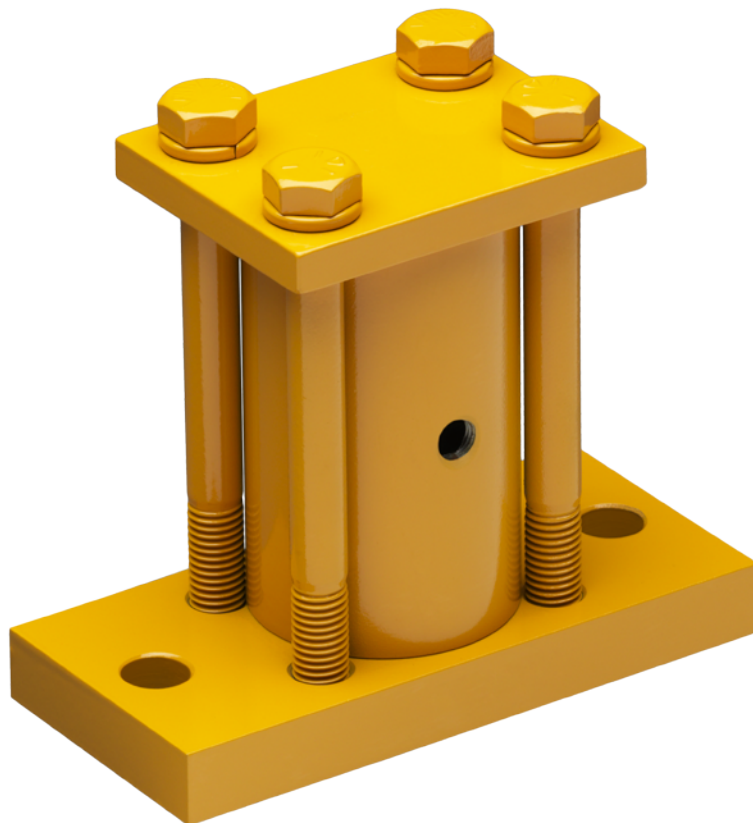




# ***Cougar<sup>®</sup> 5000 Series Piston Vibrators***

[Go to Cougar<sup>®</sup> 5000 Series Piston Vibrators web page](#)



***Operator's Manual  
M3947***

# 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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# Introduction

## General

Cougar® 5000 Series Piston Vibrators provide force to activate the free flow of sticky, coarse, high-moisture materials in bins and hoppers. The vibrators require no maintenance when used with filtered and lubricated air.

Vibrators are sized based on weight and characteristics of material in the sloped portion of bins and hoppers. Table I shows sizes of vibrators needed for applications using 1 lb of force for 10 lb of material (assuming the material can flow and weighs less than 100 lb per cubic foot). More force is needed for materials of high density or moisture.

**Table I. Cougar® 5000 Series Piston Vibrator Selection for Bins and Hoppers**

| Model | Weight of Material<br>lb (kg) | Bin Wall Thickness<br>in. (mm) | Channel Length<br>in. (mm) |
|-------|-------------------------------|--------------------------------|----------------------------|
| 5012  | 2900 (1315)                   | 1/16 to 1/8 (1.6 to 3.2)       | 36 (914)                   |
| 5016  | 4900 (2223)                   | 3/16 to 1/4 (4.8 to 6.4)       | 36 (914)                   |
| 5024  | 9800 (4445)                   | 1/4 to 3/8 (6.4 to 9.5)        | 36 (914)                   |
| 5032  | 22000 (9979)                  | 3/8 to 1/2 (9.5 to 12.7)       | 72 (1829)                  |

This manual covers installing and operating Cougar® 5000 Series Piston Vibrators on bins, hoppers, and chutes. For assistance installing the vibrators for other applications, call Martin Engineering.

Technical data is provided in Appendix A.

Dimensions for each vibrator are provided in Appendix B.

## References

The following documents are referenced in this manual:

- 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.
- Federal Register, Volume 54, Number 169, Part IV, 29 CFR 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.

## 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 standard hand tools, the following materials are required to install this equipment:

- Channel Mount, P/N 29928-XX or equivalent.
- Air Line Kit, P/N 29808 or 29809.

## 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 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.
3. If anything is missing, contact Martin Engineering or representative.

### **▲ WARNING**

**Before installing equipment, turn off and lock out/tag out energy source to conveyor and conveyor accessories.**

4. Turn off and lock out/tag out energy source 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. Cover conveyor belt with fire retardant cover.
6. Make sure mounting surface is strong and flat, within 1/16 in. (2 mm) across vibrator feet. (This will prevent internal stress to vibrator casting when tightening mount bolts.)
7. Make sure mounting surface and vibrator are clean and free of debris.

