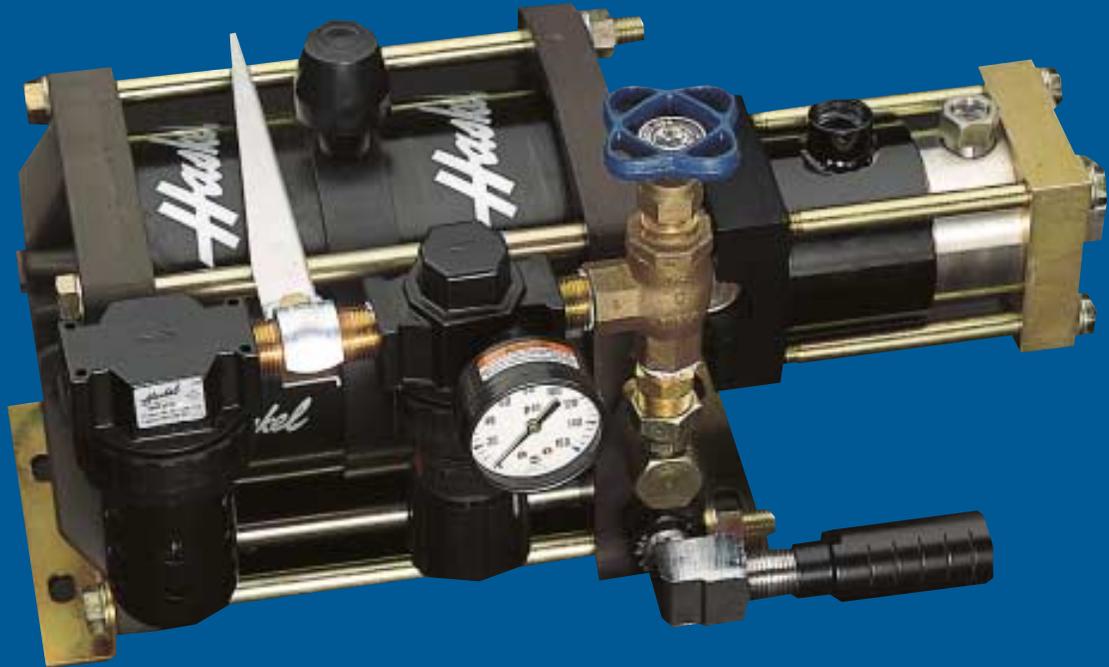


Haskel[®]
INTERNATIONAL, INC.



Haskel ALG Series Liquefied Gas Pumps

OUR PRODUCTS ARE BACKED BY OUTSTANDING TECHNICAL SUPPORT, AN
EXCELLENT REPUTATION FOR RELIABILITY AND WORLDWIDE DISTRIBUTION





Worldwide Distribution

Haskel International, Inc. has over 50 years of hydraulic and pneumatic engineering experience in the design and manufacture of their liquid and gas pumps.

Located in Burbank, California, USA with a further manufacturing plant in Sunderland, U.K., the company also has strategically placed offices and dedicated distributors throughout Europe, Asia, Pacific Rim and the Americas.

Haskel’s range of air driven liquefied gas pumps now offers the most complete range of pneumatic pump models in this industry, whether measured by ultimate pressure, flow or output horsepower capability; or by the variety of liquefied gases with which they are compatible.

Continuous investment in the most modern machinery and technology ensures that Haskel will remain the leader in this field.

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Haskel Liquefied Gas Pumps

Haskel's range of Air Driven Liquefied Gas Pumps offers complete flexibility for your liquefied gas pumping needs. A wide range of sizes provide flow rates as high as 25 lbs/min and develops output pressures up to 10,000 psi.

These features, coupled with the ability to boost most common liquefied gases, make Haskel Air Driven Liquefied Gas Pumps the preferred solution for a wide cross section of applications.

The key design elements incorporated in this range are based on the Haskel technology that has been successfully utilized for over thirty years. This technology has been combined with industry specifications in order to provide optimum liquefied gas pump performance.

