Hori Engineering

Gas Compressors

HORI ENGINEERING CO., LTD.

Wing Compressor

Introduction

The oil-free Wing Compressor was at first engineered and manufactured as a compressor which is compact and lightweight, and features low vibration and low noise to meet the demand for a compressor for use on bulk cement trucks.

Thereafter, Hori Engineering has continued to conduct R&D activities, and at present has a record of over 20,000 units having been delivered to various industries, where they are highly evaluated for their superb operation.

Six Features

1. Compact and Lightweight

The Wing Compressor operates on the rotor rocking mechanism, with the rotor as a moving element having low inertia, which allows operation at higher speeds, the characteristic swing type design providing an increased efficiency and a reduction in size. As compared to the conventional reciprocating type compressor, the Wing Compressor is approx. half in size and weight.

2. Thoroughly Clean Air

The Wing Compressor uses a self-lubricating seal bar (which is equivalent to the piston ring in the reciprocating type compressor) in the sliding portion, thus being of completely oil-free type. No oil drops from the crankcase can get in the cylinder, being prevented by the oil seals.

3. Minimized Equipment Cost

Because of low vibration in running, and lightweight, the foundation work required is simple. The complete oil-free system eliminates the need for using an oil separation device, etc. In addition, all the components needed for operation, such as the motor, aftercooler, drain separator, and receiver reservoir, are mounted on a single common bed together with the main body, and thus the installation can be performed extremely easily. (Depending upon the model, the receiver reservoir is to be separately installed.)

4. Quiet Running

Because the Wing Compressor is of horizontal axis rotor rocking type, the vibration in the vertical direction that is applied to the installation surface is extremely low, as compared to that produced by the piston reciprocating type, and thus the foundation working needed is simpler than is by the piston reciprocating type.

5. Reasonable Maintenance Cost

As compared to the provision for shaft sealing of the conventional reciprocating type compressor, that of the Wing Compressor is simple, because, in the Wing Compressor, the rotation shaft is sealed. Therefore, the maintenance cost can be suppressed to a relatively low level.

6. Capable of Accommodating Virtually Any Types of Special Gas

With the Wing Compressor, the shaft sealing portion is in the rotation shaft, therefore, the gas will not easily leak, and the gas contact portions are made of a material of choice, allowing the Wing Compressor to accommodate a special gas which cannot be accommodated by any compressors from other manufacturers.

At present, Hori Engineering has got renowned in the industry as a unique gas compressor manufacturer, supplying a number of gas engine compressors and vacuum pumps for use with gasoline vapor and solvent recovery systems.

What Is Wing Compressor?

In the cylinder Ⓐ, a suction valve seat base Ⓑ is provided in right and left symmetrical places. The rotor Ⓒ makes a rocking (swing) motion between the right and left suction valve seat bases in the cylinder from the angular position (A) to the angular position (B) in Fig. ①.

The right and left suction valve seat bases have a suction bore "a" communicating to the atmosphere, respectively, the suction bore "a" further communicating to the cylinder inside through the upper and lower holes "b", which are normally closed by the suction valves "c" in the cylinder. And, in the cylinder, the discharge holes "d" are provided above and under the suction valve seat base, the outlet port of the discharge hole "d" being normally closed by the discharge valve "e". The outside of the discharge holes "d" is covered by the cover Ⓓ, being led to the discharge port.

With the rotor being turned in a counterclockwise direction from the angular position (A) in Fig. 1, the gas in the cylinder is compressed to thereby press the suction valve on the left side and force up the discharge valve, and thus is forced out to the discharge port. At the same time, the volume on the right side of the rotor is increased, the pressure being changed into a negative one, which causes the discharge valve on the right side to be sucked and closed. Concurrently, the suction valve "c" is forced up by the atmospheric pressure, the sucked air flowing into the cylinder. When the rotor is turned to the angular position (B) in Fig. ①, the direction of rotation is inverted, the rotor being turned in a clockwise direction, thus the sucking action and the discharging one being interchanged.

