Products available from AIR WATER PLANT & ENGINEERING

01

→Product Name

V1X:Compact Nitrogen Gas Generator

→Product Features

→High purity nitrogen gas generator with a compact non-turbine design complying with non-CFC and having an integral mechanical room unit with a Distillation column, condenser, heat exchanger and CE (cold evaporator) installed in the outer tank.

→Applications

On-site gas supply for the manufacture of liquid crystals, plasma displays, semiconductors, and solar cells, etc.

→Specifications

Product	Capacity(Nm³/hr)	Purity(%)
Nitrogen gas	150～2350	99.999

02

→Product Name

V1:Nitrogen Gas Generator

→Product Features

→High purity nitrogen gas generator with a non-turbine design aimed at saving energy and non-CFC, with a focus on cost effectiveness, stability, and environmental-friendly operation. Combined low cost and high efficiency is achieved through the use of packing column with low pressure loss and high performance, reduced material processing, an integrated booster-compressor unit and a highly efficient main heat exchanger.

→Applications

On-site gas supply for the manufacture of liquid crystals, plasma displays, semiconductors, and solar cells, etc.

→Specifications

Product/Model		Capacity(Nm³/hr)	Purity(%)
Nitrogen gas	V1E	2800～3600	99.999
	V1D	4000～35000	99.999

03

→Product Name

V2:Oxygen Gas Generator
V3:Oxygen Gas & Nitrogen Gas Generator

→Product Features

→Non-turbine cryogenic air separation plant based on the V1 features.
V2: produces oxygen gas.
V3: produces both oxygen and nitrogen gas.

→Applications

On-site gas supply for steel mills, gasification, and the manufacture of liquid crystals, plasma displays, semiconductors, solar cells, glass, and more

→Specifications

Product	Capacity(Nm³/hr)	Purity(%)
Oxygen gas	300～5000	93～99.8
Nitrogen gas	300～12500	99.999

04

→Product Name

VSU:High-efficiency Liquefied Gas Generator

→Product Features

→High-efficiency air separation unit that con-currently produces liquefied nitrogen and liquefied oxygen. Our decentralized, regional industrial gas supply network of the VSUs has been installed nation-wide at major bases, enabling CO2 reduction through the reduction of tank lorry transportation. The unique process has greatly reduced Electric power consumption rate. The integrated storage tank has a large, space-saving structure in which multiple numbers of independent storage tanks are provided in the outer tank that has vacuum thermal insulation.

→Applications

Regional industrial gas supply for the manufacture of liquid crystals, plasma displays, semiconductors, solar batteries, steel, chemicals, glass, and more

→Specifications

Product	Capacity(Nm³/hr)	Purity(%)
Liquefied oxygen	300～5000	93～99.8
Liquefied nitrogen	300～12500	99.999

Products available from AIR WATER PLANT & ENGINEERING

➔Product Name
VP:Oxygen Gas Generator

05

➔Product Features

➔Oxygen gas generators produce oxygen from air by separation at a normal temperature using an adsorbent. The adsorbent is packed in the adsorption tower and selectively adsorbs more nitrogen than oxygen, resulting in a high concentration of oxygen. Advantages of this unit include reduced gas cost, optional work sharing with cryogenic separation units, ease of operation, and automatic intermittent running.

➔Applications

On-site gas supply to electric furnaces, manufacturers of chemicals and glass, paper mills, etc.

➔Specifications

Model	Capacity (Nm^3/hr)	Purity(%)	Model	Capacity (Nm^3/hr)	Purity(%)
VP-30	28	93.0	VP-150 ~2000	139~1860	93.0
VP-50	47				
VP-100	93				

➔Product Name
VH:Hydrogen Gas Generator

06

➔Product Features

➔Hydrogen gas generators using an innovative thermal neutralization process. Unlike the conventional external heat supply process, oxygen is added to the raw material and the steam reforming from both exothermic oxidative reaction and endothermic reaction carried out on the same catalyst. With the vacuum-type PSA process, the hydrogen recovery rate is more than 90%. The elimination of large-scale heating furnaces reduces green house gas emissions.

