

CITIZEN

Service Manual

Model: PPU-231

Line Thermal Printer/Presenter Unit

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**Japan CBM Corporation
Information Systems Div.**

INTRODUCTION

This manual describes the disassembly, reassembly, and maintenance procedures of the line thermal presenter/printer PPU-231. It is intended for field maintenance men.

FEATURES

Packed with features, this small line thermal printer/presenter has a wide range of uses: a terminal device for various data communication, an instrumentation terminal, an outdoor information terminal or a device that prints various tickets and coupons. Please read this manual thoroughly before you use the printer/presenter to ensure it is implemented correctly.

1. Small, lightweight, and installable in a narrow area
2. High speed and low noise, owing to line thermal print
3. Long-life printing head and high reliability, owing to the simple mechanism
4. Easy paper-loading, owing to the auto-loading function
5. Built-in input buffer.
6. Capable of printing a bar code (Special command)
7. You can choose where you attach the power connector, interface connector, etc.
8. Large diameter paper roll support

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※: For the printer mechanism LT380V and auto cutter ACS-230F, refer to the separate Service Manuals.

1. HANDLING AND MAINTENANCE OF PRINTER

See the User's Manual coming with the printer body.

2. SPECIFICATIONS

2.1 Basic Specifications

Item	Description
Printing system	Line thermal dot printing
Printing width	72 mm (576 dots/line)
Dot density	8 dots/mm (Width, Length)
Printing speed	62.5 mm/sec. (At maximum speed), (500-dot line/sec.)
Printing columns and character size	48 columns (12×24 Font A) 1.25×3.00 mm 64 columns (9×24 Font B) 0.88×3.00 mm
Line interval	Initial value: 4.23 mm (1/6 inch) Can be set with a command (1/203 inch at minimum)
Character types	Alphanumeric, Japanese, International characters
Bar code type	UPC-A, JAN(EAN) 13-/8-column, ITF, CODE 39, CODE 128, CODABAR
Paper	Thermal paper roll Width: 80 mm Outer diameter: ϕ 203 mm (Max.), (When using PHU) Inner diameter: ϕ 25.4 mm (Max.) Thickness: 60~85 μ m Recommended paper TF-50KS-E, E2C (made by Nippon Seishi)
Presenter	Length of normal issue 64~305 mm (Can be adapted to issue 457 mm lengths) 2.5~12 inches (Can be adapted to issue 18-inch lengths)
Interface	Serial (RS-232C), Parallel (Conforms to CENTRONICS)
Input buffer	4 KB
Command	ESC/POS
Sensors	Paper near end sensor (When using PHU, position adjustable) Paper end sensor (When using PMU) Black mark Sensor (Option)
Supply voltage	24 V DC $\pm$ 7%
Power consumption	100 W
Weight	PPU: 1.6 kg (Control PCB included) PHU: 0.9 kg (Paper roll excluded)
Outer dimensions	PPU: 144.7(W)×160(D)×172(H) mm PHU: 132.2(W)×120(D)×125.2(H) mm *: Protruding parts are not included.
Operating temperature and humidity	5~40°C, 35~85 % RH (No dew condensation)
Storage temperature and humidity	-20~60°C, 10~90% RH (No dew condensation)
Reliability	Printing head life: Pulse resistance : 50 million pulses or more (Print rate 12.5%) Wear resistance: 30 km or more (With recommended thermal paper at normal temperature and humidity) Auto cutter life: 300,000 cuts (With recommended thermal paper at normal temperature and humidity)

3. DISASSEMBLY AND REASSEMBLY

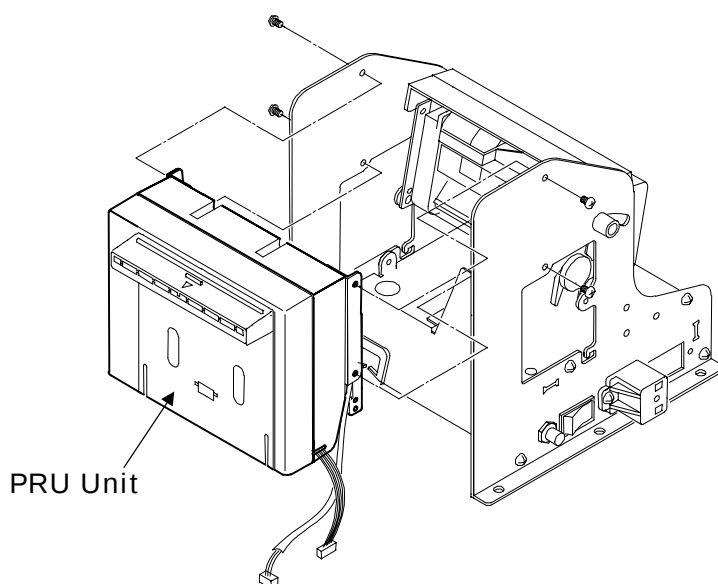
For maintenance operations, note the following:

Notes:

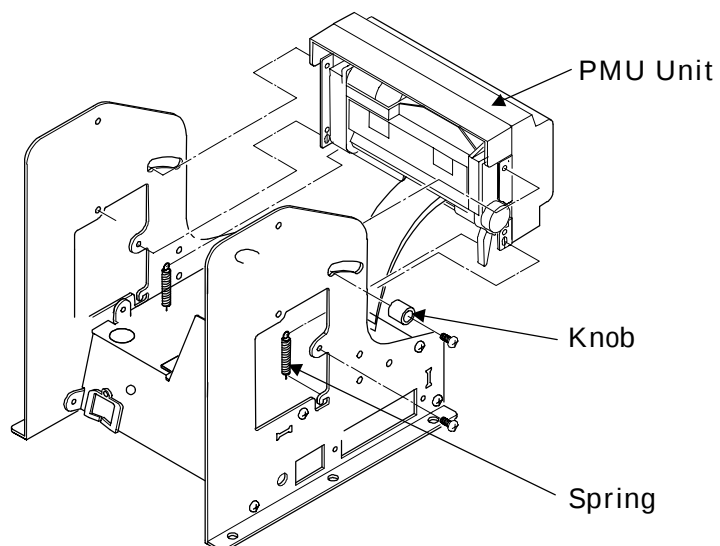
- (1) Do not disassemble/reassemble or adjust the machine, if it functions properly. Particularly, do not loosen screws on any component, unless necessary.
- (2) After completing an inspection and before turning on the power, be sure to check that there is no abnormality.
- (3) Never try to print without paper installed in the printer. Check that the printing paper is properly set.
- (4) During maintenance, be careful not to leave parts or screws unattached or loose inside the printer.
- (5) When handling the thermal head and control board, do not use gloves or other aids which can easily cause static electricity. Also, avoid a place where static electricity can occur.
- (6) When disassembling or reassembling, check cables and boards for any damage. Do not run cables into a narrow space or set cables in improper positions.

3.1 Disassembly Procedure for PPU Unit

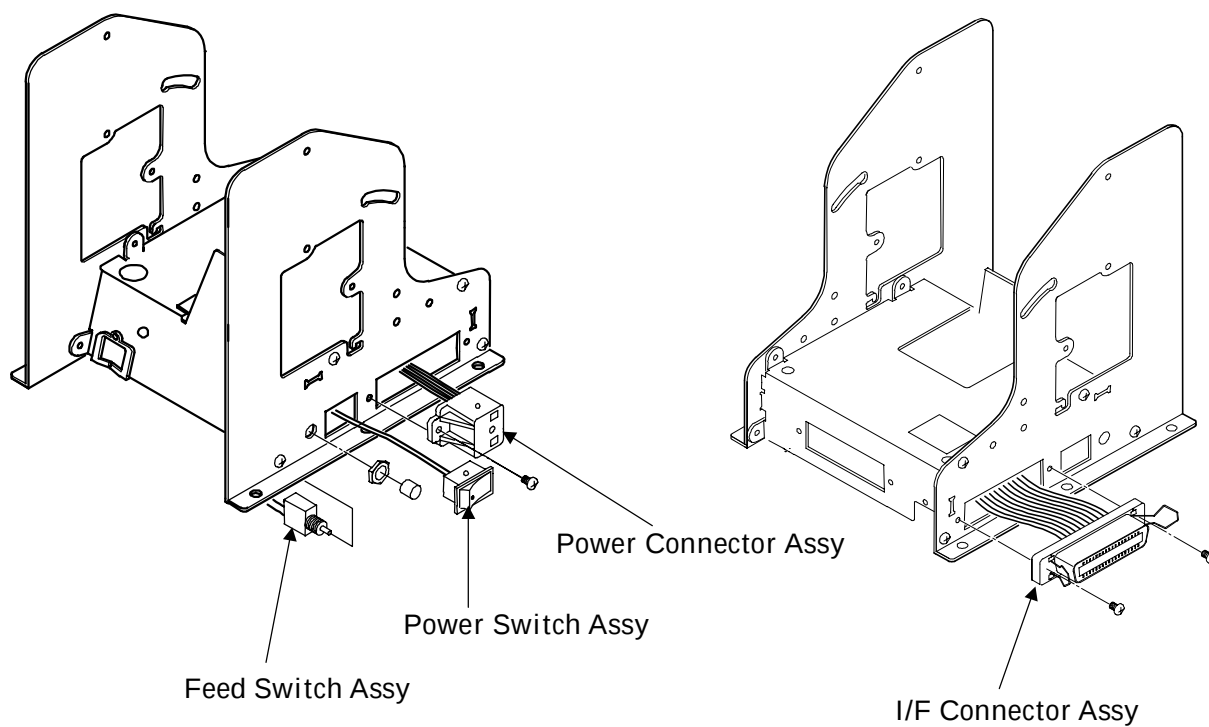
- (1) Disconnect the two connectors from the control board and detach the PRU unit after removing the four screws.



