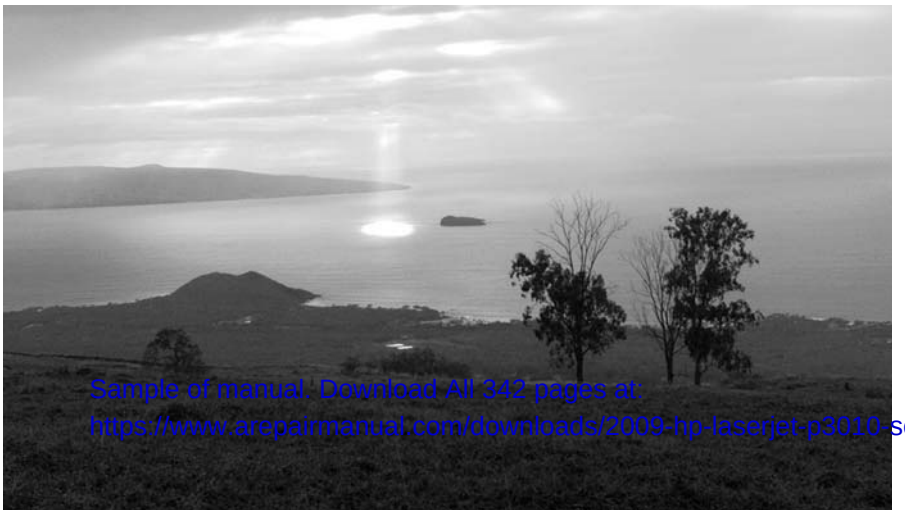
HP LaserJet P3010 Series Printers Service Manual

Additional product information:

www.hp.com/support/ljp3010series



HP LaserJet P3010 Series Printers
Service Manual

Part number: CE524-90909

Edition 1, 7/2009

Conventions used in this guide

TIP: Tips provide helpful hints or shortcuts.

NOTE: Notes provide important information to explain a concept or to complete a task.

CAUTION: Cautions indicate procedures that you should follow to avoid losing data or damaging the product.

WARNING! Warnings alert you to specific procedures that you should follow to avoid personal injury, catastrophic loss of data, or extensive damage to the product.

Table of contents

1 Theory of operation

Basic operation

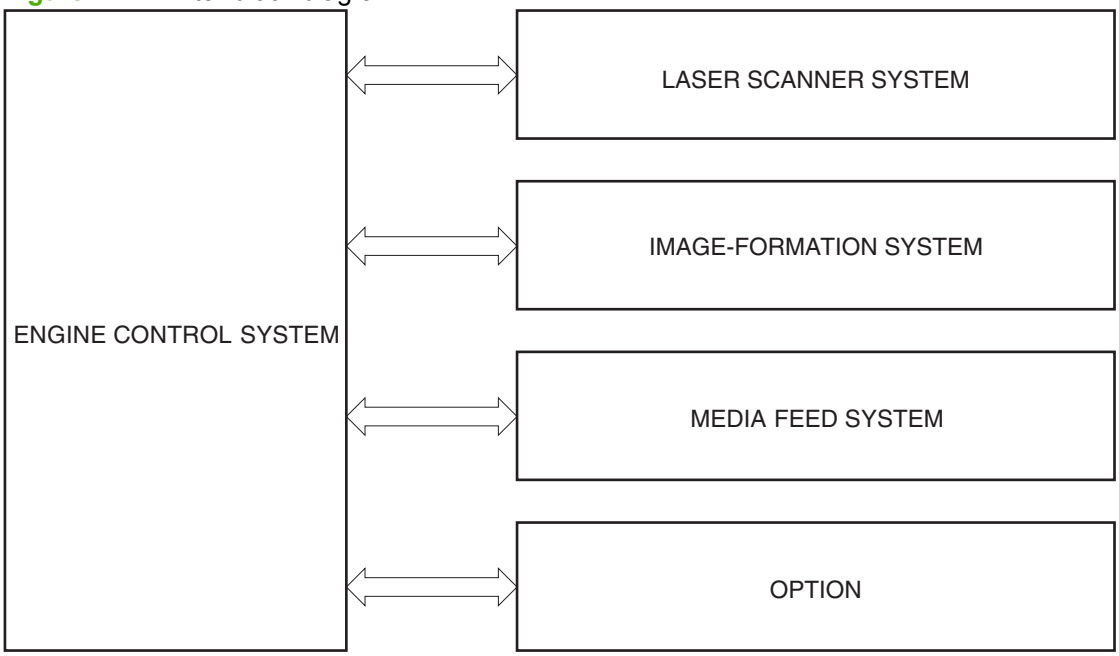
Major printer systems

The product contains the following five systems:

- Engine-control system
- Laser/scanner system
- Image-formation system
- Media feed system
- Option

Printer block diagram

Figure 1-1 Printer block diagram



Sequence of operation

The DC controller in the engine-control system controls the operational sequences of the printer. The table below describes durations and operations for each period of a print operation from when the printer is turned on until the motor stops rotating

Normal sequence of operation

Table 1-1 Sequence of operation

Name	Timing	Purpose
WAIT	From the time the power switch is turned on or the door is closed until the printer is ready for a print operation.	Brings the product to printable condition. The product performs the following during the operation: • Detects the print cartridge
STBY (standby)	From the end of the WAIT or LSTR period until either a print command is sent or the power switch is turned off.	Maintains the product in printable condition.
INTR (initial rotation)	From the time the print command is received until the temperature of the fuser unit reaches its targeted temperature.	Starts up the high-voltage biases, the laser/scanner and the fuser unit for printing.
PRINT	From the end of the INTR period until the last sheet completes the fuser operation.	Forms the image on the photosensitive drum based on the VIDEO signals from the formatter. Transfers and fuses the toner image to the paper.
LSTR (last rotation)	From the end of the PRINT period until the main motor stops rotating.	Moves the last printed sheet out of the product. The product enters the INTR period as the LSTR period is completed, if the formatter sends another print command.

Formatter-control system

The formatter is responsible for the following procedures:

- Controlling sleep mode
- Receiving and processing print data from the various product interfaces
- Monitoring control-panel functions and relaying product-status information (through the control panel and the network or bidirectional interface)
- Developing and coordinating data placement and timing with the DC controller PCA
- Storing font information
- Communicating with the host computer through the network or the bidirectional interface

The formatter receives a print job from the network or bidirectional interface and separates it into image information and instructions that control the printing process. The DC controller PCA synchronizes the image-formation system with the paper-input and -output systems, and then signals the formatter to send the print-image data.

The formatter also provides the electrical interface and mounting locations for one EIO card and an additional DIMM.

Sleep mode

NOTE: In the **SYSTEM SETUP** menu, this item is termed **SLEEP DELAY**.

This feature conserves power after the product has been idle for an adjustable period of time. When the product is in **SLEEP DELAY**, the control-panel backlight is turned off, but the product retains all settings, downloaded fonts, and macros. The default setting is for **SLEEP DELAY** to be enabled, and the product enters **SLEEP DELAY** after a 30-minute idle time.

The product exists **SLEEP DELAY** and enters the warm-up cycle when any of the following events occur:

- A print job, valid data, or a PML or PJL command is received
- A control-panel button is pressed
- A cover is opened
- A paper tray is opened
- The engine-test switch is pressed

NOTE: Product error messages override the Sleep message. The product enters **SLEEP DELAY** at the appropriate time, but the error message continues to appear.

Input/output

The product receives print data primarily from the embedded HP Jetdirect print server. The product also has a USB 2.0 port for connecting directly to a computer.

CPU

The formatter incorporates a 540 MHz Coldfire processor.

Memory

The random access memory (RAM) on the formatter PCA contains the page, I/O buffers, and the font storage area. It stores printing and font information received from the host system, and can also serve to temporarily store a full page of print-image data before the data is sent to the print engine. Memory capacity can be increased by adding a DIMM to the formatter. Note that adding memory might also increase the print speed for complex graphics.

NOTE: If the product encounters a problem when managing available memory, a clearable warning message appears on the control-panel display.

Optional hard disk

This product supports an optional EIO hard disk or an optional secure hard disk as an accessory.

Firmware

The firmware is contained on NAND flash memory soldered on the formatter board. A remote firmware upgrade process is available, which overwrites the firmware in the NAND flash.

Nonvolatile memory

The product uses nonvolatile memory (NVRAM) to store device and user configuration settings. The contents of NVRAM are retained when the product is turned off or disconnected.

