焊接绝热气瓶

使用说明书

Instruction for Welded Adiabatic Gas Cylinders

河北润丰低温设备有限公司

Hebei Runfeng Low Temperature Equipment Co. LTD

目　录

Contents

序　　言

Preface

本使用说明书适用于本公司提供的焊接绝热气瓶（以下简称气瓶），**气瓶作为一种低温绝热压力容器，主要用于存储和运输液氧、液氮、液氩、液化天然气和二氧化碳，并能自动提供连续气体的容器，**此说明书包括有关安全、操作和故障检测等方面的资料，任何操作此设备的人员都必须认真阅读并理解本说明书的内容。

本说明书旨在向用户提供所有与气瓶的操作和保养有关的必要资料。流程图中注有气瓶所用零部件的名称，整个说明书中对零部件功能、操作或维修作说明时均使用此名称，以便引起对零件的特别注意。

本公司气瓶所配置的压力表及安全附件必须在校验有效期内使用。

本说明书内安全预防措施术语表示为：

警告：能够引起个人伤害和死亡的条件描述

谨慎：能够引起零件破坏的条件描述

注意：对重要信息需要重复的声明

This instruction is applicable to the welded adiabatic gas cylinders (hereinafter referred to as gas cylinders) provided by Runfeng company. **The gas cylinders are used as a low-temperature adiabatic pressure vessel for storing and transporting liquid oxygen, liquid nitrogen, liquid argon, liquefied natural gas and carbon dioxide. It is also a container to provides a continuous gas.** This instruction contains information on safety, operation and fault detection. Anyone who operates this equipment must read carefully and understand this instruction.

This instruction is intended to provide the user with all the necessary information relating to the operation and maintenance of the cylinder. The name of the parts used for the gas cylinder is indicated in the flow chart. These name are used throughout the description for the function, operation or maintenance of the parts in order to give special attention to the parts.

The pressure gauges and safety accessories of our company's gas cylinders must be used within the validity period.

The terms of safety precautions in this instruction is expressed as:

Warning: A description about the conditions that can cause personal injury and death

Caution: A description of the conditions that can cause damage to the part

Note: Repetitive claims for important information

1、产品规格 Product specification

立式工业瓶 Vertical industrial bottle

型号：DPL450-175 / 195/210/232
工作压力：1.37MPa / 2.3MPa / 2.88MPa

Model: DPL450-175/195/210/232
Working pressure: 1.37MPa/2.3MPa/2.88MPa

型号 Model		175	195	210	232
最大灌装重量（Kg）Maximum filling weight(Kg)	氧 Oxygen	170	190	205	225
	氮 Nitrogen	120	134	145	160
	氩 Argon	208	232	250	275
	二氧化碳 Carbon dioxide	164	183	197	217
	天然气 Natural gas	70	78	84	93

注意：当工作压力为 1.37MPa 时，气瓶不能充满二氧化碳介质。
Note: When the working pressure is 1.37MPa, the gas cylinder cannot be filled with carbon dioxide medium.

卧式工业瓶 Horizontal industrial bottle

型号：DPW650-410 / 499
工作压力：1.59 MPa /2.5 MPa /3.45 MPa
Model: DPW650-410/499
Working pressure: 1.59 MPa /2.5 MPa /3.45 MPa

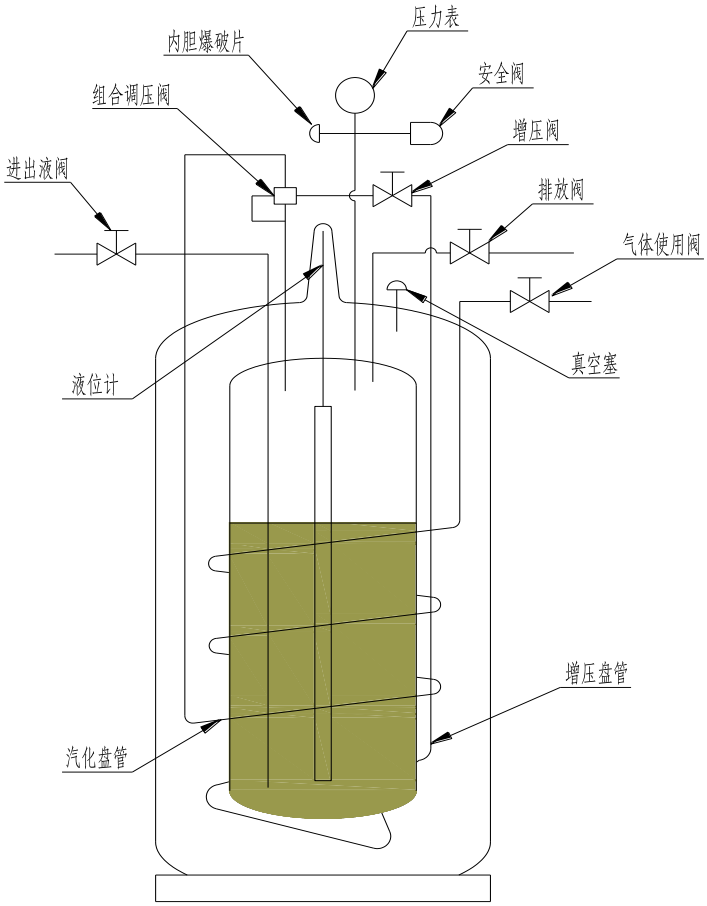
型号 Model		410	499
最大灌装重量（Kg）Maximum filling weight(Kg)	氧 Oxygen	393	478
	氮 Nitrogen	274	334
	氩 Argon	480	585
	二氧化碳 Carbon dioxide	160	460
	天然气 Natural gas	160	196

注意：工作压力为 1.59 MPa 时。 气瓶不能充满二氧化碳介质。
Note:When the working pressure is 1.59 MPa. The cylinder cannot be filled with carbon dioxide medium.

