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ADINA INDUSTRIES CO.,LTD



CHINA

Natural gas gasification pressure regulating station



LNG gasification pressure regulating station equipment is an integral skid mounted equipment of gas supply system developed for the needs of gas users such as urban independent residential quarters, industrial and mining, small and medium-sized enterprises, gas boilers, combustion furnaces, thermal spraying, etc. The skid mounted system integrates the process equipment, pipeline valves, field instruments and control systems of small LNG gasification station on several skid mounted modules. The layout is reasonable, safe and reliable, and the installation is simple.

Equipment composition: LNG storage tank, low temperature insulation bottle group (Dewar bottle), unloading supercharger, storage tank supercharger, air heated vaporizer, reheater BOG heater, EAG vaporizer, pressure regulating device, flow meter, odorizer, central control system, safety venting and safety cut-off system. It is composed of pipeline, fire protection, lightning protection and other auxiliary equipment. LNG gas stations are divided into two types: LNG cylinder skid mounted station and LNG gasification module station.



Technical characteristics

It integrates unloading pressurization, tank pressurization, vaporization, pressure regulation, metering, odorization, electrical control and other functions of LNG gas station.

Skid mounted integrated, compact structure and reasonable layout; The on-site installation is convenient and fast, with small floor area and short construction period.

Air supply is vaporized to reduce operating cost, and explosion-proof electric heating reheater is equipped. Ensure the safe operation of gas terminal equipment under extremely low ambient temperature.

The overall system has passed the national explosion-proof test and is safe and reliable.

It is equipped with anti-static grounding and lightning protection grounding. All pressure, temperature, liquid level, current and voltage signals are linked with the monitoring system to support remote monitoring without on-site personnel.

Technical parameter

Working medium: LNG

Vaporization flow: 50-6000Nm³/h

Design pressure: 3.0MPa

Inlet pressure: 0.05-1.6MPa

Outlet pressure: 0.01-0.1MPa 0.1-0.4MPa

Design temperature: - 196 °C - 50 °C before vaporization/after normal temperature reheating

Outlet temperature: 5-10 °C lower than the environment

Metering equipment: flow meter shall be selected as required.

It is also equipped with temperature compensation instrument and volume repair instrument.

Purification equipment: equipped with stainless steel precision filtering device.

Reheating device: power distribution heater type, hot water circulation type and steam heating type.

Odorization device: pump type odorizer and differential pressure odorizer are optional.

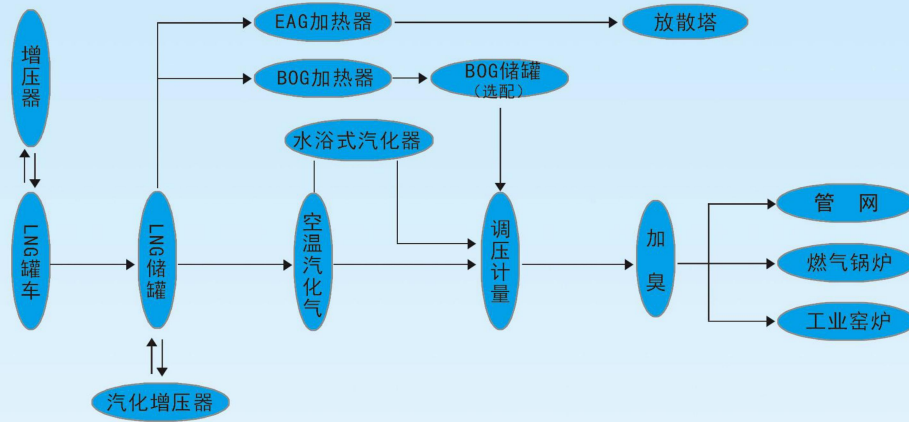
Data acquisition: relevant data such as on-site pressure and

temperature, differential pressure, flow, gas components, and equipment operation status can be collected as required.

