7. Recording head unit.

7-1. Procedure for replacing and adjusting the LD block

7-1-1. Preparation

7-1-1-1. Jigs, tools

• Wrist band: Commercial item

⚠️ CAUTION

* Wear the wrist band and connect the wrist band to the ground point during LD replacement.

7-1-2. Attention for the LD replacement.

(1) About electro-static.: The laser diode is very sensitive to static electricity. There is a possibility that longevity shortens very much when suffering.

⚠️ CAUTION

* Wear the wrist band and connect the wrist band to the ground point during LD replacement.

(2) About LD block.: Do not touch the screw directed below screen when you replace the LD block.

(These screws have locking paint.)

Only loosens this screw when remove the LD block.

Each LD has unique data below. After replace the LD, these data are needed to input.

- I-dac: Base current of each target output power (100 / 90 / 75 / 50%).
- Vm: Base APC exposure current of each target output power (100 / 90 / 75 / 50%).
- D value (Density adjust H): Density correction value.

---

PT-R8200  N-HEAD LD Block(SA)  Data Sheet

S/N: 007021245

<table>
<thead>
<tr>
<th></th>
<th>100%</th>
<th>90%</th>
<th>75%</th>
<th>50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>APC initial current : I-dac</td>
<td>166.7</td>
<td>155.3</td>
<td>139.1</td>
<td>111.5</td>
</tr>
<tr>
<td>APC power reference : Vm</td>
<td>1591</td>
<td>1425</td>
<td>1193</td>
<td>770</td>
</tr>
</tbody>
</table>

- IoPl Confirm: 166
- Density adjust H: 23
7-1-3. Replacement procedure

(1) Turn off the power to the PT-R.
(2) Remove the head cooling fan unit and head outer covers.

⚠️ CAUTION
* Performing the procedures described below while the power is ON could severely injure your eyes. Therefore, ALWAYS be sure to turn OFF the power.

(3) Remove the socket tape cable from the LD block socket.

The head cooling fan unit

The head outer covers.

Pull out

Socket
(4) Remove the **LD block fixing screws**.

(5) Put the short bar on the replaced LD block. That shrot bar is include the new LD block unit.

(6) Attach the new LD chip on the LD base. (Two pin side is top side.) In this time, clean up the LD base and LD block by air. Then insert the socket tape cable.

(7) Since the cover glass on the recording head can be easily contaminated, be sure to clean that completely.

⚠️ **CAUTION**

* For cleaning the cover glass, use the lens cleaning paper.
* Recommended: 100201546V00: Lens cleaning paper. 30 pack.
(8) Initialize the machine.
(9) Input the below data which is written on the new LD block data sheet.
Then clear the [Laser runningtime].
- Recording head / LD exchange / LD exchange pre-input

(10) Input the Density correction data which is written on the new LD block data sheet.
- Recording head / LD exchange / LD exchange Density / Select Ch. No.

⚠️ CAUTION
* Five kinds of Tables are prepared as a preservation area of a density correction value. Because, support to some kinds of media type. This Table is related with media type setting data. Therefore, adjustment is required to each media type.
- Set media type / select media / Table No.

(11) Return the covers and wiring connections to the original.
(12) Next, perform the exposure adjustment.
- 7-1-4-3.Focus adjustment.
- 7-1-4-4.Density correction.
- 7-1-4-5.Bump correction (Exposure start position of main direction).
- 7-1-4-6.Splice correction (Gap of sub direction).
7-1-4. Exposure adjustment for PT-R8200.

7-1-4-1. Set the exposure pattern.

- Set the exposure pattern to Aux. 1 and Aux. 2.
- Input parameter / Test pattern

<table>
<thead>
<tr>
<th>Aux. 1</th>
<th>In case of exposure length is long</th>
<th>Exposure length is short</th>
<th>Aux. 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1:</td>
<td>0 (H1)</td>
<td>0 (H1)</td>
<td>23</td>
</tr>
<tr>
<td>No. 2:</td>
<td>1 (H2)</td>
<td>2 (V1)</td>
<td>4</td>
</tr>
<tr>
<td>No. 3:</td>
<td>2 (V1)</td>
<td>23 (2x2)</td>
<td>4</td>
</tr>
<tr>
<td>No. 4:</td>
<td>3 (V2)</td>
<td>4 0%</td>
<td>14</td>
</tr>
<tr>
<td>No. 5:</td>
<td>23 (2x2)</td>
<td>17 (D1)</td>
<td>14</td>
</tr>
<tr>
<td>No. 6:</td>
<td>4 (D1)</td>
<td>14 100%</td>
<td>-1</td>
</tr>
<tr>
<td>No. 7:</td>
<td>17 (D1)</td>
<td>-1 (End mark)</td>
<td></td>
</tr>
<tr>
<td>No. 8:</td>
<td>14 100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 9:</td>
<td>6 50% 150 L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 10:</td>
<td>9 50% 212 L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 11:</td>
<td>12 50% 300 L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 12:</td>
<td>7 85% 150 L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 13:</td>
<td>10 85% 212 L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 14:</td>
<td>13 85% 300 L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 15:</td>
<td>-1 (End mark)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7-1-4-2. Confirming the exposure power.

⚠️ CAUTION
* Use the maximum width size plate of customer to confirm.

1) Load the plate manually.

2) Select the maximum width size plate of customer to confirm.

3) Test pattern: Exposure pattern selection
   Std.: Standard test pattern 0: H1
   1: H2
   2: V1
   3: V2
   23: 2x2
   4: 0%
   17: D1
   6: 50% 150 L

AUX1, AUX2:
A optional combination exposure pattern which can be set by /Service/ Input parameter / Test pattern
- Select the AUX2 for confirming the exposure power.
4) Setting of exposure condition.
Enter values into the following fields.

[Currently set value]
Displays the power value (in %) currently set in
“Set media type” data selected when the plate was
loaded in the PT-R.

[Initial Value]
The first power value used in the test exposure.

[Inc. Value]
The amount of change from the initial value.

[Count]
The number of times the test exposure is to be
performed.

[Start Point]
Start point of test pattern

[Exp. Length]
The exposure width of the test pattern.

