



**7106-1A
DISPLAY UNIT
MANUAL**



Introduce

- ◆ Can be connected with 7107-11 or 7107-12 linear gage, can also be connected with digital indicator(data cable 7309-C01M is needed)
- ◆ Set tolerance and make judgment (out of upper tolerance, within tolerance, out of lower tolerance), output the judgment to control outside devices, control from outside (set zero,hold reading and collect data)
- ◆ Software of display unit(included): in the software, it is possible to set tolerance and show judgment (red when out of tolerance, green when within tolerance), set zero, collect data manually or automatically (time is adjustable), output data to Excel, print report

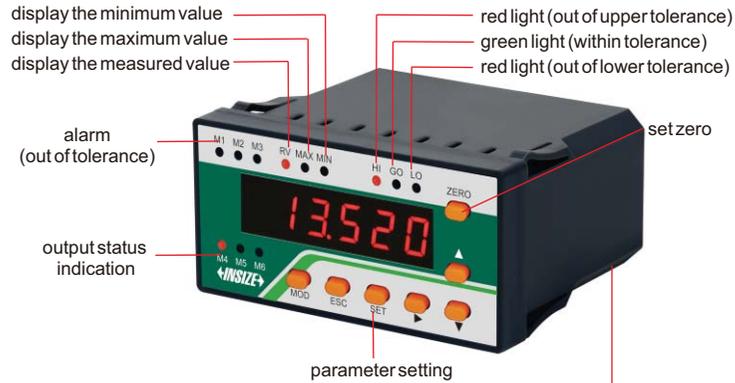
Display unit specification

Code	7106-1A
Display	6 digits
Quantity of linear gage or digital indicator to be connected	1 pc
Tolerance	set tolerance and make judgment with alarm and lights (out of upper tolerance, within tolerance, out of lower tolerance)
Output control	output the tolerance judgment (out of upper tolerance, within tolerance, out of lower tolerance) to control outside devices
Outside control	control the display units from outside (set zero, hold reading and collect data)
Data output	connect to computer software and serial communication
Power supply	DC 9~24V

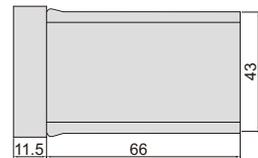
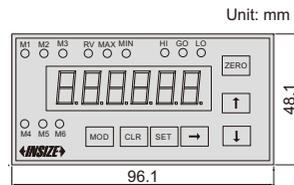
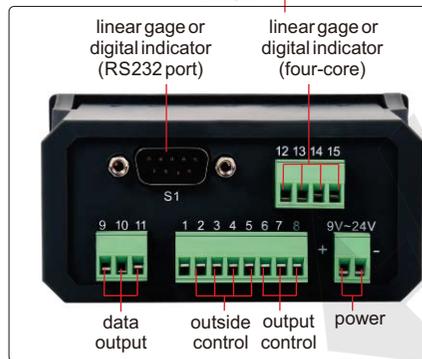
Functional characteristics

- ◆ With, can automatically judge the fault and alarm display.
- ◆ Press the key to set the device address and serial communication parameters.
- ◆ With RS232 communication interface, it can be connected to computer, PLC, etc. MODBUS communication protocol is adopted.
- ◆ Four query modes are available (real-time value, maximum value, minimum value and extreme value)
- ◆ Four external input controls realize the functions of measurement data confirmation, locking, resetting and output closing.
- ◆ Three external output tolerance test results can drive external alarm lights, relays, etc.
- ◆ Tolerance and preset value data can be set, and the preset value directly displays the reset position as the standard value of the workpiece.
- ◆ Three tolerance result output modes are available (real-time output, locked output and automatic measurement output).
- ◆ Automatic workpiece in-place judgment function. After this function is turned on, the tolerance judgment result will be output only after the probe touches the workpiece and stays stably for a period of time.
- ◆ Sound alarm function, you can choose sound alarm when out of tolerance or sound alarm when qualified.
- ◆ The update speed of micrometer data is 100 times per second;
- ◆ Communication parameter setting, data acquisition and table file export can be realized by matching software.