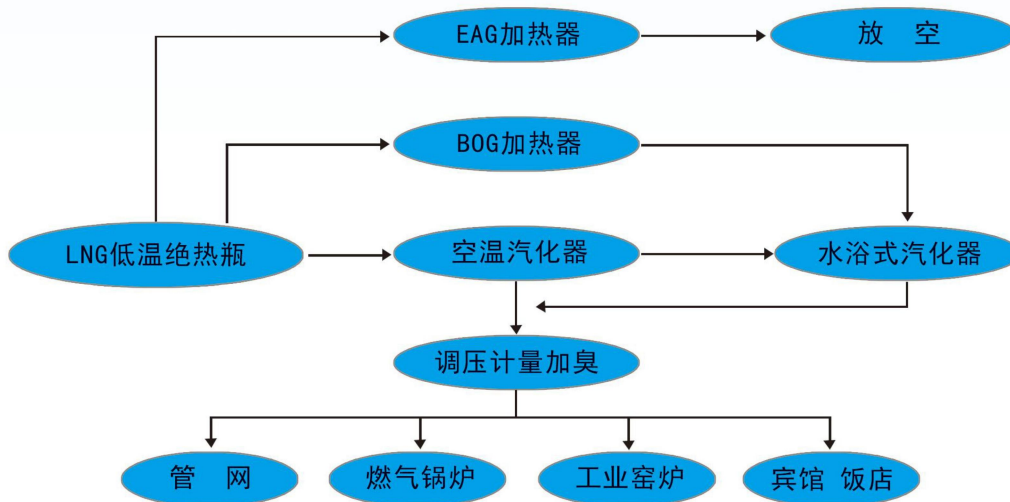
Natural gas is colorless and tasteless, and can be odorized according to regulations. Tetrahydrothiophene can be selected as the odorant.



LNG tank vaporization gas supply process



LNG tank vaporization gas supply process



Compressed natural gas pressure regulating station

Compressed natural gas refers to the purification and compression of wellhead natural gas or pipeline natural gas, and the transportation of compressed natural gas through high and intermediate pressure transmission pipelines or CNG high-pressure transport vehicles (CNG bottle sets, CNG containers, CNG pipe trailers) to the designated areas of gas cities or small and medium-sized factories and enterprises in gas cities where the gas pipe network cannot be laid temporarily through gas unloading, filtering, cutting, heat exchange (secondary or above), pressure regulation, metering. Such processes as odorization (optional) will deliver natural gas with appropriate pressure to gas users.



Equipment composition

The compressed natural gas pressure regulating station is divided into unloading system, pressure regulating system, heat exchange system, safety release device, emergency cut-off system, heating system, metering control system, odorization device, central integrated control system and other modules according to the equipment layout and functions.



Technical parameter

Applicable medium: LNG

Metering equipment selection: Roots flowmeter, temperature compensation, volume correction instrument.

Inlet pressure: 0.1-25MPa (adjustable)

Purification equipment: cyclone dust remover, high precision stainless steel filter.

Outlet pressure: 0.05-4.0MPa (adjustable)

Control valve: semi-automatic ball valve or full-automatic valve is optional.

Delivery flow: 50-60000 Nm³/h

Heating device: choose electric heating or hot water circulating heating device as required

Pressure regulating ground: double channel multi-channel pressure regulating structure is selected, with accuracy $\leq \pm 1\%$

Odorization device: mechanical or automatic odorization machine.

Safety measures: overpressure cutoff+safety release+ultra-low temperature interlock, leakage alarm.

Data acquisition: relevant data such as on-site pressure and temperature, differential pressure, flow, gas components, and equipment operation status can be collected as required.



Gas pressure regulating box pressure regulating device



Gas pressure regulating box and pressure regulating device are mainly terminal pressure regulating equipment of medium and low pressure gas transmission and distribution pipeline network. It can supply gas for residential areas, public service users, gas boilers, industrial furnaces, direct combustion equipment, etc.

Performance characteristics

Standard structure

Applicable medium: natural gas, coal gas, liquefied petroleum gas, etc.

Integrated control: pressure regulation, metering, filtering, emergency cut-off, safe diffusion and integration.

Equip with overpressure protection device, emergency switching system and safety venting device.

The pressure regulating branch adopts 100% flow design. It can realize switching between main and auxiliary air supply to ensure uninterrupted air supply.

The structure is reasonable, the function is perfect, the system coordination is strong, and the bypass is equipped with a manual control valve.

With good expansibility, gas alarm, telemetering and remote control functions can be added according to user requirements; Data acquisition, heat preservation and warming.

