Service Manual

MF4600 Series

Canon

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Application

This manual has been issued by Canon Inc. for qualified persons to learn technical theory, installation, maintenance, and repair of products. This manual covers all localities where the products are sold. For this reason, there may be information in this manual that does not apply to your locality.

Corrections

This manual may contain technical inaccuracies or typographical errors due to improvements or changes in products. When changes occur in applicable products or in the contents of this manual, Canon will release technical information as the need arises. In the event of major changes in the contents of this manual over a long or short period, Canon will issue a new edition of this manual.

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Caution

Use of this manual should be strictly supervised to avoid disclosure of confidential information.

Symbols Used

This documentation uses the following symbols to indicate special information:

Symbol	Description
	Indicates an item of a non-specific nature, possibly classified as Note, Caution, or Warning.
	Indicates an item requiring care to avoid electric shocks.
	Indicates an item requiring care to avoid combustion (fire).
	Indicates an item prohibiting disassembly to avoid electric shocks or problems.
	Indicates an item requiring disconnection of the power plug from the electric outlet.
 Memo	Indicates an item intended to provide notes assisting the understanding of the topic in question.
 REF.	Indicates an item of reference assisting the understanding of the topic in question.
	Provides a description of a service mode.
	Provides a description of the nature of an error indication.

The following rules apply throughout this Service Manual:

1. Each chapter contains sections explaining the purpose of specific functions and the relationship between electrical and mechanical systems with reference to the timing of operation.
   In the diagrams, ▭▮▮▮▭ represents the path of mechanical drive; where a signal name accompanies the symbol , the arrow ⟶ indicates the direction of the electric signal.
   The expression "turn on the power" means flipping on the power switch, closing the front door, and closing the delivery unit door, which results in supplying the machine with power.
2. In the digital circuits, '1'is used to indicate that the voltage level of a given signal is "High", while '0' is used to indicate "Low".(The voltage value, however, differs from circuit to circuit.) In addition, the asterisk (*) as in "DRMD*" indicates that the DRMD signal goes on when '0'.
   In practically all cases, the internal mechanisms of a microprocessor cannot be checked in the field. Therefore, the operations of the microprocessors used in the machines are not discussed: they are explained in terms of from sensors to the input of the DC controller PCB and from the output of the DC controller PCB to the loads.

The descriptions in this Service Manual are subject to change without notice for product improvement or other purposes, and major changes will be communicated in the form of Service Information bulletins.
All service persons are expected to have a good understanding of the contents of this Service Manual and all relevant Service Information bulletins and be able to identify and isolate faults in the machine."

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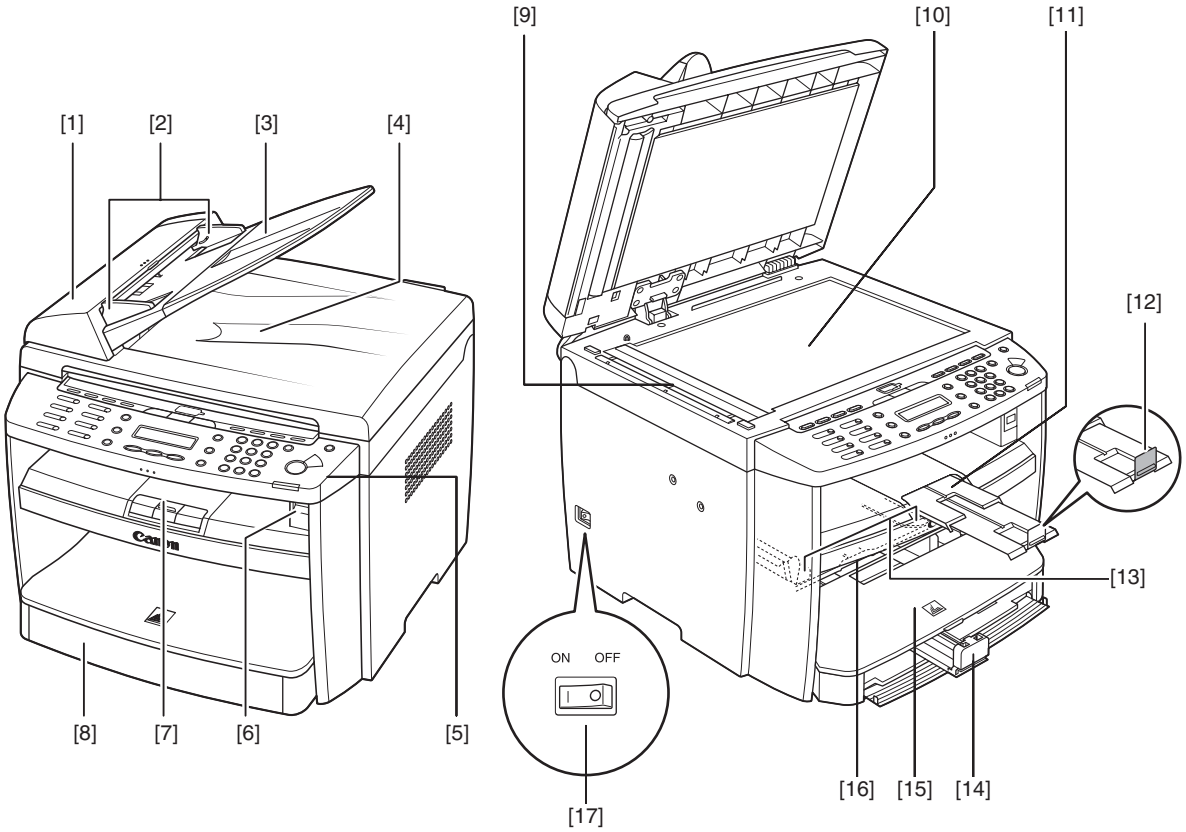
1.1 Product Specifications

1.1.1 Names of Parts

1.1.1.1 External View

i-SENSYS MF4690PL / i-SENSYS MF4660

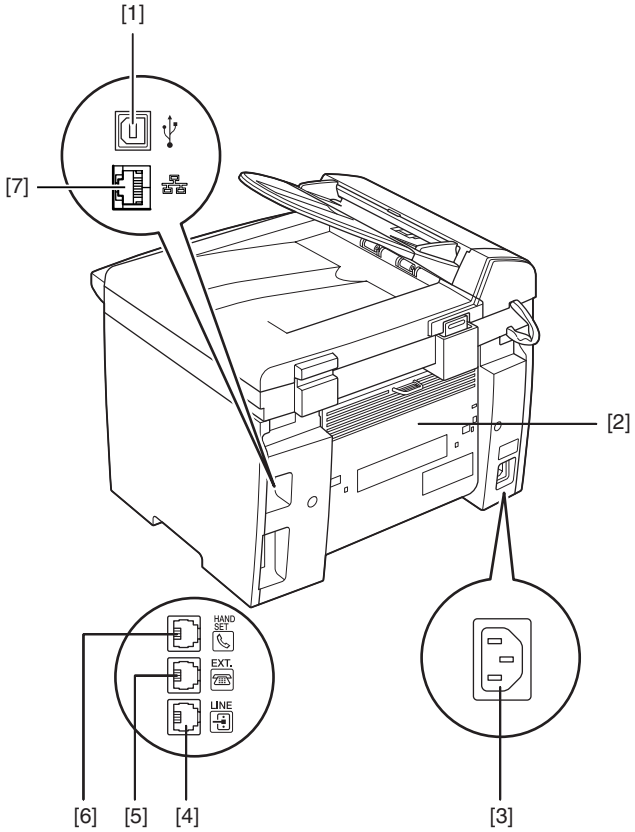
Front View (Body)



F-1-1

[1] ADF (Automatic Document Feeder)
[2] Slide Guides
[3] Document feeder tray
[4] Document delivery tray
[5] Operation panel
[6] USB memory port
[7] Output tray
[8] Paper cassette
[9] Scanning area
[10] Platen glass
[11] Output tray extension
[12] Paper stopper
[13] Slide guides for multi-purpose tray
[14] Paper guide rail
[15] Dust cover
[16] Multi-purpose tray
[17] Main power switch

Rear View (Body)



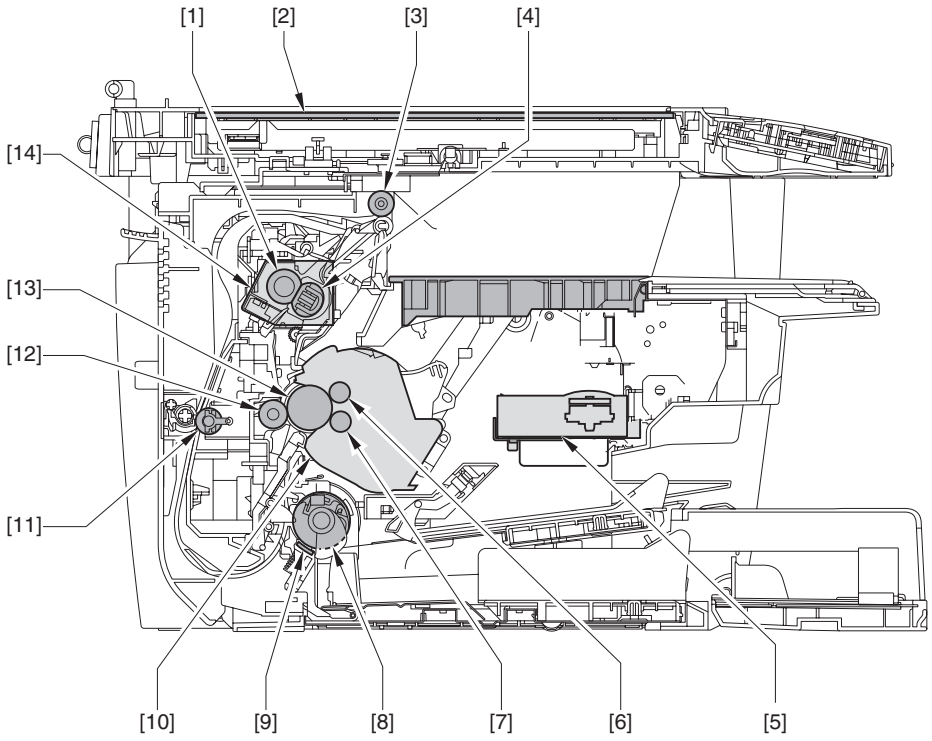
F-1-2

T-1-1

[1] USB port
[2] Rear cover
[3] Power socket
[4] Telephone line jack*
[5] External device jack*
[6] Handset jack*
[7] Ethernet port
* MF4690PL only

1.1.1.2 Section View (Host Machine)

i-SENSYS MF4690PL / / i-SENSYS MF4660

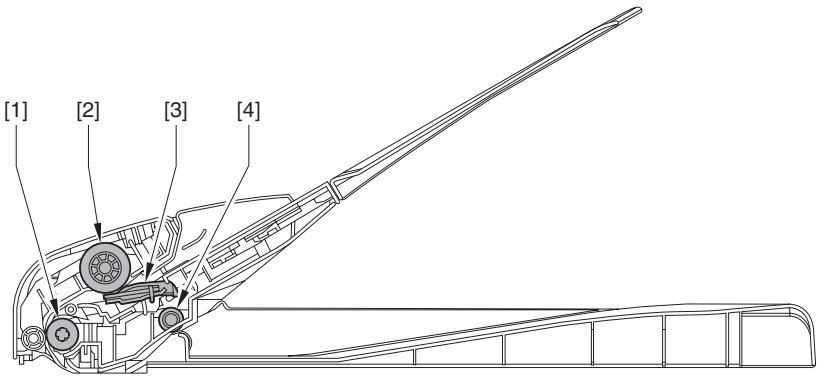


F-1-3

[1]	pressure roller	[8]	pick-up roller
[2]	copyboard glass (scanning glass)	[9]	separation pad
[3]	delivery roller	[10]	cartridge
[4]	fixing film unit	[11]	duplexing feeding roller
[5]	laser scanner unit	[12]	transfer charging roller
[6]	primary charging roller	[13]	photosensitive drum
[7]	developing cylinder	[14]	fixing unit

1.1.1.3 Section View (ADF)

i-SENSYS MF4690PL / / i-SENSYS MF4660



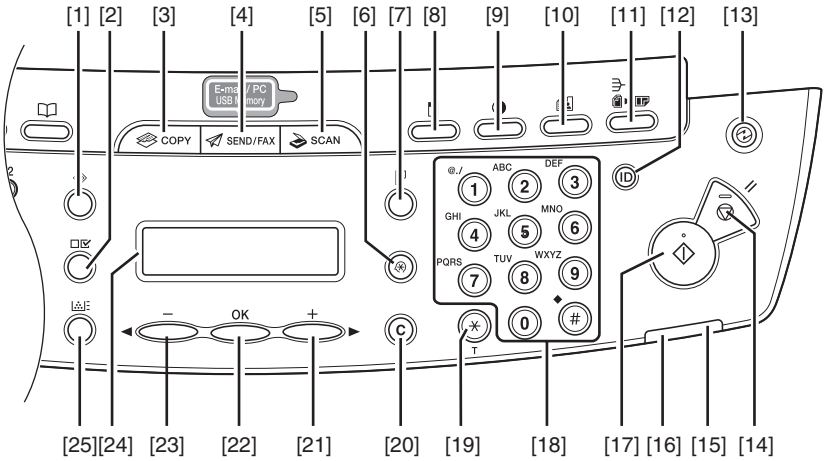
F-1-4

[1] registration roller
[2] pickup roller
[3] separation pad
[4] delivery roller

1.1.1.4 Control panel

i-SENSYS MF4690PL / i-SENSYS MF4660

- MF4690PL

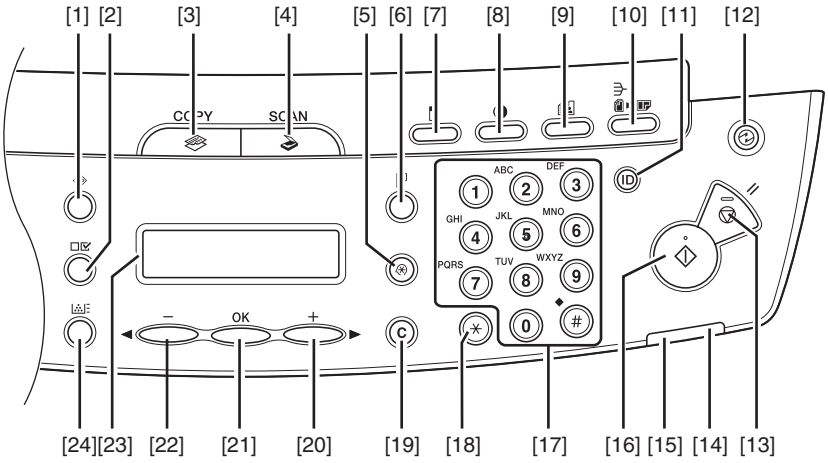


F-1-5

T-1-2

[1] [System Monitor] key	[14] [Stop/Reset] key
[2] [View Settings] key	[15] Error indicator
[3] [COPY] key	[16] Processing/Data indicator
[4] [SEND/FAX] key	[17] [Start] key
[5] [SCAN] key	[18] Numeric key
[6] [Additional Functions] key	[19] [Tone] key
[7] [2-Sided] key	[20] [Clear] key
[8] [Enlarge/Reduce] key	[21] [+] key
[9] [Density] key	[22] [OK] key
[10] [Image Quality] key	[23] [-] key
[11] [Collate/2 on 1] key	[24] LCD display
[12] [Log In/Out] key (ID) key	[25] [Toner Gauge] key
[13] [Energy Saver] key	

- MF4660PL

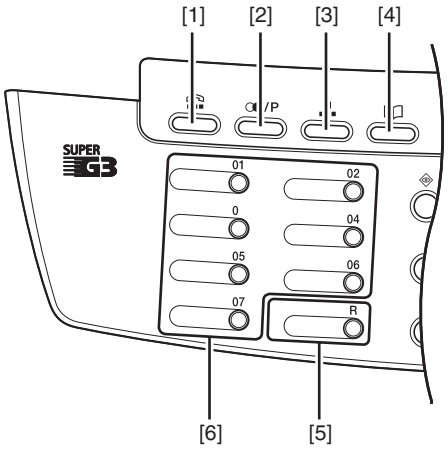


F-1-6

T-1-3

[1] [System Monitor] key	[13] [Stop/Reset] key
[2] [View Settings] key	[14] Error indicator
[3] [COPY] key	[15] Processing/Data indicator
[4] [SCAN] key	[16] [Start] key
[5] [Additional Functions] key	[17] Numeric key
[6] [2-Sided] key	[18] [Tone] key
[7] [Enlarge/Reduce] key	[19] [Clear] key
[8] [Density] key	[20] [+] key
[9] [Image Quality] key	[21] [OK] key
[10] [Collate/2 on 1] key	[22] [-] key
[11] [Log In/Out] key (ID) key	[23] LCD display
[12] [Energy Saver] key	[24] [Toner Gauge] key

- MF4690PL only



F-1-7

T-1-4

[1] [Hook] key	[4] [Address Book] key
[2] [Recall/Pause] key	[5] R key
[3] [Coded Dial] key	[6] One-Touch Speed Dial keys

1.1.2 Safety

1.1.2.1 Safety of the Host Machine's Laser Mechanism

i-SENSYS MF4690PL / / i-SENSYS MF4660

Laser radiation can prove to be harmful to the human body. The host machine's laser scanning system is completely sealed by means of a protective housing and external covers so that its light will not leak outside the host machine as long as the host machine is used normally.

1.1.2.2 CDRH Regulations

i-SENSYS MF4690PL / / i-SENSYS MF4660

The Center for Devices and Radiological Health (CDRH) of the US Food and Drug Administrator put into forth regulations that relate to laser products on August 2nd, 1976.
These regulations apply to laser products produced on and after August 1st, 1976, and prohibit the sale of laser products without certification.

The following labels certify compliance with the CDRH regulations, and must be attached to all laser products that are sold in the US.

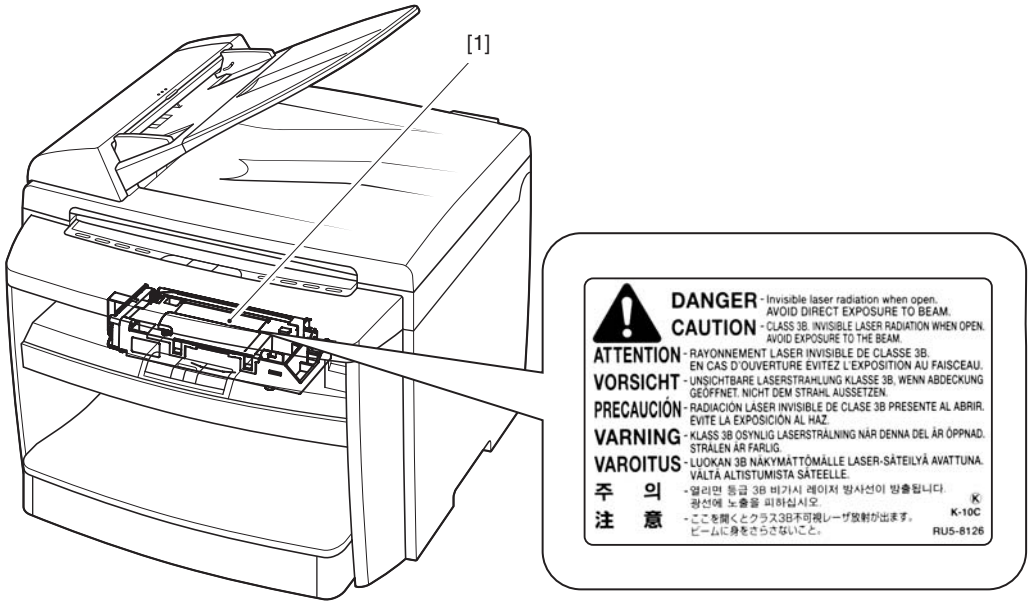
CANON
30-2, SHIMOMARUKO, 3-CHOME, OHTAKU, TOKYO, 146, JAPAN.
MANUFACTURED:
THIS PRODUCT CONFORMS WITH DHHS RADIATION PERFORMANCE STANDARD 21CFR CHAPTER 1 SUBCHAPTER J.

F-1-8

1.1.2.3 Handling of the Laser Assembly

i-SENSYS MF4690PL / / i-SENSYS MF4660

Invisible laser beam is radiated within the laser scanner unit. Laser beam radiation may pose damage to eyes. Be sure not to disassemble the laser scanner unit. The host machine's laser scanner unit cannot be adjusted in the field. The label [1] shown in the figure below is attached onto the cover of the laser scanner unit.



F-1-9

1.1.2.4 Safety of the Toner

i-SENSYS MF4690PL / / i-SENSYS MF4660

Toner in General
Toner is a non-toxic material made up of plastic, iron, and small amounts of dye.

⚠
Do not throw toner into fire. Doing so can lead to explosion.

Contact with Toner
1. Toner on the skin or clothes must be removed by washing with water immediately.
2. The use of warm water must be avoided, doing so will cause the toner to turn gel-like and to permanently fuse with the fibers of the clothes.
3. Contact with vinyl must also be avoided, as toner can readily react.

1.1.2.5 Fire Attention

i-SENSYS MF4690PL / / i-SENSYS MF4660

It is dangerous to throw the parts that include combustible materials such as lithium battery and toner cartridge etc., into fire. Any used battery must always be disposed according to the appropriate local regulations.

1.1.2.6 Points no Note when Replacing / Disposing the Lithium Battery

i-SENSYS MF4690PL / / i-SENSYS MF4660

⚠
Replacing to wrong type of battery may cause explosion.
Dispose used battery according to the instruction manual.

1.1.3 Product Specifications

1.1.3.1 Host Machine Specifications

i-SENSYS MF4690PL / i-SENSYS MF4660

Copyboard	Fixed
Body	Desktop (ADF standard type)
Light source type	LED
Image reading method	Contact Sensor Reading Method
Photosensitive medium	OPC drum
Reproduction method	Indirect electrostatic copying method
Exposure method	Semiconductor laser
Charging method	Roller contact charging method
Development method	Dry system - element jumping development method
Transfer method	Roller transfer method
Separation method	Electrostatic separation (neutralizing needle) and curvature separation
Pickup method	Cassette pick-up: 1 cassette Multi manual feeding pick-up
Cassette pickup method	Pad separation method
Multifeeder pickup method	Pad separation method
Drum cleaning method	Rubber blade
Fixing method	On-demand fixing
Toner supply type	By drum style toner cartridge
Toner type	Magnetic negative toner
Toner save mode	Yes
Original type	Sheets, books, solids (up to 2 kg)
Maximum original size	Fixed: 216mm x 297mm ADF: 216mm x 356mm
Reproduction ratio	1 to 1 + / - 1.0 %, 1 to 2.00, 1 to 1.29, 1 to 0.78, 1 to 0.64, 1 to 0.50 Zoom: 0.50 to 2.00 (specified by the percent)
Reading resolution	<TEXT/PHOTO>: 300 dpi x 300 dpi <TEXT>, <PHOTO>, <TEXT/PHOTO+>: 600 dpi x 600 dpi
Printing resolution	600 x 600 dpi
Warm-up time	9.0 seconds or less* (temperature: 20 deg C, humidity: 65%. From when turning on the main power of this product until the standby screen is displayed) *Warm-up time may vary according to use condition of this product and environment)
First print time	8.5 seconds or less (A4/LTR)
Print speed	Approximately 20 sheets / minute (A4) Approximately 21 sheets / minute (LTR) Double-sided: Approximately 5 sheets / minutes
Cassette paper size	LTR, LGL, A4, B5, A5, Executive, Envelope (COM10, Monarch, DL,ISO-C5), Oficio, Brazil-Oficio, Mexico-Oficio, Folio, Government-LTR, Government-LGL, Foolscap (76 x 127 to 216 x 356 mm)
Multifeeder paper size	LTR, LGL, A4, B5, A5, Executive, Envelope (COM10, Monarch, DL,ISO-C5), Oficio, Brazil-Oficio, Mexico-Oficio, Folio, Government-LTR, Government-LGL, Foolscap (76 x 127 to 216 x 356 mm) *For 2-sided prints, only for 64 to 80g/m2-A4/LTR
Cassette paper type	Plain paper (64 to 90g / m2), thick paper (105 to 128g / m2), recycled paper (64 to 80g / m2), transparency, label, envelop, and postcard
Multifeeder tray paper type	Plain paper (64 to 90g / m2), thick paper (105 to 128g / m2), recycled paper (64 to 80g / m2), transparency, label, envelop, and postcard
Cassette capacity	250 sheets (80g / m2 paper)
Multifeeder tray capacity	10 sheets (plain paper: 80g / m2 paper) 1 sheet (transparency, envelop)
Delivery tray stack	100 sheets (plain paper: 80g / m2 paper) 50 sheets (thick paper: 91 to 105g / m2 paper) 30 sheets (thick paper: 106 to 128g / m2 paper) 10 sheets (label, transparency, envelop, postcard)
Continuous reproduction	1 to 99 sheets
Energy save mode	Yes. (Manual ON / OFF, automatically OFF after a set period of time, automatically ON when receiving facsimile / print data)
Network	Yes
PDL	UFRII LT, PCL5 / PCLXL

SEND	MF4660: No MF4690: Yes
Operating environment (temperature range)	15 to 30 degrees C
Operating environment (humidity range)	10 to 80 %
Operating environment (atmospheric pressure)	0.16 to 1.01 hPa (0. 6 to 1 bar)
Power supply rating	220V-240V (50/60Hz)
Power consumption (maximum)	Maximum consumption: less than 730W
Power consumption	During operation: approximately 340W or less (reference value) At standby: approximately 12W (referenve velue)In sleep mode: approximately 3W (reference value)
Ozone	Maximum: less than 0.05 ppm, average: less than 0.02 ppm
Dimensions	390mm (W) x 442mm (D) x 470mm (H) (with original pick-up tray)
Weight	Approximately 13.4kg (including toner cartridges)

1.1.3.2 ADF Specifications

i-SENSYS MF4690PL / / i-SENSYS MF4660

Original orientation	Face-up method
Original position	center reference
Original processing mode	1-sided to 1-sided copy, 1-sided to 2-sided copy
Original reading	stream reading method
Stack	35 sheets (80 g/m2 or less) 15 sheets (LGL size)
Mixed original sizes	No
Original AE detection	No
Original size recognition	No
Stamp	No
Operating environment	pursuant to the host machine

1.1.3.3 FAX Specifications

i-SENSYS MF4690PL /

Applicable lines	Analog line (single line) - Telephone subscriber line (PSTN)
Transmission method	Half-duplex communication
Modulation method	<G3 image signal> ITU-T V.27 ter (2.4Kbps, 4.8Kbps) ITU-T V.29 (7.2Kbps, 9.6Kbps) ITU-T V.17 (TC7.2Kbps, TC9.6Kbps, 12Kbps, 14.4Kbps) ITU-T V.34 (2.4Kbps, 4.8Kbps, 7.2Kbps, 9.6Kbps, 12Kbps, 14.4Kbps, 16.8Kbps, 19.2Kbps, 21.6Kbps, 24Kbps, 26.4Kbps, 28.8Kbps, 31.2Kbps, 33.6Kbps) <G3 procedure signal> ITU-T V.21 No.2 (300bps) ITU-T V.8, V.34 (1200bps)
Transmission speed	33.6Kbps, 31.2Kbps, 28.8Kbps, 26.4Kbps, 24Kbps, 21.6Kbps, 19.2Kbps, 16.8Kbps, 14.4Kbps, 12Kbps, TC9.6Kbps, TC7.2Kbps, 9.6Kbps, 7.2Kbps, 4.8Kbps, 2.4Kbps With automatic fallback function
Coding	MMR, MR, MH, JBIG
Error correction	ITU-T ECM
Minimum receive input level	V.17, V.27ter, V.29: -6 to -43 dBm V.34: -10 to -43 dBm
Modem IC	CONEXANT DFX336
Scanning line density	Standard: 8 dots / mm x 3.85 lines / mm Fine: 8 dots / mm x 7.7 lines / mm Super fine: 8 dots / mm X 15.4 lines / mm Ultra fine: 16 dots / mm X 15.4 lines / mm
Half tone	256 gradation sequence
Printing resolution	600 dpi x 600 dpi
Reduction for reception	Fixed reduction: 90%, 95%, 97%, 75% Automatic reduction: 75 to 100%
FAX/TEL switching	Yes
Answering machine connection	Yes
Remote reception	ID entry method ID: 2 digits (default is 25)
Auto dialing	One-touch dial: 8 Speed dial: 192 Group dial: Maximum 199

Delayed transmission	No
Broadcast transmission	Number of Destination: Maximum 201
Dual access	Number of reservations: 70 max.
Image data backup	backup particulars: memory reception, memory transmission, broadcast image data backup IC: 128 MB (SDARAM) Backup battery: rechargeable capacity backup length: about 1 hour

Chapter 2 Basic Operation

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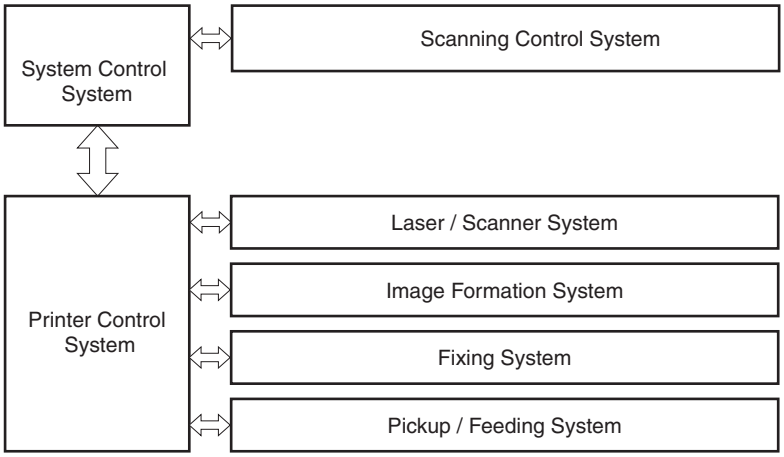
2.1 Construction

2.1.1 Function Configuration

i-SENSYS MF4690PL / / i-SENSYS MF4660

The functions of this host machine are mainly composed of the 7 blocks: System
Control System, Scanning Control System, Printer Control System, Laser Scanner System, Image Formation System, Fixing System, Pickup/Feeding System.
Below is the block diagram.



F-2-1

2.2 Basic Sequence

2.2.1 Basic Operation Sequence

i-SENSYS MF4690PL / / i-SENSYS MF4660

The operations of this host machine are controlled by CPUs of the SCNT board within the Reader Controller System and the DCNT board within the Engine Control System. The table below shows the purpose of each interval and the outline of the operations of reader unit and the engine from turnon of the power supply to stop of each motor after printing.

T-2-1

interval name	definition of interval	purpose	remarks
WAIT (wait)	Interval between turnon of the power supply and the end of the initial drive	To clear the drum surface potential and to execute the cleaning of transfer charging roller	Presence/absence of cartridge is detected during this interval.
STBY (standby)	Interval between the end of WAIT or LSTR and input of print command from SCNT board, or interval between the end of LSTR and turnoff of power supply	To make the host machine ready for printing	
INTR (initial rotation)	Interval between the input of print command from SCNT and turnon of the pickup solenoid	To stabilize the photosensitive drum as a preparation for printing Also to clean the transfer charging roller	
PRINT (print)	Interval between the end of initial rotation and turnoff of the primary high-voltage output	To form an image onto the photosensitive drum based on the video signal input from the SCNT board and to transfer the toner image onto media	
LSTR (last rotation)	Interval between turnoff of the primary high-voltage output and stop of the main motor	To fully deliver the final sheet printed Also to clean the transfer charging roller	On input of print command from the SCNT board, host machine enters INTR immediately after LSTR. However, depending on the conditions shown below, the host machine may not start INTR immediately. -media size -temperature of the fixing assembly

Chapter 3 Original Exposure System

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3.1 Basic Constraction

3.1.1 Specifications / Control / Function List

i-SENSYS MF4690PL / / i-SENSYS MF4660

T-3-1

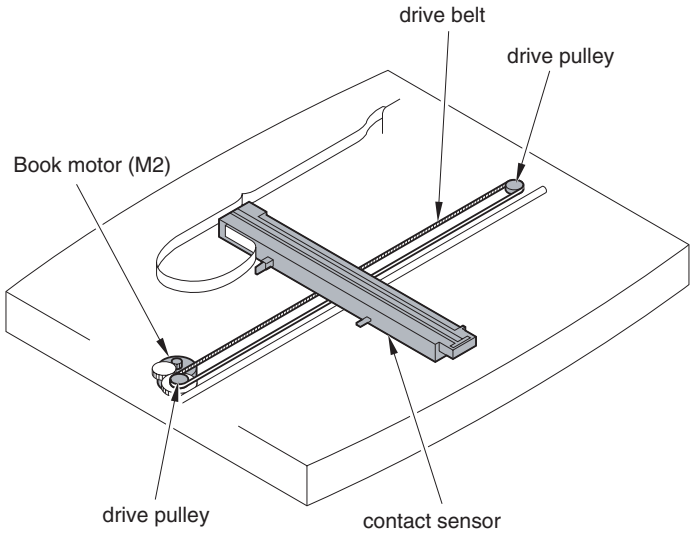
item	function / method
document exposure	LED
document scan	Book mode: scan by the shift of the contact Book mode: scan by the shift of the contact sensor (CS)
	ADF: document stream reading by fixed contact sensor (CS)
scanning resolution	600 dpi (horizontal scanner) X 600 dpi (vertical scanner)
number of gradations	256 gradations
magnification	50% to 200%
	horizontal: image processing by SCNT board
	vertical: change of carriage shift speed, image processing by SCNT board
lens	rod lens array
CMOS sensor	number of lines: 1 line
	number of pixels: 5184 pixels as total pixels (5107 pixels as effective pixels)
	maximum document scanning width: 216 mm
CS drive control	drive control by Book motor (M2)
CS HP detection	Yes
document size detection	none
Dirt sensor detection	Yes

3.1.2 Major Components

i-SENSYS MF4690PL / / i-SENSYS MF4660

Followings are the major components for Document Exposure System.
- The contact sensor to scan document
- The Book motor (M2), the drive pulley, the drive belt, to shift the contact sensor

In image scanning control, the contact sensor is shifted by rotating the Book motor based on the drive signal from the DCNT board and scan the original on the copyboard glass. When ADF is in use, image is scanned by feeding the originals by ADF instead of shifting the contact sensor.



F-3-1

3.2 Various Control

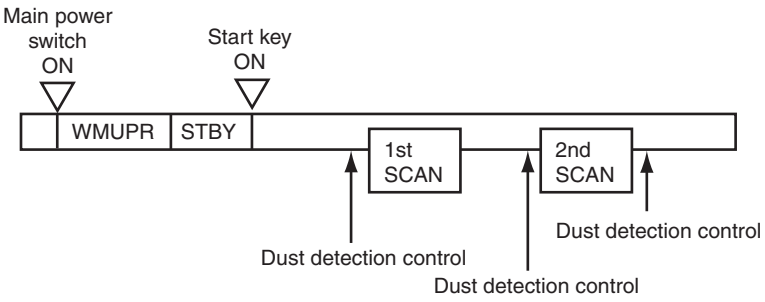
3.2.1 Dirt Sensor Control

3.2.1.1 Outline

i-SENSYS MF4690PL / / i-SENSYS MF4660

The machine changes the original read position or corrects the read image depending on the presence/absence of dust on the stream reading glass or ADF platen roller, thus preventing dust from showing up in the image. This control is performed only when the ADF is used and it is closed.

