**MagnaShear MSB4 Motor Brake**

**MODELS & SIZE**
This Installation Manual covers the Installation Procedure for the MSB4 “Quick Mount” MagnaShear Electric Motor Brake and the MSB4 Assembled Electric Brake Motor (EBM).

**DESCRIPTION & OPERATION**

- **UNIT DESCRIPTION** *(See Figure 1)*


A spring set brake stack is released when 115 VAC or 230 VAC power, depending on the Model, is supplied to the MagnaShear Brake. Control logic is made simple by use of the motor starter auxiliary contactors. Back EMF effect from the motor windings is eliminated.

The units are ideal for a wide variety of applications including indexing tables, lifts, transfer conveyors, tap heads and other start/stop devices.

- **UNIT OPERATION** *(See Figure 1)*

The cross section in Figure 1 shows the MSB4 MagnaShear Motor Brake in the Stopped position with the brake stack engaged. The MSB4 MagnaShear Motor Brake will default to this position when all power is lost.

To run the Drive Motor the Brake Coil is energized, pulling the Armature Plate Assembly away from the Brake Stack which allows the splined hub and drive motor to rotate independently from the motor brake.

To stop the Drive Motor the Brake Coil is de-energized. This allows the brake springs to push the Armature Plate Assembly against the Brake Stack, clamping it and stopping the splined hub and drive motor.

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**Force Control Industries, Inc.**
**IMPORTANT SAFETY PRECAUTIONS**

The MagnaShear Motor Brake units described in this manual must not be installed in any manner except as specified and must not be operated at speeds, horsepower loads or temperatures other than those specified in this manual.

Failure to limit the operation of the drive to the conditions specified could damage the unit or damage interconnected equipment and void the Warranty.

**WARNING**

Before Installation or attempting any repairs to the Motor Brake, open the Disconnects to the Drive Motor. Lock it out to avoid the possibility of personal injury.

**RECEIVING THE MagnaShear MOTOR BRAKE**

Check the brake for shortage or damage immediately after arrival. Prompt reporting to the carrier’s agent, with notations made on the freight bill, will expedite satisfactory adjustment by the carrier.

**A. Assembled Electric Brake Motor (EBM)**

If your MagnaShear Motor Brake is shipped pre-assembled to a drive motor, it is filled with oil and ready to run except for installing the Air Breather (#45) and electrical wiring. (See Figures 6 and 7 for Electrical Wiring Diagram and Connector.)

**NOTE:** Before shipment, the Air Breather (#45) is removed and a pipe plug put in its place. This is done to prevent oil spillage during shipment. In most cases this will be a red plastic plug. This plug must be removed and the Breather (#45) installed to prevent damage to the brake. The breather is taped to the motor shaft for shipment. Always check the oil level though, to see if the oil level is in the center of the Sight Gauge (#46). (See LUBRICATION on Page 4.)

**B. MagnaShear Motor Brake**

The standard MSB4 MagnaShear Motor Brake has been completely assembled and filled with fluid. The Air Breather (#45), (4) Mounting Bolts (#149) and (4) Lockwashers (#128) are usually shipped separate in a cloth bag tied to the brake unit.

A red plastic plug is installed in place of the Air Breather (#45) to prevent fluid from spilling out in shipment.

**NOTE:** This red plastic plug must be removed and the Air Breather (#45) installed before operating your MSB4 MagnaShear Motor Brake. Also check the fluid level to see if any has spilled out in transit. The fluid must be in the center of the Sight Gauge (#46). See LUBRICATION. Add fluid if necessary.

The Locking Collar (#111) acts as a Quill Clamping Device to clamp the Hub (#2) to the motor shaft. This Locking Collar will just be tightened enough to keep it in position on the Hub (#2). You will have to loosen the (2) Soc. Hd. Screws in the Locking Collar (#111) to insert the motor shaft into the quill end of the Hub (#2).

