

WORLD CLASS · EFFICIENCY · RELIABILITY

P|M|V

PERMANENT MAGNET
COMPRESSOR



- ▶ WORLD CLASS
- ▶ SUPER EFFICIENT
- ▶ RELIABLE
- ▶ SILENT

KAISHAN

Kaishan Compressor India

WORLD WIDE SUPPORT

Globally recognized industrial presence

Over the last sixty years, Kaishan has steadily grown to become a significant and diversified engineering company developing high value machinery for industries worldwide. With modern, specialized manufacturing facilities positioned in seven strategic locations, Kaishan's group of thirty-two subsidiary companies produce over 1,00,000 rotary screw and 2,50,000 reciprocating compressors annually. Kaishan is the world's third largest manufacturer of Compressed air equipment, mining and drilling equipment and supports industries in more than 60 countries including USA, Australia, Germany, Japan, Korea, Russia, Africa and throughout Latin America.

Vertically integrated global strategy

Kaishan's global strategy of combining highly skilled engineering with highly efficient manufacturing allows us to provide performance proven and reliable equipment at a significant cost savings to our customers. Additionally, Kaishan's manufacturing processes are 85% vertically integrated ensuring full control of the material supply chain. This approach enables to supply high quality components at a lower cost and maintain agility to respond rapidly to changing market demands.



Environmental sustainability

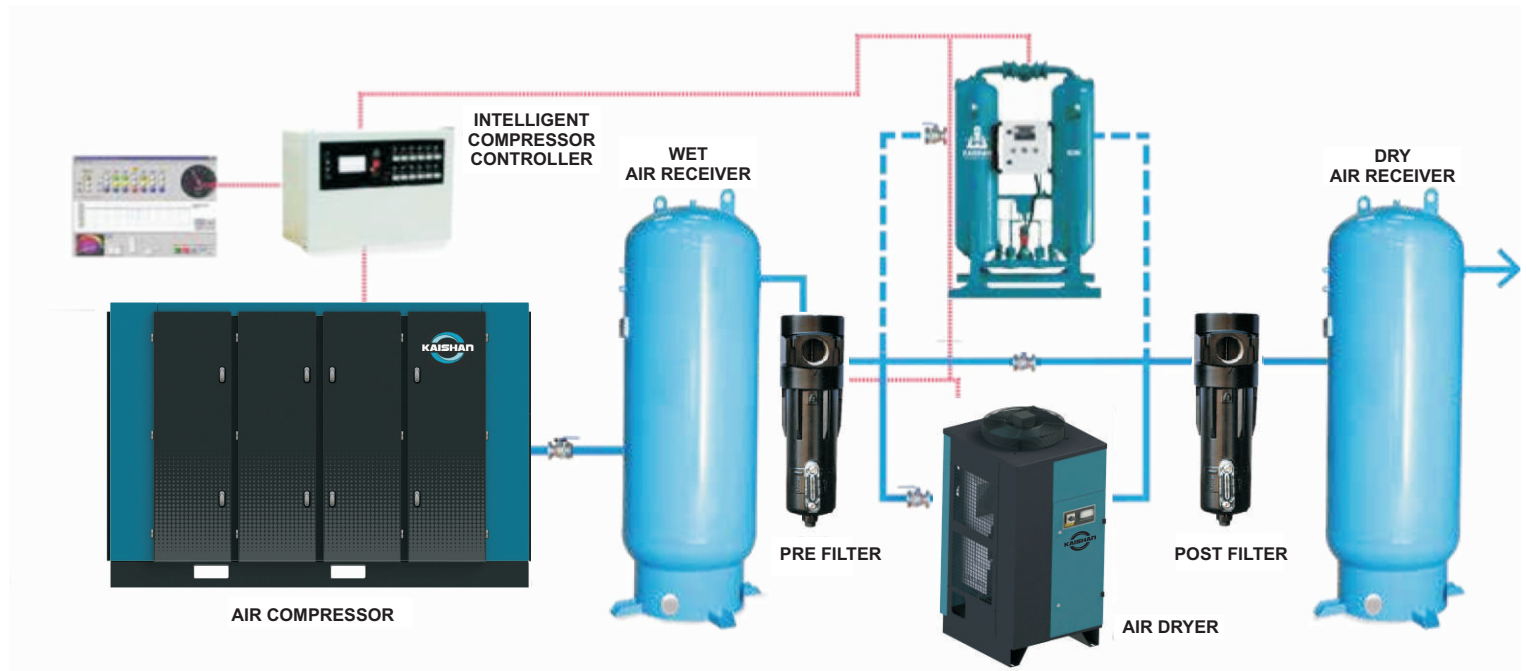
Integral to the design and manufacture of our products is outstanding energy efficiency. Kaishan's fundamental belief in environmental sustainability drives us to produce products that maximize energy efficiency and help to preserve precious energy resources. Single and two-stage compressors that produce more compressed air per unit of power input as well as expanders that utilize waste heat to produce electricity are just two of the fundamental products in our sustainable approach. Throughout our manufacturing processes, unused waste materials are recycled at every stage to maximize the use of raw materials. This approach translates to lower initial costs and lower operating costs for our customers and a smaller environmental footprint that helps us all. Kaishan's commitment to environmental responsibility ensures that we will continue to develop technologies and manufacturing solutions that provide industry with "Good and Green" products of exceptional value - now and well into the future.

