



ZDF-5227 Series/ZDF-5210 Series/ZDF-5201 Series

V01

Composite Vacuum Gauge

User Manual



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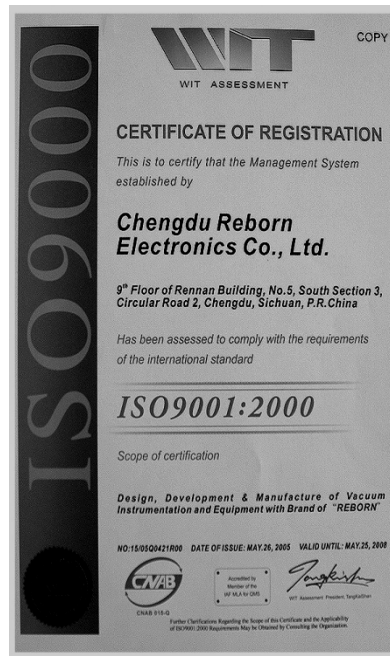
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Dear Customers:

First of all, thank you for your trust and choose our company's vacuum gauge products, our company is engaged in research and development, production and sales of vacuum measuring instruments of professional manufacturers. Our company is through and run the ISO9001 quality system of enterprises. We hope that through our products can bring you greater efficiency, and through our services to better meet your needs. Please read this user's manual carefully before using our products. Please pay attention to your use of a vacuum gauge of the various text terms and picture explanation to help you better use my company's products. If you have any questions or concerns when using our products, please contact us in time. Thanks again for your use!



In this user manual:

ZDF-5227 series represents ZDF-5227, ZDF-5227B, ZDF-5227BY three kinds of vacuum gauge;

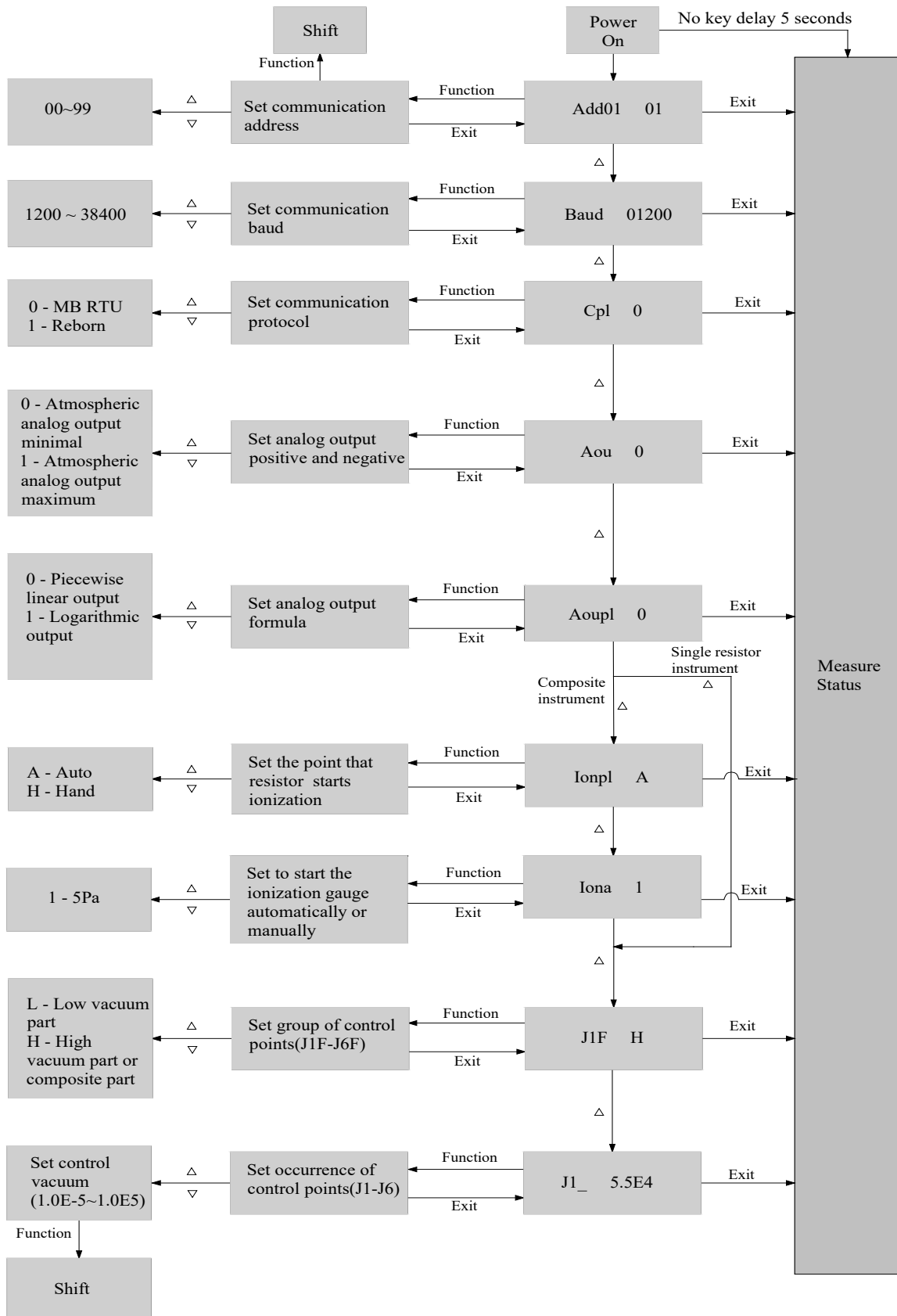
ZDF-5210 series represents ZDF-5210, ZDF-5210B, ZDF-5210BY three kinds of vacuum gauge;

ZDF-5201 series represents ZDF-5201, ZDF-5201B, ZDF-5201BY three kinds of vacuum gauge.

