

# MechaLock

## Overview

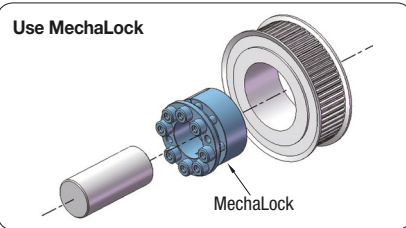
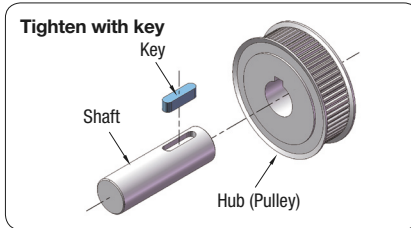
### What is MechaLock?

The MechaLock is a fastening tool to tightly fasten a hub to a shaft by using friction. This can be completed easily just by tightening screws on the hub and shaft (including the pulley, sprocket and gear).

### Features

#### 1 Keyway does not need to be added

A round shaft and round bar can be used without having to add any keyway.



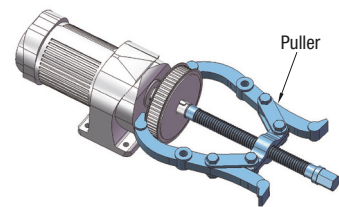
Allows the time of milling/machining to be saved and thus, can help respond to sudden design change.

#### 2 Easy installation / removal

Since the parts below are tightened only with screws, they can be installed and removed easily.

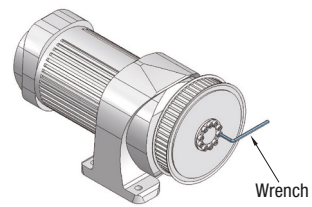
##### How to Remove Key

In order to remove the key, the special tool (puller) is required.



##### How to Remove MechaLock

MechaLock can be removed by using a standard wrench.



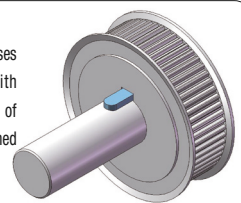
Does not require special tools and thus, facilitates facility maintenance.

#### 3 Free phase adjustment

Allows the phase to be adjusted to any position during assembly.

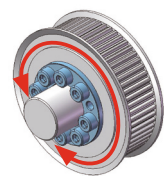
##### Tighten with key

In order to match the phases of shaft and pulley with each other, the position of keyway must be determined upon Designing stage.



##### Use MechaLock

Allows the pulley phase to be re-positioned to any point during assembly.



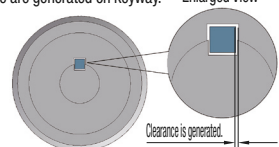
Allows phase-adjustment to be performed during assembly and thus, can remove the time and trouble of aligning the positions of key and teeth from the designing stage.

#### 4 No clearance

While use of key generates some clearance on a keyway, MechaLock does not allow any clearance and thus, is suitable for use on portions where forward / backward rotation is repeated.

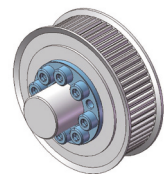
##### Tighten with key

If load is applied repeatedly, abrasion and clearance are generated on keyway.



##### Use MechaLock

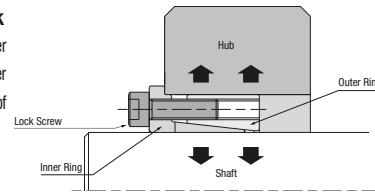
Since the shaft is secured onto the hub leveraging the friction resulting from the screw tightening force, no clearance is generated.



Allows a shaft and hub to be fastened onto each other with high coaxial accuracy in a long term. Is suitable for use in cases where a motor is toggled between forward mode and backward one repeatedly.

### Mechanism of MechaLock

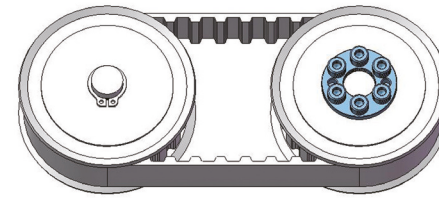
By converting the screw tightening power into pressure on the tapered inner diameter surface of the hub and the tapered O.D. of the shaft, fasten a hub to a shaft.



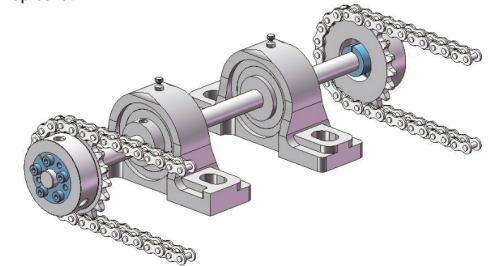
### App. Example

#### General Installation

· Pulley



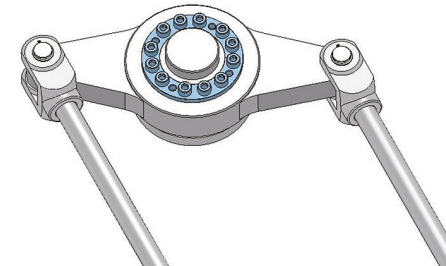
· Sprocket



The above examples indicate general applications of MechaLock. MechaLock is easy to install and remove and thus, can improve efficiency of facility maintenance.

#### Phase Adjustment

· Crank



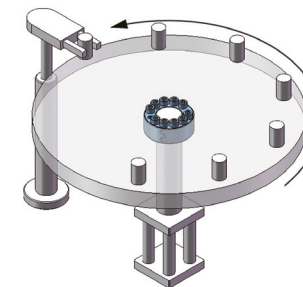
· Cam Mechanism



Allows phase-adjustment to be performed during assembly and thus, can contribute to reduction of designing labor.

