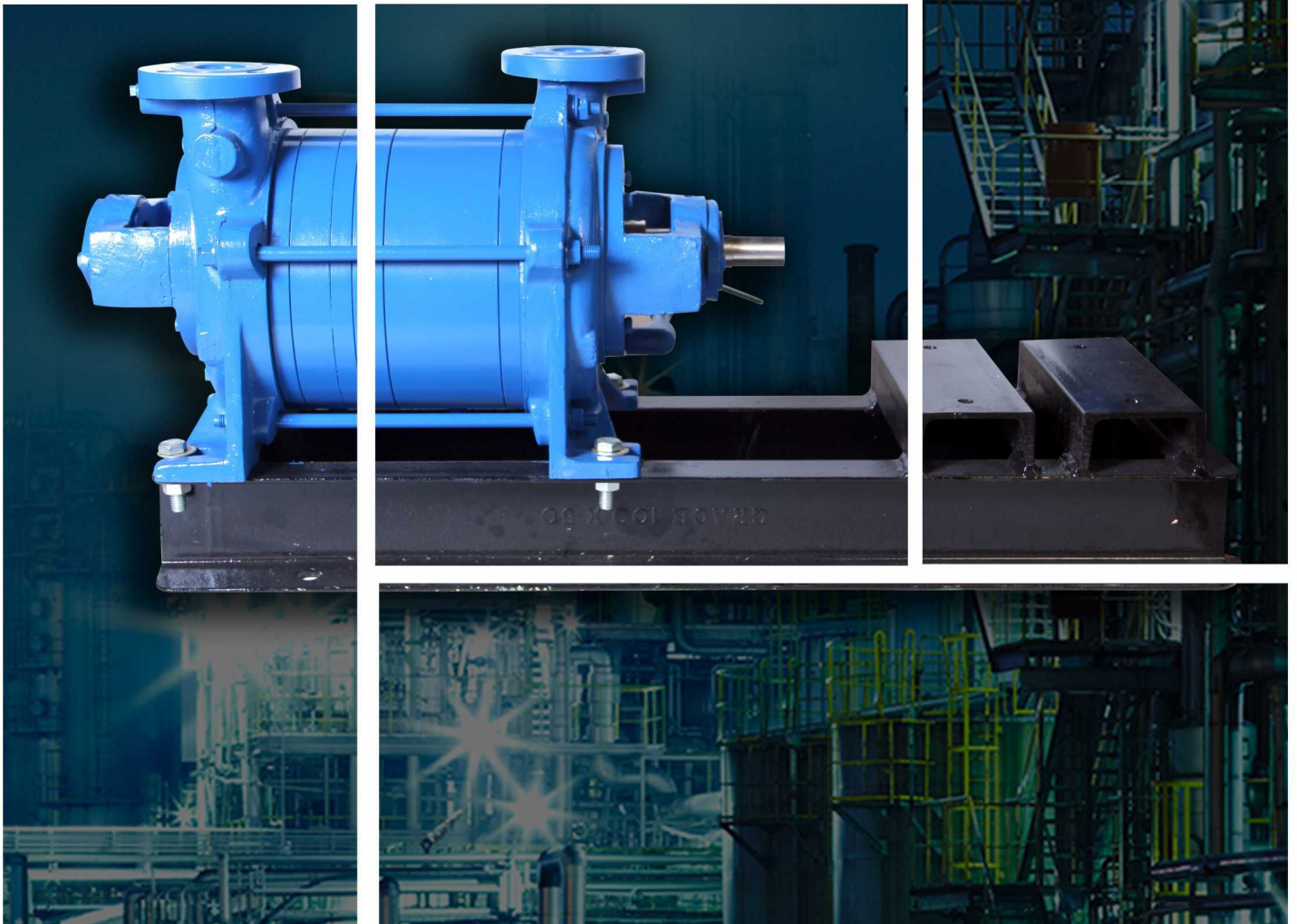


VACUUM PUMP



MEEKAJ

IS MANUFACTURING AND SUPPLING THE WORLD BEST
HIGH EFFICIENT VACUUM PUMP SERIES & COMBINATION
OF THE AIR JET EJECTOR OR HIGH VACUUM

