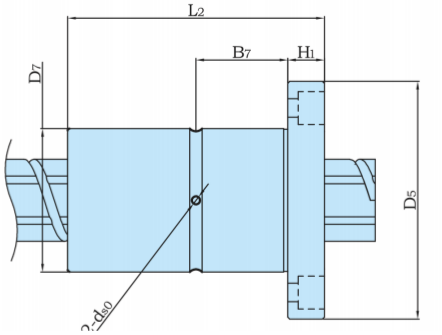
Unit: mm

Table 1 — UNS series: ball screw section

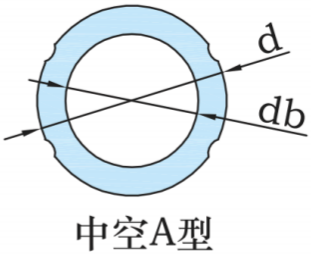
Model No.	Hollow A (standard)		Hollow K screw-shaft I.D. d_b	Lead p_h	Basic rated load (kN)		Ball-center dia. d_p	Groove-root dia. d_c	Ball screw nut dimensions												Nut moment of inertia kg·m²	Screw-shaft moment of inertia kg·m²/m	Nut mass kg	Shaft mass kg/m	Permissible speed min⁻¹
	Screw-shaft O.D. d	Screw-shaft I.D. d_b			C_a kN	C_{0a} kN			O.D. D g6	Flange dia. D_1	Overall length L_1	D_3 h7	B E	H	B_4	B_5	PCD 1	PCD 2	S	d_1					
UNS 1616	16	11	8	16	3.9	7.2	16.65	13.7	48	64	40	36	31	6	21	10	56	25	M4	4.5	8.7	10.5	3.50×10^{-5}	3.92×10^{-8}	0.31	4200
UNS 2020	20	14	10	20	6.1	12.3	20.75	17.5	56	72	49	43.5	39	6	21	11	64	31	M5	4.5	9.7	13.4	8.50×10^{-5}	9.37×10^{-8}	0.54	3320
UNS 2525	25	18	15	25	9.1	19.3	26	21.9	66	86	56.9	52	42	7	25	13	75	38	M6	5.5	12.7	18.2	2.12×10^{-4}	2.20×10^{-7}	0.88	2690
UNS 3232	32	23	–	32	13	29.8	33.25	28.3	78	103	73.5	63	58	8	25	14	89	48	M6	6.6	13.6	22.3	5.42×10^{-4}	5.92×10^{-7}	1.39	2160

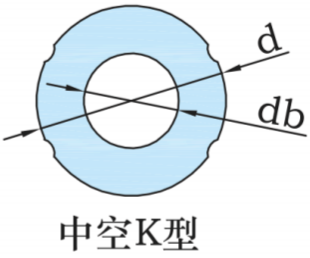


Ball screw nut — side view

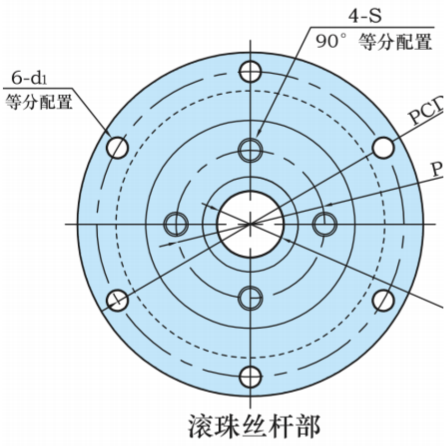


Ball spline nut — side view

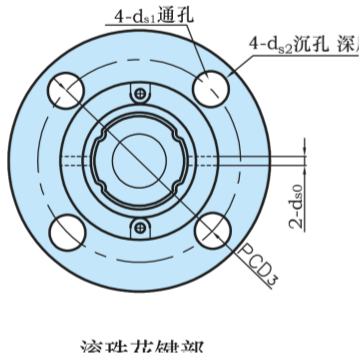




Hollow-shaft cross-sections — A type (standard) / K type



End-face view — ball screw section



End-face view — ball spline section

Ball Spline Section

Unit: mm

Table 2 — UNS series: ball spline section

Model No.	Basic rated load (kN)		Static permissible torque M_A N·m	Basic rated torque		Ball screw nut dimensions											
	C kN	C_0 kN		C_T N·m	C_{0T} N·m	O.D. D7	Flange dia. D_5 0 −0.2		Overall length L_2	H_7	B_7	d_0	P_3				
UNS 1616	7.1	12.6	67.6	31.4	34.3	31 0 −0.013	51		50 0 −0.2	7	18	2	40	4.5	8		0.23
UNS 2020	10.2	17.8	118	56.8	55.8	35 0 −0.016	58		63 0 −0.2	9	22.5	2	45	4.5	9.5	5.4	0.33
UNS 2525	15.2	25.8	210	105	103	42 0 −0.016	65		71 0 −0.3	9	26.5	3	52	5.5	9.5	5.4	0.45
UNS 3232	20.5	34	290	180	157	49 0 −0.016	77		80 0 −0.3	10	30	3	62	6.6	11	6.5	0.58

Model Number Arrangement for Complete Sets

Type designation	Component designation	Screw lead accuracy designation	Shaft type designation	Special configuration
UBS2020	R430	C5	A	/N
①	②	③	④	⑤

Model number designation ①

UBS2020	Ball screw ball spline

② Screw-shaft overall length (mm)

③ Screw lead accuracy C5

④ Shaft type

No mark	Solid shaft
A	A hollow (standard)
K	K hollow

⑤ Special configuration

N	Chrome plating
N1	Black chrome plating
No mark	No surface treatment

Ball Screw Section

Unit: mm

Table 1 — UBS series: ball screw section

Model No. UBS series	Hollow A (standard)		Hollow K screw-shaft I.D. d_b	Lead P_h	Basic rated load (kN)		Ball-center dia. d_p	Groove-root dia. d_c	Ball screw nut dimensions												Support-bearing basic rated load		Nut moment of inertia kg·m²	Screw-shaft moment of inertia kg·m²/m	Nut mass kg	Shaft mass kg/m	Permissible speed min⁻¹
	Screw-shaft O.D. d	Screw-shaft I.D. d_b			C_a kN	C_a kN			O.D. D g6	Flange dia. D_1	Overall length L_1	D_3 h7	B	E	H	B_4	B_5	PCD 1	PCD 2	S	d_1	C_a kN	C_{0a} kN					
UBS 1616	16	11	8	16	3.9	7.2	16.65	13.7	48	64	40	36	31	6	21	10	56	25	M4	4.5	8.7	10.5	3.50×10^{-5}	3.92×10^{-8}	0.31	0.8	4200
UBS 2020	20	14	10	20	6.1	12.3	20.75	17.5	56	72	49	43.5	39	6	21	11	64	31	M5	4.5	9.7	13.4	8.50×10^{-5}	9.37×10^{-8}	0.54	1.21	3370
UBS 2525	25	18	15	25	9.1	19.3	26	21.9	66	86	56.9	52	42	7	25	13	75	38	M6	5.5	12.7	18.2	2.12×10^{-5}	2.20×10^{-7}	0.88	1.79	2690
UBS 3232	32	23	–	32	13	29.8	33.25	28.3	78	103	73.5	63	58	8	25	14	89	48	M6	6.6	13.6	22.3	5.42×10^{-5}	5.92×10^{-7}	1.39	2.96	2100

