SPECIFICATION FOR APPROVAL

Product Name:	Portable Oxygen Generator Detector
Specification:	RP-A02
Customer:	
CUST P/N:	
Supplies :	Winpower Technology Co.,Ltd.
Date :	

CUSTOMER APPROVAL	CHK	APPD

DHW	CHK	APPD

- The product specifications are for reference only and shall be signed for confirmation in case of batch supply

User Manual

1. Product Overview

RP-A02 pulse oxygen detector is developed by Winpower Technology Co., Ltd. on the basis of our ultrasonic oxygen sensor.

In pulse measurement mode, measure the single supply volume of the oxygen generator , and record the trigger times, the number of misjudgments, the trigger pressure, the maximum instantaneous flow rate, the volume of 1 minute, the temperature and the oxygen concentration. In this mode, the adjustable trigger frequency and the set pressure are also provided. The basic principle is that the instrument air pump periodically aspirates, forming a negative pressure process to trigger the oxygen generator, and using a high-precision flowmeter to calculate the accumulation of a single discharge volume of the oxygen generator.

In the direct supply oxygen detection mode, the flow rate of oxygen, air and air oxygen mixture can be measured, and the gas temperature and oxygen concentration of the gas can be detected.

This product is suitable for portable oxygen generators and conventional oxygen generators.

2. Service Environment

2.1 This product can detect the output gas of the PSA oxygen generator, pure oxygen, and pure oxygen mixed with air.

2.2 This product is applicable within an atmospheric pressure range of 50 kPa to 150 kPa, corresponding to an altitude range of below 5500 meters.

2.3 When in use, please empty the humidification bottle of the oxygen generator, or directly remove the humidification bottle, so as to avoid water entering the detector and damaging the instrument.

2.4 Dust filtration required.

2.5 Please stay away from the fire.

3. Key Marking

3.1 Pulse oxygen production detection mode

POC detector	Portable oxygen generator detector	Mode switch	Click to Mode switch, Long press to standby
Frequency/gas	Click to frequency adjustment, Long press to clear the data	Pressure setting	Click to trigger pressure adjustment
Trigger cycle	trigger frequency	Single Vol	Single vent volume
Concentration	oxygen concentration	Trigger pressure	
Instant max-flow	Maximum instantaneous flow	Setting pressure	Set the maximum trigger pressure
Temp	temperature	Vol/min	The volume of gas flowing in 1 minute
Trigger	Trigger Count		
Misjudge	The first three numbers represent the number of false convictions; The last four digits represent the cumulative number of sprays		

Note：

- The number of trigger events and the number of incorrect judgments will be recorded and saved to the flash memory after continuous operation for 1 hour in the pulse mode. The last saved data will be displayed upon startup. The data can be cleared by long-pressing the frequency key.
- In the pulse mode, click the frequency/gas key to adjust the frequency; long-pressing the frequency/gas key will clear the data.

3.2 Direct oxygen production detection mode

POC detector	Portable oxygen generator detector	Mode switch	Click to Mode switch, Long press to standby
Frequency/gas	Click to frequency adjustment, Long press to clear the data	Pressure setting	Reserved.
Gas type	The type of gas detected	concentration	The oxygen concentration of the gas
Flow	gas flow	Temp	temperature
RH	relative humidity	ATM	atmospheric pressure

Note:B-pressure is meaningless. Reserved for display.

Gas type:

O2	PSA	AIR
Measure the oxygen concentration in pure oxygen mixed with air	Measure the oxygen concentration of the mixed air in the oxygen generator	Measure the oxygen concentration of the mixed air in the oxygen generator

3.3

1	12VDC1000mA	2	Detection gas inlet
3	485 port	4	485 A+ interface, 485 socket at the far left end
5	Warranty label, torn void	6	485 B-interface, 485 socket in the middle

3.4

1	Detect gas outlet	2	Air pump outlet

4. Communication protocol

The device remains in upgrade mode within 5 seconds after startup. The IAP icon appears in the upper-right corner of the interface; during this period, protocols, commands, and data transmission are not active. Once the IAP icon disappears, the device returns to normal operation, and all protocols, commands, and data transmission functions become available.

