


# Dry Air Generator
# 干燥空气发生器

# 电力变压器沙漠气候装配系统
## Dessert Climate Assembly System For Power Transformer

LINKS
合肥菱科电气有限公司
HeFei Links Electric Co.,Ltd.

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# 关于菱科 About LINKS

合肥菱科电气有限公司坐落于合肥市高新技术开发区，是一家生产干燥空气发生器，自动化设备以及在电气领域提供干燥和冷却解决方案的高新技术企业。

合肥菱科电气有限公司是电气领域干燥和冷却解决方案的首选供应商，并为电力行业提供其他优质技术服务。我们的综合实力和专业技能使我们能够与广大客户建立一个良好的合作关系；我们产品可靠性完全满足我们的客户需求，我们谋求与客户能够在相互信任的基础上建立长远的合作伙伴关系。

通过为客户提供一流的服务，牢固建立起在行业领域的领先地位，并在提高保护环境意识方面起到关键作用。

合肥菱科电气有限公司关心每一位员工的需要。为了适应工作岗位的需求，每一位新老员工都会在工作现场或国外接受适当的培训。公司提供一个公平公开的信息奖励政策以奖励每一位优秀的员工。

我们希望通过我们更优质的服务来让每一位客户得到更大的成功与进步！

本手册为客户提供必要的技术信息以便客户选择合适的产品。产品手册只包括标准产品技术信息，对于一些特殊应用，请直接与合肥菱科电气有限公司或其授权的代理联系。

我们保留在不预先通知客户的情况下对产品的技术改进及本手册相应的内容的更改。这里所提供的信息仅供参考。

Located in HeFei Hi-Tech Development Zone, HeFei Links Electric Co.,Ltd. is a business unit with key competences in producing dry air generators, automation device as well as supplying Drying and Cooling solutions for electrical field.

LINKS is the preferred supplier of drying and cooling solutions, and other services for electrical industry. Our competences and skills allow us to have an excellent co-operation with our customers. The reliabilities of our plants fully satisfy our clients and we secure a long term relationship based on mutual respect.

LINKS is establishing a leading position in this field through her first class service to customers, and playing key roles in developing the user's awareness to protect natural resources.

LINKS takes carefully the needs of her employees. Old and young employees receive a proper training on site or abroad in order to comply with the requirements of the work place. The management supports a open information policy and rewards top employees.

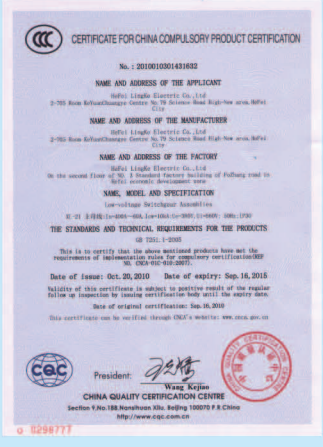
We hope our customers to be more successful with our excellent services.

This manual provides engineers and designers of transformer manufactory and electrical department with necessary technical information, so they can choose a suitable Links' product.

We reserve the rights to make technical improvements or modify the contents of this document without prior notices. All information provided here is for your reference only.


DET NORSKE VERITAS
管理体系认证证书
合肥菱科电气有限公司
ISO 9001 : 2008 标准
低压控制柜的制造；
干燥空气发生器的设计与制造


DET NORSKE VERITAS
MANAGEMENT SYSTEM CERTIFICATE
Hefei LINKS Electric Co., Ltd.
ISO 9001:2008
The Manufacture of Low Voltage Control Cabinets.
The Design and Manufacture of Dry Air Generators.


CERTIFICATE FOR CHINA COMPULSORY PRODUCT CERTIFICATION
CHINA QUALITY CERTIFICATION CENTRE


中国国家强制性产品认证证书
中国质量认证中心

# 产品介绍 Product Introduction

LINKS生产的干燥空气发生器主要用于对电力变压器（或其他电力设备）注入干燥空气以防止设备受潮降低电力设备的绝缘强度。

LINKS Dry Air Generators (DAG) are mainly used to fill power transformers with dry air to protect the active parts from moisture under which insulation capabilities may be reduced.

主要有以下几种场合（方式）使用：

It is mainly used in the below situations:

◆ 在变压器制造厂临时存放时

Temperaly store in manufacturing site

电力变压器在气相干燥完毕后，由于计划调整或后装过程中临时中断作业，以及在变压器试验完毕需要临时存放在厂内，为了防止变压器器身受潮，需要充入干燥空气。

After finishing of drying in vapour phase, or sometime after testing, due to the changes of production plan, the power transformer need to be temperaly stored on site, in those cases, a DAG need to be used to fill dry air into transformer to keep the active part dried.

