User Manual

DESICCANT DEHUMIDIFIER

KEEP THESE INSTRUCTIONS FOR FUTURE REFERENCE

Thank you for choosing our dehumidifier to provide the needs of dehumidification system. This operating manual will provide you with valuable information on the proper care and maintenance of the dehumidifier. Please take a few moments to read the instructions thoroughly and familiarize yourself with all the operational aspects of this dehumidifier.

Foreword

This manual provides all the information about this desiccant dehumidifier, including the structure, installation, working principle and the detailed operating instruction is provided. No modification of the unit is allowed without prior approval, to avoid void of warranty.

Warning!

All electrical connections works must be done by local professionals, to meet the relevant regulations or requirements. Please read through the manual before any installation work is carry on, this is to avoid any fault operation that may cause loss of life or property. Please contact the supplier or the manufacturer if there are any issues arises that are not stated in this manual.

Safety

This series of dehumidifier is in conformity with the essential safety requirements as following:

GB/4706.32-2004/IEC 60335-2-40:199	GB/T7725-1996
GB/T16803-----1997	GB/T18883-2002
GB/T17791-----1999	GB/T19411-2003
GB/755---2000	UL/474-1993
GB/T2518	GB/T191-2000
GB/50016-2006 /GBJ16-87	ANSI/AHAM DH-1-1992
GB/50243-2002	ANSI/UL94
GB/50019-2003	UL/484-1993
GB/50015-2002	UL/969
GB/J13-86	GB/T18713—2002
GB/T6424—1997	GB/T15513—1995
GB/T4271—2000	QB/T15816—2004

In each section of the manual, there are safety information and explicitly pointed out operation that may causes danger. And it is mark with "Warning Sign  "

This manual provides information on the appropriate ways of operating the dehumidifier. It shall serve as a guideline only and are not liable for any personal responsibility or to meet the local safety regulations.

During the installation and operation of the equipment, everyone shall bear the liability of the following:

- To ensure the equipment in good condition according to the description provided in this manual;
- Do care the safety of yourself and others;
- Dehumidifier should be operated and maintenance by qualify professionals;
- Do not install dehumidifier around the explosive protection devices;
- Turn off the power before accessing to the internal compartment of the machine;
- To carry out maintenance service, please allow the machine to stop and cool down about 15 minutes;
- All of the machine panel should be closed at all time if maintenance work is not carried out;
- Dehumidifier is limited to atmospheric pressure condition to dehumidify;
- All our dehumidifier come with filters, it must be properly install and cleaned on regular basis;
- Amend or remove any labels, safety marking or notes on the dehumidifier is prohibited;
- The manual should be kept well for reference;
- Original spare parts should be used for any faulty part replacement;
- The written permission from manufacture must be needed before repairing the dehumidifier by other party;