➔Applications

On-site gas supply to manufacturers of optical fibers, steel, solar cells, etc.

➔Specifications

Model	Capacity (Nm^3/hr)	Purity(%)	Model	Capacity (Nm^3/hr)	Purity(%)
VH-10	40~100	99~99.999	VH-40	160~400	99~99.999
VH-20	80~200		VH-50	200~500	
VH-30	120~300		VH-100	400~1000	

➔Product Name
Large-scale Plant Engineering

07

➔Product Features

➔Integrated installations engineered for various gases and gas supply piping for steel mills, gasifications, manufacturers of liquid crystals, plasma displays, semiconductors, solar batteries, steel, chemicals and special gases.

➔Applications

Equipment & machinery for the supply of various gases and gas piping construction associated with new plant construction and expansion of existing plants

➔Specifications

Comprehensive engineering of gas supply piping and gas production plants is carried out to the full satisfaction of our customers.

➔Product Name
High Purity Gas Purifier

08

➔Product Features

➔Ultra-high purity gas purifiers remove impurities up to ppb levels based on our reaction, adsorption and separation technologies, and provide ultra-high purity gases in a stable manner. This satisfies all of our customers' needs in terms of quality, stability and economical effectiveness.

➔Applications

Purification of nitrogen, oxygen, argon, and hydrogen gases

➔Specifications

Purified Gas Flow Rate(Nm^3/hr)	Purity(%)
10~100	99.99999

➔Product Name
VSS-GC:Cylinder Cabinet

09

➔Product Features

➔VSS-GC cylinder cabinets have been developed to achieve fully-automated systems for safe and stable supply through an automatic verification system of the open-close status of the container valve. The technology reduces the number of the joints by minimizing the internal volume of the piping and realizes a high purification level by using vacuum generators to assist in the purging of the piping.

➔Applications

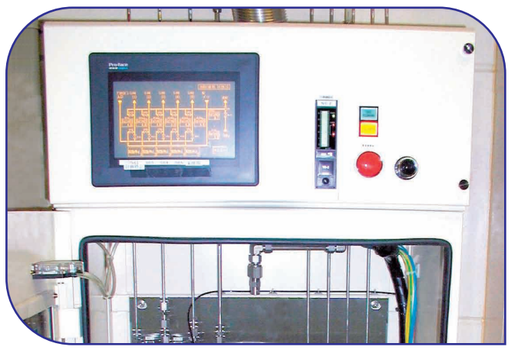
Specialty gas supply unit for the manufacture of semiconductors, liquid crystals, and solar batteries

➔Specifications

VSS-GC 1 2 3 4 5 (model number)			
1	No. of material gas containers (1~6)	4	A:Non-polishing piping
2	Supply lines (1or 2)		S:Polishing piping
3	O:Tightly sealed high pressure vessel without a purge vessel		US:Polishing piping＋block valve
	H:Tightly sealed high pressure vessel	5	No mark:Stainless steel
	N:Tightly sealed high pressure vessel with a purge vessel		C:HASTELLOY

➔Product Name
VSS-VMB:Valve Manifold Box

10



➔Product Features

➔Valve manifold box enables the supply of specialty gases to be branched off to respective production facilities of semiconductors, liquid crystals, and solar cells. Incorporation of the design concept of the VSS-GC makes this unit compact with improved performance. Safety is ensured by full automation; excellent maneuverability is achieved by the operator interface on the display panel.

➔Applications

Specialty gas branch supply box for the manufacture of semiconductors, liquid crystals, and solar cells

➔Specifications

One process gas line is branched into 2–5 lines, each corresponding to a special gas property such as high purity toxicity, combustibility (pyrophoricity), combustion-enhancing, and corrosive nature. Manufacturing is tailor-made to satisfy each customer.

