10. Maintenance

10.1 Maintenance Schedule

Perform maintenance work according to the schedule below.

The schedule is set assuming eight hours of operation a day. When the operation time is long such as 24-hour operation, shorten the maintenance intervals as needed.

	Visual inspection	Check interior	Grease supply
Start of operation	O		
After 1 month of operation	O		
After 6 months of operation	O	O	
After 1 year of operation	O	O	O
Every 6 months thereafter	O		
Every 1 year	O	O	O

10.2 Visual Inspection of the Machine Exterior

Check the following items when carrying out visual inspection.

Body	Loose mounting bolts?
Cables	Damage to cables or connection to connector box?
Stainless sheet	Damage or foreign deposit?
General	Unusual noise or vibrations?

10.3 Cleaning

- Clean the exterior as needed.
- Wipe off dirt with a soft cloth.
- Do not use strong compressed air on the actuator as this may force dust into the crevices.
- Do not use petroleum-based solvent on plastic parts or painted surfaces.
- If the unit is badly soiled, apply a neutral detergent or alcohol to a soft cloth, and wipe gently.

10.4 Interior Inspection

Turn off the power, remove the side covers, and then visually inspect the interior.
Check the following items during interior inspection.

Body	Loose mounting bolts?
Guides	Lubrication appropriate? Soiling?
Ball screw	Lubrication appropriate? Soiling?

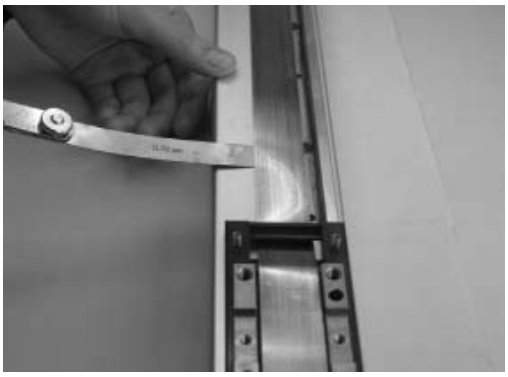
How to inspect the interior:

1) Remove both side covers.
   With the SA5, SA6 SA7 or SS type, use an Allen wrench of 1.5 mm across flats. With the SM type, use an Allen wrench of 2 mm across flats.

Make a visual check of the interior to see if there is any dust or foreign matter in the unit and check the lubrication. Even if the grease you see around the parts is brown, the lubrication is fine as long as the traveling surface appears shiny.

2) If the grease becomes dirty and dull or if the grease has worn away due to extended operating time, lubricate the parts after cleaning them.

3) When the inspection/maintenance work is complete, install the side covers.
   Tightening torque (SA5/SA6/SA7/SS): Thin-head screw M3 x 6 – 87.2 N·cm (8.90 kgf·cm)
   Tightening torque (SM): Thin-head screw M4 x 6 – 204 N·cm (20.8 kgf·cm)



When installing the side covers, do not let them contact the end faces of the stainless sheet. It may damage or bend the stainless sheet, causing the sheet to deteriorate or wear quickly. To prevent this problem, insert a shim (approx. 0.1 to 0.2 mm) between the sheet and each cover to provide an allowance, and gently push in the cover.

Caution:	When checking the interior, be careful not to bend or scratch the stainless sheet. Wear protective gloves when handling the stainless sheet, because it has sharp edges that may cause accidental cuts. The front cover is supporting the ball screw, so do not disassemble the front cover. If the front cover is misaligned, the shaft centers may become offset, thus increasing the traveling resistance, reducing the service life of each part, or generating noise.

10.5 Internal Cleaning

- Wipe off dirt with a soft cloth.
- Do not use strong compressed air on the actuator as this may force dust into the crevices.
- Do not use petroleum-based solvent, neutral detergent or alcohol.

Caution:	Do not use flushing oil, molybdenum grease or anti-rust lubricant. When grease is soiled with large amounts of foreign substances, wipe off the dirty grease and then apply new grease.

10.6 Lubricating the Guides and Ball Screw

10.6.1 What Grease to Use on the Guides

The following grease is used when we ship the unit.

Idemitsu Kosan	Daphne Eponex Grease No.2

Other companies also sell a grease similar to this. If ordering from another maker, give the name of this product and request something comparable. Comparable products include the following:

Showa Shell Oil	Albania Grease No. 2
Mobil Oil	Mobilux 2

10.6.2 What Grease to Use on the Ball Screw

The following grease is used when we ship the unit.

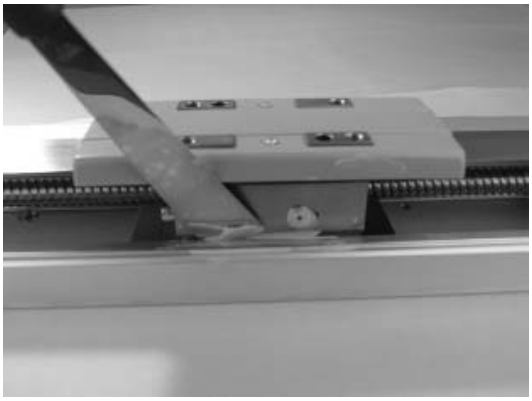
This grease offers excellent properties such as low heat generation, and is suitable for lubricating ball screws.

Kyodo Yushi	Multemp LRL3

⚠ Warning:	Never use any fluorine based grease. It will cause a chemical reaction when mixed with a lithium based grease and may cause damage to the actuator.

10.6.3 How to Apply Grease

1) When greasing the guide, use a spatula or grease applicator to squeeze or inject grease into the space between the slider and base, and then move the slider back and forth several times to let the grease spread evenly.
   Apply grease on the guides on both sides.
   Remove excess grease.



2) When greasing the ball screw, clean the ball screw, apply grease using a finger, and then move the slider back and forth several times to let the grease spread evenly.
   At this time, be careful not to deform the stainless sheet by accidentally touching the sheet.
   Remove excess grease.

3) Install the side covers.
   Tightening torque (SA5/SA6/SA7/SS): Thin-head screw M3 x 6 – 87.2 N·cm (8.90 kgf·cm)
   (SM): Thin-head screw M4 x 6 – 204 N·cm (20.8 kgf·cm)

   Refer to 3) in 10.4, “Interior Inspection,” for notes on installing the side covers.

10.7 Replacing/Adjusting the Stainless Sheet

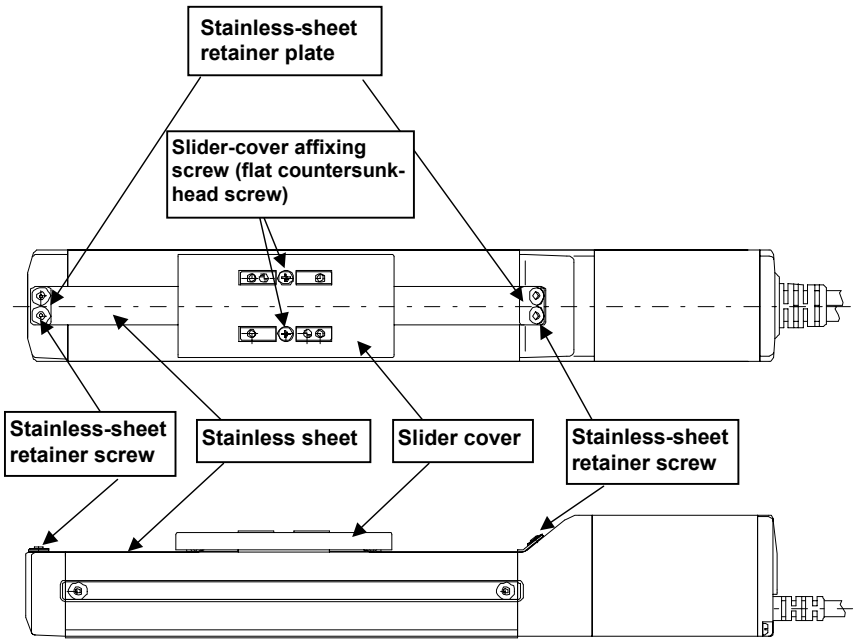
[Items Required for Replacement]

- Replacement stainless sheet
- Clearance-checking tool (a regular slider cover with holes)
  (This tool is available from IAI's Sales Engineering Section. If you are replacing the stainless sheet, please contact us to make a rental arrangement or purchase the tool.)
- Allen wrench set • Phillips screwdriver • Measure

[Note on Stainless Sheet Tension]

Deterioration and wear of the stainless sheet is affected by its tension.
If the stainless sheet is too tight, excessive clearances will be created between the sheet and slider covers and the sheet may undergo a fatigue failure.
If the stainless sheet is too loose, the sheet will contact the back of the slider covers and generate shaving.
Therefore, use a dedicated adjustment tool to properly adjust the tension of the stainless sheet so that the clearances between the stainless sheet and slider covers conform to the specified dimension.

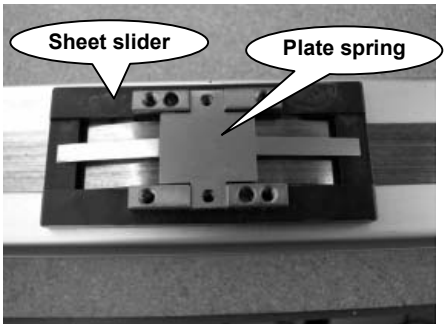
[Name of Each Part]



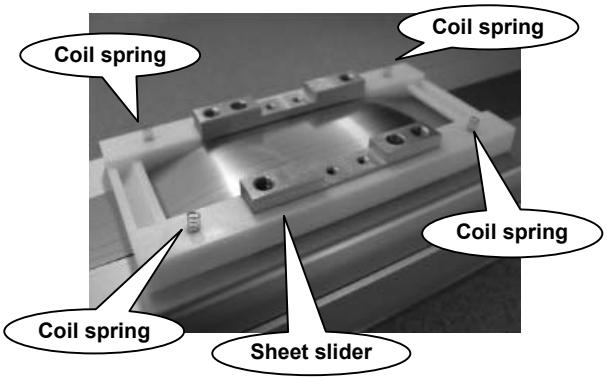
[Procedure]

1) Remove the slider-cover affixing screws and remove the covers.
   <u>After the slider covers have been removed</u>

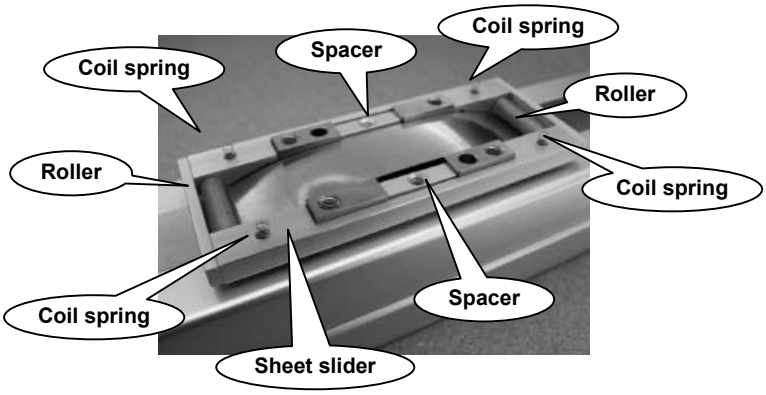
   ① Standard specification (slider structure)
   - SA5



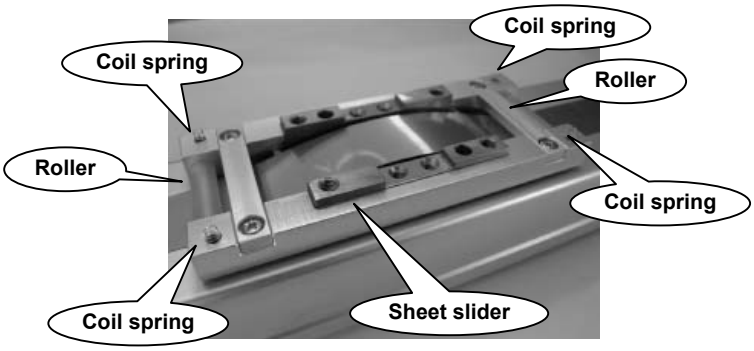
   - SA6/SA7/SS/SM



   ② SR specification (roller structure)
   - SA5/SA6

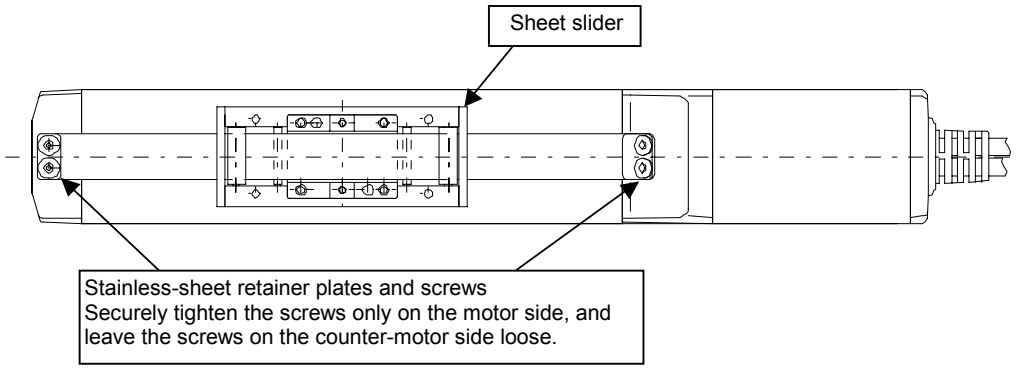


   - SA7/SS/SM

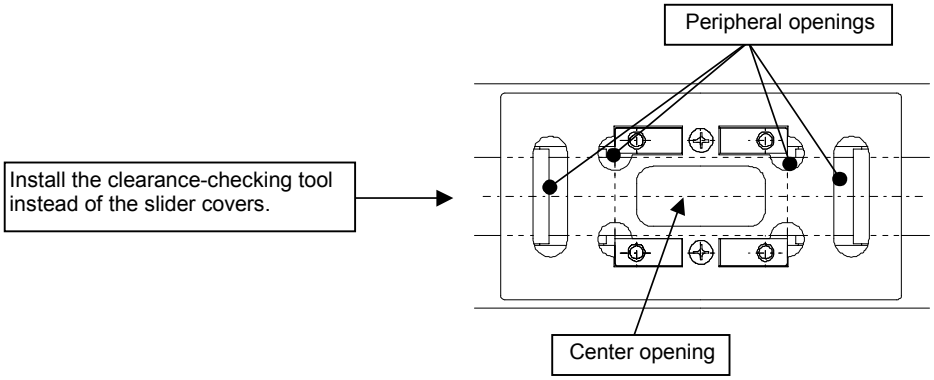


Caution:	Remove the slider covers slowly and gently. If the actuator is installed on the ceiling or oriented vertically or horizontally on side, place a plastic bag, etc., underneath the slider covers so as not to lose the coil springs and spacers in case they drop off.

