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## **MODEL K-SERIES LOCOMOTIVE AIR HORNS INSTALLATION AND MAINTENANCE**

These following instructions are general and cannot possibly meet every contingency with regard to installation, operation or maintenance of the locomotive K horns. Please consult the Manufacturer, if further information is required or to deal with specific requirements.



**WARNING:** *Nathan Airchime locomotive air horn produces extreme loudness, which can cause permanent hearing damage. All personnel involved in the operation and maintenance of this equipment **must** wear hearing protectors when testing near horns. Permanent hearing loss will occur if testing near the horn without hearing protection.*

### **INSTALLATION**

**Horns should be installed as high as practical, free from obstruction, forward front hood.**

All Model K-Series air horns have fixed diaphragm caps that require no adjustment.

All Models will emit a clear sharp note without distortion, operating at any pressure from 30 to 150 psig (2 to 10 bars). However, the sound pressure level (loudness) will vary in relation to the pressure and air consumption. Therefore, for maximum loudness and efficiency, the operating pressure should be from 100 to 150 psig (8 to 10 bars). When operating at pressures below 50 psig (3.4 bar), the air horns are supplied with larger inlet orifices to maintain loudness at lower pressure. Therefore make sure that the stated working pressure of the air horn is in accordance with the pressure of the air system.

If sound intensity must be reduced to comply with new regulatory requirements, contact the factory for restrictor.

No special tools are required to install or maintain a Nathan/Airchime air horn. Please refer to applicable assembly drawing for full details.

1. Air supply line should be one size larger than the inlet connection of the horn.

2. Air supply line should rise continuously through well graded piping, free from pockets and long horizontal runs.
3. Air supply at the horn should be clean and dry, install separators, traps and strainers to maintain this.
4. Air supply should be taken from the top of the air tank or main supply line.
5. Use thread seal sparingly and on male thread only.
6. Avoid the use of elbows if possible. (General rule of thumb is 3-psig (0.2 bar) drop on 120 psig (8.2 bar) per pipe elbow). Long radius bends are less restrictive.
7. On extreme long runs, a buffer tank, located close to the horn, will compensate excessive pressure drop. Pressure drop at the horn, should not exceed 15 psig (1 bar), when blowing. Install test gauge at the horn inlet to check this when installing.
8. Install shut off valves where necessary to facilitate servicing.
9. Install operating valve close to horn for sharp concise blasts - Sound should not “trail off” at the completion of a signal.
10. Before connecting the horn and valve, blow out all lines thoroughly, tapping pipes with hammer to free loose scale and pipe chips.
11. Outside runs that are exposed to cold weather conditions should be well protected or consideration given to electric heating of the pipe.
12. Control valve should be rated for the weather type. Otherwise, it should be heated to prevent freezing.

If the above procedures have been followed, the horn will sound loud and clear when the manual valve is pulled or the solenoid valve energized.

## MULTI-TONE AIR HORNS

All diaphragm head assemblies are common on multi-tone models and are serviced as in maintenance.



**WARNING:** *A Nathan Airchime air horn produces extreme loudness, which can cause permanent ear damage. All personnel must wear hearing protectors when testing near horns. For multiple-tone models, while horn is sounding, place hand in front of each bell mouth to determine if all horns are functioning properly.*

For test purposes, all horns should be sounding at 15 to 20 psig (1 to 1.3 bar) and increase in loudness as the air is increased to maximum operating pressure.

## ELECTRICALLY OPERATED AIR HORNS

1. Run power supply line from main source of junction to solenoid valve.
2. Confirm that the supply line voltage and solenoid voltage are the same.
3. Bring supply line into cap with standard approved fitting and allow for solder connection to coil leads.
4. Check solenoid coil and power supply line for continuity and short-circuit before switching main power supply “ON”.

**CAUTION!** *Wiring procedures and electrical installation must follow in accordance with prevailing electrical codes, at place and time of installation, subject to inspection approval.*

Other electrical equipment such as signal sequencer, switches and heating elements are manufactured with standard approved components. Their operation is self explanatory and familiar to all plant electricians.