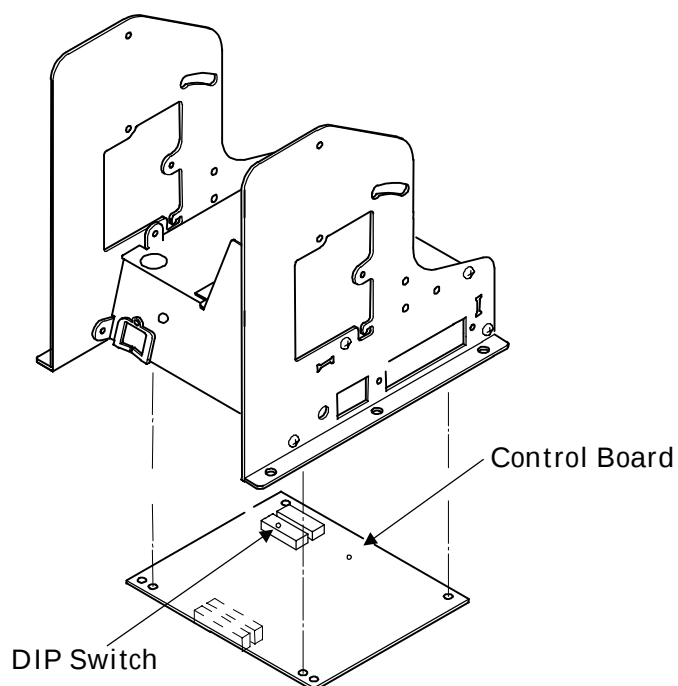
- (2) Release the lock of the FCC connector, disconnect the FCC from the control board, remove the two springs, pull out the knob, unfasten the two screws, and detach the PMU unit.



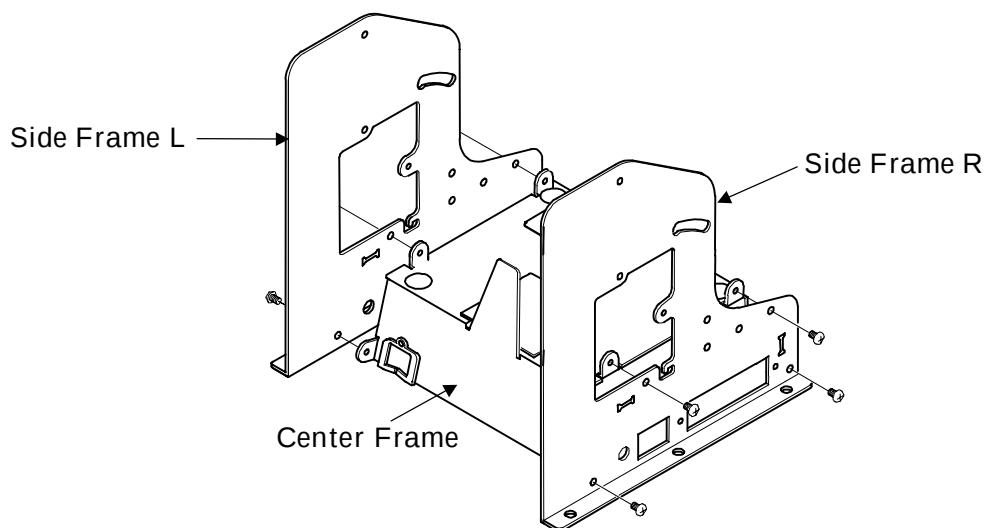
- (3) Disconnect the connectors of power connector assy, power switch assy, feed switch assy, and I/F connector assy from the control board.



- (4) Disengage the four claws that are holding the control board and detach the control board.

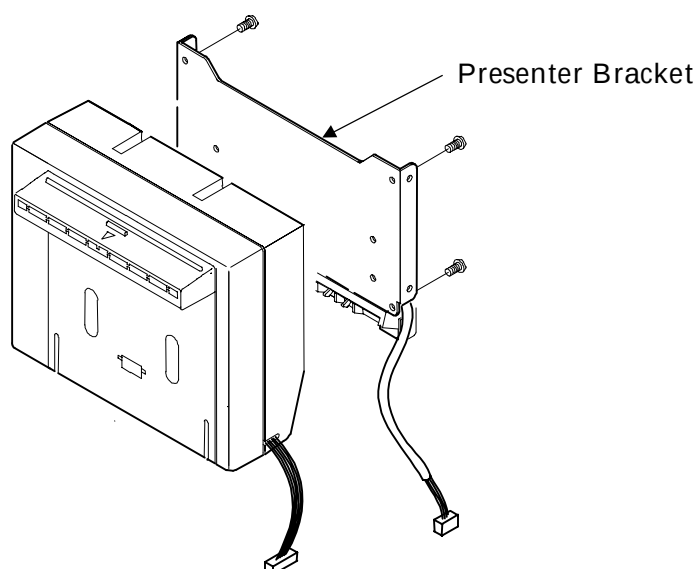


- (5) Remove the side frame L and R.

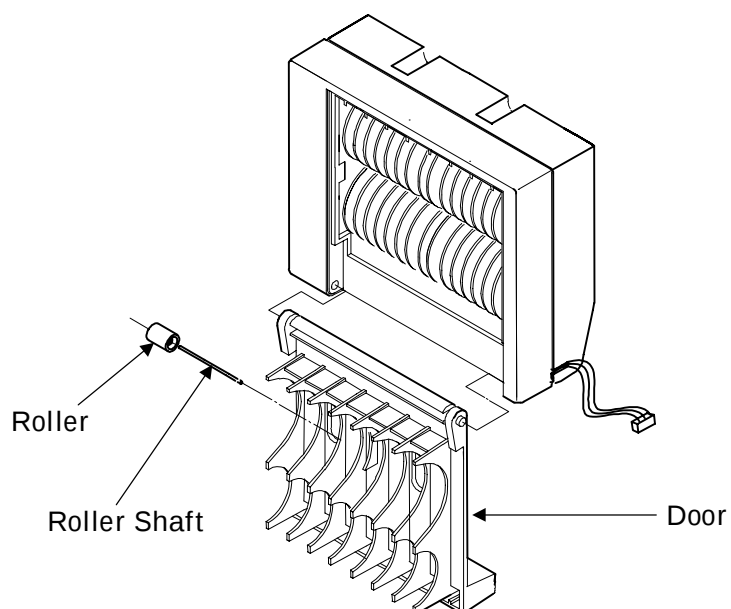


3.2 Disassembly Procedure for PRU Unit

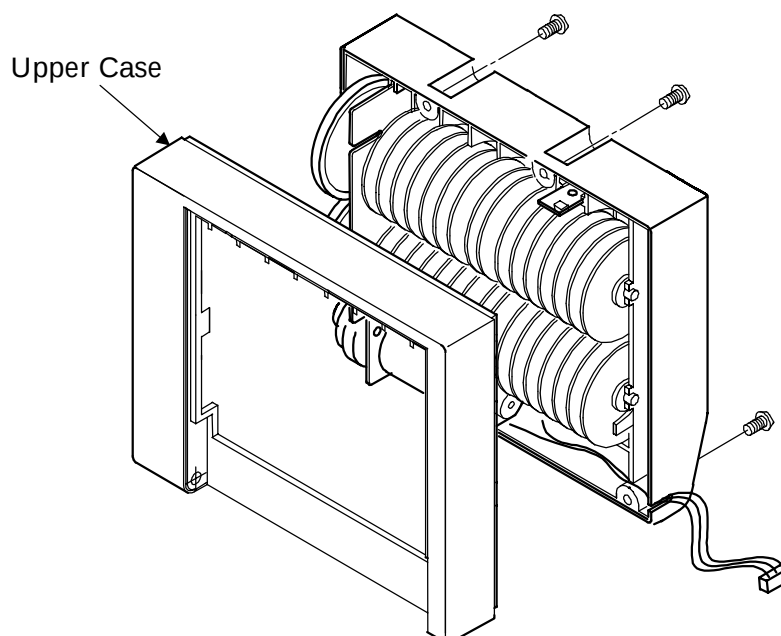
- (1) Remove the four screws from the PRU unit, that are fixing the cutter bracket. Then, remove the auto cutter unit.



