

GDQH-601-200
SF6 气体回收充气装置

产品操作手册

武汉国电西高电气有限公司

尊敬的用户：

感谢您购买本公司 **GDQH-601-200 SF6 气体回收充气装置**。在您初次使用该产品前，请您详细地阅读本使用说明书，将可帮助您熟练地使用本仪器。

我们的宗旨是不断地改进和完善公司的产品，如果您有不清楚之处，请与公司售后服务部联络，我们会尽快给您答复。



注 意 事 项

- 使用产品时，请按说明书规范操作
- 未经允许，请勿开启仪器，这会影响产品的保修。自行拆卸厂方概不负责。
- 存放保管本仪器时，应注意环境温度和湿度，放在干燥通风的地方为宜，要防尘、防潮、防震、防酸碱及腐蚀气体。
- 仪器运输时应避免雨水浸蚀,严防碰撞和坠落。

本手册内容如有更改，恕不通告。没有武汉国电西高电气有限公司的书面许可，本手册任何部分都不许以任何（电子的或机械的）形式、方法或以任何目的而进行传播。

GDQH-601-200 SF6 气体回收充气装置

General safety notes

(一般安全注意事项)

Obligation to exercise due care

The device has been designed and constructed bearing in mind the standard to be

Observed as well as additional technical specifications.

设备已经设计好，制造时要按照标准和额外的技术规范。

Safe use of the machine can only be achieved if all the necessary measures are followed.

如果遵守必要的措施，可以做到机器的安全使用。

The operator has to ensure that

操作者必须确保以下几点：

- the device is only used for the purposed for which it is intended (see chapter 2 product description

设备只可以用于完成既定的目标。（见第二章产品简介）

- the device is only operated in accordance with the instructions and in good condition and

that the safety devices are regularly checked.

设备只可以在情况良好的状态下操作，它必须定期维护。

- Maintenance and repair personnel are issued with all the required safety and protective

Clothing , which shall always be used.

维护人员在解决问题时必须要安全措施和穿必须穿防护服。

- Complete and legible operating instruction are available on site.

完整清晰的操作说明书是很有用处的。

- Only qualified personnel operates or repairs the device.

只有有资质的人员才可以操作或维修设备。

- This personnel is regularly instructed in safety procedures and environment protection and

- That this personnel is fully aware of the complete operating instruction and particularly in the

- Safety notes.

这些人员要接受有规则的安全程序 and 环境保护，他们也必须充分了解操作说明书和安全守则。

- The safety and warning notes mounted on the device are legible and not removed.

安装在设备上的安全警告标志要很清晰，而且不可以移动的。

General safety notes(一般安全注意事项)

Specific safety notes and standard symbols

详细安全事项和标准标志

In the following operating instruction specific safety warnings are given in order to draw your attention to residual risks which cannot be avoided during the operation of the device.

在以下操作说明中，被告知的具体安全警告是为了引起您在操作设备时的注意。

These residual risks contain dangers for

这些可能的风险包括

- Persons 人为
- Product and machine 产品和机器
- The environment 环境

The symbols used in the operating instruction should draw your attention specially to the safety notes.

被使用在操作说明书上的标志应该特别引起你对安全事项的关注。



This symbol refers to risks for persons (danger to life, danger of injury)

这个标志表示对人有危险（生命危险）



This symbol refers to risks for machine, material and the environment.

这个标志表示机器，材料和环境有危险。



This symbol refers to electric shock.

这个标志表示有电击的危险。

The most important aim of the safety notes is to prevent personal injuries.

安全事项最重要的目标就是防止人身伤害。

- If the warning sign “**Danger**”, appears, danger from machine, material and the environment are not excluded.

如果警报信号“**Danger**”出现，危险不排除机器，材料和环境。

- If the warning sign “**Warning**”, appears, there is no danger for persons.

如果警报信号“**Warning**”出现，这时没有人身危险。

The corresponding symbol which is used cannot replace the text of the safety note.

被使用的对应的标志是不可以替换的。

Therefore the complete text must always be read.

因此所有的文本都必须阅读。



This symbol is not for safety notes, but for information to understand the device better.

这个标志不是为安全标记的，而是注意更好的理解装置。

General safety notes(一般安全注意事项)

Work on electrical equipment

在电气设备上工作

Only properly trained electricians should carry out repair works on the device electrical equipment.

只有受过适当培训的电工才能完成电气设备的修理工作。



Regularly check the electrical equipment.

定时检查电气设备

Re-tighten loose connections.

重新调整松紧连接

Replace damaged lines/cable immediately.

立即更换管子和电缆

Always keep the control cabinet closed. Only authorized persons with key/tools

Should work on the device.

