

Incubator Monitoring Series

Operation and Installation Manual



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1 Overview

1.1 Operation Instructions of Manual

- 1.1.1 It is not allowed to print or disclose any content of this Manual, including pictures and audio products, under any name without the consent of Huchuang Union;
- 1.1.2 The equipment operator may copy some sections of this Operation Manual for internal use only, such as for instructing the user how to deal with emergencies. These sections are clearly listed in the catalogue of this manual;
- 1.1.3 Wuhan Huchuang Union Technology Co., Ltd. reserves the copyright of the Manual. The manual contains the information protected by copyright laws. No part of the Manual is allowed to be copied and sent to the users without the prior written permission of the copyright holder;
- 1.1.4 The contents of the Manual are subject to change without prior notice.

1.2 Overview

MT300 works with MT300SP to monitor the incubator temperature, the concentrations of CO₂ and O₂ and humidity in the lab, displays the current sampling values in real time on the display screen and upload the sampled data through wireless transmission at the specified interval (3 minutes by default).

1.3 Environmental Requirements

- 1.3.1 Only for indoor use, no high temperature, moisture, water or dust;
- 1.3.2 Atmospheric pressure: 70kPa~105kPa;
- 1.3.3 Working ambient temperature: 0℃~+50℃; storage ambient temperature: 0℃~+50℃;
- 1.3.4 Relative humidity of MT300 in the working environment: ≤ 80% (non-condensing); working ambient temperature of MT300SP: -20℃~+50℃;
- 1.3.5 Power adapter (input: AC100V ~ 240V, 50/60Hz; output: 5V, 2.1A, 10.5W);

1.4 Environmental Protection Instructions

- 1.4.1 MT300 device contains reusable materials, and its components can be recycled after being cleaned and sterilized.
- 1.4.2 During recycling and handling MT300 device, it is recommended that the company's technical personnel dismantle it and recycle it according to different waste groups;

1.4.3 According to national regulations, the compositions of the main raw materials of MT300 equipment shall be are shown in (Table 1).

Table 1 Compositions of Main Raw Materials of MT300

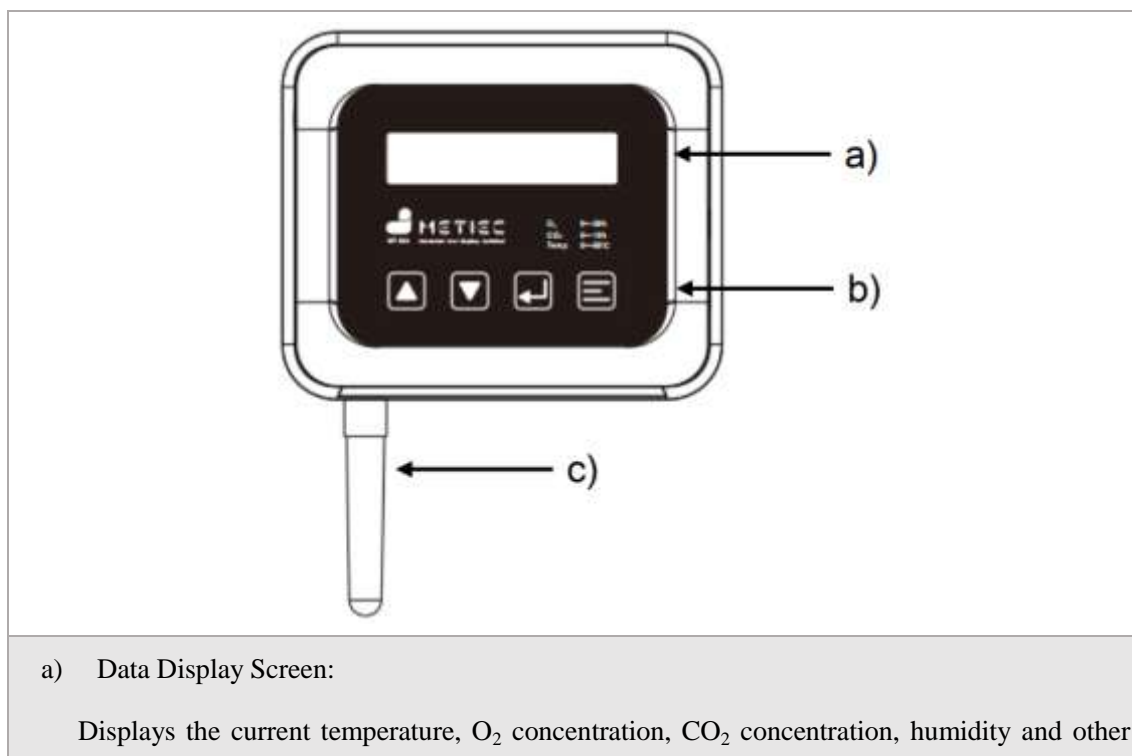
Name	Composition
Casing	ABS+PC
Cover plate	Cold-rolled sheet +aluminum alloy
PCB	Including electrical components
Battery	Polymer lithium battery

