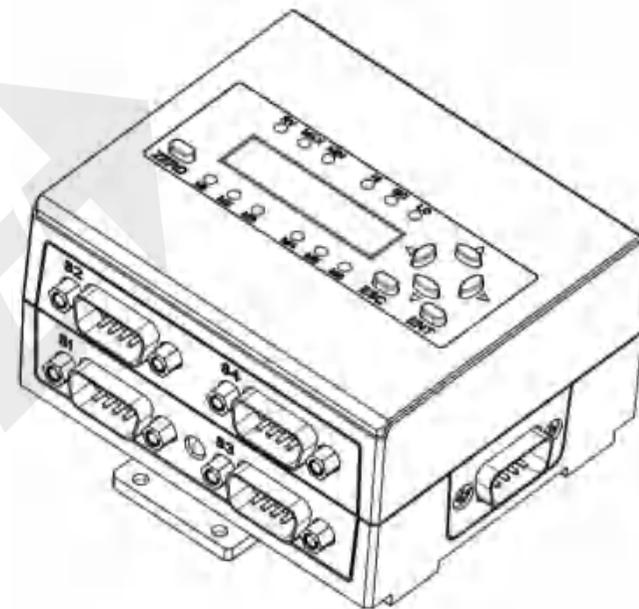




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**7133-1/7133-2**  
**MULTICHANNEL DISPLAY UNITS**  
**INSTRUCTION MANUAL**



## OVERVIEW

### 1.1 functional features

- a) It is equipped with a display and can automatically detect faults and show alarm messages.
- b) It allows you to set the device address and serial communication parameters via buttons.
- c) It comes with RS232 and RS485 communication interfaces, enabling connection to computers, PLCs, etc., and uses the MODBUS communication protocol.
- d) There are 4 query modes available (real - time value, maximum value, minimum value, and range value).
- e) Four external input controls are provided to achieve functions such as confirming, locking, zeroing, and turning off the output of measurement data.
- f) Three external outputs are used to present tolerance test results, which can drive external alarm lights, relays, etc.
- g) Tolerance and preset values can be set independently. The preset value means directly displaying the zero - setting position as the standard value of the workpiece. It can be connected to 4 micrometers. The number of micrometers can be expanded by connecting distribution boxes, with a maximum support for 60 micrometers.
- h) When the number of expanded distribution boxes does not exceed 5, the data update speed of the micrometers is 50 times per second. After that, for each additional distribution box, the data update speed of the micrometers increases by 4 milliseconds.
- i) Communication parameter settings, data collection, and export of data into table files can be achieved through the upper - computer software (GEZTEST software).

### 1.2 main product

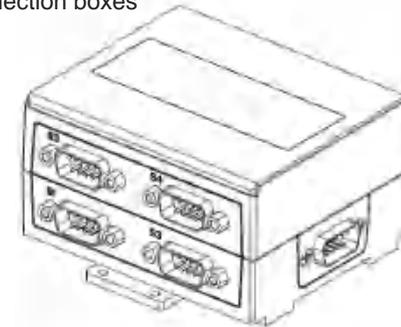
code	display and buttons	communication	query mode	input	output
7133-1	yes	yes	real-time value maximum value minimum value range value	yes	yes

### 1.3 optional accessory

- capacitance linear gauges  
code: 7107-11 , 7107-12



- connection box  
code: 7133-2 ,for expanding the number of micrometers, up to up to 14 connection boxes