➔Product Name
CE:Low Temperature Liquefied Gas Storage Tank

11

➔Product Features

➔The double structure tank with inner vessel and outer vessel to safely store liquefied oxygen, liquefied nitrogen, liquefied argon, liquefied carbon dioxide, LNG, etc. The incorporated pressurized vaporizer maintains pressure at a constant level for transporting self-pressurized liquids. The liquid is vaporized by the gas vaporizers and supplied stably as gas.

➔Applications

For equipment associated with the storage, manufacturing, and consumption of ultra- low temperature liquefied gases

➔Specifications

Model		Internal volume(L)
CE-2900	MHT	2900
CE-4900	MHT	4900
CE-10000	MHT	10000
CE-18000	MHT	18000

Model		Internal volume(L)
CE-30000	MHT	30000
Max. loading Pressure		Model M:0.93MPaG
		Model H:1.47MPaG
		Model T:2.15MPaG

➔Product Name
Air Fin Type Vaporizer

12

➔Product Features

➔We offer two types of vaporizer, applying aluminum which has good low temperature properties and ultra high thermal conductivity: an ambient air heat exchanger and a hot water type, suitable for evaporating and vaporizing ultra low temperature liquefied gas. Our vaporizers are installed at various high pressure gas production sites and are space-saving units with stable performance.

➔Applications

For plants, auxiliary equipment for the manufacture of various gases, and for the vaporizing of liquefied gas

➔Specifications

Model	Capacity(Nm³/hr)	Design Pressure(MPa)	Design Temp(℃)
SF-1~12	40~500	2	-196℃~40℃
LV-10~80	10~80		
LVL100~3000	100~3000		

Product Name
Vacuum Insulation Pipe

Product Features

➔Compact pipes developed and manufactured in-house with extremely high thermal insulation properties, that are light-weight and energy-efficient. These high-precision vacuum insulation pipes are easily installed and thus can drastically reduce capital costs.

Applications

Low-temperature liquefied gas supply pipe for the manufacture of liquid crystals, plasma displays, semiconductors, steel, solar cells, etc.

Specifications

Inner & outer pipe material: SUS304/SUS316/SUS316L
Operating Pressure (Standard Type):1MPa
Pipe length, applied welding method, and other specifications are customized to the customers' requirements.

Product Name
DO Clamp

Product Features

➔DO clamps are fittings consisting of clamps and hubs. Compared to flange joints, DO clamps provide a wider service range of temperature and pressure that better meet requirements from various industries and facilities. The superior tight-sealing property and 1/20 the weight of a JIS flange allows simplified and easier on-site work.

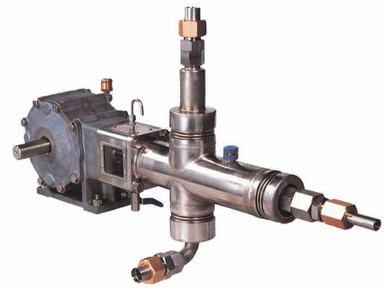
Applications

Various jointing valves
Max. loading pressure:30 MPa

Specifications

Pipe sizes range from 15A–100A and are customized to meet customer specifications.

Product Name
High-pressure liquefied Gas Pump



Product Features

➔Pumps are designed for boosting the pressure of various low-temperature liquefied gases such as liquefied oxygen, liquefied nitrogen, liquefied hydrogen, and LNG. These pumps are compact with super-high power efficiency and pressure boosting, enabling pre-cooling in a short period. The small NPSH (Net Positive Suction Head) allows minimum pressure loading on the tank and provides stable operation.

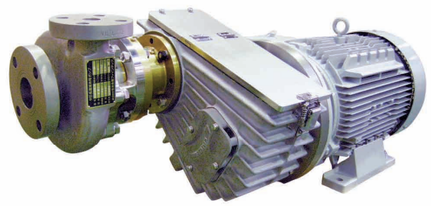
Applications

Charging liquefied gas to high-pressure vessels, supplying liquids from back-up facilities, etc.
It can be loaded on tank lorries.