Consequently, with the motion of the rotor, the suction and the discharge are performed simultaneously, and in one reciprocation of the rotor, i.e., one revolution of the crankshaft, the gas of a volume equal to "the area of the sector × the width of the rotor blade" is discharged four times, resulting in the gas of a volume near 100% of the total volume of the cylinder being discharged.

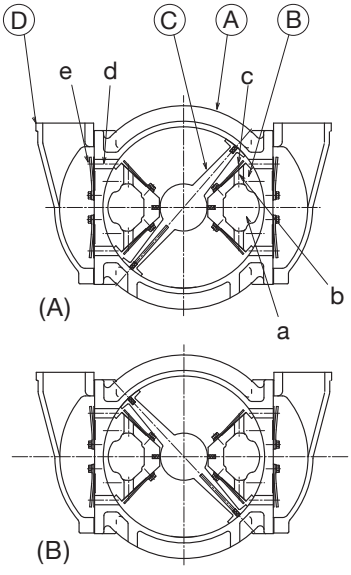
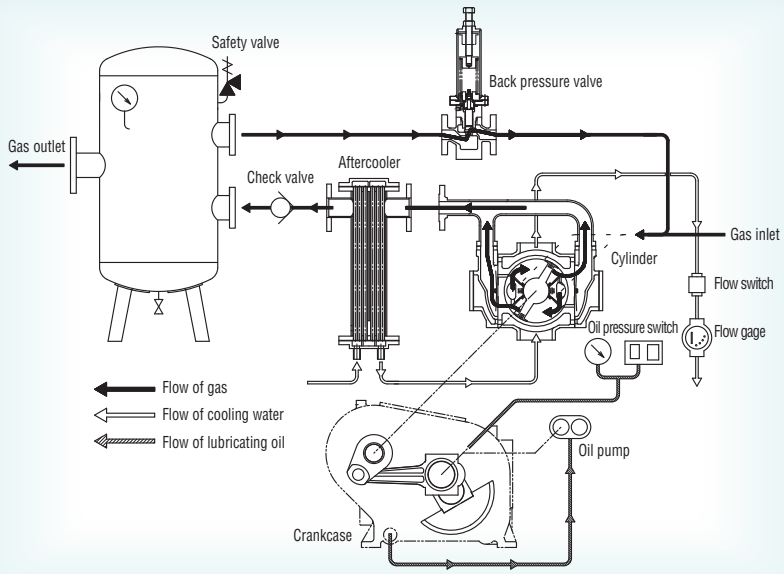


Fig.① Sectional view of Wing Compressor cylinder

Operation System

Shown at right is one example of water-cooled operation system. Suction flow is controlled with the use of a back pressure valve, which returns the surplus gas to the gas inlet. The flow rate of the cooling water is monitored by means of the flow switch, while the pressure of the bearing lubricating oil in the crank case is monitored with the oil pressure switch.



Application fluids

1 A number of Hori Engineering stationary compressors for use with city gas, natural gas, digester gas, gasoline vapor (hydro carbon vapor), and other flammable gasses have already been manufactured, being widely used.

2 For practically any gasses other than those which can corrode metals hard and those containing such a substance as a solvent with which an O-ring or other rubber product is heavily swelled, engineering and manufacture of a stationary compressor can be performed.

Max. capacities available

1 Hori Engineering stationary compressors can be designed and manufactured for use with a motor up to 220 kW.

2 The maximum displacement rate and the maximum discharge pressure greatly vary depending upon the suction conditions. For further information, please contact with Sales Dept.

