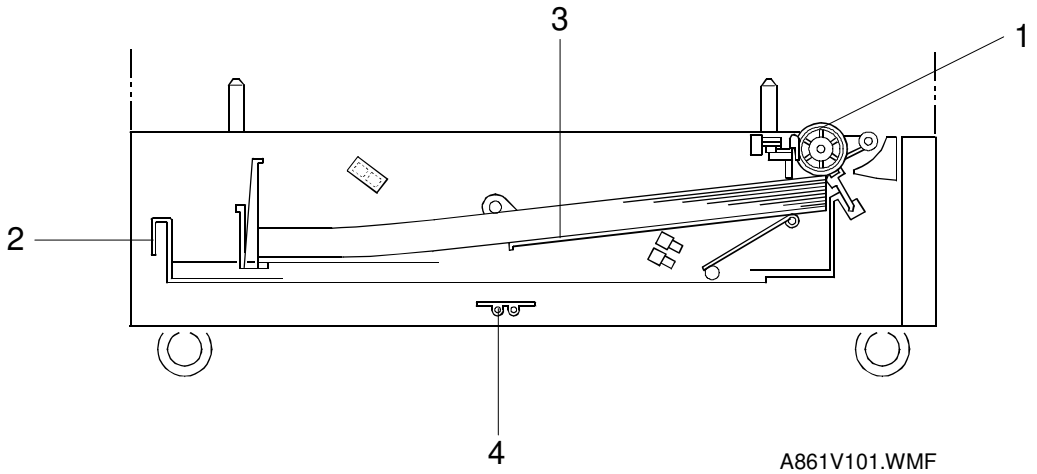
PAPER TRAY UNIT
(Machine Code: A861)

1. OVERALL MACHINE INFORMATION

1.1 SPECIFICATIONS

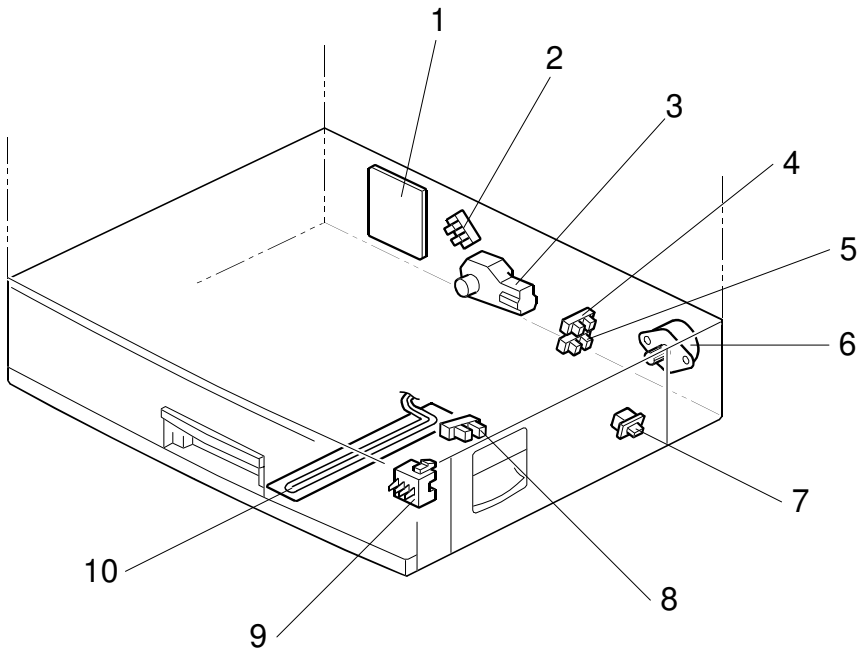
Paper Size:	A5 to A3 HLT lengthwise to DLT
Paper Weight:	60 ~ 105 g/m^2, 16 ~ 28 lbs.
Tray Capacity:	500 sheets (80 g/m^2, 20 lbs.) x 1 tray
Paper Feed System:	Feed roller and friction pad
Paper Height Detection:	4 steps (100%, 70%, 30%, Near end)
Power Source:	24 VDC and 5VDC (from the copier): 120 Vac: 120 V version, from the copier when the optional tray heater is installed 220 ~ 240 Vac: 230 V version, from the copier when the optional tray heater is installed
Power Consumption:	Max: 20 W (Copying) 23 W (Optional Tray Heater On) Average: 13 W (Copying) 15 W (Optional Tray Heater On)
Weight:	12 kg (26.4 lbs)
Size (W x D x H):	550 mm x 520 mm x 134 mm

1.2 MECHANICAL COMPONENT LAYOUT



1. Paper Feed Roller
2. Tray
3. Bottom Plate
4. Optional Tray Heater

1.3 ELECTRICAL COMPONENT LAYOUT



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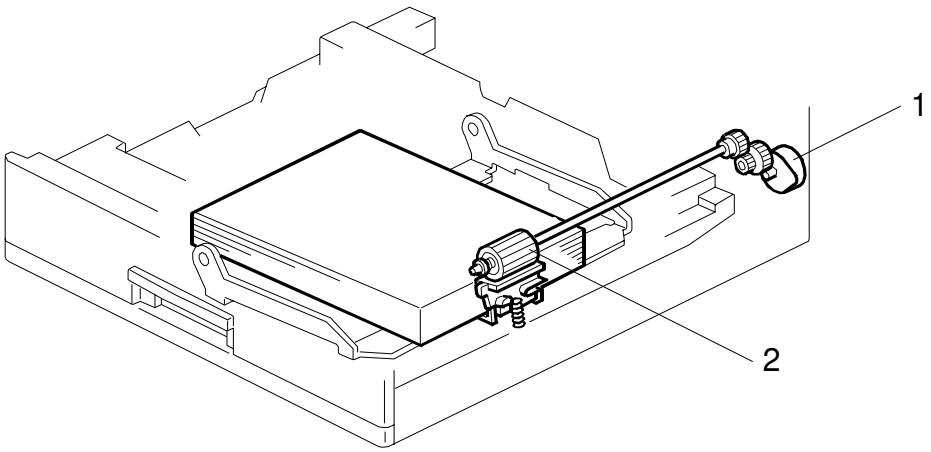
1. Tray Main Board
2. Lift Sensor
3. Lift Motor
4. Paper Height 2 Sensor
5. Paper Height 1 Sensor
6. Paper Feed Motor
7. Tray Cover Switch
8. Paper End Sensor
9. Paper Size Switch
10. Optional Tray Heater

