LB Compressor Series

RECIPROCATING GAS COMPRESSORS | PRODUCT BROCHURE



PSG a DOVER company

Blackmer®

Where Innovation Flows



SUPERIOR PERFORMANCE & RELIABILITY

Blackmer® LB Series Reciprocating Gas Compressors

Oil-Free Gas Compressors for Liquid Transfer and Vapor Recovery



LB601

Blackmer oil-free gas compressors deliver high efficiency in handling LPG (including propane and butane), and anhydrous ammonia. The LB Series Reciprocating Gas Compressors are ideal for railcar, storage, and truck vessel unloading in addition to associated vapor recovery applications. The single-stage reciprocating gas compressors are designed to give maximum performance and reliability under the most severe service conditions. All LB Compressors are equipped with a ductile iron head and cylinder providing greater resistance to both thermal and mechanical shock. Additionally, the entire interior of the crankcase is coated, with a specially formulated epoxy coating, providing an added layer of protection for the compressor

Equipped with high-efficiency valves, heavy-duty pistons, self-adjusting piston rod seals and other robust features, the LB Series Compressors are designed for quiet efficient operation and ease of maintenance, with all components readily accessible for simple, quick, and easy replacement.

Models are available with liquid transfer delivery rates up 680 gpm (2,575 L/min) and piston displacement capacities from 7 to 125 cfm (11.9 to 212 m^3/h) with working pressure up to 350 psi (24.13 bar).

SUPERIOR MATERIALS OF CONSTRUCTION

With a special epoxy coating that protects the entire interior of the crankcase, and with numerous durable and robust components like high-efficiency valves, heavy-duty pistons, self-adjusting piston rod seals, wear-resistant crosshead assemblies, among others, the LB Series Gas Compressors are built to last in the harshest conditions.

SUPERIOR DESIGN

Designed so that components are readily accessible, LB Compressors make routine maintenance and replacement of wear parts simple, quick and easy.



High-Efficiency Valves Move More Gas Volume

Blackmer valves are specifically designed for non-lubricated gas applications. With precisely engineered clearances, spring tension, and a special finish, these valves seat more positively so more gas is moved with each piston stroke. Blackmer valves offer greater strength, quiet operation, and long life.

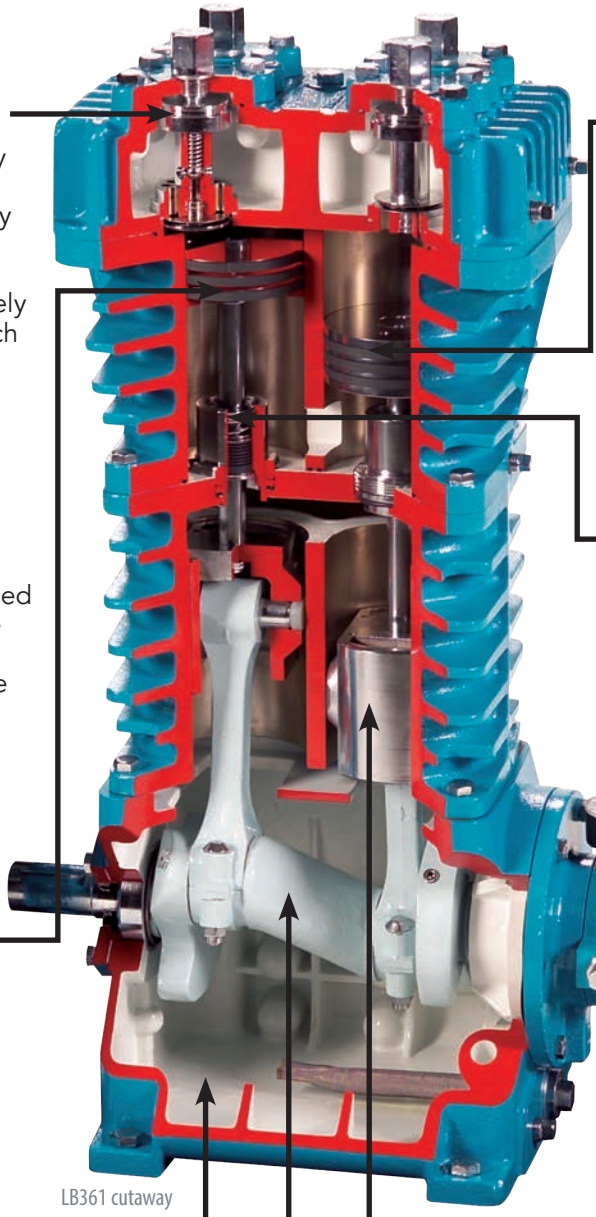
O-ring Seals: Head And Cylinder

The head and cylinder are sealed with O-rings to ensure positive sealing under all operating conditions, eliminating leakage and maintenance problems.



