COSMIC CONNECTION

MULTISTAGE MECHANICAL BOOSTER VACUUM PUMPING SYSTEM

SERIES - RC

Description

COSMIC Mechanical Booster is mounted on top of the Backing Pump through a frame work of M. S. channel. A complete pipe line is provided joining Mechanical Booster and backing pump. Mechanical Booster has a connection on the suction side to connect the pumping unit with the system. The pipe line has one gauge sensor port on Mechanical Booster and one on backing pump to measure the vacuum separately, if required. The combination operates from atmospheric pressure down to its ultimate vacuum.

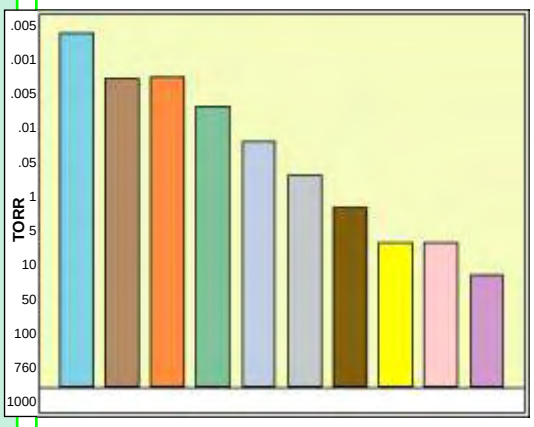
Each pump is equipped with its own motor with the starting circuits interlocked. Air filter at the Mechanical Booster, and electrically operated air admittance valve at the backing pump are provided.

The Mechanical Booster is fitted with a pressure switch and a by-pass valve. When the backing pump roughs the system down to the pre-set cut-in-pressure of the Mechanical Booster, through the by-pass valve, the Mechanical Booster automatically starts and the by-pass valve close and further pumping is accomplished directly through the Booster Pump. If the pressure at the Mechanical Booster inlet should rise above the cut-in-point, the Mechanical Booster automatically stops and the Backing Pump resumes its roughing function through the by-pass valve, until the cut-in-pressure is attained again.

A control panel, having ON/OFF switches, indicators, contractors, single phase preventer and relays etc, for the pumping system is provided.

NB: 1. Requirement of by-pass valve in the pumping system depends on a particular application.
2. Suitable vacuum gauge can be provided along with sensors, if required.

Typical Vacuum Range for Various Vacuum Pumping Devices



- Booster / Double Stage Rotary Pump Combination
- Double Stage Rotary Pump
- Booster / Single Stage Rotary Pump Combination
- Single Stage Rotary Pump
- Booster / Air Ejector / Liquid Ring or Booster / Booster / Liquid ring Combination
- Booster / Liquid Ring or Booster / Liquid Jet Combination
- Air Ejector / Liquid Ring Combination
- Liquid Jet Pump
- Compound Liquid Ring Pump
- Single Stage Liquid Ring Pump

Operating Principal

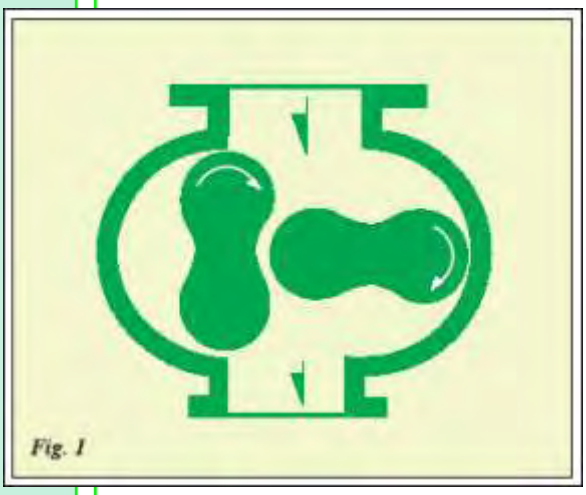


Fig. 1

Mechanical Booster Vacuum Pump contains two rotors, cocoon-shaped (Fig. 1) in cross-section housed in a precision machined, cylindrical casing. The axes of the rotors are parallel and supported at each end by precision timing gears to synchronize the movement of the rotors.

