SONY

INTERCHANGEABLE LENS DIGITAL CAMERA

ILME-FR7
ILME-FR7K

α XAVC

SERVICE MANUAL
1st Edition

⚠ 警告

このマニュアルは，サービス専用です。
お客様が，このマニュアルに記載された設置や保守，点検，修理などを行うと感電や火災，人身事故につながることがあります。
危険をさけるため，サービストレーニングを受けた技術者のみご使用ください。

⚠ WARNING

This manual is intended for qualified service personnel only.
To reduce the risk of electric shock, fire or injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

⚠ WARNUNG

Die Anleitung ist nur für qualifiziertes Fachpersonal bestimmt.
Alle Wartungsarbeiten dürfen nur von qualifiziertem Fachpersonal ausgeführt werden. Um die Gefahr eines elektrischen Schlages, Feuergefahr und Verletzungen zu vermeiden, sind bei Wartungsarbeiten strikt die Angaben in der Anleitung zu befolgen. Andere als die angegeben Wartungsarbeiten dürfen nur von Personen ausgeführt werden, die eine spezielle Befähigung dazu besitzen.

⚠ AVERTISSEMENT

Ce manual est destiné uniquement aux personnes compétentes en charge de l’entretien. Afin de réduire les risques de décharge électrique, d’incendie ou de blessure n’effectuer que les réparations indiquées dans le mode d’emploi à moins d’être qualifié pour en effectuer d’autres. Pour toute réparation faire appel à une personne compétente uniquement.

警告

本機は電源スイッチを備えていません。
万一，異常が起きた際に，お客様が電源を切ることができるように，設置の際には，機器近くの固定配線内に専用遮断装置を設けるか，機器使用中に，容易に抜き差しできるコンセントに電源プラグを接続してください。

WARNING

This unit has no power switch.
When installing the unit, incorporate a readily accessible disconnect device in the fixed wiring, or connect the power cord to a socket-outlet which must be provided near the unit and easily accessible, so that the user can turn off the power in case a fault should occur.

WARNUNG

Dieses Gerät hat keinen Netzschalter.
Beim Einbau des Geräts ist daher im Festkabel ein leicht zugänglicher Unterbrecher einzufügen, oder das Netzkabel muß mit einer in der Nähe des Geräts befindlichen, leicht zugänglichen Wandsteckdose verbunden werden, damit sich bei einer Funktionsstörung die Stromversorgung zum Gerät jederzeit unterbrechen läßt.

安全のために，周辺機器を接続する際は，過大電圧を持つ可能性があるコネクターを以下のポートに接続しないでください。
: NETWORK 端子
: OPTION 端子
上記のポートについては本書の指示に従ってください。

For safety, do not connect the connector for peripheral device wiring that might have excessive voltage to the following port(s).
: NETWORK connector
: OPTION connector
Follow the instructions for the above port(s).

注意

指定以外の電池に交換すると，破裂する危険があります。
必ず指定の電池に交換してください。
使用済みの電池は，国または地域の法令に従って処理してください。

CAUTION

Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type recommended by the manufacturer.
When you dispose of the battery, you must obey the law in the relative area or country.

ATTENTION

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur.
Lorsque vous mettez la batterie au rebut, vous devez respecter la législation en vigueur dans le pays ou la région où vous vous trouvez.

VORSICHT

Explosionsgefahr bei Verwendung falscher Batterien.
Batterien nur durch den vom Hersteller empfohlenen oder einen gleichwertigen Typ ersetzen.
Wenn Sie die Batterie entsorgen, müssen Sie die Gesetze der jeweiligen Region und des jeweiligen Landes befolgen.

FÖRSIKTIGHET!

Fara för explosion vid felaktigt placerat batteri.
Byt endast mot samma eller likvärdig typ av batteri, enligt tillverkarens rekommendationer.
När du kasserar batteriet ska du följa rådande lagar för regionen eller landet.

PAS PÅ

Fare for eksplosion, hvis batteriet ikke udskiftes korrekt.
Udskift kun med et batteri af samme eller tilsvarende type, som er anbefalet af fabrikanten.
Når du bortskaffer batteriet, skal du følge lovgivningen i det pågældende område eller land.

HUOMIO

Räjähdysvaara, jos akku vaihdetaan virheellisesti.
Vaihda vain samanlaiseen tai vastaavantyyppiseen, valmistajan suosittelemaan akkuun.
Noudata akun hävittämisessä oman maasi tai alueesi lakeja.

FORSIKTIG

Eksplosjonsfare hvis feil type batteri settes i.
Bytt ut kun med samme type eller tilsvarende anbefalt av produsenten.
Kasser batteriet i henhold til gjeldende avfallsregler.

注意

如果更换的电池不正确，就会有爆炸的危险。
只更换同一类型或制造商推荐的电池型号。
处理电池时，必须遵守相关地区或国家的法律。

Table of Contents

Section 1
Service Overview

1-1. Tightening Torque

When tightening screws used in this unit, be sure to use a torque driver and tighten screws to the specified tightening torque.
If the specified tightening torque is described in the figure in this section, tighten screws to the specified tightening.

Tightening Torque

M1.7:	0.12±0.02 N·m
M2/TP2:	0.18±0.02 N·m
M2.5/M2.6:	0.53±0.07 N·m
TP2.6:	0.4±0.05 N·m
M3:	0.8±0.12 N·m
M4:	1.4±0.2 N·m
Hexagon nut (SDI connector):	1.40±0.14 N·m

Tip

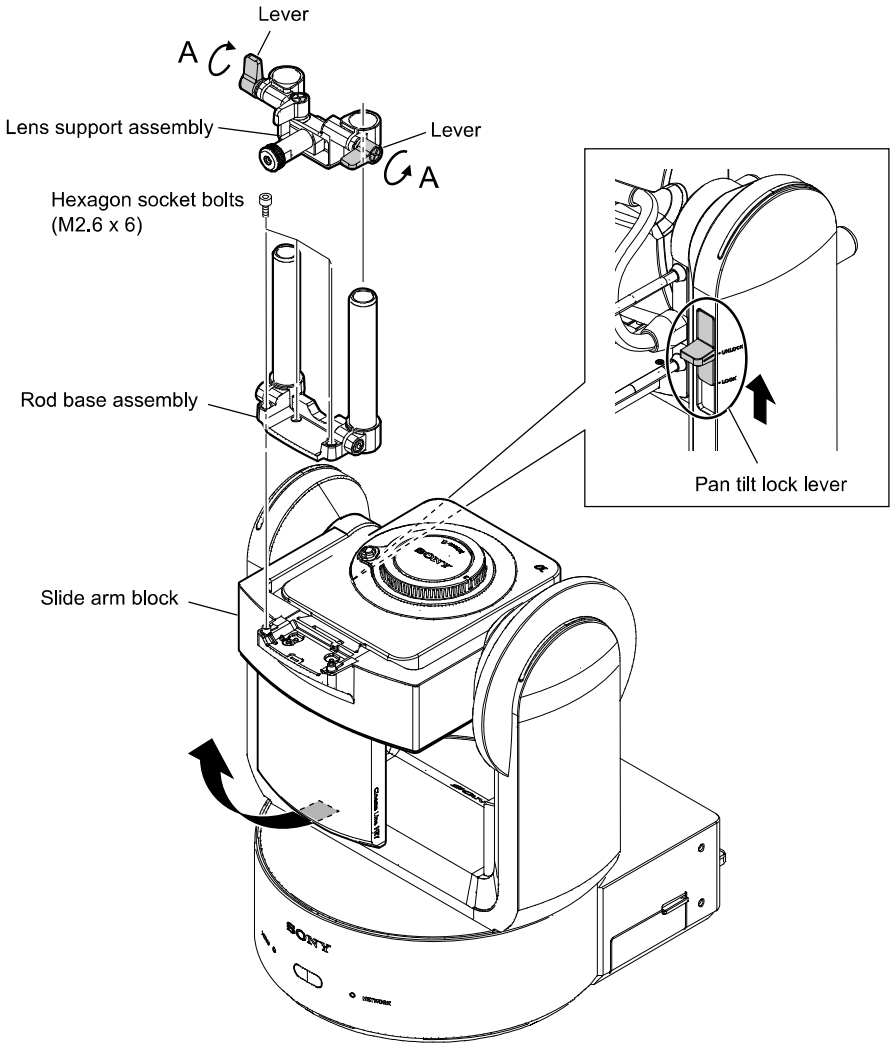
When using the torque driver with the notation of cN·m, interpret it as follows.
Example: 0.8 N·m = 80 cN·m

1-2. Removing/Installing the Cabinet

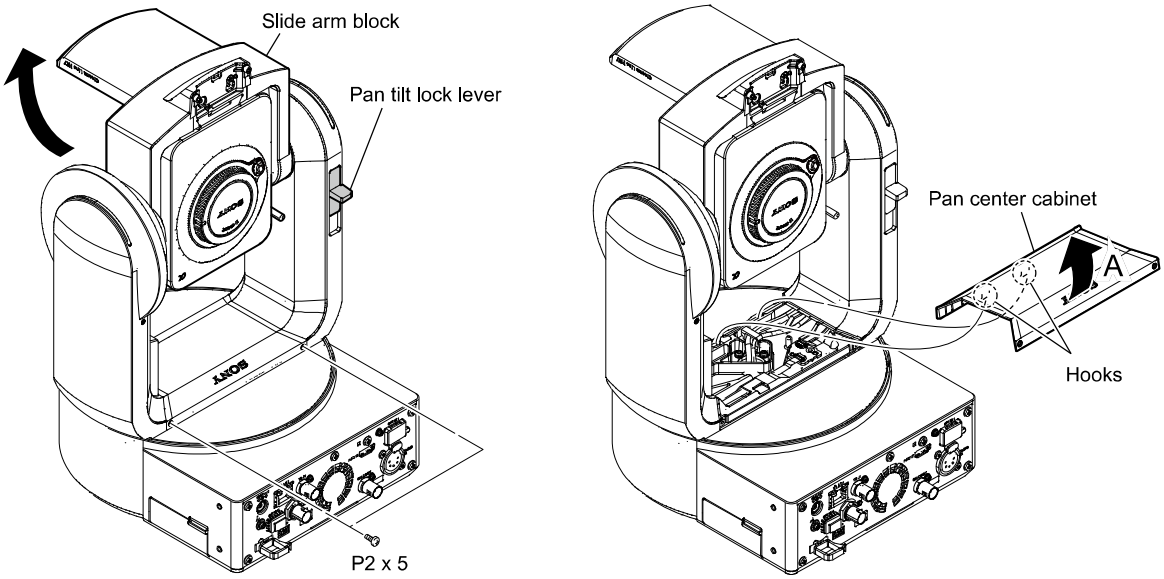
1-2-1. Pan Center Cabinet

Procedure

1. Turn the slide arm block to the direction shown below using the pan tilt lock lever.
2. Turn the two levers in the direction of the arrow A and remove the lens support assembly.
3. Remove the four hexagon socket bolts (M2.6 x 6), and then remove the rod base assembly.



4. Turn the slide arm block to the direction shown below using the pan tilt lock lever.
5. Remove the two screws.
6. Lift the pan center cabinet in the direction of the arrow A, release the two hooks, and then remove the pan center cabinet.



7. Install the removed parts by reversing the steps of removal.

1-2-2. Bottom Plate

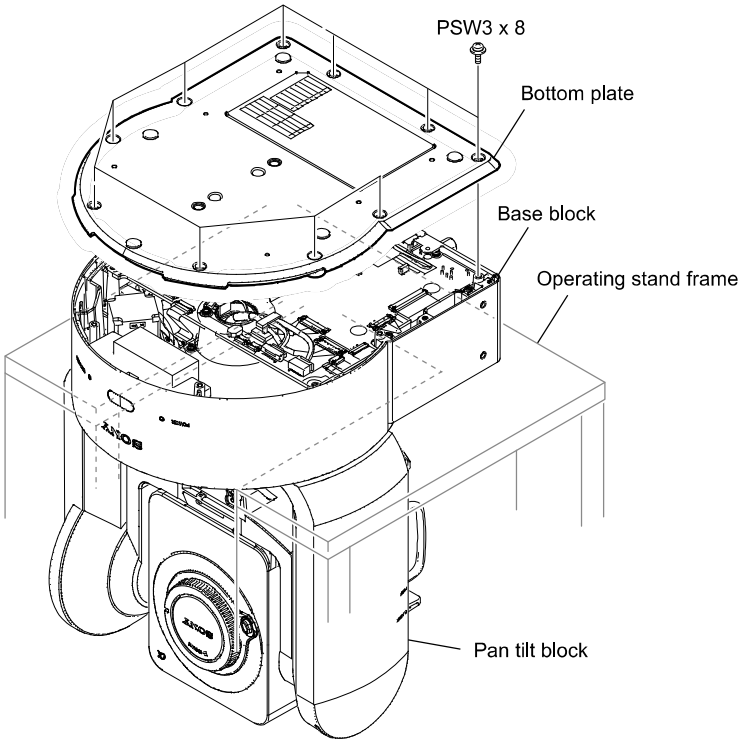
Note

When this unit is turned upside down to removing/installing the parts in the base block, place this unit with holding the base block assembly.

Do not place this unit with causing stress to the pan tilt assembly.

Procedure

1. Remove the ten screws, and then remove the bottom plate.

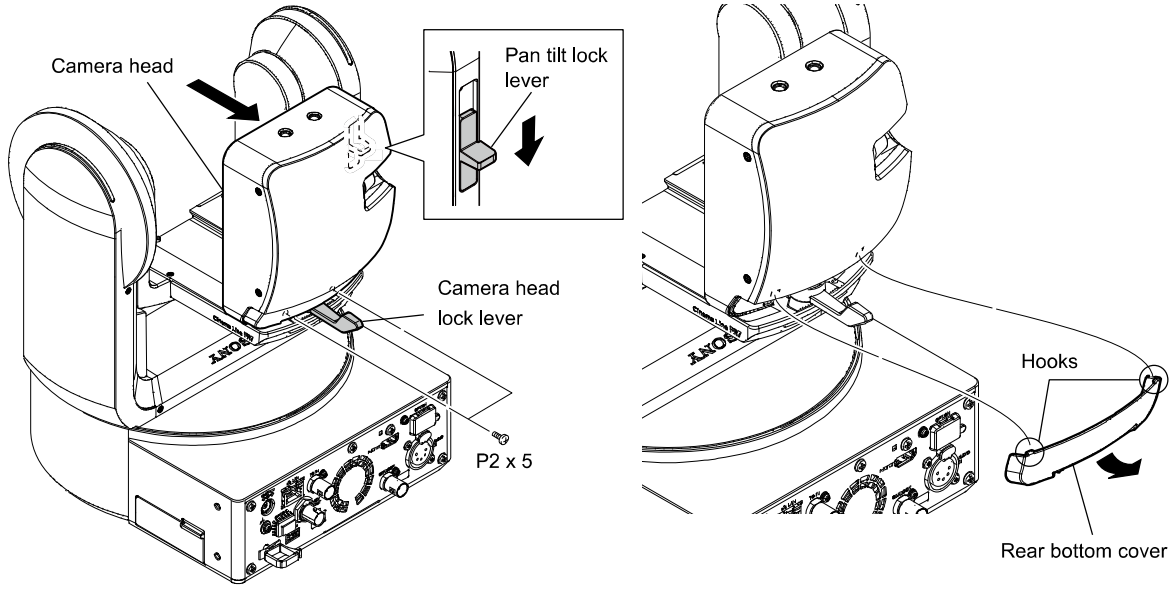


2. Install the removed parts by reversing the steps of removal.

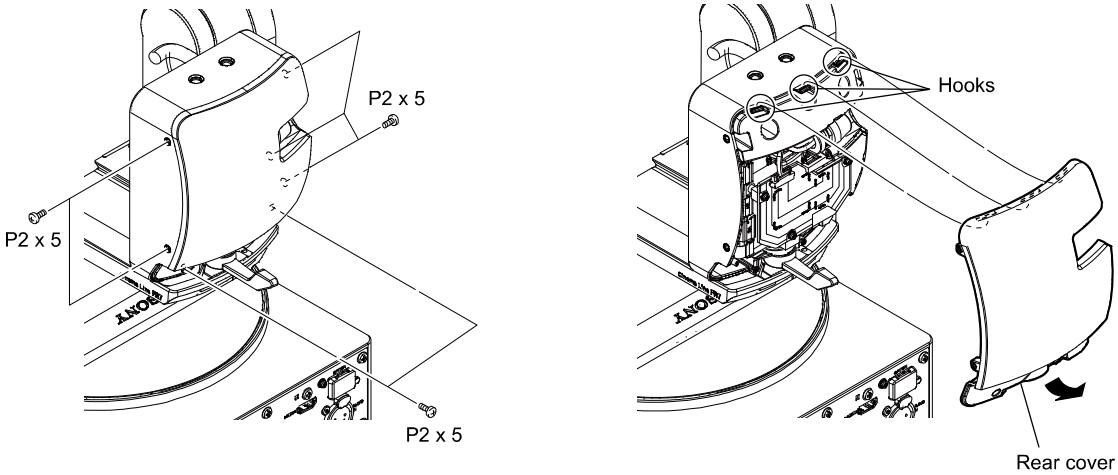
1-2-3. Rear Cover

Procedure

1. Set the pan tilt lock lever to the lock state.
2. Slide the camera head to the position shown below using the camera head lock lever.
3. Remove the two screws.
4. Release the two hooks, and then remove the rear bottom cover.



5. Remove the seven screws.
6. Release the three hooks, and then remove the rear cover.



7. Install the removed parts by reversing the steps of removal.

1-2-4. Outside Cabinet (D), Top Cabinet (D)

Preparation

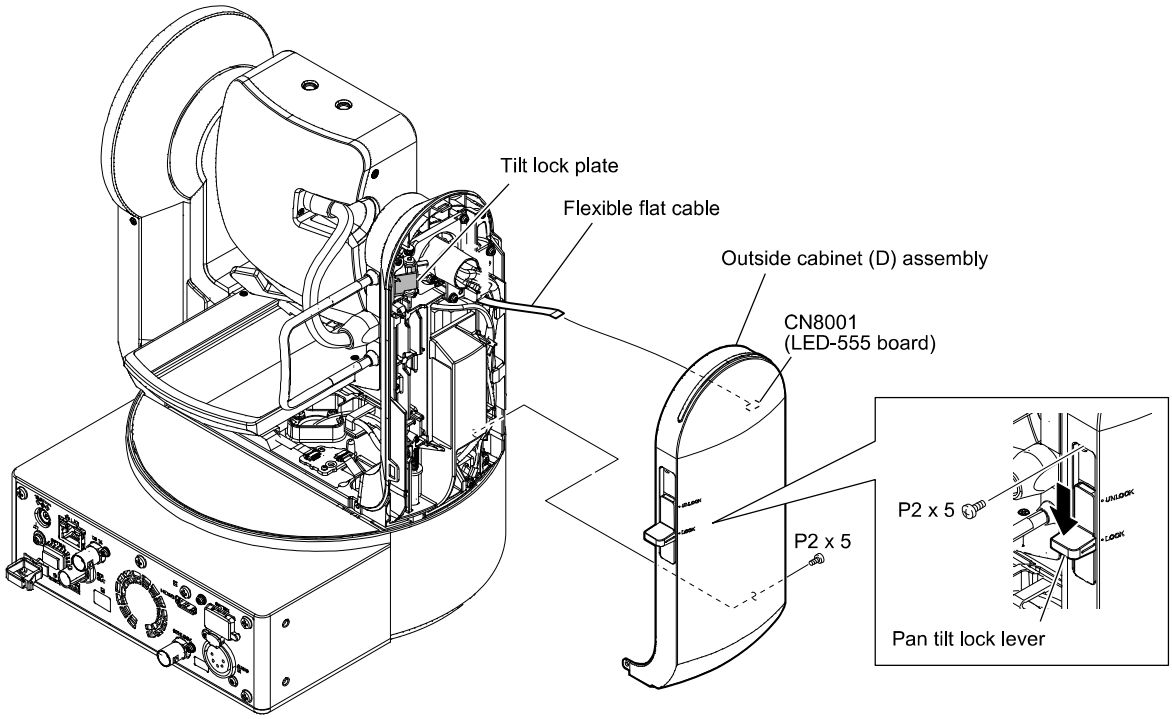
1. Remove the pan center cabinet. (Refer to “1-2-1. Pan Center Cabinet”.)

Procedure

1. Set the pan tilt lock lever to the lock state, and then remove the two screws.
2. Remove the outside cabinet (D) assembly, and then disconnect the flexible flat cable from the connector (CN8001) on the LED-555 board.

   Note

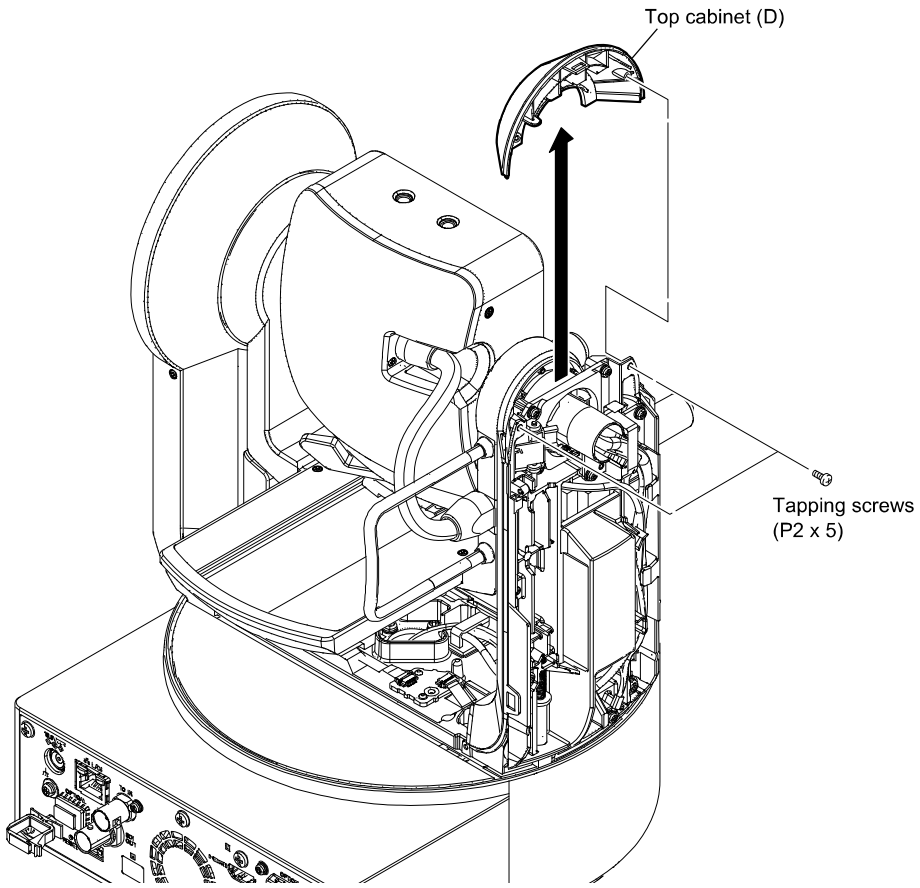
   Remove the outside cabinet (D) assembly with the pan tilt lock lever locked.



Note

At the time of the installation, install the outside cabinet (D) assembly with the tilt lock plate and the pan tilt lock lever locked.

3. Remove the two tapping screws, and then remove the top cabinet (D) in the direction of the arrow.



4. Install the removed parts by reversing the steps of removal.

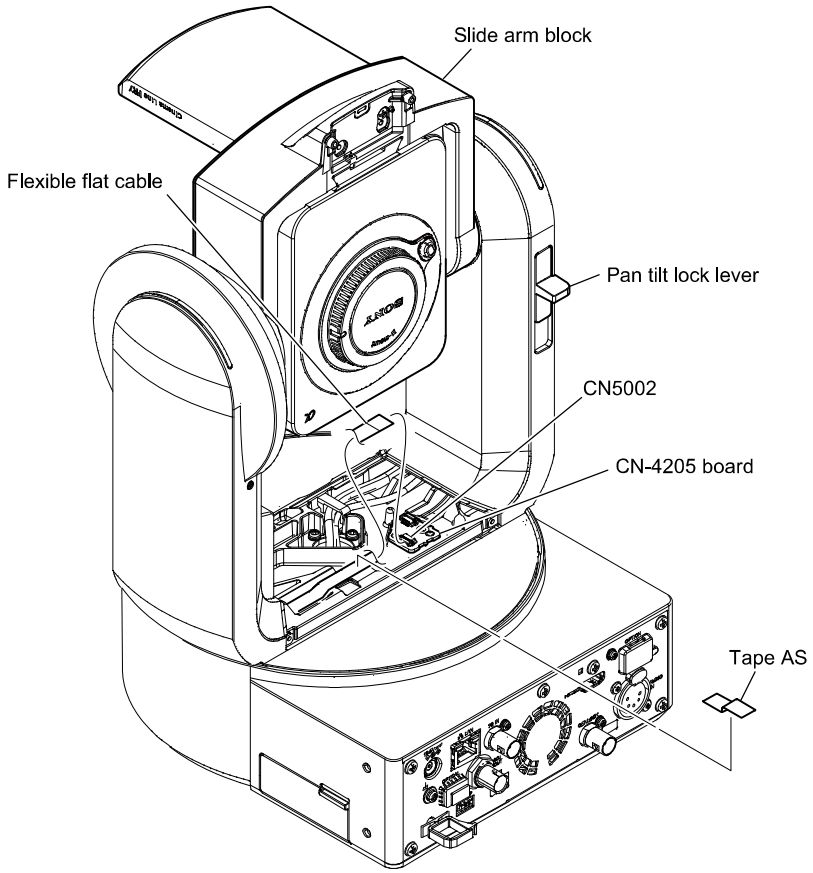
1-2-5. Outside Cabinet (G)

Preparation

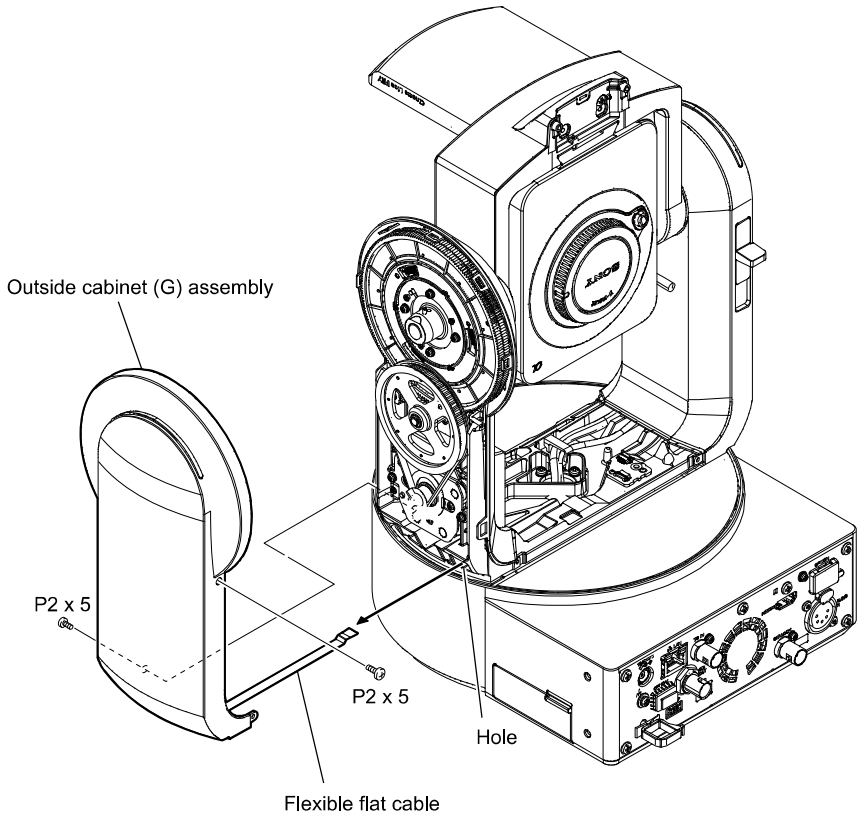
1. Remove the pan center cabinet. (Refer to “1-2-1. Pan Center Cabinet”.)

Procedure

1. Turn the slide arm block to the direction shown below using the pan tilt lock lever.
2. Peel the tape AS.
3. Disconnect the flexible flat cable from the connector (CN5002) on the CN-4205 board.



4. Remove the two screws, pull the flexible flat cable out of the hole, and then remove the outside cabinet (G) assembly.



5. Install the removed parts by reversing the steps of removal.

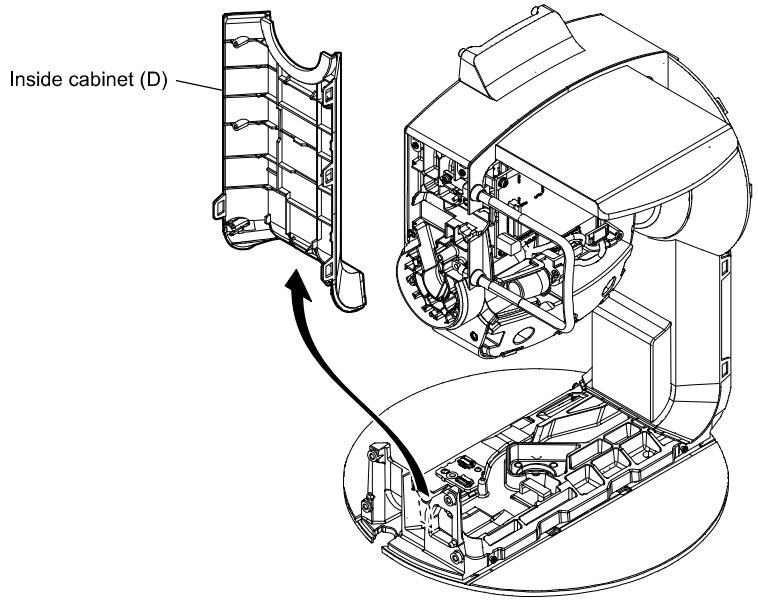
1-2-6. Inside Cabinet (D)

Preparation

1. Remove the rear cover. (Refer to “1-2-3. Rear Cover”.)
2. Disconnect the connector cable from the IF board. (Refer to steps 1, 2 in “3-3-5. IF Board”.)
3. Remove the pan center cabinet. (Refer to “1-2-1. Pan Center Cabinet”.)
4. Remove the outside cabinet (D) assembly. (Refer to “1-2-4. Outside Cabinet (D), Top Cabinet (D)”.)
5. Remove the bottom plate. (Refer to “1-2-2. Bottom Plate”.)
6. Remove the pan tilt block. (Refer to “3-2-1. Pan Tilt Block”.)
7. Remove the connector cable. (Refer to “3-2-6. Connector Cable”.)
8. Remove the DR-709 board. (Refer to “3-3-6. DR-709 Board”.)
9. Remove the tilt motor assembly. (Refer to “3-2-4. Tilt Motor”.)

Procedure

1. Remove the inside cabinet (D).



2. Install the removed parts by reversing the steps of removal.

1-2-7. Gear Assembly (Pan), Pan Shutter

Preparation

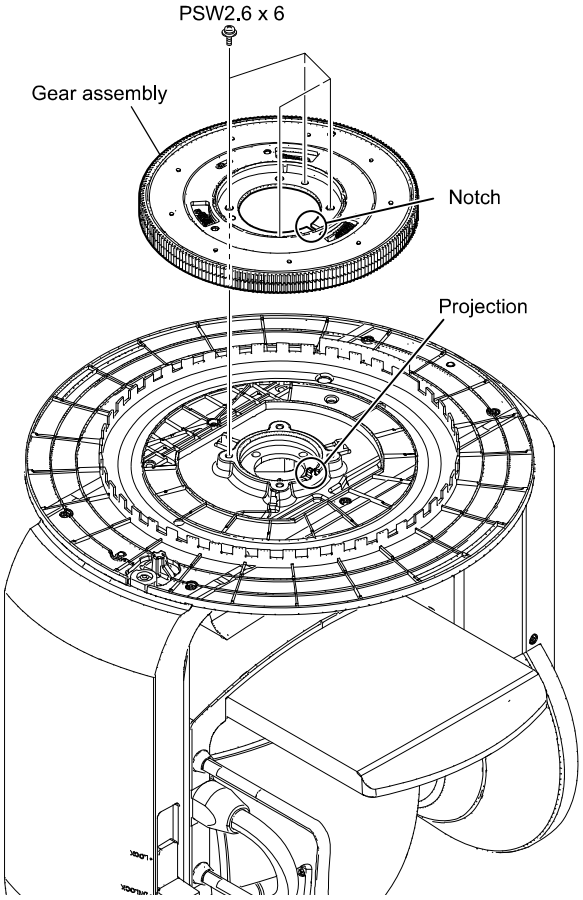
1. Remove the pan center cabinet. (Refer to “1-2-1. Pan Center Cabinet”.)
2. Remove the bottom plate. (Refer to “1-2-2. Bottom Plate”.)
3. Remove the pan tilt block. (Refer to “3-2-1. Pan Tilt Block”.)