◆ 输中防止受潮

Protect transformer from humidity during transportation

过去，为了降低运输重量，电力变压器通常在试验结束后排出变压器油，充入氮气运输，在变压器运抵现场后，要排出氮气，工作人员通过人孔进入变压器内检查。这种做法存在相当大的安全风险。因为存在于变压器底部（人孔以下部位）的氮气很难短时间内排尽，如果时间过长，外部的空气会使变压器器身受潮而降低变压器的绝缘水平。如果没有排尽就进入检查，很容易因缺氧窒息造成人身安全事故，这在历史上是经常发生的事故。

为了避免不必要的事故发生，目前通常对变压器充入干燥空气进行运输，经过本干燥空气发生器产生的空气，其成分与大气无异，但高度洁净干燥，既能保护变压器不至受潮，又不会威胁人身安全。

In the past, in order to reduce transportation weight, we need to drain the oil out, and same time filling the transformer with nitrogen. Once the transformer is delivered to the site, the nitrogen will be drained out. The people will enter into transformer inside through the man hole to take final checking. This has seriously body safety risks due to lack of oxygen, as it is very difficult to drain the nitrogen out completely in short time, especially for the nitrogen stored in the bottom (below man hole). Such cases have happened often in the past history, if the draining of nitrogen take long time, much moisture will enter into transformer to make active parts wet.

In order to avoid such problems, it is suggested to fill DRY AIR instead of nitrogen into transformer, the dry air composes are same as neutral gas, but highly clean and dried, it can not only secure human body safety, but also protect transformer from moisture.

◆ 现场施工过程中对变压器本体充入干燥空气

Continuously filling dry air into transformer during on-site installation

在现场检查器身时，为了避免外部的大气（含有大量的水分和污物）通过人孔进入变压器，从而导致器身受潮，一个严格的要求就是在人孔打开的同时，要对变压器连续不断地充入干燥空气，以保证器身内部始终维持一个合适的微小正压，防止外部的空气进入变压器内部，干燥空气发生器在这里得到普遍应用。

Normally, the inspection and installation on site will take several days or even longer, during which the transformer is opened, a DAG is used to connect to transformer to continuously fill dry air into transformer, thus to keep a small positive pressure inside to avoid wet air coming into transformer. This process is widely used for this purpose.

◆ 气相干燥破真空时向干燥罐充干燥空气

Filling dried air into autoclave instead of nature air, protect active parts from wet

器身在气相干燥罐完成干燥后，向干燥罐充干燥空气以代替大气进行破真空，从而防止器身受潮。

## 原理简述 Theory

外部空气（大气）进入本装置后，首先经过第一次油污及杂质过滤后，进入压缩机进行第一次干燥，进入微热型空气干燥器进一步干燥，干燥后的空气在进入变压器之前经过精细过滤器，进一步排出杂质和油污，确保充入变压器的空气干燥洁净。大约90%的干燥空气进入变压器器身，少量的干燥空气将返回到空气干燥器，对所使用的吸附剂进行干燥再生。

Outside air entering into DAG, it will first go through oil dirty and particles filter for initial cleaning, then the compressor for first drying, and then will pass through fine filters and air dryer for farther cleaning and drying. In this way, the air is clean and dry before filing into the transformer. About 90% dried air will go into transformer, and 10% will return to air drier for the generation of adsorbent.

使用无热或微热式空气干燥器，其特点是分两列，两列每隔一定的时间交替除湿干燥和本身再生，该装置有较高的效率，对所用的普通吸附器通过出口的干燥空气（约10%）进行再生，因此吸附器可以长期使用，利于环保。

We use micro-heating air drier or no heating air drier. This type drier has two columns tanks with adsorbent inside, they will be alternating adsorbing and regeneration, therefore, it can be used for longtime with high efficiency, and is good for environment.