1.4 ELECTRICAL COMPONENT DESCRIPTION

Symbol	Name	Function	Index No.
Motors			
M1	Paper Feed	Drives the paper feed roller.	6
M2	Lift	Lifts the tray bottom plate.	3
Sensors			
S1	Lift	Detects when the paper in the tray is at the correct feed height.	2
S2	Paper End	Informs the copier when the tray runs out of paper.	8
S3	Paper Height 1	Detects the amount of paper in the tray.	5
S4	Paper Height 2	Detects the amount of paper in the tray.	4
Switches			
SW1	Tray Cover	Detects whether the tray cover is opened.	7
SW2	Paper Size	Determines what paper size is in the tray.	9
PCBs			
PCB1	Tray Main	Controls the paper tray unit and communicates with the copier.	1
Others			
H1	Optional Tray Heater	Removes humidity from the paper in the tray.	10

1.5 DRIVE LAYOUT



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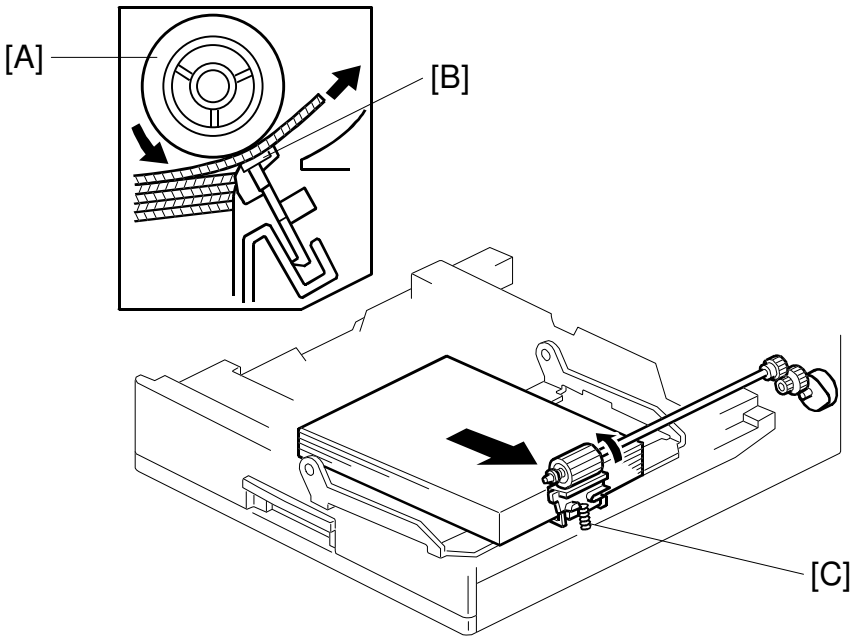
1. Paper Feed Motor
2. Paper Feed Roller

2. DETAILED DESCRIPTIONS

2.1 PAPER FEED AND SEPARATION



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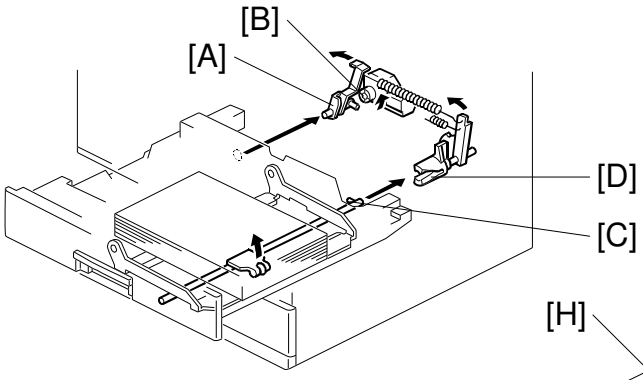
The paper tray holds 500 sheets. The paper feed roller [A] drives the top sheet of paper from the paper tray to the copier. The friction pad [B] allows only one sheet to feed at a time. The friction pad applies pressure to the feed roller with a spring [C].

2.2 PAPER LIFT MECHANISM



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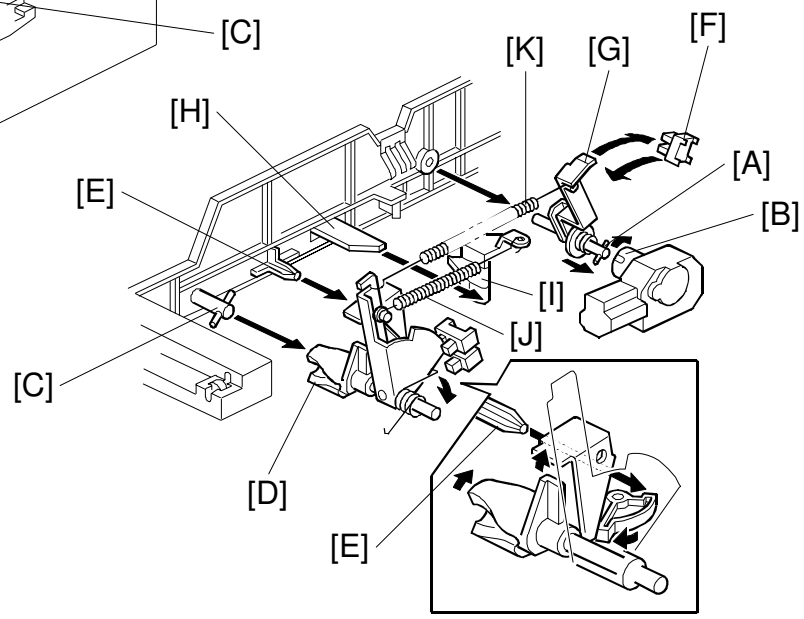

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The SP modes mentioned in this section apply to A250 only, and not to G038.

The paper size switch detects when the tray is pushed in.

When the paper tray is pushed into the machine, the pin [A] for the lift motor pressure shaft engages the lift motor coupling [B] and the pin [C] for the bottom plate lift shaft in the tray engages the bottom plate pressure lever coupling [D]. The pin [E] on the rear of the tray pushes the lock lever so that the lift motor can lift the bottom plate pressure lever.

The lift motor turns on, and turns clockwise as viewed on the diagram. The main pressure spring [K] pulls the bottom plate pressure lever, and this lifts the tray bottom plate.

When the top of the stack touches the feed roller, the motor cannot pull up the plate any more, so it pulls the actuator [G] into the lift sensor [F].

The pressure of the feed roller on the paper is now too high, so the lift motor reverses to reduce this pressure. It reverses for 300 ms or 600 ms, depending on the paper size. For smaller paper, it reverses the larger amount (600 ms) to reduce the pressure more.

When the paper tray is pulled out, the pins [A, C] disengage from the couplings [B, D], and the bottom plate drops. To make it easier to push the tray in, the lift motor rotates backwards 1.7 seconds to return the bottom plate pressure lever coupling [D] to the original position.

The paper size thresholds for this feature depend on SP1-908-8 and 9. (Note that there are two paper size thresholds: small and middle. Some models only use the small threshold.) The amount of reverse depends on SP 1-908-1, 2, and 3. (See the table later in this section for details of how these SP modes work.)