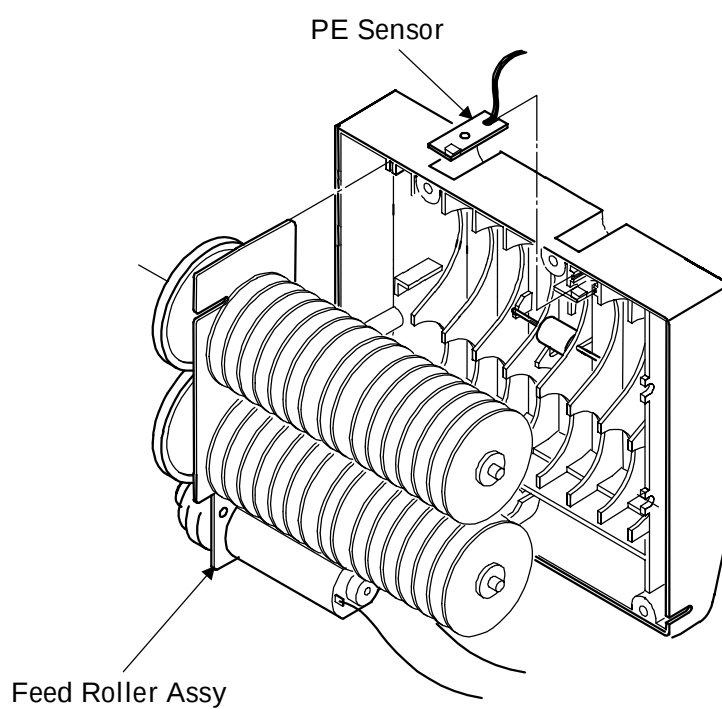
- (2) Push the U-shaped part of the door and remove the door. Then, pull out the roller shaft and remove the roller.



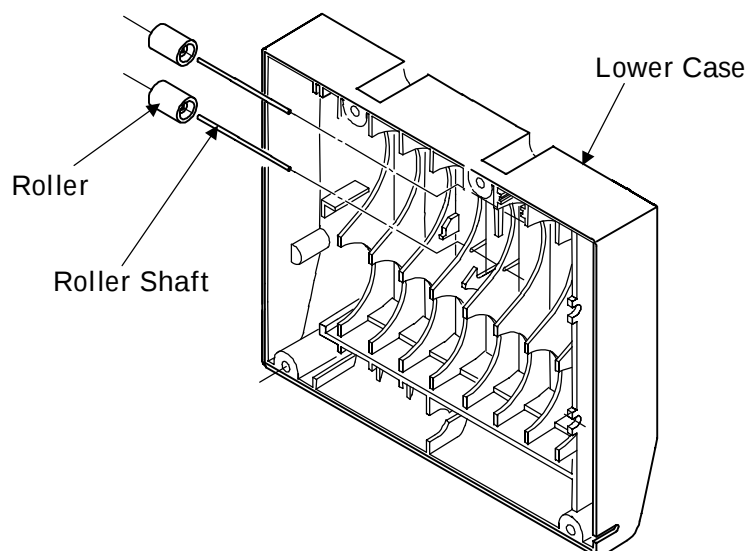
- (3) Remove the four screws that are fixing the upper case and detach the upper case.



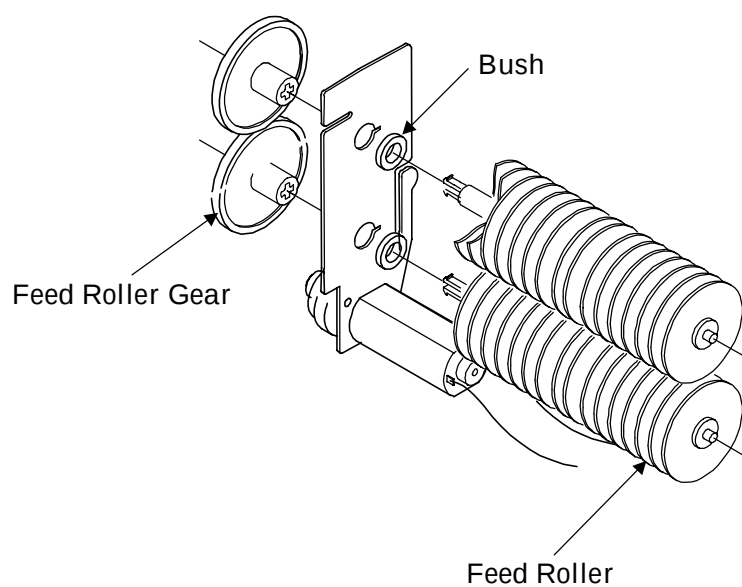
- (4) Remove the feed roller assy and PE sensor assy by pulling them horizontally.



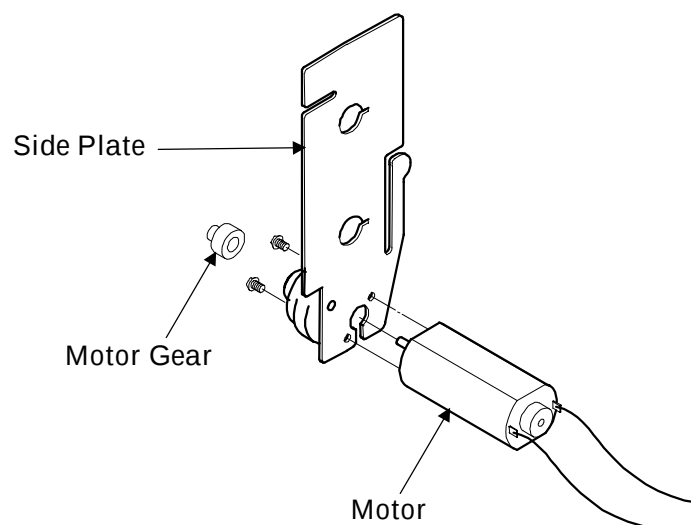
- (5) Pull out the roller shafts and remove the rollers.



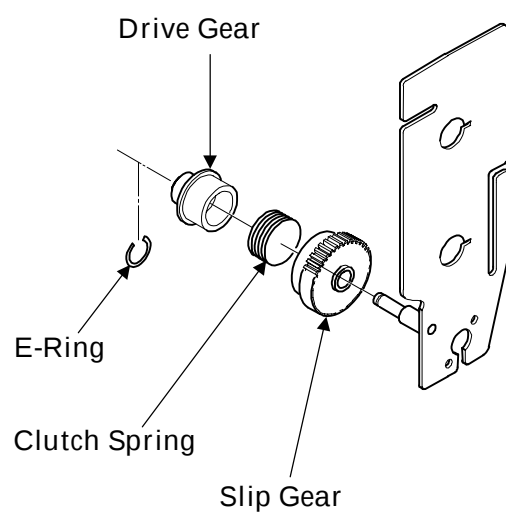
- (6) Release the claws that are fixing the feed roller gears and remove the feed rollers and bushes.



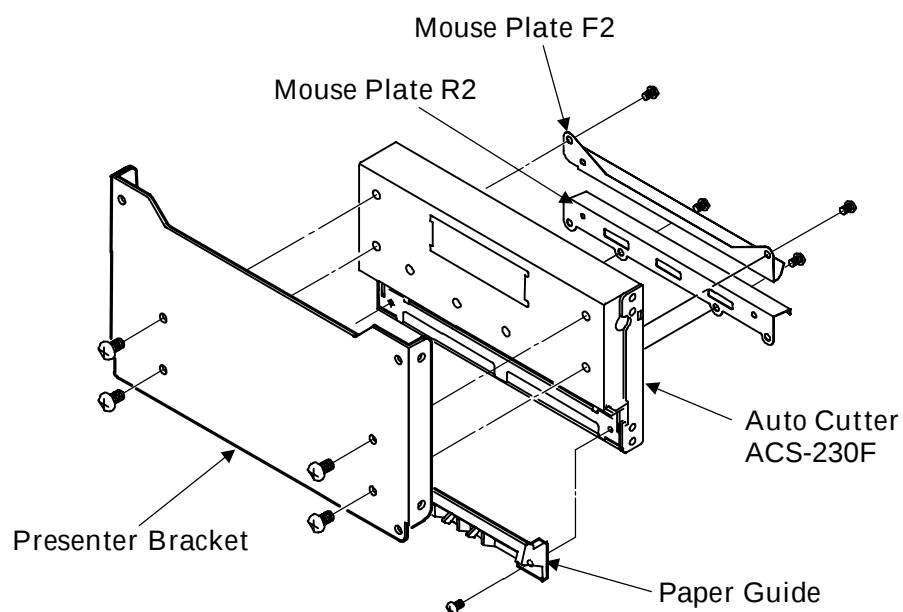
- (7) Pull out the motor gear, remove the two screws, and detach the motor.