# LINKS干燥空气发生器技术特点
# Technical Characteristics

LINKS干燥空气发生器系统采用螺杆压缩机，除尘粗过滤器，0.1微米前级过滤芯，0.01微米后置过滤芯，除臭过滤器，特殊定制无热或微热式（根据需要）吸附式干燥机，机组保护装置等高性能配置。LINKS干燥空气发生器，由于采用了当今世界上最先进的吸附干燥技术及变频技术压缩机，因此无须采用冷冻式干燥机就可以达到较低的露点满足客户需要，不仅节省了能源，而且因无制冷媒体而保护了环境。

LINKS DAG is equipped with screw compressor, particles and water filter, 0.1μm pre-filter, 0.01μm fine filter, and 0.01μm stink filter, and special designed air dryer. Due to application of the advanced air dryer and frequency conversion technology, LINKS DAG can fully satisfy customer's requirement without using cooling dryer, therefore, it can not only save energy, but also protect the environment.

## 压缩机 Compressor

使用世界上最先进的变频技术进口螺杆压缩机，其特点如下:

Using the most advanced Europe screw compressor with below advantages:

◎ 流量均匀，效率高，节能

Stable flow rate with high efficiency, lower energy consumption.

◎ 结构简单，紧凑，体积、重量小

Simple construction, compacted.

◎ 运转平稳，无振动，噪音小

Stable operation, lower noise.

◎ 可靠性高

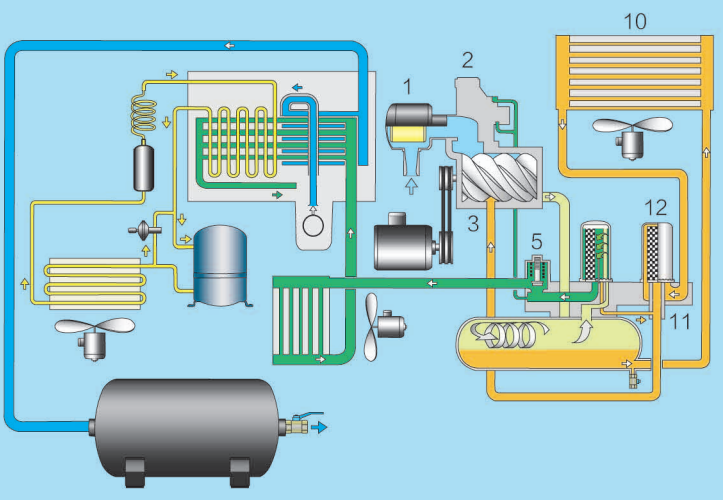
Higher reliability

◎ 简单而快速的保养

Simple and quick maintenance

◎ 使用寿命较长

Long life






## 净化（过滤）系统 Purification System

产品配备了三级过滤器，第一级过滤装置放置在螺杆空气压缩机的出口，为粗过滤器，起除尘作用，主要用于防止大的污染物进入系统和保护其他配件不会因吸入较硬的固体颗粒而损坏。

LINKS DAG is designed with 3 stage filtration system, The first stage filter which is put in outlet of compressor to remove the particles in air, is mainly used to remove big particles that could damage the equipment.

**所有过滤器系列**

| 类型 Type | 定义 Definition | 除油效果 Oil Removing | 除尘效果 Dust Removing |
|---|---|---|---|
| DD | 一般防护用过滤器 Ordinary filter | 0.1 ppm | 1 μm |
| DDp | 一般防护用除尘过滤器 Dust removal filter | – | 1 μm |
| PD | 高效过滤器 Efficient filter | 0.01 ppm | 0.01 μm |
| PDp | 高效除尘过滤器 Efficient dust removal filter | – | 0.01 μm |
| QD | 活性炭过滤器 Active carbon filter | 0.003 ppm | – |

选择正确的过滤器可避免压缩空气系统、产品、生产工艺中出现的污染问题。
Using correct filters can protect your equipment from pollution.

第二级精过滤器放置在吸附式干燥机进口处，过滤精度0.1微米，除油效果0.1ppm,经过净化后的气体，其污染程度大大降低，保证了系统内部件，如管路、吸附式干燥机、阀件始终保持清洁，不会因长期运行在污染的环境下，流阻加大，使设备不能正常运行，真正实现了系统的免维护。

The second stage filter is put in the inlet of air dryer, to remove particles (0.1μm), and oil (0.1ppm). Air after the filtration is clean enough to prevent the equipment (air dryer, all valves, etc.) from pollution which could increase flow resistance thus damage the equipment, no maintenance is guaranteed.

第三级过滤器后加设一个除臭过滤器装置，使气体进入变压器之前的质量得到了有力保障，气体中的颗粒度、含油量得到大幅度的降低，满足使用性能.

LINKS DAG put a 0.01μm stink filter after the third stage filter, the filter will remove stinks from dry air before the dry air enter into transformer, the oil, water, particles and stinks are therefore cleaned completely.



