User's Manual

Tuxon-S

GENERAL MEASURE

Ver. 2 / 2022 / 01

SAFETY PRECAUTION

WARNING
1. Use a lightning surge protector to avoid the risk or injury to operators and damage to instruments when lightning surge occurs frequently in the working environment.
2. Make sure the voltage of power supply is proper.
3. Ground the grounding terminal.
4. Carefully check all the wiring before the indicator is powered on.
5. In the case of smoke, abnormal smell or strange sound, immediately cut off the power.
CAUTION
1. Please do not install the indicator directly in the following environments: 1) Where the temperature or humidity exceeds allowed range. 2) Where the indicator's main body is easily affected by vibrations. 3) Where exist a mass of dust and powder, such as salt and iron power. 4) Places containing caustic, flammable and explosive das. 5) Where easily to be splashed by water, oil or chemicals.
2. Please take adequate shielding measures when the indicator is used at following locations: 1) Near power lines 2) Containing strong electrical field and magnetic field 3) Where static or relay noise is generated.
3. Please cut off the power of Indicator before doing the following operations: 1) Installation 2) Wiring 3) Dismounting

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1 General Description

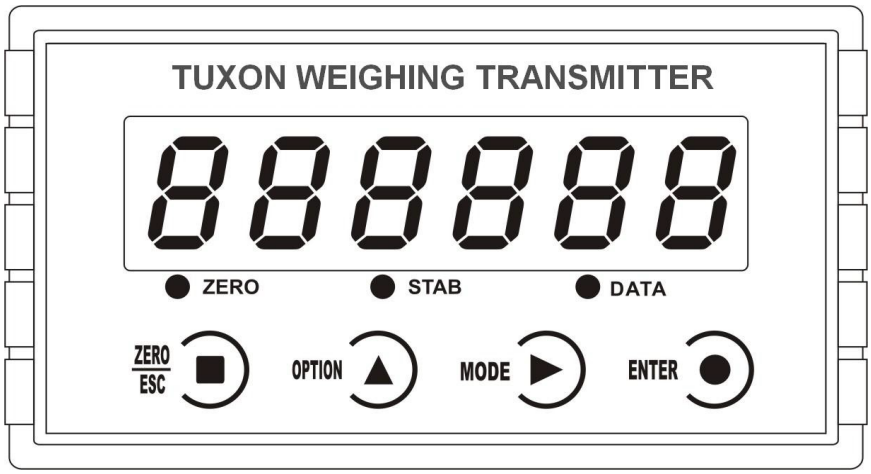
1.1 General Description

Tuxon-S weighing indicator is specially designed for weight transmitting in industrial fields. This indicator has the features of small volume, plenty communicating commands, stable performance, easy operation and practicability. It can be widely applied to concrete and bitumen mixing equipment, metallurgy furnace and converter, chemical industry and feed, etc. .

Functions and Characteristics

- Applicable to all kinds of resistance strain gauge bridge load cell.
- Front panel numerical calibration
- Multilevel of digital filter
- Automatic zero -tracking
- Automatically zero when powered on
- Serial communication interface:RS232 and RS485
- Calibration via serial interface

1.3 Front Panel



Keypad:

: Zero/Esc.

Zero Key: Used to clear display data.

Esc Key: Used to exit from current operation or go previous.

:Option Key. Used to scroll optional values of parameter.

And to make flashing digit increase 1 while data inputting.

:Function Selecting Key.

To make flashing position move to the right digit when data inputting.

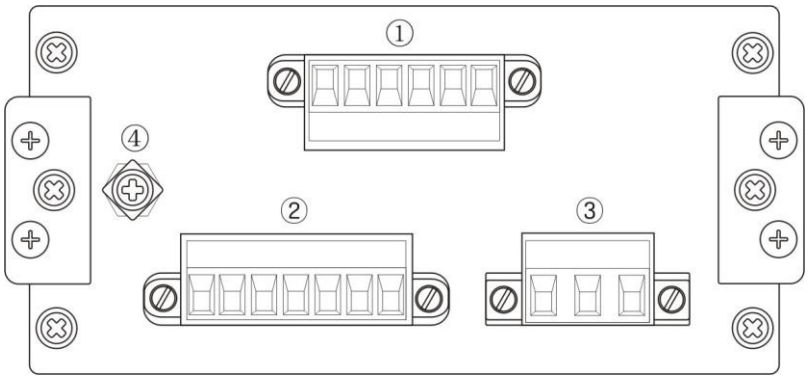
:Confirming Key. Used to confirm present operation.

Status Indicator Lamp:

- **ZERO:** Light on when present weight is within **0±1/4d**.
- **STAB:** Light on when changes of weight values are within the range of motion detecting during motion detecting time.
- **DATA:** Light on when indicator displays the value of D/A output.