UBS series — nut end view

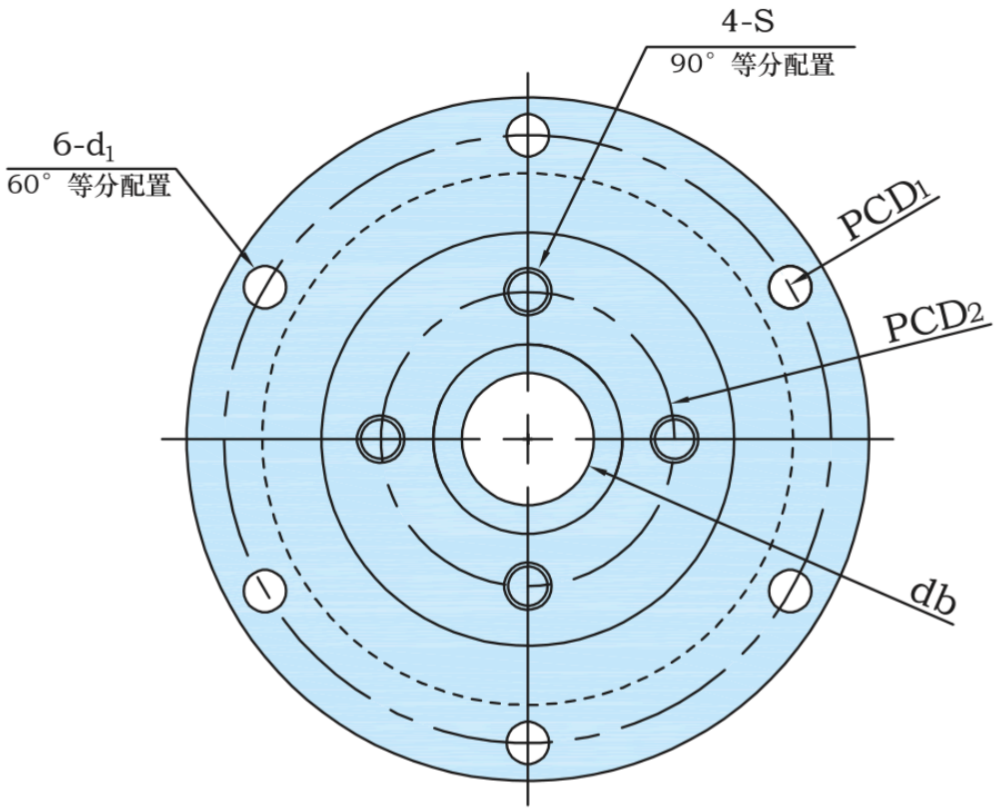


Fig. 1 — Nut end view: 6×d_1 at 60°, 4×S at 90°, PCD1, PCD2, d_b

UBS series — nut and screw shaft

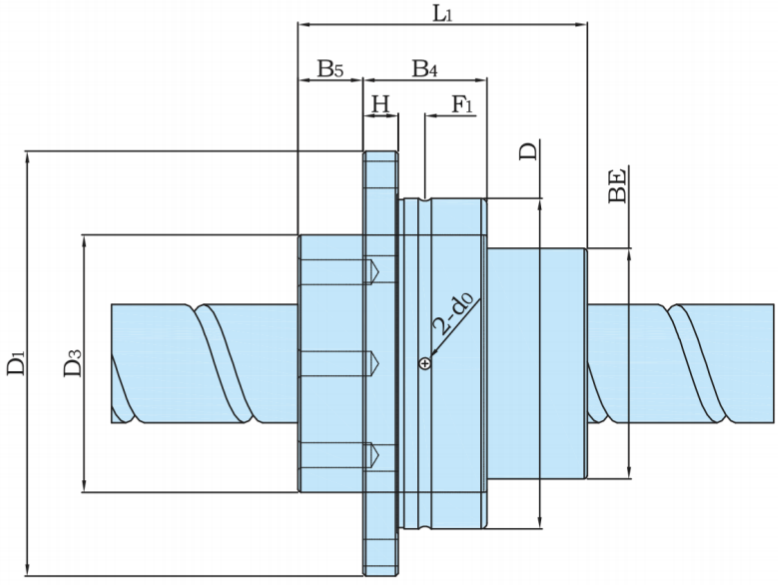


Fig. 2 — Side view: D_1, D, D_3, L_1, B_4, B_5, H, F_1, BE, 2×d_0

Hollow-shaft cross-sections

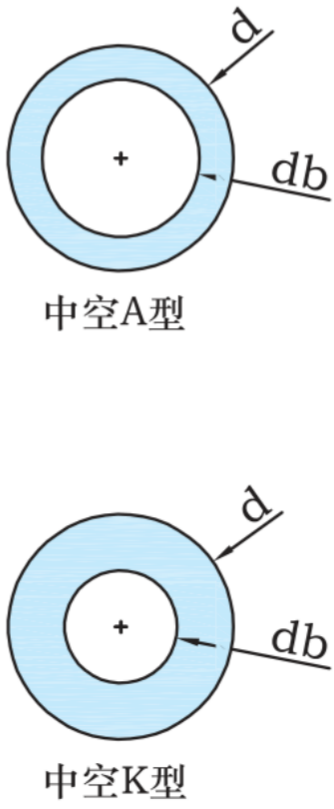
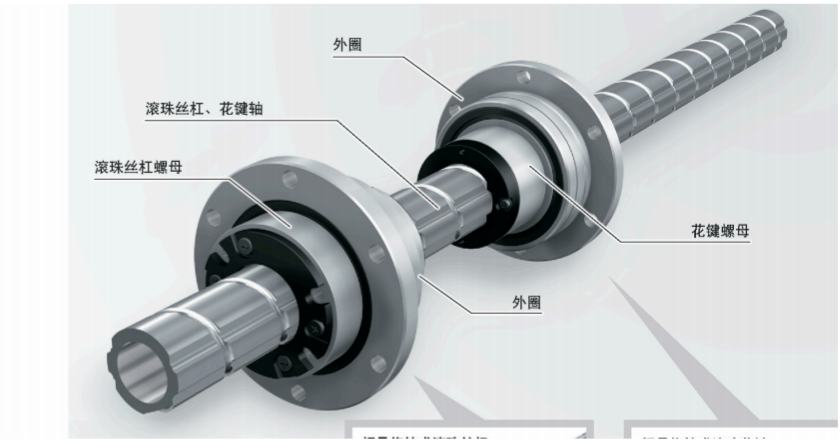


Fig. 3 — Hollow type A (standard) and hollow type K: d, d_b

Product Structure

UBNS is a combined product in which ball-screw grooves and ball-spline grooves are machined on a single shaft, and dedicated support bearings are mounted directly on the outer circumference of the ball screw nut and the spline nut. By rotating or stopping the ball screw nut and the spline nut, rotary, linear and helical motion can be obtained with a single shaft.



Callouts, top to bottom: outer ring · ball screw and spline shaft · ball screw nut · spline nut · outer ring.

Fig. 1 — UBNS construction: ball screw nut and spline nut on one shaft



Fig. 2 — Nut-rotating ball screw: support bearing built into the nut



Fig. 3 — Nut-rotating ball spline: support bearing built into the nut

Figs. 2 and 3 show the internal structure of the support bearing built into the ball screw nut and into the spline nut respectively.

Motion Mechanism

By rotating or stopping the ball screw nut and the spline nut, UBNS provides linear, rotary and helical motion with a single shaft.

Motion obtained with a single shaft

Motion	Operation	Shaft motion
① **Linear motion**	Rotate the ball screw nut	The shaft moves up and down (without rotating).
② **Rotary motion**	Rotate the ball screw nut and the spline nut	The shaft rotates immediately.
③ **Helical motion**	Rotate the spline nut	The shaft moves up and down while rotating.

The ball screw and the ball spline use the company's latest technology to improve motion performance, achieving higher speed than conventional products.

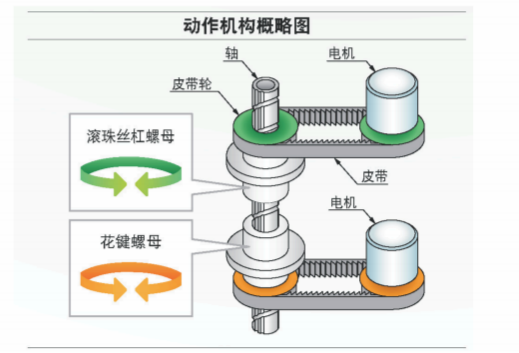


Fig. 4 — Schematic of the motion mechanism

Schematic labels: shaft · motor · pulley · belt · ball screw nut · spline nut · motor.

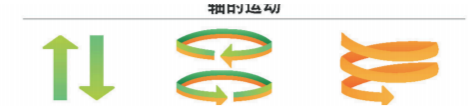


Fig. 5 — Shaft motion: ① linear, ② rotary, ③ helical

Applications

Well suited to equipment that combines rotary and linear motion, such as the Z axis of horizontal articulated robots (SCARA), assembly robots, automatic loaders and the ATC units of machining centres.

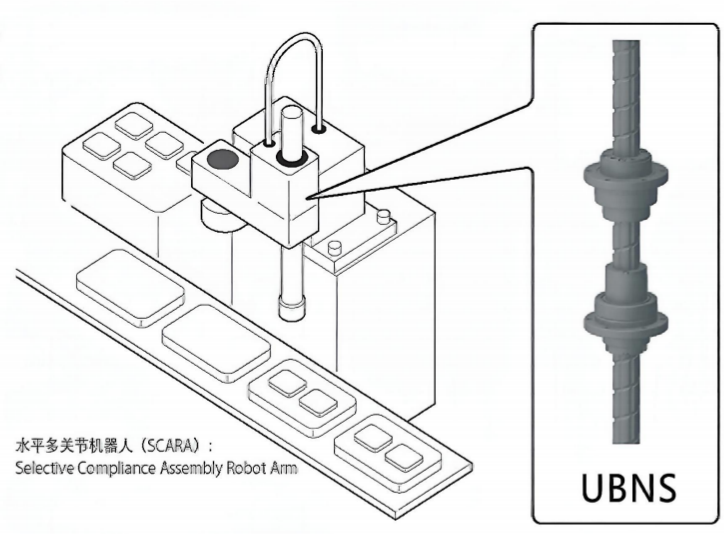


Fig. 6 — Horizontal articulated robot (SCARA): Selective Compliance Assembly Robot Arm — UBNS used on the Z axis

Mounting Examples

UBNS mounting example

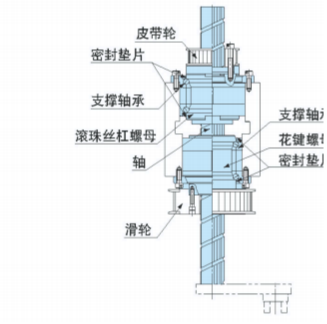


Fig. 7 — UBNS: pulleys mounted outside the ball screw nut and the spline nut

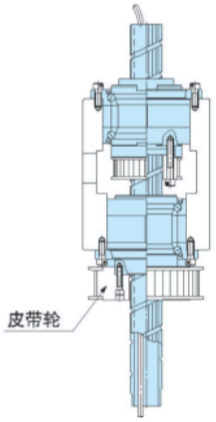


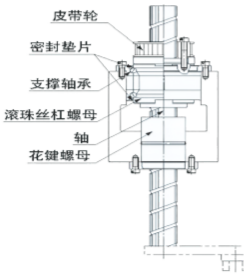
Fig. 8 — UBNS: ball screw nut pulley mounted inside the support block

Fig. 7 — Example with the pulleys of both the ball screw nut and the spline nut mounted on the outer sides. The length of the support block can be kept to a minimum.

