

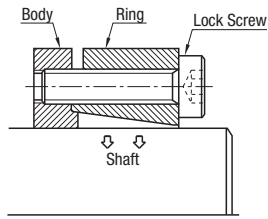
# Shaft Collars Guide

## -Keyless Bushing Mechanism / Wedge Mechanism / Clamping Force Data-

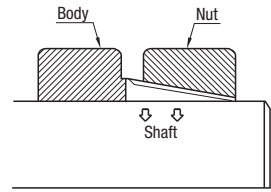
### Keyless Bushing Mechanism Features

- **Clamping force increased up to 2.2 times \*D35 is used for comparison.**  
Compared with the conventional Shaft Collars, these Collars can clamp the shafts firmly. Refer to Clamping Force Data on P.236.
- **Easy installation in limited spaces**  
Collar tightening action is applied in axial direction from the front, effective where radial access is limited.
- **8 components are reduced by using the Sensor-less System.**  
As these Collars can clamp the shafts firmly, the Shaft Collar can be used as an origin of position.

### Keyless Bushing Type - Standard Type Mechanism



### Keyless Bushing Type - Nut Type Mechanism



### Installation

- Clean (wipe off) shaft surface.
- Clean (wipe off) contact surface of the body and ring (nut) as well.
- Temporarily assemble the body and ring (nut) and insert the shaft.  
(Do not tighten the screws without a shaft inserted.)
- After positioning the collar, tighten the locking screws with a torque wrench in a diagonal order, start lightly (approx. 1/4 of the specified tightening torque.)
- Tighten the screws further to an increased torque (approximately 1/2 specified torque.)
- Tighten the screws to specified torque.
- Finally, tighten the lock screws in circumferential order.

### Cautions for Installation

- For Keyless Bushing Type, tighten the screws after the shaft is inserted.  
(If the screws are tightened before the shaft is inserted, the locking mechanism would be deformed.)
- Use a torque wrench to tighten the screws.
- Do not use lock screws other than those included.
- Refer to P.236 For the recommended tightening torque, please refer to Clamping Force Data.

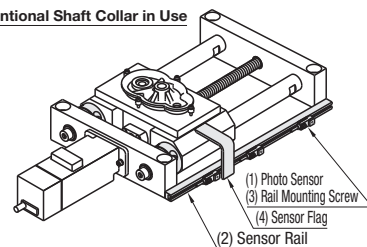
### Removal

- Be sure the system is completely shut down and stopped before beginning the work.
- Loosen lock screws in circumferential order.
- Insert screws in removal holes and tighten evenly.
- Repeat "Installation" process for re-installation.

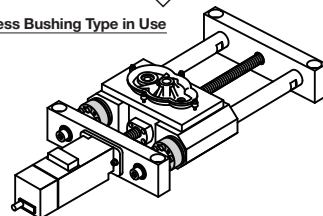
### Proposals for Parts Reduction

- \*The Shaft collar is used as an origin of position.
- \*Motor with an absolute encoder is used for this example.

#### Conventional Shaft Collar in Use



#### Keyless Bushing Type in Use

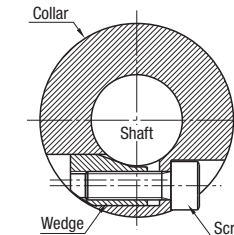
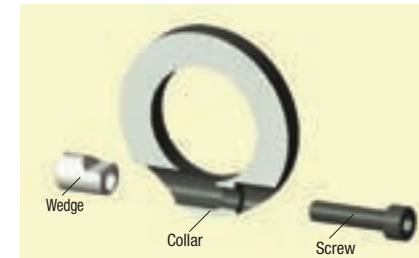


#### Advantages of sensor-less systems

- Reduced parts count (in the case above)  
(1) 3 Photo Sensors + (2) 1 Sensor Rail  
+ (3) 3 Rail Mounting Screws + (4) 1 Sensor Flag  
= 8 components can be reduced.
- No breakdown by sensor disconnection.
- Troubles from sensor errors can be reduced.
- Adjustments and maintenance can be reduced.

### Wedge Mechanism Features

- The screws pull a wedge and the shaft is clamped; this structure requires less force for tightening.
- Good work efficiency; suitable for use in frequent positioning adjustments like width guide applications.  
The wedge for "With Clamp Lever Type" (P.261) is made of brass and does not damage shafts.



