OLYMPUS RESEARCH MICROSCOPES

BH2 SERIES

TROUBLESHOOTING

&

ADJUSTMENT MANUAL

FOR ELECTRICAL BASE


OLYMPUS
INTRODUCTION

Three types of electrical base, B2-BDT/B2-BDS-2/B2-BDS-3 are available for the BH2 Series. Refer to the manuals for each model.

• B2-BDT is used commonly for BHT, BHTU and BHTM.
• B2-BDS-2 and B2-BDS-3 are used commonly for BHS, BHSU and BHSP.

The difference between B2-BDS-2 and B2-BDS-3 is described in "Hints for Using This Manual" in the manual.

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• Troubleshooting for B2-BDS-2 ................................. Section B
• Adjustment for B2-BDS-2 ................................. Section C
• Troubleshooting for B2-BDS-3 ................................. Section D
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A. TROUBLESHOOTING (B2-BDT)

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        is turned on. ................................................................. No. A-8

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1. Hints for Using This Manual

- This manual is written in the flowchart format. Follow the arrow mark to find out a defective part.

- The numbers and symbols like $1$, $2$ indicate the numbers of connector and pin.

- "Refer to the waveform of $1$ - $2$" means "Connect HOT to pin 1 and GND to pin 2 when using a multimeter or an oscilloscope".

- "$2$ - $1$" means "Connect HOT to pin 2 and GND to pin 1".

GND → A reference voltage, $0V$, in an electronic circuit.
HOT → A line to apply a supply voltage.

- The symbols like $A$ and $B$ mean "Jump to $A$ and $B$ in the same item".

- The symbols $a$ and $b$ mean "Proceed the work according to the check methods $a$ and $b$ given in the same item".
2. Lamp

2-1 Lamp is not lit.

Causes

1. Burnt lamp
2. Defective transistor Q101
3. Defective UYPC48
4. Defective lamp socket
5. Defective variable resistor RV101
6. Defective power supply part

Is the 0V LED lit when the main switch is turned ON?

- NO
- YES

Does the 2V - 7V LEDs change with the adjustment of the light intensity control?

- NO
  - Replace the UYPC48.
  - Proceed the work according to "No. A-8 4. Power Supply".
- YES

Is the variable resistor RV101 normal?

- NO
- YES

Is the lamp conducting? (Resistance at both ends of the lamp ≈ 0Ω)

- YES
- NO

Is the lamp lit?
A. TROUBLESHOOTING (B2-BDT)  

Replace the lamp.  

Is the lamp lit?  

YES  

END  

NO  

Are the lamp socket terminals conducting with the lamp set on the lamp socket?  

YES  

NO  

Replace the lamp socket.  

Is the lamp lit?  

YES  

END  

NO  

Is the transistor Q101 normal?  

YES  

NO  

Replace the Q101  

Is the lamp lit?  

YES  

END  

NO  

Replace the UYPC48.  

NO  

END  

Replace the UYPC48.  

LED display  

Normal if the resistance value between [4] (orange) and [5] (blue) varies smoothly from 0 to 500Ω when the light intensity control lever is slid with the J102 removed. Abnormal if not.  

Normal if 0.6V or greater voltage is generated between the base (yellow) and the emitter (brown) of Q101 when measured with a multimeter with the light intensity control lever set to the Max. position. Abnormal if the voltage is lower than 0.6V.
2-2 Light intensity adjustment fails.

Causes
1. Defective variable resistor RV101
2. Defective transistor Q101
3. Defective UYPC48

a) Is the variable resistor RV-101 normal?
   YES
   NO
   Replace the RV101.

   Is the lamp light intensity adjustable?
   YES
   NO
   END

b) Is the transistor Q101 normal?
   YES
   NO
   Replace the Q101.

   Is the lamp light intensity adjustable?
   YES
   NO
   END

Replace the UYPC48.

a) Normal if the resistance value between 4 (orange) and 5 (blue) varies smoothly in 0 to 500Ω when the light intensity control lever is slid with the J102 removed. Abnormal if not.

b) Normal if 0.6V or greater voltage is generated between the base (yellow) and the emitter (brown) of Q101 when measured with a multimeter with the light intensity control lever set to the Max. position. Abnormal if the voltage is lower than 0.6V.

2-3 Lamp flickers.

![Circuit Diagram]

<table>
<thead>
<tr>
<th>Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Contact failure of the lamp caused by the stained contact in the lamp socket</td>
</tr>
<tr>
<td>2. Defective variable resistor RV101</td>
</tr>
<tr>
<td>3. Defective transistor Q101</td>
</tr>
<tr>
<td>4. Defective UYPC48</td>
</tr>
</tbody>
</table>

**Check the lamp socket (mainly the contact with the lamp).** If the contact is stained, clean it and check if the lamp is normally lit.