Fig. 8 — Example with the ball screw nut pulley mounted inside the support block.

Drawing labels: pulley · seal gasket · support bearing · ball screw nut · shaft · spline nut · seal gasket.

UNS mounting example



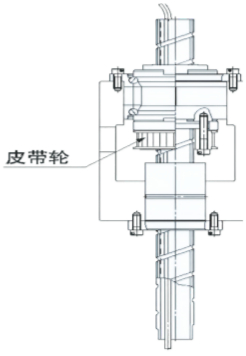


Fig. 9 — Example with the ball screw nut pulley mounted outside the support block. The length of the support block can be kept to a minimum.

Fig. 10 — Example with the ball screw nut pulley mounted inside the support block.

Drawing labels: pulley · seal gasket · support bearing · ball screw nut · shaft · spline nut.

Model Number Arrangement for Complete Sets

Nut type	Screw nominal diameter (mm)	Lead (mm)	Screw-shaft shape	Threaded length (mm)	Thread direction	Screw overall length (mm)	Accuracy grade
UVTF	08	02	A	100	L	200	C5
①	②	③	④	⑤	⑥	⑦	⑧

Model number designation ①–⑤

① Nut type	UVTF	Flange nut (ground)
② Screw nominal diameter (mm)	Code as in the model number example above	
③ Lead (mm)	Code as in the model number example above	
④ Screw-shaft shape	No mark	Solid shaft
	A	Hollow shaft
⑤ Threaded length (mm)	Code as in the model number example above	

Model number designation ⑥–⑧

⑥ Thread direction	R	Right-hand
	L	Left-hand
	L/R	Left-right
⑦ Screw overall length (mm)	Code as in the model number example above	
⑧ Accuracy grade	C5	High grade
	C3	Precision grade

Table 1 — UVTF series: dimensions and load ratings (1 of 2)

Model No. UVTF series	Diameter *d*	Lead *P*	Ball diameter *Da*	Number of circuits *n*	Load rating N	
					Dynamic load *Ca* (N)	Static load *Csa* (N)
UVTF 0606	6	6	1.2	1.6*2	1260	2130
UVTF 0610	6	10	1.2	1.2*2	950	1600
UVTF 0804	8	4	1.5875	1.6*2	1714	2763
UVTF 0808	8	8	1.5875	1.6*2	2200	3800
UVTF 0810	8	10	1.5875	1.6*2	2200	3800
UVTF 0812	8	12	1.5875	1.6*2	2200	4000
UVTF 1010	10	10	2	1.6*2	3300	5980
UVTF 1015	10	15	2	1.6*2	3300	5980
UVTF 1020	10	20	1.5875	1.6*2	3300	5980
UVTF 1210	12	10	2.5	1.6*2	4200	8900
UVTF 1220	12	20	2.5	1.6*2	4500	9300

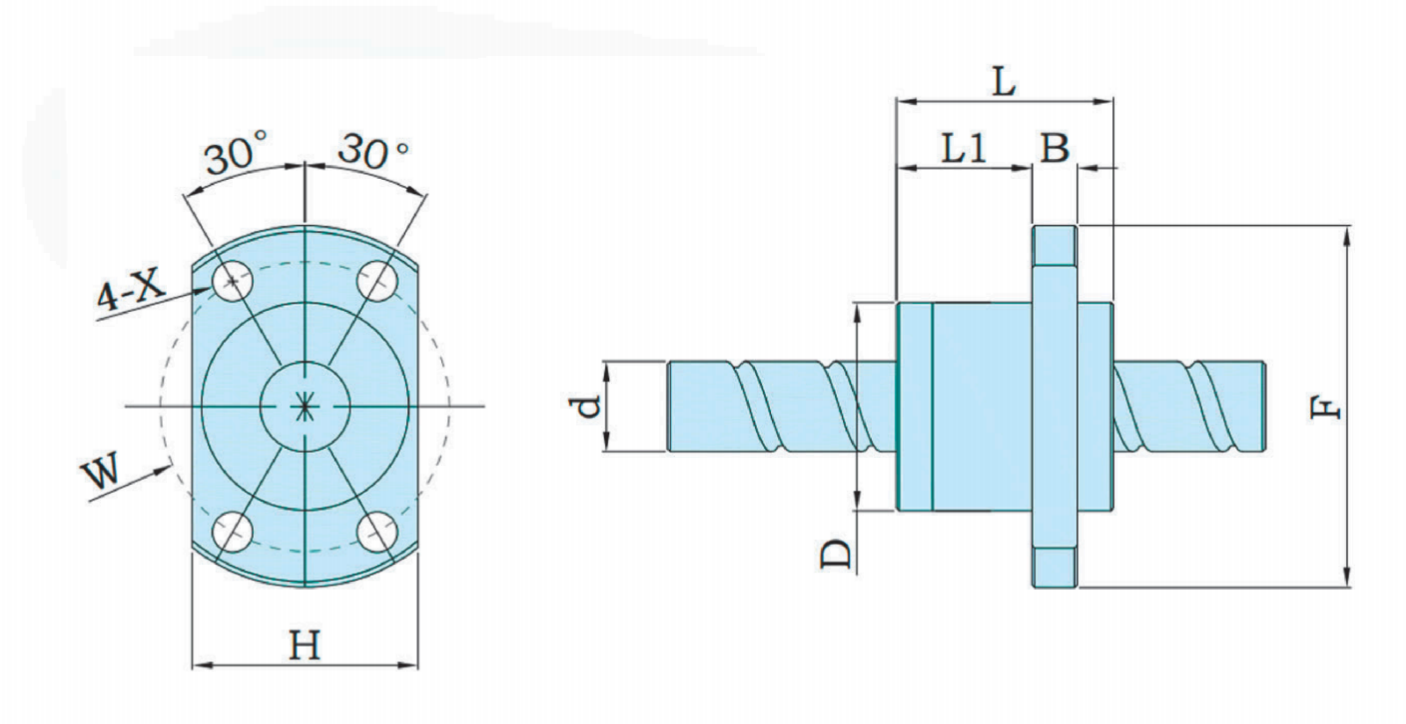


Fig. 1 — Flange nut, end view: 4-X mounting holes at 30°, W, H; side view: *d*, *D*, L_1, *B*, *L*, *F*

Table 1 — UVTF series: dimensions and load ratings (2 of 2)

Model No. UVTF series	Nut dimensions mm							
	D	*F*	*B*	L_1	*L*	*W*	*H*	*X*
UVTF 0606	14	27	4	9.5	17	21	16	3.4
UVTF 0610	14	27	4	13	23	21	16	3.4
UVTF 0804	16	29	4	14.2	21.9	23	20	3.4
UVTF 0808	18	31	4	12.5	20	25	20	3.4
UVTF 0810	18	31	4	17	25	25	20	3.4
UVTF 0812	18	31	4	20.2	28	25	20	3.4
UVTF 1010	23	40	5	15.5	24	32	25	4.5
UVTF 1015	23	40	5	24	33	32	25	4.5
UVTF 1020	20	37	5	14	23	29	22	4.5
UVTF 1210	24	41	6	19	24	33	26	4.5
UVTF 1220	24	41	6	33.7	43	32	24	4.5

US — Limited-Stroke Ball Spline

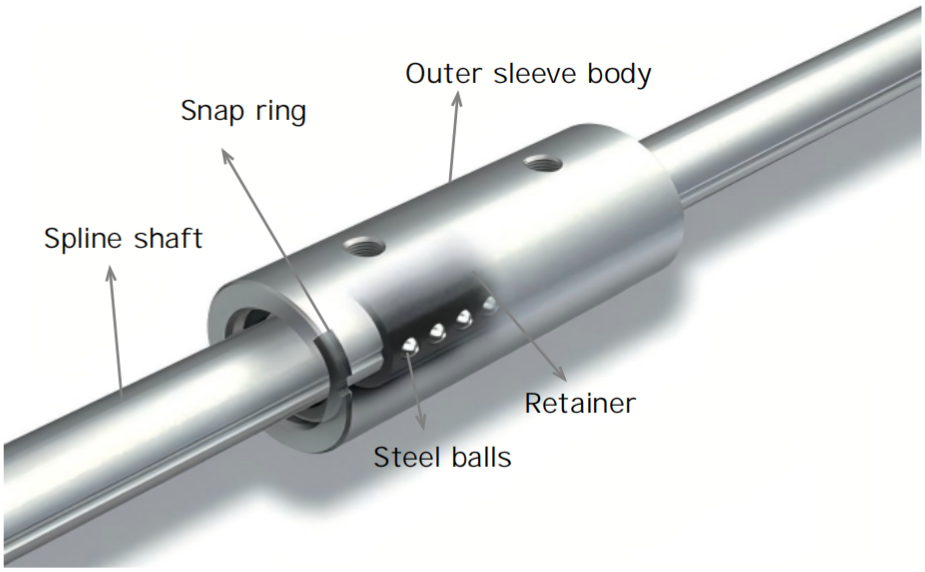


Fig. 1 — US limited-stroke ball spline: outer-cylinder body with retainer, steel balls and stop ring; the outer cylinder is fitted with tapped holes

Points

Extremely smooth sliding. The limited-stroke type has no ball circulation resistance; a high-precision retainer is built in, so the fluctuation of the sliding resistance is extremely small and light, smooth sliding is obtained even when the unit is used on a vertical shaft.

