



This training course provides service technician training for the Furud-PJ1 series.



This section provides an overview of the machine, and the options that can be installed.

### ■ What Models are there in the Series? **RICOH** imagine. change.

- Furud-PJ1cw (Y0A5, Y0A7): PJ WXL4540, PJ LW3000ST
  - 3000 lumens, WUXGA resolution
- Furud-PJ1w (Y0A4, Y0A6): PJ XL4540, PJ LX3000ST
  - 3000 lumens, WXGA resolution
- The models in red are for the China market.
- These are short-throw projectors using a laser light source.
- There is no network connectivity for this model.

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No additional notes

Main Specifications		RICOH imagine. change.
	Furud-PJ1 cx	Furud-PJ1 cw
Type	0.55DMD	0.65DMD
Brightness	3000 lm	3000 lm
Lamp type	Laser diode bank x 1	
Resolution	WXGA (1024 x 768)	WUXGA (1280 x 800)
Projection distance	0.75 - 1.33 m	0.78 - 1.12 m
Projection screen size	56.4 - 100 inch	69.4 - 100 inch
Dimensions (W x D x H, mm)	383 x 308 x 85	
Weight	5.5kg (12.2lb)	
Power Consumption	< 330W (normal), <210 (eco)	
Keystone	Vertical	
Speaker	speaker (10W, mono) x1	
Wired LAN	none	
USB	Mini USB (for Firmware Update)	

See the specifications table in the service manual for more details.

## **Service Features**

- This product can be installed by users, except when mounted on a ceiling or wall.
- This product is designed for user maintenance. Regular on-site maintenance is not needed.
- LEDs show the machine status and symptoms for troubleshooting.
- A service mode is available.

No additional notes

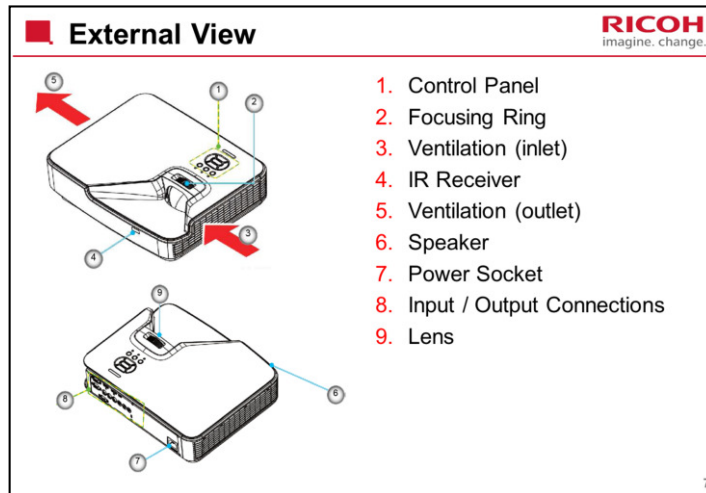
## ■ Major Selling Points

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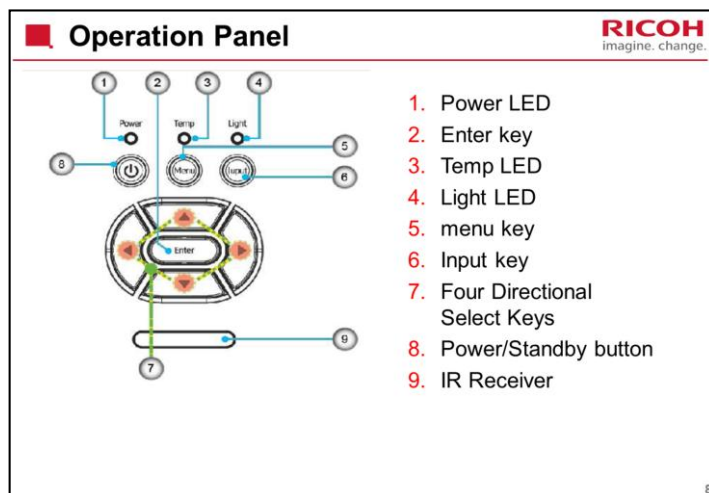
- 3,000lm short throw laser projector, WXGA and WUXGA
- 20,000 hours ultra long life (using eco-mode)
  - 10,000 hours in normal mode
  - Thanks to the laser light source, lamp-free design allows continuous operation, maintenance-free