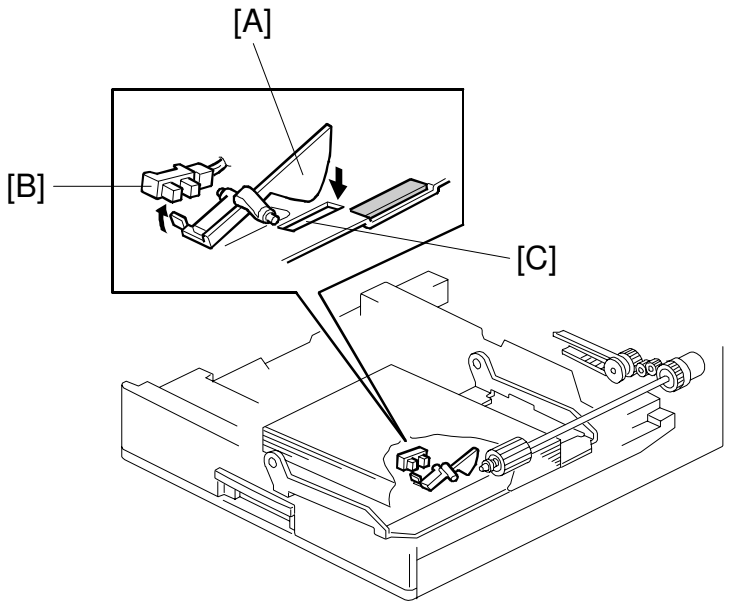
For A4-width paper or wider, a projection [H] on the side fence engages the secondary pressure spring [J] through a lever [I] . Then, the secondary pressure spring [J] applies paper feed pressure in addition to the main pressure spring [K], to ensure that extra pressure is applied to wider paper.

As stated earlier, various SP modes control this mechanism. The following table summarizes them.

No Middle Size Programmed (Default for A250)	With Middle Size Programmed
Paper width: More than 1-908-8 (Default: Wider than HLT) Amount of reverse: 1-908-1 (Default 300 ms)	Paper width: More than 1-908-9 Amount of reverse: 1-908-1
Paper width: 1-908-8 or less (Default: HLT or narrower) Amount of reverse: 1-908-2 (Default: 600 ms)	Paper width: More than 1-908-8, up to and including 1-908-9 Amount of reverse: 1-908-3
	Paper width: 1-908-8 or less Amount of reverse: 1-908-2

When the paper tray is pulled out, the pins [A, C] disengage from the couplings [B, D], and the bottom plate drops. To make it easier to push the tray in, the lift motor rotates backwards 1.7 seconds to return the bottom plate pressure lever coupling [D] to the original position.

2.3 PAPER END DETECTION



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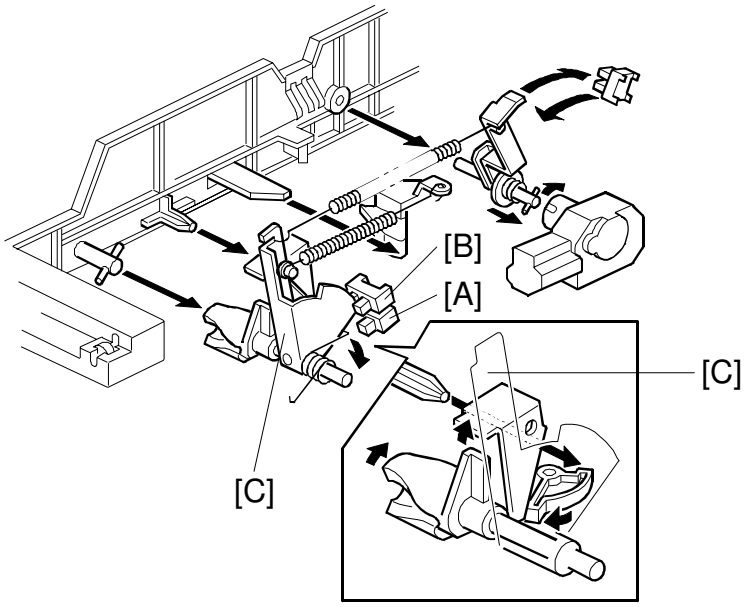
If there is some paper in the paper tray, the paper stack raises the paper end feeler [A] and the paper end sensor [B] is deactivated.

When the paper tray runs out of paper, the paper end feeler drops into the cutout [C] in the tray bottom plate and the paper end sensor is activated.

When the paper tray is drawn out with no paper in the tray, the shape of the paper end feeler causes it to lift up.

2.4 PAPER HEIGHT DETECTION



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The SP modes mentioned in this section apply to A250 only, and not to G038.

The amount of paper in the tray is detected by the combination of on/off signals from two paper height sensors [A] and [B].

When the amount of paper decreases, the bottom plate pressure lever [C] moves the actuator up.

The following combination of sensor signals is sent to the copier.

Amount of Paper	Paper Height Sensor 1	Paper Height Sensor 2
Near End	OFF	ON
30%	ON	ON
70%	ON	OFF
100%	OFF	OFF

When the tray contains paper of a small width, the paper feed pressure may become too low when the thickness of the stack of remaining paper has decreased. The lift motor rotates forward 300 ms after the sensor detects a certain amount of paper remaining in the tray to increase paper feed pressure, simulating the pressure generated by a full tray.

The amount of remaining paper depends on SP modes 1-908-6 and 7. The amount of forward rotation depends on SP1-908-4 and 5. Note that there are two paper size thresholds: small and middle (this is the same as for the paper lift mechanism described earlier). Some models only use the small threshold. The paper size thresholds depend on SP1-908-8 and 9.

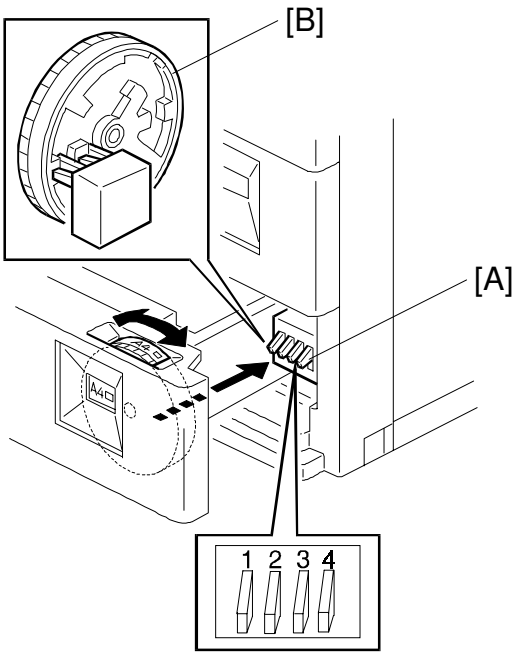
The following table summarizes how these SP modes work.