# Installing Vibrator

## IMPORTANT

Read entire section before beginning work.

## CAUTION

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

To install the Cougar<sup>®</sup> 5000 Series Piston Vibrator, follow the procedures corresponding to the following steps:

1. Determine where to locate the vibrator on the structure.

## IMPORTANT

Piston vibrators produce linear vibration best applied to wet, sticky material adhering to a bin wall. The object is to move the wall back and forth to dislodge the material.

2. Install 1- to 3-ft (305- to 914-mm) channel or beam onto sloped section of bin.
3. Install channel mount or equivalent onto structure or beam reinforcement, as applicable.
4. Mount vibrator to structure.
5. Connect lubricated air lines to vibrator.

### *Locating vibrator on structure*

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

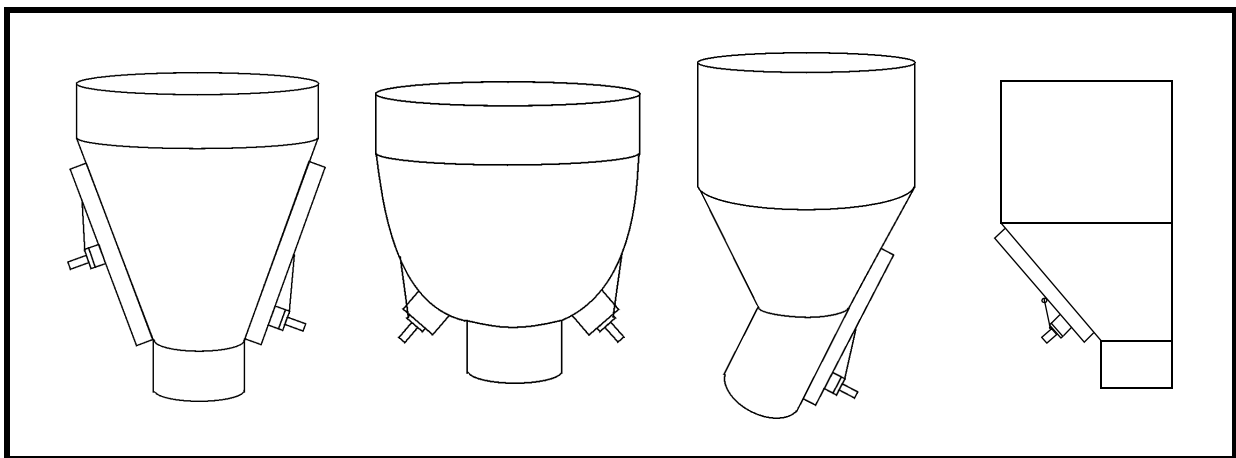


Figure 1. Locating Vibrator on Structure

***Installing reinforcing beam onto structure***

**NOTE**

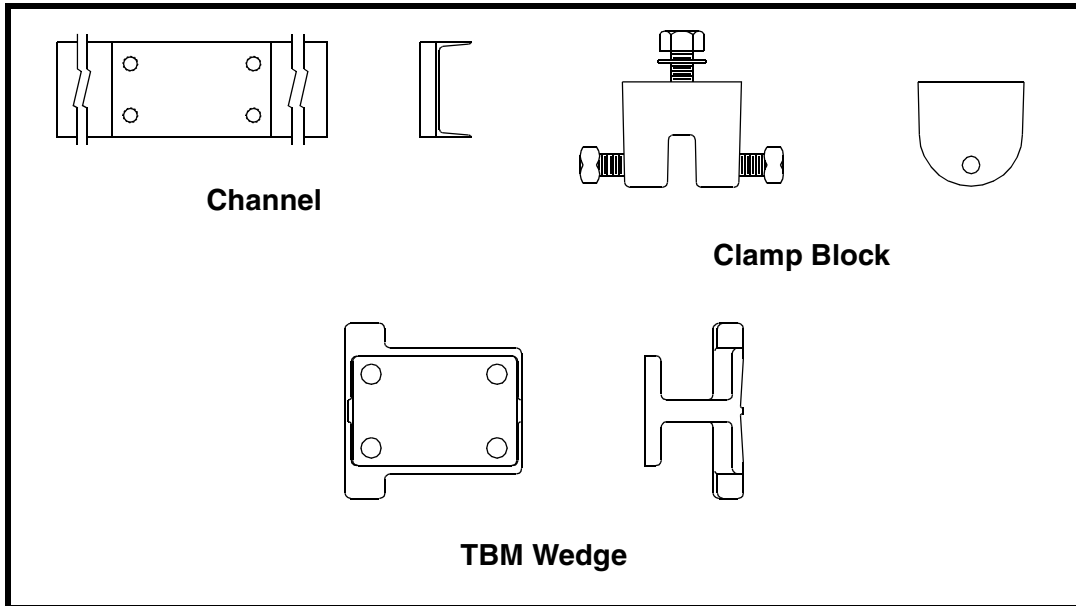
This section provides instructions for installing vibrator on steel structure. To install vibrator on concrete structure, contact Martin Engineering for instructions.