#### Load Capacity

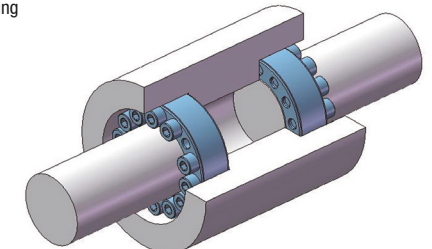
· Index Table



Can withstand axial load and thus, is suitable for use on load-intensive portions.

#### Others

· Coupling



Since MechaLock does not allow any clearance and excels in coaxial accuracy, it can also serve as the coupling.

### How to Mount

- 1 Coat with Lubricant** Wipe off the shaft surface and apply oil or grease. \* Do not use any oil or grease containing molybdenum type antifriction agent.
- 2 Positioning** After temporarily assembling the MechaLock and hub, position them while inserting into the shaft.
- 3 Screw Tightening** By using a torque wrench, tighten locking screws in the diagonal line order. Tighten a screw lightly at first (at approx. 1/2 of the predetermined tightening torque) and then, fully at the predetermined torque.
- 4 Finally Tighten** Finally tighten the locking screws at the pre-determined torque in circumferential order.

### How to Remove

- 1 Remove Screws** Loosen the lock screws in circumferential order.
- 2 Remove MechaLock** Insert a screw in a hole for removal and tighten evenly.

# MechaLock

## Overview

### Selection Guidance

Series	Nut	Thin	Standard	Straight Straight for High Torque	Compact
Allowable Load	○	△	○	◎	△
Installation Tool	Wrench	Hex Wrench	Hex Wrench	Hex Wrench	Hex Wrench
Centering Function	Not Provided	Not Provided	Provided	Not Provided	Provided
Features	Installation can be completed by tightening one nut.	The screw is installed directly on the hub. Small difference between the I.D. and O.D.	Available in wide range of sizes, materials and surface treatment types. Centering Function provided	High load capacity Multiple piece can be used easily.	Small difference between the I.D. and O.D. Centering Function provided
Part Number	MLN, MLNB, MLNP	MLSL	MLM, MLMB, MLMP, MLHS	MLA, MLAP, MLAT	MLR, MLRP, MLRS
Page	P.1490	P.1490	P.1491, 1492	P.1493, 1494	P.1495, 1496

### Step ① Check Shaft O.D. / Hub I.D.

Select the proper MechaLock based on the shaft O.D. and hub I.D.

See the diagram on the right.

Shaft Outer Dia. ds = MechaLock Inner Dia. d

Hub Inner Dia. Dh = MechaLock Outer Dia. D

Furthermore, make sure that, on the mounting surface of shaft/hub, the value for the tolerance / roughness of surface conforms to the following standards. Otherwise, MechaLock might be unable to be installed.

Mounting Surface	Tolerance	Roughness of Surface
Shaft Outer Dia. ds	h7(g6)	Ra1.6 or less
Hub Inner Dia. Dh	H7	Ra3.2 or less

### Step ② Check Installation Space

When installing MechaLock, use a torque wrench.

When installing MechaLock, consider the corresponding installation space.



The photo above shows MLM40.

### Step ③ Check the Material / Surface Treatment

For MISUMI MechaLock product lineup, a various options are offered in material and surface treatment. For location full of humidity, condensation or moisture, adoption of Electroless Nickel Plating Type or Stainless Steel Type is recommended. It should be noted that the option list for material / surface treatment differs depending on the current series.

### Step ④ Check MechaLock for allowable load applied

Calculate the torque/load applied to MechaLock and make sure that the calculation result does not exceed the upper limit provided for the selected series type.

Torque applied to MechaLock < Upper Limit for Torque applied to MechaLock

Thrust Load applied to MechaLock < Upper Limit for Thrust Load applied to MechaLock

Cautions Can be used on shafts/hubs with keyways with width within JIS standards but allowable torque and thrust ratings will be reduced by 15~20%.

Basically, MechaLock must not be subjected to bending moment. The adequate MechaLock becomes available by changing the load receiving location or by selecting the properly shaped hub.

### Step ⑤ Check Shaft / Hub for Rigidity

Shaft For shaft materials, verify the Yield Point Stress and select the material that is equal to or exceeds the following value: Side Surface Pressure of Hub provided for the selected series type x 1.2.

Hub For hub materials, verify the Yield Point Stress and select the material that is equal to or exceeds the following value: Side Surface Pressure of Hub provided for the selected series type x 1.2.

For the typical materials used for hub, the corresponding min. outer diameters of hub are calculated and listed. Please refer to the Min. Outer Diameter table for the selected series type.

### Cautions

① Tapered portions of inner ring and outer ring will bite into each other even with a little shock from conveyance. Loosen the screw and nut and disassemble parts to release tapered parts before installation.

② Please do not tighten the screw before inserting the shaft. MechaLock may deform.

③ Do not use lock screws other than those included.

# MechaLock

## Easy Mounting (Nut) / Thin

Feature: Installation can be completed easily just by tightening one nut.

### Easy Mounting (Nut)

**MLN**  
**MLNB** (Black Oxide)  
**MLNP** (Electroless Nickel Plating)

Type	Material	Surface Treatment
MLN	EN 1.1191 Equiv.	-
MLNB	-	Black Oxide
MLNP	-	Electroless Nickel Plating

RoHS

Nut of MLNP is colored with RED coating material.

