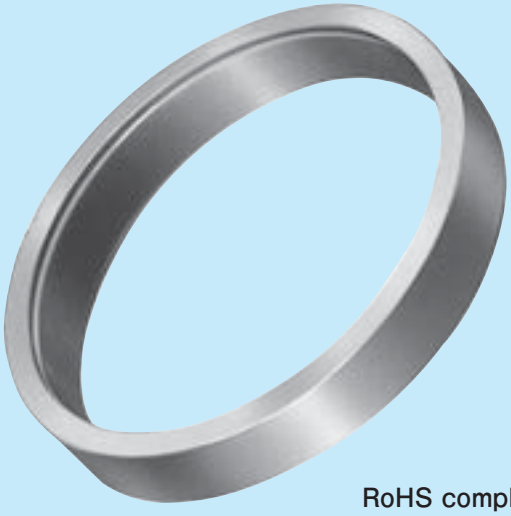
Power-Lock® EL Series

Sizes：φ10～φ150
Shaft tolerances：（φ10～φ38）h6
（φ40～φ150）h8
Hub bore tolerances：（φ10～φ38）H7
（φ40～φ150）H8
Surface roughness：Ra0.8



RoHS compliant.

Features

1 Space Saving
Extremely compact and lightweight. Excellent for applications where installation space is a concern.

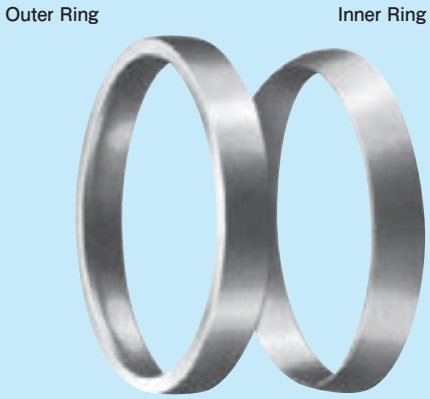
2 Various Design Configurations
No requirements on the size and number of bolts to be tightened or even the number of ELs to be installed. Use as necessary depending on your design needs.

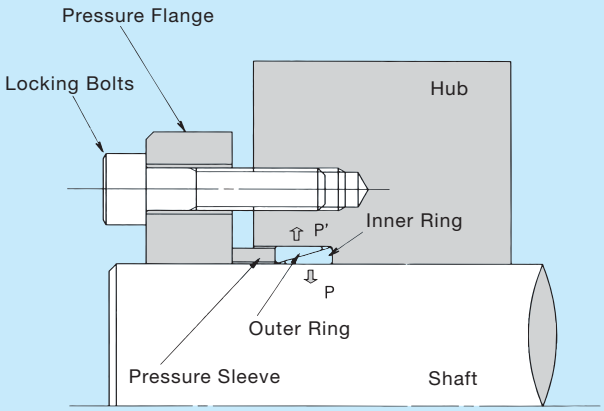
3 Dynamic Balance
The no-slit, complete ring design offers a dynamic balance.

4 Tight Seal
Completely sealed with high pressure so that they may be used in contaminated environments.

5 Simple Construction
Simply constructed with just an inner and an outer ring.

Parts



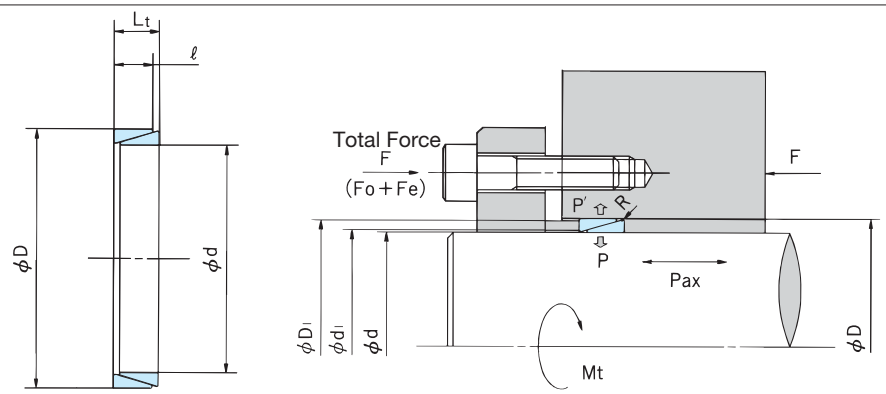


Reference Number System

PL 010 X 013 E

- E — Series
- 013 — Outer Diameter mm
- 010 — Shaft Diameter mm
- PL — Power-Lock

Model Numbers and Specifications



※ To simplify your calculations, the figures provided below are based on the maximum transmissible torque and thrust at shaft Contact Pressure, P=98Mpa{10Kgf/mm²}.
When other Fe values apply, calculate specifications proportionally.