4.1 Communication Port

1. 485 Communication Port	A USB to RS-485 device is required

4.2 Communication Configuration

Communication baud rate	115200bps
data bit	8
check	None
Start/Stop Bit	1

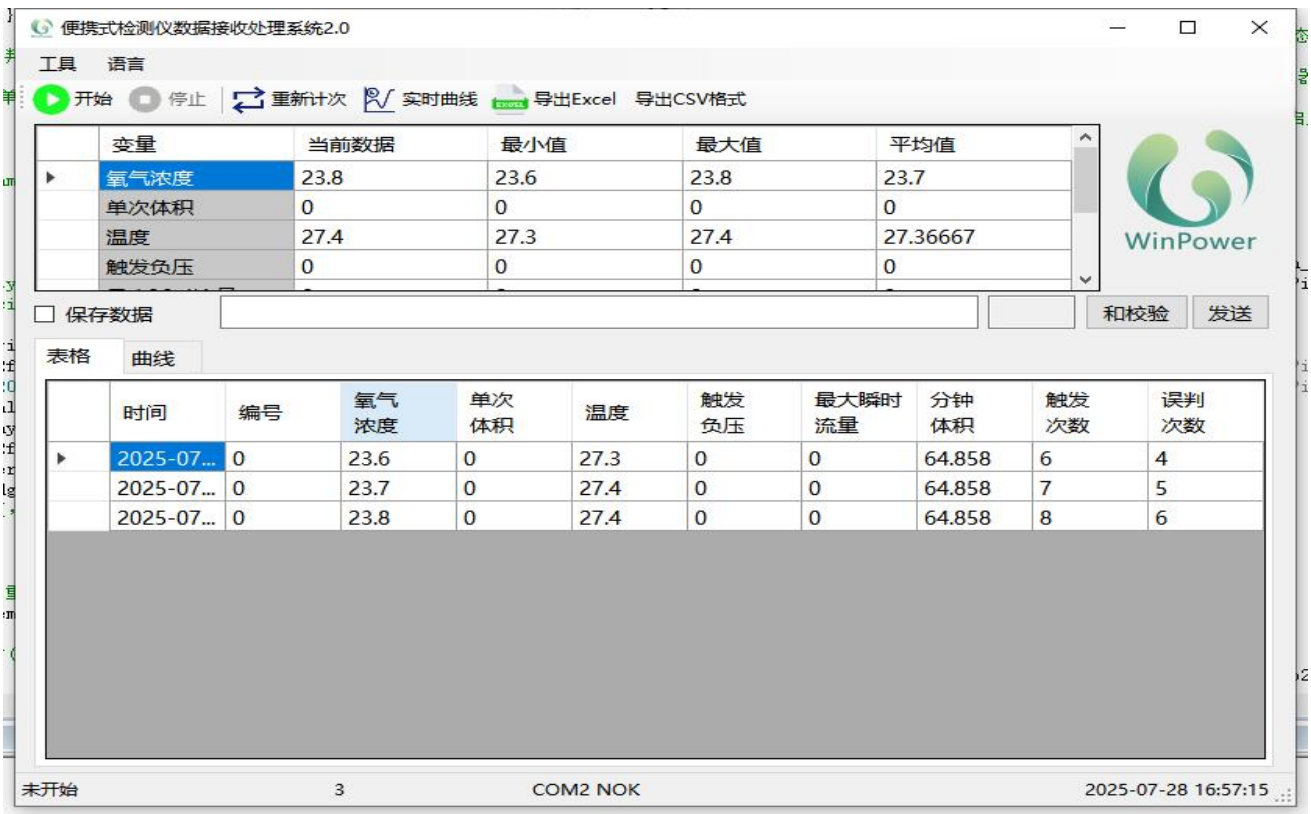
4.3 Data Content

4.3.1 Content of Pulse Mode Report Data

Trigger the data submission once every time.

