

**Installation, Operating and Maintenance  
Instructions for Backstop FCBM 72 SF**

**E 08.770e**



**RINGSPANN GmbH**

Schaberweg 30-34  
61348 Bad Homburg  
Germany

Telephone +49 6172 275-0  
Telefax +49 6172 275-275

[www.ringspann.com](http://www.ringspann.com)  
[mailbox@ringspann.com](mailto:mailbox@ringspann.com)

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## IMPORTANT

Please read these instructions carefully before installing and operating the product. Your particular attention is drawn to the notes on safety.

These installation and operating instructions are valid on condition that the product meets the selection criteria for its proper use. Selection and design of the product is not the subject of these installation and operating instructions.

Disregarding or misinterpreting these installation and operating instructions invalidates any product liability or guarantee by RINGSPANN; the same applies if the product is taken apart or changed.

These installation and operating instructions should be kept in a safe place and should accompany the product if it is passed on to others -either on its own or as part of a machine- to make it accessible to the user.

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## SAFETY NOTICE

- Installation and operation of this product should only be carried out by skilled personnel.
- Repairs may only be carried out by the manufacturer or accredited RINGSPANN agents.
- If a malfunction is indicated, the product or the machine into which it is installed, should be stopped immediately and either RINGSPANN or an accredited RINGSPANN agent should be informed.
- Switch off the power supply before commencing work on electrical components.
- Rotating machine elements must be protected by the purchaser to prevent accidental contact.
- Supplies abroad are subject to the safety laws prevailing in those countries.



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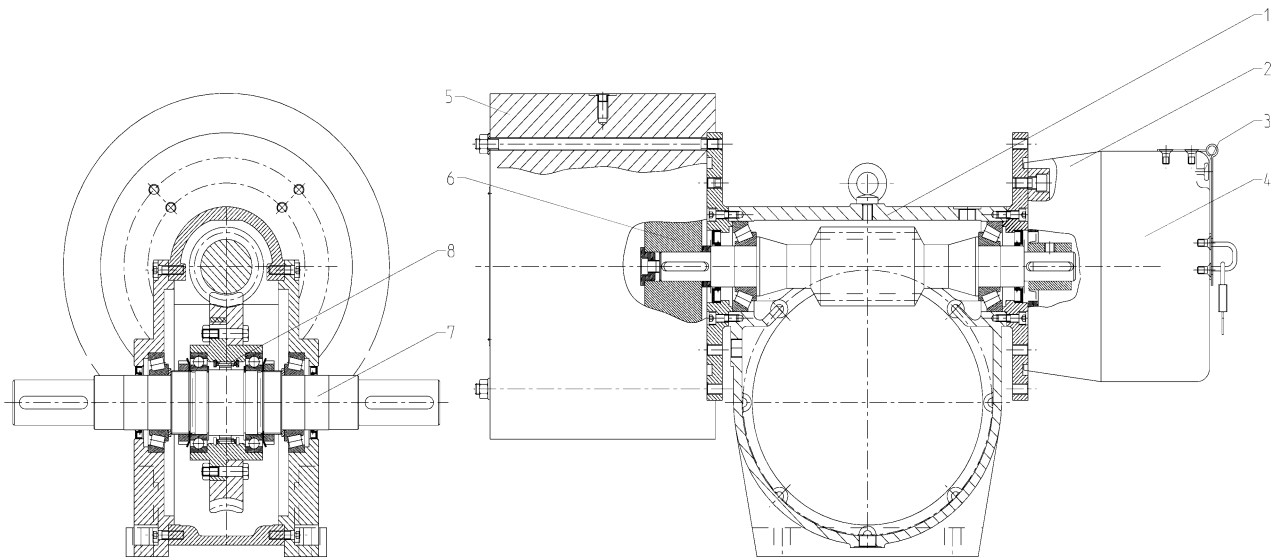
Schaberweg 30-34    Telefon +49 6172 275-0    internet: <http://www.ringspann.com>  
D-61348 Bad Homburg    Telefax +49 6172 275-275    e-mail: [mailbox@ringspann.com](mailto:mailbox@ringspann.com)

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## 1. General

### 1.1 Function

The Backstop FCBM 72 SF is a safety device.

It protects rotating equipment from uncontrolled runback of the kiln due to gravity. This backstop is usually installed between emergency drive and emergency gearbox.

This unit consists of a RINGSPANN freewheel clutch SF 72 (8) on the main emergency drive shaft (7, freewheel shaft) and two brakes. These brakes are mounted on the secondary shaft (2, worm shaft). One brake is an electromagnetically released disc brake (4) and the other brake is a centrifugal brake (6). The brakes are automatically engaged when the main shaft (7) tries to reverse the direction of rotation. The integration and proper function of these brakes is made possible with the RINGSPANN freewheel clutch SF 72 (8).

The disk brake (4) is designed to hold the reverse load of the kiln upon termination of forward motion. Before forward motion of the kiln can be restored, the offset mass within the kiln must be allowed to come to a state of rest. To do this, the disk brake must be released either electrically from a central control station or mechanically with the manual release (3). Once the disk brake is released, the centrifugal brake will allow the kiln to reverse at a safe and controlled speed. The released energy of the kiln is transferred into heat which is then dissipated by the aluminum brake drum (5).

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## 1.2 Proper Use

The backstop FCBM 72 SF has been manufactured in accordance with the latest state of technological development and is delivered in a condition for safe and reliable use. Unauthorized changes, additions or modifications which reduce reliability and/or safety are not permitted. This also applies to safety features that are designed to prevent accidental contact.

The backstop FCBM 72 SF may be used and operated only in accordance with the conditions laid down in the service and supply contract.

## 1.3 Warnings and symbols used in these Operating Instructions



This symbol indicates safety measures which must be observed to avoid **personal injury**.

**Caution:** This symbol indicates safety measures which must be observed to avoid **damage to the backstop FCBM 72 SF**.

**Note:** This symbol indicates general **operating instructions** which are of particular importance.

## 2. Technical Description

### 2.1 Identification marking

Color codes for ventilation, oil level and oil drainage:

Ventilation and oil filling: orange  
Oil level and lubrication points: silver  
Oil drain: blue

The direction of freewheeling rotation is indicated by an arrow.

### 2.2 Nameplates

There are different nameplates on the equipment.

- Nameplate of the backstop FCBM 72 SF is located on the face of the centrifugal brake drum.
- Nameplate of the worm gear box is located on top of the MRT 150 housing.
- Nameplate of the electrically released disc brake is located on the top of the disc brake.

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### 3. Warnings

It is important that the information in this manual be used as the basis for proper care of the backstop FCBM 72 SF. Improper care can cause failure of the backstop FCBM 72 SF to brake the reversal speed of the kiln, thus permitting runaway and danger of centrifugal explosion to equipment.

**Caution:** Care must be taken not to place the unit in operation until it has been filled with oil.



An overloaded condition may be present if both the main and emergency drives need to be used to rotate the kiln. This overload can cause serious damage to elements within the drive train.



Do not touch the drum during runback of the kiln. The drum becomes hot due to operation of the centrifugal brake during kiln reversal.



Do not remove the drum while a load is present! Removing the drum will compromise the function of the backstop and can result in centrifugal explosion if a load is present.



Rotating equipment is potentially dangerous and could cause injury or damage if not properly protected. Follow applicable codes and regulations.

### 4. Shipping

The backstop FCBM 72 SF is ready assembled and shipped without oil.

The shaft ends have been provided with a rust-preventive paint coating and covered by an elastic stocking. It is resistant to seawater and tropical conditions for a period of 12 months. The properties of the outer paint coat are as follows: Resistant to acids, weak alkalis, solvents, atmospheric action, temperatures up to 120 °C (temporarily up to 140 °C) and to tropical conditions. The internal parts of the gear unit are treated with preservative. This preservative is sufficient for normal transport conditions (including overseas transport) and for a period of 6 months until initial start-up. For longer periods of storage (> 6 months) we advise regular checking and, if necessary, renewal of the internal and external preservation.