Part Number	Type	d	D	B	D1	L1	L2	L3	L4	Max. Allowable Torque (N·m)	Allowable Thrust Load (kN)	Tightening Torque (N·m)	Mass (g)	Side Surface Pressure of Hub (MPa)	H Hub Minimum O.D.						Hub Machining Depth L	Unit Price					
															206		294		392								
8	14	22	23.5	19	11	8	19	29.4	21	6.9	5.2	24.5	34	178	128	31	24	24	21	22	19	13					
10	17	21	22	12	9	21	34.3	24	22	39.2	28	5.1	34.3	46	132	92	38	30	29	25	25	23	14				
11	18	24	26	10	10	20	49.0	34	23	49.0	34	7.3	5.7	44.1	50	122	82	40	32	31	27	28	25	15			
12	20	23	13	11	26	88.3	62	12.3	8.9	58.8	80	106	73	41	34	34	30	31	28	17							
14	23	30	32.5	16	12	31	186	130	19.6	15.3	98.1	96	107	74	50	41	40	35	36	33	21						
15	24	33	33	20	33	245	172	24.5	17.2	137	135	114	80	52	44	39	40	37	22								
17	26	36	39	13	35	275	193	25.5	18.3	167	185	83	58	48	47	42	43	40	26								
20	29	41	44	15	38	353	247	27.5	19.8	186	187	85.1	60	55	49	48	44	44	41	27							
22	32	44	47	17	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41
24	34	47	50	18	43	378	265	26.5	18.9	226	320	68.9	48	57	52	51	48	48	45	30							
25	35	48	60	16	46	392	274	25.5	18.3	255	398	66.3	46	61	55	54	50	50	48	32							
28	40	50	54	17	52	461	323	18.5	18.5	294	521	50	35	64	59	58	55	55	53	37							
30	42	55	60	16	46	392	274	25.5	18.3	255	398	66.3	46	61	55	54	50	50	48	32							
35	48	60	66	17	52	461	323	18.5	18.5	294	521	50	35	64	59	58	55	55	53	37							

Ordering Example Part Number MLN25

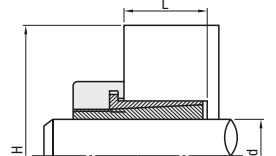
Recommended Tolerance of Shaft and Hub / Roughness of Surface

Shaft O.D.	h7(g6)	Ra1.6 or less
Hub I.D.	H7	Ra3.2 or less

How to Determine Hub O.D.

After selecting the MechaLock size, hub size and material, confirm that the selected values meet the conditions Hshub in the Minimum O.D. Table.

kgf=Nx0.101972 kgf/mm<sup>2</sup>=MPax0.101972



Features: Because the screw is installed directly on the hub, the inner and outer diameter difference is small and thin. Applicable to installation on a small hub.

### Thin

**MLSL**

Type	Material	Surface Treatment
MLSL	EN 1.1191 Equiv.	-

RoHS

\* Thread diameter of screw hole for removal is the same as that of locking screw.

Part Number	Type	d	D	D1	P.C.D.	T	B	Locking Screw		Max. Allowable Torque (N·m)	Allowable Thrust Load (kN)	Mass (g)	Side Surface Pressure of Hub (MPa)	H Hub Minimum O.D.			Hub Machining Depth L1	Unit Price
								MxL	Qty.					206	294	392		
5	8	8	22	15	4	10	M3x10	3	2	4	2	13	134	21.5	21.5	21.5	8	
6	9	9	23	16	4	10	M3x10	3	2	6	2	15	132	23	22.5	22.5		
8	11	11	25	18	5	12	M3x10	3	2	9	2	17	123	25	24.5	24.5		
10	13	13	29	21	5	12	M3x10	3	2	18	4	28	153	38	29	29	9.5	
12	15	15	31	23	5	12	M3x10	3	2	23	4	31	139	39	31	31		
14	18	18	36	26	6	14	M4x18	4	4	37	5	52	161	56	38	36		
15	19	19	37	27	6	14	M4x18	4	4	39	5	55	149	52	38	37		
16	20	20	38	28	6	14	M4x18	4	4	42	5	57	143	52	39	38		
17	21	21	39	29	6	14	M4x18	4	4	45	5	59	138	52	39	39		
19	24	24	42	32	7	15	M5x20	4	8	49	5	71	118	51	42	42		
20	25	25	46	36	7	15	M5x20	4	8	97	10	103	198	62	49	49		
22	26	26	47	37	7	15	M5x20	4	8	110	10	101	196	64	51	51		
24	28	28	49	39	7	15	M5x20	4	8	121	10	106	184	64	52	52		
25	30	30	51	41	7	15	M5x20	4	8	124	10	119	169	101	63	53		
28	32	32	53	43	7	15	M5x20	4	8	141	10	118	160	96	64	55		
30	35	35	56	46	7	15	M5x20	4	8	149	10	135	145	99	66	57		

\* Unavailable due to excessive Side Surface Pressure

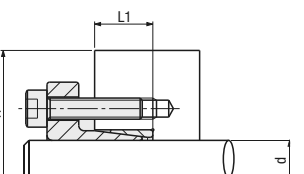
Ordering Example Part Number MLSL10

How to Determine Hub O.D.

After selecting the MechaLock size, hub size and material, confirm that the selected values meet the conditions Hshub in the right-hand Hub Minimum O.D. Table.

Recommended Tolerance of Shaft and Hub / Roughness of Surface


Shaft O.D.	h7(g6)	Ra1.6 or less
Hub I.D.	H7	Ra3.2 or less



# MechaLock

## Standard (Centering Function)

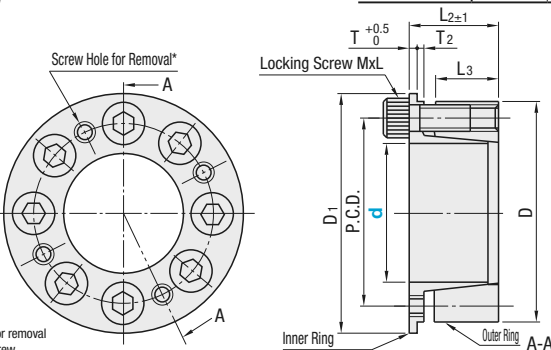
■ **Features:** Various options are offered in size, material and surface treatment. The Centering function comes with. This is the most widely used MechaLock.