Highest quality on Competitive rates

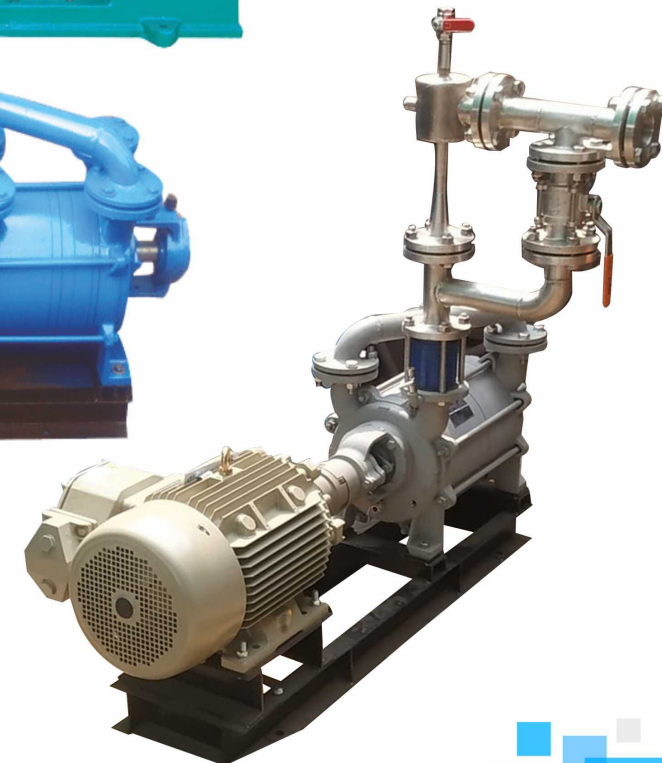
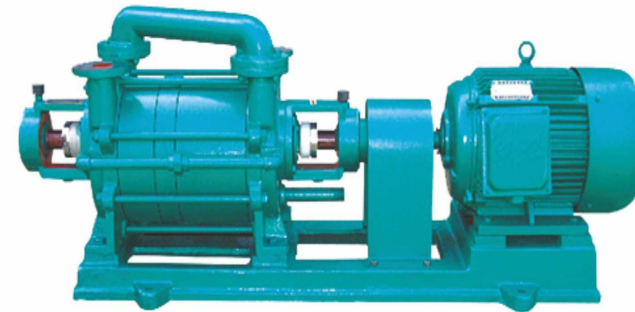
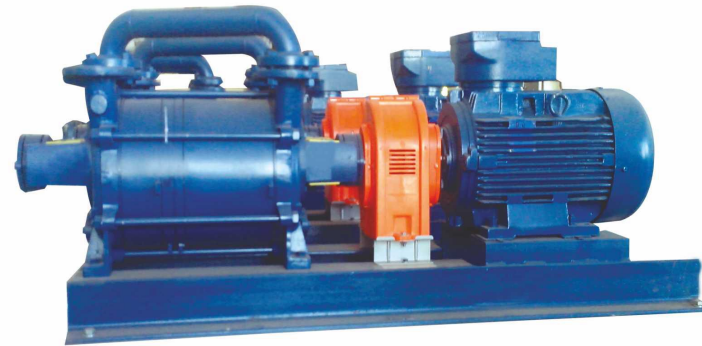
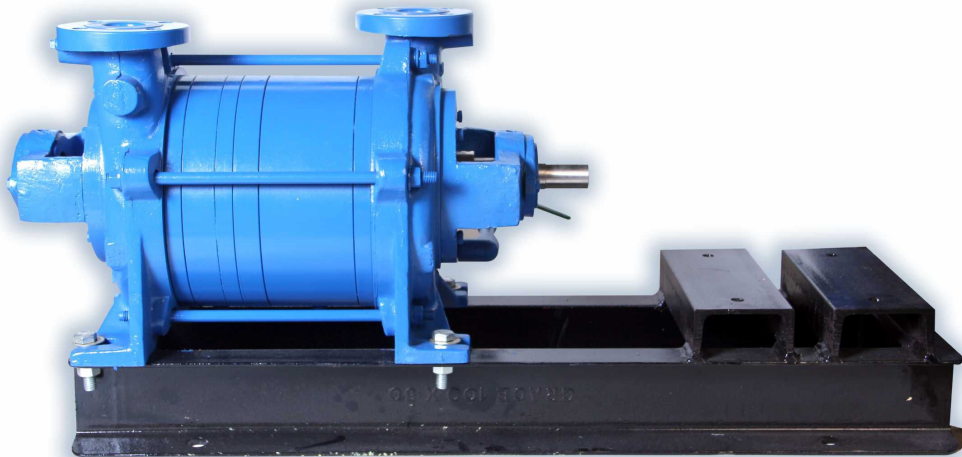
Reliable, simple design which involves only one rotating part, which is not subject to more wear internally no need any lubrication (It is Oil Free)

