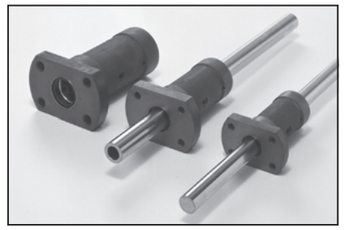
Oiles 500 Guide Units BK Type



RoHS2 ELV

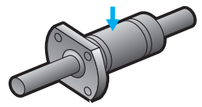
Feature

- Highly durable guide units with Oiles 500SP bearings in the sliding surfaces exclusively designed for reciprocating motion.
- Highly rigid guide units for improved strength.
- Available in various inner diameters, length, etc.

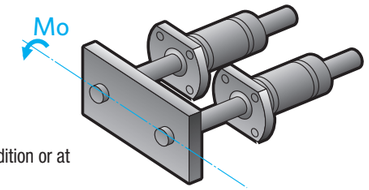
Service Range

Allowable Load, Allowable Moment

Static and Dynamic Allowable Load for Guide Units N {kgf}



Allowable Moment for two Guide Units on two Shafts N.m {kgf.m}



- Allowable static load: Allowable load when a load is applied at a stationary condition or at quite low speed near stopping (not more than 0.0017 m/s [0.1 m/min.])
- Allowable dynamic load: Allowable load in the condition with sliding speed of 1.0m/s {60m/min} or less.

Part No.	Allowable load N {kgf}		Allowable moment N・m {kgf・m}		Part No.	Allowable load N {kgf}		Allowable moment N・m {kgf・m}	
	Type	Upright	Cases	Mo		Type	Upright	Cases	Mo
BBFK20-60	Static	6,180 { 630}	2 axes 2 sets	147 {15}	BBFK35-120	Static	21,610 {2,200}	2 axes 2 sets	686 { 70}
	Dynamic	2,060 { 210}				Dynamic	7,200 { 735}		
BBFK20-100	Static	8,830 { 900}	2 axes 2 sets	294 {30}	BBFK35-180	Static	21,610 {2,200}	2 axes 2 sets	1,117 {114}
	Dynamic	2,940 { 300}				Dynamic	7,200 { 735}		
BBFK20-150	Static	8,830 { 900}	2 axes 2 sets	441 {45}	BBFK35-270	Static	21,610 {2,200}	2 axes 2 sets	1,764 {180}
	Dynamic	2,940 { 300}				Dynamic	7,200 { 735}		
BBFK25-80	Static	11,000 {1,125}	2 axes 2 sets	294 {30}	BBFK40-120	Static	28,200 {2,880}	2 axes 2 sets	1,130 {115}
	Dynamic	3,680 { 375}				Dynamic	9,410 { 960}		
BBFK25-120	Static	13,200 {1,350}	2 axes 2 sets	530 {54}	BBFK40-180	Static	28,200 {2,880}	2 axes 2 sets	1,700 {173}
	Dynamic	4,410 { 450}				Dynamic	9,410 { 960}		
BBFK25-180	Static	13,200 {1,350}	2 axes 2 sets	794 {81}	BBFK40-270	Static	28,200 {2,880}	2 axes 2 sets	2,540 {259}
	Dynamic	4,410 { 450}				Dynamic	9,410 { 960}		
BBFK30-100	Static	15,900 {1,620}	2 axes 2 sets	530 {54}	BBFK50-120	Static	35,300 {3,600}	2 axes 2 sets	1,410 {144}
	Dynamic	5,300 { 540}				Dynamic	11,800 {1,200}		
BBFK30-150	Static	15,900 {1,620}	2 axes 2 sets	794 {81}	BBFK50-180	Static	44,100 {4,500}	2 axes 2 sets	2,650 {270}
	Dynamic	5,300 { 540}				Dynamic	14,700 {1,500}		
BBFK30-250	Static	15,900 {1,620}	2 axes 2 sets	1,320 {135}	BBFK50-270	Static	44,100 {4,500}	2 axes 2 sets	3,970 {405}
	Dynamic	5,300 { 540}				Dynamic	14,700 {1,500}		

Service Range

Allowable Velocity

Lubrication conditions	Allowable max velocity	Remarks
Dry	0.5m/s {30m/min}	——
Periodical lubrication	1.0m/s {60m/min}	Apply lubrication every 10 km of sliding

※Greasing is needed if the stroke is 1 meter or more or the allowable wear amount is small.

Seal Friction Fs / Metal Scraper Friction Ms

Part No.	BBFK16	BBFK20	BBFK25	BBFK30	BBFK35	BBFK40	BBFK50
Fs	1.5N {0.15kgf}	2.0N {0.20kgf}	2.5N {0.25kgf}	2.9N {0.30kgf}	3.5N {0.36kgf}	3.9N {0.40kgf}	4.9N {0.50kgf}
Ms	11.8N { 1.2kgf}	11.8N { 1.2kgf}	14.7N { 1.5kgf}	14.7N { 1.5kgf}	15.7N { 1.6kgf}	16.7N { 1.7kgf}	16.7N { 1.7kgf}

