



# **Cougar<sup>®</sup> B Series Electric Vibrators B3-3000-2**

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**Operator's Manual  
M4037**

# Important

MARTIN ENGINEERING HEREBY DISCLAIMS ANY LIABILITY FOR: DAMAGE DUE TO CONTAMINATION OF THE MATERIAL; USER'S FAILURE TO INSPECT, MAINTAIN AND TAKE REASONABLE CARE OF THE EQUIPMENT; INJURIES OR DAMAGE RESULTING FROM USE OR APPLICATION OF THIS PRODUCT CONTRARY TO INSTRUCTIONS AND SPECIFICATIONS CONTAINED HEREIN. MARTIN ENGINEERING'S LIABILITY SHALL BE LIMITED TO REPAIR OR REPLACEMENT OF EQUIPMENT SHOWN TO BE DEFECTIVE.

Observe all safety rules given herein along with owner and Government standards and regulations. Know and understand lockout/tagout procedures as defined by American National Standards Institute (ANSI) z244.1-1982, *American National Standard for Personnel Protection - Lockout/Tagout of Energy Sources - Minimum Safety Requirements* and Occupational Safety and Health Administration (OSHA) Federal Register, Part IV, 29 CFR Part 1910, *Control of Hazardous Energy Source (Lockout/Tagout); Final Rule*.

The following symbols may be used in this manual:



**Danger:** Immediate hazards that will result in severe personal injury or death.



**Warning:** Hazards or unsafe practices that could result in personal injury.



**Caution:** Hazards or unsafe practices that could result in product or property damages.



**Important:** Instructions that must be followed to ensure proper installation/operation of equipment.



**Note:** General statements to assist the reader.

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## **General**

Cougar<sup>®</sup> Electric Vibrators are designed and manufactured to ensure the best performance and reliability in severe-duty applications. The vibrator motor has a recommended operational ambient temperature and mounting surface temperature range of -22 to 104°F (-30 to 40°C). If operating the motor in environments beyond these temperatures, call Martin Engineering, as the vibrator may require rating reduction, more frequent lubrication, or lubrication substitution.

This manual provides instructions for installation onto steel bins and hoppers only. For installation onto other structures, call Martin Engineering or a representative.

## **References**

The following documents are referenced in this manual:

- *The National Electrical Code (NEC)*, National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy MA 02269-9101.
- American National Standards Institute (ANSI) z244.1-1982, *American National Standard for Personnel Protection - Lockout/Tagout of Energy Sources - Minimum Safety Requirements*, American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.
- Code of Federal Regulation (CFR) 29, Part 1910, *Control of Hazardous Energy Source (Lockout/Tagout); Final Rule*, Department of Labor, Occupational Safety and Health Administration (OSHA), 32nd Floor, Room 3244, 230 South Dearborn Street, Chicago, IL 60604.
- CFR 29, Part 1910.15, *Occupational Noise Exposure*, Department of Labor, OSHA, 32nd Floor, Room 3244, 230 South Dearborn Street, Chicago, IL 60604.

## **Safety**

All safety rules defined in the above documents and all owner/employer safety rules must be strictly followed when working on the vibrator.

## **Materials required**

In addition to hand tools, the following materials are required to install this equipment:

- Martin<sup>®</sup> Safety Cable Kit, P/N 32271, or equivalent.

## **Storage**

Store vibrator in an ambient temperature not less than 41°F (5°C) with a relative humidity not more than 60%. If the vibrator has been stored for 2 or more years, remove bearings, wash them, and repack them with new grease (see “Maintenance”).

## Before Installing Vibrator

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### IMPORTANT

The delivery service is responsible for damage occurring in transit. Martin Engineering CANNOT enter claims for damages. Contact your transportation agent for more information.

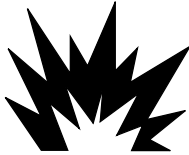
1. Inspect shipping container/pallet for damage. Report damage to delivery service immediately and fill out delivery service's claim form. Keep any damaged goods subject to examination.
2. Remove vibrator from shipping container/pallet.
3. If anything is missing contact Martin Engineering or a representative.



### WARNING

Turn off and lock out/tag out all energy sources to conveyor/loading systems to mounting structure.

4. Before installing vibrator, turn off and lock out/tag out all energy sources to conveyor/loading systems to mounting structure according to ANSI standards (see "References").



### WARNING

If equipment will be installed in an enclosed area, gas level or dust content must be tested before using a cutting torch or welding. Using a cutting torch or welding in an area with gas or dust may cause an explosion.

5. If using a cutting torch or welding, test atmosphere for gas level or dust content.
6. Mounting surface must be strong and flat, 0.01 in. (0.25 mm) across vibrator feet. (This will minimize internal stress to vibrator casting when tightening mount bolts. Welding in the area of the mounting surface could affect its flatness.)
7. Make sure mounting surface is free of paint and debris and foot of vibrator is clean.

## IMPORTANT

Read entire section before beginning work. This manual provides instructions for installations onto steel bins and hoppers only. For other installations, call Martin Engineering or a representative.

## CAUTION

If installation instructions are not followed, structure and vibrator can be damaged. Abusing or handling vibrator carelessly will accelerate wear and shorten bearing life.

