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## Instructions

If it is the first time for you to use the product, please pay attention to following:

1. The instrument automatically enters the measurement state after 360 seconds starting up and initializing. When the measurement is started, first open all the flow valve on the panel to adjust the flow. When the measurement is over, the operation is reversed.
2. The instrument has a built-in large-capacity lithium battery, which can work continuously for more than 15 hours after being fully charged.
3. When the instrument is not used for a long time, there will be some air left in the test pipe and air chamber. Therefore, during the first test, the high humidity gas will affect the test speed, because the humidity in the air needs to be taken away before the measured SF6 gas reaches saturation. Therefore, we will find that the speed of testing the second SF6 Electrical equipment and subsequent measurement will be very fast (3-5 minutes).
4. When printing data, it is recommended to plug in AC220V power supply to increase battery life (optional for printer).
5. In case of high temperature weather, and measurement is required, we recommend that you try to arrange the measurement time in the morning when the temperature is low, because the higher temperature will affect the accuracy of the measurement.

Reference standard: People's Republic of China Electric Power Industry Standard DL/T506-2007 "Method for Measuring Humidity of Insulating Gas in Electrical Equipment of SF6".

6. Requirements for ambient temperature and humidity when measuring:  
Ambient temperature: 5°C~35°C (Measure between 10 °C and 30 °C as much as possible)

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## I. Functional characteristics

1. **Self-calibration:** The sensor probe can automatically calibrate the zero point, automatically eliminate the system error introduced by the zero point and drift, ensure the accuracy of each measurement, and at the same time avoid the cumbersome annual calibration.
2. **Fast gas saving:** The measuring time of each SF6 gas is set at about 2min after starting the machine and entering the measuring state.
3. **Self-locking connector:** The self-locking connector imported from Germany is adopted, which is safe and reliable without air leakage.
4. **Data storage:** It adopts large-capacity design and can store up to 1000 sets of test data.
5. **Curve function:** The large-screen curve displays the dew point measurement process.
6. **Clear display:** The color LCD screen directly displays the Dew point, Micro water(ppm), ambient temperature, time, date and others.
7. **Printing function:** external micro thermal printer.
8. **USB interface:** The stored data can be imported into the U Flash, and the data can be processed on the computer.
9. **Built in power supply:** rechargeable lithium battery, charged for 2 hours, and can work continuously for 15 hours once sufficient.