Rotating Metallic parts are non contacting therefore, no inside wearing

No vibration and low noise level

Of existing High vacuum system with all ejectors and steam cost is higher than replace the last stage ejector with vacuum pump and save the steam

Avoid the contamination of the cooling tower can be provided the water re-circulating arrangement introducing the shell-tube type cooler or Plate type heat exchanger



New innovated Double stage vacuum pump with additional futures for long Trouble Free operation

All vacuum pimps are 100% Performance tested as per HEI standard prior to shipment

Proven Technology

Most of regular models in stock for immediate delivery

we provide the mechanical seals of affordable rate so can increase the shaft life and reduce the maintenance cost

Quality Assurance Using High-Precision Vacuum Pump

Installation

With a normal installation using water as ring and cooling fluid, the water as well as the exist air delivered together into the drains. in order to reduce operating noise, it is necessary to provide a silence in the exist piping. Silence is requiring in the single stage type pump only, in the double stage vacuum pump due to noise in acceptable limits silencer is not require. A non return valve is fitted in the suction piping so that with un forcing operation failure no water is allowed back in the vacuum piping. if part of the conveying medium is absorb by eater or if any another ring-fluid is used, special device I to be built in ti the silencer, so as to separate the gas from the ring fluid whereby the latter can be re-circulated to the vacuum pump. with the use of such ring fluid circulation, attention must be given to its's re cooling vacuum pump seldom requires any special governing device. In some cases the height of the produce vacuum has to be limited by vacuum relief valve. As soon as the vacuum reaches its pre set maximum value, the relief valve opens automatically allowing to atmospheric air in to the vacuum piping. With the good starting properties of the Meekaj water ring vacuum pump fully automatic control, whereby the pump is started and switched-off within the to vacuum limits, can easily be foreseen.

Vacuum level : 40 mm Hg (A) at 30°C Seal Water Temp.
Capacity : 49 m3/hr to 1500m3/hr
Power Range : 3.0 to 65 HP
Material of construction :

Single Stage Vacuum pump

- Alt. 1 : Complete pump in Cast iron material with En8 Shaft
- Alt. 2 : Partially SS 304 or 316 (All contact parts i.e. Control Plate, casing ring, Shift protecting bushes are in SS 304 pr 316 balance parts in cast iron)
- Alt. 3 : Complete pump in stainless steel material

Double Stage Vacuum pump

- Alt. 1 : Standard Model - Shaft, Impeller in SS and balance parts in cast iron)
- Alt. 2 : Partially SS - All contact parts i.e. Control plate, casing, and shaft are in SS 304 or 316 balance parts in cast iron
- Alt. 3 : Complete pump in stainless steel material

Advantages or benefits of Meekaj's liquid ring vacuum pimp :