* Note) 4

Model No. d X D Shaft Diameter X Outer Diameter mm	Dimensions mm Lt	ℓ	Preload Force Fo[1] kN	{kgf}	Actual Locking Force [Fe][2] kN	{kgf}	Transmissible Torque [Mt][3] N・m	{kgf・m}	Transmissible Thrust [Pax][3] kN	{kgf}	Contact Pressure Shaft P MPa	{kgf/mm²}	Hub P' MPa	{kgf/mm²}	Mass g
PL 010 X 013 E	4.5	3.7	5.9	600	6.2	630	6.9	0.70	1.37	140	98	10	75	7.7	1.82
PL 011 X 014 E	4.5	3.7	5.4	553	6.7	690	8.2	0.84	1.50	153	98	10	77	7.9	2.08
PL 012 X 015 E	4.5	3.7	5.0	510	7.4	750	9.8	1	1.64	167	98	10	78	8.0	2.14
PL 013 X 016 E	4.5	3.7	4.7	480	8.0	820	11.6	1.18	1.77	181	98	10	79	8.1	2.30
PL 014 X 018 E	6.3	5.3	8.1	830	12.3	1260	19.2	1.96	2.74	280	98	10	76	7.8	4.83
PL 015 X 019 E	6.3	5.3	10.3	1050	13.2	1350	22.1	2.25	2.94	300	98	10	77	7.9	5.13
PL 016 X 020 E	6.3	5.3	9.8	1000	14.1	1440	25.1	2.56	3.14	320	98	10	78	8	5.43
PL 017 X 021 E	6.3	5.3	9.2	940	15.0	1530	28.3	2.89	3.33	340	98	10	79	8.1	5.73
PL 018 X 022 E	6.3	5.3	8.9	910	15.9	1620	31.8	3.24	3.53	360	98	10	80	8.2	6.04
PL 019 X 024 E	6.3	5.3	12.3	1260	16.8	1710	35.3	3.6	3.72	380	98	10	77	7.9	7.89
PL 020 X 025 E	6.3	5.3	11.9	1210	17.6	1800	39.2	4	3.92	400	98	10	78	8	8.26
PL 022 X 026 E	6.3	5.3	8.9	910	19.4	1980	47.0	4.8	4.31	440	98	10	83	8.5	7.24
PL 024 X 028 E	6.3	5.3	8.2	840	21.2	2160	56.8	5.8	4.70	480	98	10	84	8.6	7.85
PL 025 X 030 E	6.3	5.3	9.7	990	22.1	2250	60.8	6.2	4.90	500	98	10	81	8.3	10.1
PL 028 X 032 E	6.3	5.3	7.2	730	24.7	2520	76.4	7.8	5.49	560	98	10	86	8.8	9.05
PL 030 X 035 E	6.3	5.3	8.3	850	26.5	2700	88.2	9	5.88	600	98	10	84	8.6	11.9
PL 032 X 036 E	6.3	5.3	7.7	790	28.2	2880	100	10.2	6.27	640	98	10	87	8.9	10.3
PL 035 X 040 E	7	6	9.9	1010	34.9	3560	136	13.9	7.74	790	98	10	86	8.8	15.5
PL 036 X 042 E	7	6	11.4	1160	35.9	3660	144	14.7	7.94	810	98	10	84	8.6	19
PL 038 X 044 E	7	6	10.9	1110	37.9	3870	160	16.3	8.43	860	98	10	84	8.6	20
PL 040 X 045 E	8	6.6	13.5	1380	44.1	4500	195	19.9	9.75	995	98	10	87	8.9	20.2
PL 042 X 048 E	8	6.6	15.3	1560	46.1	4700	216	22	10.3	1050	98	10	86	8.8	25
PL 045 X 052 E	10	8.6	25.6	2610	64.7	6600	321	32.8	14.3	1460	98	10	85	8.7	40.3
PL 048 X 055 E	10	8.6	24.1	2460	68.6	7000	367	37.4	15.3	1560	98	10	85	8.7	42.8
PL 050 X 057 E	10	8.6	23.2	2370	71.5	7300	397	40.5	15.9	1620	98	10	86	8.8	44.5
PL 055 X 062 E	10	8.6	21.3	2170	78.4	8000	480	49	17.4	1780	98	10	87	8.9	48.6
PL 056 X 064 E	12	10.4	28.6	2920	97.0	9900	603	61.5	21.6	2200	98	10	86	8.8	68.9
PL 060 X 068 E	12	10.4	26.9	2740	104	10600	692	70.6	23.0	2350	98	10	86	8.8	73.5
PL 063 X 071 E	12	10.4	25.6	2610	109	11100	764	78	24.2	2470	98	10	87	8.9	77
PL 065 X 073 E	12	10.4	24.9	2540	113	11500	813	83	25.0	2550	98	10	87	8.9	79.2
PL 070 X 079 E	14	12.2	30.4	3100	142	14500	1110	113	31.6	3220	98	10	87	8.9	113
PL 071 X 080 E	14	12.2	30.0	3060	144	14700	1140	116	32.0	3270	98	10	87	8.9	114
PL 075 X 084 E	14	12.2	33.7	3440	152	15500	1260	129	33.8	3450	98	10	87	8.9	120
PL 080 X 091 E	17	15	47.1	4810	200	20400	1770	181	44.1	4500	98	10	86	8.8	193
PL 085 X 096 E	17	15	44.6	4550	212	21600	2000	204	47.0	4800	98	10	86	8.8	204
PL 090 X 101 E	17	15	42.2	4310	224	22900	2240	229	50.0	5100	98	10	87	8.9	215
PL 095 X 106 E	17	15	40.1	4090	237	24200	2500	255	52.9	5400	98	10	88	9	227
PL 100 X 114 E	21	18.7	59.8	6100	311	31700	3450	352	69.6	7100	98	10	86	8.8	379
PL 110 X 124 E	21	18.7	64.1	6540	342	34900	4170	425	76.4	7800	98	10	87	8.9	415
PL 120 X 134 E	21	18.7	59.0	6020	373	38100	4950	505	83.3	8500	98	10	88	9	450
PL 130 X 148 E	28	25.3	93.8	9570	547	55800	7840	800	122	12400	98	10	86	8.8	850
PL 140 X 158 E	28	25.3	87.5	8930	589	60100	9110	930	131	13350	98	10	87	8.9	910
PL 150 X 168 E	28	25.3	82.0	8370	631	64380	10500	1070	140	14300	98	10	87	8.9	970