16 09 01	00	41 A8 00 00	41 D3 33 33	42 C6 66 66	
Frame header	status byte	Field 1: Concentration	Field 2: Single Volume	Field 3: Temperature	
00 00 00 00	00 00 00 00	00 00 00 00	00 00 00 00	00 00 00 00	A9
Field 4: Trigger Pressure	Field 5: Maximum instantaneous flow rate	Field 6: Minute Volume	Field 7: Trigger Count	Field 8: Number of Misjudgments	sum check

The data submitted in pulse mode is shown below.

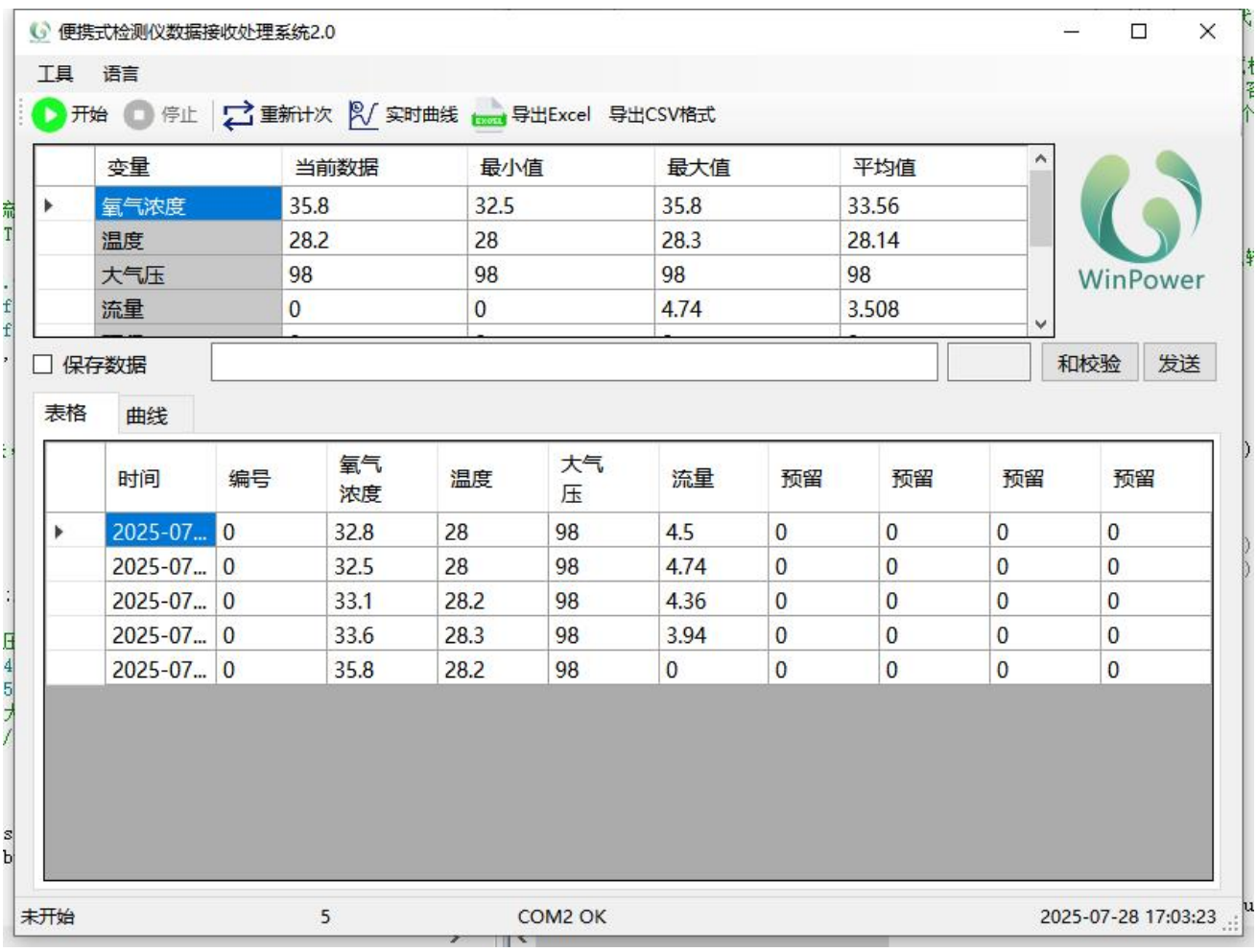


4.3.2 Content of Normal Mode Report Data

Report once every 500 milliseconds

16 09 01	01	41 A8 00 00	41 D9 99 9A	42 C6 00 00	
Frame header	status byte	Field 1: Concentration	Field 2: Temperature	Field 3: Atmospheric Pressure	
00 00 00 00	00 00 00 00	00 00 00 00	00 00 00 00	00 00 00 00	62
Field 4: Flow	Field 5: Reserve	Field 6: Reserve	Field 7: Reserve	Field 8: Reserve	sum check

As below :



4.4 Data Analysis

4.4.1 Data Explanation

The data consists of a frame header, a status byte, a data field, and a checksum byte.

The frame header contains fixed content: 0x16,0x09,0x01.

The status byte consists of one byte; for detailed status information, refer to Section 4.5 Status Byte.

Data field: The high-end byte of a floating-point number. Each field occupies 4 bytes and represents

one piece of data. For the content of the data field, refer to Section 4.3 Data Content.

Concentration: 41 A8 00 00 is the high-end byte of a floating-point number, corresponding to the decimal value 21.0.

And sum check byte: Set the lower eight bits of the sum of all submitted hexadecimal data to 0.

4.4.2 Data Field Parsing:

```
buffer[0] = 0x41; // MMSB O2
buffer[1] = 0xA8 ; // MLSB O2
buffer[2] = 0x00; // LMSB O2
buffer[3] = 0x00; // LLSB O2
// cast 4 bytes to one unsigned 32 bit integer
tempU32 = (unsigned int)((((unsigned int)buffer[0]) << 24) |