Main Display: 6 digits, for displaying weight and the information of parameters.

1.4 Rear Panel



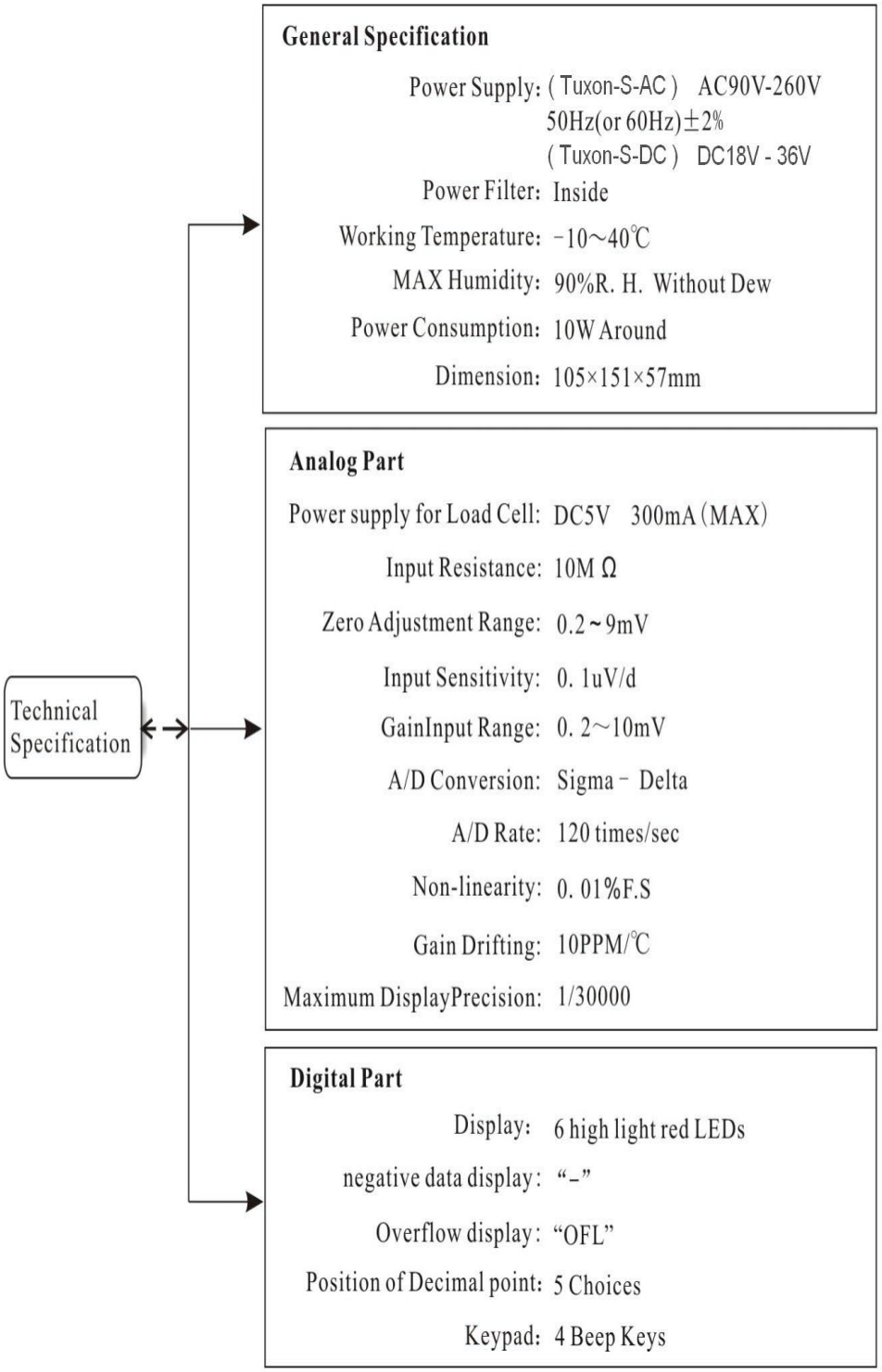
1. Serial Communication Connector/D/A Output Connector

