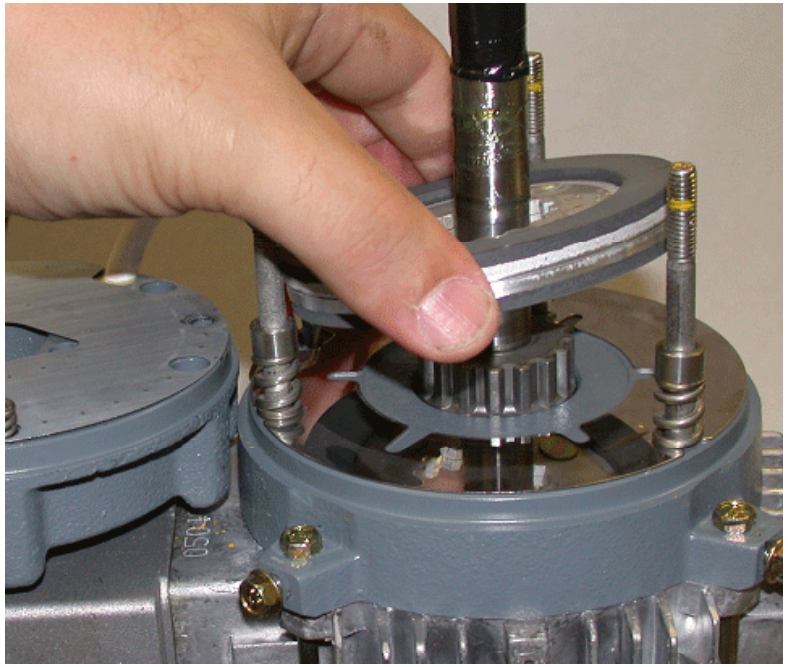
SEW Maintenance Series

Brake Disc Replacement

Objectives

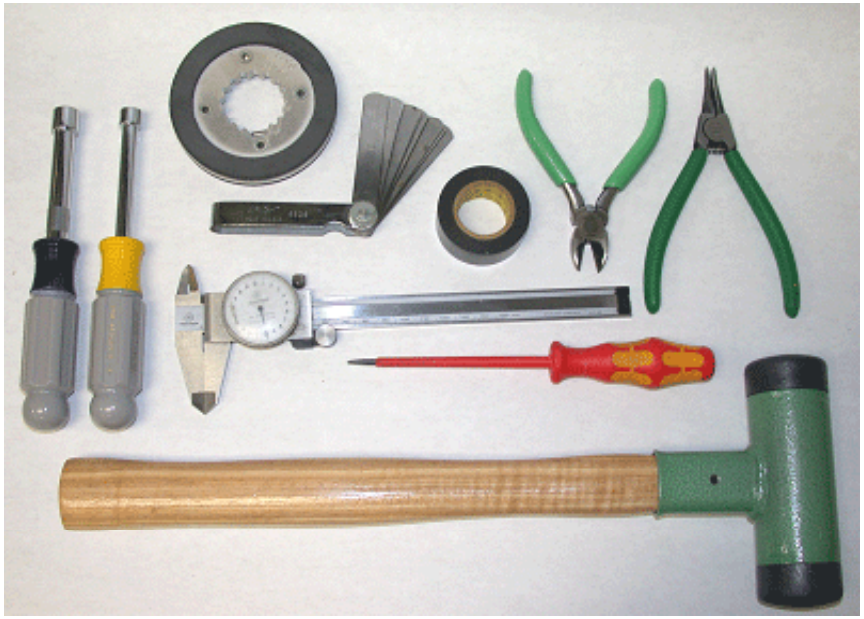
- After studying the contained information you will be able to accomplish the following:
  - Perform the removal of the existing brake disc
  - Perform the installation of the replacement brake disc



Tools and Materials

- What you will need:

  - 1 10mm Nut-driver
  - 1 8mm Nut-driver
  - 1 Medium Flat Tip Screwdriver
  - 1 External Snapring Pliers
  - 1 Metric Feeler Gage Pack
  - 1 Dead-blow Hammer
  - 1 Cutting Pliers
  - 1 Metric Dial-calipers
  - 1 Replacement Brake Disc
  - 1 Roll of Electrical Tape



Safety

- Always follow the proper lockout/tagout procedures.

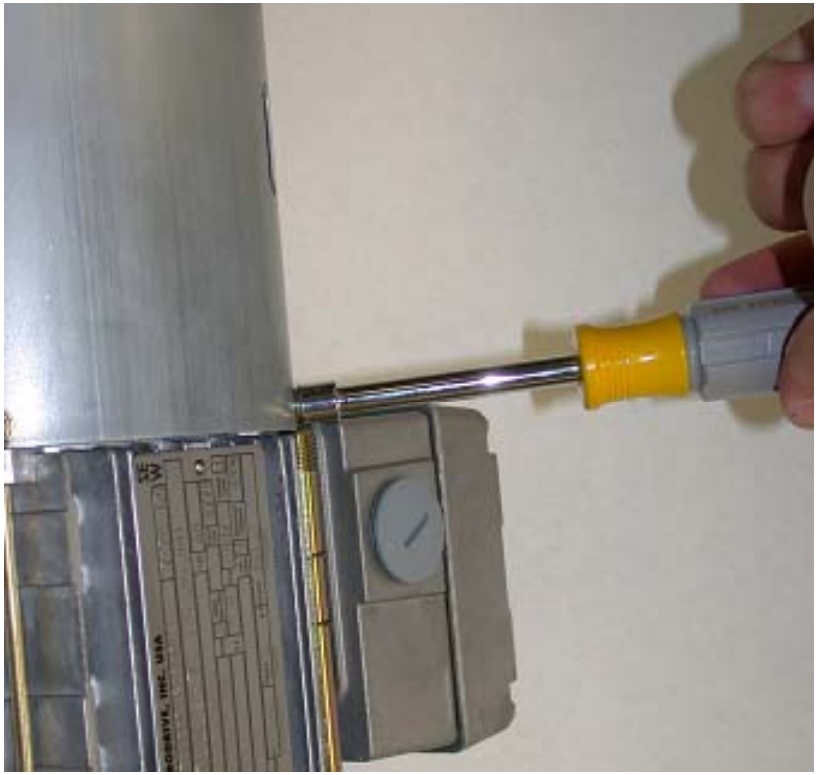
- Make sure to use the proper safety equipment at all times.

Step 1

- Disconnect all power sources to the motor.

Step 2

- Remove the 4 small screws that hold the motor fan guard in place with the 8mm nut-driver.



Step 3

- Remove the fan guard.

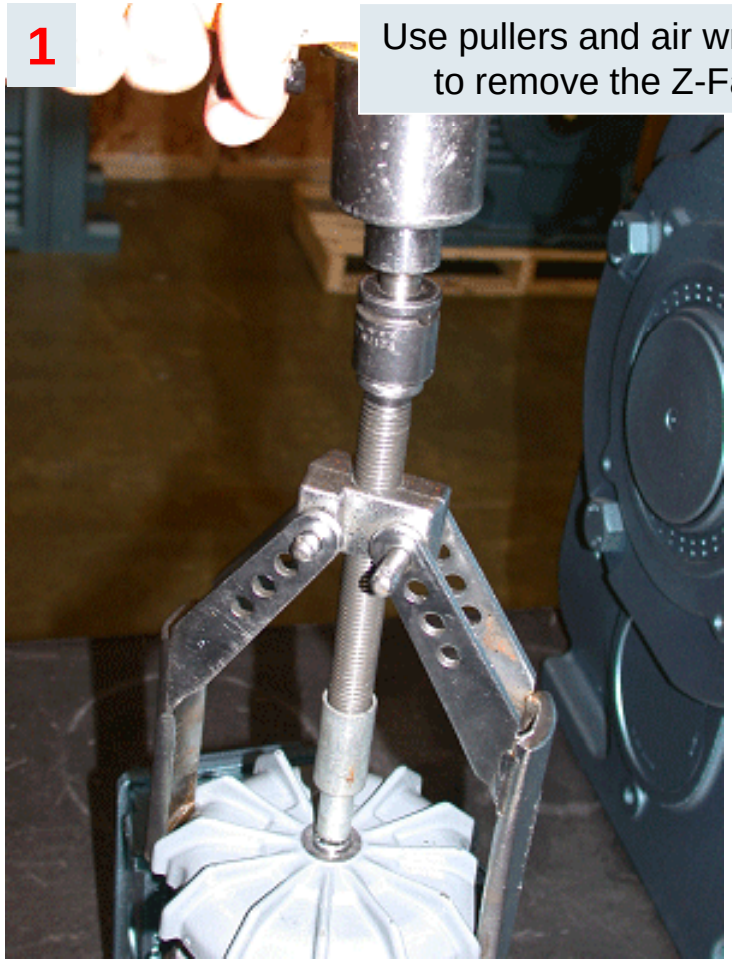
Step 4

- Using the external snapring pliers, remove the snapring that holds the fan secure.

