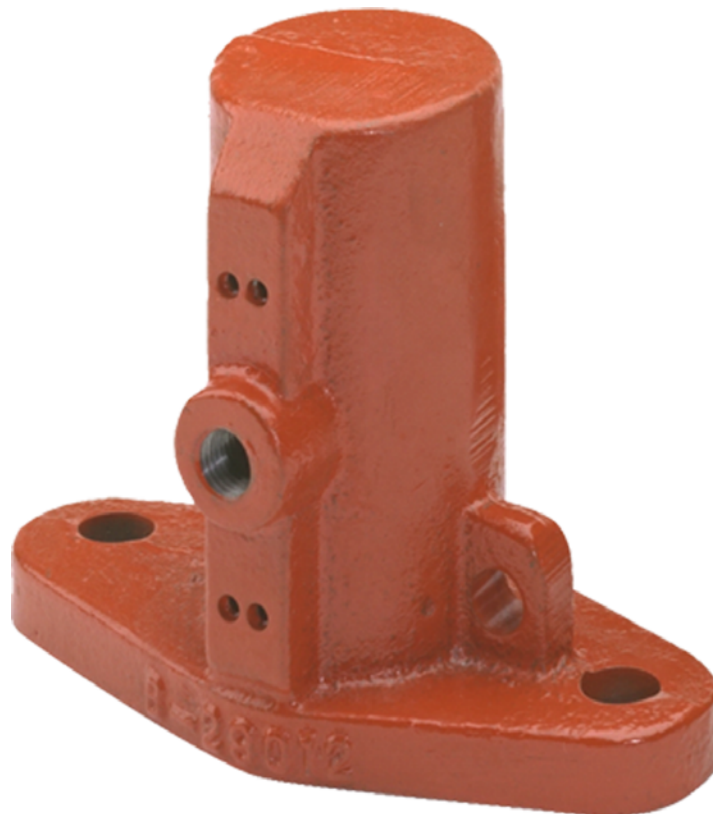




Cougar[®] P-Series Piston Vibrators

[Go to Cougar[®] P-Series Piston Vibrators web page](#)



***Operator's Manual
M3156***

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.

Table of Contents

Section	Page
List of Figures	ii
List of Tables	ii
Introduction	1
General	1
References	1
Safety	1
Materials required	1
Before Installing Vibrator	2
Installing Vibrator	3
Locating vibrator on structure	4
Installing reinforcing beam onto structure	4
Mounting vibrator onto structure	6
Connecting air lines	8
After Installing Vibrator	9
Weekly Maintenance	10
Troubleshooting	11
Part Numbers	12
Appendix A. Cougar [®] P-Series Piston Vibrator Specifications	A-1
Appendix B. Cougar [®] P-Series Piston Vibrator Dimensions	B-1

List of Figures

Figure	Title	Page
1	Locating Vibrator on Structure	4
2	TPC Channel, Clamp Block, TBM Wedge, and W-Beam Mounts	5
3	Skip Weld	5
4	Mounting Vibrator without Spring	6
5	Installing Vibrator Safety Cable	8
6	P-1.25 Piston Vibrator Assembly	14
7	P-2 Piston Vibrator Assembly	15
8	P-3 Piston Vibrator Assembly	16
9	PR-3 Railcar Piston Vibrator Assembly	17
10	P-4 Piston Vibrator Assembly	18
11	Piston Vibrator Warning Label, P/N 29814	19
12	Loud Noise Warning Tag, P/N 34070	19

List of Tables

Table	Title	Page
I	Cougar [®] P-Series Piston Vibrator Selection for Bins and Hoppers	1
II	Bolt Sizes and Torque Specifications	7

Introduction

General

Cougar® P-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® P-Series Piston Vibrator Selection for Bins and Hoppers

Model	Weight of Material lb (kg)	Bin Wall Thickness in. (mm)	Channel Length in. (mm)
P-1.25	2900 (1315)	1/16 to 1/8 (1.6 to 3.2)	36 (914)
P-2	4900 (2223)	3/16 to 1/4 (4.8 to 6.4)	36 (914)
P-3	9800 (4445)	1/4 to 3/8 (6.4 to 9.5)	36 (914)
P-4	22000 (9979)	3/8 to 1/2 (9.5 to 12.7)	72 (1829)

This manual covers installing and operating Cougar® P-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[®] P-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.

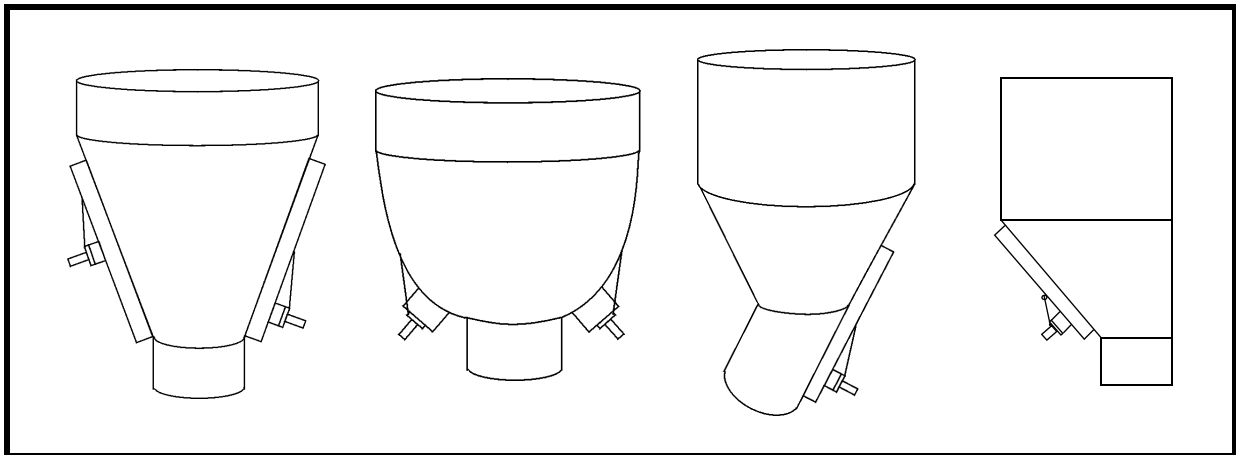


Figure 1. Locating Vibrator on Structure

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.