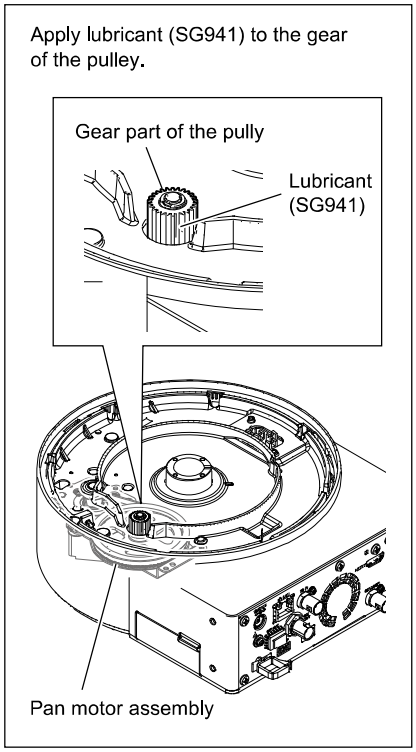
Procedure

1. Remove the four screws, and then remove the gear assembly.

   Tip

   Disassemble the gear assembly using the same procedure as for disassembling the gear assembly (tilt). (Refer to “3-2-5. Main Gear, Gear Assembly (Tilt)”.)

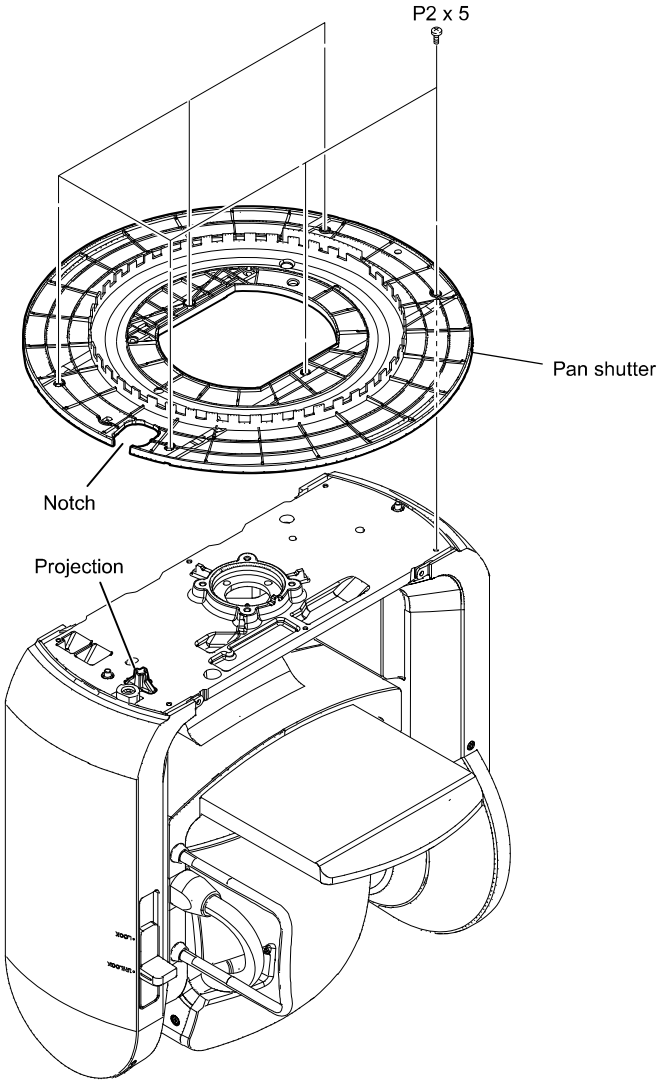




Note

- At the time of the installation, apply lubricant (SG941) at the gear part of the pully of the pan motor assembly. (Refer to “3-2-1. Pan Tilt Block”.)
- At the time of the installation, align the notch with the projection.

2. Remove the six screws, and then remove the pan shutter.



Note

At the time of the installation, align the notch with the projection.

3. Install the removed parts by reversing the steps of removal.

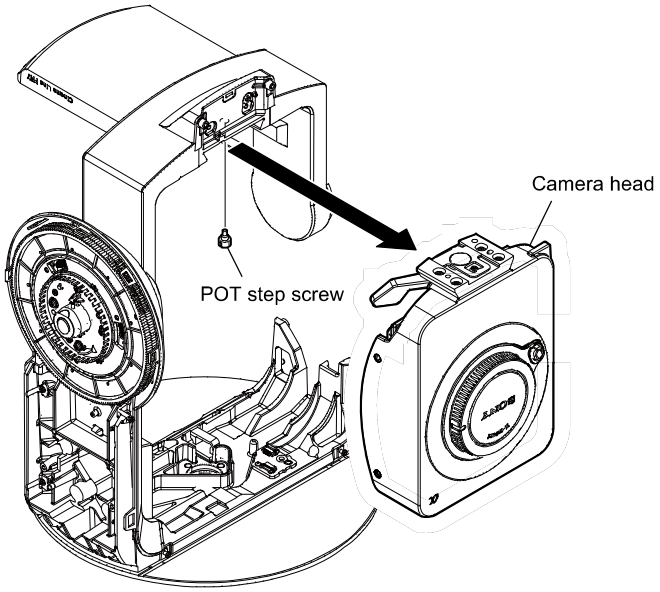
1-2-8. Inside Cabinet (G)

Preparation

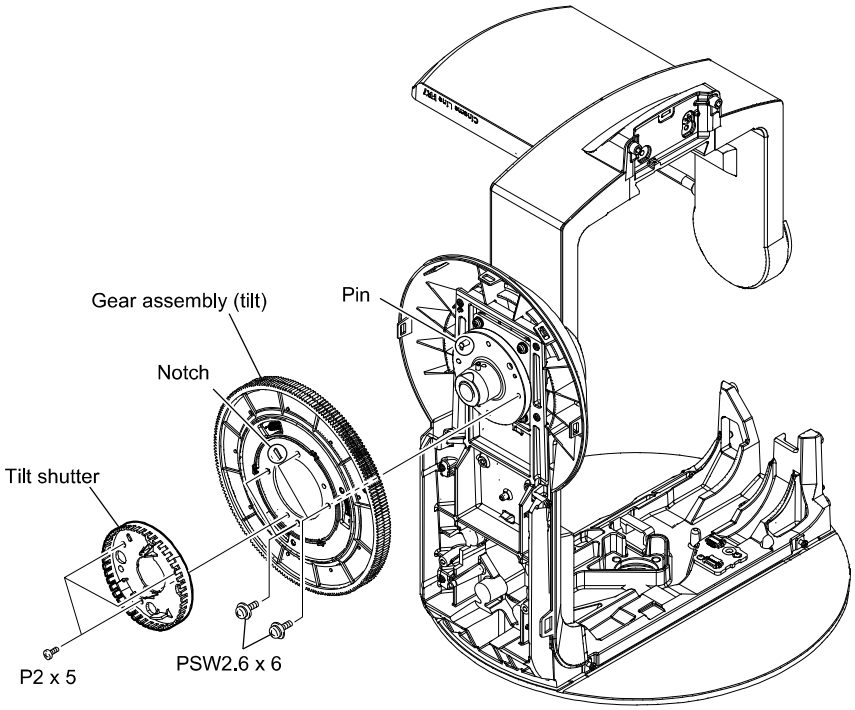
1. Remove the rear cover. (Refer to “1-2-3. Rear Cover”.)
2. Disconnect the connector cable from the IF board. (Refer to steps 1, 2 in “3-3-5. IF Board”.)
3. Remove the pan center cabinet. (Refer to “1-2-1. Pan Center Cabinet”.)
4. Remove the outside cabinet (D) assembly. (Refer to “1-2-4. Outside Cabinet (D), Top Cabinet (D)”.)
5. Remove the bottom plate. (Refer to “1-2-2. Bottom Plate”.)
6. Remove the pan tilt block. (Refer to “3-2-1. Pan Tilt Block”.)
7. Remove the connector cable. (Refer to “3-2-6. Connector Cable”.)
8. Remove the DR-709 board. (Refer to “3-3-6. DR-709 Board”.)
9. Remove the tilt motor assembly. (Refer to “3-2-4. Tilt Motor”.)
10. Remove the inside cabinet (D). (Refer to “1-2-6. Inside Cabinet (D)”.)

Procedure

1. Remove the POT step screw, and then slide and remove the camera head.



2. Remove the three screws (P2 x 5), and then remove the tilt shutter.
3. Remove the four screws (PSW2.6 x 6), and then remove the gear assembly (tilt).



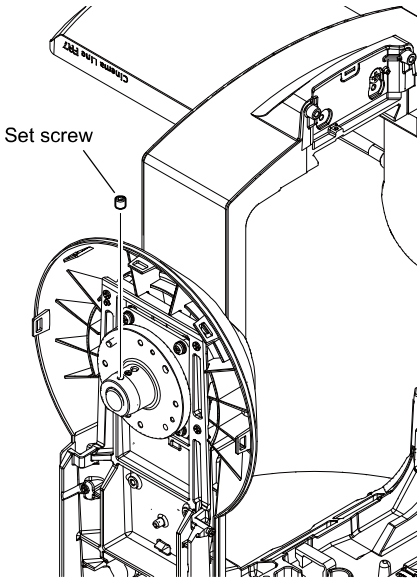
Note

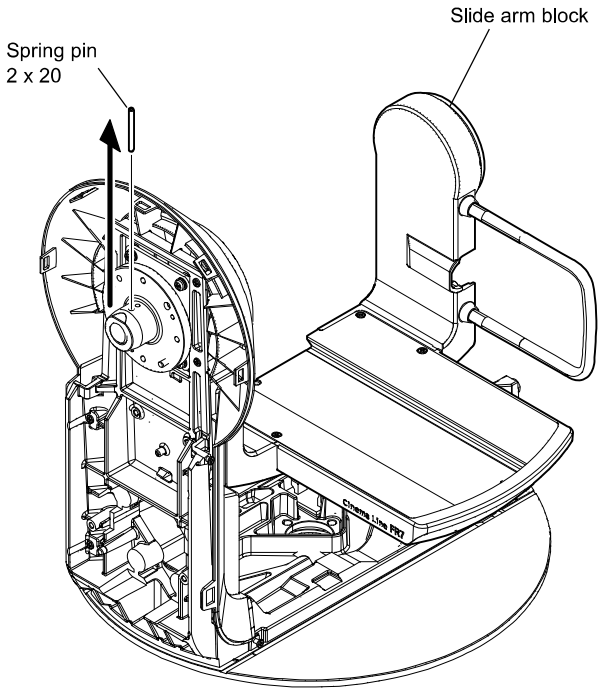
At the time of the installation, align the notch with the pin.

4. Remove the set screw.
5. Turn the slide arm block to the direction shown below, and then remove the spring pin 2 x 20.

Tip

- Nip the spring pin 2 x 20 with pliers and pull it out straight.
- If the removed spring pin 2 x 20 is deformed or damaged, replace it with a new one.



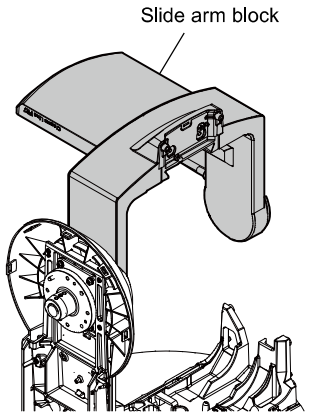


Note

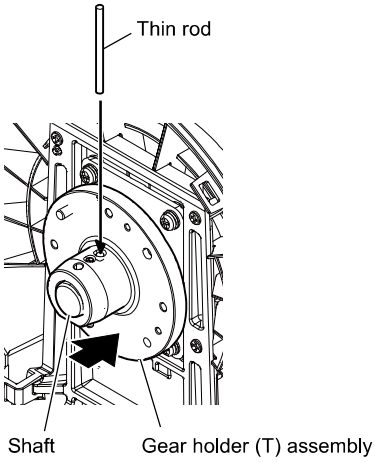
- At the time of the installation, apply Loctite 243 to the threads of the set screw.
- At the time of the installation, install the spring pin 2 x 20 according to the instructions on the next page.

Installing the spring pin 2 x 20

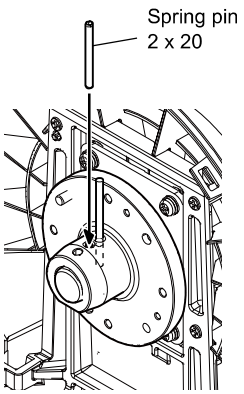
(1) Turn the slide arm block 180 degrees.



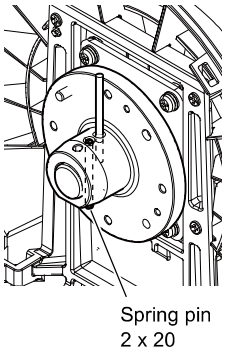
(2) Push the gear holder (T) assembly in the direction of the arrow, match the shaft hole with the gear holder (T) assembly hole, and then insert a thin rod.



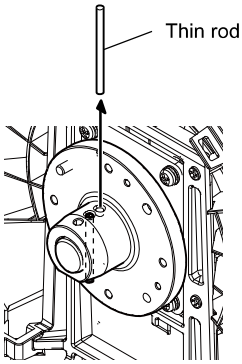
(3) Insert the spring pin 2 x 20.



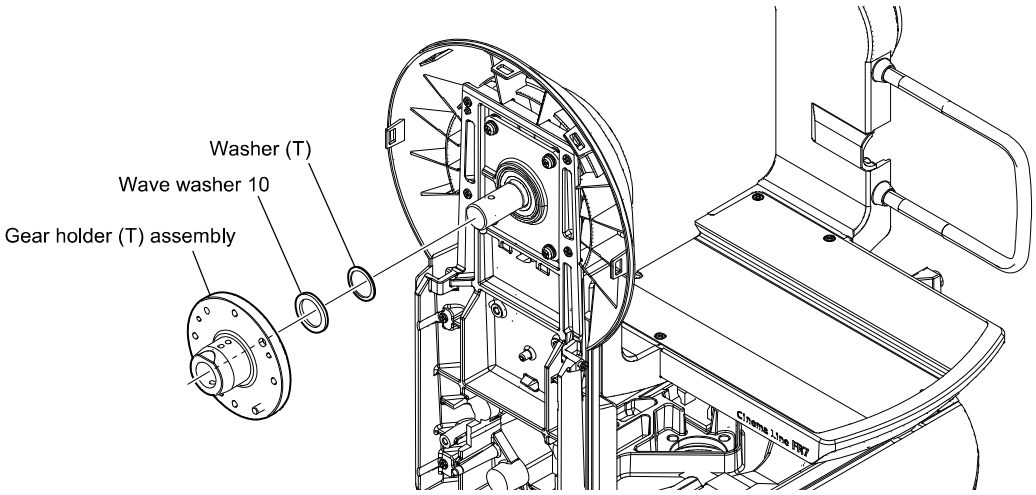
(4) Push the spring pin 2 x 20 with pliers as far as it will go.



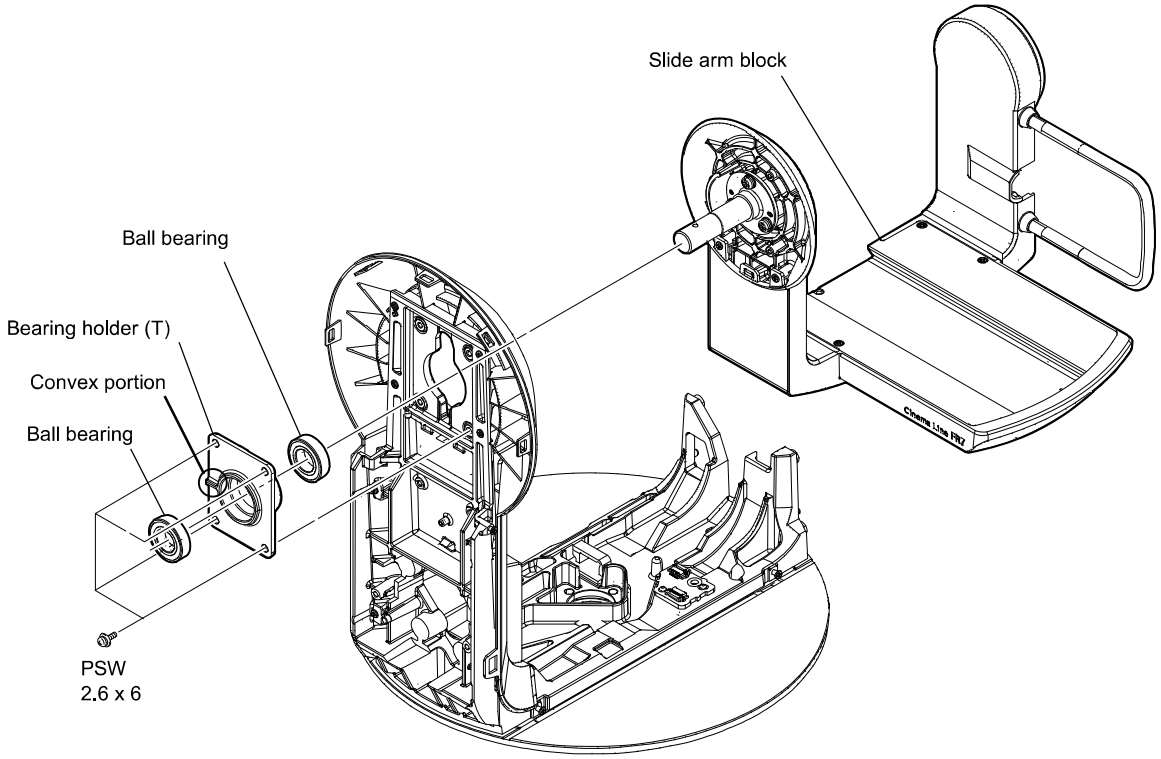
(5) Remove the thin rod.



6. Remove the gear holder (T) assembly, wave washer 10 and washer (T).



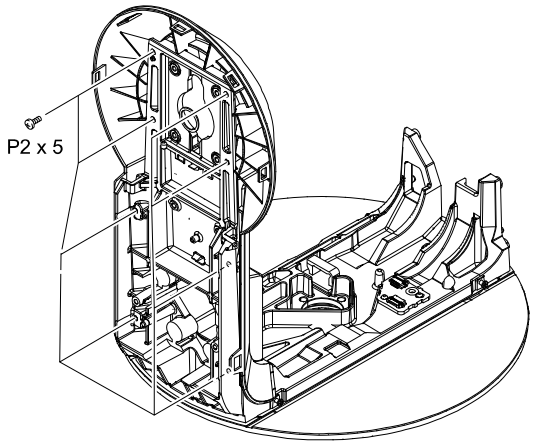
7. Remove the four screws, and then remove the two ball bearings, bearing holder (T) and slide arm block.

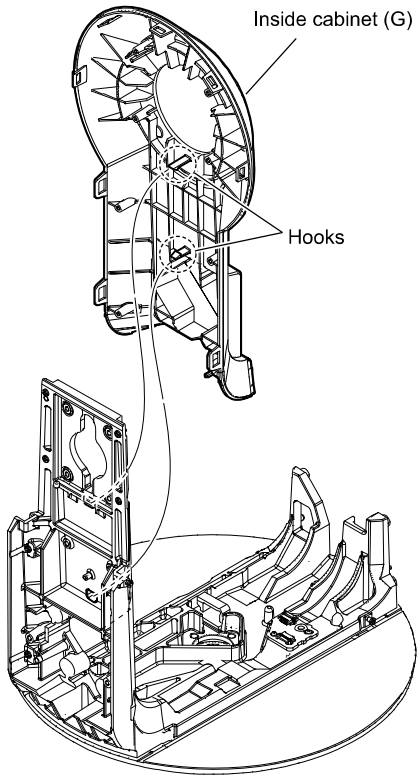


Note

At the time of the installation, install the bearing holder (T) with its convex portion at the position shown above.

8. Remove the eight screws.
9. Release the two hooks, and then remove the inside cabinet (G).





10. Install the removed parts by reversing the steps of removal.

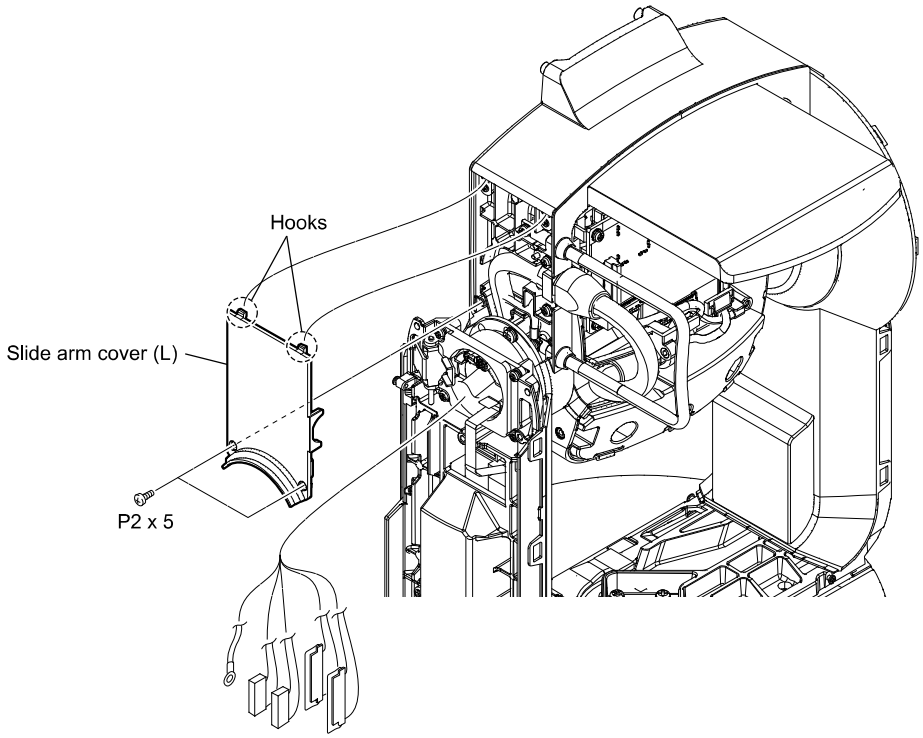
1-2-9. Slide Arm Cover (L)

Preparation

1. Remove the rear cover. (Refer to “1-2-3. Rear Cover”.)
2. Disconnect the connector cable from the IF board. (Refer to steps 1, 2 in “3-3-5. IF Board”.)
3. Remove the pan center cabinet. (Refer to “1-2-1. Pan Center Cabinet”.)
4. Remove the outside cabinet (D) assembly. (Refer to “1-2-4. Outside Cabinet (D), Top Cabinet (D)”.)
5. Remove the bottom plate. (Refer to “1-2-2. Bottom Plate”.)
6. Pull out the connector cable from the hole. (Refer to steps 1 to 5 in “3-2-1. Pan Tilt Block”.)
7. Remove the top cabinet (D). (Refer to steps 1 to 7 in “3-2-6. Connector Cable”.)

Procedure

1. Remove the two screws.
2. Release the two hooks, and then remove the slide arm cover (L).



3. Install the removed parts by reversing the steps of removal.

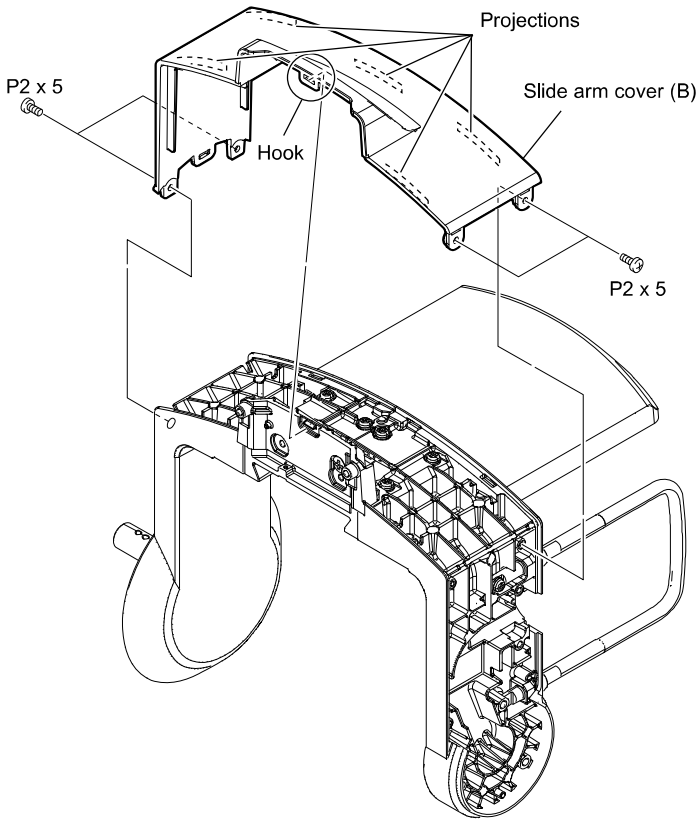
1-2-10. Slide Arm Cover (B), Slide Base Cover

Preparation

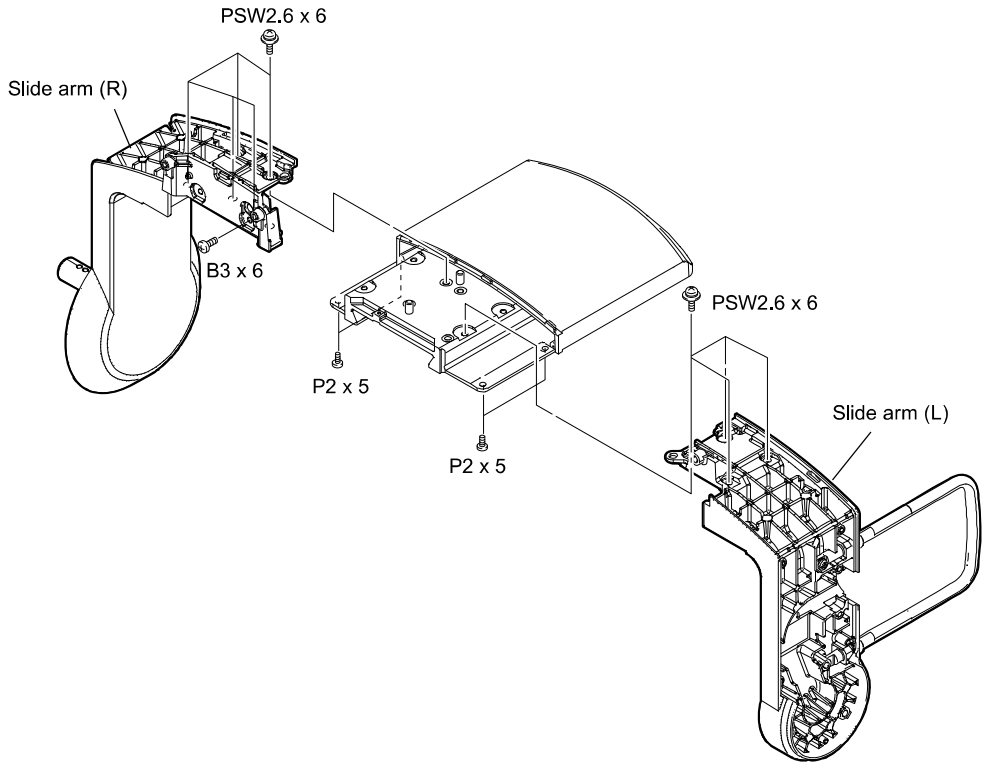
1. Remove the rear cover. (Refer to “1-2-3. Rear Cover”.)
2. Disconnect the connector cable from the IF board. (Refer to steps 1, 2 in “3-3-5. IF Board”.)
3. Remove the pan center cabinet. (Refer to “1-2-1. Pan Center Cabinet”.)
4. Remove the outside cabinet (D) assembly. (Refer to “1-2-4. Outside Cabinet (D), Top Cabinet (D)”.)
5. Remove the bottom plate. (Refer to “1-2-2. Bottom Plate”.)
6. Remove the pan tilt block. (Refer to “3-2-1. Pan Tilt Block”.)
7. Remove the connector cable. (Refer to “3-2-6. Connector Cable”.)
8. Remove the DR-709 board. (Refer to “3-3-6. DR-709 Board”.)
9. Remove the tilt motor assembly. (Refer to “3-2-4. Tilt Motor”.)
10. Remove the inside cabinet (D). (Refer to “1-2-6. Inside Cabinet (D)”.)
11. Remove the inside cabinet (G). (Refer to “1-2-8. Inside Cabinet (G)”.)

Procedure

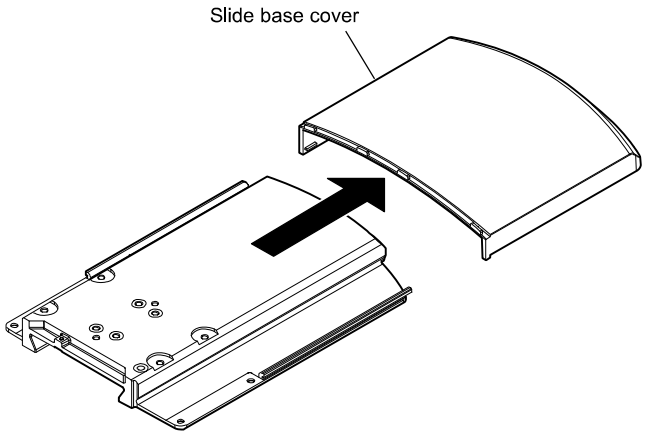
1. Release the four screws.
2. Release the projections and the hook, and then remove the slide arm cover (B).



3. Remove the four screws (P2 x 5), screw (B3 x 6), five screws (PSW2.6 x 6), and then remove the slide arm (R).
4. Remove the four screws (PSW2.6 x 6), and then remove the slide arm (L).



5. Remove the slide base cover.



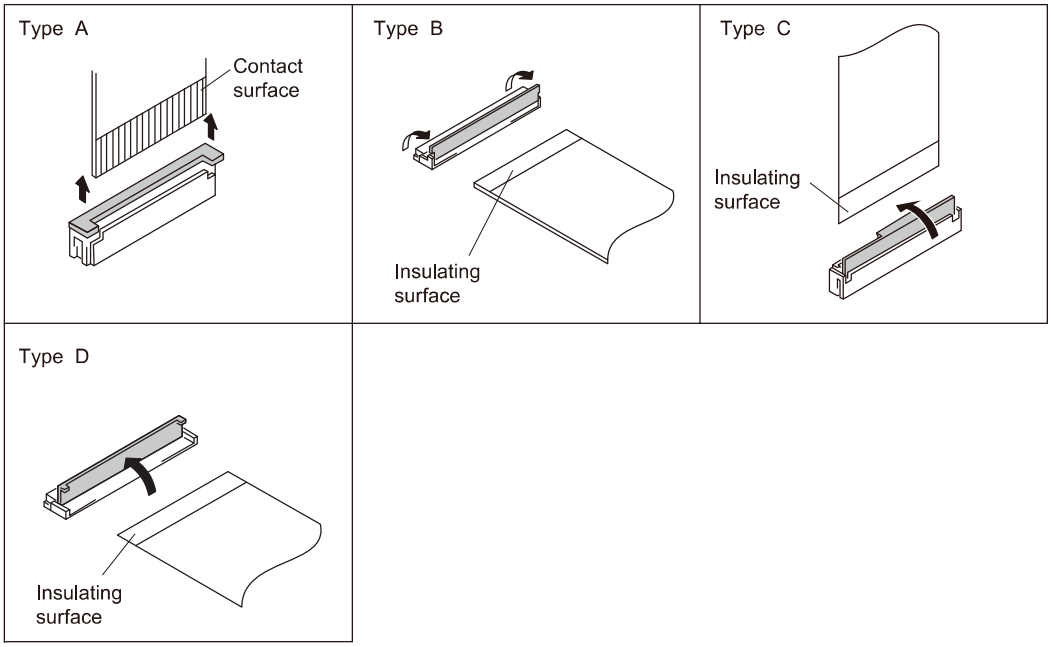
6. Install the removed parts by reversing the steps of removal.

1-3. Flexible Flat Cable and Fine-Wire Coaxial Cable

1-3-1. Disconnecting/Connecting Flexible Flat Cable

Note

- Be very careful not to fold flexible flat cables. Life of flexible flat cable will be significantly shortened if it is folded.
- Each flexible flat cable has conductive side and insulated side. If the flexible flat cable is connected in the wrong orientation of the conductive side and the insulated side, the circuit will not function.
- Check that the conductive side of the flexible flat cable is not contaminated.
- Insert the flexible flat cable straight and securely all the way to the back of the connector.



Disconnection

1. Unlock the connector.
2. Pull out the flexible flat cable.

Connection

1. Unlock the connector.
2. Insert the flexible flat cable into the connector.
3. Lock the connector.

1-3-2. Disconnecting/Connecting Fine-Wire Coaxial Cable

Note

- Be very careful when handling the fine-wire coaxial cable so that fine wires are not disconnected.
- When disconnecting the fine-wire coaxial cable, be sure to hold the connector. Do not attempt to pull the cable.
- Check that the contact surface of the fine-wire coaxial cable connector is not contaminated.

Type A

Disconnecting

1. Hold both sides of the fine-wire coaxial cable connector, and pull the connector straight to disconnect it.

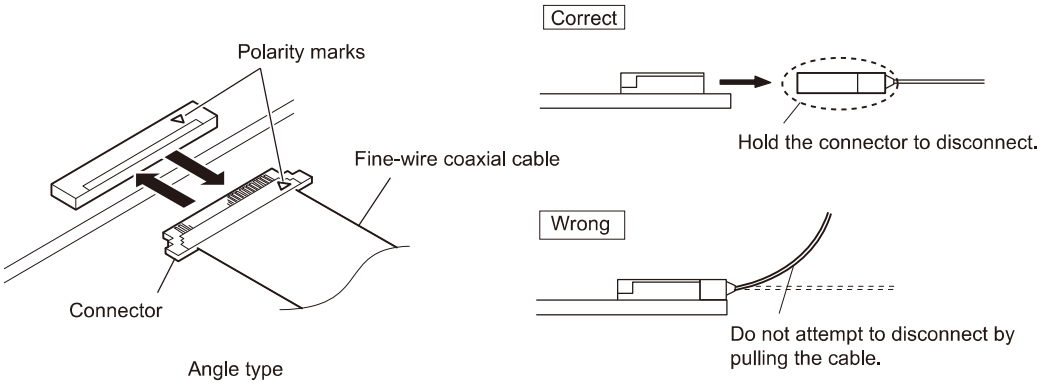
Connecting

1. Insert the connector straight matching the polarity marks.

   Note

   Inserting the connector at an angle so may damage it.