Test data

Reciprocating motion test

<Testing conditions>

Type: BBFK30-150 two guide units
BGS30-400 dual-axis

Load: 588N {60kgf}

Moment load: 195N・m {19.8kgf・m}

Velocity: 0.13m/s {8m/min}

Stroke: 200mm

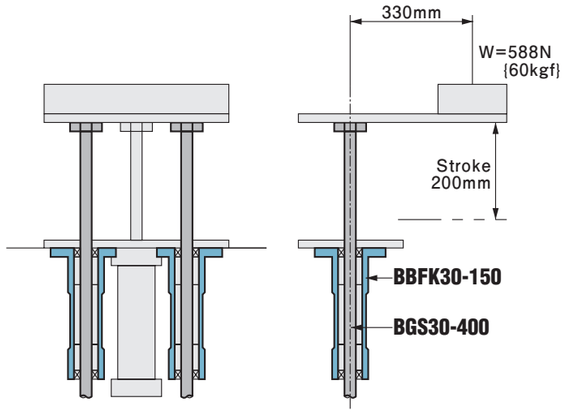
Sliding distance: 400km

<Result>

Wear amount on bushing: 0.105mm
on shaft: 0.013mm

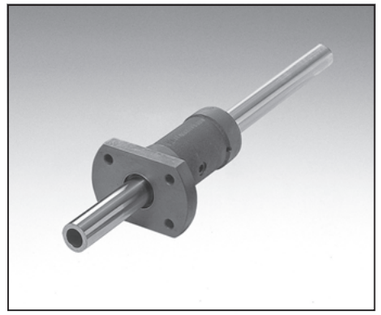
Coefficient of friction: 0.10～0.25

Temperature of friction: 35～53℃



BBFK Shaft BGS/BGSP Hollow shaft Oiles 500 Guide Units BK Type

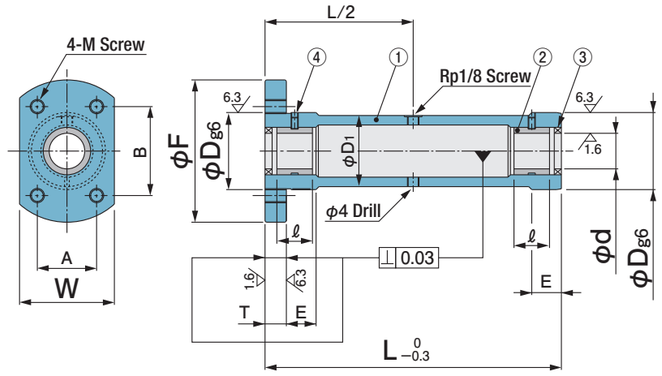
RoHS2 ELV



● Use BGS or BGSP standard shaft (P.319) or φde7 tolerance shaft.

Specify Part No. by required size.
(e.g.) I.D. is 30mm and length is 150mm.

Specify by BBFK 30 - 150 **Part No.**



	Parts name	Material
①	Sleeve	FC250
②	Guide bushing (Note)	Oiles metal
③	Dust seal	NBR+SPCC
④	Bushing set screw	—

(Note) Guide bushing of BBFK20-60 is one in the center.

Part No.	I.D. φd	I.D. Tolerance	φF	O.D. φD	O.D. Tolerance	L	W	Sleeve D1	Sleeve Tolerance	ℓ	T	E	A	B	Mounting hole M	Weight kg
BBFK20-60	20	+0.035 +0.014	80	44	−0.009 −0.025	60	50	41	±1	35	12	15	30	55	M10	0.6
BBFK20-100	20	+0.035 +0.014	80	44	−0.009 −0.025	100	50	41	±1	25	12	15	30	55	M10	0.8
BBFK20-150	20	+0.035 +0.014	80	44	−0.009 −0.025	150	50	41	±1	25	12	15	30	55	M10	1.0
BBFK25-80	25	+0.035 +0.014	100	54	−0.010 −0.029	80	65	51	±1	25	15	20	40	65	M10	1.3
BBFK25-120	25	+0.035 +0.014	100	54	−0.010 −0.029	120	65	51	±1	30	15	20	40	65	M10	1.6
BBFK25-180	25	+0.035 +0.014	100	54	−0.010 −0.029	180	65	51	±1	30	15	20	40	65	M10	2.1
BBFK30-100	30	+0.036 +0.015	120	65	−0.010 −0.029	100	80	61	±1	30	18	25	50	75	M12	2.2
BBFK30-150	30	+0.036 +0.015	120	65	−0.010 −0.029	150	80	61	±1	30	18	25	50	75	M12	2.6
BBFK30-250	30	+0.036 +0.015	120	65	−0.010 −0.029	250	80	61	±1	30	18	25	50	75	M12	4.0
BBFK35-120	35	+0.040 +0.015	130	75	−0.010 −0.029	120	85	70	±1	35	20	25	54	85	M12	3.2
BBFK35-180	35	+0.040 +0.015	130	75	−0.010 −0.029	180	85	70	±1	35	20	25	54	85	M12	4.1
BBFK35-270	35	+0.040 +0.015	130	75	−0.010 −0.029	270	85	70	±1	35	20	25	54	85	M12	6.0
BBFK40-120	40	+0.040 +0.015	140	80	−0.010 −0.029	120	90	75	±1	40	20	30	60	90	M16	3.7
BBFK40-180	40	+0.040 +0.015	140	80	−0.010 −0.029	180	90	75	±1	40	20	30	60	90	M16	4.8
BBFK40-270	40	+0.040 +0.015	140	80	−0.010 −0.029	270	90	75	±1	40	20	30	60	90	M16	6.3
BBFK50-120	50	+0.046 +0.021	160	95	−0.012 −0.034	120	100	89	±1	40	25	30	70	100	M16	4.8
BBFK50-180	50	+0.046 +0.021	160	95	−0.012 −0.034	180	100	89	±1	50	25	30	70	100	M16	5.8
BBFK50-270	50	+0.046 +0.021	160	95	−0.012 −0.034	270	100	89	±1	50	25	30	70	100	M16	7.3