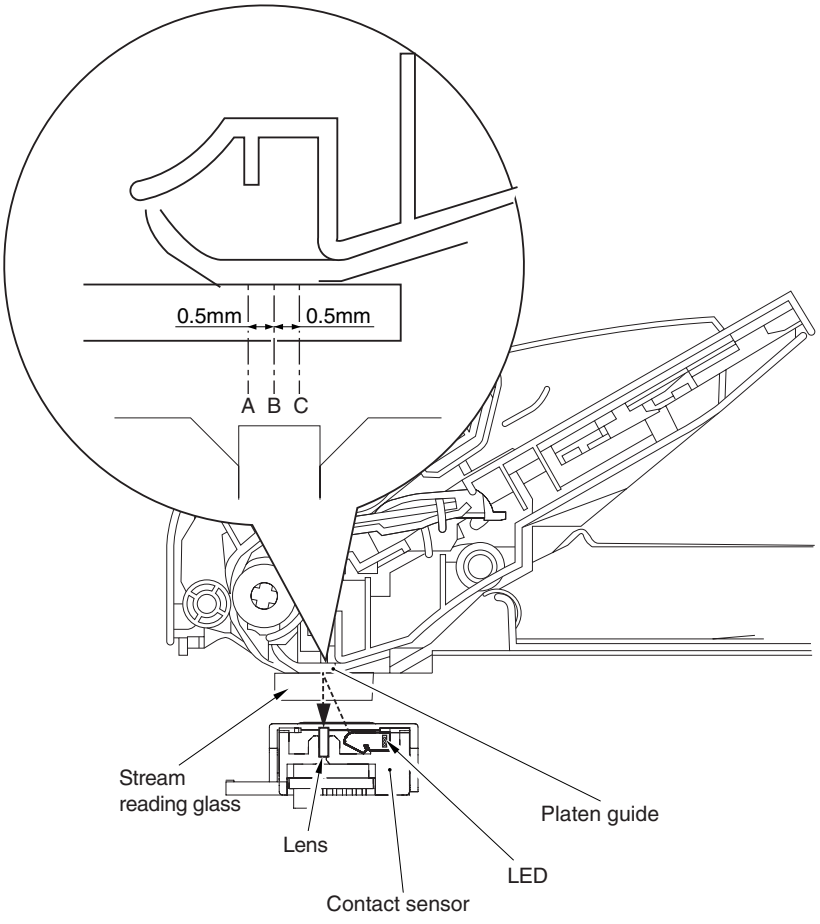
[Control Timing]
- At job end



F-3-2

[Description of Control]
- At job completion:
The contact sensor (CS) detects the reflecting light from the surface of the ADF platen guide at scanning position to judge if there is dust at the point.
After the job is complete, dust detection is performed three times. First the detection is performed at "A" position and if there is no dust, then it is performed twice more. If no duct is detected for three times, the document is scanned at "A" position. In case the dust is detected at "A" position, it moves to "B" position to perform dust detection twice. If no dust is detected at "B" position, the document is scanned at "B" position. In case the dust is also detected at "B" position, it moves to "C" position to perform dust detection once. In case the dust is also detected at "C" position, it returns to "A" position to scan the document.

⚠
- In the control at job completion, if dust is detected at all three positions (A/B/C), a message is displayed on the control panel to encourage cleaning of glass surface.



F-3-3

The original is read at the position determined at job end or start. If presence of dust is detected there, the read image is corrected.

T-3-2

Position	Description
A	Reference position for scanning
B	Approx. 0.5mm from the reference point
C	Approx. 1.0mm from the reference point

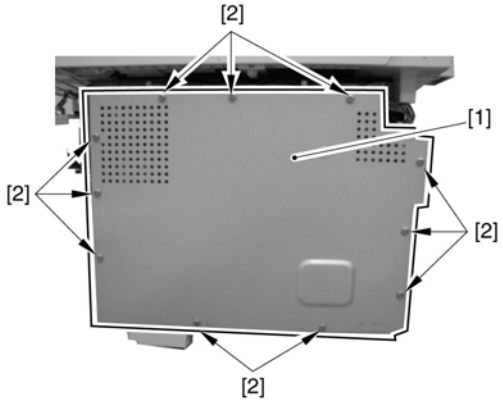
3.3 Parts Replacement Procedure

3.3.1 Scanner Unit

3.3.1.1 Preparation for Removing the Control Panel Assembly

i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the front cover.
2) Remove the right cover.
3) Remove the left cover.
4) Remove the rear cover.
5) Remove the frame [1].
   - 11 screws [2]



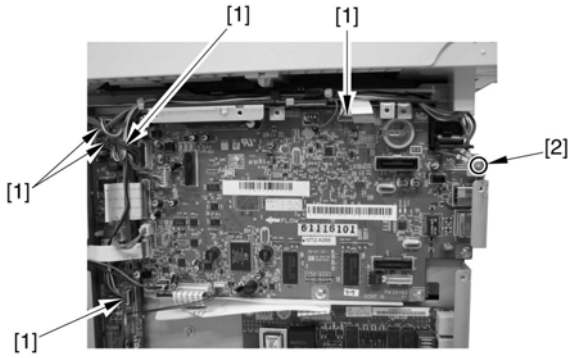
F-3-4

6) Remove the Analog processor PCB.

3.3.1.2 Removing the Control Panel Assembly

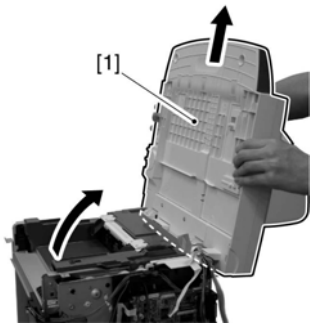
i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Disconnect the 5 connectors [1], and remove the 1 screw [2] of the grounding wire.



F-3-5

2) Open the control panel assembly [1] to remove it upward.



F-3-6

3.3.2 Book Motor

3.3.2.1 Preparation for Removing the Flat Bed Motor

i-SENSYS MF4690PL / / i-SENSYS MF4660

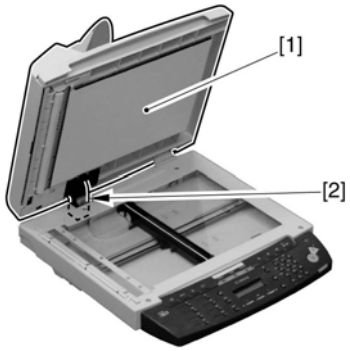
1) Remove the front cover.
2) Remove the right cover.
3) Remove the left cover.
4) Remove the rear cover.
5) Remove the control panel assembly.

3.3.2.2 Removing the Flat Bed Motor

i-SENSYS MF4690PL / / i-SENSYS MF4660

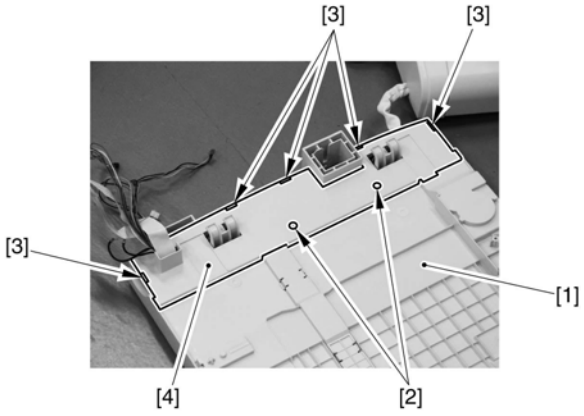
1) Open the copyboard glass cover [1], and remove it upward.
   Pull out the hinge [2] on the left side while keeping it tilted toward the back.

⚠
Place the detached copyboard glass cover on cloth etc. not to damage the bottom sheet.



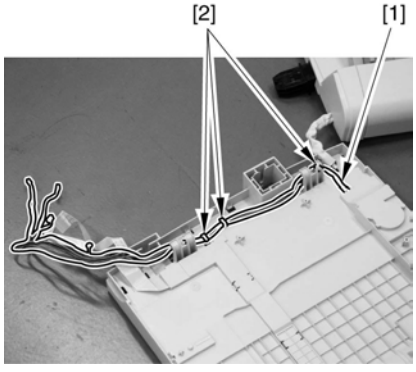
F-3-7

2) Reverse the copyboard [1] and detach the bottom cover [4].
   - 2 screws [2]
   - 5 claws [3]



F-3-8

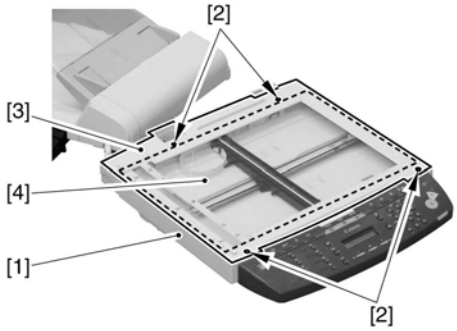
3) Free the cable [1] from the cable guide [2].



F-3-9

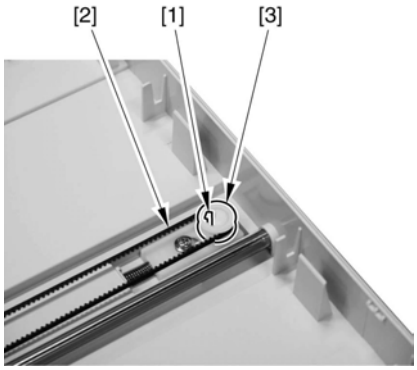
4) Reverse the copyboard [1] again.
5) Remove the 4 screws [2], and detach the copyboard cover [3].
6) Remove the copyboard glass [4].

⚠
Do not make dirty the bottom of the copyboard glass.



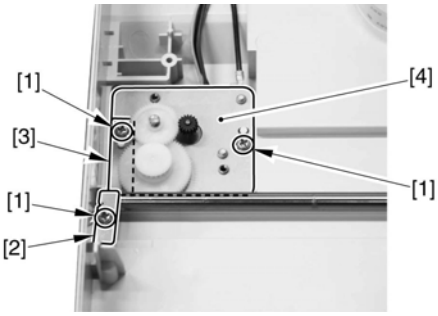
F-3-10

7) Unhook the 1 claw [1], and remove the gear [3] with the belt [2].



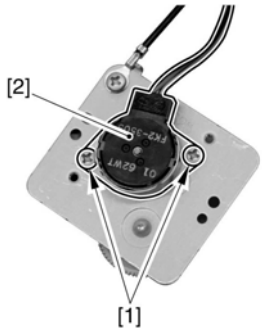
F-3-11

8) Remove the 3 screws [1] to remove the shaft retainer [2], the grounding plate [3] and the motor unit [4].



F-3-12

9) Remove the 2 screws [1] to remove the flat bed motor [2].



F-3-13

3.3.3 Contact Sensor

3.3.3.1 Removing the Contact Sensor

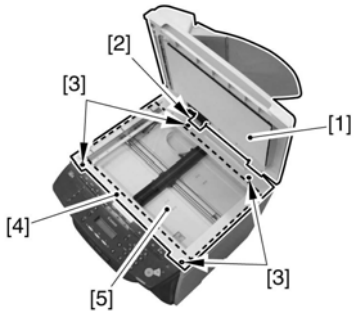
i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Open the copyboard glass cover [1] and detach it upward.
Pull out the hinge [2] on the left side while tilting it toward the rear side.

⚠
Be sure to put the copyboard glass cover that you detached onto the mount etc., so as not to damage the cable.

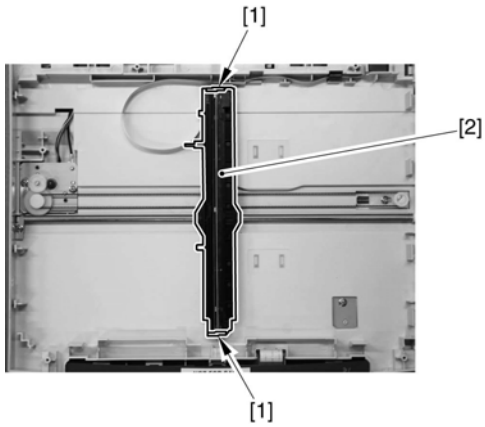
2) Remove the 4 screws [3], and detach the copyboard glass cover [4].
3) Remove the copyboard glass cover [5].

⚠
Be sure not to get the bottom surface of the scanner glass soiled.



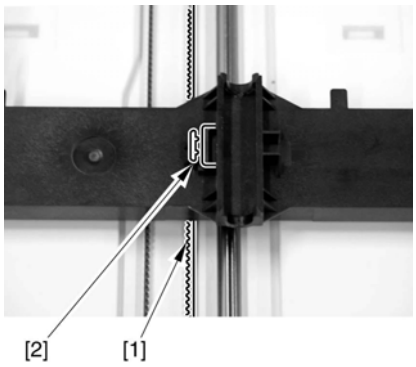
F-3-14

4) Remove the 2 spacers [1].
5) Remove the contact sensor unit [2] upward.



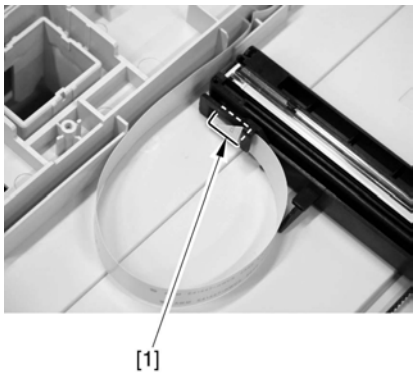
F-3-15

⚠ **Points to Note at Attaching**
Be sure to fit the gear [1] of the belt with the gear [2] on the bottom surface of the contact sensor unit.



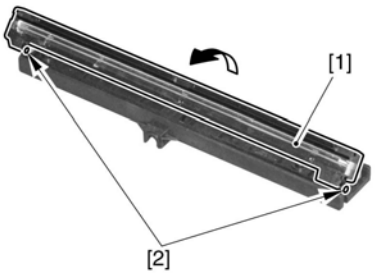
F-3-16

6) Disconnect the connector [1].



F-3-17

7) Turn the contact sensor [1] in the direction shown by the arrow, remove the 2 shafts [2], and then remove the contact sensor [1].



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Chapter 4 Original Feeding System

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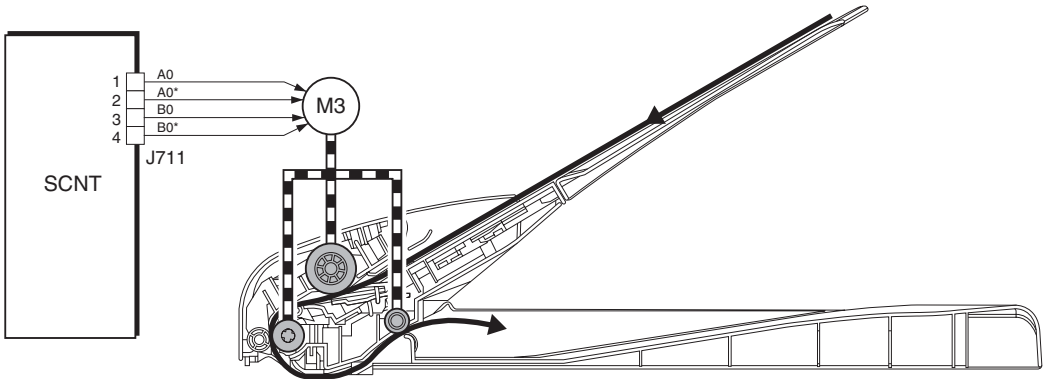
4.1 Basic Operation

4.1.1 Basic Operation

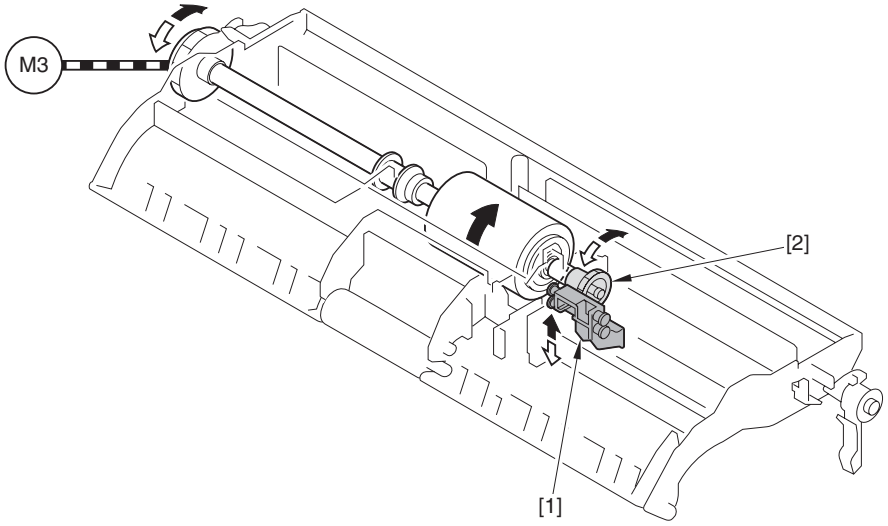
i-SENSYS MF4690PL / / i-SENSYS MF4660

The Auto Document Feeder (ADF) mounted onto this host machine is dedicated to stream-reading.
1 motor (DF motor: M3) is engaged in pickup/feeding/delivery.
At the start of copy/fax/scan, the DF motor (M3) is driven by the drive command from the SCNT to pickup/feed the originals set face up on the original tray one by one in order from the top. The original is scanned by the contact sensor when moving through the copyboard glass, and then delivered face down to the original delivery assembly.



F-4-1

Within the ADF pickup assembly is the stop [1] for the purpose of preventing the push-in of original, which descends/ascends in conjunction with the gear [2] on the end of the pickup roller shaft.



F-4-2

- When the originals are moving through the machine

(➡)

By the CW drive of the DF motor (M3), which is transmitted to the pickup roller via the gear/spring clutch and results in positive rotation of the pickup roller, original pickup is performed. At this point, the gear on the pickup roller shaft rotates positively as well, ascending the stop. When the originals are moving through the equipment, the stop is kept ascended.

- At detection of original being set and after delivery of the last sheet of the original

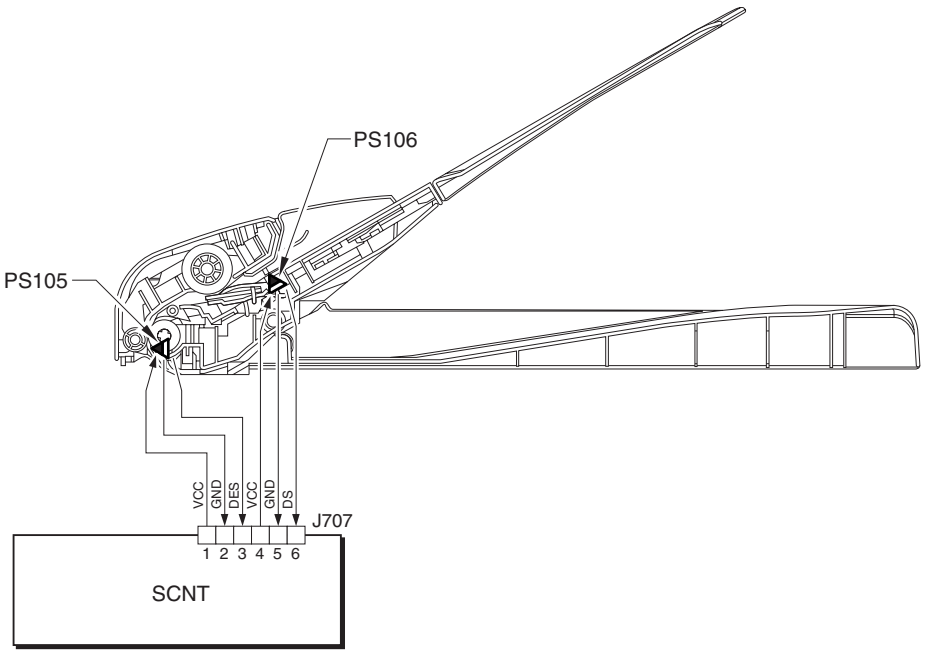
(⇨)

The gear on the pickup roller shaft rotates negatively by the CCW drive of the DF motor (M3), descending the stop. At the CCW drive, the drive is not transmitted to the pickup roller via the spring clutch, leaving the pickup roller stopped.

4.1.2 Original Detection

i-SENSYS MF4690PL / / i-SENSYS MF4660

There are two types of original detection in this equipment.



F-4-3

1. Original Presence / Absence Detection
   Detected by DS (Document Sensor: PS106)
   Setting the original onto the original tray pushes up the actuator, activating (light shielded =>light transmitted) the DS (PS106), and resulting in detection of the presence of original.

2. Detection of the End of the Original
   Detected by the DES (Document End Sensor: PS105)
   The leading edge of the original that is fed pushes up the actuator, activating the DES (PS105) (light shielded =>light transmitted) and resulting in detection of the reach of the leading edge of original. Furthermore, when the trailing edge of the original passes the actuator position, the actuator returns to the original position, inactivating the DES (PS105) (light transmitted => light shielded). The trailing edge of the original is detected by this mechanism. The original length that can be scanned with this equipment is less than 400 mm. Passing of the original longer than this results in jam stop. The original length is calculated by the time it takes from detection of the leading edge of the original to detection of the trailing edge of the original.

MEMO:
There is no function to detect the original size (original width, length) in this equipment.

4.2 Detection Jams

4.2.1 Jam Detection

i-SENSYS MF4690PL / / i-SENSYS MF4660

The following cases are judged as ADF jam.

1. In case of delay in reaching DS/DES or stationary during scanning of document
2. In case DS/DES is detected as ON at power-on (residual paper jam)
3. In case of detecting document of which length is 630 mm or longer (At SEND: 370 mm)

- Operation after Detection of Jam
  The machine stops scanning operation and displays "CHECK DOCUMENT" on the control panel. No jam code is displayed.
  In case of the model equipped with fax function (with built-in speaker), the warning beep occurs at the detection of jam.
- How to release Jam
  Remove the jammed paper and open / close the ADF upper cover

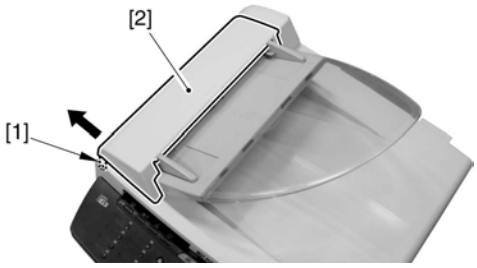
4.3 ADF

4.3.1 Pick-up Roller

4.3.1.1 Removing the ADF Pickup Roller

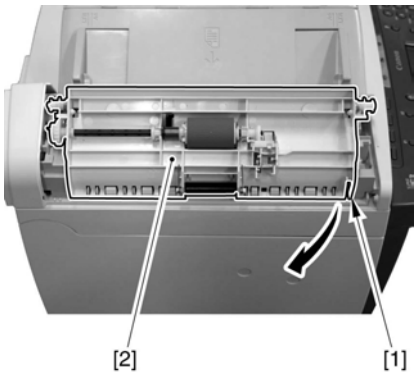
i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the shaft [1] with driver etc., and detach the ADF cover [2] in the direction of the arrow.



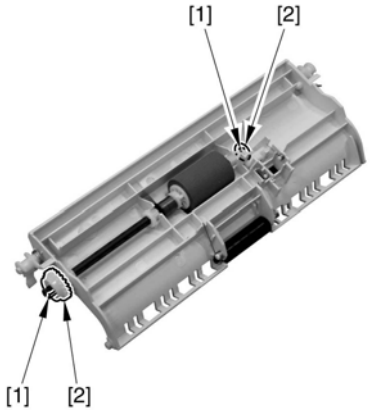
F-4-4

2) Remove the shaft [1] with driver etc., and remove the pick-up assembly [2] in the direction of the arrow.



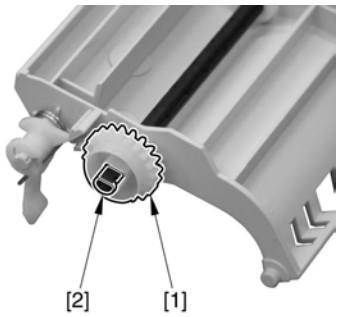
F-4-5

3) Unhook one each of the claws [1] to remove the 2 gears [2].



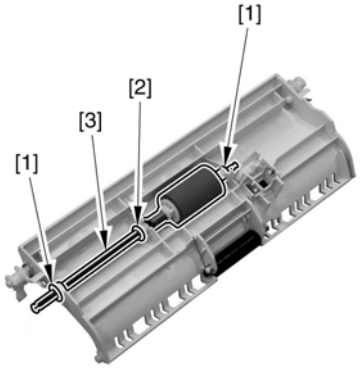
F-4-6

Points to Note when Attaching
Match the gear [1] with the D cut surface of the ADF pickup roller shaft [2].



F-4-7

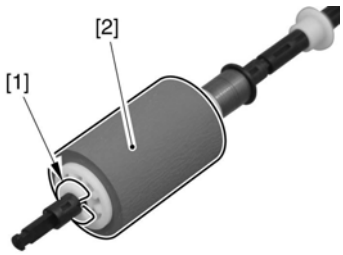
4) Remove the 2 bushings [1].
5) Remove the 1 E ring [2] to remove the ADF pick-up roller shaft [3].



F-4-8

6) Remove the 1 E ring [1] to remove the ADF pickup roller [2].

Do not touch the roller with bare hands.



F-4-9

4.3.2 ADF Motor

4.3.2.1 Preparation for Removing the ADF Motor

i-SENSYS MF4690PL / / i-SENSYS MF4660

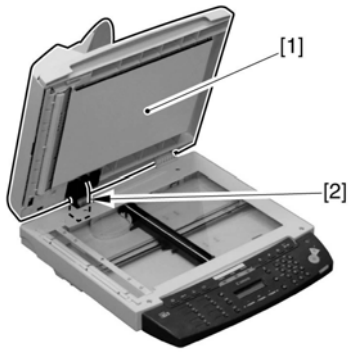
1) Remove the front cover.
2) Remove the right cover.
3) Remove the left cover.
4) Remove the rear cover.
5) Remove the control panel assembly.

4.3.2.2 Removing the ADF Motor

i-SENSYS MF4690PL / / i-SENSYS MF4660

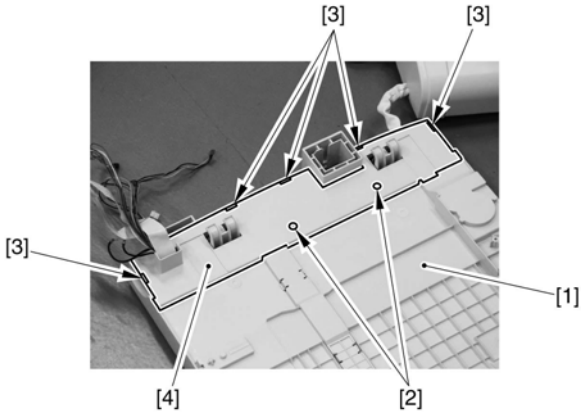
1) Open the copyboard glass cover [1] to detach it upward.
Pull out the hinge [2] on the left side while keeping it tilted toward the back.

Place the detached copyboard glass cover on cloth etc. not to damage the bottom sheet.



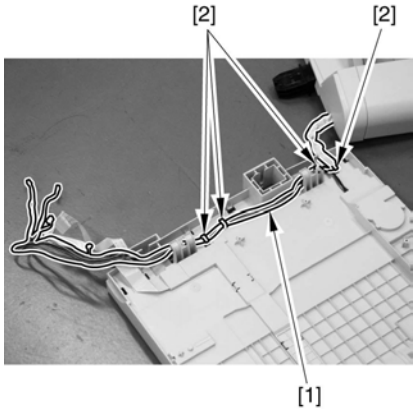
F-4-10

2) Reverse the copyboard [1] and detach the bottom cover [4].
- 2 screws [2]
- 5 claws [3]



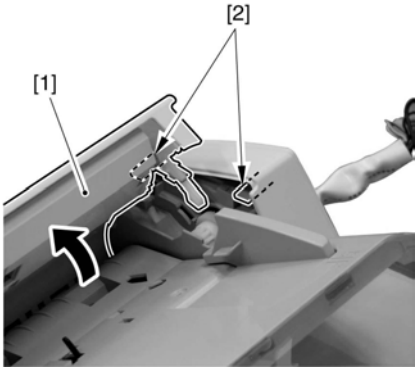
F-4-11

3) Free the cable [1] form the cable guide [2].



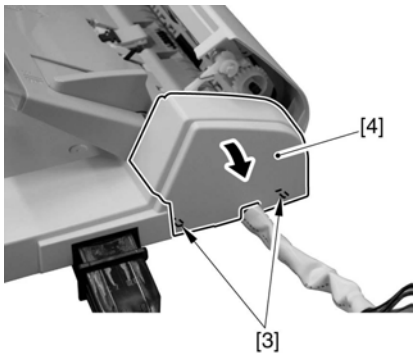
F-4-12

4) Open the ADF cover [1], and unhook the 2 claws [2].



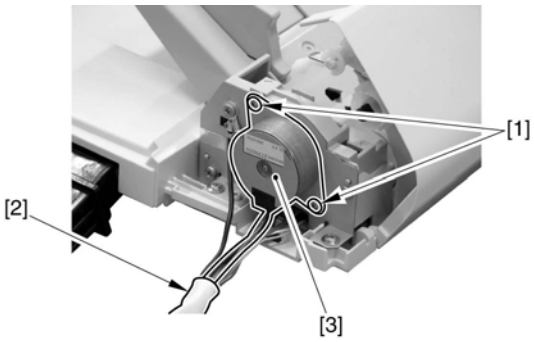
F-4-13

5) Unhook the 2 claws [3] to remove the ADF motor cover [4].



F-4-14

6) Remove the ADF motor [3].
- 2 screws [1]
- 1 cable tube [2]



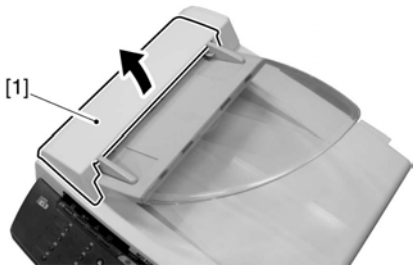
F-4-15

4.3.3 Separation Pad

4.3.3.1 Removing the Separation Pad

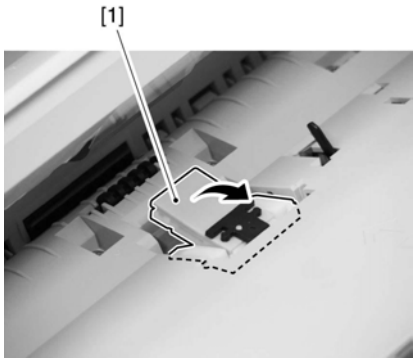
i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Open the ADF cover [1].



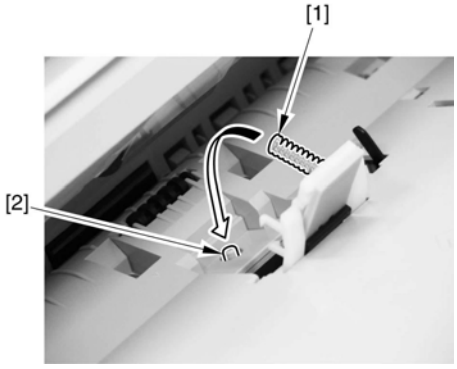
F-4-16

2) Remove the separation pad [1] in the direction of the arrow.



F-4-17

Points to Note when Attaching
Insert the spring [1] of the separation pad into the boss [2].



F-4-18

Chapter 5 Laser Exposure

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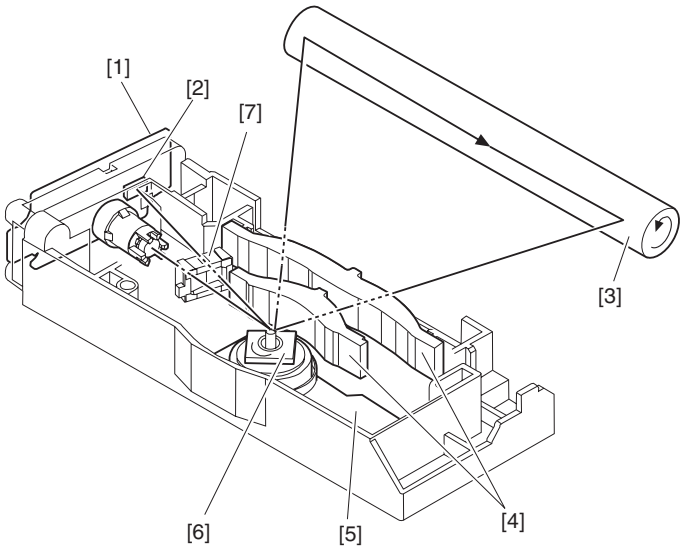
5.1 Overview/Configuration

5.1.1 Overview

i-SENSYS MF4690PL / / i-SENSYS MF4660



F-5-1

[1] Laser driver PCB
[2] BD sensor
[3] Photosensitive drum
[4] Condensing lens
[5] Scanner motor
[6] Four-surface mirror
[7] Cylindrical lens

The laser scanner assembly is composed of the laser driver and the scanner motor etc., and controlled by the signal input from the DCNT board.
The laser driver emits laser diode according to the laser control signal and the video signal from the DCNT board.
The laser beam passes the collimator lens and the cylindrical lens, and reaches the four-surface mirror rotating at constant speed.
The laser beam reflected by the four-surface mirror passes through the condensing lens placed in front of the four-surface mirror and focuses on the photosensitive drum.
When the four-surface mirror rotates at constant speed, the laser beam on the photosensitive drum scans the photosensitive drum at constant speed.
When the photosensitive drum rotates at constant speed and the laser beam scans the photosensitive drum at constant speed, the latent image is formed on the photosensitive drum.

MEMO:

E100: When the error related to the following laser exposure occurs, error code (E100) is lit.

BD fault
If /BDI signal cannot be detected in 0.1 sec after forced acceleration of the scanner motor or the specified value of /BDI signal cycle cannot be detected for 2 sec or more after the scanner motor reached the specified rotation, it should be judged as BD fault.

Scanner fault
If /BDI signal cannot be detected 1.5 sec after completing forced acceleration of the scanner motor, extend the detection time by 120 sec. If the specified value of /BDI signal cycle cannot be detected during that time, it should be judged as scanner fault.

BD error
If /BDI signal cannot be detected at the specified cycle during /BDI signal output, it should be judged as BD error.
If the case of the following conditions, it should not be judged as BD error.

In the case that door open is detected in 0.2 sec after BD error was detected.

⚠

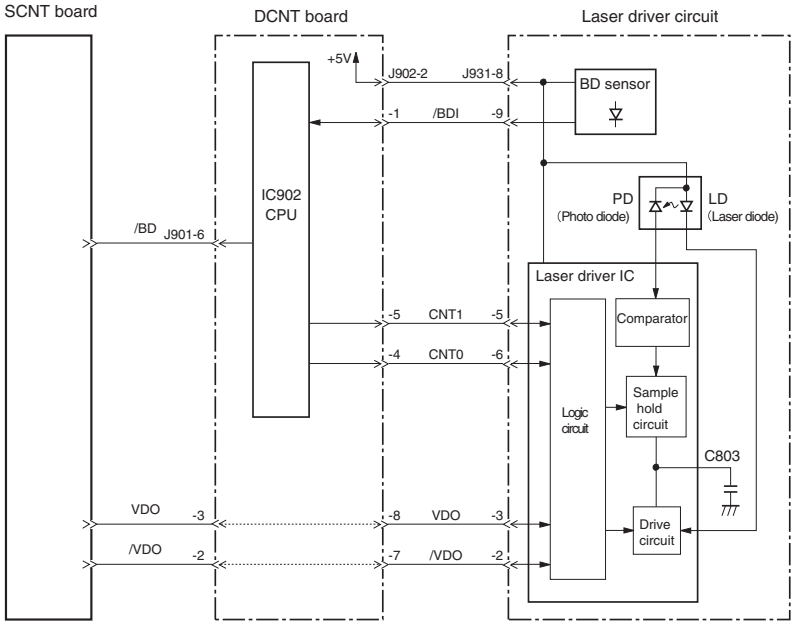
The laser scanner has the components unadjustable in the field. Never disassemble the laser scanner unit.