1. 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.
2. See Figure 2. If using Martin® Channel Mount, W-Beam Mount (or equivalent), or T-beam to mount vibrator onto structure, do the following:
  - a. Locate beam so that vibrator can be positioned as shown in Figure 1.

**IMPORTANT**

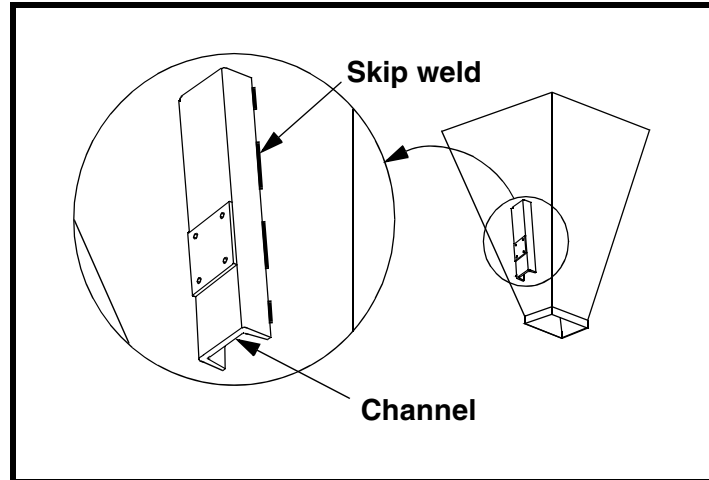
If material is dry, chute wall should be more rigid and a longer channel or beam installed. A channel or beam 3/4 the length of the sloped wall is recommended for movement of dry materials.

- b. Install 1- to 3-ft (305- to 914-mm) channel or beam onto chute wall.



**Figure 2. Channel, Clamp Block, and TBM Wedge Mounts (Top and Side Views)**





**Figure 3. Skip Weld**

- c. See Figure 3. Skip-weld beam in place: Weld 3 in. (76 mm), then skip 2 in. (51 mm). Repeat for entire perimeter of beam. Do not weld last 1 in. (25 mm) of either end of beam or any corner.
- d. If installing vibrator on hopper with wedge mount already in place, use TBM Wedge (see Figure 2) or equivalent to mount vibrator. Mount female half of wedge rigidly to beam extending at least 3/4 the slope length.

***Mounting vibrator onto structure***

**▲ WARNING**

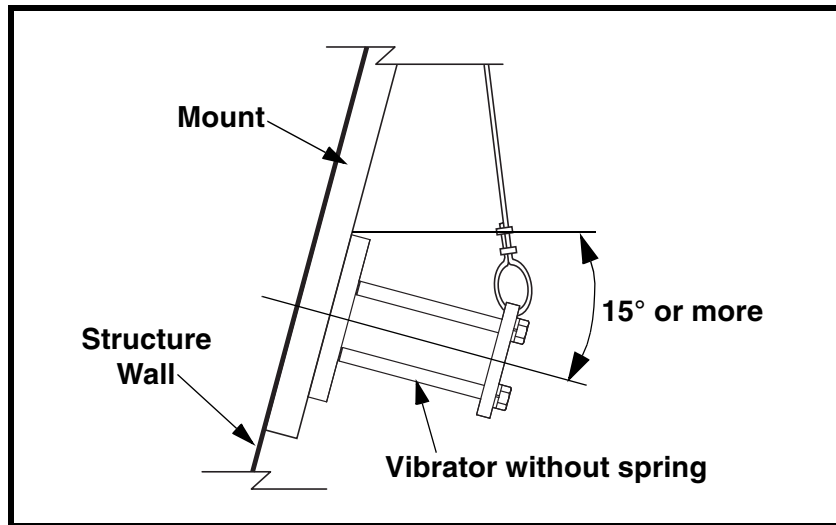
Move vibrator into final position carefully. Sudden movements could cause piston to fall out of vibrator body causing damage to piston or injury to personnel.

**IMPORTANT**

If vibrator has been partially disassembled, make sure piston is reinserted correctly and strike plate is firmly seated before mounting.

