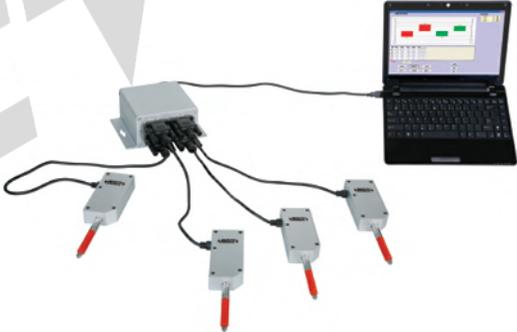




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**7107
MULTI LINEAR
GAGE SYSTEM
OPERATION MANUAL**



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Appendix: 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
```

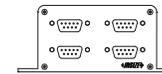
```
{
  int i, j;
  unsigned short crc, flag;
  crc=0xffff;
  for(i=0; i<n; i++)
  {
    crc^=frame[i];
    for(j=0; j<8; j++)
    {
      flag=crc&0x0001;
      crc>>=1;
      if(flag)
      {
        crc&=0x7fff;
        crc^=0xa001;
      }
    }
  }
  return(crc);
}
```

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

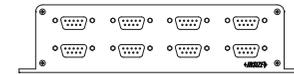
Introduction

- ◆ Multi channel interface box

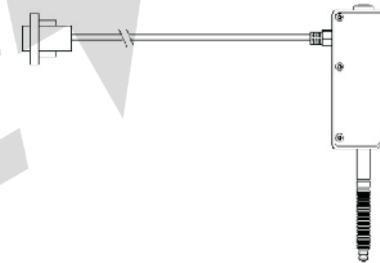
4-channel interface box
(Code 7107-1)



8-channel interface box
(Code 7107-2)



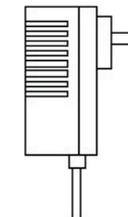
- ◆ Linear gage Plug-Type (Code 7107-11/12)



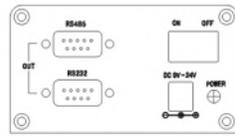
- ◆ Cable RS232 data port



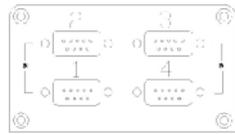
- ◆ Power 12V voltage power for multi channel interface box



◆ Plate

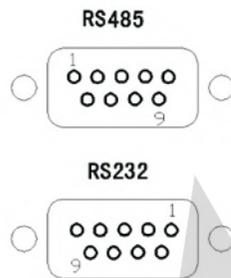


front plate



back plate

1. Power in and data output is on front plate, and two kinds data port RS232 and RS485 shows below:



RS232 data port		RS485 data port	
Code	Function	Code	Function
2	RXD	2	A(+)
3	TXD	3	B(-)
5	GND(ground)	5	GND(ground)

2. Linear gage connecting port is on the back plate.

Host command 80 06 02 02 00 01 F6 63		Multi channel interface box response 80 06 02 02 00 01 F6 63	
Address code	80H	Address code	80H
Function code	06H	Function code	06H
The first address access register	02H	The first address access register	02H
	02H		02H
Parity mode after modification	00H	Parity mode after modification	00H
	01H		01H
CRC(low 8 order)	F6H	CRC(low 8 order)	F6H
CRC(high 8 order)	63H	CRC(high 8 order)	63H

Note 1: Parity mode setting

- 0000H no parity, 2 bits stop bits
- 0001H odd parity, 1 bit stop bit
- 0002H even parity, 1 bit stop bit(factory default)

Note 2: In above example, the parity mode is odd parity.

Note 1: Address range setting of multi channel interface box 0001H00FEH (1254) Factory default is 0080H(128)

Note 2: In above example, address is modified from 80H to 01H.

2.3 Modify baud rate

(Before modify baud rate, remember to send key command first.)

Host command 80 06 02 01 00 01 06 63		Multi channel interface box response 80 06 02 01 00 01 06 63	
Address code	80H	Address code	80H
Function code	06H	Function code	06H
The first address access register	02H	The first address access register	02H
	01H		01H
Baud rate after modification	00H	Baud rate after modification	00H
	01H		01H
CRC(low 8 order)	06H	CRC(low 8 order)	06H
CRC(high 8 order)	63H	CRC(high 8 order)	63H

Note 1: Baud rate mode setting

0000H baud rate is 9600 0001H baud rate is 19200
0002H baud rate is 38400(factory default)

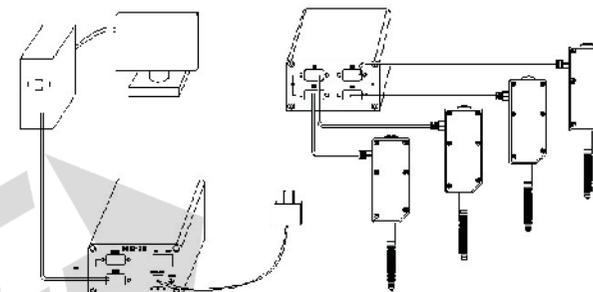
Note 2: In above example, set the baud rate 19200.