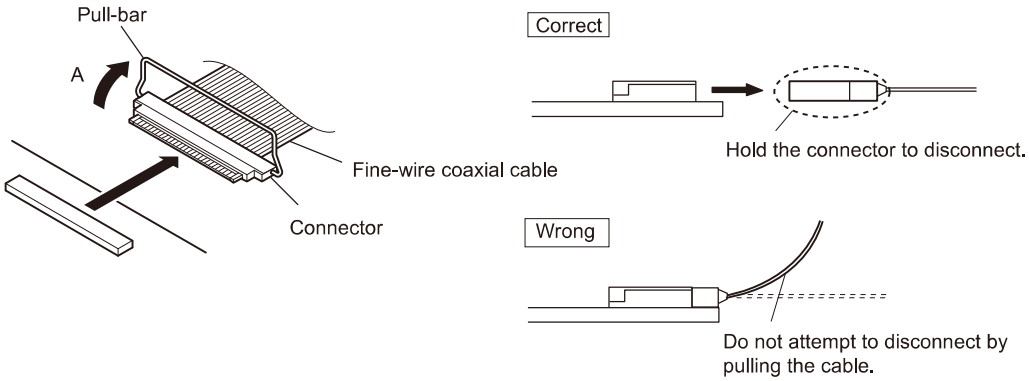
   Insert the connector firmly as far as it will go.



Type B

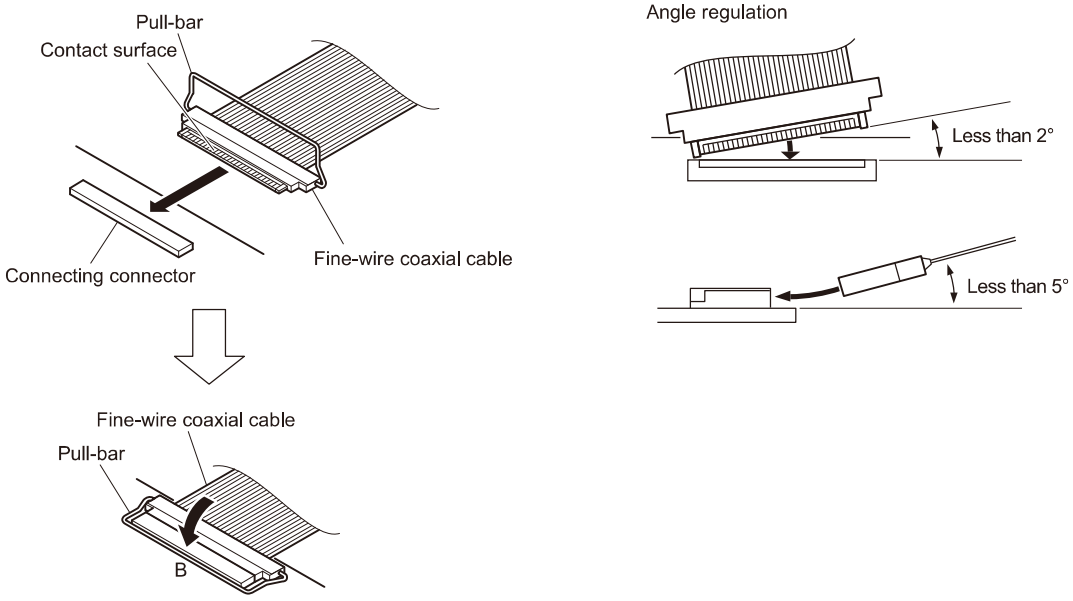
Disconnecting

1. Raise the pull-bar in the direction of arrow A to unlock it.
2. Hold both sides of the fine-wire coaxial cable connector, and pull the connector straight to disconnect it.



Connecting

1 Hold both sides of the fine-wire coaxial cable connector with the contact surface facing up.
2. Insert the connector straight to meet the angle specified.
3. Turn the pull-bar in the direction of arrow B and lock it.



Note

Insert the connector carefully so that the connector guides are not caught by the edge of the mating connector.

Section 2
Troubleshooting

If an error occurs, check the symptoms beginning with No. 1 of each problem and take appropriate actions.

2-1. Power Problems

2-1-1. The POWER Indicator Does Not Light Even after Power Is Supplied from the AC Adapter

No.	Symptoms	Confirmation item	Cause or remedy
1	The POWER indicator does not light even after power is supplied from the AC adapter.	Supply power from PoE++ and check whether the POWER indicator lights.	If this problem still remains, refer to "2-1-3. Power Is Not Turned On (AC Adapter and PoE++) and the POWER Indicator Does Not Light".
2	When the supplied AC adapter is connected, AC power (+19.5 V) is not supplied.	Remove the bottom plate and the rear cover and check that a voltage (about +19.5 V including measurement error) is applied to the center pin of J5001 (NET board). Check whether +19.5 V is output from the DC jack of the AC adapter.	Connect the AC adapter correctly. If this problem still remains, replace the AC adapter.
3	No power voltage is present on CN1001 (DD-59 board).	Connect the AC adapter with CN5001 (NET board) connected to CN1001 (DD-59 board) and check whether a voltage (about +19.5 V including measurement error) is applied to pins 17 to 20 of CN1001 (DD-59 board).	Connect the harness correctly between CN5001 (NET board) and CN1001 (DD-59 board).
4	No power voltage is input to the power switching circuit on the DD-59 board.	Connect the AC adapter with CN5001 (NET board) connected to CN1001 (DD-59 board), and check that a voltage (11.5 V to 12.9 V) is applied to TP1001 (DD-59 board).	The DC/DC converter on the DD-59 board is defective. Replace the DD-59 board.
5	No main power voltage is present on the DD-59 board.	Connect the AC adapter with CN5001 (NET board) connected to CN1001 (DD-59 board), and check that a voltage (11.5 V to 12.9 V) is applied to TP1301 (DD-59 board).	The power switching circuit on the DD-59 board is defective. Replace the DD-59 board.

2-1-2. The POWER Indicator Does Not Light Even after Power Is Supplied from the PoE++

No.	Symptoms	Confirmation item	Cause or remedy
1	The POWER indicator does not light even after power is supplied from the PoE++ (IEEE.802.3bt type 4 class 8)	Supply power from AC adapter and check whether the POWER indicator lights.	If this problem still remains, refer to "2-1-3. Power Is Not Turned On (AC Adapter and PoE++) and the POWER Indicator Does Not Light".
2	A hub or injector compatible with PoE++ (IEEE.802.3bt type 4 class 8) is not used.	Check whether a hub or injector compatible with PoE++ (IEEE.802.3bt type 4 class 8) is used.	Use a hub or injector compatible with PoE++ (IEEE.802.3bt type 4 class 8).
3	A correct cable (compliant with Cat5e or higher) is not used.	Check the state and type of the Ethernet cable.	Replace the cable with a normal Ethernet cable.
4	Failure of PoE DC/DC converter	Remove the CC board to make the NET and DD-59 boards visible, supply power from PoE++, and check that a voltage (11.5 V to 12.9 V) is applied of TP1207 (DD-59 board).	The PoE DC/DC converter (IC1201) on the DD-59 board is defective. Replace the DD-59 board.
5	No main power voltage is present on the DD-59 board.	Remove the CC board to make the NET and DD-59 boards visible, supply power from PoE++, and check that a voltage (11.5 V to 12.9 V) is applied of TP1301 (DD-59 board).	The power switching circuit on the DD-59 board is defective. Replace the DD-59 board.

2-1-3. Power Is Not Turned On (AC Adapter and PoE++) and the POWER Indicator Does Not Light

No.	Symptoms	Confirmation item	Cause or remedy
1	No main power voltage is present on the DD-59 board.	Remove the CC board to make the NET and DD-59 boards visible, connect the AC adapter or PoE++, and check that a voltage (11.5 V to 12.9 V) is applied of TP1301 (DD-59 board).	The power switching circuit on the DD-59 board is defective. Replace the DD-59 board.
2	No 5 V power is present on the DD-59 board.	Remove the CC board to make the NET and DD-59 boards visible, connect the AC adapter or PoE++, and check that a voltage (5.0 V to 5.3 V) is applied of TP1002 (DD-59 board).	The DC/DC converter on the DD-59 board is defective. Replace the DD-59 board.
3	No power is supplied to the NET board.	Remove the CC board to make the NET and DD-59 boards visible, connect the AC adapter or PoE++, and check that voltages are applied to the pins of CN5001 (NET board) as follows. 4 to 8 pins: 11.5 V to 12.9 V 9 to 11 pins: 5.0 V to 5.3 V	Connect the harness correctly between CN5001 (NET board) and CN1001 (DD-59 board).
4	No 12 V power is supplied to the CC board.	Mount all boards to their original locations, connect the AC adapter or PoE++, and check that a voltage (11.5 V to 12.9 V) is applied to pins 1 to 7 of CN9802 (CC board).	Connect the harness correctly between CN4002 (DD-59 board) and CN9802 (CC board).
5	No 5 V power is supplied to the CC board.	Check that a voltage (5.0 V to 5.3 V) is applied to pins 1 to 7 of CN9803 (CC board).	Connect the harness correctly between CN4003 (DD-59 board) and CN9803 (CC board).
6	The LED signal is disconnected	Check that a voltage (3.0 V to 3.5 V) is applied of Q3002-B and a voltage (0 V to 0.5 V) is applied of Q3002-C.	Connect the harness correctly between CN4004 (DD-59 board) and CN9807 (CC board).

2-2. Problems of Pan/Tilt Mechanism

2-2-1. Pan/Tilt Is Not Initialized after Power On

No.	Symptoms	Confirmation item	Cause or remedy
1	The pan/tilt lock lever is set to “LOCK”.	Check the pan/tilt lock lever state.	Set the pan/tilt lock lever to “UNLOCK” and turn on the unit.
2	The pan/tilt locking mechanism is broken.	Turn off the unit, perform pan or tilt operation slowly, and check that pan or tilt moves slowly. Remove the outside cabinet (D) assembly and check the pan/tilt locking mechanism.	Repair the pan/tilt locking mechanism.
3	Pan or tilt moves with the pan/tilt lock lever set to “LOCK”.	Remove the outside cabinet (D) assembly and check that the pan/tilt lock sensor is free of dust or dirt.	Remove dust and dirt on the pan/tilt lock sensor.
4	The pan/tilt lock PI sensor is defective.	Measure the voltage on pins 6 to 8 of CN6001 (DR-709 board), insert a thick paper into the PI sensor slit, and check that the pin voltage changes to 3.3 V and 0 V.	Replace the TSI-68 board.
5	The motor is not excited.	Check the pan and tilt motor drivers. Pan: Check that the voltage of pins A6, A7, and B6 of IC2006 (DD-59 board) is about 12 V. Tilt: Check that the voltage of pins A6, A7, and B6 of IC2001 (DR-709 board) is about 12 V.	Failure of motor driver Replace the board (DD-59 or DR-709 board) that mounts the defective motor driver.
6	The motor is not excited.	Check the power fuse. Pan: Check whether the F1401 fuse on the DD-59 board is connected. Tilt: Check whether the F1001 fuse on the DR-709 board is connected.	Fuse is blown. Replace the affected fuse.
7	The motor is not excited.	Check the voltage of the connector. Pan: Check that the voltage of pin 13 of CN4004 (DD-59 board) is about 3.3 V. Tilt: Check that the voltage of pin 13 of CN6003 (DR-709 board) is about 3.3 V.	Failure of the DD-59 board or DR-709 board. Replace the affected board.
8	The motor is not excited.	Check that the voltage of pins 8 and 9 of IC4002 (CC board) is about 3.3 V.	Pan: Failure of the flexible flat cable between CN9807 (CC board) and CN4004 (DD-59 board). Tilt: Failure of the flexible flat cable between CN6003 (CC board) and CN2001 (DR-709 board). Connect the flexible flat cable or harness correctly.
9	A voltage of 3.3 V is present, but the motor is not excited.	—	Failure of the GPU board. Replace the GPU board assembly.
10	When the unit is turned on with the pan/tilt lock lever set to “UNLOCK”, the motor is excited but is not initialized.	—	Refer to “2-2-2. Pan/Tilt Operation Stops”.

2-2-2. Pan/Tilt Operation Stops

No.	Symptoms	Confirmation item	Cause or remedy
1	Pan/tilt operation is locked.	Check the pan tilt lock lever state.	Set the pan tilt lock lever to "UNLOCK" and turn on the unit.
2	PT limit is present.	Check the pan/tilt operation range control function.	Open the Web App, select [Pan-Tilt] > [Range Limit], and then set [Setting] to OFF. If this problem still remains, reset pan/tilt. (Refer to the Help Guide.)
3	The pan/tilt shaft does not move smoothly.	Turn off the unit, perform pan or tilt operation slowly, and check that pan or tilt moves slowly.	Find and remove the cause of non-smooth movement of the pan/tilt shaft.
4	The pan tilt locking mechanism is defective.	Remove the outside cabinet (D) assembly and check the pan tilt locking mechanism.	Repair the pan tilt locking mechanism.
5	Improper mounting of tilt photosensor	Check that no gap, shift or damage of the right arm is present viewed from the front side.	Remove the outside cabinet (G) assembly and remove the defective parts.
6	The tilt photosensor slit is damaged.	Remove the outside cabinet (G) assembly and check whether the tilt shutter slit is damaged.	Replace the tilt photosensor slit.
7	The tilt gear is damaged.	Remove the outside cabinet (G) assembly and check whether the main gear, scissors gear, or pulley is damaged.	Replace the main gear, scissors gear, or pulley.
8	The tilt shaft timing belt is loose.	Remove the outside cabinet (G) assembly and check whether the tilt shaft timing belt is set with a proper tension.	Adjust the timing belt tension.
9	Improper wiring of tilt photosensor	Check whether the flexible flat cables and harnesses connected between the TSI-68, CN-4205, DR-709, and CC boards are disconnected.	Connect the harness and flexible flat cable correctly. Replace the harness and flexible flat cable if necessary.
10	Defective operation of the tilt photosensor	Remove the outside cabinet (G) assembly and check that the TSI-68 board is free of dust or dirt.	Remove dust and dirt on the TSI-68 board.
11	The tilt photosensor is defective.	Measure the voltage on pins 6 to 8 of CN6001 (TSI-68 board), insert a thick paper into the PI sensor slit, and check that the pin voltage changes to 3.3 V and 0 V.	Replace the TSI-68 board.
12	The pan photosensor slit is broken.	Remove the pan tilt block from the base block and check whether the pan shutter slit is damaged.	Replace the tilt arm lower mold.
13	Defective operation of the pan photosensor	Remove the pan tilt block from the base block and check that the sensor of the PS-966 board attached to the base section is free of dust or dirt.	Remove dust and dirt on the sensor.
14	The pan photosensor is defective.	Measure the voltage on pins 2 to 5 of CN6101 (CC board), insert a thick paper into the photosensor slit on the PS-966 board, and check that the pin voltage changes to 3.3 V and 0 V.	Failure of the photosensor. Replace the PS-966 board.
15	The pan gear is damaged.	Remove the pan tilt block from the base block and check whether the main gear, scissors gear, or pulley is damaged.	Replace the main gear, scissors gear, or pulley.
16	The pan shaft timing belt is loose.	Disassemble the base section and check whether the pan shaft timing belt is set with a proper tension.	Adjust the timing belt tension.

2-3. Image Problems

2-3-1. No Image Is Output from SDI OUT

No.	Symptoms	Confirmation item	Cause or remedy
1	No image is output from SDI OUT.	Check the settings to identify the cause. Open the Web App and perform [Maintenance] > [Reset] > [Factory Default]. (Refer to the Help Guide.) Then connect the unit to a monitor that allows 3G-SDI 1920x1080 60P and check images.	When images appear on the monitor, the settings are not correct. (Completed)
2	The SDI OUT connector is defective.	Check whether any of the core wires of J1001 (SDI-135 board) is broken or bent.	The connector is defective. Replace the SDI-135 board.
3	Defective fine wire coaxial cable connection.	Remove the CC board and check that the fine wire coaxial cable between the CC board and SDI-135 board.	Connect the fine wire coaxial cable correctly. If this problem still remains, replace the fine wire coaxial cable.
4	SDI-135 board is defective.	—	Replace the SDI-135 board. If this problem still remains after replacing the SDI-135 board, refer to “2-3-3. No Camera Image Appears”.

2-3-2. No Image Is Output from HDMI

No.	Symptoms	Confirmation item	Cause or remedy
1	No image is output from HDMI.	Check the settings to identify the cause. Open the Web App and perform [Maintenance] > [Reset] > [Factory Default]. (Refer to the Help Guide.) Then connect the unit to a monitor that allows 3G-SDI 1920x1080 60P and check images.	When images appear on the monitor, the settings are not correct. (Completed)
2	Defective fine wire coaxial cable connection.	Check that the fine wire coaxial cable between the CN2001 (NET board) and CN4050 (CC board).	Connect the fine wire coaxial cable correctly. If this problem still remains, replace the fine wire coaxial cable.

2-3-3. No Camera Image Appears

No.	Symptoms	Confirmation item	Cause or remedy
1	Poor connector cable connection (CC board side)	Check connections of the connector cable at CN9601, CN9602, CN9804 (CC board).	Connect the connector cable correctly.
2	Poor connector cable connection (Camera head side)	Disassembly the camera head and check connections of the connector cable at CN4102 and CN4103 (IF board), CN1102 (DD-60 board).	Connect the connector cable correctly.
3	Abnormal composite cable power	Disassembly the camera head and check that a voltage (11.5 V to 12.9 V) is applied to pins 1 to 10 of CN1102 (DD-60 board).	Replace the composite cable.
4	The camera head is defective.	Replace the camera head and check if an image appears.	Replace the camera head.

2-3-4. The Lens Does Not Work

No.	Symptoms	Confirmation item	Cause or remedy
1	Failure of lens	Check whether the lens works normally in another device.	Replace the lens.

2-3-5. Web App Live Video Is Not Output

No.	Symptoms	Confirmation item	Cause or remedy
1	Inconsistent setting of connected monitor	When the HDMI output is connected to the monitor, disconnect it and check whether live video is output.	If live video is output, the corresponding format between HDMI output and monitor is not consistent.
2	Incorrect software setting	Open the Web App and perform [Maintenance] > [Reset] > [Factory Default]. (Refer to the Help Guide.)	If live video is output, the corresponding format of HDMI output is not consistent.
3	Failure of HDMI signal peripheral circuit	Then connect the unit to a monitor that allows 3G-SDI 1920x1080 60P and check images.	If live video is not output, the HDMI peripheral circuit is defective. Refer to “2-3-3. No Camera Image Appears”.

2-4. Communication Problems

2-4-1. The Tally Lamp Is Not Turned On or Off

No.	Symptoms	Confirmation item	Cause or remedy
1	Malfunction of only the tally lamp on the right arm viewed from the front side	Check the flexible flat cables connected between the TSI-68, CN-4205, DR-709, and CC boards for disconnection.	If any flexible flat cable is disconnected, replace it. When there is no disconnection, replace the TSI-68 board.
2	Malfunction of only the tally lamp on the left arm viewed from the front side	Check the connection of the flexible flat cable between LED-555 board and DR-709 board and the harness between DR-709 board and CC board.	If any flexible flat cable or harness is disconnected, replace it. When there is no disconnection, replace the LED-555 board.

2-4-2. External Synchronization Is Disabled

No.	Symptoms	Confirmation item	Cause or remedy
1	The shooting frame rate and the external synchronization signal are not consistent.	Check the settings of the shooting frame rate and the external synchronization signal. (Refer to the Help Guide.)	Match the shooting frame rate setting with the external synchronization signal source setting.

2-4-3. Low Sound Level, Noise in Signals, or Sound Cracks

No.	Symptoms	Confirmation item	Cause or remedy
1	The connected microphone is defective.	Connect the microphone to another device that operates normally and check that there is no problem.	If there is any problem with the microphone, replace it with a normal microphone.

2-4-4. Infrared Remote Control Does Not Function

No.	Symptoms	Confirmation item	Cause or remedy
1	Infrared remote control battery dead	Check the battery of the infrared remote control.	Replace the battery.
2	Failure of the infrared remote control	Check whether another unit operates with the infrared remote control.	If the unit does not operate, the infrared remote control is defective. Replace the infrared remote control.
3	Incorrect software settings	Open the Web App and perform [Maintenance] > [Reset] > [Factory Default]. (Refer to the Help Guide.) Next, check whether the unit operates with the infrared remote control.	When the unit operates with the infrared remote control, the infrared remote control is set to “OFF”.
4	The front light receiver does not function.	Operate the infrared remote control so that only the front light receiver is exposed to infrared light, and then check whether the unit operates normally.	The DD-59 board is defective. Replace the DD-59 board.

2-4-5. SDI Output from SFP Is Disabled

No.	Symptoms	Confirmation item	Cause or remedy
1	Incorrect software settings	Check that a video signal is being output from SDI OUT.	Open the Web App and perform [Maintenance] > [Reset] > [Factory Default]. (Refer to the Help Guide.) If the signal is not output even after executing the [Factory Default], refer to “2-3-1. No Image Is Output from SDI OUT”.
2	Unsupported SFP module	Change the output format and check whether output is present.	An SFP module that does not conform to the desired output format is used.
3	Failure of the SFP module	Attach the SFP module to another unit and check operation.	Replace the SFP module with a normal one.
4	The OPTICAL connector is defective	Check that the connector pins are not bent or cracked and the cage is not distorted of the CN2001 on the SDI-135 board.	Replace the SDI-135 board.
5	The cable driver of the SDI-135 board is defective	—	Replace the SDI-135 board.

2-5. Connection Problems

2-5-1. No Time Code Is Input

No.	Symptoms	Confirmation item	Cause or remedy
1	The shooting frame rate and the time code signal are not consistent.	—	Match the shooting frame rate setting with the time code generator setting.
2	Failure of the flexible flat cable	Check that the flexible flat cable between the CN7001 (NET board) and CN7004 (CC board).	Connect the flexible flat cable correctly. If this problem still remains, replace the flexible flat cable.

2-5-2. DC Fan Does Not Rotate or a Fan Alarm Goes Off

No.	Symptoms	Confirmation item	Cause or remedy
1	DC fan rotation is physically blocked.	Check whether any foreign matter is present in the DC fan, or the fan panel or internal bracket is deformed.	Remove foreign matter.
2	Failure of the fan connector	Remove the bottom plate, and check if the DC fan connector is normal.	Connect the connector of the DC fan correctly.
3	Failure of the fan harness	Remove the bottom plate and check the DC fan harness for disconnection.	Replace the DC fan.
4	Failure of the flexible flat cable	Check that the flexible flat cable between the CN7001 (NET board) and CN7004 (CC board).	Connect the flexible flat cable correctly. If this problem still remains, replace the flexible flat cable.
5	Failure of the fan	Connect pin 3 of the DC fan to GND and apply +12 V to pin 1 and check that the DC fan rotates.	Replace the DC fan.

2-5-3. OPTION Connector Not Working

No.	Symptoms	Confirmation item	Cause or remedy
1	The OPTION connector is defective	Check that the connector pins and case are not bent or cracked of the J701 on the NET board.	Replace the OPTION connector.
2	The tally output external circuit is defective.	Check whether the circuit is used within an external voltage range of 5 V to 12 V.	Use the circuit correctly according to the Help Guide.
3	The tally input external circuit is defective.	Check that the pin is 0.6 V or less when tally is enabled.	Use the circuit correctly according to the Help Guide.
4	Insufficient tally input settings	Check whether the settings are made to enable tally input using the Camera menu.	Open the camera menu and set [Technical] > [Tally] > [Tally Control] correctly. (Refer to the Help Guide.)

Section 3
Replacement of Main Parts

3-1. Basic Knowledge

3-1-1. Precautions when Working with This Unit Turned Upside Down

When this unit is turned upside down to removing/installing the parts in the base block, place this unit with holding the base block. Do not place this unit with causing stress to the camera block.

3-1-2. Tool/Parts Information

Tool

- Part name: SDI connector fixing nut jig (box wrench)
  Part number: J-6805-770-A

Parts information

- Part name: Tape AS
  Part number: 3-079-115-01
  Tip
  Replace the removed tape AS with the new one.

- Part name: Insulating sheet
  Part number: 5-040-679-01
  Tip
  Replace the removed insulating sheet with the new one.

- Part name: Light shielding sheet U (2166)
  Part number: 5-043-196-01
  Tip
  Replace the removed light shielding sheet U (2166) with the new one.

- Part name: FFC cover sheet
  Part number: 5-040-823-01
  Tip
  Replace the removed FFC cover sheet with the new one.

- Part name: Soft gasket (6X6 (2.5))

  Part number: 5-044-870-01

  Tip

  Replace the removed soft gasket (6X6 (2.5)) with the new one.

- Part name: Tally shading sheet (2166)

  Part number: 5-043-557-01

  Tip

  Replace the removed tally shading sheet (2166) with the new one.

- Part name: Spring pin 2X20

  Part number: 7-626-314-51

  Tip

  If the removed spring pin 2X20 is deformed or damaged, replace it with a new one.

- Part name: Tape A

  Part number: 3-080-272-01

  Tip

  Replace the removed tape A with the new one.

- Part name: Fan cushion

  Part number: 5-038-824-01

  Tip

  Replace the removed fan cushion with the new one.

- Part name: Cable clamp

  Part number: 5-038-818-01

  Tip

  Replace the removed cable clamp with the new one.

- Part name: USB hidden sheet

  Part number: 5-038-825-01

  Tip

  Replace the removed USB hidden sheet with the new one.

3-2. Replacement of Main Parts

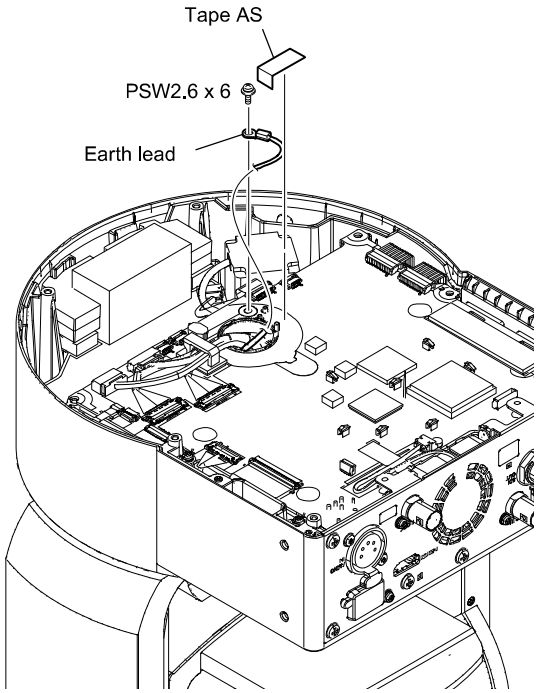
3-2-1. Pan Tilt Block

Preparation

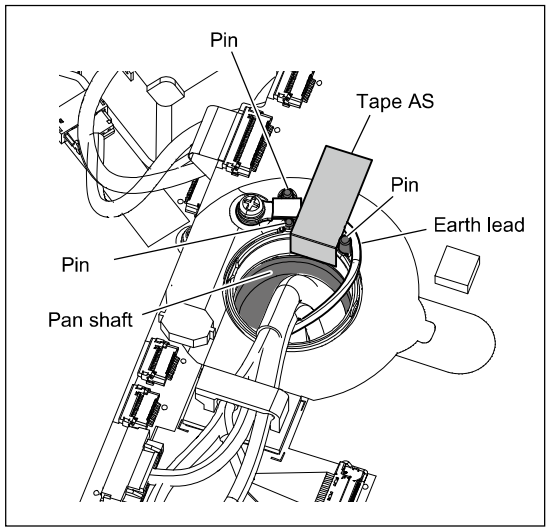
1. Remove the pan center cabinet. (Refer to “1-2-1. Pan Center Cabinet”.)
2. Remove the bottom plate. (Refer to “1-2-2. Bottom Plate”.)

Procedure for removal

1. Peel the tape AS.
2. Remove the screw, and then remove the earth lead.



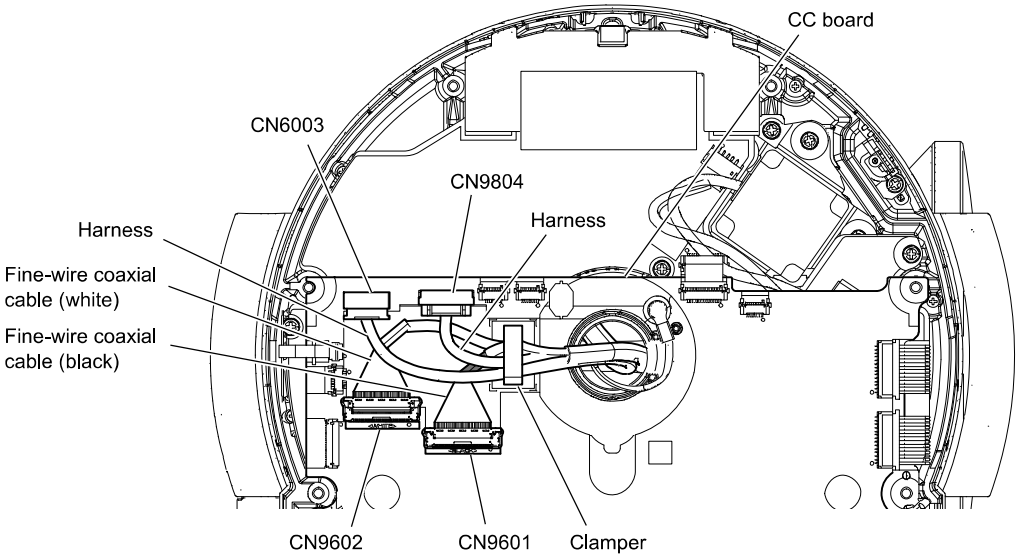
Arrangement of earth lead



Note

- At the time of the installation, pass the ground wire between the pins and fix it with tape AS as shown above.
- Attach the tape AS so that it does not overlap with the pan shaft.

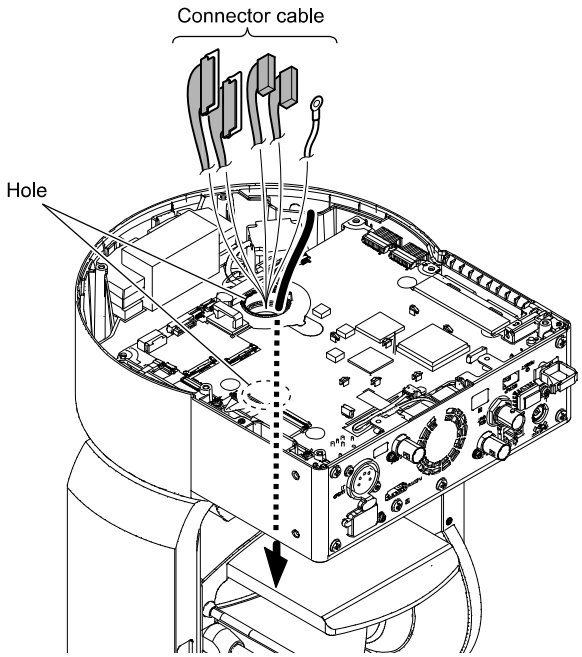
3. Release the two fine-wire coaxial cables and the two harnesses.
4. After disconnecting the two harnesses from the connectors (CN6003, CN9804) on the CC board, disconnect the two fine-wire coaxial cables from the connector (CN9601, CN9602) on the CC board.



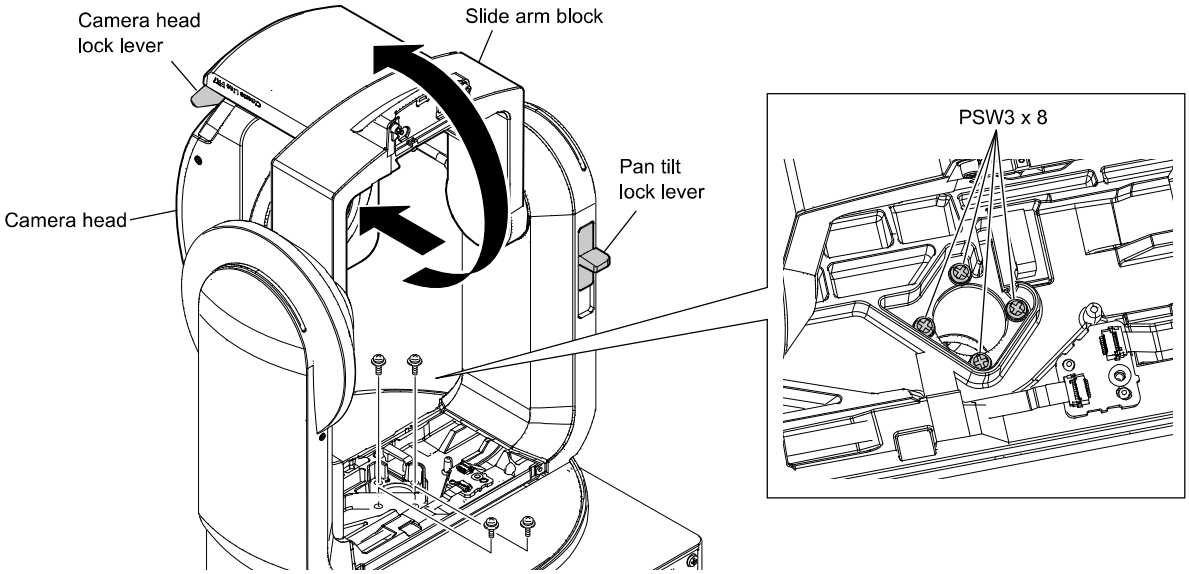
Note

At the time of the installation, clamp the two fine-wire coaxial cables (lower) and the two harnesses (upper) with the clamper as shown above.