Integrated design, compact structure, simple installation and debugging.

The outer box is made of steel plate spraying box, stainless steel box and color steel insulation box, which can meet different environmental requirements of customers.



Steel cylinder container

According to the international standards, there are two types of gas cylinder container: vertical and horizontal. Its specifications include 4, 6, 9, 12, 15, 16, 20, 25, 33, 56, 59, 72 and 136 bottle groups. Its main technical parameters: working pressure: 1-30MPa, air tightness test pressure: 33MPa, strength test pressure: 45MPa, applicable to oxygen, nitrogen, argon, hydrogen, oxygen, acetylene, natural gas and other gases.



LNG Filling Station

Summary

LNG filling stations are divided into skid mounted stations and fixed stations. Fixed stations refer to tanks, pump skids and filling machines that are fixed and installed on the stations respectively; Skid mounted station means that storage tank, pump skid, booster and filler are assembled on one skid to facilitate the transportation of the whole station.

Brief Introduction

The LNG filling station is suitable for large and medium-sized investors. Its main equipment consists of medium pressure cryogenic liquid storage, filling skid (composed of submersible pump, cryogenic valve, vent valve, shut-off valve, cryogenic pipeline, etc.), liquid dispenser, central portable integrated control system, computer information platform, etc.



Technical Parameter

technical parameter

Applicable medium: LNG

Working pressure: 1.6MPa

Ambient temperature: - 30 °C~55 °C

Operating power: single pump \leq 11KW, double pump \leq 22KW

Pipeline vacuum degree: $<$ 0.005MPa

Instrument air source: 0.5~0.7MPa compressed air/nitrogen

Maximum flow of single equipment: single pump 20400L/h, double pump 40800L/h

Operating temperature: - 163 °C

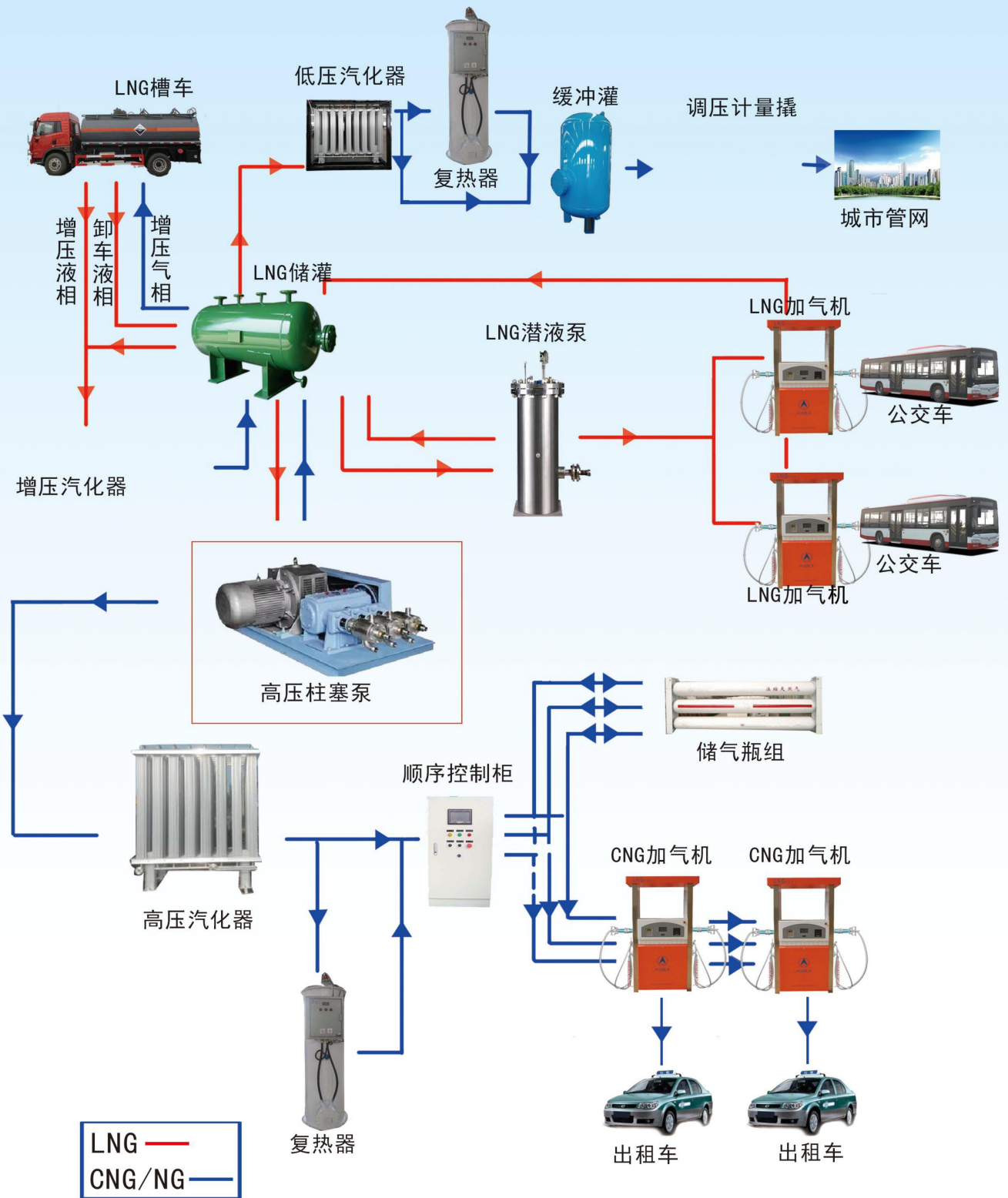
Working power supply: three-phase 380V/50HZ