**RoHS**

**MLM**  
**MLMB** (Black Oxide)  
**MLMP** (Electroless Nickel Plating)  
**MLHS** (Stainless Steel)

Type	Main Body	Surface Treatment
MLM	EN 1.1191 Equiv.	Black Oxide
MLMB	EN 1.1191 Equiv.	Black Oxide
MLMP	EN 1.1191 Equiv.	Electroless Nickel Plating
MLHS	EN 1.4301 Equiv.	-



\* Thread diameter of screw hole for removal is the same as that of locking screw.  
 ⚠ Lock screw of MLMB and MLMP is colored with RED coating material.

Part Number Type	d	D	D1	P.C.D.	L2	L3	T	T2	Locking Screw MxL Qty.	Unit Price			
										MLM	MLMB	MLMP	MLHS
5	16	18.5	11.7	13	8	1.8	1.2	M3x10					
6	19	21.5	14	14.3	9	2.0	1.3	M4x12	4				
8	21	23.5	15.4	14.6	9.3	2.0	1.3	M4x12	4				
10	23	25.5	17.5	14.8	9.5								
11	24	26.5	18.4	15.8	10.5	2.5	1.5	M4x15	6				
12	26	28.5	20.2	12.5						1.6	1.6	M4x15	6
14	28	30.5	22.2		15.3	3.0	1.8	M5x18	8				
15	29	31.5	23.2	16.3						3.5	1.8	M5x18	8
16	30	33.0	24.2		17.3	4.0	2.0	M6x20	10				
17	31	33.5	25.2	20.5						4.5	2.0	M6x20	10
18	32	34.5	26.2		21.0	5.0	2.0	M6x20	12				
19	33	35.5	27.2	22.0						5.0	2.0	M6x20	12
20	38	42.0	30.8		26.6	5.0	2.0	M6x20	14				
22	40	44.0	32.8	27.6						5.0	2.0	M6x20	14
24	42	46.0	34.8		28.3	5.0	2.0	M6x20	14				
25	43	47.0	35.8	18.3						5.0	2.0	M8x25	14
28	46	50.0	38.8		19.5	5.0	2.0	M8x25	14				
30	48	52.0	40.8	20.0						5.0	2.0	M8x25	14
32	50	54.0	42.8		20.5	5.0	2.0	M8x25	14				
35	57	62.0	48.4	21.0						5.0	2.0	M8x25	14
38	60	65.0	51.4		21.5	5.0	2.0	M8x25	14				
40	62	67.0	53.4	21.5						5.0	2.0	M8x25	14
42	64	69.0	55.4		21.5	5.0	2.0	M8x25	14				
45	67	72.0	58.4	21.5						5.0	2.0	M8x25	14
48	70	75.0	61.4		21.5	5.0	2.0	M8x25	14				
50	72	77.0	63.4	21.5						5.0	2.0	M8x25	14
55	77	83.0	68.4		21.5	5.0	2.0	M8x25	14				
60	82	87.0	73.4	21.5						5.0	2.0	M8x25	14
65	87	92.0	78.4		21.5	5.0	2.0	M8x25	14				
70	97	103.0	86.2	21.5						5.0	2.0	M8x25	14

**MLM**  
**MLMB** (Black Oxide)  
**MLMP** (Electroless Nickel Plating)  
**MLHS** (Stainless Steel)

Ordering Example **Part Number**  
**MLM35**

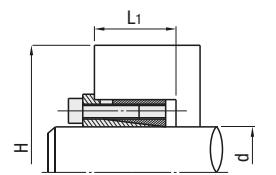
- **Features**
- With pilot on flange of the inner ring, the tightening lock screw presses hub I.D.. This generates effect to control instability on the hub end face and O.D. (centering effect).
  - Free phase adjustment and positioning.
  - No hub movement in axial direction when tightened with locking screw.
  - No backlash after tightening.

■ **Recommended Tolerance of Shaft and Hub / Roughness of Surface**

Shaft O.D.	h7(g6)	Ra1.6 or less
Hub I.D.	H7	Ra3.2 or less

■ **Allowable Load applied to MechaLock** For Design Steps, see [P.1489](#). kgf=Nx0.101972

Type	MLM, MLMB				MLMP			MLHS			Mass (g)
	Max. Allowable Torque (N·m)	Allowable Thrust Load (kN)	Screw Tightening (N·m)		Max. Allowable Torque (N·m)	Allowable Thrust Load (kN)	Screw Tightening (N·m)	Max. Allowable Torque (N·m)	Allowable Thrust Load (kN)	Screw Tightening (N·m)	
5	7	2.8	1.9	1.6	4.6	1.84	1.9	2.8	1.13	0.88	18
6	14	4.67	3.9	3.2	10.7	2.49	3.9	7.8	2.54	2.7	26
8	22	5.6			16.6	4.1		10.7	2.64		35
10	25	5.6	19.6	3.9	12.7	2.55	40				
11	30	5.6	22.5	4.0	14.7	2.64	45				
12	50	8.41	36.2	5.9	24.5	4.02	53				
14	65	9.46	50.9	7.2	28.4		61				
15	70	9.46	54.8	7.3	30.4	5.39	66				
16	75	9.46	58.8	7.3	32.3		75				
17	110	12.6	76.4	8.9	46.1	75					
18	115	12.6	80.3		8.9	49.0	80				
19	120	12.6	85.2	8.8	51.9	81					
20	220	21.6	183.0		18.3	121.6	144				
22	290	26	201.0	21.0	133.4	12.06	165				
24	320	26	252.0		21.0	146.1	12.16	180			
25	350	27.2	264.0	21.1	153.0	15.20	188				
28	380	27	295.0		21.1		213.8	15.20	195		
30	410	27	396.0	26.4	229.5	15.30	208				
32	440	27	423.0		26.4	244.2	15.20	219			
35	720	41.1	548.0	31.3	301.1	17.16	325				
38	770	40.2	741.0		39.0	409.0	21.48	362			
40	810	40.2	779.0	39.0		430.6		380			
42	850	40.2	823.0	39.2	452.2	9.6	405				
45	1200	52.9	882.0		39.2		484.6	435			
48	1200	48.2	1117.0	46.5	620.9	25.80	460				
50	1500	56.3	1362.0		46.5	754.3	30.11	485			
55	1600	56.3	1512.0	54.4	55.0	-	520				
60	1900	60.3	1768.0				54.4	58.9	560		
65	2000	60.3	1915.0	58.9	-	-	610				
70	3400	94.8	2920.0				58.9	83.6	37.3	845	