Equipment panel

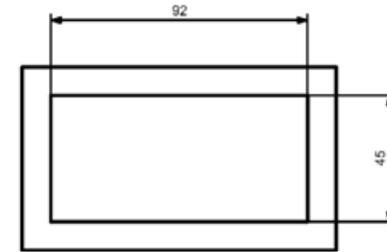


BACK



Fix

As shown in the figure, insert the display box into the hole of the equipment. The size of the hole is 92 x 45 mm.



It can be connected to a probe or digital display meter, or connected to a computer to realize serial communication, or used with software. Connecting PLC is the same as connecting computer.

Software(included)



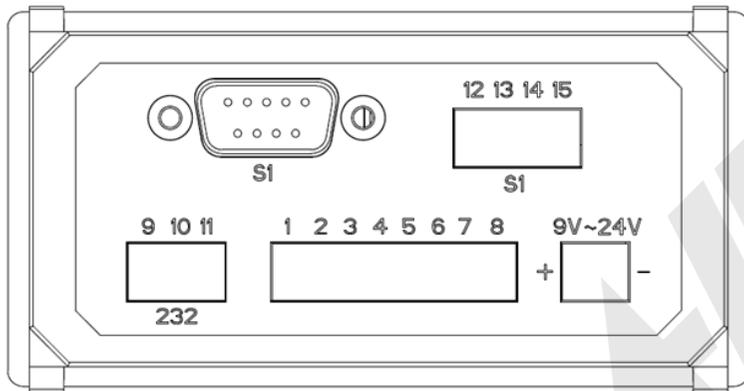
Connected with 7107-11 or 7107-12 linear gage



Connected with digital indicator
(data cable 7309-C01M is needed)



Port description



◆ Power

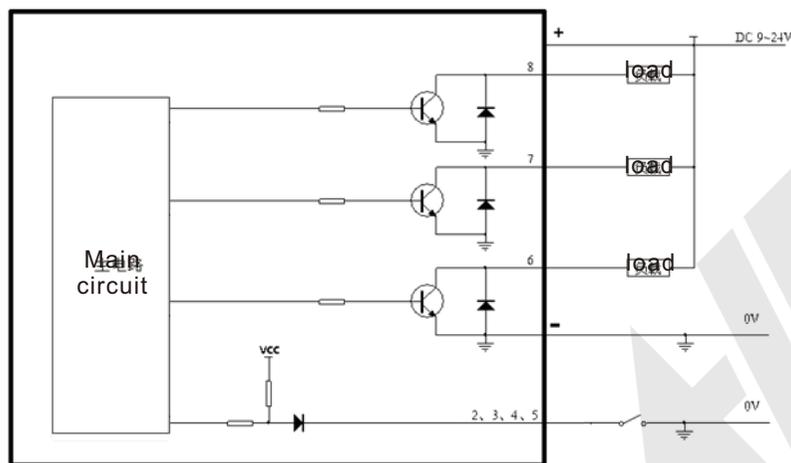
Port number	Name	Instruction	Remarks
+	Input power supply positive pole	The power supply range is 9~24V	Input power < 1W
-	Input power supply GND negative pole		

