



# ELECTROMAGNETIC CLUTCH & BRAKE ELECTROMAGNETIC-ACTUATED CLUTCHES & BRAKES CS/101/111

## Instruction Manual

☆This instruction manual describes mainly installation, removal, and notes pertaining to same for standard-specification products after purchase; see the Miki Pulley website and our latest catalog for product specifications and performance.

☆Before use this product, read the instruction manual carefully and use the product safely and correctly.

☆First, please check that it is the correct product and if the product was damaged during transportation.

### CONTENTS

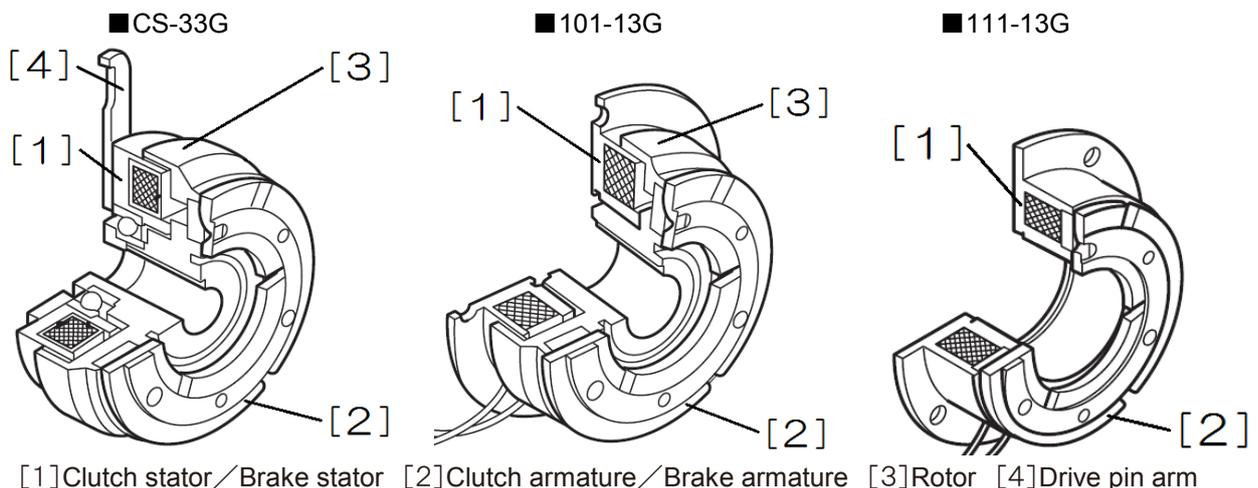
- |                                      |                             |
|--------------------------------------|-----------------------------|
| 1. STRUCTURE AND PARTS               | 6. CONNECTION               |
| 2. NOTES                             | 7. OPERATION CHECK          |
| 3. MOUNTING (COMPONENT CONSTRUCTION) | 8. MAINTENANCE & INSPECTION |
| 4. MOUNTING (STATOR AND ROTOR)       | 9. REMOVING THE PRODUCT     |
| 5. MOUNTING (ARMATURE)               |                             |

## 1. STRUCTURE AND PARTS

### Note

The method of installation and accessories depend on the product model and type (varistor, screw type, disc spring washer, shim).

Model	C S			1 0 1			1 1 1		
Type	3 3 G	3 5 G	3 1 G	1 3 G	1 5 G	1 1 G	1 3 G	1 2 G	1 1 G
Armature	Type-3	Type-5	Type-1	Type-3	Type-5	Type-1	Type-3	Type-2	Type-1
Application	CLUTCH			CLUTCH			BRAKE		
Main parts	Clutch stator & Drive pin arm Clutch armature Rotor(Integrated with the stator)			Clutch stator Clutch armature Rotor			Brake stator Brake armature		



## 2. NOTES

### 2.1 SAFETY PRECAUTIONS

Please read carefully through the instruction manual and the technical information for proper use and safety. In this manual, safety precautions are classified by "DANGER" and "CAUTION".

**[CLASS]**

	<b>DANGER</b>	When death or serious injury may result by mishandling.
	<b>CAUTION</b>	When disability or only physical damage may result by mishandling.

**[FIGURE SIGN]**

	<b>PROHIBITION</b>	In the handling of the product, it indicates that prohibit the act.
	<b>CAUTION</b>	In the handling of the product, it indicates that attention is required.
	<b>MANDATORY</b>	In the handling of the product, it indicates that the action is compulsory on the basis of the instructions.

## DANGER

	<b>Make sure that the main power of the product is off before mounting or performing maintenance/inspection.</b>		<b>Set up a safety mechanism such as a safety brake to avoid any danger.</b>
	It is extremely dangerous if the driving part starts operating by accident while handling the product.		The driven and driving sides could become completely detached if the product is damaged while in operation and not immediately halted.
	<b>Do not use in flammable environments.</b>		<b>Be sure to use a safety cover.</b>
	There is a danger of explosion due to sparks from machinery or the product in operation. In particular, explosion can occur easily in environments with oil/grease or flammable gas.		It is extremely dangerous if hands, fingers, hair, clothing, etc. get caught in the product or a rotating part while in operation.