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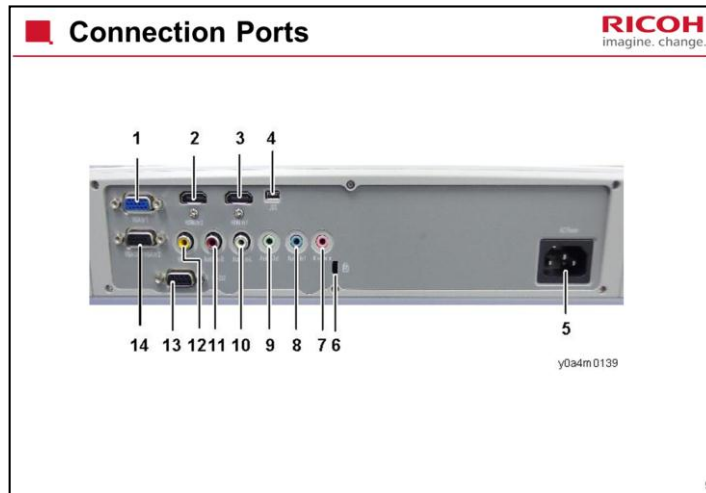
No additional notes



No additional notes



No additional notes



1. Computer-In/YPbPr Connector (PC Analog Signal/Component Video Input/HDTV/YPbPr)
2. HDMI2 Input Connector
3. HDMI1 Input Connector
4. USB socket for firmware update
5. Power Socket
6. Kensington Lock Port
7. Microphone Input Connector
8. Audio Input 1 Connector (3.5mm mini jack)
9. Audio Output Connector (3.5mm mini jack)
10. Audio Input 2 (left) Connector
11. Audio Input 2 (right) Connector
12. Video Input Connector
13. PC Control (9-pin DIN Type)
14. Monitor-Out Connector

## LED Indicators

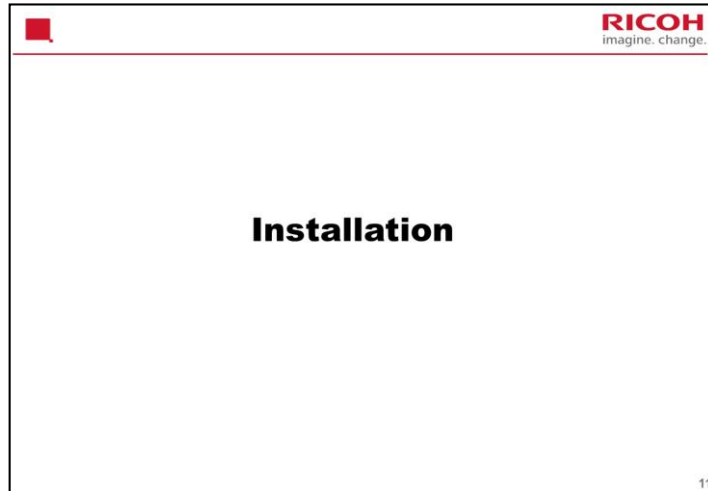
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- The status of these LEDs tells you about the machine condition.
- See the 'Troubleshooting > LED Indicators' section of the service manual for details on the meanings of the various states of these LEDs.

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No additional notes



This projector is installed by the customer. However, please study the installation procedure in the user's guide to be familiar with the procedure, because some customers may need help.

## ■ Installation by the Customer

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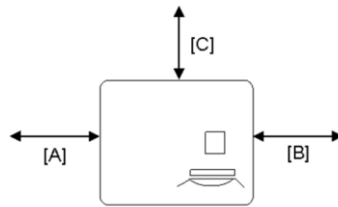
- This projector is installed by the customer.
- However, please study the installation procedure in the user's guide to be familiar with the procedure, because some customers may need help.