**5000 Series vibrator without spring must be mounted with a minimum slope of 15° below horizontal. (See Figure 4.)**

1. If using vibrator without spring, ensure mounting location has a minimum slope of 15° below horizontal. (See Figure 4.)



**Figure 4. Mounting Vibrator without Spring**

2. Make sure vibrator is totally assembled before mounting. If strike plate and piston have come out, reassemble as follows:
  - a. Insert piston, making sure the end labeled “TOP” goes in first.
  - b. If using a 5000 series vibrator with a spring, insert the spring next. If spring does not easily fit around lower end of piston, make sure piston is inserted correctly (see step 1.a).
  - c. Make sure o-ring is seated in groove around strike plate. Press strike plate into place, making sure it is flush with bottom of vibrator body.
3. Before installing vibrator onto mount, apply thread sealing compound to all bolts.

**⚠ CAUTION**

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

4. Install vibrator onto Channel mount, W-beam mount, clamp blocks, or TBM wedge (see Figure 2) as follows:
  - a. Align mounting holes in vibrator with mounting holes in mount.
  - b. Install vibrator onto mount with four new lock nuts, compression washers, and Grade 5 bolts. (See Table II for specific size and torque requirements.) Use lock nuts and lock washers same size as bolts.

**Table II. Bolt Sizes and Torque Specifications**

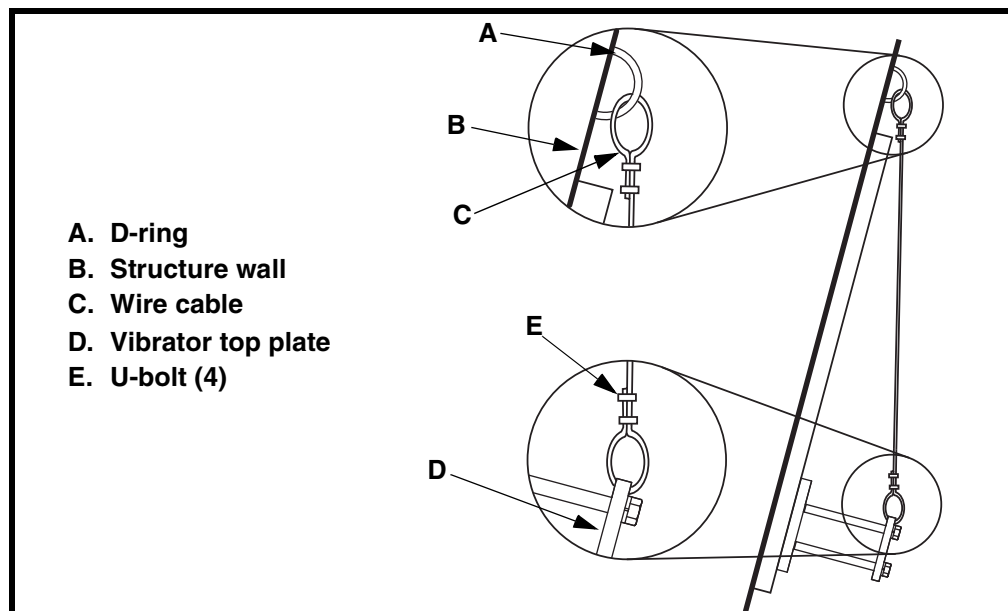
| Model Number     | Bolt Size  | Torque             |
|------------------|------------|--------------------|
| 5012, 5016, 5024 | 5/8 -11 NC | 170 ft-lb (23 kgm) |
| 5032             | 7/8 -9 NC  | 400 ft-lb (55 kgm) |

5. To install clamp block onto structure, do the following:
  - a. Loosen two set screws.
  - b. Slide feet of clamp blocks (with vibrator attached) onto T-beam or rail on structure.
  - c. Tighten two set screws into clamp block bushings to secure clamp blocks to beam or rail.
6. To install TBM wedge onto hopper, do the following:
  - a. Remove hex nut, flat washer, and slide bracket from threaded rod.
  - b. Slide TBM wedge (with vibrator attached) into mount on hopper.
  - c. Install slide bracket, flat washer, and hex nut onto TBM wedge to secure it in mount.

**▲ 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 a 1/8-in. (3 mm) diameter cable assembly, P/N 29827, or equivalent as follows (cable is included with Mounting Kit for Cougar® 5000 Series Piston Vibrators):
  - a. Weld D-ring (A, Figure 5) onto structure wall (B) above vibrator.
  - b. Loop 1/8-in. (3 mm) wire cable (C) through hole in vibrator top plate (D) and D-ring on structure wall.
  - c. Make sure cable is taut and has 3-1/4 in. (83 mm) of turn-back at each end.