我们选用的欧洲原装进口过滤器可以有效去除油分和粉尘并保证低压降
We use the best filters imported from Europe, to remove the water, particles, and the oil in air effectively with lower pressure losses

# LINKS干燥空气发生器技术特点
# Technical Characteristics

## 干燥机系统 Air Dryer System

特殊定制无热或微热式吸附式干燥机：利用变压吸附的原理，使用干燥剂在管网压力下吸附，然后再切换到大气压力下脱附，并从干燥机出口处引回大约10%的干燥空气体对干燥剂进一步净化再生。双塔交替进行以上过程，提供出干燥的气体。特殊定制的吸附干燥机压力露点可达到≤-70℃。

**节约能源：**由于系统采用高性能配置部件，无需冷冻式干机，便可达到技术要求，满足生产要求。

Special designed air dryer with micro-heating or without heating using adsorbent to adsorb the water under working pressure, and release the water under atmospheric pressure, roughly 10% of dry air will return to absorbent tank to regenerate the adsorbent. The process of adsorbing and regeneration are alternating in two tanks. Therefore the drying processing can be continuously conducted. The dew point of generated air can reach to -70℃.

**Saving Energy:** LINKS DAG using the most advanced drying technology, it does not need additional cold and dry machine, so no refrigerant is used, therefore it can not only save energy, but also protect the environment.












## 控制及保护系统 Controlling and Protection System

由于变压器壳体（油箱）的强度要求，严格控制设备的出口压力不大于0.05 Mpa（根据客户要求设定），系统在管路上设置两个减压阀，一个在压缩机出口处，另外一个带反馈信号安装在出口处，系统同时设置有压力开关及电磁阀，通过电信传输给电气控制系统，有效及时地保护管路因压力过高（超过设定值）时及时停机，同时设有安全压力释放阀进行双重保护，即便是在控制系统故障时也能保证出口压力不大于0.05MPa（根据客户要求设定），确保变压器油箱内的压力处于安全范围。

LINKS DAG strictly controls the pressure (specified by customer) of transformer during filling dry gas. There are two decompression valves in pipe lines: one is placed in outlet of compressor, another one in outlet of DAG with electronic signal. The system is equipped with pressure switch and magnetic valves with electronic signals, which are transmitted to control system. The DAG will be stopped once the pressure exceeds the set pressure (by customer). For safety reason, the system is equipped with pressure release valves for double protection, it will automatically release pressure once the system pressure is too high even in case the controlling system is failed.




1) 配备了相序保护
2) 欠电压自动检测和保护
3) 所有电机配有进口的电机保护开关
4) 控制系统采用PLC控制和触摸屏，实现对变压器充入干燥空气工艺过程的控制。
5) 在线检测露点
6) 系统设置监测装置，在系统出现异常的情况下，自动打开电磁阀，系统排除压缩空气，有效保护设备
7) 采用欧洲进口控制柜壳体
8) 按IEC标准

Control Cabinet:
1) Phases sequence protection
2) Under-voltage protection
3) Motor protection
4) PLC control and touch screen operation
5) On-line dew point measuring
6) Pressure monitoring and controlling
7) Cabinet made in Europe
8) IEC standard









# 技术参数 Technical Data

## 1.1 设备使用环境 /Ambience

海拔：≤ 4000 m
温度：−40℃ ~ +40℃
地震基本裂度按7度设防
年平均相对湿度低于85%

Elevation: ≤ 4000 m
Temperature: −40℃ ~ +40℃
Earthquake Intensity: 7
Average Relative Humidity: 85%

