



220Series weighing / force measuring controller manual of operation V1.0

- Weighing (force measurement) is shown
- Quantitative priming controls the peak-keeping function
- Upper / lower limit alarm output or OC output
- Select sorting mode testing qualified products
- Support for the 485ModbusRTU communication protocol
- Current 4-20mA or voltage 0-10V transmission output

preface

Thank you very much for choosing our company products! This manual contains product safety tips, technical indicators, operation interface, parameter description, calibration method, etc. In order to use the product for a long time, please read the operation manual carefully and keep it properly for any reference that the manual shall not be reproduced without the permission of the Company.

Safety tips

1. Please do not use devices on atomic energy devices and life-related medical devices.
2. All input and output signal lines of this product, to prevent surge, set the appropriate surge suppression circuit.
3. To prevent instrument damage and machine failure, install safety circuit breaker protection devices such as the power fuse or input / output line with large current capacity.
4. Please do not mix metal chips or wire debris into this product, otherwise it may cause electric shock, fire or failure.
5. Please indeed tighten the terminal screws, if not completely tightened,

may cause electric shock, fire.

6. Be sure to clean it again after cutting the power off.
7. When cleaning, please wipe the dirt with a dry soft cloth. Please do not use moisture agent. Otherwise, it may lead to deformation, discoloration.
8. Please do not use hard rub or tap the display section.
9. The installation, commissioning and maintenance of this product shall be carried out by qualified engineering and technical personnel.

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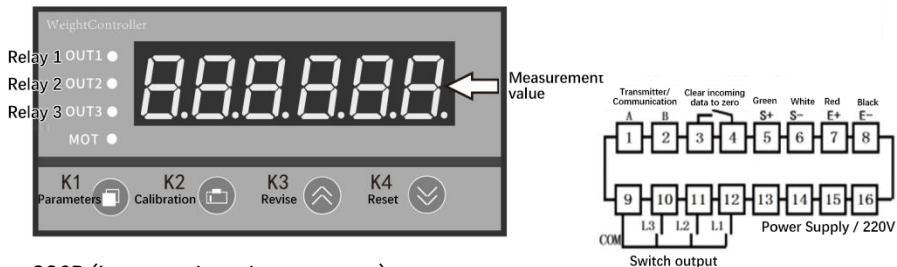
1. qualification

Enter the signal	0-2.5MV/V Supply bridge voltage 5V/100mA
Measurement accuracy	0.05%
Sampling speed	10 or 80s / s
Display mode	A single row of red LED shows the main display window display range:-9999~29500
Switch quantity input	1 Open, short valid (optional)
Switch volume output	Optional 4-way relay or OC output, relay contact AC 250V/1A, OC output drive 100mA/48V
Change send	Output 4-20mA, 0-20mA, 0-5V, 0-10V, 12bit precision, drive load of $\leq 500 \Omega$
Communication	Modbus-RTU 485 protocol or active upload protocol (only one

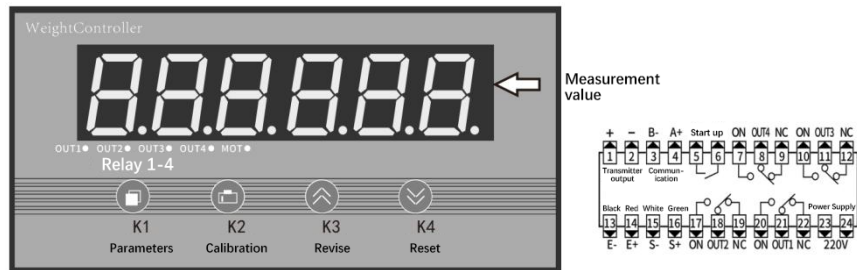
	option for transmission communication)
Use the environment	Ambient temperature: -20°C ~ 50°C ; relative humidity: $\leq 85\%\text{RH}$; to avoid strong corrosive gas
Work power supply	AC 100~240V, 50~60HZ; power dissipation $\leq 5\text{W}$
Structure	Panel / Cabinet, High quality plastic shell 220 (Small size instrument) Appearance size: 96*48*84mm, Open hole size: 92*45*82mm 220B (Large size instrument) Appearance size: 160*80*125mm, Open hole size: 152*72*123mm

2. Interface introduction

220 (Small size instrument):



220B (Large size instrument):



3. work pattern

The 220 series has three working modes, switched to different modes, the startup can be displayed: 220 regular mode and 230 startup mode; besides the above mode, the instrument also has 0-10V, 4-20mA, 485 communication function.

