Data Projector

PROJECTOR

Service Manual

EMP-822/EMP-83
EMP-X5/EMP-S5

EPSON

INTRODUCTION

This Service Manual describes basic functions, theory of electrical and mechanical operations, maintenance and repair procedures of the EMP-822/EMP-83/EMP-X5/EMP-S5. This information is intended for the experienced repair technicians, and attention should be given to the precautions on the preceding pages.

This manual consists of four chapters and Appendix.

Chapter 1	**PRODUCT DESCRIPTIONS** Provides a general overview and basic specifications, specifications of controls, interfaces, consumable supplies, and after service parts.
Chapter 2	**OPERATING PRINCIPLES** Describes the configuration of each mechanism, theory of operations of the basic mechanisms and controls in this product.
Chapter 3	**TROUBLE SHOOTING** Describes the step-by-step procedures of the trouble shooting.
Chapter 4	**DISASSENBLY & ASSEMBLY** Describes the step-by-step procedures for disassembling and assembling the components.
Chapter 5	**APPENDIX** Provides maintenance information (After service menu etc.) required for servicing the product.

NOTICE

REVISION HISTORY

After first release of this manual, the parts and mechanism may be subject to change for improvement of their performance and the manual may be revised. Be sure to always keep this manual up to date.

History	Date	Detail of change
Rev.A	2007.3.2	First Release

IMPORTANT PRECAUTIONS IN SAFETY AND MAINTENANCE PERFORMANCE

Here describes the important points to keep in mind in repair and maintenance performance.

Symbols

To prevent injury to the repair technicians and to protect the devices, the categorized safety instructions are provided in this manual with the symbols below. Be sure to read and understand their meanings before proceeding to the next section.

Category	Symbol	Meaning
Danger		Indicates an extremely hazardous operation which, if ignored or operated incorrectly, could result in serious or fatal personal injury.
Warning		Indicates a potentially hazardous operation which, if ignored or operated incorrectly, could result in serious or fatal personal injury.
Caution		Indicates a potentially hazardous operation which, if ignored or operated incorrectly, could result in minor injury or damage to equipment.
Prohibited Matter		Indicates a prohibited action or operation in repair and maintenance performance.
Instruction		Indicates a compulsory action or operation that must be carried out in repair and maintenance performance.

Safety Instructions

The precautionary measures itemized below should be fully understood when performing repair and maintenance procedures.

WARNING	
	When disassembling/assembling, be sure to turn off the power switch and pull out the power cable from the projector beforehand.
	Never touch the current-carrying part or high temperature section during a test operation, signal measurement or any other situations that is necessary to perform the repair/maintenance work with the power turned on and the cover removed. Do not wear the metal products such as wrist watch, cuff buttons, rings, tiepin etc. to avoid getting a electric shock.
	Do not touch the lamp assy. or the parts around it. They are extremely hot even after completed the cooling down operation, and may cause a burn injury. Therefore, leave the unit until it becomes cool enough before performing maintenance work.
	Never let the safety devices mounted in this product inactivated for any reason whatsoever.
	Never modify the safety devices or replace them with the ones that are not designated for any reason whatsoever. (Such actions may cause a fire or serious injury.)
	Never modify the product for any reason whatsoever. (Except for a case that is under the instructions to do so.)
	Never peer through the projection lens during repair/maintenance work when the power is on. (Such an action may cause a visual disability because of a very strong light emission.)
	Never use a deformed plug or a damaged power cable to this product. If any deformations or damages are found on the power cable or plug section, replace it with a new specified power cable.
	Never use the air blowers that contain flammable gas in repair/maintenance work.

⚠ CAUTION	
	Never use or replace with any service parts that is not specified by EPSON.
	Be sure to perform the repair/maintenance work on the even and stable work bench to prevent the product from dropping down or mal-operation due to the improper setting of the product.
	Be sure to wear the gloves during the repair/maintenance work to avoid injuries by the parts with sharp edges such as metal plate or the like.
	To protect sensitive circuitry, follow the instructions below. • When disassembling or reassembling, be sure to wear static discharge equipment such as an anti-static wrist strap and a mat. • When replacing the circuit component such as a board or the optical engine, be sure to contact the anti-static case containing the new one to the metal part of this product before taking it out.
	When performing the repair/maintenance work, be sure to use the specified tools and follow the instructions that are specified in the documents (service manual etc.) concerning to this product.
	When carrying out the test operation, do not block the intake and exhaust ducts. (Such an action raises the internal temperature and may cause a fire or a damages to the internal parts of this product.)
	Be careful not to drop a metal part such as a screw, a washer, or a clip into the inside of the product. If such cases should occur accidentally, never turn on the power supply until all the dropped parts are found and removed.
	After reassembling the product, check the followings before turning the power on. • All the parts and screws are installed and secured to the proper positions. • No cables are caught in the metal frames.

Other Caution

■ Since the lamp of this product contains mercury, be sure to dispose the used lamp pursuant to the government's law and regulations.

Chapter 1 Product Specifications

Chapter 2 Theory of Operation

Chapter 3 Troubleshooting

Chapter 4 Disassembly/Assembly

Chapter 5 Appendix

Chapter 1 Product Specifications

1.1 Product Features

The EMP-822/EMP-83/EMP-X5/EMP-S5 is a portable data projector in a compact body and with the following features.

1.1.1 Features of the Projector

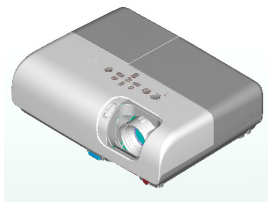
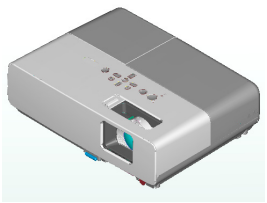
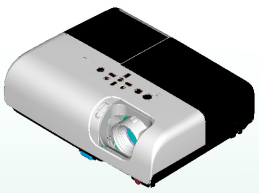
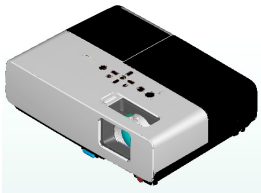
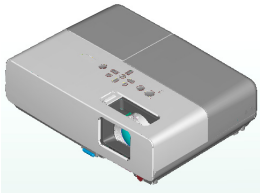
☐ **EMP-822/EMP-83/EMP-X5/EMP-S5 Common Features**

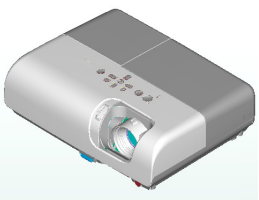
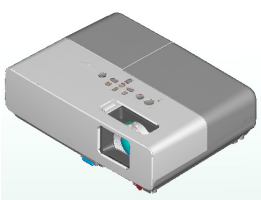
- **The A/V mute slide makes it easy to project and store**
  The A/V mute slide simplifies stopping and resuming projection. You can stop/resume projection simply by closing/opening the A/V mute slide.
- **No need to cool down (Instant Off)**
  You can detach the projector's power cable soon after the power is off.
- **Simple designed foot**
  Easy height adjustment.
- **Ample protect functions**
  •Password Protect
  By setting a password, you can control and restrict who can use the projector.
  •Operation Lock
  Setting this function effective can prevent someone from changing the projector's settings without permission in a situation such as the use in an event, or in a school.
  •Security slot, security cable attachment part
  Function to prevent the device from being stolen.

☐ EMP-822/EMP-83 Features

- **Direct power On/Off**
  The power On/Off can also be controlled directly by the power supply.

1.1.2 External View

Model	EMP-S5	EMP-X5	EMP-83	EMP-822
EMD/EAL EHK/ESP EKL/ETT				
ECC				

Model	PL-S5	PL-S5+/77c	PL-83c	PL-822p
EAI				

1.2 Specifications

MODEL			EMP-S5	EMP-X5	EMP-83	EMP-822
Specification of main parts	LCD	Size	0.55-inch without MLA	0.63-inch without MLA		0.63-inch with MLA
		Pixel number	480,000 dots (800 x 600) x 3	786,432 dots (1024 x 768) x 3		
		Native Resolution	SVGA	XGA		
		Aspect ratio	4:3			
	Projecti on Lens	Type	Digital zoom / Manual focus	Manual zoom / Manual focus		
		Zoom ratio	No Optical Zoom, Digital Zoom (1.0-1.35)	Optical Zoom1-1.2		
	Lamp	Type	170W UHE			
		Life	3000H(High Bright)/4000H(Low Bright)			
Brightness (Color mode: Game, Zoom: Wide)	High Brightness Mode		2000 ANSI lumens	2200 ANSI lumens		2600 ANSI lumens
	Low Brightness Mode		1600ANSI lumens	1760 ANSI lumens		2080 ANSI lumens
Sound output			1W Monaural		7W Monaural	
Operating Temperature			5°C to 35°C <41°F to 95°F> (20% - 80% humidity) /Thermal shut down: T > 45°C			
Operating Altitude			0 m to 2286 m <0 ft to 7500 ft> (over 1500 m / 4921 ft: with High altitude mode)			
Start-up period			about 5 seconds (warm-up period: 30 seconds)			
Cool-down period			Instant off			
Power Supply Voltage			100 - 240 V AC +/10%, 50/60 Hz			
Power Consumption	100-120V Area (JAPAN, USA, etc.)	Lamp On	248 W			
		Standby (Network On)	-		5 W	
		Standby (Network Off)	4.1 W			
	220-240V Area (Europe, etc.)	Lamp On	231 W			
		Standby (Network On)	-		7 W	
		Standby (Network Off)	5.8 W			
	Rated Voltage & Current		100 - 240 V AC 2.8 - 1.2 A 50/60 Hz			
Dimension	Exclude Feet (D x W x H)		245 x 327 x 92 mm			
	Maximum Dimension (D x W x H)		245 x 327 x 108 mm			
Weight			Approx. 5.8 lbs. / 2.6 kg	Approx. 6.0 lbs. / 2.7 kg	Approx. 6.4 lbs. / 2.9 kg	
Fan Noise	High Brightness mode		35 dB			
	Low Brightness mode		28 dB			

1.3 External Views

■ EMP-822/83

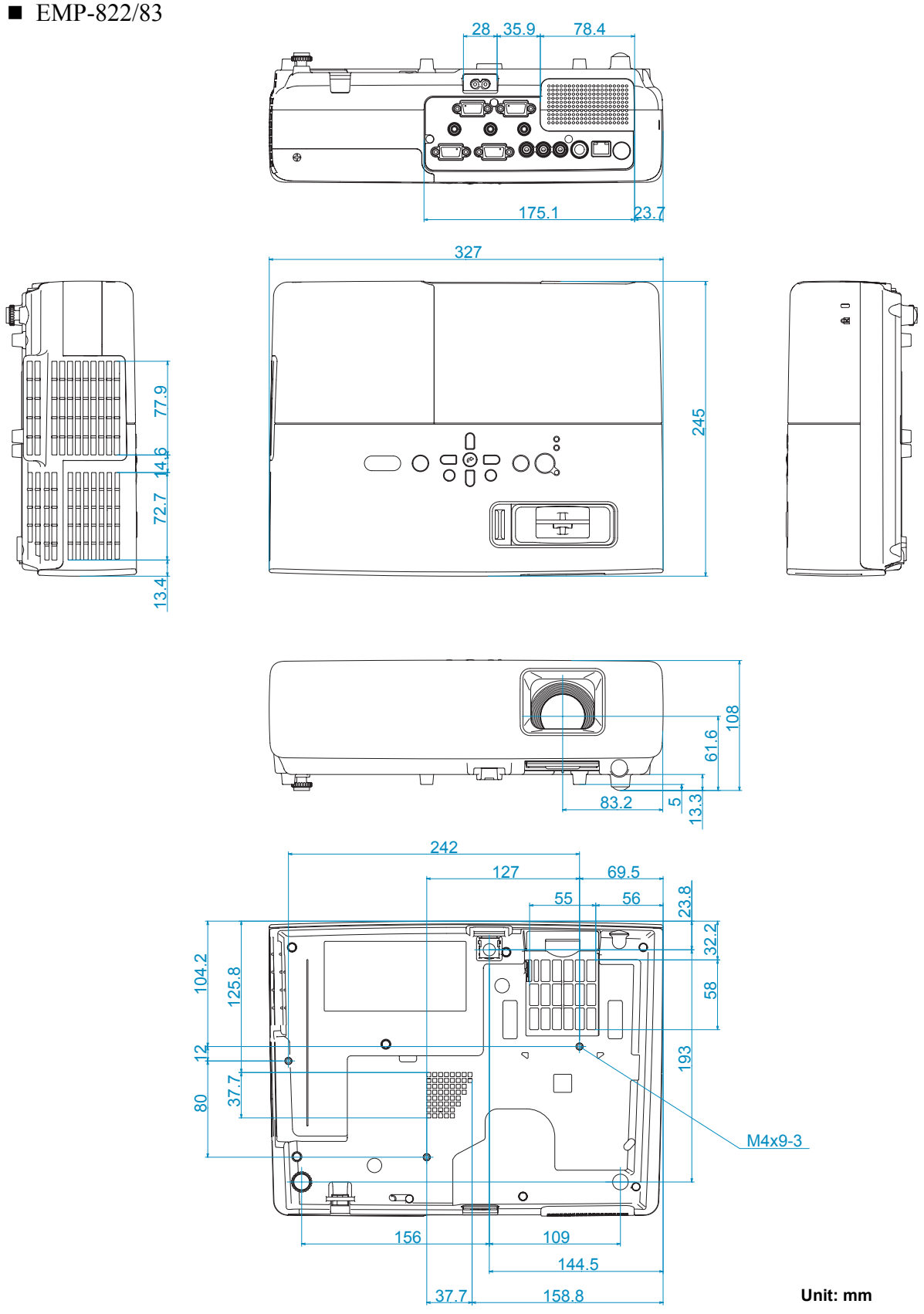


Figure 1-1. External Dimensions (EMP-822/83) (mm)

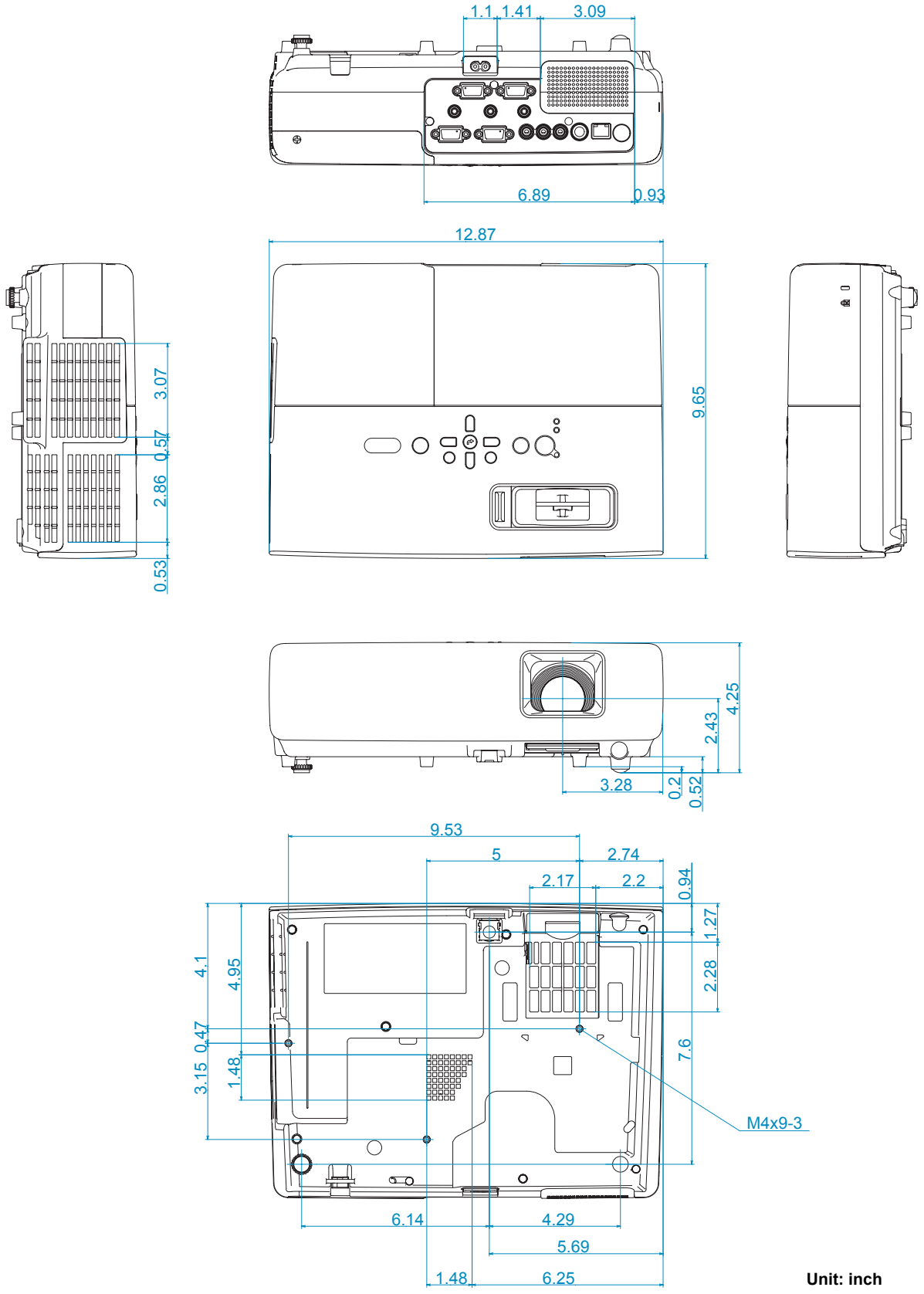


Figure 1-2. External Dimensions (EMP-822/83) (inch)

■ EMP-X5/S5

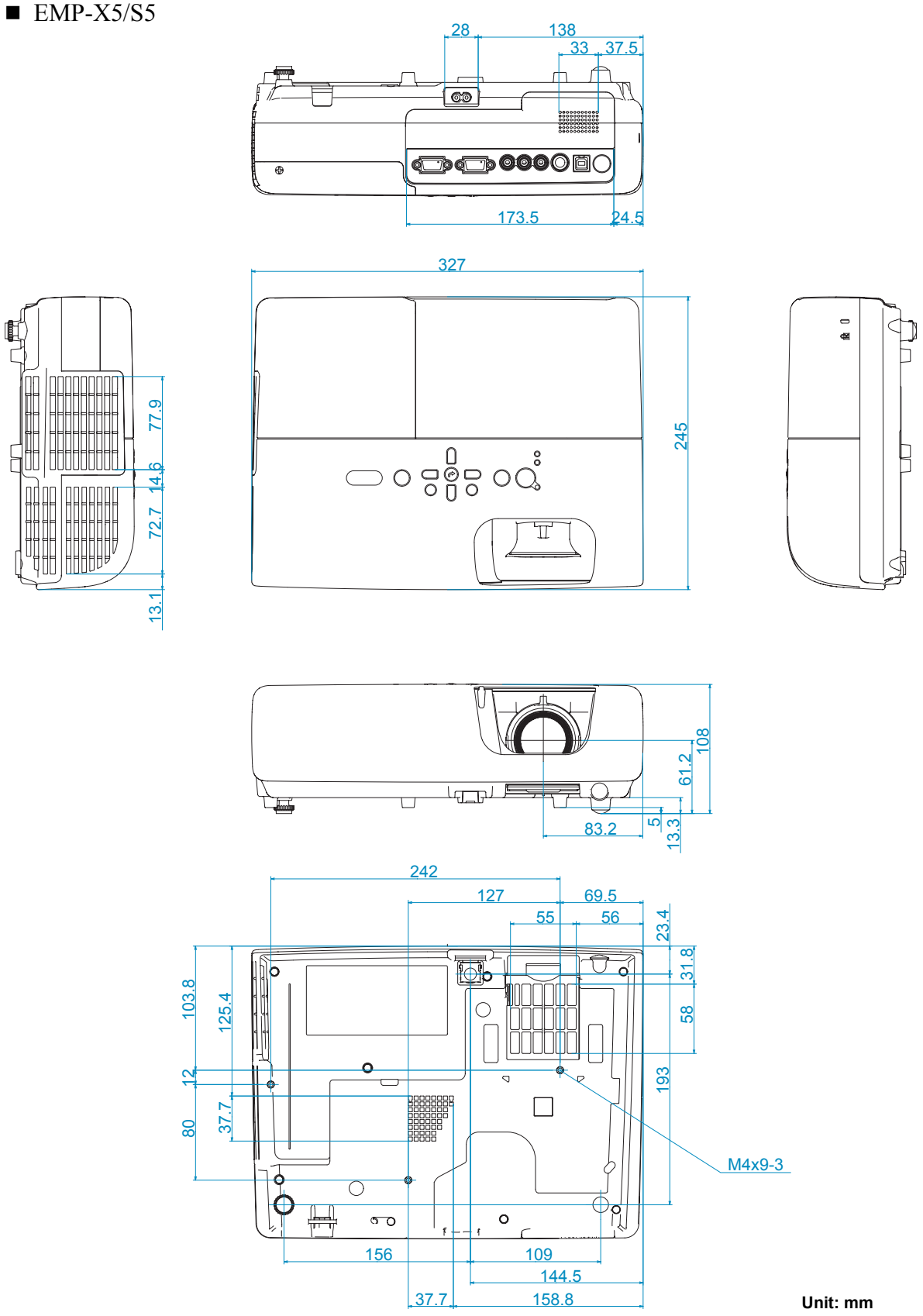


Figure 1-3. External Dimensions (EMP-X5/S5) (mm)

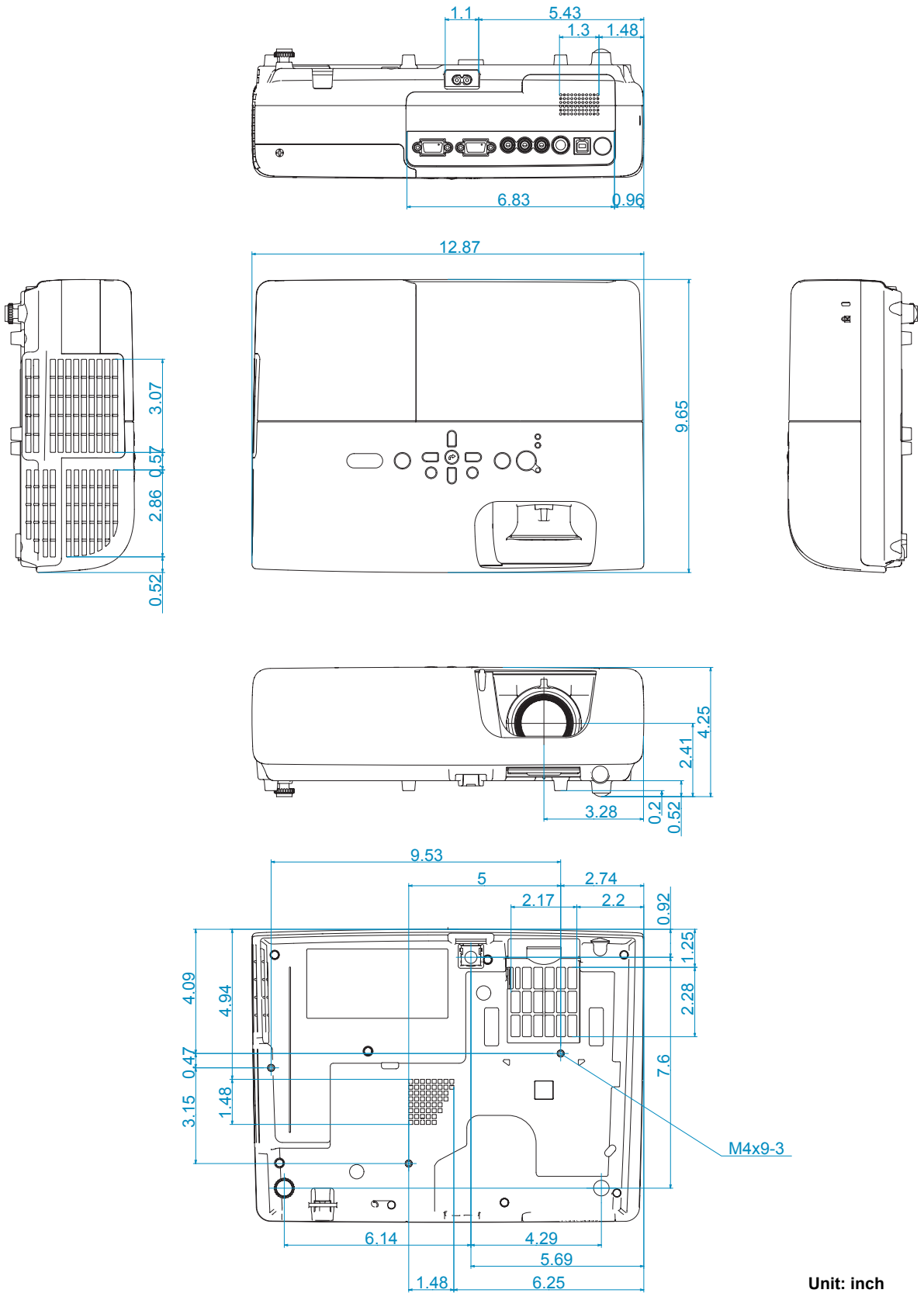


Figure 1-4. External Dimensions (EMP-S5/X5) (inch)

1.4 Dimensions for Ceiling Mount

■ EMP-822/83

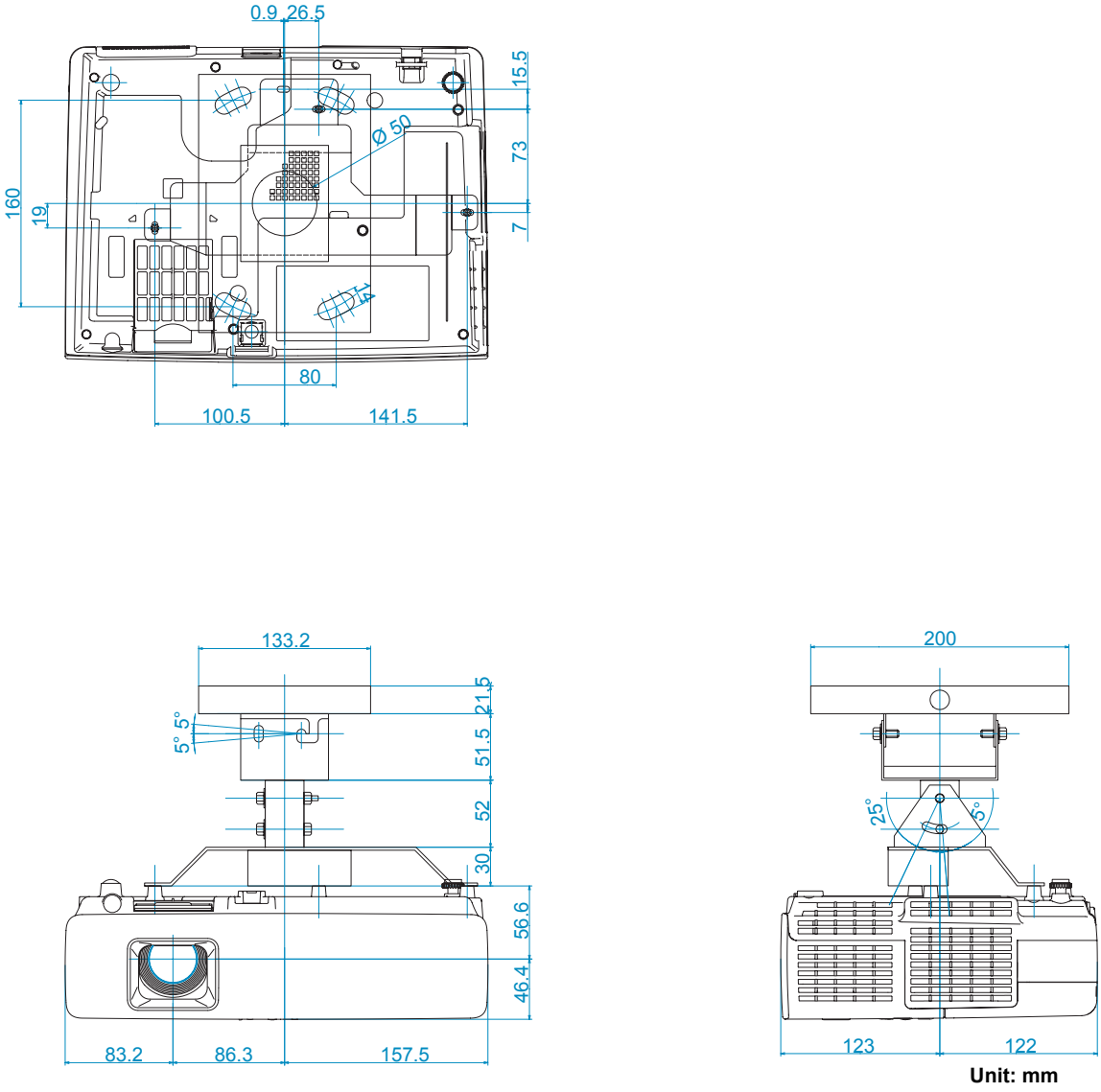


Figure 1-5. Dimensions for Ceiling Mount (EMP-822/83) (mm)

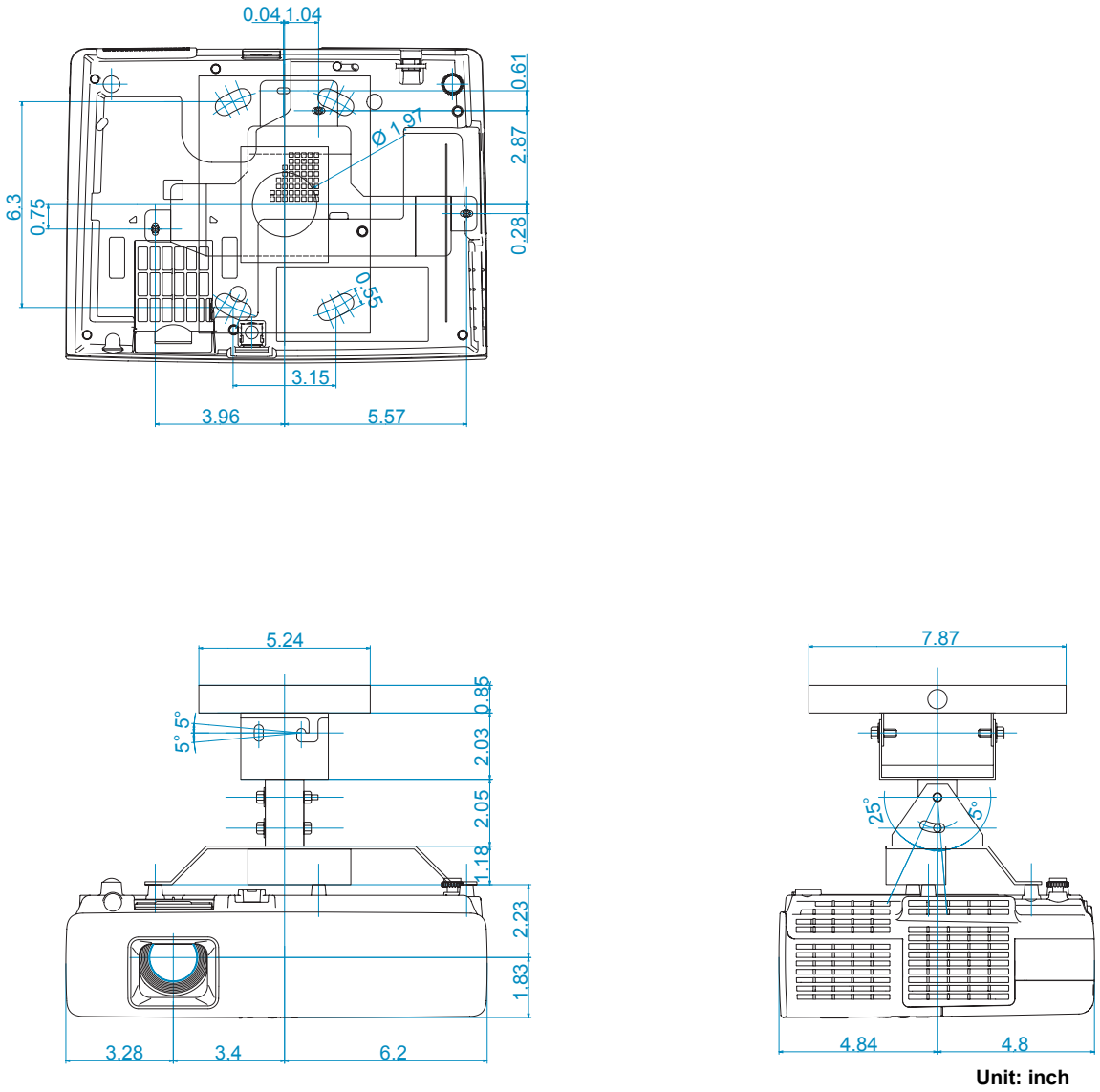


Figure 1-6. Dimensions for Ceiling Mount (EMP-822/83) (inch)

■ EMP-X5/S5

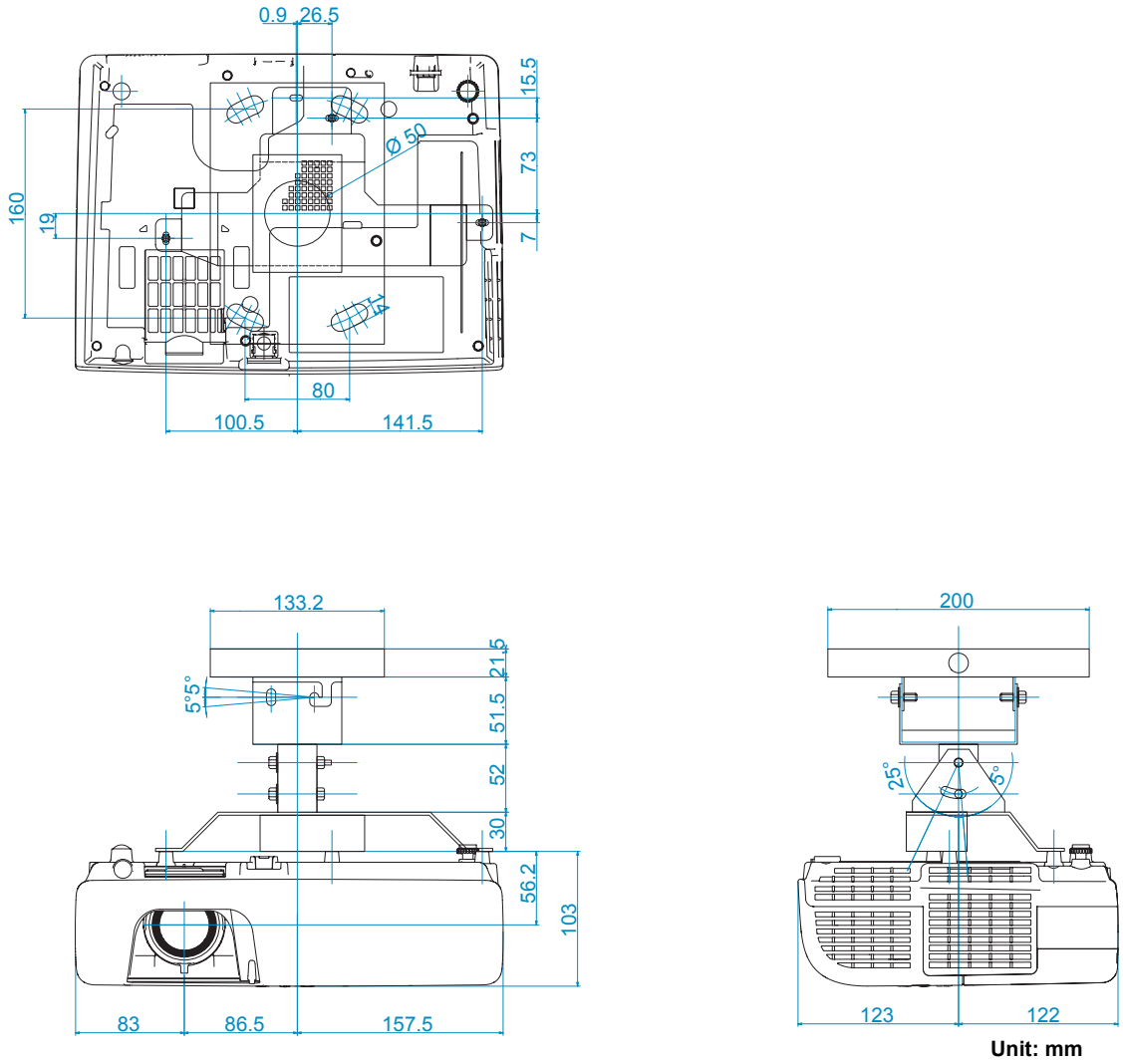


Figure 1-7. Dimensions for Ceiling Mount (EMP-X5/S5) (mm)

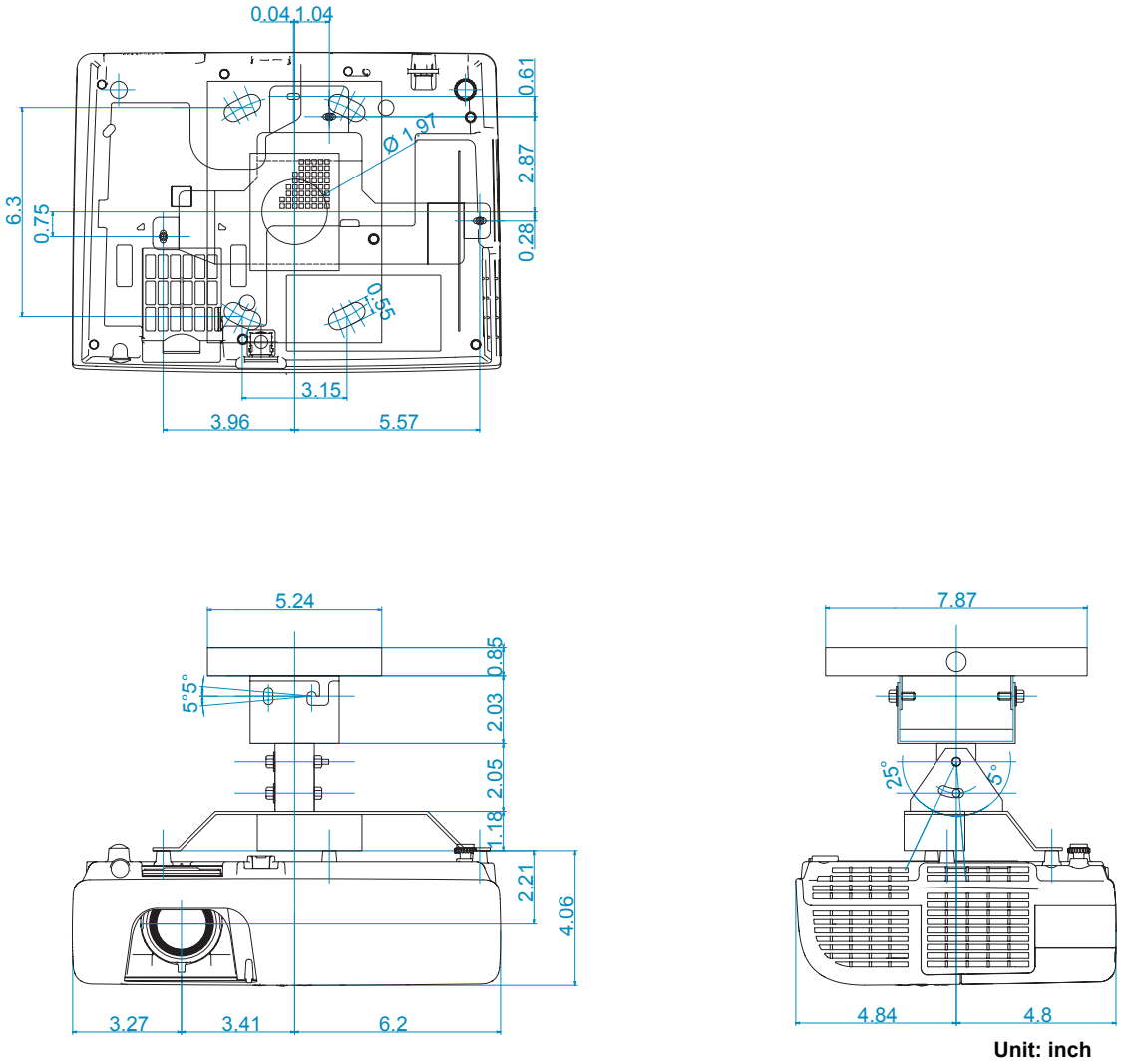


Figure 1-8. Dimensions for Ceiling Mount (EMP-X5/S5) (inch)

Chapter 2 Theory of Operation

2.1 Internal Components

The main components that make up the projector are shown in the figure below.