### *Mounting vibrator onto structure*

1. See Figure 1. Locate vibrator in lower 1/4 to 1/3 of structure slope length. If second vibrator is required, mount 180° from first vibrator and halfway up slope.

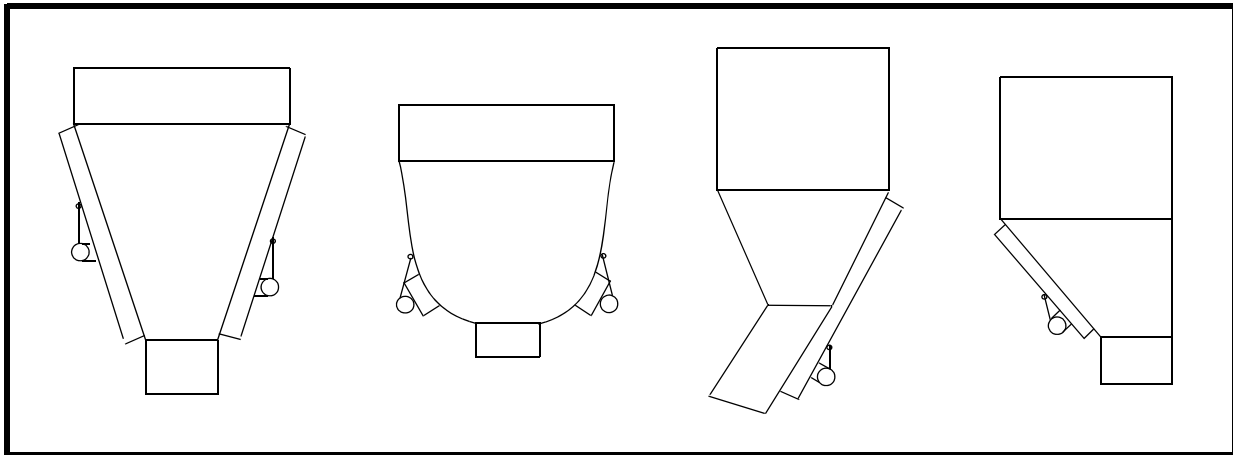


Figure 1. Locating Vibrator on Hoppers

## CAUTION

Never weld structure with vibrator mounted and wired. Welding may cause damage to motor windings and bearings.

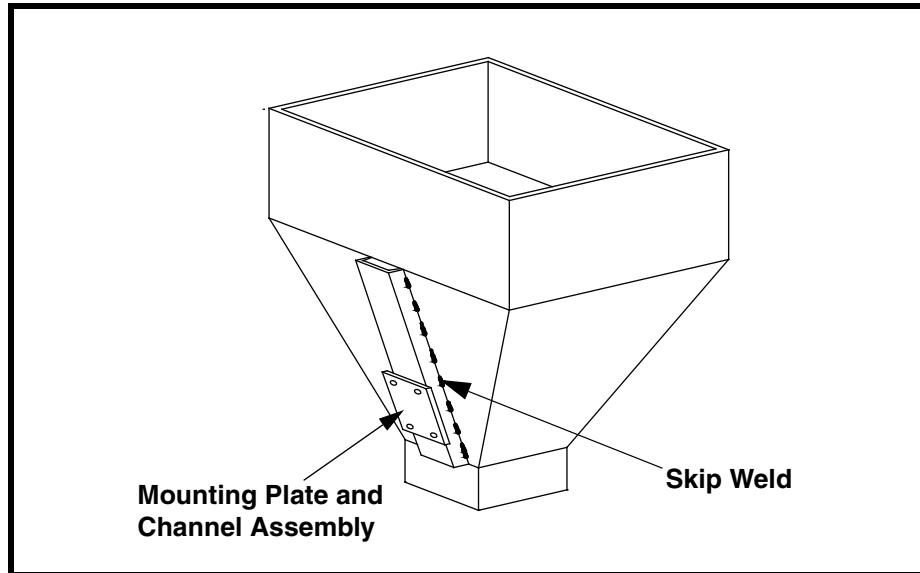
## IMPORTANT

The object of rotary vibration on bins, hoppers, and chutes is to transmit vibration through the wall into the product contained inside. If structure is not made rigid, vibrator may draw high amperage and move material less efficiently.

**Make sure structure is free of paint before mounting vibrator.**

2. If using customer-supplied mounting plate to mount vibrator onto structure, do the following:
  - a. Make sure plate is at least the size of vibrator base.
  - b. Locate plate so that vibrator can be positioned as shown in Figure 1.
  - c. Weld mounting plate onto structure.

3. If using mounting plate and channel assembly to mount vibrator onto structure (see Figure 2), do the following:
  - a. Locate channel so that vibrator can be positioned as shown in Figure 1.
  - b. Extend channel at least  $\frac{3}{4}$  the length of sloped wall. Cut off end(s) of channel if necessary to fit on structure.
  - c. Skip-weld channel in place: Weld 3 in. (76 mm), then skip 2 in. (51 mm). Repeat for entire perimeter of channel. Do not weld last 1 in. (25 mm) of either end of channel or any corner.
  - d. Install vibrator onto mounting plate.



