

Change of the carbon brush replacement procedure in DAD3350 Maintenance Manual

Purpose of this document

There were cases where the replacement operation of the carbon brush was not correctly performed, since the parts are not clearly instructed for carbon brush replacement in the DAD3350 Maintenance Manual.

This document is to clarify the latest carbon brush replacement procedure, and notify that ahead of the manual revision. Although the procedure for the 1.8kW spindle and 2.2kW spindle [optional accessory] were described together, they are now divided according to each mechanism.

Applicable model

DAD3350

Applicable manuals and sections

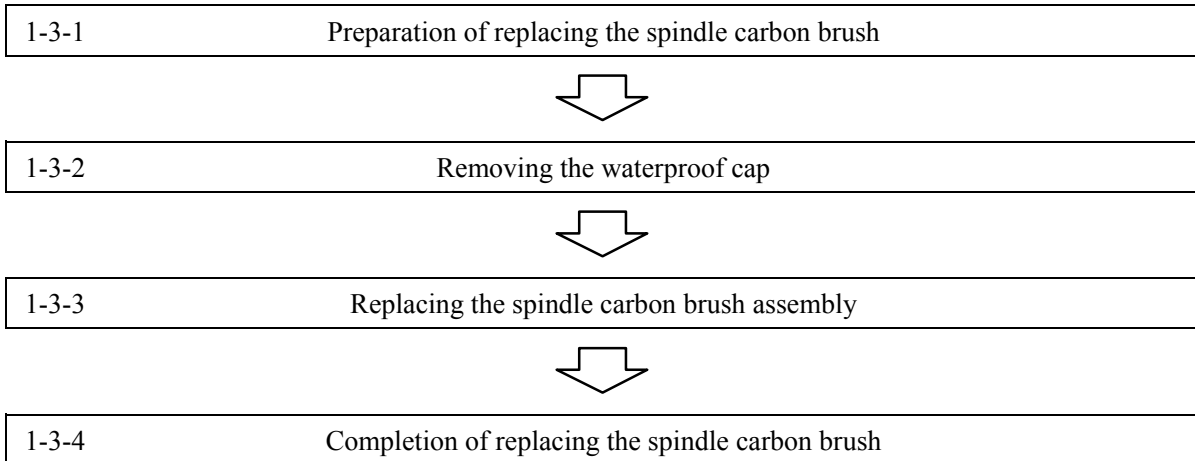
Manual	Manual part No.	Section
DAD3350 Maintenance Manual Japanese	UKBSMJH014*	<ul style="list-style-type: none">• Section 1-3, [Replacing the 1.8kW Spindle Carbon Brush] of Chapter F• Section 1-4^{*1}, [Replacing the 2.2kW Spindle Carbon Brush] of Chapter F
DAD3350 Maintenance Manual English	UKBSMEH014*	<ul style="list-style-type: none">• Section 1-3, [Replacing the 1.8kW Spindle Carbon Brush] of Chapter F• Section 1-4^{*1}, [Replacing the 2.2kW Spindle Carbon Brush] of Chapter F

*1: The Section 1-4 is newly created, and the subsequent section number is updated to 1-5 and 1-6.

1-3. Replacing the 1.8kW Spindle Carbon Brush

Operation flow

The procedure for replacing the spindle carbon brush consists of the following steps:



Safety items for replacing the spindle carbon brush

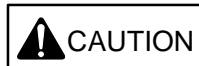


Perform the operation after shutting OFF the machine power and facility power supply

The operation requires you to put your hands in the drive section. Performing the operation with power supplied may cause your fingers or hands to be caught or cut off.

During the operation, do not allow anybody else except the maintenance personnel to touch the machine

This procedure requires the maintenance personnel to put their hands into the drive section, where their hands or fingers could be caught or cut off. If a person other than the personnel touches the machine, it may operate unexpectedly, causing the personnel to get injured.



The machine outer covers removed when performing maintenance work on the machine should be placed far enough from the working area

Also make sure to replace the removed covers immediately after the maintenance work is completed. If the covers are placed against the machine during operations, they may fall when an earthquake or other accident occurs and injure maintenance personnel at work.

CAUTION

Do not remove any screws other than those instructed to be removed

Getting any foreign matter into the interior of the spindle may cause breakage of the spindle.

Equipment you must have ready

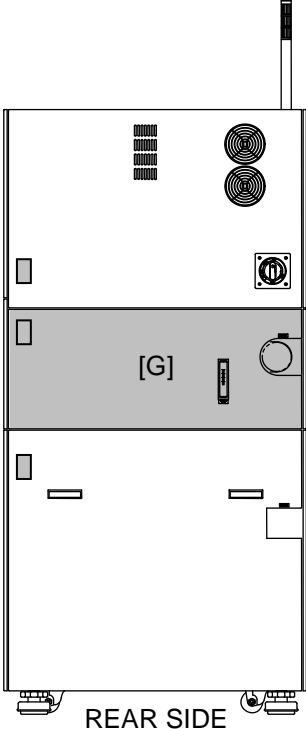
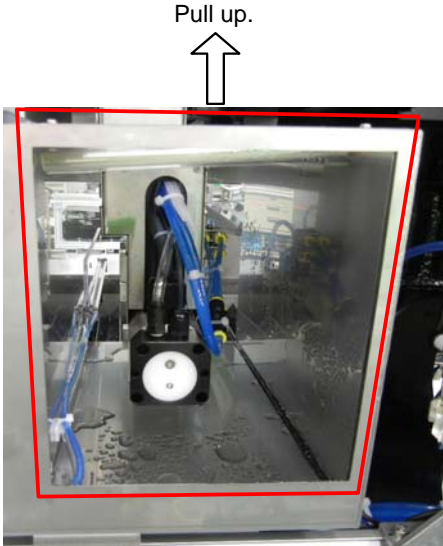
Phillips screwdriver
M4x20 bolt (two)
3 mm Allen wrench
Lint-free cloth
Tester

