

DOA SERIES LABORATORY DIAPHRAGM VACUUM PUMP AND COMPRESSOR OPERATION & MAINTENANCE MANUAL



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KEEP THIS DOCUMENT FOR FUTURE REFERENCE

This is the hazard alert symbol: m. When you see this symbol, be aware that personal injury or property damage is possible. The hazard is explained in text following the symbol.

Read this information carefully before proceeding.

The following is an explanation of the three different types of hazards:

- m **DANGER** Severe personal injury or death will occur if hazard is ignored.
- m **WARNING** Severe personal injury or death can occur if hazard is ignored.
- m **CAUTION** Minor injury or property damage can occur if hazard is ignored.

GENERAL INFORMATION

- m **DANGER** Do not pump flammable or explosive gases or operate unit in an atmosphere containing them. Use only in well-ventilated area.
- m **CAUTION** Ambient temperature should not exceed 40°C (105°F). For operation at higher temperatures, consult the factory.
- m **CAUTION** All electrical products generate heat. Do not touch unit during operation or until it has cooled.

Construction

Your reciprocating diaphragm pump is a precision product. Protect it against dirt and excessive moisture and have years of trouble-free service.

Never lubricate this oilless pump. The sealed bearings are permanently lubricated

INSTALLATION

- m **WARNING** Disconnect electrical power supply before installing and/or servicing. Failure to do so could result in electrical shock, personal injury or death.
- m **WARNING** To avoid risk of electrocution do not use this product in an area where it could come in contact with water or other liquids. If exposed to the elements it must be weather protected.

If pump is required to start against system pressure, install a positive-seal check valve at pressure port.

Mounting Pump

To reduce noise and vibration use shock mounts, or vibration-isolated mounting surface that will not resonate.

- m **CAUTION** Do not block flow of cooling air over pump in any way.

Plumbing

To prevent flow restriction, use pipe and fittings that are same size as or larger than threaded ports. Note that ports are not designed to support plumbing.

Wiring

- m **WARNING** Improper wiring can result in electric shock. All power to motor must be de-energized and disconnected before servicing.

Building must conform to all required safety codes. Check that voltage at power outlet agrees with motor nameplate.

Filters

An intake filter and/or liquid trap is required for dirty environments. This unit has a factory-installed filter. When installing an optional liquid trap do so between line and intake filter. Consult a Gast representative for recommendations.

OPERATION

- m **WARNING** Solid or liquid material exiting unit can cause eye or skin damage. Keep away from air stream.
- m **CAUTION** Pump is designed for air only. Do not allow corrosive gases or particulate material to enter pump. Water vapor, oil-based contaminants, or other liquids must be filtered out. Contact the factory when using in an application other than air.

Performance is reduced by lower atmospheric pressure found at high altitudes. Consult Gast distributor for details.

Troubleshooting

- m **WARNING** Always disconnect power before servicing. Motor is thermally protected and automatically restarts after it cools and thermal protection switch resets.

If motor fails to start, or it slows down under load, turn it off and unplug it. Make sure that voltage at power outlet agrees with motor nameplate. Examine plug, cord, and switch for deterioration. It is usually cheaper to return pump for repair to closest Authorized Service Facility than to call an electrician, especially within guarantee period, even if electric motor appears to be source of trouble.

If pump overheats or is noisy, stop pump immediately for repair. Return pump to closest Authorized Service Facility (see list on back page), or perform following rebuild procedures.

NOTE: Gast will not guarantee performance of a field-rebuilt pump.

Inspection

Regular inspection can prevent unnecessary damage and repairs. A dirty filter or muffler restricts airflow and can cause overheating and noise. Regularly check filters located under pump head cover. If necessary, clean pump head using only water-based solvents.

m CAUTION Do not use petroleum-base compounds, acids, caustics, chlorinated or combustible solvents to clean or lubricate any parts. It will reduce service life of pump. Use water-base solvents for cleaning.

SERVICE KIT INSTALLATION

NOTE: Gast will not guarantee performance of a field-rebuilt pump. You can return pump to a Gast authorized service facility, or perform following rebuild procedures for installing a service kit.

Each kit contains all or most of following: Three filter elements, two slotted valve screws, two leaf valves, one valve limiter, one valve retainer, and one cover gasket. Follow these steps to install kit.

Pump Disassembly

1. Disconnect pump from electrical power.

m WARNING Always disconnect power before servicing. Failure to do so can result in severe personal injury or death.

2. Vent all air lines to pump to remove pressure.

m WARNING Vent all air lines to pump to remove pressure before servicing. Failure to do so can result in severe personal injury or death.

