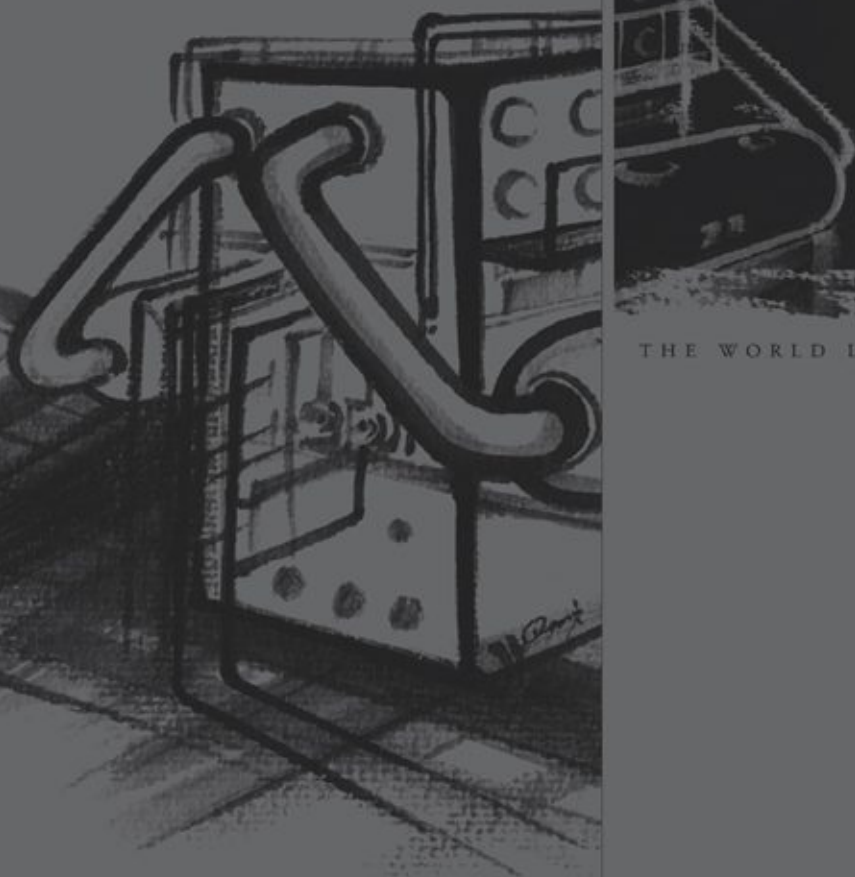


RECIPROCATING COMPRESSORS



THE WORLD LEADER IN GAS COMPRESSORS



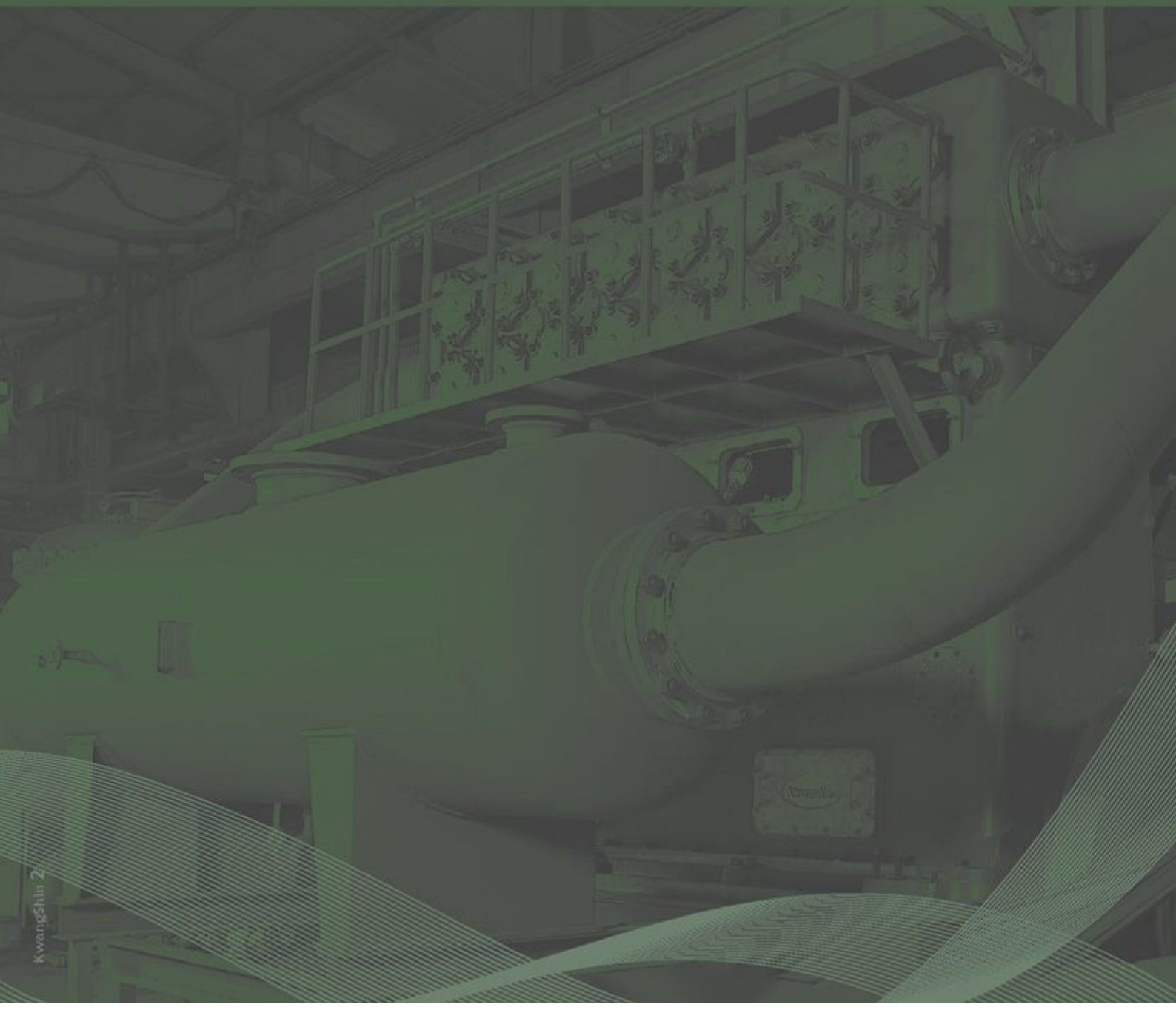


API STANDARD 618

Kwangshin Compressors have been designed Kwangshin Standard and in conformity with API STANDARD 618, the latest edition, recommendations.

They also comply with many guidelines and international construction codes and customer requirements in force.

Kwangshin produces diverse types of compressor to satisfy pressure and use in any ranges require by customers.