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No additional notes

## ■ Installing Projectors Side-by-side



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- 30 cm space is required at [A], [B], and [C] for the air vents.

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No additional notes

  
imagine. change.

# Basic Points about Service

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No additional notes

## ■ Swap and Repair

**RICOH**  
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- This product is intended for 'swap-and-repair'.
- If the projector needs repairs, it is taken away from the customer site and a temporary replacement is provided to the customer.

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No additional notes

## ■ Special Tools Needed

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- RS-232C cable (cross)
- USB cable (Type A to Mini B)
- Laptop (with terminal emulation software, which is required for collecting error logs and updating firmware)
- DLP composer Lite software (will be delivered with firmware)
- nuMicro ISP Programming Tool (will be delivered with firmware)

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An example of terminal emulation software is Tera Term.

## **Antistatic Clothing**

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- To protect the components from damage, wear anti-static clothing when you disassemble the machine.

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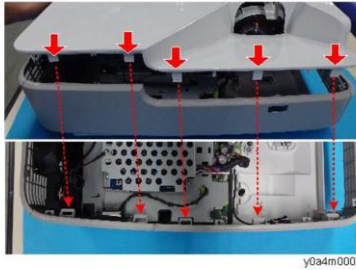
No additional notes

- After replacing parts, some adjustments may be needed. See the table in the following section of the service manual: Replacement and Adjustment - Required Action After Replacing Parts
  - Whenever you replace a component, check this table to see if you have to do any of these procedures.
  - The service manual says that the ADC Calibration procedure should be done after updating firmware. However, it is not necessary to do this.

No additional notes

## ■ Removing the Top Cover

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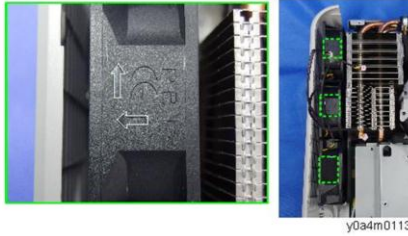
- Take care not to break the hooks when removing this cover.

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No additional notes

## ■ Replacing the Fans

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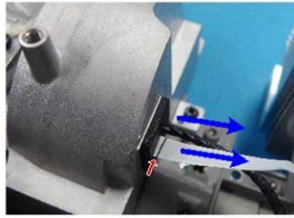
- Make sure that the markings on the fans are positioned as shown in the above diagram, or the air flow will not be in the correct direction.

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No additional notes

## ■ Replacing the Filter Wheel

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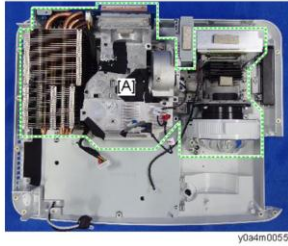
- After attaching the cover, pull out the FFC until the black line appears. If the FFC is loose inside the cover, it might come into contact with the filter wheel, causing an error.

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No additional notes

## Optics Engine Layout

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- The Optics Engine [A] contains the following 3 main modules:
  - Engine Unit
    - Lens Module, DMD Module (DMD Chip, DMD Board)
  - Combiner Unit
    - Heat Sink, Heat Pipe, Laser Bank (Laser Diode, Laser Bank Board), Phosphor Wheel
  - Filter Wheel
- The three main modules of the optics engines can be replaced in the field.
  - For example, if the laser banks don't work, replace the combiner unit.