- (8) Disengage the E-ring, and remove the drive gear, clutch spring, and slip gear in that order.

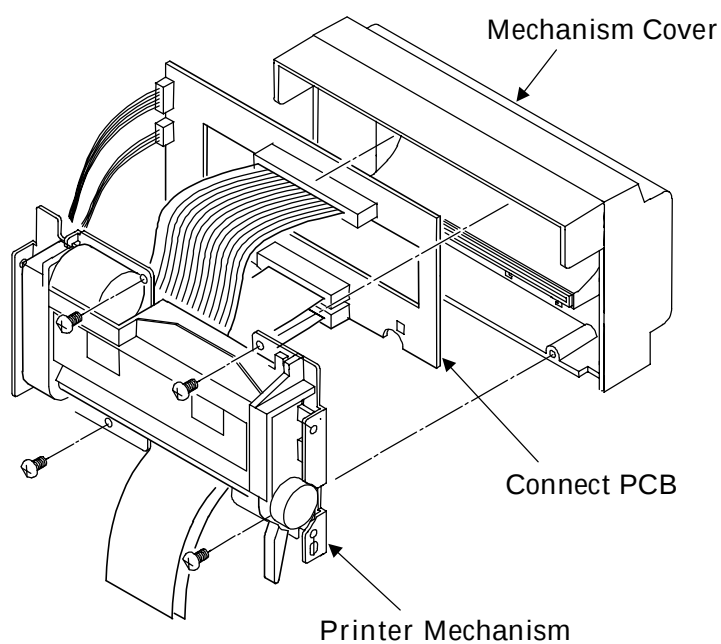


- (9) Remove the auto cutter from the presenter bracket and detach the paper guide, mouse plate F2, and mouse plate R2.

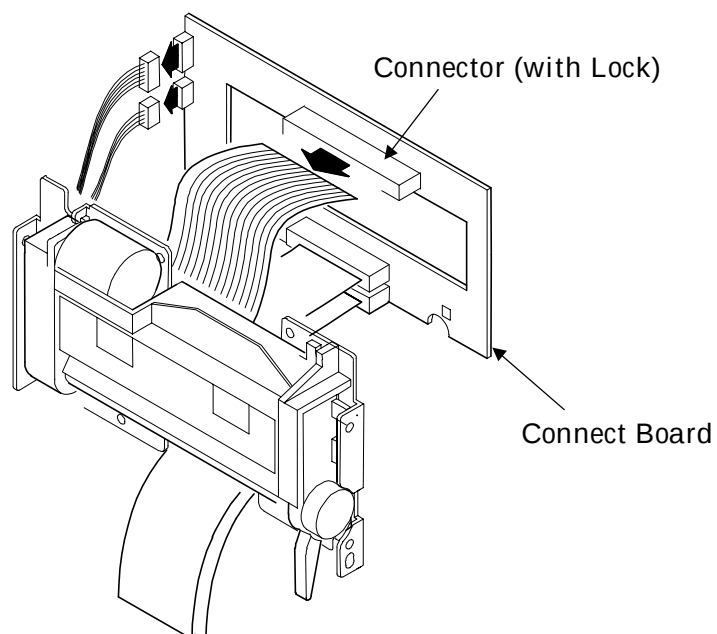


3.3 Disassembly Procedure for PMU Unit

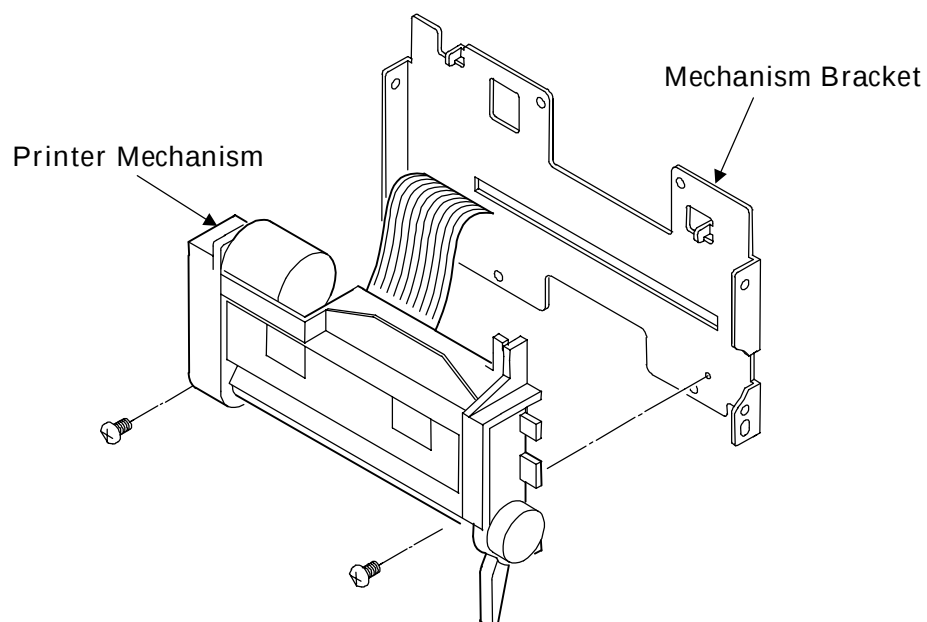
- (1) Remove the four screws that are fixing the mechanism cover and release the claw that is fixing the connect board. Then, remove the mechanism cover.



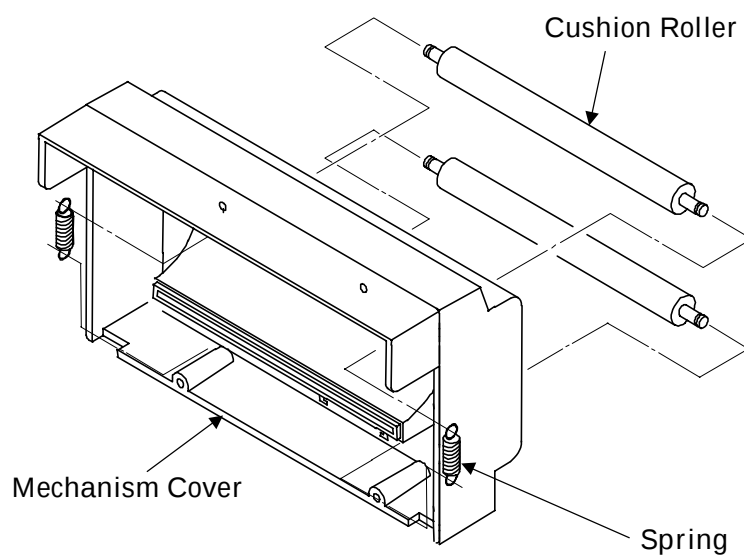
- (2) Disconnect the two connectors and one FPC from the connect board.



- (3) Remove the two screws that are fixing the mechanism bracket and detach the printer mechanism.



- (4) Unhook the springs and remove the cushion rollers.



3.4 Reassembly Procedure

Reassemble each part in the reverse order of the disassembly procedures described in Sections 3.1 to 3.3.

4. TROUBLESHOOTING

4.1 Troubleshooting Procedure

When a trouble occurs, confirm its phenomenon, locate a defective part in accordance with 4.2 Troubleshooting Guide, and troubleshoot as described below.

- **Phenomenon:** Find a trouble phenomenon in this column. If there are multiple phenomena, take all the corresponding items into consideration. This allows you to specify a hidden defective part.
- **Cause:** Lists as many possible causes as possible. Guess a trouble cause out of them and take its check method to specify the trouble cause.
- **Check Method:** Describes a check method to specify a trouble cause.
- **Remedy:** Troubleshoot by taking a remedy described in this column.

By troubleshooting in accordance with the above-mentioned procedure, you can troubleshoot efficiently with fewer misjudgments.