**Is the variable resistor RV101 normal?**

- **YES**
  - **END**
- **NO**
  - Replace the RV101
  - **Is the lamp normally lit?**
    - **YES**
      - **END**
    - **NO**

**Is the transistor Q101 normal?**

- **YES**
- **NO**

**Remove the lamp and screw from the lamp socket, and check the contact with the lamp for any stain.**

- **(Take care not to fly the spring.)**
  - *Don't touch the lamp by a bare hand.*
  - *Avoid opening the contact excessively. The contact will be broken.*

**Normal if the resistance value between 4 (orange) and 5 (blue) varies smoothly in 0 to 500Ω when the light intensity control lever is slid with the J102 removed. Abnormal if not.**

**Normal if 0.6V or greater voltage is generated between the base (yellow) and the emitter (brown) of Q101 when measured with a multimeter with the light intensity control lever set to the Max. position. Abnormal if the voltage is lower than 0.6V.**
A. TROUBLESHOOTING (B2-BDT)

Replace the Q101.

Is the lamp normally lit?

YES

NO

END

Replace the UYPC48.

2-4 Lamp burns out.

Causes

1. Defective transistor Q101
2. Defective UYPC48

Is the transistor Q101 normal?

YES

NO

Replace the Q101.

Is the lamp lit?

YES

NO

END

Replace the UYPC48.

a) Normal if 0.6V or greater voltage is generated between the base (yellow) and the emitter (brown) of Q101 when measured with a multimeter with the light intensity control lever set to the Max. position. Abnormal if the voltage is lower than 0.6V.
A. TROUBLESHOOTING (B2-BDT)

3. Display

3-1 Abnormal display

Causes

1. Defective UYPC48
2. Defective variable resistor RV101
3. Defective power supply part

(a) Is the 0V LED lit when the main switch is turned on?

YES

NO

(b) Does the 2V - 7V LEDs change with the adjustment of the light intensity control?

YES

NO

(c) Is the variable resistor RV101 normal?

YES

NO

Replace the RV101.

Replace the UYPC48.

Does the 2V - 7V LEDs change with the adjustment of the light intensity control?

YES

NO

END

(b) Normal if the resistance value between 4 (orange) and 5 (blue) varies smoothly in 0 to 500Ω when the light intensity control lever is slid with the J102 removed. Abnormal if not.
A. TROUBLESHOOTING (B2-BDT)  
No. A-8

4. Power Supply

4-1 Power is not supplied even after the main switch is turned on.

![Troubleshooting Diagram]

**Causes**

1. Defective diode bridge DB101
2. Defective transformer T101
3. Defective main fuse F101 (200V channel)
4. Defective AC cord (UYCP15 (100V channel))
5. Defective AC inlet
6. Defective main switch SW101
7. Defective primary voltage selector switch SW102
8. Defective UYPC48

**Diagram Flowchart**

- a) Is the AC cord (UYCP) conducting?  
  - YES
  - NO
    - Replace the AC cord.

- Is power supplied normally?  
  - YES
    - END
  - NO
    - Replace the F101.

- 200V channel only

- a) Normal if the terminals illustrated below are conducting.
A. TROUBLESHOOTING (B2-BDT)

Is power supplied normally?

YES

END

NO

B Is the output of the transformer T101 normal?

YES

C

NO

Is the primary side input of the transformer T101 normal?

YES

Replace the T101.

NO

D Is the AC inlet J101 normal?

YES

Is power supplied normally?

YES

END

NO

Replace the J101.

C

D

Normal if AC 9V is generated when measured with a multimeter at the input terminal of the diode bridge DB101.

Replace the T101.

Is power supplied normally?

YES

END

NO

C

Check the input voltage between the terminal of the primary side voltage selector switch SW102 (blue and purple wires) and the terminal 4 of the main switch SW101 (white wire).

1. When the input voltage is AC100V (AC220V)

   Check if AC100V (AC220V) is detected between the purple wire of the SW102 and the terminal 4 (white wire) of the SW101.

2. Check if AC115V (AC240V) is detected between the blue wire of the SW102 and the terminal 4 (white wire) of the SW101.
A. TROUBLESHOOTING (B2-BDT)

4 Are the terminals of the AC inlet J101 and the main switch SW101, GND (W101) conducting?

Replace the SW102.

Is power supplied normally?

YES

 Replace the T101.

END

NO

Is the primary side voltage selector with SW102 normal?

YES

Replace the SW102.

NO

Is power supplied normally?

YES

Replace the DB101.

END

Is the output of the diode bridge DB101 normal?

YES

Replace the DB101.

NO

Is power supplied normally?

YES

END

Replace the UYPC48.

Normal if the resistance values between the terminals of the main switch SW101 are as shown below when measured with a multimeter.

Remove the SW102 and check it for continuity. Normal if it is as shown below. Record the wire colors connected to each terminal.