**Figure 5. Installing Vibrator Safety Cable**

- d. Apply thread sealing compound to threads of nuts on U-bolts (E). Install four cable clamps (two on each end) to secure cable to vibrator eye and D-ring. Torque nuts to 4.5 ft-lb (0.6 kgm).
- e. Trim loose ends of wire cable.

## *Connecting air lines*

### **IMPORTANT**

**At least 40 psi (2.75 bar) is required to operate the vibrator. Martin Engineering recommends using an air filter on the air line (available from Martin Engineering).**

**Lubricated air must be used to ensure proper operation of the vibrator.**

1. Run a lubricated air line (supplied by the customer) to the intake on the side of the vibrator body.
2. Remove plastic plug.
3. Connect air line to vibrator.

# After Installing Vibrator

---

## **IMPORTANT**

Read entire section before beginning work.

1. Start vibrator.

## **▲ WARNING**

**Piston vibrators are loud when operating. Use ear protection to avoid impairment or loss of hearing.**

2. Observe operation of vibrator. If there is noticeable movement of the hopper wall or mount during operation, add more reinforcement to structure (see “Installing reinforcing beam onto structure”).
3. After 1 hour of operation, tighten mounting bolts while vibrator is operating to fully seat vibrator.

# Troubleshooting

---

If you are experiencing problems with the vibrator, see below.

| <b>Symptom</b>                             | <b>Corrective Action</b>                                                                                                                                                                                                                                                   |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Vibrator not moving material               | <ul style="list-style-type: none"> <li>• Vibrator assembled incorrectly. Dismantle vibrator and assemble correctly.</li> <li>• No air pressure. Make sure air is on and reaching vibrator.</li> </ul>                                                                      |
| Vibrator making unusual noise              | <ul style="list-style-type: none"> <li>• Vibrator assembled incorrectly. Dismantle vibrator and assemble correctly.</li> <li>• Contaminant has entered vibrator. Disassemble vibrator and clean body and piston. If piston shows signs of wear, replace piston.</li> </ul> |
| Structure wall moving or beginning to tear | Wall not rigid enough. Reinforce structure wall or mount.                                                                                                                                                                                                                  |

# Part Numbers

---

This section provides product names and corresponding part numbers for Cougar® 5000 Series Piston Vibrators and related equipment. Please reference part numbers when ordering parts.

## *Cougar® 5000 Series Piston Vibrators*

### **Impacting Piston Vibrators:**

- 5012 Piston Vibrator Assembly:** P/N 890200.
- 5012-SP Piston Vibrator Assembly with Spring:** P/N 890200-SP.
- 5016 Piston Vibrator Assembly:** P/N 890300.
- 5016-SP Piston Vibrator Assembly with Spring:** P/N 890300-SP.
- 5024 Piston Vibrator Assembly:** P/N 890500.
- 5024-SP Piston Vibrator Assembly with Spring:** P/N 890500-SP.
- 5032 Piston Vibrator Assembly:** P/N 890700.
- 5032-SP Piston Vibrator Assembly with Spring:** P/N 890700-SP.

### **Non-Impacting Piston Vibrators:**

- 5012-AC Piston Vibrator Assembly:** P/N 890201.
- 5012-AC-SP Piston Vibrator Assembly with Spring:** P/N 890201-SP.
- 5016-AC Piston Vibrator Assembly:** P/N 890301.
- 5016-AC-SP Piston Vibrator Assembly with Spring:** P/N 890301-SP.
- 5024-AC Piston Vibrator Assembly:** P/N 890501.
- 5024-AC-SP Piston Vibrator Assembly with Spring:** P/N 890501-SP.
- 5032-AC Piston Vibrator Assembly:** P/N 890701.
- 5032-AC-SP Piston Vibrator Assembly with Spring:** P/N 890701-SP.

## *Vibrator mounts*

- Channel Mount for 5012 Series:** P/N 29928-XX.
- Channel Mount for 5016 Series:** P/N 29928-XX.
- Channel Mount for 5024 Series:** P/N 29928-XX.
- Channel Mount for 5032 Series:** P/N 29928-XX.

## *Miscellaneous*

- 1/2 in. (13 mm) NPT Filter-Regulator-Lubricator (FRL) Kit:** P/N 14760.
- 1/2 in. (13 mm) Bronze Ball Valve:** P/N 14824.
- 1/2 in. (13 mm) NPT Solenoid Valve (120 V 60 Hz):** P/N 14736.
- 30-Minute Cycle Timer (120 V 60 Hz):** P/N 18073.
- Martin® Controller - single circuit:** P/N 38902-20.