4.2 Troubleshooting Guide

● Printing failure

Phenomenon	Cause	Check Method	Remedy
No printing	Faulty DC output voltage from the AC adapter	Check whether the 24V DC is output from the AC adapter.	Replace the AC adapter.
	Faulty printer mechanism	_____	Replace the printer mechanism unit.
Faint printout	Faulty DC power supply from the AC adapter	Check whether the AC adapter has enough power margin.	Replace the AC adapter.
Missing dots	Foreign substance is adhered to the thermal head.	Check whether any foreign substances are adhered to the thermal head.	Dip a cotton swab or soft cloth in ethyl alcohol and wipe the foreign substances with them.
Badly blurred printout	Faulty DC power supply from the AC adapter	Check whether the AC adapter has enough power margin.	Replace the AC adapter.
	Dirt is attached to the thermal head.	Check whether dirt is adhered to the thermal head.	Dip a cotton swab or soft cloth in ethyl alcohol and wipe away the dirt.
Bad printing quality	Faulty paper	Check whether the paper meets the specifications.	Replace it with the specified paper.

● Paper feed failure

Phenomenon	Cause	Check Method	Remedy
Paper feed motor does not work or does not run smoothly.	Faulty connection of the motor connector	Check connection of the motor connector.	Connect the connector correctly.
	Faulty DC power supply from the AC adapter	Check whether the AC adapter has enough power margin.	Replace the AC adapter.
	Faulty printer mechanism	—————	Replace the printer mechanism
Paper is not fed or fed irregularly	Paper feed failure	Check whether or not the paper is jamming or torn and caught in the paper path.	Eliminate unnecessary paper in the paper path and set paper properly.
	Foreign substance in the gear	Check whether any foreign substance caught in the platen gear or motor gear in the printer mechanism.	Eliminate the foreign substance.
	Broken gear	Check for any breakage of the platen gear or motor gear in the printer mechanism.	If it is broken, replace the printer mechanism.

● Faulty paper ejection

Phenomenon	Cause	Check Method	Remedy
Paper is not ejected.	Wear of the clutch	—————	Replace the clutch.
	Paper being used is too thick.	Check the thickness of the paper.	Change the paper.
	Deformation of the paper guide	Check whether the paper guide is deformed or not.	Replace the paper guide.
	DC power to the drive motor is insufficient.	Check whether the AC adapter has enough power margin.	Replace the AC adapter.
	Faulty paper path	Check whether paper is left in the paper path.	Eliminate the remaining paper.

● Inoperative feed roller

Phenomenon	Cause	Check Method	Remedy
The roller does not turn.	Faulty connection of the motor connector	Check connection of the motor connector.	Connect the connector correctly.
	Foreign substance in the gear	Check whether any foreign substance caught in the motor gear or feed roller.	Eliminate the foreign substance.
	Broken gear	Check for any breakage of the feed roller gear, gear in the clutch part, or motor gear.	If broken, replace the parts.

● Faulty sensor

Phenomenon	Cause	Check Method	Remedy
Does not detect presence of paper.	Faulty paper sensor	Check whether any foreign substances are adhered to the window of the paper sensor.	Eliminate the foreign substance.
	Faulty connection of the paper sensor	Check connection of the paper sensor.	Connect the connector correctly.

● Faulty auto cutter

Phenomenon	Cause	Check Method	Remedy
The cutter does not functionl.	Faulty connection of the motor connector	Check connection of the motor connector.	Connect the connector correctly.
	Paper feed failure (Paper jam)	Check whether the paper is jamming or not.	Eliminate jammed paper in the paper path.
	Faulty auto cutter		Replace the auto cutter.

● If the problem is not still solved

Phenomenon	Cause	Check Method	Remedy
_____	_____	Replace the control board and check whether the problem is solved or not.	If solved, replaced the control board.

Note: If the no-paper condition is not detected while the printer is running out of the recording paper, it will print without the paper, leading to a trouble of the head, and so on.

5. SERVICE PARTS LIST

5.1 Parts List for Mechanism

EXPLODED VIEW

1/2

Ref. No.	Parts No.	Description	Q'ty	Remarks
1	E66201-070	Upper Case	1	
2	E62040570	Door	1	
3	E62020400	Lower Case	1	
4	E6601-380	Side Plate	1	
5	E6612-090	Feed Roller	2	
6	E8019-160	Feed Roller Gear	2	
7	E8025-100	Bush	2	
8	O-25	O-Ring	2	P25 4C Silicon 50°
9	E8017-100	Motor	1	FM-120RA1 (24V)
10	E8019-170	Motor Gear	1	
11	76G57459	Screw	10	M2×3 S Tite
12	E8024-120	Gear Shaft	1	
13	E8019-180	Slip Gear	1	
14	E8519-020	Clutch Spring	1	
15	E8019-190	Drive Gear	1	
16	E2.5	E-Ring	1	E2.5
17	E8024-130	Roller Shaft	3	
18	E8031-130	Roller	3	
19	E6233-150	Presenter Bracket	1	
20	23G22839	Screw	12	M2.6×8 B Tite
21	E40000315	PE Sensor Assy	1	
22	ACS230F	Auto Cutter	1	ACS-230F
23	E8022-140	Paper Guide	1	
24	E8010-290	Mouse Plate F2	1	
25	E8010-270	Mouse Plate R2	1	
26	71G57473	Screw	4	M2.3×5 S Tite
27	23G57466	Screw	2	M2×6 S Tite
30	E8023-090	Mechanism Cover	1	
31	E8031-140	Cushion Roller	2	
32		Spring	2	2057
33	E6233-160	Mechanism Bracket	1	
34	E70010905	Connect PCB	1	
35	LT380V	Printer Mechanism	1	LT380V
36	E4900-640	Flat Cable	2	

