SANDA®

SDCS series
Semiconductor dehumidification device

User's manual

Zhuzhou Sanda Electronic Manufacturing Co., Ltd.

Thank you very much for using our company's products

We will serve you wholeheartedly

Safety Operating Instructions:

All personnel engaged in the installation, commissioning, operation, maintenance and repair of this equipment:

◆ Must have corresponding professional qualifications.

◆ It must be operated in strict accordance with the product instruction manual.

Violation or misuse may result in:

◆ Reduce the service life of the equipment.

◆ Damage to this equipment or other equipment of the user.

◆ Cause serious personal injury.

This manual uses the following methods to emphasize important matters in terms of safe operation:

Attention!

This kind of reminder is an important explanation of a certain transaction, please pay attention to it!

01/Product Introduction

The Semiconductor dehumidification device adopts the semiconductor refrigeration dehumidification method, actively sucks the humid air in the confined space into the dehumidification duct under the action of the fan, and the water vapor in the air is condensed into water after passing through the semiconductor refrigeration mechanism, and then discharged out of the cabinet through the water guide pipe, which can achieve a very good dehumidification effect.

By reducing the water content in the air, the relative humidity and absolute humidity are reduced at the same time, the temperature is hardly increased, and the negative impact caused by the temperature difference is not generated, which fundamentally eliminates or reduces the occurrence of accidents, and will not accelerate the aging of the devices and the cabinet due to the high temperature. The intelligent dehumidification device changes the passive prevention of condensation to active guidance of condensation, which can effectively prevent the aging of equipment in the cabinet, the reduction of insulation strength, the breakdown of secondary terminals, the mildew of materials and the corrosion of steel structural parts and other safety hazards, and ensure the safety of the power grid safe operation.

Creepage and flashover accidents caused by condensation inside the equipment generally occur in the following situations: First, the humidity in the area is high, the weather temperature changes greatly, the bottom of the switchgear is wet, and some cable trenches even have water; The switchgear is in the basement, the humidity is high, the temperature inside the cabinet, especially the temperature close to the ground, is lower than the ambient temperature; the third is that some equipment is temporarily out of service, and the inside ambient temperature in the electrical cabinet is lower than the surrounding ambient temperature. It is very easy to form condensation. In this case, once the power transmission is put into operation, the accident will follow. In order to ensure the safe operation of the power grid system and the long life and safe and effective use of electrical equipment, the power system puts forward higher requirements for moisture-proof and anti-condensation in the cabinet.

02/Application scope

1. Knife switch, GIS control cabinet, high and low voltage control cabinet, high and low voltage switch cabinet, ring network cabinet, outdoor terminal box, mechanical control cabinet, box type substation, dry type substation and other electrical equipment;

2. Integrated circuits, silicon crystals, liquid crystal devices, ceramic devices, resistance-capacitance components, active devices, connectors, SMD devices, CPUs, and computer boards for moisture-proof storage;

3. Moisture-proof management of physical and chemical instruments, experimental materials, and insulating materials, and moisture-proof storage of chemicals, medicines, food, fibers, and biological agents.

03/Product Features

1. Small size, light weight, convenient and fast installation;

2.Switch between automatic operation and manual dehumidification function, adjustable temperature start value and dehumidification start value;

3. The dehumidification air duct actively induces condensation and exhausts gas to heat and dehumidify, effectively achieving the comprehensive management of moisture-proof and dehumidification in the enclosed space of the electrical cabinet;

4. 24-hour real-time sampling of humidity and temperature sensors, and automatic condensation when the set start value is exceeded;

5. Humidity and temperature settings have a memory function, and will not disappear due to shutdown;

6. Adopt special moisture-proof components, and the shell adopts sheet metal structure to ensure normal operation in humid environment;

7. The application of shielding and isolation technology conforms to the level 3 standard of

GB/T17626-2008, ensuring that it can work under strong electromagnetic fields;

8. The dehumidification and condensate pipeline can discharge the condensed water out of the cabinet, and it can also be collected outside the cabinet by using a liquid storage bag.