◆ In-Out

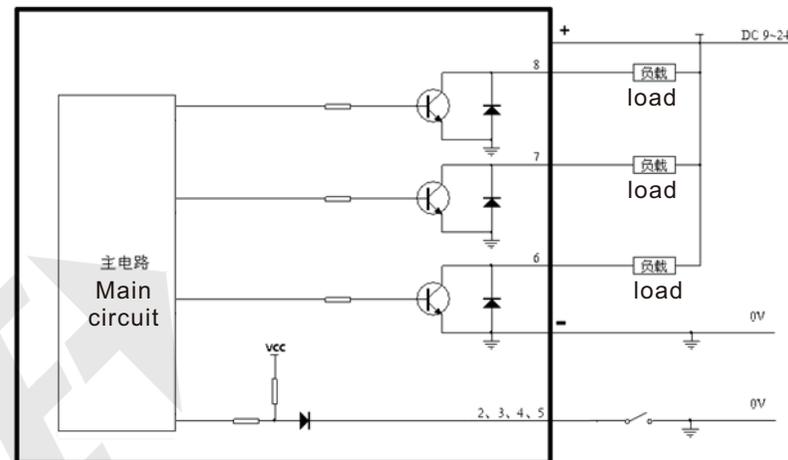
Port number	name	instruction	remarks
1	reserve		
2	Output off	Turn off tolerance result output	External output 6~8 pins
3	External clearing	Clear micrometer data	
4	External locking	Lock micrometer data	
5	External confirmation	Actively upload micrometer data	The software automatically recognizes and records data as standard.
6	HI(Over-difference output)	Output when the micrometer data is greater than the upper tolerance.	Output 0V
7	GO(Output qualified)	Output when the micrometer data is within the tolerance range.	Output 0V
8	LO(Out of tolerance output)	Output when the micrometer data is less than the lower tolerance	Output 0V

- 1) The data can be cleared by keeping the short-circuit port 3 and the negative GND of the power supply for 20ms;
- 2) Keeping the short-circuit port 5 and the negative GND of the power supply for 20ms can confirm that the current data actively uploads the micrometer data;

- 3) The display data of the micrometer can be locked by keeping the short-circuit port 4 and the negative GND of the power supply for 20ms;
- 4) Short-circuit port 2 and power supply negative GND can turn off the output of tolerance comparison results;
- 5) External output ports 6~8 are open collector gate outputs (OC gates) with overcurrent protection control. When the external output current exceeds 100mA, it will trigger the hub to automatically disconnect the output and display overcurrent alarm information.
- 6) The circuit diagram of I/O port of display box is as follows:



input and output ports to the PLC (note: the PLC input port needs to be leakage type or mixed type), as shown in the following figure :



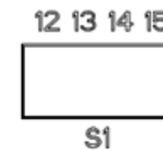
◆ Communication interface

Port number	Name	Instruction	Remarks
9	Input power GND	GND	
10	RS232-transmit(TXD)	You can connect to the computer serial port -Pin2 (accept data RXD)	
11	RS232-receive(RXD)	You can connect to computer serial port -Pin3 (TXD)	

◆ Sensor interface

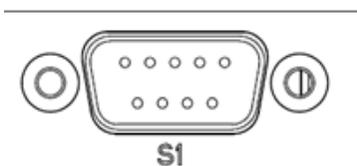
Sensor interface S1 has two interfaces, one of which can't be used at the same time.

- ① Wire-connecting micrometer

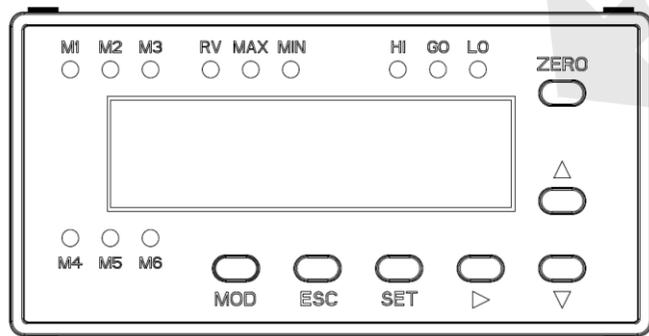


Port number	Name	Instruction	remarks
15	5V	Wire-connected micrometer (yellow wire: 5V power supply)	
14	Input power GND	Wire-connected micrometer (red wire: GND ground)	
13	RS232-transmit(T)	Wire-connected micrometer (blue wire: RXD data in)	
12	RS232-receive®	Wire-connected micrometer (black wire: TXD data OUT)	