### 5. Handling and Storage

Eye bolts are to be used when moving, lifting and lowering the backstop FCBM 72 SF into position.

Use only lifting and handling equipment of sufficient load-bearing capacity.

**Caution:** Do not knock the free shaft ends. This may damage the backstop FCBM 72 SF.

The backstop FCBM 72 SF should never be handled by placing slings or chains around the shaft extension or the brake housings. Do not use the front threads at the shaft ends to attach eye bolts for transportation.

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The backstop FCBM 72 SF must be stored on a vibration-free base in a place protected from the weather. Do not stack backstop units on the top of one another.

## 6. Foundations

Care should be taken in the selection of flexible foundations such as light steel timber structures as they may produce damaging effects.

A rigid foundation such as a reinforced concrete bed or substantial steel structure is recommended. The top of the foundation should be flat to prevent housing distortion.

If the backstop FCBM 72 SF is to be mounted on a concrete foundation, a steel base plate containing the foot mounting bolts should first be anchored to the foundation.

## 7. Installation

### 7.1 Direction of Rotation

**Caution:** The backstop FCBM 72 SF must be installed for desired freewheeling rotation to avoid damage due to overspeeding in the forward or reverse direction. The freewheeling rotation is marked on the gearbox housing with an arrow.

The manual brake release handle (3) must be **pushed** in the “On” position before checking the freewheeling rotation. The backstop FCBM 72 SF shaft (7) will freewheel in one direction and hold in the opposite direction. The desired freewheeling direction of rotation should be checked as outlined in paragraphs a) and b).

The backstop FCBM 72 SF is provided with double shaft extension (7).

- a) If both ends of the shaft should be connected with the drive system, then the direction of freewheeling rotation must be determined by looking at the backstop FCBM 72 SF from the emergency drive position.
- b) If only one end of the shaft should be connected with the drive system, then the direction of freewheeling rotation must be determined by looking at the backstop FCBM 72 SF from the unused shaft position.

Be sure the free rotation of the shaft (7) is in the desired direction.

### 7.2 General information on assembly and installation

Accurate alignment of backstop FCBM 72 SF shaft with the shafts of the connected equipment is most important, and should be done in accordance with the coupling manufacturer’s instructions. Misalignment may develop unnecessary overloads and stresses in shafts and bearings, and can be responsible for failure of the equipment.

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- The air feed for cooling the gear unit must not be impaired.
- A means of monitoring the oil level must be provided.
- Foundations and connections must be designed and constructed so as to prevent vibration being transmitted from adjacent components and assemblies.
- The unit must be carefully aligned with the motor on the input and output sides. Possible strain deformations due to operating forces must be taken into account.
- Fastening bolts or nuts must be tightened to the prescribed torque. For the tightening torque, refer to the relevant tables. Bolts of the minimum strength class 8.8 must be used.
- If external forces are acting upon the gear unit, it is advisable to prevent displacement by means of lateral stops.
- To ensure proper lubrication, the installation position specified in the order must always be observed.

### 7.3 Description of assembly

Remove anti-corrosive paint from the shaft ends and connecting surfaces with a mild cleaning agent.



Adequate ventilation must be ensured when using cleaners containing solvent additives. If necessary, the flammability of the cleaning agent must be noted.

**Caution:** Cleaning agent must not be allowed to get under the sealing lips of the shaft sealing rings.

Install couplings and similar add-on parts onto the shaft ends and secure them. If these are to be heated before mounting, the manufacturer of the parts must be consulted for the correct joining temperatures.

The gear unit shaft ends have tapped holes in their end faces to aid the pulling on of couplings, washers, gears, etc.

**Caution:** The components to be mounted must be fitted with the aid of suitable equipment to prevent the shaft bearings from being damaged by axial joining forces. Always use suitable lifting equipment. When fitting the components, care must be taken that the shaft sealing rings and shaft running surface are not damaged.

**Caution:** Never use force or knock the couplings into position, as this will damage the rolling bearings, locking rings, etc.

**Caution:** The operating instructions for the part to be attached must be observed. Evidence of damage caused by disregard of these instructions is readily traceable, and RINGSPANN GmbH will not be held responsible for the failure of the affected part or parts.



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## 7.4 Alignment

The backstop FCBM 72 SF shaft ends should be connected to the emergency equipment shafts through suitable sizes of double engagement, self-aligning, gear-type flexible couplings. Do not use couplings of pin, flexible spring, or single-engagement types without the approval of RINGSPANN GmbH.

After the backstop FCBM 72 SF has been lowered in place, it is desirable to use metal shims to obtain proper alignment of the backstop FCBM 72 SF shaft with the shafts of the emergency equipment. Locate housing axially to provide proper shaft gaps per coupling manufacturer.

Failure to properly shim the backstop FCBM 72 SF housing feet may cause the housing to distort when the mounting bolts are tightened.

If the transverse axis of the backstop FCBM 72 SF is mounted on an incline, the longitudinal axis must be placed in a horizontal position and checked with a spirit level. If the horizontal axis of the backstop FCBM 72 SF is mounted on an incline, then the transverse axis must be placed in a horizontal position and checked with a spirit level.

It is important that the alignment of the backstop FCBM 72 SF shaft with the shaft of the emergency equipment be rechecked after the final tightening of the mounting bolts, and before the coupling sleeves are bolted together.

After the installation has been properly aligned, dowel the backstop FCBM 72 SF in place by using two dowels, locating them on the same side of housing. Doweling will preserve the original alignment and proper shaft relationship should it become necessary to remove and reinstall the backstop FCBM 72 SF, thus providing every possible precaution against wrong reassembly.

## 7.5 Centrifugal Brake

The centrifugal brake (5) is to control the reversal speed of the kiln when the electromagnetically released disc brake is released by electric control, or by the emergency manual release.

**Caution:** Do not remove the brake drum when the kiln is loaded and subject to reverse rotation. Without the brake drum, uncontrolled kiln rollback can occur and cause dangerous reverse over-speeding of the main or emergency drive elements.

## 7.6 Electromagnetically Released Disc Brake

The backstop FCBM 72 SF is equipped with a spring set actuated / electromagnetically released disc brake. Electrical connections to the brake solenoid are to be made at the half-inch tapped hole on the brake housing.

Before placing in operation, be sure the manual brake-release handle is **pushed** into the brakes "On" position. The electric brake may be controlled from a single push-button at a control station.

**Caution:** To prevent shock loading, rollback of the kiln must be completed before the electromagnetic brake is reengaged either electrically or manually.

Refer to the Stearns Electric Corp. sheets enclosed with this manual for instructions on installation and maintenance of the electrically released disc brake.

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## 7.7 Emergency Manual Brake Release

The external manual brake release of the electromagnetically released disc brake is provided for release only in the event of a complete power failure. Pulling the handle out to the brake "Off" position will release the brake and allow the kiln to reverse. A padlock arrangement is assembled to permit only authorized personnel access to the manual release.



**Do not run the backstop FCBM 72 SF with electromagnetic brake in the manual release position.**

The manual release is intended for use only for emergency movement of the kiln, not as a substitute for full electrical release. The electromagnetic brake is not fully released when operated manually.

## 8. Starting

### 8.1 Environmental protection

- When changing oil, the used oil must be collected in suitable containers. Any oil spillage must be removed immediately.
- Preservative agents should be stored separately from used oil.
- Used oil, preservative agents, oil-binding agents and oil-soaked rags must be disposed of in accordance with environmental legislation.

### 8.2 Filling the Gear Box with Oil

The backstop FCBM 72 SF will be shipped without oil. The required oil quantity is 2,75 Liter. The backstop FCBM 72 SF must be properly filled with oil before starting.

When putting in the oil, the oil must be allowed sufficient time to distribute so that the final oil level can be determined. Various lubricants are indicated in the lubricant table according to the oil manufacturer's recommendations. Equivalent brands of non-foaming oil by other manufacturers may also be used. It is important to use the type of oil (synthetic or mineral oil) specified on the nameplate. However, we cannot guarantee that a selected lubricant is completely suitable.