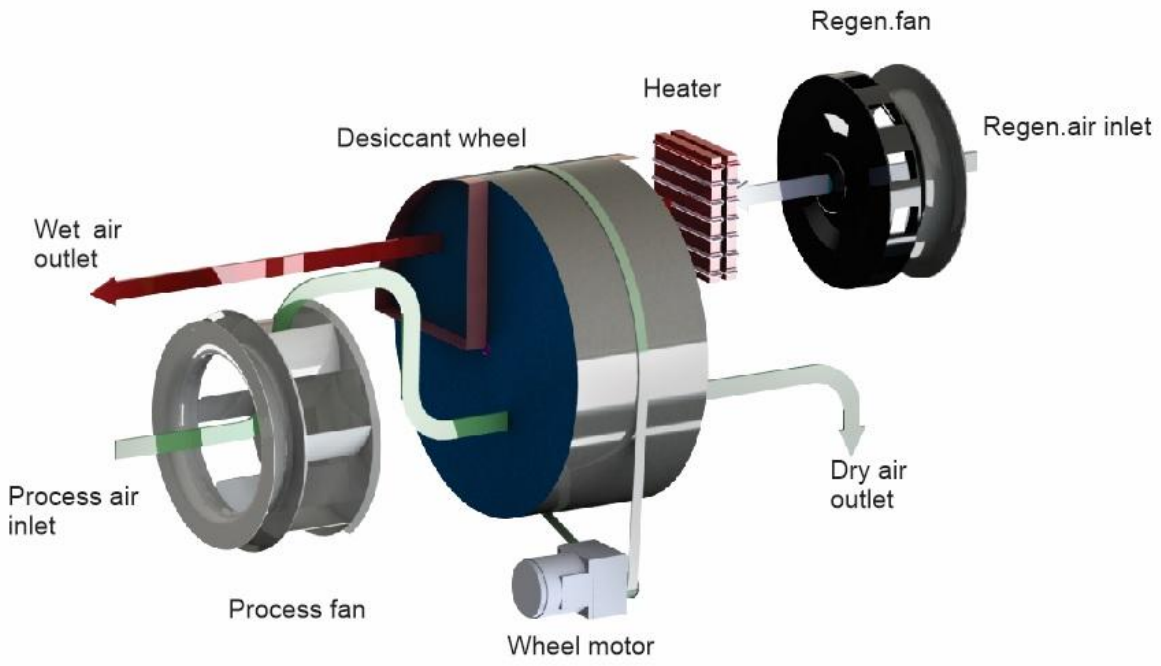
1 Introduction

1.1 Principle

The desiccant dehumidifiers are developed to effectively treat applications that requiring low air humidity. The desiccant dehumidifier operates based on the adsorption principal. Treated air is simply passed through a porous wheel of solid desiccant and its moisture in the air is absorbed and the humidity level is lowered. After the wheel absorb the moisture, it will become saturates and in order to be used again it must be 'recharged' or also called as 'regenerated' by heating it up until the absorbed moisture is evaporated. The evaporated moisture will be driven off the desiccant wheel and goes right back to outdoor air or to surrounding ambient, which is not the treated room. The desiccant dehumidifier is designed so that the treated air is separated from the incoming air stream to dry the wheel, which will be exhausted to the outside.

The desiccant wheel is slowly rotating in the system to continuously absorb moisture to keep the treated air dry and regenerated using heatto help remove the absorb moisture from the desiccant. Roughly ¾ of the time the desiccant will be absorbing moisture out of the treated room air, and the remaining ¼ of the time it will recharge. The process mentioned above is shown as picture in 1.2 showing below.

1.2 Working process



1.3 Construction

1.3.1 Housing：

- Our Desiccant dehumidifier equipment is built with solid steel frame structure of 1.2mm thickness, which is insulated to prevent condensation on machine surface, powder coated paint for better anti-corrosion.
- The rugged steel frame structure, is meant for heavy duty usage, where it can be move and handle by forklift for transportation and installation purpose;
- The machine is design for easier maintenance. The machine panel can be easily screw and unscrew for machine troubleshoot. And the electrical panel can be easily located and opened hinge door with clip;
- The desiccant wheel is make of high quality material which can last long under normal usage with care. It is effective and reliable;

1.3.2 Process air duct：

- There are filters for each air inlets, it is conveniently to remove for cleaning purpose. It is suggested to clean the filter regularly to maintain the performance of the machine.
- Our centrifugal fan (or EC Centrifugal fan) is of high quality unit, the rotor blades and steel spiral case, high efficiency, low noise, high airflow;
- Process air outlet can be connected to other air treatment equipment according the user needs.

1.3.3 Reactivation air duct：

- There are filters for each air inlets, it is conveniently to remove for cleaning purpose. It is suggested to clean the filter regularly to maintain the performance of the machine.
- Reactivation blower will delay to stop while reactivation temperature up to 60 ℃, ensure that the water vapor and heat can be taken away totally;
- Reactivation heater The controller acquire signals of the heating temperature transmitter, then PID adjusts internally, adjust the power of SCR to ensure the wheel is in constant temperature, to allow better energy saving.

1.3.4 Desiccant rotor：

Desiccant wheel and the frame part are the core of the dehumidifier, whose performance characteristics directly influence the dehumidifier performance and characteristics:

- Both desiccant rotor and sealing strip are imported material from USA;
- The desiccant rotor is made by special heat resistance composite materials, which is corrugated structure containing high performance of moisture absorption, forms lots of tiny air hole, has large air contact area, improving the dehumidification efficiency;

1.3.5 Driving system of wheel：

The slow rotation of wheel is realized through the motor and belt transmission device. Belt is located at the wheel rim, driven through the drive motor pulley;