Pressure Assisted Piston Rings For Positive Seating

Constructed of self-lubricating PTFE, the special piston ring design provides maximum sealing efficiency with minimal friction wear, resulting in peak performance and extended compressor service life.



LB361 cutaway



Heavy-Duty Pistons

The one-piece, heavy-duty pistons are connected with a single positive locking nut. The pistons are stronger and simpler than multi-piece designs with numerous fasteners which eliminates potential problems.

Self-Adjusting Piston Rod Seals

Crankcase oil contamination and cylinder blow-by are prevented with loaded glass filled PTFE seals which maintain a constant sealing pressure around the piston rods.

Ductile Iron Construction

All pressure parts are made of ductile iron for greater resistance to both thermal and mechanical shock, and provides more corrosion resistance.



Special Epoxy Coating

The entire interior of the crankcase is coated with a specially formulated epoxy coating, providing an added layer of protection.

Heavy-Duty Crankshaft

The ductile iron crankshaft is precision ground with integral counterweights for smooth, quiet operation. Rifle drilling ensures positive oil distribution to the wrist pin and connecting rod bearings.

Wear-Resistant Crosshead Assemblies

The ductile iron crossheads are designed for maximum lubrication and wear resistance.

Multiple Seal Options

For applications that require maximum leakage control, double piston rod seals and a distance piece chamber are available for all Blackmer LB Compressors.

Pressure Lubricated Bearings

A rotary oil pump provides positive oil distribution to all running gear components for long life and minimal wear.

LB Compressor Series | Standard Features

Special Epoxy Coating
The entire interior of the crankcase is coated with a specially formulated epoxy coating, providing an added layer of protection.

Ductile Iron Cylinder and Head
Ductile iron is stronger, much more resistant to thermal shock, and more corrosion resistant than ordinary cast iron.

O-Ring Seals Between the Cylinder and Head
O-rings in place of flat gaskets eliminate leakage and maintenance problems.

High Efficiency Valves
Designed to move more gas volume, Blackmer high efficiency steel valves are built for toughness and simplicity. Constructed of corrosion resistant stainless steel discs and springs, the valves are easily removed for service without disturbing the piping. With their simple design they are easily repaired and reassembled.

One Piece Piston with Single Positive Locking Nut
The one-piece heavy-duty piston and single positive locking nut are both stronger and simpler than multi-piece designs with numerous fasteners found on competitor's equipment. The LB940 Series features a two-piece piston design.

Pressure Assisted PTFE Piston Rings for Positive Sealing
A special chamber ensures pressure behind the ring to provide maximum sealing efficiency with minimal friction wear.

No Packing Adjustment Nut
The Blackmer spring loaded packing never requires adjustment. No expensive scored rods due to over tightened packing.

Wear Resistant Crosshead Assemblies
The ductile iron crossheads feature special machined lubrication channels and ports to provide extensive lubrication of the crosshead and guide. Wear is minimized and galling is eliminated.

Pressure Lubricated Crankcase
An oil pump directly driven by the crankshaft ensures positive lubrication of all bearing surfaces. The oil pump is self-reversing for either direction of rotation and is available with an external automotive type oil filter for extra protection.

Forged Steel Fittings are Standard on all "TU" and "LU" Mountings
All tees, ells, and crosses used in Blackmer Compressor piping assemblies are forged steel (2000# or better).

Standard Liquid Traps are Repairable and Easily Upgraded
The trap may be easily opened for inspection and cleaning of the interior and replacement of the stainless steel float. Every trap includes a 1½" NPT opening for a high liquid level switch which can be added at any time.

14 Gauge Steel Belt Guard on all Mounted Units
Complete with a support brace, the heavy gauge guard is extremely strong yet can be removed for easy access to the V-belts.

Oversized Main Bearings
Crankshaft main bearings on Blackmer Compressors are oversized, ensuring long life and durability. These bearings will not need to be replaced during the compressor's service life.



BLACKMER® LB COMPRESSORS

LB080 Series | LB081, LB082

The smallest LB Compressor available. This compact compressor features one cylinder and is well suited for portable use, small vessel unloading, and vapor recovery applications. The LB080 Series has a flow rate of 8.45 CFM (14.35 m^3/hr) at 825 rpm.