Z-Fan Instructions

Cast Iron Z-Fan Removal Instructions

1 Use pullers and air wrench to remove the Z-Fan



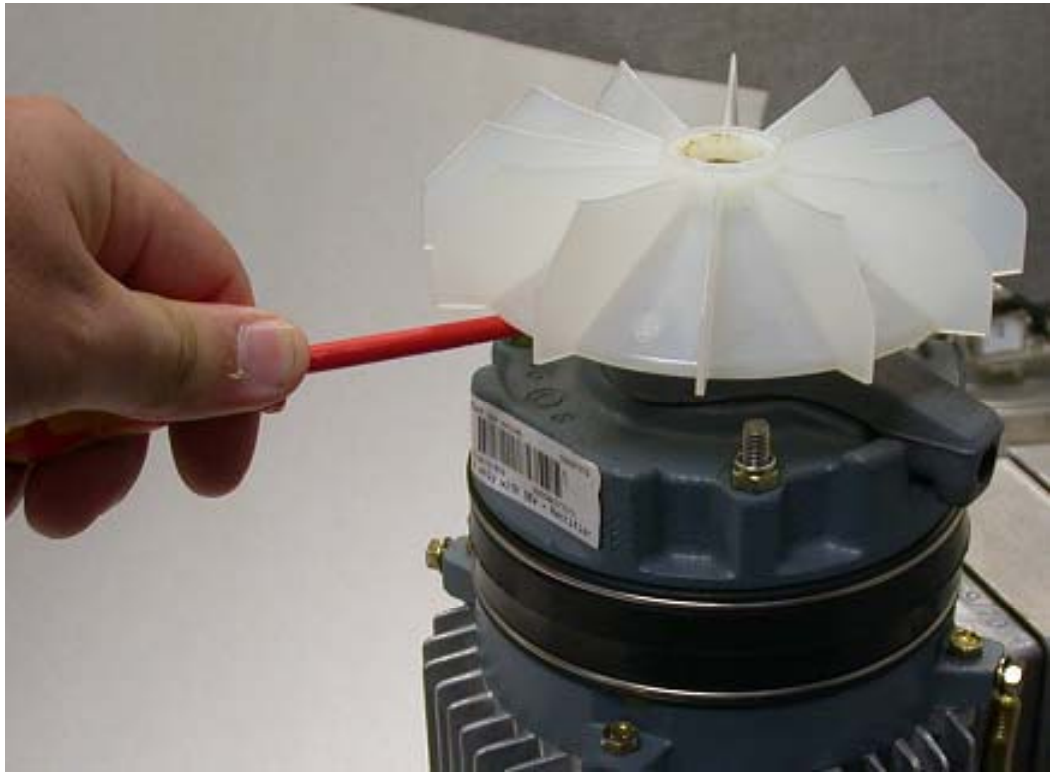
2 Ensure proper placement of puller jaws between fan blades

3 Remove the Z-Fan from the motor

Return to Disc Replacement

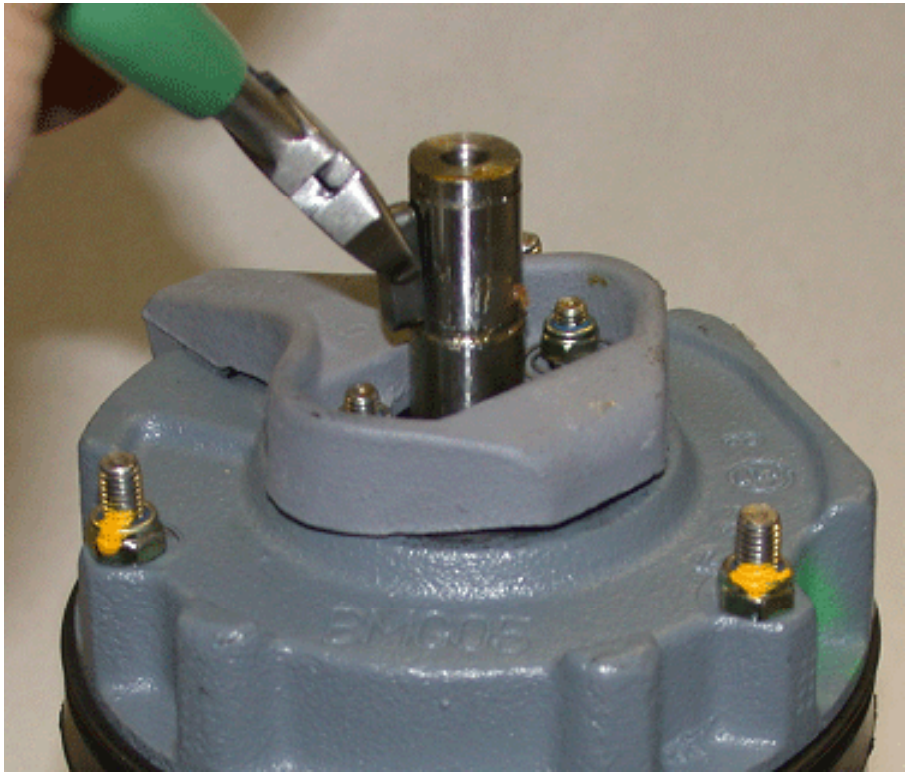
Step 5

- With the medium sized flat-tip screwdriver, use a prying action to remove the motor fan, using caution to not damage the fan.



Step 6

- Remove the fan key using the pair of cutting pliers.



Step 7

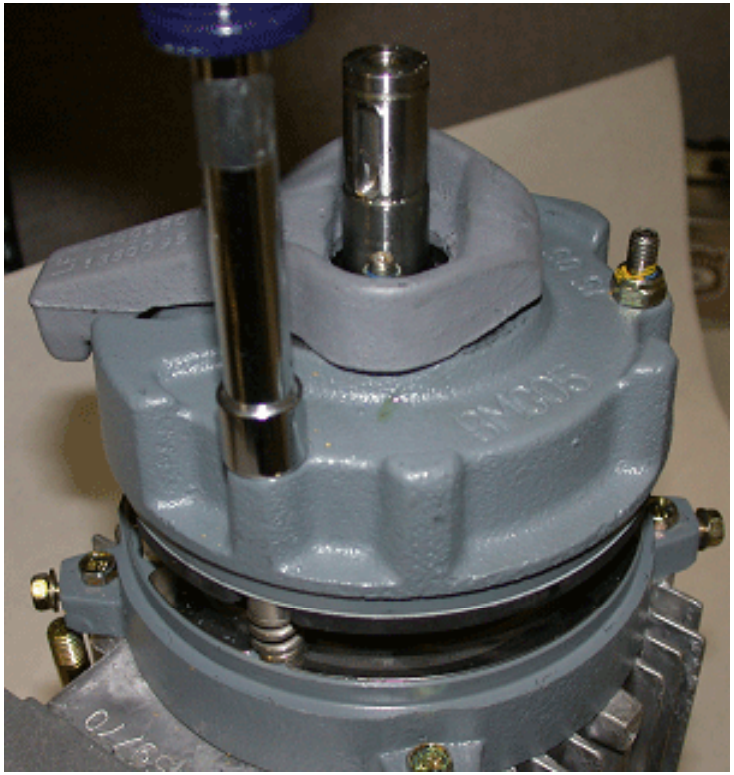
- Using the flat tip screw driver, remove the 2 brake sealing band clamps (if applicable).

Step 8

- Remove the brake sealing band with the flat tip screwdriver, using caution not to damage the sealing band.

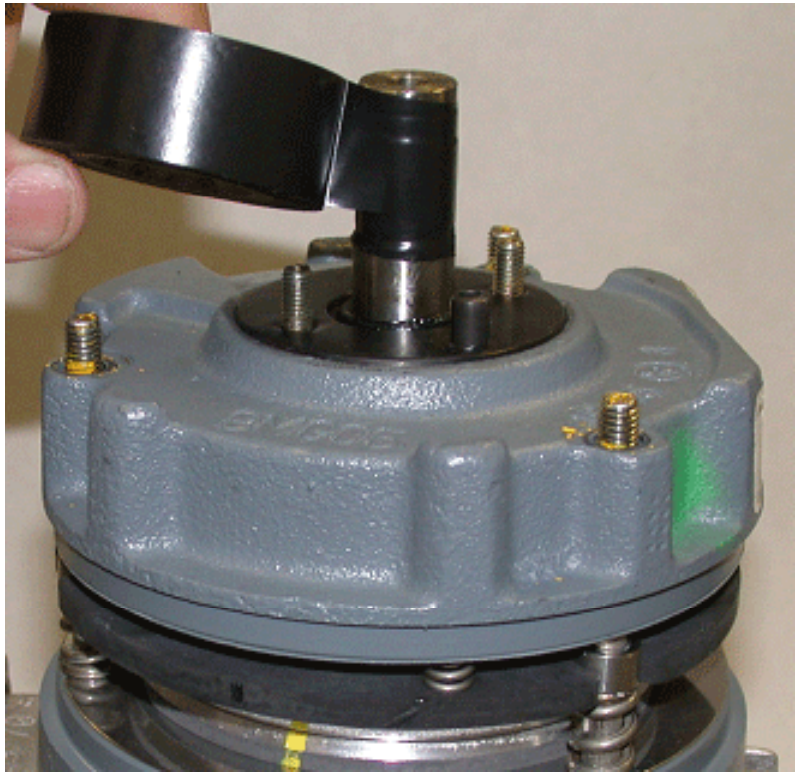
Step 9

- Using the 10mm nut-driver, remove the 3 retaining nuts on the brake housing.