• Expose the test patterns below condition.
  • Initial value: 60 %
  • Inc value: 10 %
  • Count: 5
  • Exp. Length: Recommend over 100mm.

Confirm the best focus position of each channel. Then decide the best focus value which is
average of all channels.

• The exposure start point is the distance from the plate edge to the point where the test exposure
begins. This value is updated (moved to the next possible exposure position) each time a test
exposure ends. (In this sequence, the exposure starting point is automatically recalculated by
adding 5 mm to the last exposure end point.)

• When performing a test exposure, the settings for the media type registered in the plate data that
is selected when the plate is loaded are used for settings other than the initial value, incremental
value, and count.
5) Check the displayed information and press [START]. The test exposure begins using the set information. When the test exposure is completed, the test exposure selection screen reappears.

⚠️ CAUTION

The test exposure exposes the width that you set in [Exp. Length] and automatically inserts a 5 mm gap between exposures.

Exposure start point.

Exposure result.

(1030 mm x 800 mm)

- Find out the channel number of the highest density (the darkest) of 2 x 2 area. Then confirm the 0% area of that channel number. (Confirm the clearing point power.)

<Reference>

- In general, from 75 to 80% of proper light power is normal clearing point power.
- When proper light power is 100%: from 75 to 80%.
- When proper light power is 100%: from 67 to 72%.
7-1-4-3. Focus adjustment.

⚠️ CAUTION
* Use the maximum width size plate of customer to confirm.

1) Load the plate manually.

2) Select [focus] in the screen on the left and press [OK].

3) Test pattern: Exposure pattern selection
Std: Standard test pattern for focus (2x2 checker)
AUX1, AUX2:
A optional combination exposure pattern which can be set by /Service/ Input parameter/ Test pattern

* Select the Std. for focus series exposure.
4) Setting of focus exposure
Enter values into the following fields.

[Currently set value]
Displays the focus value (in pulse) currently set in “Set media type” data selected when the plate was loaded in the PT-R.

[Initial Value]
The first focus value used in the test exposure.

[Inc. Value]
The amount of change from the initial value.

[Count]
The number of times the test exposure is to be performed.

[Start Point]
Start point of test pattern

[Expo Length]
The exposure length of the test pattern.

⚠️ CAUTION

- Focus latitude of PT-R8200 is wider than another PT-R.

- In case of exposure check during installation.
  Expose the focus series below condition.
  - Initial value: Current value -150 pulse
  - Inc value: 50 pulse
  - Count: 7
  - Expo Length: Recommend over 100mm.

  Confirm the best focus position of each channel. Then decide the best focus value which is average of all channels.

- In case of exposure check during LD replacement.
  Expose the focus series below condition and check whether there are any problems in an exposure result.
  When it have problem, make sure to confirm the LD attachment states (slack of a screw, dust, etc.)
  - Initial value: Current value -50 pulse
  - Inc value: 50 pulse
  - Count: 3
  - Expo Length: Recommend over 100mm.

- The exposure start point is the distance from the plate edge to the point where the test exposure begins. This value is updated (moved to the next possible exposure position) each time a test exposure ends. (In this sequence, the exposure starting point is automatically recalculated by adding 5 mm to the last exposure end point.)

- When performing a test exposure, the settings for the media type registered in the plate data that is selected when the plate is loaded are used for settings other than the initial value, incremental value, and count.
5) Check the displayed information and press [START]. The test exposure begins using the set information. When the test exposure is completed, the test exposure selection screen reappears.

⚠️ CAUTION
The test exposure exposes the width that you set in [Plotting Width] and automatically inserts a 5 mm gap between exposures.

---

Exposure patterns: Std.

- Checker 2x2

<table>
<thead>
<tr>
<th>Ch.83</th>
<th>Ch.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus current value</td>
<td>Focus current value</td>
</tr>
<tr>
<td>(+150 \text{ puls})</td>
<td>(-150 \text{ puls})</td>
</tr>
</tbody>
</table>

Exposure start point. Exposure result.

(1030 mm x 800 mm)

⚠️ CAUTION

* The 2 x 2 checker test pattern is limitation of quality exposure test pattern for PT-R8200. The 2 x 2 checker pattern density is changed easily by developing condition (condition of chemical, processor, sensitivity of plate batch and etc.) Therefore, confirm the developing condition before start this adjustment. And it is very difficult to make even density for everywhere on 2 x 2 checker pattern. Actually, it is enough quality which 2 x 2 checker pattern does not have strong level change banding (contrast) each next channel. As a final check, expose the 50% 300L tint and 4 x 4 checker patterns and confirm that there is no level change banding.
7-1-4-4. Density correction.

⚠️ CAUTION
* The 2 x 2 checker test pattern is limitation of quality exposure test pattern for PT-R8200. The 2 x 2 checker pattern density is changed easily by developing condition (condition of chemical, processor, sensitivity of plate batch and etc.) Therefore, confirm the developing condition before start this adjustment. And it is very difficult to make even density for everywhere on 2 x 2 checker pattern. Actually, it is enough quality which 2 x 2 checker pattern does not have strong level change banding (contrast) each next channel. As a final check, expose the 50% 300L tint and 4 x 4 checker patterns and confirm that there is no level change banding.

• Adjust the 2x2 pattern density by LD on / off responsibility.

Five kinds of Tables are prepared as a preservation area of a density correction value. Because, support to some kinds of media type. This Table is related with media type setting data. Therefore, adjustment is required to each media type.

• Set media type / select media / Table No.

⚠️ CAUTION
* Explain as an example of the ch. 10 of LD.

(1) Confirm the current density correction value.
* Recording head / RH parameter / Density correction table H / Correction table parameter / Select Density correction table No.

(2) Enter the test exposure screen.
* Push 3 times at position A -> OK -> position A -> OK -> position A -> OK.

(3) Confirm the reference density correction value on the data sheet with new LD block.
* When reference density correction value is +: Select 30. Density +.
* When reference density correction value is -: Select 31. Density -.
(4) Input the new LD block number in the field number 1. When adjust the density to several channel same time, input the channel number in field number 2. and later.

* Reference: Special exposure mode. (Input the below value in field number 1.)
  -1: Select all odd channel.
  -2: Select all even channel.

(5) Set the Initial value and Increment value.