This brochure details the standard range of Haskel Air Driven Liquefied Gas Pumps. Additionally, fully engineered, custom designed systems are available from Haskel, the quality high pressure technology company.

Features and Benefits

- **Comprehensive Range**

Provides solutions for applications requiring low to high pressure ratios and a wide range of performance.

- **Cooling**

No need for feed pumps or expensive cooling in most applications. Reduces heat transfer from drive section to pumping section.

- **Reliability**

Simple, efficient design based on over 50 years of experience in liquid/gas applications. Easy service and maintenance.

- **Full Insulation**

Reduces heat transfer from drive section to pump section.

- **Efficient**

Transfers and compresses large volumes of liquefied gas at high supply and discharge pressures. Minimizes unswept volume and improves tolerance to flashing. Improves pumping efficiency and promotes self flushing of vapor pockets.

- **Priming**

Ability to stop/start without bypass circuit and rapid reprime capability, without losing downstream pressure.

- **Economical**

Ability to pump in liquefied condition provides substantial economic benefits over alternative "gas" transfer.

ALG Series Technical & Performance Data

CO ₂ DATA								
Pump	ALG-8	ALG-15	ALG-32	ALG-60	ALG-122	8ALG-25	8ALG-52	8ALG-100
cu in per cy	9.05	2.70	2.70	0.67	0.67	14.00	14.00	3.52
cpm max	40	40	40	40	40	30	30	30
rated cipm	308	92	92	23	23	357	357	90
cu.ft./min	0.178	0.053	0.053	0.013	0.013	0.207	0.207	0.052
Lb./min*	11.3	3.4	3.4	0.8	0.8	13.2	13.2	3.3
Lb./hr.*	680	203	203	50	50	790	790	199
Ratio	8	15	30	60	120	25	50	100
Max Drive	150	150	150	150	150	130	130	130
Max Press	1200	2250	4500	9000	15000	3550	6800	10000

* Based on CO₂ @ 0 degrees F, 305 psig, 85% vol. eff.

Note: Based on density of CO₂ @ 0 degrees F, 305.5 psig, 63.7 lb/cu ft.
@ 70 degrees F, 0853 psia, 43.35 lb/cu ft.

System Considerations When Pumping CO₂

CO₂ is a liquefied gas and needs specific system considerations in order to be pumped efficiently as a liquid. Typically CO₂ is delivered as a liquid at 200 psig @ -20 deg. F or 300 psig @ 0 deg. F. Haskel CO₂ pumps will accept inlet pressures up to the maximum rated outlet pressure of pump. Cooling jackets are designed for 800 psig max. Haskel does not recommend routing outlet CO₂ from the pump through the cooling jacket.

All Haskel ALG series pumps are designed to increase tolerance to “flashing” inside the pump. For maximum reliability, it is recommended that the inlet piping be designed with a minimum of 1 meter (H₂O) positive NPSHA at pump inlet. Line sizes should be at least as large as the inlet to the pump. It should not be assumed that if in-plant CO₂ is available at 300 psig that the piping is sized properly for temperature insulation and pressure drop.

Caution should also be taken to maintain proper temperatures of CO₂ from the tank supply to the pump inlet. Proper insulation of the inlet pipe and pump body is mandatory for good efficient pump rates. Please consult factory if uncertain of the piping design.

Haskel ALG series single acting pumps use a 3-way cycling spool allowing the pump piston to be returned by the positive pressure of inlet CO₂. This eliminates “suction” inside the pump cavity. This allows the pump to run at maximum speed while minimizing any tendency to “flash” to a gas state, which would reduce pumping efficiencies.

In order to avoid excessive heating effects, Haskel recommends sizing single acting pumps (ALG-8, ALG-15, ALG-32, ALG-60, ALG-122) to limit the maximum cycle rate to 40 cpm. Double acting models should be limited to 30 cpm max.

There are two methods of cooling the pump body. One method is use of a “chiller” with a water glycol solution. The chiller should be designed with a minimum of 3 gpm and adequate BTU/hour rating.