1-3-1. Preparation of replacing the spindle carbon brush

Procedures for preparation of replacing the spindle carbon brush

Step No.	Procedure
1	Press the <System Initial> button to effect system initialization.
2	Turn OFF the main switch and then pull out the key.
3	Turn OFF the circuit breaker at the back of the machine.
4	Shut off the facility power supply.
5	Close the facility main valves of air and spindle coolant water.
6	<p>Remove the cover [F]. Then store it sufficiently away from the working area. →For the procedures for removing the cover, see Section B-2-1-2, [Removing the machine outer cover] of the Installation Manual.</p> <div data-bbox="746 745 1053 1473" data-label="Image"> <p>The diagram shows the rear side of a vertical machine cabinet. At the top, there are two circular fans and a panel labeled [F] with a square icon, indicating the location of the cover to be removed. Below this are various ports and a control panel. The text 'REAR SIDE' is printed at the bottom of the diagram.</p> </div>
7	<p>Lock out the breaker lever with a padlock or the like.</p> <div data-bbox="762 1563 1037 1892" data-label="Image"> <p>The diagram shows a close-up of a circular breaker lever. The lever is in the 'OFF' position. A padlock is attached to the lever's handle to lock it in place. The text 'TRIPPED' and 'ON' are visible on the dial, and 'OFF' is visible on the handle.</p> </div>

Procedures for preparation of replacing the spindle carbon brush (Continued)

Step No.	Procedure
8	<p>Remove the cover [G]. Then store it sufficiently away from the working area. →For the procedures for removing the cover, see Section B-2-1-2, [Removing the machine outer cover] of the Installation Manual.</p>  <p>REAR SIDE</p>
9	<p>Remove the spindle protection cover. • To remove the spindle protection cover, pull it up.</p> <p>Pull up.</p> 

Continued in the next section.

1-3-2. Removing the waterproof cap

Procedures for removing the waterproof cap

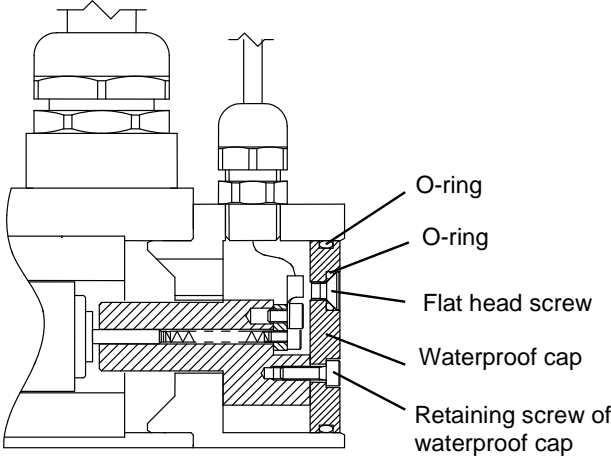
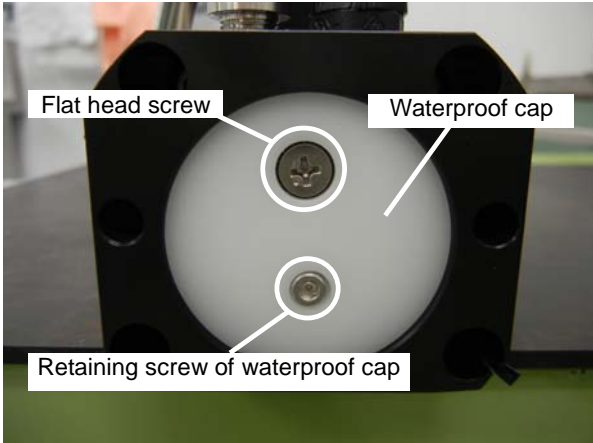
CAUTION

Do not pull the waterproof cap with excessive force

There are cables in the waterproof cap.

Do not stretch or bend the spring of the carbon brush assembly

If it is stretched or bent, abnormal performance might be detected during setup or the spindle interior might be damaged.

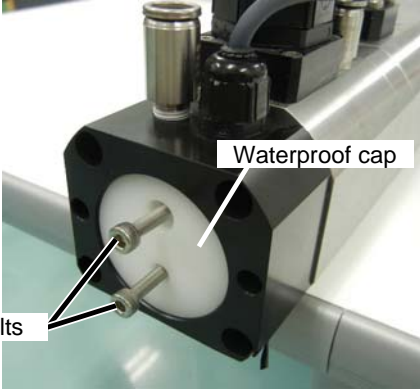
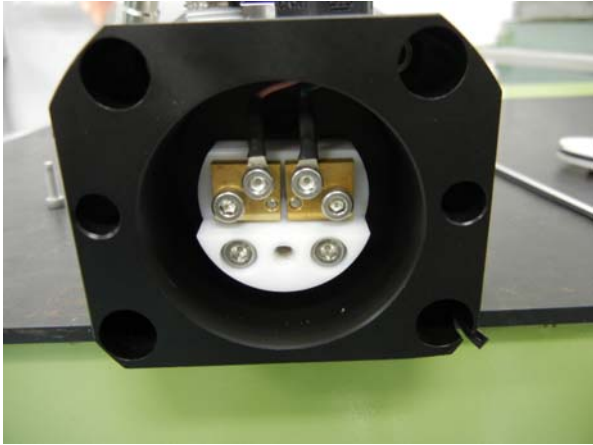
Step No.	Procedure (Continued from the previous section)
1	With a lint-free cloth, wipe off water or stain around the waterproof cap that is mounted at the rear of the spindle.
2	<p data-bbox="389 994 1294 1025">With the 3 mm Allen wrench, remove the retaining screw of the waterproof cap.</p> <div data-bbox="580 1048 1193 1503">  <p data-bbox="995 1218 1066 1249">O-ring</p> <p data-bbox="995 1267 1066 1299">O-ring</p> <p data-bbox="995 1339 1174 1370">Flat head screw</p> <p data-bbox="995 1388 1166 1420">Waterproof cap</p> <p data-bbox="995 1438 1193 1503">Retaining screw of waterproof cap</p> </div> <div data-bbox="604 1532 1198 1973">  <p data-bbox="639 1621 815 1653">Flat head screw</p> <p data-bbox="987 1621 1163 1653">Waterproof cap</p> <p data-bbox="639 1883 1007 1915">Retaining screw of waterproof cap</p> </div>
3	<p data-bbox="389 1995 1042 2027">With the Phillips screwdriver, remove the flat head screw.</p> <ul data-bbox="389 2033 1034 2065" style="list-style-type: none"> • Be careful not to lose the O-ring inside the screw hole.