3. Disconnect air lines to pump.

4. Label pressure and vacuum gauges and pump ports so you can reassemble them correctly later. Remove gauges.
 5. Remove screws in head cover and remove cover and cover gasket. Discard old cover gasket.
 6. Remove slotted valve screw, valve limiter and leaf valve. Discard old screw and leaf valve. Remove and discard three old filter elements, noting their positions.
 7. Remove hex nuts and washers under handle. Remove socket-head cap screws and washers from pump head, and remove head. Save four thin washers you find under head.
 8. Turn head over. On underside of head, remove valve screw, valve retainer and leaf valve. Discard old screw and leaf valve.
 9. If necessary, clean pump head using water-base solvents and/or blow off with air.
- m CAUTION** Do not use petroleum-base compounds, acids, caustics, or chlorinated solvents to clean or lubricate any parts. It will reduce service life of pump. Use only water-base solvents for cleaning.
10. Visibly check diaphragm and retainer plate for excessive wear or corrosion. If replacing diaphragm, remove countersunk screws from diaphragm retainer plate and discard old diaphragm. Save retainer plate and screws for reassembly.
- m CAUTION** Do not make any scratches or burrs in valve seat areas.

Pump Reassembly

11. If replacing diaphragm, choose new diaphragm based on primary intended use (blue for pressure, red for vacuum). Place diaphragm over raised ring the connecting rod, with blue side up, or red side down. Apply Loctite adhesive to countersunk screws and reinstall retainer plate. Tighten screws to 30 lb-in.
12. On underside of head, install new leaf valve, valve retainer, and new slotted screw. Orient retainer so that u-shaped mark is visible (facing you).
13. Make sure that valve and valve retainer are secured by raised locating bar so they point directly toward valve seat. Tighten screw to 12 lb.-in.
14. Position four thin washers on corners of pump body. Refer to labels made earlier to orient pump head correctly. Install pump head with cap screws and washers. Tighten screws to 90-100 lb.-in.

Service Kit Installation: Pump Re-assembly (Continued)

15. Install new leaf valve, valve limiter, and new slotted screw in top of pump head. Make sure that valve and valve limiter are secured by raised locating bar so they point directly toward valve seat. Tighten screw to 12 lb.-in.
16. Install new filter elements in pump head. Small element goes in recess nearest to inlet port.
17. One of four gasket screw holes is farther from edge than other three. Position new gasket on pump head, with side up that allows all four-screw holes to be visible at once. Install head cover using slotted screws. Tighten screws to 30 lb.-in.
18. Reinstall handle with hex nuts and washers.
19. Reinstall gauges, referring to labels made earlier.

| PARTS ORDERING INFORMATION | | | |
|----------------------------|---------------------------------|-----|----------------------------|
| Ref No | Description | Qty | DOA-P104-AA DOA-P104-BN |
| 1 | Pressure Gauge | 1 | AA806 |
| 2 | Pressure Regulator/Relief Valve | 1 | AF887 |
| 3 | Vacuum Gauge | 1 | AE136 |
| 4 | Vacuum Regulator/Relief Valve | 1 | AA550CV |
| 5 | Cover | 1 | AH703A |
| *6 | Cover Gasket | 1 | AH705 |
| *7 | Filter/Muffler Element | 2 | AG998A |
| *8 | Filter Element | 1 | AF857A |
| 9 | Head | 1 | AF804 |
| *10 | Valve Screw | 2 | BB317 |
| *11 | Valve Limiter | 1 | AF856 |
| *12 | Leaf Valve | 2 | AF817 |
| *13 | Valve Retainer | 1 | AF819A |
| 14 | Nipple | 2 | AG613 |
| 15 | Retainer Plate | 1 | AF809 |
| 16 | Diaphragm | 1 | AF818A |
| 17 | Felt Spacer | 3 | AA929 |
| 18 | Spacer | 1 | AG970 |
| 19 | Fan | 1 | AF533 |
| 20 | Front Cover | 1 | AF806 |
| 21 | Grille | 1 | AF807 |
| 22 | Rubber Foot | 4 | AF584A |
| 23 | Power Cord | 1 | AE941 |
| 24 | Rear Cover | 1 | AF806B |
| 25 | Handle | 1 | AF870 |
| | Service Kit | 1 | K294J |