No Middle Size Programmed (Default for A250)	With Middle Size Programmed
Paper width: More than 1-908-8 (Default: Wider than HLT) Amount of forward rotation: None	Paper width: More than 1-908-9 Amount of forward rotation: None
Paper width: 1-908-8 or less (Default: HLT or narrower) Amount of remaining paper: 1-908-6 (Default: When near-end is detected) Amount of forward rotation: 1-908-4 (Default: 300 ms)	Paper width: More than 1-908-8, up to and including 1-908-9 Amount of remaining paper: 1-908-7 Amount of forward rotation: 1-908-5
	Paper width: 1-908-8 or less Amount of remaining paper: 1-908-6 Amount of forward rotation: 1-908-4

2.5 PAPER SIZE DETECTION

SW / Size	1	2	3	4
A3, F (8 1/2" x 13")	●	●	●	❍
A4 Lengthwise	●	❍	●	❍
A4 Sideways	●		❍	❍
A5 Sideways, 11" x 17"	●	●	❍	❍
B4, 8 1/2" x 14"	❍	●	❍	❍
B5 Sideways, 8 1/2" x 11"	❍	❍	❍	❍
B5 Lengthwise, 11" x 8 1/2"	❍	❍	●	❍
* (Asterisk)	❍	❍	●	●

●: ON (Not pushed)
❍: OFF (Pushed)



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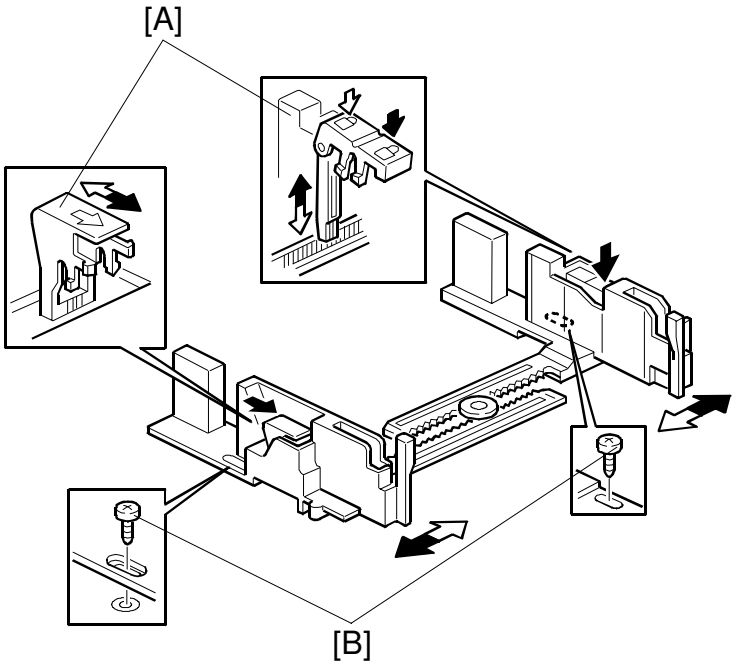
There are four paper size microswitches [A] on the front right plate of the paper tray unit. The switches are actuated by a paper size actuator [B] behind the paper size indicator plate, which is on the front right of the tray.

Each paper size has its own actuator, with a unique combination of notches. To determine which size tray has been installed, the CPU reads which microswitches the actuator has switched off.

The CPU disables paper feed from a tray if the paper size cannot be detected. If the paper size actuator is broken, or if there is no tray installed, the Add Paper indicator will light.

When the paper size actuator is at the "*" mark, the paper tray can be set up to accommodate one of a wider range of paper sizes by using user tools. If the paper size for this position is changed without changing the user tool setting, a paper jam will result.

2.6 SIDE AND END FENCES



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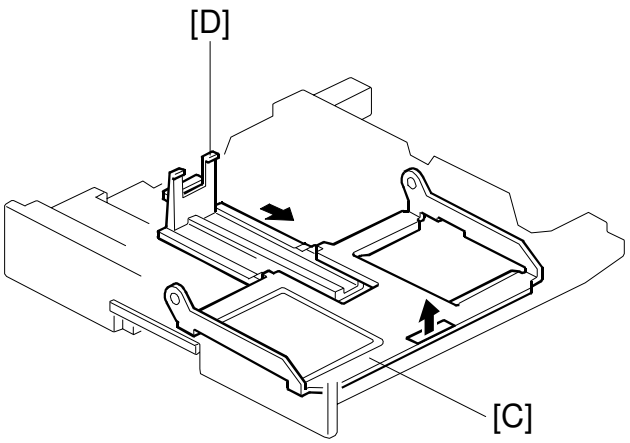

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Side Fences

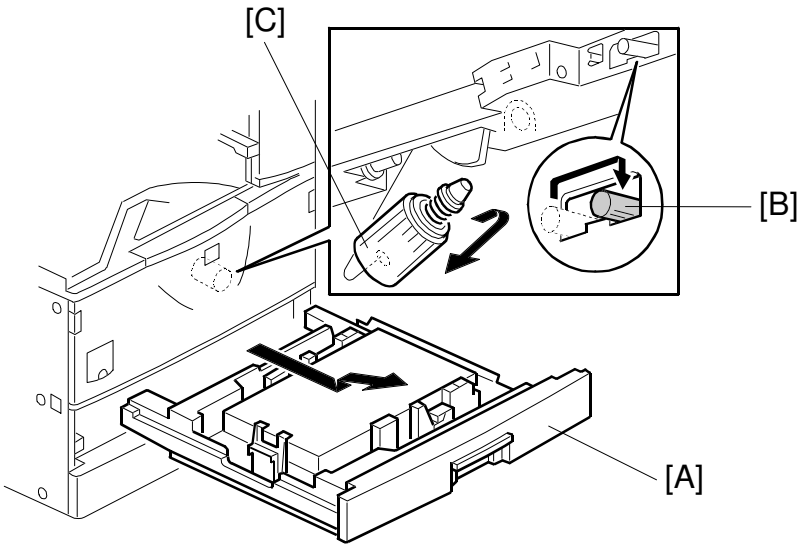
If the tray is full of paper and it is pushed in strongly, the fences may deform or bend. This may cause the paper to skew or the side-to-side registration to be incorrect. To correct this, each side fence has a stopper [A] attached to it. Each side fence can be secured with a screw [B], for customers who do not want to change the paper size.