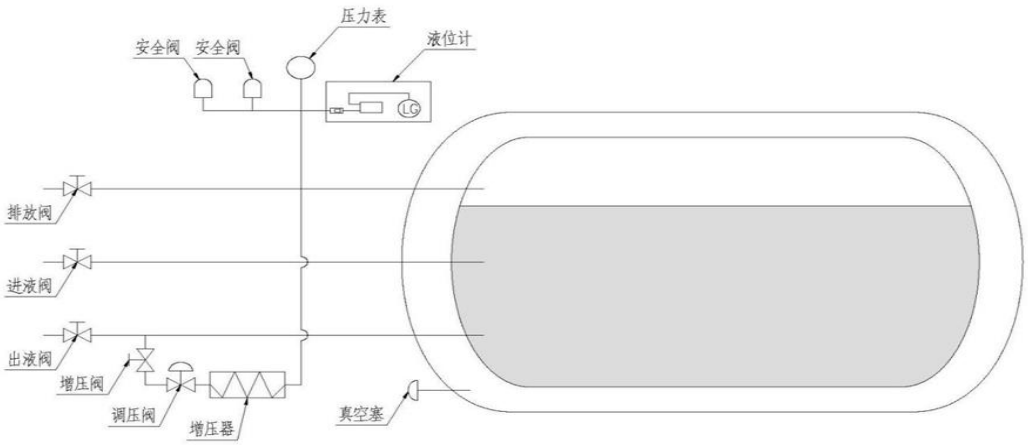
2. 气瓶描述 Cylinder details

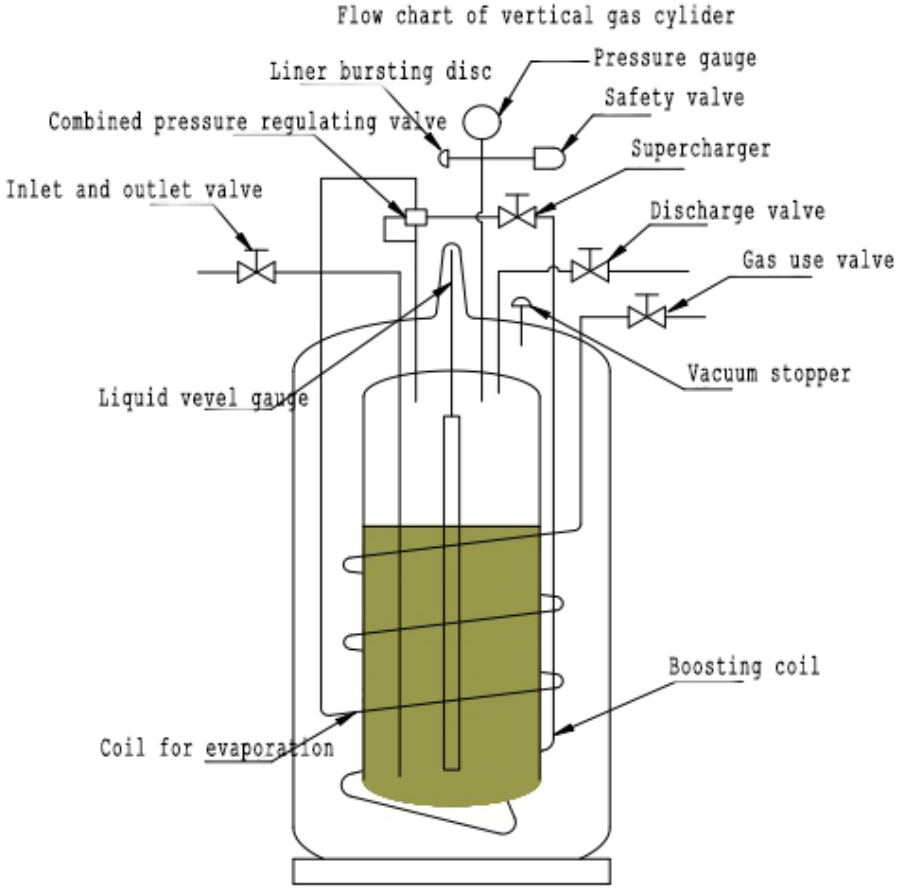
立式气瓶流程图

Vertical gas cylinder flow chart

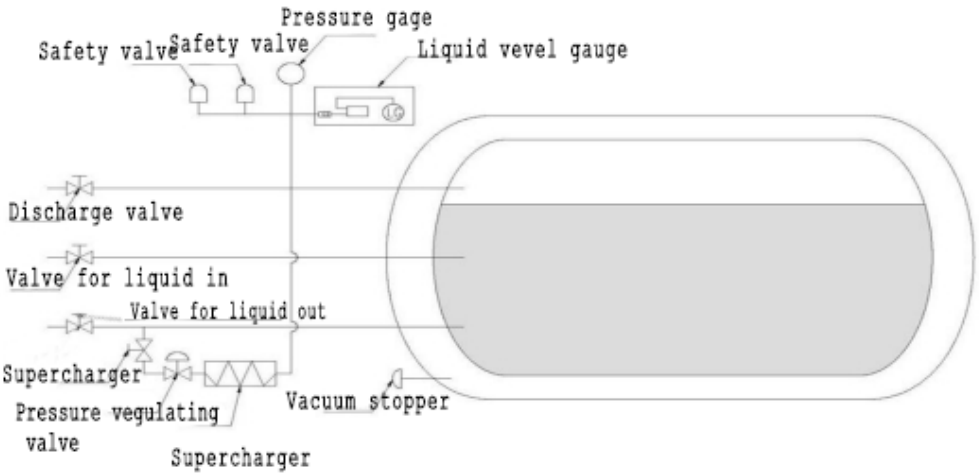


卧式气瓶流程图





Horizontal cylinder flow chart

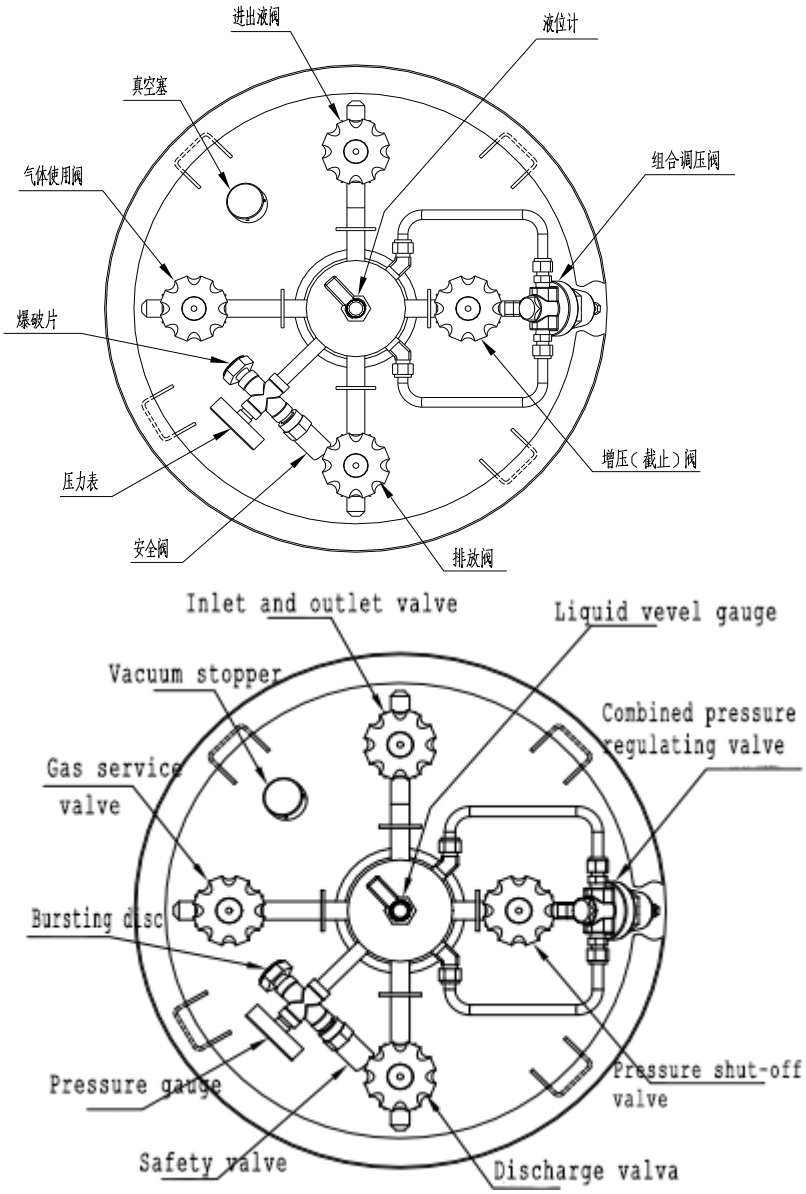


2.1 主要部件 Main components

2.1.1 立式气瓶 Vertical gas cylinder

气瓶的功能由以下组件实现。 在操作之前，应仔细阅读，以熟悉气缸的各个组件的功能和用法。

The functions of the gas cylinder are realized by the following components. It should be read carefully before operation to familiarize yourself with the functions and usage of the various components of the cylinder.



立式气瓶阀零件图 Diagram of vertical gas cylinder valve parts

内置汽化器：该汽化器为内置式汽化盘管，安装在气瓶的夹层内部。打开气体使用阀，低温液体通过紧贴外壳的汽化盘管与外界进行热交换，实现液气转换达到液体汽化的目的。在常温常压下，所需气体流量在 350cfh（9.2m^3/h）以下时，该内置汽化器可以满足客户持续用气需求，如需气体流量更大时，需并联几个气瓶到一根总管路上或采取单个气瓶（出液口）连接一个外置式汽化器加以解决。

增压器：增压器用于保证在高排放时气瓶内有足够的驱动压力，迅速压出低温液体或气体，满足客户用气需求。开启增压截止阀，气瓶底部低温液体通过紧贴外壳的增压盘管与外

界进行热交换，低温液体转化为饱和蒸汽，经组合调压阀回到气瓶顶部的气相空间以增加气瓶内的压力；

组合调压阀：此阀具备调整气瓶内介质压力的功能。打开增压截止阀：当气瓶压力低于设定值时，组合调压阀自动增压，瓶内低温液体通过增压盘管转化为气体，回到内胆，使压力升高；当压力高于设定值时，组合调压阀自动关闭。

气体使用阀：它与内置汽化器相连，通过此阀可得到汽化后的气体。

进出液阀：此阀控制低温液体的充灌和排放。

增压（截止）阀：此阀控制增压器回路，开启此阀即可向瓶内增压。

排放阀：此阀与气瓶气相空间相连，开启后可释放瓶内气体使压力降低。

液位计：（1）气瓶液位计采用浮子式液位计，利用低温液体的浮力，能近似地指示气瓶内低温液体的容量。

（2）气瓶液位计采用电容式液位计，电容传感器根据瓶内的液体高度产生一个成比例的电信号，液位显示表在接受电信号后进行信号转换，以百分比数字表示不同的液体量。

压力表：显示气瓶内胆压力，单位是兆帕（MPa）或磅每平方英寸（psi）。

安全装置：气瓶整体设计有安全阀和爆破片，在超压时起到保护气瓶的作用。安全阀开启，其作用是放散高压气体达到设定压力后自动关闭。在安全阀失效时，爆破片将开启泄压，以确保气瓶安全。

Built-in vaporizer: The vaporizer is a built-in vaporization coil that is installed inside the interlayer of the cylinder. When the gas use valve is opened, and the low temperature liquid exchanges heat with the outside through the vaporization coil which is close to the outer casing, thereby to realize the purpose of liquid vaporization by liquid gas conversion .

Under normal temperature and pressure, when the required gas flow rate is below 350cfh (9.2m3/h), the built-in vaporizer can meet the customer's continuous gas demand. If the gas flow rate is larger, several gas cylinders need to be connected in parallel to one main pipe. Or a single cylinder (outlet) is connected to an external vaporizer to make it.

Supercharger: The supercharger is used to ensure that there is enough driving pressure in the cylinder at high discharge, and the low temperature liquid or gas can be quickly pressed out to meet the customer's gas demand. The pressure shut-off valve is opened, and the low temperature liquid at the bottom of the cylinder exchanges heat with the outside through the pressure coil which is close to the outer casing, and the low temperature liquid is converted into saturated steam, and the combined pressure regulating valve is returned to the gas phase space at the top of the cylinder to increase the internal pressure of the cylinder;

Combined pressure regulating: This valve has the function of adjusting the pressure of the medium in the cylinder. Open the pressure shut-off valve: When the cylinder pressure is lower than the set value, the combined pressure regulating valve is automatically pressurized, and the low temperature liquid in the bottle is converted into gas through the boosting coil, and returns to the inner tank to increase the pressure;while above the set value, the combined regulator automatically closes.

Gas service valve: It is connected to a built-in vaporizer and the vaporized gas is obtained through it.

Inlet and Outlet Valve: This valve controls the filling and discharging of cryogenic liquids.

Pressurized (cut-off) valve: This valve controls the booster circuit. Increasing the pressure in the bottle by opening it.

Discharge valve: This valve is connected to the gas phase space of the cylinder. When opened, the gas in the bottle can be released to reduce the pressure.

Liquid level gauge: (1) The cylinder level gauge uses a float type liquid level gauge, which uses the buoyancy of the cryogenic liquid to approximately indicate the volume of the cryogenic liquid in the cylinder.

(2) The gas cylinder level gauge adopts a capacitive liquid level meter. The capacitance sensor generates a proportional electrical signal according to the liquid height in the bottle. The liquid level display meter performs signal conversion after receiving the electric signal, and represents different percentages of the amount of liquid.

Pressure gauge: Displaying liner pressure in megapascals (MPa) or pounds per square inch (psi).

Safety device: The gas cylinder is designed with safety valve and bursting disc to protect the cylinder when overpressured. The safety valve is opened, and it is to automatically close the high pressure gas when reaching the set pressure. In case of the failure of it, the bursting disc will open to relieve pressure to ensure the safety of the cylinder.

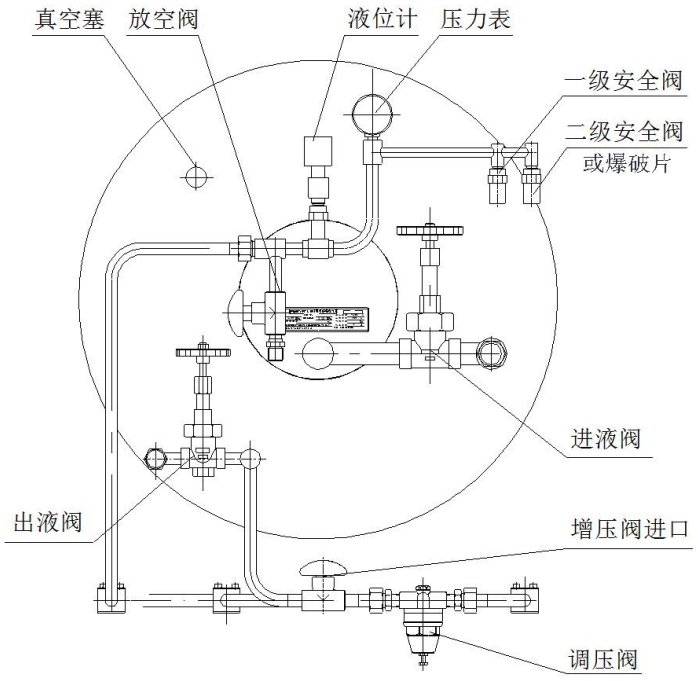
2.1.2 卧式气瓶 Horizontal gas cylinder

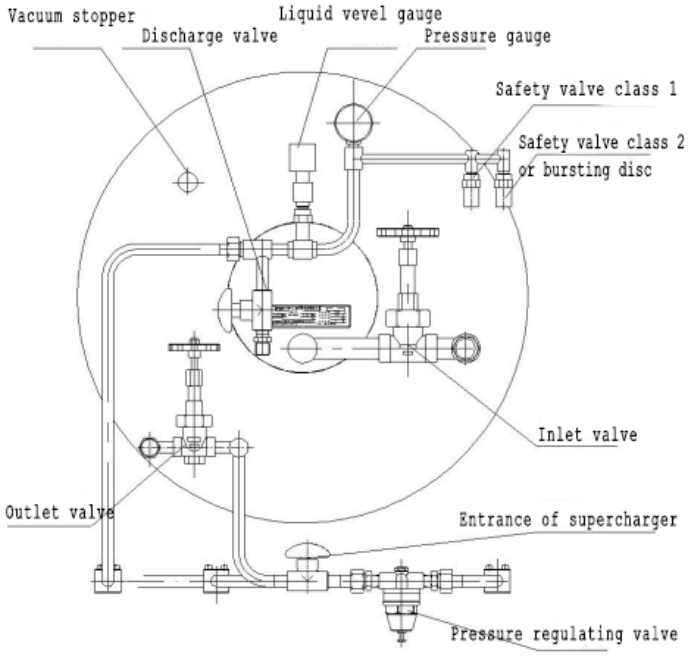
卧式气瓶的各项功能是通过下面的零部件来实现的，在操作前应仔细阅读，以熟悉气瓶各个零部件的作用及使用方法。

The functions of the horizontal gas cylinders are realized by the following components. They should be read carefully before operation to get familiar with the functions and usage of the various components.

卧式气瓶阀门部件示意图

Diagram of horizontal gas cylinder valve parts





增压器：增压器采用翅片式换热器，安装在气瓶的底部，用以提高瓶内气体压力。

排放阀：此阀与气瓶气相空间相连，开启此阀释放瓶内气体使压力降低。

进液截止阀：此阀用于控制低温液体的充灌。

出液截止阀：此阀用于控制低温液体的输出。

增压截止阀：此阀用于控制增压器回路，开启此阀即可向瓶内增压。

增压调节阀：低温液体通过此阀进入增压器转化为气体，回到内胆，从而使瓶内压力达到增压调节阀的设定值。

液位计：液位计采用电容式液位计，电容传感器根据瓶内的液体高度产生一个成比例的电信号，液位显示表在接受电信号后进行信号转换，以百分比数字表示不同的液体量。

压力表与安全阀：参见立式气瓶说明。

Supercharger: The supercharger uses a finned heat exchanger.It's installed at the bottom of the cylinder to increase the gas pressure inside the bottle.

Discharge valve: This valve is connected to the gas phase space of the cylinder. When it is opened, the gas in the bottle is released to reduce the pressure.

Inlet shut-off valve: This valve is used to control the filling of cryogenic liquids.

Outlet shutoff valve: This valve is used to control the output of cryogenic liquids.

Boost shut-off valve: This valve is used to control the booster circuit. When it is opened, the cylinder is pressurized.

Pressurization regulating valve: The cryogenic liquid enters the supercharger through this valve , converts into gas, and returns to the inner tank, so that the pressure in the bottle reaches the set value of the boost regulating valve.

Liquid level gauge: The level gauge uses a capacitive level gauge. The capacitive sensor produces a proportional electrical signal based on the liquid level in the bottle. The liquid level display meter converts the signal after receiving the electrical signal, indicating the different liquids as a percentage of the amount of liquid.

Pressure gauges and safety valves: See the instruction to vertical gas cylinder.