(((unsigned int)buffer[1]) << 16) |
(((unsigned int)buffer[2]) << 8) |
((unsigned int)buffer[3]));
// cast unsigned 32 bit integer to 32 bit float
o2Concentration = *(float*)&tempU32; // o2Concentration =21.0f
```

Note：The other data follow the same pattern.

4.5 Status Byte

The fourth byte of the submitted data, byte[3], is regarded as the status + number byte.

The definitions of each bit are as follows in the table.

byte[3]	Status Word and number （ 8bit）		
bits:<7> : Standard conditions and working condition distinctions	bits<6:5>: Pulse and Conventional Mode Distinction	bits<4>: reserved	bits<3:0>: Number 0-15
0: Representative Standard Condition	0: Represent pulse	None	0-15
1: Representative working condition	1: Regular, Air		
	2: Regular, Oxygen		
	3: Regular, Air-oxygen mixture		

4.6 Instruction Set

Operate time： After 5 seconds of startup, the normal data reporting mode is activated.

function	Instruction code, hexadecimal				Command response content, hexadecimal
Time 0	0x11	0x02	0x00	0xed	String report: "时间清0"
View parameters	0x11	0x03	0x00	0xec	String containing runtime and pump built-in parameters
Switch to standard/ working conditions	0x11	0x04	0x00	0xEB	（as bellow）
Check current status	0x11	0x05	0x00	0x0A	（as bellow）
	Fixed frame header	Respiratory frequency/20	Setting pressure /60		（as bellow）

Command response content, hexadecimal							
Status Word and number	frequency	negative pressure	00（reserve）	00（reserve）	00（reserve）	00（reserve）	checksum byte
Status Word and number	frequency	negative pressure	00（reserve）	00（reserve）	00（reserve）	00（reserve）	checksum byte
Status Word and number	frequency	negative pressure	00（reserve）	00（reserve）	00（reserve）	00（reserve）	Checksum byte

Provide serial port control instruction: Control breathing rate, trigger pressure.