2.4 Modify parity mode

(Before modify parity mode, remember to send key command first.)

Operation of multi channel interface box

◆ Connect the multi channel interface box to PC or IPC



1. Connect to a standard data port PC with RS232 cable. And connect to an unusual data port PC with RS232 and USB cable, so the multi channel interface box can connect to USB port, then the computer can install the driver of the cable.

2. Data output refers to manual operation of output protocol

◆ Linear gage connect to PLC(programable logic controller)

The connecting type of linear gage to computer is the same with PLC to computer, connect the RS232 or RS485 port of the interface box to the port of PLC, and this protocol is standard MODBUS protocol, PLC can custom protocol to collect data of linear gages via serial communications. If PLC is equipped with MODBUS mode, communication is easier, and there is an example about PLC communication mode in appendix of this manual operation.

MODBUS output protocol of multi channel interface box

1. Data frame format: RTU mode
Baud rate: 38400
Data frames: 1start bit, 8pcs data bits, 2pcs stop bits
Note: Can send commands to modify baud rate and parity parameter of stop bits, and also can modify address of multi channel interface box
2. Read data of multi channel interface box
 - 2.1 Read data of 4-channel interface box

Host command 80 03 00 00 00 08 A4 1B		Multi channel interface box response 80 03 10 01 00 12 35 00 00 13 A6 01 00 14 16 00 00 14 B8 C8 58			
Address code	80H	Address code	80H		
Function code	03H	Function code	03H		
The first address access register	00H	Data bytes	10H		
	00H	Data 1 higher 8 bits	01H	Data of linear gage 1	Flat bit
Data bytes	00H	Data 1 higher 8 bits	00H		
	08H	Data 2 higher 8 bits	12H	Data of linear gage 2	Data (hexadecimal)
CRC(low 8 order)	A4H	Data 2 higher 8 bits	35H		
CRC(high 8 order)	1BH	Data 3 higher 8 bits	00H	Data of linear gage 3	Flat bit
		Data 3 higher 8 bits	00H		
		Data 4 higher 8 bits	13H	Data of linear gage 4	Data (hexadecimal)
		Data 4 higher 8 bits	A6H		
		Data 5 higher 8 bits	01H	Data of linear gage 3	Flat bit
		Data 5 higher 8 bits	00H		
		Data 6 higher 8 bits	14H	Data of linear gage 4	Data (hexadecimal)
		Data 6 higher 8 bits	16H		
		Data 7 higher 8 bits	00H	Data of linear gage 3	Flat bit
		Data 7 higher 8 bits	00H		
		Data 8 higher 8 bits	14H	Data of linear gage 4	Data (hexadecimal)
		Data 8 higher 8 bits	B8H		
		CRC(low 8 order)	C8H		
		CRC(high 8 order)	58H		

2 Internal parameter setting

2.1 Parameter key setting

(Before modify internal parameter, remember to send key command first then execute the modification command.)

Key command 80 06 08 06 AB 56 B4 8A		Multi channel interface box response 80 06 08 06 AB 56 B4 8A	
Address code	80H	Address code	80H
Function code	06H	Function code	06H
The first address access register	08H	The first address access register	08H
	06H		06H
Address of multi channel box after modification	ABH	Address of multi channel box after modification	ABH
	56H		56H
CRC(low 8 order)	B4H	CRC(low 8 order)	B4H
CRC(high 8 order)	8AH	CRC(high 8 order)	8AH

2.2 Setting address of multi channel interface box (Before modify address parameter, remember to send key command first)

Host inquiry command 80 06 02 00 00 01 A3 57		Multi channel interface box response 80 06 02 00 00 01 A3 57	
Address code	80H	Address code	80H
Function code	06H	Function code	06H
The first address access register	02H	The first address access register	02H
	00H		00H
Address of multi channel box after modification	00H	Address of multi channel box after modification	00H
	01H		01H
CRC(low 8 order)	A3H	CRC(low 8 order)	A3H
CRC(high 8 order)	57H	CRC(high 8 order)	57H

Inquiry command 80 03 02 00 00 04 5B A0		Multi channel interface box response 80 03 08 00 80 00 02 00 02 00 00 61 21		
Address code	80H	Address code	80H	
Function code	03H	Function code	03H	
The first address access register	02H	Data bytelength	08H	
	00H	Data 1 higher 8 bits	00H	Address of multi channel interface box ---note 1
Data byte length	00H	Data 1 higher 8 bits	80H	
	04H	Data 2 higher 8 bits	00H	Baud rate ---note 2
CRC(low 8 order)	5BH	Data 2 higher 8 bits	02H	
CRC(high 8 order)	A0H	Data 3 higher 8 bits	00H	Parity mode ---note 3
		Data 3 higher 8 bits	02H	
		Data 4 higher 8 bits	00H	—
		Data 4 higher 8 bits	00H	
		CRC(low 8 order)	61H	
		CRC(high 8 order)	21H	

Note 1: Address setting range of multi channel interface box
0001H00FEH (1254) factory default is 0080H(128)

Note 2: Baud rate setting
0000H baud rate is 9600
0001H baud rate is 19200
0002H baud rate is 38400(factory default)

Note 3: Parity mode setting
0000H no parity, 2 bits stop bits
0001H odd parity, 1 bit stop bit
0002H even parity, 1 bit stop bit(factory default)

Note:

1) It is a sample about 4-channel interface box with control unit above. The control unit send 8 data bytes inquiry command, and the multi channel interface box response 21 bytes, higher bit is first, and the yellow part are measuring data of 4 pcs linear gages.