End Fence

As the amount of paper in the tray decreases, the bottom plate [C] lifts up gradually. The end fence [D] is connected to the bottom plate. When the tray rises, the end fence moves forward and pushes the back of the paper stack to keep it squared up

3. REPLACEMENT AND ADJUSTMENT

3.1 FEED ROLLER REPLACEMENT



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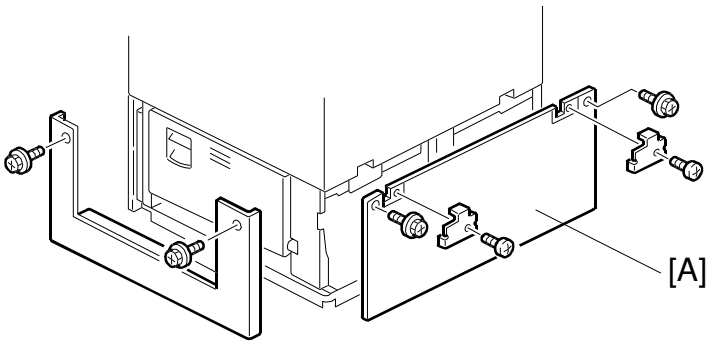
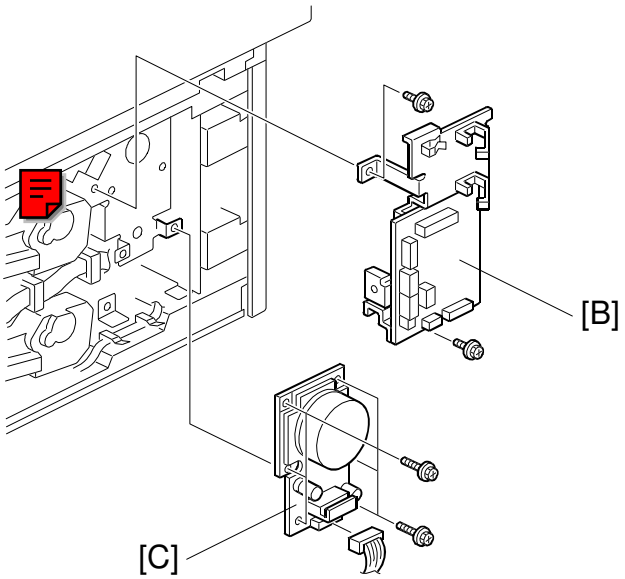
1. Remove the paper tray [A].
2. Move the release lever [B] to the front.
3. Pull the feed roller [C] to the operation side and remove it.
4. Replace the feed roller.



A861R151.WMF



A861R103.WMF

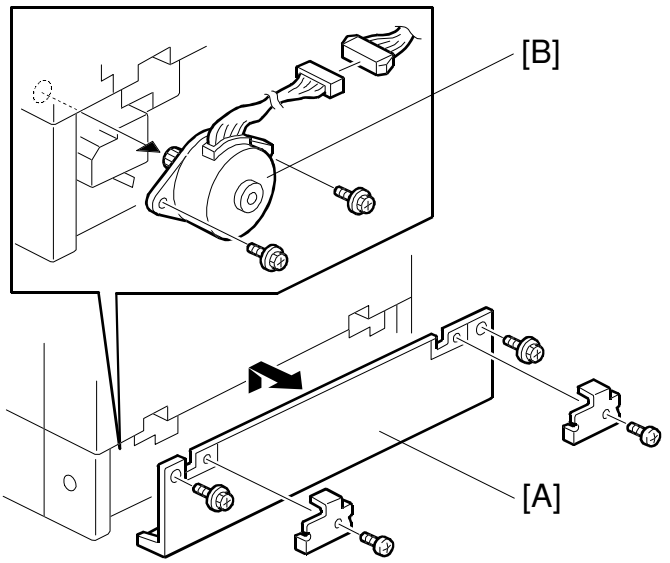
3.2 TRAY MAIN BOARD REPLACEMENT

1. Remove the rear cover [A] (4 screws).
2. Replace the tray main board [B] (4 screws and 8 connectors).

3.3 TRAY MOTOR REPLACEMENT

1. Remove the rear cover (4 screws).
2. Disconnect 8 connectors on the tray main board [B].
3. Remove the tray main board with the bracket (2 screws).
4. Remove the tray motor [C] (6 screws and 1 connector).

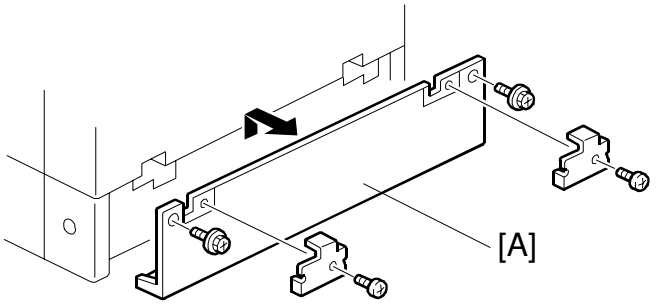
3.4 TRAY MOTOR REPLACEMENT



A861R102.WMF

1. Remove the rear cover [A] (4 screws).
2. Replace the tray motor [B] (2 screws and 1 connector).

3.5 LIFT MOTOR REPLACEMENT



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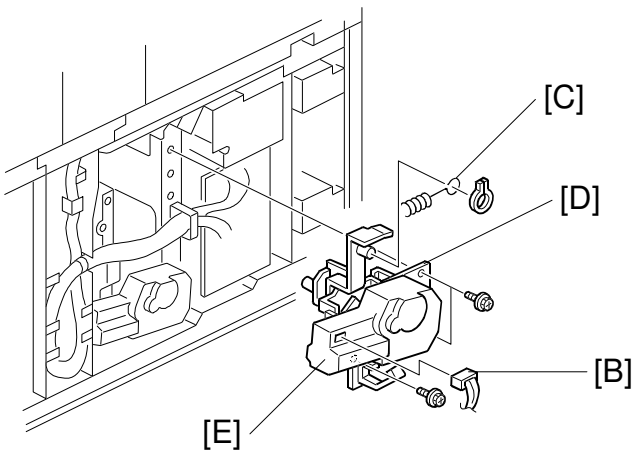
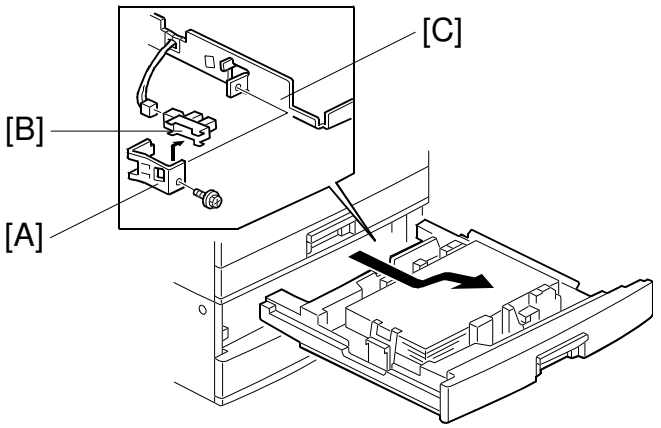


A861R104.WMF

1. Pull out the paper tray.
2. Remove the rear cover [A] (4 screws).
3. Disconnect the 2P connector [B].
4. Remove the spring [C].
5. Remove the lift motor unit [D] (3 screws).
6. Remove the lift motor [E] (2 screws).