Quantity of liquid dispensers available: 2-6 sets

Pipe vacuum rate: $<$ 1 * 10⁻¹⁰ Pa. m³/h

Pipe heat leakage: 0.5 (W/m)

Process Flow Diagram of LNG\L-CNG Gas Station



L-CNG Gas Station

L-CNG gas station uses low-temperature and high-pressure plunger pump to pressurize LNG liquid to 20-25MPa, and high-pressure liquid enters high-pressure air heated vaporizer to vaporize into compressed natural gas (CNG), and then fills CNG vehicles. Its advantage is that LNG transportation cost is lower than CNG, and it is more energy-saving than ordinary CNG gas stations. LNG automobile gas station and L-CNG automobile gas station can be jointly constructed to realize the function of adding LNG and CNG. L-CNG gas filling stations are divided into fixed and mobile skid mounted stations.



L-CNG Fixed Gas Station



L-CNG Mobile Skid Mounted Gas Station

The main equipment includes LNG storage tank, low-temperature and high-pressure plunger pump, high-pressure air heated vaporizer, water bath heater, sequential control panel, CNG gas storage cylinder group, CNG gas dispenser, process pipeline, valve and station control system.

LPG/Propane Vaporization Package

The overall LPG/propane equipment is composed of liquid manifold system, vaporizer (furnace), electrical control system, alarm system, gas-liquid separator, pressure regulating system, safe venting device and other modules.

Working Principle

Liquefied gas and propane are first led to the vaporizer through the diverter in the steel cylinder, and then heated by electric heater through the heat exchange coil inside the vaporizer. Liquefied gas in the heat exchanger is heated by hot water for forced vaporization, and the liquefied gas or propane is heated to the rated temperature. After the gas is fully gasified and saturated, the pressure is adjusted, and then it is delivered to the combustion equipment at the gas terminal to improve the heating value. The full and complete use of gas, the increase of fire power, the effect of energy conservation and environmental protection can make the gas in the cylinder completely used up, and avoid waste.



Liquefied Gas Vaporizer

Performance Characteristics

Light and beautiful, simple installation, suitable for factories, restaurants, hotels and other small and medium-sized gas units. Self suction sewage discharge, more thorough discharge of residual liquid.

It is equipped with automatic temperature control system and water temperature alarm device.

The electric cabinet is of flameproof design

The internal heat exchanger is stainless steel explosion-proof type

Equipped with safety release device to ensure safety.

Equipped with high precision pressure filter and regulator to ensure the use of pressure.

Save floor space, install and use immediately.

Technical Parameter

Applicable medium: LPG, propane, propylene and other fuels.