5.2 Controlling the Laser Activation Timing

5.2.1 Laser ON / OFF Control

i-SENSYS MF4690PL / / i-SENSYS MF4660

This is the control where the laser driver turns on / off the laser diode (LD) based on the laser control signal sent from the DCNT board.
The following is the circuit diagram for laser control.



F-5-2

The DCNT board sends the video signal (VDO, /VDO) for image formation and the laser control signal (CNT0, CNT1) for switching the laser operation mode to the logic circuit in the laser driver IC.
The laser driver IC performs laser control based on the combination of CNT0 and CNT1 signals.
The following chart shows the combination of the laser control signals (CNT0, CNT1).

T-5-1

Operation mode	CNT0	CNT1	Remarks
Discharge mode	L	L	Discharge of C803
Print mode	H	L	Use at normal printing
LD APC mode	L	H	Use at LD APC
LD forced OFF mode	H	H	Use at masking image

5.3 Controlling the Intensity of Laser Light

5.3.1 Auto Photoelectric Current Control (APC)

i-SENSYS MF4690PL / / i-SENSYS MF4660

This is the control to emit the definite level of laser diode.
There are initial APC during initial rotation (note 1) and line space APC during printing (note 2), which are performed in the same procedure. The following is its procedure.
1) When the laser control signal (CNT0, CNT1) turned into LD APC mode, the laser driver emits LD forcedly.
2) After being detected with the photodiode (PD), the LD emission level as current is converted to the one as voltage and compared with the reference voltage (the voltage equivalent to the target laser level).
3) The laser driver controls the laser current until it reaches the voltage of LD target level.
4) When the laser control signal turns into LD forced OFF mode, LD is forcedly off and the laser driver converts the adjusted laser level to the voltage of the condenser and keeps it.

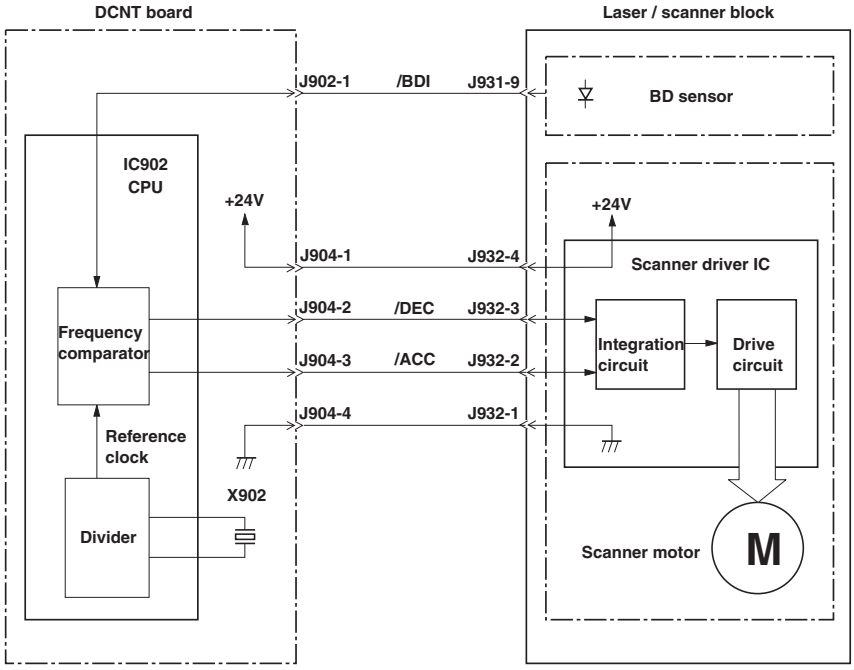
Note 1. Initial APC
APC during initial rotation. Laser level is adjusted by APC.
Note 2. Line space APC
APC during printing. Adjustment of laser level for one line is performed before writing one line.

5.4 Controlling the Laser Scanner Motor

5.4.1 Overview

i-SENSYS MF4690PL / / i-SENSYS MF4660

This is the control to rotate the scanner motor at constant speed.
The scanner motor is the 3-phase DC brush-less motor with hall element included, and is combined with the drive circuit.
The following chart shows the control circuit for the scanner motor.



F-5-3

5.4.2 Scanner Motor Speed Control

i-SENSYS MF4690PL / / i-SENSYS MF4660

This is the control to rotate the scanner motor at constant speed.
The following is the procedure of this control.
1) At activating the scanner motor, CPU outputs /ACC signal to the scanner driver IC to accelerate the scanner motor forcedly. The scanner motor will start rotating.
2) CPU periodically turns on the laser, and compares /BDI signal and the cycle of the reference clock to detect the rotation of the scanner motor.
3) When the rotation of the scanner motor exceeds the specified value, CPU outputs /DEC signal to decelerate the scanner motor. CPU controls /ACC or /DEC signal to control the rotation of the scanner motor until it becomes its specified value.

5.4.3 Detection of Fault of the Scanner Motor

i-SENSYS MF4690PL / / i-SENSYS MF4660

CPU of the DCNT board monitors the frequency comparator to judge if the scanner motor rotates at the specified rotation frequency.
When the following statuses occur, CPU judges that there is a fault or error and stops the engine. At the same time, it notices the details of the error to the SCNT board.

1) Scanner fault
If /BDI signal cannot be detected 1.5 sec after completing forced acceleration of the scanner motor, extend the detection time by 120sec. If the specified cycle of /BDI signal cannot be detected, it should be judged as scanner fault.

2) BD fault
If /BDI signal cannot be detected in 100msec after forced acceleration of the scanner motor or the specified cycle of /BDI signal cannot be detected for 2 sec or more after the scanner motor reached its specified rotation, it should be judged as BD fault.

3) BD error
If /BDI signal cannot be detected at the specified cycle while CPU outputs /BD signal to the SCNT board, it should be judged as BD error.
If door open is detected in 200msec after BD error was detected, CPU does not transmit BD error to the SCNT board.

5.5 Parts Replacement Procedure

5.5.1 Laser/Scanner Unit

5.5.1.1 Preparation for Removing the Laser Scanner Unit

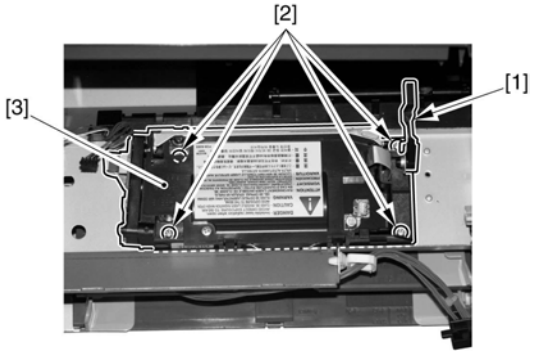
i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the front cover.
2) Remove the right cover.
3) Remove the left cover.
4) Remove the DCNT board.

5.5.1.2 Removing the Laser Scanner Unit

i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the shutter arm [1].
2) Remove the 4 screws [2] to remove the laser scanner unit [3].



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Chapter 6 Image Formation

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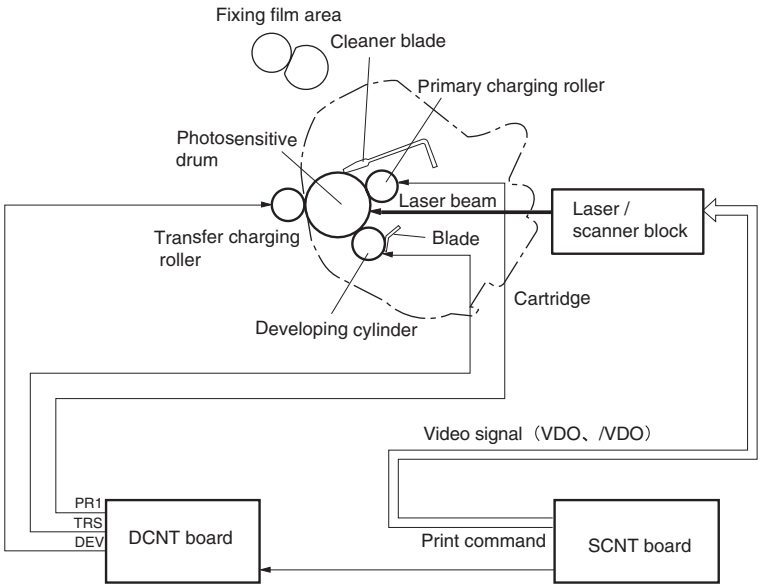
6.1 Overview/Configuration

6.1.1 Configuration

i-SENSYS MF4690PL / / i-SENSYS MF4660

The image forming system is the core part of this machine, and is composed of the cartridge, the transfer charging roller, the fixing assembly, etc.
When receiving the print command from the SCNT board, the DCNT board activates the main motor to rotate the photosensitive drum, the developing cylinder, the primary charging roller, the transfer charging roller and the pressure roller.
The surface of the photosensitive drum is evenly charged negative by the primary charging roller, and the laser beam converted with the video signal (VDO, /VDO) is reflected to the surface of the photosensitive drum to form the latent image by the laser diode.
The latent image formed on the photosensitive drum is turned visible with the toner on the developing cylinder and is transferred on the paper by the transfer charging roller. The transferred toner turns into the permanent image on the paper when the heat and pressure are applied there at the fixing assembly. The cleaner blade removes the residual toner on the surface of the photosensitive drum, whose potential is made even by the primary charging roller to be ready for the formation of the next latent image.

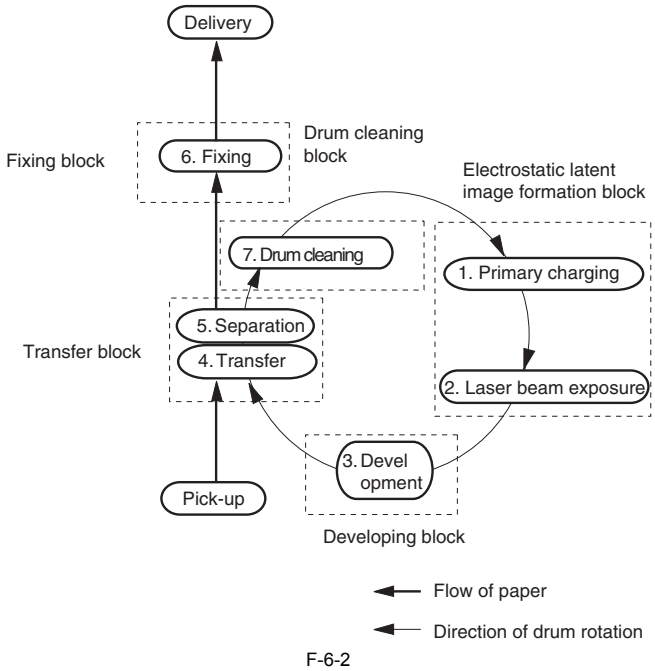


F-6-1

6.1.2 Print Process

i-SENSYS MF4690PL / / i-SENSYS MF4660

The print process shows the basic operation process for image formation by the printer.
The print process of this machine has the main 5 blocks and 7 steps. The toner image is formed on papers by following the steps of each block.
The following is the outline of the blocks and steps of the print process.



F-6-2

1) Electrostatic latent image formation block
Electrostatic images are formed on the photosensitive drum.
Step1: Primary charging (Charges negative potential evenly on the surface of the photosensitive drum)
Step 2: Laser beam exposure (Forms electrostatic images on the photosensitive drum)

2) Developing block

Put the toner on the electrostatic latent image on the surface of the photosensitive drum to visualize
Step 3: Development

3) Transfer block
The toner image on the surface of the photosensitive drum is transferred to papers.
Step 4: Transfer (Transfers the toner on the photosensitive drum to a paper)
Step 5: Separation (Separates the paper from the photosensitive drum)

4) Fixing block
The toner image is fixed on the paper.
Step 6: Fixing

5) Drum cleaning block
The residual toner on the photosensitive drum is removed.
Step 7: Drum cleaning (Removes the residual toner on the photosensitive drum)

6.2 Driving and Controlling the High-Voltage System

6.2.1 Generation of Transfer Charging Bias

i-SENSYS MF4690PL / / i-SENSYS MF4660

The transfer charging bias (TRS) is output to transfer the toner on the photosensitive drum to papers.
There are transfer charging DC positive bias and transfer charging DC negative bias generated at the transfer charging bias generation circuit in the high-voltage power supply circuit. The transfer charging DC positive bias is output to the transfer charging roller at transferring the toner. The transfer charging DC negative bias is applied to the transfer charging roller at cleaning the transfer charging roller.
The transfer charging bias generation circuit applies these transfer charging biases to the transfer charging roller according to each print sequence.
The following are the biases for print sequences.
- Cleaning bias:
This is the bias for transferring the toner on the photosensitive drum to the paper at the time of print sequence. The transfer charging DC positive bias is applied to the transfer charging roller.
- Sheet-to-sheet bias:
This is the bias to prevent the residual toner on the photosensitive drum from being attracted to the transfer charging roller, at between sheets during continuous printing. Faint transfer charging DC positive bias is applied to the transfer charging roller.
- Cleaning bias:
This is the bias to return the residual toner on the transfer charging roller to the photosensitive drum at the time of warm-up or last rotation sequence. The transfer charging DC negative bias is applied to the transfer charging roller.
The transfer charging DC positive bias is changed due to the instruction of the DCNT board. To realize appropriate transfer density, the DCNT board changes the voltage of the transfer charging DC positive bias for constant current control according to the transfer current feedback signal (TRCRNT) sent from the transfer charging bias generation circuit.

6.3 Toner Cartridge

6.3.1 Toner Level Detection

i-SENSYS MF4690PL / / i-SENSYS MF4660

Overview
The toner sensor (magnetic sensor) detects the remaining toner level. When a toner cartridge is inserted, the toner sensor becomes in contact with the lower part of the cartridge. The lower part of the cartridge being in contact with the toner sensor is made thin to achieve increased sensor sensitivity.
The toner sensor converts the magnetic force change in the cartridge filled with the toner made from magnetic body and resin into voltage.
The MPU of the DCNT board compares this output voltage of the toner sensor with the reference value, and detects the toner level.

Toner detections sequence
Detection is performed per 2.16 sec after 550 ms passing since the main motor was activated. The CPU of the DCNT board compares the output voltage of the toner sensor with the reference value.
At initialize rotation after power-on and opening/closing the toner cover, it is detected once at 4.32 sec.

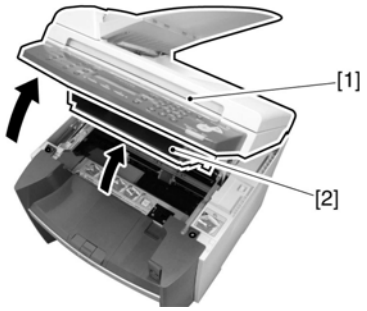
6.4 Parts Replacement Procedure

6.4.1 Transfer Charging Roller

6.4.1.1 Removing the Transfer Charging Roller

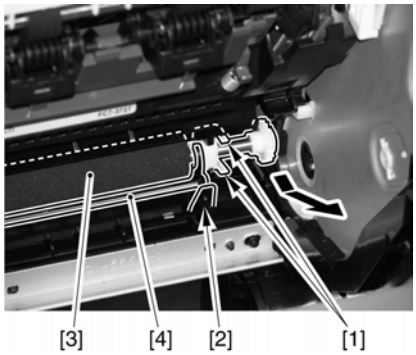
i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Open the control panel assembly [1].
2) Open the printer cover [2].



F-6-3

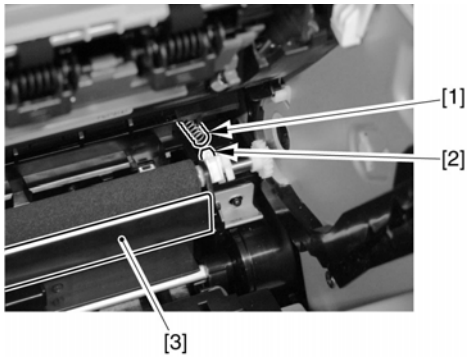
3) Unhook the 2 claws [1] and the claw [2] to remove the transfer charging roller [3] with the transfer guide [4] in the direction of the arrow.



F-6-4

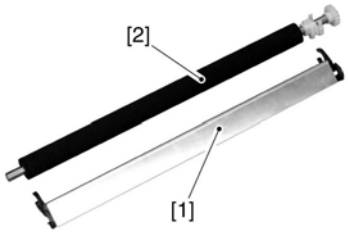
⚠
Do not touch the roller with bare hands.

⚠ **Points to Note when Attaching**
- Insert the spring [1] into the boss [2] of the bushing.
- Push in the transfer guide [3] until it stops.



F-6-5

4) Remove the transfer charging roller [2] from the transfer guide [1].



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Chapter 7 Pickup and Feed System

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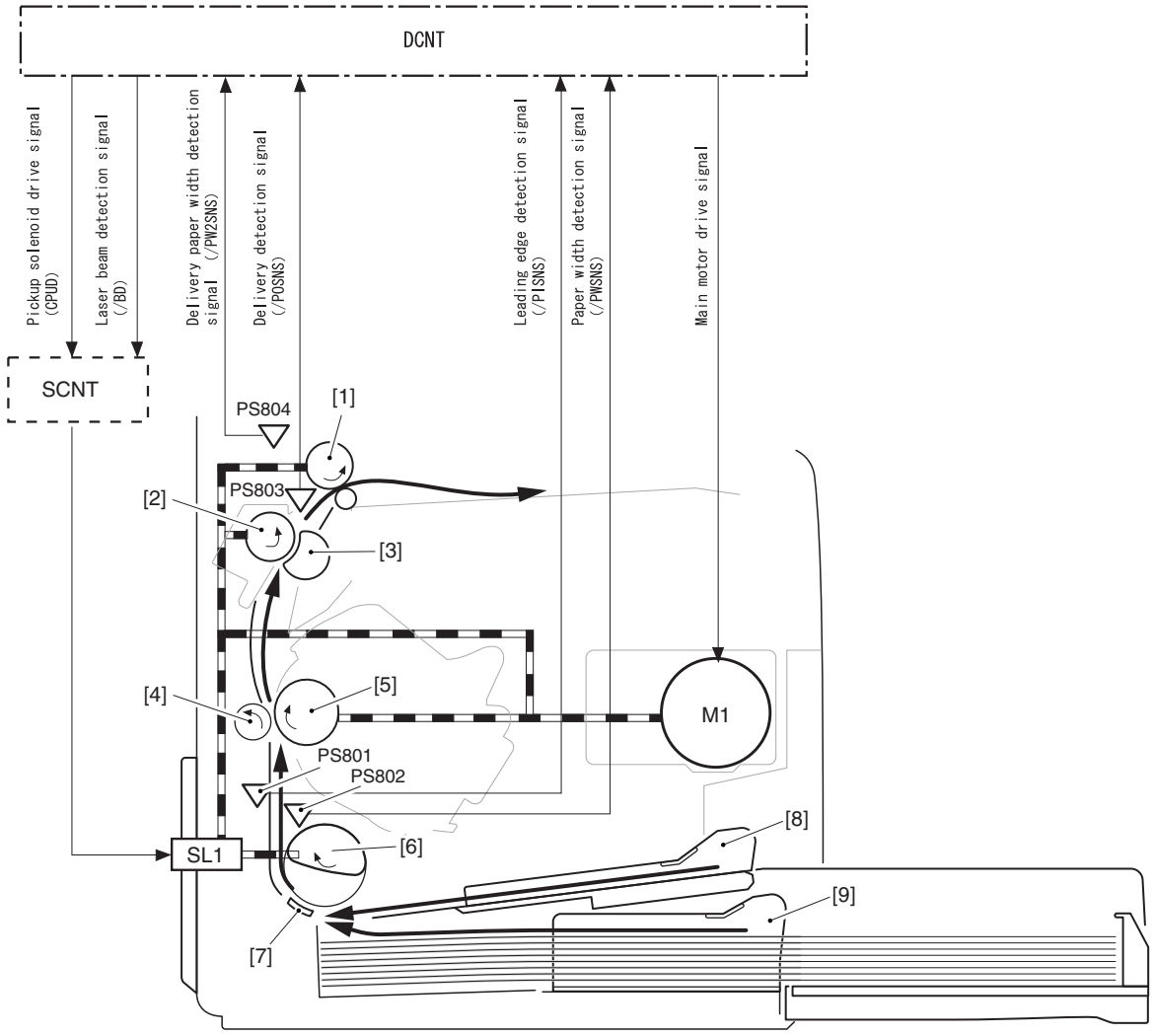
7.1 Overview/Configuration

7.1.1 Overview

i-SENSYS MF4690PL / / i-SENSYS MF4660

The pickup/feeding system is the part to pickup and feed a paper, and it is composed of the main motor, solenoid, and various motors.
In this machine, a paper is picked up from either the pickup tray or the manual feed tray, and it is delivered from the delivery tray.
A paper set in either the pickup tray or the manual feed tray is picked up with the same pickup roller. Then, it is fed to the photosensitive drum, transfer charging roller, fixing film, pressure roller, and face-down delivery roller, in that order, and is delivered to the delivery tray.
On the feed path of a paper, the following 4 photointerrupters are allocated: the leading edge/paper width sensor (PS801, PS802), delivery sensor (PS803), and delivery paper width sensor (PS804), and they detect either the arrival or passage of paper.
If a paper does not arrive or pass each sensor, except the fixing paper width sensor, within the predetermined time, CPU on the DCNT board judges as a jam and notify the occurrence of jam to the SCNT board.
The diagrammatic illustration for each motor, solenoid, and sensor is shown below.



F-7-1

[1] Face-down delivery roller
[2] Pressure roller
[3] Fixing film unit
[4] Transfer charging roller
[5] Photosensitive drum
[6] Pickup roller
[7] Separation pad
[8] Manual feed tray
[9] Pickup tray
M1: Main motor
SL1: Pickup solenoid
PS801: Leading edge sensor
PS802: Paper width sensor
PS803: Delivery sensor
PS804: Delivery paper width sensor

7.2 Other Control

7.2.1 Overview

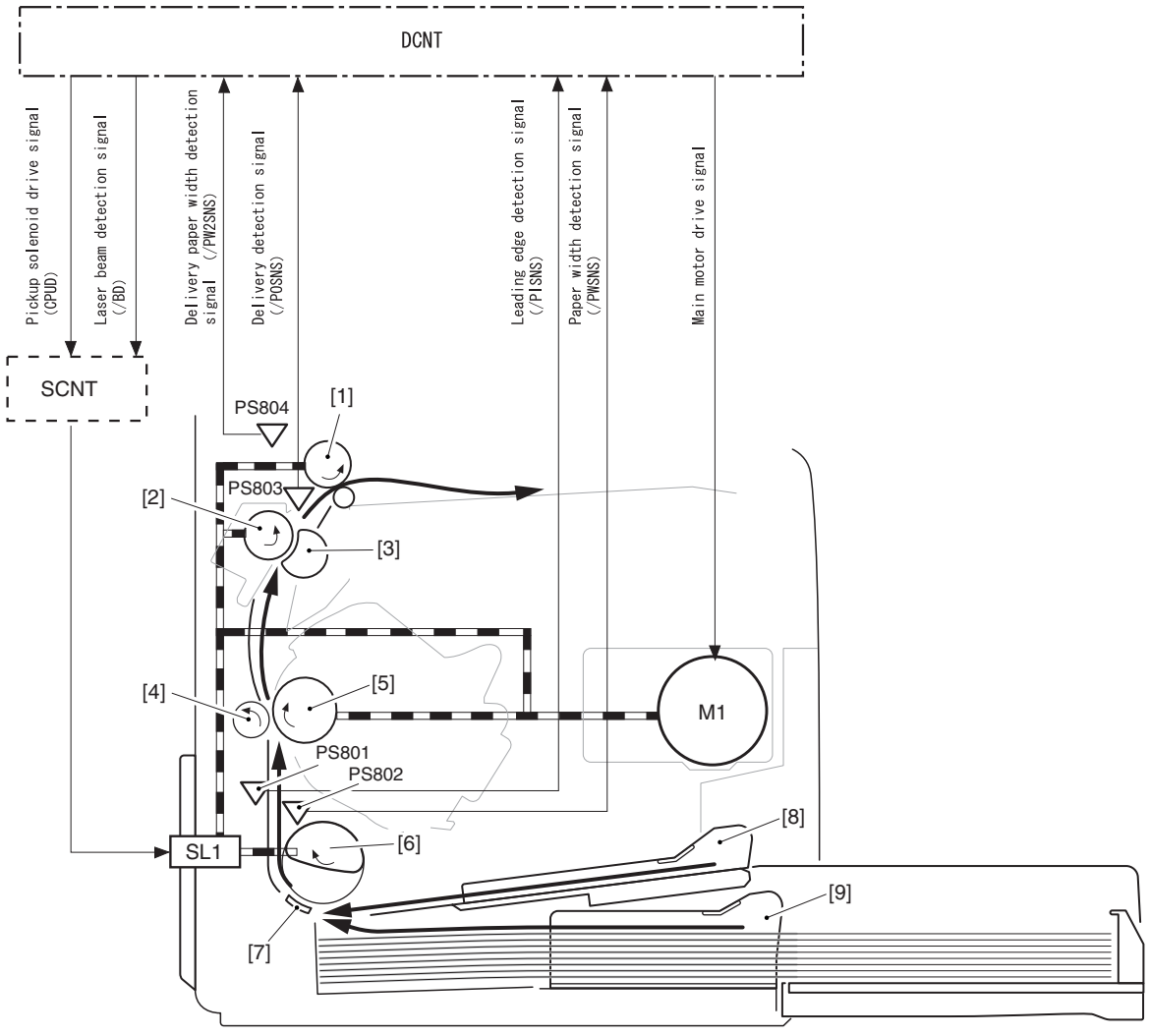
i-SENSYS MF4690PL / / i-SENSYS MF4660

Pickup/Feed Operation
The pickup/feed assembly is the mechanism to pickup and feed paper one at a time from the pickup tray or the manual feed tray.
The pickup/feed operation of the machine is explained below.

1) Right after the DCONT board receives a print command from the SCNT board, it rotates the main motor (M1). By doing so, other rollers, except the pickup roller, start to rotate.
2) When it becomes initial rotation ready state, the pickup solenoid (SL1) turns ON for about 0.2 sec. As a result of that, the rotation of the main motor is transferred and the pickup roller starts to rotate.

Initial Rotation Ready
It indicates the following state: the main motor drives, and after a certain period of time, the temperature of the fixing assembly reaches to the specified value and the scanner motor reaches to the specified number of rotation.

3) The pickup cam rotates along with the rotation of the pickup roller, and by following the shape of the pickup cam, the lifting plate is pushed up with the force of the spring. A paper pushed up with the lifting plate is picked up by the rotation of the pickup roller and fed to inside of the machine.
4) After a certain period of time that the leading edge sensor (PS801) detects the leading edge of picked up paper, the DCNT board transmits the laser beam detection signal (/BD) to the SCNT board.
5) Based on the /BD signal, the SCNT board transmits the video signal to the laser/scanner assembly and an image is formed on the photosensitive drum. Because of that, it is controlled to match the leading edges of an image and a paper.
6) A paper is delivered to the delivery tray with the rotation of the photosensitive drum, pressure roller, and face-down delivery roller.



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[1] Face-down delivery roller
[2] Pressure roller
[3] Fixing film unit
[4] Transfer charging roller
[5] Photosensitive drum
[6] Pickup roller
[7] Separation pad
[8] Manual feed tray
[9] Pickup tray
M1: Main motor
SL1: Pickup solenoid
PS801: Leading edge sensor
PS802: Paper width sensor
PS803: Delivery sensor
PS804: Delivery paper width sensor

7.3 Detection Jams

7.3.1 Jam Detection Outline

7.3.1.1 Overview

i-SENSYS MF4690PL / / i-SENSYS MF4660

The machine has the following paper sensors to detect the presence/absence of paper at the time of startup, opening the door, or feeding a paper, as well as to detect whether a paper is fed normally.

1. Leading edge sensor (PS801)
2. Paper width sensor (PS802)
3. Delivery sensor (PS803)
4. Delivery paper width sensor (PS804)

In terms of jam, it is judged by whether a paper is at the sensor assembly at the time of the check time memorized in the CPU beforehand. If the CPU judges as the occurrence of jam, the printing operation is aborted and at the same time, it notifies it to the SCNT board.

7.3.2 Delay Jams

7.3.2.1 Pickup Delay Jam

i-SENSYS MF4690PL / / i-SENSYS MF4660

In order to prevent the pickup delay jam due to the pickup failure, the machine executes the retry control that performs the pickup operation up to twice.
In the second pickup operation, if the leading edge sensor (PS801) cannot detect the leading edge of paper within about 1.45 sec since the pickup solenoid (SL1) turns ON, the DCNT board judges as the pickup delay jam.

7.3.2.2 Delivery Delay Jam

i-SENSYS MF4690PL / / i-SENSYS MF4660

If the delivery sensor (PS803) cannot detect the leading edge of paper after passing about 1.65 sec from the detection of the leading edge of paper with the leading edge sensor (PS801), the DCNT board judges as the delivery delay jam.

7.3.3 Stationary Jams

7.3.3.1 Pickup Stationary Jam

i-SENSYS MF4690PL / / i-SENSYS MF4660

If the trailing edge of paper cannot be detected after passing about 5.4 sec since the leading edge sensor (PS801) detects the leading edge of paper, the DCNT board judges as the pickup stationary jam.

7.3.3.2 Delivery Stationary Jam

i-SENSYS MF4690PL / / i-SENSYS MF4660

If the delivery sensor (PS803) cannot detect the leading edge of paper within about 1.48 sec after the leading edge sensor (PS801) detects the trailing edge of paper, the DCNT board judges as the delivery stationary jam.

7.3.4 Other Jams

7.3.4.1 Door Open Jam

i-SENSYS MF4690PL / / i-SENSYS MF4660

If the leading edge sensor (PS801) or the delivery sensor (PS803) detects a paper when door open is detected, the DCNT board judges as the door open jam.

7.3.4.2 Wrapping Jam

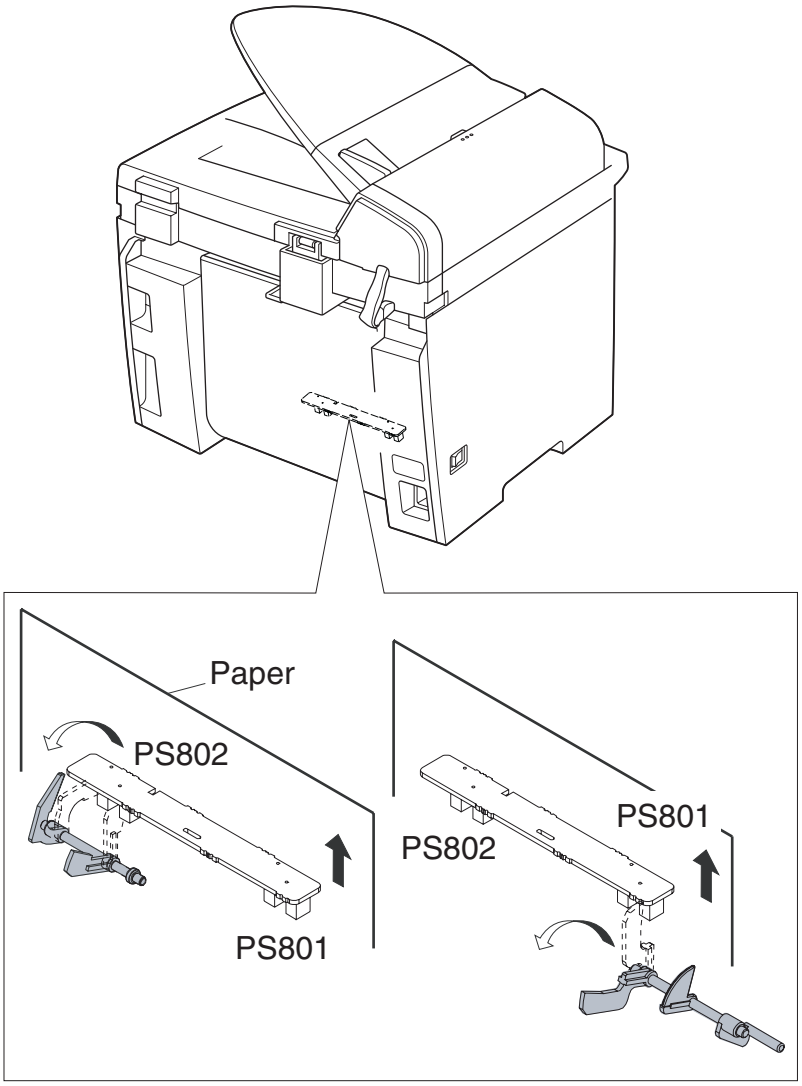
i-SENSYS MF4690PL / / i-SENSYS MF4660

CPU executes the wrapping jam detection after it judges there is no delivery delay jam present.
If the delivery sensor (PS803) detects the trailing edge of paper within the predetermined time (from after about 0.08 sec since the detection of the paper leading edge by the delivery sensor (PS803) until about 1.09 sec after the detection of the paper trailing edge y the leading edge sensor (PS801)), CPU judges as the wrapping jam.
If it judges as the wrapping jam, it notifies the occurrence of the delivery stationary jam to the SCNT board.

7.3.4.3 Residual Jam at Startup

i-SENSYS MF4690PL / / i-SENSYS MF4660

If either the leading edge sensor (PS801) or the paper width sensor (PS802) detects a paper at the start of initial rotation, CPU judges as the residual jam at startup. When there is paper in inside the machine, the leading edge sensor flag is pushed up with paper, and paper having is judged.



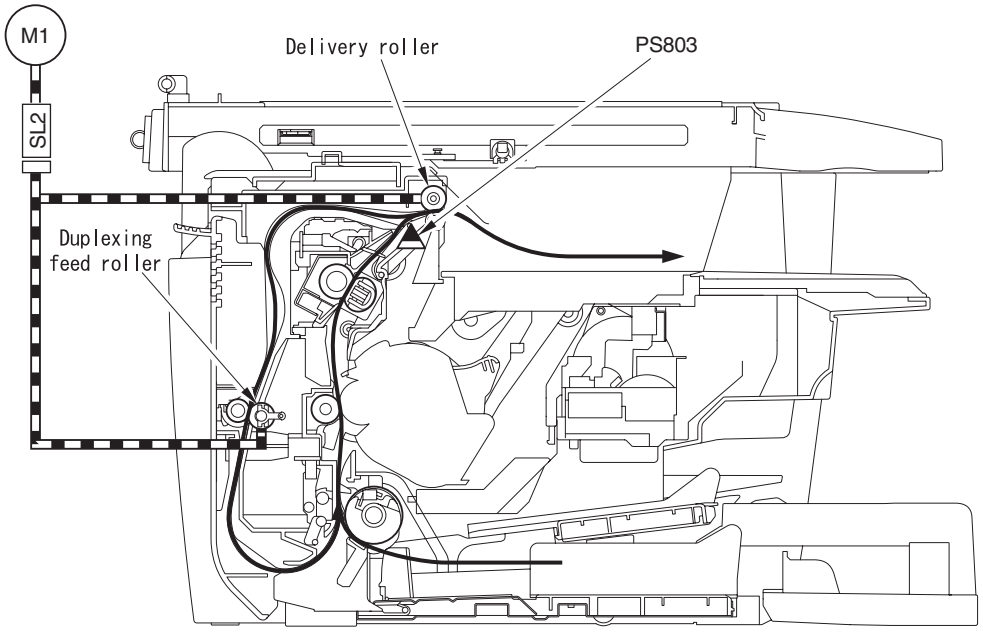
F-7-3

7.4 Duplex Unit

7.4.1 Overview

i-SENSYS MF4690PL / / i-SENSYS MF4660

The duplexing pick up operation of this machine is performed by the drive of the main motor (M1) under CPU control of the DCNT board.
After the machine completes the 1st print and the paper's trailing edge passes over the delivery sensor (PS803), the duplexing drive solenoid (SL2) is turned on and the drive of the main motor (M1) is transmitted to the delivery roller and the duplexing feed roller.
By turning the delivery roller in reverse direction, the paper is lead to the duplexing feed unit, and sent to the feed roller via duplexing feed roller.
There is no sensor on the duplexing paper's feeding path to detect the arrival/passage of paper.
There is no stationary function to stop and retain paper in duplexing unit.