PJL overview

The printer job language (PJL) is an integral part of configuration, in addition to the standard printer command language (PCL). With standard cabling, the product can use PJL to perform a variety of functions such as these:

- Two-way communication with the host computer through a network connection or a USB connection. The product can inform the host about such things as the control-panel settings, and the control-panel settings can be changed from the host.
- Dynamic I/O switching. The product uses this switching to be configured with a host on each I/O. The product can receive data from more than one I/O simultaneously, until the I/O buffer is full. This can occur even when the product is offline.
- Context-sensitive switching. The product can automatically recognize the personality (PS or PCL) of each job and configure itself to serve that personality.
- Isolation of print environment settings from one print job to the next. For example, if a print job is sent to the product in landscape mode, the subsequent print jobs print in landscape mode only if they are formatted for landscape printing.

PML

The printer management language (PML) allows remote configuration and status read-back through the I/O ports.

Control panel

The formatter sends and receives product status and command data to and from the control-panel PCA.

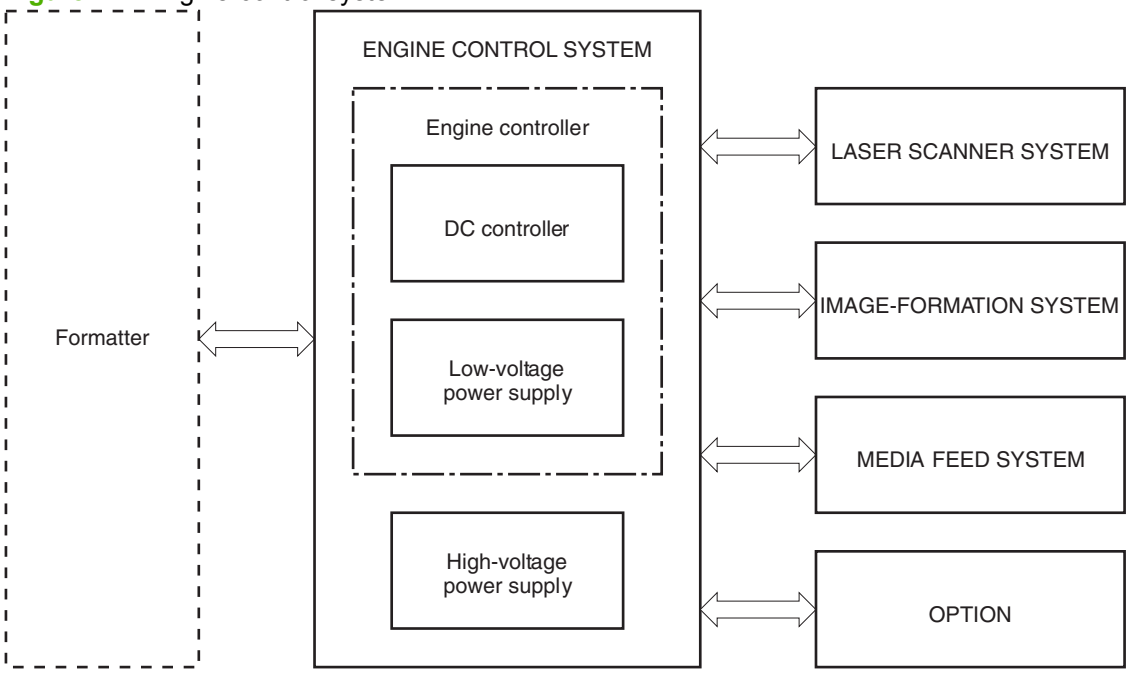
Engine-control system

The engine-control system coordinates all product functions, according to commands that the formatter sends. The engine-control system drives the laser/scanner system, the image formation system, and the pickup/feed/delivery system.

The engine control system contains the following major components:

- Engine-control unit (ECU)
  - DC controller
  - Low-voltage power supply
- High-voltage power supply

Figure 1-2 Engine-control system



Motors, fans, clutches, solenoids, switches, and sensors

Figure 1-3 Motors

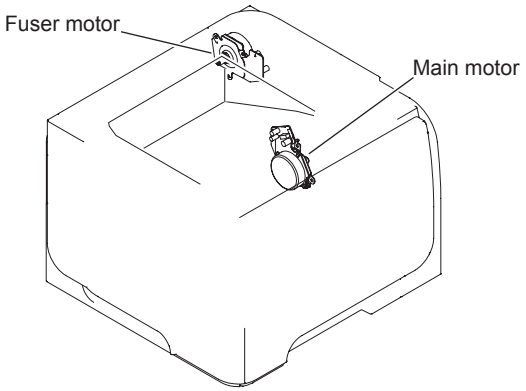


Table 1-2 Motors

Description	Components driven	Fault detection
Main motor (M8001)	• Pickup roller • Feed roller • Transfer roller • Photosensitive drum • Developing roller • Duplex repickup roller (duplex models only)	Yes
Fuser motor (M8002)	• Pressure roller • Delivery roller • Fuser-delivery roller • Duplex-feed roller (duplex models only)	Yes