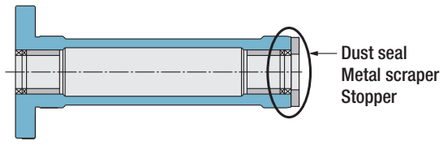
Dimension Table of Optional Parts Applicable to BK Type

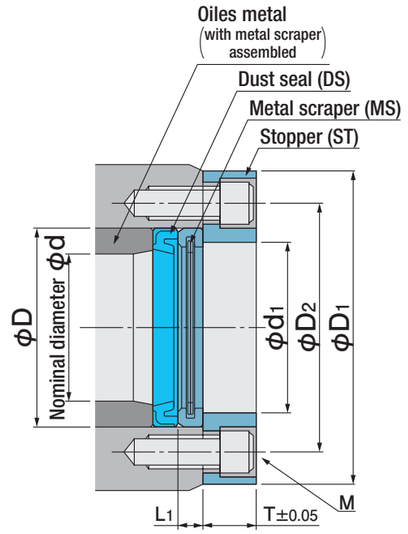
■ Metal Scraper (MS)

- Use the metal scraper (MS standard) to remove welding sputters adhered to the guide shaft, stuck grease, etc.
- The metal scraper causes no damages to the guide shaft, since it is a coil scraper made of phosphor bronze.
- The metal scraper may also be used with the SPB bushings.

■ Stopper (ST)

- The stopper (ST standard) is a part used for positioning by butting the end of the sleeve body of the shifter. It is quenched and its accuracy will not deteriorate.





Measurement Table/Product Identification for Ordering

■ When using optional part for product

Example: When I.D. is 20 mm and length is 100 mm

Specify by BBFK 20 - 100 - MS - SW **Part No.**

- Stopper (optional)
  - No symbol: None
  - SW: Both ends
  - SF: Flange end only
  - SS: Sleeve end only
- Metal scraper (MS)
  - No symbol: None
  - MS: Both ends

■ When Using Alone

■ Metal Scraper (MS)

Example: When I.D. is 20 mm

Specify by MS 20 **Part No.**

■ Stopper

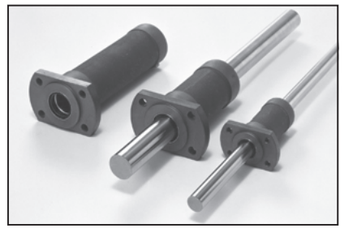
Example: When I.D. is 20 mm

Specify by ST 20 **Part No.**

Metal scraper (MS)※				Stopper (ST)						Applicable guide
Part No.	φd	φD	L1	Part No.	φd1	φD1	φD2	T	M	
MS20	20	28	4.9	ST20	25	43.5	35	7	2-M4	BBFK20
MS25	25	33	4.9	ST25	30	53.5	42	9	2-M5	BBFK25
MS30	30	40	3.9	ST30	36	64.5	52	10	2-M6	BBFK30
MS35	35	45	4.9	ST35	41	74.5	59	12	2-M6	BBFK35
MS40	40	50	5.3	ST40	46	79.5	65	13	2-M8	BBFK40
MS50	50	62	5.3	ST50	56	94.5	78	15	2-M8	BBFK50

※Press-fit hole tolerance should be φD Js7 and applicable shaft diameter tolerance should be φde7 to h7, if the metal scraper is used alone.
※For the dust seal (DS), see page 317.

Oiles 500 Guide Units BT Type with Pilot



RoHS2 ELV

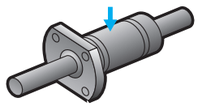
Feature

- Pilots may be used for positioning, highly durable guide units with Oiles 500SP bearings in the sliding surfaces exclusively designed for reciprocating motion.
- Highly rigid guide units for improved strength.
- Available in various inner diameters, length, etc.

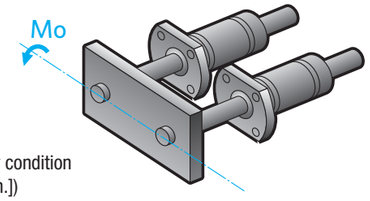
Service Range

Allowable Load, Allowable Moment

Static and Dynamic Allowable Load for Guide Units N {kgf}



Allowable Moment for two Guide Units on two Shafts N.m {kgf.m}



- Allowable static load: Allowable load when a load is applied at a stationary condition or at quite low speed near stopping (not more than 0.0017 m/s [0.1 m/min.])
- Allowable dynamic load: Allowable load in the condition with sliding speed of 1.0m/s {60m/min} or less.

