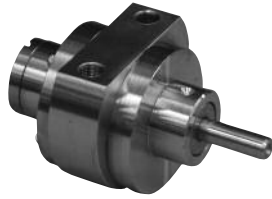


# STAINLESS SERIES LUBRICATED AIR MOTORS

## OPERATION & MAINTENANCE MANUAL



1AM



4AM



6AM

Thank you for purchasing this Gast product. It is manufactured to the highest standards using quality materials. **This manual includes general safety instructions for operation under normal conditions and for operation in hazardous conditions.** Please follow all recommended maintenance, operational and safety instructions and you will receive years of trouble free service.

**IMPORTANT: PLEASE READ THIS MANUAL COMPLETELY BEFORE INSTALLING AND USING THIS MOTOR. SAVE THIS MANUAL FOR FUTURE REFERENCE AND KEEP IN THE VICINITY OF THE MOTOR.**

### General information

#### Operating Pressure Limits: Model

1AM  
4AM  
6AM

#### Pressure

100 PSI / 7 bar  
100 PSI / 7 bar  
100 PSI / 7 bar

### Product Use Criteria:

- Normal conditions: Operate at temperatures up to 250°F (121°C).
- Hazardous conditions: Operate at temperatures up to 104°F (40°C).
- Protect unit from dirt and moisture.
- Use ONLY compressed air to drive motor.
- Air lines connected to motor should be the same size or the next size larger than the inlet port for efficient output and speed control.
- Protect all surrounding items from exhaust air.
- Bearings are packed with food grade grease.
- Use Gast #AS117 food grade oil, #AD220 pneumatic lubricating oil, or a detergent SAE#10 automotive engine oil for lubricating.

- Motors are to be used in commercial installations only.

•  This symbol appears on labels of air motors that are designed for use in hazardous atmospheres.

**These air motors comply with the applicable standards and specifications and meet the requirements of the guidelines of the EC directive 94/9EC (ATEX 100a). They are intended to be used in zones 1 and 2 where explosive atmospheres are likely to occur.**

- Air supply, directional control valve and pressure regulator should be selected based upon the air consumption of the motor.



A Unit of **IMX** Corporation

ISO 9001 & 14001 CERTIFIED

[www.gastmfg.com](http://www.gastmfg.com)

**Your safety and the safety of others is extremely important.**

We have provided many important safety messages in this manual and on your product. Always read and obey all safety messages.



This is the safety alert symbol. This symbol alerts you to hazards that can kill or hurt you and others. The safety alert symbol and the words “DANGER” and “WARNING” will precede all safety messages. These words mean:

## DANGER

You will be killed or seriously injured if you don't follow instructions.

## WARNING

You can be killed or seriously injured if you don't follow instructions.

All safety messages will identify the hazard, tell you how to reduce the chance of injury, and tell you what can happen if the safety instructions are not followed.

## CODE SYMBOLS



Hazard. Possible consequences : death or severe injuries.



Hazardous situation. Possible consequences : slight or mild injuries.



Dangerous situation. Possible consequences : damage to the drive or the environment.



Important instructions on protection against explosion.



Application tips and useful information.

**Improper environment, installation and operation can result in severe personal injury and/or damage to property.**

**Qualified personnel must perform all work to assemble, install, operate, maintain and repair air motor.**

**Qualified personnel must follow:**

- These instructions and the warning and information labels on the motor.
- All other drive configuration documents, startup instructions and circuit diagrams.
- The system specific legal regulations and requirements.
- The current applicable national and regional specifications regarding explosion protection, safety and accident prevention.



Complete the following checklist prior to starting installation in a hazardous area. All actions must be completed in accordance with ATEX 100a.

### Checklist for installation in hazardous areas:

- Read air motor label to check that motor has been designed for use in a hazardous application:
  - Hazardous zone
  - Hazardous category
  - Equipment group
  - Temperature class
  - Maximum surface temperatures

Example:

Model designation: 1UP-NRV-10

Year manufactured: 2003

 Gast Mfg. Corp.