## II. Technical parameters

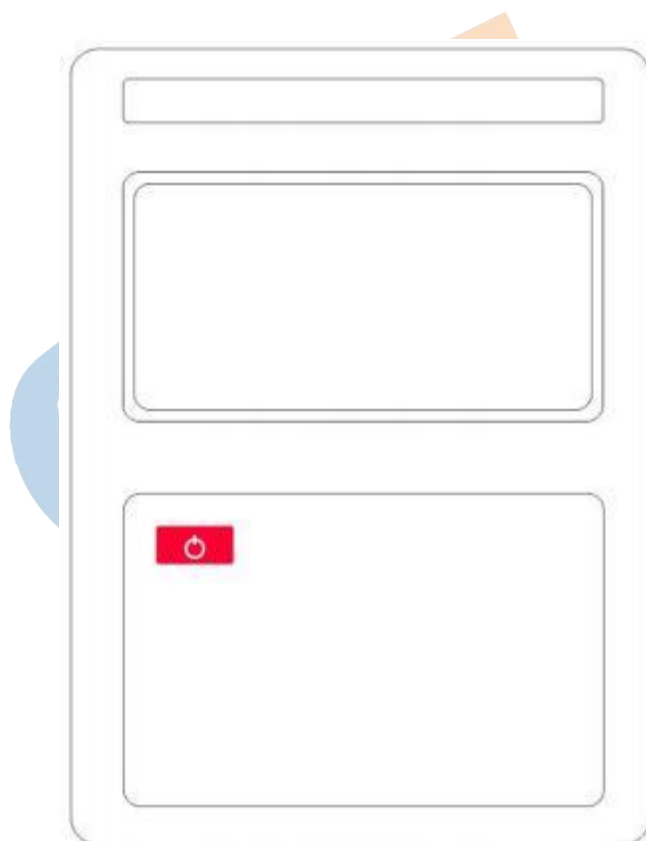
Dew Point	Measurement	-80 °C ~ +20 °C (0.04ppm-23700ppm)
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	range	
	Measurement accuracy	$\pm 1.0^{\circ}\text{C}$ ( $-60^{\circ}\text{C} \sim +20^{\circ}\text{C}$ ) $\pm 2.0^{\circ}\text{C}$ ( $-80^{\circ}\text{C} \sim -60^{\circ}\text{C}$ )
	Response time ( $+20^{\circ}\text{C}$ )	for $-60^{\circ}\text{C} \sim +20^{\circ}\text{C}$ : 63% needs 5 seconds, 90% needs 45 seconds for $+20^{\circ}\text{C} \sim -60^{\circ}\text{C}$ : 63% needs 10 seconds, 90% needs 240 seconds
Ambient Temperature		$-10^{\circ}\text{C} \sim +60^{\circ}\text{C}$
Ambient Humidity		0~100% RH
Display		4.3 inch color touch screen
Power Display		Percentage of battery status
Date Display		Year, month, day
Time Display		Hour, minute, second
Printing Function		External micro thermal printer
Power Supply		AC 220V
		Built-in rechargeable battery
Battery Performance		Charging time: 2 hours; working time more than 10 hours
Weight		2kg

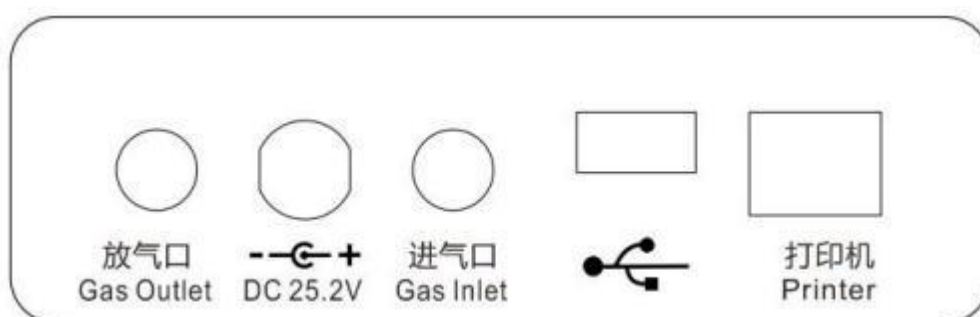
Dimension	250*100*300mm
Operation Temperature	-40℃~+60℃
Storage Temperature	-40℃~+80℃