Specifications

Model	Max. Discharge Pressure(MPa)	Discharge Volume(m^3/hr)	Maximum Operating Suction Pressure(MPa)
CL-1-75S	29.4	0.3~1	2.16
CL-1-125S	24.5	0.3~1	
CL-1A-150S	19.6	0.6~2	

Product Name
Medium-pressure liquefied Gas Pump



Product Features

➔Centrifugal pumps are light weight and compact with high performance, suitable for transporting various liquefied gases at low temperatures and require limited space. The inducer impellor design provides stable operation from the small NPSH (Net Positive Suction Head). To meet piping layout needs, the discharge direction of the liquefied gas is flexible. Operation can be preset to a wide range of flow rates from low-pressure/low flow to high-pressure/high flow.

Applications

Transporting of liquefied gas, supplying liquids from back-up facilities, etc.
It can be loaded on tank lorries.

Specifications

Model	Discharge Head(m)	Discharge Volume (m^3/hr)	Maximum Operating Suction Pressure(MPa)
TC-21 1×2×6-1S	20~276	2~20	0.49
TC-21 1×2×6-2S	123~446		
TC-21 32×10	46~126		

➔Product Name
Cryogenic Liquefied Gas Lorry

17

➔Product Features

➔An efficient tool for the supply and transport of ultra-low temperature liquefied gases including oxygen, nitrogen, argon and hydrogen from the production site to the customer site. Unique thermal insulation technology reduces the weight of the insulation material one-fifth, which enables an increased loading capacity and reduced maintenance cost.

➔Applications

Transport of ultra-low temperature liquefied gases, such as oxygen, nitrogen, argon, hydrogen, etc.

➔Specifications

Type	Kinds of Liquefied gas	Loading Pressure(MPa)
Pump-loading	O_2·N_2·Ar·H_2·CO_2	0.3
Self-pressuring		2.0

➔Product Name
LNG Tank Container

19

➔Product Features

➔For transportation of LNG containers, this is the first product in the industry, that complies with ISO requirements. Various methods are available for transporting LNG by truck, railway or ship. Container sizes 40-, 30- and 20-feet are available. Vehicles to transport the containers are also on our product line.

➔Applications

LNG transportation by truck, railway and ship

➔Specifications

Type	Max. Loading Capacity (ton)	Max. Loading Pressure (MPa)	Gross Weight (ton)
40ft	13.5	0.60	23.5
30ft	10	0.98	19.8
20ft	5.6	0.98	12.4

➔Product Name
LNG Monocoque Lorry

18

➔Product Features

➔Trailer-type lorry, designed and developed for transporting a large volume of LNG with mono-cock construction of a unified tank–chassis frame (patent pending). The loading capacity is 14t, the largest class A in Japan, applicable for LNG, oxygen and nitrogen lorries. The unique low center of gravity and light weight is unrivalled.

➔Applications

Transportation of LNG, liquefied oxygen, liquefied nitrogen, etc.

➔Specifications

Max. Loading Capacity (ton)	Max. Loading Pressure (MPa)	Gross Weight(ton)
14(LNG) max. loading capacity in Japan	0.60	27.07

➔Product Name
LNG Satellite Facilities

20

➔Product Features

➔LNG satellite facilities (storage, vaporization, and transfer equipment) promote LNG utilization at detached areas where pipelines are not installed. In combination with LNG containers for transportation, they ensure a stable supply of LNG from LNG receiving terminals.

➔Applications

Supply of natural gas for boilers, industrial furnaces and on-site power generators

➔Specifications

Storage and processing equipments are customized to the customer requirements.

Products available from AIR WATER PLANT & ENGINEERING

➔Product Name
AGG:Aqua Gas Generator

21

➔Product Features

➔Generation of aqua gas (fuel gas) for fusing. Hydrogen and oxygen produced through electrolysis of water are mixed with hydrocarbon gas, such as LPG, to produce aqua gas. Aqua gas, which shows higher burning velocity and greater energy density than LPG, is suitable for fusion cutting.
Eliminating the necessity of a separating membrane for the electrodes for purifying contributes to cost savings.