Shaft Seal

To accommodate all types of gas and a wide range of suction pressure, the following types of shaft seal are provided as a choice.

a. Carbon labyrinth seal
b. High-pressure oil seal
c. U-packing seal
d. Mechanical seal
e. Canned seal

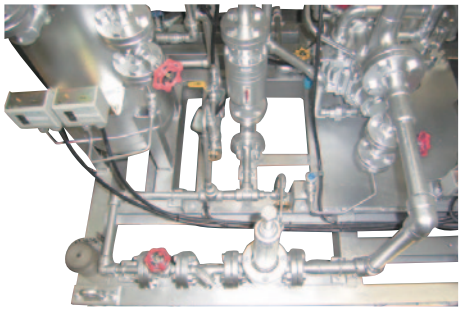
Gas contacting portion material

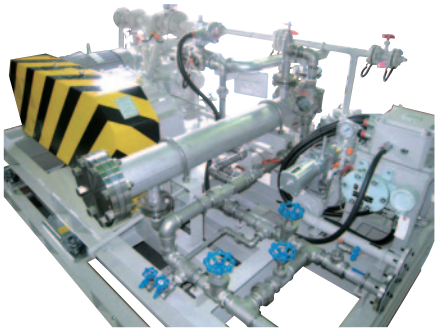
FC (gray iron casting) or FCD (ductile iron casting) is used as a standard material, but stainless steel can be specified as an optional.

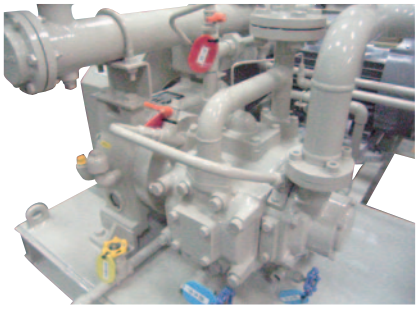
Single stage type			
Model	Discharge press. MPa (gage)	Suction flow Nm^3/min	Motor kW
1003, 1006	0.5	0.1 to 0.3	0.4 to 5.5
1408, 1414	0.7	0.3 to 1.0	1.5 to 11
2020, 2026	0.7	2.0 to 4.0	15 to 30
2426, 2626	0.7	4.0 to 8.0	22 to 45
2630, 2640	0.7	8.0 to 12.0	30 to 55
2652, 2660	0.2	12.0 to 15.0	30 to 45
2630W, 2640W	0.7	15.0 to 24.0	55 to 132
2652Z, 2660Z	0.2	48.0 to 60.0	30 to 75

Double stage type			
Model	Discharge press. MPa (gage)	Suction flow Nm^3/min	Motor kW
1006H	1.0	0.1 to 0.3	1.5 to 7.5
1414H	1.0	0.3 to 1.0	2.2 to 15
2026H	2.0	2.0 to 4.0	22 to 45
2626H	2.0	4.0 to 8.0	30 to 75
2640H	1.0	8.0 to 12.0	45 to 75
2660H	1.0	12.0 to 15.0	55 to 90
2640WH	1.0	15.0 to 24.0	90 to 110
2660ZH	1.0	48.0 to 60.0	110 to 150

Natural Gas/City Gas Pressure-Up Compressors







What Is Natural Gas?

It is a combustible gas mined in its native state, consisting mainly of methane.
In recent years, it is being utilized as environmentally-friendly energy.

Advantages of Natural Gas

1 Clean Energy

As compared to coal and petroleum, natural gas emits a less amount of carbon dioxide when burnt.