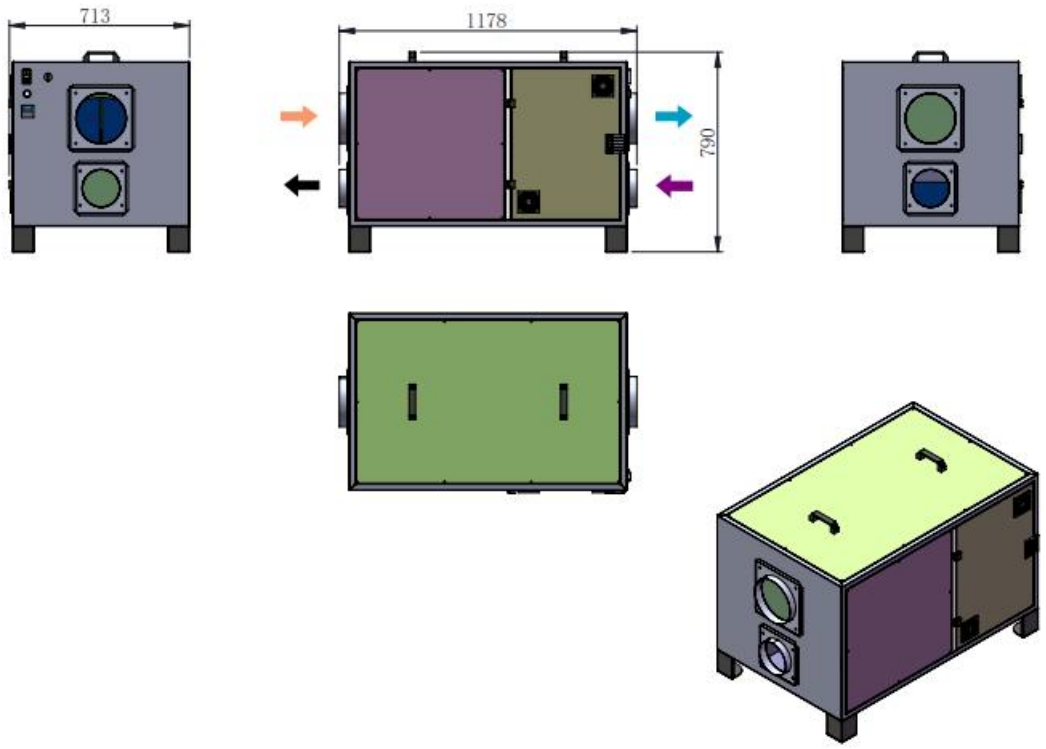
Belt tension device can ensure belt in the appropriate firmness, prevents belt slide and to deal with driving devices are in correct operation. The front panel can be open to check the wheel rotation direction.

1.3.6 Protective device：

Motor overloaded and short circuit protection: Processing motor, reactivation motor and the motor of wheel are introduced the overload and short circuit protection function.;

Stop protection： When dehumidifier stops in normal, reactivation fans (including wheel) will continue to run until reactivation heater cools down to 60 ℃ below;