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Procedures for removing the waterproof cap (Continued)

Step No.	Procedure
4	Have on hand two M4x20 bolts.
5	<p>Slowly screw the M4x20 bolts into each screw hole of the flat head screw and the waterproof cap retaining screw.</p> <ul style="list-style-type: none">• <u>Lightly turn</u> the M4x20 bolts until they reach the end.  <p>The image shows a close-up of a black, square-shaped component with a white circular cap. Two M4x20 bolts are being inserted into the cap. Labels with arrows point to the bolts and the cap, identifying them as "M4x20 bolts" and "Waterproof cap".</p>
6	<p>Pull the M4x20 bolts.</p> <ul style="list-style-type: none">• The waterproof cap comes off.  <p>The image shows the black component with the white cap removed. The cap is now a separate piece, and the internal terminals are visible. The terminals are arranged in a 2x2 grid on a white base. The black component has four circular holes around the perimeter.</p>

Continued in the next section.

1-3-3. Replacing the spindle carbon brush assembly

Procedures for replacing the spindle carbon brush assembly

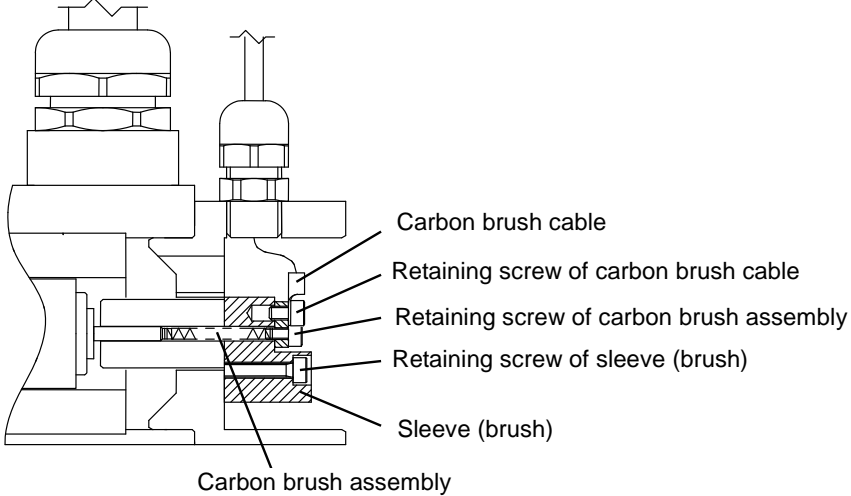
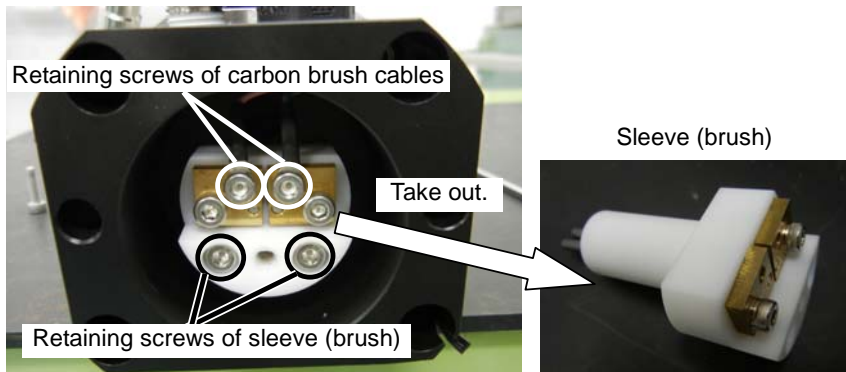
NOTICE

Be sure to replace both the right and left carbon brushes at the same time

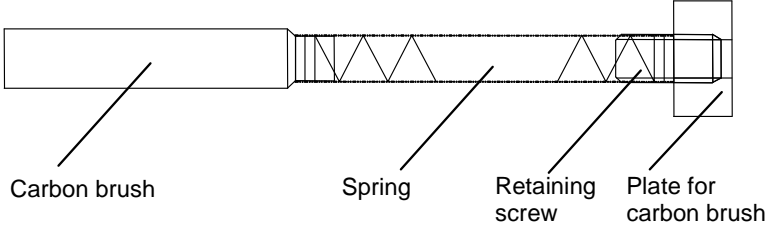
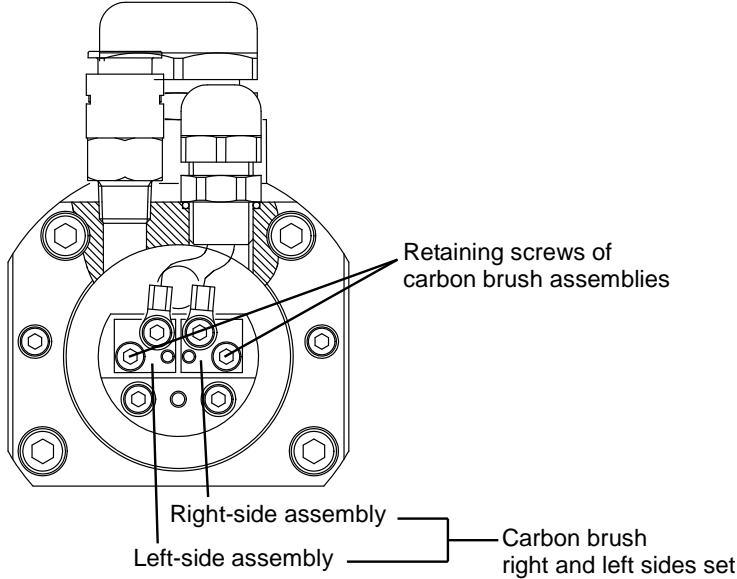
If you replace only one carbon brush, that may cause the abnormal wear, such as the carbon brush of only one side is worn away.