**IMPORTANT - Make sure the motor shaft and motor mounting surfaces are thoroughly cleaned before installing the brake. DO NOT USE ANY LUBRICANT ON THE MOTOR SHAFT.**

**VERIFYING MOTOR SPECIFICATIONS**

The Motor Manufacturer’s Specifications must be verified first to ensure the Motor Brake Oil Seal Reliability. (1) Motor Shaft Runout and (2) Mounting Face Runout need to be checked with a Dial Indicator as shown in Figure 3.

Maximum Allowable T.I. R. as per NEMA MG 1 Standard:

1. Motor Shaft Runout - .002"
2. Mntg. Face Runout - .004"

**MSB4 MagnaShear Motor Brake Specifications**

<table>
<thead>
<tr>
<th>BRAKE SIZE</th>
<th>AVAILABLE MNTG BC (Inches)</th>
<th>QUILL BORE (Inches)</th>
<th>No. OF SPRINGS</th>
<th>STATIC TORQUE (Lb. Fl.)</th>
<th>DYNAMIC TORQUE (Lb. Fl.)</th>
<th>MAX. KE per ENGMT. (Lb. Fl.)</th>
<th>INERTIA (Lb. Fl.)²</th>
<th>OIL CAP. (Ounces)</th>
<th>INPUT VOLTAGE (VAC)</th>
<th>INRUSH CURRENT (.4 Sec.) (Amps)</th>
<th>HOLDING CURRENT (Amps)</th>
<th>MAX. DUTY CYCLE</th>
<th>COIL RESISTANCE @ 20° C (Ohms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSB4</td>
<td>5.875</td>
<td>.875</td>
<td>3</td>
<td>14</td>
<td>12</td>
<td>22,000</td>
<td>40</td>
<td>115</td>
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<td>1.7</td>
<td>.4</td>
<td>75%</td>
<td>47</td>
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<tr>
<td></td>
<td>7.250</td>
<td>1.25</td>
<td>4</td>
<td>21</td>
<td>18</td>
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<td>60</td>
<td>142</td>
<td>5.5</td>
<td>1.7</td>
<td>.4</td>
<td>75%</td>
<td>47</td>
</tr>
</tbody>
</table>

**Thermal Horsepower Rating**

<table>
<thead>
<tr>
<th>% DUTY</th>
<th>CYCLE RATE (cpm)</th>
<th>AMBIENT TEMPERATURE</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>25° C</td>
</tr>
<tr>
<td>25%</td>
<td>2</td>
<td>.26</td>
</tr>
<tr>
<td>5</td>
<td>.25</td>
<td>.18</td>
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<tr>
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<tr>
<td>10</td>
<td>.21</td>
<td>.12</td>
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</tbody>
</table>

**NOTES:** Thermal horsepower ratings are based on 96° C maximum oil temperature and 1800 RPM motor.

% - Duty is percentage of time brake is released. (Coil is Energized.)

**INSTALLATION**

**IMPORTANT SAFETY PRECAUTIONS**

The MagnaShear Motor Brake units described in this manual must not be installed in any manner except as specified and must not be operated at speeds, horsepower loads or temperatures other than those specified in this manual.

Failure to limit the operation of the drive to the conditions specified could damage the unit or damage interconnected equipment and void the Warranty.

**WARNING**

Before installation or attempting any repairs to the Motor Brake, open the Disconnects to the Drive Motor. Lock it out to avoid the possibility of personal injury.

**NOTE:** The Input Voltage is either 115 VAC or 230 VAC, depending on the Model Number.
**INSTALLING THE MagnaShear BRAKE** (See Figure 4)

1. If you have an Adapter Sleeve (#23), make sure all the clamping slots are aligned with each other as shown in Figure 4.
   If you don’t have the Adapter Sleeve (#23), two of the slots in the Hub (#2) must be aligned with the (2) slots in the Clamping Collar (#111) as shown in Figure 4.

