

Installation & Maintenance Manual

COMBINATION AIR ENGAGED FRICTION CLUTCH- AIR ENGAGED FRICTION BRAKE STOP & START THE SHAFT – BALL BEARING PILOT



Catalog Products:

[Z3A1R-STH](#)

[Z4A1R-STH](#)

[Z5A1R-STH](#)

[Z6A1G-STH](#)

*And non-catalog variations of
this clutch-brake design.*

CLICK on product numbers
above to obtain the product detail
sheet which includes dimensional
data helpful during installation.

Mach III Technical Support

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Detail sheets and 3D models are available on the Mach III website:

<http://www.machiii.com/Products/Clutch-Brakes/Stop-Start-Shaft-Clutch-Brakes-Air-Air.asp>

Please contact Mach III to obtain assembly and parts list drawings.



This product includes rotating equipment and should be guarded according to OSHA requirements and other Federal, State and local regulations. It is the responsibility of the user to provide necessary guarding.

I. New Clutch-Brake Torque

New clutch or brake torque is approximately 40% less than rated design torque until the friction and drive discs are worn in (lapped, burnished). The length of time for wear-in to occur depends upon the application.

II. Installing a Sprocket or Pulley

Mach III units are typically shipped from the factory with the required sprocket or pulley preinstalled. This section pertains only to those who need to install or replace a pulley or sprocket in the field. Please use the links on page one of this document to obtain the detail sheet for your unit. This sheet will include the pilot diameter and other dimensions needed to machine the sprocket or pulley.

Bore the sprocket or pulley for clearance (slide fit) over pilot and drill standard clearance holes for the number and type of screws on corresponding bolt circle. The cap screws used to attach the sprocket or pulley should not be longer than the sum of the depth of the threaded hole plus the thickness of the sprocket or pulley. Otherwise, the cap screws may bottom out. Tighten all screws to uniform torque based on screw size and use proper Loctite[®] (or equivalent) compound to assure a permanent mount.

III. Clutch-Brake Installation

A. SHAFT PREPARATION & MOUNTING

Mach III Clutch products are bored to fit a precision plug gauge for the specified bore size and should slide fit the mating shaft. Make certain that the shaft is free of burrs or nicks. It may be necessary to file or sand the shaft to assure a slide fit. **Never hammer the clutch-brake onto the shaft.** Hammering on the clutch-brake may cause evident damage or subtle injury that will shorten the wear life of the unit, and will void the warranty.

- (1) Apply the anti-seize (E-Z Break[®]) lubricant from the packet provided, or equivalent, to the shaft.
- (2) Insert key (customer supplied) onto the shaft.
- (3) Slide clutch-brake over key on the shaft, align the sprocket or pulley.
- (4) Tighten set screws to secure the clutch-brake to the shaft.

B. AIR LINE CONNECTION

Refer to the dimensional spec sheet for NPT size to obtain correct fitting. Install fitting using a thread sealing compound to prevent air leakage. Connect a flexible air line to the fitting. **Do not use rigid piping.** Air supply should be both filtered and regulated. Contamination in the air supply may damage the clutch-brake.

C. ANTI-ROTATION (REACTION) ARM CONNECTION

The air cylinder portion of a Mach III clutch-brake is designed to remain stationary. Due to friction in the bearing housed in the air cylinder and torque caused by the brake, this member will rotate unless an anti-rotation arm (a.k.a. reaction arm) is installed. Threaded holes and slots are provided in the brake adapter for the installation of anti-rotation screws or pins. Please refer to Mach III's *Anti-Rotation (Reaction) Arm Installation Instructions* document for illustrations of proper mounting. This document is available from the Mach III website, or by calling Mach III to have a copy sent by email or fax. <http://www.machiii.com/pdf/ReactionArmInstallation.pdf>

Note that in all cases, the machine frame or bracket should not be tight against the housing of the clutch as contact will shorten bearing life.

D. FINAL INSPECTION & TESTING

Check alignment of the sprocket or pulley. Cycle the clutch-brake with the machine off to check for air leaks and to ensure proper engagement and release. After a short run, check set screws and alignment.

IV. Clutch-Brake Operation

The maximum operating pressure should not exceed 80 PSI. Operation at pressures greater than that required for proper function will decrease the life of the bearings.