Step 10

- Wrap the fan end of the rotor with electrical tape to protect the brake seal from the keyway.



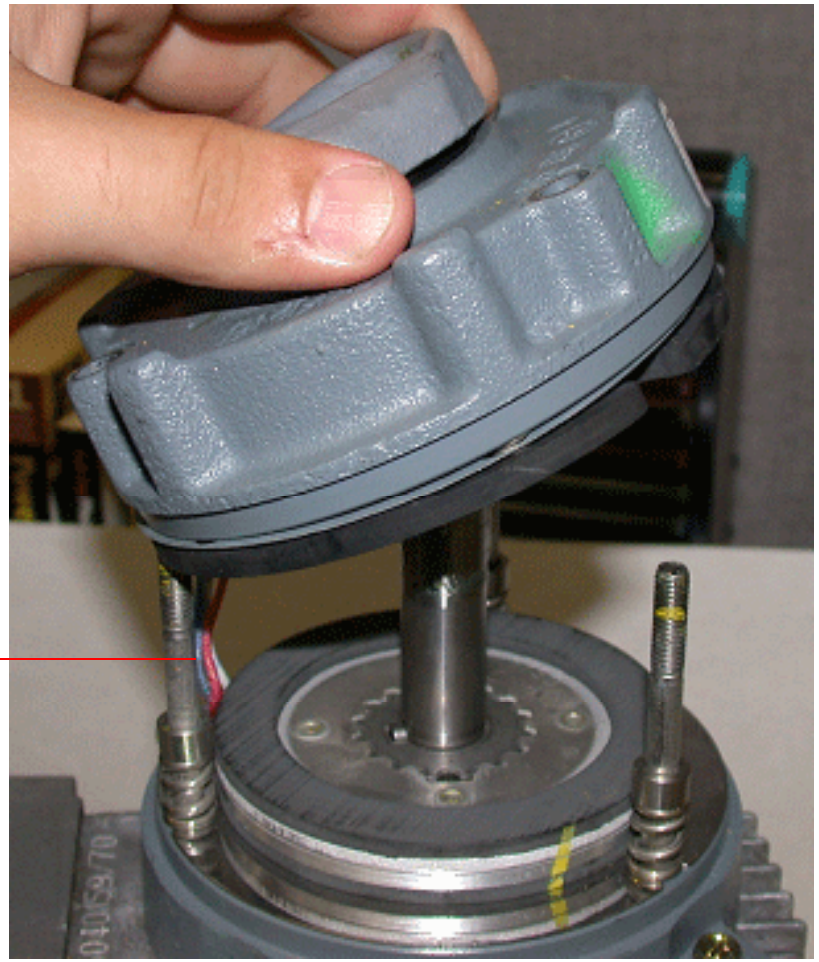
Step 11

- Carefully remove the brake assembly from the motor.

Caution!

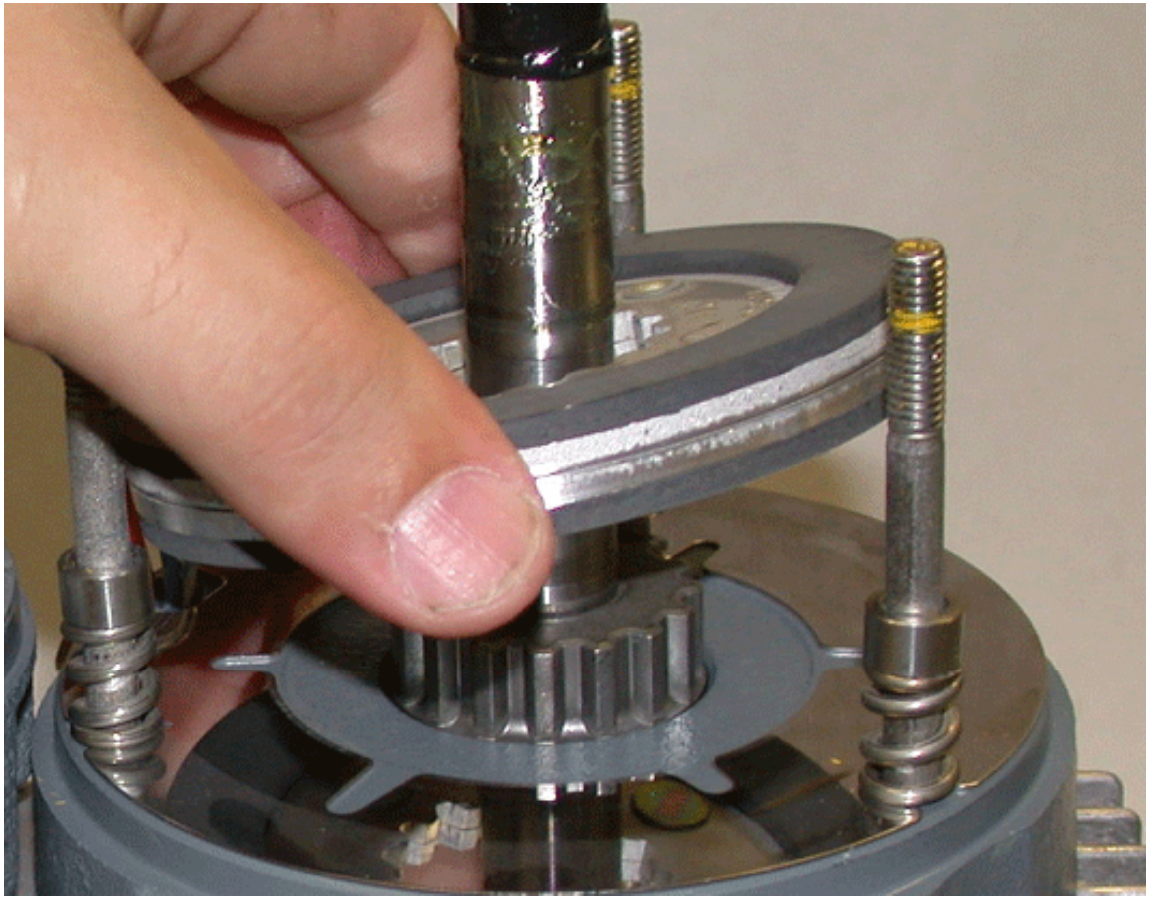
Make sure that there is enough slack in the brake wires.

With some applications, disconnecting the wires may be necessary to provide more slack.



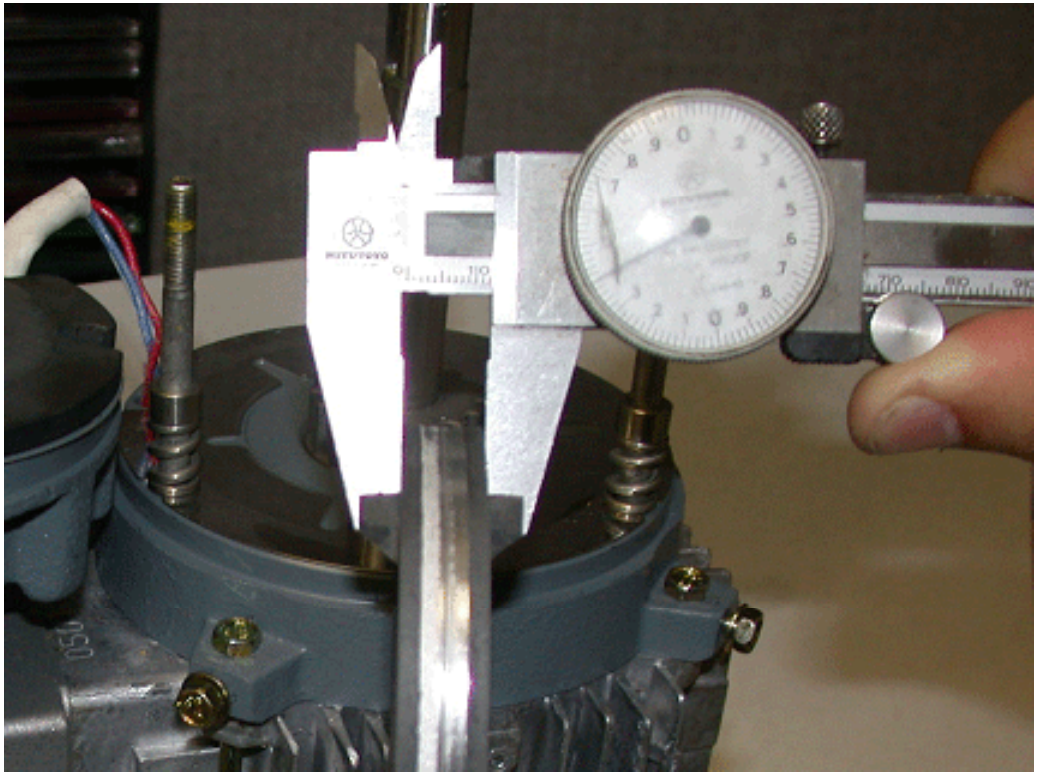
Step 12

- Remove the old brake disc.



