



Martin[®] Sonic Horns

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Operator's Manual
M3829

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
Introduction	1
General	1
Required accessories	1
References	1
Safety	1
Materials required	1
Before Installing Sonic Horn	2
Installing Sonic Horn	3
Installing sonic horn	3
Installing restraining cable	6
Connecting air supply to sonic horn	7
After Installing Sonic Horn	9
Maintenance	10
Every month	10
Troubleshooting	11
Part Numbers	12
Appendix A	A-1

List of Figures

Figure	Title	Page
1	Flush Mount Installation	4
2	Mid-Mount Installation	5
3	Installing Restraining Cable	6
4	Plumbing Detail for Normally-Closed Solenoid Valve	8
5	Martin [®] Sonic Horn Assembly, P/N SH075-XXXXXXX	13
6	Martin [®] Sonic Horn Assembly, P/N SH230-XXXXX	15

List of Tables

Table	Title	Page
I	Martin [®] Sonic Horn Assembly, P/N SH075-XXXXXXX	14
II	Martin [®] Sonic Horn Assembly, P/N SH230-XXXXX	15

Introduction

General

The Martin[®] Sonic Horn is a pneumatic bulk material-moving system that generates intense sound waves and introduces vibration into vessels, transfer chutes, gas ducts, and feed pipes to maintain material or gas flow.

This manual provides instructions for installing sonic horns on steel structures only. For installations on other structures, call Martin Engineering or a representative.

Specifications

See Appendix A for technical data specific to individual models.

Required accessories

A sonic horn system requires additional accessories in order to be fully operational. These accessories, which consist of solenoid valves, filters, regulators, ball valves, air hoses, mounting plates, etc., can be purchased from Martin Engineering. These accessories are packaged in kits for convenience and are ordered separately from the sonic horn assembly. Contact Martin Engineering or a representative to determine which kits are required for your specific application.

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.
- *The National Electrical Code (NEC) Handbook*, National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy MA 02269-9101.
- ICS 1-1988, *General Standards for Industrial Control and Systems*, and 250-1985, *Enclosures for Electrical Equipment (1000 Volts Maximum)*, National Electrical Manufacturers Association (NEMA), 2101 L Street N.W., Washington, D.C. 20037.

Safety

All safety rules defined in the above documents, and all owner/employer safety rules, must be strictly followed when installing and servicing this equipment.

Materials required

Materials other than standard hand tools that are required to complete tasks are listed where applicable.

Before Installing Sonic Horn

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 sonic horn assembly from shipping container.
3. If you purchased accessories from Martin Engineering, they will be packaged separately. Remove this equipment from its shipping container.
4. Take inventory of the equipment received. If anything is missing, contact Martin Engineering or representative.

⚠ WARNING

Before installing sonic horn, lock out/tag out any equipment that is loading or unloading material from the vessel.

5. Turn off and lock out/tag out energy source to accessory equipment according to ANSI standards (see "References").

⚠ WARNING

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

6. If using a cutting torch or welding, test atmosphere for gas level or dust content.

NOTE

NOTICE OF LIMITED LIABILITY: Due to possible presence of latent structural defects in the apparatus of the purchaser, Martin Engineering shall not be responsible for consequential damage to the purchaser's equipment and/or apparatus resulting from the application of a Martin® Product. Martin Engineering shall not be liable for improper installation by the purchaser or other circumstances beyond the control of Martin Engineering. Liability is disclaimed for the structural soundness of apparatus or equipment not supplied by Martin Engineering. Liability shall be strictly limited to the replacement of the purchased product or refund of the purchase price. To secure the integrity of the installation, specify supervision by qualified personnel from Martin Engineering.

Installing sonic horn

Sonic horns must be solidly mounted to the vessel and the horn must have unrestricted flow. A variety of installation methods and mount plate designs can be used to install sonic horns. This section will describe the installation using the most common methods. If you are not sure how to install the sonic horn for optimum performance and convenience, contact Martin Engineering or a representative.

NOTE

If you are unsure where to locate sonic horn(s) on your vessel, contact Martin Engineering or your representative.

1. Mark location for each sonic horn on vessel. Make sure sonic horn is not positioned where material can flow into horn.