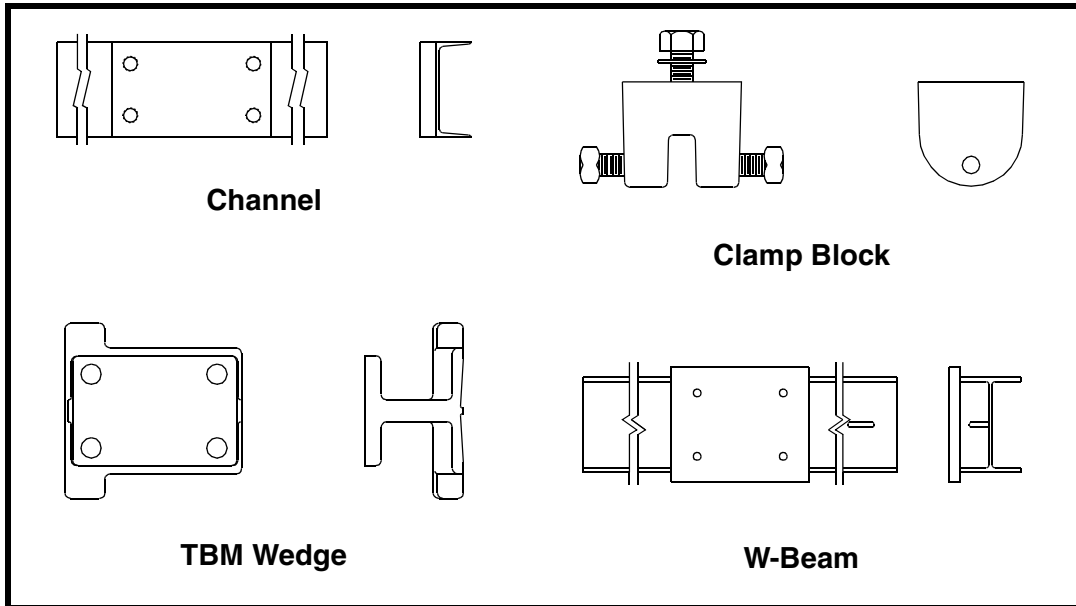


Figure 2. Channel, Clamp Block, TBM Wedge, and W-Beam Mounts (Top and Side Views)

- 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.

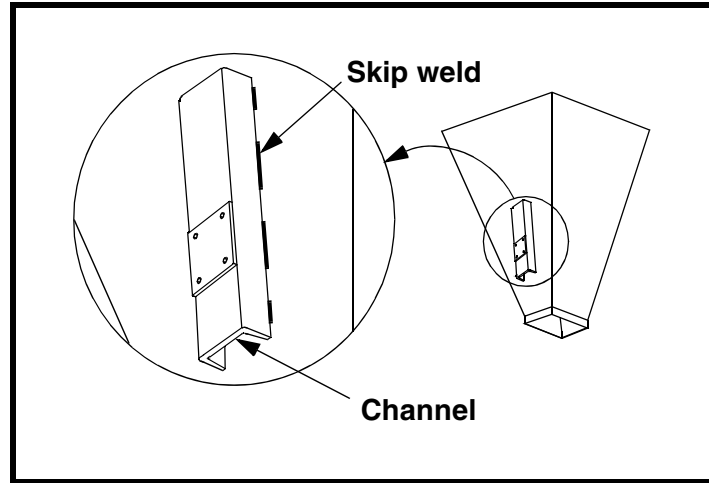


Figure 3. Skip Weld

- 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.

P-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.)

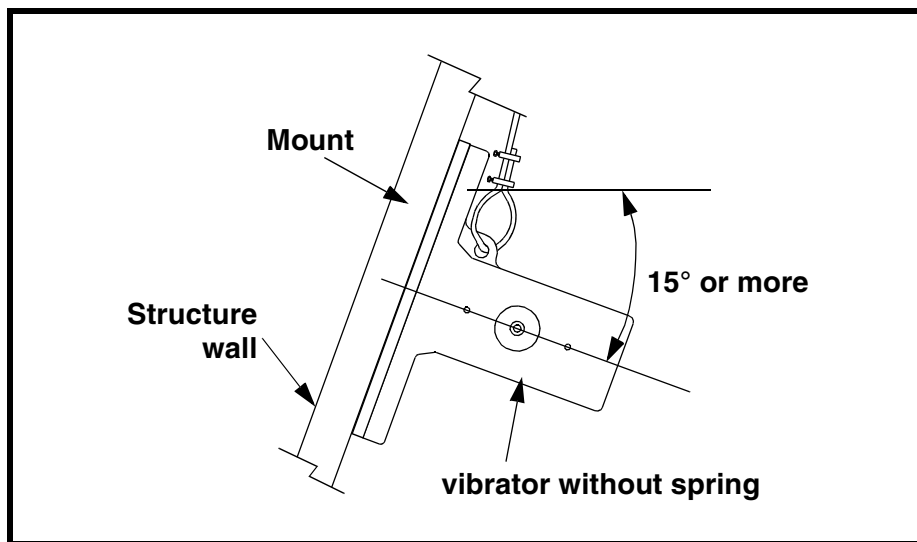


Figure 4. Mounting Vibrator without Spring

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 P-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
P-1.25	1/2 -13 NC	75 ft-lb (10 kgm)
P-2	5/8 -11 NC	170 ft-lb (23 kgm)
P-3	7/8 -9 NC	430 ft-lb (59 kgm)
P-4	1 -8 NC	645 ft-lb (89 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® P-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 vibrator lifting eye (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.