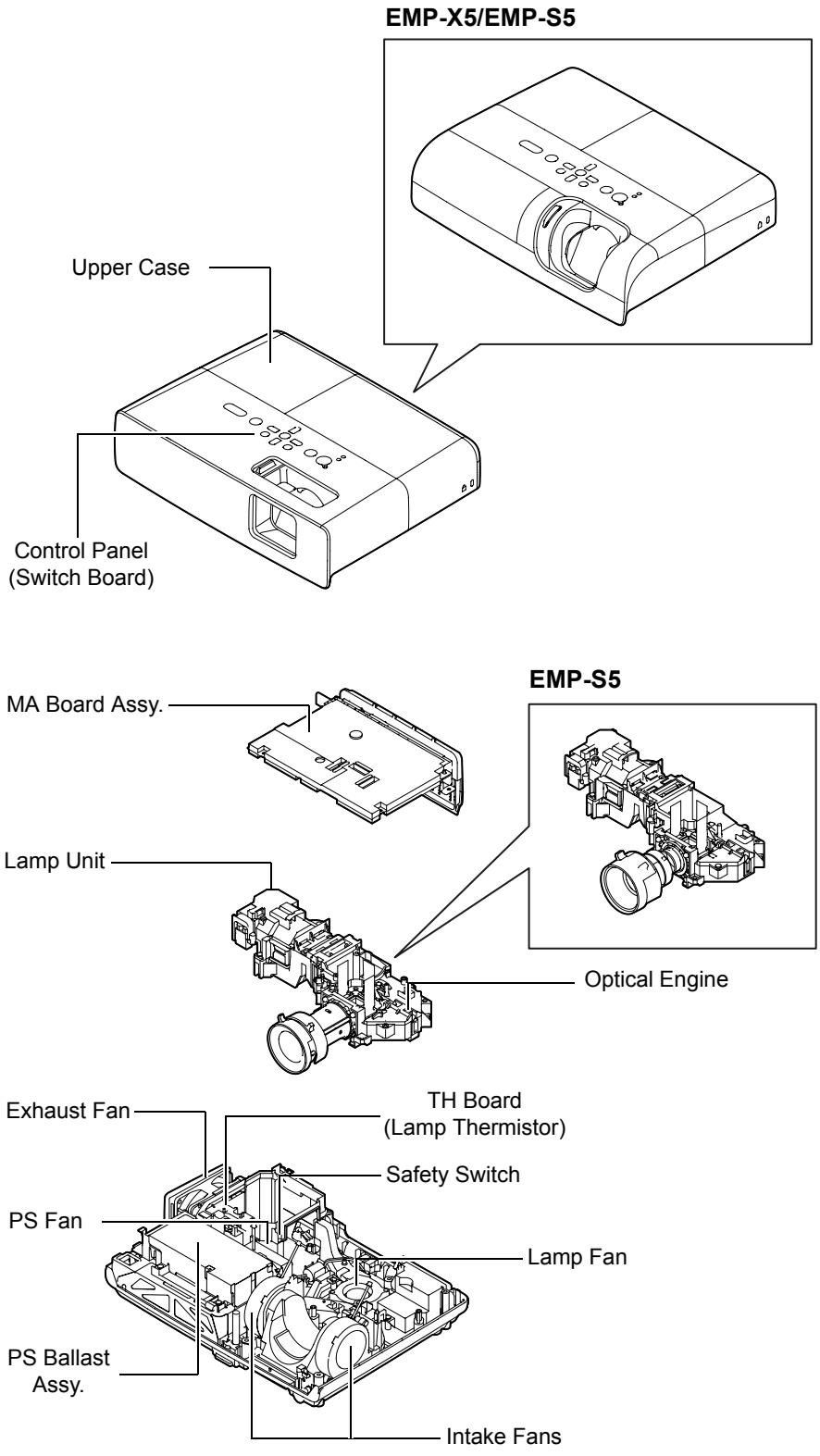


Figure 2-1.

2.2 Hardware Overview

The hardware of this projector consists of the optical block and the electrical circuit components. The overview of the hardware and functions is shown below.

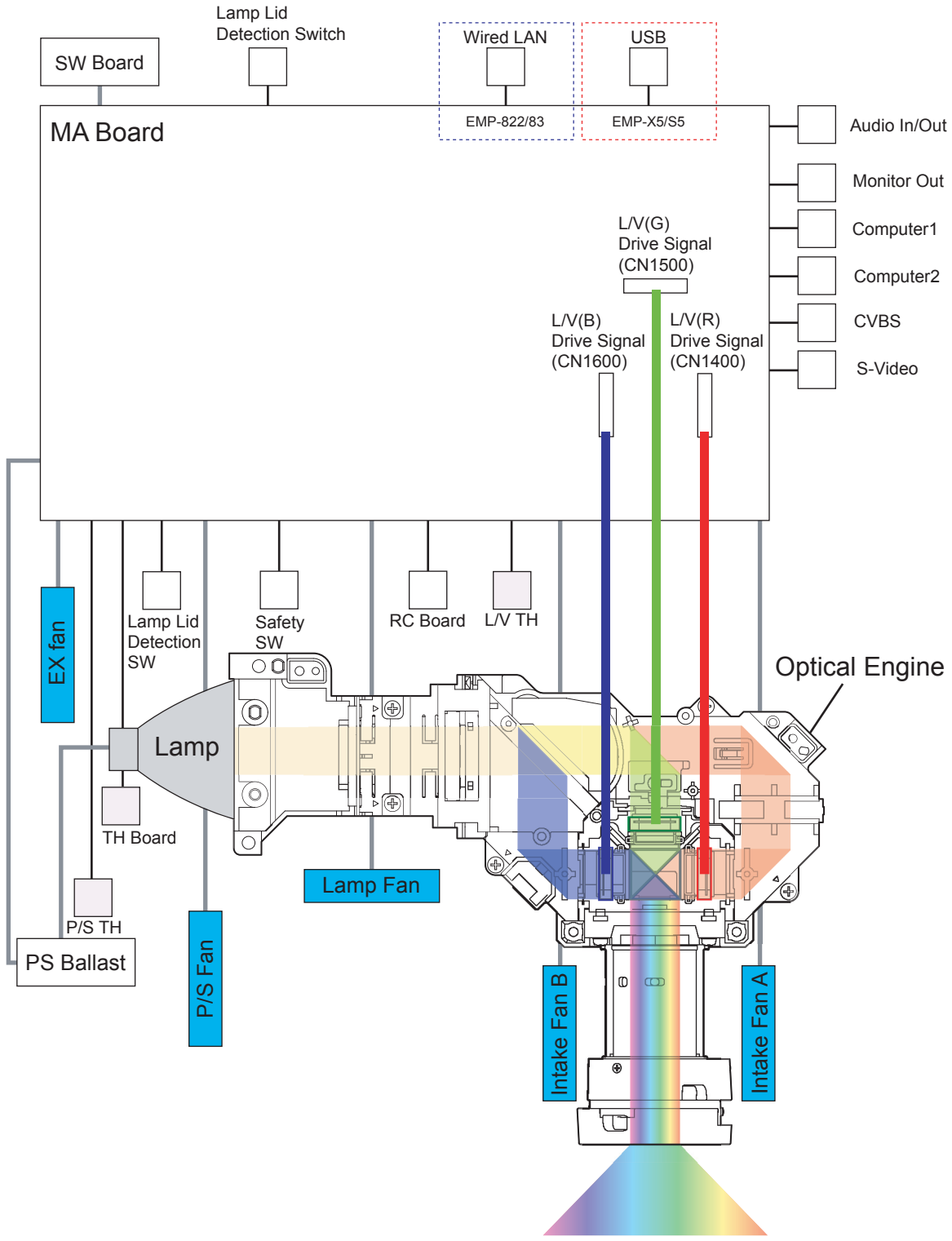


Figure 2-2.

2.2.1 Electrical Circuit Components

The components and their functions are explained below.

Component name		Function
MA Board		The circuit board that controls the whole system and functions of the projector. The main functions are listed below. • Digitally processes the input data from the external devices. • Generates the drive signals of the L/V (R/G/B). • Controls the external I/O interface. • Drives and controls the Lamp. • Monitors the sensors' input and controls the internal temperature with the fans (fan drive control).
PS Ballast Assy.	PS Unit	Generates and supplies the DC power used in each components from the AC input.
	Ballast Unit	Generates the power supply to drive the Lamp from the DC power supplied from the PS Unit.
SW Board		The control part of the projector located on the Upper Case. Various buttons for each functions are mounted on the panel.
RC Board		Receives the IR signal from the remote controller. Mounted at the front and the back of the projector.
Fans	P/S Fan	Ventilates the PS Ballast Assy.
	Lamp Fan	Ventilates the Lamp.
	EX Fan	Exhausts the heated air generated inside the projector to the outside.
	Intake Fan A/B	Take in fresh air and ventilate the L/V.
Sensors	TH Board (Lamp Thermistor)	The thermal detection sensor for the Lamp mounted on the Inner Exhaust Duct around the lamp., The fans are controlled based on the detected thermal data together with the others explained below. The temperature around the Lamp exceeds the specified level, the "High Temp Warning" is issued. If the temperature continues to rise, the projector issues the "High Temp. Error" message with LED indicators and stop the Ballast Unit, and shuts off the power supply to the Lamp.
	L/V Thermistor	The thermal detection sensor for L/V mounted on the MA Board right above the POP of the Optical Engine. The fans are controlled based on the detected thermal data together with the others explained above and below. The temperature around the L/V exceeds the specified level, the "High Temp Warning" is issued. If the temperature continues to rise, the projector issues the "High Temp. Error" message with LED indicators and stop the Ballast Unit, and shuts off the power supply to the Lamp.
	P/S Thermistor	The thermal detection sensor for the PS Ballast Assy. mounted on the assembly. The fans are controlled based on the detected thermal data together with the ones explained below. The temperature around the P/S Ballast Assy exceeds the specified level, the "High Temp Warning" is issued. If the temperature continues to rise, the projector issues the "High Temp. Error" message with LED indicators and stop the Ballast Unit, and shuts off the power supply to the Lamp.
	Safety Switch	Functions as the safety device in the case of the loss of temperature control due to the failure of the thermistors. This is a detection switch for the prevention of overheating, and is mounted on the side of the Inner Exhaust Duct. If the internal temperature exceeds the specified level, the switch cuts off the AC power supply. The power supply cannot be activated until the internal temperature drops below the certain level.
	Lamp Lid Detection Switch	Detects the status of the cover for the lamp replacement. If the Lamp Lid opens, the power supply to the Lamp is cut off. In such a case, the power supply cannot be activated.

Component name		Function
Sensors	Foot Detection	EMP-X5 has an auto keystone correction function. It uses a mechanical device to measure the amount of protrusion of the Front Foot to detect the tilting level of the projector. The device detects only four predetermined points. If the auto correction does not adjust the distortion enough, you can make further correction manually.
Lens Shutter Detection Sensor (Mechanical Contact Switch)		The switch using a mechanical contact to detect the status of the Lens Shutter. The "Closed" status is detected when the protrusion of the shutter for detection pushes the switch to close the contact. On the "Closed" Status: the solid black is displayed. the audio output switches to the A/V mute mode. the Lamp turns to the Low Brightness mode.

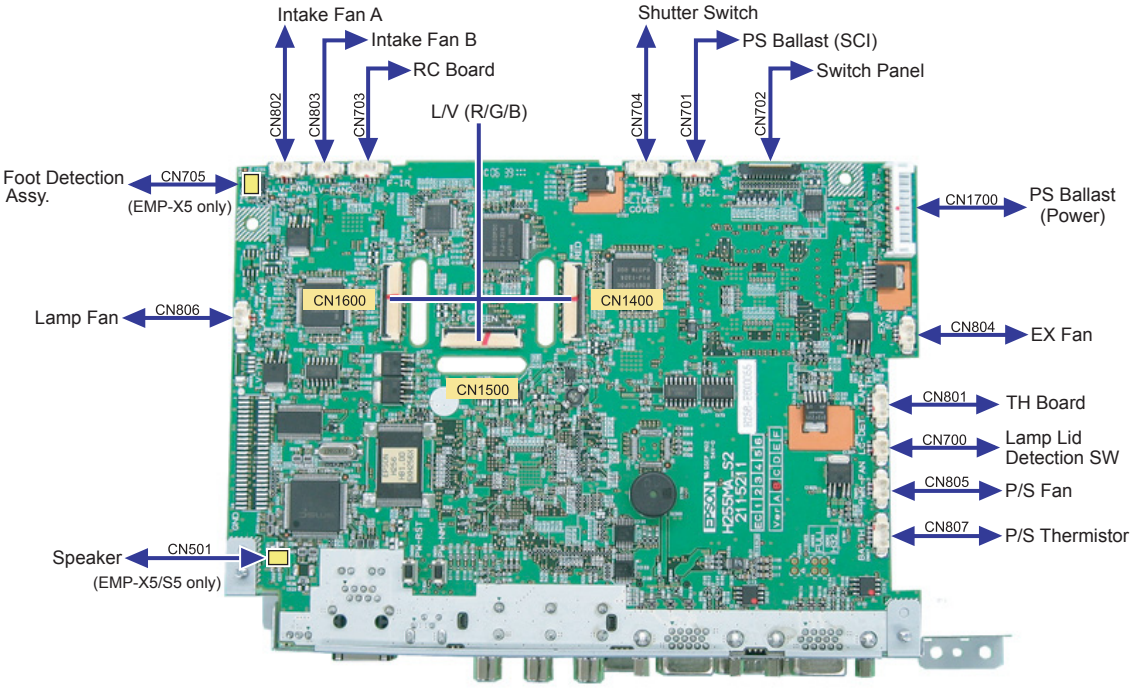


Figure 2-3. Control Circuit Connecting Diagram

2.2.2 Optical Engine

The Optical Engine consists of the Lamp Unit, the Light Guide Unit, the POP (Panel-on-Prism) Unit, and the projection lens.

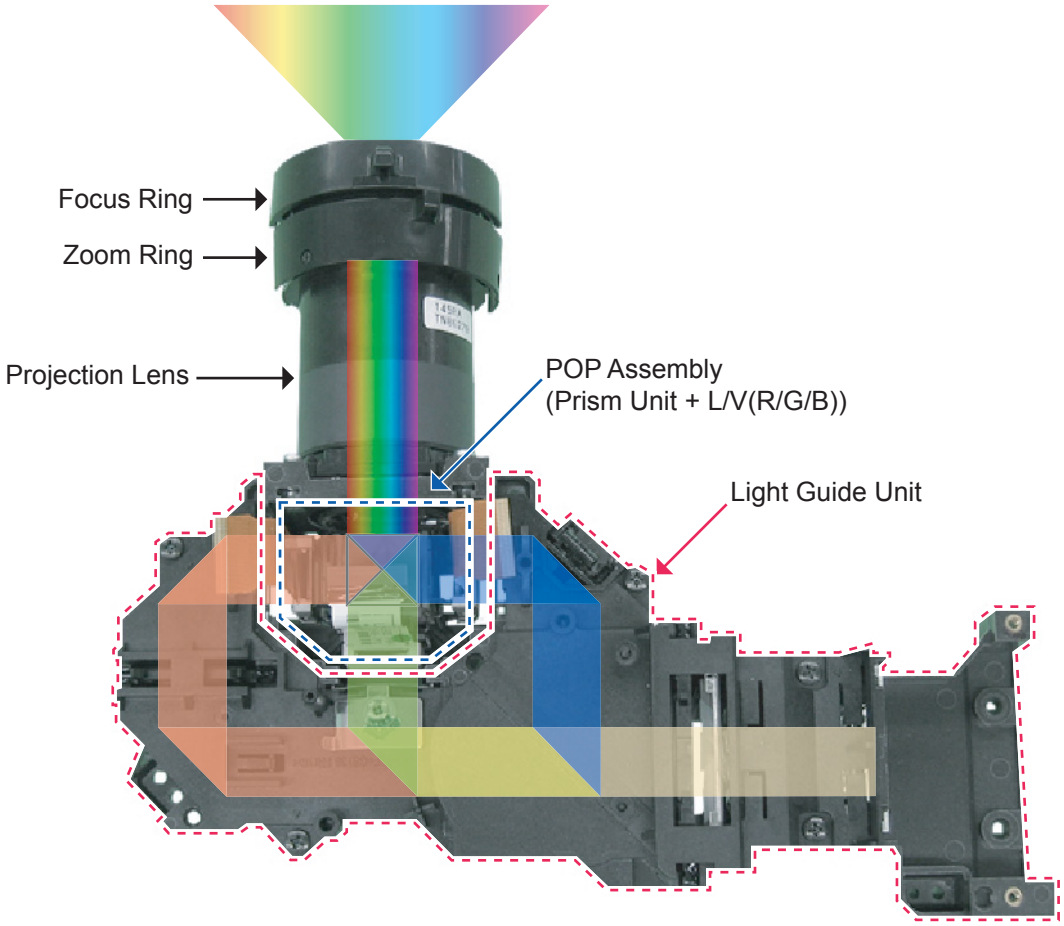


Figure 2-4. Optical Engine

Component Name	Function/Other	
Lamp Unit	An UHE-170W high-intensity discharge lamp is used as the light source.	
Light Guide Unit	In addition, a UV filter protects the LCDs from harmful ultraviolet light. After this light is polarized, it is then split into 3 spectrums (R, G and B).	
	Multi Lens Alley (EMP-822 only)	Diffuses the light from the lamp to provide uniform illumination.
	Polarizer (PBS)	Polarizes the light and remove the U/V component harmful to the L/V.
	Dichroic Mirrors	Disperse the polarized light into the R/G/B spectrums.
POP Unit	The heart of the Optical Engine. Consists of the L/V (R/G/B) and the Prism Unit.	
	Light Valve (L/V)	Controls the intensity of the distributed components of the RGB light.
	Prism Unit	Integrates the RGB light
Projection lens	Sends the integrated light onto the screen. Two adjustment rings are mounted: the Zoom Ring to scale the projected image, and the Focus Ring to focus the lens.	

2.3 Temperature Control

The internal temperature of this projector is monitored by the sensors (the Lamp thermistor, L/V thermistor) in order to protect the projector from internal overheat, which may cause unsafe state or damage to the projector. The fans' revolutions are controlled according to the detected temperature data. The fans' revolutions are altered by changing the driving voltage based on the detected data. In this way, the ventilation level is optimized and the internal temperature is kept stabilized.

2.3.1 Sensors and Switches

The fans and sensors mounted in this product, and the routes of air flow are shown below.

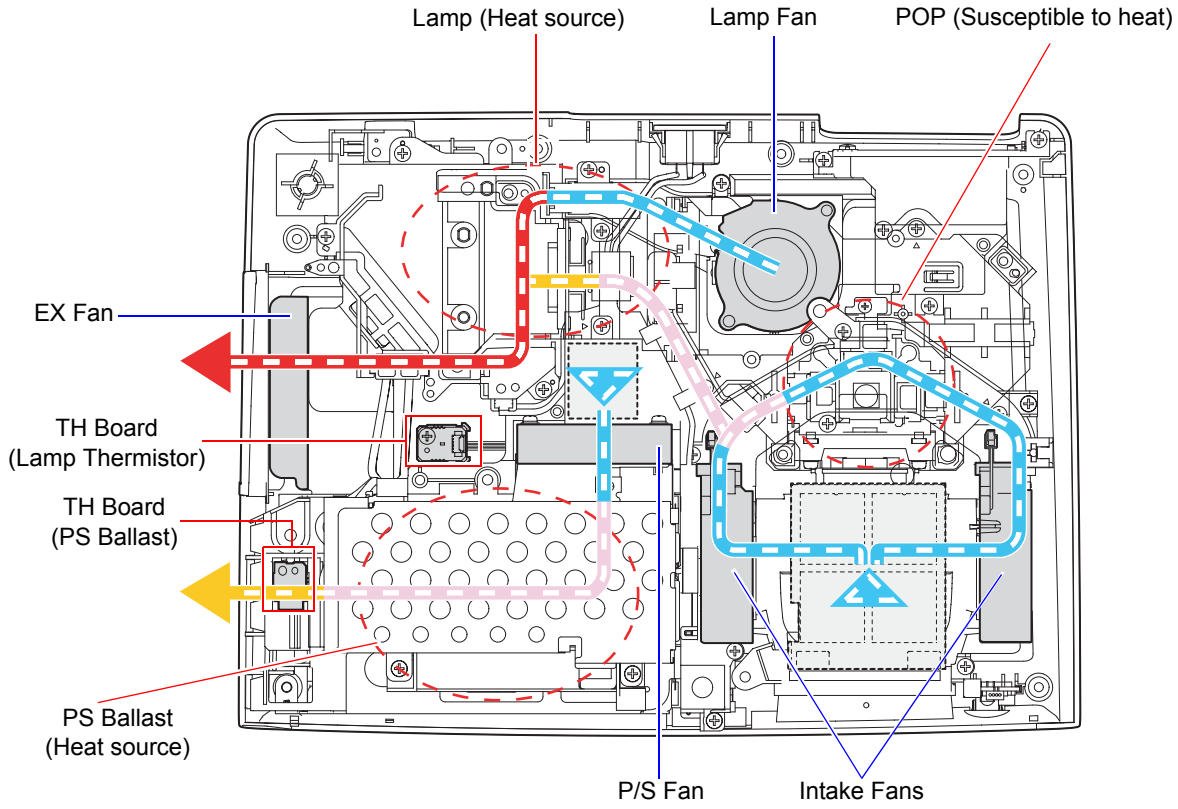


Figure 2-5.

Part Name	Function
Intake Fan A/B	Take in fresh air from the intake duct (with Air Filter) located in the bottom of the projector, and supply it to the Light Valves R/G/B.
P/S Fan	Ventilates the circuit boards of the PS Ballast Assy.
Lamp Fan	Ventilates the inside of the Lamp Unit.
EX Fan	Exhausts the heated air generated inside the projector to the outside.

Chapter 3 Troubleshooting

3.1 Before Carrying Out Troubleshooting

- If repairs involving the replacement of parts or components have been carried out, always be sure to re-check whether the replacement parts themselves are operating correctly or not in order to determine whether the problem is the result of something such as a loose connector.
- All instructions and procedures listed in troubleshooting flowcharts should be carried out as given.
- Follow the procedures given in Chapter 4 Disassembly and Assembly when replacing any of the projector components.
- When checking the operation of the projector, always check that the connectors are connected securely before proceeding to other checks.
- In order to confirm proper operation, use AC power from a normal source and use the correct cable type.

3.1.1 Troubleshooting Tools and Equipment

- The following tools and equipment will be required in order to carry out troubleshooting, and so you should check that they are on hand.

Table 3-1.

Name	Quantity	Application/Other
Projection screen	1	Projecting images
Host computer	1	Transmitting audio and image data
USB mouse	1	Checking the operation of the mouse
Video equipment	1	Transmitting audio and image data
Multi meter	1	Measuring resistance values and voltages (AC/DC)
Double-sided tape	Short length	Attaching parts
General tools	1 set	Tools and equipment listed in Section 4.1

3.2 Basic Information on Troubleshooting

This section describes basic information needed when executing the troubleshooting.

3.2.1 LED Indicators

The control panel has three LEDs that indicate the operating status of the projector.

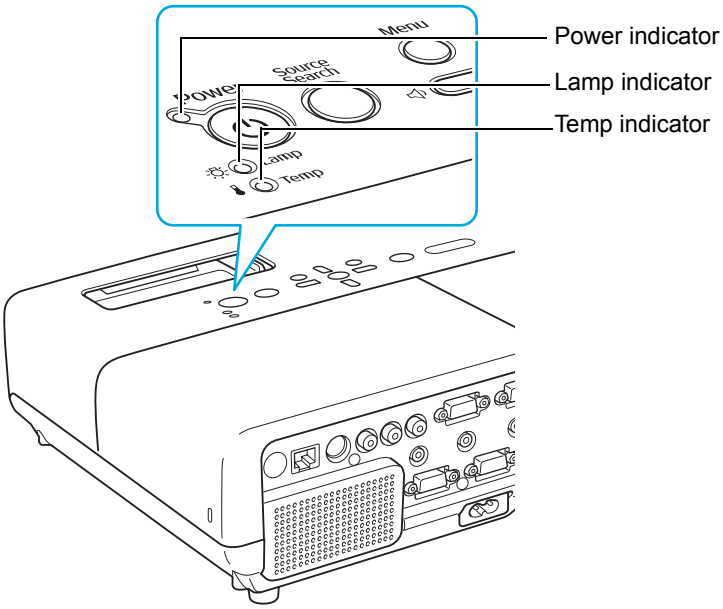


Figure 3-1 LED Indicators

The following tables show what the indicators mean and how to remedy any problem indicated.

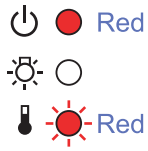
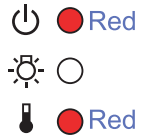
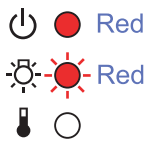
☐ Power indicator lights red: Abnormal

● ON ☼ Blink ○ OFF

Table 3-2. LED Indicator Status (Error)

Indicator Status	Projector Status	Problem and Remedy
☼ Red ☼ Red ☼ Red	Internal Error	[**Status**] Abnormality is detected from any of the following elements on the MA board. • ROM Error • RAM Error • I2C Error • DR Status Error [**Remedy**] Disconnect the AC cable once, and reconnect it, then turn the power on. If the same error occurs, replace the Optical Engine and MAB set because the MA board is broken. (refer to 4.4.2 "Removing the Optical Engine and MAB set(1) (MA Board Assy.) /IF Case" (p. 26) / 4.4.5 "Removing the Optical Engine and MAB set (2) (Optical Engine)" (p. 39))

Table 3-2. LED Indicator Status (Error)

Indicator Status	Projector Status	Problem and Remedy
	Fan Error Sensor Error	[**Status**] Abnormality is detected from any of the fans or the sensors mounted on the projector. (Fan's abnormality: irregular revolution/disconnection, Sensor's abnormality: irregular value detected/disconnection) [**Remedy**] Check the connections between the fans/sensors and the MA board. If the same error occurs after improvement, replace the Optical Engine and MAB set because the MA board is broken. (refer to 3.2.3 "Cable Connection and Projector's Status" (p. 9) / 4.4.2 "Removing the Optical Engine and MAB set(1) (MA Board Assy.) /IF Case" (p. 26) / 4.4.5 "Removing the Optical Engine and MAB set (2) (Optical Engine)" (p. 39))
	High Temp Error (overheating)	[**Phenomenon**] The lamp turns off automatically, and the projection stops. Left the projector for 5 minutes untouched, it switches to the standby mode. [**Status**] The internal temperature rises over the specified level. (The TH sensor detects overheating.) (refer to 3.3.2 "Abnormality Check" (p. 12)) [**Remedy**] Check the Air Filter's condition (dirt accumulation, clogging) When clogging or the like is found, clean/replace the filter. (refer to 4.3.2 "Removing the Air Filter Assy." (p. 13))
	Lamp problem Lamp failure Lamp cover is open	[**Status**] Abnormality occurs to the lamp and the ignition/illumination processes fail, or the Lamp Lid is not securely closed. [**Remedy**] Check the following one by one. After checking and improving, turn on the power again and check if the same error occurs again. • Whether the Lamp Lid is securely fixed. Check the Lamp Lid, and fix it securely if it is loose/open. • Whether the lamp is securely fixed. Check the lamp and fix it securely if it is loose. • Whether the lamp is broken/damaged. Take out and check the lamp for damage. If the lamp is not cracked: Re-fit the lamp and turn on the power. If the error continues, replace the lamp with a new one. If the lamp is broken/damaged, replace it with a new one. (refer to 4.3.1 "Removing the AS Lamp Unit" (p. 12)) • The Air Filter's condition (dirt accumulation, clogging) When clogging or the like is found, clean/replace the filter. (refer to 4.3.2 "Removing the Air Filter Assy." (p. 13)) When using the projector at an altitude of 1500 m or more, set "High Altitude Mode" to "On"

☐ Lamp or Temp indicator flashes orange: Warning

● ON ☼ Blink ○ OFF ● Varies according to the projector status

Table 3-3. LED Indicator Status (Warning)

Indicator Status	Projector Status	Problem and Remedy
⏻ ● Red ☼ ○ 🌡 ☼ Orange	High Temp Warning	(This is not an abnormality. However, if the temperature rises too high again, projection stops automatically.) • Check that the air filter and air exhaust vent are clear, and that the projector is not positioned against a wall. • If the air filter is clogged, clean or replace it. (refer to 3.3.2 "Abnormality Check" (p. 12) /4.3.2 "Removing the Air Filter Assy." (p. 13))
⏻ ● ☼ ☼ Orange 🌡 ○	Replace Lamp	Replace it with a new lamp. If you continue to use the lamp after the replacement period has passed, the possibility that the lamp may explode increases. Replace it with a new lamp as soon as possible. (refer to 4.3.1 "Removing the AS Lamp Unit" (p. 12))

3.2.2 Troubleshooting from the Error Code

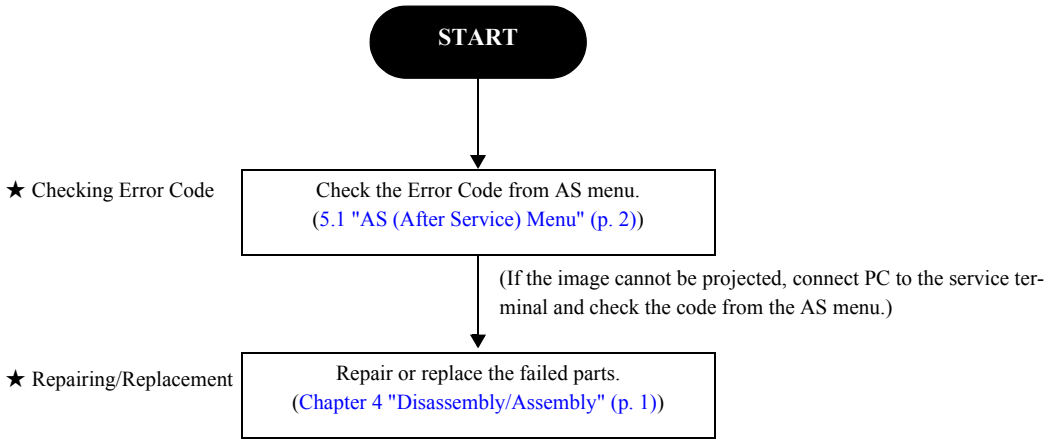


Figure 3-2 Flowchart of Troubleshooting from the Error Code

The troubleshooting to each error is explained below.

Error Status (AS menu)	Cause	Point to be checked	Remedy (Part to be improved/Reference)
Internal overheat (TH)	Overheating due to the clogging of the filter	Filter's condition	Replace the Air Filter Assy. • Air Filter (p. 13)
	Overheating due to the blocking of ventilation space	Abnormality of the external parts that causes the blocking	If damaged, replace the parts. • Chapter 4 "Disassembly/Assembly" (p. 1)
	Failure of the thermistor	Abnormality of the thermistor	If damaged, replace the thermistor. • TH Board Assy.(p. 35) • PS Ballast Assy.(p. 47)
	Damaged thermal parameters	Status of the parameters	Download the parameters again. (Backing up is required.)
Fan error (FN)	Broken fin	Abnormal sound of the fan	Replace the fan. • EX Fan (p. 37) • Intake Fans (p. 43) • Lamp Fan (p. 50)
	Abnormal revolutions of the fan	Fan's condition	If damaged, replace the fan. • EX Fan (p. 37) • Intake Fans (p. 43) • Lamp Fan (p. 50)
Fan error (FN)	Inappropriate connection of connectors	Connection status	If not appropriate, correct the connection. • MA Board Assy. (p. 26)
		Condition of cables/conduction state	Replace the fan. (due to the damaged cable) • EX Fan (p. 37) • Intake Fans (p. 43) • Lamp Fan (p. 50)
Fan error (FN)	Accumulation of dust on the fan	Influence of accumulated dust to the revolution of fan	Clean the fan. • EX Fan (p. 37) • Intake Fans (p. 43) • Lamp Fan (p. 50)
	Abnormality of the micro-computer	TBD	Replace the Optical Engine and MAB set. • MA Board Assy. (p. 26) • Optical Engine (p. 39))
	The thermal parameters are broken	TBD	Re-download the parameters. (Backing up the data is needed.)

