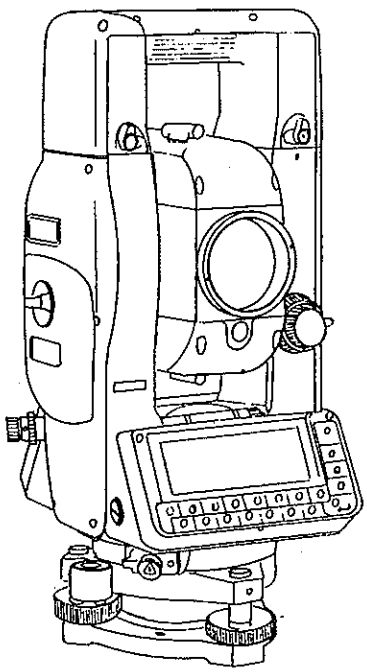
Nikon

Field Station

DTM-801 series

REPAIR MANUAL



NIKON GEOTECS CO., LTD.

02.02.90

REV. RECORD

RH-0024	REV. NUMBER : 0

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9	A		44	A	
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12	A		47	A	
13	A		48	A	
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97	A		132	A	
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105	A		140	A	

Contents

Contents

Telescope EDM Unit

1. Introduction

- This repair manual describes the product disassembly, reassembly, adjustment, and electrical adjustment procedures, in sequence.
- The electrical adjustment procedure for the encoder section is the same as that for the DTM-800-series Field Station, and the electrical adjustment procedure for the EDM section is the same as that for the DTM-500-series Total Station. However, some changes have been made. Be sure to read the repair manual and follow the instructions for adjustment.
- The manual is intended to facilitate your understanding of the configuration of mechanical and optical components, and necessary adjustments by describing all procedures in sequence from start to finish.
- When using an oscilloscope to monitor the detector signal, be sure to place a dark cover over the unit to prevent external light from entering the detector section.
- The manual is also organized so that each section can be referred to independently.
- The manual can be used as training TEXT in repair courses.
- Regarding parts, refer to the RH-0013A Parts List for the DTM-800-series Field Station.

2. Repair Information

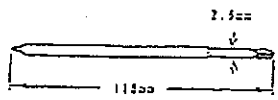
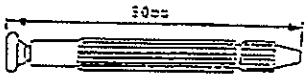
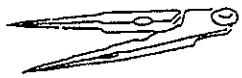
Always remove the battery before disassembling the product.

★ **To prevent losing the customer's data, be sure to copy and save the data in memory before starting repair work.**

- Wear an anti-static wristband and perform work on an anti-static mat.
- When reassembling glass components, be sure to blow off surface dust and wipe the components using a lens tissue or clean cotton cloth moistened in lens cleaner or an alcohol-ether mixture.
- Use only the specified adhesives and lubricants.
- Using organic solvents (e.g. alcohol, acetone, thinner) to clean plastic or rubber parts may cause discoloration or deformation. To clean plastic and rubber parts, use an eraser or wash with a neutral detergent.
- Adhesive (#350) is applied to machine screws to prevent loosening. If screws are too tight to unscrew, use alcohol to dissolve the adhesive.
- Use the appropriate screwdriver to loosen and tighten screws.

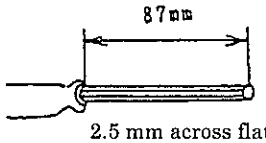
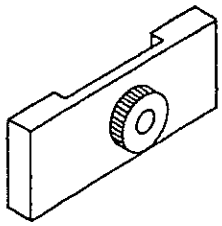
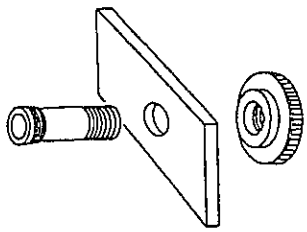
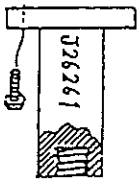
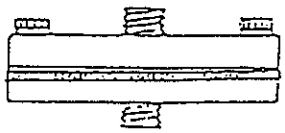
★ In this manual, important information is indicated by "★." Be sure to read the sections marked "★" and follow the instructions given.

3. General Tools and Required Items

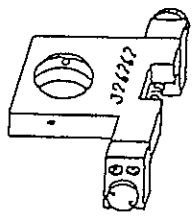
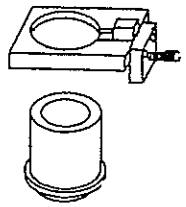
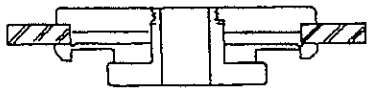
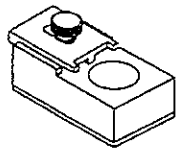
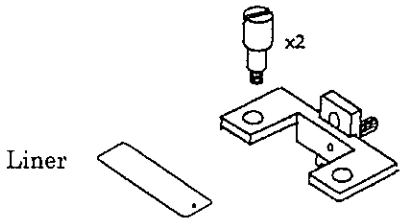
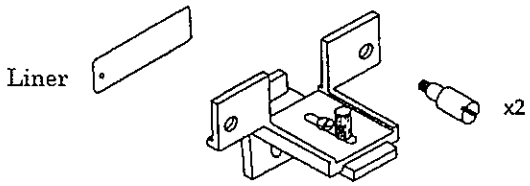
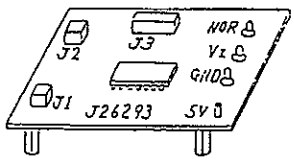
Tool No	Name	Outline
T91000	Screwdriver set (6-piece set)	
T91204	Screwdriver with wooden handle, 6-mm diameter	
T91102	Standard screwdriver with wooden handle, 5.5-mm width	
T91035	Screwdriver bit	
T91320	Screwdriver-bit holder	
T92041	Tweezers AA	
T92162	Compass wrench A	
T92163	Compass wrench B	
J5001	Hand lap (alcohol container)	
J21076	Allen wrench	Ballpoint

Required items
Storage oscilloscope, anti-static mat, lens tissue (E703),
low-temperature solder, low-temperature soldering iron,
lens cleaner (or alcohol-ether mixture), gasoline for cleaning,
eraser (for cleaning support covers and other parts), neutral detergent,
adhesive, lubricant (specified type)

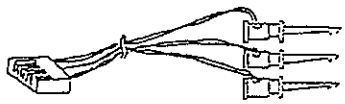
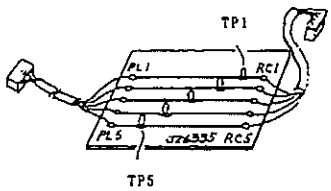
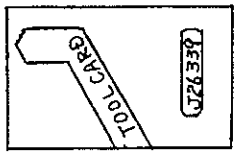
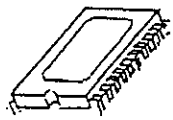
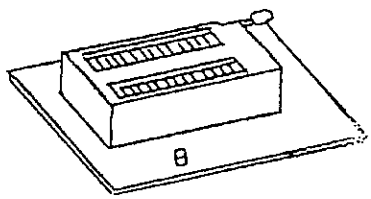
4. Tools for Exclusive use

Tool No	Name	Outline
J21995A	Hexagonal Bar screwdriver	 2.5 mm across flats
J26273	Special hex-key	 3 mm across flats
J26212A	Trunnion removing tool	
J26292	Trunnion-removing bolt (Male threads)	
J26270	Trunnion-removing tool for clamp tangent screw side	
J26261	H-encoder centering adjustment stand	 Provided with three plummet-rotor mounting screws
J26261A	J26261 centering adapter	

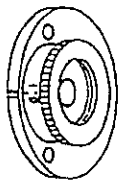
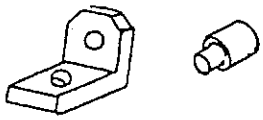
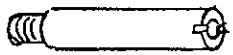
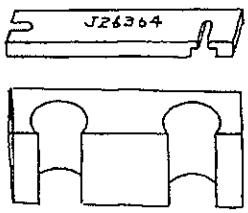
4. Tools for Exclusive use

Tool No	Name	Outline
J26262	H-encoder centering adjustment adapter	
J26338	H-encoder centering-adjustment-adapter guide	
J26309	H-encoder gluing tool	
J26334	V-encoder gluing tool	
J26336	Index gluing tool	
J26337H	H-index-gap adjuster	
J26337V	V-index-gap adjuster	
J26293	Zero-signal checker	

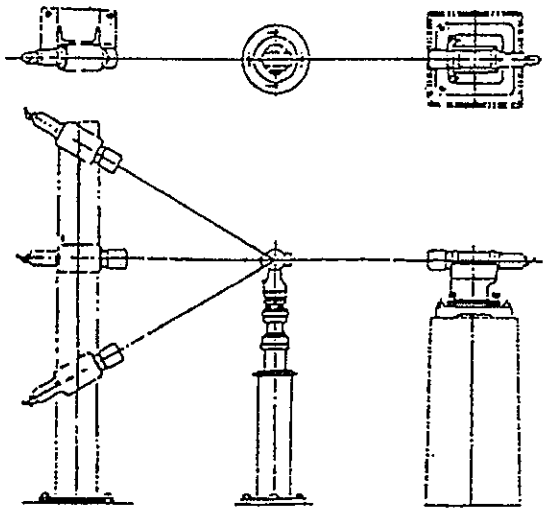
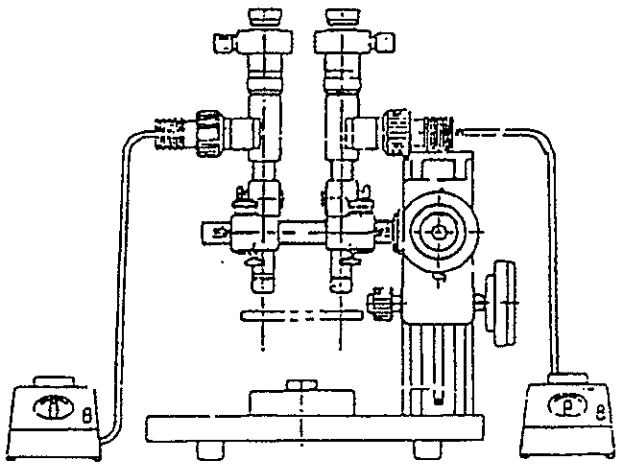
4. Tools for Exclusive use

Tool No	Name	Outline
J26293D	Power cable D	
J26293G	Power cable G	
J26317	Signal cable	
J26335	Signal checker	
J26339	Tool card	 The tool card for the DTM-800 series can be used for the DTM0-801 series, and NPL-820/NPL-821 by updating the version.
J26344E	DTM-801-series program master	 J26344 for DTM-800 series cannot be used.
J26355	Program installer 1	

4. Tools for Exclusive use

Tool No	Name	Outline
J26359	Fiber F adjuster	
J26360	EDM CPU board holder	
J26363	Fiber adjustment spacer	 Same as 2K146-250
J26364	Sector attachment tool	
J26365	Allen wrench	 across flats
J26196H	J26196 modification kit	
J26196IJ	J26196NEW modification kit	DTM-350/330 can also be used. When J261961 is installed, this kit is not required for the product.

4. Tools for Exclusive use

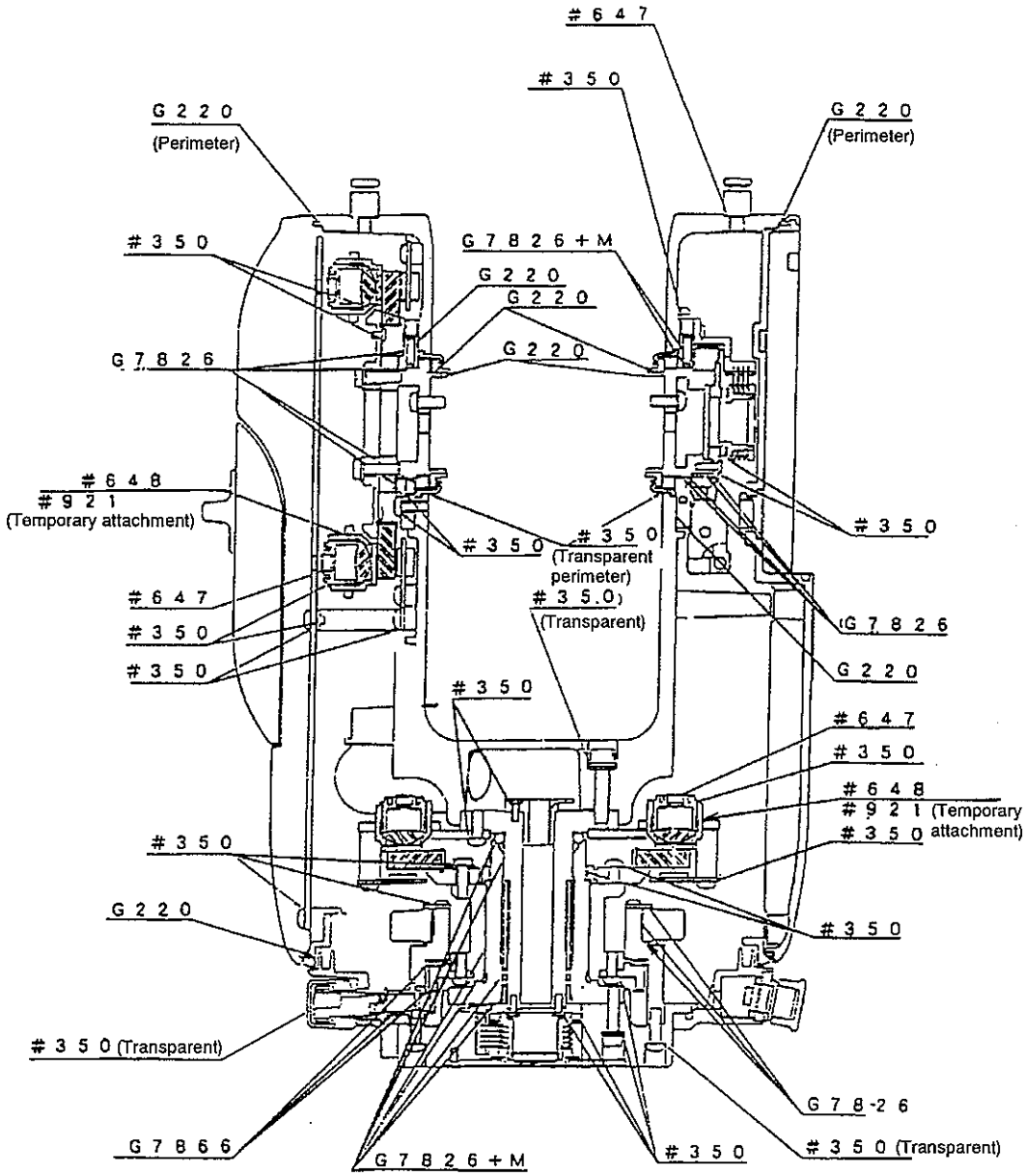
Tool No	Name	Outline
HLB000AB	Collimator for surveying instrument	 The configuration and specifications are subject to change without prior notice. The secondary/upward/downward collimator support and main collimator base are not included. Refer to the product manual for installation and operation instructions.
HXA20307	Scale centering tool	 The configuration and performance are subject to change without prior notice. Refer to the product manual for operation instructions.

5. Lubricants and Adhesives

Theodolite unit

The following reference diagram shows the theodolite fitted with a detachable leveling base. This diagram also applies to the lubricating system for the operating mechanisms of the theodolite fitted with a shift-type leveling base.