**Caution:** Always select the gear oil in accordance with the viscosity class indicated on the rating plate on each gear unit. If other viscosities are used, thicker oils are preferable to thinner ones.

**Caution:** The oil must be put in until it is at least up to the middle of the sight glass or at most up to the upper edge of the oil sight glass or the lower edge of the oil level hole (shown in silver). The upper screw plug (marked yellow) must be replaced with the breather screw supplied along with the unit. Max. allowed inclining of the emergency drive shaft is 4%.

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### 8.3 Initial Start Up

On starting up care must be taken that the breather screw with its cap is fitted; if necessary, remove plastic screw stopper or screw plug.

The gear unit must then be run on intermittent load, i.e. run on normal load for a few minutes, alternating with breaks several times the length of the operating cycle. The duty cycle can gradually be increase up to normal operation, while at the same time monitoring the operating temperature. Operating temperatures up to approx. 100 °C are permissible.

During the initial starting operation, check whether there is any vibration present due to loose foundation bolts or misalignment of shafts. If any correction is necessary, it should be made before placing the backstop FCBM 72 SF into permanent operation.

### 9. Lubrication Maintenance

Centrifugal brake and electrically released disc brake must not be lubricated. Following paragraphs are referring to the gear box.

#### 9.1 Environmental protection

- When changing oil, the used oil must be collected in suitable containers. Any oil spillage must be removed immediately.
- Preservative agents should be stored separately from used oil.
- Used oil, preservative agents, oil-binding agents and oil-soaked rags must be disposed of in accordance with environmental legislation.

#### 9.2 General notes on lubrication maintenance



Depending on operating conditions, the surface of the gear unit may heat up considerably. **Danger of burns!**

When changing oil, take care to prevent scalding by hot oil.

Measures	Periods	Remarks
Check oil level	every 3 months	Oil level at least up to the middle of the oil sight glass or at most up to the upper edge of the oil sight glass or the lower edge of the oil level hole when the gear is cold and out of operation
First oil change	after approx. 300-600 operating hours	see items 8.1, 8.2, 9.3
subsequent oil changes	after approx. 2000-4000 operating hours, but at the latest after 18 months	see items 8.1, 8.2, 9.3

**Note:** The times shown apply to mineral oils.

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### 9.3 Changing the oil

**Caution:** When changing the oil, the gear unit must be filled with the type of oil previously used. Never mix different types of oil or oils made by different manufacturers. In particular, synthetic oils must never be mixed with mineral oils.

The oil must be drained off immediately after shutting down the gear unit and while the oil is still warm. The oil must be given sufficient time to drain off in order to remove oil sludge, abraded metal and oil residues. If iridescent abraded bronze particles appear in the oil, this is not in any way harmful.

### 9.4 Lubricants

For its gear units, FLENDER approves only CLP oils which contain ingredients to DIN 51517-3 for improvement of corrosion protection, resistance to ageing, and which reduce wear in mixed-friction areas.

**For its freewheel inside the gear box, RINGSPANN GmbH highly recommends to use mineral oils only acc. viscosity ISO-VG DIN 51519 at 40 °C (mm<sup>2</sup>/s) of VG 320, which is also recommended for the main gear box.**

If a different viscosity is selected, or oil of a type other than those recommended in these instructions, the operator assumes the responsibility for its technical suitability. In order to minimize the technical risk in such a case, RINGSPANN GmbH recommends the use of a CLP oil of the above quality which should be accompanied by a statement of suitability by the oil manufacturer.

## 10. Maintenance of Friction Type Brakes

**Caution:** Inspection; Maintenance, and servicing of the brakes can only be done when the kiln is stopped at a normal rest position without an unbalanced load condition present. Inspection should be done at each shutdown period, with a maximum of 12 month intervals.

### 10.1 Electromagnetically released Disc Brake

Refer to Stearns Electric Corp. Sheets enclosed with this manual for instructions on installation and maintenance of the electromagnetically released disc brake.

**Caution:** The friction discs should be replaced when they have been worn to a thickness of 3,5mm (1/8 inch) or less. Be sure to push hand lever in, to brake "On" position after inspection.

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## 10.2 Centrifugal Brake

Refer to Hilliard Corp. sheet enclosed with this manual for instructions on installation and maintenance of the centrifugal brake.

**Caution:** The centrifugal brake unit should be replaced when the thickness of friction material remaining on the lining is 1,6mm (1/16 inch) or less (bonded lining) or 2,4mm (3/32 inch) or less (riveted lining).

Keep the inside of the centrifugal brake drum free from oil, corrosion, and loose particles.

**Caution:** The brake drum should be replaced when the contact surface is worn 0,4mm (1/64 inch) or more.

Make certain that the fasteners holding the brake housing to the adapter ring are tight on reassembly.

## 11. Maintenance and repair of the Gear Box

It is the responsibility of the user to be sure the backstop FCBM 72 SF is in a safe operating condition at all times. This may include returning the unit to RINGSPANN GmbH for periodic inspection, if necessary.

Individual experience and usage of this unit can only determine the actual frequency of lubrication and maintenance needed for save operation.

Field disassembly and repair of clutch elements within the worm gear housing is not recommended. Should problems occur, contact RINGSPANN GmbH directly.

### 11.1 General notes on maintenance

Measures	Periods	Remarks
Monitor oil temperature, gear unit noise and leak tightness	Continuously	see item 11.2
Check oil level	every 3 months	Oil level at least up to the middle of the oil sight glass or at most up to the upper edge of the oil sight glass or the lower edge of the oil level hole when the gear is cold and out of operation
First oil change	after approx. 300-600 operating hours	see items 8.1, 8.2 and 9.3
subsequent oil changes	after approx. 2000-4000 operating hours, but at the latest after 18 months	see items 8.1, 8.2 and 9.3
Cleaning the breather screw	if dirty	
Clean housing	if dirty	see item 11.3
Checking tightness of fastening bolts	with every oil change	see item 11.4

## 11.2 Possible faults

Malfunctions	Causes	Remedy
Changes in gear	noise Excessive bearing play Bearing defective Damage to gear teeth Fastening has worked loose	Contact Customer Service. Contact Customer Service. Contact Customer Service. Tighten bolts / nuts to prescribed torque. Replace damaged bolts / nuts.
Operating temperature too high	Oil level in gear-unit housing too high or too low Oil too old Oil badly contaminated Suction opening in cover and/or housing clogged by dirt Bearing defective Freewheel not running freely	Check the oil level at room temperature and, if necessary, adjust oil level Change oil. See section 10. Change oil. See section 10. Clean housing  Contact Customer Service. Contact Customer Service.
Oil leak	Radial shaft sealing rings defective	Replace radial shaft sealing rings

## 11.3 Clean housing

Stop gear unit by deactivating the drive unit, and secure from turning  
Remove any corrosion.

**Caution:** The gear unit must not be cleaned with high-pressure cleaning equipment.

## 11.4 Checking tightness of fastening bolts

Stop gear unit by deactivating the drive unit, and secure from turning  
Check all fastening bolts for tightness and, if necessary, tighten.

**Caution:** For the tightening torques for the fastening bolts, refer to the relevant tables.

**Note:** Damaged bolts must be replaced with new bolts of the same type and strength class.

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## 12. Spare Parts

### 12.1 Stocking Spare Parts

When ordering spare parts, refer to the spare-parts list and spare parts drawing.  
We guarantee only original spare parts supplied by RINGSPANN GmbH

**Caution:** Please note that spare parts and accessories not supplied by RINGSPANN GmbH have also not been tested and approved by us. The installation and/or use of such products may therefore impair essential characteristics of the backstop FCBM 72 SF, thereby posing an active or passive risk to safety. RINGSPANN GmbH will assume no liability or guarantee for damage caused by spare parts and accessories not supplied by RINGSPANN GmbH.