## CAUTION

	<b>Do not touch the hot brake body or power supply.</b>		<b>Always use bolts specified by Miki Pulley and a calibrated torque wrench correctly to install brakes at the specified tightening torque.</b>
	Hot while in operation; will result in burn injuries if touched. Warm surroundings will prevent brake body heat from dissipating; locate in a well-ventilated area.		Depending on the tightening adjustment of bolts or screws, exceptionally dangerous situations such as product damage or performance degradation could occur.
	<b>Be careful lifting a heavy weight. Do not lift with a bad posture.</b>		<b>Use a safety glasses or gloves.</b>
	Straining yourself to lift a heavy product or using a torque wrench, or an awkward posture when installing the product in a machine could cause back injury.		Sharp portions of product bore diameter, keyway, shaft keyway, etc. may cause injury. Wear protective equipment to also prevent burn injuries and electric shock.

## 2. 2 IMPORTANT POINTS OF PRODUCT SPECIFICATIONS

	<p><b>Do not use the product in a bad environment.</b>  <b>Product is for dry use; do not allow exposure to water or oil/grease.</b></p>		<p><b>Request disposal with a waste-collection company, or dispose of according to laws and regulations.</b></p>
	<p>Operating temperature range:                  -10~+40°C</p> <p>Do not use the product in an environment where water, oil, or chemicals may spill (no matter how little), that is corrosive, where temperature is extremely high or low, that is dusty, where condensation forms, that is exposed to wind and rain, or that is subject to a high degree of vibration/impact; may cause product damage or performance deterioration.</p>		<p>When disposing of the product, request disposal with professionals, or dispose of according to law and local regulations if disposing of product by yourself.                  Do not dispose of or leave unattended where children play or in a public space.</p>
	<p><b>Never disassemble, modify, additionally process, or perform any work on the product other than drilling.</b></p>		
	<p>We do not guarantee quality nor shall we be liable for damages in the event of damage or affected performance of the product or of injury or accident occurring as a result of the product being disassembled, modified, or additionally processed by the customer.</p>		

## 2. 3 IMPORTANT POINTS BEFORE MOUNTING

	<p><b>Do not carry with the lead wire dangling.</b>  <b>Do not pull or bend the lead wire forcefully.</b></p>		<p><b>Make sure to keep fluctuations in power supply voltage to within ±10% of the rated voltage.</b></p>
	<p>May break wire, and render the product unusable. If lead wire breaks or slips from your hand, the product may fall on and injure your foot.</p>		<p>Extreme fluctuations in power voltage may prevent the product from reaching optimal performance.</p>
	<p><b>Do not use any bolt or screw other than the bolts on the product.</b></p>		<p><b>Implement screw-locking measures such as an adhesive thread-locking compound to bolts and screws used to install products.</b></p>
	<p>Check the strength category of the bolt or screw as well as the strength and material of where the product is being installed. Inadequate strength will result in the product being poorly installed and may cause an accident.</p>		<p>Loosening of the bolts or screws due to operational vibration, etc. may allow the product to detach and cause an accident.</p>

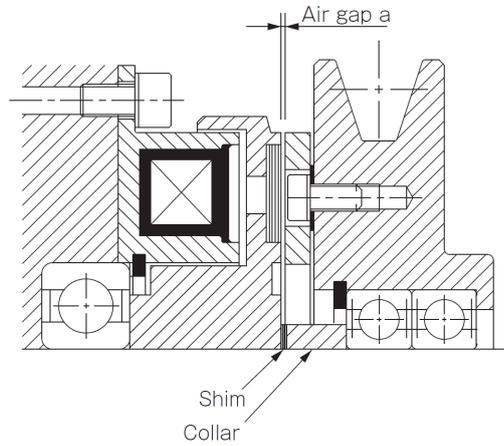
### 3. MOUNTING (COMPONENT CONSTRUCTION)

Observing the mounting precision for each component, first mount the stator and rotor, and then the armature, as shown in the component construction diagram.

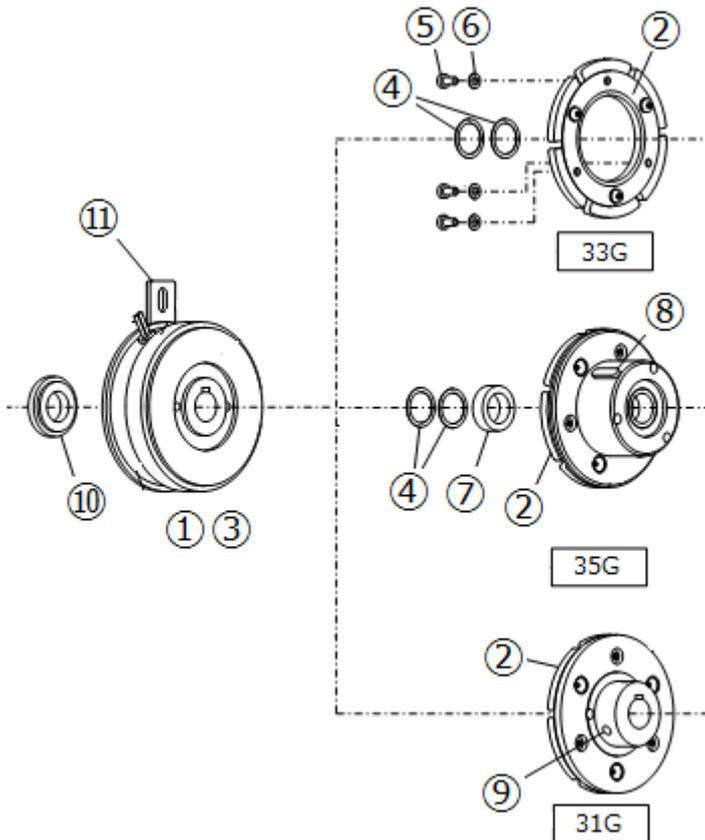
Beforehand, be sure to see "Items Checked for Design Purposes"/especially "Air Gap Design and Adjustment", etc. in the catalog, and also again check aspects which were considered when designing the system such as setting the air gap "a" between the frictional surfaces and eliminating axial play.