Instruction Explanation

Instruction	0x11	0x06	0x14	0x3C
	Fixed frame header		Respiratory frequency/20	setting pressure /60

The optional frequency parameters include: 10,15,20,25,30,35,40.

The set pressure parameters are: 30,35,40,45,50,55,60.

Note: Parameters must be converted to hexadecimal format and included in the command.

Eg: Send respiratory rate 40, set pressure 60 Command:

0x11	0x06	0x28	0x3c

Eg: Send a command with a respiratory rate of 20 and a pressure setting of 30:

0x11	0x06	0x14	0x1E

4.7 Relay

Using in conjunction with the relay module can uniformly collect data from 16 machines. For detailed information, please refer to the relay manual.

5. Instructions for Use

5.1 Press the power button to enter the pulse detection mode. To switch interfaces, simply click the mode switch button.

5.2 In the pulse mode, you can adjust the frequency and pressure separately by using the frequency and pressure adjustment buttons.

5.3 Press the frequency/gas button for a long time to clear the data.

5.4 Switch the gas in the direct supply detection mode by clicking the frequency/gas button.

5.5 The power supply for this device is 12VDC 1000mA.

5.6 The factory calibration is provided. Customers do not need to perform calibration.

6. Detect content

Model	Measure	单位
Impulse detection	Trigger pressure	Pa
	Single volume	ml
	Trigger Count	
	Number of misjudgments	
	respiratory minute volume	ml
	Oxygen concentration	%
	Instantaneous maximum discharge	L/min
	Temperature	℃
Direct oxygen production test	Oxygen concentration	%
	Flow	L/min
	Temperature	℃
	Humidity	%rh
	Atmospheric pressure	kPa

Note: Measurement of oxygen concentration for different gas types in normal operating mode:

O2	PSA	AIR
Measure the oxygen concentration in pure oxygen mixed with air	Measure the oxygen concentration of the mixed air in the oxygen generator	Measure the oxygen concentration of the mixed air in the oxygen generator

6.1 Accuracy Range

Flow detection range:	0 - 25 slm
Resolution ratio：	1.0 sccm
Accuracy： (Error is percentage of reading)	0 - 20slm ± 2.1%
	20 - 25slm ± 2.5%
Concentration detection range:	In PSA and AIR modes: 21.0% - 95.6%; In O2 mode: 0 - 100%
Resolution ratio：	0.1 %
Accuracy：	± 1.5%
Negative pressure detection range:	-500Pa~0pa
Accuracy：	± 0.5%
Trigger negative pressure	5pa-60pa

6.2 Other parameters and functions

Gas type:	O2、Air、PSA
temperature range	(+5～+50) ℃
power supply	12VDC 1000mA
communication mode	RS485
Joint gas pipe:	PU pipe;outer diameter*inner diameter*length=8*5*70mm
weight	425g
size	25cm*12cm*7cm

7. Maintenance maintenance

7.1 In the process of use, it should be handled gently to avoid collision with other objects, so as not to affect the detection accuracy of the instrument.

7.2 Empty clothes into the box, do not weigh.

7.3 If the instrument fails, it shall not be disassembled or repaired without permission, and it shall contact the manufacturer in time.

8. Other matters

Special statement:
All information in this material has been carefully checked, if there is any printing errors or errors in the content, the company reserves the right to interpret. Products are subject to improvement without prior notice.

9. Warranty Policy

Customer name		Purchasing date	
Invoice number			
Customer address			

10. Product warranty description

10.1 The product warranty period is one year (calculated from the invoice issuance date).

10.2 For any quality issues occurring during the warranty period, after-sales service will be provided for the sold products in accordance with the national three guarantees policy.

10.3 The following circumstances are not covered by this warranty:

- Damage caused by improper use, storage, or maintenance by the user (e.g., water ingress or dust accumulation).
- Caused by failure to operate in accordance with the instructions.
- Caused by force majeure factors.
- It is not possible to provide sales invoices.

Contact us：

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