Error Status (AS menu)	Cause	Point to be checked	Remedy (Part to be improved/Reference)
Thermistor error (SE)	Inappropriate connection of connectors	Connection status	If not appropriate, correct the connection. • MA Board Assy. (p. 26) • TH Board Assy. (p. 35)
		Connecter's terminal status	If damaged, replace the cable/board including the damaged terminal. • MA Board Assy. (p. 26) • TH Board Assy. (p. 35)
	Disconnection of the cable	Condition of cables/conduction state	Replace the thermistor. • TH Board Assy.(p. 35) • PS Ballast Assy.(p. 47)
	Failure of the sensor board	Condition of the sensor board	If damaged, replace the sensor board. • TH Board Assy.(p. 35) • PS Ballast Assy.(p. 47)
	Abnormality of the circuit	MAB's condition	Replace the Optical Engine and MAB set. • MA Board Assy. (p. 26) • Optical Engine (p. 39)
Lamp burnt out (LE)	Abnormal value of the V-LA (smaller than normal)	V-LA's status	Replace the AS Lamp Unit. • AS Lamp Unit (p. 12)
	Broken lamp damaged in operation	Damage of the lamp	
	Abnormality of the lamp due to the breakdown of the thermistor of the Ballast	Condition of the PS Air Filter (dirt, clogging)	Clean/replace the PS Air Filter. • Lower Case (p. 51)
Lamp burnt out (LE)	Malfunction of the thermistor	Condition of the PS Ballast Assy.	Replace the PS Ballast Assy. (PS's Failure) • PS Ballast Assy.(p. 47)
			Replace the PS Ballast Assy. (Ballast's failure) • PS Ballast Assy.(p. 47)
	Instability of the Input AC power supply.	Quality of the customer's power supply	If not appropriate, request the improvement.
Lighting failure (LF)	Abnormal value of the V-LA (greater than normal)	V-LA's status	Replace the AS Lamp Unit. • AS Lamp Unit (p. 12)
	Abnormal value of the V-LA (smaller than normal)		
	Instability of the Ballast's drive waveform		Replace the PS Ballast Assy. (Ballast's failure) • PS Ballast Assy.(p. 47)
	Failure of the lamp	Abnormality of the bulb (arc tube)	Replace the AS Lamp Unit. • AS Lamp Unit (p. 12)
		Breakage of the molybdic wire	
		Bend of the lead wire	
		Adhering of the mercury	Vibrate the Lamp unit. • AS Lamp Unit (p. 12)
Lighting failure (LF)	Failure of the lamp	Short-circuit between the electrodes	Replace the AS Lamp Unit. • AS Lamp Unit (p. 12)
	Overheating due to the clogging of the filter	Filter's condition	Replace the Air Filter Assy. • Air Filter (p. 13)

Error Status (AS menu)	Cause	Point to be checked	Remedy (Part to be improved/Reference)
Internal error RAM (RA)	Abnormality of the RAM	Menu's operation	Replace the Optical Engine and MAB set. • MA Board Assy. (p. 26) • Optical Engine (p. 39)
Internal error ROM (RO)	Abnormality of the MAB		
	Deterioration of the Flash ROM		
	Unstability of the Input AC power supply.	Quality of the customer's power supply	If not appropriate, request the improvement.
Internal error I2C (II)	Abnormality of the MAB	Menu's operation	Replace the Optical Engine and MAB set. • MA Board Assy. (p. 26) • Optical Engine (p. 39)
	Unstability of the Input AC power supply.	Quality of the customer's power supply	If not appropriate, request the improvement.
	Access timing error (occurs in a low temperature environment (Y43 series))	Temperature of the customer's operating environment.	
Internal error DR (ID)	Abnormality of the MAB	Menu's operation	Replace the Optical Engine and MAB set. • MA Board Assy. (p. 26) • Optical Engine (p. 39)
Lamp cover open (LC)	Abnormality of the Lamp Lid Detection Switch	Condition of the switch (shape, deformation)	Replace the Lamp Cover. • AS Lamp Unit (p. 12)
	Inappropriate connection of the cable.	Connection of the cable	Replace the Lamp Lid Detection Switch. • Lamp Lid Detection Switch (p. 35) If inappropriate, correct the connection. • Lamp Lid Detection Switch (p. 35)
	Abnormality of the Lamp Lid	Condition of the Lamp Cover	Replace the Lamp Cover. • AS Lamp Unit (p. 12)

3.2.3 Cable Connection and Projector's Status

The projector's status when disconnection occurs somewhere is described below.
When some irregular status is seen, refer to the following table and check the doubted connectors are securely connected. If there is a disconnection or a loose connection, connect it firmly. (For the procedure to remove the Upper Case, refer to 4.3.4 "Removing the Upper Case Unit" (p. 15))

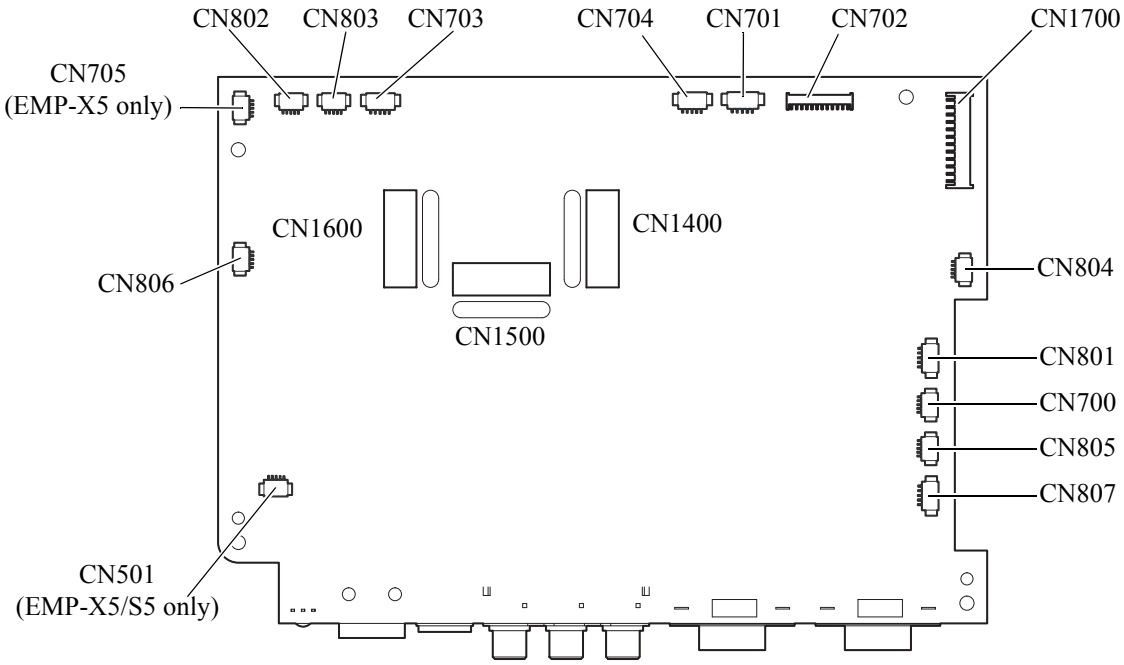


Figure 3-3 Connectors on the MA board

Table 3-4. Mal-connection and the Projector's Status

Connection (All models in common)		Status
MA board	Connected to	
CN1400	Optical Engine (L/V(R))	The power can turn on and the projection starts. But the projected image is all red or magenta (with a red frame).
CN1500	Optical Engine (L/V(G))	The power can turn on and the projection starts. But the projected image is all green or cyan (with a green frame).
CN1600	Optical Engine (L/V(B))	The power can turn on and the projection starts. The projected image is all blue, but this error cannot be easily found since the default window is the same color. Check the color of the menu window.
CN1700	PS Ballast (PS)	Even if the AC cable is connected, the power indicator is not lit. The power button does not work. (the same status as CN702 Switch Panel)
CN501	Speaker (EMP-X5/S5 only)	The power can turn on and the projection starts normally. But no sound is output from the speaker even if the audio input is applied.
CN700	Lamp Lid Detection SW	The power can turn on and the projection starts, but instantly the projector changes to the Lamp Error mode. (refer to 3.2.1 "LED Indicators" (p. 3)) The power turns off after a certain period of cooling. But the error message continues to be on.

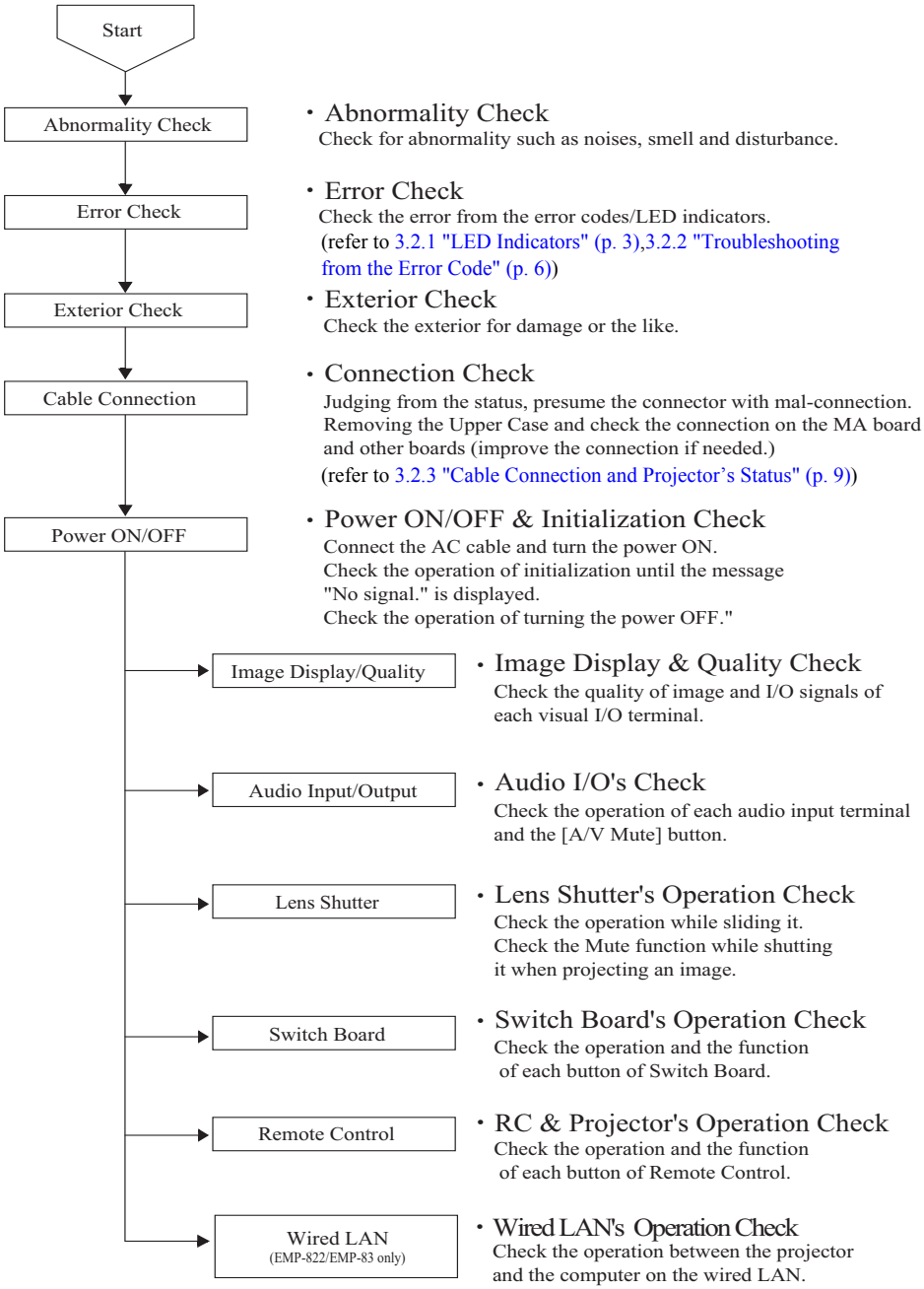
Table 3-4. Mal-connection and the Projector's Status

CN701	PS Ballast (SCI)	The power can turn on and the power indicator blinks, but the lamp is not ignited, so no image is projected. After a while, the projector changes to the Lamp Error mode. (refer to 3.2.1 "LED Indicators" (p. 3)) The power turns off after a certain period of cooling. But the error message continues to be on.
CN702	Switch Panel	Even if the AC cable is connected, the power indicator is not lit. The power button does not work. (the same status as CN1700 PS Ballast (PS))
CN704	Shutter Switch	The power can turn on and the projection starts normally. But even if the lens shutter is closed, the projection continues fully and the lamp keeps on. The AV mute function does not work when the shutter is closed, so the sound continues to be on. If the shutter kept closed, it may be deformed or damaged, so be careful. • Note: The control of AV Mute from the Remote Controller is effective.
CN703	RC board	The power can turn on and the projection starts normally. But the control from the front does not function. The control from the rear is still effective. When checking, send the signal to the front of the projector only. Otherwise, this error can be easily slipped over, so be careful. • Note: The setting of the RC receivers (active/inactive) is available from the menu. So, check the setting of the corresponding receiver before applying the remedy.
CN801	TH board	The power can turn on and the projection starts, but instantly the projector changes to the Fan/Sensor Error mode. (refer to 3.2.1 "LED Indicators" (p. 3)) The power turns off after a certain period of cooling. But the error message continues to be on.
CN807	P/S thermistor	
CN802	Intake Fan A	
CN803	Intake Fan B	
CN804	Exhaust Fan	
CN805	P/S Fan	
CN806	Lamp Fan	
Connection (EMP-822/83 only)		**Status**
IF board	**Connected to**	
CN3003	Speaker Unit	The power can turn on and the projection starts normally. But no sound is output from the speaker even if the audio input is applied.

3.3 Troubleshooting

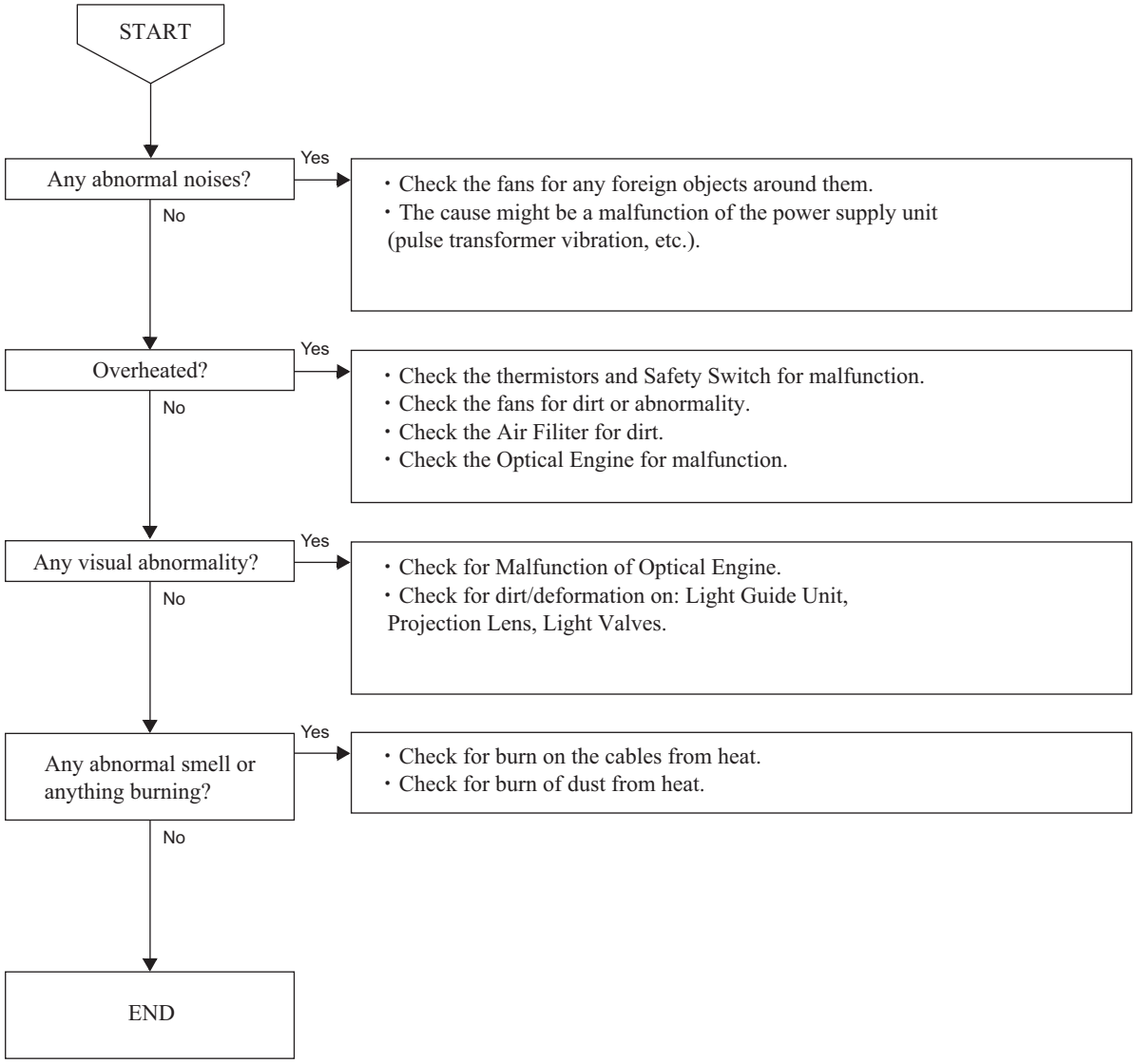
Following the Basic Checking Flowchart below, check the trouble and refer to the flowchart corresponding to it (the charts are provided from the next page).

3.3.1 Basic Checking Flowchart



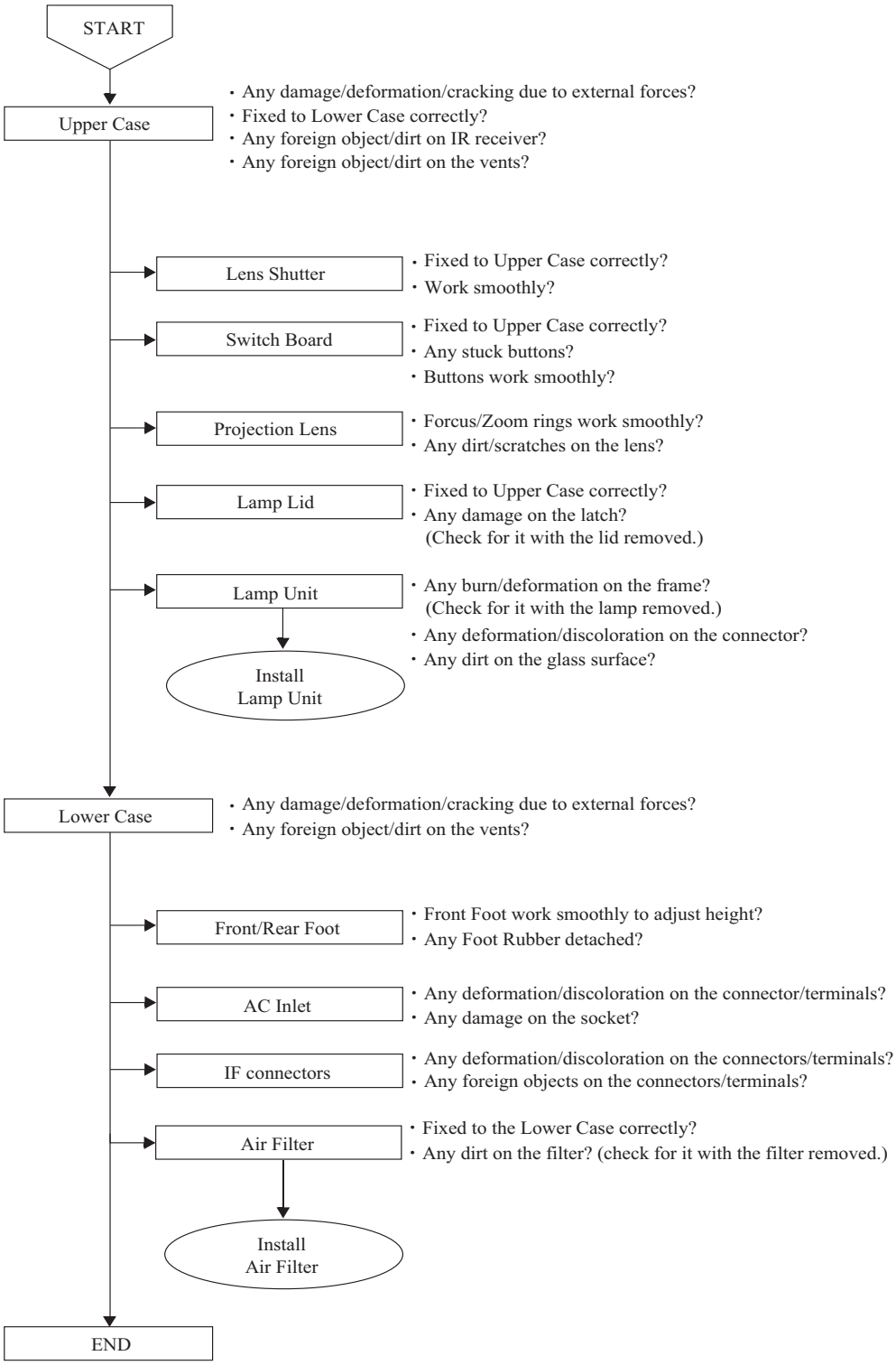
Flowchart 3-1 Basic Checking Flowchart

3.3.2 Abnormality Check



Flowchart 3-2 Abnormality Check

3.3.3 Exterior Check

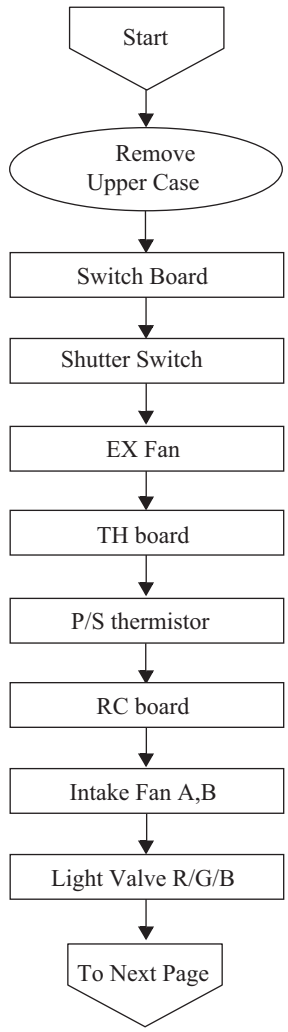


For more information, refer to 4.3.1 "Removing the AS Lamp Unit" (p. 12) / 4.3.2 "Removing the Air Filter Assy." (p. 13).

Flowchart 3-3 Exterior Check

3.3.4 Connection Check

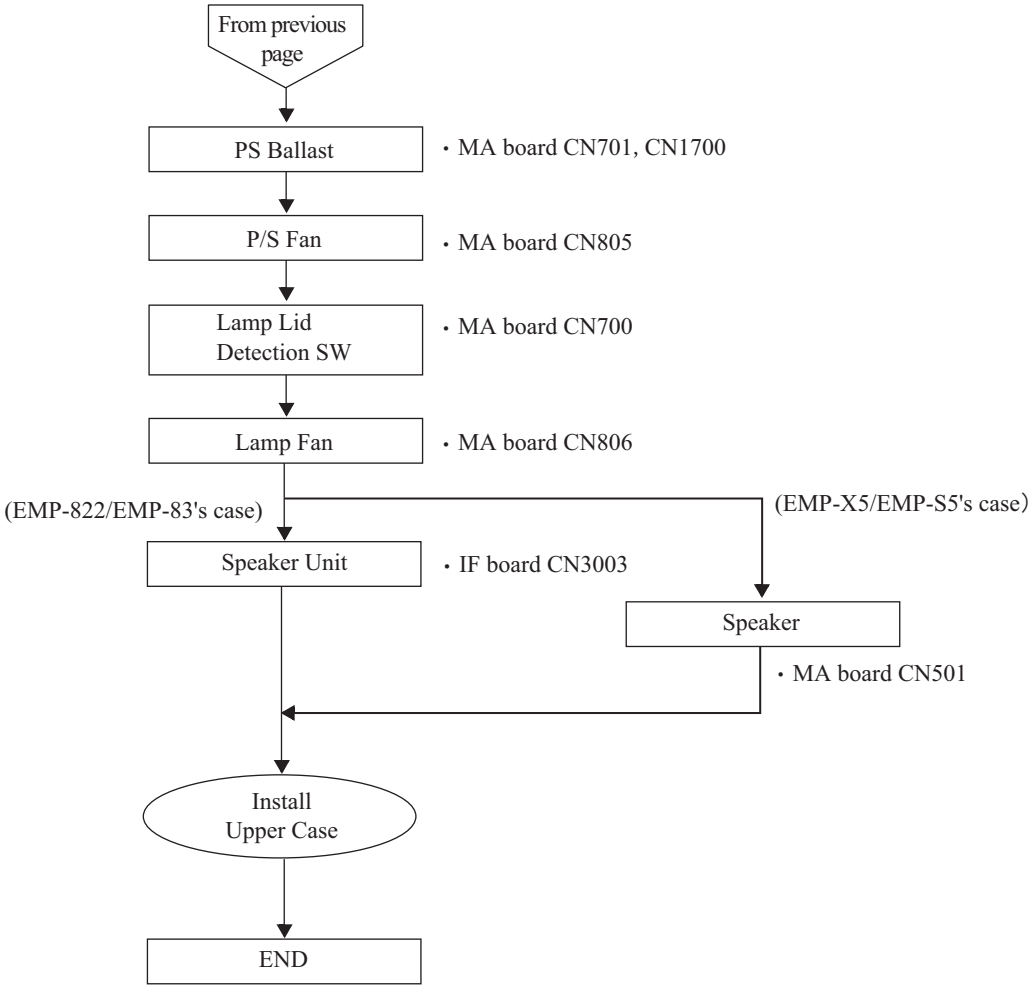
Before starting the checking work, be sure to turn off the power and detach the AC cable. (refer to 3.2.3 "Cable Connection and Projector's Status" (p. 9))



- MA board CN702 (Lock-type connector)
- MA board CN704
- MA board CN804
- MA board CN801
- MA board CN807
- MA board CN703
- MA board CN802, CN803
- MA board CN1400/CN1500/CN1600 (Lock-type connector)

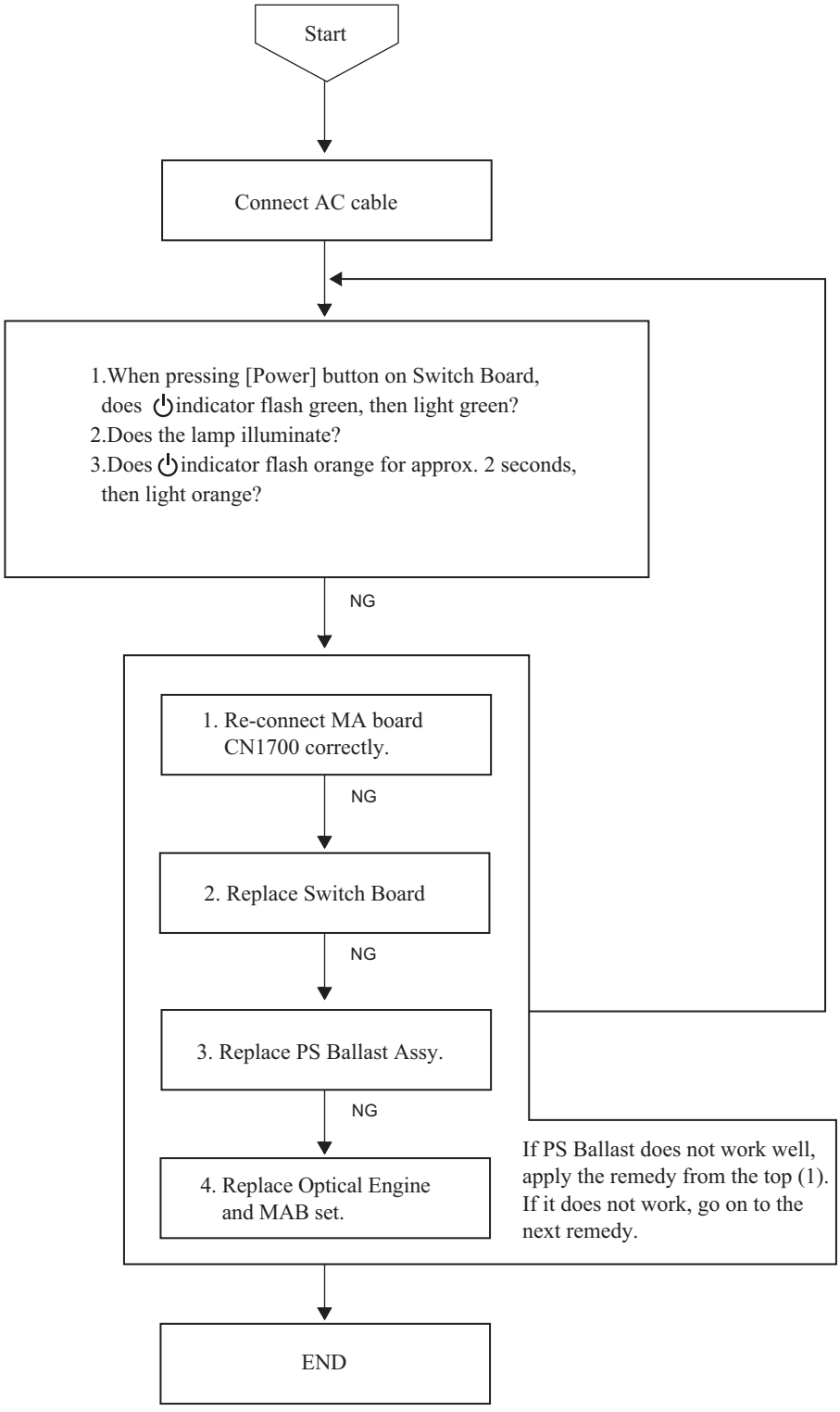
For more information, refer to 4.3.4 "Removing the Upper Case Unit" (p. 15) / 4.4.2 "Removing the Optical Engine and MAB set(1) (MA Board Assy.) /IF Case" (p. 26).

Flowchart 3-4 Connection Check (1)



Flowchart 3-5 Connection Check (2)

3.3.5 Power ON/OFF & Initialization Check

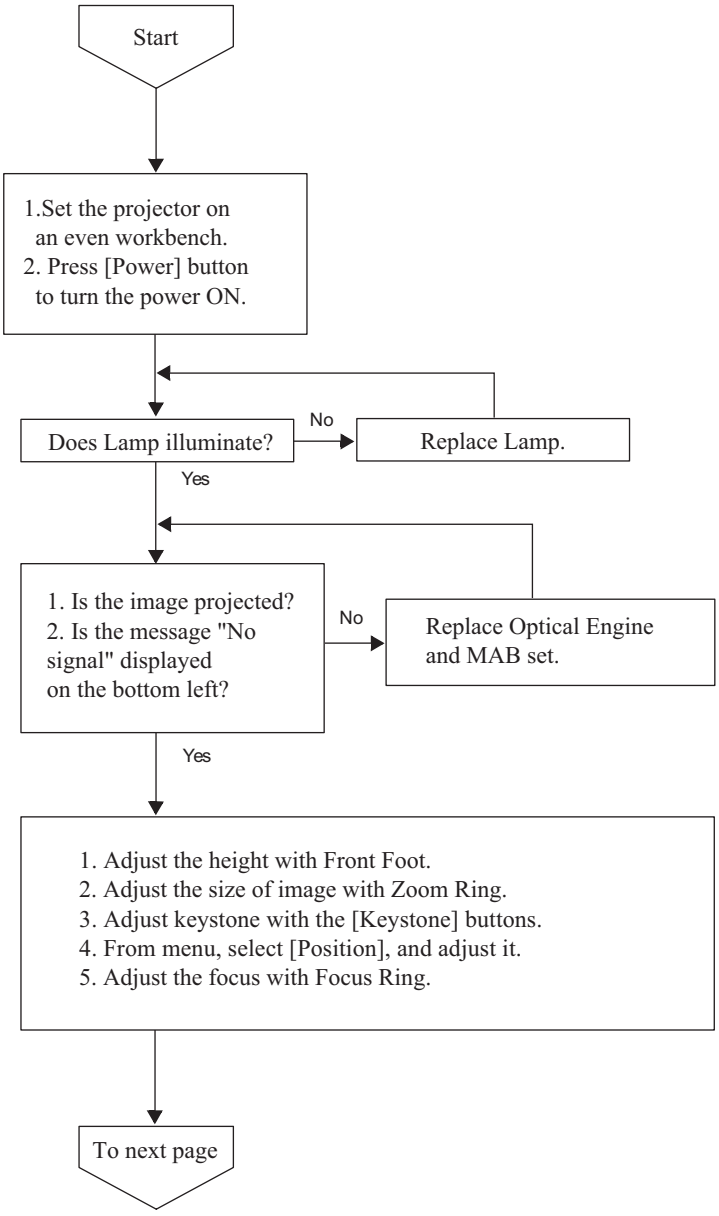


For more information, refer to 4.3.4.1. "Removing the Switch Board Assy." (p. 17) / 4.5.2 "Removing the PS Ballast Assy." (p. 47) / 4.4.2 "Removing the Optical Engine and MAB set(1) (MA Board Assy.) /IF Case" (p. 26) / 4.4.5 "Removing the Optical Engine and MAB set (2) (Optical Engine)" (p. 39)

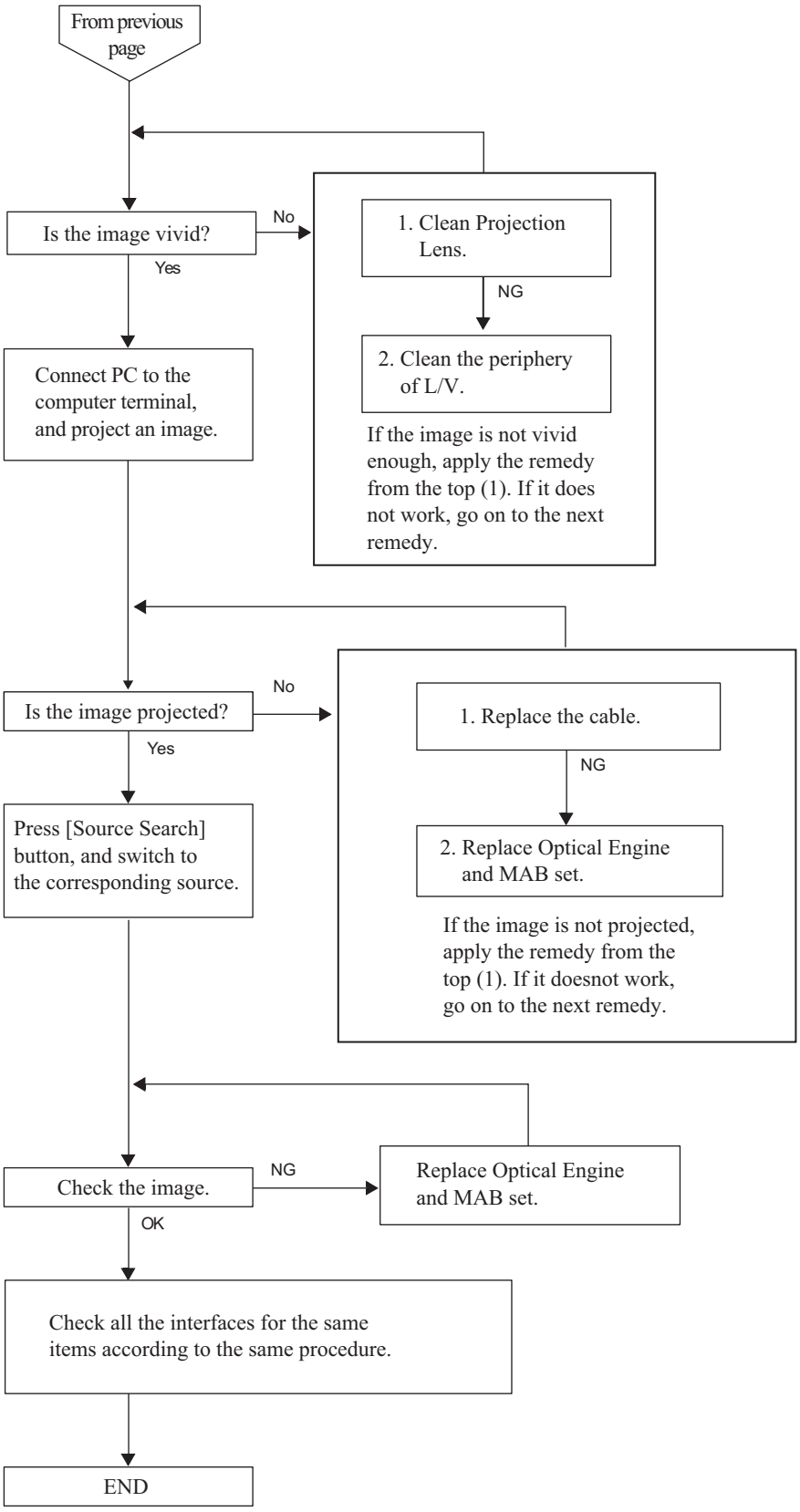
Flowchart 3-6 Power ON/OFF & Initialization Check

3.3.6 Image Display & Quality Check

The image quality can also be affected by condensation or by a dirty lens. If condensation forms, the problem will correct itself naturally if the projector is left to stand for a while.