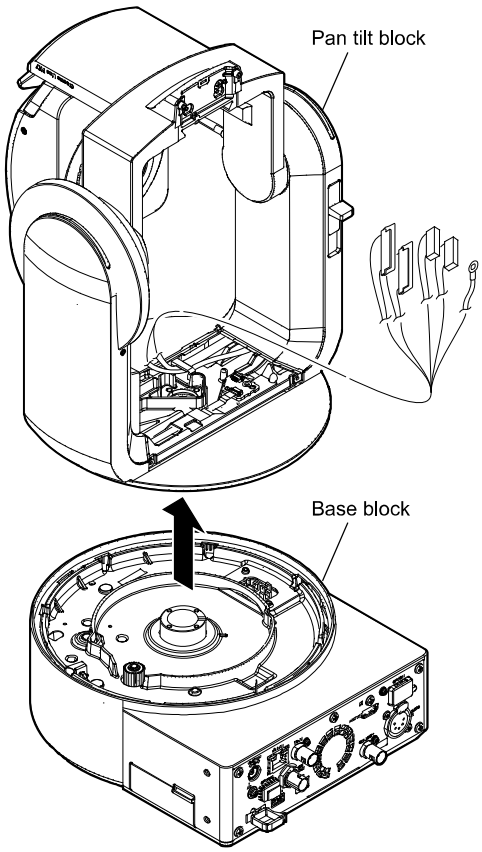
5. Pull out the connector cable from the hole.



6. Turn upside down this unit
7. Turn the slide arm block and the camera head to the direction shown below using the pan tilt lock lever and the camera head lock lever.
8. Remove the four screws.

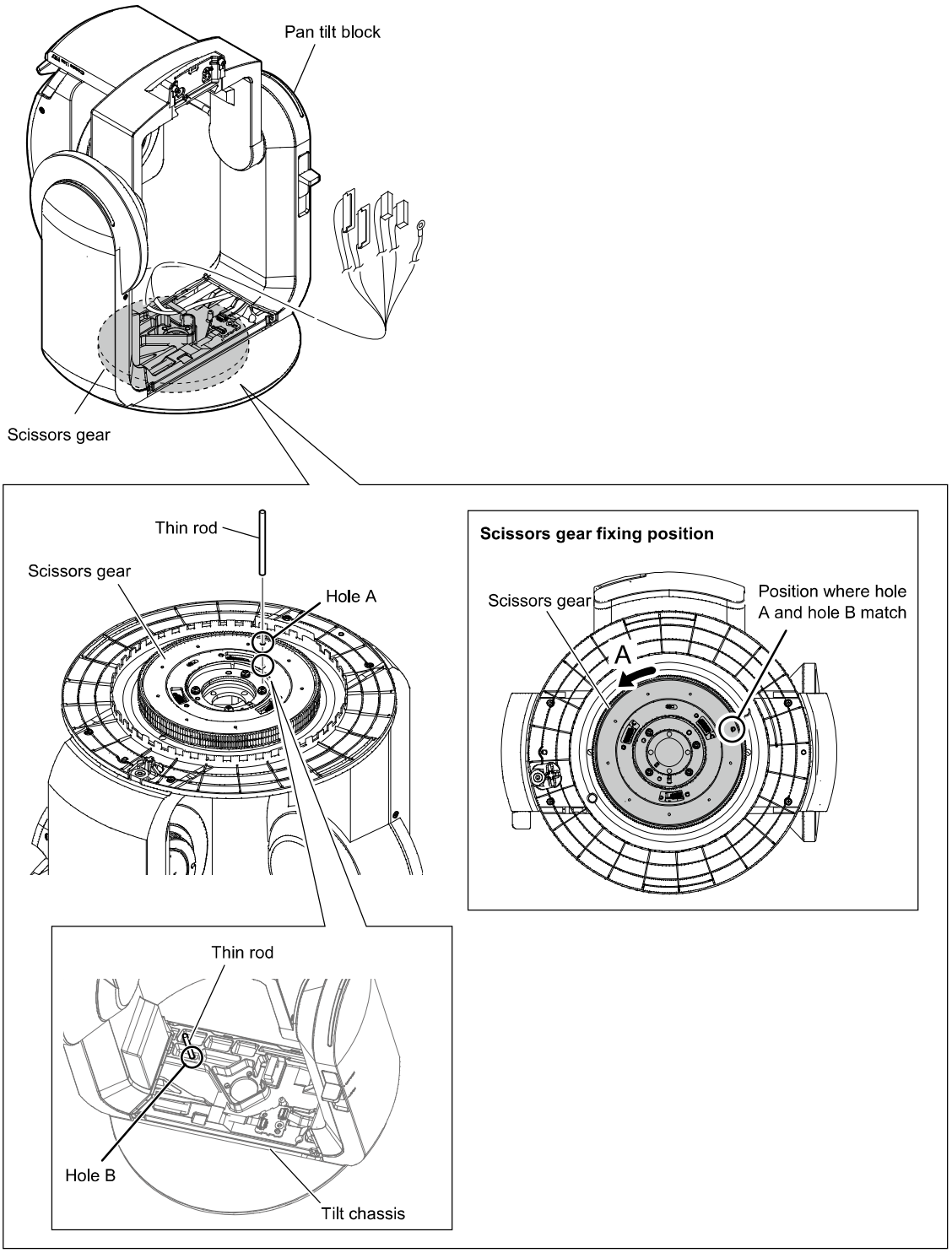


9. Remove the pan tilt block from the base block in the direction of the arrow.

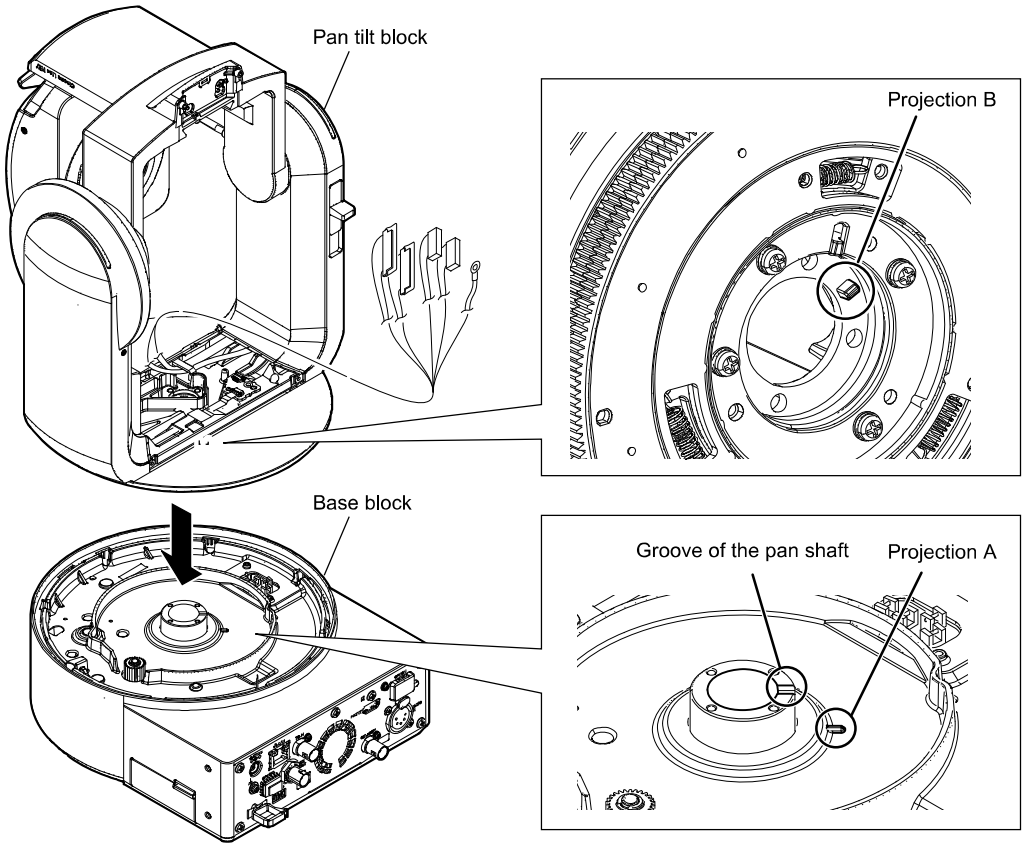


Procedure for installation

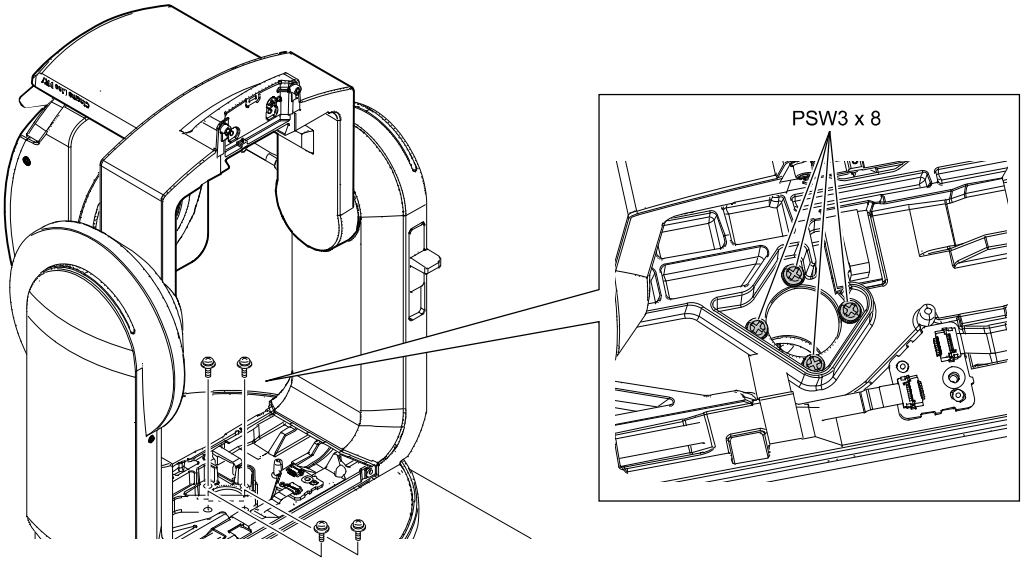
10. Turn the scissors gear in the direction of the arrow A until the scissors gear hole A matches the tilt chassis hole B.
11. Insert a thin rod (Φ2 mm) into the hole A until it comes out of the hole B.



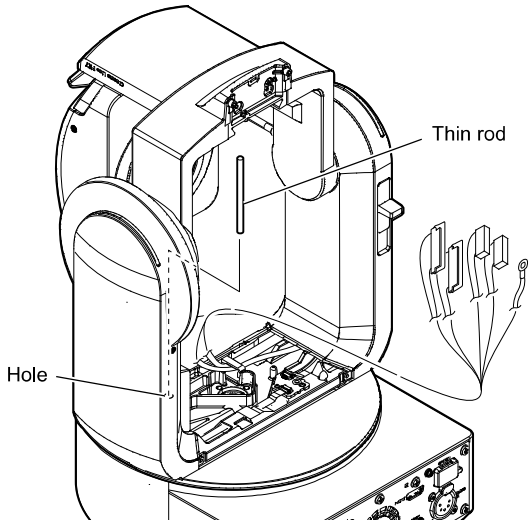
12. Align the pan shaft groove with the projection A.
13. Fit the pan shaft groove with the projection B and install the pan tilt block to the base block.



14. Fix the four screws.



15. Remove the thin rod (Φ2 mm).



16. Perform steps 1 to 6 in procedure for removal reversely.

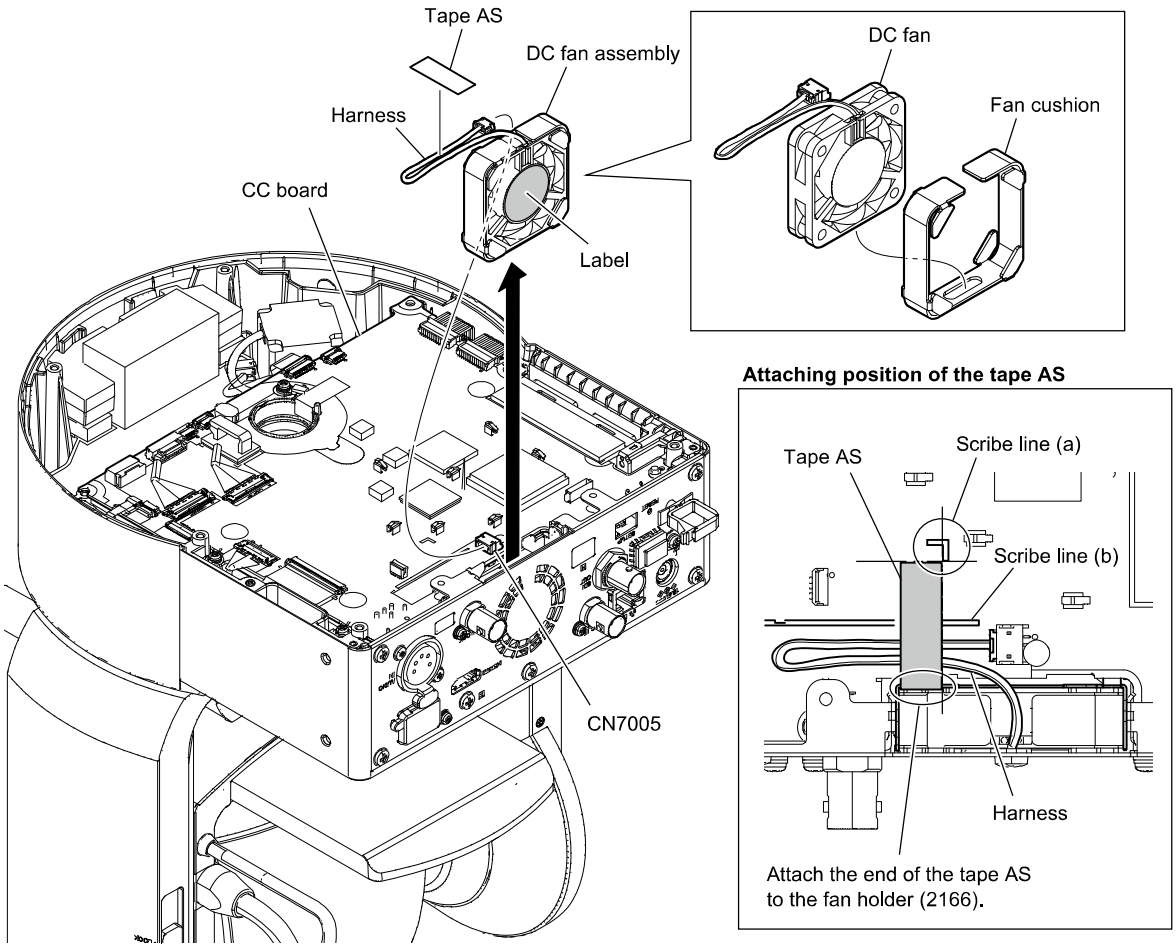
3-2-2. DC Fan

Preparation

1. Remove the bottom plate. (Refer to “1-2-2. Bottom Plate”.)

Procedure

1. Peel the tape AS.
2. Disconnect the harness from the connector (CN7005) on the CC board.
3. Remove the DC fan assembly.
4. Peel the fan cushion from the DC fan.



Note

- Install the DC fan carefully paying attention to the label side and the harness position.
- Attach the tape AS at the position as shown in the figure.
- Arrange the harness so that it does not come out of scribe line (b).

5. Install the removed parts by reversing the steps of removal.

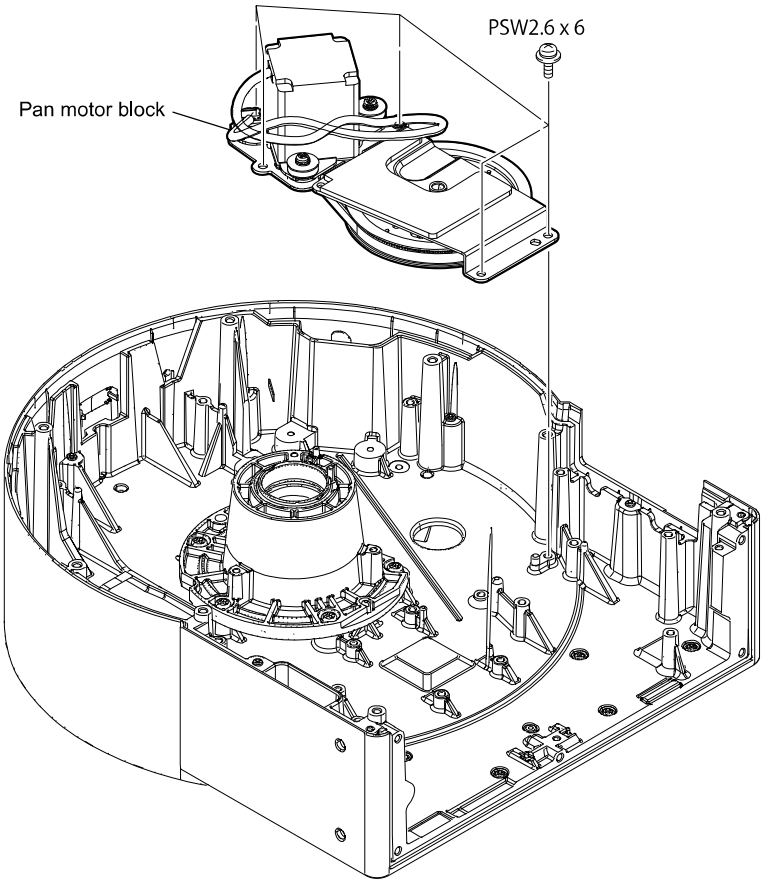
3-2-3. Pan Motor, Pully

Preparation

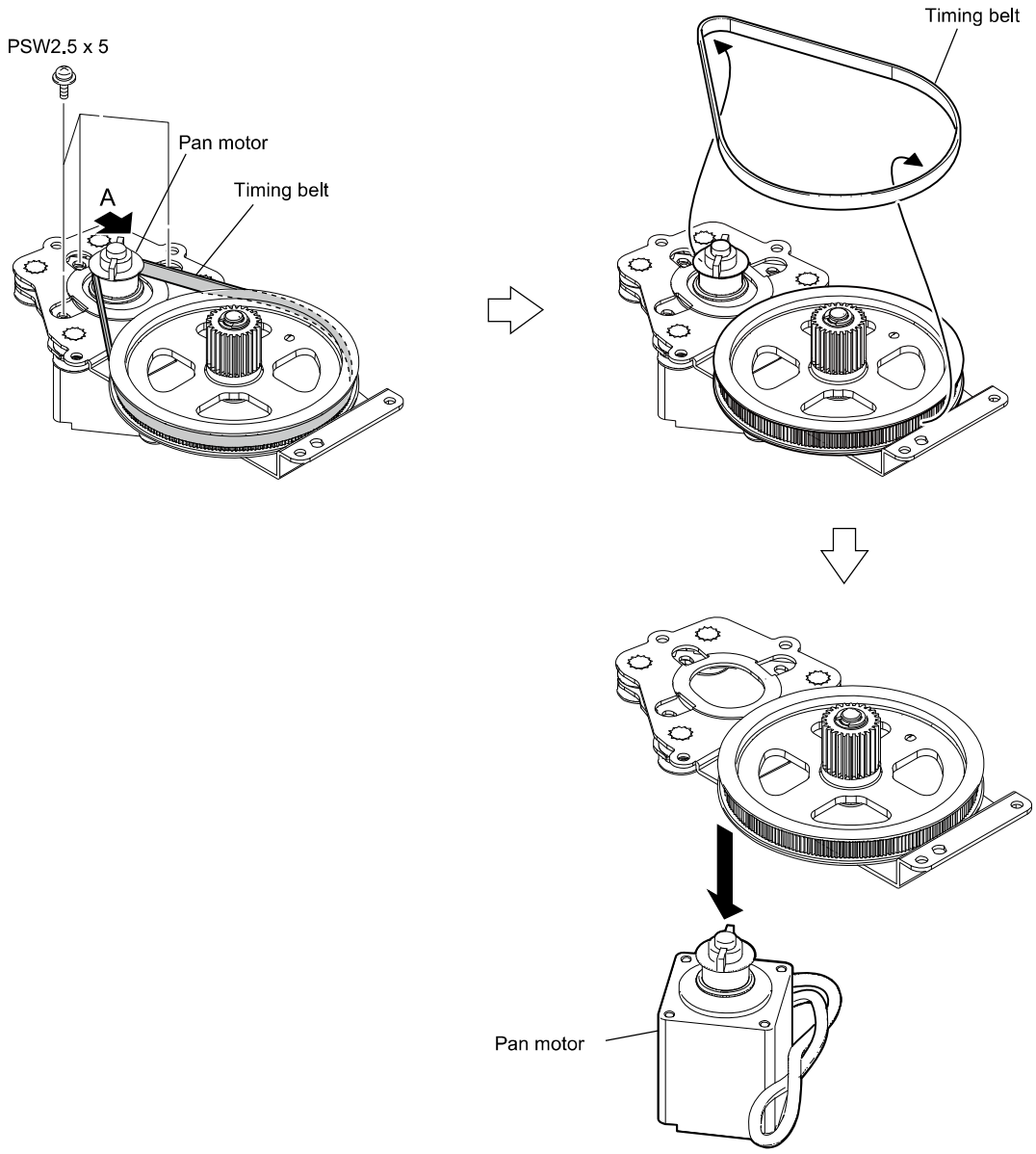
1. Remove the pan center cabinet. (Refer to “1-2-1. Pan Center Cabinet”.)
2. Remove the bottom plate. (Refer to “1-2-2. Bottom Plate”.)
3. Remove the pan tilt block. (Refer to “3-2-1. Pan Tilt Block”.)
4. Remove the DC fan. (Refer to “3-2-2. DC Fan”.)
5. Remove the CC board assembly. (Refer to steps 1 to 8 in “3-3-1. CC Board, SDI-135 Board”.)
6. Remove the DD-59 board assembly. (Refer to steps 1 to 8 in “3-3-2. DD-59 Board”.)
7. Remove the NET board assembly. (Refer to steps 1 to 3 in “3-3-3. NET Board, GPU Board”.)

Procedure

1. Remove the five screws, and then remove the pan motor block.



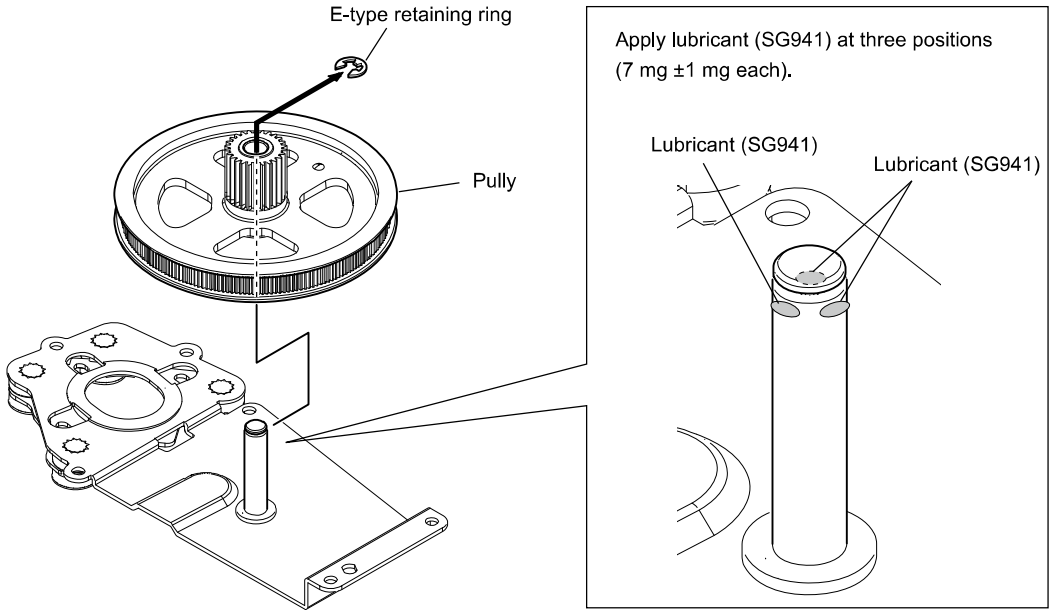
2. Remove the three screws, push the pan motor in the direction of the arrow A to loosen the timing belt tension, and then remove the timing belt.
3. Remove the pan motor.



Note

When installing the timing belt, pull the pan motor in the opposite direction of the arrow A until the timing belt tension becomes the previous tension.

4. Remove the E-type retaining ring, and then remove the pully.



Note

At the time of the installation, apply lubricant (SG941) at the positions specified in the figure above.

5. Install the removed parts by reversing the steps of removal.

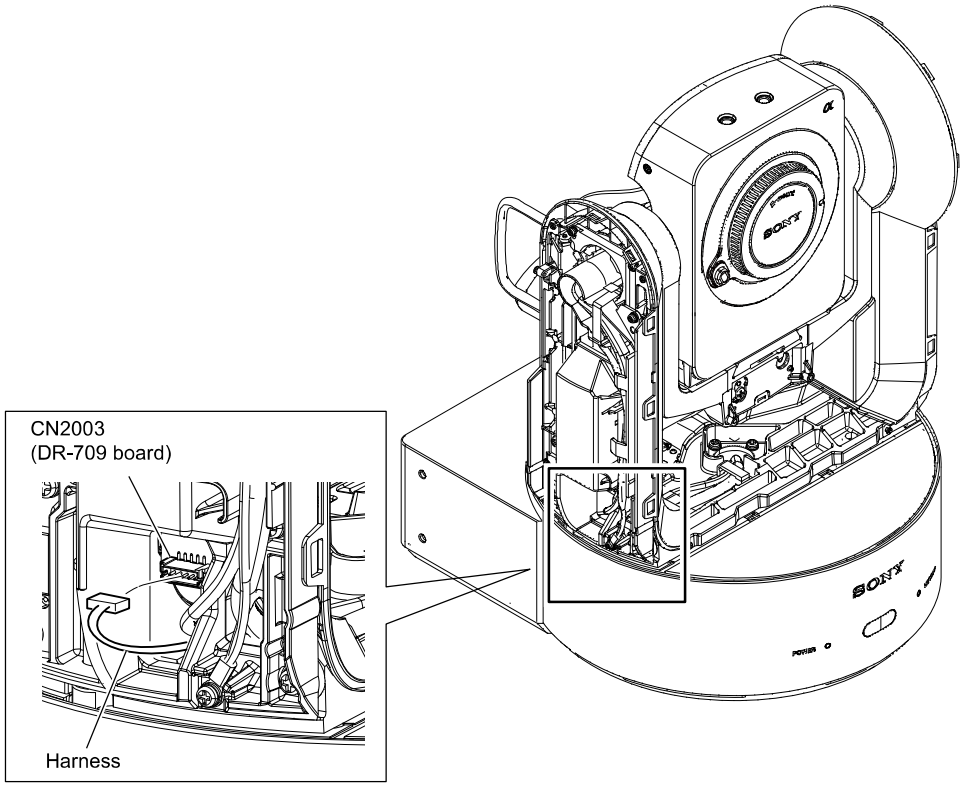
3-2-4. Tilt Motor

Preparation

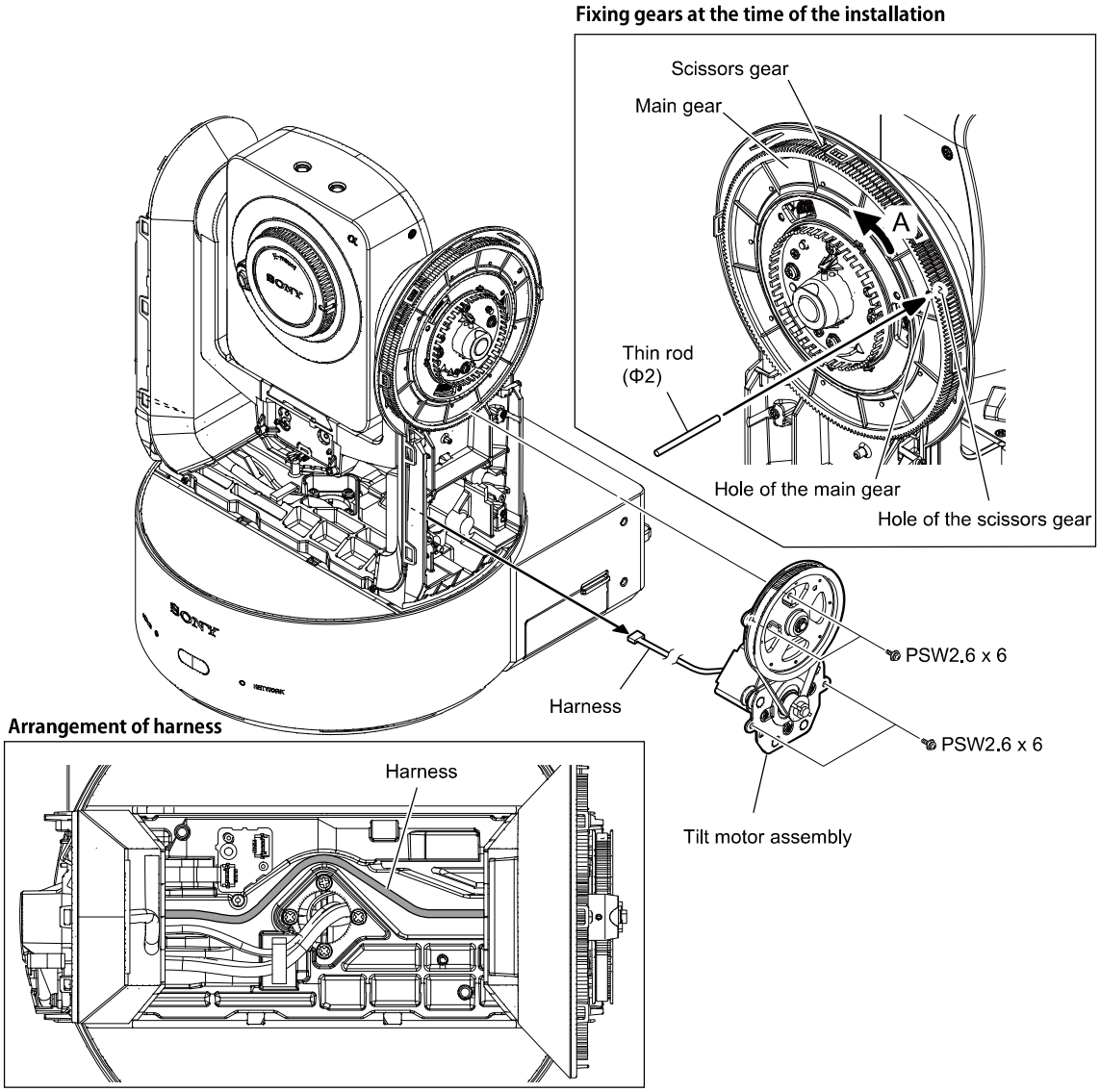
1. Remove the pan center cabinet. (Refer to “1-2-1. Pan Center Cabinet”.)
2. Remove the outside cabinet (D). (Refer to “1-2-4. Outside Cabinet (D), Top Cabinet (D)”.)
3. Remove the outside cabinet (G). (Refer to “1-2-5. Outside Cabinet (G)”.)

Procedure

1. Disconnect the harness from the connector (CN2003) on the DR-709 board.



2. Remove the four screws, pull the harness out of the hole, and then remove the tilt motor assembly.



Note

At the time of the installation, turn the main gear in the direction of the arrow A until the main gear hole matches the scissors gear hole, and then insert a thin rod (Φ2 mm) into the hole. Pull out the thin rod after the tilt motor assembly is installed.

Tip

Remove the tilt motor from the tilt motor assembly using the same procedure as for removing the pan motor from the pan motor assembly. (Refer to “3-2-3. Pan Motor, Pully”.)