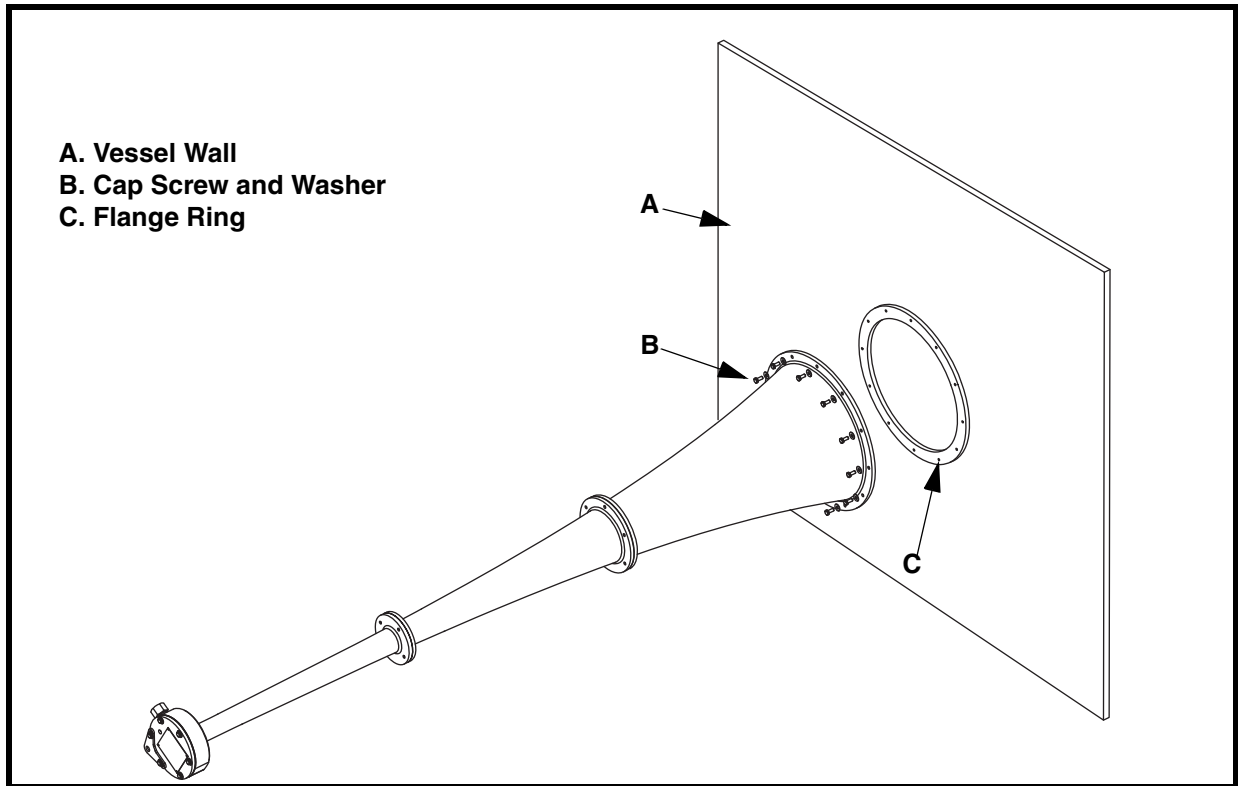


Figure 1. Flush Mount Installation

2. For flush mount installations:
 - a. Cut a hole in vessel using flange ring (C) as a template.
 - b. Tack weld flange ring (C) to vessel.
 - c. Attach sonic horn to flange ring (C) using cap screws and washers (B).
 - d. Weld flange ring (C) to vessel. Make a continuous weld around perimeter of flange ring.