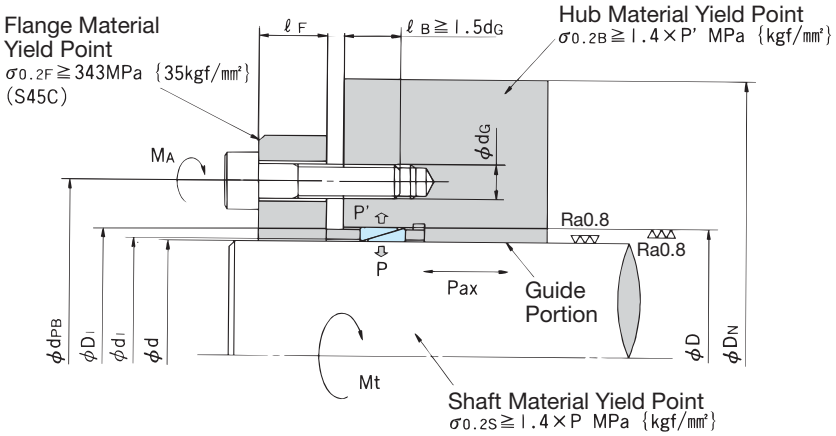
Notes) 0. Stocked models are in bold.
1. Fo is the preload force required to achieve a 0 clearance fit between the rings and the shaft or hub, when installing a "Power-Lock" EL Series shaft-hub locking device.
2. [Fe] is the actual locking force that generates torque or Contact Pressure. Fo and [Fe] are added to calculate the total force. Therefore, F=Fo + [Fe].
3. [Mt] indicates torque at 0 transmissible thrust while [Pax] indicates transmissible thrust at 0 torque. If transmissible torque and thrust apply simultaneously, calculate and compare the combined value with the transmissible torque provided in the table.
4. Dimensions when this product is attached to the shaft and hub.

Recommended Designs (1) (Hub-pressure flange mounting)

■ Shaft Diameter (d) and Hub Tap Diameter (D) Tolerances

Shaft Diameter (d)	Shaft Diameter Tolerance (d)	Hub Bore Tolerance (D)
φ10~φ38	h6	H7
φ40~φ150	h8	H8

- Refer to Pressure System Designs for d_1 and D_1 measurements.
- Determine the length of a guide portion based on the required centering accuracy. (d/2 or above is most commonly used.)



Notes) 1. Tightening torque or Ma values shown in the table below are based on 10.9 strength bolts. Use 10.9 or 12.9 strength bolts accordingly.

2. Use the following formula to calculate transmissible thrust, Pax. $Pax = \frac{2000 \times Mt}{d}$ (Mt : Transmissible Torque N·m{kgf·m}, d : Shaft Diameter mm)

