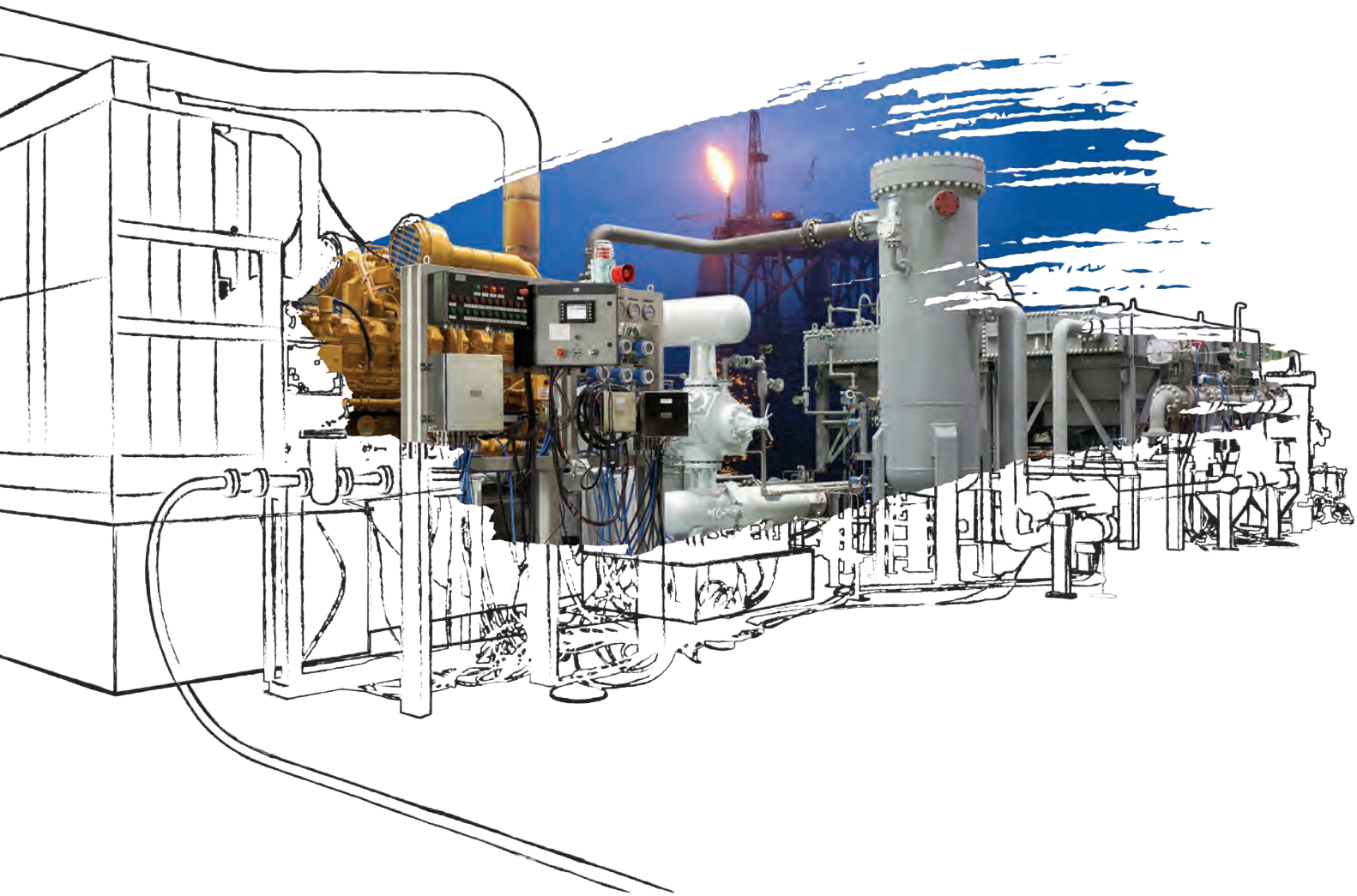




KwangShin

GEO series **PIPELINE BOOSTERS**





Total Solution Provider for Pipeline Boosters

Over a half century accumulated in house experience in developing, engineering and producing a variety of reciprocating compressors for air and gas applications required in various industries, KwangShin has been providing the most efficient and reliable solutions to clients. Since after KwangShin launched own CNG compressor brand "GEO Series" in 2001, KwangShin has delivered more than 1600 CNG compressors over the world. Based on long experiences for manufacturing industrial/CNG compressors, KwangShin became able to introduce GEO Series pipeline boosters. Its technology and manufacturing are the accumulation of KwangShin compressor history and KwangShin can provide customized solution for any given condition. KwangShin, as one of the best compressors manufacturer, will be at any time and in any place where pipeline boosters are needed in the world.



New technology