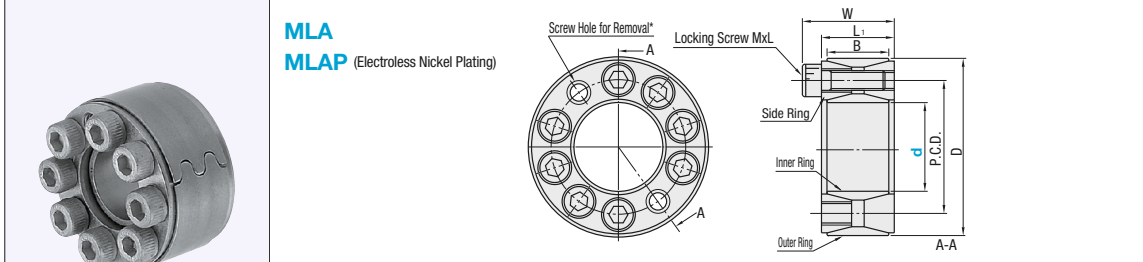


■ **Shaft/Hub Rigidity** For Design Steps, see [P.1489](#). kgf/mm<sup>2</sup>=MPax0.101972

d	MLM, MLMB										MLMP					MLHS				
	Shaft Side Surface Pressure (MPa)	Side Surface Pressure of Hub (MPa)	H Hub Minimum O.D.			Hub Machining Depth L1	Shaft Side Surface Pressure (MPa)	Side Surface Pressure of Hub (MPa)	H Hub Minimum O.D.			Hub Machining Depth L1	Shaft Side Surface Pressure (MPa)	Side Surface Pressure of Hub (MPa)	H Hub Minimum O.D.			Hub Machining Depth L1		
			206	294	392				206	294	392				206	294	392			
5	249	81	25	22	20	13	217	51	21	20	13	175	42.0	20	19	18	13			
6	318	102	33	28	25	14	258	59	26	24	23	14	251	58.0	26	24	22	14		
8	239	107	38	31	28	15	244	92	35	29	27	15	196	62.6	28	26.0	25.5	15		
10	186	96	39	33	30	16	192	77	31	29	16	153	55.9	29	27.5	27.5	16			
11	170	92	39	34	31	16	174	73	36	31	16	139	53.6	30	28.5	28.5	16			
12	233	115	49	40	36	17	239	91	43	36	33	191	67.1	35	32.0	30.5	17			
14	225	120	55	44	39	17	204	84	44	38	35	164	62.3	36	34.0	32.5	17			
15	186	106	52	43	39	18	205	90	47	40	37	136	55.0	37	35.0	33.5	18			
16	166	98	51	43	39	18	193	87	48	41	38	121	50.9	38	35.0	35.0	18			
17	197	121	61	49	43	19	205	97	53	44	40	144	63.1	40	37.0	36.0	19			
18	186	118	62	49	44	19	166	93	54	45	41	136	61.2	40	37.0	36.0	19			
19	177	114	62	50	45	19	184	91	55	46	42	129	59.2	42	39.0	38.0	19			
20	234	139	87	64	56	23	213	97	64	54	49	165	69.8	51	47.0	44.0	23			
22	256	159	112	74	62	24	193	92	65	56	51	150	66.3	53	49.0	46.0	24			
24	217	142	98	72	62	24	121	105	74	61	56	128	59.2	54	50.0	48.0	24			
25	216	137	96	72	62	25	212	102	75	62	57	122	54.5	54	51.0	49.0	25			
28	192	127	95	74	65	25	212	107	82	68	61	136	63.7	60	55.0	53.0	25			
30	179	122	95	75	67	26	198	102	86	69	63	127	61.1	62	57.0	55.0	26			
32	156	110	91	75	67	26	192	103	87	73	66	110	55.4	63	59.0	57.0	26			
35	204	138	129	95	83	28	207	105	100	83	75	107	51.4	72	67.0	67.0	28			
38	178	125	122	95	84	28	208	110	109	89	80	119	59.5	79	73.0	70.0	28			
40	164	118	119	95	85	29	202	113	113	92	83	110	56.2	80	74.0	72.0	29			
42	156	114	120	97	87	29	192	106	114	94	85	105	54.4	82	76.0	74.0	29			
45	186	140	154	113	98	30	184	104	117	97	88	95	50.8	85	79.0	77.0	30			
48	159	123	140	110	97	30	206	118	135	108	96	107	58.4	91	84.0	81.0	30			
50	173	136	160	119	104	31	202	119	140	111	99	116	64.6	97	88.0	84.0	31			
55	158	127	159	123	108	31	185	106	137	113	102	-	-	-	-	-	-	-		
60	150	125	166	130	115	31	176	104	143	119	108	-	-	-	-	-	-	-		
65	139	118	167	134	119	31	163	98	146	124	113	-	-	-	-	-	-	-		
70	187	152	250	172	147	34	206	119	188	150	133	-	-	-	-	-	-	-		

# MechaLock Straight

**Features:** Has larger maximum allowable torque than Standard Type, and locks the shaft and hub firmly. Has any part not shouldered to work the Centering function but makes applications based on several pieces easier than ever.



