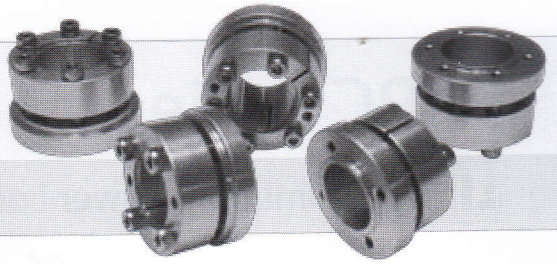
LIMA

Power Lock





Power Lock SAPC Series



LIMA Aluminium Power Lock

Features

1. Aluminum Material

It is important to reduce the moment of inertia for high speed servo motor controlled positioning. It is possible by using the suitable aluminum power lock to realize low moment of inertia with high speed.

2. Suitable for Aluminum Pulley

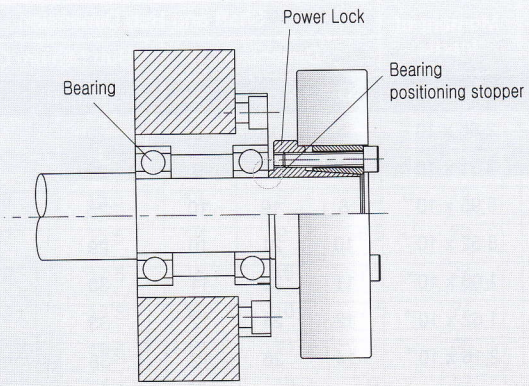
There was slipping problem with servo motor with timing pulley driving caused by mismatch of hub diameter, which ordinal frictional connection unit has high surface pressure. SAPC series are limited for servo motor torque and reduce the surface pressure to bore by reducing the screws.

3. New suggestion Bearing positioning construction

Bearing construction is on Power Lock. Bearing positioning stopper is unnecessary

4. Easy operation for installation positioning

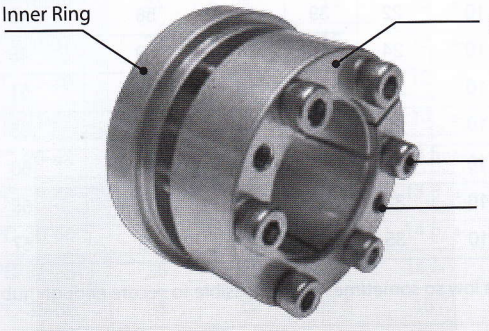
We have been suggested to leave the 1mm space for the installation before to concern the uninstall situation. However SAPC series provide smooth uninstall operation by positioning stopper. Also positioning is easy with it.





※ Be careful for deciding the hub outer diameter with aluminum alloy strength, which may modulus of direct elasticity be low.
※ Contact us for the combination of aluminum alloy and steel shaft installation with over 80 °C circumstances. It may cause of torque reduction at high temperature

Structure & Material

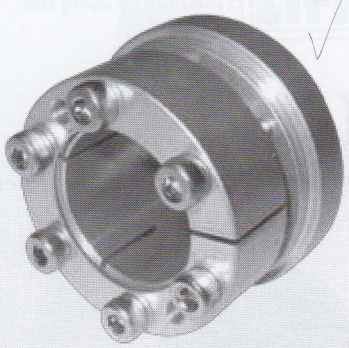


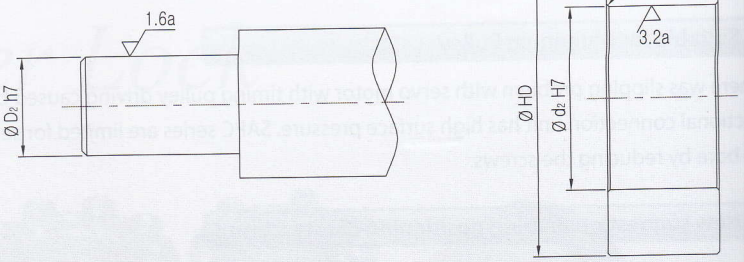
	Material	Surface Treatment
Inner Ring	Aluminum Alloy	Alumite
Outer Ring	Aluminum Alloy	Alumite
Locking Bolt	SCM 435	Electroless Nickel Coating