Best suited to the nozzle section of SMT mounters. Stable high positioning accuracy is also obtained in the stroke direction, which makes the series ideal for use on a vertical shaft and for high-cycle operation in SMT mounters.

Special shapes are also available. Special shapes can be produced to suit the customer's application (machining of the shaft end, outer cylinder with bracket, etc.). Please consult UVT.

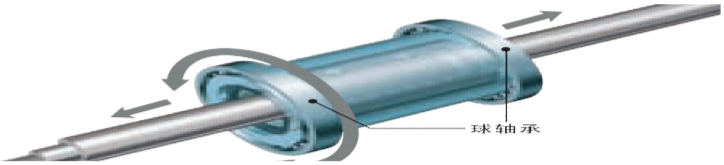
Shaft-end machining and bracket specifications (examples)



Fig. 2 — Internal thread machined in the shaft end



Fig. 3 — Stepped shaft end with external thread



Specifying the Model Number and Specifications

Model Number Arrangement

The specifications of the US series are designated by the model number. The applicable specifications are indicated in the model number by the type designation, the size and component designation, the preload designation, the grade designation and the auxiliary designation.

Complete set (US series)

Type designation		Size	Component designation		Preload designation	Grade designation	Special configuration
US	A	5	C1	R150	T_1	P	/S
①	②	③	④	⑤	⑥	⑦	⑧

Model number designation ①–⑧

No.	Designation	Code in the example	Meaning
①	Form	US	Limited-stroke ball spline (US series)
②	Spline-shaft shape	A	Hollow shaft (see page 45)
③	Size	5	4 5 6
④	Number of outer cylinders	C1	1 (one) outer cylinder
⑤	Spline-shaft length	R150	150 mm (standard length)
⑥	Preload amount	T_1	Light preload
⑦	Accuracy grade	P	Precision grade
⑧	Special configuration	S	Stainless-steel spline shaft (see page 47)

Explanation of the Model Number and Specifications

Form · spline-shaft shape · size · number of outer cylinders · spline-shaft length

No.	Designation	Code	Meaning / remarks
①	Form	US	Limited-stroke ball spline (US series). See Table 1 for the applicable forms and sizes.
②	Spline-shaft shape	No mark T	Solid shaft (no mark) / Hollow shaft (T). See Table 1 for the applicable forms and sizes.
③	Size	4 5 6	See Table 1 for the applicable forms and sizes.
④	Outer-cylinder length	C1	The number of outer cylinders fitted on one spline shaft is limited to one (C1).
⑤	Spline-shaft length	R...	The spline-shaft length is given in millimetres. See the dimension table for the standard and maximum lengths.
⑥	Preload amount	T_1	Only light preload (T_1) can be specified. See Table 2 for details of the preload amount.

Table 1 — Forms and sizes of the US series

Shape	Form	Size		
		4	5	6
Solid shaft	US	○	○	○
Hollow shaft	USA	○	○	○

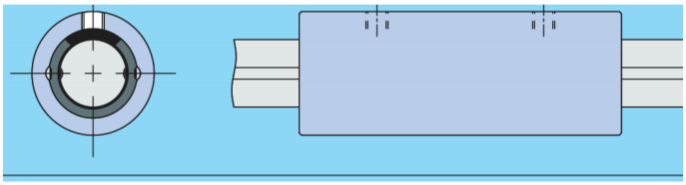


Fig. 1 — Solid shaft: end view and side view

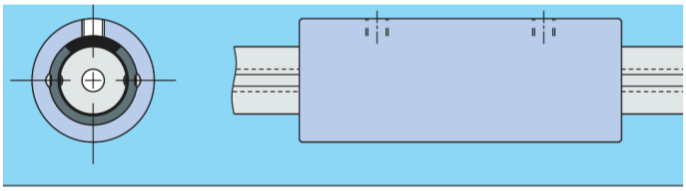


Fig. 2 — Hollow shaft: end view and side view

Table 2 — Preload

Preload type	Preload code	Preload amount *N*	Operating conditions
Light preload	T_1	$0.02C_0$	· Minimum vibration · Balanced load · Light, precise motion

Note C_0 indicates the basic static load rating.

Preload Amount and Accuracy Grade

No.	Designation	Code	Meaning / remarks
⑦	Accuracy grade	P	Only the precision grade (P) can be specified. See Tables 3, 4 and 5 for details of the accuracy grade.

Table 3 — Tolerances of each part (unit: μm)

Size	Relative to the axis of the spline-shaft support portions	
	Radial circular runout of the component mounting portion(1)	Perpendicularity of the spline-portion end face(1)
	Precision grade (P)	Precision grade (P)
4	8	6
5		
6		

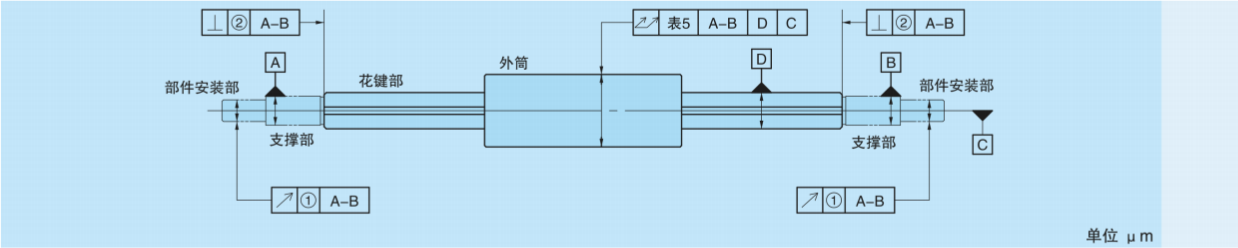


Fig. 3 — Datum and tolerance callouts of Table 3: component mounting portion, spline portion, outer cylinder and support portions; datum A-B

Table 4 — Twist of the groove relative to the effective spline length (unit: μm)

Accuracy grade	Precision grade (P)
Permissible value	6

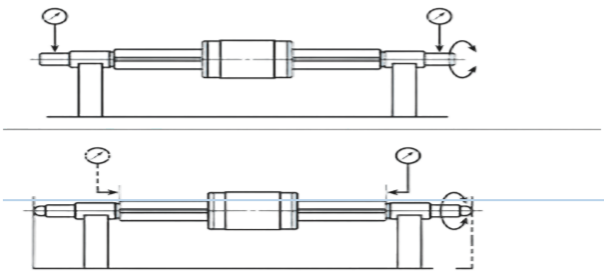
Note Applies to any position within each 100 mm of the effective spline length.

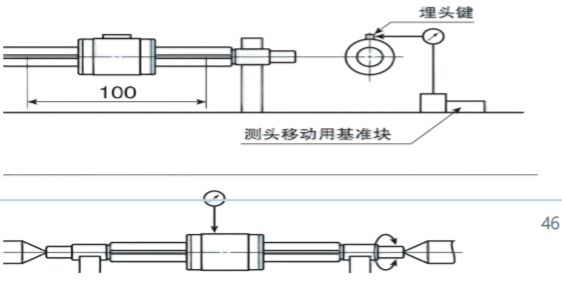
Table 5 — Permissible radial total runout of the spline-shaft axis (unit: μm)

Spline-shaft overall length mm		Precision grade (P)
Over	Up to	
–	200	26
200	300	57

Table 6 — Measuring method of accuracy

Item	Measuring method
① Radial circular runout of the component mounting portion relative to the axis of the spline-shaft support portions (see Table 3 ①)	Support the spline shaft on its support portions, place the probe against the outer circumference of the component mounting portion and measure the runout during one revolution of the spline shaft.
② Perpendicularity of the spline-portion end face relative to the axis of the spline-shaft support portions (see Table 3 ②)	Support the spline shaft on one spline-shaft support portion and at one end, place the probe against the end face of the spline portion and determine the perpendicularity from the runout measured during one revolution of the spline shaft.
③ Twist of the groove relative to the effective spline length (see Table 4)	Fix and support the spline shaft, apply a suitable unidirectional torque to the measuring unit, bring the probe into contact with the flank of the key fitted to the outer cylinder in the direction perpendicular to the spline shaft, and calculate the runout when the outer cylinder and the probe are moved axially together by 100 mm at any point of the effective spline length of the spline shaft. The probe should be kept as close as possible to the outer surface of the outer cylinder.
④ Radial total runout of the spline-shaft axis (see Table 5)	Support the spline shaft on its support portions or between two centres, place the probe against the outer circumference of the outer cylinder, measure the runout during one revolution at several axial positions and take the maximum value.





Special Configuration

No.	Designation	Code	Remarks
⑧	Special configuration	Stainless-steel spline shaft /S	Applicable to solid shafts of sizes 5 and 6.

Stainless-steel spline shaft /S
The material of the solid spline shaft is changed to stainless steel. The load ratings in this case are the values obtained by multiplying the load ratings of the stee spline shaft by a factor of 0.8.

Permissible Load

At the contact area where the product is subjected to the maximum contact stress, the sum of the elastic deformation of the rolling elements and of the raceway surface is small; the load at which smooth rolling motion can be performed is called the permissible load.