Table 2 Compositions of Main Raw Materials of MT300SP

Name	Composition
Casing	Aluminum
PCB	Including electrical components

2 Structure Features and Equipment Parameters

2.1 Structure Features of MT300

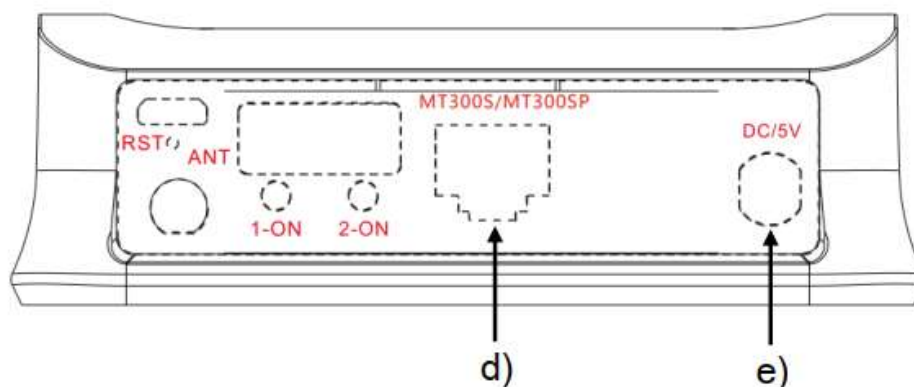


data; If no sensor is connected or data is invalid, "--:--" is displayed. The data is uploaded once every 3 minutes by default.

b) Push-type buttons:

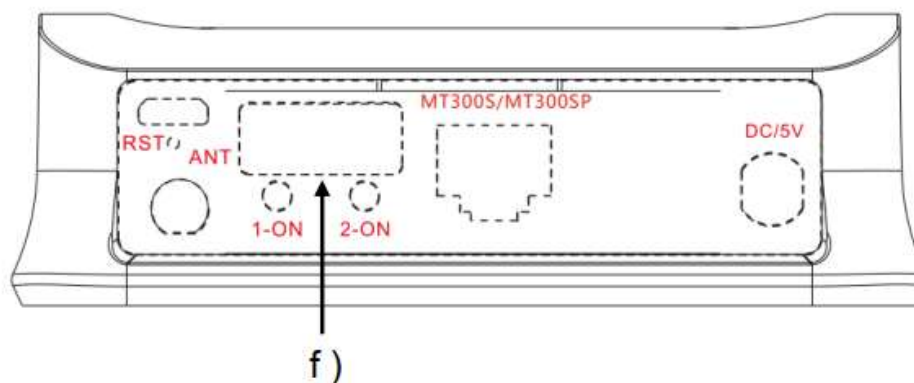
Set the relevant parameters through button operations.

c) Antenna.



d) Network port holder: Used to connect MT300S or MT300SP.

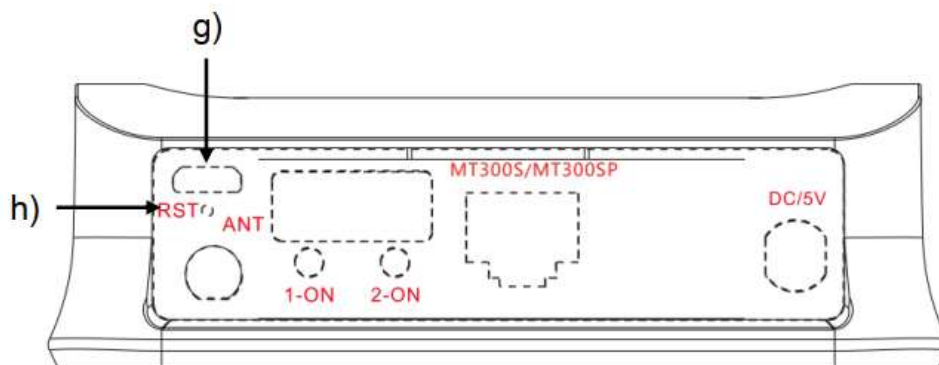
e) Power interface: Equipped with a 5V/2A power adapter.