Working pressure: 2.5MPa

Vaporizer: 30KG-1000KG

Working water temperature: 50 °C~75 °C (adjustable)

Safety interlock, high and low limit of water temperature

Alarm mode: light alarm

Working power supply: 220V/380V

Heating power: 6-120KW

Water temperature control: automatic control system

Electric Heating Vaporizer

This series of vaporizers uses a special high efficiency electric heater to heat the water in the cylinder, and then heats the low temperature liquid (LO₂, LN₂, LAr, LNG, LCO₂, LPG, LC₂J₄, LNH₃, LC₃H₈, liquid chlorine, liquid ammonia) in the compact heat exchange tube. Advanced water temperature control system and automatic alarm system are adopted. The vaporization amount and pressure are stable during operation. The outlet temperature is normal temperature or can be set according to user requirements.

Performance characteristics

Specially made high efficiency electric heater, the general replacement cycle is five years
Fully automatic and semi-automatic temperature control device is adopted, which is safe and reliable.

High quality low temperature special stainless steel heat exchange tube, compact design, durable.

Equipped with all stainless steel explosion-proof sensing system to make temperature control more accurate.

Imported paint is used to make the surface quality more permanent.

High voltage safety control device is configured to ensure safe and reliable operation of equipment.

All are manufactured according to oxygen standard and food grade standard.

The main body of the vaporizer is a double insulation layer, and the water temperature and heat loss are basically zero.

The supporting parts are complete, and each set of vaporizer includes: vaporizer body, stainless steel electric heating, electrical control box, stainless steel explosion-proof sensor automatic alarm system, level gauge, thermometer, safety drain valve, drain valve, water inlet valve, gas-liquid separator and other parts.



Applicable media: LO₂, LN₂, LAr, LNG, LCO₂, LPG, liquefied gas, propane, propylene, liquid chlorine, liquid ammonia and other cryogenic liquids.

Working pressure: 0.8-35.0MPa

Single flow: 50-12000 Nm/h

The cylinder can be made of carbon steel or stainless steel according to different requirements.

Audible and visual alarm for high and low outlet temperature

Add emergency cut-off device

Overall skid mounted design of equipment

It can be designed and manufactured according to electronic level

Siemens and Schneider can be used

Explosion proof electric cabinet and explosion-proof electric heater can be used



Air Temperature Vaporizer

The air heated vaporizer is used to vaporize low temperature liquid gas (LNG, L02, LN2, LAr, LC02, LPG, etc.) into gas with a certain temperature through heat exchange, which can be divided into high and low pressure according to the use. High pressure vaporizer is used to vaporize cryogenic liquid into high-pressure gas and fill the cylinder with liquid oxygen, liquid nitrogen and liquid argon pressurized by cryogenic liquid pump. The low-pressure vaporizer vaporizes the cryogenic liquid in the cryogenic container into low-pressure gas, which is transported to the use site through the pipeline through the pressure regulating device. Air heated vaporizer is a product with high efficiency and energy saving. Compared with water bath electric heating vaporizer and steam heating water bath vaporizer, it can save a lot of electricity or steam.



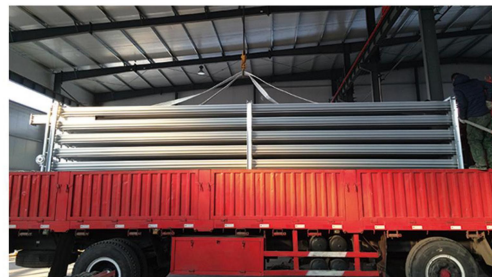
Technical Parameter

Working medium: L02, LN2, LAr, LC02, LNG, LPG, LC2H4 and other cryogenic liquids

Working pressure: 0.8-45MPa

Vaporization capacity of a single set: 50-12000 m3/h (combined type is required for larger evaporation capacity)

Material: JC-6063-T5 (aluminum profile)



Performance Characteristics

No energy consumption, no pollution, and environmental protection. Simple installation, convenient maintenance and long service life. The special large diameter finned tubes of $\varnothing 120$, $\varnothing 160$ and $\varnothing 200$ are used, and the internal fin structure with fast and effective defrosting speed is used to improve the effect of heat exchange tubes. Oxygen shall be degreased and cleaned according to CGA4.1 and ISO15001 standards.

