

DESCRIPTION

TWIN SCREW ADVANTAGES

The LDB Rotary Screw Booster Compressor offers all the many economic advantages for which the twin screw type of compressor is already famous. It has fewer moving parts which simplifies maintenance procedures and reduces required parts inventory. Balanced design reduces part wear which helps to maintain high efficiencies and extend the life of the unit. The Frick LDB is a light compact unitized package that provides more capacity in less floor space. Pre-piped and pre-wired at the factory it is remarkably easy to install. It delivers more tons of refrigeration per kilowatt of energy than any other type of booster compressor. In short, the LDB reduces installation, operating and maintenance costs, dramatically.

ENGINEERING FOR BOOSTER DUTY

The LDB is designed specifically for booster duty. It features a Frick-designed internal volume ratio that is tailored for refrigerant booster compression applications. Lubrication circuits were engineered by Frick specifically for refrigerant booster duty. It has simple, effective controls. It is designed for 150 psig working pressure, and is constructed to booster-duty, weight-saving standards. Extensive capacity testing has been carried out to guarantee maximum efficiency at rated capacities with minimum energy consumption.

LUBRICATION SYSTEM

Low oil consumption is achieved with a proven Frick three-stage horizontal oil separator with an integral sump. The first stage performs impingement, change of direction and reduction in velocity. The second stage is a large settling chamber, and the third stage uses coalescing elements to precipitate oil smoke from the refrigerant vapor. The integral sump contains tubular oil heaters that are replaceable without compressor shutdown.

The oil pump is integral to the compressor and is sized to provide oil for lubrication and cooling. A strainer of pleated and reinforced wire is in the oil line ahead of the pump, and all oil is filtered through a 15 micron, full-flow filter without bypass before entering the compressor. Oil pressure to the compressor is regulated by a pilot-operated pressure regulator. Direct liquid refrigerant injection oil cooling arrangement is provided as standard.

EASY-TO-OPERATE CONTROLS

All controls and gauges are pre-wired at the factory and centralized in a control panel. Standard controls include high and low pressure cutouts, temperature safety cutouts, operating controls and a full complement of indicator lights for troubleshooting.

The exclusive Frick Easi-Start system, used for reduced-load starting, also includes a suction check valve, suction strainer and suction shut-off valve. A disc-type check valve and a stop valve for the unit discharge is also incorporated.

DESIGN DATA

LDB MODEL	FT ³ /MIN SWEPT VOL.	NOMINAL RATINGS*				WEIGHT (Less motor/valves (lbs.))
		R-717		R-22		
		TR	BHP	TR	BHP	
26	257	23.6	25.4	31.0	30.4	3800
39	390	36.9	38.5	46.2	46.3	4200
52	515	49.3	49.7	60.7	59.5	4400
74	742	71.7	73.1	87.0	86.2	4600
103	1033	101.3	99.3	124.6	120.2	5100
148	1484	146.8	143.9	178.1	172.7	5400
208	2077	204.3	204.8	248.9	245.8	9000
300	2996	296.3	292.1	362.7	347.6	9400

*-40° F suction temperature, 10° F intermediate temperature

DESIGNED LIMITS

Design Working Pressure	150 PSIG
Max. Inlet Pressure	50 PSIG
Min. Inlet Pressure	25" HG (Vac)
Max. Inlet Temperature	100° F
Min. Inlet Temperature	-60° F
Max. Differential Pressure	100 PSIG
Max. Outlet Temperature	210° F

GUIDE SPECIFICATIONS

Furnish and install as shown on plans Frick Model LDB rotary screw booster compressor unit(s) providing tons of refrigeration and requiring brake horsepower input at °F saturated suction temperature (psig) and °F intermediate (psig) with °F superheat and with liquid to the evaporators cooled to °F. Refrigerant shall be ammonia/R22 (select one). Screw compressor package shall conform to the following specifications.

Compressor — Compressor to be helical rotary screw type, positive displacement with male driven and female rotors within a close grained cast iron housing. Rotors to be precision machined from SAE 1035 steel. Main bearings to be cylindrical roller bearings and thrust bearings to be oversized angular contact type. Compressor to be designed specifically for refrigerant booster duty and shall meet ANSI B9.1 requirements.