2. Load Cell Connector

3. Power Supply Connector

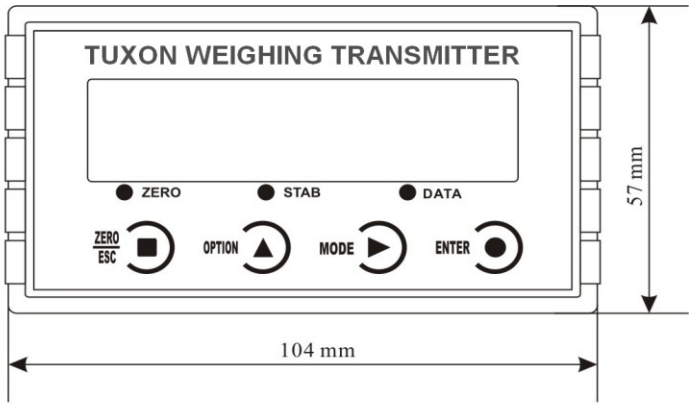
4. Grounding Terminal

1.5 Technical Specifications

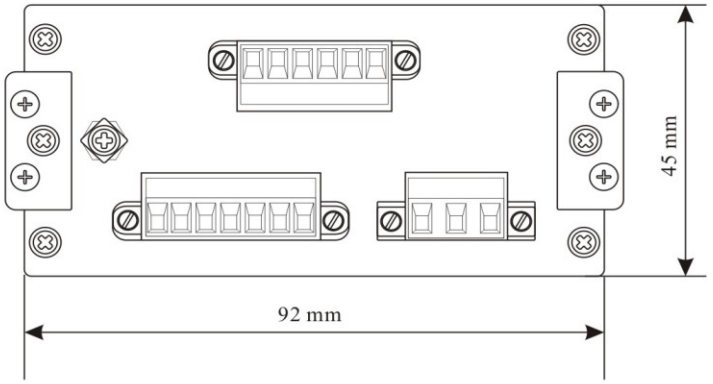


1.6 Dimensions of Indicator

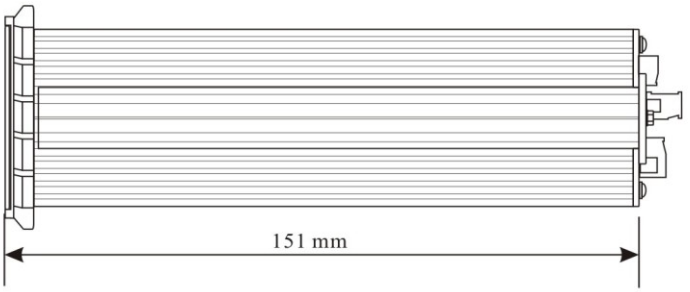
Dimension of Front Panel



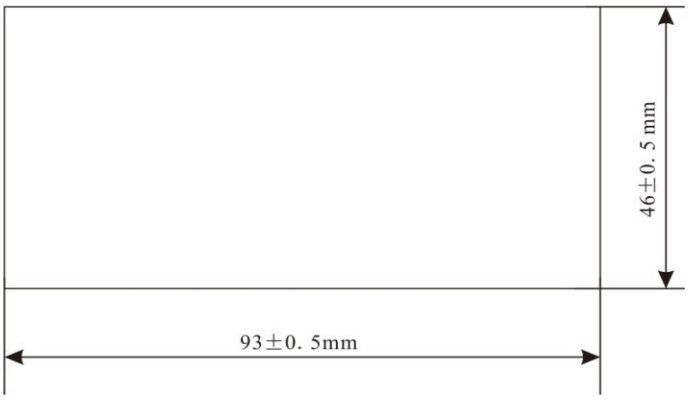
Dimension of Rear Panel



Side View Dimension

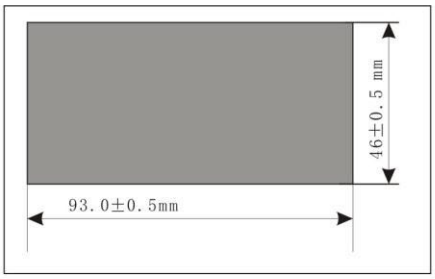


Panel Cutout Dimension

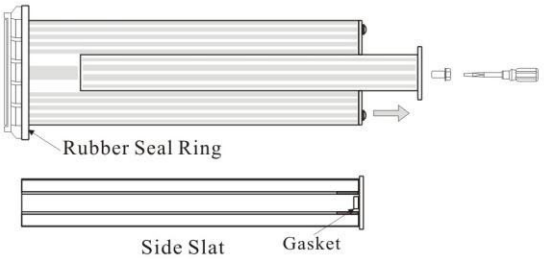


2 Installation and Wiring

2.1 How to Install Indicator

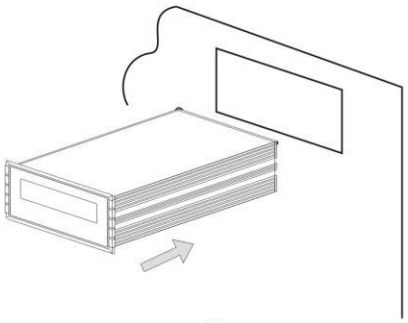


1.Make a cutout on the panel of control box according to the left dimension.