**Figure 2. Mounting Plate and Channel Assembly**

## **⚠ CAUTION**

**Never weld structure with vibrator mounted and wired. Welding may cause damage to motor windings and bearings.**

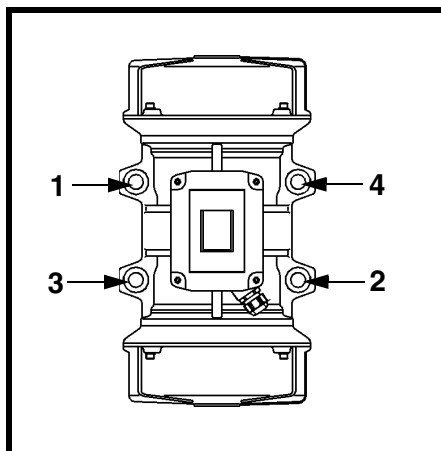
**Use only new Grade 5 bolts and lock nuts to install vibrator. Old fasteners can break and cause damage to vibrator or structure.**

**Do not use split lock washers to install vibrator onto mount. Damage to vibrator could result.**

**Tighten mounting bolts in sequence shown in Figure 3. If not tightened in order, vibrator casting could be damaged.**

4. Before installing vibrator onto mount, apply thread sealing compound to all bolts.
5. Install vibrator onto mount with new lock nuts, compression washers, and bolts according to Table I. Tighten bolts in order given in Figure 3 to avoid damaging vibrator casting. (Contact fastener manufacturer for specific information regarding bolt torque.)





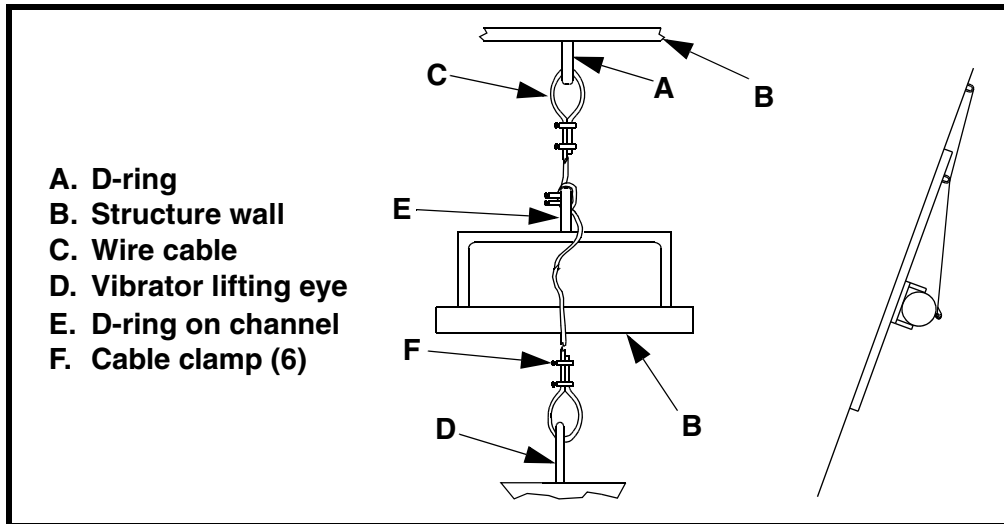
**Figure 3. Mounting Bolt Tightening Sequence**

6. After the vibrator has been operated for 10 to 20 minutes, check bolt torque. Tighten if necessary.

**Table I. Mounting Bolts and Torque Requirements\***

English		Metric	
Bolt Size (Gr 5)	Dry Torque (ft-lb)	Bolt Size	Dry Torque (N•m)
3/8 in. -16NC	31	M10	42
1/2 in. -13NC	75	M12	102
5/8 in. -11NC	150	M16	203
3/4 in. -10NC	265	M20	360
1 in. -8NC	640	M24	868

\*Torque specifications are for reference only. Contact fastener manufacturer for specific information regarding bolt torque.



**Figure 4. Installing Restraining Cable**

## ⚠ WARNING

**If vibrator is mounted more than 6 in. (152 mm) above ground, install cable securing vibrator to structure. Without cable, vibrator could fall and cause injury.**

7. Secure vibrator to structure by installing Martin® Safety Cable Kit, P/N 32271, or equivalent as follows:
  - a. Weld D-ring (A, Figure 4) onto structure wall (B) above vibrator.
  - b. Loop 1/4-in. (6 mm) wire cable (C) through vibrator lifting eye (D) and D-ring on structure wall.
  - c. If using a mounting plate and channel assembly, also loop cable through D-ring on channel (E) as shown. Take up slack so cable is taut.
  - d. Apply thread-sealing compound to nuts on cable clamps (F). Install six cable clamps (two on each end and two on loop around D-ring on channel) to secure cable to vibrator eye and D-rings. Tighten nuts on cable clamps.
  - e. Trim loose ends of wire cable.

*Connecting power to vibrator*

**⚠ WARNING**

Wire vibrator in accordance with National Electrical Code Article 430. Have wiring installed by a qualified electrician only.