KwangShin is one of the best gas compressor manufacturer in the world. An innovator in this field since 1967, KwangShin sets customized for gas compressors. We apply this technology to GEO series pipeline boosters.

Global networks

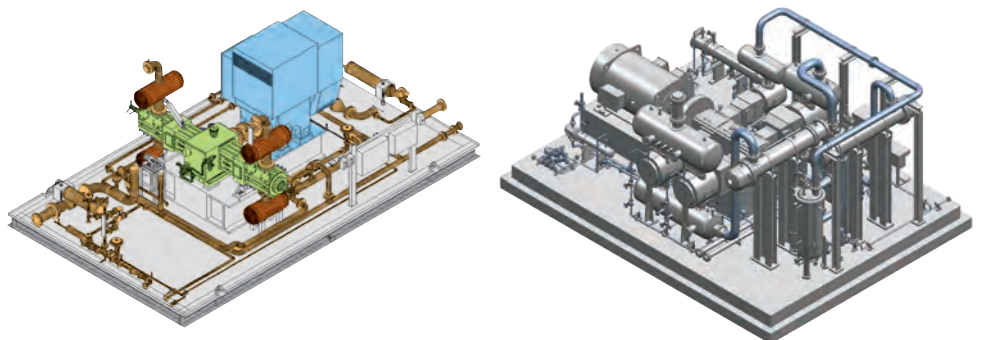
KwangShin has the global network through partners over the world. As our references for compressors over the world indicates, KwangShin has the global capability to do businesses in any place in the world.

Excellent quality assurance

KwangShin's ISO9001/ISO14001/OHSAS 18001 certified quality systems, utilizing the most modern equipment and the most advanced manufacturing techniques, are the finest in the industry.

Simultaneous Customer Service

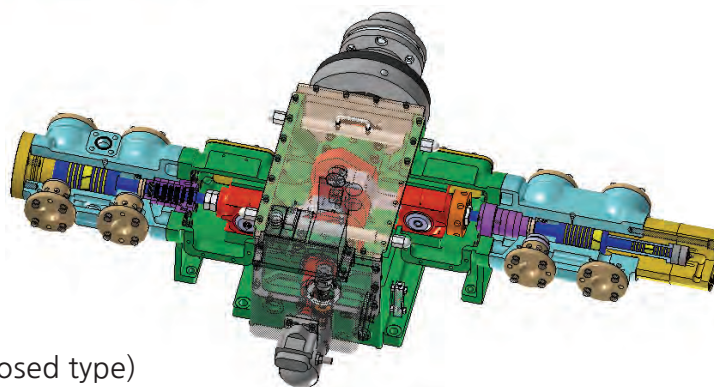
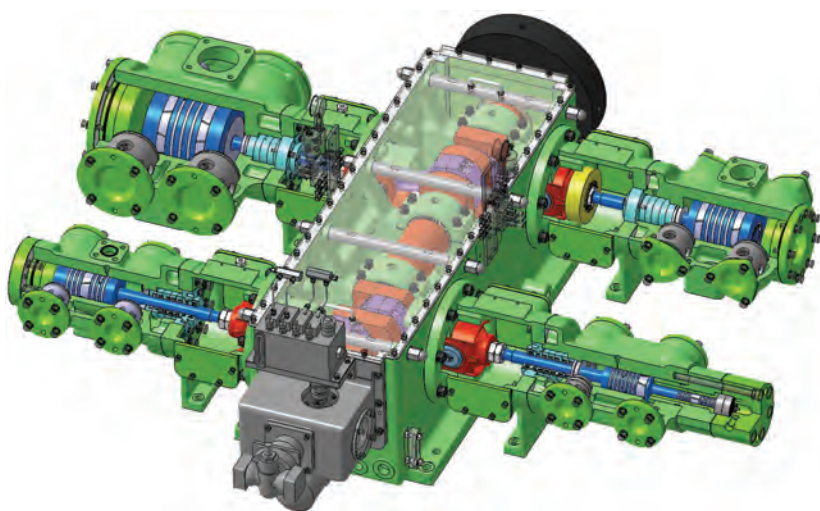
KwangShin's after-sales and service network stands ready to provide customer assistance for 24-7, anywhere in the world. We offer exactly what customer needs from technical problem solving to training customer personnel in the proper operation and maintenance with genuine parts.