Therefore, when very smooth motion and high accuracy are required, use the product within a load range that does not exceed the permissible load.

Load Direction and Load Rating

For the US series, the load rating is used after correction according to the load direction. Correct the basic dynamic load rating and the basic static load rating given in the dimension table in accordance with Table 7 before use.

Table 7 — Load ratings corrected for the load direction

Size	Basic dynamic load rating			Basic static load rating		
	Load direction Upward	Load direction Downward	Lateral	Load direction Upward	Load direction Downward	Lateral
4 5 6	C	C	$1.47C$	C_0	C_0	$1.73C_0$

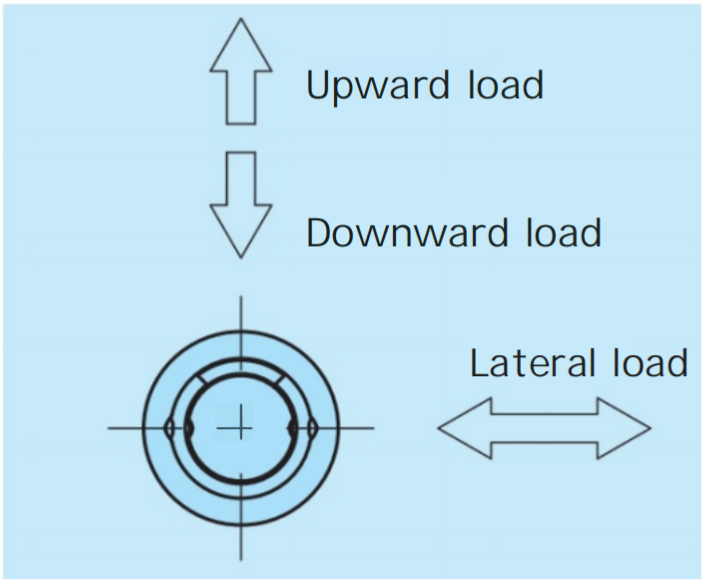


Fig. 1 — Section of the outer cylinder with the six ball ows; the load ratings above apply to upward, downward and lateral loading as indicated

Second Moment of Area and Section Modulus of the Spline Shaft

Table 8 — Second moment of area and section modulus of the spline shaft

Size	Second moment of area mm^4		Section modulus mm^3	
	Solid shaft	Hollow shaft	Solid shaft	Hollow shaft
4	12	12	6	6
5	29	29	12	12
6	61	61	21	21

Lubrication

The US series is not filled with grease. Lubricate the unit properly before use.

The product is coated with rust-preventive oil at delivery. Wash it off with a cleaning fluid before mounting, then apply a high-quality lubricating oil or grease. For grease lubrication a high-quality lithium-soap-based grease is recommended.

As there are no lips or oil holes, apply the grease directly to the raceway portions of the spline shaft.

Dust Protection

The US series is not fitted with dust-protection gaskets. When the unit is used in a non-clean environment, it is recommended to cover the whole assembly with a dust cover, etc., in order to prevent harmful foreign matter such as chips and dust from entering.

Handling Precautions

① Fit of the outer cylinder

The fit between the outer cylinder and the housing bore is generally an intermediate fit (J7). Where the requirements for accuracy and rigidity are not severe, a clearance fit (H7) may also be used.

② General mounting structure

The outer cylinder is mounted as shown in Fig. 2. The tapped hole provided in the outer cylinder is used to prevent rotation of the outer ring. When mounting, do not screw in beyond the maximum screw-in depth given in the dimension table. Since the tapped hole of the outer cylinder is a through hole, an excessive screw-in depth presses the spline shaft and the retainer against the screw, which adversely affects the running accuracy and the service life.

As there is no built-in mechanical stop, provide an external limit mechanism for applications in which over-stroke may occur.

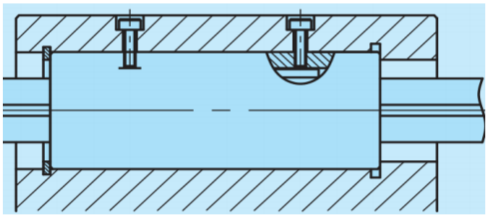


Fig. 2 — Mounting example: outer cylinder fixed in the housing by a screw through the tapped hole

③ Operation during running

Use the unit within the effective stroke given in the dimension table.

If an eccentric load or irregular high-speed motion occurs during use, the retainer may deviate from its normal position. After every given operating time or given number of reciprocations, run the unit over the full stroke in order to correct the position of the retainer.

④ Additional machining of the spline-shaft end

⑥ Mounting the outer cylinder on the spline shaft

When assembling the outer cylinder onto the spline shaft, align the grooves of the outer cylinder and of the spline shaft correctly and move the outer cylinder in parallel and gently. Rough handling may cause the steel balls to drop out, etc. Correct the position of the retainer so that it is located at the centre of the outer cylinder after mounting. Then, after mounting the outer cylinder in the housing, insert the spline shaft gently. The retainer also moves together with the shaft until it stops in contact with one end face. Continue to push the spline shaft gently to 1/2 of the maximum stroke length, taking care not to damage the steel balls and the raceway surface, and then retract it by the same length (1/2 of the maximum stroke). The retainer is then at the centre of the outer cylinder and correct mounting is achieved.

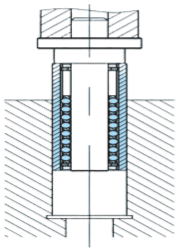
In addition, the best accuracy is obtained when the UVT marks on the outer cylinder and on the spline shaft face the same direction. During assembly, always take care not to change the assembly direction. (See Fig. 3)



Fig. 3 — Mounting direction of the outer cylinder: the UVT US5 marking on the outer cylinder aligned with the UVT US5 marking on the spline shaft

⑦ Installation of the outer cylinder

When pressing the outer cylinder into the housing, use a press-in jig and install it correctly with a press, etc. (See Fig. 4)



Model Number Arrangement for Complete Sets

Type designation		Size	Component designation		Preload designation	Grade designation	Special configuration
US	A	5	C1	R150	T_1	P	/S
①	②	③	④	⑤	⑥	⑦	⑧

Model number designation ①–⑧

No.	Designation	Code	Meaning
①	Form	US	Limited-stroke ball spline
②	Spline-shaft shape	No mark A	Solid shaft (no mark) / Hollow shaft (A)
③	Size	4 5 6	–
④	Number of outer cylinders	C1	1 (one) outer cylinder
⑤	Spline-shaft length	R150	150 mm
⑥	Preload amount	T_1	Light preload
⑦	Accuracy grade	P	Precision grade
⑧	Special configuration	S	Stainless-steel spline shaft

Table 1 — US series: dimensions (1 of 2)

Model No. US series	Free combination	Mass (reference) g		Outer-cylinder dimensions & tolerances mm						Spline-shaft dimensions & tolerances mm			
		Outer cylinder	Spline shaft (per 100 mm)	*D*	D tolerance	L_1	L_2	*M*	Max. screw-in depth	*d*	d tolerance	d_1(1)	d_2
US 4	–	5.7	9.6	8	0 −0.009	24	10	M2	1.3	4	0 −0.012	3.2	–
USA 4	–		8.6										1.5
US 5	–	8.9	14.9	10	0 −0.009	27	12	M2	1.4	5	0 −0.012	4.2	–
USA 5	–		12.4										2
US 6	–	10.9	19	11	0 −0.011	29	15	M2	1.4	6	0 −0.012	5.2	–
USA 6	–		16.5										2

(*1) d_1 is the maximum diameter when the shaft end is machined.

(*2) Indicates the standard length. Products outside the standard lengths are also manufactured; when ordering, specify the spline-shaft length in millimetres in the model number.

Note Not filled with grease. Lubricate adequately before use.

Dimension drawing

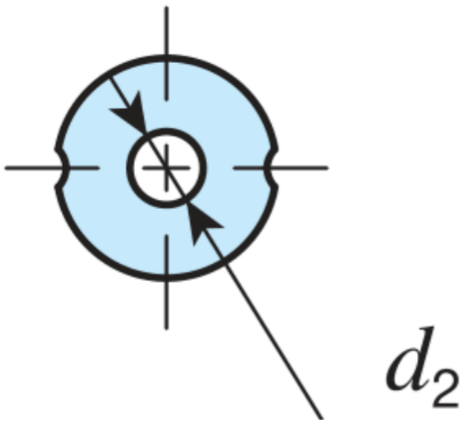


Fig. 1 — Hollow-shaft dimensions of the USA type: d_2

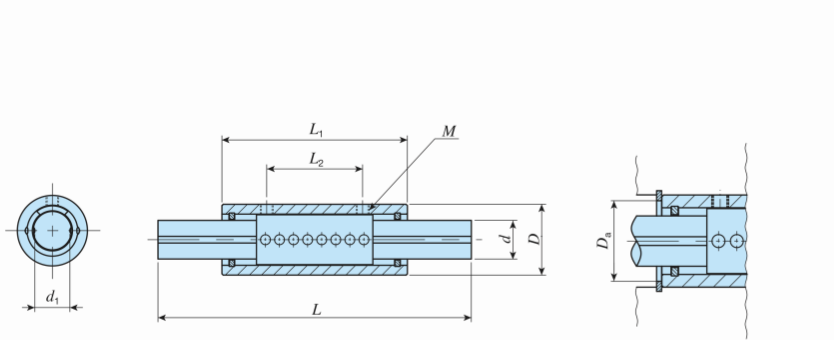


Fig. 2 — End view: d_1; lateral section: L_1, L_2, M, L, d, D; outer-cylinder view: Da