[CONTROL AIR GAP VALUE]

SIZE	Air gap a [mm]
06	0.2 ±0.05
08	0.2 ±0.05
10	0.2 ±0.05
12	0.3 +0.05 ~ -0.1
16	0.3 +0.05 ~ -0.1
20	0.5 +0 ~ -0.2
25	0.5 +0 ~ -0.2

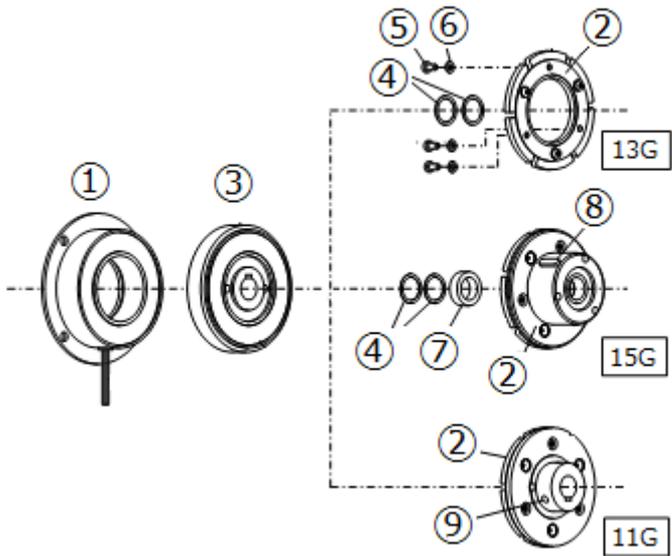


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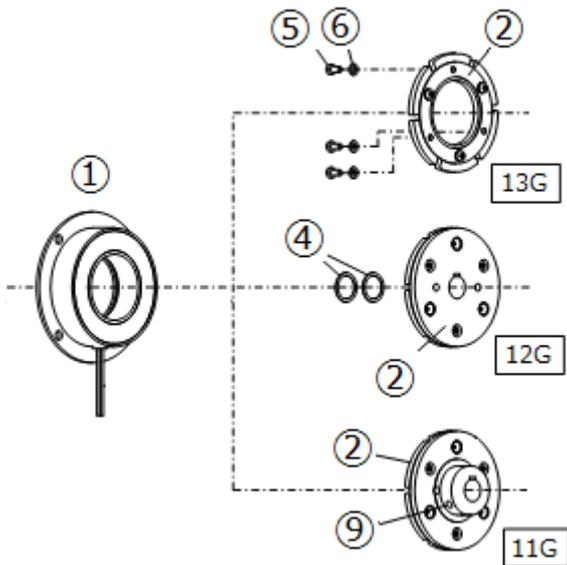
①Stator ②Armature ③Rotor ④Shims ⑤Special hexagon socket head cap screw (low-head) ⑥Disc spring washer ⑦Collar ⑧Key ⑨Hexagon socket set screw ⑩Bearing holder ⑪Drive pin arm

■101



①Stator ②Armature ③Rotor ④Shims ⑤Special hexagon socket head cap screw(low-head) ⑥Disc spring washer ⑦Collar ⑧Key ⑨Hexagon socket set screw

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①Stator ②Armature ④Shims ⑤Special hexagon socket head cap screw(low-head) ⑥Disc spring washer ⑨Hexagon socket set screw

## 4. MOUNTING (STATOR AND ROTOR)

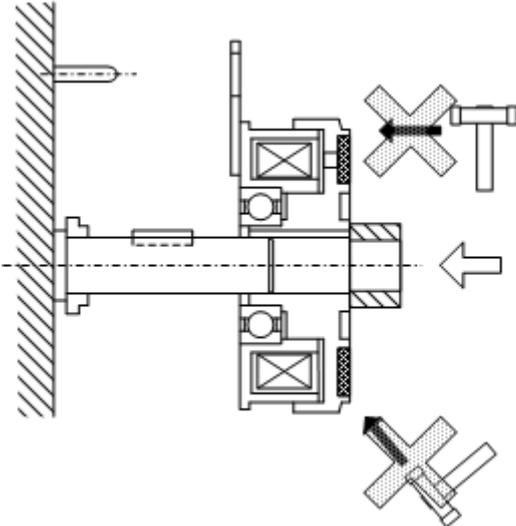
### 4.1 CS MODEL

Note that mounting method and check points differ with other models and per each type of armature as in the table below.

Model	C S		
Type	3 3 G	3 5 G	3 1 G
Armature	Type-3	Type-5	Type-1
Mounting method	Bearing-mounted type (Shaft-mounted type)		
	Installation of drive pin arm on stator		
	For use with through-shafts or butt shafts	For use with through-shafts	For use with butt shafts
Check points			Concentricity between the rotation shaft and other shaft

(1)

Insert the stator (integrated with the rotor) onto the shaft. Press carefully using a piece of metal as a tool, avoiding hitting with a hammer, etc.