Figure 1-4 Fans

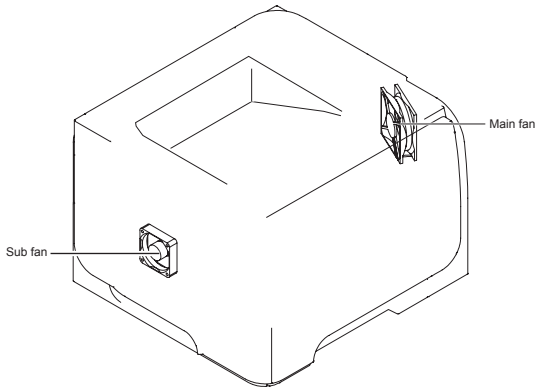


Table 1-3 **Fans**

Description	Area cooled	Type	Speed
Main fan (FM1)	Inside the product	Intake	Full
Sub fan (FM2)	Inside the product	Intake	Full

Figure 1-5 Solenoids and clutches (product)

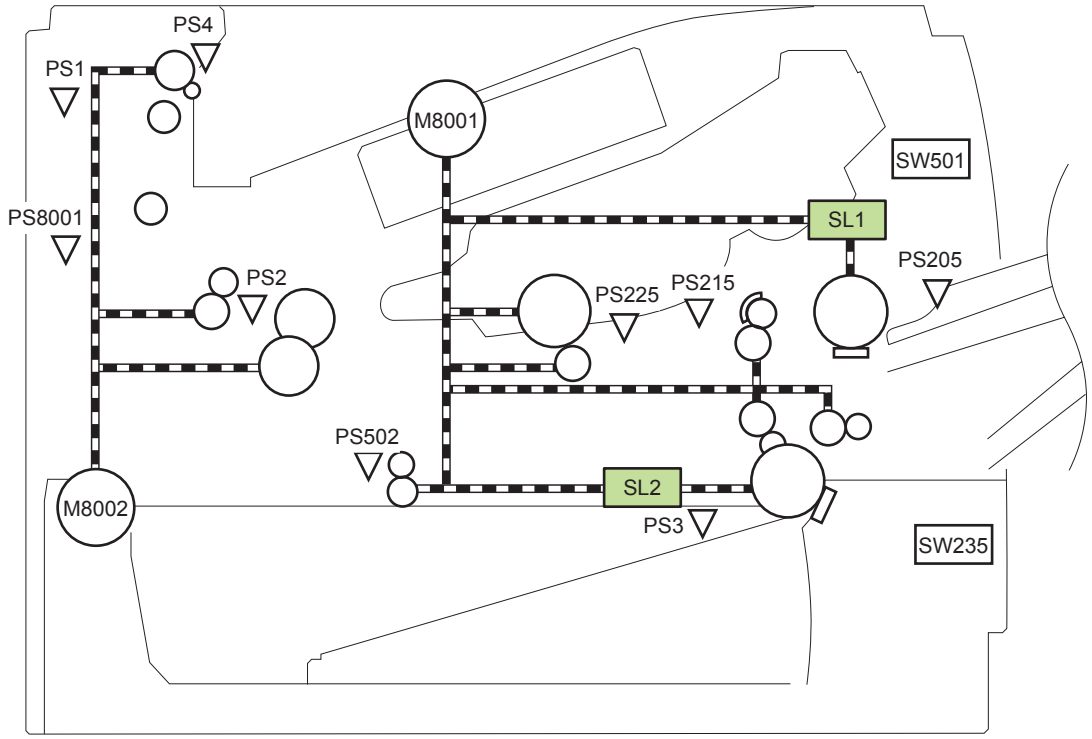


Table 1-4 **Solenoids and clutches (product)**

Item	Description
SL1	Tray 1 (multipurpose tray) pickup solenoid
SL2	Cassette (Tray 2) pickup solenoid

