

Ball Plungers / Ball Buttons

Bolt / Flanged

Ball Plungers – Bolt Type

Type	Body		Ball	Spring	Spacer	Operating Temperature
	Material	Hardness				
Light Load	Hex Screw	1045 Carbon Steel or Equivalent	52100 Bearing Steel	55 HRC min.	304 Stainless Steel	-30~80°C
Heavy Load						
Light Load	Hex Socket Head Cap Screw	4137 Alloy Steel	52100 Bearing Steel	55 HRC min.	304 Stainless Steel	-30~80°C
Heavy Load						

Bolt Type BPHL BPHH

Hex Socket Head Cap Screw Type BPRL BPRH

L dimension includes the incomplete threaded portion (pitch x 2).

Part Number Type	M	L Selection										Load (N)			
		10	15	20	30	40	50	60	70	80	90	min.	max.	min.	max.
Bolt Type BPHL BPHH	4											1.9	4.9	3.9	9.8
	5											3.3	9.8	4.9	19.6
Hex Socket Head Cap Screw Type BPRL BPRH	6											5.1	15.3	9.8	29.4
	8											5.5	19.1	12.7	39.2
	10											8.9	24.1	18.6	49
	12											10.9	29.3	19.6	58.8
	16											14.9	48.9	29.4	98

Ⓛ L size marked with * is only available for BPHL and BPHH. Ⓛ L size marked () Not available for BPHL.

Part Number Example

Part Number: BPRL5 - L: 30

Ball Plungers – Flanged

Type	Material	Body Hardness	Surface Treatment	Ball Material	Ball Hardness	Spring Material	Operating Temperature
FBPJ	1045 Carbon Steel or Equivalent	29~35 HRC	Black Oxide	440C Stainless Steel	55 HRC min.	631J1 Stainless Steel	-30~80°C
FBPJS	303 Stainless Steel	—	—	—	—	—	-30~260°C

kgf=Nx0.101972

Part Number Type	M (Course)	D	L	S	d	a	FBPJ Load (N)		FBPJS Load (N)		Applicable Wrench
							min.	max.	min.	max.	
FBPJ	5	7	5	0.8	3	0.8	0.6	5.6	1.3	6.4	BPJG1
	6	8	6	1	4	1	2.8	6.3	2.7	8	BPJG2
	8	10	7	1.6	5	1.5	2.9	9.6	1.3	10.2	BPJG3
FBPJS	10	12	9	1.9	6.35	1.5	6.4	11.7	6.1	17.2	BPJG4
	12	14	11.5	2.4	7.94	2	9	15	2.1	18.8	BPJG5
	16	18	16	3.2	9.53	2	9.9	21.5	1.3	25.5	

Part Number Example

Part Number: FBPJ5

Ball Buttons

BBT

Material: W1-9 Tool Steel
Hardness: 53~58 HRC min.

Type	Part Number	D	D ₁₅	L	d	ℓ
BBT	6		+0.006 +0.001	8	2	2
	8		+0.007	10	3	
	10		+0.001	12	4	
	12		+0.009	14	5	3
	16		+0.001	18	8	

Ⓛ When using it in combination with a ball plunger, make sure to match their catalog numbers (M=D). (BBT6 is also available for M5.)

Part Number Example

Part Number: BBT6

Press-Fit Plungers / Ball Buttons

Standard / Roller / Tapped

Press-Fit Plungers – Standard Type

Type	Body Material	Ball Material	Ball Hardness	Spring Material	Operating Temperature
Light Load	303 Stainless Steel	440C Stainless Steel	55 HRC min.	631J1 Stainless Steel	-20~120°C
Heavy Load					-30~80°C
Light Load	Polyacetal	Polyacetal	—	—	-30~80°C

kgf=Nx0.101972

Part Number Type	D	D ₁	L		S	d	d ₁	Light Load (N)				Heavy Load (N)	
			Light Load	Heavy Load				PFSSN		PFPSN / PFPPN		PFSSR	
			min.	max.				min.	max.	min.	max.	min.	max.
PFSSN PFSSR PFPSN PFPPN	2	2.5	3	—	0.3	1	0.5	0.54	0.78	0.54	0.78	—	—
	3	3.6	4	—	0.6	2	1	0.74	0.98	0.74	0.94	—	—
	4	4.6	5	6.5	0.8	3	1.5	0.65	5.6	1.3	6.4	3.1	8.7
	5	5.6	6	8	1	4	2	2.8	6.3	2.7	8.0	5.1	13.5
	6	6.6	7	9	1.6	5	2.5	2.95	9.6	1.15	10.2	5.3	16.5
	8	8.6	9	12	1.9	6.35	3	6.5	11.7	6.15	17.2	8	28
10	10.6	11.5	14.5	2.4	8	3	9	15	2.1	18.8	13.5	30.5	

Part Number Example

Part Number: PFSSN4

Ⓛ Recommended Diameter of Mounting Hole D₁₅^{+0.13}_{-0.08}
Ⓛ Use adhesive when installing.

Press-Fit Plungers – Roller

Type	Body Material	Main Ball Material	Sub Ball Material	Spring	Operating Temperature
PFPR	Polyacetal	Polyacetal	440C Stainless Steel	631J1 Stainless Steel	-30~80°C

The combination structure of the main ball and the sub ball helps smooth rotation of the balls.

Part Number Type	D	D ₁	D ₂	L	S	L ₁	d	A	B	E	C	Allowable Load (N)		
												min.	min. -0.1 mm	max.
PFPR	7	9	—	7.5	1.5	1	4.76	7.5	1	1.5	0.8	0	0.1	2
	9	11	8.4	10	1.7	1	5.56	7	1.2	2.5	3	0	0.2	4
	13	15	12.4	15	2.8	1	8.73	8.5	1.5	3	1	0	0.3	7
	15	17	14.7	16.5	3.5	1.5	10.32	10.5	3.5	6.4	1	0	0.3	11
	20	22	19.4	22.5	5.2		15.88	13.5	5.3			0	0.3	14
	24	26	23.4	29	6.6		19.05		6.4			0	0.3	21

Part Number Example

Part Number: PFPR15

Ⓛ Recommended Diameter of Mounting Hole D₁₈

Ball Buttons – Tapped

Type	Material	Hardness	Surface Treatment
TBBT	W1-9 Tool Steel	55~60 HRC min.	Electroless Nickel Plating

Ⓛ When using it with a ball plunger, select the same M.

Part Number Type	M (Course)	B	L	C	T	R	d	Part Number Example	
								Part Number	Part Number
TBBT Coarse	4	7	5	8	2	8.4	1.5	TBBT	TBBT6
	5	8	6	9	2	10.2	2		
	6	10	8	12	2	18	2		
	8	13	10	15	3	27.6	3		
	10	17	12	20	3	48.5	4		
	12	19	15	22	3	57.8	5		