1.3.7 Dimension：

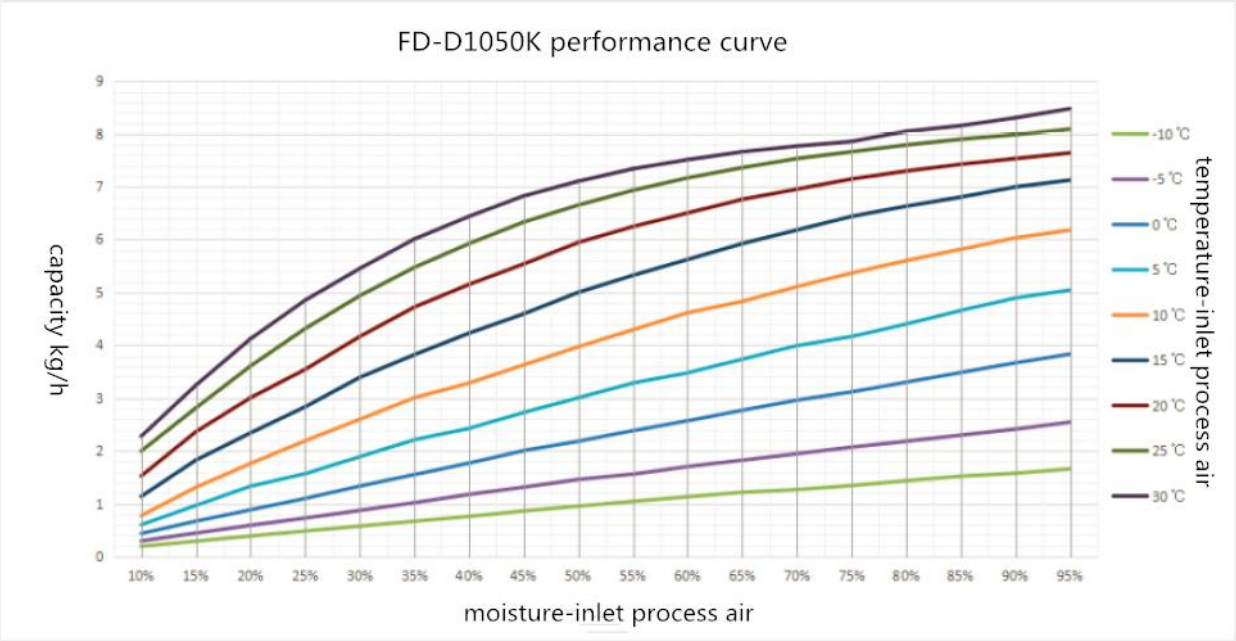


1.3.8 Technical Specifications：

Sr.	Item	Technical Specifications
1	Model	FD-D1050K
2	Type	Desiccant Dehumidifier
3	Voltage	380V/3PH/50Hz
4	Rated Power	11.8KW
5	Current	18.5A
6	Operating temp.	－20°C ~ 60°C
7	Storage temp.	－20°C ~ 60°C
8	Capacity	7.2 kg/h
9	Process air flow	1100 m3/h (200PA)
10	Regeneration air flow	380m3/h (150PA)
11	Product dimension	Refer to above dimension drawing
12	Weight	145kg

Note: the capacity data is calculated while the ambient temp.is 20°C and humidity keeps 60%RH.

1.3.9 Performance Chart：



2 Installation

2.1 Introduction

This section content involves working instructions about installation; it provide helpful information to assist in installation.

2.2 Transport & storage

In order to guarantee the quality and reliability of the desiccant dehumidifier, each will be inspected before their delivery. If the equipment has to be stored for long period before installing, the following items should be paid attention:

- Do not abandon or destroy the original package.
- Avoid any physical damage.
- Prevent dust, frost and rain.

2.3 Inspection

First, check if there are any damages during the transportation. Opening the package, and then connecting the power to test products. If any damage is found, please contact the manufacturer / distributor. Secondly, connect the machine with appropriate layout of the duct work. If environmental and installation conditions are not satisfactory, please contact the manufacturer too, and the designers will help you to improve the work.

2.4 Moving

The weight of dehumidifier is nearly 125kg, in order to prevent any injury or damage, do please use carrying & lifting device to move. Avoid turning upside down. The dehumidifier is design for easy use of carrying & lifting device.

2.5 Location

The dehumidifier is suitable for indoor usage. **For the convenience of maintenance and inspection, some space around the machine should be retained (800mm gap at least).** In order to prevent condensation inside the machine, the dehumidifier should not be put into the condition in which the air temperature is below the dew point. In addition, if the machine is

installed outdoors, some protective measures should be done to prevent rain, snow and dust and etc.

2.6 Installation base

Dehumidifier must be installed on horizontal ground or platform, and the ground or platform must have enough capacity to bear the total weight of the dehumidifier. After installation works, it is better to re-check whether the dehumidifier is level. If the dehumidifier is required a fixed installation, the mounting holes should be done in the prefabricated steel feet.

