# ■ PS CIRCUIT BOARD REPAIR GUIDE

## 1. Applicable Circuit Board

This guide is applicable when repairing the circuit board specified in the table 1-1.

Table 1-1

| Circuit Board | Part No. | Destination | Power Supply |
|---|---|---|---|
| PS84U | WD949200 | U/V | AC 120 V |
| PS84H | WD949300 | H/B/W/K/O | AC 230 V |
| PS84A | WD949400 | A | AC 240 V |

## 2. Electrical Performance

### 2-1 Preparation

- Connect the SW circuit board (WD945300) to CN410 and CN411.
- Connect the OUT circuit board (U/V/A/K/O: WE842800, H/B/W: WE842900) to CN401 and CN402.
- Adjust the power supply voltage suites each circuit boards. Refer to the table 1-1 above.
- Connect the power cable to the AC inlet on the OUT circuit board.

### 2-2 Voltages of Each Part

The output voltage is normal if it is in the range specified in the table 2-1 when turning the power on.

Table 2-1

| Measuring Item | Measuring Part | Output Voltage (DC) | | Load Resistance |
|---|---|---|---|---|
| | | U/VT/A | H/B/WT/K/O | |
| +BL | CN406-CN407 | approx. +56.6 V | approx. +57.4 V | 5 kΩ, 3 W |
| –BL | CN408-CN407 | approx. –56.6 V | approx. –57.4 V | 5 kΩ, 3 W |
| +15 V | CN415 1-2 pin | approx. +15.0 V | approx. +15.0 V | 10 kΩ, 1/4 W |
| –15 V | CN415 3-2 pin | approx. –15.0 V | approx. –15.0 V | 10 kΩ, 1/4 W |

Note: The output voltage may be out of the range if it is measured without the load resistance or the power supply voltage differs from the specified in the table 1-1.

### 2-3 Discharge

To prevent the electrical shock (discharge of the electric charge from the capacitor), discharge electricity between the following part when handling the PS circuit board.

- Between the positive (+) and negative (–) terminals of C409 and C410. If you have left the unit for 10 minutes or more after turning the power off, you do not have to discharge.
- Between CN406 and CN408.

# 3. Example of Repair

**All DC voltage is not output from secondary side.**

## 3-1 Instruction

Follow the instruction below. (See section 3-2 and diagram 3-3 on page 82.)

① Check the resistor value of R418 and R424 (6.8 Ω, 5 W).
If opened, replace R418 and R424.

② Check the resistor value between C-E of Q406 and Q407.
If short-circuited or the resistor value lowers by several values (Ω), remove Q406 or Q407. Also replace IC402 because it is broken.

③ Check the resistor value of R419 and R421 is 33 Ω.
If opened or the resistor value increases, replace R419 and R421.
If short-circuited or the resistor value is extremely small, replace D404 and D405. After replacing D404 and D405, check the resistor value again.

④ Check the resistor value of R440 is 220 Ω.
If opened or the resistor value increases, replace R440. Also replace Q414 because it may be broken.

⑤ Check the resistor value of R429, R430, R453 and R454.
If opened or the resistor value increases, replace R429, R430, R453 or R454.

⑥ Check the resistor value of F401.
If opened, replace F401.

⑦ Check the resistor value between following pins of IC402 with the analog multi tester. When checking, put negative (-) side of the analog multi tester to pin 4.

| | Pin | *Resistor Value | Remedy |
|---|---|---|---|
| 1 | Pin 4-5 (GND-LVG) | approx. 10 kΩ | Replace IC402. |
| 2 | Pin 4-3 (GND-Vcc) | approx. 5.5 kΩ | Replace IC403. If the problem is not resolved, replace IC401. |
| 3 | Pin 4-2 (GND-HIN) | approx. 500 MΩ | Replace IC402. If the problem is not resolved, replace IC401. |
| 4 | Pin 4-1 (GND-LIN) | approx. 500 MΩ | Replace IC402. If the problem is not resolved, replace IC401. |

*** The resistor value is the standard value. Replace IC402 if the resistor value is extremely different from the standard.**

If the resistor value is out of the range, counter with the problem in the way specified in the “Remedy” section of the table above and check the resistor value again.