If the actual product appearance and function are inconsistent whit the user manual, please prevail in kind! If updated, not specifically for the notice.

Aftermarket calls: 028-85880371-613

V01 series of products using the flow chart
 The instrument uses a four-key system. The fonts on the arrow in the following figure stand for the keys.



1. Summarize

The series of composite vacuum gauge is made up of one or two Pirani resistor vacuum gauge (ZJ-52T) and a hot cathode ionization (ZJ-27 \ ZJ-10 \ ZJ-12) vacuum gauge .

ZDF-5227 consists of one roads resistor and one roads ionization; ZDF-5227B \ ZDF-5227BY consists of two roads resistor and one roads ionization.

ZDF-5210 consists of one roads resistor and one roads ionization; ZDF-5210B\ZDF-5210BYconsists of two roads resistor and one roads ionization.

ZDF-5201 consists of one roads resistor and one roads ionization; ZDF-5201B\ZDF-5201BYconsists of two roads resistor and one roads ionization.

A total of nine models of composite vacuum gauge, which resistor 1 alone measured, resistor 2 and ionization complex measurements.

The series of composite vacuum gauge using the ARM system to measure the data nonlinear processing and error correction, So they have higher accuracy and repeatability, fast response, stable and reliable measurement, anti-interference ability and so on, and they are one of the ideal instruments for wide range vacuum measurement.

2. Technical indicators

Parameters	Types	ZDF-5227 _{v01} ZDF-5227B _{v01} ZDF-5227BY _{v01}	ZDF-5210 _{v01} ZDF-5210B _{v01} ZDF-5210BY _{v01}	ZDF-5201 _{v01} ZDF-5201B _{v01} ZDF-5201BY _{v01}
	Measuring Range (unit: Pa)		1×10 ⁵ -1×10 ⁻⁵	1×10 ⁵ -1×10 ⁻⁴
Matching Gauge		ZJ-52T ZJ-27	ZJ-52T ZJ-10	ZJ-52T ZJ-12
Electrical Parameters		anode voltage : 225V Cathode voltage : 25V Emission current: 1mA/100μA	anode voltage : 165V Cathode voltage : 50V Emission current: 0.5mA /50μA	anode voltage : 200V Cathode voltage :50V Emission current: 4mA/400μA
The Number of Measurements	Two roads or Three roads (Vacuum gauge with BY letter)			
Display Window	Two or Three (Vacuum gauge with BY letter) display windows			
Display Method	LED Digital Display: Scientific notation (1.0E 5 Pa stands for 1 ×10 ⁵ Pa)			
Control Point Output Mode	Six roads point control or regional control output through the six-terminal			
Control Range	Full measure range control			
Communication, Analog Output Mode	0-5、4-20mA、RS232、RS485 output through the six-terminal, formula and protocol are optional			
Zero Wander	±5%			
Input Power	AC/50HZ 220V±10%			
Rated Power Consumption	50W			
Instrument Net Weight	3.5Kg			

3. Characteristics

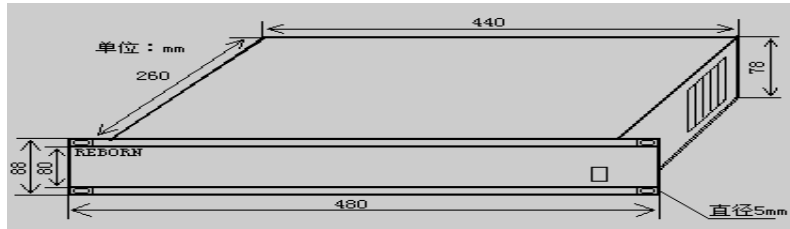
- Luxury spray chassis, Omron touch switch, green or red highlighted LED display, chassis structure is reasonable, anti-vibration ability, nice appearance.
- Using digital filtering and optical isolation technology, with high measurement accuracy and anti-jamming capability.
- Six sets of control signal output, and a light indicator.
- A separate control system that can simultaneously measure, control and display multiplexed signals.

- Using the ARM system for nonlinear compensation and error correction, and the measured pressure for full digital display, automatic shift, with a variety of control functions output.
- The front panel resistor measurement section is equipped with "zero point+", "zero point-" and "full scale" key-type calibration, to ensure that the instrument in the low vacuum measurement accuracy and easy adjustment.