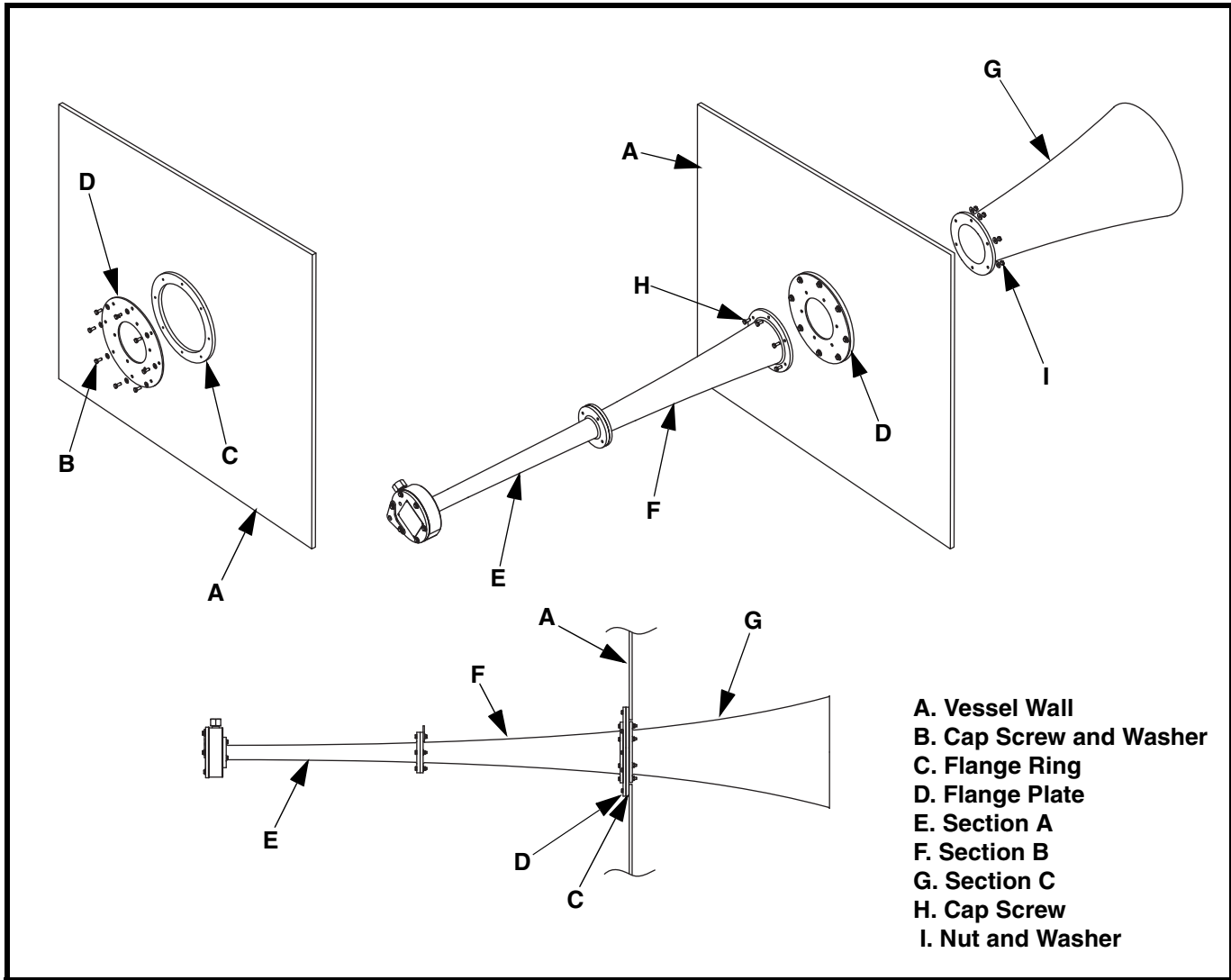


Figure 2. Mid-Mount Installation

3. For mid-mount installations:
 - a. Cut a hole in vessel using flange ring (C) as a template.
 - b. Tack weld flange ring (C) to vessel.
 - c. Attach flange plate (D) to flange ring (C) using cap screws and washers (B).
 - d. Weld flange ring (C) to vessel. Make a continuous weld around perimeter of flange ring.
 - e. Place sections A and B (E and F) of sonic horn on the outside of the flange plate (D) and place section C (G) on the inside of the flange plate. Attach both sections to flange plate and to each other using cap screws (H) and washers and nuts (I).

*Installing
restraining cable*

▲ WARNING

Always install restraining cable to secure sonic horn to vessel. Without restraining cable, sonic horn could fall and cause injury.

Do not use restraining cable to mount sonic horn to vessel wall. Purpose of restraining cable is to keep sonic horn from falling should it come loose from vessel wall, not as primary means of securing sonic horn to wall.

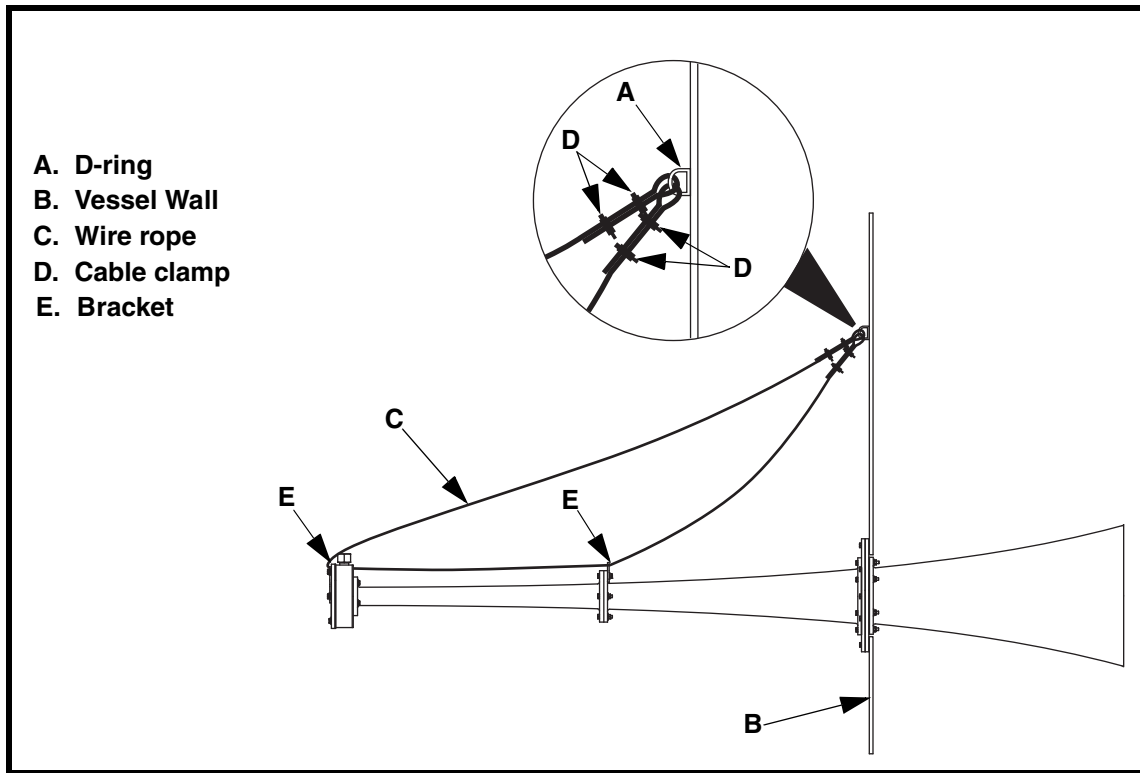


Figure 3. Installing Restraining Cable

1. Weld D-ring (A) onto vessel wall (B) with 1/4-in. (6-mm) field weld.
2. Insert one end of wire rope (C) through D-ring (A) on vessel, making a 3-in. (76-mm) loop.
3. Route wire rope (C) through brackets (E) and back to D-ring on vessel.
4. Insert wire rope (C) through D-ring (A) on vessel, making a 3-in. (76-mm) loop.
5. To fasten each wire loop:
 - a. Clamp wire rope with one cable clamp (D) as close to loop as possible. Place another cable clamp 1-3/4 in. (44 mm) from first clamp.
 - b. Leave at least 1 in. (25 mm) of wire rope on dead end.
 - c. Gradually tighten nuts alternately and evenly to 15 ft-lbs. Leave 2 to 3 in. (51 to 76 mm) slack in wire rope.