⑧ Check the AC input voltage is appropriate for the destination.

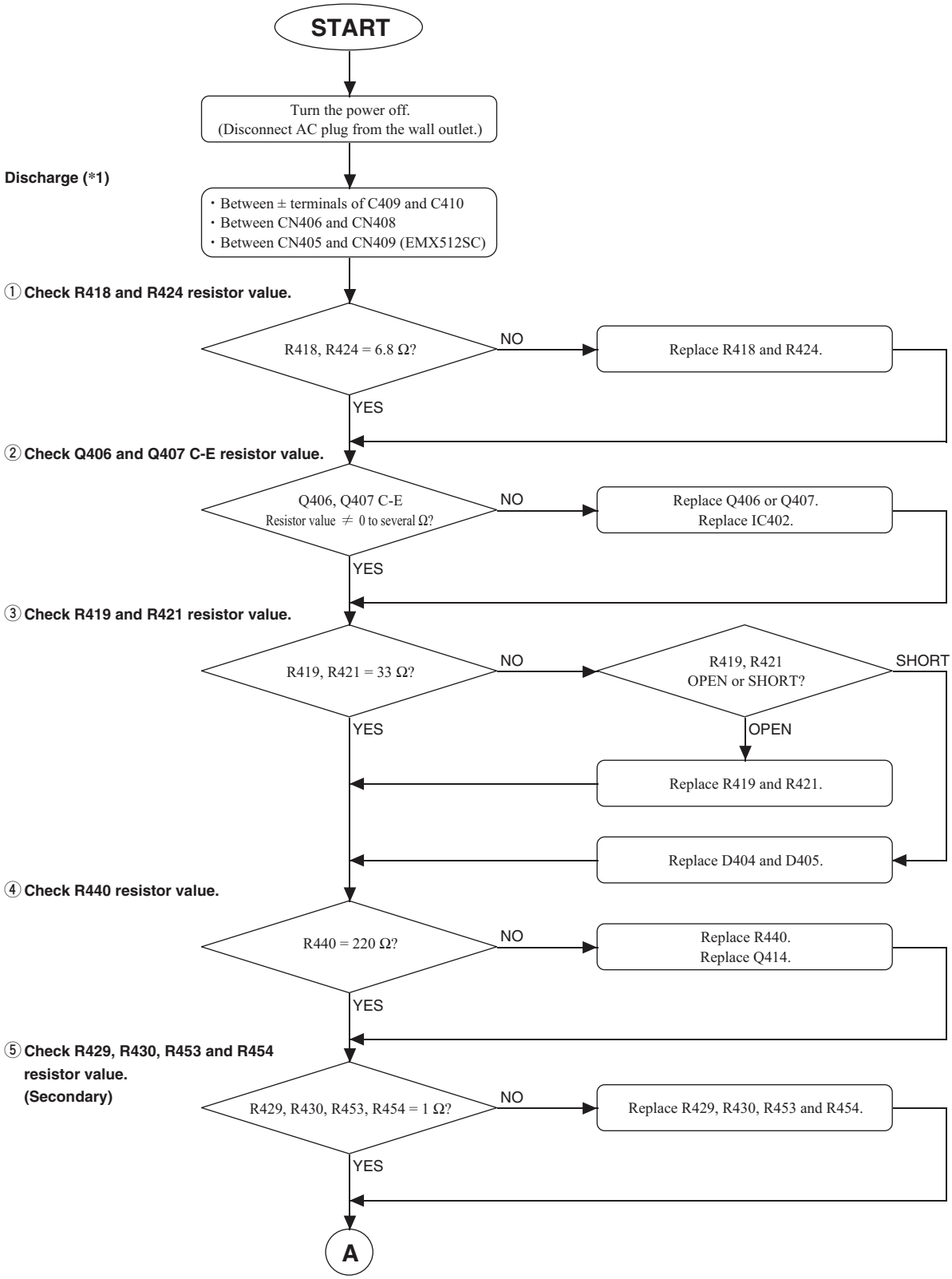
⑨ After checking items ① to ⑧ , put the AC power and check the waveform between pin 4 (GND) and pin 5 (LVG) of IC402 with oscilloscope. Check the measured waveform is the square wave (0-15 V) around 70 kHz.
If the measured waveform is abnormal, check the output of IC403 (3-pin regulator) is +15 V.
If the output is less than +15 V, replace IC402 and check the waveform again. If IC402 is already replaced, replace IC401.
For the normal waveform, see the figure on page 68.