- 12V power supply and power converter



- RS232



- USB to RS232 cable



## CONNECTION

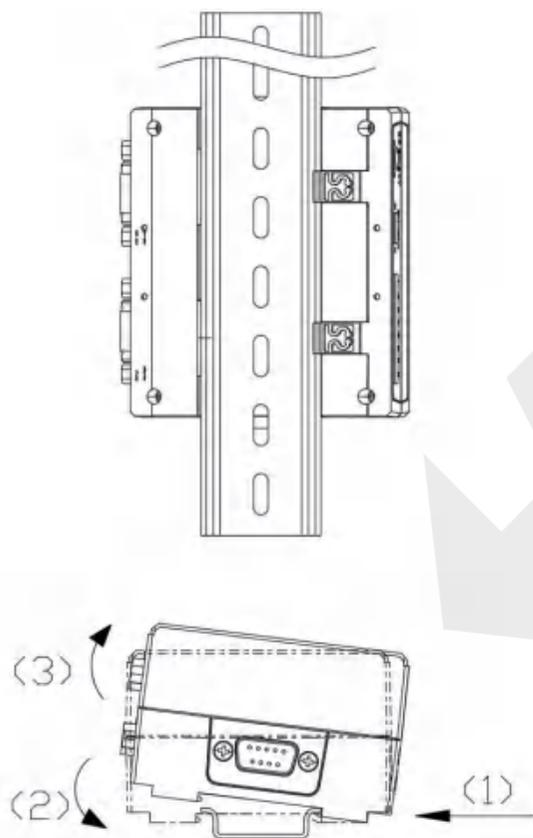
### 2.1 mounting

There are 2 ways to install:

Track Installation:

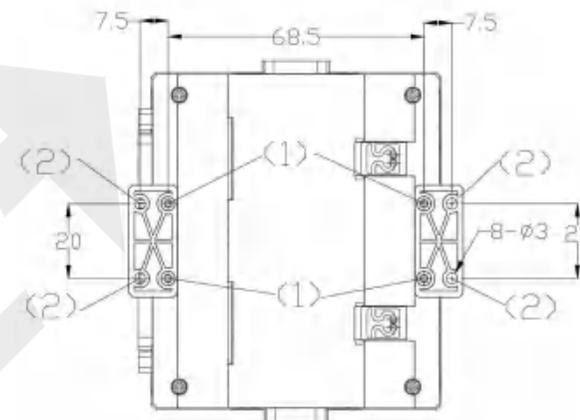
Attach the adjustment tabs of the hub to the rail. When inserting the hub in the direction of the arrow (1), push it into the track with a little tension downwards in the direction of the arrow (2).

If it is necessary to remove the hub, pull back with a little force in the direction of the arrow (1) and pull up the hub in the direction of the arrow (3).



Screwdriver Installation:

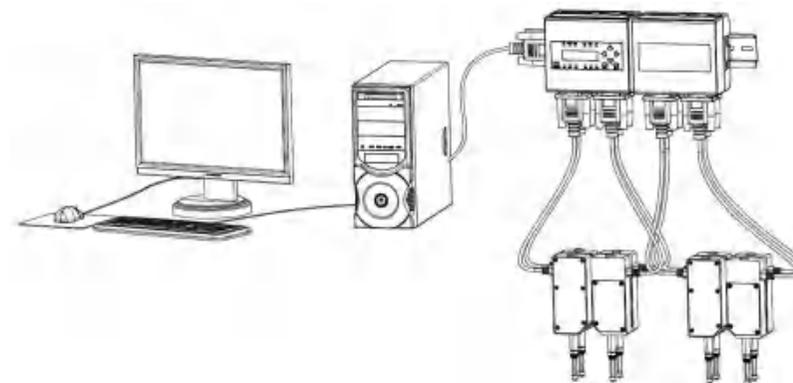
M2X4 self-tapping nails on arrow 1 to attach the gasket to the box;  
M2X8 screws on arrow 2 to mount where needed.



### 2.2 attach

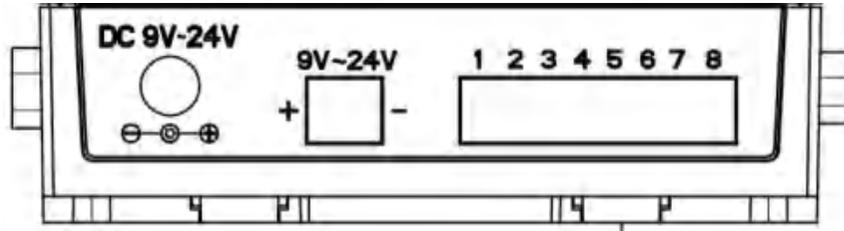
To connect with computer with standard serial port, please use RS232 serial port cable. To connect to a computer without a standard serial port, use a USB to RS232 cable to connect to the hub through the computer's USB port, and install the driver for this cable on the computer. Alternatively, use a USB to RS485 cable as defined.

