ORDER NO. KMS1502800SE

Service Manual

Hybrid IP-PBX

Supplement-2

Model No. KX-NS500
KX-NS520 Series

Power Supply Unit Change

Please file and use this supplement manual together with the service manual.

Model No.	Order No.
KX-NS500BX	KMS1403027CE
KX-NS500BR	KMS1403037CE
KX-NS500LA	KMS1403038CE
KX-NS500NE	KMS1403039CE
KX-NS500SU	KMS1403040CE
KX-NS500UE	KMS1403041CE

Model No.	Order No.
KX-NS520BX	KMS1403028CE
KX-NS520BR	KMS1403042CE
KX-NS520LA	KMS1403043CE
KX-NS520NE	KMS1403044CE
KX-NS520SU	KMS1403045CE
KX-NS520UE	KMS1403046CE

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Panasonic®

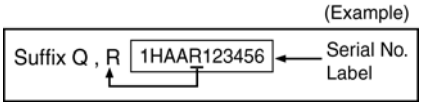
TABLE OF CONTENTS

1 CHANGES

1.1. Subject

Suffix	Reason for suffix change
G to H	Change PSU and the related parts. (KX-NS500SU)
G to H	Change PSU and the related parts. (KX-NS500BR/BX/LA/NE)
H to I	Change PSU and the related parts. (KX-NS500UE)
E to F	Change PSU and the related parts. (KX-NS520SU/BR/BX/LA/NE/UE)

Suffix Location



1.2. Replacement Parts List

Reason for Change	
*The following items (1-8) indicate the reason for change. See the "**Notes**" column for each part in **ORIGINAL AND NEW PARTS COMPARISON LISTS.**	
1. Improve performance	1. Mark*1 has been changed at the same time.
2. Change of material or dimension	
3. To meet approved specification	
4. Standardization	
5. Addition	
6. Deletion	
7. Correction	
8. Other	

Interchangeability Code (Symbols: B) Following V-Z interchange abilities are indicated on the Notes in the bottom column.		
Parts	Set Production	
V Original New	Early (before change) Late (after change)	Original or new parts may be used in early or late production sets. Use original parts until exhausted, then stock new parts.
W Original New	Early (before change) Late (after change)	Original parts may be used in early production sets only. New parts may be used in early or late production sets. Use original parts where possible, then stock new parts.
X Original New	Early (before change) Late (after change)	New parts only may be used in early or late production sets. Stock new parts.
Y Original New	Early (before change) Late (after change)	Original parts may be used in early production sets only. New parts may be used in late production sets only. Stock both original and new parts.
Z Other		

KX-NS500

Ref. No.	Part No.		Part Name & Description	Pcs	Remarks	Notes		Time of change (Suffix)
	Original (Old)	**New**						
CABINET AND ELECTRICAL PARTS								
2	PNKM1522Z1	PNZCNS500BX	LOWER CABINET	1	*1	8	Y	H
2	PNKM1522Z1	PNZCNS500NE	LOWER CABINET (NE Only)	1	*1	8	Y	
7	PNMH1321Z	---	CAPACITOR COVER	1		6	Y	H-I
8	PNHR1973Z	---	SPACER	1		6	Y	H-I
9	PNMH1311Z	---	CONNECT PLATE	1		6	Y	H-I
10	PNHX1787Z	---	PROTECT SHEET	1		6	Y	H-I
11	PNMH1318Y	---	FG PLATE	1		6	Y	H-I
12	PNHR1629Z	---	LOCKING WIRE SADDLE	1		6	Y	H-I
16	PNMC1107Z	---	GASKET	1		6	Y	H-I
17	PNJS101016Z	---	WIRE	1		6	Y	H
22	---	PNWSNS700NE	DC SW CABLE ASS'Y	1	*1	5	Y	H
23	---	PNJS101019Z	POWER CABLE	1	*1	5	Y	H
24	---	J0KG00000098	FILTER	1	*1	5	Y	H
25	---	PSHE1177Z	CABLE STRAP	1	*1	5	Y	H
POWER SUPPLY BOARD PARTS								
PCB3	PNLP2290Y	PNLP8531Y	POWER SUPPLY ASS'Y (RTL)	1	*1 ⚠	8	Y	H

KX-NS520

Ref. No.	Part No.		Part Name & Description	Pcs	Remarks	Notes		Time of change (Suffix)
	Original (Old)	**New**						
CABINET AND ELECTRICAL PARTS								
2	PNKM1522X1	PNZCNS520BX	LOWER CABINET	1	*1	8	Y	F
2	PNKM1522X1	PNZCNS520NE	LOWER CABINET (NE Only)	1	*1	8	Y	F
6	PNMH1321Z	---	CAPACITOR COVER	1		6	Y	F
7	PNHR1973Z	---	SPACER	1		6	Y	F
8	PNMH1311Z	---	CONNECT PLATE	1		6	Y	F
9	PNHX1787Z	---	PROTECT SHEET	1		6	Y	F
10	PNMH1318Y	---	FG PLATE	1		6	Y	F
11	PNHR1629Z	---	LOCKING WIRE SADDLE	1		6	Y	F
15	PNMC1107Z	---	GASKET	1		6	Y	F
16	PNJS101016Z	---	WIRE	1		6	Y	F
22	---	PNWSNS700NE	DC SW CABLE ASS'Y	1	*1	5	Y	F
23	---	PNJS101019Z	POWER CABLE	1	*1	5	Y	F
24	---	J0KG00000098	FILTER	1	*1	5	Y	F
25	---	PSHE1177Z	CABLE STRAP	1	*1	5	Y	F
POWER SUPPLY BOARD PARTS								
PCB3	PNLP2290Y	PNLP8531Y	POWER SUPPLY ASS'Y (RTL)	1	*1 ⚠	8	Y	F

2 Technical Descriptions

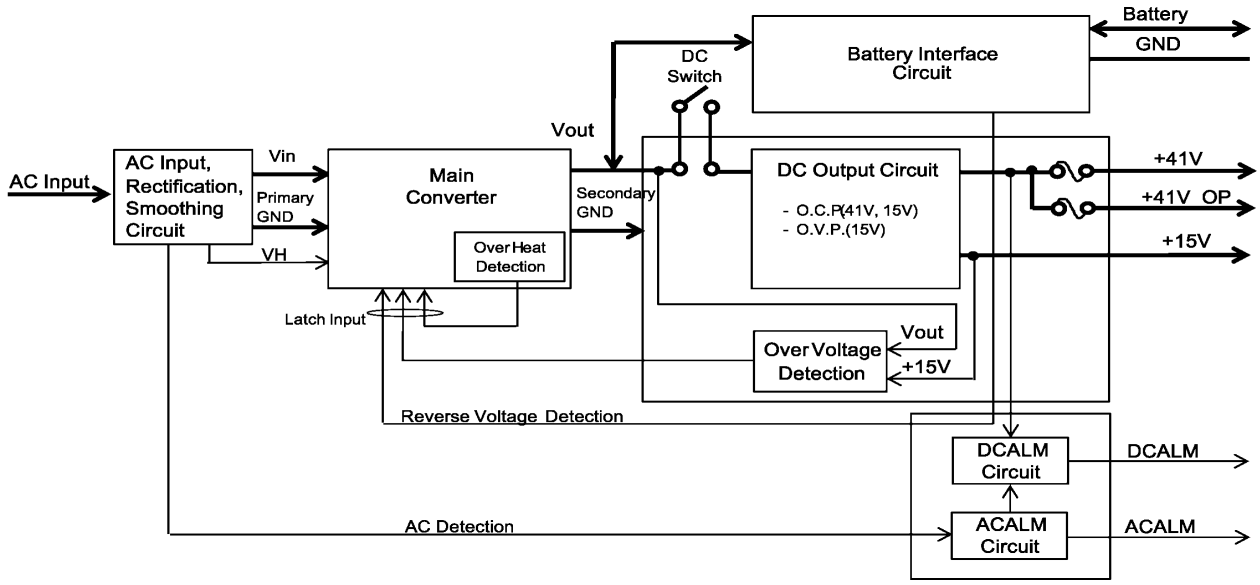
2.1. Power Supply Unit

Changed from Original Service Manual as section 4.4.

This unit is switching regulator power supply and supplies DC voltages to CPU Board (MPR), and optional card (free slot). PSU (power supply unit) has two outputs (41V, 15V). 15V output is supplied only in CPU Board (MPR) and option card. Other outputs are mainly used as an object for the electric supply to a terminal.

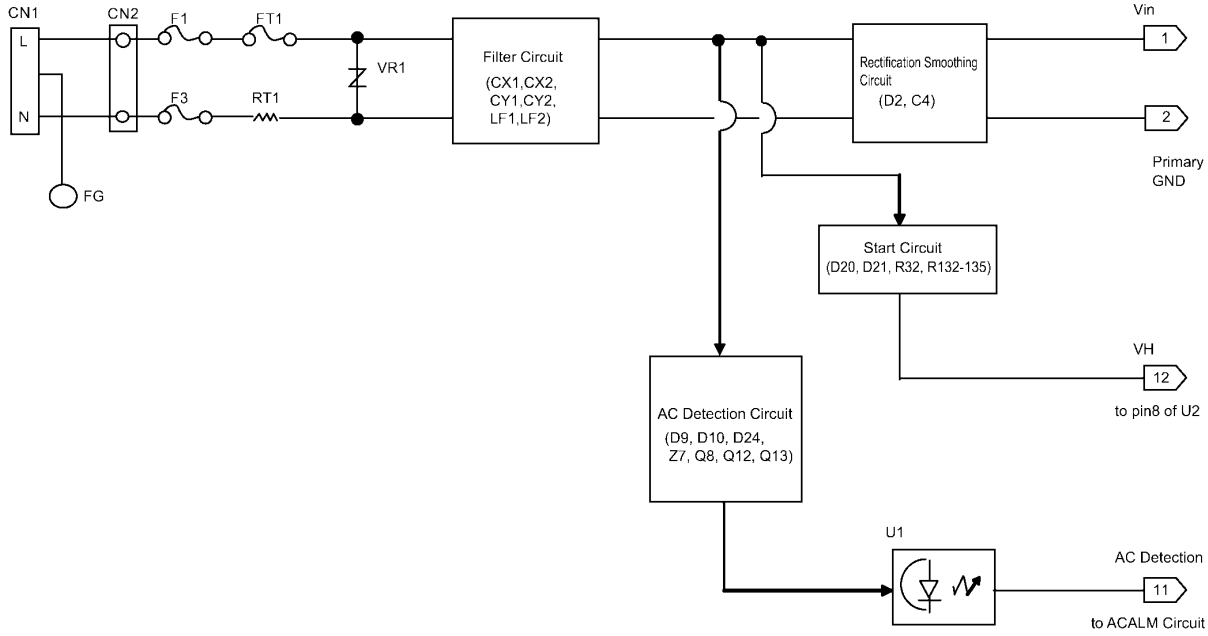
2.1.1. Block Diagram and Circuit Description of PSU

Changed from Original Service Manual as section 4.5.1.



2.2. AC input, Rectification Smoothing Circuit

Changed from Original Service Manual as section 4.6.



1) Filter Circuit

This circuit consists of the following components and removes the exogenous noise or the noise generated at power supply.

CX1, CX2: normal mode filter (X-Capacitor)

LF1, LF2: common mode noise filter

CY1, CY2: common mode noise filter (Y-Capacitor)

2) Rectification Smoothing Circuit

This circuit consists mainly of the following components and performs AC-DC conversion.

D2: Diode Bridge

C4: Primary Smoothing Capacitor

3) Surge Absorber Circuit

As the main component of this circuit, VR1 protects the system against exogenous noise such as lightning surge.

VR1: Varistor

4) Inrush Current Avoiding Circuit

Immediately after AC input applies voltage, the following components control inrush current to the Smoothing Capacitor.

RT1: thermistor

5) AC Detection Circuit

This circuit consists of the following components and detects AC input voltage.