- Reliable, simple design which involves only one rotation part, which in not subject to more wear
- Can handle condensable vapors or even slugs of liquid entrained in the gas stream without damage to pump or affecting pump performance
- Produces a steady non-pulsating gas flow when it is used as either a vacuum pump or compressor
- Resistant to contaminants entering with the gas stream these will be dilute and washed through the pump by the seal liquid
- Internally no need any lubrication (It is oil Free)
- Rotating metallic parts are non contacting therefore, no inside wearing
- No vibration and low noise level
- Very safe for explosive gases if existing High vacuum system with all ejectors and steam cost is higher than replace the last stage ejector with vacuum pump and save the sream
- Avoid the contamination of the cooling tower water can be provided the water re-circulating arrangement introducing the shell-tube type cooler or plate types heat exchanger

Bearing
The shaft bears upon two ball bearings lubricated with hard grease

Pump case
Pump casing made of cast iron as standard, other material combinations optional

Flanges
Suction and discharge flanges

Impeller
Star type impeller eccentrically Placed in cylindrical body

Pump Shaft stainless steel

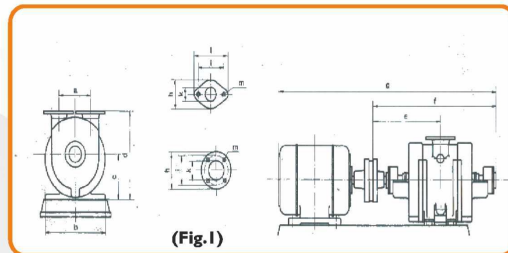
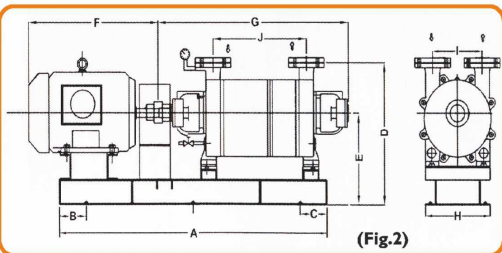
Observed problem	Problem Source	Corrective measure
1 Reduced Capacity of pump	<ul style="list-style-type: none"> ➔ Seal Water temperature higher than design ➔ Low seal water flow rate 	<ul style="list-style-type: none"> ➔ Reduce temperature by in creasing cooling water flow or check se al cooler for fouling ➔ Adjust seal Water flow rate or check centrifugal recirculation pump
2 Excessive noise	<ul style="list-style-type: none"> ➔ Excessive ro insufficient seal liquid to pump ➔ Coupling misalignment 	<ul style="list-style-type: none"> ➔ Adjust seal flow rate ➔ Realign coupling
3 High power consumption	<ul style="list-style-type: none"> ➔ Excessive seal liquid ➔ Coupling misalignment ➔ Excessive discharge pressure ➔ Defective bearing ➔ Gland ring to o tight ➔ Improperly mounted pump 	<ul style="list-style-type: none"> ➔ Adjust seal flow rate ➔ Realign coupling ➔ Correct as necessary ➔ Replace bearing ➔ Loosen gland ring ➔ Make sure mounting surface is level
4 Overheating	<ul style="list-style-type: none"> ➔ Excessive se al liquid temperature ➔ Insufficient seal liquid flow rate ➔ Coupling misalignment ➔ Defective bearing ➔ Gland ring too tight ➔ Improperly mounted pump 	<ul style="list-style-type: none"> ➔ check coolant flow rate and seal cooler fouling ➔ Increase seal liquid flow rate ➔ Realign coupling ➔ Replace be aring ➔ Loosen gland ring ➔ Make sure mounting surface is level