Part No.	Allowable load N {kgf}		Allowable moment N・m {kgf・m}		Part No.	Allowable load N {kgf}		Allowable moment N・m {kgf・m}	
	Type	Upright	Cases	Mo		Type	Upright	Cases	Mo
BBT20-60	Static	6,180 { 630}	2 axes 2 sets	147 {15}	BBT40-120	Static	28,200 {2,880}	2 axes 2 sets	1,130 {115}
	Dynamic	2,060 { 210}				Dynamic	9,410 { 960}		
BBT20-100	Static	8,830 { 900}	2 axes 2 sets	294 {30}	BBT40-180	Static	28,200 {2,880}	2 axes 2 sets	1,700 {173}
	Dynamic	2,940 { 300}				Dynamic	9,410 { 960}		
BBT20-150	Static	8,830 { 900}	2 axes 2 sets	441 {45}	BBT40-270	Static	28,200 {2,880}	2 axes 2 sets	2,540 {259}
	Dynamic	2,940 { 300}				Dynamic	9,410 { 960}		
BBT25-80	Static	11,000 {1,125}	2 axes 2 sets	294 {30}	BBT50-120	Static	35,300 {3,600}	2 axes 2 sets	1,410 {144}
	Dynamic	3,680 { 375}				Dynamic	11,800 {1,200}		
BBT25-120	Static	13,200 {1,350}	2 axes 2 sets	530 {54}	BBT50-180	Static	44,100 {4,500}	2 axes 2 sets	2,650 {270}
	Dynamic	4,410 { 450}				Dynamic	14,700 {1,500}		
BBT25-180	Static	13,200 {1,350}	2 axes 2 sets	794 {81}	BBT50-270	Static	44,100 {4,500}	2 axes 2 sets	3,970 {405}
	Dynamic	4,410 { 450}				Dynamic	14,700 {1,500}		
BBT30-100	Static	15,900 {1,620}	2 axes 2 sets	530 {54}					
	Dynamic	5,300 { 540}							
BBT30-150	Static	15,900 {1,620}	2 axes 2 sets	794 {81}					
	Dynamic	5,300 { 540}							
BBT30-250	Static	15,900 {1,620}	2 axes 2 sets	1,320 {135}					
	Dynamic	5,300 { 540}							

Service Range

Allowable Velocity

Lubrication conditions	Allowable max velocity	Remarks
Dry	0.5m/s {30m/min}	——
Periodical lubrication	1.0m/s {60m/min}	Apply lubrication every 10 km of sliding

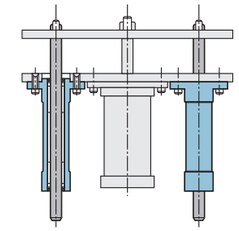
※Greasing is needed if the stroke is 1 meter or more or the allowable wear amount is small.

Seal Friction Fs / Metal Scraper Friction Ms

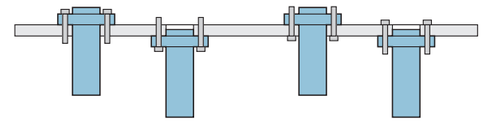
Part No.	BBT16	BBT20	BBT25	BBT30	BBT40	BBT50
Fs	1.5N {0.15kgf}	2.0N {0.20kgf}	2.5N {0.25kgf}	2.9N {0.30kgf}	3.9N {0.40kgf}	4.9N {0.50kgf}
Ms	11.8N { 1.2kgf}	11.8N { 1.2kgf}	14.7N { 1.5kgf}	14.7N { 1.5kgf}	16.7N { 1.7kgf}	16.7N { 1.7kgf}

Example of BT Type Installation

- Use the BGS-compatible guide shafts (shown on page 319) or ϕd e7 guide shaft.
- This unit may be used for various lifting units and pusher guides.
- This unit may be positioned with the end of the mounting flange as the pilot as shown on the right.



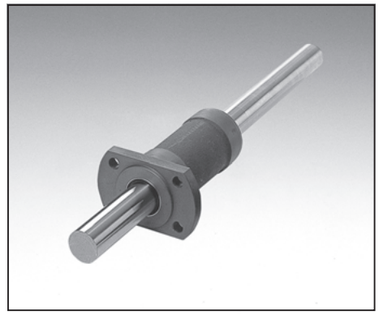
- The clamping bolt fixing methods shown on the right are selectable. See the right table and select the proper bolt size.



Part No.	Attach bolt size	
	A	B
BBT20	M8	M10
BBT25	M8	M10
BBT30	M10	M12
BBT40	M12	M16
BBT50	M12	M16

BBT Shaft BGS/BGSP Hollow shaft Oiles 500 Guide Units BT Type (with Pilot)

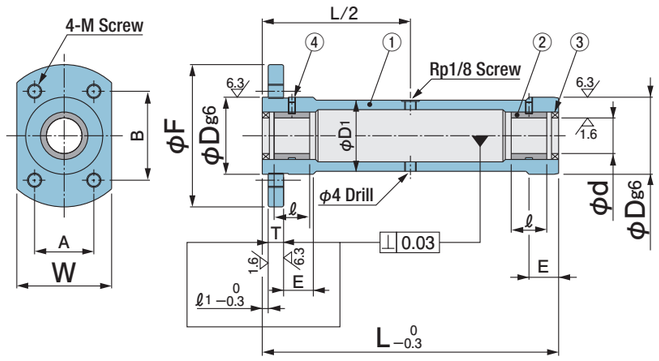
RoHS2 ELV



● Use BGS or BGSP standard shaft (P.319) or φde7 tolerance shaft.

Specify Part No. by required size.
(e.g.) I.D. is 30mm and length is 150mm.

Specify by **BBT 30 - 150** Part No.



	Parts name	Material
①	Sleeve	FC250
②	Guide bushing (Note)	Oiles metal
③	Dust seal	NBR+SPCC
④	Bushing set screw	—

(Note) Guide bushing of BBFK20-60 is one in the center.