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7.5 Parts Replacement Procedure

7.5.1 Main Motor

7.5.1.1 Preparation for Removing Main Motor

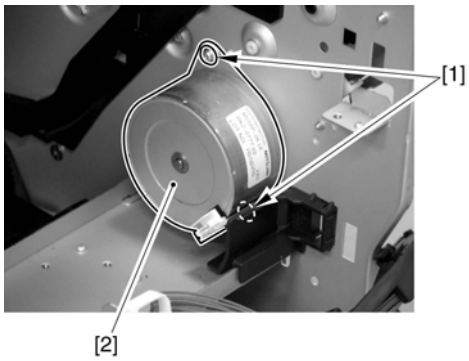
i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the front cover.
2) Remove the right cover.
3) Remove the left cover.
4) Remove the DCNT board.
5) Remove the laser scanner unit.

7.5.1.2 Removing Main Motor

i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the 2 screws [1], and remove the main motor [2].



F-7-5

7.5.2 Separation Pad

7.5.2.1 Preparation for Removing Separation Pad

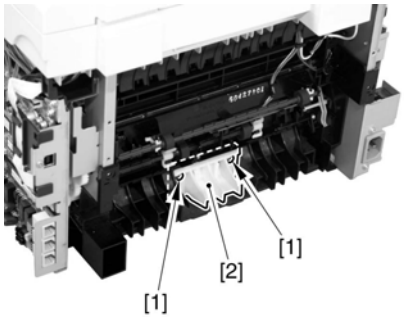
i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the front cover.
2) Remove the right cover.
3) Remove the left cover.
4) Remove the rear cover.

7.5.2.2 Removing Separation Pad

i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the 2 screws [1], and remove the separation pad [2].



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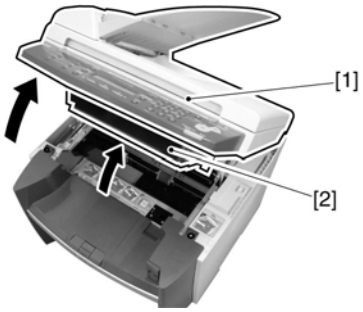
7.5.3 Pickup Roller

7.5.3.1 Removing Pickup Roller

i-SENSYS MF4690PL / / i-SENSYS MF4660

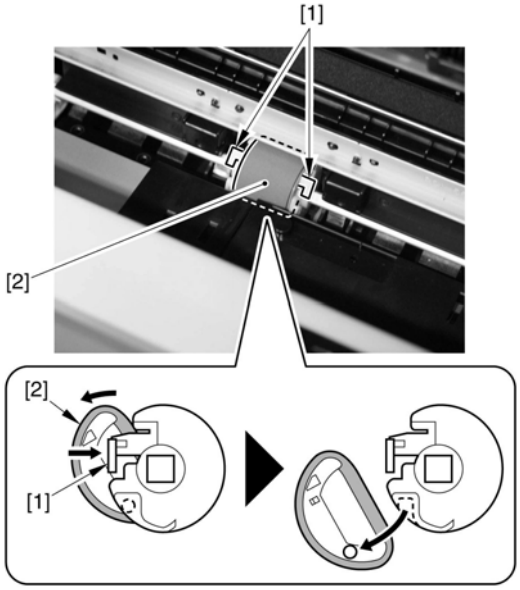
1) Open the control panel [1].
2) Open the printer cover [2].



F-7-7

3) Unhook the 2 claws [1] toward outside, and remove the pickup roller [2].

⚠
Do not touch the roller with bare hands.



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Chapter 8 Fixing System

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8.1 Overview/Configuration

8.1.1 Specification/Control/Function List

i-SENSYS MF4690PL / / i-SENSYS MF4660

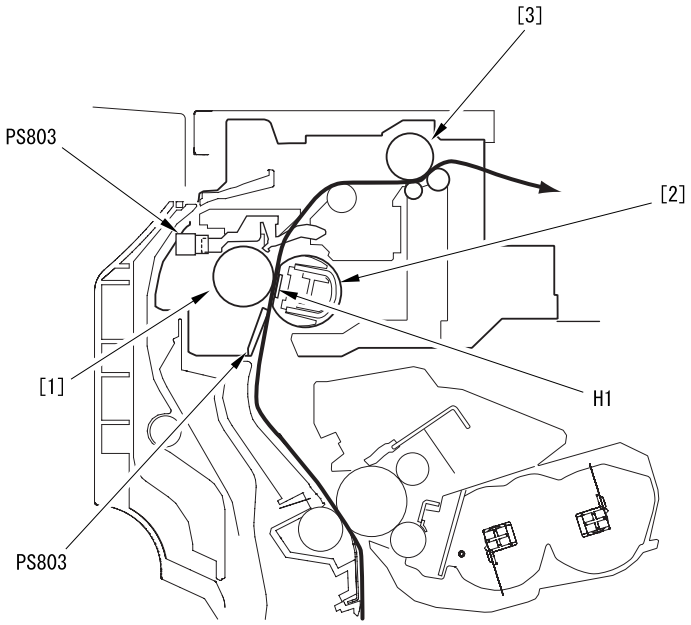
T-8-1

Item	Function/Method
Fixing method	On-demand fixing
Fixing heater	Flat heater
Fixing temperature detection	Thermistor (TH1): temperature control, detection of abnormality
	Temperature fuse (TP1): detection of abnormality
Fixing temperature control	Temperature control at startup
	Temperature control at normal times
	Temperature control at sheet-to-sheet interval
Protection function	Temperature error detection with the thermistor
	Temperature rise detection with the temperature fuse

8.1.2 Overview

i-SENSYS MF4690PL / / i-SENSYS MF4660

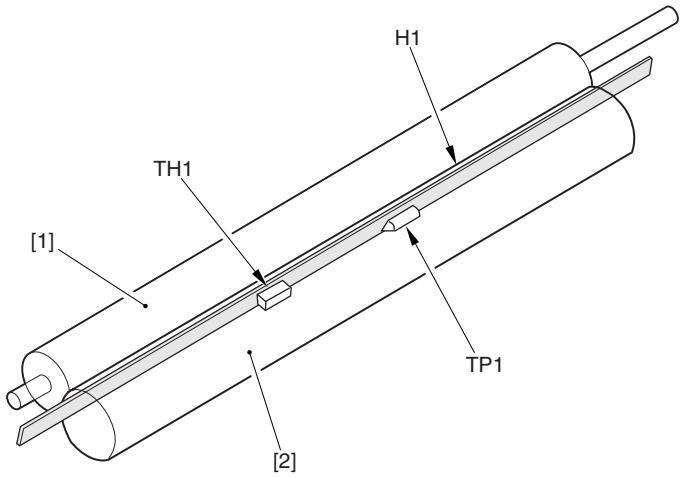
The fixing unit employees the on-demand fixing method, and it is composed of fixing film unit, in which the fixing heater, thermistor, and temperature fuse are incorporated, and the pressure roller.
The pressure roller and the delivery roller are driven with the main motor (M1).
A paper separated from the photosensitive drum is fed to inside of the fixing assembly, and the toner is fixed on a paper with the fixing film and the pressure roller.
A paper being fixed is detected with the delivery sensor (PS803); then, delivered to outside of the machine via the delivery roller.



F-8-1

[1] Pressure roller
[2] Fixing film
[3] Delivery roller
H1: Fixing heater
PS803: Delivery sensor

The fixing heater is the heater (ceramic heater) that the heating pattern is deposited on the ceramic plate.
By heating the fixing film with the fixing heater, it gives heat to passing papers.
The thermistor (TH1) locates at the center of the fixing heater (H1), and detects the temperature of the heater.
The temperature fuse (TP1) locates at the top center of the fixing heater. If the temperature of the fixing heater increases abnormally, it blocks power supply to the heater by meltdown.
The temperature control of the fixing assembly composed of the foregoing components is executed at the fixing control circuit on the DCNT board with the instruction of the CPU (IC902). There are the fixing heater drive circuit and the fixing heater safety circuit in the fixing control circuit.



F-8-2

[1] Pressure roller
[2] Fixing film
H1: Fixing heater
TH1: Thermistor
TP1: Temperature fuse

8.2 Various Control Mechanisms

8.2.1 Controlling the Temperature of the Fixing Unit

8.2.1.1 Fixing Temperature Control

i-SENSYS MF4690PL / / i-SENSYS MF4660

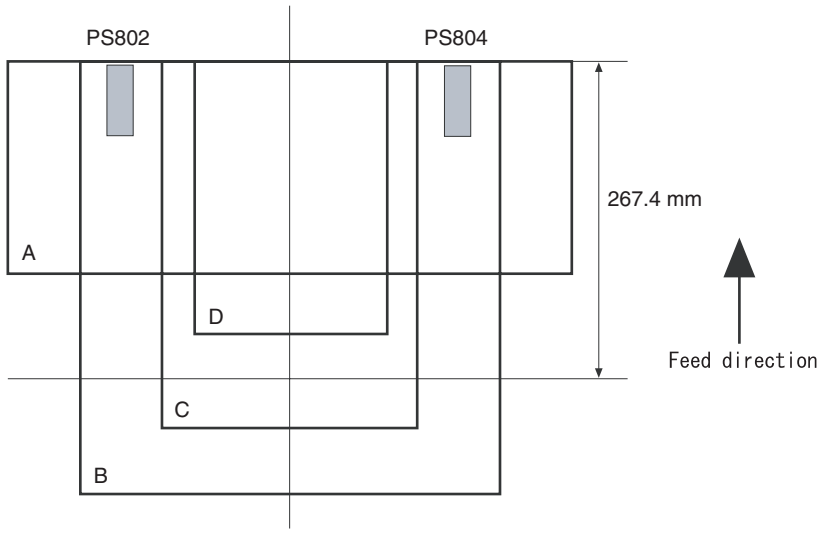
With this control, the surface temperature of the fixing heater is detected, and also the drive signal of the fixing heater is controlled to maintain the target temperature of the fixing heater.
The temperature control of the fixing heater is executed with the following 3 modes:

Temperature Control at Startup:
The temperature control at startup is executed from the entry of print command to the DCNT board until the temperature of the fixing heater reaches the fixing target temperature.
The fixing target temperature is set to execute fixing with appropriate fixing temperature in accordance with paper type, size, thickness, and shape.

Temperature Control at Normal Times:
The temperature control at normal times is executed during printing to maintain the temperature of the fixing heater as its target temperature.

Temperature Control at Sheet-to-sheet Interval:
The temperature control at sheet-to-sheet interval is executed to keep the temperature lower than the target temperature in order to prevent the temperature raise at the area between a preceding sheet and a succeeding sheet in case of the envelop mode and the small size mode.
The temperature of the fixing heater is detected with the thermistor located on the fixing heater. When the surface temperature of the fixing heater increases, the resistance value of the thermistor is decreased, and the voltage of the fixing heater temperature detection signal of the thermistor is decreased.
The CPU (IC902) on the DCNT board monitors the voltage of the FSRTH signal. By outputting the fixing heater drive signal (FSRD) in accordance with the voltage, the CPU makes the phototriac coupler to turn ON/OFF, and it controls the temperature of the fixing heater to be the specified value.
The CPU starts the fixing heater temperature control to be 100 deg C when the power is ON.
Because the viscosity of grease inside of the fixing film unit is high, melting the grease fully prevents feed fault inside of the fixing assembly or faulty image.

Fixing Mode:
In this machine, the fixing mode is determined by detecting paper size based on the time that a paper needs to go through the paper leading edge sensor, the paper width sensor, and the delivery paper width sensor.
The relationship between paper size being detected and the fixing mode is shown below. (From A to D indicate paper size.)

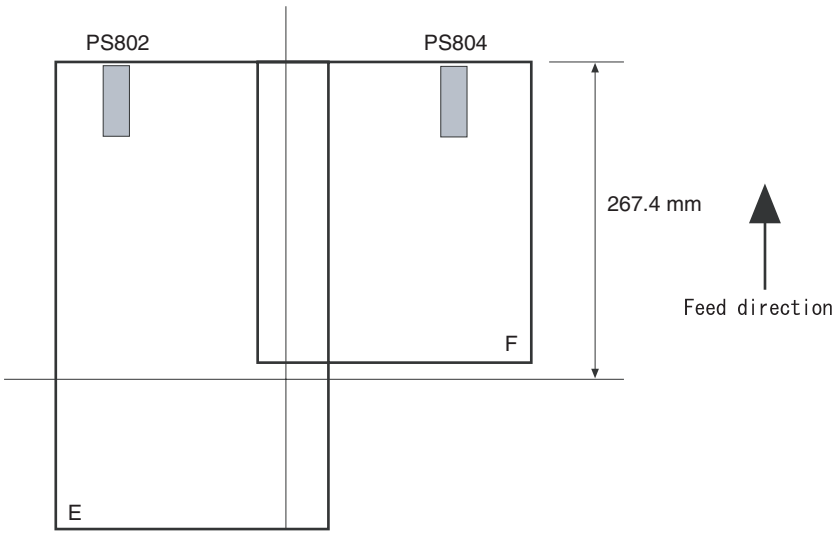


F-8-3

T-8-2

	Paper length	Paper width sensor PS802	Delivery paper width sensor PS804	Fixing mode
A	Less than 267.4 mm	Detect	Detect	Envelop
B	267.4 mm or above	Detect	Detect	Normal*1
C	267.4 mm or above	Not detect	Not detect	Small size paper
D	Less than 267.4 mm	Not detect	Not detect	Envelop

In order to prevent temperature increase at the end of the fixing film that occurs when putting papers on one side and passing them through the machine while the paper width guide is fully opened, the machine has the delivery paper width sensor.
The relationship between paper size when putting papers on one side and passing them through the machine and the fixing mode is shown below. (E and F indicate paper size.)



F-8-4

T-8-3

	Paper length	Paper width sensor	Delivery paper width sensor	Fixing mode
E	No object *2	Detect	Not detect	Small size paper mode
F	No object *2	Not detect	Detect	Small size paper mode

*1: Eight modes, except envelop/small size paper
*2: When setting papers at the end of the paper guide and passing them through the machine, it becomes the small size paper mode regardless of paper length.

Memo:
The following are the throughput at down sequence.

Fixing mode	Number of fixed sheets	Throughput
Plain paper	-	20 ppm
Thick paper	-	16 ppm
Thick paper H	-	8 ppm
Envelope	5 or less 15 or less 40 or less 41 or more	9 ppm 7 ppm 5 ppm 4 ppm
Postcard/double postal card	5 or less 15 or less 40 or less 41 or more	5 ppm 4 ppm 3 ppm 3 ppm

8.3 Protection Function

8.3.1 Protection Function

i-SENSYS MF4690PL / / i-SENSYS MF4660

In order to prevent the fixing heater runaway, the machine has the following 3 protection functions.
1. Protection function with CPU
2. Protection function with the fixing heater safety circuit
3. Protection function with the temperature fuse
The description of each function is as follow:

1. Protection Function with CPU
CPU always monitors voltage of the fixing heater temperature detection signal sent from the thermistor. If the fixing temperature greatly exceeds the specified value, CPU judges as failure of the fixing assembly, and it blocks the power distribution to the fixing heater.
Moreover, error (E000) is displayed in the operation part at the same time.

T-8-4

Failure of fixing assembly	Thermistor temperature	Heater temperature detection time
From the start of temperature control until 1.47 sec	Less than 55 deg C	
Normal times	230 deg C or above	0.15 sec in a row
During normal temperature control	Less than 100 deg C	1.2 sec in a row
During temperature control at sheet-to-sheet interval, during cleaning mode	Less than 55 deg C	1.2 sec in a row
After the thermistor temperature exceeds 50 deg C	Less than 20 deg C	0.3 sec in a row
From the start of power distribution to the fixing heater until 23 sec	Less than 100 deg C	
While a paper is nipped in the fixing assembly	Less than 210 deg C	30 sec in a row
	Less than 145 deg C	30 sec in a row

2. Protection function with the fixing heater safety circuit

The circuit always monitors voltage of the fixing heater temperature detection signal sent from the thermistor. If the fixing temperature greatly exceeds the specified value, it blocks the power distribution to the fixing heater regardless of the instruction from CPU.
If the temperature of the fixing heater abnormally increases and the voltage of the fixing heater temperature detection signal sent from the thermistor becomes less than about 0.57V (equivalent of 265 deg C), the output of the comparator becomes 'L' and the transistor turns OFF. As a result of that, the relay is turned OFF to block the power distribution to the fixing heater regardless the relay drive signal sent from the CPU.

3. Protection function with the temperature fuse
If the temperature of the fixing heater abnormally increases and the temperature of the temperature fuse exceeds about 230 deg C, the temperature fuse meltdown to block the power distribution to the fixing heater.

8.4 Parts Replacement Procedure

8.4.1 Fixing Unit

8.4.1.1 Preparation for Removing Fixing Assembly

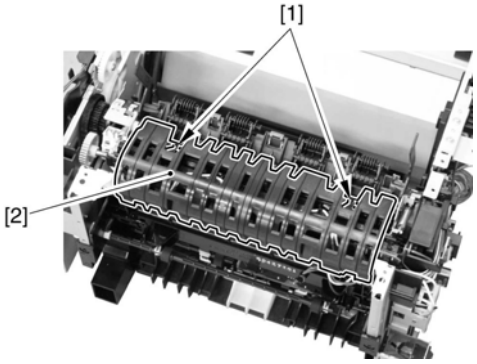
i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the front cover.
2) Remove the right cover.
3) Remove the left cover.
4) Remove the rear cover.
5) Remove the control panel.
6) Remove the printer cover.
7) Remove the upper cover.

8.4.1.2 Removing Fixing Assembly

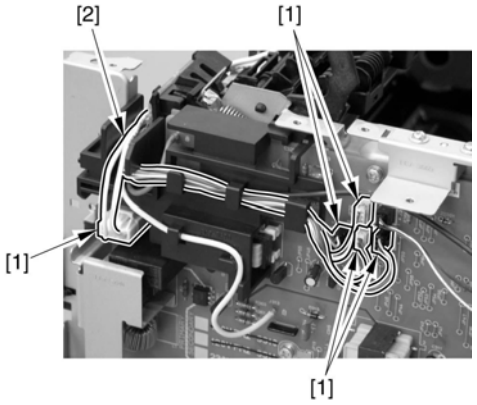
i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Unhook the 2 claws [1], and remove the fixing guide [2].



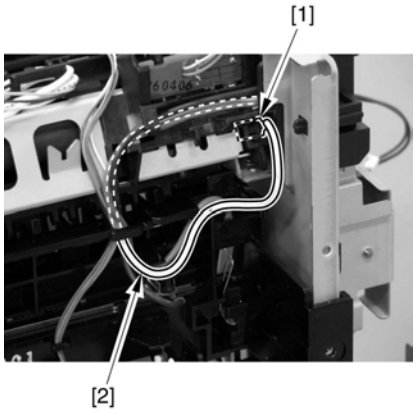
F-8-5

2) Disconnect the 5 connectors [1] on the left side, and remove the cable [2] from the cable guide.



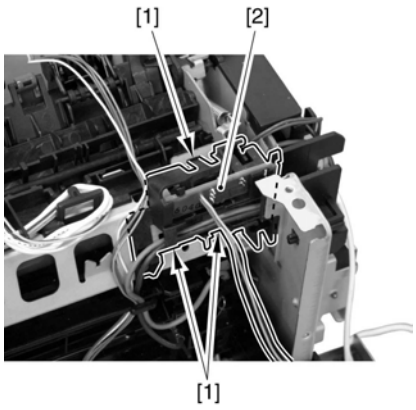
F-8-6

3) Disconnect the connector [1], and remove the cable (white) [2] from the cable guide.



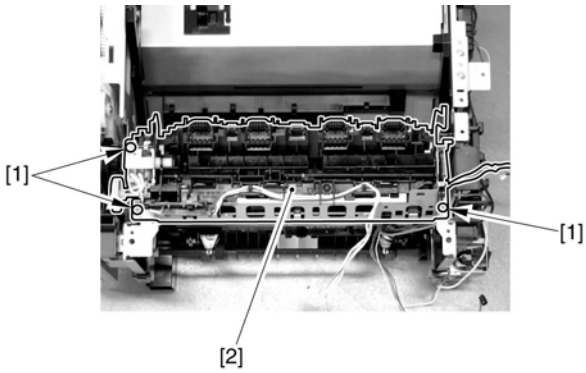
F-8-7

4) Unhook the 3 claws [1], and remove the delivery sensor [2].



F-8-8

5) Remove the 3 screws [1], and remove the fixing assembly [2].



F-8-9

8.4.2 Fixing Film Unit

8.4.2.1 Preparation for Removing Fixing Film Unit

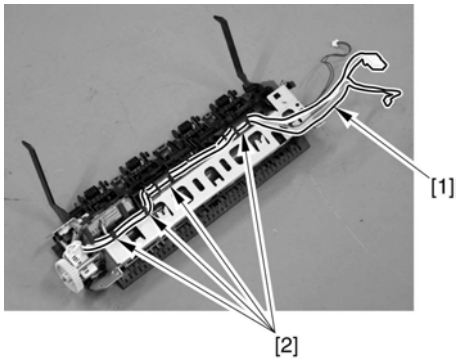
i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the front cover.
2) Remove the right cover.
3) Remove the left cover.
4) Remove the rear cover.
5) Remove the control panel.
6) Remove the printer cover.
7) Remove the upper cover.
8) Remove the fixing assembly.

8.4.2.2 Removing Fixing Film Unit

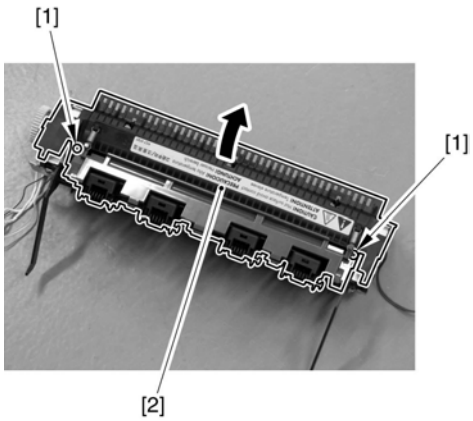
i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Free the cable [1] from the cable guide [2].



F-8-10

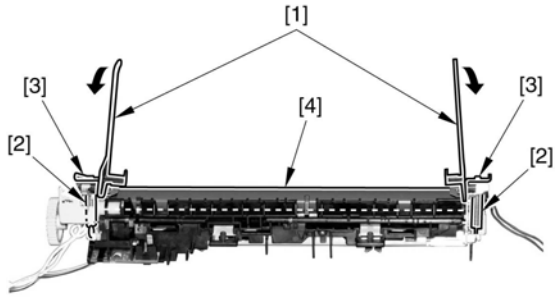
2) Remove the 2 screws [1], and detach the fixing cover [2] by opening it in the direction of the arrow.



F-8-11

3) Recline the 2 pressure release levers [1], and remove the 2 springs [2].
4) Remove the fixing film unit [4].
- 2 pressure release levers [1]
- 2 pressure plates [3]

Do NOT touch the roller with bare hands.



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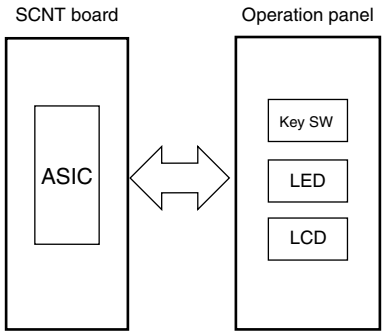
9.1 Control Panel

9.1.1 Outline

i-SENSYS MF4690PL / / i-SENSYS MF4660

The machine's control panel consists of the following PCBs, and is controlled by the SCNT board.



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9.2 Power Supply

9.2.1 Protection Function

9.2.1.1 Protecting Function

i-SENSYS MF4690PL / / i-SENSYS MF4660

In the case of troubles with power supply PCB such as short circuit to loads, and resulted in occurring overcurrent or over overvoltage, there is a protecting function for overcurrent/overvoltage to automatically shut the output voltage to avoid fault of power supply PCB.
In the case that the protecting function for overcurrent/overvoltage is activated, it recovers by turning off the main power switch to handle the load trouble, and then, turning on the main switch again. Also, there are 2 pc of fuses in PCB. If there is overcurrent in AC line, fuse is blown out and power distribution is shutdown.

9.3 Parts Replacement Procedure

9.3.1 Front Cover

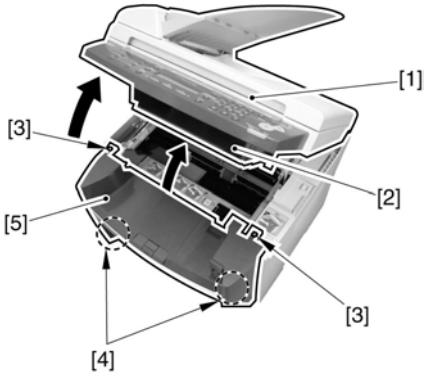
9.3.1.1 Removing the Front Cover

i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the paper cassette [1].

F-9-2

2) Open the control panel [1].
3) Open the printer cover [2].
4) Remove the front cover [5].
   - 2 screws [3]
   - 2 claws [4]



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9.3.2 Rear Cover

9.3.2.1 Preparation for Removing the Rear Cover

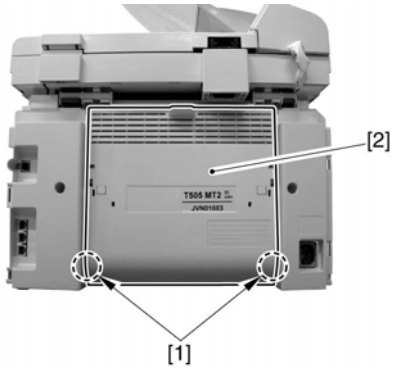
i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the front cover.
2) Remove the right cover.
3) Remove the left cover.

9.3.2.2 Removing the Rear Cover

i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the 2 shafts [1], and detach the rear cover [2].



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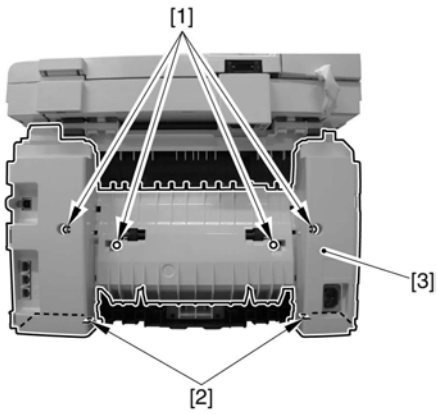
2) Remove the rear cover 2 [3].
   - 4 screws [1]
   - 2 claws [2]



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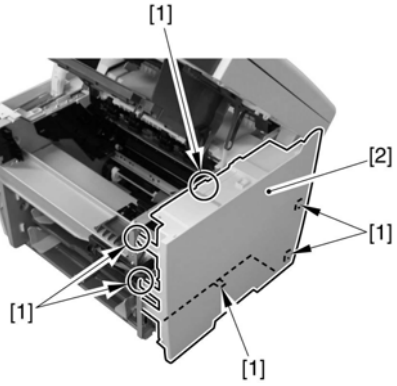
9.3.3 Right Cover

9.3.3.1 Removing the Right Cover

i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the front cover.
2) Unhook the 6 claws [1], and detach the right cover [2].



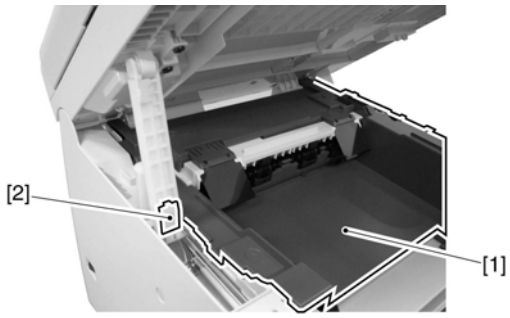
F-9-6

9.3.4 Left Cover

9.3.4.1 Removing the Left Cover

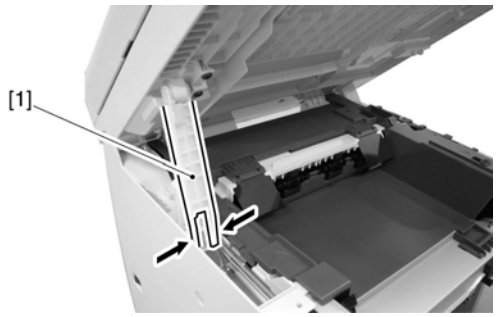
i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the front over.
2) Close the printer cover [1].
3) Disengage the claw to remove the holder [2].



F-9-7

4) Remove from the damper rail while picking the damper [1]



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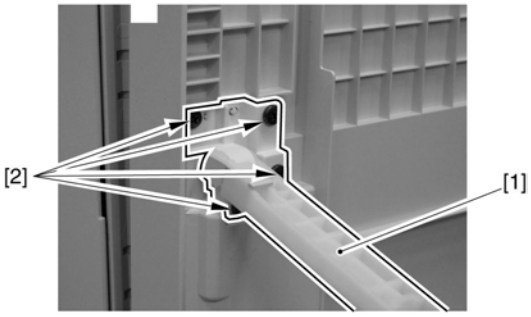
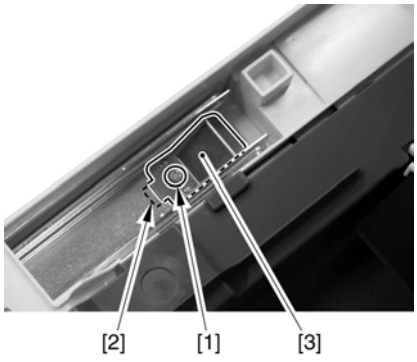
5) Remove the 4 screws [2] to remove the damper [1].



F-9-9

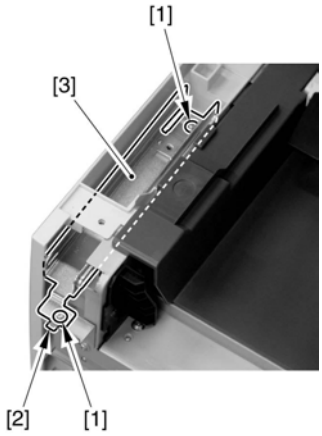
Once removing the damper, the control panel cannot be fixed. Take care not to catch your hands in the control panel since you have to perform operations with the control panel opened afterwards.

6) Remove the damper stopper [3].
-1 screw [1]
-1 claw [2]



F-9-10

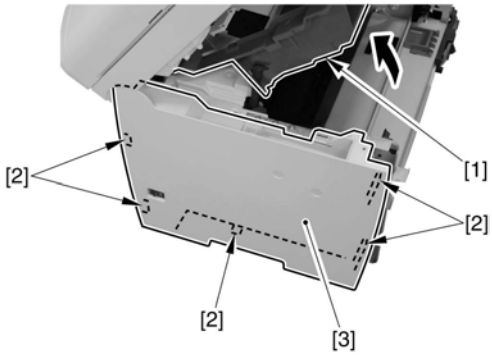
7) Remove the damper rail [3].
-2 screws [1]
-1 claw [2]



F-9-11

8) Open the printer cover [1].

9) Unhook the 5 claws [2], and detach the left cover [3].



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9.3.5 Upper Cover

9.3.5.1 Preparation for Removing the Upper Cover

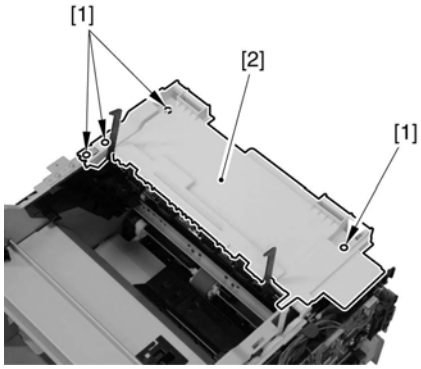
i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the front cover.
2) Remove the right cover.
3) Remove the left cover.
4) Remove the rear cover.
5) Remove the control panel.
6) Remove the printer cover.

9.3.5.2 Removing the Upper Cover

i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the 4 screws [1], and detach the upper cover [2].



F-9-13

9.3.6 Cartridge Cover

9.3.6.1 Preparation for Removing the Printer Cover

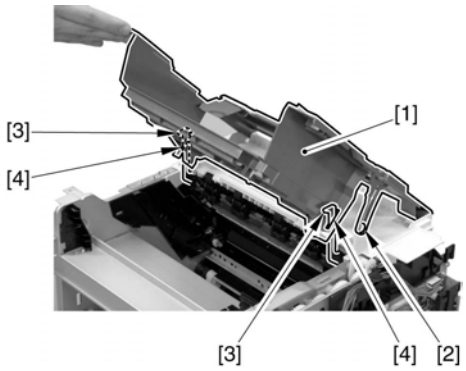
i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the front cover.
2) Remove the right cover.
3) Remove the left cover.
4) Remove the rear cover.
5) Remove the control panel.

9.3.6.2 Removing the Printer Cover

i-SENSYS MF4690PL / / i-SENSYS MF4660

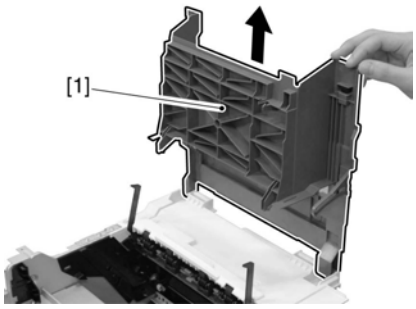
1) Open the printer cover [1].
2) Remove the link stopper [2].
3) Remove the 2 pressure release levers [3] through the 2 holes [4].



F-9-14

Points to Note When Attaching
Make sure to attach the link stopper [2] after attaching the right cover. If attaching the link stopper while attaching the printer cover, it may drop inside the machine.

4) With the printer cover [1] opened, detach it upward.



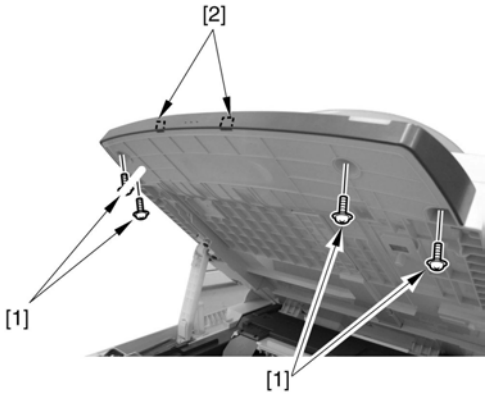
F-9-15

9.3.7 Operation Panel Unit

9.3.7.1 Removing the Control Panel Unit

i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the 4 screws [1] and the 2 claws [2].



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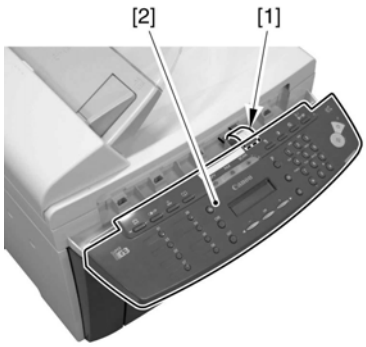
2) Disconnect the connector [1], and remove the control panel unit [2].