⑩ Check the “2. Electrical Performance” is satisfied. If satisfied, repair is finished.

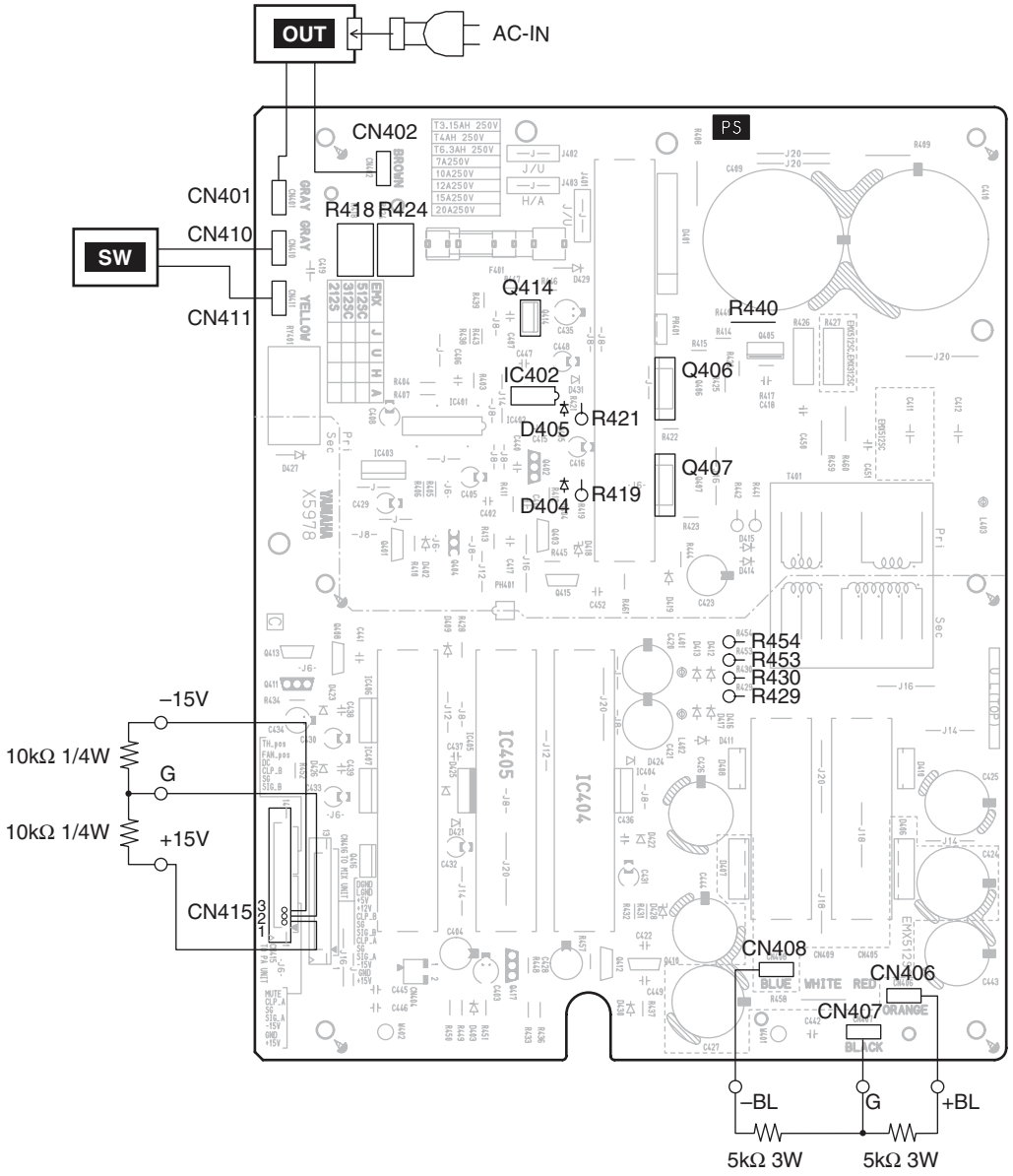
## 3-2 Repair Flowchart

Check the primary side circuit.