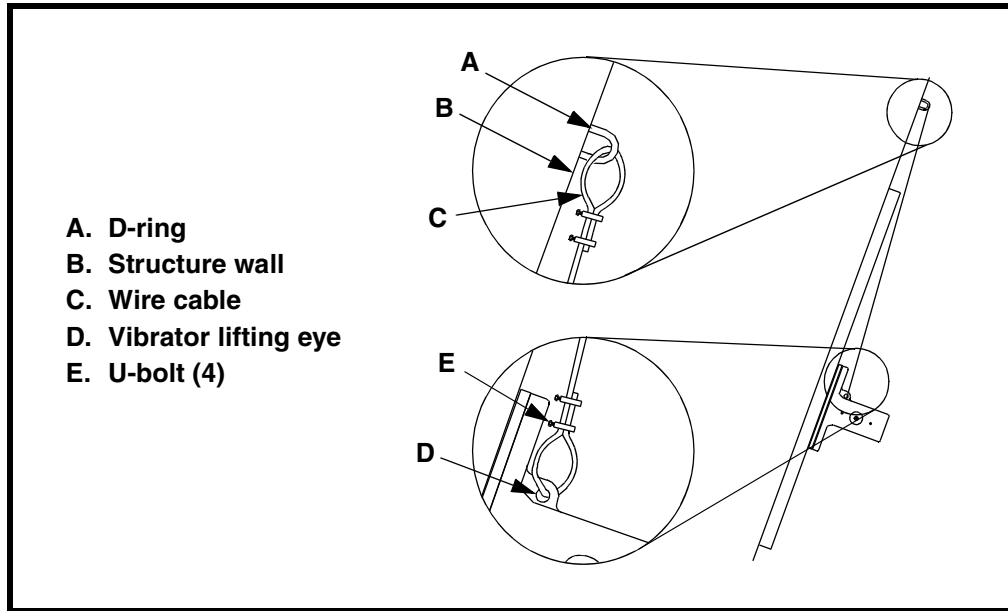


Figure 5. Installing Vibrator Safety Cable

- 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.

IMPORTANT

Connecting air lines

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.

Weekly Maintenance

IMPORTANT

Read entire section before beginning work.

1. Check vibrator mounts for structural damage. If hopper wall is beginning to tear or if vibrator is moving, reinforce hopper wall underneath vibrator mount (see “Installing reinforcing beam onto structure”).
2. Make sure all fasteners are tight. Tighten if necessary.

▲ WARNING

Shut off air pressure before disassembling unit. Servicing vibrator before air pressure is turned off can cause serious injury.

3. If vibrator is making unusual noise or is not moving material away from hopper wall, disassemble by doing the following:
 - a. Shut off air pressure to unit.
 - b. Loosen mounting bolts but do not remove.
 - c. Slide shims under vibrator so it is 3/8 to 1/2 in. (9 to 13 mm) away from mount.
 - d. Tighten mounting bolts to the proper torque (see Table I).

▲ CAUTION

Apply only 10 psi (0.69 bar) air pressure to vibrator during disassembly. Damage to vibrator could result if more pressure is used.

- e. Apply 10 psi (0.69 bar) air pressure to vibrator to dislodge strike plate.
- f. Shut off air supply to vibrator and remove unit from mount.
- g. Inspect parts for wear (see “Troubleshooting”).

▲ CAUTION

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

4. Re-assemble vibrator. Mount onto structure using new fasteners (see “Mounting vibrator onto structure”).
5. Wipe all labels clean. If labels are not readable, contact Martin Engineering or representative for replacements.
6. Install safety cable and air line.
7. Restart vibrator.

Troubleshooting

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

Symptom	Corrective Action
Vibrator not moving material	<ul style="list-style-type: none">• Vibrator assembled incorrectly. Dismantle vibrator and assemble correctly.• No air pressure. Make sure air is on and reaching vibrator.
Vibrator making unusual noise	<ul style="list-style-type: none">• Vibrator assembled incorrectly. Dismantle vibrator and assemble correctly.• Contaminant has entered vibrator. Disassemble vibrator and clean body and piston. If piston shows signs of wear, replace piston.
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[®] P-Series Piston Vibrators and related equipment. Please reference part numbers when ordering parts.

Cougar[®] P-Series Piston Vibrators

P-1.25 Piston Vibrator Assembly: P/N 29010. See Figure 6.

P-1.25S Piston Vibrator Assembly with Spring: P/N 29010-S.

P-1.25SI Piston Vibrator Assembly (Single Impacting):
P/N 29010-SI.

P-1.25Q Piston Vibrator Assembly (Quiet): P/N 29010-Q.

P-2 Piston Vibrator Assembly: P/N 29478. See Figure 7.

P-2SI Piston Vibrator Assembly (Single Impacting): P/N 29478-SI.

P-2Q Piston Vibrator Assembly (Quiet): P/N 29478-Q.

P-2S Piston Vibrator Assembly with Spring: P/N 29478-S.

P-3 Piston Vibrator Assembly: P/N 28459. See Figure 8.

P-3S Piston Vibrator Assembly with Spring: P/N 28459-S.

P-3SI Piston Vibrator Assembly (Single Impacting): P/N 28459-SI.

P-3Q Piston Vibrator Assembly (Quiet): P/N 28459-Q.

P-3QM Assembly with 1/2 in. (6 mm) NPT Mufflers: P/N 28459-QM.

PR-3 B Piston Vibrator Assembly (Railcar Model with Bracket):
P/N 28459-RB. See Figure 9.

PR-3 BS Piston Vibrator Assembly (Railcar Model with Bracket and Spring): P/N 28459-RBS.

PR-3 Q Piston Vibrator Assembly (Quiet Railcar Model):
P/N 28459-RQ.

PR-3 BQ Piston Vibrator Assembly (Quiet Railcar Model with Bracket): P/N 28459-RBQ.

P-4 Piston Vibrator Assembly: P/N 29489. See Figure 10.

P-4S Piston Vibrator Assembly with Spring: P/N 29489-S.

P-4Q Piston Vibrator Assembly (Quiet): P/N 29489-Q.

Vibrator mounts

Channel Mount for P-1.25 Series: P/N 29928-01.

Channel Mount for P-2 Series: P/N 29928-02.

Channel Mount for P-3 Series (excluding Railcar models): P/N 29928-03.