3. Install the removed parts by reversing the steps of removal.

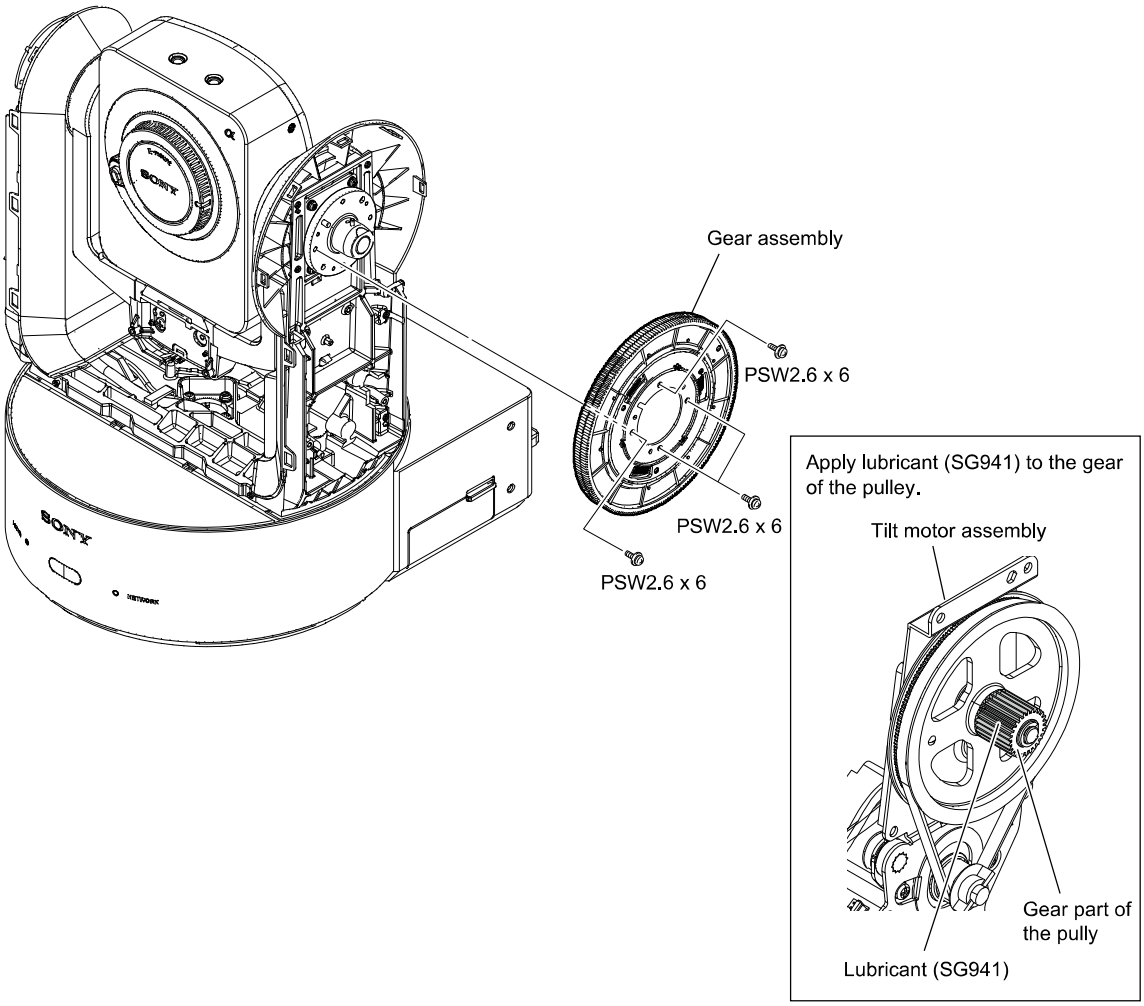
3-2-5. Main Gear, Gear Assembly (Tilt)

Preparation

1. Remove the pan center cabinet. (Refer to “1-2-1. Pan Center Cabinet”.)
2. Remove the outside cabinet (D). (Refer to “1-2-4. Outside Cabinet (D), Top Cabinet (D)”.)
3. Remove the outside cabinet (G). (Refer to “1-2-5. Outside Cabinet (G)”.)

Procedure

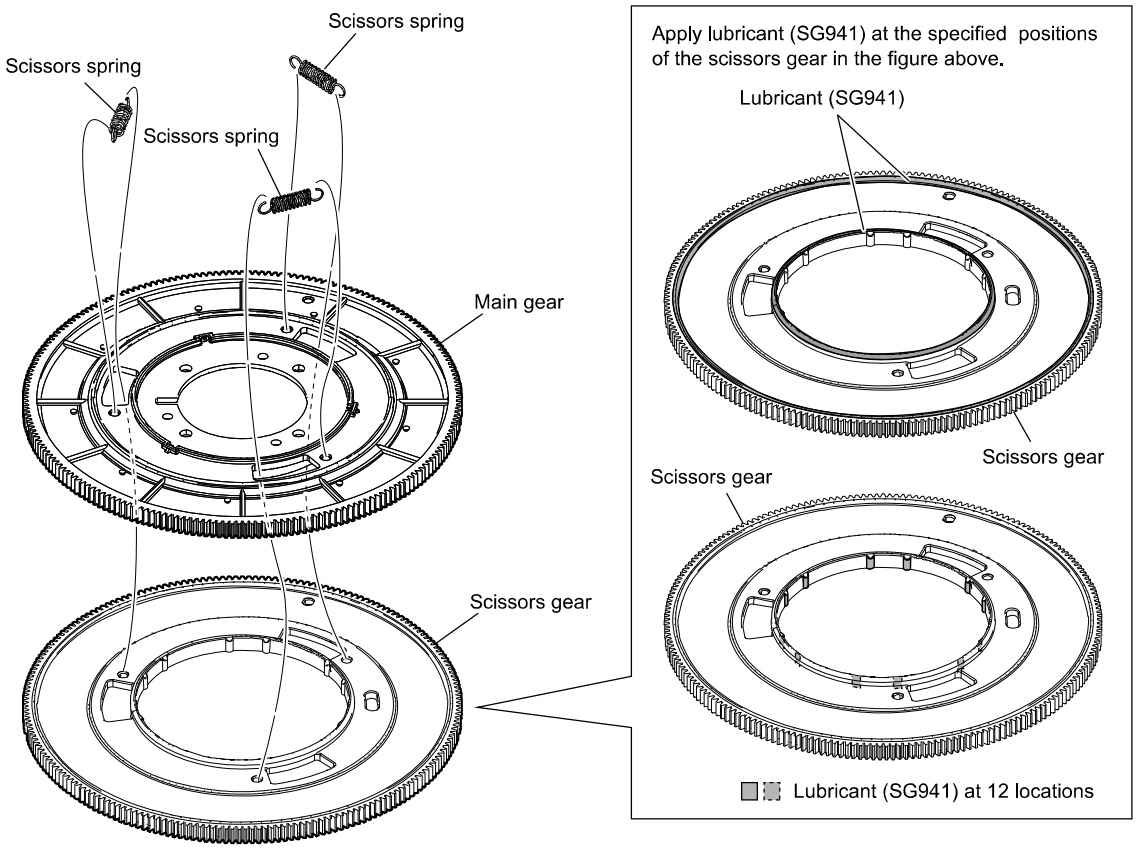
1. Remove the four screws, and then remove the gear assembly.



Note

At the time of the installation, apply lubricant (SG941) at the gear part of the pully of the tilt motor assembly. (Refer to “3-2-4. Tilt Motor”.)

2. Remove the three scissors springs and separate the main gear from the scissors gear.



Note

When the gears has been replaced, apply lubricant (SG941) at the specified positions of the scissors gear in the figure above.

3. Install the removed parts by reversing the steps of removal.

3-2-6. Connector Cable

Preparation

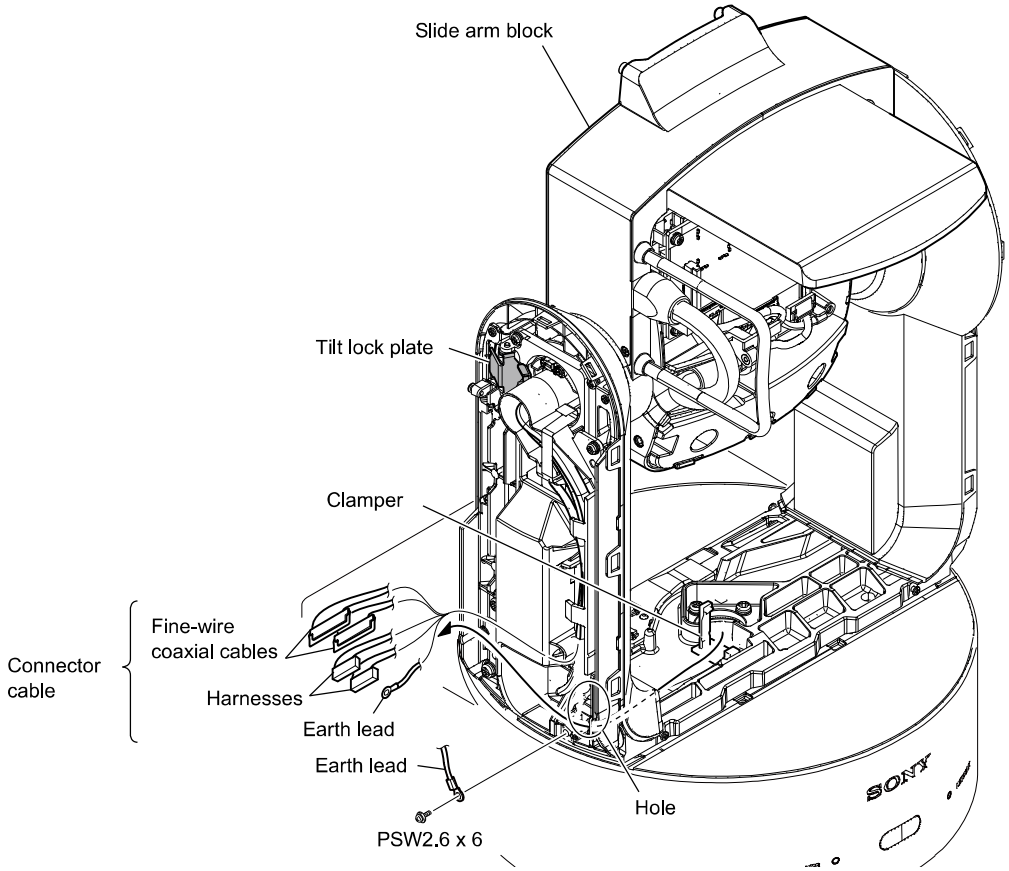
1. Remove the rear cover. (Refer to “1-2-3. Rear Cover”.)
2. Disconnect the connector cable from the IF board. (Refer to steps 1, 2 in “3-3-5. IF Board”.)
3. Remove the pan center cabinet. (Refer to “1-2-1. Pan Center Cabinet”.)
4. Remove the outside cabinet (D) assembly. (Refer to “1-2-4. Outside Cabinet (D), Top Cabinet (D)”.)
5. Remove the bottom plate. (Refer to “1-2-2. Bottom Plate”.)
6. Pull out the connector cable from the hole. (Refer to steps 1 to 5 in “3-2-1. Pan Tilt Block”.)

Procedure

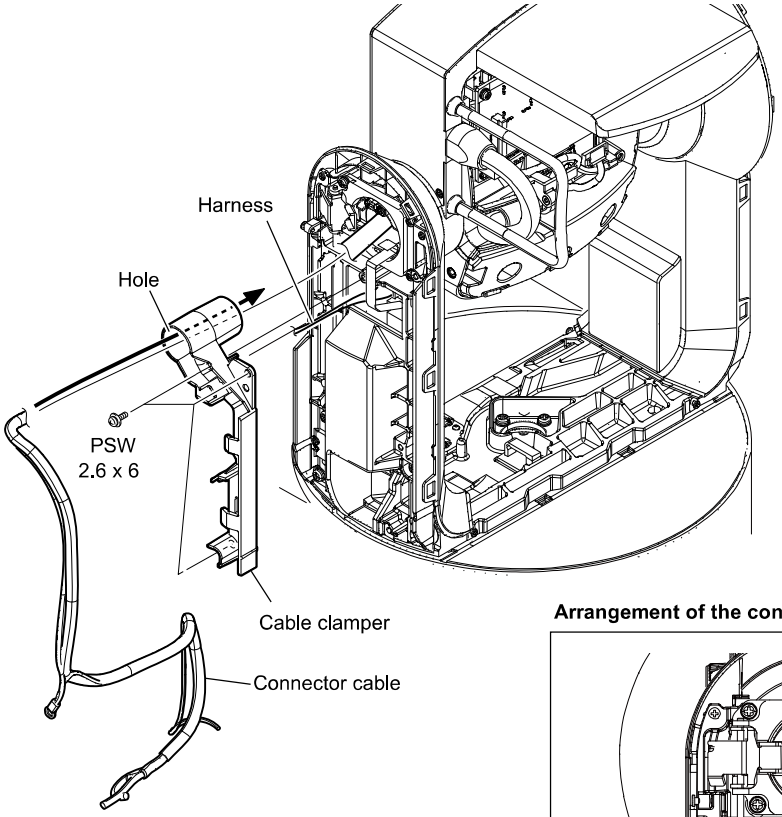
1. Turn the slide arm block to the direction shown below using the tilt lock plate.
2. Remove the screw, and then remove the earth lead.
3. Pass the connector cable through the hole.

   Tip

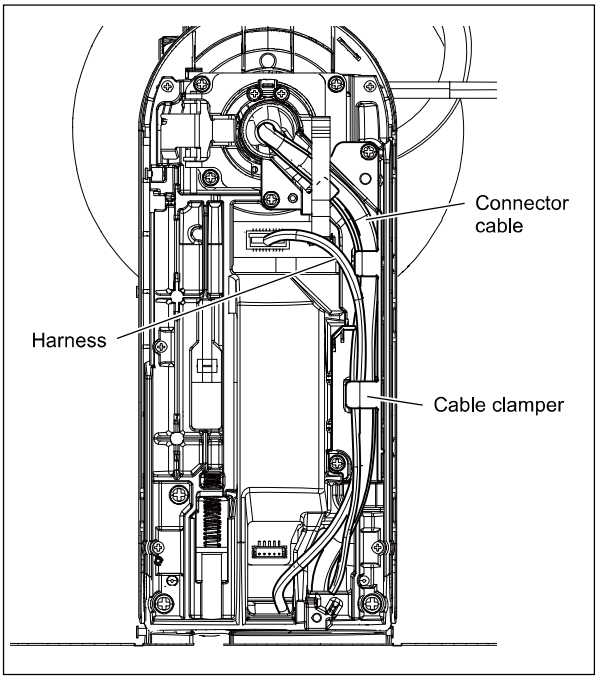
   Pass the ground wire first, two fine-wire coaxial cables, and then two harnesses sequentially through the narrow hole.



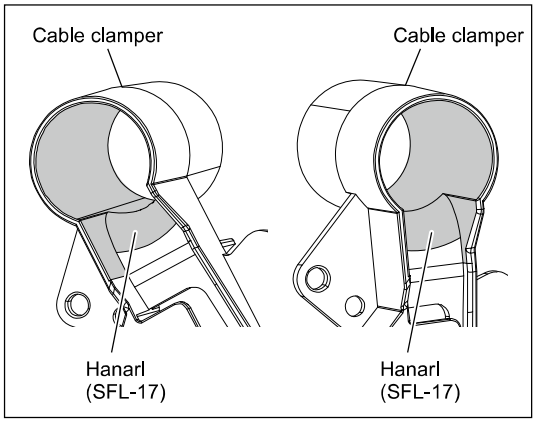
4. Release the cables from the cable clamper.
5. Remove the three screws, and then remove the cable clamper.
6. Pass the connector cable through the hole of the cable clamper.



Arrangement of the connector cable and the harnesses



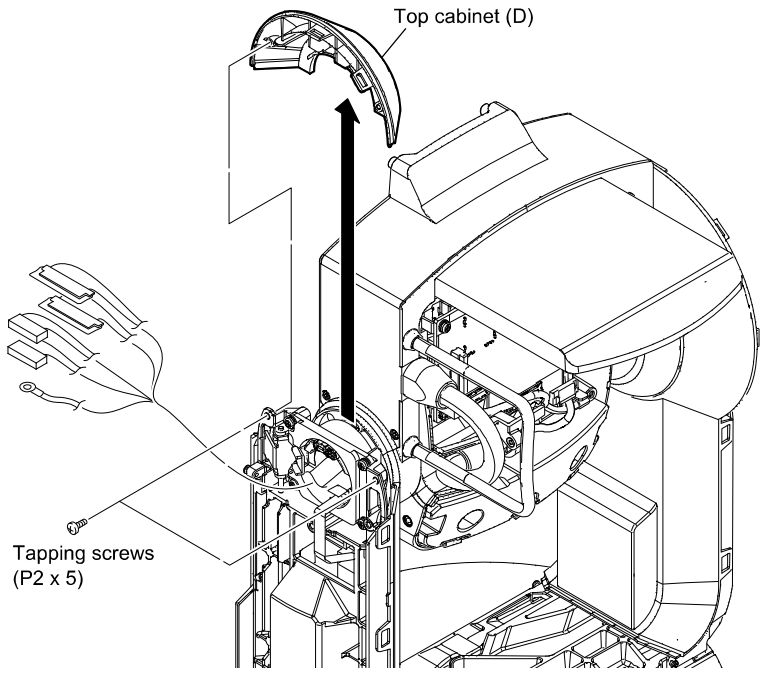
Hanarl (SFL-17) application area



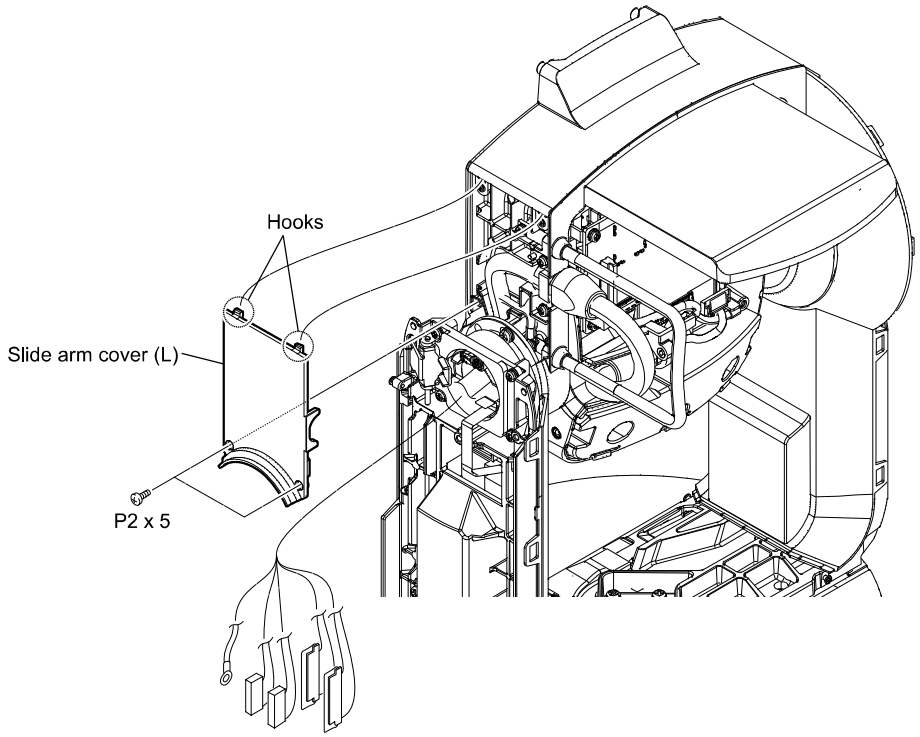
Note

When the cable clamper is replaced or lubricant is removed, apply new lubricant hanarl (SFL-17).

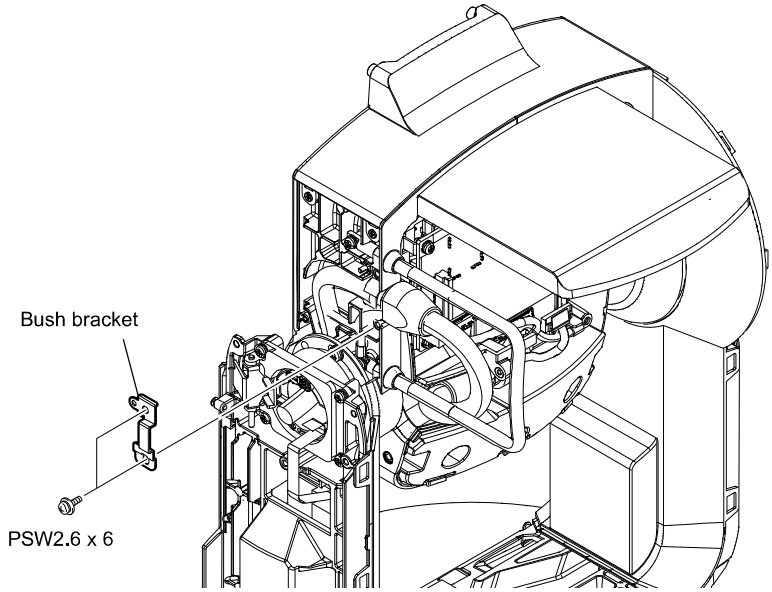
7. Remove the two tapping screws, and then remove the top cabinet (D) in the direction of the arrow.



8. Remove the two screws.
9. Release the two hooks, and the remove the slide arm cover (L).



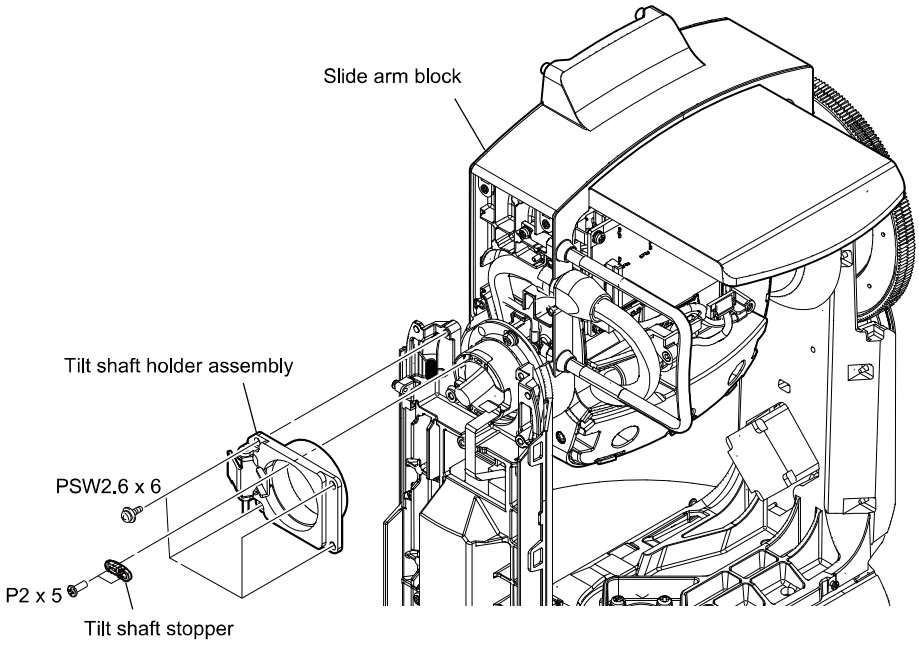
10. Remove the two screws, and then remove the bush bracket.



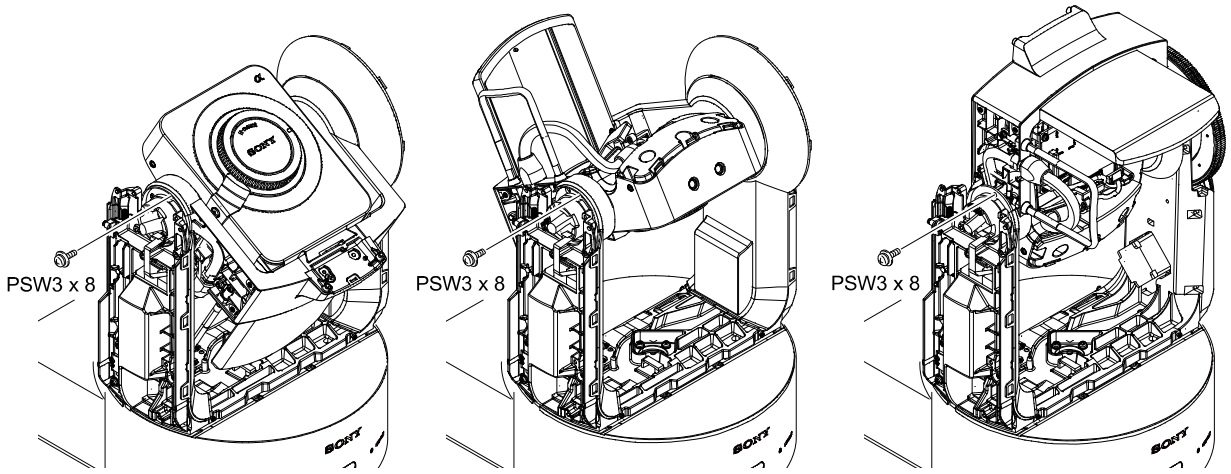
11. Remove the two screws (P2 x 5), and then remove the tilt shaft stopper.
12. Remove the four screws (PSW2.6 x 6), and then remove tilt shaft holder assembly.

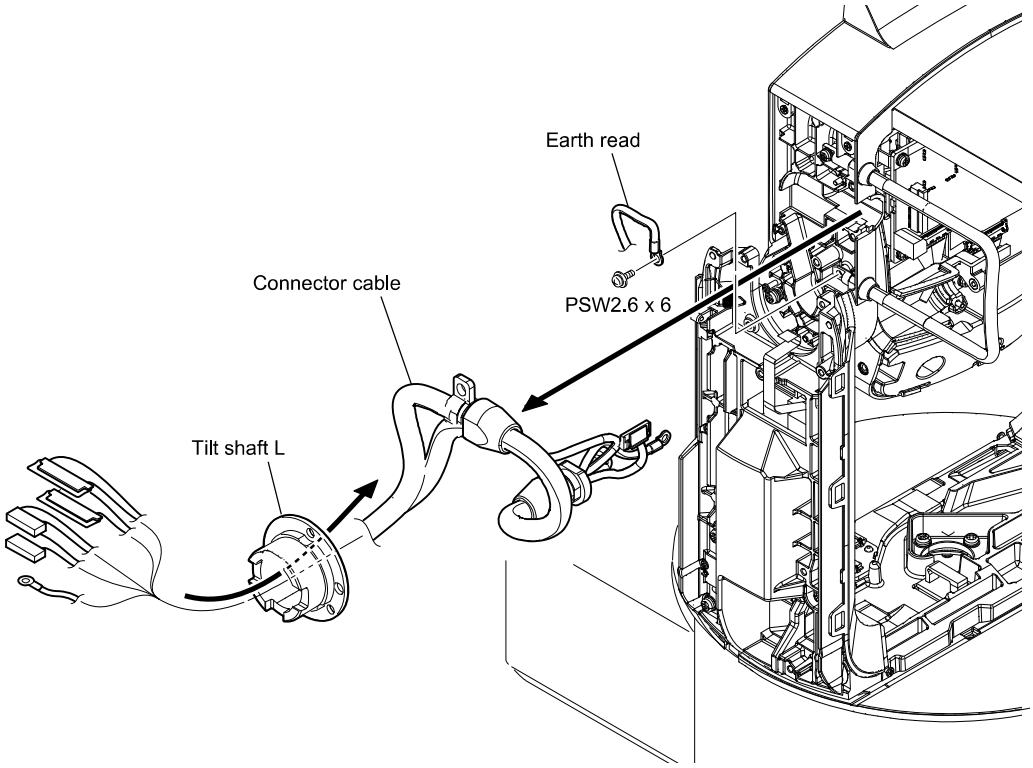
Tip

There is no support for the slide arm block. Hold the slide arm assembly during the following work.



13. Turn the slide arm block to a position where the three screws are visible, and then remove the three screws (PSW3 x 8).
14. Remove the screw (PSW2.6 x 6), and then remove the earth read.
15. Disconnect the connector cables and remove the tilt shaft L, and then pull the connector cables out of the tilt shaft L.





Note

At the time of the installation, apply Loctite 246 to the threads of the screws (PSW3 x 8).

16. Install the removed parts by reversing the steps of removal.

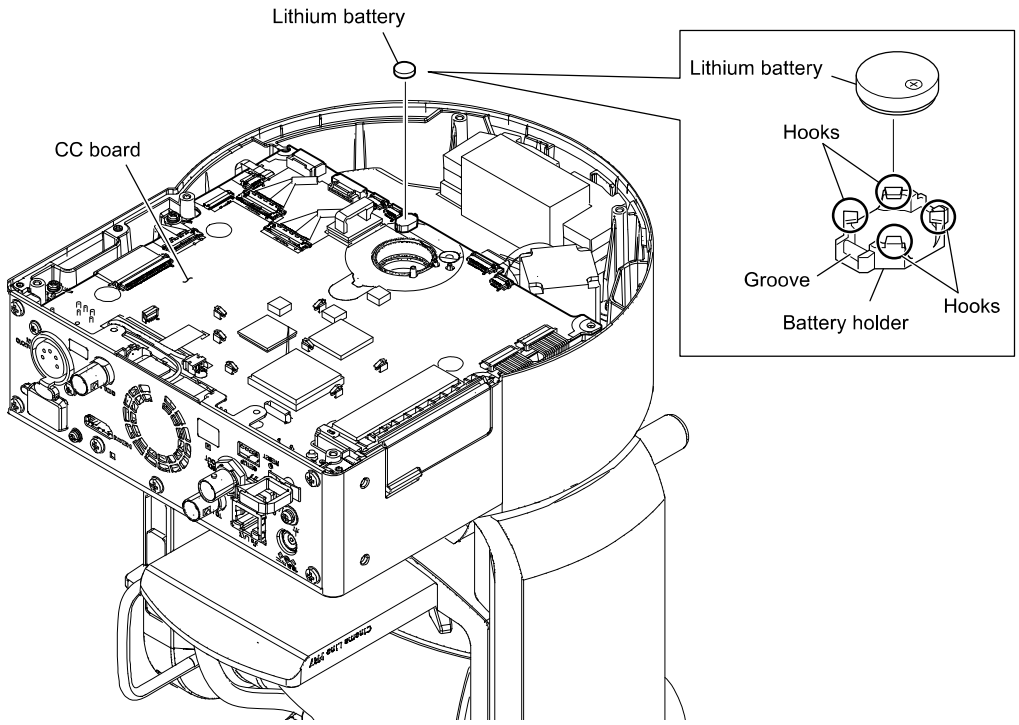
3-2-7. Lithium Battery

Preparation

1. Remove the bottom plate. (Refer to “1-2-2. Bottom Plate”.)

Procedure

1. Remove the lithium battery with a non-conductive stick.



2. Install the removed parts by reversing the steps of removal.

3-3. Board Replacement

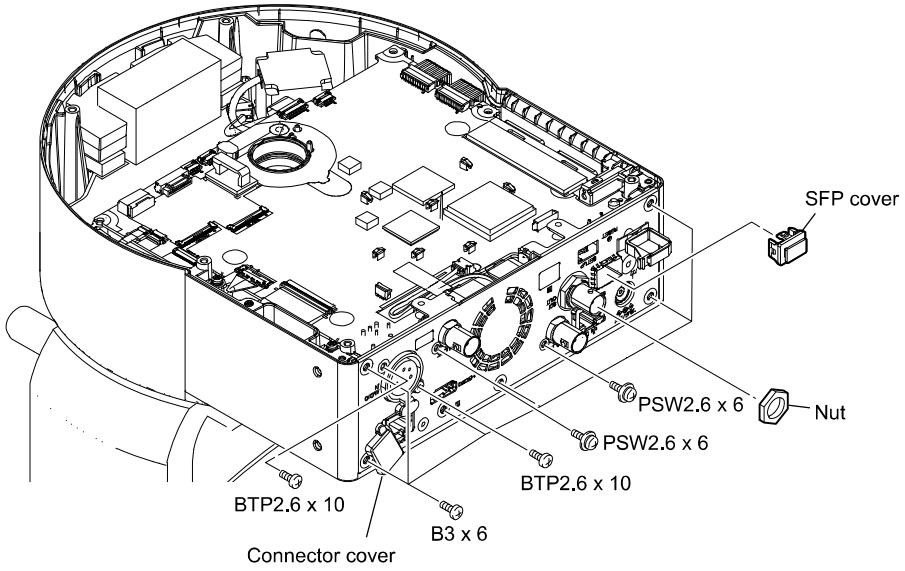
3-3-1. CC Board, SDI-135 Board

Preparation

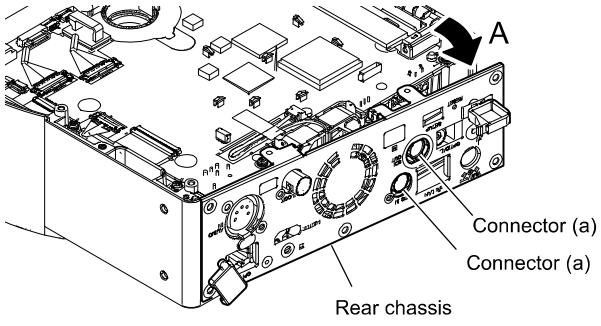
1. Remove the bottom plate. (Refer to “1-2-2. Bottom Plate”.)
2. Disconnect the cables from the CC board. (Refer to steps 1 to 5 in “3-2-1. Pan Tilt Block”.)

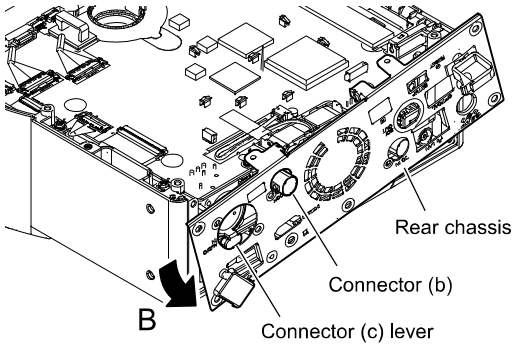
Procedure

1. Remove the connector cover and the SFP cover.
2. Remove the nut, two screws (PSW2.6 x 6), six screws (B3 x 6) and two tapping screws (BTP2.6 x 10).