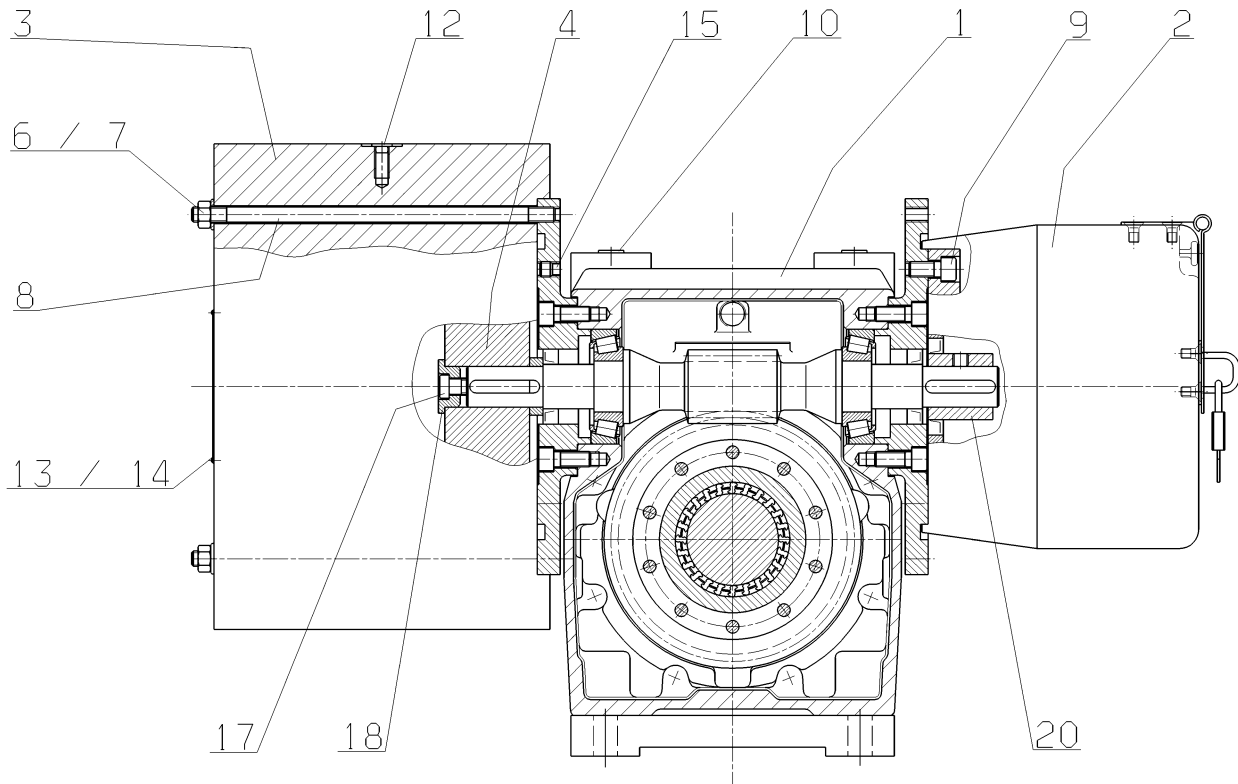
When ordering spare parts, always state the following:

- Part-No (Sach-Nr.) on nameplate of backstop FCBM 72 SF
- Series (Serie) on nameplate of backstop FCBM 72 SF
- Order no. - item - serial no. on nameplate of the worm gear box
- Model number on nameplate of electrically released disc brake
- Serial Number on nameplate of electrically released disc brake

and then

Part no.        (from spare parts list)  
Quantity       (from spare parts list)

## 12.2 Spare Part Lists



Item	Part-No.	Description	Qty	Remark
1	3887.072.401.000000	worm gear box MRT 150 special	1 pc	Separate Spare part list available
2	4451.200.1xx.Axxxxx	disc brake, electromagnetically released, with padlock	1 cp	Size and type depends on customer's individual application. (See 12.1)
3	2764.381.105.000000 2774.295.100.000000	Drum with brake flange	1 cp	
4	3452.221.0xx.032H33	Centrifugal brake	1 cp	Size and type depends on customer's individual application. (See 12.1)
6	5101.012.001.000000	Hexagon nut M12 DIN 934-8	4 cp	
7	5105.013.001.000000	Disc 13 DIN 125-St	4 cp	
8	5014.012.047.000000	screw M12	4 cp	
9	5001.012.004.000000	Head cap screw M12x20 DIN 912-10.9	4 cp	
12	5025.016.001.000000	Plug KAPSTO GPN-300-F7	1 cp	
13	5206.002.003.000000	Nail 2x6 DIN 1476	4 cp	
14	2520.000.000.A19000	Name plate for FCBM 72	1 cp	
15	5012.012.058.000000	Hexagon Socket set screw M12x16 DIN 915-45H	4 cp	
17	5002.012.002.000000	Head cap screw M12x25 DIN 6912-8.8	1 cp	
18	2791.042.100.000000	Holding disc	1 cp	
20	2741.044.109.000000	Distance ring	1 cp	

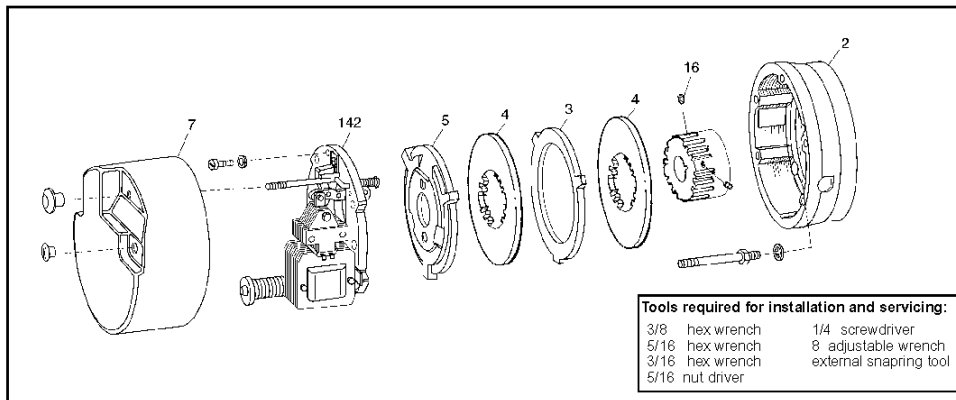


### 13. Installation and Service Instructions Disc Brake

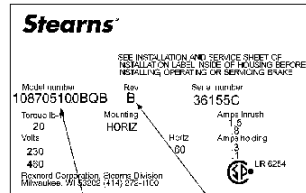
#### Spring-Set Disc Brakes

P/N 8-078-928-01  
effective 6/26/01

## Installation and Service Instructions for 87,000 & 87,100 Series Self-Adjust Brakes (rev. B)



#### Typical Nameplate



**Note:**  
MODEL NUMBER will appear on brake nameplate.  
REVISION CONTROL (if applicable) and brake serial number

#### Important

Please read these instructions carefully before installing, operating, or servicing your Stearns Brake. Failure to comply with these instructions could cause injury to personnel and/or damage to property if the brake is installed or operated incorrectly. For definition of limited warranty/liability, contact Reynold Corporation, Stearns Division, 5150 S. International Dr., Cudahy, WI 53110, (414) 272-1100.

#### Caution

1. Installation and servicing must be made in compliance with all local safety codes including Occupational Safety and Health Act (OSHA). All wiring and electrical connections must comply with the National Electric Code (NEC) and local electric codes in effect.
2. Do not install the brake in atmospheres containing explosive gases or dusts.
3. To prevent an electrical hazard, disconnect power source before working

on the brake. If power disconnect point is out of sight, lock disconnect in the *off* position and tag to prevent accidental application of power.

4. Make certain power source conforms to the requirements specified on the brake nameplate.
5. Be careful when touching the exterior of an operating brake. Allow sufficient time for brake to cool before disassembly. Surfaces may be hot enough to be painful or cause injury.
6. Do not operate brake with housing removed. All moving parts should be guarded.
7. Installation and servicing should be performed only by qualified personnel familiar with the construction and operation of the brake.
8. For proper performance and operation, only genuine Stearns parts should be used for repairs and replacements.
9. After usage, the brake interior will contain burnt and degraded friction material dust. This dust must be removed before servicing or adjusting the brake.

