

INSTRUCTION INFORMATION FOR TYPE "DB" ELECTRIC DISC BRAKE (DB-9)

OPERATION

Zenar's type "DB" brakes are classified as a holding or parking type electro-mechanical operated disc brake. The brake is mechanically spring set in the braking mode and magnetically released from the braking mode when electrical direct current (DC) power is applied to the magnet shunt wound coil. Upon removal of the DC power, the brake automatically resets to the braking mode.

Refer to FIGURE 1 for a mechanical picture of the brake. Rotating mechanical power to the brake is provided by a drive shaft (25), that drives both brake lining discs (6) & (22), through the brake spline hub (16). Braking is achieved by spring (8) pressure being applied to the armature plate (5) that places equal pressure on both brake lining discs (6) & (22). Rotating mechanical power is then absorbed and converted to heat and dissipated through the armature plate (5), brake plates (7) and mounting plate (2). When the magnet shunt wound coil is electrically energized, it pulls the armature plate (5) towards the magnet pot (4) releasing the spring (8) pressure on both brake lining discs (6) & (22), which removes braking pressure and allows the drive shaft (25) to rotate freely.

Zenar has two AC to DC type rectifier controls for the "DB" series brakes. One controller provides 100% power to the magnet shunt wound coil and is normally used on traversing type drives (Trolley and/or Bridge motion). The other controller, a forced voltage type, provides 250% power to the magnet coil to release the brake. Upon release of the brake, the power is reduced to 25%. The forced voltage controller provides a faster release and setting time for the brake.

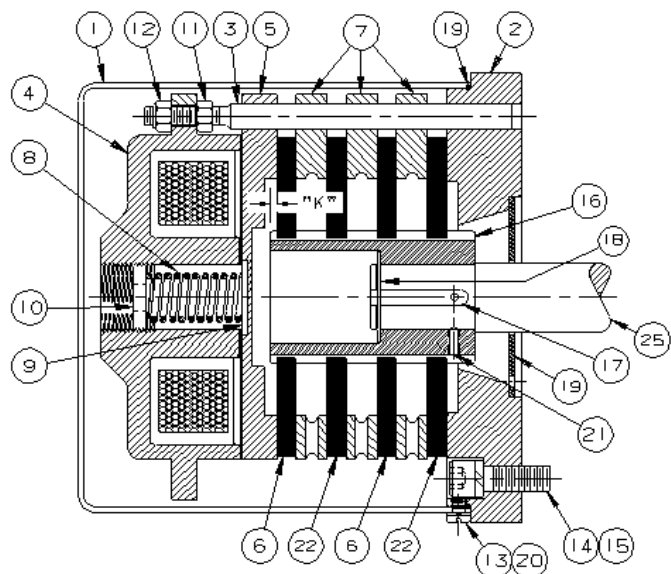


FIGURE 1. BRAKE ASSEMBLY

INSTALLATION

READ THE ENTIRE INSTALLATION AND ADJUSTMENT PROCEDURES BEFORE COMMENCING!

1. Inspect brake for any shipping damages. Immediately report any damages to the carrier for a claim. Advise Zenar and replace any damaged parts before continuing installation.
2. For proper mounting a flat surface perpendicular to the drive shaft (25) is required. The mounting surface shall have proper mounting holes and fasteners as follows:

<u>Brake Model</u>	<u>Bolt Circle</u>	<u>Number of Holes</u>	<u>Hole Size</u>	<u>Min. No. Fasteners</u>	<u>Fastener Size</u>
DB-9	9"	4 @ 90 Deg.	0.51"	4	1/2"-13 UNC
DB-9	11"	4 @ 90 Deg.	0.63"	4	5/8"-11 UNC

Fastener type is a socket head cap screw (14) with a hi-collar lock washer (15) and minimum of Grade 5 material. Mounting fasteners are not supplied. Proper length of the fastener shall be determined by actual measuring.

3. Spline hub (16) and drive shaft (25) must not extend 0.062 inches (dimension "K") beyond the outer brake lining disc (6), otherwise, the brake will not operate. See FIGURE 1, page 1.
4. Spline hub (16) must be securely fastened to the drive shaft (25). Locating dimension "K" must be held by one of the following three methods:
 - a. PREFERABLE METHOD - Provide a Class RC2* sliding fit between the spline hub (16) and the drive shaft (25). Hub shall be keyed (17) (minimum AISI 1018 CDS keystock) to the drive shaft (25). A retaining ring (18) shall be installed on the drive shaft (25) to prevent the key (17) and spline hub (16) from backing off the shaft. A shaft (25) shoulder should be provided to prevent hub (16) movement in the opposite direction.
 - b. ACCEPTABLE METHOD - Provide a Class LN3* location interference fit between the spline hub (16) and the drive shaft (25). Using a 3/16 inch diameter drill, indent key (17) and shaft (25) through both set screw holes in hub (16). Then firmly install both set screws (21) to lock the hub (16) on the shaft (25).

* Fits are per USAS B4.1 - 1967 Revised 1974.