Part No.	I.D. φd	Tolerance	φF	O.D. φD	Tolerance	L	W	Sleeve D1	Tolerance	ℓ	T	ℓ1	E	A	B	Mounting hole M	Weight kg
BBT20-60	20	+0.035 +0.014	80	44	−0.009 −0.025	60	50	41	±1	35	8	4	15	30	55	M10	0.5
BBT20-100	20	+0.035 +0.014	80	44	−0.009 −0.025	100	50	41	±1	25	8	4	15	30	50	M10	0.7
BBT20-150	20	+0.035 +0.014	80	44	−0.009 −0.025	150	50	41	±1	25	8	4	15	30	50	M10	0.9
BBT25-80	25	+0.035 +0.014	100	54	−0.010 −0.029	80	65	51	±1	25	11	4	20	40	65	M10	1.0
BBT25-120	25	+0.035 +0.014	100	54	−0.010 −0.029	120	65	51	±1	30	11	4	20	40	65	M10	1.3
BBT25-180	25	+0.035 +0.014	100	54	−0.010 −0.029	180	65	51	±1	30	11	4	20	40	65	M10	1.9
BBT30-100	30	+0.036 +0.015	120	65	−0.010 −0.029	100	80	61	±1	30	13	5	25	50	75	M12	1.9
BBT30-150	30	+0.036 +0.015	120	65	−0.010 −0.029	150	80	61	±1	30	13	5	25	50	75	M12	2.3
BBT30-250	30	+0.036 +0.015	120	65	−0.010 −0.029	250	80	61	±1	30	13	5	25	50	75	M12	3.7
BBT40-120	40	+0.040 +0.015	140	80	−0.010 −0.029	120	90	75	±1	40	15	5	30	60	90	M16	3.4
BBT40-180	40	+0.040 +0.015	140	80	−0.010 −0.029	180	90	75	±1	40	15	5	30	60	90	M16	4.4
BBT40-270	40	+0.040 +0.015	140	80	−0.010 −0.029	270	90	75	±1	40	15	5	30	60	90	M16	6.0
BBT50-120	50	+0.046 +0.021	160	95	−0.012 −0.034	120	100	89	±1	40	20	5	30	70	100	M16	4.5
BBT50-180	50	+0.046 +0.021	160	95	−0.012 −0.034	180	100	89	±1	50	20	5	30	70	100	M16	5.5
BBT50-270	50	+0.046 +0.021	160	95	−0.012 −0.034	270	100	89	±1	50	20	5	30	70	100	M16	7.0

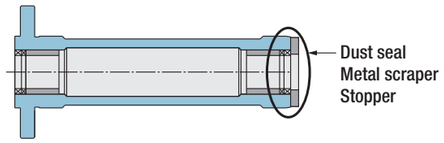
Dimension Table of Optional Parts Applicable to BT Type

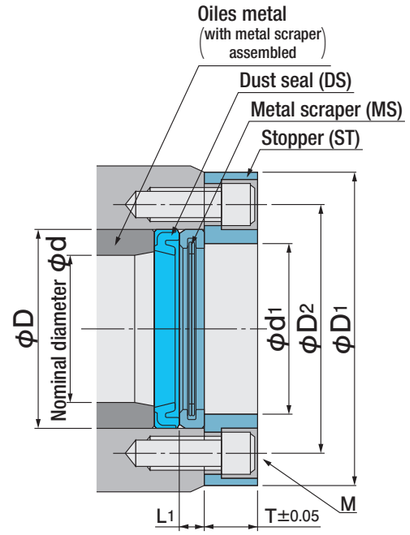
■ Metal Scraper (MS)

- Use the metal scraper (MS standard) to remove welding sputters adhered to the guide shaft, stuck grease, etc.
- The metal scraper causes no damages to the guide shaft, since it is a coil scraper made of phosphor bronze.
- The metal scraper may also be used with the SPB bushings.

■ Stopper (ST)

- The stopper (ST standard) is a part used for positioning by butting the end of the sleeve body of the shifter. It is quenched and its accuracy will not deteriorate.





Measurement Table/Product Identification for Ordering

■When Using Optional Part for Product

Example: When I.D. is 20 mm and length is 100 mm

Specify by **BBT 20 - 100 - MS - SW** Part No.

- Stopper (optional)
  - No symbol: None
  - SW: Both ends
  - SF: Flange end only
  - SS: Sleeve end only
- Metal scraper (MS)
  - No symbol: None
  - MS: Both ends

■When Using Alone

■ Metal Scraper (MS)

Example: When I.D. is 20 mm

Specify by **MS 20** Part No.

■ Stopper

Example: When I.D. is 20 mm

Specify by **ST 20** Part No.

Metal scraper (MS)※				Stopper (ST)						Applicable guide
Part No.	φd	φD	L1	Part No.	φd1	φD1	φD2	T	M	
MS20	20	28	4.9	ST20	25	43.5	35	7	2-M4	BBT20
MS25	25	33	4.9	ST25	30	53.5	42	9	2-M5	BBT25
MS30	30	40	3.9	ST30	36	64.5	52	10	2-M6	BBT30
MS40	40	50	5.3	ST40	46	79.5	65	13	2-M8	BBT40
MS50	50	62	5.3	ST50	56	94.5	78	15	2-M8	BBT50

※Press-fit hole tolerance should be φD Js7 and applicable shaft diameter tolerance should be φde7 to h7, if the metal scraper is used alone.