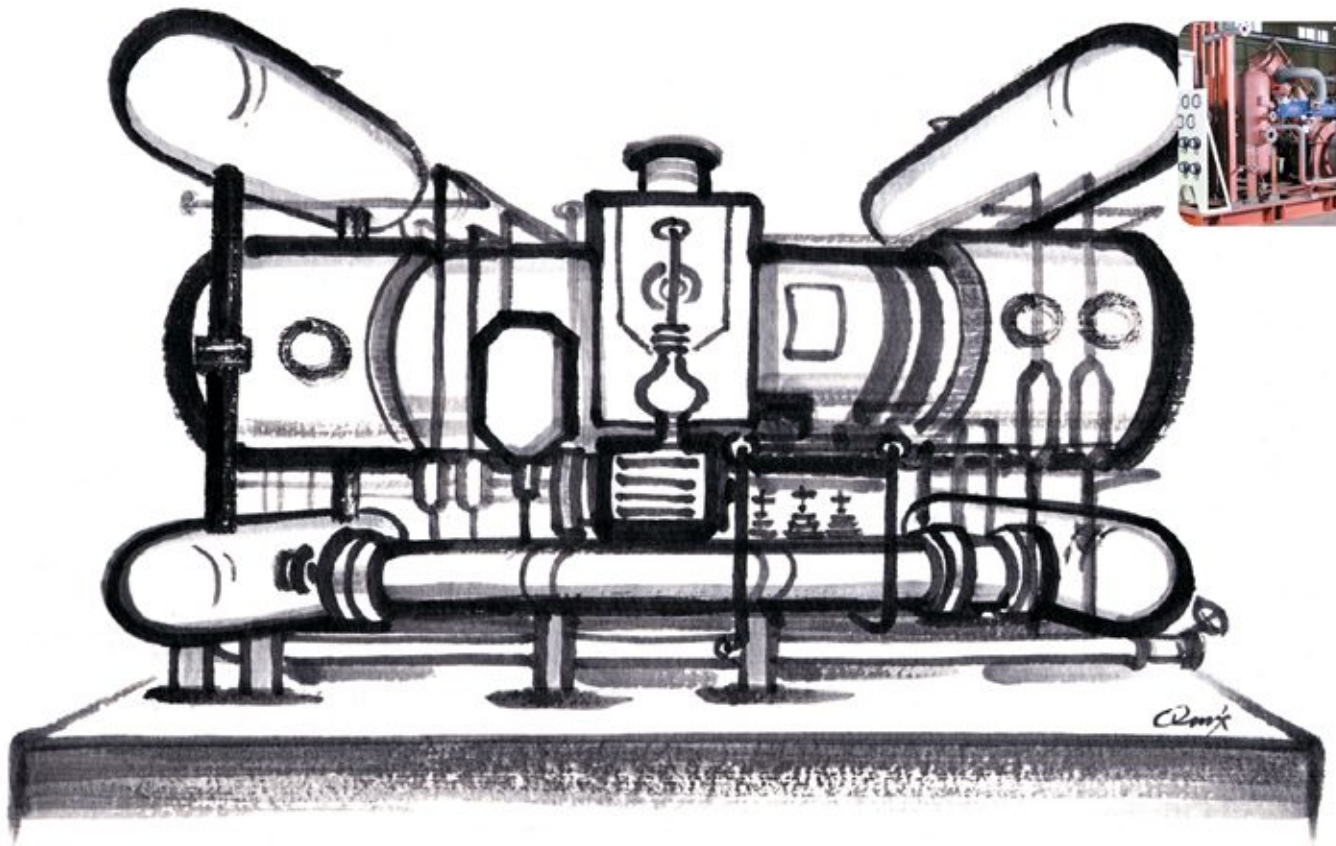


KwangShin

Dependable Compressors

*Passion that has lasted for 40 years,
Firm philosophy with respect to products,
and make the best products rather seeking to be
the top ranked company ?*

These are the factors that make Kwangshin a leader.



We will be wherever compressors are needed





For the past 40 years since it was founded in 1967, KwangShin has earned its reputation as the leader in the Korean compressor market, and developed new technologies unceasingly.

We have developed the following: reciprocating compressors for industrial use for the first time in Korea ; reciprocating gas compressors for process industries ; and high-pressurized compressors for PET bottle manufacturing. We have been also producing in Korea the screw compressors of Sullair, USA, and developed and supplied various compressors required in various industries. Based on decades of experiences and technical expertise, we also developed high-efficiency Air & Gas Turbo Compressors for the electronic, ship building, automobile and chemical industries that require clean, compressed air in large air & gas volume.

In order to cope with the atmospheric contamination that is getting worse every day, and in an effort to preserve the nature and environment for generations to come, KwangShin initiated the business for the engineering and construction of fueling station and CNG Compressors that uses natural gas for NGV.

KwangShin now handles a complete range of compressors. As a comprehensive compressor manufacturer that can meet the customer requirements for any purpose and any industry, KwangShin will be wherever compressors are needed in the world.

C.E.O 



*As a Leader in the Worldwide
compressor market*



New technology

Kwangshin is one of the best gas compressor manufacture in the world. An innovator in this field since 1967, Kwangshin sets customized for Reciprocating gas compressors. We use this technology to compressor.

Global capabilities

Thanks to our partnership with domestic plants and overseas partners, Kwangshin is capable of producing more than 100 sets of CNG and Reciprocating compressors a month.

Excellent quality assurance

Kwangshin's ISO9001 certified quality systems, utilizing the most modern equipment and the most advanced manufacturing techniques, are the finest in the industry.

A rapid customer service

Kwangshin's after-sales and service network stands ready to provide one day customer assistance anywhere in the world. We offer everything from technical problem solving to training customer personnel in the proper operation and maintenance of Kwangshin compressor. Our offer market support also include worldwide availability of genuine Kwangshin service parts, as well as fast, dependable product delivery. At Kwangshin, Total customer satisfaction is a cornerstone of our corporate philosophy.

Commitment to innovation

Underlying Kwangshin's leadership is a dedication to excellence and a commitment to innovation. At Kwangshin, we are constantly exploring new ideas and seeking new ways to meet customer's need for increasingly sophisticated, energy efficient compressor system. At Kwangshin, more than ever before, we are committed to expanding the horizons of compressor technology.

Systematic process control system



Superior Quality Dependable Compressors

The Quality of all components constituting the compressors is assured by ISO 9001 & ISO 14001 applied to the entire process of manufacture from initial design to final delivery.

An Inspection Plan is prepared for each compressor or compressor system order entered by Kwangshin. When no specific requirements are called for by the customer, Kwangshin's standard QA plan defining all checks, inspection procedures and relevant documents is applied.

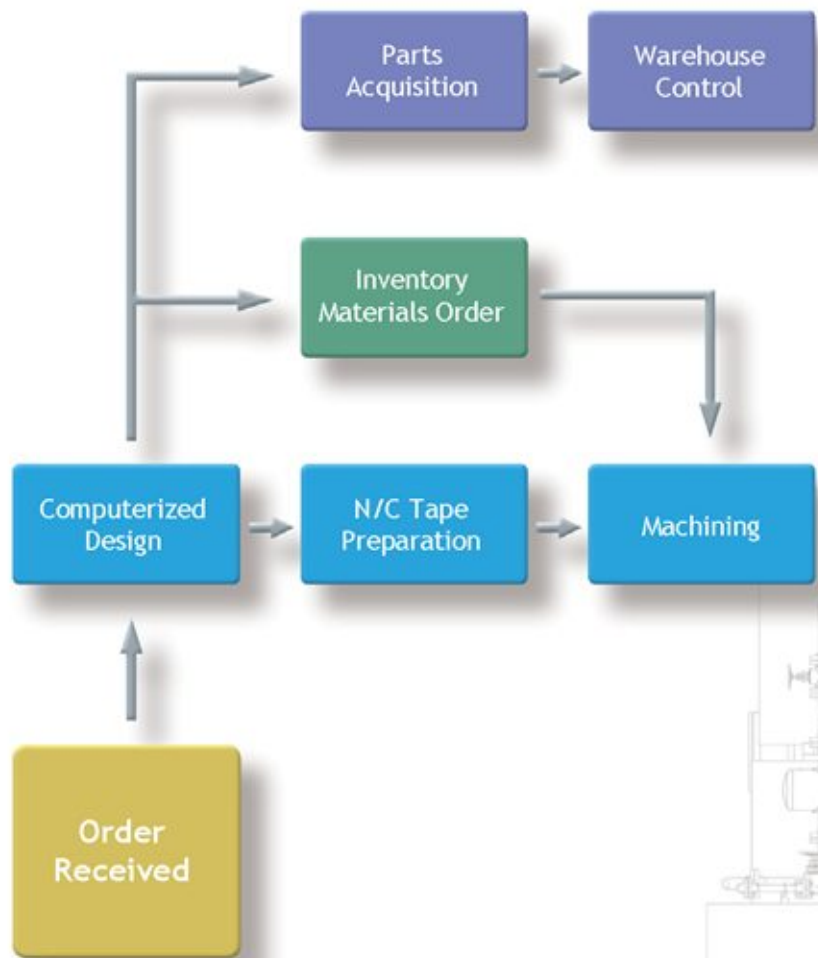
Kwangshin's Quality Assurance Team makes sure that all critical operations comply with the relevant procedures and makes dependable Compressors.