Product Range Table

| Description \ Model | GEO-A II | GEO-B II | GEO-C2 | GEO-C4 | GEO-D2 | GEO-D4 | GEO-E2 | GEO-E4 | GEO-F2 | GEO-F4 |
|---------------------|----------|----------|--------|--------|-------------|-------------|-------------|-------------|-------------|-------------|
| Rated Power (HP) | 175 | 250 | 375 | 600 | 600 | 1200 | 1200 | 2400 | 2500 | 5000 |
| Number of Throw | 2 | 2 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 |
| Max rpm | 1800 | 1800 | 1500 | 1500 | 1000~1200 | 1000~1200 | 1000~1200 | 1000~1200 | 1000~1200 | 1000~1200 |
| Stroke (mm) | 80.0 | 75.0 | 80.0 | 80.0 | 110.0~130.0 | 110.0~130.0 | 110.0~130.0 | 110.0~130.0 | 110.0~130.0 | 110.0~130.0 |



Features

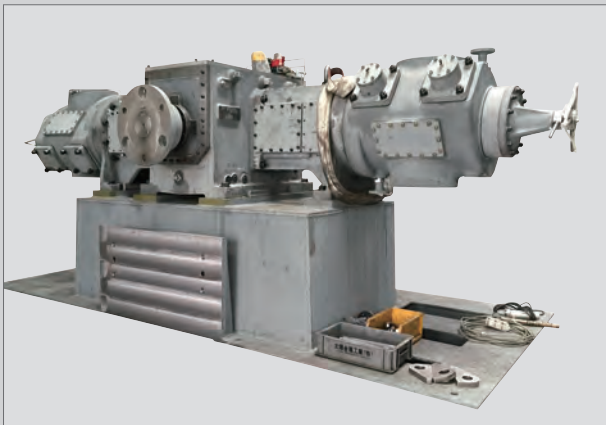
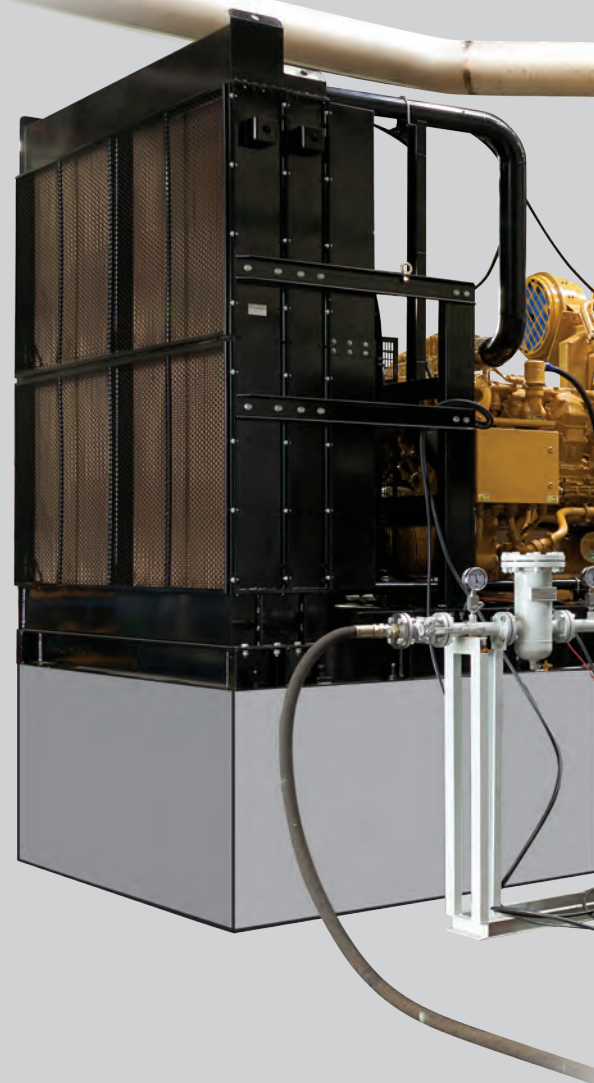
- API design
- High efficiency bare shaft
- Engine or Motor driven
- Minimum vibration (Balanced-opposed type)
- Operator-friendly control system (PLC based automation system)
- Suitable for extreme weather condition
- Lowest maintenance cost with occupying genuine parts

GEO SERIES PIPELINE BOOSTERS

Geo Series pipeline boosters have the model from GEO-All to GEO-F4 and will be able to operate with various range of inlet/outlet pressures and capacity in accordance with international standards. Geo Series pipeline boosters will go outlet pressure up to meet the sales line pressure requirements in downstream as suctioning inlet pressure in upstream. The complete pipeline booster package does not only include bare shafts, but also all pressure vessel, heat exchangers, KO drums, drivers, electrical/instrument parts and piping stretching as meeting customer's every requirement. KwangShin with innovative technology for 50 years, offers full package of pipeline booster solutions.

From design to package

KwangShin GEO series Pipeline Boosters designed based on API application with in-house technology, and one stop manufacturing system which is from design to packaging. High efficiency bare shaft from self-developed computerized designing program. Gas/Diesel Engine or Electric Motor driven. Various types of model to meet customer-made requirement upon capacity & pressure. Easy installation & maintenance with common skid design.