DO NOT BLOW OFF DUST using an air hose. It is important to avoid dispersing dust into the air or inhaling it, as this may be dangerous to your health.

- a) Wear a filtered mask or a respirator while removing dust from the inside of a brake.
- b) Use a vacuum cleaner or a soft brush to remove dust from the brake. When brushing, avoid causing the dust to become airborne. Collect the dust in a container, such as a bag, which can be sealed off.

#### General Description

These series of brakes are spring-set, electrically released. They contain one or more rotating friction discs (4) driven by a hub (16) mounted on the motor or other shaft.

#### Operating Principle

These series contain one or more friction discs (4) assembled alternately between the endplate (2) friction surface, stationary disc(s) (3) and pressure plate (5). The stationary components are restrained from rotating by being keyed into the endplate. With the brake released, all disc pack components are free to slide axially and the friction disc(s) to rotate.

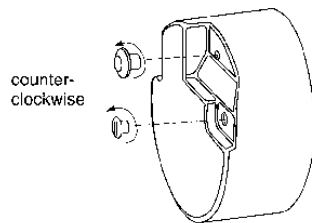
Brake release occurs when the solenoid coil is electrically energized, causing the solenoid plunger to travel a specified distance and through a lever system, overcoming the pressure spring force. This action releases the clamping force on the disc pack, thereby allowing the friction disc(s) and brake hub to rotate.

Brake sets and torque is produced when electric current to the solenoid coil is interrupted, thereby collapsing the solenoid magnetic field. The solenoid plunger returns to its original de-energized position allowing the lever arm to move forward by virtue of the compressed torque springs. This action compressed the disc pack components which applies a retarding torque to the brake hub and ultimately restores the brake to a spring-set static condition.

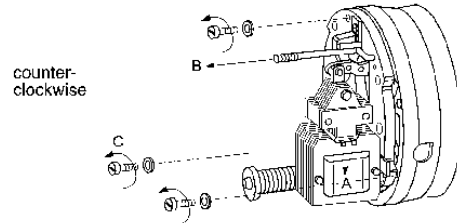
**Caution!** While the brake is equipped with a manual release to allow manual shaft rotation, the motor should not be run with the manual release engaged, to avoid overheating the friction disc(s).

**BRAKE MOUNTING**

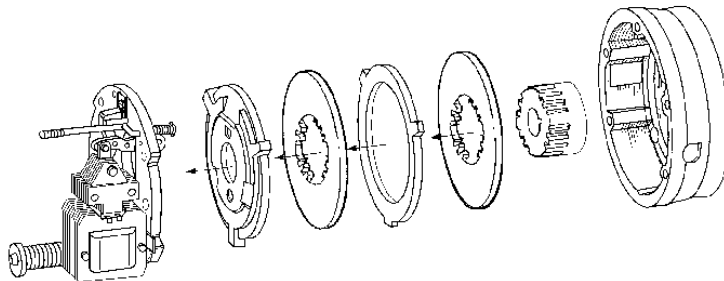
- 1** Remove manual release knob.  
Remove housing screws.  
Remove housing.



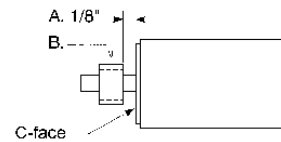
- 2** A. Push plunger down.  
B. Pull manual release to hold plunger.  
C. Remove support plate screws.



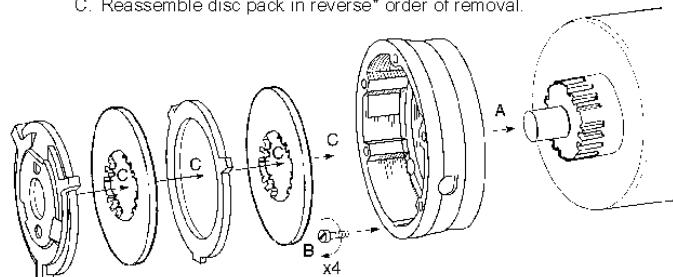
- 3** Lift off support plate.  
Remove disc pack.



- 4** A. Position hub on shaft as shown.  
B. Tighten set screws to motor shaft.  
Torque to: 5/16 - 156 in-lb;  
3/8 - 288 in-lb;  
1/2 - 625 in-lb.



- 5** A. Position endplate on motor register.  
B. Insert four mounting bolts and tighten.  
C. Reassemble disc pack in reverse\* order of removal.

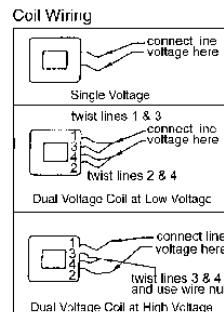


\*For vertical brakes, refer to Figure 2, page 3.

- 6** A. Route lead wires through conduit hole.  
B. Position support plate on endplate.  
C. Insert three mounting screws;  
tighten to: 50 in-lb.

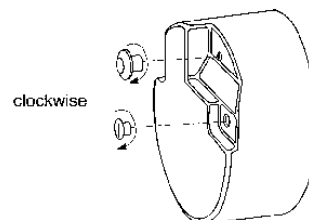
- 7** Coil wiring. Refer to nameplate for voltage rating\*.

**Caution:** Keep wiring away from pinch points.



\* For DC voltages see sheet 8-078-950-00.

- 8** Replace housing.  
Tighten housing screws and release knob  
to 50-55 in-lb.



**General Maintenance**

**Warning!** Any mechanism or load held in position by the brake should be secured to prevent possible injury to personnel or damage to equipment before any disassembly of the brake is attempted or before the manual release knob or lever is operated on the brake. Observe all cautions listed at the beginning of this manual.

Note 1: To obtain correct replacement parts for the Series 87,000 Marine Duty, obtain brake serial number and consult factory.

Note 2: Replace friction disc in single disc brakes when wear surface area is one-half the original disc thickness. In multiple disc brakes, replace all friction discs when throat of lever arm (17) is within 1/16" of touching teeth of pinion (32).

**Troubleshooting**

**A. If brake does not stop properly or overheats, check the following:**

1. Is manual release engaged, and is motor energized?
2. Friction discs may be excessively worn, charred or broken.
3. Hub may have become loose and shifted on shaft.
4. Are controls which govern start of braking cycles operating properly?
5. On vertically mounted brakes, are springs in place in disc pack?

6. Is solenoid air gap adjusted correctly? See *Air Gap Adjustment*, Page 4.
7. Solenoid lever stop (22) must be in place on support plate.
8. Solenoid may not be energizing and releasing the brake. Check voltage at the coil and compare to the coil and/or nameplate voltage rating.
9. Check that heads of mounting bolts do not extend above wear surface of endplate.
10. If stopping time is more than two seconds, the brake torque rating may be insufficient. If the brake stops high inertial loads and/or brake stops more than five times per minute, check thermal requirements of application versus thermal capacity rating of brake.
11. Use Loctitefi 242 to secure link screw nut (13N) to link screw (13C) if vibration causes nut to loosen.
12. Check pressure spring length to insure correct compressed height. Original spring lengths are given in the following Table so that correct setting may be verified and corrected if necessary. With worn friction discs, add amount of wear to the approximate spring length shown.

Color	Torque (lb-ft)	Compressed Spring Length
Black	10	3-1/4
White	15	3-1/4
Orange	25 & 50	3-1/4
Purple	35, 75 & 105	3-1/4

13. If a heater is supplied and excess rusting has occurred in brake, check power source to heater to be sure it is operating and that heater is not burned out.

**B. If brake hums, solenoid pulls in slowly, or coil burns out, check the following:**

1. Voltage supply at coil versus coil rating.
2. Is solenoid air gap excessive? See *Air Gap Adjustment*, Page 4.
3. Solenoid frame and plunger may be excessively worn.
4. Solenoid mounting screws may have become loose, causing frame to shift and plunger to seat improperly.