Connecting a PLC is the same as connecting a PC.



## PORT DESCRIPTION

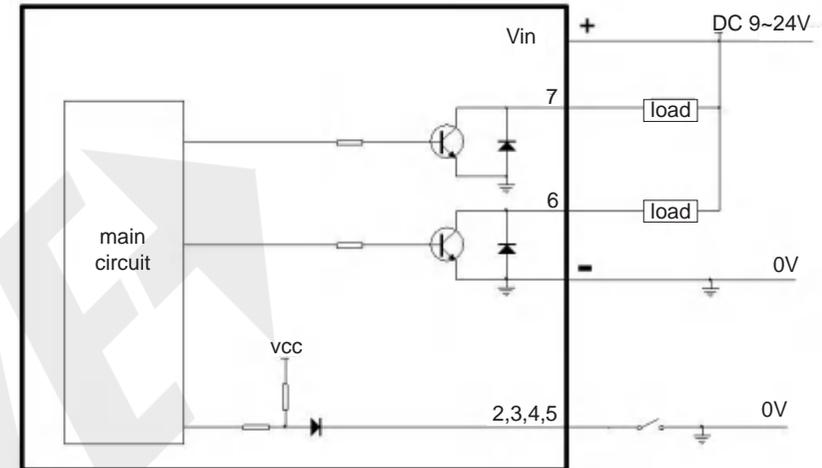
### 3.1 input and output



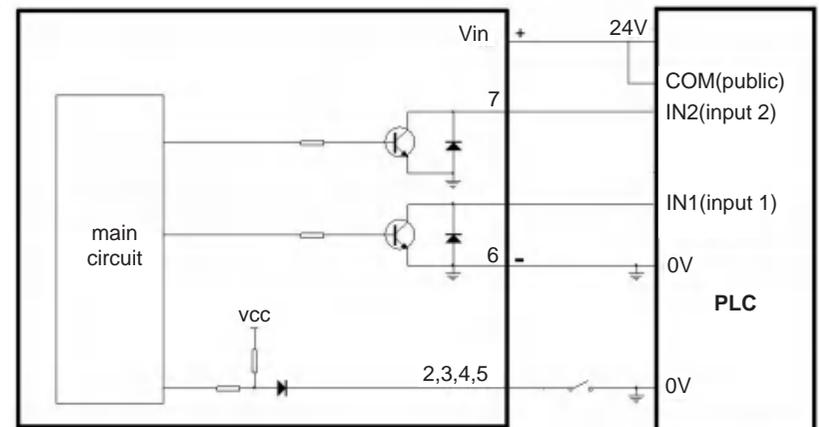
No.	name	instruction	note
+	input power positive	voltage input	input power <1W
-	input power negative/GND	range 9~24	

No.	name	instruction	note
1	input power negative/GND		GND
2	output shutdown	close tolerance result output	external output pin 6-7
3	external zeroing	zero all micrometer data	
4	external locking	lock current micrometer data	
5	external confirmation	active upload of micrometer data see 5 communication protocols	Software automatically recognises and records
6	overtolerance output	output when data is out of tolerance	output 0V
7	qualified output	output when data is within tolerance	output 0V
8	reserve		