3.1. 210A (Peak mode): Ed-20 inport 01;

When the instrument boot screen shows "210A", the instrument working mode is peak mode. Press the third button, and the display interface is "Peak mode state when A XXX";

Description of the operation mode: when the measurement value reaches the trigger threshold, the peak judgment is started; if the measurement value is less than the trigger threshold, the peak judgment ends;

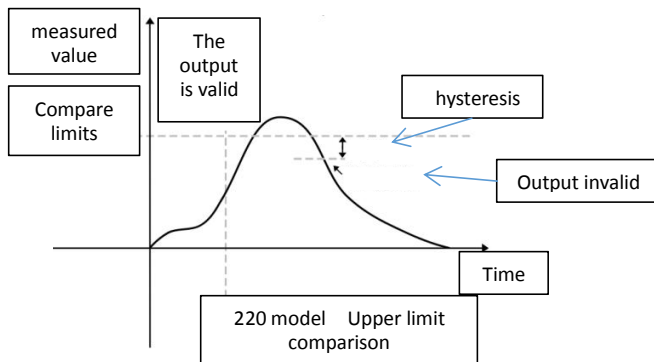
3.2. 220 (Conventional mode): Ed-20 inport 09;

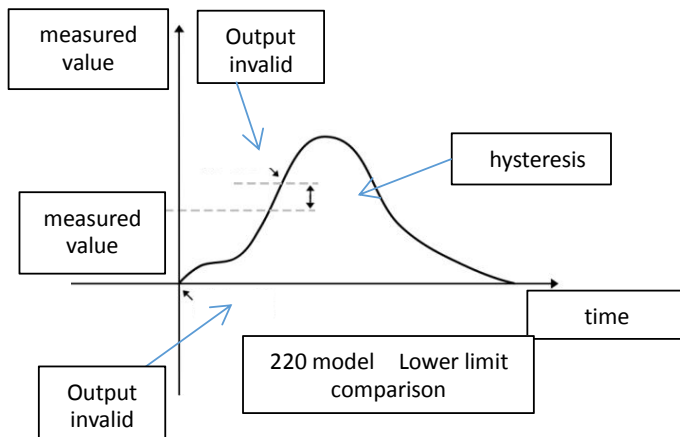
When the instrument boot interface shows "220", the instrument working mode is the regular working mode, with the function of displaying real-time weight value and switch quantity comparison output;

Working of description:

The three outputs of the instrument can be set to greater than or less than the comparison; when the output is set to greater than the comparison, the output is valid when the measurement value $\geq$ is upper, and the output is invalid when the measurement value is less than the lower limit decreases back. When the output is set to less than the comparison, the measurement value is less than the lower limit, and the lower limit of the measurement value $\geq$ is invalid;

More than comparison:	Less than comparison:
Measurement value $\geq$ is relatively limited, then the output is valid;	Measurement value $\leq$ is relatively limited, then the output is valid;
The measurement value < comparison limit-back lag, then the output is invalid;	The measurement value $\geq$ compares the + lag, then the output is invalid;



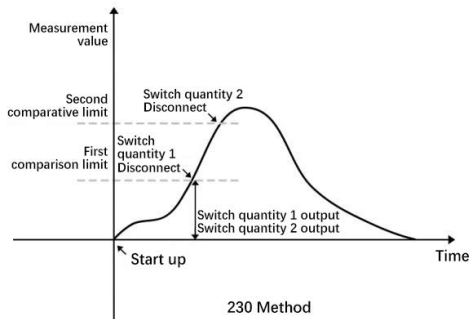


3.3. 230 (Start mode): Ed-20 inport 10;

When the instrument boot interface displays "230", the instrument working mode is the starting working mode, which is suitable for quantitative filling and start-stop control work occasions;

How to Work:

Close the turn-on start terminal 1s Disconnect after The instruments OUT1 and OUT2 lights are on, the switch amount 1 and the switch amount 2 are closed. When the weight value reaches the first comparison limit, the OUT1 light turns off the OUT1 light and the OUT2 light is off on the start terminal again, during which the switch terminal is not on, the switch amount has no output;