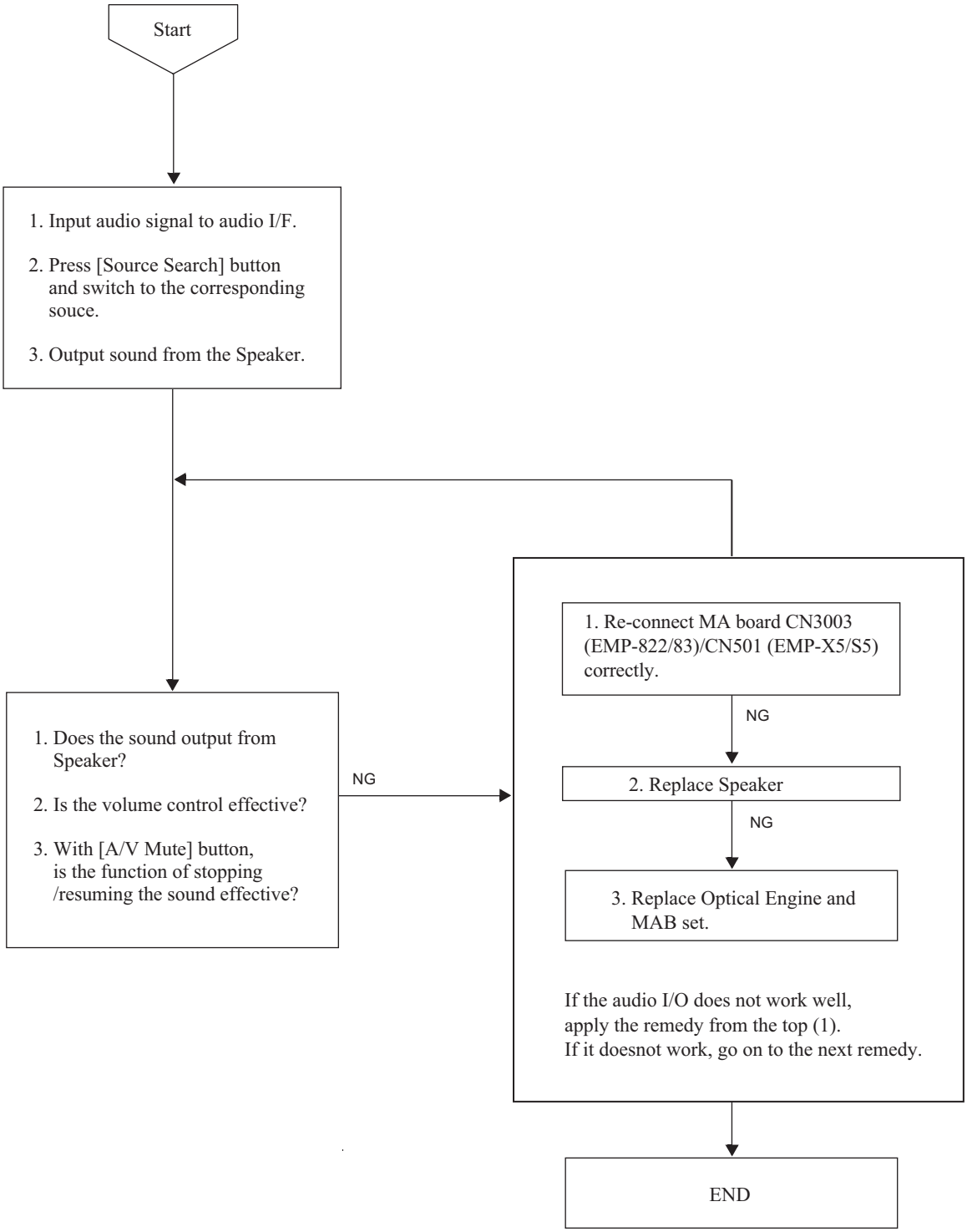
Flowchart 3-7 Image Display & Quality Check (1)



For more information, refer to 4.3.1 "Removing the AS Lamp Unit" (p. 12) / 4.4.2 "Removing the Optical Engine and MAB set(1) (MA Board Assy.) /IF Case" (p. 26) / 4.4.5 "Removing the Optical Engine and MAB set (2) (Optical Engine)" (p. 39)

Flowchart 3-8 Image Display & Quality Check (2)

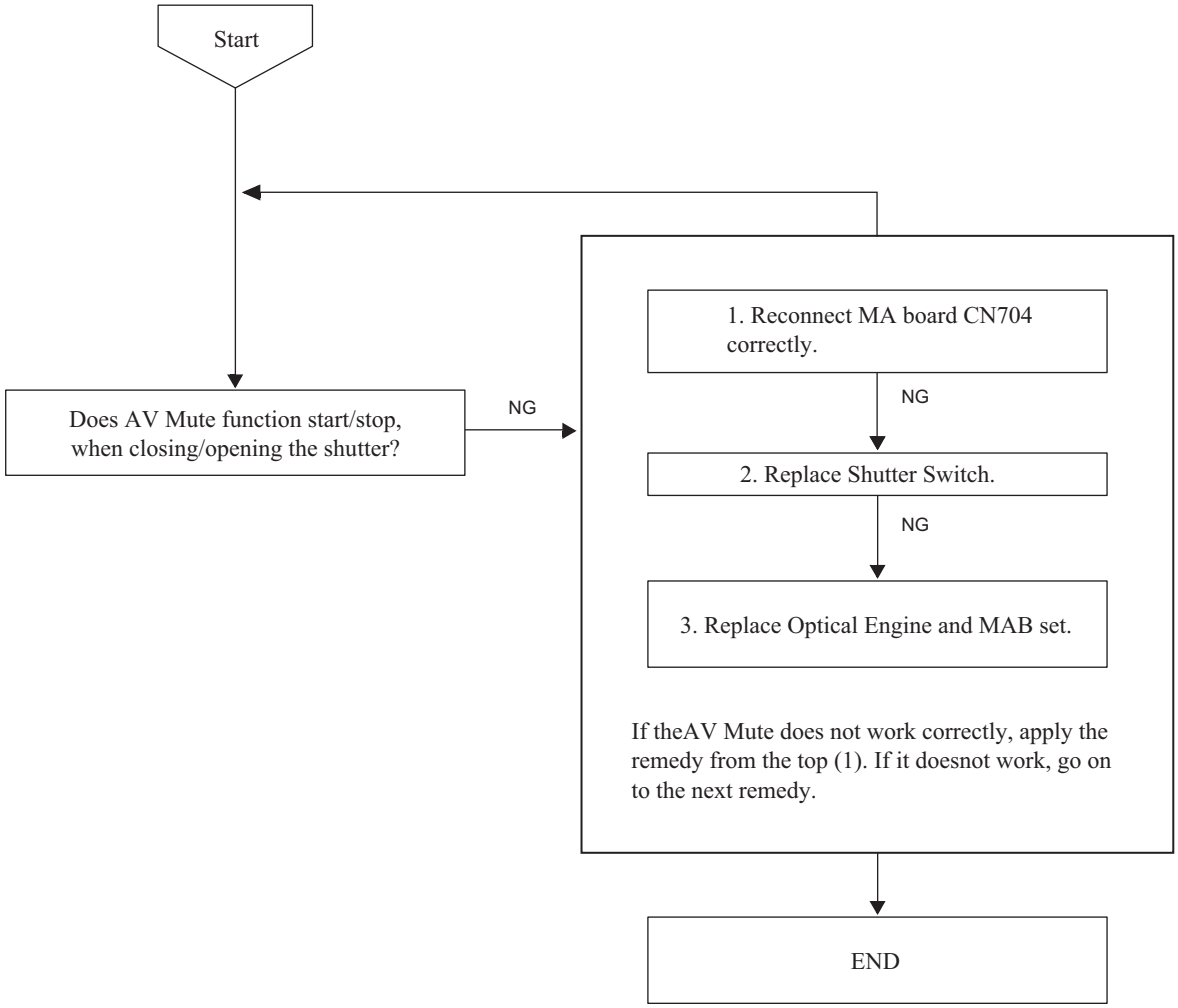
3.3.7 Audio I/O's Check



For more information, refer to 4.5.3 "Removing the Lamp Fan/Speaker Unit (EMP-822/EMP83 only)" (p. 50) / 4.4.2.2. "Removing the Speaker. (EMP-X5/EMP-S5 only)" (p. 34)/4.4.2 "Removing the Optical Engine and MAB set(1) (MA Board Assy.) /IF Case" (p. 26) / 4.4.5 "Removing the Optical Engine and MAB set (2) (Optical Engine)" (p. 39)

Flowchart 3-9 Audio I/O's Check

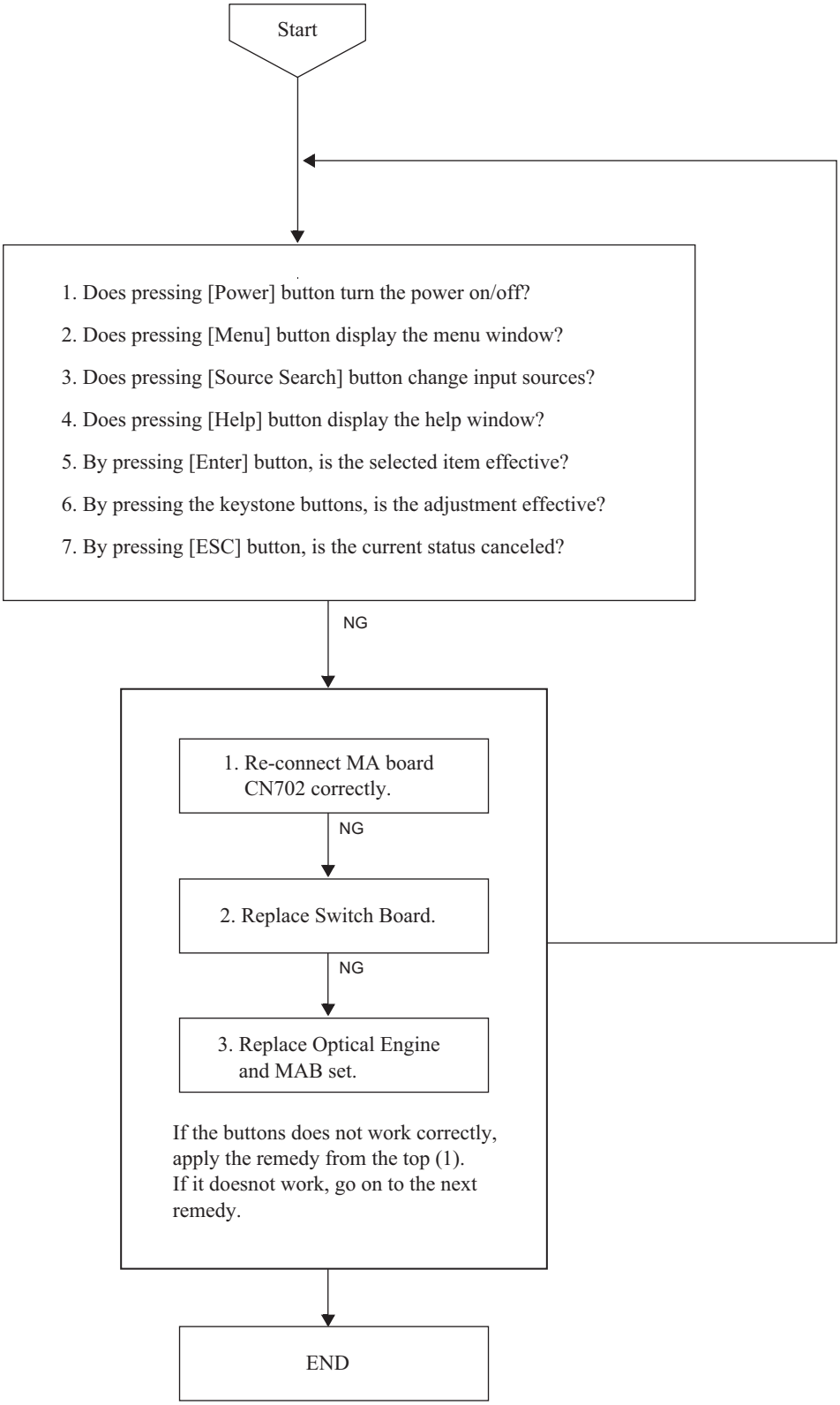
3.3.8 Lens Shutter's Operation Check



For more information, refer to 4.3.4.2. "Removing the Shutter Switch" (p. 19) / 4.4.2 "Removing the Optical Engine and MAB set(1) (MA Board Assy.) /IF Case" (p. 26) / 4.4.5 "Removing the Optical Engine and MAB set (2) (Optical Engine)" (p. 39)

Flowchart 3-10 Lens Shutter's Check

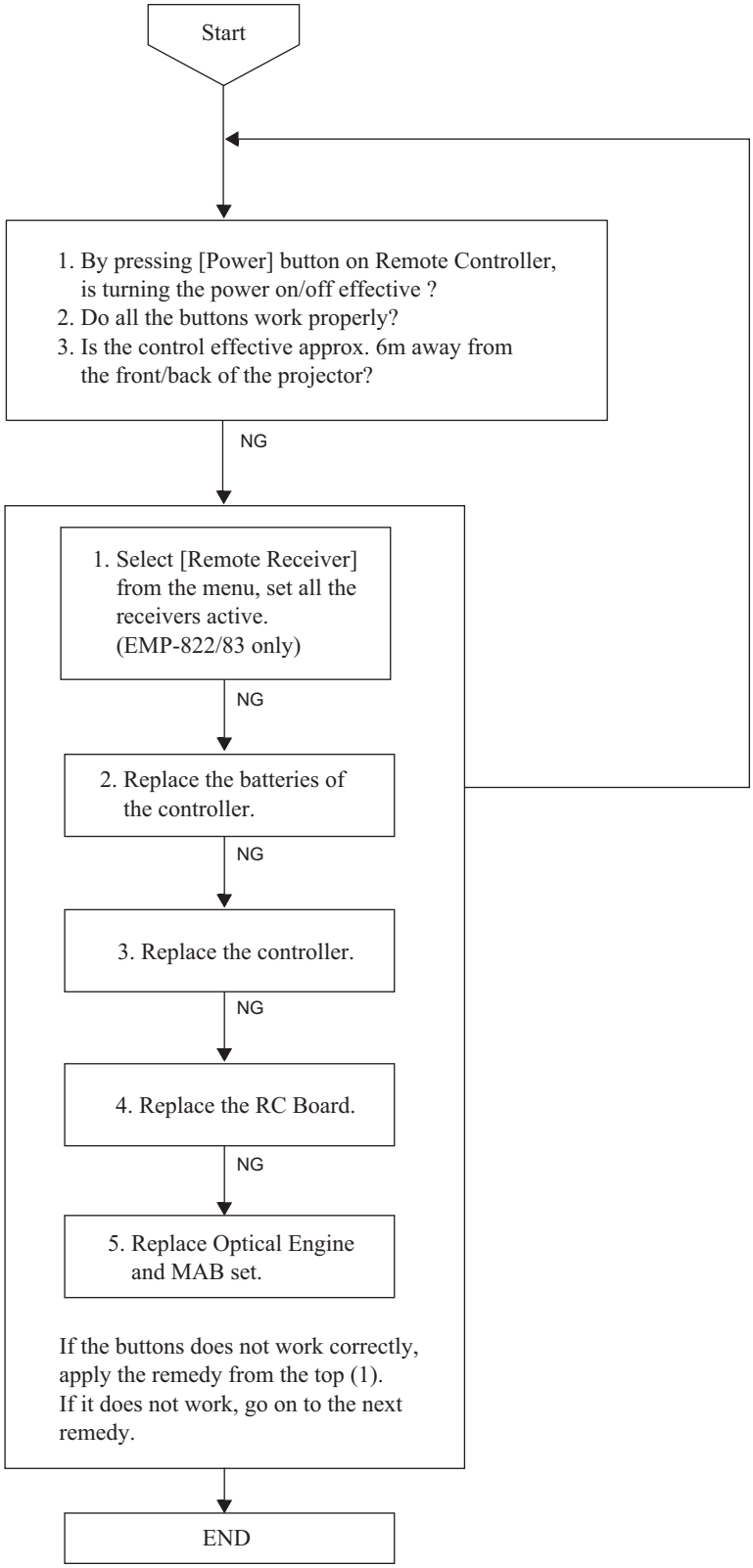
3.3.9 Switch Board's Operation Check



For more information, refer to 4.3.4.1. "Removing the Switch Board Assy." (p. 17)/4.4.2 "Removing the Optical Engine and MAB set(1) (MA Board Assy.) /IF Case" (p. 26)/4.4.5 "Removing the Optical Engine and MAB set (2) (Optical Engine)" (p. 39).

Flowchart 3-11 Switch's Operation Check

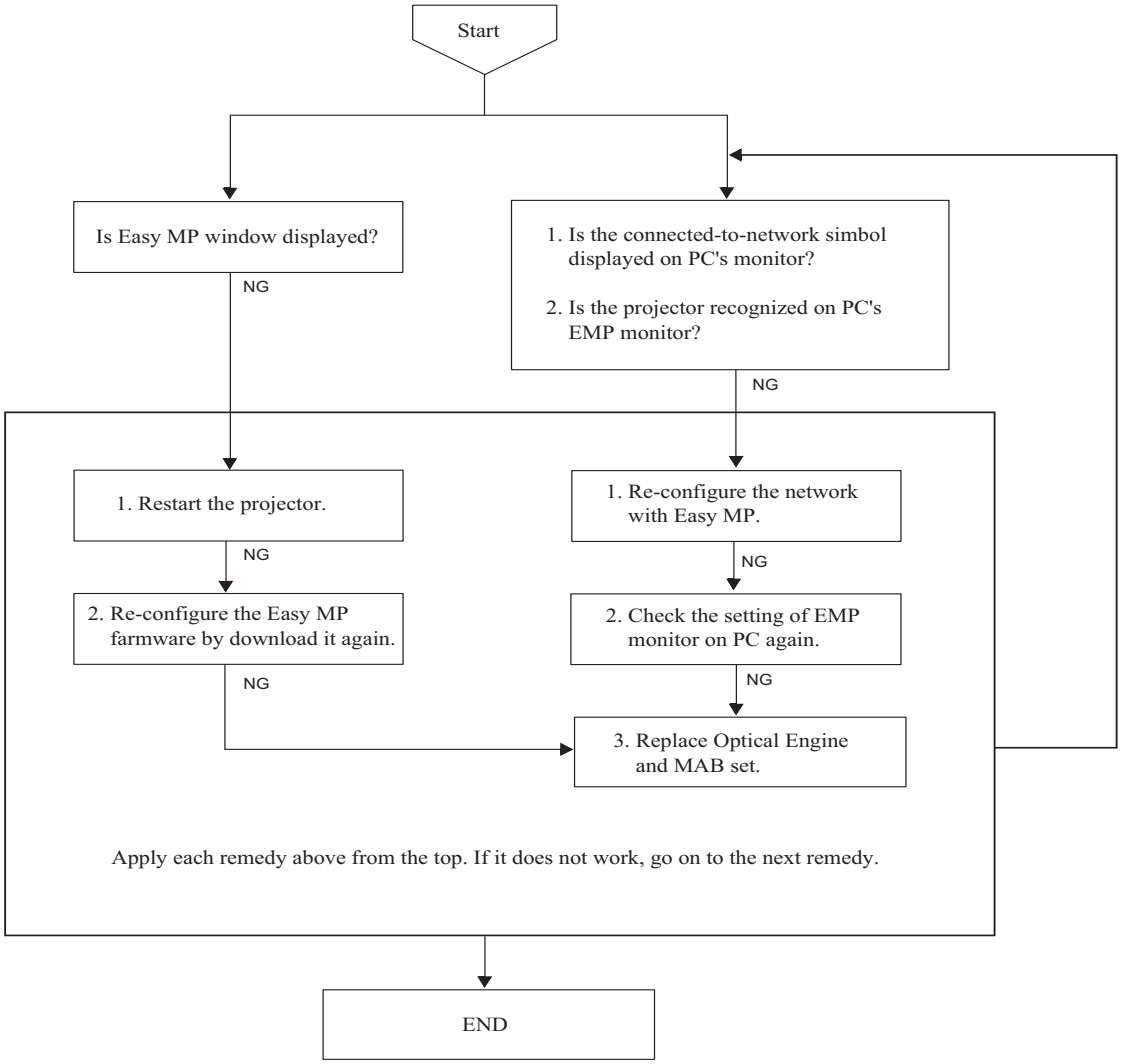
3.3.10 RC & Projector's Operation Check



For more information, refer to 4.5.1 "Removing the Inner EX Duct A/Intake Fan/RC Board Assy." (p. 43)/4.4.2 "Removing the Optical Engine and MAB set(1) (MA Board Assy.) /IF Case" (p. 26) / 4.4.5 "Removing the Optical Engine and MAB set (2) (Optical Engine)" (p. 39).

Flowchart 3-12 RC & Projector's Operation Check

3.3.11 Wired LAN's Operation Check (EMP-822/EMP-83 only)



For more information, refer to 4.4.2 "Removing the Optical Engine and MAB set(1) (MA Board Assy.) /IF Case" (p. 26) / 4.4.5 "Removing the Optical Engine and MAB set (2) (Optical Engine)" (p. 39).

Flowchart 3-13 Wireless/Wired LAN's Operation Check (EMP-822/EMP-83 only)

Chapter 4 Disassembly/Assembly

4.1 Overview

This chapter describes the procedures for disassembling and assembling the main components of the EMP-822/EMP-83/EMP-X5/EMP-S5 projector. Unless otherwise specified, reassembly is the reverse of the disassembly procedure. Read the precautions described in the next section before starting.

4.1.1 Precautions

Some procedures require specific precautions that must be followed, and those will be noted throughout this chapter. Note the following precaution definitions:

WARNING

Procedures which, if not strictly observed, could result in personal injury are described under the heading **WARNING**

CAUTION

CAUTION signals a precaution which, if ignored, could result in damage to equipment.

REASSEMBLY

If assembly needs special attention or the procedure is different from the reversed disassembly procedure, the correct procedure is described under the heading **REASSEMBLY**.

CHECK POINT

Important tips for procedures are described under the heading **CHECK POINT.**

4.1.2 Precautions which must be taken when servicing

The precautions given below must be always observed whenever you disassemble/reassemble the projector to maintain the quality. In addition, make sure to observe the WARNING and CAUTION precautions given in each section which describe disassemble/reassemble procedure of each unit or component in this chapter.

- When the projector is disassembled, the dust in and around parts (such as the fans and air filter) may get transferred to other parts such as the R, G and B light valves which are the central part of the display mechanism. This may have an adverse effect on the quality of projected images. Accordingly, be sure to check whether any of the parts are dusty or dirty, and use a vacuum cleaner to clean them first before carrying out disassembly work.
- The Optical Engine and the circuit boards are very sensitive to static electricity. Place them inside static-proof bags once they have been removed from the projector.
- When carrying out any of the following operations, check that there is no dust or dirt on the respective components or on any
- and glass surfaces before installation. If any such contamination is found, clean it off using isopropyl alcohol.
  - Optical Engine removal
  - Lamp assembly removal
  - Air filter removal

- The speaker unit contains a permanent magnet, so keep it away from any storage media such as floppy disks and magnetic cards.
- The Optical Engine is very sensitive to vibration and shocks, so handle it with care.
- Do not disassemble any components (such as the power supply unit) which do not have express disassembly procedures described in this Service Manual.

4.1.3 Safety precautions

For safety purpose, and to protect the product from damage, the precautions given below must always be observed.

1. Disconnect the power cable from both the projector and the electrical outlet.
2. Disconnect any interface cables from the projector.
3. Always wear gloves when disassembling and reassembling the projector.
4. Use static discharge equipment such as anti-static wrist straps when accessing internal components to protect sensitive electronic components and circuitry.
5. Remove any metallic objects such as wristwatches, shirt cuff buttons, rings and tie pins which may pose a danger of coming into contact with the projector.
6. Before disassembling the projector, make sure to clean any dust or dirt on the air filter, interface section and outer case using a vacuum cleaner or other method.

4.1.4 Safety Check after Servicing

Definition
"Unsafe state" is the state of a part that may cause or contain the risk of the following:

- personal injuries
- damages to the property
- abnormal heat generation
- smoking
- fire
- explosion
- damage to the part to be installed
- disturbance to/from the peripheral device (EMC disturbance)
- chemical substances regulated by the law

1. Safety Devices/Functions are:
   - the parts that become unsafe if their specifications or functions are nonconforming.
   - the parts that require attention to the safety precautions of the customer.
   - the parts that are designated by the public safety regulations or the like.
2. The Safety Control Points are:
   - the processes that Safety Devices/Functions are manufactured, or checked.
   - the processes that require the management to maintain the workers' safety.
3. Safety Devices/Functions of this product
   - PS-Ballast Assy.
   - Lamp
   - The caution not to look through the Projection Lens (printed on the Upper Case)
   - The caution for replacing the Lamp (Caution Label, A)
   - The caution about opening the Lamp Cover (Caution Label, F)
   - Lamp Lid Detection Switch

4. Method to check the Safety Control Points

☐ Insulation resistance test

■ Testing procedure

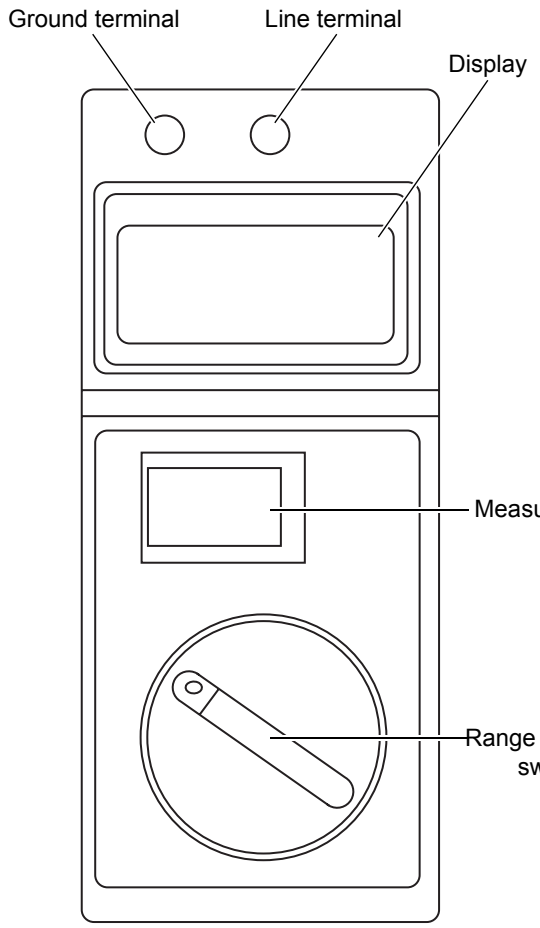
Carry out testing in the order given below.

■ Testing methods

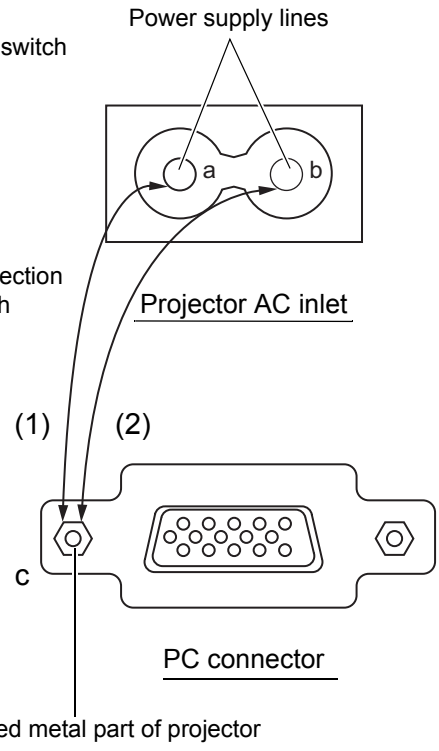
- Testing apparatus: Insulation ohmmeter (Rating: 500 V/100 MΩ)

Check Item	Tool	Standard
Insulation resistance check	Insulation ohmmeter	Insulation resistance should be 10 MΩ or more.

- Insulation ohmmeter settings



1. Set the range selection switch to 500 V.
2. Connect the black lead wire to the ground terminal.
3. Connect the red lead wire to the line terminal.
4. Connect the black lead wire (crocodile clip) to c in order to measure the insulation resistance (1) (between a and c) in the diagram below.
5. Next, insert the probe of the red lead wire into a.
6. Set the measure switch to LOCK, and then measure the insulation resistance after 1 minute.
7. Check that the insulation resistance after 1 minute is 10 MΩ or more.
8. Next, measure the insulation resistance at (2) (between b and c) in the diagram below in the same way as for (1).
9. Check that the insulation resistance at (2) after 1 minute is 10 MΩ or more.

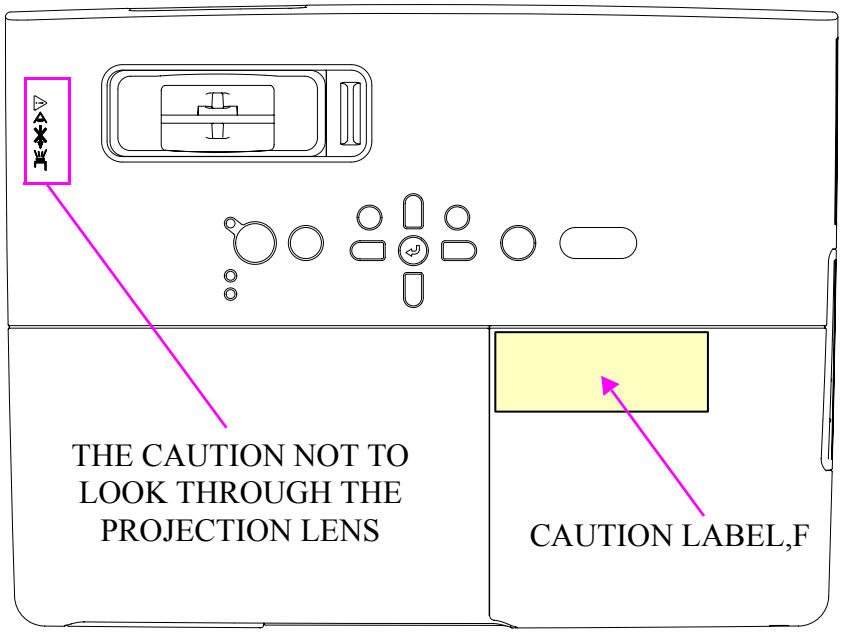


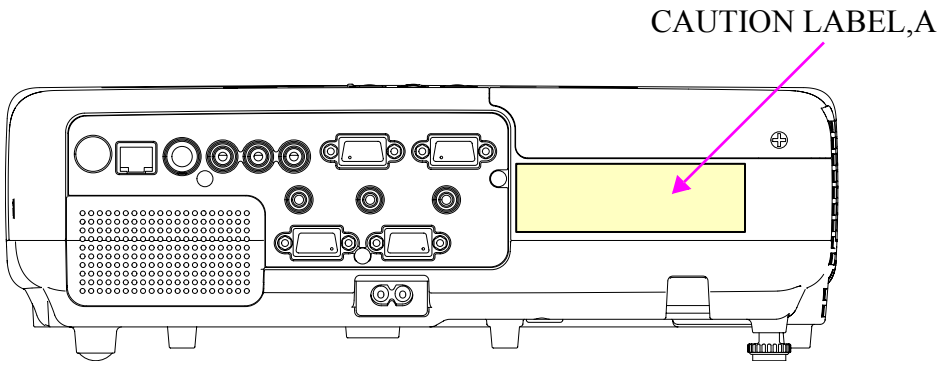
Caution

Because high voltage (500 V) is present, do not touch the probe during testing.

- Checking labels

Check that each caution labels are placed in the positions shown in the figure below.
* When replacing parts with caution labels attached, make sure to stick the label to the replaced parts.





4.1.5 Tools and Equipment

The table below lists the tools and equipment required for servicing the projector. All are commercially available, and should be made ready beforehand.

Table 4-1.

Name	Qty.	Application
Phillips screwdriver No. 0 (8cm)	1	Disassembling the focus ring and the zoom ring
Phillips screwdriver No. 1 (10cm)	1	Disassembling the outer case and inner components
Phillips screwdriver No. 2 (10cm)	1	Disassembling the outer case and inner components
Flathead screwdriver	1	Disassembling the rear foot
Hexagonal box screwdriver (5 mm)	1	Removing the computer interface
Tweezers	1	Removing the front foot
Heat-resistant tape	q.s.*	Securing cables
Brush	1	Cleaning away dust
Vacuum cleaner	1	Cleaning away dust
Lens cleaner	q.s.*	Cleaning the projection lens
Gloves	1	
Anti-static wrist band	1	
Lubricant	q.s.*	

* q.s.: Sufficient quantity

4.1.6 Precautions for Optical Engine and Main (MA) Board

The Optical Engine and MA Board are paired together as a single service part. Neither is available separately. For servicing that requires the replacement either of the MA Board or the Optical Engine, both components must be replaced together.
The component parts of the Optical Engine require mechanical installation positions to be adjusted in relation to each other. In addition, the control circuit also has its own unique characteristics, such as display signal output drivers, that differ from projector to projector. There are also unique differences in each optical system mechanism, such as in the light valves.
In order to obtain the optimum display, it is necessary to eliminate these differences in electrical and mechanical characteristics as well as to make mechanical adjustments. The various correction values are set at the time of shipment from the factory and are stored in ROM on the MA Board.

- Always replace the Optical Engine and MA Board together as a matched pair.
- Do not disassemble the Optical Engine. Special jigs are required for reinstalling the optical components in the engine, such as POP Assy., condenser lens, mirrors. Reassembling the Optical Engine without using the jigs are strictly prohibited.
- Do not remove the upper guide cover of the Optical Engine. Doing so may contaminate the internal components with dust or dirt attached to the Optical Engine and adversely affect the image quality.

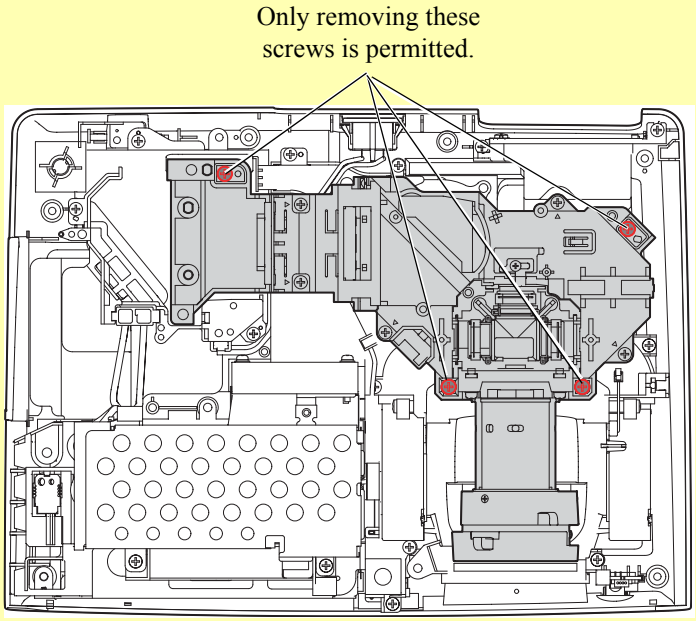
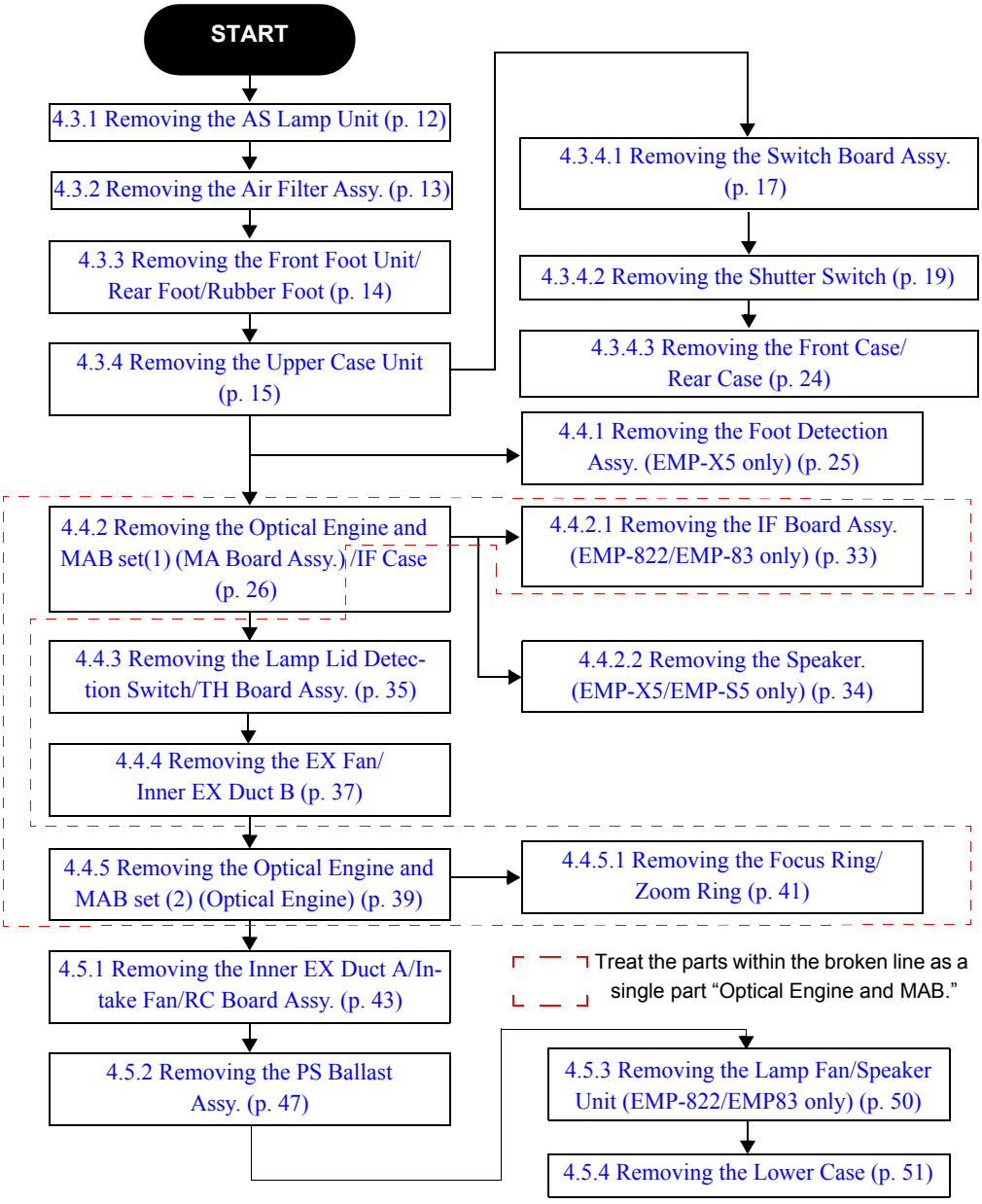


Figure 4-1.

4.2 Projector Disassembly and Assembly

The general disassembly procedure for the EMP-822/EMP-83/EMP-X5/EMP-S5 projectors is illustrated below. Except where indicated separately, all reassembly should be carried out by following the disassembly procedures in reverse. Detailed disassembly procedures for each component are given in Sections 4.3 Removing Exterior Parts/Components to 4.5 Removing Other Main Parts , links to which are given in the flowchart below.

Do not reassemble the Optical Engine.



CHECK POINT

- The procedures are described with EMP-822 otherwise specified.
- The part names above and in this chapter are simplified. See the "Part Names given in the SPI" table on the next page for the corresponding official names.

Figure 4-2.

The table below shows the part names used in this chapter and their official names given in the After Service Part List in the SPI (Service Part Information).

Table 4-2. Part Names given in the SPI

Names used this Chapter	Official Name used in SPI
Air Filter Assy.	AIR FILTER ASSY
AS Lamp Unit	--
AS Lamp Lid	lamp cover, unit;G
Button	BUTTON;W
EMI Sheet	sheet,EMI
EX Fan	FAN,EXHAUST
Focus ring	FOCUS RING
Foot Detection Assy.(EMP-X5 only)	FOOT DETECT ASSY.
Foot Rubber	FOOT RUBBER
Front Case	case,front;AJ
Front Foot Unit	FOOT UNIT,FRONT
IF Case	CASE,IF;G
IF Label	label if ;J
IF Board Assy.(EMP-822/83 only)	PRINTED CIRCUIT BOARD ASSEMBLY;IF_R1
Inner Exhaust Dust A	DUCT,EXHAUST,INNER;A42
Inner EX Dust B	DUCT,EXHAUST,INNER;B
Intake Duct	DUCT,INTAKE
Intake Fan	FAN,INTAKE
Intake Fan Sheet	SHEET,INTAKE FAN
Lamp Duct	DUCT,LAMP
Lamp Fan	FAN,LAMP
Lamp Lid Detection Switch	LAMP COVER DETECTION SWITCH
Lamp Shield B	SHIELD LAMP;B
Lamp Shield	SHIELD,LAMP
LED Lens	LENS,LED
LED Shading Cushion	CUSHION SHADING,LED
Lens Shading Sheet	SHEET,SHADING,LENS
Lower Case	CASE,LOWER,ASSY;G;AS
Lower Case Seal	SEAL,CASE LOWER;G
MA Board Assy.	Optical Engine and MAB set (1) (refer to Components of the Optical Engine and MAB set (p. 40))
MA Plate	PLATE,MA
MA Shield	SHIELD,MA

Table 4-2. Part Names given in the SPI

Names used this Chapter	Official Name used in SPI
Optical Engine	Optical Engine and MAB set (2) (refer to Components of the Optical Engine and MAB set (p. 40))
Plate Nut	PLATE,NUT;M3
PS Air Filter	AIR,FILTER,PS
PS Ballast Assy.	ps ballast,assy;AS
RC Board Assy.	PRINTED CIRCUIT BOARD ASSEMBLY;RC_R1
RC Cable	Cable RC;B
RC Filter	FILTER,RC
Rear Case	CASE,REAR;G
Rear Foot	FOOT,REAR
Shutter A	SHUTTER;A
Shutter Ball	BALL,SHUTTER
Shutter Frame	frame,shutter;a
Shutter Sheet	sheet,shutter
Shutter Spring	SPRING,SHUTTER
Shutter Switch	SWITCH,SHUTTER
Speaker Spring	Spring Speaker
Speaker(EMP-X/S5 only)	Speaker
Speaker Unit(EMP-822/83 only)	Speaker Unit
SW Shading Sheet	SHEET,SHADING,SW;B
Switch Board Assy.	PRINTED CIRCUIT BOARD ASSEMBLY;SW_R2
TH Board Assy.	PRINTED CIRCUIT BOARD ASSEMBLY;TH_R1
Upper Case Unit	--
Zoom Ring	ZOOM RING

4.3 Removing Exterior Parts/Components

4.3.1 Removing the AS Lamp Unit

This part is designated as the Safety Device. When removing/replacing the part for repair, be sure to refer to the following section. According to the instructions in it, handle the part and perform the procedure after servicing.

