Newland

SCANNING MADE SIMPLE

RVM
RING SCANNER

OEM Scan Engines

Version: V1.0

Troubleshooting and Repair Manual

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Revision History

Version	Description	Date
V1.0	Initial release.	19 July 2024

Chapter 1 Troubleshooting

Light Troubles When Power On

In the case of a normal NLS-RVM100, after powering up the scanner, its normal lighting process occurs sequentially as follows:

1. The indicator lights in blue. During this time, the scanner is in the necessary configuration and inspection.
2. The blue indicator light is off. The power-on beeper is on. The scanner enters into the working state.
3. If the scanner is in sense mode, place a beverage bottle into the scanner, then the illumination is on and the scanner starts decoding. If the scanner is in continuous mode, the illumination is always on.
4. The indicator lights in green when successfully decoding a barcode.

Users can determine if the scanner is troubled by the normal lighting process described above. Users can analyse and locate faults according to abnormal light phenomena as below (Please ensure that there is no foreign matter in the glass cylinder when powering the scanner up).

Light Trouble 1: The indicator does not light in blue when powering on the scanner.

If this fault phenomenon occurs, please refer to the following troubleshooting steps:

1) Disconnect the power supply and ensure that the following operations are carried out in a safe condition.
2) Open the structural component housing of the scanner.
3) Check the cable connection between the mainboard and the indicator board for broken cables or poor cable contact.
4) Replace the current indicator board with a known normal indicator board. Then power on the scanner to test it for proper operation.
5) Replace the current mainboard with a known normal mainboard. Reconnect all necessary cables again. Finally, power on the scanner and test it for proper operation.

Light Trouble 2: The indicator light lights in red for 2 seconds when powering on the scanner.

If this fault phenomenon occurs, please refer to the following troubleshooting steps:

1) Ensure there is no foreign matter in the glass cylinder. Send the programming command **NREAIR1** to the scanner. The data returned by this command is **NREAIR[xxxx,yyyy,zzzz]**. xxxx, yyyy and zzzz are the values of each infrared respectively.
2) If the infrared value is less than 200, check the cable connection between the mainboard and the indicator board and the cable connection between the indicator boards to determine if there are broken cables or poor cable contact.
3) If the infrared value is greater than 3200, check if foreign matters in the glass cylinder and check if the lass cylinder is intact.
4) If no faults are found in 2) or 3), replace the current indicator board with a known normal indicator board. Then power on the scanner and test it for proper operation.

Light Trouble 3: The indicator light always lights in red when powering on the scanner.

If this phenomenon occurs, replace the current mainboard with a known mainboard. Then power on the scanner and test it for proper operation.

Light Trouble 4: The indicator lights in red for 1 second for every 2 seconds and repeats for 3 rounds.

A, B and C are the possible causes of the light trouble, with additional steps on how to investigate each cause.

A. Confirm the number of the faulty scan engine:
   1) Send command **MASSHS** to the scanner.
   2) Record the number of the troubled scan engine returned by the scanner to identify the troubled scan engine.

B. Check the cable connection of the scan engine:
   1) Disconnect the power supply and ensure that the following operations are carried out in a

safe condition.

2) Open the structural component housing of the scanner, and locate the cable connected to the troubled scan engine.
3) Check this cable for looseness, breakage or poor contact.
4) Unplug this cable and inspect the cable and connector for damage.
5) Replace the current cable with a normal cable and ensure that contact is firm.
6) Reconnect the cable. Then power on the scanner and observe if the light trouble occurs.

C. Check the troubled scan engine:

1) If the trouble occurs again after replacing the cable with a new one. Disconnect the power supply and ensure that the following operations are carried out in a safe condition.
2) Replace the current scan engine with a normal one. Ensure it is solidly assembled.
3) Reconnect the cable of the scan engine. Then power on the scanner and check if the trouble still occurs.

Trouble during Use

Trouble during Use 1: The illumination does not light and the scanner cannot decode a barcode when placing a beverage bottle in.

If the trouble occurs, power off the NLS-RVM100 and power it on again. Observe the status of the indicator and listen to the power-on beeper. Then, the following A, B and C phenomena may occur. There are corresponding troubleshooting methods and repair methods under each detailed phenomenon.

Phenomenon A: The indicator does not light and no power-on beeper when powering on the scanner.

1) Check power supply and mainboard:
    a) Ensure that the scanner is powered up.
    b) Check the power outlet and the power cable are working properly.
    c) Power up the scanner with a known normal power supply and observe whether the scanner is normal.
    d) If the indicator still does not light up and the beeper does not sound, then the mainboard may be faulty.
    e) Disconnect the power supply and ensure that the following operations are carried out in a safe condition.
    f) Replace the current mainboard with a proper one. Reconnect all necessary cables, power on

and test the scanner.

2) Determine the failure and replace the defective part:
   a) Based on the test results, determine if the power supply or mainboard is faulty.
   b) Replace the defective part (power supply or motherboard).

Phenomenon B: The scanner can be powered on normally, and the indicator is on, accompanied by a power-on beep.

1) Check the switchboard and the illumination board:
   a) Disconnect the power supply and ensure that the following operations are carried out in a safe condition.
   b) Check the cable connection between the mainboard and the switchboard for or broken cables or poor contact.
   c) Replace the current switchboard with a known normal switchboard and power on the scanner to test for proper operation.
   d) Replace the current illumination board with a known normal one. Then reconnect all necessary cables, and power on the scanner to test for proper operation.
2) Determine the failure and replace the defective part:
   a) Based on the test results, determine if the cable connection, switchboard or illumination board is faulty.
   b) Replace the defective part (Cable between mainboard and switchboard, switchboard or illumination board).

Phenomenon C: The scanner can be powered on normally with a power-on beep, but the indicator does not light up.

1) Check the indicator board and cables:
   a) Disconnect the power supply and ensure that the following operations are carried out in a safe condition.
   b) Open the covers of the scanner.
   c) Check the cable connection between the mainboard and indicator board for or broken cables or poor contact.
   d) Replace the current indicator board with a known normal one. The power on the scanner to test for proper operation.
   e) Replace the current mainboard with a known normal one. The reconnect all necessary cables. Finally, power on the scanner to test for proper operation.
2) Determine the failure and replace the defective part:

a) Based on the test results, determine if the cable connection, indicator board or mainboard is faulty.

b) Replace the defective part (Cable between mainboard and indicator board, indicator board, or mainboard).

Trouble during Use 2: The scanner successfully decodes a barcode when placing a beverage bottle in, but the host system receives no data.

Power off the scanner and power it on. Observe the indicator status and listen to the power-on beep.

Normal phenomenon: The scanner can be powered on normally, and the indicator light is on, and there is a power-on beep, and the decoding success indicator light is on.