Connecting air supply to sonic horn

IMPORTANT

Depending upon the application, a receiver tank may be needed to supply amount of air required to effectively operate sonic horns. For more information contact Martin Engineering or a representative.

IMPORTANT

Do not use a lubricated air supply for sonic horns.

1. Apply pipe sealant to all fittings.
2. See Figure 4. Connect 1" lockout ball valve to compressed air source with desired length of 1" pipe. Look at arrow on side of ball valve to make sure flow is correct.
3. Connect air filter/regulator to 1" lockout ball valve with desired length of 1" pipe. Look at arrow on side of air filter/regulator to make sure flow is correct.
4. Connect 1" to 3/4" reducer to air filter/regulator with desired length of 1" pipe.
5. Connect 3-way electrical solenoid valve to 1" to 3/4" reducer with 6" long 3/4" pipe nipple. See Figure 4 for solenoid connections.
6. Connect 3/4" lockout ball valve to solenoid valve using desired length of 3/4" pipe.
7. Connect sonic horn sound generator to 3/4" lockout ball valve using braided stainless steel hose.

IMPORTANT

For electrical solenoid valve installations, design and wire electrical solenoid controls according to NEC Handbook. Electrical push buttons, timers, and programmable controllers are available through Martin Engineering.

8. For electrical solenoid valve installations, if using electrical solenoid controller, install according to instructions provided with controller.

⚠ WARNING

Do not exceed 80 psi (5.52 bar) maximum working pressure. Minimum recommended pressure for most applications is 60 psi (4.14 bar), but lower pressures can be used. Make sure air supply is filtered and regulated.

9. Anchor all pipes and wires to prohibit movement.

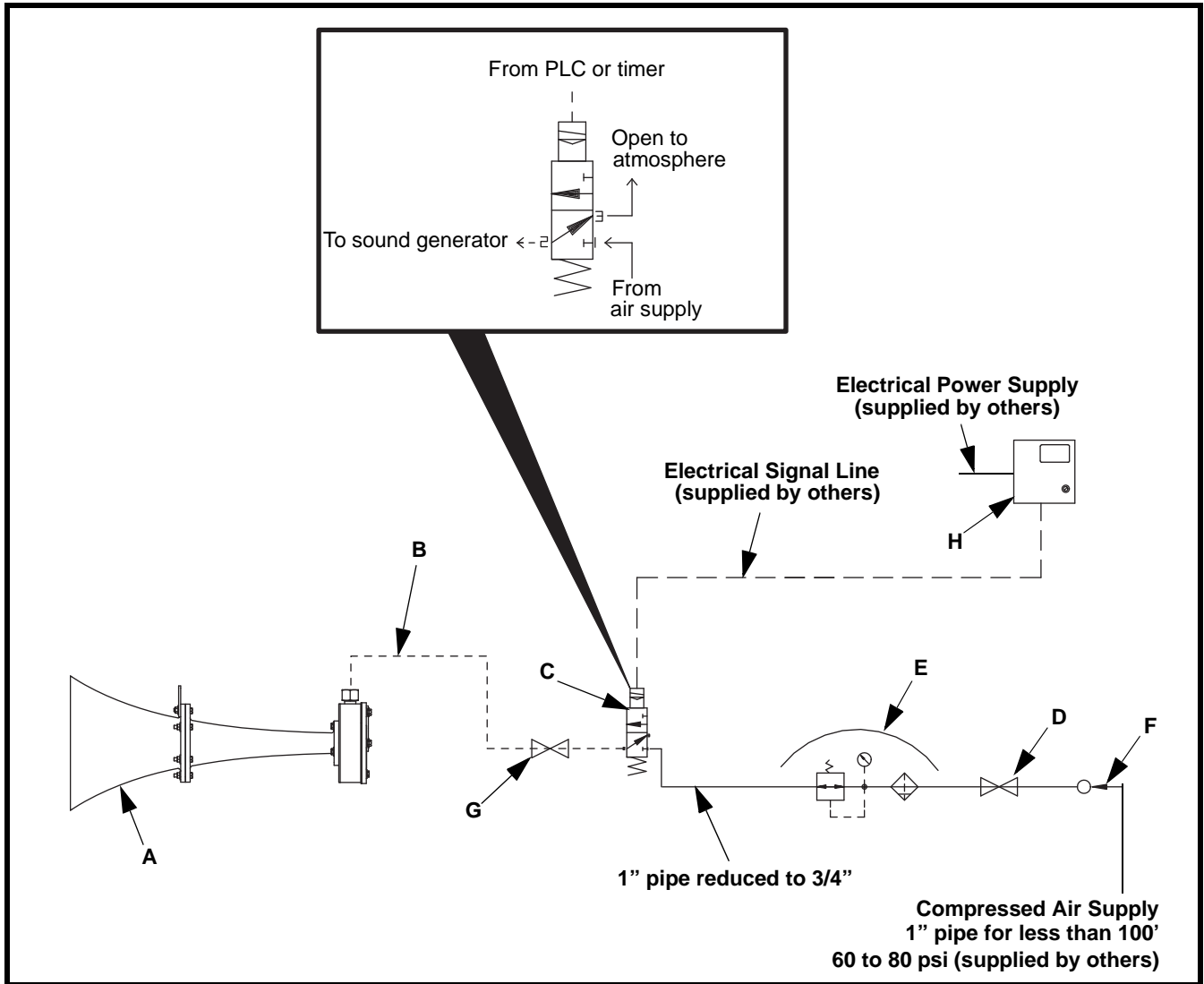


Figure 4. Plumbing Detail for Normally-Closed Solenoid Valve

Item	Description	Assembly & Kit Part Numbers**
A	Martin® Sonic Horn	SH075-XXXXXXX & SH230XXXXX
B	Braided Stainless Steel Hose 3/4"	38795-5
C	3-Way Solenoid Valve (normally closed)	38794-XXX
D	Lockout Valve 1"	32284-04
E	Filter Regulator Unit	38736
F	Air Supply Pipe 1"	103005 or by others
G	Lockout Valve 3/4"	32284-02
H	Controller/PLC	*

* Contact MARTIN ENGINEERING for Recommendation.