The motor and the drive rotors are directly coupled.

Efficient and effective vacuum pumping is accomplished by trapping a volume of gas at the Mechanical Booster inlet and between each rotor and the housing. The volume of gas is quickly and clearly swept by the fast revolving rotors which carry the air to the exhaust side of the Mechanical Booster where the air is then discharged to atmosphere by the backing pump (Fig. 2). Mechanical Booster Vacuum Pump always requires a backing pump as it cannot compress and discharge air into the atmosphere. Its pumping speed and intake pressure depends on the performance of the backing pump which is selected carefully for a particular application.

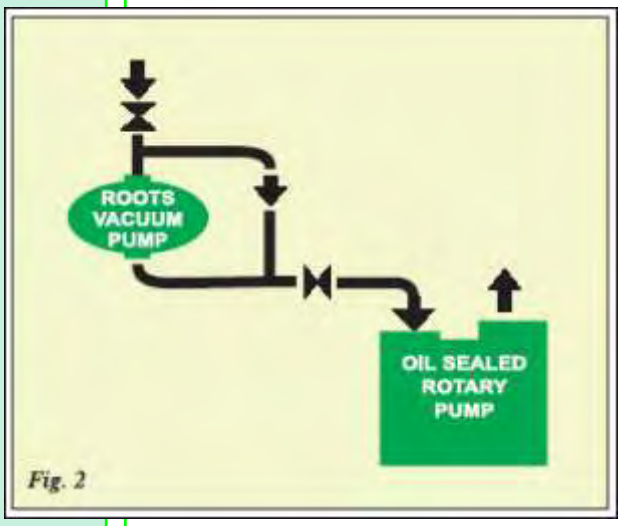


Fig. 2

Material

COSMIC Mechanical Boosters are made of Cast Iron Alloy.
Mechanical Boosters in any other material can be provided.

Features

- Very high volumetric efficiency and speed in the low pressure range compared to oil sealed rotary pumps provide significant savings in both time and power.
- As oil free pump, the Mechanical Booster provides clean, dry, vacuum pumping with low back streaming rate compared to either an oil-sealed mechanical pump or an oil ejector pump.
- Extensive selection of backing pumps, both oil-sealed and water-sealed, provides unparalleled flexibility in meeting the process needs.
- Rotors are precision-machined to close tolerances, are statically and dynamically balanced and use high quality bearings for longer life and trouble free operation.
- Timing gears are specially designed to provide noise free long lasting performance.
- COSMIC Mechanical Boosters are produced by highly experienced engineers. All pumps are subjected to strict quality control checks.

Specification

BOOSTER COMBINATON		MODEL NO.					
		RC-7	RC-15	RC-30	RC-50	RC-65	RC-90
Booster Pump Displacement	l/m m^3/hr	6700 400	13300 800	27800 1670	48800 2930	65000 3900	87000 5250
Booster Pump Motor	h.p.	3	5	7.5	10	15	15
Booster Pump Inlet Connection Dia	m.m.	65	75	125	125	200	200
Booster Cut-in-Pressure	torr	90	70	55	40	50	35
Pressure Limit for Continuous Operation	torr	50	30	30	20	30	20
Oil requirement, Booster Pump*	L	1.5	2	2.5	3.5	5	7
Water required, Booster Pump, 20^{0}C	l/m	--	--	--	10	15	20
Backing Pump Displacement **	l/m m^3/hr	1000 60	3000 180	5000 300	7500 450	5000x2 300x2	7500x2 450x2
Backing Pump Motor	h.p.	2	5	12.5	15	12.5x2	15x2
Oil requirement, Backing Pump***	L	8	18	28	32	28x2	32x2
Water required, Backing Pump, 20^{0}C	l/m	15	20	35	50	70	100
Ultimate Vacuum****	torr	$5x10^{-4}$	$5x10^{-4}$	$5x10^{-4}$	$5x10^{-4}$	$5x10^{-4}$	$5x10^{-4}$