Oiles Guide Shafts BGS/BGSP

- Guide shafts applicable to the Oiles Slide Shifters BTCA, BTSA, BTC, and BTF and Guide Units BK and BT.
- Guide shafts cut to various standard lengths are available.
- Guide shafts of 30 mm or larger diameters are made of hollow shafts effective for weight reduction.
- We also offer various types of end processing of the shafts.

RoHS2 ELV

Variation

Part No.	Type	Shaft diameter	Material	Maximum length	Applications
BGS	Solid	ϕ8～ϕ12	S45C+hard chrome-plated (Plating thickness 15μ or more)	1,000mm	General
		ϕ16～ϕ50		2,900mm	
BGSP	Hollow shaft	ϕ30～ϕ50	STKM13C+hard chrome-plated (Plating thickness 15μ or more)		

BGS/BGSP Oiles Guide Shafts

RoHS2 ELV

Product Identification for Ordering

Specify by **BGS** **O.D.** - **Length** (Part No.)

(e.g.) O.D. is 30mm and length is 1000mm. ▶ **BGS30-1000**

Dimension Table

■ BGS

■ BGSP

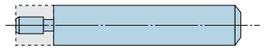
Part No.	O.D. ϕD	O.D. Tolerance	I.D. ϕd	Standard length L (mm) 300	400	500	600	800	1,000	1,200	1,500
BGS8	8	−0.013 −0.035	—	0.12		0.20			0.39		
BGS10	10	−0.013 −0.035	—	0.18		0.31			0.61		
BGS12	12	−0.016 −0.043	—	0.26		0.44			0.88		
BGS16	16	−0.025 −0.050	—	0.47	0.63				1.6		
BGS20	20	−0.030 −0.060	—	0.73	1.0	1.2	1.5		2.5		
BGS25	25	−0.030 −0.060	—	1.1	1.5	1.9	2.3		3.8		
BGS30	30	−0.035 −0.065	—	1.7	2.2	2.8	3.3	4.4	5.5		
BGS30P	30	−0.035 −0.065	20	0.9	1.2	1.5	1.8	2.4	3.0		
BGS35	35	−0.040 −0.070	—				4.5		7.5		
BGS40	40	−0.035 −0.065	—		3.9		5.9		9.8	11.8	
BGS40P	40	−0.035 −0.065	30		1.8		2.6		4.3	5.3	
BGS50	50	−0.040 −0.075	—		6.1		9.2		15.3		23.0
BGS50P	50	−0.040 −0.075	35		3.2		4.8		7.8		12.0

※The values shown above in Standard length column are weight (kg).
※Contact us for other length of shaft.

BGS Oiles Guide Shafts

※Product identification methods differ with machining type. Refer to each product identification code entry methods.

Machining Areas

1: Single end	2: Both ends	3: Different shapes on both ends
		

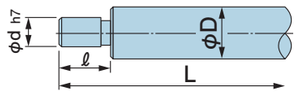
Machining Shapes and Product Identification Code Entry Methods

DN Step machining

BGS D - L - 2 - DN - φd × ℓ

Part No. (Shaft dia.) / Length / Shape / Step

1: Single end, 2: Both ends, 3: Different shapes on both ends

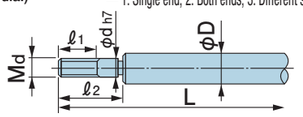


DS Stepped threading

BGS D - L - 2 - DS - Md × ℓ1 × ℓ2

Part No. (Shaft dia.) / Length / Shape / Step

1: Single end, 2: Both ends, 3: Different shapes on both ends

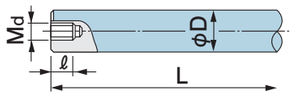


ES End face threading

BGS D - L - 2 - ES - Md × ℓ

Part No. (Shaft dia.) / Length / Shape / Step

1: Single end, 2: Both ends, 3: Different shapes on both ends

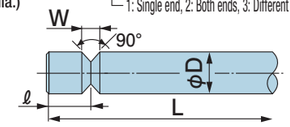


VR V-shaped ring groove machining

BGS D - L - 2 - VR - ℓ × W

Part No. (Shaft dia.) / Length / Shape / Step

1: Single end, 2: Both ends, 3: Different shapes on both ends

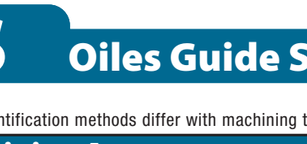


KY Keyway machining

BGS D - L - 2 - KY - W × H × ℓ1 × ℓ2

Part No. (Shaft dia.) / Length / Shape / Step

1: Single end, 2: Both ends, 3: Different shapes on both ends

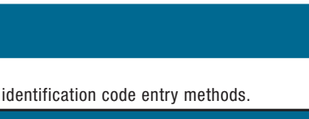


KY Keyway machining

BGS D - L - 2 - KY - W × H × ℓ

Part No. (Shaft dia.) / Length / Shape / Step

1: Single end, 2: Both ends, 3: Different shapes on both ends

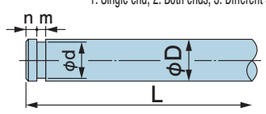


RM Ring groove machining

BGS D - L - 2 - RM - n × m × φd

Part No. (Shaft dia.) / Length / Shape / Step

1: Single end, 2: Both ends, 3: Different shapes on both ends

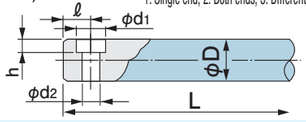


BS Counter boring (Note 1)