2. Push the Locking Collar (#111) back against the small shoulder “A” on the Hub (#2) as shown in Figure 4., then slide the Brake Unit onto the motor shaft as far as it will go. Align the (4) mounting holes with the motor and attach with (4) Mounting Bolts and (4) Mounting Lockwashers. Finger tighten the (4) bolts. Make sure the brake is snug against the motor face.

3. Connect the electrical service to the Brad-Harrison Connector and actuate the brake coil to release the brake. (See Figures 6 and 7)

4. Evenly torque the (2) Screws in the Clamping Collar (#111) to 20 Lb. Ft.

**IMPORTANT** - Make sure that both gaps in the Locking Collar (#111) are the same after torquing the (2) Screws.

**NOTE** - This will correctly center the brake and allow the brake to “Float” into position.

5. Turn the motor shaft by hand to make sure the bearings turn freely. Adjust if necessary.

6. Evenly torque the (4) Mounting Bolts in an opposite manner to the following torques:

**VERTICAL MOUNTING**

Vertical Mounting vs. Horizontal Mounting is determined by the mounting angle. See Figure 5 below to determine the correct mounting configuration for your MagnaShear Motor Brake.

**WIRING SPECIFICATIONS** (See Figures 6 and 7)

**START-UP**

Verify that the Brake Coil is connected correctly. Check to see if the Drive Motor is wired correctly, fuses are in place and the motor disconnect is turned on. Set-up preliminary settings on positioning switches to insure the brake will stop. “Bump” the Drive Motor to check for correct rotation. If the rotation is incorrect change two of the phase wires and recheck rotation. Verify that the Brake Coil Indicator Light on the Conduit Box is ON while the drive motor is running. (The indicator light comes on bright for .4 seconds and then dims after that.)

Next, complete a cycle to insure that there are no interference problems within the system. Set-up Position Switches as required.
LUBRICATION

● CHECKING THE OIL LEVEL

When the brake is installed and weekly thereafter, or until experience dictates otherwise, check the oil level. Always check the oil level with the brake at room temperature and while it is not running.

The MSB4 MagnaShear Motor Brake has an Oil Sight Gauge (#46) to visually check the fluid level. See Figure 8 below for the location of this sight gauge.

It is located on the side of the End Housing (#9) for Horizontal and Vertical Up brakes and on the side of the Input Housing (#15) for Vertical Down brakes.

The oil level is to be at the center of this Sight Gauge (#46) for all models with the drive motor turned off.

● OPERATING TEMPERATURES

A. Ambient Temperature - The standard oil used in the MSB2 MagnaShear Motor Brake was designed to operate in an ambient temperature of 125° F Max. If the ambient temperature falls outside of this range please contact Force Control for specific recommendations on proper lubricant and oil seals.

B. Oil Sump Temperature - The maximum recommended oil sump temperature is 200° F.

● CHANGING THE OIL (See Figure 8 below)

IMPORTANT - Always open the disconnects to the drive motor and lock them out before changing the oil.

Every three months completely drain the oil from the brake by removing the Drain Plug (#64). The Sight Gauge (#46) and Air Breather (#45) should also be removed and cleaned at this time.

The oil should be changed more frequently when used in harsh environments or high cyclic applications.

1. Remove Pipe Plug (#64) and drain out all the oil into a suitable container. Save or discard as conditions warrant. Replace the pipe plug when finished.

2. Remove the Pipe Plug (#62) and fill with fresh oil to the center of the sight Gauge (#46). Replace the pipe plug when finished.

CAUTION - Do not overfill the brake unit. Excess oil will cause the brake to over heat.

● TYPE OF OIL

Use only Mobil Automatic Transmission Fluid ATF-210 (Type F) or Mobil Multi-Purpose Automatic Transmission Fluid for most drives. Other fluids may be specified for special applications.

Always use the type of oil specified on the Name Plate.

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