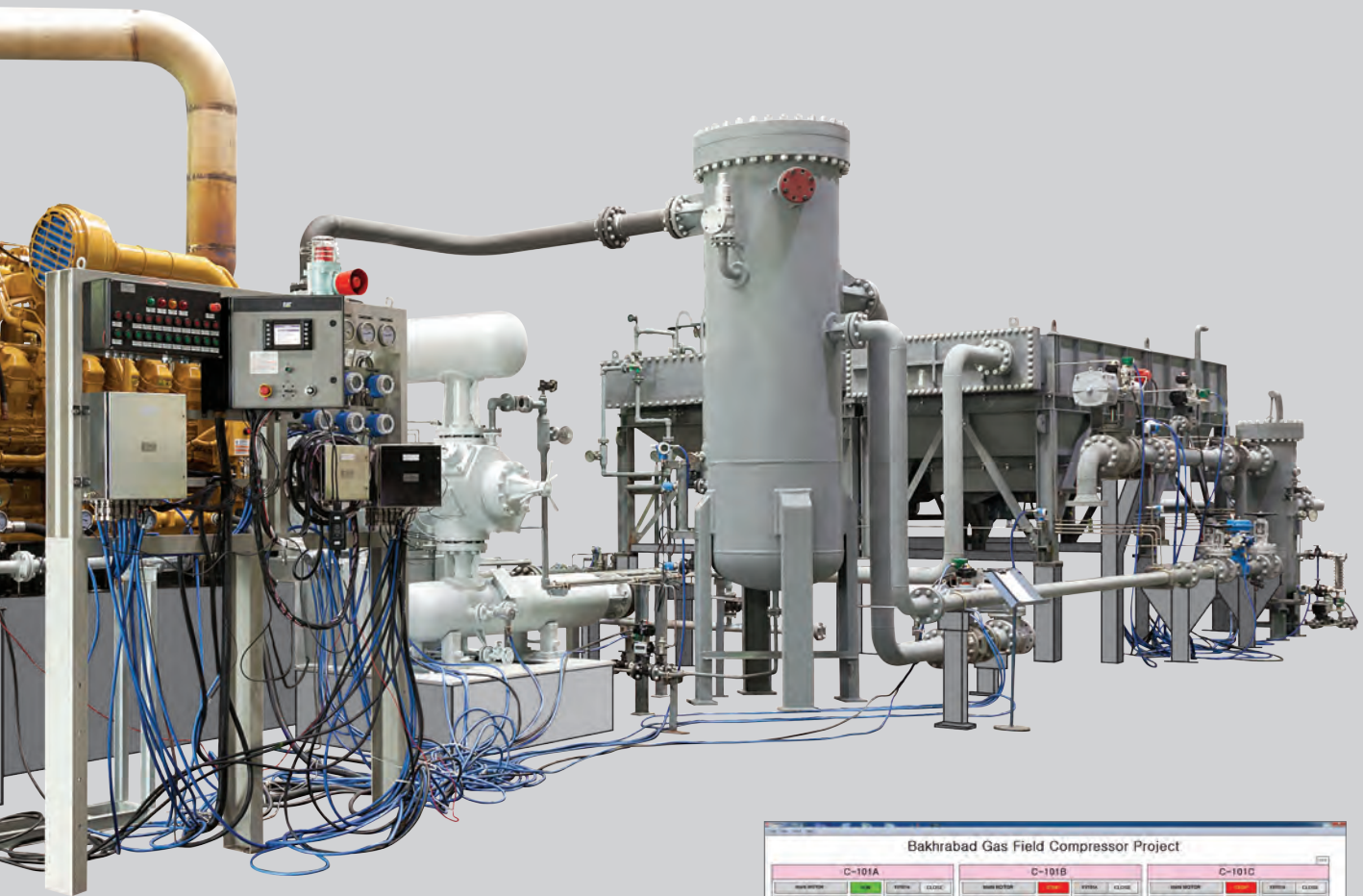
► Bare Shaft

High-efficiency bare shaft with self-developed computerized design program. From crank case to cylinders, optimum parts have been applied to save energy. KwangShin GEO brand consists of 2 or 4 throws bare shaft models from A model to F model depend on suction pressure & required flow capacity by client. Air or water cooled cylinders.



