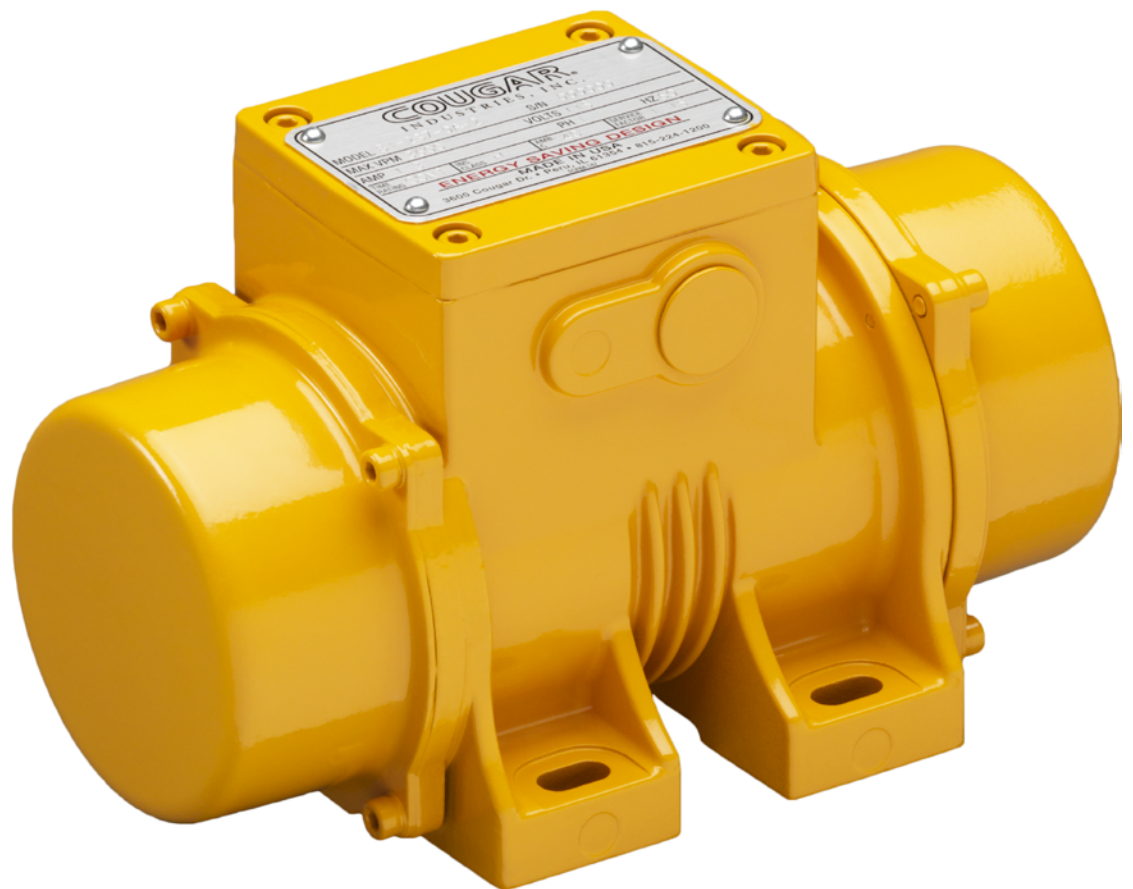




Cougar[®] B Series Electric Vibrators Zero Frame

[Go to Cougar[®] B Series Electric Vibrators web page](#)



**Operator's Manual
M3892**

Table of Contents

Section	Page
List of Figures	ii
List of Tables	ii
Introduction	1
General	1
References	1
Safety	1
Materials required	1
Storage	1
Before Installing Vibrator	2
Installing Vibrator	3
Mounting vibrator onto structure	3
Connecting power to vibrator	7
Installing overload, short-circuit, and ground-fault protection	8
After Installing Vibrator	9
Checking shaft rotation	9
Adjusting eccentric weights	9
Initial start up/checking line current	11
Variable frequency inverter	12
Maintenance	13
Lubricating vibrator	13
Repairing motor and replacing bearings	13
Inspecting vibrator	14
Part Numbers	15

List of Figures

Figure	Title	Page
1	Locating Vibrator on Hoppers.....	3
2	Mounting Plate and Channel Assembly	4
3	Mounting Bolt Tightening Sequence	5
4	Installing Restraining Cable	6
5	Three Phase Wiring Diagrams.....	7
6	Adjusting Eccentric Weights.....	10
7	Cougar [®] Electric Vibrator, Model B1-237-0A-2	16
8	Cougar [®] Electric Vibrator, Model B1-380-0A-2	18
9	Cougar [®] Electric Vibrator, Models B3-237-0A-2 & B3-380-0A-2	20

List of Tables

Table	Title	Page
I	Mounting Bolts and Torque Requirements	5
II	Eccentric Weight Settings	10
III	Lubrication Schedule For Each Bearing	13
IV	Cougar [®] Electric Vibrator Model Numbers and Part Numbers	15
V	Cougar [®] Electric Vibrator Part Numbers and Quantities	21

General

Cougar[®] 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 metric hand tools, the following materials are required to install this equipment:

- Mounting plate and channel assembly , P/N 32401-B0.
- Martin[®] 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

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.