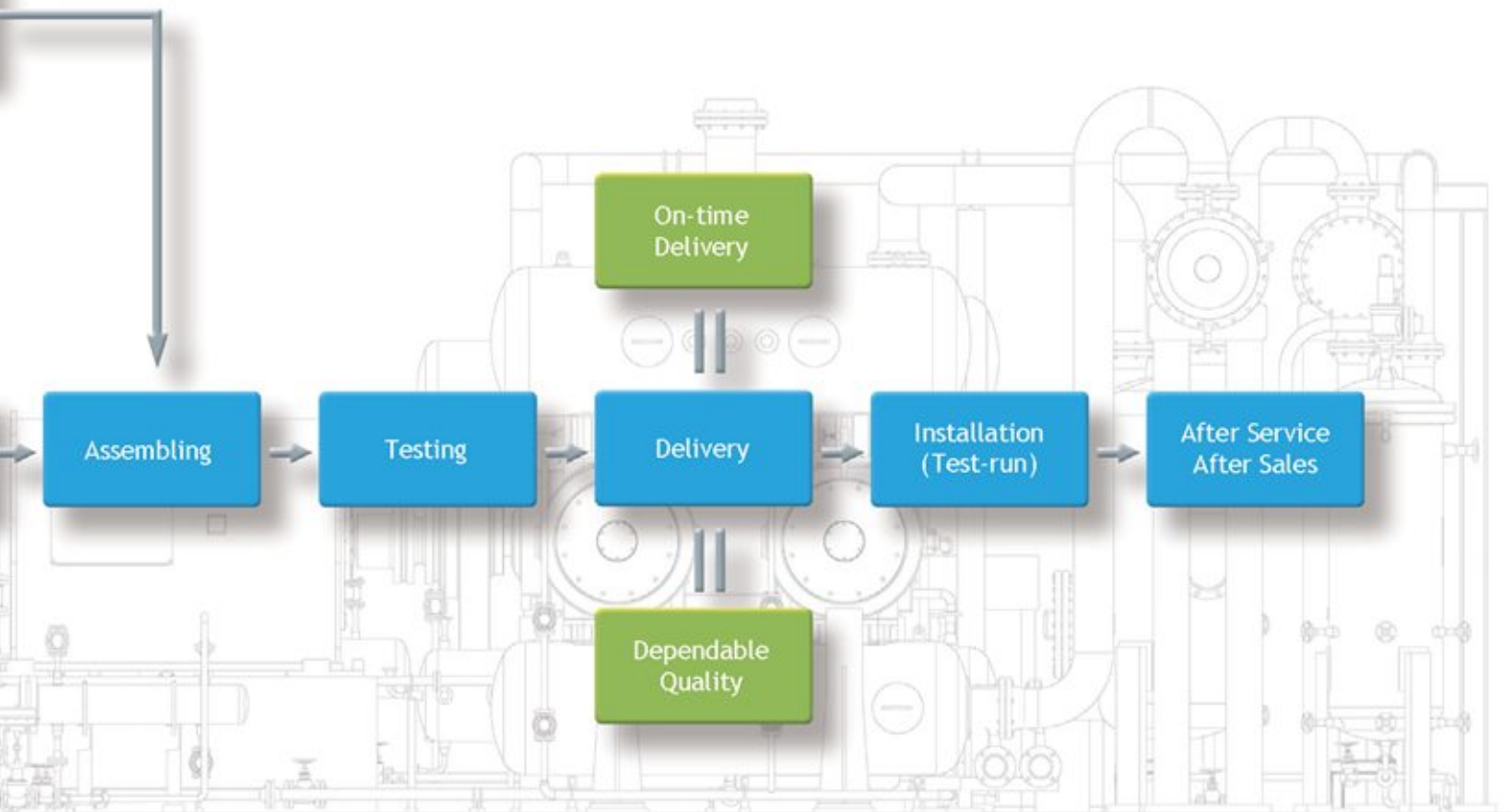
On-Time Delivery To Keep Your Project On - Schedule

Reliable on-time delivery is ensured through Kwangshin's consistent systematic process control system which covers everything from order acceptance to delivery. Computerized design, N/C machining, assembling and shop test and inspections are utilized throughout, as illustrated above, to provide constant process supervision and process control. As a result, actual order process is always known, assuring on-time delivery.

Perfect and Rapid After Sales & Service

More than 50 after-service staves are always standing by nationwide to provide users with prompt after service to meet requirement of users to the maximum, and we are proud of the fact that we have established a system to supply any parts rapidly as required.





Kwangshin Reciprocating Compressors Classification & Application Range by Type

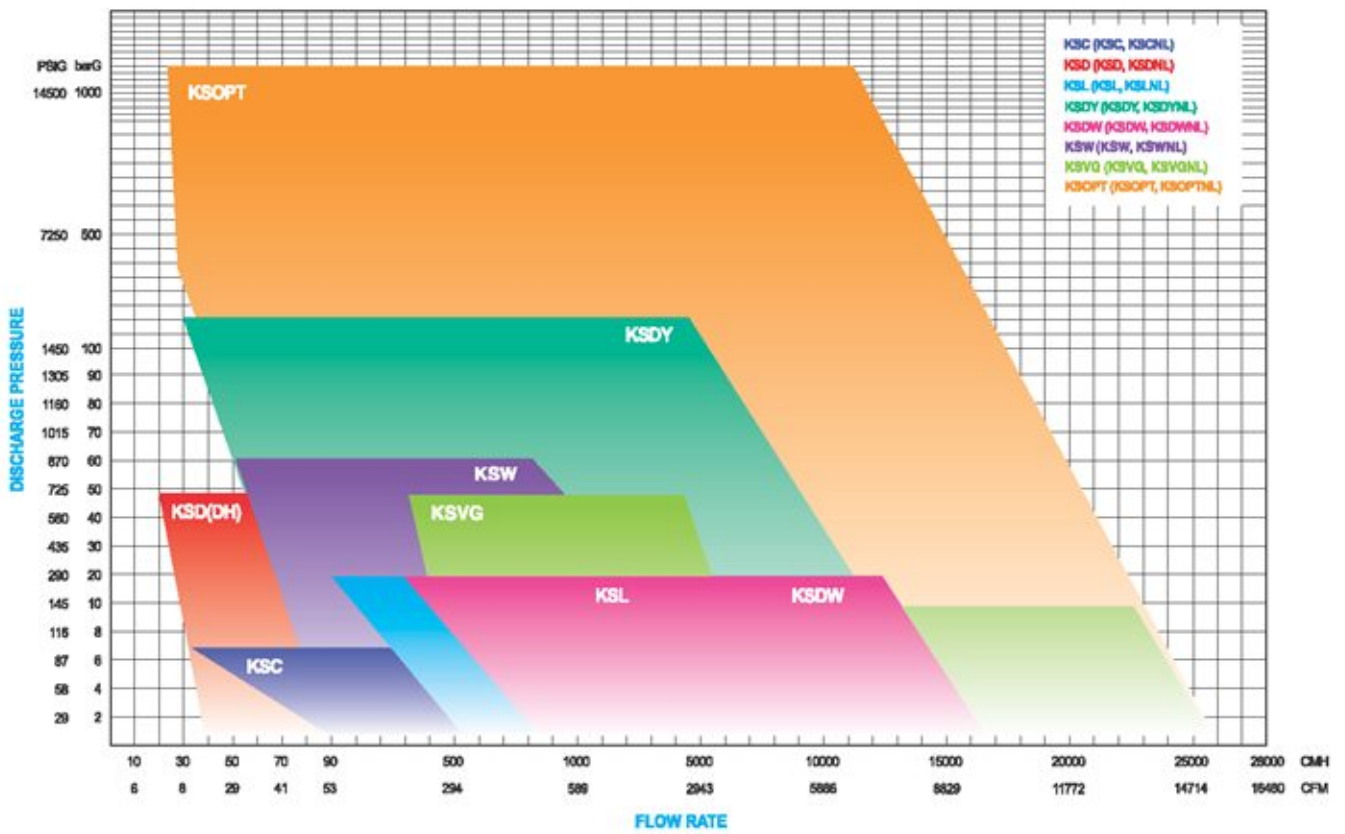
KSD(DH)-TYPE



KSDY-TYPE



KSW-TYPE



KSVG-TYPE



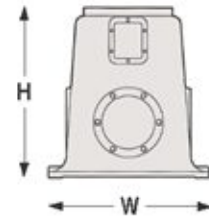
KSOPT-TYPE



Kwangshin Reciprocating Compressor Frames

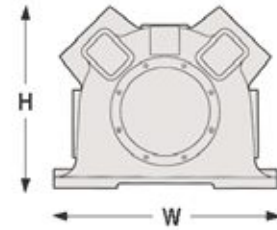
KSD(DH) Type

Frame	W(mm)	L(mm)	H(mm)	Stroke(mm)	Rated Power(kw)
1101-11-01-01	620	320	670	130	22
1101-11-02-01	760	400	800	150	30
1101-11-03-01	800	420	840	180	37
1101-11-04-01	1010	460	1005	230	55
1101-11-05-01	1010	460	1005	180	93