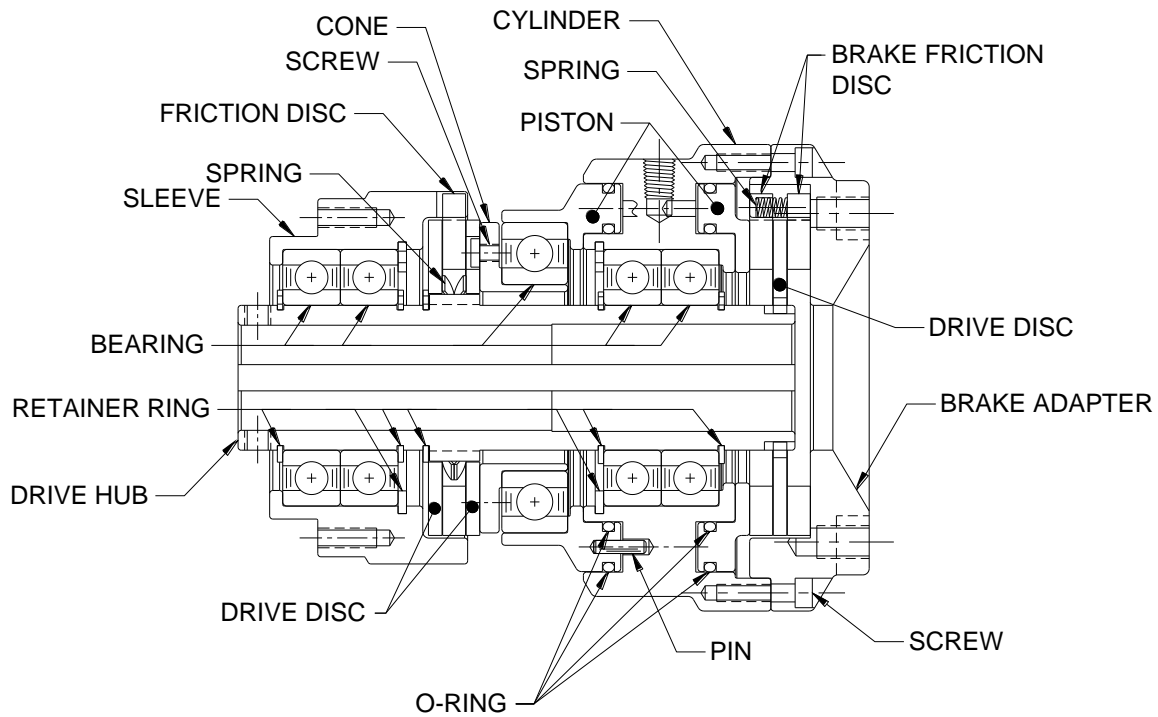
Special Note Regarding Friction Disc Contamination:

The friction material used in this product will absorb oil, water, chemicals and other contaminants. Depending on the type of contamination, clutch or brake may either seize up entirely or lose torque capacity. If friction discs become contaminated, they should be replaced. See repair kit ordering information below.

V. Routine Maintenance

When installed and operated according to the preceding guidelines, Mach III Clutch products should require little or no routine maintenance. A repair kit is available which contains all parts subject to typical wear: friction discs, springs and O-rings.

VI. Parts diagram



Repair Kit:	Part number = Clutch-Brake Product Number + "-RPRK" (e.g. Z3A1R-STH-RPRK).
Additional Parts:	Contact Mach III to obtain a complete listing of additional parts kits available for your specific clutch-brake. Please reference product number when calling or e-mailing.
Repair services:	Factory repair is available. A return materials authorization (RMA) number must be obtained prior to sending any unit in for repair.

VII. Repair Kit Installation Procedure

Tools Required	Compounds Required
Hex Wrench Set	Grease
Rubber Mallet or similar soft face hammer	O-ring Lubricant
Retainer (snap) Ring Pliers	Loctite® #609 Retaining Compound
Scraper	Anti-Seize Lubricant (for re-installation)

A. CLUTCH FRICTION DISC & SPRING REPLACEMENT

- (1) Remove clutch-brake from shaft and place in vertical position with sleeve (pilot/sprocket) end facing upward.
- (2) Remove retainer ring.
- (3) Remove sleeve assembly from drive hub. The sleeve's bearings are a slide fit on the drive hub and are affixed to the drive hub with a thin coating of Loctite®. You may need to strike the hub, or an object inserted in the hub with a rubber mallet or similar soft face hammer, while pulling the sleeve upwards to break the Loctite® seal.
- (4) Two remaining retainer rings should now be accessible. Remove the retainer rings.
- (5) Remove the drive discs, spring and friction disc.
(If replacing O-rings see O-RING REPLACEMENT below)
- (6) Drive discs should be clean, dry and free of burrs or nicks.
- (7) Assure that drive discs move freely on the drive hub and that the lugs of the friction discs move freely in the drive slots of the sleeve.
- (8) Reassemble drive & friction disc section according to reference drawing using new friction discs, springs and steel drive discs as necessary. Note that the first drive disc contains a milled hole. **It is important that this disc is replaced first during reassembly to line up with the screw in the cone.** After installing friction disc, drive discs and spring replace retainer ring.
- (9) Replace sleeve assembly and remaining retainer rings according to reference drawing.

B. BRAKE FRICTION DISC & SPRING REPLACEMENT

- (10) Invert clutch-brake with cylinder end facing upward.
- (11) Remove cap screws in brake adapter.
- (12) Remove the drive discs, springs and friction disc.
(If replacing O-rings see O-RING REPLACEMENT below)
- (13) Drive discs should be clean, dry and free of burrs or nicks.
- (14) Assure that drive discs move freely on the drive hub and that the lugs of the friction discs move freely in the drive slots of the top plate.
- (15) Reassemble drive & friction disc section according to reference drawing using new friction discs, springs and steel drive discs as necessary. **It is important that the springs be seated in milled holes in friction disc.**
- (16) Replace top plate and cap screws.

C. O-RING REPLACEMENT

- (1) Remove cone/piston [clutch] or piston [brake]
- (2) Remove & inspect O-ring seals.
- (3) Replace O-rings that have been lubricated with an O-ring lubricant such as Dow Corning® #4 Compound or equivalent.
- (4) A very *thin* coat of O-ring lubricant should also be applied to the inner walls of the cylinder. **Be careful not to contaminate clutch or brake friction disc with O-ring lubricant.**
- (5) Replace cone/piston [clutch (making sure the pins in cylinder are aligned with holes in piston)] or piston [brake].

See "CLUTCH-BRAKE INSTALLATION" portion of these instructions for the proper procedure for reinstalling the clutch-brake.

Technical assistance is available by contacting Mach III Clutch, Inc.

Mach III Product Warranty
<http://www.machiii.com/Resources/Warranty-Info.asp>

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