f) Switch Testing Interface/ Switch Indicator:

The two-way 2-pin connection terminal is mainly used to test the switch. By default, the two switches are enabled by default. To disable the switch, press the button or use the parameter modification tool to modify the switch setting. The switch is open and the indicator is off by default. When the switch is closed, the indicator is normally on. The switch status is uploaded once every 3 minutes by default; if the switch state changes (OFF-> ON; ON->OFF), it will immediately trigger the alarm, the buzzer gives a short beep, and an alarm information will be

uploaded.

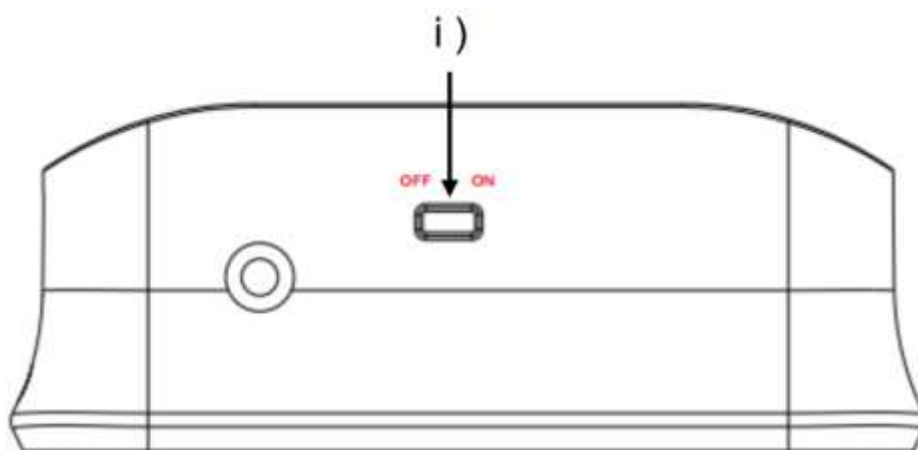


g) Upgrade Debugging Port:

Micro USB interface; it has 2 functions: Firstly, it can be used for program upgrade: The special USB cable customized by the company is used for upgrading program; secondly, it is used to modify parameters: The special USB cable customized by the company shall be used for modifying parameters; it needs to work with the modification software of " Huchuang Union Wireless Slaver Debugging Platform.exe".

h) Reset Button (Pin-socket type):

The whole system can be reset through the ejector pin here when the equipment breaks down.

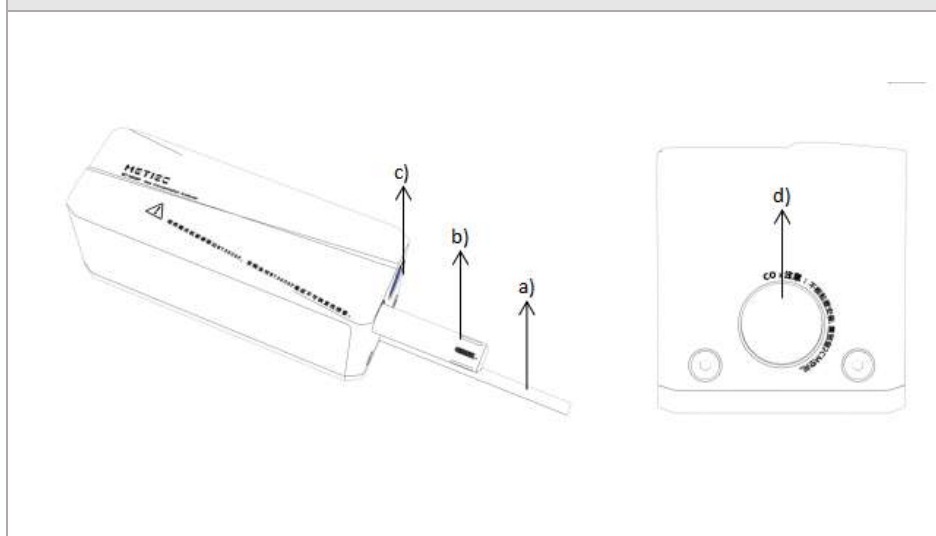


i) Power toggle switch:

The device can be powered ON normally only when the toggle switch is turned to ON position.