2) Remove the stainless-sheet retainer screws on both sides and pull out the stainless sheet.
3) Guide a new stainless sheet into the slider.
4) Hold the stainless sheet in place, and affix the retainer plates and screws.
   At this time, securely tighten the screws only on the motor side, and leave the screws on the counter-motor side loose.

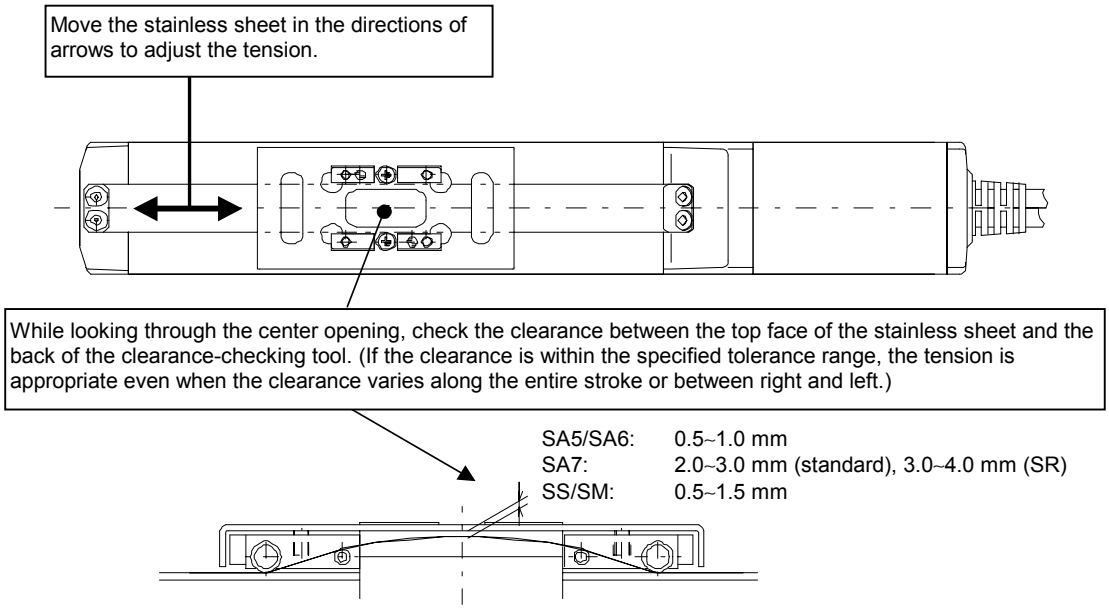


5) Install the clearance-checking tool.



6) Adjust the tension of the stainless sheet.

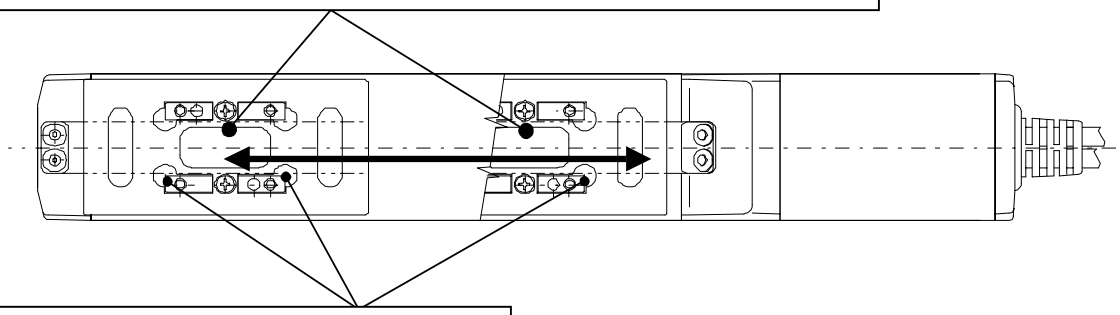
① While looking through the center opening in the clearance-checking tool, move the stainless sheet on the loose end in the directions of arrows until the clearance between the top face of the stainless sheet and the back of the clearance-checking tool falls within the specified range.



② When the stainless sheet has been properly positioned, tighten the screws on the loose end to a level that the stainless sheet no longer moves.

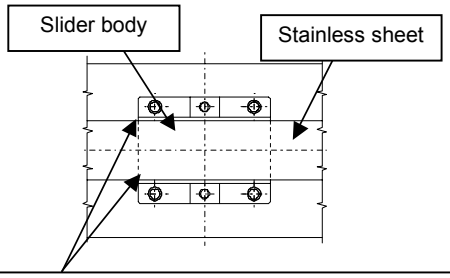
③ Move the slider and check the tension of the stainless sheet along the entire stroke.

Checkpoint 1:
Check if the clearance between the top face of the stainless sheet and the back of the clearance-checking tool falls within the specified range along the entire stroke.



Checkpoint 2:
Look through the peripheral openings and confirm that the stainless sheet edges do not contact the slider body.
Move the slider back and forth at least three times over the entire stroke to ensure the edges do not contact the slider.
The sheet may move during the slider strokes, but slight movement is acceptable as long as the offset does not increase and the sheet does not contact the slider.
If the stainless sheet contacts the slider, repeat the adjustment from ①.

The stainless sheet is not perfectly straight, but it bends to right and left slightly.
It is impossible to adjust the right and left clearances perfectly uniform.
Slight variation in clearance in the stroke direction or between right and left is acceptable, as long as the stainless sheet edges do not contact the slider body over the entire stroke.

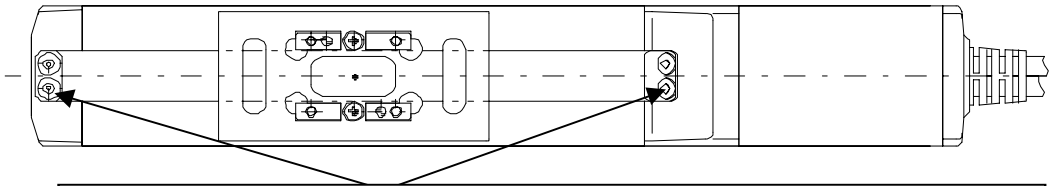


Clearances between stainless sheet edges and slider body

If the conditions in Checkpoints 1 and 2 are not satisfied, loosen the screws and readjust the position and tension of the stainless sheet again from ①.

Note) If the condition in Checkpoint 2 cannot be met after the readjustment, try installing the stainless sheet in the reverse direction or placing it upside down. If the stainless sheet is still not adjusted properly, replace it with a new sheet.

④ When proper clearances are obtained between the slider body and stainless sheet and an absence of contact between the two is confirmed, tighten the two screws on the loose end alternately, and then finally tighten all screws to a uniform torque to securely affix the stainless sheet. If the screws are not tightened uniformly, the sheet may meander or lift.



Apply additional torque to the screws on both ends until the stainless sheet no longer moves.

Tightening torque:	SA5/SA6/SA7/SS	87.2 N·cm (8.90 kgf·cm)	[Reference value]
	SM	204 N·cm (20.8 kgf·cm)	[Reference value]

⑤ Remove the clearance-checking tool and install the slider covers.
Note) Again, pay attention not to lose the coil springs and spacers.

10.8 Reduction Belt [Motor Reversing Type]

10.8.1 Inspecting the Belt

Remove the pulley cover and visually inspect the belt.
Durability of the reduction belt is affected significantly by the operating condition, and there is no standard guideline as to when the belt should be replaced.
Generally, the belt is designed to withstand several millions of flexing loads.
As a practical guideline, replace the reduction belt when any of the conditions listed below is observed:

- The teeth and end faces of the belt have worn significantly.
- The belt has swollen due to deposits of oil, etc.
- Cracks and other damages are found on the teeth or back of the belt.
- The belt has broken.

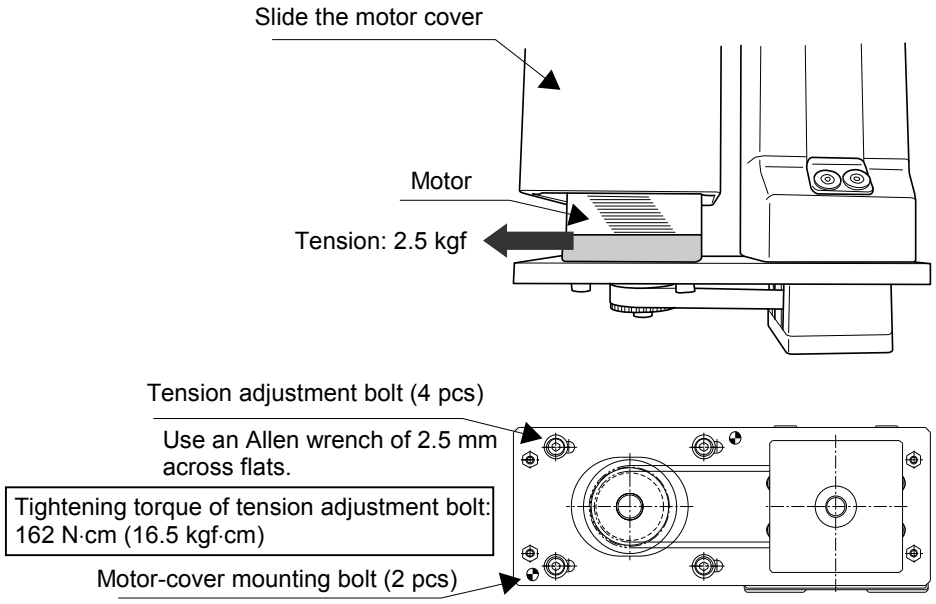
10.8.2 Applicable Belt

Manufacturer:	Bando Chemical Industries		
Model numbers:	60S2M184U, 6 mm wide:	Polyurethane rubber specification	(SA5R/SA6R)
	150S3M255U, 15 mm wide:	Polyurethane rubber specification	(SA7R)
	100S3M219U, 10 mm wide:	Polyurethane rubber specification	(SSR)
	150S3M252U, 15 mm wide:	Polyurethane rubber specification	(SMR)

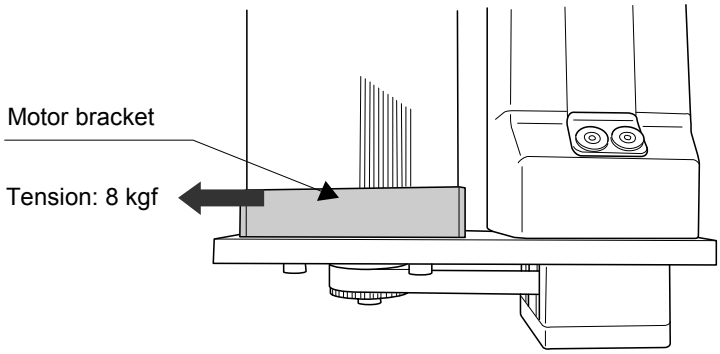
10.8.3 Adjusting the Belt Tension

Remove the pulley cover and loosen the four tension adjustment bolts. Slide the motor to the left to apply a tension to the belt, and then tighten the tension adjustment bolts.

- SA5R/SA6R

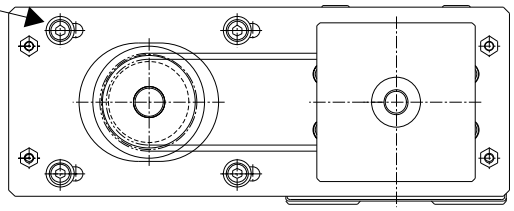


• SA7R



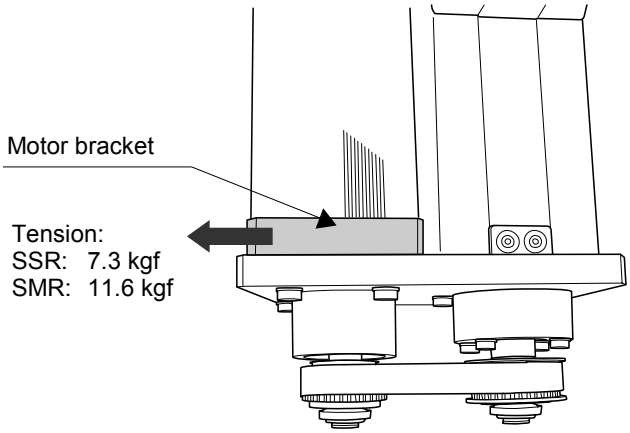
Tension adjustment bolt (4 pcs)

Use an Allen wrench of 3 mm across flats.



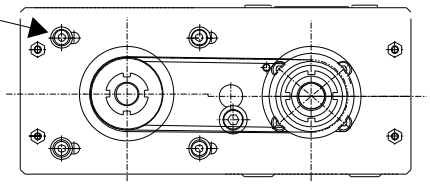
Tightening torque of tension adjustment bolt: 323 N·cm (33 kgf·cm)

• SSR/SMR



Tension adjustment bolt (4 pcs)

Use an Allen wrench of 3 mm across flats.