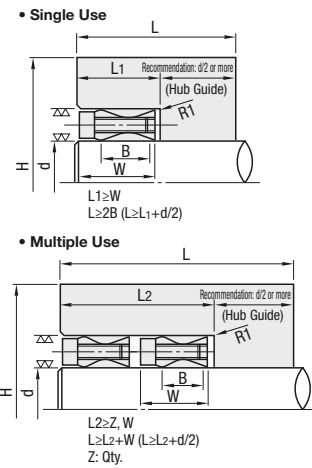
**MLA**  
**MLAP** (Electroless Nickel Plating)

Screw Hole for Removal\*  
Locking Screw MxL  
Side Ring  
Inner Ring  
Outer Ring

Type	Main Body
	Material Surface Treatment
MLA	EN 1.1191 Equiv. -
MLAP	- Electroless Nickel Plating

\* Thread diameter of screw hole for removal is the same as that of locking screw.  
 Lock screw of MLA and MLAP is colored red due to coating agent.  
 When installation, press down side rings strongly and tighten with screws.

Part Number	Type	d	D	W	P.C.D.	L1	B	Locking Screw			Mass (g)	Unit Price		
								MxL	Qty.	Tightening Torque (N·m)		MLA	MLAP	
20	MLA MLAP	20	47	26	34.5	20	18	M6x18	8	5	12.7	240		
22		230												
24		50	37.5	21	18	21	21	M8x22	10	6	29.4	250		
25												240		
28		55	42.5	24	21	24	24	M8x22	12	6	29.4	290		
30												280		
32		60	47.5	27	24	27	27	M8x22	14	6	29.4	340		
35												310		
38		65	52.5	30	27	30	30	M8x22	12	6	29.4	370		
40												350		
42		75	60	32	27	32	32	M8x22	12	6	29.4	600		
45												570		
48		80	65	35	27	35	35	M8x22	14	6	29.4	630		
50												610		
55		85	70	38	27	38	38	M8x22	14	6	29.4	660		
60												700		
65	95	80	41	27	41	41	M8x22	14	6	29.4	710			



**Check MechaLock for allowable load applied**  
For Calculation Steps, see P.1489.

d	Max. Allowable Torque (N·m)	Allowable Thrust Load (kN)
20	300	29.5
22	330	29.5
24	410	33.8
25	430	33.8
28	530	37.8
30	570	37.8
32	730	45.4
35	800	45.4
38	1010	52.9
40	1060	52.9
42	1560	74.1
45	1670	74.1
48	1780	74.1
50	1860	74.1
55	2530	91.8
60	2760	91.8
65	2990	91.8

kgf=Nx0.101972

**Check Shaft/Hub for Rigidity** For Design Steps, see P.1489.

d	Shaft Side Surface Pressure MPa	Side Surface Pressure of Hub MPa	Single Use				Hub Machining Depth L1	2 Hubs				Hub Machining Depth L2	
			H Hub Minimum O.D.					H Hub Minimum O.D.					
			147	206	294	392		147	206	294	392		
20	217	93	70	62	57	55	87	72	63	58	28	55	
22	198	93	70	62	57	55	83	69	62	55			
24	207	100	77	68	62	59	85	72	65	61			
25	199	100	77	68	62	59	98	82	72	67			
28	199	101	86	75	68	65	115	93	81	75			
30	186	101	86	75	68	65	109	90	79	74			
32	209	111	98	84	76	72	126	101	88	81			
35	191	111	98	84	76	72	159	123	105	96			
38	205	120	112	94	84	79	171	128	107	98			
40	195	120	112	94	84	79	170	131	112	102			
42	223	125	132	110	98	91	159	127	109	101			
45	208	125	132	110	98	91	200	147	123	111			
48	195	117	135	115	103	96	214	156	130	118			
50	187	117	135	115	103	96	211	159	134	123			
55	211	136	160	130	114	106						34	67
60	193	129	162	134	118	110							
65	178	122	165	138	123	115							

kgf/mm<sup>2</sup>=MPax0.101972

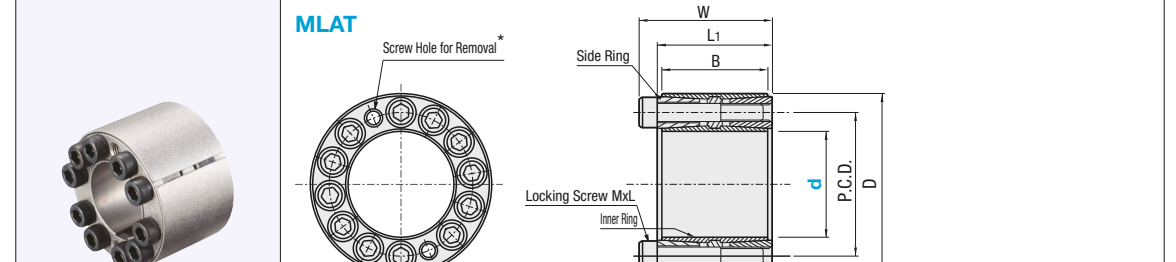
Ordering Example **Part Number**  
**MLA30**

**Recommended Tolerance of Shaft and Hub / Roughness of Surface**

Mounting Surface	Tolerance	Roughness of Surface
Shaft Outer Dia.	h7(g6)	Ra1.6 or less
Hub I.D.	H7	Ra3.2 or less

# MechaLock Straight for High Torque

**Features:** In order to withstand higher load, is made longer in axial direction than conventional Straight Type.



**MLAT**

Screw Hole for Removal\*  
Side Ring  
Locking Screw MxL  
Inner Ring  
Outer Ring

Type	Main Body
	Material Surface Treatment
MLAT	EN 1.1191 Equiv. -

\* The thread diameter of the screw hole for removal is the same as those of the lock screw.  
 Weight of side ring itself may shrink or enlarge the inner or outer rings. When installation, loosen side rings on both sides and insert a shaft into the hub.