2.2 Structure Features of MT300SP

- a) Connecting wire used to connect with MT300 display terminal
- b) Temperature/ humidity test port
- c) Oxygen test port
- d) Carbon dioxide test port



2.3 Equipment Parameters

Table 3 MT300 Parameters

Item	Parameter
Overall dimensions	103.5mm*86mm*33mm
Weight	280g
Transmission method	Wireless
Working frequency band	425-445MHz
Transmission distance	1200 m in open area, 1000 m in streets, about 300 m

	inside buildings (not shielded by metal objects) under the transmission rate of 10Kbps
Sensor	None It works with MT300SP to test the temperature, O2 concentration, CO2 concentration and humidity;
External Interface	1. RJ45 interface 2. Pluggable terminal block
Power failure alarm	Audible and visual alarm
Battery	1000mAh, providing the power supply for more than 2 hours after power failure in fully charged state
Display screen	2.23 inches
Data refresh frequency of display screen	1 second/ time
Data upload frequency	3 min/time (modifiable)
Power supply mode	External adapter
Maximum power consumption	0.4A @DC5V
Average power consumption	0.15A @DC5V
Storage temperature	-20℃ ~ +50℃
Operating ambient temperature	0℃ ~ +50℃
Humidity	≤80% (Non-condensing)

Table 4 MT300SP Parameters

Item	Parameter
Overall dimensions	203mm*50mm*53mm
Weight	400g

Display resolution	0.01
Temperature test accuracy	$\pm 0.1^{\circ}\text{C}$ (37 $^{\circ}\text{C}$)
Temperature test range	0 $^{\circ}\text{C}$ ~ +50 $^{\circ}\text{C}$
O ₂ concentration test accuracy	$\pm 0.1\%$
O ₂ concentration test range	0% ~ 30%
CO ₂ concentration test accuracy	$\pm 0.1\%$
CO ₂ concentration test range	0% ~ 10%
Humidity test accuracy	$\pm 2\%$
Humidity test range	0% ~ 100%
Power supply mode	DC12V/0.2A
Data upload frequency	1 second/ time
Data transmission mode	Wireless transmission working with MT300
Preheating time	Waiting for 5 min

3 Basic Operation Instructions

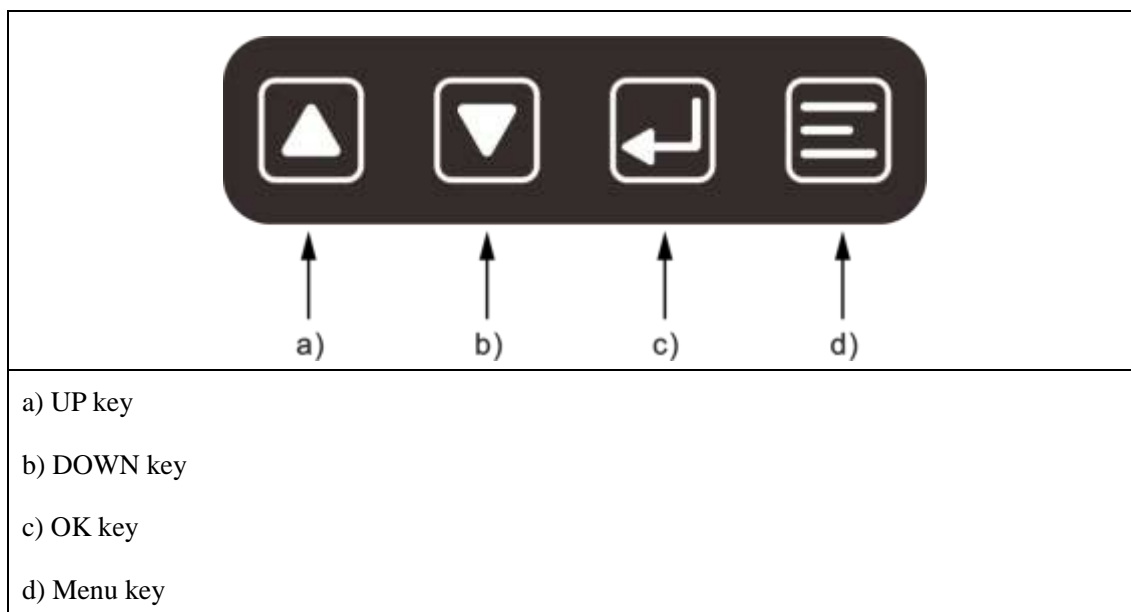
3.1 Power-On for Use

Step 1: Connect the device with the external 5V adapter; Step 2: Turn the power toggle switch to "ON" position, at the moment, the display screen will be on, and the buzzer will give a short beep, indicating that the system starts normally.