3.6 PAPER END SENSOR REPLACEMENT

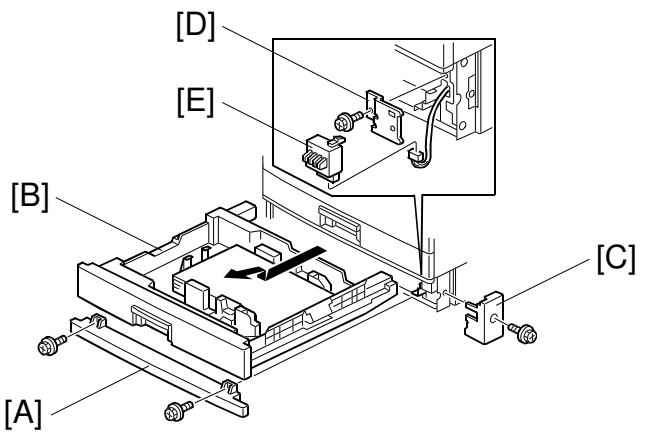


A861R106.WMF

1. Remove the paper tray.
2. Remove the paper end sensor bracket [A] (1 screw and 1 connector).
3. Replace the paper end sensor [B].

NOTE: After replacing the sensor, pull the sensor harness to the right side of the frame [C] so that the harness does not touch the paper in the tray.

3.7 PAPER SIZE SWITCH REPLACEMENT

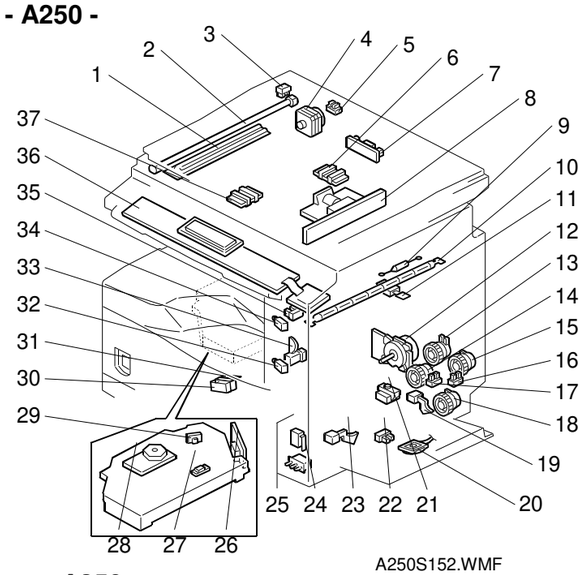


A861R101.WMF

1. Remove the lower tray cover [A] (2 screws).
2. Remove the paper tray [B].
3. Remove the right front cover [C] (1 screw).
4. Remove the paper size switch bracket [D] (1 screw).
5. Replace the paper size switch [E].

ELECTRICAL COMPONENT LAYOUT (A250/A859/A860/A861/A869)

- A250 -



A250S152.WMF

- A250 -

Symbol	Index No.	Description	P to P
Motors			
M1	4	Scanner	K2
M2	28	Polygonal Mirror	C8
M3	12	Main	G2
M4	46	Exhaust Fan	B2
Magnetic Clutches			
MC1	14	Paper Feed	F2
MC2	15	By-pass Feed	C2
MC3	18	Vertical Transport	F2
MC4	13	Registration	B2
Switches			
SW1	40	Main	B7
SW2	30	Right Door Switch 1	A2
SW3	31	Right Door Switch 2	A2
SW4	25	Vertical Transport Cover Switch	B2
SW5	24	Paper Size	L2
Sensors			
S1	3	Scanner HP	K2
S2	37	Original Width	J2
S3	6	Original Length 1	I2
S4	6	Original Length 2	I2
S5	21	Toner Near-End	B2
S6	23	Paper End	B2
S7	19	Paper Near-End	C2
S8	16	By-pass Tray Paper	D2
S9	20	By-pass Paper Size	D2
S10	22	Vertical Transport	E2
S11	17	Registration	D2
S12	35	Fusing Exit	A4
S13	27	Exit Tray Paper	E2
S14	5	Platen Cover	J2
S15	33	AIO Set	L2
PCBs			
PCB1	44	BICU	E9
PCB2	39	PSU	C7
PCB3	45	IOB	E3
PCB4	8	SBU	C9
PCB5	7	Lamp Stabilizer	J2
PCB6	26	LD Unit	C8
PCB7	36	Operation Panel	E10
PCB8	—	Memory (option)	G9
PCB9	42	Printer Controller (option)	G9
PCB10	43	FCU (Option)	F10
PCB11	47	NCU (option)	—

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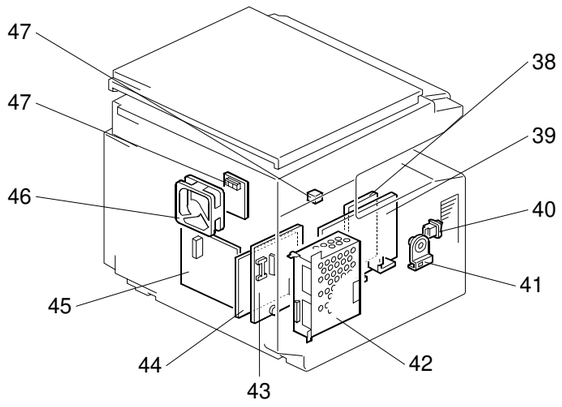

A250S153.WMF

- A250 -

Symbol	Index No.	Description	P to P
Lamps			
L1	2	Exposure Lamps	J2
L2	10	Fusing Lamp	A5
Heaters			
H1	1	Anti-Condensation	A6
H2	—	Drum (option)	A6
Others			
TF1	9	Fusing Thermofuse	A5
TH1	11	Fusing Thermistor	A4
PP1	38	C/B/T	H2
LSD 1	29	Laser Synchronization Detector	C9
CO1	48	Total	F2
CO2	—	Key (option)	L1
LED1	32	Exit Tray	E2
LED2	34	1-bin Tray	F2
SP1	41	Speaker	—

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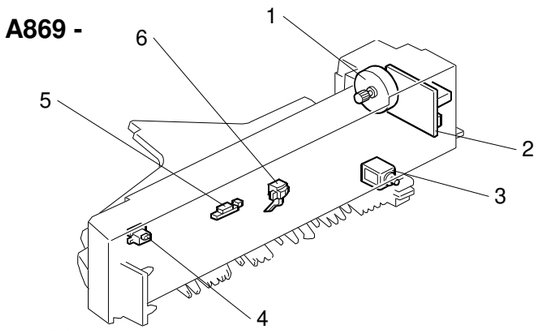

A869S103.WMF

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Symbol	Index No.	Description	P to P
Motors			
M1	1	Tray	M1
Sensors			
S1	6	Exit	N1
S2	5	Paper	N1
Switches			
SW1	4	Bin Tray	N1
PCBs			
PCB1	2	1 Bin Tray	N2
LEDs			
LED1	7	1 Bin Exit Tray	F2
Solenoid			
SOL1	3	Junction Gate	M1