<table>
<thead>
<tr>
<th>Black + COM</th>
<th>Purple + 100V (220V)</th>
<th>Blue + 115V (240V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>Purple</td>
<td></td>
</tr>
<tr>
<td>100V (220V)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>115V (240V)</td>
<td>O</td>
<td>X</td>
</tr>
</tbody>
</table>

○ → Conducting △ → 15Ω  
X → Opened
A. TROUBLESHOOTING (B2-BDT)  

Remove the J102 and check the waveform of [1] - [2] with an oscilloscope. Normal if the waveform is as shown below.
B. TROUBLESHOOTING (B2-BDS-2)

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   2-1 Lamp is not normally lit. ........................ No. B-3
3. Display
   3-1 Abnormal display ................................. No. B-5
4. Power Supply
   4-1 Power is not supplied even after the main switch is
        turned on. ....................................... No. B-6
5. Circuit Diagram ......................................... No. B-11
1. Hints for Using This Manual

- This manual is written in the flowchart format. Follow the arrow mark to find out a defective part.

- The numbers and symbols like [1], [2] and [N] indicate the numbers of connector and pin.

- "Refer to the waveform of [1] - [2]" means "Connect HOT to pin 1 and GND to pin 2 when using a multimeter or an oscilloscope".

- "[2] - [1]" means "Connect HOT to pin 2 and GND to pin 1".

  GND + A reference voltage, OV, in an electronic circuit.
  HOT + A line to apply a supply voltage.

- The symbols like [A] and [B] mean "Jump to [A] and [B] in the same item". The symbol [Z] means "Jump to [Z] in another item".

- The symbols [a] and [b] mean "Proceed the work according to the check methods [a] and [b] given in the same item".

- The electrical base for BHS is available in B2-BDS-2 and B2-BDS-3. Refer to the manuals for each model. The difference in the appearance of the two models is shown below.

<table>
<thead>
<tr>
<th></th>
<th>B2-BDS-2</th>
<th>B2-BDS-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED color</td>
<td>Red</td>
<td>Green</td>
</tr>
<tr>
<td>Primary voltage selector switch</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Nameplate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100V Channel</td>
<td>AB098800</td>
<td>AB615900</td>
</tr>
<tr>
<td></td>
<td>AB099900</td>
<td>AB616100</td>
</tr>
<tr>
<td>200V Channel</td>
<td>AB098900</td>
<td>AB616000</td>
</tr>
<tr>
<td></td>
<td>AB100000</td>
<td>AB616200</td>
</tr>
</tbody>
</table>

YES : The selector switch is provided.

NO : The selector switch is not provided.

The nameplates are compared on the next page.
## Troubleshooting (B2-BDS-2)

### 100V Channel

<table>
<thead>
<tr>
<th>Model</th>
<th>B2-BDS-2</th>
<th>B2-BDS-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parts No.</td>
<td>AB098800</td>
<td>AB615900</td>
</tr>
<tr>
<td>Name plate</td>
<td>1.6/1.4A100/115V ~50-60Hz □</td>
<td>100-120V ~50-60Hz 210VA □</td>
</tr>
<tr>
<td>Parts No.</td>
<td>AB099900</td>
<td>AB616100</td>
</tr>
<tr>
<td>Name plate</td>
<td>100/115 V~ 1.60/1.40 A □ 50-60 Hz □ LAMP 12V100W OLYMPUS OPTIAL CO., LTD. JAPAN</td>
<td>100-120V MAX 210 VA □ 50-60 Hz □ LAMP 12V100W OLYMPUS OPTIAL CO., LTD. JAPAN T-2</td>
</tr>
</tbody>
</table>

### 200V Channel

<table>
<thead>
<tr>
<th>Model</th>
<th>B2-BDS-2</th>
<th>B2-BDS-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parts No.</td>
<td>AB098900</td>
<td>AB616000</td>
</tr>
<tr>
<td>Name plate</td>
<td>0.80/0.75A220/240V ~50-60Hz □</td>
<td>220-240V ~50-60Hz 230VA □</td>
</tr>
<tr>
<td>Parts No.</td>
<td>AB100000</td>
<td>AB616200</td>
</tr>
<tr>
<td>Name plate</td>
<td>220/240 V~ 0.80/0.75 A □ 50-60 Hz □ LAMP 12V100W OLYMPUS OPTIAL CO., LTD. JAPAN</td>
<td>220-240V MAX 230 VA □ 50-60 Hz □ LAMP 12V100W OLYMPUS OPTIAL CO., LTD. JAPAN T-2</td>
</tr>
</tbody>
</table>
2. Lamp

2-1 Lamp is not normally lit.

- ** Causes **

  1. Burnt lamp
  2. Defective lamp socket
  3. Contact failure caused by the stained contact of the lamp in the lamp house.
  4. Defective variable resistor RV101
  5. Defective UYPC65
  6. Defective UYPC64
  7. Defective power supply part

- ** Action **

  a. Remove the lamp house, and dismount the lamp from the lamp socket.