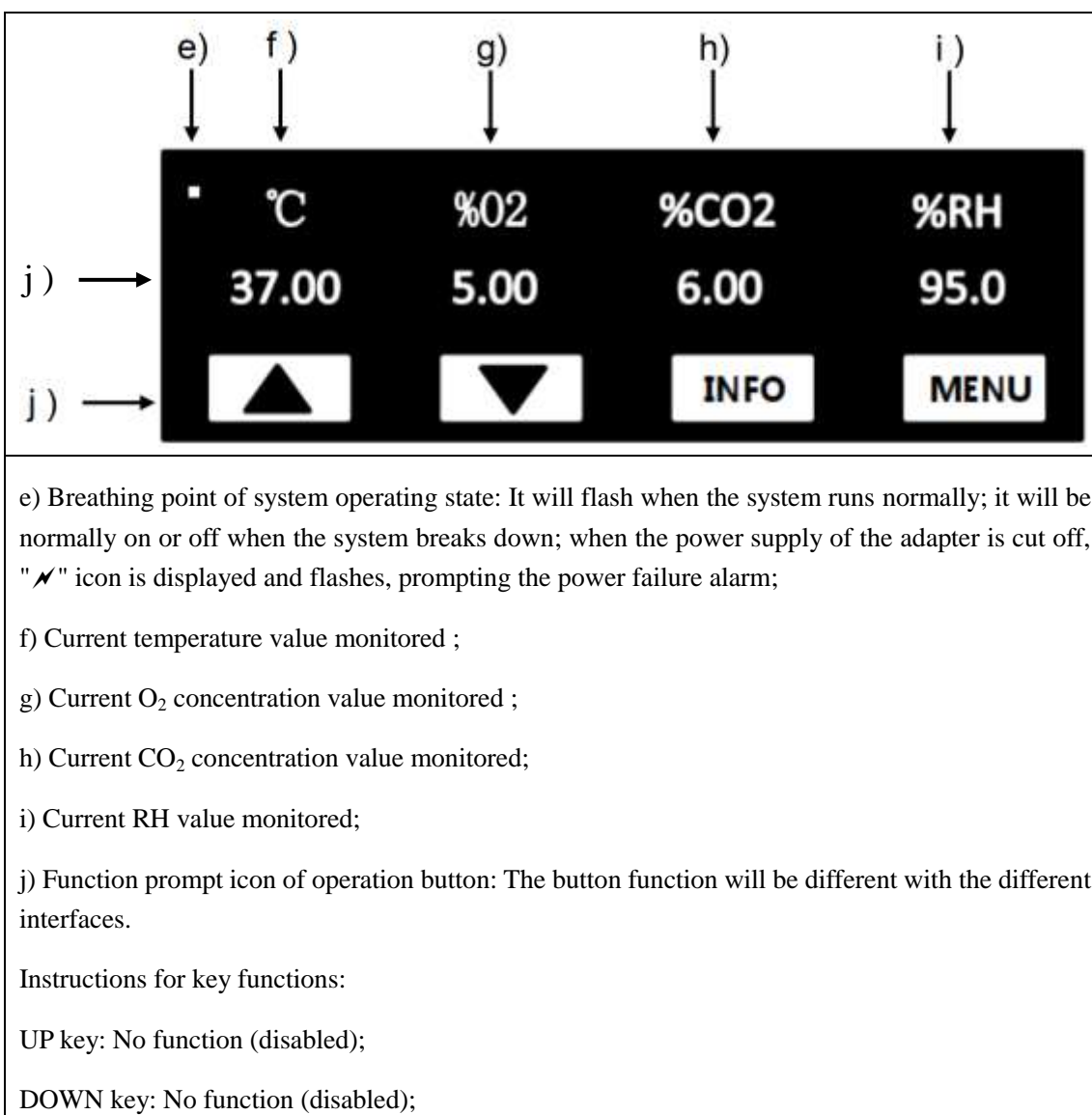
After MT300+ MT300SP and MT500 devices are installed normally, users can download the "Laboratory Monitoring System" APP to view the monitored temperature data; or view the temperature data through the computer web version.