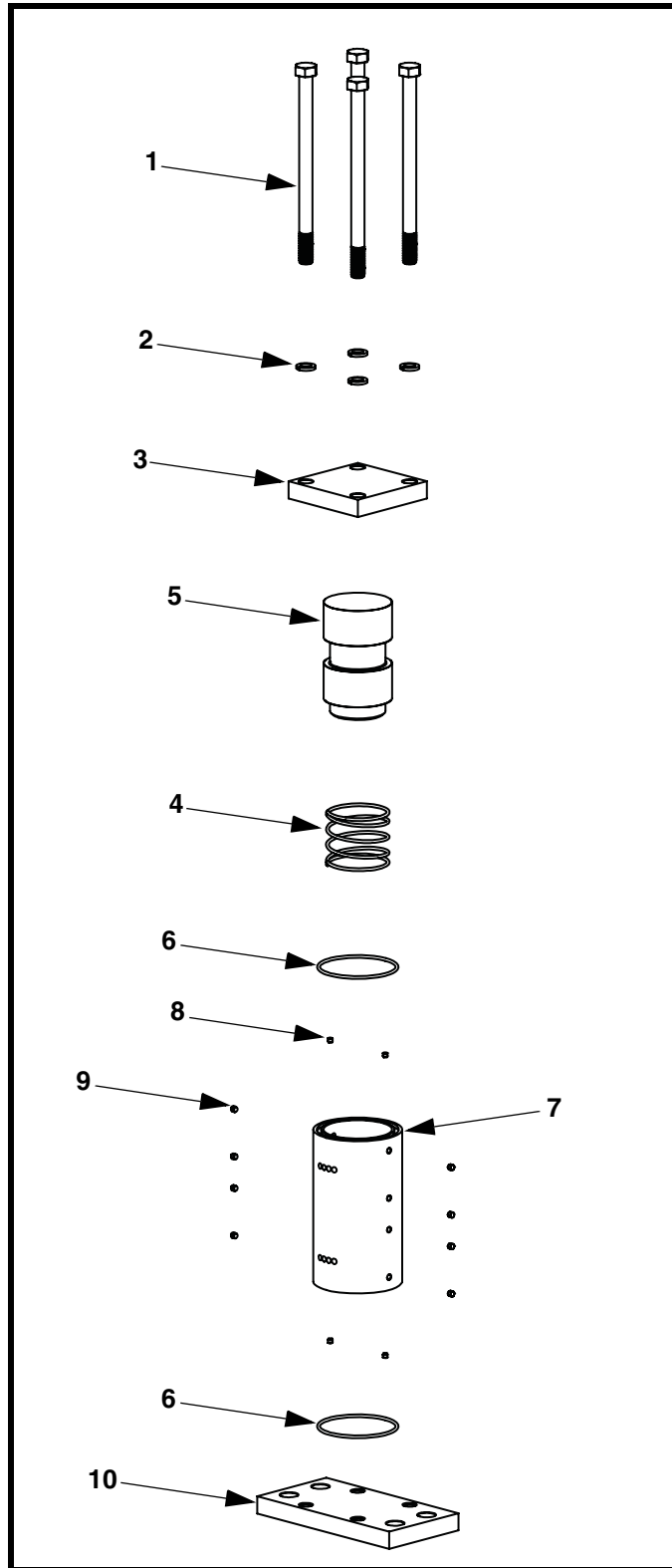


Figure 6. Cougar® 5000 Series Piston Vibrator Part Numbers



| Model      | Assembly P/N | 1      |             | 2      | 3      | 4 | 5      | 6      | 7      | 8 | 9 | 10     |
|------------|--------------|--------|-------------|--------|--------|---|--------|--------|--------|---|---|--------|
|            |              | Bolt   | Lock Washer |        |        |   |        |        |        |   |   |        |
| 5012       | 890200       | 897461 | 517804      | 896040 | —      | — | 894420 | 897153 | 894020 | — | — | 894880 |
| 5012-SP    | 890200-SP    | 897461 | 517804      | 896040 | 897207 | — | 894420 | 897153 | 894020 | — | — | 894880 |
| 5012-AC    | 890201       | 897461 | 517804      | 896040 | —      | — | 894423 | 897153 | 894020 | — | — | 894880 |
| 5012-AC-SP | 890201-SP    | 897461 | 517804      | 896044 | 897212 | — | 894424 | 897153 | 894020 | — | — | 894880 |

