

martin®

Cougar® AP5 Series ***Piston Vibrators***

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Operator's Manual
M3898

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[®] AP5 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[®] AP5 Series Piston Vibrator Selection for Bins and Hoppers

Model	Qty	Weight of Material lb (kg)	Minimum Bin Wall Thickness in. (mm)	Channel Length in. (mm)
AP5-200	1	15,000 (6800)	3/16 to 1/4 (4.8 to 6.4)	24 (610)
AP5-200	2	30,000 (13,600)	1/4 to 3/8 (6.4 to 9.5)	24 (610)

This manual covers installing and operating Cougar[®] AP5 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 14760.

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[®] AP5 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 1.5- to 6-ft (457- to 1829-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 of structure slope length. If second vibrator is required, mount 180 degrees from first vibrator and 1/3 up slope.

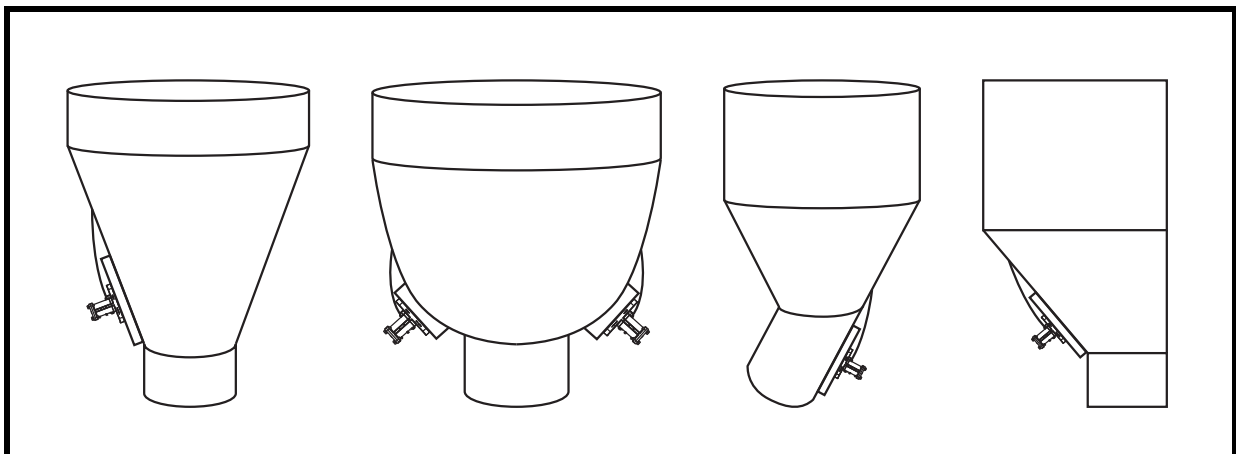


Figure 1. Locating Vibrator on Structure

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 to mount vibrator onto structure, do the following:
 - a. Locate mount so that vibrator can be positioned as shown in Figure 1.
 - b. Install 1.5- to 6-ft (457- to 1829-mm) channel or beam onto chute wall.