### III. Panel Introduction

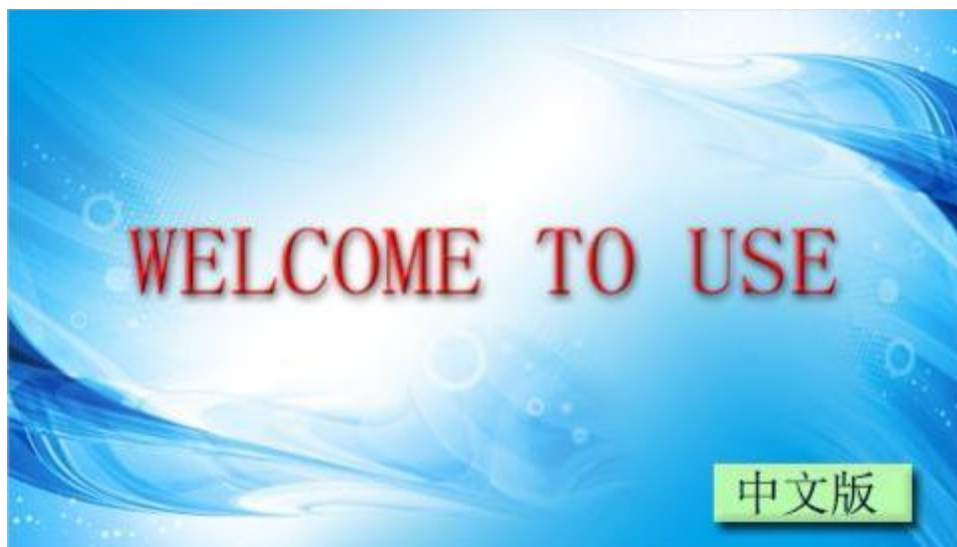
#### 1. Front Panel



#### 2. Back Panel



### 3. LCD Screen



- ① The software system adopts Chinese/English interface, easy to learn and operate;
- ② Dual display of data and graph;
- ③ Historical data query function;
- 4 Data storage function, data output function-output data to Excel and other software;
- ⑤ Undervoltage alarm function;

## IV. Measurement Method

### 1. Connect SF6 equipment

First, find the connector matching with SF6 Electrical Equipment in the instrument connector accessories, connect the threaded end of the measuring gas pipe with the accessory connector, and tighten it with a wrench; Then insert one end of the quick connector on the test gas pipe into the sampling port on the instrument, and connect the exhaust pipe to the air outlet; Finally,

connect the accessory connector with the measuring interface of SF6 Electrical equipment and tighten it with a wrench.

## 2. Startup initialization

Press the power switch button of the instrument for a long time. After the instrument is started, it will first enter the initialization self calibration process, and then enter the preheating state. The preheating process can also be skipped.



## 3. Function Selection

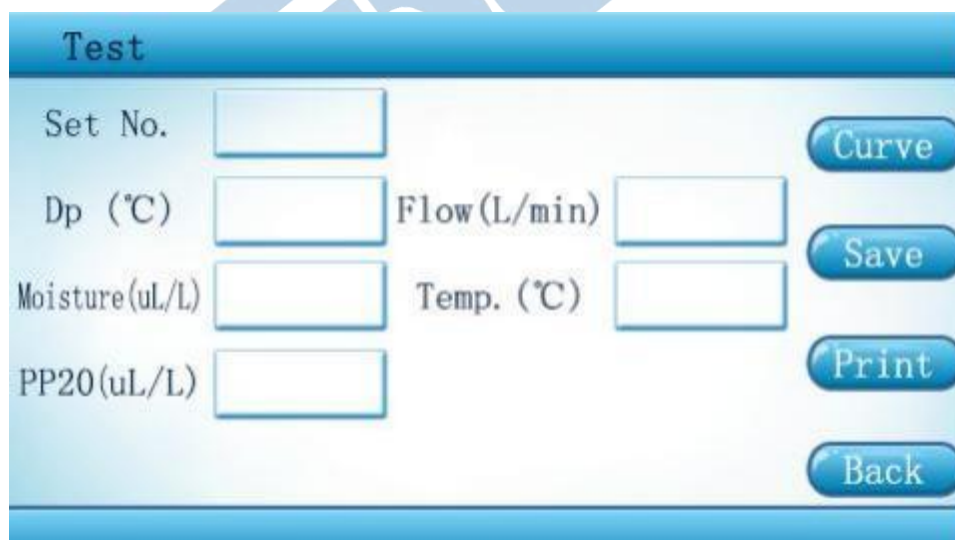
After preheating or skipping preheating, the instrument will automatically enter the "function selection" interface, as shown in the following figure.





#### 4. Check the battery status

Select "data test" to enter the data test interface, as shown in the following figure. Please check the battery level displayed in the upper right corner. If the battery level is lower than 1, please turn off the machine and continue to use it after charging.