Table 1 — US series: dimensions and load ratings (2 of 2)

Model No. US series	Spline-shaft length mm		Stroke mm		Max. dimension related to mounting Da mm	Basic dynamic load rating C N	Basic static load rating C_0 N	Permissible load F N	Dynamic torque rating T N·m	Static torque rating T_0 N·m	Static moment rating	
	$(L)^{(2)}$	Max. length	Effective stroke length	Max. stroke length							T_X N·m	T_Y N·m
US 4	100 150	200	10	13.2	5	285	380	127	0.66	0.87	0.88	1.5
USA 4		150										
US 5	100 150	200	10	14	7	616	748	249	1.8	2.2	2.0	3.5
USA 5												
US 6	150 200	300	10	13.6	8	673	855	285	2.4	3.0	2.6	4.4
USA 6												

Directions of the Load Ratings

1N≈0.102kgf

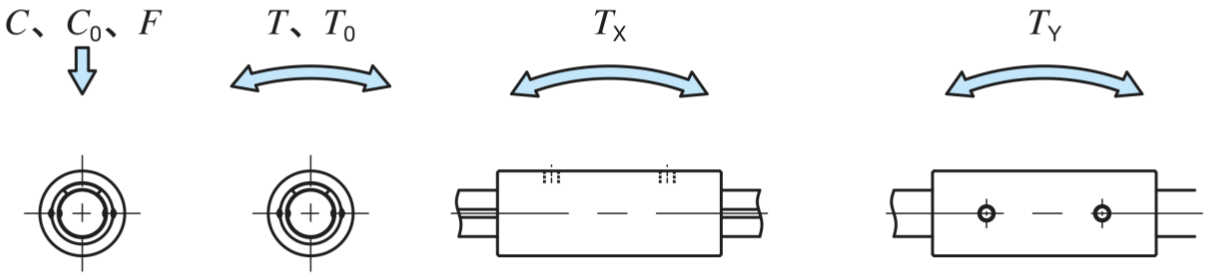


Fig. 3 — Load directions: C, C_0, F (radial); T, T_0 (torque); T_X and T_Y (static moment)

1N≈0.102kgf

Φ5 mm Complete Ball Spline Set



Fig. 1 — Φ5 mm complete ball spline set, model C-F11L46-UVTA5C1R180X

Product features

- **Economical one-piece design**
- **Model:** C-F11L46-UVTA5C1R180X
- **High accuracy:** the lengthened nut increases the number of load-bearing points, giving higher accuracy and longer service life.
- **High integration:** the spline nut, the nut fixing sleeve and the bearing seat are designed as one highly integrated three-in-one unit — high accuracy and easy mounting.
- **High cost performance:** on the basis of meeting the required equipment performance, cost is further brought under effective control.

Technical Parameters

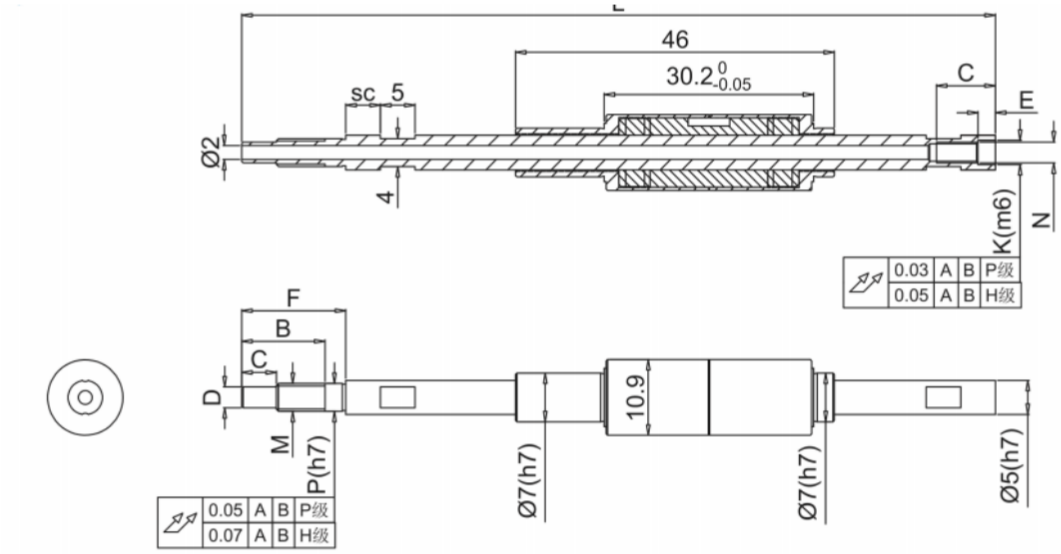


Fig. 2 — Outline drawing: overall length L, 46, 30.2 $^{0}_{-0.05}$, SC 5, 4, C, E, Φ2, N, K (m6); section view: F, B, C, D, M, P (h7), Φ7 (h7), 10.9, Φ5 (h7); geometric tolerances 0.03 / 0.05 (P grade, H grade) and 0.05 / 0.07 (P grade, H grade)

Shaft Additional Machining

Selection: C-F11L46-UVTLA5C1R(L)-(D)-(C)-(M/MS)-(B)-(P)-(F)-(K)-(E)-(N/NS)-(C)-(2/SC)-(H/P)

Code positions of the shaft additional-machining designation

Position	Meaning	Position	Meaning
L	Shaft length	K	Step bore diameter
D	Step diameter	E	Step length
C	Step length	N/NS	Internal thread (NS: fine thread)
M/MS	External thread (MS: fine thread)	C	Thread length
B	Thread length	2/SC	Wrench flats (2: two flats)
P	Step diameter	H/P	Accuracy grade
F	Step length		

Example: C-F11L46-UVTLA5C1R180-D3-C5-M4-B12-P4-F15-K3.2-E3-NS3-C10-2SC5-HP

Φ5 mm Complete Ball Spline Set



Fig. 3 — Φ5 mm complete ball spline set, model C-MXL15L62-UVTA5C2R190X

Product features

- **High-precision one-piece design**
- **Model:** C-MXL15L62-UVTA5C2R190X
- **High accuracy:** the double-nut guard is longer, giving higher accuracy and longer service life.
- **High integration:** the spline nut, the nut fixing sleeve, the bearing seat and the timing pulley are designed as one highly integrated four-in-one unit — higher accuracy, and quicker, more convenient setting up.
- **Long life:** HRC60±2° ultra-high hardness, combined with the load-bearing points spread over two nuts, greatly improves wear resistance.
- **Technical highlight:** while quality and performance are guaranteed, the shaft pitch is reduced to 10.5 mm; even at this extreme miniaturisation, high accuracy and high efficiency are maintained, greatly increasing output per unit area.

Technical Parameters

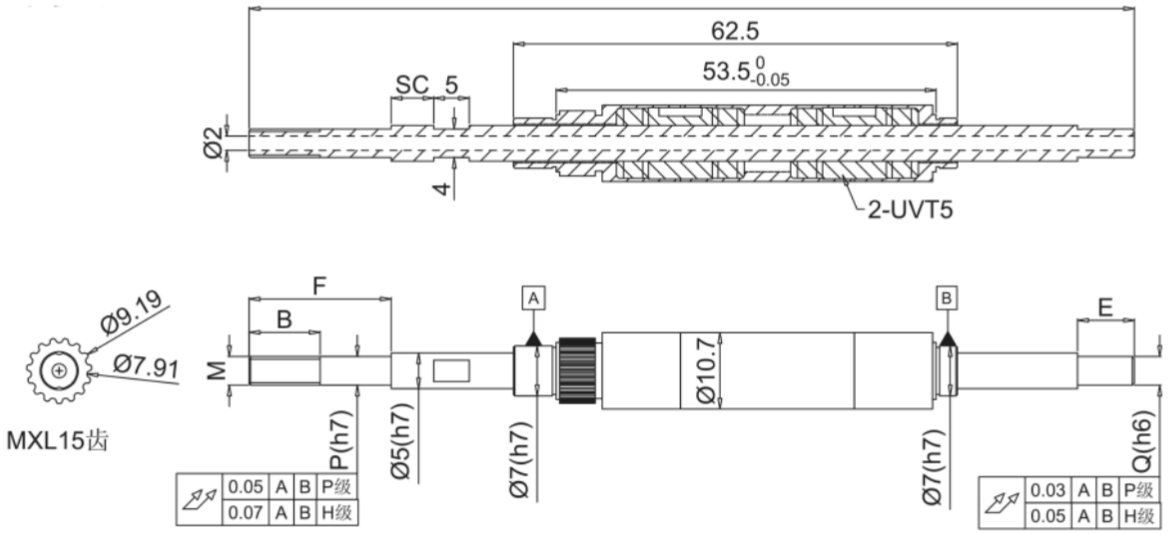


Fig. 4 — Outline drawing: overall length L, 62.5, 53.5 $^{0}_{-0.05}$, SC 5, 4, 2-UVT5, Φ2; section view: F, B, M, P (h7), Φ5 (h7), Φ7 (h7), Φ10.7, E, Φ7 (h6), Q; MXL15 pulley Φ19 / Φ7.91; geometric tolerances 0.05 / 0.07 and 0.03 / 0.05 (P grade, H grade)