**Vertical Spring Assembly**

**Note:** For vertical brakes refer to Figure 2 for proper stationary disc positioning. Discs must be inserted spring side first. Also refer to instruction sheet 8-078-937-06.

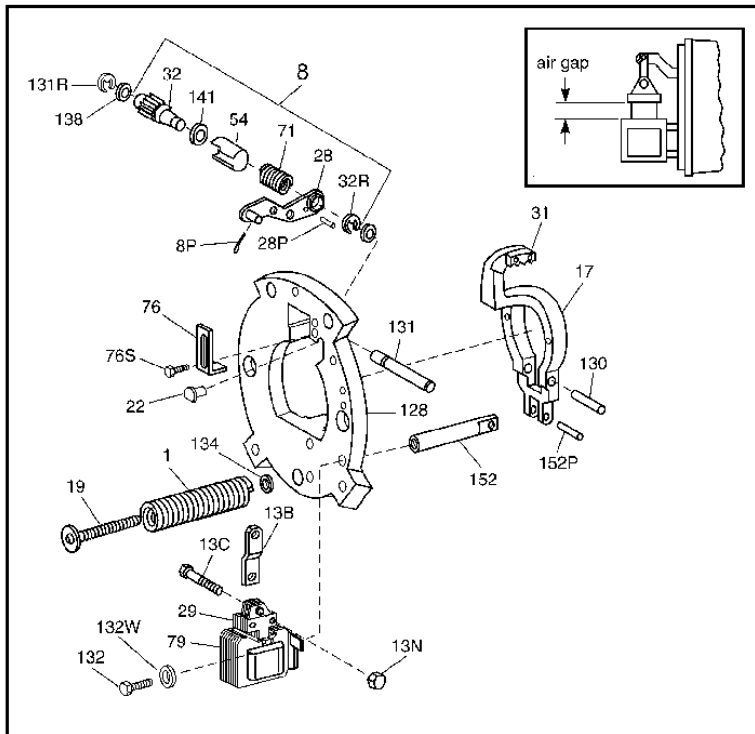
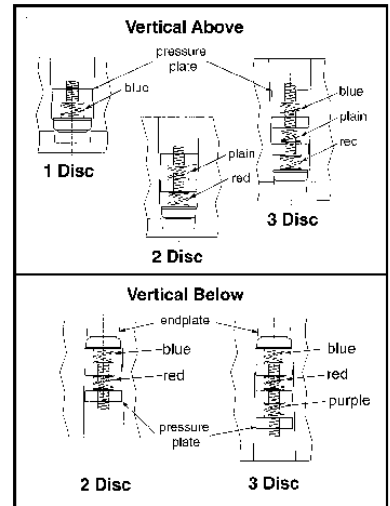
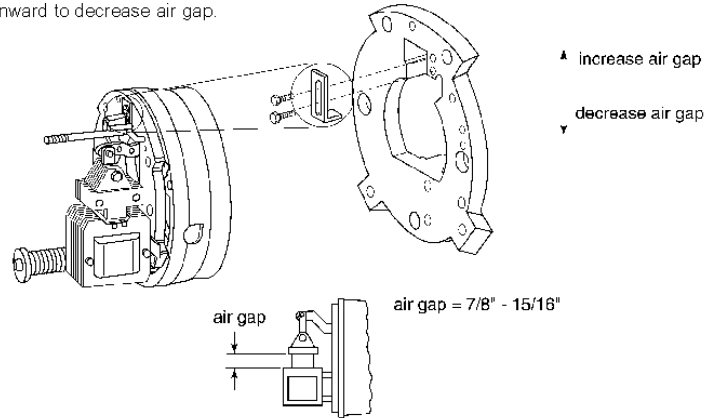


Figure 1



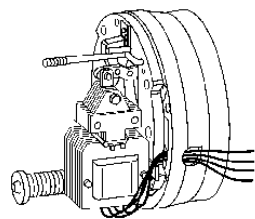
**AIR GAP AJUSTMENT**

- 1** Loosen two locking screws.  
Slide bracket outward to increase or inward to decrease air gap.  
Tighten screws to 45-55 in.-lb.

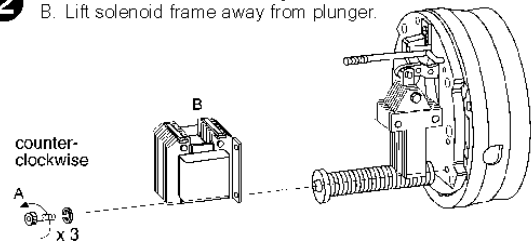


**COIL REPLACEMENT**

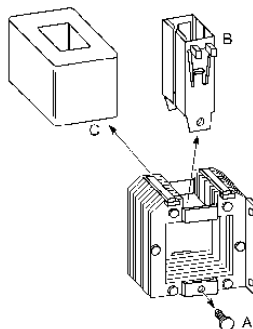
- 1** Disconnect coil lead wires from power source and pull them out of the brake.



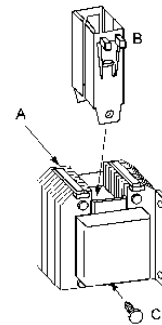
- 2** A. Remove solenoid mounting screws.  
B. Lift solenoid frame away from plunger.



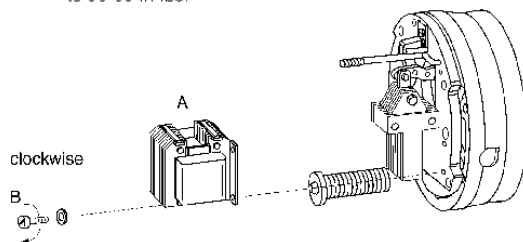
- 3** A. Remove guide screws.  
B. Lift guides out of coil.  
C. Push coil out of frame.



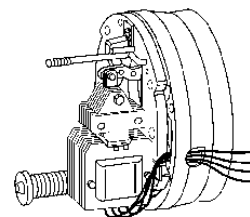
- 4** A. Insert new coil.  
B. Press plunger guides into place.  
C. Insert and tighten guide screws.



- 5** A. Slide coil assembly onto plunger.  
B. Insert mounting screws and tighten to 50-55 in.-lbs.

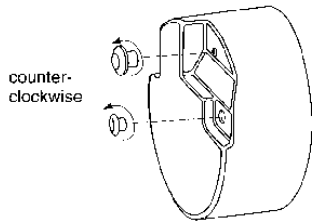


- 6** Reroute coil wires and reconnect to power supply.

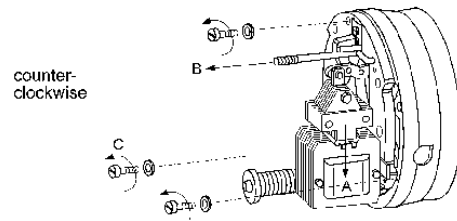


**FRICION DISC REPLACEMENT**

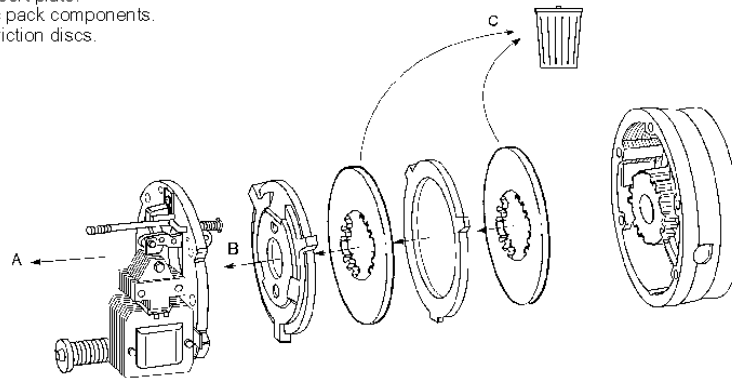
- 1** Remove manual release knob.  
Remove housing screws.  
Remove housing.