Tightening torque of tension adjustment bolt: 323 N·cm (33 kgf·cm)

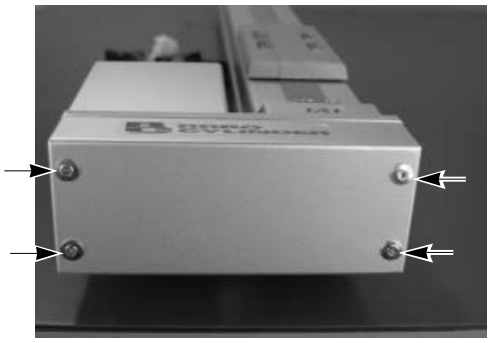
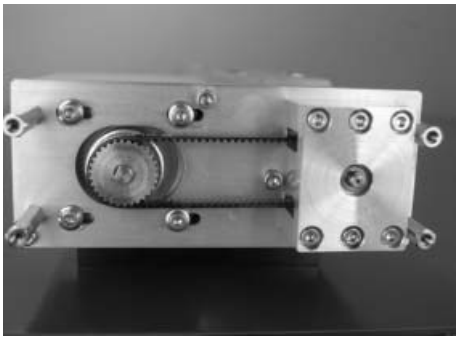
10.8.4 Replacing the Belt

- SA5R/SA6R

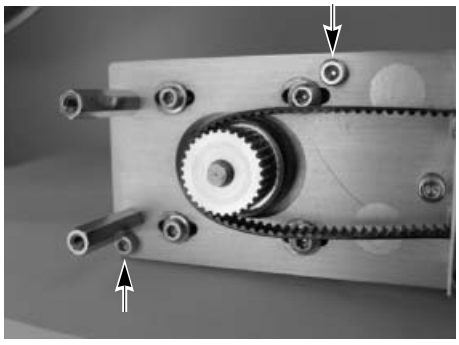
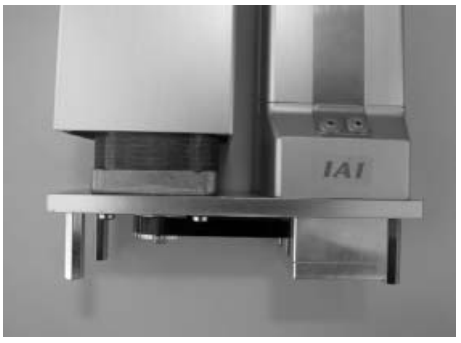
[Items Required for Replacement]
- Replacement reduction belt • Allen wrench set
- Tension gauge (capable of applying a tensile load of 3 kgf or more)
- Strong string or long tie-band

[Procedure]

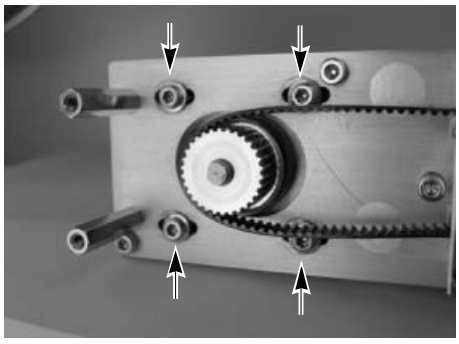
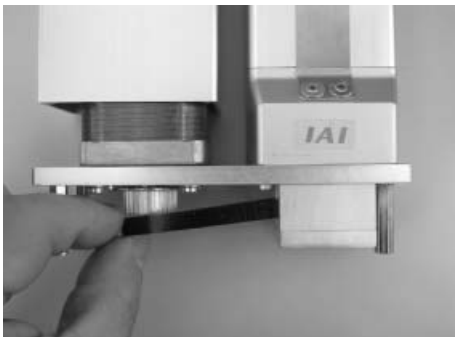
1) Remove the pulley cover.
   Remove the four thin-head mounting screws using an Allen wrench of 1.5 mm across flats.

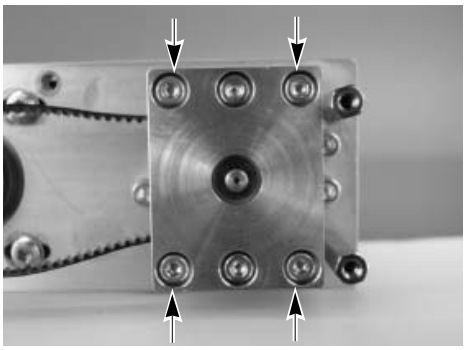
2) Remove the two motor-cover mounting bolts and move the motor cover by approx. 20 mm. (Use an Allen wrench of 2.5 mm across flats.)

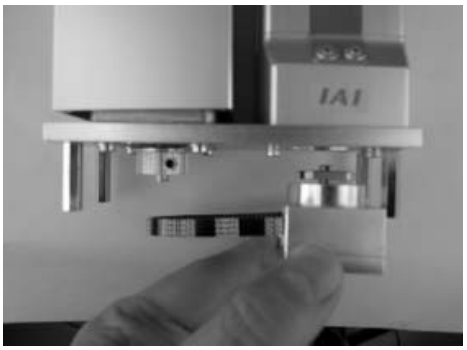



3) Loosen the four tension adjustment bolts to loosen the belt. (Use an Allen wrench of 2.5 mm across flats.)
4) Remove the belt from the pulleys.

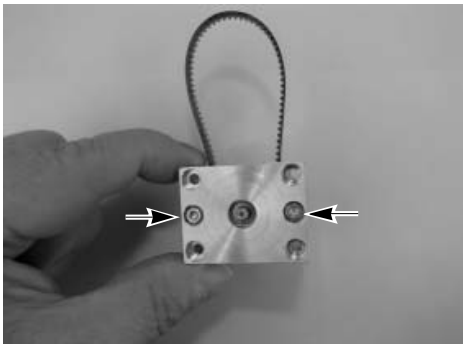



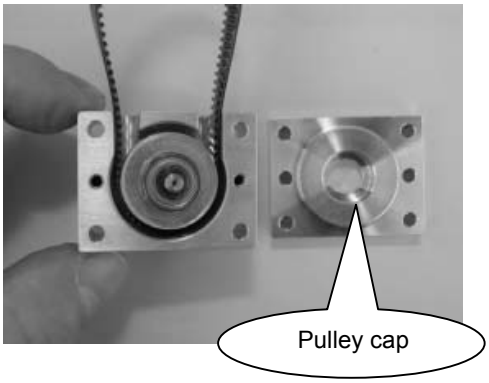
5) Remove the pulley assembly.
   - Remove the four mounting bolts using an Allen wrench of 2.5 mm across flats.
   - Pull out the assembly with a hand.



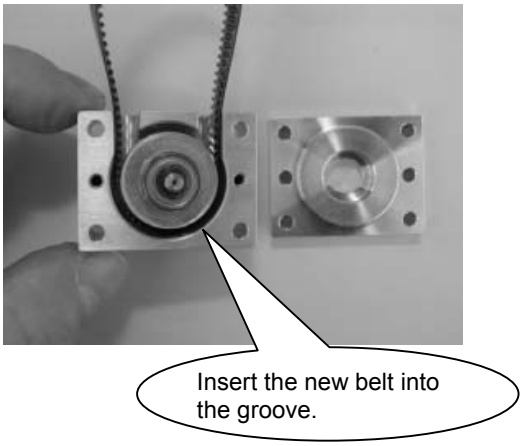


6) Remove the pulley cap.
   - Remove the two mounting bolts using an Allen wrench of 2.5 mm across flats.





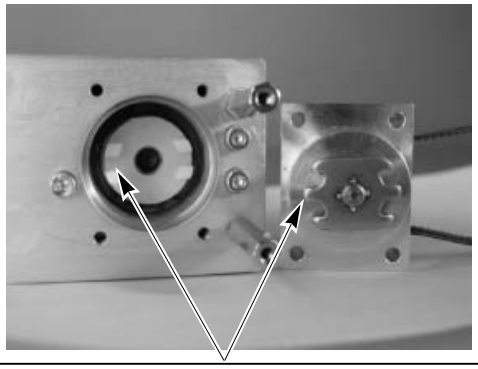
7) Pull out the belt and insert a new belt.



8) Install the pulley cap.
   Tighten the hexagon socket-head bolts (M3 x 8, 2 pcs) using an Allen wrench of 2.5 mm across flats.

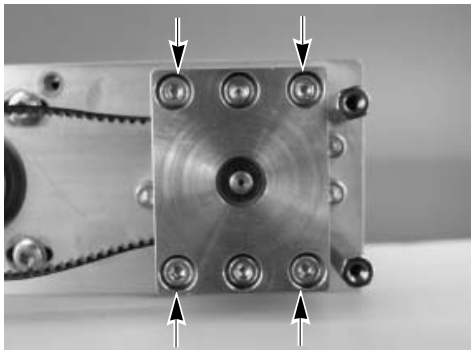
Tightening torque: 83 N·cm (8.47 kgf·cm)

9) Install the pulley assembly.
   - Align the angles of projections and depressions on the couplings.



Align the angles of projections and depressions.

   - Tighten the hexagon socket-head bolts (M3 x 22, 4 pcs) using an Allen wrench of 2.5 mm across flats.



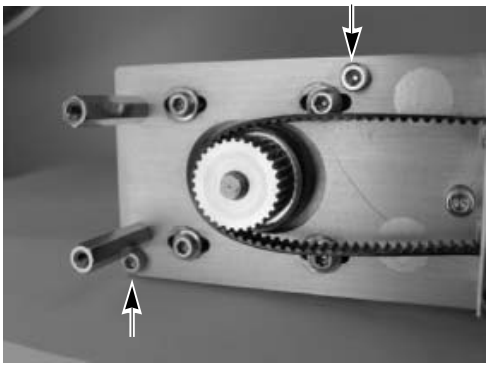
Tightening torque: 83 N·cm (8.47 kgf·cm)

10) Pass the belt around the pulleys.

11) Hook a looped strong string (or long tie-band) on the flange at the base of the motor, pull the string with a tension gauge to the specified tension, and then securely and uniformly tighten the adjustment bolts (hexagon socket-head bolt with washer M3 x 10, 4 pcs). (Use an Allen wrench of 2.5 mm across flats.)

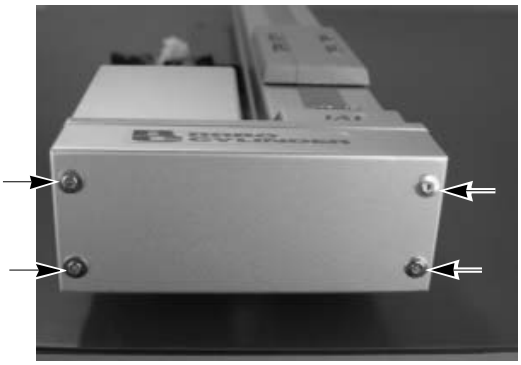
Tensile force: 2.5 kgf
Tightening torque of adjustment bolt:
162 N·cm (16.5 kgf·cm)

12) Install the motor cover.
    Tighten the hexagon socket-head bolts (M3 x 12, 2 pcs) using an Allen wrench of 2.5 mm across flats.



Tightening torque: 83 N·cm (8.47 kgf·cm)

13) Install the pulley cover.
    Tighten the thin-head screws (M3 x 6, 4 pcs) using an Allen wrench of 1.5 mm across flats.



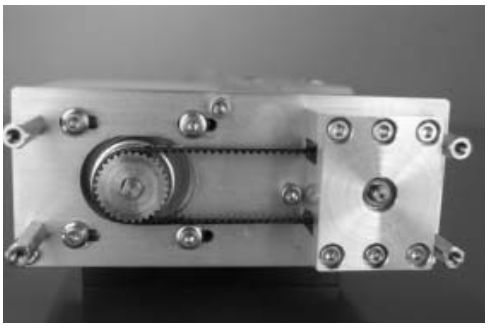
Tightening torque: 87.2 N·cm (8.90 kgf·cm)

• SA7R

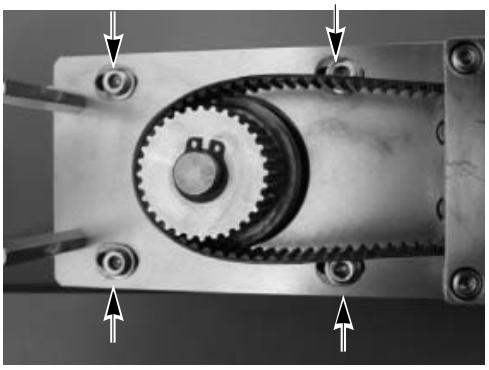
[Items Required for Replacement]
- Replacement reduction belt • Allen wrench set
- Tension gauge (capable of applying a tensile load of 8 kgf or more)
- Strong string or long tie-band

[Procedure]

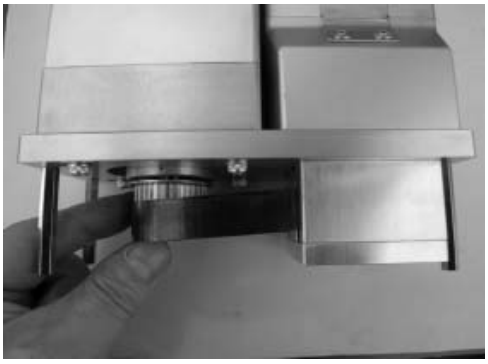
1) Remove the pulley cover.
   Remove the four thin-head mounting screws using an Allen wrench of 1.5 mm across flats.



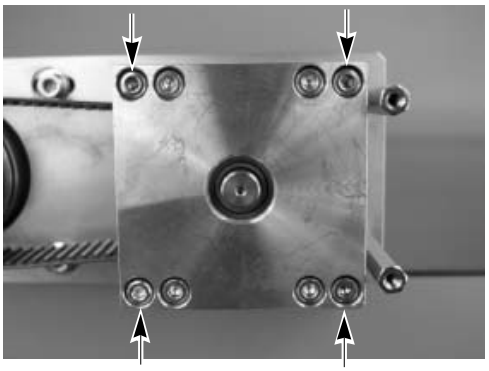
2) Loosen the four tension adjustment bolts to loosen the belt.
   (Use an Allen wrench of 3 mm across flats.)