### Tightening torque of Slit Type, Wedge Type and Keyless Bushing Type shaft collars.

- **Testing Conditions**  
1. Shaft: MISUMI Hardened Shaft (SF-J) Page P.107  
2. Testing Instrument: Universal Tester  
3. Tightening Torque: Select Tightening Torque from the tables on the right depending on the conditions of use.  
4. Condition of antirust oil: Wiped with a cloth as arrived.

#### Definition of Max. Thrust Load

The shaft collar is tightened to torque value(s) shown in the chart below, then compressive load is applied with the tester. The compressive load where the shaft begins to move is defined as the Max. Thrust Load.

#### Clamp Type / Wedge Type

Nominal	Tightening Torque (Nm)	
	1045 Carbon Steel/304 Stainless Steel	2017 Aluminum Alloy
M2.6	0.94	-
M3	1.61	1.61
M4	3.71	3.71
M5	7.54	7.54
M6	12.87	7.54
M8	31.2	12.87
M10	61.75	12.87
M16	267	-

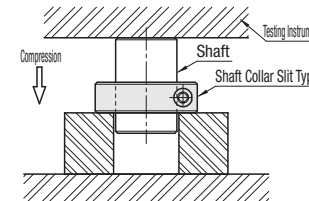
#### Keyless Bushing Type - Standard Type -

Nominal	Tightening Torque (Nm)	
	1045 Carbon Steel	304 Stainless Steel
M6	15.7	9.6

#### Keyless Bushing Type - Nut Type -

D (Inner Diameter)	Tightening Torque (Nm)	
	1045 Carbon Steel	1045 Carbon Steel
12	12	29.4
16	16	49
20	20	105
25	25	171
30	30	218
35	35	288

### Testing Method



### About screw tightening

Aluminum or plastic threads may be damaged by repetitive tightening and loosening of the screw.

Formula for weight: Weight(g) = Volume(cm<sup>3</sup>) x Specific Gravity P.3479  
Specific Gravity 2017 Aluminum Alloy:2.8, 1045 Carbon Steel:7.9, 304 Stainless Steel:8.0

### Slit Type

Dimension	D (Inner Diameter)	B (Width)	M	Max. Thrust Load (kN)			Weight (g)
				SCS / SCSJ (1045 Carbon Steel Black oxide coating)	SSCS (304 Stainless Steel)	SCSA (2017 Aluminum Alloy)	
3	*8	3	0.5	0.5	0.4	11	
4	8	3	0.5	0.5	0.3	14	
	*6	2.6	0.7	0.4	-	8	
5	8	3	1.1	0.7	0.6	17	
	10	4	1.3	1.0	-	26	
	*6	2.6	0.7	0.4	-	10	
6	8	3	1.1	0.5	0.4	17	
	10	4	1.8	1.0	-	21	
	*6	2.6	0.9	0.3	-	14	
	8	3	0.6	0.6	0.1	26	
8	10	4	2.2	1.1	0.3	32	
	12	5	3.3	1.5	-	58	
	15	6	5.1	1.2	-	71	
	*6	2.6	0.7	0.3	-	17	
	8	3	1.2	0.4	-	36	
10	10	4	2.0	1.0	0.3	45	
	12	5	5.1	0.9	-	55	
	15	6	3.9	2.1	-	95	
	*6	2.6	0.7	0.3	-	16	
	8	3	1.1	0.8	-	34	
12	10	4	2.8	0.8	0.5	43	
	12	5	4.0	1.2	-	52	
	15	6	10.0	3.6	-	92	
	*8	3	1.1	0.8	-	28	
13	10	4	2.0	0.7	0.7	43	
	12	5	5.9	1.3	-	67	
	15	6	4.6	1.6	-	90	
	*8	3	1.5	0.6	-	31	
15	10	4	1.5	1.1	1.4	54	
	12	5	5.1	1.8	-	69	
	15	6	5.6	1.4	-	119	