Mount the right and left carbon brush assemblies so that the terminals of their cables do not contact with each other

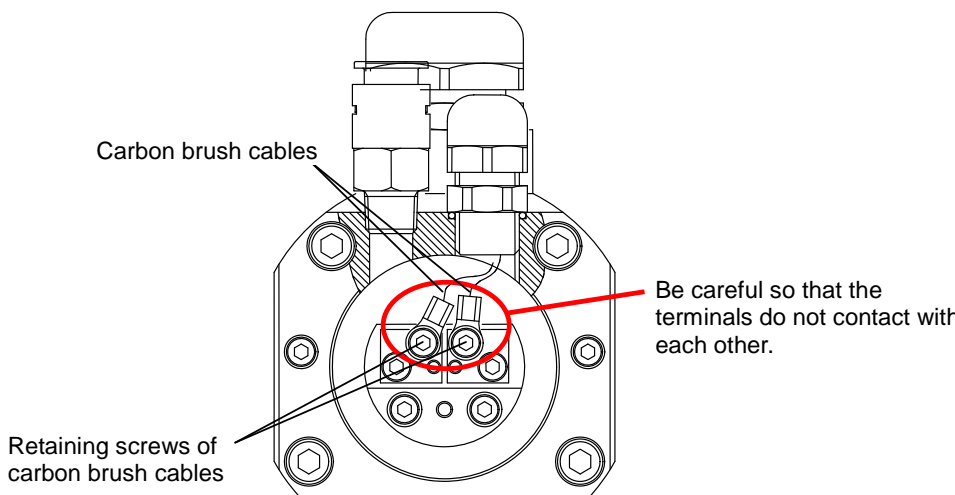
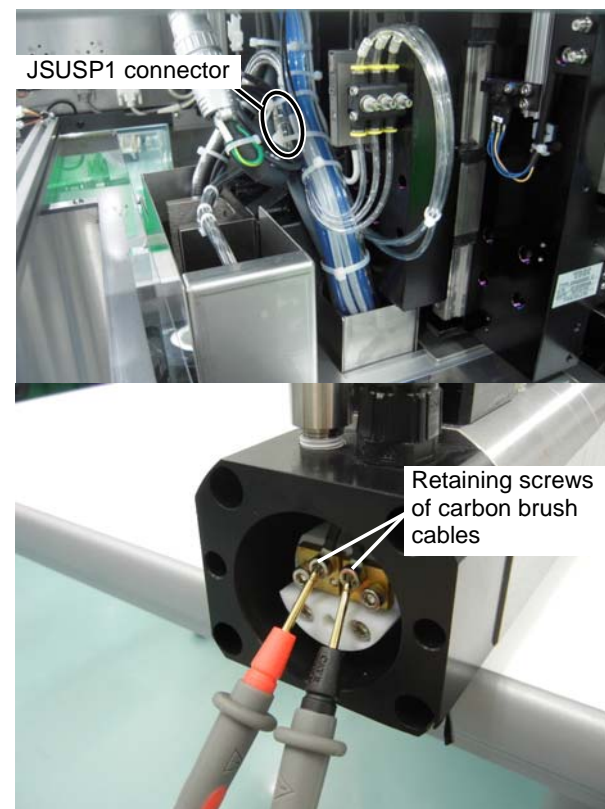
If the terminals of the right and left cables contact with each other, the machine fails to detect spindle abnormality.

Step No.	Procedure (Continued from the previous section)
1	<p>Remove the carbon brush cable by removing its retaining screws with the 3mm Allen wrench.</p>  

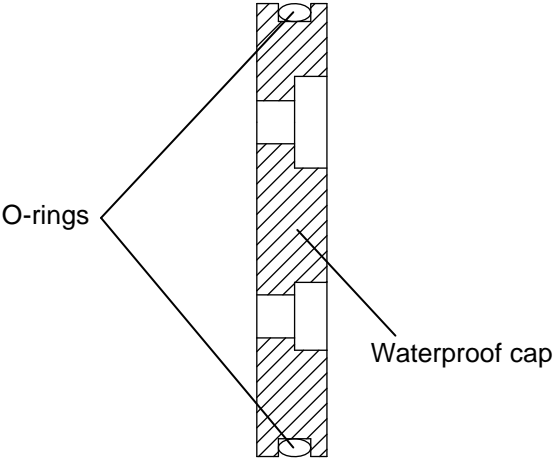
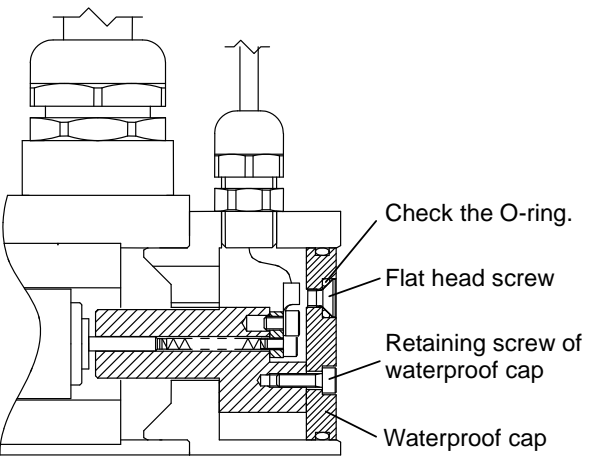
Procedures for replacing the spindle carbon brush assembly (Continued)

Step No.	Procedure				
2	Take out the sleeve (brush) by removing its retaining screws with the 3mm Allen wrench.				
3	Take out the carbon brush assemblies from the sleeve (brush) by removing the retaining screws of carbon brush assemblies with the 3mm Allen wrench.				
4	<p>Insert the new carbon brush assemblies to the sleeve (brush), and install them with the retaining screws of carbon brush assemblies.</p> <ul style="list-style-type: none"> The figure below shows the construction of the carbon brush assembly. Take care not to stretch or bend the spring section. <div style="text-align: center;">  <p>Carbon brush Spring Retaining screw Plate for carbon brush</p> </div> <div style="text-align: center;">  <p>Retaining screws of carbon brush assemblies</p> <p>Right-side assembly Carbon brush right and left sides set</p> <p>Left-side assembly</p> </div> <ul style="list-style-type: none"> Different carbon brush assemblies are used for the right side and the left side. Be careful not to reverse right and left. <table border="1" style="width: 100%; margin-top: 10px;"> <thead> <tr> <th data-bbox="416 1630 874 1671">Item</th> <th data-bbox="874 1630 1385 1671">DISCO Part ID</th> </tr> </thead> <tbody> <tr> <td data-bbox="416 1671 874 1742">Carbon brush right and left sides set (For 1.8kW spindle)</td> <td data-bbox="874 1671 1385 1742">CARBON BRUSH LR SET NCBZ-010040-0</td> </tr> </tbody> </table>	Item	DISCO Part ID	Carbon brush right and left sides set (For 1.8kW spindle)	CARBON BRUSH LR SET NCBZ-010040-0
Item	DISCO Part ID				
Carbon brush right and left sides set (For 1.8kW spindle)	CARBON BRUSH LR SET NCBZ-010040-0				
5	Reinstall the sleeve (brush) to the original position, and install it with its retaining screws.				