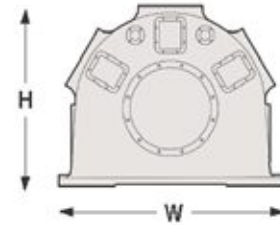
KSDY Type

Frame	W(mm)	L(mm)	H(mm)	Stroke(mm)	Rated Power(kw)
1101-12-01-01	900	455	738	150	37
1101-12-02-01	1060	580	872	150	75
1101-12-03-01	1580	700	1067	180	150
1101-12-03-21	1580	700	1067	180	190
1101-12-04-01	1580	700	1067	180	261



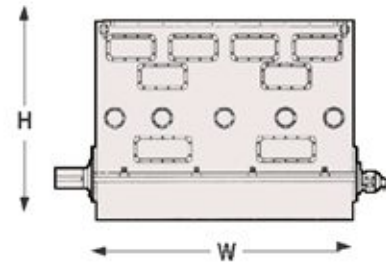
KSW Type

Frame	W(mm)	L(mm)	H(mm)	Stroke(mm)	Rated Power(kw)
1101-14-01-01	1400	1030	1110	150	110
1101-14-02-01	1600	1230	1280	180	340



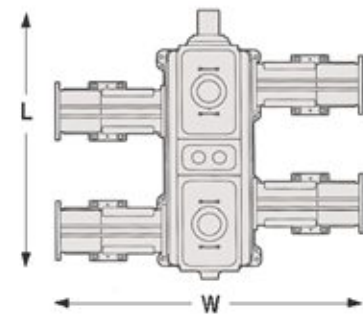
KSVG Type (3-4throws)

Frame	W(mm)	L(mm)	H(mm)	Stroke(mm)	Rated Power(kw)
1201-15-51-01	1100	2000	1800	180	150
1201-15-51-02	1100	2000	1800	180	220
1201-15-51-03	1250	3290	1850	200	300
1201-15-51-04	1250	3290	1850	200	600
1201-15-51-05	1350	4050	2450	250	675
1201-15-51-06	1480	4050	2450	250	1100
1201-15-51-07	1480	4300	2600	300	1200
1201-15-51-08	1480	4300	2600	300	1500
1201-15-51-09	1600	4600	2750	350	1600
1201-15-51-10	1600	4600	2750	375	1900



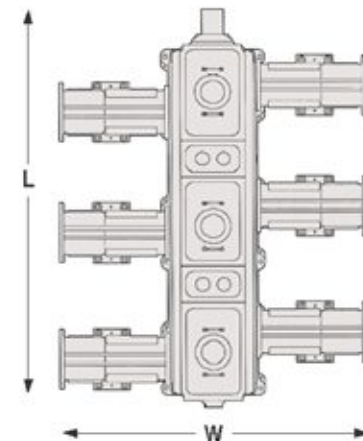
KSOPT Type (2throws)

Frame	W(mm)	L(mm)	H(mm)	Stroke(mm)	Rated Power(kw)
1101-13-01-01	1420	586	580	160	150
1101-13-02-01	1700	625	655	200	340
1101-13-05-01	1700	794	690	200	450
1101-13-04-01	2080	805	760	200	750
1101-13-06-01	3560	1705	895	300	1500



KSOPT Type (4throws)

Frame	W(mm)	L(mm)	H(mm)	Stroke(mm)	Rated Power(kw)
1101-13-21-01	1420	1760	600	160	300
1101-13-21-02	1420	1760	600	160	370
1101-13-22-01	1700	2050	680	200	485
1101-13-22-02	1700	2050	680	200	750
1101-13-23-01	3250	2025	830	280	1500
1101-13-24-01	3560	2575	895	300	2600



KSOPT Type (6throws)

Frame	W(mm)	L(mm)	H(mm)	Stroke(mm)	Rated Power(kw)
1101-13-31-01	3250	2800	900	250	1100
1101-13-32-02	3250	2800	900	250	1350
1101-13-33-01	3250	3150	950	280	1500
1101-13-34-02	3250	3150	950	280	1900
1101-13-35-01	3500	4200	950	300	2250
1101-13-35-02	3500	4200	950	300	2600

General Description of Kwangshin Heavy-duty Reciprocating Compressors



Rigid construction

The compressor crankcase is of the rigid type construction, and spacer blocks and cylinders are strongly bolted each other. And auxiliary pressure vessels and heat exchanger are designed and located strong angle and supported.

Minimized vibration

The arrangement of compressor cylinders arranged on opposite sides of the crankshaft provides for mutual balancing of the reciprocating inertia forces, to ensure minimized vibration generated by the reciprocating masses.

Maximized efficiency

Throttling and other causes of pressure loss are minimized through careful design of passages; friction and other mechanical loses are minimized through special attention in design and manufacture to ensure smooth movement of all parts.

Easy installation

With the exception of very large units, all reciprocating compressors are completely assembled on the compressor bed in factory, and are shipped ready of installation with no assembly work required at the site.

Easy operation and maintenance

Completely automated control equipment permits startup at the push of a button; operation thereafter can be remotely controlled from a central panel, with all necessary interlocking devices provided to prevent trouble from operator's error or other disturbance. Routine inspection and maintenance are facilitated by the flat arrangement of the cylinders on both sides of the compressor frame.



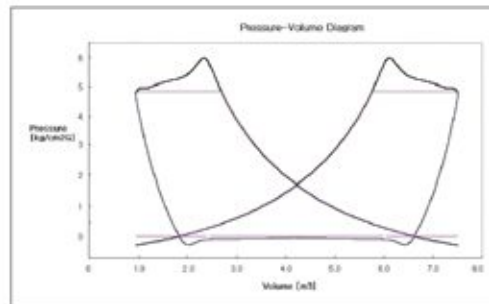
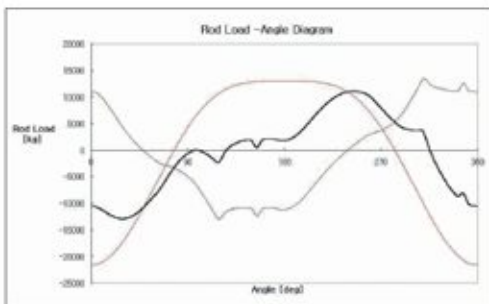
General Description of Kwangshin Heavy-duty Reciprocating Compressors

Extended maintenance - free life time

An extended period of maintenance- free life is ensured by the high quality of design, material, workmanship and inspection provided for the reciprocating compressors: At least 8,000 hours operation is ensured for most uses, through application to the cylinder sliding parts of the results obtained on a variable testing and long experience.

Kwangshin has developed own compressor design software and all the calculation process are done by this software.

The software has data bank of all the gas and mixed gas characteristics to help thermodynamic calculation, the results obtained are defined, by stage, by cylinder, or by effect.