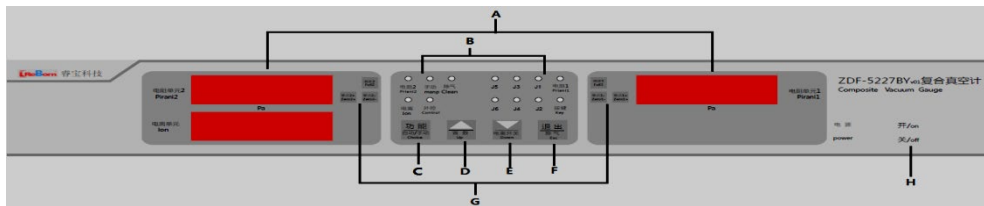
4.Chassis Structure and Wiring

4.1 Chassis Size

The series of vacuum gauge design for the standard B-type chassis size:



4.2 Front panel

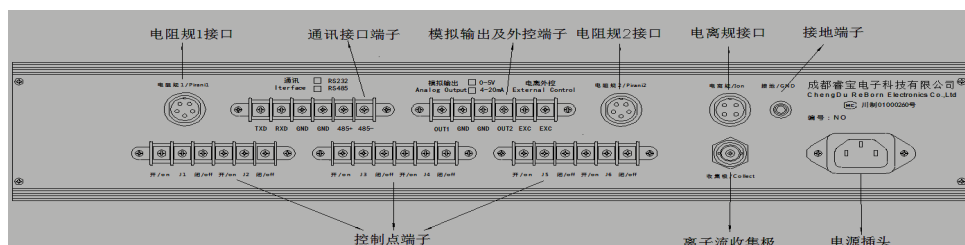


4.3 Front panel instruction

Number	Name	Function
A	Display Window	Displays the vacuum level measured in real time by the vacuum gauge.
B	Pilot Lamp	Various states of pilot lamp.
C	Choice	A) Set the menu function to determine the button, B) Ionization gauge working condition (manual / automatic conversion)
D	Up	Set the value of the menu function plus the key to loop(from 0 to 9)
E	Down	A)Set the value of the menu function Press the key (from 0 to 9) to loop B)On/Off Ionization gauge when manual state
F	Esc	A) Exit button when setting menu function B) Degassing switch when measuring Ionization gauge
G	Full / Zero	resistor gauge "full scale" \ "zero point+" and "zero point-"
H	Power	Power on / off vacuum gauge

4.4 Rear panel

The series rear panel wiring is connected as shown. In order to ensure the normal work of the instrument, please be sure to properly plug all kinds of cables, the instrument is equipped with wire, which is error-proof design, wrong connection will not be inserted, do not force plug, to avoid damage to the connector.



4.5 Rear panel wiring instruction

Name	Feature Description	Wiring instructions
Resistor Gauge	Five-core Cable	The correspondence between the socket and the gauge:{1-1,2-2,3-3,4-4}, you can only wiring pin 2, pin 3.
Communication	RS485\RS232	User selection. Please follow the instructions on the rear panel cable, please note that the communication protocol and the relevant baud rate, boot can be set. A single vacuum gauge can only be a communication hardware.
Analog Output	0-5V\4-20mA	User selection. Please follow the instructions on the rear panel cable, please note that the analog output is positive and negative, boot can be set. A single vacuum gauge can only be an analog output.
External Control	Control Ionization Gauge	Shorting the external control line to achieve the corresponding function
Ionization Gauge	Fore-core Cable	The correspondence between the socket and the gauge:{1-7,2-2,3-5,4-4} is the wiring of the gauge ZJ-27; {1-4,2-5,3-2} is the wiring of the gauge ZJ-10; {The red pin connects the accelerator pole and the black pin connects the filament} is the wiring of the gauge ZJ-12. (See the gauge manual)
Grounding Column	Ground	Please ensure good grounding
Power Socket	Three-pin Socket	Standard
Collector	Tuner	(Glass gauge) The clip connects to the cap of ionization gauge; 27 metal gauge connects to the first pin (A coil of metal which is derived from the gauge pipe) ; 10 metal gauge connects to the 7th pin (A coil of metal which is derived from the gauge pipe) ; 12 metal gauge connects to the middle pin of the diameter. (See the gauge manual)
Control Points	Six-terminal	A total of six groups of control points, respectively, open, medium and closed three contact output, can be different from the display window vacuum control relay output, boot can be set.

5. Operation Guide

5.1 Wiring:

Follow the "4.5 rear panel wiring instructions" to connect all the wires on the rear panel, connect the regulatory installation to the test end, and check it after checking it.

Be sure to use a three-wire plug to supply power to the meter. The ground line is indispensable. Be sure to connect the grounding post of the meter to the system. Otherwise it may cause the instrument's anti-jamming performance to be

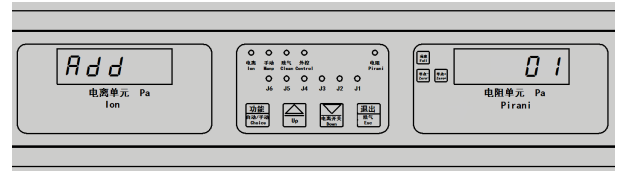
affected, and even leakage caused personal injury.