G or L: Lubricant #: Adhesive

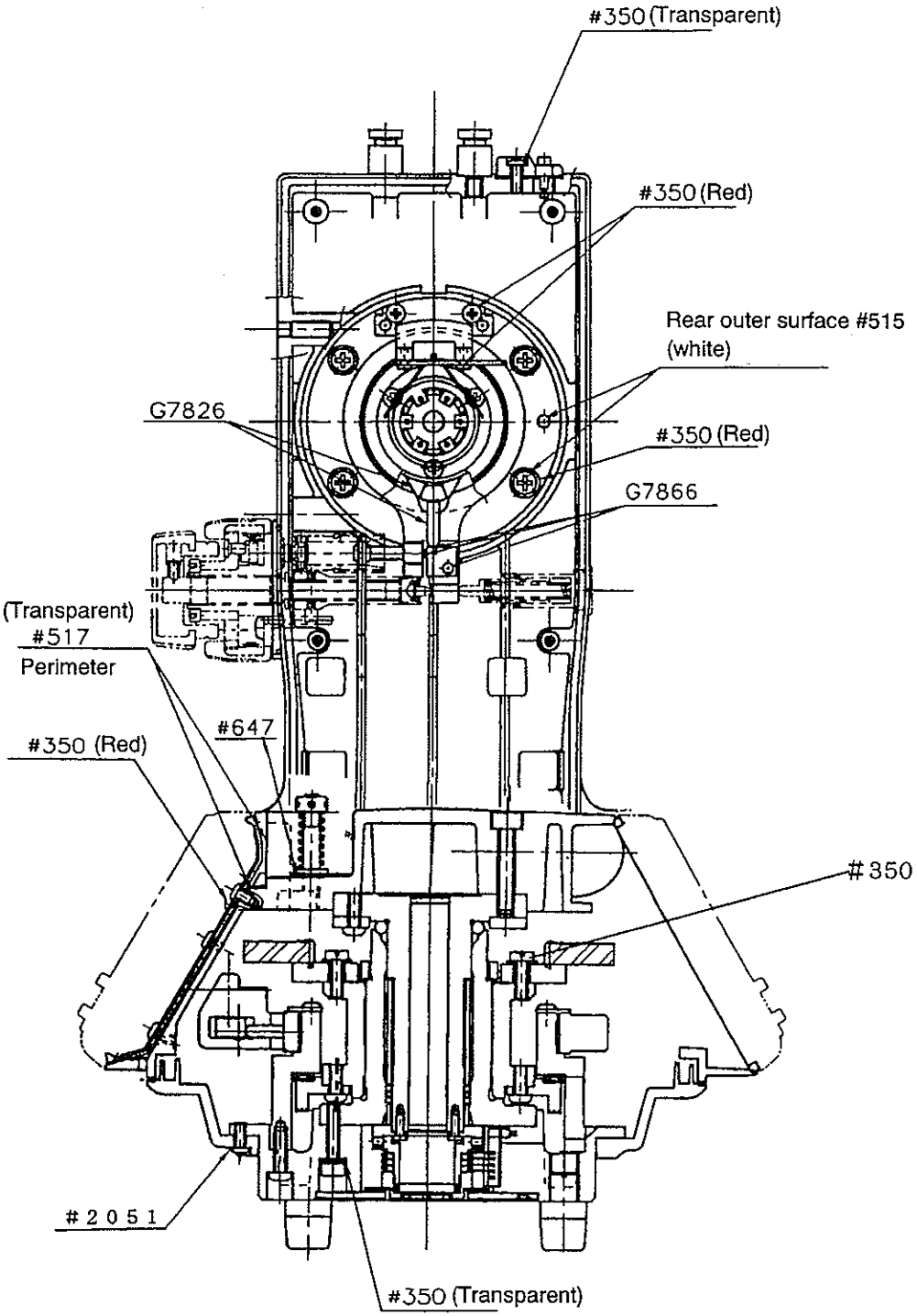


5. Lubricants and Adhesives

Theodolite unit

The following reference diagram shows the theodolite fitted with a detachable leveling base. This diagram also applies to the lubricating system for the operating mechanisms of the theodolite fitted with a shift-type leveling base.

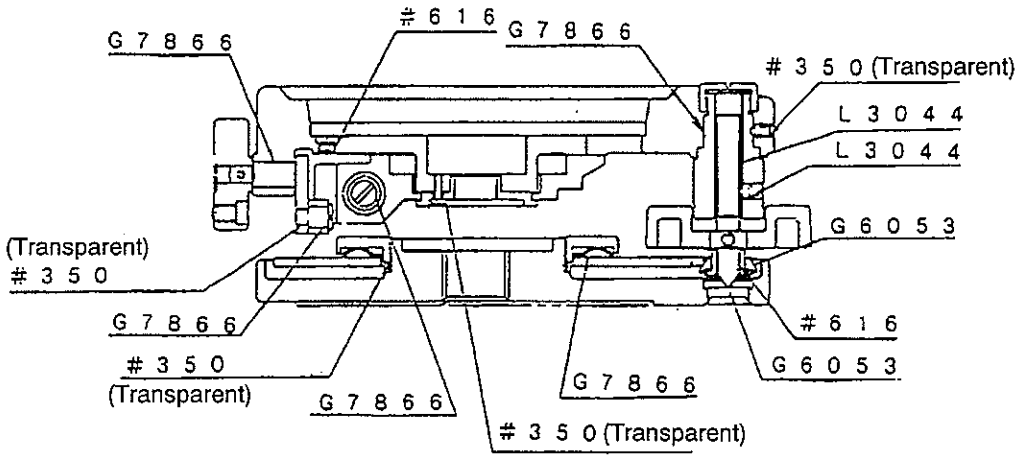
G or L: Lubricant #: Adhesive



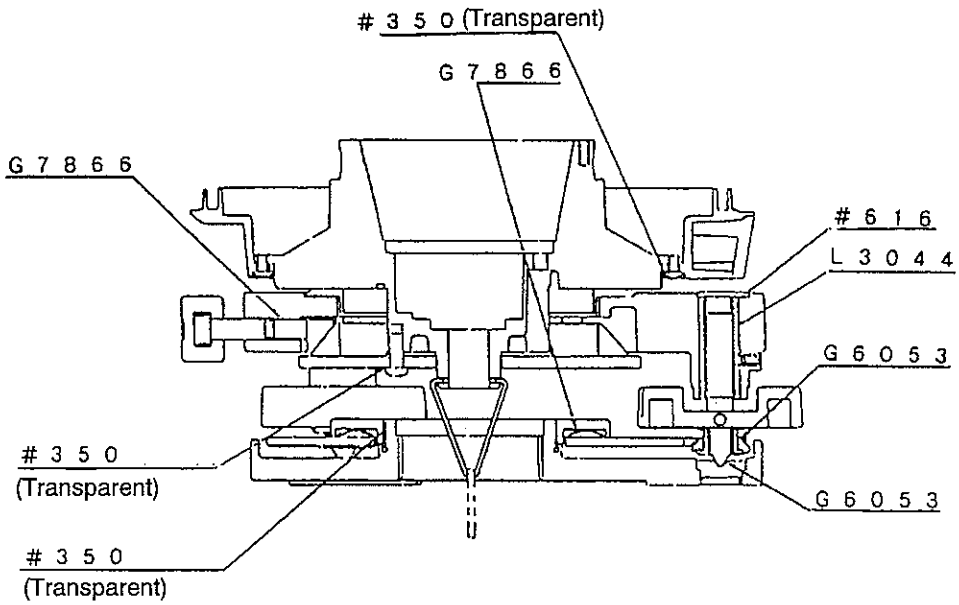
5. Lubricants and Adhesives

Detachable leveling base

G or L: Lubricant #: Adhesive



Leveling base with shift device

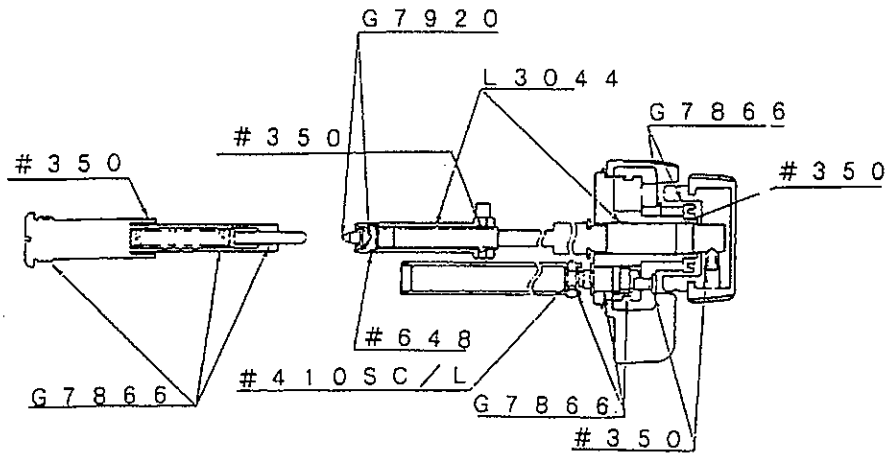


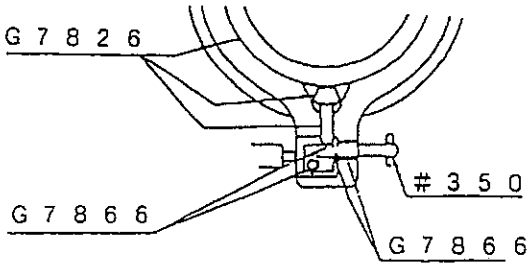
5. Lubricants and Adhesives

Clamp and Tangent Screw

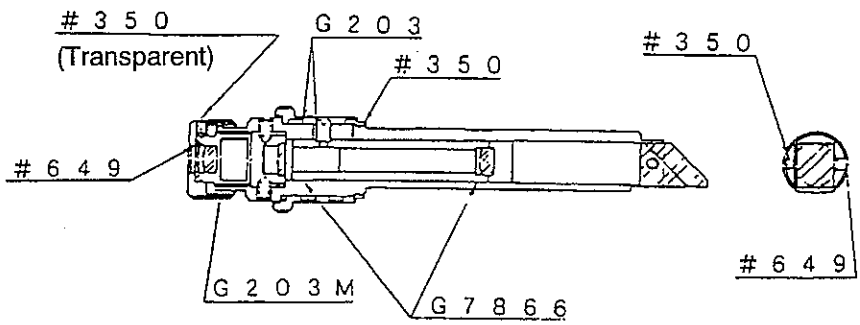
The following reference diagram shows the horizontal clamp and tangent screw. This diagram also applies to the lubricating system for the operating mechanisms of the vertical clamp and tangent screw.