Special anti-oxidation treatment process for the surface of heat exchange tubes.

Optimize the process design to minimize the pressure without bias, and ensure that the flow rate is controlled within a safe range.

Advanced high pressure pipe composite technology ensures 100% full contact between pressure pipe and heat exchange pipe, ensuring heat exchange efficiency.

Avoid sealing freezing, the sealing performance is safe and reliable, without corrosion, and the special sealing structure has no leakage.

The "bridge" type connecting element is beautiful and generous, which can eliminate the stress caused by thermal expansion and cold contraction of each part during operation.

It can be designed and manufactured according to electronic standards.



Explanation

1. Factors affecting the vaporization amount include: equipment working cycle, ambient temperature, humidity, altitude, wind, light, service pressure, and adjacent buildings.
2. Design conditions: ambient temperature: $-20\text{ }^{\circ}\text{C}$, relative temperature: 70%, evaporation capacity for 24 hours of continuous operation.
3. Since the heat absorbed by cryogenic liquid comes from ambient air, the vaporizer should be placed in an air free environment.
4. In the work of air heated vaporizer, local frosting is normal, and no external force is required to remove it, so as to avoid damage to the fin tube.

Remarks: Our company can customize various types of vaporizers with special working pressure and vaporization capacity.

Steam Heated Vaporizer

This series of vaporizers uses steam to heat the water in the cylinder, and then heats the low temperature liquid (L02, LN2, LAr, LNG, LC02, LPG, liquefied gas, propane, propylene, liquid chlorine, liquid ammonia) in the compact heat exchange tube. It uses the internationally advanced steam thermostatic control system, and the gasification volume is extremely stable during operation. The outlet temperature is normal temperature or can be set according to user requirements.



Performance Characteristics

High quality low temperature special stainless steel heat exchange tube, compact design, durable.

The dual way design of steam special control valve is adopted to ensure continuous use.

The special steam jet device is used to make the work quieter, noiseless and vibration free.

Imported paint is used to make the surface quality more permanent.

LG hot water special circulating pump is adopted, and the water temperature is balanced without stratification.

All are manufactured according to oxygen standard and food grade standard

The supporting parts are complete, and each set of vaporizer includes: vaporizer body, steam control device, steam injection device, electrical control box, safety drain valve

level gauge, thermometer, water inlet valve, drain valve, and gas-liquid separator.

The cylinder can be made of carbon steel or stainless steel.

Audible and visual alarm for high and low outlet temperature.

Add emergency cut-off device.

Skid mounted design of equipment (for small flow)

It can be designed and manufactured according to electronic level.

Look at the detachable heat exchanger core.

Explosion proof electric cabinet and explosion-proof electric heater can be used.



Technical Parameter

Applicable media: L02, LN2, LAr, LNG, LC02, LPG, liquefied gas, propane, propylene, liquid chlorine, liquid ammonia and other cryogenic liquids.