Compressor Performance

BHP-adiabatic / mechanical/ valve absorbed/ total

- Temperature adiabatic
- Compressibility factors
- Condensate volume
- Gas flow rate through valve
- Valve calibration
- Cooler calibration

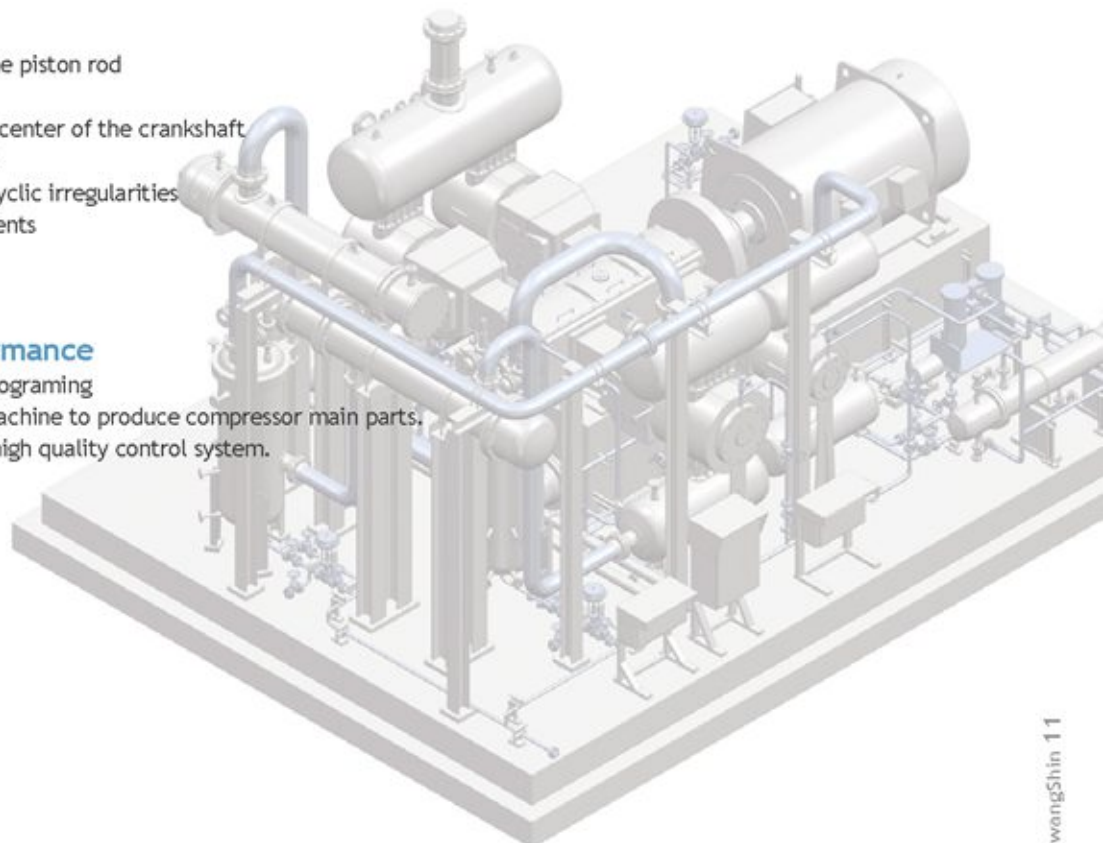
Mechanical Calculation

- Inertia force and pressure on the piston rod
- Reverse rod load
- Residual efforts brought to the center of the crankshaft
- Residual efforts at all the parts
- Inertia balance weight and of cyclic irregularities Depend on Customer Requirements
- Pulsation analysis
- Torsional analysis

High Quality and Performance

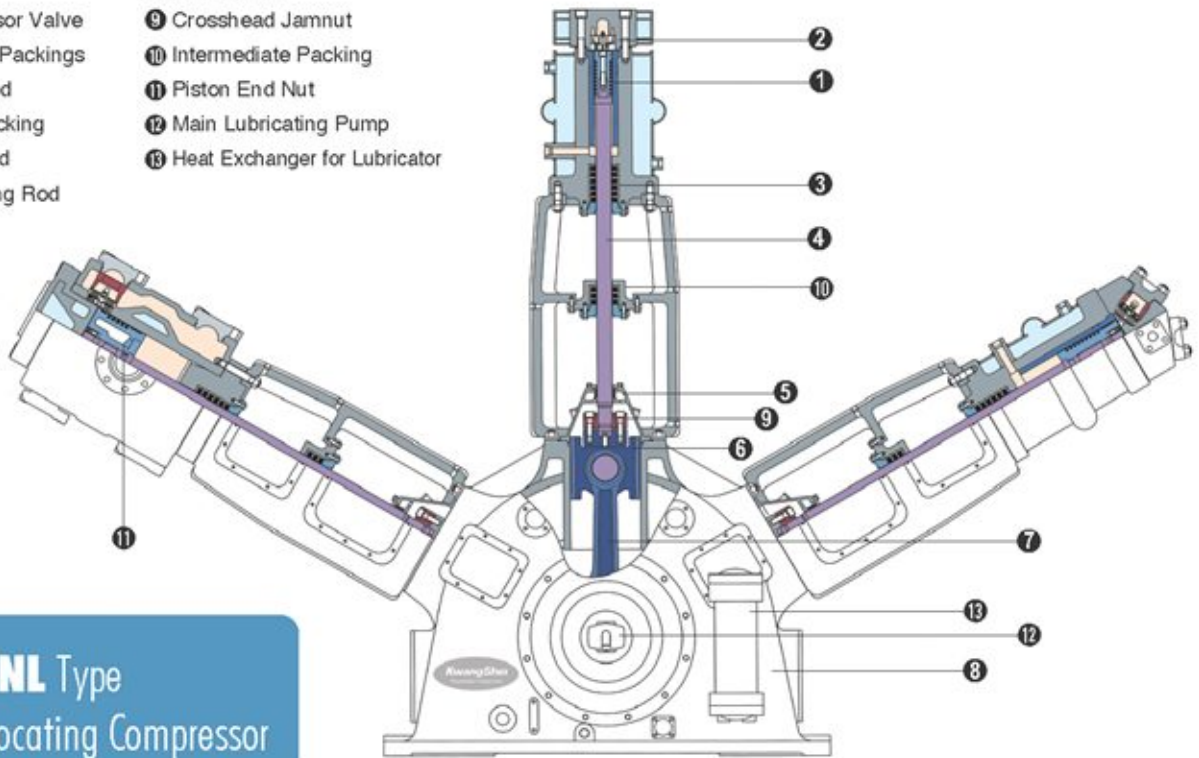
The drawings used machining programming and use high performance NC machine to produce compressor main parts. This all steps are controlled by high quality control system.

- NC boring machines
- NC machining centers
- NC turning machines
- NC parallel lathes
- NC planner



Main Parts Description of Kwangshin Reciprocating Compressors

- ① Piston
- ② Compressor Valve
- ③ Pressure Packings
- ④ Piston Rod
- ⑤ Wiper Packing
- ⑥ Crosshead
- ⑦ Connecting Rod
- ⑧ Crank Case
- ⑨ Crosshead Jamnut
- ⑩ Intermediate Packing
- ⑪ Piston End Nut
- ⑫ Main Lubricating Pump
- ⑬ Heat Exchanger for Lubricator



KSWNL Type
Reciprocating Compressor



Non-lubricated compressors

The customer may require non-lubricated compressors where no lube oil is allowed in the process gas for reasons of taste, catalyst fouling or risk of explosion. PTFE is used for piston ring and wear-band, and also for the piston rod packings. This material has excellent running properties. Extra long or double compartment distance pieces are incorporated in non-lubricated compressors which prevent the piston rod from alternately entering the crankcase and stuffing box; this avoids oil carry over.

Cylinders

Depending on the intended service, the cylinders are of either special-grade cast iron, cast steel or tempered forged steel, to provide maximum durability in continuous service under severe conditions.

The cylinder design provides for minimum gas flow disturbance and throttling, while ensuring minimized clearance volume and prevention of drain collection. Disassembly for checking and maintenance are simplified by considerations in design for easy dismantling of suction and discharge valves from the cylinder interior, for removal of piston and piston rod from cylinder by simply removing the cylinder cover, and for easy extraction of the piston rod packing.