② Plug-in micrometer



Case description



◆ Key description: :

- 【MOD】 key: set the tolerance switch
- 【▶】 key: move the key/switch settings/switch display state
- 【▲】 key: add key/modify key
- 【▼】 key: reduce key/modify key
- 【ZERO】 key: the reset key
- 【SET】 key: confirm key/set key
- 【ESC】 key: back key/exit key/exit lock/check failure

◆ LED description

- 【RV】 Real-time value status indication
- 【MAX】 Maximum value status indication
- 【MIN】 Minimum state indication
- 【HI】 Out-of-tolerance
- 【GO】 The product is qualified and within the tolerance zone
- 【LO】 Out of tolerance, unqualified
- 【M1】 Sound alarm on indication
- 【M2】 Automatic mode indicator light indication
- 【M3】 Setting status indication
- 【M4】 Output status indicator --- 【M4】 on: external output on, 【M4】 off: external output off
- 【M5】 Lock status indicator --- 【M5】 flashing: data has been locked.
- 【M6】 The external confirmation instruction --- 【M6】 flashes.

Operating Instruction

◆Power on:

After the main box is powered on, it starts to initialize. First, "--" is displayed. The whole process takes about 3 seconds. Then directly display the micrometer count.

◆the data shows that ...

The display number is the displacement data of the probe, with the unit of millimeter and the minimum resolution of 1 micron.

There are four inquiry modes. Press the **【▶】** key to switch. After switching for 3 seconds, the status will be automatically saved (save in case of power failure). The factory defaults to **【RV】** mode.

Name	instruction
【Rv】 Light	Display real-time displacement value
【MAX】 Light	Display the maximum displacement value
【MIN】 Light	Show the minimum displacement value
【MAX】 【MIN】 Lighting at the same time	Display displacement extreme value

◆ Clear data:

Press the **【ZERO】** key to clear the displayed data to 0. When the preset value is not 0 and the query mode is not the extreme value of **【MAX】** and **【MIN】**, the preset value will be displayed after clearing.

name	instruction	remarks
	【Rv】 Real time value	【MAX】 maximum 【MIN】 minimum value 【MAX】 【MIN】 极差值
Briefly press the 【ZERO】 key	Clear micrometer data to zero	Clear the micrometer maximum and minimum memory only.
Long press the 【ZERO】 key	Clear micrometer data to zero.	Clear the micrometer maximum and minimum memory only.
External clearing	Short circuit port 3 and power supply negative GND clear the micrometer data to zero	

◆ Fault display:

The display can automatically detect the fault. When the fault occurs, the main box directly displays the fault code, and M1 lights up at the same time, or press and hold the **【ESC】** key to view the fault code; The fault code shows "EXXX00", and "E" indicates a fault. When X=1, it indicates this fault. When X=0, it indicates this fault is normal, counting from left to right. The first X indicates an output overcurrent fault, the second X indicates an upper computer communication fault and the third X indicates a micrometer communication fault.

Show serial number	1	2	3	4	5	6
Definition	examine Fault information	overflowing breakdown	upper computer Communication failure	micrometer Communication failure	reserve	reserve
Show content	E	1or0	1or0	1or0	0	0
		1 indicates this failure. 0 indicates that this item is normal.				

In the fault display interface, press the **【ESC】** key briefly to exit, and no longer report the fault actively, but the overcurrent fault will definitely report the fault; After all faults return to normal, the fault display interface will automatically exit after 10 seconds, and M1 will go out.

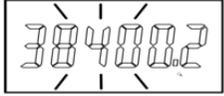
Parameter setting

- ◆ Press and hold the **【SET】** key for a long time, and **【M3】** lights up to enter the parameter setting interface;
- ◆ First, display the serial number. Press the **【▲】** key or **【▼】** key briefly to increase or decrease the serial number.