Oil Separator/Reservoir — Oil separator shall be of horizontal, three stage design with integral sump and equipped with access port for maintaining the coalescing-type oil mist eliminators. Separator to be of ASME Section VIII, Div. 1 design and construction and be equipped with dual relief valve, oil sight glasses and tubular oil heater that is replaceable without shutting down compressor unit. Oil usage shall not exceed two parts per million, by weight on standard ammonia units.

Lubrication System — Lubrication shall be achieved using an integral, shaft-mounted positive displacement oil pump with a strainer in the suction line to the pump. Oil pressure shall be regulated with an external, pilot-operated regulating valve. All oil is to be filtered through a 15 micron, full flow filter without bypass with replaceable elements. The strainer, filter and regulator shall be isolated with valves.

Oil Cooling — Standard Ammonia Units Only — Oil shall be cooled by direct contact with liquid refrigerant injected into the compressor discharge. Liquid feed arrangement shall consist of stop valve, strainer, solenoid valve metering valve and stop valve. Metering valve shall control temperature of oil returning to compressor at 110°F to 130°F.

Oil Cooling — R22 Units — DX refrigerant cooled oil cooler is required as described in options.

Control Center — Compressor shall include a factory mounted and wired control panel of standard NEMA 1 construction. Safety controls shall include high pressure cutout, low pressure cutout, low oil pressure cutout, high discharge temperature cutout, high oil temperature cutout, low oil temperature cutout and anti-recycle timer.

CAPACITY DATA NOTES

Rating Explanation — Frick LDB Booster Compressor Units are rated in tons of refrigeration (TR) and brake horsepower (BHP) based on suction temperature at the compressor inlet and corresponding saturated pressure versus the intermediate temperature (booster compressor discharge) and corresponding saturated pressure. Furthermore, the ratings are based on no suction superheat at the inlet of the compressor and liquid supplied to evaporators at the saturated intermediate (booster compressor discharge) temperature.

Allowances must be made for pressure drop in the suction line between evaporators and the compressor inlet and adjustments in unit ratings must be made for conditions other than saturated conditions. Reduce the published ratings by 1.3% for each five (5) degrees of superheat, and reduce the published unit ratings 1% for each five (5) degrees of liquid temperature for ammonia and 2.7% for each five (5) degrees of liquid temperature above intermediate temperature for R22.

NOTE: High stage compressor capacity must include booster oil cooling load (See Table 1 for ammonia or Table 2 for R-22 application data).

Operating controls shall be control power off/on switch and unit off/auto/manual switch with closed transition from manual to automatic position (reset pushbutton). Indicator lights shall be control power on, oil heater on, high pressure cutout, low pressure cutout, low oil temperature cutout, high discharge temperature cutout, high oil temperature cutout, and anti-recycle timer. Pressure gauges shall be suction pressure, discharge pressure and oil pressure and shall be mounted in the panel. Pressure containing devices shall be in separate, isolated compartment from electrical controls.

Thermometers — Wells for suction, discharge and oil temperature readings shall be furnished along with separately shipped thermometers.

Valves — Discharge line from unit shall have factory mounted check valve and flanged stop valve. Suction valve shall be Frick exclusive Easi-Start system with shut-off valve for reduced-load starting and integral check valve, stop valve and removable suction strainer.

Finish — Finish shall be machinery enamel over a prime base coat.

OPTIONAL ACCESSORIES

Dual Oil Filters — The lubrication system shall include two vertical full flow without bypass, 15 micron filters with replaceable elements. Both filters shall be piped in parallel and each isolated by stop valves so that filter elements can be replaced while unit is running.

DX Oiler Cooler — (R-22 Units) Oil shall be cooled in a Dx refrigerant cooled, shell-and-tube heat exchanger with the oil on the shell side. Cooler shall be designed and constructed according to ASME Section VIII, Division 1. Oil temperature shall be maintained by thermally-controlled metering valve and refrigerant feed assembly shall consist of stop valve, strainer, solenoid valve, metering valve and stop valve.