## DAG（无热）系列参数
## DAG（No Heating）Series

| 型 号 Type | DAG−20 | DAG−40 | DAG−60 | DAG−80 | DAG−120 | DAG−150 | DAG−180 | DAG−240 | DAG−300 | DAG−360 | DAG−480 | DAG−660 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 标称供气量 Nom. Flow($m^3$/h) | 20 | 40 | 60 | 80 | 120 | 150 | 180 | 240 | 300 | 360 | 480 | 660 |
| 实际供气量 Act. Flow($m^3$/h) | Nominal Flow Rate ± 5% | | | | | | | | | | | |
| 最高工作压力 Work Press | 1Mpa | 0.85Mpa | | | | | | 0.8Mpa | | | | |
| 出口压力 Outlet Press | 0.05~0.5 Mpa（根据客户要求）(Upon Requirement) | | | | | | | | | | | |
| 露点温度 Dew Point | −70℃ ± 5℃(根据客户要求定制) (Upon Requirement) | | | | | | | | | | | |
| 颗粒过滤精度 Particle Diameter | ≤ 0.01μm | | | | | | | | | | | |
| 固体颗粒浓度 Particle Content | ≤ 0.01mg/$m^3$（或不低于要求不低于NAS2级）(or NAS2) | | | | | | | | | | | |
| 排气含油量 Oil Content | ≤ 0.003mg/$m^3$ | | | | | | | | | | | |
| 吸附剂 Adsorbent | 氧化铝 分子筛 (Alumina Molecular Sieve) | | | | | | | | | | | |
| 出口气体温度 Outlet Temp. | 在输入气体温度30℃时，出口气体温度40℃ Outlet Temp. 40℃ (In case the temperature of inlet air is 30℃) | | | | | | | | | | | |
| 控制方式 Controlling | PLC | | | | | | | | | | | |
| 噪音（dB） Noise Level | ≤ 75 | | | | | | | | | | | |
| 电源 Power Supply | ~ 380V，50Hz | | | | | | | | | | | |
| 功率 kw Rated Power | 4 | 5.5 | 7.5 | 11 | 15 | 18.5 | 22 | 30 | 37 | 45 | 55 | 75 |
| 出气口 管 径 Outlet Diam | 1/2" | | | 1" | | | 1.5" | | 2" | | | |
| 重量 kg Weight | 380 | 500 | 550 | 650 | 800 | 850 | 900 | 1050 | 1400 | 1450 | 1850 | 2350 |
| 外形 Outline (mm) L | 1500 | 1200 | 1200 | 1200 | 2200 | 2200 | 2200 | 1500 | 2150 | 1600 | 2200 | 2200 |
| W | 900 | 900 | 900 | 1100 | 1400 | 1700 | 1750 | 1650 | 1800 | 1700 | 2100 | 2100 |
| H | 1350 | 1800 | 1800 | 2000 | 2300 | 2300 | 2300 | 2100 | 2330 | 2400 | 2500 | 2300 |

注/Note：
出口压力：出口气体压力可根据客户要求设计　Outlet Pressure can be designed upon requirement
露点温度：可根据客户要求设计　Dew Point can be designed upon requirement
电　　源：可根据客户要求设计　Power Supply can be designed upon requirement
外形尺寸：外形尺寸及重量仅供参考，以实际产品为准　Outline and Weight is for reference only

## 1.2 DAG-MH（微热）系列参数
## DAG-MH (Micro-Heating) Series

| 型 号 Type | DAG-80-MH | DAG-120-MH | DAG-160-MH | DAG-200-MH | DAG-240-MH | DAG-360-MH | DAG-400-MH | DAG-500-MH | DAG-660-MH |
|---|---|---|---|---|---|---|---|---|---|
| 标称供气量 Nom. Flow($m^3$/h) | 90 | 120 | 160 | 200 | 240 | 360 | 400 | 500 | 660 |
| 实际供气量 Act. Flow($m^3$/h) | Nominal Flow Rate ± 5% | | | | | | | | |
| 工作压力 Work Press | 0.85Mpa | | | | 0.8Mpa | | | | |
| 出口气体压力 Outlet Press | 0.05~0.5 Mpa（根据客户要求）（Upon Requirement） | | | | | | | | |
| 露点温度 Dew Point | −70℃ ± 5℃(根据客户要求定制)（Upon Requirement） | | | | | | | | |
| 颗粒过滤精度 Particle Diameter | ≤ 0.01μm | | | | | | | | |
| 固体颗粒浓度 Particle Content | ≤ 0.01mg/$m^3$（或不低于NAS2级）(or NAS2) | | | | | | | | |
| 排气含油量 Oil Content | ≤ 0.003mg/$m^3$ | | | | | | | | |
| 吸附剂 Adsorbent | 氧化铝 分子筛 (Alumina Molecular Sieve) | | | | | | | | |
| 出口气体温度 Outlet Temp. | 在输入气体温度30℃时，出口气体温度40℃ Outlet Temp. 40℃ (In case the temperature of inlet air is 30℃) | | | | | | | | |
| 控制方式 Controlling | PLC | | | | | | | | |
| 噪音（dB） Noise Level | ≤ 75 | | | | | | | | |
| 电源 Power Supply | ~ 380V，50Hz | | | | | | | | |
| 压缩机功率 Rated Power (Compressor)（kW） | 4 | 5.5 | 7.5 | 11 | 15 | 18.5 | 22 | 30 | 37 |
| 干燥器功率 Rated power (Air Dryer)（kW） | 1.4 | 1.45 | 1.45 | 2 | 2.5 | 3 | 3 | 4 | 5 |
| 出气口 管 径 Outlet Diam | 1" | | | 1.5" | | | 2" | | |
| 重量 kg Weight | 680 | 850 | 850 | 900 | 1050 | 1400 | 1450 | 1850 | 2350 |
| 外形 Outline (mm) L | 1600 | 2000 | 2000 | 2000 | 1750 | 2000 | 2000 | 2200 | 2350 |
| 外形 Outline (mm) W | 1300 | 1600 | 1600 | 1750 | 1500 | 1600 | 1600 | 2150 | 2200 |
| 外形 Outline (mm) H | 2000 | 2300 | 2300 | 2300 | 2200 | 2500 | 2350 | 2650 | 2650 |