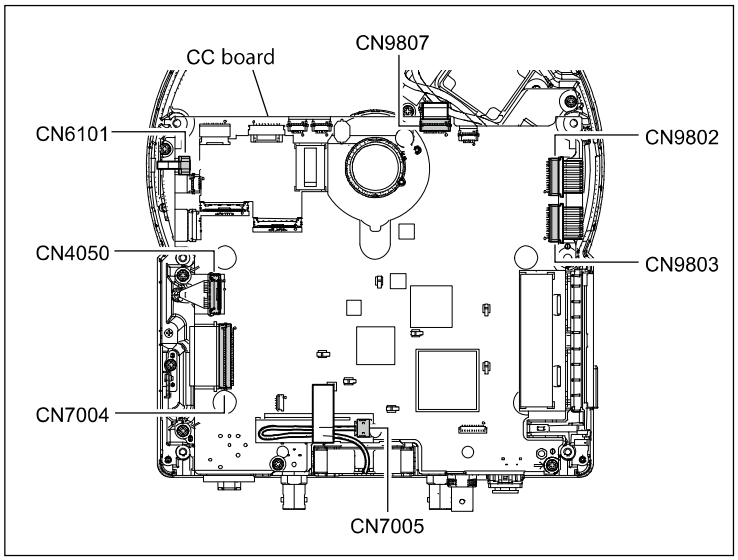


3. Pull the rear chassis in the direction of the arrow A to disconnect the two connectors (a).
4. Turn the rear chassis in the direction of arrow B around connector (b) to remove it from the connector (c) lever.

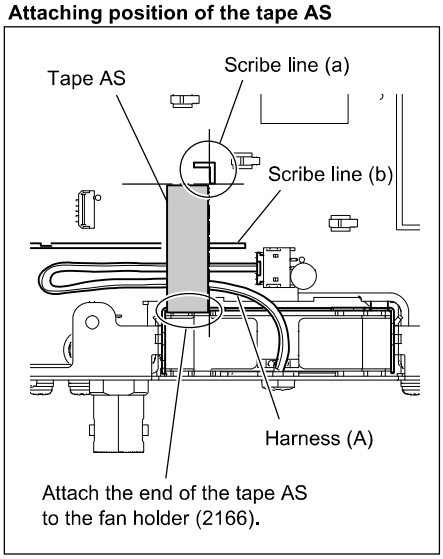


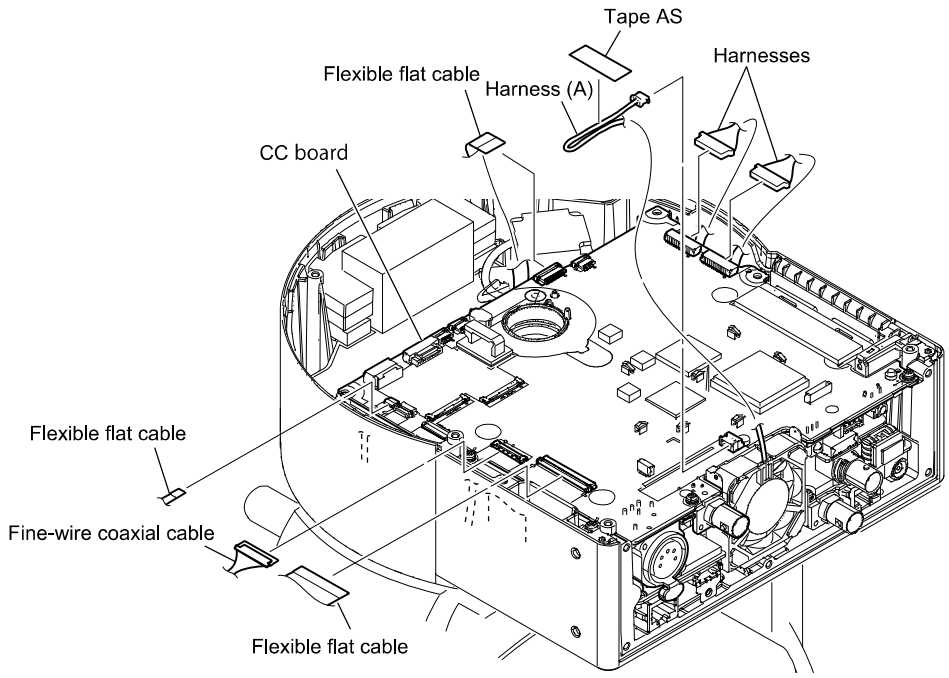


5. Peel the tape AS.
6. Disconnect the cables from the connectors (CN4050, CN6101, CN7004, CN7005, CN9803, CN9802, CN9807) on the CC board.



Attaching position of the tape AS

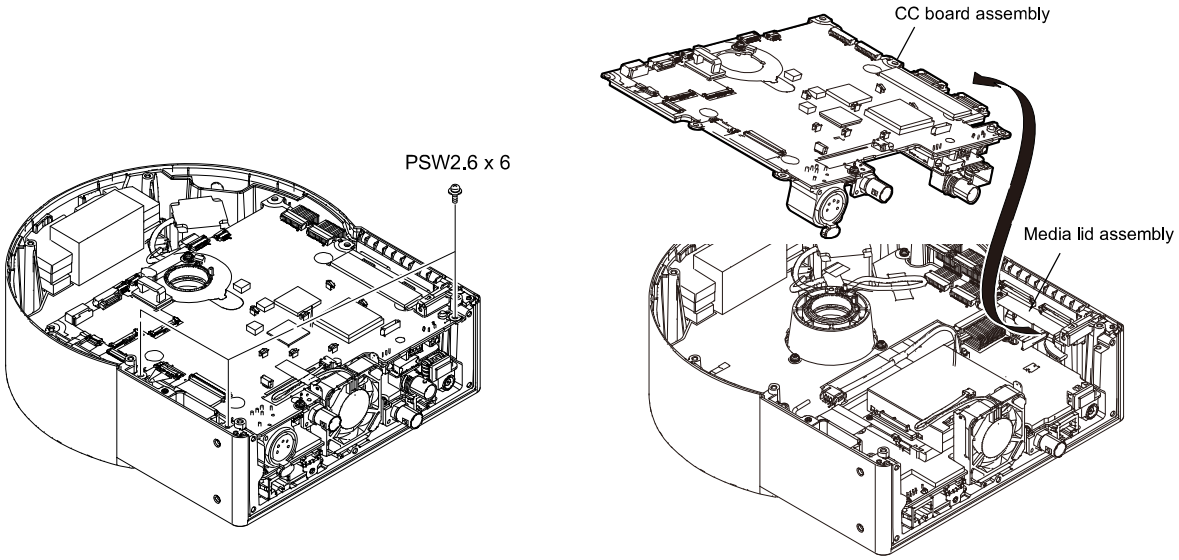




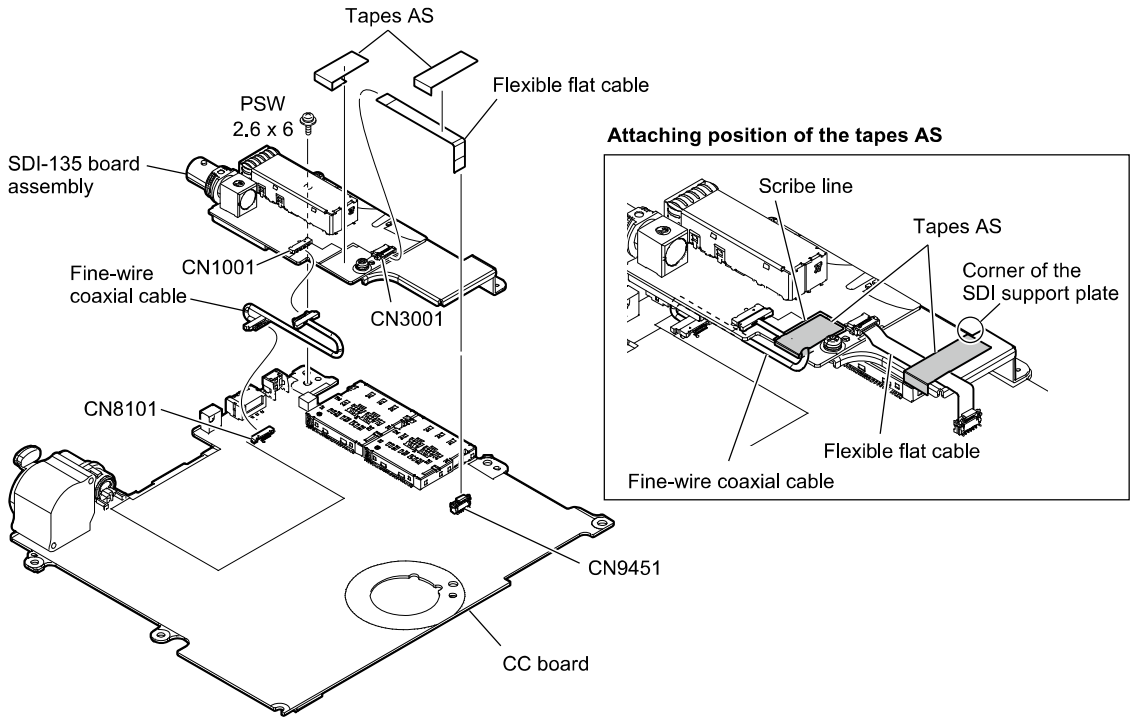
Note

- Attach the tape AS at the position as shown in the figure above.
- Arrange the harness (A) so that it does not come out of scribe line (b).

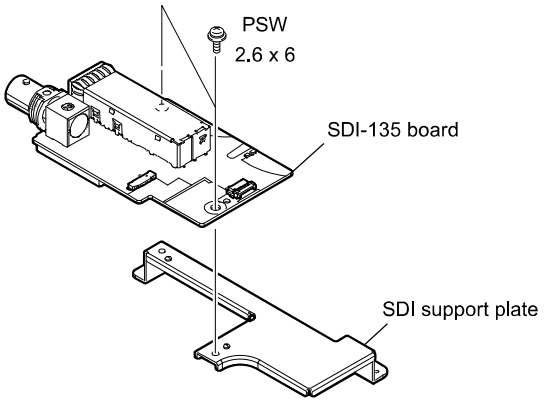
7. Remove the three screws.
8. Carefully remove the CC board assembly so as not to contact the media lid assembly.



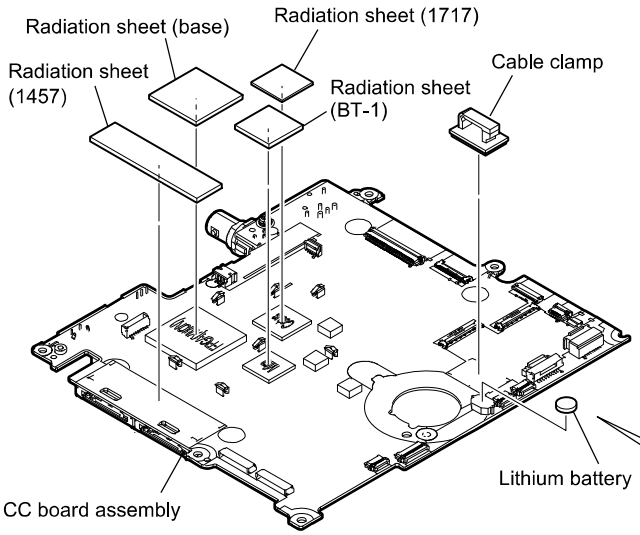
9. Peel the two tapes AS.
10. Disconnect the fine-wire coaxial cable and the flexible flat cable from the connectors (CN1001, CN3001) on the SDI-135 board.
11. Remove the screw, and then remove the SDI-135 board assembly.
12. Disconnect the fine-wire coaxial cable from the connector (CN8101) on the CC board.
13. Disconnect the flexible frat cable from the connector (CN9451) on the CC board.



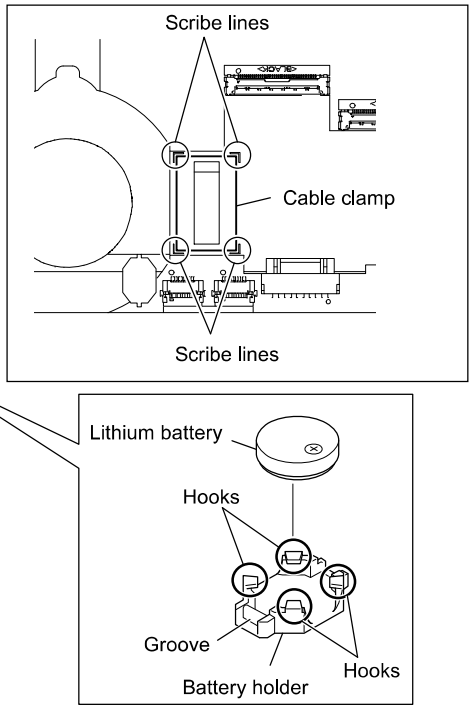
14. Remove the two screws, and then remove the SDI-135 board.



15. Remove the lithium battery with a non-conductive stick.
16. Remove the four radiation sheets and the cable clamp.



Attaching position of the cable clamp



17. Install the removed parts by reversing the steps of removal.

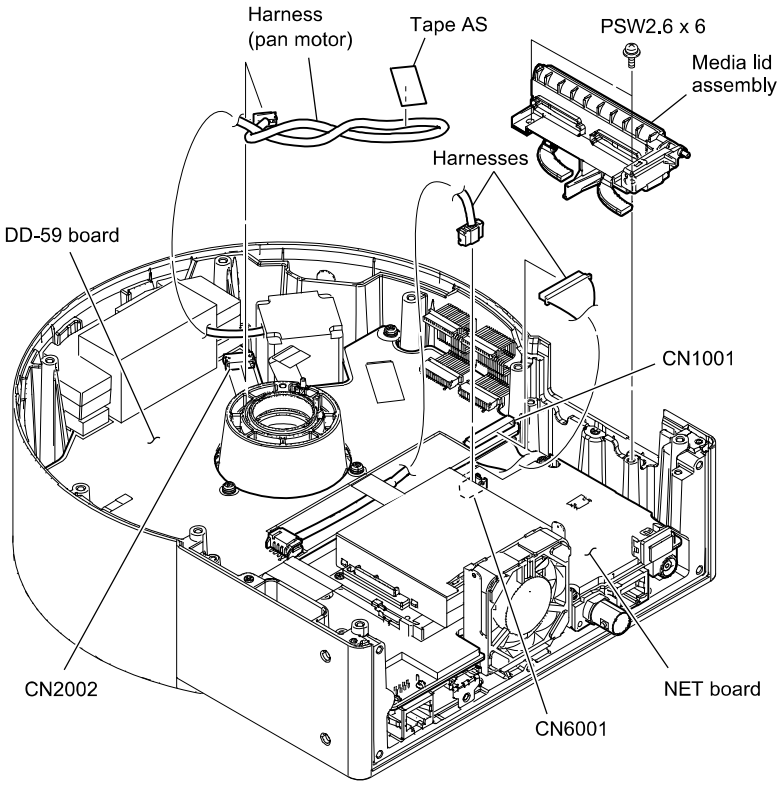
3-3-2. DD-59 Board

Preparation

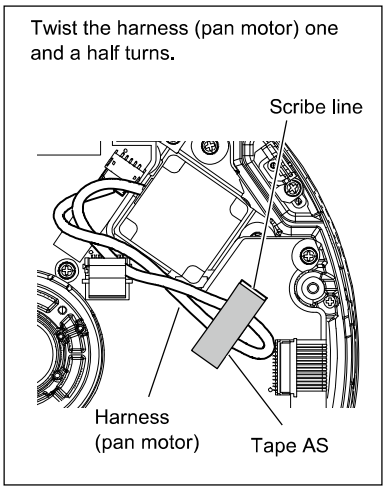
1. Remove the bottom plate. (Refer to “1-2-2. Bottom Plate”.)
2. Remove the pan tilt block. (Refer to “3-2-1. Pan Tilt Block”.)
3. Remove the CC board assembly. (Refer to steps 1 to 8 in “3-3-1. CC Board, SDI-135 Board”.)

Procedure

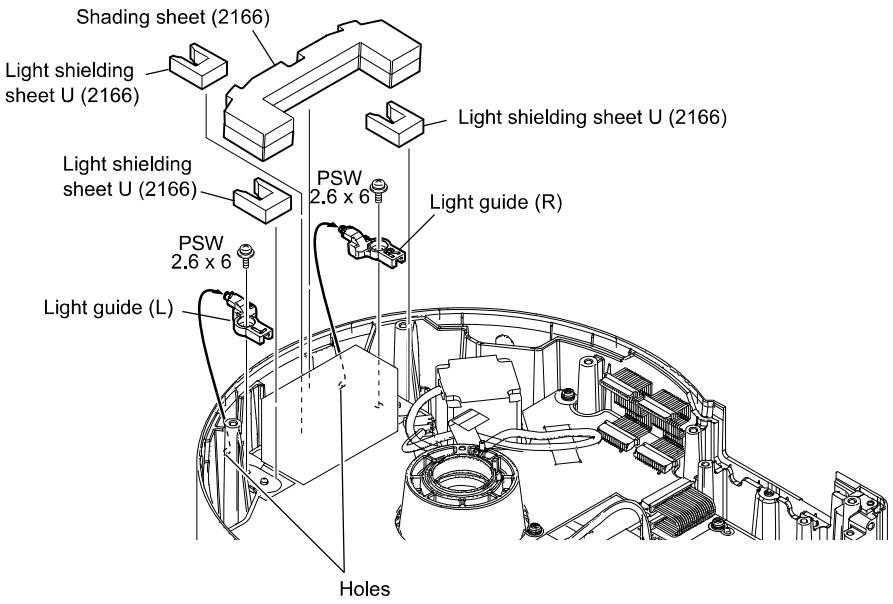
1. Remove the two screws, and then remove the media lid assembly.
2. Peel the tape AS, and then disconnect the harness (pan motor) from the connector (CN2002) on the DD-59 board.
3. Disconnect the harness from the connector (CN1001) on the DD-59 board.
4. Disconnect the harness from the connector (CN6001) on the NET board.



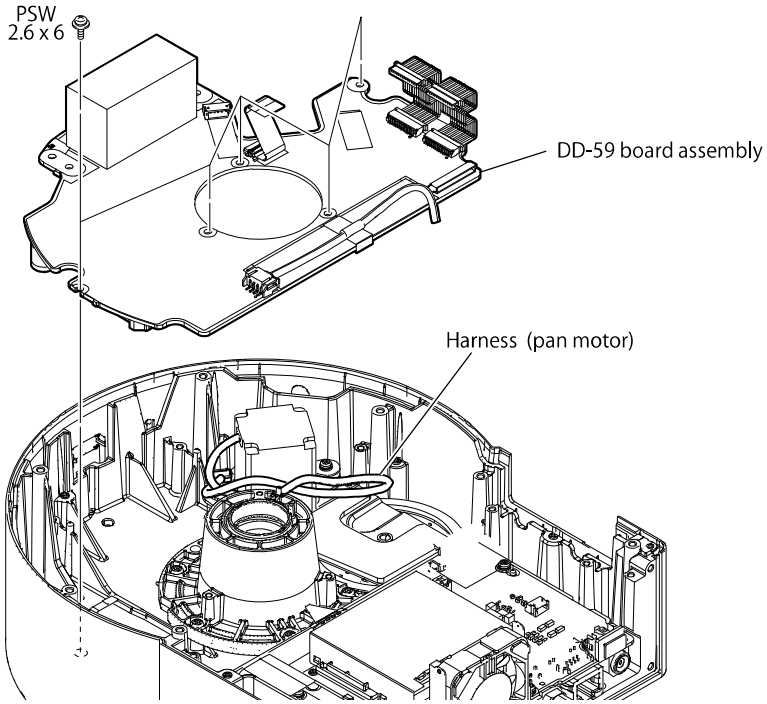
Attaching position of the tape AS



5. Remove the shading sheet (2166).
6. Remove the three light shielding sheets U (2166).
7. Remove the two screws, and the remove the two light guides from the two holes.



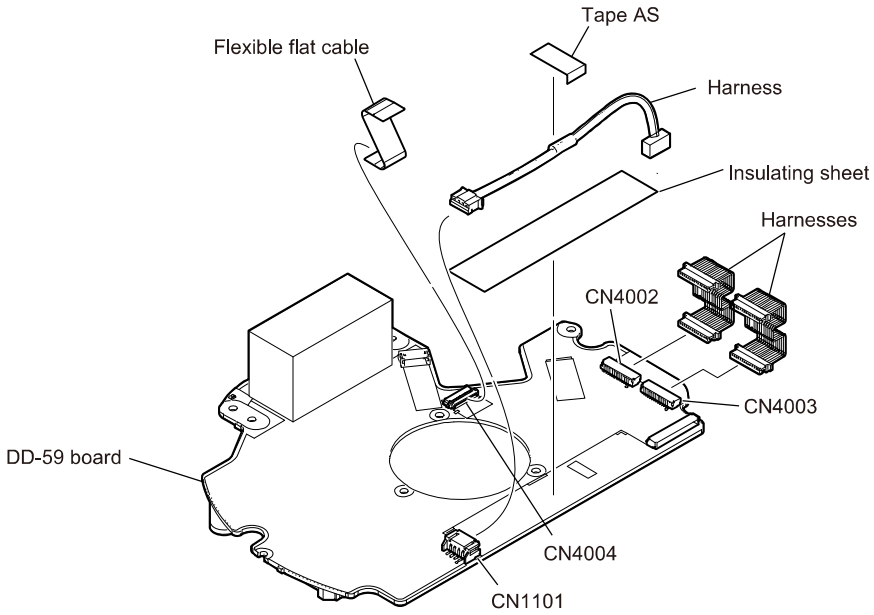
8. Remove the five screws, and then remove the DD-59 board assembly.



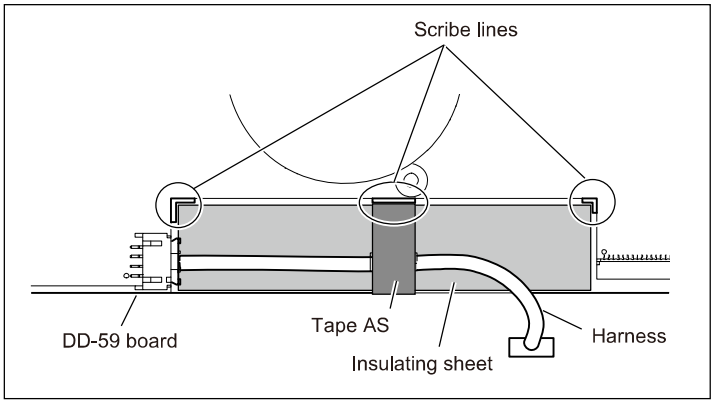
Note

At the time of the installation, be careful not to pinch the harness (pan motor).

9. Peel the tape AS, and then disconnect the harness from the connector (CN1101) on the DD-59 board.
10. Disconnect the two harnesses and flexible flat cable from the connectors (CN4002 to CN4004) on the DD-59 board.
11. Peel the insulating sheet.



Attaching positions of the insulating sheet and the tape AS



12. Install the removed parts by reversing the steps of removal.

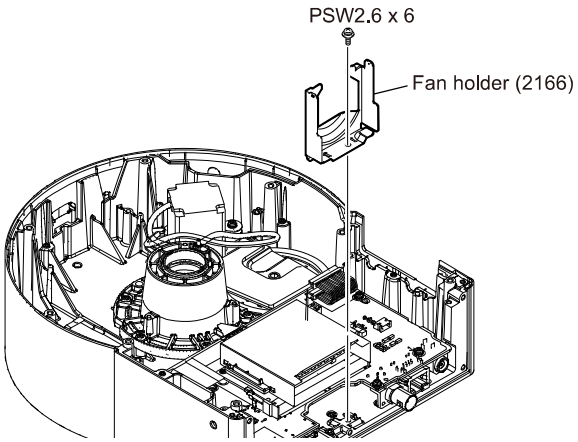
3-3-3. NET Board, GPU Board

Preparation

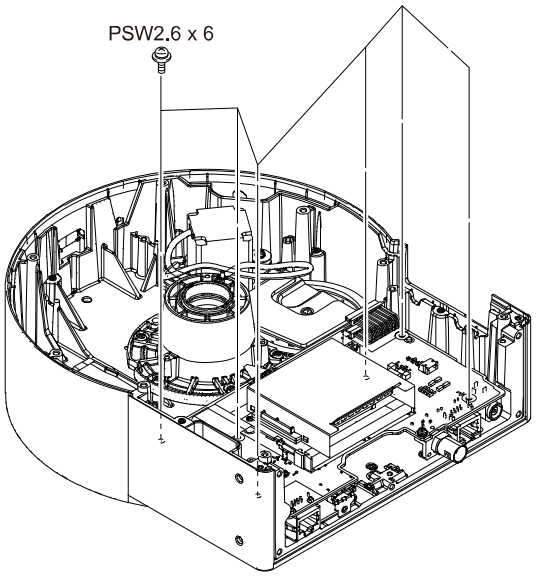
1 Remove the bottom plate. (Refer to “1-2-2. Bottom Plate”.)
2. Remove the pan tilt block. (Refer to “3-2-1. Pan Tilt Block”.)
3. Remove the DC fan. (Refer to “3-2-2. DC Fan”.)
4. Remove the CC board assembly. (Refer to steps 1 to 8 in “3-3-1. CC Board, SDI-135 Board”.)
5. Remove the DD-59 board assembly. (Refer to steps 1 to 8 in “3-3-2. DD-59 Board”.)

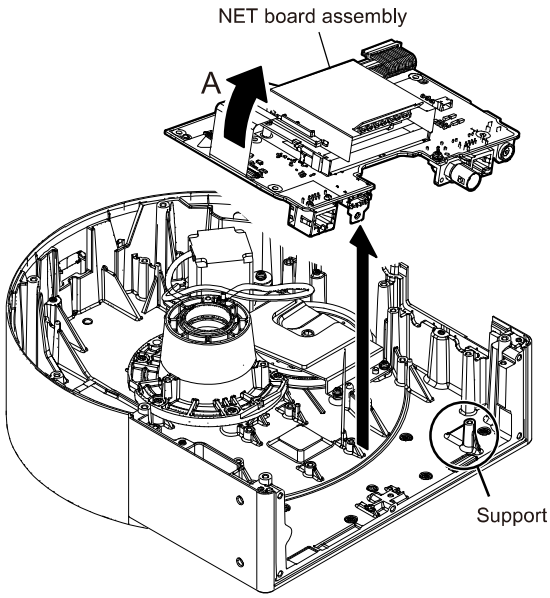
Procedure for removal

1. Remove the screw, and then remove the fan holder (2166).

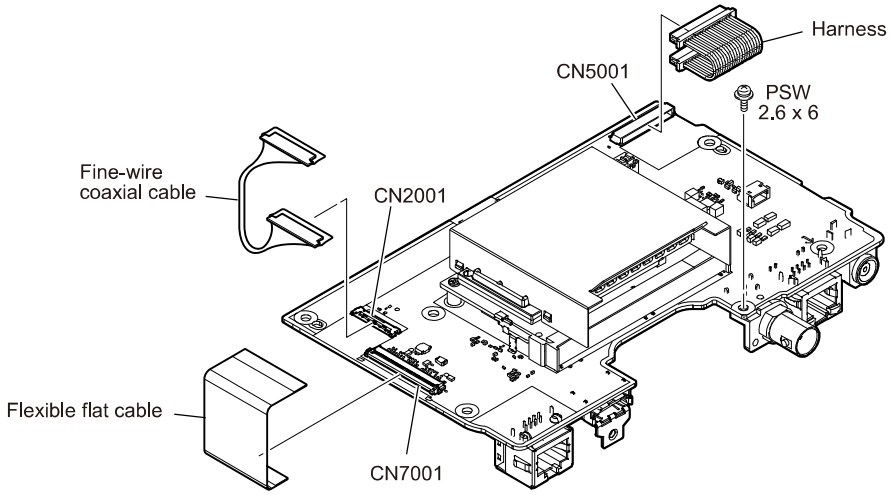


2. Remove the six screws.
3. Tilt the board in the direction of the arrow A and remove the NET board assembly so as not to contact the support.

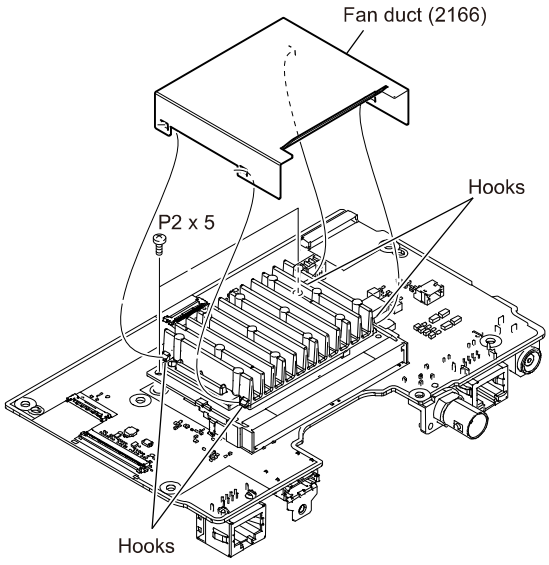


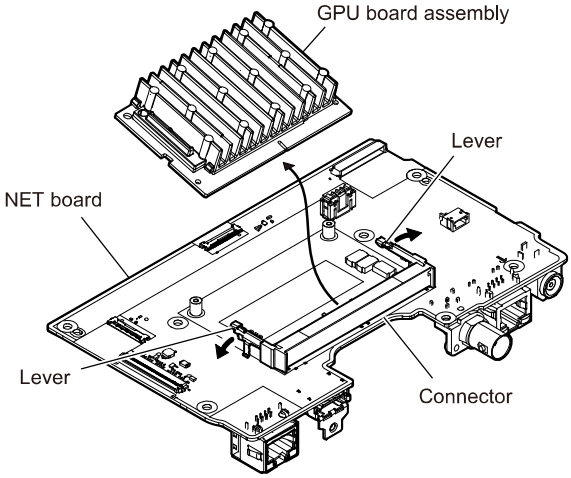


4. Disconnect the fine-wire coaxial cable and the flexible flat cable from the connectors (CN2001, CN5001, CN7001) on the NET board.
5. Remove the screw.



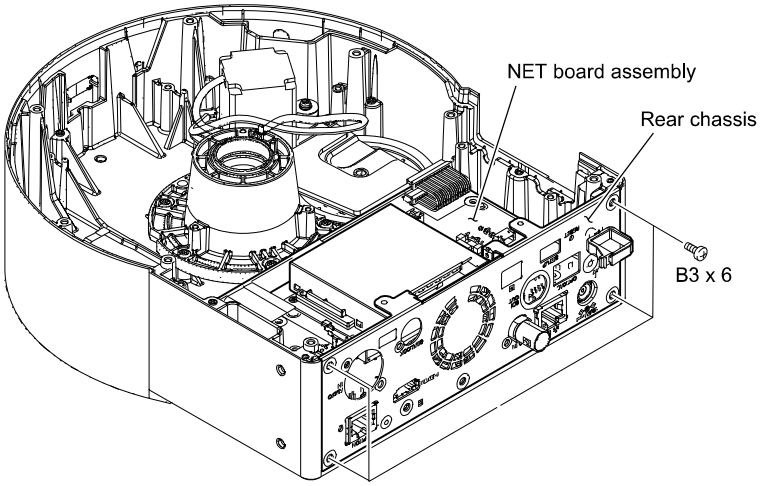
6. Release the four hooks, and then remove the fan duct (2166).
7. Remove the two screws.
8. Pull the levers outward, and then remove the GPU board assembly from the connector of the NET board.



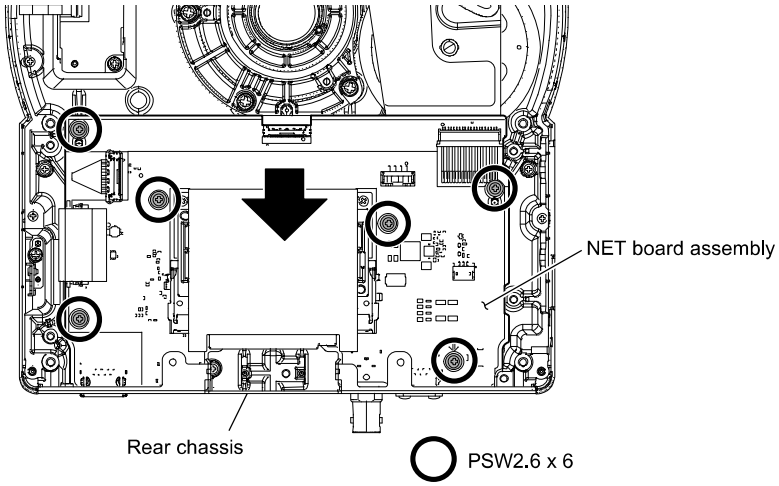


Procedure for installation

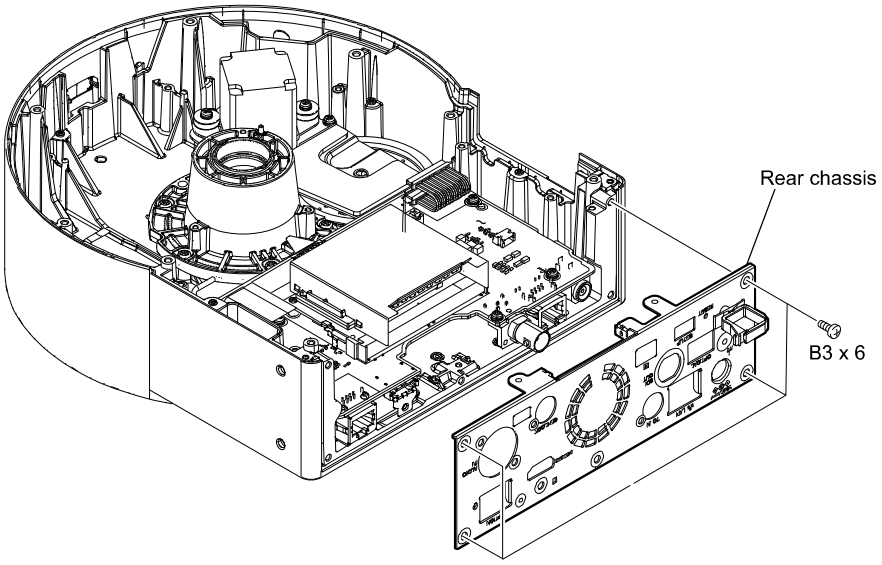
9. Perform steps 4 to 8 in procedure for removal reversely.
10. Install the NET board assembly and the rear chassis, and then tighten the four screws.