Part Number	Type	d	D	W	P.C.D.	L1	B	Locking Screw			Mass (g)	Unit Price
								MxL	Qty.	Tightening Torque (N·m)		
MLAT	30	55	44	38	35	M6x35	10	15.7	490			
												12
		40	65	58	50	45	M8x45	12	37.3	1090		
		45	75	58	50	45	M8x45	12	37.3	1250		
	50	80	58	50	45	M8x45	12	37.3	1430			
												14
	55	85	58	50	45	M8x45	12	37.3	1430			
												14
	60	90	58	50	45	M8x45	12	37.3	1430			
												14
65	95	58	50	45	M8x45	12	37.3	1430				
											14	1430

**Check MechaLock for allowable load applied**  
For Calculation Steps, see P.1489.

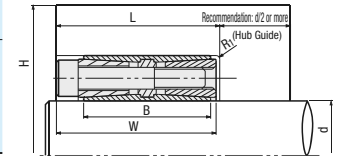
**Check Shaft / Hub for Rigidity.**  
For Design Steps, see P.1489.

d	Max. Allowable Torque (N·m)	Allowable Thrust Load (kN)
30	1110	74
35	1550	88.8
40	2070	103
45	3800	
50	4220	
55	4640	
60	5060	
65	6400	197

kgf=Nx0.101972

d	Shaft Side Surface Pressure MPa	Side Surface Pressure of Hub MPa	H Hub Minimum O.D.			Hub Machining Depth L
			206	294	392	
30	250	136	122	91	80	44
35	257	150	151	106	90	
40	262	161	187	121	101	
45	277	166	229	143	118	
50	249	156	215	145	122	
55	226	147	207	147	126	
60	208	138	204	151	131	
65	224	153	247	170	144	

kgf/mm<sup>2</sup>=MPax0.101972



**Recommended Tolerance of Shaft and Hub / Roughness of Surface**

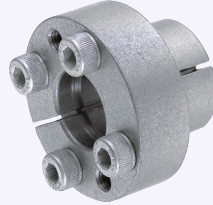
Mounting Surface	Tolerance	Roughness of Surface
Shaft Outer Dia.	h7(g6)	Ra1.6 or less
Hub I.D.	H7	Ra3.2 or less

Ordering Example **Part Number**  
**MLAT35**

# MechaLock

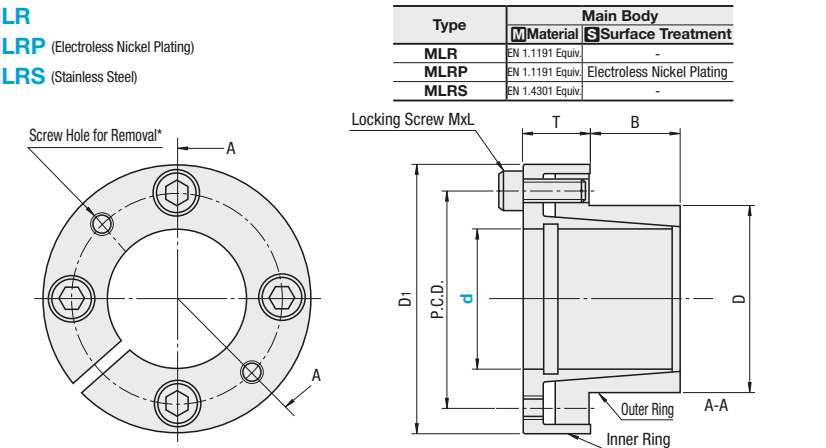
## Compact (Centering Function)

■ **Features:** Is provided with the Centering function and is suitable for combination use with small-sized hubs.



**MLR**  
**MLRP** (Electroless Nickel Plating)  
**MLRS** (Stainless Steel)

Type	Main Body
	Material Surface Treatment
MLR	EN 1.1191 Equiv. -
MLRP	EN 1.1191 Equiv. Electroless Nickel Plating
MLRS	EN 1.4301 Equiv. -



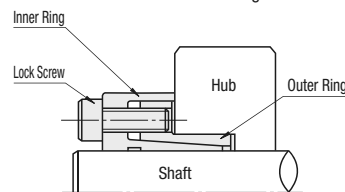
⚠ Thread diameter of screw hole for removal\* is the same as that of locking screw. ⚠ Lock screw of MLR and MLRP is colored red due to coating agent.

Part Number Type	d	D	D1	P.C.D.	T	B	Locking Screw		Unit Price		
							MxL	Qty.	MLR	MLRP	MLRS
5	5	12	23	15.5	9	10	M3x8	4			
6	6	15	28	19.5	11	12	M4x10	4			
8	8	18	31.5	22.5	11	12	M4x10	5			
10	10	20	33.5	24.5	11	12	M4x10	5			
12	12	22	35.5	26.5	11	12	M4x10	5			
14	14	22	35.5	26.5	11	12	M4x10	5			
15	15	23	38.5	28.5	13	14	M5x12	4			
16	16	24	39.5	29.5	13	14	M5x12	4			
17	17	25	40.5	30.5	13	14	M5x12	4			
18	18	26	46	33	14	14	M5x12	4			
19	19	27	47	34	14	14	M5x12	4			
20	20	28	48	35	14	14	M5x12	4			
22	22	32	52	39	16	16	M6x14	4			
24	24	34	54	41	16	16	M6x14	4			
25	25	34	54	41	16	16	M6x14	4			
28	28	39	59	46	16	16	M6x14	6			
30	30	41	61	48	16	16	M6x14	6			
32	32	43	63	50	16	16	M6x14	6			
35	35	47	67	54	20.5	30	M8x18	8			
38	38	50	70	57	20.5	30	M8x18	8			
40	40	53	73	60	20.5	30	M8x18	8			
42	42	55	75	62	20.5	30	M8x18	8			
45	45	59	84	69	20.5	30	M8x18	8			
48	48	62	87	72	20.5	30	M8x18	8			
50	50	65	90	75	20.5	30	M8x18	8			

**MLR**  
**MLRP** (Electroless Nickel Plating)  
**MLRS** (Stainless Steel)

Ordering Example Part Number **MLR10**

- **Features**
- Small difference between the I.D. and O.D. makes compact design possible.
  - Hub does not move when tightened because the inner ring touches the end face of the hub.
  - It has a function (centering function) to control pendulum of the end face and the circumference of the hub against the shaft.