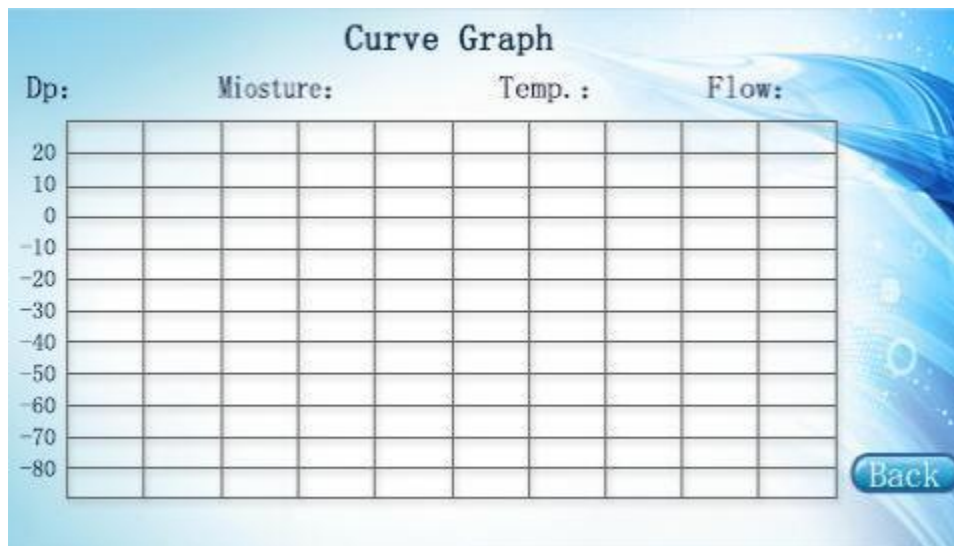


#### 5. Start measurement

First, open the flow valve on the panel to adjust the flow, adjust the flow to about 0.5l/min, and start to measure the dew point of SF6. The measurement time of the first equipment takes 5-10 minutes, and that of each subsequent equipment takes 3-5 minutes.

## 6. Display Curve

Click the curve on the measurement interface to enter the micro water curve display interface, and the change trend of dew point and micro water can be displayed in real time, as shown in the following figure.



## 7. Store Data

After equipment measurement, click "equipment number" to modify the number, and click "save" to save the data in the instrument.

## 8. Print Data

After connecting the external printer, click "print" to print the test results directly.

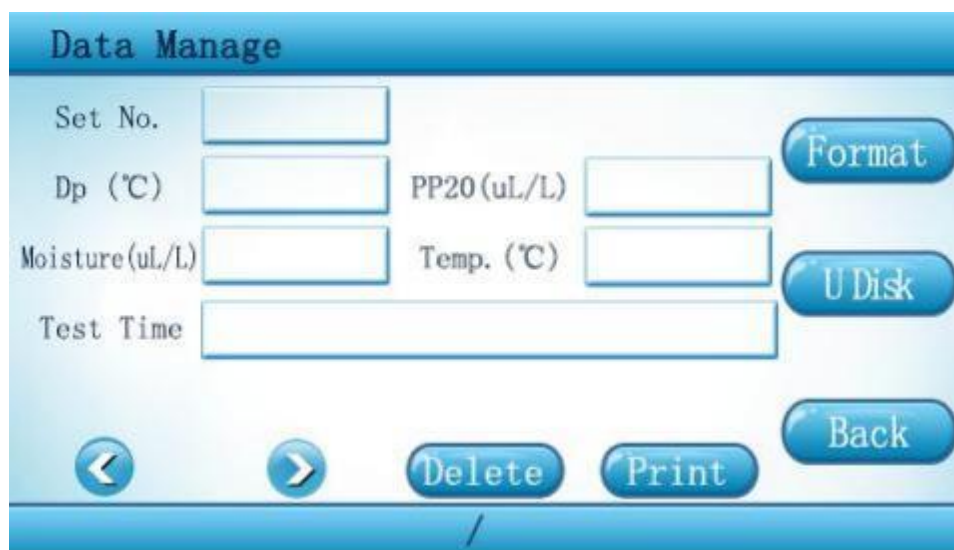
## 9. Change Time

Click on the time display position in the function selection interface to modify the system time.