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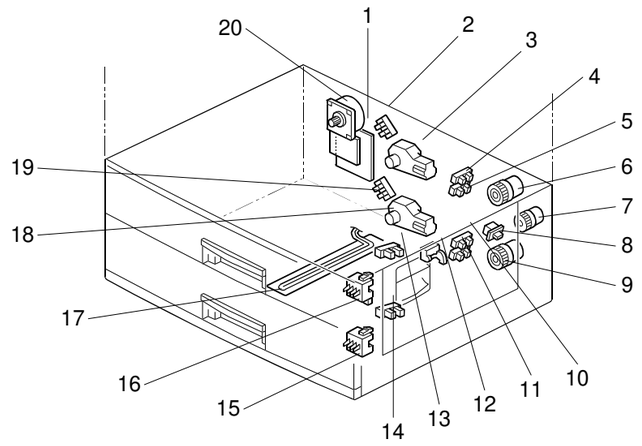

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Symbol	Index No.	Description	P to P
Motors			
M1	20	Tray	L8
M2	3	Upper Lift	N8
M3	18	Lower Lift	M8
Sensors			
S1	2	Upper Lift	M8
S2	19	Lower Lift	M8
S3	13	Upper Paper End	J8
S4	14	Lower Paper End	J8
S5	12	Vertical Transport	I8
S6	15	Upper Paper Size	I8
S7	16	Lower Paper Size	I8
S8	5	Upper Paper Height 1	H8
S9	4	Upper Paper Height 2	H8
S10	11	Lower Paper Height 1	G8
S11	10	Lower Paper Height 2	G8
Switches			
SW1	8	Tray Cover	J8
Magnetic Clutches			
MC1	6	Upper Paper Feed	J8
MC2	9	Lower Paper Feed	K8
MC3	7	Relay	K8
PCBs			
PCB1	1	Tray Main	K7
Others			
H1	17	Option Tray Heater	N8

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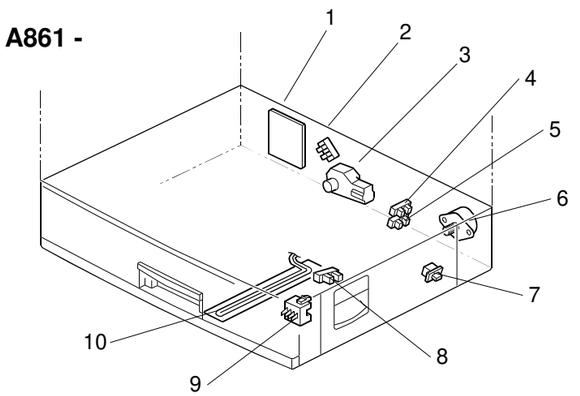

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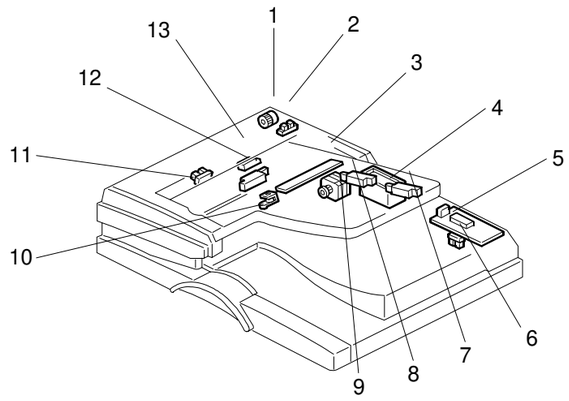

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Symbol	Index No.	Description	P to P
Motors			
M1	9	DF Transport	K6
Sensors			
S1	6	DF Open	M6
S2	13	Registration	L6
S3	2	Feed Cover Open Sensor	M6
S4	3	Original Width	M6
S5	8	Original Length 1	N6
S6	7	Original Length 2	N6
S7	11	Original Set	L6
S8	12	Original Trailing Edge	N6
Solenoids			
SOL1	4	DF Pick-up	L6
SOL2	10	Stamper	K6
Clutches			
MC1	1	DF Feed	K6
PCBs			
PCB1	5	DF Drive	M5

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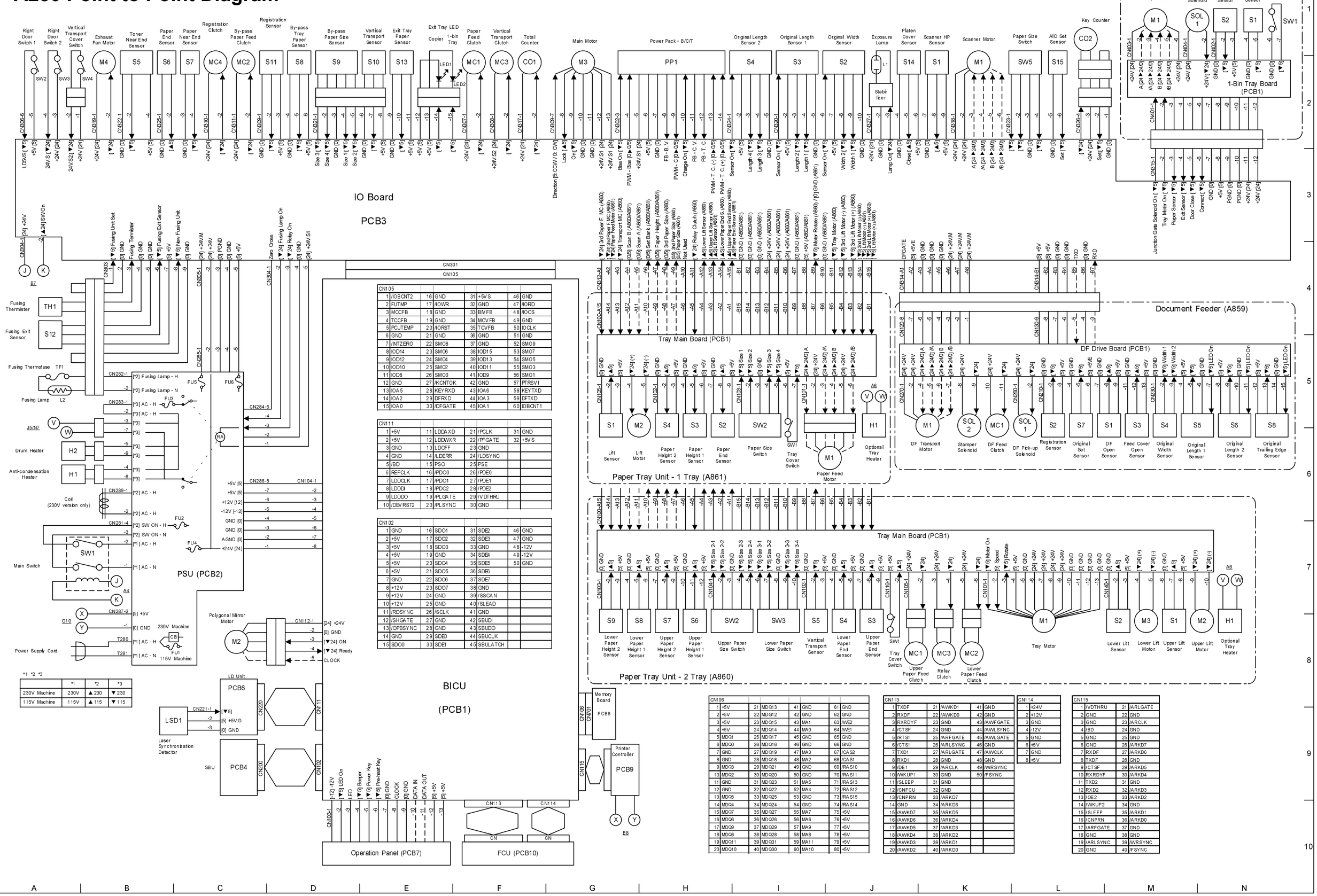
Symbol	Index No.	Description	P to P
Motors			
M1	6	Paper Feed	J6
M2	3	Lift	H6
Sensors			
S1	2	Lift	G6
S2	8	Paper End	H6
S3	9	Paper Size	I6
S4	5	Paper Height 1	H6
S5	4	Paper Height 2	H6
Switches			
SW1	7	Tray Cover	I6
PCBs			
PCB1	1	Tray Main	H5
Others			
H1	10	Option Tray Heater	J6