1) Check the connection between the scanner and the host system:
   a) Disconnect the power supply and ensure that the following operations are carried out in a safe condition.
   b) Check all cable connections between the scanner and host system for broken cables or poor contact.
   c) Plug out all cables and inspect the cables and connectors for damage.
   d) Replace the current cables with normal cables. Ensure each contact is solid.
   e) Reconnect all cables. Power on the scanner and test and observe if the trouble occurs.
2) Check the mainboard and test with a known normal mainboard:

   If the problem persists after replacing the cables, disconnect the power supply and then power on the scanner. Replace the current mainboard with a known normal one. Reconnect all necessary cables, and power on the scanner to test for proper operation.
3) Determine the failure and replace the defective part:
   a) Based on the test results, determine if the cable connection or the mainboard is faulty.
   b) Replace the defective part (cable or mainboard).

Trouble in Use 3: After placing a beverage bottle in, the brightness of the illumination is abnormal, and the scanner cannot decode the barcode.

Power off the scanner and re-power it on. Observe the status of the indicator and observe if there is a power-on beep.

1) Check the cable connection between the switchboard and illumination board:
    a) Disconnect the power supply and ensure that the following operations are carried out in a safe condition.
    b) Open the covers of the scanner and locate the switchboard and the illumination board.
    c) Check the cable connection between the switchboard and the illumination board for broken cables or poor contact.
    d) Plug out the cable and inspect the cables and connectors for damage.
    e) Replace the current cable with a normal one. Ensure each contact is solid.
    f) Reconnect all necessary cables. Power on the scanner. Observe if the illumination is working properly.
2) Check the switchboard:

    If the trouble occurs after replacing the cable. Then power off the scanner. Replace the current switchboard with a normal one. Reconnection all necessary cables and power on the scanner to test for proper operation.
3) Check the illumination board:
    a) If the trouble occurs after replacing a normal switchboard. The power off the scanner and remove the illumination board.
    b) Check this filler panel for any abnormalities such as burnout, discolorations, or looseness.
    c) Replace the illumination board with a normal one. Reconnect all necessary cables. Then power on the scanner to test for proper operation.
4) Determine the failure and replace the defective part:
    a) Based on the test results, determine if the cable connection, switchboard or illumination board is faulty.
    b) Replace the defective part (cable, switchboard or illumination board).

Trouble in Use 4: After placing a beverage bottle, the barcode cannot be decoded at specific positions or angles.

Disconnect the power supply and re-power on the scanner. Observe the status of the indicator and if there is a power-on beep.

1）Determine the trouble scan engine:

a) Send the command **MASSHS** to the scanner.

b) Locate the troubled scan engine by the response of the command.

2）Check the cable connection of the scan engine:

a) Disconnect the power supply and ensure that the following operations are carried out in a safe condition.

b) Open the covers of the scanner. Locate the trouble cable of the scan engine connection.

c) Check the cable connection for broken cables or poor contact.

d) Plug out the cable and inspect the cables and connectors for damage.

e) Replace the current cable with a normal one. Ensure each contact is solid.

f) Reconnect all necessary cables. Re-power the scanner and observe if the indicator lights in red.

3）Inspect the trouble scan engine:

a) If the trouble occurs after replacing the cable, disconnect the power supply and ensure that the following operations are carried out in a safe condition.

b) Replacing the current scan engine with a normal one. Ensure the connection is solid.

c) Reconnect the cable to the scan engine. Power on the scanner to test and observe if the indicator lights in red.

4) Determine the failure and replace the defective part:

a) Based on the test results, determine if it is a faulty cable or a faulty scan engine.

b) Replace the defective part (cable or scan engine).

Troubleshooting by Command (MASSHS)

Users can also use the self-check command (MASSHS) to further locate the fault. The execution process is as follows:

1. The indicator starts blinking and the scanner is in the self-test state.
2. The RBG light blinks in the order of red, green and blue, and lights up for 0.5s each time.

3. Accompanied by a long beep.
4. Wait for the self-check to complete.
5. When the self-check is completed, the indicator lights in green for 2 seconds and is accompanied by 2 short beeps from the buzzer.
6. Illumination returns to normal state.
7. The scanner outputs the self-test result.

The response data of the command is:

[index:x,com:y, camera:y, pic:y,empower:y, config:z]

[index:x,com:y, camera:y, pic:y,empower:y, config:z]

[index:x,com:y, camera:y, pic:y,empower:y, config:z]

[index:x,com:y, camera:y, pic:y,empower:y, config:z]

[index:x,com:y, camera:y, pic:y,empower:y, config:z]

[index:x,com:y, camera:y, pic:y,empower:y, config:z]

[index:x,com:y, camera:y, pic:y,empower:y, config:z]

[index:x,com:y, camera:y, pic:y,empower:y, config:z]

[index:x,com:y, camera:y, pic:y,empower:y, config:z]

[index:x,com:y, camera:y, pic:y,empower:y, config:z]

MCU:y

MemUsed:zzzzzz,MemMax:zzzzzz,RunTime:zzzzzz,ConfigChange:y

In [index:x,com:y, camera:y, pic:y,empower:y, config:z]:

The pic stands for whether the scan engine can capture images properly. A negative value represents an exception.

The com indicates whether the communication between the scan engine and the master chip is normal.

The camera indicates whether the CMOS of the scan engine is normal. A negative value represents an exception.

The empower indicates whether the scan engine is authorized. A negative value represents an exception.

MCU: Indicates the infrared function of the scanner, and a negative y means there is an anomaly.

MemUsed, MemMax: Indicates memory usage of the scanner.

RunTime: indicates the running time of the scanner.

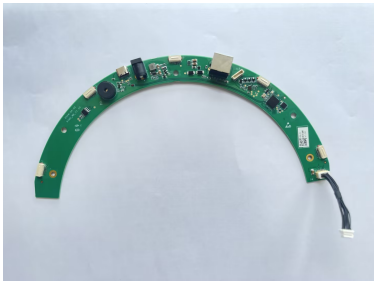
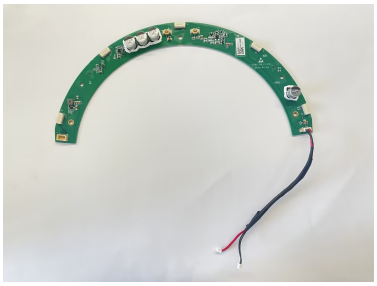
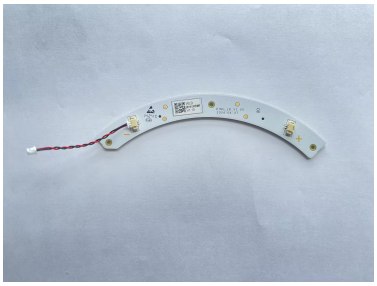
ConfigChang: Indicates whether there has been any configuration modification to the scanner from power up to the present, a value of 1 indicates that a modification has been made.