Cylinder liners

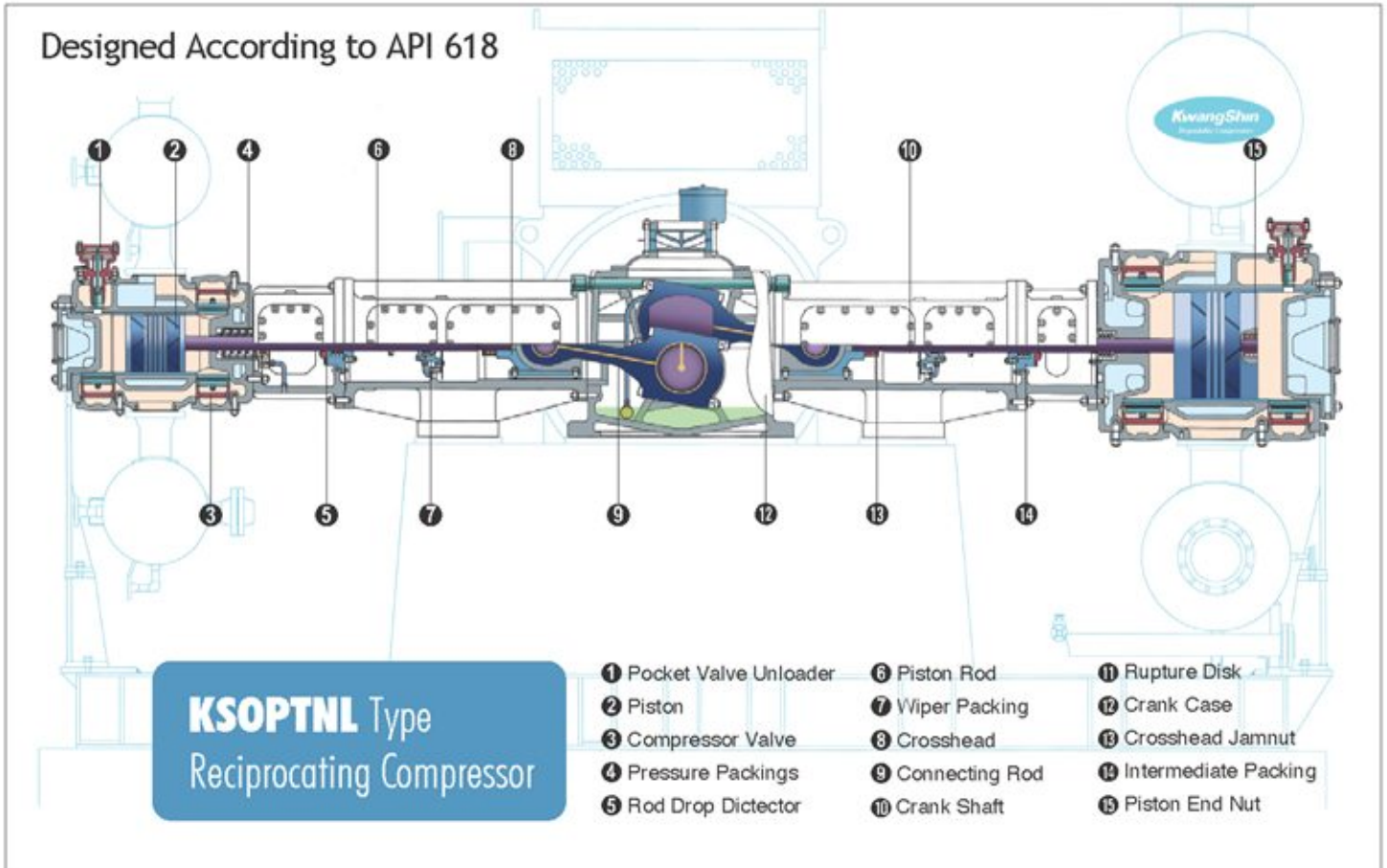
Cylinder liners of dry type are provided for cylinders.

Made of special perlite cast iron or alloy cast steel according to the service intended, the cylinder liners are honed to mirror finish and chromium Plated, to ensure durable service for the piston rings and wear band. When worn, the liners can be easily removed for reborng.



Main Parts Description of Kwangshin Reciprocating Compressors

Designed According to API 618



Crankcase

The compressor crankcase is of the rigid box type construction, made of cast iron, or of the open type having spacer block and tie-rods.

The crosshead guides are correctly aligned on each side of the crankcase by means of accurately-machined faucet joints, firmly fixed by strong bolts and sealed by gasket to prevent all leakage of oil.

The bottom of the crankcase is bulged to serve as oil reservoir. The top is provided with removable cover to facilitate checking and maintenance of the internal components.

Crankshaft

The crankshaft designed without bearing between the opposed crank throws, which are thus closely spaced to minimize the axial moment applying on the shaft. The shaft is rugged one-piece forged steel, tested after manufacture by both ultra-sonic and magnaflux inspections.

The drive end of the shaft can be provided with any type of connection rigid or flexible flange coupling, V-belt pulley, etc.

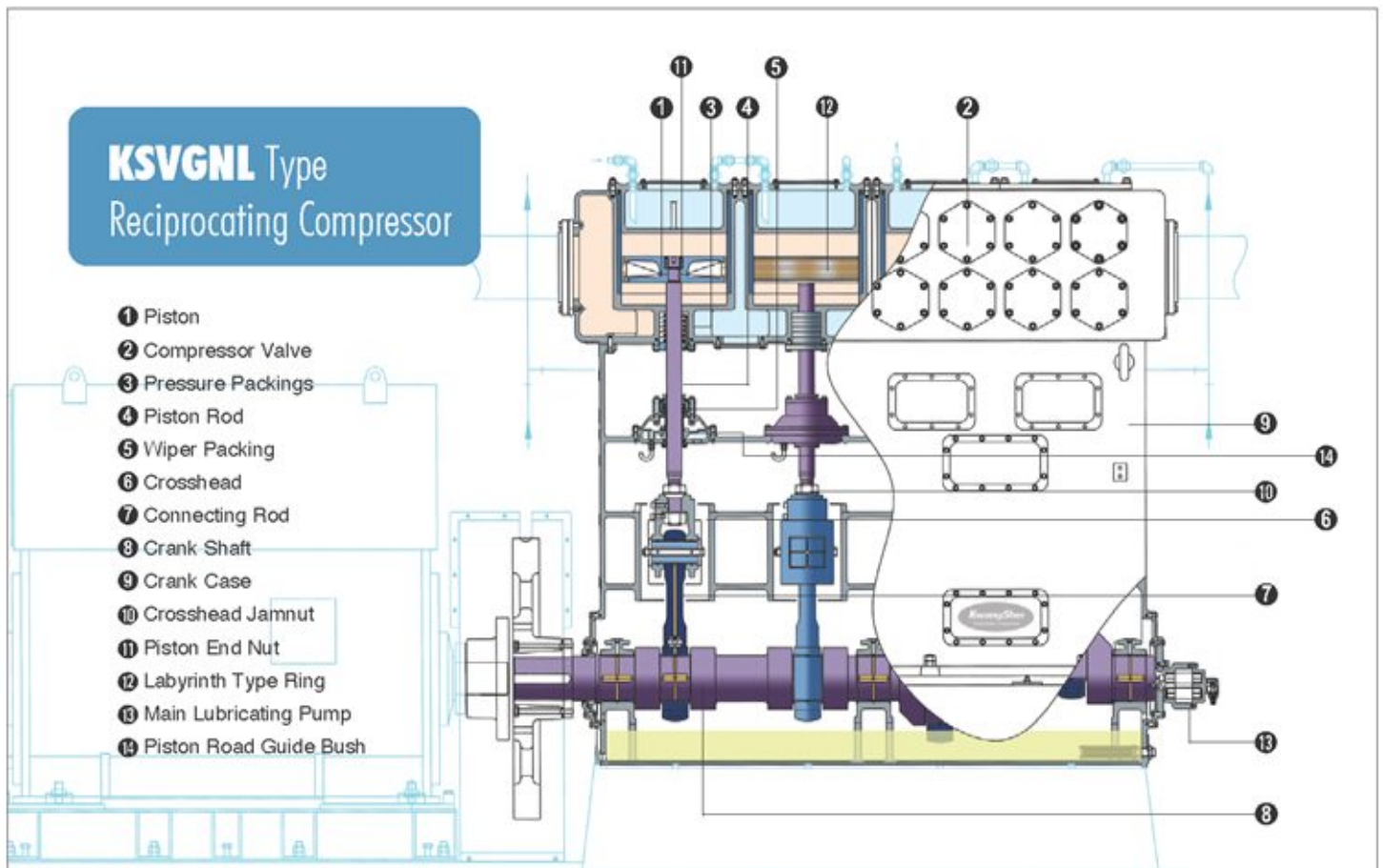
Oil passages provided through the crankshaft ensure forced lubrication of the connecting rods and crossheads.