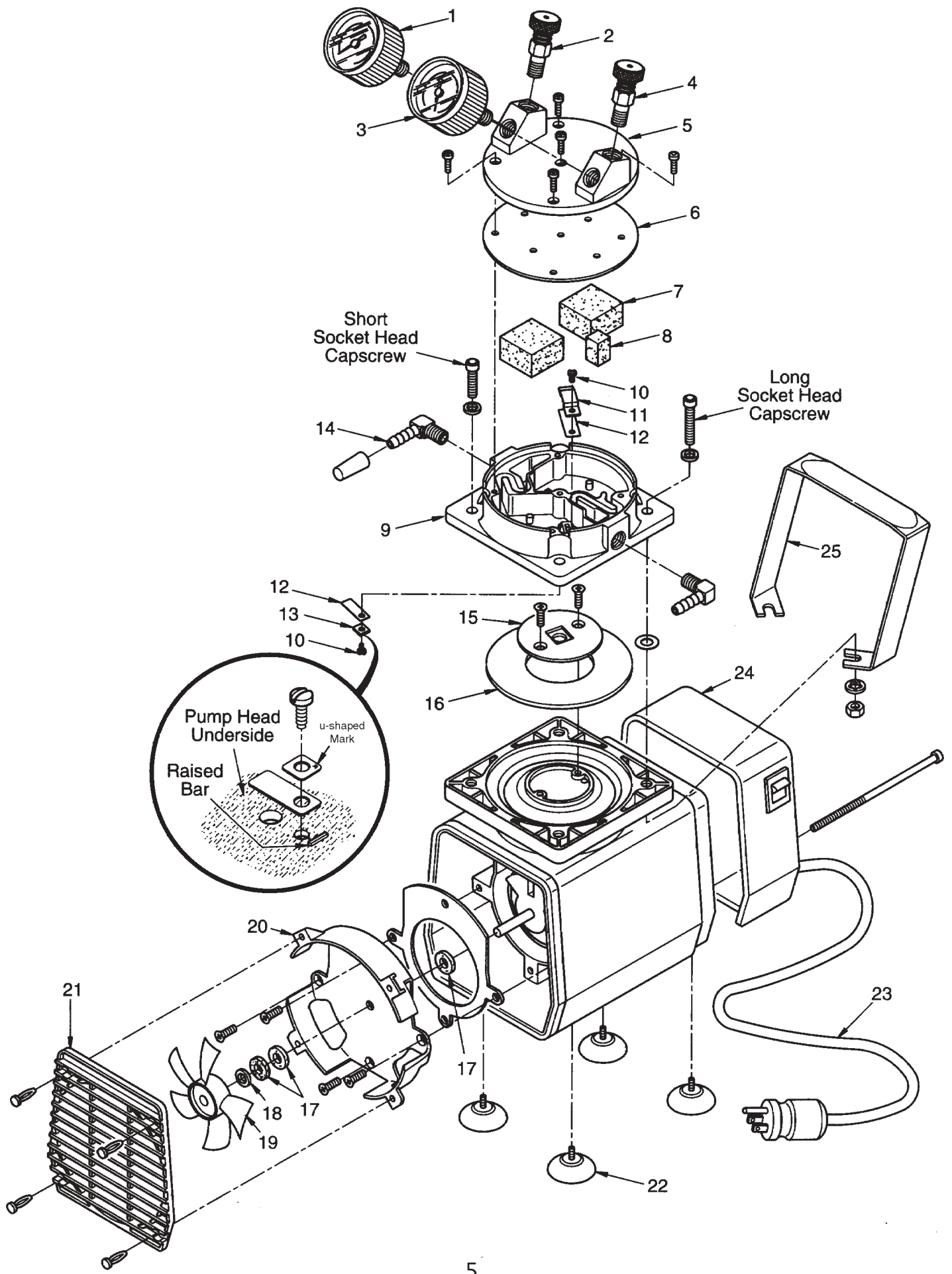
* Denotes parts included in Service Kit.

When corresponding or ordering parts, please give complete model and serial numbers.

Gast reserves the right to change part numbers without notice.

TROUBLESHOOTING GUIDE

| Possible Reason | Pressure | | Vacuum | | Excessive Noise | Over-heating | Won't Start |
|-------------------------|----------|------|--------|------|-----------------|--------------|-------------|
| | Low | High | Low | High | | | |
| Dirty Filter | X | | X | X | | X | |
| Dirty Muffler | X | | X | X | | X | |
| Dirty Valves | X | | X | X | X | X | |
| Bent Valves | X | | X | X | | | |
| Low Voltage | X | | X | X | | X | X |
| Wrong Voltage | | | | | | X | X |
| Regulators Set Too High | | X | X | | | X | |
| Regulators Set Too Low | X | | | X | | | |



YOUR 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.

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