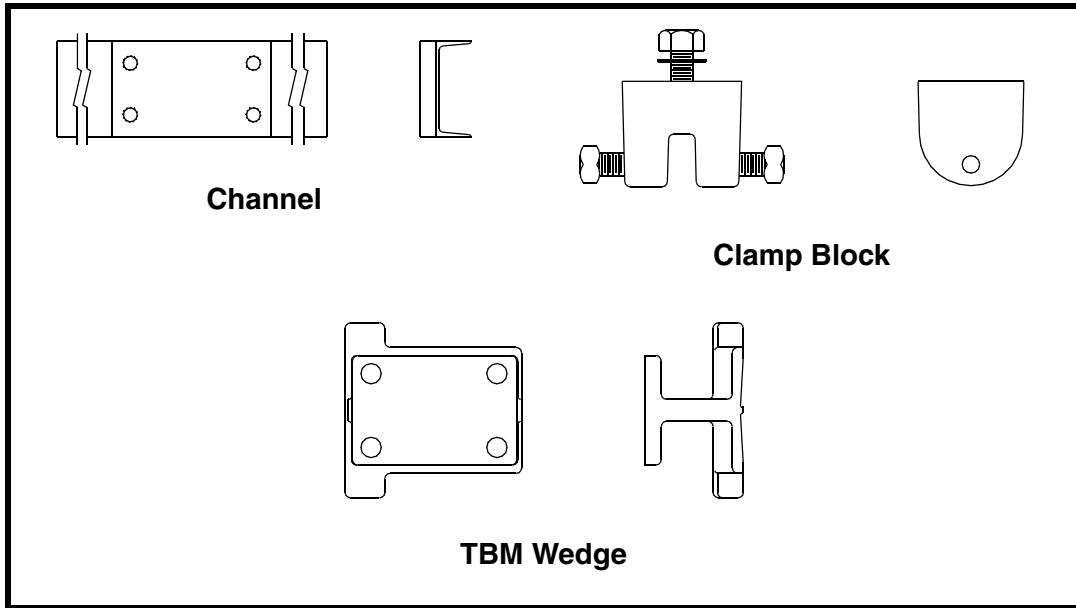


Figure 2. Channel, Clamp Block, and TBM Wedge Mounts (Top and Side Views)

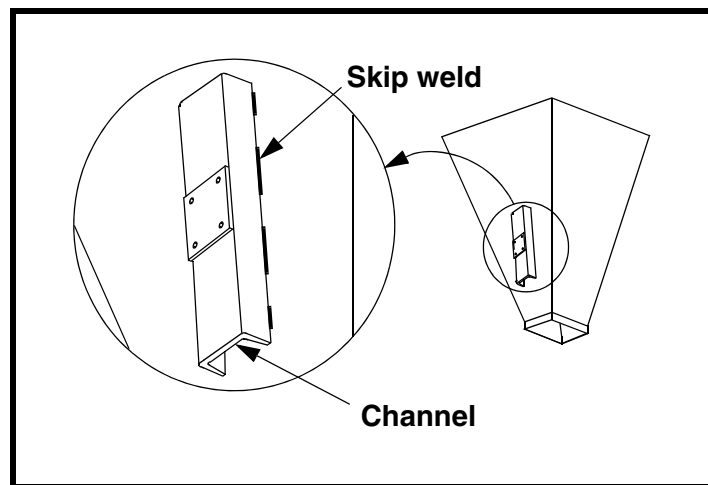


Figure 3. Skip Weld

- 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.

AP5 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.)

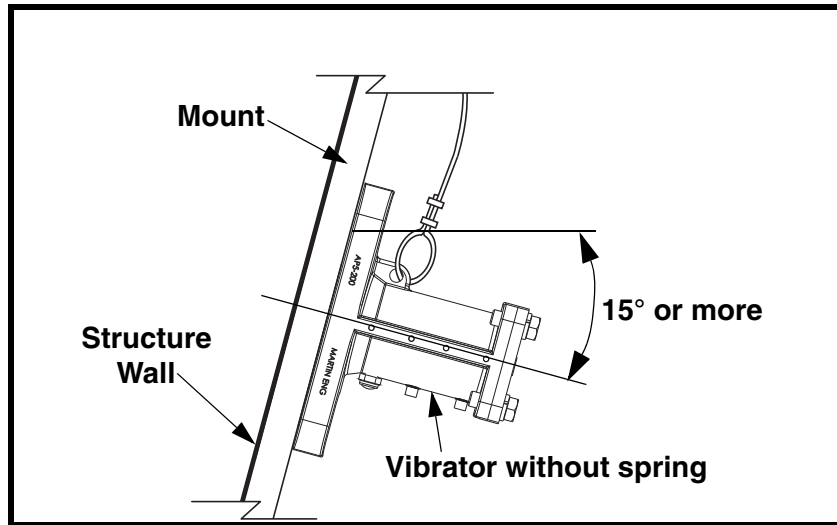


Figure 4. Mounting Vibrator without Spring

⚠ CAUTION

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

2. 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
AP5-200	5/8 -11 NC	170 ft-lb (23 kgm)

3. 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.
4. 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.

5. 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[®] AP5 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.