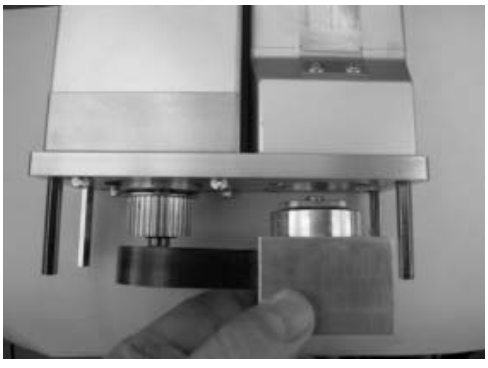
3) Remove the belt from the pulleys.



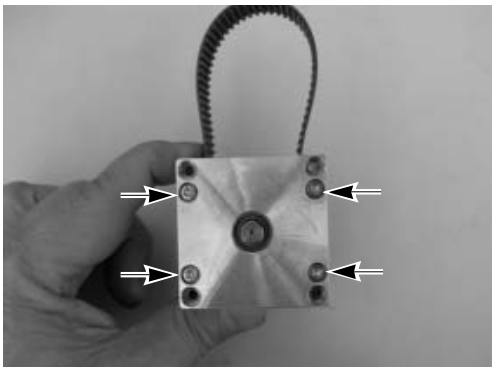
4) Remove the pulley assembly.
   - Remove the four mounting bolts using an Allen wrench of 2.5 mm across flats.

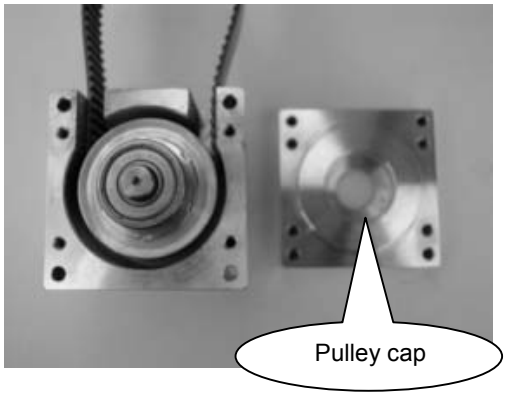


- Pull out the assembly with a hand.

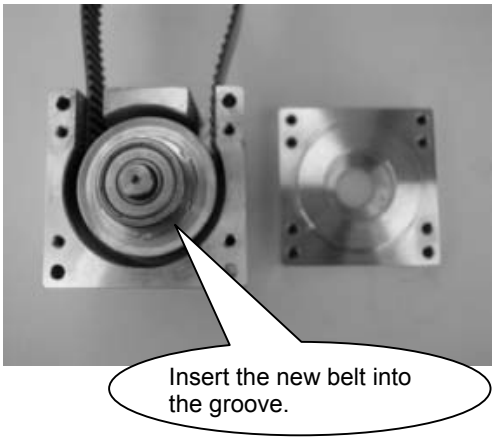


5) Remove the pulley cap.
   - Remove the four mounting bolts using an Allen wrench of 2.5 mm across flats.





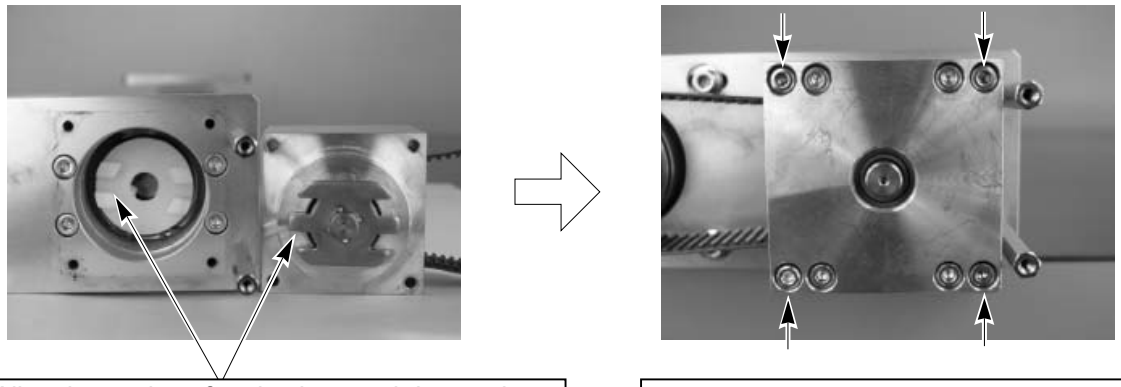
6) Pull out the belt and insert a new belt.



7) Install the pulley cap.
   Tighten the hexagon socket-head bolts (M3 x 10, 4 pcs) using an Allen wrench of 2.5 mm across flats.

Tightening torque: 83 N·cm (8.47 kgf·cm)

8) Install the pulley assembly.
   - Align the angles of projections and depressions on the couplings.
   - Tighten the hexagon socket-head bolts (M3 x 40, 4 pcs) using an Allen wrench of 2.5 mm across flats.

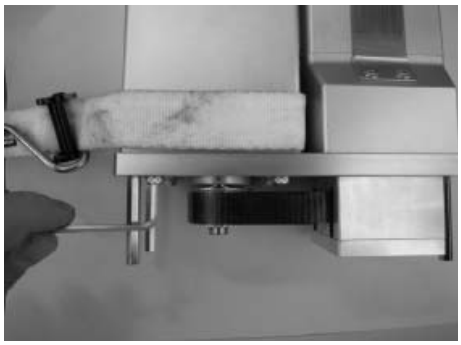


Align the angles of projections and depressions.

Tightening torque: 83 N·cm (8.47 kgf·cm)

9) Pass the belt around the pulleys.

10) Hook a looped strong string (or long tie-band) on the flange at the base of the motor, pull the string with a tension gauge to the specified tension, and then securely and uniformly tighten the adjustment bolts (hexagon socket-head bolt with washer M4 x 20, 4 pcs). (Use an Allen wrench of 3 mm across flats.)



Tensile force: 8 kgf
Tightening torque of adjustment bolt:
323 N·cm (33 kgf·cm)

11) Install the pulley cover.
Tighten the thin-head screws (M3 x 6, 4 pcs) using an Allen wrench of 1.5 mm across flats.

Tightening torque: 87.2 N·cm (8.90 kgf·cm)

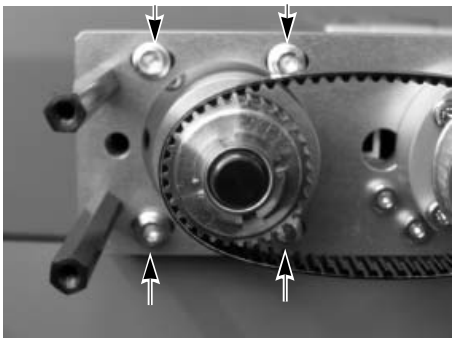
- SSR/SMR

[Items Required for Replacement]
- Replacement reduction belt
- Allen wrench set
- Tension gauge (capable of applying a tensile load of 12 kgf or more)
- Strong string or long tie-band

[Procedure]

1) Remove the pulley cover.
   Remove the four thin-head mounting screws using an Allen wrench of 2 mm across flats.

2) Loosen the four tension adjustment bolts to loosen the belt.
   (Use an Allen wrench of 3 mm across flats.)



3) Remove the belt from the pulleys.

4) Pass a new belt around both pulleys.

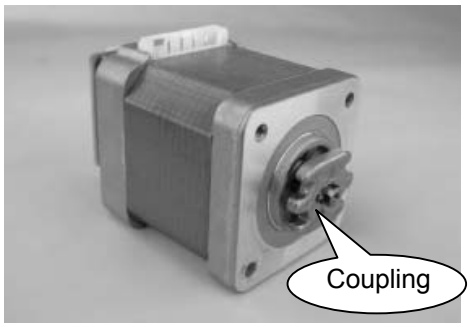
5) Hook a looped strong string (or long tie-band) on the motor bracket, pull the string with a tension gauge to the specified tension, and then securely and uniformly tighten the adjustment bolts (hexagon socket-head bolt with washer M4 x 20, 4 pcs).

Tensile force: SSR 7.3 kgf, SMR 11.6 kgf
Tightening torque of adjustment bolt:
323 N·cm (33 kgf·cm)

6) Install the pulley cover.
Tighten the thin-head screws (M4 x 6, 4 pcs) using an Allen wrench of 2 mm across flats.

Tightening torque: 204 N·cm (20.8 kgf·cm)

10.9 Replacing the Motor



10.9.1 Motor Straight Type

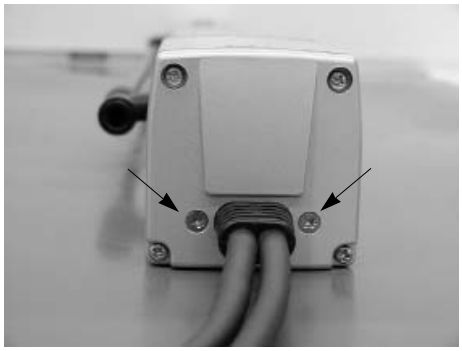
- SA5/SA6

[Items Required for Replacement]
- Replacement motor (with a coupling on the motor shaft; see the photograph at right)
- Allen wrench set • Phillips screwdriver
- Grease (Kyodo Yushi's Multemp LRL3 or equivalent)

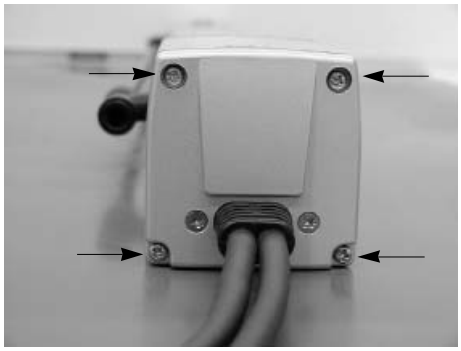
[Procedure]

1) Remove the flat countersunk-head screws (M3 x 8, 2 pcs) affixing the cable ends on the motor-end cap, and then remove the pan-head screws (M3 x 80, 4 pcs) affixing the motor-end cap.

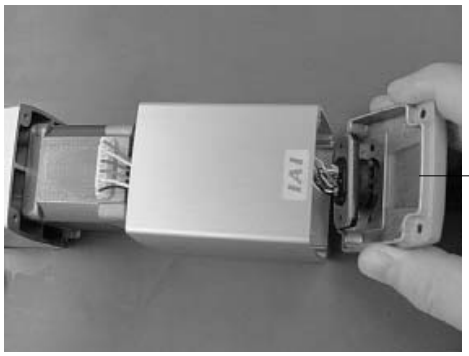
• Flat countersunk-head screws (M3 x 8, 2 pcs)



• Pan-head screws (M3 x 80, 4pcs)

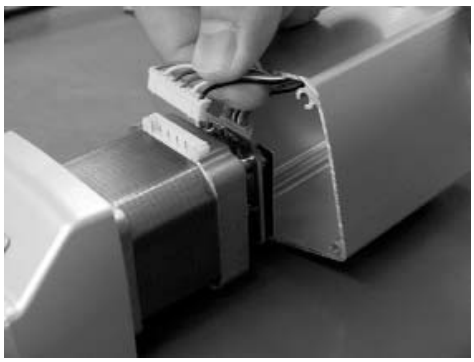


2) Push in the cable-end molding to create a slack along the inner cable.

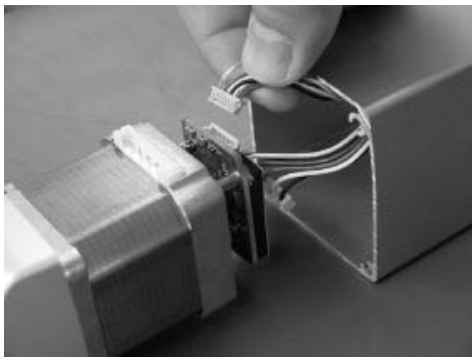


Push in the molding as much as possible.

3) Pull out the motor connector.



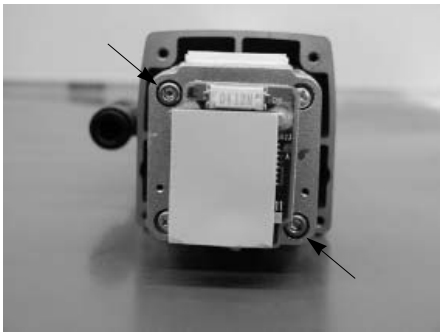
4) Pull out the encoder connector.



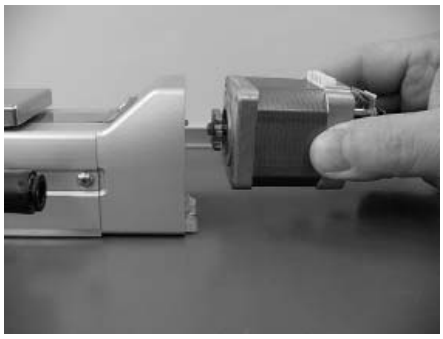
Caution: When applying the force, do not touch the encoder directly.

5) Remove the motor.

- Remove the affixing bolts (M3 x 50, 2 pcs) using an Allen wrench of 2.5 mm across flats.

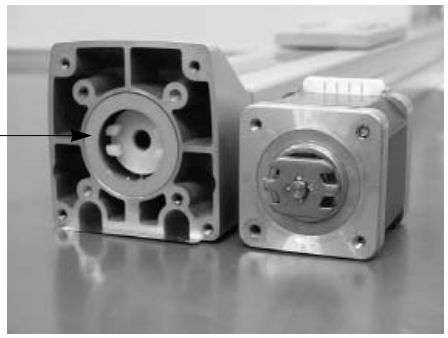


- Pull out the motor with a hand.

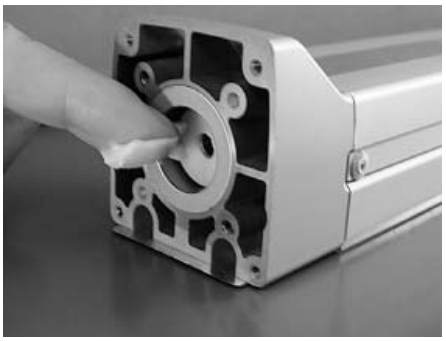


- Decoupled motor and actuator

Pilot alignment metal
If this metal is attached on the decoupled motor, put it back to the pilot on the actuator side.