** Contact MARTIN ENGINEERING for breakdown of parts contained in assemblies and kits.

After Installing Sonic Horn

WARNING

Sonic horns produce intense sound waves. Use ear protection to avoid impairment or loss of hearing.

WARNING

Do not exceed 80 psi (5.52 bar) maximum working pressure. Minimum recommended pressure for most applications is 60 psi (4.14 bar), but lower pressures can be used. Make sure air supply is filtered and regulated.

1. Turn on air supply and open ball valves.
2. Sound sonic horn five times to ensure proper operation.
3. If sonic horn sounds properly, continue to operate as needed. If problems occur, see “Troubleshooting.”
4. If sonic horn does not sound, see “Troubleshooting.”
5. Check system for air leaks. If leaking, see “Troubleshooting.”

Maintenance

⚠ WARNING

Do not open door/port or enter vessel before turning off compressed air source, locking out controls, and purging line pressure.

Turn off and lock out/tag out energy source according to ANSI standards (see “References”).

Every month

1. Inspect all connections from air supply to sonic horn for leaks and deterioration. If connections are leaking, seal all fittings with pipe sealant and tighten. Replace any deteriorating connections. Make sure hoses do not flex more than 1/4 inch (6 mm).
2. Make sure all pipes and wires are anchored to prohibit movement. Secure as needed.
3. Inspect sonic horn for material buildup. Remove buildup as necessary.
4. Inspect electrical solenoid valve, lockout ball valve, and air filter/regulator for proper operation. If not operating correctly, replace.
5. Inspect sound generator for correct operation; If not operating correctly see “Troubleshooting.”

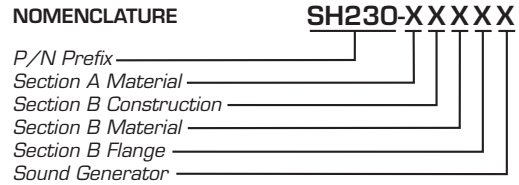
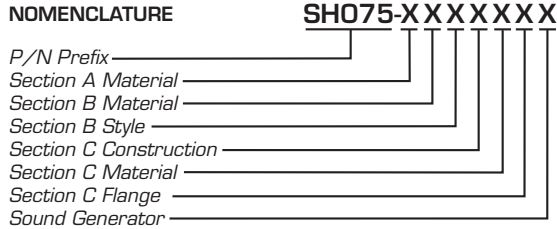
Troubleshooting

If sonic horn will not sound, find possible cause(s) in appropriate chart below and follow steps in “Solution” column. If after doing so you are still experiencing problems, contact Martin Engineering or a representative.

Problem: Sonic Horn Will Not Sound	
Cause	Solution
Compressor source.	Make sure compressor is on and air line has pressure.
Ball valves open.	Check that ball valves are fully open.
Filter/Regulator.	Factory-set at zero. Rotate clockwise to increase. Check plumbing air flow direction (indicated with an arrow).
Solenoid plumbing.	Make sure plumbing is correct. Check for leaks. Check plumbing direction.
Solenoid electrical.	Make sure wiring is connected. Check that voltage is correct. Check for signal.
Blocked discharge— horn makes high-pitched sound.	Remove blockage.
Titanium diaphragm worn.	Replace diaphragm.
Sound generator worn.	Return to Martin Engineering for refurbishing.

Part Numbers

This section provides product names and corresponding part numbers for Martin[®] Sonic Horns and related equipment. Please reference part numbers when ordering parts. Part numbers for accessory equipment not listed here are available from Martin Engineering or representative.



SECTION A MATERIAL
D: Ductile Iron
S: Stainless Steel

SECTION C MATERIAL
D: Ductile Iron
S: Stainless Steel

SECTION A MATERIAL
D: Ductile Iron
S: Stainless Steel

SECTION B FLANGE
O: No Flange
1: With Flange

SECTION B MATERIAL
D: Ductile Iron
S: Stainless Steel

SECTION C FLANGE
O: No Flange
1: With Flange

SECTION B CONSTRUCTION
C: Cast
F: Fabricated

SOUND GENERATOR
D: Ductile Iron
S: Stainless Steel
Blank: No Generator

SECTION B STYLE
O: Straight
9: 90 Degree Elbow

SOUND GENERATOR
D: Ductile Iron
S: Stainless Steel
Blank: No Generator

SECTION B MATERIAL
D: Ductile Iron
S: Stainless Steel

SECTION C CONSTRUCTION
C: Cast
F: Fabricated

Recommended Spare Parts

Description	Part No.	Qty*
Sound Generator Body Assembly	38770	15% of Total Number of Sonic Horns
Sonic Horn Diaphragm/Gasket Kit	38798	40% of Total Number of Sonic Horns

*Recommended quantity for two years of operation.