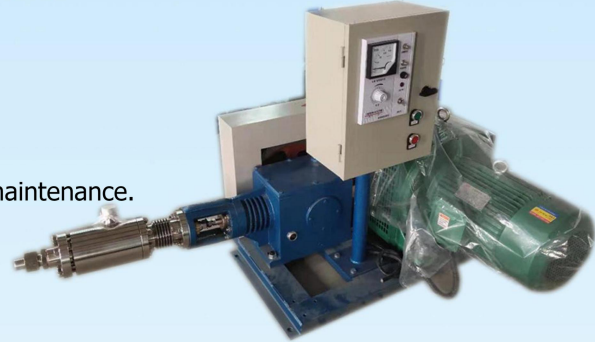
Working pressure: 0.8-35.0MPa

Single flow: 50-40000Nm³/h

Cryogenic Liquid Pump

Performance Characteristics

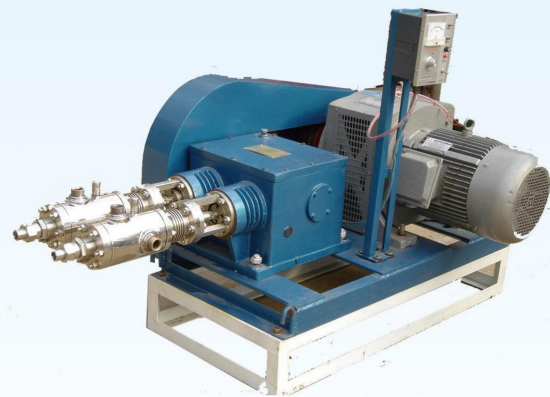
1. It is mainly used for liquid oxygen, liquid argon and liquefied natural gas.
2. Gas supply system for large and medium-sized steel plants.
3. Dewar bottle filling.
4. Centralized air supply system.
5. Pressure test and purging of large pipelines.
6. Chemical, petroleum, energy and other industries
7. Modular design, wide traffic coverage.
8. Simple pump head assembly design, convenient for maintenance.
9. Reliable sealing structure, long service life.
10. Various configurations are improved, and the pump is safe and automatic.



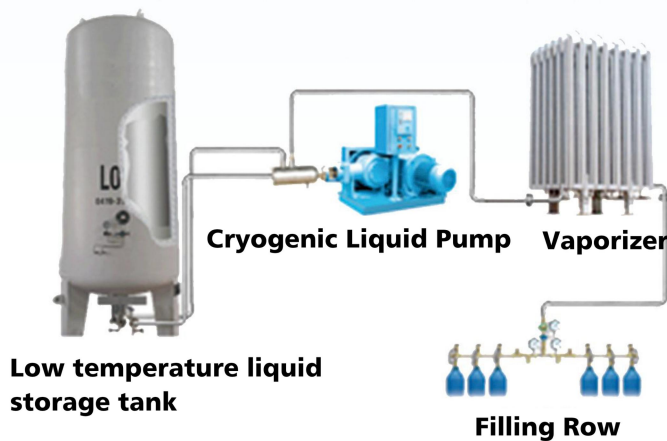
CO2 Pump

Technical Parameter

Inlet pressure: 0.02-0.8MPa
 Outlet pressure: 0.1-8.0MPa
 Output flow: 2000-65000L/h
 Power: 18.5-165KW



Double Cryogenic Liquid Pump



Filling System Flow Chart



Triple Cryogenic Liquid Pump

Gas Manifold

The gas manifold is mainly applicable to the unit that consumes a large amount of gas. It is a device that inputs bottled gas into the manifold header, and then delivers it to the use site after decompression and regulation. Due to its compact structure and simple operation, it is convenient for gas pressure control and flow control, and is a necessary device to ensure safety and civilized production. It is widely used in hospital, welding and cutting, chemical industry, electronics, shipbuilding, pharmacy, glass, laboratory, machinery manufacturing and other related fields.



Single Side Gas Manifold

Structural Characteristics

The main manifold is made of high-quality stainless steel 316 or copper H62. The whole system is safe and reliable through strict strength test and air tightness test.

Gantry design, reasonable structure layout, convenient installation.

The system is equipped with high-precision filter to ensure the demand of gas consumption.

Propane, propylene, acetylene and natural gas media are equipped with flashback preventers to ensure safety.

The pressure switch interface and expansion interface can be reserved to meet the expansion needs.

Reliable wall installation or horizontal installation.



Single Side Gas Manifold



Pressure reducing valve group/pressure stabilizing device

The pressure regulating device, also known as the pressure regulating valve group, plays a role in reducing and stabilizing the pressure in the centralized gas supply system of the pipeline to ensure that the pressure of the gas terminal is more accurate and stable. The pressure reducing device is equipped with an accurate and stable pressure regulating valve, pressure gauge and gauge valve, safety relief valve, standby bypass valve and manual relief valve. According to the type of pressure regulating valve, it can be divided into manual type and self-supporting type. According to the gas supply structure of the pressure relief device, it can be divided into single circuit, double circuit and multiple circuit.



Two way gas self-supporting pressure reducing device

Technical Parameter

1. Suitable for oxygen, nitrogen, argon, hydrogen, carbon dioxide, acetylene, propane, natural gas and other gases.
 2. Inlet pressure: 0-3.0MPa, 0.2-6.5MPa (adjustable)
 3. Outlet pressure: 0-1.4MPa, 0.2-6.0MPa (adjustable)
 4. Output flow: 1-5500Nm³/h (single circuit)
 5. Operating temperature: - 30~35 °C
 6. Pressure regulating accuracy: $\pm 1.5\%$
 7. Closing pressure: \pm safety overpressure relief valve
- On off valve: manual, pneumatic and electric.