  Is the lamp conducting? (Resistance at both ends of the lamp \( \approx 0\Omega \))

    - ** YES **
      - Replace the lamp.
    - ** NO **
      - Replace the lamp.

  Is the lamp lit normally?

  a. Don't touch the lamp by a bare hand!
B. TROUBLESHOOTING

B2-BDS-2)

No. B-4

**B.** Is the lamp socket conducting?

- **YES**
  - **YES**
    - Replace the lamp socket.
  
  **NO**
  - **YES**
    - Check the lamp house interior for any stain (particularly the contact with the lamp), and clean it if stained.
  
  **NO**
  - **YES**
    - Is the lamp lit normally?

- **YES**
  - **NO**

**END**

**C.** Is the variable resistor RV101 normal?

- **YES**
  - **YES**
    - Replace the RV101.
  
  **NO**
  - **YES**
    - Is the lamp lit normally?

- **YES**
  - **NO**

**END**

Proceed the work according to "No. J-7 4. Power Supply 2".

**B.** Check the lamp socket terminals for continuity with the lamp mounted. Normal if conducting, and abnormal if not.

* Don't touch the lamp by a bare hand.

**C.** Measure the resistance between 3 (brown) and 4 (orange) of J201 with a multimeter. Normal if the resistance value varies smoothly from 0 to 2KΩ when the light intensity control lever is slid. Abnormal if not.
3. Display

3-1 Abnormal display

* The display with LED is unstable when a lamp is burnt out or not mounted. Be sure to mount a lamp and set the primary voltage selector switch SW103 (the 100/115V selector switch in the 100V channel and the 220/240V selector switch in the 200V channel) to the appropriate position.

<table>
<thead>
<tr>
<th>Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Defective variable resistor RV101</td>
</tr>
<tr>
<td>2. Defective UYPC65</td>
</tr>
<tr>
<td>3. Defective UYPC64</td>
</tr>
<tr>
<td>4. Defective power supply part</td>
</tr>
</tbody>
</table>

Is the variable resistor RV101 normal?  
**YES**  
NO  
Replace the RV101.

Does the display with LED change with the adjustment of the light intensity control?  
**YES**  
**NO**  
END

Measure the resistance between 3 (brown) and 4 (orange) of J201 with a multimeter. Normal if the resistance value varies smoothly from 0 to 2kΩ when the light intensity control lever is slid. Abnormal if not.  
Proceed the work according to "No. J-7 4, Power Supply, 2".
4. Power Supply

4-1 Power is not supplied even after the main switch is turned on.

Causes

1. The breaker functions.
2. Blown main fuse F101
3. Defective UYPC65
4. Defective UYPC64
5. Defective transformer T102
6. Defective transformer T101
7. Defective main switch SW102
8. Defective primary voltage selector switch SW103
9. Defective breaker SW101
10. Defective noise filter RC101
11. Defective spark gap RC102/RC103
12. Defective AC inlet J101
13. Defective AC cord (UYCP15 in 100V channel)

Is the breaker functioning?

NO

YES

Press the breaker button.

Is power supplied normally?
B. TROUBLESHOOTING (B2-BDS-2)

a) Is the AC cord (UYCP) conducting?
   - YES: Replace the AC cord (UYCP).
   - NO: Is power supplied normally?
     - YES: END
     - NO: Replace the FL01.

b) Are the secondary and third output voltages of the transformer T102 normal?
   - YES: Measure the secondary and third output voltages of the transformer T102 at J201 and J301 with a multimeter. Normal if the voltage values are as specified below. Abnormal if not.
   - NO: END

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Color</th>
<th>Output Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>J201 8</td>
<td>red</td>
<td>AC15V</td>
</tr>
<tr>
<td>J201 7</td>
<td>blue</td>
<td>AC15V</td>
</tr>
<tr>
<td>J301 4</td>
<td>orange</td>
<td>AC7V</td>
</tr>
<tr>
<td>J301 3</td>
<td>orange</td>
<td>AC7V</td>
</tr>
</tbody>
</table>
B. TROUBLESHOOTING (B2-BDS-2)

1. Is the primary input voltage of Tl02 normal?

   YES

   NO

2. Is the input voltage of the primary voltage selector switch SW103 normal?

   YES

   NO

3. Is the input voltage of the main switch SW102 normal?

   YES

   NO

4. Is the input voltage of the noise filter RC101 normal?

   YES

   NO

5. Is the input voltage of the breaker SW101 normal?

   YES

   NO

   Replace the AC inlet J101.

   Is power supplied normally?

   YES

   NO

   Replace the Tl02

   Is power supplied normally?

   YES

   NO

   END

6. Measure the voltage between SW103

   1: Red (AC100V/AC220V)

   2: Blue (AC115V/AC240V)

   F101 with a multimeter.

   Normal if the voltage equal to the AC line voltage is applied. Abnormal if not.