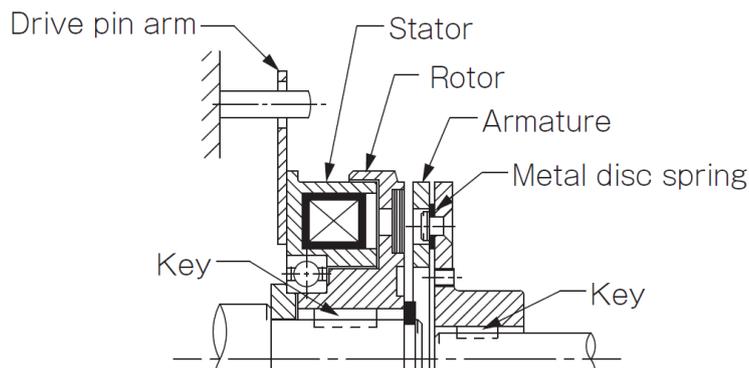


(2)

The drive pin arm should therefore be held to the machinery's stationary parts to prevent drag turning. Hold lightly in the direction of rotation without pushing it in the axial direction.

**Note**

Holding the drive pin arm forcefully can noticeably shorten the service life of the bearings in the stator. Let the drive pin arm have a little play in the direction of rotation.



(3)

Type 31G for use with butt shafts: make sure that the concentricity between the rotation shaft and other shaft does not exceed the allowable values in the table below.

**【MOUNTING PRECISION BETWEEN THE ROTATION SHAFT AND OTHER SHAFT】**

※Accuracy value is indicated by T.I.R.

(Total Indicator Reading = difference in minimum and maximum runout values)

SIZE	Concentricity T.I.R. [mm]
<b>06</b>	<b>0.08</b>
<b>08</b>	<b>0.08</b>
<b>10</b>	<b>0.1</b>
<b>12</b>	<b>0.1</b>
<b>16</b>	<b>0.12</b>
<b>20</b>	<b>0.12</b>
<b>25</b>	<b>0.14</b>

## 4.2 101 MODEL

Note that mounting method and check points differ with other models and per each type of armature as in the table below.

Model	1 0 1		
Type	1 3 G	1 5 G	1 1 G
Armature	Type-3	Type-5	Type-1
Mounting method	Flange-mounted type(Wall-mounted type)		
	For use with through-shafts or butt shafts	For use with through-shafts	For use with butt shafts
Check points	Concentricity and perpendicularity between stator and shaft		
	Positional relationship between stator and rotor		
			Concentricity between the rotation shaft and other shaft

(1)

These stators must be correctly positioned with respect to the rotation shaft before mounting.

The inner and outer circumferences of the stators have grades for fit.

The surface on which the stator is mounted should be positioned relative to the rotation shaft and the allowable values for concentricity and perpendicularity of the diameter should not be exceeded.

**Note**

Bolts should be hexagon socket head cap screws, with a strength category of 10. 9.

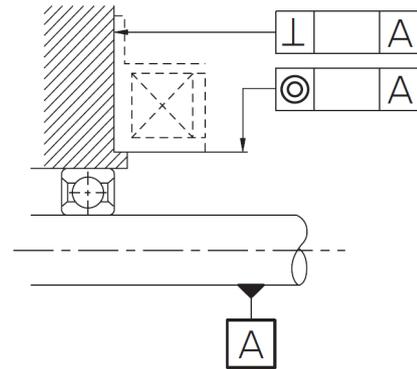
Select the bolt length according to your design specifications.

【MOUNTING PRECISION BETWEEN STATOR AND THE ROTATION SHAFT】

※Accuracy value is indicated by T.I.R.

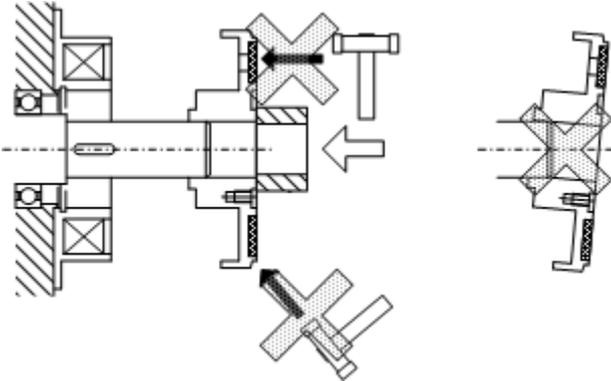
(Total Indicator Reading = difference in minimum and maximum runout values)

SIZE	Concentricity T.I.R. [mm]	Perpendicularity T.I.R. [mm]
06	0.08	0.05
08	0.08	0.05
10	0.1	0.05
12	0.1	0.07
16	0.12	0.08
20	0.12	0.13
25	0.14	0.13



(2)

Insert the rotor onto the shaft. Press carefully using a piece of metal as a tool, avoiding hitting with a hammer, etc.



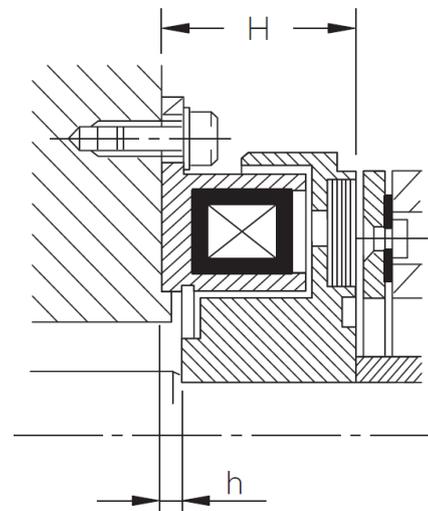
(3)

Check with 【THE POSITIONAL RELATIONSHIP BETWEEN STATOR AND ROTOR】.