注/Note：

气体压力：出口气体压力可根据客户要求设计　Outlet Pressure can be designed upon requirement

露点温度：可根据客户要求设计　Dew Point can be designed upon requirement

电　　源：可根据客户要求设计　Power Supply can be designed upon requirement

外形尺寸：外形尺寸及重量仅供参考，以实际产品为准　Outline and Weight is for reference only

## 1.3 AD－MH（微热）系列技术参数
## AD-MH（Micro-Heating） Series

AD-MH系列空气干燥器利用厂内压缩空气系统产生干燥洁净的空气，无需配置压缩机。
No compressor is needed in AD-MH series air dryer.

压缩空气入口压力要求：> 0.6Mpa
Compress air inlet press: > 0.6Mpa

| 型 号 Type | DAG-100MH | DAG-150MH | DAG-200MH | DAG-300MH | DAG-400MH | DAG-500-MH | DAG-600-MH | DAG-700-MH | DAG-800-MH | DAG-900-MH |
|---|---|---|---|---|---|---|---|---|---|---|
| 标称供气量 Nom. Flow($m^3$/h) | 100 | 150 | 200 | 200 | 400 | 500 | 600 | 700 | 800 | 900 |
| 实际供气量 Act. Flow($m^3$/h) | Nominal Flow Rate ± 5% | | | | | | | | | |
| 最高工作压力 Work Press | 0.6Mpa | | | | | | | | | |
| 出口压力 Outlet Press | 0.05~0.4Mpa（根据客户要求）（Upon Requirement） | | | | | | | | | |
| 露点温度 Dew Point | −70℃ ± 5℃(根据客户要求定制)（Upon Requirement） | | | | | | | | | |
| 颗粒过滤精度 Particle Diameter | ≤ 0.01μm | | | | | | | | | |
| 固体颗粒浓度 Particle Content | ≤ 0.01 mg/$m^3$（或不低于NAS2级）(or NAS2) | | | | | | | | | |
| 排气含油量 Oil Content | ≤ 0.003mg/$m^3$ | | | | | | | | | |
| 吸附剂 Adsorbent | 氧化铝 分子筛 (Alumina Molecular Sieve) | | | | | | | | | |
| 出口气体温度 Outlet Temp. | 在输入气体温度30℃时，出口气体温度40℃ Outlet Temp. 40℃ (In case the temperature of inlet air is 30℃) | | | | | | | | | |
| 控制方式 Controlling | PLC | | | | | | | | | |
| 噪音（dB） Noise Level | 60 | | | | | | | | | |
| 电源 Power Supply | ~ 380V，50Hz | | | | | | | | | |
| 功率（kW） Rated Power | 1.4 | 1.45 | 2.2 | 2.7 | 3.2 | 4.2 | 5.2 | 6.2 | 6.2 | 7.7 |
| 出气口 管 径 Outlet Diam | | 1" | 1.5" | | 2" | | | | 2.5" | |

注/Note：
气体压力：出口气体压力可根据客户要求设计　Outlet Pressure can be designed upon requirement
露点温度：可根据客户要求设计　Dew Point can be designed upon requirement
电　　源：可根据客户要求设计　Power Supply can be designed upon requirement
外形尺寸：外形尺寸及重量仅供参考，以实际产品为准　Outline and Weight is for reference only

## 1.4 AD（无热）系列产品技术参数 请参照上述表格
## AD（No Heating）Seires Please ref. to table 1.3

重要提示：上述系列产品技术参数1.1~1.4 为我司标准产品参数。对于特殊要求，我司可根据客户具体要求进行设计制造。
Notice： Not limited to above standard product, we can design upon customer's requirement.