Air is free, Compressed Air is Not!

Compressed Air is the Fourth Largest Utility for an Industry after Electricity, Gas and Water. Very few people understand the cost associated with compressed air production. Compressed air is the most expensive form of energy used in an industry.

Energy Cost

Consider a compressor of 500 cfm and 100 psi (g). This will use a 100 HP / 75 kW motor. Running for 24 hrs a day, 365 days a year, with a 70% load factor, it would consume approximately 600000 units annually. At Rs 7 per kWh, it would cost 42 lakhs a year. That is 3-4 times the cost of the compressor itself.



PATENTED 'SKY' TWO/SINGLE - STAGE AIREND

Larger Rotor Size

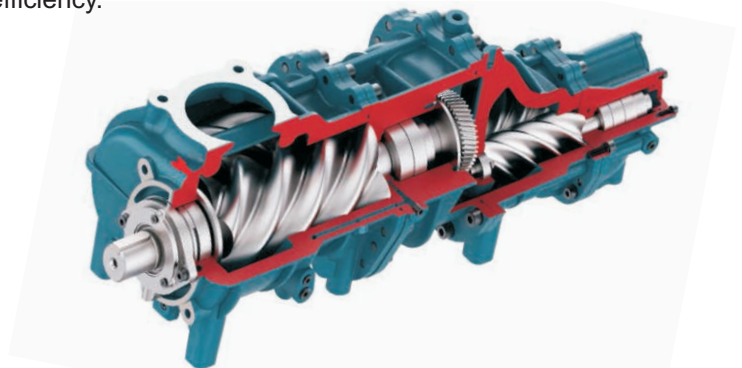
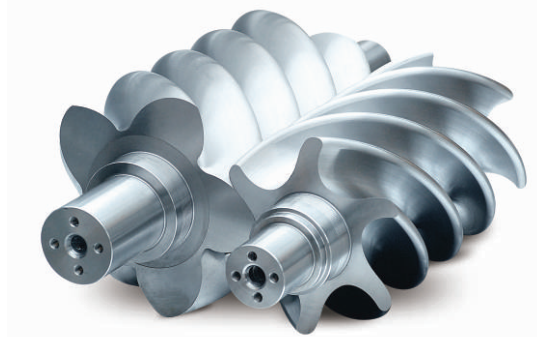
To increase the rotor throughput, the Airends of our Compressors are larger than usual. Our Air Compressors are built with 5/6 lobes and larger rotor size which reduces the specific power Consumption and runs at slow speed.

Lower inter-lobe leakage losses

Pressure differences between two neighbouring working chambers is small due to a greater number of lobes. This reduces inter-lobe leakage losses. Hence leakage to delivery ratio decreases as the number of rotor lobes increases.

Larger wrap angle & discharge port

A greater number of lobes combined with a larger wrap angle ensures multiple rotor contact. This reduces vibrations and thus minimizes noise. Larger discharge ports decrease the discharge velocity and therefore reduce the discharge pressure losses, thereby increasing the compressor's overall efficiency.





DIGITAL CONTROL PANEL

Monitors & Controls Key Compressor Functions

- Current transformer provides constant readout of operating current
- Protection against phase sequence changes
- Provides service schedule notification
- External monitoring via RS 485 interface
- High current input reading triggers shutdown
- Sequencing of up to 16 compressors

INTEGRATED MICRO PROCESSOR CONTROL FOR INDUSTRY 4.0

- Ease of use due to mimic diagram and constant pressure and temperature readout.
- Selective readout of operation and maintenance parameters provided
- Safety shutdown feature included
- Automatic start/stop operation over 24 hour period with lead/lag sequencing of multiple compressors
- Auto dual control : If there is no air demand during the pre-set time delay, the compressor shuts down the drive motor.
- The controller will restart the motor only when pressure falls below the pre-selected levels
- Integrated with IoT technology which allows remote monitoring and control over local or web networks



3 STAGE AIR / OIL SEPARATION

Lower Pressure Drop / Lower Absorbed Power

- Excellent oil mechanical pre-separation/ reduced direct oil impingement onto separator element
- Lower dust contact resulting in lower pressure drop / longer element life / lower energy consumption
- Residual oil carryover limited to 3 ppm

SINGLE PASS OIL & AFTER COOLERS

Long Life / Easily Accessible

- Minimise thermal stress
- Cooler running temperatures even at 50°C ambient conditions.
- Low oil carryover
- Low cooling air velocity reduces dust build up
- Increased lubricant life

RARE EARTH MAGNET TECHNOLOGY

Rare earth technology gives the permanent magnet motor superior energy efficiency compared to conventional induction motors. PM synchronous torque motors provide faster acceleration and deceleration, a great advantage in compressor applications as they can rapidly vary output to match application demands.