3. 安全提要 Security summary

手册的此部分涉及必要的低温设备防护知识。在充满氧气的环境下，易燃物会剧烈燃烧并可能爆炸，氧气聚集过度会使周围充满氧气（通常氧气聚集量超过 23％即表明周围充满氧气）。有些被认为在空气中不会燃烧的物件，在充满氧气的环境下也可能会立即燃烧起来。要清除所有有机物和其它可燃物，使之不会与氧气接触，尤其是不能使油、脂类、煤油、布、木材、油漆、沥青、煤、灰尘或可能会粘有油或脂类的污垢等接触到氧气，不允许在任何储存、输送或使用氧气的区域内吸烟或有明火，如不遵守此警告，可能会导致严重的人员伤害。

空气中氮和氩的挥发气体会减低维持生命所必需的氧气的浓度，吸入高浓度的这类气体会出现缺氧症，导致头昏、恶心、呕吐或昏迷甚至死亡，在氧气含量低于 19％的地方要禁止人员进入，否则要戴上随身携带的呼吸器，如氧气浓度低于 8％，可能会在没有任何迹象的情况下导致昏迷和死亡。

警告：严禁在任何情况下拔出真空塞。

注意：爆破片只能一次性使用。爆破片作用之后必须更换。可向本公司购买。

注意：充装天然气时，采用双安全阀，取消爆破片。

注意：增压调节阀是自动启闭，无需人工操作，不同压力的气瓶，使用的增压调节阀出厂设定压力不同，调节范围不同。不得随意调整。

This part of the manual covers the necessary knowledge of cryogenic equipment protection. In an oxygen-filled environment, inflammable materials burn intensely and may explode. Excessive oxygen accumulation will fill the surrounding area with oxygen (usually the amount of oxygen concentration exceeds 23% ,the surroundings are full of oxygen). Some objects that are considered to be unburned in the air may burn immediately in an oxygen-filled environment.

Remove all organic matter and other combustible materials so that they keep away from oxygen, especially oil, grease, kerosene, cloth, wood, paint, asphalt, coal, dust or some dirt which may stick to oil or grease. Don't smoke or have an open flame in any area where it is stored, transported or used. Or ,it may have serious personal injury.

Volatile gases such as nitrogen and argon in the air reduce the concentration of oxygen which is necessary to sustain life. In-drawing high concentrations of these gases can cause hypoxia, which can lead to dizziness, nausea, vomiting, coma or even death. The place with less than 19% oxygen, should be forbidden to enter, otherwise a respirator should be put on, if oxygen concentration is below 8%, it may lead to coma and death without any signs.

Warning: Do not remove the vacuum plug under any circumstances.

Note: The bursting disc can only be used once. It must be replaced after acting. It can be purchased from our company.

Note: When filling natural gas, double safety valve and no bursting disc.

Note: The booster regulating valve automatically opens and closes, no manual operation is required. Cylinders with different pressures, the booster regulating valves have different factory setting pressures and different adjustment ranges. Do not adjust it optionally.

3.1 安全防护 Security protection

- 工人在操作时必须穿长衣长裤，戴护目镜、脸罩、绝热手套。否则就有可能造成冷灼伤。

- ◆ 在拆卸、维修气瓶零件时需将气瓶内液体排尽，压力降至零，以避免气瓶余压对人员造成伤害。
- ◆ 当气瓶作为低温液氧气瓶使用时，必须使用与用氧规定配套的设备与附件，而且上述设备和附件必须达到用氧规定的要求。
- ◆ 气瓶在搬运时，可用配套的小车或其他工具通过气瓶保护圈上的吊耳来辅助搬运。
- ◆ 气瓶在任何条件下都必须保证垂直放置，任何压迫、跌落和翻倒等都可能会对气瓶造成致命的损伤。

警告：充装或使用过程中，应防止低温液体飞溅或溢出，操作时应有防冻措施。

◆ Workers must wear long trousers, goggles, face shields, and insulated gloves when handling. Otherwise it may cause cold burns.

◆When disassembling and repairing the cylinder parts, the liquid in the cylinder should be drained and the pressure should be reduced to zero to avoid the damage caused by the residual pressure of the cylinder.

◆ When the cylinder is used as a cryogenic liquid oxygen cylinder, use the equipment and accessories which comply with the oxygen regulations , and they must meet the oxygen requirements.

◆When transporting the cylinder, use the matching trolley or other tools to assist the handling through the lifting lugs on the cylinder protection ring.

◆Gas cylinders must be placed vertically in all conditions, Any pressure, drop and tipping may cause fatal damage to the cylinder.

Warning: During the filling or use, the cryogenic liquid should be prevented from splashing or overflowing . Anti-freezing measures should be taken during operation.

3.2 警告 Warning

- ◆ 保护眼睛和暴露的皮肤
- ◆ 保持设备所在地区通风良好
- ◆ 充装液氧时远离易燃品或电火花
- ◆ 严禁采用横卧滚动方式来搬动气瓶。

◆ Protect your eyes and exposed skin

◆ Maintain good ventilation in the area where the equipment is located.

◆ Keep away from flammable products or sparks when filling liquid oxygen

◆ Horizontal scrolling is strictly forbidden to move the cylinder.

4. 操作 Operation

4.1 使用前检查 Check before use

在收到气瓶后，卸下包装保护外套，做以下检查：

a) 运输过程中是否造成损坏，包括气瓶表面划伤及凹痕、气瓶外部管道及附件被碰坏或弯曲。如有，请立刻向运输公司报告损坏之处。

b) 是否有产品合格证，使用说明书，合格证是否与所收到的气瓶相符合。

c) 在使用此气瓶前应先仔细阅读并理解本使用技术说明书。

如有问题，请与您的气瓶经销商联络，或直接与河北润丰低温设备有限公司销售部联系。

After receiving the cylinder, remove the protective jacket and make the following inspection:

a) Whether it’s damaged during transportation, including scratches and dents on the

surface, and damaged or bent external pipes and accessories. If so, report it to the shipping company immediately.

b) Whether there is a product certificate, instruction manual, and whether the certificate matches the received gas cylinder.

c) Read and understand this technical manual carefully before using this cylinder.

If any questions, please contact your gas cylinder dealer or contact the sales department of Hebei Runfeng Cryogenic Equipment Co., Ltd. directly.

4.2 起吊程序 Lifting procedure

气瓶的顶部带有一个不锈钢保护圈，设计此圈是为了保护顶部的管道阀门部件。不锈钢保护圈有四个支架支撑在气瓶上，每个支架上有一长圆形孔。这个长孔可以用于吊装气瓶或挂在运输小车上搬运。

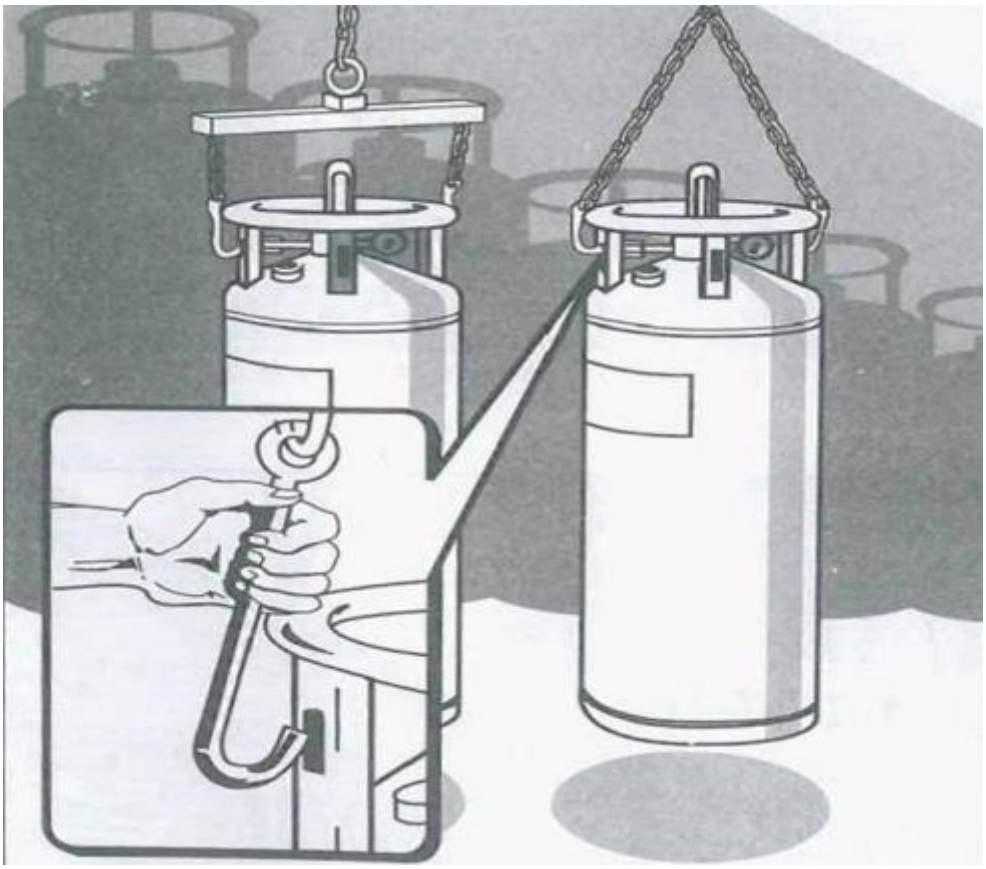
The top of the cylinder is fitted with a stainless steel retaining ring designed to protect the top pipe valve components. The stainless steel protection ring has four brackets supported on the cylinders, each with an oblong hole. This long hole can be used to lift a cylinder or to be carried on a transport trolley.

4.2.1 起吊 Lifting

当需提起气瓶时，选用适当的挂钩并挂在两个支架的长圆孔上，且要保证气瓶垂直吊起。如图所示带链挂钓吊起气瓶，或采用两条链的挂钩，保证起吊安全可靠。

It is necessary to lift the cylinder, use the appropriate hooks and hang them on the long round holes of the two brackets, and the cylinders are lifted vertically.

As shown in the picture, hook and lift the cylinder with chain, or use two hooks to ensure the lifting safe and reliable.



4.2.2 搬运 Handling

气瓶应用专用的运瓶小车来搬，不要依靠气瓶底座来滚动气瓶 。气瓶必须在垂直状态下存放与使用。当有必要用卡车运输气瓶时，应用升降台、起重机或作斜坡(小于 15°)来进行装卸，若不按照上述要求进行将导致气瓶严重损坏及人员受伤。

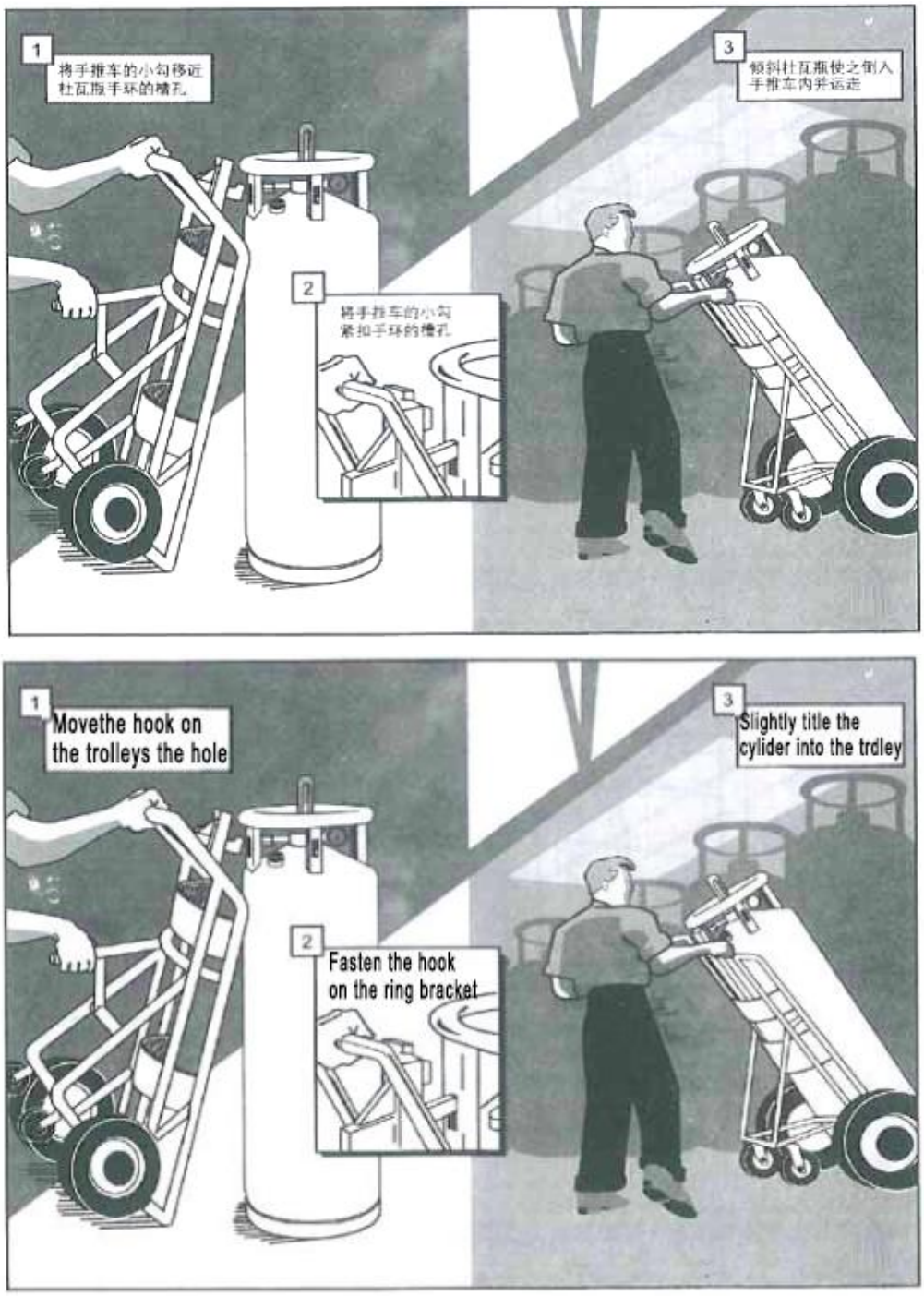
下图所示气瓶的搬运方式，使用带充气轮胎的手推车进行搬运，搬运时注意手推车上的小钩要与气瓶保护圈支架上的槽孔紧扣，操作时气瓶是直立的，搬运时气瓶可稍微倾斜。