■ 4.1.4 "Safety Check after Servicing" (p. 4)

1. Loosen the screw (SCREW,LAMP;3X6) that secures the AS Lamp Lid, and remove the AS Lamp Lid.
2. Remove the screw (SCREW,LAMP;3X6) from the AS Lamp Lid.
3. Loosen the two screws that secure the AS Lamp Unit and remove the AS Lamp Unit.

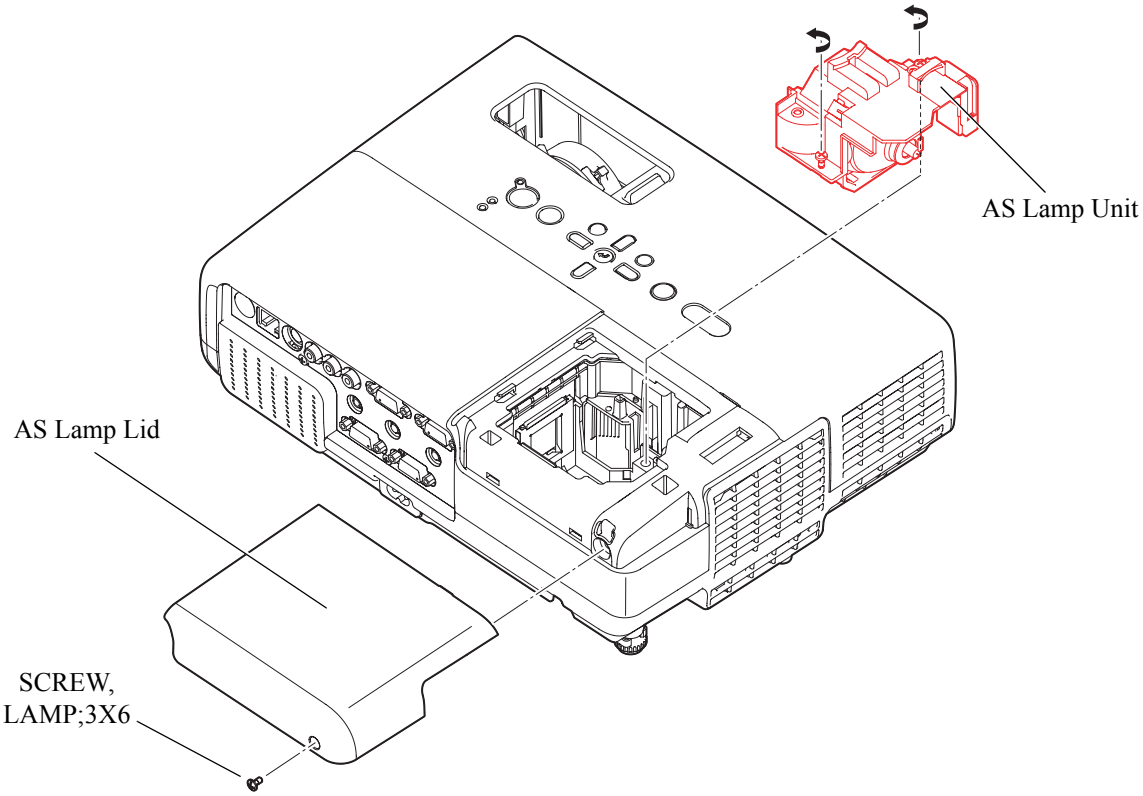


Figure 4-3.

4.3.2 Removing the Air Filter Assy.

1. Pull the tab of the Air Filter Assy. outward with your finger, and remove the Air Filter Frame.

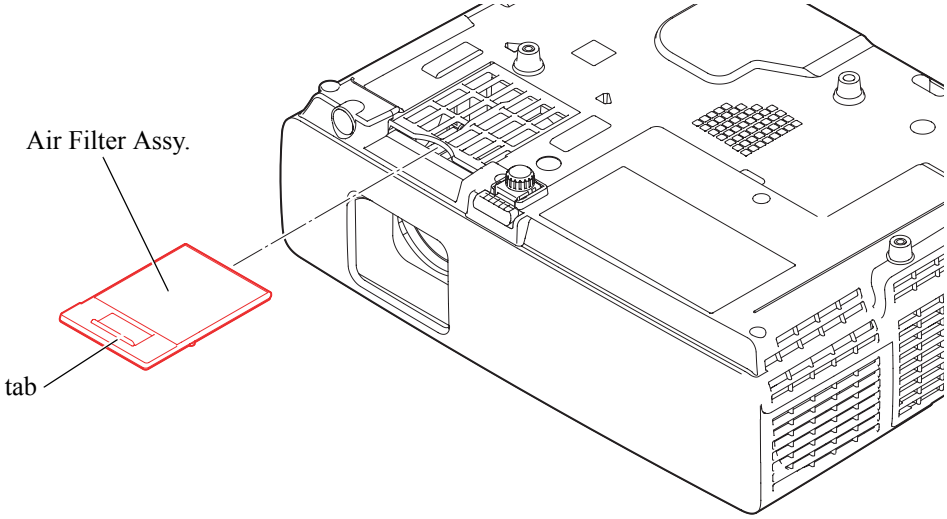


Figure 4-4.

4.3.3 Removing the Front Foot Unit/Rear Foot/Rubber Foot

■ Removing the Front Foot Unit

1). Press a Tweezers or similar tool into the small slot beside the Front Foot Unit, and take out the Front Foot Unit.

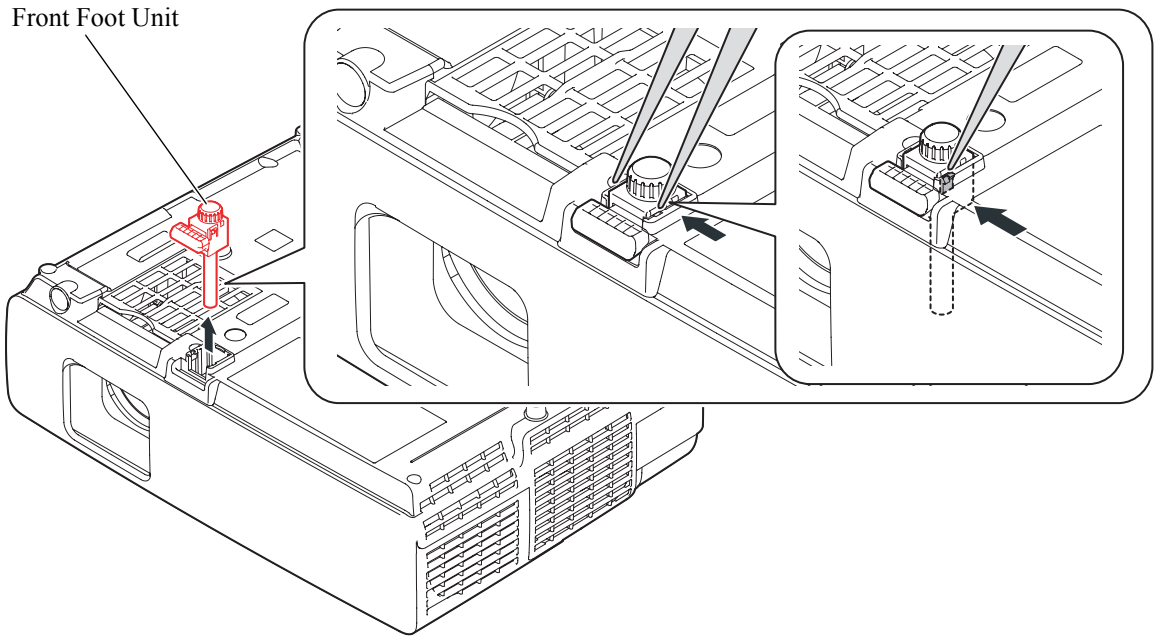


Figure 4-5.

■ Removing the Rear Foot/Foot Rubber

1). Pull and rotate the Rear Foot to remove the Rear Foot.

2). Press a screwdriver or similar tool into the small slot beside the Rear Foot and pry out the Foot Rubber from the Rear Foot.

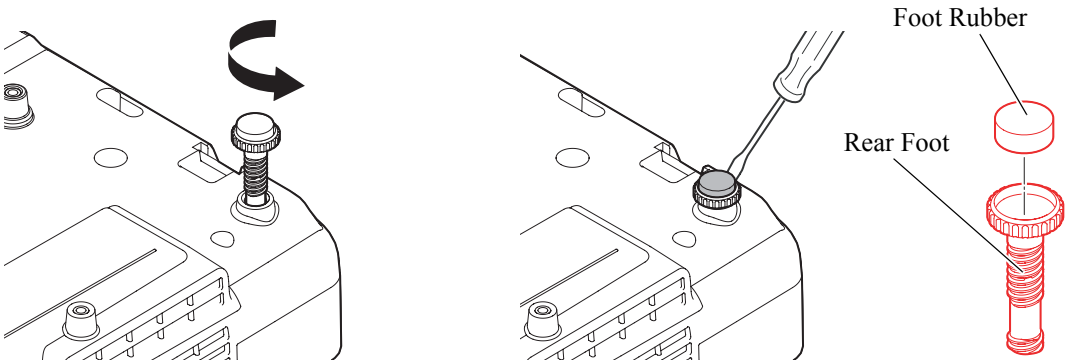


Figure 4-6.

4.3.4 Removing the Upper Case Unit

1. Remove the eight screws (C.B.P-TITE SCREW,3X10,F/ZB-3C) that secure the Upper Case Unit from the bottom.

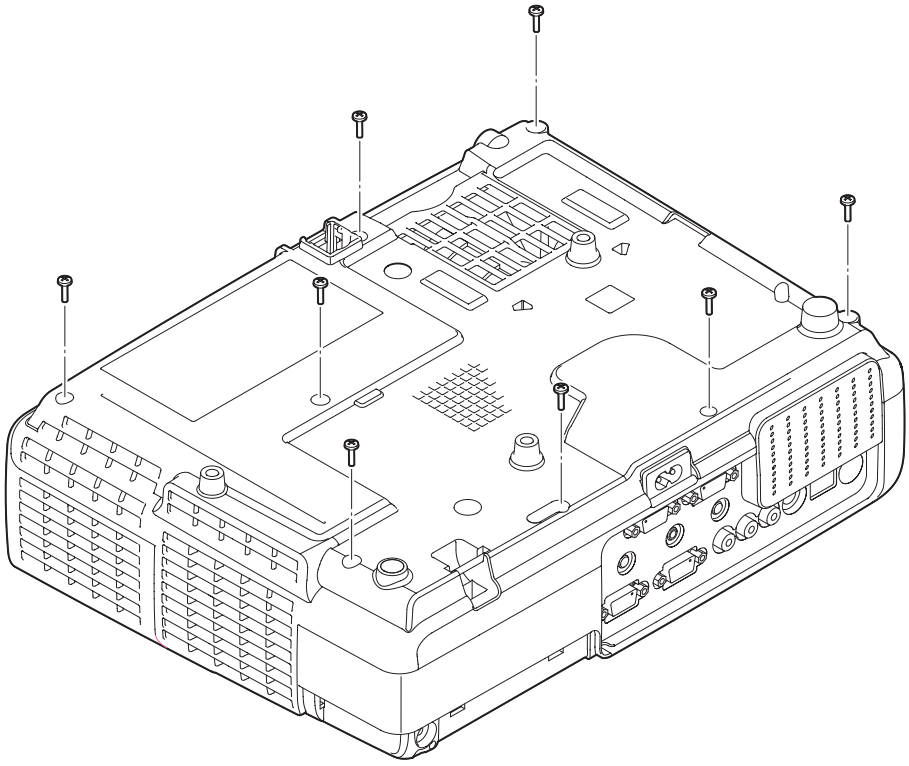


Figure 4-7.

Be careful, as there are 2 cables connected to the Upper Case Unit.

2. Lift the Upper Case Unit carefully.

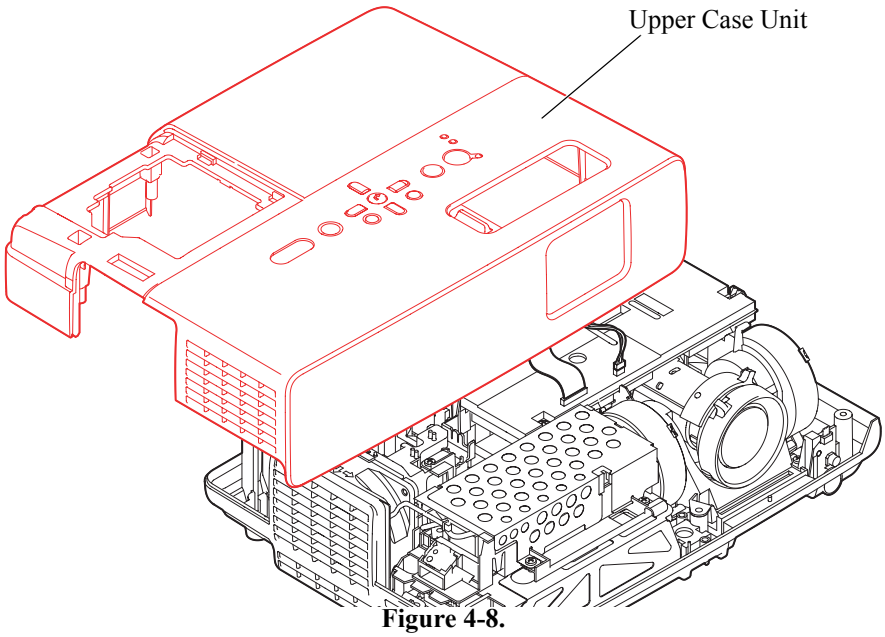


Figure 4-8.

When connecting the cable to CN702, be sure to lock the connector.

3. Disconnect the Shutter Switch cable from the connector CN704 on the MA Board, and unlock the connector CN702 and disconnect the Switch Board cable.

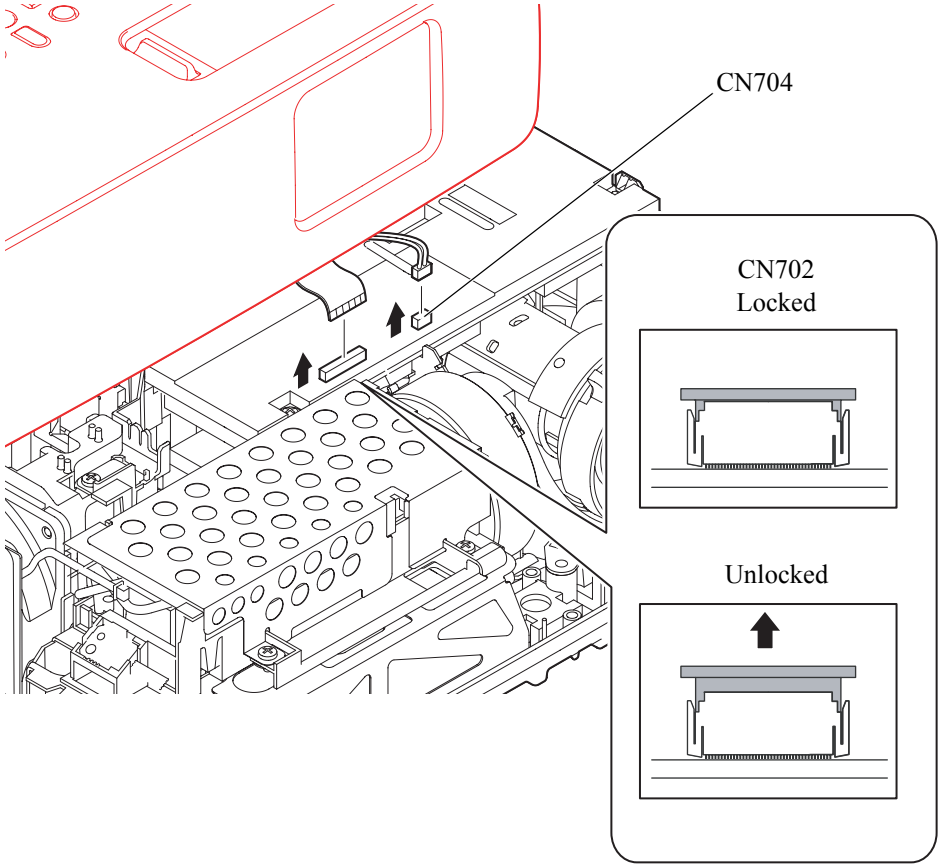


Figure 4-9.

4.3.4.1. Removing the Switch Board Assy.

1. Remove the four screw (C.C.P-TITE SCREW,3X8,F/ZN-3C) that secure the Switch Board Assy., and remove the Switch Board Assy. from the Upper Case Unit.
2. Remove the following parts from the Upper Case Unit.
   - Button (the color differs according to the model.)
   - LED Lens
   - Lens Shading Sheet
   - LED Shading Cushion
3. Remove the SW Shading Sheet from the Switch Board Assy.

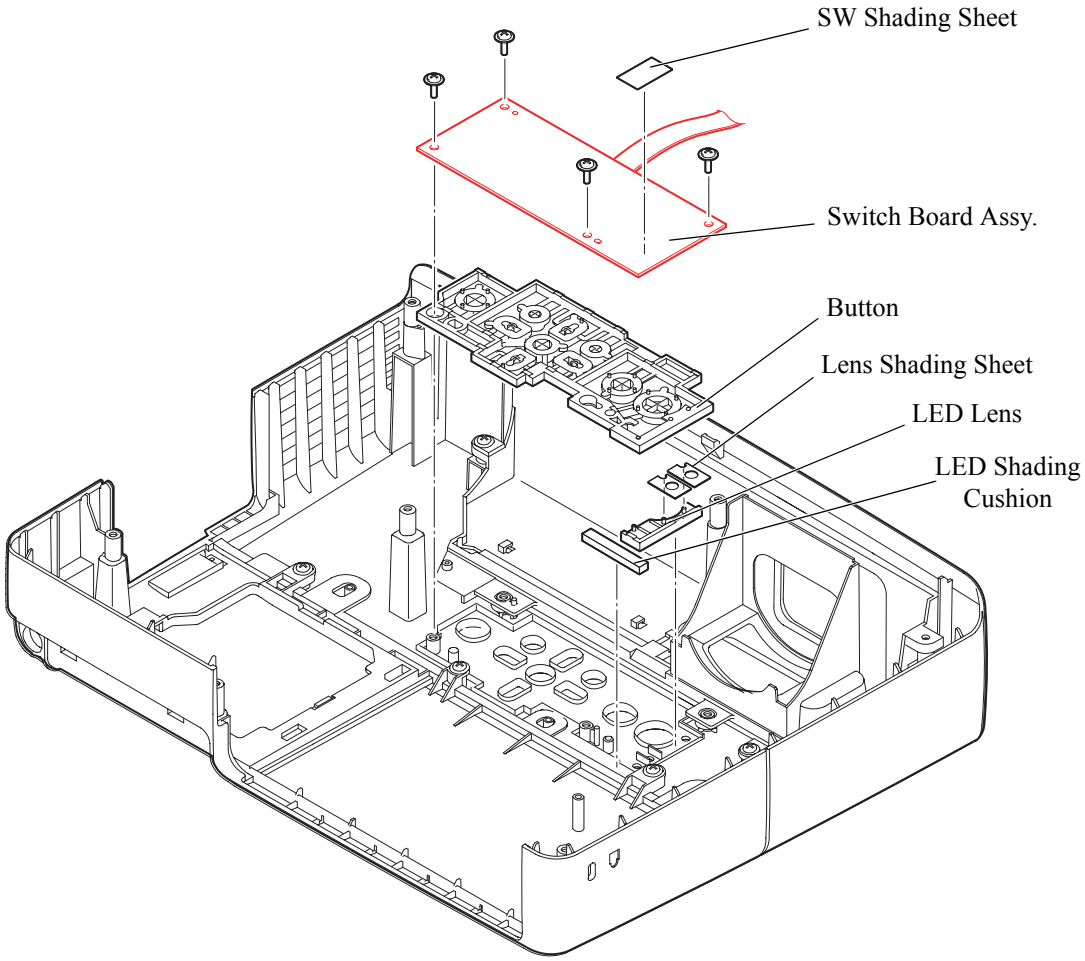


Figure 4-10.

■ When reassembling the SW Board Assy., be careful of the following.

- On the central part of the SW Board, fold the cable of the SW Board Assy., and secure it with a heat-resistant tape.
- Route the cable of the Shutter Switch as shown in the figure below, and fix it with the heat-resistant tape fixing the SW Board Assy.

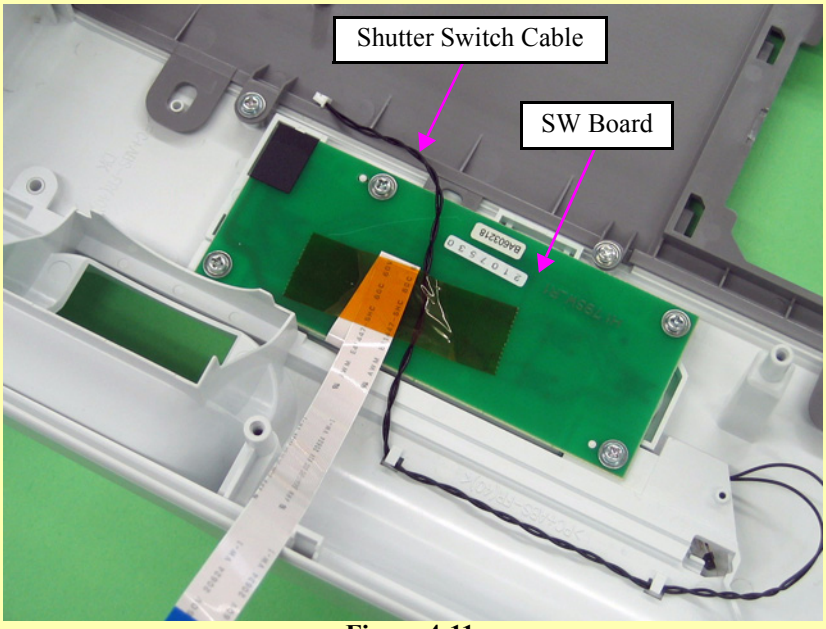


Figure 4-11.

4.3.4.2. Removing the Shutter Switch

1. Remove the screw (C.B.P-TITE SCREW,3X8,F/ZN-3C) that secures the Shutter Frame, and remove the Shutter Frame from the Upper Case Unit carefully not to lose the Shutter Spring and the Shutter Ball.

When carrying out the following steps, be careful not to lose the Shutter Ball, and the Shutter Spring.

2. Remove the following parts from the Upper Case Unit.
   - Shutter Ball
   - Shutter Spring
   - Shutter A
3. Remove the screw (C.P.TYPE1 B-TITET-A.SCREW,2X6,F/ZB-3C) that secures the Shutter Switch, and remove the Shutter Switch from the Shutter Frame.

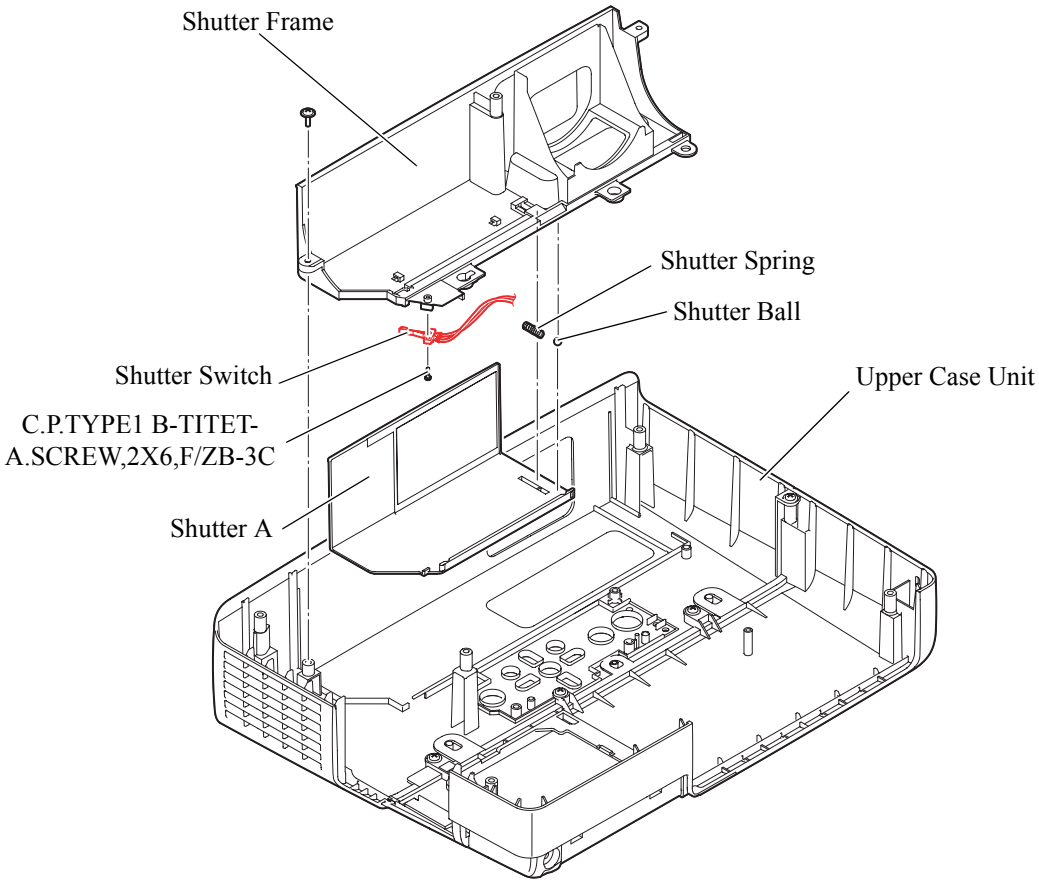


Figure 4-12.

- When installing the Shutter Switch, make sure that it is closed, as shown in the figure below.

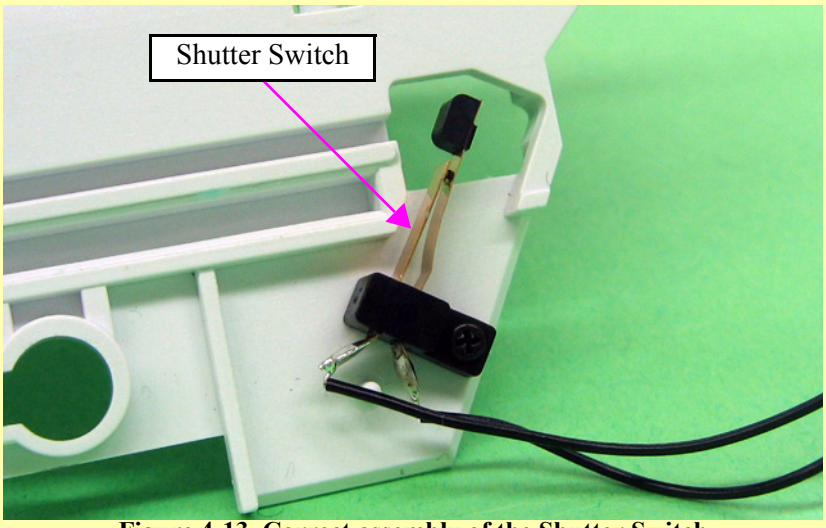


Figure 4-13. Correct assembly of the Shutter Switch

- Stick the Shutter Sheet to the Shutter A in the position shown in the figure below.

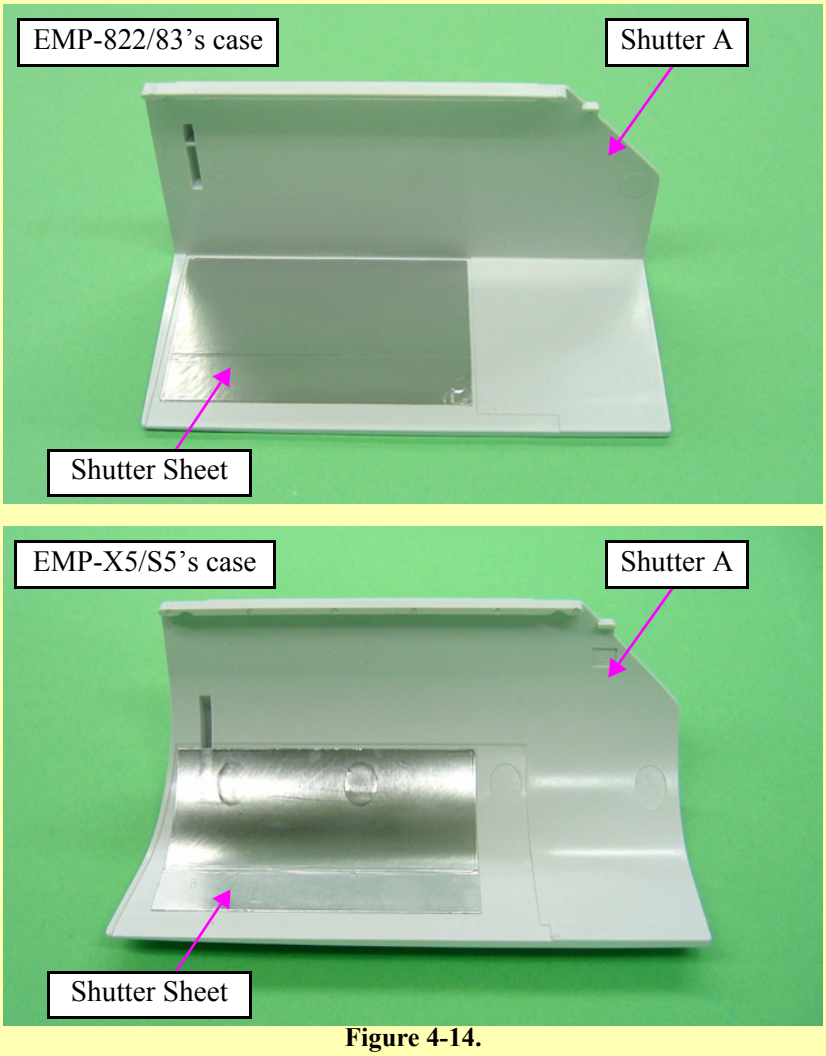


Figure 4-14.

■ After replacing the Shutter A and the Shutter Frame, or when the sliding action of the shutter become awkward, apply grease in the size of a grain of rice to the positions indicated in the figure below. (EMP-822/83's case)

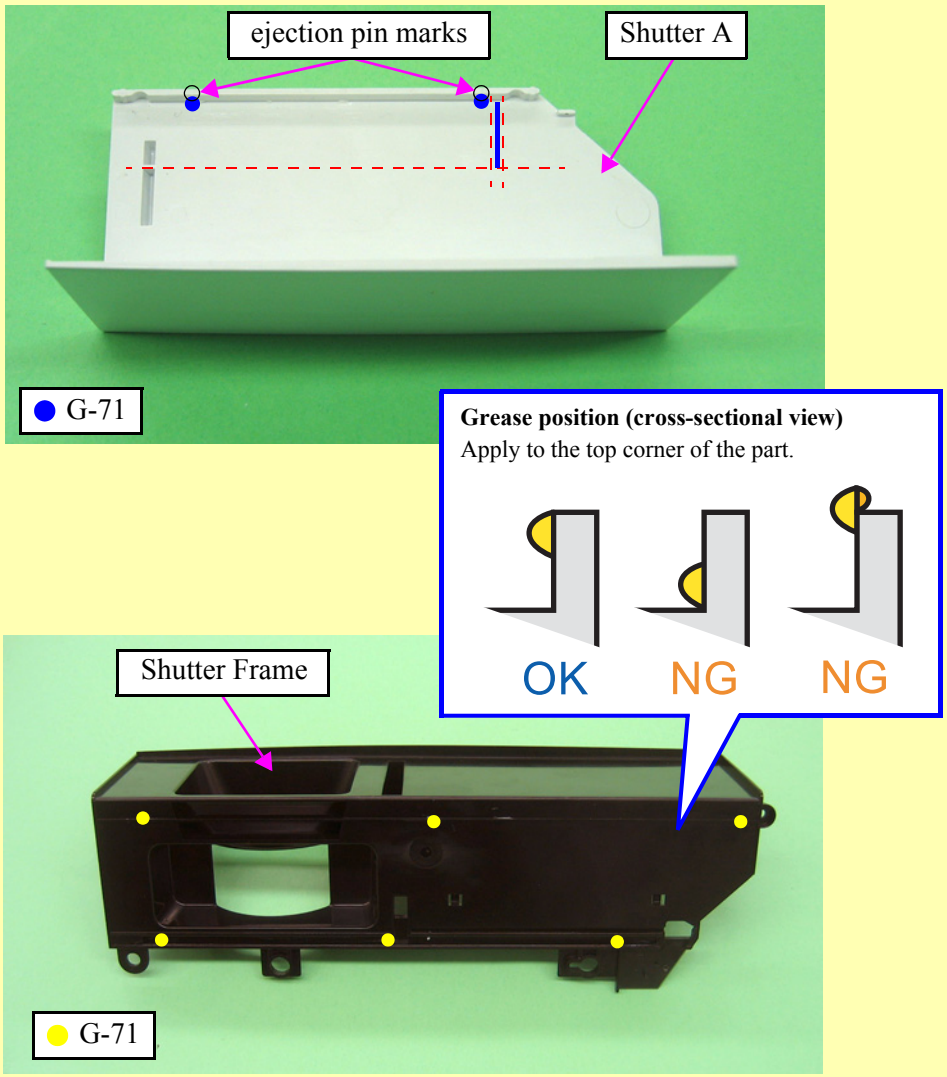


Figure 4-15.

■ After replacing the Shutter A and the Shutter Frame, or when the sliding action of the shutter become awkward, apply grease in the size of a grain of rice to the positions indicated in the figure below.(EMP-X5/S5's case)

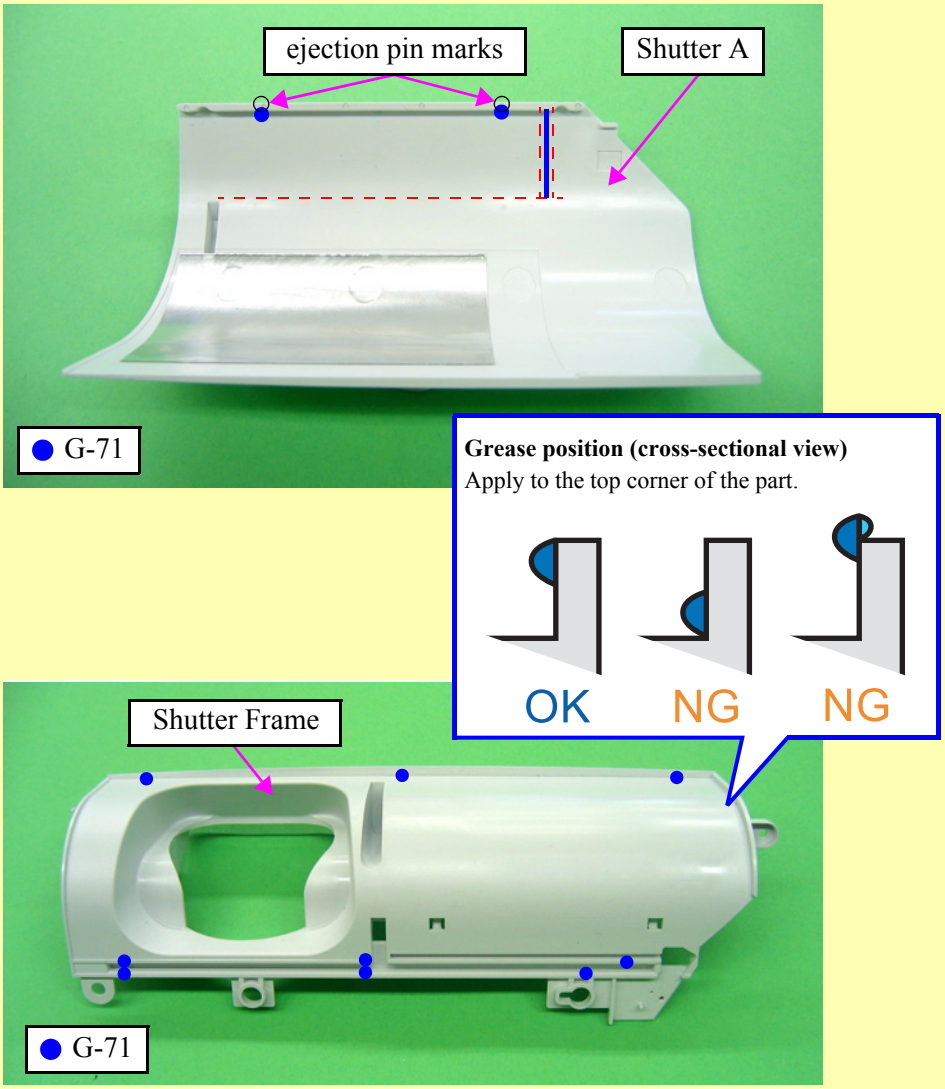


Figure 4-16.

■ When reassembling the Shutter Spring and the Shutter Ball, assemble in the order of the following.

1). Keep the Shutter A open.

2). Put the Shutter Ball into the hole of the Shutter Frame.

3). Move the Shutter Ball to the direction of the arrow, then squeeze and insert the Shutter Spring to the hole of the Shutter Frame. (Be careful not to lose the Shutter Ball and the Shutter Spring during assembly.)