Step 13

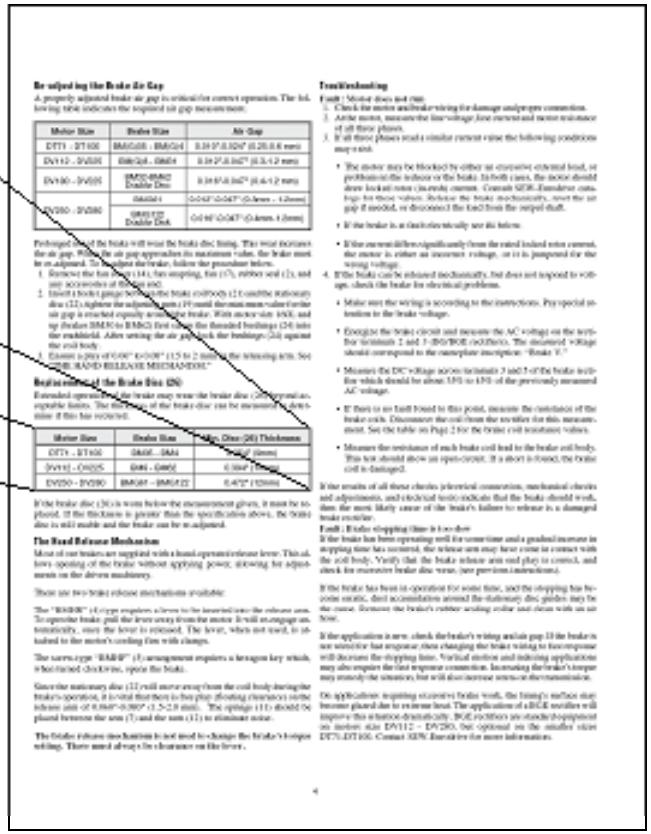
- Using the metric dial-calipers, measure the old brake disc to determine its current thickness.



Step 14

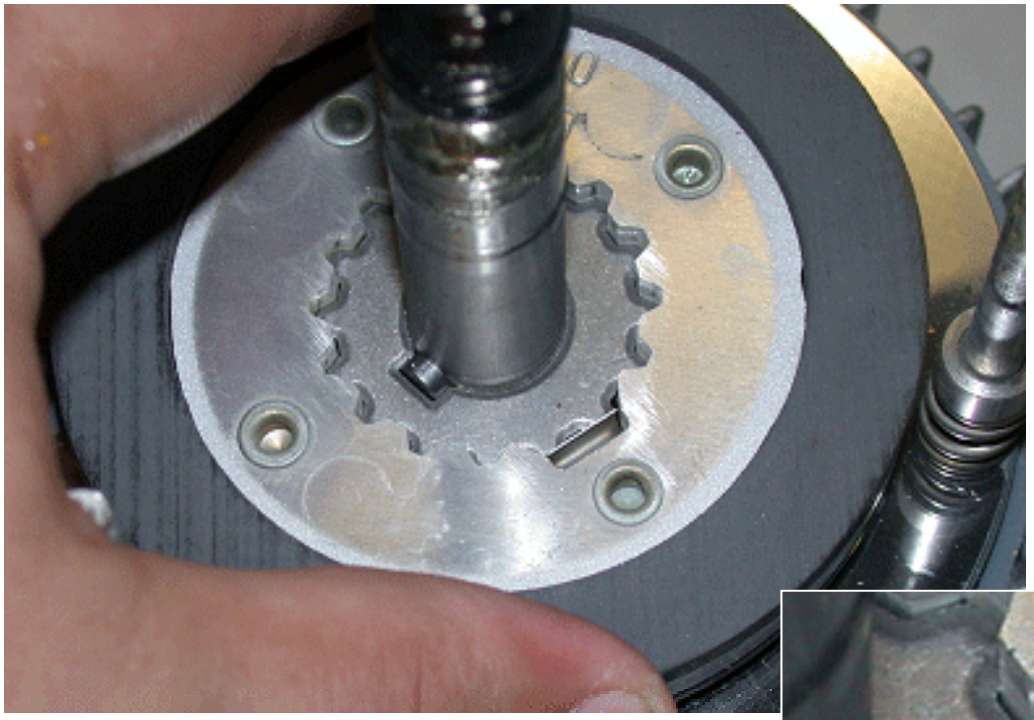
- To determine the proper brake disc thickness, please refer to the second chart on page 4 of the Motor and Brakemotor Operating Instructions (Document # 09 793 77).

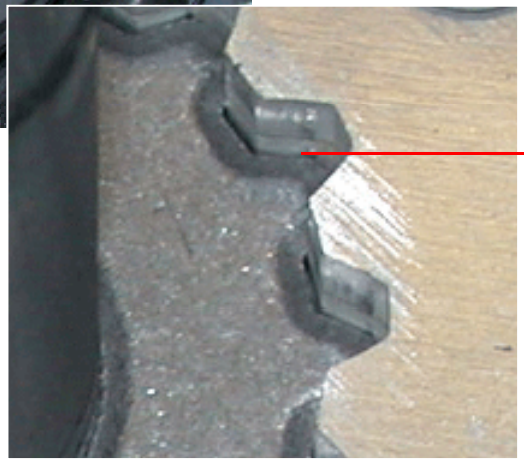
Motor Size	Brake Size	Min. Disc (26) Thickness
DT71 - DT100	BM05 - BM4	0.354" (9mm)
DV112 - DV225	BM8 - BM62	0.394" (10mm)
DV250 - DV280	BMG61 - BMG122	0.472" (12mm)



Step 15

- If the thickness of the current brake disc is within the specified tolerance and the disc is undamaged, reinstall it. Otherwise, replace it with a new one.





Caution!

Verify that the brake disc splines are aligned with the brake carrier splines.

Step 16

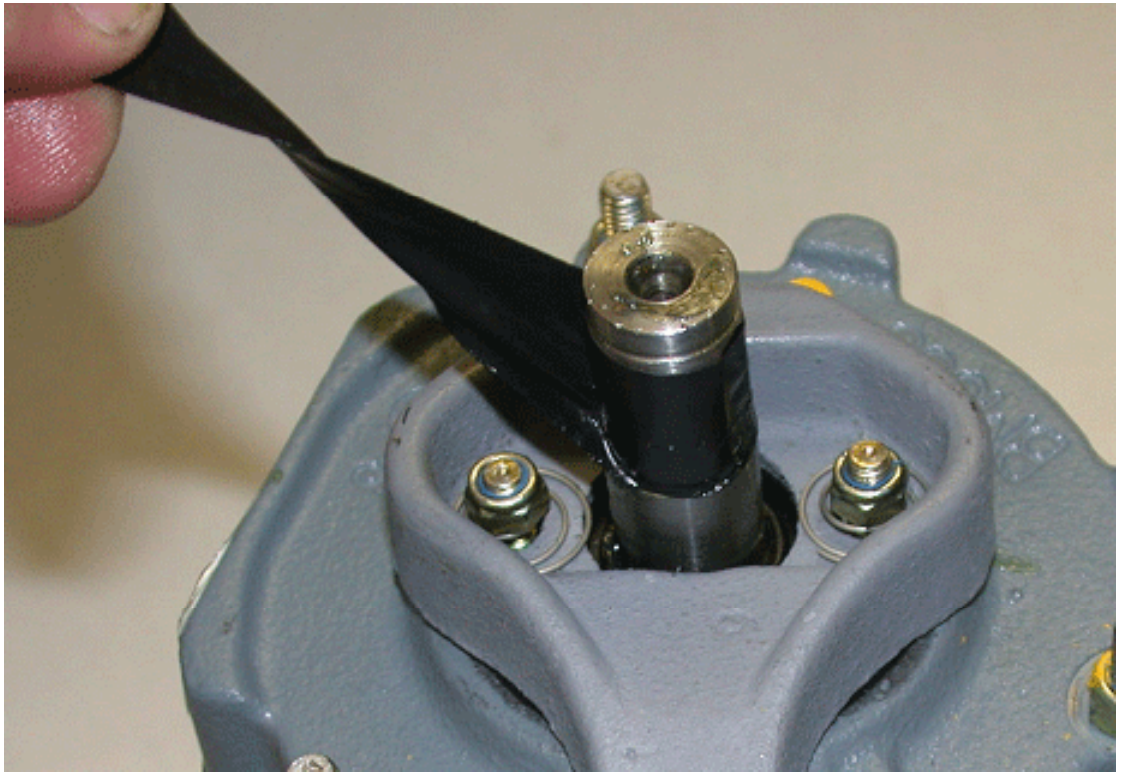
- Reinstall the brake assembly, sliding it over the motor rotor and studs.