下图中所示的小车是我公司设计的专用于运送气瓶的。当在短距离内频繁移动液体气瓶时，使用运输小车是很方便的。只要保证小车工作区域内地面平整，即可方便安全地运送气瓶。运瓶小车上的充气轮胎也可用外包有坚硬橡胶的金属轮代替。

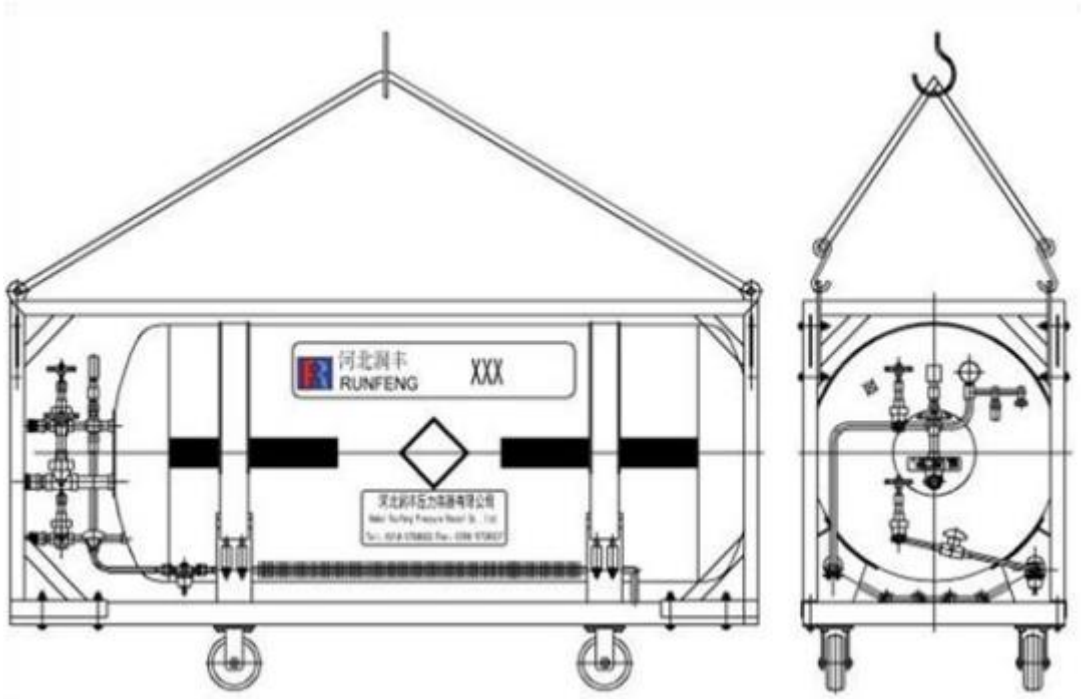
The gas cylinder should be carried by a special bottle transporter. Don’t roll the cylinder relying on the cylinder base. Cylinders must be stored and used in a vertical position. When it is necessary to transport cylinders by truck, use lifting platforms, cranes or slopes (less than 15°) for loading and unloading. If not,it may cause in serious damage to the cylinders and personal injury.

As shown in the picture below,in the picture it is carried out by using a trolley with pneumatic tires. When handling, the small hook on the trolley should be fastened to the slot on the cylinder protection ring bracket. The cylinder is erected during operating, and slightly tilted during handling.

The trolley shown in the picture below is designed by our company to transport gas cylinders. When moving a liquid gas cylinder frequently within a short distance, it is convenient to use a transport trolley. As long as the ground in the working area trolley is flat, it is convenient and safe to transport the cylinder. Pneumatic tires on the bottle can also be replaced by metal wheels with hard rubber.



卧式气瓶 Horizontal cylinder



*吊装时按上图所示
*可用叉车托举底部
*平坦地面短距离可用气瓶底座来运动气瓶
* When lifting, as shown above
* Lift the bottom with a forklift
* Move the cylinder by its base if flat ground short distance.

4.2.3 运输 Transportation

为防止气瓶在运输过程中移动或相互碰撞，气瓶装上卡车后用尼龙带固定，不要用钢制链条捆绑。

To prevent the cylinders from moving or colliding with each other during transportation, they are mounted on the truck and fixed with nylon straps. Do not bundle them with steel chains .

4.2.4 储存 Storage

气瓶应存放在通风良好的地方，不得在烈日下长时间曝晒。

Gas cylinders should be stored in a well-ventilated place and should not be exposed to the sun for a long time .

4.3 充装 Filling

4.3.1 热瓶充装 Hot bottle filling

通常我们将首次充装低温液体前和停止工作两周以上的瓶称为“热瓶”。由于其内胆部分为环境温度，与低温液体温差较大，直接充装会使低温液体大量蒸发而造成不必要的浪费，下面是热瓶充装程序：

1、 首先向瓶内充入大约 20L 的低温液体，静置，在瓶内低温液体气化升压的过程中，瓶内胆也得到冷却；
2、 当瓶内压力达到正常工作压力后，进行系统的检漏；
3、 通过开启排放阀降低瓶内压力后，即可按常规充装程序进行操作；

警告：充装时应先将瓶内的空气排净。按照气瓶标识相对应的介质充装。

警告：严禁对气瓶超限充装

警告：应在通风良好的场所进行充装，因为气体的累积是非常危险的。

警告：LNG 气瓶首次使用前，必须对内容器用氮气进行置换处理，并作含氧量分析，含氧量必须≤0.3%。LNG 与空气或氧气混合，能形成爆鸣性气体，如遇火种会进行燃烧，因此 LNG 必须通过管道引至安全场所进行排放。

注意：一只完全充满的瓶其压力上升十分迅速，可能导致安全阀开启。

注意：在刚进行有关液氧的作业之后，由于衣服中很可能溅有液氧，请注意不要吸烟或靠近有火的地方。

注意：当二氧化碳的饱和压力降到 0.49MPa（70 psi）时，二氧化碳就会形成固态干冰，冰堵管道。所以在使用气瓶充装二氧化碳时，必须先把瓶内二氧化碳气体加压，才可以充装。工作压力为 1.37MPa 和 1.59 MPa 气瓶不能充装二氧化碳介质。

注意：低温绝热气瓶所充低温液体的过饱和度，以及超量充装是充装后瓶内压力异常升高的另外两个重要因素。

Usually we name the bottle before which is never used or isn't be filled by cryogenic liquid for more than two weeks ,as a "hot bottle". The temperature of the liner is the ambient one , which is different so much from that of the cryogenic liquid . Unnecessary waste happens because of much cryogenic liquid evaporating if filling the hot bottle directly .

Here is the hot bottle filling procedure:

1. First fill the bottle with about 20L of cryogenic liquid, let it stand. During in the process of low-temperature liquid gasification and boosting in the bottle, the bottle liner is also cooled;
2. When the pressure inside the bottle reaches the normal working pressure, the system detects the leak;
3. After lowering the pressure inside the bottle by opening the discharge valve, filling can be done according to the conventional procedure;

Warning: Drain the air in the bottle before filling. Fill with the corresponding media according to the cylinder label.

Warning: Overfilling the cylinder is strictly forbidden;

Warning: Filling in a well-ventilated area, because the accumulation of gas is very dangerous.

Warning: Before the first using of the LNG cylinder, it must be replaced with nitrogen and do analysis for oxygen content. The oxygen must be ≤0.3%. Blasting gas comes if LNG mixes with air or oxygen, and it burns with tinder,so LNG must be piped to a safe place for discharge.

Note: The pressuring of a fully filled bottle will rise very quickly and which may make the safety valve open.

Note: At the beginning of the operation with liquid oxygen, please don't smoke or be near a fire because liquid oxygen is likely to be splashed in the clothes.

Note: When the saturation pressure of carbon dioxide drops to 0.49 MPa (70 psi), carbon dioxide forms solid dry ice, which blocks the pipe. Therefore, when the cylinder is filled with carbon dioxide, the carbon dioxide gas in the bottle must be pressurized before it can be filled.

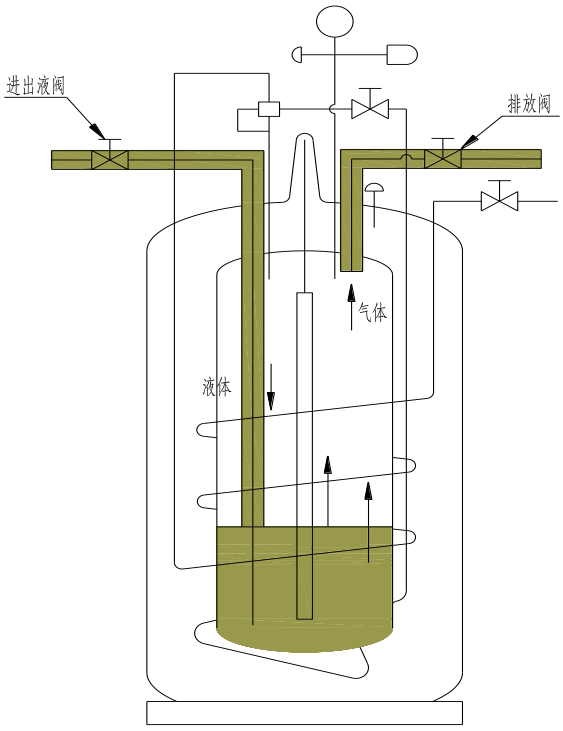
Note: Another two important factors for the abnormal pressure increasing the degree of supersaturation and overfilling of the cryogenic liquid.

4.3.2 压差法充装 Filling by differential pressure

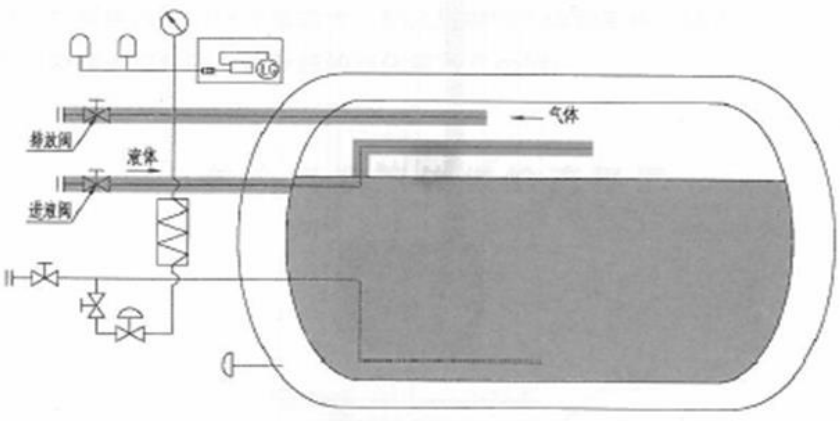
1、 用专门的输送软管将气瓶进出液阀与供应源相接，并拧紧无泄漏。
2、 开启气瓶的排放阀和进出液阀，然后开启供应阀，开始充装。
3、 在充装过程中，通过压力表监测瓶内压力并调节排放阀使压力保持在 0.07~0.1MPa（10~15 psi）。
4、 当达到所需的充装质量后，关闭进出液阀（充液截止阀）、排放阀和供应阀。
5、 卸下输送软管，并将气瓶从磅秤上移走。

1. Connect the cylinder inlet and outlet valves by a special conveying hose with the supply source and tighten them.
2. Open the discharge valve and inlet & outlet valve of the cylinder, then open the supplying valve to start filling.
3. During the filling process, check the pressure inside the bottle through the pressure gauge and adjust the discharge valve to maintain the pressure at 0.07~0.1MPa (10~15 psi).
4. When the required filling quality is reached, close the inlet and outlet valves (filling shut-off valve), discharge valve and supply valve.
5. Remove the transfer hose and remove the cylinder from the scale.