G or L: Lubricant #: Adhesive





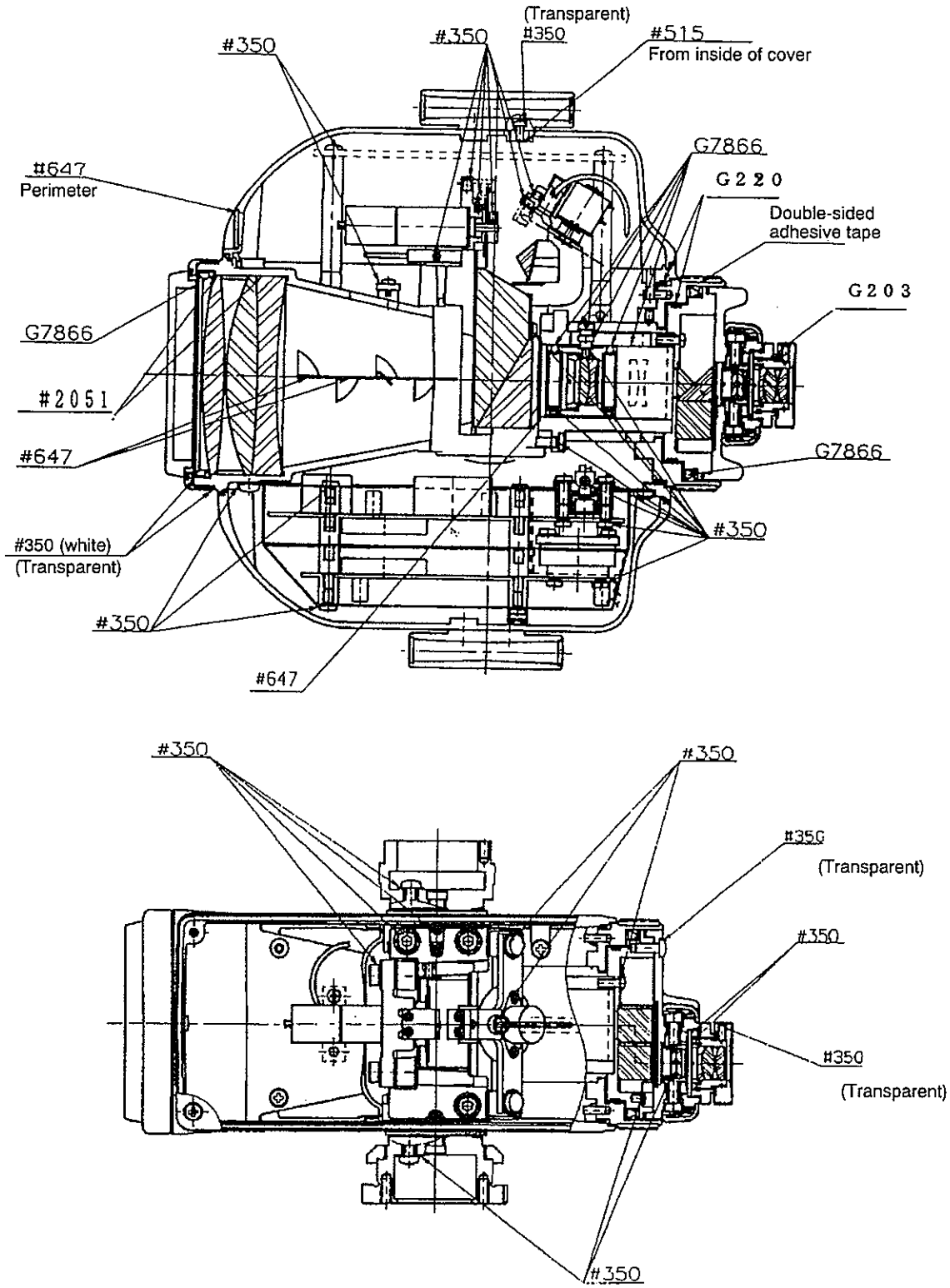
Optical plummet



5. Lubricants and Adhesives

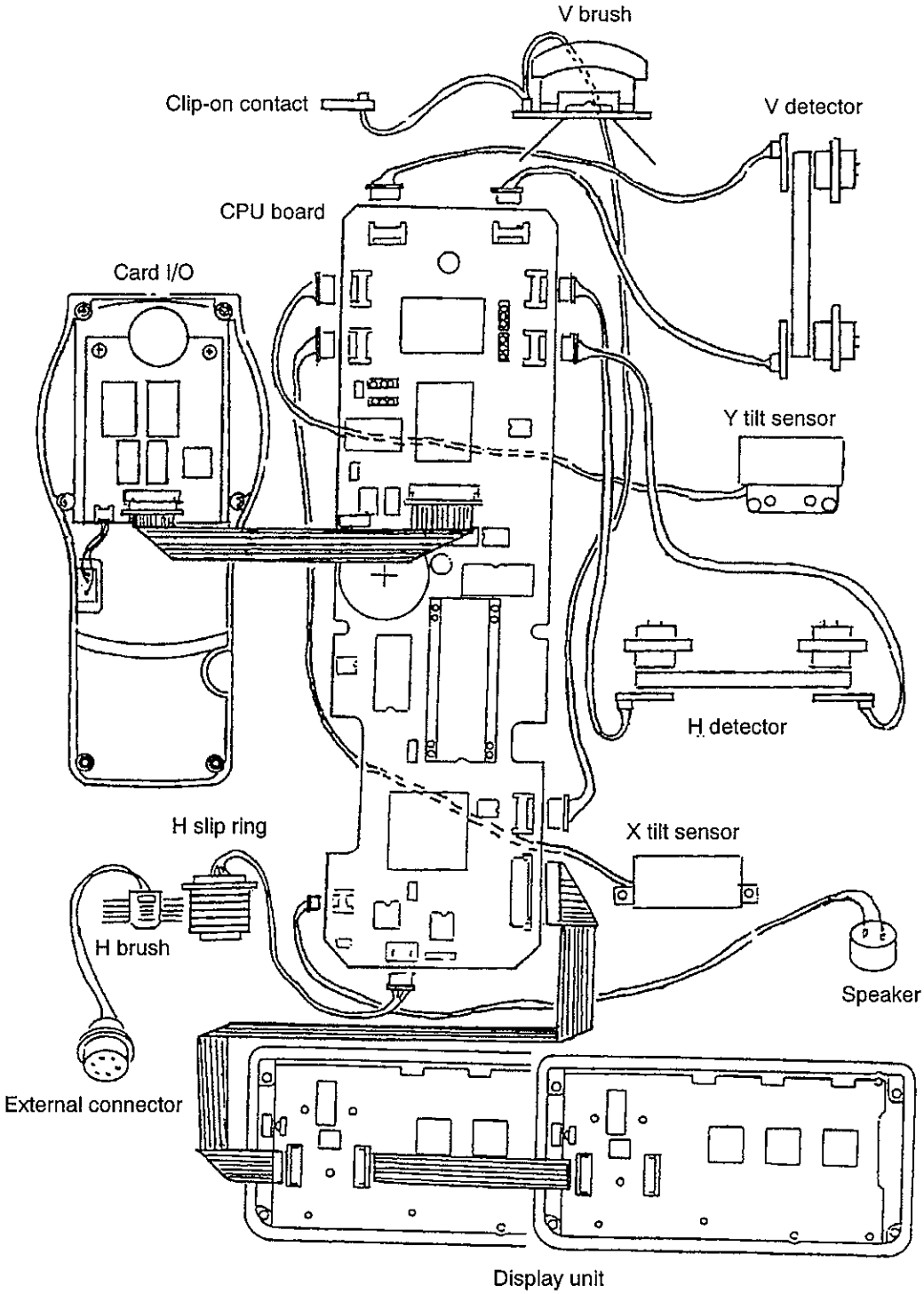
Telescope

G or L: Lubricant #: Adhesive



6. Connection Diagram

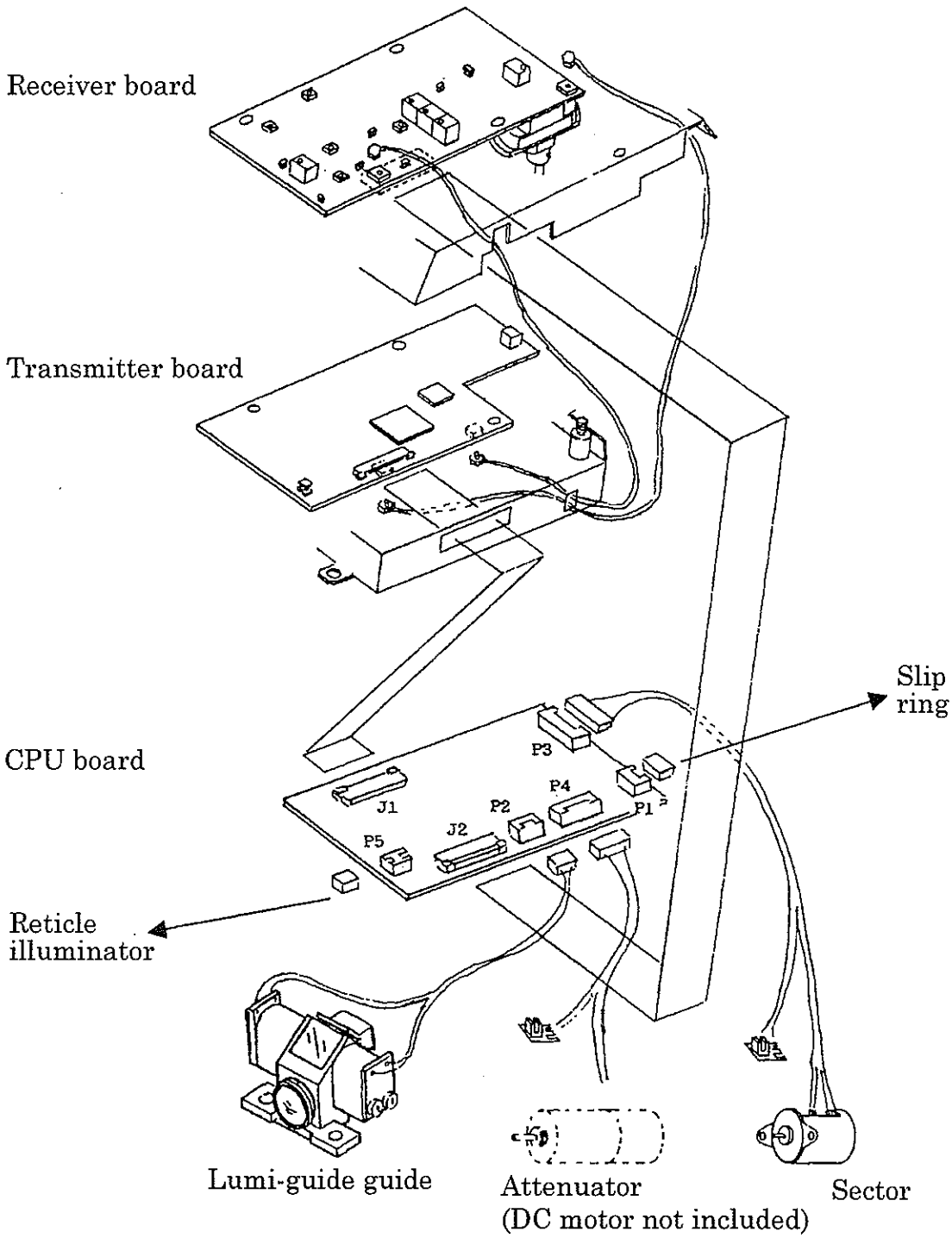
Theodolite unit



6. Connection Diagram

EDM unit

★ Carefully route cables to prevent pinching by the shield plate.



7. Disassembly

The following describes the procedure for disassembling the theodolite unit. The procedure for disassembling the EDM unit is described separately, as the EDM unit should be disassembled after the theodolite unit is completely repaired.

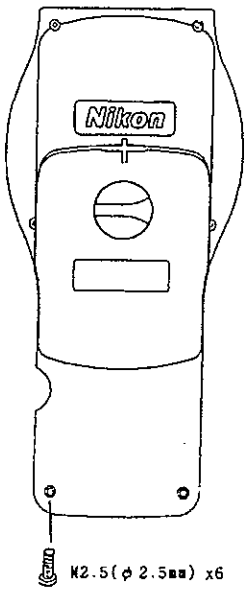
Copy and save necessary parameters and compensation values from the CPU-board to memory area on the tool card (J26339) for easy data restoration following completion of the repair procedures.

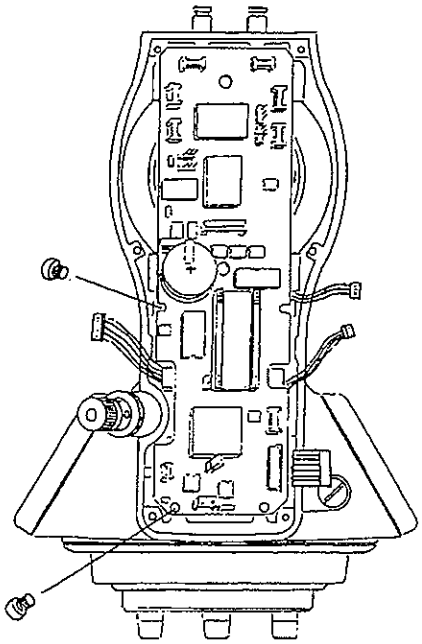
- ◎ The disassembly procedures are divided into separate blocks in the manual, but are organized so that the entire unit can be disassembled by following all procedures in sequence.
- ◎ In this manual, disassembly is omitted where considered unnecessary.
- ◎ Be sure to read the notes marked "★." These notes describe important points and precautions on disassembly and reassembly.

7-1. Disassembling the Left Column

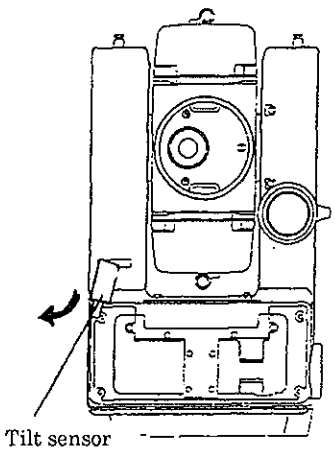
1. Removing the left side cover
   Carefully remove the left side cover, as a flat cable is connected between the CPU board and interface board located behind the cover.

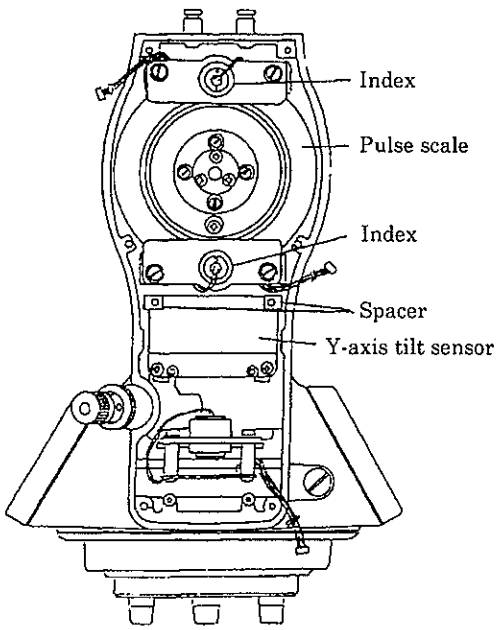
2. Detaching the CPU board
   Disconnect all connectors from the CPU board, then remove the board-mounting screws to detach the CPU board.





3. Removing the Y-axis tilt sensor
   Pull the lower section of the tilt sensor forward and remove the sensor at an angle.



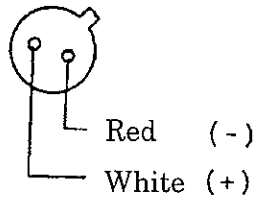


7-1. Disassembling the Left Column

4. Removing lead wires of LED on index section from cable at soldered sections
   ★ The LED on the index section is connected to the cable from the detector board installed in the main body. The procedure described below protects the pulse scale against damage due to contact with the index section during removal.

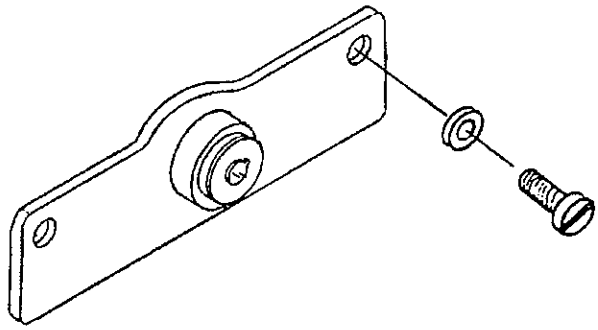
   ★ When the pulse scale is not removed, it is not necessary to conduct the following procedure.

   ★ When reinstalling the LED, carefully check the polarities.



5. Removing the V upper/ lower indexes
   The upper and lower indexes can be distinguished by the following indications:
   Upper index: QD4 stamped on index glass
   Lower index: QD3 stamped on index glass

Index glass

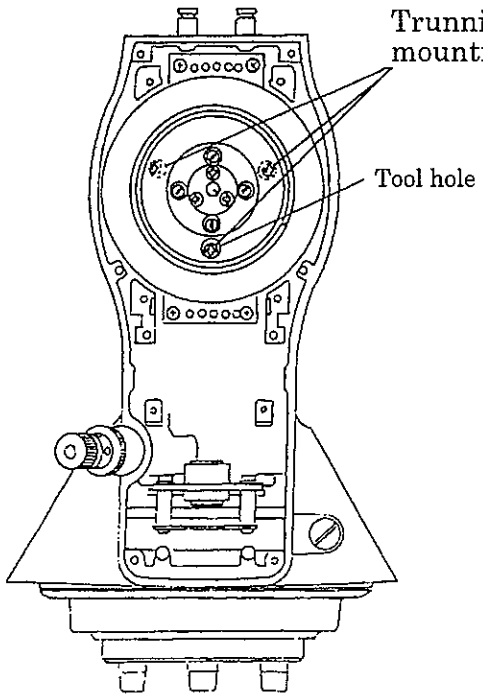


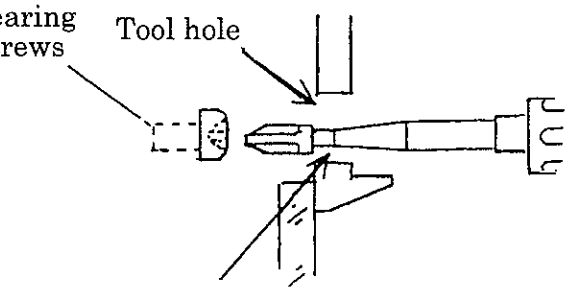
6. Removing the trunnion

   1) Rotate the telescope and remove the three mounting screws through the tool hole in the pulse scale holder.
      ◎ Rotating the telescope one turn will expose the three trunnion-mounting screws via the tool hole in the pulse scale holder.
      Screws: One location indicated by a solid line and two locations indicated by a dotted line in the diagram below

      ★ The tool hole and trunnion-bearing mounting screws are not located on the concentric circle. Grinding the section of the screw driver that contacts the edge of the tollo hole.

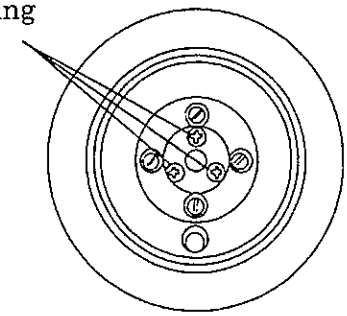
Enlarged diagram



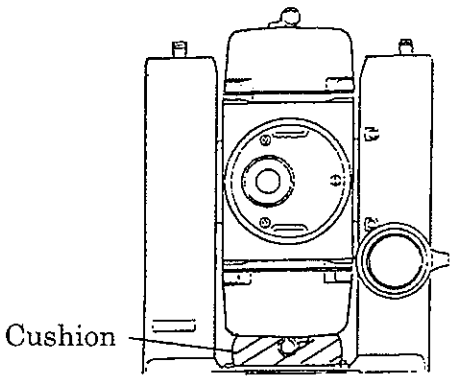


7-1. Disassembling the Left Column

2) Remove the trunnion mounting screws.