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No additional notes

## **Service Mode**

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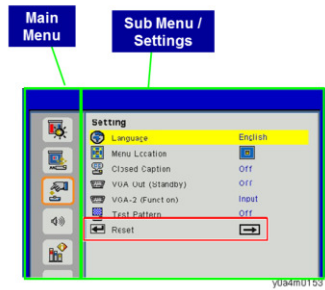
- See the following section of the service manual for how to enter service mode, and for details on each item in the service mode menu.
  - Adjustment > Service Mode

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No additional notes

## Factory Reset: Method 1

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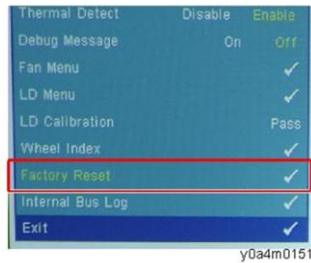


- This erases all OSD menu settings and restores the default setting (except the service mode settings).
- Procedure:
  - Press the "Menu" key to enter the OSD menu.
  - Select "Setting" -> "Reset".

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No additional notes

## Factory Reset: Method 2



- This does the same as method 1 on the previous slide.

- Procedure:
  - Get into service mode, and select Factory Reset.

No additional notes



This section explains the basic points about updating the firmware.

## ■ Three Types of Firmware

- System Firmware
- MCU Firmware
- EDID Firmware

No additional notes

## ■ Updating the System Firmware

**RICOH**  
imagine. change.

- Equipment needed
  - Software
    - DLP Composer Lite
    - Firmware (\*.img)
    - HD26FlashDeviceParameters
  - Hardware
    - USB Cable mini USB to USB (A)
    - PC / Laptop
- The detailed procedure is in the Firmware Update - System Firmware Update section of the service manual.

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Download "DLP Composer Lite" and "HD26FlashDeviceParameters" from the website that provides the relevant tools for maintenance.

## ■ Updating the MCU Firmware

**RICOH**  
imagine. change.

- Equipment Needed
  - Software
    - NuMicro ISP Programming Tool
    - Firmware (\*.isp)
  - Hardware
    - Female to female RS232 Cable
    - PC or Laptop
- The detailed procedure is in the Firmware Update – MCU Firmware Update section of the service manual.

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No additional notes

## ■ Updating the EDID Firmware - 1

**RICOH**  
imagine. change.

- Equipment Needed
  - Software
    - EDID Program
    - EDID File (\*.ini)
  - Hardware
    - VGA Cable
    - HDMI to DVI cable
    - Generic Fixture Board for EDID Key-in
    - RS-232 9 Pin Cable
    - Power Adapter (Output DC 12V)
    - PC or Laptop
- The detailed procedure is in the Firmware Update – EDID Update section of the service manual.

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Fixture board, power adapter: See the next slide

## ■ Updating the EDID Firmware - 2

**RICOH**  
imagine. change.

**Fixture Board**



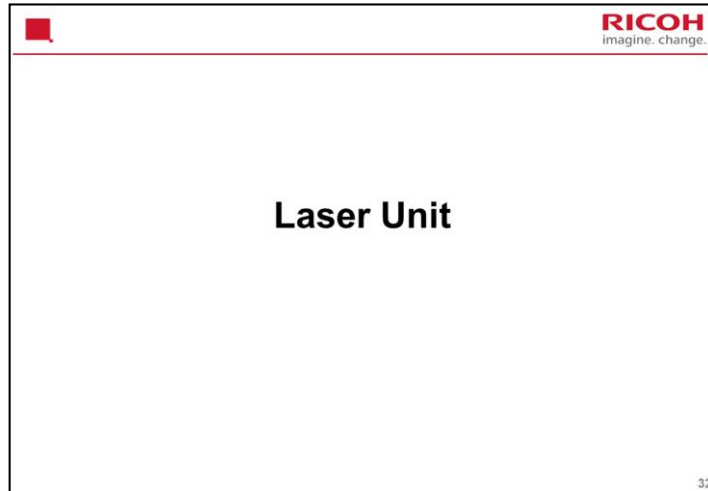
**Projector**



- To update the EDID firmware, the projector must first be connected to the PC/Laptop through a special board called the 'Fixture Board'.
  - The RS232C cable goes to the PC/Laptop
  - The two VGA cables and the HDMI to DVI all go to the projector.
- The fixture board is powered with a 12V DC power adapter.
- Consult your supervisor when you need a fixture board and 12V adapter.