Main components: D9, D10, D24, Q8, Q12, Q13, U1, Z7

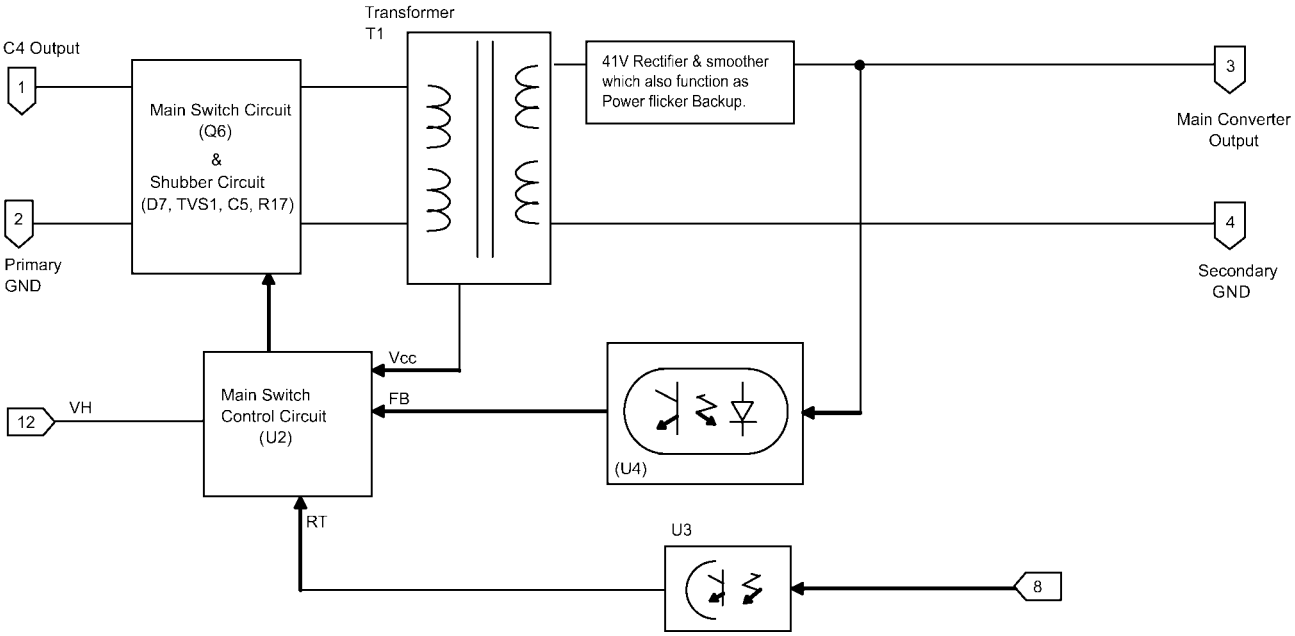
AC voltage commutates through D9, D10.

When AC voltage is over the threshold, Q8, Q12, and Q13 are switched ON to allow AC Detection Circuit to transfer AC input status to the secondary side AC alarm signal delivery section through U1.

2.3. Main Converter

Changed from Original Service Manual as section 4.7.

This section describes the main converter circuit which insulates the primary DC voltage and converts the voltage to a Secondary voltage " Vout" (41V).



1) Main Converter Section (Primary)

This main converter consists of the following components.

Q6: main switch FET

T1: isolation transformer

U2: Controls Q6

U4: device for transfer control secondary side

Other peripheral circuit

Secondary side output condition is transferred by U4 to the primary side.

Q6 is switched to ON/OFF in U2 to control the secondary side voltage.

2) Main converter section (Secondary)

T1: The output of this isolation transformer is 41V, and is the power supply for output voltage in section 3.

RT2: If the heatsink of Q6 become too hot.

Vout:

This output consists of the Rectification Smoothing Circuit of D6, C10, C11, C36.

This is the source of 15V output and 41V output of PSU.

The thermistor RT2 decreases the resistance value.

3) Latch function for protection

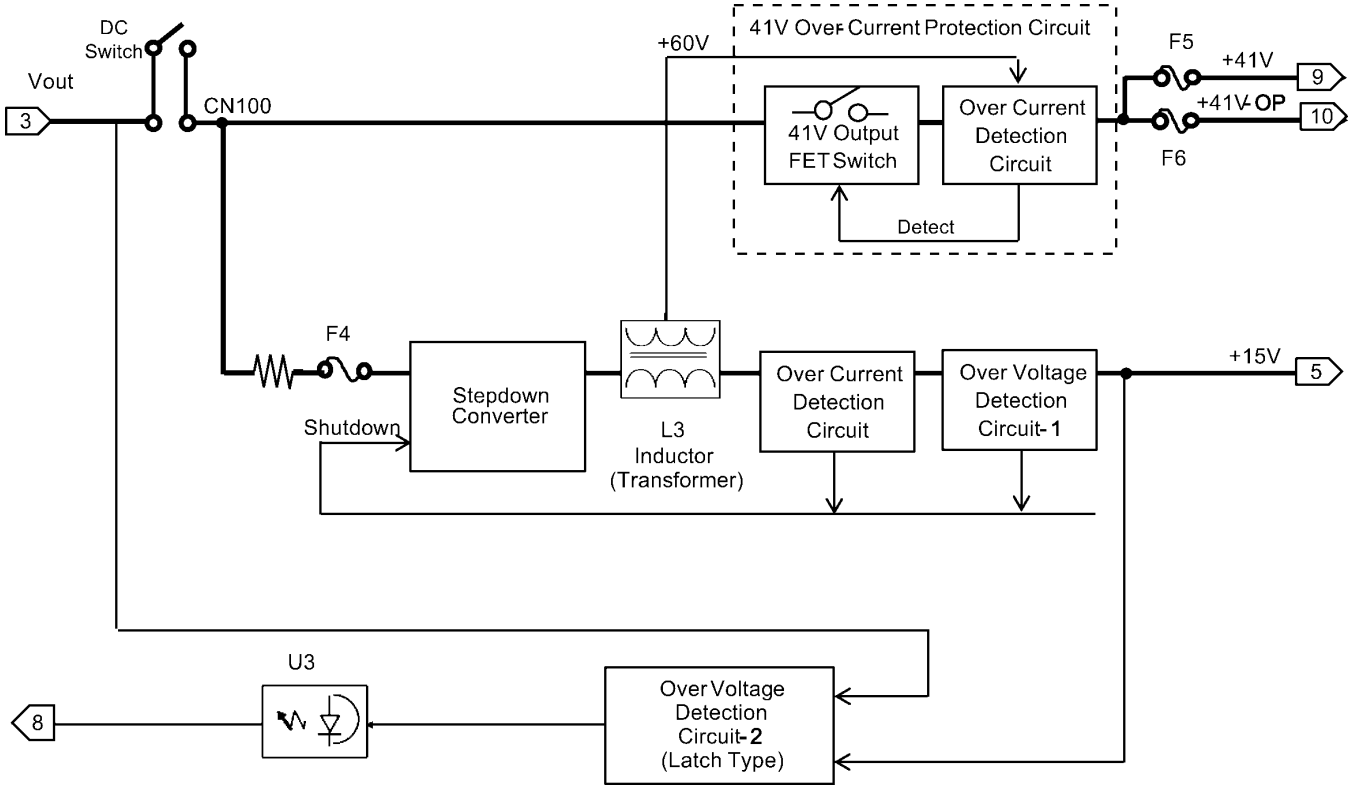
Control IC U2 has the latch fonction to stop the PSU operation when over heat or over voltage is detected .

To release the latch status, release the abnormal state at first, then remove the AC cord from PSU and leave for 60 seconds before restart.

2.4. DC Switch and DC Output Circuit

Changed from Original Service Manual as section 4.8.

This section describes the operation of the 41V output circuit and 15V output circuit which consists of DC/DC converter.



1) DC Switch

Vout(41V), the output of Main Converter is supplied to post circuits via CN100 and DC Switch mounted on the cabinet.

2) 41V Output

2-1) 41V Overcurrent Protection Circuit

This circuit consists of mainly of Q19, R62, R105 and Q15

When Overcurrent flows to R62, the voltage potential defference between R62 and R105 is detected by Q19 and Q19 turns ON.

Then Q15(FET Switch) turns OFF.

Consequently the fold back current limiting shuts down 41V output.

To control this circuit, +60V voltage which is generated in 15V Circuit.

2-2) 41V Output Converter Circuit

41V is devided to two outputs, "+41V" and "+41V_OP")

"+41V" is fed to the circuit on Base Board / CPU Boaerd.

"+41V_OP" is fed to the optional card via Base Board.

3) 15V Output

3-1) 15V Output Converter Circuit

This circuit generates +15V from +41V.

This circuit consists of mainly of F4, C12, U7, D14, L3, C26

3-2) 15V Output Overcurrent Detection Circuit

This circuit consists of mainly of R63, Q30, and Q31.

If overcurrent of 15V output is detected, Q30, Q31, and Q29 get ON, then SD(Shut Down) pin of U7 get high and U7 shut downs.

3-3) 15V Output Overvoltage Detection Circuit

This circuit consists of mainly of Z12, Q28 and Q27.

If overvoltage of 15V output is detected, Q28, Q27, and Q29 get ON, then SD(Shut Down) pin of U7 get high and U7 shut downs.

4) Overvoltage Detection Circuit-2

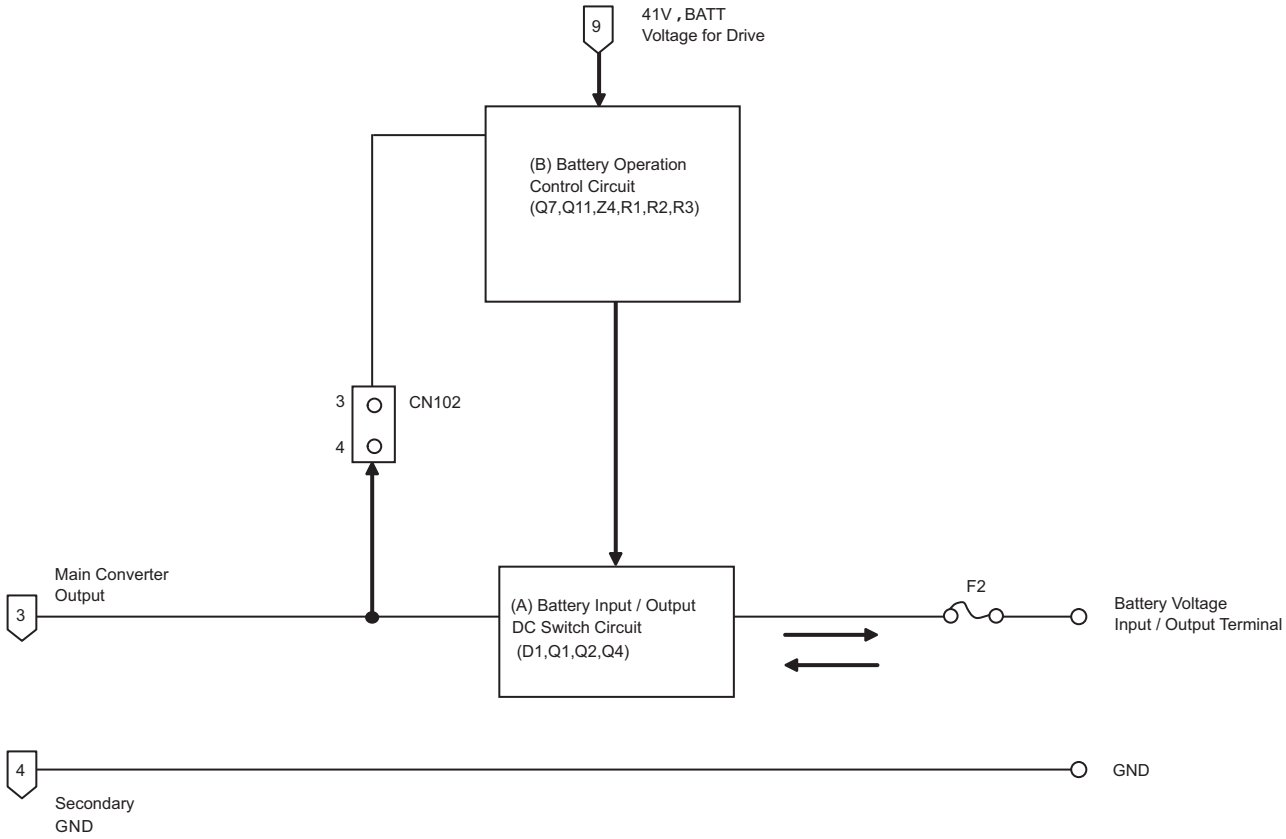
When 15V or 41V output becomes abnormally high, it makes Photo Coupler U3 ON via D13.

Then the control IC(U2) stops with the latch mode.

2.5. Battery voltage input and output

Changed from Original Service Manual as section 4.9.

This section describes the operation of battery input and output.



1) Battery voltage output (charge time)

Charge circuit has constant voltage and constant current.

When the battery voltage is high, a controlled fixed voltage of the main converter is output.

When the battery voltage is low, a controlled fixed current of main converter is output.

When DC switch is turned on and CN102 (3)-(4) is short circuited, the main converter output supplies voltage with controlled circuit, and Q7, Q11, Z4 change to ON. Q1, Q2 of DC switch circuit is turned on and battery output.

When the battery voltage is low, battery output is limited to a fixed current controlled by R1, R2, R3, and Q4.

When voltage is even lower.