* An example
  - When reference density correction value is +
    Initial value: 0
    Inc value: 2
  - When reference density correction value is -
    Initial value: -1
    Inc value: -2

(6) Expose the density correction test pattern.

Exposure start point.

Exposure result.
(e.g., 1030mm x 800mm)

⚠️ CAUTION
* One pattern length is 40 mm. 20 patterns are exposed on 1030 mm x 800 mm plate.
(7) Choose the even density area to each next channel.

(8) Set the new density correction value on the Density correction H screen.
   - Recording head / LD exchange / LD exchange Density / Select Ch. No.
   - New density correction value
     - When reference density correction value is +: 20
     - When reference density correction value is -: -21

⚠️ CAUTION
* Keep the density correction V to 100.
* The density correction H are common for every dpi.
* Unnecessary to adjustment for the recovery mode normally.

(9) Finally, confirm the new density correction parameter.
   - Recording head / RH parameter / Density correction table H / Select Density correction table No.
7-1-4-5. Bump correction (Exposure start position of main direction).

- Correct the exposure start position of main direction.

⚠️ CAUTION
* Explain as an example of the ch. 10 of LD.

1. Confirm the current bump correction value.
   - Recording head / RH parameter / Bump correction

2. Enter the test exposure screen.
   - Push 3 times at position A -> OK -> position A -> OK -> position A -> OK.


4. Set channel no.

5. Set the Initial value and Increment value.

   - An example
     - Initial value: -27
     - Inc value: 4

Initial val.
- Range  - / + 27.4 at 2400 dpi
- / + 27.8 at 2438 dpi
- / + 29 at 2540 dpi

Increment
- Range: From +1 to +7
(6) Expose the bump correction test pattern.

⚠️ CAUTION

* One pattern length is 50 mm. 14 patterns are exposed on 1030 mm x 800 mm plate.

Exposure result. (e.g., 1030mm x 800mm)

⚠️ CAUTION

* Increase the value: Start position is change to higher.
* Decrease the value: Start position is change to lower.
C. Replacement & Adjustment

(7) Choose the even the exposure start position area to each next channel.

⚠️ CAUTION
* Target is within - / + 0.5 dot.

(8) Set the new bump correction value on the Bump correction screen.
- Recording head / LD exchange / LD exchange Bump / Select Ch. No. / Select dpi
- New bump correction value: +9.0

⚠️ CAUTION
* The input bump correction value is calculated from dot to mm automatically.
* The bump correction is common for every dpi.
* Unnecessary to adjustment for the recovery mode normally.

(9) Finally, confirm the new density correction parameter.
- Recording head / RH parameter / Bump correction
7-1-4-6.Splice correction (Gap of sub direction).

- Correct the gap of sub direction.

⚠️ CAUTION
* Explain as an example of the ch. 10 of LD.

(1) Confirm the current splice correction value.
- Recording head / RH parameter / splice correction / Select dpi

(2) Enter the test exposure screen.
- Push 3 times at position A -> OK -> position A -> OK -> position A -> OK.

(3) Select 10. Splice phase.

(4) Set the Initial value and Increment value.

(5) Input the reduced exposure power. (Pattern is much easier to check on plate. Recommend about 60 % to 80 %.)
(6) Expose the Splice phase expo. pattern.

⚠️ CAUTION

* Please use plate of Density or Bump correction pattern for decide the channel number.

Exposure start point. Exposure result. (Less than version 1.40)
(e.g, 1030mm x 800mm)

Exposure start point. Exposure result. (Version 1.40 or later)
(e.g, 1030mm x 800mm)
(7) Find the positions which are matched the exposure start line and reference line. (Check the each gap for ch.10 (Gap 11 and 10.).

Then count the line from end of reference line to the exposure start line.

Or expose the 11:Splice line pattern. (Version 1.4 or later. Refer to the 7-1-4-7.Splice line exposure.)
C. Replacement & Adjustment

(8) Set the new splice correction value.

Case 1: Replacing the Ch.1, Ch.84 (ch on the edge)
-> Follow to the procedure (8)-2.

Case 2: Replacing two or more LD to a consecutive channel number except Ch.1, Ch.84.
-> Follow to the procedure (8)-3.

Case 3: Except case 1, case 2.
-> Follow to the procedure (8)-1.

(8)-1 Case 3: Except case 1, case 2.

- Set the step number and line number on the Splice correction screen.
  - Recording head / LD exchange / LD exchange Splice / Select Ch. No. / Select dpi
    - Gap11: Line: 15 Step: 1
    - Gap10: Line: 20 Step: 3

* The new Splice correction value is calculated automatically.
* Copy the new splice correction value to other resolutions.
* Unnecessary to adjustment for the recovery mode normally.

(9) Confirm the new density correction parameter.

- Recording head / RH parameter / Splice correction / Select dpi

(10) Expose the 13: Splice confirm expo. pattern. (Version 1.4 or later. Refer to the 7-1-4-8.Splice confirm exposure.)

In case of old version, expose the power series below condition.

- Initial value: Current value
- Inc value: 1 pulse
- Count: 1
- Exp. Length: Recommend over 100mm.
- Exposure pattern: Std.

Then compare the V1 and D1 patterns on adjusted splice areas Gap11 and Gap10 each other. Each gap areas of splice over lap value are almost equal if new splice correction values are good enough. Change the same bit value of each new splices correction values when their splice over lap amount is not equal.

(11) Finally, make a back up of all data.
(8) -2 Case 1: Replacing the Ch.1, Ch.84 (ch on the edge)

Ch.1 has the gap 1 and the gap 2. However, the gap amount of the gap 1 cannot be confirmed.

Therefore, the gap 1 correction value is always “0.”

The gap number of Ch.84 is only 84.

- Set the step number and line number on the Splice correction screen.
  - Recording head / LD exchange / LD exchange Splice / Select Ch. No. / Select dpi
    - In case of Ch.1
    - Gap2: Line: 20 Step: 3
    - Gap84: Line: 15 Step: 1

* The new Splice correction value is calculated automatically.
* Copy the new splice correction value to other resolutions.
* Unnecessary to adjustment for the recovery mode normally.