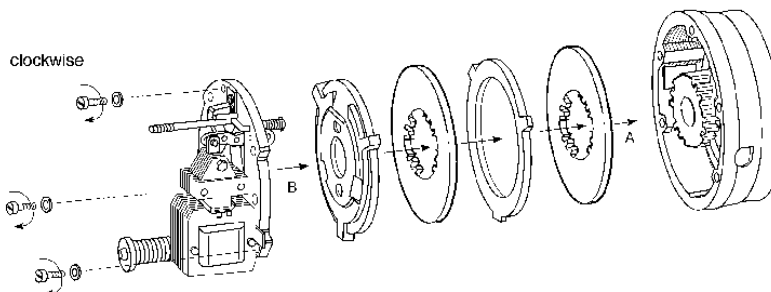
- 2** A. Push plunger down.  
B. Pull manual release to hold plunger  
C. Remove support plate screws.



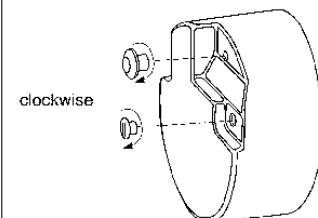
- 3** A. Remove support plate.  
B. Remove disc pack components.  
C. Discard old friction discs.



- 4** A. Install new friction discs and reassemble in reverse order of disassembly.\*  
B. Position support plate and tighten 3 screws to 50 in-lb.



- 5** Replace housing.  
Tighten housing screws to 50-55 in-lb Hand tighten release knob.



\* For vertical brake assembly refer to Figure 2, page 3.

**Information required when ordering replacement parts:**

Give part number of parts or kits needed, brake model number, and brake serial number. The brake model and serial number may identify special brakes not covered by this parts list.

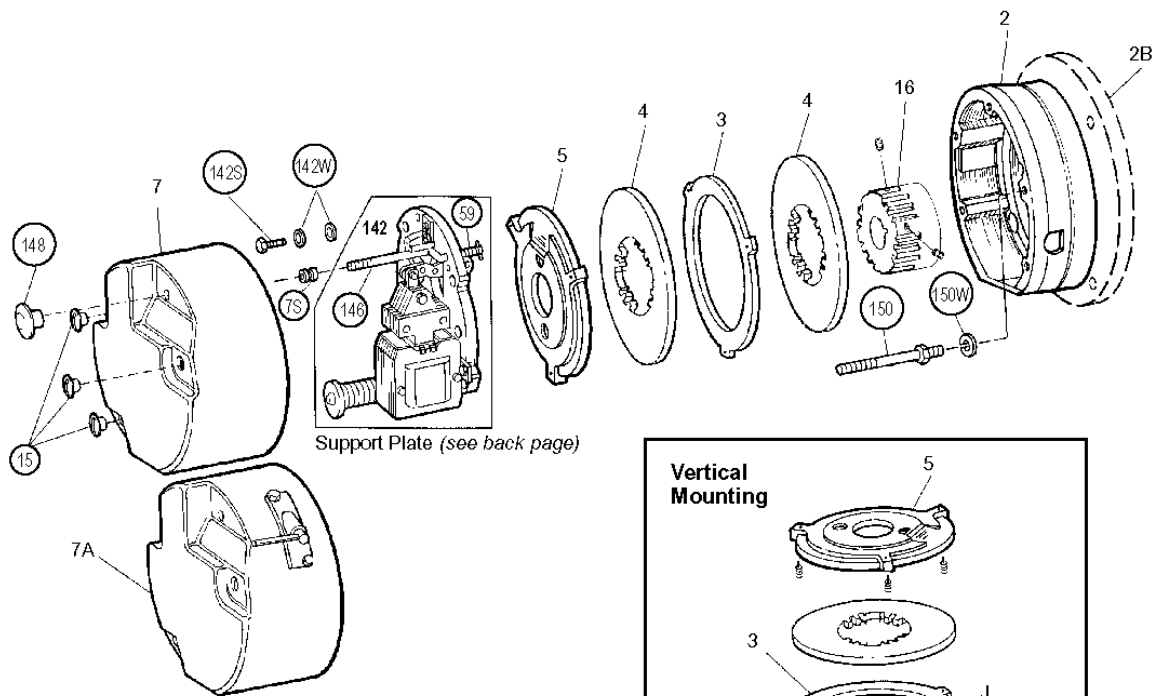
Description items in ***CAPITALIZED BOLD ITALICS*** are recommended spare parts. One set per 5 brakes in service is recommended.

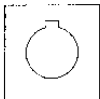
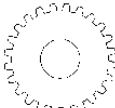
For 87,100 Series see Table 2.

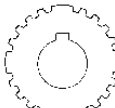
Circled items are contained in kit Item A, Table 4.

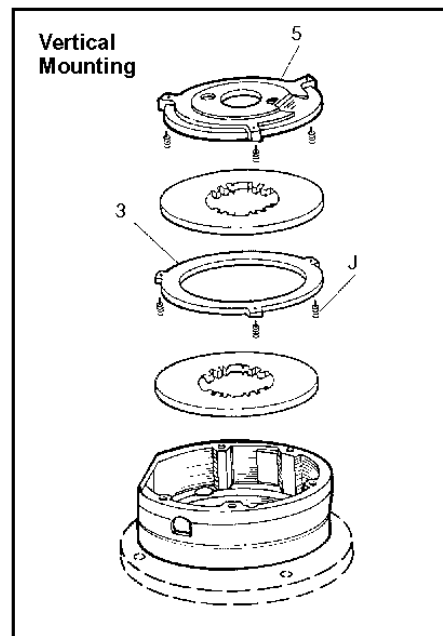
For installation and service instructions, see PIN 8-078-937-06.

Detailed service instruction sheet is included with each kit.



Old Configurations	
	
2.75 square	24 tooth 4.24 diameter

New Patented Design	
Rev. B	
	
20 tooth	3.12 diameter



**Stearns**

SEE INSTALLATION AND SERVICE SHEET OR THE INSTALLATION LABEL INSIDE OF HOUSING BEFORE INSTALLING, OPERATING OR SERVICING BRAKE.

Model number: 1087051 00EQB  
 Rev. B  
 Torque limit: Mounting  
 Amps holding: Amps holding

Serial number: \_\_\_\_\_  
 Part #: \_\_\_\_\_

Reinforced Corporation, Stearns Division  
 Milwaukee, WI 53202 (414) 272-1100

LR 6254

**Note:**  
 MODEL NUMBER will appear on brake nameplate.  
 REVISION CONTROL (if applicable) and brake serial number



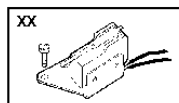
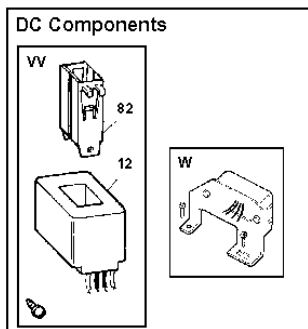
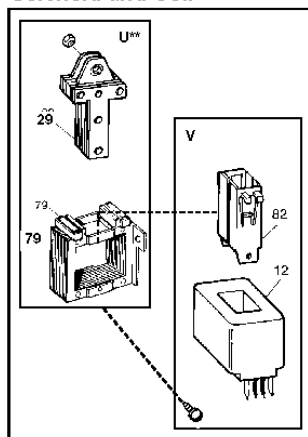
**TABLE 3: Components of Support Plate and Coil Assembly**