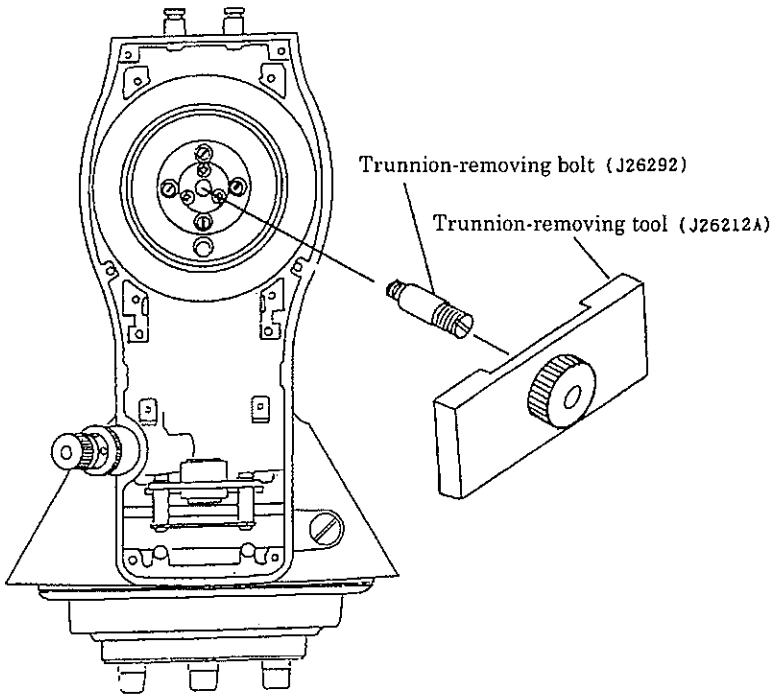


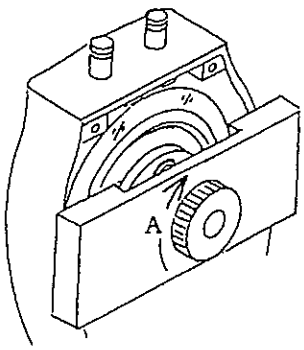
3) Detach the trunnion.
When the trunnion is detached, the telescope section tilts downward. To prevent it from tilting, insert a sponge or other cushioning material between the main body and telescope section.



◎ Screw the trunnion-removing bolt (J26292) into the center of the trunnion, attach the trunnion-removing tool, then turn the handle of the tool clockwise (arrow A) to remove the trunnion.

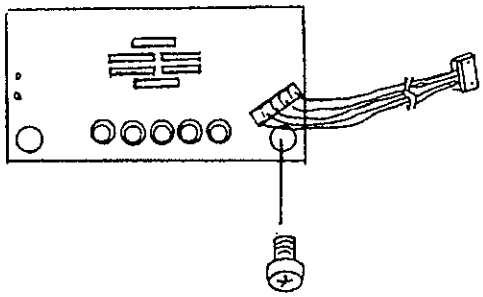
★ **When the pulse-scale mounting screws are removed and the pulse scale detached from the trunnion, the pulse scale must be centered and adjusted.**





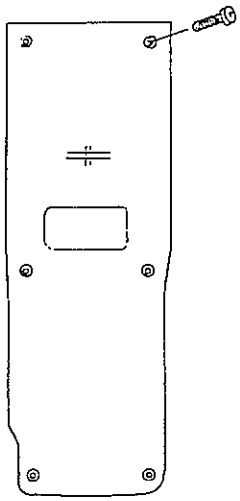
7-1. Disassembling the Left Column

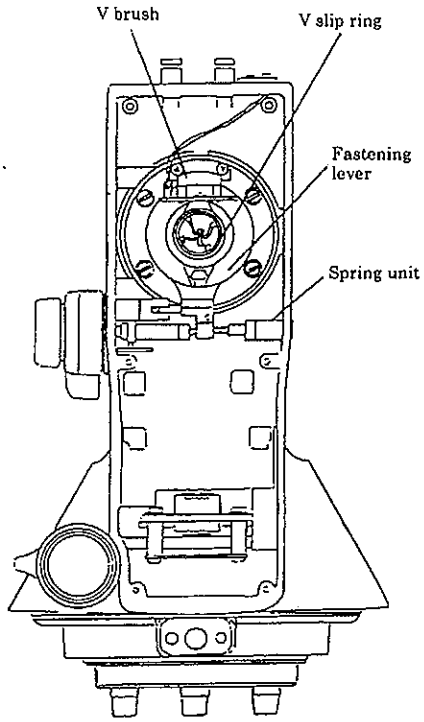
7. Removing the V upper/lower detector board
The detector board is installed directly on the main body.



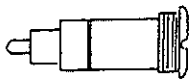
7-2. Disassembling the Right Column

1. Removing the left side cover

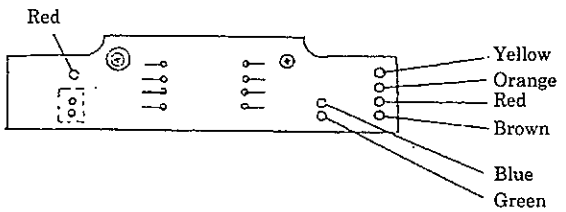




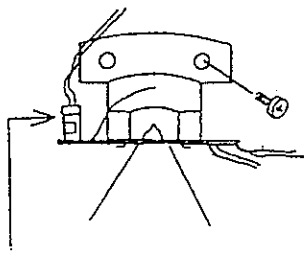
2. Removeing the spring unit



3. Removing the V brush
   1) Disconnect the connector of the cable connected to the clip-on battery contact.
   2) Remove the V-brush mounting screws.



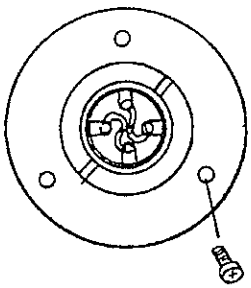
V-brush board (viewed from the bottom)

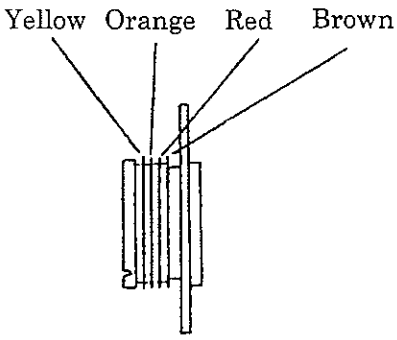


Cable connector

7-2. Disassembling the Right Column

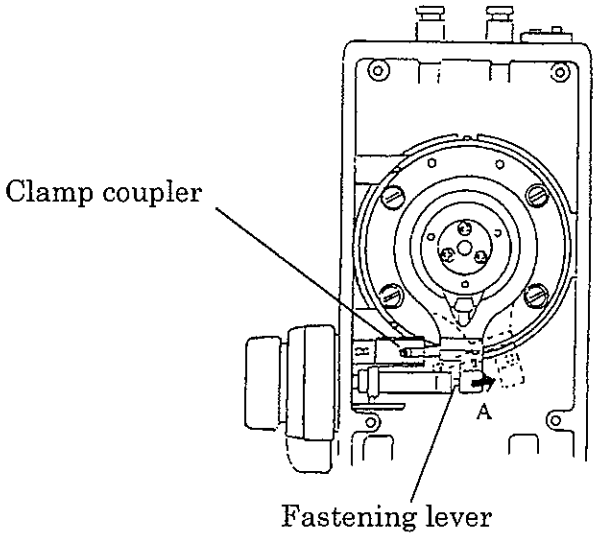
4. Removing the V slip ring
Remove solder from the slip-ring terminals, then remove the slip ring.





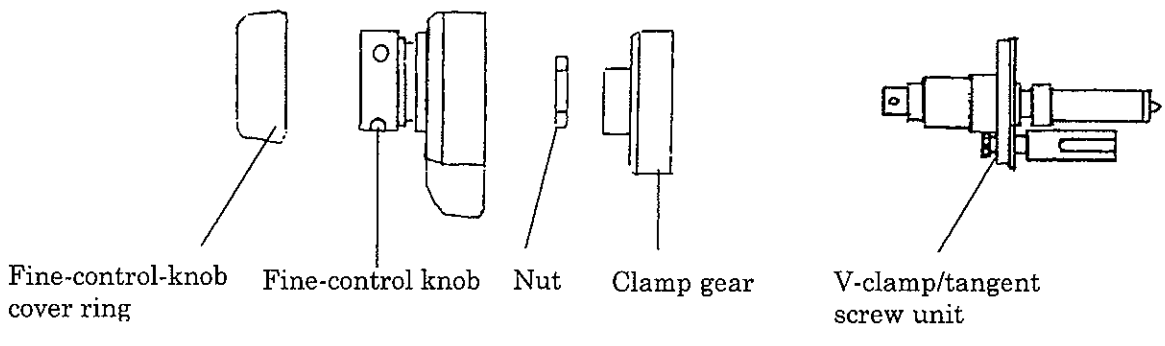
Cable connection to the slip ring
Wires are color-coded as shown in the diagram when viewed from the exterior of the slip ring (from side-cover).

5. Detaching the fastening-lever unit
Turn the fastening-lever unit counterclockwise (arrow A). When the clamp coupler detaches from the clamp joint, pull the fastening-lever unit forward to remove. Note that a washer is installed between the fastening-lever unit and trunnion.



6. Removing the V-clamp/tangent screw

1) Remove the fine-control knob.
Remove the fine-control-knob cover ring, loosen the two fine-control-knob setscrews, then detach the fine-control knob.
◎ Adhesive (#350) is applied to the setscrews. Use alcohol to dissolve the adhesive before unscrewing them.



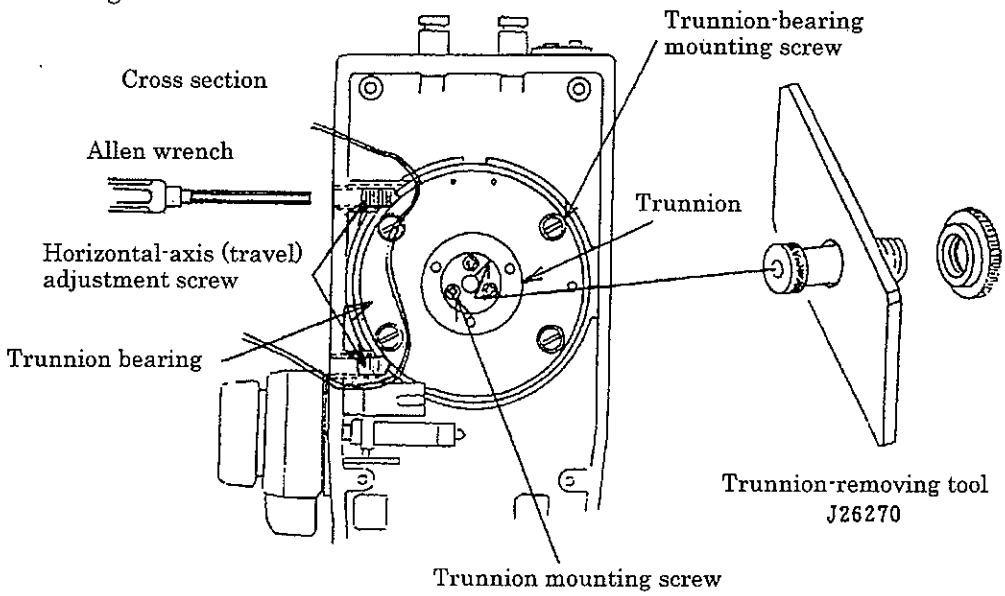
7-2. Disassembling the Right Column

2) Remove the V-clamp gear
Remove the V-clamp cover ring unscrew the clamp gear-retaining nut, then detach the V-clamp gear.

3) Dismount the V-clamp/tangent screw unit.
Unscrew the two V-clamp/tangent screw unit mounting screws, then detach the V-clamp/tangent screw unit.

8. Detaching the trunnion and trunnion bearing

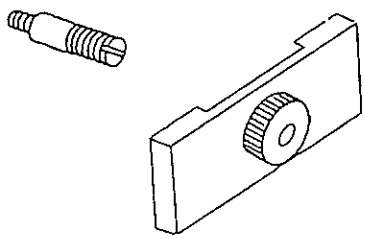
1) Loosen the horizontal-axis adjustment screw until it contacts the trunnion bearing.



2) Remove the trunnion-bearing mounting screws.

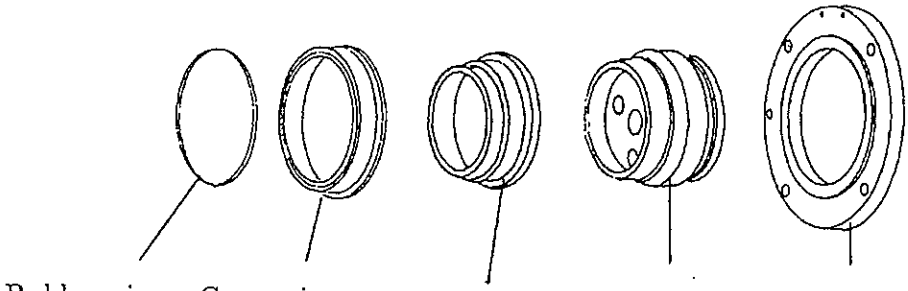
3) Detach the trunnion.
Screw the trunnion-removing tool (J26270) into the hole of the trunnion, then remove the trunnion.

◎ The combination of the trunnion-removing bolt (J26292) and trunnion-removing tool (J26212A) used for disassembly of the left support can also be used to remove the trunnion. Note that for such combined use, pull out the cable at the center of the trunnion toward the EDM unit before performing the removal work.

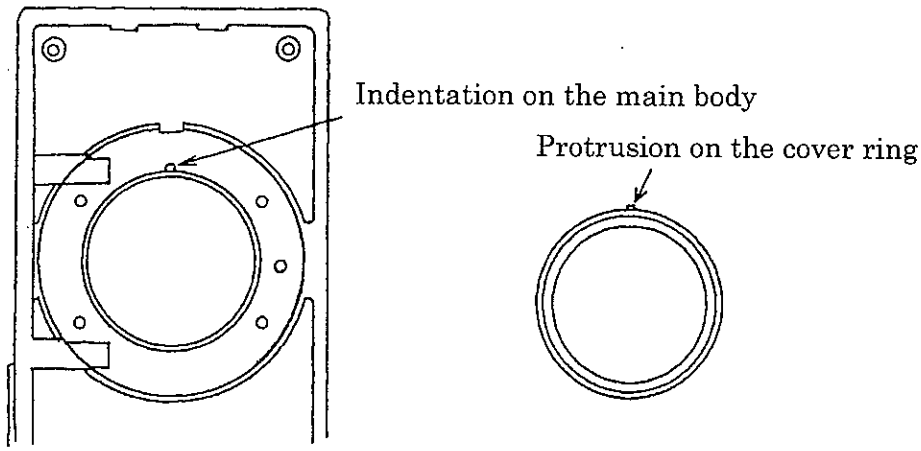


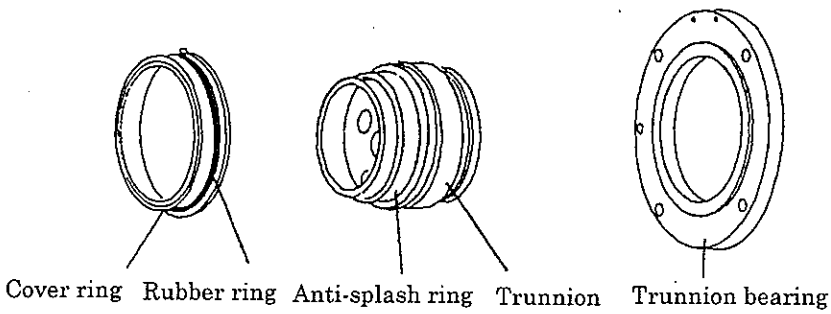
7-2. Disassembling the Right Column

◎ The anti-splash ring, cover ring, and rubber ring cannot be removed unless the trunnion is removed.