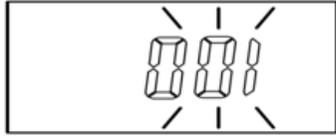
Serial number	Functional description	Remarks	Factory default
PA-01	Serial port setting	Set serial port baud rate, check bit and stop bit	38400,n,8,1
PA-02	Postal address	Set the device address in Modbus protocol	1
PA-03	Output mode of tolerance	Set the output mode of external ports 6-8	Continuous output
PA-04	Tolerance setting	Set the tolerance range of data qualification judgment	Lower tolerance 1.000 Upper tolerance 1.000 default 0.000
PA-05	Data format and direction switching	Set the format and direction of sensor displacement data	Signed integer; forward direction
PA-06	Alarm mode	Set the sound alarm switch and mode	Close the alarm
PA-07	Restore factory settings	Set the factory default values of the above settings	

In the parameter setting interface, press the **【SET】** key to confirm, and then enter the function setting corresponding to the corresponding serial number to modify.

Serial port setting

Parameter name	Baud rate	Stop bit
Display position	Show the first 5 digits	Show the last digit
Parameter switching method PA-03	Press the short ▶ key to switch the setting content, and only the flashing parameters can be modified	
		
Modifying method	Press the ▲ key or ▼ key to modify it. Finally, press the SET key to save, or press the ESC key to exit without saving.	
Setting parameters	4800 9600 19200 38400 115200	“1” Indicates 1 stop bits and no check “2” Indicates 2 stop bits and no check “E” Indicates 1 stop bit and even check “O” Indicates a stop bit and odd parity

Postal address

Parameter name	postal address
Display position	
Modifying method	Press the short ▲ key or ▼ key to increase or decrease; Finally, press the SET key to save, or press the ESC key to exit without saving;
Setting parameters	1~254

Tolerance output mode

Parameter name	Tolerance output mode	
Display position	Display the 1st digit	
		
Modifying method	Press the ▲ key or ▼ key to modify it. Finally, press the SET key to save, or press the ESC key to exit without Saving.;	
Setting parameters	"0" means continuous output	Keep the output state all the time, don't turn it off, and the M4 light is always on. HI GO LO lighting is consistent with the corresponding external output. Hi light up: data > upper tolerance setting data, and the corresponding port 8 output is pulled down to the parameter name. Go Lights up: the data is within the tolerance setting range, and the corresponding port 7 output is pulled down to GND. Lo Lights up: data < lower tolerance setting data, and the corresponding port 6 output is pulled down to GND
	"1" means: external locking control	Output only when external locking signal is valid. When locking, ports 6~8 have output, M4 lights up, but when unlocking, ports 6~8 have no output, and M4 lights out. Among them: RV status: the locked input (port 4) is locked when grounded to GND, and unlocked when disconnected. In non-RV state: after the locked input (port 4) is grounded to GND, the memory will be erased immediately, and then the data will be continuously collected until it is disconnected from GND, and the locked data will be displayed and the tolerance result will be output. At the same time, M5 will flash, and the exit can only be unlocked by pressing the ESC key briefly, or the next measurement can be continued

Parameter name	Tolerance output mode	
Setting parameters	"2" means: automatic detection	<p>The data of the micrometer will be output only after it is stable within the specified time. The [M4] light is on, and the ports 6~8 have output; otherwise, there is no output, and the 【M4】 light goes out. The last 5 related parameters will be displayed automatically</p>  <p>At this time, you can press the 【▶】 key briefly to switch the setting content, and you can only modify the flashing parameters, among which: The second digit indicates the automatic detection time, with the modification range of 1~9, and the unit is 200ms. The third digit indicates the stable variation of the test data, with the modification range of 1~9, and the unit is 0.5um. The 4th and 5th bits indicate the timeout output time, ranging from 01 to 99, in seconds. The 6th digit indicates the starting point of automatic detection, L indicates the minimum value as the starting point, and H indicates the maximum value as the starting point;</p> <p>Clear the starting point memory value. For example, "2.5.2.10.L" means: When the probe data exceeds the minimum value (starting point) of 0.05mm, the timing will be automatically judged and output; if the data change within 1 second does not exceed 0.01mm, the tolerance result will be output; otherwise, it will not be output; But if the tolerance result is forcibly output after more than 10 seconds:</p>

Operating Instruction

◆ Enter the setting state:

At this time, both the highest digit and the "LO" indicator light are flashing, the digit flashing indicates that it can be modified, and the "LO" indicator light flashing indicates that the lower tolerance is now set.