II 2GD c + 1°C Ta +40°C\*

Benton Harbor, MI USA

Telephone: 269.926.6171

\* Legend:

II Equipment group II

2 Equipment category 2

G Gas atmospheres

D Dust atmospheres

c Constructional safety

+1CTa +40°C Max. surface temp. 275°F/135°C

Ambient range +1°C to +40°C (34°F/104°F)

- Check the site environment for potentially explosive oils, acids, gases, vapors or radiation
- Check the ambient temperature of the site and the ability to maintain proper ambient temperature.  
Ambient range:  
Normal conditions: 34°F/1°C to 250°F/121°C  
Hazardous conditions: 34°F/1°C to 104°F/40°C
- Check the site to make sure that the air motor will be adequately ventilated and that there is no external heat input (e.g. couplings). The cooling air may not exceed 104°F/40°C.
- Check that products to be driven by the air motor meet ATEX approval.
- Check that the air motor is not damaged.

## INSTALLATION

**Correct installation is your responsibility.** Make sure you have the proper installation conditions.



## WARNING

### Injury Hazard

**Install proper guards around output shaft as needed.**

**Air stream from product may contain solid or liquid materials that can result in eye or skin damage.**

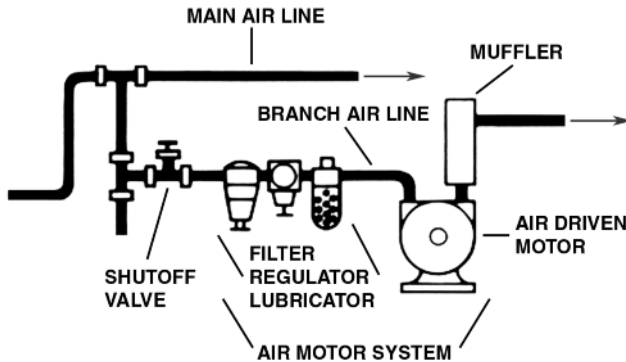
**Wear eye protection when installing this product.**

**Failure to follow these instructions can result in serious injury or property damage.**

## Mounting

This product can be installed in any orientation. Mount the motor to a solid metal base plate that is mounted to a stable, rigid operating surface. Use shock mounts to reduce noise and vibration. Install a pressure regulator or simple shut-off valve to control motor.

## Connection



Check the direction of the motor airflow. A single rotation motor will operate properly only in one direction. Single rotation motors require a sound absorber to be connected to the air port. Remove the plastic shipping plugs from the ports. Save plugs for future use during storage.

Install a 5-micron filter in the air line before the connection to the motor. Next install an air pressure regulator to control motor speed and torque.

An automatic air line lubricator should be installed in the air line as close as possible and no more than 18 inches (1/2 meter) from the air motor. Install the lubricator level with or above the air motor so that the oil mist will blow directly into or fall down into the motor.

Fill the oil reservoir to the proper level with Gast #AS117 food grade oil, #AD220 pneumatic lubricating oil, or a detergent SAE#10W automotive engine oil. Adjust lubricator to feed 1 drop of oil for every 50-75 cubic feet of air while the unit is running. Do Not overfeed oil or exhaust air may become contaminated.

Clean the compressed air connection with low pressure air to remove any dirt from the line before connecting to the ports.

Use the proper sized fasteners. For the most efficient output and control of speed, use air lines that are the same size as the motor inlet port if the connection is less than 7 feet (2 meters). For longer connections, use the next pipe size larger than the motor intake port. Connect lines to motor in the proper direction.

A reversible motor will work equally well in both directions. Connect a 4-way valve with piping to both air ports of motor to make reversing possible. Connect the sound absorber on the exhaust air port or valve connection.