2) Battery voltage input (power outage)

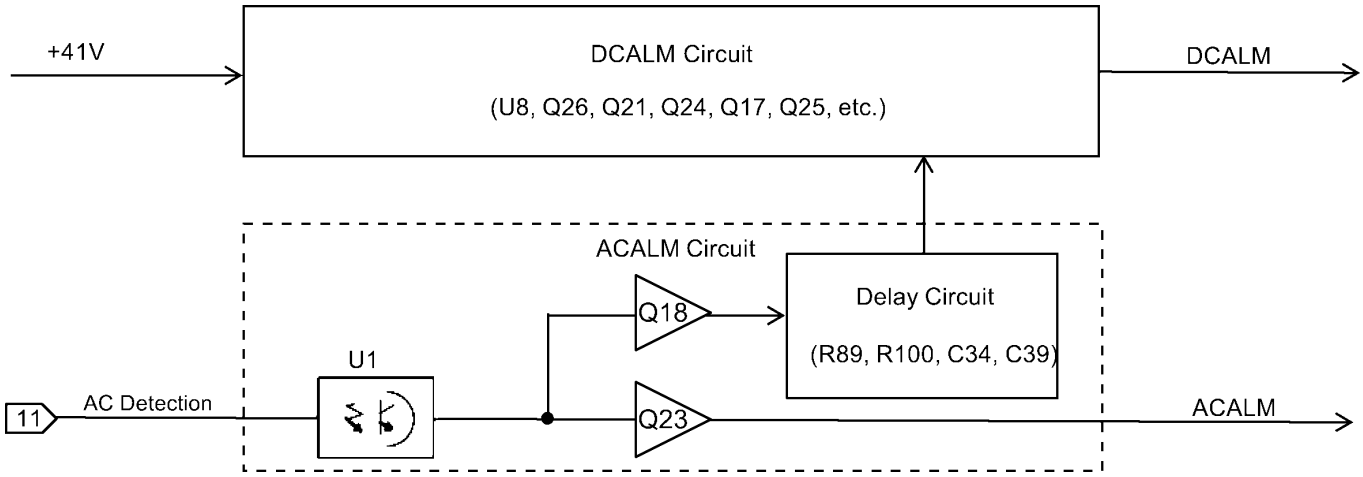
When AC input falls, is shifts to the backup supply from the battery. Battery voltage conducts to FET Q2 and diode D1, and is supplied by main converter output (C10, C11, C36).

When the battery voltage is reduced, Q7, Q11, Z4 on the battery control circuit go OFF. Q2 of the battery input/output DC switch circuit goes to OFF status and releases the battery which stops the power supply.

2.6. AC Alarm Circuit and DC Alarm Circuit

Changed from Original Service Manual as section 4.10.

This section describes the operation of the circuit that sends the AC alarm/DC alarm signal.



1) AC alarm circuit

When the AC Detection Circuit (described in section 1.2. (5)) detects AC input as "Yes", the Secondary side transistor of U1 turns ON. This action turns Q23 ON and then a LOW signal is sent to AC alarm output.

However, if the AC input is detected as "No", the Secondary side transistor of U1 turns OFF. This action turns Q23 OFF and then AC alarm sending output becomes OPEN. (Open collector output)

Q18 functions as same as Q23 and the output of Q23 is used for DC ALM control.

2) DC Alarm Signal Sending Circuit

When 41V is output normally, shunt regurator U8 in the output voltage detection circuit turns ON and Q26 turns OFF. Q21 also turns on and then DC alarm sending output becomes LOW.

When 41V output becomes abnormal, shunt regurator U8 turns OFF and Q26 turns ON, Q21 also turns OFF and DC alarm sending output becomes OPEN. (Open collector output)

Q17 and Q25 function for the hysterysis of DC ALM detect/undetect voltage.

If AC alarm is detected, Q24 turns ON and Q21 tourns OFF (DCALM Low → Open) with some delay.

Deletion from Original Service Manual as section 4.11.

3 Troubleshooting Guide

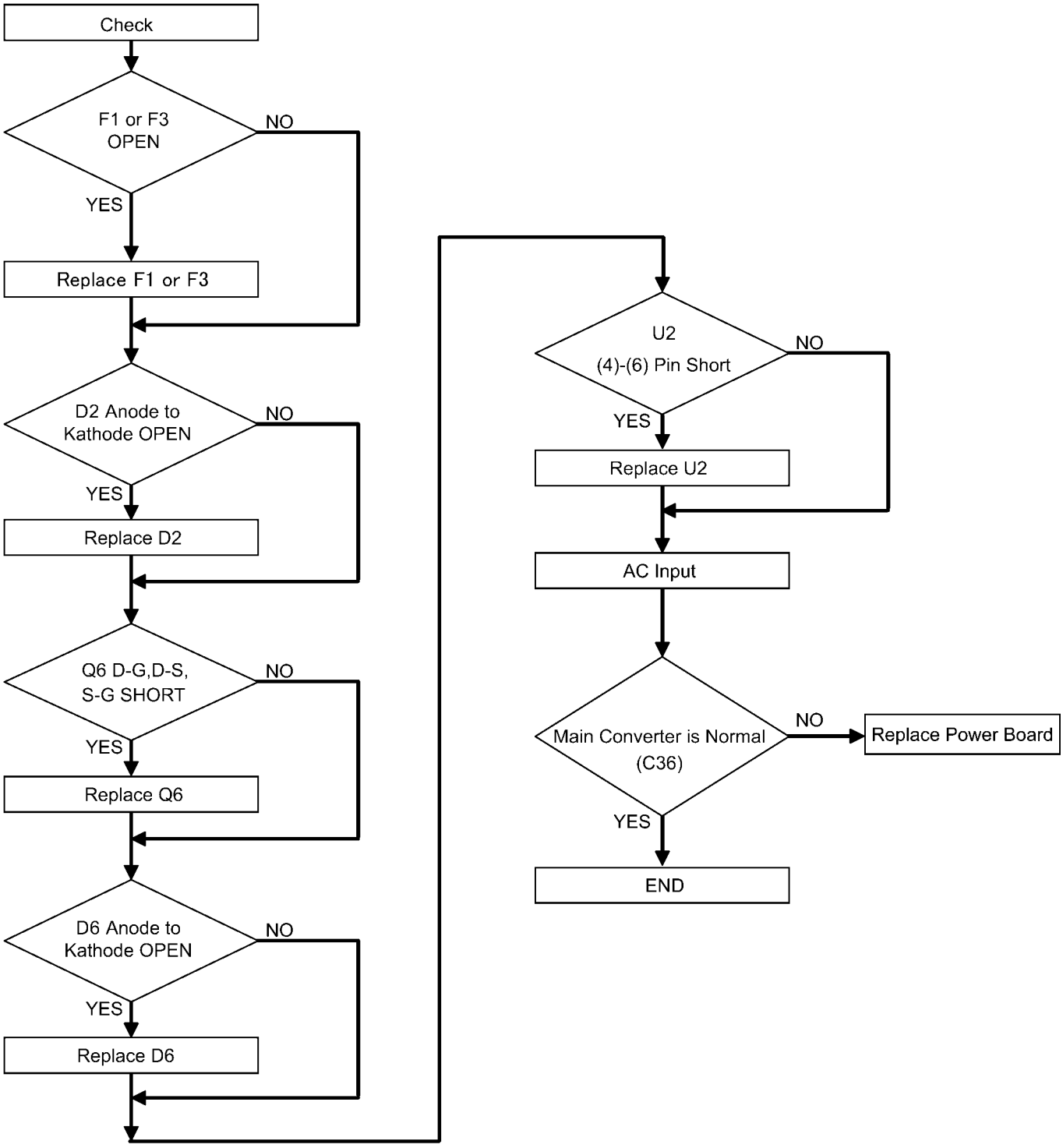
3.1. Power Supply Unit

Changed from Original Service Manual as section 9.2.

3.1.1. No Voltage is Output at All (1)

Changed from Original Service Manual as section 9.2.1.

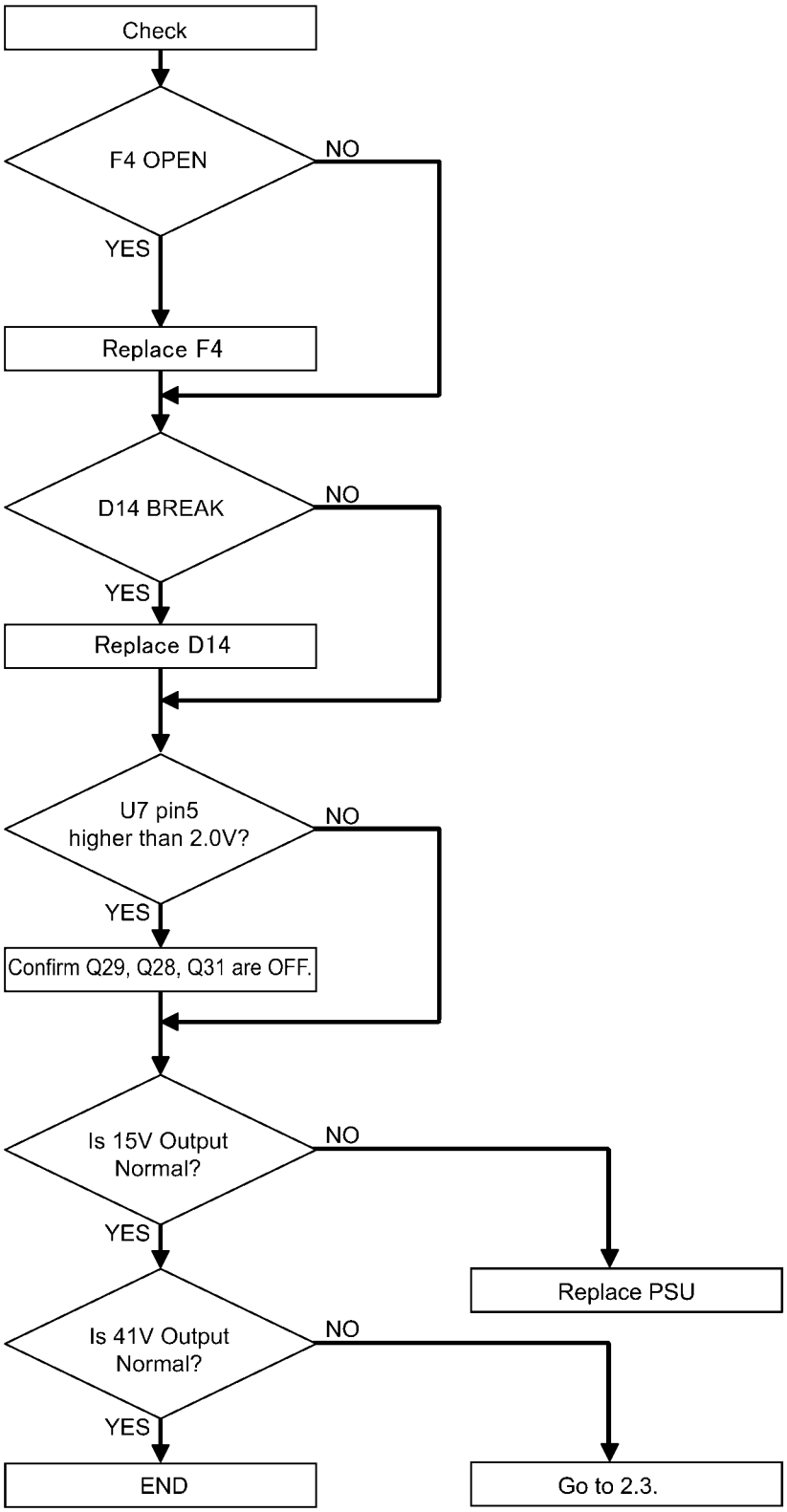
Main converter output voltage error [Between pin1 and pin2 of CN100, DC Switch OFF]



3.1.2. No Voltage is Output at All (2)

Changed from Original Service Manual as section 9.2.2.

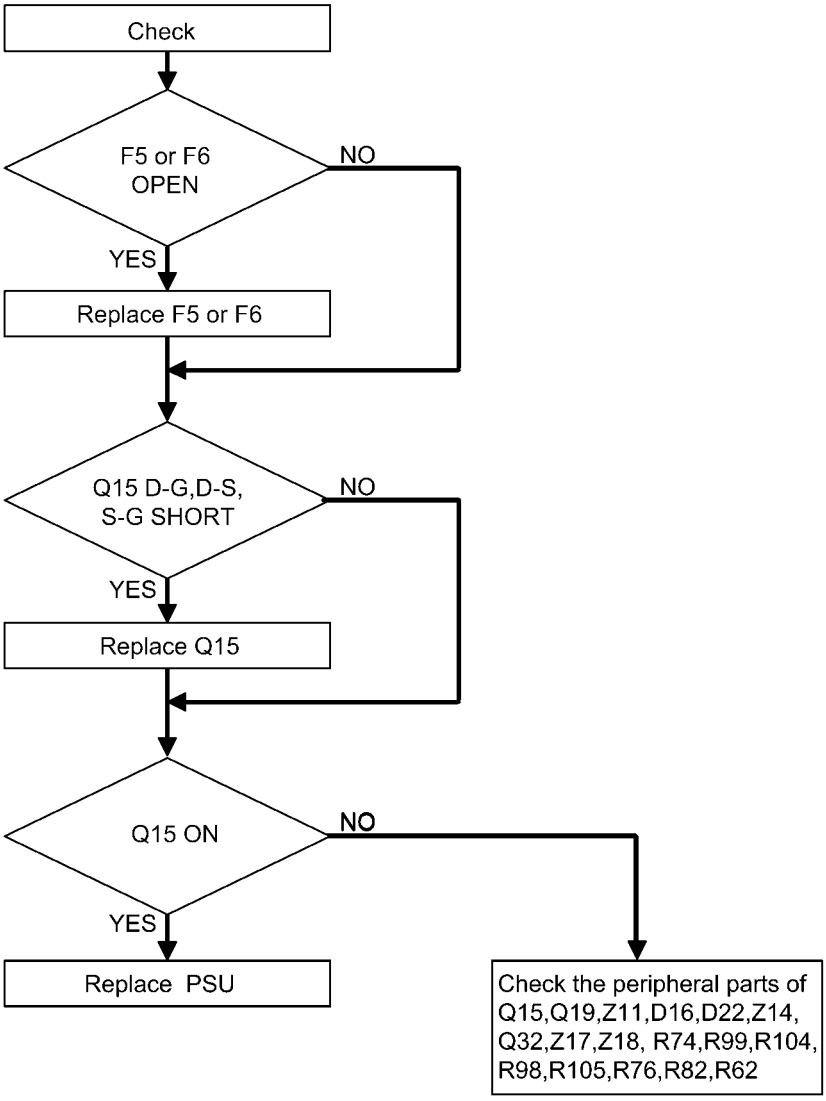
Output voltage of Main Converter is Normal [Between pin1 and pin2 of CN100, DC Switch ON]