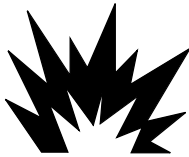
1. Inspect shipping container/pallet for damage. Report damage to delivery service immediately and fill out delivery service's claim form. Keep any damaged goods subject to examination.
2. Remove vibrator from shipping container/pallet.
3. If anything is missing contact Martin Engineering or a representative.



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.

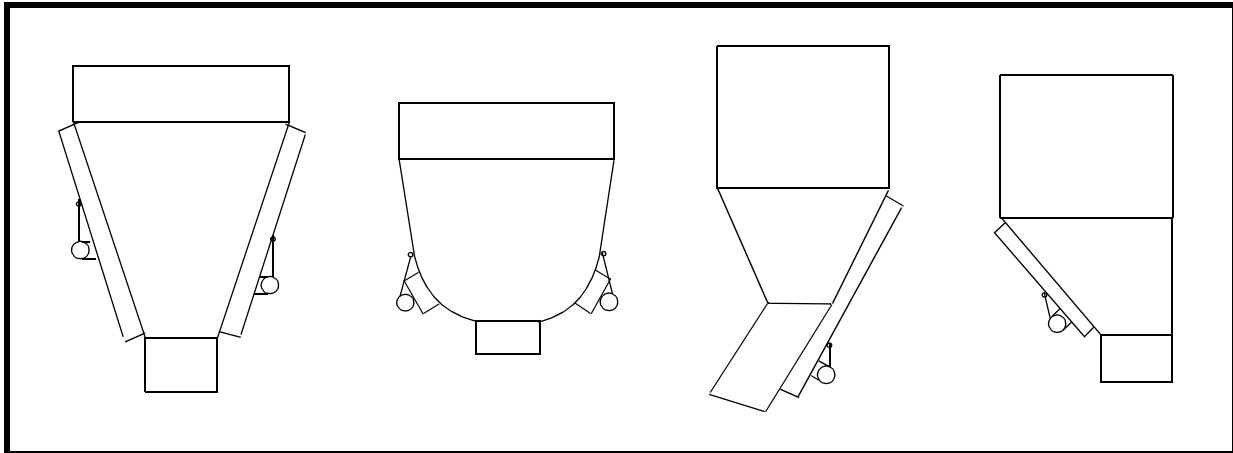


Figure 1. Locating Vibrator on Hoppers

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 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.

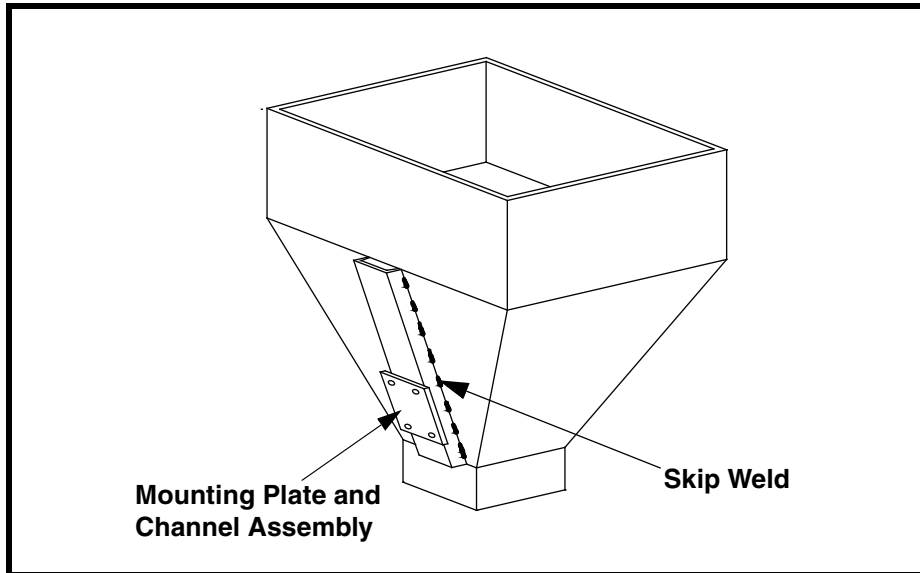


Figure 2. Mounting Plate and Channel Assembly

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.)

