

# air info

Information on  
Pneumatic Technology  
Volume XXVII

## New miniature diaphragm pump developed for specialized portable applications

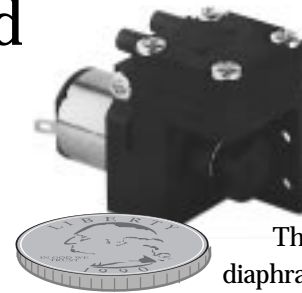
In response to the demand for even smaller diaphragm pumps, Gast is now introducing another decrease in size—the new 2D miniature diaphragm pump. It's the smallest offering yet in the Gast family of miniature oilless diaphragm pumps that already includes the 15D, the 10D, and the 5D.

Weighing slightly more than half an ounce, the new pump is just over 1-1/4 inches long, less than 3/4 inch wide, and slightly more than an inch tall. Yet it is capable of delivering pressure as high as 4.5 psi (0.31 bar) or vacuum to 10 inches of mercury (675 mbar). Open air flow is rated at 0.5 liter per minute.

Designed for portable, personal applications, the 2D diaphragm pump is specifically targeted at the air sampling and gas detection markets. It also serves a wide variety of medical applications as well, including blood pressure cuffs and prosthetic attachments.

Smaller than the 5D, the new pump is ideally suited for specialized applications where the full pressure or vacuum output of the 5D pump is not required. Due to the 2D's small size and highly efficient motor, its amp draw is lower so it can run for a longer period of time on a single set of batteries.

*The 5D, 10D, and 15D  
miniature diaphragm  
pumps*



*The 2D miniature  
diaphragm pump  
(shown actual size)*

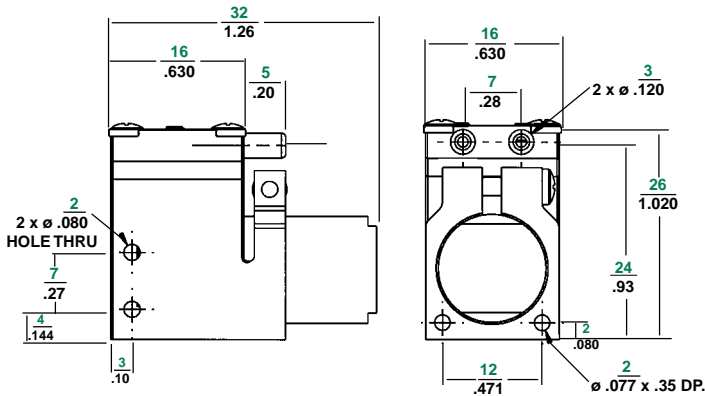
The pump valve and diaphragm are made from an ethylene propylene diene monomer (EPDM) elastomer, which provides excellent resistance to most chemicals. Its head and valve plate are fabricated from polyphenylene sulfide

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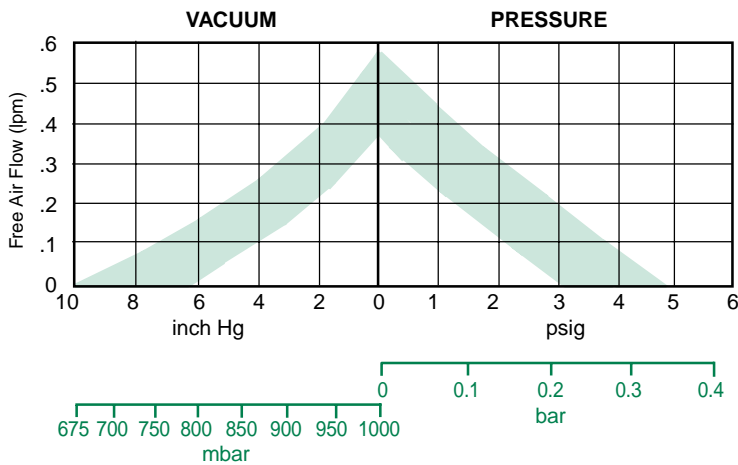
# Miniature diaphragm pump continued from cover

## Product Dimensions (mm) (inches)



## Product Performance (Metric, U.S.)

Note: The performance on 2D models is based on technical data and test results of nominal units.



Shaded area represents performance capabilities. To achieve a specific performance within this range, please consult factory for customized model.