   1: Purple

   2: Blue

   3: White

   4: Purple

   5: White

   6: Blue

7. Measure the voltage between J103

   1: White

   J301 with a multimeter.

   Normal if the voltage equal to the AC line voltage is applied. Abnormal if not.

   1: Black

   2: White

   3: Black

   4: White

8. Remove the UYPC65 and measure the voltage between SW102

   1: Black

   2: White

   3: Black

   4: White

   Normal if the voltage equal to the AC line voltage is applied. Abnormal if not.
B. TROUBLESHOOTING (B2-BDS-2)  

1. Are the UYPC64 and the primary voltage selector switch SW103 conducting?
   - YES
   - NO

   Replace the spark gap RC102 and RC103.

   Is power supplied normally?
   - YES
   - NO

   Replace the transformer Tl01.

2. Replace the UYPC65.

   Is power supplied normally?
   - YES
   - NO

3. Measure the voltage between SWl101 [and J101 [N] with a multimeter. Normal if the voltage equal to the AC line voltage is applied. Abnormal if not. The terminals are covered with a tube. Tear the tube or puncture it with a needle for the measurement.

4. Monitor the waveform between J201 [and J201 [1] with an oscilloscope. Normal if the waveform is almost as shown below. Abnormal if not.
   * When the light intensity control lever is moved from "Min" to "Max" position, the high level cycle of a signal is prolonged.

5. Measure the voltage between SWl101 [2 and J101 [N] with a multimeter. Normal if the voltage equal to the AC line voltage is applied. Abnormal if not. The terminals are covered with a tube. Tear the tube or puncture it with a needle for the measurement.

6. Monitor the waveform between J301 [1 and J301 [2] with an oscilloscope. Normal if the waveform with the AC phase controlled as shown below is obtained. Abnormal if not.
   * When the light intensity control lever is adjusted, the phase angle is varied.
B. TROUBLESHOOTING (B2-BDS-2)

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Power Supply Status</th>
<th>Next Step</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-10</td>
<td>Replace the primary voltage selector switch SW103.</td>
<td></td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>Is power supplied normally?</td>
<td>YES</td>
<td>END</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NO</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Replace the main switch SW102.</td>
<td></td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>Is power supplied normally?</td>
<td>YES</td>
<td>END</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NO</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Replace the noise filter RC101.</td>
<td></td>
<td>G</td>
</tr>
<tr>
<td></td>
<td>Is power supplied normally?</td>
<td>YES</td>
<td>END</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NO</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Replace the breaker SW101.</td>
<td></td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>Is power supplied normally?</td>
<td>YES</td>
<td>END</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NO</td>
<td>C</td>
</tr>
</tbody>
</table>
C. ADJUSTMENT (B2-BDS-2)

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2. Locations of Adjusting Trimmers .......................... No. C-1
3. Adjustment Procedure ...................................... No. C-1
C. ADJUSTMENT (B2-BDS-2)

1. Measuring Instruments To Be Used
   1. RMS type multimeter
      (A multimeter capable of measuring an RMS value)
      * An ordinary multimeter can not be used.
   2. Lamp house with a 12V/100W halogen lamp
      * Use a lamp house with small contact resistance and not used for a long time.

2. Locations of Adjusting Trimmers

   LED
   
   RV2
   RV1

   UYPC65

3. Adjustment Procedure
   1. Set the light intensity control lever to the "Min" position, and turn on the main switch.
   2. Set the light intensity control lever to the "Max" position.
   3. Turn the adjusting trimmer RV2 fully clockwise.
   4. Turn the adjusting trimmer RV1 fully counterclockwise.
   5. Measure the lamp output voltage with a multimeter (RMS type), and turn the adjusting trimmer RV1 clockwise so that 11.8 ± 0.2V is obtained.
      * Measure the output voltage at the brass part for connecting the lamp house as illustrated below.
      
      RMS type multimeter

   6. Turn the adjusting trimmer RV2 counterclockwise to set the output voltage to 11.7 ± 0.2V.
   7. Set the light intensity control lever to the "Min" position, and verify that the output voltage is 3V or lower.
      * Defective if the voltage is not lower than 3V.
      Repair or replace the PCB UYPC65.
   8. Turn off the power, and wait until the lamp goes out completely.
   9. Set the light intensity control lever to the "Min" position, turn on the power and verify that the lamp is lit.
   10. Verify that only the left-most LED is lit when the light intensity control lever is set to the "Min" position and all the LEDs are lit when the lever is set to the "Max" position.
D. TROUBLESHOOTING (B2-BDS-3)

CONTENTS

1. Hints for Using This Manual ......................... No. D-1
2. Lamp
   2-1 Lamp is not normally lit. .......................... No. D-3
3. Display
   3-1 Abnormal display .................................. No. D-6
4. Power Supply
   4-1 Power is not supplied even after the main switch
       is turned on. ......................................... No. D-8
5. Circuit Diagram ........................................ No. D-11
1. Hints for Using This Manual

This manual is written in the flowchart format. Follow the arrow mark to find out a defective part.