1. Find wiring diagram number for your vibrator on vibrator nameplate or see Figure 5.

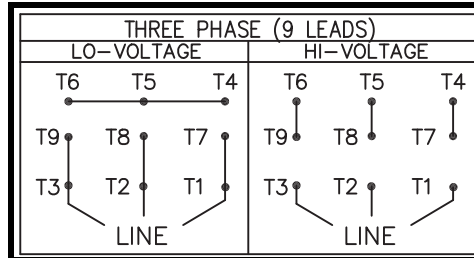


Figure 5. Three Phase Wiring Diagrams

**⚠ CAUTION**

Before running cord to vibrator, make sure cord voltage rating equals or exceeds the voltage at which you will be operating the vibrator. It must have a minimum temperature rating of 221°F (105°C). If wire is not proper diameter, cord grip will not tighten properly and vibrator could be damaged by moisture or material getting inside wiring compartment. If cord is damaged, it could short power supply or short to ground causing damage to vibrator.

2. The frame size of the electric vibrator will define the size of the cord grip. Each cord grip is designed for a specific cord diameter range.

**IMPORTANT**

The compression nut must be tightened to a position that will provide proper strain relief for the cord. If the compression nut is not tight enough, the electrical connections may be stressed. If the compression nut is too tight, the cord may be damaged.

**IMPORTANT**

When wiring vibrator, leave slack in electrical cable so that cable does not become taut during vibration cycle and cause stress on wire connections. On applications where moisture is present, leave enough slack in power cable to prevent moisture from running down cable into vibrator.

3. Wire vibrator according to appropriate wiring diagram inside terminal box.

*Installing  
overload, short-  
circuit, and  
ground-fault  
protection*

**▲ WARNING**

**Vibrator must be grounded using the power supply ground wire (or other if specified in the NEC). Failure to properly ground vibrator can cause severe injury or death.**

4. Connect power supply ground wire (or other if specified in the NEC) to ground vibrator terminal.
5. Reassemble wiring cover, o-ring, and rubber compression block(s), taking care not to pinch the o-ring. Tighten cord grip around supply line(s).

**▲ CAUTION**

**Install overload protection for vibrator. If vibrator is not protected from overload, vibrator can be destroyed and warranty will be void. Determine size of overload protection according to NEC Article 430 and have it installed by a qualified electrician only.**

1. Determine overload, short-circuit, and ground-fault protection according to NEC Article 430.
2. Have qualified electrician install overload, short-circuit, and ground-fault protection.
3. If overload trips during operation, fix problem before resetting.

**▲ CAUTION**

**For vibratory equipment using two vibrators (such as feeders, screens and bin dischargers), the two motors must be electrically interlocked. If using a single contactor, each motor must be provided with separate overload protection. The motor control circuit must be arranged so that if one motor becomes de-energized, the other motor will automatically and immediately become de-energized. Failure to properly interlock motors could result in severe damage to equipment if one vibrator fails.**

4. If using two vibrators, interlock the two vibrator motors and install separate overload protection for each.

## After Installing Vibrator

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### *Checking shaft rotation*

#### **CAUTION**

**DO NOT** run vibrator with eccentric weights removed. Running vibrator with eccentric weights removed will damage bearings.

#### **WARNING**

**When checking shaft rotation with weight cover removed, keep hands away from swinging weights. Weights can crush fingers.**

1. Remove cap screws, washers, and vibrator weight covers.
2. Start vibrator for one second, then stop.
3. Observe direction of motor rotation. If motor is not rotating in correct direction, lock out/tag out energy source and reverse rotation. To reverse rotation of three-phase vibrator, reverse any two of the three power supply wires.
4. Replace weight cover, taking care not to pinch o-ring.

#### **NOTE**

All Cougar® Electric Vibrators have one set of eccentric weights on each end of shaft. Eccentric weights are set at 60% at factory.

The percentage increments on the weight or on the weight adjustment disks are percentages of the total force pounds listed on the nameplate. For example, if the nameplate shows 8340 lb, setting the weights to 60% would produce 5004 pounds of force.

#### **IMPORTANT**

**For the most efficient operation, vibrator eccentric weights should be adjusted to the lowest force setting required to move the material. This will increase vibrator life and reduce energy costs.**