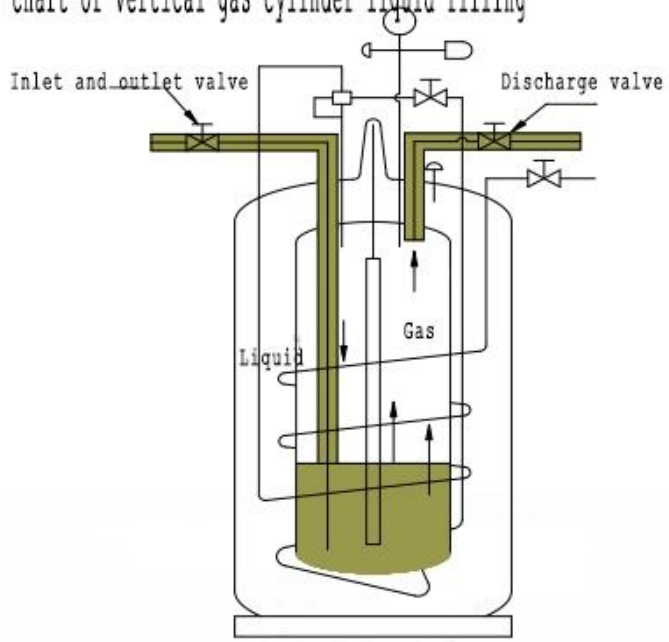
立式气瓶液体充装流程图



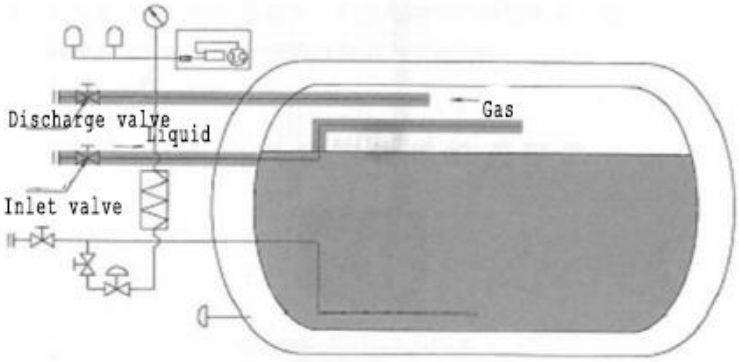
卧式气瓶充装流程图



Flow chart of vertical gas cylinder liquid filling



Flow chart of horizontal cylinder filling



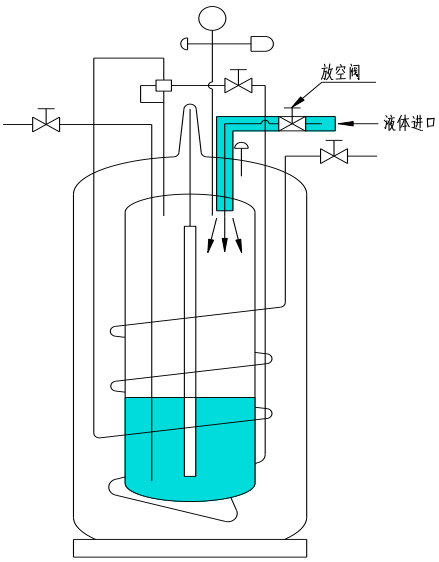
4.3.3 利用离心液泵充装 Filling with a centrifugal pump

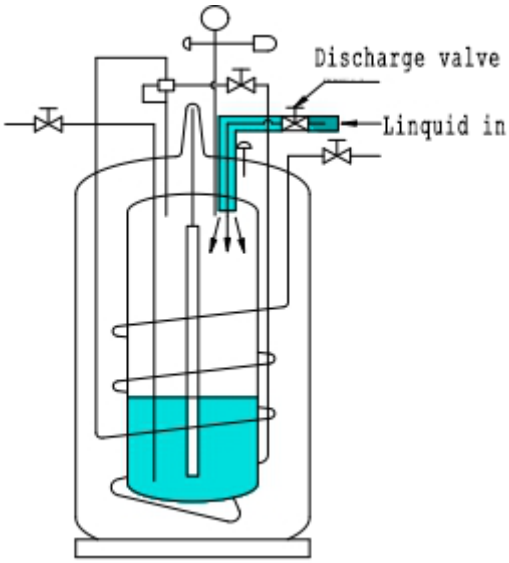
用离心液泵充装可降低充装过程中的介质损耗，液体可在不进行放空的情况下被泵入气瓶。液体经过排放阀进入气瓶，充装过程中应该密切注意压力表数值，当压力接近气瓶的安全阀起跳压力或泵的额定压力时，应立即停止泵运行，应选用出口压力小于安全阀起跳压力的低温离心泵。如用户想利用离心泵完成充装，具体事宜请咨询我公司。

Filling with a centrifugal pump can reduce the loss of media during the filling process, and the liquid can be pumped into the cylinder without emptying. The liquid enters the cylinder through the discharge valve. The pressure gauge value should be closely noticed during the filling process. When it is close to the safety valve, lifting pressure or the rated pressure of the pump, the pump should be stopped immediately. The outlet pressure should be smaller than the safety valve. Lifting pressure cryogenic centrifugal pump should be chosen. If the user wants to complete the filling with the centrifugal pump, please consult our company for details.

立式气瓶液体充装流程图

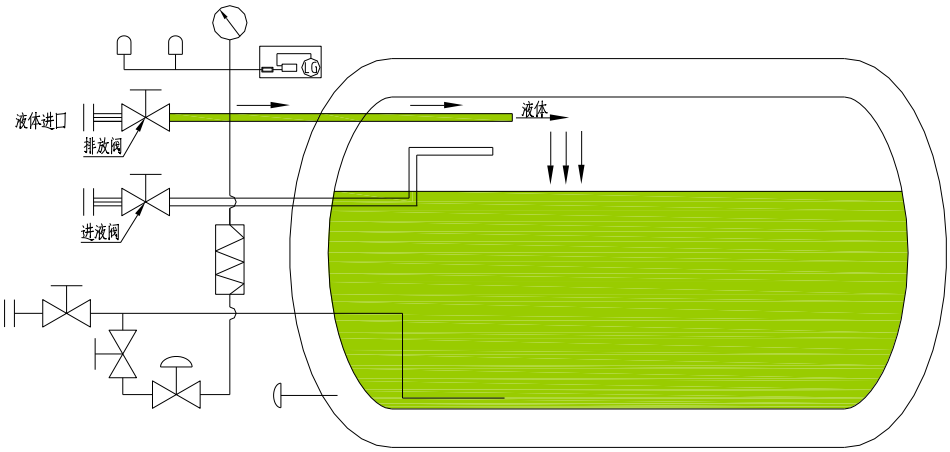
Flow chart of vertical gas cylinder liquid filling

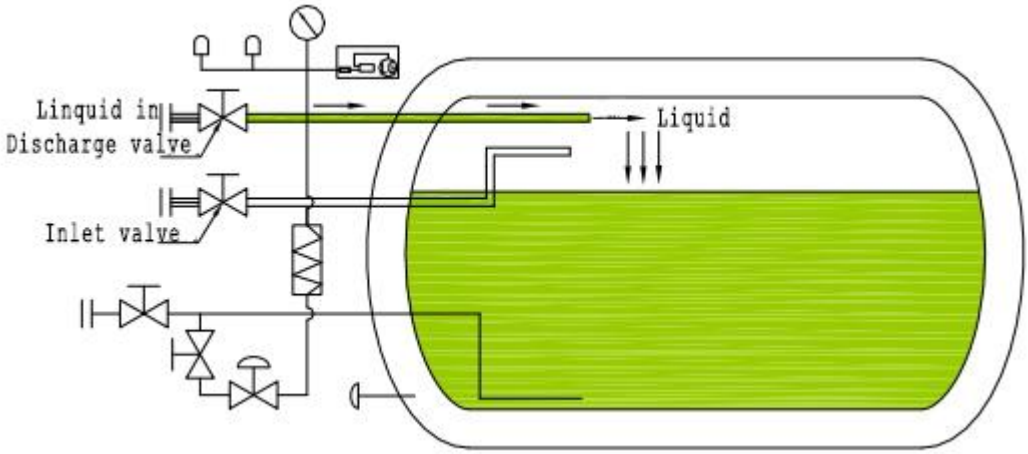




卧式气瓶液体充装流程图

Flow chart of horizontal cylinder filling





4.4 液体供给 Liquid supply

1、 用专门的输送软管将气瓶进出液阀与接受源相接，并拧紧无泄漏。

2、 开启接受源阀，然后开启气瓶的进出液阀或出液截止阀，开始供液。

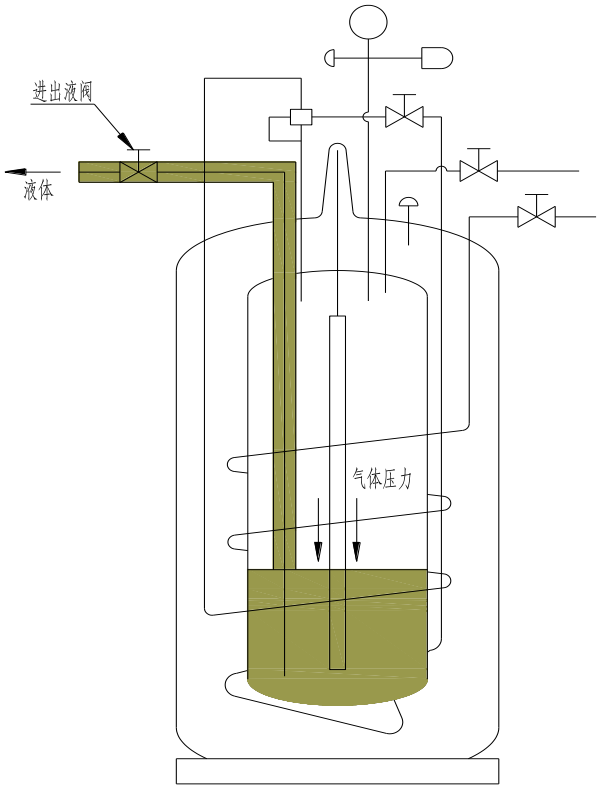
3、 当瓶内压力小于接受设备压力时，请先开启增压（截止）阀增压，再进行供液。

4、 关闭接受阀和进出液阀或出液截止阀，卸下输送软管。

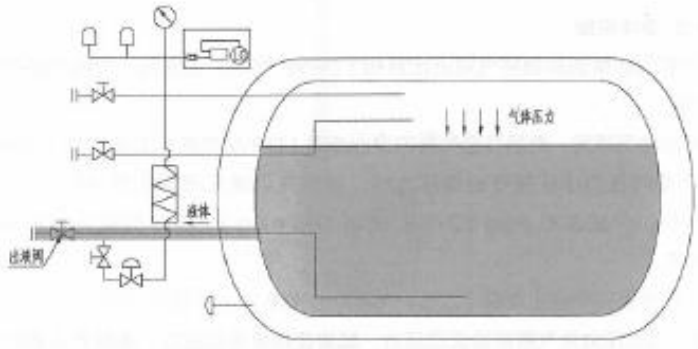
1. Connect the inlet and outlet valve to the receiving source with a special conveying hose and tighten it without leakage.
2. Open the receiving source valve, then open the inlet and outlet valve or the outlet shut-off valve of the cylinder to start the liquid supply.
3. When the pressure inside the bottle is less than that of the receiving device, please first open the pressure-increasing(cut-off) valve to pressurize before liquid supply.
4. Close the receiving valve , the inlet and outlet valve or the outlet shutoff valve and then remove the delivery hose.