5.2 Power on :

After the check is correct, you can boot, turn on the power button, the vacuum gauge in the left side of the display window, such as "Add", after 5 seconds delay can enter the measurement state, its display such as: "1.0E 2". When no measurement signal is input, the corresponding window will display "P". When "Add" is displayed, press the key **功能(自动/手动)** on the panel to enter the function setting menu, the left window displays the parameter item, and the right window displays the corresponding parameter current value. Press the key "△" or the key "▽" to select the item to be modified. Press the key **功能(自动/手动)** to enter the modification item. The parameter to be changed will flash and press the key **功能(自动/手动)** to switch the bit to be modified. Press the key "△" or the key "▽" to change the value that is flashing. After each menu is set, press **退出** to exit the current item, press "△" or "▽" to scroll to other menu settings:

(1) When instrument displays "Add" :

Press the key **功能(自动/手动)** to enter the vacuum gauge communication setup menu, set the communication address, Press the key **功能(自动/手动)** to select, select the bit of the digital tube will flash tips, Press the key "△" or "▽" to change the number, the number will be in the "0--9" in the cycle of change (generally the initial value of "01"), after setting, press to **退出** to save and exit "Add". There is no need to set the boot next time.

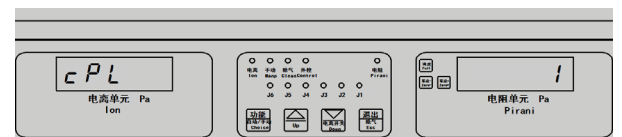


ZDF-5227 \ 5210 \ 5201 only need to set a channel (Add_1) in order to communicate with the computer, when the resistor measurement, the communication return data is the resistor window shows the degree of vacuum, when the ionization start measurement, the communication return data is the ionization window display Vacuum degree.

The ZDF-5227B \ 5210B \ 5201B and ZDF-5227BY \ 5210BY \ 5201BY vacuum gauges need to set up two channels (Add_1 and Add_2) to communicate with the computer. "Add_2" is set the same as the "Add_1" method. Please do not set the two channel addresses to the same, otherwise it will affect the communication. "Add_1" communication address stands for the right single resistor 1 communication address, "Add_2" communication address stands for resistor 2 and ionization compound communication address, When the resistor 2 is measuring, the communication return data is the vacuum displayed in the resistor 2 window. When the ionization starts the measurement, the communication return data is the vacuum displayed by the ionization window.

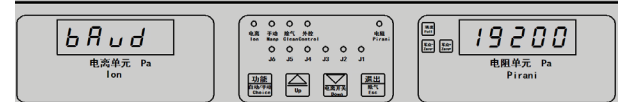
(2) When instrument displays "bAud" :

Press the key **功能(自动/手动)** to enter the communication baud rate setting menu, press "△" or "▽" to select, the baud rate is cycled between 1200 and 38400. Please select the appropriate communication baud rate to communicate.



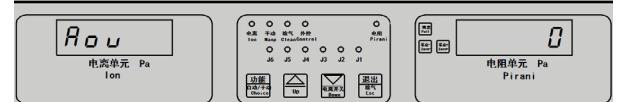
(3) When instrument displays "cPL" :

Press the key **功能(自动/手动)** to enter the communication protocol setting menu, press "△" or "▽" to select, the numbers are cycled between "0" and "1", "0" stands for ModBus-RTU communication protocol, "1" stands for Reborn protocol.



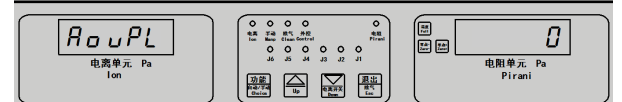
(4) When instrument displays "Aou" :

Press the key **功能(自动/手动)** to enter the analog output direction setting menu, press "△" or "▽" to select, the numbers are cycled between "0" and "1", "0" stands for the vacuum at a standard atmospheric pressure analog output value of the smallest, "1" stands for the vacuum at a standard atmospheric pressure analog output value of the largest.



(5) When instrument displays "Aoupl" :

Press the key **功能(自动/手动)** to enter the analog output formula setting menu, press "△" or "▽" to select, the numbers are cycled between "0" and "1", "0" stands for the piecewise linear formula, see Section 9 Analog Output Table. "1" stands for the logarithmic relationship output formula, the specific formula is:



$$P = 10^{2U-5} \quad (\text{ZDF-5227 series, ZDF-5210series})$$

$$P = 10^{\frac{13U}{5}-8} \quad (\text{ZDF-5201 series})$$

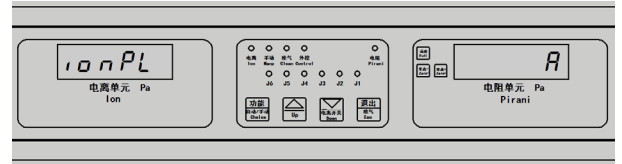
P is pressure, range is (from 1.0E-5 or 1.0E-8 to 1.0E 5) , unit is Pa.

U is the analog output voltage, range is (from 0 to 5) , unit is V.

When the vacuum gauge with two analog output, the two analog output logarithmic relationship between the same formula.

(6) When instrument displays “ ionpl ” :

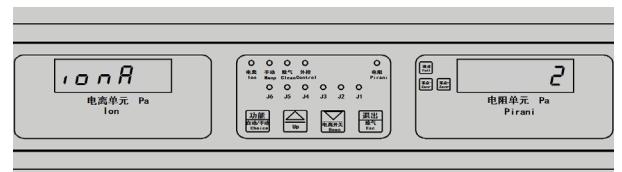
Press the key **功能(自动/手动)** to enter the ionization manual or auto start mode setting menu, press "△" or "▽" to select, the numbers are cycled between "A" and "H". "A" stands for automatic mode of operation (resistance gauge automatically initiates ionization gauge measurement), "H" stands for manual operation mode (ionization gauge requires manual adjustment). Generally do not work in the manual state. In the manual state, the ionization gauge work, it's only controlled by the key **电离开关** . It is possible that the actual vacuum does not reach the measurement range of the ionization gauge and the artificial opening of the ionization gauge work, the short time multiple switch ionization gauge may damage the filament or reduce its service life.