3. For pressure flange designs, see Pressure System Designs on page 73.

Model No. d X D Shaft Diameter X Outer Diameter mm	Locking Bolts				Transmissible Torque Mt								Contact Pressure				Pressure Flange	
					Number of EL Series Shaft-hub Locking Devices								Shaft P		Hub P′		PCD DIA	Thickness
					1		2		3		4							
	Quantity	Size dG	Tightening Torque MA															
			N·m	{kgf·m}	N·m	{kgf·m}	N·m	{kgf·m}	N·m	{kgf·m}	N·m	{kgf·m}	MPa	{kgf/mm²}	MPa	{kgf/mm²}	dPB	ℓF
PL 010 X 013 E	3	M 4	4.0	0.41	11.3	1.15	17.4	1.78	20.9	2.13	22.5	2.30	161	16.4	123	12.6	25	8
PL 011 X 014 E	3	M 4	4.0	0.41	12.8	1.31	19.9	2.03	23.7	2.42	25.6	2.62	153	15.6	120	12.3	26	8
PL 012 X 015 E	3	M 4	4.0	0.41	14.7	1.50	22.7	2.32	27.2	2.78	29.4	3.00	147	15.0	118	12.0	27	8
PL 013 X 016 E	3	M 4	4.0	0.41	16.3	1.66	25.3	2.58	30.1	3.07	32.5	3.32	138	14.1	113	11.5	28	8
PL 014 X 018 E	4	M 4	4.0	0.41	20.6	2.10	31.9	3.26	38.2	3.90	41.2	4.20	105	10.7	81	8.3	30	8
PL 015 X 019 E	6	M 4	4.0	0.41	36.3	3.70	56.3	5.74	67.6	6.90	72.5	7.40	161	16.4	126	12.9	31	8
PL 016 X 020 E	6	M 4	4.0	0.41	39.2	4.00	61.7	6.30	73.5	7.50	79.4	8.10	155	15.8	123	12.6	32	8
PL 017 X 021 E	6	M 4	4.0	0.41	43.1	4.40	66.6	6.80	79.4	8.10	86.2	8.80	149	15.2	121	12.3	33	8
PL 018 X 022 E	6	M 4	4.0	0.41	46.1	4.70	71.5	7.30	85.3	8.70	92.1	9.40	141	14.4	116	11.8	34	8
PL 019 X 024 E	6	M 4	4.0	0.41	41.2	4.20	64.7	6.60	76.4	7.80	83.3	8.50	116	11.8	91	9.3	36	8
PL 020 X 025 E	6	M 4	4.0	0.41	45.1	4.60	69.6	7.10	83.3	8.50	90.2	9.20	112	11.4	89	9.1	37	8
PL 022 X 026 E	6	M 4	4.0	0.41	55.9	5.70	87.2	8.90	104	10.6	112	11.4	117	11.9	99	10.1	38	8
PL 024 X 028 E	6	M 4	4.0	0.41	63.7	6.50	99.0	10.1	119	12.1	128	13.1	111	11.3	95	9.7	40	8
PL 025 X 030 E	6	M 4	4.0	0.41	61.7	6.30	95.1	9.7	114	11.6	123	12.6	99	10.1	82	8.4	42	8
PL 028 X 032 E	6	M 4	4.0	0.41	77.4	7.90	120	12.2	142	14.5	154	15.7	99	10.1	86	8.8	44	8
PL 030 X 035 E	8	M 4	4.0	0.41	115	11.7	177	18.1	213	21.7	229	23.4	127	13.0	109	11.1	47	8
PL 032 X 036 E	8	M 4	4.0	0.41	123	12.6	192	19.6	229	23.4	248	25.3	122	12.4	108	11.0	50	8
PL 035 X 040 E	6	M 5	8.3	0.85	167	17.0	259	26.4	309	31.5	333	34.0	120	12.2	105	10.7	55	10
PL 036 X 042 E	6	M 5	8.3	0.85	166	16.9	257	26.2	307	31.3	331	33.8	113	11.5	97	9.9	57	10
PL 038 X 044 E	6	M 5	8.3	0.85	175	17.9	272	27.8	325	33.2	352	35.9	108	11.0	93	9.5	59	10
PL 040 X 045 E	6	M 6	13.7	1.4	268	27.3	416	42.4	496	50.6	536	54.7	134	13.7	120	12.2	61	12
PL 042 X 048 E	6	M 6	13.7	1.4	275	28.1	426	43.5	510	52.0	549	56.0	125	12.8	110	11.2	64	12
PL 045 X 052 E	8	M 6	13.7	1.4	364	37.1	568	58.0	676	69.0	725	74.0	111	11.3	96	9.8	67	12
PL 048 X 055 E	8	M 6	13.7	1.4	399	40.7	617	63.0	735	75.0	794	81.0	107	10.9	93	9.5	72	12
PL 050 X 057 E	8	M 6	13.7	1.4	419	42.8	647	66.0	774	79.0	843	86.0	104	10.6	91	9.3	73	12
PL 055 X 062 E	10	M 6	13.7	1.4	657	67.0	970	99.0	1150	118	1250	128	127	13.0	113	11.5	78	12
PL 056 X 064 E	6	M 8	34.3	3.5	666	68.0	1040	106	1230	126	1340	137	109	11.1	95	9.7	82	16
PL 060 X 068 E	6	M 8	34.3	3.5	735	75.0	1130	115	1350	138	1460	149	103	10.5	91	9.3	86	16
PL 063 X 071 E	8	M 8	34.3	3.5	1100	112	1710	174	2030	207	2200	224	141	14.4	125	12.8	89	16
PL 065 X 073 E	8	M 8	34.3	3.5	1140	116	1750	179	2100	214	2260	231	136	13.9	122	12.4	91	16
PL 070 X 079 E	10	M 8	34.3	3.5	1540	157	2380	243	2840	290	3070	313	136	13.9	121	12.3	97	16
PL 071 X 080 E	10	M 8	34.3	3.5	1560	159	2410	246	2880	294	3120	318	134	13.7	120	12.2	99	16
PL 075 X 084 E	10	M 8	34.3	3.5	1610	164	2500	255	2980	304	3220	329	124	12.7	111	11.3	102	16
PL 080 X 091 E	8	M10	67.6	6.9	2150	219	3330	340	3970	405	4260	435	119	12.1	104	10.6	111	20
PL 085 X 096 E	8	M10	67.6	6.9	2310	236	3590	366	4260	435	4610	470	114	11.6	101	10.3	116	20
PL 090 X 101 E	10	M10	67.6	6.9	3190	326	4950	505	5930	605	6370	650	139	14.2	124	12.7	121	20
PL 095 X 106 E	10	M10	67.6	6.9	3390	346	5240	535	6270	640	6760	690	133	13.6	120	12.2	126	20
PL 100 X 114 E	12	M10	67.6	6.9	4170	425	6420	655	7740	790	8330	850	118	12.0	103	10.5	134	24
PL 110 X 124 E	10	M12	118	12	5680	580	8820	900	10500	1070	11400	1160	133	13.6	119	12.1	146	24
PL 120 X 134 E	10	M12	118	12	6220	635	9700	990	11600	1180	12400	1270	123	12.6	111	11.3	156	24
PL 130 X 148 E	10	M14	186	19	9110	930	11200	1140	16900	1720	18200	1860	113	11.5	99	10.1	170	28
PL 140 X 158 E	10	M14	186	19	9900	1010	15300	1560	18300	1870	19800	2020	106	10.8	94	9.6	180	28
PL 150 X 168 E	12	M14	186	19	13100	1340	20400	2080	24300	2480	26300	2680	123	12.5	110	11.2	190	28

Recommended Designs (2) (Shaft – pressure flange mounting)

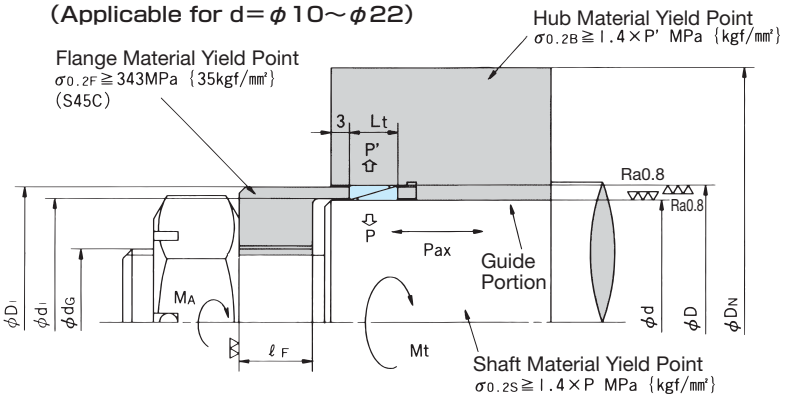
■ Shaft Diameter (d) and Hub Tap Diameter (D) Tolerances

Shaft Diameter (d)	Shaft Diameter Tolerance (d)	Hub Bore Tolerance (D)
φ10~φ38	h6	H7
φ40~φ150	h8	H8

- Refer to Pressure System Designs for d_1 and D_1 measurements.
- Determine the length of a guide portion based on the required centering accuracy. (d/2 or above is most commonly used.)