The positional relationship between rotor and stator is important. The table below lists allowable values for each size. The allowable value for the dimension h should conform to the normal JIS allowable value (medium specification). If the dimension H in the figure below is too small, the rotor and stator will touch; if H is too large, the attraction force will decline.

【THE POSITIONAL RELATIONSHIP BETWEEN STATOR AND ROTOR】

SIZE	H [mm]	h [mm]
06	24.0±0.2	2.0±0.1
08	26.5±0.2	2.5±0.1
10	30.0±0.3	3.0±0.1
12	33.5±0.3	3.5±0.1
16	37.5±0.3	3.5±0.1
20	44.0±0.4	4.0±0.1
25	51.0±0.4	4.0±0.1



(4)

Type 11G for use with butt shafts: make sure that the concentricity between the rotation shaft and other shaft does not exceed the allowable values in the table below.

**【MOUNTING PRECISION BETWEEN THE ROTATION SHAFT AND OTHER SHAFT】**

※Accuracy value is indicated by T.I.R.

(Total Indicator Reading = difference in minimum and maximum runout values)

SIZE	Concentricity T.I.R. [mm]
<b>06</b>	<b>0.08</b>
<b>08</b>	<b>0.08</b>
<b>10</b>	<b>0.1</b>
<b>12</b>	<b>0.1</b>
<b>16</b>	<b>0.12</b>
<b>20</b>	<b>0.12</b>
<b>25</b>	<b>0.14</b>

### 4.3 111 MODEL

Note that mounting method and check points differ with other models and per each type of armature as in the table below.

Model	1 1 1		
Type	1 3 G	1 2 G	1 1 G
Armature	Type-3	Type-2	Type-1
Mounting method	Flange-mounted type		
	(Rotor-mounted type)	(Shaft-mounted type)	
Check points	Concentricity and perpendicularity between stator and shaft		

(1)

These stators must be correctly positioned with respect to the rotation shaft before mounting.

The inner and outer circumferences of the stators have grades for fit.

The surface on which the stator is mounted should be positioned relative to the rotation shaft and the allowable values for concentricity and perpendicularity of the diameter should not be exceeded.

**Note**

Bolts should be hexagon socket head cap screws, with a strength category of 10. 9.

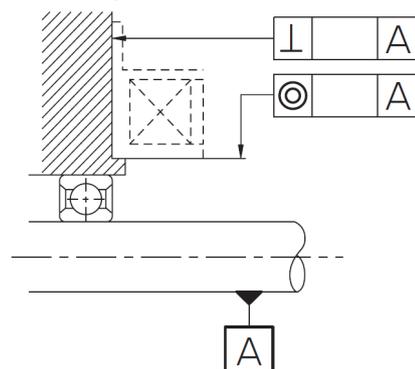
Select the bolt length according to your design specifications.

**【MOUNTING PRECISION BETWEEN STATOR AND THE ROTATION SHAFT】**

※Accuracy value is indicated by T.I.R.

(Total Indicator Reading = difference in minimum and maximum runout values)

SIZE	Concentricity T.I.R. [mm]	Perpendicularity T.I.R. [mm]
<b>06</b>	<b>0.08</b>	<b>0.05</b>
<b>08</b>	<b>0.08</b>	<b>0.05</b>
<b>10</b>	<b>0.1</b>	<b>0.05</b>
<b>12</b>	<b>0.1</b>	<b>0.07</b>
<b>16</b>	<b>0.12</b>	<b>0.08</b>
<b>20</b>	<b>0.12</b>	<b>0.13</b>
<b>25</b>	<b>0.14</b>	<b>0.13</b>

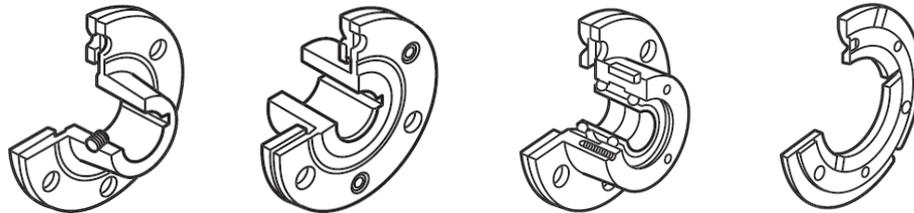


## 5. MOUNTING (ARMATURE)

Note when mounting that check points and required components/processing differ per each type of armature as in the table below.

Before affixing the armature securely, a shim, collar, etc. is necessary for ensuring the air gap between the frictional surfaces and eliminating axial play.