|            |           |        |        |        |        |   |        |        |        |        |        |        |
|------------|-----------|--------|--------|--------|--------|---|--------|--------|--------|--------|--------|--------|
| 5016       | 890300    | 897461 | 517804 | 896060 | —      | — | 894441 | 897154 | 894030 | 897251 | 897251 | 894920 |
| 5016-SP    | 890300-SP | 897461 | 517804 | 896060 | 897209 | — | 894441 | 897154 | 894030 | 897251 | 897251 | 894920 |
| 5016-AC    | 890301    | 897461 | 517804 | 896060 | —      | — | 894443 | 897154 | 894030 | 897251 | 897251 | 894920 |
| 5016-AC-SP | 890301-SP | 897461 | 517804 | 896061 | 897208 | — | 894445 | 897154 | 894030 | 897251 | 897251 | 894920 |

|            |           |        |        |        |        |   |        |        |        |        |        |        |
|------------|-----------|--------|--------|--------|--------|---|--------|--------|--------|--------|--------|--------|
| 5024       | 890500    | 897481 | 517805 | 896080 | —      | — | 894481 | 897156 | 894050 | 897252 | 897252 | 894960 |
| 5024-SP    | 890500-SP | 897481 | 517805 | 896080 | 897214 | — | 894481 | 897156 | 894050 | 897252 | 897252 | 894960 |
| 5024-AC    | 890501    | 897481 | 517805 | 896080 | —      | — | 894483 | 897156 | 894050 | 897252 | 897252 | 894960 |
| 5024-AC-SP | 890501-SP | 897481 | 517805 | 896080 | 897214 | — | 894483 | 897156 | 894050 | 897252 | 897252 | 894960 |

|            |           |        |        |        |        |   |        |        |        |        |        |        |
|------------|-----------|--------|--------|--------|--------|---|--------|--------|--------|--------|--------|--------|
| 5032       | 890700    | 897484 | 517805 | 896100 | —      | — | 894520 | 897158 | 894070 | 897254 | 897255 | 894990 |
| 5032-SP    | 890700-SP | 897484 | 517805 | 896100 | 897220 | — | 894520 | 897158 | 894070 | 897254 | 897255 | 894990 |
| 5032-AC    | 890701    | 897484 | 517805 | 896100 | —      | — | 894523 | 897158 | 894070 | 897254 | 897255 | 894990 |
| 5032-AC-SP | 890701-SP | 897484 | 517805 | 896100 | 897220 | — | 894523 | 897158 | 894070 | 897254 | 897255 | 894990 |