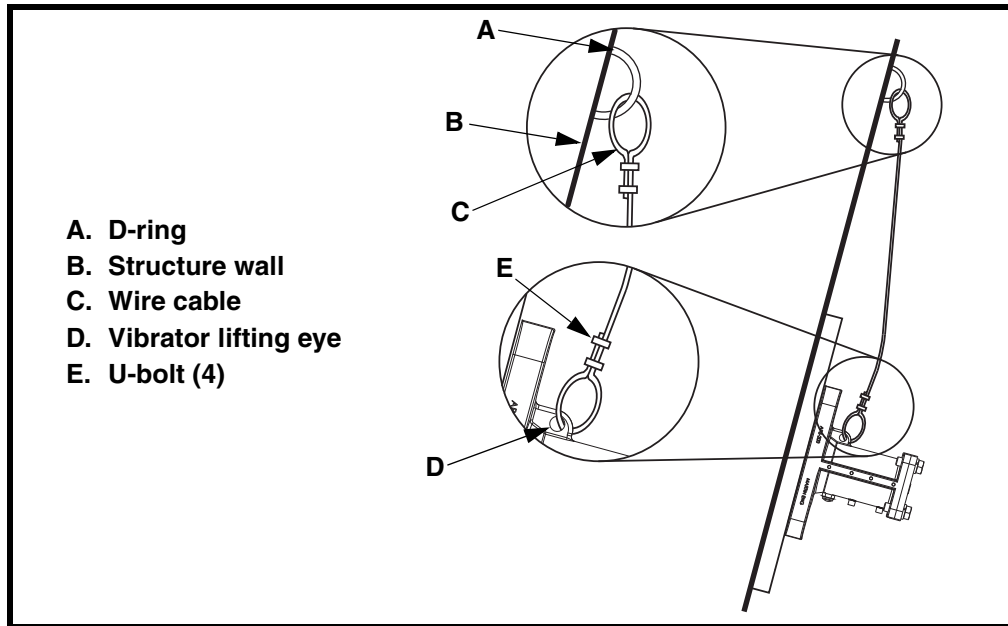


Figure 5. Installing Vibrator Safety Cable

- 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.

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.

Troubleshooting

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

Symptom	Corrective Action
Vibrator not moving material	No air pressure. Make sure air is on and reaching vibrator.
Vibrator making unusual noise	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® AP5 Series Piston Vibrators and related equipment. Please reference part numbers when ordering parts.

Cougar® AP5 Series Piston Vibrators

AP5 Series Piston Vibrators (2 inch):

Standard Piston Vibrator Assembly: P/N AP5-200-X.

Quiet Piston Vibrator Assembly: P/N AP5-200Q-X.

Spring Piston Vibrator Assembly: P/N AP5-200S-X.

Single Impacting Piston Vibrator Assembly: P/N AP5-200SI-X.

Vibrator mounts

Channel Mount for AP5-200: P/N 29928-C2.

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.

3/8 in. (10 mm) NPT Solenoid Valve (120V 60 Hz): P/N 14735.

Safety Cable: P/N 29827.

Martin® Controller - single circuit: P/N 38902-20.

