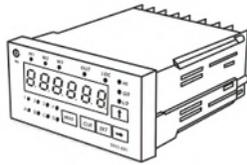**+INSIZE+**

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**7106
LINEAR GAGE
AND DISPLAY UNIT
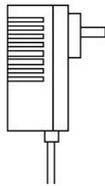OPERATION MANUAL**

V0

+INSIZE+

Introduction

◆ Display Unit(Code 7106-1)

◆ AC/DC adapter
   12V voltage

◆ Conversion Cable

Red
Black

◆ Linear Gage(7106-11 and 7106-12)

yellow
red
blue
black
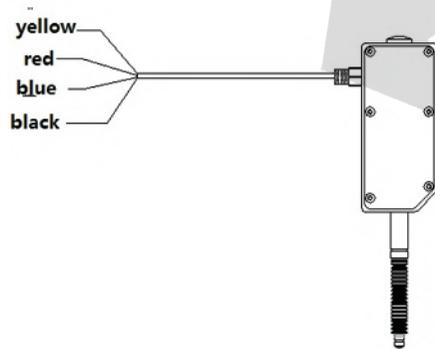
3. Zero function

Zero command 01 06 08 00 AB 56 74 A4		Linear gage response 01 06 06 00 AB 56 74 A4	
Address code	01H	Address code	01H
Function code	06H	Function code	06H
The first address access register	08H	The first address access register	06H
	00H		00H
Zero designator	ABH	Zero designator	ABH
	56H		56H
CRC(low 8 order)	74H	CRC(low 8 order)	74H
CRC(high 8 order)	A4H	CRC(high 8 order)	A4H