- c. ACCEPTABLE METHOD - Provide a Class RC1 to RC2* running or slide fit between the spline hub (16) and the drive shaft (25). Apply "LOCKTITE NO. 271 THREADLOCKER" between hub (16) and shaft (25) to prevent the key (17) and spline hub (16) from backing off the shaft. Using a 3/16 inch diameter drill, indent key (17) and shaft (25) through both set screw holes in hub (16). Then firmly install both set screws (21) to lock the hub (16) into the shaft (25).

NOTE: On the weather resistant units, the shield plate (19) must be installed on the shaft (25) before mounting the hub (16).

* Fits are per USAS B4.1 - 1967 Revised 1974.

5. Brake unit must be disassembled to mount. Remove cover (1) by removing four screws (13). **WARNING! Check dimension "J" for a .00 inch dimension, see FIGURE 2, page 4. If required, adjust spring plug (10) by turning with a 1-1/8 inch hex socket wrench to obtain a .00 inch dimension. This will reduce spring (8) force to prevent the magnet pot (4) from accidentally moving off the mounting studs (3) when removing the locknuts (12).** Remove three locknuts (12) from mounting studs (3). Remove magnet pot (4), three nuts (11), armature plate (5), brake discs (6), brake plates (7) and brake discs (22).

If applicable, install shield plate (19) by pressing or tapping into mounting plate (2). Orientate shield plate (19) so the drain hole is at the bottom.

Position two of the three mounting studs (3) above the third stud, then mount the mounting plate (2) to your mounting bracket using fasteners as described in item 2 from above. Re-assemble the brake in the reverse order of disassembly, except, leave the cover (1) off to make adjustments as described in the ADJUSTMENT SECTION of this bulletin. Brake discs (6) & (22) must rotate within + or - .01 inch concentricity of the mounting plate (2).

6. Electrical hook-up of the brake requires a minimum of number 16 AWG stranded wire with 200 deg. C insulation (similar to a "SRML" wire) when the connection is made within the brake cover. The brake must be supplied with direct current (DC) power suitable for brake coil voltage as stated on the brake nameplate, found on the brake cover. Brake wire leads must be threaded through the hole in the flange on the magnet pot (4) and then through the right angle conduit hole in the mounting plate (2). If applicable, a grounding screw is provided on the flange of the magnet pot (4). Wiring methods shall be in accordance with the latest issue of the National Electric Code.

ADJUSTMENT

WARNING!

TO PREVENT PERSONAL INJURY CARE SHOULD BE EXERCISED IN ADJUSTING OR MAINTAINING THESE BRAKES. UNDER OPERATING CONDITIONS SOME BRAKE COMPONENTS MAY EXCEED 400 DEGREES FAHRENHEIT. BEFORE SERVICING, THE ELECTRIC POWER IS TO BE AT LOCK-OUT. ON HOIST DRIVES, THE LOAD AND LOWER BLOCK IS TO BE SET ON THE FLOOR.

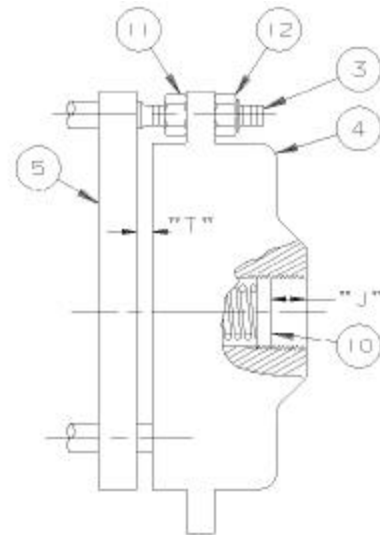


FIGURE 2.

1. AIR GAP adjustment, dimension "T" FIGURE 2, must be maintained to allow the brake to release and prevent the loss of braking torque. Dimension "T" is measured between the surfaces of the magnet pot (4) and the armature plate (5) at three equal distance points (120 degrees apart) about the magnet pot (4). This dimension should be held at 0.032 inches and in no case allowed to exceed 0.12 inches.

If the air gap does not measure 0.032 inches, adjust as follows:

- a. Loosen all three nuts (11).
- b. Approximate the required air gap dimension by pushing the magnet pot (4) towards the armature plate (5) and bringing two nuts two (11) up against the magnet pot (4).
- c. Loosely position the three locknuts (12) against the magnet pot (4)*.
- d. Using the two nuts (12) in Step "b" above, finely adjust the air gap "T" to 0.032 inches. Ensure these two nuts (11) are equally spaced from the armature plate (5).
- e. Tighten the two locknuts (12) that correspond to the two nuts (11) in Step "d" above. This step requires snug tightening only. – **DO NOT OVERTIGHTENED – DO NOT USE A TORQUE WRENCH!**
- f. Bring up the third nut (11) to bottom of the magnet coil (4) insuring that it is also equally spaced to the armature plate (4) with regards to the two nuts (11) in step "d".
- g. Snug tighten the third locknut (12) as in Step "e".