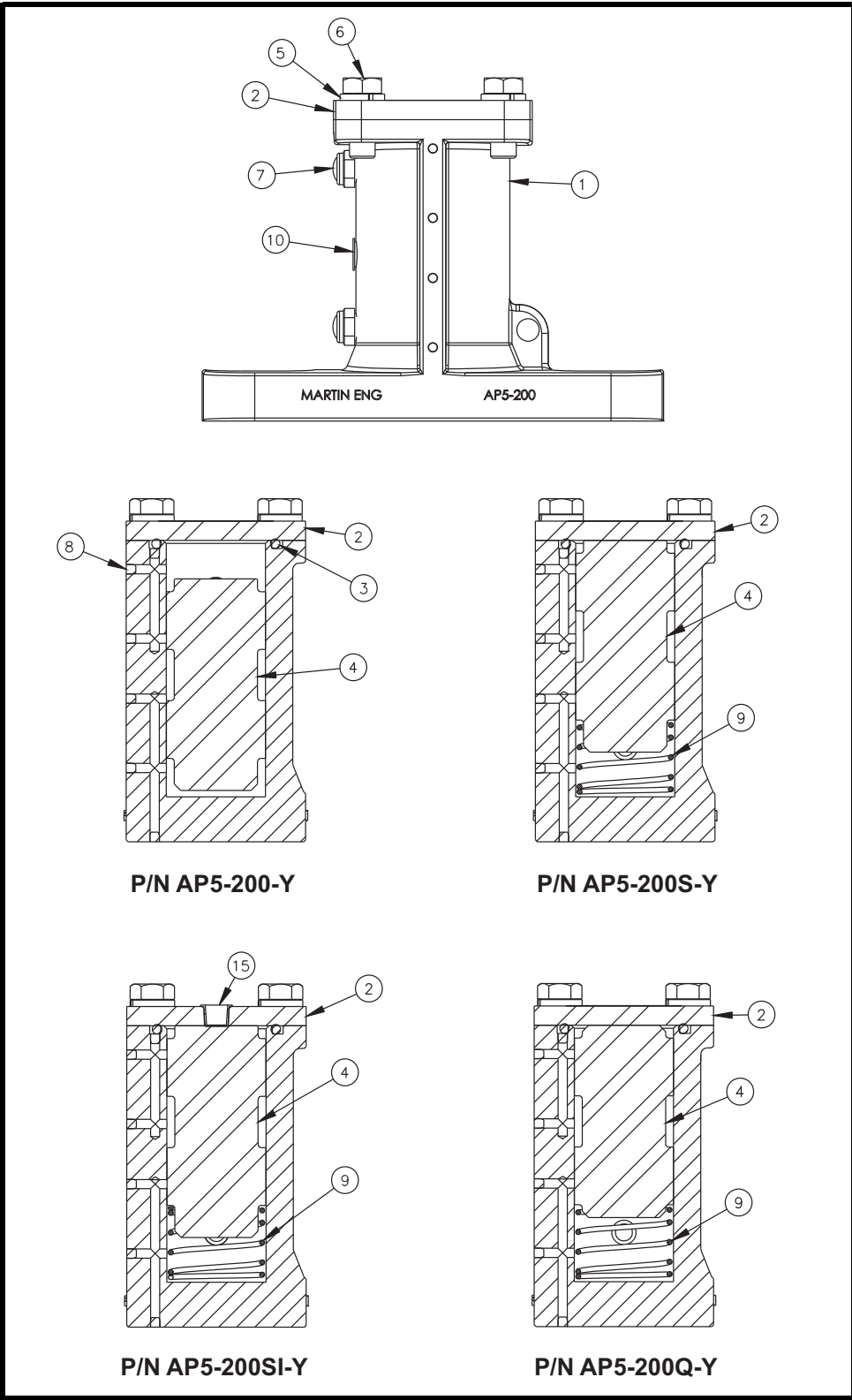


Figure 6. Cougar® AP5 Series Piston Vibrator Part Numbers

Item	Description	Part No.	Qty
1	Body	CG-100369	1
2	Top Plate	Table III	1
3	O-ring	897154	1
4	Piston	Table III	1
5	Washer Lock Split 1/2 ZP	517802	4
6	Screw HHC 1/2-13 x 1 ZP	500174	4
7	Button Muffler 1/4-18 NPT	898501	Table III
8	Port Pin	897251	6
9	Spring Compression	897209	Table III
10	Plug Pipe 1/4-18NPT	17524	Table III
11 (NS)	Label	CG-100328-2	1
12 (NS)	Operator's Manual	M3898	1
13 (NS)	Tag Loud Warning	34070	1
14 (NS)	Tie Wire Cable	30916	1
15	Caplug 1/4 NPT	606012	1

NS = Not Shown

Figure 6. Cougar® AP5 Series Piston Vibrator Part Numbers

Table III. Cougar® AP5 Series Piston Vibrator Part Numbers and Quantities

Part Number	Description	Item 2 P/N	Item 4 P/N	Item 7 Qty	Item 9 Qty	Item 10 Qty
AP5-200-Y	Standard	CG-100370	894440	2	0	0
AP5-200Q-Y	Quiet	CG-100370	894442	2	1	0
AP5-200S-Y	Spring	CG-100370	894440	2	1	0
AP5-200SI-Y	Single Impacting	CG-100370-T	894440	1	1	2