## **MANUALLY OPERATED AIR HORNS**

1. Check lanyard for excessive slack.
2. Check return spring for proper tension.
3. Inspect plunger assembly for excessive wear or binding.
4. Check for debris chip lodged on diaphragm seat.

## **TROUBLESHOOTING**

**HORN STOPS BLOWING:** Air is not getting to the horn or control valve. Solenoid valve coil is defective or applied voltage is incorrect. Manual valve plunger assembly is worn or stuck. Lanyard has excessive slack.

**HORN SOUNDS RASPY AND DISTORTED:** Cracked diaphragm discs. Debris chips lodged on diaphragm seat. Loose cap.

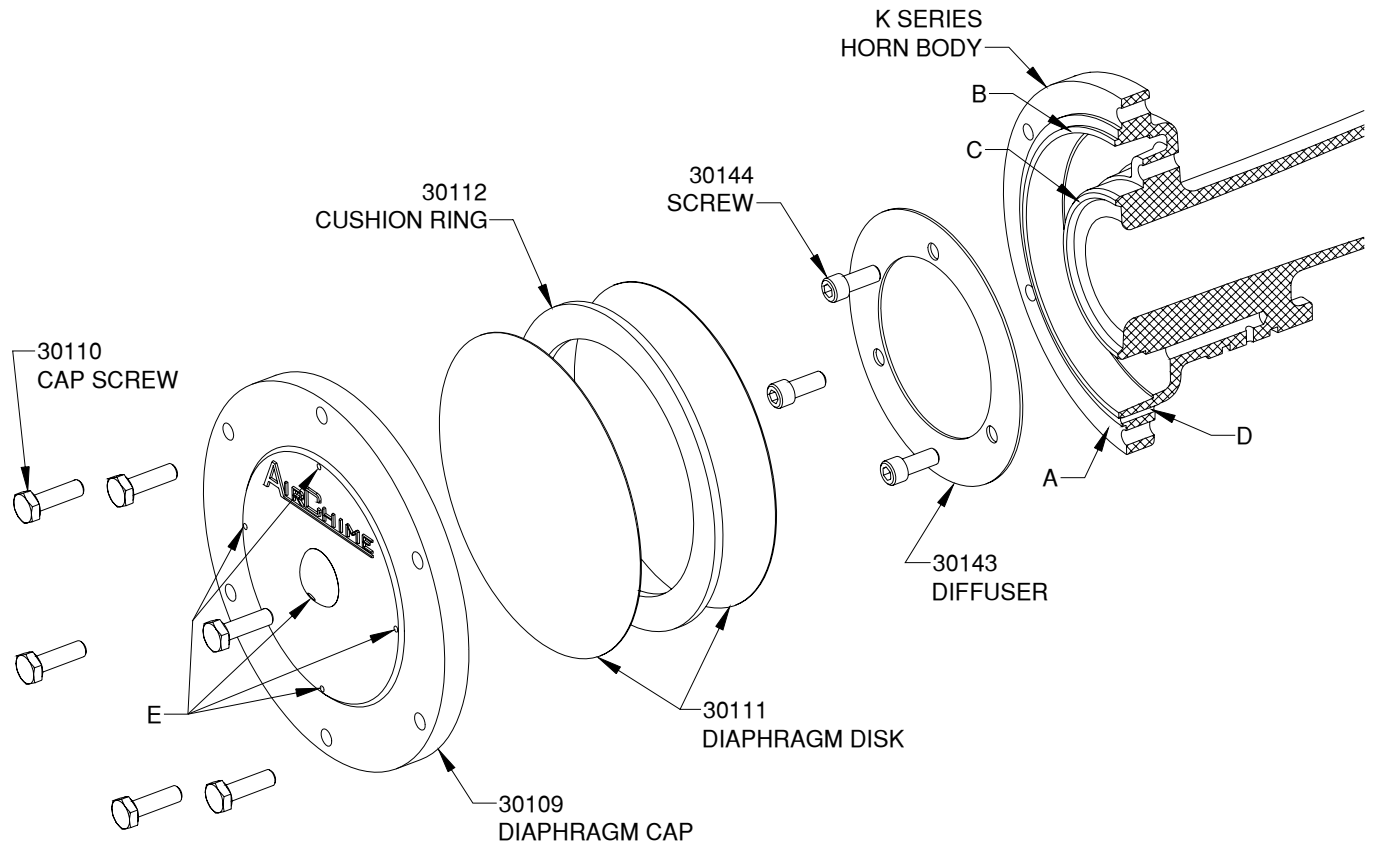
**HORN HISSES WHEN BLOWN:** Diaphragm discs warped and not seating properly. Excessive pressure. Diaphragm seat badly scored or scuffed.