Shaft Additional Machining

Selection: C-MXL15L62-UVTA5C2R(L)-(M/MS)-(B)-(P)-(F)-(Q)-(E)-(SC)-(H/P)

Code positions of the shaft additional-machining designation

Position	Meaning	Position	Meaning
L	Shaft length	Q	Step diameter
M/MS	External thread (MS: fine thread)	E	Step length
B	Thread length	SC	Wrench flats
P	Step diameter	H/P	Accuracy grade
F	Step length		

Example: C-MXL15L62-UVTA5C2R190-M4-B10-P4-F18-Q4-E10-SC5-H/P

Φ6 mm Complete-Set Ball Spline



Product Features

Economical model

Model No.: UVTA6C2R180

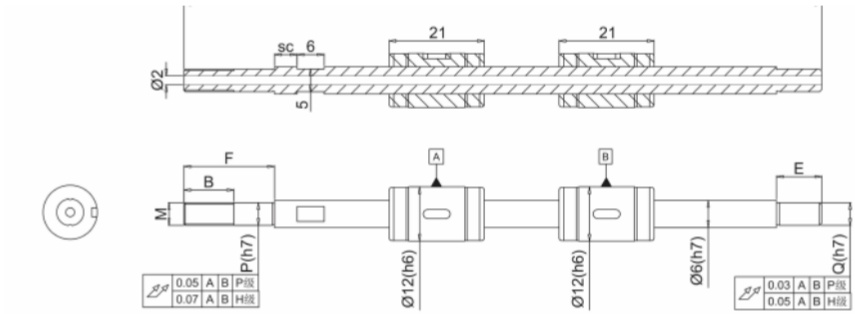
High accuracy: dual nuts give longer protected travel — durable and highly accurate.

Long life: the two nuts share the load, so each nut bears less force and wears slowly; overall fatigue resistance is improved, extending service life.

High cost-performance: freely combinable according to different accuracy requirements and cost considerations, achieving the dual value of "performance on target" + "controllable cost".

Custom Φ6 mm complete-set ball spline (double-nut type, hollow shaft)

Technical Parameters



轴追加工 ■

选型：UVTA6(C2)R(L)-(M/MS)-(B)-(P)-(F)-(Q)-(E)-(SC)-(H/P)

螺母数量
轴长度
外螺纹(MS:细牙)
螺纹长度
台阶轴径
台阶长度
台阶轴径
台阶长度
扳手位
精度等级

范例：UVTA6C2R180-M5-B10-P5-F20-Q5-E10-SC5-H/P

Overall and shaft-machining dimensions of the Φ6 mm complete set — hollow shaft bore Ø2; nut lengths 21 + 21; wrench flat SC 6; external thread M; diameters P(h7), Ø12(h6), Ø12(h6), Ø6(h7), Q(h7); runout 0.05 (grade P) / 0.07 (grade H) at nut A, 0.03 (grade P) / 0.05 (grade H) at nut B

Shaft Additional Machining — Model Number Arrangement

Symbol arrangement — UVTA6(C2)R(L)-(M/MS)-(B)-(P)-(F)-(Q)-(E)-(SC)-(H/P)

C2		(M/MS)	(B)	(P)	(F)	(Q)	(E)	(SC)	(H/P)
Number of nuts	Shaft length	External thread (MS: fine pitch)	Thread length	Step shaft dia.	Step length	Step shaft dia.	Step length	Wrench flat	Accuracy grade

Φ6 mm Complete-Set Ball Spline



Custom Φ6 mm complete-set ball spline (integrated type with synchronous pulley, pointed shaft end)

Product Features

High-accuracy integrated type

Model No.: C-MXL19L62-UVTA6C2R200X

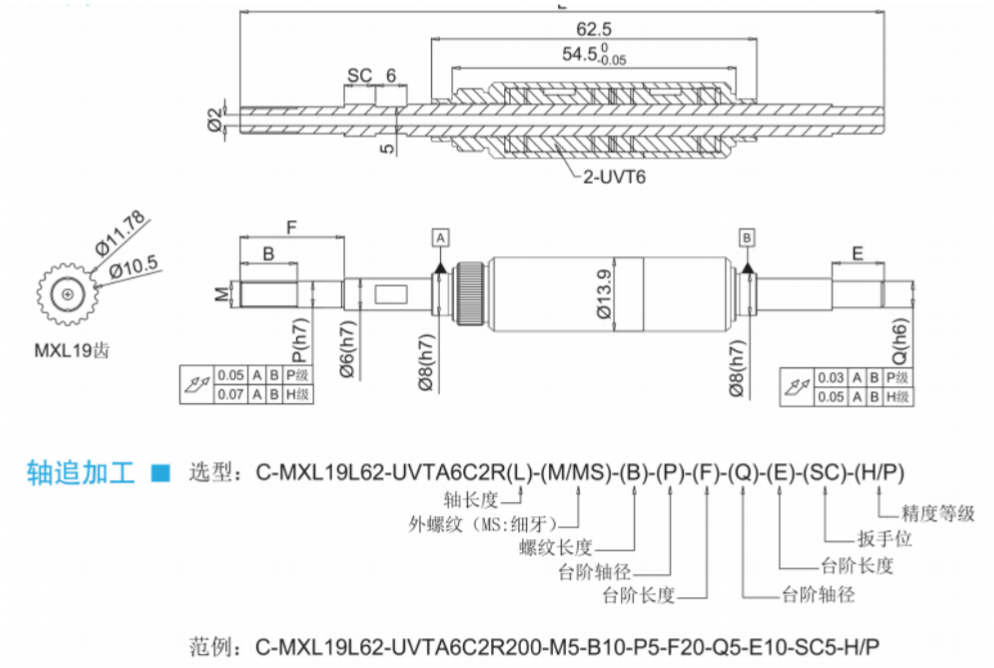
High accuracy: two high-precision cylindrical-type spline nuts are built in, giving precise control of running accuracy.

High integration: spline nut, nut fixing sleeve, bearing seat and synchronous pulley are combined into one four-in-one design — higher accuracy, and installation and adjustment are more convenient and efficient.

Long life: HRC60±2° ultra-high hardness, combined with the dual-nut dispersed load points, greatly improves wear resistance.

Technical highlight: while guaranteeing quality and performance, the maximum outer diameter is reduced to 13.9 mm — the compact structure helps make equipment extremely compact, precise and efficient.

Technical Parameters



Overall and shaft-machining dimensions of the integrated Φ6 mm complete set — nut assembly length 62.5 (54.5 0/−0.05); wrench flat SC 6; hollow shaft bore Ø2; 2×UVT6 spline nuts; MXL19 synchronous pulley Ø11.78/Ø10.5; body Ø13.9; external thread M; diameters P(h7), Ø6(h7), Ø8(h7), Ø8(h7), Q(h6); runout 0.05 (grade P) / 0.07 (grade H) at A, 0.03 (grade P) / 0.05 (grade H) at B

Shaft Additional Machining — Model Number Arrangement

Symbol arrangement — C-MXL19L62-UVTA6C2R(L)-(M/MS)-(B)-(P)-(F)-(Q)-(E)-(SC)-(H/P)

Example: **C-MXL19L62-UVTA6C2R200-M5-B10-P5-F20-Q5-E10-SC5-H/P**

(C2)	(L)	(M/MS)	(B)	(P)	(F)	(Q)	(E)	(SC)	(H/P)
Number of nuts	Shaft length	External thread (MS: fine pitch)	Thread length	Step shaft dia.	Step length	Step shaft dia.	Step length	Wrench flat	Accuracy grade

Φ8 mm Complete-Set Ball Spline



Custom Φ8 mm complete-set ball spline (double-nut type, hollow shaft)

Product Features

Economical model

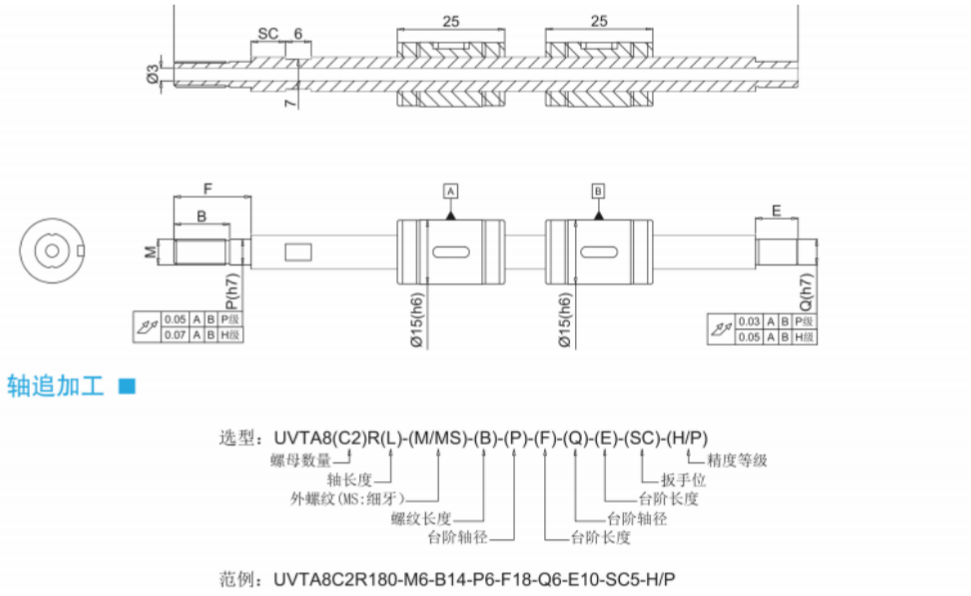
Model No.: UVTA8C2R180

High accuracy: dual nuts give longer protected travel — durable and highly accurate.