Caution!

Verify that the brake wire sleeve is properly inserted into the relief area for wiring.

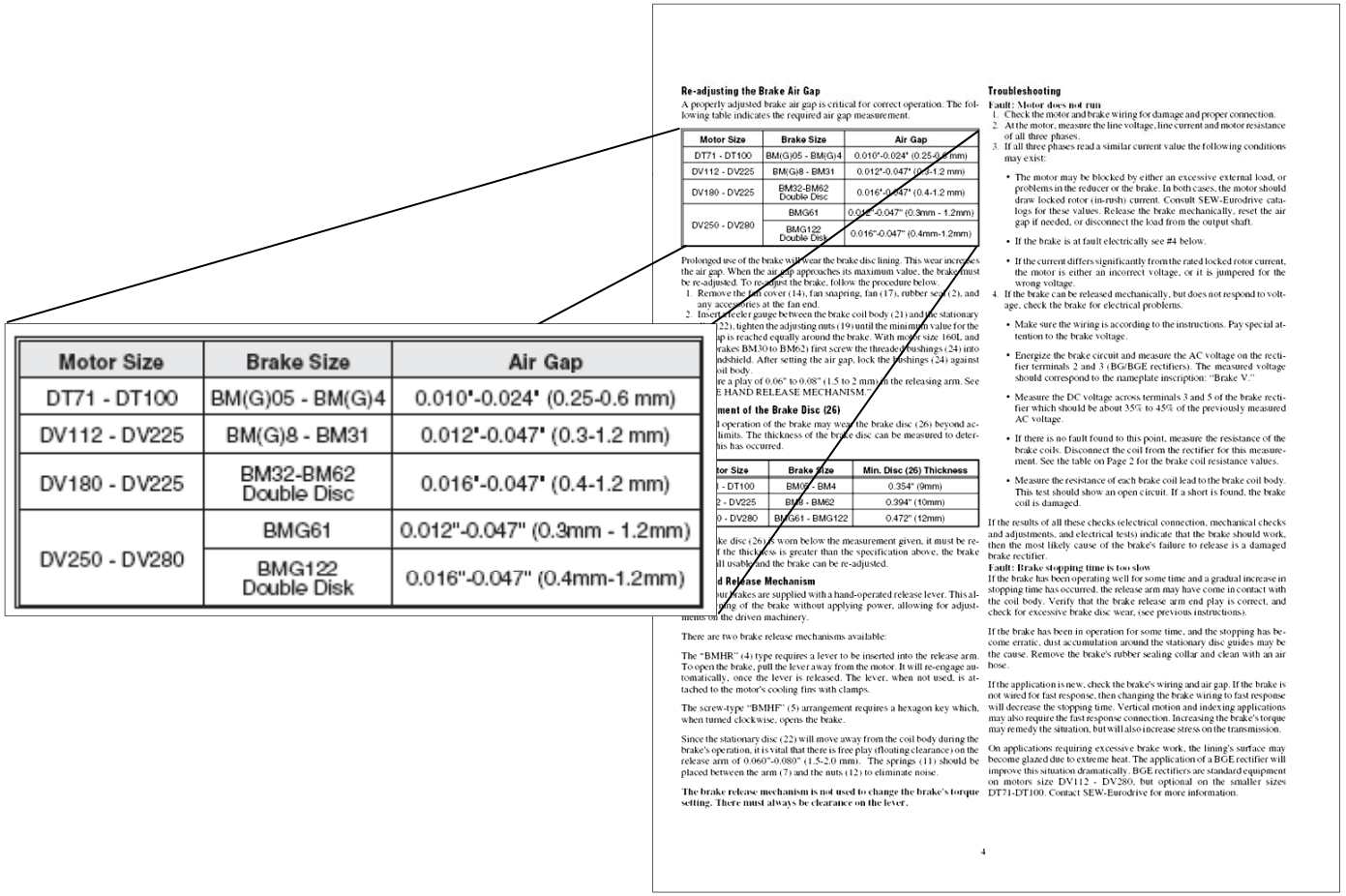
Step 17

- Remove the protective tape from the fan end of the motor rotor.



Step 18

- Before adjusting the air-gap, determine its proper value. Refer to the first chart on page 4 of the Motor and Brakemotor Operating Instructions (Document # 09 793 77).



Motor Size	Brake Size	Air Gap
DT71 - DT100	BM(G)05 - BM(G)4	0.010"-0.024" (0.25-0.6 mm)
DV112 - DV225	BM(G)8 - BM31	0.012"-0.047" (0.3-1.2 mm)
DV180 - DV225	BM32-BM62 Double Disc	0.016"-0.047" (0.4-1.2 mm)
DV250 - DV280	BMG61	0.012"-0.047" (0.3mm - 1.2mm)
	BMG122 Double Disk	0.016"-0.047" (0.4mm-1.2mm)

Re-adjusting the Brake Air Gap

A properly adjusted brake air gap is critical for correct operation. The following table indicates the required air gap measurement.

Motor Size	Brake Size	Air Gap
DT71 - DT100	BM(G)05 - BM(G)4	0.010"-0.024" (0.25-0.6 mm)
DV112 - DV225	BM(G)8 - BM31	0.012"-0.047" (0.3-1.2 mm)
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DV250 - DV280	BMG61	0.012"-0.047" (0.3mm - 1.2mm)
	BMG122 Double Disk	0.016"-0.047" (0.4mm-1.2mm)

Prolonged use of the brake will wear the brake disc lining. This wear increases the air gap. When the air gap approaches its maximum value, the brake must be re-adjusted. To re-adjust the brake, follow the procedure below.

1. Remove the fan cover (14), fan snapring, fan (17), rubber seal (2), and any accessories at the fan end.
2. Insert a feeler gauge between the brake coil body (21) and the stationary
(22), tighten the adjusting nuts (19) until the minimum value for the
ap is reached equally around the brake. With motor size 160L and
rakes BM30 to BM62) first screw the threaded bushings (24) into
adshield. After setting the air gap, lock the bushings (24) against
oil body.
re a play of 0.06" to 0.08" (1.5 to 2 mm) in the releasing arm. See
E HAND RELEASE MECHANISM."

ment of the Brake Disc (26)

f operation of the brake may wear the brake disc (26) beyond ac-
limits. The thickness of the brake disc can be measured to deter-
his has occurred.

tor Size	Brake Size	Min. Disc (26) Thickness
- DT100	BM(G) - BM4	0.354" (9mm)
- DV225	BM5 - BM62	0.394" (10mm)
- DV280	BMG61 - BMG122	0.472" (12mm)

ke disc (26) is worn below the measurement given, it must be re-
f the thickness is greater than the specification above, the brake
ll usable and the brake can be re-adjusted.

d Release Mechanism

ur brakes are supplied with a hand-operated release lever. This al-
ng of the brake without applying power, allowing for adjust-
ments on the driven machinery.

There are two brake release mechanisms available:

The "BMHR" (4) type requires a lever to be inserted into the release arm. To open the brake, pull the lever away from the motor. It will re-engage automatically, once the lever is released. The lever, when not used, is attached to the motor's cooling fins with clamps.

The screw-type "BMHF" (5) arrangement requires a hexagon key which, when turned clockwise, opens the brake.

Since the stationary disc (22) will move away from the coil body during the brake's operation, it is vital that there is free play (floating clearance) on the release arm of 0.060"-0.080" (1.5-2.0 mm). The springs (11) should be placed between the arm (7) and the nuts (12) to eliminate noise.

The brake release mechanism is not used to change the brake's torque setting. There must always be clearance on the lever.

Troubleshooting

Fault: Motor does not run

1. Check the motor and brake wiring for damage and proper connection.
2. At the motor, measure the line voltage, line current and motor resistance of all three phases.
3. If all three phases read a similar current value the following conditions may exist:
   - The motor may be blocked by either an excessive external load, or problems in the reducer or the brake. In both cases, the motor should draw locked rotor (in-rush) current. Consult SEW-Eurodrive catalogs for these values. Release the brake mechanically, reset the air gap if needed, or disconnect the load from the output shaft.
   - If the brake is at fault electrically see #4 below.
   - If the current differs significantly from the rated locked rotor current, the motor is either an incorrect voltage, or it is jumpered for the wrong voltage.
4. If the brake can be released mechanically, but does not respond to voltage, check the brake for electrical problems.
   - Make sure the wiring is according to the instructions. Pay special attention to the brake voltage.
   - Energize the brake circuit and measure the AC voltage on the rectifier terminals 2 and 3 (BG/BGE rectifiers). The measured voltage should correspond to the nameplate inscription: "Brake V."
   - Measure the DC voltage across terminals 3 and 5 of the brake rectifier which should be about 35% to 45% of the previously measured AC voltage.
   - If there is no fault found to this point, measure the resistance of the brake coils. Disconnect the coil from the rectifier for this measurement. See the table on Page 2 for the brake coil resistance values.
   - Measure the resistance of each brake coil lead to the brake coil body. This test should show an open circuit. If a short is found, the brake coil is damaged.