Generally do not work in the manual state. In the manual state, the ionization gauge work, it's only controlled by the key **电离开关** . It is possible that the actual vacuum does not reach the measurement range of the ionization gauge and the artificial opening of the ionization gauge work, the short time multiple switch ionization gauge may damage the filament or reduce its service life.

(7) When instrument displays “ ionA ” :

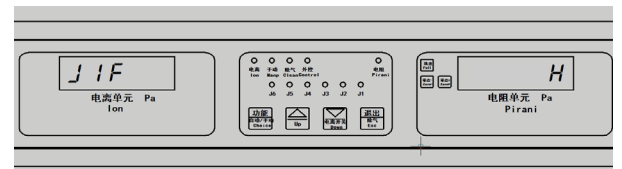
Press the key **功能(自动/手动)** to enter the resistor gauge to automatically start the ionization of the vacuum settings menu, press "△" or "▽" to select, the numbers are cycled between "1" and "5".



Type Number	ZDF-5227 Series		ZDF-5210 Series		ZDF-5201 Series
	Resistor starts ionization	Resistor closes ionization	Resistor starts ionization	Resistor closes ionization	
1	1 Pa	2 Pa	1 Pa	5 Pa	Without this setting, when the resistor measurement of the vacuum is higher than 1.5E-1, start ionization, less than 2.0E-1 close ionization.
2	2 Pa	3 Pa	5 Pa	10 Pa	
3	3 Pa	4 Pa	10 Pa	15 Pa	
4	4 Pa	5 Pa	15 Pa	20 Pa	
5	5 Pa	6 Pa	20 Pa	30 Pa	

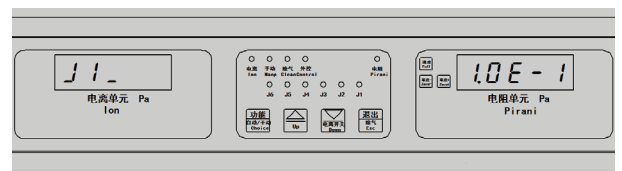
(8) When instrument displays “ J1F ” :

Press the key **功能(自动/手动)** to enter the vacuum gauge control point grouping menu, press "△" or "▽" to select, the numbers are cycled between "L" and "H". "L" stands for low vacuum (single resistance 1 vacuum control point output) "H" stands for high vacuum (If using ZDF-5227 \ 5210 \ 5201, H stands for the ionization vacuum control point output; If using ZDF-5227B \ 5210B \ 5201B and ZDF-5227BY \ 5210BY \ 5201BY, H stands for the resistor 2 and the ionization measurement of the vacuum at the same time control the control point output), As shown above, the first control point is output by high vacuum control. The menu can be set to 6 roads (J1F, J2F, J3F, J4F ...) control points of the packet output, please set separately.



(9) When instrument displays “ J1_ ” :

Press the key **功能(自动/手动)** to enter the vacuum gauge control point output setting menu, set the control output threshold. The vacuum gauge displays "J1.", which means setting the lower limit of the first control point; Press **功能(自动/手动)** to select, select the bit of the nixie tube will flash tips, press the "△" or "▽" to change the number, the number will be in the "0-9" in the cycle of change; After setting press **退出**, then press the "△" or "▽" to turn the page into the upper limit of the first control point; When the vacuum gauge



displays "J1", in accordance with the set "J1" method set "J1"; then use the same method to set "2,3,4,5,6" road control point. When all the control points are set, and then press **退出** will save the settings and enter the normal measurement state. Do not need to set up later.

★The control mode is divided into point control and regional control.

- Point Control: When setting the control point, set the upper and lower limits of the two sets of control values equal (for example, 1 = 1.0E 2 Pa; 1 = 1.0E 2 Pa). When the test vacuum is higher than the set value (vacuum value of less than 1.0E 2 Pa), the relay action, the corresponding panel lights; When the test vacuum is below the set value (vacuum value greater than 1.0E 2 Pa), the relay is reduced and the lamp on the corresponding panel is off.
- Regional Control: When you set control point, please set 1.and 1; 2. and 2; 3. and 3; 4. and 4 ... in a region so that the two sets of values are not equal(Note: The value of the lower limit is less than the upper limit, for example, the value of 1. is 1.0E 1 Pa; the value of 1 is 1.5E 1 Pa). When the test vacuum is higher than the lower limit set value (vacuum value of less than 1.0E 1 Pa), the relay action, the corresponding panel lights; When the test vacuum is below the upper limit setting (the vacuum value is greater than 1.5E 1 Pa), the relay is reduced and the lamp on the corresponding panel is off.