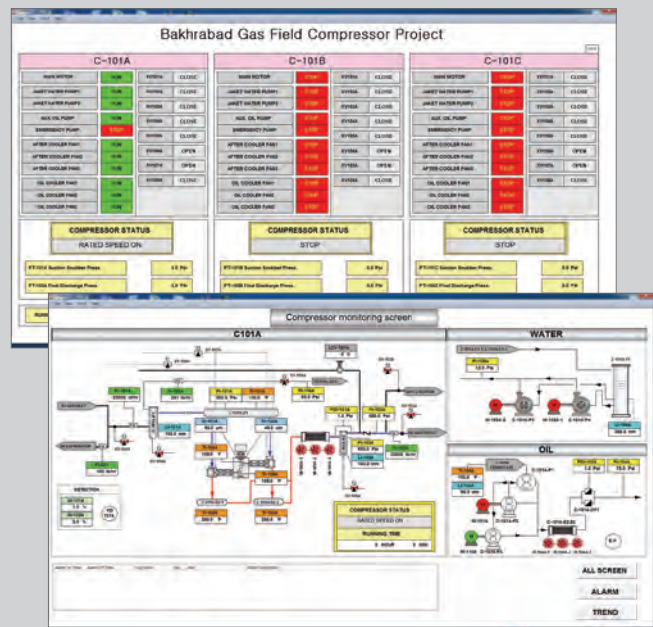
► Vessels & Coolers

Vessels & Coolers shall be designed, based on ASME (code stamp possible), and fabricated with following strict Inspection & Test Procedure. The Inspection & Test Procedure shall be based on ISO standard, and material certificate as well.



► Gas Engines (or Motors)

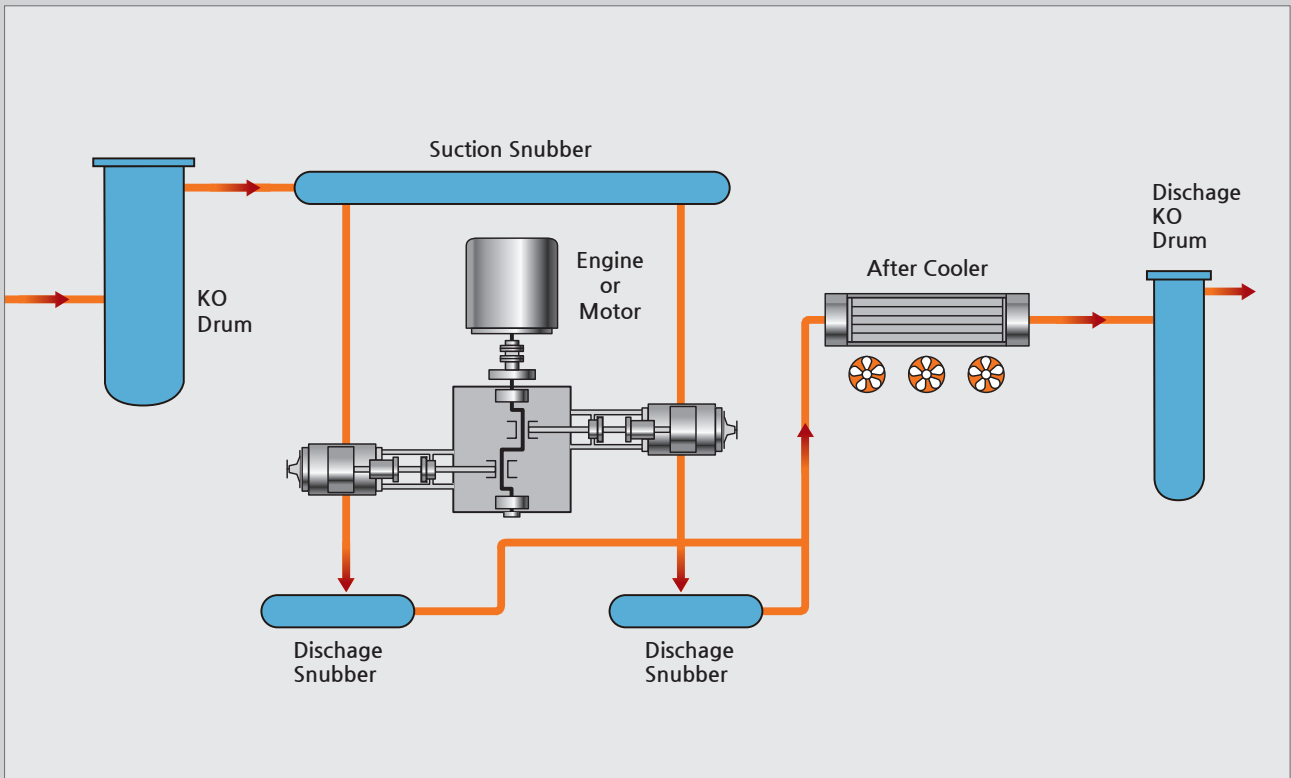
Main driver can be applied to Gas/Diesel Engine or Electric Motor. We apply for various brands from various requirement of site condition.