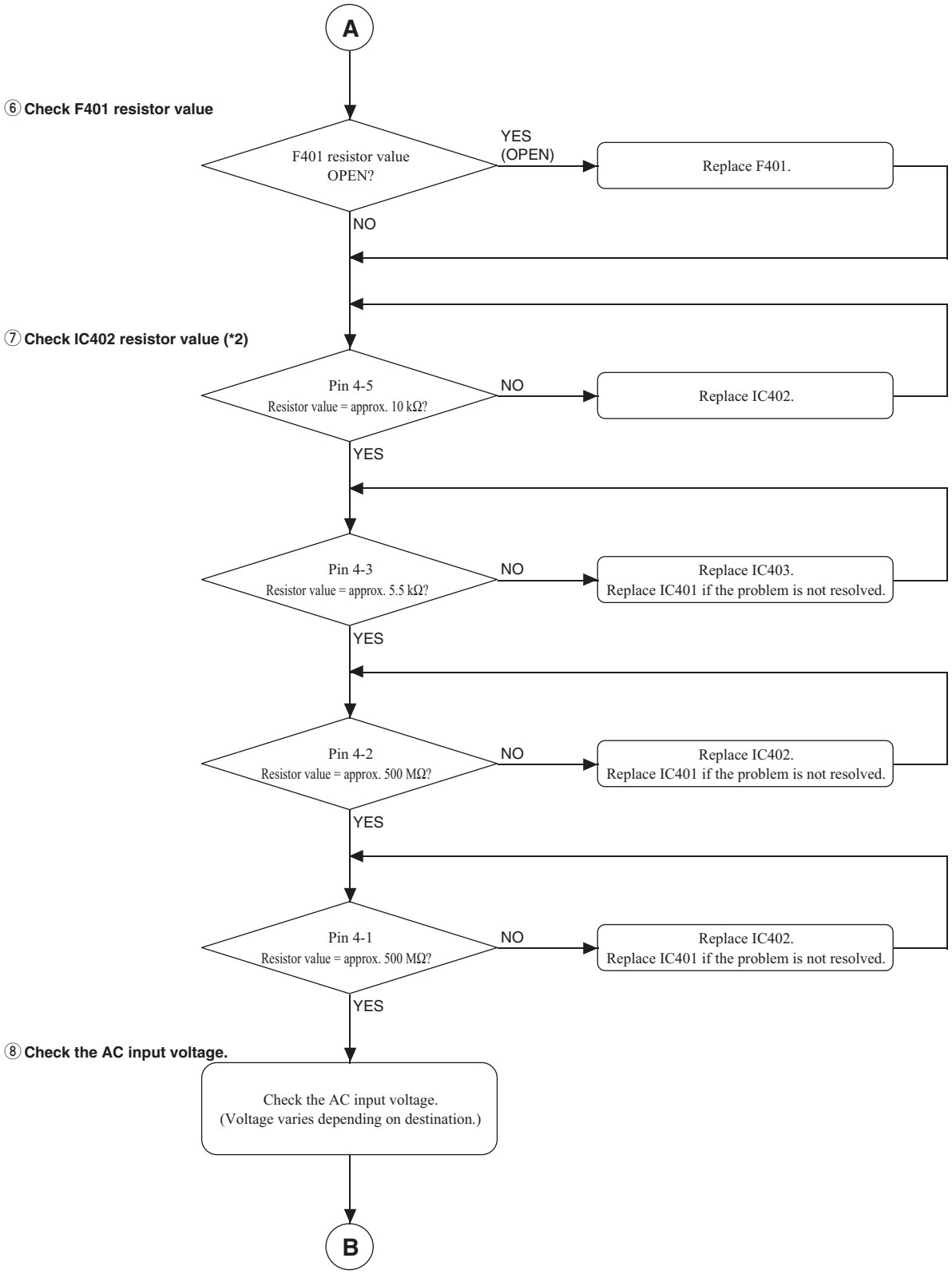
**Note: Check and repair must be done carefully, otherwise the electrical shock may be caused.**