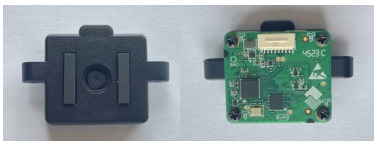
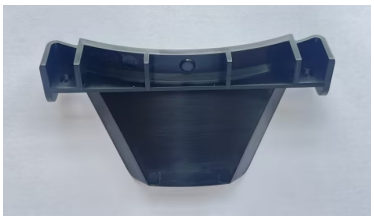
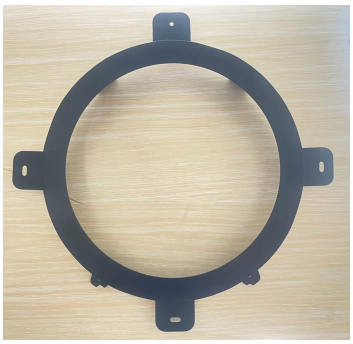
Observe whether the status of the indicator, the illumination light and the beeper in the self-check process are consistent with the normal process. Analyze the response information of the scanner after the self-check is completed. Refer to the following steps:

1. Whether the status of the indicator is normal, if not, please refer to the **Phenomenon C** in **Trouble in Use 1**.
2. Whether the status of the illumination is normal, if not, please refer to the **Phenomenon B** in **Trouble in Use 1**.
3. Analyze the response information of the scanner:
    a. One or several scan engines communicate abnormally, please refer to the **Trouble in Use 4**.
    b. CMOS faulty, cannot capture images properly. It is suggested to replace it with a normal scan engine in this case.
    c. MCU faulty. Please refer to the **Light Trouble 2** and the **Light Trouble 3**.

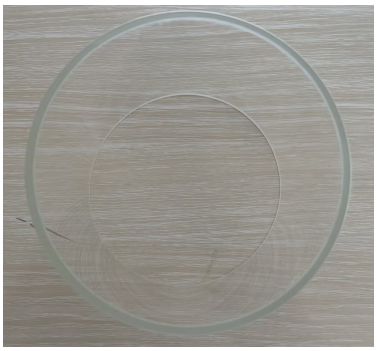
Chapter 2 Repair

Part Details

Part Name	Part Number	Picture	Replacement Step (See **Part Replacement**)
Mainboard	RVM100-MB		(12)(1)(4)(5)(6)(8)
Switchboard	RVM100-SWB		(12)(1)(4)(5)(6)(8)
Indicator Board	RVM100-IND		(1)(4)(5)(6)(7)
Illumination Board	RVM100-ILL-WHITE		(1)(4)(5)(6)(8)(9)(10)(11)

Scan Engine	RVM100-EMOR13		(12)
Aqueduct	RVM100-AQUEDUCT		(1)
Back Cover	RVM100-BC		(1)(2)
Metal Plate Support	RVM100-MPS		(1)(4)
Mainboard Cover	RVM100-MBC		(1)(4)(5)

Indicator Cover	RVM100-INDC		(1)(4)(5)(6)(7)
Indicator Support	RVM100-INDS		(1)(4)(5)(6)(7)
Main Body Support-Up	RVM100-MBS-UP		(1)(4)(5)(6)(8)(9)(10)
Main Body Support-Down	RVM100-MBS-DW		(1)(4)(5)(6)(8)(9)(11)

Diffusion Ring	RVM100-DIFSR		(1)(4)(5)(6)(8)(9)(10)(11)
Scan Engine Cover	RVM100-SEC		(12)
Glass Cylinder	RVM100-GC		[(13)optional](1)(2)(3)

Part Replacement

(1) Remove the Aqueduct

As shown in Figure 1-1, remove the 2 machine screws from the back of the scanner①, and remove the aqueduct②(RVM100-AQUEDUCT). The specification of the machine screw is M3*8mm.

When replacing the aqueduct, refer to (1) Remove the Aqueduct.

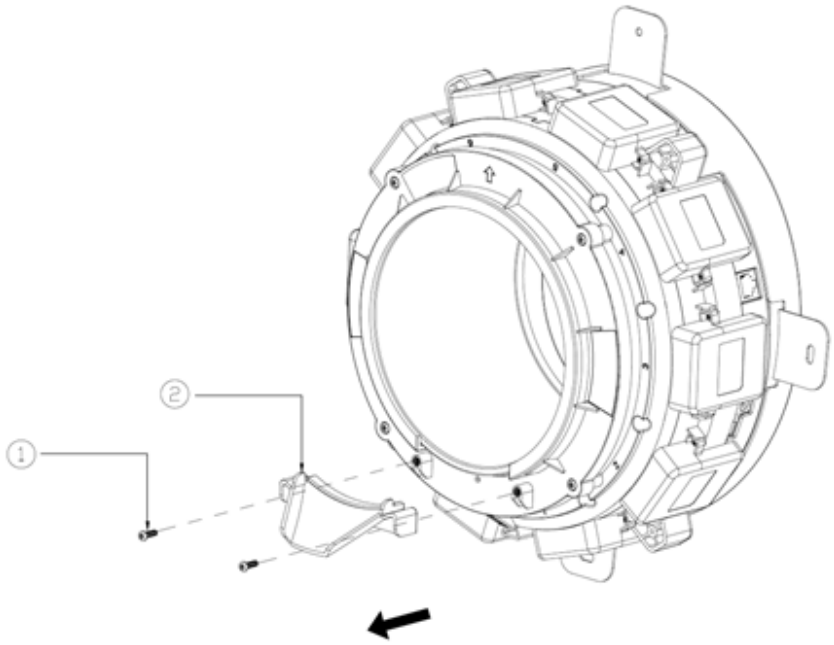


Figure 1-1

(2) Remove the Back Cover

As shown in Figure 2-1, remove the 4 screws① from the back of the scanner, and remove the back cover②(RVM100-BC). The specification on the machine screw is M3*8mm.

If the back cover needs to be assembled, assemble it in the reverse order as described above. Pay attention to the error-proofing. Refer to the arrow mark③ for the error-proofing, and assemble in the same direction.

When replacing the back cover, refer to (2) Remove the Back Cover.