### *Adjusting eccentric weights*



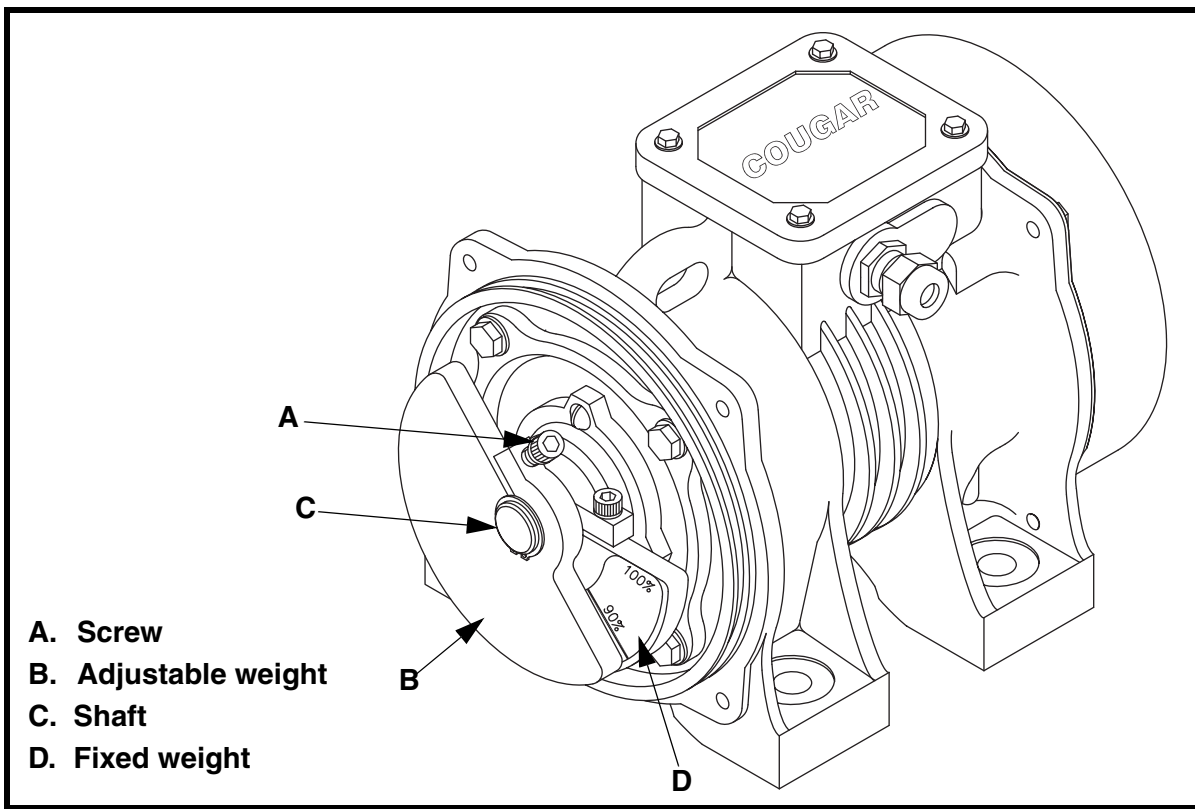
**⚠ WARNING**

Before adjusting eccentric weights, turn off and lock out/tag out energy source to vibrator.

**NOTE**

The fixed weight is keyed to the shaft. The adjustable weight rotates around the shaft.

1. Turn off and lock out/tag out energy source to vibrator according to ANSI standards (see “References”).
2. Remove weight cover.
3. Loosen screw (A, Figure 6) so adjustable weight (B) will rotate around shaft (C).



**Figure 6. Adjusting Eccentric Weights**

4. Rotate adjustable eccentric weight to proper setting. To produce more force, move weight to higher setting (i.e., higher number). When set, tighten screw.
5. Check o-rings for damage. Replace if damaged.

**⚠ CAUTION**

Do not operate vibrator with weight covers removed. Dust accumulating around vibrator shaft could cause unit to fail.

6. Replace weight covers.

**▲ CAUTION**

Adjust both sets of eccentric weights to same setting number (mirror images) or force output will be uneven.

7. Repeat steps 1 through 6 for second set of weights. Set both sets of weights to same setting number so they are mirror images, as shown in Figure 7.

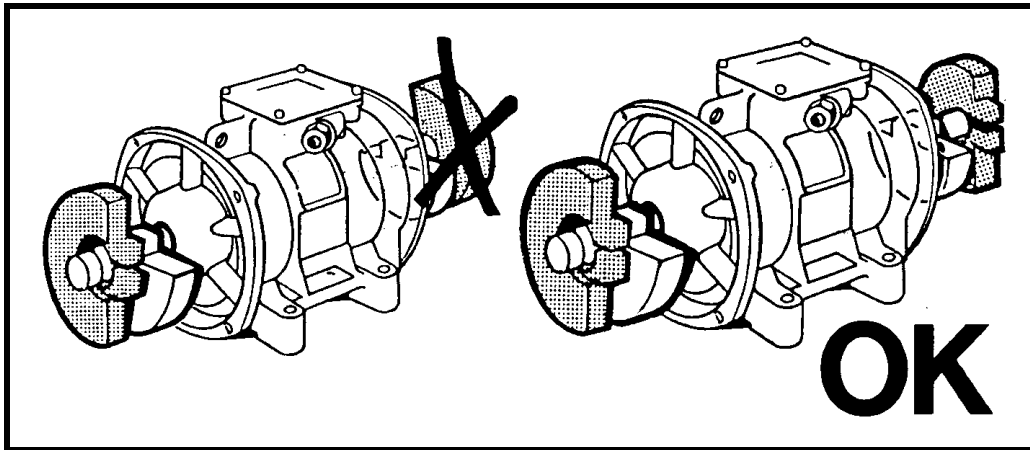


Figure 7. Setting Sets of Eccentric Weights to Mirror Images

***Initial start up/  
checking line  
current***

1. Close power supply disconnect switch and allow motor(s) to operate for 10 to 20 minutes.
2. If vibrator makes unusual or excessive noise, make sure mounting bolts are tight and mount welds are not damaged.