SAPC Series

LIMA Aluminium Power Lock

Specification





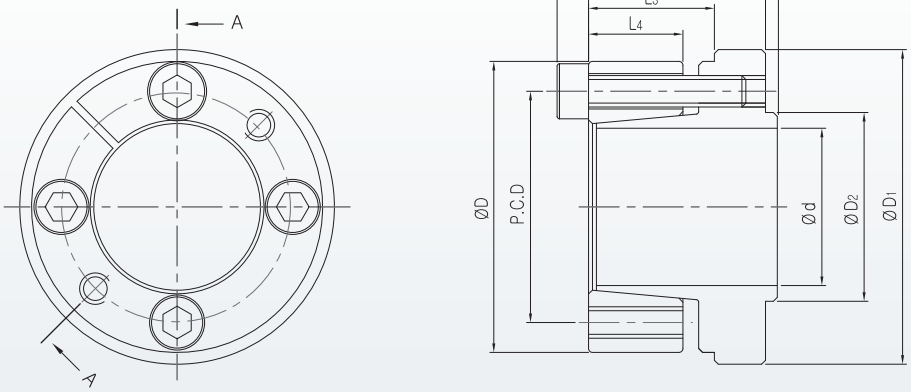
Shaft and Hub Dimension

Model No.	Max Allowance Torque (N.m)	Allowance Trust Load (kN)	Surface pressure		Moment of Inertia	Shaft and Hub Dimension				
						Dimension			Hub Minium OD (HD)	
			Shaft(N/mm²)	Hub(N/mm²)	(kg/m²)	D_2	d_2	HL	Aluminum	S45C
SAPC-5-16	2.5	1.00	121	35	2.65×10^{-7}	5	16	9	20	19
SAPC-6-17	4	1.33	151	49	3.31×10^{-7}	6	17	9	23	21
SAPC-8-19	6	1.51	129	51	5.95×10^{-7}	8	19	10	26	24
SAPC-10-21	8	1.63	104	46	8.52×10^{-7}	10	21	10	29	26
SAPC-11-22	9	1.66	88	41	1.08×10^{-6}	11	22	11	30	26
SAPC-12-24	12	1.99	89	42	1.62×10^{-6}	12	24	12	33	29
SAPC-14-26	18	2.56	91	47	2.16×10^{-6}	14	26	12	38	31
SAPC-15-28	25	3.34	79	38	3.18×10^{-6}	15	28	13	40	33
SAPC-16-29	26	3.34	74	37	3.50×10^{-6}	16	29	13	41	34
SAPC-17-30	27	3.18	66	34	4.23×10^{-6}	17	30	14	42	35
SAPC-18-31	29	3.23	78	41	4.75×10^{-6}	18	31	14	46	36
SAPC-19-32	33	3.50	74	40	5.32×10^{-6}	19	32	14	49	37
SAPC-20-37	54	5.47	92	46	1.06×10^{-5}	20	37	16	54	44
SAPC-22-39	65	5.94	83	43	1.33×10^{-5}	22	39	16	56	46
SAPC-24-41	85	7.07	84	46	1.67×10^{-5}	24	41	18	59	48
SAPC-25-42	110	8.77	97	53	2.08×10^{-5}	25	42	19	64	51
SAPC-28-45	125	8.91	101	57	2.65×10^{-5}	28	45	19	72	55
SAPC-30-50	180	12.08	99	56	4.46×10^{-5}	30	50	20	76	60
SAPC-32-53	210	13.13	104	59	5.55×10^{-5}	32	53	20	81	65
SAPC-35-56	230	13.13	92	54	7.61×10^{-5}	35	56	22.5	85	67

※ Hub outer diameter with aluminum alloy strength, which may modulus of direct elasticity is low so sometimes it is impossible to secure enough hub outer diameter with aluminum alloy strength.

※ Transmission reduce 15-20% about keyway type because of reduction of contact surface