Example: CRC algorithm
unsigned short CRC (unsigned char frame[], int n)
//Array frame is the object of CRC need to verify, n is the number of bytes need to verify

```
{
    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: About the transmission of MODBUS CRC check code, low order first then high order.

Output protocol of display unit

1. Data frame format: RTU mode
   Baud rate: 38400
   Data frames: 1 start bit, 8pcs data bits, no parity, 2 pcs stop bits

2. Read data from linear gage

Inquiry command 01 03 00 00 00 02 C4 0B		Linear gage response 01 03 04 01 00 12 35 37 78			
Address code	01H	Address code	01H		
Function code	03H	Function code	03H		
The first address access register	00H	Data bytes	04H		
	00H	Data 1 higher 8 bits	01H	Data	Flag bit
Data bytes	00H	Data 1 lower 8 bits	00H	of	
	02H	Data 2 higher 8 bits	12H	linear	Data (hexadecimal)
CRC(low 8 order)	C4H	Data 2 lower 8 bits	35H	gage	
CRC(high 8 order)	0BH	CRC(low 8 order)	37H		
		CRC(high 8 order)	78H		

Operation of the display unit

1. Main function:
   - ◆ Display the value of linear gage
   - ◆ Can set tolerance with LED indicator
   - ◆ Tolerance can be outputted，can drive external LED or Relay
   - ◆ External zero
   - ◆ External control and lock function
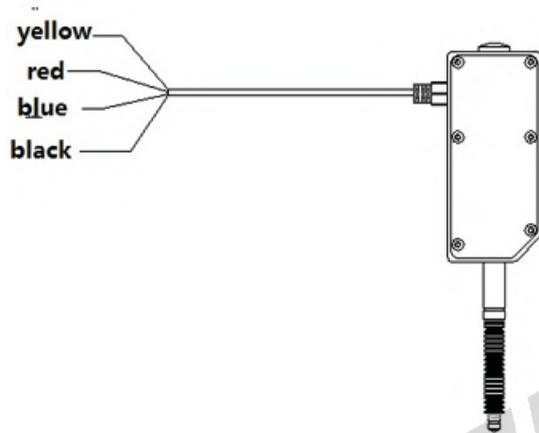   - ◆ External control tolerance output

2. Front plate
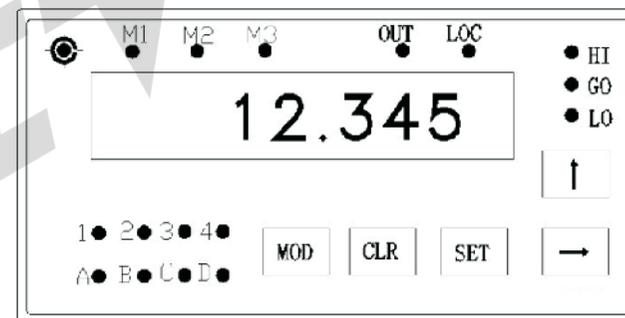
Four keys：
【MOD】 Mode key
【CLR】 Zero key
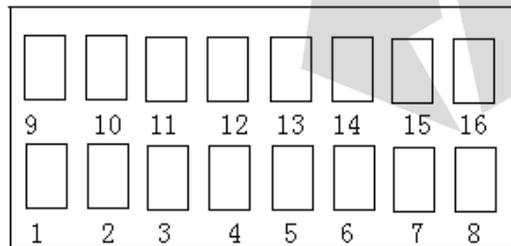【SET】 Setting key
【 → 】 Moving key
【 ↑ 】 Adjusting key/Alarm turn on/off

LED indicator
【HI】 Upper limit
【GO】 Within tolerance
【LO】 Lower limit
【M1】 Alarm on/off indicator
【LOC】 Frozen the value
【OUT】 Tolerance output

3. Types of connecting linear gage

The type of connecting the linear gage and the display unit is shown as below: please refer to the form: function of each pin.

4. Pins on the back of the display unit

Back

2 Display unit

Code	7106-1
Display	6 digits
Quantity of linear gages to be connected	1pc
Tolerance	set tolerance and make judgment with alarm and lights (out of upper limit, within tolerance, out of lower limit)
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)
Data output	connect to PC
Power supply	DC 9~24V

3 I/O pins circuit diagram
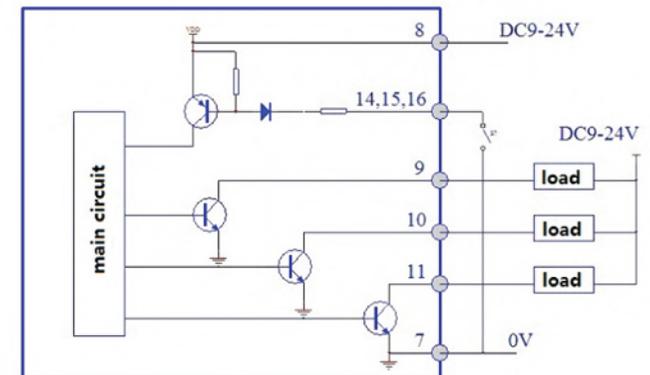
7.4 16(LOCK) is a pin for frozen the display. When input low level(or short-circuit with power in GND), the data will be locked, and light "LOC" light on. When linear gage touches workpiece stably, data can be locked through this pin even move the linear gage away.

7.5 Pin 15 and pin 16 can work with PLC, so it can be worked as an convenience system for selecting.

Specification

1 Linear gage

Code	7106-11	7106-12
Measuring range	12mm	12mm
Resolution	0.01mm	0.001mm
Accuracy	20μm	5μm
Hysteresis	10μm	2μm
Measuring principle	capacity system	
Voltage	5V	
Sample frequency	100 time/sec.	
Working life	ten million times	
Dust/waterproof	IP 65	
Measuring force	1.5N	
Cable length	2m	
Data output	four-core wire	

5. Function of each pin

Code	Function	Code	Function
1	Power output	9	HI(Tolerance output)
2	Power output GND	10	GO(Tolerance output)
3	Data OUT	11	LO(Tolerance output)
4	Data in	12	———
5	RXD	13	———
6	TXD	14	GLR(External zero)
7	Power in GND	15	OUTCLT(OUTPUT control)
8	Power in	16	LOCK(Frozen the display)

5.1 Please connect the lead wire to display unit as follow sequence.

Code	LEAD WIRE OF LINEAR GAGE
1	Yellow
2	Red
3	Blue
4	Black

5.2 Connect the conversion cable to display unit, black to pin 7 and red to pin 8, then plug the adapter to conversion cable.

5.3 Pin 5 and 6 are used for data output, they work as RS232 mode.

5.4 Short-circuit pin 14 and pin 7 can set zero.

5.5 Short-circuit pin 15 and pin 7 can make tolerance output invalid.

5.6 Short-circuit pin 16 and pin 7 can frozen the screen of display unit.

5.8 Tolerance output pins use open-collector mode, driver current is 20mA.

6. Operation

6.1 Value display：
Connect the linear gage 7106-11 or 7106-12 to display unit, plug in the AC/DC adapter. The value will be shown on the screen.

6.2 Zero:
Press【CLR】 to set zero or show preset value.

6.3 Tolerance setting and preset:
Press【SET】key and M3 indicator will light, now we can set tolerance. The left digit and LO indicator will flash, press adjusting key (up arrow) to set value and press moving key to move the cursor, press【MOD】to switch to【HI】and【GO】 tolerance. Press 【SET】 key again to finish the setting.
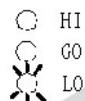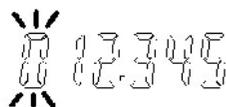
6 .4 Alarm turn on/off
Press adjusting key (up arrow) can turn on/off the alarm during measuring mode.

◆ Switch to the types of setting data:
Press【MODE】button, light "LO", light "HI" and light "GO" will cycling light one by one, "LO" means setting lower tolerance, "HI" means upper tolerance, "GO" means setting start value as zero, and also set the offset of zero.

The start value adds fixed value basing on zero, and it will display the value when set zero each time. If can not return to zero when setting zero, please check if set the start value or not. The usage is that you can set the start value as the standard workpiece size, when verify with this standard size, press set, then will display the standard value, then will display the actual size when measure each workpiece instead of deviation value.

After setting the upper and lower tolerance, it will compare the two value automatically, for the lower tolerance should be smaller than the upper one, so if wrong, it will warn error, see below picture:
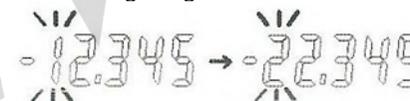
then it will auto return to the station of setting tolerance.

◆ Modify setting data
On above setting station, if the previous one lights, press button【↑】, it will switch between "0" and "-", so you can set plus or minus data

press button【→】, the light value will move to the right one, and also can cycling move, then press button【↑】, it will add one on the lighting value.

◆ Exit setup
After setting, press 【SET】 button, "M3" will light off, exit the tolerance setting station, then save the setting data.

6.5 Buzzer function control

Light "M1" means if the buzzer function works or not. If "M1" light, when the measuring data is out of tolerance, the buzzer chirping. "M1" light off, the buzzer function does not work any more. If it is not under setting station, press【→】 can control the "M1" light on or off.

7. Outer input control

7.1 Outer pin 14, 15, 16 are used for controlling display data input.

7.2 14(CLR) is used for setting zero, when input low level(or short-circuit with power in GND), the data will be clear.

7.3 15(OUTCLT)is the pin for output control when comparing the tolerance. If input low level, tolerance will not be output and light "OUT" off. If the linear gage does not touch the workpiece stably. Users can control the tolerance not output through this pin in case of wrong operations.