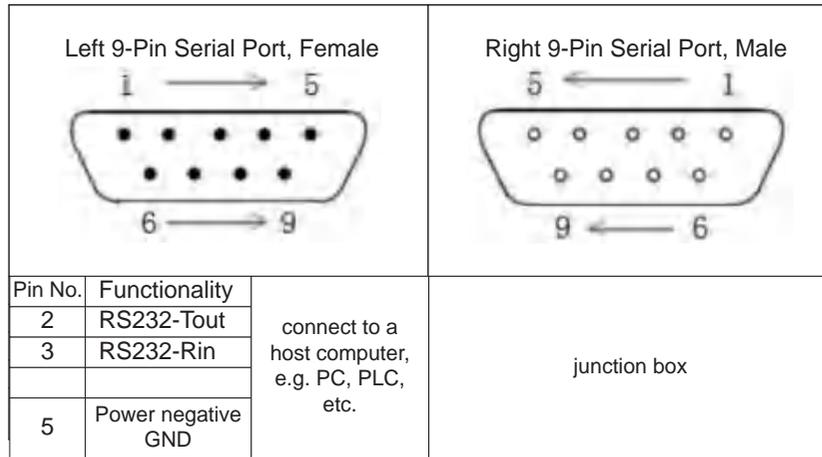
- 1) shorting port 3 and negative power GND for 20ms clears the data.
- 2) shorting port 5 and power negative GND for 20ms confirms current data and actively uploads micrometer data.
- 3) short-circuiting port 4 and holding power negative GND for 20ms locks the micrometer's display.
- 4) Short-circuiting port 2 and power supply negative GND turns off the tolerance comparison result output.
- 5) External output ports 6~7 are open collector gate outputs (OC gates) with overcurrent protection control, which may trigger the hub to automatically disconnect the outputs and display an overcurrent alarm message when the external output current exceeds 100mA.
- 6) The display box input/output IO port circuit diagram is as follows:



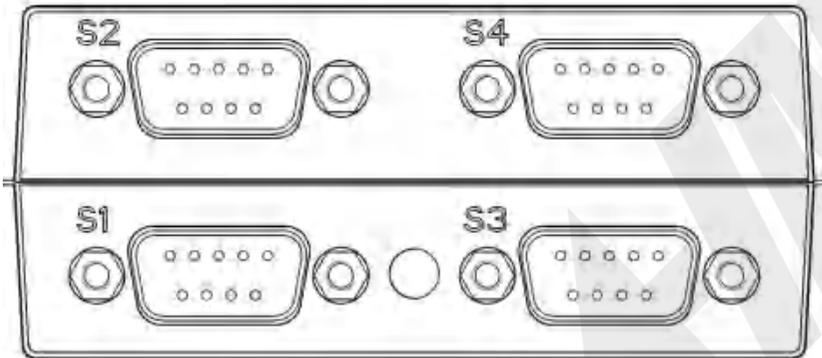
Input and output ports into the PLC (Note: PLC ports need to be time-drain or hybrid), as follows



3.2 communication interface



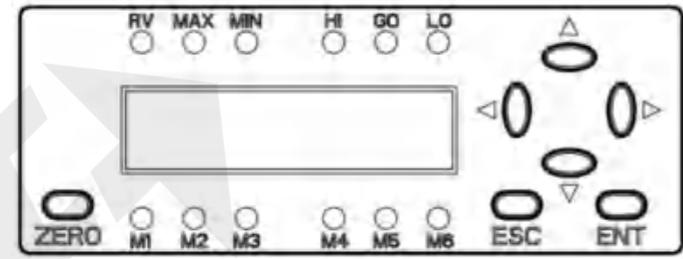
3.3 sensor interface



connecting micrometer, see accessories options

**INSTRUCTIONS FOR USE**

4.1 Panel description



Button Description:

- 【←】: view the channel channel where the micrometer is currently located
- 【→】: moving the keys/switch the settings/switching the display
- 【▲】: add/modify key
- 【▼】: reduce/modify key
- 【ZERO】: clear key
- 【ENT】: confirmation/setting key
- 【ESC】: back/exit/exit lock/view fault

LED indicator

- 【RV】: real-time value status indication
- 【MAX】: maximum value status indication
- 【MIN】: minimum value status indication
- 【HI】: exceedingly Poor, failed
- 【GO】: product qualified, within tolerance
- 【LO】: reserve
- 【M1】: malfunction indication
- 【M2】: reserve
- 【M3】: setting status indication
- 【M4】: output status indication----Lamp on: external output on  
;Lamp off: external output off
- 【M5】: lock status indication----blinking: data locked
- 【M6】: external confirmation instruction----blinking