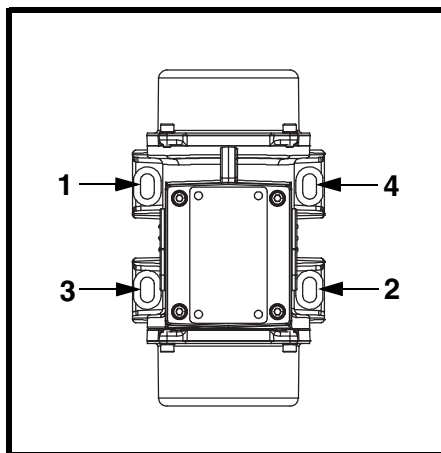


Figure 3. Mounting Bolt Tightening Sequence

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)
5/16 in. -18NC	17	M8	23

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

▲ 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:

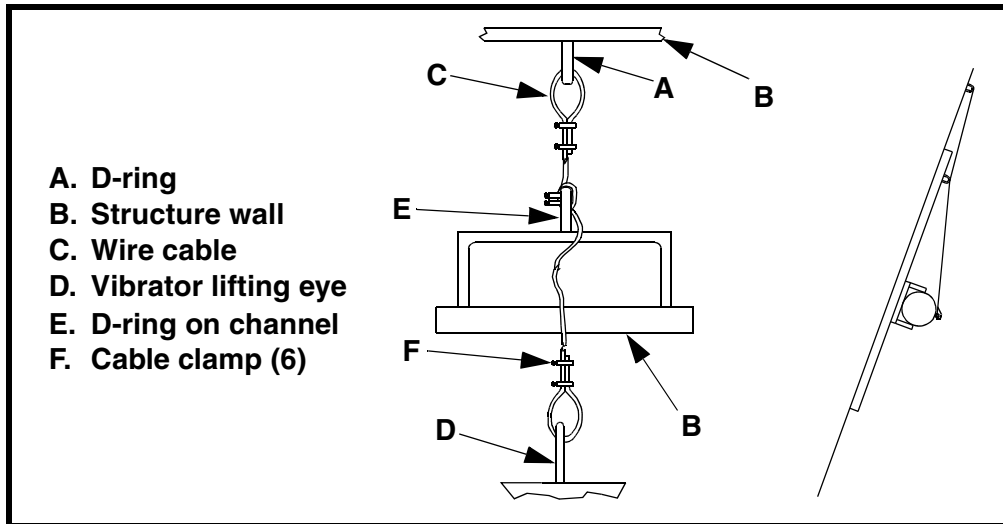


Figure 4. Installing Restraining Cable

- 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.

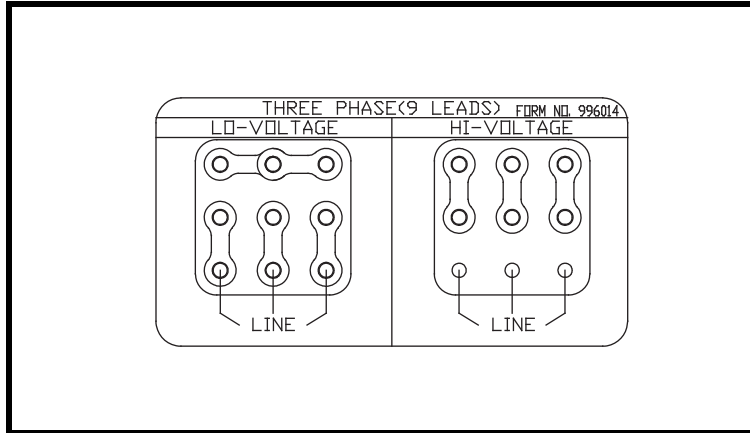


Figure 5. Three Phase Wiring Diagrams

⚠ 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.

⚠ 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).

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

⚠ 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.

NOTE

All single-phase vibrators are supplied with overload protection.

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

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.

Adjusting eccentric weights

NOTE

Eccentric weights are set at 60% at factory. Table II shows the force output for each weight configuration.

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.

