Installation and Maintenance Manual



SensiFlex®
TENSION CONTROL BRAKES

Patent No. 6,578,691 B1

This document applies to the following catalog standard products, and custom versions based upon these models:

38BK & 38BK-ULOW

58BK & 58BK-ULOW

78BK & 78BK-ULOW

98BK & 98BK-ULOW

PLEASE NOTE

Mach III products are manufactured on a per order basis and may only be returned in cases of warranty defect. We strongly recommend reviewing all new applications with Mach III Engineering staff to ensure suitability of the chosen product for the intended use.

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ADDITIONAL RESOURCES AND SERVICES

PRODUCT DETAIL SHEETS

Click on the product number shown on page 1 of this document for a link to download the product detail sheet which contains dimensional data, torque capacity and other specifications along with parts list and parts kits details. For custom products (part numbers ending in three numeric characters), contact Mach III Engineering.

TECH SUPPORT, 3D MODELS, APPLICATION REVIEW AND SELECTION ASSISTANCE

Mach III Engineering: engineering@machiii.com
859-291-0849

FACTORY REPAIR SERVICE

Clients who want to have a unit evaluated for factory repair service should contact Mach III Customer Service to obtain return materials authorization (RMA). Mach III will evaluate the unit and will issue a quotation if the unit is repairable, or for replacement if the unit is not repairable. Lead time for the repair or replacement will depend upon parts availability and will be included in the quotation.

Mach III Customer Service: orders@machiii.com
859-291-0849

GENERAL SAFETY PRECAUTIONS

WARNING	
	These products include rotating equipment and should be guarded according to OSHA requirements. It is the responsibility of the user to provide the necessary guarding.

WARNING	
	This product can emit a spark and is not recommended for use in any explosive environment.

NEW VERSUS BURNISHED TORQUE

The torque output of a new friction clutch or brake can be up to 40% less than the published torque rating. To achieve full design torque, a unit must be cycled under load to burnish the friction surfaces. The exact number of cycles varies by application. When calculating required torque always use a safety factor of 1.5 to 2. It is not recommended to select a product for use at its maximum rated torque for continuous duty.

PRODUCT SELECTION

Torque capacity is only one factor to consider when making a product selection. Ensure that you will have the right product for the job by contacting our engineering department for application review and selection assistance.

INSTALLATION

1. 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 onto the shaft.** Hammering on the clutch may cause evident damage or subtle injury that will shorten the wear life of the unit and will void the warranty.

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

B. MOUNTING

If the surface on which the brake will be mounted is perpendicular to the shaft, drill and tap holes for the number and type of clearance holes on corresponding bolt circle. Tighten all bolts uniformly to the torque recommended for the bolt size using proper Loctite® (or equivalent) compound to ensure a permanent mount. If the mounting plate is not perpendicular to the shaft, it is recommended that the brake be mounted using shoulder bolts in holes, or pins in slots on corresponding bolt circle to allow the brake housing to float.

C. AIR LINE CONNECTION

Refer to the Product Detail Sheet to determine the NPT or BSPT size and connect an air fitting of the applicable size. Install the fitting using a thread sealing compound to prevent air leakage. ***Do not use rigid piping.*** Flexible air line should always be used.

D. AIR SUPPLY

Mach III products require clean, filtered, pressure regulated air. Air lubricators are neither required nor recommended as all bearings, bushings and seals are lubricated for life upon assembly.

E. FINAL INSPECTION & TESTING

Cycle the 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 mounting screws.

OPERATION

A. AIR PRESSURE

Torque output of this model is proportional to air pressure applied. Refer to the Product Detail Sheet for specifics regarding torque capacity. The air pressure supplied to the unit should be regulated to the minimum amount necessary to attain the required torque output. **The maximum operating pressure should not exceed 80 PSI.** SensiFlex® brakes are designed for use in slip applications, typically to maintain tension on a web during unwinding or a similar tension control application. Mach III Clutch, Inc. should always be consulted to assist with selection of a SensiFlex® Brake to ensure that the required tension can be maintained while dissipating the heat caused by constant slip.