Figure 1-6 Solenoids and clutches (Tray 3 and Tray 4)

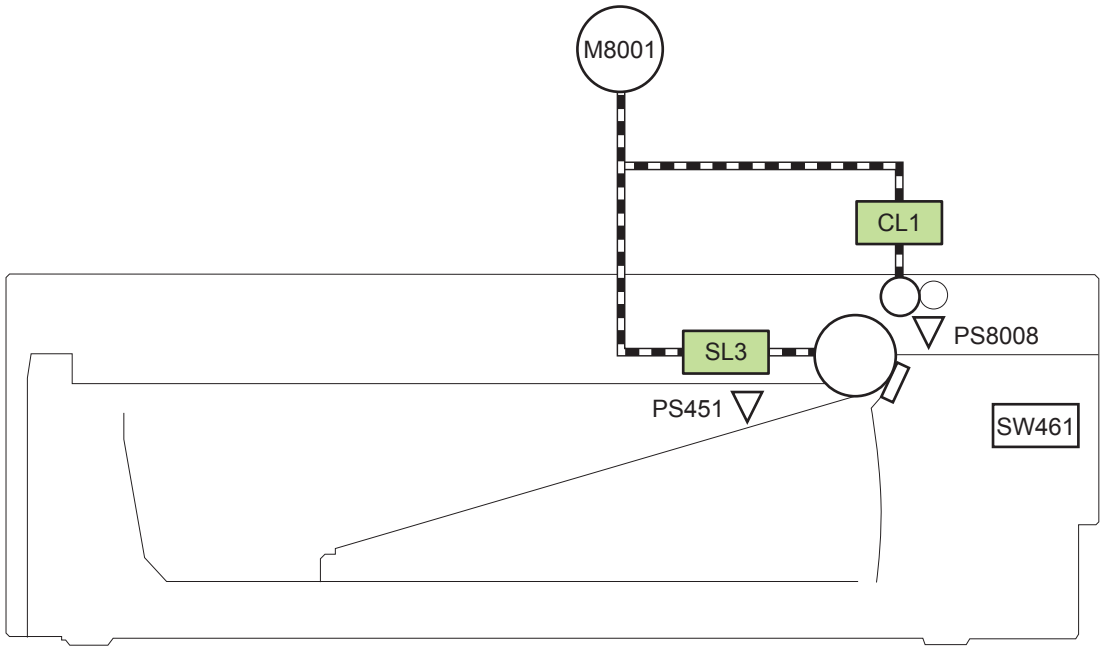


Table 1-5 Solenoids and clutches (Tray 3 and Tray 4)

Item	Description
SL3	Paper feeder pickup solenoid
CL1	Paper feeder pickup clutch

[1] Tray 3 and Tray 4 are identical 500-sheet input trays.

Figure 1-7 Switches (product)