2 Abundant Resource

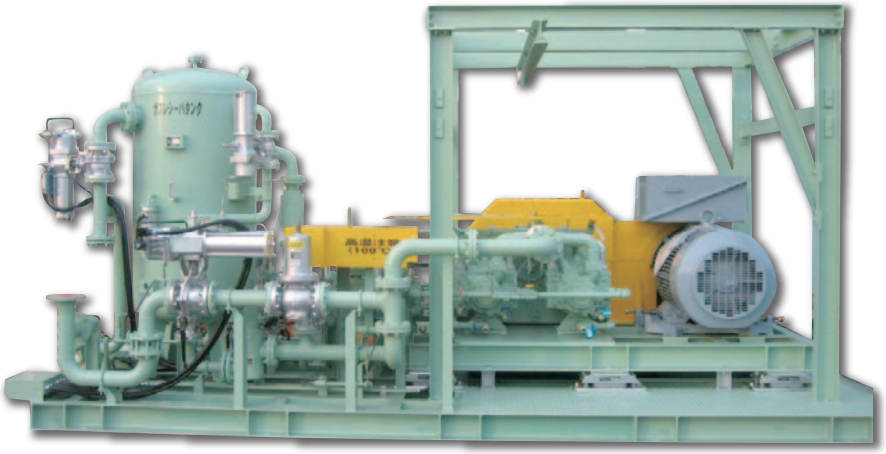
Being reserved in quantity in the earth, it is attracting attention as energy which will be substituted for petroleum.

Applications for Hori Natural Gas/City Gas Pressure-Up Compressors

1 Supplying natural gas/city gas to gas engines in power generation facilities

2 Force feed or circulation of natural gas

Hori Engineering has already delivered a number of natural gas/city gas pressure-up compressors.



Model
HC-2026GWDQ

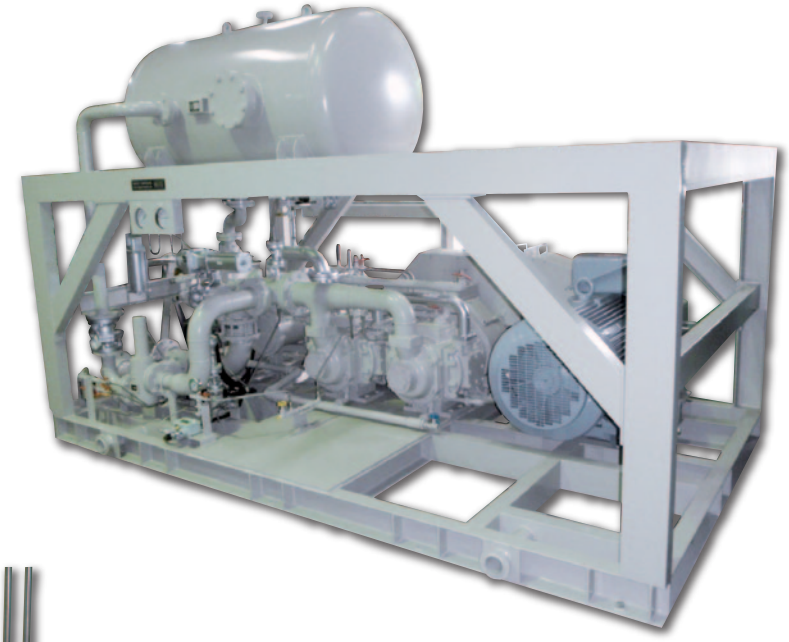
Application
Supplying city gas to gas engines

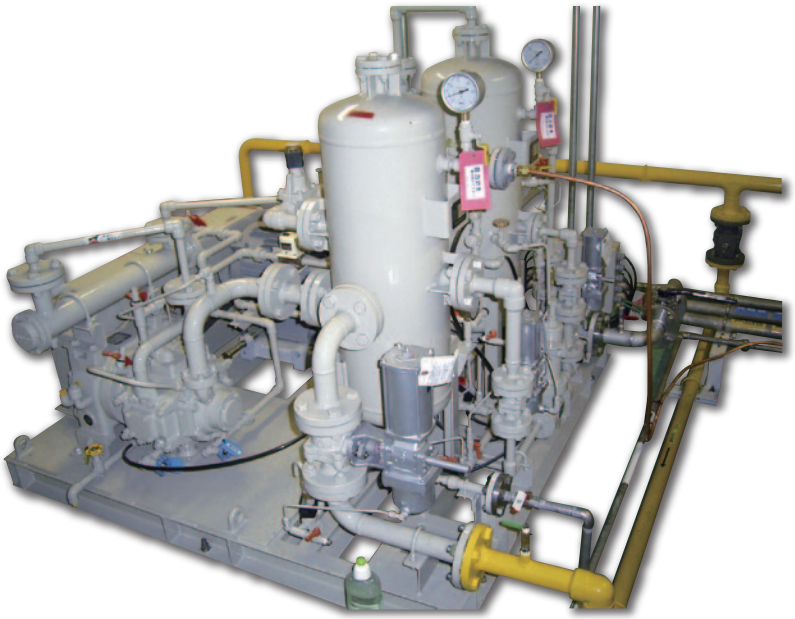
Specifications
Fluid : City gas 13A
Suction flow : 1250 Nm^3/h
Suction pressure : 0.20 MPaG
Discharge pressure : 0.51 MPaG