If the results of all these checks (electrical connection, mechanical checks and adjustments, and electrical tests) indicate that the brake should work, then the most likely cause of the brake's failure to release is a damaged brake rectifier.

Fault: Brake stopping time is too slow

If the brake has been operating well for some time and a gradual increase in stopping time has occurred, the release arm may have come in contact with the coil body. Verify that the brake release arm end play is correct, and check for excessive brake disc wear, (see previous instructions).

If the brake has been in operation for some time, and the stopping has become erratic, dust accumulation around the stationary disc guides may be the cause. Remove the brake's rubber sealing collar and clean with an air hose.

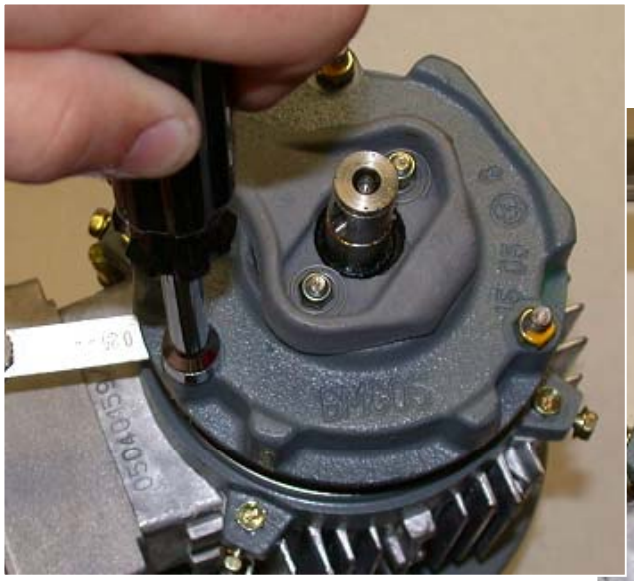
If the application is new, check the brake's wiring and air gap. If the brake is not wired for fast response, then changing the brake wiring to fast response will decrease the stopping time. Vertical motion and indexing applications may also require the fast response connection. Increasing the brake's torque may remedy the situation, but will also increase stress on the transmission.

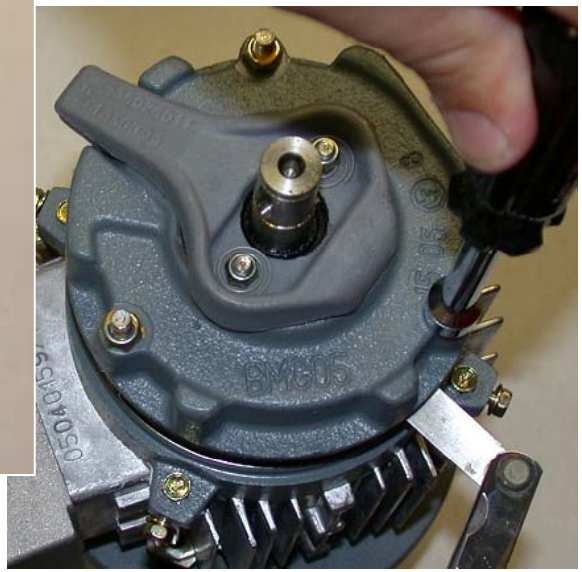
On applications requiring excessive brake work, the lining's surface may become glazed due to extreme heat. The application of a BGE rectifier will improve this situation dramatically. BGE rectifiers are standard equipment on motors size DV112 - DV280, but optional on the smaller sizes DT71-DT100. Contact SEW-Eurodrive for more information.

4

Step 19

- Using the metric feeler gage and the 10mm nut driver, tighten or loosen the three retaining nuts, until you have arrived at the proper air-gap.





Caution!

Adjustments to the air-gap must be made evenly.

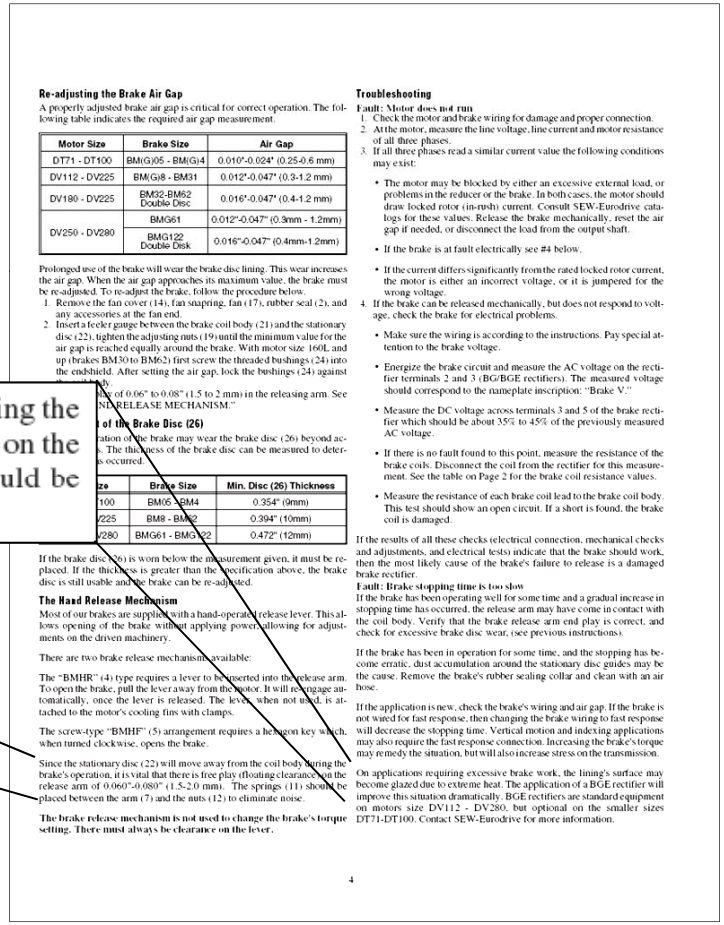
Adjust each nut and recheck adjustment once the final gap has been set.

Step 20

- Any adjustment to the air gap will affect the play in the manual release.

Step 21

- To determine the correct free play (clearance), please refer to the next to last paragraph on page 4 of the Motor and Brakemotor Operating Instructions (Document # 09 793 77).



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Prolonged use of the brake will wear the brake disc lining. This wear increases the air gap. When the air gap approaches its maximum value, the brake must be re-adjusted. To re-adjust the brake, follow the procedure below.

1. Remove the fan cover (14), fan snapring, fan (17), rubber seal (2), and any accessories at the fan end.
2. Insert a feeler gauge between the brake coil body (21) and the stationary disc (22), tighten the adjusting nuts (19) until the minimum value for the air gap is reached equally around the brake. With motor size 160L and up (brakes BM30 to BM62) first screw the threaded bushings (24) into the endshield. After setting the air gap, lock the bushings (24) against ...ly.

...ap of 0.06" to 0.08" (1.5 to 2 mm) in the releasing arm. See ...NUAL RELEASE MECHANISM."

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If the brake disc (26) is worn below the measurement given, it must be replaced. If the thickness is greater than the specification above, the brake disc is still usable and the brake can be re-adjusted.

The Hand Release Mechanism

Most of our brakes are supplied with a hand-operated release lever. This allows opening of the brake without applying power, allowing for adjustments on the driven machinery.

There are two brake release mechanisms available:

The "BMHR" (4) type requires a lever to be inserted into the release arm. To open the brake, pull the lever away from the motor. It will re-engage automatically, once the lever is released. The lever, when not used, is attached to the motor's cooling fins with clamps.

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Since the stationary disc (22) will move away from the coil body during the brake's operation, it is vital that there is free play (floating clearance) on the release arm of 0.060"-0.080" (1.5-2.0 mm). The springs (11) should be placed between the arm (7) and the nuts (12) to eliminate noise.

The brake release mechanism is not used to change the brake's torque setting. There must always be clearance on the lever.

Troubleshooting

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2. At the motor, measure the line voltage, line current and motor resistance of all three phases.
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If the results of all these checks (electrical connection, mechanical checks and adjustments, and electrical tests) indicate that the brake should work, then the most likely cause of the brake's failure to release is a damaged brake rectifier.

Fault: Brake stopping time is too slow

If the brake has been operating well for some time and a gradual increase in stopping time has occurred, the release arm may have come in contact with the coil body. Verify that the brake release arm end play is correct, and check for excessive brake disc wear, (see previous instructions).

If the brake has been in operation for some time, and the stopping has become erratic, dust accumulation around the stationary disc guides may be the cause. Remove the brake's rubber sealing collar and clean with an air hose.

If the application is new, check the brake's wiring and air gap. If the brake is not wired for fast response, then changing the brake wiring to fast response will decrease the stopping time. Vertical motion and indexing applications may also require the fast response connection. Increasing the brake's torque may remedy the situation, but will also increase stress on the transmission.