The other method of cooling is to route the “inlet CO₂” through the cooling jacket of the pump. Using CO₂ for the coolant requires a recirculation pump to feed the Haskel ALG pump and the cooling circuit. Please consult the factory for recommendations. The recirculation pump should provide approximately 40 - 70 psig lift for transferring the CO₂ through the jackets and back to tank. This pump should be located as close to the CO₂ tank as possible with care taken to maintain the line sizes and insulation. Again, please consult the factory if uncertain of circuitry necessary.

Typical Applications

In recent years, there has been an increased demand for liquefied gases within many industries. Some liquefied gases such as Carbon Dioxide (CO₂) are now commonly used in applications that previously utilized halocarbons such as Halon, Freon, etc.

The ALG Series described in this catalog is utilized throughout many industries for such applications as supercritical (dense phase) extraction, plastic and foam manufacture and fire protection.

In addition to supplying bare pumps, Haskel also specializes in the design and manufacture of custom system solutions.

For further information or assistance on your requirements, please contact your nearest Haskel facility (*see back cover*).

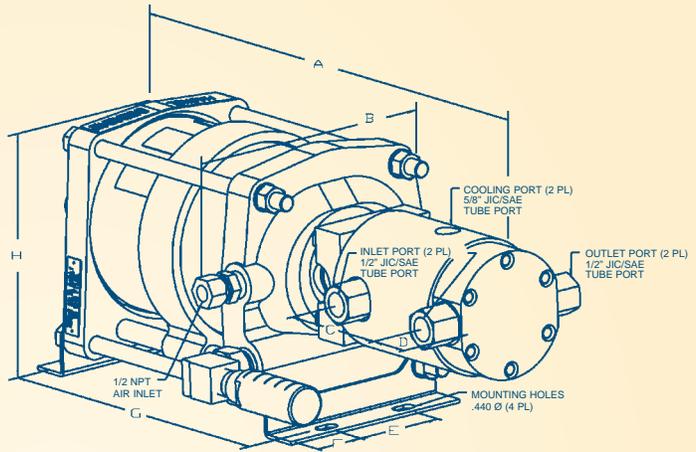
Plastics/Foam	Polymer Production Blowing Agents Foam Expansion
Food/Drink	Carbonation in Soft Drinks Supercritical Extraction (caffeine, tobacco)
Fire Protection.....	Fire Extinguishers Gas Blanketing Halon Recovery
General Industry.....	Welding, Laser Cutting Dry Cleaning Chilling
Gas Producers	Bulk Transfer
Construction	Impregnation (concrete/ceramics)
Oil/Gas & Petroleum Industry	Fractionation Extraction Processing