B. CONTAMINATION

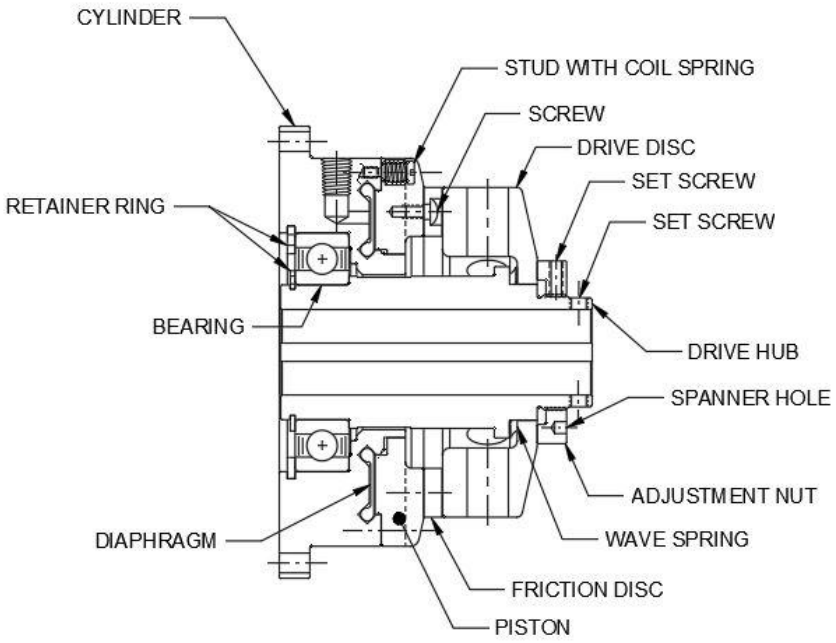
The friction material (pads) contained within this product will absorb oil, water, chemicals, and other contaminants. Depending on the type of contamination, clutch may either seize up entirely or lose torque capacity. If friction discs become contaminated, they should be replaced. Particulate contamination can also cause premature wear of the drive surfaces and seals. If the operating environment is prone to contamination, a custom, covered unit should be considered. Contact Mach III Engineering to explore options.

MAINTENANCE & REPAIR

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. The following pages provide instructions for installing a repair kit.

When more extensive repairs are required, contact Mach III Engineering for technical support or Mach III Customer Service for factory rebuild options.

PARTS DIAGRAM



REPAIR KIT INSTALLATION PROCEDURE

TOOLS REQUIRED

Hex Wrench Set
Rubber Mallet or similar soft face hammer
Retainer (snap) Ring Pliers
Scraper

COMPOUNDS REQUIRED

Molykote® G-N Metal Assembly Paste
Dow Corning® #4 Compound
Loctite® #609 Retaining Compound
Anti-Seize Lubricant (for re-installation)
Feeler Gauge

A. DISASSEMBLY

1. Loosen set screws and bolts from flange and slide the brake off the shaft. Place brake in a horizontal position with the cylinder facing downward.
2. Loosen nylon point set screw in adjustment nut and remove the nut.
3. Remove drive disc which should slide easily off drive hub.
4. Inspect the drive surface which contacts the friction disc. Grooves in the surface would indicate that the friction disc should have been replaced sooner and the heads of the mounting screws have made contact. This surface must be free from grooves, burrs and foreign materials for the brake to operate properly. If damage is pronounced, please contact Mach III Clutch or your distributor for a replacement. In addition, the drive disc surface should be inspected for discoloration (turning blue). If discoloration is present, the unit is being operated beyond its capacity and Mach III Clutch should be contacted for assistance.

B. FRICTION DISC REPLACEMENT

1. Remove brass screws which affix the disc to the piston.
2. Remove the worn friction disc and make sure the mounting surface is smooth and free from contamination.
3. Mount new friction disc by snugging all screws using an alternating sequence. Do not over-tighten. If no other components require replacement, skip to section D2 for the proper procedure for reassembling the brake.

C. DIAPHRAGM AND/OR BEARING REPLACEMENT

Diaphragm replacement should rarely be necessary if the air supply is regulated and free of contamination and if the gap between the friction and drive disc is properly set. Care should be taken when mounting the brake to ensure maximum bearing life. See "Shaft Preparation & Mounting" for guidelines

1. Diaphragm Replacement

a. First, follow disassembly instructions above. Friction disc can remain mounted on piston during this procedure. Wave spring should be removed and set aside.
b. Turn assembly so that the retainer rings in the air cylinder end are accessible.
c. Remove innermost retainer ring.
d. Remove the drive hub with use of an arbor press or strike the hub or an object inserted into the hub with a rubber mallet or similar soft face hammer.
e. Remove stud & coil springs and separate the air cylinder and piston.
f. Pinch the diaphragm and pull from the grooves which retain it. Make sure that the retaining grooves and surface underneath the diaphragm are clean & free from debris.