11. Push the NET board assembly against the rear chassis, and then secure the NET board assembly with six screws.



12. Remove the four screws, and then remove the rear chassis.



13. Perform step 1 in procedure for removal reversely.

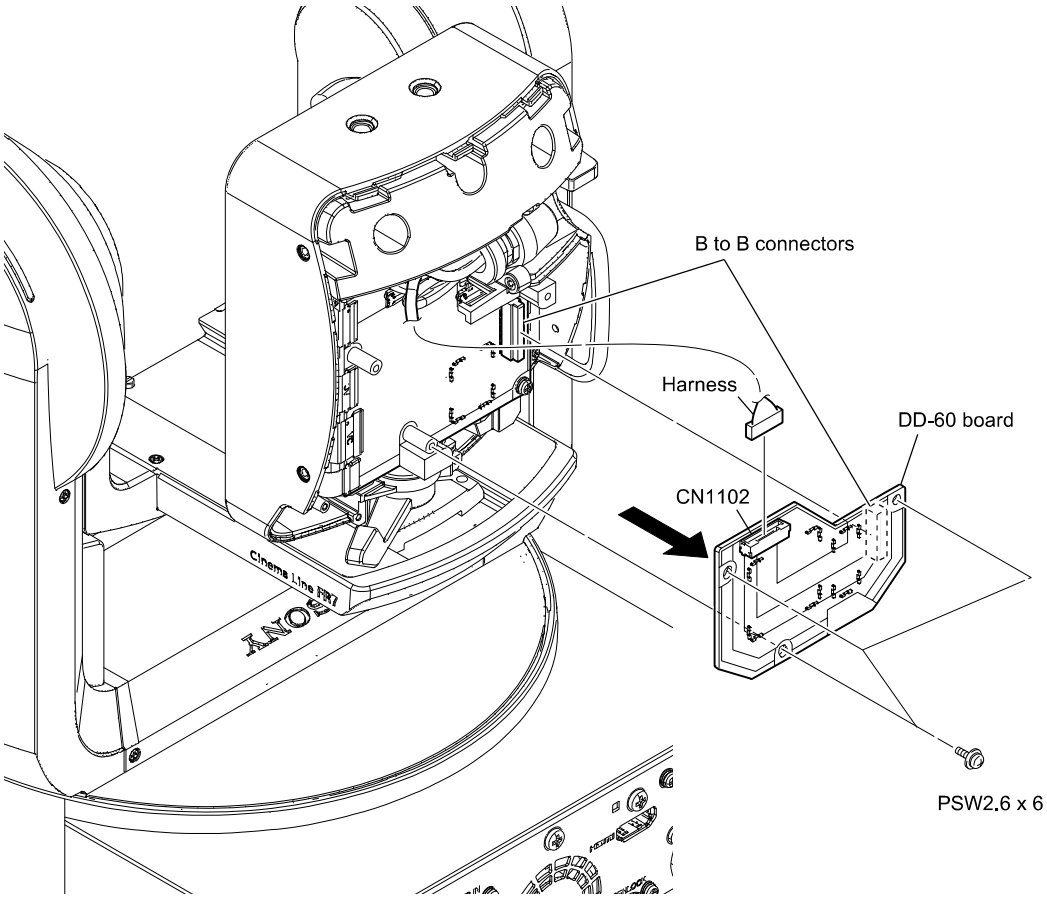
3-3-4. DD-60 Board

Preparation

1. Remove the rear cover. (Refer to “1-2-3. Rear Cover”.)

Procedure

1. Disconnect the harness from the connector (CN1102) on the DD-60 board.
2. Remove the three screws.
3. Draw the DD-60 board in the direction of the arrow, and then disconnect the B to B connector.



4. Install the removed parts by reversing the steps of removal.

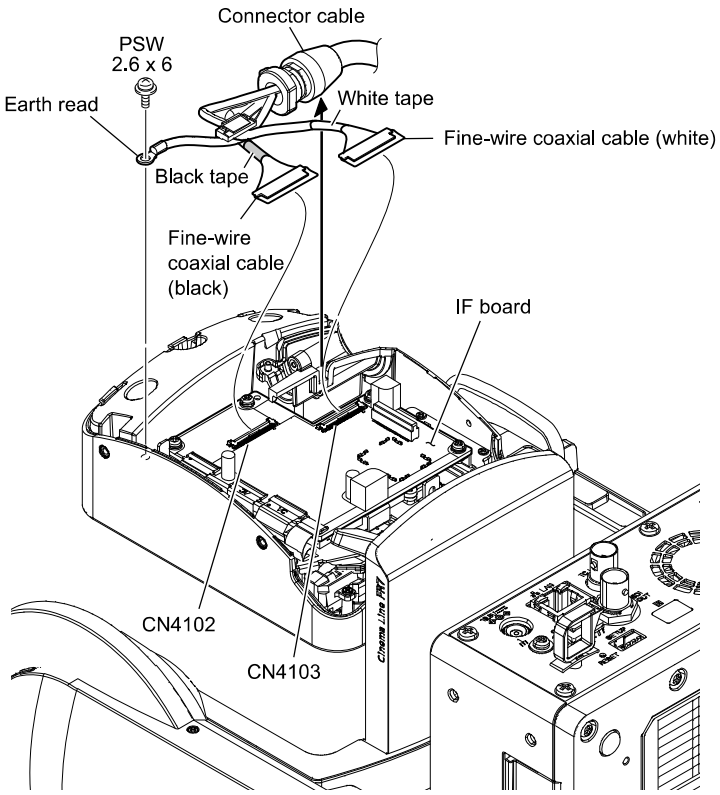
3-3-5. IF Board

Preparation

1. Remove the rear cover. (Refer to “1-2-3. Rear Cover”.)
2. Remove the DD-60 board. (Refer to “3-3-4. DD-60 Board”.)

Procedure

1. Remove the screw, and then remove the earth read.
2. Disconnect the two fine-wire coaxial cables from the connectors (CN4102, CN4103) on the IF board, and then remove the connector cable.



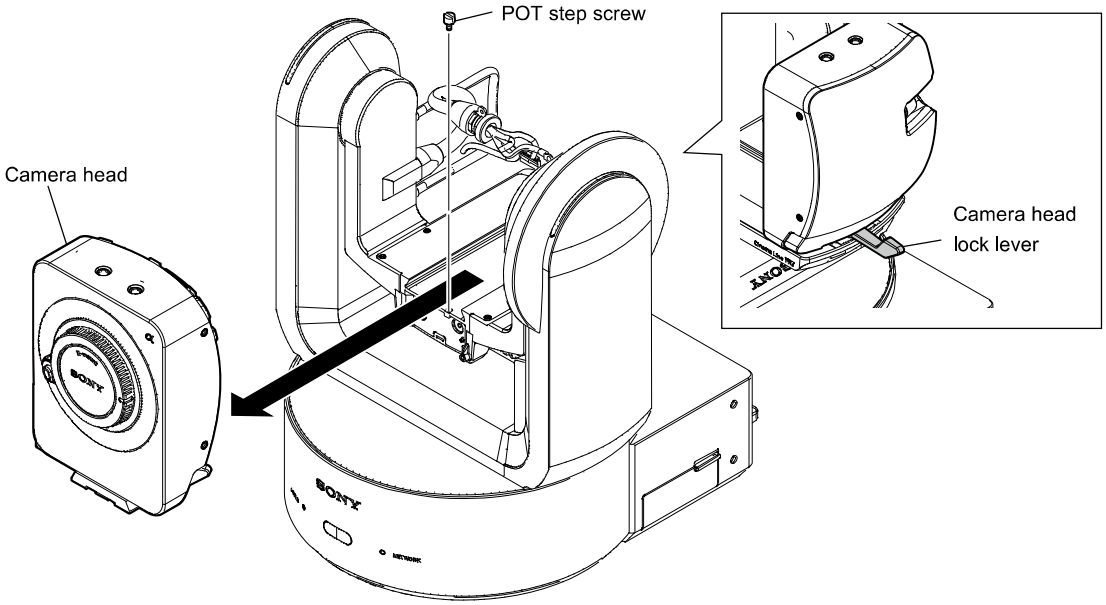
Note

At the time of the installation, identify the fine-wire coaxial cables with tape colors and connect them as follows.

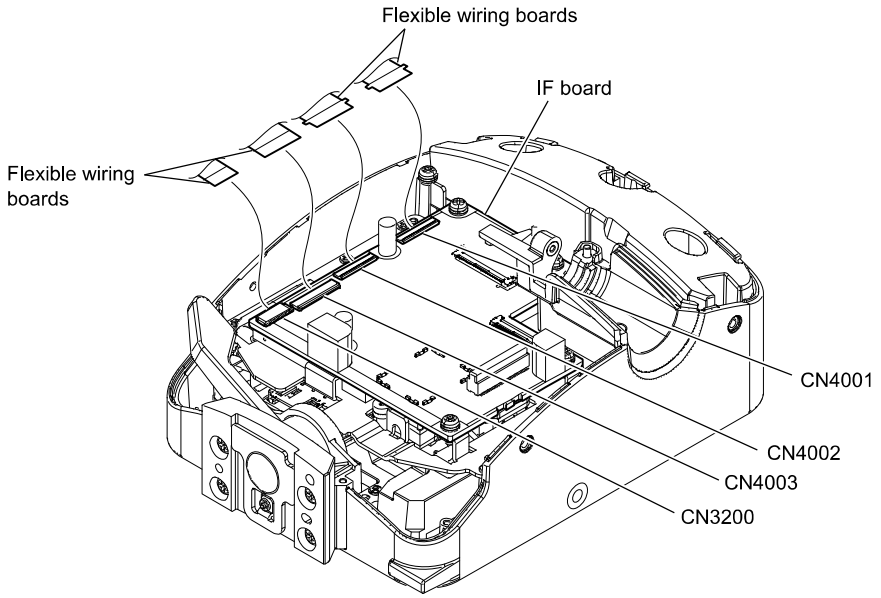
Fine-wire coaxial cable (white): CN4103

Fine-wire coaxial cable (black): CN4102

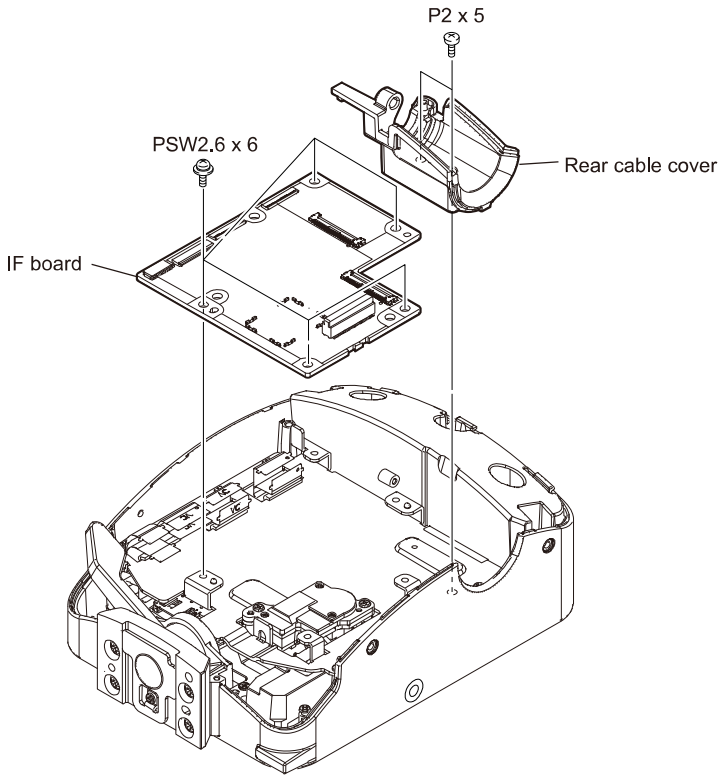
3. Remove the POT step screw.
4. Slide and remove the camera head by using the camera head lock lever.



5. Disconnect the four flexible wiring boards from the connectors (CN3200, CN4001, CN4002, CN4003) on the IF board.



6. Remove the two screws (P2 x 5), and then remove the rear cable cover.
7. Remove the five screws (PSW2.6 x 6), and then remove the IF board.



8. Install the removed parts by reversing the steps of removal.

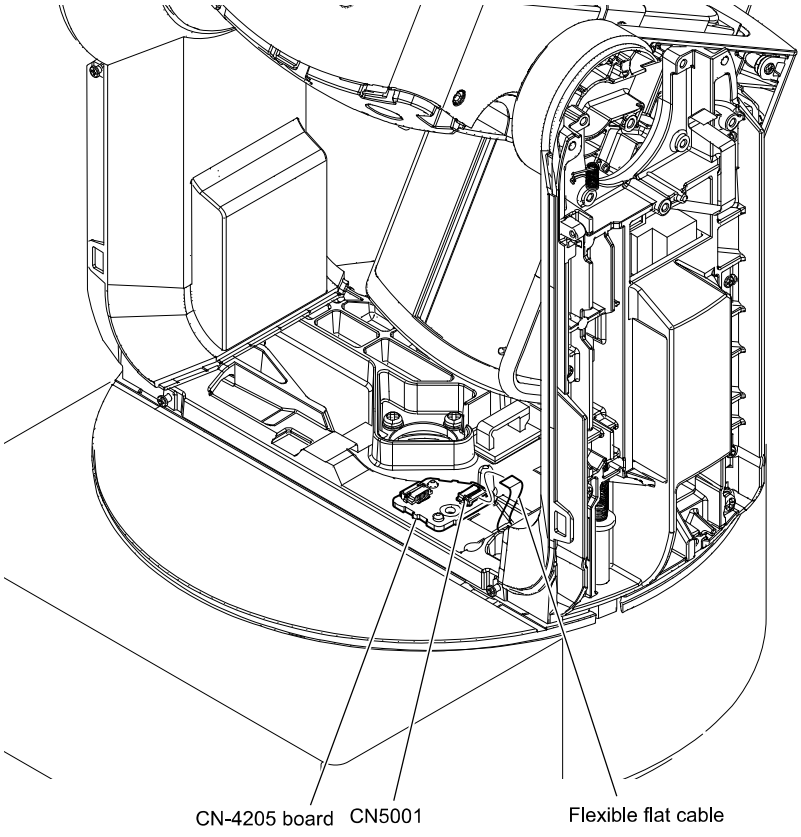
3-3-6. DR-709 Board

Preparation

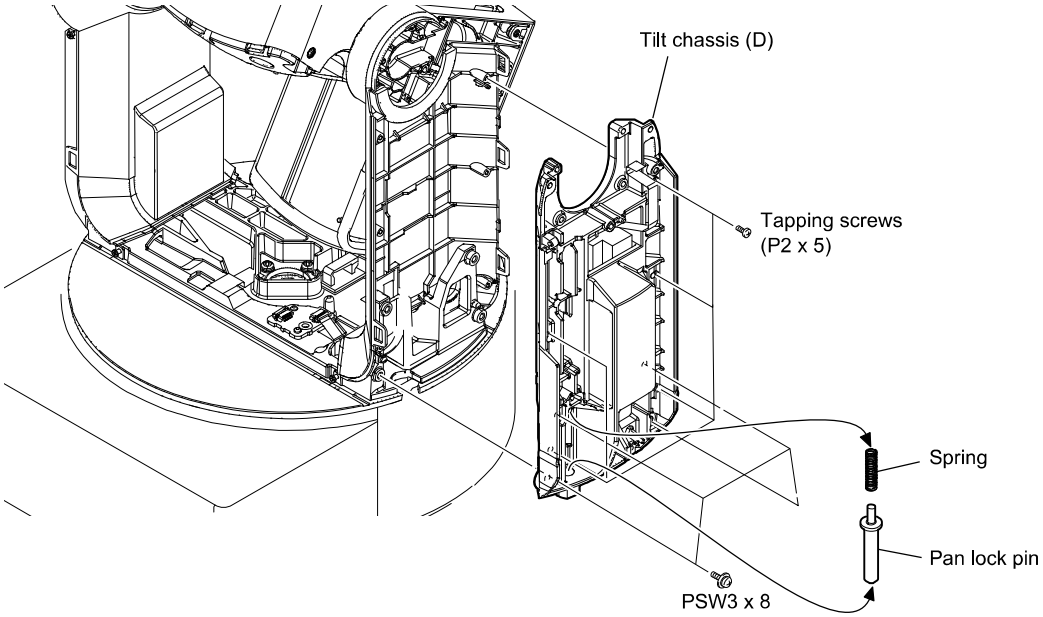
1. Remove the rear cover. (Refer to “1-2-3. Rear Cover”.)
2. Remove the pan center cabinet. (Refer to “1-2-1. Pan Center Cabinet”.)
3. Remove the outside cabinet (D) assembly. (Refer to “1-2-4. Outside Cabinet (D), Top Cabinet (D)”.)
4. Remove the bottom plate. (Refer to “1-2-2. Bottom Plate”.)
5. Remove the pan tilt block. (Refer to steps 1 to 5 in “3-2-1. Pan Tilt Block”.)
6. Remove the slide arm cover (L). (Refer to steps 1 to 9 in “3-2-6. Connector Cable”.)

Procedure

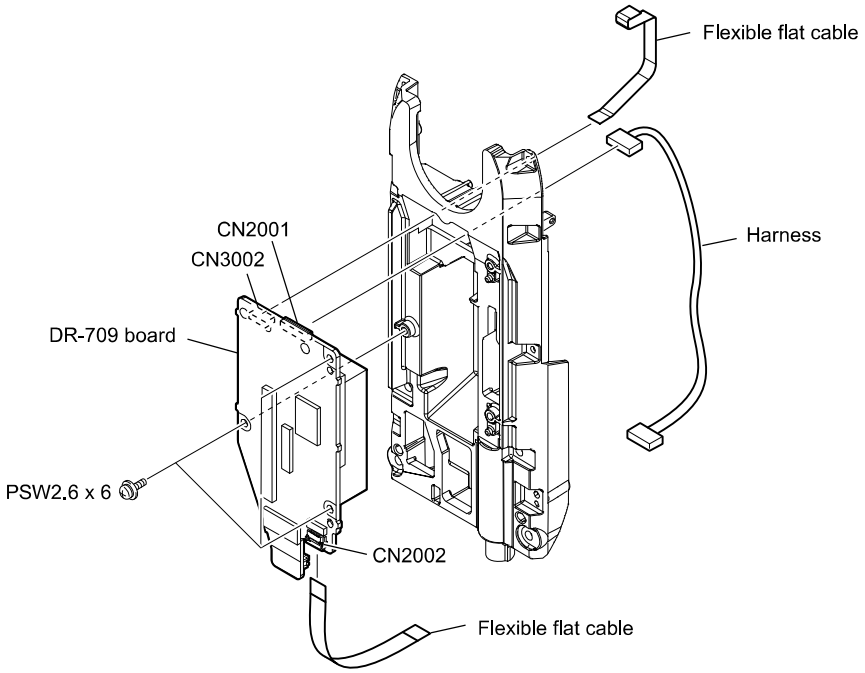
1. Disconnect the flexible flat cable from the connector (CN5001) on the CN-4205 board.



2. Remove the five tapping screws (P2 x 5) and the four screws (PSW3 x 8), and then remove the spring, pan lock pin and the tilt chassis (D).



3. Disconnect the two flexible flat cables and the harness from the connectors (CN2001, CN2002, CN3002) on the DR-709 board.
4. Remove the three screws, and then remove the DR-709 board.



5. Install the removed parts by reversing the steps of removal.

Section 4
Spare Parts

4-1. Note on Repair Parts

1. **Safety Related Components Warning**

   WARNING

   Components marked ⚠ are critical to safe operation. Therefore, specified parts should be used in the case of replacement.

2. **Standardization of Parts**

   Some repair parts supplied by Sony differ from those used for the unit. These are because of parts commonality and improvement.

3. **Stock of Parts**

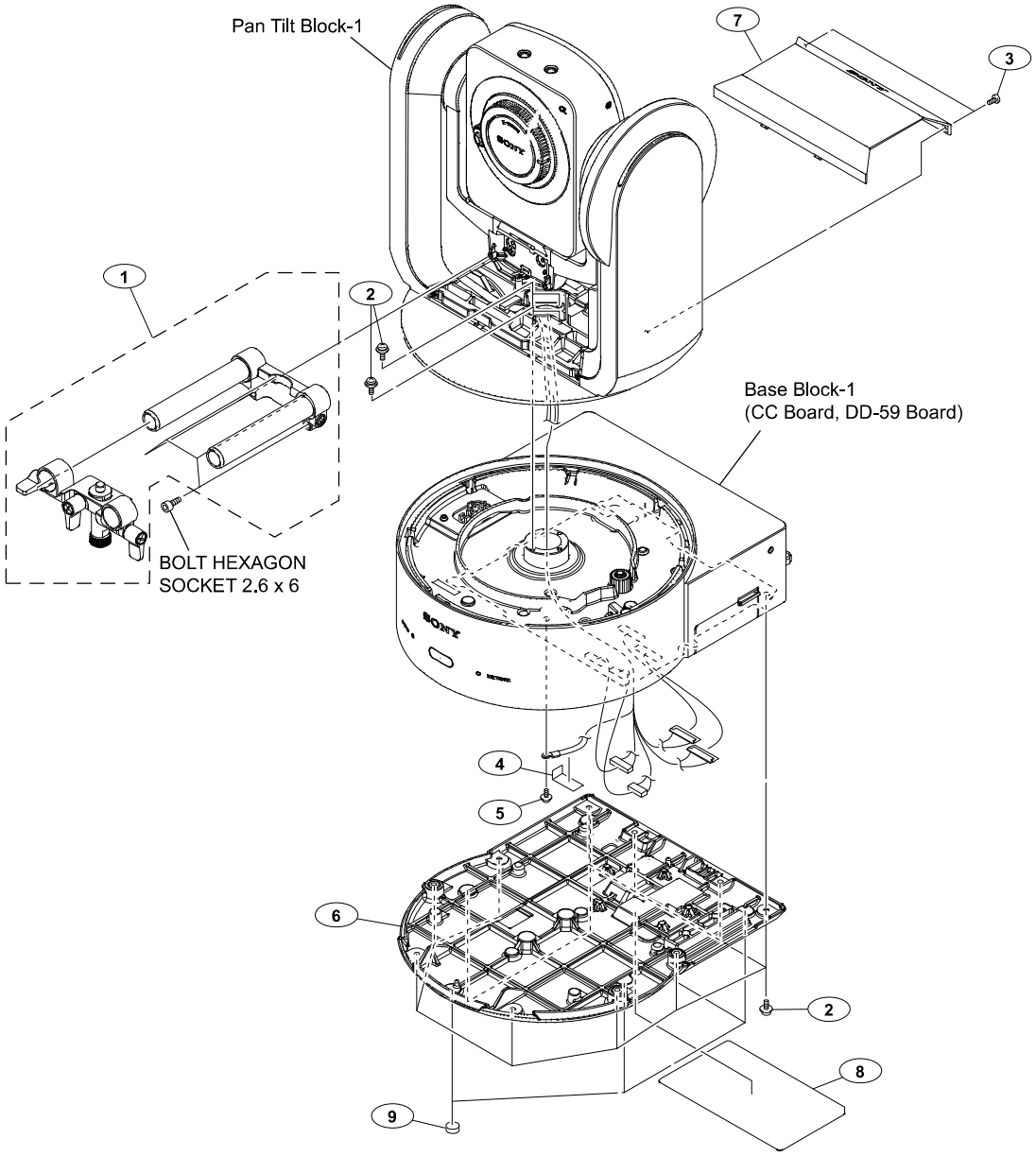
   Parts marked with “o” at SP (Supply Code) column of the spare parts list may not be stocked. Therefore, the delivery date will be delayed.

4. **Harness**

   Harnesses with no part number are not registered as spare parts.

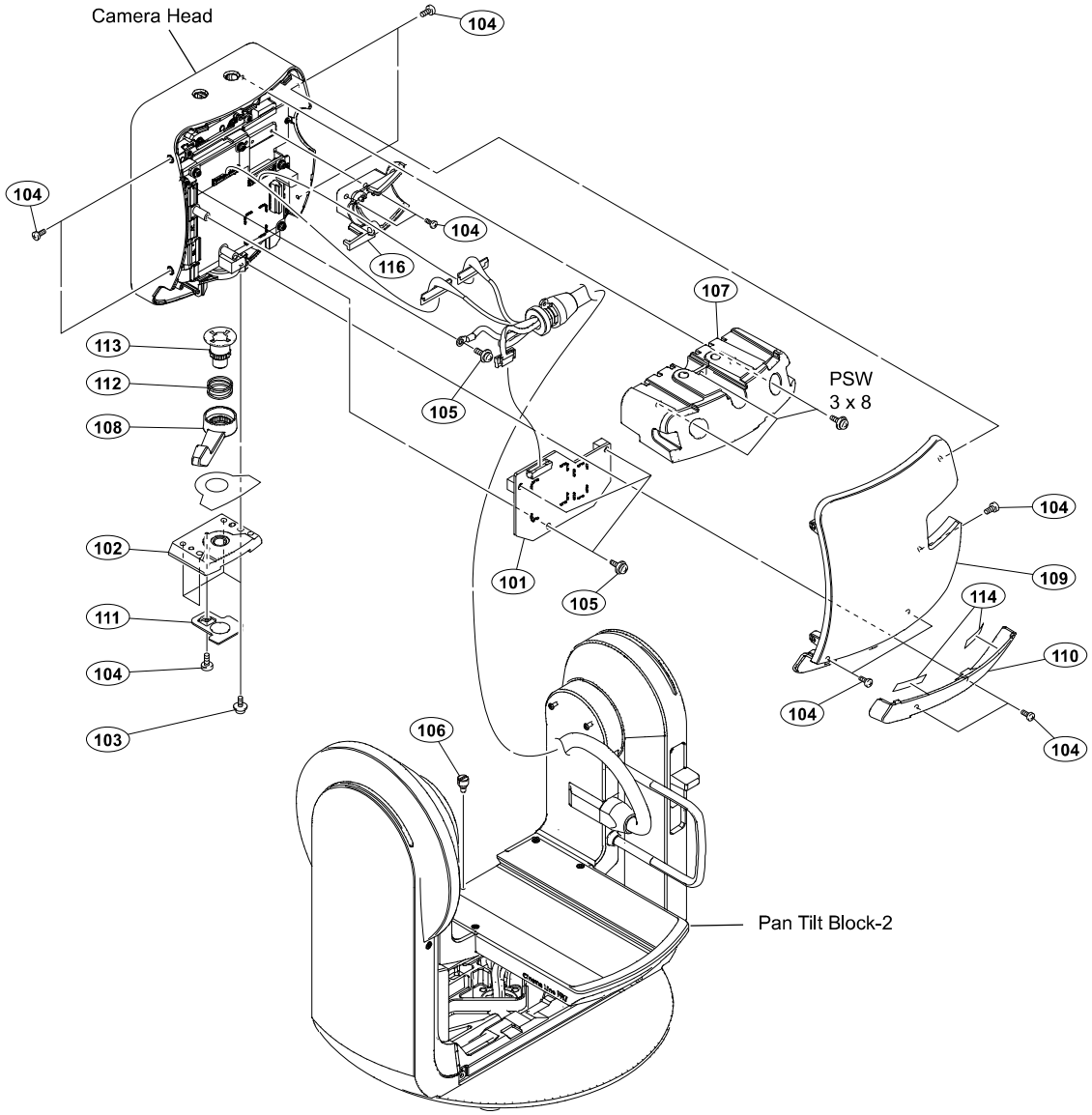
4-2. Exploded Views

Overall



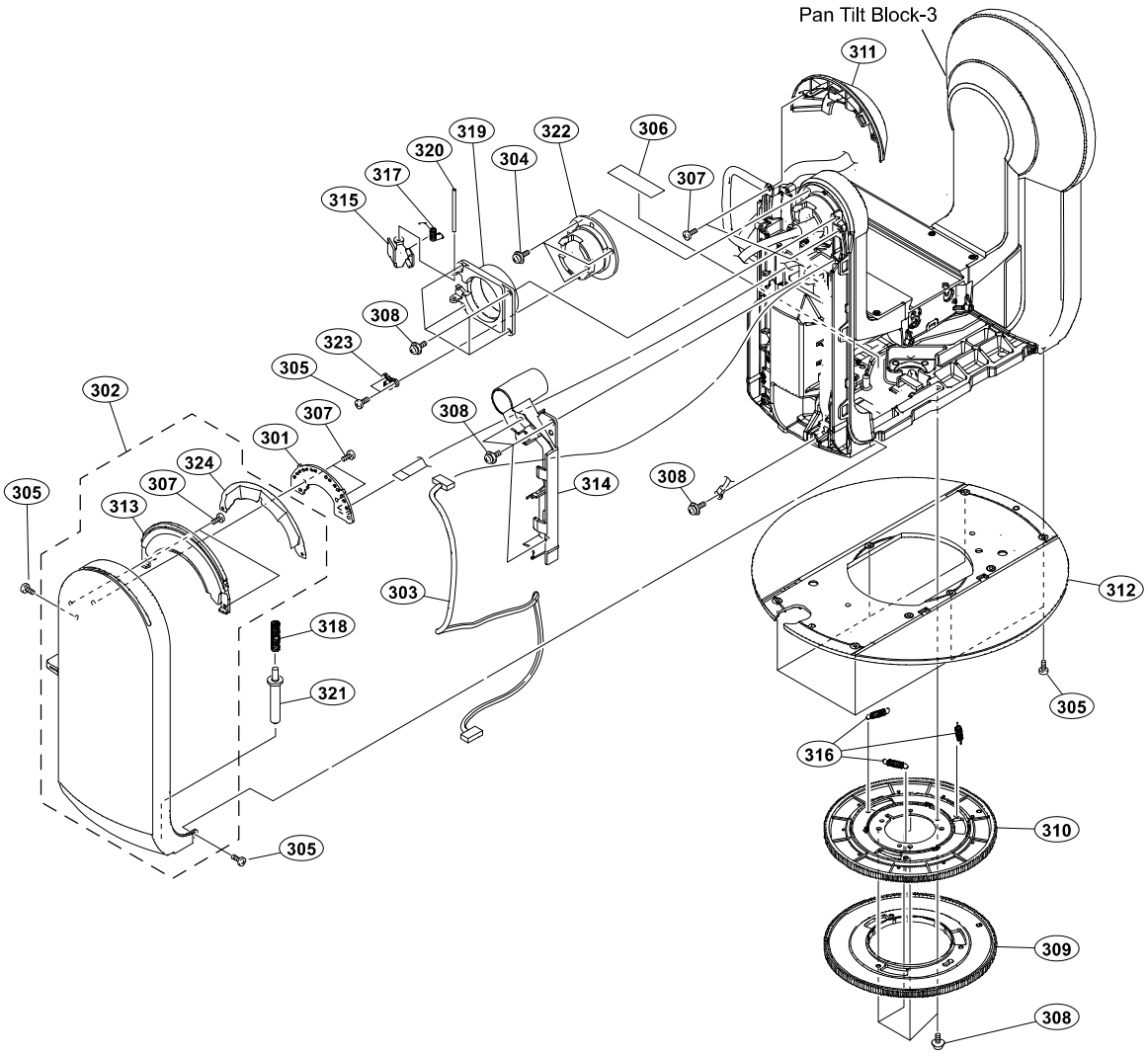
No.	Part No.	SP	Description
1	A-5048-784-A	s	LENS SUPPORT ASSY
2	2-580-592-01	s	SCREW, +PSW M3X8
3	2-630-005-01	s	SCREW(M2),NEW TRUSTER,P2
4	3-079-115-01	s	TAPE AS
5	3-986-877-01	s	+PSW2.6X6
6	5-038-645-01	s	PLATE BOTTOM (2166)
7	5-038-780-01	s	CABINET PAN CENTER(2166)
8	5-038-826-01	s	BOTTOM SHEET
9	5-038-827-01	s	ANTI-SLIDE SHEET
	7-683-412-05	s	BOLT,HEXAGON SOCKET 2.6X6