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9.3.8 SCNT Board

9.3.8.1 Preparation for Removing the SCNT Board

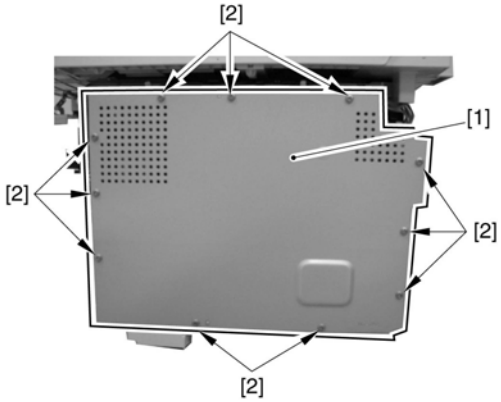
i-SENSYS MF4690PL / / i-SENSYS MF4660

Outputting report
Before replacing the SCNT board, output and record the report for the information such as the user setting and the setting of the service mode.
Service mode > REPORT
Initial setting/registration > Report setting > Report output

9.3.8.2 Removing the SCNT Board

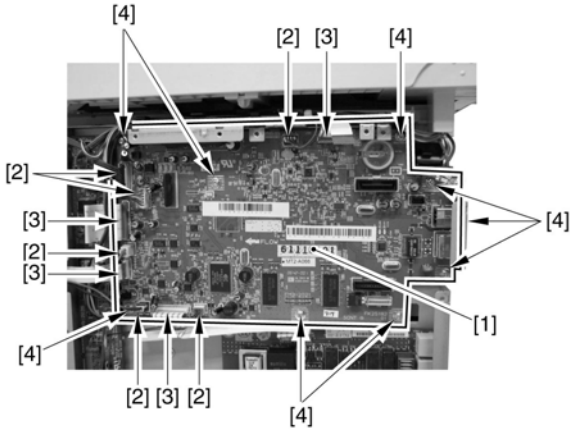
i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the front cover.
2) Remove the right cover.
3) Remove the left cover.
4) Remove the rear cover.
5) Remove the frame [1].
- 11 screws [2]



F-9-18

6) Remove the Analog processor PCB.
7) Remove the SCNT board [1].
- 9 connectors [2]
- 4 flatcables [3]
- 9 screws [4]



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9.3.8.3 Actions At Replacing the SCNT Board

i-SENSYS MF4690PL / / i-SENSYS MF4660

Outputting report

Before replacing the SCNT board, output and record the report for the information such as the user setting and the setting of the service mode.
Service mode > REPORT
Initial setting/registration > Report setting > Report output
After replacing the SCNT board, enter the user data and the service data according to the report.

Changing the jumper connector

When replacing the SCNT board, change the position of the jumper connector to ON.
* The SCNT board is shipped with the jumper connector of the lithium battery OFF.

9.3.9 DCNT Board

9.3.9.1 Preparation for Removing the DCNT Board

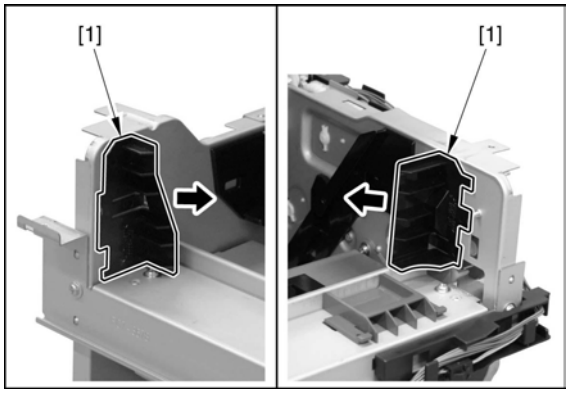
i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the front cover.
2) Remove the right cover.
3) Remove the left cover.

9.3.9.2 Removing the DCNT Board

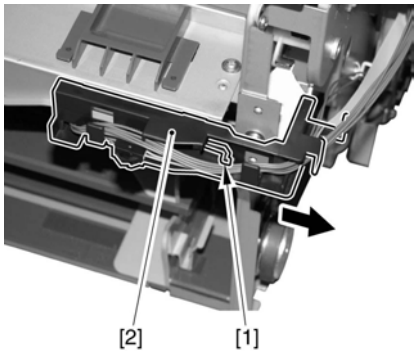
i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the 2 guides [1] in the direction of the arrow.



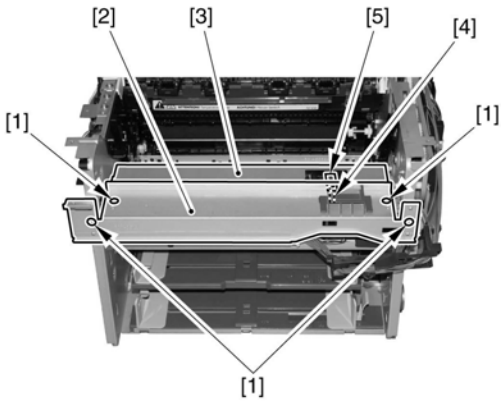
F-9-20

2) Unhook the claw [1], and remove the cable guide [2] in the direction of the arrow.



F-9-21

3) Remove the 4 screws [1], and detach the scanner cover (front) [2] and the scanner cover (rear) [3].

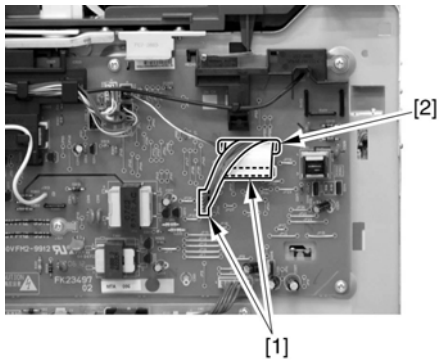


F-9-22

Points to Note When Attaching

Make sure to insert the shutter arm [4] through the hole [5] of the scanner cover (rear).

4) Disconnect the 2 connectors [1] located at the left side, and put them inside the left side plate through the holes [2].



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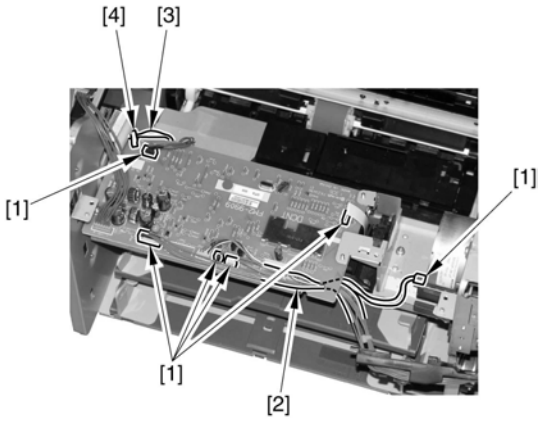
5) Disconnect the 6 connectors [1], and free the cable [2] through the hole of PCB.
6) Free the cable [3] from the cable clamp [4].



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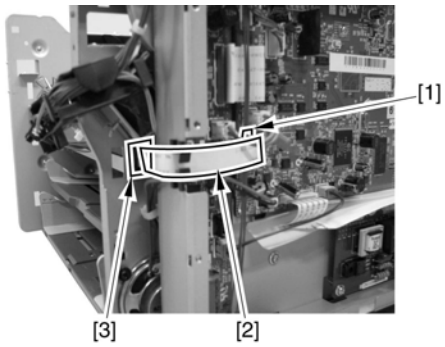
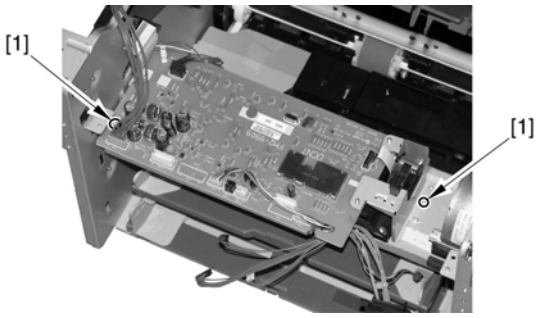
7) Disconnect the connector [1] to remove the flat cable [2].



F-9-25

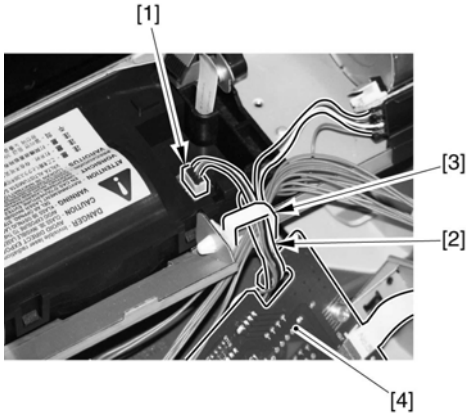
Points to Note When Attaching
Make sure to put the flat cable [3] through the hole [4].

8) Remove the 2 screws [1].



F-9-26

9) Disconnect the connector [1], put the cable [2] through the cable clamp [3], and remove the DCNT board [4].



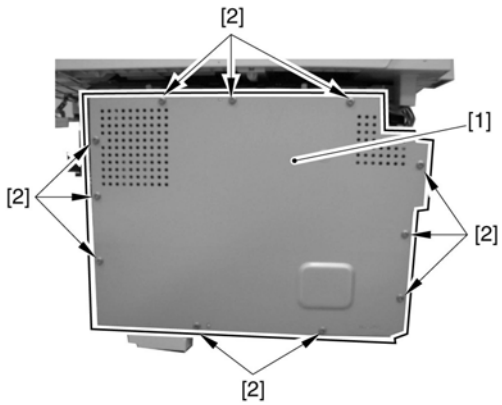
F-9-27

9.3.10 Analog Processor PCB

9.3.10.1 Preparation for Removing the Analog processor PCB

i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the front cover.
2) Remove the right cover.
3) Remove the left cover.
4) Remove the rear cover.
5) Remove the frame [1].
   - 11 screws [2]

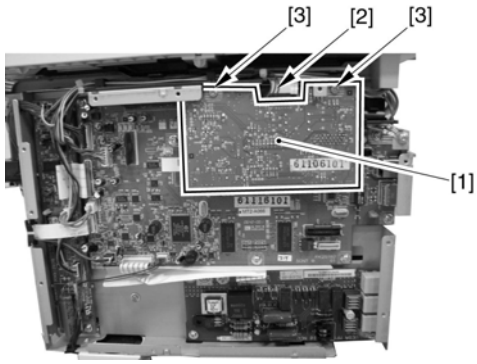


F-9-28

9.3.10.2 Removing the Analog processor PCB

i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the Analog processor PCB [1].
   - 1 connector [2]
   - 2 screws [3]



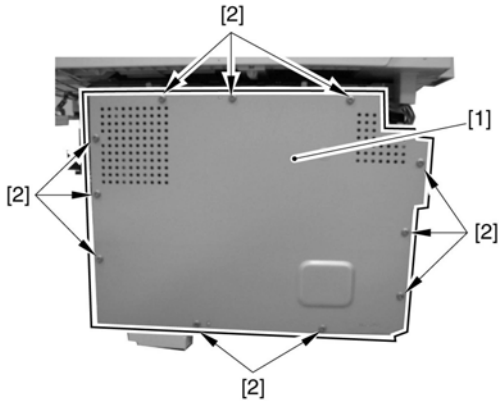
F-9-29

9.3.11 NCU Board

9.3.11.1 Preparation for Removing the NCU Board

i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the front cover.
2) Remove the right cover.
3) Remove the left cover.
4) Remove the rear cover.
5) Remove the frame [1].
   - 11 screws [2]

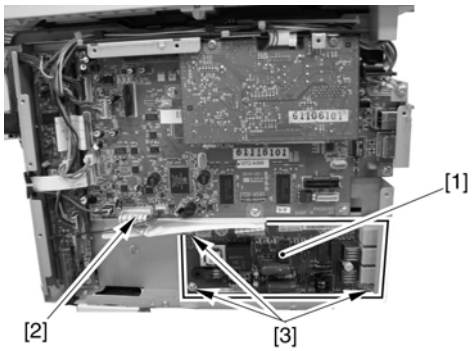


F-9-30

9.3.11.2 Removing the NCU Board

i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the NCU board [1].
   - 1 connector [2]
   - 3 screws [3]



F-9-31

9.3.12 Power Supply PCB

9.3.12.1 Preparation for Removing the Power Supply Board

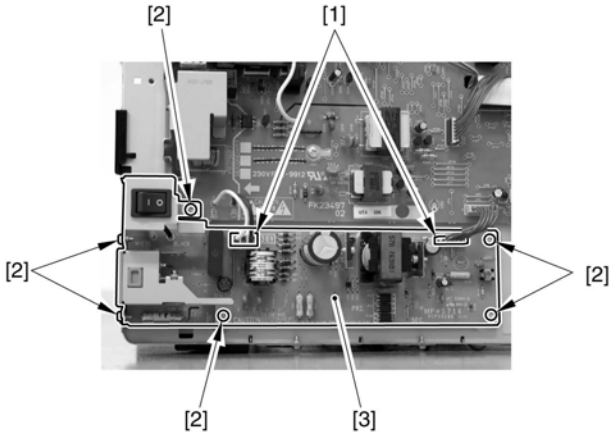
i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the front cover.
2) Remove the right cover.
3) Remove the left cover.
4) Remove the rear cover.

9.3.12.2 Removing the Power Supply Board

i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the power supply board [3].
   - 2 connectors [1]
   - 6 screws [2]



F-9-32

9.3.13 High-voitage Power Supply PCB

9.3.13.1 Preparation for Removing the High Voltage Power Supply Board

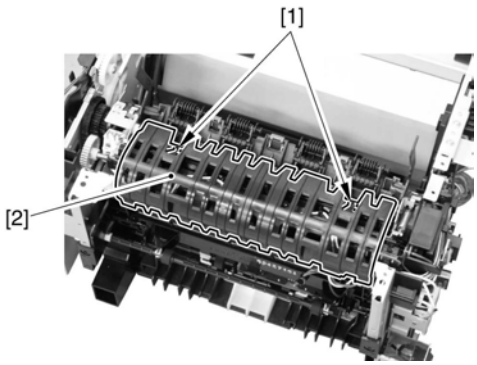
i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the front cover.
2) Remove the right cover.
3) Remove the left cover.
4) Remove the rear cover.
5) Remove the control panel.
6) Remove the printer cover.
7) Remove the upper cover.

9.3.13.2 Removing the High Voltage Power Supply Board

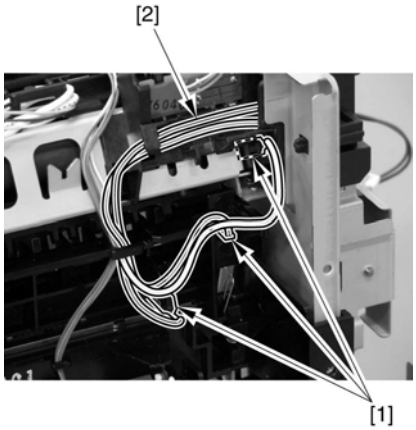
i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Unhook the 2 claws [1], and remove the fixing guide [2].



F-9-33

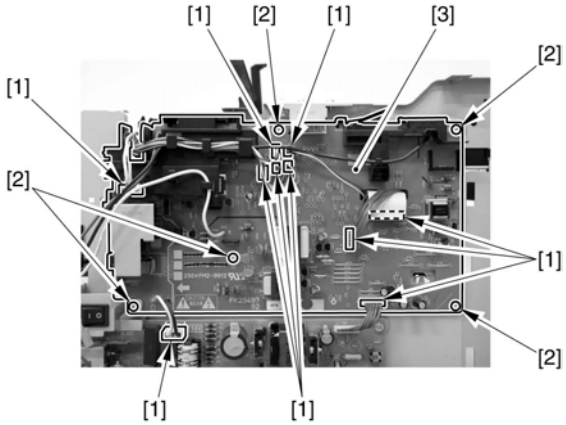
2) Disconnect the 3 connectors [1] located at the backside, and free the cable [2] from the cable guide.



F-9-34

Points to Note When Attaching
Do not confuse the connecting target for the black cable and the red cable. Make sure to connect to the respective terminals stamped as 'RED' and 'BLACK'.

3) Remove the high voltage power supply board [3].
   - 10 connectors [1]
   - 5 screws [2]



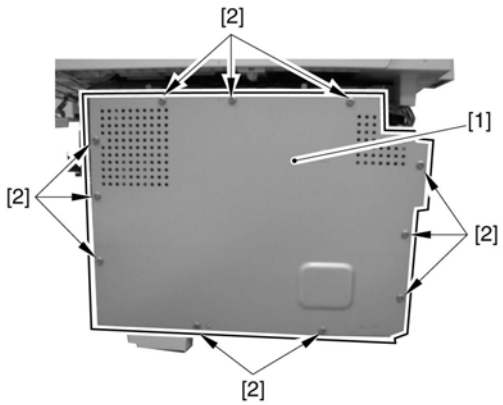
F-9-35

9.3.14 Motor Driver PCB

9.3.14.1 Preparation for Removing the Motor driver PCB

i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the front cover.
2) Remove the right cover.
3) Remove the left cover.
4) Remove the rear cover.
5) Remove the frame [1].
   - 11 screws [2]

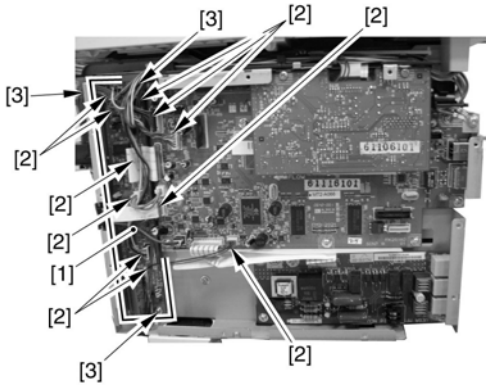


F-9-36

9.3.14.2 Removing the Motor driver PCB

i-SENSYS MF4690PL / / i-SENSYS MF4660

1) Remove the Motor driver PCB [1].
   - 11 connectors [2]
   - 3 screws [3]



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Chapter 10 Maintenance and Inspection

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10.1 Periodically Replaced Parts

10.1.1 Periodically Replaced Parts

i-SENSYS MF4690PL / / i-SENSYS MF4660

There are no periodically replaced parts with this machine.

10.2 Consumables

10.2.1 Consumable

i-SENSYS MF4690PL / i-SENSYS MF4660

T-10-1

Charge	Consumable	Standard of exchange
User	Toner cartridge FX-10	The toner disappears and.
Field engineer	-	-

10.3 Periodical Service

10.3.1 Periodically Service Items

i-SENSYS MF4690PL / / i-SENSYS MF4660

There are no periodically service items with this machine.

10.4 Cleaning

10.4.1 Cleaning Items

i-SENSYS MF4690PL / / i-SENSYS MF4660

T-10-2

Responsible by:Cleaning area	Cleaning area	Cleaning timing
User	External covers	When they are smudged
	Copyboard glass	When the image read from the copyboard is smudged
	Backside of copyboard cover	When the image read from the copyboard is smudged
	ADF reading area	When the image read from the ADF has a black line in vertical direction
	Document pickup roller	When document pickup performance drops away
	Scraper	When document separating performance drops away
	Document feed roller	When document feeding performance drops away
	Document delivery roller	When document delivery performance drops away
	Pressure roller (fixing unit)	When there are irregular black lines in vertical direction in the paper
Service Technician	Pickup roller	When paper pickup performance drops away
	Separation pad	When paper separating performance drops away
	Feed roller	When paper feeding performance drops away
	Transfer charging roller	When there is smudge at the back of the paper, or when there are white spots at the constant intervals of approx. 46mm in the image.
	Static eliminator	When there are dot patterns in the image
	Fixing inlet guide	When there is smudge in the paper, when there are irregular black lines in vertical direction, when there is paper jam, when there are wrinkles in the paper

⚠
Make sure to turn off the power and disconnect the power supply plug upon cleaning. It may cause fire/electric shock if failing turning off the power.

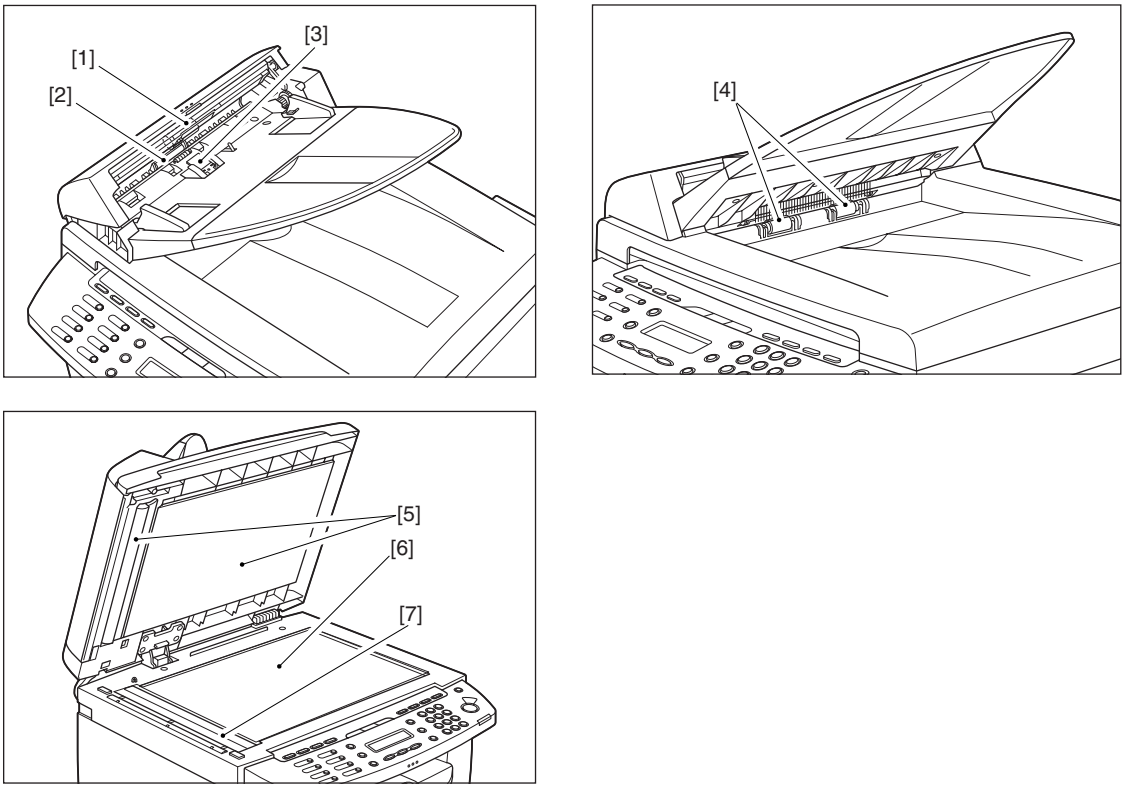
10.4.2 Cleaning Method (External Covers)

i-SENSYS MF4690PL / / i-SENSYS MF4660

Wring of the cloth moistened with water or mild detergent, and wipe off the smudges.
In the case of using mild detergent, make sure to wipe off the detergent with the cloth moistened with water afterward.
Once the smudge is removed, dry with the soft dry cloth.

10.4.3 Cleaning Method (Reader Unit)

i-SENSYS MF4690PL / / i-SENSYS MF4660



F-10-1

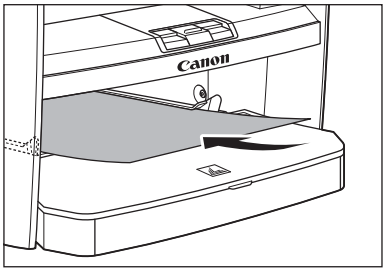
[1] Document pickup roller
Open the ADF and wipe off the smudge with the soft dry cloth.
[2] Document feed roller
Open the ADF and wipe off the smudge with the soft dry cloth.
[3] Scraper
Open the ADF and wipe off the smudge with the soft dry cloth.
[4] Document delivery roller
Wipe off the smudge with the soft dry cloth.
[5] Backside of copyboard cover
Open the copyboard cover and wipe off the smudge with the soft dry cloth.
[6] Copyboard glass
Open the copyboard cover and wipe off the smudge with the soft dry cloth.
[7] ADF reading area
Open the copyboard cover and wipe off the smudge with the soft dry cloth.

10.4.4 Cleaning Method (Pressure Roller)

i-SENSYS MF4690PL / / i-SENSYS MF4660

MEMO:
Cleaning the roller takes approximately 130 seconds.

1) Press [Additional Functions].
2) Press [<-] or [+>] to select <ADJUST./CLEANING>, then press [OK].
3) Load a sheet of blank A4 paper (standard paper) in the multi-purpose tray.



F-10-2

4) Press [<-] or [+>] to select <FIX. UNIT CLEANING>, then press [OK].
Cleaning starts. When finished, the display returns to standby mode.

Chapter 11 Measurement and Adjustments

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11.1 Scanning System

11.1.1 Procedure after Replacing the CIS

i-SENSYS MF4690PL / / i-SENSYS MF4660

After replacing the contact image sensor (CIS), go through the following steps to perform inter-channel output correction:

1) Enter the service mode.
Sequentially press the Additional functions key, 2 key, 8 key, and Additional functions key on the operation panel.
2) Press the arrow key on the touch panel to display "TEST MODE".
3) Press [OK].
4) Press the [2] key to display "SCAN TEST".
5) Press the [1] key to display "SHADING".

After completion of the above procedure, the contact sensor output is compensated and parameters are set automatically.
After completion of automatic adjustment, "OK" is displayed.

11.1.2 Procedure after Replacing the Copyboard Glass

i-SENSYS MF4690PL / / i-SENSYS MF4660

After replacing the copyboard glass, go through the following steps to perform inter-channel output correction:

1) Enter the service mode.
Sequentially press the Additional functions key, 2 key, 8 key, and Additional functions key on the operation panel.
2) Press the arrow key on the touch panel to display "TEST MODE".
3) Press [OK].
4) Press the [2] key to display "SCAN TEST".
5) Press the [1] key to display "SHADING".

After completion of the above procedure, the contact sensor output is compensated and parameters are set automatically.
After completion of automatic adjustment, "OK" is displayed.

11.2 Electrical Adjustments

11.2.1 Procedure after Replacing the SCNT board

i-SENSYS MF4690PL / / i-SENSYS MF4660

If you have replaced the SCNT board with a new one, perform the following operations:

Outputting report

Before replacing the SCNT board, output and record the report for the information such as the user setting and the setting of the service mode.
Service mode > REPORT
Additional functions > Report setting > Report output
After replacing the SCNT board, enter the user data and the service data according to the report.

Changing the jumper connector

When replacing the SCNT board, change the position of the jumper connector to ON.
* The SCNT board is shipped with the jumper connector of the lithium battery OFF.

Make the following adjustments:
- Correction of output between CS channels
1) Enter the service mode.
Sequentially press the Additional functions key, 2 key, 8 key, and Additional functions key on the operation panel.
2) Press the arrow key on the touch panel to display "TEST MODE".
3) Press [OK].
4) Press the [2] key to display "SCAN TEST".
5) Press the [1] key to display "SHADING".
6) Press [OK].
After completion of the above procedure, the contact sensor output is compensated and parameters are set automatically.

If automatic adjustment fails, "NG" appears. Perform the following procedure:
Clean the scanning area of the ADF and the Backside of copyboard cover of the host machine, and then retry auto adjustment.

Chapter 12 Correcting Faulty Images

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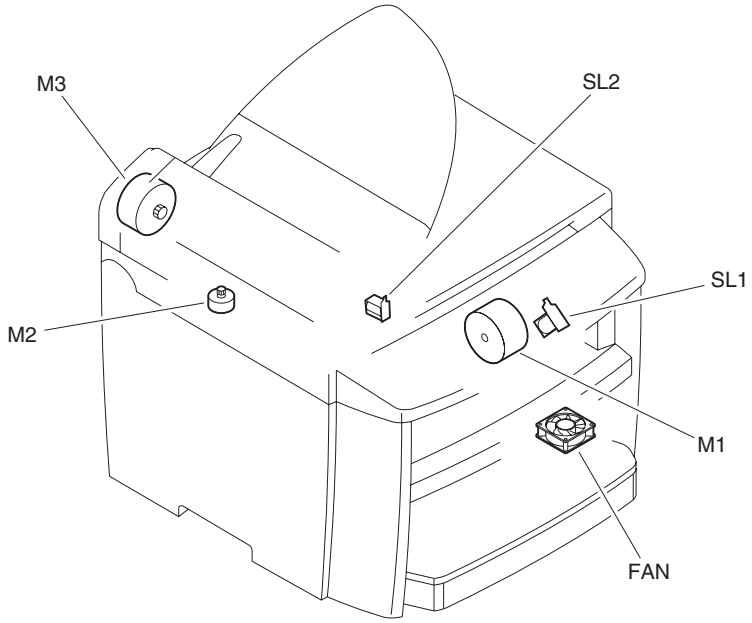
12.1 Outline of Electrical Components

12.1.1 Clutch/Solenoid/Motor/Fan

12.1.1.1 List of Solenoids/Motors

i-SENSYS MF4690PL / / i-SENSYS MF4660



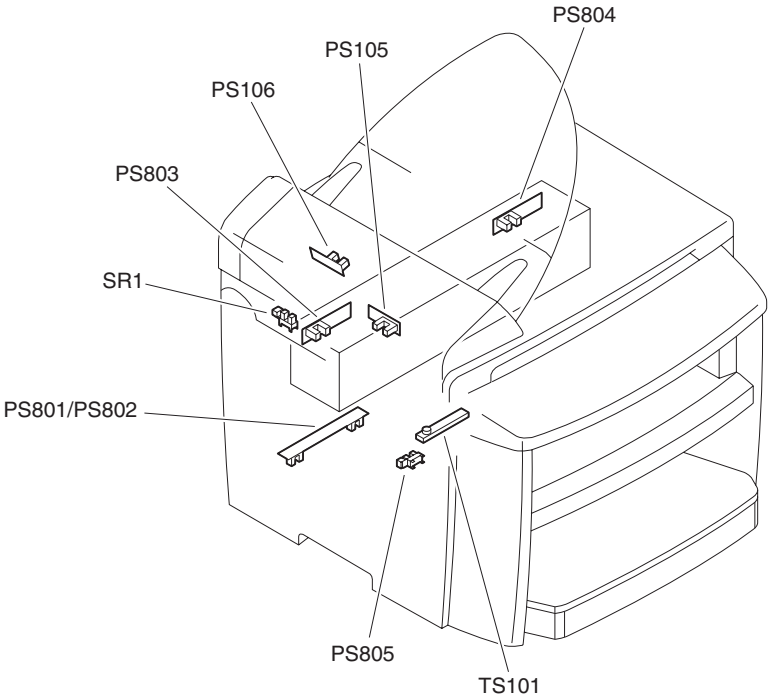
F-12-1

Symbol	Name
M1	Main motor
M2	Book motor
M3	DF motor
SL1	pickup solenoid
SL2	duplexing drive solenoid
FAN	Heat discharge fan

12.1.2 Sensor

12.1.2.1 List of Sensors

i-SENSYS MF4690PL / / i-SENSYS MF4660



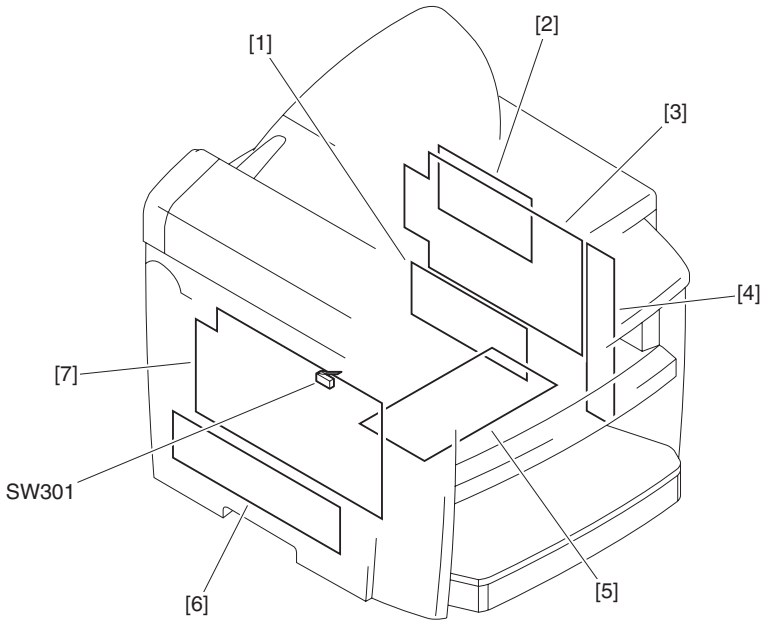
F-12-2

Symbol	Name
PS105	DES sensor
PS106	DS sensor
PS801/PS802	leading edge/paper width sensor
PS803	delivery sensor
PS804	delivery paper width sensor
PS805	Multi-purpose pickup sensor
SR1	CS home position sensor
TS101	Toner level sensor

12.1.3 PCBs

12.1.3.1 List of PCBs

i-SENSYS MF4690PL / / i-SENSYS MF4660



F-12-3

Symbol	Name
[1}	NCU board
[2}	Analog processor PCB
[3}	SCNT board
[4]	Motor driver PCB
[5]	DCNT board
[6}	Power supply PCB
[7}	High voltage PCB
SW301	Door switch

Chapter 13 Error Code

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13.1 Error Code

13.1.1 List of Error Codes

i-SENSYS MF4690PL / / i-SENSYS MF4660

T-13-1

Display Code	Detail Code	Main Cause/Symptom	Countermeasure
E000	0000	Startup error	
		The temperature detected by the main or sub thermistor does not rise to the specified value during startup control.	- Check the fixing film connector. - Replace the fixing film unit. - Replace the DC controller PCB.
E001	0000	Abnormally high temperature (detected by main thermistor)	
		The main thermistor detected an abnormally high temperature (235 deg C) during temperature control.	- Check the connector of the fixing film unit. - Replace the fixing film unit. - Replace the DC controller PCB.
	0001	Abnormally high temperature (detected by sub thermistor)	
		The sub thermistor detected an abnormally high temperature (300 deg C) during temperature control.	- Check the connector of the fixing film unit. - Replace the fixing film unit. - Replace the DC controller PCB.
E002	0000	Low temperature during temperature control.	
		The target temperature is not reached during temperature control.	- Check the connector of the fixing film unit. - Replace the fixing film unit. - Replace the DC controller PCB.
E003	0000	Abnormally low temperature (detected by main thermistor)	
		After the temperature detected by the main thermistor has reached the specified value, it does not reach the specified value during initial rotation.	- Check the connector of the fixing film unit. - Replace the fixing film unit. - Replace the DC controller PCB.
	0001	Abnormally low temperature (detected by sub thermistor)	
		After the temperature detected by the sub thermistor has reached the specified value, it does not reach the specified value during initial rotation.	- Check the connector of the fixing film unit. - Replace the fixing film unit. - Replace the DC controller PCB.
E010	0000	Main motor failure	
		The main motor is faulty.	- Check the connector of the main motor. - Replace the main motor. - Replace the DC controller PCB.
E100	0000	BD detection PCB failure	
		The BD detection PCB is faulty.	- Check the connector of the BD detection PCB. - Replace the laser scanner unit. - Replace the DC controller PCB.
E196	0001	Flash ROM write/read error	- Replace the image processor PCB.
		The write/read of Flash ROM in the image processor PCB is faulty.	
	0002	PCL ROM write/read error	- Replace the PCL PCB. - Replace the image processor PCB.
		The write/read of PCL ROM in the image processor PCB is faulty.	
E197	0000	Printer engine communication error	
		Erroneous communication between the DC controller PCB and image processor PCB was detected.	- Check the connectors of the DC controller PCB and image processor PCB. - Replace the DC controller PCB for normal connection. - Replace the image processor PCB.
E716	0000	Erroneous communication with optional cassette	
		Disconnection of the optional cassette was detected after power-on, detection of normal connection to the optional cassette, and start of communication.	- Check the connectors of the optional cassette PCB and DC controller PCB. - Replace the optional cassette PCB for normal connection. - Replace the DC controller PCB.
E730	0000	inside error of the image processor PCB (PDL system error)	- Replace the image processor PCB.
		The inside of the image processor PCB is faulty.	
E733	0000	Erroneous communication between controller and printer	
		Cannot communicate with the printer at startup.	- Check the connectors of the DC controller PCB and image processor PCB for normal connection. - Check the power supply of the printer (Check whether initialization is performed at startup). - Replace the DC controller PCB or image processor PCB.
E736	0000	CCU communication error	
		The installed modem PCB is incompatible.	- Check the connectors of the image processor PCB and modem. - Replace the modem PCB. - Replace the image processor PCB.
E739	0000	Erroneous communication between controller and network board	
		The installed network board is incompatible.	- Check the connectors of the image processor PCB and LAN PCB for normal connection. - Replace the LAN PCB. - Replace the image processor PCB.
E805	0000	Fan failure	
		The fan is faulty.	- Check the fan connector. - Replace the fan. - Replace the DC controller PCB.