5.3 Degassing Method:

The filament heating degassing is only for the ionization gauge. When the 27 and 10 gauges measure the vacuum higher than 1.0E-2Pa; When the 12 gauges measure the vacuum higher than 1.0E-3Pa, In order to make the vacuum measurement value closer to the true value, you can press the key **除气** to degassing the ionization filament, when pressing **除气**, the filament heating degassing, vacuum gauge shows 180 seconds countdown, three minutes after the automatic return to the measurement state . If you want to complete the degassing ahead of time, you can press **除气**, you can return to the measurement state in advance.

5.4 Resistor Gauge Calibration :

Calibration method: As far as possible the resistor gauge installed vertically on the vacuum system, exposed to the atmosphere, power on after 5 minutes, press the front panel corresponding to the button **满度** in order to display:"1.0E 5". When it is determined that the vacuum is higher than 1.0E-1 (or when the vacuum measurement of the ionization section is shown to be 1.0E-1), press the button **零点+** or **零点-** on the front panel in order to display:"1.0E-1" or "1.1E-1", and then exposed to the resistor gauge in the atmosphere, press **满度**, just to show: "1.0E 5". Normally, the instrument has been adjusted at the time of the factory and does not need to be calibrated. Unless you change a new resistor gauge or the resistor is used too long time, and the working environment is too bad, these conditions cause that the measurement error is too large, it needs to be recalibrated.

When the calibration resistor 2 and the ionization section measure the vacuum display in a window , please press **功能(自动/手动)** (manual indicator light) to adjust the vacuum gauge to manual, That means, ionization does not automatically start, only resistor 2 measurement, and then follow the resistor gauge calibrate method to calibrate the zero and full of the resistor 2. After calibration, press **功能(自动/手动)** (manual indicator off) to adjust the vacuum gauge to the automatic state.

When the vacuum gauge shows "1. E 5", it means that the vacuum gauge measured by the vacuum gauge exceeds the maximum value that the resistor gauge can measure. Press **满度** to calibrate.

When the vacuum gauge shows "1. E-1", it means that the vacuum of the vacuum gauge exceeds the minimum value that the resistor gauge can measure. Press **零点+** or **零点-** to calibrate.

★When the resistor part of the zero or full scale calibration is invalid, that the resistor gauge is polluted more seriously, and it can not work, please change the gauge.

5.5 External Control Function (User Selection) : There are two ways to control the external control, please follow the requirements of the order.

★When the external control line is shorted, turn off the ionization unit display and control output, do not judge the opening of the ionization regulation, until the external control line is broken, re-judge and start work. When work normally, the external control line can not be shorted. (Standard foreign control method)

★When the external control line is shorted, regardless of any situation will open the ionization unit work, disconnect the external control line is closed ionization unit display and control output, work normally(when the vacuum to determine the range of ionization measures), external control lines needs to be shorted.

5.6 Gauge Judgment (User Selection) :

When the instrument has an ionization gauge judgment function: The instrument used by the ionization gauge suddenly damaged or poor contact, and vacuum suddenly is higher than the vacuum gauge can measure the ultimate vacuum, the instrument will automatically determine,

turn off all the display and control output of the ionization unit, When troubleshooting, please re-boot, then the vacuum gauge can normal work and measure.

6. Fault Handling

Here are a few common faults and their solutions:

Fault 1: Digital tube does not light.

Solution: Check whether the power line is connected and the digital tube is loose.

Fault 2: Key failure.

Solution: Check whether the button is pressed by the film can not rebound, or the button is bad (the key life of more than 100,000 times).

Fault 3: No change when tested.

Solution: (a) Check the rear panel on the regulatory line or regulatory socket is fully in contact.

(b) Check that the piping is in full contact with the gauge.

(c) Check whether the gauge is damaged and change gauge ,then can be re-tested.

Fault 4: The control point output status is inaccurate.

Solution: Refer to set the control points of 5.2- (8), 5.2- (9).

Fault 5: resistor to start ionization, the ionization gauge automatically protects and closes the ionization gauge.

Solution: Description of the resistor gauge measurement error, resistor gauge zero lead, please refer to 5.4 "resistor gauge calibration" for resistor gauge calibration.

Fault 6: start the ionization gauge directly after the display "0.0E- ※" Pa.

Solution: (a) Check if the filament is bright. If it is not bright, it means that the gauge is damaged, please change the gauge;

(b) Check whether the collector is connected or the collection line is ok.

7. Notices

- 1) The resistor gauge of different gas components have different sensitivity, in the actual measurement process, for the more concentrated other gases, will bring some errors, the specific circumstances, please contact the company technical department.
- 2) If the resistor gauge after the pollution, the display value will be error, available alcohol, acetone cleaning, natural dry.
- 3)The instrument work in the atmosphere, through the resistor gauge wire of the largest current, therefore, should try to avoid long-term work in the atmosphere.
- 4)The instrument panel buttons are touch keys, the operation should not force too much.
- 5) In order to protect the instrument, the instrument can immediately shut down after work, and shut down after the best in 10 seconds after the boot work.
- 6) The instrument has 220V AC voltage, if the instrument goes wrong, please call us, for safety reasons, do not open their own maintenance.
- 7)Analog voltage output impedance > 10K, analog current output impedance < 300Ω.