3.1.3. 41V are Not Output

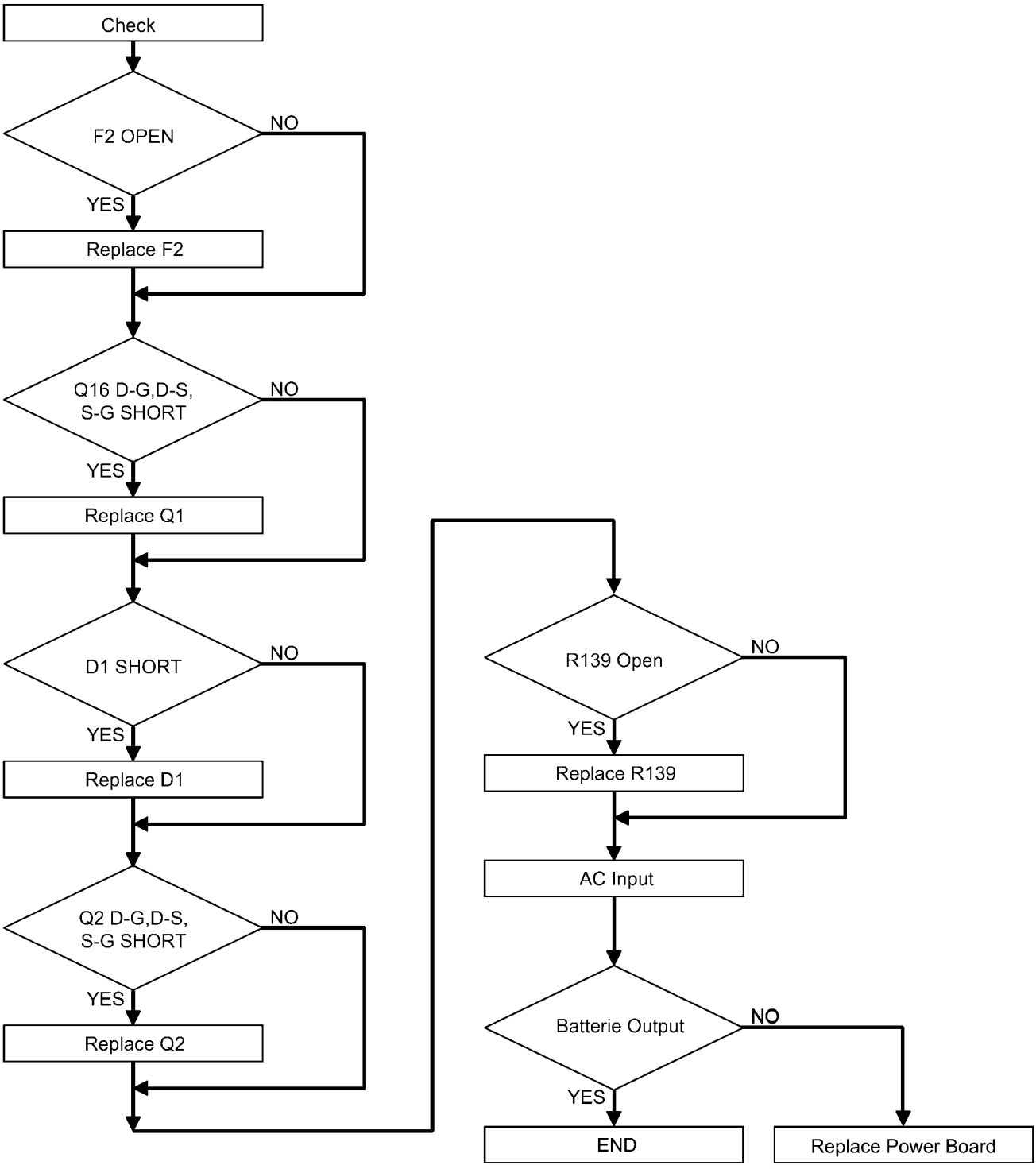
Changed from Original Service Manual as section 9.2.3.

(Only 15V is output)



3.1.4. Battery Backup Function Does Not Operate / PSU can Not Charge Batteries

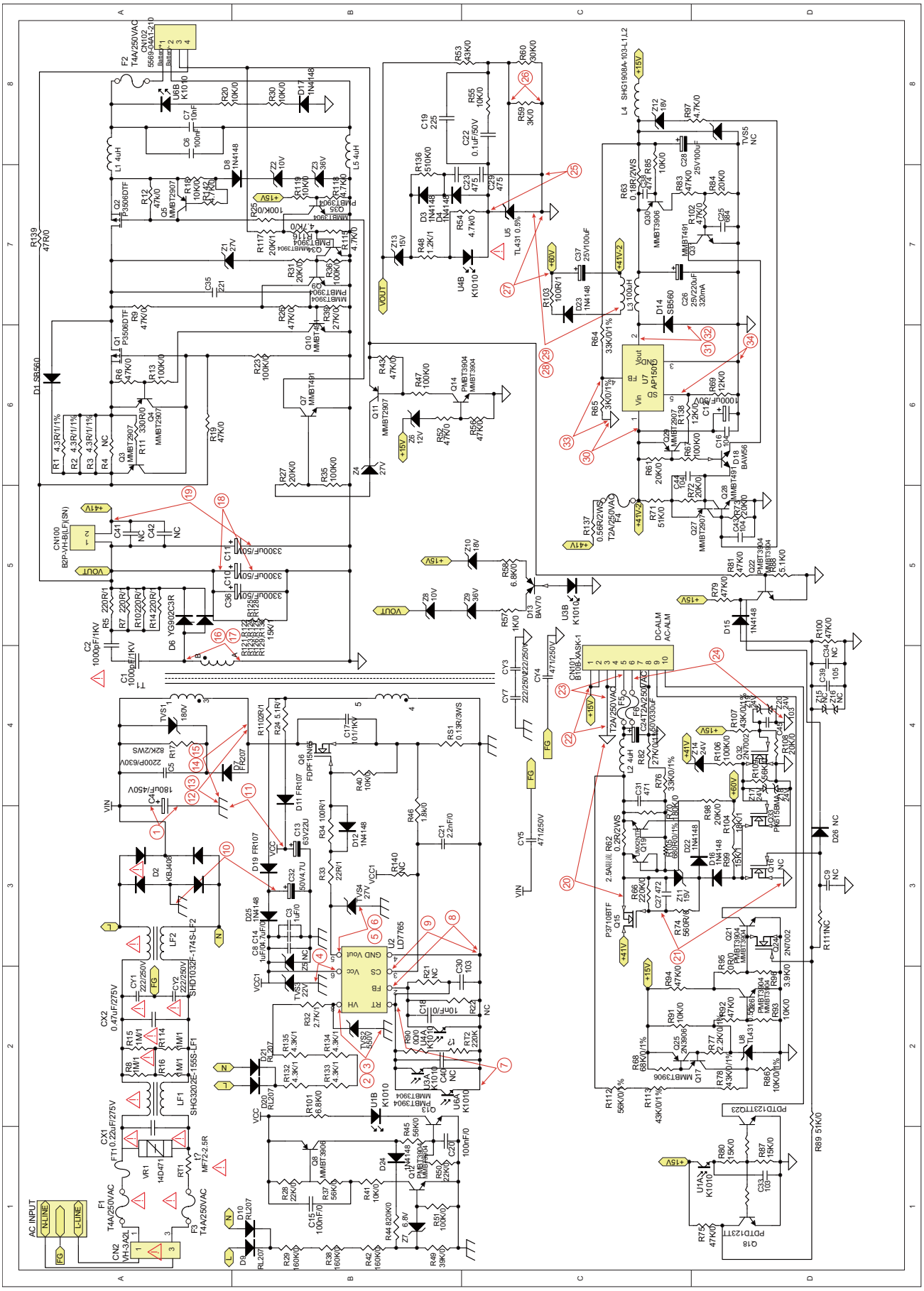
Changed from Original Service Manual as section 9.2.4.



4 Schematic Diagram

4.1. Power Supply Board

Changed from Original Service Manual as section 12.6.

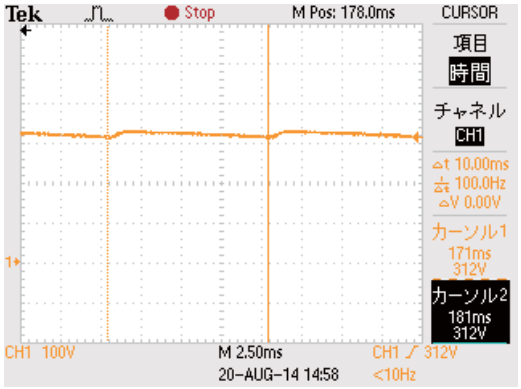


4.2. Waveform

4.2.1. Power Supply Board

Changed from Original Service Manual as section 12.7.6.