## 关键部件 Key Components

| | |
|---|---|
| 空气压缩机<br>Air compressor | 欧洲<br>Europe |
| 干燥器<br>Air dryer | 欧洲<br>Europe |
| 在线露点仪<br>Online dew point measurement | CS德国<br>CS Germany |
| 过滤器1,2,3<br>Filter 1,2,3 | 欧洲<br>Europe |
| 阀门<br>Valves | Kitz，日本<br>Kitz, Japan |
| 温度表<br>Temperature measurement | Jumo，德国<br>Jumo, Germany |
| 压力表<br>Pressure measurement | Jumo，德国<br>Germany |
| 减压阀<br>Decompression valves | SMC，日本<br>SMC, Japan |
| 压力开关（传感器）<br>Pressure switcher | TECSIS，德国<br>TECSIS, Germany |





# 电力变压器沙漠气候装配系统
# Dessert Climate Assembly System For Power Transformer

变压器器身经过气相干燥后，温度相对较高。试验证明，温度越高，器身上的绝缘件吸收潮气越快。众所周知，器身受潮会大大降低变压器的绝缘水平，降低其耐压强度。因此，所有的变压器制造商都根据自身的制造环境与工艺水平，限定了二次装配整理的时间，尽量减少器身暴露在空气中的过程，将吸潮过程尽可能缩短。

这种方式存在诸多弊病：

◎ 一般大型变压器二次装配整理需要12小时以上，器身会吸潮，绝缘水平降低，尤其对于超高压变压器，这是绝对不允许的
◎ 时间要求过紧，往往与质量保证相矛盾
◎ 器身温度高，对工人安全健康不利
◎ 大气中的污物（油污、粉尘等）及工人汗渍对器身的污染
◎ 受作息时间及计划调整的影响，需暂停时，往往需要将器身滞留在气相干燥罐内，真空防潮，严重影响生产。或者露空存放，以后重新干燥，浪费生产资源。
◎ 可靠性低，往往会存在高压试验（耐压、局放等）时不能一次通过的风险，则需重新回炉干燥。