■ Fastened with a single nut. (Applicable for d=φ10~φ22)

Note) Ensure that the nut does not loosen by conducting an anti-rotation test after installation.



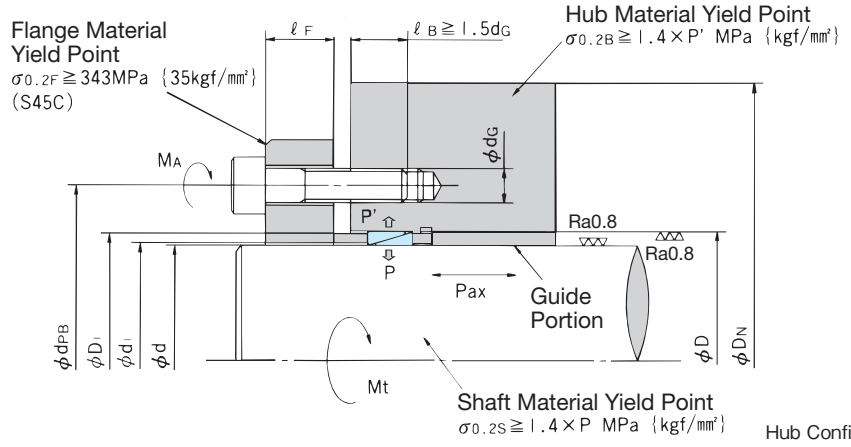
Notes) 1. Tightening torque or Ma values shown in the table below are based on 10.9 strength bolts. Use 10.9 or 12.9 strength bolts accordingly.

2. Use the following formula to calculate transmissible thrust, Pax. $Pax = \frac{2000 \times Mt}{d}$ (Mt : Transmissible Torque N·m{kgf·m}, d : Shaft Diameter mm)