只可以有钥匙和工具的授权的人员可以在装置上工作，平时要关闭操作室。

Never clean control cabinets and other electrical equipment housings using a water hose.

不可以清洗操作室和其它电气设备。

Work on pneumatic equipment

在有气压设备上工作

Only specially trained personnel should carry out maintenance and repair works

On pneumatic equipment.

只有受过特殊训练的人员才可以完成有气压设备的保养和修理工作

Prior to maintenance and repair works depressurize the device pneumatic

equipment. Replace hose lines for preventive purposes even if no damage is

visible.(Follow recommendations of manufacturer).

做预防保养和修理：更换软管和接头，即使没有发现坏的情况下。

After having carried out maintenance and repair works and prior

to putting back

Into service.

在完成好保养和修理工作后，接下来就是检查。

- check that loosened screw connections are properly seated.

检查连接处松开的螺丝钉有没全部拧紧。

- ensure that the tank caps, sieves or filter that have been removed

have been re-installed.

确保箱盖，滤网，过滤器已经更换或重新安装。

After having carried out the maintenance and repair works and before operation

ensure that all material ,tools and other equipment which were necessary for

the maintenance or repair works have been removed from the working area of

the device.

在完成好保养和修理工作后和在操作前，要确保所有的材料工具和其它

对于保养和修理时用的重要的设备等撤离。

Liquids that may have come out have been removed(wiped away)

All safety devices for the unit are properly set and in working order.

排除可能流出来的液体（擦去） 所有的保险装置单元能正常的启动和工作。

Observe environment standards 注意环境标准

Whenever working on and with the device please observe legal requirements

for waste handing and disposal.

每当与设备工作时，请观察法律对于废弃物的支配和处理。

Particularly during installation, repair and maintenance works substances that

cause water pollution such as:

特别在安装，维修和保养工作中那些导致水污染的 例如：

- - lubricating greases and oil
- 润滑油
- - hydraulic oil
- 液压油
- - cooling agents
- 冷却剂
- - cleansing liquors containing solvent
- 有溶解力的清洁剂
- must not contaminate the soil or flow into drains.

- 不可以污染土壤或流进下水沟。
- These substances should be stored in suitable vessels, and removed and
- disposed of according to local regulations.

这些物质应该根据当地规定存储在适当的容器中，然后处理掉。

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Basic safety measures during normal operation(基本安全措施)

Only trained and authorized persons who are fully aware of the operating instructions should

operate the device and should do so in accordance with the operating instructions.

只有那些完全了解操作说明的受过训练的权威人士才能操作设备，操作应该与操作说明

一致。

Before switching on the device ensure that

在接通设备前要确保以下内容

Only authorized persons are present at the device

有被授权的人员在装置前

nobody can hurt by the operation of device

在操作设备时没人受到伤害。

Whenever the device is started check for visible damage beforehand and ensure that it is

operated in the correct conditions. Eminate any damage immediately or inform your

Supervisor.

每当设备开启前，要预先检查下可见的损害，确保在正确的环境下操作。立即

排除故障或通知你的主管。

Prior to each start check and make sure that safety features are properly set.

在开机前，要检查和确保安全装置都已经开启。

Basic safety measures during maintenance（保养的基本安全措施）

Follow inspection and maintenance periods described in the operating instructions.

根据操作说明书里的检查和保养周期。

Follow maintenance and repair instructions for individual components in these operating

instructions

根据操作要求关于元件的保养和维修说明。

Prior to carrying out maintenance and repair works turn off the main switch for the power

supply and secure it with a padlock.. the key for this lock must be in the hands of the person

who carries out the repair works. If there is on main switch unplug the

power supply cable at

the plant and secure against it being plugged back in.

在完成保养和维修工作前要关掉总电源开关，用挂锁确保安全。这把锁的钥匙必须在完成

维修工作的人员手里。如果没有拔掉设备供电电缆的总开关，要确保不被插上电源。

When exchanging heavy machine parts only use suitable lifting devices in good working

condition.

当调换巨大机器部件时，在好的工作环境下，用适当的起重装置调换。

Prior to carrying out maintenance or repair works ensure that parts which may need to be

handled have cooled down to room temperature.

在完成保养或维修工作前确保有把手的部分已经冷却到室温。

Dispose of grease, coolant or cleaning in accordance with environmental regulations.