LB080 Series Technical Data:

Bore	3" (76.2 mm)
Stroke	2.5" (63.5 mm)
Piston Displacement @ 825 rpm	8.45 CFM (14.35 m^3/hr)
Max. Power	5 BHP (4 kW)
Inlet/Outlet Connections	0.75" NPT

LB081 - Top End Repair Kit - 791129
LB081 - Intermediate Repair Kit - 791130



LB081

LB160 Series | LB161, LB162

Slightly larger than the LB080 series, the LB160 Series is a two-cylinder compressor that features higher flow rates of 16.9 CFM (28.7 m^3/hr) at 825 rpm.

LB160 Series Technical Data:

Bore	3" (76.2 mm)
Stroke	2.5" (63.5 mm)
Piston Displacement @ 825 rpm	16.9 CFM (28.7 m^3/hr)
Max. Power	7.5 BHP (6 kW)
Inlet/Outlet Connections	0.75" NPT

LB161 - Top End Repair Kit - 792229
LB161 - Intermediate Repair Kit - 792230





BLACKMER® LB COMPRESSORS

LB360 Series | LB361, LB362

The LB360 Series two-cylinder compressor provides flow rates of 36 CFM (61.2 m^3/hr) at 825 rpm.

LB360 Series Technical Data:

Bore	4" (101.6 mm)
Stroke	3" (76.2 mm)
Piston Displacement @ 825 rpm	36 CFM (61.2 m^3/hr)
Max. Power	15 BHP (11 kW)
Inlet/Outlet Connections	1.25" NPT

LB361 - Top End Repair Kit - 793229
LB361 - Intermediate Repair Kit - 793230



LB361

LB600 Series | LB601, LB602

As one of the larger LB models, the LB600 Series is a two-cylinder compressor that offers flow rates of 64.2 CFM (107.9 m3/hr) at 825 rpm. Additionally, LB600 Series Compressors are equipped with special features not available on smaller units:

- The S3R oil control seal, only available in the LB602, keeps oil in the crankcase and prevents oil migration within the compressor
- Special needle bearings designed for full load capability

LB600 Series Technical Data:

Bore	4.625" (117.4 mm)
Stroke	4" (101.6 mm)
Piston Displacement @ 825 rpm	64.2 CFM (107.9 m^3/hr)
Max. Power	40 BHP (30 kW)
Inlet/Outlet Connections	2" NPT inlet/1.5" NPT outlet

LB601 - Top End Repair Kit - 794237
LB601 - Intermediate Repair Kit - 794238



LB601



LB940 Series | LB942, LB943



LB943

Equipped with two double-acting cylinders, the LB940 Series compressors provide high volume fluid transfer and gas compression for large applications from barges, ships, and railcars. They offer high flow rates of 125.2 CFM (212 m^3/hr) at 825 rpm. These high-capacity compressors are also equipped with thick and robust wear parts – piston rings, wrist pins, needle bearings and valves that will keep the compressor operating over longer periods between maintenance cycles than the competition. LB940 Series Compressors have numerous other construction, component, and design advantages not found on competitive units.

SUPERIOR MATERIALS OF CONSTRUCTION

Constructed with materials that won't degrade when exposed to harsh gases, the LB940 Compressors reliably operate in demanding applications.

- PEEK valve plates with option for all stainless steel
- Stainless steel suction valve unloaders
- No yellow metals
- Steel wrist pin needle bearings

SUPERIOR WEARING COMPONENTS

Blackmer LB940 Series Compressor wear components are built to last, providing you with peak performance and extended service life.

- Oversize piston rings for longer life
- Wrist pin needle bearing for even loading
- Oversize main bearings

SUPERIOR DESIGN

Designed for simplicity, Blackmer LB940 Series Compressors make routine maintenance and replacement of wear parts simple, quick, and easy.

- Oversize valves for improved gas flow
- One piece piston with single lock nut
- Full load capability with needle bearings
- S3R oil control seal keeps oil in the crankcase and prevents oil migration within the compressor

LB940 Series Technical Data:

Bore	4 5/8" (101.6 mm)
Stroke	4" (101.6 mm)
Piston Displacement @ 825 rpm	125.2 CFM (212 m^3/hr)
Max. Power	50 BHP (37 kW)
Inlet/Outlet Connections	2" ANSI 300#