3. For pressure flange designs, see Pressure System Designs on page 73.

Model No. d X D Shaft Diameter X Outer Diameter mm	Locking Bolts				Transmissible Torque Mt								Contact Pressure				Pressure Flange	
					Number of EL Series Shaft-hub Locking Devices								Shaft P		Hub P′		PCD DIA	Thickness
					1		2		3		4							
	Quantity	Size dG	Tightening Torque MA															
			N・m	{kgf・m}	N・m	{kgf・m}	N・m	{kgf・m}	N・m	{kgf・m}	N・m	{kgf・m}	MPa	{kgf/mm²}	MPa	{kgf/mm²}	dPS	ℓF
PL 010 X 013 E	1	M 8	24.5	2.5	11.5	1.17	17.7	1.81	21.2	2.16	22.8	2.33	164	16.7	125	12.8		4
PL 011 X 014 E	1	M 8	24.5	2.5	13.0	1.33	20.2	2.06	24.1	2.46	26.1	2.66	156	15.9	121	12.6		4
PL 012 X 015 E	1	M 8	24.5	2.5	14.9	1.52	23.1	2.36	27.5	2.81	29.8	3.04	149	15.2	120	12.2		4
PL 013 X 016 E	1	M 8	24.5	2.5	16.5	1.68	25.6	2.61	30.5	3.11	33.0	3.37	140	14.3	114	11.6		4
PL 014 X 018 E	1	M10	48.0	4.9	27.2	2.78	42.1	4.30	51.0	5.20	54.9	5.60	139	14.2	108	11.0		5
PL 015 X 019 E	1	M10	48.0	4.9	25.7	2.62	40.2	4.10	47.0	4.80	51.0	5.20	114	11.6	90	9.2		5
PL 016 X 020 E	1	M10	48.0	4.9	28.2	2.88	44.1	4.50	51.9	5.30	56.8	5.80	111	11.3	88	9.0		5
PL 017 X 021 E	1	M10	48.0	4.9	31.1	3.17	48.0	4.90	57.8	5.90	61.7	6.30	108	11.0	87	8.9		5
PL 018 X 022 E	1	M10	48.0	4.9	33.1	3.38	51.0	5.20	61.7	6.30	66.6	6.80	102	10.4	83	8.5		5
PL 019 X 024 E	1	M12	84.3	8.6	52.9	5.40	82.3	8.40	98.0	10.0	106	10.8	147	15.0	117	11.9		7
PL 020 X 025 E	1	M12	84.3	8.6	56.8	5.80	82.2	9.00	106	10.8	114	11.6	143	14.6	115	11.7		7
PL 022 X 026 E	1	M12	84.3	8.6	69.6	7.10	108	11.0	128	13.1	139	14.2	144	14.7	122	12.4		7
PL 024 X 028 E	3	M 5	9.8	1.0	62.7	6.40	97.0	9.90	116	11.8	124	12.7	108	11.0	92	9.4	11	10
PL 025 X 030 E	3	M 5	9.8	1.0	59.8	6.10	93.1	9.50	111	11.3	120	12.2	97	9.9	81	8.3	12	10
PL 028 X 032 E	3	M 6	13.7	1.4	92.1	9.40	143	14.6	172	17.5	185	18.9	119	12.1	104	10.6	14	12
PL 030 X 035 E	3	M 6	13.7	1.4	96.0	9.80	148	15.1	177	18.1	191	19.5	107	10.9	91	9.3	16	12
PL 032 X 036 E	3	M 6	13.7	1.4	104	10.6	161	16.4	192	19.6	208	21.2	102	10.4	90	9.2	16	12
PL 035 X 040 E	4	M 6	13.7	1.4	154	15.7	239	24.4	285	29.1	309	31.5	111	11.3	97	9.9	19	12
PL 036 X 042 E	4	M 6	13.7	1.4	153	15.6	237	24.2	282	28.8	306	31.2	104	10.6	89	9.1	20	12
PL 038 X 044 E	4	M 6	13.7	1.4	163	16.6	252	25.7	300	30.6	324	33.1	100	10.2	86	8.8	22	12
PL 040 X 045 E	6	M 6	13.7	1.4	268	27.3	417	42.5	495	50.5	534	54.5	134	13.7	120	12.2	24	12
PL 042 X 048 E	6	M 6	13.7	1.4	275	28.1	426	43.5	510	52.0	549	56.0	125	12.8	110	11.2	26	12
PL 045 X 052 E	8	M 6	13.7	1.4	364	37.1	564	57.5	671	68.5	725	74.0	111	11.3	96	9.8	29	12
PL 048 X 055 E	8	M 6	13.7	1.4	397	40.5	617	63.0	735	75.0	794	81.0	107	10.9	93	9.5	32	12
PL 050 X 057 E	8	M 6	13.7	1.4	421	43.0	652	66.5	774	79.0	843	86.0	104	10.6	91	9.3	34	12
PL 055 X 062 E	8	M 6	13.7	1.4	475	48.5	735	75.0	882	90.0	951	97.0	97	9.9	86	8.8	39	12
PL 056 X 064 E	6	M 8	34.3	3.5	671	68.5	1040	106	1230	126	1350	138	109	11.1	95	9.7	38	16
PL 060 X 068 E	6	M 8	34.3	3.5	730	74.5	1130	115	1350	138	1460	149	103	10.5	91	9.3	42	16
PL 063 X 071 E	8	M 8	34.3	3.5	1100	112	1710	174	2030	207	2200	224	141	14.4	125	12.8	45	16
PL 065 X 073 E	8	M 8	34.3	3.5	1140	116	1750	179	2100	214	2260	231	136	13.9	122	12.4	47	16
PL 070 X 079 E	6	M10	67.6	6.9	1450	148	2250	230	2700	275	2910	297	128	13.1	114	11.6	50	20
PL 071 X 080 E	6	M10	67.6	6.9	1480	151	2280	233	2730	279	2950	301	127	13.0	113	11.5	51	20
PL 075 X 084 E	6	M10	67.6	6.9	1530	156	2360	241	2820	288	3050	311	119	12.1	106	10.8	55	20
PL 080 X 091 E	8	M10	67.6	6.9	2150	219	3330	340	3970	405	4310	440	119	12.1	104	10.6	60	20
PL 085 X 096 E	8	M10	67.6	6.9	2130	236	3590	366	4260	435	4610	470	114	11.6	101	10.3	65	20
PL 090 X 101 E	10	M10	67.6	6.9	3190	326	4950	505	5930	605	6370	650	139	14.2	124	12.7	70	20
PL 095 X 106 E	10	M10	67.6	6.9	3390	346	5240	535	6270	640	6760	690	133	13.6	120	12.2	75	20
PL 100 X 114 E	12	M10	67.6	6.9	4170	425	6420	655	7740	790	8330	850	118	12.0	103	10.5	80	20
PL 110 X 124 E	10	M12	118	12	5680	580	8820	900	10500	1070	11400	1160	133	13.6	119	12.1	88	24
PL 120 X 134 E	10	M12	118	12	6220	635	9700	990	11600	1180	12400	1270	123	12.6	111	11.3	98	24
PL 130 X 148 E	10	M14	186	19	9110	930	14100	1440	16900	1720	18200	1860	113	11.5	99	10.1	108	28
PL 140 X 158 E	10	M14	186	19	9900	1010	15300	1560	18300	1870	19800	2020	106	10.8	94	9.6	118	28
PL 150 X 168 E	12	M14	186	19	13100	1340	20400	2080	24300	2480	26300	2680	123	12.5	110	11.2	128	28

Hub Diameters (1)



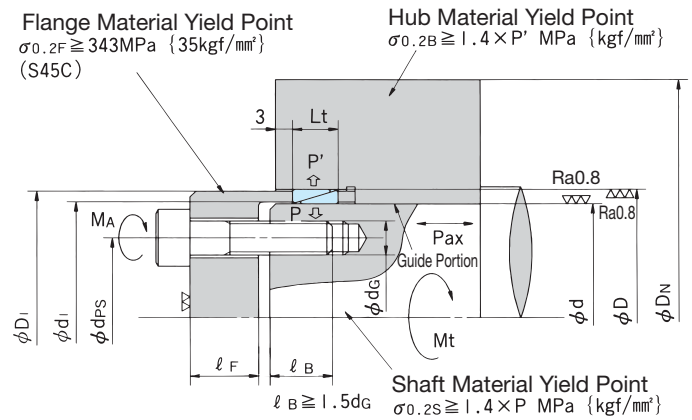
Hub Configuration Coefficient $K_3 = 0.8$

Minimum hub diameter ϕD_N(mm)