04/Technical parameters

Data name	Technical Parameters	Data name	Technical Parameters
Working power	DC24V	Dehumidification efficiency	⩾430±10mL/day (temperature 35℃ humidity 85%RH)
Dehumidification power	60W	Operating temperature	-30℃～55℃
Humidity detection range	0%RH～100%RH	Temperature detection range	-25℃～60℃
Dehumidification start value	45%RH～95%RH (Factory setting 70%RH)	Dehumidification temperature	5℃～45℃
Humidity Measurement Accuracy	±3%RH	Temperature Measurement Accuracy	±1℃
Display method	Double row 3 digit display	Display resolution	0.1
Shell material	Sheet metal	Dimensions	235×130×65mm（H*W*D）
Net Weight	1.24kg	Drain-pipe	Silica gel inside diameter7mm outside diameter 10mm、L150cm

05/Working principle

The intelligent dehumidification device is composed of a power supply system, an air supply system, a semiconductor refrigerator, a temperature and humidity detection control circuit, a heating circuit, a wireless module (external) and a drainage pipeline.

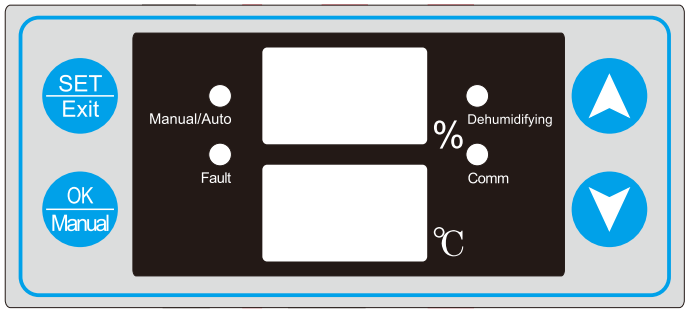
1) Principle of dehumidification

After the humid air is inhaled by the fan, it flows through the specially designed air duct,

and first passes through the semiconductor refrigerator to cool down and condense. After fully dehumidifying within the set starting value, the air humidity in the cabinet is reduced to below the dew point, and the entire moisture-proof condensation heating process is completed. At the same time, the signal acquisition sensor of the intelligent dehumidification device is external, which can accurately collect the real humidity in the cabinet in real time, so as to ensure that the intelligent dehumidification device starts dehumidification in advance when the condensation condition is about to be reached in the cabinet.

2) Operating Instructions

After starting up, the dehumidifier enters the self-test state. After the self-test is completed, the dehumidifier enters the working state after 3 seconds, and the digital tube displays the humidity value of the cabinet.



Indicator light description:

1. Manual/automatic : the indicator light is on, indicating that the dehumidifier is in manual operation. When the indicator light is off, it means that the dehumidifier is in automatic operation state.

2. Dehumidifying : The dehumidifying indicator is always on, indicating that the device is dehumidifying at this time, and when it is off, indicating that the dehumidifying is complete. (If the manual light is off, it means automatic dehumidifying; if the manual light is on, it means manual dehumidifying)

3. Fault : When the indicator light is on, it means that the device is faulty.

06/Display instructions

1. Manual mode: When the dehumidifier works in the automatic state, the 'Manual' indicator light is off. After pressing the 'OK/Manual' button, the 'Manual' indicator light is always on, and the 'Manual' indicator light is on. At this time, the dehumidification device start the dehumidification module, and then press the 'OK/Manual' button, and the dehumidification device will automatically switch to automatic mode.

2.1 Parameter setting mode: After the power is turned on and the dehumidification device passes the self-test, it will automatically enter the automatic mode. The digital display on the left displays the current temperature value; the digital tube on the right displays the current humidity value. Press the 'Set/Exit' key to set the dehumidification start value and dehumidification cut-off value.

2.2 Set the humidity start value: When the dehumidifier is working normally (the two digital tubes display the current humidity value and temperature value respectively, which means it is normal), press the 'Set/Exit' button, the dehumidifier enters the setting state, the digital tube display (the first digit of the left digital tube displays H, indicating that the two digits on the right are the humidity start value at this time, the first digit on the left displays L, indicating that the right two digits are the humidity disconnect value at this time, and the first digit on the left digital tube displays t indicates that the two digits on the right are the temperature starting value), press the 'Up' or 'Down' button to modify the starting value of the humidity; after the modification is completed, press the 'OK/Manual' button to save and modify the setting of the starting value of the humidity Finish.