➔Applications

Supply of fuel gas for cutting metals

➔Specifications

Model	Capacity (Nm^3/hr)	Input Voltage (V) Equipment Capacity (kVA)
AGG-10000S-E2	12.8	AC200 45
AGG-20000S-E2	25.6	AC200 91
AGG-30000S-E2	38.5	AC200 137

➔Product Name
MIX Master

22

➔Product Features

➔Gas mixing unit (dual-component type) using a pressure control system that is more economical than the conventional flow control system. By mixing two fluids using a pressure equalizing valve, the concentration is determined by the ratio of gases passing area of the loaded filter. A pressure-equalizing valve regulates the pressure regardless of the fluctuation of flow of fluid, enabling the mixed gas to be supplied at a fixed concentration.

➔Applications

Shielding gas for welding and mixed gas for foods

➔Specifications

Gas	Flow range (Nm^3/hr)	Mixing Conc (%)	Max. Operating Press (MPa)
Based on customer's Spec	30~200	5~40%	0.95

➔Product Name
Deoxygenator

23

➔Product Features

➔Water downflow and rising nitrogen are dispersed uniformly in the static reactor to remove dissolved oxygen through efficient gas-liquid contact. By using a multiple number of reactors, the dissolved oxygen can be significantly reduced with only a small amount of nitrogen. Because this is a non-chemical system, this equipment is health- and environmental-friendly.

➔Applications

Deoxygenating boiler water and anti-corrosion of the cold/hot water piping of air-conditioning systems

➔Specifications

Model	Treated water volume (m^3/hr)	Nitrogen requirement (Nm^3/hr)	DO Treatment (mg/hr)
NRD01-05	5	1	0.1
NRD01-10	10	2	
NRD01-15	15	3	
NRD01-20	20	4	
NRD01-30	30	6	
NRD01-40	40	8	

➔Product Name
Abater:Sterilizing Gas Treatment Unit

24

➔Product Features

➔Abater treats EO (ethylene oxide) used for the sterilization of medical devices. EO exhausted from the sterilizer is treated by a catalytic oxidation method resulting in nonpoisonous carbon dioxide and water . Abater is available in a range of sizes for small sterilizers for hospital use to large scale applications.

➔Applications

Unit for treatment the waste sterilizing gas for medical use

➔Specifications

Model	Recommended treating volume (g/min)	Dilution Air Flow (m^3/min)
#100	12.4	1.4
#50	6.2	2.8

*A range of models from large to small is available.

➔Product Name
VCE:High-vacuum Epitaxial Growth System

25

➔Product Features

➔The High-vacuum Epitaxial Growth System was developed based on a new concept introduced by US Chevron Research. By using the ultra-high vacuum process, material gas is supplied to wafers in molecular beam epitaxy so that a high level of uniform filming is created with fine thickness control. The applied showerhead system enables response to wafer growth of super-large diameter.

➔Applications

Unit for Si selective growth, SiC growth, GaAs growth, etc.

➔Specifications

Degree of Vacuum	Substrate Size	Substrate Heating
10^{-5} Pa order or below	~φ300mm	Radiant electric resistance heating system (Special PBN heater)
		Heat temp. rising rate MAX200C/ min. or more

➔Product Name
Artificial Air Production System

26

➔Product Features

➔The artificial air production system with an orifice-type blender of oxygen and nitrogen achieves stable blending. The 3-line back-up system ensures stable supply during at any emergency. Blenders with low-pressure mixing are available for existing low-pressure type CEs. Our 2-stage CE (patented) incorporates oxygen and nitrogen tanks within an outer tank and have the storage capacity of 2 units in one unit.

➔Applications

Artificial air production for medical use

➔Specifications

Type	Rated Production Capacity (L/min)	Max. Production Capacity (L/min)	Blending Rate (%)
JIK-01 Small volume blender x 1 unit x 1 line	400	800	Oxygen 22±1
JIK-02 Small volume blender x 2 unit x 2 line	800	1600	
JIK-03 Large volume blender x 1 unit x 2 line	1500	3000	

*Blenders use alternating operation.