◎ When reassembling the trunnion, place the rubber ring over the cover ring, align the protrusion on the cover ring with the indentation on the main-body guide, install the anti-splash ring and trunnion on the telescope, then install the trunnion bearing.



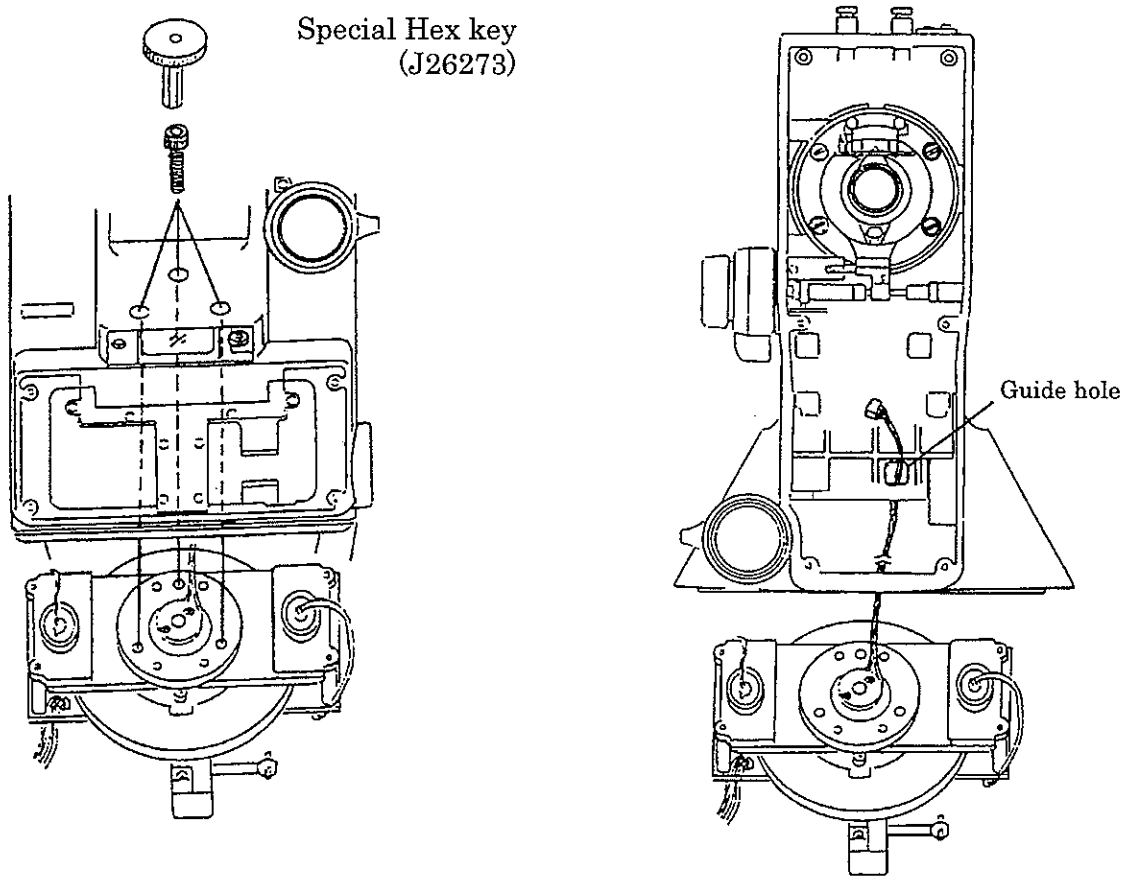


7-3. Detaching the Upper Main Body from the Base

1. Detaching the main body from the base

   1) Use a standard Allen wrench to loosen the hexagonal socket-head bolts on the main body, then remove the bolts using the special Hex key (J26273).

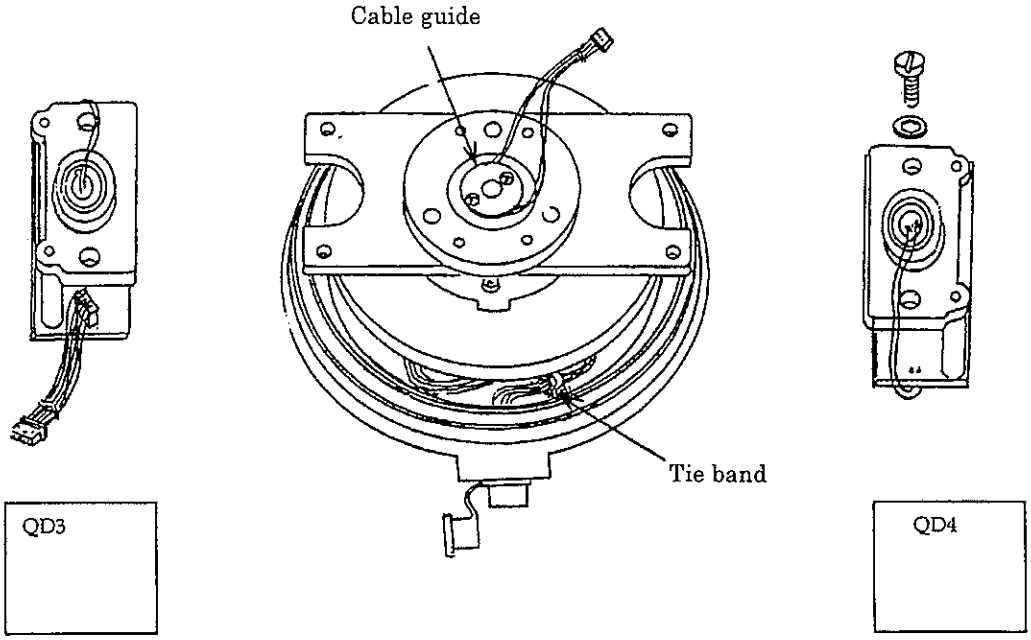
   2) Lift the main body slightly, pull out the cable connected to the center shaft of the base through the guide hole located at the lower section of the main body, then lift the main body to detach it.



★ Caution on reinstalling the main body
The fastening-lever clamp joint and main-body mounting screws on the center shaft must be positioned as shown in the diagram at the above left. Pull up a sufficient length of cable connected to the center shaft from the guide hole located at the lower section of the main body, then confirm that the cable is not caught between the main body and center shaft.

7-4. Disassembling the Vertical Axle (Leveling Base with Shift Device)

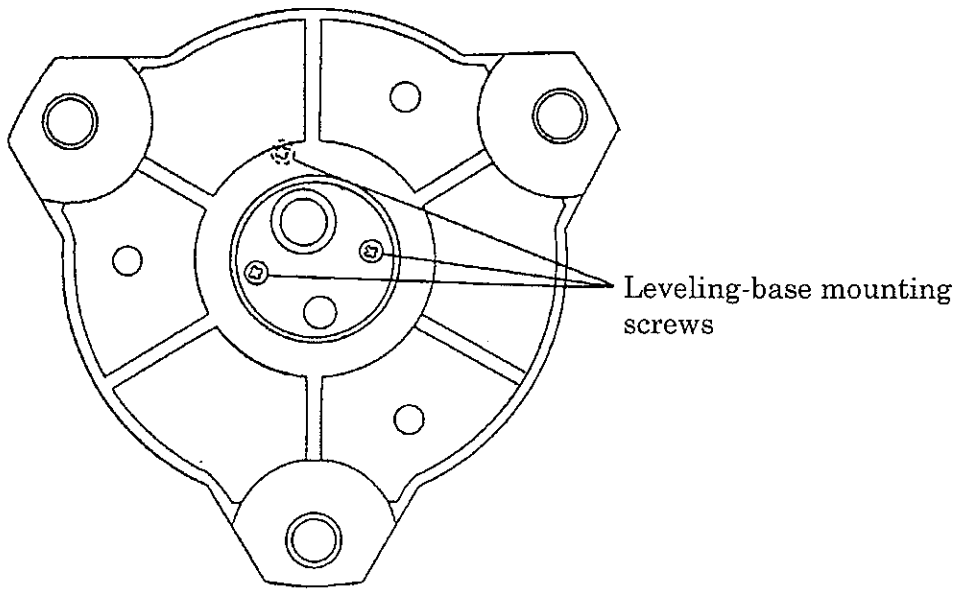
1. Removing the right and left detector units
   ★ To prevent cable breakage, do not detach the cable guide in this step.



   ★ The right and left detector units can be distinguished by the number stamped on the index glass. The index glass for the left column is stamped "QD3." The index glass for the right column is stamped "QD4."

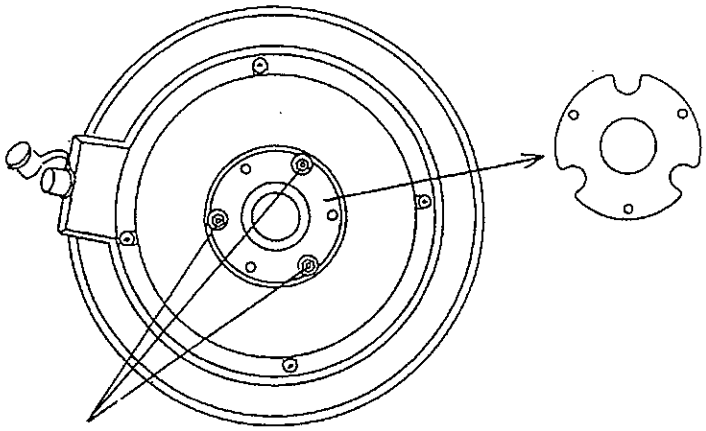
2. Removing the tie band

3. Removing the shift-type leveling base
   Remove the leveling-base mounting screws through the fastening-lever hole located at the center of the leveling base, then remove the leveling base.

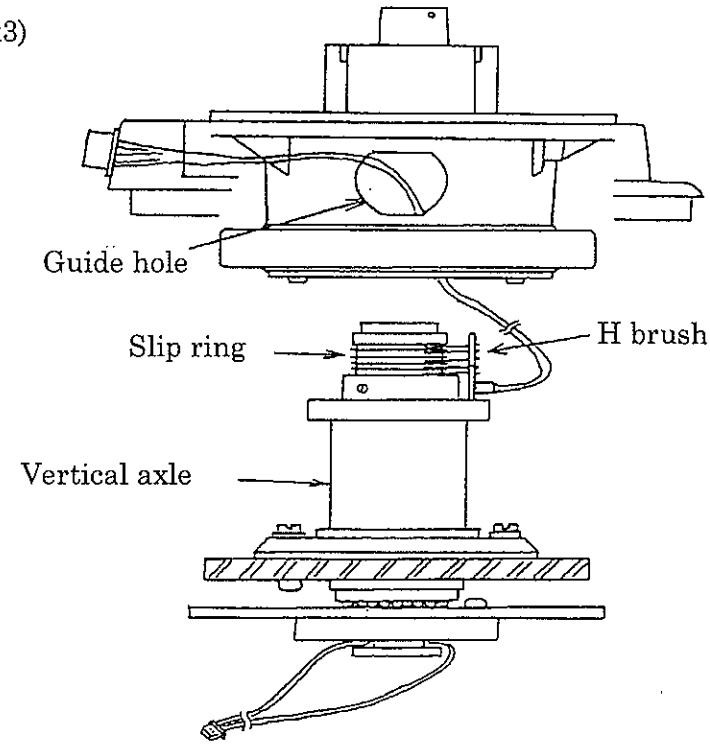


7-4. Disassembling the Vertical Axle (Leveling Base with Shift Device)

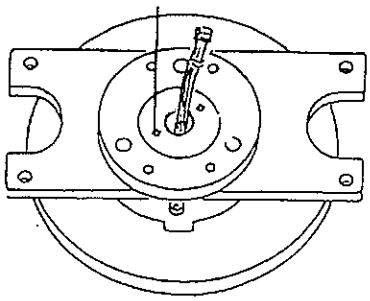
4. Detaching the vertical axle
Remove the bottom-plate mounting screws, insert the cable located between the external plug and H brush into the bottom-plate cable guide hole, then lift the bottom plate while ensuring that the axle and H brush detach simultaneously.



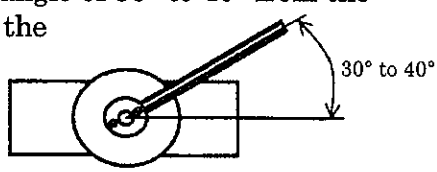
Vertical axle mounting screws (x3)



5. Removing the cable guide

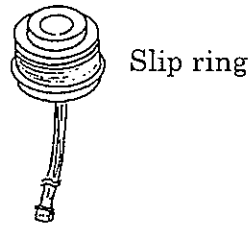


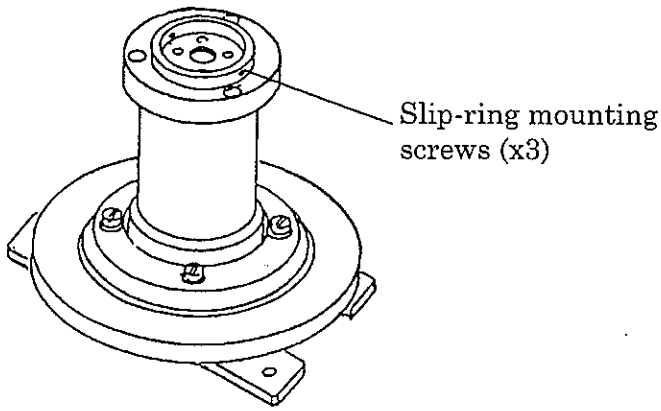
★ **Caution on reassembling the cable guide**
Install the cable routed from the center shaft through the cable-guide gap at an angle of 30° to 40° from the index plate. Assembling the cable at an angle of less than 30° may result in the cable being pinched by the main body.