Crosshead

Particular care is taken to ensure trueness of the crosshead pin axis in reference to the crosshead, to the guide surfaces and to the piston rod socket, to provide geometrically correct motion free from distortion. The crosshead pins have their surfaces heat-treated and ground to mirror finish.



Main Parts Description of Kwangshin Reciprocating Compressors



Connecting rod

The forged steel connecting rods are also subjected to ultrasonic and magnaflux inspections. The big end bolts are of high tensile steel with polished stem; tightening of the bolts is carefully controlled to prevent overstraining conducive to fatigue. Special bearing metal is cast into the big and small end bearings of precision type.

Main bearings

The high-load long-life bearings provided for the crankshaft are of symmetric-type with white metal cast-in lining easy to maintenance. The two segments are fixed between the frame body and the housing cap.

Axial expansion of the crankshaft is accommodated on the side away from the driven end of crankshaft.

Forced lubrication is provided by gear pump drawing oil from the frame body reservoir.

Pressures

For medium pressure duties we supply cast iron or cast steel cylinders. For high pressures up to 600 bars, we supply special forged steel cylinders.

Corrosive gases

When corrosive gas components are present, various parts have to be made of special corrosion resistant materials. We have experience with all types of gas, e.g. HCl and wet CO₂, SO₂ and H₂S.

Main Parts Description of Kwangshin Reciprocating Compressors

Piston

Piston material is selected to best suit the service intended and the service pressure. Piston/rider rings of highly wear resistant filled teflon permitting no lube oil are provided to ensure correct straight-line motion of the piston. Piston rings are of special cast iron or filled teflon in lubricated version; lead or phosphor-bronze castings, as well as chromium plated cast iron, or filled teflon with high safety in lubrication are used for high pressure applications. In non-lubricated version, the piston rings are of filled teflon resin or special resin with sufficiently extended life.



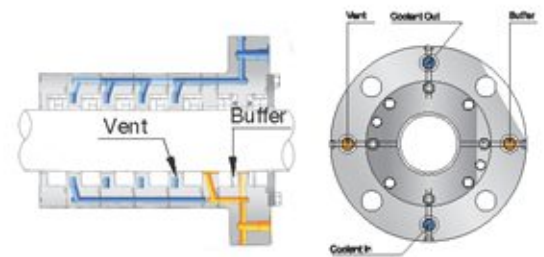
Piston rods

Piston rods are of carbon steel, stainless steel, alloy steel inspected by ultrasonic and magnaflux tests after heat treatment and surface polishing, to ensure high wear resistance as well as durability for both piston rod and packings. For certain special services, the piston rod surface is Plated with chromium or specially treated.



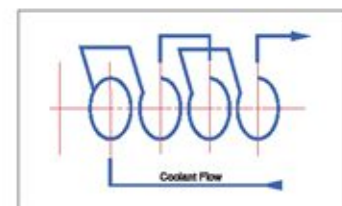
Valves

For non-lubricated applications, the suction and discharge valves which largely determine the compressor performance operate with perforated disc valve plates entirely devoid of any sliding part. For lubricated applications, the sliding valve plate is guided by a uniquely arranged center collar, to ensure smooth movement. For both applications the backing plate and valve springs minimize the reseating impact of the valve plate. (Dual Cushion type). The conical springs to reseal the valve plate are designed separately for different service pressures and multiply their force with increasing displacement, minimize the time lag of initial opening while ensuring the requisite reseating force, and to reduce the reseating impact. The materials used for the valve plates and springs are normally of stainless steel, but special material(PEEK) are used for customer's requirements. And also Kwangshin prepared other types of valve for special applications.



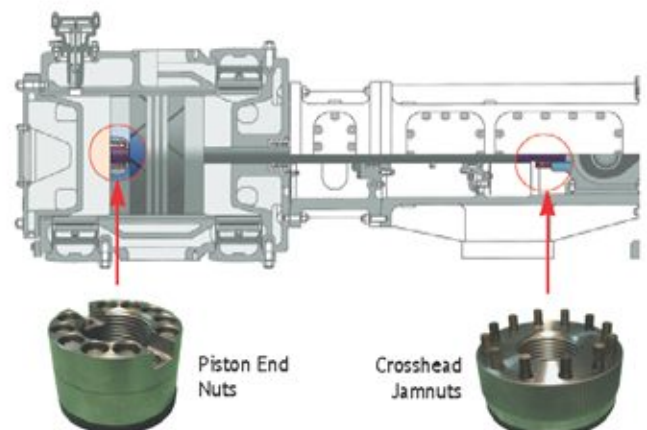
Piston rod packings

Piston rod packings are selected to suit the service and pressure. For lower and medium pressure service, self-lubricating material(filled teflon resin) is used as standard for both lubricated and non-lubricated applications. For higher pressure service, special type filled teflon resin packings are used. The piston rod packings are dismountable completely with housing to facilitate checking and maintenance.



The garter springs provided to hold the packing segments together are designed so as not to rub against the piston rod and damage it with direct metallic contact, even when the packing has completely worn out. KwangShin packings provide satisfactory gas sealing, even with non-lubricated application. The packing cases of the non-lubricated application are cooled by water to ensure long service life.

With lubricated application, the packing gland is provided with oil wiper rings, oil seal or other elements to suppress oil leakage along the piston rod surface into the distance chamber.



Multi-Bolt designed Nut

Kwangshin adapt Multi-Bolt designed Nut to Piston End and Crosshead. There is no need to clamp the Piston rod when installing or removing Piston End Nuts. Crosshead Jamnuts are safe and easy to install /remove on compressor crossheads.

These Nuts have "captive" machinery type jackbolts as an added

Main Parts Description of Kwangshin Reciprocating Compressors

safety feature. Nut material may also vary due to corrosion resistance requirements. Multi-Bolt designed Nut can generate higher bolt tensions than any other bolting method use only standard torque wrenches.

Pneumatic Barring Device

A Pneumatic Barring Device is a tool designed to safely and easily bar the compressor. Exact positioning for maintenance, or complete rotation of the compressor for other purposes, can be achieved using the device.

Capacity control

One of the advantages of a reciprocating compressor is that loss free capacity control can be realised, in order:

- to keep energy costs low with varying demand.
- to keep process conditions stable with varying demand.
- to start the compressor completely or partially unloaded.

Compressors can have stepped capacity control or stepless, and can be operated manually and/or automatically.

Cylinder unloading

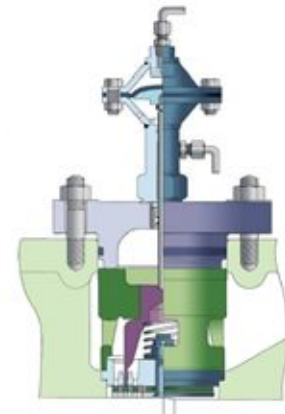
Stepped control can be realised by unloading one or two cylinder sides, which results in a three step control for one cylinder, i.e. 100-50-0%. Five steps or more can be obtained with more cylinders in parallel operation. Because of its simplicity and reliability stepped control is the most commonly used capacity control. Furthermore, it is loss free i.e. the power consumption is almost proportional to the quantity of gas that has to be delivered.

Volumetric control

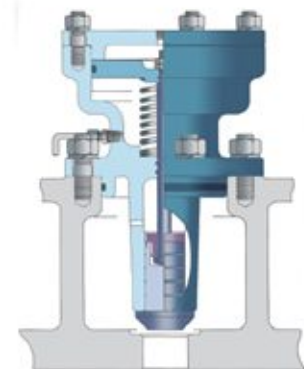
Stepless control can also be achieved by means of a variable clearance pocket. Variable volume is achieved by means of a piston which is operated in the cylinder with a handwheel and spindle, so that any desired clearance can be achieved. Again, this system of control is loss-free.