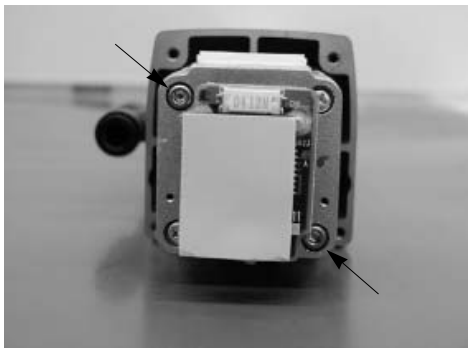
6) Apply grease to the coupling on the actuator side.



Kyodo Yushi's Multemp LRL3 has been applied before shipment.

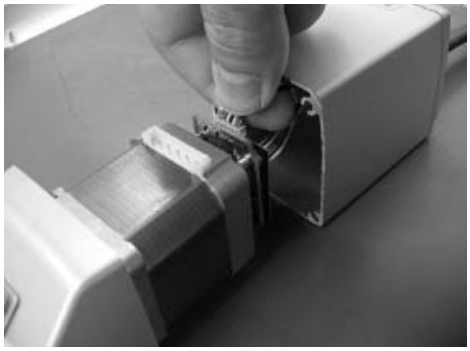
Note: Never use fluoride grease. It will chemically react with lithium grease to cause damaging effects on the machine.

7) Install a new motor.
   - After confirming that the angles of projections and depressions on the couplings are aligned, assemble the motor, and then tighten the affixing bolts (M3 x 50, 2 pcs). (Use an Allen wrench of 2.5 mm across flats.)



Tightening torque: 59 N·cm (6 kgf·cm)

8) Connect the encoder connector.

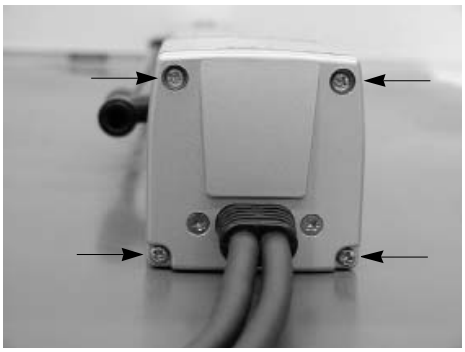


9) Connect the motor connector.

Caution: When applying the force, do not touch the encoder directly.

10) Replace the cable-end molding in the original position, and affix it with the flat countersunk-head screws (M3 x 8, 2 pcs).

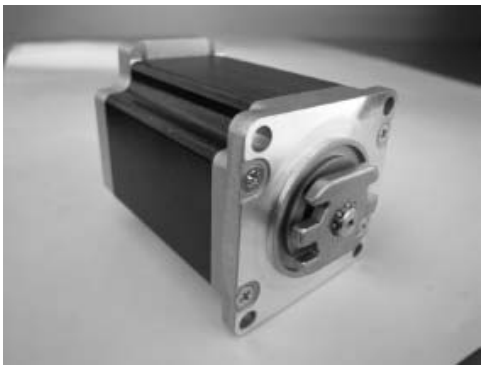
11) Affix the motor-end cap with the pan-head screws (M3 x 80, 4 pcs). At this time, pay attention not to pinch the cables.



Tightening torque: 61.5 N·cm (6.3 kgf·cm)

- SA7

[Items Required for Replacement]
- Replacement motor (with a coupling on the motor shaft; see the photograph below)
- Allen wrench set
- Phillips screwdriver
- Grease (Kyodo Yushi's Multemp LRL3 or equivalent)

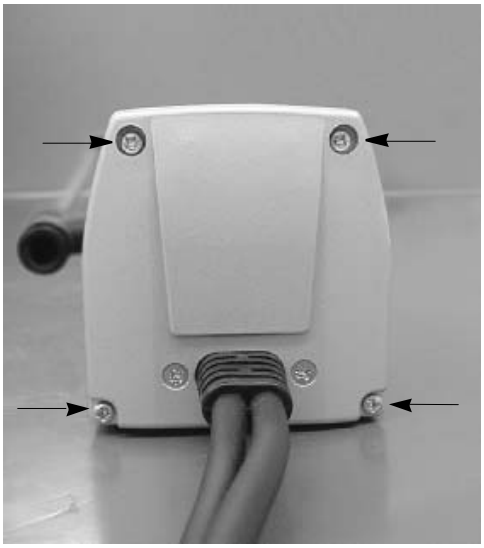


[Procedure]

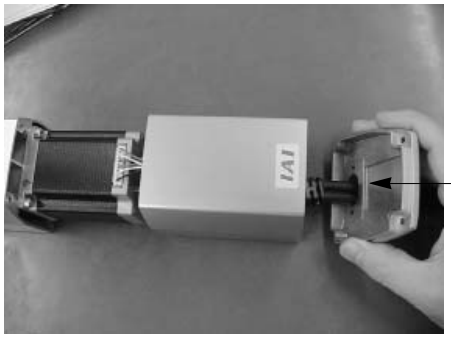
1) Remove the flat countersunk-head screws (M3 x 8, 2 pcs) affixing the cable ends on the motor-end cap, and then remove the pan-head screws (M3 x 105, 4 pcs) affixing the motor-end cap.

- Flat countersunk-head screws (M3 x 8, 2 pcs)

- Pan-head screws (M3 x 105, 4pcs)

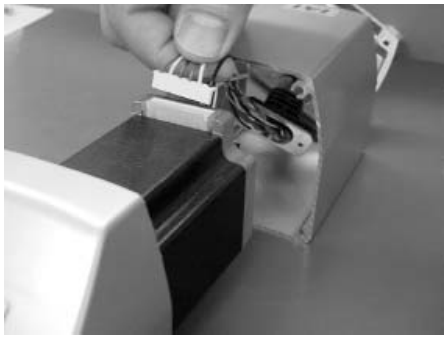


2) Push in the cable-end molding to create a slack along the inner cable.

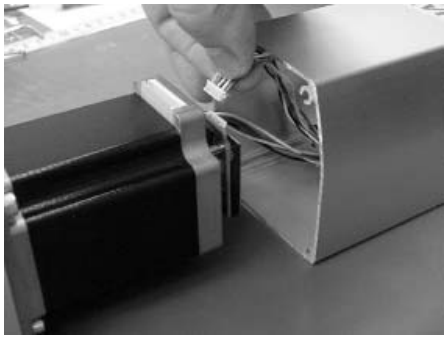


Push in the molding as much as possible.

3) Pull out the motor connector.



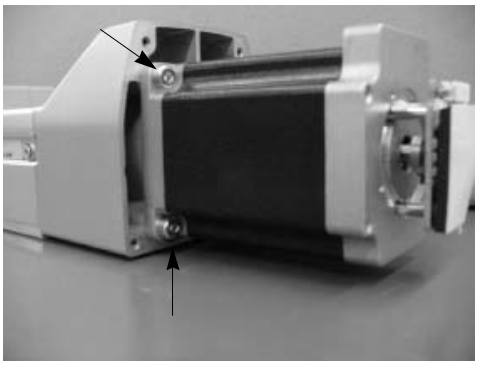
4) Pull out the encoder connector.

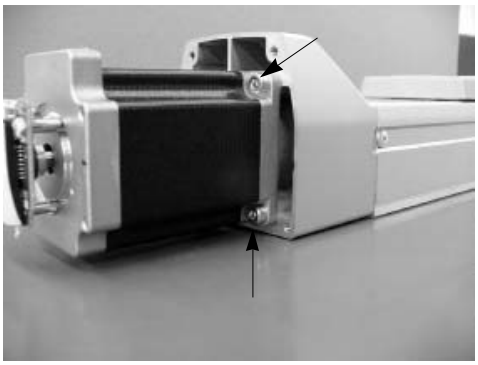


Caution:	When applying the force, do not touch the encoder directly.

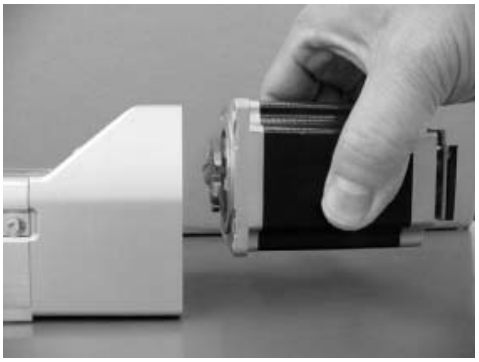
5) Remove the motor.

- Remove the affixing bolts (M4 x 15, 4 pcs) using an Allen wrench of 3 mm across flats.

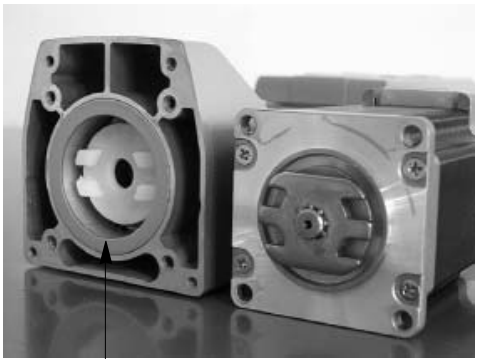




- Pull out the motor with a hand.

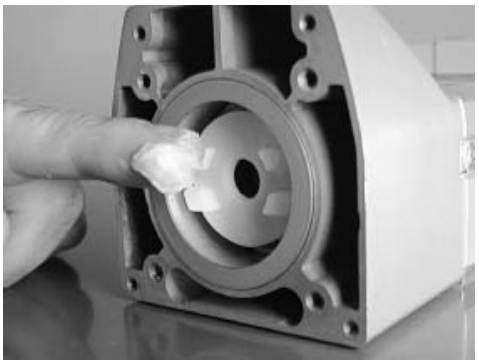


- Decoupled motor and actuator



Pilot alignment metal
If this metal is attached on the decoupled motor, put it back to the pilot on the actuator side.

6) Apply grease to the coupling on the actuator side.

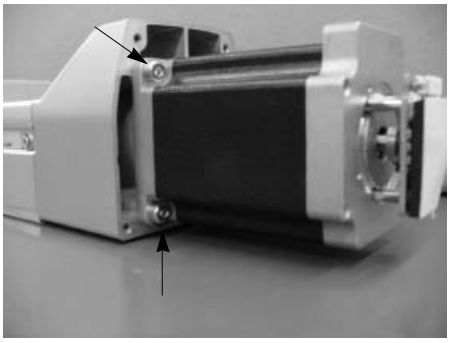


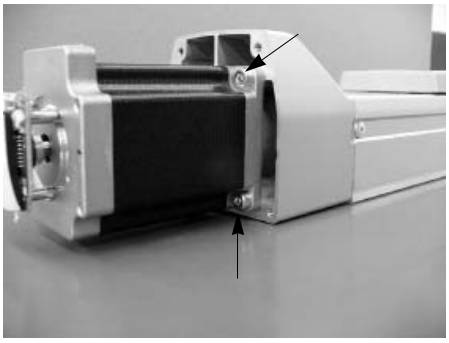
Kyodo Yushi's Multemp LRL3 has been applied before shipment.

Note: Never use fluoride grease. It will chemically react with lithium grease to cause damaging effects on the machine.

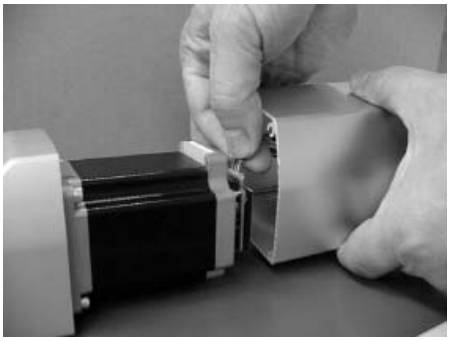
7) Install a new motor.
   - After confirming that the angles of projections and depressions on the couplings are aligned, assemble the motor, and then tighten the affixing bolts (M4 x 15, 4 pcs). (Use an Allen wrench of 3 mm across flats.)

Tightening torque: 176 N·cm (18 kgf·cm)





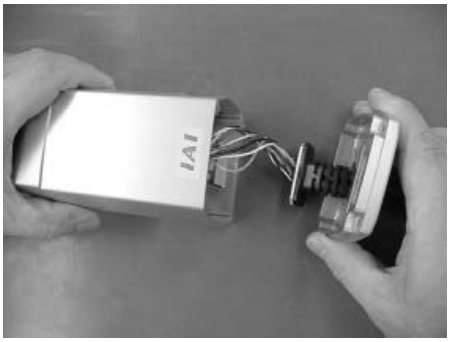
8) Connect the encoder connector.



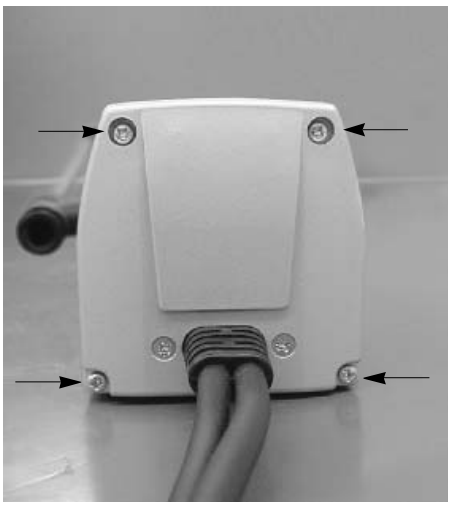
9) Connect the motor connector.

Caution: When applying the force, do not touch the encoder directly.

10) Replace the cable-end molding in the original position, and affix it with the flat countersunk-head screws (M3 x 8, 2 pcs).



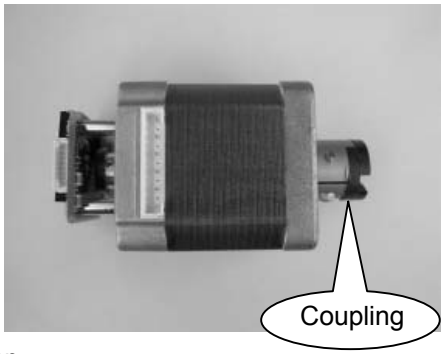
11) Affix the motor-end cap with the pan-head screws (M3 x 105, 4 pcs). At this time, pay attention not to pinch the cables.