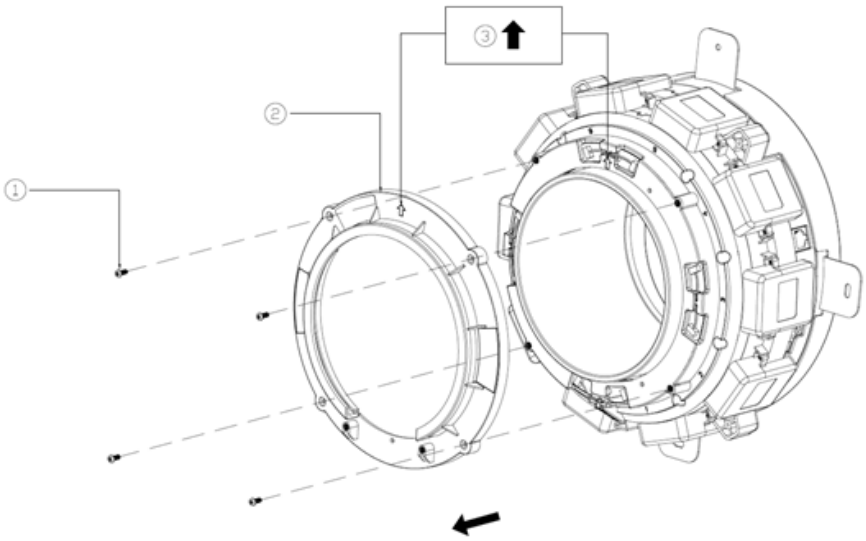


Figure 2-1

(3) Remove the Glass Cylinder

As shown in Figure 3-1, remove the glass cylinder①(RVM100-GC) in the direction of the arrow. If you want to clean or replace the glass cylinder, please try using alcohol or glass water with a dust-free cloth to wipe the glass cylinder.

To assemble the glass cylinder, follow the above steps in reverse. Center the glass cylinder and gently place it in the correct position with the bottom of the glass cylinder pressed firmly against the bottom of the scanner.

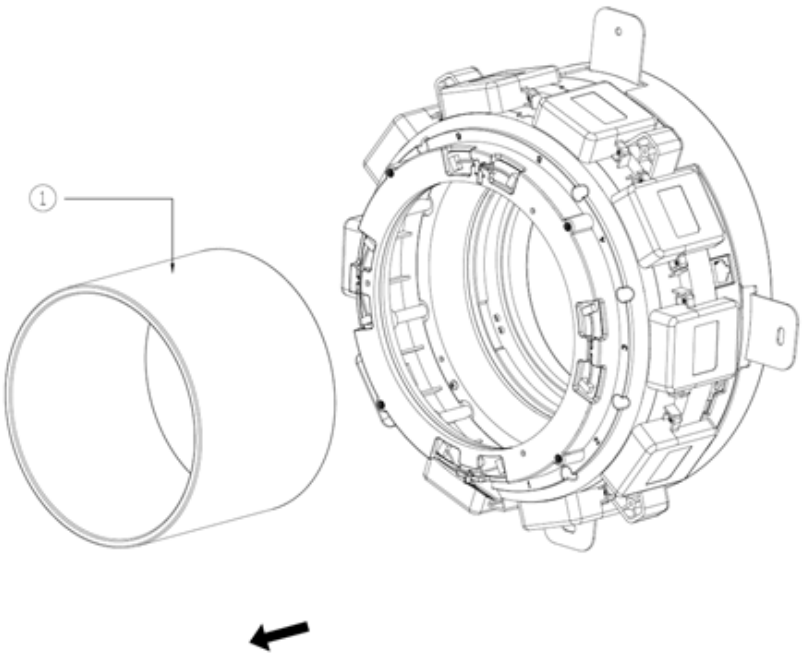


Figure 3-1

(4) Remove the Metal Plate Support

As shown in Figure 4-1, remove 4 screws① from the front of the scanner, and remove the metal plate support②(RVM100-MPS).

To assemble the metal plate support, follow the above steps in reverse. Please pay attention to the error-proofing③ between the metal plate support and the main body supports.

When replacing the metal plate support, refer to (4) Remove the Metal Plate Support.

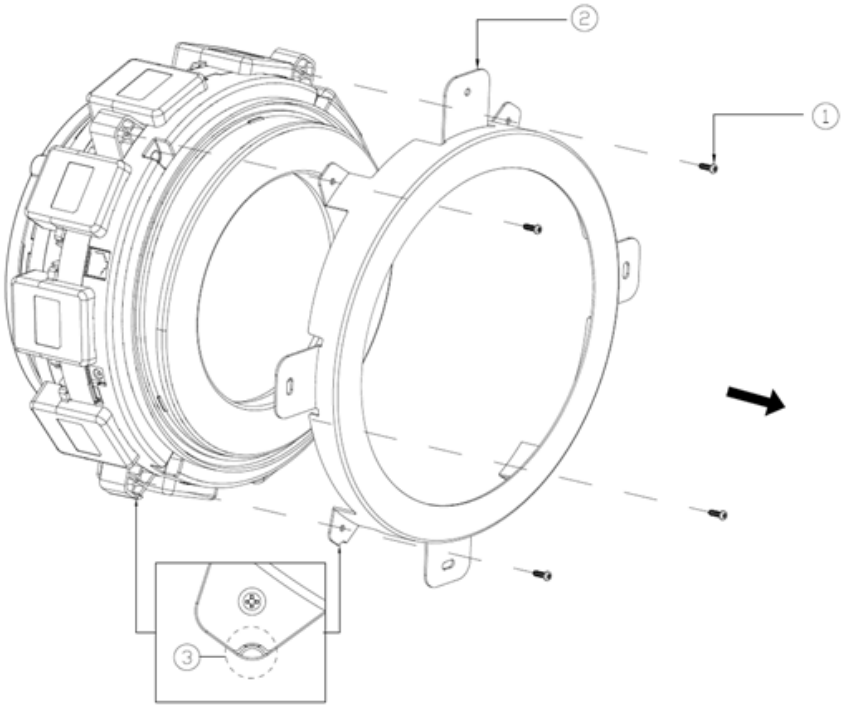


Figure 4-1

(5) Remove the Silicone Ring and the Mainboard Cover

As shown in Figure 5-1, remove the silicone ring① directly from the front of the scanner in the direction of the arrow, remove the 4 screws ②, and remove the mainboard cover③(RVM100-MBC). The specification of the screw is the self-tapping screw, ST3*10mm.

To assemble the silicone ring and the mainboard cover, follow the above steps in reverse. Please pay attention to the error-proofing④ between the main body support and the mainboard cover. The silicone ring has to be compacted and flattened to the mainboard cover.

When replacing the mainboard cover, refer to (5) Remove the Silicone Ring and the Mainboard Cover.