处理油膏、冷却或清洁剂，要符合章程。

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● 概述 Introduction

本装置系用于 SF6 气体绝缘电气设备的制造、使用及科研部门从 SF6

设备中回收，净化 SF6 气体，并有抽真空及充气能力的专用设备。This is a special purpose device, which can be used to reclaim and purify sf6 gas from the sf6 gas insulated electric equipment by persons who manufacture, user or research into the equipment。 This device also has the functions of vacuum-pumping and gas filling。

● 功能 Function

1、该设备能对 SF6 电器开关抽真空并测定真空度。

vacuum pumping the sf6 switch and testing the limited vacuum 。

2、能对 SF6 电器开关充入 SF6 气体。

Back –filling the SF6 gas into the switch。

3、能对 SF6 电器开关的气体进行回收。

Reclamation of the SF6 gas from the switch。

4、能对回收的 SF6 气体净化处理。

Purification and drying treatment of the reclaimed SF6 GAS。

5、存储 SF6 气体。

Storage of the SF6 gas in pressure tank。

● 主要元件 Main part

1、真空泵 vacuum pump

Model: R060 ---60m³/H 极限真空 0.5Pa

2、压缩机 compressor

Model: H220CC 12m³/H

3、净化系统 filter-driers

Model: EMERSON 滤芯、F—03 吸附剂 配有活化系统。It is used to filter and dry the gas。 There is a F-03 absorption activating and heating system。

4、冷却系统 cooling system

风冷机组 SF6 存储。Heat-exchanger, air cooling unit

5、存储罐 pressure tank

200L 容器，安全阀，压力 3.8Mpa 可连接外接气瓶

200Liter safety valve pressure 3.8MPa

6、阀门 valve

球阀 ball-valve

7、控制系统 control system

可进行装置的各项操作和仪表监视。

Using the control system , you can operate the device and monitor all the instruments。