(9) Confirm the new density correction parameter.
- Recording head / RH parameter/ Splice correction / Select dpi

(10) Expose the 13:Splice confirm expo. pattern. (Version 1.4 or later. Refer to the 7-1-4-8.Splice confirm exposure.)

In case of old version, expose the power series below condition.
- Initial value: Current value
- Inc value: 1 pulse
- Count: 1
- Exp. Length: Recommend over 100mm.
- Exposure pattern: Std.

Then the adjusted splice areas are compared with the not adjusted area by V1 and D1 patterns. If there have a difference, adjust the splice correction value more finely.

Recording head / RH parameter / Splice correction / Select dpi

(11) Finally, make a back up of all data.
Case 2: Replacing two or more LD to a consecutive channel number except Ch.1, Ch.84.

Explain as an example of the case where Ch.9 and Ch.10 are exchanged.

- Write down the current splice correction value.
  - Recording head / RH parameter / splice correction / Select dpi
  - Ch.9: -8.7  Ch.10: 56.6  Ch.11: -36.3

- Calculate the gap amount.
  - Gap amount = (number of measurement lines - 19 lines) x 10.58 (1 dot / 2400 dpi) - (shift amount)
    - In case of Gap 9 / Step 2 (shift amount = -0.8) 22 lines
      -40.20 micron = (19 - (22 + (-0.8)) x 10.58
    - In case of Gap 2 / Step 3 (shift amount = -0.7) 20 lines
      -3.17 micron = (19 - (20 + (-0.7)) x 10.58
    - In case of Gap 84 / Step 1 (shift amount = -0.9) 15 lines
      51.84 micron = (19 - (15 + (-0.9)) x 10.58

- Calculate the new Splice correction value.
  - Goff = (Total of current splice correction values - Total of new gap amount) / Number of gaps.
    - 2.75 = (((-8.7) + (56.6) + (-36.3)) - ((-40.42) + (-3.17) + (51.84))) / 3
  - New Splice correction value = New Gap amount + Goff
    - Ch.9: -37.45 = -40.20 + 2.75
    - Ch.10: -0.42 = -3.17 + 2.75
    - Ch.11: 54.59 = 51.84 + 2.75

- Set the new Splice correction value.
  - Recording head / RH parameter / Splice correction / Select dpi

### CAUTION
- Copy the new splice correction value to other resolutions.
- Unnecessary to adjustment for the recovery mode normally.

In case of old version, expose the power series below condition.

- Initial value: Current value
- Inc value: 1 pulse
- Count: 1
- Exp. Length: Recommend over 100mm.
- Exposure pattern: Std.

Then compare the V1 and D1 patterns on adjusted splice areas Gap11, Gap10 and Gap9 each other. Each gap areas of splice over lap value are almost equal if new splice correction values are good enough. Change the same bit value of each new splices correction values when their splice over lap amount is not equal.

- Recording head / RH parameter / Splice correction / Select dpi

Finally, make a back up of all data.
<Reference: About overlap value>

- The best setting of overlap is 5 micron.
- When increase the splice correction value, overlap amount became less.
- When decrease the splice correction value, overlap amount became more.

Factory target + 5 micron (Over lap: 0 micron)
Condition: no margin.

Factory target: Best setting (Over lap: 5 micron)

Factory target - 5 micron (Over lap: 10 micron)
Condition: too much overlapped.
<Explanation>

- The exposure start position (Splice exposure area side) are shifted to + direction (right side) from -0.9 to 0.0 every two steps (even and odd number of channels)
- The exposure end side (reference line) is not shifted (integer).
- The exposure end side (reference line) is exposed 1219 lines. (Expose it to 19 extra lines.). Because the case of the the gap under lap is assumed.

Therefore, the calculation type of the amount of the gap is as follows.

- Gap amount = (number of measurement lines - 19 lines) x 10.58(1 dot / 2400 dpi) - (shift amount)
  - In case of Gap 2 / Step 3 (shift amount = -0.7) 20 lines
    -3.17 micron = (19 - (20 + (-0.7))) x 10.58
  - In case of Gap 84 / Step 1 (shift amount = -0.9) 15 lines
    51.84 micron = (19 - (15 + (-0.9))) x 10.58

- However, the difference of phase (dot) is confirmed between reference line (integer area) and splice exposure area which is shifted exposure start position of splice exposure area each 0.1 dot unit during Splice test exposure. In an actual exposure, the Splice correction is executed in consideration of all LD Splice correction value. (automatic control with software).

Therefore, the amounts of the gap values, which are calculated by the above-mentioned, are not equal to the each splice correction value. Splice correction when LD replacement, perform the splice correction from the LD exchange / Splice correction screen.

However, when two or more LD is replaced to a consecutive channel number, the automatic calculating of the correction value cannot be done. Therefore, it is necessary to calculate the correction value from the above-mentioned calculation type.
7-1-4-7 Splice line exposure. (Version 1.4 or later)

- This is the exposure test, which is changed the gap amount step by step.

**CAUTION**
- Explain as an example of the ch. 10 of LD.

1. Confirm the current bump correction value.
   Then change the bump correction value temporary.
   - In case of even channel: current value -100.
   - In case of odd channel: current value +100.
- Recording head / RH parameter / Bump correction

2. Enter the test exposure screen.
   - Push 3 times at position A -> OK -> position A -> OK -> position A -> OK.

3. Select 11. Splice line (Version 1.4 or later)

4. Set the exposure condition.

   - **Exp. Length:** 794mm.
   - **Start Point:** 6.0

5. Input the reduced exposure power. (Pattern is much easier to check on plate. Recommend about 60% to 80%).
(6) Expose the Splice line expo. pattern.

Exposure start point. Exposure result.
(e.g. 1030mm x 800mm)

⚠️ CAUTION
* Please use plate of Density or Bump correction pattern for decide the channel number.
(7) Find the position which exposure start side and exposure finish side begin to separate. (Check the each gap for ch.10 (Gap 11 and 10.))
Exposure result.
(e.g., 1030mm x 800mm)

Gap 11 / 15 Line (Step 25)  Gap 10 / 20 Line (Step 20)

Exposure start side
Exposure finish side

The position which exposure start side and exposure finish side begin to separate.

(8) Make sure to return back the bump correction value to the original.