**Do not add any thrust to the end or side of the shaft when making connections. To press a component onto the shaft, remove the end cap and support the rear end of the shaft**



**Do not use a hammer on the shaft or connections.**



**Lubricating the drive shaft will make assembly easier. Use a puller for removal of pulleys, couplings and pinions on the motor shaft. Check that the tension on the belt pulley matches the manufacturer's specifications. Do not exceed the maximum radial and axial forces on the shaft. If the motor shaft is connected to the part to be driven without a coupling, check that the radial offset and axial force effect will not cause problems.**



**Use only belts with < 10° electrical leakage resistance to prevent static electrical problems.**

## Accessories

Consult your Gast representative for filter recommendations. Install a moisture trap and filter in the air line ahead of the motor. For the most efficient output and control of speed use air lines that are the same size or the next pipe size larger than the motor intake.

An automatic air line lubricator should be installed 18" or as close as possible in the air line just ahead of the motor. Adjust the lubricator to feed one drop oil for every 50-75 cubic feet of air moving through the motor. Air consumption at various speeds and pressures are available from your local Gast representative, online at [www.gastmfg.com](http://www.gastmfg.com) or from the factory 269/926-6171.

Air consumption data at various speeds and pressures are available from your Gast Distributor/Representative or the factory.

## OPERATION



## WARNING

### Injury Hazard

**Air stream from product may contain solid or liquid material that can result in eye or skin damage.**

**Do Not use combustible gases to drive this motor.**

**Wear hearing protection. Sound level from motor may exceed 87db(A).**

**Failure to follow these instructions can result in eye injury or other serious injury.**

**Check all connections before starting motor. It is your responsibility to operate this product at recommended speeds, loads and room ambient temperatures. Do not run the motor at high speeds with no load. This will result in excessive internal heat that may cause motor damage.**

The starting torque is less than the running torque. The starting torque will vary depending upon the position of the vanes when stopped in relation to the air intake port.

Use a pressure regulator and/or simple shut-off valve to regulate the motor's speed and torque. This will provide the required power and will conserve air. Open the air supply valve to the motor. Set the pressure or flow rate to the required speed or torque. Adjust the lubricator to feed one drop of oil for every 50-75 CFM (1.5-2 M<sup>3</sup> per minute) of air moving through motor. Check the oil level daily.



**Operate the motor for approximately 2 hours at the maximum desired load. Measure the surface temperature of the motor on the body opposite the pipe ports. The maximum surface temperature listed on the motor is for normal environmental and installation conditions. For most air motors, the maximum surface temperature should not exceed 203°F/95°C. Do not continue to operate the motor if the measured surface temperature exceeds temperature listed on the motor. If your measured temperature does exceed listed value, consult with your Gast Distributor/Representative for a recommendation.**

## MAINTENANCE



## WARNING

### Injury Hazard

**Disconnect air supply and vent all air lines.**

**Wear eye protection when flushing this product.**

**Air stream from product may contain solid or liquid material that can result in eye or skin damage.**

**Flush this product in a well ventilated area.**

**Do Not use kerosene or other combustible solvents to flush this product.**

**Failure to follow these instructions can result in eye injury or other serious injury.**

It is your responsibility to regularly inspect and make necessary repairs to this product in order to maintain proper operation.

### Lubrication

For applications requiring food grade lubrication, Gast #AS117 food grade oil is available. Gast #AD220 or a detergent SAE #10 automotive engine oil is recommended for other applications. Lubricating is necessary to prevent rapid wear of internal components on lubricated models. Excessive moisture in air line may cause ice to form in the muffler when air expands as it passes through the motor. Install a moisture separator in the air line and an after cooler between compressor and air receiver to help prevent moisture problems.

### Manual Lubrication

Shut the air motor down and oil after every 8 hours of operation. Add 10-20 drops of oil to the air motor intake port.

### Automatic Lubrication

Adjust inline oiler to feed 1 drop of oil per minute for high speed or continuous duty usage. Do Not overfeed oil or exhaust air may become contaminated.