***WARNING!**

MAGNET POT (4) WILL BE PROPELLED OFF THE MOUNTING STUDS (3) BY THE BRAKE SPRING (8) IF THE LOCKNUTS (12) ARE REMOVED.

2. BRAKE TORQUE adjustment, dimension "J" FIGURE 2, controls braking effort by changing the spring (8) pressure. Increasing dimension "J" increases brake torque and decreasing "J" decreases brake torque. Brake nameplate located on the brake unit cover shows the "Minimum", "Maximum" and "Set" dimensions for brake torque. The "Minimum" dimension is the smallest dimension that the brake can be set at to obtain the least braking torque. The "Maximum" dimension is the largest dimension that the brake can be set at to obtain the highest brake torque. Exceeding this

dimension will prevent the brake from releasing. The "Set" dimension is the factory recommended brake torque for your application.

WARNING! DO NOT DECREASE THE BRAKE TORQUE SETTING FOR HOIST DRIVE APPLICATIONS, THIS MAY CAUSE THE HOOK LOAD TO FALL.

Any final torque adjustment should be made after the brake has been used repeatedly for 15-20 operations. Adjustment is made by removing the brake cover (1) and inserting a 1-1/8 inch hex socket wrench onto the spring plug (10). Spring plug (10) is rotated clockwise to increase dimension "J" and counter-clockwise to decrease dimension "J" until proper dimension "J" is achieved.

WARNING! DO NOT OVERTIGHTEN - DO NOT USE A TORQUE WRENCH TO MAKE THIS ADJUSTMENT!

Replace brake cover (1) securely with fasteners (13) and (20). Orientate the brake cover with the drain hole at the bottom.

INSPECTION & MAINTENANCE PROCEDURE

All inspection and maintenance procedures shall be performed in accordance with the latest specification of all local, State, and Federal Governments that have jurisdictional authority over this equipment. Also, the latest edition of ASME "Inspection, Testing and Maintenance" safety standards and the entire "DB" brake "Instruction Information" should be read and understood before attempting inspection or maintenance procedures on this equipment.

Frequency of Inspection:

- a. Prior to the initial operation of a new or repaired brake.
- b. Prior to any special lift or movement of the unit.
- c. Normal service, CMAA Class A, B and C cranes monthly.
- d. Heavy service, CMAA Class D crane, weekly to monthly, dependent upon the severity of the service.
- e. Severe service, CMAA Class E & F cranes, daily to monthly, dependent upon the severity of the service.

Inspection should include the visual inspection for deficiency in mechanical failure or misalignment, the proper release of the brake when electrically energized, loose fasteners, warped brake plates (7) or armature plate (5), frayed or broken wiring, excessive air gap, proper electrical voltage being applied and worn lining discs. Replace, adjust and tighten where required. Brake linings (6) & (22) should be replaced when lining thickness, as measured on the outside diameter of the lining, becomes less than 0.4 inches.

After any replacement, repair or adjustment to the brake, the brake should be operated several times without any load to ensure proper seating of all components. Then it should be tested for proper functioning and the achievement of sufficient braking torque to stop the motion. For hoist applications, see additional instructions (CMDBII-05 01-04.doc) on braking in new hoist brake lining discs.

WARNING! DO NOT UNDER ANY CIRCUMSTANCE LUBRICATE ANY COMPONENT ON THIS BRAKE, LOSS OF BRAKING TORQUE WILL OCCUR RESULTING POSSIBLY IN DAMAGE TO THE EQUIPMENT OR THE INJURY OR DEATH OF PERSONNEL.

STORAGE

Brake unit should be covered with canvas, plastic or heat shrink plastic. Allow the unit to breathe with the drain hole in the bottom position, brake spring (8) pressure should be removed by turning the spring plug (10) counter clockwise until dimension "J" is zero or remove the spring (8) entirely from the brake. Before using the brake after long term storage, the brake should be disassembled and cleaned removing any oxidation from the braking surfaces, re-assembled and adjusted.

PARTS INFORMATION

For item number, part number, and quantity of parts required for maintaining and servicing this equipment see the specific bill of material and assembly drawings as supplied with this instruction information manual. To insure prompt service, each repair parts order should contain the following information:

- | | |
|----------------------------|----------------------------|
| 1. Serial No. of Equipment | 5. Nameplate Voltage |
| 2. Part Number | 6. Quantity |
| 3. Nameplate Size | 7. Shipping Destination |
| 4. Description | (Address, Dept. No., etc.) |

Telephone orders are to be confirmed by letter to insure that proper parts or information is supplied.

All orders are to be addressed or telephoned to:

Zenar Corporation
Parts Department
P.O. Box 22
Oak Creek, WI 53154
Phone: (414) 764-1800
Fax: (414) 764-1614

To return a defective or broken part you must obtain a return authorization from Zenar's Replacement Parts and Service Department. All returned parts must be returned freight pre-paid.

RECOMMENDED SPARE PARTS

- Qty. (1) Spring
- Qty. (4) Brake Lining Discs