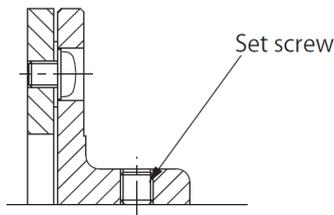
Model/Type	CS-31G 101-11G 111-11G	111-12G	CS-35G 101-15G	CS-33G 101-13G 111-13G
Armature	Type-1	Type-2	Type-5	Type-3
Check points				Mounting precision between armature and shaft
Required components and processing for mounting or affixing the armature	① Hexagon socket set screw ② Shaft keyway machining	① Components for affixing armature (C-shaped retaining ring, collar, etc.) and recessing of shaft ② Shaft keyway machining	① Components for affixing armature (C-shaped retaining ring, collar, etc.) and recessing of shaft	① Armature mounting components and processing of screw bores and clearance well for screw/rivet heads ② Special hexagon socket head cap screws (low-head) ③ Disc spring washer ④ Torque wrench



### 5.1 ARMATURE TYPE-1

Securely affix the armature with the provided hexagon socket set screw.

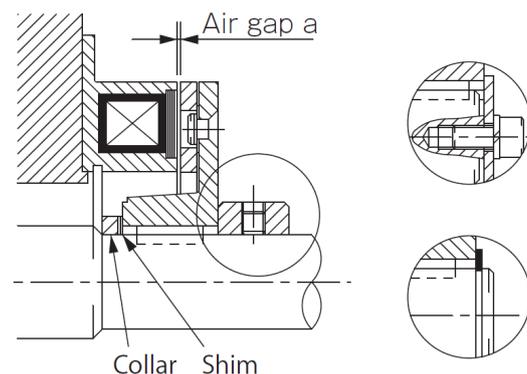
If you are concerned that it might be loosened by vibration or high-frequency operations, apply adhesive to the threads, which is effective in stopping loosening.



### 5.2 ARMATURE TYPE-2

Since the boss is hidden on the inside of the stator, secure it firmly using a C-shaped snap ring, collar, or the like, as shown in the figure below.

After securing, check that the air gap "a" between the frictional surfaces calculated at the design stage is at the control value.



### 5.3 ARMATURE TYPE-5

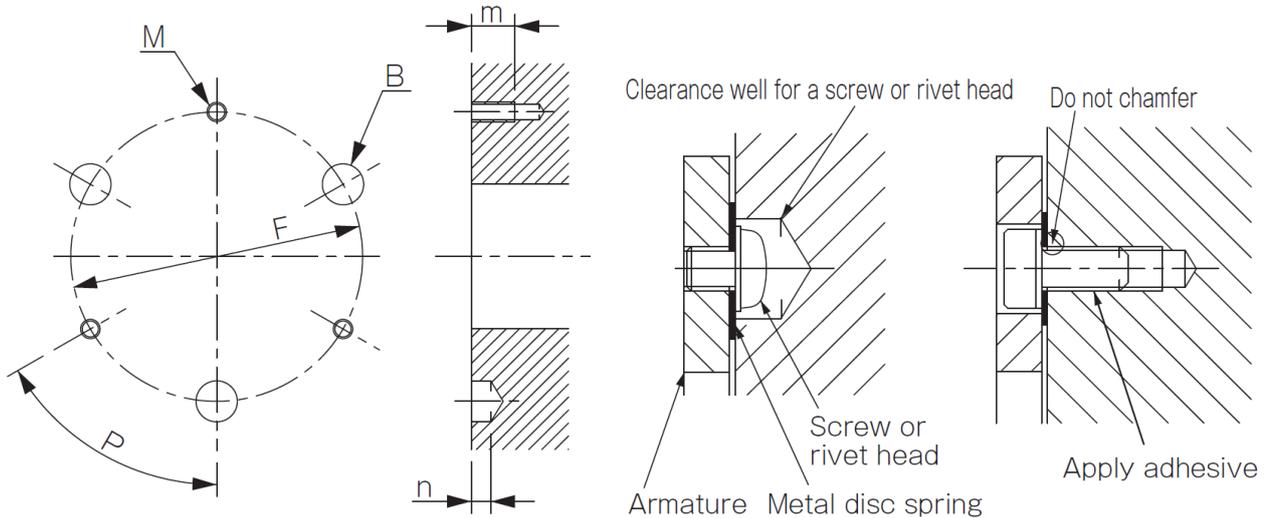
As when assembling armature type-2, firmly press the end face of the armature with a C-shaped snap ring, collar or the like.

### 5.4 ARMATURE TYPE-3

(1)

Machine in the screw bores and clearance well for screw and/or rivet heads in the mounting surface. The mounting screw bores should not be beveled; simply removing burr is sufficient.

SIZE	F (P.C.D.) [mm]	P	M [mm]	m (MIN) [mm]	B [mm]	n (MIN) [mm]
06	46±0.05	60° ±5'	3-M3	7	3-7	3.5
08	60±0.05	60° ±5'	3-M4	9	3-8.5	3.5
10	76±0.05	60° ±5'	3-M5	11	3-10.5	4
12	95±0.05	60° ±5'	3-M6	11	3-12.5	4
16	120±0.05	60° ±5'	3-M8	16	3-15.5	4.5
20	158±0.05	60° ±5'	3-M10	18	3-19	5.5
25	210±0.1	45° ±5'	4-M12	22	4-22	6



(2)

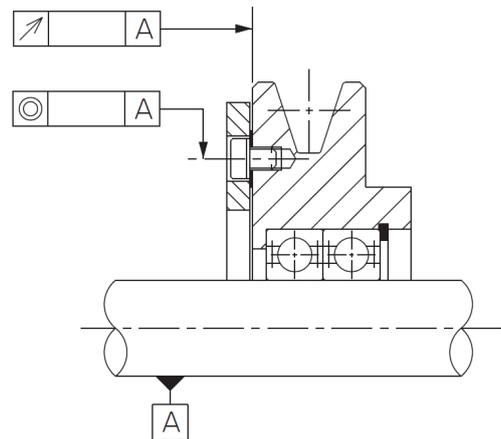
Assemble armature type-3 correctly so that the concentricity and perpendicularity relative to the rotation shaft do not exceed the allowable values in the table below.