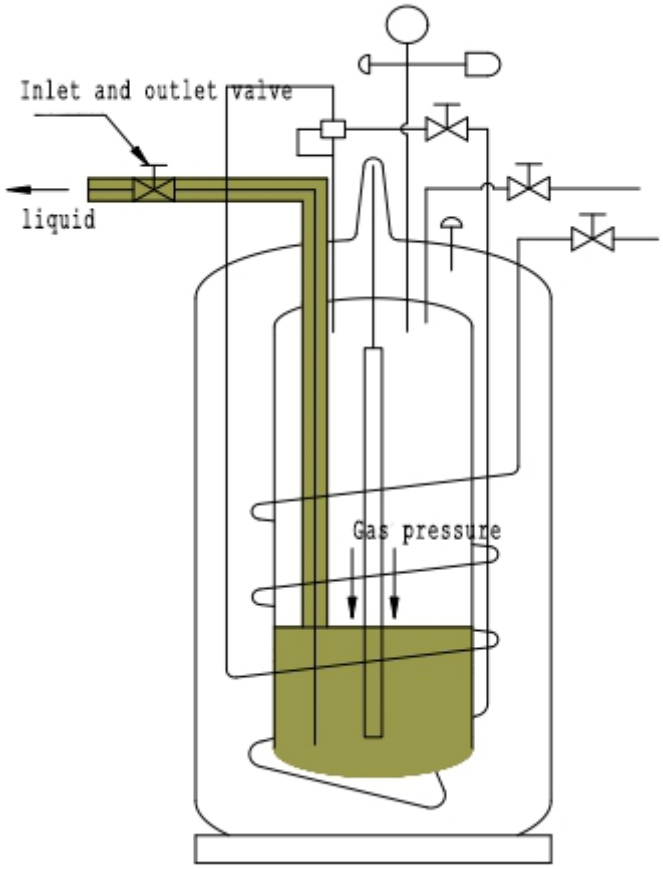
液体供给流程图

Flow chart of liquid supply

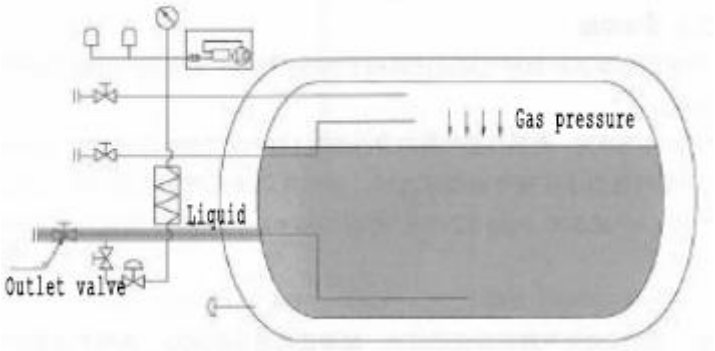


卧式气瓶液体供给流程图





Flow chart of horizontal cylinder



4.5 单个气瓶气体供给 Single cylinder gas supply

1、 用专门的输送软管将气瓶气体使用阀与接受源相接，并拧紧无泄漏。
2、 开启气瓶气体使用阀和增压（截止）阀。
3、 开启接受源阀门，即可得到连续稳定的气体。
4、关闭气体使用阀、增压阀，停止供气。

5、关闭接受源阀门，卸下输送软管。

谨慎：如果要求的气体流量增大，那么提供的气体温度将会降低。

4、 **注意：使用天然气时，立式气瓶汽化器的汽化量为** 6 N·m³/h，卧式中压、高压气瓶气化量约 7.8 N·m^3/h，超高压气化量约 15.7 N·m^3/h）。

5、 **注意：使用二氧化碳时，立式气瓶汽化器的汽化量为** 3.9 N·m³/h，卧式中压、高压气瓶气化量约 5.1 N·m^3/h，超高压气化量约 10.2 N·m^3/h）。

6、 **注意：**使用液氧，液氩时立式气瓶气化量约 9.2N·m^3/h，卧式中压、高压气瓶气化量约 12 N·m^3/h，超高压气化量约 24 N·m^3/h

1. Connect the gas service valve to the receiving source with a special conveying hose and tighten it without leakage.
2. Open the gas service valve and the supercharger (cutoff) valve.
3. Open the receiving source valve to obtain a continuous and stable gas.
4. Close the gas service valve and supercharger valve to stop the gas supply.
5. Close the receiving source valve and remove the delivery hose.

Caution: If the required gas flow increases, the temperature of the supplied gas will decrease.

4. **Note:** When using natural gas, the vaporization amount of the vertical gas cylinder vaporizer is 6 N·m3/h, the gasification amount of the horizontal medium pressure and high pressure gas cylinder is about 7.8 N·m3/h, and the ultrahigh pressure gasification amount is about 15.7. N·m3/h).
5. **Note:** When using carbon dioxide, the vaporization amount of the vertical gas cylinder vaporizer is 3.9 N·m3/h, the gasification amount of the horizontal medium pressure and high pressure gas cylinder is about 5.1 N·m3/h, and the ultrahigh pressure gasification amount is about 10.2. N·m3/h).
6. **Note**: When using liquid oxygen, and liquid argon the gasification volume of vertical gas cylinder is about 9.2N·m3/h , and the gasification amount of horizontal medium pressure and high pressure gas cylinder is about 12 N·m3/h, and about 24 N·m3/h with ultra-high pressure

4.6 多个气瓶气体供给 Multiple gas cylinder gas supply

1、根据用气量，用户可将若干个气瓶并联接于汽化器。

2、开启气瓶气体使用阀和增压阀。

3、开启接受源阀门，即可得到连续稳定的气体。

4、关闭气体使用阀、增压阀，停止供气。

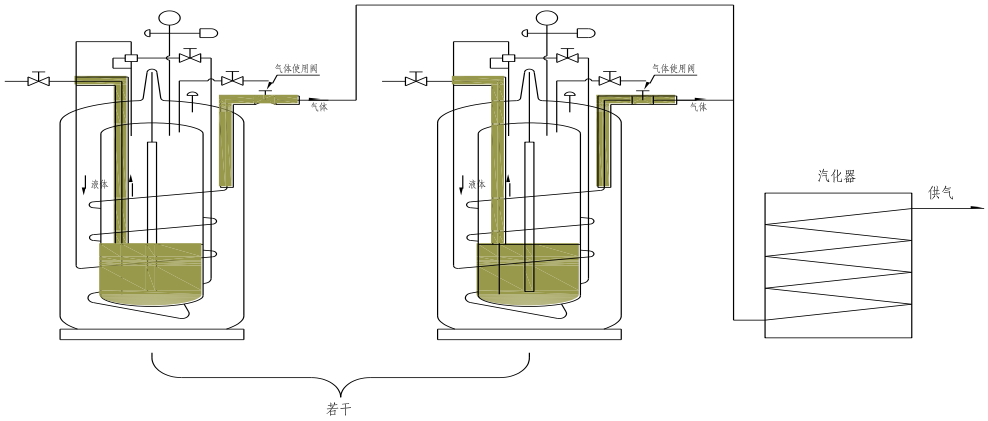
5、关闭接受源阀门，卸下输送软管。

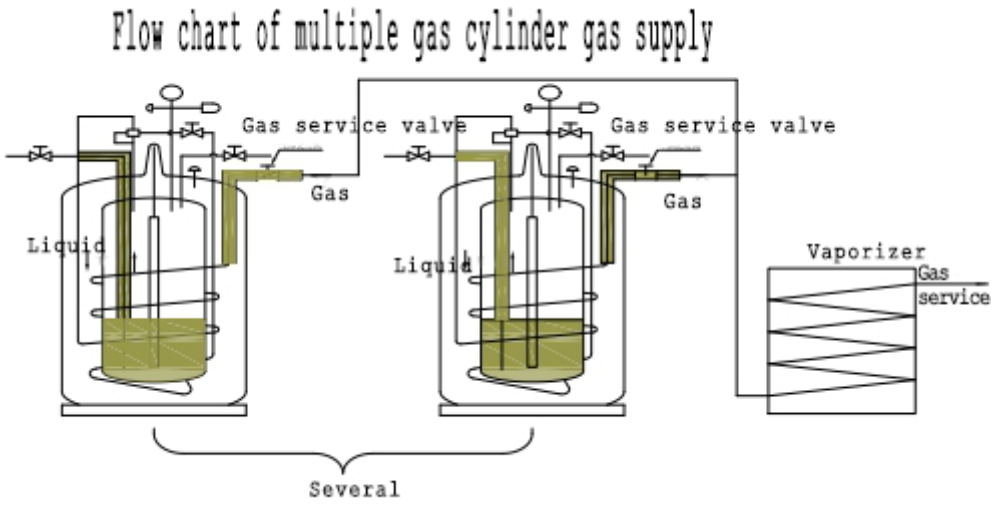
注意：为控制供气温度，一般要求在汽化器出口处加装一个温度计。

1. According to the amount of gas need, the user can connect several cylinders to the vaporizer.
2. Open the gas cylinder valve and supercharger valve.
3. Open the receiving source valve to obtain a continuous and stable gas.
4. Close the gas service valve and supercharger valve to stop the gas supply.
5. Close the receiving source valve and remove the delivery hose.

Note: To control the supply gas temperature, generally a thermometer is required at the outlet of the vaporizer.

多个气瓶气体供给示意图程





4.7 液体保留 Liquid retention

瓶内的液体应遗留 2~3L 为宜，使瓶处于冷态，不会转变为“热瓶”。

The liquid left in the bottle should be left 2~3L, so that the bottle is in a cold state and will not be converted into a "hot bottle".

5. 维修保养 Maintenance

在维修气瓶前请先阅读前面安全防护部分的内容。决不允许带压操作，维修前应先打开排放阀卸放压力，维修液氧瓶前检查你的工具确保洁净无油，每次修理后必须检漏确保无漏

点。

Please read the front contents of the safety protection section before servicing the cylinder. Never operate with pressure. Open the discharge valve to discharge pressure before maintenance. Check your tools before cleaning the liquid oxygen bottle to ensure then clean and oil-free. After each repairment, it must be checked to ensure no leakage point.

5.1 检漏 Leak detection

为确保气瓶正常运行，必须定期地进行系统检漏，如果发现漏点应立即进行维修。可以借助肥皂水准确判断漏点。

In order to ensure the normal operation of the cylinder, the system must scheduled for leak detection. If there is a leak, it should be repaired immediately. The leakage point can be accurately determined by soapywater.

5.2 泄漏维修 Leak repair

任何泄漏，一经发现必须立即维修：

a) 如果是阀后接头管螺纹泄漏，关闭阀门后拆开连接，检查螺纹面是否有损伤，无损伤则清洗接头螺纹面，并使用规定的密封带进行再组装；若螺纹面有明显损伤，请更换接头重新组装。

b) 如果是安全阀、压力表或爆破片根部及组合调压阀卡套接头处发现漏点，必须在开始维修之前打开排放阀泄压至大气压。重新安装后，进行压力检漏。

c) 如果是阀或阀座泄漏，请先打开排放阀泄压至大气压，若是进出液阀则应将瓶内液体和气体全部放空，再按照截止阀安装程序进行操作。

Any leaks must be repaired as soon as they are discovered:

a) If the thread leakage is in the rear joint pipe, close the valve first and disassemble the connection, check whether the thread surface is damaged. If no damage, clean the joint thread surface, and reassemble it with the specified sealing tape; if obviously damaged, Please replace the connector and reassemble it.

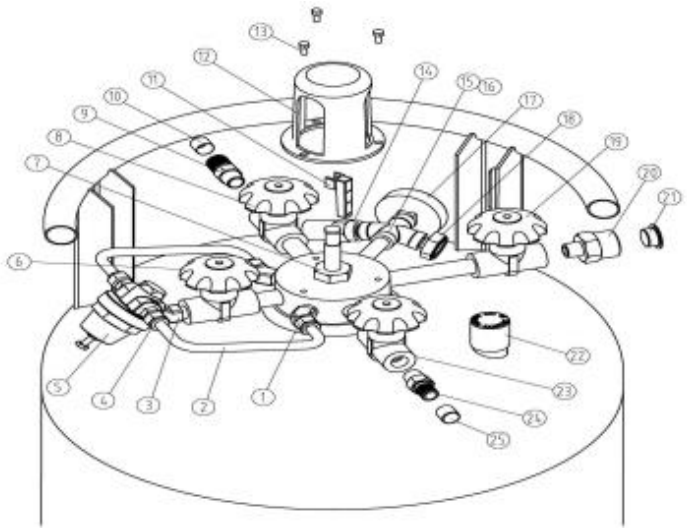
b) If a leak is found at the roof of the safety valve, pressure gauge or bursting disc and the combination regulator valve ferrule joint, the discharge valve must be opened to reach atmospheric pressure before service. After reinstallation, check the pressure leak.

c) If the valve or its bottom leaks, please open the discharge valve to release to atmospheric pressure. If the inlet and outlet valve leaks, the liquid and gas in the bottle should be completely emptied, and then operate according to the shut-off valve installation procedure.