Bypass control

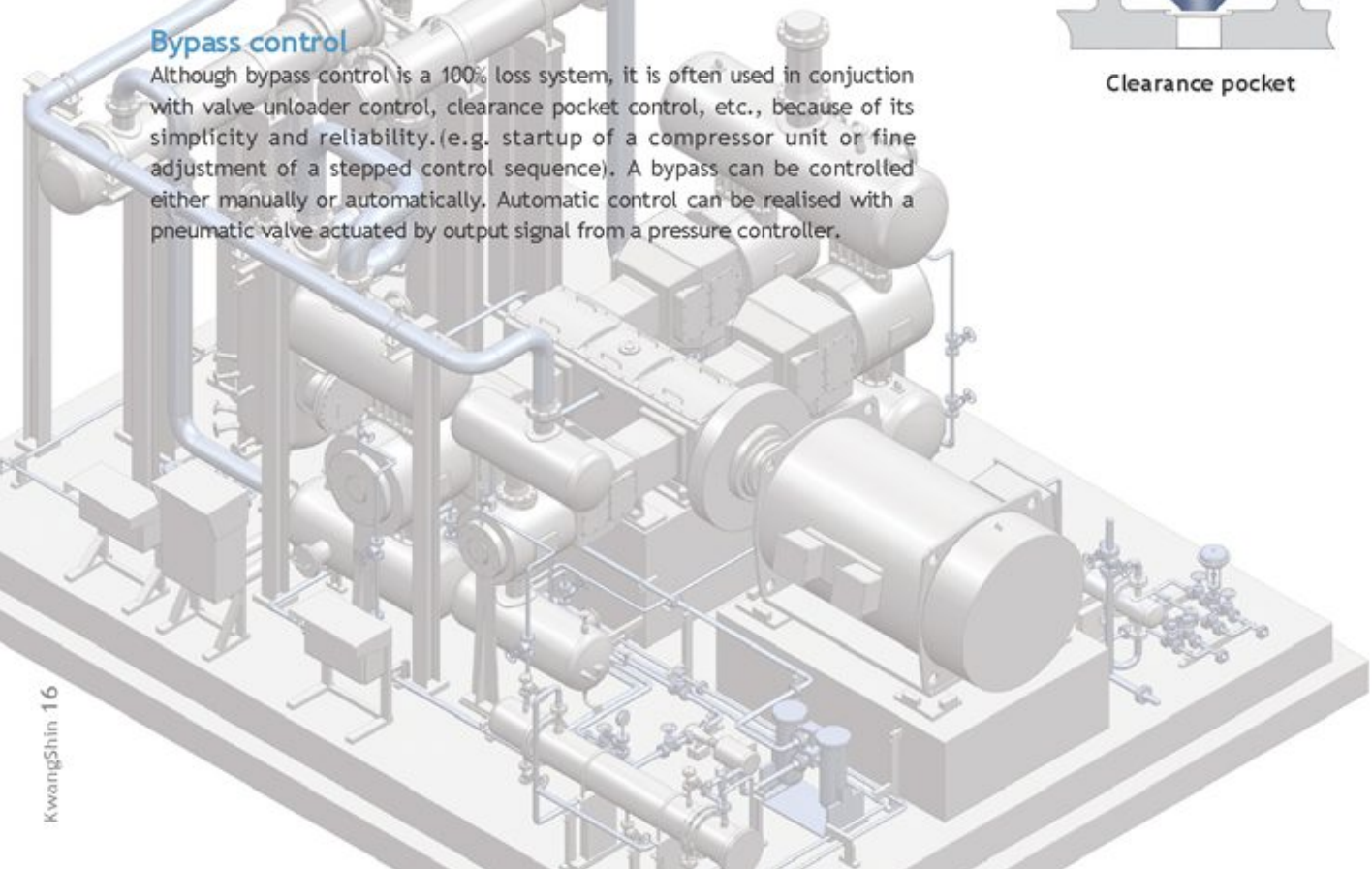
Although bypass control is a 100% loss system, it is often used in conjunction with valve unloader control, clearance pocket control, etc., because of its simplicity and reliability. (e.g. startup of a compressor unit or fine adjustment of a stepped control sequence). A bypass can be controlled either manually or automatically. Automatic control can be realised with a pneumatic valve actuated by output signal from a pressure controller.



Suction valve unloader



Clearance pocket





One of the Best Compressor manufacturer in the World

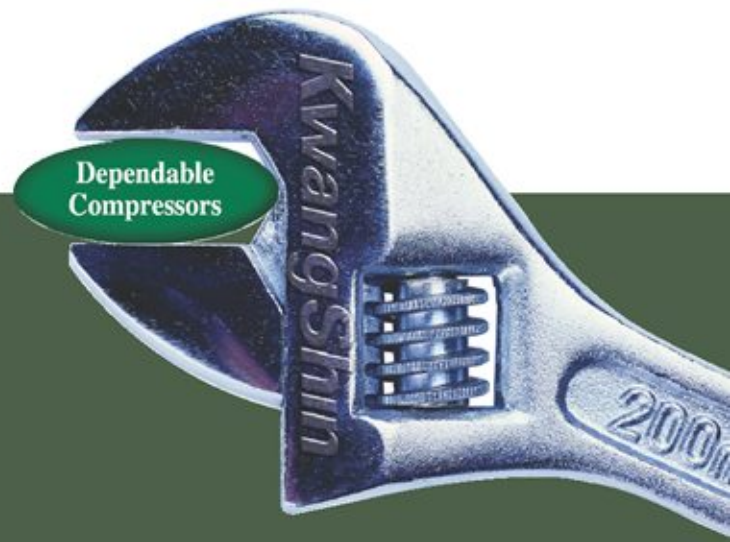
Kwangshin “localized” reciprocating compressors for the first time in Korea, meaning that we were the first Korean company to manufacture reciprocating compressors with Korean technology.

Our compressor development efforts started first when we supplied compressors to fermentation plant. Since then, we have been making continuing efforts for the development of new technologies and products. Now we manufacturing compressors that having its power up to 3,000Hp and having its pressure up to 1,000Kg/Cm²G. Our R&D efforts have never stopped since we purchased up-to-date design development technology.

Compressors are a key product for the “backbone” industry of Korea. Producing a compressor calls for virtually “zero” tolerance, and without accumulated expertise and experiences, it is virtually impossible to produce a quality compressor. For the past decades, our mission has been : “we produce reliable compressors”. That mission has never been changed. At this moment, more than 5,000 Kwangshin compressors are being operated in major plants around the world.



After Sales Service



Business Development and After Service

Just as the continued growth of a true enterprise is guaranteed through the provision of diversified models and superior function plus the highest quality, so is the promise made to customers to provide perfect after-sale service important of all to guarantee growth. KwangShin, since long ago, has been implementing perfect-service system in which KwangShin takes responsibility to the last on all products sold to world markets such as those of Europe and Southeast Asia, not to speak of domestic markets.

The KwangShin's service teams, operating without a rest throughout the year, provide services satisfying regional characteristics and operate active management system by conducting regular inspections even on products sold overseas. In order to provide faster and more comprehensive service, KwangShin operates 1-day service system for domestic customers and makes continued effort to provide advanced A/S through the expansion of overseas branches. The KwangShin's sole total service spirit believing that customers' trust begin from small things - That is the promise KwangShin has made with customers.



Overseas Partners

The global network system checks, on a real-time basis, Kwangshin products to see if they are satisfactorily operating in every corner of the world.

Kwangshin's global network system can take immediate actions under any environment irrespective of place and time providing the best services that suit the highest-quality products by creating a harmonious community with customers.



BANGLADESH	INTRACO CNG LTD(FOR CNG COMPRESSOR)	TEL +880-2-988-1887	FAX +880-2-881-9921
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EGYPT	D.I.G LTD	TEL +20-2-403-8838	FAX +20-2-266-3890
INDIA	JYO TECH ENGINEERING	TEL +91-11-2644-7966	FAX +91-11-2648-2189
INDONESIA	PT. PETROSS GAS	TEL +62-21-726-0630	FAX +62-21-726-0448
IRAN	HAVAYAR GROUP	TEL +98-21-895-2139	FAX +98-21-896-9826
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