4. parameter declaration

4.1. Parameter modification operation:

- 1) After the running interface press [k1] for three seconds, after entering the parameter interface, show Ed-04 to change the upper limit
- 2) Short press [k1] switches the next (long press can switch quickly) to display Ed-02;
- 3) Press [k4] to enter the Ed-02 parameter, and the value of the highest bit flashes;
- 4) After going in, press [k4] to move the flicker bit, move to the flicker bit to modify, press [k3] to increase the flicker bit value; the value is modified to 200;
- 5) After modification, press [k1] to confirm to return to parameter interface, press [k2] to exit to operation interface;

A list of parameters

symbol	Parameter name	span	Windows default	explain
Ed-01	First, compare the upper and lower limits	-9999-30000	5000	
Ed-02	Second, compare the upper and lower limits	-9999-30000	500	
Ed-03	Third, compare the upper and lower limits	-9999-30000	20	
Ed-04	Comparison method		011	“011” From right to left represents the first, second and three upper and lower limits respectively; 1 indicates the upper limit

				alarm, 0 indicates the lower limit alarm;
Ed-05	Back block	0-1000	2	Trigger the upper and lower limits
Ed-07	Turn on zero range	0-1000	100	
Ed-09	Alarm delay	0-60	5.0	Unit: seconds
Ed-10	Zero bit tracking	0-10	0	Number of zero tracking times
Ed-11	Digital filtering	0-100	8	
Ed-12	Determine the scope of stability	0-5000	20	
Ed-13	Displays the refresh speed	1-20	10	
Ed-15	Number of decimal bits	0-5	2	“2”Represents two decimal places
Ed-18	Rated variable delivery	0-19999	5000	inport Total sensor schedule

	schedule			
Ed-19	Power clearance function	0-111	000	“001” This function is opened
Ed-20	How to work	0-10	9	“9” For 220 mode
Ed-21	Acquisition speed	0-1	1	0=10 Secondary / second 1=80 Secondary / second
Ed-22	Open into zero	0-2	0	0=Do not clear zero 1= zero clearing
Ed-23	Transfer switch	0-4	0	0=close 1=open
Ed-24	Change to zero	0-4095	800	When empty load:1=4mA V=0V
Ed-25	Variant full degree	1-4095	4000	full load :1=20mA V=10V
Ed-26	Change and send negative deviation	-9999-30000	0	
Ed-27	Communication	0-3	0	0=of no avail

	mode			1=Modbus-RTU 2=Upload actively
Ed-28	Communication machine code	1-128	1	Communication station number
Ed-29	Potter rate	1-4	2	1=4800 2=9600 3=19200 4=38400
Ed-30	Stop bit	0-1	0	0=2 digit capacity 1=1 digit capacity
Ed-31	Sensor Scale	100-1999 9	10000	For digital calibration
Ed-32	Sensor sensitivity	1. 0000-3 . 0000	2. 0000	For digital calibration
Ed-33	inport Zero Point ad	-1000-10 000		0mv/v The ad code value of the signal
Ed-34	Current zero ad	-9999-20 000		
Ed-35	inport Full ad	10000-32 000		20mv/v The ad code value of the signal

Ed-36	Coefficients	100-3270 0		For hardware calibration
Ed-37	Gravity acceleration	9.000-9. 900	9.800	
Ed-41	Password	201-3000	00220	You can set the parameter encryption operation
Ed-42	Multi-function code	0-0100	0000	0011=210A 0019=220 0020=230 0040=Digital calibration

Transmission output instance:

For example, a sensor with a range of 1000kg transmits an output of 10V or 20mA. when weighing a full load

- ①Enter the Ed-18 parameter, the range 1000 of the inport sensor.
- ②The Ed-23 is modified to 1 to open the transmitter output.
- ③Connect the meter terminal 1 and terminal 2; modify the Ed-24 parameters so that the multimeter is measured to 0V or 4mA.
- ④Modify the Ed-25 parameter so that the multimeter measurements are

made up to 10V or 20mA.

- ⑤When the sensor is weighed for 500kg, 5 V or 12 mA. can be measured between the transmission output terminal 1 and the terminal 2

5. Calibration method

The 220B can be calibrated in the following three ways: 1. Weight calibration. Hardware calibration 3. Digital calibration;

5.1. Weight calibration method

If known weights can be calibrated by this method, the known weight object should be greater than 10% of the sensor range and should not exceed 30,000 before calibrating.

Step 1: Long press [k2] in three seconds for three xxxxx》。

Step 2: When the sensor is not weighed, press [k4] zero calibration is complete.