- Energy efficient over a wide speed range.
- Variable speed in constant and changing torque requirements.
- Lower routine and long term maintenance.



LAMINAR FLOW INLET VALVE

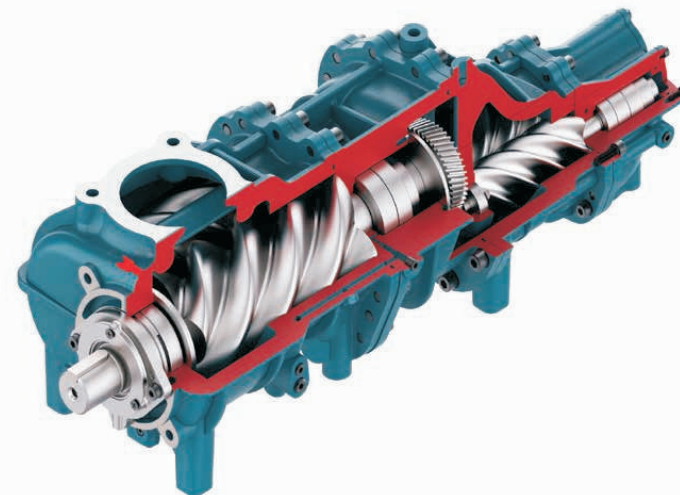
Minimum Pressure Drop / Increased Output

- Laminar flow inlet valve results in lower pressure drop through the intake, increasing output and saving energy.

“SKY” SERIES 2-STAGE AIR END

Maximum Output with Less Energy Usage

- Asymmetric 5 / 6 rotor profile with 100% SKF bearings
- PMV Grinder rotor technology for tighter clearances and world class efficiency and performance.
- Precision machined bell housing to maintain rigid alignment



316 STAINLESS STEEL CONTROL TUBING

Long Tubing Life / Reduced Downtime

- Increased reliability due to corrosion free material.
- Material such as nylon, copper or mild steel will fail in time causing downtime.
- Increased Lubricant life.

SAFETY AND THE ENVIRONMENT

Reduced OH & S Risk and Injury

- The entire Kaishan range of compressors includes full safety features such guarded rotating components and shrouded electrical components to reduce the risk of injury.

Permanent Magnet Variable Frequency Rotary Screw Air Compressors

Precision engineered integrated compressor unit

The new range of PMV compressors integrate the highest quality and most effective components into a compact unit to provide maximum output with minimum energy usage. These highly advanced air compressors provide world class efficiency and performance and yet they are heavy duty units developed to ensure superior durability and reliability. Precision engineering utilising latest technologies has achieved energy standards exceeding international expectations.

Developed by Kaishan Engineers, these revolutionary rotary screw air compressors bring together an integrated systematic optimisation of the compressor unit; an advanced permanent magnet motor and Kaishan SKY technology to achieve outstanding energy efficiency. This unique integrated combination all the way down to 15 kW is a game changer in compressed air industry offering unsurpassed efficiency.



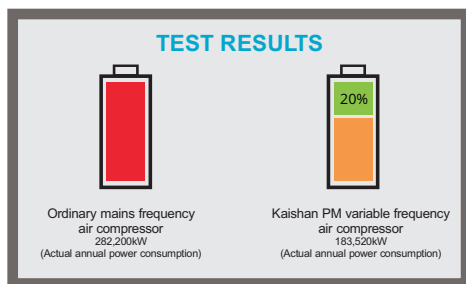
Rare earth material technology gives higher possible rotating speeds, wider operating parameters and increased energy efficiency to the permanent-magnet synchronised motors. Within their wide operating speed range the Permanent Magnet Variable Frequency rotary screw air compressors are able to maintain extremely high motor efficiency compared to those using conventional drive motors.



37kW Kaishan PM variable frequency screw compressor



37kW ordinary mains frequency screw compressor



Kaishan's Permanent Magnet Variable Frequency Rotary Screw Air Compressors operate at peak efficiency even with 80% reduction in air output. It also offers far greater integrated control precision through an advanced PID control algorithm that helps generate highly stable supply pressure.

The fully enclosed oil cooled Permanent Magnet motor generates very little heat, resulting in longer life. No cooling fan means significantly lower noise and less fan drag compared to conventional motors. The motor is heat resistant up to 18°C and cannot be magnetised. With no external electrical excitation, the motor maintains a power factor close to unity. The precision speed adjustment capability (1/30,000) greatly reduces discharge fluctuations of these new age air compressors.