2.7 Duct connection

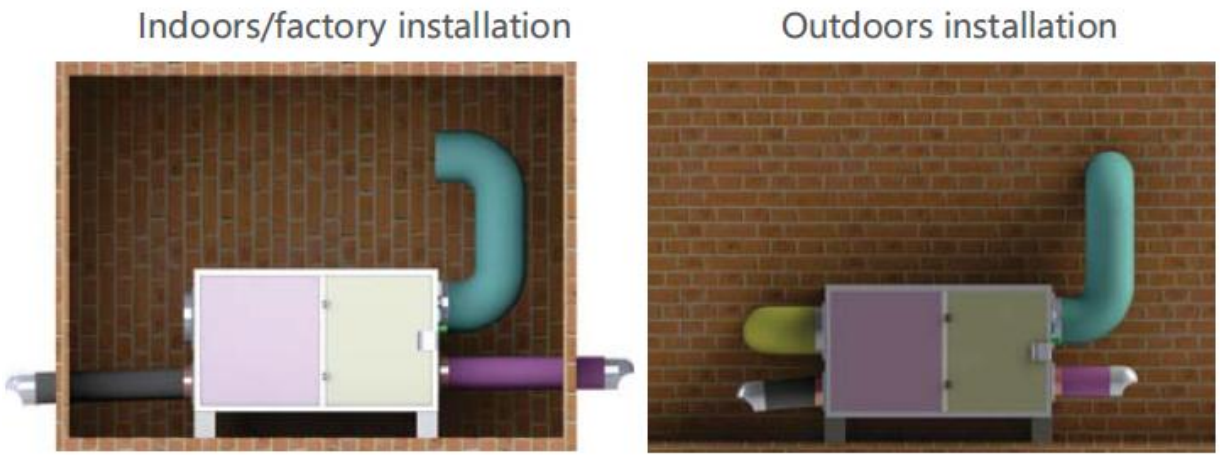
•The dimension of duct for process air and reactivation air should be in line with ISO7807 recommended values. Ducting should be connected with the connection part on flange. Please take note of the following during connection of the duct work.

- In order to reduce loss of static pressure, it is advice to install with the shortest length of the duct possible.
- To ensure the machine performance, all rigid (galvanized) duct fittings are required to be air tight.
- The duct should have a good capacity of thermal insulation, to prevent moisture condensation inside or outside the duct surface.
- To reduce noise and vibration transmitted along the duct, the good quality, soft and strong airtight adapting pieces should be used in the joint parts.
- The air valve must be installed in the duct of process air and reactivation air if it is needed.
- If the reactivation air is introduced from outdoor air, the reactivation air duct should be high enough off the ground to prevent inhale of dust and debris, meanwhile, it must be far away from some sources of pollution, such as energy emissions, steam and gases. In order to prevent wet air outlet is inhaled back into machine, the distance between the regeneration inlet air and wet air outlet should be at least distant by 1 meter.
- The outlet air from the wet air outlet is very humid, it is advise to install the duct for wet air outlet on downward position. This is to allow the wet air to flow smoothly when it is exhausted out

2.8 Installation Guide

Indoors: The regeneration air inlet and outlet are ducted to the outdoors. The process air inlet can be free return, while the dry air outlet can be ducted to designated area to be treated or can be evenly distributed within the treated room.

Outdoors: The process air inlet and outlet are to be ducted to the treated area. The regeneration air inlet and outlet can be ducted to outdoor if the machine is installed outside of the treated room, or it can be allowed to free flow if it is installed at outdoor.



LUKO Desiccant Dehumidifier is design for easy ducting connection. For inspection and maintenance, please ensure there are enough space in front of the unit. This is to provide clearance for opening the access door and remove the desiccant wheel.

To load, unload, moving or relocating the machine, it is recommended to use material handling equipment such as Hand Pallet Jack, Forklift and others. Please do not place the dehumidifier in explosive areas, it is not designed for explosive environment or with explosive materials.When installing the duct work, it is to avoid recirculation of outlet air to inlet. For instant, please make sure the Wet Air outlet is far from Regeneration Air Inlet and the Process Air Inlet is distant away from the Dry Air Outlet.

It is also recommended to minimize the length of the duct used. As the longer the ducting is, the performance of the machine will be affected. The Dry Air outlet of the unit can be fitted with a Volume Control Damper to regulate the airflow volume when necessary. The damper can also be installed at the wet air outlet, if you would like to reduce the dehumidification capacity.

Please beware that Condensation may occur in the ducting that connected to Wet Air Outlet. This

is due to the higher moisture content of the wet air that is being discharged. It is therefore recommended that the duct for the Wet Air Outlet to be insulated and installed at an angle so that the condensed water will not flow back to the dehumidifier. A 10mm diameter hole shall be provided in the lower part of the duct for the discharge of condensate water.