BLACKMER® LB COMPRESSORS

LB Compressors | Applications

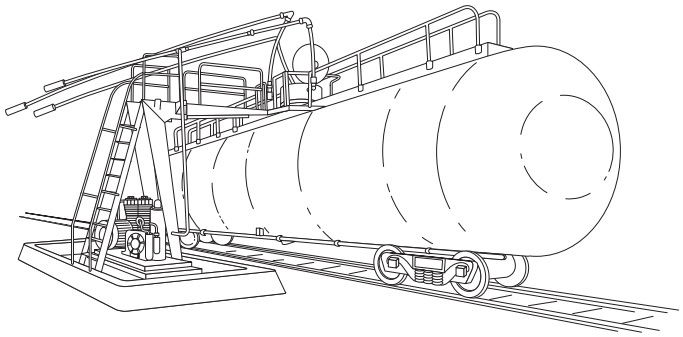
Blackmer LB Compressors may be used in many industries and in many situations. In general, most LPG and anhydrous ammonia applications will fall into two categories:

Liquefied Gas Transfer:

Many liquid transfer applications can be handled more efficiently with a reciprocating gas compressor than a pump. Compressors are especially well-suited for liquefied gas transfer in situations where system piping restricts flow and may cause a pump to cavitate.

The most common application of this technique is the unloading of LPG and anhydrous ammonia from railcars into stationary storage vessels or other situations that require an initial lift to the liquid. Compressors can also be used for general liquid transfer in a plant, such as storage tank to transport or bulk truck, and back to a storage tank.

After the liquid has been pushed out of the vessel, a vapor recovery operation is often performed.



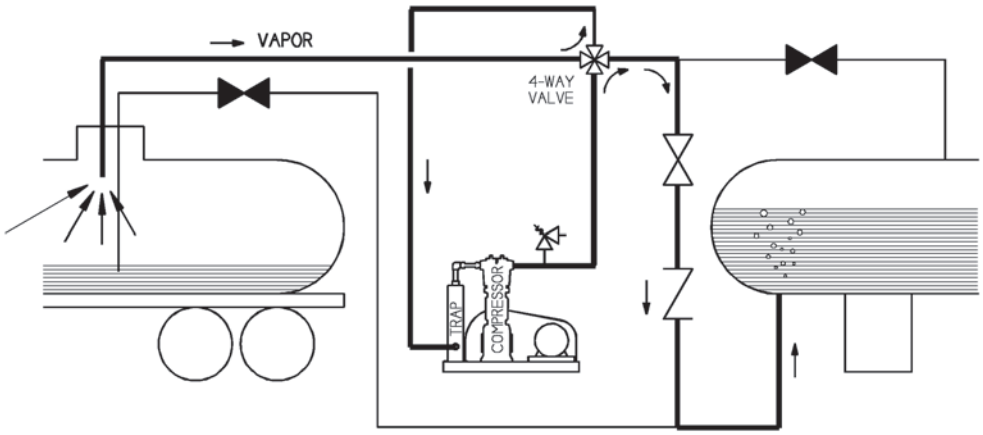
Tank car vapor recovery system

Vapor Recovery:

When the liquid transfer phase has been completed, a significant amount of product in both liquid and vapor form is left in the vessel, often 3% or more of the vessel's capacity.

Recovery of the leftover gas or liquid is vital for environmental, safety and economic considerations and can be done easily with a reciprocating gas compressor. By adjusting a valve, the pressure reduces in the supply vessel, which vaporizes the liquids. The compressor will compress the vapors slightly and discharge them into the storage tank, where they will condense back to liquid.

Specific applications of vapor recovery are vapors left in a vessel prior to a maintenance or refurbishment operations, and evacuation of cylinders, hoses and lines.



4-Way Valves	For piping, in aiding for easy transition from liquid transfer to vapor recovery - comes with handle and flow indicator
Float Switch Information	Activates alarms and/or shut-down equipment when a liquid rises or falls past the switch
Pressure Switches	Activates alarms and/or shutdown equipment for suction, discharge, differential, and/or oil pressure
Temperature Switches	Activates alarms and/or shutdown equipment for discharge and/or oil temperature
Liquid Traps	Trap installed in the suction line to stop liquid from entering the compressor
Liquid Traps, ASME Code	ASME coded trap installed in the suction line to stop liquid from entering the compressor
Strainer	Features a 30-mesh stainless steel screen
Belt Guards	Standard material is steel, options are available for aluminum and stainless steel
Pressure Gauges	Visual confirmation of pressure - typically on the suction, discharge, and oil locations
Thermowells	Protects temperature monitoring devices from harsh process gas conditions
Relief Valves	Overpressure safety devices required on the compressor discharge and any associated ASME code vessels
Shutoff Valves	Available in either manual or powered
Motor or Engine Drives	Available in various classifications and fuel types

LB Compressors | Compressor Selections

To select a compressor that best fits your application requirements, use the charts shown. The data provided is based on approximate delivery rates when handling LPG or anhydrous ammonia. Actual capacities will depend upon line restrictions, size and length of piping. Horsepower requirements for both liquid transfer and vapor recovery applications are based on moderate climatic conditions.