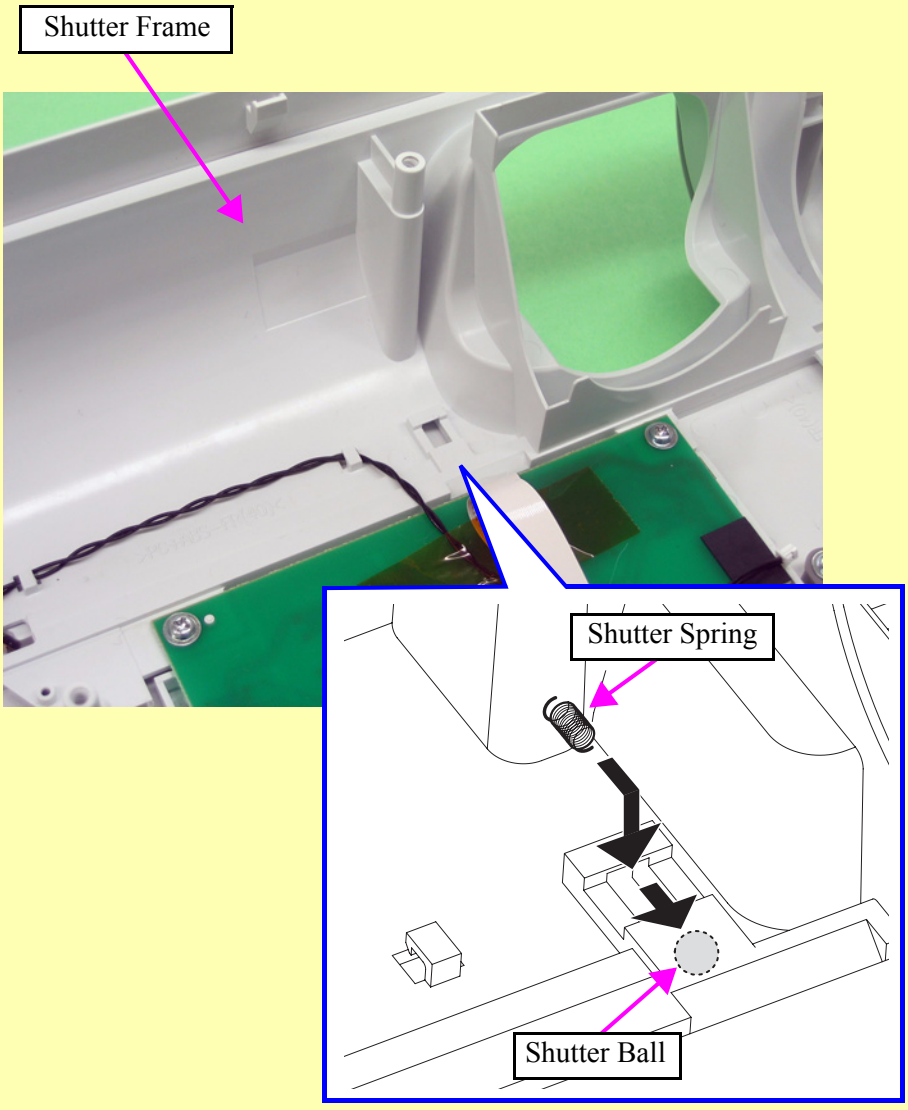


Figure 4-17.

4.3.4.3. Removing the Front Case/Rear Case

1. Remove the four screws (C.C.P-TITE SCREW,3X8,F/ZN-3C) that secure the Front Case and the Rear Case, and remove the Rear Case from the Front Case.
2. Remove the screw (C.C.P-TITE SCREW,3X8,F/ZN-3C) that secures the Plate Nut, and remove the Plate Nut from the Rear Case.

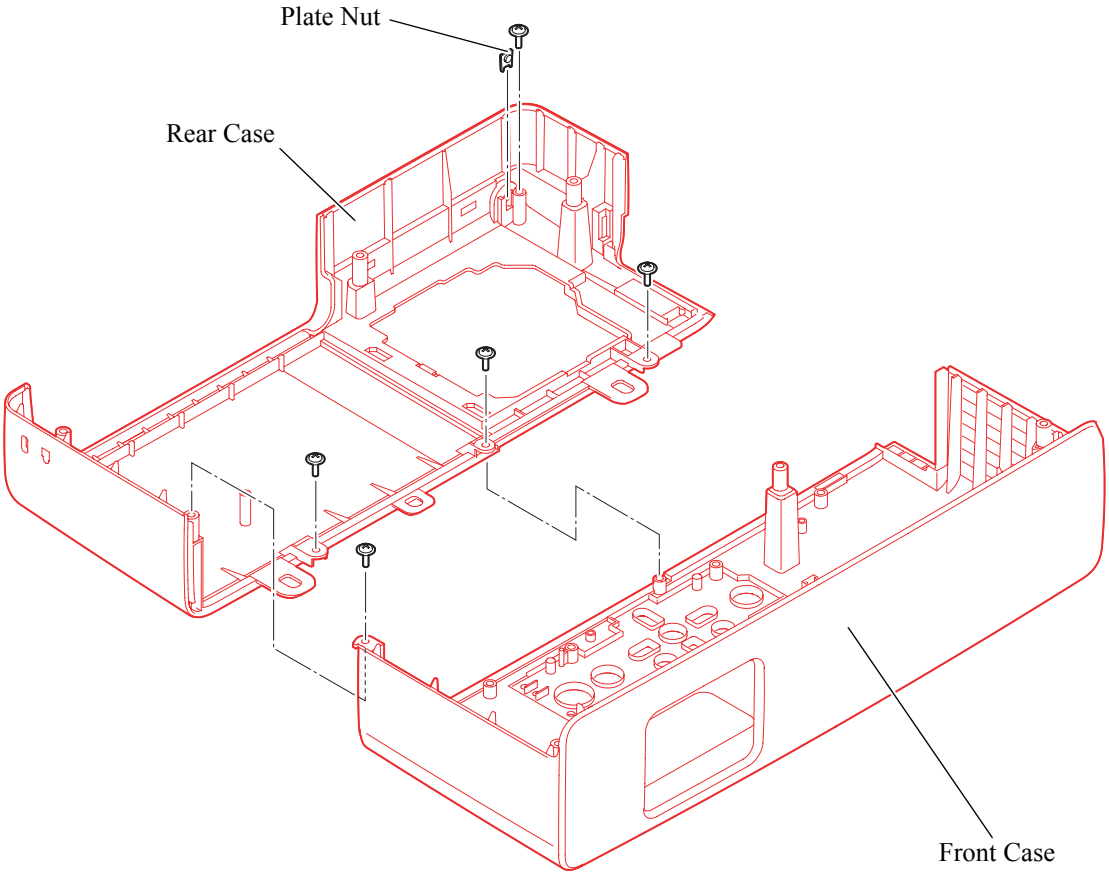


Figure 4-18.

4.4 Removing the Engine/Boards

4.4.1 Removing the Foot Detection Assy. (EMP-X5 only)

1). Disconnect the cable of the Foot Detection Assy. from the connector CN705 on the MA Board.

2). Remove the two screws (C.B.P-TITE SCREW,3X10,F/ZB-3C) that secure the Foot Detection Assy., and remove the Foot Detection Assy.

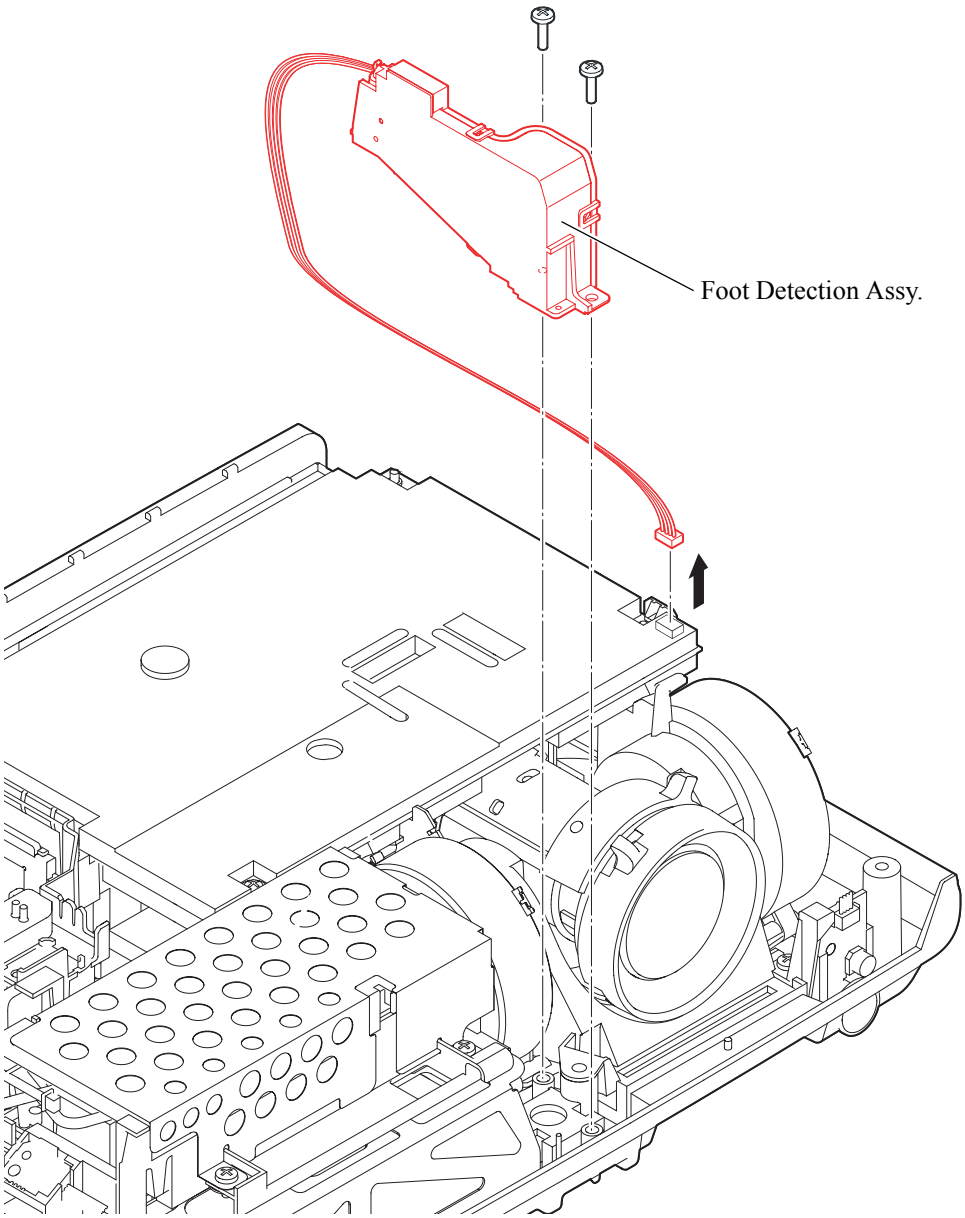


Figure 4-19.

4.4.2 Removing the Optical Engine and MAB set(1) (MA Board Assy.) /IF Case

1). Unlock the connectors of the Light Valve R/G/B connection cables.

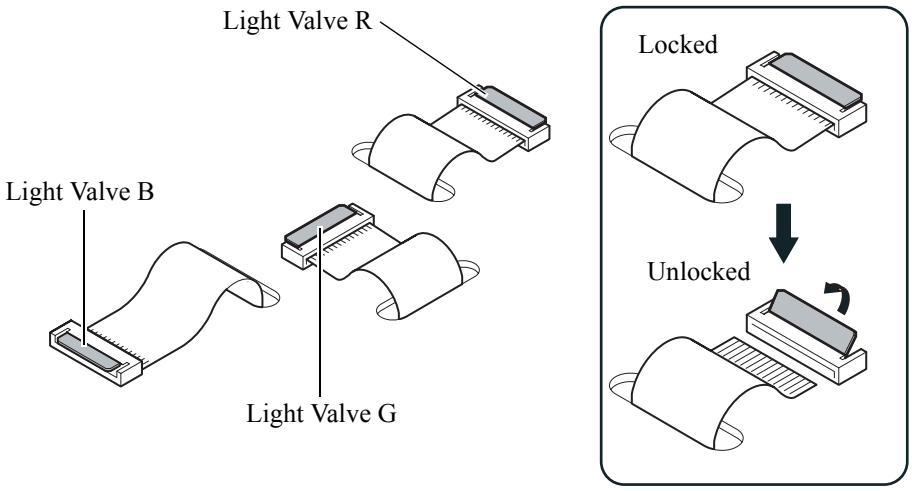


Figure 4-20.

- When connecting the R/G/B Light Valve cables, be sure to insert the R/G/B Light Valve cables securely into the connectors to the end. If there is a loose connection (a half-way/slant connection), it may cause short-circuiting, or malfunction, and which may result in damage to or overheating of the ICs on the cables.
- Be sure to lock the connectors when reassembling.

2). Disconnect all the following cables that are connected to the MA Board from the board.

- **CN1400/CN1500/CN1600**: Light Valve R/G/B connection cables
- **CN1700**: Power Cable
- **CN700**: Lamp Lid Detection Switch
- **CN701**: SCI Cable
- (* **CN702**): Switch Board cable
- **CN703**: RC Board Assy.
- (* **CN704**): Shutter Switch cable
- **CN801**: TH Board (Lamp Thermistor)
- **CN802/CN803**: Intake Fan 1, Intake Fan 2
- **CN804**: EX Fan
- **CN805**: P/S Fan
- **CN806**: Lamp Fan
- **CN807**: P/S Thermistor
- **CN501**: Speaker (EMP-X5/EMP-S5 only)
- **CN705**: Foot Detection Assy. (EMP-X5 only)

*: The connectors to be disconnected before this step. If remaining connected, disconnect them at this point.

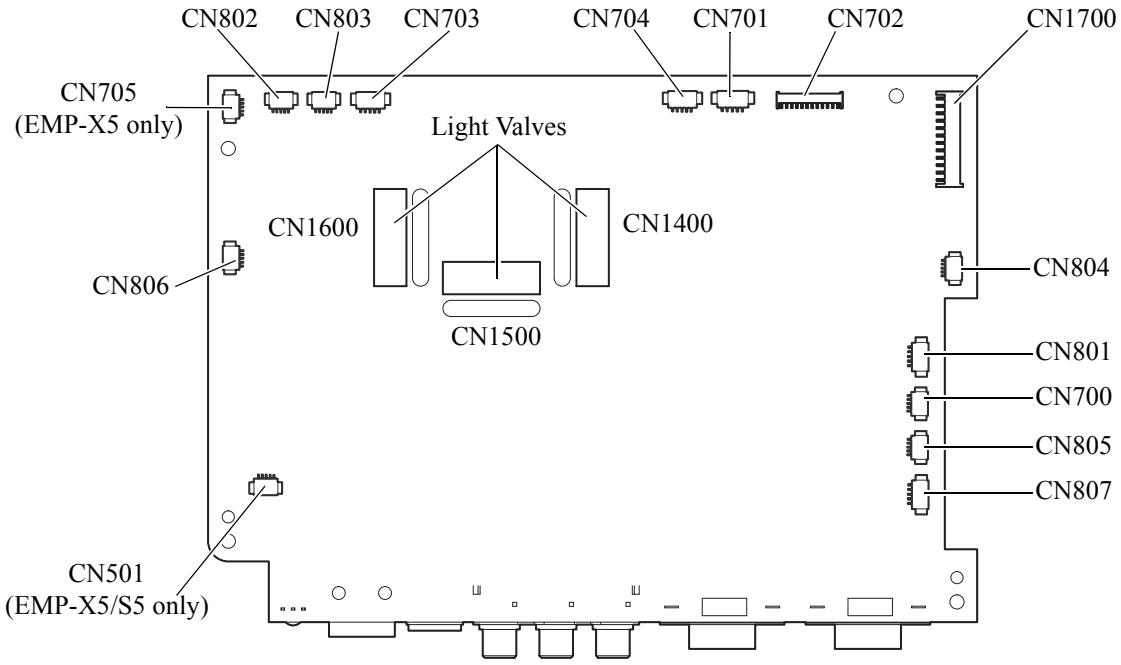


Figure 4-21.

■ Removing the Optical Engine and MAB set (1) (MA Board Assy.) /IF Case (EMP-822/EMP-83's case)

Be careful when lifting the IF Board Assy., as the Speaker Unit Cable is connected to connector CN3003.

1). Remove the three screws (one C.C.SCREW,3X6,F/ZN-3C, and two C.B.P-TITE SCREW,3X10,F/ZB-3C) that secures the MA Board Assy., and lift it up.

2). Disconnect the Speaker Unit Cable from the connector CN3003, and remove the MA Board Assy.

3). Remove the three screws (C.B.SCREW,3X6,F/ZB-3C) that secure the IF Case, and remove the IF Case.

4). Remove the RC Filter from the IF Case.

5). Remove the IF Label from the IF Case.

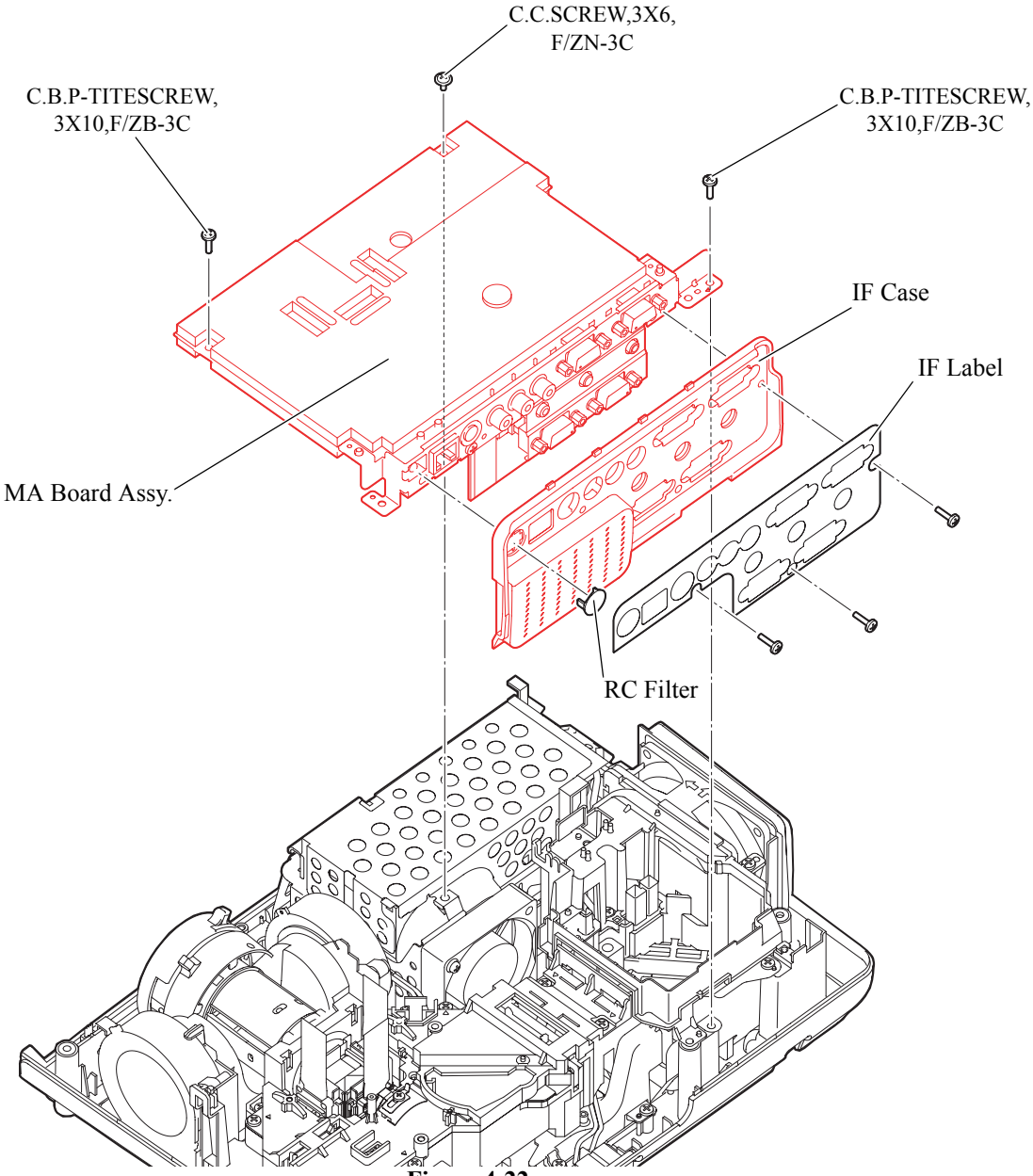


Figure 4-22.

■ Removing the Optical Engine and MAB set (1) (MA Board Assy.) /IF Case (EMP-X5/EMP-S5's case)

1). Remove the three screws (one C.C.SCREW,3X6,F/ZN-3C, and two C.B.P-TITE SCREW,3X10,F/ZB-3C) that secure the MA Board Assy., and the screw (C.B.P-TITE SCREW,3X10,F/ZB-3C) that secure the IF Case, and remove the MA Board Assy.

2). Remove the two screws (C.B.P-TITE SCREW,3X10,F/ZB-3C) that secure the IF Case, and remove the IF Case.

3). Remove the RC Filter from the IF Case.

4). Remove the IF Label from the IF Case.

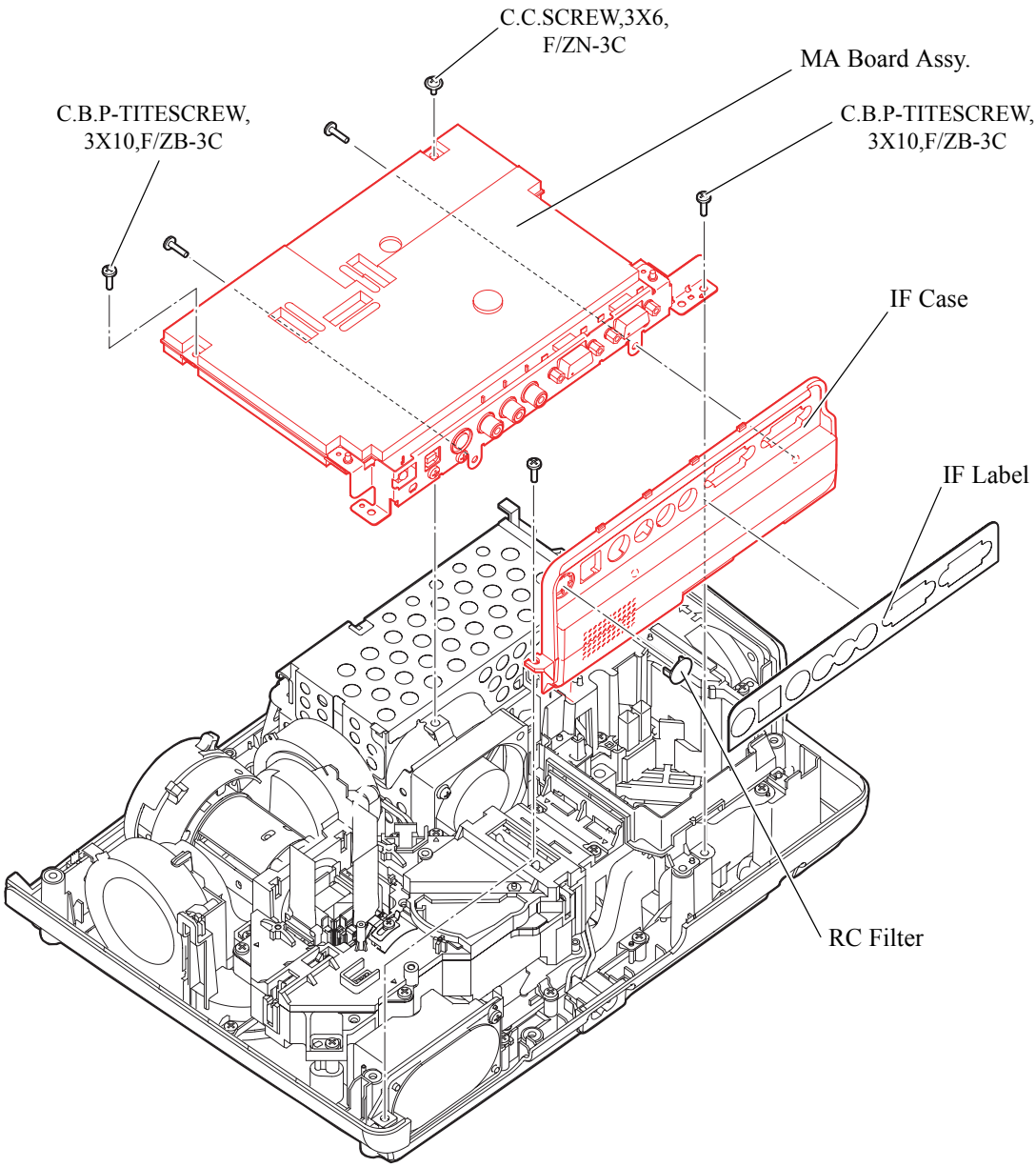


Figure 4-23.

■ When connecting the connectors to the MA Board Assy., route the cables as shown below.

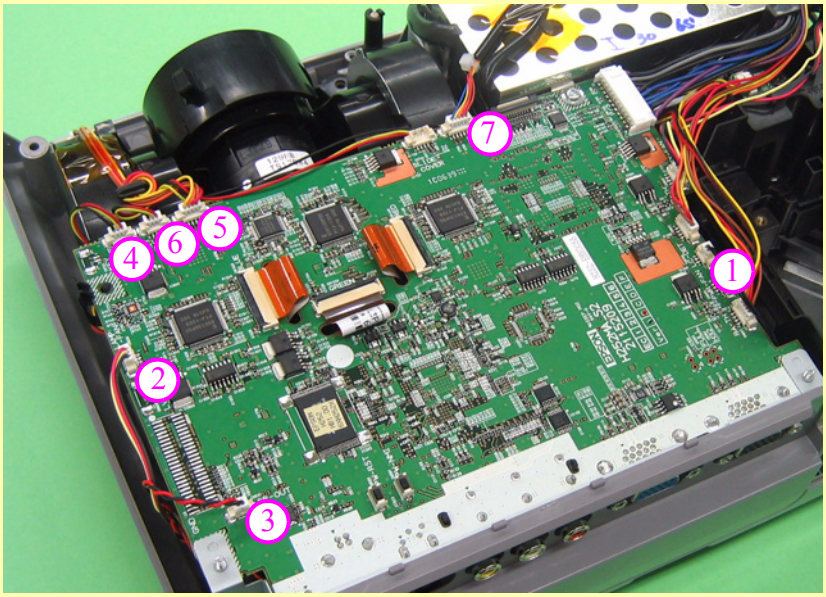


Figure 4-24.

No	Connector	No	Connector
1	Lamp Lid Detection SW	5	RC Board
2	Lamp Fan	6	Intake Fan2
3	Speaker	7	PS Ballast Assy.(SCI)
4	Intake Fan1		

- (1)'s Routing

1). Route the cable of the Lamp Lid Detection Switch under the MA Plate, and through the slit shown in the figure below in the direction of the arrow.

2). Connect to CN700 on the MA Board Assy.

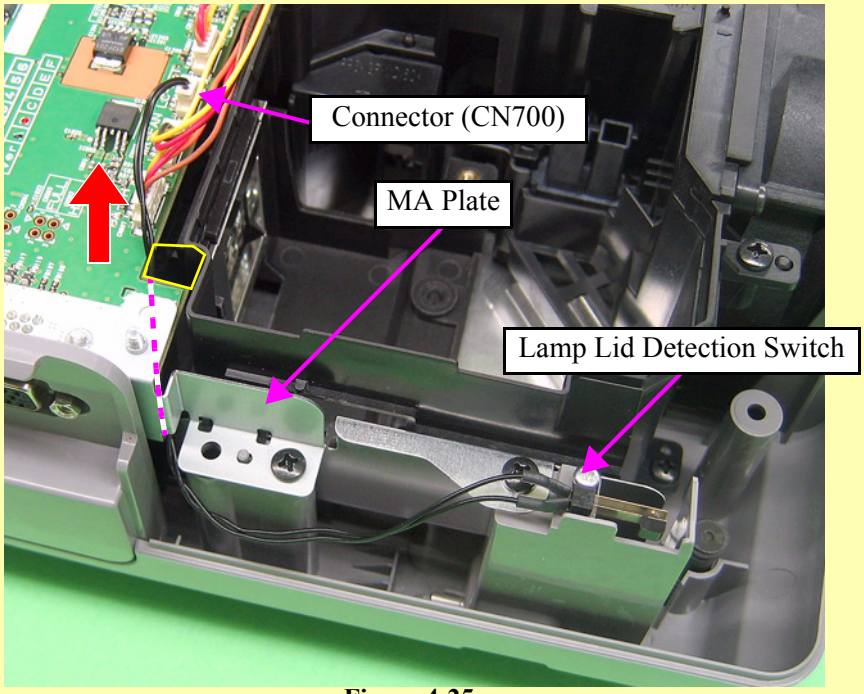


Figure 4-25.

- (2), (4)'s Routing

1). Route the Lamp Fan Cable twice around the Speaker Cable, then connect the connector.

2). Route the Intake Fan1 Cable twice around the Intake Duct, then connect the connector.

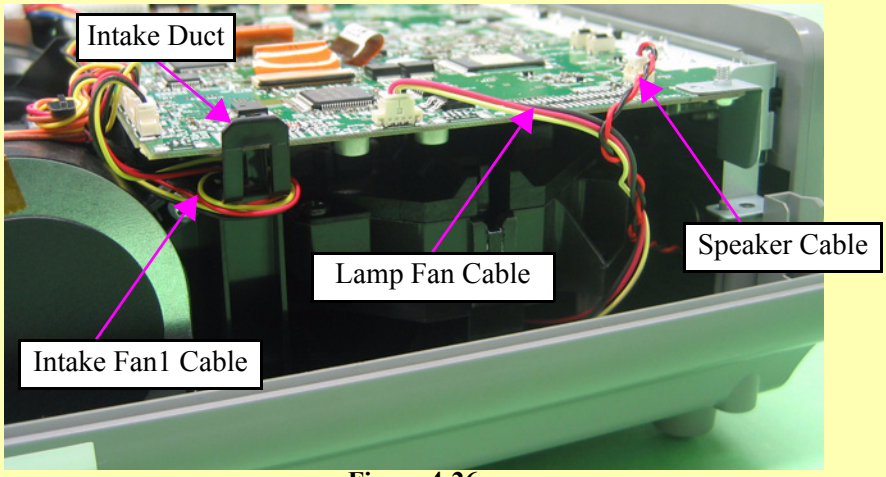


Figure 4-26.

- (5)'s Routing

1). Secure the RC Board Cable to the Intake Fan1 with a heat-resistant tape, then route it twice around the Intake Duct, and connect the connector.

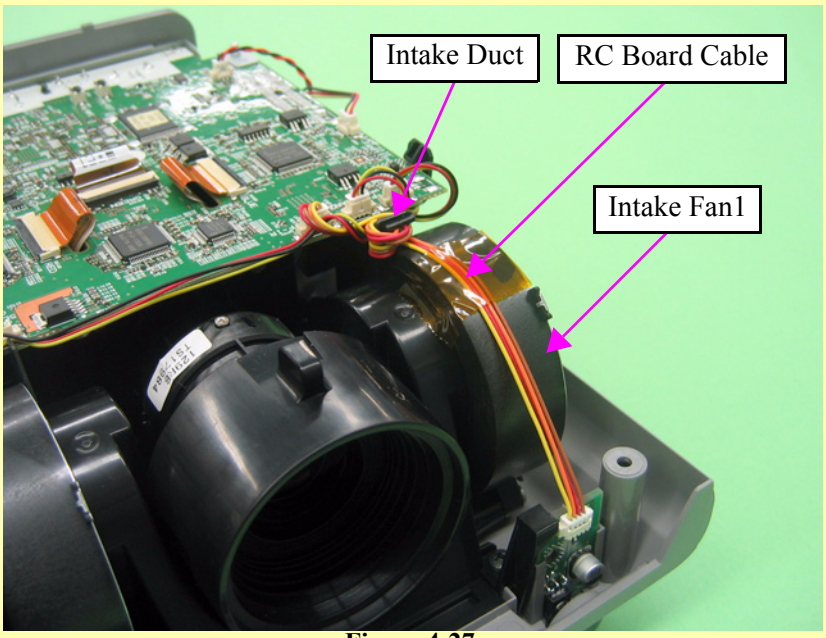


Figure 4-27.

- (6), (7)'s Routing

1). Route the Intake Fan2 Cable in between the protrusion of the Intake Duct and the MA Board Assy.

2). When routing the SCI Cable, do not pull from the PS Ballast Assy. side.

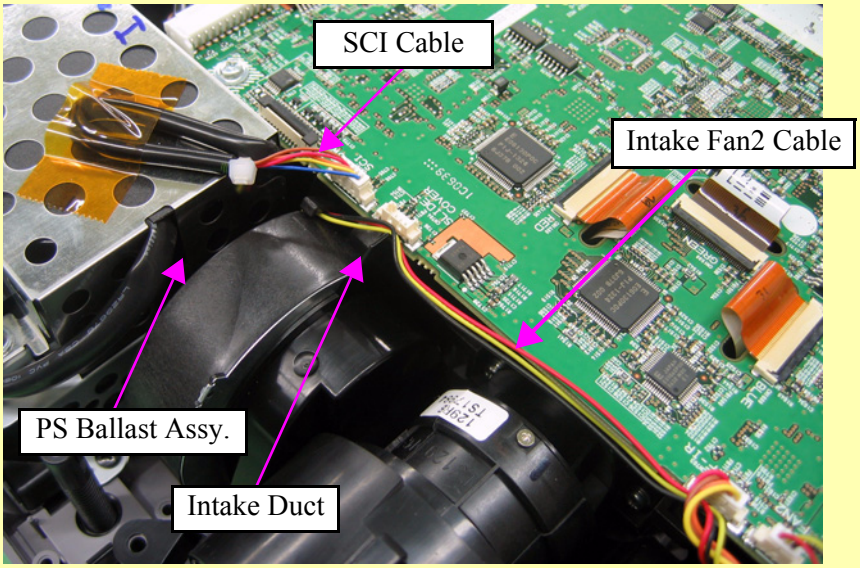


Figure 4-28.

4.4.2.1. Removing the IF Board Assy. (EMP-822/EMP-83 only)

1. Remove the following screws and remove the MA Plate, the MA Shield and the IF Board Assy.
   - D sub15pin fastening screws (1/4-40X1/4,H.H.,F/NI,O SCREW): x 8
   - S-terminal/RCA terminal fastening screws (C.B.P-TITE SCREW,3X10,F/ZB-3C): x 2
   - MA Shield fastening screws (C.C.SCREW,3X6,F/ZN-3C): x 2

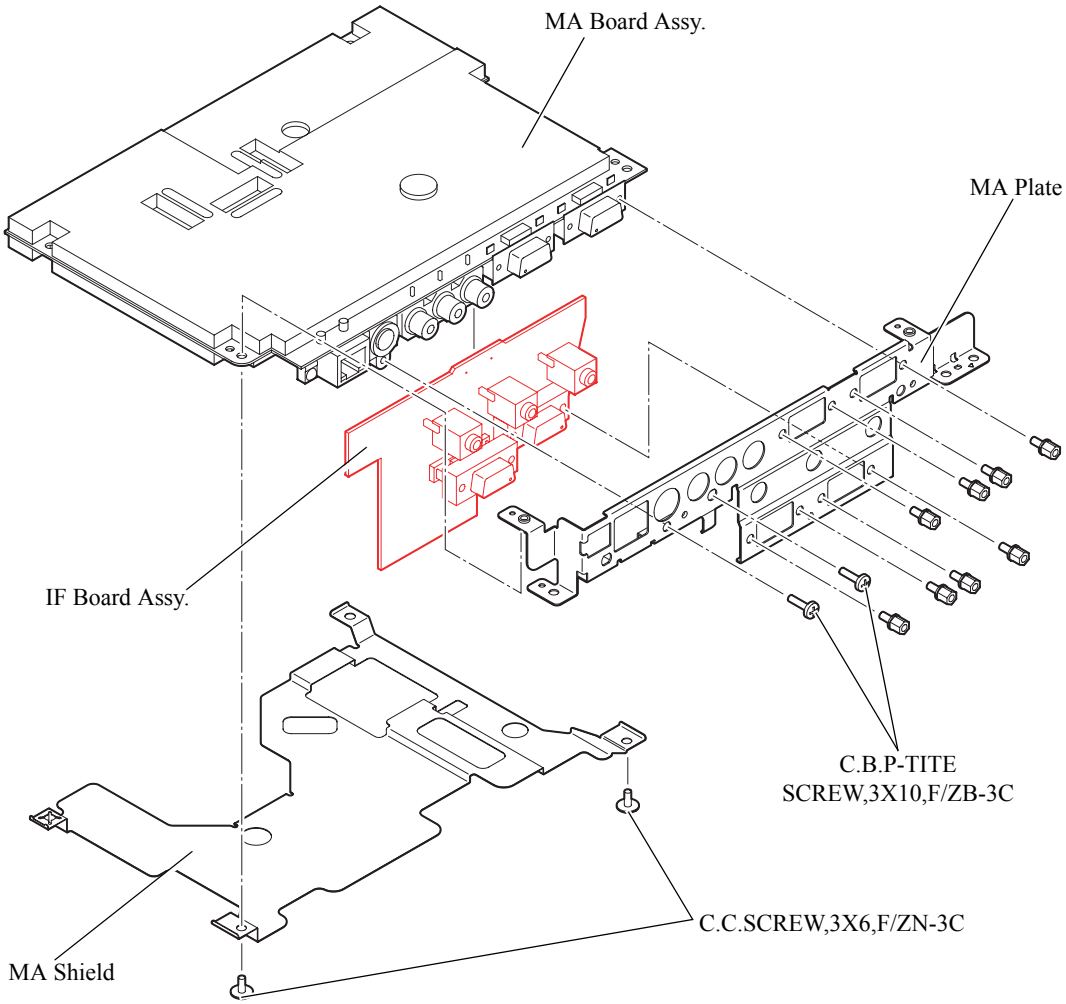


Figure 4-29.

4.4.2.2. Removing the Speaker. (EMP-X5/EMP-S5 only)

1. Remove the two screws (C.P.TYPE2 P-TITESCREW,1.7X6,F/ZB-3C) that secure the Speaker and remove the Speaker from the IF Case.