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See the procedure in the service manual for details on how all this is connected up.



This section briefly describes the technology used in the laser diode units.

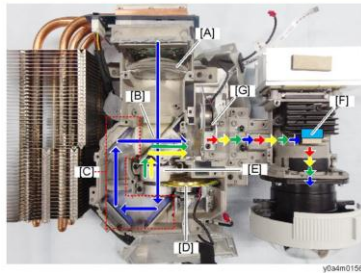
## Overview

- This projector uses blue lasers for a light source.
- A phosphor wheel and an index wheel create the other required colours (yellow, red, green) from the blue light.

No additional notes

## Light Path - 1

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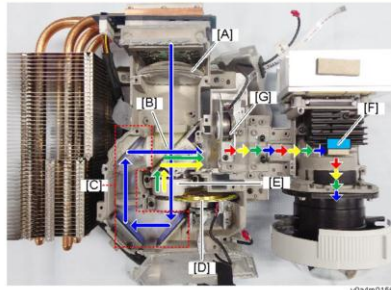
- Blue light from the laser diode banks goes through the afocal lens [A] and the dichroic mirror [B].
- The collimator [E] adjusts the beam before it reaches the phosphor wheel [D].

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Afocal lens: No convergence, light is transmitted to a distant point as parallel rays.

## Light Path - 2

**RICOH**  
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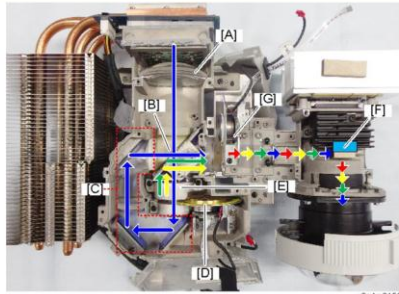
- The phosphor wheel [D] creates green and yellow light from the blue light.
- The green and yellow light are reflected back to the dichroic mirror [B], but the blue light passes straight through.

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Afocal lens: No convergence, light is transmitted to a distant point as parallel rays.

### Light Path - 3

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imagine. change.



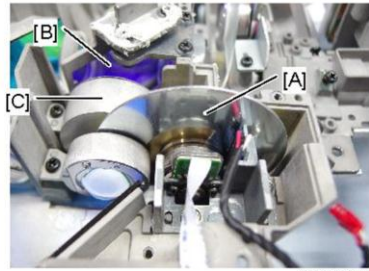
- The green, yellow, and blue light reaches the filter wheel [G]. This wheel creates red light from the yellow light.
- The four beams (blue, green, yellow, red) reach the DMD [F] and the image is assembled for projection.

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Afocal lens: No convergence, light is transmitted to a distant point as parallel rays.

## ■ Phosphor Wheel

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y0a4m0156

- The phosphor wheel [A] has three segments: blue transparency, yellow phosphor, green phosphor.
  - [B]: Dichroic mirror, [C]: Collimator

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No additional notes

## Filter Wheel



y0s4m0158

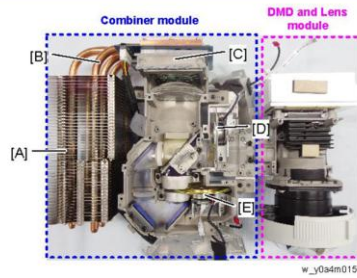
- The filter wheel has 4 segments: green, blue, red, and yellow.
- The blue segment contains a diffuser to reduce the coherence of the blue laser light, for safety purposes.

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No additional notes

## Combiner Module

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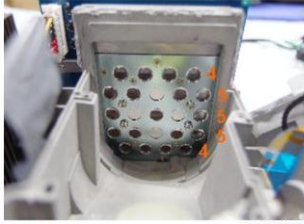
- This module contains the heat sink [A], heat pipe [B], laser bank [C], filter wheel [D], and phosphor wheel [E]

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No additional notes

## ■ Laser Banks

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imagine. change.



y0a4m0160

- There is one laser bank of 24 laser diodes, cooled by a heat pipe.

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No additional notes



The End