Procedures for replacing the spindle carbon brush assembly (Continued)

Step No.	Procedure
6	<p>Install the carbon brush cables with their retaining screws.</p> <ul style="list-style-type: none"> • Be careful so that the terminals of the left and right cables do not contact with each other. 
7	<p>Disconnect the JSUSP1 connector. Place the tester at the carbon brush cable retaining screws and verify that the resistance is less than 20 Ω .</p>  <p><u>When the resistance is 20 Ω or higher</u> The contact between the spindle shaft and carbon brush may be poor. Repeat the operations of Step 5 through 6.</p> <p><u>When the resistance remains 20 Ω or higher even after repeating the operation</u> Contact your nearest DISCO office or DISCO service office.</p>

Procedures for replacing the spindle carbon brush assembly (Continued)

Step No.	Procedure
8	Connect the unhooked JSUSP1 connector.
9	<p>Make sure that the waterproof cap has the O-rings.</p> 
10	Reinstall the waterproof cap to the original position, and remove the M4x20 bolts.
11	<p>With the 3mm Allen wrench, fix the waterproof cap with its retaining screw. Also, tighten the flat head screw with the Phillips screwdriver.</p> <ul style="list-style-type: none"> • Be sure to attach the O-ring to the flat head screw section. 

Continued in the next section.

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1-3-4. Completion of replacing the spindle carbon brush

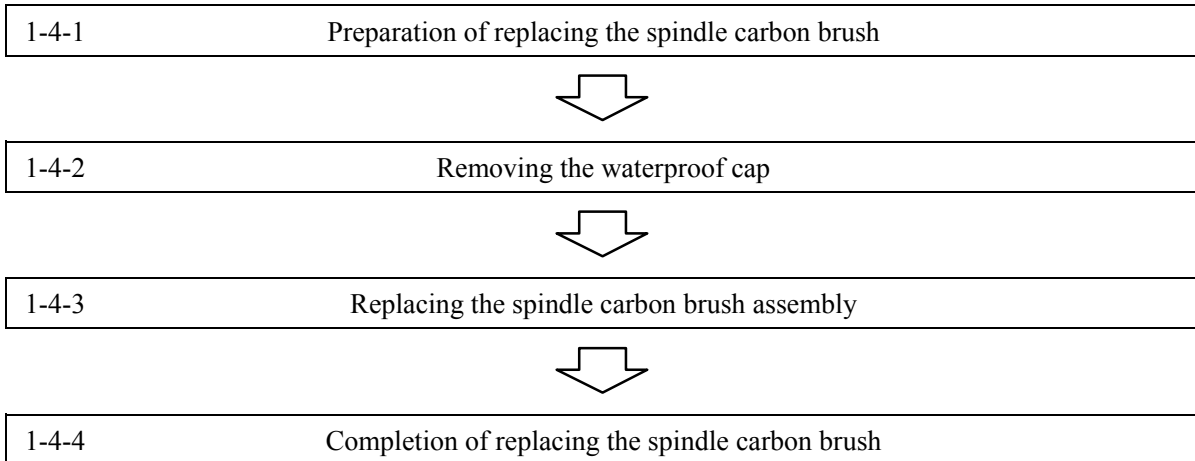
Procedures for completion of replacing the spindle carbon brush

Step No.	Procedure (Continued from the previous section)
1	Reinstall the spindle protection cover.
2	Open the lock of the breaker at the back of the machine.
3	Reinstall the covers [F] and [G]. →For the cover installation procedures, see Section B-1-6, [Mounting the Machine Outer Cover] of the Installation Manual.
4	Open the facility main valve of air
5	Turn ON the facility power supply.
6	Turn ON the circuit breaker.
7	Insert the key into the main switch and then turn ON the main switch.

1-4. Replacing the 2.2kW Spindle Carbon Brush

Operation flow

The procedure for replacing the spindle carbon brush consists of the following steps:



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Safety items for replacing the spindle carbon brush

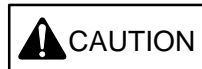


Perform the operation after shutting OFF the machine power and facility power supply

The operation requires you to put your hands in the drive section. Performing the operation with power supplied may cause your fingers or hands to be caught or cut off.

During the operation, do not allow anybody else except the maintenance personnel to touch the machine

This procedure requires the maintenance personnel to put their hands into the drive section, where their hands or fingers could be caught or cut off. If a person other than the personnel touches the machine, it may operate unexpectedly, causing the personnel to get injured.



The machine outer covers removed when performing maintenance work on the machine should be placed far enough from the working area

Also make sure to replace the removed covers immediately after the maintenance work is completed. If the covers are placed against the machine during operations, they may fall when an earthquake or other accident occurs and injure maintenance personnel at work.

CAUTION

Do not remove any screws other than those instructed to be removed

Getting any foreign matter into the interior of the spindle may cause breakage of the spindle.