2) Each measuring data includes 4 data bytes, the first byte is sign bit which stands for plus-minus, and the third and fourth bytes are measuring data of hexadecimal.

3) In above example, the four measuring data can convert to decimal:

Linear gage 1: 4661 Linear gage 2: 5030

Linear gage 3: 5142 Linear gage 4: 5304

For the resolution is 1μm, sign bit 01H of linear gage 1 and linear gage 2 means minus, so the actual shift length as below:

Linear gage 1: -4.661mm Linear gage 2: 5.030mm

Linear gage 3: -5.142mm Linear gage 4: 5.304mm

4) The factory initial code of address code is 80H(128 decimal), and address code can be modified according to command, after modification, the address code in command would be changed accordingly.

5) Native CRC is adopted as the 16 bits CRC test code, and the polynomial is $X^{16}+X^{15}+X^2+1$, and the detail example refers to appendix.

2.2 Read data of 8-channel interface box

Host command 80 03 00 00 00 10 5A 17		Multi channel interface box response 80 03 20 01 00 12 35 00 00 13 A6 01 00 14 16 00 00 14 B8 01 00 12 35 00 00 13 A6 01 00 14 16 00 00 14 B8 77 87			
Address code	80H	Address code	80H		
Function code	03H	Function code	03H		
The first address access register	00H	Data bytes	20H		
	00H	Data bit 1 to 2	01001235H	Data of linear gage 1	
Data byte length	00H	Data bit 3 to 4	000013A6H	Data of linear gage 2	
	08H	Data bit 5 to 6	01001416H	Data of linear gage 3	
CRC(low 8 order)	5AH	Data bit 7 to 8	000014B8H	Data of linear gage 4	
CRC(high 8 order)	17H	Data bit 9 to 10	01001235H	Data of linear gage 5	
		Data bit 11 to 12	000013A6H	Data of linear gage 6	
		Data bit 13 to 14	01001416H	Data of linear gage 7	
		Data bit 15 to 16	000014B8H	Data of linear gage 8	
		CRC(low 8 order)	77H		
		CRC(high 8 order)	87H		

Note:

- 1) The way of reading data from 8-channel and 4-channel is almost the same, the only different is the reading length is different.
- 2) Please refer to the introduction of 4-channel to process data.
- 3) For above, 8 measuring data can convert to decimal:
 Linear gage 1: -4.661mm Linear gage 2: 5.030mm
 Linear gage 3: -5.142mm Linear gage 4: 5.304mm
 Linear gage 5: -4.661mm Linear gage 6: 5.030mm
 Linear gage 7: -5.142mm Linear gage 8: 5.304mm
- 4) Native CRC is adopted as the 16 bits CRC test code, and the polynomial is $X^{16}+X^{15}+X^2+1$, and the detail example refers to appendix.

Reset of multi channel interface box

Host command 80 06 08 00 AB 56 6A B5		Multi channel interface box response 80 06 08 00 AB 56 6A B5	
Address code	80H	Address code	80H
Function code	06H	Function code	06H
The first address access register	08H	The first address access register	08H
	00H		00H
Reset command	ABH	Reset command	ABH
	56H		56H
CRC(low 8 order)	6AH	CRC(low 8 order)	6AH
CRC(high 8 order)	B5H	CRC(high 8 order)	B5H

- 1) This command can set zero of all four-channel linear gages.
- 2) The factory initial code of address code is 80H, and address code can be modified according to command, after modification, the address code in command would be changed accordingly.
- 3) Native CRC is adopted as the 16 bits CRC test code, and the polynomial is $X^{16}+X^{15}+X^2+1$, and the detail example refers to appendix.

Operation of internal parameter

1. Read internal parameter