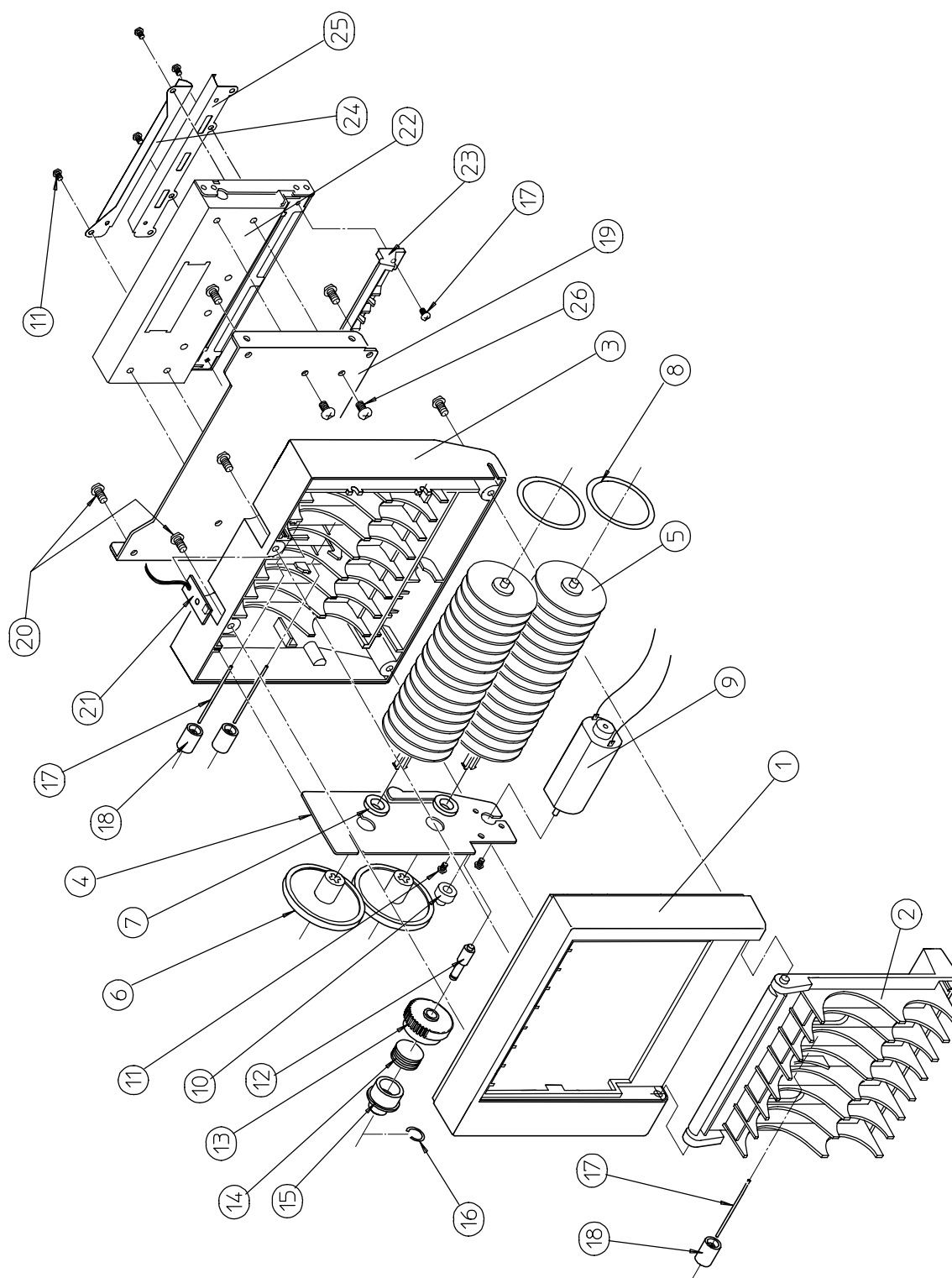
EXPLODED VIEW

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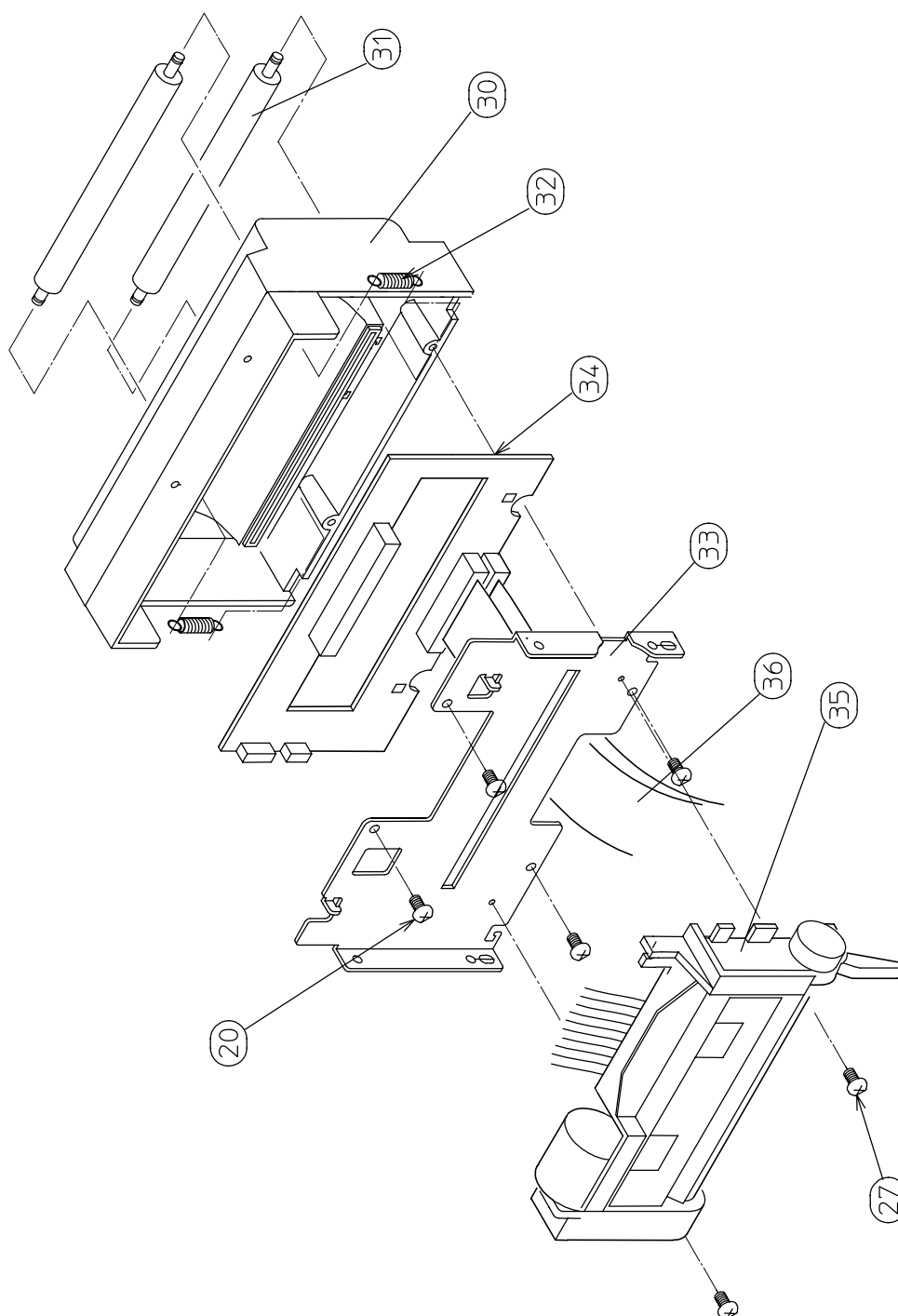
Ref. No.	Parts No.	Description	Q'ty	Remarks
40	E8010-310	Center Frame	1	
41	E8010-320	Side Frame L	1	
42	E8010-330	Side Frame R	1	
43	23G29538	Screw M3×5 S Tite	8	
44	E8025-110	Locking Card Spacer KGLS-6RF	4	
45	E8500-090	Edge Holder EHS-11U	2	
46	E4035-870	Insulating Sheet	1	
47	E8029-050	Knob	2	
48	23G22821	Screw M3×8 S Tite	4	
49		Spring 6612	2	

5.2 Disassembly Drawing

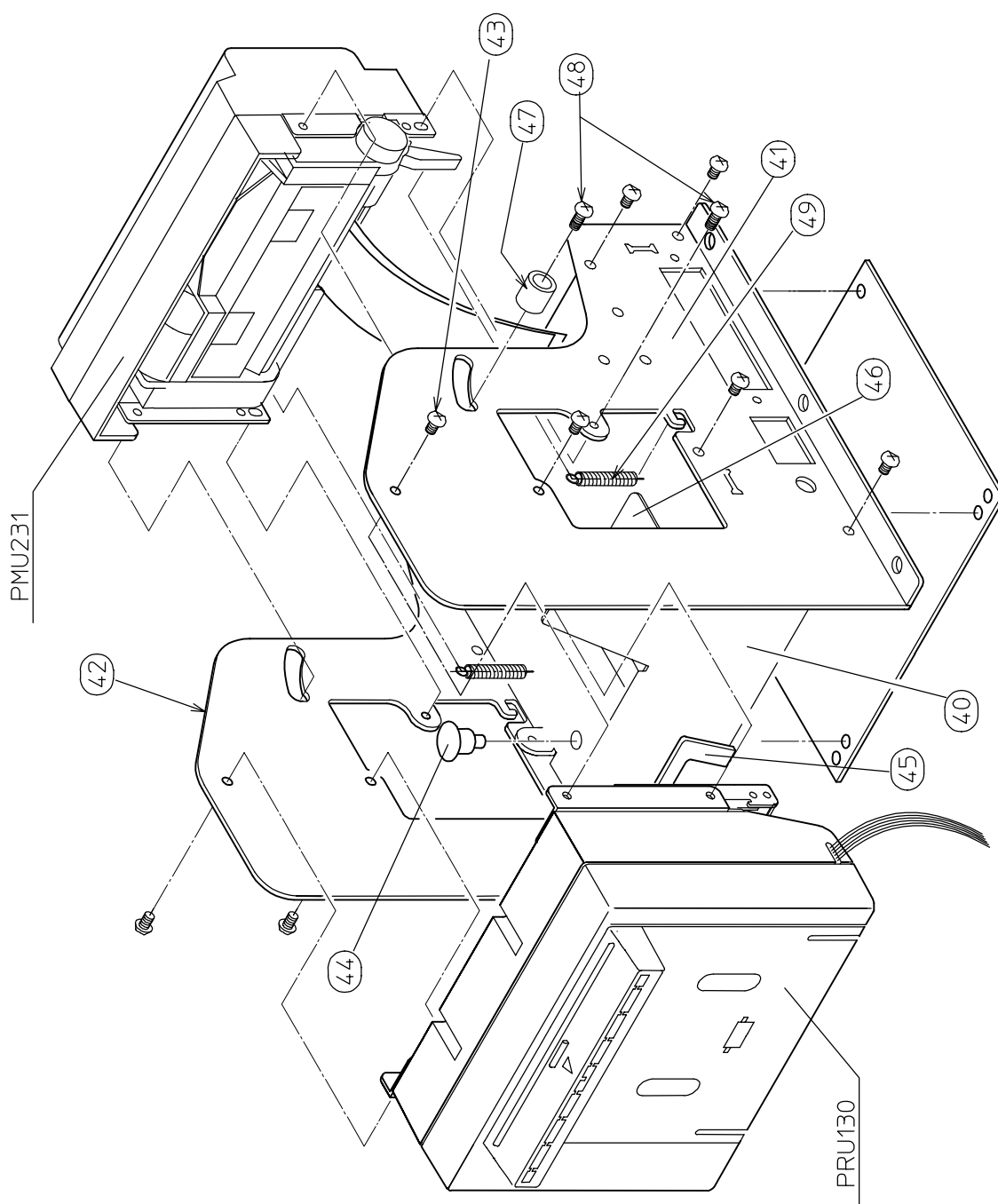
● Disassembly Drawing-1 (PRU-130)