Performance data of Single Stage Vacuum Pumps

EFFECTIVE DELIVERY AND POWER CONSUMPTION																			
VACUUM %	0		10		30		50		70		80		85		90		93.4		Speed RPM
ln mmHg A.	29.92		26.93		20.94		14.96		8.98		5.98		4.49		2.99		1.97		
TORR	760		684		532		380		228		152		114		76		50		
VACUUM PUMP MODEL	M3/HR	SHP	M3/HR	SHP	M3/HR	SHP	M3/HR	SHP	M3/HR	SHP	M3/HR	SHP	M3/HR	SHP	M3/HR	SHP	M3/HR	SHP	
MKJ-SL-0049-007- 03-025	49																		2880
MKJ-SL-0081-010- 05-033	81	3.6	80	3.7	78	3.9	72	4.3	65	4.2	55	4	32	3.8	15	3.7	0	3.6	2880
MKJ-SL-0123-012-7.5-040	123	5.1	120	5.1	118	5.3	116	5.5	105	5.6	82	5.5	65	5.4	45	5.1	0	5	2880
MKJ-SL-0165-016-7.5-050	165	5.4	164	5.4	155	6.4	145	6.5	135	6.5	110	6.3	84	6.15	55	5.9	0	5.7	1450
MKJ-SL-0220-020- 10-050	220	6.7	220	6.7	215	7.1	200	8.1	175	8.7	145	8.5	110	7.9	65	7.5	0	5.7	1450
MKJ-SL-0330-030- 15-080	330	9.6	328	9.6	316	9.9	292	11	245	12.5	195	12.5	150	12	98	11.9	0	11.7	1450
MKJ-SL-0440-040- 20-080	440	13.4	438	14.5	418	15.6	390	16.2	345	17	282	17.5	200	16.8	132	16.1	0	15.9	1450
MKJ-SL-0725-060- 30-150	725	18.9	720	19.2	693	20.4	655	23.8	590	24.8	443	24.4	307	22.9	160	21.6	0	21	980
MKJ-SL-1080-100- 40-150	1080	33.2	1060	34	1020	36.6	940	38.4	875	39.6	745	39.7	583	38.3	332	36.8	0	36.2	980
MKJ-SL-1500-150- 65-200	1500	51.5	1480	53.1	1400	59	1290	59.7	1200	59.6	1025	58.9	785	57.4	473	56.3	0	55	725

Dimension of Single Stage Vacuum Pump (Fig.1)

VACUUM PUMP MODEL	RPM	Max Capacity M3/HR	a	b	c	d	e	f	g	h	i	k	l	m
MKJ-SL-0049-007- 03-025	2880	49	130	264	120	240	236	360	696	72	75	25	100	10
MKJ-SL-0081-010- 05-033	2880	81	130	264	120	240	236	405	770	85	90	32	120	12
MKJ-SL-0123-012-7.5-040	2880	123	130	395	120	240	236	445	810	95	100	40	130	12
MKJ-SL-0165-016-7.5-050	1450	165	200	395	220	435	236	620	1040	150	120	60	-	4X15
MKJ-SL-0220-020- 10 -050	1450	220	200	395	220	435	236	656	1159	150	120	60	-	4X15
MKJ-SL-0330-030- 15-080	1450	330	200	395	220	435	236	750	1314	190	150	80	-	4X18
MKJ-SL-0440-040- 20-080	1450	440	200	395	220	435	236	820	1452	190	150	80	-	4X18
MKJ-SL-0725-060- 30-150	980	725	290	534	315	640	236	885	1615	240	200	125	-	4X18
MKJ-SL-1080-100- 40-150	980	1080	290	534	315	640	236	940	1741	240	200	125	-	4X18
MKJ-SL-1500-150- 65-200	980	1500	290	534	315	640	236	1020	1815	240	200	125	-	4X18



Dimension of Double Stage Vacuum Pump (Fig.2)

VACUUM PUMP MODEL	RPM	Max Capacity M3/HR	a	b	c	d	e	f	g	h	i	j		
MKJ-TSL-0090-08-05-040	1450	90	900	150	150	486	320	386	616	275	200	272		
MKJ-TSL-0160-11-7.5-040	1450	160	1000	150	150	486	320	470	706	275	200	372		
MKJ-TSL-0210-20-10-050	1450	210	1100	150	150	570	370	510	786	320	236	466		
MKJ-TSL-0320-28-15-050	1450	320	1250	125	125	570	370	580	886	320	236	576		
MKJ-TSL-0450-30-20-050	1450	450	1450	125	125	570	370	626	1020	320	236	722		

Operating Principle :

The liquid ring vacuum pump is a specific form of rotary positive displacement pump utilizing liquid as the principle element in gas compression.