Check intake and exhaust filters after first 500 hours of operation. Clean filters and determine how frequently filters should be checked during future operation. This one procedure will help assure the motor's performance and service life.

### Flushing

Flushing this product to remove excessive dirt, foreign particles, moisture or oil that occurs in the operating environment will help to maintain proper vane performance. Flush the motor if it is operating slowly or inefficiently.

### Use Gast recommended Flushing Solvents.



**DO NOT use kerosene or ANY other combustible solvents to flush this product.**

1. Disconnect air line and muffler.
2. Add flushing solvent directly into motor. If using liquid solvent, pour several tablespoons directly into the intake port. If using spray solvent, spray for 5-10 seconds into intake port.
3. Rotate the shaft by hand in both directions for a few minutes.
4. **You must wear eye protection for this step.** Cover exhaust with a cloth and reconnect the air line. Slowly apply pressure until there is no trace of solvent in the exhaust air.
5. Listen for changes in the sound of the motor. If motor runs smooth, you are finished. If the motor does not sound like it is running smoothly, installing a service kit will be required (See "Service Kit Installation").

**Check that all external accessories such as relief valves or gauges are attached and are not damaged before operating product.**

### Shutdown

**It is your responsibility to follow proper shutdown procedures to prevent product damage.**

1. Turn off air intake supply.
2. Disconnect air supply and vent all air lines.
3. Disconnect air lines.
4. Remove air motor from connecting machinery.
5. Remove the muffler.
6.   **Wear eye protection. Keep away from air stream.** Use clean, dry air to remove condensation from the inlet port of the motor.
7. Lubricate motor with a small amount of oil into the intake port. Rotate shaft by hand several times to distribute oil.
8. Plug or cap each port.

## SERVICE KIT INSTALLATION

**Gast will NOT guarantee field-rebuilt product performance. For performance guarantee, the product must be returned to a Gast Authorized Service Facility.**

Service Kit contents vary. Most contain vanes, end cap gasket, body gasket, bearings and a muffler element or felt.

### Rebuilds

**Tool kits which include a more in-depth rebuild manual are available through your Gast**

**Distributor/Representative.** These kits include the tools required to remove and reassemble end plates, bearings and shaft seals, and to set the proper end clearance. The rebuild manual also includes step by step instructions, including illustrations, to help achieve a successful rebuild. Gast highly recommends using the air motor rebuild manual and tool kit when attempting a minor or major rebuild to your Gast air motor.

### Minor Rebuild:

1. Remove the end cap.
2. Remove dead end plate bolts.
3. Remove dead end plate using factory issued tool, (do NOT use screwdriver to remove the end plate).
4. Remove vanes.
5. Clean parts. Check for scoring on the end plate and rotor assembly. If scoring exists, send unit to a Gast authorized service facility.
7. Place the dead end plate on the body.
8. Place the bearing onto the shaft using a factory supplied bearing pusher.
9. Install end plate bolts. Check to make sure the end plate does not bind - it should allow a small amount of movement. Tighten bolts to 60-80 in-lbs.
10. Use the bearing tapper from kit to lightly tap on the inner race of the dead end bearing to free up and center the rotor in the body; the rotor should not rub on either end plate when pushed or pulled.
11. Reattach the end cap.
12. **Lubricated models only:** add a few drops of oil into the ports and rotate shaft by hand for a few rotations.