Accessories

Martin[®] Sonic Horn Mounting Flange Kit: P/N 38800-XXXXXXXXXX

Martin[®] Sonic Horn Air Line Kit: P/N 38793-XXX

Martin[®] Sonic Horn Diaphragm/Gasket Kit: P/N 38798

Martin[®] Sonic Horn Manifold Plumbing Kit: P/N 38927

Martin[®] Sonic Horn Controller: P/N 38901-S

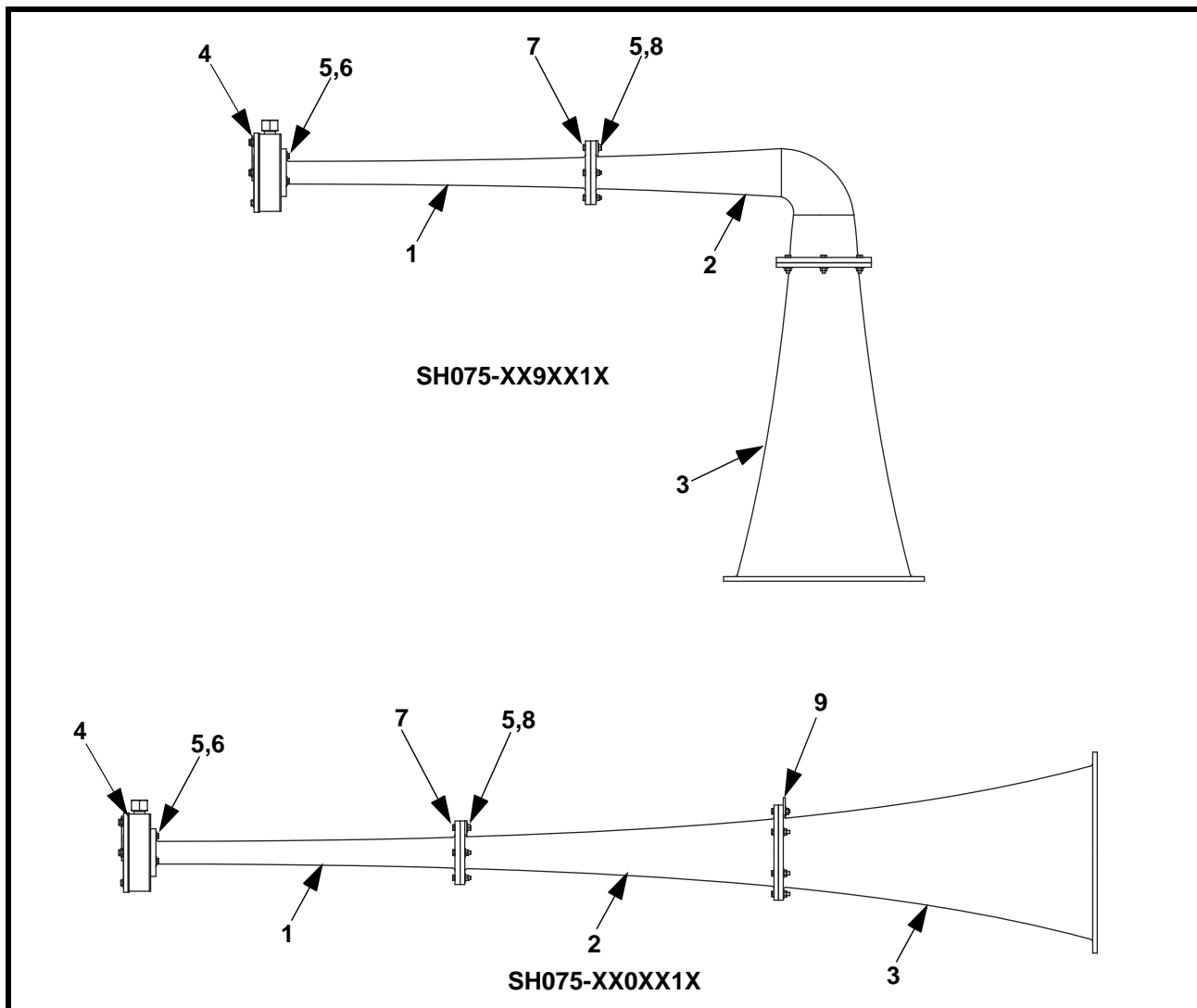


Figure 5. Martin® Sonic Horn Assembly, P/N SH075-XXXXXXX

Item	Description	Part No.	Qty
1	75 Hz Section A	Table I	1
2	75 Hz Section B	Table I	1
3	75 Hz Section C	Table I	1
4	Sound Generator Assembly	Table I	1
5	Washer Compression 5/16 SS	38698	13
6	Screw, HHC 5/16-18NC x 1-1/4 SS	38697	3
7	Screw, HHC 5/16-18NC x 1-1/2 SS	SP04436-30	10
8	Nut Hex 5/16-18NC SS	37723	10
9	Safety Cable Clip	38797	2
10 (NS)	D-ring	32265	1
11 (NS)	Cable Clamp	32264	4
12 (NS)	Wire Rope 1/4	100258	12 ft
13 (NS)	Operator's Manual	M3829	1

NS = Not Shown

Table I. Martin® Sonic Horn Assembly, P/N SH075-XXXXXXX

Assembly Part No.	Item 1 Part No.
SH075-DXXXXXX	38771
SH075-SXXXXXX	38771-SS

Assembly Part No.	Item 2 Part No.
SH075-D0XXXXX	38772
SH075-S0XXXXX	38772-SS
SH075-D9XXXXX	38777
SH075-S9XXXXX	38777-SS