Display Code	Detail Code	Main Cause/Symptom	Countermeasure
E808	0000	Fixing drive circuit failure	
		- The heater does not turn on. - A fixing drive motor failure was detected.	- Check the connector of the fixing film unit. - Replace the fixing film unit. - Replace the fixing drive motor. - Replace the DC controller PCB. - Replace the power supply PCB.

The following are the error codes used in the image transmission function with network.

T-13-2

Error Code	Send			Recive		Error detail
	SMTP	FTP	SMB	SMTP	POP3	
#705	Yes					Exceeded max. image size per document Exceeded max number of image pages (100 pages) in PDF transmission
#751		Yes				Failed to connect to server (Socket level) Disconnected the network (Socket is closed.)
#752	Yes			Yes	Yes	Failed to connect to server (Socket level) Disconnected the network (Socket is closed.)
#753	Yes	Yes	Yes	Yes	Yes	Occurred socket errors other than E751/E752
#755	Yes	Yes	Yes			It started beginning to transmit before the network was connected.
#801	Yes		Yes	Yes		Returned error from SMTP server SMTP protocol time out Exceeded the specified connecting time limit.
#802	Yes	Yes			Yes	Failed in name resolution using DNS server
#804		Yes	Yes			Returned error from FTP server (No access right to the folder)
#806	Yes	Yes	Yes			Returned error from FTP server (User name/Password)
#808		Yes				Returned error from FTP server (Other than E804/E806) FTP protocol time out Exceeded the specified connecting time limit.
#810					Yes	Returned error from POP3 server POP3 protocol time out Exceeded the specified connecting time limit.
#812					Yes	POP3 password error
#813					Yes	POP3 login name error
#819				Yes	Yes	MIME data error
#820				Yes	Yes	Base64/uuencode error
#821				Yes	Yes	TIFF analysis error
#827				Yes	Yes	non support MIME receive
#828				Yes	Yes	Type of HTML mail receive error
#829				Yes	Yes	Exceeded max receivable size
#839	Yes					SMTP AUTH authentication error(email and iFAX transmitt

13.2 Fax Error Codes

13.2.1 Outline

13.2.1.1 Error Code Outline

i-SENSYS MF4690PL / / i-SENSYS MF4660

An error code is used to indicate a fault in a machine, and is indicated in the machine's LCD or reports, showing the nature (symptoms) of the fault. Using the error code, the user or the service man can readily find out how to correct the fault by simply referring to the User's Manual or service manual.
An error code may be either of the following two types:

User Error Codes
A fault indicated as a user error code is one that can easily be corrected by the user, as by operating the machine. It takes the form of "#+number."

Service Error Codes
If a fault calls for a service man for correction, it is indicated as a service man error code in the form of "##+number" or "SYSTEM ERROR E+number."

Memo
A service error code expressed in the form of "##+number" will not appear on the LCD, Error Tx Report, or Activity Report while the machine remains in factory default state. To check a service error code, shift bit 0 of service soft switch #1 SSSW SW01 to '1'.

Memo
Display only the error codes which are newly incorporated in this machine as well as which require remedies unique to the product. For the causes and countermeasures of other error codes, refer to the separate G3/G4 Facsimile Error Code List (Rev. 2).

13.2.2 User Error Code

13.2.2.1 User Error Code

i-SENSYS MF4690PL / / i-SENSYS MF4660

T-13-3

No.	Tx/Rx	Description
#0001	[Tx]	an original has jammed.
#0003	[Tx/Rx]	tine-out for copying or sending/receiving a single page has occurred.
#0005	[Tx/Rx]	time-out for initial identification (T0/T1) has occurred.
#0009	[Rx]	recording paper has jammed or is absent.
#0012	[Tx]	recording paper is absent at the other party.
#0018	[Tx/Rx]	auto call initiation has failed.
#0037	[Rx]	image memory overflow at time of reception has occurred.
#0059	[Tx]	The number you dial and connected number (CSI) does not match.
#0995/0099	[Tx/Rx]	a memory communication reservation has been cancelled.

13.2.3 Service Error Code

13.2.3.1 Service Error Code

i-SENSYS MF4690PL / / i-SENSYS MF4660

T-13-4

No.	Tx/Rx	Description
##0100	[Tx]	at time of transmission, the procedural signal has been transmitted more than specified.
##0101	[Tx/Rx]	the modem speed does not match that of the other party.
##0102	[Tx]	at time of transmission, fall-back cannot be used.
##0103	[Rx]	at time of reception, EOL cannot be detected for 5 sec (15 sec if CBT).
##0104	[Tx]	at time of transmission, RTN or PIN is received.
##0106	[Rx]	at time of reception, the procedural signal is received for 6 sec while in wait for the signal.
##0107	[Rx]	at time of reception, the transmitting party cannot use fall-back.
##0109	[Tx]	at time of transmission, a signal other than DIS, DTC, FTT, CFR, or CRP is received, and the procedural signal has been sent more than specified.
##0111	[Tx/Rx]	memory error has occurred.
##0114	[Rx]	at time of reception, RTN is transmitted.
##0200	[Rx]	at time of reception, no image carrier is detected for 5 sec.
##0201	[Tx/Rx]	DCN is received outside the normal parity procedure.
##0220	[Tx/Rx]	system error (main program out of control) has occurred.
##0232	[Tx]	encoding error has occurred.
##0237	[Rx]	decoding error has occurred.
##0261	[Tx/Rx]	system error has occurred.
##0280	[Tx]	at time of transmission, the procedural signal has been transmitted more than specified.
##0281	[Tx]	at time of transmission, the procedural signal has been transmitted more than specified.
##0282	[Tx]	at time of transmission, the procedural signal has been transmitted more than specified.
##0283	[Tx]	at time of transmission, the procedural signal has been transmitted more than specified.
##0284	[Tx]	at time of transmission, DCN is received after transmission of TCF.
##0285	[Tx]	at time of transmission, DCN is received after transmission of EOP.
##0286	[Tx]	at time of transmission, DCN is received after transmission of EOM.
##0287	[Tx]	at time of transmission DCN is received after transmission of MPS.
##0288	[Tx]	after transmission of EOP, a signal other than PIN, PIP, MCF, RTP, or RTN has been received.
##0289	[Tx]	after transmission of EOM, a signal other than PIN, PIP, MCF, RTP, or RTN has been received.
##0290	[Tx]	after transmission of MPS, a signal other than PIN, PIP, MCF, RTP, or RTN has been received.
##0670	[Tx]	at time of V.8 late start, the V.8 ability of DIS front the receiving party is expected to be detected, and the CI signal is expected to be transmitted in response; however, the procedure fails to advance, and the line is released because of T1 time-out.
##0671	[Rx]	at time of V.8 arrival, procedure fails to move to phase 2 after detection of CM signal from caller, causing T1 time-out and releasing line
##0672	[Tx]	at time of V.34 transmission, a shift in procedure from phase 2 to phase 3 and thereafter stops, causing the machine to release the line and suffer T1 timeout.
##0673	[Rx]	at time of V.34 reception, a shift in procedure from phase 2 to phase 3 and thereafter stops, causing the machine to release the line and suffer T1 timeout.
##0674	[Tx]	at time of V.34 transmission, a shift in procedure from phase 3 and phase 4 to the control channel and thereafter stops, causing the machine to release the line and suffer T1 timeout.
##0675	[Rx]	at time of V.34 reception, a shift in procedure from phase 3 and phase 4 to the control channel and thereafter stops, causing the machine to release the line and suffer T1 timeout.
##0750	[Tx]	at time of ECM transmission, no meaningful signal is received after transmission of PPS-NULL, causing the procedural signal to be transmitted more than specified.
##0752	[Tx]	at time of ECM transmission, DCN is received after transmission of PPS-NULL.
##0753	[Tx]	at time of ECM transmission, the procedural signal has been transmitted more than specified after transmission of PPS-NULL, or T5 time-out (60 sec) has occurred.

No.	Tx/Rx	Description
##0754	[Tx]	at time of ECM transmission, the procedural signal has been transmitted more than specified after transmission of PPS-NULL.
##0755	[Tx]	at time of ECM transmission, no meaningful signal is received after transmission of PPS-MPS, causing the procedural signal to be transmitted more than specified.
##0757	[Tx]	at time of ECM transmission, DCN is received after retransmission of PPS-MPS.
##0758	[Tx]	at time of ECM transmission, the procedural signal has been transmitted more than specified after transmission of PPS-MPS, or T5 time-out (60 sec) has occurred.
##0759	[Tx]	at time of ECM transmission, the procedural signal has been transmitted more than specified after transmission of PPS-MPS.
##0760	[Tx]	at time of ECM transmission, no meaningful signal is received after transmission of PPS-EOM, causing the procedural signal to be transmitted more than specified.
##0762	[Tx]	at time of ECM transmission, DCN is received after transmission of PPS-EOM.
##0763	[Tx]	at time of ECM transmission, the procedural signal has been transmitted more than specified after transmission of PPS-MPS, or T5 time-out (60 sec) has occurred.
##0764	[Tx]	at time of ECM transmission, the procedural signal has been transmitted more than specified after transmission of PPS-EOM.
##0765	[Tx]	at time of ECM transmission, no meaningful signal is received after transmission of PPS-EOP, causing the procedural signal to be transmitted more than specified.
##0767	[Tx]	at time of ECM transmission, DCN is received after transmission of PPS-EOP.
##0768	[Tx]	at time of ECM transmission, the procedural signal has been transmitted more than specified after transmission of PPS-EOP, or T5 time-out (60 sec) has occurred.
##0769	[Tx]	at time of ECM transmission, the procedural signal has been transmitted more than specified after transmission of PPS-EOP.
##0770	[Tx]	at time of ECM transmission, no meaningful signal is received after transmission of EOR-NULL, causing the procedural signal to be transmitted more than specified.
##0772	[Tx]	at time of ECM transmission, DCN is received after transmission of EOR-NULL.
##0773	[Tx]	at time of ECM transmission, the procedural signal has been transmitted more than specified after transmission of EOR-NULL, or T5 time-out (60 sec) has occurred.
##0774	[Tx]	at time of ECM transmission, ERR is received after transmission of EOR-NULL.
##0775	[Tx]	at time of ECM transmission, no meaningful signal is received after transmission of EOR-MPS, causing the procedural signal to be transmitted more than specified.
##0777	[Tx]	at time of ECM transmission, DCN is received after transmission of EOR-MPS.
##0778	[Tx]	at time of ECM transmission, the procedural signal has been transmitted more than specified after transmission EOR-MPS, or T5 time-out (60 sec) has occurred.
##0779	[Tx]	at time of ECM transmission, ERR is received after transmission of EOR-MPS.
##0780	[Tx]	at time of ECM transmission, no meaningful signal is received after transmission of EOR-EOM, causing the procedural signal to be transmitted more than specified.
##0782	[Tx]	at time of ECM transmission, DCN is received after transmission of EOR-EOM.
##0783	[Tx]	at time of ECM transmission, the procedural signal has been transmitted more than specified after transmission of EOR-EOM, or T5 time-out (60 sec) has occurred.
##0784	[Tx]	at time of ECM transmission, ERR is received after transmission of EOR-EOM.
##0785	[Tx]	at time of ECM transmission, no meaningful signal is received after transmission of EOR-EOP, causing the procedural signal to be transmitted more than specified.
##0787	[Tx]	at time of ECM transmission, DCN is received after transmission of EOR-EOP.
##0788	[Tx]	at time of ECM transmission, the procedural signal has been transmitted more than specified after transmission of EOR-EOP, or T5 time-out (60 sec) has occurred.
##0789	[Tx]	at time of ECM transmission, ERR is received after transmission of EOR-EOP.
##0790	[Rx]	at time of ECM reception, ERR is transmitted after transmission of EOR-Q.
##0791	[Tx/Rx]	while ECM mode procedure is under way, a signal other than a meaningful signal is received.
##0792	[Rx]	at time of ECM reception, PPS-NULL cannot be detected over partial page processing.
##0793	[Rx]	at time of ECM reception, no effective frame is received while high-speed signal reception is under way, thus causing time-out.
##0794	[Tx]	at time of ECM reception, PPR with all 0s is received.
##0795	[Tx/Rx]	a fault has occurred in code processing for communication.

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14.1 Outline

14.1.1 Outline of Service Mode

i-SENSYS MF4690PL / / i-SENSYS MF4660

Service Mode contains the following service data items. Each service data can be viewed or modified using the menu items displayed on the screen.

#SSSW
Use it to register/set basic fax functions (e.g., error control, echo remedy, communication error correction).
Use it to make settings related counter functions.

#MENU
Use it to register/set items related to functions needed at time of installation (e.g., NL equalizer, transmission level).

#NUMERIC
These setting items are for inputting numeric parameters such as the various conditions for the RTN signal transmission.

#SPECIAL
These setting items are for telephone network control functions.

> **#NCU**
> These setting items are for telephone network control functions such as the selection signal transmission conditions and the detection conditions, for the control signals sent from the exchange.

#FAX
Do not use.

#SCAN
These setting items are for image adjustment in scanning.

#PRINT
These setting items are for image adjustment in printer assembly and for special mode for the field-related measures.

#NETWORK
Do not use.

#CODEC
Do not use.

#SYSTEM
These are used for the import/export of user information through USB.

#ACC
Do not use.

#COUNTER
Use it to check estimates for maintenance/parts replacement.

#REPORT
Use it to generate reports on various service data.

#DOWNLOAD
Use it to download firmware to the ROM of a PCB in question.

#CLEAR
Use it to reset various data to initial settings.

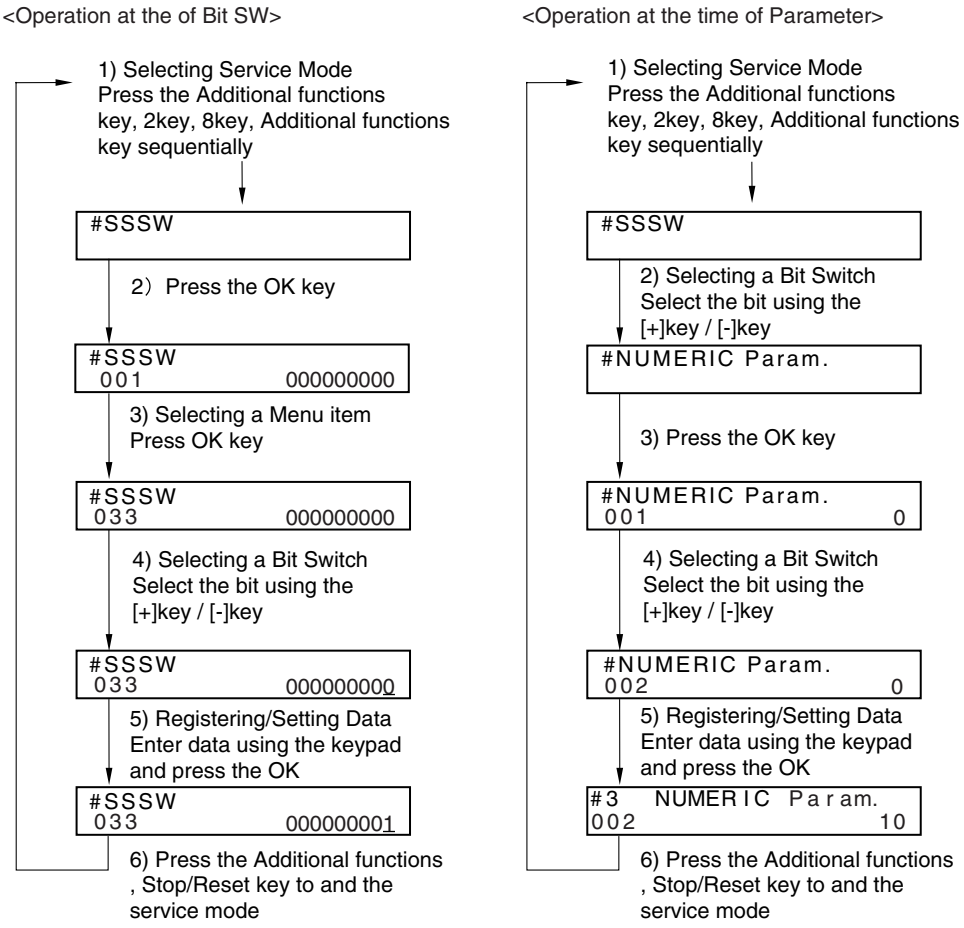
#ERROR DISPLAY
An error code is displayed when a service error has occurred.

#ROM
Displays ROM information, such as version numbers and checksums.

#TEST MODE
Makes various status checks, such as contact sensor, sensor and print status.

14.1.2 Using the Mode

i-SENSYS MF4690PL / / i-SENSYS MF4660



F-14-1

14.2 Default Settings

14.2.1 Service Mode Menus

i-SENSYS MF4690PL / / i-SENSYS MF4660

#SSSW		
No.	**Initial setting**	**Function**
SW01	00000000	error/copy control
SW02		not used
SW03	00000000	echo remedy setting
SW04	10000000	communication fault remedy setting
SW05	00000000	standard function (DIS signal) setting
SW06 - SW11		not used
SW12	00000010	page timer setting
SW13	00000000	meter/inch resolution setting
SW14	00000001	inch/meter resolution setting
SW15 - SW17		not used
SW18	00000000	communication fault remedy setting (2)
SW19 - SW24		not used
SW25	00000000	report display function settings
SW26 - SW27		not used
SW28	00000000	V.8/V.34 protocol settings
SW29		not used
SW30	0010000	Assigning a New Dial Tone Detection Method
SW31 - SW50		not used

#MENU			
No.	**Initial setting**	**Range of setting**	**Function**
01: - 04:			not used
05:	0	ON/OFF	NL equalizer setting

#MENU			
No.	**Initial setting**	**Range of setting**	**Function**
06:	0	0: DIAL 1: SERVICEMAN [1] 2: SERVICEMAN [2] 3: OFF	line monitor setting
07:	10	0-15	transmission level setting
08:	0	0: 3429 1: 3200 2: 3000 3: 2800 4: 2743 5: 2400	V.34 baud rate
09:	0	0: 33.6kbs 1: 31.2kbs 2: 28.8kbs 3: 26.4kbs 4: 24.0kbs 5: 21.6kbs 6: 19.2kbs 7: 16.8kbs 8: 14.4kbs 9: 12.0kbs 10: 9.6kbs 11: 7.2kbs 12: 4.8kbs 13: 2.4kbs	V.34 transmission speed
10:	1	0: 50Hz 1: 25Hz 2: 17Hz 3: 20Hz	pseudo CI signal frequency setting
11: - 20:			not used

#NUMERIC			
No.	**Initial setting**	**Range of setting**	**Function**
001:			not used
002:	10 (10%)	(1-99)	RTN signal transmission condition (1) setting
003:	15 (15lines)	(2-8)	RTN signal transmission condition (2) setting
004:	12 (12times)	(1-99)	RTN signal transmission condition (3) setting
005:	4 (4sec)	(1-60)	NCC pause time (pre-ID code) setting
006:	4 (4sec)	(1-60)	NCC pause time (post-ID code) setting
007: - 009:			not used
010:	5500 (55sec)	(0-9999)	line connection identification time length
011:	3500 (35sec)	(0-9999)	T.30 T1 timer (for reception)
012:			not used
013:	1300 (13sec)	(500-3000)	T30 EOL timer
014:			not used
015:	120 (1200ms)	(0-999)	hooking detection time setting
016:	4 (4sec)	(0-9)	fax/tel switch-over function: between line acquisition and pseudo RBTtransmission
017:	100 (1000ms)	(0-999)	pseudo RBT signal pattern: ON time setting
018:	0 (0ms)	(0-999)	pseudo RBT signal pattern: OFF time (short) setting
019:	200 (2000ms)	(0-999)	pseudo RBT signal pattern: OFF time (long) setting
020:	100 (1000ms)	(0-999)	pseudo CI signal pattern: ON time setting
021:	0 (0ms)	(0-999)	pseudo CI signal pattern: OFF time (short) setting
022:	200 (2000ms)	(0-999)	pseudo CI signal pattern: OFF time (long) setting
023:	4	(0-7)	fax/tel switch-over pseudo RBT transmission level
024:	20 (-20dBm)	(0-20)	fax/tel switch-over pseudo RBT transmission level
025:	60 (60sec)	(0-999)	Answering machine connection function signal detection time
026:			not used
027:	0	(0-20)	V21 low-speed flag preamble detection time length
028: - 055:			not used
056:	101	(0-999)	count type select 1
057:	201	(0-999)	count type select 2
058:	0	(0-999)	count type select 3
059:	0	(0-999)	count type select 4
060:	0	(0-999)	count type select 5
061:	0	(0-999)	count type select 6
062: - 080:			not used

#SPECIAL	Do not change.
#NCU	Do not change.

#FAX	Not used.

#SCAN				
	No.	**Initial setting**	**Range setting**	**Explanation**
#SCAN SW	SW1 - SW50			Not used
#SCAN NUMERIC	001: - 030:			Not used
	031:	0	0 to 70, one unit=0.1mm	Vertical scan start position adjustment
	032:			Not used
	033:	32	0 to 64, one unit=0.1%	Vertical scan magnification correction
	034:			Not used
	035: - 036:	423		Book motor speed adjustment
	037: - 040:			Not used
	041:	0	0 to 70, one unit=0.1mm	Vertical scan start position adjustment (scanning on ADF)
	042:- 046:			Not used
	047:	32	0 to 64, one unit=0.1%	Vertical scan magnification correction (scanning on ADF)
	048:	32	0 to 64, one unit=0.1%	Horizontal scan magnification correction (scanning on ADF)
	049: - 350:			Not used

#PRINT				
	No.	**Initial setting**	**Range setting**	**Explanation**
#PRINT SW	SW01 - SW014			Not used
	SW15	00000000		Delivery-related setting
	SW16 - SW50			Not used
#PRINT NUMERIC	01: - 33:			Not used
	34:	100	0 to 200, one unit = 0.1 mm	Left-end registration adjustment (multi-purpose tray)
	35:	100	0 to 200, one unit = 0.1 mm	Left-end registration adjustment (cassette)
	36 - 38:			Not used
	39:	100	0 to 200, one unit = 0.1 mm	Left-end registration adjustment (duplex unit)
	40 - 52:			Not used
	53:	40		Adjustment of margin at leading edge of copy
	54:	50		Adjustment of margin at trailing edge of copy
	55:	0		Adjustment of margin at right edge of copy
	56:	0		Adjustment of margin at left edge of copy
	57 - 70:			Not used
#PRINT CST	U1	0		Not used
	U2	0		Not used
	03	0		Not used

#NETWORK	Not used.
#CODEC	Not used.

#SYSTEM				
	No.	**Initial setting**	**Range of setting**	**Function**
#SYSTEM SW	SW01- SW02			not used
	SW03	00001000		Import/export of the user information via USB
	SW04 - SW50			not used
#SYSTEM NUMERIC	001: -100:			not used

#ACC	Not used

#COUNTER	
Item	**Function**
TOTAL	total counter
PICK_UP	pickup-related counter
FEEDER	feeder counter
JAM	jam-related counter
MISC	not used

#REPORT		
	Setting	**Function**
#REPORT SW		Not used
#REPORT OUTPUT	SERVICE DATA LIST	Output of service data list
	SYSTEM DATA LIST	Output of system data list
	SYSTEM DUMP LIST	Output of system dump list
	COUNTER LIST	Output of counter list
	ERROR LOG LIST	Not used
	SPEC LIST	Output of spec list
	SERVICE LABEL	Not used
#REPORT NUMERIC		Not used

#DOWNLOAD	Download mode

#CLEAR		
Item	**Level2**	**Function**
TEL & USER DATA		Use it to clear all areas under user registration/setting.
SERVICE DATA		Use it to clear the counters (numerator), date, and start data form the system dump list.
COUNTER		Use it to clear the maintenance counter data and each mode counter data.
SOFT-CNT		Not used.
TYPE		Use it to clear the user data and the service data by specified settings.
HST	ACTIVITY	Use it to clear the contents of the communications control report.
	ACCOUNT	Not used.
	JAM	Not used.
	ERR	Not used.
	ALARM	Not used.
CARD		Not used.
ERR	E355	Not used.
	E719	Not used.
PWD		Use it to clear the system administrator's password.
FILE SYSTEM		Delete unnecessary language files in the USB memory.
FORMAT	USB MEMORY	Format the USB memory. (This mode is used when the USB memory error is damaged and E744 occurs.)
	LICENSE DRIVE	Not used.
ALL		Use it to clear all settings/registration data except the counter (denominator, numerator).

#ERROR DISPLAY	Not used.

#ROM	
Item	**Function**
MAIN	Use it to indicate the version of the ROM (SYSTEM) on the SCNT board.
MAIN2	Use it to indicate the version of the ROM (BOOT) on the SCNT board.
OPROM	Not used.
ECONT	Use it to indicate the version of the ROM on the DCNT board.

#TEST MODE [1] - [9]	
Item	**Function**
(1) DRAM [1] - [2]	Data check in D-RAM
(2) SCAN TEST [1] - [8]	CS automatic correction and document scan position adjustment
(3) PRINT TEST [1] - [9]	Output of test prints
(4) MODEM TEST [1] - [9]	modem/NCU related tests
(5) AGING TEST	not used
(6) FACULTY TEST [1] - [9]	Various functional tests
(0) ROLLER CLEAN	ADF roller cleaning

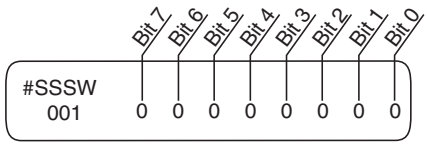
14.3 Service Soft Switch Settings (SSSW)

14.3.1 Outline

14.3.1.1 Bit Switch Composition

i-SENSYS MF4690PL / / i-SENSYS MF4660

The items registered and set by each of these switches comprise 8-bit switches. The figure below shows which numbers are assigned to which bits. Each bit has a value of either 0 or 1.



F-14-2

Do not change service data identified as "not used"; they are set as initial settings.

14.3.2 SSSW-SW01:

14.3.2.1 List of Functions

i-SENSYS MF4690PL / / i-SENSYS MF4660

T-14-1

Bit	Function	1	0
0	service error code	output	not output
1	not used	-	-
2	not used	-	-
3	not used	-	-
4	not used	-	-
5	not used	-	-
6	not used	-	-
7	not used	-	-

14.3.2.2 Detailed Discussions of Bit 0

i-SENSYS MF4690PL / / i-SENSYS MF4660

Selects whether or not service error codes are output.
When output is selected, service error codes is report.

14.3.3 SSSW-SW03

14.3.3.1 List of Functions

i-SENSYS MF4690PL / / i-SENSYS MF4660

T-14-2

Bit	Function	1	0
0	not used	-	-
1	not used	-	-
2	not used	-	-
3	not used	-	-
4	not used	-	-
5	not used	-	-
6	not used	-	-
7	tonal signal before CED signal transmission	transmit	do not transmit

14.3.3.2 Detailed Discussions of Bit 7

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to enable/disable transmission of a 1080-Hz tonal signal before transmission of the CED signal.
Select 'transmit' if errors occur frequently because of an echo when reception is from overseas.

Memo:
Any of the following error code may be indicated because of an echo at time of reception
##0005, ##0101, ##0106, ##0107, ##0114, ##0200, ##0201, ##0790

14.3.4 SSSW-SW04

14.3.4.1 List of Functions

i-SENSYS MF4690PL / / i-SENSYS MF4660

T-14-3

Bit	Function	1	0
0	not used	-	-
1	not used	-	-
2	the number of final flag sequences of protocol signals	2	1
3	Reception mode after CFR signal transmission	high speed	high speed/low speed
4	the length of the period of ignoring low speed signals after CFR output	1500 ms	700 ms

Bit	Function	1	0
5	not used	-	-
6	CNG signal for manual transmission	Not transmitted	Transmitted
7	CED signal for manual reception	Not transmitted	Transmitted

14.3.4.2 Detailed Discussions of Bit 2

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to select the number of last flag sequences for a protocol signal (transmission speed at 300 bps). Select '2' if the other party fails to receive the protocol signal properly.

Memo:
Any of the following error codes may be indicated at time of transmission
##0100, ##0280, ##0281, ##0750, ##0753, ##0754, ##0755, ##0758, ##0759, ##0760, ##0763 ##0764, ##0765, ##0768, ##0769,##0770, ##0773, ##0775, ##0778, ##0780, ##0783, ##0785, ##0788

14.3.4.3 Detailed Discussions of Bit 3

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to select an appropriate reception mode after transmission of the CFR signal.
If errors occur frequently at time of reception because of the condition of the line, select 'high speed' for reception mode and, at the same time, selects 'do not receive' for 'ECM reception.'

Memo:
Any of the following error codes may be indicated at time of reception because of line condition
##0107, ##0114, ##0201
Be sure to change bit 4 before changing this bit; if errors still occur, change this bit.
When 'high speed' is selected, only high-speed signals (images) will be received after transmission of the CFR signal.

14.3.4.4 Detailed Discussions of Bit 4

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to select the time length during which low-speed signals are ignored after transmission of the CFR signal.
If the condition of the line is not good and, therefore, the reception of image signals is difficult, select '1500 ms.'

14.3.4.5 Detailed Discussions of Bit 6

i-SENSYS MF4690PL / / i-SENSYS MF4660

Selects whether or not to transmit CNG signal during manual transmission.
In manual transmitting to a fax with the FAX/TEL switching mode, if there are frequent errors due to failure to switch to fax mode, select "Transmitted" for the CNG signal.

14.3.4.6 Detailed Discussions of Bit 7

i-SENSYS MF4690PL / / i-SENSYS MF4660

Selects whether or not to transmit CED signals during manual reception. If the other fax does not transmit even when you start manual reception, select "Transmitted" for the CED signal.

14.3.5 SSSW-SW05

14.3.5.1 List of Functions

i-SENSYS MF4690PL / / i-SENSYS MF4660

T-14-4

Bit	Function	1	0
0	not used	-	-
1	Conversion from mm to inch (text mode)	convert	do not convert
2	Conversion from mm to inch (text/photo mode)	convert	do not convert
3	not used	-	-
4	not used	-	-
5	not used	-	-
6	not used	-	-
7	not used	-	-

14.3.5.2 Detailed Discussions of Bit 1

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to enable/disable millimeter/inch conversion in sub scanning direction for images read in text mode.
Scanning direction in conversion follows the Bit 2 setting of SW14.

14.3.5.3 Detailed Discussions of Bit 2

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to enable/disable millimeter/inch conversion in sub scanning direction for images read in text/photo mode while bit 1 is set to '1'.
Scanning direction in conversion follows the Bit 2 setting of SW14.

14.3.6 SSSW-SW12

14.3.6.1 List of Functions

i-SENSYS MF4690PL / / i-SENSYS MF4660

T-14-5

Bit	Function	1	0
0	Time-out period for one page upon transmission	1	0
1	Time-out period for one page upon transmission	1	0
2	not used	-	-
3	not used	-	-
4	Time-out period for one page upon reception	1	0
5	Time-out period for one page upon reception	1	0
6	not used	-	-
7	Respective page timer settings for transmission and for reception	enable	do not enable

The machine will stop the ongoing communication if the transmission/reception of a single original page takes 32 min or more. To use the timer for a purpose other than this function, refer to the tables that follow, and select an appropriate time length.
When 'do not enable' is selected using bit 7, the time-out length for a single page for all modes will depend on the setting of bit 0 and bit 1.

T-14-6

Time-Out Length for Transmission/Reception	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
8 min	0	*	*	*	*	*	0	0
16 min	0	*	*	*	*	*	0	1
32 min	0	*	*	*	*	*	1	0
64 min	0	*	*	*	*	*	1	1

T-14-7

Time-Out Length for Transmission (in text mode)	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
8 min	1	*	*	*	*	*	0	0
16 min	1	*	*	*	*	*	0	1
32 min	1	*	*	*	*	*	1	0
64 min	1	*	*	*	*	*	1	1

T-14-8

Time-Out Length for Reception	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
8 min	1	*	0	0	*	*	*	*
16 min	1	*	0	1	*	*	*	*
32 min	1	*	1	0	*	*	*	*
64 min	1	*	1	1	*	*	*	*

14.3.7 SSSW-SW13

14.3.7.1 List of Functions

i-SENSYS MF4690PL / / i-SENSYS MF4660

T-14-9

Bit	Function	1	0
0	not used	-	-
1	not used	-	-
2	Convert "inch" into "mm" when transmitting the received image data	convert	do not convert
3	not used	-	-
4	not used	-	-
5	not used	-	-
6	not used	-	-
7	not used	-	-

14.3.7.2 Detailed Discussions of Bit 2

i-SENSYS MF4690PL / / i-SENSYS MF4660

It converts "inch" into "mm" when transmitting the received image data.
Scanning direction in conversion follows the Bit 2 setting of SW14.

14.3.8 SSSW-SW14

14.3.8.1 List of Functions

i-SENSYS MF4690PL / / i-SENSYS MF4660

T-14-10

Bit	Function	1	0
0	not used	-	-
1	not used	-	-
2	direction of scanning for inch/mm conversion	both main and sub scanning directions	sub scanning direction only
3	not used	-	-
4	inch-configuration resolution declaration	declare	do not declare
5	not used	-	-
6	not used	-	-
7	not used	-	-

14.3.8.2 Detailed Discussions of Bit 2

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to specify whether to convert or not convert an inch-configuration resolution into a millimeter-configuration resolution for image read in G3 transmission: either in sub scanning direction only or in both main and sub scanning directions. The setting is valid only when bit 1 of SW05 of #SSSW is set to '1'.

14.3.8.3 Detailed Discussions of Bit 4

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to specify whether to declare or not declare an inch-configuration resolution to the other machine for G3 communication: if 'declare' is selected, the machine will indicate that it reads and records at an inch-configuration resolution using the DIS, DCS, or DTC signal.

14.3.9 SSSW-SW18

14.3.9.1 List of Functions

i-SENSYS MF4690PL / / i-SENSYS MF4660

T-14-11

Bit	Function	1	0
0	Detection of carrier disconnection between the DCS signal and the TCF signal	Yes	No*
1	Waiting time for carrier disconnection between the DCS signal and the TCF signal	600 msec	300 msec*
2	Not used	-	-
3	Not used	-	-
4	Not used	-	-
5	Not used	-	-
6	Not used	-	-
7	Not used	-	-

14.3.9.2 Detailed Discussions of Bit 0

i-SENSYS MF4690PL / / i-SENSYS MF4660

It is possible to select whether or not to detect carrieir disconnection between the DCS signal and the TCF signal during reception.
If the receiving machine returns an FTT signal while the other machine (PC-FAX) is transmitting a TCF siganl and a reception error occurs, set this bit to "1".
If thw error still occurs, set bit 1 of #SSSW SW18 to "1".

14.3.9.3 Detailed Discussions of Bit 1

i-SENSYS MF4690PL / / i-SENSYS MF4660

It is possible to select the detection time for caarrier disconnection between the DCS signal and TCF signal during reception.
This bit is available for use when #SSSW SW18 Bit0 is set to "1".
If the symptom is not resolved by setting SW18 Bit 0 to "1," set this bit to "1."