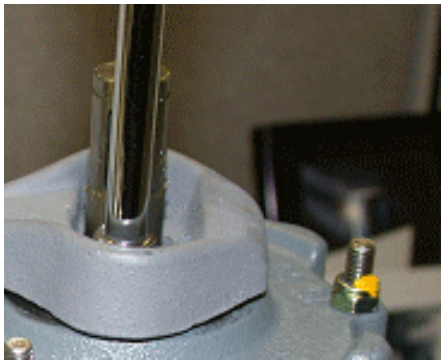
On applications requiring excessive brake work, the lining's surface may become glazed due to extreme heat. The application of a BGE rectifier will improve this situation dramatically. BGE rectifiers are standard equipment on motors size DV112 - DV280, but optional on the smaller sizes DT71-DT100. Contact SEW-Eurodrive for more information.

4

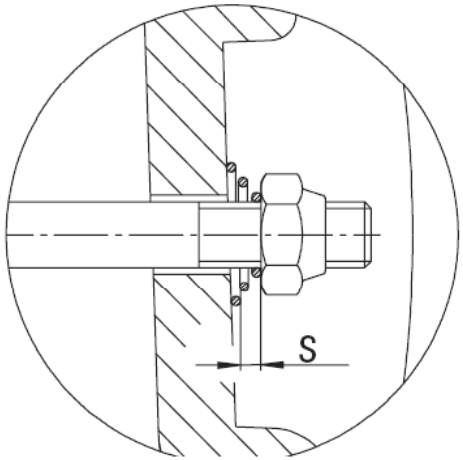
Since the stationary disc (22) will move away from the coil body during the brake's operation, it is vital that there is free play (floating clearance) on the release arm of 0.060"-0.080" (1.5-2.0 mm). The springs (11) should be placed between the arm (7) and the nuts (12) to eliminate noise.

Step 22

- Using the 8mm nut driver and the metric feeler gage, adjust the manual release arm until the proper amount of play is achieved.



Verify the free play on the release arm. adjust the locking nuts as needed to achieve 1.5 – 2.0 mm gap. (S Dimension)



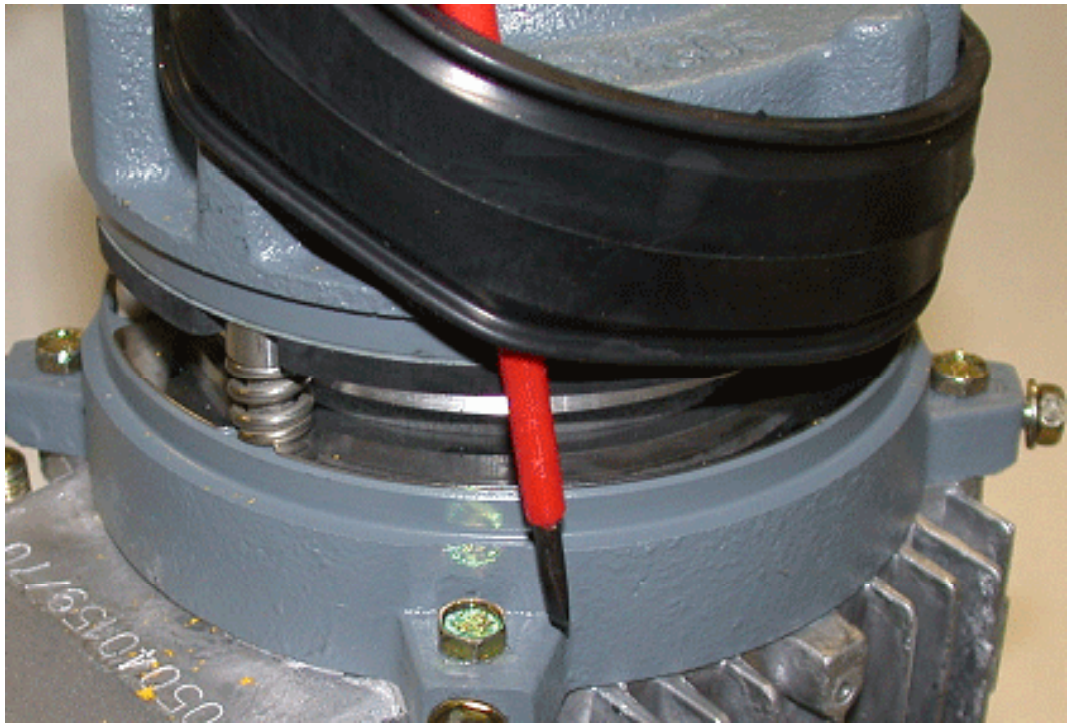
Caution!

There must always be clearance on the lever.

Note: The brake release mechanism is not used to change the brake's torque setting.

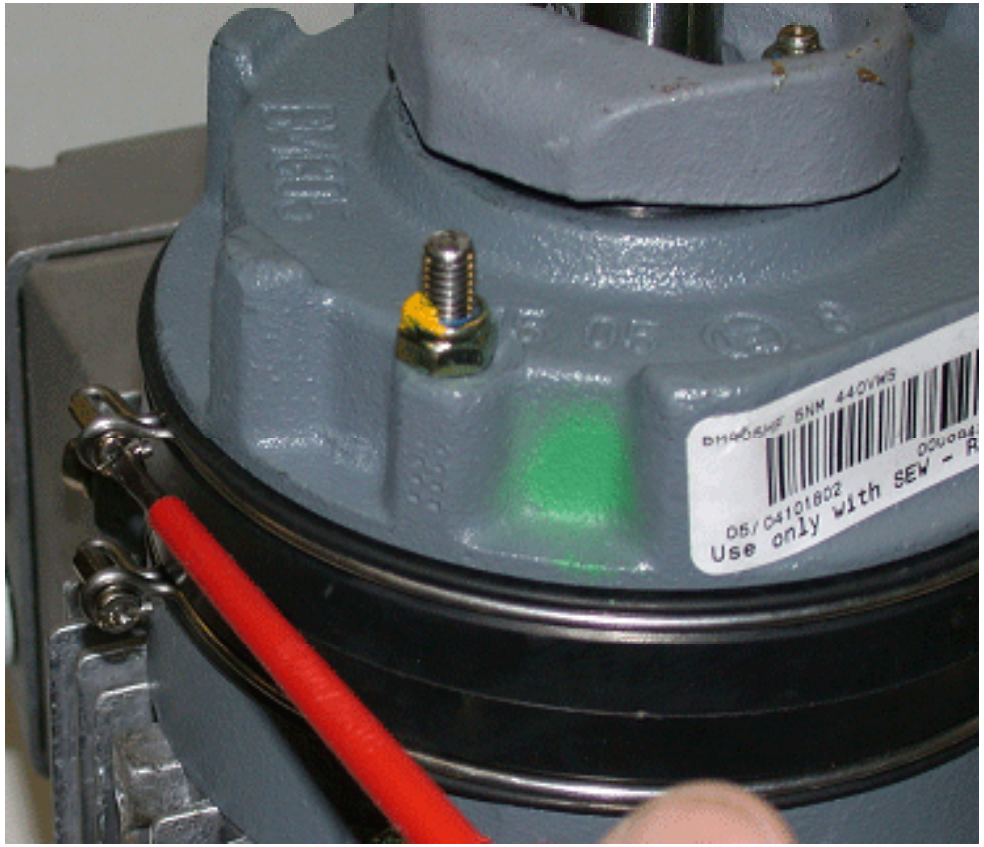
Step 23

- Using the flat tip screwdriver, install the rubber brake band, using caution not to damage the band.



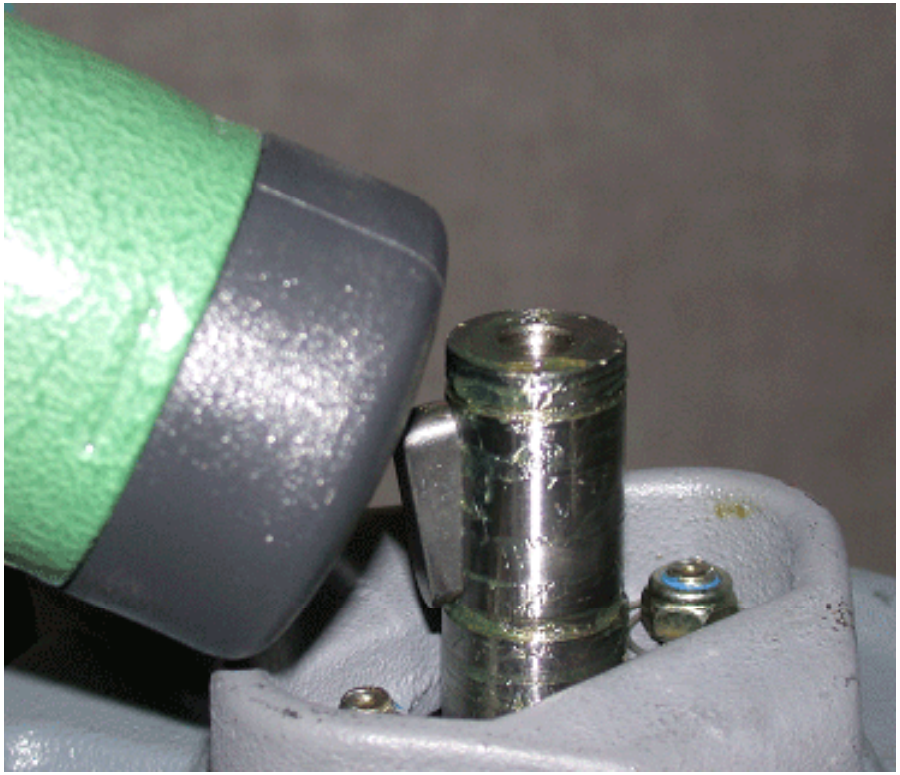
Step 24

- Re-install the 2 brake band clamps using the flat tip screwdriver.