Model
HC-2630TKWDQ

Application
Supplying city gas to gas engines

Specifications
Fluid : City gas 13A
Suction flow : 726 Nm^3/min
Suction pressure : 0.02 MPaG
Discharge pressure : 0.60 MPaG





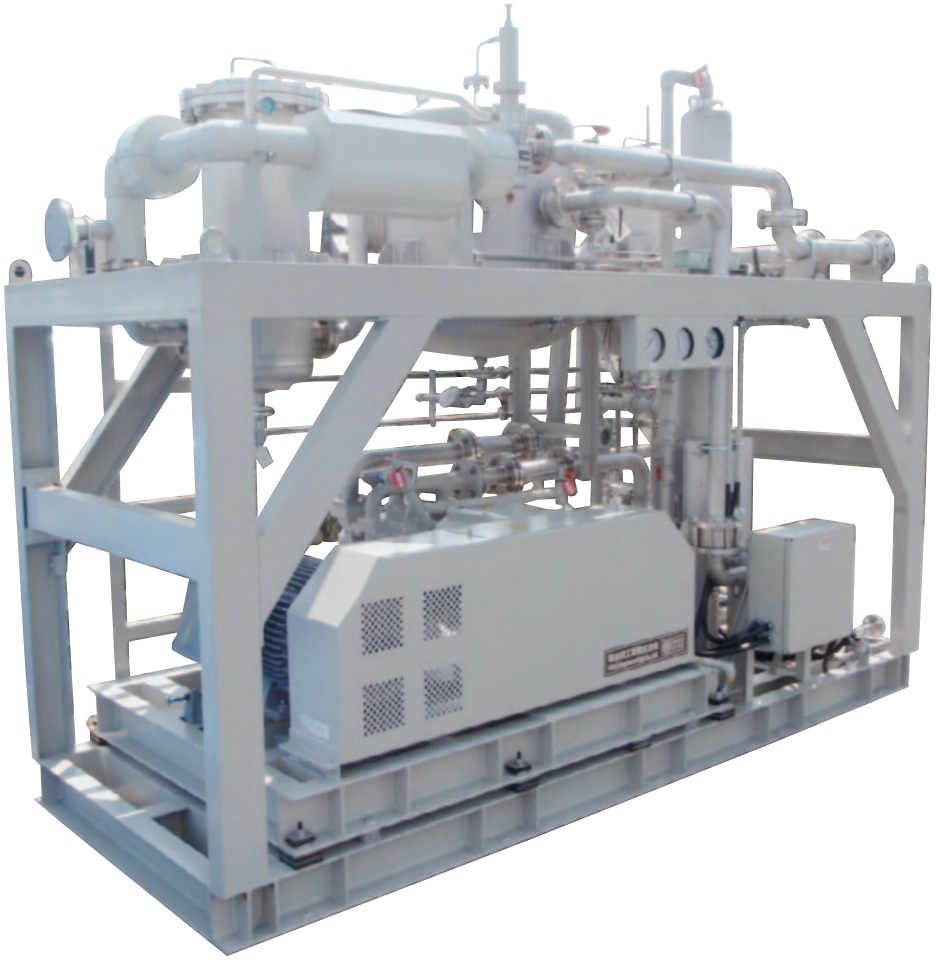
Model
HC-1414TDDQ

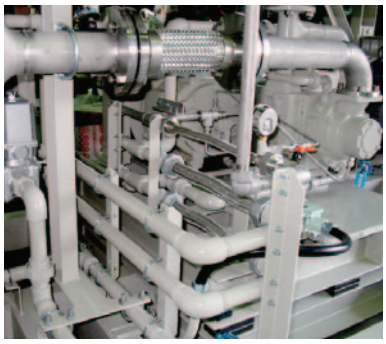
Application
Force feed of natural gas

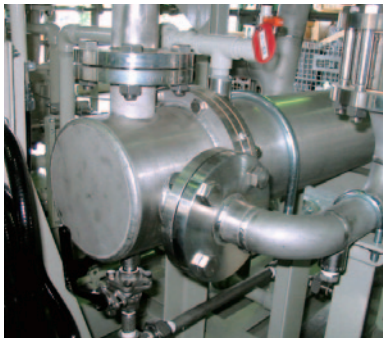
Specifications
Fluid : Natural gas
Suction flow : 70 Nm^3/h
Suction pressure : 0.10 MPaG
Discharge pressure : 0.90 MPaG

Biogas/Digester Gas Pressure-Up Compressors

Force Feed of Gases Occurring from Wastes and Sewage Sludge







What Is Biogas?

It is a combustible gas which is obtained by fermenting organic wastes, such as kitchen garbage, livestock excreta, or the like.

What Is Digester Gas?

It is a gas generated in a sewage treatment process.