BGS D - L - 2 - BS - ℓ

Part No. (Shaft dia.) / Length / Shape / Step

1: Single end, 2: Both ends, 3: Different shapes on both ends

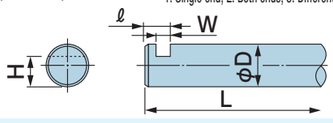


KK Cutout

BGS D - L - 2 - KK - H × ℓ × W

Part No. (Shaft dia.) / Length / Shape / Step

1: Single end, 2: Both ends, 3: Different shapes on both ends

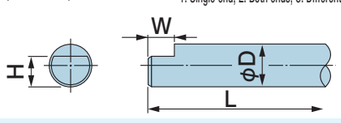


KK Cutout

BGS D - L - 2 - KK - H × W

Part No. (Shaft dia.) / Length / Shape / Step

1: Single end, 2: Both ends, 3: Different shapes on both ends



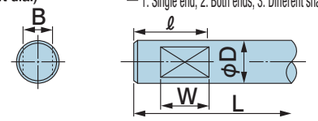
Machining Shapes and Product Identification Code Entry Methods

SK Wrench receptacle machining

BGS D - L - 2 - SK - B × ℓ × W

Part No. (Shaft dia.) / Length / Shape / Step

1: Single end, 2: Both ends, 3: Different shapes on both ends

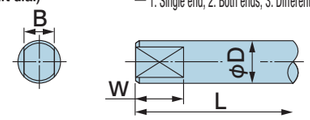


SK Wrench receptacle machining

BGS D - L - 2 - SK - B × W

Part No. (Shaft dia.) / Length / Shape / Step

1: Single end, 2: Both ends, 3: Different shapes on both ends

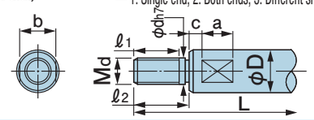


DSS Stepped threading with wrench receptacle (Note 2)

BGS D - L - 2 - DSS - Md × ℓ1 × ℓ2

Part No. (Shaft dia.) / Length / Shape / Step

1: Single end, 2: Both ends, 3: Different shapes on both ends

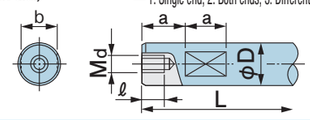


ESS End face threading with wrench receptacle (Note 2)

BGS D - L - 2 - ESS - Md × ℓ

Part No. (Shaft dia.) / Length / Shape / Step

1: Single end, 2: Both ends, 3: Different shapes on both ends

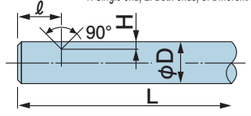


KM Drilling

BGS D - L - 2 - KM - H × ℓ

Part No. (Shaft dia.) / Length / Shape / Step

1: Single end, 2: Both ends, 3: Different shapes on both ends



- C0.5 unless chamfer dimensions are specified.
- Also specify the thread pitch (Md×P) in the product identification code when fine thread is specified.

Note 1: d1, d2 and h of BS (counter boring) are machined in the standard dimensions shown below. BS (counter boring) is applicable to solid shafts (BGS) only. Use hexagonal socket head bolts.

Note 2: a, b and c of DSS and ESS (threading with wrench receptacle) are machined in the standard dimensions shown below.

■ Standard dimensions of BS (counter boring) (Unit: mm)

Shaft dia. φD	8	10	12	16	20	25	30	35	40	50
φd1	6.5	8	9.5	11	14	14	14	14	17.5	20
φd2	3.4	4.5	5.5	7	9	9	9	9	11	14
h	3.5	4.5	5.5	7	9	9	9	9	11	147

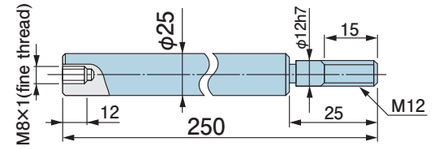
■ Standard dimensions of DSS and ESS (wrench receptacle machining) (Unit: mm)

Shaft dia. φD	8	10	12	16	20	25	30	35	40	50
a	8	8	10	10	10	10	15	15	20	20
b	7	8	10	14	17	22	27	32	36	41
c	5	5	5	5	5	5	5	5	10	10

Examples of Product Identification

Example 1: Single end: end face threading + single end: stepped threading

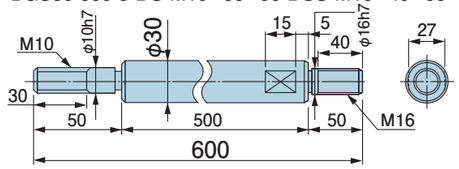
BGS25-250-3-ES-M8×P1.0×12-DS-M12×15×25



* Also specify the thread pitch as shown above when fine thread is specified.