Dimension



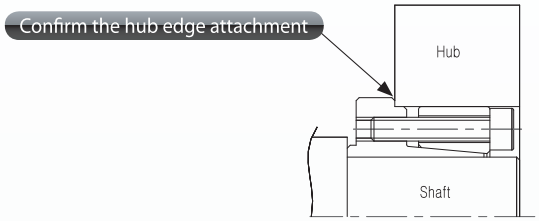
A-A Cross section

Model No. (dxD)	Dimension (mm)							Attachment Bolt			Mess (g)
	L	L_2	L_3	L_4	D_1	D_2	P.C.D	Size	Quantity	Attachment Torque (N.m)	
SAPC-5-16	15.5	13	9	6.5	19	7.5	11.1	M2.5	2	1.0	7
SAPC-6-17	15.5	13	9	6.5	20	8.5	12.1	M2.5	3	1.0	8
SAPC-8-19	17.5	15	10	7.5	22	11	14.1	M2.5	4	1.0	11
SAPC-10-21	17.5	15	10	7.5	24	13	16.1	M2.5	4	1.0	12
SAPC-11-22	19.5	17	11	8	25	14	17.1	M2.5	4	1.0	14
SAPC-12-24	20.5	18	12	9	27	15	19.2	M2.5	5	1.0	17
SAPC-14-26	20.5	18	12	9	29	17	21.2	M2.5	6	1.0	19
SAPC-15-28	23	20	13	9.5	31	18.5	22.2	M3	4	1.9	24
SAPC-16-29	23	20	13	9.5	32	19.5	23.2	M3	4	1.9	25
SAPC-17-30	24	21	14	10	33	20.5	24	M3	4	1.9	28
SAPC-18-31	24	21	14	10	34	21.5	25	M3	5	1.9	29
SAPC-19-32	24	21	14	10	35	22.5	26	M3	5	1.9	30
SAPC-20-37	28	24	16	12	40	24	29.4	M4	4	3.9	47
SAPC-22-39	28	24	16	12	42	26	31.4	M4	4	3.9	52
SAPC-24-41	30	26	18	13	45	28	33.3	M4	5	3.9	57
SAPC-25-42	32	28	19	13.5	46	29	34.3	M4	6	3.9	67
SAPC-28-45	32	28	19	13.5	49	32	37.3	M4	7	3.9	73
SAPC-30-50	35	30	20	14.5	55	34.5	41.3	M5	5	8.8	101
SAPC-32-53	35	30	20	14.5	58	36.5	43.3	M5	6	8.8	112
SAPC-35-56	38	33	22.5	16	62	40	46.6	M5	6	8.8	134

Caution of installation

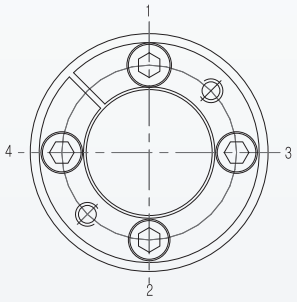
1. Please be clean installation inner diameter surface of power lock.

2. After install of power lock to shaft, and insert to the hub, which processed in selected dimension. Confirm the hub edge perfectly attached to flange. Confirm the depth by depth gage or caliper if it is difficult to judge by sight. If there is a gap at connection, power lock flange may be deformed and it is impossible to use deformed product again.

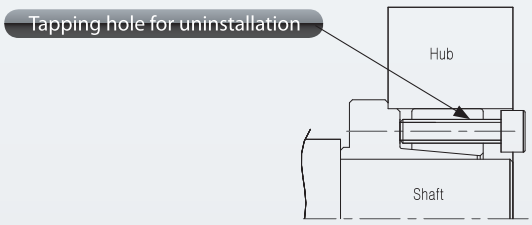


3. The inner ring taper and outer ring taper are stacking together by transportation and hard to insert the shaft and hub, loose the locking screws and disassemble the taper pats of power lock by using disassemble screw.

4. Tighten slowly and evenly in diagonal direction by 1/4 tightening torque after checking there are no gap between flange edge and hub. Next please increase to tightening torque, and finally please tighten by tightening torque of catalog. Also confirm the tightening torque is right for all screws and if there is not loosen bolt.



5. When you disassemble the power lock, please disassemble slowly by loosening screw in diagonal direction. If you don't disassemble step by step by using disassemble bolt hole, inner ring is deformed and it is impossible to use deformed product again.



Installation Guide

Torque

Calculate the torque form r.p.m and motor torque line when you found motor capacity, there is reduction gear or not, and reduction gear rate. If there is no information of motor, then please use the standard formula below.

$$Tmax = \frac{9550 \hat{} Pmax}{N} \times R \times K$$

Tmax : Generated Torque [N · m]
Pmax : Motor Capacity [kW]
N : Rotation Speed [rpm]
R : Reverse number of reduction gear
K : Safe Factor

Factor of Load		K
Small inertia	Application is under 60% of motor rated torque.	1.5~2.0
Medium inertia	Long time for speeding up and reducing, or reversing operation is limited.	2.0~3.0
Large inertia	Rapid speed reduction and impact or frequent reversing.	3.0~5.0

Thrust Load

Calculate by using general formula below when it has toque and thrust load together and compare with allowable maximum torque capacity of Power Lock