Advantages of Biogas/Digester Gas

1 No need for cost of energy source material

Gas which would originally be discarded can be restored to be effectively utilized as energy.

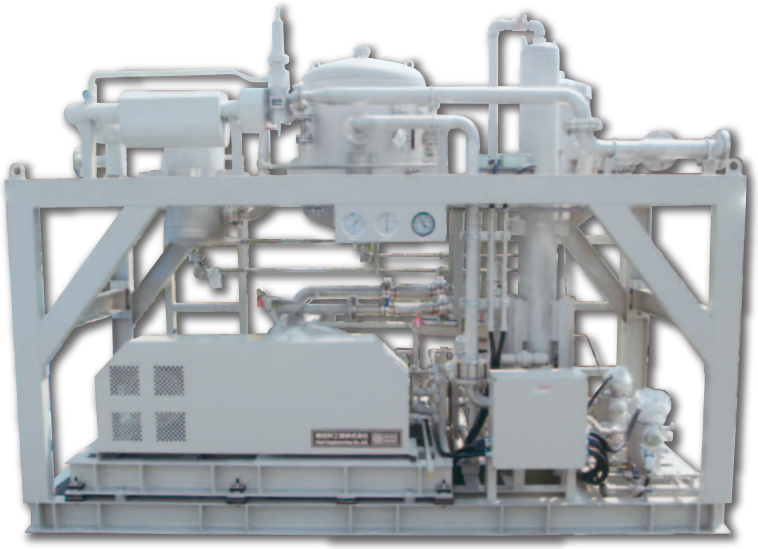
2 Prevention of Global Warming

The biogas and the digester gas contain greenhouse gases at high percentages. Effectively utilizing the greenhouse gases without being emitted into the atmosphere will lead to prevention of the earth from being warmed.

Applications for Hori Biogas/Digester Gas Pressure-Up Compressors

1. Supplying biogas/digester gas to gas engines in power generation facilities
2. Supplying biogas/digester gas to fuel gas recovery plants
3. Stirring of digester gas

Hori Engineering has already delivered a number of biogas/digester gas pressure-up compressors.