- Recording head / RH parameter / Bump correction

Then Input the line value to the procedure (8) in 7-1-4-6.Splice correction (Gap of sub direction).

⚠️ In case of above result, gap 11 is 15 lines and gap 10 is 20 lines.
7-1-4-8. Splice confirm exposure. (Version 1.4 or later)

- This is the exposure test, which is changed the balance of the adjoining gap amount.

1. Enter the test exposure screen.
   - Push 3 times at position A -> OK -> position A -> OK -> position A -> OK.

2. Select 13. Splice confirm (Version 1.4 or later)
3. Select the Std. test pattern.
4. Select the LD channel number.
5. Set the exposure condition.
   - Initial Value: -9.0
   - Inc Value: 3.0
   - Count: 7
   - Start Point: 6.0
   - Exp. Length: Recommend over 100mm.

6. Input the 100% to exposure power.
7. Input the -10 microns to the overlap value that make more easily to see the splice condition.
8. Expose the Splice confirm pattern.

Exposure patterns:
- No.9: 9 (50% 212L)
- No.8: 6 (50% 150L)
- No.7:14 (100%)
- No.6:17 (D1)
- No.5: 4 (0%)
- No.4:23 (2x2)
- No.3: 1 (V1)
- No.2: 1 (V1)
- No.1: 0 (H1)
(9) Confirm the splice position in the 0% area and D1 pattern. (Check the each gap for ch.10 (Gap 11 and 10.))

Exposure result.
(e.g. 1030mm x 800mm)

<table>
<thead>
<tr>
<th>Balance</th>
<th>Gap 11</th>
<th>Gap 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>-34.1 = (Current - 9)</td>
<td>86.7 = (Current + 9)</td>
</tr>
<tr>
<td>6</td>
<td>-31.1 = (Current - 6)</td>
<td>83.7 = (Current + 6)</td>
</tr>
<tr>
<td>3</td>
<td>-28.1 = (Current - 3)</td>
<td>80.7 = (Current + 3)</td>
</tr>
<tr>
<td>0</td>
<td>-25.1 = (Current)</td>
<td>77.7 = (Current)</td>
</tr>
<tr>
<td>-3</td>
<td>-22.1 = (Current + 3)</td>
<td>74.7 = (Current - 3)</td>
</tr>
<tr>
<td>-6</td>
<td>-19.1 = (Current + 6)</td>
<td>71.7 = (Current - 6)</td>
</tr>
<tr>
<td>-9</td>
<td>-16.1 = (Current + 9)</td>
<td>68.7 = (Current - 9)</td>
</tr>
</tbody>
</table>
(10) Find the even overlapping in splice position of the gap 11 and 10 like below picture.

Balance -3 (Gap11 +3: Black line underlap)  Balance -3 (Gap10 -3: White line overlap)

Balance -6 (Gap11 +6: almost 0 lapping.)  Balance -6 (Gap10 -6: almost 0 lapping.)

Balance -9 (Gap11 +9: White line overlap)  Balance -9 (Gap10 -9: Black line underlap)
(11) Set the best balance value on the Splice confirm (shift) screen.

- Recording head / LD exchange / Splice confirm (shift) / Select Ch. No. / Select dpi

<table>
<thead>
<tr>
<th>Balance</th>
<th>Gap11</th>
<th>Gap10</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>-34.1=(Current-9)</td>
<td>86.7=(Current+9)</td>
</tr>
<tr>
<td>6</td>
<td>-31.1=(Current-6)</td>
<td>83.7=(Current+6)</td>
</tr>
<tr>
<td>3</td>
<td>-28.1=(Current-3)</td>
<td>80.7=(Current+3)</td>
</tr>
<tr>
<td>0</td>
<td>-25.1=(Current)</td>
<td>77.7=(Current)</td>
</tr>
<tr>
<td>-3</td>
<td>-22.1=(Current+3)</td>
<td>74.7=(Current-3)</td>
</tr>
<tr>
<td>-6</td>
<td>-19.1=(Current+6)</td>
<td>71.7=(Current-6)</td>
</tr>
<tr>
<td>-9</td>
<td>-16.1=(Current+9)</td>
<td>68.7=(Current-9)</td>
</tr>
</tbody>
</table>

⚠️ In case of above result, the collection values is -6.

⚠️ CAUTION

* The new Splice correction value is calculated automatically.
* Copy the new splice correction value to other resolutions.
* Unnecessary to adjustment for the recovery mode normally.

(12) Expose the power series below condition.

- Initial value: Current value
- Inc value: 1 pulse
- Count: 1
- Exp. Length: Recommend over 100mm.
- Exposure pattern: Std.

(13) Compare the V1 and D1 patterns on adjusted splice areas Gap11 and Gap10 each other. Each gap areas of splice over lap value are almost equal if new splice correction values are good enough.

(14) Finally, make a back up of all data.

< Explanation >

- In case of make miss take to count the 1 line of splice area, the result of the calculation value of the gap amount is shifted to about +/- 10 micron. However, PTR8200 distributes this error to a gap on either side equally by automatic calculation. Therefore, in fact, splice correction values of each gap are shifted to +/- 5 microns. (However, when two or more LD is replaced to a consecutive channel number, the automatic calculating of the correction value cannot be done.)

- Splice confirm exposure is exposed shifting the above-mentioned gap gradually.

- For example, when Gap10 is counted in an one-line in surplus, the compensation value of Gap10 is more 5 micron and Gap11 is less 5 micron. In this condition, when Splice confirm exposure is performed, the balance of the position of Gap10 -5 micron and Gap11 +5 micron will become good.

- In the case of the above example, the position of Balance -6 (Gap10 / -6 micron, Gap11 / +6 micron) will be the best position.
7-1-4-9. <Reference> Splice overlap exposure.

- This is the exposure test, which is changed gradually the amount of the overlap at the gap position.