The compression is performed by a ring of liquid formed as a result of the relative eccentricity between the pump's casing and a rotating multi-bladed impeller. The eccentricity result in near complete filling then partial emptying of each rotor chamber during every revolution. The filling-emptying-action creates a piston action within each set of rotor impeller blades.



Application

liquid ring vacuum pump are used in chemical, pharma, edible oil and petro chemical, pulp-paper, food, milk etc application like distillation, drying, evaporation, cooling filtration, beaching, edible and crud oil refining process etc and in power industries ti evacuate steam turbine condensers (exhausting air and to create the min possible negative pressure to minimizes the turbine back pressure.

If require more vacuum

- Vacuum can increase using colder seal liquid (Water) i.e. Using water temp 15deg. as sealant (Partial vapor Pressure = 17mbar) min vacuum will be available
- Using lower vapor pressure sealant i.e with ethylene glycol at 80 deg C temp (partial pressure = 57 mbar around) min vacuum will be 70 mbar
- With the hybrid system, it is made up of ejector, condenser and vacuum pimp.

NOMENCLATURE

MKJ - TSL OR SL-0090-08-05-040

MKJ	Company name
TSL	Two stage liquid ring vacuum pump
SL	Single stage liquid ring vacuum pump
0090	Capacity in m3/hr
08	Seal liquid flow rate in LPM
05	Required horse power
O40	Suction/Discharge flange size in NB

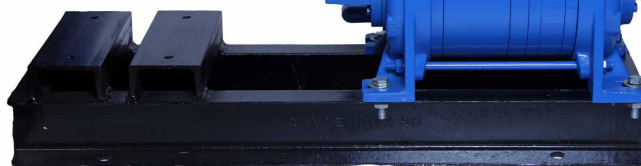


Single Stage Vacuum Pimp's Specification at the sealing water temp 30°C

PUMP MODEL	Max. Cap (m3/hr.)	Required Sealing water (LPM)	Motor HP / Speed
MKJ-SL-0049-010- 03-025	49	07	03 / 2880
MKJ-SL-0081-010- 05-033	81	10	05 / 2880
MKJ-SL-0123-012-7.5-040	123	12	7.5 / 2880
MKJ-SL-0165-016-7.5 -050	165	16	7.5 / 1450
MKJ-SL-0220-020- 10 -050	220	20	10 / 1450
MKJ-SL-0330-030- 15-080	330	30	15 / 1450
MKJ-SL-0440-040- 20-080	440	40	20 / 1450
MKJ-SL-0725-060- 30-150	725	60	30 / 980
MKJ-SL-1080-100- 40-150	1080	100	40 / 980
MKJ-SL-1500-150- 65-200	1500	150	65 / 725

Two stage vacuum pump's specifications at the sealing water temp 30°C

PUMP MODEL	Max. Cap (m3/hr.)	Required Sealing water (LPM)	Motor HP / Speed
MKJ-TSL-0090-08- 05-040	90	08	05 / 1450
MKJ-TSL-0160-11- 7.5-040	150	11	7.5 / 1450
MKJ-TSL-0210-20- 10-050	230	20	10 / 1450
MKJ-TSL-0320-28- 15-050	320	28	15 / 1450
MKJ-TSL-0450-30- 20-050	450	30	20 / 1450
MKJ-TSL-0720-40- 30-100	720	40	30 / 1450
MKJ-TSL-1100-50- 40-150	1100	50	40 / 1450
MKJ-TSL-1280-60 -50-150	1280	60	50 / 1450