The numbers and symbols like \( H-1 \) and \( W-2 \) indicate the numbers of connector and pin.

"Between \( H-1 \) and \( W-2 \)" means "Connect HOT to \( H-1 \) and GND to \( W-2 \) when measuring with a multimeter".

GND \( \rightarrow \) A reference voltage, OV, in an electronic circuit.
HOT \( \rightarrow \) A line to apply a supply voltage.

The symbols like \( A \) and \( B \) mean "Jump to \( A \) and \( B \) in the same item".

The symbols \( a \) and \( b \) mean "Proceed the work according to the check methods \( a \) and \( b \) given in the same item".

* Be sure to set up the unit before turning on the main switch.
A terminal is exposed at \( B-1 \) and \( W-2 \). Measure at the exposed part without removing.

The electrical base for BHS is available in B2-BDS-2 and B2-BDS-3. Refer to the manuals for each model. The difference in the appearance of the two models is shown below.

<table>
<thead>
<tr>
<th></th>
<th>B2-BDS-2</th>
<th>B2-BDS-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED color</td>
<td>Red</td>
<td>Green</td>
</tr>
<tr>
<td>Primary voltage</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>selector switch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100V channel</td>
<td>AB098800</td>
<td>AB615900</td>
</tr>
<tr>
<td></td>
<td>AB099900</td>
<td>AB616100</td>
</tr>
<tr>
<td>200V channel</td>
<td>AB098900</td>
<td>AB616000</td>
</tr>
<tr>
<td></td>
<td>AB100000</td>
<td>AB616200</td>
</tr>
</tbody>
</table>

YES : The selector switch is provided.
NO : The selector switch is not provided.

The nameplates are compared on the next page.
D. TROUBLESHOOTING (B2-BDS-3)  

No. D-2

100V Channel

<table>
<thead>
<tr>
<th>MODEL</th>
<th>B2-BDS-2</th>
<th>B2-BDS-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parts No.</td>
<td>AB098800</td>
<td>AB615900</td>
</tr>
<tr>
<td>Name Plate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>○ 1.6/1.4A100/115V~50-60Hz ○</td>
<td>○ 100-120V~ 50-60Hz 210VA ○</td>
</tr>
<tr>
<td>Parts No.</td>
<td>AB099900</td>
<td>AB616100</td>
</tr>
<tr>
<td>Name Plate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100/115 V~</td>
<td>100-120 V~</td>
</tr>
<tr>
<td></td>
<td>1.60/1.40A</td>
<td>MAX 210 VA</td>
</tr>
<tr>
<td></td>
<td>50-60 Hz</td>
<td>50-60 Hz</td>
</tr>
<tr>
<td></td>
<td>LAMP 12V100W</td>
<td>LAMP 12V100W</td>
</tr>
<tr>
<td></td>
<td>OLYMPUS OPTIAL CO., LTD.</td>
<td>OLYMPUS OPTIAL CO., LTD.</td>
</tr>
<tr>
<td></td>
<td>JAPAN T-2</td>
<td>JAPAN T-2</td>
</tr>
</tbody>
</table>

200V Channel

<table>
<thead>
<tr>
<th>MODEL</th>
<th>B2-BDS-2</th>
<th>B2-BDS-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parts No.</td>
<td>AB098900</td>
<td>AB616000</td>
</tr>
<tr>
<td>Name Plate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>○ 0.80/0.75A220/240V~50-60Hz ○</td>
<td>○ 220-240V~ 50-60Hz 230VA ○</td>
</tr>
<tr>
<td>Parts No.</td>
<td>AB100000</td>
<td>AB616200</td>
</tr>
<tr>
<td>Name Plate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>220/240 V~</td>
<td>220-240 V~</td>
</tr>
<tr>
<td></td>
<td>0.80/0.75A</td>
<td>MAX 230 VA</td>
</tr>
<tr>
<td></td>
<td>50-60 Hz</td>
<td>50-60 Hz</td>
</tr>
<tr>
<td></td>
<td>LAMP 12V100W</td>
<td>LAMP 12V100W</td>
</tr>
<tr>
<td></td>
<td>OLYMPUS OPTIAL CO., LTD.</td>
<td>OLYMPUS OPTIAL CO., LTD.</td>
</tr>
<tr>
<td></td>
<td>JAPAN T-2</td>
<td>JAPAN T-2</td>
</tr>
</tbody>
</table>
2. Lamp

2-1 Lamp is not normally lit.

Is the lamp conducting? (Resistance at both ends of the lamp \( \neq 0 \)Ω)

- YES
- NO

Replace the lamp.

Is the lamp lit normally?

- YES
- NO

END

a) Is the lamp conducting? (Resistance at both ends of the lamp \( \neq 0 \)Ω)

Don't touch the lamp by a bare hand!