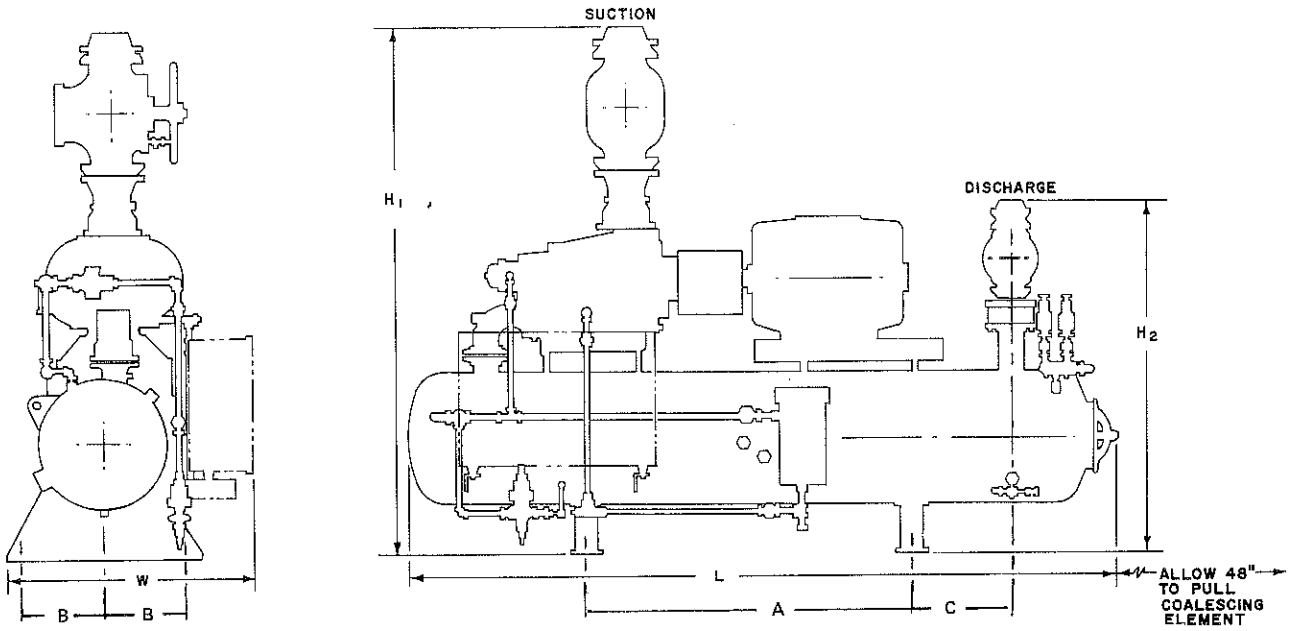
Capacity Control — Two Methods: 1. Capacity control shall be achieved by pressure actuated, motorized butterfly valve in the suction line of the unit. Capacity control butterfly valve shall be shipped separately for field installation. 2. Hot gas by-pass — Field mounted between unit suction and discharge connections.

MOTOR SELECTION

Motors for LDB booster applications need to be sized for start-up and pull down duty as well as for the design operating condition. It should be noted that start-up and pull down will quite often be the more demanding requirement.

Refer to starting torque data on page 10 for additional information.

FRICK ROTARY SCREW COMPRESSOR UNITS
DIMENSIONS



FOR REFERENCE ONLY –
USE CERTIFIED DRAWINGS FOR ERECTION

MODEL NO.	L	W	H ₁	H ₂ (1)	CONNECTIONS		MOUNTING HOLES LOCATIONS			BOLT HOLE DIA.
					SUCT.	DISCH. (1)	A	B	C	
26	105-1/2	37	70-5/8	44-1/16	4	2	54	12	13	1
39	115	41	77	51	4	3	54	12	13	1
52	115	41	77	51	4	3	54	14	13	1
74	115	41	75	51	6	3	54	14	13	1
103	130	45	91	60	6	4	60	16	18	1-1/8
148	130	45	91	60	6	4	60	16	18	1-1/8
208	145	52	108	74	8	6	66	18-5/8	24	1-3/8
300	145	52	108	74	8	6	66	18-5/8	24	1-3/8

Dimensions are in inches

1. R-22 units will have larger discharge valves which will change dimensional data.