The size of the duct should meet the recommended values of ISO7807. Installation of duct and elbow flange pipe connections shall not exceed 20 mm in bolt length. When installing the dehumidifier inlet and outlet connecting pipes, you should pay attention to the following suggestions:

- Minimize the duct length, this is to reduce the static pressure loss. To ensure better performance, all rigid (galvanized) duct connections must be airtight.
- The air duct should be insulated to avoid condensation on the outer wall of the duct when the air temperature in the duct falls below the dew point of the outside air, this would also cause corrosion of the duct. Insulation can also prevent from energy loss.
- Ensure that there are no blockage on the operation to provide maintenance and servicing of the machine. In order to reduce noise and vibration, a good quality and air-tight soft connection can be installed between the outlet of the regenerative fan and the regenerating duct.
- Damper can be installed on the outlet duct of the dry air and wet air.
- If the system is to be used for dehumidifying fresh air, the process air inlet should be at a sufficient height above the floor to prevent the ingress of dust and debris. The process air inlet must be kept away from possible sources of air pollution. In order to prevent wet air outlet recirculate back to process air inlet, the process air inlet must be at least 2 m away from the wet air outlet. In addition, the location of installing the machine should be considered to prevent rain and snow.

2.9 Electrical connection

 Be careful! All electrical connection works must obey local electrical equipment installation standards, done by qualified professionals. The machine needs three-phase AC power supply, as per the specification table in 1.3.8 above.

- It is forbidden to connect the power supply beyond the specified voltage and frequency.
- Before the three-phase AC power is supplied, its real status should be checked to ensure that its voltage and frequency fluctuation does not go beyond ±10%.
- Unit must be grounded. Setting the power isolation switch to ensure the machine is totally off power during checking work. The main switch to be directly connected with the main power devices.

2.10 Sensitive elements connection

 The installation of temperature and humidity sensors, the following requirements should be abided：

- Temperature and humidity sensors should be installed above ground 1 m to 1.5 meters, making sure the device can detect the representative data in the dehumidifying area;
- The sensors should be installed away from dry air or wet air or airflow from outside;
- Temperature and humidity sensor should stay away from direct intact with cooling equipment, do not directly exposed to sunshine place, as the change of the temperature will affect the actual assessment;
- External control system must be compatible with the low voltage control circuit of dehumidification equipment.

3 Operations

CONTROL PANEL

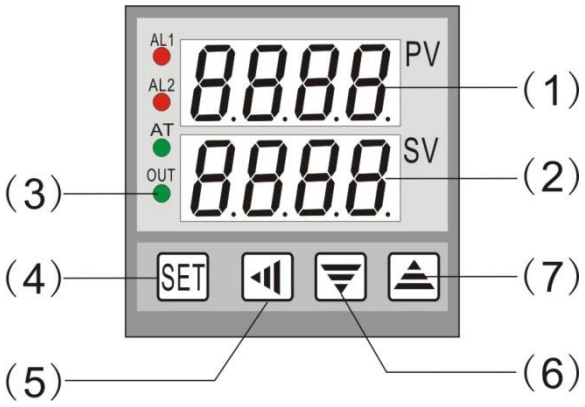
1.UNIT RUN INDICATOR

Indicator light's on when the machine is running,
Indicator light's off when the machine is not running.

2.POWER ON/OFF INDICATOR

Indicator light's on when the machine is powered on,
Indicator light's off when the machine is powered off.

3.PID HUMIDITY CONTROLLER



（1）Front Panel Overview:

PV Screen:measured value.
Under working status,display current humidity;
Under setting status,display menu code;

SV Screen:set value.
Under working status,display set humidity;
Under setting status,display set value of each parameter displayed in PV screen.

OUT(green): the OUT indicator is on while control output stays on.

SET:Press the key for 3 seconds to enter set mode or press it once to check the SV screen output.
◄:shift key,press it to change the parameters
▼:down key in setting mode,press to decrease the value;press for 3 seconds to enter the setting mode.
▲:up key in setting mode,press to increase the value;press for 3 seconds to enter the setting mode.