Tightening torque: 61.5 N·cm (6.3 kgf·cm)

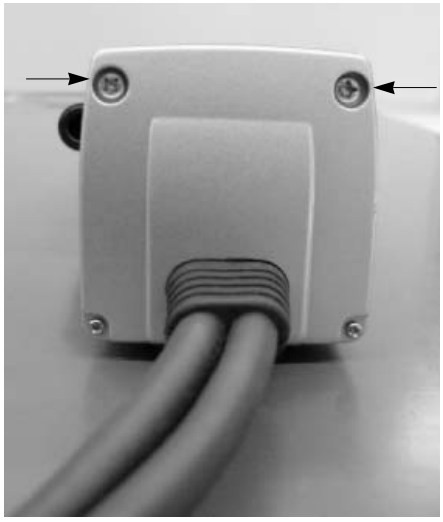
- SS

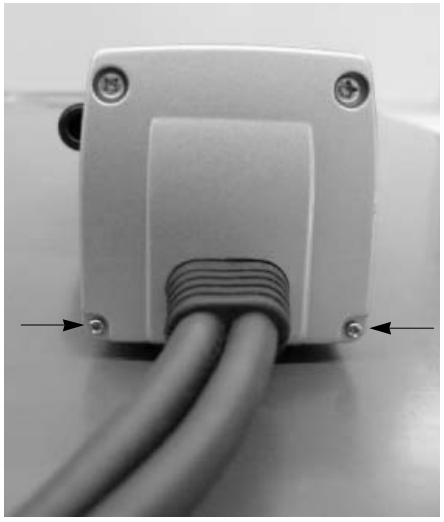
[Items Required for Replacement]
- Replacement motor (with a coupling on the motor shaft; see the photograph below)
- Allen wrench set
- Phillips screwdriver
- Plastic hammer



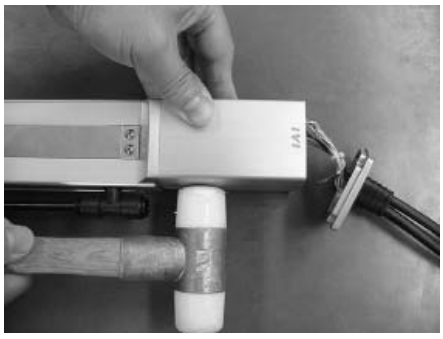
[Procedure]

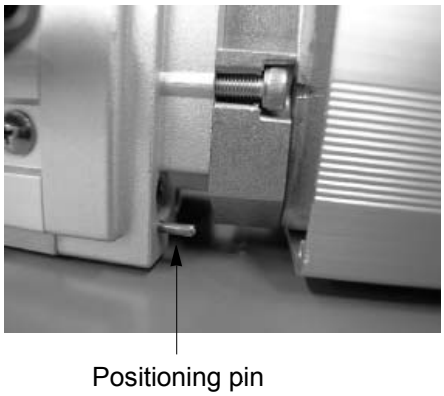
1) Remove the pan-head screws affixing the motor-end cap.
   - Pan-head screws (M3 x 95, 2 pcs)
   - Pan-head screws (M2 x 10, 2pcs)





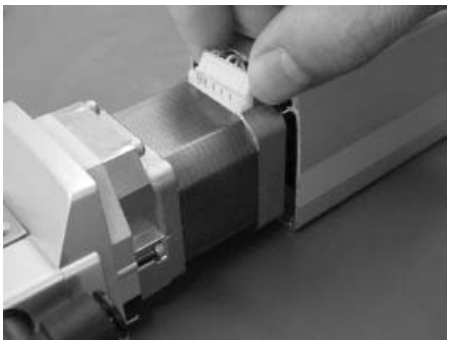
2) Remove the motor cover.
   The motor cover is engaged with a positioning pin. If the cover does not come off easily, use a plastic hammer to gently tap the motor cover from side, and pull out the cover.



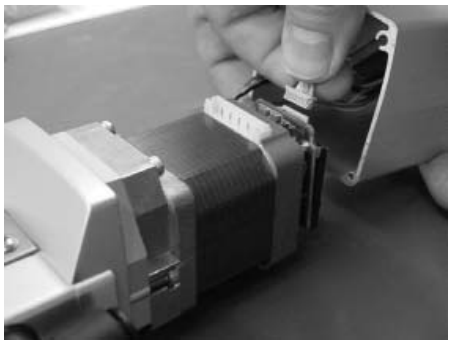


3) Push in the motor-end cap into the motor cover.

4) Pull out the motor connector.

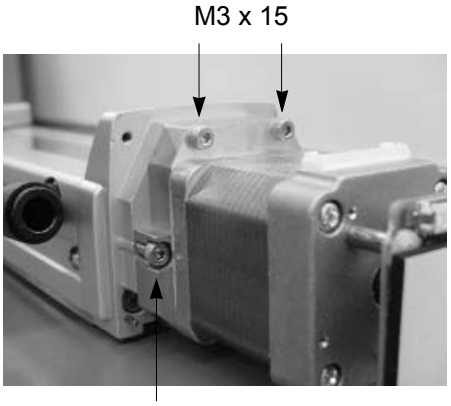


5) Pull out the encoder connector.

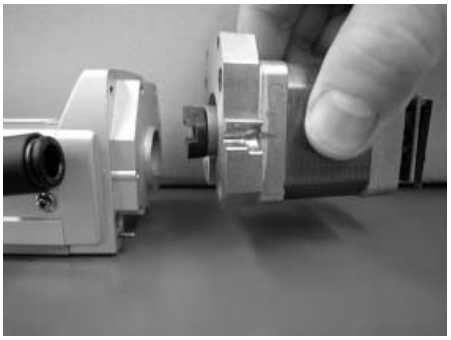


Caution:	When applying the force, do not touch the encoder directly.

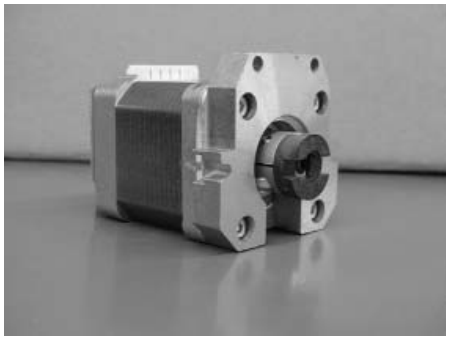
6) Remove the motor.
   - Remove the affixing bolts (M3 x 15, 2 pcs/M3 x 18, 2 pcs) using an Allen wrench of 2.5 mm across flats.



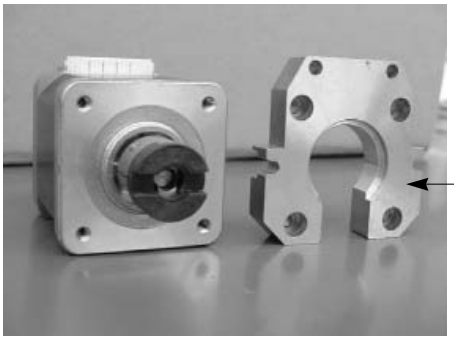
   - Pull out the motor with a hand.



   - Decoupled motor

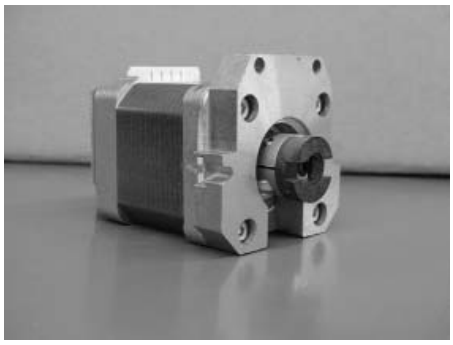


   - Remove the motor flange.
     Remove the affixing bolts (M3 x 8, 4 pcs) using an Allen wrench of 2.5 mm across flats.

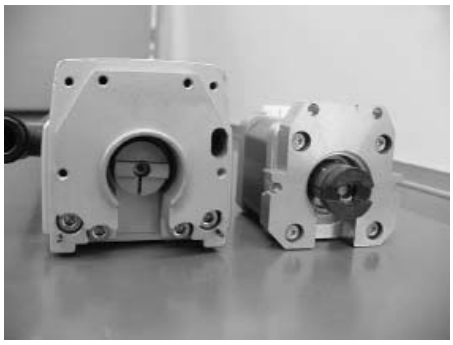


7) Install a new motor.

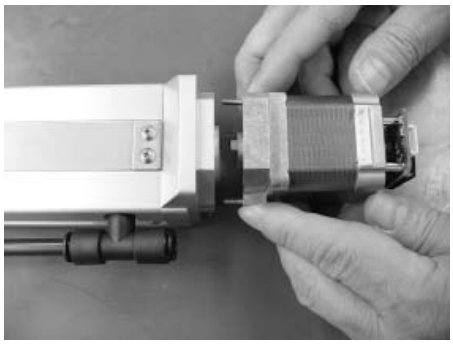
- Tighten the motor flange with the affixing bolts (M3 x 8, 4 pcs).



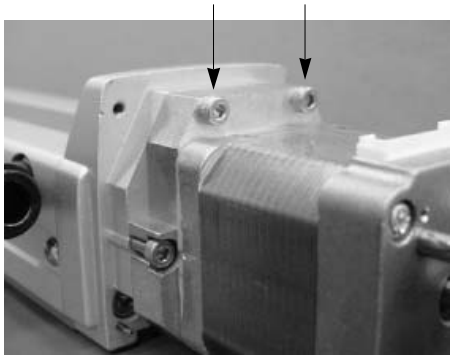
- Confirm that the angles of projections and depressions on the couplings are aligned.



- First, tighten the right and left affixing bolts (M3 x 18, 2 pcs) uniformly.

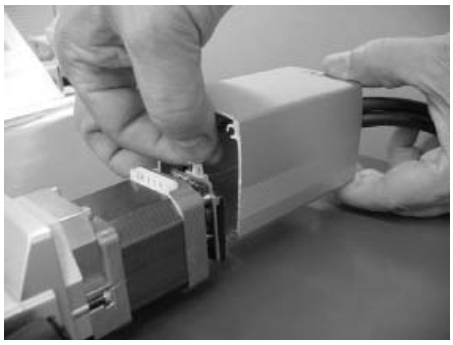


- Next, tighten the upper affixing bolts (M3 x 15, 2 pcs) uniformly.

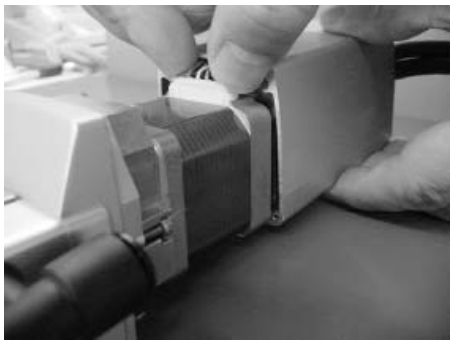


Tightening torque of M3 bolt: 83 N·cm (8.5 kgf·cm)

8) Connect the encoder connector.



9) Connect the motor connector.

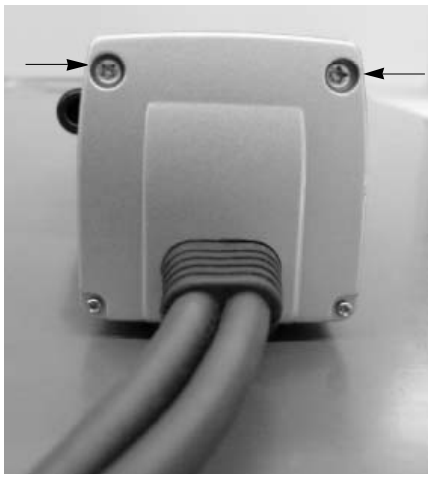


Caution: When applying the force, do not touch the encoder directly.

10) Pull out the motor-end cap from the motor cover and affix it with the pan-head screws. At this time, pay attention not to pinch the cables.

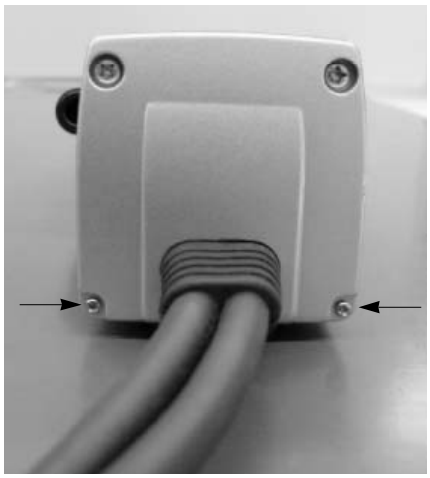
- Pan-head screws (M3 x 105, 2 pcs)

Tightening torque: 61.5 N·cm (6.3 kgf·cm)



- Pan-head screws (M2 x 10, 2pcs)

Tightening torque: 16.9 N·cm (1.7 kgf·cm)

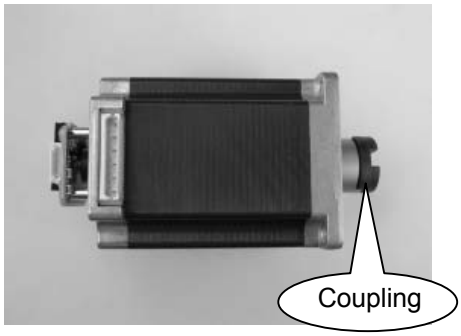


11) Affix the motor cover.

- If the positioning pin does not go in smoothly, gently tap the motor-end cap using a plastic hammer.