Equipment you must have ready

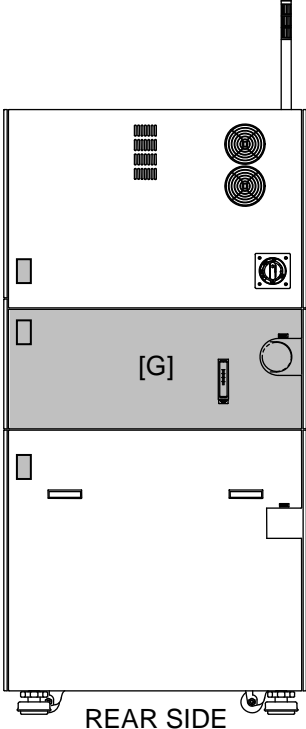
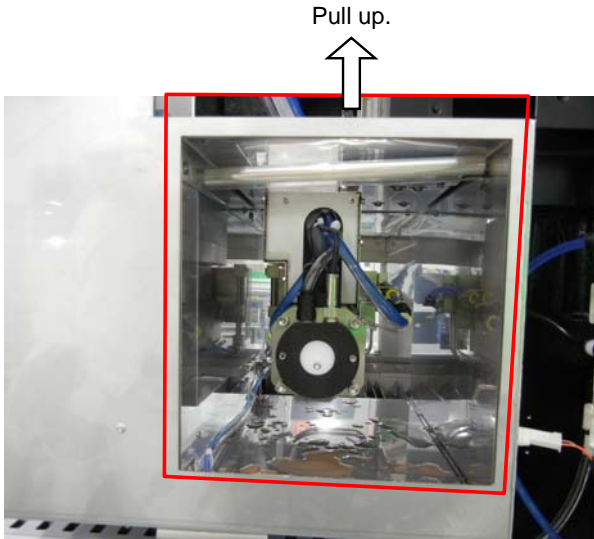
M4x20 bolt
3 mm Allen wrench
Lint-free cloth
Tester

1-4-1. Preparation of replacing the spindle carbon brush

Procedures for preparation of replacing the spindle carbon brush

Step No.	Procedure
1	Press the <System Initial> button to effect system initialization.
2	Turn OFF the main switch and then pull out the key.
3	Turn OFF the circuit breaker at the back of the machine.
4	Shut off the facility power supply.
5	Close the facility main valves of air and spindle coolant water.
6	<p>Remove the cover [F]. Then store it sufficiently away from the working area. →For the procedures for removing the cover, see Section B-2-1-2, [Removing the machine outer cover] of the Installation Manual.</p> <div data-bbox="746 745 1053 1473" data-label="Image"> <p>The diagram shows the rear side of a vertical machine cabinet. At the top, there are two circular fans and a rectangular panel labeled [F], which is the cover to be removed. Below this, there are various electrical components, including a circuit breaker and a main switch. The text 'REAR SIDE' is printed at the bottom of the diagram.</p> </div>
7	<p>Lock out the breaker lever with a padlock or the like.</p> <div data-bbox="762 1563 1037 1892" data-label="Image"> <p>The diagram shows a close-up of a circuit breaker's handle. The handle is in the 'OFF' position. A padlock is attached to the handle, preventing it from being moved to the 'ON' position. The words 'TRIPPED' and 'ON' are visible on the handle's face.</p> </div>

Procedures for preparation of replacing the spindle carbon brush (Continued)

Step No.	Procedure
8	<p>Remove the cover [G]. Then store it sufficiently away from the working area.</p> <p>→For the procedures for removing the cover, see Section B-2-1-2, [Removing the machine outer cover] of the Installation Manual.</p>  <p>The diagram shows the rear side of the machine. A central horizontal panel is shaded and labeled [G]. Above this panel are two circular fans and a vertical vent. Below the panel are two sets of feet. The text 'REAR SIDE' is centered below the diagram.</p>
9	<p>Remove the spindle protection cover.</p> <ul style="list-style-type: none">• To remove the spindle protection cover, pull it up.  <p>The photograph shows the internal spindle area. A red rectangular box highlights the spindle protection cover. A white arrow points upwards from the top of the box, with the text 'Pull up.' written above it.</p>

Continued in the next section.

1-4-2. Removing the waterproof cap

Procedures for removing the waterproof cap

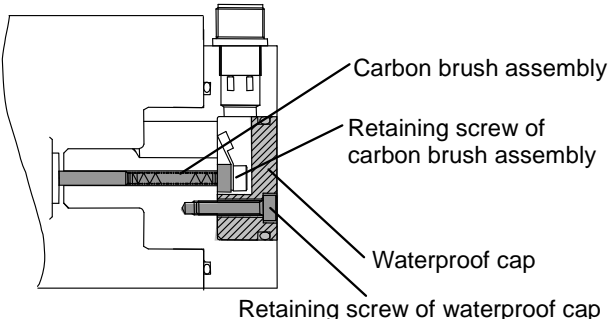
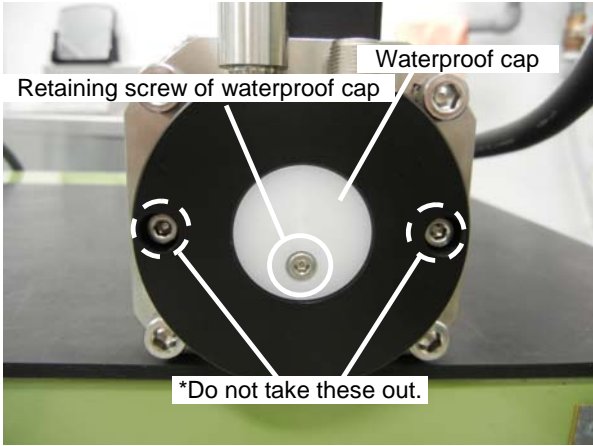
CAUTION

Do not pull the waterproof cap with excessive force

There are cables in the waterproof cap.

Do not stretch or bend the spring of the carbon brush assembly

If it is stretched or bent, abnormal performance might be detected during setup or the spindle interior might be damaged.