## 10. View historical data

Click "return" to return the instrument to "function selection". Select data management in the function selection interface to enter the data view interface,

as shown in the following figure. You can view previously saved data in this interface.



After selecting data, click “Print” to print the data. Click “Delete” to select whether to delete a record.

### 11. Format

Click the format button to format the storage in the system. After formatting, all saved data will be lost, and the system will prompt whether to confirm the format.

### 12. Export Data to USB Flash

Insert the USB Flash in the attached accessory into the USB port of the instrument. After about 2 seconds, the system recognizes the USB Flash and clicks export to USB Flash. All the data in the internal memory can be saved to the USB Flash, and then the data can be viewed or processed in the computer.

### 13. Measuring other equipment

After the measurement of one equipment is completed, close the flow regulating valve on the instrument. Remove the adapter from the SF6 Electrical equipment. If you need to continue measuring other equipment, follow the above steps to continue measuring other equipment.

#### **14. End of measurement**

After all equipment measurements are completed, press and hold the power button to turn off the power of the instrument.

#### **V. Note**

- ❖ The instrument shall be placed in a safe position to prevent damage. Avoid violent vibration.
- ❖ Do not measure corrosive gas.
- ❖ The instrument shall be charged in time before use.
- ❖ The instrument shall be charged in time before use. When charging, only connect the charger to the 220V socket, and connect the charging hole to the instrument. Without turning on the power switch, the instrument will automatically charge. The charging time generally needs more than 4 hours.

#### **VI. Packaging List**

NO	Name	Quantity
1	Host	1pc
2	Gas inlet pipe	1pc

3	Gas outlet pip	1pc
4	PTFE TAPE	1pc
5	Printer (Optional)	1pc
6	Printing paper	2pcs
7	USB flash	1pc
8	25.2V charger	1pc
9	Adapter (aluminum/copper optional)	1set
10	Network cable	1pc
11	Manual	1pc
12	Test report	1pc
13	Certificate/Warranty Card	1pc

## Appendix A

Requirements for moisture content measurement of SF6 circuit breaker:

Test Content	Standard ( $\mu\text{l/l}$ , 20°C)
<p>The moisture values of the breaking unit and the column unit shall be measured respectively during the ex-factory and overhaul of the SF6 circuit breaker (before the overall assembly).</p>	<p><math>\leq 150</math></p>
<p>During handover, the moisture value of the circuit breaker shall be measured by the inflation interface</p>	<p><math>\leq 150</math></p>
<p>During operation, the moisture value of the circuit breaker is measured by the air charging interface at the lower part of the pillar. The test cycle shall be in accordance with the provisions of "pre test procedures".</p>	<p><math>\leq 200</math></p>
<p>During operation, if necessary (gas leakage of the breaking unit, disassembly of the breaking unit), the moisture content of the breaking chamber of the SF6 circuit breaker shall be measured separately at the self sealing joint in the header.</p>	<p><math>\leq 300</math></p>