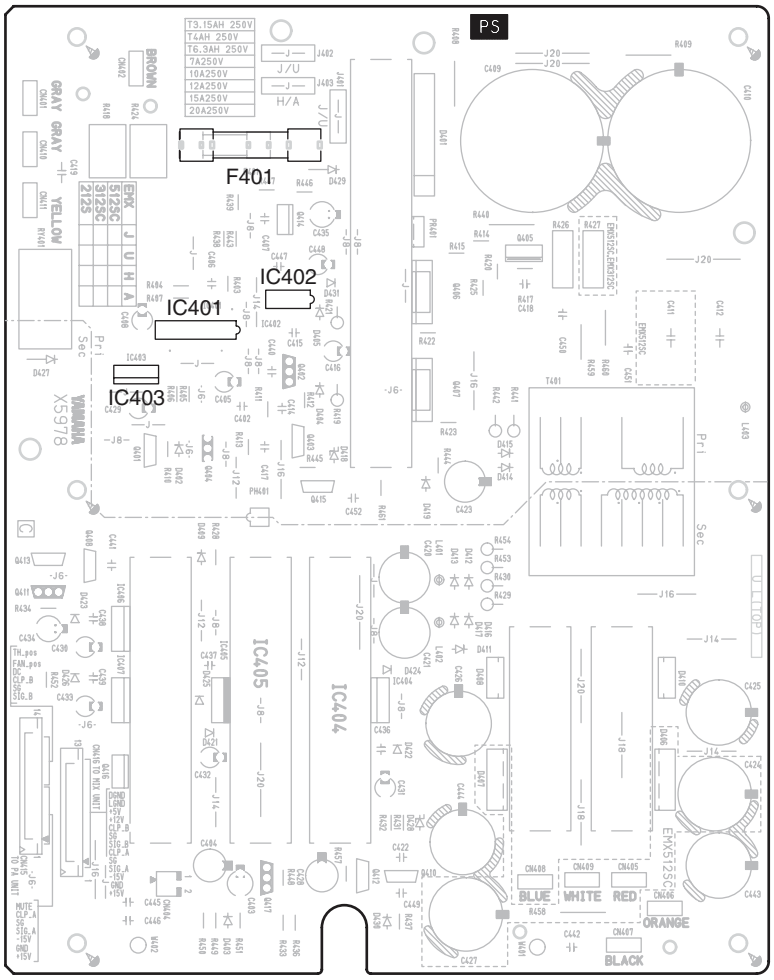

*1) **To prevent the electrical shock, be sure to discharge electricity from the capacitor. Discharge is not necessary if you have left the unit for 10 minutes or more after turning the power off.**