5.3 零件清单 Parts List

立式瓶配件清单

List of vertical bottle accessories

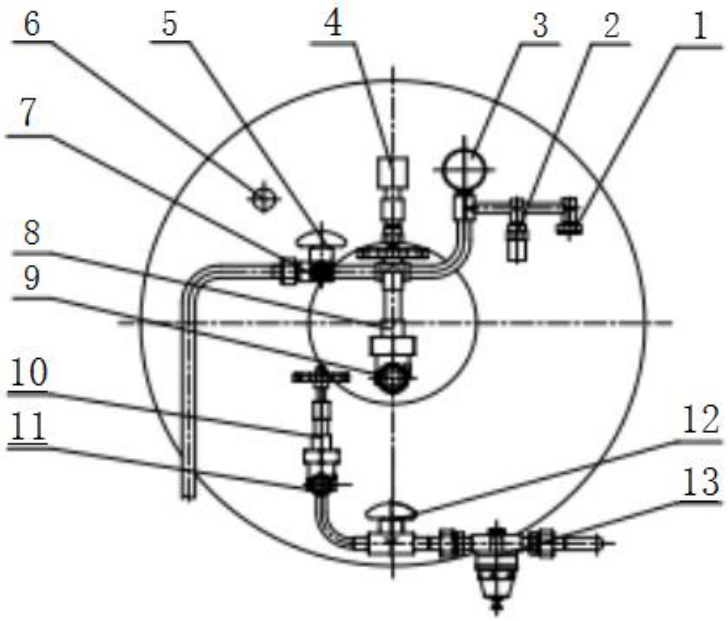


项目 Item	数量 Quantity	配件名称 Accessory Name
1	2	135° ferrule point NPT1/4-¢10
2	2	Ferrule brass tube Φ10×1
3	1	135° card sleeve joint NPT1/4-NPT3/8
4	2	Straight ferrule joint NPT1/4-¢10
5	1	Combined pressure regulating valve 0.86MPa/2.06 MPa /2.76 MPa
6	1	Supercharge stop valve
7	1	Buoyancy liquid level gauge
8	1	Discharge valve
9.1	1	Connector CGA440 (oxygen)
9.2	1	Connector CGA295 (nitrogen, argon, natural gas, carbon dioxide)
10	1	Dust cover
11	1	Buoyancy indicator
12	1	Liquid level gauge shield
13	3	M5×10 bolt
14	1	Safety valve 1.59MPa/2.41MPa/3.45MPa for medium LNG safety valve 2.4MPa/3.45MPa/4.15MPa
15	1	Cross connector
16	1	Cylinder short tube
17	1	Pressure gauge 0～2.5MPa/ 0～4MPa/0～6MPa
18	1	2.4MPa/3.6MPa/5.17MPa bursting disc device
19	1	Gas service valve
20	1	Connector CGA540/ CGA580/ CGA320
21	1	Dust cover
22	1	Vacuum shield
23	1	Inlet and outlet valve
24	1	Connector CGA440/ CGA295

25	1	Dust cover

卧式气瓶配件清单

List of horizontal gas cylinder accessories



项目Item	数量 Quantity	配件名称Accessory name
1	1	Bursting disc device2.4MPa/3.6MPa/5.17MPa
2	1	Safety valve 1.89mpa / 2.86mpa / 3.45mpa for medium LNG safety valve 2.4mpa / 3.45mpa / 4.15mpa
3	1	Pressure gauge 0 ~ 2.5 MPa / 0 ~ 4 MPa / 0 ~ 6 MPa
4	1	Liquid level gauge
5	1	Discharge valve DN15 PN4.0
6	1	Vacuum shield
7	1	Discharge joint (G5/8, M27 2)
8	1	Inlet shut-off valve DN25, PN4.0
9	1	Inlet connector (G5/8, M36×2)
10	1	liquid outlet valve DN10, PN4.0

11	1	liquid outlet joint (G5/8, M27×2)
12	1	Supercharge valve stop valve DN10, PN4.0
13	1	Pressurized (pressure regulating) valve 0.86MPa/2.06MPa/3.3MPa

5.4 故障一览表 Fault list

故障现象 Fault	可能原因 Possible reason	解决方法 Solution
压力或升压速度过快 Pressure or boost speed too fast	用气量小 Small gas amount	如果用气量太小，应及时启用增压截止阀 If the amount of used gas is too small, the booster stop valve should be activated in time.
	充装过量 Overfilling	若充装过量，瓶内压力可能在充装完毕后急剧升压，禁止过量充装，或者进行适量排放。 If the filling is excessive, the pressure inside the bottle may rise sharply after the filling is completed. Don't overfill or discharge some.
	真空度丧失 Vacuum Loss	瓶体表面出现冒汗或均匀结霜现象，返回工厂进行维修 Sweating or even frosting on the surface of the bottle, return it to the factory for repair.
压力过低 Too low pressure	用气量过大 Excessive gas consumption	参照说明书，按照建议的最大气体用量及增压能力进行使用 Refer to the instruction, use it according to the recommended maximum gas consumption and supercharging capacity.
	组合调压阀或增压调压阀关闭 Combined regulator or boost regulator closed	打开组合调压阀或增压调压阀 Open combination regulator or boost regulator
	组合调压阀或增压调压阀没有正常打开 Combined pressure regulator or boost regulator is not working properly	测试组合调压阀或增压调压阀在设定压力时是否正常工作 Test whether the combined pressure regulator or boost regulator is working properly when setting pressure
	组合调压阀或增压调压阀设定值过低 Combined pressure regulator or boost regulator is set too low	组合调压阀或增压调压阀的设定值至所需压力要求 Set it to the required value
	有泄漏For leaks	检查瓶体阀门部位是否有结霜现象或漏气声音,进行气气密试验Check whether there is frosting or air leakage sound at the valve of the bottle, and go air tightness test
	液体温度太低 Liquid temperature is too low	打开组合调压阀或增压调压阀,可能需要长时间增压,或借助外压力进行增压 Open the combined regulator or boost regulator, much time for pressurizing or pressurize by external

		pressure.
	安全阀低压起跳 Safety valve lifting under low pressure	安全阀的起跳压力设置不合适,应更换合适的安全阀 Safety valve's lighting pressure setting is not suitable. Have an appropriate safety valve
	瓶内结冰 Icing in the bottle	充装时管道水汽进入，用热氮气吹扫 When filling , vapor enters the pipe and is purged with hot nitrogen.
	压力表坏 Bad pressure gauge	更换压力表Replace it
气瓶充满但无压力显示 Cylinder is full but no pressure force display	压力表坏Bad pressure gauge	更换压力表Replace it
	爆破片损坏Bad bursting disc	更换爆破片Replace bursting disc
	安全阀不回位或损坏 Safty valve does not return or is damaged	安全阀不回位时一般为冰堵造成，需用热水浇在安全阀上，或用橡胶锤轻敲安全阀，使其回位，如果还不回位，应更换 When the safety valve is not returned, it is usually caused by ice blockage. It needs to be poured on the safety valve with hot water. Or tap the safety valve with a rubber hammer to return it. If still not returned, replace it.
	阀门关闭不严 The valve can’t close tightly	检修或更换阀门 Repair or replace the valve.
气瓶充满但无液位显示 Cylinder is full but no liquid bit display	铝杆与液位计脱离 The aluminum rod is separated from the level gauge.	卸下液位计，重新连接铝杆，重新安装，气密试验 The level gauge is removed, the aluminum rod is reconnected, reinstalled, and do the airtight test .
	液位计浮漂坏（显示仪表坏） The level gauge floats broken (displayer is broken)	更换浮漂（更换新仪表，并校满） Replace the float (replace the new instrument and fill it)
瓶体下部有结霜现象 Frosting at the lower part of the bottom	正在利用增压回路进行增压 Boosting with booster circuit	如果瓶内压力低于组合调压阀设定值，此现象正常 If the pressure in the bottle is lower than the set value of the combined regulator, it is a normal situation.
瓶底中下部有螺旋状结霜现象 Spiral frosting in the lower part of the bottom of the bottle.	正利用汽化回路汽化液体成气体 Vaporizing liquid into a gas by vaporizing circuit	正常 normal
瓶顶有结霜现象 Frosting on the neck of the bottle	液位计泄漏 Level gauge leakage	检查液位计连接处有无泄漏，压力排空后，更换密封垫圈，重新安装，气密试验 Check the connection of the level gauge for leaks. After draining the pressure , replace the gasket, reinstallation and airtight test.
	组合调压阀管路泄漏 Pipeline leakage on combined	拧紧接头，气密试验 tighten the joint, air tight test

	regulating valve	
瓶体有均匀结霜现象 The bottle body has uniform frosting	用气量过高导致 Excessive gas consumption causes	正常 Normal
安全阀频繁起跳 Safety valve frequently lifting	真空度丧失 Loss of vacuum	返厂修理Refund to the factory
	安全阀设定值低 Safety valve set valve is low	重新设定安全阀开启压力 Reset safety valve opening pressure
供气温度太低 The gas supply temperature is too low	用气量太大 The gas consumption is too large	参考最大用气量使 Refer to maximum gas consumption

6. 应急处理措施 Emergency measures

6.1 应急处理人员的着装要求
Dressing requirements for emergency handlers

眼睛或皮肤接触到低温液体会导致类似烧伤的冷灼伤。要对身体可能与低温液体接触的部位进行保护，要配戴专用的防护用品、用具。

Eyes or exposure skin to cryogenic fluids can result in cold burns which is similar to burns. Protect the parts of the body which may touch cryogenic liquids by wearing special protective equipment and utensils.

6.2 处于火灾环境时 In a fire condition

此时，应及时关闭所有与气、液相相通的阀门。当阀门无法关闭或泄漏处无法堵塞时，禁止用水直接喷淋液体泄漏处，推荐使用干粉（最好是碳酸钾）灭火器。

At this time, all valves which are connected to the gas and liquid phase, should be closed in time. When the valve cannot be closed or the leak cannot be blocked, don't spray the liquid directly with water. It is recommended to use a dry powder (preferably potassium carbonate) fire extinguisher.

6.3 处于超压泄放时 When reliefing overpressure

此时，应及时开启排放阀，将瓶内超压气体尽快泄放到安全阀正常回座时止。在向空气中排放氧气时，应事先确定附近确实无明火、无易燃物以及无行人通过后进行。如果排放气体降压效果较差，可将气瓶移动至空旷处，连接输送软管，在排放阀放空的同时开启进出液阀放空。

注意：放空的液体不允许往地下排水沟内排放。

At this time, the discharge valve should be opened in time to discharge the overpressure gas in the bottle as soon as possible until the safety valve returns to the normal position. When discharging oxygen into the air, it should be determined in advance that there is no open flame,

no flammable materials nearby, and no pedestrians passing. If the exhaust gas has a poor pressure-reducing effect, on move the cylinder to an open area, connect the delivery hose, and open the inlet and outlet valves to vent while the discharge valve is vented.

Note: Liquids that are emptied are not allowed to drain into underground drains.

6.4 内胆意外泄漏时 When the inner tank leaks accidentally

此时，因内部液体泄漏而使内胆处于过剩压力状态下，将会导致并造成事故，应尽快小心地将瓶内的液体排放出来或卸到其他完好的同类瓶内。在条件许可的情况下，应尽快将损坏的瓶转移至无明火、无易燃物以及无行人通过的场所进行应急处理。

At this time, if the inner tank is in excess pressure due to internal liquid leakage, it will cause an accident, The liquid in the bottle should be carefully discharged or into other intact bottles as soon as possible. Where conditions permit, the bad bottles are transferred to a without flame, flammable materials, or pedestrians for emergy treatment.

6.5 阀门冻住时 When the valve is frozen

若阀门冻住，应使用清洁无油的温水或热氮气解冻后，方可操作。不得用锤或其他物件敲击强行开启。

If the valve is frozen, it should be defrosted with clean, oil-free warm water or hot nitrogen before it is operated. Do not use a hammer or other object to strike forcibly.