14.3.10 SSSW-SW25

14.3.10.1 List of Functions

i-SENSYS MF4690PL / / i-SENSYS MF4660

T-14-12

Bit	Function	1	0
0	Transmission telephone numbers displayed on reports	Other fax number	Called number
1	not used	-	-
2	Action when receiving blank CSI	Disregard	Receive
3	not used	-	-
4	not used	-	-
5	not used	-	-
6	not used	-	-
7	not used	-	-

14.3.10.2 Detailed Discussions of Bit 0

i-SENSYS MF4690PL / / i-SENSYS MF4660

Selects the transmission telephone number displayed on reports after the completion of transmission.

When "Called number" is selected, the telephone number the fax called is displayed on reports.
When "Other fax number" is selected, the telephone number sent from the other fax (the CSI signal data) is displayed on reports.

14.3.10.3 Detailed Discussions of Bit 2

i-SENSYS MF4690PL / / i-SENSYS MF4660

When "Disregard" is selected, the received blank CSI is disregarded and a dialed number, if any, is displayed on LCD/report.
When "Receive" is selected, LCD/report is blank if the dialed number is known.

14.3.11 SSSW-SW28

14.3.11.1 List of Functions

i-SENSYS MF4690PL / / i-SENSYS MF4660

T-14-13

Bit	Function	1	0
0	Caller V.8 protocol	NO	YES
1	Called party V.8 protocol	NO	YES
2	Caller V.8 protocol late start	NO	YES
3	Called party V.8 protocol late start	NO	YES
4	V.34 reception fallback	Prohibited	Not prohibited
5	V.34 transmission fallback	Prohibited	Not prohibited
6	not used	-	-
7	not used	-	-

14.3.11.2 Detailed Discussions of Bit 0

i-SENSYS MF4690PL / / i-SENSYS MF4660

Select whether to use the V.8 protocol when calling. If NO is selected, the V.8 protocol is inhibited at calling and the V.21 protocol is used.

14.3.11.3 Detailed Discussions of Bit 1

i-SENSYS MF4690PL / / i-SENSYS MF4660

Select whether to use the V.8 protocol when called. If NO is selected, the V8 protocol is inhibited when called and the V.21 protocol is used.

14.3.11.4 Detailed Discussions of Bit 2

i-SENSYS MF4690PL / / i-SENSYS MF4660

If ANSam signal is not received during transmission, select whether to use the V.8 protocol when the other fax machine declares the V.8 protocol in DIS signal. If NO is selected, the CI signal is not transmitted and the V.8 protocol is not used even if the DIS that specifies the V.8 protocol is received.
The V.8 late start is not executed during manual transmission regardless of this setting.

14.3.11.5 Detailed Discussions of Bit 3

i-SENSYS MF4690PL / / i-SENSYS MF4660

Select whether to declare the V.8 protocol in DIS signal for reception. If NO is selected, the V.8 protocol cannot be used because it is not declared in DIS signal.
The V.8 late start is not executed during manual reception regardless of this setting.

14.3.11.6 Detailed Discussions of Bit 4

i-SENSYS MF4690PL / / i-SENSYS MF4660

Select whether the receiver falls back during V.34 reception. If 'Prohibit' is selected, the receiver does not fall back.

14.3.11.7 Detailed Discussions of Bit 5

i-SENSYS MF4690PL / / i-SENSYS MF4660

Select whether the transmitter falls beck during V.34 transmission. If 'Prohibit' is selected, teh transmitter does not fall back.

14.3.12 SSSW-SW30

14.3.12.1 List of Functions

i-SENSYS MF4690PL / / i-SENSYS MF4660

T-14-14

Bit	Function	1	0
0	Not used	-	-
1	Not used	-	-
2	Not used	-	-
3	Not used	-	-
4	Not used	-	-
5	New dial tone detection method	Detect with the new method.	Detect with the existing method.
6	Not used	-	-
7	Not used	-	-

14.3.12.2 Detailed Discussions of Bit 5

i-SENSYS MF4690PL / / i-SENSYS MF4660

When "Detect with the new method" is selected, tone is detected for 3.5 seconds before call origination in order to discriminate between dial tone and voice. If dial tone is detected and the time since line seizure is 3.5 seconds or longer, call origination takes place immediately. If the time since line seizure is less than 3.5 seconds, call origination takes place after waiting for 1 second. (If the time since line seizure reaches 3.5 seconds during the 1-second waiting period, call origination takes place immediately. By default, "Detect with a new method" is assigned for this SW.

14.4 Menu Switch Settings (MENU)

14.4.1 Menu Switch Composition

i-SENSYS MF4690PL / / i-SENSYS MF4660

T-14-15

No.	Function	Range of settings
005	NL equalizer	1: ON, 0: OFF
006	telephone line monitor	0:DIAL, 1:SERVICEMAN1, 2:SERVICEMAN2, 3:OFF
007	transmission level (ATT)	from 0 to 15 (ex: 15= -15 dBm)
008	V.34 modulation speed upper limit	0:3429, 1:3200, 2:3000, 3:2800, 4:2743, 5:2400
009	V34 data speed upper limit	0:33.6 kbps, 1:31.2 kbps, 2:28.8 kbps, 3:26.4 kbps, 4:24.0 kbps, 5:21.6 kbps, 6:19.2 kbps, 7:16.8 kbps, 8:14.4 kbps, 9:12.0 kbps, 10:9.6 kbps, 11:7.2 kbps, 12:4.8 kbps, 13:2.4 kbps
010	Frequency of pseudoring signal	0:50 Hz, 1:25 Hz, 2:17 Hz, 3:20 Hz

14.4.2 <No.005 NL equalizer>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to enable-disable the NL equalizer.
If errors occur often during communication because of the condition of the line, enable (ON) the NL equalizer.

Any of the following error codes may be indicated at time of transmission because of the line condition:
##100, ##101, ##102, ##104, ##201, ##281, ##282, ##283, ##750, ##755, ##765, ##774, ##779, ##784, ##789
Any of the following error codes may be indicated at time of transmission because of the line condition:
##103, ##107, ##114, ##201, ##790, ##793

14.4.3 <No.006 telephone line monitor>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to s the telephone line monitor function:
DIAL: generate the monitor sound of the telephone line using the speaker from the start of transmission to DIS.
SERVICEMAN [1]: generate the monitor sound of the telephone line using the speaker from the start of communication to the end of it.
SERVICEMAN [2]: generate the monitor sound of the telephone line2 (Option).
OFF: do not generate the monitor sound of the telephone line using the speaker.

14.4.4 <No.007 ATT transmission level>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to set the transmission level (ATT).
Raise the transmission level if errors occur frequently at time of communication because of the condition of the line. (It means close to 8)

Any of the following error codes may be indicated at time of transmission because of the line condition:
##100, ##101, ##102, ##104, ##201, ##280, ##281, ##282, ##283, ##284, ##750, ##752, ##754, ##755, ##757, ##759, ##760, ##762, ##764, ##765, ##767, ##769, ##770, ##772, ##774, ##775, ##777, ##779, ##780, ##782, ##784, ##785, ##787, ##789
Any of the following error codes may be indicated at time of reception because of the line condition:
##103, ##106, ##107, ##201, ##793

14.4.5 <No.008 V.34 modulation speed upper limit>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to set an upper limit to the modulation speed (baud rate) for the V.34 primary channel.

14.4.6 <No.009 V.34 data speed upper limit>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to set an upper limit to the data transmission speed for the V.34 primary channel between 2.4K and 33.6K bps in increments of 2400 bps. (0: 2.4K to 13: 33.6K bps).

14.4.7 <No.010 Frequency of the pseudo CI signal>

i-SENSYS MF4690PL / / i-SENSYS MF4660

You may select a frequency for the pseudo CI signal.
Some types of external telephones do not ring when the fax/tel switch-over function is ON. To sound the ring, change the pseudo CI signal.

14.5 Numeric Parameter Settings (NUMERIC Param.)

14.5.1 Numerical Parameter Composition

i-SENSYS MF4690PL / / i-SENSYS MF4660

T-14-16

No.	Item	Range of settings
002	RTN transmission condition(1)	1% to 99%
003	RTN transmission condition (2)	2 to 99 item
004	RTN transmission condition (3)	1 to 99 lines
005	NCC pause time length (pre-ID code)	1 to 60 sec
006	NCC pause time length (post-ID code)	1 to 60 sec
010	line condition identification time length	0 to 9999 (10 msec)
011	T.30T1 timer (for reception)	0 to 9999 (10 msec)
013	T.30 EOL timer	500 to 3000 (10 msec)
015	hooking detection time length	0 to 999
016	time length to first response at time of fax/tel switchover	0 to 9
017	pseudo RBT signal pattern ON time length	0 to 999
018	pseudo RBT signal pattern OFF time length (short)	0 to 999
019	pseudo RBT signal pattern OFF time length (long)	0 to 999
020	pseudo CI signal pattern ON time length	0 to 999
021	pseudo CI signal pattern OFF time length (short)	0 to 999
022	pseudo CI signal pattern OFF time length (long)	0 to 999
023	CNG detection level at time of fax/tel switchover	0 to 7
024	pseudo RBT transmission level at time of fax/tel switchover	10 to 20 0 to 20 (120/230V)
025	Answering machine connection function signal detection time	0 to 999
027	preamble detection time length for V21 low-speed flag	20 (x 10ms)
056	display the type of soft counter 1	101 (Fixed)
057	Display the type of soft counter 2	0 to 999
058	Display the type of soft counter 3	0 to 999
059	Display the type of soft counter 4	0 to 999
060	Display the type of soft counter 5	0 to 999
061	Display the type of soft counter 6	0 to 999

14.5.2 <002: RTN transmission condition (1)><003: RTN transmission condition (2)><004: RTN transmission condition (3)>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to set RTN signal transmission conditions. Raise these parameters for more lenient conditions if errors occur frequently at time of reception because of transmission of the RTN signal.

Memo:
Any of the following error codes may be indicated at time of reception because of RTN signal transmission
##0104, ##0107, ##0114, ##0201

RTN signal transmission condition (1) affects the ratio of error lines to the total number of lines per single page of received images.
RTN signal transmission condition (2) affects the standard value (*2) of burst errors (*1).
RTN signal condition (3) affects the number of errors not reaching the standard value of burst errors.

*1: transmission error occurring cover several lines.
*2: for instance, if '15' is set, a single burst error will represent an error occurring continuously cover 15 lines.

If any of these lines is detected while an image signal is being received, the RTN signal will be transmitted after receiving the protocol signal of the transmitting party. Higher parameters restrict the transmission of the RTN signal.

14.5.3 <005: NCC pause length (pre-ID code)>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to set the length of the pause automatically entered between access code and ID code when the NCC (New Common Carrier) line is used for dialing.

14.5.4 <006: NCC pause length (post-ID code)>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to set the length of the pause automatically entered between ID code and telephone number of the other party when the NCC (New Common Carrier) line is used for dialing.

14.5.5 <010: line connection identification length>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to set the time for identifying the line connection. Raise this parameter if errors occur frequently at time of communication because of the condition of the line.

Memo:
Any of the following error codes may be indicated because of the condition of the line
##0005, ##0018
The line condition identification time is between when the dial signal is transmitted and when the line condition is cut for the transmitting party, while it is between when the DIS signal is transmitted and when the line is cut for the receiving party.

14.5.6 <011: T.30 T1 timer (for reception)>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Set the T1 timer for the receiver (wait time after DIS transmission starts until a significant signal is received).

14.5.7 <013: T.30 EOL timer>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Set it so that the 1-line transmission time is longer for reception to prevent reception errors caused by a long data length per line (e.g., computer FAX).

14.5.8 <016: time length to first response at time of fax/tel switchover>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Allows setting of the time from seizing the line till pseudo RBT is sent, when the Fax/ Tel switching function is operating.

14.5.9 <017: pseudo RBT signal pattern ON time length><018: pseudo RBT signal pattern OFF time length (short)><019: pseudo RBT signal pattern OFF time length (long)>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to set the pattern of the pseudo RBT signal transmitted at time of a fax/tel switchover.

14.5.10 <020: pseudo CI signal pattern ON time length><021: pseudo CI signal pattern OFF time length (short)><022: pseudo CI signal pattern OFF time length (long)>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to set the pseudo CI signal pattern transmitted at time of a fax/tel switchover.

14.5.11 <023: CNG detention level for fax/tel switchover>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to set the CNG detention level for a fax/tel switchover.

14.5.12 <024: pseudo RBT transmission level at time of fax/tel switchover>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to set the pseudo transmission level for a fax/tel switchover.

14.5.13 <025: Answering machine connection function signal detection time>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Sets the signal detection time for the answering machine connection function operation. When the answering machine connection function is operating, if the function does not operate normally because the fax does not detect CNG signal sent from the line, raise this parameter to increase the signal detection time.

14.5.14 <027: V.21 low-speed flag preamble identification length>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to detect the time of detection after which command analysis is started after detecting V.21 low-speed command preambles continuously for a specific period of time.

14.5.15 <056 - 061: Count type select >

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to confirm the count type indicated on the Counter Check screen, which appears in response to a press on the Counter key.
When '0' is selected, count type will not be indicated.
No.56: Use it to indicate the type of software counter 1 of the control panel. The type of soft counter 1 cannot be changed.
No.57: Use it to change the type of soft counter 2* of the control panel to suit the needs of the user.
No.58: Use it to change the type of soft counter 3* of the control panel to suit the needs of the user.
No.59: Use it to change the type of soft counter 4* of the control panel to suit the needs of the user.
No.60: Use it to change the type of soft counter 5* of the control panel to suit the needs of the user.
No.61: Use it to change the type of soft counter 6* of the control panel to suit the needs of the user.
*:The default type settings of soft counter is different from models.
<Soft Counter Specifications>
The soft counters are classified a follows in terms of input numbers:
100s: total
200s: copy
300s: print
400s: copy + print
500s: scan
700s: received file print
800s: report pint
900s: transmitted scan

Guide to the Table
- 1:Count sheets of all sizes by one.
- 2:Count sheets of the large size by two.
- C:full color
- Bk:black mono
- L:large size (larger than A4/LTR)
- S:small size (A4/LTR or smaller)

MEMO:
To make a change so that B4 papers (for print) will be counted as large-size, use service mode: make the following selections, and change bit 0 to '1': #SSSW>SW33.
To make a change so that B4 papers (for scan) will be counted as large-size, use service mode: make the following selections, and change bit 2 to '1': #SSSW>SW33.

Serial No. on counter check screen	Counter type	Print system															
		Bk 1-sided L				Bk 1-sided S				Bk 2-sided L				Bk 2-sided S			
		Local copy	PDL print	FAX print	Report print	Local copy	PDL print	FAX print	Report print	Local copy	PDL print	FAX print	Report print	Local copy	PDL print	FAX print	Report print
101	Total1	1	1	1	1	1	1	1	1								
102	Total2	2	2	2	2	1	1	1	1								
103	Total (L)	1	1	1	1												
104	Total (S)					1	1	1	1								
108	Total (Bk1)	1	1	1	1	1	1	1	1								
109	Total (Bk2)	2	2	2	2	1	1	1	1								
112	Total (Bk/L)	1	1	1	1												
113	Total (Bk/S)					1	1	1	1								
114	Total1 (2-sided)									1	1	1	1	1	1	1	1
115	Total2 (2-sided)									2	2	2	2	1	1	1	1
116	L (2-sided)									1	1	1	1				
117	S (2-sided)													1	1	1	1
126	TotalA1		1	1	1		1	1	1								
127	TotalA2		2	2	2		1	1	1								
128	TotalA (L)		1	1	1												
129	TotalA (S)						1	1	1								
132	TotalA (Bk1)		1	1	1		1	1	1								
133	TotalA (Bk2)		2	2	2		1	1	1								
136	TotalA (Bk/L)		1	1	1												
137	TotalA (Bk/S)						1	1	1								
138	TotalA1 (2-sided)										1	1	1		1	1	1
139	TotalA2 (2-sided)										2	2	2		1	1	1
140	L A (2-sided)										1	1	1				
141	S A (2-sided)														1	1	1
150	TotalB1		1	1	1		1	1	1								
151	TotalB2		2	2	2		1	1	1								
152	TotalB (L)		1	1	1												
153	TotalB (S)						1	1	1								
156	TotalB (Bk1)		1	1	1		1	1	1								
157	TotalB (Bk2)		2	2	2		1	1	1								
160	TotalB (Bk/L)		1	1	1												
161	TotalB (Bk/S)						1	1	1								
162	TotalB1 (2-sided)										1	1	1		1	1	1
163	TotalB2 (2-sided)										2	2	2		1	1	1
164	LB (2-sided)										1	1	1				
165	SB (2-sided)														1	1	1
201	Copy(Total1)	1				1											
202	Copy(Total2)	2				1											
203	Copy(L)	1															
204	Copy(S)					1											
205	CopyA (Total1)	1				1											
206	CopyA (Total2)	2				1											
207	CopyA (L)	1															
208	CopyA (S)					1											
209	Local copy(Total1)	1				1											
210	Local copy(Total2)	2				1											
211	Local copy(L)	1															
212	Local copy(S)					1											
221	Copy(Bk1)	1				1											
222	Copy(Bk2)	2				1											
227	Copy(Bk/L)	1															
228	Copy(Bk/S)					1											
237	Copy(Bk/L/2-sided)									1							
238	Copy(Bk/S/2-sided)													1			
249	CopyA (Bk1)	1				1											
250	CopyA (Bk2)	2				1											
255	CopyA (Bk/L)	1															
256	CopyA (Bk/S)					1											
265	CopyA (Bk/L/2-sided)									1							

Serial No. on counter check screen	Counter type	Print system															
		Bk 1-sided L				Bk 1-sided S				Bk 2-sided L				Bk 2-sided S			
		Local copy	PDL print	FAX print	Report print	Local copy	PDL print	FAX print	Report print	Local copy	PDL print	FAX print	Report print	Local copy	PDL print	FAX print	Report print
266	CopyA (Bk/S/2-sided)													1			
277	Local copy(Bk1)	1				1											
278	Local copy(Bk2)	2				1											
283	Local copy(Bk/L)	1															
284	Local copy(Bk/S)					1											
293	Local copy(Bk/L/2-sided)									1							
294	Local copy(Bk/S/2-sided)													1			
301	Print (Total1)		1		1		1		1								
302	Print (Total2)		2		2		1		1								
303	Print (L)		1		1												
304	Print (S)						1		1								
305	PrintA (Total1)		1		1		1		1								
306	PrintA (Total2)		2		2		1		1								
307	PrintA (L)		1		1												
308	PrintA (S)						1		1								
313	Print (Bk1)		1		1		1		1								
314	Print (Bk2)		2		2		1		1								
319	Print (Bk/L)		1		1												
320	Print (Bk/S)						1		1								
329	Print (Bk/L										1		1				
330	Print (Bk/S/2-sided)														1		1
331	PDL print (Total1)		1				1										
332	PDL print (Total2)		2				1										
333	PDL print (L)		1														
334	PDL print (S)						1										
339	PDL print (Bk1)		1				1										
340	PDL print (Bk2)		2				1										
345	PDL print (Bk/L)		1														
346	PDL print (Bk/S)						1										
355	PDL print (Bk/L/2-sided)										1						
356	PDL print (Bk/S)														1		
403	Copy+Print (Bk/L)	1	1		1												
404	Copy+Print (Bk/S)					1	1		1								
405	Copy+Print (Bk2)	2	2		2	1	1		1								
406	Copy+Print (Bk1)	1	1		1	1	1		1								
411	Copy+Print (L)	1	1		1												
412	Copy+Print (S)					1	1		1								
413	Copy+Print (2)	2	2		2	1	1		1								
414	Copy+Print (1)	1	1		1	1	1		1								
421	Copy+Print (Bk/L)									1	1		1				
422	Copy+Print (Bk/S)													1	1		1
701	Recieved print (Total1)																
702	Recieved print (Total2)																
703	Recieved print (L)																
704	Recieved print (S)																
709	Recieved print (Bk1)																
710	Recieved print (Bk2)																
715	Recieved print (Bk/L)																
716	Recieved print (Bk/S)																
725	Recieved print (Bk/L/2-sided)											1					
726	Recieved print (Bk/S/2-sided)															1	
801	Report print (Total1)																
802	Report print (Total2)																
803	Report print (L)																
804	Report print (S)																
809	Report print (Bk1)																
810	Report print (Bk2)																
815	Report print (Bk/L)																

Serial No. on counter check screen	Counter type	Print system															
		Bk 1-sided L				Bk 1-sided S				Bk 2-sided L				Bk 2-sided S			
		Local copy	PDL print	FAX print	Report print	Local copy	PDL print	FAX print	Report print	Local copy	PDL print	FAX print	Report print	Local copy	PDL print	FAX print	Report print
816	Report print (Bk/S)																
825	Report print (Bk/L)												1				
826	Report print (Bk/S)																1

Serial No. on counter check screen	Counter type	Scan system													
		Bk 1-sided L				Bk 1-sided S				Bk 2-sided L				Bk 2-sided S	
		Total scan	E-mail scan	FileShare DBscan	E-mail FileShare DB scan	FileShare DB BoxFscan	E-mail FileShare DB Box	Total scan	Total scan	E-mail scan	FileShare DB scan	E-mail FileShare DB scan	FileShare DB scan	E-mail FileShare DB BOX scan	Total scan
501	Scan (Total1)	1							1						
505	Bk scan (Total1)	1						1							
506	Bk scan (Total2)	2						1							
507	Bk scan (L)	1													
508	Bk scan (S)							1							
509	C scanTotal (1)								1						1
510	C scanTotal (2)								2						1
511	C scan (L)								1						
512	C scan (S)														1
915	Transmission scan total2 (C)													1	
916	Transmission scan total2 (Bk)						1								
917	Transmission scan total3 (C)											1			
918	Transmission scanTotal3 (Bk)				1										
921	Transmission scanTotal5 (C)										1				
922	Transmission scanTotal5 (Bk)			1											
929	Transmission scanTotal6 (C)												1		
930	Transmission scanTotal6 (Bk)					1									
945	Transmission scan/E-mail (C)									1					
946	Transmission scan/E-mail (Bk)		1												

14.6 Scanner Function Settings (SCANNER)

14.6.1 Numeric Parameter Functional configuration

i-SENSYS MF4690PL / / i-SENSYS MF4660

No.	Function	Default	Setting range	Unit
001: - 025:	Not used			
026:	Distance from the standby position of CIS to the shading start point.	10	6-48	one unit=0.1mm
027: - 030:	Not used			
031:	Vertical scan start position adjustment	0	0-70	one unit=0.1mm
032:	Not used			
033:	Vertical scan magnification correction	32	0-64	one unit=0.1%
034:	Not used			
035: - 036:	Reader motor speed adjustment	423		
037: - 040:	Not used			
041:	Vertical scan start position adjustment (scanning on ADF)	0	0-70	one unit=0.1mm
042: - 046:	Not used			
047:	Vertical scan magnification correction (scanning on ADF)	32	0-64	one unit=0.1%
048:	Horizontal scan magnification correction (scanning on ADF)	32	0-64	one unit=0.1%
049: - 053:	Not used			
054:	Pickup motor speed correction (when the ADF is used)	32	0-64	one unit=0.1%
055: - 350:	Not used			

If any operation error occurs after changing the setting value, change the setting value to the original one.

14.6.2 <031Vertical scan start position adjustment>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Adjust the position at which vertical scanning of a book starts. The larger the adjustment value, the narrower the left-side margin of the image becomes.

14.6.3 <033Vertical scan magnification correction>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Correct the magnification of vertical scanning of a book. The larger the adjustment value, the more the image stretches in the vertical scanning direction.

14.6.4 <035: - 036:Reader motor speed change>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Though no market adjustment work needs to be carried out, enter factory defaults at image processor PCB replacement.

14.6.5 <041: Vertical scan start position adjustment (when scanning on a document fed from ADF)>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Adjust the position at which vertical scanning of a document fed from the ADF starts. The larger the adjustment value, the narrower the left-side margin of the image becomes.

14.6.6 <047: Vertical scan magnification correction (when scanning on a document fed from ADF)>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Correct the magnification of vertical scanning of a document fed from the ADF. The larger the adjustment value, the more the image stretches in the vertical scanning direction.

14.6.7 <048: Horizontal scan magnification correction (when scanning on a document fed from ADF)>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Correct the magnification of horizontal scanning of a document fed from the ADF. The smaller the adjustment value, the more the image stretches in the horizontal scanning direction.
This menu is used to adjust the ADF feed motor speed. If you changed the adjustment value in this mode, the adjustment value selected for SCAN NUMERIC>54 must also be incremented/decremented by the same amount.

Do not change the adjustment value extremely.

14.7 Printer Function Settings (PRINTER)

14.7.1 Service Soft Switch Settings (SSSW)

14.7.1.1 SSSW-SW15

14.7.1.1.1 List of Function

0016-2090

i-SENSYS MF4690PL /

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Bit	Function	1	0
0	Not used	-	-
1	Not used	-	-
2	Not used	-	-
3	IFAX Permission of split recording of text data	Enable	Disable
4	Not used	-	-
5	Not used	-	-
6	Not used	-	-
7	Not used	-	-

14.7.1.1.2 Detailed Discussions of Bit 3

0016-2095

i-SENSYS MF4690PL /

Select whether split recording is to be enabled when text data such as a header and body text is recorded. Selecting "Set" may split text data when a small paper size such as A5 is selected. In this case, a page may be split in the middle of a character string.

14.7.2 Numeric Parameter Settings (NUMERIC Param.)

14.7.2.1 <034: Left-end registration adjustment (malti-purpose tray)>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Adjust the left-end registration margin of paper picked from a multi-purpose tray. The larger the adjustment value, the wider the left-end margin of the image becomes.

14.7.2.2 <035: Left-end registration adjustment (cassette)>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Adjust the left-end registration margin of paper picked from cassette. The larger the adjustment value, the wider the left-end margin of the image becomes.

14.7.2.3 <039: Left-end registration adjustment (duplex unit)>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Adjust the left-end registration margin of paper picked from a duplex unit. The larger the adjustment value, the wider the left-end margin of the image becomes.

14.7.2.4 <053: Margin adjustment at the leading edge of the copy>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Adjust the margin at the leading edge of the copy. Increasing the value makes the margin at the leading edge larger.

14.7.2.5 <054: Margin adjustment at the trailing edge of the copy>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Adjust the margin at the trailing edge of the copy. Increasing the value makes the margin at the trailing edge larger.

14.7.2.6 <055: Margin adjustment at the right edge of the copy>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Adjust the margin at the right edge of the copy. Increasing the value makes the margin at the right edge larger.

14.7.2.7 <056: Margin adjustment at the left edge of the copy>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Adjust the margin at the left edge of the copy. Increasing the value makes the margin at the left edge larger.

14.8 Setting of System Functions (SYSTEM)

14.8.1 Bit Switch Settings

i-SENSYS MF4690PL / / i-SENSYS MF4660

SSSW-SW03 functional configuration

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Bit	Function	1	0
0	Not used	-	-
1	Not used	-	-
2	Not used	-	-
3	Not used	-	-
4	Not used	-	-
5	Not used	-	-
6	Imports and exports user information via USB.	Enable	Disable
7	Not used	-	-

Bit 6 details
Select whether to enable the host machine to work as a USB storage device or not. If the host machine is plugged into a PC with this setting enabled, it allows user registration data (user data and telephone registration data) to be imported and exported to and from the PC, except for the data embedded in the department management information and user management IDs in the system management information.

14.9 Counter Indication (COUNTER)

14.9.1 Counters

i-SENSYS MF4690PL / / i-SENSYS MF4660

This copier is furnished with a maintenance/supplies counter set (DRBL-1), which can be used to gain rough measures of when to replace supplies. The counter set increments by one on counting each sheet of small-sized paper (up to A4/LTR) and by two on counting each sheet of large-sized paper (larger than A4/LTR).

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Maintenance counter list		
Item	**Counter**	**Explanation**
TOTAL (Total counter)	SERVICE1	Service total counter 1
	SERVICE2	Service total counter 2
	TTL	Total counter
	COPY	Total copy counter
	PDL-PRT	PDL print counter
	FAX-PRT	Fax print counter
	RPT-PRT	Report print counter
	2-SIDE	Double-sided copy/print counter
	SCAN	Scan counter

Maintenance counter list		
Item	**Counter**	**Explanation**
PICK-UP (Paper pickup counter)	C1	Cassette jam counter
	C2	Not used
	C3	Not used
	C4	Not used
	MF	Multi-purpose tray pickup total counter
	2-SIDE	Double-sided paper pickup total counter
FEEDER (Feeder related counters)	FEED	ADF pickup total counter
	DFOP-CNT	Not used
JAM (Jam counters)	TTL	Unit total jam count
	FEEDER	ADF total jam count
	SORTER	Not used
	2-SIDE	Duplex unit jam counter
	MF	Multi-purpose tray jam counter
	C1	Cassette jam counter
	C2	Not used
	C3	Not used
	C4	Not used
MISC (Other required counter)	WST-TNR	Not used

14.9.2 Clearing Counters

i-SENSYS MF4690PL / / i-SENSYS MF4660

- Maintenance counter all clear
Execute service mode > CLEAR > COUNTER to clear all maintenance counters.

14.10 Report Output (REPORT)

14.10.1 Report Output

i-SENSYS MF4690PL / / i-SENSYS MF4660

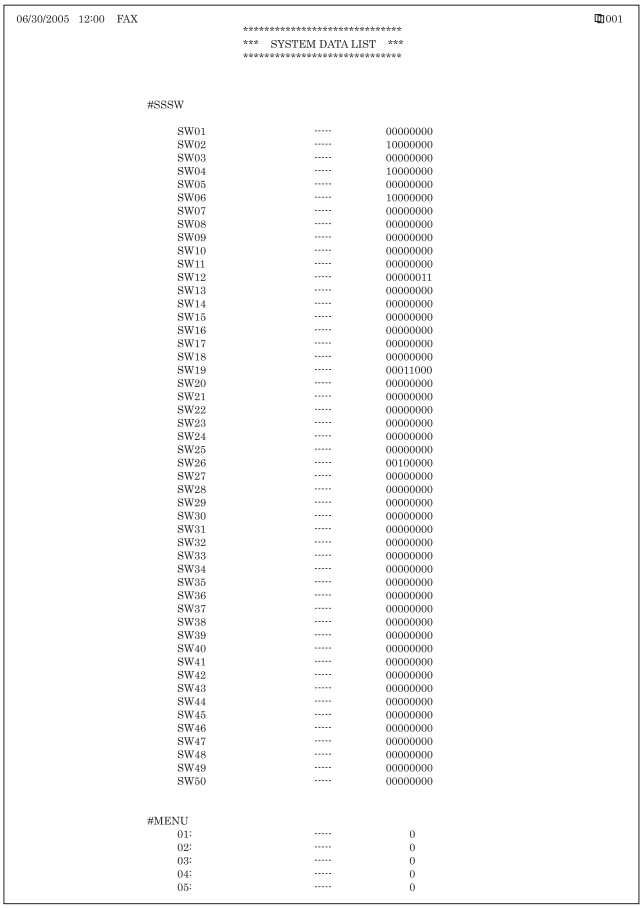
The table below lists the kinds of reports that are supported.

Item	Explanation
SERVICE DATA LIST	Service mode service soft switch output (SSSW, MENU, NUMERIC Param., SPECIAL, NCU, SCAN, PRINT, SYSTEM, ROM, start date)
SYSTEM DATA LIST	Service mode service soft switch output (SSSW, MENU, NUMERIC Param., SPECIAL, NCU, SCAN, PRINT, SYSTEM, ROM, start date) System dump list output
SYSTEM DUMP LIST	Transmission count, reception count, record chart count, error count and other outputs
COUNTER REPORT	Counter output
ERROR LOG LIST	Not used
SPEC LIST	Type setting, print speed, memory size, ROM indication, adjustment data and other outputs
SERVICE LABEL	Not used

14.10.2 System Data List

i-SENSYS MF4690PL / / i-SENSYS MF4660

Use it to check the settings associated with the service soft switch and service parameters.



06/30/2005 12:00 FAX 001

****
*** SYSTEM DATA LIST ***
****

#SSSW

SW01	-----	00000000
SW02	-----	10000000
SW03	-----	00000000
SW04	-----	10000000
SW05	-----	00000000
SW06	-----	10000000
SW07	-----	00000000
SW08	-----	00000000
SW09	-----	00000000
SW10	-----	00000000
SW11	-----	00000000
SW12	-----	00000011
SW13	-----	00000000
SW14	-----	00000000
SW15	-----	00000000
SW16	-----	00000000
SW17	-----	00000000
SW18	-----	00000000
SW19	-----	00011000
SW20	-----	00000000
SW21	-----	00000000
SW22	-----	00000000
SW23	-----	00000000
SW24	-----	00000000
SW25	-----	00000000
SW26	-----	00100000
SW27	-----	00000000
SW28	-----	00000000
SW29	-----	00000000
SW30	-----	00000000
SW31	-----	00000000
SW32	-----	00000000
SW33	-----	00000000
SW34	-----	00000000
SW35	-----	00000000
SW36	-----	00000000
SW37	-----	00000000
SW38	-----	00000000
SW39	-----	00000000
SW40	-----	00000000
SW41	-----	00000000
SW42	-----	00000000
SW43	-----	00000000
SW44	-----	00000000
SW45	-----	00000000
SW46	-----	00000000
SW47	-----	00000000
SW48	-----	00000000
SW49	-----	00000000
SW50	-----	00000000

#MENU

01:	-----	0
02:	-----	0
03:	-----	0
04:	-----	0
05:	-----	0

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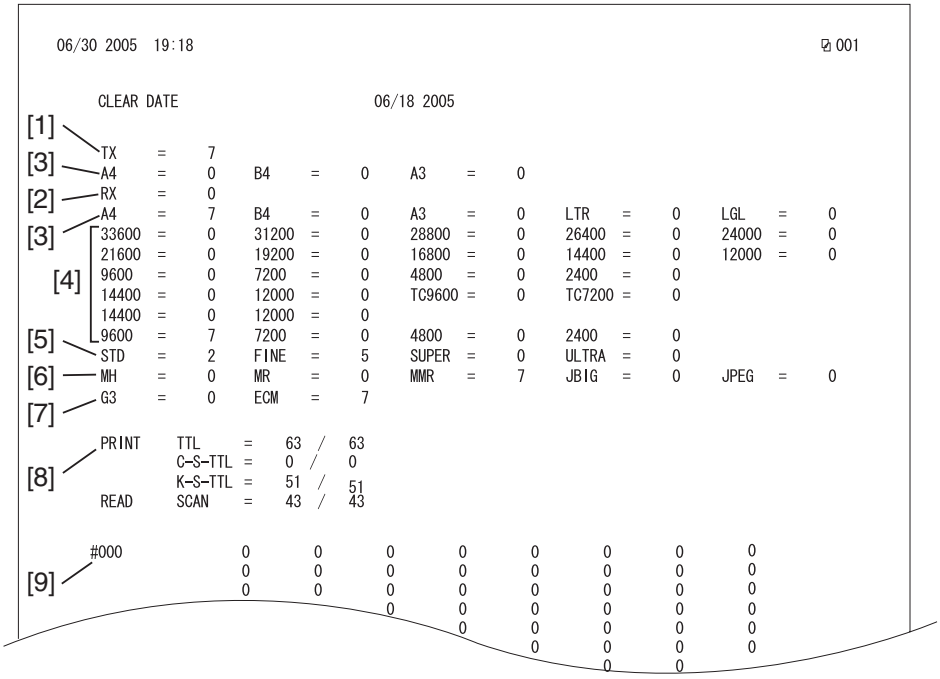
14.10.3 System Dump List

i-SENSYS MF4690PL / / i-SENSYS MF4660

- System Dump List
Use it to check the history of communications, both successful and error.