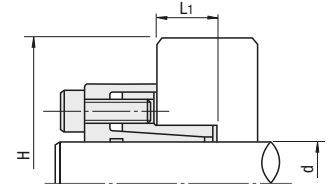
■ **Recommended Tolerance of Shaft and Hub / Roughness of Surface**

Shaft O.D.	h7(g6)	Ra1.6 or less
Hub I.D.	H7	Ra3.2 or less

■ **Allowable Load applied to MechaLock** For Design Steps, see P.1489.

Type	MLR			MLRP			MLRS			Mass (g)
	Max. Allowable Torque (N·m)	Allowable Thrust Load (kN)	Screw Tightening (N·m)	Max. Allowable Torque (N·m)	Allowable Thrust Load (kN)	Screw Tightening (N·m)	Max. Allowable Torque (N·m)	Allowable Thrust Load (kN)	Screw Tightening (N·m)	
5	9	3.45	1.7	9	3.45	1.7	3	1.05	1.1	36
6	11	6.09	4.0	11	6.09	4.0	4	1.92	2.7	34
8	25	8.71	8.0	25	8.71	8.0	8	2.75	5.6	61
10	44	15.3	14.0	44	15.3	14.0	14	7.4	9.6	78
12	53	23.2	34.0	53	23.2	34.0	17	11.1	23.6	86
14	61	46.4	84.5	61	46.4	84.5	20	14.9	1090	94
15	115	84.5	34.0	115	84.5	34.0	38	27.5	1090	135
16	123	84.5	34.0	123	84.5	34.0	41	27.5	1090	140
17	131	84.5	34.0	131	84.5	34.0	43	27.5	1090	146
18	210	84.5	34.0	210	84.5	34.0	68	27.5	1090	221
19	221	84.5	34.0	221	84.5	34.0	71	27.5	1090	228
20	233	84.5	34.0	233	84.5	34.0	75	27.5	1090	235
22	256	84.5	34.0	256	84.5	34.0	83	27.5	1090	287
24	279	84.5	34.0	279	84.5	34.0	90	27.5	1090	302
25	291	84.5	34.0	291	84.5	34.0	94	27.5	1090	293
28	488	84.5	34.0	488	84.5	34.0	157	27.5	1090	378
30	523	84.5	34.0	523	84.5	34.0	168	27.5	1090	396
32	558	84.5	34.0	558	84.5	34.0	180	27.5	1090	414
35	813	84.5	34.0	813	84.5	34.0	262	27.5	1090	484
38	883	84.5	34.0	883	84.5	34.0	284	27.5	1090	512
40	929	84.5	34.0	929	84.5	34.0	299	27.5	1090	560
42	976	84.5	34.0	976	84.5	34.0	314	27.5	1090	580
45	1910	84.5	34.0	1910	84.5	34.0	620	27.5	1090	962
48	2040	84.5	34.0	2040	84.5	34.0	670	27.5	1090	1000
50	2120	84.5	34.0	2120	84.5	34.0	690	27.5	1090	1090

kgf=Nx0.101972



■ **Shaft/Hub Rigidity** For Design Steps, see P.1489.

d	MLR, MLRP						MLRS					
	Shaft Side Surface Pressure MPa	Side Surface Pressure MPa	H Hub Minimum O.D.			Hub Machining Depth L1	Shaft Side Surface Pressure MPa	Side Surface Pressure MPa	H Hub Minimum O.D.			Hub Machining Depth L1
			Yield Point Stress of Hub Material (MPa)						Yield Point Stress of Hub Material (MPa)			
			206	294	392				206	294	392	
5	188	99	23	23	23	12	57	30	23	23	23	12
6	156	99	23	23	23	12	48	30	23	23	23	12
8	174	116	29	28	28	14	55	37	29	28	28	14
10	193	134	40	31.5	31.5	14	61	43	31.5	31.5	31.5	14
12	161	121	40	33.5	33.5	14	51	39	33.5	33.5	33.5	14
14	138	110	40	35.5	35.5	16	44	35	35.5	35.5	35.5	16
15	178	150	58	41	38.5	16	59	49	38.5	38.5	38.5	16
16	167	144	58	42	39.5	16	55	47	39.5	39.5	39.5	16
17	158	138	57	42	40.5	16	52	46	40.5	40.5	40.5	16
18	195	198	-*	59	46	18	63	64	46	46	46	18
19	185	191	-*	59	47	18	60	62	47	47	47	18
20	176	184	-*	59	48	18	57	59	48	48	48	18
22	146	141	74	54	52	22	47	46	52	52	52	22
24	134	133	74	56	54	22	43	43	54	54	54	22
25	128	133	74	56	54	22	42	43	54	54	54	22
28	146	139	89	66	59	24	47	45	59	59	59	24
30	136	132	88	67	61	24	44	43	61	61	61	24
32	128	126	88	68	63	24	41	41	63	63	63	24
35	145	140	108	79	69	24	47	45	67	67	67	24
38	133	131	106	81	71	24	43	42	70	70	70	24
40	127	124	107	84	74	24	41	40	73	73	73	24
42	121	119	107	85	76	24	39	39	75	75	75	24
45	160	148	146	103	88	32	52	49	84	84	84	32
48	150	141	144	105	91	32	49	46	87	87	87	32
50	144	135	143	107	94	32	47	44	90	90	90	32

\* Unavailable due to excessive Side Surface Pressure

kgf/mm<sup>2</sup>=MPax0.101972