**[MOUNTING PRECISION BETWEEN THE ATTACHMENT SURFACES AND THE ROTATION SHAFT]**

※Accuracy value is indicated by T.I.R.

(Total Indicator Reading = difference in minimum and maximum runout values)

SIZE	Surface runout T.I.R. [mm]	Concentricity T.I.R. [mm]
06	0.16	0.04
08	0.16	0.05
10	0.16	0.05
12	0.16	0.06
16	0.16	0.07
20	0.24	0.11
25	0.24	0.11



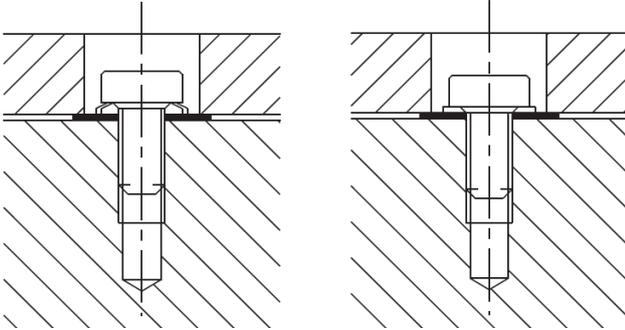
(3)

Mount the armature using the supplied special hexagon socket head cap screws and disc spring washers. Use disc spring washers as depicted in the figure below. They will not fasten effectively if used facing backwards.

**Note**

The special hexagon socket head cap screws supplied are special low-head bolts.

(Before being tightened down)      (After being tightened down)



(4)

Affix the armature by tightening the special hexagon socket head cap screws evenly to the tightening torque values in [INSTALLATION BOLT SPECIFICATIONS AND TIGHTENING TORQUES] using a calibrated torque wrench correctly.

Also implement screw-locking measures such as an adhesive thread-locking compound at the same time. Never allow adhesive, etc. to adhere anywhere other than the special hexagon socket head cap screws.

[INSTALLATION BOLT SPECIFICATIONS AND TIGHTENING TORQUES]

SIZE	Special hexagon socket head cap screws (low-head)	
	Nominal size	Tightening torque [N · m]
<b>06</b>	<b>M3</b>	<b>1.08</b>
<b>08</b>	<b>M4</b>	<b>2.5</b>
<b>10</b>	<b>M5</b>	<b>5.2</b>
<b>12</b>	<b>M6</b>	<b>8.8</b>
<b>16</b>	<b>M8</b>	<b>22.0</b>
<b>20</b>	<b>M10</b>	<b>40.0</b>
<b>25</b>	<b>M12</b>	<b>77.0</b>

## 6. CONNECTION

Beforehand, be sure to see “Items Checked for Design Purposes”, etc. in the catalog, and also again check aspects which were considered when designing the system such as circuits (control circuit, power supply circuit, discharge circuit) and components for power supplies (transformers, rectifiers, relays).

### 6. 1 POWER SUPPLIES

Voltage is DC 24 V . Users who use any of our recommended power supplies (listed in our catalog) can use full-wave rectified single-phase commercial AC 100 V or 200 V.

Make sure to keep fluctuations in voltage to within  $\pm 10\%$ .

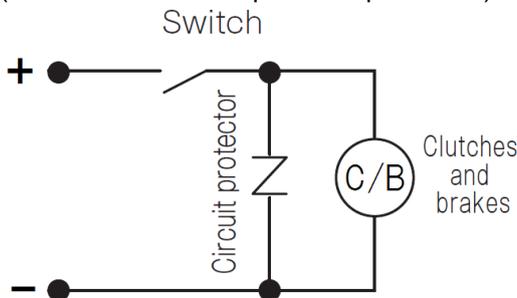
### 6. 2 SWITCHING

Set switching to the DC side. It can also be set to the AC side, however, operation time becomes longer.

### 6. 3 CIRCUIT PROTECTORS (VARISTOR)

Connect in parallel with the clutch or brake. This element does not have polarity.

Also note that our selection of recommended power supplies features units with a built-in circuit protector (connection to circuit protector prohibited).



## 7. OPERATION CHECK

### 7. 1 OPERATION CHECK

After completing installation and wiring, first operate the product without transmitting power to check that it operates normally.

If operation is normal, engage the product with the driving side. Use caution, as fingers can be caught with only the operation of the product.

### 7. 2 TEST RUN

Test run the product. If abnormal noise or vibration is generated, stop the product immediately and remedy the cause.

Also check that the product is running “below the allowable energy rate” and “below the maximum rotation speed”.

## 8. MAINTENANCE & INSPECTION

Although the product requires almost no maintenance during its life when used under normal operating conditions, periodically inspection will allow longer and better performance of its function.

Also be sure to carry out routine maintenance and inspection according to any items specified separately for the machinery or apparatus with which the product is combined.