Step 3: Press [k2] turns C 0》, plus known weights into Cxxxxx》。

Step 4: After stabilization, press [k4] to enter, in the parameter modification interface, press [k4] to shift, the displacement selected number will flash, press [k3] to increase, the flicker

number will be added 1, through the value of [k4] and [k3] inport.

Step 5: inport Press [k2] for calibration.

Step 6: The display value shall be consistent with the inport value.

If inaccurate, restart the fourth and fifth steps, and press [k1] to return to the operation interface.

5.2. Hardware calibration method

Using known weights, a calibration can be made by calculating the range coefficient that cannot exceed 32,700.

Step 1: Known weights (set to X).

Step 2: After the known weight, check the values displayed on the instrument (set to Y).

Step 3: Enter the Ed-36 parameter and view the value of the coefficient in the Ed-36 parameter (set to Z).

Step 4: Calculate the new coefficient $i, i = X/Y * Z$ (i = standard weight / display weight * Ed-36 parameter value).

Step 5: Increase the newly calculated coefficient i inport Ed-36 number parameter by pressing [K4] key displacement and [K3] key

increase. Step 6: After pressing the [K1] key to determine, the [K2] key exits. If you do not accurately press the above steps, repeat them

again.

5.3. Digital calibration method

Digital calibration method should know the sensitivity and range of the sensor, and the general sensor sensitivity is approximately, so the calibration is not accurate, and there is a certain error.

Step 1: Go to the range of the Ed-31 number parameter inport sensor first.

Step 2: Go back to the Ed-32 parameter inport sensor sensitivity.

Step 3: Then inport 0040, determines by [k1], and the digital calibration can be automatically completed by pressing [k2] to exit; when using multiple sensors, the inport range is the total of all sensor scales.

6. Instrument information description

The symbol is displayed at the beginning	Other ways to illustrate	Way 9
(No display symbol)	measured value	measured value
A	Peak	The first comparison is limited

b	Trigger the door limit	Second comparison limit
c	Alarm upper limit	Third comparison limit
d	The lower limit of the alarm	Comparison method
AL	Alarm status	Alarm status
st	Running status	Running status
E	A/D code value	A/D code value
dA	Send output code	Send output code

7. Detailed solution of communication protocol

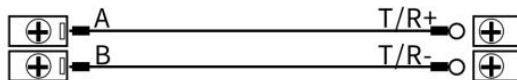
Instrument data are 32 bits, the high before, the low after, read the number of registers please read the multiple of 2. The 220 series instrument comes with a 485 communication interface with two modes: Modbus-RTU and active transmission. The Modbus-RTU mode can read current measurements and parameter values, and can modify parameter values and achieve zero clearance. In active sending mode, the instrument constantly sends packets with ASCII code, fixed to seven bytes.

Port connection diagram diagram:

RS485 Wiring diagram of the communication section

220 Instrument section port

485Communication Part Port



7.1. Commix Serial port debug assistant settings

Use the 485 communication line to connect with the instrument A, B port, to modify the instrument parameters, and then set the assistant to operate the instrument; data bit 8 bits, stop bit 2 bits, no verification; the following figure is Commix setting, the instrument should be repowered after setting.

The screenshot shows the 'Commix Serial port debug assistant' settings window. The interface is organized into several sections. The top section contains fields for 'Port' (set to COM5), 'BaudRate' (set to 9600), and checkboxes for 'DTR' and 'RTS'. An 'Apply' button is next to the BaudRate field, and an 'Open Port' button is on the right. The second section contains 'DataBits' (set to 8), 'Parity' (set to None), 'StopBits' (set to 2), a checked 'ModbusRTU' checkbox, and a 'Pause' button. The third section has input/output format options: 'Input HEX' and 'Show HEX' are selected, while 'Input ASC' and 'Show ASC' are unselected. There are also checkboxes for 'Ignore Space' (checked), 'New Line' (checked), and 'Show Interval' (unchecked), along with a dropdown menu showing '...' and a 'Clear' button. The bottom section features a large text area for input/output, a 'Send' button with a '[s]' icon, and a checked 'by Enter' checkbox. The window has a standard Windows-style title bar and a scroll bar on the right side of the text area.