7.定期检验 Regular inspection

7.1 检验机构及其检验人员 Inspection agency and its inspectors

气瓶定期检验机构应当按照《特种设备检验检测机构核准规则》(TSG Z7001)的规定，取得气瓶定期检验核准证，严格按照核准的检验范围从事气瓶定期检验工作，并接受质监部门的监督。

气瓶检验人员应当取得气瓶检验人员资格证书，气瓶无损检测人员应当取得相应无损检测资格证书。

The gas cylinder periodic inspection agency shall work in accordance with the “Specifications for the Approval of Special Equipment Inspection and Testing Institutions” (TSG Z7001), to obtain the periodic inspection approval certificate for gas cylinders, conduct regular inspections of gas cylinders in strict accordance with the approved inspection scope, and to be supervised the quality supervision department.

The inspector should obtain the qualification certificate of the cylinder inspector, and the non-destructive testing personnel of the cylinder should obtain the corresponding non-destructive testing qualification certificate.

7.2 气瓶检验机构的主要职责：

Main duties of the gas cylinder inspection agency:

(1)对气瓶进行定期检验，出具检验报告，并且对其正确性负责；

(2)对可拆卸的气瓶瓶阀等附件进行更换，更换的瓶阀应当选择具有相应瓶阀制造许可证的单位制造的气瓶阀门产品；

(3)对气瓶表面涂敷颜色和色环，按照规定做出检验合格标志；

(4)受气瓶产权单位委托，对报废气瓶进行消除使用功能(压扁或者解体)处理；

(1) Conduct regular inspections of gas cylinders, issue inspection reports, and be responsible for their correctness;

(2) Replace the detachable cylinder valve and other accessories, and the chosen bottle valve manufactured by the company with the corresponding bottle valve manufacturing license;

(3) Apply color and color ring to the surface of the cylinder, and make the inspection mark according to the regulations;

(4) Entrusted by the owner of the gas cylinder, eliminate the function (flattening or solution) of the reported abandoned cylinder ;

7.3 检验工作安排 Work arrangement Inspection

气瓶产权单位或者充装单位应当及时将到期需要检验的气瓶，送到有相应资质的气瓶定期检验机构进行定期检验。

气瓶定期检验机构接到送检气瓶后，应当及时进行检验。禁止对气瓶和气瓶瓶阀进行修理、焊接、挖补、拆解和翻新。

The cylinder manufacturer and filling company should send the filling unit should promptly send the gas cylinders that when cylinders to the place with corresponding qualifications for regular inspection.

When the gas cylinder periodic inspection agency receives the gas cylinder for inspection, it should conduct the inspection in time. It is forbidden to repair, weld, dig, disassemble and refurbish cylinders and its valves.

7.4 检验周期与报废年限 Inspection cycle and retirement limit

7.4.1 焊接绝热气瓶 Welded insulated gas cylinders

每 3 年检验一次。检验或者使用中发现存在影响绝热性能等问题时，应当送到具有相应资质的制造单位或者原制造单位委托的单位进行维护或者修理。

Test them every 3 years. If there is any problem in the inspection or use that affects the thermal insulation performance, it should be sent to the manufacturer with the corresponding qualification or the unit entrusted by the original manufacturer for maintenance or repair.

7.4.2 超过设计使用年限的处理 Treatment beyond the service life

对焊接绝热气瓶(含焊接绝热车用气瓶)，如果绝热性能无法满足使用要求且无法修复的应当报废。

For welded adiabatic cylinders (including gas cylinders for welded adiabatic vehicles), if the adiabatic performance cannot meet the requirements or cannot be repaired, it should be scrapped.

7.5 提前检验 **Advanced inspection**

使用过程中，发现气瓶有下列情况之一的，应当提前进行定期检验：

(1)有严重腐蚀、损伤或者对其安全可靠性有怀疑的；

(2)缠绕气瓶缠绕层有严重损伤的；

(3)库存或者停用时间超过一个检验周期后使用的；

(4)机动车发生可能影响车用气瓶安全使用的交通事故后重新投用的；

(5)气瓶检验标准规定需提前进行定期检验的其他情况以及检验人员(或者充装人员)认为有必要提前检验的。

If the cylinder is found to have one of the following conditions, while using it should be inspected in advance:

(1) There is serious corrosion, damage or doubt about its safety and reliability;

(2) The winding layer of the wound cylinder is seriously damaged;

(3) The inventory or deactivation time is more than one inspection period;

(4) Re-application of a motor vehicle after a traffic accident that may affect the safe use of the vehicle gas cylinder;

(5) Other circumstances in which regular inspection is required in accordance with the cylinder inspection standard and where the inspection personnel (or filling personnel) deem it necessary to test in advance.

7.6 气瓶检验前处理 Gas cylinder inspection before treatment

气瓶进行定期检验前，应当对瓶内残余气体进行回收和处理。回收和处理至少符合以下要求：

(1)盛装毒性、可燃气体气瓶内的残余气体采取环保的方式回收处理，不得向大气排放；

(2)确认气瓶内压力降为零后，方可卸下瓶阀；

(3)盛装可燃气体的气瓶须经置换；盛装液化石油气等可燃液化气体的气瓶需经蒸汽吹扫或者采用其他不损伤瓶体材料、不降低瓶体材料性能的方法进行内部处理，达到规定的安全要求，否则，严禁用压缩空气进行气密性试验。

The gas in the bottle should be recovered and treated before the gas cylinder is inspected periodically. Recycling and disposal must follow the requirements here:

(1) The residual gas contained in the toxic and flammable gas cylinders should be recycled in an environmentally friendly manner and should not be discharged into the atmosphere;

(2) After confirming that the pressure drop in the cylinder is zero, remove the bottle valve;

(3) Gas cylinders containing flammable gas should be replaced; cylinders with flammable liquefied gases such as liquefied petroleum gas should be internally treated by means of steam purging or other methods that do not damage the material of the bottle or do not degrade the material properties of the bottle. Meet the specified safety requirements, otherwise, the air tightness test with compressed air is strictly forbidden.

7.7 检验项目和要求：
Items and requirements for inspection:

(1)各类气瓶定期检验的项目和要求应当符合有关安全技术规范及相应国家标准的规定；

(2)气瓶定期检验应当逐只进行，检验时发现进行过焊接、修理、挖补、拆解、翻新的气瓶或者瓶阀，应当予以报废；

(3)气瓶定期检验机构应当保证检验合格的气瓶及气瓶阀门能够在正常使用情况下安全使用一个检验周期，不能安全使用到下一个检验周期的气瓶，应当报废。不能保证安全使用到下一检验周期的气瓶阀门，应当更换。

(1) The items and requirements for periodic inspection of various types of gas cylinders should comply with the relevant safety technical specifications and relevant national standards;
(2) Periodic inspection of should be carried out one by one. Gas cylinders or bottle valves which have been welded, repaired, dug, disassembled or refurbished should be scrapped during the inspection;
(3) The inspection agency should ensure that the gas cylinders and cylinder valves that pass the inspection can be safely used one inspection cycle under normal use conditions, if not cylinder should be scrapped. And the cylinder valves should be replaced.

7.8 检验记录和报告 Records and reports of the inspection

气瓶定期检验机构应当认真填写检验记录，检验结束后应当对检验合格或者报废的气瓶及时出具气瓶检验报告。检验记录和检验报告应当真实、准确。

The periodic inspection agency should fill in the inspection records carefully. After that, the relative report should be issued in time for the qualified or scrapped gas cylinders. Inspection records and reports should be true and accurate.

7.9 消除使用功能处理 Eliminate the use of functional processing

消除报废气瓶使用功能的处理由当地质监部门指定单位负责。消除使用功能处理应当采用压扁或者将瓶体解体等不可修复的方式，不得采用钻孔或者破坏瓶口螺纹的方式。

承担气瓶消除使用功能处理的机构或者单位应当将消除使用功能处理的气瓶进行登记，并每年向所在市级质监部门报告。报废气瓶应当由气瓶产权单位办

理气瓶使用登记注销手续。

为避免报废气瓶被修理或者翻新后重新使用，禁止气瓶充装单位或者检验机构将未进行消除使用功能处理的报废气瓶转卖他人。

The treatment of eliminating the use of the exhaust gas bottle is handled by the designated unit of the local quality supervision department. Elimination of the use of functional processing should be used in an unrecoverable manner such as flattening or disassembling the bottle, and drilling or breaking the thread of the bottle shouldn't be used.

The organization or unit that undertakes the elimination of enabling gas cylinders should register the cylinders , and report to the municipal quality supervision department every year. The exhaust gas bottle should be reported to the gas cylinder owner for registration and cancellation of the use of gas cylinders.

In order to avoid the scrapped gas cylinder from being repaired or refurbished, it is forbidden for the cylinder filling unit or the inspection agency to resell the reported exhaust gas cylinder which has not been removed from use.

8.售后服务 After-sales service

为了不断提高产品的质量和更好地为用户服务，我们恳切希望用户能对产品在设计、制造、外观质量等方面存在的不足提供宝贵的意见和建议，我们诚挚的欢迎用户把您的意见和建议及时反馈给我公司，我公司将及时采纳您的合理化建议并及时改进。

In order to continuously improve the quality of our products and offer better serve our customers, we sincerely hope that users can provide valuable opinions and suggestions on the shortcomings of products such as of designing, manufacturing and appearance quality. We sincerely welcome users to propose your opinions to our company, we will promptly adopt your proper suggestions and improve ourselves in time.

产品保修卡

保修说明:

1. 保修卡是您的钢瓶在使用中出现故障寻求特约维修所必须具备的，请妥善保管（遗失不补）。
2. 本产品按发票购买日起享有零部件 12 个月（真空 36 个月）的保修服务。保修期内因产品质量问题所引起的维修，可免收费用。
3. 即使在保修期内，凡属下列情况的维修，需收取维修费（修理费+零部件费+运输费）：

◆ 无保修卡或保修卡遗失；
◆ 保修卡填写不正确、涂改或回执内容不一致；
◆ 用户未按产品使用说明书使用而造成的故障或损坏；
◆ 用户自行维修或未经本公司书面许可委托的第三方维修后出现的故障；
◆ 因意外事故造成的故障或损坏。

1、 请用户在购买瓶后 1 个月内填写"用户反馈单"返回公司，以便在公司及时建立质保档案。请妥填下表后沿虚线剪下，交经销处或直接邮寄本公司。

Product warranty card

Warranty instructions:

1. The warranty card is necessary for you to seek special maintenance if your cylinder breaks

down during use. Please keep it properly (it will not be replaced if lost).

2. This product is guaranteed for 12 months (vacuum for 24 months) from purchasing date on the invoice.

Maintenance caused by bad quality may be free of charge within the warranty period.

3. Maintenance fee (repair fee + parts fee + transportation fee) will be charged for the following repairs even within the warranty period, :

No warranty card or the warranty card is lost;

The warranty card is incorrectly filled, altered or inconsistent with the receipt;

Failures or damages caused by the user's fault because of not using the product according to the operating instructions;

Faults caused by self-maintenance or by third parties without written permission of our company;

Fault or damage caused by accidents.

1. Please fill in the "feedback form user" and return it to our company within one month after the purchasing date, so as we can establish the quality assurance file in time. Please fill in the form below and cut it out along the dotted line.

用户反馈单

用户名称： _____

用户地址： _____

联系人： _____

联系电话： _____

传真： _____

E-mail： _____

产品出厂编号： _____

购买日期： _____

销售公司： _____

请在此处写下您宝贵意见及建议： _____

_____

_____

_____

_____

User feedback sheet

User's name:_____

User's address:_____

Contact:_____

Tel:_____

Fax:_____

E - mail:_____

Article no. :_____

Purchasing date :_____

Sales company:_____

Your kind comments and Suggestions :

_____
_____
_____
_____
_____
_____

维护记录（适用于制造商及其公司的维护人员）

Maintenance record (for maintenance personnel from the manufacturer and its company)

序号 Times	内容 Content	签名 Signature	用户签名 User's Signature	日期 Date
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				

河北润丰低温设备有限公司
Hebei Runfeng Low Temperature Equipment Co. LTD

地址：河北省饶阳市西城工业区正港路1号。
电话：0318-5708000
传真：0318-5708007
邮政编码：053900
网站：www.runfengdiwen.com
ADD: no. 1 zhengang Road, Xicheng Industrial Zone of Raoyang, Hebei ,China.
Tel:0318-5708000
Fax: 0318-5708007
Post code: 053900
Website: www.runfengdiwen.com