A250 Point to Point Diagram



CN105					
1	/IOBCNT2	16	GND	31	+5V S
2	FUTMP	17	/IOWR	32	GND
3	MCCFB	18	GND	33	BMFB
4	TCCFB	19	GND	34	MCVFB
5	PCUTEMP	20	/IORST	35	TCVFB
6	GND	21	GND	36	GND
7	/INTZERO	22	SMO8	37	GND
8	IOD14	23	SMO6	38	IOD15
9	IOD12	24	SMO4	39	IOD13
10	IOD10	25	SMO2	40	IOD11
11	IOD8	26	SMO0	41	IOD9
12	GND	27	/KCNTOK	42	GND
13	IOA 5	28	KEYRXD	43	IOA 6
14	IOA 2	29	DFRXD	44	IOA 3
15	IOA 0	30	/DFGATE	45	IOA 1

CN111					
1	+5V	11	LDDAXD	21	/PCLK
2	+5V	12	LDDWXR	22	/PFGATE
3	GND	13	LDCFF	23	GND
4	GND	14	/LDERR	24	/LDSYNC
5	/BD	15	PSO	25	PSE
6	REFCLK	16	/PDO0	26	/PDE0
7	LDDCLK	17	/PDO1	27	/PDE1
8	LDDDI	18	/PDO2	28	/PDE2
9	LDDDO	19	/PLGATE	29	/VDTHRU
10	/DEVRST2	20	/PLSYNC	30	GND

CN102							
1	GND	16	SDO1	31	SDE2	46	GND
2	+5V	17	SDO2	32	SDE3	47	GND
3	+5V	18	SDO3	33	GND	48	-12V
4	+5V	19	GND	34	SDE4	49	-12V
5	+5V	20	SDO4	35	SDE5	50	GND
6	+5V	21	SDO5	36	SDE6		
7	GND	22	SDO6	37	SDE7		
8	+12V	23	SDO7	38	GND		
9	+12V	24	GND	39	/SSCAN		
10	+12V	25	GND	40	/SLEAD		
11	/RDSYNC	26	/SCLK	41	GND		
12	/SHGATE	27	GND	42	SBUDI		
13	/OPBSYNC	28	GND	43	SBUDO		
14	GND	29	SDE0	44	SBUCLK		
15	SDO0	30	SDE1	45	SBULATCH		

CN106					
1	+5V	21	MDQ13	41	GND
2	+5V	22	MDQ12	42	GND
3	+5V	23	MDQ15	43	MA1
4	+5V	24	MDQ14	44	MA0
5	MDQ1	25	MDQ17	45	GND
6	MDQ0	26	MDQ16	46	GND
7	GND	27	MDQ19	47	MA3
8	GND	28	MDQ18	48	MA2
9	MDQ3	29	MDQ21	49	GND
10	MDQ2	30	MDQ20	50	GND
11	GND	31	MDQ23	51	MA5
12	GND	32	MDQ22	52	MA4
13	MDQ5	33	MDQ25	53	GND
14	MDQ4	34	MDQ24	54	GND
15	MDQ7	35	MDQ27	55	MA7
16	MDQ6	36	MDQ26	56	MA6
17	MDQ9	37	MDQ29	57	MA9
18	MDQ8	38	MDQ28	58	MA8
19	MDQ11	39	MDQ31	59	MA11
20	MDQ10	40	MDQ30	60	MA10

CN113					
1	TXDF	21	/AWKD1	41	GND
2	RXDF	22	/AWKD0	42	GND
3	RXRDYF	23	GND	43	/AVFGATE
4	CTSF	24	GND	44	/AWLSYNC
5	RTS1	25	/ARFGATE	45	/AWLGATE
6	CTS1	26	/ARLSYNC	46	GND
7	TXD1	27	/ARLGATE	47	/AVVCLK
8	RXD1	28	GND	48	GND
9	IDE1	29	/ARCLK	49	/VRSYNC
10	/WKUP1	30	GND	50	/FSYNC
11	/SLEEP	31	GND		
12	/CNFCU	32	GND		
13	/CNPRN	33	/ARKD7		
14	GND	34	/ARKD6		
15	/AWKD7	35	/ARKD5		
16	/AWKD6	36	/ARKD4		
17	/AWKD5	37	/ARKD3		
18	/AWKD4	38	/ARKD2		
19	/AWKD3	39	/ARKD1		
20	/AWKD2	40	/ARKD0		

CN114	
1	+24V
2	+12V
3	GND
4	-12V
5	GND
6	+5V
7	GND
8	+5V

CN115			
1	/VDTHRU	21	/ARLGATE
2	GND	22	GND
3	GND	23	/ARCLK
4	/BD	24	GND
5	GND	25	GND
6	GND	26	/ARKD7
7	RXDF	27	/ARKD6
8	TXDF	28	GND
9	CTSF	29	/ARKD5
10	RXRDYF	30	/ARKD4
11	TXD2	31	GND
12	RXD2	32	/ARKD3
13	OE2	33	/ARKD2
14	/WKUP2	34	GND
15	/SLEEP	35	/ARKD1
16	/CNPRN	36	/ARKD0
17	/ARFGATE	37	GND
18	GND	38	GND
19	/ARLSYNC	39	/VRSYNC
20	GND	40	/FSYNC

*1 *2 *3	*1	*2	*3
230V Machine	230V	▲230	▼230
115V Machine	115V	▲115	▼115