Port:	COM5	BaudRate:	9600	Apply	☐ DTR	☐ RTS	Open Port
DataBits:	8	Parity:	None	StopBits:	2	☒ ModbusRTU	Pause
Input HEX	Show HEX	☒ Ignore Space	☒ New Line	☐ Show Interval	...	Clear	
Input ASC	Show ASC						
							[s] Send
							☒ by Enter

7.2. Directive details

The instrument supports functional codes such as 0x02 read-on command, 0x03 read parameter command, 0x05 switch output command 0x06 single-byte write command and 0x10 multi-byte write command; this Commix software verification code will automatically calculate inport, send command without manual inport.

7.3. Example explanation

7.3.1. 02 The command reads in

Send instructions: 01 02 0000 0002

Instrument machine code	01
Directive function code	02
Data address	00 00
Number of data	00 01

Port: COM5 BaudRate: 9600 Apply ☐ DTR ☐ RTS Open Port

DataBits: 8 Parity: None StopBits: 2 ☒ ModbusRTU Pause

Input HEX Show HEX
Input ASC Show ASC ☒ Ignore Space ☒ New Line ☐ Show Interval ... Clear

Send window

01 02 0000 0002

(s) Send
☒ by Enter

Receiving window

01 02 00 00 00 02 B9 CA
01 02 01 10 A0 44

Return to receive:

01 02 0000 0002 B9CA This instruction is sending the returned instruction, the receiving window will be displayed, added to the calculated CRC test code B9CA. (Checkcode: B9CA is the result of the previous data (01 02 0000 00001); data errors may occur during data transmission, and CRC is used to detect whether the received data is correct).

Directive analysis:

The data address 0000 is the OUT lamp address, the number of data 0001 is the number of data to query, the value in the instruction is 16 decimal, data 10 is hexadecimal value; converted to binary $0x10=0001$ (high byte) 0000 (low bytes); 0 indicates OUT lamp out, 1 indicates OUT lamp on;

7.3.2. 03 Command Read parameter (instance)

Read the current numerical command

load instruction :01 03 0000 0002 C4 0B

bridging order:01 03 02 05 2D 7B 09

Send Return	Instrument machine code	Read the command	Data address	Number of read registers	Calibration code
	01	03	0000	0002	C4 0B
Send	Instrument machine code	Read the command	Number of bytes	Current 16 decimal value	Calibration code
	01	03	04	1388 000	7B 09

You can modify the value of the instrument with different addresses.

The instrument parameter address is shown in the attached table below:

Address	The parameter serial number of the parameter table is + 29	Number type	fetch (R) write in (W)	remarks
---------	--	-------------	---------------------------	---------

0	Calibrate weight weight	Int	R	
1	Door limit back block	Int	R	
2	Comparison method	Int	R	
3	Trigger the door limit	Int	R	
4	The lower limit of the alarm	Int	R	D0-3 memory error
5	Alarm upper limit	Int	RW	The D8-system is stable
6	Error code	Int	RW	D9 null status
7	Running status	Int	RW	See details in the manual parameter table for details
8	Valley value	Int	RW	See details in the manual parameter table for details
9	Peak	Int	RW	See details in the manual parameter table for details

18	Real-time measurements	UInt	RW	Calibrate the weight (or physical) weight
30-71	Parameter name		RW	Example: The address of the first parameter in the parameter table is 30

Note: except the above data, all parameters in the parameter table of the instrument can be read or modified in communication, and all real-time data can be read.

7.4. 05The command controls the switch volume output

Send instructions:01 05 00 01 ff 00

bridging order:01 05 00 01 ff 00

The command can realize the switch amount output control, the alarm reset, etc. See the following attached table for the specific functions:

Address	Parameter name	command format	Clear the measured peak valley
---------	----------------	----------------	--------------------------------

			value and output at 210A
0x01	Output 3 control	01 05 00 01 FF 00 DD FA	Write weight to address 18
0x02	Output 2 control	01 05 00 02 ff 00 2D FA	The code value of the zero clearance range is less than 32767
0x03	Output 1 control	01 05 00 03 FF 00 7C 3A	210A is simultaneously cleared output
0x04	Restore the factory	01 05 00 04 FF 00 CD FB	Note

0x05	Clear measurement value	01 05 00 05 ff 00 crc0 crc1	
0x0	Calibration	01 05 00 0b ff 00 crc0 crc1 effective 01 05 00 0b 00 00 crc0 crc1 of no avail	
0x0c	Zero zero	01 05 00 0c ff 00 crc0 crc1 effective 01 05 00 0c 00 00 crc0 crc1 of no avail	
0x0d	Clear alarm	01 05 00 0d ff 00 crc0 crc1 effective 01 05 00 0d 00 00 crc0 crc1 of no avail	