Figure 6. Cougar® 5000 Series Piston Vibrator Part Numbers



**Appendix A**  
**Cougar<sup>®</sup> 5000 Series Piston Vibrator Specifications**

**Cougar<sup>®</sup> 5000 Series Piston Vibrator Specifications**

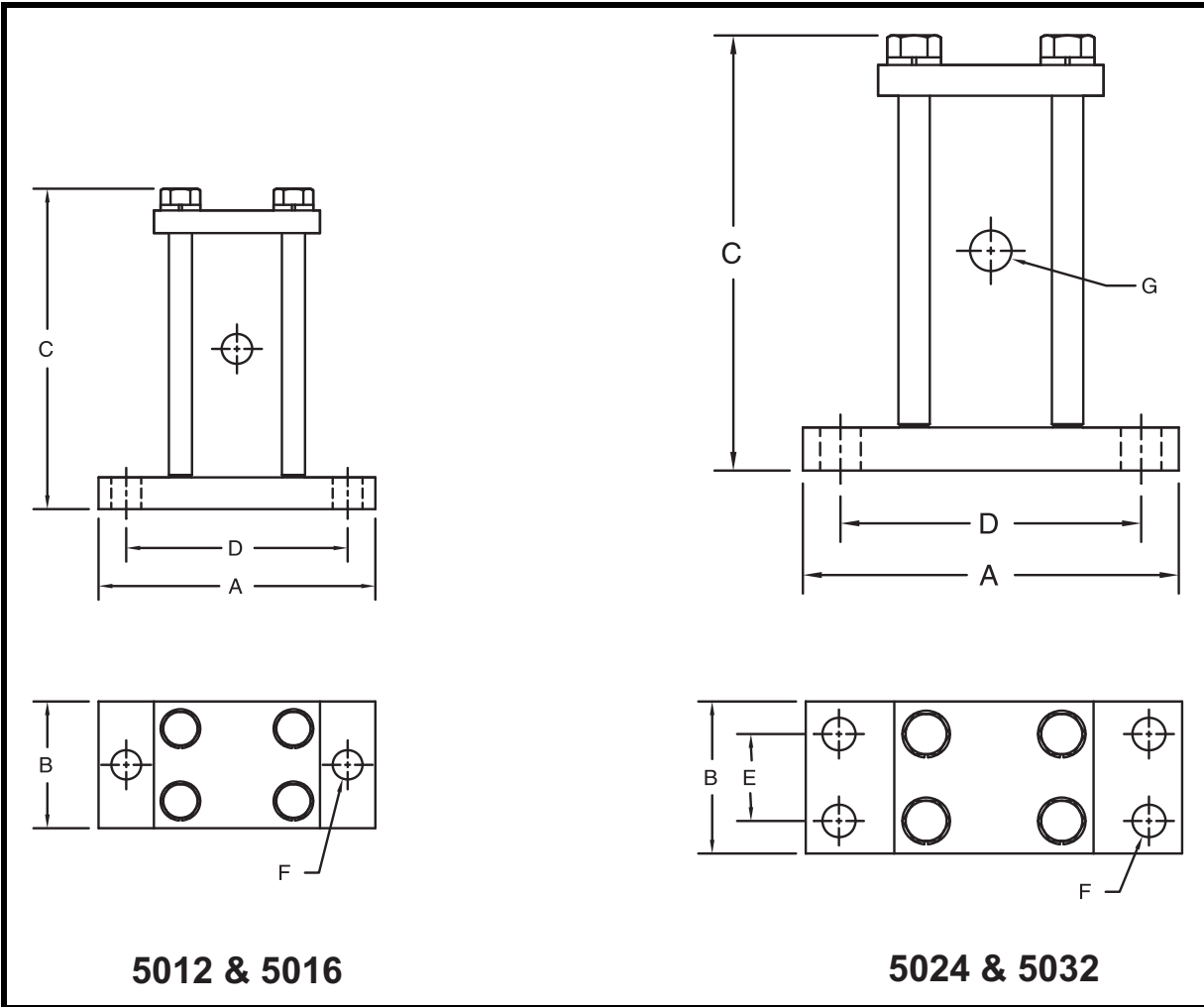
| Model | Piston Size<br>in. | 40 psi |       | 60 psi |       | 80 psi |       |
|-------|--------------------|--------|-------|--------|-------|--------|-------|
|       |                    | VPM*   | CFM** | VPM*   | CFM** | VPM*   | CFM** |
| 5012  | 1-1/2              | 2800   | 5.3   | 3500   | 8.1   | 4100   | 10.9  |
| 5016  | 2                  | 2600   | 11.0  | 3900   | 16.1  | 4100   | 20.9  |
| 5024  | 3                  | 2100   | 10.2  | 2600   | 16.7  | 3000   | 22.4  |
| 5032  | 4                  | 1200   | 19.1  | 1700   | 31.8  | 1900   | 40.3  |

| Model   | Piston Size<br>in. | 40 psi |       | 60 psi |       | 80 psi |       |
|---------|--------------------|--------|-------|--------|-------|--------|-------|
|         |                    | VPM*   | CFM** | VPM*   | CFM** | VPM*   | CFM** |
| 5012-AC | 1-1/2              | 2350   | 6.2   | 2900   | 6.9   | 3400   | 10.9  |
| 5016-AC | 2                  | 2250   | 6.8   | 2750   | 9.5   | 3200   | 12.5  |
| 5024-AC | 3                  | 2000   | 9.6   | 2100   | 15.2  | 2400   | 21.6  |
| 5032-AC | 4                  | 1200   | 13.7  | 1350   | 23.9  | 1700   | 35.9  |

\*Vibrations per minute.

\*\*Cubic feet per minute.

**Appendix B**  
**Cougar<sup>®</sup> 5000 Series Piston Vibrator Dimensions**



**Table B-I. Cougar® 5000 Series Piston Vibrator Dimensions**

| Model               | A    | B   | C      | Bolt Pattern |       | Bolt Size | Port NPT | Weight lbs |
|---------------------|------|-----|--------|--------------|-------|-----------|----------|------------|
|                     |      |     |        | D            | E     | F         | G        |            |
| <b>5012/5012-AC</b> | 7.5  | 3.0 | 7.125  | 6            | —     | 5/8       | 1/4      | 14.50      |
| <b>5016/5016-AC</b> | 7.5  | 3.5 | 7.000  | 6            | —     | 5/8       | 1/4      | 20.00      |
| <b>5024/5024-AC</b> | 10.5 | 4.5 | 8.750  | 8-7/16       | 2-1/2 | 5/8       | 1/2      | 44.00      |
| <b>5032/5032-AC</b> | 10.5 | 5.5 | 11.625 | 8-7/16       | 2-1/2 | 7/8       | 1/2      | 69.25      |

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