Assembly Part No.	Item 3 Part No.
SH075-XXXCD0X	38773-0
SH075-XXXCD1X	38773
SH075-XXXCS0X	38773-SS0
SH075-XXXCS1X	38773-SS
SH075-XXXFS0X	38773-FSS0
SH075-XXXFS1X	38773-FSS

Assembly Part No.	Item 4 Part No.
SH075-XXXXXXD	38770
SH075-XXXXXXS	38770-SS

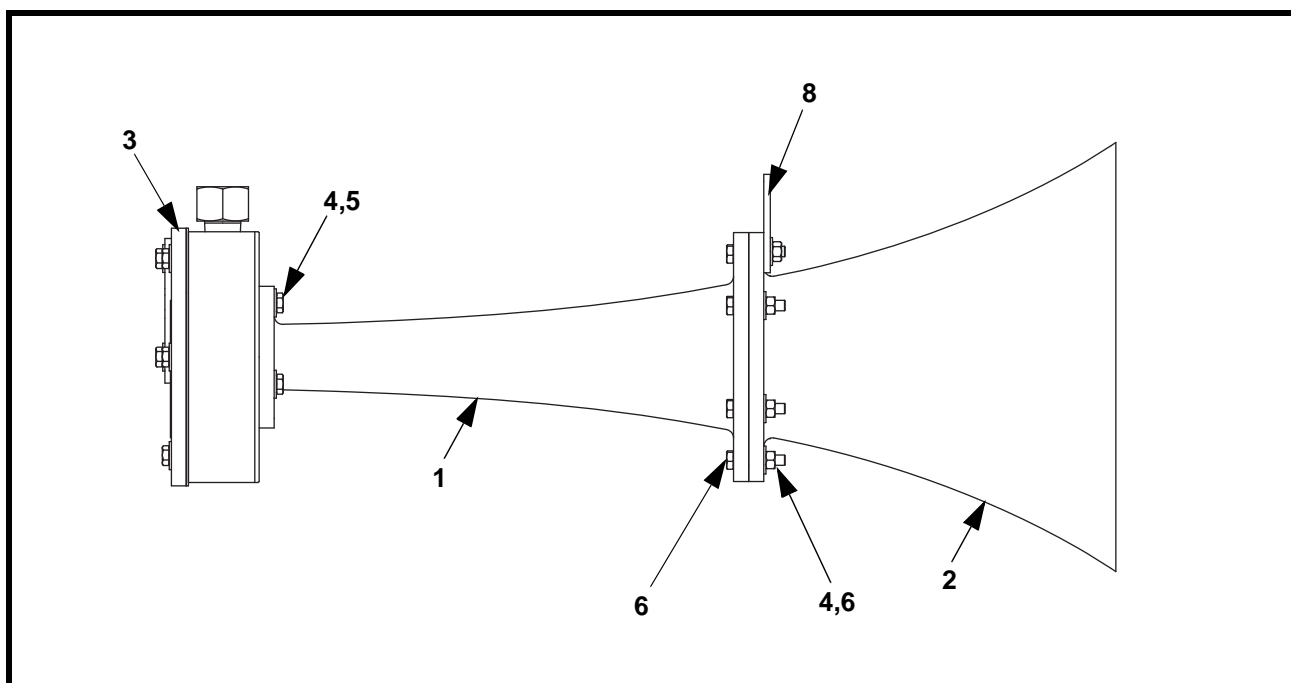


Figure 6. Martin® Sonic Horn Assembly, P/N SH230-XXXXX

Item	Description	Part No.	Qty
1	230 Hz Section A	Table II	1
2	230 Hz Section B	Table II	1
3	Sound Generator Assembly	Table II	1
4	Washer Compression 5/16 SS	38698	9
5	Screw, HHC 5/16-18NC x 1-1/4 SS	38697	3
6	Screw, HHC 5/16-18NC x 1-1/2 SS	SP04436-30	6
7	Nut Hex 5/16-18NC SS	37723	6
8	Safety Cable Clip	38797	1
9 (NS)	D-ring	32265	1
10 (NS)	Cable Clamp	32264	4
11 (NS)	Wire Rope 1/4	100258	10 ft
12 (NS)	Operator's Manual	M3829	1