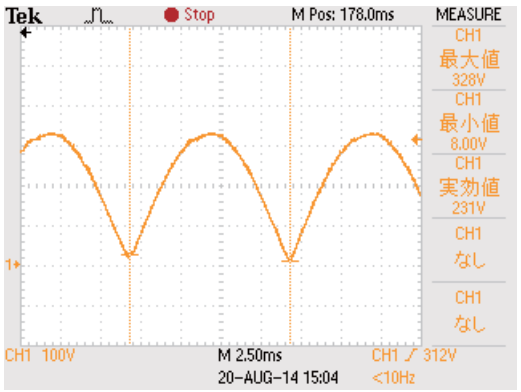
①



VOLTAGE
312V

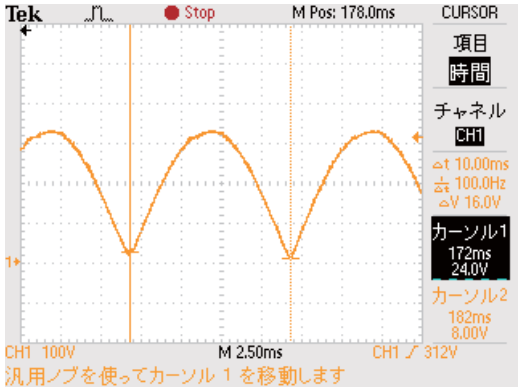
CYCLE
10.00ms

②



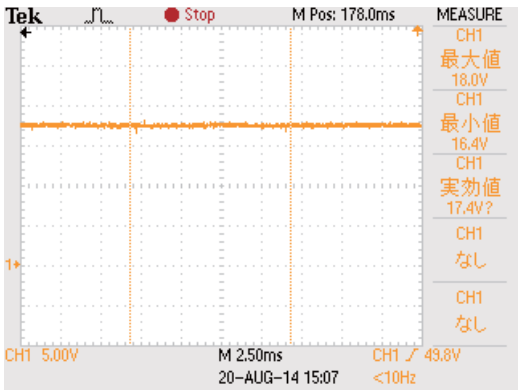
VOLTAGE
328V

③



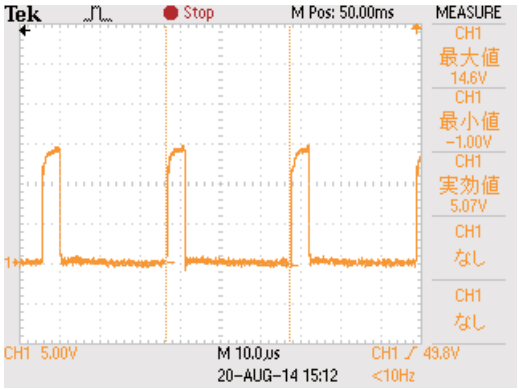
CYCLE
10.00ms

④



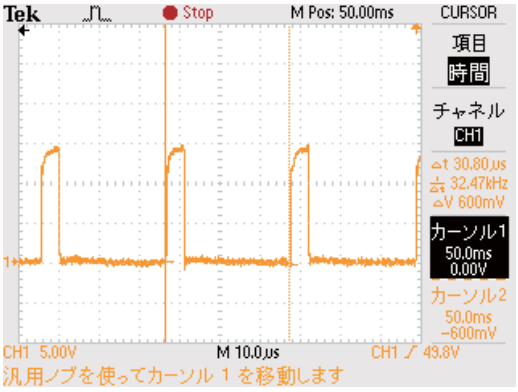
VOLTAGE
18.0V

⑤



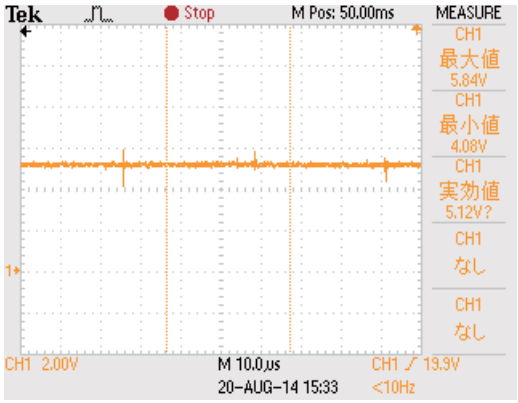
VOLTAGE
14.6V

⑥



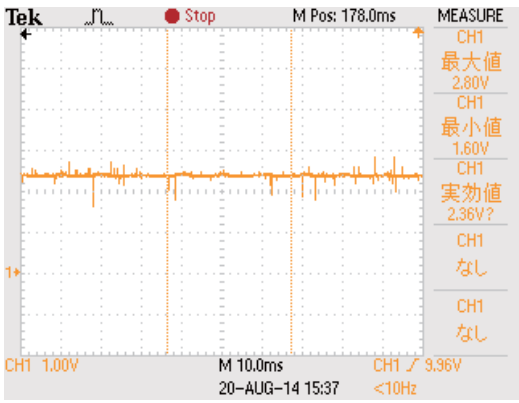
CYCLE
30.80µs

⑦



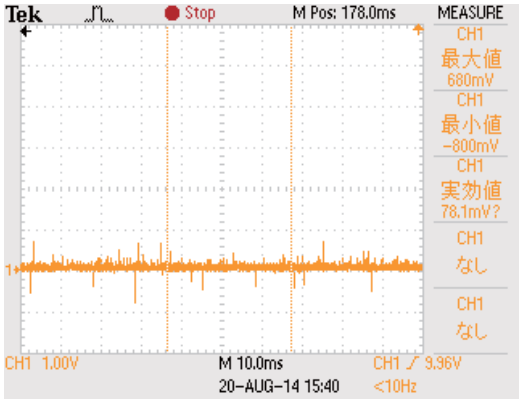
VOLTAGE
5.84V

⑧



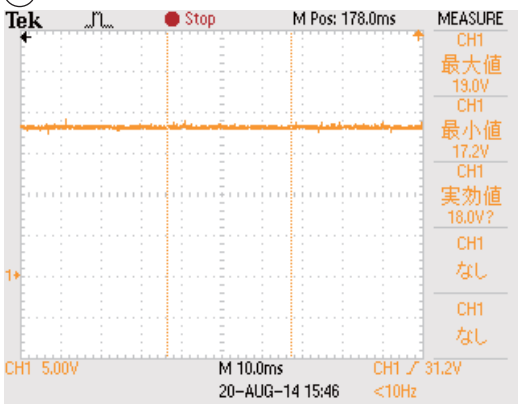
VOLTAGE
2.80V

⑨



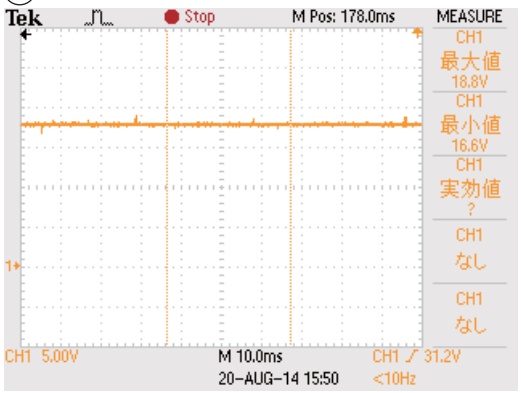
VOLTAGE
0V

⑩



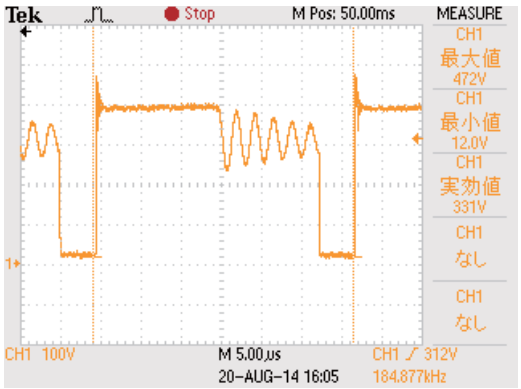
VOLTAGE
19.0V

⑪



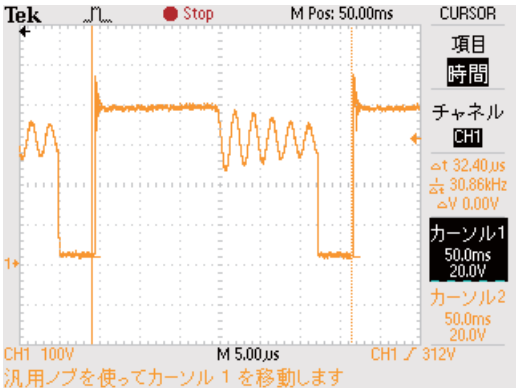
VOLTAGE
18.8V

⑫



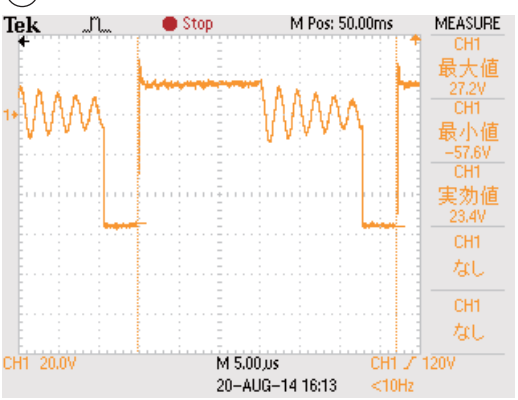
VOLTAGE
472V

⑬



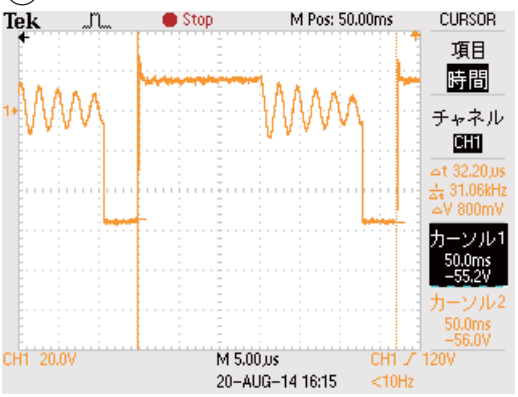
CYCLE
32.40µs

⑭



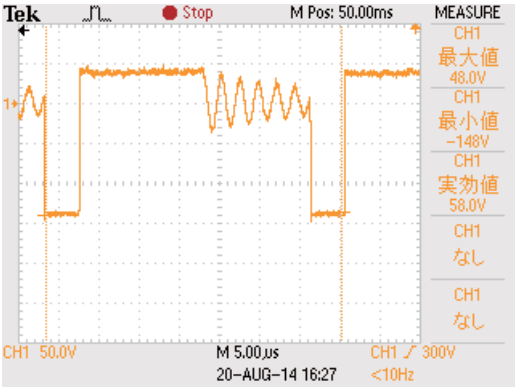
VOLTAGE
27.2V

⑮



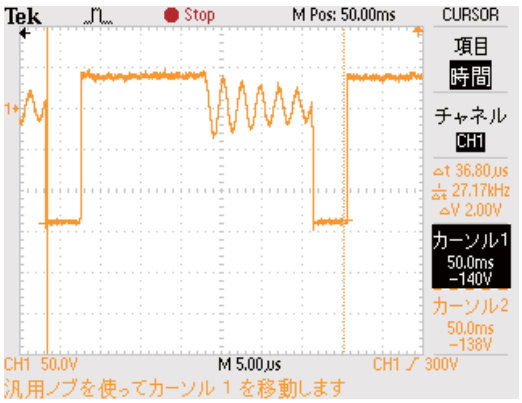
CYCLE
32.20µs

⑯



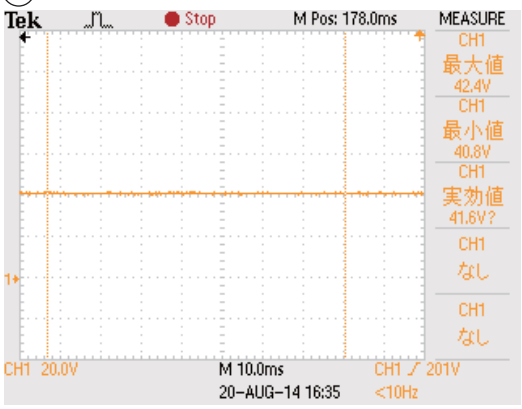
VOLTAGE
48.0V

⑰



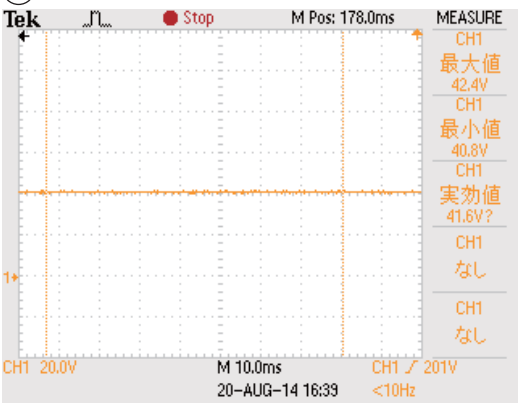
CYCLE
36.80µs

⑱



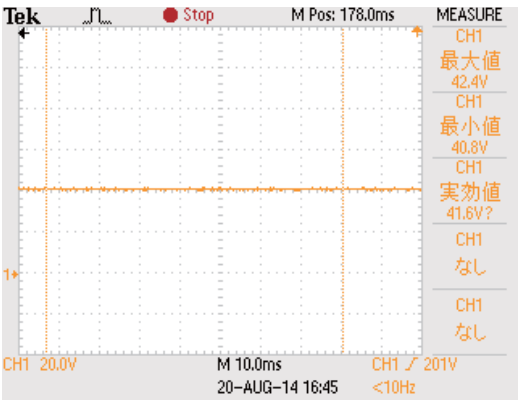
VOLTAGE
42.4V

⑲