8. Standard Equipments

Name	Specifications and Models	Quantity
Resistor Gauge	ZJ-52T (interface through user selection)	1/2
Ionization Gauge	ZJ-27/10/12 (interface through user selection)	1
Resistor Cable	Five-core Cable (length optional)	1/2
Ionization Cable	Fore-core Cable (length optional)	1
Collector	Coaxial Cable (length optional)	1
Power Line	Standard three-core cable	1
Product certification	ZDF-52_v01	1
User Manual	ZDF-52_v01	1

9. Analog Output (User Selection. Defined when ordering, generally positive)

ZDF-5227B\5210B\5201B and ZDF-5227BY\5210BY\5201BY Single Resistor 1 Partial Segmentation Linear Table

Vacuum range(Pa)	Vacuum in the positive voltage(0-5V)	Vacuum in the positive current (4-20mA)
$10^{-1} \sim 10^0$	$[1 + 10.8 \times (V - 0.000)] \times 10^{-1}$	$[1 + 3.37 \times (mA - 4.000)] \times 10^{-1}$
$10^0 \sim 10^1$	$[1 + 10.8 \times (V - 0.833)] \times 10^0$	$[1 + 3.37 \times (mA - 6.667)] \times 10^0$
$10^1 \sim 10^2$	$[1 + 10.8 \times (V - 1.667)] \times 10^1$	$[1 + 3.37 \times (mA - 9.333)] \times 10^1$
$10^2 \sim 10^3$	$[1 + 10.8 \times (V - 2.500)] \times 10^2$	$[1 + 3.37 \times (mA - 12.00)] \times 10^2$
$10^3 \sim 10^4$	$[1 + 10.8 \times (V - 3.334)] \times 10^3$	$[1 + 3.37 \times (mA - 14.67)] \times 10^3$
$10^4 \sim 10^5$	$[1 + 10.8 \times (V - 4.167)] \times 10^4$	$[1 + 3.37 \times (mA - 17.34)] \times 10^4$

ZDF-5227/5210 Full Measure Range、ZDF-5227B\ZDF-5227BY\ZDF-5210B\ZDF-5210BY Resistor 2 and Ionization Composite Partial Segmentation

Linear Table

Vacuum range(Pa)	Vacuum in the positive voltage(0-5V)	Vacuum in the positive current (4-20mA)
$10^{-5} \sim 10^{-4}$	$[1 + 18 \times (V - 0.0)] \times 10^{-5}$	$[1 + 5.625 \times (mA - 4.0)] \times 10^{-5}$
$10^{-4} \sim 10^{-3}$	$[1 + 18 \times (V - 0.5)] \times 10^{-4}$	$[1 + 5.625 \times (mA - 5.6)] \times 10^{-4}$
$10^{-3} \sim 10^{-2}$	$[1 + 18 \times (V - 1.0)] \times 10^{-3}$	$[1 + 5.625 \times (mA - 7.2)] \times 10^{-3}$
$10^{-2} \sim 10^{-1}$	$[1 + 18 \times (V - 1.5)] \times 10^{-2}$	$[1 + 5.625 \times (mA - 8.8)] \times 10^{-2}$
$10^{-1} \sim 10^0$	$[1 + 18 \times (V - 2.0)] \times 10^{-1}$	$[1 + 5.625 \times (mA - 10.4)] \times 10^{-1}$
$10^0 \sim 10^1$	$[1 + 18 \times (V - 2.5)] \times 10^0$	$[1 + 5.625 \times (mA - 12.0)] \times 10^0$
$10^1 \sim 10^2$	$[1 + 18 \times (V - 3.0)] \times 10^1$	$[1 + 5.625 \times (mA - 13.6)] \times 10^1$
$10^2 \sim 10^3$	$[1 + 18 \times (V - 3.5)] \times 10^2$	$[1 + 5.625 \times (mA - 15.2)] \times 10^2$
$10^3 \sim 10^4$	$[1 + 18 \times (V - 4.0)] \times 10^3$	$[1 + 5.625 \times (mA - 16.8)] \times 10^3$
$10^4 \sim 10^5$	$[1 + 18 \times (V - 4.5)] \times 10^4$	$[1 + 5.625 \times (mA - 18.4)] \times 10^4$

ZDF-5201 Full Measure Range、ZDF-5201B and ZDF-5201BY Resistor 2 and Ionization Composite Partial Segmentation Linear Table