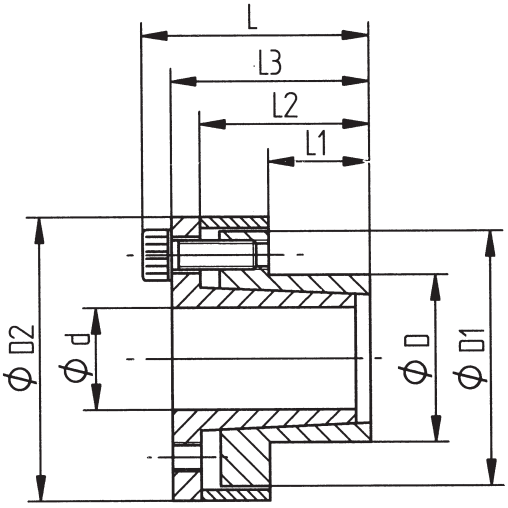
$$Ts = \sqrt{\left(\frac{9550 \hat{} Pmax}{N}\right)^2 + \left(\frac{H \hat{} d}{2000}\right)^2} \hat{} K$$

Ts : Combined Load [N · m]
H : Thrust Load [N]
d : Inner Size [mm]
K : Safe Factor

KBS 80

Spannsatz
Locking Device

Die empfohlenen Bearbeitungstoleranzen für die Druckflächen sind:
Welle h 8 Nabe H 8
Recommended machining tolerances:
Shaft h 8 Hub H 8



BESTELLBEISPIEL:
ORDER CODE:

Bei einer Welle mit ø 95 mm und Drehmoment 11000 Nm
For a shaft with d=95 mm and a transmissible torque value lower than or equal to 11000 Nm

KBS 80 - 95 x 120

Innen/ Außen Ø Inner/ outer Ø	Dreh-moment Torque	Abmessungen Dimensions				Flansch Flange	Flansch Flange	Flächenpressung an Surface pressure on		Spannschrauben Screws			Gewicht Mass
	T	L	L 1	L 2	L 3	Außenkegel outer	Innenkegel inner	Welle Shaft Pw	Nabe Hub Pn	n	Size	TA	
d x D	Nm	mm	mm	mm	mm	D1	D2	N/mm²	N/mm²	St.	DIN 912	Nm	kg
6 x 14	12	25.5	10	18.5	22.5	23	25	190	80	3	M3x10	2.2	0.02
8 x 15	29	29.5	12	21.5	25.5	24	27	205	110	3	M4x12	5	0.06
9 x 16	31	31.5	14	23.5	27.5	25	28	150	85	3	M4x12	5	0.065
10 x 16	35	31.5	14	23.5	27.5	25	28	140	85	3	M4x12	5	0.08
11.x 18	52	31.5	14	23.5	27.5	28	32	170	105	4	M4x12	5	0.09
12 x 18	58	31.5	14	23.5	27.5	28	32	150	100	4	M4x12	5	0.09
14 x 23	69	31.5	14	23.5	27.5	35	39	140	80	4	M4x12	5	0.11
15 x 24	170	42.5	16	29.5	36.5	40	45	158	98	4	M6x18	17	0.21
16 x 24	180	42.5	16	29.5	36.5	40	45	148	98	4	M6x18	17	0.22
18 x 26	200	45.5	19	32.5	39.5	42	47	180	125	4	M6x18	17	0.22
19 x 27	210	45.5	19	32.5	39.5	43	49	170	120	4	M6x18	17	0.25
20 x 28	220	45.5	19	21.5	39.5	44	50	160	115	4	M6x18	17	0.25
22 x 32	250	52.5	26	39.5	46.5	48	54	115	80	4	M6x18	17	0.30
24 x 34	395	52.5	26	39.5	46.5	50	56	146	102	6	M6x18	17	0.35
25 x 34	410	52.5	26	39.5	46.5	50	56	140	102	6	M6x18	17	0.35
28 x 39	465	52.5	25.5	39.5	46.5	55	61	135	98	6	M6x18	17	0.45
30 x 41	510	52.5	25.5	39.5	46.5	57	62	127	90	6	M6x18	17	0.45
32 x 43	705	52.5	25.5	39.5	46.5	59	65	146	108	8	M6x18	17	0.45
35 x 47	790	58.5	31.5	45.5	52.5	62	69	105	80	8	M6x18	17	0.55
38 x 50	860	58.5	31.5	45.5	52.5	66	72	100	76	8	M6x18	17	0.60
40 x 53	900	58.5	31.5	45.5	52.5	69	75	96	72	8	M6x18	17	0.65
42 x 55	940	58.5	31.5	45.5	52.5	71	78	90	70	8	M6x18	17	0.90
45 x 59	1840	79	45	62.5	71	80	86	110	85	8	M8x22	41	1.10
48 x 62	2000	79	45	62.5	71	81	87	105	80	8	M8x22	41	1.10
50 x 65	2100	79	45	62.5	71	86	92	100	75	8	M8x22	41	1.25
55 x 71	2580	89	55	72.5	81	92	98	85	65	9	M8x22	41	1.50
60 x 77	2800	89	55	72.5	81	98	104	75	60	9	M8x22	41	1.60
65 x 84	3050	89	55	72.5	81	105	111	70	55	9	M8x22	41	1.90
70 x 90	5250	106.5	65	86.5	96.5	113	119	90	70	9	M10x25	83	2.85
75 x 95	5600	106.5	65	86.5	96.5	119	126	80	65	9	M10x25	83	2.95
80 x 100	8000	106.5	65	86.5	96.5	125	131	100	80	12	M10x25	83	3.30
85 x 106	8500	106.5	65	86.5	96.5	131	137	85	75	12	M10x25	83	3.60
90 x 112	9000	106.5	65	86.5	96.5	137	144	80	75	12	M10x25	83	3.90
95 x 120	11000	106.5	65	86.5	96.5	142	149	100	80	14	M10x25	83	4.30
100 x 125	15000	106.5	65	86.5	96.5	147	154	120	95	18	M10x25	83	4.65
110 x 140	16000	140	90	114	128	172	180	80	65	12	M12x35	154	8.20
120 x 155	17500	140	90	114	128	187	198	70	55	12	M12x35	154	10.50