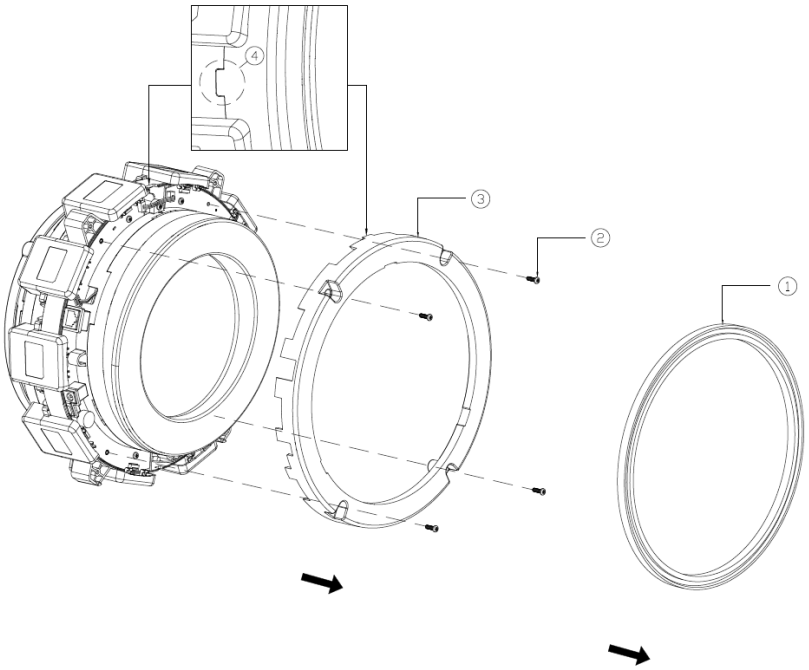


Figure 5-1

(6) Remove the Indicator Support Package

As shown in Figure 6-1, remove the 4 screws①, then move the indicator support②. The specification of the screw is the self-tapping screw, ST3*10mm.

To assemble the indicator support, follow the above steps in reverse. Pay attention to the error-proofing③ between the indicator support and the main body support.

When replacing the indicator support, refer to (6) Remove the Indicator Support.

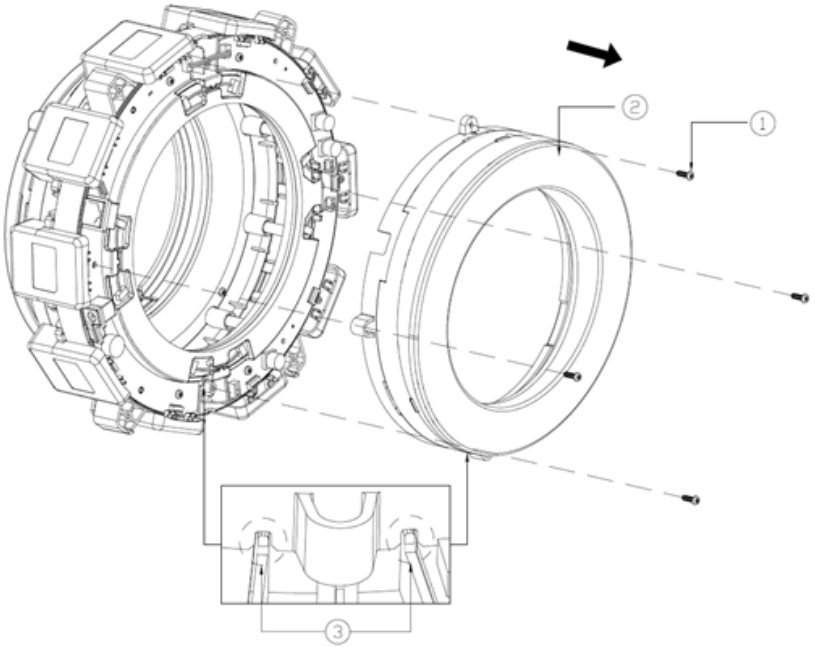


Figure 6-1

(7) Disassemble the Indicator Package

As shown in Figure 7-1, remove the 3 screws①, then remove the indicator cover②(RVM100-INDC). The specification of the screw is the self-tapping screw, ST3*10mm.

As shown in Figure 7-2, remove the 3 Dupont cables④ from the back, remove the 12 screws⑤ from the front, and remove the indicator board⑥(RVM100-IND) and the indicator support⑦(RVM100-INDS). The specification of the screw is the self-tapping screw, ST2*6mm.

To assemble the indicator board package, follow the above steps in reverse. Pay attention to the error-proofing③ between the indicator cover and the indicator support.

When replacing the indicator cover, indicator board, and indicator support, refer to (7) Remove the Indicator Package.

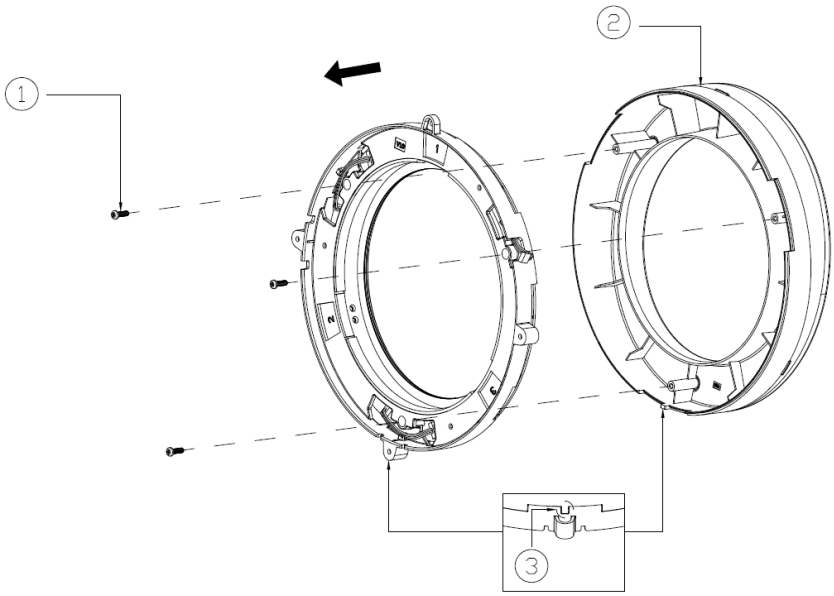


Figure 7-1

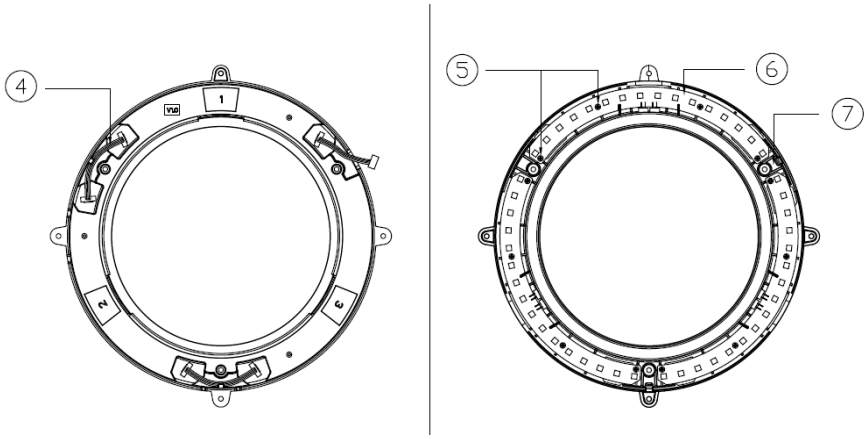


Figure 7-2

(8) Remove the Mainboard and the Switchboard

As shown in Figure 8-1, remove the 4 screws①, remove the DuPont cable connection, and remove the mainboard②(RVM100-MB) and the switchboard⑧(RVM100-SWB. The specification of the screw is the self-tapping screw, ST3*10mm.