Kaishan PM variable frequency screw compressor
Annual power consumption: 183,520kW

Ordinary mains frequency screw compressor
Annual power consumption: 281,200kW

Ordinary PM variable frequency screw compressor
Annual power consumption: 201,280kW

External variable frequency screw air compressor
Annual power consumption: 236,800kW

Motor angular position sensors are not required, simplifying the system and improving both stability and reliability. Torque can be compensated at any angle within 360° to achieve perfect torque control and the utilisation of bus voltage is greater than 93%, which is much greater than conventional inverters.

By regulating the volume of air output, the compressor can maintain maximum efficiency under all usage demands from 15% to 100%. Particularly in applications with widely fluctuating demand, Kaishan's Permanent Magnet Variable Frequency type air compressors demonstrate a remarkable energy saving capability over conventional types.

BENEFITS

- Complete control of air output to meet operating demand.
- Lower energy input for required air generation.
- Excessive part load energy consumption is significantly reduced.
- Gradual increase in motor speed eliminates starting spikes and cost penalties.
- A steady system pressure is maintained, lowering system stress and overall air demand.
- Reduced artificial demand due to lower operating pressures.
- Reduced maintenance time and cost.
- Significantly lower noise levels.

PMV SERIES SPECIFICATIONS

Model No	Discharge Pressure Bar	Flow Range cfm	Motor Power kW	Discharge	Dimension L X B X H mm	Weight kg
PMV-15	6-9	84 - 102	15	G1	1200 x 830 x 1240	380
PMV-22	6-9	127 - 149	22			480
PMV-37	6-9	222 - 263	37	G 1-1/2	1400 X 1000 X 1540	710
PMV -55	6-9	353 -422	55	G 1-1/2	1500 X 1160 X 1700	990
PMV2-22	6-9	134-162	22	G1	1650×900×1110	550
PMV2-37	6-9	229-270	37	G11/2	1820×1000×1140	740
PMV2-55	6-9	370-442	55	G11/2	2100×1200×1330	1100
PMV2-75	6-9	512-582	75	G2	2160×1220×1580	1450
PMV2-75-6	6	585				
PMV2-75-7	7	558				
PMV2-75-8	8	520	75	DN 65	2760 x 1630 x 1735	2220
PMV2-75-10	10	485				
PMV2-90-6	6	765				
PMV2-90-7	7	711		DN 80		2770
PMV2-90-8	8	679	90		2760 x 1630 x 1735	
PMV2-90-10	10	582		DN 65		2680
PMV2-110-6	6	902				
PMV2-110-7	7	847				
PMV2-110-8	8	812	110	DN 80	3070 x 1810 x 1800	3000
PMV2-110-10	10	710				
PMV2-132-6"	6	1161			3300 x 1810 x 2100	4380
PMV2-132-7	7	1008		DN 100	3070 x 1810 x 2080	3150
PMV2-132-8	8	950	132		3070 x 1810 x 1800	3050
PMV2-132-10	10	845		DN 80	3070 x 1810 x 2080	3050
PMV2-160-6	6	1345				
PMV2-160-7	7	1292				
PMV2-160-8	8	1205	160	DN 100	3660 x 1980 x 2100	4700
PMV2-160-10	10	1003				
PMV2-200-6	6	1692				
PMV2-200-7	7	1600			3660 X 1980 X 2100	5050
PMV2-200-8	8	1522	200	DN 100		
PMV2-200-10	10	1292			3660 X 1980 X 2230	4950
PMV2-250-6	6	2108				
PMV2-250-7	7	1978				6700
PMV2-250-8	8	1843	250	DN 100	3890 X 2160 X 2250	
PMV2-250-10	10	1589				6320

Unit Performance Measured in accordance with ISO 1217, Ed3, Annex C-1996

Reference conditions : Absolute inlet pressure = 1 bar, Ambient temperature = 20°C,

Cooling temperature = 20°C, Sound pressure level measured in accordance with test code : ISO2151-2004(E).

NOTE : Technical specifications of compressors are subject to change without notice



MODEL	COMPRESSOR TYPE	FEATURES
KRSP2	Two Stage	Global leader in air compressor efficiency
KRSP	Single Stage	Patented 'SKY' air end, triple SKF bearings
KRSD	Single Stage	Direct drive, TEFC motor, low sound enclosure
KRSB	Single Stage	Belt drive, economical to own and operate
KRST	Single Stage	Belt drive, tank mounted
KRSH	Two Stage High Pressure	Pressure up to 40 Bar
KRSA	Single Stage Low Pressure	Pressure as low as 1.5 Bar
KRSV	Rotary Screw Vacuum Pump	World class vacuum efficiency



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