7.5. 06 Command a single-byte write (instance): Modify the value in the Ed-01

Send command: 01 06 001E 0100

Return command : 01 06 00 1E 01 00 E8 5C

Send Return	Instrument machine code	Write command	Register address	Write to the 16 decimal values	
	01	06	00 1E	01 00	

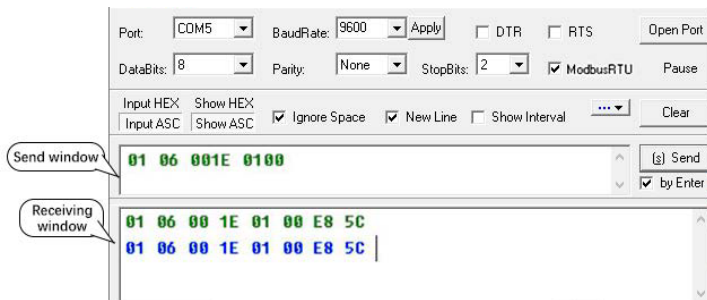
Send	Instrument machine code	Read the command	Number of data	Write to the 16 decimal values	Check bit
	01	06	00 1E	01 00	E8 5C

7.6. instruction parse

7.6.1. Register address 00 1E is Ed01+ 29 (parameter 1 parameter + 29)

7.6.2. Write to the 16 decimal values 01 00 =256

Note: Register address = parameter serial number + 29



7.7. 10 Command multibyte write (instance):

Write to the values in Ed-01 and Ed-02

instruction parse:

- 7.7.1. The current address value of 0100 (16 decimal system) is the value in Ed-01;



7.7.2. Next — The address value of 0101 (16 decimal system) is the value in Ed-02;

Note: Register address = parameter No. + 29;

Send instructions: 01 10 001E 00 02 04 0100 0101

bridging order: 01 10 00 1E 00 02 21 CE

Instrument machine code	Write command	Register address	Number of registers	Number of data	Current address value	Next address value
01	10	00 1E	00 02	04	0100	0101
Instrument machine code	Write command	Register address	Number of registers	Number of registers	Calibration code	
01	10	00 1E	00 02	00 02	21CE	

Common data address parameters are listed in the following table:

address	Parameter name	Number type	fetch (R) write in (W)
---------	----------------	-------------	---------------------------

0x00	Real-time measurements	Int	R
0x01	Peak	Int	R
0x02	Valley value	Int	R
0x03	Running status	Int	R
0x04	Error code	Int	R
0x05	Alarm upper limit	Int	RW
0x06	The lower limit of the alarm	Int	RW
0x07	Trigger the door limit	Int	RW
0x08	Comparison method	Int	RW
0x09	Door limit back block	Int	RW
0x12	Calibrate weight weight	UInt	RW
0x1E	The first comparison is limited	Int	RW
0x1f-0x47	Parameters of the corresponding parameter table of instructions: the second comparison is limited to address to multi-function code address		RW

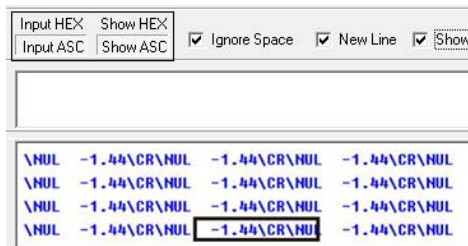
Note: All parameters in the parameter table of the instrument can be read or modified in communication, and all real-time data can be read.

7.8. Active upload (instance):ED27 inport 2

The instrument communication mode transmits data by active upload, and inport HEX displays ASC code transmission and display data;

The -1.44 \ CR \ NUL is the real-time value, corresponding to the instrument value;

As shown in the following figure:



warn

1. This instrument requires an external safe environment, which ensures the whole system even if the instrument function fails!
2. Do not open the instrument housing.
3. Use is not prohibited in the following environments:
 - Places of corrosive or combustible gas.
 - Places that may be splashed or stained with water, oil, or chemicals.
4. Provide special power to the instrument, the power power should be more than 2 times the total power of all instruments (each meter power is calculated at 5W).
5. Sensor lines, communication lines, transmission output lines and shield cables.