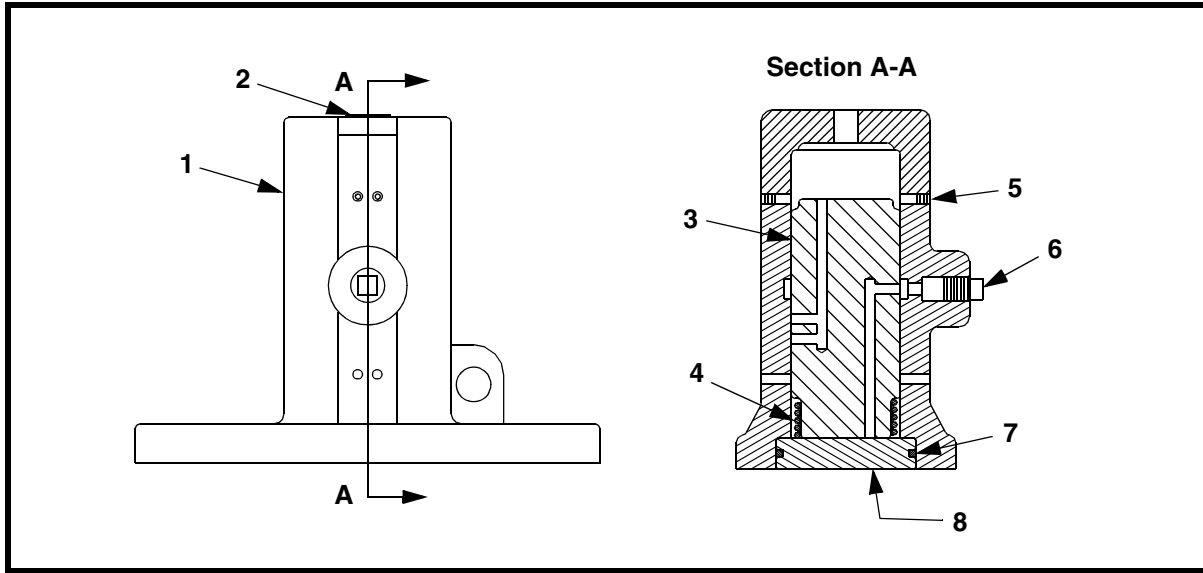
Channel Mount for P-4 Series: P/N 29928-04.

PR-3 TBM Wedge Bracket (for Railcar models [finished]): P/N 30048.

Clamp Block for P-1.25 Series: P/N 12958-03.

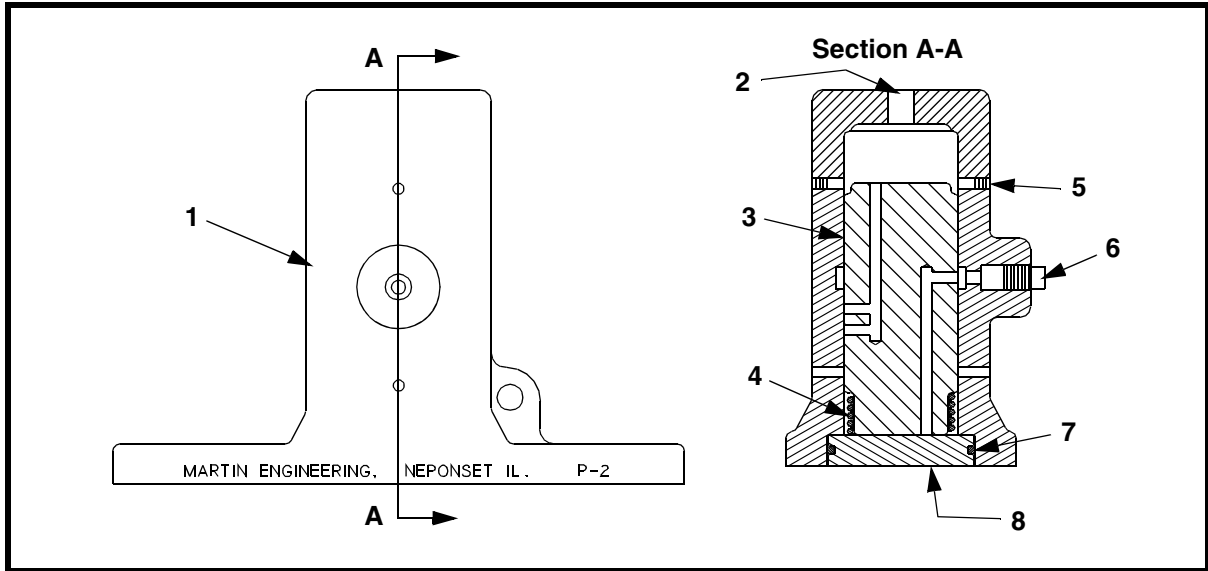
Clamp Block for P-3 Series (excluding Railcar models): P/N 12958-05.

Mounting Kits**Mounting Kit for P-1.25 Series: P/N 29810.****Mounting Kit for P-2 Series: P/N 29811.****Mounting Kit for P-3 Series (including Railcar models): P/N 29812.****Mounting Kit for P-4 Series: P/N 29813.*****Miscellaneous*****1/4 in. (6 mm) NPT Air Line Filter (120 psi [8.28 bar] max.): P/N 14749.****1/4 in. (6 mm) NPT Brass Regulator (120 psi [8.28 bar] max.): P/N 14728.****1/4 in. (6 mm) NPT Air Line Lubricator (120 psi [8.28 bar] max.):
P/N 14754.****1/4 in. (6 mm) NPT Filter-Regulator-Lubricator (FRL) Kit: P/N 29808.****1/4 in. (6 mm) NPT Solenoid Valve (120 V 60 Hz): P/N 14734.****3/8 in. (10 mm) NPT Air Line Lubricator (120 psi [8.28 bar] max.):
P/N 14755.****3/8 in. (10 mm) NPT Filter-Regulator-Lubricator (FRL) Kit: P/N 29809.****3/8 in. (10 mm) NPT Solenoid Valve (120 V 60 Hz): P/N 14735.****1/2 in. (13 mm) NPT Air Line Filter (120 psi [8.28 bar] max.): P/N 14751.****1/2 in. (13 mm) NPT Air Line Lubricator (120 psi [8.28 bar] max.):
P/N 14756.****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.****5-Minute Cycle Timer (120 V 60 Hz): P/N 20973.****30-Minute Cycle Timer (120 V 60 Hz): P/N 18073.**