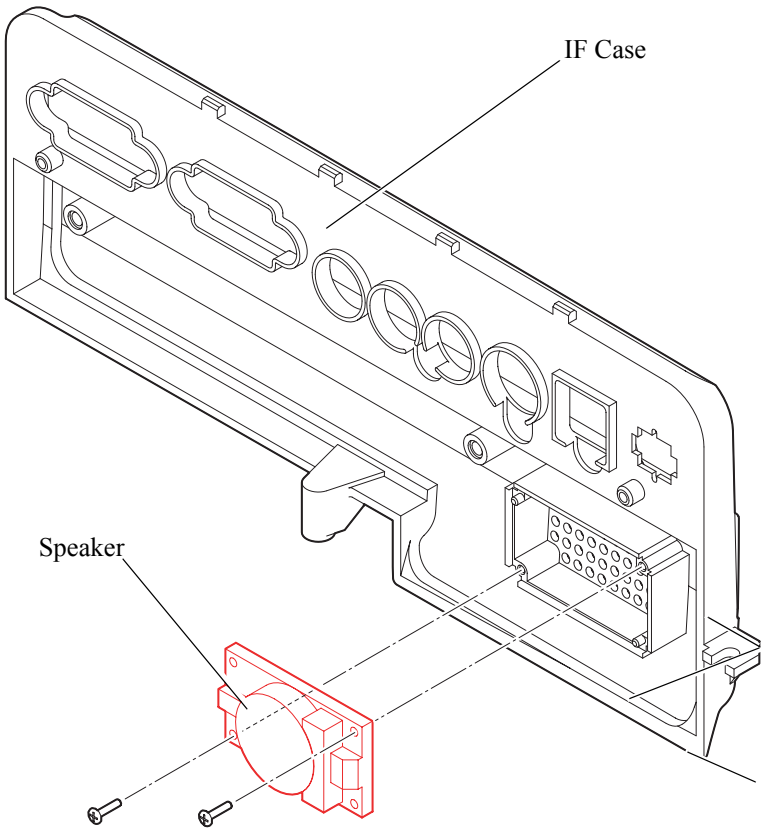


Figure 4-30.

4.4.3 Removing the Lamp Lid Detection Switch/TH Board Assy.

■ Removing the Lamp Lid Detection Switch

Safety device

This part is designated as the Safety Device. When removing/replacing the part for repair, be sure to refer to the following section. According to the instructions in it, handle the part and perform the procedure after servicing.

■ 4.1.4 "Safety Check after Servicing" (p. 4)

1). Remove the screw (C.P.P-TITESCREW,2.5X8,F/ZN-3C) that secures the Lamp Lid Detection Switch, and remove the Lamp Lid Detection Switch.

■ Removing the TH Board Assy.

1). Remove the screw (C.B.P-TITE SCREW,3X10,F/ZB-3C) that secures the TH Board Assy., and remove the TH Board Assy.

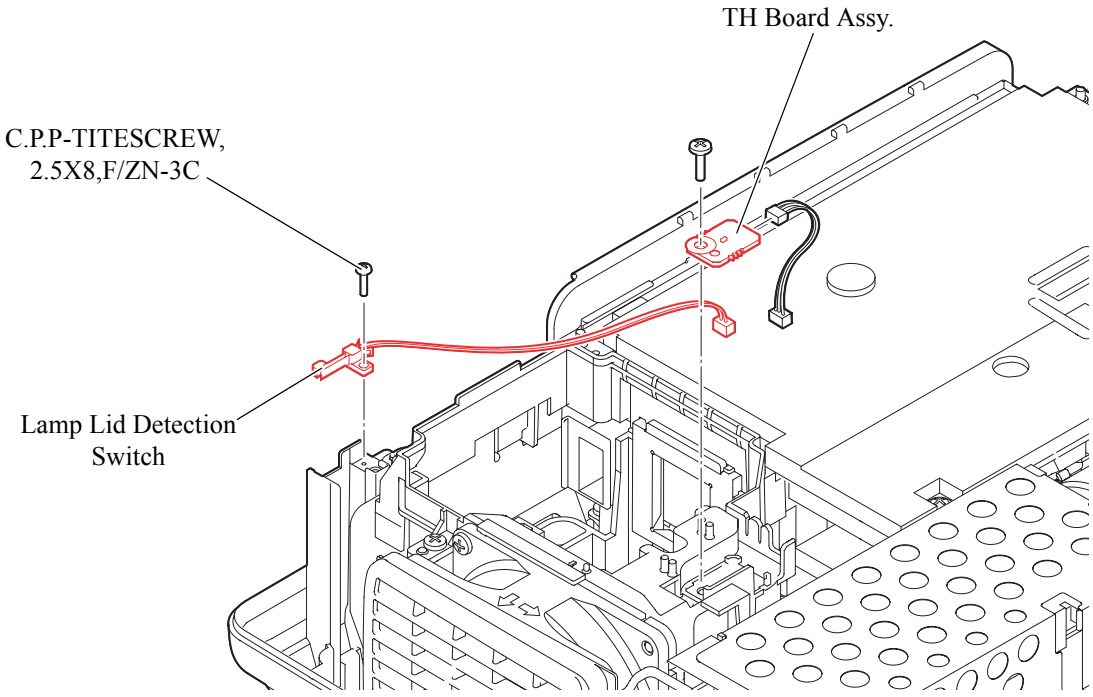


Figure 4-31.

■ Check the following, when installing the Lamp Lid Detection Switch.

- The contact has no deformation.
- The distance between two contact points must be 0.3mm and more.

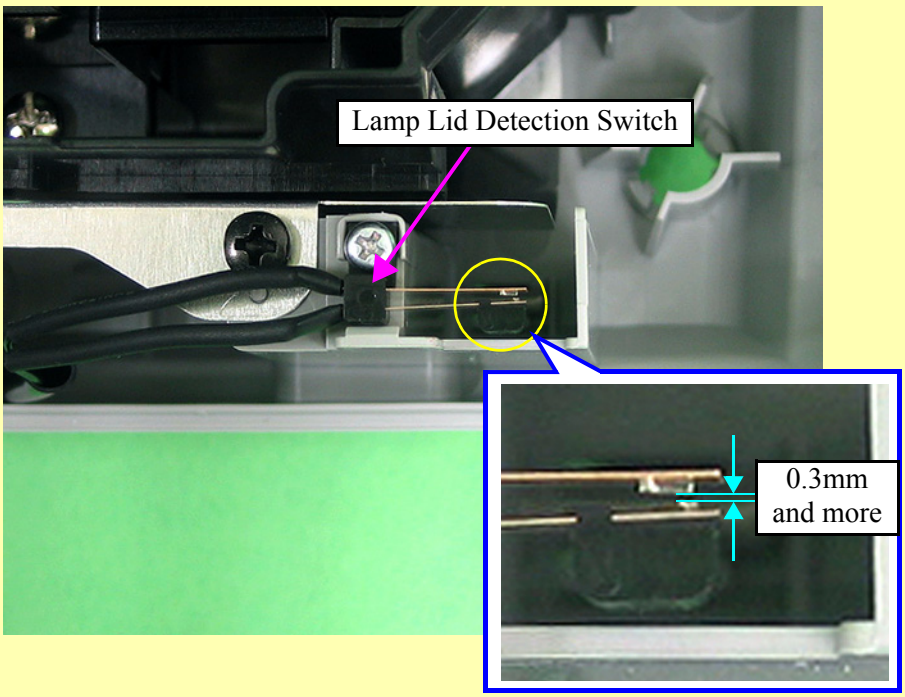


Figure 4-32. Correct status of the Lamp Lid Detection Switch

■ When installing the Lamp Lid Detection Switch, connect the cable of the Lamp Lid Detection Switch in the order described below.

1). Route the cable of the Lamp Lid Detection Switch under the MA Plate, and through the slit shown in the figure below in the direction of the arrow.

2). Connect to CN700 on the MA Board Assy.

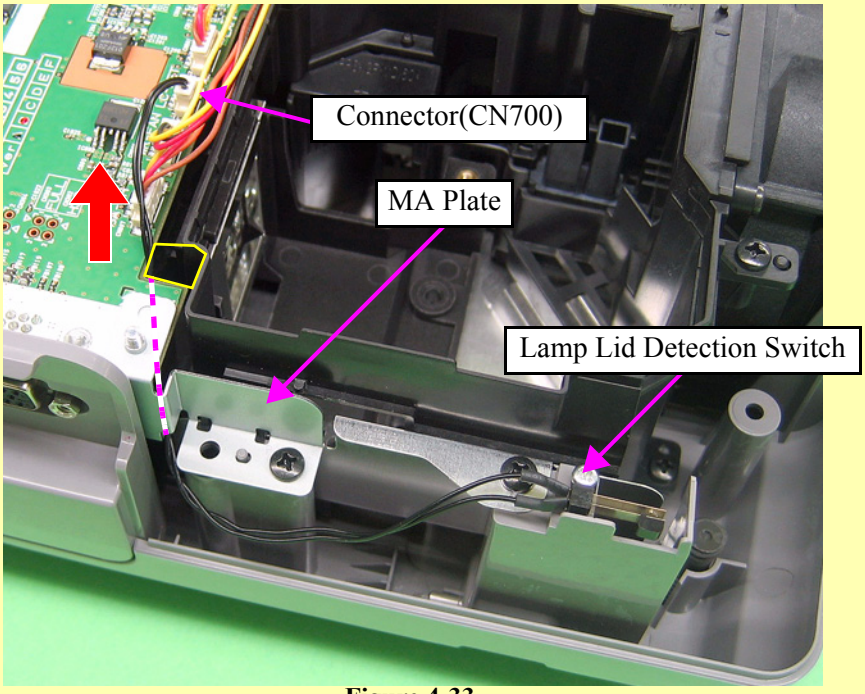


Figure 4-33.

4.4.4 Removing the EX Fan/Inner EX Duct B

1. Remove the three screws (C.B.P-TITE SCREW,3X10,F/ZB-3C) that secure the Inner EX Duct B, and remove the Inner EX Duct B together with the EX Fan.
2. Remove the two screws (C.B.P-TITE SCREW,3X10,F/ZB-3C) that secure the EX Fan, and remove the EX Fan from the Inner EX Duct B.

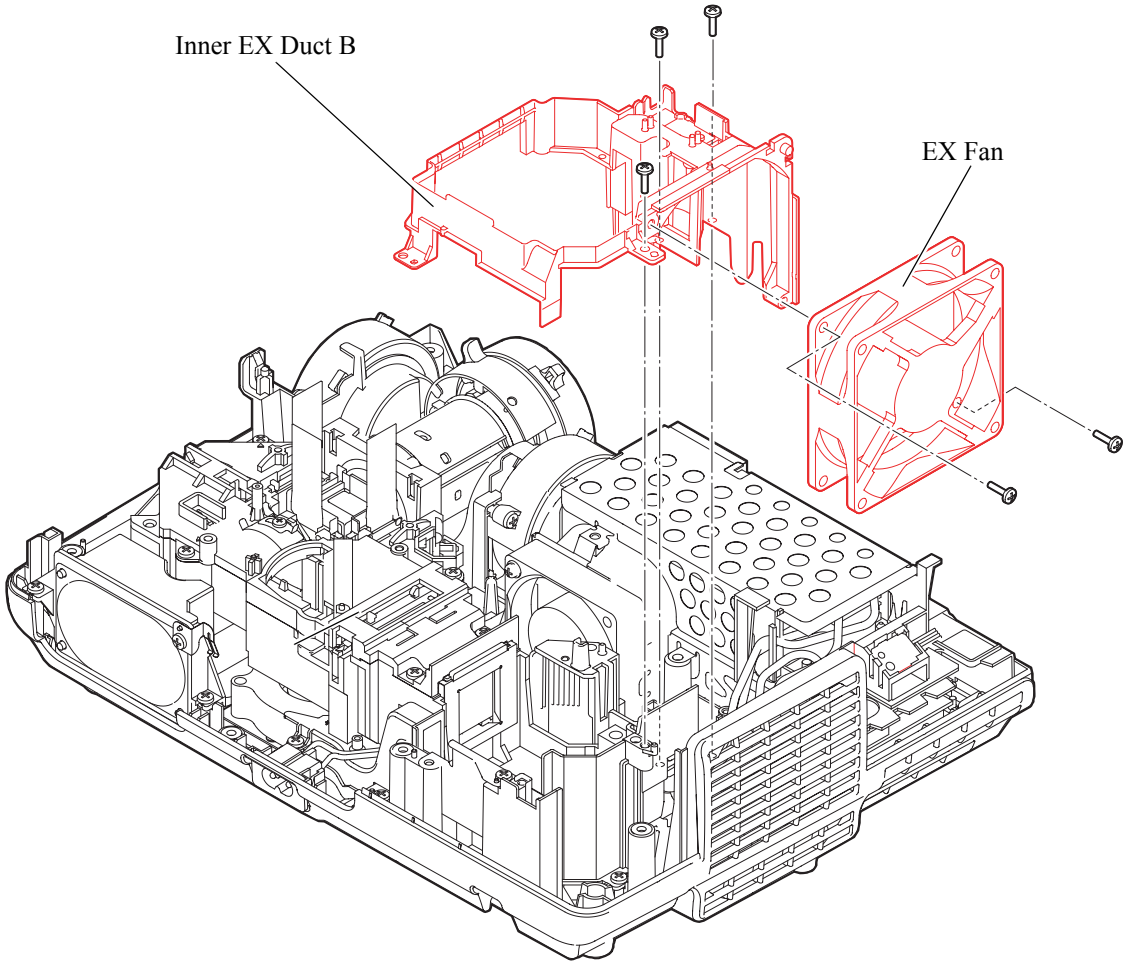


Figure 4-34.

- Route the cable of the Ex Fan to the ditch of the Inner EX Duct B.

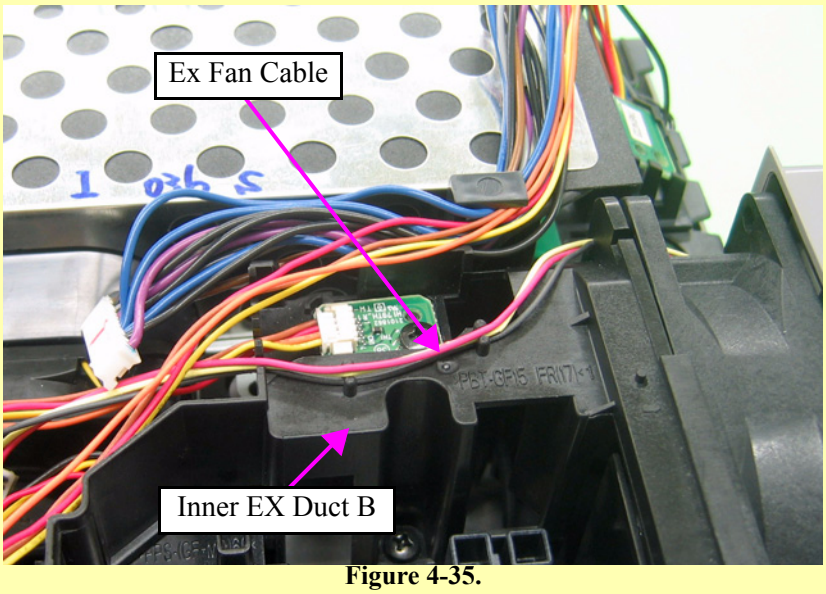


Figure 4-35.

- When installing the Inner EX Duct B, split the Lamp Connector Cable into two, and route the cables to the protrusion of Inner EX Duct B as shown in the figure below.

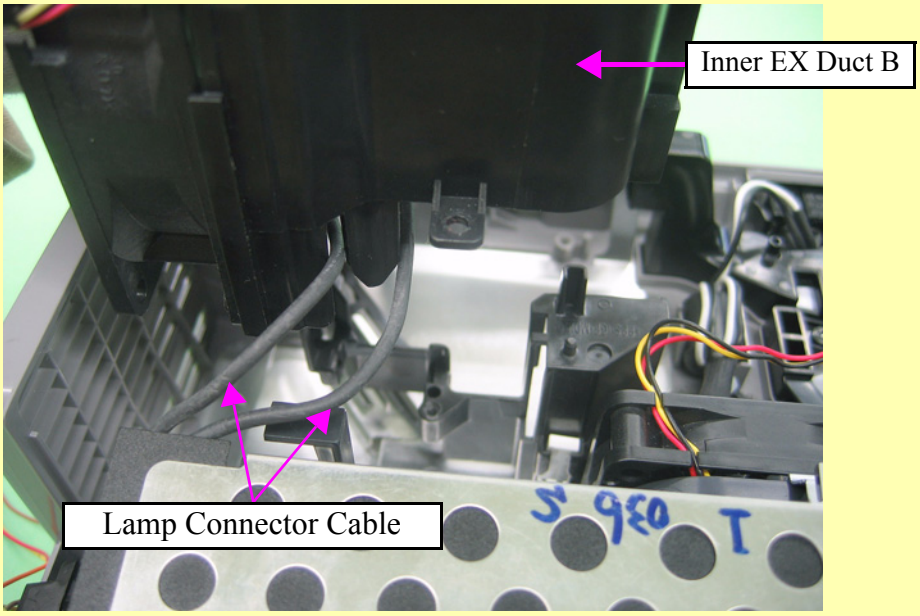


Figure 4-36.

4.4.5 Removing the Optical Engine and MAB set (2) (Optical Engine)

1. Remove the four screws (C.B.P-TITE SCREW,3X10,F/ZB-3C) that secure the Optical Engine, and remove the Optical Engine.

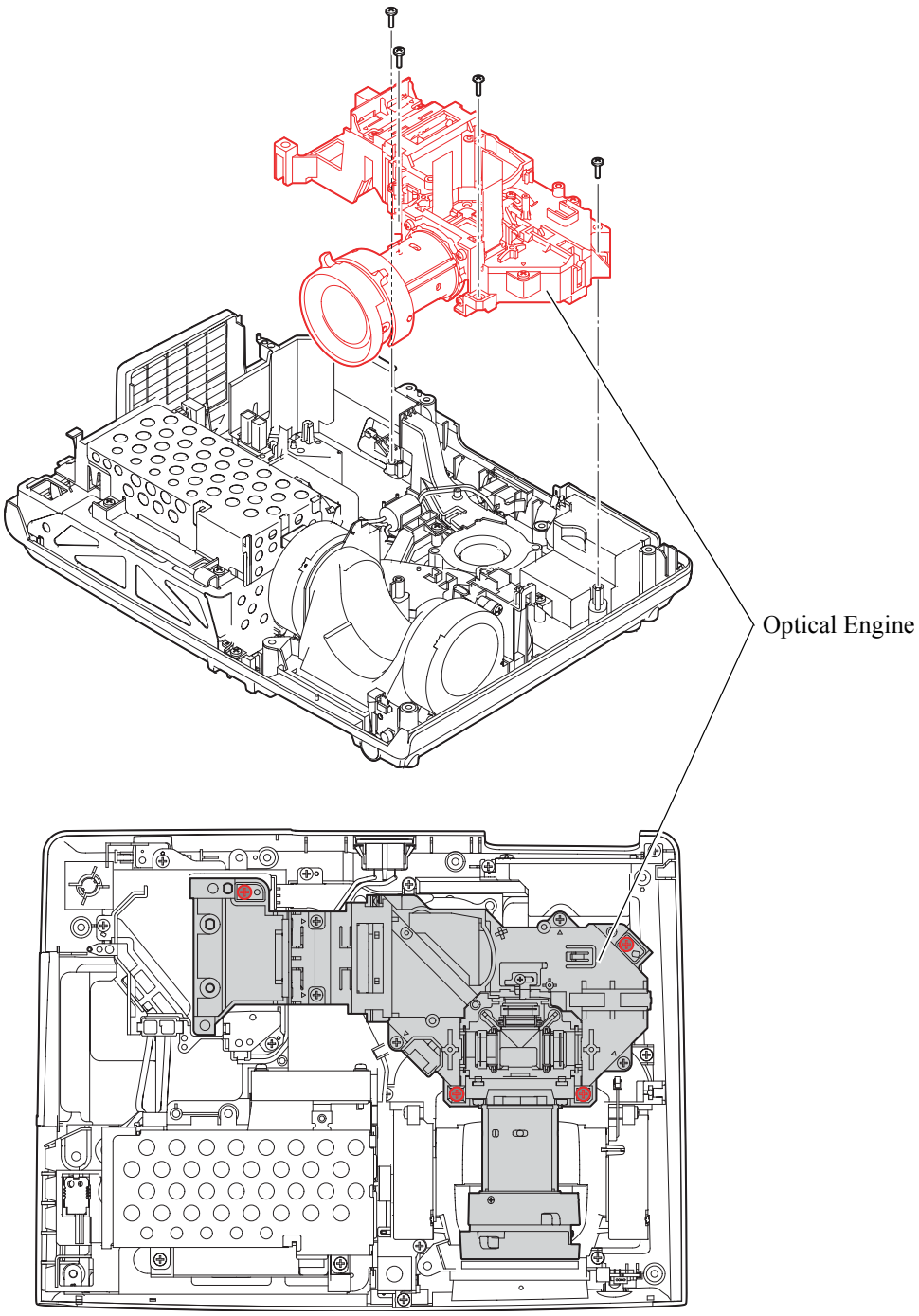


Figure 4-37.

■ Components of the Optical Engine and MAB set

	EMP-822/83	EMP-X5/S5
Optical Engine	OPTICAL ENGINE	OPTICAL ENGINE
MA Board Assy.	PRINTED CIRCUIT BOARD ASSEMBLY;MA_R1	PRINTED CIRCUIT BOARD ASSEMBLY;MA_S2
MA Plate	PLATE,MA	PLATE,MA
MA Shield	SHIELD,MA	SHIELD,MA
Screw	C.C.SCREW,3X6,F/ZN-3C	C.C.SCREW,3X6,F/ZN-3C
IF Board Assy.	PRINTED CIRCUIT BOARD ASSEMBLY;IF_R1	--

4.4.5.1. Removing the Focus Ring/Zoom Ring

■ Removing the Focus Ring/Zoom Ring (EMP-822/EMP-83/EMP-X5's case)

1. Remove the four screws (C.P.(S-P1)SCREW,3X10,F/ZN-3C) and the four nuts (H.N.-3,F/ZN-3C) that secure the PROJECTION LENS, and the PROJECTION LENS.
2. Remove the two screws (C.P.TYPE1 B-TITET-A.SCREW,2X6,F/ZB-3C) that secure the Focus Ring, and remove the Focus Ring.
3. Remove the two screws (C.P.TYPE1 B-TITET-A.SCREW,2X6,F/ZB-3C) that secure the Zoom Ring, and remove the Zoom Ring.

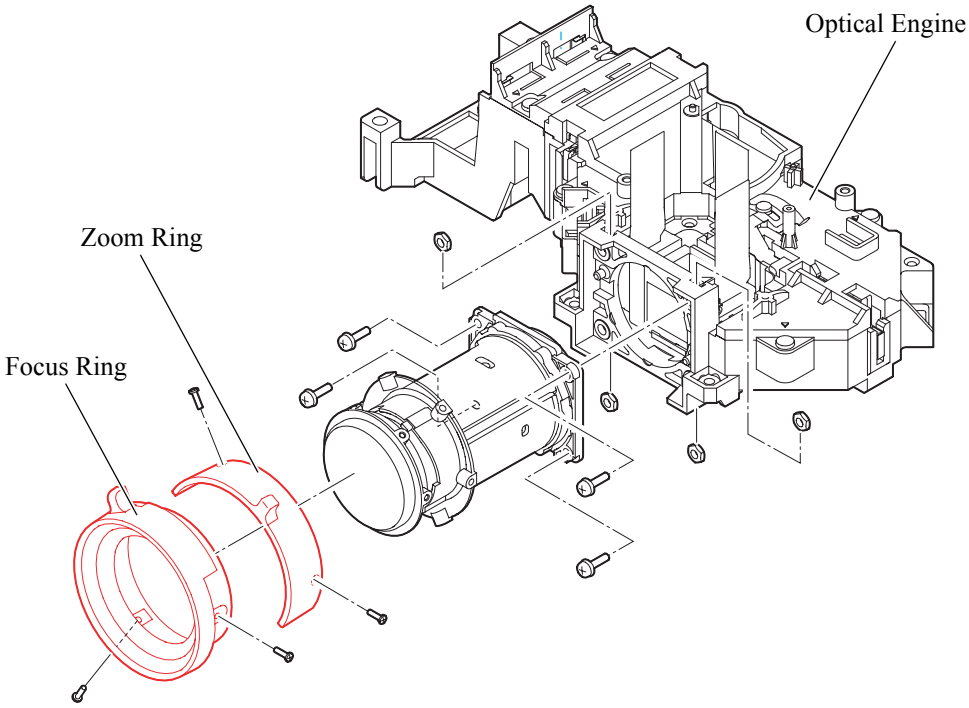


Figure 4-38.

■ Removing the Focus Ring (EMP-S5's case)

1. Remove the four screws (C.P.(S-P1)SCREW,3X10,F/ZN-3C) and the four nuts (H.N.-3,F/ZN-3C) that secure the PROJECTION LENS, and the PROJECTION LENS.
2. Remove the two screws (C.P.TYPE1 B-TITET-A.SCREW,2X6,F/ZB-3C) that secure the Focus Ring, and remove the Focus Ring.

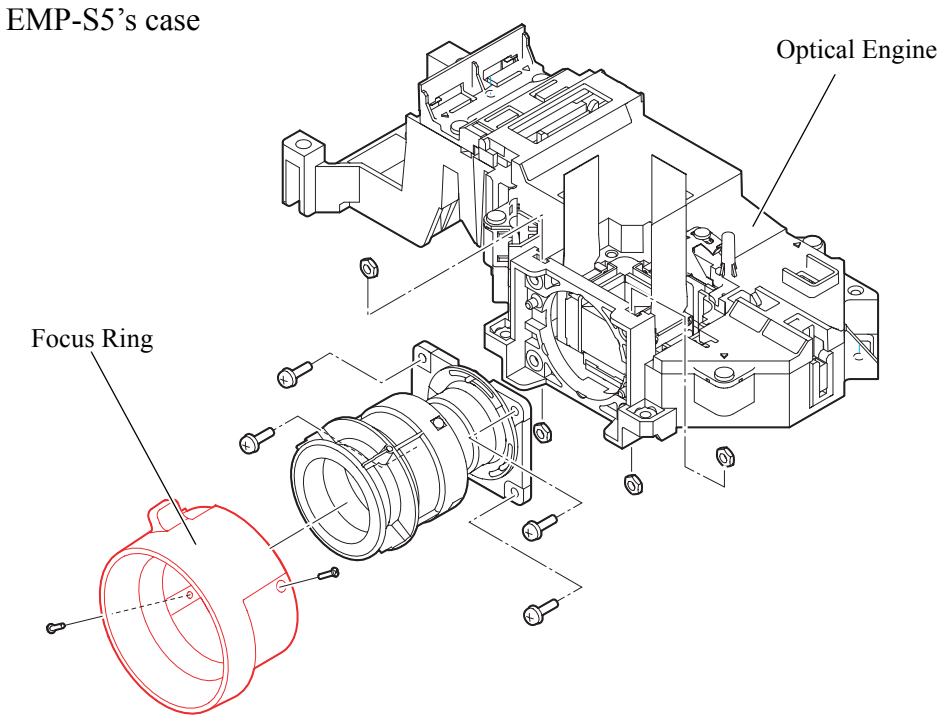


Figure 4-39.

4.5 Removing Other Main Parts

4.5.1 Removing the Inner EX Duct A/Intake Fan/RC Board Assy.

■ Removing the Inner EX Duct A

1). Remove the two screws (C.B.P-TITE SCREW,3X10,F/ZB-3C) that secure the Inner Exhaust Duct A, and remove the Inner Exhaust Duct A.

■ Removing the Intake Fan

1). Remove the five screws (C.B.P-TITE SCREW,3X10,F/ZB-3C) that secure the Intake Duct, and remove the Intake Duct together with the Intake Fans.

2). Remove the four screws (two each: C.B.P-TITE SCREW,3X12,F/ZN-3C) that secure the Intake Fans, and remove the Intake Fans from the Intake Duct.

3). Remove the Intake Fan Sheet (one each) from the Intake Fans.

■ Removing the RC Board Assy.

1). Remove the RC Board Assy. from the Lower Case.

2). Remove the RC Cable from the RC Board Assy.

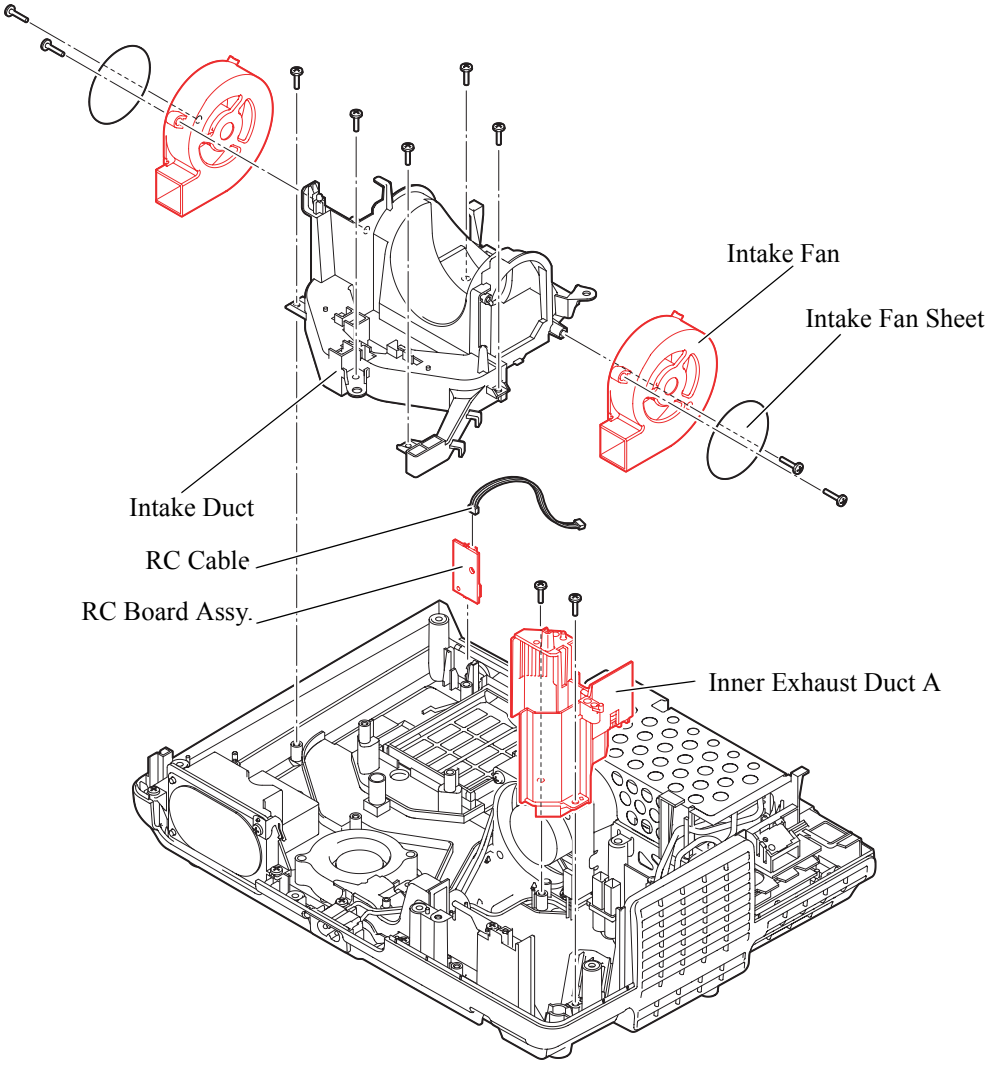


Figure 4-40.

■ Before installing the Intake Fan, attach the Intake Fan Sheet to the fan. Make sure to align the arc of the sheet with the arc of the fan where the fan cable comes out.

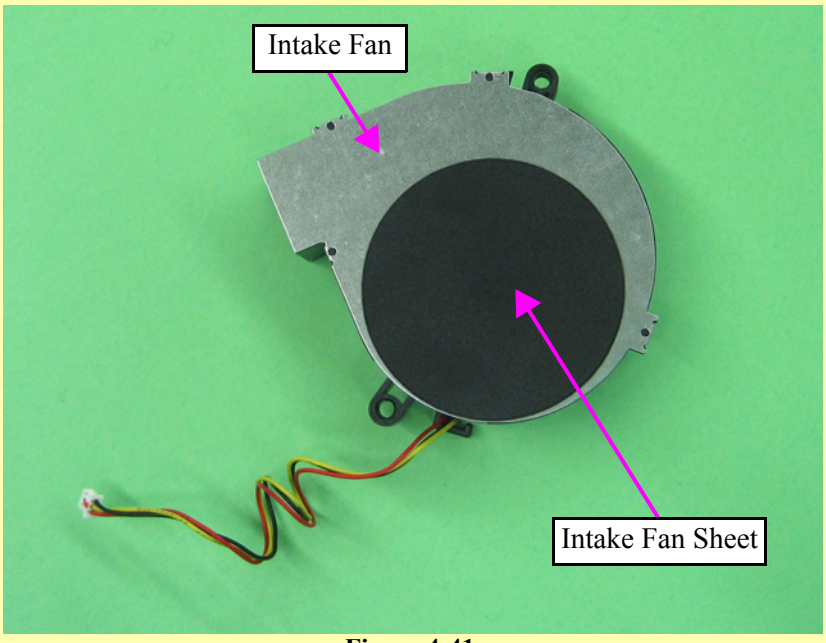


Figure 4-41.

■ When installing the Intake Duct, be careful of the routing of the cables below.

- Secure the AC Cable to the ditch of the Lower Case.
- Secure the AC Cable under the Intake Duct.

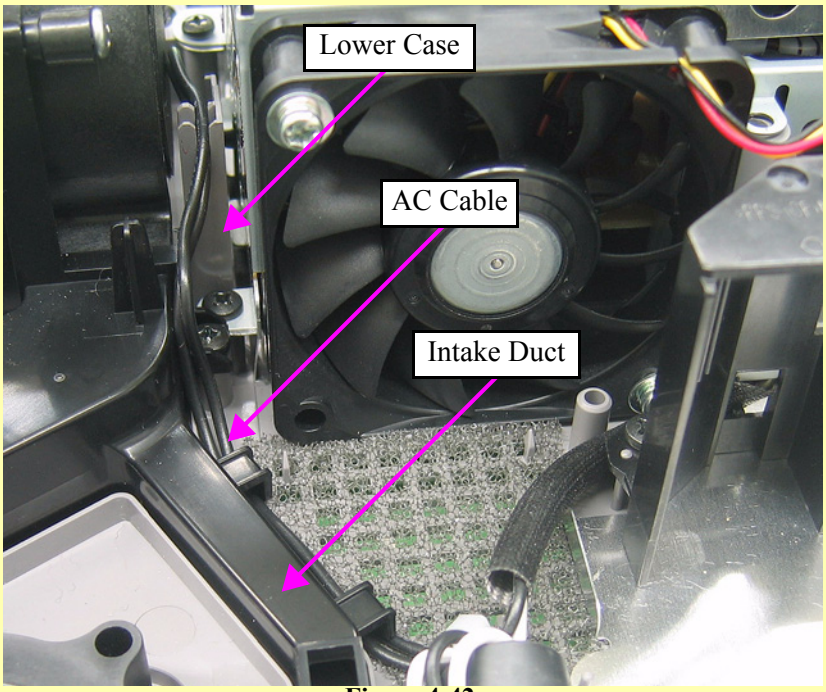


Figure 4-42.

- Route the cable of the Lamp Fan under the Intake Duct.

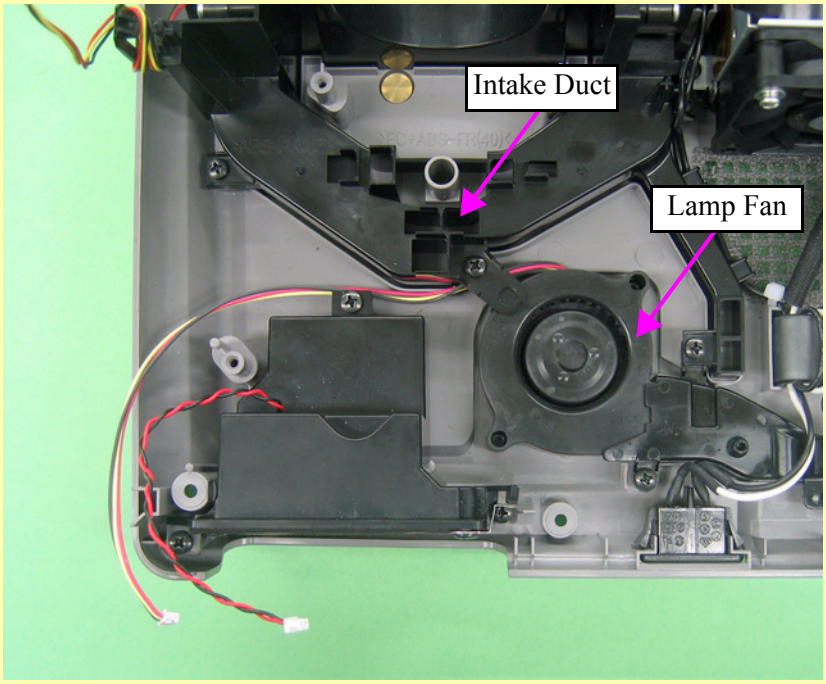


Figure 4-43.

■ When installing the Inner Exhaust Duct A, check the following.

- The Lamp Connector is secured to the notch of the Inner Exhaust Duct A.
- The Safety Switch is secured to the notch of the Inner Exhaust Duct A.

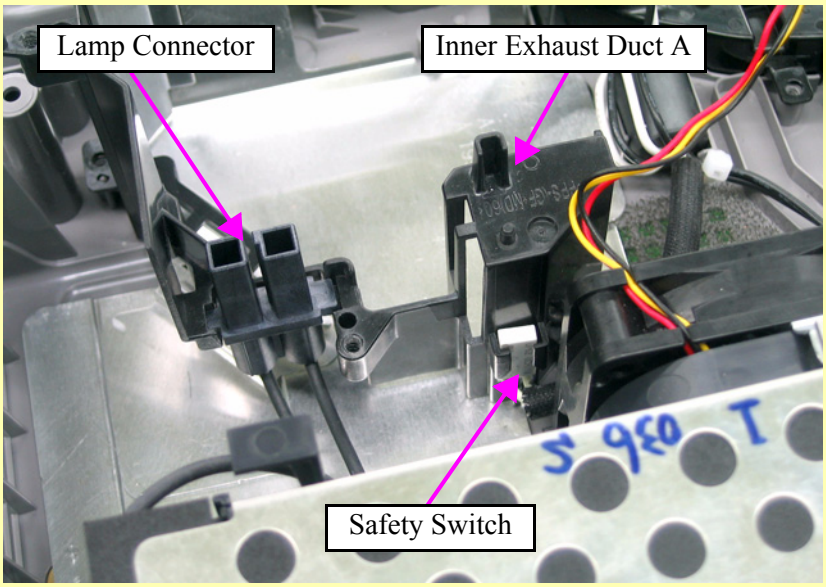


Figure 4-44.