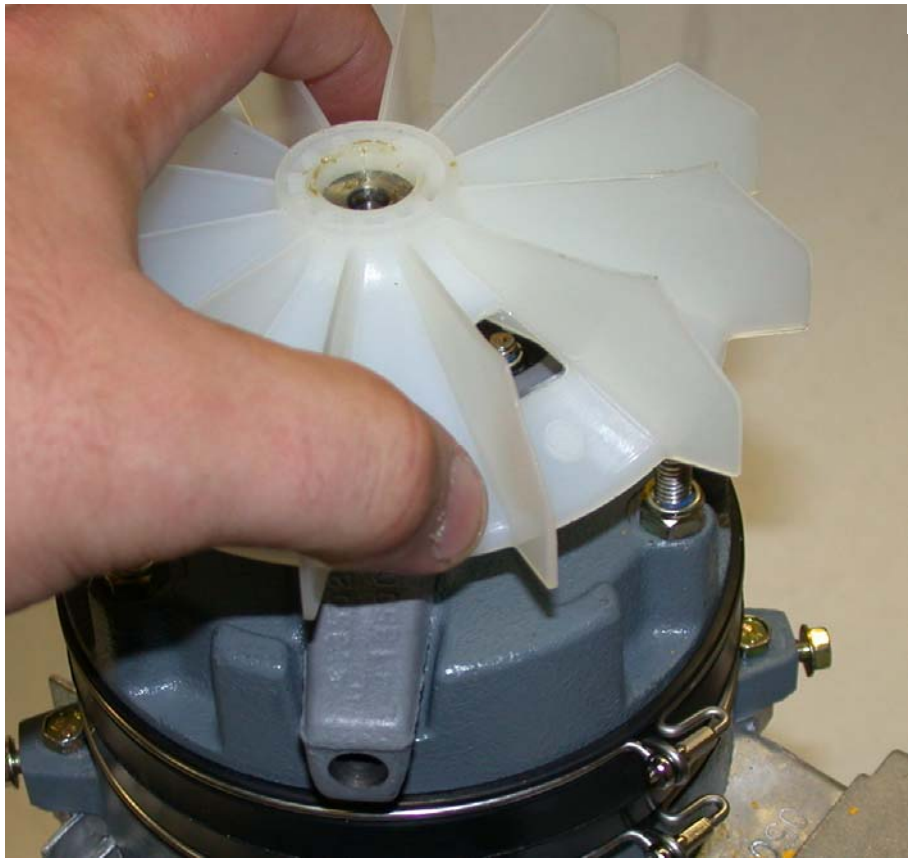
Step 25

- Insert the fan key and lightly tap it into place using the dead-blow hammer or rubber hammer.



Step 26

- Re-install the fan.



Z-Fan Instructions

Cast Iron Z-Fan Installation Instructions

1

Heat the Z-Fan in an oven to approximately 250 degrees Fahrenheit

2

Apply a light coat of oil to the rotor end

3

Install the Z-fan

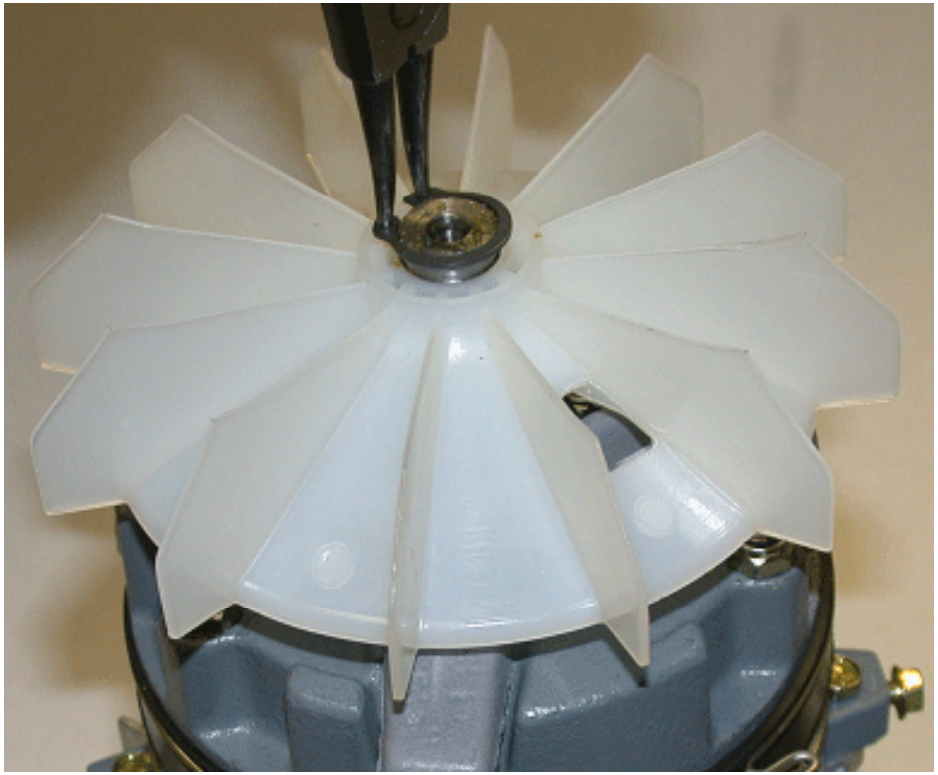
4

Install the Circlip

Return to Disc Replacement

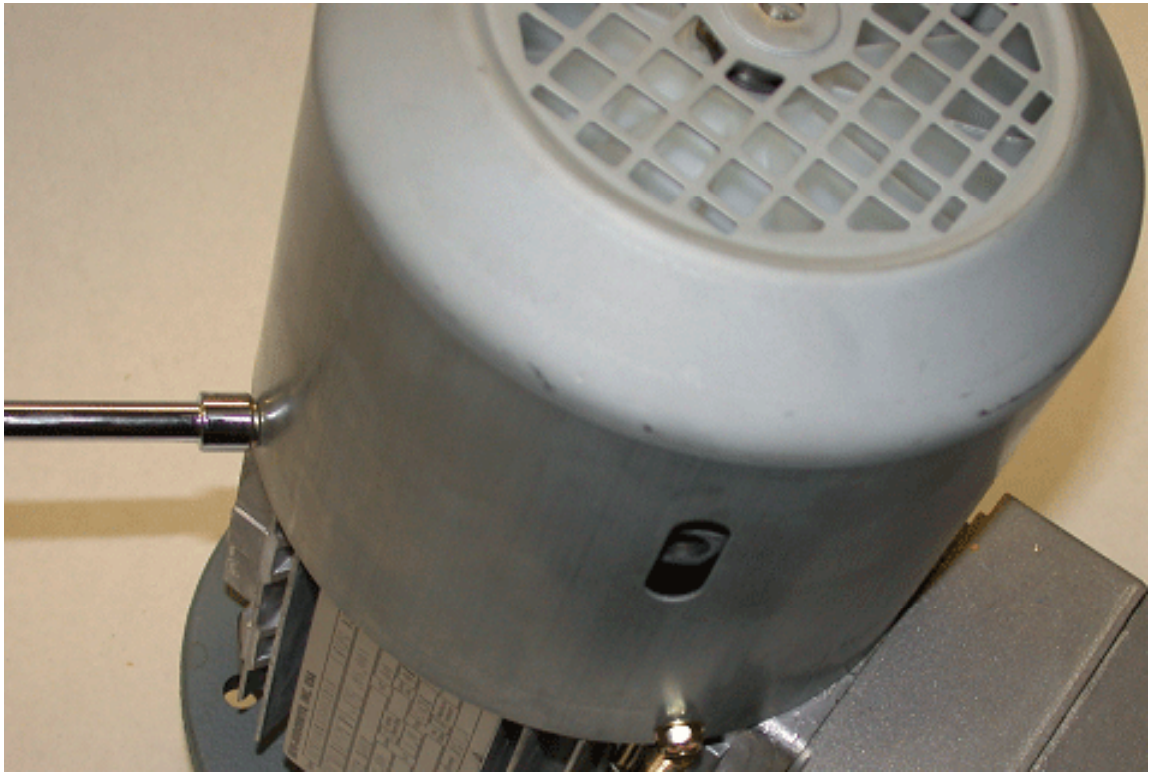
Step 27

- Reinstall the snapring using the snapring pliers.



Step 28

- Re-install the motor fan guard, using the 8mm nut driver.



Step 29

- Reconnect power and confirm the proper operation of the brakemotor and attached equipment.