### Major Rebuild:

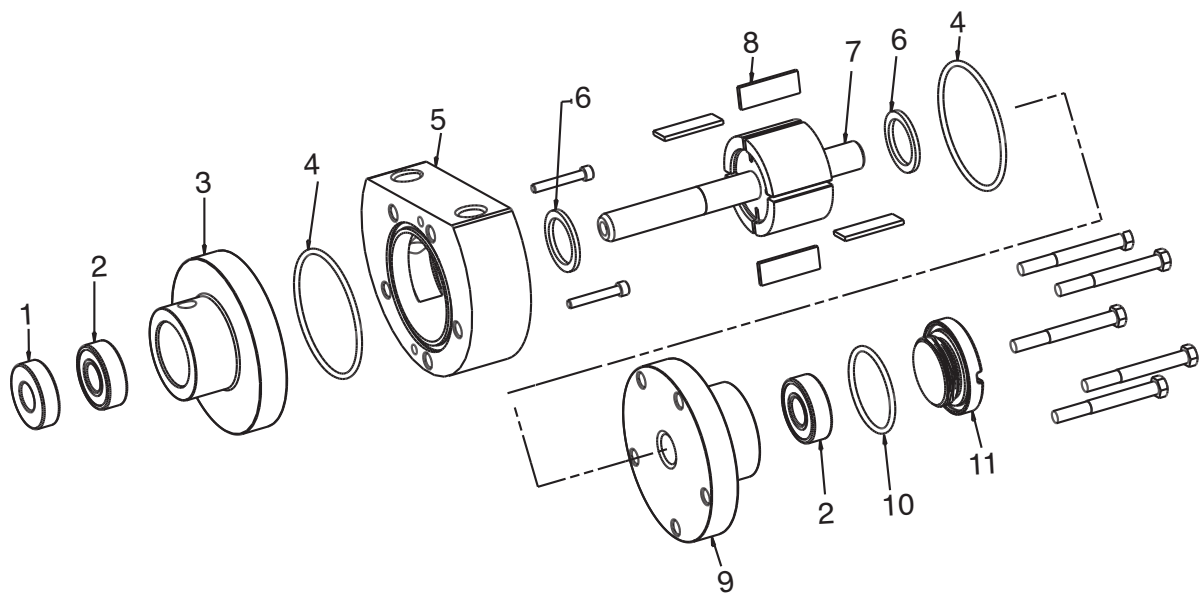
For major repairs, it is recommended that the unit be sent to a Gast authorized service facility.



**Disposal** (Please note current regulations)

Parts of the air motor may be recycled as scrap metal.