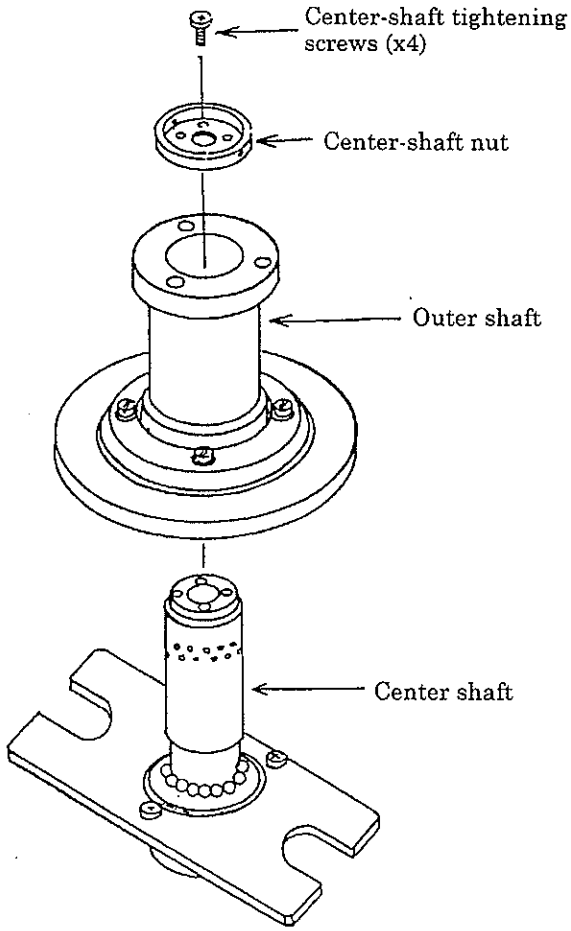
7-4. Disassembling the Vertical Axle (Leveling Base with Shift Device)

6. Removing the slip ring
   Loosen the three slip-ring mounting setscrews, then remove the slip ring.



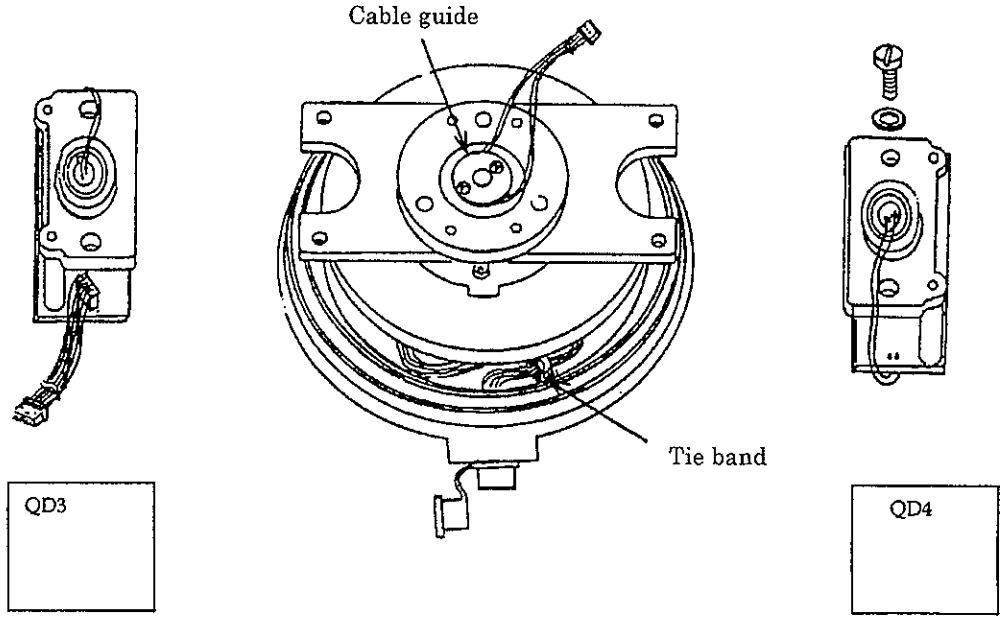


7. Disassembling the vertical axle
   Remove the center-shaft nut, then lift the outer shaft to disassemble the vertical axle.
   ★ **Be careful not to drop any steel balls.**



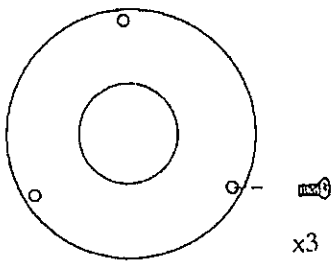
7-5. Disassembling the Vertical Axle

1. Removing the right and left detector units
   ★ **To prevent cable breakage, do not detach the cable guide in this step.**

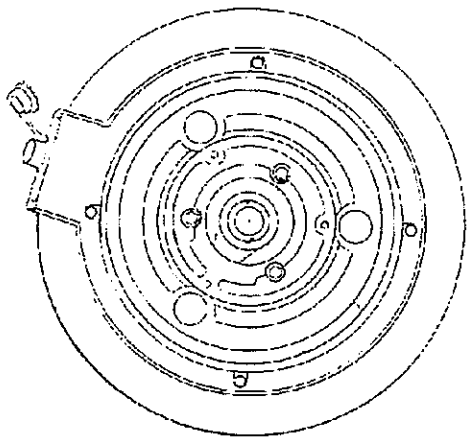


   ★ The right and left detector units can be distinguished by the number stamped on the index glass. The index glass for the left support is stamped "QD3." The index glass for the right support is stamped "QD4."

2. Detaching the bottom cover

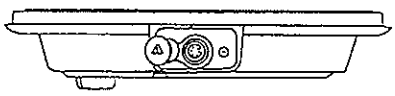


Bottom cover

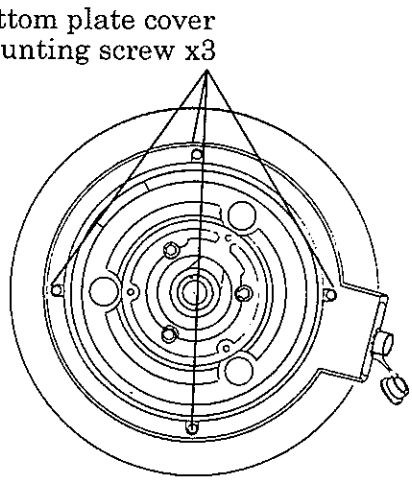


7-5. Disassembling the Vertical Axle

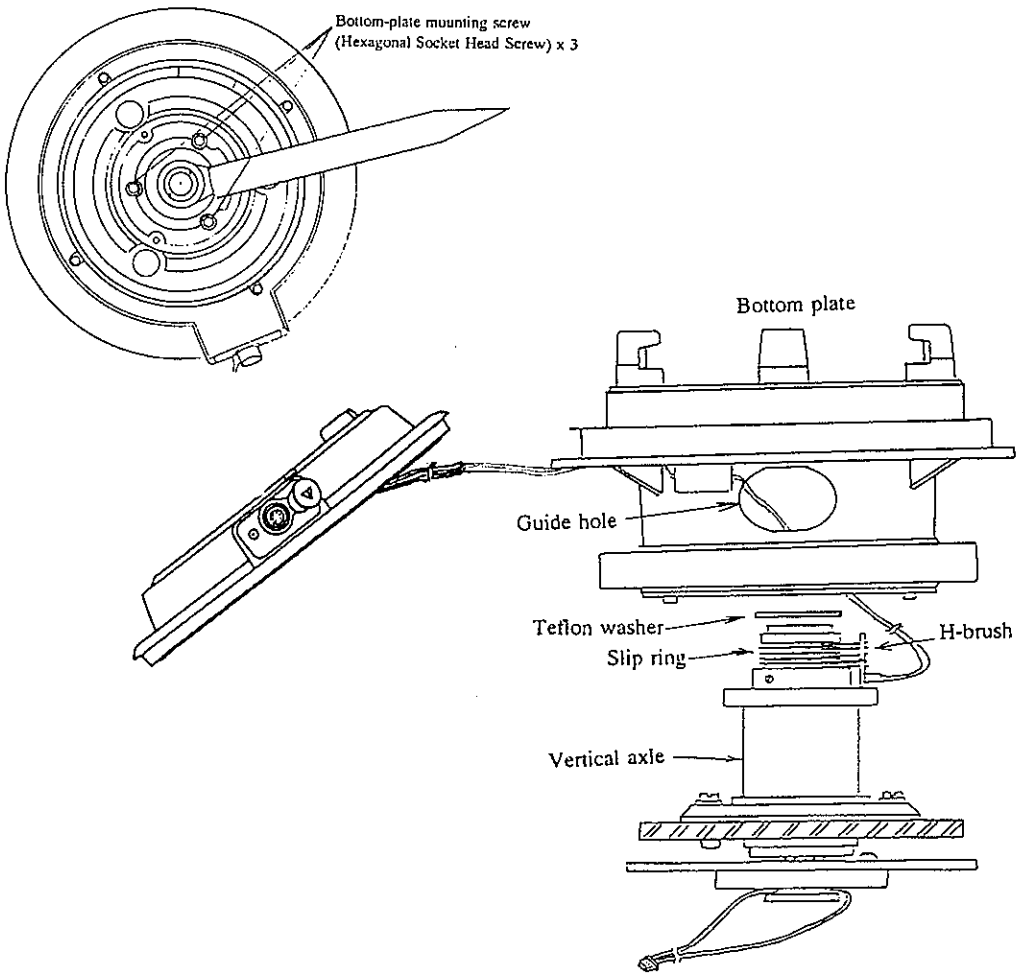
3. Removing the bottom-plate-cover mounting screws
The cable routed between the brush and external plug on the bottom plate cover is secured to the bottom plate with a tie band. In this step, remove the screws, but do not detach the bottom-plate cover.



Bottom-plate cover

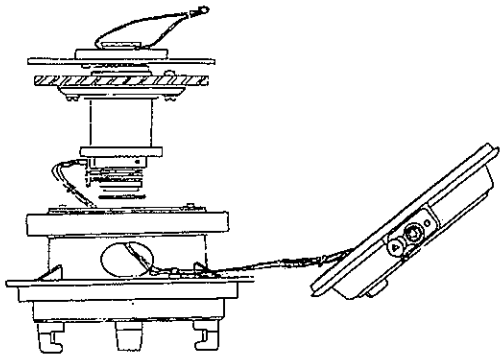


4. Detaching the bottom plate
Remove the three bottom-plate mounting screws located on the outside of the bottom plate and the three inside vertical axle mounting screws. Use tweezers to gently press and hold the brush (visible from the bottom-plate side), then lift the bottom plate.



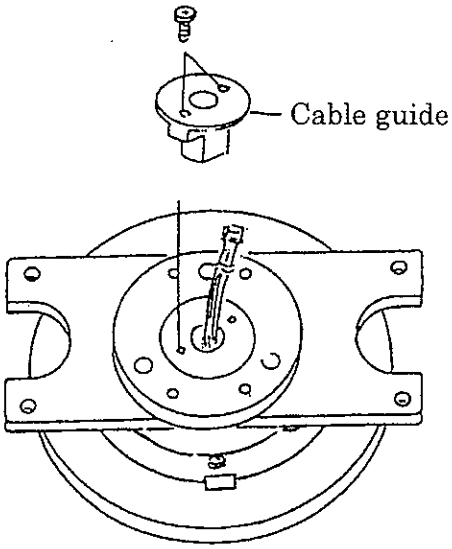
7-5. Disassembling the Vertical Axle

5. Removing the tie band

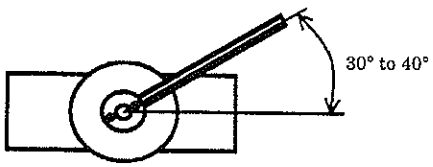


6. Removing the bottom-plate cover
   The external plug and H brush are connected by a cable. This cable must be disconnected at the soldered section on either side before the bottom-plate cover can be completely detached. It is not necessary to disconnect the cable unless the bottom-plate cover must be separated.

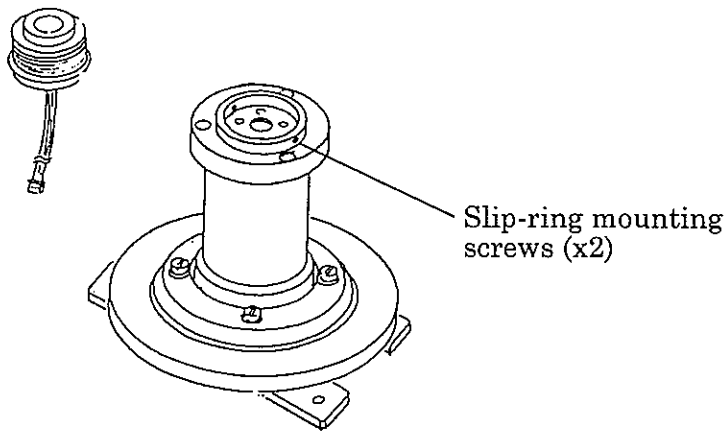
7. Removing the cable guide



★ Caution on reassembling the cable guide
Install the cable routed from the center shaft through the cable-guide gap at an angle of 30° to 40° from the index plate.
Installing the cable at an angle of less than 30° may result in the cable being pinched by the main body.

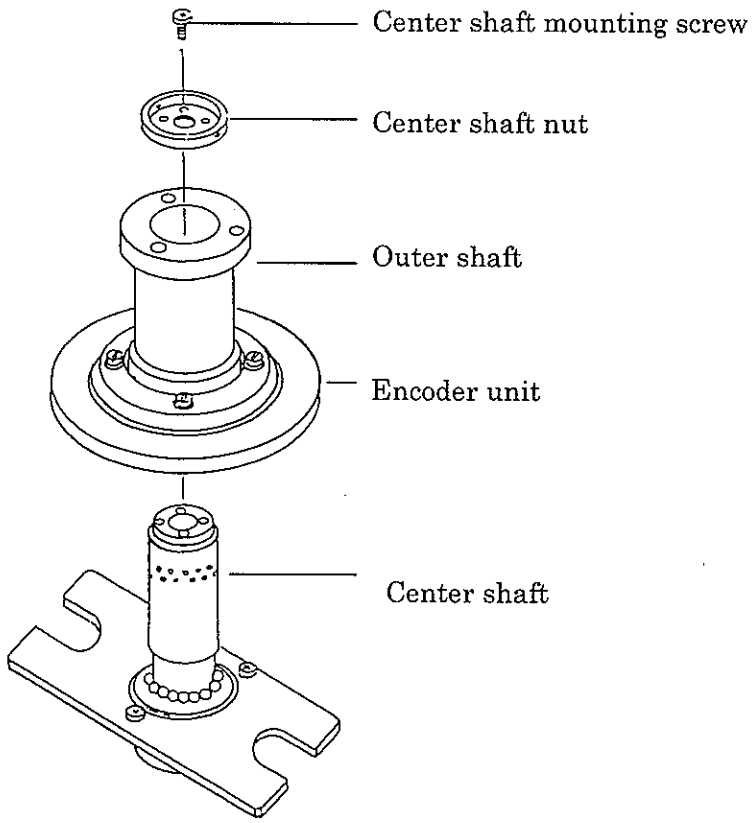


8. Removing the slip ring
   Loosen the two slip-ring mounting screws, then remove the slip ring.



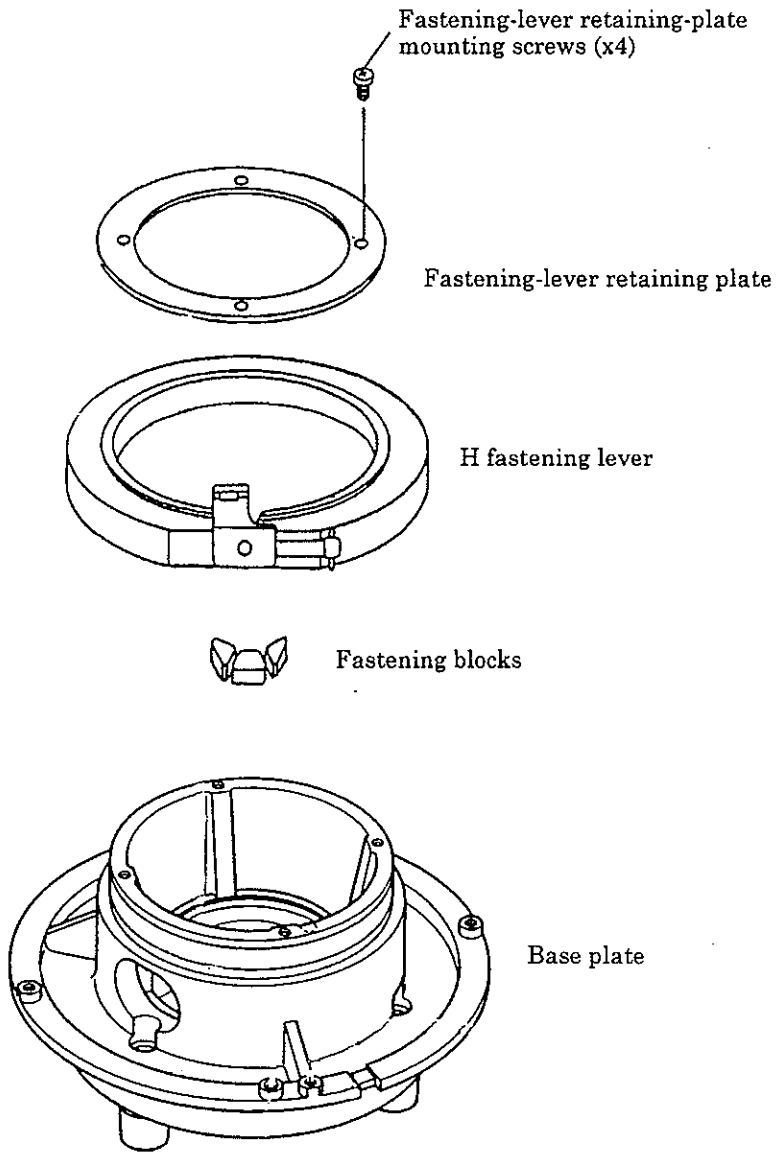
7-5. Disassembling the Vertical Axle

9. Disassembling the vertical axle
   Remove the three center-shaft mounting screws, then lift the outer shaft and encoder unit to remove the center shaft.