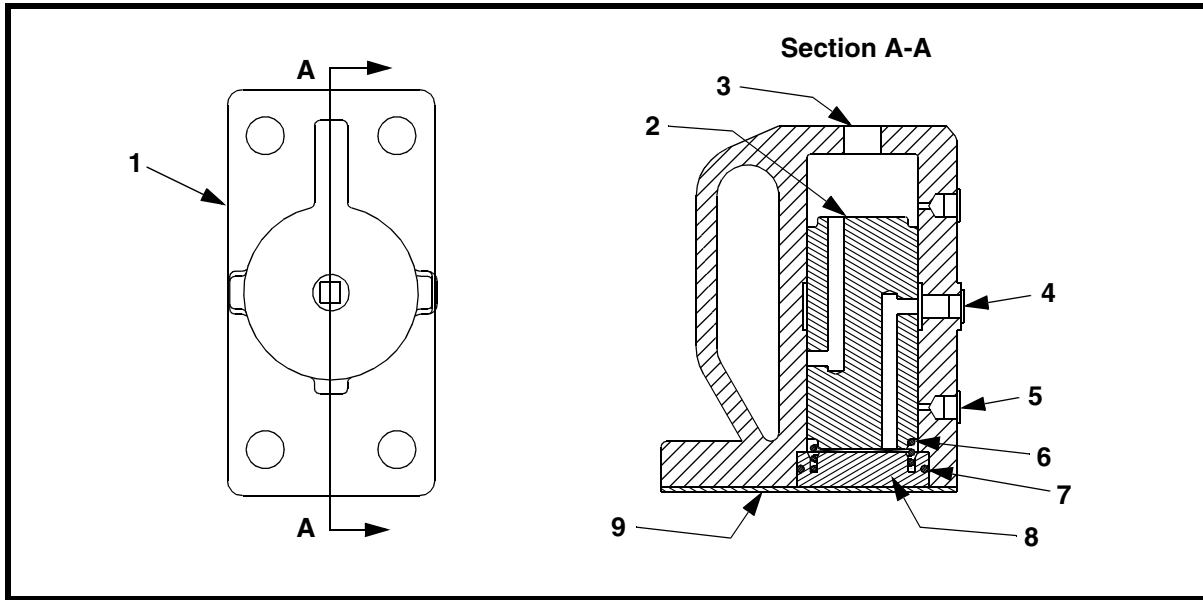
Item	Description	P-1.25 Part No.	P-1.25S Part No.	P-1.25SI Part No.	P-1.25Q Part No.	Qty
1	P-1.25 Body	29011	29011	29011-SI	29011	1
2	Plug Pipe 1/4			11460		1
3	P-1.25 Piston	31004-01	31004-01	31004-01SI	31004-01Q	1
4	Spring 1.16 ID x .059 WD x 1.23 Lg		29684-01	29684-01	29684-01	1
5	Screw SHSS #10-24 x 3/16			11486		2
6	Plug Pipe 1/4	11460	11460		11460	1
	Plug Pipe 1/4 -18 NPT Sq Hd			17524		1
7	O-Ring 1.612 OD x .103 Thick N70	11639	11639	11639	11639	1
8	P-1.25 Strike Plate	29014	29014	29014	29014	1
Fig. 11	Piston Vibrator Warning Label	29814	29814	29814	29814	1
Fig. 12	Loud Noise Warning Tag	34070	34070	34070	34070	1

Figure 6. P-1.25 Piston Vibrator Assembly (P-1.25SI [P/N 29010-SI] shown)



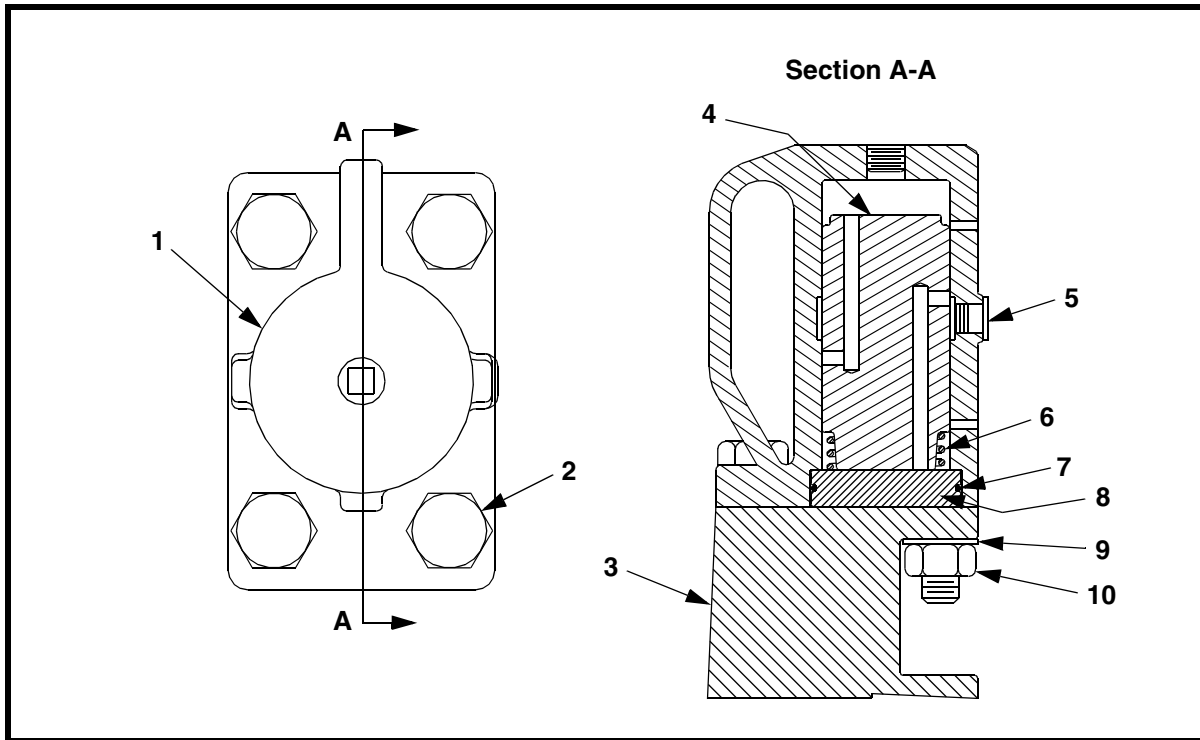
Item	Description	P-2 Part No.	P-2S Part No.	P-2SI Part No.	P-2Q Part No.	Qty
1	P-2 Body	29479	29479	29479-SI	29479	1
2	Plug Pipe 1/4			11460		1
3	P-2 Piston Dia 1.988	31004-02	31004-02	31004-02SI	31004-02Q	1
4	Spring 1.66 ID x .105 WD x 1.00 Lg		29684-02	29684-02	29684-02	1
5	Screw SOC HD Cup Pt Set Plain			13934		2
6	Plug Pipe 1/4	11460	11460		11460	1
	Plug Pipe 1/4 -18 NPT Sq Hd			17524		1
7	O-Ring 2-1/2 x 2-1/4 x .139 N70	14034	14034	14034	14034	1
8	P-2 Strike Plate	29482	29482	29482	29482	1
Fig. 11	Piston Vibrator Warning Label	29814	29814	29814	29814	1
Fig. 12	Loud Noise Warning Tag	34070	34070	34070	34070	1