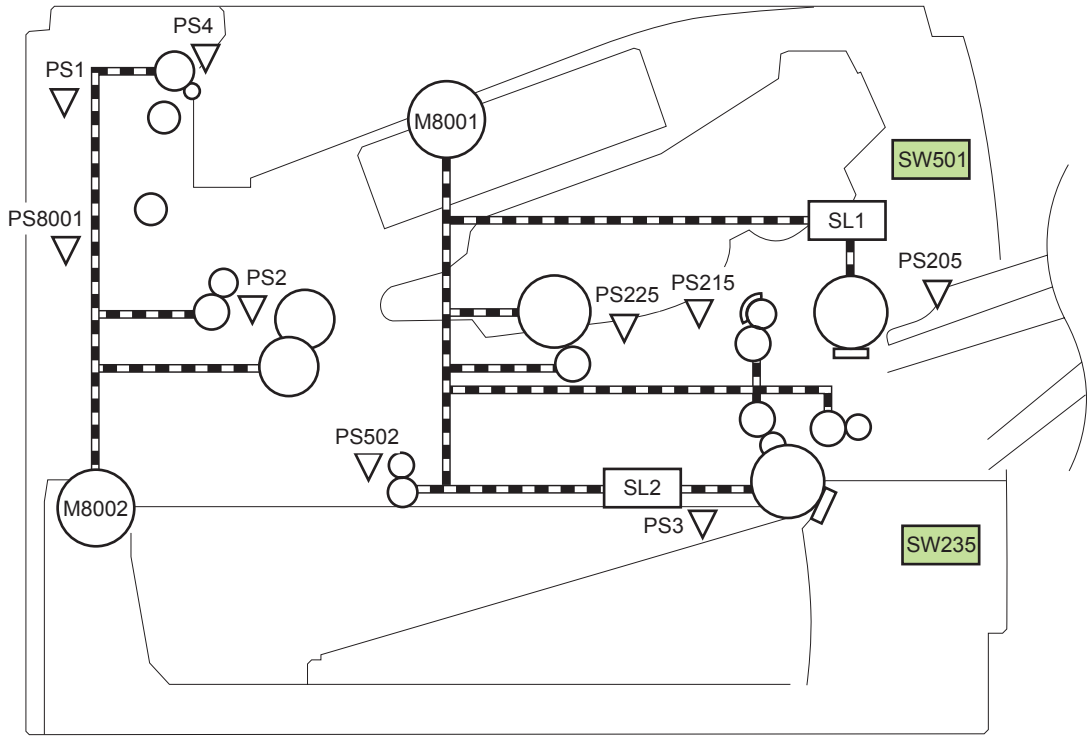


Table 1-6 Switches (product)

Item	Description
SW235	Cassette presence switch
SW501	Cartridge-door switch

Figure 1-8 Switches (Tray 3 and Tray 4)

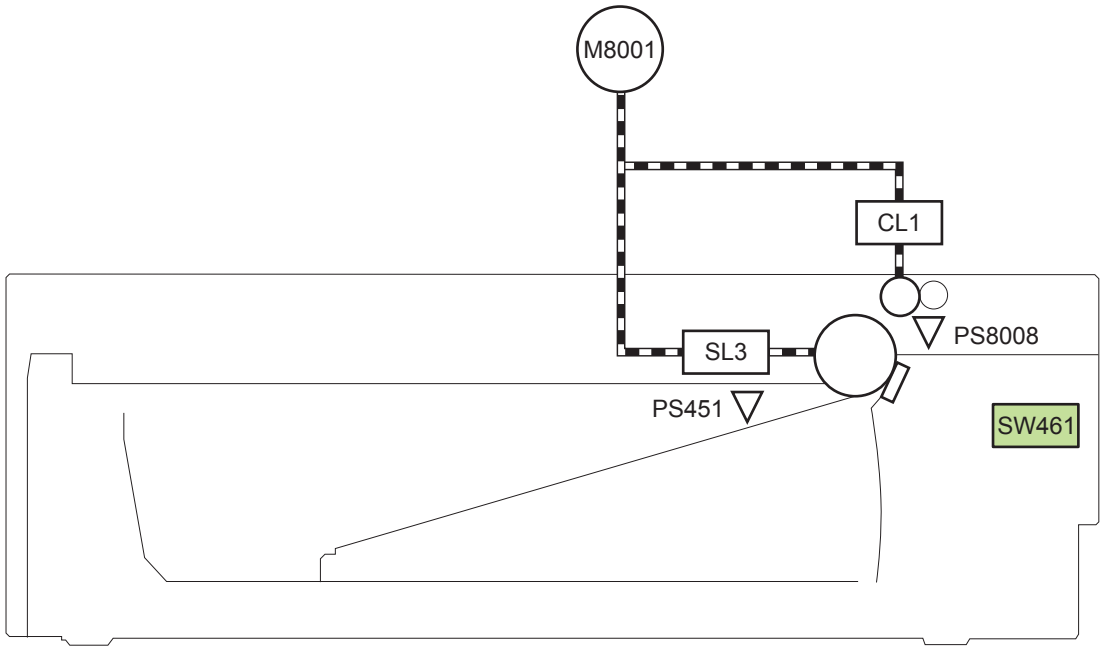


Table 1-7 Switches (Tray 3 and Tray 4)

Item	Description
SW461	Paper feeder cassette presence switch

[1] Tray 3 and Tray 4 are identical 500-sheet input trays.