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*1: TX, number of total pages transmission.
*2: Total number of pages transmitted/received according to original size.
*3: RX, number of total pages reception.
*4: Total number of pages transmitted and received for each modem speed
*5: Total number of pages transmitted/received in connection with different modem speeds (Standard, Fine, Super Fine, Ultra Fine).
*6: Total number of pages transmitted and received for each coding method
*7: Total number of pages transmitted and received in each mode
*8: Total number of pages printed/scanned
*9: Total number of occurrences for error code

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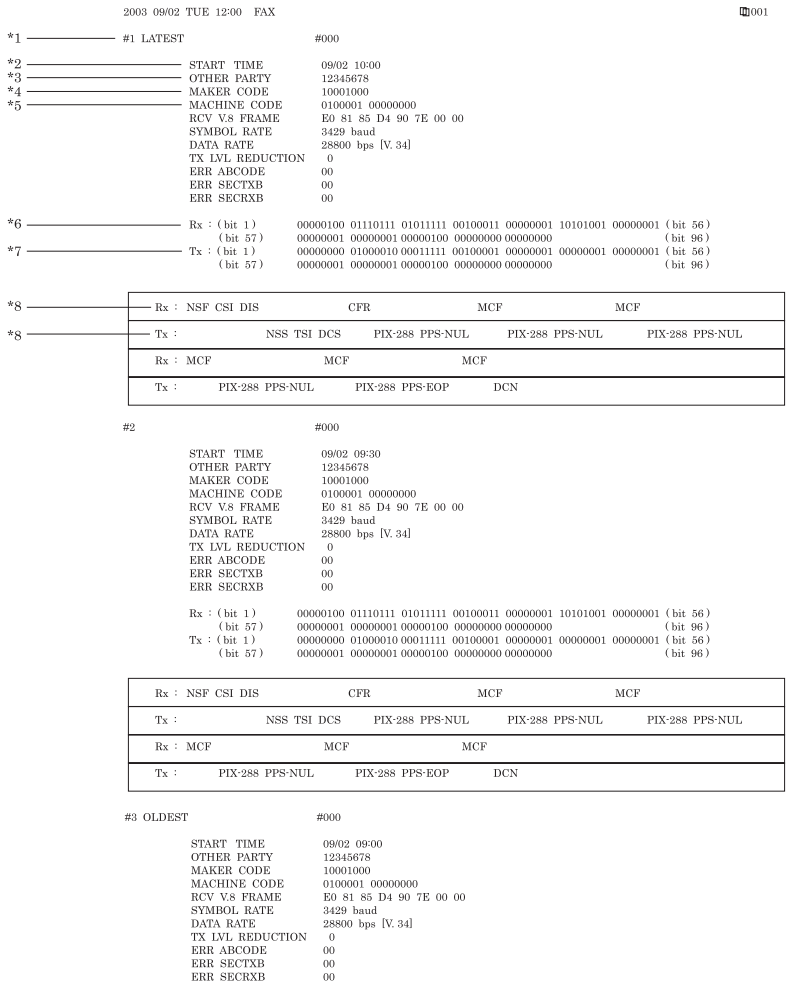
Indication sample					
##280	1	7	3	0	0
	##280 number of errors	##281 number of errors	##282 number of errors		

It provides error information on the 3 most recent communications.



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*1: service error code.
*2: START TIME, date and time (in 24-hr notation).
*3: OTHER PARTY, telephone number sent by the other party.
*4: MAKER CODE, manufacturer code.
*5: MACHINE CODE, model code.
*6: bit 1 through bit 96 of DIS, DCS, or DTC that has been received.
*7: bit 1 through bit 96 of DIS, DCS, or DTC that has been transmitted.
*8: RX, procedural signal received; TX, procedural signal transmitted.

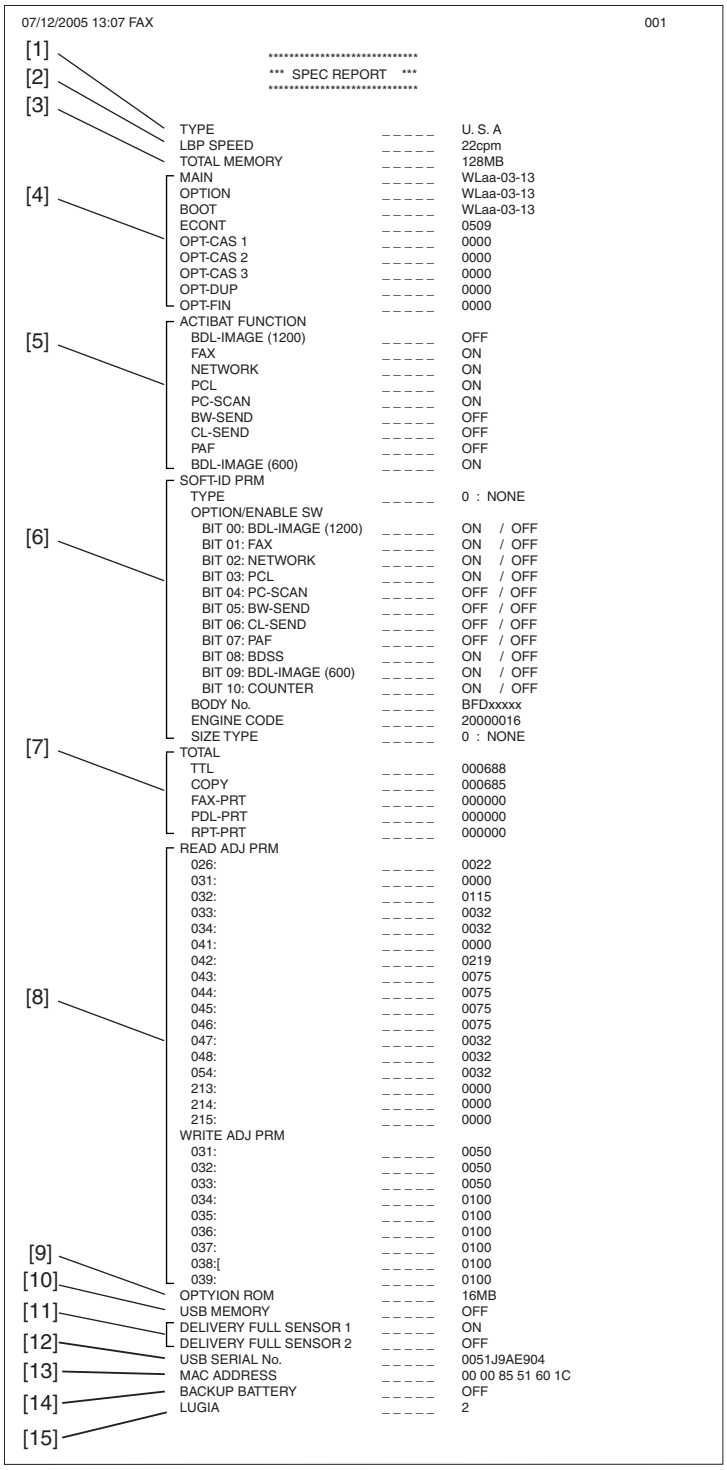
14.10.4 Counter List

i-SENSYS MF4690PL / / i-SENSYS MF4660

Explanation: Maintenance counter output.
(For more detailed information about the maintenance counter output, execute service mode > Display counter information > Counters.)

14.10.5 Spec List

i-SENSYS MF4690PL / / i-SENSYS MF4660



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[1] Type setting
[2] Print speed
[3] Memory size
[4] ROM version (MAIN/BOOT/ECONT/option cassette/duplex unit/finisher)
[5] Activation function ON/OFF
[6] Soft ID information
[7] Total counter (TOTAL/COPY/FAX/PDL/REPORT record counts)
[8] Adjustment data (factory scan/record adjustment values)
[9] Option ROM availability
[10] USB memory availability
[11] No. 1/No. 2 paper full sensor sensor availability
[12] USB serial number
[13] MAC address
[14] Backup battery availability
[15] Anlog purocessor PCB version

14.11 Data Initialization Mode (CLEAR)

14.11.1 Clear

i-SENSYS MF4690PL / / i-SENSYS MF4660

Group	Item	Explanation
TEL & USER DATA		Clears all user-registered and -set areas of telephone registration data and user data. (Telephone registration refers to the registration of codes on one-touch dialing, abbreviated dialing, and group dialing.)
SERVICE DATA		Clears the system dump list, except for counters and clear dates.
COUNTER		Clears the maintenance counter, parts counter and mode-specific counters. Initializes the counter (numerator) in the system dump list.
TYPE		Initializes user data and service data to suit specified destination settings.
SOFT-CNT		Not used
HST	ACTIVITY	Initializes the activity report
	ACCOUNT	Not used
	JAM	Not used
	ERR	Not used
	ALARM	Not used
CARD		Not used
ERR	E355	Not used
	E719	Not used
PWD		Clears the system administrator's password.
FILE SYSTEM		Not used
FORMAT	USB MEMORY	Format the USB memory. (This mode is used when the USB memory error is damaged and E744 occurs.)
	LICENSE DRIVE	Not used
ERDS-DAT		Not used
ALL		Clears user and service data (except for some scan parameters and print parameters), and the counter setting/registration data in the system dump list, except for the print count.

14.12 ROM Management (ROM)

14.12.1 ROM Display

i-SENSYS MF4690PL / / i-SENSYS MF4660

The table below lists the items of ROM display mode that are supported.

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Item	Explanation
MAIN	Displays the version number of the ROM (SYSTEM) mounted on the image processor PCB.
MAIN2	Displays the version of the ROM (BOOT) mounted on the image processor PCB.
ECONT	Displays the version number of the ROM mounted on the DC controller PCB.
OPROM	Not used

14.13 Test Mode (TEST)

14.13.1 Overview

14.13.1.1 Outline

i-SENSYS MF4690PL / / i-SENSYS MF4660

Test mode must be executed by keeping track the flow of menu items appearing on the LCD. Menu items in test mode are organized into seven blocks as described below. Numerals enclosed in parentheses denote a numeric keypad key to be pressed each.

1. D-RAM test ((1) D-RAM)
Checks to see if data can be correctly written to and read from D-RAM.

2. Scan test ((2) SCAN TEST)
Used to adjust contact sensor output and the position at which a document fed from the ADF is scanned.

3. Print test ((3) PRINT TEST)
Used to generate service test patterns.

4. Modem test ((4) MODEM TEST)
Performs relay actuation, modem DTMF and tonal signal transmission/reception tests.

5. Aging test ((5) AGING TEST)
Not used.

6. Function test ((6) FUNCTION TEST)
Used to verify the operations of microswitches, sensors, speakers and ADF functions.

7. Roller cleaning mode ((0) ROLLER CLEAN)
Used to clean the delivery roller or ADF pickup roller by idling them.

14.13.1.2 Test Mode Menu List

i-SENSYS MF4690PL / / i-SENSYS MF4660

Test mode menu list
To invoke test mode, follow these steps:

1) Enter service mode.
Press the operation panel Additional functions key, 2 key, 8 key and Additional functions key in this order.
2) Press the operation panel arrow keys to show "TEST MODE."
3) Press the OK key.

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Numerals enclosed in parentheses denote a numeric keypad key to be pressed each.					
Group	**Subgroup**	**Item 1**	**Item 2**	**Item 3**	**Explanation**
TEST MODE [1] - [9], [#]					
(1) DRAM [1] - [2]					D-RAM data check
	(1) D-RAM TEST				Write/read check
	(2) D-RAM TEST				Read check
(2) SCAN TEST [1] - [8]					
	(1) SHADING				Automatic gain adjustment
	(3) SHEET POS ADJ				Not used
	(4) TRASH DETECT				Not used
	(5), (6), (9), (*)				Not used
(3) PRINT TEST [1] - [9]					
	(1)				Not used
	(2)				All-black output
	(3)				Not used
	(4)				Back belt output
	(5), (6), (7), (8), (9), (*)				Not used
(4) MODEM TEST [1] - [9]					
	(1) RELAY TEST [1] - [2]				
		(1) RELAY TEST 1			NCU relay (and switch) ON/OFF test
		(2) RELAY TEST 2			230 V common NCU test
	(2) FREQ TEST [0] - [6]				Frequency test
		(0) FREQ TEST 462Hz			
		(1) FREQ TEST 1100Hz			
		(2) FREQ TEST 1300Hz			
		(3) FREQ TEST 1500Hz			
		(4) FREQ TSST 1650Hz			
		(5) FREQ TEST 1850Hz			
		(6) FREQ TEST 2100Hz			
	(4) G3 SIGNAL TX TEST [0] - [8]				G3 signal transmission test
		(0) G3 SIGNAL TX TEST 300bps			
		(1) G3 SIGNAL TX TEST 2400bps			
		(2) G3 SIGNAL TX TEST 4800bps			
		(3) G3 SIGNAL TX TEST 7200bps			
		(4) G3 SIGNAL TX TEST 9600bps			
		(5) G3 SIGNAL TX TEST TC7200bps			
		(6) G3 SIGNAL TX TEST TC9600bps			
		(7) G3 SIGNAL TX TEST 12000bps			
		(8) G3 SIGNAL TX TEST 14400bps			
	(5) DTMF TEST [0] - [9], * , #				DTMF transmission test
		(0) G3 SIGNAL TX TEST 300bps			
		(1) G3 SIGNAL TX TEST 2400bps			
		(2) G3 SIGNAL TX TEST 4800bps			
		(3) G3 SIGNAL TX TEST 7200bps			
		(4) G3 SIGNAL TX TEST 9600bps			
		(5) G3 SIGNAL TX TEST TC7200bps			
		(6) G3 SIGNAL TX TEST TC9600bps			
		(7) G3 SIGNAL TX TEST 12000bps			
		(8) G3 SIGNAL TX TEST 14400bps			
		(9) G3 SIGNAL TX TEST TC9600bps			
		(*) G3 SIGNAL TX TEST 12000bps			
		(#) G3 SIGNAL TX TEST 14400bps			
	(6) MODEM TEST				Tonal sign reception test
	(8) G3 V.34 Tx TEST				V34 G3 signal transmission test
	(9)				Not used

Numerals enclosed in parentheses denote a numeric keypad key to be pressed each.					
Group	**Subgroup**	**Item 1**	**Item 2**	**Item 3**	**Explanation**
(5) AGING TEST					Not used
(6) FUNCTION TEST [1] - [9]					
	(1) FUNCTION TEST G3 4800bps				G3 4800 bps signal transmission test
	(3) 6-3 SENSOR [1] - [8]				Sensor checks
		(1) CRG ON FCV ON ALS [of of of]			
		(2) PW of PW2 of			
		(3) DS of DES of HPS of			
		(4) TN Value 125 USB memory of			
		(5) CRG ON FCV ON ALS [of of of]			
		(6), (7), (8)			Not used
	(4) ADF FEED TEST				ADF delivery operation test
	(5) BOOK FEED TEST				Book copy operation test
	(6) 6-6 SPEAKER FREQ:[1] VOL:[2]				Speaker volume and buzzer frequency test
	(7) Operation Panel				Operation panel key, LCD and LED test
	(8) FUNCTION TEST LAMP TEST ALL				Lamp test
	(9) LINE TEST [1] - [3]				Line signal reception test
(0) ROLLER CLEAN 0:PRT 1:ADF					Printer and ADF roller cleaning
	(0) PRT ROL CLEAN Press start key				Not used
	(1) ADF ROL CLEAN Press start key				

14.13.2 DRAM Test

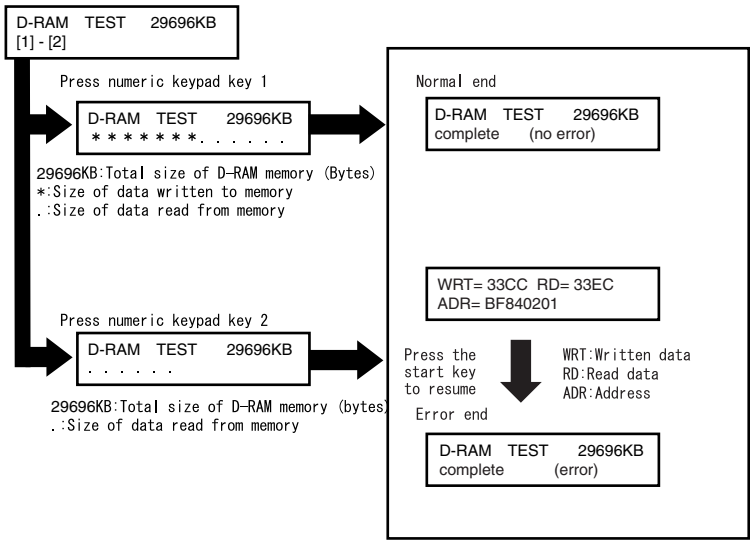
14.13.2.1 D-RAM Test<(1) D-RAM TEST>

i-SENSYS MF4690PL / / i-SENSYS MF4660

D-RAM Test((1) D-RAM)
Press the numeric keypad key 1 on the test mode menu to select the D-DRAM test.
Press numeric keypad keys 1 and 2 during the D-DRAM test to carry out the individual tests described below.

Numeric keypad key 1
Checks to see if data can be correctly written to and read from all areas of D-RAM (SDRAM). If an error occurs making this check, the test is aborted, with an error appearing on the touch panel (LCD).

Numeric keypad key 2
Checks to see if data can be correctly read from all areas of D-RAM (SDRAM). If an error occurs making this check, the test is aborted, with an error appearing on the touch panel (LCD).



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14.13.3 Scan Test

14.13.3.1 Scan Test ((2) SCAN TEST)

i-SENSYS MF4690PL / / i-SENSYS MF4660

Scan test ((2) SCAN TEST)

Press the numeric keypad key 2 on the test mode menu to select the SCAN test.
Press numeric keypad keys 1 during the SCAN test to carry out the individual tests described below.

Numeric keypad key 1
Corrects the LED output of the contact sensor and sets its parameters automatically. (AGC adjustment)

14.13.4 Print Test

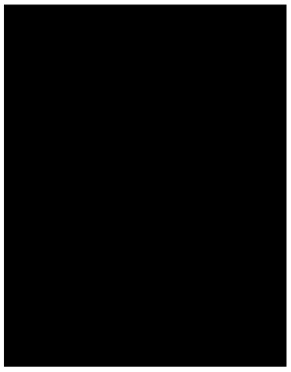
14.13.4.1 Print Test ((3) PRINT TEST)

i-SENSYS MF4690PL / / i-SENSYS MF4660

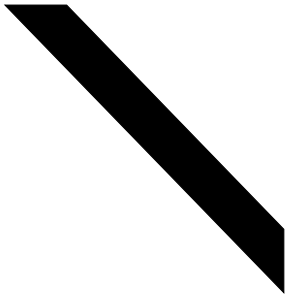
Print test ((3) PRINT TEST)
Press the numeric keypad key 3 on the test mode menu to select the print test.
Press numeric keypad keys 2 and 4 during the print test to generate test patterns as described below. Two kinds of service test patterns are available. Other test patterns are reserved for factory/development purposes.

Numeric keypad key 2
(2) BLACK: All-black output
Numeric keypad key 4
(4) ENDURANCE: Black belt output

To cancel test printing, press the stop key.



Use it to make sure that the print pattern does not have white lines or uneven image.



Use it to make sure that the print pattern does not have contraction/ elongation of an image or dirt/black line.s

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14.13.5 Modem Test

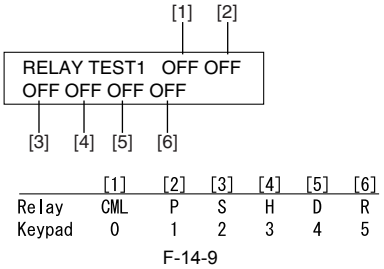
14.13.5.1 MODEM Test ((4) MODEM TEST)

i-SENSYS MF4690PL / / i-SENSYS MF4660

MODEM test((4) MODEM TEST)
These tests test modem and NCU transmission and reception. The modem tests check whether signals are sent correctly from the modem by comparing the sound of the signals from the speaker with the sounds from a normal modem.
End this test by pressing the Stop key.

Keypad	Type	Description
1	Relay test	Use it to turn on/off a selected relay to execute a switch-over test
2	Frequency test	The modem sends tonal signals from the modular jack and the speaker.
4	G3 signal transmission test	The modem sends G3 signals from the modular jack and the speaker.
5	DTMF signal reception test	Use it to generate the DTMF signal coming from the modem using the telephone line terminal and the speaker.
6	Tonal signal reception test	Use it to monitor a specific frequency and the DTMF signal received from the telephone line terminal by causing them to be indicated on the LCD (i.e., the presence/absence as detected). The reception signal is generated by the speaker.
8	V.34 G3 signal transmission test	The modem sends V.34 G3 signals from the modular jack and the speaker.

Relay Test
Press '1'or '2' on the keypad on the Modem test menu to select relay test mode. Use the keypad to operate the various relays of the NCU. '2' on the keypad is used for 230V machine.
Numeric keypad key 1
The input key and relay are shown below:



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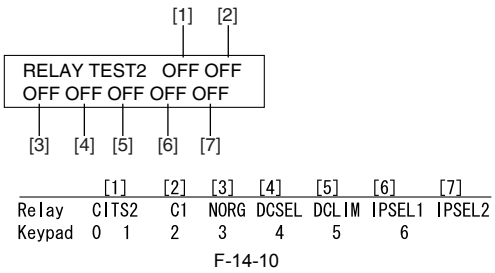
Numeric keypad key 2
The input key and relay are shown below:



F-14-10

The touch panel (LCD) is turned on or off in relation to the transmission of the relay operation signal as is operated on the keypad; for this reason, you cannot use the touch panel (LCD) to check a fault on a single relay.

Frequency Test
A press on '2' on the keypad from the MODEM test menu selects the frequency test.
In this test, signals of the following frequencies from the modem are transmitted using the telephone line terminal and the speaker. To select a different frequency, use the keypad.

Keypad	Frequency
0	462Hz
1	1100Hz
2	1300Hz
3	1500Hz
4	1650Hz
5	1850Hz
6	2100Hz

MEMO:
The frequency and the output level of individual frequencies are in keeping with the output level set in service mode.

G3 Signal Transmission Test
A press on '4' on the keypad from the MODEM test menu selects the G3 signal transmission test. In this test, the following G3 signals from the modem are transmitted using the telephone line terminal and the speaker. To select a different transmission speed, use the keypad.

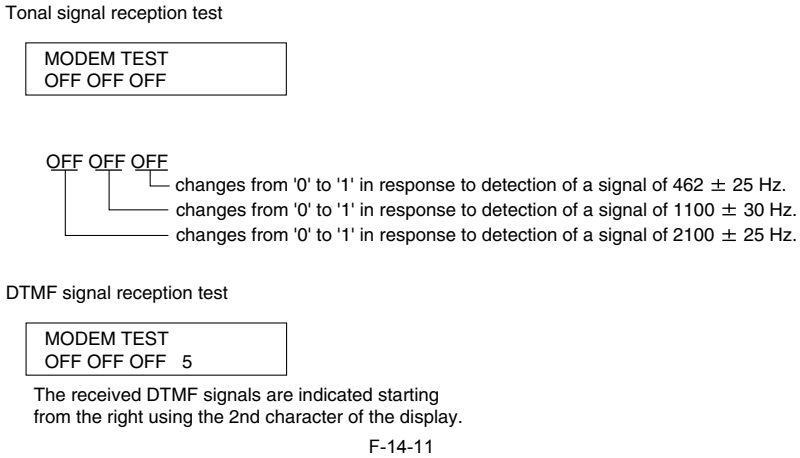
Keypad	Transmission speed
0	300bps
1	2400bps
2	4800bps
3	7200bps
4	9600bps
5	TC7200bps
6	TC9600bps
7	12000bps
8	14400bps

MEMO:
The output level of individual signals is in keeping with the setting made in service mode.

DTMF Signal Transmission Test
A press on '5' on the MODEM test menu selects the DTMF signal transmission test. In the test, the following DTMF signals from the modem are transmitted using the telephone line terminal and the speaker. The number pressed on the keypad selects a specific DTMF signal.

MEMO:
The output level of individual signals is in keeping with the setting made in service mode.

Tonal/DTMF Signal Reception Test
A press on '6' on the keypad from the MODEM test menu selects the tonal signal/DTMF signal reception 0 test. In this signal, the tonal signal/DTMF signal received from the telephone line terminal can be checked to find out if it was detected by the modem.



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V.34 G3 Signal Transmission Test
A press on '8' on the keypad from the MODEM test menu selectes the V.34 G3 signal transmission test. The V.34 G3 signals below are sent from the modem using the modular jack and the speaker by pressing the start key. The Baud rate can be changed with the keypad, and the Speed can be changed with the left/right arrow key.

Keypad	Baud rate
0	3429baud
1	3200baud
2	3000baud
3	2800baud
4	2743baud
5	2400baud

Left/right arrow key	Transmission speed
	2400bps
	4800bps
	7200bps
	9600bps
<	12000bps
	14400bps
	16800bps
	19200bps
	21600bps
>	24000bps
	26400bps
	28800bps
	31200bps
	33600bps

14.13.6 Faculty Test

14.13.6.1 FUNCTION TEST <(6) FUNCTION TEST>

i-SENSYS MF4690PL / / i-SENSYS MF4660

Function test ((6) FUNCTION TEST)
Press the numeric keypad key 6 on the test mode menu to select the function test.
Press numeric keypad keys 1 and 3 to 9 during the function test to enter the menus listed below.

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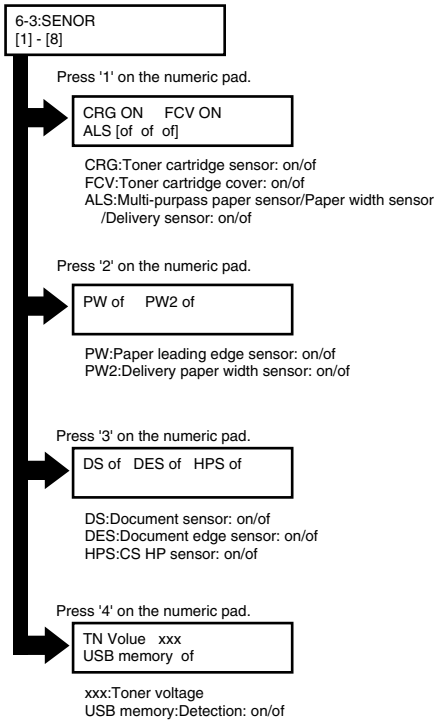
Keypad	Item	Explanation
1	G3 signal transmission test	Transmits 4800-bps G3 signals to a telephone line and speaker.
2	Not used	
3	Sensor test	Sensor actuation test
4	ADF test	ADF operation test
5	Book test	Host machine operation test
6	Speaker test	Speaker operation test
7	Operation panel test	LCD, LED and control key operation test
8	Lamp test	Contact sensor illumination test
9	Line signal reception test	NCU board signal sensor and frequency counter operation test

G3 signal transmission test (6-1: G3 480 bps Tx)
Press numeric keypad key 1 on the FUNCTION TEST menu to select the G3 signal transmission test. This test transmits 4800-bps G3 signals from the telephone line connection terminal and speaker.

Sensor test (6-3: SENSOR)
This mode is used to verify the status of the unit sensors from LCD indications. Press numeric keypad key 3 on the FUNCTION TEST menu to select the sensor

test. LCD indications change as the associated sensors turn on and off.

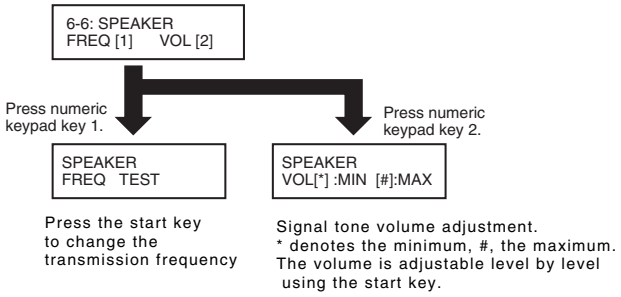


F-14-12

ADF feed test (ADF FEED TEST)
ADF operation verification mode. Press numeric keypad key 4 on the FUNCTION TEST menu to select the ADF feed test. Place a document on the document platen and press the start key to transfer the document at the speed matched to the scan resolution setting. In this test, enter a transfer speed between 500 and 2000 (mm/s) from the numeric keypad and verify the transfer speed. Select between the ON and OFF states with the left and right cursor keys to select between single-sided document feed (OFF) and double-sided document feed (ON).

Book feed test (6-5: BOOK FEED TEST)
Performs a book feed operation with a specified magnification and in a specified size.

Speaker test (6-6: SPEAKER)
Speaker operation verification mode. Press numeric keypad key 6 on the FUNCTION TEST menu to select the speaker test. In this test, the speaker generates tonal signals at 100 Hz intervals, from 200 Hz to 5 kHz, in varying sound volumes. Signal output from the speaker is thus verified.



F-14-13

Operation panel test (6-7: OPERATION PANEL)
Operation panel operation verification mode. Press numeric keypad key 7 on the FUNCTION TEST menu to select the OPERATION PANEL test menu. Functions that can be verified from this menu are listed below.

- LCD test
Start the OPERATION PANEL test by pressing the start key. The LCD test is carried out first, displaying all-H characters. Press the start key once again to produce a total black display.
- LED lamp test
Press the start key after the LCD test to select the LCD lamp test, turning on all lamps on the operation panel.
- Operation key test
Press the start key after the LCD lamp test to select operation key test (1). The test succeeds if the characters appearing in the LCD are erased when the corresponding keys are pressed.
When the entire character display is erased, operation key test (2) launches (only on models with the FAX feature installed). As in (1), the test succeeds if the characters appearing in the LCD are erased when the corresponding keys are pressed.

Operation key test (1) correspondence diagram

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Character	Operation key	Character	Operation key
0-9,*,#	Numeric key	I	Density key
A	Cursor key (+)	L	View settings key
B	Cursor key (-)	M	Toner Gauge key
C	OK key	N	2-Sided key
D	Additional Functions key	O	Enagy Saver key

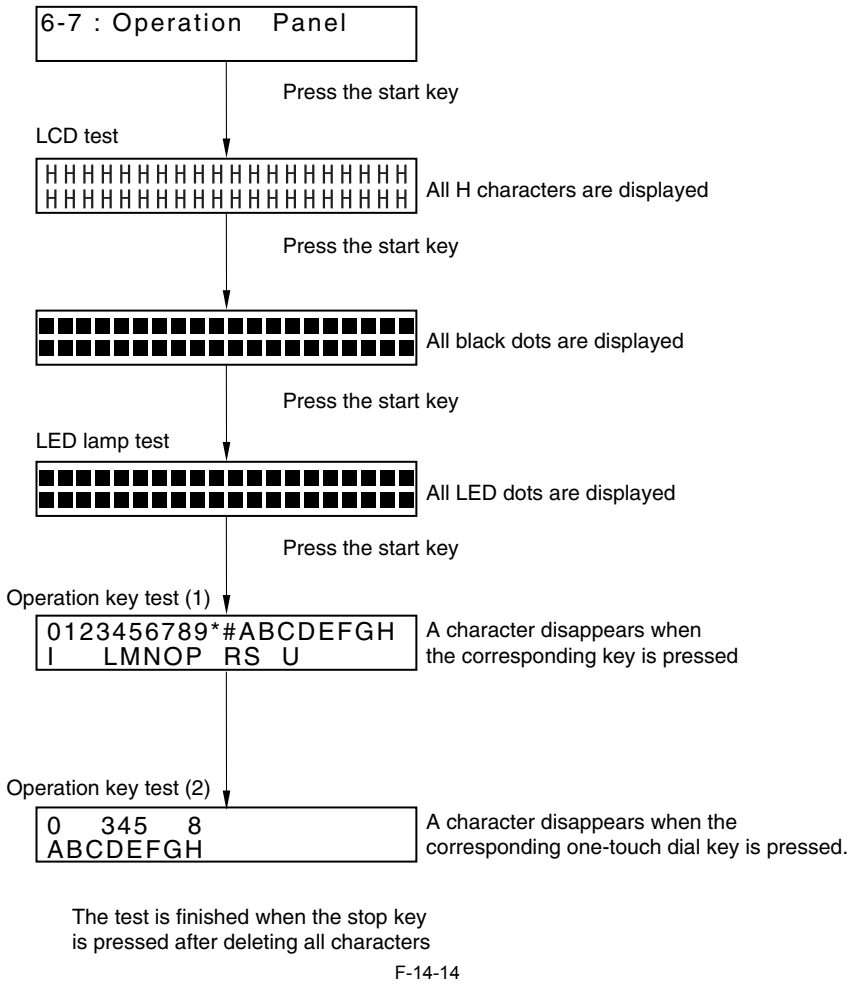
Character	Operation key	Character	Operation key
E	Status Monitor key	P	Clear key
F	Collate/2 on 1 key	R	COPY key
G	Image Quality key	S	SCAN key
H	Enlarge/Reduce key	U	ID key

Operation key test (2) correspondence diagram

T-14-25

Character	Operation key	Character	Operation key
0	SEND/FAX key	5	Coded key
3	Recall/Pause key	8	Hook key
4	Address Book key	A - H	One-touch key

The flow of operation panel testing is shown below.



F-14-14

Lamp test (6-8: LAMP TEST)
Press numeric keypad key 8 on the FACULTY menu to select the scan lamp illumination mode. The test checks to see if the scan lamp is on or not. Numeric keypad key 1 selects LAMP TEST ALL. Press the start key to turn on all scan lamps. LAMP TEST AGC is not used.
Line signal reception test (9: LINE DETECT)
Press numeric keypad key 9 on the FACULTY menu to select the line signal reception test. In this test, verify the successful operations of the NCU signal sensor and the frequency counter. Menu 1 detects the CI state, while menu 3 detects the CNG signal.

Test menu 1
Press numeric keypad key 1 on the LINE DETECT menu to select test menu 1. When CI is detected on the telephone line connection terminal, the LCD display changes from OFF to ON, indicating the received frequency. The LCD also displays the on-hook or off-hook state of an external telephone set as detected. The LCD displays, from left to right, CI, CI frequency, hook port and FC with indications of 1:ON and 0:OFF.

Test menu 2
Press numeric keypad key 2 on the LINE DETECT menu to select test menu 2. When the CNG signal is detected on the telephone line connection terminal, the LCD display changes from OFF to ON, indicating the received frequency. The LCD displays the status of CML, CNG and FED detection, from left to right, with ON/OFF indications. Numeric keypad key 2 turns on the CML relay to detect CNG.

Test menu 3
Press numeric keypad key 3 on the LINE DETECT menu to select test menu 3. When the CNG signal is detected on the telephone line connection terminal, the LCD display changes from OFF to ON, indicating the received frequency. The LCD displays the status of CML, CNG and FED detection, from left to right, with ON/OFF indications. Numeric keypad key 3 turns off the CML relay to detect CNG.

14.13.7 Cleaning Mode

14.13.7.1 Roller cleaning mode ((0) ROLLER CLEAN)

i-SENSYS MF4690PL / / i-SENSYS MF4660

Roller cleaning mode ((0) ROLLER CLEAN)
Press numeric keypad key 0 in test mode to select roller cleaning mode. Press numeric keypad keys 0 and 1 during this test to enter the following menus:

Numeric keypad key 1
Not used.

Numeric keypad key 2
Press the start key clean the unit transfer rollers by idling.
Press the stop key to exit this mode.

Chapter 15 Service Tools

Contents

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15.1 Service Tools

15.1.1 Solvents / Lubricants Table

i-SENSYS MF4690PL / / i-SENSYS MF4660

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No.	Name	Purpose of Use	Component	Remarks
1	Alcohol	Cleaning E.g.) Plastics Rubber Metals Grease Buildup Toner Buildup	Alcohols	- Do not put close to fire. - Source locally
2	Lubricating Oil	- Apply to the gear - Apply in-between the shaft and the shaft support	Special oil Special solid lubricant agent Lithium soap	- Molykote EM-50L (Produced by Dow Corning Corporation) - Tool number: HY9-0007
3	Lubricating Oil	- Apply in-between the pressure roller shaft and the grounding plate	Carbon black Graphite Highly refined mineral oil	- Molykote 41 (Produced by Dow Corning Corporation) - Tool number: CK-8007

Use a rag to clean the exterior of the machine. Soak a rag in water and wring it out as completely as possible before cleaning.

Feb 26 2007

Canon