- After installing the Safety Switch, pull the Protection Tube in the direction of the arrow, and make sure that the cable of the Safety Switch is covered with the Protection Tube.

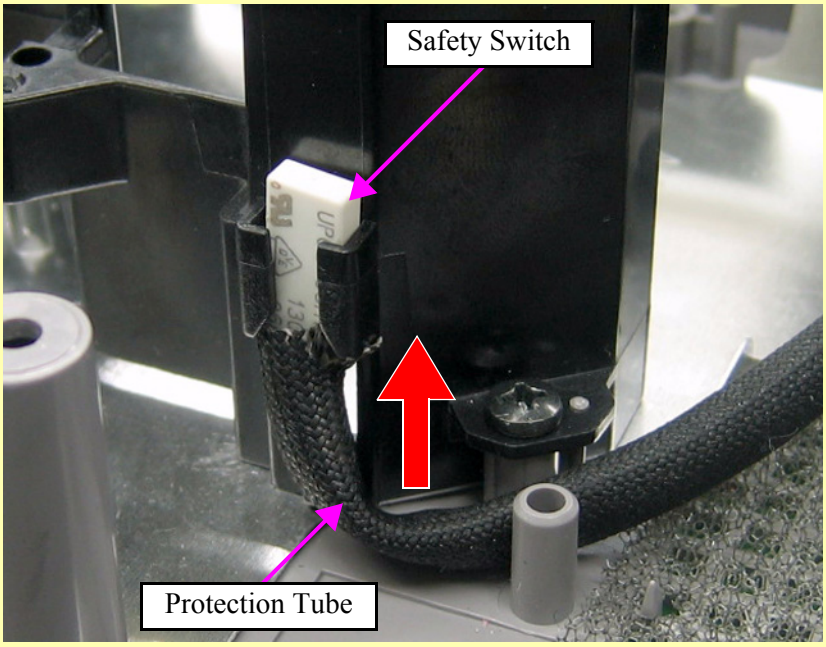


Figure 4-45.

4.5.2 Removing the PS Ballast Assy.

■ Removing the PS Ballast Assy.

Safety device

This part is designated as the Safety Device. When removing/replacing the part for repair, be sure to refer to the following section. According to the instructions in it, handle the part and perform the procedure after servicing.

■ 4.1.4 "Safety Check after Servicing" (p. 4)

1). Release the Ferrite Core and AC Inlet of the AC Cable from the Lower Case.

2). Remove the three screws (C.B.P-TITE SCREW,3X10,F/ZB-3C) that secure the PS Ballast Assy., and remove the PS Ballast Assy. from the Lower Case.

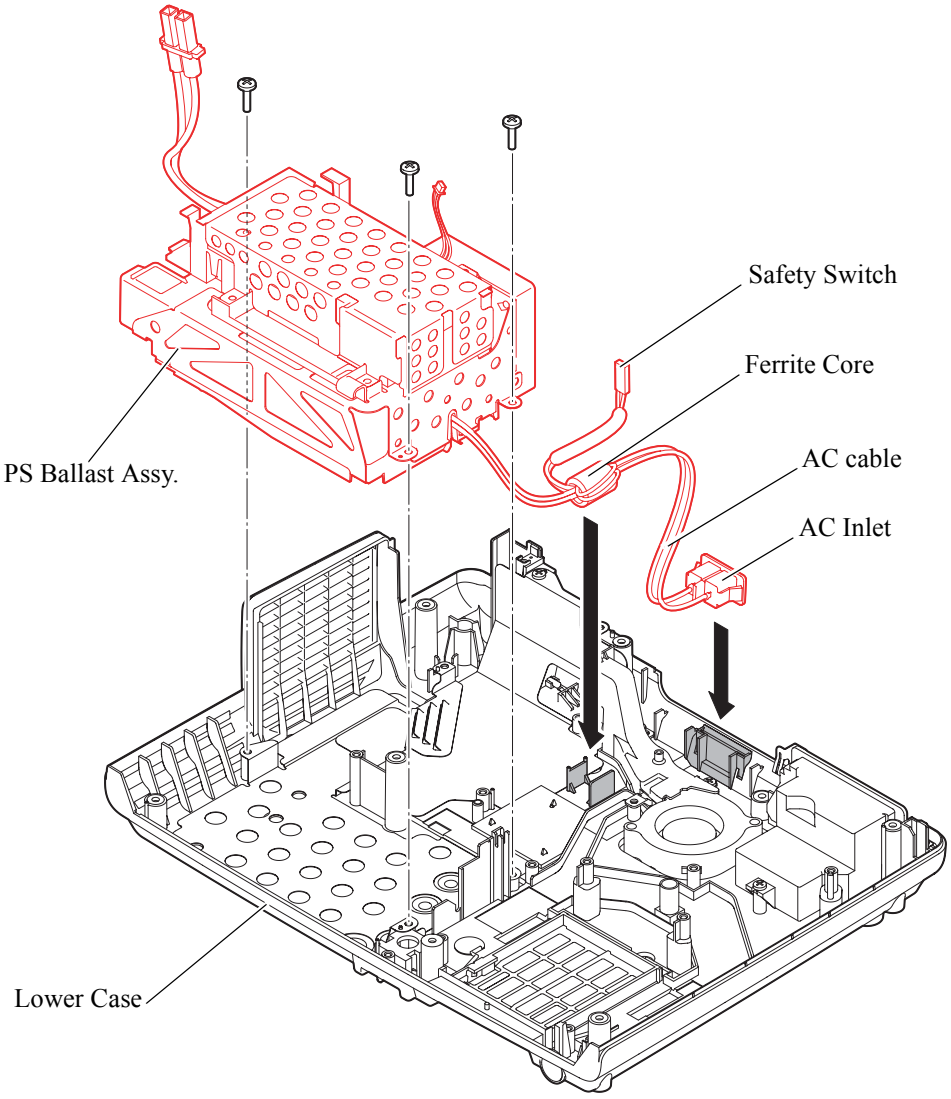


Figure 4-46.

■ When installing the PS Ballast Assy., check the following.

- The AC Cable is secured to the ditch of the Lower Case.

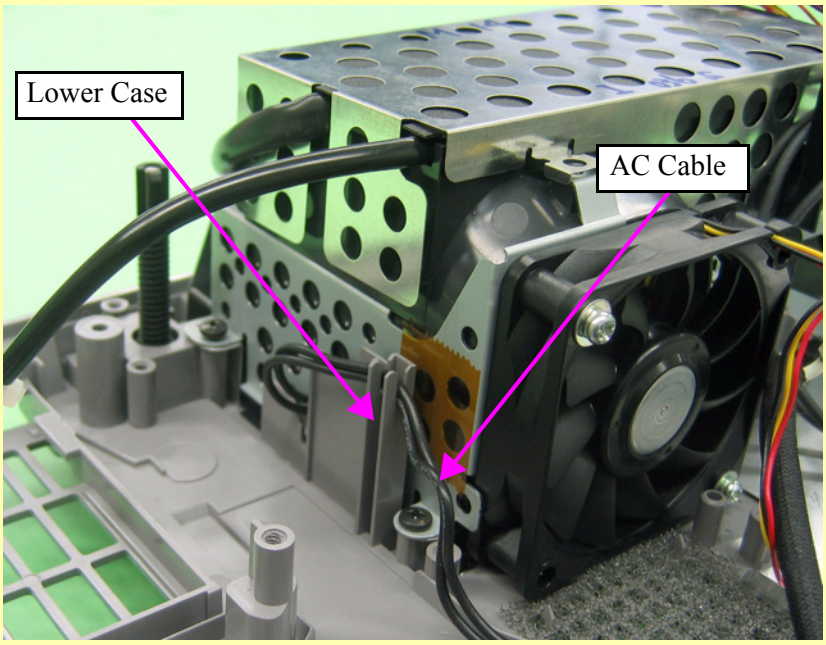


Figure 4-47.

- The AC Inlet is set so that the AC Cable come to the top.
- The tube part of the AC Inlet is not crossing over the Lamp Duct. (To prevent the AC Cable from being caught between the IF Board Assy. and the Lamp Duct, when the MA Board Assy. is installed.)(EMP-822/83 only)

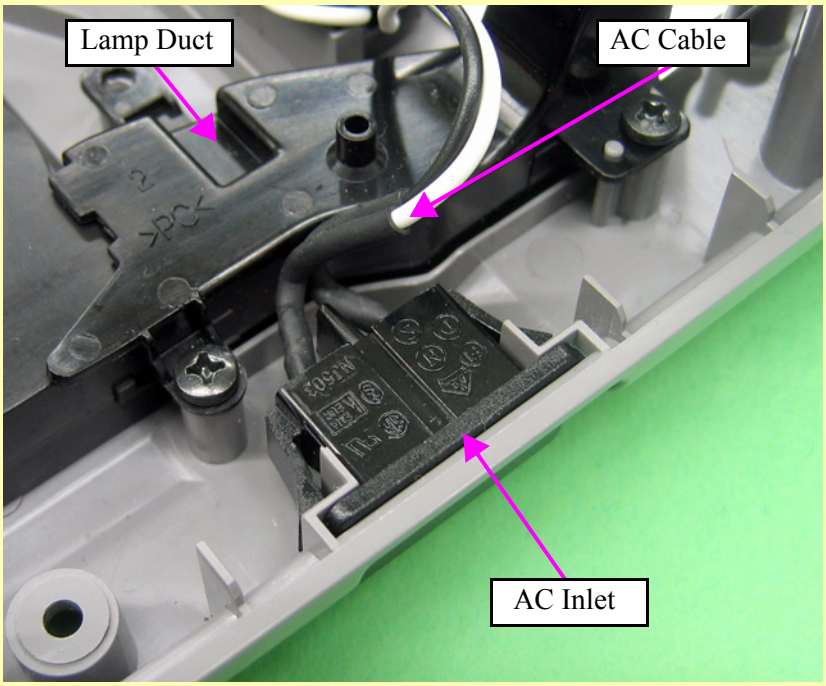


Figure 4-48.

- The Ferrite Core is set so that the AC Cable is facing the Lamp Fan side.

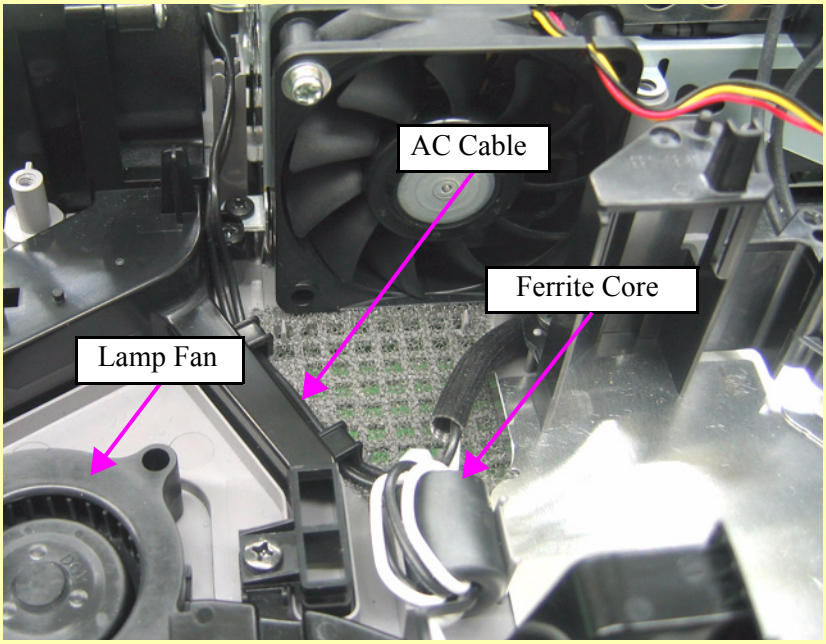


Figure 4-49.

- The Lamp Connector Cable in the figure below are routed to the two ditches of the PS Ballast Assy.

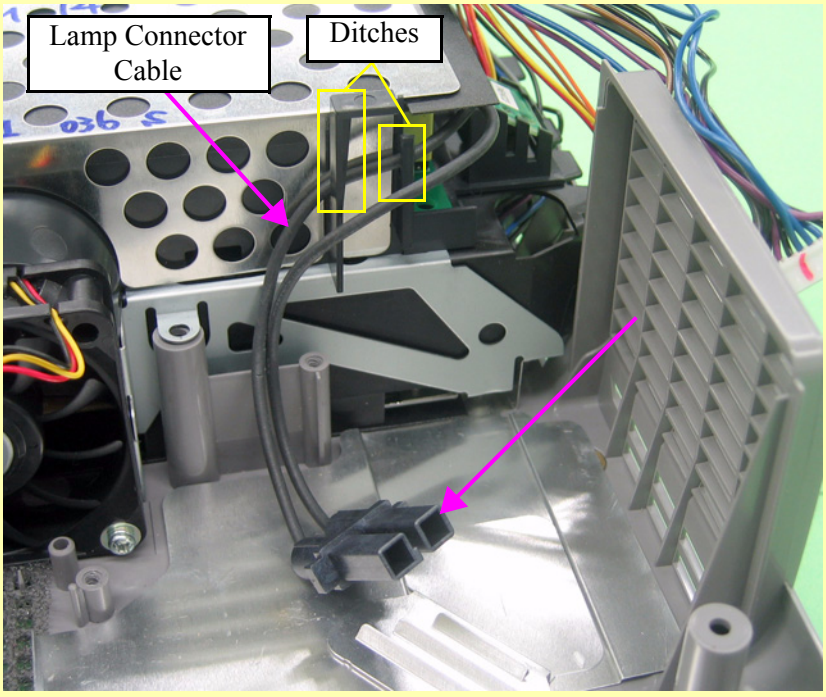


Figure 4-50.

4.5.3 Removing the Lamp Fan/Speaker Unit (EMP-822/EMP83 only)

■ Removing the Lamp Fan

1). Remove the two screws (C.B.P-TITE SCREW,3X10,F/ZB-3C) that secure the Lamp Duct, and remove the Lamp Duct and the Lamp Fan from the Lower Case.

■ Removing the Speaker Unit

1). Remove the three screws (C.B.P-TITE SCREW,3X10,F/ZB-3C) that secure the Speaker Unit, and remove the Speaker Unit from the Lower Case.

2). Remove the screw (C.B.P-TITE SCREW,3X10,F/ZB-3C) that secures the Speaker Spring, and remove the Speaker Spring from the Speaker Unit.

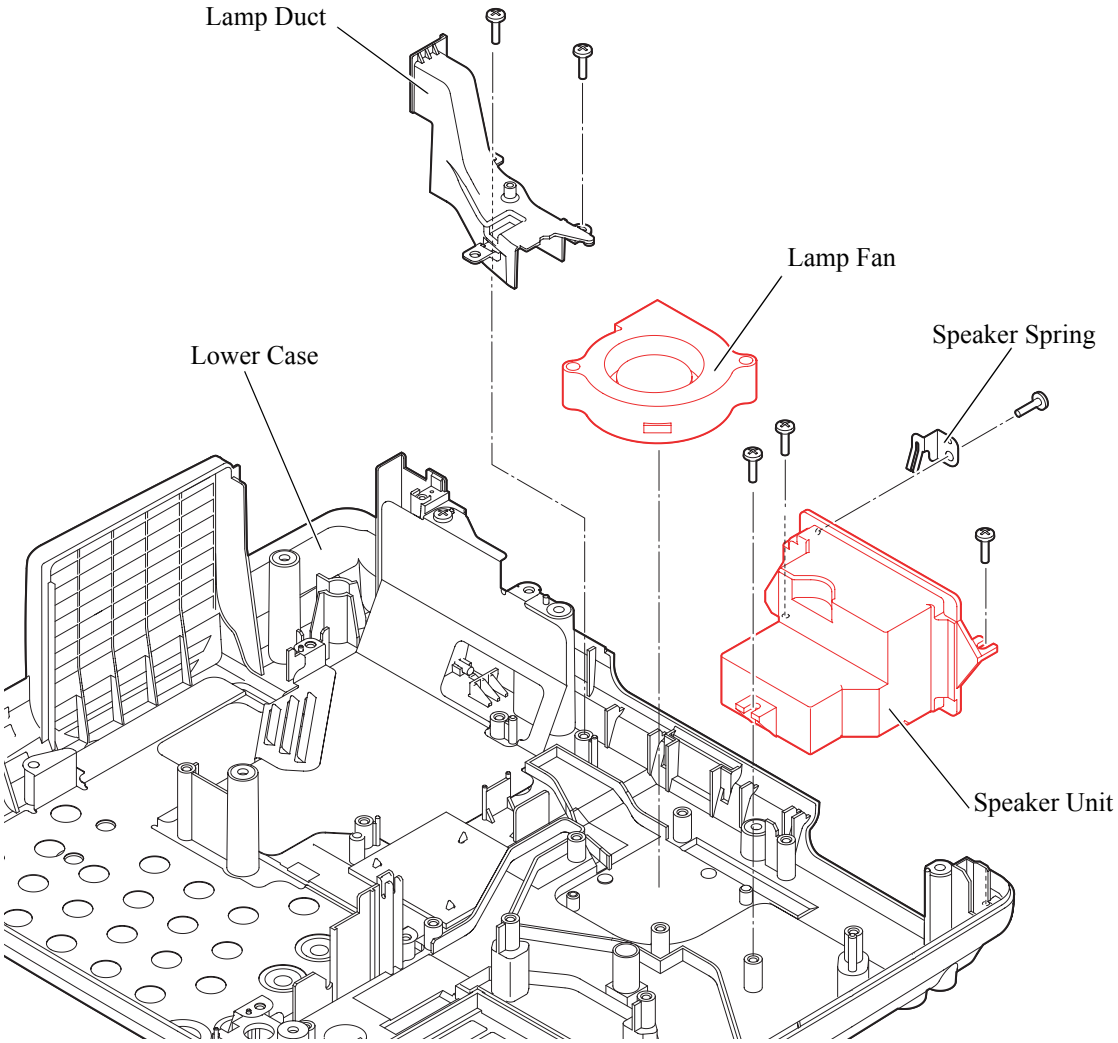


Figure 4-51.

4.5.4 Removing the Lower Case

1. Remove the following parts from the Lower Case.
   - Lower Case Seal
   - Filter,RC
   - Lamp Shield B
2. Remove the screw (C.B.P-TITE SCREW,3X10,F/ZB-3C) that secures the Lamp Shield, and remove the Lamp Shield from the Lower Case.
3. Remove the PS Air Filter.

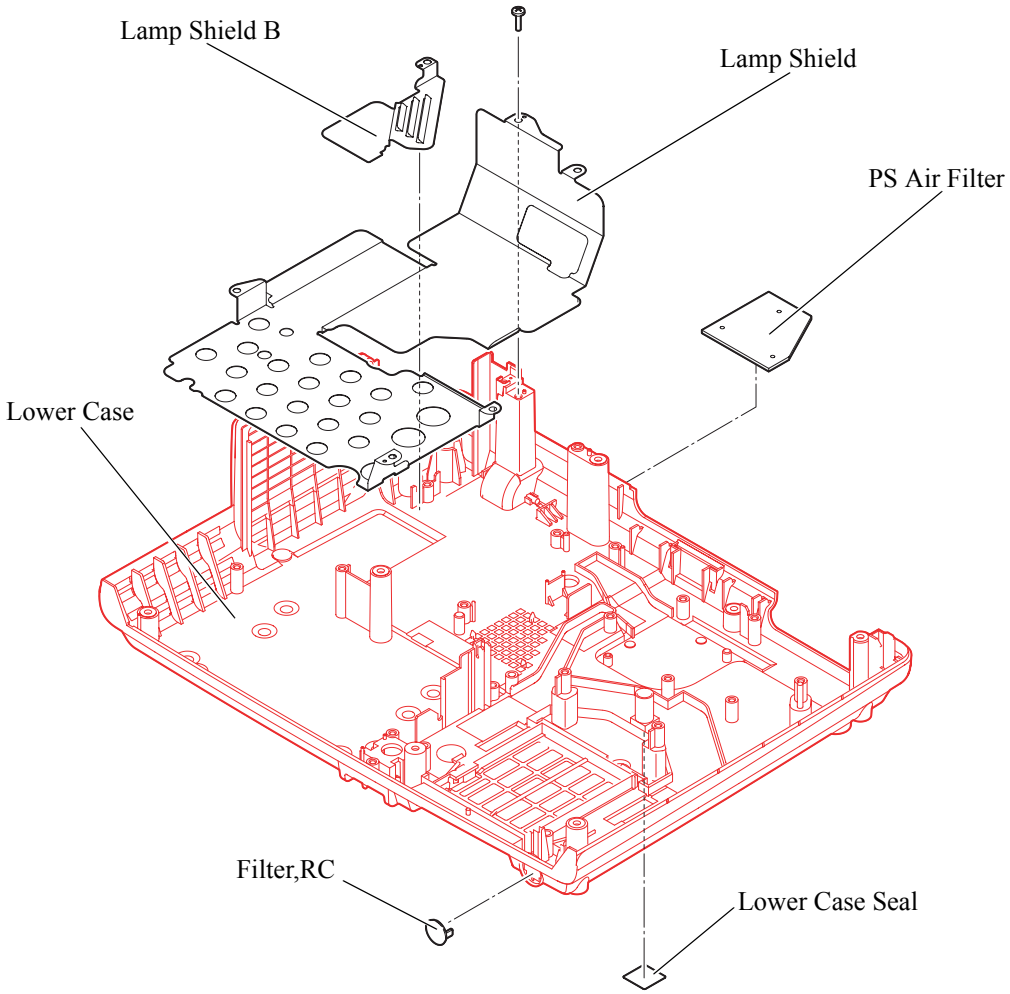


Figure 4-52.

■ When installing the EMI Sheet, stick it to the position described below.

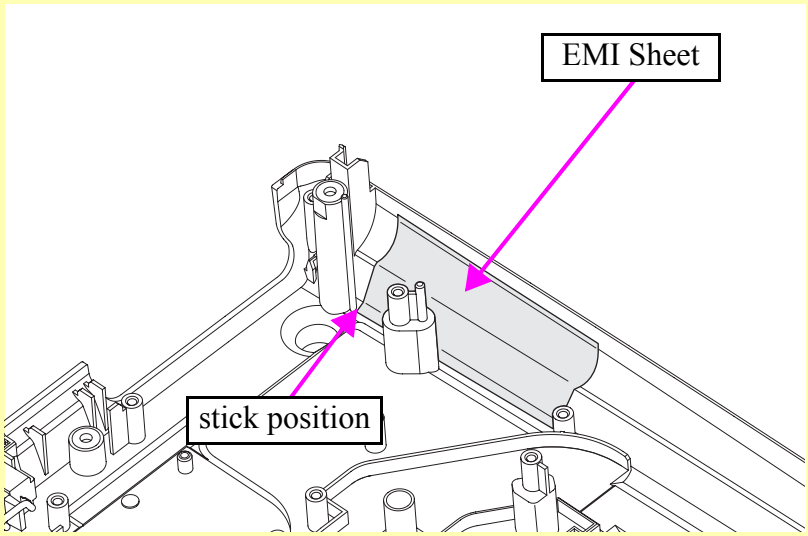


Figure 4-53.

■ When installing the Lamp Shield, secure the PS Air Filter under it.

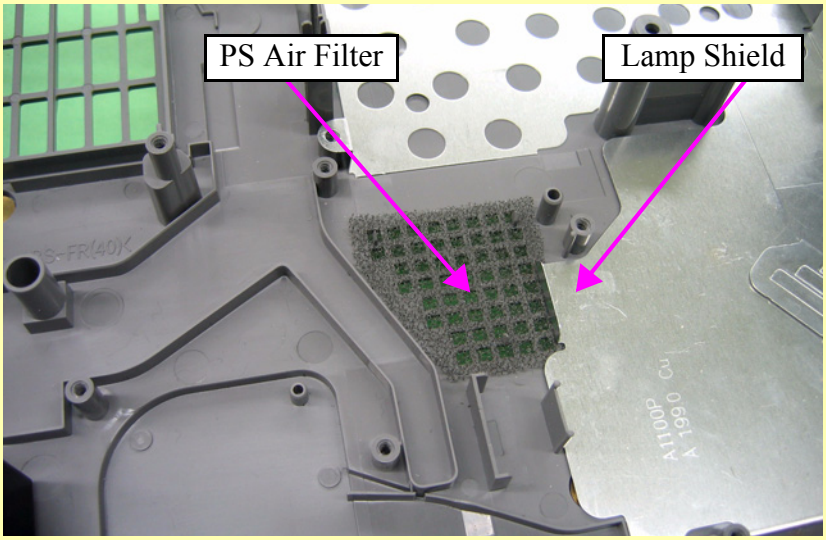


Figure 4-54.

Chapter 5 Appendix

CAUTION

The contents of this chapter are for use only by Epson Authorized Services, and are not to be disclosed to others without the express written consent of Epson.

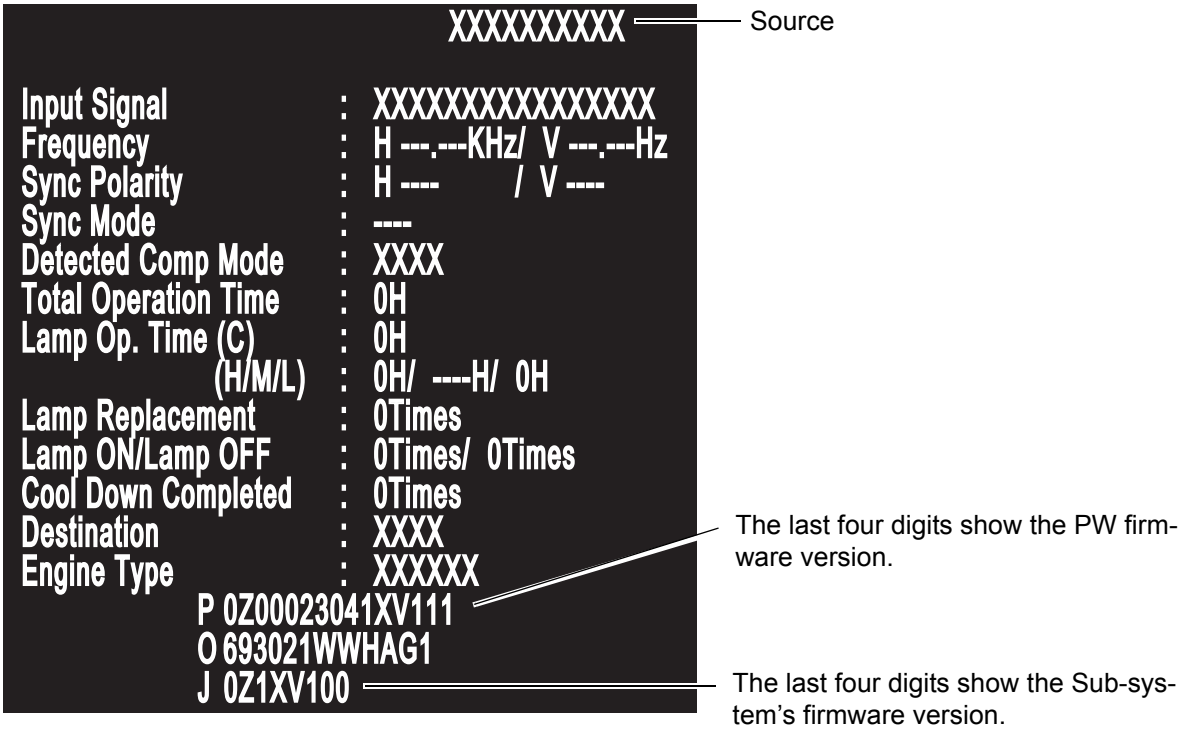
5.1 AS (After Service) Menu

This menu provides information and settings that are not displayed on the standard menu.

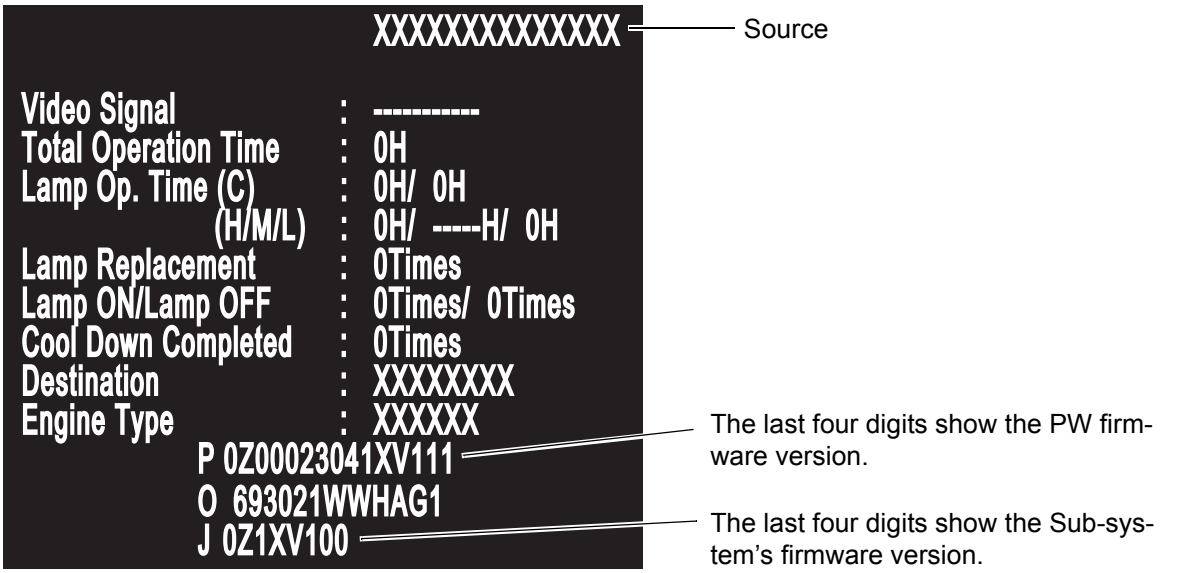
5.1.1 How To Display the AS (After Service) Menu

1. Press the **[Menu]** button either on the remote control or on the projector's control panel for at least 5 seconds.
2. Within 4 seconds after pressing the **[Menu]** button, hit these buttons in order shown below.
   [Esc] → **[Esc]** → **[Right]** → **[Left]**
   AS Menu is displayed. (The items vary according to the input source.)

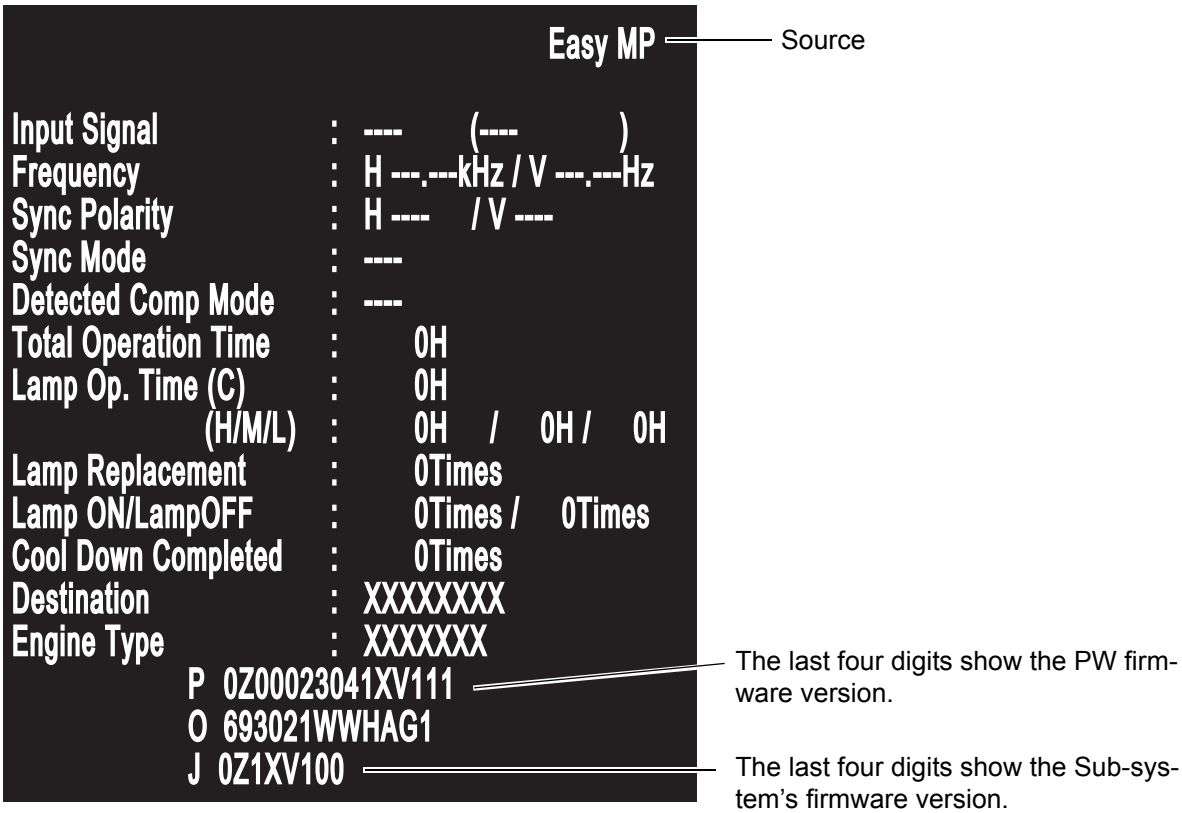
   ■ The video source's case. (Component, PC, HDMI, or D input (Page 1))



■ S-Video/ Video's case. (Page 1)

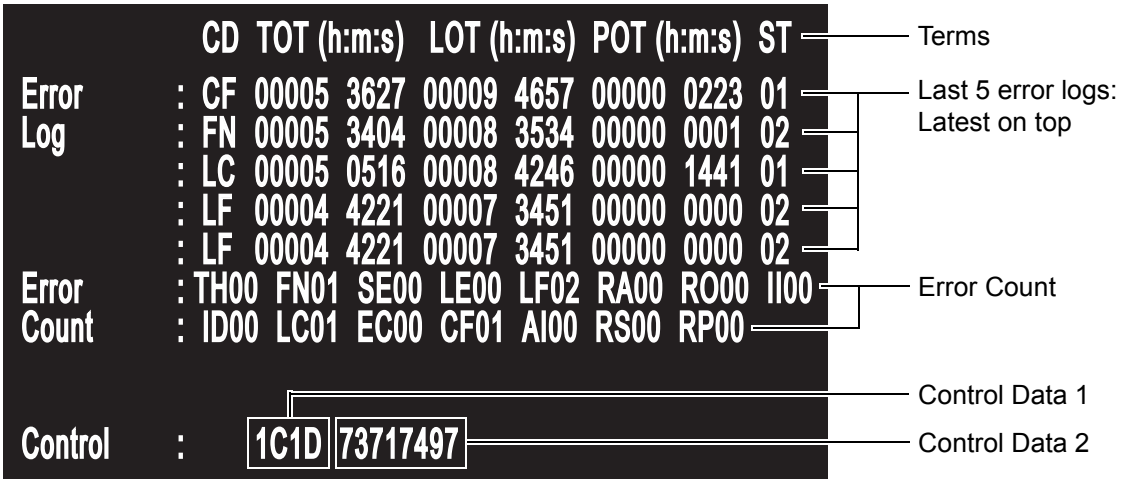


■ Easy MP's case. (Page 1)



■ Error Log Window (Page 2)

While the AS menu is displayed, the Error Log Window can be displayed by pressing the **[Right]** button. To go back to the AS menu, press the **[Left]** button.



Item	Contents		Representation
Error Log	CD	Error Code	Two alphabets
	TOT	Total Operation Time	h: 5-digit number (00000-65535) Over 65535: "65535" (Not cleared to "0.") m: 2-digit number (00-59) s: 2-digit number (00-59)
	LOT	Lamp Operation Time	
	POT	Time after Lamp is ON	
	ST	PJ (Projector)'s status	Acquired data of PWR? of the ESC/VP21 command

- The last 5 error logs are displayed (the latest on top). None is displayed if there's no error.
- In the case of the above window, the latest error is "Cinema Filter Error" (TOT: 5 hours 36 minutes 27 seconds, LOT: 9 hours 46 minutes 57 seconds, POT: 0 hours 2 minutes 23 seconds, PJ's status: Lamp ON).
- The 2nd latest error is "Fan Error" (TOT: 5 hours 34 minutes 4 seconds, LOT: 8 hours 35 seconds 34 minutes, POT: 0 hours 0 minutes 1 second, PJ's status: Warming up).

Item	Contents		Representation
Error Count (times)	TH	Internal overheat	2-digit number (00-99) Over 99: “99” (Not cleared to “0.”)
	FN	Fan error	
	SE	Thermistor error	
	LE	Lamp burnt out	
	LF	Lighting failure	
	RA	Internal error (RAM)	
	RO	Internal error (ROM)	
	II	Internal error (I2S)	
	ID	Internal error (DR)	
	LC	Lamp cover open	
	EC	Connection failure to Electrical double layer capacitor	
	CF	Cinema Filter error	
	AI	Auto IRIS error	
	RS	Sub system ROM error	
	RP	Sub system error (PW error)	
Control	Control data 1	Thermal data of each thermistor	Acquired data of TEMP? of the ESC/VP21 command
	Control data 2	Voltage of each fan	Acquired data of TEMP? of the ESC/VP21 command

5.1.2 Initializing (Resetting) the AS Menu Values

The operational procedures and the values of initialization of the AS Menu are shown below.

Type	Clearing the Lamp Information	Clearing the AS Information	Clearing the Log Information
Operation / Item	Press **[Up]** and **[Source]** for 10 sec. during displaying Page 1/Page 2.	Press **[Down]** and **[Source]** for 10 sec. during displaying Page 1/Page 2.	Press **[Right]** for more than 5 sec., then within 3 sec. press **[Select]** for 2 sec. during displaying Page 2.
Total Operation Time	No Change	Reset to 0H	No Change
Lamp Operation Time (C/H/M/L)	Reset to 0H	Reset to 0H	No Change
Lamp ON	Reset to 1	Reset to 1	No Change
Lamp OFF	Reset to 0	Reset to 0	No Change
Lamp Replacement	Add 1 to the current value	Reset to 0	No Change
Cool Down Complete	Reset to 0	Reset to 0	No Change
Error Log	No Change	No Change	Spacing (Status of acquiring none)
Error Count	No Change	No Change	Reset to 0
Control	No Change	No Change	No change