**EXPLODED PRODUCT VIEW, PARTS & ORDERING INFORMATION 1AM SERIES**



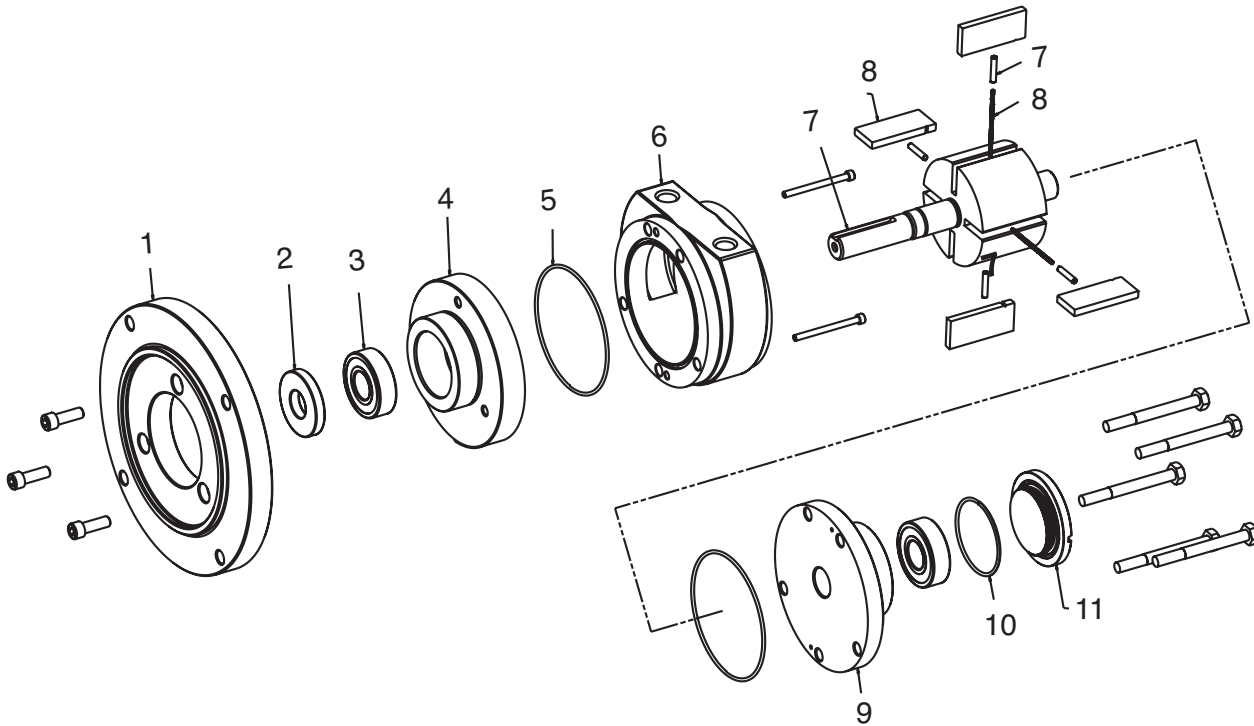
**1AM SERIES**

REF#	DESCRIPTION	QTY	Face Mount 1AM-NRV-7SS	Hub Mount 1AM-NRV-39SS	NEMA 42C Flange Mount 1AM-NRV-105SS
1 Δ	SEAL	1	AC190	AC190C	AC190C
2 Δ	BEARING	2	AG549A	AG549A	AG549A
3	DRIVE END PLATE	1	AS111A	AS111	AS111A
4	O-RING, BODY	2	AK945A	AK945A	AK945A
5 ΔΔ	BODY	1	AS110	AS110	AS110
6	CAM RING	2	AC195	AC195	AC195
7	ROTOR ASSEMBLY	1	AS114	AS114	AS114
8	VANE	4	AC259A	AC259A	AC259A
9 Δ	DEAD END PLATE	1	AS112	AS112	AS112
10	O RING END CAP	1	AS116	AS116	AS116
11 Δ	END CAP	1	AS113	AS113	AS113
	FLANGE (NOT SHOWN)	1	AS115		
*** Δ	MUFFLER	1			
***	FOAM	1			
***	SERVICE KIT	1	K201SS	K201SS	K201SS

\*\*\* Items not shown  
 Δ Denotes parts in the service kit

To avoid injury, exhaust air should be plumbed away or appropriate muffler should be used