## Product Specifications

Model Number	Nominal Operating Voltage	Milliamps at Nominal Voltage	Potential Operating Voltage Range	Material	Net Wt.	
					oz	g
2D1-101-KDV	4.5V DC	30-70	3-5V DC	EPDM diaphragm and valve	.56	16
2D1-101-KFV	6V DC	25-45	5-7V DC	EPDM diaphragm and valve	.56	16

(PPS), which is inert to most chemicals and provides good dimensional stability.

Three stroke options (0.030 inch, 0.034 inch, and 0.040 inch) and operational voltages between 1.5 and 12 volts provide a wide range of performance capabilities for customers to choose from. The new pump can be mounted in any plane, and

the head can be rotated to any of four 90-degree positions on the pump.

The 2D utilizes two basic motor types: brush-type ironless core and brush-type iron core. These motor options will provide customers with the flexibility to choose a pump with the characteristics (performance, efficiency, life, cost) that meet their

requirements. Brushless DC motors are also being evaluated, and this option may become available in the future if there is sufficient interest from potential buyers.

For more information about the new 2D miniature diaphragm pump, circle **1** on the Gast Fax Facts card. ■

# New single-stage blower

combines increased pressure  
and vacuum capabilities with higher  
free air flow

Gast is pleased to announce another addition to the REGENAIR® regenerative blower product line. The new R4M3090A is a single-stage blower designed for high-volume vacuum or compressed air applications.

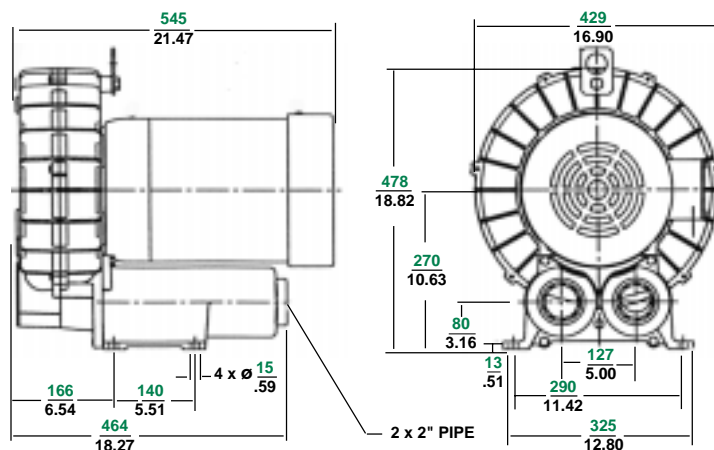
Due to its regenerative design, the new blower's vacuum and pressure capabilities are comparable with those of a two-stage blower, yet it still provides the greater free air flow capacity of a single-stage blower. The R4M generates pressure up to 6.14 psi (170 inches H<sub>2</sub>O) and produces a vacuum level of 10 inches Hg (136 inches H<sub>2</sub>O). It also has a free air flow capability of 252 cfm.



Regenerative blowers provide continuous, pulse-free air flow and oilless operation. They also offer longer life and quieter operation than positive displacement blowers. The new R4M blower is well-suited for applications requiring clean, fresh air at pressure, such as aeration in a cleaning bath. The R4M can also be used

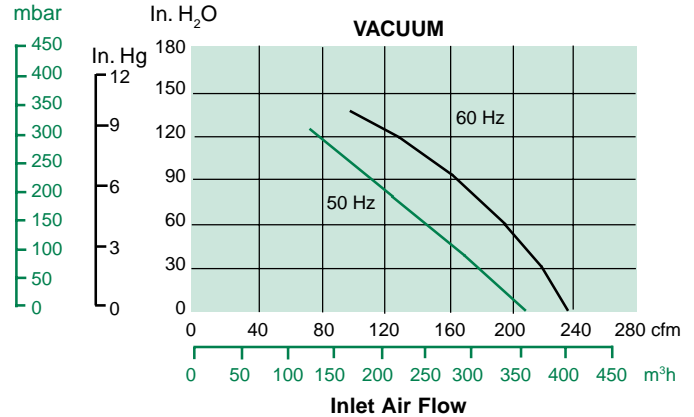
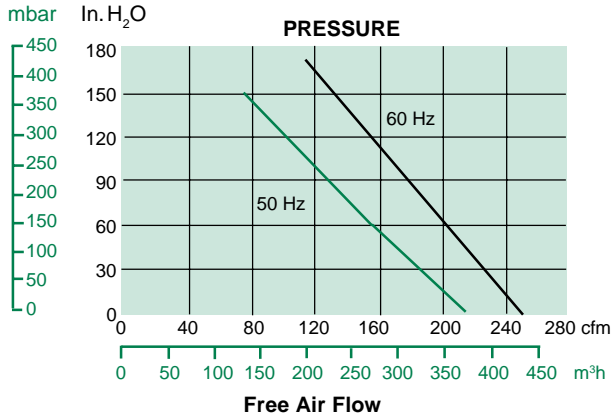
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**Product Dimensions (mm) (inches)**



