Keyless Bushing

Overview

Features of Keyless Bushing

– The Keyless Bushing is a fastening tool to tightly fasten a hub to a shaft by using friction. This is accomplished by converting screw tightening power into pressure on the tapered inner diameter surface of the hub, and the tapered outer diameter of the shaft.

A hub (such as pulleys, gears and sprockets) can be easily connected with a shaft by screwing.

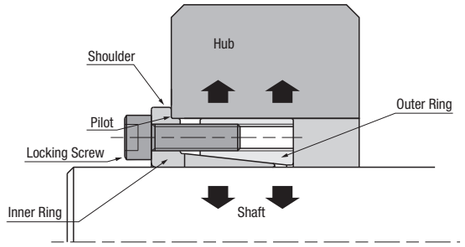
– It is well suited to applications with repeated forward / backward rotation as it virtually eliminates backlash.

– It can also handle some thrust.

– Design allows for infinite phase adjustment after installation.

– It saves complex key machining on shafts and hubs as well as polishing in assembling, which leads to total cost reduction.

Structure of Keyless Bushing



Installation

(1) Wipe off the shaft surface and apply oil or grease.
(Do not use any oil or grease containing molybdenum sulfide).

(2) Wipe off and apply oil and grease on contact surfaces of Keyless Bushing and Hub.
Apply oil or grease to the thread and seat of lock screws.

(3) Please insert the shaft after assembling the Keyless Bushing and Hubs temporarily.
(Please do not tighten the screws before inserting the shaft.)

(4) After locating, tighten the lock screws using a torque wrench in the diagonal line order, beginning lightly (approx. 1/4 of the predetermined tightening torque).

(5) Tighten the screws further to an increased torque (approximately 1/2 specified torque).

(6) Tighten the screws up to specified torque.

(7) Finally tighten the lock screws in circumferential order.

Note

– Make sure to apply oil or grease before installation.

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

– Please insert the shaft after assembling the Keyless Bushing and Hubs temporarily.
(Please do not tighten the screw before inserting the shaft. Keyless Bushing may deform.)

– Use torque wrench to tighten screws.

– Do not use lock screws other than those included.

Removal

– Be sure to work after the system is completely shut down.

– Loosen the lock screws in circumferential order.

– Insert a screw in a hole for removal and tighten evenly.

– Repeat Installation process for re-installation.

Selection Table

Part Number	MLSL	MLR / MLRP MLRS	MLM / MLMB MLMP / MLHS	MLA / MLAP MLAT	MLN / MLNB MLNP
Page	P.1453	P.1454	P.1456	P.1458–1459	P.1459
Series	Thin Type	Compact Type	Standard Type	Straight Straight Type for High Torque	Nut Type
					
Allowable Torque	Acceptable	Good	Good	Excellent	Good
Thin (Inner and Outer Dia. Difference)	Excellent	Excellent	Good	Good	Good
Lightness	Excellent	Good	Good	Good	Good
Centering Function	Poor	Good	Excellent	Poor	Poor
Installation	Acceptable	Good	Good	Good	Excellent
Price	Excellent	Excellent	Excellent	Good	Good
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, also. Best suitable for the aluminum belt pulley, etc.	Because mounting tap of the screw is built in the flange, the inner and outer diameter difference is small and thin. Applicable to installation on a small hub, also. Centering function is equipped.	Most widely used locking mechanism. High-performance centering function. Available in wide range of sizes, materials and types of surface treatment.	Has larger maximum allowable torque than Standard Type, and locks the shaft and hub firmly. Compact Straight Type for high torque is also available.	Installation can be completed by tightening one nut and is much easier than the conventional lock screw type.

ⓘ In the case of shafts with keyway, the Keyless Bushing can be installed on such shafts if the groove width is within JIS Standard. However, allowable torque and allowable thrust load will become 15–20% smaller.

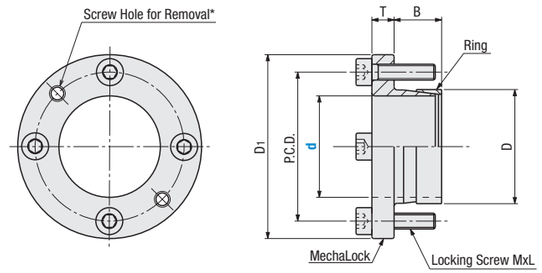
Keyless Bushing

Thin Type

Keyless Bushing – Thin Type

RoHS 10

MLSL



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

Main Body Material: 1045 Carbon Steel or Equivalent

kgf=Nx0.101972

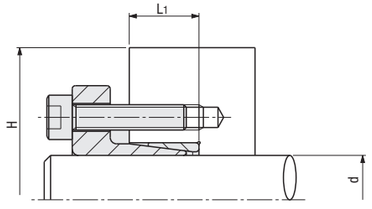
Part Number Type	d	D	D_1	P.C.D.	T	B	Locking Screw M x L	Locking Screw Qty.	Locking Screw Tightening Torque (Nm)	Max. Allowable Torque (Nm)	Allowable Thrust Load (kN)	Mass (g)
MLSL	5	8	21.5	15	4	9.5	M3 x 10	3	1.9	4.2	1.69	13
	6	9	22.5	16						5.6	1.87	15
	8	11	24.5	18						8.5	2.12	17
	10	13	29	21	5	11.5	M4 x 18	4	3.9	18	3.59	28
	12	15	31	23						23	3.76	31
	14	18	36	26	6	14				37	5.21	52
	15	19	37	27						39	5.10	55
	16	20	38	28						42	5.17	57
	17	21	39	29						45	5.23	59
	19	24	42	32						49	5.12	71
	20	25	46	36	7	15	M5 x 20	4	7.8	97	9.68	103
	22	26	47	37						110	9.98	101
	24	28	49	39						121	10.0	106
	25	30	51	41						124	9.90	119
	28	32	53	43						141	10.0	118
	30	35	56	46						149	9.89	135

Part Number Example

Part Number
MLSL10

How to Determine Hub Outer Diameter

After selecting Keyless Bushing size as well as hub size and material, confirm that the selected values meet the conditions H≤hub minimum outer diameter in the right table.



Recommended Tolerance of Shaft and Hub

Shaft Outer Diameter	h7 (g6)
Hub Inner Diameter	H7

Finish surface roughness at or below 1.6a in shaft and 3.2a in hub.

Hub Minimum Outer Diameter Table

kgf/mm²=MPax0.101972

d	Side Surface Pressure of Hub MPa	H Hub Minimum Outer Diameter Yield Point Stress of Hub Material (MPa) 206 FC350 1018 Carbon Steel or Equivalent 1010 Carbon Steel	294 FCD Cast Iron 450 1035 Carbon Steel	392 FCD Cast Iron 600 1055 Carbon Steel	Hub Machining Depth L_1
5	134	21.5	21.5	21.5	8
6	132	23	22.5	22.5	
8	123	25	24.5	24.5	
10	153	38	29	29	9.5
12	139	39	31	31	
14	161	56	38	36	11
15	149	52	38	37	
16	143	52	39	38	
17	138	52	39	39	
19	118	51	42	42	
20	198	—*	62	49	12
22	196		64	51	
24	184		64	52	
25	169	101	63	53	
28	160	96	64	55	
30	145	89	66	57	

*Not available.