## 4.2 Operating instructions

### 1) Turn on the power

After the main box is powered on, it starts to initialise, first displaying '----', the whole process is about 3 seconds; then it starts to scan the number of probes and assign the address, such as displaying '-04-' that means a total of Scanning to 4 micrometers; if there is a fault display fault, 2 seconds after the display of the current operating mode, such as displaying "CH01" that is ready to display the No. 1 channel of the micrometer data, 1 second after the direct display of: the No. 1 micrometer data; this time, a short press of the **▲** key or the **▼** key can be switched to display the various channels of the micrometer data.

### 2) Data display

The display shows figures for probe displacement data in mm with a minimum resolution of 1µm.

There are four modes of enquiry, short press **▶** key to switch, switch 3s after automatically save the state (power off to save), the factory default for the **RV** mode

<b>RV</b> light up	Displays the real-time micrometer displacement of the micrometer for the current channel
<b>MAX</b> light up	Displays the maximum displacement of the micrometer for the current channel
<b>MIN</b> light up	Displays the minimum displacement of the micrometer for the current channel
<b>MAX</b> <b>MIN</b> light up	Displays the micrometer differential displacement value for the current channel

### 3) Data zero

Short press **ZERO** key can make the display data clear 0, when the preset value is not 0, and the query mode is not **MAX** **MIN** extreme difference value, it will display the preset value after clearing the zero value; about the preset value setting see 4-3-3

	<b>RV</b> real time value	<b>MAX</b> max values <b>MIN</b> min values <b>MAX</b> <b>MIN</b> extreme value
short press <b>ZERO</b>	zero the current channel' micrometer data	clear the max and min value records for the current channel
long press <b>ZERO</b>	zero the micrometer on all channels	clear the max and min value records of all channels
external zero	short port 3 and power negative to zero all channels of the micrometer	

### 4) Working mode

Short press **◀** to query the channel number where the current micrometer is located, and return to the micrometer display interface after 1 second.

## 5) Fault display

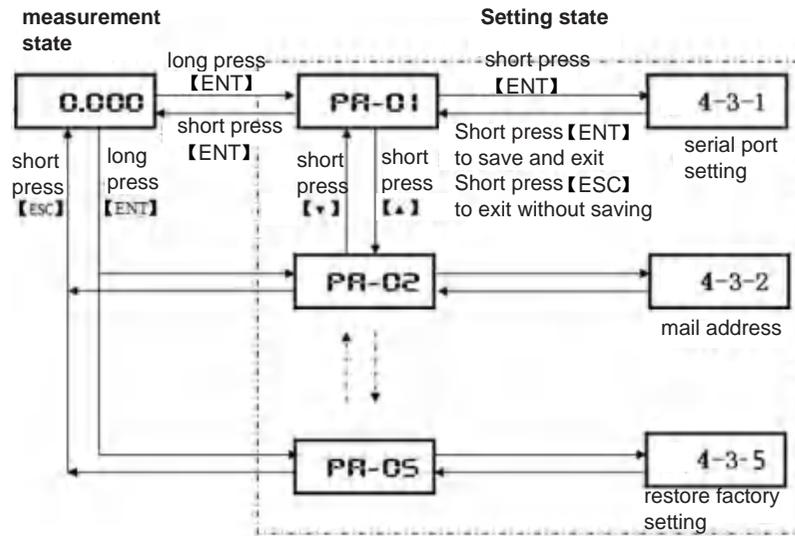
The main box can automatically detect faults, when a fault occurs, the main box directly displays the fault code, at the same time, M1 lights up, or long press the **ESC** key to view the fault code; the fault code displays 'EXXXXXX', 'E' indicates a fault, when X = 1, indicates that this fault, when X = 0, indicates that this fault is not a problem. "E" means fault, when X=1, it means this fault, when X=0, it means this fault is normal, counting from left to right, the first x means output overcurrent fault, the second x means communication fault of upper computer, the third x means communication fault of internal micrometer query module of the main box, and the last 2 numbers means communication fault address of the sub-box.