To assemble the mainboard and the switchboard, follow the above steps in reverse. Pay attention to the error-proofing on the boards.

When replacing the mainboard and switchboard, refer to (8) Remove the Mainboard and the Switchboard.

①Self-tapping screw, ST3*10mm, 4 PCS

②Mainboard

③DuPont – Scan Engine – Mainboard/Switchboard, 10 PCS

④RJ45 silicone sleeve

⑤DC connector sleeve

⑥DuPont – Illumination Board – Switchboard,150mm

⑦DuPont – Illumination Board – Switchboard, 50mm, 2 PCS

⑧Switchboard

⑨DuPont – Mainboard - Switchboard

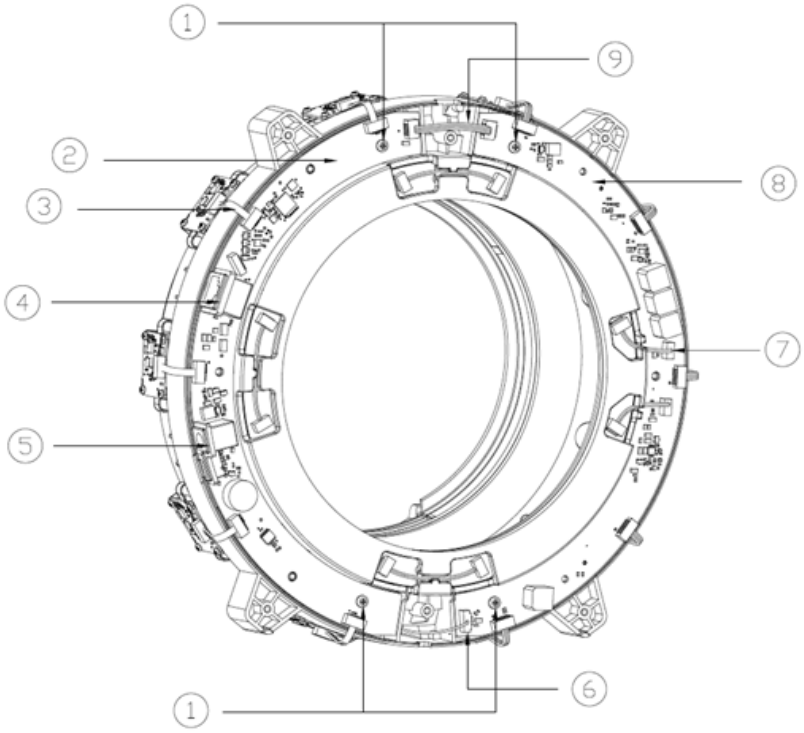


Figure 8-1

(9) Disassemble the Main Body Support-Up and the Main Body Support-Down

As shown in Figure 9-1 and Figure 9-2, remove the DuPont cable①. Red DuPont connects to "+". Black DuPont connects to "-". Remove 8 screws②, remove the Main Body Support–Up④ and the Main Body Support–Down③. The specification of the screw is the self-tapping screw, ST3*10mm.

To assemble the Main Body Support–Up and the Main Body Support–Down, follow the above steps in reverse. Pay attention to the error-proofing⑤ between the two parts.

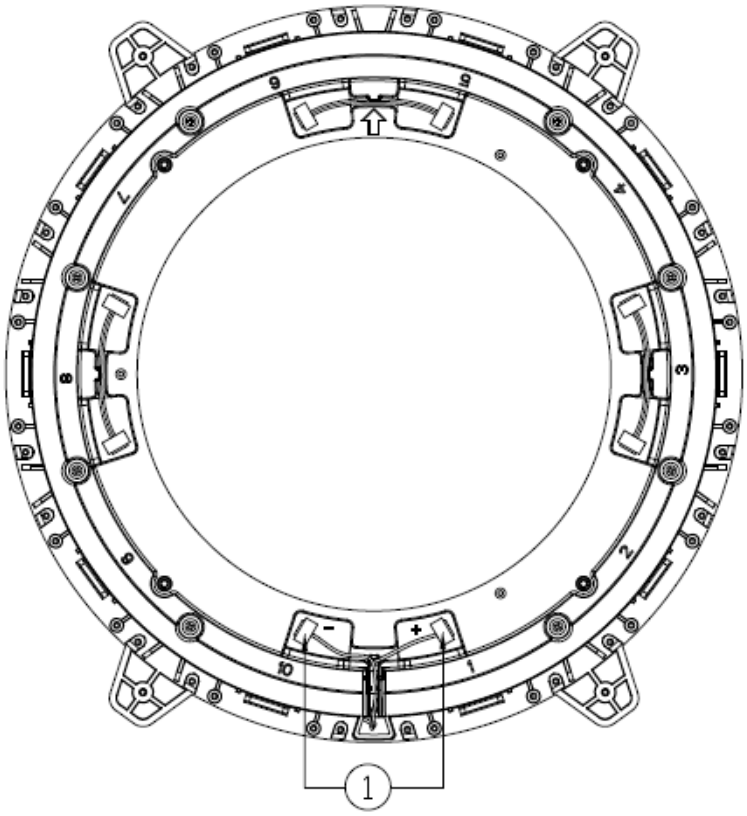


Figure 9-1

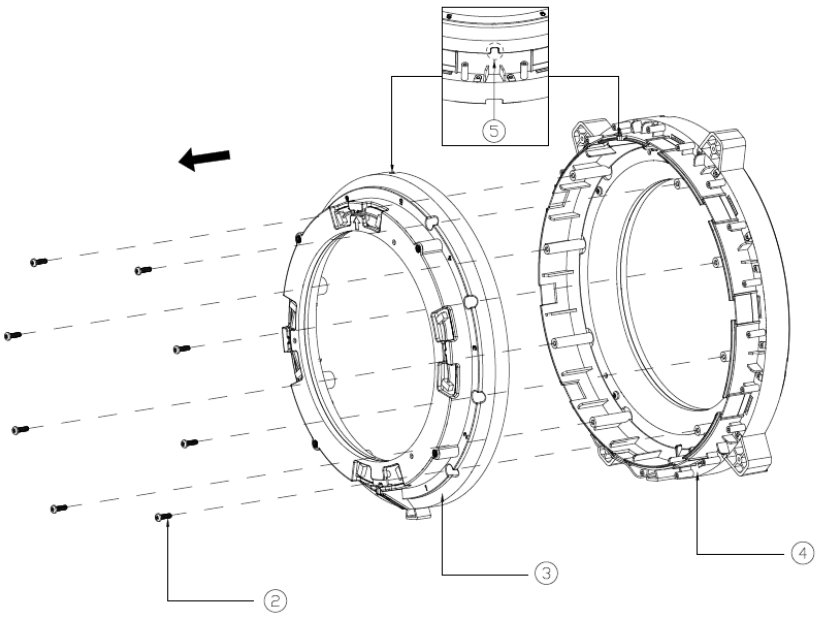


Figure 9-2

(10) Disassemble the Diffusion Ring and the Illumination Board

As shown in Figure 10-1, remove the 4 screws①, remove the Diffusion Ring②(RVM100-DIFSR) and the Main Body Support-Up Package③. The specification of the screw is the self-tapping screw, ST3*10mm.