**▲ WARNING**

**Vibrator may produce loud noise during operation when mounted on structure. See OSHA 1910.95 for guidelines. If required, wear ear protection to avoid impairment or loss of hearing.**

3. Check decibel level of vibrator noise during operation. See OSHA 1910.95 to determine whether noise exceeds safe limits. If required, wear ear protection to avoid impairment or loss of hearing.

**▲ CAUTION**

**Do not allow motor current to exceed nameplate rating. If vibrator is operated continuously with line current above nameplate rating, vibrator can be damaged.**

4. After a few hours of operation, check each line current. If reading is higher than nameplate rating, reduce eccentric weight setting, stiffen vibrator mount, or move vibrator to more rigid location. After making adjustments, check line current again to ensure line current does not exceed nameplate rating.
5. After first 8 hours of use and periodically thereafter, check mounting bolts and tighten if necessary.

*Variable  
frequency inverter*



**All motors can be supplied with a variable frequency inverter. NEVER operate the motor at a frequency higher than that specified on the nameplate. Damage to vibrator can result.**

Do not operate vibrator motor at frequency higher than specified on nameplate. Throughout frequency range, verify that each line current does not exceed current rating on nameplate. If reading is higher than nameplate, consult inverter manual. If necessary, adjust inverter, reduce eccentric weight setting, stiffen vibrator mount location, or move vibrator to more rigid location. After making adjustment, check line current again to ensure line current does not exceed nameplate rating.





## IMPORTANT

Read entire section before beginning work. Allow vibrator to cool to ambient temperature before working on it.

## WARNING

Turn off and lock out/tag out all energy sources to vibrator and conveyor/loading systems before performing maintenance.

## CAUTION

Use Castrol Optimol Longtime PD2 grease or equivalent.

Use only prescribed amount of grease to lubricate vibrator. Too much grease will cause bearings to overheat and result in premature bearing failure.

### *Lubricating vibrator*

## NOTE

All vibrators are lubricated at the factory.

1. See Table II for lubrication schedule and amount of grease required for your vibrator.

**Table II. Lubrication Schedule**

Model	Grease Amount per Bearing	Interval (hours)
B3-3000-2	4.1 g (0.15 oz)	380

### *Repairing motor and replacing bearings*

## CAUTION

Do not attempt to repair vibrator motor or replace bearings yourself. If you attempt to do so during the warranty period, the warranty may be void.

If vibrator motor needs repair or if bearings need to be replaced, call Martin Engineering at **800-544-2947** for instructions.

*Inspecting  
vibrator*



**Before inspecting vibrator, turn off and lock out/tag out energy source to vibrator.**

1. At least quarterly, inspect vibrator, cable, and connections as follows:
  - a. Turn off and lock out/tag out energy source to vibrator according to ANSI standards (see “References”).
  - b. Inspect weight covers for cracks and check cap screws for tightness.
  - c. Inspect cable for damage including cuts and abrasions. Replace if damaged.
  - d. Inspect ground connection. Make sure ground connection to motor enclosure does not exceed 0.1 ohm. Ensure screw on ground terminal is tightened to proper torque.
  - e. Make sure all wiring connections are tightened properly.

# Part Numbers

This section provides product names and corresponding part numbers for Cougar<sup>®</sup> Electric Vibrators and related equipment. Please reference part numbers when ordering parts:

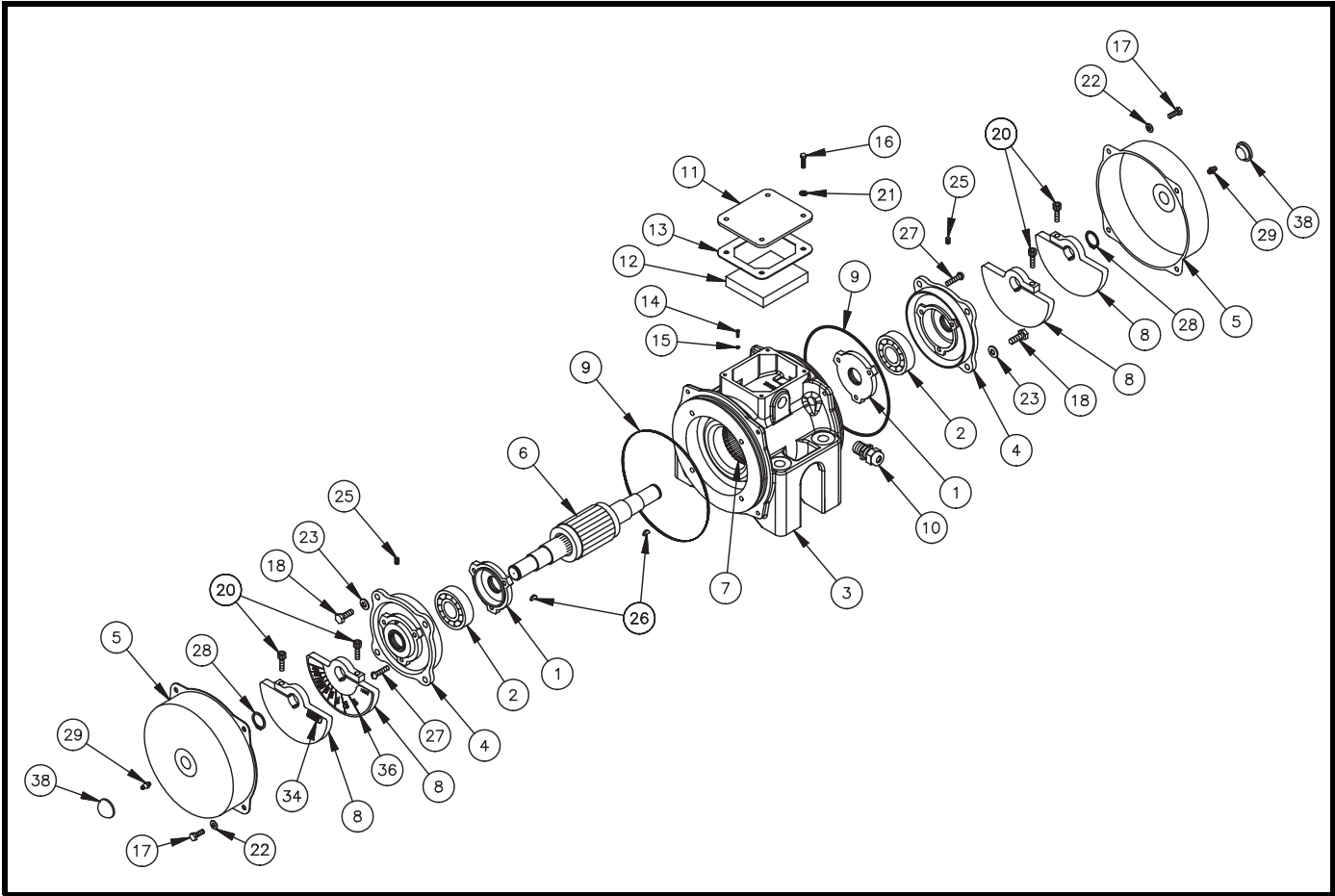


Figure 8. Cougar<sup>®</sup> Electric Vibrator, Model B3-3000-2, P/N 206055-20

Item	Description	Part No.	Qty
1	Bearing Cap	CG-100245	2
2	Bearing	CG-100248	2
3	Housing	110343-10	1
4	Bearing Bell	120204-01	2
5	End Cap	130228-01	2
6	Rotor Assembly	150647-20	1
7	Stator	160241-20	1
8	Stationary Weight	170897	4
9	O-ring	603017	2
10	Liquid Tight Connector	194851	1
11	Conduit Box Cover	196514	1
12	Polyfoam	196551	1
13	Gasket	196661	1
14	Ground Screw	197060	1
15	Cup Washer	197061	1
16	Screw HHC 1/4-20NC x 3/4 ZP	500003	4
17	Screw HHC 5/16-18NC x 1/2 ZP	CG-500036	8
18	Screw HHC 3/8-16NC x 1 ZP	500080	8
19 (NS)	Screw HHC 5/8-11NC x 5-1/2 ZP	500278	4
20	Screw HHC 5/16-18NC x 1 PF	501246	4
21	Washer Lock Split 1/4 ZP	CG-517798	4
22	Washer Compression 5/16 ZP	CG-517694	8
23	Washer Compression 3/8 ZP	CG-517696	8
24 (NS)	Washer Compression 5/8 ZP	CG-517705	4
25	Screw SSHS 1/4-28 x 1/4 CP PF	520380	2
26	Key Woodruff 1/8 x 1/2 #404	520798	2
27	Screw RHM 1/4-20NC x 1-1/4 ZP	521139	6
28	Retaining Ring	530231	2
29	Grease Zerk	532302	2
30 (NS)	Drive Screw	532400	2
31 (NS)	Caution Electric	Form #119	1
32 (NS)	Electric Vibrator Instruction Tag	Form #131	1
33 (NS)	Cougar Nameplate	CG-100351	1
34	Weight Edge Decal	Form #150	2
35 (NS)	L.H. Adjustment Decal	Form #151	1
36	R.H. Adjustment Decal	Form #152	1
37 (NS)	Operator's Manual	M4037	1
38	Plug	606017	2