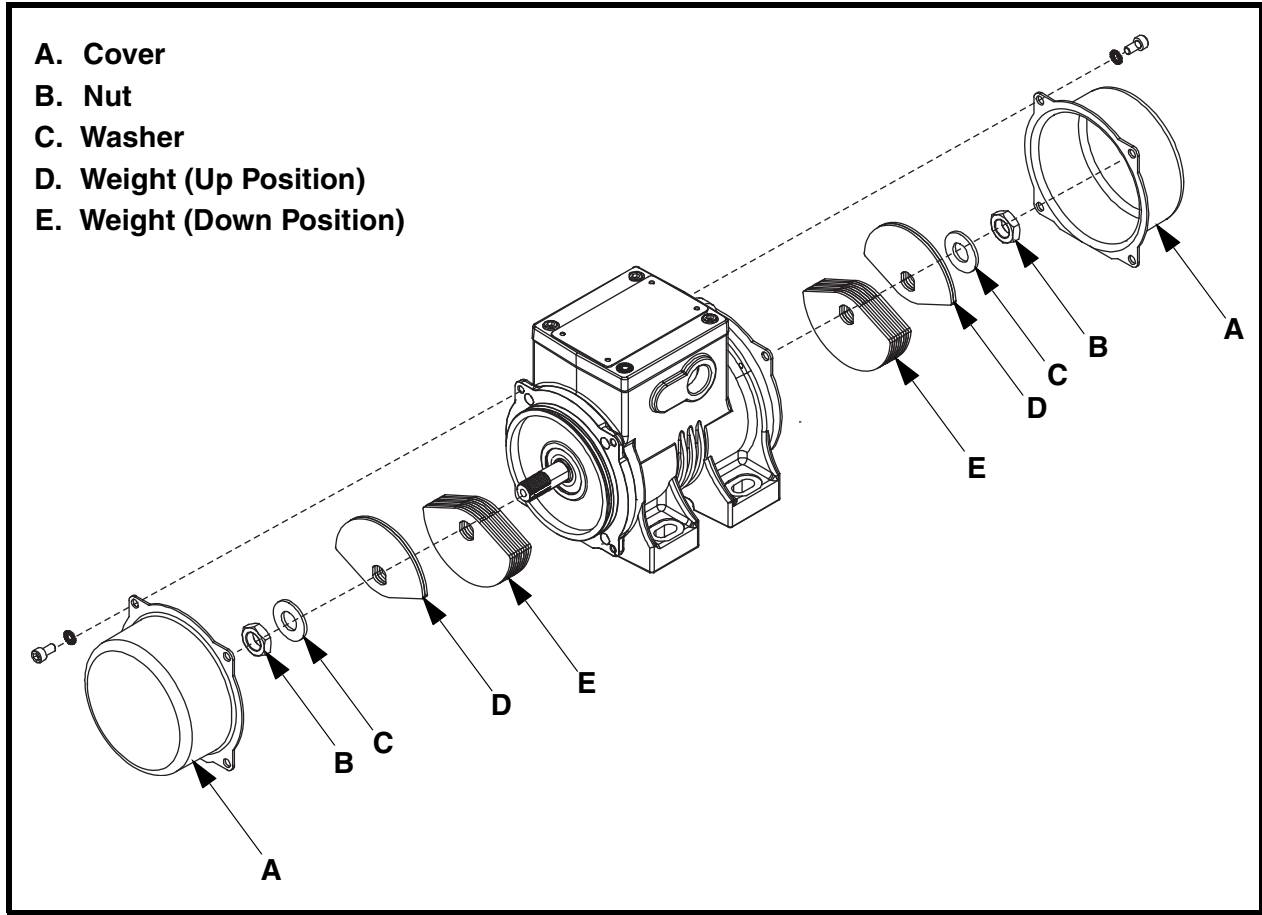


Figure 6. Adjusting Eccentric Weights

Table II. Eccentric Weight Settings

Models B1-237-0A-2 & B3-237-0A-2		
Lbs of Force	Qty of Weights in Up Position	Qty of Weights in Down Position
26	4	5
78	3	6
105	2	7
183*	1*	8*
237	0	9

Models B1-380-0A-2 & B3-380-0A-2		
Lbs of Force	Qty of Weights in Up Position	Qty of Weights in Down Position
33	5	6
99	4	7
166	3	8
232*	2*	9*
298	1	10
380	0	11

*Factory Setting



▲ WARNING

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

1. Turn off and lock out/tag out energy source to vibrator according to ANSI standards (see “References”).
2. Remove weight cover (A).
3. Remove nut (B) and washer (C).
4. Adjust weights according to Table II.
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 (mirror images) or force output will be uneven.

7. Repeat steps 1 through 6 for second set of weights. Set both sets of weights the same so they are 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.

*Variable
frequency inverter*

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.



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.

Lubricating vibrator

NOTE

All vibrators are lubricated at the factory.

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

Table III. Lubrication Schedule

2-Pole 3450 RPM 60 Hz		
Model	Grease Amount per Bearing	Interval (hours)
B1-237-0A-2	Lubricated for Life	
B1-380-0A-2	Lubricated for Life	
B3-237-0A-2	Lubricated for Life	
B3-380-0A-2	Lubricated for Life	

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[®] Electric Vibrators and related equipment. Please reference part numbers when ordering parts:

Table IV. Cougar[®] Electric Vibrator Model Numbers and Part Numbers

Model Number	Part Number
B1-237-0A-2	206202-02
B1-380-0A-2	206204
B3-237-0A-2	206200
B3-380-0A-2	206203