Figure 1-9 Sensors

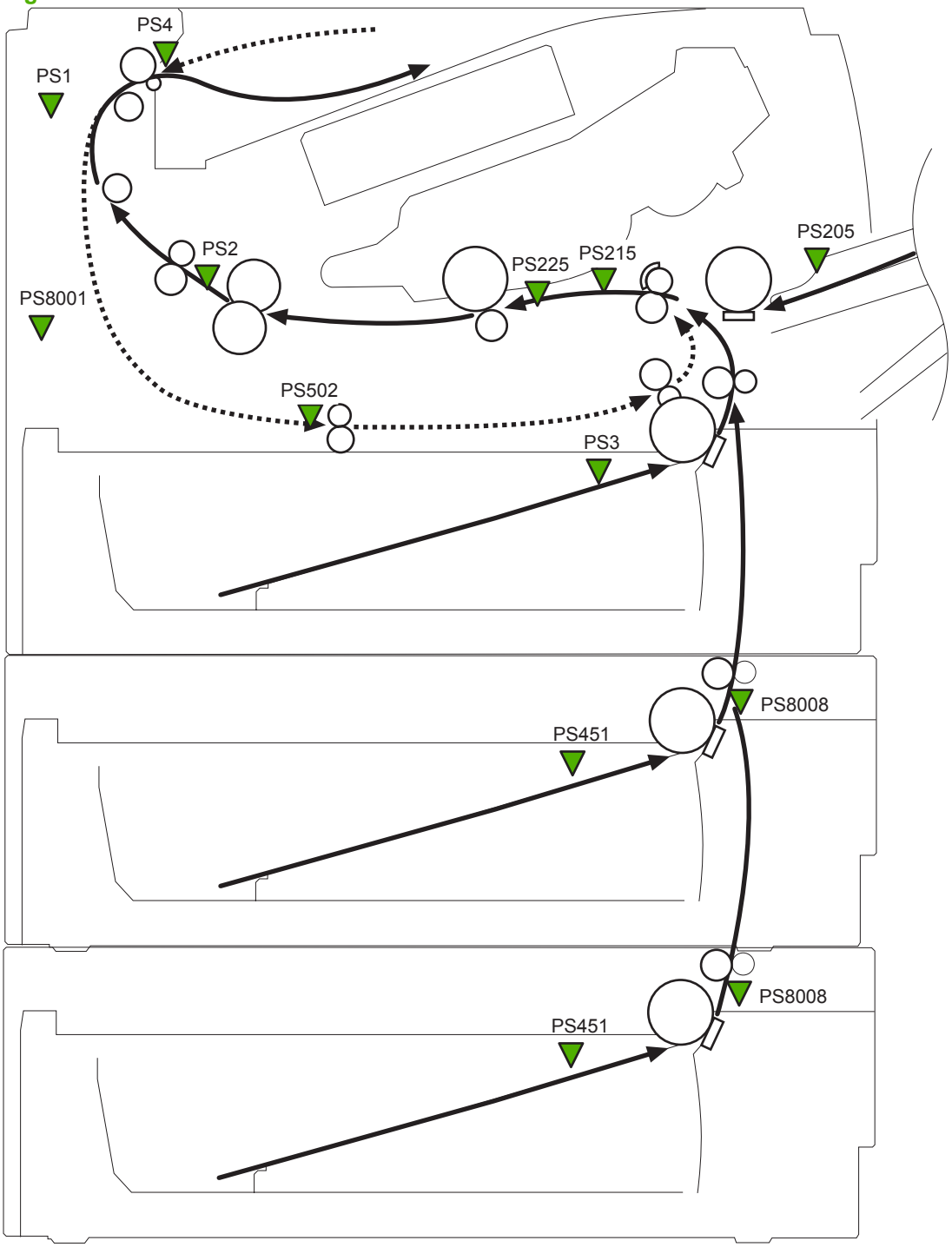


Table 1-8 **Sensors**

Item	Description	Item	Description
PS1	Face-up sensor	PS225	Media width sensor
PS2	Fuser delivery sensor	PS502	Duplex media-feed sensor (duplex models only)
PS3	Cassette media-presence sensor	PS451	Paper feeder cassette media-presence sensor **NOTE:** PS451 is used in Tray 3, and Tray 4

Table 1-8 Sensors (continued)

Item	Description	Item	Description
PS4	Face-down tray media-full sensor	PS8001	Rear door sensor
PS205	Tray 1 (multipurpose tray) media-presence sensor	PS8008	Paper feeder media-feed sensor **NOTE:** PS8008 is used in Tray 3, and Tray 4
PS215	Top-of-Page (TOP) sensor		

DC controller operations

The DC controller controls the operational sequences of the product systems.