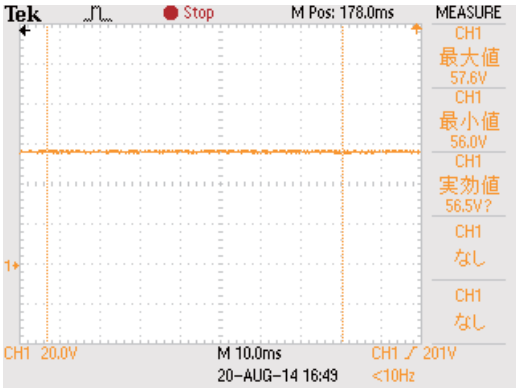
VOLTAGE
42.4V

⑳



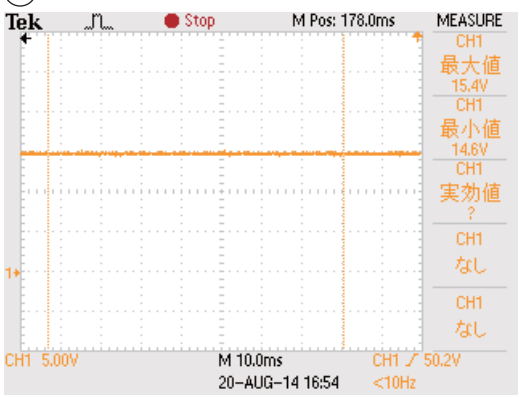
VOLTAGE
42.4V

㉑



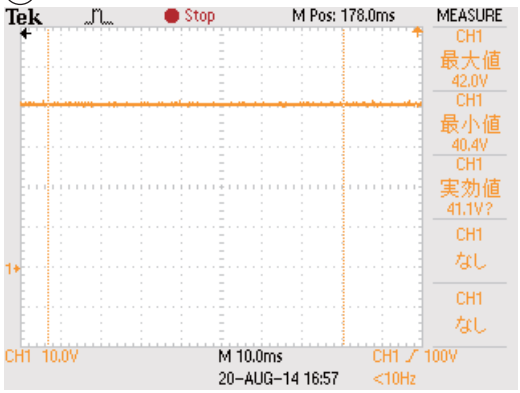
VOLTAGE
57.6V

㉒



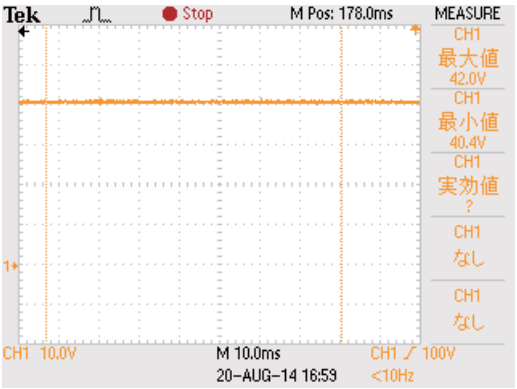
VOLTAGE
15.4V

㉓



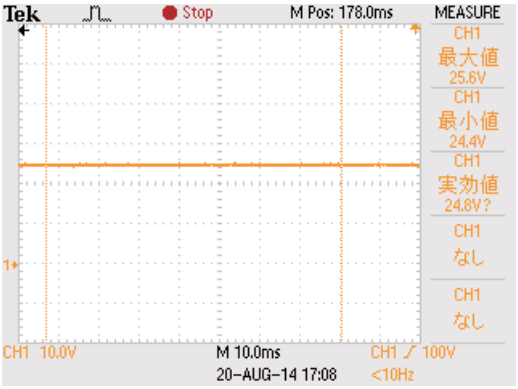
VOLTAGE
42.0V

㉔



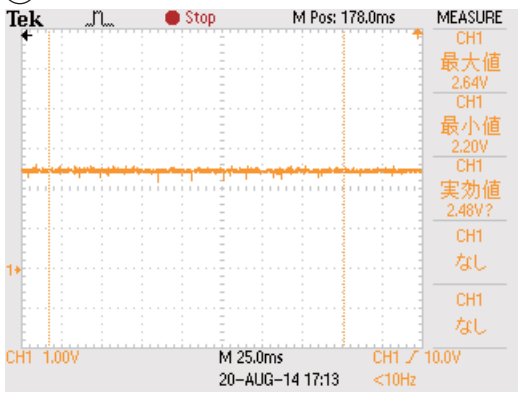
VOLTAGE
42.0V

㉕



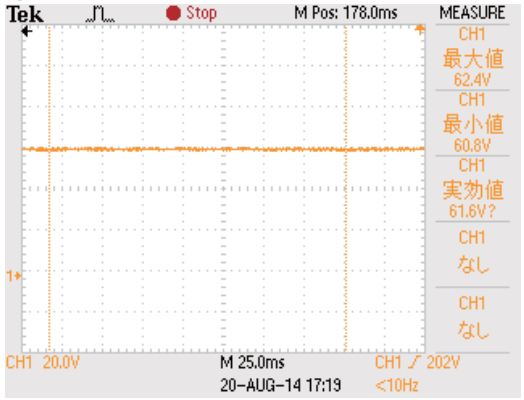
VOLTAGE
25.6V

㉖



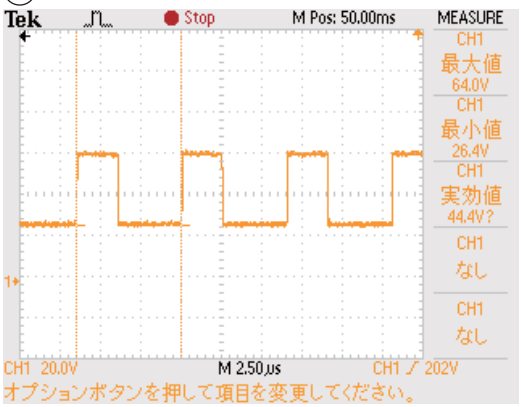
VOLTAGE
2.64V

㉗



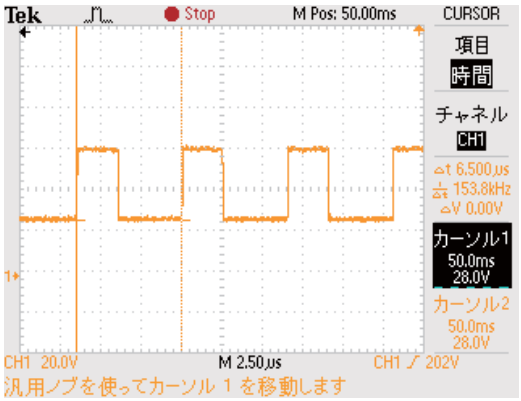
VOLTAGE
62.4V

㉘



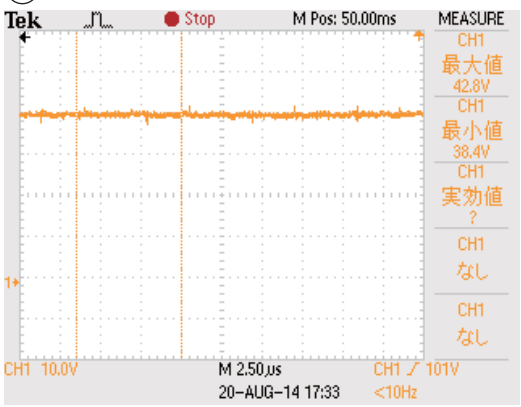
VOLTAGE
64.0V

㉙



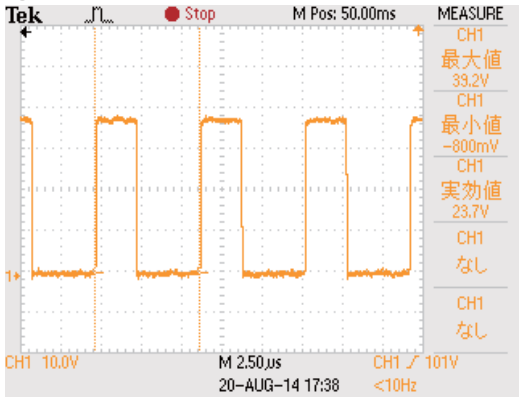
CYCLE
6.500µs

㉚



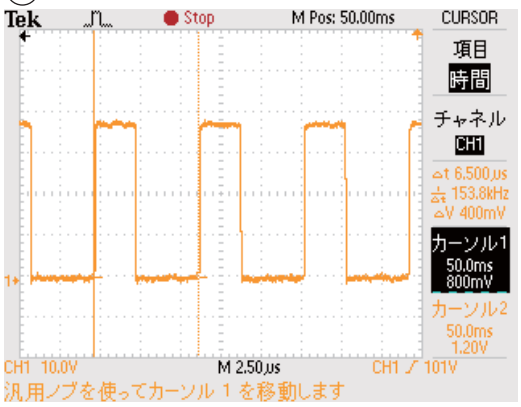
VOLTAGE
42.8V

㉛



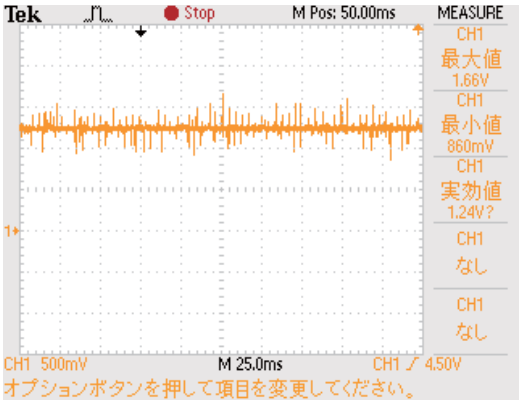
VOLTAGE
39.2V

㉜



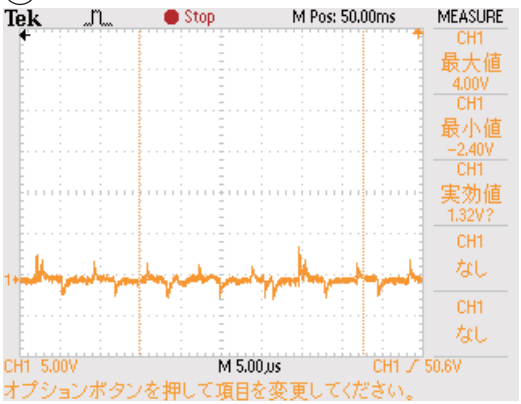
CYCLE
6.500µs

㉝



VOLTAGE
1.66V

㉞



VOLTAGE
0V

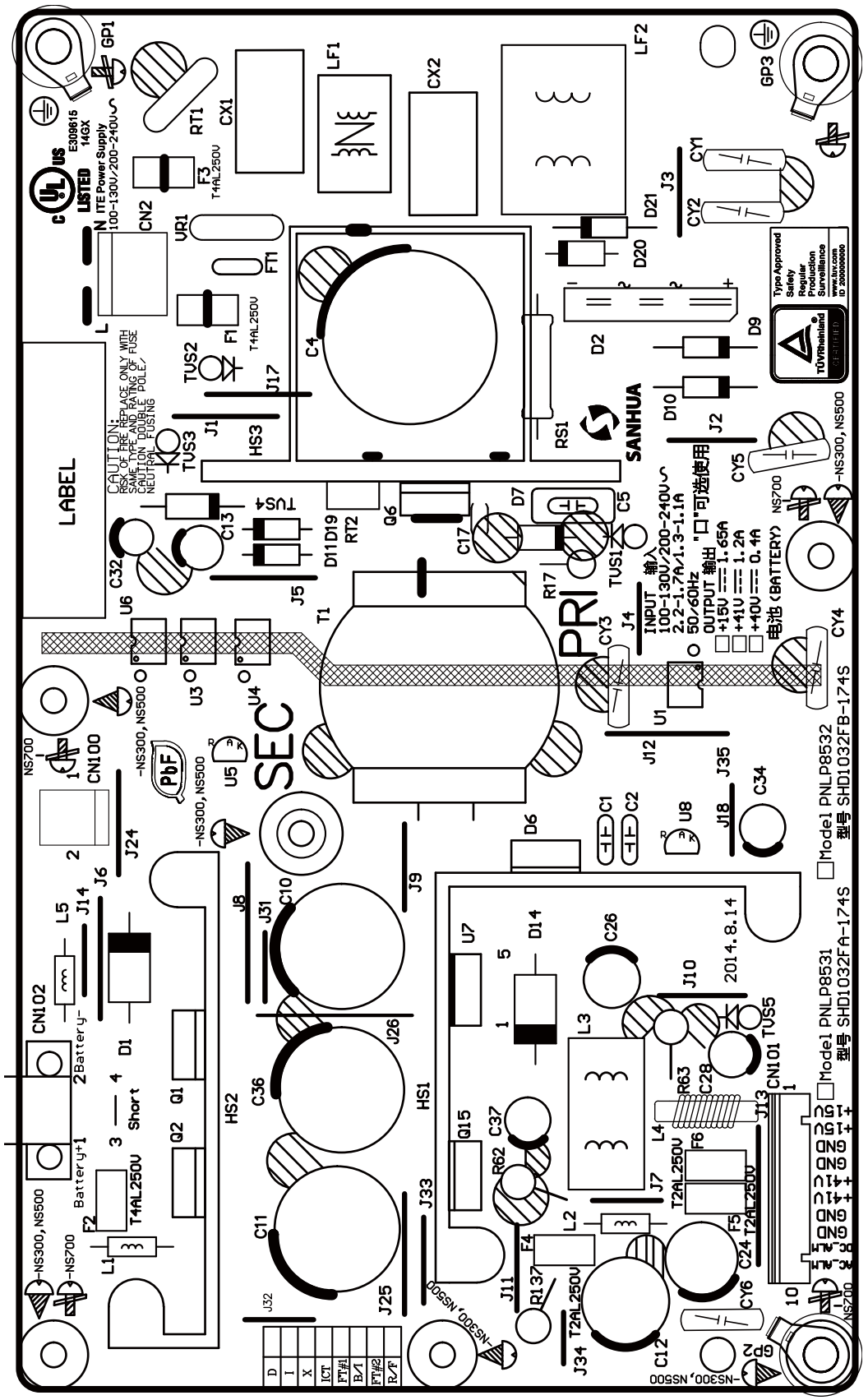
5 Printed Circuit Board

5.1. Power Supply Board

Changed from Original Service Manual as section 13.5.

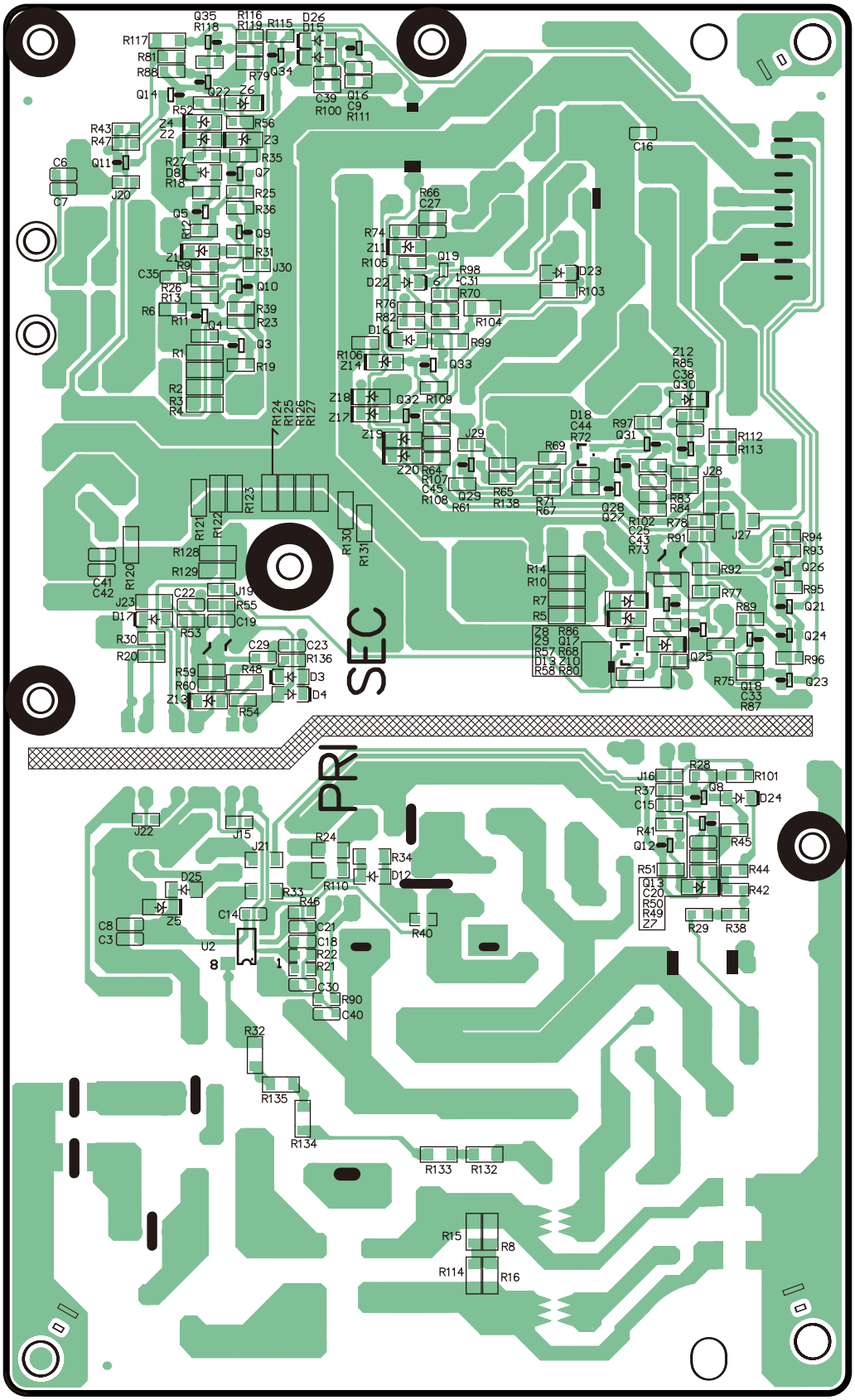
5.1.1. Component View

Changed from Original Service Manual as section 13.5.1.