**CHANGE IN CHARACTER OF SOUND:** Cracked diaphragm disc. Warped diaphragm disc. All horns are not blowing (Multi-tone models).

**HORN FAILS TO SHUT OFF:** Manual valve stuck on. Return spring broken. Debris chip lodged on diaphragm seat. Solenoid valve is frozen. Short-circuit in electrical supply.

***Make any repairs to horn as outlined under maintenance.***

## MAINTENANCE



Diaphragm head components and their order of assembly are shown above. This is typical for all model K-Series Horns. Use rebuilt kit part number WH-SA-109 for each bell flare.

1. To dismantle, remove cap screws (30110) and insert pin or wire in hole (D) to remove diaphragms (30111) and cushion ring (30112).
2. Clean thoroughly and inspect discs (30111) for unusual wear, cracks, or scuffmarks.
3. Inspect cushion ring (30112); it should measure 0.145" (3.6mm) in thickness and not show signs of flattening or hardening.
4. Wipe off and inspect seats (B and C). Remove any particles that are lodged or imbedded. This should be done carefully without destroying the flatness or smooth surface of the seat faces. (If air system is not clean, seats can become badly scuffed or nicked and should be returned to factory for machining).
5. Make certain that the 5 relief holes (E) are clear and unrestricted. If plugged the horn will stop sounding.
6. Replace any damaged or worn parts with factory replacements (both the diaphragm disc (30111) and cushion ring (30112) are made of special mill ordered materials. General materials will not give the same results or service). It is recommended that 2 diaphragm discs and a cushion ring are to be replaced as a diaphragm assembly to ensure horn optimal performance and reliability.
7. Wipe seat faces (B and C) clean.
8. Wipe and install new parts in order shown. They should turn freely in diaphragm head.
9. Do not squeeze the discs together when placing in diaphragm head.
10. Inside of cap must be clean before replacing cap (30109). Making sure that relief horn pointing downward.
11. Alternately tighten opposite cap screws (30110) a little at a time to bring cap evenly and snug.

## Model K Series Locomotive Air Horns Maintenance Schedule

1. Horns are part of critical safety equipment on a locomotive. Under normal operating conditions, we recommend that routine maintenance on these horns to be done at least annually. Inspection frequency should be shortened if horns are subjected to severe or dirty operating environment such as exhaust soot or under carriage horn mounting. Diaphragm disc assembly which is an integral part of sounding mechanism should be replaced systematically at least every two years in service regardless frequency of usage.
2. In addition to annual maintenance, periodic inspection must be done when the train operator observes any change in tonal characteristics, reduction of sound intensity or any irregularity of system functionality.
3. For proper maintenance, each bell on a horn cluster should be visually inspected. Diaphragm head assembly should be checked and cleaned thoroughly. Worn or broken parts (diaphragm discs) must be replaced with factory parts. Sounding test should be done after the servicing to ensure system integrity by feeling the vibration with hand at each bell mouth when blowing the horns.



**WARNING:** Wear proper hearing protection when conducting horn tests. Hearing loss or permanent damage may result from unsafe use.

4. We strongly recommend that a regulatory compliance test should be done each time horn maintenance, repair or service is performed using a sound level meter to check for conformance.

Contact us if you need further help:

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