| | REF NO. | PART NO. | DESCRIPTION | | 部品名 | REMARKS |
|---|---|---|---|---|---|---|
| ① | R418 | **VN067400** | Wire Wound Resistor | 6.8 5W K | セメント抵抗 | |
| | R424 | **VN067400** | Wire Wound Resistor | 6.8 5W K | セメント抵抗 | |
| ② | IC402 | **X5908A00** | IC | L6385 | IC | |
| | Q406 | **WD886500** | IGBT | IRGB10B60KDPBF | IGBT | |
| | Q407 | **WD886500** | IGBT | IRGB10B60KDPBF | IGBT | |
| ③ | D404 | **VD631600** | Diode | 1SS133,176,HSS104 | ダイオード | |
| | D405 | **VD631600** | Diode | 1SS133,176,HSS104 | ダイオード | |
| | R419 | **HV754330** | Flame Proof C. Resistor | 33 1/4W J | 不燃化カーボン抵抗 | |
| | R421 | **HV754330** | Flame Proof C. Resistor | 33 1/4W J | 不燃化カーボン抵抗 | |
| ④ | Q414 | **WD886500** | IGBT | IRGB10B60KDPBF | IGBT | |
| | R440 | **VC759500** | Metal Oxide Film Resistor | 220 2W J | 酸化金属被膜抵抗 | |
| ⑤ | R429 | **HV753100** | Flame Proof C. Resistor | 1.0 1/4W J | 不燃化カーボン抵抗 | |
| | R430 | **HV753100** | Flame Proof C. Resistor | 1.0 1/4W J | 不燃化カーボン抵抗 | |
| | R453 | **HV753100** | Flame Proof C. Resistor | 1.0 1/4W J | 不燃化カーボン抵抗 | |
| | R454 | **HV753100** | Flame Proof C. Resistor | 1.0 1/4W J | 不燃化カーボン抵抗 | |




*2) The resistor value is the standard value. Replace IC402 if the resistor value is extremely different from the standard.




| | REF NO. | PART NO. | DESCRIPTION | | 部品名 | | REMARKS |
|---|---|---|---|---|---|---|---|
| ⑥ | F401 | **KB001390** | Fuse | 10A U | ヒューズ | | J/U/V |
| | F401 | **VT943000** | Fuse | TH 3.15A S | ヒューズ | | H/B/W/A/K/O |
| ⑦ | IC401 | **X2383A00** | IC | SG3525AN | I | C | |
| | IC402 | **X5908A00** | IC | L6385 | I | C | |
| | IC403 | **XJ603A00** | IC | NJM78M15FA | I | C | |

B

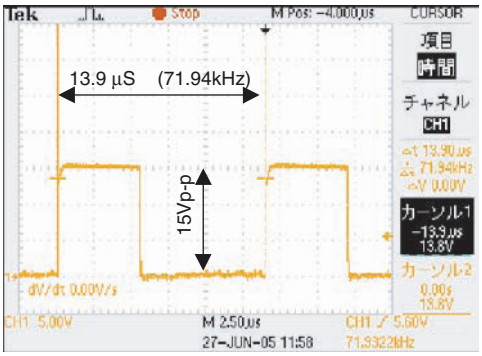
Turn the power on.

D

⑨ **Check the waveform.**

Note: Do not short-circuit the oscilloscope chassis with the chassis of this unit when checking the waveform.

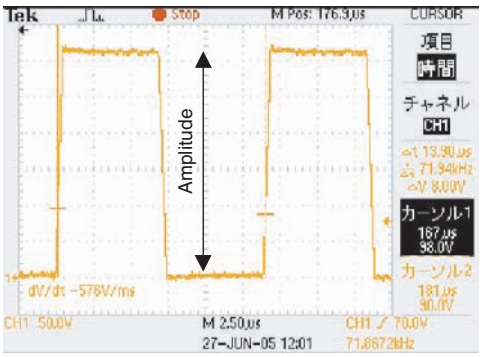
■ Check the waveform between pin 4-5 (GND-LVG) of IC402




Check the rectangular wave.
・Period: approx. 14 µS (approx. 70kHz)
・Amplitude: approx. 15 Vp-p

(Probe GND: IC402 Pin 4)

■ Check the waveform between emitter and collector of Q407 (IGBT)