Appendix A

Cougar[®] AP5 Series Piston Vibrator Specifications

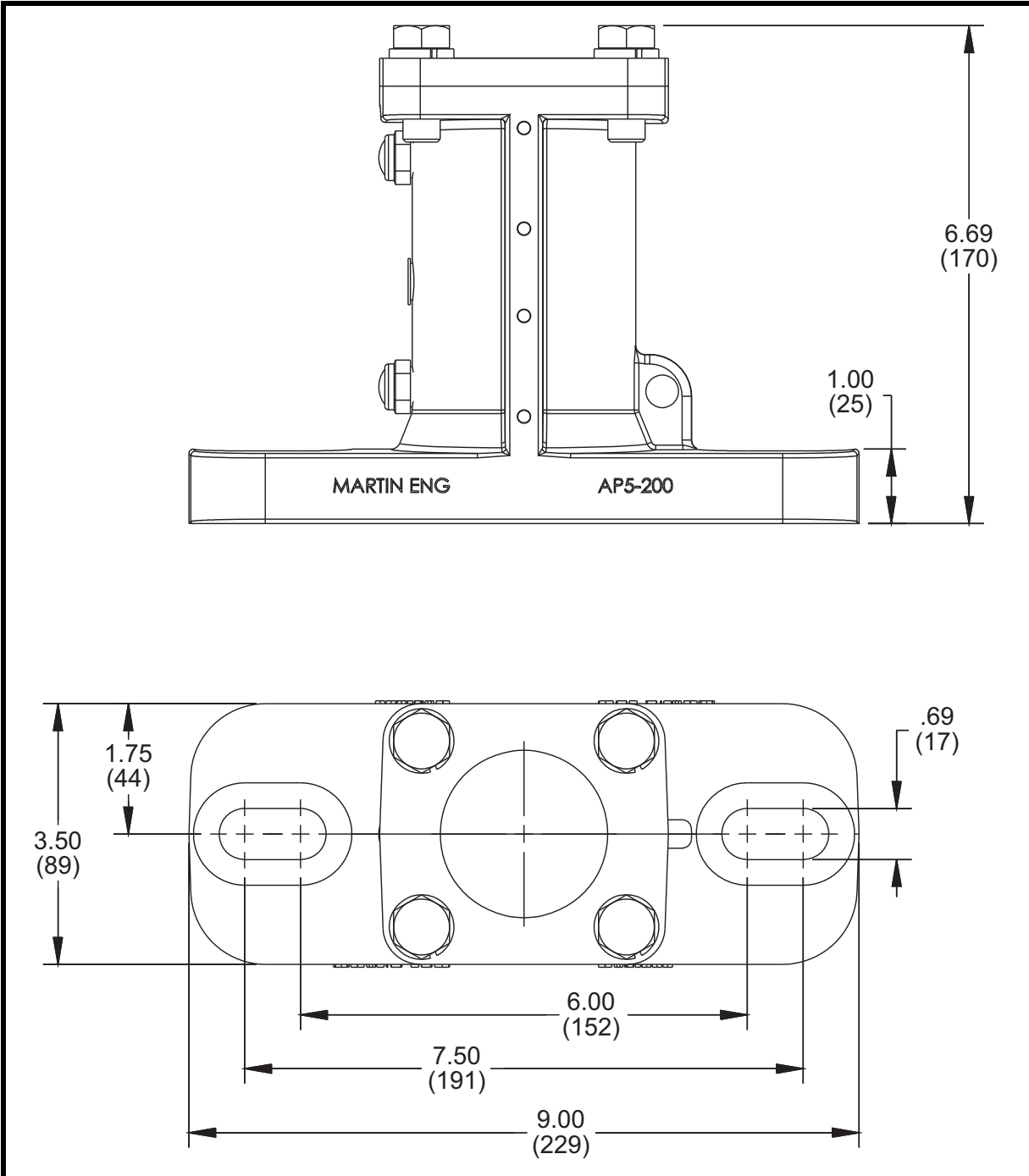
Model	Piston Size in.	40 psi			60 psi			80 psi		
		VPM*	CFM**	Force lb	VPM*	CFM**	Force lb	VPM*	CFM**	Force lb
AP5-200	2	2640	9	504	3180	14	731	3600	18	937

*Vibrations per minute.

**Cubic feet per minute.

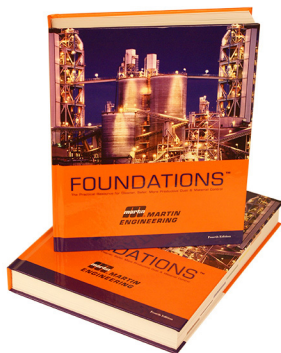
Appendix B

Cougar[®] AP5 Series Piston Vibrator Dimensions



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