⚠️ CAUTION

* Expose the test pattern which is changed the overlap value to plus or minus from the current splice correction value.
  - Plus: Overlap (Increase the overlap amount)
  - Minus: Underlap (Decrease the overlap amount)

1. Enter the test exposure screen.
   - Push 3 times at position A -> OK -> position A -> OK -> position A -> OK.

3. Select exposure pattern. (Std.: Standard test pattern)
4. Set the exposure condition.

   - Initial Value: -10
   - Inc Value: 5
   - Count: 5.0
   - Exp. Length: Recommend over 100mm.
   - Start Point: 6.0

   - The exposure start point is the distance from the plate edge to the point where the test exposure begins. This value is updated (moved to the next possible exposure position) each time a test exposure ends. (In this sequence, the exposure starting point is automatically recalculated by adding 5 mm to the last exposure end point.)
   - When performing a test exposure, the settings for the media type registered in the plate data that is selected when the plate is loaded are used for settings other than the initial value, incremental value, and count.

5. Check the displayed information and press [START]. The test exposure begins using the set information. When the test exposure is completed, the test exposure selection screen reappears.

---

An example

- Initial Value: -10
- Inc Value: 5
- Count: 5.0
- Exp. Length: Recommend over 100mm.
- Start Point: 6.0
Exposure patterns:

- No.9: 17 (D1)
- No.8: 12 (50% 300L)
- No.7: 9 (50% 212L)
- No.6: 6 (50% 150L)
- No.5: 4 (0%)
- No.4: 3 (V2)
- No.3: 2 (V1)
- No.2: 1 (H2)
- No.1: 0 (H1)

< Reference >

- The reference amount of the overlap is from 5 microns. Therefore, -10 micron area has a under lapping (black line), and -5 micron area has an even and a few position have an over lapping (white line).
- However, splice positions are influenced the development condition and plate sensitivity. Importance thing is every position has almost same result.
7-1-4-10. Density media match exposure. (Version 1.4 or later)

- Standard density correction table is optimized according to each media of plate.
- In case of media require the exclusive density table; make the exclusive density table for that media. In case of expect media type, use standard density table.

⚠️ CAUTION

* Make sure to confirm the head cover glass without dirty and processor condition which do not have problem before performing this adjustment. If they have problem, new density correction table is not made correctly. Especially, make sure to verify the clearing point power of plate. (Refer to 7-1-4-2. Confirming the exposure power.)

1. Just in case, confirm the focus first.
   Set the 2 x 2 checker pattern in Aux.1 or Aux.2. (No.23 is 2 x 2 checker pattern.)
   - Input parameter / Test pattern

2. Enter the test exposure screen.
   - Push 3 times at position A -> OK -> position A -> OK -> position A -> OK.

3. Select 32. Density media match (Version 1.4 or later)

4. Select the test pattern which is 2 x 2 checker pattern. (Aux.1 or Aux.2.)

5. Select the reference density correction table. (Normally, standard density correction table number 1. is used.)

6. Set the exposure condition.
   ! The proper gain value is informed to evaluated media of plate in advance. Skip those procedures to step (9).
   - Initial Value: 0.8
   - Inc Value: 0.1
   - Count: 5
   - Start Point: 6.0
   - Exp. Length: Recommend over 100mm.
(7) Expose the Density media match pattern.

Exposure patterns:

No.1: 23 (2x2)

Gain 1.2
(120%)

Gain 1.1
(110%)

Gain 1.0
(100%)

Gain 0.9
(90%)

Gain 0.8
(80%)

Exposure start point. Exposure result. (1030 mm x 800 mm)

(8) Select the 2 or 3 kinds of the gain values with better concentration of level change banding of each channel on a checker 2x2.
(9) Select the 32:Density media match again.

(10) Select the Std. test pattern.

(11) Select the reference density correction table. (Normally, standard density correction table number 1. is used.)

(12) Set the exposure condition. Then expose.

- In case of Gain 90% and 100% are better.
  - Initial: 0.9
  - Inc. Va: 0.1
  - Count: 2
  - Start Point: 6.0
  - Exp. Length: Recommend over 350.0 mm

Keep the exp. length is 350.0 mm or more. When 3 or more kind of gain value are exposed, recommend exposing them to another plates.

Exposure patterns:

- No.4: 12 (50% 300L)
- No.3: 25 (4x4)
- No.2: 4 (0%)
- No.1: 23 (2x2)

(13) Select the best gain value of level change banding of each channel on a checker 2x2.
(14) Make new density correction table.
- Recording head / RH parameter / Density correction table H / Save media match table

Select the reference density correction table. (Normally, standard density correction table number 1. is used.)

Select the new density correction table number. (Example No.2)

Input the gain value. (Example 0.8 (80%))

Setting data will be appeared. Confirm the data then save them. New density correction data will be store to number 2.

!! CAUTION !!
The table No.2 is updated by this operation.
(15) Set the new density correction table number to media setting. (Example number 2.)
- Set media type / select media / Table number

(16) Confirm the level change banding of each channel on a checker 2x2, which was exposure at procedure (12). If strong level change banding on some channel in there, try to adjust the density correction parameter one by one. (Refer to 7-1-4-4.density correction.)

However, the 2 x 2 checker test pattern is limitation of quality exposure test pattern for PT-R8200. Actually, it is enough quality which the 50% 300L tint and 4 x 4 checker patterns does not have strong level change banding (contrast) each next channel.
<Explanation>

- About density correction parameter.
  - PT-R8200 is adjusted the each LD’s character (density) by LD on / off responsibility. (Reference target is the 2x2 checker pattern density.)
  - Five kinds of tables are prepared as a preservation area of a density correction value. Because, support to some kinds of media type. This table is related with media type setting data.
  - In the factory, make the density correction table, which is adjusted to standard media plate. (Density correction table number 1.) However, this density correction parameter is influenced LD’s character and density of each position of plate self same time.
About the calculation method of a new density correction parameter.

- First, the low frequency of density (density of each position of plate self) is deleted using High Pass Filter. Thereby, the pure density correction parameters of each LD’s character are calculated.