（2）Code and description

number	code	Definition	Range	Explanation	Default
1	**SP**	Set value	0～100%	Set the required humidity	30
2	**P**	Proportional band	0～9999	Set P to 0	0
3	**Hy**	hysteresis value	0.1～50.0	Set the hysteresis value	2.0
4	**Sc**	Calibrate the readin	-50.0～50.0	If measured humidity is higher then the real humidity,set it positive If measured humidity is lower than the real humidity,set it negative	0.0
5	**dp**	Decimal point	0～1	0: without decimal point 1:with decimal point	0
6	**LOCK**	Function lock	0～150	LOCK=0,every value change in each mode allowed LOCK=1,value change of SP(set point) allowed only LOCK≠0,1,all value changes prohibited	0

（3）**Set the controller**

SET SP:

Press ▲ or ▼ for 3 seconds to enter settings menu;
Once PV screen shows the code SP,SV screen shows the value,press ◄、▼、▲ to set the value;
Press SET to save the value.

SET other parameters(number 2~6):

Press SET for 3 seconds to enter settings menu;

Once PV screen shows the code SP,SV screen shows the value,press ◄、▼、▲ to set the value;
Press SET to save the value.

During setting,if there is no operation in 15 seconds,the system will save setting automatically and return to normal display mode.

（4）**OUT indicator description**

When the measured humdity PV＞ the set humdity SP, the relay is closed,the OUT indicator is on,the dehumidifier starts working;

When the measure humidty PV≤ the set humidty SP- Hy, the relay is opened,the OUT indicator is off,the dehumidifier stops working.

4 Maintenance

4.1 Introduction

Desiccant dehumidifier can work for long hour and require routine maintenance service in order to prolong the lifespan of the machine and also its performance. The frequency of the maintenance depends on the operation conditions and the quality of the working environment. If the process air is dusty, more maintenance work will be required. If the machine is not properly maintain, it will affects the dehumidification performance while the lifespan of the machine will be shorten as well.

 The Dehumidifier should be shut down 15 minutes before accessing to the panel or carry out any maintenance work, such as removing the filter for cleaning purpose.

 Cut off the main power before any maintenance work

 There is a high temperature area (reactivation heating section) in the dehumidification equipment, it is recommended to allow the machine cool down completely before carrying out any maintenance.

4.2 Mesh Filter

Our desiccant dehumidifier is equipped two filters, one for process airflow and the other is for reactivation airflow. Mesh filter is installed at the inlet of the airflow, this is to filter the dust and particles before entering into the desiccant wheel. Clean or replacing the filter should be done periodically if found the filter condition is covered with dust and dirt that will block the smooth flow of air. Do not operate machine without the filter, because the dust and airborne particles may go into machine and damage the desiccant rotor. By default, It is recommended to clean the filter once every month or at least once bi-monthly.

4.3 Desiccant Wheel

General maintenance is not needed for the Desiccant Wheel. However, if it is necessary to carry out the maintenance work, using compressed air to clean it. For stubborn dirt on the wheel, it can be dismantled and can be wash with water. However, it is not recommended to wash the desiccant wheel too frequent.

4.4 Motor

The motor is equipped with bearing, no additional maintenance is required. Please check every year to ensure the motor run smoothly and fine.

4.5 Heating unit

No additional maintenance required. Please check twice a year to ensure the heater is in optimum condition.

4.6 Driving belt

Checking the belt tension regularly is recommended. Belt tension equipment should be used to check belt tightness.

5 Troubleshooting

Malfunction	Possible cause of trouble	Corrective action
None, or reduced dehumidification capacity	Filter clogged	Clean or replace filters
	Electrical heater faulty	Check fuses
	Airflow reduced	Check openings and dampers
	No rotation of rotor	Check belt tensioning
	Internal leakage in unit	Check springs
	Altered air volumes	Measure and check air volumes
	Altered reactivation temperature	Check reactivation heater
	Air leakage	Check panel and casing
Main fuse faulty	Fan faulty	Check fans and motors
	Too large air volume	Check air volumes and dampers
	Rotor does not rotate	Check drive motor
	Reactivation heater	Check reactivation heater
	No power supply	Check main fuse
Dehumidifier does not start	No control circuit	Check control fuses
	Faulty control circuit	Check external start/stop signal
	Fuse for controls faulty	Check electrical components
Rotor does not rotate	Drive belt is slipping	Check belt tensioning
	Drive belt broken or worn	Replace drive belt
	Rotor jammed	Check centre shaft, rim of rotor
	Drive motor faulty	Replace complete gear motor
No dry- or wet air volume	Filter clogged	Clean or replace filters
	Fan faulty	Check fan, motor and impeller
	Ducts blocked	Check dampers and ducts