As shown in Figure 10-2, remove the 5 DuPont cable⑤ on the back of the Main Body Support–Up, remove the 12 screws⑥ on the front side, remove all illumination boars⑦(RVM100-ILL-WHITE) and the Main Body Support–Up⑧(RVM100-MBS-UP). The specification of the screw is the self-tapping screw, ST2*6mm.

To assemble the Illumination Board and the Diffusion Ring, follow the above steps in reverse. Pay attention to the error-proofing④ between the Main Body Support–Up and the Diffusion Ring.

When replacing the Diffusion Ring and the Illumination Board, refer to (10) Remove the Diffusion Ring and the Illumination Board.

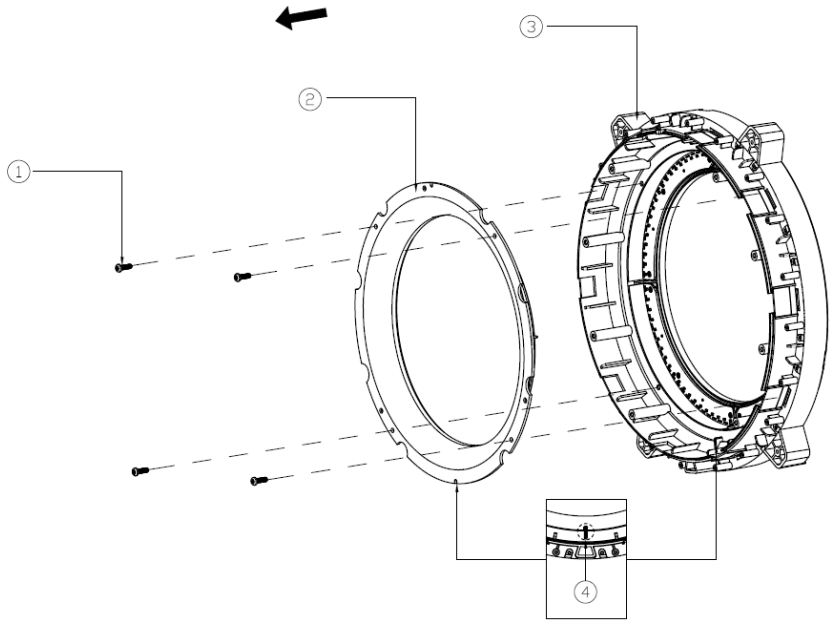


Figure 10-1

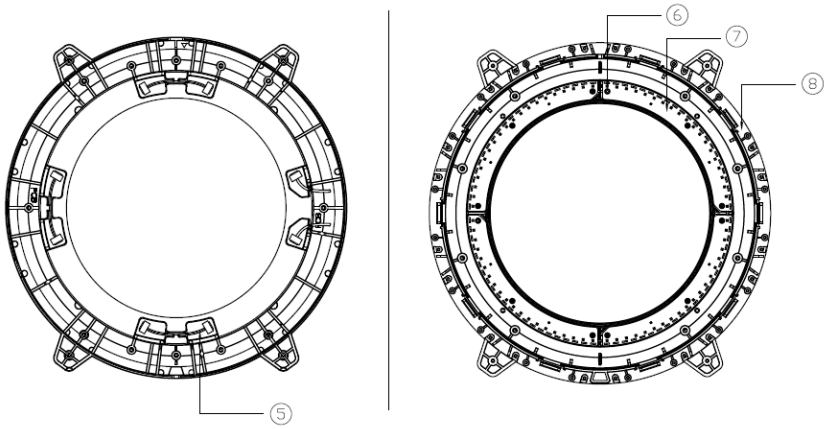


Figure 10-2

(11) Disassemble the Main Body Support–Down and the Diffusion Ring

As shown in Figure 11-1, remove 4 screws①, remove the Diffusion Ring②(RVM100-DIFSR) and the Main Body Support-Down Package③. The specification of the screw is the self-tapping screw, ST3*10mm.

As shown in Figure 11-2, remove the 3 DuPont cables⑤ from the back of the Main Body Support-Down, remove the 12 screws⑥ from the front, and remove all illumination board⑦(RVM100-ILL-WHITE) and the Main Body Support-Down⑧(RVM100-MBS-DW). The specification of the screw is the self-tapping screw, ST2*6mm.

To assemble the Main Body Support-Down and the Diffusion Ring, follow the above steps in reverse.

Pay attention to the error-proofing④ between the two parts.

When replacing the Diffusion Ring and the Illumination Board, refer to (11) Remove the Main Body Support- Down and the Diffusion Ring.