7-5. Disassembling the Vertical Axle

10. Detaching the fastening lever
Remove the fastening-lever retaining plate, then detach the fastening lever and fastening blocks.

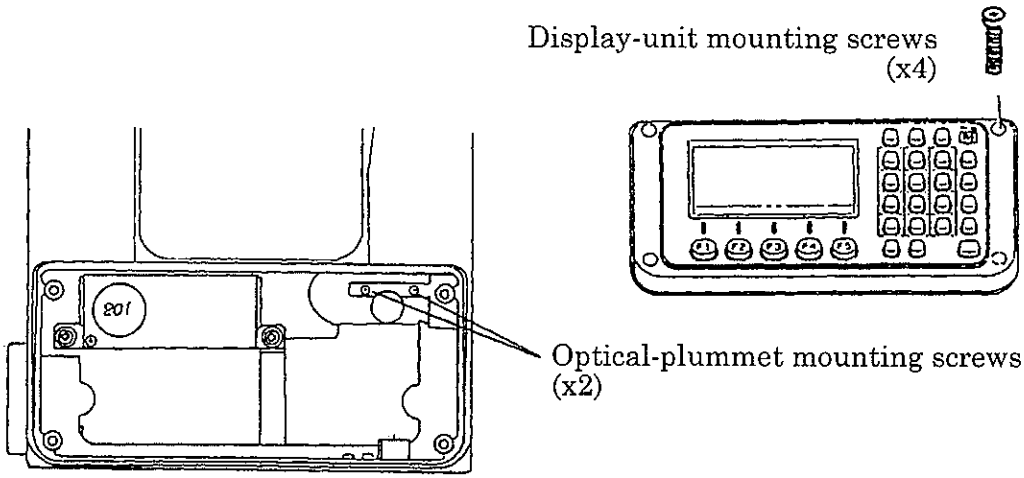


★ Use only the specified oil to lubricate the fastening lever. Using other oil may result in clamp malfunction.

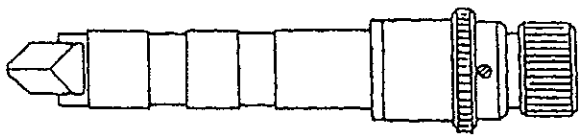
7-6. Disassembling the Optical Plummet

When disassembling the optical plummet immediately after 7-5, start from step 2.

1. Removing the subdisplay unit



2. Detaching the optical plummet
From the subdisplay-unit section, remove the optical-plummet mounting screws from the main body, then pull out the optical plummet.



★ **The optical plummet must be adjusted after it is reassembling. Disassembly of the optical plummet is omitted in this manual. Refer to the repair parts chart when disassembling the optical plummet or when necessary to study its structure.**

8. Reassembly and Adjustment

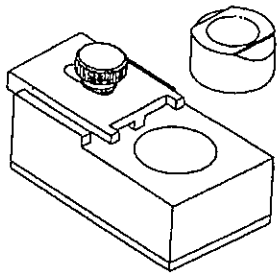
- The structure is relatively simple, and the product can be reassembled by reversing the disassembly procedure. Therefore, an explanation of the reassembly procedure is omitted.
- The following primarily describes the reassembly and adjustment procedures that require tools, for exclusive use.
- Some parts may not function if reassembly and adjustment procedures have not been completed. All procedures must be performed in the sequence described.

8-1. Gluing the Index

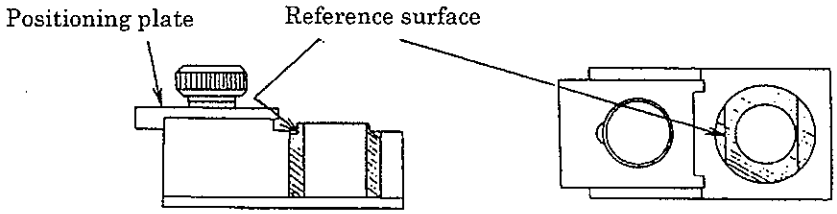
★ Only when the index glass is detached is it necessary to glue the index using the index gluing tool (J26336) as shown below.

1. Gluing the index glass

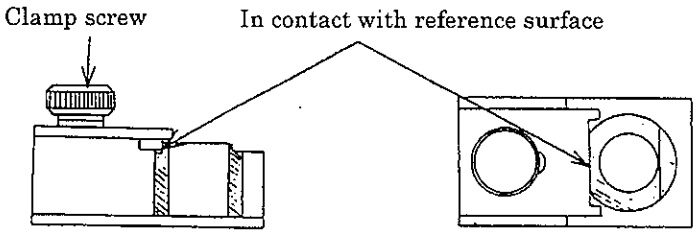
   1) Insert the condenser lens case into the hole of the index gluing tool (J26336).



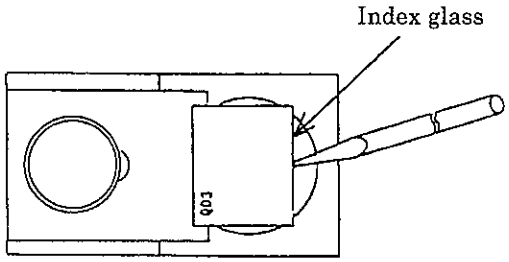
   2) Face the condenser lens case to toward the attachment reference surface (i.e. toward the positioning plate of the index adjustment too).



   3) Set the index positioning plate firmly against the reference surface of the condenser lens case, then tighten the clamp screw.

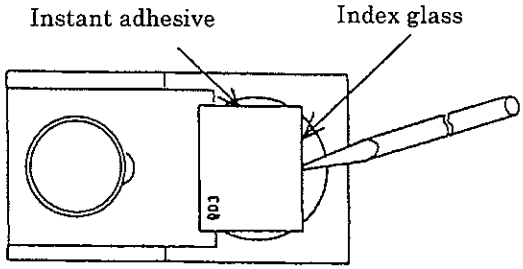


   4) With the deposition surface facing up, place the index glass on the condenser lens case, then press the side marked "QD3" or "QD4" against the index positioning plate.

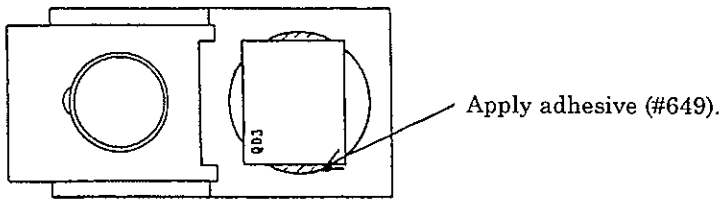


8-1. Gluing the Index

5) Apply a small amount of instant adhesive (#921) to the contacting surfaces of the condenser lens case and index glass, then press down for about one minute.

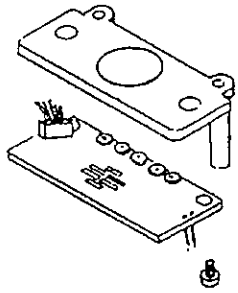


6) Apply adhesive (#648) to the contacting surfaces (shaded area) of the condenser lens case and index glass.
   ★ Do not apply adhesive to the reference surface of the condenser lens case in this step. The reference surface is used for positional adjustment of the H/V index.

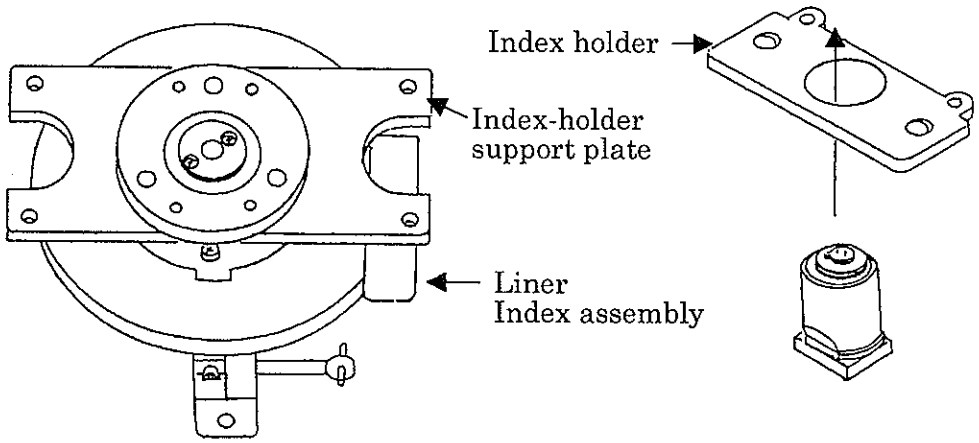


7) Leave the index assembly (condenser lens case and index glass) at room temperature for 24 hours to allow the adhesive to harden.

8-2. Positioning the H Index

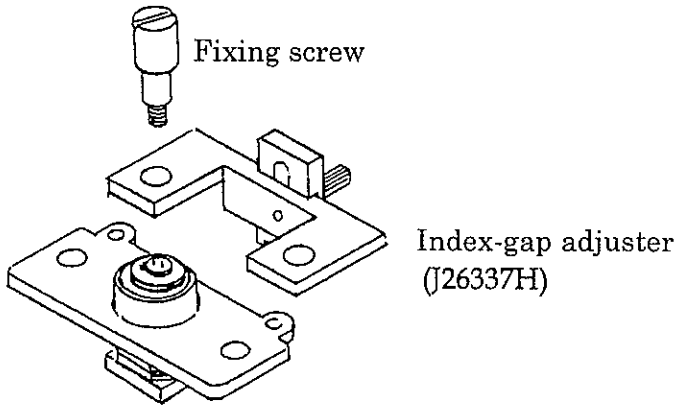


1. Detach the detector board from the board-mounting support of the index holder.
2. Place the gap-adjusting liner (t = 0.24 ± 0.04 mm) on the encoder pulse scale.
3. Insert the index assembly into the index holder, then place it on the index-holder support plate.

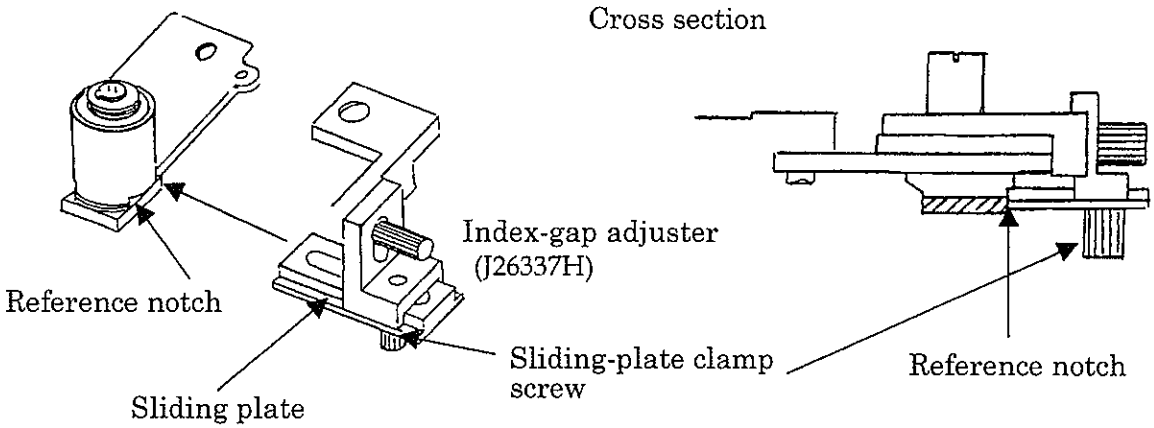


4. Place the index-gap adjuster (J26337H) on the index holder, and secure it to the index support plate using the fixing screws.

★ Use a screwdriver with a wooden handle to tighten the two fixing screws.



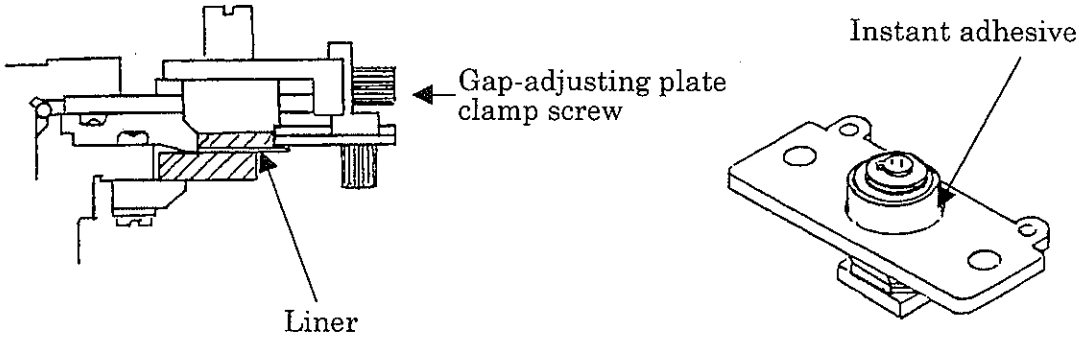
5. Push the sliding plate of the index-gap adjuster against the inclination-adjustment reference notch on the condenser lens case, then tighten the sliding-plate clamp screw.



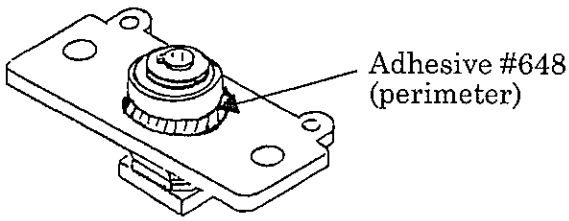
8-2. Positioning the H Index

6. Confirm that the index gap-adjusting liner is located between the encoder pulse scale and index glass. Move the gap-adjusting plate up and down to press the index assembly firmly against the liner, then tighten the clamp screw. Apply a small amount of instant adhesive to several locations on the contacting surfaces of the index holder and index assembly, then allow to dry for one minute.

★ **Make sure the sliding plate is not tilted by contacting the pulse scale.**



7. Apply adhesive #648 along the entire contacting edges of the index holder and index assembly.

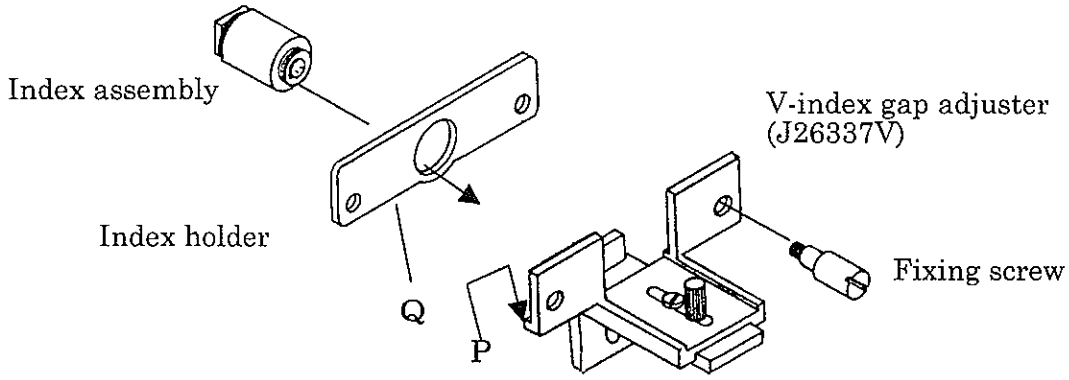


8. Remove the index-gap adjuster (J26337H) and gap-adjusting liner, then leave the index holder and index assembly at room temperature for 24 hours to allow the adhesive to fix.