PSL-K

Single bolt tightening | Center ring | No axial direction displacement *1 | Basic antirust | Stain less | LIMA

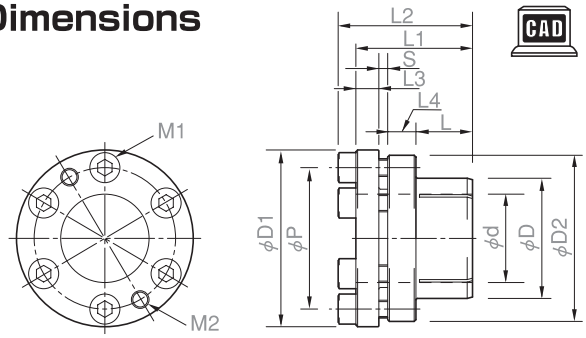
* *1: See Mounting and Dismounting (P53).

Specification

Model	Max. permissible torque [N·m]	Max. permissible thrust power [N]	Shaft-side surface pressure [N/mm²]	Hub-side surface pressure [N/mm²]	Bolt tightening torque [N·m]	Moment of inertia [kg·m²]	Mass [kg]	Price
PSL-K-6	5.9	1950	160	80	2	2.5×10^{-6}	0.037	—
PSL-K-6.35	6.2	1950	150	80	2	2.5×10^{-6}	0.036	—
PSL-K-7	6.8	1950	130	80	2	2.5×10^{-6}	0.035	—
PSL-K-8	23	5900	290	160	4	5.0×10^{-6}	0.056	—
PSL-K-9	26	5900	260	160	4	5.0×10^{-6}	0.053	—
PSL-K-9.525	28	5900	250	130	4	7.8×10^{-6}	0.069	—
PSL-K-10	29	5900	230	130	4	7.7×10^{-6}	0.068	—
PSL-K-11	32	5900	210	130	4	7.6×10^{-6}	0.065	—
PSL-K-12	47	7800	260	160	4	10×10^{-6}	0.076	—
PSL-K-12.7	50	7800	250	140	4	10×10^{-6}	0.073	—
PSL-K-14	55	7800	220	140	4	13×10^{-6}	0.083	—
PSL-K-15	95	12700	290	190	8	24×10^{-6}	0.125	—
PSL-K-16	100	12700	270	180	8	27×10^{-6}	0.130	—
PSL-K-17	110	12700	260	170	8	33×10^{-6}	0.145	—
PSL-K-18	110	12700	240	170	8	32×10^{-6}	0.140	—
PSL-K-19	120	12700	230	160	8	40×10^{-6}	0.155	—
PSL-K-20	130	12700	220	160	8	39×10^{-6}	0.150	—
PSL-K-22	210	19000	250	170	8	65×10^{-6}	0.210	—
PSL-K-24	230	19000	230	160	8	76×10^{-6}	0.220	—
PSL-K-25	240	19000	220	160	8	75×10^{-6}	0.210	—
PSL-K-28	380	27000	220	160	14	203×10^{-6}	0.390	—
PSL-K-30	400	27000	210	150	14	230×10^{-6}	0.400	—
PSL-K-32	430	27000	190	140	14	260×10^{-6}	0.425	—
PSL-K-35	630	36000	210	150	14	366×10^{-6}	0.525	—
PSL-K-40	720	36000	160	120	14	511×10^{-6}	0.599	—