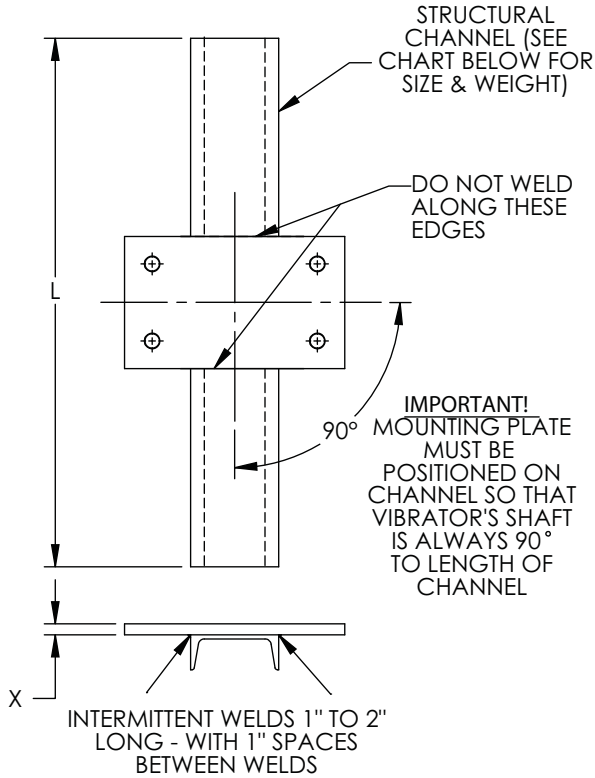
NS = Not Shown

**Figure 8. Cougar® Electric Vibrator, Model B3-3000-2, P/N 206055-20**

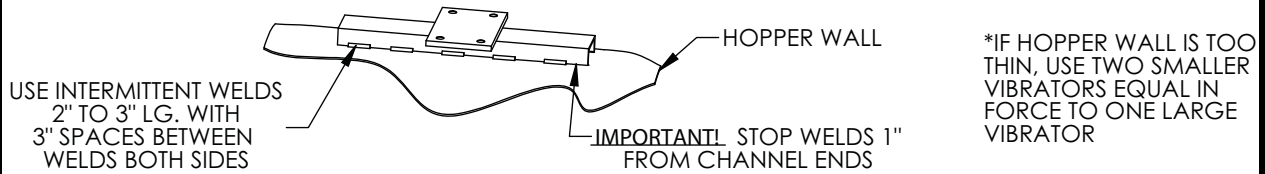
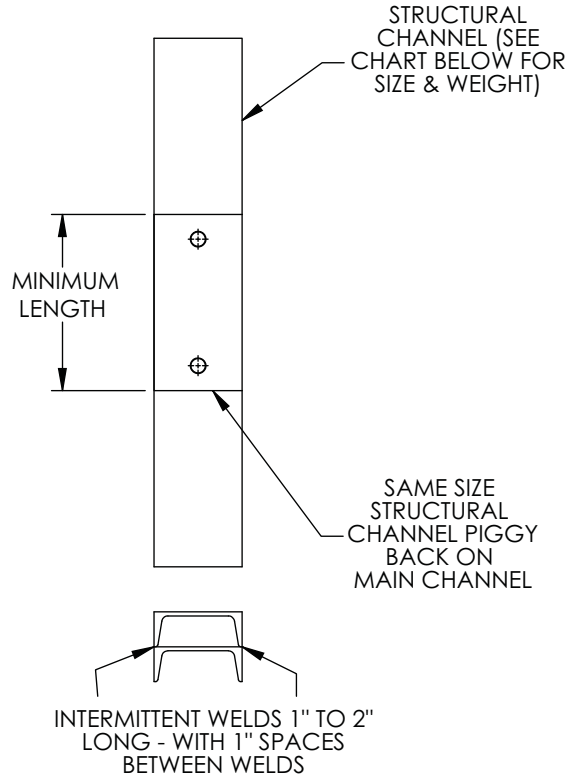
**Appendix**  
**Cougar® Electric Vibrators**  
**Mount Plate and Channel Fabrication Details**

NOTE: ALL WELDING SHOULD BE DONE WITH NORMAL MILD STEEL ROD WHEN ATTACHING MOUNTING ASS'Y. TO MILD STEEL STRUCTURES.  
 THESE SAME STRUCTURAL MILD STEEL CHANNELS CAN BE WELDED TO A STAINLESS STEEL HOPPER WALL BY USING A ROD OF THE SAME TYPE OF STAINLESS STEEL AS THE HOPPER IS.

### 4 BOLT MOUNTING



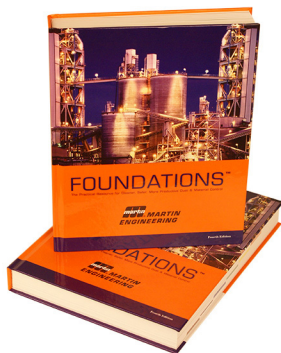
### 2 BOLT MOUNTING



MAXIMUM CENTRIFUGAL FORCE OF VIBRATION	MIN. HOPPER WALL THICKNESS ALLOWABLE *	CHANNEL LENGTH L	MT'G. PLATE THICKNESS X	CHANNEL SIZE AND WEIGHT
200	12 GAUGE	18" - 24"	1/4"	4" C @ 5.4#
500	1/8"	20" - 26"	3/8"	4" C @ 5.4#
700	1/8"	24" - 30"	1/2"	4" C @ 5.4#
900	3/16"	36" - 48"	1/2"	4" C @ 5.4#
1300	3/16"	40" - 50"	3/4"	4" C @ 7.25#
2500	1/4"	54" - 60"	3/4"	6" C @ 10.5#
3500	3/8"	60" - 72"	1"	6" C @ 10.5#
5000	1/2"	72" - 84"	1 1/4"	10" C @ 20#

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One Martin Place  
Neponset, IL 61345-9766 USA  
800 544 2947 or 309 852 2384  
Fax 800 814 1553  
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