## Appendix B

### Humidity \ dew point \ ppm comparison table

Dew Point(°C)	Dew point (Fahrenheit F)	Water Vapor Pressure	Volume ratio of PPM moisture	Relative Humidity	Mass ratio of PPM moisture
-150	-238	$7 \times 10^{-15}$	$9.2 \times 10^{-12}$	–	$5.7 \times 10^{-12}$
-140	-220	$3 \times 10^{-10}$	$4.0 \times 10^{-7}$	–	$2.5 \times 10^{-7}$
-130	-202	$7 \times 10^{-8}$	$9.2 \times 10^{-5}$	–	$5.7 \times 10^{-5}$
-120	-184	$10 \times 10^{-8}$	$1.3 \times 10^{-4}$	$5.4 \times 10^{-7}$	$8.1 \times 10^{-5}$
-118	-180	0.00000016	0.00021	0.0000009	0.00013
-116	-177	0.00000026	0.00034	0.0000014	0.00021
-114	-173	0.00000043	0.00057	0.0000023	0.00035
-112	-170	0.00000069	0.00091	0.0000037	0.00057
-110	-166	0.0000010	0.00132	0.0000053	0.00082
-108	-162	0.0000018	0.00237	0.0000096	0.0015
-106	-159	0.0000028	0.00368	0.000015	0.0023
-104	-155	0.0000043	0.00566	0.000023	0.0035
-102	-152	0.0000065	0.00855	0.000035	0.0053
-100	-148	0.0000099	0.0130	0.000053	0.0081
-98	-144	0.000015	0.0197	0.000080	0.012
-96	-141	0.000022	0.0289	0.00012	0.018
-94	-137	0.000033	0.0434	0.00018	0.027
-92	-134	0.000048	0.0632	0.00026	0.039
-90	-130	0.000070	0.0921	0.00037	0.057
-88	-126	0.00010	0.132	0.00054	0.082
-86	-123	0.00014	0.184	0.00075	0.11
-84	-119	0.00020	0.263	0.00107	0.16
-82	-116	0.00029	0.382	0.00155	0.24
-80	-112	0.00040	0.526	0.00214	0.33
-78	-108	0.00056	0.737	0.00300	0.46
-76	-105	0.00077	1.01	0.00410	0.63

-74	-101	0.00105	1.38	0.00559	0.86
-72	-98	0.00143	1.88	0.00762	1.17
-70	-94	0.00194	2.55	0.0104	1.58
-68	-90	0.00261	3.43	0.0140	2.13
-66	-87	0.00349	4.59	0.0187	2.84
-64	-83	0.00464	6.11	0.0248	3.79
-62	-80	0.00614	8.08	0.0328	5.01
-60	-76	0.00808	10.6	0.0430	6.59
-58	-72	0.0106	13.9	0.0565	8.63
-56	-69	0.0138	18.2	0.0735	11.3
-54	-65	0.0178	23.4	0.0948	14.5
-52	-62	0.0230	30.3	0.123	18.8
-50	-58	0.0295	38.8	0.157	24.1
-48	-54	0.0378	49.7	0.202	30.9
-46	-51	0.0481	63.3	0.257	39.3
-44	-47	0.0609	80.0	0.325	49.7
-42	-44	0.0768	101	0.410	62.7
-40	-40	0.0966	127	0.516	78.9
-38	-36	0.1209	159	0.644	98.6
-36	-33	0.1507	198	0.804	122.9
-34	-29	0.1873	246	1.00	152
-32	-26	0.2318	305	1.24	189
-30	-22	0.2859	376	1.52	234
-28	-18	0.351	462	1.88	287
-26	-15	0.430	566	2.30	351
-24	-11	0.526	692	2.81	430
-22	-8	0.640	842	3.41	523
-20	-4	0.776	1020	4.13	633
-18	0	0.939	1240	5.00	770
-16	3	1.132	1490	6.03	925
-14	7	1.361	1790	7.25	1110



-12	10	1.632	2150	8.69	1335
-10	14	1.950	2570	10.4	1596
-8	18	2.326	3060	12.4	1900
-6	21	2.765	3640	14.7	2260
-4	25	3.280	4320	17.5	2680
-2	28	3.880	5100	20.7	3170
0	32	4.579	6020	24.4	3640
2	36	5.294	6970	28.2	4330
4	39	6.101	8030	32.5	4990
6	43	7.013	9230	37.4	5730
8	46	8.045	10590	42.9	6580
10	50	9.209	12120	49.1	7530