# regenerative blower continued

## Product Performance



Pressure vs. Air Temp Rise Over Ambient (°F)

In. H <sub>2</sub> O	60 Hz	50 Hz
0	16	12
25	27	24
50	42	39
75	59	59
100	81	83
125	103	117
150	133	164
170	169	—

Pressure vs. K Watts Input

In. H <sub>2</sub> O	60 Hz	50 Hz
0	2.2	1.4
25	3.0	2.0
50	3.7	2.6
75	4.6	3.3
100	5.5	4.1
125	6.3	4.8
150	7.1	5.5
170	7.8	—

Vacuum vs. Air Temperature Rise (°F)

In. H <sub>2</sub> O	60 Hz	50 Hz
0	15	10
20	25	19
40	37	31
60	51	53
80	74	76
100	103	116
120	184	179
135	200	—

Vacuum vs. K Watts Input

In. H <sub>2</sub> O	60 Hz	50 Hz
0	2.0	1.2
20	2.5	1.7
40	3.0	2.1
60	3.6	2.7
80	4.3	3.2
100	4.9	3.8
120	5.5	4.4
135	6.1	—

## Product Specifications *Recommended NEMA starter size for motor — 1/1.*

Model Number	Motor Specs	Full Load Amps	Locked Rotor Amps	HP	KW	RPM	Max Vac.			Max Press.		Max Flow		Net Wt.	
							In. Hg	In. H <sub>2</sub> O	mbar	In. H <sub>2</sub> O	mbar	cfm	m³/h	lbs	kg
R4M3090A	208-230/460-60-3	24-22.2/11.1	105 @ 460V	9	6.75	3500	10	136	339	170	423	252	428	198	90
	190-220/380-440-50-3	19.8-18.5/9.9-9.3		7	5.25	2850	9.2	125	311	150	374	217	369		

for vacuum applications, such as central vacuum systems or pick-and-place units.

The blower utilizes a three-phase, dual frequency, totally enclosed fan cooled (TEFC) motor. When operating at 60 Hz, it is rated at 9 horsepower. The motor is UL listed and CSA certified, and it features permanently sealed ball bearings.

The R4M is suitable for use in outdoor environments: the enclosure is IP54 compliant, and the unit features Class F insulation. The housing and moving parts are made from corrosion-resistant cast aluminum, and the blower can be mounted in any plane.

A full range of accessories is offered for the R4M, including

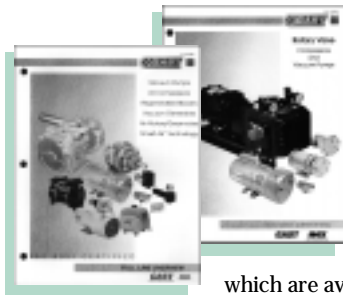
vacuum and pressure gauges, an in-line filter, a vacuum relief valve, and an external muffler. For more information on the new R4M regenerative blower, circle **2** on the Gast Fax Facts card. ■

# lit<sub>erature</sub>

## Full-line overview catalog

Perhaps you are familiar with one or a handful of Gast products. Did you know that Gast manufactures more than 100 basic pneumatic product lines, including vacuum pumps, compressors, air motors, gear-motors, vacuum generators, and regenerative blowers? This information-filled summary catalog shows the full extent of Gast's product offerings and provides data and charts that allow you to compare the operating characteristics and applications for each type. Includes complete global listings of Gast representatives, distributors, and sales offices.

For a copy of the full-line overview catalog, circle **3** on the Gast Fax Facts card.



large graphic arts models. Gast rotary vane pumps and compressors are offered in oilless, lubricated, motor mounted, and separate drive styles. Lab models and special purpose units for applications such as soil sparging are also included in the catalog.

Just circle **4** on the Gast Fax Facts card.