3.2 Operation Instructions of Buttons

3.2.1 Button Description



3.2.2 Description of Main Interface (Work with MT300SP)

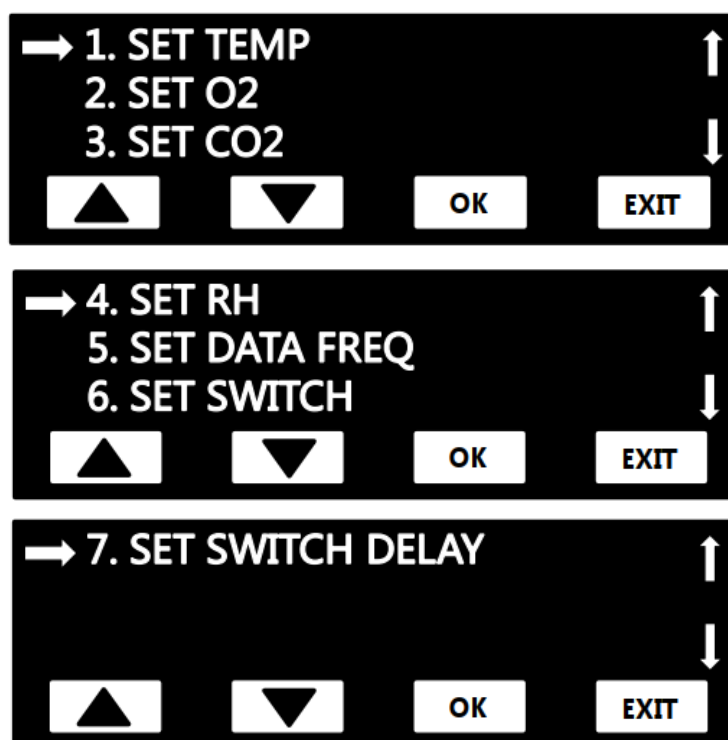


OK key: Press it to enter "System information interface";

Menu key: Press it to enter "Parameter setting interface";

3.2.3 Instructions of Setting Interface

Press the "MENU" button on the main interface to enter the "Setting interface" which includes three pages and can flip, as shown in the picture below:



Menu Function Description:

"1. SET TEMP": Temperature calibration function;

"2. SET O2": O₂ concentration calibration function;

"3. SET CO2": CO₂ concentration calibration function;

"4. SET RH": Relative humidity calibration function;

"5. SET DATA FREQ": Setting function of data upload frequency;

"6. SET SWITCH": Switch enable/ disable setting function;

"7. SET SWITCH DELAY": Switch test delay time setting function.

Operation Instructions of Buttons:

UP key: Press this key to move to the previous option;

DOWN key: Press this key to move to the next option;

"OK" key: Confirm the selection;

"MENU" key: The system exits and returns to the main screen (or the system automatically returns to the main screen after 30 seconds) when the button is pressed;

3.2.4 "1.SET TEMP"

Select "1.SET TEMP" on the setting interface, and then press the "OK" button to enter the temperature calibration interface, as shown in the picture below:

Temperature Calibration Interface:



Temperature Calibration Interface and Operation Instructions When MT300SP Is Not Connected



UP key: No function

DOWN key: No function

OK key: The system returns to the setting interface when this key is pressed

Menu key: The system returns to the setting interface when this key is pressed

Interface and Operation Instructions Upon Temperature Calibration Failure




UP key: Press this button to add the value by 0.01 °C and press and hold this button to add the value by 1 °C

DOWN key: Press this button to reduce the value by 0.01 °C and press and hold this button to reduce the value by 1 °C

OK key: Start calibration again

Menu key: The system returns to the setting interface when this key is pressed (the calibration fails and the system does not save the calibrated value)

Interface and Operation Instructions Upon Successful Temperature Calibration

	<p>UP key: Press this button to add the value by 0.01 °C and press and hold this button to add the value by 1 °C</p> <p>DOWN key: Press this button to reduce the value by 0.01 °C and press and hold this button to reduce the value by 1 °C</p> <p>OK key: Start calibration again</p> <p>Menu key: The system returns to the setting interface when this key is pressed (the system will save the calibrated value automatically)</p>
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Note:

1. Temperature calibration setting range: From 0 °C to 50 °C;



3.2.5 "2.SET O2"


Select "2.SET O2" on the setting interface, and then press the "OK" button to enter the O₂ concentration calibration setting interface, as shown in the picture below:

O₂ Concentration Calibration Interface:



O₂ Concentration Calibration Interface and Operation Instructions When MT300SP Is Not Connected

	<p>UP key: No function</p> <p>DOWN key: No function</p> <p>OK key: The system returns to the setting interface when this key is pressed</p> <p>Menu key: The system returns to the setting interface when this key is pressed</p>
<p>Interface and Operation Instructions Upon O₂ Concentration Calibration Failure</p> 	<p>UP key: Press this button to add the value by 0.1% and press and hold this button to add the value by 1%</p> <p>DOWN key: Press this button to reduce the value by 0.1% and press and hold this button to</p>

	<p>reduce the value by 1%</p> <p>OK key: Start calibration again</p> <p>Menu key: The system returns to the setting interface when this key is pressed (the calibration fails and the system does not save the calibrated value)</p>
Interface and Operation Instructions Upon Successful O ₂ Concentration Calibration	
	<p>UP key: Press this button to add the value by 0.1% and press and hold this button to add the value by 1%</p> <p>DOWN key: Press this button to reduce the value by 0.1% and press and hold this button to reduce the value by 1%</p> <p>OK key: Start calibration again</p> <p>Menu key: The system returns to the setting interface when this key is pressed (the system will save the calibrated value automatically)</p>

Note:

1. O₂ concentration calibration setting range: From 0% to 30%;
2. Calibrate two points for MT300SP: 5% concentration and 21% concentration (air calibration);




3.2.6 "3. SET CO₂"

Select "3. SET CO₂" on the setting interface, and then press the "OK" button to enter the CO₂ concentration calibration setting interface, as shown in the picture below:

CO₂ Concentration Calibration Interface:



CO₂ Concentration Calibration Interface and Operation Instructions When MT300SP Is Not Connected

	<p>UP key: No function</p> <p>DOWN key: No function</p> <p>OK key: The system returns to the setting interface when this key is pressed</p> <p>Menu key: The system returns to the setting interface when this key is pressed</p>
Interface and Operation Instructions Upon CO ₂ Concentration Calibration Failure	
	<p>UP key: Press this button to add the value by 0.1% and press and hold this button to add the value by 1%</p> <p>DOWN key: Press this button to reduce the value by 0.1% and press and hold this button to reduce the value by 1%</p> <p>OK key: Start calibration again</p> <p>Menu key: The system returns to the setting interface when this key is pressed (the calibration fails and the system does not save the calibrated value)</p>
Interface and Operation Instructions Upon Successful CO ₂ Concentration Calibration	
	<p>UP key: Press this button to add the value by 0.1% and press and hold this button to add the value by 1%</p> <p>DOWN key: Press this button to reduce the value by 0.1% and press and hold this button to reduce the value by 1%</p> <p>OK key: Start calibration again</p> <p>Menu key: The system returns to the setting interface when this key is pressed (the system will save the calibrated value automatically)</p>

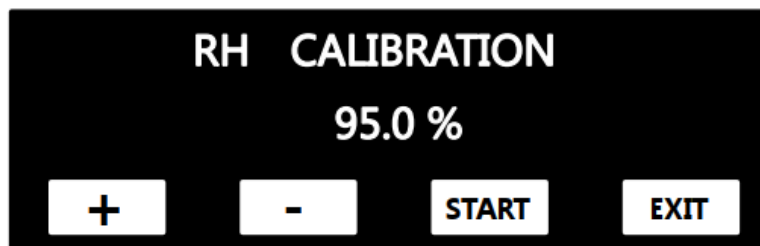
Note:

1. CO₂ concentration calibration setting range: From 0% to 10%;

3.2.7 "4. SET RH"

Select "4. SET RH" on the setting interface, and then press the "OK" button to enter the temperature calibration interface, as shown in the picture below:

RH Calibration Interface:



Relative Humidity Calibration Interface and Operation Instructions When MT300SP Is Not Connected



UP key: No function

DOWN key: No function

OK key: The system returns to the setting interface when this key is pressed

Menu key: The system returns to the setting interface when this key is pressed

Interface and Operation Instructions Upon MT300SP Humidity Calibration Failure



UP key: Press this button to add the value by 0.1% and press and hold this button to add the value by 1%