If you want to exit the fault display interface, you can short press the **ESC** key to exit, no longer actively display fault information; or wait for all the faults are back to normal after a delay of 3 seconds to exit the fault display interface, and at the same time the next time there is a failure to actively display the fault information. m1 light off.

No.	mean	display content
1	view fault information	E
2	overcurrent	1 or 0, 1 indicates this fault 0 means this item is normal
3	upper computer communication faults	
4	micrometer communication faults	1 or 2 or 3 or 4
5	sub-box fault No.	00 or XX, 00 means no fault
6		XX indicates a fault in the corresponding numbered cassette

## 4.3 Parameter setting

long press **ENT**, **M3** light on, enter the parameter setting interface first display the No. short press **▲** or **▼** to increase or decrease



No.	functional description	note	factory default	note
PA-01	serial port setting	set serial port baud rate, parity bit, stop bit	38400, n, 8, 1	4-3-1
PA-02	mail address	setting the device address in Modbus protocol	128	4-3-2
PA-03	tolerance setting	setting the tolerance range for conformity judgement	lower -1.000 upper 1.000 preset 0.000	4-3-3
PA-04	Data format and direction switch	setting the format and mode of sensor displacement data	signed integer; positive	4-3-4
PA-05	restore factory setting	restore factory defaults for settings		4-3-5

Under the parameter setting interface, short press [ENT] to enter the function setting corresponding to the corresponding serial number for modification, for details, see note.

### 4.3.1 serial port setting

parameter	baud	stop bit
show position	show top 5	show last digit
switching parameter methods	short press [▶] to modify the content, can only modify the parameter in blinking state.	
modification methods	short press [▲] or [▼] to modify short press [ENT] to save and exit, short press [ESC] to exit without saving.	
configurable parameter	4800 9600 19200 38400 115200	"1" indicates 1 stop bit "2" indicates 2 stop bits "E" indicates 1 stop bit Even parity "O" indicates 1 stop bit Odd parity

compatible with 1 stop bit or 2 stop bits under no parity conditions

### 4.3.2 mail address

parameter	mail address
show position	
modification methods	short press [▲] or [▼] to modify short press [ENT] to save and exit, short press [ESC] to exit without saving.
configurable parameter	1~254

### 4.3.3 tolerance and preset settings

Display "TOL-A" for all the probe tolerance data set to the same; non-A under the display number, such as displaying "TOL-01" ~ "TOL-04" is set separately. If "TOL-01" ~ "TOL-04" is displayed, the tolerance data of the corresponding number of micrometer will be set individually; short press [▲] key or [▼] key to increase or decrease the serial number, and finally short press [ENT] to start setting.



### 4.3.4 restore factory setting

At first, “no” is displayed, indicating cancellation, at this time, if you press the **[ENT]** key or **[ESC]** key, it will exit, you can only press the **[▲]** key or **[▼]** key, “YES” is displayed, indicating OK, at this time, then press the **[ENT]** key briefly to restore the factory settings. After factory setting and exit.

## COMMUNICATION PROTOCOLS

- Using MODBUS RTU mode
- Users can read all sensor data at once, sensor data in order in the hub data space, each sensor data length of two words (four bytes), can also be read all the way sensor data alone.
- Users can zero all sensors at once, or zero each sensor individually.
- Default slave address: 16
- All sensor data reading operation: MODBUS function code:03 , data start address:00, data length:TOL\*2 (TOL is the number of sensors, if it is 4-way sensor then data length is 8). Note: Siemens PLC data start address is 40001.
- Individual sensor data reading: MODBUS function code: 03, data start address: (NUM-1)\*2, data length: 2. (NUM is the sensor number).
- All sensor zeroing operations: MODBUS function code: 06, data address: 2048, data content: AB56 (hexadecimal). Note: Siemens PLC write address: 42049.
- Individual zero setting operation: MODBUS function code: 06, data address: (NUM-1)\*2, data content: AB56 (hexadecimal). (NUM is the sensor number).