Double stage water ring vacuum pump

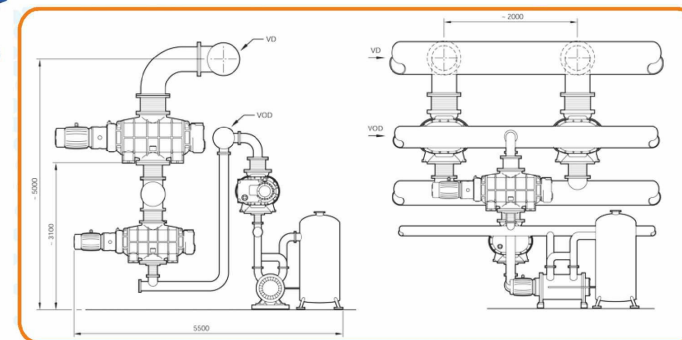
EFFECTIVE DELIVERY AND POWER CONSUMPTION																			
VACUUM %	0		10		30		50		70		80		87.3		90		94.7		Speed RPM
In mmHg A.	29.92		26.93		20.94		14.96		8.98		5.98		4.49		2.99		1.57		
TORR	760		684		532		380		228		152		114		76		40		
VACUUM PUMP MODEL	M3/HR	SHP	M3/HR	SHP	M3/HR	SHP	M3/HR	SHP	M3/HR	SHP	M3/HR	SHP	M3/HR	SHP	M3/HR	SHP	M3/HR	SHP	
MKJ-TSL-0090-08-05-040	70	3.6	75	3.8	82	4.2	85	4.3	87	4.5	83	4.4	80	4.3	55	4.2	0	4	
MKJ-TSL-0160-11-7.5-040	110	6.7	116	6.9	120	7	122	7.2	120	7.1	115	7.1	110	7	75	6.9	0	6.8	
MKJ-TSL-0210-20-10-050	155	8.7	160	8.8	162	9	160	9.1	158	9.3	155	9.2	145	9.1	110	9.2	0	9.3	
MKJ-TSL-0320-28-15-050	290	12	300	12.4	312	12.7	325	13.8	305	13.7	285	13.6	250	13.5	190	13.4	0	13.2	
MKJ-TSL-0450-30-20-050	380	16.8	390	17.1	415	17.5	450	18.4	440	18.5	380	18.6	350	18.4	280	18.1	0	18.1	

About the to read pressure and vacuum

The term 'Pressure' is used to describe either negative (below atmospheric) or positive (above atmospheric) pressure. Positive pressure is called 'gauge pressure'. The term 'vacuum' is used to describe the region of pressure below one atmosphere of pressure, also referred to as negative pressure. When speaking of vacuum, one must remember it as the opposite of pressure; high vacuum means low pressure. A vacuum ("HgV) reading is similar to gauge pressure (PSIG), in that the gauge reading is referenced to the current atmospheric or barometric pressure (which change over time and place to place). When the reading is referenced to the theoretical absolute zero for unit of measure, the reading is called an absolute value (PSIA, "HgA). At sea level atmospheric pressure is considered 29.92 "HgA, 760 torr, or 14.7 PSIA.

When using a vacuum a gauge pressure reading in a calculation, the reading must be converted to an absolute value. This is done by taking the current barometric pressure and subtracting the vacuum reading or adding the gauge pressure reading.

A vacuum reading of 650mmHgV is converted as follows:
Standard pressure - vacuum Reading = Absolute Pressure
760mm HgA - 650mm HgV = 110mmHgA



It is a mechanical pump with high evacuating speed also referred to as mechanical booster pump.