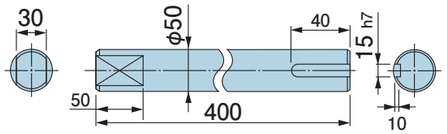
Example 2: Single end: stepped threading + single end: stepped threading with wrench receptacle

BGS30-600-3-DS-M10×30×50-DSS-M16×40×50



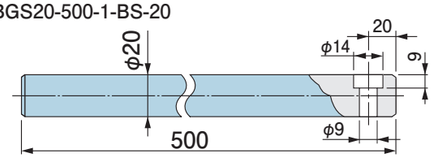
Example 3: Single end: wrench receptacle machining + single end: keyway machining

BGS50-400-3-SK-30×50-KY-15×10×40



Example 4: Single end: counter boring

BGS20-500-1-BS-20



Calculation Examples of Four Lengthwise Vertical Dual-Axis Tables (BF Type)

Load Calculation, Driving Force Calculation and Service Life Calculation

Use conditions and required service life

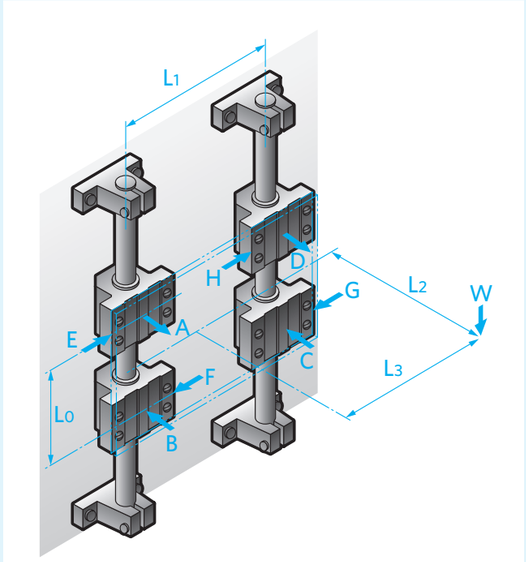
N=300,000 cycles	W=300kgf	L_0=250mm	fc =0.85, single-axis, two units	fe=3.0, 30˚C or less, foreign matter
a=0.1mm	K=5×10^6	L_1=200mm	fw=1.0, no impact load	fℓ=1.0, no lubrication
S=0.2m		L_2=250mm	fv =2.0, 25m/min	
		L_3=300mm	{0.42m/s}	

① Calculating loads applied to tables

A=B=C=D=W/2×L_2/L_0
E=F=G=H=W/2×L_3/L_1

Use the load calculating formula shown above and find the load to be applied to each table from the use conditions.

W = load = 300 kgf
L_0, L_1, L_2 and L_3 = distance between load application point and each table
L_0 = 250mm, L_1 = 200mm, L_2 = 250mm, L_3 = 300mm
Find load applied to each table from above conditions.
A = B = C = D = 300/2 × 250/250 = 150kgf
E = F = G = H = 300/2 × 300/200 = 225kgf
Select the shift table BTF30 so that the values of A, B, C, D, E, F, G, and H are within the ranges of values in the allowable load table shown in the description.



Allowable load with simple load (Unit: N {kgf})

Part No.	Load type	Installation condition
BTF16	Allowable static load	4,410 { 450}
	Allowable dynamic load	1,470 { 150}
BTF20	Allowable static load	6,180 { 630}
	Allowable dynamic load	2,060 { 210}
BTF25	Allowable static load	8,830 { 900}
	Allowable dynamic load	2,940 { 300}
BTF30	Allowable static load	13,200 {1,350}
	Allowable dynamic load	4,410 { 450}
BTF40	Allowable static load	21,200 {2,160}
	Allowable dynamic load	7,060 { 720}
BTF50	Allowable static load	26,500 {2,700}
	Allowable dynamic load	8,830 { 900}

- Allowable static load: Allowable load when it is born in the stationary condition or at quite low speed near stopping (not more than 0.0017 m/s [0.1 m/min.])
- Allowable dynamic load: Allowable load in the condition with sliding speed of 1.0 m/s [60 m/min] or less.

② Calculating driving force

F=(μ_1|A|+μ_2|B|+μ_3|C|+μ_4|D|+nFs+nMs+μ_1|E|+μ_2|F|+μ_3|G|+μ_4|H|)×S±W

Type	Types except for S type
Coefficient of friction μ	0.15

Find the driving force from the use conditions using the above formula.

F = driving force
S = safety factor (2 in this example)
μ_1, μ_2, μ_3, μ_4 = coefficient of friction of each table
μ_1 = μ_2 = μ_3 = μ_4 = 0.15
A, B, C, D, E, F, G, and H = load applied to each table
A = B =C =D = 150kgf
E = F = G = H = 225kgf
n = number of tables = 4
Fs = seal friction = 0.30kgf
Ms = metal scraper friction = 1.5kgf
F = (0.15×150+0.15×150+0.15×150+0.15×150+4×0.30+4×1.5+0.15×225+0.15×225+0.15×225+0.15×225) × 2 ≒ 464 (±300) kgf
Rising F_1 = 764kgf
Falling F_2 = 164kgf

③ Calculating service life

N=a×K×(1/2S)×(Wa/Wi)×fc/(fw×fv×fe×fℓ)

Find the service life from the use conditions using the above formula.

N = service life = required service life (300,000 cycles)
a = allowable wear amount = 0.1 mm
K = coefficient of friction = 5 x 10^6
S = stroke = 0.2 m
Wa = allowable load = 450 kgf (BTF 30)
Wi = applied load = 225 kgf (Value closest to the allowable load: Select the severest one among the loads found with the load Calculating formula.)
fc = contact factor = 0.85 (Two single-axis units)
fv = velocity factor = 2.0 (25 m/min [0.42m/s])
fw = load factor = 1.0 (No impact load)
fe = environmental factor= 3.0 (30˚C, no foreign matter)
fl = lubrication factor = 1.0 (No lubrication)
N = 0.1 × 5 × 10^6 × (1/2 × 0.2) × (450/225) × 0.85/ (1.0 × 2.0 × 3.0 × 1.0)
= 354,166 The required service life of 300,000 cycles is satisfied.