ALG Series Dimensional Data

ALG-8 P/N 85000

A	17.9
B	9.1
C	2.156
D	2.26
E	3.0
F	1.78
G	11.2
H	7.8

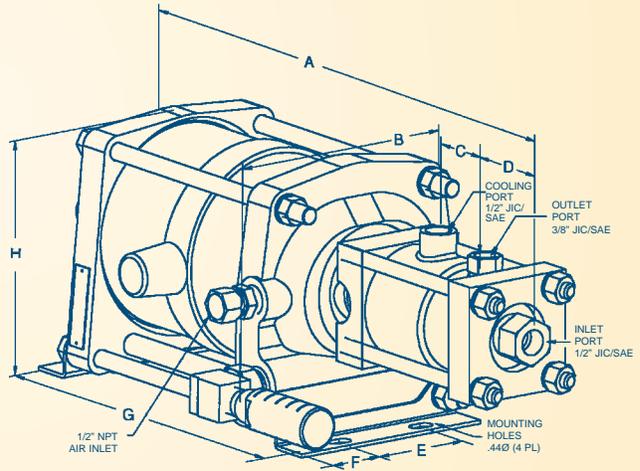


ALG-32 P/N 85002

A	19.5
B	9.5
C	2.0
D	3.6
E	3.0
F	1.8
G	11.2
H	7.8

ALG-122 P/N 85004

A	18.0
B	9.5
C	2.0
D	2.3
E	3.0
F	1.8
G	11.2
H	7.8

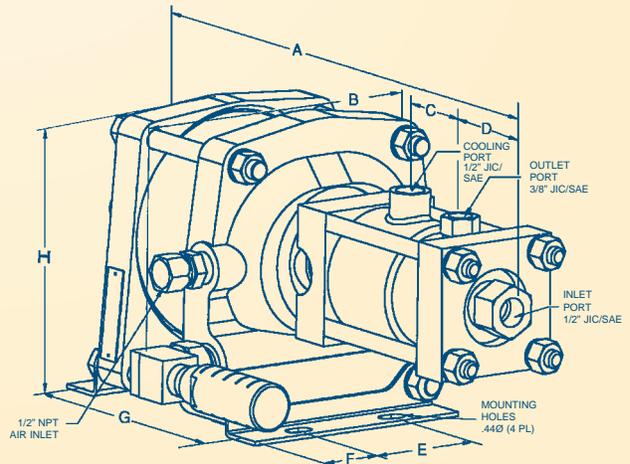


ALG-15 P/N 85001

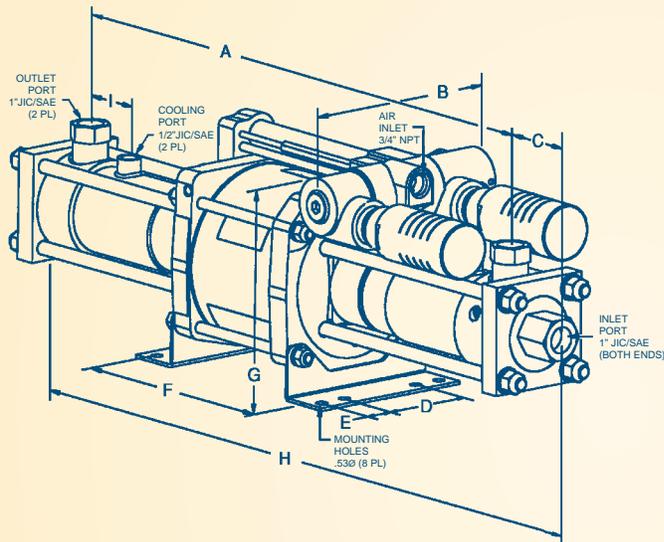
A	15.3
B	9.5
C	2.0
D	3.6
E	3.0
F	1.8
G	7.0
H	7.8

ALG-60 P/N 85003

A	14.0
B	9.5
C	2.0
D	2.3
E	3.0
F	1.8
G	7.0
H	7.8



8ALG Series Dimensional Data

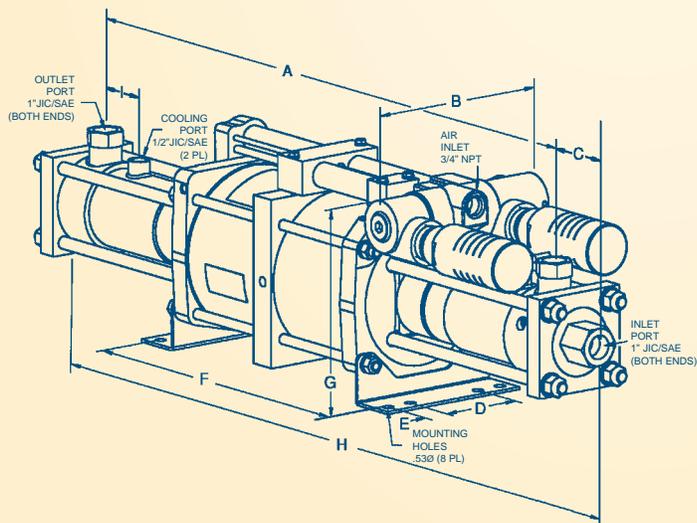


8ALG-25 P/N 85041

A	29.0
B	9.5
C	3.5
D	4.3
E	1.4
F	11.4
G	11.0
H	36.0
I	2.6

8ALG-100 P/N 50480

A	34.5
B	9.5
C	3.2
D	4.3
E	1.4
F	11.4
G	11.0
H	41.0
I	4.8



8ALG-52 P/N 50690

A	35.6
B	9.8
C	3.5
D	4.3
E	1.4
F	18.1
G	11.0
H	42.6
I	2.6



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