► Control System

Control System for Pipeline Booster shall be based on PLC which is installed in control room or local. PLC shall be supplied from approved manufacturers for reliability. Full automation system shall be applied for compressor package as high-efficiency energy saving system.

Typical Process Diagram



All-in-One Enclosure Type



- In one common skid including bare shafts, drivers, heat exchangers, vessels, instruments, control panel
- Easy installation/maintenance
- Convenient relocation
- Noise/weather proof type enclosure provided



KwangShin operates localized service system



- Operates prompt service system for local customers
- Makes continued effort to provide advanced A/S through the expansion of overseas branches
- Stock-ready genuine parts for on-time supporting system
- Well-trained service engineers on every local service center



Over 20 Global Network System Partners, Checks on real time basis





GEO SERIES

GEO-M

FEATURES

- Inlet pressure : 0~200Bar
- Discharge pressure : 250~350Bar
- Required power : 30~100HP
- RPM : Maximum 1800RPM
- Electric or motor Natural gas engine driven
- Air cooling or Water cooling type heat exchanger



GEO-AII

FEATURES

- 2Throws balance opposed type
- Inlet pressure : 0~200Bar
- Discharge pressure : 250~350Bar
- Required power : 50~175HP
- RPM : Maximum 1800RPM
- Electric or motor Natural gas engine driven
- Air cooling or Water cooling type heat exchanger





GEO-BII

FEATURES

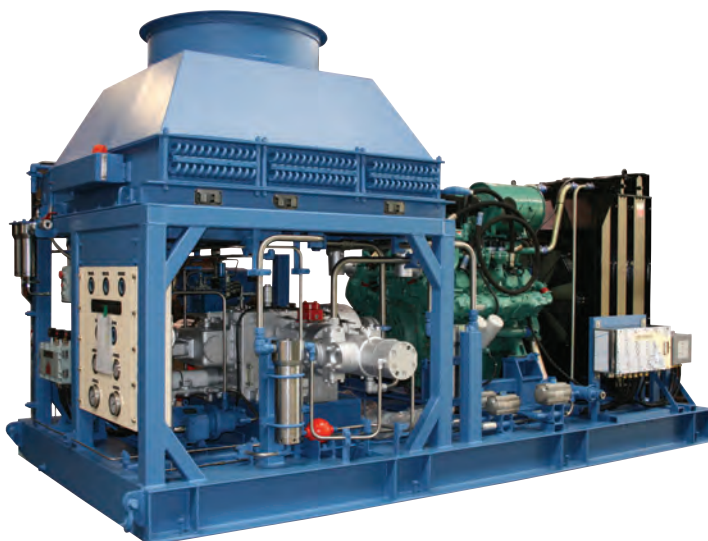
- 2Throws balance opposed type
- Inlet pressure : 0~200Bar
- Discharge pressure : 250~350Bar
- Required power : 175~250HP
- RPM : Maximum 1800RPM
- Electric or motor Natural gas engine driven
- Air cooling or Water cooling type heat exchanger



GEO-C2&C4

FEATURES

| | GEO-C2 | GEO-C4 |
|----------------------|-----------------|-----------|
| Throws | 2Thorws | 4Thorws |
| Inlet pressure | 0~200Bar | |
| Discharge pressure | 250~350Bar | |
| Required horse power | 250~400HP | 300~600HP |
| RPM | Maximum 1800RPM | |



FEATURES

- Electric motor driven or Natural gas engine driven
- Air cooling or Water cooling type heat exchanger