Model No. d X D Shaft Diameter X Outer Diameter mm	Hub Contact Pressure P' MPa	{kgf/mm²}	Yield Point of Hub Material σ 0.2 MPa	206	225	245	274	294	343	392	441
			kgf/mm²	21	23	25	28	30	35	40	45
				FC350 SS400 SC410 S10C FCMB360	SC450 S15C SF440	FCD400 SS490 SC480 S20C SF490	S30C SF540	FCD450 S35C SF590	FCD500 S45C	FCD600 S55C	FCD700
PL 010 X 013 E	123	12.6		35	35	35	35	35	35	35	35
PL 011 X 014 E	120	12.3		36	36	36	36	36	36	36	36
PL 012 X 015 E	118	12.0		37	37	37	37	37	37	37	37
PL 013 X 016 E	113	11.5		38	38	38	38	38	38	38	38
PL 014 X 018 E	81	8.3		40	40	40	40	40	40	40	40
PL 015 X 019 E	126	12.9		41	41	41	41	41	41	41	41
PL 016 X 020 E	123	12.6		42	42	42	42	42	42	42	42
PL 017 X 021 E	121	12.3		43	43	43	43	43	43	43	43
PL 018 X 022 E	116	11.8		44	44	44	44	44	44	44	44
PL 019 X 024 E	91	9.3		46	46	46	46	46	46	46	46
PL 020 X 025 E	89	9.1		47	47	47	47	47	47	47	47
PL 022 X 026 E	99	10.1		48	48	48	48	48	48	48	48
PL 024 X 028 E	95	9.7		50	50	50	50	50	50	50	50
PL 025 X 030 E	82	8.4		52	52	52	52	52	52	52	52
PL 028 X 032 E	86	8.8		54	54	54	54	54	54	54	54
PL 030 X 035 E	109	11.1		59	57	57	57	57	57	57	57
PL 032 X 036 E	108	11.0		60	59	59	59	59	59	59	59
PL 035 X 040 E	105	10.7		67	66	66	66	66	66	66	66
PL 036 X 042 E	97	9.9		68	68	68	68	68	68	68	68
PL 038 X 044 E	93	9.5		70	70	70	70	70	70	70	70
PL 040 X 045 E	120	12.2		80	77	74	73	73	73	73	73
PL 042 X 048 E	110	11.2		82	78	76	76	76	76	76	76
PL 045 X 052 E	96	9.8		83	80	79	79	79	79	79	79
PL 048 X 055 E	93	9.5		86	84	84	84	84	84	84	84
PL 050 X 057 E	91	9.3		89	86	85	85	85	85	85	85
PL 055 X 062 E	113	11.5		105	101	97	93	91	90	90	90
PL 056 X 064 E	95	9.7		102	99	96	96	96	96	96	96
PL 060 X 068 E	91	9.3		106	103	100	100	100	100	100	100
PL 063 X 071 E	125	12.8		129	123	118	112	109	104	103	103
PL 065 X 073 E	122	12.4		130	124	119	114	111	106	105	105
PL 070 X 079 E	121	12.3		139	133	128	122	119	113	111	111
PL 071 X 080 E	120	12.2		140	134	129	123	120	115	113	113
PL 075 X 084 E	111	11.3		141	135	131	125	123	117	116	116
PL 080 X 091 E	104	10.6		150	144	140	134	132	127	127	127
PL 085 X 096 E	101	10.3		155	150	145	140	137	132	132	132
PL 090 X 101 E	124	12.7		181	172	165	158	154	146	141	137
PL 095 X 106 E	120	12.2		185	177	170	163	159	151	146	142
PL 100 X 114 E	103	10.5		184	177	172	165	162	156	151	150
PL 110 X 124 E	119	12.1		216	206	199	190	185	177	171	166
PL 120 X 134 E	111	11.3		224	215	208	199	195	187	181	176
PL 130 X 148 E	99	10.1		234	226	219	212	208	200	194	190
PL 140 X 158 E	94	9.6		244	236	230	222	218	210	204	200
PL 150 X 168 E	110	11.2		278	266	257	247	241	231	223	218

Note) 1) The above values are based on the minimum outer hub diameter D_N of each model.

Hub Diameters (2)



Hub Configuration Coefficient $K_3 = 0.6$

Minimum hub diameter ϕD_N(mm)