Long life: the two nuts share the load, so each nut bears less force and wears slowly; overall fatigue resistance is improved, extending service life.

High cost-performance: freely combinable according to different accuracy requirements and cost considerations, achieving the dual value of "performance on target" + "controllable cost".

Technical Parameters



Overall and shaft-machining dimensions of the Φ8 mm complete set — hollow shaft bore Ø3 (keyway depth 7); nut lengths 25 + 25; wrench flat SC 6; external thread M; diameters P(h7), Ø15(h6), Ø15(h6), Q(h7); runout 0.05 (grade P) / 0.07 (grade H) at nut A, 0.03 (grade P) / 0.05 (grade H) at nut B

Shaft Additional Machining — Model Number Arrangement

Symbol arrangement — UVTA8(C2)R(L)-(M/MS)-(B)-(P)-(F)-(Q)-(E)-(SC)-(H/P)

		(M/MS)	(B)	(P)	(F)	(Q)	(E)	(SC)	(H/P)
Number of nuts	Shaft length	External thread (MS: fine pitch)	Thread length	Step shaft dia.	Step length	Step shaft dia.	Step length	Wrench flat	Accuracy grade

Φ8 mm Complete-Set Ball Spline



Custom Φ8 mm complete-set ball spline (rotary integrated type with mounting flange)

Product Features

High-accuracy integrated type

Model No.: ULTRA8C1R180X

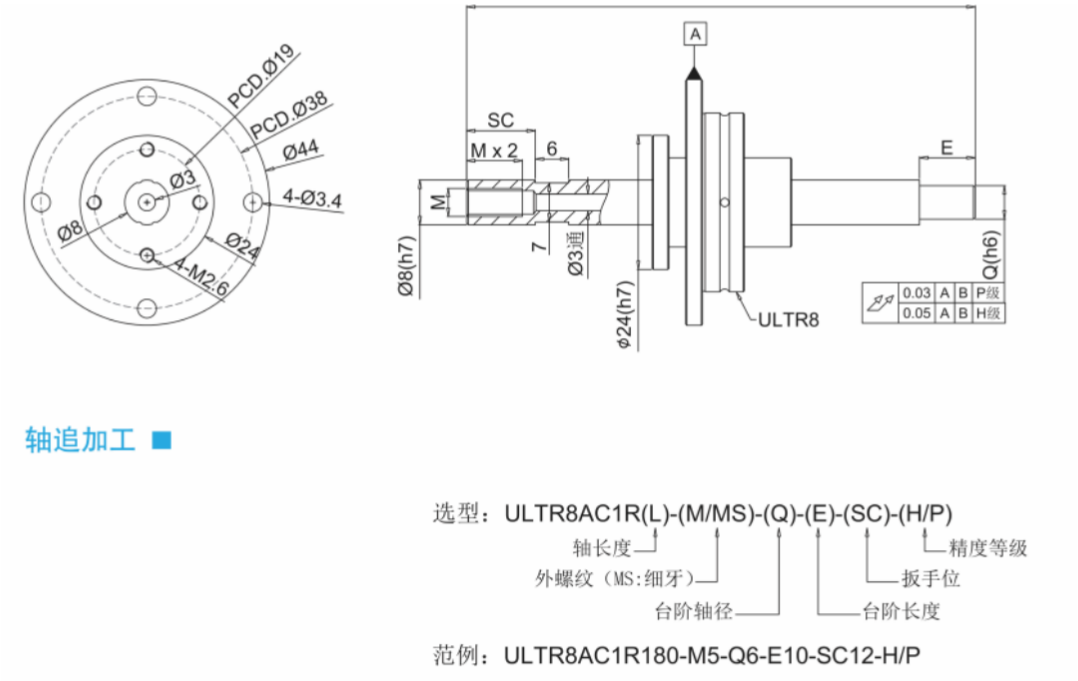
High accuracy: integrated construction reduces the assembly gaps between components — higher accuracy and greater durability.

High integration: spline nut, nut fixing sleeve, bearing and flange mounting seat are combined into one four-in-one highly integrated design — higher accuracy, and installation and adjustment are more convenient and efficient.

Long life: HRC60±2° ultra-high hardness and the high accuracy of the integrated design reduce wear, greatly improving service performance.

Technical highlight: integrated design — higher accuracy and greater durability, with more efficient and convenient installation and adjustment.

Technical Parameters



Overall and shaft-machining dimensions of the rotary integrated Φ8 mm complete set — flange Ø44 with PCD Ø38 and PCD Ø19, 4×Ø3.4 holes, 4×M2.6, hub Ø24, spline shaft Ø8(h7) with Ø3 through hole, wrench flat SC, external thread M×2, body Ø24(h7), ULTR8 nut, right end Q(h6); runout 0.03 (grade P) / 0.05 (grade H) at A

Shaft Additional Machining — Model Number Arrangement

Symbol arrangement — ULTR8AC1R(L)-(M/MS)-(Q)-(E)-(SC)-(H/P)

Example: **ULTR8AC1R180-M5-Q6-E10-SC12-H/P**

(L)	(M/MS)	(Q)	(E)	(SC)	(H/P)
Shaft length	External thread (MS: fine pitch)	Step shaft dia.	Step length	Wrench flat	Accuracy grade

Integrated Ball Splines for SMT Mounting Equipment



Customized integrated ball splines for SMT mounters (pick-and-place machines) — sample applications

(*) Note: The above product solutions are protected as independent intellectual property under law, covering core content including technology and design. Without our company's authorization, any party is strictly prohibited from infringing through production, distribution or other forms; once discovered, we will pursue full liability through legal channels.

Ball Splines for Semiconductor|Insertion|Robots|Medical Equipment

-半导体设备滚珠花键- Semiconductor Equipment





-插件机设备滚珠花键- Insertion Equipment





-功能性机器人滚珠花键- Function Robots





-医疗设备滚珠花键- Medical equipment





Quality, Safety & Environmental Certification







Management-system certificates — Quality management system (GB/T 19001-2016 / ISO 9001:2015), Environmental management system (GB/T 24001-2016 / ISO 14001:2015), Occupational health & safety management system (GB/T 45001-2020 / ISO 45001:2018)

Intellectual Property



















Patent certificates (utility model patents and design patents)

Currently 20+ patents granted...

⚠ Handling Precautions

◆ Spline Outer Cylinder (Nut) and Spline Shaft

• Do not remove the spline outer cylinder from the spline shaft arbitrarily. If removal is unavoidable, when re-installing, align the steel-ball positions inside the spline outer cylinder with the groove positions on the spline shaft, then insert the spline shaft straight and slowly into the outer cylinder.

• When inserting, if the spline shaft is tilted, the steel balls may fly out or the retaining-ring parts may be damaged — be sure to take care.

• If obstruction is felt during insertion, do not force it in; withdraw it, re-confirm the positions of the steel balls and the spline-shaft grooves, then insert straight and slowly.

• After assembling the spline outer cylinder and spline shaft, confirm that the outer cylinder and shaft move smoothly. If forced in, functional damage may result even if no damage is visible externally — please take note.

◆ Precautions for Storage

• Do not disassemble any of the parts. Otherwise foreign matter may enter, or the assembly accuracy of the parts may be adversely affected.

• After the spline outer cylinder and spline shaft are assembled, if the outer cylinder and shaft are tilted they may fall under their own weight — take care.

• Dropping or striking the miniature ball spline may cause damage. Also, if an impact is applied, functional loss may occur even if no damage is visible externally — take note.

◆ About Lubrication

• Wipe off the anti-rust oil carefully and charge with lubricant before use.

• Avoid mixing lubricants of different characteristics together.

• When used in special environments such as places with frequent vibration, clean rooms, vacuum, low or high temperature, ordinary lubricants may not be usable — **consult UVT** for details.

• To use a special lubricant, **consult UVT**.

• With oil lubrication, the oil may sometimes fail to reach the surfaces owing to the mounting orientation of the spline outer cylinder, etc. — in that case **consult UVT**.

• Greasing intervals vary with the conditions of use — **consult UVT**.

◆ Handling Precautions

• Foreign matter entering the product may damage the ball-circulating parts or cause loss of function. Prevent dust, cutting chips and other foreign matter from entering the system. When using in environments where coolant may enter the inside of the spline outer cylinder, note that some types of coolant affect product performance — **consult UVT** for details.

Avoid using the product at temperatures above 100°C. If use above 100°C is required, **consult UVT**.

If foreign matter or cutting chips adhere, clean the product and re-charge it with lubricant. Regarding usable detergent types, **consult UVT**.

For use in special environments such as places with frequent vibration, clean rooms, vacuum, low or high temperature, **consult UVT**.

• When the spline outer cylinder is pulled off the spline shaft and assembled again, the steel balls may fall out — take full care during this operation.

◆ Storage

• When storing miniature ball splines, store them horizontally in their UVT factory packaging, avoiding high-temperature, low-temperature and highly humid environments.