* The maximum permissible torque is the value when the thrust power is zero, and the maximum permissible thrust power is the value when the torque is zero.

Dimensions



CAD

Ordering Information

PSL - K - □

Size

Former model ETP - K - □

Unit [mm]

Model	d	D	D1	D2	P	L	L1	L2	L3	L4	S	M1	M2	CAD file No.
PSL-K-6	6	12	25	23	17	10	20	24	3.5	5	1.5	2-M4×8	2-M4	PSL-K01
PSL-K-6.35	6.35	12	25	23	17	10	20	24	3.5	5	1.5	2-M4×8	2-M4	PSL-K02
PSL-K-7	7	12	25	23	17	10	20	24	3.5	5	1.5	2-M4×8	2-M4	PSL-K03
PSL-K-8	8	15	28	26	20	12	24	28	5	5	2	3-M4×10	3-M4	PSL-K04
PSL-K-9	9	15	28	26	20	12	24	28	5	5	2	3-M4×10	3-M4	PSL-K05
PSL-K-9.525	9.525	18	31	29	23	12	24	28	5	5	2	3-M4×10	3-M4	PSL-K06
PSL-K-10	10	18	31	29	23	12	24	28	5	5	2	3-M4×10	3-M4	PSL-K07
PSL-K-11	11	18	31	29	23	12	24	28	5	5	2	3-M4×10	3-M4	PSL-K08
PSL-K-12	12	20	33	31	25	12	24	28	5	5	2	4-M4×10	2-M4	PSL-K09
PSL-K-12.7	12.7	20	33	31	25	12	24	28	5	5	2	4-M4×10	2-M4	PSL-K10
PSL-K-14	14	22	35	33	27	12	24	28	5	5	2	4-M4×10	2-M4	PSL-K11
PSL-K-15	15	23	39	36	29	14	29	34	6	7	2	4-M5×12	2-M5	PSL-K12
PSL-K-16	16	24	40	37	30	14	29	34	6	7	2	4-M5×12	2-M5	PSL-K13
PSL-K-17	17	26	42	39	32	14	29	34	6	7	2	4-M5×12	2-M5	PSL-K14
PSL-K-18	18	26	42	39	32	14	29	34	6	7	2	4-M5×12	2-M5	PSL-K15
PSL-K-19	19	28	44	41	34	14	29	34	6	7	2	4-M5×12	2-M5	PSL-K16
PSL-K-20	20	28	44	41	34	14	29	34	6	7	2	4-M5×12	2-M5	PSL-K17
PSL-K-22	22	32	48	45	38	16	33	38	6.5	8	2.5	6-M5×14	2-M5	PSL-K18
PSL-K-24	24	34	50	47	40	16	33	38	6.5	8	2.5	6-M5×14	2-M5	PSL-K19
PSL-K-25	25	34	50	47	40	16	33	38	6.5	8	2.5	6-M5×14	2-M5	PSL-K20
PSL-K-28	28	39	62	59	47	20	39	45	7.5	9	2.5	6-M6×16	2-M6	PSL-K21
PSL-K-30	30	41	64	61	49	20	39	45	7.5	9	2.5	6-M6×16	2-M6	PSL-K22
PSL-K-32	32	43	66	63	51	20	39	45	7.5	9	2.5	6-M6×16	2-M6	PSL-K23
PSL-K-35	35	47	70	67	55	22	43	49	8	10	3	8-M6×18	2-M6	PSL-K24
PSL-K-40	40	53	76	73	61	22	43	49	8	10	3	8-M6×18	2-M6	PSL-K25

* L1, L2 and S are the measurements before the POSI LOCK is fixed.