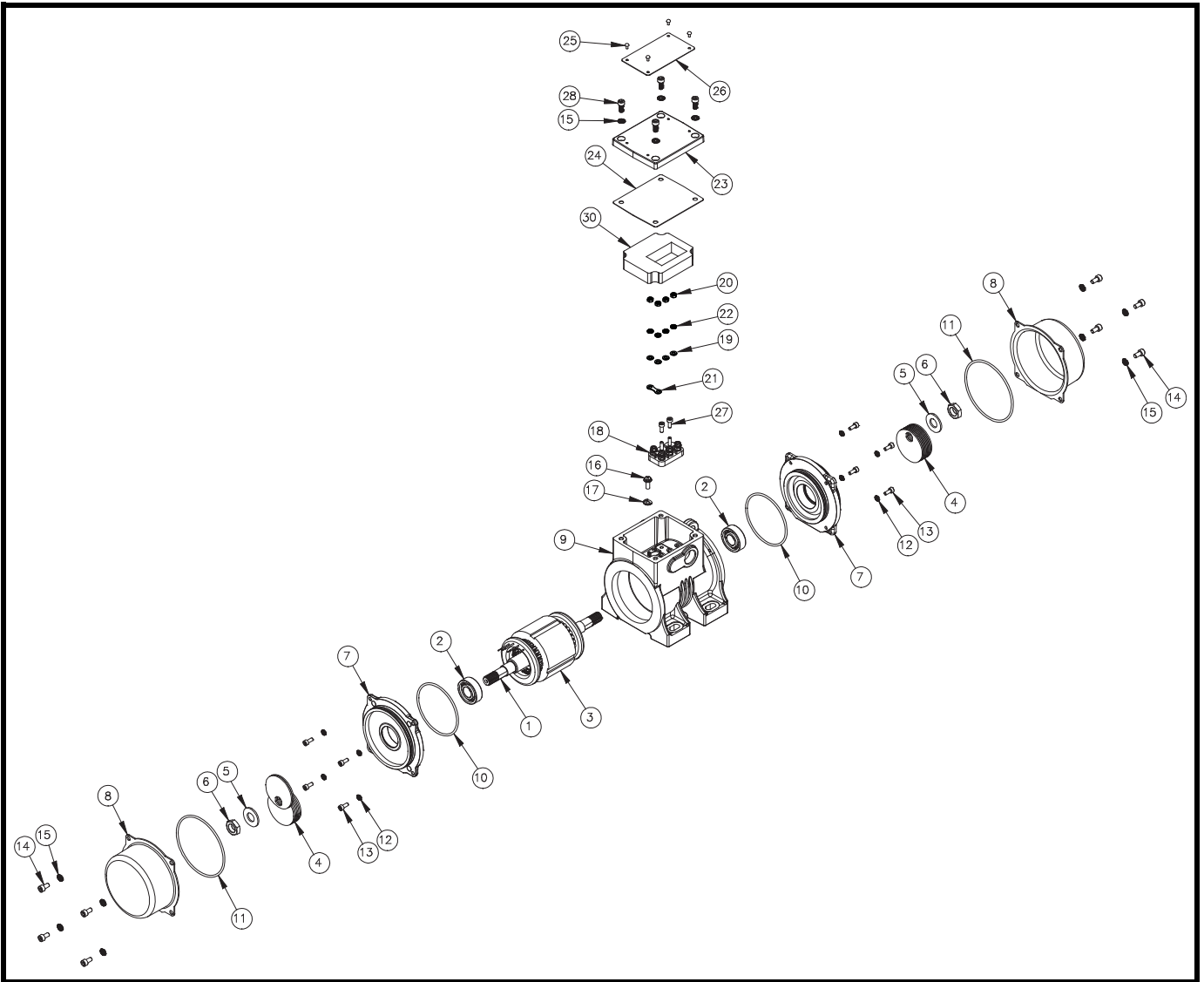


Figure 7. Cougar[®] Electric Vibrator, Model B1-237-0A-2

Item	Description	Part No.	Qty
1	Shaft	150692	1
2	Bearing	100141	2
3	Stator	160292	1
4	Weight	170963	18
5	1/2 Compression Washer	517702	2
6	M13 x 1 Nut	518980	2
7	Endbell	120248	2
8	Endcap	130268	2
9	Housing	110358	1
10	O-ring	603031	2
11	O-ring	603034	2
12	M4 Washer	517451	8
13	M4 x 0.7 x 10 SHCS	501763	8
14	M5 x 0.8 x 10 SHCS	501781	8
15	M5 Washer	517452	12
16	Ground Screw	197060	1
17	Washer	197061	1
18	Terminal Block	195658	1
19	M4 Washer	517406	8
20	M4 x 0.7 Nut	518957	8
21	Jumper	195661	1
22	M4 Washer	532201	4
23	Cover	196518	1
24	Gasket	196665	1
25	Drive Screw	532400	4
26	Nameplate	Form 147	1
27	M4 x 0.7 x 16 SHCS	501766	2
28	M5 x 0.8 x 12 SHCS	501783	4
29 (NS)	Cord Grip	194995	1
30	Foam	196160	1
31 (NS)	Switchbox	194317	1
32 (NS)	Caution Electric	Form 119	1
33 (NS)	Instructional Tag	Form 131	1
34 (NS)	Operator's Manual	M3892	1