2.3 Set the humidity cut-off value: When the dehumidifier is working normally (the two digital tubes display the current humidity value and the humidity value respectively, it is in the normal state), press the 'Set/Exit' button, the dehumidifier enters the setting state, Repeatedly press the 'Set/Exit' button until the first digit on the left of the digital tube displays L (the first digit on the left digital tube displays H, indicating that the two digits on the right are the humidity starting value at this time, and the first digit on the left digital tube displays L, indicating that at this time. The two digits on the right are the humidity cut-off value, the first digit of the digital tube on the left shows t, which means that the two

digits on the right are the temperature start-up value), press the 'Up' or 'Down' button to modify the humidity cut-off value; press the 'OK/Manual' key to save after the modification is completed; the setting of the modified humidity disconnect value is completed.

Note: The temperature cut-off value does not need to be set, the software automatically adjusts it, and the tolerance is 5°C; if the temperature start value is set to 10°C, the cut-off value is 15°C.

3. Check the temperature value: When the dehumidifier is working on the main interface, press the 'Down' button to display the internal temperature value, and it will automatically change to display the humidity value after 8 seconds or press the 'Down' button to display the humidity value.

4. Fault display description: When displaying the humidity value, the digital tube displays '---' indicating that the humidity sensor is faulty or there are water drops on the humidity sensor; when displaying the temperature value, the digital tube displays '---' indicating that the temperature sensor is faulty.

The fault codes are as follows:

E2: external temperature sensor fault; E3: cold surface temperature sensor fault; E4: hot surface temperature sensor fault; E5: external ambient temperature is too high; E6: Refrigeration plate failure.

07/Installation

1. When installing, the dehumidifier must be placed vertically with the water outlet facing down;

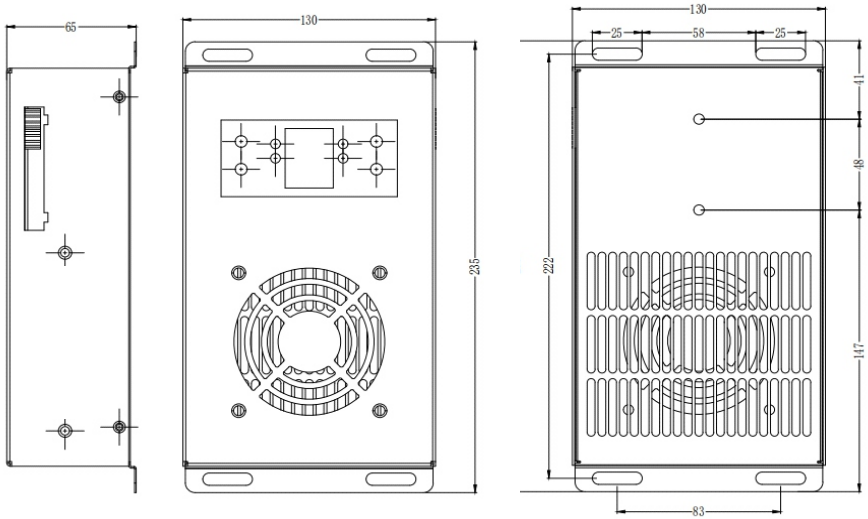
2. Ensure that there is more than 5cm of space between the front of the dehumidifier and other devices to ensure smooth air intake from the front fan air inlet.

3. Connect one end of the outlet pipe to the delivery port of the dehumidification device

and fix it with a clamp. Keep the middle of the outlet pipe smooth and not entangled to facilitate drainage. The other end leads to the outside of the casing.

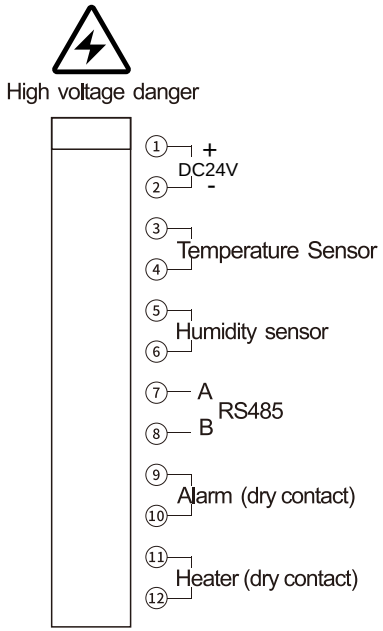
4. There are two power supply versions available: AC220V or DC12V. AC220V can be directly connected to the power supply wiring, and the terminal L/N is sufficient; In the DC12V version, attention should be paid to distinguishing between positive and negative poles, with the positive pole connected to (L+) and the negative pole connected to (N -).