8、连接管道 rubber hose

接口 M27*1.5---M27*1.5 mm 1 根， M20*1.5-mm----气瓶接口 1 根。

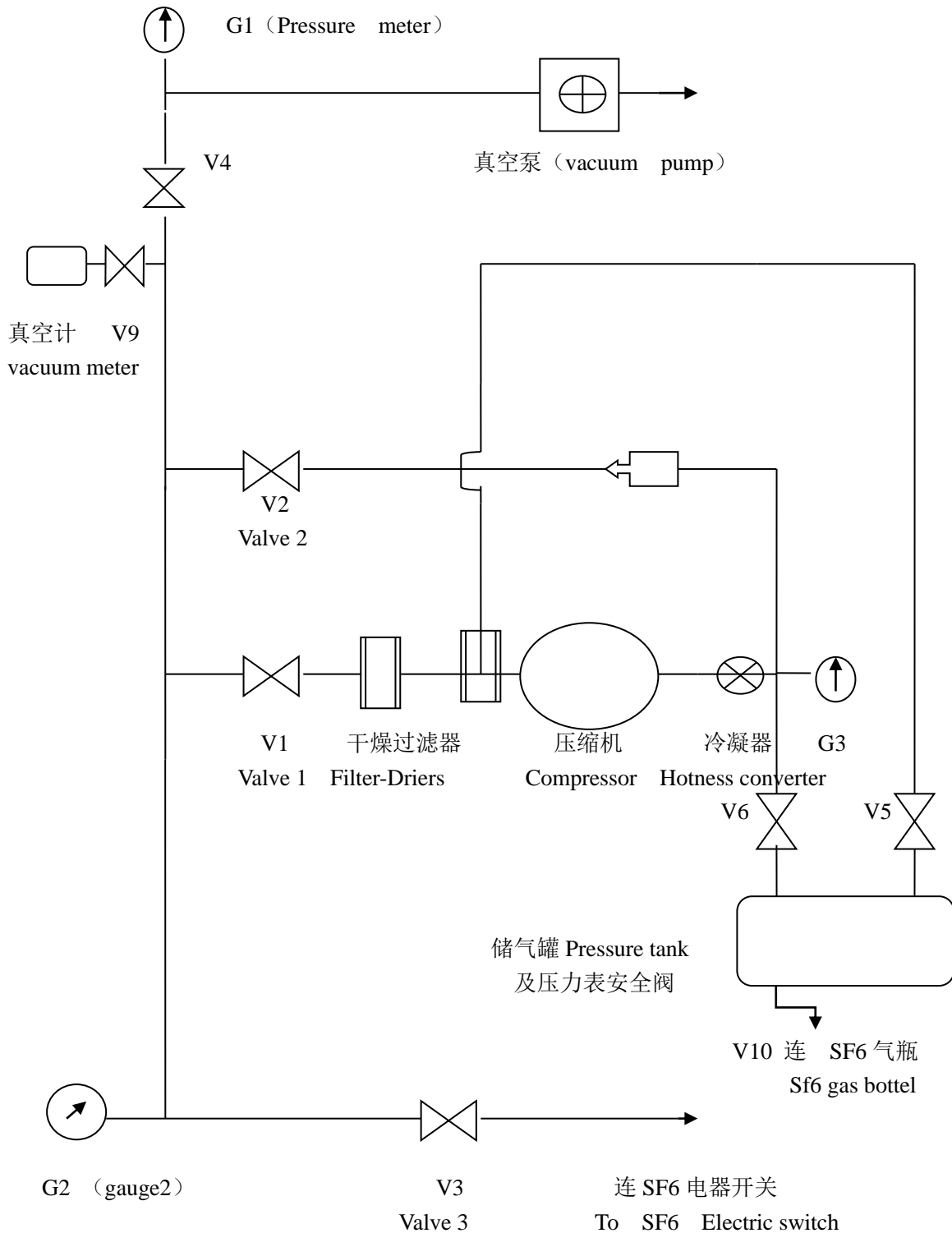
● 技术参数 technical parameters

■ 抽真空速率 Rate of vacuum: 60M³/H 真空度 limited vacuum: 10Pa

- 充气速率 rate of back-filling: 8M³/H
- 回收速率 rate of reclamation: 12M³/H
- SF6 回收率 reclamation percentage: 95%左右 终压力: 53KPa
- 工作环境温度: working environmental temperature:
Upper limit: +45°C , lower limit: -10°C
- 存储罐 pressure tank: 200L 4MPa
- 回收初压力 first pressure of reclamation: 8bar
- 机组重量 weight of the device: 650KG
- 电源 power: three-phase 380V±10%, 50HZ
- 功率: Power: 8kw

● 系统原理图

Drawing of System Principle



● 操作程序图 operating order

操 作 程 序 图		
1	电器开关抽真空	依次打开：SF6 电器开关阀、V3、V4、真空泵 V9
	停机	依次关闭：SF6 电器开关阀、V3、V4、真空泵 V9
2	回收	依次打开：SF6 开关电器阀、V3、V1、压缩机、V6、 (或根据需要连气瓶接口)
	停机	依次关闭：SF6 电器开关阀、V3、V1、压缩机、V6
3	加压充气	依次打开：SF6 电器开关阀、V5、V2、V3、压缩机
	停机	依次关闭：V5、压缩机、SF6 电器开关阀、V3、V2、
4	储气罐充气	依次打开：SF6 电器开关阀、V5、V1、V3 (控制流量合适)
	停机	依次关闭：V5、V1、V3、SF6 电器开关阀、
5	本机抽真空	依次打开：真空泵、V1、V4、V6、V2、封闭 SF6 电器接口
	停机	依次关闭：V6、V4、V2、V1、真空泵
6	过滤器吸附剂活化处理	依次打开：真空泵、V4、V1、60 分钟左右、
	停机	依次关闭：电加热器、真空泵、V4、V1
<p>备注： 机组不使用时，所有阀门均关闭。储气罐有 SF6 气时，气罐不抽真空。</p>		

Operating order

1	Vacuum pumping of switches	(start them in proper order): SF6 switch valve、 V3、 V4、 vacuum pump V9
	Stop the machine	(stop them in proper order): SF6 switch valve、 V3、 V4、 vacuum pump 、 V9
2	reclaiming	(start them in proper order): 、 SF6switch valve、 V3、 V1、 compressor、 V6、
	Stop the machine	(stop them in proper order): SF6switch valve、 V3、 V1、 compressor、 V6
3	Filling gas with pressure	(start them in proper order): SF6switch valve 、 V5、 V2、 V3、 compressor
	Stop the machine	(stop them in proper order): V5、 compressor、 SF6switch valve 、 V3、 V2、
4	Tank filling gas	(start them in proper order): SF6switch valve、 V5、 V1、 V3 (the flow of controlling gas pot valve should gas be in proper) (decompress filling gas V6、 V2、 V3)
	Stop the machine	(stop them in proper order): V5、 V1、 V3、 SF6switch valve 、
5	Vacuum pumping of the machine	(start them in proper order) vacuum pump、 V1、 V4、 V6、 V2、
	Stop the machine	(stop them in proper order): V6、 V4、 V2、 V1、 vacuum pump
6	Activation disposal of filter adsorbent	(start them in proper order): keep the power heater working for about an hour、 vacuum pump、 V4、 V1、
	Stop the machine	(stop them in proper order): power heater、 vacuum、 V4、 V1
attention: while the unit is not being used, all the valves should be closed. The pressure tank can not vacuum pump when there is gas pressure.		

注意事项 caution

1、 使用前检查各部件，应完好无松动、无损坏。

Check up all the parts of the device for such as connection wiring each tighten , They should be in good condition , tight and undestroyed.

2、 设备元件油位合适。

Oil level of compressor and vacuum pump should be kept suitable.

3、 真空泵不得反转。

Vacuum pump must not be reversed.

4、 设备及气罐有气体压力时不能开 V9 及抽真空。

V9 can be opened when there is gas pressure