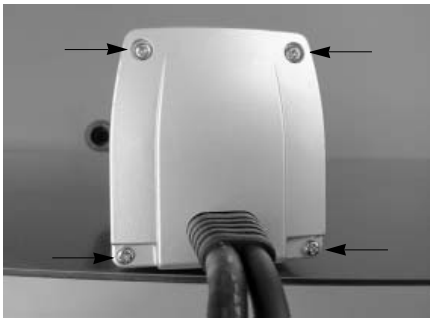
- SM

[Items Required for Replacement]
- Replacement motor (with a coupling on the motor shaft; see the photograph below)
- Allen wrench set
- Phillips screwdriver
- Plastic hammer

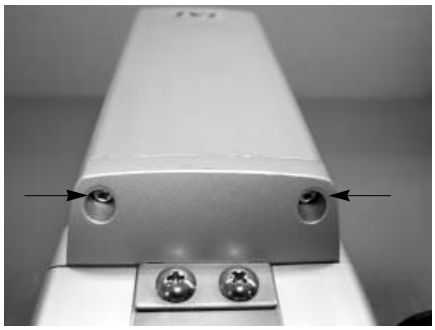


[Procedure]

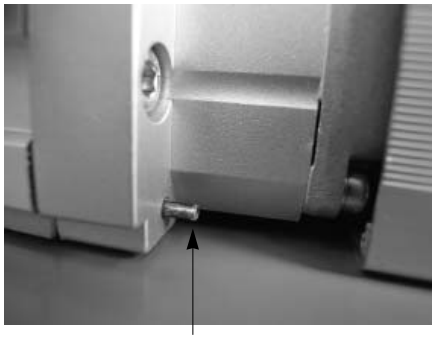
1) Remove the pan-head screws (M3 x 10, 4 pcs) affixing the motor-end cap.



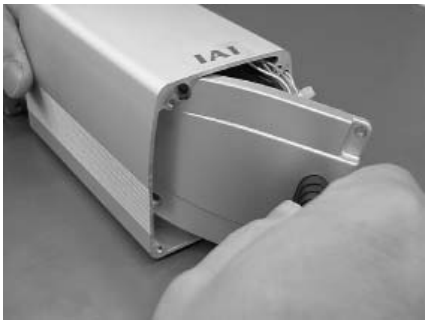
2) Remove the pan-head screws (M3 x 10, 2 pcs) affixing the motor cover.



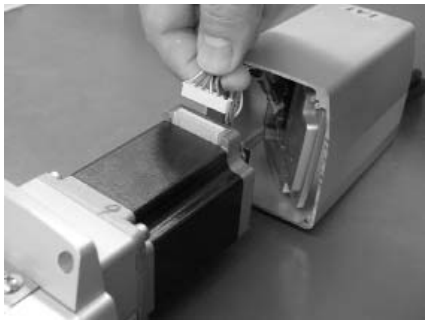
3) Remove the motor cover.
The motor cover is engaged with a positioning pin. If the cover does not come off easily, use a plastic hammer to gently tap the motor cover from side, and pull out the cover.



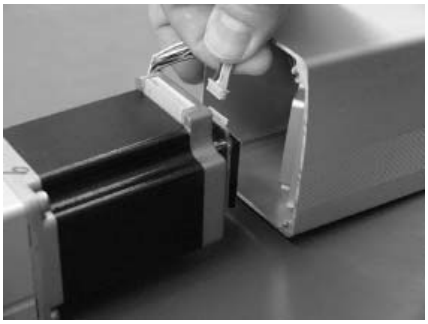
3) Push in the motor-end cap into the motor cover.



4) Pull out the motor connector.

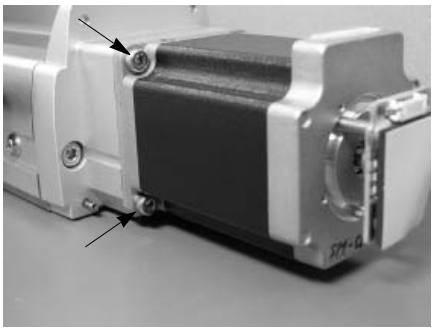


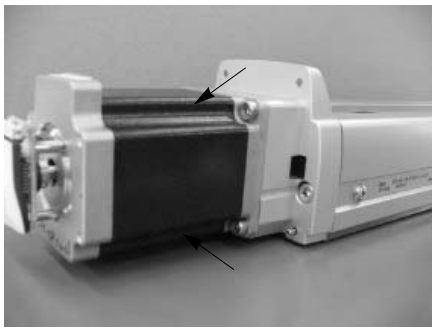
5) Pull out the encoder connector.



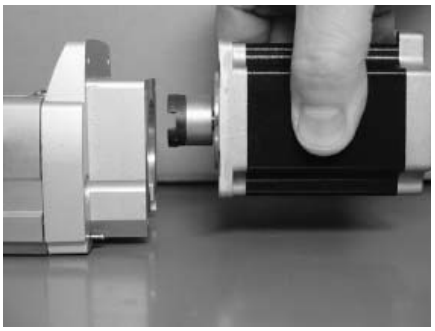
Caution:	When applying the force, do not touch the encoder directly.

7) Remove the motor.
   - Remove the affixing bolts (M4 x 15, 4 pcs) using an Allen wrench of 3 mm across flats.

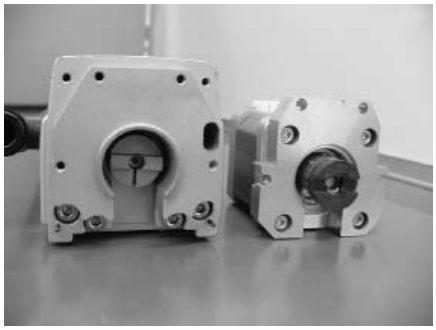




   - Pull out the motor with a hand.

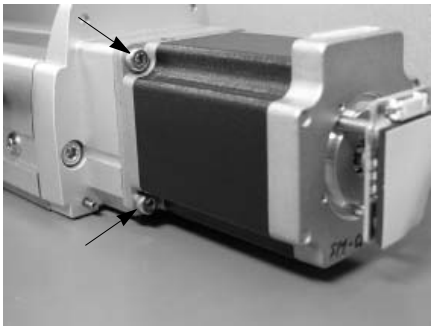


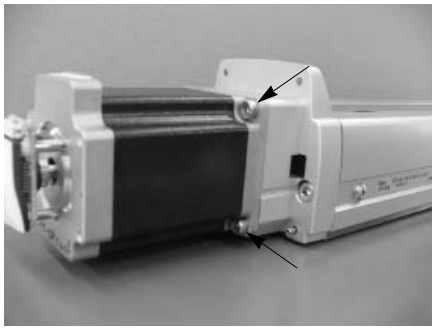
   - Decoupled motor and actuator



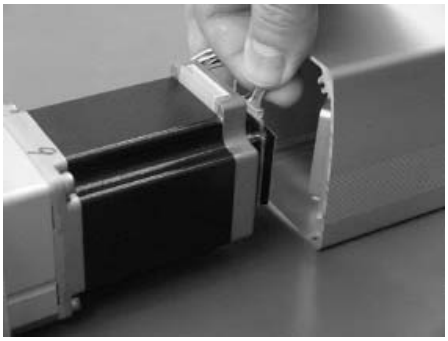
8) Install a new motor.
   - After confirming that the angles of projections and depressions on the couplings are aligned, assemble the motor, and then tighten the affixing bolts (M4 x 15, 4 pcs). (Use an Allen wrench of 3 mm across flats.)

Tightening torque: 176 N·cm (18 kgf·cm)

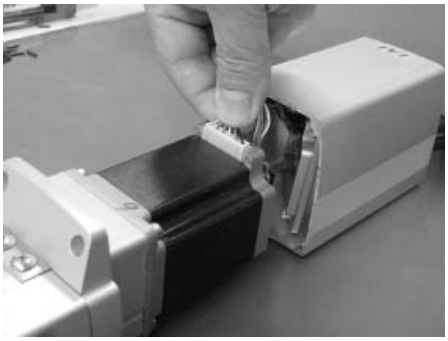




9) Connect the encoder connector.

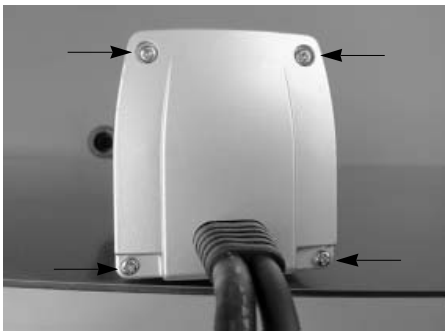


10) Connect the motor connector.



Caution: When applying the force, do not touch the encoder directly.

11) Pull out the motor-end cap from the motor cover and affix it with the pan-head screws (M3 x 105, 4 pcs). At this time, pay attention not to pinch the cables.



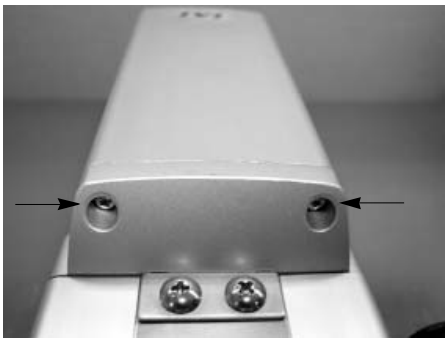
Tightening torque: 61.5 N·cm (6.3 kgf·cm)

12) Affix the motor cover.

- If the positioning pin does not go in smoothly, gently tap the motor-end cap using a plastic hammer.

- Tighten the pan-head screws (M3 x 10, 2 pcs).

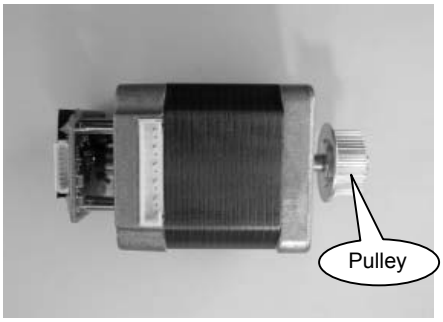
Tightening torque: 61.5 N·cm (6.3 kgf·cm)



10.9.2 Motor Reversing Type

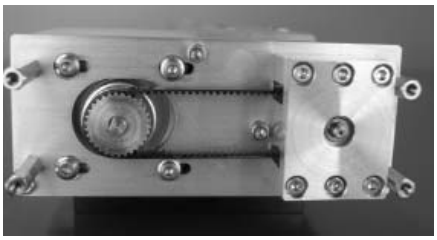
- SA5R/SA6R

[Items Required for Replacement]
- Replacement motor (with a pulley on the motor shaft; see the photograph at right)
- Allen wrench set
- Phillips screwdriver
- Tension gauge
  (capable of applying a tensile load of 3 kgf or more)
- Strong string or long tie-band

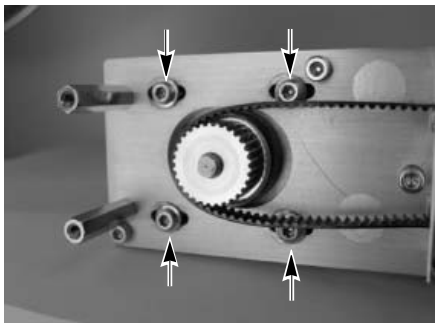


[Procedure]

1) Remove the pulley cover.
   Remove the four thin-head mounting screws using an Allen wrench of 1.5 mm across flats.

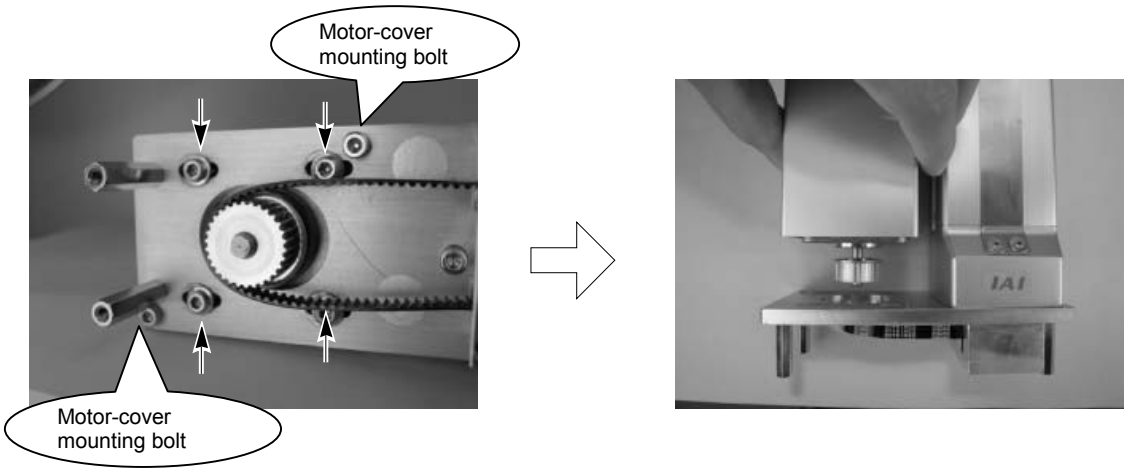


2) Loosen the tension adjustment bolts to loosen the belt. (Use an Allen wrench of 2.5 mm across flats.)

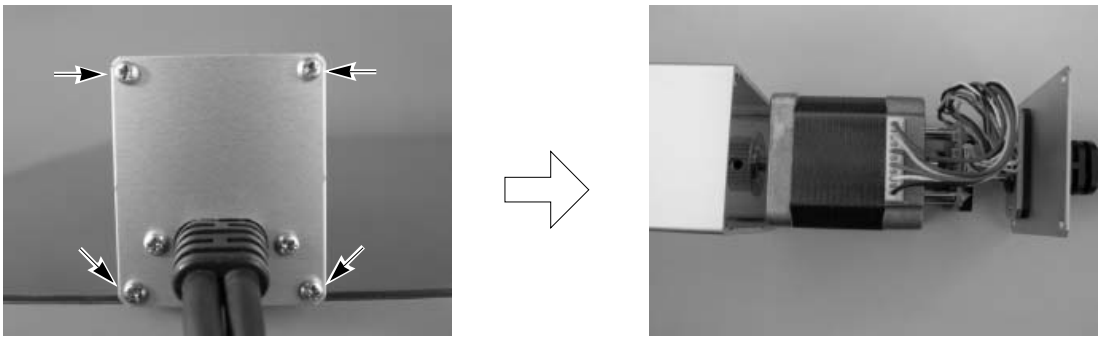


3) Remove the belt from the pulleys.