### Wedge Type

Dimension	D (Inner Diameter)	B (Width)	M	Max. Thrust Load (kN)			Weight (g)
				SCS / SCSJ (1045 Carbon Steel Black oxide coating)	SSCS (304 Stainless Steel)	SCSA (2017 Aluminum Alloy)	
16	*8	3	2.1	1.1	-	29	
	10	5	7.1	2.9	1.6	55	
	12	5	5.4	2.3	2.4	67	
	15	6	10.2	1.5	-	116	
18	*10	5	6.5	1.8	-	75	
	12	5	5.1	2.3	-	89	
	15	6	9.4	1.6	-	148	
20	*8	3	2.2	0.8	-	38	
	10	5	5.8	2.7	1.4	69	
	12	5	6.4	1.7	3.4	84	
	15	6	10.4	3.0	3.0	140	
25	*10	4	3.6	1.8	-	66	
	12	5	8.8	2.6	2.1	98	
	15	6	8.8	3.6	2.0	164	
	20	6	10.0	1.2	-	284	
30	*12	5	8.4	2.8	-	111	
	15	6	8.9	2.2	2.4	185	
	20	8	15.0	4.0	-	318	
35	*12	5	6.4	2.4	-	124	
	15	6	9.9	2.7	1.8	207	
40	*12	5	7.0	3.1	-	139	
	18	8	21.3	6.0	6.3	348	
50	*18	8	18.0	4.5	-	415	
	22	10	35.8	11.8	6.7	604	
60	22	10	21.0	-	-	698	
80	32	16	90.0	-	-	1954	
100	36	16	120.0	-	-	2639	

Note 1. \* marked are Compact Types only. (SCSJ, SSCSJ.)

- 2. These values are merely test results, and not guaranteed by the manufacturer.
- 3. Use optimum tightening torques depending on the condition of use by users.

### Keyless Bushing Type - Standard Type -

Dimension	D (Inner Diameter)	B (Width)	M	Max. Thrust Load (kN)			Weight (g)
				SCML (1045 Carbon Steel Black oxide coating)	SSCML (304 Stainless Steel)	SCML (1045 Carbon Steel)	
10	10	4	4	1.6	1.2	29	
12	10	4	2.2	1.4	35		
15	10	4	1.8	1.5	37		
16	12	5	3.0	2.3	57		
20	12	5	3.5	3.0	69		
25	12	5	3.5	3.2	88		
30	12	5	3.2	3.2	94		
35	15	6	-	3.1	154		
40	15	8	-	3.1	243		
50	15	8	-	3.1	299		

### Keyless Bushing Type - Nut Type -

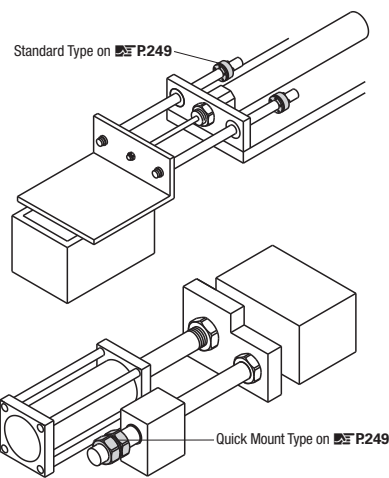
Dimension	D (Inner Diameter)	B (Width)	M	Screw Quantity	Max. Thrust Load (kN)			Weight (g)
					SCML (1045 Carbon Steel Black oxide coating)	SSCML (304 Stainless Steel)	SCML (1045 Carbon Steel)	
12	27	6	3	13.3	4.0	291		
16	27	6	3	13.3	4.0	259		
20	27	6	4	17.8	5.3	372		
25	27	6	4	17.8	5.3	371		
30	28.5	6	5	22.2	6.7	523		
35	28.5	6	5	22.2	6.7	534		

### Keyless Bushing Type - Nut Type -

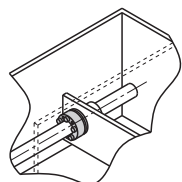
Dimension	D (Inner Diameter)	B (Width)	Max. Thrust Load (kN)		Weight (g)
			SCOL (1045 Carbon Steel Black oxide coating)	SCOL (1045 Carbon Steel)	
12	20	3	3.7	29	
16	25.5	5.4	5.4	54	
20	31.5	8.8	8.8	105	
25	36	15.7	15.7	171	
30	41	17.7	17.7	218	
35	45	20.6	20.6	288	



### Example Cylinder Stopper



### Tightening from axial direction



Use Standard Type on P.249