Lubricate the new diaphragm with an O-ring lubricant such as Dow Corning® #4. Install with the lips located on the ID and OD of the diaphragm facing downward. Press the lips into the grooves by applying pressure while gliding a finger along each perimeter of the diaphragm and then ensure that the lips are fully seated by running your thumb across the surface of the diaphragm in a clockwise motion several times.

2. Bearing Inspection & Replacement

g. Check bearing for external damage (missing seal, etc.). Make sure the bearing rotates freely and smoothly by hand. OD of bearing is press fit into the cylinder.
h. If bearing replacement is necessary, remove additional retainer ring (at the bearing OD). The bearing should be removed from the cylinder using an arbor press.
i. The new bearing should be pressed back into the cylinder using Loctite® #609 Retaining Compound on the OD of the bearing.
j. Replace outer retainer ring.

D. REASSEMBLY

IMPORTANT: **The gap between the friction and drive disc surface is factory set between 0.010 and 0.020 In. This is the ideal clearance for proper performance. Increasing this gap may result in air leaks and damage to the diaphragm actuator. Decreasing this gap prevents full disengagement of the brake.**

1. Reassembly from the point of diaphragm and/or bearing replacement:
    a. Make sure that face of diaphragm is free from debris.
    b. Apply a thin coat of grease (such as Molykote® G-N Metal Assembly Paste) to the polygon shaped I.D. of the piston.
    c. Replace piston.
    d. Replace springs over studs and screw studs into cylinder. DO NOT OVER-TIGHTEN.
    e. Apply a thin coat of Loctite® #609 retainer compound to the inside diameter of the bearing, then slide the air cylinder assembly over the drive hub. Replace the inner retainer ring at cylinder end of the drive hub (outer retainer ring should have already been replaced) making sure that it is fully seated in the groove provided in the hub.

2. Reassembly from the point of friction disc replacement:
    a. Replace wave spring.
    b. Replace drive disc.
    c. Apply a thin coat of grease (such as Molykote® G-N Metal Assembly Paste) to the hex shaped I.D. of the drive disc.
    d. Place nut on threads and tighten using spanner wrench to a point where a 0.010 - 0.020 gap remains between the friction and drive disc surfaces. It is recommended that a feeler gauge be used.
    e. Tighten set screw in adjustment nut when proper clearance has been achieved.
    f. See Brake Installation section of this document for the proper re-installation procedure.

MACH III PRODUCT WARRANTY

Mach III Clutch warrants its products to be free from defects in materials and workmanship for a period of one year from the date of shipment from our factory or from the location of one of our authorized distributors provided the product is properly installed, maintained and has been operated under normal conditions. This warranty shall not apply to products that have been subject to misuse, negligence or accident, or damaged by circumstances beyond the control of Mach III Clutch, or which has been used in a manner contrary to Mach III Clutch instructions or recommendations. Products that have been altered after shipment or repaired without following proper repair procedures, as deemed by Mach III Clutch, are also expressly excluded from this warranty.

Warranty claims shall be made in writing and the product(s) shall, if requested by Mach III Clutch, be returned with transportation charges prepaid for evaluation. Upon our determination that a defect exists, Mach III Clutch, at its sole discretion, will either repair or replace the defective component(s) or product(s).

THIS WARRANTY IS MADE EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THE BUYER'S SOLE AND EXCLUSIVE REMEDY SHALL BE FOR THE REPAIR OR REPLACEMENT OF DEFECTIVE PRODUCTS AS PROVIDED HEREIN AND UNDER NO CIRCUMSTANCES WILL MACH III CLUTCH LIABILITY EXCEED THE PRICE OF THE DEFECTIVE UNITS. THE BUYER AGREES THAT NO OTHER REMEDY (INCLUDING, BUT NOT LIMITED TO, INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR LOST PROFITS, LOST SALES, INJURY TO PERSON OR PROPERTY OR ANY OTHER INCIDENTAL OR CONSEQUENTIAL LOSS) SHALL BE AVAILABLE TO HIM OR HER.

Mach III Clutch neither assumes nor authorizes any person to assume for it any other liability in connection with the sale of its products.

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Motion Control Solutions

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