Vacuum range(Pa)	Vacuum in the positive voltage(0-5V)	Vacuum in the positive current (4-20mA)
$10^{-8} \sim 10^{-7}$	$[1 + 23.4 \times (V - 0.0)] \times 10^{-8}$	$[1 + 7.3125 \times (mA - 4.0)] \times 10^{-8}$
$10^{-7} \sim 10^{-6}$	$[1 + 23.4 \times (V - 0.3846)] \times 10^{-7}$	$[1 + 7.3125 \times (mA - 5.2308)] \times 10^{-7}$
$10^{-6} \sim 10^{-5}$	$[1 + 23.4 \times (V - 0.7692)] \times 10^{-6}$	$[1 + 7.3125 \times (mA - 6.4615)] \times 10^{-6}$
$10^{-5} \sim 10^{-4}$	$[1 + 23.4 \times (V - 1.1538)] \times 10^{-5}$	$[1 + 7.3125 \times (mA - 7.6923)] \times 10^{-5}$
$10^{-4} \sim 10^{-3}$	$[1 + 23.4 \times (V - 1.5385)] \times 10^{-4}$	$[1 + 7.3125 \times (mA - 8.9231)] \times 10^{-4}$
$10^{-3} \sim 10^{-2}$	$[1 + 23.4 \times (V - 1.9231)] \times 10^{-3}$	$[1 + 7.3125 \times (mA - 10.1538)] \times 10^{-3}$
$10^{-2} \sim 10^{-1}$	$[1 + 23.4 \times (V - 2.3077)] \times 10^{-2}$	$[1 + 7.3125 \times (mA - 11.3846)] \times 10^{-2}$
$10^{-1} \sim 10^0$	$[1 + 23.4 \times (V - 2.6923)] \times 10^{-1}$	$[1 + 7.3125 \times (mA - 12.6154)] \times 10^{-1}$
$10^0 \sim 10^1$	$[1 + 23.4 \times (V - 3.0769)] \times 10^0$	$[1 + 7.3125 \times (mA - 13.8461)] \times 10^0$
$10^1 \sim 10^2$	$[1 + 23.4 \times (V - 3.4615)] \times 10^1$	$[1 + 7.3125 \times (mA - 15.0769)] \times 10^1$
$10^2 \sim 10^3$	$[1 + 23.4 \times (V - 3.8461)] \times 10^2$	$[1 + 7.3125 \times (mA - 16.3077)] \times 10^2$
$10^3 \sim 10^4$	$[1 + 23.4 \times (V - 4.2308)] \times 10^3$	$[1 + 7.3125 \times (mA - 17.5385)] \times 10^3$
$10^4 \sim 10^5$	$[1 + 23.4 \times (V - 4.6154)] \times 10^4$	$[1 + 7.3125 \times (mA - 18.7692)] \times 10^4$

★Above the vacuum corresponding to the analog output voltage is 0-5V, current 4-20mA, our company can follow the customer needs to change the corresponding analog output, if necessary or special requirements, please contact us.

10. Communications Protocol(User Selection)

Our company have two communication protocols, one is the ordinary communication protocol, the other is the Modbus RTU communication protocol, please note that distinction. Boot can be set.

(1) Ordinary Communication Protocol

The vacuum gauge sends vacuum data

Four frames of data content : Using ASCII code, for example display : 5 . 0 E - 1, the data bit format :

The 1st frame is the integer bit of vacuum: 35H

The 2nd frame is the decimal place of the vacuum: 30H

The 3rd frame is the exponent sign bit of the degree of vacuum: 2DH

The 4th frame is the exponential bit of vacuum: 31H

Using the response mode; The vacuum gauge communication address through the panel settings; Need to shake hands before each communication.

One frame has 10 bits, 4 consecutive frames. The instrument sends the data format using ASCII code.

First Frame Data			Second Frame Data			Third Frame Data			Forth Frame Data		
1	2-9	10	1	2-9	10	1	2-9	10	1	2-9	10
Start bit 0	Data bit	Stop bit 1	Start bit 0	Data bit	Stop bit 1	Start bit 0	Data bit	Stop bit 1	Start bit 0	Data bit	Stop bit 1

Vacuum gauge communication address setting:

When power on display "Add", press the key **功能(自动/手动)** to display the factory communication address, if more than one instrument at the same time communication, please set the communication address of each instrument is not the same, so as to avoid conflict.

The upper-computer sends the communication address

The address of the vacuum gauge is issued in hexadecimal as a frame address. For example, the vacuum gauge communication address: 01, sent in hexadecimal 01; For example the communication address of vacuum gauge: 10, It is sent in hexadecimal 0A.

One frame has 10 bits, 2 consecutive frames. The instrument sends the data format using ASCII code.

One Frame Data		
1	2-9	10
Start bit 0	Address data bit	Stop bit 1

(2) Modbus RTU Communication Protocol

1). Communication setting:

Start Bit: 0 Stop Bit: 1 Data Bit: 8

2). Communication format:

E.g. Read the data from the communication address 01

Communication Address	Function Code	Data Start Address Register Byte	Data Read The Number Of Register Bytes	CRC16 Low Byte	CRC16 High Byte
01H	03H	00H 6BH	00H 02H	XXH	XXH

Response data frame. The response contains the communication address, the function code, the number of data, and the CRC16 error check.

E.g. Display Vacuum: 5 . 0 E – 1

Communication Address	Function Code	Read The Number Of Data	Data 1	Data 2	Data 3	Data 4	CRC16 Low Byte	CRC16 High Byte
01H	03H	04H	35H	30H	2DH	31H	XXH	XXH

Data content: Using ASCII code

Data 1 is the integer bit of vacuum: 35H

Data 2 is the decimal place of the vacuum: 30H

Data 3 is the exponent sign bit of the degree of vacuum: 2DH

Data 4 is the exponential bit of vacuum 31H

The upper-computer sends the communication address

The address of the vacuum gauge is issued in hexadecimal as a frame address. For example, the vacuum gauge communication address: 01, sent in hexadecimal 01; For example the communication address of vacuum gauge: 10, It is sent in hexadecimal 0A.

The instrument sends the data format in hexadecimal

One frame data		
1	2-9	10
Start bit 0	Address data bit	Stop bit 1

★The above communication protocols are my company's common communication protocols, if the customer has other requirements, please explain in advance so that we can change the design, thank you!

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诚信

优质

真空检测

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