NS = Not Shown

Figure 7. Cougar® Electric Vibrator, Model B1-237-0A-2

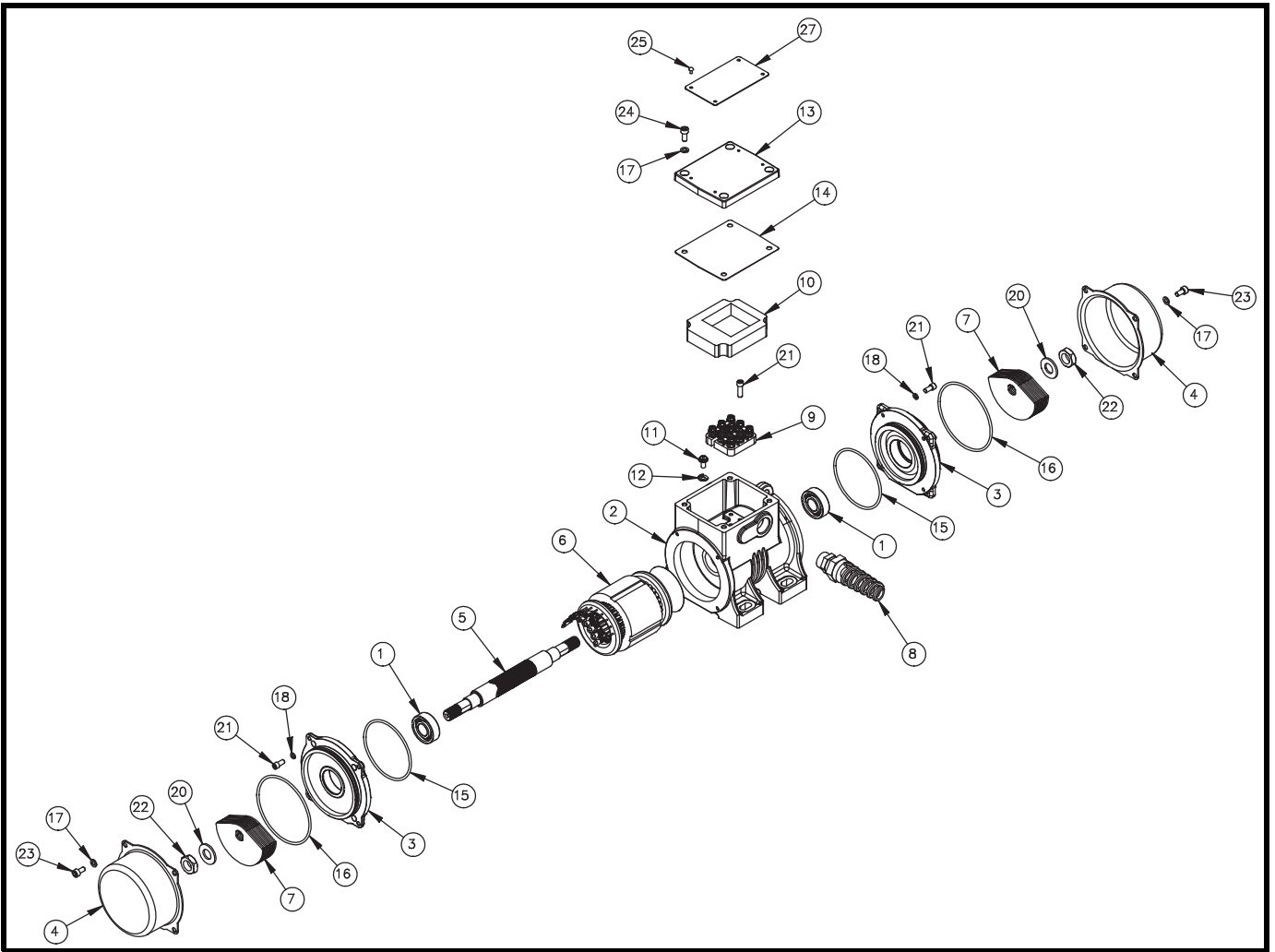


Figure 8. Cougar[®] Electric Vibrator, Model B1-380-0A-2

Item	Description	Part No.	Qty
1	Shaft Assembly	150692	1
2	Bearing with Shield	CG-100141	2
3	Stator	160292	1
4	1/2 Compression Washer	517702	2
5	M5 Washer	517452	12
6	M4 Washer	517451	8
7	M13 x 1 Nut	518980	2
8	Weight	170964	22
9	Endbell	120248	2
10	Housing	110358	1
11	Endcap	130268	2
12	O-ring	603031	2
13	O-ring	603034	2
14	M4 x 0.7 x 10 SHCS	501763	8
15	M5 x 0.8 x 10 SHCS	501781	8
16	M4 x 0.7 x 16 SHCS	501766	2
17	M5 x 0.8 x 16 SHCS	501783	4
18	Ground Screw	197060	1
19	Cup Washer	197061	1
20	Terminal Block	195658	1
21	Conduit Box Cover	196518	1
22	Gasket	196665	1
23	Drive Pin	532400	4
24 (NS)	Cord Grip	194995	1
25	Insulating Block	196160	1
26 (NS)	Switchbox 115V 3.15 Amps	194317-3	1
27 (NS)	Cougar Vibration Label	CG-100328-2	2
28	Nameplate	Form 147	1
29 (NS)	Caution Electric	Form 119	1
30 (NS)	Instructional Tag	Form 131	1
31 (NS)	Operator's Manual	M3892	1