Causes

1. Burnt lamp
2. Defective lamp socket (including the stained lamp contact)
3. Defective variable resistor R101
4. Defective secondary PCB UL02
5. Defective display PCB UL03
6. Defective power supply part
D. TROUBLESHOOTING (B2-BDS-3)

Check the lamp house interior for any stain (particularly the contact with the lamp), and clean it if stained.

Is the lamp lit normally?

YES \rightarrow NO

END

Are the lamp socket terminals conducting with the lamp mounted?

NO \rightarrow YES

Replace the lamp socket.

Is the lamp lit normally?

YES \rightarrow NO

END

Is the variable resistor RV101 normal?

NO \rightarrow YES

Replace the RV101

Is the lamp lit normally?

YES \rightarrow NO

END

Measure the resistance between CN4 [3] (brown) and CN4 [2] (purple) of the secondary PCB U102 with a multimeter. Normal if the resistance value varies smoothly from 0 to 2kΩ. Abnormal if not.
D. TROUBLESHOOTING (B2-BDS-3)

Is the input voltage of the secondary PCB U102 normal?

- **YES** → Replace the U102

- **NO** → Is the input voltage of the display PCB U103 normal?

- **YES** → Replace the display PCB U103.

- **NO** → Proceed the work according to "No. J-7 4. Power Supply".

Measure the input voltage of the secondary PCB U102 with a multimeter. Normal if the input voltage is as specified in the following table when the light intensity control lever is moved from "Min" to "Max". Abnormal if not.

<table>
<thead>
<tr>
<th>U102</th>
<th>Input voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-1 gray - U102 W-1 white</td>
<td>Approx. AC 5 - 20V</td>
</tr>
<tr>
<td>CN3 1 black - CN3 2 white</td>
<td>Approx. AC 4V</td>
</tr>
<tr>
<td>CN2 2 purple - CN2 1</td>
<td>Approx. DC 14 - 17V</td>
</tr>
<tr>
<td>CN2 3 blue - CN2 1</td>
<td>Approx. DC 14 - 17V</td>
</tr>
</tbody>
</table>

* Approximately AC 0.8V is detected when the light intensity control lever is set to the "Min" position and the main switch is turned on. This is not defective. When the light intensity control lever is moved toward the "Max" direction after the main switch is turned on and the voltage once reaches AC 5V, the voltage is not lowered even if the lever is moved back to the "min" position. "Approx. AC 5 - 20V" in the table indicates this state.

Measure the input voltage of the display PCB U103 with a multimeter. Normal if the input voltage is as specified in the following table when the light intensity control lever is moved from "Min" to "Max". Abnormal if not.

<table>
<thead>
<tr>
<th>CN1 2 blue - CN1 3 purple</th>
<th>Input voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>CN1 3 gray - CN1 1 purple</td>
<td>Approx. DC 17 - 14V</td>
</tr>
</tbody>
</table>
D. TROUBLESHOOTING (B2-BDS-3)

3. Display

3-1 Abnormal display

![Diagram of electrical components]

<table>
<thead>
<tr>
<th>Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Defective variable resistor R101</td>
</tr>
<tr>
<td>2. Defective display PCB U103</td>
</tr>
<tr>
<td>3. Defective secondary PCB U102</td>
</tr>
<tr>
<td>4. Defective power supply part</td>
</tr>
</tbody>
</table>

- Remove the electrical base.
- **a) Is the variable resistor R101 normal?**
  - **NO** Replace the R101.
  - **YES**
    - **a) Measure the resistance between CN4 [3] (brown) and CN4 [2] (purple) in the secondary PCB U102 with a multimeter. Normal if the resistance value varies smoothly from 0 to 2kΩ. Abnormal if not.
    - **YES** Does the display with LED change with the adjustment of the light intensity control?
      - **NO** END
      - **YES**
Is the input voltage of the display PCB U103 normal?

- YES → Replace the U103
- NO → Proceed the work according to "No. J-4. Power Supply" 

Is the input voltage of the secondary PCB U102 normal?

- YES → B
- NO → Replace the U102.

A) Measure the input voltage of the display PCB U103 with a multimeter. Normal if the input voltage is as specified in the following table when the light intensity control lever is moved from "Min" to "Max". Abnormal if not.

<table>
<thead>
<tr>
<th>Input voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>CN1 [3] gray - CN1 [1] purple</td>
</tr>
</tbody>
</table>

B) Measure the input voltage of the secondary PCB U102 with a multimeter. Normal if the input voltage is as specified in the following table when the light intensity control lever is moved from "Min" to "Max". Abnormal if not.