GEO-D2&D4

| | GEO-D2 | GEO-D4 |
|----------------------|-----------------|------------|
| Throws | 2Thorws | 4Thorws |
| Inlet pressure | 0~200Bar | |
| Discharge pressure | 3.5~350Bar | |
| Required horse power | 400~600HP | 600~1200HP |
| RPM | Maximum 1200RPM | |

FEATURES

- Electric motor driven or Natural gas engine driven
- Air cooling or Water cooling type heat exchanger



GEO-E2,E4&F2,F4

| | GEO-E2 | GEO-E4 | GEO-F2 | GEO-F4 |
|----------------------|-----------------|------------|-----------------|-------------|
| Throws | 2Thorws | 4Thorws | 2Thorws | 4Thorws |
| Inlet pressure | 0~200Bar | | 0~200Bar | |
| Discharge pressure | 3.5~350Bar | | 3.5~350Bar | |
| Required horse power | 400~1200HP | 800~2400HP | 1200~2500HP | 2400~5000HP |
| RPM | Maximum 1200RPM | | Maximum 1200RPM | |

FEATURES

- Electric motor driven or Natural gas engine driven
- Air cooling or Water cooling type heat exchanger

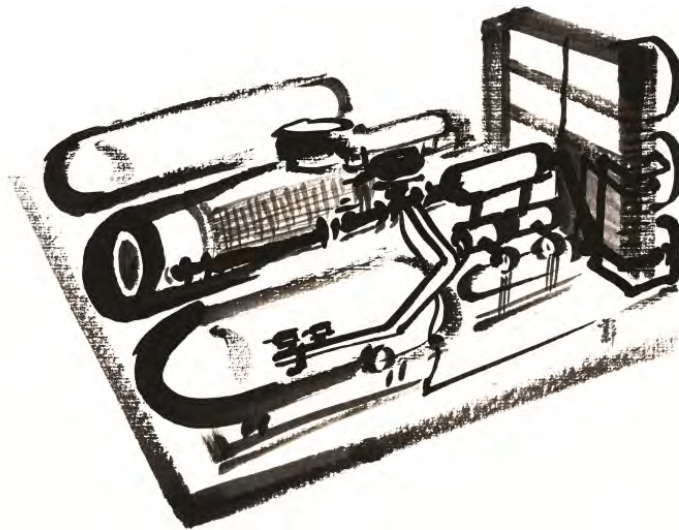


CERTIFICATE & HISTORY



- 1967.08 Founded KwangShin Machine Ind. Co., Ltd.
- 1976.06 Technical tie-up with Mikuni Heavy Ind. Co. Japan
- 1996.05 Technical cooperation with Samsung Techwin Co. for Turbo Compressors
- 1996.10 Acquired ISO 9001 Certification
- 1997.02 Established a Compressor system research center
- 1998.06 Screw Compressor package assembly agreement in Korea with SULLAIR
- 1999.07 Developed Turbo compressor and Blower with KIMM (Korea Institute of Machinery & Materials)
- 2000.11 Turbo compressor manufacturing and Co-develop agreement with HITACHI Japan
- 2001.12 Launched KwangShin GEO series CNG Compressors
- 2002.03 Obtained the utility model right and applied a patent for KwangShin CNG Compressors
- 2002.10 Awarded an achievement award for the CNG fueling system localization in Korea
- 2006.10 Acquired ISO 14001 Certification
- 2008.12 Launched own CNG Dispenser
- 2008.12 Developed Diaphragm type Hydrogen Gas Compressor
- 2011.01 Acquired Russian GOST-R Certification
- 2011.06 Acquired OHSAS 18001 Certification
- 2011.12 Launched own CNG station, "G-Station", inside KwangShin factory
- 2012.03 Launched KwangShin LNG/LCNG Station
- 2013.02 Acquired ASME Certification of authorization
- 2013.03 Acquired the National Board of Boiler & Pressure Vessel Inspectors Certificate of Authorization (USA)

As a Leader in the Worldwide Compressor market



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