NS = Not Shown

Table II. Martin® Sonic Horn Assembly, P/N SH230-XXXXX

Assembly Part No.	Item 1 Part No.
SH230-DXXXX	38778
SH230-SXXXX	38778-SS

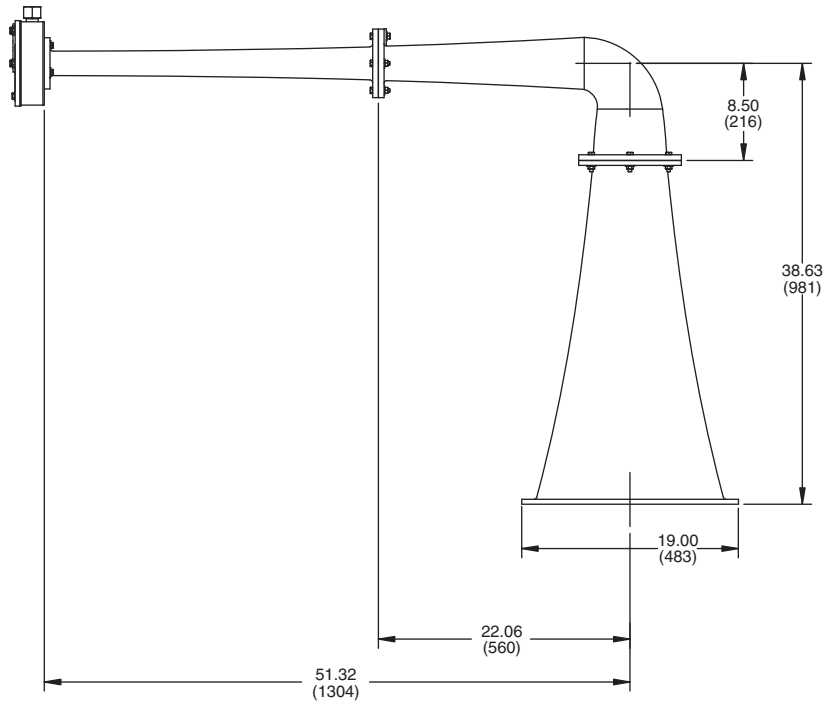
Assembly Part No.	Item 2 Part No.
SH230-XCD0X	38779-0
SH230-XCD1X	38779
SH230-XCS0X	38779-SS0
SH230-XCS1X	38779-SS

Assembly Part No.	Item 3 Part No.
SH230-XXXXD	38770
SH230-XXXXS	38770-SS

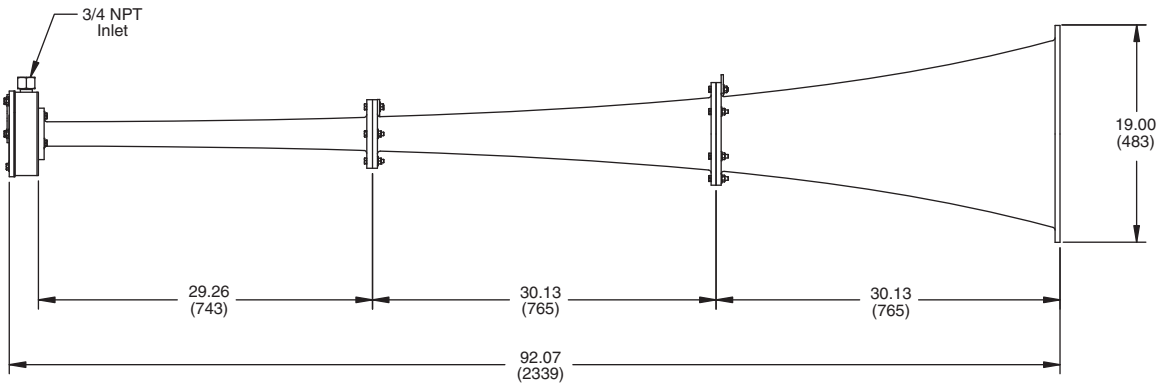
Notes

Appendix A
Martin® Sonic Horns
Specifications

Martin® Sonic Horn Dimensions, P/N SH075-XXXXXXX

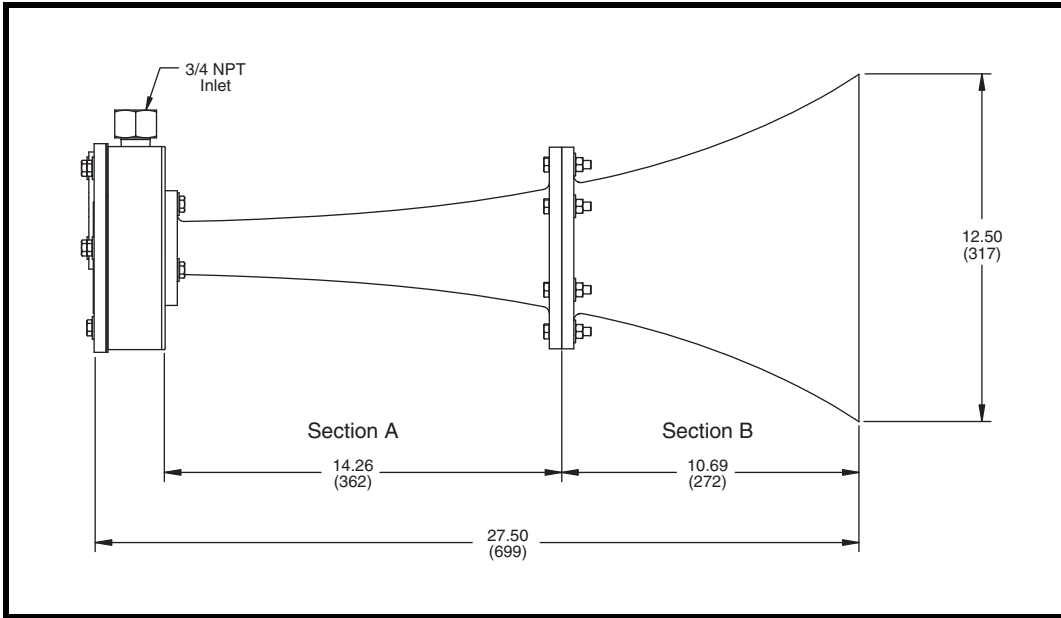


SH075-XX9XX1X



SH075-XX0XX1X

Martin® Sonic Horn Dimensions, P/N SH230-XXXXX



Appendix A

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