Terminal box/gas collector/gas distributor

The terminal box is mainly applicable to the end of the centralized gas supply system, which is used for gas distribution. It is divided into box type and tank type. The box is metal shell, and there are three types of output structures: direct type, pressure regulating type and flow type. The combustible gas can be equipped with flashback preventer, and the welding and cutting gas can be equipped with station pressure reducer and flowmeter, which can make the gas supply pressure and output flow more accurate, easy to install, safe and reliable.



Gas Connector Box



Gas Connector Box



Gas Distributor



Gas Terminal Box



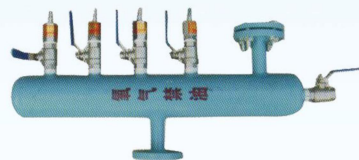
Damping Chamber



Gas Distributor



Connector Box



Gas Distributor



Gas Collector

Technical Parameter

1. Applicable medium: oxygen, nitrogen, argon, hydrogen, carbon dioxide, acetylene, propane, natural gas and other gases.
2. Design pressure: 1.6MPa, 3.0MPa, 6.4MPa.
3. Design temperature: - 30 °C~40 °C.
4. Material: GB8163 seamless steel pipe, stainless steel 304.
5. The fuel gas can be equipped with flame arrester.
6. Output interface and quick check connector.
7. Main configuration: gas collector, pressure reducer, inlet valve output valve, pressure gauge, flowmeter box and other related accessories.



Low temperature liquid storage tank

Product name: cryogenic liquid storage tank
 Applicable media: liquid natural gas, liquid oxygen, liquid nitrogen, liquid argon, carbon dioxide, etc
 Nominal pressure: 0.8, 1.6, 2.16MPa
 Nominal volume: 5, 10, 15, 20, 30, 50, 60, 80, 100m³
 Structural form: vertical and horizontal
 Thermal insulation type: vacuum powder thermal insulation



Product name: Low temperature insulation bottle (Dewar bottle)
 Applicable media: liquid natural gas, liquid oxygen, liquid nitrogen, liquid argon, carbon dioxide, etc
 Nominal pressure: 1.37, 2.3, 2.88MPa (vertical)
 1.6, 2.5, 3.0 MPa (horizontal)
 Nominal volume: 175L, 195L, 210L, 480L, 495L, 499L
 Structural form: vertical and horizontal



Product name: gas buffer tank
 Applicable media: oxygen, nitrogen, argon, air, carbon dioxide, etc
 Nominal pressure: 0.8, 1.0, 1.3, 1.6, 2.0, 2.5, 3.0 MPa (vertical)
 Nominal volume: 0.3, 0.5, 0.6, 1.0, 1.5, 2.0, 3.0, 5.0m³
 Structural form: vertical and horizontal
 Main material: carbon steel, stainless steel



Gas valve/cryogenic hose



高压截止阀
Globe Valve



高压不锈钢防爆软管
S.S. Hose Pipe



低温截止阀
L.Tmp. Globe Valve



低温高压截止阀
L.Tmp. Globe Valve



低温阀门
L.Tmp. Valve



低温单向阀
L.Tmp. Check Valve



低温波纹管
L.Tmp. Hose Pipe



低温调压阀
L.Tmp. Regulating Valve



低温波纹管
L.Tmp. Hose Pipe



低温不锈钢软管
L.Tmp. Hose Pipe



CNG减压器
Pressure Relief Valve



超高压截止阀
Globe Valve



不锈钢高压减压器
S.S. Pressure Relief Valve



不锈钢减压器
S.S. Pressure Relief Valve



低温安全阀
Safety Valve



高压球阀
Ball Valve



高压球阀
Ball Valve



管道阻火器
Flame Arresters



高压橡胶软管
Rubber Hose Pipe



管道减压器
Pipeline Pressure Reducer



氧气专用阻火器
Oxygen Flame Arrester



氧气专用截止阀
Globe Valve



管道阻火器
Flame Arresters



管道减压器
Pipeline Pressure Reducer



高压截止阀
Globe Valve

Construction case





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