Figure 7. P-2 Piston Vibrator Assembly (P-2SI [P/N 29478-SI] shown)



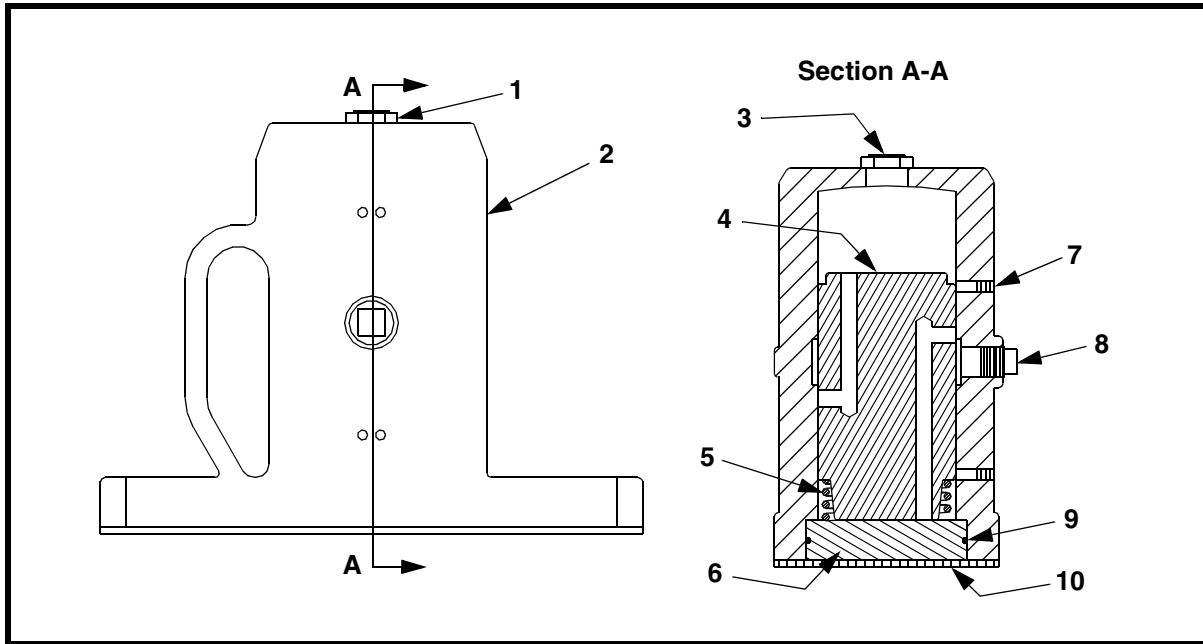
Item	Description	P-3 Part No.	P-3S Part No.	P-3SI Part No.	P-3Q Part No.	P-3QM Part No.	Qty
1	P-3 Piston Vibrator Body	28460	28460	28460-SI	28460	28460-QM	1
2	P-3 Piston Dia 2.998	31004-03	31004-03	31004-03SI	31004-03Q	31004-03Q	1
3	Bushing Hex 3/4 NPT to 3/8 NPT			33626			1
4	Plug Plastic 3/8	11659	11659		11659	11659	1
	Pipe Plug 3/8 -18 NPT Sq Head			17788			1
5	Plug Plastic 3/8					11659	4
6	Spring 2.47 ID x .156 WD x 2.5 Lg		29684-03	29684-03	29684-03	29684-03	1
7	O-Ring 3-1/2 OD x 3-1/4 ID N70	12201	12201	12201	12201	12201	1
8	P-3 Vibrator Plate	29088	29088	29088	29088-Q	29088-Q	1
9	Piston Keeper 10-1/8 x 5-1/8	29829-02	29829-02	29829-02	29829-02	29829-02	1
N/S	Screw Set 5/16 -18 x 1/4 FI Pt Plain			19933			4
N/S	Reducer 1/2 to 3/8					31616	4
N/S	Muffler Air 1/2					19664	4
Fig. 11	Piston Vibrator Warning Label	29814	29814	29814	29814	29814	1
Fig. 12	Loud Noise Warning Tag	34070	34070	34070	34070	34070	1

Figure 8. P-3 Piston Vibrator Assembly (P-3QM [P/N 28459-QM] shown)



Item	Description	PR-3 B Part No.	PR-3 BS Part No.	PR-3 Q Part No.	PR-3 BQ Part No.	Qty
1	Body	28460-R	28460-R	28460-R	28460-R	1
2	Screw HHC 7/8-9 x 3 Gr 5 ZP	29823	29823		29823	4
3	Bracket	30048	30048		30048	1
4	P-3 Piston Dia 2.998	31004-03	31004-03	31004-03Q	31004-03Q	1
5	Plug Plastic 3/8	11659	11659	11659	11659	1
6	Spring 2.47 ID x .156 WD x 2.5 Lg		29684-03		29684-03	1
7	O-Ring 3-1/2 OD x 3-1/4 ID N70	12201	12201	12201	12201	1
8	P-3 Vibrator Plate	29088	29088	29088	29088-Q	1
9	Washer-Spring 7/8 x 1-3/4 OD ZP	33420	33420		33420	4
10	Nut Hex 7/8-9 GR 5 ZP	32007	32007		32007	4
N/S	Piston Keeper 10-1/8 x 5-1/8			29829-02		1
Fig. 11	Piston Vibrator Warning Label	29814	29814	29814	29814	1
Fig. 12	Loud Noise Warning Tag	34070	34070	34070	34070	1