<table>
<thead>
<tr>
<th>Input voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>U102 [H-1] gray - U102 [W-1] white</td>
</tr>
</tbody>
</table>

* Approximately AC0.8V is detected when the light intensity control lever is set to the "Min" position and the main switch is turned on. This is not defective. When the light intensity control lever is moved toward the "Max" direction after the main switch is turned on and the voltage once reaches AC5V, the voltage is not lowered even if the lever is moved back to the "min" position. "Approx. AC5 - 20V" in the table indicates this state.
4. Power Supply

4-1 Power is not supplied even after the main switch is turned on.

Causes

1. The breaker CB101 functions.
2. Defective main switch S101
3. Defective AC cord (UYCP15 in 100V channel)
4. Defective AC inlet P101
5. Defective breaker CB101
6. Defective filter PCB U104
7. Defective primary PCB U101

Is the breaker functioning?

Yes

NO

Press the breaker button.

Is power supplied normally?

Yes

NO

END

A
A. Troubleshooting (B2-BDS-3) No. D-9

**A.** Is the AC cord (UYCP) conducting?

- **NO**
  - Replace the AC cord (UYCP in 100V channel).
  - Is power supplied normally?
    - **YES** END
    - **NO** Replace the AC inlet P101.

- **YES**
  - Is the output voltage of the AC inlet P101 normal?
    - **YES** END
    - **NO** Replace the AC inlet P101.

**B.** Measure the voltage between P101 L and P101 N with a multimeter. Normal if the AC line voltage is detected. Abnormal if not.

- **NO**
  - Is the input voltage of the filter PCB U104 normal?
    - **YES** B
    - **NO** Replace the breaker CB101.

**C.** Measure the voltage between U104 B-2 black and U104 W-1 white with a multimeter. Normal if the AC line voltage is detected. Abnormal if not.

Normal if the terminals illustrated below are conducting.
D. TROUBLESHOOTING (B2-BDS-3)  

Is power supplied normally?  

YES  

END  

NO  

Is the output voltage of the filter PCB U104 normal?  

YES  

NO  

Replace the filter PCB U104.  

Is power supplied normally?  

YES  

END  

NO  

Turn on the main switch.  

Is the input voltage of the primary PCB U101 normal?  

YES  

NO  

Replace the main switch S101.  

Is power supplied normally?  

YES  

END  

NO  

Replace the primary PCB U101.  

Measure the voltage between U104 B-3 black and U104 W-2 white with a multimeter. Normal if the AC line voltage is detected. Abnormal if not.

Measure the voltage between U101 B-4 black and U101 W-3 white with a multimeter. Normal if the AC line voltage is detected. Abnormal if not.
5. Circuit Diagram

100V ....... J1 Short
200V ....... J1 Open
E. ADJUSTMENT (B2-BDS-3)

CONTENTS

1. Adjusting the maximum voltage value ..................... No. E-1
2. Checking the minimum voltage value ...................... No. E-2
3. Checking the LED indication voltage ...................... No. E-2
E. ADJUSTMENT (B2-BDS-3)  No. E-1

1. Adjusting the maximum voltage value

1-1 Connect a digital voltmeter or a multimeter between H-2 and W-2 terminals of the secondary PCB DZ082400.

H-2 (Gray cord): +
W-2 (White cord): -

* Be sure to set a halogen lamp (12V/100W) before making the adjustment.

1-2 Adjust the adjusting trimmer VR2 of the secondary PCB DZ082400 so that DC11.8±0.1V when the light intensity control lever is set to the "MAX" position.

<table>
<thead>
<tr>
<th>Light intensity controller</th>
<th>Max. voltage</th>
<th>Adjusting trimmer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max.</td>
<td>DC11.8±0.1(V)</td>
<td>VR2</td>
</tr>
</tbody>
</table>

---

Light intensity controller
2. Checking the minimum voltage value

2-1 Verify that the voltage is DC2.5V when the light intensity control lever is set to the "MIN" position in the same state as "1. Adjusting the maximum voltage value".

<table>
<thead>
<tr>
<th>Light intensity controller</th>
<th>Min. voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min.</td>
<td>DC2.5V or lower</td>
</tr>
</tbody>
</table>

3. Checking the LED indication voltage

3-1 Set the light intensity control lever so that all the LEDs up to "9" are lit and the LED of "9.5" is not lit in the LED indication shown below. * LED of "9.5" = LED located between "9" and "10"

Verify that the output voltage is DC 9.0 ±0.07V then.

<table>
<thead>
<tr>
<th>3 6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OFF</td>
</tr>
</tbody>
</table>

LEDs up to "9" are lit. OFF

<table>
<thead>
<tr>
<th>Voltage indication LED</th>
<th>Standard value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lit up to &quot;9&quot;</td>
<td>DC 9.0 ±0.07 (V)</td>
</tr>
</tbody>
</table>

3-2 Verify that only the LED of "3" is lit when the light intensity control lever is set to the "MIN" position.

<table>
<thead>
<tr>
<th>3 6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Only the LED of "3" is lit.
3-3 Verify that the LEDs up to "12" are lit when the light intensity control lever is set to the "MAX" position.

All the LEDs are lit.