● Disassembly Drawing-2 (PMU-231)



● Disassembly Drawing-3 (PPU-231)



5.3 Parts List for Control Board

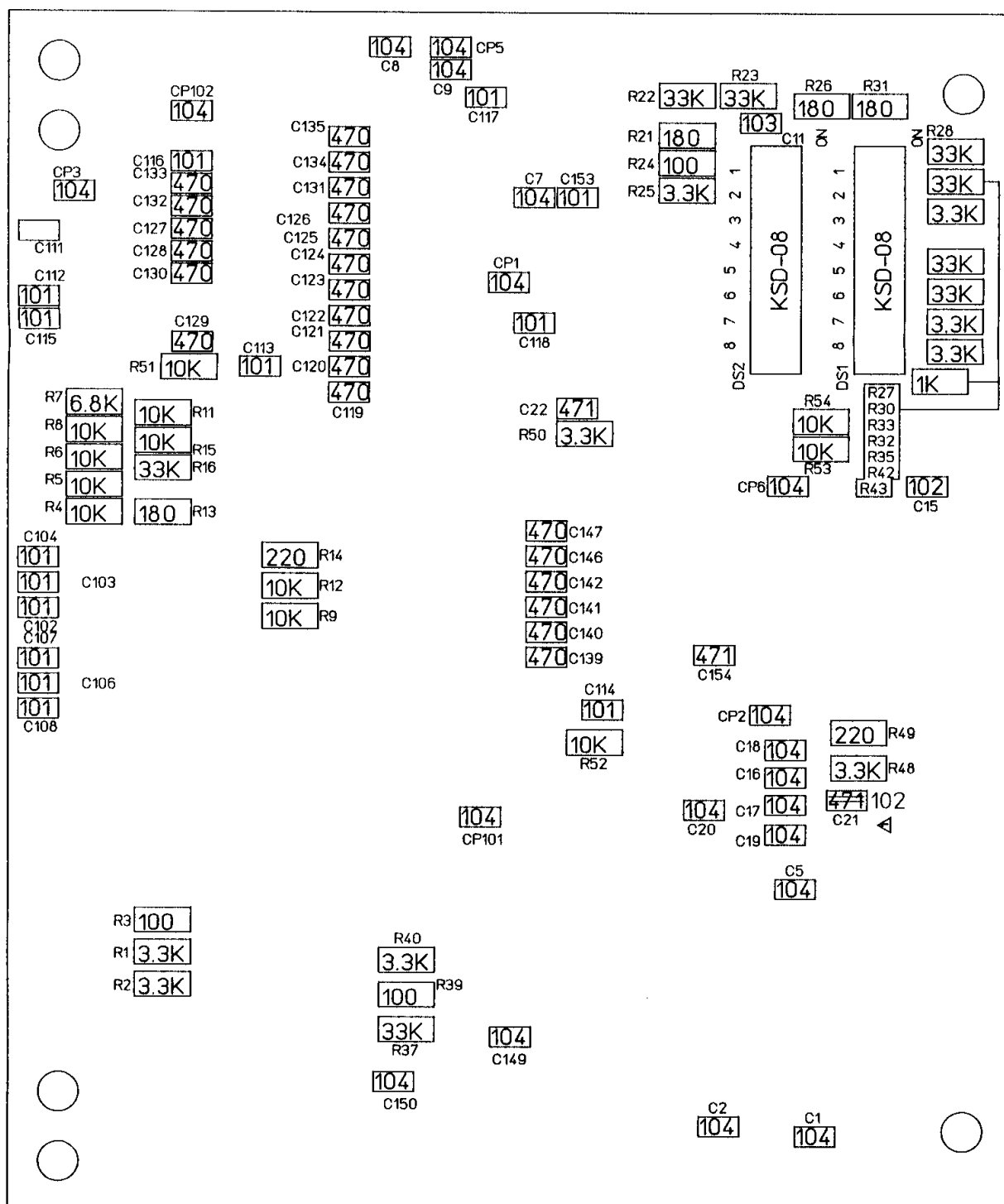
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Ref. No	Parts No.	Description	PPU-231 F
	E70010985	23212-31 Main Assy (USA/EUR)	(1)
IC1	E 104-580	CPU HD6413002F16	1
IC2	E 104-530	Gate Array CBM202LA-00	1
IC3	E 107-380	RAM GM76C8128C-55	1
IC4	E 210-070	HCMOS-IC 74HC04AF	1
IC5	E 210-130	Reset IC M51953BPF-600C	1
IC6	E2020040	I/F SP232can	1
IC7	E4101-720	DC/DC Converter SI-8401L	1
IC102	E 104-690	EPROM M27C1001-45XF1	1
(IC102)		ROM Label	1
(IC102)	E48000920	IC Socket 2-644018-3	1
TA1	E 390-310	Tr. Array LB1650	1
TA2	E 202-830	Tr. Array TA8428K	1
TR1,4	E 358-080	Transistor RN1302	2
TR2	E 358-090	Transistor 2SJ267-FD13	1
TR3-5,8	E 359-190	Transistor 2SC2712-GR (TE85R)	5
TR9	E 359-170	Transistor 2SC4671-AN	1
D1-8	E 400-470	Diode S1G-GI1	8
ZD1	E 406-090	Z. Diode RD6.2FM	1
C1,2,5,7-9 16-20,101 149-152 CP1-6,101 102	E2110-865	C. Cap. GRM40CH470J50PT	24
C3	E2230-260	Ele. Cap. SME35VB220M	1
C4	E2230-250	Ele. Cap. SME16VB470M	1
C6,10,15,21	E2110-880	C. Cap. GRM40B102K50PT	4
C11-14	E2110-875	C. Cap. GRM40B103K50PT	4
C22,154	E2110-900	C. Cap. GRM40B471K50PT	2
C102-110 112-118,148 153	E2110-905	C. Cap. GRM40CH101J50PT	18
C119-147	E2110-870	C. Cap. GRM40F104Z50PT	29

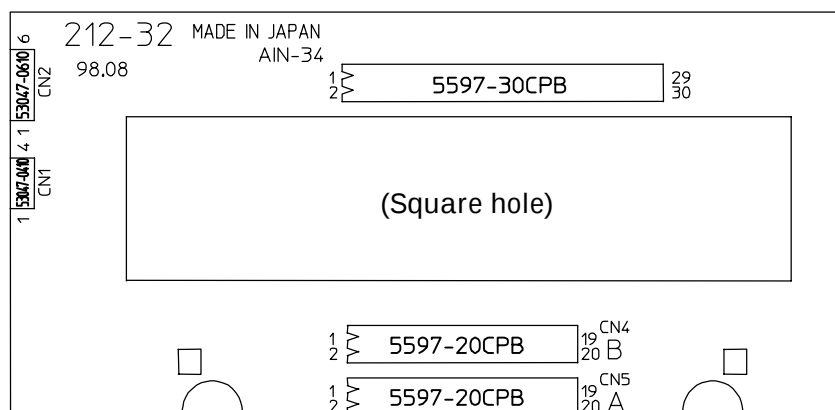
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Ref. No	Parts No.	Description		PPU-231 F
R1,2,30,35 40,42,48,50 55		Chip Resistor	CR18-332J	9
R3,24,29,34 39		Chip Resistor	CR18-101J	5
R4-6,8-12,15 17,19,46,47 51-54		Chip Resistor	CR18-103J	17
R7		Chip Resistor	CR18-682J	1
R13,21,26,31 36		Chip Resistor	CR18-181J	5
R14,49		Chip Resistor	CR18-221J	2
R16,22,23,27 28,32,33,37 38		Chip Resistor	CR18-333J	9
R20,41,43		Chip Resistor	CR18-102J	3
R44,45		Chip Resistor	CR18-331J	2
F1	E4005-795	Fuse	MS3	1
F2	E4005-770	Fuse	MQ1.5	1
X1	E 501-400	X'tal	CSTCS16.00MX0C3-TC	1
L3,6-14 16-18,20-28 30-48	E4009-490	Fe. Beads	BLM21A121S	41
L4,5,15,19	E4009-480	Fe. Beads	BLM41P600S	4
L1,2	E4009-280	Fe. Beads	BL02RN2-R62	2
DS1,2	E5103-510	DIP Switch	KSD-08	1
CN1	E4800-915	Wafer Assy	5267-05A-X	1
CN2	E48000925	Wafer Assy	5273-02A	1
CN3	E4800-945	Wafer Assy	5267-04A-X	1
CN4	E48000765	Connector	53014-0510	1
CN5	E48000930	Connector	53014-0610	1
CN6	E48000755	Connector	53014-0310	1
CN7,8	E48000940	Connector	5597-20CPB	2
CN9	E48000650	Wafer Assy	5267-06A-X	1
CN10	E48000935	Connector	53313-2015	1
PCB		PCB	212-31	1
	E40000320	Power Connector Assy		1
	E5109-230	Power Switch Assy		1
	E5109-220	Feed Switch Assy		1
	E4900-580	I/F Connector Assy	Serial (mm)	1
	E4900-590	I/F Connector Assy	Serial (inch)	1
	E4900-600	I/F Connector Assy	Parallel	1