Item	Description	Part Number	Torque (lb-ft)			
			6 10	15	25 50	35 75 105
126	Support plate and bearing assembly	5-26-7007-00	1	1	1	1
	Support plate and bearing assembly	5-26-7008-00				1
8	<b>SOLENOID LEVER AND PINION KIT</b>	5-66-7371-00	1	1	1	1
17	Lever arm kit	5-66-7271-00	1	1	1	1
19 & 152	Pressure spring tube kit	5-66-7471-00	1	1	1	1
11	Pressure spring kit black	5-66-3072-00	1			
	Pressure spring kit white	5-66-3074-00		1		
	Pressure spring kit orange	5-66-3076-00			1	
	Pressure spring kit purple	5-66-3078-00				1
<b>AC Brakes</b>						
U	<b>NO. 5 SOLENOID KIT</b>	5-66-5051-00	1			
	<b>NO. 6 SOLENOID KIT</b>	5-66-5061-00		1	1	
	<b>NO. 8 SOLENOID KIT</b>	5-66-5081-00				1
13B	Solenoid link	8-013-703-00	1	1	1	
	Solenoid link	8-013-704-00				1
13C	Solenoid link cap screw	8-157-701-00	1			
	Solenoid link cap screw	8-157-702-00		1	1	
	Solenoid link cap screw	8-157-703-00				1
V	<b>No. 5 Coil kit 60 Hz</b>	115/230 Vac 230/460 Vac 115 Vac 230 Vac 460 Vac 575 Vac	1 1 1 1 1 1			

Item	Description	Part Number	Torque (lb-ft)			
			6 10	15	25 50	35 75 105
V	<b>No. 6 Coil kit 60 Hz</b>	115/230 Vac	5-66-6607-33	1	1	
		230/460 Vac	5-66-6609-33	1	1	
		115 Vac	5-66-6601-33	1	1	
		230 Vac	5-66-6602-33	1	1	
		460 Vac	5-66-6604-33	1	1	
		575 Vac	5-66-6605-33	1	1	
	<b>No. 8 Coil kit 60 Hz</b>	115/230 Vac	5-66-6807-33			1
		230/460 Vac	5-66-6809-33			1
		115 Vac	5-66-6801-33			1
		230 Vac	5-66-6802-33			1
		460 Vac	5-66-6804-33			1
		575 Vac	5-66-6805-33			1
XX	Brake release interlock switch	5-57-5528-00	1	1	1	1
<b>DC Brakes</b>						
W	Electronic DC Switch Kit	24/28 Vdc 115 Vdc 230 Vdc	5-57-5712-07 5-57-5716-07 5-57-5717-07	1 1 1	1 1 1	1 1 1
VV	<b>No. 5 Coil assembly</b>	115 Vdc	5-96-6516-33	1		
		230 Vdc	5-96-6517-33	1		
	<b>No. 6 Coil assembly</b>	115 Vdc	5-96-6616-33		1	1
		230 Vdc	5-96-6617-33		1	1
	<b>No. 8 Coil assembly</b>	115 Vdc	5-96-6816-33			1
		230 Vdc	5-96-6817-33			1

\*Consult factory for price and availability on complete support plate assemblies including solenoid.

### Solenoid and Coil


**TABLE 4: Contents of Kits and Assemblies (contents may vary)**

Item	Kit Description	Item	Kit Description
A	Hardware kit (5-66-1007-01) 2 External lead wire plugs 1 Wrap spring stop 2 Wrap spring stop screws 1 Solenoid lever stop 3 Support plate screws 3 Support plate conical spring washers 3 Support plate flat washers 3 Housing studs 3 Housing stud lock washers 3 Housing nuts 1 Release rod 1 Release rod spring 1 Release spring retainer 1 Housing grommet 1 Release knob	17	Lever arm kit (5-66-7271-00) 1 Lever arm assembly 1 Lever arm pivot pin 1 Spring tube pivot pin
	Gasket and seal kit (5-66-1271-0X) 1 Endplate oil seal 1 Housing seal 3 Housing nut gaskets 1 Housing to endplate gasket 3 Endplate rubber plugs (-01 only) 1 Manual release gasket (-01 only)	19 and 152	Pressure spring tube kit (5-66-7471-00) 1 Pressure spring tube 1 Pressure spring screw 1 Spring tube pivot pin
3	Stationary disc kit (5-66-8372-00) 1 Stationary disc (horizontal or vertical)	11	Pressure spring kit (5-66-307X-00) 1 Pressure spring
4	Friction disc kit - splined (5-66-8483-00) 1 Friction disc - splined	U	Solenoid kit (5-66-50X-1-00) 1 Plunger 1 Frame 3 Solenoid mounting screws 3 Solenoid mtg. conical spring washers 1 Solenoid link nut
5	Pressure plate kit (5-66-8571-00) 1 Pressure plate (horizontal or vertical)	V	Coil kits (5-66-6XXX-33) AC coils 1 Coil 2 Plunger guides 2 Plunger guide screws
J	Vertical spring kit (5-66-317X-00) 15 Vertical above mounting springs	VV	Coil assembly (5-96-6XXX-33) DC coils 1 Coil 2 Plunger guides 2 Plunger guide screws 4 Wire fasteners
8	Solenoid lever and pinion kit (5-66-737X-00) 1 Solenoid lever & pinion assembly 1 Cotter pin 1 Solenoid lever pivot pin 1 Pivot pin retaining ring	W	DC switch kit (5-57-57XX-07) 1 switch 1 Mounting bracket 2 Support plate mounting screws 2 Switch mounting screws 2 Nuts 3 Crimp connectors
		XX	AC switch assembly (5-57-5528-00) 1 Microswitch 1 Mounting bracket 2 Lead wire assemblies 2 Mounting bracket screws 2 Nuts 2 Support plate screws 1 Actuator arm 1 Actuator arm mounting bolt 1 Actuator arm nut



Rexnord Corporation  
Stearns Division  
5150 S. International Drive  
Cudahy, Wisconsin 53110  
(414) 272-1100 Fax: (414) 277-4364 www.rexnord.com

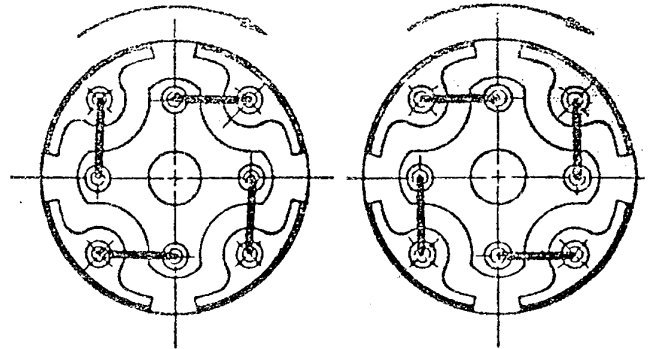


<b>RINGSPANN GmbH</b>	<b>Installation, Operating and Maintenance Instructions for Backstop FCBM 72 SF</b>	<b>E08.770e</b>
issue: 10.06.2016	version : 01	drawn:KISR checked:HEUT pages: 25 page: 25

## 14. Installation and Maintenance Instructions of Centrifugal Brake

### DIRECTION OF ROTATION

Leading shoe mechanisms must be installed with links pointing toward the direction of rotation (to push the shoes). Trailing shoe mechanisms must be installed with links pointing away from the direction of rotation. A rotation sticker is usually attached to the mechanism.



Leading Shoe

Trailing Shoe

### FITTING

1. Check that the linings and inside of the drum are free from oil, grease or loose particles.
2. Fit mechanism on driving shaft in the correct direction of rotation. Exert pressure only on the hub and not on links or bushings. Firmly tighten socket set screw over key.
3. Never run the mechanism at operating speed without the drum in place.
4. The Twiflex should not be operated in ambient temperature above 158°F. Elevated temperatures require special consideration.

### MAINTENANCE

The Twiflex mechanism should never be lubricated.

The shoe linings and rubber hub bushings normally have a very long life although periodic examination is advisable. The brake linings should be replaced when the thickness of friction material remaining on the linings is 1/16 inch (bonded lining) or 3/32 inch (riveted lining).

The rubber hub bushings should be replaced if they show obvious signs of deterioration such as a separation of the rubber from the metal, a compression buildup of the rubber in the direction of thrust or a local stickiness or softening.

Return brake mechanisms transportation prepaid to The Hilliard Corporation for examination and replacement of parts.

Make certain that the fasteners holding the brake drum are tight on reassembly.

THE HILLIARD CORPORATION, 100 West Fourth Street, Elmira, New York 14902

**Attention:** The brake drum must be exchanged, if the contact areas are worn out around 0.4 mm.