- The above-mentioned calculation result makes the pure density correction parameters. This is defined to basic gain. (Gain: 1.0)

- Average of these correction values is ‘0’. Because these correction values are choose only the high frequency ingredient. Therefore, calculate the average value of the original density correction parameters, and this is added as offset. (Gain: 1.0 + offset). This is the new density correction table.
C.Replacement & Adjustment

• In fact, the density correction table of Gain: 1.0 + offset is not the best one. Because, media responsibility (sensitivity) by density correction value is not same as each kind of medias. In Density media match exposure, this Gain value is changed step by step. The best matching of Gain value is decided for the target media by that exposure result.
7-1-4-11. Exposure adjustment in case there is no plate of the maximum width (1060mm). (Version 1.4 or later)

- When there is no maximum width (1060mm) plate, Exposure adjustment cannot to outside of exposure area (non exposure area) of LD. (Example: At 1030mm width, 1ch and 84ch are outside of exposure area (non-exposure area). Also, the exposure width of LD became narrow which is the most away side on the exposure area. That width is changed by the plate width (exposure width). (Example: At 1030mm width, the exposure width of 2ch becomes narrow.)

- Exposure start position is fixed to the maximum plate width (1060mm) by ‘Enable on edge.’ function to ON. Also, Plate could load which can shifted to left or right edge (home or away side). Machine expose the all-maximum image area of plate width (1060mm) when turn on the ‘Enable on edge.’ function. In this moment, exposure start position is fixed to the maximum plate width (1060mm). Also, machine can load the plate to shift on left or right edge (home or away side). However, Plate Y size is checked as normal sequence. Therefore, Plate width has to cover the PH50 plate detection sensor.

- Thereby, when there is no maximum plate width (1060mm), all LD adjustments are possible.

Plate of 1030mm width is explained to an example.

1. Enable the ‘Enable on edge.’ function.
   - User Maintenance/ Password : 8200/ Enable on edge. [ON]

2. Load the 1030mm x 800mm plate by 1030mm x 800mm plate setting. In this moment, set the plate to the left or right edge (home or away side) position of maximum width (1060mm).

3. Carry out the exposure adjustment same as normal condition.

4. After adjustment is finished, disable the ‘Enable on edge.’ function.
   - User Maintenance/ Password : 8200/ Enable on edge. [OFF]
8-5. Replacement procedure of the NIA_DRVC_E24 / E16 board. (LD driver board.)

8-5-1. The cautions when exchanging

- Require the main firmware of version 1.3 or later to download the FPGA data.
- NIA_DRVC_E24 is upper compatible to NIA_DRVC_E16. Therefore in case of NIA_DRVC_E16 board (it mounts on no. 4 of DRVC) is broken; attach the NIA_DRVC_E24 on no. 4 of DRVC board.
- In case of replacing NIA_DRVC_E24 / E16, Require to confirm the LD density for just in case. (Refer to the Chap. C: 7-1-4-4. Density correction.)
- Require inputting no unique data.

The FPGA data and unique data are downloaded to the NIA_DRVC_E24 board to be provided. And also, board has data sheet from factory.

- Service / Recording head / RH parameter DRVC board correction 1
- Service / Recording head / RH parameter DRVC board correction 2

The FPGA download times are below.

- DRVC E24 / E16 1-board: About 7 minutes
- DRVC 1,2,3 (E24) 3-board same time: About 15 minutes
- DRVC 1,2,3 (E24) + DRVC 4 (E16) = 15 minutes + 7 minutes = About 22 minutes

8-5-2. Replacement procedure.

1) Initialize the machine then choose a DRVC type confirm. Confirm the FPGA version.

- Service / Recording head / DRVC Fpga program download / DRVC type confirm

2) Replace the NIA_DRVC_E board.

3) Initialize the machine then choose a DRVC type confirm. Confirm the FPGA version again.

- Service / Recording head / DRVC Fpga program download / DRVC type confirm

Download the new FPGA data, if board FPGA version is old. (Refer to the Chap. E: 3-9-2. Procedure for downloading the FPGA for the NIA_DRVC_E board.)

- Latest FPGA version for NIA_HCB_E (July. 1st. 2007 present)
  - HeadFPGA2_DRVC24_V130.dat
  - HeadFPGA3_DRVC16_V130.dat

4) Recommend to compare the board data sheet and below parameters, just in case.

- Service / Recording head / RH parameter DRVC board correction 1
- Service / Recording head / RH parameter DRVC board correction 2

5) Require to confirm the LD density for just in case. (Refer to the Chap. C: 7-1-4-4. Density correction.)
3-9-2. Procedure for downloading the FPGA for the NIA_DRVC board.

⚠️ CAUTION

- Require the main firmware of version 1.3 or later.
- NIA_DRVC_E24 is upper compatible to NIA_DRVC_E16. Therefore in case of NIA_DRVC_E16 board (it mounts on no. 4 of DRVC) is broken; attach the NIA_DRVC_E24 on no. 4 of DRVC board.
- In case of replacing NIA_DRVC_E24 / E16, Require to confirm the LD density for just in case. (Refer to the Chap. C: 7-1-4-4. Density correction.)
- Confirm that all switches of DIP SW 2 on the RCP(3) board are off.
- Require inputting no unique data.
  The FPGA data and unique data are downloaded to the NIA_DRVC_E24 board to be provided. And also, board has data sheet from factory.
  - Service / Recording head / RH parameter DRVC board correction 1
  - Service / Recording head / RH parameter DRVC board correction 2
- The FPGA download times are below.
  - DRVC E24 / E16 1-board. : About 7 minutes
  - DRVC 1,2,3 (E24) 3-board same time. : About 15 minutes
  - DRVC 1,2,3 (E24) + DRVC 4 (E16) = 15 minutes + 7 minutes = About 22 minutes

3-9-2-1. Confirm the each board type and present FPGA version.

1) Initialize the machine then choose a DRVC type confirm. Confirm the FPGA version.
   - Service / Recording head / DRVC Fpga program download / DRVC type confirm

2) Turn off the power to the PT-R. Then open the head cover and confirm the DRVC no.4 board type by yourself.

⚠️ CAUTION

- E24 board is mounted on DRVC 1 to 3.
- E16 board is mounted on DRVC 4 from the factory. E24 is mounted on there, if DRVC 4 board was replaced ago.
- The FPGA data of the NIA_DRVC_E24 and E16 board are different. Therefore, when the FPGA data is downloaded DRVC no.4, require specifying the DRVC no.4 board type E24 or E16.
3-9-2-2. Pre-check for FPGA data communication port

- **NIA_HCB_E board** has a possibility of problem, which is one of communication ports defective for FPGA data until serial number 26. However, this communication port is only for using to download the FPGA data on NIA_DRVC_E board. Therefore, machine has no problem normally.