Model No. d X D (Shaft Diameter X Outer Diameter) mm	Hub Contact Pressure P' MPa	Hub Contact Pressure P' {kgf/mm²}	Yield Point of Hub Material σ 0.2 MPa	206	225	245	274	294	343	392	441
			kgf/mm²	21	23	25	28	30	35	40	45
				FC350 SS400 SC410 S10C FCMB360	SC450 S15C SF440	FCD400 SS490 SC480 S20C SF490	S30C SF540	FCD450 S35C SF590	FCD500 S45C	FCD600 S55C	FCD700
PL 010 X 013 E	125	12.8		19	18	18	17	17	16	16	15
PL 011 X 014 E	121	12.6		21	20	20	19	19	18	17	17
PL 012 X 015 E	120	12.2		22	21	20	20	19	19	18	18
PL 013 X 016 E	114	11.6		23	23	21	21	20	20	19	19
PL 014 X 018 E	108	11.0		25	24	24	23	23	22	21	21
PL 015 X 019 E	90	9.2		25	24	24	23	23	22	22	21
PL 016 X 020 E	88	9.0		26	25	25	24	24	23	23	23
PL 017 X 021 E	87	8.9		27	27	26	25	25	24	24	24
PL 018 X 022 E	83	8.5		28	28	27	26	26	25	25	25
PL 019 X 024 E	117	11.9		34	33	32	31	31	30	29	28
PL 020 X 025 E	115	11.7		35	34	33	32	32	31	30	29
PL 022 X 026 E	122	12.4		38	36	35	34	33	32	31	31
PL 024 X 028 E	92	9.4		37	36	35	34	34	33	32	32
PL 025 X 030 E	81	8.3		38	37	37	36	35	35	34	34
PL 028 X 032 E	104	10.6		44	43	42	40	40	38	38	37
PL 030 X 035 E	91	9.3		46	45	44	43	42	41	40	40
PL 032 X 036 E	90	9.2		47	46	45	44	43	42	41	41
PL 035 X 040 E	97	9.9		53	52	51	50	49	47	46	46
PL 036 X 042 E	89	9.1		55	53	52	51	50	49	48	47
PL 038 X 044 E	86	8.8		57	56	55	53	53	51	50	50
PL 040 X 045 E	120	12.2		65	63	61	59	58	56	54	53
PL 042 X 048 E	110	11.2		67	65	63	61	60	58	57	56
PL 045 X 052 E	96	9.8		69	68	66	64	63	62	60	59
PL 048 X 055 E	93	9.5		73	71	69	68	67	65	63	62
PL 050 X 057 E	91	9.3		75	73	72	70	69	67	66	65
PL 055 X 062 E	86	8.8		80	78	77	75	74	72	71	70
PL 056 X 064 E	95	9.7		85	83	81	79	78	76	74	73
PL 060 X 068 E	91	9.3		89	87	85	83	82	80	78	77
PL 063 X 071 E	125	12.8		104	100	98	94	92	89	86	84
PL 065 X 073 E	122	12.4		106	102	99	96	94	91	88	86
PL 070 X 079 E	114	11.6		111	108	105	102	100	97	94	92
PL 071 X 080 E	113	11.5		113	109	106	103	101	98	95	93
PL 075 X 084 E	106	10.8		116	112	110	106	105	101	99	97
PL 080 X 091 E	104	10.6		124	121	118	115	113	109	107	105
PL 085 X 096 E	101	10.3		130	126	124	120	118	115	112	110
PL 090 X 101 E	124	12.7		148	143	138	134	131	126	122	120
PL 095 X 106 E	120	12.2		153	147	143	139	136	131	128	125
PL 100 X 114 E	103	10.5		155	151	147	143	141	137	134	131
PL 110 X 124 E	119	12.1		178	172	167	162	159	153	149	146
PL 120 X 134 E	111	11.3		187	182	177	172	169	163	159	156
PL 130 X 148 E	99	10.1		200	194	190	185	182	177	173	170
PL 140 X 158 E	94	9.6		210	205	200	195	192	187	183	180
PL 150 X 168 E	110	11.2		235	227	222	215	211	205	200	196

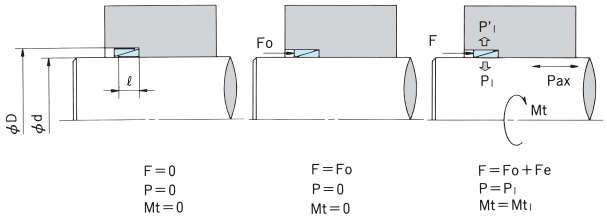
Note) 1) The above values are based on the minimum outer hub diameter D_N of each model.

EL

Basic Characteristics

1. Transmissible Torque, Transmissible Thrust and Contact Pressure

Mt : Transmissible Torque
Pax : Transmissible Load
P、P' : Contact Pressure
Fo : Preload Force
Fe : Actual Locking Force
F : Total Force

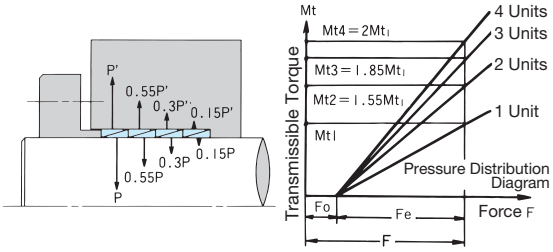


The "Power-Lock" EL Series shaft-hub locking devices require preload force Fo to obtain a 0 clearance shaft-hub connection.

The degree of tightness achieved by applying the actual locking force Fe in addition to the preload force Fo, is directly proportional to the Fe as indicated in the above diagram. Accordingly, we use the following formula to calculate the total force required to reach the desired degree of tightness. F=Fe+Fo.

Note) Mt_1, P_1,P_1' refer to single unit installation

2. Contact Pressure and Transmissible Torque for Multiple Power-Lock Installation



In the case of multiple EL Power-Lock installation the pressure applied on the rings will distribute as illustrated above.

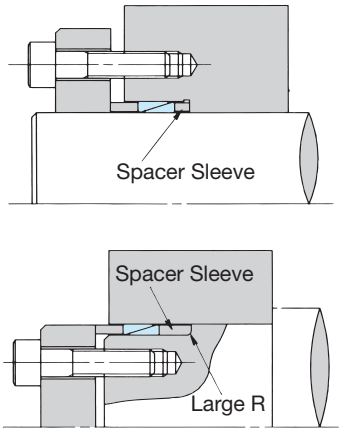
The following table indicates transmissible torque ratios for specific numbers of unit(s) installed.

No. of Unit(s) Z	Multiplying Ratio
1	1.0
2	1.55
3	1.85
4	2.0

A maximum of four "Power-Lock" EL Series shaft-hub locking devices may be installed.

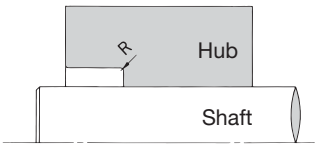
Spacer Sleeves

Use a spacer sleeve (as illustrated below) if indentations or large Corner R values cannot be avoided due to specific machining requirements.



Corner R Values

If you are not using a spacer sleeve, maintain the following Corner R values.



(mm)

Model No.	Corner R	Model No.	Corner R
PL010X013E ⟩ PL042X048E	Below 0.2	PL070X079E ⟩ PL090X106E	Below 0.3
PL045X052E ⟩ PL065X073E	Below 0.3	PL100X114E ⟩ PL150X168E	Below 0.4

Innovation in Motion

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