5.1.2. Bottom View

Changed from Original Service Manual as section 13.5.2.

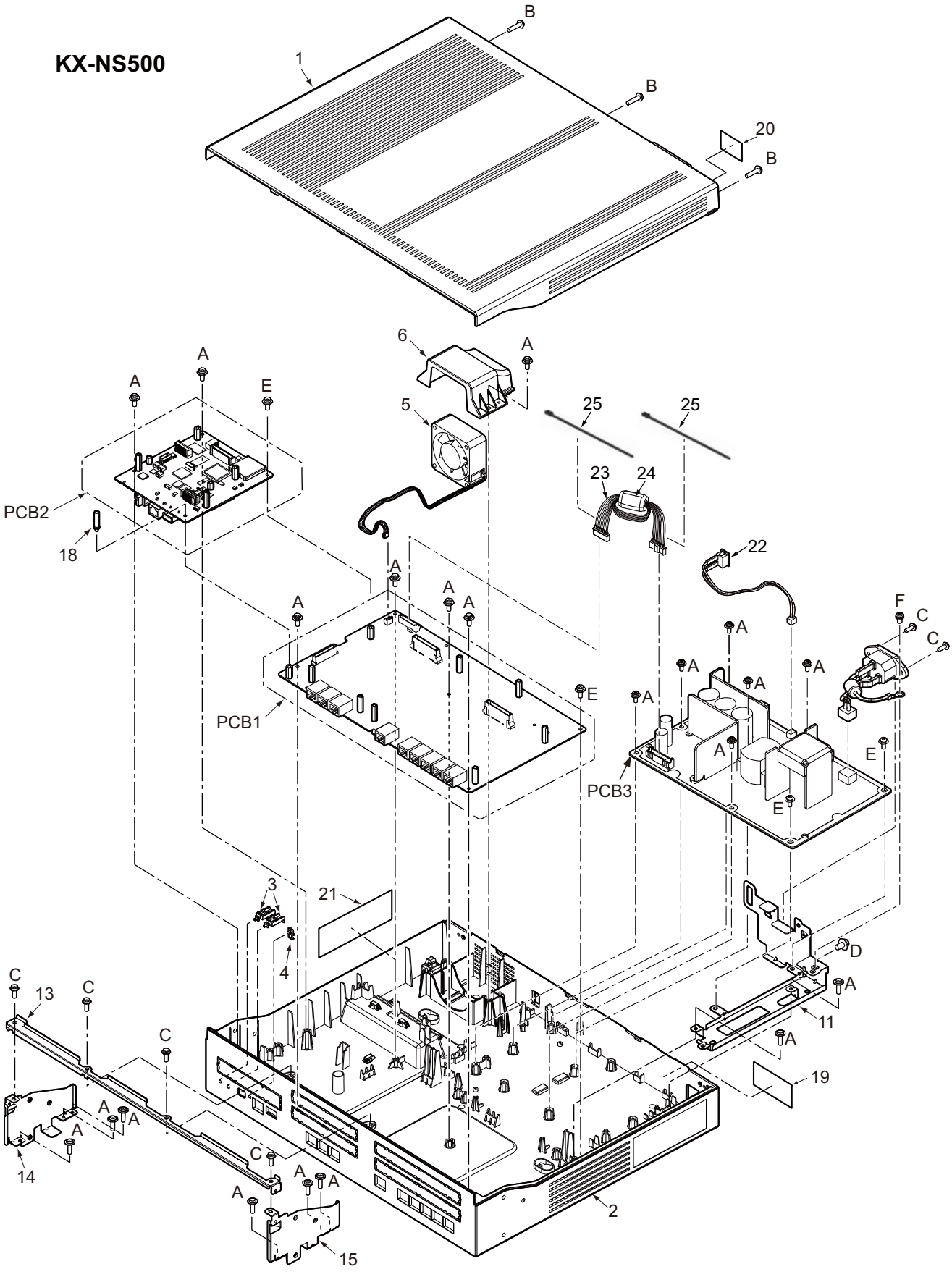


6 Exploded View and Replacement Parts List

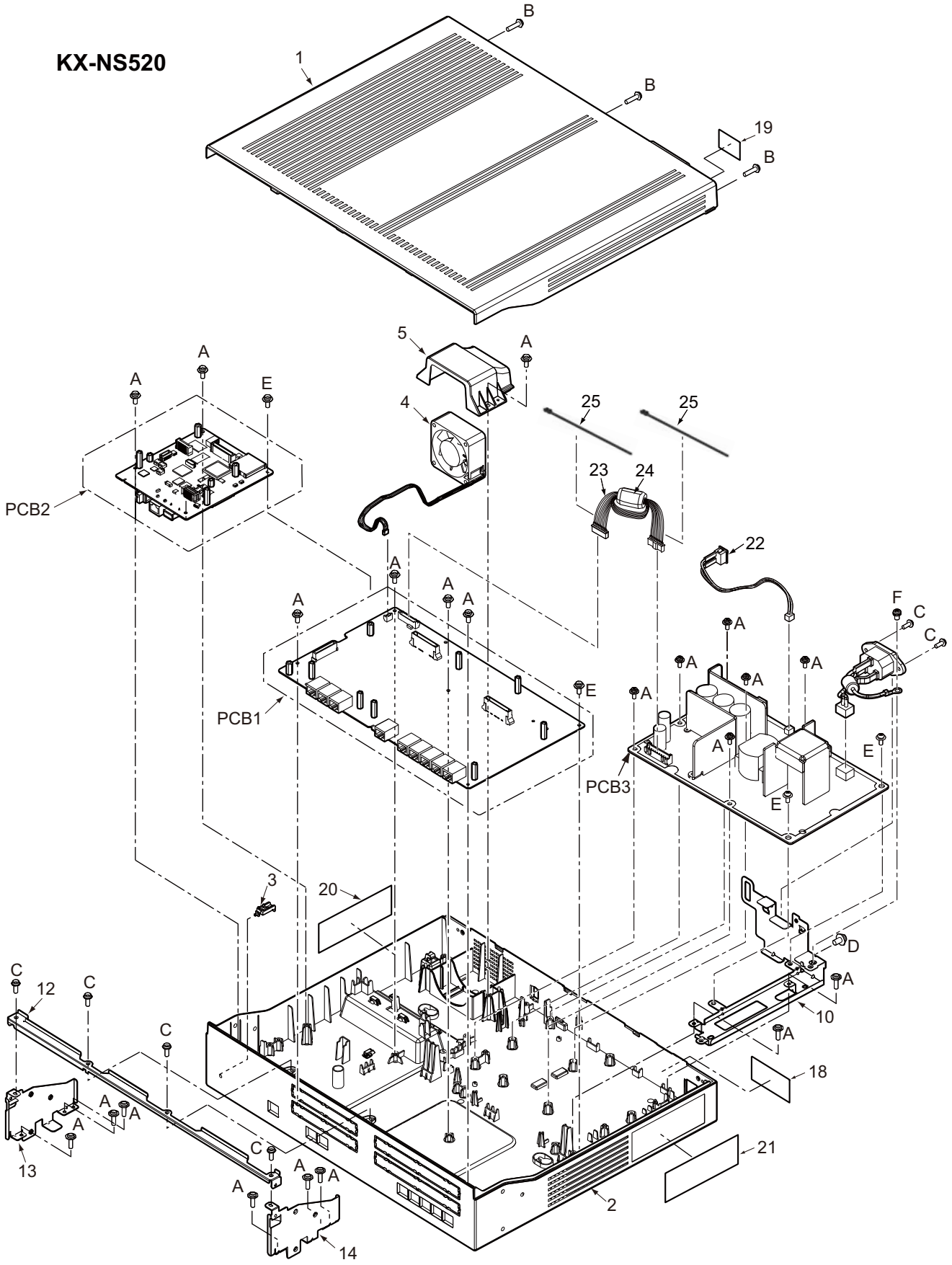
6.1. Cabinet and Electrical Parts Location

6.1.1. PSU

Changed from Original Service Manual as section 15.2.1.



KX-NS520


1
B
B
19
B
5
A
4
25
25
23
24
22
A
A
E
PCB2
A
A
A
A
E
PCB1
A
A
A
A
A
A
A
A
E
PCB3
E
F
C
C
3
20
C
12
C
C
A
A
A
13
C
A
A
A
14
D
A
10
A
18
21
2

6.2. Replacement Parts List

6.2.1. Power Supply Board parts (PCB3)

Changed from Original section “15.4.5. Power Supply Board parts (PCB3)”.