Compressor Model	LB081 LB082	LB161 LB162	LB361 LB362	LB601 LB602	LB942 LB943
Number of Cylinders	1	2	2	2	2 Double Acting
Bore - Inches (mm)	3.0 [1] (76.2)	3.0 [2] (76.2)	4.0 [2] (101.6)	4.625 [2] (117.4)	4.625 [3] (117.4)
Stroke - Inches (mm)	2.5 (63.5)	2.5 (63.5)	3.0 (76.2)	4.0 (101.6)	4.0 (101.6)
Piston Displacement - CFM (m^3/h) @ 350 rpm @ 825 rpm	 3.58 (6.1) 8.45 (14.35)	 7.16 (12.2) 16.9 (28.7)	 15.3 (26) 36 (61.2)	 27.2 (46.3) 64.2 (109)	 52.46 (89.1) 125.2 (212)
Compressor Speed Minimum rpm Maximum rpm	 350 825	 350 825	 350 825	 350 825	 350 825
Maximum Working Pressure - psia (bar)	350 (24.13)	350 (24.13)	350 (24.13)	350 (24.13)	350 (24.13)
Maximum Brake - hp (kW)	5 (4)	7.5 (6)	15 (11)	40 (30)	50 (37)
Max. Discharge Temperature - °F (°C)	350 (177)	350 (177)	350 (177)	350 (177)	350 (177)
Max. Compression Ratio [4] Continuous Duty [5] Intermittent Duty [5]	 5 9	 5 9	 5 9	 5 9	 5 9
Weight - lb (kg)	~180 (82)	~225 (102)	~365 (166)	~705 (320)	~905 (411)
Inlet/Outlet Connections	0.75" NPT	0.75" NPT	1.25" NPT	*2.00", 1.50", 1.25"	2" 300# ANSI

1 One single-acting cylinder
2 Two single-acting cylinders
3 Two double-acting cylinders
4 Compression Ratio defined as absolute discharge pressure divided by absolute inlet pressure.
5 Compression Ratios are limited by discharge temperature. High compression ratios can create excessive heat, i.e., over 350°F (177°C). The duty cycle must provide for adequate cooling time between periods of operation to prevent excessive operating temperature.





BLACKMER® LB COMPRESSORS

LB Compressors Selection Data | LPG & Anhydrous Ammonia

Model	Speed	Approximate Liquid Transfer Delivery[1]		Piston Displacement		Driver Size[2]		Pipe Diameter[3]			
								Vapor		Liquid	
	rpm	U.S. gpm	L/min	CFM	m³/hr	HP	kW	in.	mm	in.	mm
LB081	425	25	93	4.2	7.2	1.5	1.1	0.75	19	1.5	38
	560	32	123	5.6	9.5	3	2				
	715	41	157	7.2	12.2	3	2	1	25		
	780	45	171	7.8	13.3	5	4				
	810	46	174	8.1	13.8	5	4				
LB161 LB162	425	49	186	8.5	14.4	3	2			2	50
	560	65	246	11.2	19.0	5	4				
	715	83	314	14.3	24.3	5	4	1¼	32		
	780	90	341	15.6	26.5	7.5	6				
	810	92	348	16.2	27.5	7.5	6				
LB361 LB362	495	123	466	21.3	36.2	7.5	6			2½	65
	540	134	507	23.2	39.5	10	7				
	650	161	609	28.0	47.5	10	7	1½ - 2	38-50	3	80
	780	194	734	33.5	57.0	15	11				
	810	201	761	34.8	59.1	15	11				
LB601 LB602	545	242	916	42.0	72.0	15	11	2 - 2½	50-65	4	100
	655	288	1,090	50.6	85.9	20	15				
	755	335	1,268	58.7	99.8	25	19				
	800	355	1,344	62.2	105.7	30	22				
LB942 LB943	470	400	1,514	70	119	25	19	3 - 4	76-102	6	152
	565	480	1,817	84	143	30	22				
	750	640	2,422	112	190	40	30				
	800	680	2,575	119	202	50	37				

1 Delivery will depend on proper system design, pipe sizing and valve capacity.

2 Horsepower is for liquid transfer and vapor recovery in moderate climates. For liquid transfer without vapor recovery, horsepower will be lower. For severe climates, contact your Blackmer representative for horsepower required.

3 Use next larger pipe size if piping exceeds 100 feet (30 meters).

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