◆Set the data type:

Press the 【MOD】 key, and the "LO" light, "HI" light and "GO" light will flash circularly in turn, and "LO" means setting the lower tolerance; "HI" light indicates the upper tolerance; The "GO" light indicates setting the preset value, that is, setting the displayed value after clearing.

The preset value is to increase the set value on the basis of zero point, which will be displayed every time it is cleared. The usage of the preset value is that the user sets the preset value to the actual size of the standard workpiece. When the user calibrates with the standard workpiece, press the reset key, and then the preset standard value will be displayed. In this way, when measuring other workpieces, the actual size of the measured workpiece will be displayed instead of the deviation value.

After setting the tolerance, the upper and lower tolerances can be automatically compared, and the lower tolerance should be smaller than the upper tolerance. If the setting is wrong, an error will be reminded, as shown in the figure below



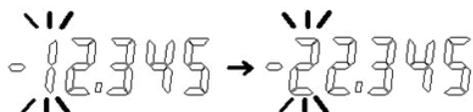
After the error message is displayed, it will automatically return to the upper tolerance setting state

◆Modify the setting data:

In the above three setting states, if the highest bit flashes, press the 【▲】 key or 【▼】 key to switch between "0~9" and "-", which indicates that negative numbers can be set. Long press the 【ZERO】 key to reset the setting value



Press the **▶** key:, and the blinking position moves to the right by one position, so that it can cycle continuously. Press the **▲** key to increase the data of the flashing position by one, or press the **▼** key to decrease the data of the flashing position by one



◆ Exit settings:

After setting, press the **SET** key, the "M3" indicator will go out, exit the tolerance setting state and save the set data. If you don't want to save the currently set data, press the **ESC** key briefly to exit the tolerance setting state

Data format and direction switching

Parameter name	Format	Direction
Display position	Display the 3rd and 4th digits	Show the last digit
Parameter switching method	Press the short ▶ key to switch the setting content, and only the flashing parameters can be modified	
Modifying method	Press the ▲ key or ▼ key to modify it. Finally, press the SET key to save, or press the ESC key to exit without saving;	

Parameter name	Format		Direction	
	Setting parameters	"01"	Data represent four bytes of that micromet is a 32-bit unsigned integer, When the first byte is 01, it indicates a negative number; 00 indicates a positive number; 01 00 00 01 indicates-0.001mm	"0"
	"FF"	The four bytes of data of the micrometer are 32-bit signed integers; As ff ff ff ff indicates-0.001mm	"1"	Indicates reverse. Data decreases when the measuring rod is pushed

Alarm mode

Parameter name	Alarm switch	Alarm condition		
Display position	Show the first 3 digits	Show the last 3 digits		
Parameter switching method	Press the short ▶ key to switch the setting content, and only the flashing parameters can be modified			
Modifying method	Press the ▲ key or ▼ key to modify it. Finally, press the SET key to save, or press the ESC key to exit without saving;			
Setting parameters	"oF"	Turn off the sound alarm	"nG"	Indicates data out-of-tolerance alarm
	"on"	Turn on the sound alarm	"Go"	Indicates that the data is qualified.