● Dip Side



5.4.2 Connect Board

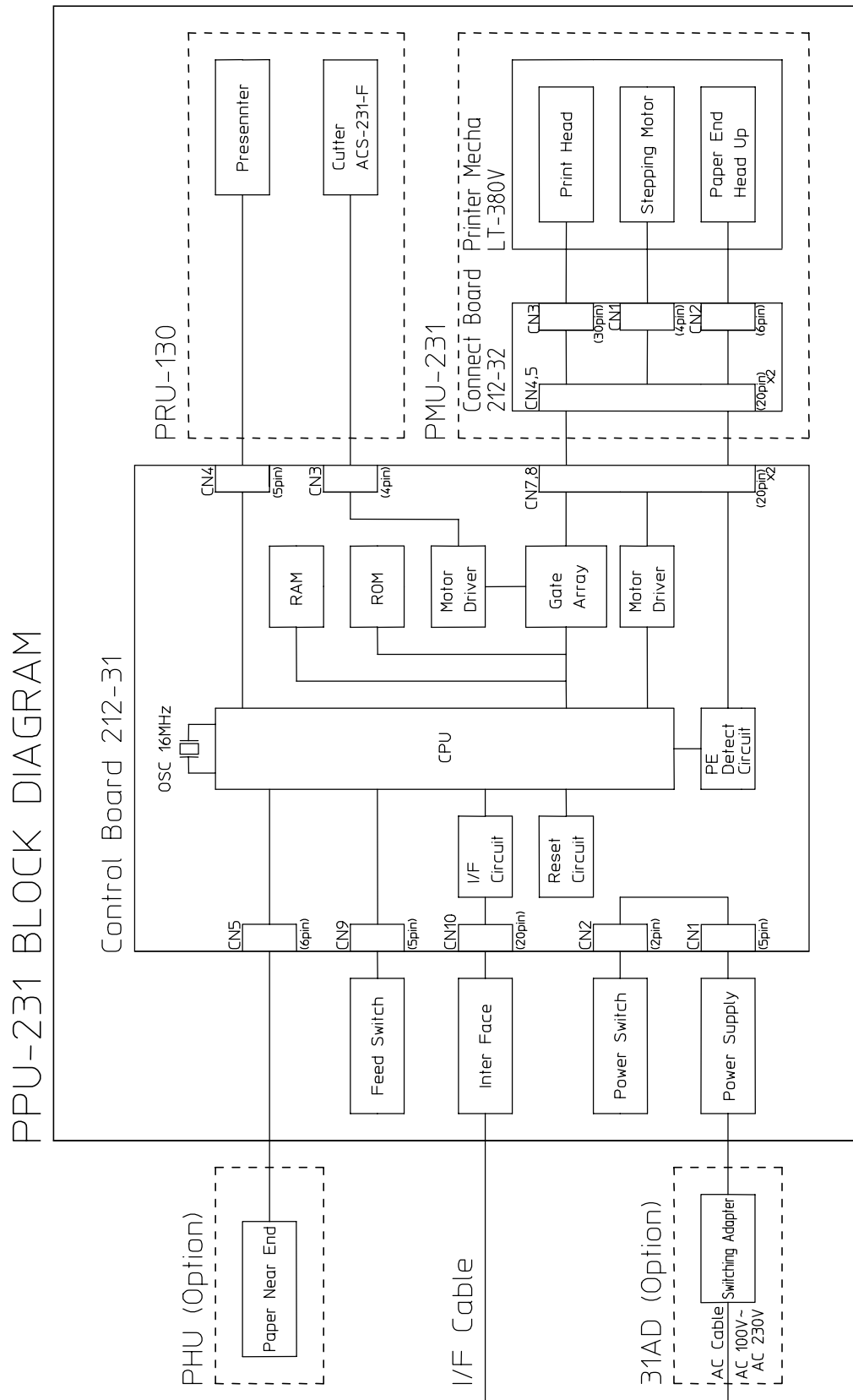


6. DRAWING

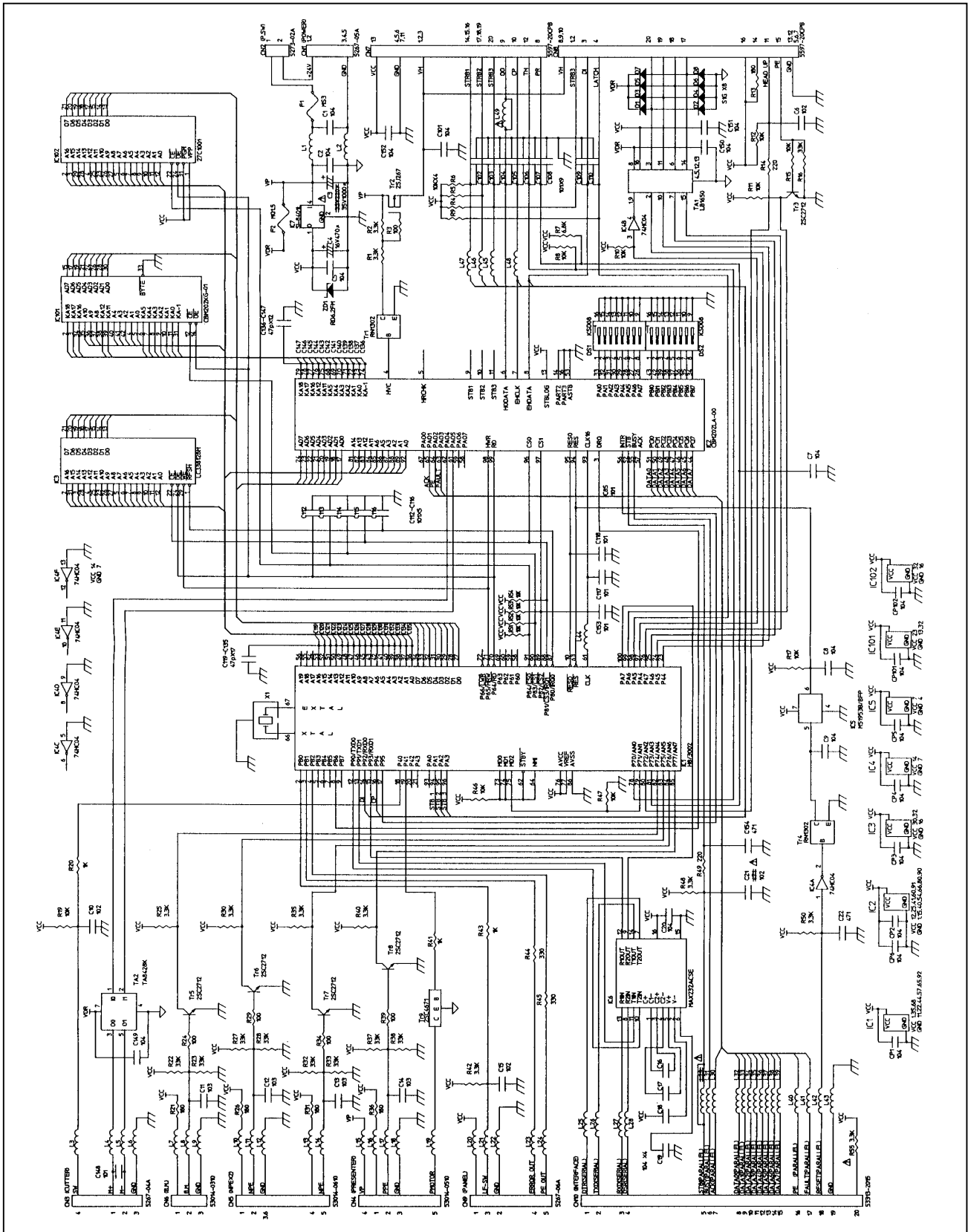
The following lists the reference drawings for maintenance, and so on.

- Block diagram
- Circuit diagram

6.1 Block Diagram



6.2 Circuit Diagram



7. OUTER DIMENSION

Unit: mm