4) Pull out the four tension adjustment bolts and two motor-cover mounting bolts, and then remove the motor unit.

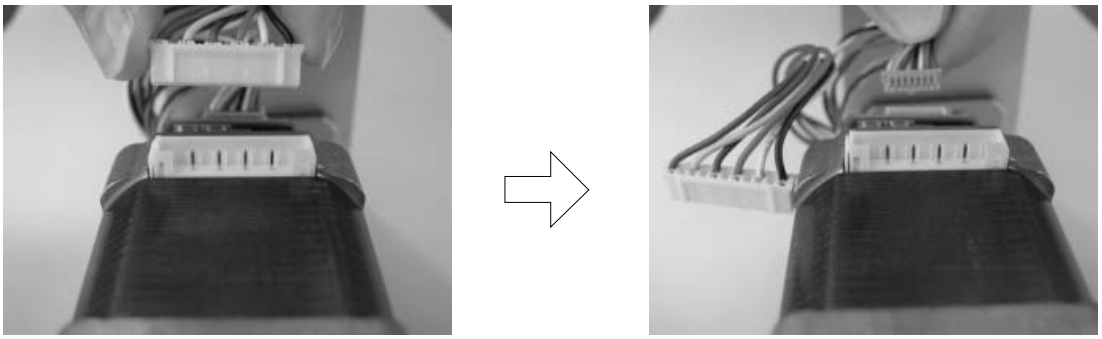


5) Remove the four pan-head screws mounting the motor-end cap on the motor unit, and then pull out the motor.



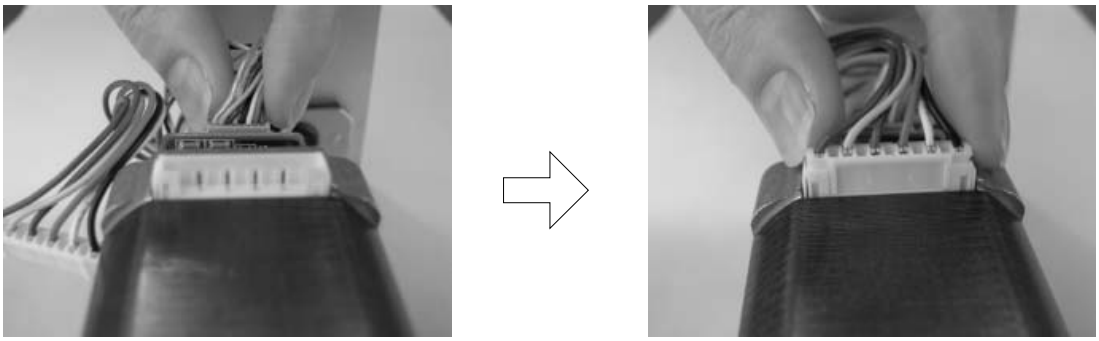
6) Pull out the motor connector.

7) Pull out the encoder connector.



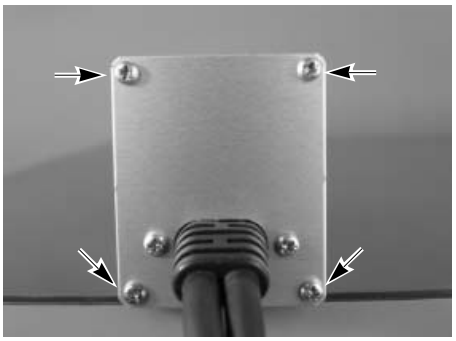
Caution:	When applying the force, do not touch the encoder directly.

8) Connect the encoder connector and motor connector to a new motor.
   - Connect the encoder connector.
   - Connect the motor connector.



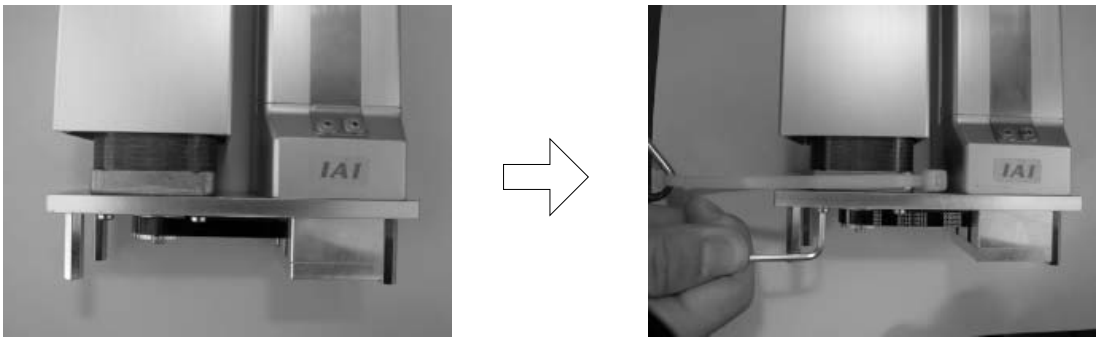
Caution: When applying the force, do not touch the encoder directly.

9) Connect the motor cover and motor-end cap using the pan-head mounting screws (M3 x 6, 4 pcs). At this time, pay attention not to pinch the cables.



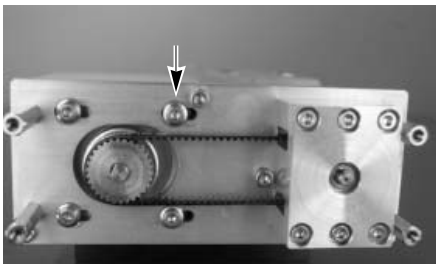
Tightening torque: 61.5 N·cm (6.27 kgf·cm)

10) Loosely affix the motor in place using the tension adjustment bolts (hexagon socket-head bolt with washer M3 x 10, 4 pcs), and then pass the belt. In this condition, hook a looped strong string (or long tie-band) on the flange at the base of the motor, pull the string with a tension gauge to the specified tension, and then securely and uniformly tighten the adjustment bolts. (Use an Allen wrench of 2.5 mm across flats.)



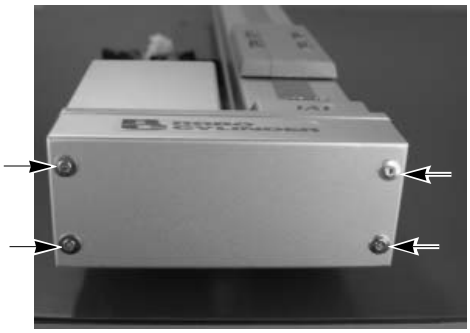
Tensile force: 2.5 kgf
Tightening torque of adjustment bolt:
162 N·cm (16.5 kgf·cm)

11) Install the motor cover.
Tighten the hexagon socket-head bolts (M3 x 12, 2 pcs) using an Allen wrench of 2.5 mm across flats.



Tightening torque: 83 N·cm (8.47 kgf·cm)

12) Install the pulley cover.
Tighten the thin-head screws (M3 x 6, 4 pcs) using an Allen wrench of 1.5 mm across flats.



Tightening torque: 87.2 N·cm (8.90 kgf·cm)

- SA7R

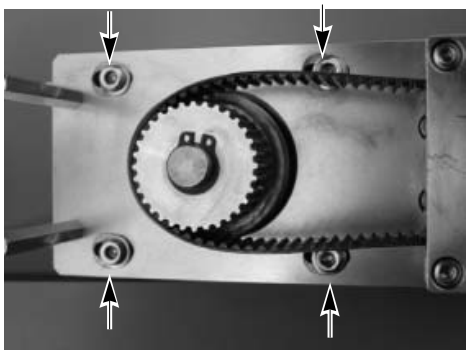
[Items Required for Replacement]
- Replacement motor unit (see the photograph at right)
- Allen wrench set
- Tension gauge (capable of applying a tensile load of 8 kgf or more)
- Strong string or long tie-band

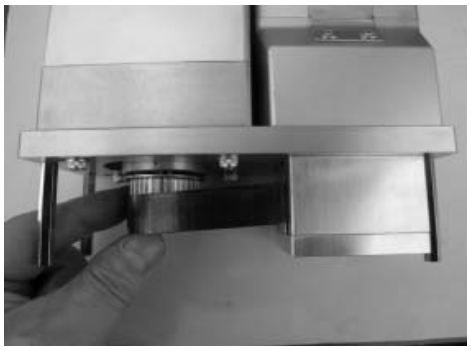
[Procedure]

1) Remove the pulley cover.
   Remove the four thin-head mounting screws using an Allen wrench of 1.5 mm across flats.

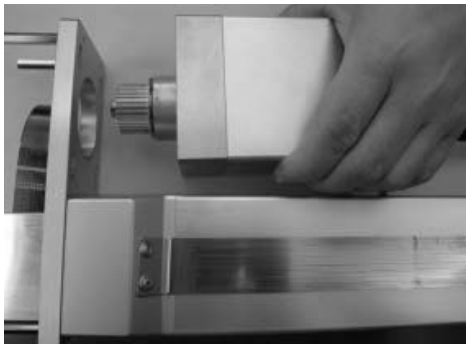
2) Loosen the tension adjustment bolts to loosen the belt. (Use an Allen wrench of 3 mm across flats.)

3) Remove the belt from the pulleys.



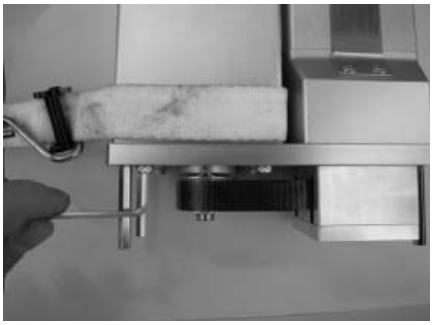


4) Pull out the tension adjustment bolts and remove the motor unit.



5) Install a new motor unit, and loosely tighten the tension adjustment bolts (hexagon socket-head bolt with washer M4 x 20, 4 pcs).
In this condition, pass the reduction belt around the pulleys.

6) Hook a looped strong string (or long tie-band) on the motor bracket, pull the string with a tension gauge to the specified tension, and then securely and uniformly tighten the adjustment bolts.



Tensile force: 8 kgf Tightening torque of adjustment bolt: 323 N·cm (33 kgf·cm)

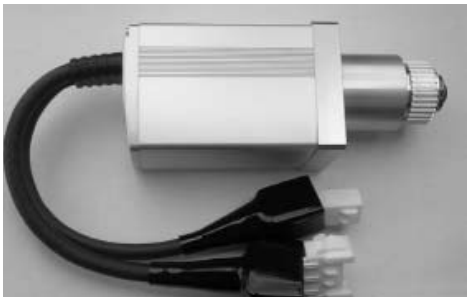
7) Install the pulley cover.
Tighten the thin-head screws (M3 x 6, 4 pcs) using an Allen wrench of 1.5 mm across flats.

Tightening torque: 87.2 N·cm (8.90 kgf·cm)

- SSR/SMR

[Items Required for Replacement]

- Replacement motor unit (see the photograph at right)
- Allen wrench set
- Tension gauge (capable of applying a tensile load of 12 kgf or more)
- Strong string or long tie-band

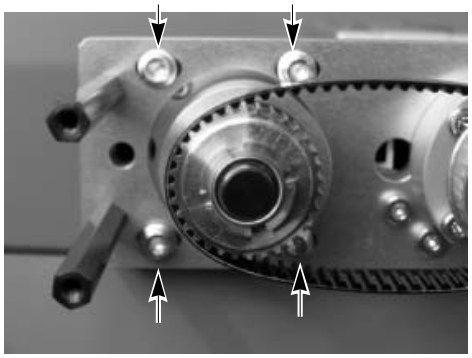


[Procedure]

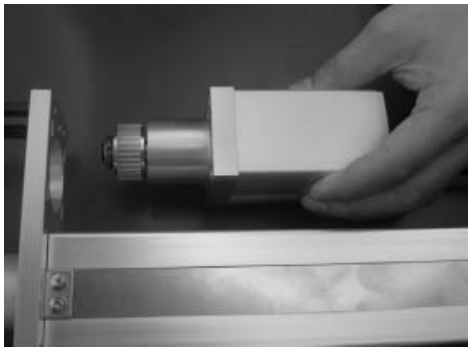
1) Remove the pulley cover.
   Remove the four thin-head mounting screws using an Allen wrench of 2 mm across flats.

2) Loosen the tension adjustment bolts to loosen the belt. (Use an Allen wrench of 3 mm across flats.)

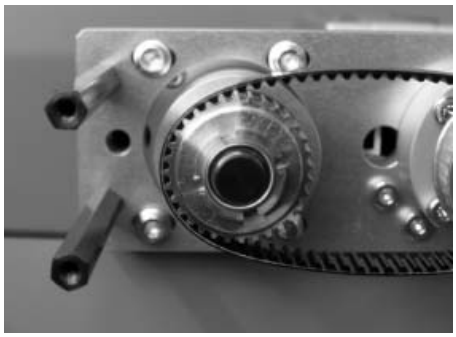
3) Remove the belt from the pulleys.



4) Pull out the tension adjustment bolts and remove the motor unit.



5) Install a new motor unit, and loosely tighten the tension adjustment bolts (hexagon socket-head bolt with washer M4 x 20, 4 pcs). In this condition, pass the reduction belt around the pulleys.



6) Hook a looped strong string (or long tie-band) on the motor bracket, pull the string with a tension gauge to the specified tension, and then securely and uniformly tighten the adjustment bolts.

Tensile force: SSR 7.3 kgf, SMR 11.6 kgf
Tightening torque of adjustment bolt:
323 N·cm (33 kgf·cm)

7) Install the pulley cover.
Tighten the thin-head screws (M4 x 6, 4 pcs) using an Allen wrench of 2 mm across flats.

Tightening torque: 204 N·cm (20.8 kgf·cm)