Restore factory settings

When "no" is displayed at first, it means cancellation. At this time, if you press **【SET】** or **【ESC】** for a short time, you can only press **【▲】** or **【▼】** for a short time, and "YES" will be displayed, which means OK. At this time, press **【SET】** for a short time to restore the factory settings and exit

Protocol

- ◆ Adopt MODBUS RTU mode, CRC16/Modbus x16 +x15 +x2 +1.
- ◆ CRC_L represents the lower 8 bits of the check code, and CRC_H represents the upper 8 bits of the check code.
- ◆ Default station number address: 01; the following example uses 01 as the communication address;

Query displacement data

Illustrate	Read command: 03 Read data address: 00 (Siemens PLC : 400001) Read data length: 02								
serial number	1	2	3	4	5	6	7	8	9
Sending format	add ress	03	00	00	00	02	CRC_L	CRC_H	
Answer format	add ress	03	04	Dat1	Dat2	Dat3	Dat4	CRC_L	CRC_H
	Dat1~Dat4 are sensor displacement data								
Example for sending	01 03 00 00 00 02 c4 0b								
Example 1 of answers	01 03 04 01 00 00 0a 7b cb								
	01 00 00 0a means -0.01mm, and the data format is "01"								
Example 2 of answers	01 03 04 FF FF FF FF FB A7								
	FF FF FF FF means -0.001mm, and the data format is "FF"								

Clear

Illustrate	Write command: 06 Write address: 0800H (hexadecimal) 2048 (decimal) Write data: AB56H (hexadecimal)								
Serial number	1	2	3	4	5	6	7	8	
Sending format	address	06	08	00	AB	56	CRC_L	CRC_H	
Answer format	address	06	08	00	AB	56	CRC_L	CRC_H	
Example for sending	01 06 08 00 AB 56 74 A4								
Example for answers	01 06 08 00 AB 56 74 A4								

Internal parameter reading

Illustrate	Station: FF Read command: 03 Read data address: 3030H (hexadecimal) 12336 (decimal) Read data length: 02									
Serial number	1	2	3	4	5	6	7	8	9	
Sending format	FF	03	30	30	00	02	DE	EA		
Answer format	FF	03	04	stop place	check Digit Baud rate	measuring head quantity	address	CRC_L	CRC_H	
Answer format	<p>4th byte stop bit: 1 means 2 stop bits, and 0 means 2 stop bits.</p> <p>Baud rate of the 5th byte check bit: The upper 4 bits are check bits (02 means even parity, 01 means odd parity, 00 means no parity), The lower 4 bits are wave holdup (04 means 115200, 03 means 38400, 02 means 19200, 01 means 9600, 00 means 4800)</p>									
Example for sending	FF 03 30 30 00 02 DE DA									
Example for answers	FF 03 04 00 03 01 01 D5 AC									
Example for answers	Baud rate is 38400; Stop bit 1; The number of probes is 1; Address is 1;									

External confirmation

Trigger condition	Short-circuit port 5 and power supply negative GND are kept for 20ms, The display box confirms that the current data is actively uploaded with micrometer data.								
Serial number	1	2	3	4	5	6	7	8	9
Sending format	address	83	04	Dat1	Dat2	Dat3	Dat4	CRC_L	CRC_H
	Dat1~Dat4 are sensor displacement data								
Example for sending	01 83 04 00 00 00 00 E5 F3								

Key command

Illustrate	Write command: 06 Write address: 7010H (hexadecimal) 28688 (decimal) Write data: AB56H (hexadecimal)							
Serial number	2	3	4	5	6	7	8	
Sending format	06	70	10	AB	56	CRC_L	CRC_H	
Answer format	06	08	00	AB	56	CRC_L	CRC_H	
Example for sending	01 06 70 10 AB 56 6D C1							
Example for answers	01 06 70 10 AB 56 6D C1							
Remarks	Before modifying the parameters of the display box, the key command must be issued first, and then the following modification command can be issued to save the display box after power failure							

Modification address

Illustrate	Write command: 06 Write address: 3031H (hexadecimal) 12337 (decimal) Write data: new address (1~254)								
Serial number	1	2	3	4	5	6	7	8	
Sending format	Address	06	30	31	00	New address	CRC_L	CRC_H	
Answer format	Address	06	30	31	00	New address	CRC_L	CRC_H	
Example for sending	01 06 30 31 00 02 56 C4								
Example for answers	01 06 30 31 00 02 56 C4								
	The address is changed from 01 to 02, and the new setting will take effect immediately after replying to the command.								