## Rotary vane pump catalog

A revised 40-page catalog describes Gast's entire line of rotary vane air compressors and vacuum pumps,

which are available in a wide range of sizes from miniatures to



## Miniature pump catalog

Gast also offers a catalog specifically devoted to our line of miniature compressors and vacuum pumps. The 5D, 10D, 15D, and 22D miniature diaphragm pumps are all described in the catalog, as well as the 0332 series miniature rotary vane pumps, and the 8R and 55R series rocking piston pumps. The catalog includes performance information and describes the available motor options for each

product. Additional information includes product features, dimensions, and materials of construction.

For a free copy of this miniature pump catalog, circle **5** on the Gast Fax Facts card.

# Gast **fax** facts

Volume **XXVII**

For more information on any of the products featured in **airinfo** fill out this form and fax it to **1-800-771-8349**. Include your fax number and we'll fax back the information you need within 24 hours. Or if it's too extensive for faxing, we'll mail it to you immediately.

### Application data

This is for:

- a new application
- a replacement unit
- an OEM application

application \_\_\_\_\_

pressure/vacuum required \_\_\_\_\_

flow required \_\_\_\_\_

size constraints? \_\_\_\_\_

ambient temperature \_\_\_\_\_

special considerations? (explosion proof, corrosion resistant...) \_\_\_\_\_

if replacement, what's being used now? \_\_\_\_\_

additional comments: \_\_\_\_\_

\_\_\_\_\_

Date \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ ZIP \_\_\_\_\_

Phone(\_\_\_\_\_) \_\_\_\_\_

Fax(\_\_\_\_\_) \_\_\_\_\_

E-mail \_\_\_\_\_

Send information on the following products:

**1 2 3 4 5 6 7 8**

my need is current

have technical rep call

send the name of my nearest dealer

My company's major product or service is:

\_\_\_\_\_

\_\_\_\_\_

Please add my colleague's name to the **airinfo**

mailing list:

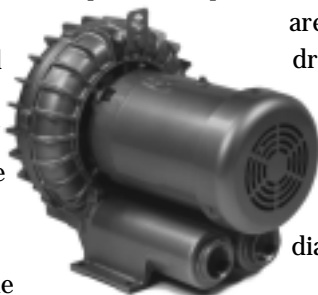
Name \_\_\_\_\_

Title \_\_\_\_\_

## Two-stage regenerative blower

The new R4H two-stage regenerative blower produces 13.5 inches Hg (183 inches H<sub>2</sub>O) of vacuum, and the -1 version creates a vacuum level of 15 inches Hg (204 inches H<sub>2</sub>O). The new blower also creates pressure up to 10.25 psi (284 inches H<sub>2</sub>O), and it has a free air flow capability of 128 cfm. Because the R4H is a two-stage blower, air travels around the motor side of the impeller, crosses over, and then travels around the cover side of the impeller before being discharged. This creates higher pressure and vacuum levels with a single impeller.

For more information on the new R4H regenerative blower, circle number **6** on the Gast Fax Facts card.



## More double diaphragm pumps

The DDL series of double diaphragm linear pumps offers free air flow ranging from 0.39 cfm to 8.6 cfm (11 to 244 lpm) with pressure to 10.5 psi (0.72 bar) and vacuum to 12.1 inches Hg (603 mbar). Linear pumps are operated by an electromagnetic driving force linked directly to the diaphragms. Consequently, DDL pumps have extended operating lives, are more efficient, and have reduced vibration and noise. Double diaphragm pumps are typically used in applications as diverse as medical instruments, wastewater treatment, and automotive emission test equipment.



For more information on Gast's expanded line of DDL pumps, circle **7** on the Gast Fax Facts card.

## Miniature diaphragm pump

Slightly larger than the new 2D miniature diaphragm pump, the 5D is a small, quiet source of moderate vacuum or pressure. The 5D delivers up to 12.5 inches Hg of vacuum or 8.5 psi pressure, yet it weighs just 1-1/2 ounces. Open air flow for the 5D is rated slightly below 1 liter per minute. The pump is less than 1-1/2 inches tall, less than 1 inch wide, and less than 1-3/4 inches long. Three DC voltage options (4, 6, or 12 volt) are available for the pump.



To receive information on the 5D series oilless miniature diaphragm pump, circle number **8** on the Gast Fax Facts card.

# GAST

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