Periodic check points:

- ① Normal on-off operation
- ② Abnormal noise generation
- ③ Abnormal heat generation
- ④ Friction parts and revolving parts for entering or sticking of foreign objects, water, oil, grease.
- ⑤ Widening of friction part clearance
- ⑥ Large amounts of rust
- ⑦ Proper supply of exciting voltage
- ⑧ Broken lead wire or poor connection
- ⑨ Operating temperature range

### 【CONTROL AIR GAP VALUE】

When inspecting the above air gap, adjust if the gap is wider than the value in the table.

SIZE	Initial [mm]	Limit [mm]
<b>06</b>	<b>0.2 ±0.05</b>	<b>0.4</b>
<b>08</b>	<b>0.2 ±0.05</b>	<b>0.4</b>
<b>10</b>	<b>0.2 ±0.05</b>	<b>0.5</b>
<b>12</b>	<b>0.3 +0.05 ~ -0.1</b>	<b>0.6</b>
<b>16</b>	<b>0.3 +0.05 ~ -0.1</b>	<b>0.8</b>
<b>20</b>	<b>0.5 +0 ~ -0.2</b>	<b>1.0</b>
<b>25</b>	<b>0.5 +0 ~ -0.2</b>	<b>1.0</b>

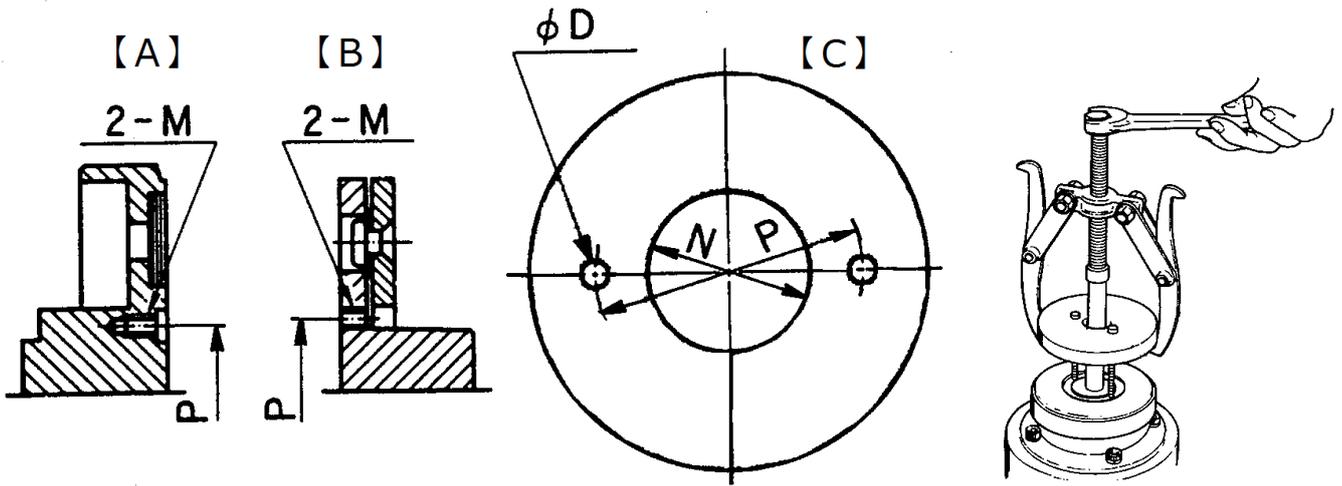
## 9. REMOVING THE PRODUCT

If the customer is disassembling or assembling the product, information on removing parts to facilitate work is given at THE POSITIONAL RELATIONSHIP BETWEEN STATOR AND ROTOR (dimensions H and h) described earlier and at adjustment of the air gap between friction parts under INSPECTION above.

Before beginning work, the customer is required to prepare a plate (pull plate) beforehand as in the figure.

Pull holes are provided in the rotor and armature to allow them to be removed from the shaft. Remove with a gear puller, etc. using the plate and a bolt that matches pull holes.

However, avoid directly pulling on the rotor, etc. with the gear puller or striking with a hammer. Doing so may cause product damage or performance deterioration.



[A]Rotor [B]Armature [C]Plate

SIZE	Rotor		Armature Type-1 Type-2		Plate	
	P (P.C.D.)	M	P (P.C.D.)	M	D	N
<b>06</b>	<b>28</b>	<b>M4</b>	<b>31</b>	<b>M4</b>	<b>5</b>	<b>18</b>
<b>08</b>	<b>34</b>	<b>M4</b>	<b>37</b>	<b>M4</b>	<b>5</b>	<b>22</b>
<b>10</b>	<b>45</b>	<b>M4</b>	<b>47</b>	<b>M4</b>	<b>5</b>	<b>30</b>
<b>12</b>	<b>54</b>	<b>M4</b>	<b>56</b>	<b>M4</b>	<b>5</b>	<b>40</b>
<b>16</b>	<b>71</b>	<b>M5</b>	<b>73</b>	<b>M5</b>	<b>6</b>	<b>55</b>
<b>20</b>	<b>90</b>	<b>M6</b>	<b>93</b>	<b>M6</b>	<b>7</b>	<b>70</b>
<b>25</b>	<b>112</b>	<b>M8</b>	<b>120</b>	<b>M8</b>	<b>9</b>	<b>85</b>

# MIKI PULLEY

<http://www.mikipulley.co.jp/>

### Contact by email

Please contact us using the inquiry form and be aware that support for inquiries received on Saturdays, Sundays, holidays, New Year's, and summer business holidays will be provided on the next business day.

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