08/Installation diagram



Dimensions(H*W*D):
235mmx130mmx65mm

09/Product Wiring Diagram



10/Packing list

Serial number	Packing List	Quantity	Unit
1	Intelligent dehumidifier	1	piece
2	Product Manual	1	piece
3	High temperature resistant silicone drain pipe	1	piece/1.5m
4	Product certification	1	piece
5	Rail bracket and mounting screws	1	piece
6	Water pipe clamp	1	piece

Attached: Communication Protocol

This device adopts MODBUS (RTU mode) communication protocol, RS-485 communication mode, baud rate 9600bps, 1 start bit, 8 data bits, no parity, 1 stop bit, that is, 1 byte data total 10bits, the low bit of the CRC16 check code is in the front and the high bit is in the back. The station number is set to 01 when the device leaves the factory, and the user can reset it according to the site conditions.

1. The master station queries the temperature and humidity values

Device reply (8 bytes in total)							
Device station number	function code	Data length (number of bytes)		Data (see Table 1 for data address)		CRC16 check code	
Add.	03H	00H	H	00H	__H	Low 8 bits	High 8 bits

Device reply (11 bytes in total)							
Device station number	function code	Data length (number of bytes)	Data (see Table 1 for data address)			CRC16 check code	
Add.	03H	00H	H	00H	H	Low 8 bits	High 8 bits

Note: The master station sends this message to read the data in real time.

For example: issued by the master station: 01 03 00 01 00 01 check code

Slave machine reply: 01 03 02 53 02 check code

The last bit of temperature and humidity represents the decimal place, and the highest pointof the 16-bit temperature value at negative temperature is 1

For example : -10.1C means 1000 0000 0110 0101

		03 code reading data	06 code reading data	Note
	Modbus word add			
Current Temperature	0	Read only		
Current humidity	1	Read only		
Humidity start value	2	Read only	Write Only	
Humidity stop value	3	Read only	Write Only	
Heating start value	4	Read only	Write Only	
Temperature alarm value	5	Read only		
Humidity alarm value	6	Read only		
Heating status	7	Read only		00 No heating,01 heating
Working status	8	Read only		00 Standby,01 Dehumidifying, 02~09 Fault(Please refer to the product manual for the fault code)
Dehumidifying manual/auto switch	9	Read only	Write Only	00 Auto,01Manual
Manual output humidification	A	Read only		
Manual output heating	B	Read only		
Over temperature reminder	C	Read only		
Over humidity reminder	D	Read only		

Table 1 addresses for each of the data are shown in figure

2.The master station sends and changes a single parameter of the device (code 06)

The master station sends and changes the device parameters (8 bytes in total)								
Device station number	function code	address			parameter settings		CRC16 check code	
Add.	06H	Humidity start	0X00	0X02	0X00	0X40	Low 8 bits	High 8 bits
		Humidity stop	0X00	0X03	0X00	0X2A		
		Heating start	0X00	0X04	0X00	0X05		
		Manual switch	0X00	0X09	0X00	0X00		

Note: The master station can send this message to change the parameters of the dehumidifier

For example: the master station issued: 01 06 00 00 00 40 check code

Slave machine reply: 01 06 00 00 00 40 check code (retum and send the same)

This message indicates that the humidity start value is set to: 64%RH

3. The master station queries the temperature and humidity values

Message format sent by the master station			
1	Add	Device address	
2	10	function code	
3	Start address	00	
		00	
4	Number of registers	00	
		0E	
5	Number of bytes	1C	
		Register address	Written value
6	Humidity start	0X0002	0x0040
7	Humidity stop	0X0003	0x002a
8	Heating start	0X0004	0x0005

9	Hand switch	0X0009	0x0001
10	CRC	CRC low	
		CRC high	

Note: 1. The 10 code of this protocol is fixed to write data from the starting address of 0X0000, and the number of data is fixed to 14 registers (28 bytes);

2.Other unexplained register addresses are reserved. lt is recommended to write 0XFFFF by default.

For example: issued by the master station: 01 10 00 00 00 0E 1C FF FF FF FF 00 4000 2A00 05 FF FF FF FF FF FF FF FF 00 01 FF FF FF FF FF FF FF FF check code

Slave machine reply: 01 10 00 00 00 0E check code

3.Precautionslt is recommended that the MODBUS frame rate on the 485 bus connected to thisdevice is not more than 3 frames/sec.

lt is recommended to connect only our products on the same communication bus.

if you want to change the device station number, it is recommended to stop thebackground communication first.