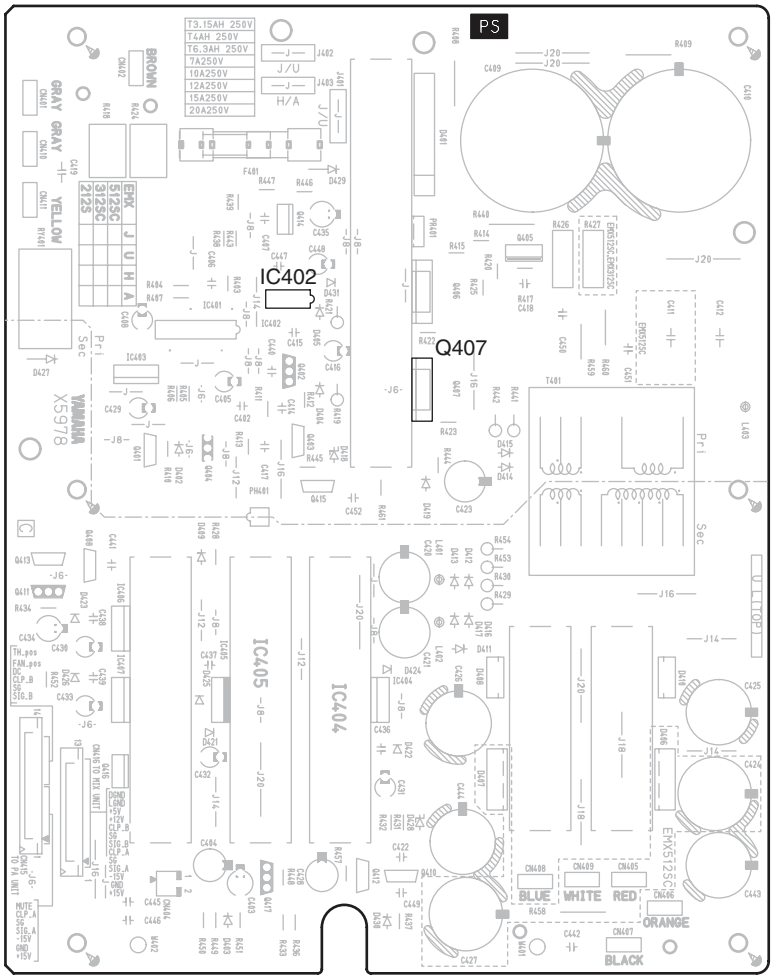



Check the rectangular wave.
・Period: approx. 14 µS (approx. 70kHz)
・Amplitude: approx. 338 Vp-p (U/V)
approx. 320 Vp-p (H/B/W/K/O)
approx. 338 Vp-p (A)

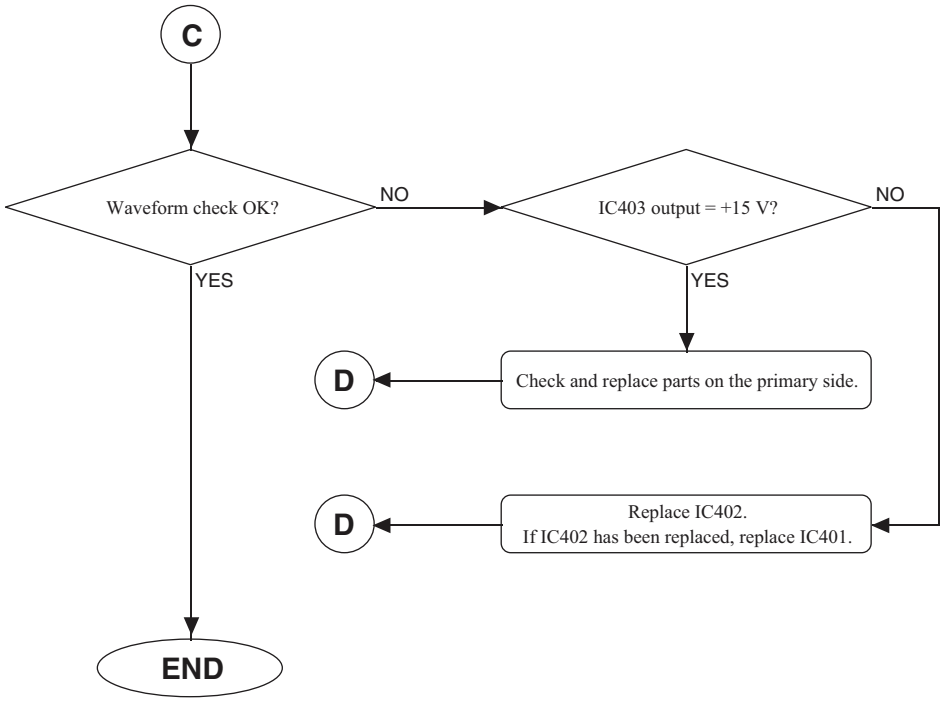
Amplitude may vary depending on the primary side.