Pan Tilt Block-1



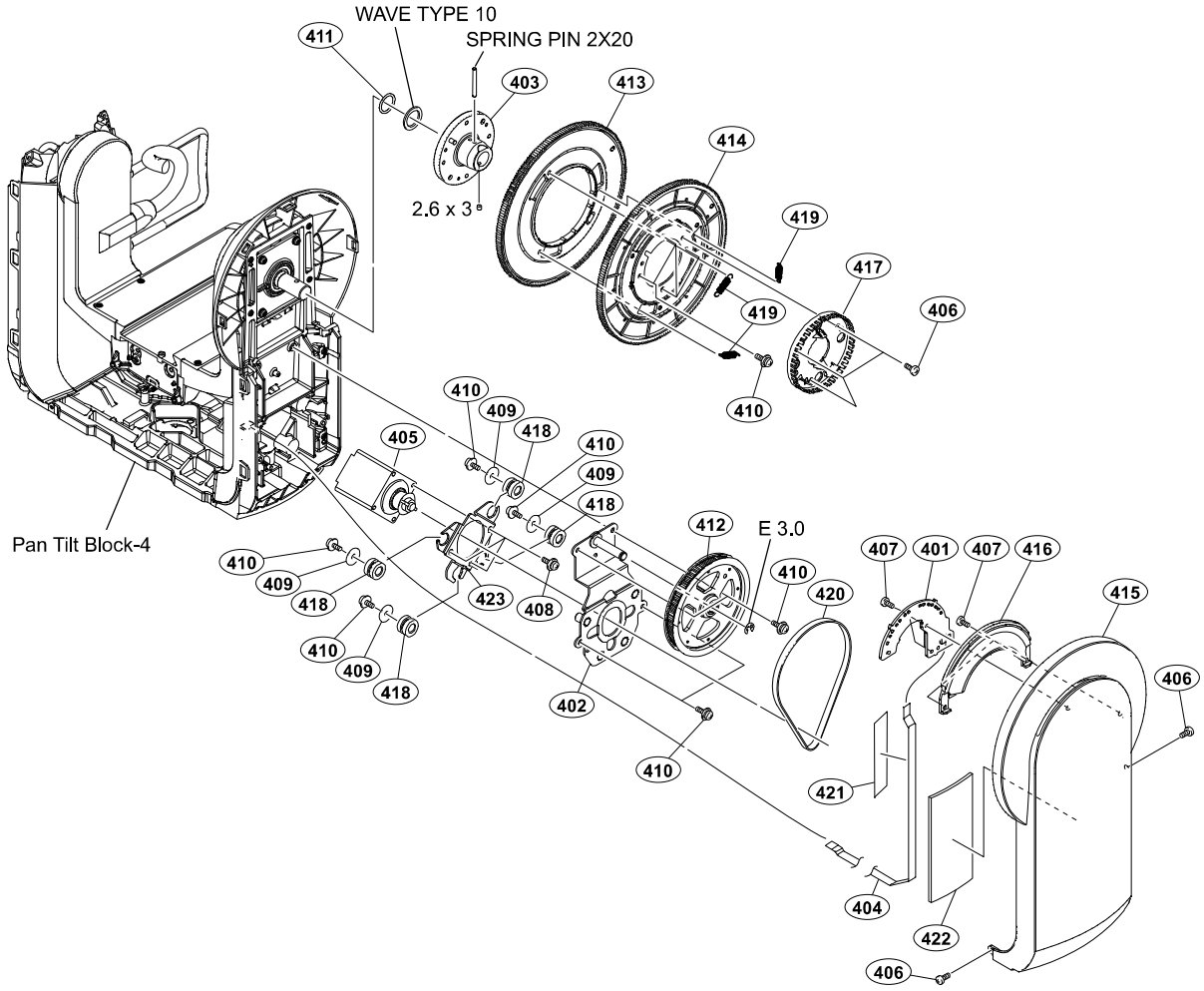
No.	Part No.	SP	Description
101	A-5032-441-A	s	DD-60 MOUNT
102	X-5003-074-1	s	SLIDE PLATE ASSY(2166)
103	2-580-592-01	s	SCREW, +PSW M3X8
104	2-630-005-01	s	SCREW(M2),NEW TRUSTER,P2
105	3-986-877-01	s	+PSW2.6X6
106	4-590-492-02	s	SCREW, POT STEP
107	5-038-651-01	s	BALANCER BLOCK (2166)
108	5-038-652-01	s	SLIDE LOCK LEVER (2166)
109	5-038-787-01	s	REAR COVER(2166)
110	5-038-788-01	s	REAR BOTTOM COVER (2166)
111	5-038-805-01	s	PLATE SLIDE LOCK (2166)
112	5-038-814-01	s	SLIDE LOCK SPRING (2166)
113	5-039-253-01	s	SLIDE LOCK SCREW(2166)
114	3-080-272-01	s	TAPE A
116	5-038-786-01	s	REAR CABLE COVER(2166)
	7-682-948-01	s	SCREW +PSW 3X8

Pan Tilt Block-2



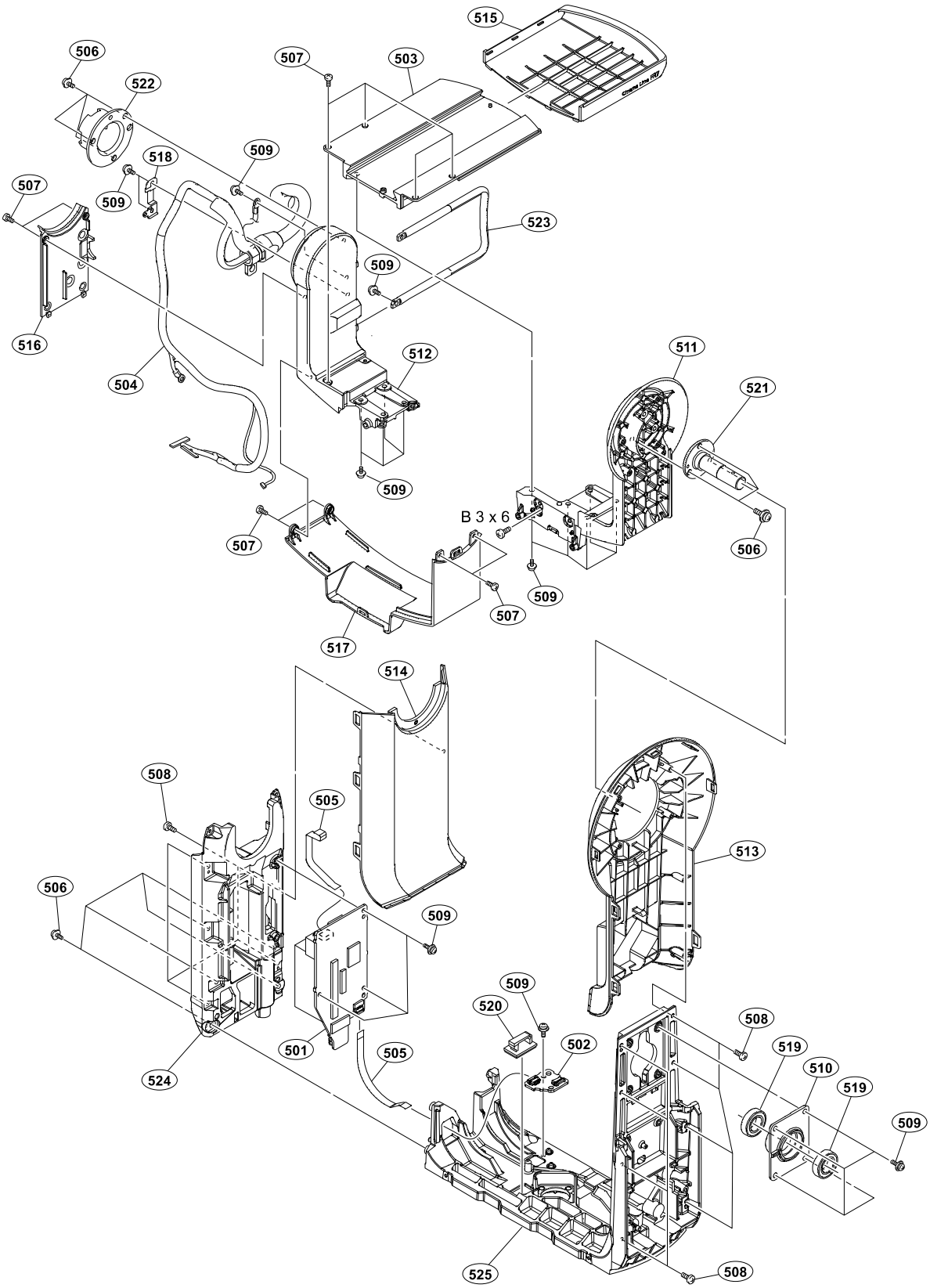
No.	Part No.	SP	Description
301	A-5048-629-A	s	LED-555 COMPL-NC
302	X-5003-055-1	s	CABINET OUTSIDE(D) ASSY
303	1-014-462-11	s	CABLE, CONNECTION (20P)
304	2-580-592-01	s	SCREW, +PSW M3X8
305	2-630-005-01	s	SCREW(M2),NEW TRUSTER,P2
306	3-079-115-01	s	TAPE AS
307	3-080-206-21	s	SCREW, TAPPING, P2
308	3-986-877-01	s	+PSW2.6X6
309	5-038-770-01	s	GEAR SCISSORS(2166)
310	5-038-771-01	s	GEAR MAIN(2166)
311	5-038-778-01	s	CABINET TOP(D)(2166)
312	5-038-779-01	s	PAN SHUTTER(2166)
313	5-038-781-01	s	TALLY LIGHT GUIDE(2166)
314	5-038-782-01	s	CLAMPER CABLE(2166)
315	5-038-803-01	s	LOCK PLATE TILT (2166)
316	5-038-810-01	s	SCISSORS SPRING (2166)
317	5-038-812-01	s	TILT LOCK SPRING (2166)
318	5-038-813-01	s	PAN LOCK SPRING (2166)
319	5-039-249-01	s	HOLDER TILT SHAFT
320	5-039-250-01	s	TILT LOCK SHAFT (2166)
321	5-039-251-01	s	PAN LOCK PIN (2166)
322	5-039-255-01	s	TILT SHAFT L (2166)
323	5-040-369-01	s	TILT SHAFT STOPPER(2166)
324	5-043-557-01	s	TALLY SHADING SHEET(2166)

Pan Tilt Block-3



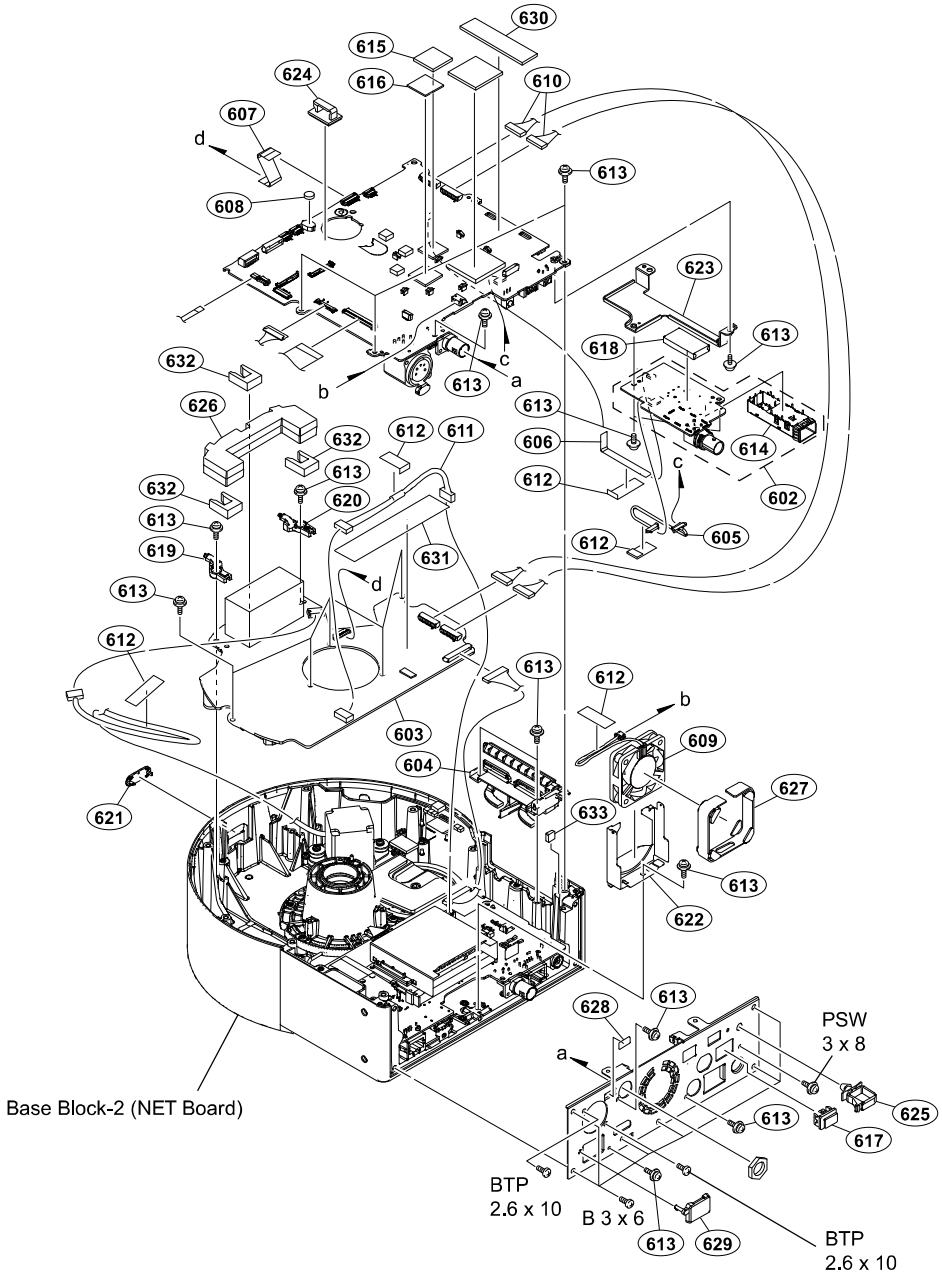
No.	Part No.	SP	Description
401	A-5048-628-A	s	TSI-68 COMPL-NC
402	X-5003-073-1	s	MOTOR PLATE ASSY(T)(2166)
403	X-5003-183-1	s	HOLDER GEAR(T)ASSY (2166)
404	1-014-459-11	s	FLEXIBLE FLAT CABLE (10P)
405	⚠ 1-787-729-23	s	MOTOR, STEPPING
406	2-630-005-01	s	SCREW(M2),NEW TRUSTER,P2
407	3-080-206-21	s	SCREW, TAPPING, P2
408	3-277-886-01	s	SW +P SCREW M2.5X5
409	3-874-446-01	s	WASHER, DAMPER
410	3-986-877-01	s	+PSW2.6X6
411	3-986-898-01	s	WASHER (T)
412	5-038-769-01	s	PULLY(2166)
413	5-038-770-01	s	GEAR SCISSORS(2166)
414	5-038-771-01	s	GEAR MAIN(2166)
415	5-038-775-01	s	CABINET OUTSIDE(G)(2166)
416	5-038-781-01	s	TALLY LIGHT GUIDE(2166)
417	5-038-790-01	s	TILT SHUTTER(2166)
418	5-038-809-01	s	DUMPER MOTOR (2166)
419	5-038-810-01	s	SCISSORS SPRING (2166)
420	5-038-820-01	s	TIMING BELT
421	5-040-823-01	s	SHEET, FFC COVER
422	5-043-558-01	s	DAMPING SHEET(2166)
423	5-045-293-01	s	BRACKET MOTER
	7-621-737-08	s	SET-SCT,HEX. 2.6X3,FLAT POINT
	7-623-710-57	s	WASHER 10, WAVE TYPE
	7-624-106-04	s	STOP RING 3.0, TYPE -E
	7-626-314-51	s	SPRING PIN 2X20

Pan Tilt Block-4



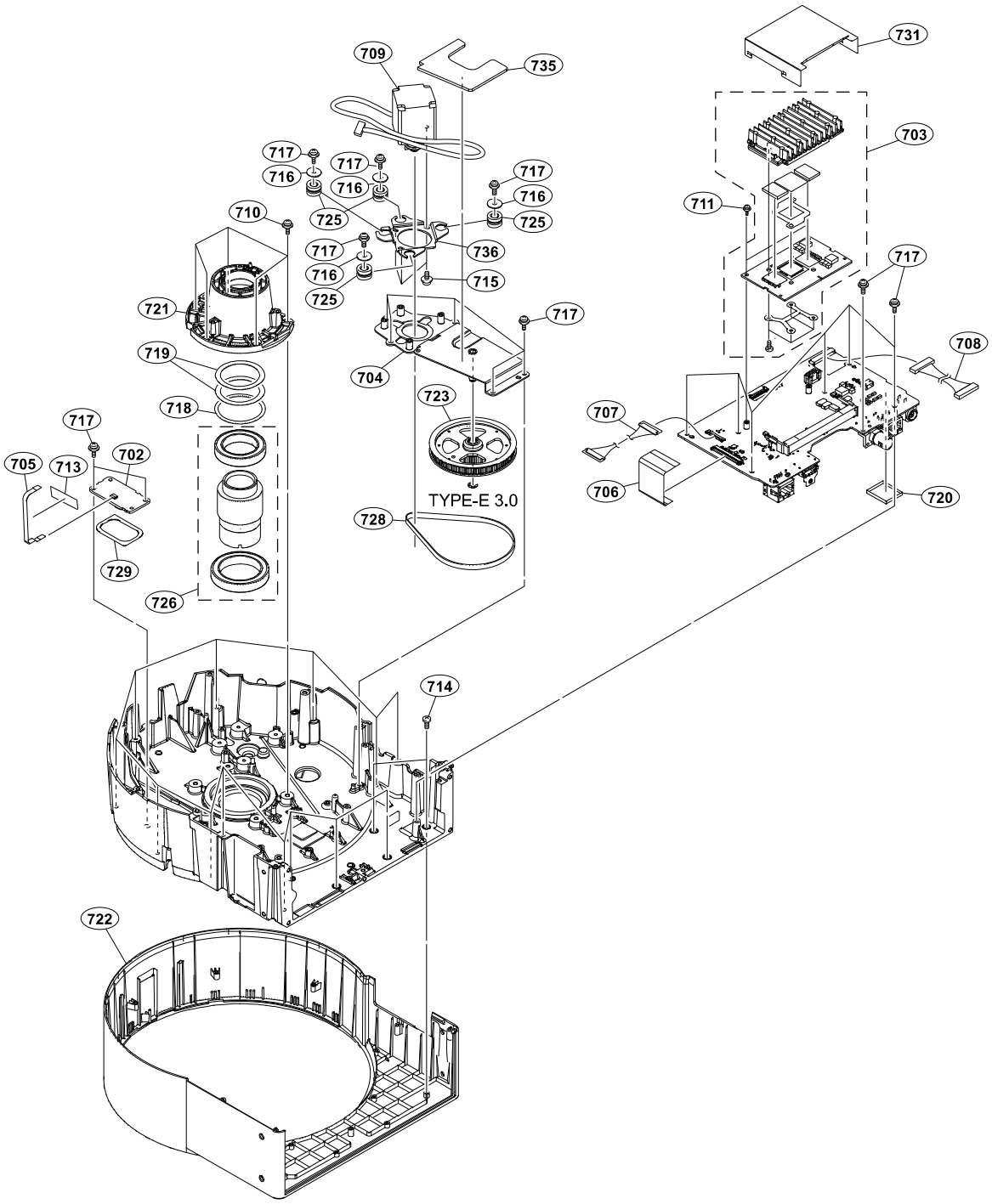
No.	Part No.	SP	Description
501	A-5048-627-A	s	DR-709 COMPL-NC
502	A-5048-630-A	s	CN-4205 COMPL-NC
503	X-5003-121-1	s	SLIDE BASE ASSY(2166)
504	1-011-944-11	s	CABLE, CONNECTION (CC-IF)
505	1-014-457-11	s	FLEXIBLE FLAT CABLE (10P)
506	2-580-592-01	s	SCREW, +PSW M3X8
507	2-630-005-01	s	SCREW(M2),NEW TRUSTER,P2
508	3-080-206-21	s	SCREW, TAPPING, P2
509	3-986-877-01	s	+PSW2.6X6
510	5-038-648-01	s	HOLDER BEARING (T) (2166)
511	5-038-653-01	s	SLIDE ARM(R) (2166)
512	5-038-654-01	s	SLIDE ARM(L) (2166)
513	5-038-776-01	s	CABINET INSIDE(G)(2166)
514	5-038-777-01	s	CABINET INSIDE(D)(2166)
515	5-038-789-01	s	SLIDE BASE COVER(2166)
516	5-038-791-01	s	SLIDE ARM COVER (L)(2166)
517	5-038-792-01	s	SLIDE ARM COVER (B)(2166)
518	5-038-807-01	s	BRACKET BUSH (2166)
519	5-038-817-01	s	BALL BEARING(6800ZZ)
520	5-038-818-01	s	CABLE CLAMP
521	5-039-254-01	s	TILT SHAFT R (2166)
522	5-039-255-01	s	TILT SHAFT L (2166)
523	5-039-256-01	s	GUARD CABLE (2166)
524	5-038-647-01	s	TILT CHASSIS(D) (2166)
525	5-038-646-01	s	TILT CHASSIS(G) (2166)
	7-682-547-09	s	SCREW +B 3X6

Base Block-1 (CC Board, DD-59 Board)



No.	Part No.	SP	Description
602	A-5048-633-A	s	SDI-135 COMPL-NC
603	A-5048-634-A	s	DD-59 COMPL-NC
604	X-5003-054-1	s	MEDIA LID ASSY(2166)
605	1-007-992-11	s	HARNESS(VC-SDI-10P)
606	1-014-457-11	s	FLEXIBLE FLAT CABLE (10P)
607	1-014-458-11	s	FLEXIBLE FLAT CABLE (20P)
608	⚠ 1-528-900-34	s	BATTERY, LITHIUM SECONDARY
609	⚠ 1-787-899-11	s	FAN, DC (40 SQUARE)
610	1-969-380-11	s	HARNESS, SUB (14P/PS-SY)
611	⚠ 1-969-447-12	s	HARNESS, SUB (RE-CN)
612	3-079-115-01	s	TAPE AS
613	3-986-877-01	s	+PSW2.6X6
614	4-476-418-01	s	CAGE, SINGLE PORT
615	4-588-357-01	s	SHEET (BT-1), RADIATION
616	4-588-362-01	s	SHEET (1717), RADIATION
617	4-589-348-01	s	COVER, SFP
618	5-015-212-01	s	SHIELD CASE, SDI
619	5-038-766-01	s	LIGHT GUIDE (L)(2166)
620	5-038-767-01	s	LIGHT GUIDE (R)(2166)
621	5-038-768-01	s	FRONT IR WINDOW(2166)
622	5-038-798-01	s	HOLDER FAN (2166)
623	5-038-801-01	s	SUPPORT PLATE, SDI (2166)
624	5-038-818-01	s	CABLE CLAMP
625	5-038-819-01	s	LOCKING WIRE SADLE
626	5-038-823-01	s	SHADING SHEET (2166)
627	5-038-824-01	s	CUSION FAN
628	5-038-825-01	s	USB HIDDEN SHEET
629	5-040-286-01	s	RJ45 CONNECTOR COVER
630	5-040-320-01	s	SHEET (1457), RADIATION
631	5-040-679-01	s	INSULATING SHEET
632	5-043-196-02	s	LIGHT SHIELDING SHEET U(2166)
633	5-044-870-01	s	GASKET (6X6 (2.5)), SOFT
	7-682-547-09	s	SCREW +B 3X6
	7-682-948-01	s	SCREW +PSW 3X8
	7-685-535-19	s	SCREW +BTP 2.6X10 TYPE2 N-S

Base Block-2 (NET Board)



No.	Part No.	SP	Description
702	A-5048-635-A	s	PS-966 COMPL-NC
703	A-5056-044-A	s	SERVICE, GPU BOARD COMPL
704	X-5003-072-1	s	MOTOR PLATE ASSY(P)(2166)
705	1-014-455-11	s	FLEXIBLE FLAT CABLE (6P)
706	1-014-456-11	s	FLEXIBLE FLAT CABLE (50P)
707	1-014-460-11	s	MICRO COAXIAL CABLE (30P)
708	1-014-461-11	s	CABLE, CONNECTION (20P)
709	⚠ 1-787-729-13	s	MOTOR, STEPPING
710	2-580-592-01	s	SCREW, +PSW M3X8
711	2-630-005-01	s	SCREW(M2),NEW TRUSTER,P2
713	3-079-115-01	s	TAPE AS
714	3-080-206-21	s	SCREW, TAPPING, P2
715	3-277-886-01	s	SW +P SCREW M2.5X5
716	3-874-446-01	s	WASHER, DAMPER
717	3-986-877-01	s	+PSW2.6X6
718	3-986-900-01	s	WASHER, P
719	3-990-382-01	s	WASHER, WAVE
720	5-015-236-01	s	SHIELD CASE, DD
721	5-038-643-01	s	HOLDER BEARING (P) (2166)
722	5-038-765-01	s	CABINET BASE(2166)
723	5-038-769-01	s	PULLY(2166)
725	5-038-809-01	s	DUMPER MOTOR (2166)
726	A-5056-396-A	s	PAN SHAFT ASSY
728	5-038-820-01	s	TIMING BELT
729	5-038-822-01	s	CUSION PS SHEAL
731	5-039-261-01	s	DUCT FAN(2166)
735	5-043-741-01	s	DAMPING SHEET P(2166)
736	5-045-293-01	s	BRACKET MOTER
	7-624-106-04	s	STOP RING 3.0, TYPE -E

4-3. Supplied Accessories

Q'ty	Part No.	SP	Description
1pc	⚠ 1-014-473-11	s	REMOTE COMMANDER (RMT-RC1)
1pc	1-569-007-31	s	ADAPTOR, CONVERSION 2P [For E38 model]
1pc	⚠ 1-493-490-42	s	AC ADAPTOR (120W) [For UC2 model]
1pc	⚠ 1-493-490-51	s	AC ADAPTOR (120W) [Other than UC2 model]
1pc	4-584-984-01	s	PLATE, HDMI RETAINER
1pc	4-188-536-01	s	CAP, BODY

Power supply cords

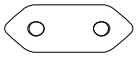
[For UC2 model] Any of the following power supply cords can be used.

1pc	⚠ 1-846-090-52	s	CORD SET, POWER-SUPPLY
1pc	⚠ 1-846-425-33	s	CORD SET, POWER-SUPPLY

[For J1 model] Any of the following power supply cords can be used.

1pc	⚠ 1-836-110-11	s	CORD SET, POWER-SUPPLY
1pc	⚠ 1-846-089-32	s	CORD SET, POWER-SUPPLY
1pc	⚠ 1-849-254-31	s	POWER SUPPLY CORD SET

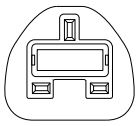
[For CEC model]
Select the power cord that matches your countries/regions.
C type(SE type)



Any of the following power supply cords can be used.

1pc	⚠ 1-015-943-31	s	POWER SUPPLY CORD SET
1pc	⚠ 1-837-426-55	s	CORD SET, POWER-SUPPLY
1pc	⚠ 1-846-093-32	s	CORD SET, POWER-SUPPLY
1pc	⚠ 1-848-679-23	s	POWER SUPPLY CORD SET

G type(BF type)



Any of the following power supply cords can be used.

1pc	⚠ 1-837-421-55	s	CORD SET, POWER-SUPPLY
1pc	⚠ 1-848-678-24	s	POWER SUPPLY CORD SET

[For CN1 model] Any of the following power supply cords can be used.

1pc	⚠ 1-838-705-53	s	CORD SET, POWER-SUPPLY
1pc	⚠ 1-846-098-31	s	CORD SET, POWER-SUPPLY
1pc	⚠ 1-846-103-42	s	CORD SET, POWER-SUPPLY
1pc	⚠ 1-848-680-22	s	POWER SUPPLY CORD SET

[For KR2 model] Any of the following power supply cords can be used.

1pc	⚠ 1-837-428-53	s	CORD SET, POWER-SUPPLY
1pc	⚠ 1-846-432-32	s	CORD SET, POWER-SUPPLY

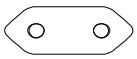
[For IN5 model] Any of the following power supply cords can be used.

1pc	⚠ 1-848-066-35	s	AC POWER SUPPLY CORD SET
1pc	⚠ 1-848-142-35	s	POWER SUPPLY CORD SET

[For E38 model] Any of the following power supply cords can be used.

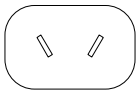
1pc	⚠ 1-837-424-53	s	CORD SET, POWER-SUPPLY
1pc	⚠ 1-846-096-32	s	CORD SET, POWER-SUPPLY
1pc	⚠ 1-846-431-33	s	CORD SET, POWER-SUPPLY

[For AP2 model]
Select the power cord that matches your countries/regions.
C type(SE type)



Any of the following power supply cords can be used.
1pc ⚠ 1-015-943-31 s POWER SUPPLY CORD SET
1pc ⚠ 1-837-426-55 s CORD SET, POWER-SUPPLY
1pc ⚠ 1-846-093-32 s CORD SET, POWER-SUPPLY
1pc ⚠ 1-848-679-23 s POWER SUPPLY CORD SET

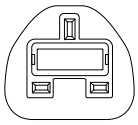
I type



1-837-429-53 1-846-095-32/1-846-430-36

Any of the following power supply cords can be used.
1pc ⚠ 1-837-429-53 s CORD SET, POWER-SUPPLY
1pc ⚠ 1-846-095-32 s CORD SET, POWER-SUPPLY
1pc ⚠ 1-846-430-36 s CORD SET, POWER-SUPPLY

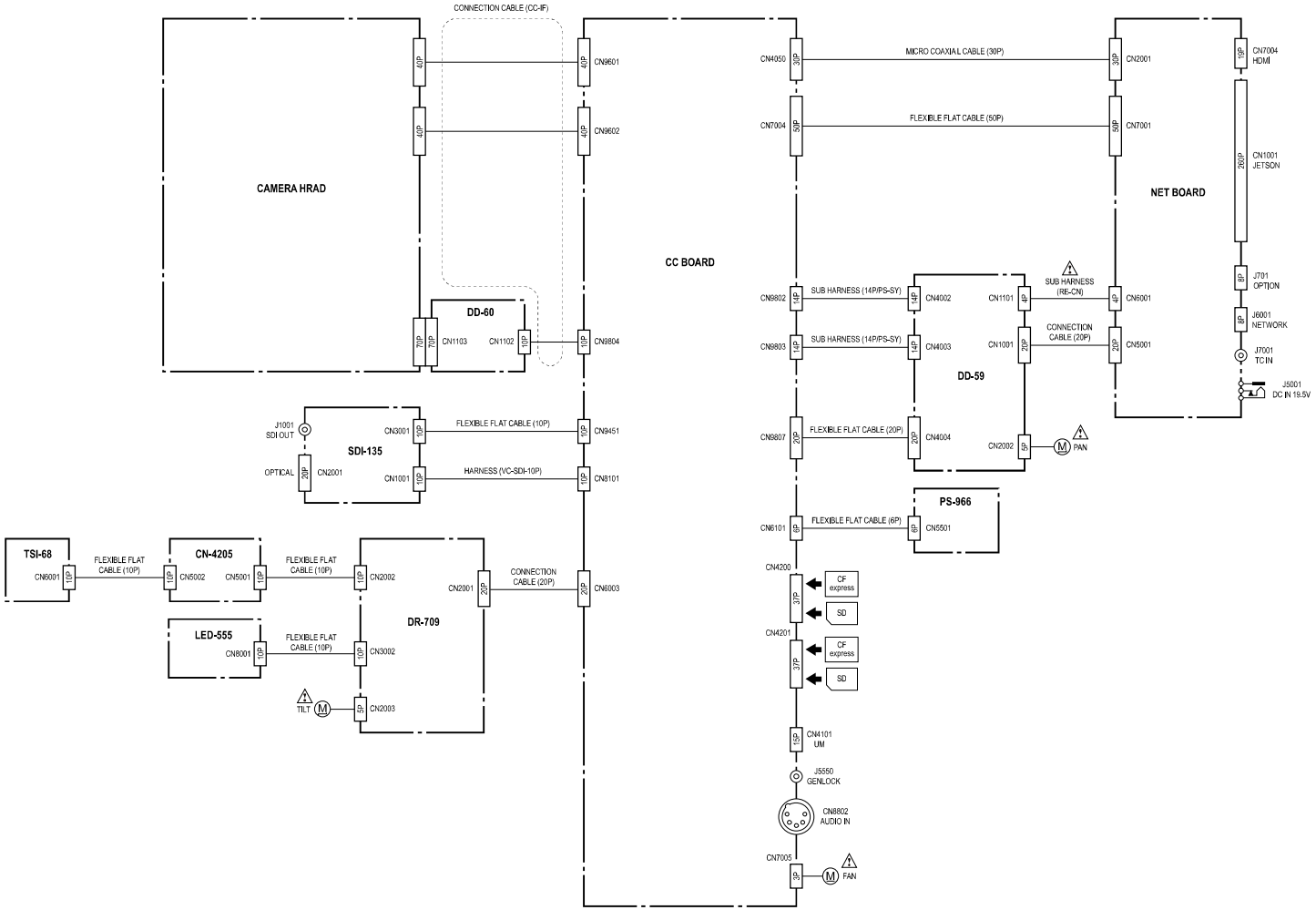
G type(BF type)



Any of the following power supply cords can be used.
1pc ⚠ 1-837-421-55 s CORD SET, POWER-SUPPLY
1pc ⚠ 1-848-678-24 s POWER SUPPLY CORD SET

Section 5
Diagrams

Frame Wiring



Revision History

Date	History	Contents
2024. 5	1st Edition 9-932-897-01	—

ILME-FR7
ILME-FR7K E
9-932-897-01

Sony Corporation

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