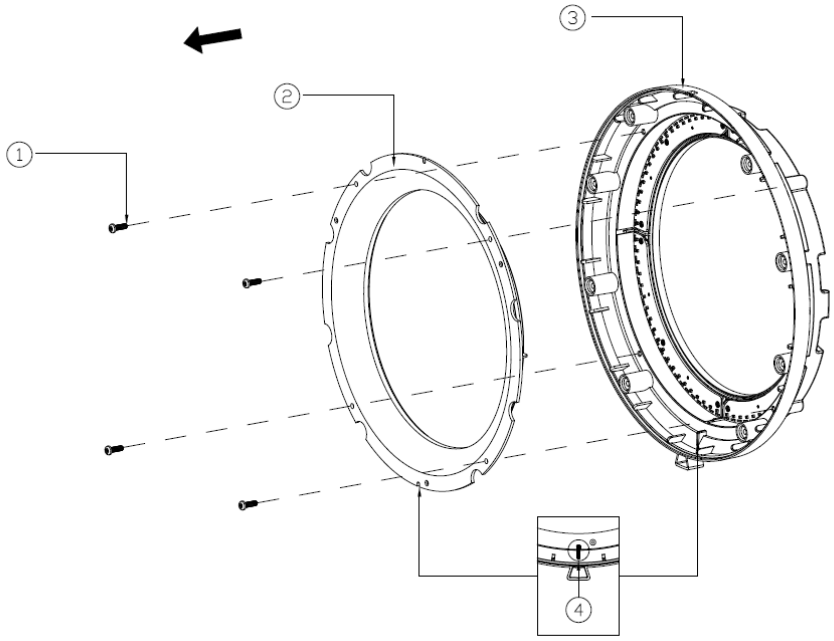


Figure 11-1

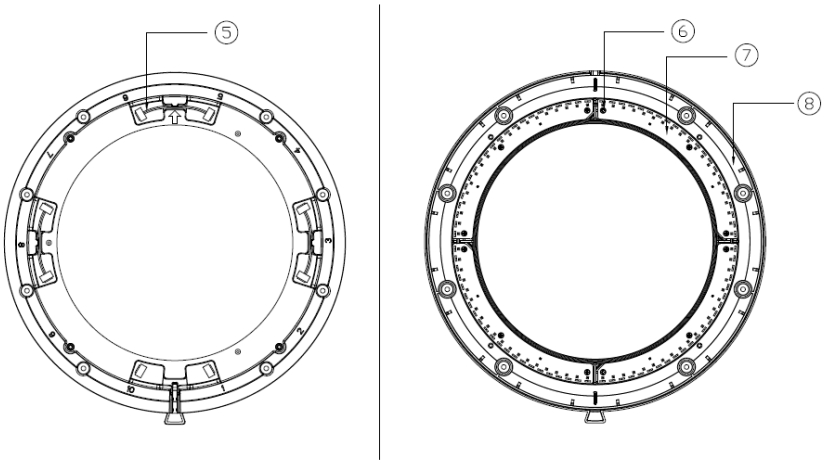


Figure 11-2

(12) Disassemble and Replace Scan Engines

Scan engines can be disassembled without the above steps from (1) to (11). Each scan engine has its number①.

As shown in Figure 12-1, remove the 2 screws② on the Scan Engine Cover③(RVM100-SEC), remove the scan engine cover, and remove the scan engine ④(RVM100-EMOR13). The specification of the

screw is the self-tapping screw, ST2*6mm.

To assemble scan engines, follow the above steps in reverse. P

When replacing scan engines scan engine cover.

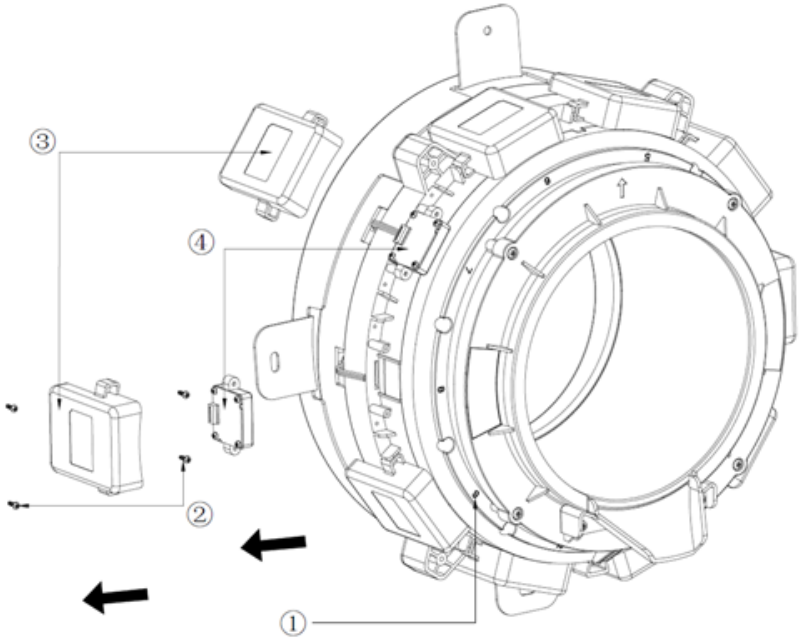


Figure 12-1

(13) Clean up the Shattered Glass Cylinder

As Shown in Figure 13-1, if the glass cylinder①(RVM100-GC) is broken, the maintenance personnel should wear protective gloves. Remove large pieces of glass①, and then use an industrial vacuum cleaner② to clean the debris inside the scanner. Finally, replace the glass cylinder ①with a new one.

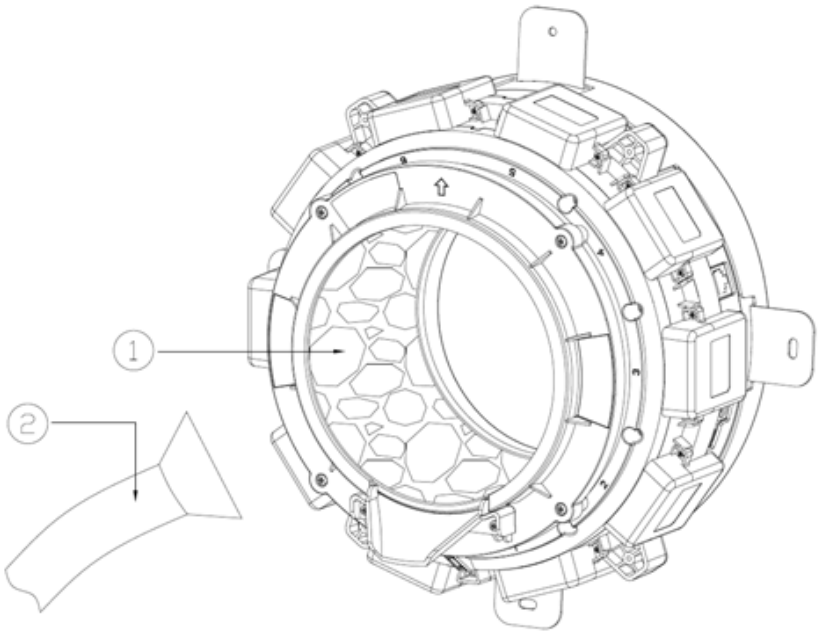


Figure 13-1

Suggested Ratio for Part

Part Number	Part Name	Detailed Description	Frequency of Replacement	Suggested Ratio
RVM100-GC	Glass Cylinder	Glass cylinder *1 Machine screw *4	3-6 months	1:1 (six months)
RVM100-MB	Mainboard	Mainboard *1 Mainboard-Switchboard DuPont cable *1	When damaged	100:1
RVM100-SWB	Switchboard	Switchboard *1 DuPont cable – Illumination *2	When damaged	100:1
RVM100-EMOR13	Scan Engine	Scan engine *1 Scan engine-Mainboard DuPont cable *1	When damaged	100:5
RVM100-IND	Indicator Light Board		When damaged	100:1
RVM100-ILL-WHITE	Illumination Board		When damaged	100:1
RVM100-AQUEDUCT	Aqueduct	Aqueduct *1 Aqueduct foam *1 Machine screw*2	When damaged	--
RVM100-BC	Back Cover	Back cover *1 Foam *3 Ring-shaped foam *3 Machine screw *4	When damaged	--
RVM100-MBC	Mainboard Cover	Mainboard cover *1 Foam *2	When damaged	--
RVM100-INDS	Indicator Support	Indicator support *1 Foam *3 Ring-shaped silicone mat *1	When damaged	--
RVM100-MBS-UP	Main Body Support-UP	Main body support - Up *1 Diffusion reflective film *4	When damaged	--
RVM100-MBS-DW	Main Body Support-Down	Main body support - Down *1 Diffusion reflective film *4	When damaged	--
	Others		When damaged	

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