NS = Not Shown

Figure 8. Cougar[®] Electric Vibrator, Model B1-380-0A-2

Part Numbers

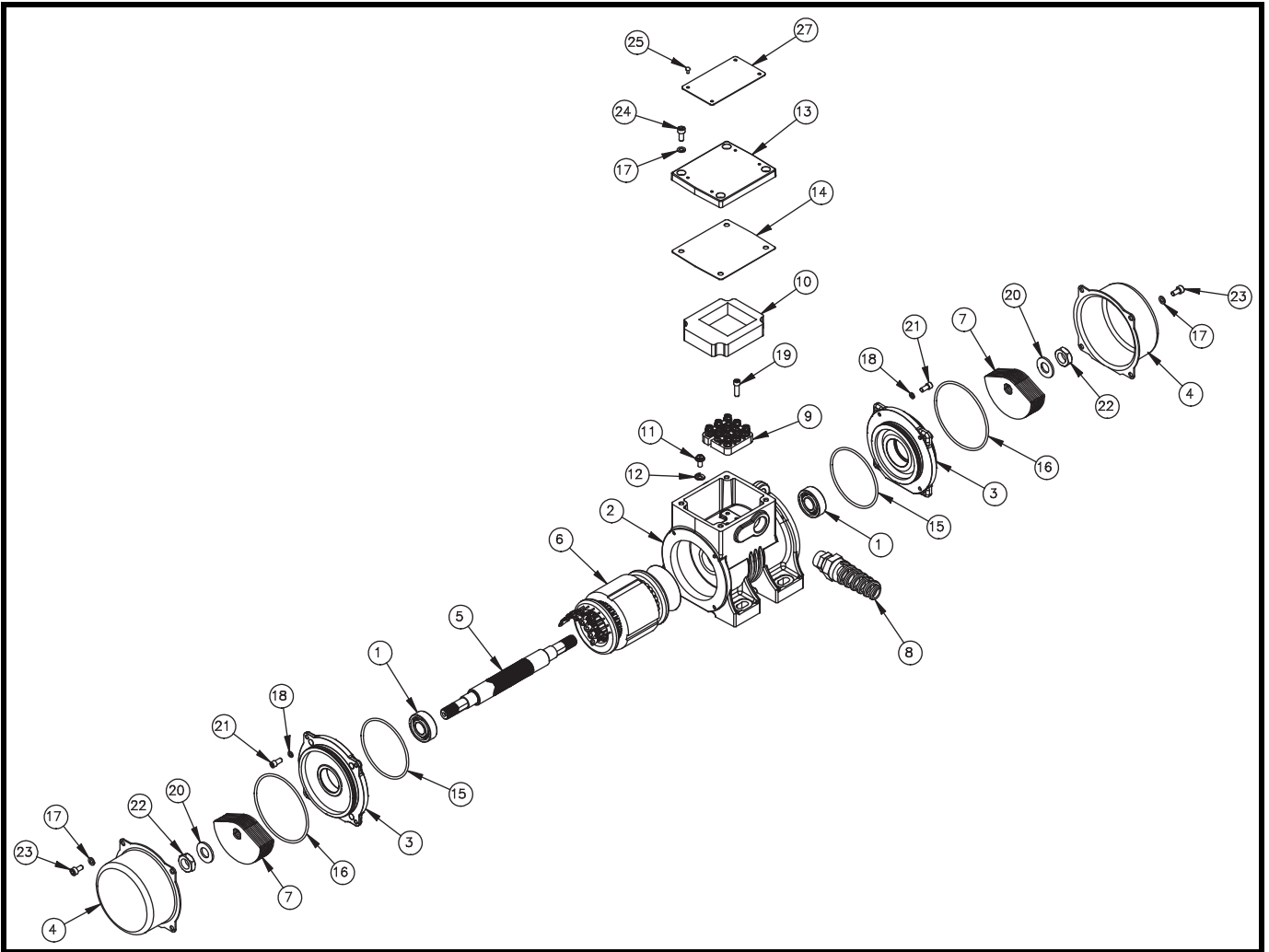


Figure 9. Cougar[®] Electric Vibrator, Models B3-237-0A-2 and B3-380-0A-2

Item	Description	Part No.	Qty
1	Bearing with Shield	CG-100141	2
2	Housing	110358	1
3	End Bell	120248	2
4	Endcap	130268	2
5	Rotor Assembly	150691	1
6	Stator	160291	1
7	Weight	Table V	Table V
8	Cord Grip	194995	1
9	Terminal Block Assembly	195659-02	1
10	Insulating Block	196159	1
11	Ground Screw	197060	1
12	Cup Washer	197061	1
13	Conduit Box Cover	196518	1
14	Gasket	196665	1
15	O-ring	603031	2
16	O-ring	603034	2
17	Washer Compression M5	517452	12
18	Washer Compression M4	517451	8
19	Screw SHC M4 x 16 PF	501766	3
20	Washer Compression 1/2 ZP	517702	2
21	Screw SHC M4 x 10 PF	501763	8
22	Nut Hex	518980	2
23	Screw SHC M5 x 10 PF	501781	8
24	Screw SHC M5 x 12 PF	501783	4
25	Drive Pin	532400	4
26 (NS)	Wiring Diagram	996014	1
27	Nameplate	Form 147	1
28 (NS)	Caution Electric	Form 119	1
29 (NS)	Cougar Vibration Label	CG-100328-2	1
30 (NS)	Instructional Tag	Form 131	1
31 (NS)	Operator's Manual	M3892	1