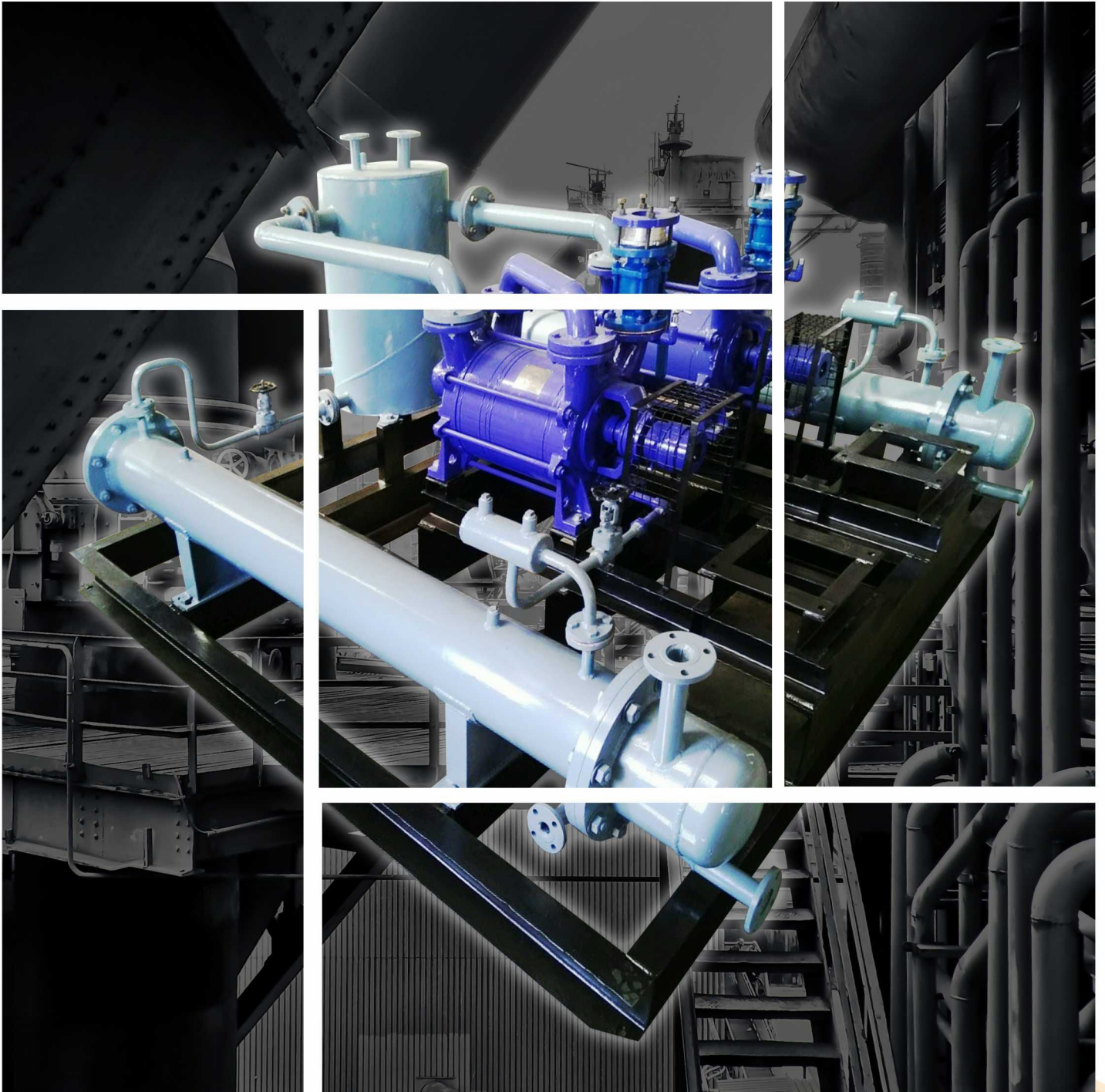
The rotors synchronously in opposite directions and high speeding.

The pump cannot be used singly, it must be used as boosters combined with a backing pump such as a rotary piston or a rotary vane vacuum pump or a liquid ring vacuum pump.

These vacuum systems can get higher vacuum, a stable, fairly high pumping speed can be gained in effective pressure range.

The backing pump decide the ultimate pressure of roots pump. The data of the list is lowest ultimate pressure with the standard equipment (equipped double stage oil machine vacuum pump).

The roots pump are widely used in vacuum moulding, vacuum smelting, vacuum gas pumping, vacuum coating industry. vacuum distilling and vacuum drying of chemical and pharmaceutical industry etc. The pump is insensitive to a little dust.



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