- Also, NIA_HCB_E board has four-communication ports for DRVC 1 to 4. They have compatibility each other.

(1) Turn on the bit 5 and 8 of DSW 4 on the NIA_HCB_E board.
   If the JP1 to JP4 positions are 2-3 side on the NIA_DRVC_E board, change them positions to 1-2 side.

(2) Prepare the port check file.
   - HeadFPGA2_DRVC24_PortCheck.dat
   - HeadFPGA3_DRVC16_PortCheck.dat

(3) Enter the download target select screen.
   - Service / Recording head / DRVC Fpga program download / download target select
   Select 1: DRVC 1 (24ch).

(4) Execute RMLight6.exe. The window shown in step 5 appears.

(5) Click Download in the window below. The window shown in step 6 appears.

(6) Select the data to be downloaded and click the Open button.
   The window shown in step 7 appears.
   - HeadFPGA2_DRVC24_PORTCheck.dat
   - HeadFPGA3_DRVC16_PORTCheck.dat
(7) Click OK to start downloading of the selected data.
Download time: approximately 10 more seconds.

The following screen is displayed in the main unit panel during downloading.

(8) When the data has been downloaded successfully, RMLight is returned back step 5. And main unit panel is returned back to step 3. Then continue to check the other port (DRVC 2,3,4)
In case of error, RMLight is returned back step 5. And main unit panel is displayed like below. Once turn off/on the power. Then continue to check the other port (DRVC 2,3,4)
3-9-2-3. Download the FPGA data

- There are two kinds of FPGA data for NIA_DRVC_E24 and E16.
- The FPGA data of NIA_DRVC_E24 is common to all NIA_DRVC_E24 board.
- However, the unique data are downloaded to the NIA_DRVC_E24 / E16 board to be provided.
- These data is displayed on below screen.
  - Service / Recording head / RH parameter DRVC board correction 1
  - Service / Recording head / RH parameter DRVC board correction 2
- Refer to the Chap.C: Replacement procedure of the NIA_DRVC_E24 / E16 board. for the replacement procedure.

(1) Turn on the bit 5 and 8 of DSW 4 on the NIA_HCB_E board.
   If the JP1 to JP4 positions are 2-3 side on the NIA_HCB_E board, change them positions to 1-2 side.

(2) Prepare the FPGA data file.
- Latest FPGA version for NIA_HCB_E (July. 1st. 2007 present)
  - HeadFPGA2_DRVC24_V130.dat
  - HeadFPGA3_DRVC16_V130.dat

(3) Enter the download target select screen.
- Service / Recording head / DRVC Fpga program download / download target select
  - In case of correct all communication ports.
    - Select the DRVC board number to download the FPGA data.
    - 10: DRVC 1,2,3 (24ch) can be selected, when the FPGA data is downloaded to all DRVC board during the upgrade etc. However, the DRVC 4 board cannot be selected at the same time because there are the cases of E24 or E16. Download the FPGA data separately.
  - In case of defective some communication port.
    - When communication port for target DRVC board number is correct, select that DRVC board number.
    - First, select correct communication port DRVC board number when the FPGA data is downloaded to all DRVC board during the upgrade etc. 10: DRVC 1,2,3 (24ch) can be selected, if defective communication port is only for DRVC 4.
    - Refer to the 3-9-2-4. Method of substituting communication port below to download the FPGA data for defective communication port DRVC board.
(4) Execute RMLight6.exe. The window shown in step 5 appears.

(5) Click Download in the window below. The window shown in step 6 appears.

(6) Select the data to be downloaded and click the Open button. The window shown in step 7 appears.
   - HeadFPGA2_DRVC24_V130.dat
   - HeadFPGA3_DRVC16_V130.dat

(7) Click OK to start downloading of the selected data.
   Download time:
   - DRVC E24 / E16 Single (1 piece): about 7 min.
   - DRVC 1,2,3 (E24) 3 piece same time: about 15 min.

The following screen is displayed in the main unit panel during downloading.
(8) When the data has been downloaded, the following window appears. Click OK, then RMLight is returned back step 5.

After the download of data is completed, the following window displayed in the PT-R panel.

⚠️ CAUTION
* When downloading the FPGA data, "Burning ROM now! Please wait." is still displayed in the main unit panel even when the window step 8. This means that the data is writing to the FPGA data to FPGA, although FPGA data had completed downloading to NIA_DRVC_E board. Make sure to wait until finished the writing the FPGA data.

(9) When the data has been downloaded successfully, main unit panel is returned back to step 3. Then continue to download the FPGA data to the other NIA_DRVC_E board if necessary.

(10) After FPGA download are finished, turn off the bit 5 and 8 of DSW 4 on the NIA_HCB_E board.
3-9-2-4. Method of substituting communication port

⚠️ NIA_HCB_E board has a possibility of problem, which is one of communication ports defective for FPGA data until serial number 26. However, this communication port is only for using to download the FPGA data on NIA_DEVC_E board. Therefore, machine has no problem normally.

Also, NIA_HCB_E board has four-communication ports for DRVC 1 to 4. They have compatibility each other.

<In case of either DRVC 1, 2 or 3 communication port has problem.>

- Connect the correct communication port cable of X805 on the DRVC board to the defective communication port of X805 on DRVC board.

Then, download the FPGA data through the correct communication port number.

< Example: The third communication port (for DRVC 3) is defective, and the first communication port (for DRVC 1) is corrected.>

- Connect the communication cable of X805-1 on the DRVC 1 board to the X805-3 on DRVC 3 board.
- Select the 1: DRVC 1 (24ch) to download the FPGA data to DRVC board number.

<In case of DRVC 4 communication port has problem.>

- Connect the communication cable of X805-1 on the DRVC 1 board to the X805-4 on DRVC 4 board.
- Select the 1: DRVC 1 (24ch) to download the FPGA data to DRVC board number if DRVC 4 board is E24.
- Select the 20: DRVC 1 (16ch) to download the FPGA data to DRVC board number if DRVC 4 board is E16.

In case of DRVC 4 is E16.

In case of DRVC 4 is E24.

⚠️ CAUTION

* After finished download, make sure to return back the communication cable to the original position.