Figure 1-10 DC controller block diagram

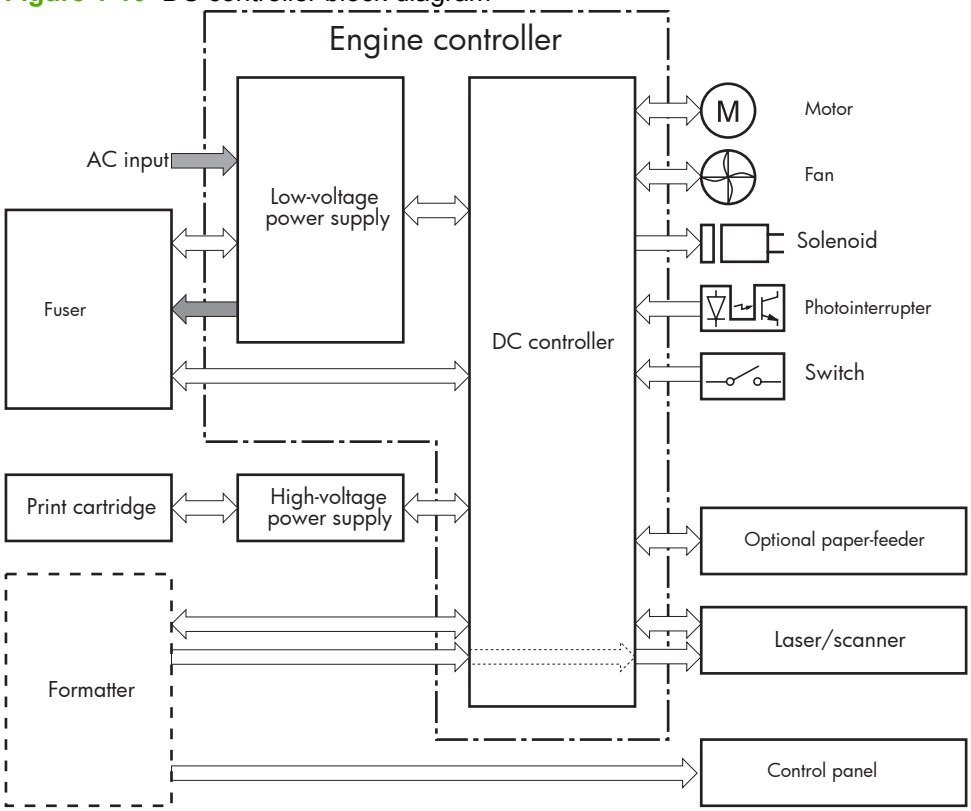


Table 1-9 **DC controller controlled components**

Component	Designator	Description
Motor	M8001	Main motor
	M8002	Fuser motor
Fan	FM1	Main fan
	FM2	Sub fan
Solenoid	SL1	Tray 1 (multipurpose tray) pickup solenoid
	SL2	Cassette (Tray 2) pickup solenoid

Table 1-9 DC controller controlled components (continued)

Component	Designator	Description
Photointerrupter	PS1	Face-up sensor
	PS2	Fuser delivery sensor
	PS3	Cassette media presence sensor
	PS4	Face-down tray (output bin) media-full sensor
	PS205	Tray 1 (multipurpose tray) presence sensor
	PS215	Top-Of-Page (TOP) sensor
	PS225	Media width sensor
	PS451	Paper feeder cassette media-presence sensor **NOTE:** PS451 is used in Tray 3, and Tray 4
	PS502	Duplex media-feed sensor (duplex models only)
	PS8001	Rear door sensor
	PS8008	Paper feeder media-feed sensor
Switch	SW235	Cassette-presence switch **NOTE:** PS8008 is used in Tray 3, and Tray 4
	SW240	Power switch
	SW250	Test Print switch
	SW501	Cartridge-door switch

Fuser-control circuit

The fuser-control circuit monitors and controls the temperature in the fuser. The product uses on-demand fusing. The fuser-control circuit consists of the following major components:

- Fuser heater (H1); heats the fusing film
- Thermistor (TH1 and TH2); detects the fuser temperature (contact type)
  - Main thermistor (TH1); controls the temperature in the fuser (contact type)
  - Sub thermistor (TH2); detects a one-sided temperature rise in the fuser and controls the temperature in the fuser (contact type)
- Thermoswitch (TP1); prevents abnormal temperature rise in the fuser (contact type)

Figure 1-11 Fuser control circuit