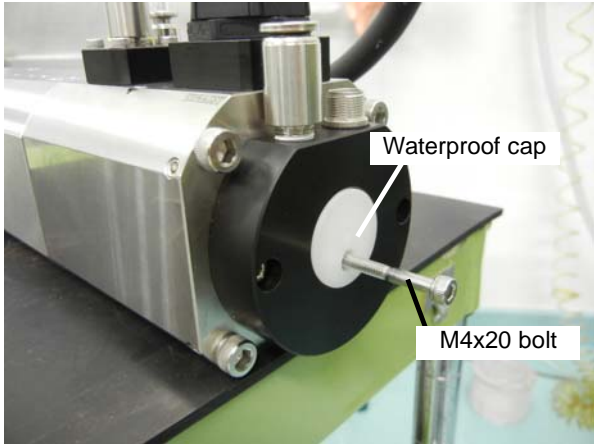
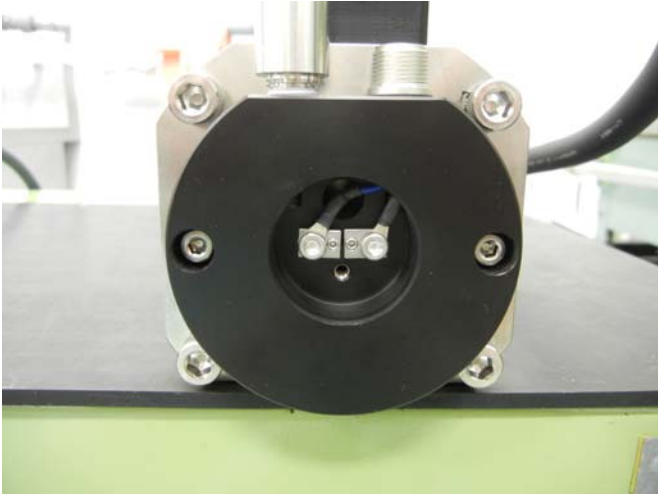
Step No.	Procedure (Continued from the previous section)
1	With a lint-free cloth, wipe off water or stain around the waterproof cap that is mounted at the rear of the spindle.
2	<p data-bbox="389 994 1294 1025">With the 3 mm Allen wrench, remove the retaining screw of the waterproof cap.</p> <div data-bbox="580 1043 1190 1361">  <p data-bbox="927 1099 1190 1126">Carbon brush assembly</p> <p data-bbox="927 1160 1190 1211">Retaining screw of carbon brush assembly</p> <p data-bbox="951 1290 1118 1317">Waterproof cap</p> <p data-bbox="815 1339 1182 1366">Retaining screw of waterproof cap</p> </div> <div data-bbox="604 1395 1198 1839">  <p data-bbox="975 1440 1142 1467">Waterproof cap</p> <p data-bbox="616 1469 983 1496">Retaining screw of waterproof cap</p> <p data-bbox="775 1771 1031 1798">*Do not take these out.</p> </div>

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Procedures for removing the waterproof cap (Continued)

Step No.	Procedure
3	Have on hand the M4x20 bolt. • The M4x20 bolt is different from the retaining screw of the waterproof cap.
4	Slowly screw the M4x20 bolt into the screw hole of the waterproof cap retaining screw. • <u>Lightly turn</u> the M4x20 bolt until it reaches the end. 
5	Pull the M4x20 bolt. • The waterproof cap comes off. 

Continued in the next section.

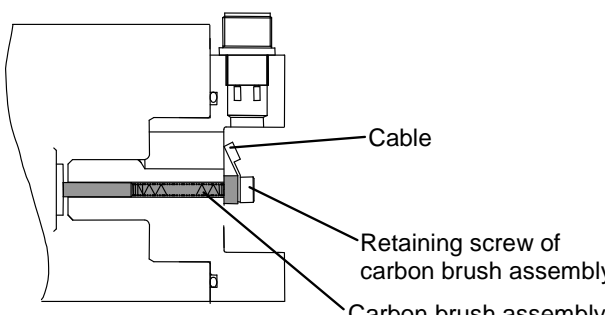
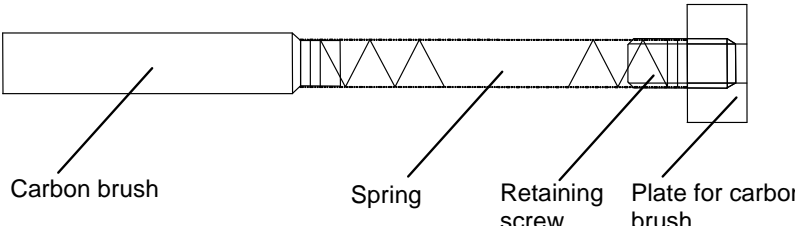
1-4-3. Replacing the carbon brush assembly

Procedures for replacing the spindle carbon brush assembly

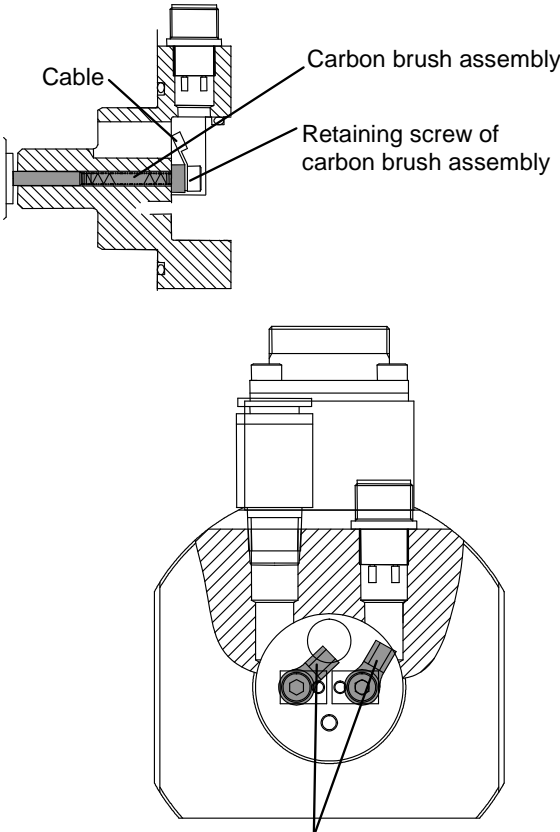
NOTICE

Mount the right and left carbon brush assemblies so that the terminals of their cables do not contact with each other

If the terminals of the right and left cables contact with each other, the machine fails to detect spindle abnormality.