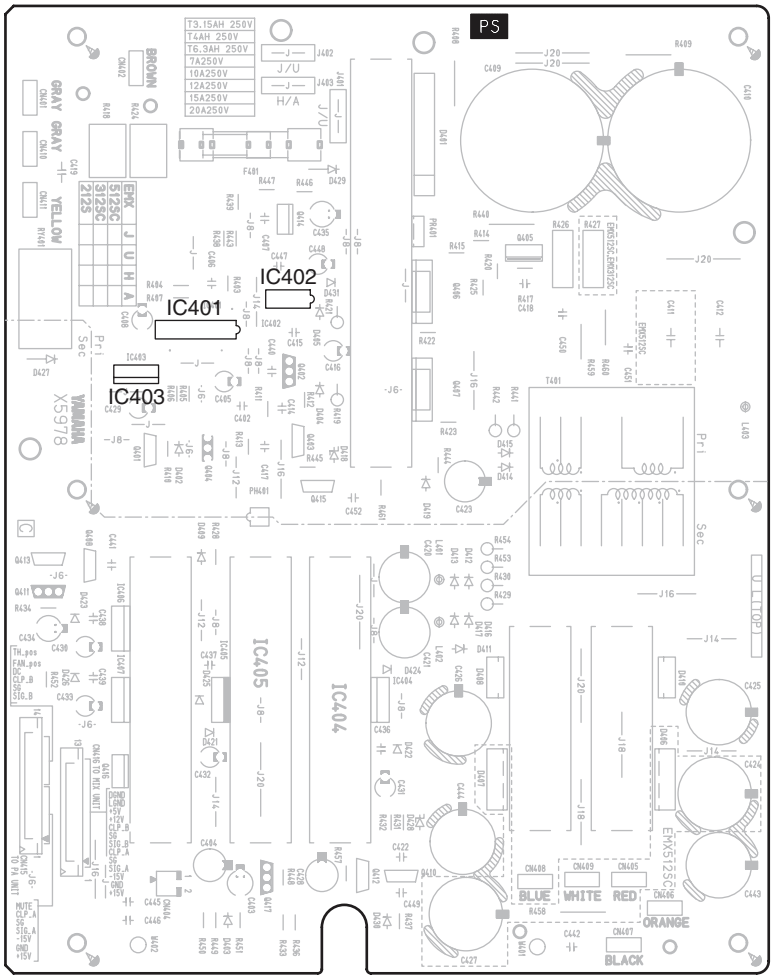
(Probe GND: Q407 emitter)

C




| | REF NO. | PART NO. | DESCRIPTION | | 部品名 | REMARKS |
|---|---|---|---|---|---|---|
| ⑨ | IC402 | **X5908A00** | IC | L6385 | IC | |
| | Q407 | **WD886500** | IGBT | IRGB10B60KDPBF | IGBT | |


C
Waveform check OK?
NO
IC403 output = +15 V?
NO
YES
YES
D
Check and replace parts on the primary side.
D
Replace IC402.
If IC402 has been replaced, replace IC401.
END




| | REF NO. | PART NO. | DESCRIPTION | | 部品名 | REMARKS |
|---|---|---|---|---|---|---|
| ⑨ | IC401 | **X2383A00** | IC | SG3525AN | I C | |
| | IC402 | **X5908A00** | IC | L6385 | I C | |
| | IC403 | **XJ603A00** | IC | NJM78M15FA | I C | |