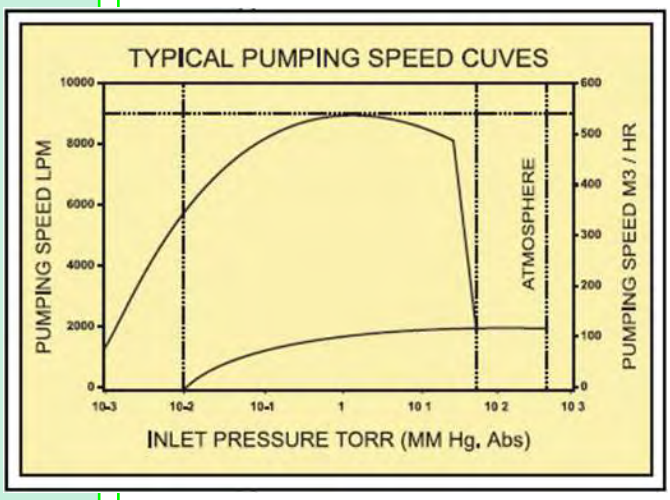
* Use gear oil, grade 90 or equivalent.

** Backing Pump selection depends on application.

*** Use COSMIC fluid ROTOMAX equivalent.

**** Ultimate vacuum depends on Backing Pump. Table shows Double Stage, Oil Sealed Rotary Vacuum Pump as Backing Pump.

Specifications are subject to change without notice.



In vacuum distillation and drying applications, Booster Pumping System replaces the use of conventional steam ejector pumps, thus saving huge running costs.

It can handle volatile, toxic, corrosive gases in chemical and process industries and prevent replacements of costly pumping systems, damaged due to corrosion.

COSMIC Mechanical Booster operates at high efficiency over a wide range of sub-atmospheric pressures. This is in contrast to conventional mechanical rotary pumps, in which the pumping speed diminishes as the inlet pressure is decreased.

Typical Application

APPLICATION	FUNCTION OF VACUUM SYSTEM	EXAMPLES OF USE
Vacuum Metallising	Evacution of vacuum chamber at a much faster speed	Metallising on Glass, Metal & Plastic objects.
Vacuum Furnaces	Removal of gases produced due to high temperature	Heat Treatment, Hardening, Melting etc.
Cooling/Chilling	Rapid evaportion of content moisture	Fruits & Vegetable
Deaeration and Degassification	Removal of gases	Water, Rubber, Products, Oils, Plastics, Molten Metals, Beveragese.
Dehydration	Removal of condensable vapours	Transformers, Refrigeration Systems, Foods, Chemicals, Electrical Cables & Conduits, Grain, Textiles, Ink & dyes, Rotary Dryers.
Deodorization	Removal of offensive gases	Chemical, Food Product, Effluent, Processing.
Distillation	Vacuum extraction of fractions	Chemicals, Petroleum, Petrochemicals, Pharmaceuticals, Food Products.
Evacuation	Removal of vapours & gases	Environmental Chambers, Steam Condensers,Leak Test Chambers, Reactors, Process Vessels, TV Tubes, Lighting Tubes & Bulbs, Acceletrators.
Filtration	Increase flow of filtrate by reducing pressure on discharge side of filter	Chemicals, Food Products, Pharmaceuticals.
Freeze Drying	Removal of moisture by sublimation under vacuum	Coffee, Fruits & Vegetable, Pharmaceuticals, Food Products.
Vacuum Cooking	Reduction of cooking or boiling temperature by lowering pressure in vessel.	Food, Candy, Chemicals.

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