Step No.	Procedure (Continued from the previous section)				
1	<p>With the 3mm Allen wrench, remove the retaining screw of the carbon brush assembly and disconnect the cable.</p> 				
2	<p>Take out the carbon brush assembly.</p> <ul style="list-style-type: none"> The figure below shows the construction of the carbon brush assembly. Take care not to stretch or bend the spring section.  <table border="1" data-bbox="414 1668 1380 1803"> <thead> <tr> <th>Item</th> <th>DISCO Part ID</th> </tr> </thead> <tbody> <tr> <td>Carbon brush assembly (For 2.2kW spindle)</td> <td>CARBON BRUSH ASSY. NCBZ-010021-0</td> </tr> </tbody> </table>	Item	DISCO Part ID	Carbon brush assembly (For 2.2kW spindle)	CARBON BRUSH ASSY. NCBZ-010021-0
Item	DISCO Part ID				
Carbon brush assembly (For 2.2kW spindle)	CARBON BRUSH ASSY. NCBZ-010021-0				

Procedures for replacing the spindle carbon brush assembly (Continued)

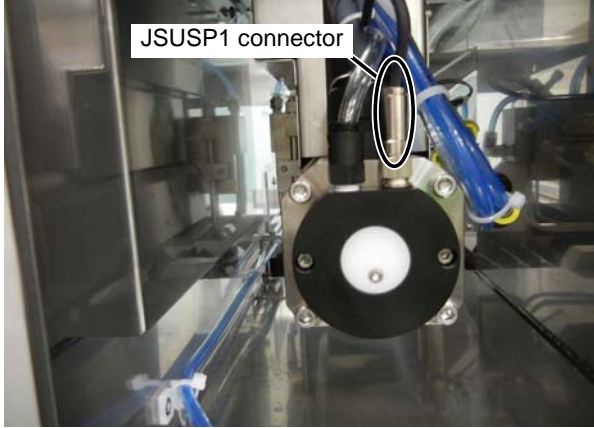
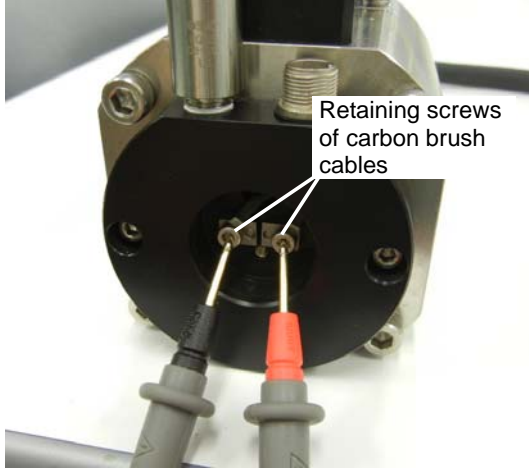
Step No.	Procedure
3	<p>Insert new carbon brush to the original position, and install it with the carbon brush assembly retaining screw together with the cable.</p> <ul style="list-style-type: none">• Be careful so that the terminals of the left and right cables do not contact with each other. <p>[Cross-sectional view]</p>  <p>Be careful so that the terminals do not contact with each other.</p>

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Procedures for replacing the spindle carbon brush assembly (Continued)

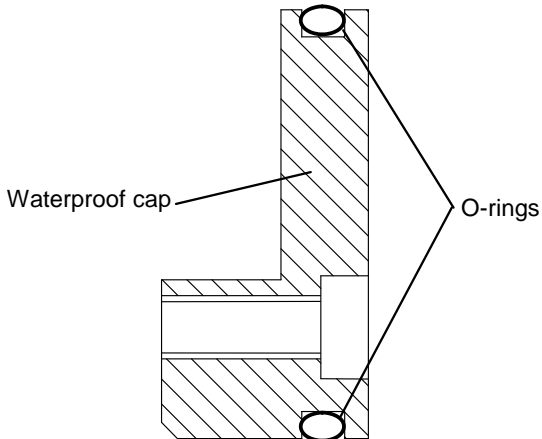
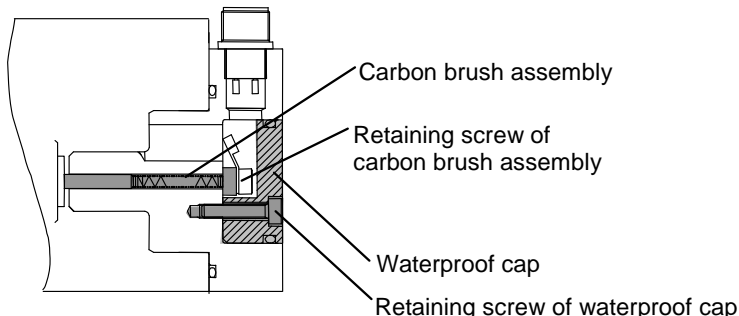
Step No.	Procedure
4	<p data-bbox="387 383 1358 450">Disconnect the JSUSP1 connector. Place the tester at the carbon brush cable retaining screws, and verify that the resistance is less than 20 Ω .</p> <div data-bbox="603 483 1198 909"><p data-bbox="738 506 951 539">JSUSP1 connector</p></div> <div data-bbox="636 943 1166 1413"><p data-bbox="951 1043 1142 1122">Retaining screws of carbon brush cables</p></div> <p data-bbox="387 1435 1414 1603"><u>When the resistance is 20 Ω or higher</u> The contact between the spindle shaft and carbon brush may be poor. Repeat the operation of Step 3. <u>When the resistance remains 20 Ω or higher even after repeating the operation</u> Contact your nearest DISCO office or DISCO service office.</p>
5	Connect the unhooked JSUSP1 connector.

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Procedures for replacing the spindle carbon brush assembly (Continued)

Step No.	Procedure
6	<p>Make sure that the waterproof cap has the O-rings.</p> 
7	<p>Reinstall the waterproof cap to the original position, and remove the M4x20 bolt.</p>
8	<p>With the 3mm Allen wrench, fix the waterproof cap with its retaining screw.</p> 

Continued in the next section.

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1-4-4. Completion of replacing the spindle carbon brush

Procedures for completion of replacing the spindle carbon brush

Step No.	Procedure (Continued from the previous section)
1	Reinstall the spindle protection cover.
2	Open the lock of the breaker at the back of the machine.
3	Reinstall the covers [F] and [G]. →For the cover installation procedures, see Section B-1-6, [Mounting the Machine Outer Cover] of the Installation Manual.
4	Open the facility main valve of air
5	Turn ON the facility power supply.
6	Turn ON the circuit breaker.
7	Insert the key into the main switch and then turn ON the main switch.

Inquiries

Please contact your local DISCO sales representative or DISCO service office if you have any questions regarding this matter.