沙漠气候净化装配系统，简称“沙漠房”，正是为了解决上述问题而设计的用于大型超高压电力变压器二次装配整理的理想设备。

这种设备将提供一个高度干燥，洁净，温度适宜的绿色操作空间，既保证变压器器身在整理过程中不致受潮降低绝缘强度，又有利于工人舒适操作。且时间可根据需要控制。

系统设计时考虑到为了避免器身受潮，或者将受潮降低到最小程度，保证沙漠房内的相对湿度在一定的范围,在这个湿度下，室内温度保持在25℃~30℃。

为了防止未经处理的空气进入沙漠房从而破坏沙漠房内的气候条件（温度、湿度、洁净度），系统会始终维持沙漠房内有一个微小的正压。

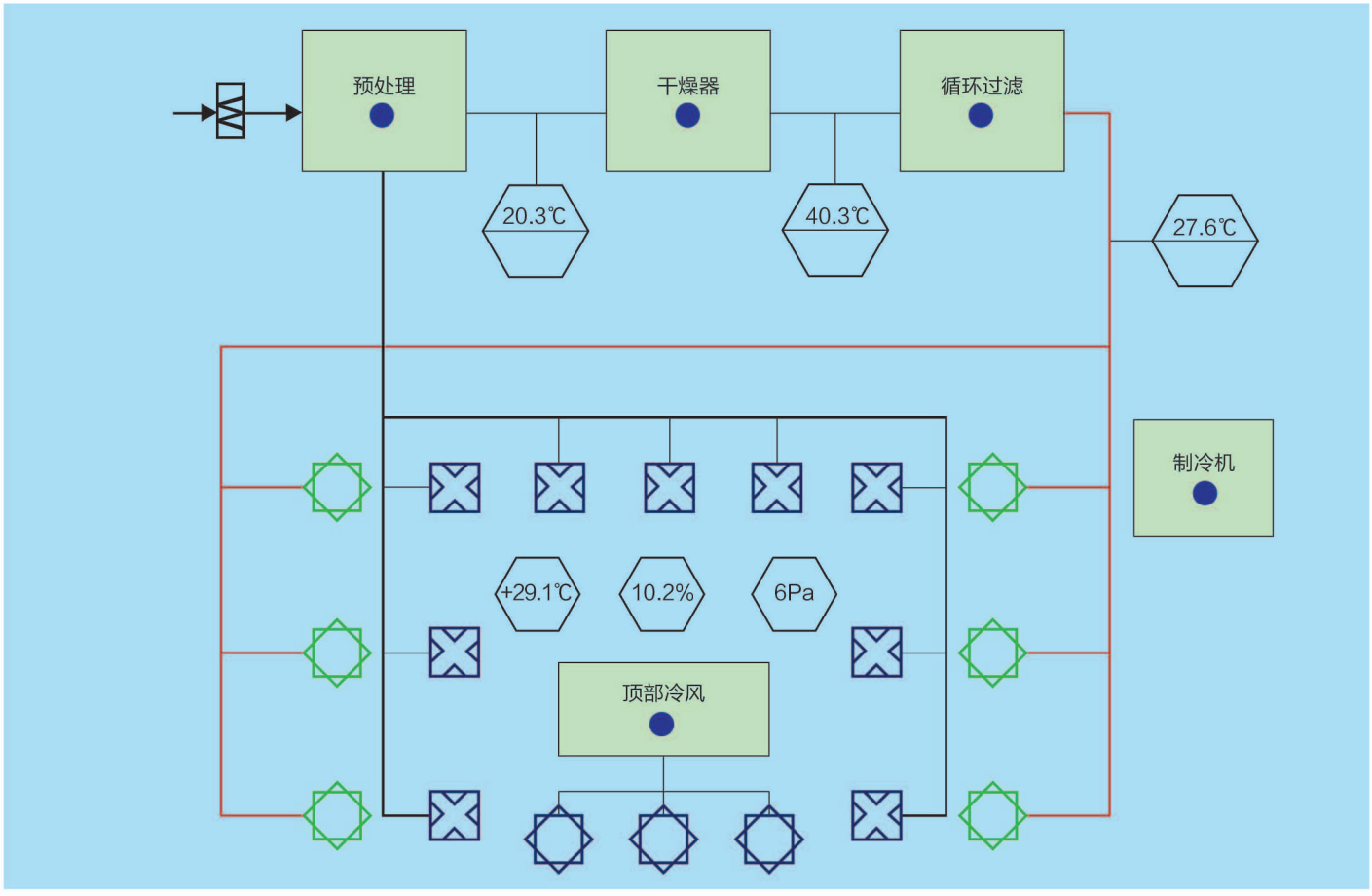
系统在运行过程中，在不影响室内固定的循环空气流量的情况下，提供一定比列的新鲜空气，另外，还保证操作人员不会因较高的气流所妨害。

系统的操作是通过两个操作面板，及计算机可视化软件进行的，沙漠房内部的气候条件（参数）可以永久保存，便于以后的产品质量分析。

After drying in vapour phase, the temperature of active part is very high, which means the insulation parts will absorb moisture quickly, and the insulation ablity of the transformer will decrease in a great deal. Therefore, the manufacturers normally specify a time in which the assembly after drying must be finished to reduce exposed time. This has lots of disadvantages:

- Low reliablity (at least 8–12hours requirement)
- Not human friendly (operators need to work in a higher temperature environment)
- Quality Assurance
- Polution (particles, oil etc in the air, and sweats will pollut the active parts)
- …… 

Dessert Climate Assembly System (Dessert House for briefly) will supply an environment in which the temperature, humidity,neatness are well controlled. The transformer after drying can be assembled in this house without damp.




整个装配系统组成如下：

◎ 空气预处理系统

主要用来向沙漠房内提供压力和补充新鲜空气，并且在空气进入干燥机之前将空气冷却到一定温度。

◎ 干燥空气循环系统

用来对来自预处理系统和装配室内的空气进行循环干燥净化处理，并对干燥净化后的空气进行温度/湿度控制。

◎ 顶部冷风系统

当一个较热的变压器器身或其他组件进入沙漠房时，周边的温度会大幅上升，上升的幅度与器身的重量有关。这种较高的热量在短时间内靠干燥空气循环系统很难释放。因此需要一个附加的冷却系统才能快速降温。

◎ 控制系统

所有的控制和参数设置均在电脑上完成，系统采用可视化人机对话管理并控制，所有系统参数直观的在计算机屏幕上实时显示。操作简单方便。

◎ 装配室

一个空间合适，方便变压器器身进出的且有一定密封性能的装配室。装配室内提供照明，操作平台，及可供操作人员短时休息的附室等。

The system is composed of:

- Pretreatment system
- Drying and circulation systemn
- Top load system (top cooling system)
- Controlling system
- Assembly House

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