**EXPLODED PRODUCT VIEW, PARTS & ORDERING INFORMATION 4AM SERIES**

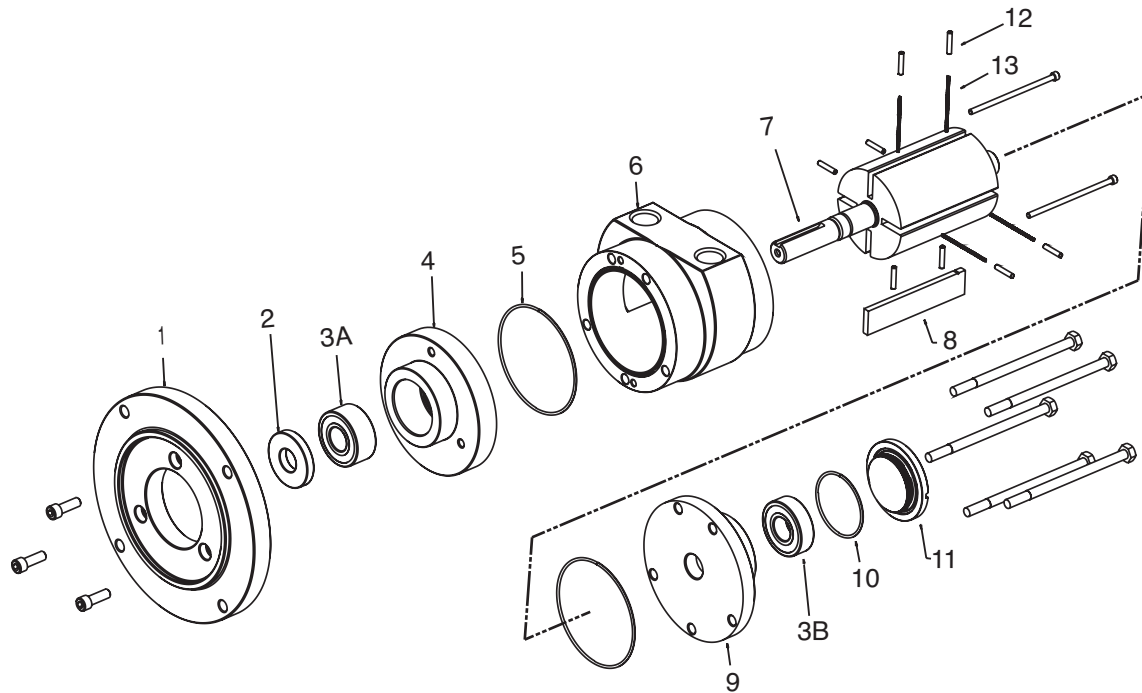


**4AM SERIES**

REF#	DESCRIPTION	QTY	HUB MOUNT	FLANGE MOUNT
			4AM-NRV-200SS	4AM-NRV-201SS
1	FLANGE	1		AS128
2 Δ	SEAL	1	AS132	AS132
3	BEARING	2	AS131	AS131
4	DRIVE END PLATE	1	AS121	AS121
5 Δ	O-RING, BODY	2	AS130	AS130
6	BODY	1	AS120	AS120
7	ROTOR ASSEMBLY	2	AS124	AS124
8Δ	VANE	4	AB876	AB876
9	DEAD END PLATE	1	AS122	AS122
10Δ	O RING END CAP	1	VG2145	VG2145
11	END CAP	1	AS123	AS123
12	PUSH PIN	4	AM467	AM467
13	SPRING	2	AM466	AM466
*** Δ	SERVICE KIT	1	K205SS	K205SS

\*\*\* Items not shown  
 Δ Denotes parts in the service kit

To avoid injury, exhaust air should be plumbed away or appropriate muffler should be used



**6AM SERIES**

REF#	DESCRIPTION	QTY	FACE MOUNT 6AM-NRV-200SS	NEMA 56C FLANGE MOUNT 6AM-NRV-201SS
1	FLANGE	1		AS128
2 Δ	SEAL	1	AS132	AS132
3A	DRIVE END BEARING	1	AD638C	AD638C
3B	DEAD END BEARING	1	AS131	AS131
4	DRIVE END PLATE	1	AS139	AS139
5 Δ	O-RING, BODY	2	AS130	AS130
6	BODY	1	AS134	AS134
7	ROTOR ASSEMBLY	2	AS135	AS135
8Δ	VANE	4	AS137	AS137
9	DEAD END PLATE	1	AS122	AS122
10Δ	O RING END CAP	1	VG2145	VG2145
11	END CAP	1	AS123	AS123
12	PUSH PIN	8	AM467	AM467
13	SPRING	4	AM466	AM466
*** Δ	SERVICE KIT	1	K281SS	K281SS
*** Items not shown				
Δ Denotes parts in the service kit				

To avoid injury, exhaust air should be plumbed away or appropriate muffler should be used



## WARRANTY

Gast finished products, when properly installed and operated under normal conditions of use, are warranted by Gast to be free from defects in material and workmanship for a period of twelve (12) months from the date of purchase from Gast or an authorized Gast Representative or Distributor. In order to obtain performance under this warranty, the buyer must promptly (in no event later than thirty (30) days after discovery of the defect) give written notice of the defect to Gast Manufacturing Incorporated, PO Box 97, Benton Harbor Michigan USA 49023-0097 or an authorized Service Center (unless specifically agreed upon in writing signed by both parties or specified in writing as part of a Gast OEM Quotation). Buyer is responsible for freight charges both to and from Gast in all cases.