DOWN key: Press this button to reduce the value by 0.1% and press and hold this button to reduce the value by 1%

OK key: Start calibration again

Menu key: The system returns to the setting interface when this key is pressed (the calibration fails and the system does not save the calibrated value)

Interface and Operation Instructions Upon Successful MT300SP Humidity Calibration



UP key: Press this button to add the value by 0.1% and press and hold this button to add the value by 1%

DOWN key: Press this button to reduce the value by 0.1% and press and hold this button to reduce the value by 1%

OK key: Start calibration again

Menu key: The system returns to the setting interface when this key is pressed (the system will save the calibrated value automatically)

Note:

1. RH calibration setting range: From 10.0% to 99.9%;

2. The humidity calibration is only applicable for MT300SP;

3.2.8 "5. SET DATA FREQ"

Select "5. SET DATA FREQ" on the setting interface, and then press the "OK" button to enter the data upload frequency setting interface, as shown in the picture below:



Operation Instructions of Buttons:

UP key: Press this button to add the value by 1 and press and hold this button to add the value by 10 (in the range from 1~3600 seconds);

DOWN key: Press this button to reduce the value by 1 and press and hold this button to reduce the value by 10 (in the range from 1~3600 seconds);

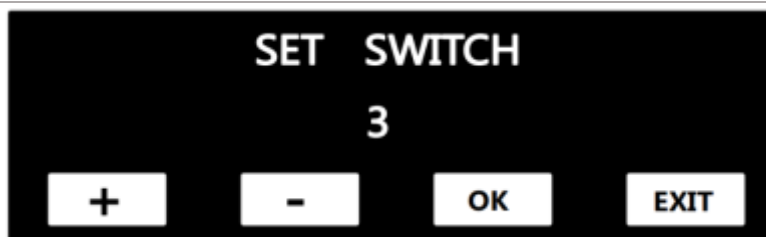
"OK" key: The system saves the parameter and returns to the main interface when this key is pressed;

"MENU" key: The system does not save parameter and directly returns to the main interface (or the system automatically returns to the main screen after 30 seconds) when the button is pressed;

Note: The upload frequency is 180 seconds by default;

3.2.9 "6. SET SWITCH"

Select "6.SET SWITCH" on the setting interface, and then press the "OK" button to enter the switch enable/ disable setting interface, as shown in the picture below:



Operation Instructions of Buttons:

UP key: Press this button to add the value by 1 (in the range from 1~3);

DOWN key: Press this button to reduce the value by 1 (in the range from 1~3);

"OK" key: The system saves the parameter and returns to the main interface when this key is pressed;

"MENU" key: The system does not save parameter and directly returns to the main interface (or the system automatically returns to the main screen after 30 seconds) when the button is pressed;

Note: Value 0- Indicating that both switches are disabled; Value 1- Only Switch 1 is enabled; Value 2- Only Switch 2 is enabled; Value 3- Enable both switches.

3.2.10 "7. SET SWITCH DELAY"

Select "7. SET SWITCH DELAY" on the setting interface, and then press the "OK" button to enter the switch test delay setting interface, as shown in the picture below:



Operation Instructions of Buttons:

UP key: Press this button to add the value by 1 and press and hold this button to add the value by 10 (in the range from 1~60 seconds);

DOWN key: Press this button to reduce the value by 1 and press and hold this button to reduce the value by 10 (in the range from 1~60 seconds);

"OK" key: The system saves the parameter and returns to the main interface when this key is

pressed;

"MENU" key: The system does not save parameter and directly returns to the main interface (or the system automatically returns to the main screen after 30 seconds) when the button is pressed;

Note: This delay time affects the switch test sensitivity: The longer the time is, the lower the sensitivity will be; the shorter the time is, the higher the sensitivity will be; the lower the sensitivity is, the better it can filter the alarm signal triggered in a short time to prevent frequent alarm. The default value is 5 seconds.

4 Precautions

The transmission distance of MT300 +MT300SP is limited and should generally not exceed 3 rooms. If the walls of the rooms are made of metal materials, it is better to install a MT500 receiver in each room;

MT300+MT300SP is not waterproof, so the equipment shall not directly contact with liquid water;

5 FCC Warning

15.19 Labeling requirements.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1)

This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

15.21 Information to user.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

15.105 Information to the user.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio

frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



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