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
⚠	PCB3	PNLP8531Y	POWER SUPPLY ASS'Y(RTL)	
			(ICS)	
	U2	08LD776507U	IC	
	U7	08AP150105S	IC	
			(DIODES)	
	D1	050SB560S0B7	DIODE(SI)	
	D2	05KBJ408H7X	DIODE(SI)	
	D3	051N4148EPX8	DIODE(SI)	
	D4	051N4148EPX8	DIODE(SI)	
	D6	05Y902C3F6X	DIODE(SI)	
	D7	050FR207E0X	DIODE(SI)	
	D8	051N4148EPX8	DIODE(SI)	
	D9	050RL207F7X1	DIODE(SI)	
	D10	050RL207F7X1	DIODE(SI)	
	D11	050FR107FBX1	DIODE(SI)	
	D12	051N4148EPX8	DIODE(SI)	
	D13	040BAV70ITX1	DIODE(SI)	
	D14	050SB560S0B7	DIODE(SI)	
	D15	051N4148EPX8	DIODE(SI)	
	D16	051N4148EPX8	DIODE(SI)	
	D17	051N4148EPX8	DIODE(SI)	
	D18	04BAW56LETX1	DIODE(SI)	
	D19	050FR107FBX1	DIODE(SI)	
	D20	050RL207F7X1	DIODE(SI)	
	D21	050RL207F7X1	DIODE(SI)	
	D22	051N4148EPX8	DIODE(SI)	
	D23	051N4148EPX8	DIODE(SI)	
	D24	051N4148EPX8	DIODE(SI)	
	D25	051N4148EPX8	DIODE(SI)	
	Z1	04ZMM27VDTX4	DIODE(SI)	
	Z2	04ZMM10VDTX4	DIODE(SI)	
	Z3	04ZMM36VDTX4	DIODE(SI)	
	Z4	04ZMM27VDTX4	DIODE(SI)	
	Z6	04ZMM12VDTX4	DIODE(SI)	
	Z7	04ZMM6V8DTX4	DIODE(SI)	
	Z8	04ZMM10VDTX4	DIODE(SI)	
	Z9	04ZMM36VDTX4	DIODE(SI)	
	Z10	04ZMM18VDTX4	DIODE(SI)	
	Z11	04ZMM15VDT14	DIODE(SI)	
	Z12	04ZMM18VDTX4	DIODE(SI)	
	Z13	04ZMM15VDT14	DIODE(SI)	
	Z14	04ZMM24VDTX4	DIODE(SI)	
	Z17	04ZMM24VDTX4	DIODE(SI)	
	Z18	04ZMM24VDTX4	DIODE(SI)	
	Z19	04ZMM24VDTX4	DIODE(SI)	
	Z20	04ZMM24VDTX4	DIODE(SI)	
			(CONNECTORS)	
⚠	CN2	30VH3A2L02C	CONNECTOR	
	CN100	30B2PVHB02B	CONNECTOR	
	CN101	30B10BXASKX3	CONNECTOR	
	CN102	3.05569E+11	CONNECTOR	
			(RESISTOR)	
	J15	12BB0000JTX1	0	
	J16	12BB0000JTX1	0	
	J19	12BB0000JTX1	0	
	J20	12BB0000JTX2	0	
	J21	12CC0000JTX1	0	
	J22	12BB0000JTX1	0	
	J23	12CC0000JTX1	0	
	J27	12CC0000JTX1	0	
	J28	12CC0000JTX1	0	
	J29	12BB0000JTX1	0	
	J30	12BB0000JTX2	0	
	R1	12CC0439FTX2	4.3	
	R2	12CC0439FTX2	4.3	
	R3	12CC0439FTX2	4.3	
	R5	12CC0221JTX1	220	
	R6	12BB0473JTX2	47k	
	R7	12CC0221JTX1	220	
	R8	12CC0105JTX1	1	
	R10	12CC0221JTX1	220	
	R11	12BB0331JTX1	330	
	R12	12BB0473JTX2	47k	
	R13	12BB0104JTX2	100k	
	R14	12CC0221JTX1	220	
	R15	12CC0105JTX1	1	
	R16	12CC0105JTX1	1	
	R17	11FG0823JBS2	82k	
	R18	12BB0103JTX2	10k	
	R19	12BB0473JTX2	47k	
	R20	12BB0103JTX2	10k	
	R23	12BB0104JTX2	100k	
	R24	12CC0519JTX1	5.1	
	R25	12BB0104JTX2	100k	
	R26	12BB0473JTX2	47k	
	R27	12BB0203JTX2	20k	
	R28	12BB0223JTX2	22k	
	R29	12BB0164JTX1	160k	
	R30	12BB0103JTX2	10k	
	R31	12BB0203JTX2	20k	
	R32	12CC0272JTX1	2.7k	
	R33	12CC0220JTX1	22	
	R34	12CC0101JTX1	100	
	R35	12BB0104JTX2	100k	
	R36	12BB0104JTX2	100k	
	R37	12BB0563JTX1	56k	
	R38	12BB0164JTX1	160k	
	R39	12BB0273JTX2	27k	
	R40	12BB0103JTX1	10k	
	R41	12BB0103JTX1	10k	
	R42	12BB0164JTX1	160k	
	R43	12BB0473JTX2	47k	
	R44	12BB0824JTX1	820k	
	R45	12BB0563JTX1	56k	
	R46	12BB0182JTX1	1.8k	
	R47	12BB0104JTX2	100k	
	R48	12CC0122JTX1	1.2k	
	R49	12BB0393JTX1	39k	
	R50	12BB0223JTX2	22k	
	R51	12BB0104JTX1	100k	
	R52	12BB0473JTX2	47k	
	R53	12BB0433ATX2	43k	
	R54	12BB0472JTX1	4.7k	
	R55	12BB0103JTX1	10k	
	R56	12BB0473JTX2	47k	
	R57	12BB0102JTX2	1k	
	R58	12BB0682JTX1	6.8k	
	R59	12BB0302ATX2	3k	
	R60	12BB0303ATX2	30k	
	R61	12BB0203JTX1	20k	
	R62	11NG0208TNX2	0.2	
	R63	11NG0188JBX	0.18	
	R64	12BB0333FTX1	33k	
	R65	12BB0302FTX1	3k	
	R66	12BB0224JTX1	220k	
	R67	12BB0104JTX1	100k	
	R68	12BB0683FTX1	68k	
	R69	12BB0123JTX1	12k	
	R70	12BB0184JTX1	180k	
	R71	12BB0513JTX1	51k	
	R72	12BB0203JTX1	20k	
	R73	12BB0203JTX1	20k	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	R74	12BB0561JTX1	560	
	R75	12BB0473JTX1	47k	
	R76	12BB0333FTX1	33k	
	R77	12BB0222FTX1	2.2k	
	R78	12BB0433FTX1	43k	
	R79	12BB0473JTX2	47k	
	R80	12BB0153JTX1	15k	
	R81	12BB0473JTX2	47k	
	R82	12BB0273FTX2	27k	
	R83	12BB0473JTX1	47k	
	R84	12BB0203JTX1	20k	
	R85	12BB0103JTX1	10k	
	R86	12BB0103FTX2	10k	
	R86	12BB0392JTX1	3.9k	
	R87	12BB0153JTX1	15k	
	R88	12BB0512JTX1	5.1k	
	R89	12BB0513JTX1	51k	
	R90	12BB0000JTX1	0	
	R91	12BB0103JTX1	10k	
	R92	12BB0473JTX1	47k	
	R93	12BB0103JTX1	10k	
	R94	12BB0473JTX1	47k	
	R95	12BB0000JTX1	0	
	R96	12BB0392JTX1	3.9k	
	R97	12BB0472JTX1	4.7k	
	R98	12BC0203FTX2	20k	
	R99	12CC0153JTX1	15k	
	R100	12BB0473JTX1	47k	
	R101	12BB0682JTX1	6.8k	
	R102	12BB0473JTX1	47k	
	R103	12CC0101JTX1	100	
	R104	12CC0183JTX1	18k	
	R105	12BB0681FTX2	680	
	R106	12BB0104JTX1	100k	
	R107	12BB0433FTX1	43k	
	R108	12BB0203JTX1	20k	
	R109	12BB0563JTX1	56k	
	R110	12CC0020JTX1	2	
	R112	12BB0563FTX1	56k	
	R113	12BB0433FTX1	43k	
	R114	12CC0105JTX1	1	
	R115	12BB0472JTX2	4.7k	
	R116	12BB0472JTX2	4.7k	
	R117	12CC0203JTX2	20k	
	R118	12BB0472JTX2	4.7k	
	R119	12BB0103JTX2	10	
	R120	12CC0183JTX1	18k	
	R121	12CC0183JTX1	18k	
	R122	12CC0183JTX1	18k	
	R123	12CC0183JTX1	18k	
	R124	12CC0183JTX1	18k	
	R125	12CC0183JTX1	18k	
	R126	12CC0183JTX1	18k	
	R127	12CC0183JTX1	18k	
	R128	12CC0183JTX1	18k	
	R129	12CC0183JTX1	18k	
	R130	12CC0183JTX1	18k	
	R131	12CC0183JTX1	18k	
	R132	12CC0432JTX1	4.3k	
	R133	12CC0432JTX1	4.3k	
	R134	12CC0432JTX1	4.3k	
	R135	12CC0432JTX1	4.3k	
	R136	12BB0514JTX1	510k	
	R137	11RG0568JGX	0.56	
	R138	12BB0123JTX1	12k	
	R139	12BB0470JTX2	47	
	R142	12BB0472JTX2	4.7k	
⚠	RS1	11NH0138JBS2	0.13	
			(CAPACITORS)	
	C3	18BD0105KIA1	1	
⚠	C4	15NF181R532S	180	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	C5	17MJC222JUX5	2200	
	C6	18BB0104KIA1	0.1	
	C7	18BB0103KIA1	0.01	
	C8	18BD0105KIA1	1	
	C10	15NFF332R0F	3300	
	C11	15NFF332R0F	3300	
	C12	15NFF102R013	1000	
	C13	15NGY220RY05	22	
	C14	18BD0475KID1	4.7	
	C15	18BB0104KIA1	0.1	
	C16	18BB0104KIA1	0.1	
	C17	16AKB101KFA5	100p	
	C18	18BB0103KIA1	0.01	
	C19	18BD0225KIA1	2.2	
	C20	18BB0104KIA1	0.1	
	C21	18BB0222KIA1	2200p	
	C22	18BB0104KIA1	0.1	
	C23	18BD0475KID1	4.7	
	C24	15NFF331R02	330	
	C25	18BD0684KIA1	0.68	
	C26	15NDF221R007	220	
	C27	18BB0472KIA1	4700p	
	C28	15NDY101R005	100	
	C29	18BD0475KID1	4.7	
	C30	18BB0104KIA1	0.1	
	C31	18BB0471KIA1	470p	
	C32	15NFY479RYA	4.7	
	C33	18BB0103KIA1	0.01	
	C35	18BB0221KIA1	220p	
	C36	15NFF332R0F	3300	
	C37	15NDY101R005	100	
	C38	18BD0474KIA1	0.47	
	C39	18BD0105KIA1	1	
	C43	18BB0104KIA1	0.1	
	C44	18BB0104KIA1	0.1	
	C45	18BB0103KIA1	0.01	
⚠	CY1	16AQN222MUDN	2200	
⚠	CY2	16AQN222MUDN	2200	
⚠	CY3	16AQN222MUDN	2200	
⚠	CY4	16APN471KFDJ	470	
⚠	CY5	16APN471KFDJ	470	
⚠	CX1	17ATK224KUG	0.22	
⚠	CX2	17ATK474KUG1	0.47	
⚠	J4	16AQN222MUDN	2200	
			(TRANSISTORS)	
	Q1	06P3506D0CX	TRANSISTOR(SI)	
	Q2	06P3506D0CX	TRANSISTOR(SI)	
	Q3	07MT29070BX1	TRANSISTOR(SI)	
	Q4	07MT29070BX1	TRANSISTOR(SI)	
	Q5	07MT29070BX1	TRANSISTOR(SI)	
	Q7	07MBT4910BX1	TRANSISTOR(SI)	
	Q8	07MM39060BX1	TRANSISTOR(SI)	
	Q9	07PMBT040EX	TRANSISTOR(SI)	
	Q10	07MBT4910BX1	TRANSISTOR(SI)	
	Q11	07MT29070BX1	TRANSISTOR(SI)	
	Q12	07PMBT040EX	TRANSISTOR(SI)	
	Q13	07PMBT040EX	TRANSISTOR(SI)	
	Q14	07PMBT040EX	TRANSISTOR(SI)	
	Q17	07MM39060BX1	TRANSISTOR(SI)	
	Q18	07P123TT0BX	TRANSISTOR(SI)	
	Q19	07UM2NTR0BX6	TRANSISTOR(SI)	
	Q21	07PMBT040EX	TRANSISTOR(SI)	
	Q22	07PMBT040EX	TRANSISTOR(SI)	
	Q23	07P123TT0BX	TRANSISTOR(SI)	
	Q24	06N7002K0EX	TRANSISTOR(SI)	
	Q25	07MM39060BX1	TRANSISTOR(SI)	
	Q26	07PMBT040EX	TRANSISTOR(SI)	
	Q27	07MT29070BX1	TRANSISTOR(SI)	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	Q28	07MBT4910BX1	TRANSISTOR(SI)	
	Q29	07MT29070BX1	TRANSISTOR(SI)	
	Q30	07MM39060BX1	TRANSISTOR(SI)	
	Q31	07MBT4910BX1	TRANSISTOR(SI)	
	Q32	06N7002K0EX	TRANSISTOR(SI)	
	Q33	06615BMA0EX	TRANSISTOR(SI)	
	Q34	07PMBT040EX	TRANSISTOR(SI)	
	Q35	07PMBT040EX	TRANSISTOR(SI)	
			(THERMISTORS)	
⚠	RT1	14NTC511XCX	THERMISTOR	
	RT2	14NT224JXKX	THERMISTOR	
			(VARISTOR)	
⚠	VR1	14VD471KCEX	VARISTOR	
			(COILS)	
	L1	23Z3560800X	COIL	
	L3	22S1032F0L3H	COIL	
	L4	22S8L1L26LXB	COIL	
	L5	23Z3560800X	COIL	
			(FILTERS)	
⚠	LF1	22S3202ELF1H	FILTER	
⚠	LF2	22S1032FLF2H	FILTER	
			(TRANSFORMER)	
⚠	T1	24S32FT1FX1	TRANSFORMER	
			(REGULATORS)	
	U5	08TL431BILT	REGULATOR	
	U8	08TL431BILT	REGULATOR	
			(FUSES)	
⚠	F1	3404000D6USD	FUSE	
⚠	F2	3404000D6USD	FUSE	
⚠	F3	3404000D6USD	FUSE	
⚠	F4	3402000D6USD	FUSE	
⚠	F5	3402000D6USD	FUSE	
⚠	F6	3402000D6USD	FUSE	
⚠	FT1	3405000DMUXB	FUSE	
			(OTHERS)	
	TVS1	05P6K180K0X3	TVS	
	TVS2	056KE550KBX3	TVS	
	TVS3	05P6K22AK0X3	TVS	
	TVS4	05P6KE27KBX3	TVS	
	L2	23Z3560800X	CORE	
		23FB163500X	CORE For D6,Q6,D7,C5	
⚠	Q6	06F15N650CX	MOSFET	
	Q15	06P3710B0CX	MOSFET	
⚠	U1	080PC817CFD	PHOTOCOUPLE	
⚠	U3	080PC817CFD	PHOTOCOUPLE	
⚠	U4	080PC817CFD	PHOTOCOUPLE	
⚠	U6	080PC817CFD	PHOTOCOUPLE	
⚠	E1	35GE02131XH	AC INLET	
	E2	41Z03080102	Screw	
	E3	41Z03060102	Screw	
	E4	41F30060102	Screw	
	E5	41P30060102	Screw	
	E6	41P30060102	Screw	
	E7	40PO3O6OBT2	Screw	
	E8	41Z03080102	Screw	
		364001000U0	TUBE For FT1	
		364413000UT	TUBE For FT1,VR1	
		364006000U0	TUBE For R17	
		36441500U0	TUBE For RT1	
		364008000U0	TUBE For R137	
	A	XTW3+8LFJK7	Screw	
	B	XYN3+F8FJ	Screw	
	C	PJNAC0021Z	Screw	