This warranty does not apply to electric motors, electrical controls, and gasoline engines not supplied by Gast. Gast's warranties also do not extend to any goods or parts which have been subjected to misuse, lack of maintenance, neglect, damage by accident or transit damage.

THIS EXPRESS WARRANTY EXCLUDES ALL OTHER WARRANTIES OR REPRESENTATIONS EXPRESSED OR IMPLIED BY ANY LITERATURE, DATA, OR PERSON. GAST'S MAXIMUM LIABILITY UNDER THIS EXCLUSIVE REMEDY SHALL NEVER EXCEED THE COST OF THE SUBJECT PRODUCT AND GAST RESERVES THE RIGHT, AT ITS SOLE DISCRETION, TO REFUND THE PURCHASE PRICE IN LIEU OF REPAIR OR REPLACEMENT.

GAST WILL NOT BE RESPONSIBLE OR LIABLE FOR INDIRECT OR CONSEQUENTIAL DAMAGES OF ANY KIND, however arising, including but not limited to those for use of any products, loss of time, inconvenience, lost profit, labor charges, or other incidental or consequential damages with respect to persons, business, or property, whether as a result of breach of warranty, negligence or otherwise. Notwithstanding any other provision of this warranty, BUYER'S REMEDY AGAINST GAST FOR GOODS SUPPLIED OR FOR NON-DELIVERED GOODS OR FAILURE TO FURNISH GOODS, WHETHER OR NOT BASED ON NEGLIGENCE, STRICT LIABILITY OR BREACH OF EXPRESS OR IMPLIED WARRANTY IS LIMITED SOLELY, AT GAST'S OPTION, TO REPLACEMENT OF OR CURE OF SUCH NONCONFORMING OR NON-DELIVERED GOODS OR RETURN OF THE PURCHASE PRICE FOR SUCH GOODS AND IN NO EVENT SHALL EXCEED THE PRICE OR CHARGE FOR SUCH GOODS. GAST EXPRESSLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE WITH RESPECT TO THE GOODS SOLD. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTIONS SET FORTH IN THIS WARRANTY, notwithstanding any knowledge of Gast regarding the use or uses intended to be made of goods, proposed changes or additions to goods, or any assistance or suggestions that may have been made by Gast personnel.

Unauthorized extensions of warranties by the customer shall remain the customer's responsibility.

CUSTOMER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF GAST PRODUCTS FOR CUSTOMER'S USE OR RESALE, OR FOR INCORPORATING THEM INTO OBJECTS OR APPLICATIONS WHICH CUSTOMER DESIGNS, ASSEMBLES, CONSTRUCTS OR MANUFACTURES.

This warranty can be modified only by authorized Gast personnel by signing a specific, written description of any modifications.

## MAINTENANCE RECORD

DATE	PROCEDURE PERFORMED

## TROUBLESHOOTING CHART

Problem					
Low Torque	Low Speed	Won't Run	Runs Hot	Runs Well Then Slows Down	Reason & Remedy For Problem.
.	.	.			Dirt or foreign material present. Inspect and clean.
.	.	.	.	.	Vanes misaligned. Realign vanes.
.	.				Low air pressure. Increase pressure.
	.				Air line too small. Install larger line(s).
	.			.	Restricted exhaust. Inspect and repair.
.	.	.		.	Motor is jammed. Disassemble and repair.
	.			.	Air source inadequate. Inspect and repair.
	.			.	Air source too far from motor. Reconfigure setup.

For the name of your nearest Gast Certified Service Center, please contact one of the sales offices below:

**Gast Manufacturing, Inc.**

2300 S. M139  
Benton Harbor, MI 49022  
Ph: 269/926-6171  
FAX: 269/925-8288  
www.gastmfg.com

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