Model
HCN-2032GDDBQ

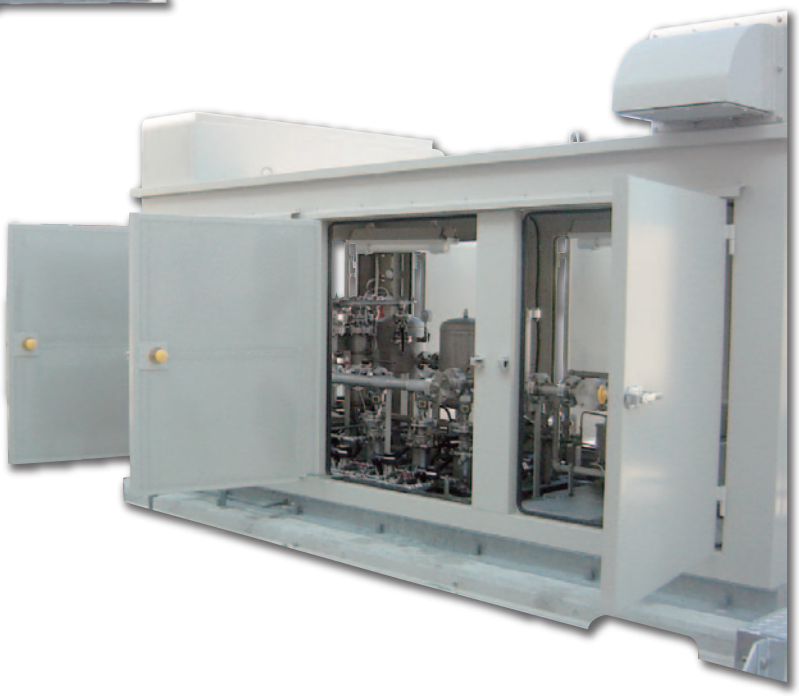
Application
Supplying digester gas to gas engines

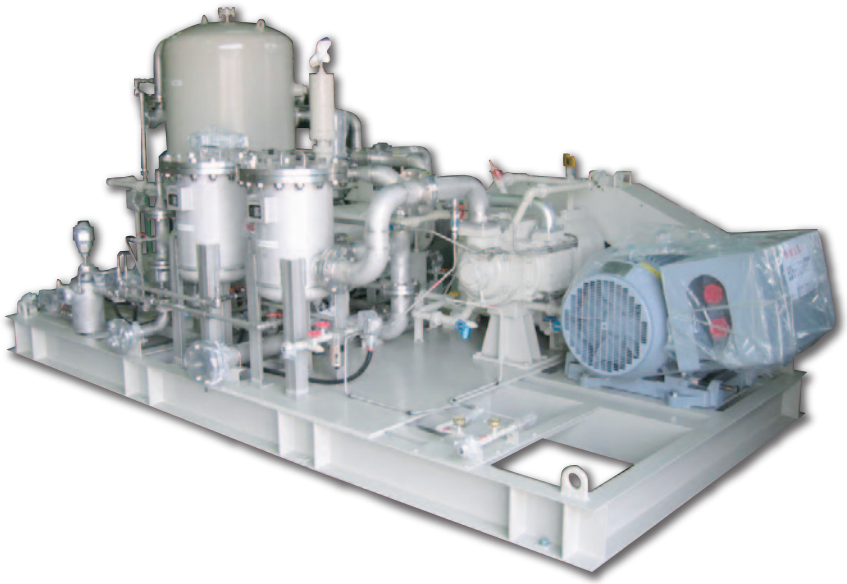
Specifications
Fluid : Digester gas
Suction flow : 310 Nm^3/h
Suction pressure : Atmospheric pressure
Discharge pressure : 0.25 MPaG

Model
HCE-2020TDDBS

Application
Supplying digester gas to fuel cells

Specifications
Fluid : Digester gas
Suction flow : 110 Nm^3/h
Suction pressure : 1.96 kPaG
Discharge pressure : 0.40 MPaG





Model
HC-2426TDDBQS

Application
Biogas recovery

Specifications
Fluid : Biogas
Suction flow : 120 Nm^3/h
Suction pressure : Atmospheric pressure
Discharge pressure : 0.80 MPaG

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