NS = Not Shown

Figure 9. Cougar[®] Electric Vibrator, Models B3-237-0A-2 and B3-380-0A-2

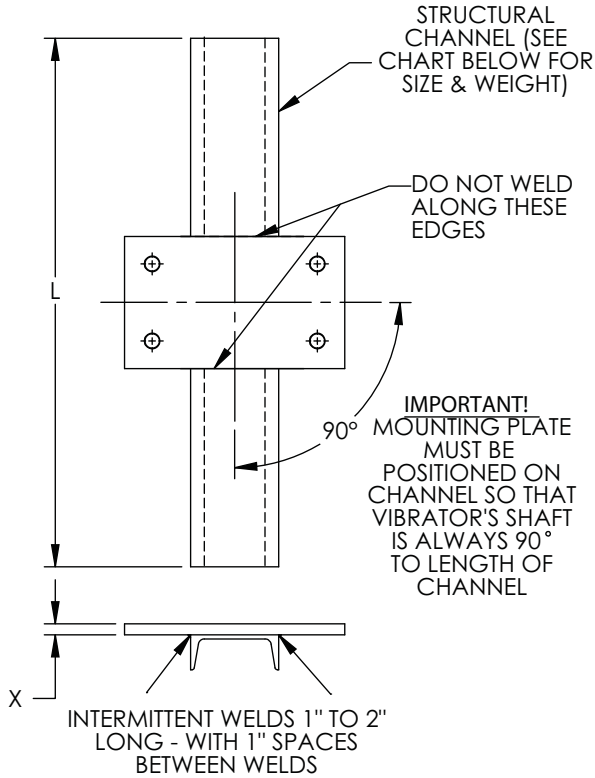
Table V. Cougar[®] Electric Vibrator Part Numbers and Quantities

Model Number	Item 7 Part Number	Item 7 Qty
B3-237-0A-2	170963	18
B3-380-0A-2	170964	22

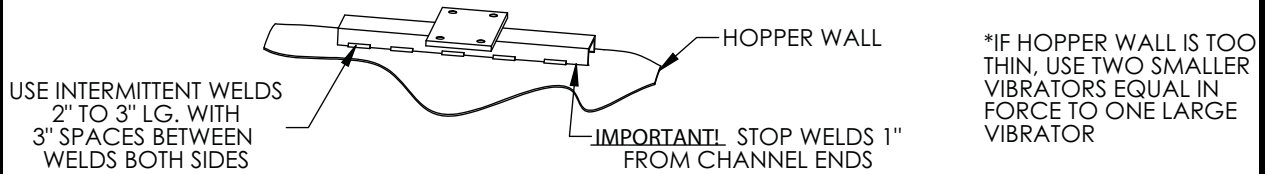
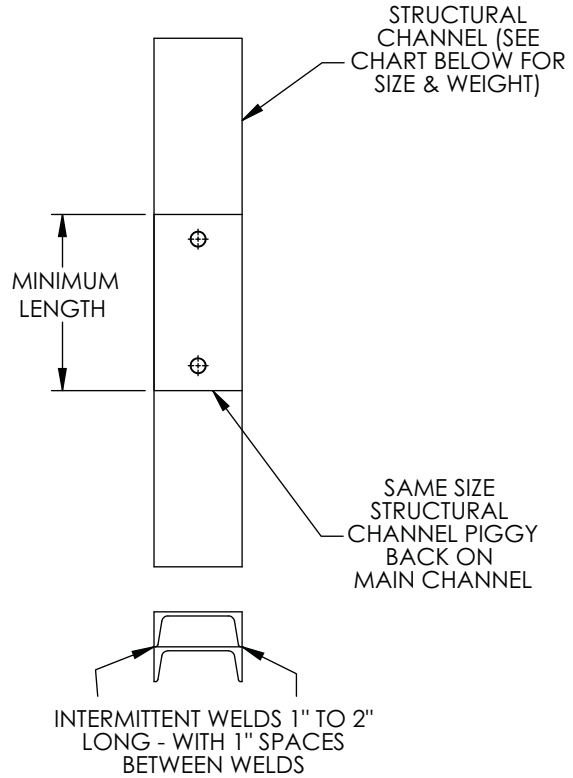
Appendix
Cougar[®] Electric Vibrators
Mount Plate and Channel Fabrication Details

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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