Modify baud rate and stop bit

Illustrate	Write command: 06 Write address: 3030H (hexadecimal) 12336 (decimal) Write data: AB56H (hexadecimal)								
Serial number	1	2	3	4	5	6	7	8	
Sending format	address	06	30	30	Stop bit	Check Digit Baud rate	CRC_L	CRC_H	
Answer format	address	06	30	30	Stop bit	Check Digit Baud rate	CRC_L	CRC_H	
Answer format	5th byte stop bit (1 means 2 stop bits, 0 means 1 stop bit) Baud rate of the 6th byte check bit: The upper 4 bits are parity bits (02 indicates even parity, 01 indicates odd parity, and 00 indicates no parity). The lower 4 bits are wave holdup (04 means 115200, 03 means 38400, 02 means 19200, 01 means 9600, 00 means 4800).								
Example for sending	01 06 30 30 01 02 06 94								
Example for answers	01 06 30 30 01 02 06 94 Change stop bit to 2 bits, baud rate to 19200, no check, The new settings will take effect immediately after the reply								

Modify query modeA

illustrate	Write command: 06 Write address: 3036H (hexadecimal) 12342 (decimal) Writing data: query mode								
Serial number	1	2	3	4	5	6	7	8	
Sending format	address	06	30	36	00	Query mode	CRC_L	CRC_H	
Answer format	address	06	30	36	00	Query mode	CRC_L	CRC_H	
Answer format	Query mode =0, indicating the real-time value mode. Query mode =1, indicating the maximum mode. Query mode =2, indicating the minimum mode. Query mode =3, indicating extreme range mode (difference between maximum and minimum values).								
Example for sending	01 06 30 36 00 01 A7 04								
Example for answers	01 06 30 36 00 01 A7 04 The query mode is set to the maximum mode								

Appendix I Examples of CRC Algorithm

unsigned short CRC(unsigned char frame[],int n)
 //The array frame is the object of CRC check, and n is the number of
 bytes to check

```

{
    int i,j;
    unsigned short crc,flag;
    crc=0xffff;
    for(i=0;i<n;i++)
    {
        crc^=frame[i];
        for(j=0;j<8;j++)
        {
            flag=crc&0x0001;
            crc>>=1;
            if(flag)
            {
                crc&=0x7fff;
                crc^=0xa001;
            }
        }
    }
    return(crc);
}
    
```

Note: MODBUS CRC check code transmission is the low bit in front and the high bit in the back

Appendix II Troubleshooting

Breakdown	Check	Solution
Can't connect to the computer	Whether the box display is normal or not	Check the power supply
	Computer Manager checks COM to see if the computer recognizes USB-232 data cable?	Unable to identify, replace USB-232 data cable
	Is the COM port number greater than 16?	Change the USB port, or change the port number < 16
	Does GEZTEST software prompt to scan the current COM port number?	The software is not compatible with USB-232 data cable, so it is recommended to use USB-232 data cable produced by our company
	Abnormal display box	Replace the display box
Push the micrometer data unchanged	Is the micrometer damaged? Does the alarm display E00100?	Replace micrometer.
	Replace the normal micrometer or not	Replace the display box
The data after clearing is not 0	Check whether the preset value is not set to 0	The default value is 0
Abnormal function		Restore factory settings
Inaccurate data		Replace micrometer
No output	Is the M4 lamp on?	Check the tolerance setting mode
	Is the M1 lamp on?	Stop the output when some faults occur
Show E10000	Excessive external current	Check the external output load