#### 1) Query displacement data

instruction	Read command: 03    Read data length: 08 Read data address: 00 (Siemens PLC: 40001)								
No.	1	2	3	4	5	6	7	8	9
send format	address	03	00	00	00	08	CRL-L	CRL-H	
No.	1	2	3	4	5	6	7	8	9
reply format	address	03	10	Dat1	Dat2	Dat3	Dat4	CRL-L	CRL-H
	Among them, Dat1~Dat4 are the displacement data of No.1~No.4 sensors respectively, and each data occupies 4 bytes.								
send example	80 03 00 00 00 08 5A 1D								
reply example1	80 03 10 00 00 00 00 00 00 00 01 00 00 0A 00 00 00 00 A9 B6 01 00 00 0a indicates -0.01mm, data format is “01”, see 4.3.4.								
reply example2	80 03 10 00 00 00 00 00 00 00 FF FF FF FF 00 00 00 00 B0 6B FF FF FF FF indicates -0.001mm, data format is “FF”, see 4.3.4.								

#### Multiplexed Micrometer Read Command

Read No.1~8 micrometer data: 80 03 00 00 00 10 5A 17  
 Read No.1~12 micrometer data: 80 03 00 00 00 18 5B D1  
 Read No.1~16 micrometer data: 80 03 00 00 00 20 5A 03  
 Read No.1~20 micrometer data: 80 03 00 00 00 28 5B C5

#### Single Micrometer Read Command

Read No.1 micrometer data: 80 03 00 00 00 02 DA 1A  
 Read No.2 micrometer data: 80 03 00 00 00 02 7B DA  
 Read No.3 micrometer data: 80 03 00 00 00 02 9B DB  
 Read No.4 micrometer data: 80 03 00 00 00 02 3A 1B

#### 2) Zero

instruction	Read command: 03    Read data length: 08 Read data address: 00 (Siemens PLC: 40001)								
No.	1	2	3	4	5	6	7	8	
send format	address	06	08	00	AB	56	CRL-L	CRL-H	
No.	address	06	08	00	AB	56	CRL-L	CRL-H	
send example	80 06 08 00 AB 56 6A B5								
reply example	80 06 08 00 AB 56 6A B5								

#### Individual Micrometer Zero Command

Zeroing Micrometer No. 1: 80 06 00 00 AB 56 68 D5  
 Zeroing Micrometer No. 2: 80 06 00 02 AB 56 C9 15  
 Zeroing Micrometer No. 3: 80 06 00 04 AB 56 29 14  
 Zeroing Micrometer No. 4: 80 06 00 06 AB 56 88 D4

Appendix I-----CRC algorithm example

unsigned short CRC(unsigned char frame[],int n)  
 //the array frame is the object of CRC checksums,  
 n is the number of bytes in the checksum

```

{
    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);
}
    
```

**FAULT RESOLUTION**

fault	check	solution
the main box won't connect to the computer	whether the main box display is normal	check the power supply
	computer device manager to view COM, whether to identify the USB-232 cable	unrecognised Replacement of USB-232 cable
	is the COM port number greater than 16	replace the USB port, or change the port number less than 16
	whether the software prompts to scan the current port	replace our USB-232 cable
no change in driving micrometer data	abnormal main box	replacement of the main box
	is the micrometer indicator blinking	replacement of micrometer
no change in all micrometer data	determine the micrometer OK	replacement of the main box
	does the main box alarm“E00100” is the internal query module abnormal	replacement of the main box
data is not zero after clearing	check that the preset value is not set to zero	set preset value to zero
functional abnormality		restore factory setting
inaccurate data		replacement of micrometer
no output	is the M1 light on	output stops when a partial fault occurs
show E10000	excessive external output current	check external output load
show E00100	internal module damage	replacement of the main box
show E001xx	cassette fault	replacement of sub-box xx
	access to only one sub-box	replacement of the main box