Figure 9. PR-3 Railcar Piston Vibrator Assembly (PR-3 BS [P/N 28459-RBS] shown)



Item	Description	P-4 Part No.	P-4S Part No.	P-4SI Part No.	P-4Q Part No.	Qty
1	Bushing Hex 1 NPT x 1/2 NPT			31764		1
2	P-4 Piston Vibrator Body	29490	29490	29490-SI	29490	1
3	Plug Plastic 1/2			11661		1
4	P-4 Piston Dia 3.997	31004-04	31004-04	31004-04SI	31004-04Q	1
5	Spring 3.31 ID x .192 WD x 4.34 Lg		29684-04	29684-04	29684-04	1
6	P-4 Piston Vibrator Plate	29493	29493-Q	29493	29493-Q	1
7	Screw SOC HD Cup 3/8 -16 x 1/2			12921		4
8	Plug Plastic 1/2	11661	11661		11661	1
	Plug 1/2 NPT Sq Hd Pipe			21874		1
9	O-Ring 4-5/8 x 4-3/8 N70	11859	11859	11859	11859	1
10	Piston Keeper 15-1/8 x 6-5/8	29829-01	29829-01	29829-01	29829-01	1
Fig. 11	Piston Vibrator Warning Label	29814	29814	29814	29814	1
Fig. 12	Loud Noise Warning Tag	34070	34070	34070	34070	1

Figure 10. P-4 Piston Vibrator Assembly (P-4SI [P/N 29489-SI] shown)



Figure 11. Piston Vibrator Warning Label, P/N 29814

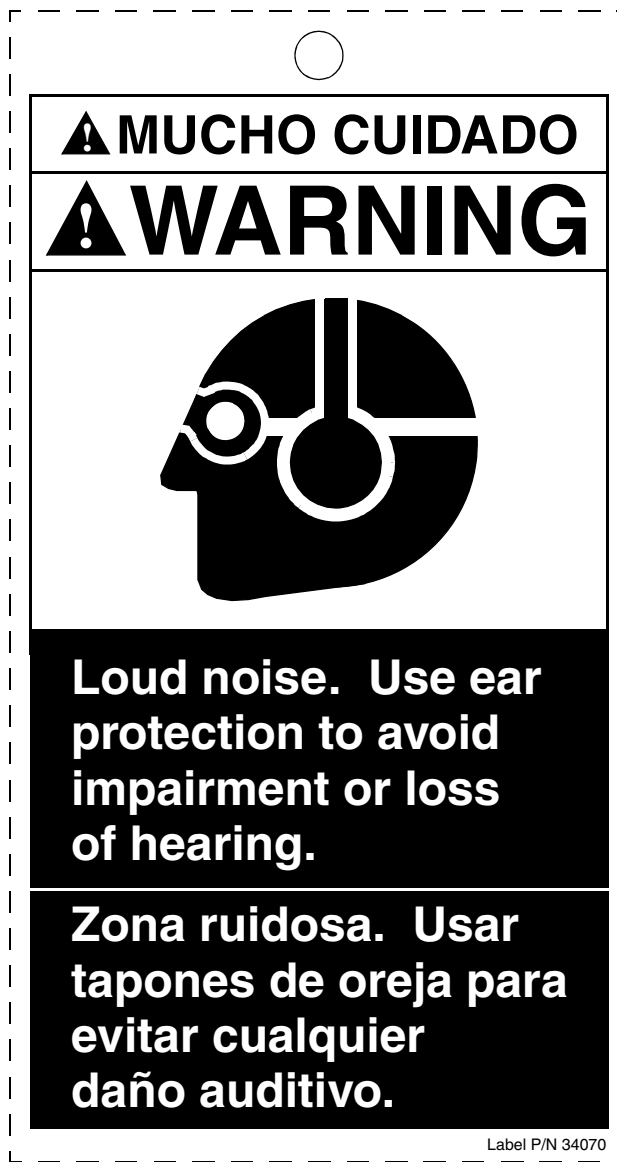


Figure 12. Loud Noise Warning Tag, P/N 34070

Notes

Appendix A
Cougar[®] P-Series Piston Vibrator Specifications

Cougar® P-Series Piston Vibrator Specifications

Model	Starting psi (bar)	40 psi (2.76 bar)			60 psi (4.14 bar)			80 psi (5.51 bar)			db [†]	Weight lb (kg)	Inlet Size in. (mm)
		VPM*	CFM** (l/min)	Force lb (kgf)	VPM*	CFM** (lit/min)	Force lb (kgf)	VPM*	CFM** (lit/min)	Force lb (kgf)			
P-1.25	4 (0.27)	4200	4.5 (130)	180 (82)	5000	6.3 (180)	230 (104)	5500	8.5 (240)	290 (132)	101	5 (2.27)	1/4 (6)
P-2	4 (0.27)	2100	6.4 (180)	260 (118)	2600	9.5 (270)	375 (170)	2800	13.0 (370)	490 (222)	103	16 (7.26)	1/4 (6)
P-3	6 (0.41)	1850	9.1 (260)	570 (258)	2000	17.0 (480)	810 (367)	2200	21.0 (590)	985 (447)	106	43 (19.50)	3/8 (10)
P-4	10 (0.69)	1500	22.0 (620)	1330 (603)	1750	25.0 (700)	2010 (912)	1900	42.0 (1180)	2200 (998)	118	106 (48.08)	1/2 (13)

Cougar® P-Series Piston Vibrator Specifications (with optional noise reduction)