8-3. Positioning the V Index

◎ The V-index gas adjuster (J26337V) cannot be used to adjust the gap at the upper index position. If the upper index gap requires adjustment, move the index holder and index assembly to the lower index mounting position, and then adjust the gap.

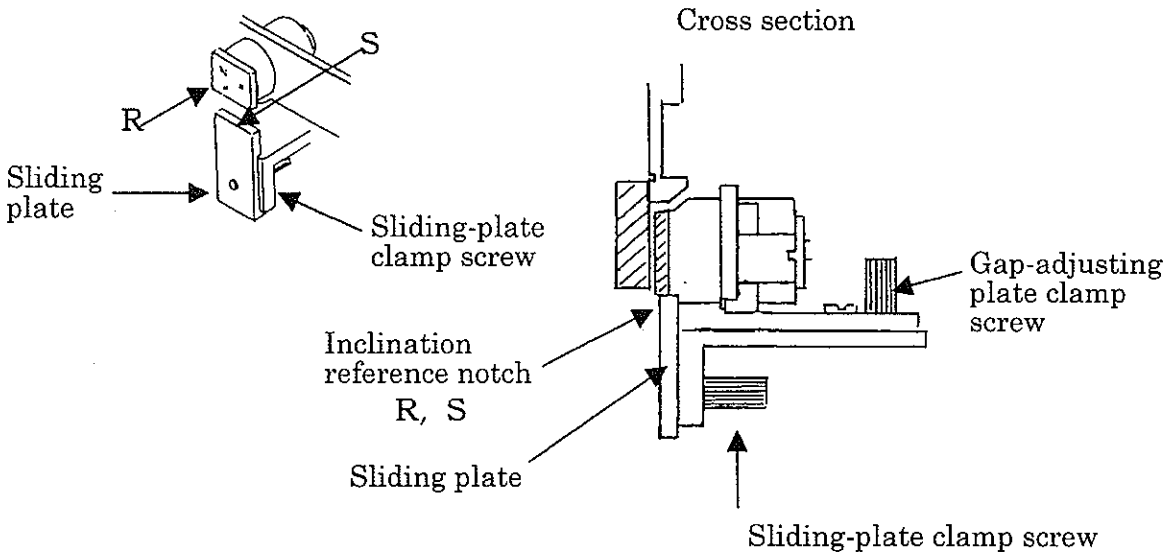
1. Insert the condenser lens case into the index holder.



2. Install the index holder to the V-index gap adjuster (J26337V) so that the index-holder bottom side (Q) firmly contacts the V-index-gap adjuster's reference surface (P), and then use the fixing screws to secure the index holder to the left column of the main body.

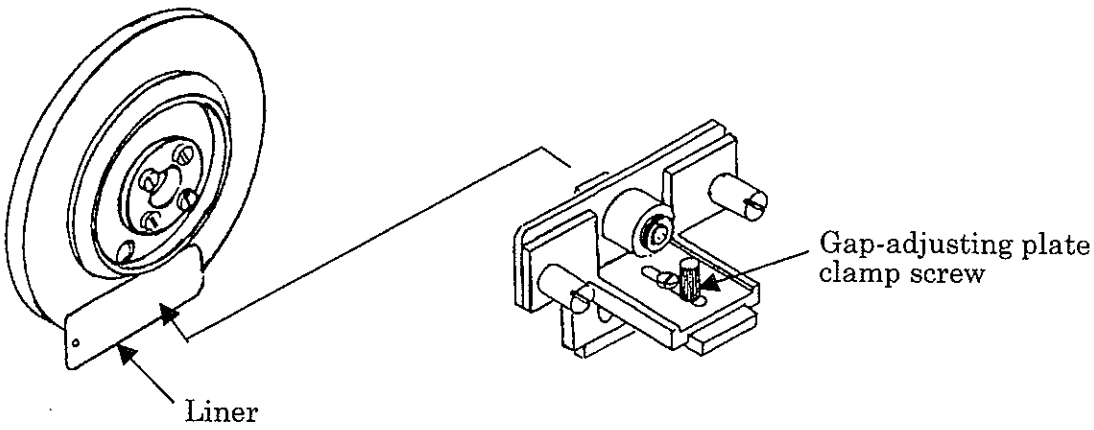
★ **Use a screwdriver with a wooden handle to tighten the two fixing screws.**

3. Set the sliding plate (S) of the index gas adjuster firmly on the reference notch (R) of the index assembly, and then tighten the sliding-plate clamp screw.

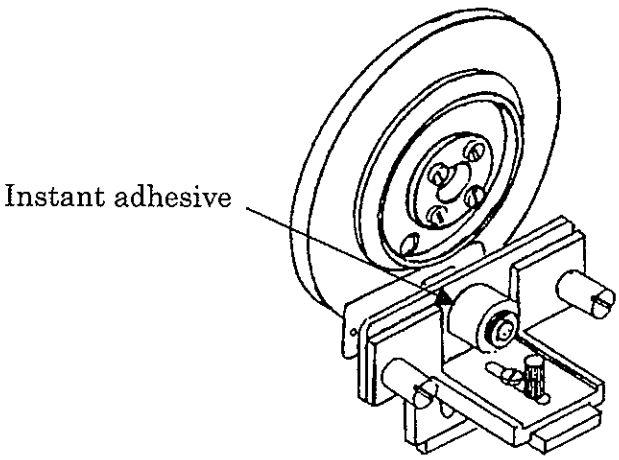


8-3. Positioning the V Index

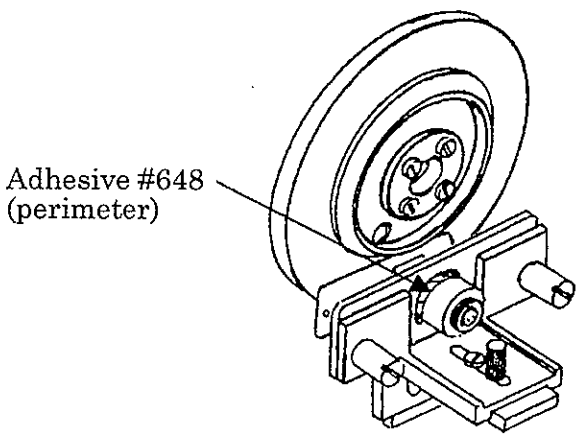
4. Place the gap-adjusting liner (t = 0.24 ± 0.04 mm) on top of the V pulse scale, move the gap-adjusting plate back and forth to press the index assembly firmly against the gap-adjusting liner, and then tighten the clamp screws.



5. Apply a small amount of instant adhesive to several locations on the contact surfaces of the index holder and index assembly. Allow to stand for one minute.
   ★ **If the pressing force of the gap-adjusting plate is too weak to hold the liner in place, hold the index assembly with your fingers until the instant adhesive hardens.**



6. Apply adhesive #648 to the entire contact perimeter of the index holder and index assembly.



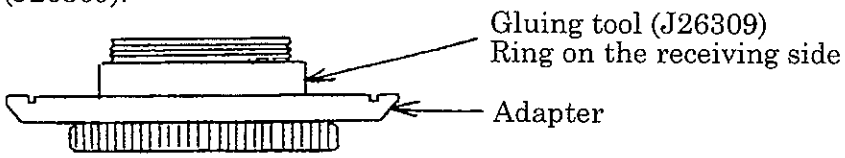
7. Remove the index-gap adjuster (J26337V) and liner, then leave the index holder and index assembly at room temperature for 24 hours to allow the adhesive to fix.

8-4. Gluing the H Pulse Scale

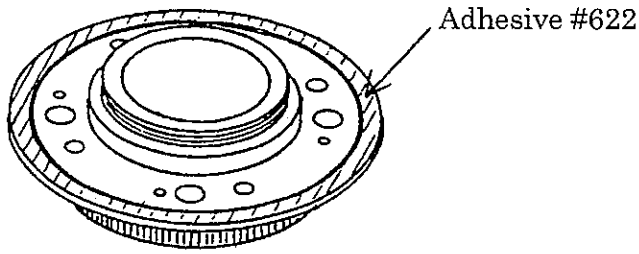
★ When the H pulse scale has detached from the pulse-scale adapter, use the pulse-scale gluing tool (J26309) and glue the parts as shown below.

★ Preheating
Thoroughly clean the pulse scale, pulse-scale adapter, and pulse-scale gluing tool (J26309), then place them on a hot plate and heat at a temperature of approximately 40°C for 30 to 60 minutes. The following procedure must be performed while the parts are heated on the hot plate.

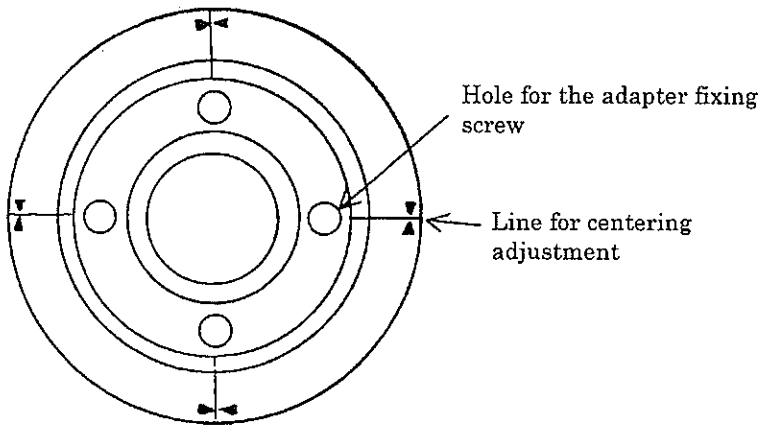
1. Place the pulse-scale adapter on top of the ring on the receiving side of the H pulse-scale gluing tool (J26309).



2. Apply a thin coat of adhesive (#622) to the section (shaded area) outside the groove on the perimeter of the pulse-scale adapter.



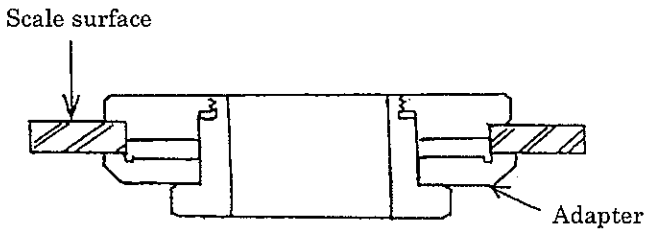
3. With the scale surface facing up, position the pulse scale so that the centering adjustment lines align with the holes for the pulse-scale adapter fixing screws. Then tighten the retaining ring of the pulse-scale gluing tool.
   ★ It is not necessary to precisely align the adjustment lines on the pulse scale with the centers of the holes in the adapter. This procedure matches the pulse-scale adapter fixing screws with the direction of motion of the adapter for easier centering adjustment.



Pulse scale

8-4. Gluing the H Pulse Scale

4. Leave the pulse-scale assembly (pulse scale and pulse-scale adapter) at room temperature for 24 hours to allow the adhesive to harden.
   ★ **After bonding, centering must be performed.**



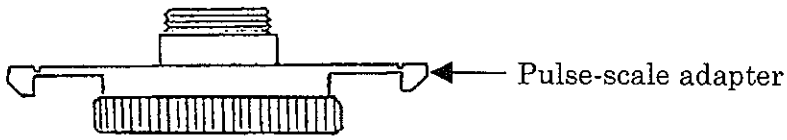
H pulse-scale gluing tool
(J26309)

8-5. Gluing the V Pulse Scale

★ When the V pulse scale is detached from the pulse-scale adapter, use the pulse-scale gluing tool (J26334) and glue the parts as shown below.

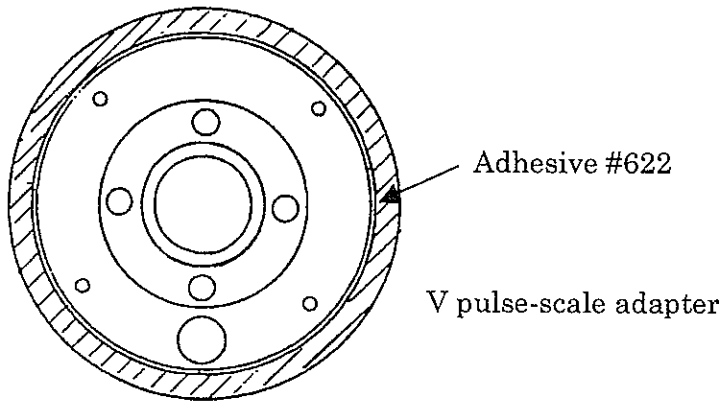
★ Preheating
Thoroughly clean the pulse scale, pulse-scale adapter, and pulse-scale gluing tool (J26334), then place them on a hot plate and heat them at a temperature of approximately 40°C for 30 to 60 minutes. The following procedure must be performed while the parts are being heated on the hot plate.

1. Place the pulse-scale adapter on top of the ring on the receiving side of the V pulse-scale gluing tool (J26334).

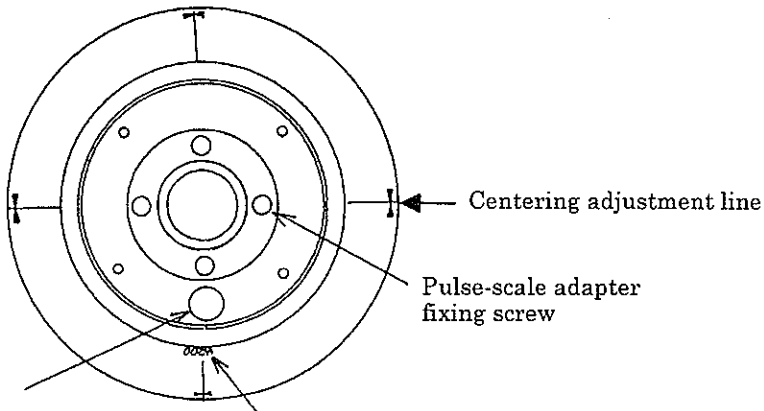


Gluing tool (J26334)
Holder on receiving side

2. Apply a thin coat of adhesive (#622) to the section (shaded area) outside the groove on the perimeter of the pulse-scale adapter.

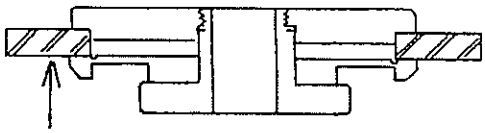


3. With the scale surface facing down, position the pulse scale so that the tool hole for assembling of the trunnion-bearing fixing screws is aligned with the center of the stamped pulse-scale number, and that the centering adjustment lines and adapter fixing screws are aligned in a straight line, then tighten the retaining ring of the pulse-scale gluing tool.
   ★ If the pulse scale is installed upside down, zero-signal adjustment cannot be performed.



8-5. Gluing the V Pulse Scale

4. Leave the pulse-scale assembly (pulse scale and pulse-scale adapter) at room temperature for 24 hours to allow the adhesive to harden.
   ★ **After bonding, centering must be performed.**



Scale surface

V pulse-scale gluing tool
(J26334)