Model	Starting psi (bar)	40 psi (2.76 bar)			60 psi (4.14 bar)			80 psi (5.51 bar)			db [†]	Weight lb (kg)	Inlet Size in. (mm)
		VPM*	CFM** (lit/min)	Force lb (kgf)	VPM*	CFM** (lit/min)	Force lb (kgf)	VPM*	CFM** (lit/min)	Force lb (kgf)			
P-1.25Q	4 (0.27)	2500	4.5 (130)	95 (43.2)	2800	6 (170)	130 (59)	3200	8 (226)	170 (77)	85	5 (2.27)	1/4 (6)
P-2Q	4 (0.27)	2000	6.0 (170)	190 (86.2)	2100	9 (255)	250 (114)	2200	11 (311)	300 (136)	87	16 (7.26)	1/4 (6)
P-3Q	6 (0.41)	1450	8.5 (240)	280 (127.0)	1600	15 (424)	390 (177)	1700	17 (480)	500 (227)	92	43 (19.50)	3/8 (10)
P-4Q	10 (0.69)	1000	20.0 (566)	590 (267.0)	1100	22 (620)	820 (372)	1150	42 (1180)	1000 (453)	97	106 (48.08)	1/2 (13)

*Vibrations per minute.

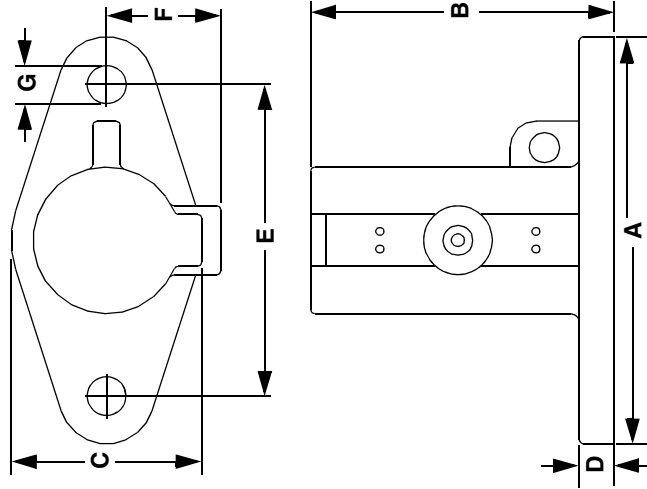
**Cubic feet per minute.

†Decibels measured at 60 psi (4.14 bar) at 4 ft (1219 mm).

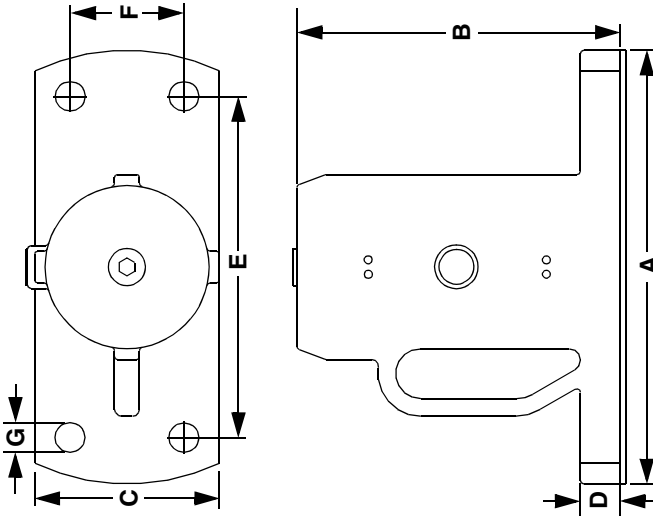
Appendix B
Cougar[®] P-Series Piston Vibrator Dimensions

Appendix B

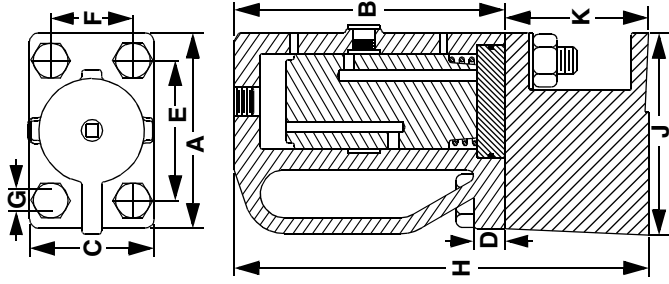
P-1.25 and P-2 Models



P-3, P-3SI, P-3Q, P-3QM and P-4 Models



PR-3 Railcar Models



Model	Dimensions in. (mm)										
	A	B	C	D	E	F	G	H	J	K	
P-1.25	5.88 (149)	4.38 (111)	2.75 (70)	0.50 (13)	4.50 (114)	1.64 (42)	0.56 (14)—9/16	—	—	—	
P-2	9.50 (241)	6.50 (165)	4.00 (102)	0.69 (18)	7.50 (191)	2.25 (57)	0.69 (18)—11/16	—	—	—	
P-3	10.00 (254)	8.50 (216)	5.00 (127)	1.00 (25)	7.75 (197)	3.25 (83)	0.93 (24)—15/16	—	—	—	
P-4	15.25 (387)	11.36 (289)	6.50 (165)	1.40 (36)	12.00 (305)	4.00 (102)	1.06 (27)—1-1/16	—	—	—	
PR-3	8.00 (203)	8.50 (216)	5.10 (130)	1.00 (25)	5.75 (146)	3.38 (86)	0.93 (24)—15/16	13.00 (330)	8.00 (203)	4.50 (114)	

Any product, process, or technology described here may be the subject of intellectual property rights reserved by Martin Engineering Company. Trademarks or service marks designated with the ® symbol are registered with the U.S. Patent and Trademark Office and may be proprietary in one or more countries or regions. Other trademarks and service marks belonging to Martin Engineering Company in the United States and/or other countries or regions may be designated with the “TM” and “SM” symbols. Brands, trademarks, and names of other parties, who may or may not be affiliated with, connected to, or endorsed by Martin Engineering Company, are identified wherever possible. Additional information regarding Martin Engineering Company’s intellectual property can be obtained at www.martin-eng.com/trademarks.

Problem Solved™ ***GUARANTEED!***



Martin Engineering USA

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

**COMPANY WITH
QUALITY SYSTEM
CERTIFIED BY DNV
= ISO 9001:2008 =**