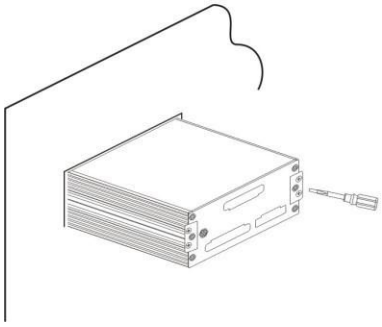


2. Unscrew the screws and take down the side slates.

Note: If there is no rubber seal ring, please take the gasket out.



3. Install the indicater into the control box from front.



4. Insert the side slates into indicator and then lock them with screws.

2.2 Connection of Power Supply

1. AC power must have the grounding protection.
2. Do not connect the ground wire of indicator directly to the GND of other equipments.

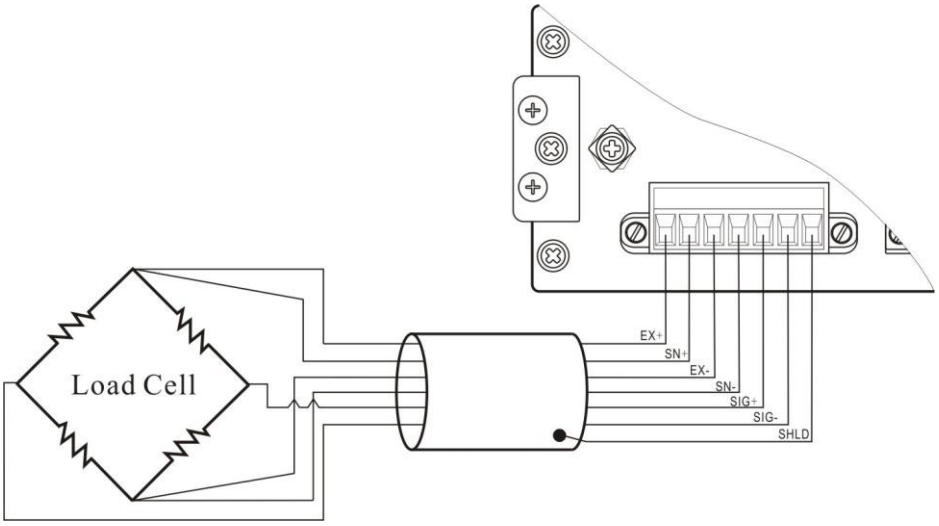
2.3 Connection of Load Cell

Please refer to the picture below to connect load cells to Tuxon-S. When you use 4-wired load cells, you must bridge the SN+ with EX+ and bridge the SN- with EX-.

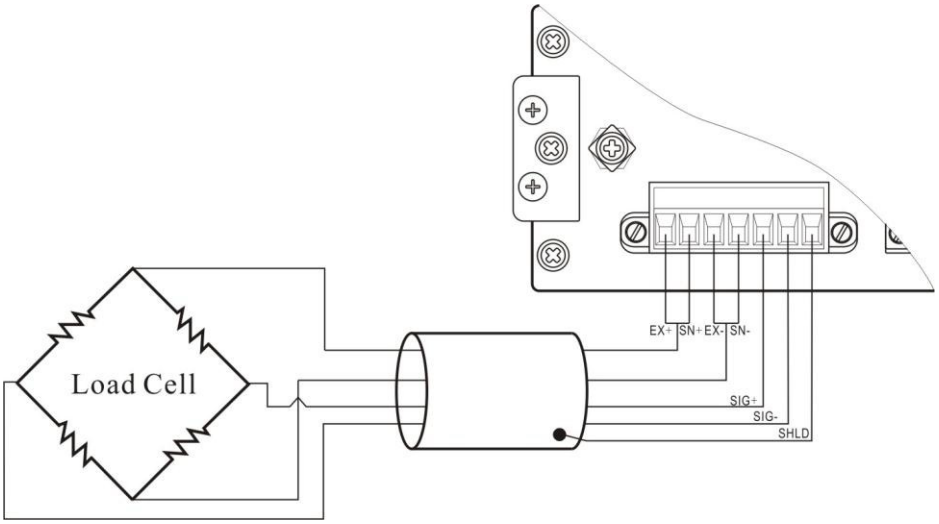
The signal definition of each port of the load cell connector is as follows:

Port	EX+	SN+	EX-	SN-	SIG+	SIG-	SHLD
Definition	Excitation+	Sense+	Excitation-	Sense-	Signal+	Signal-	Shield

2.3.1 6-wired Connection



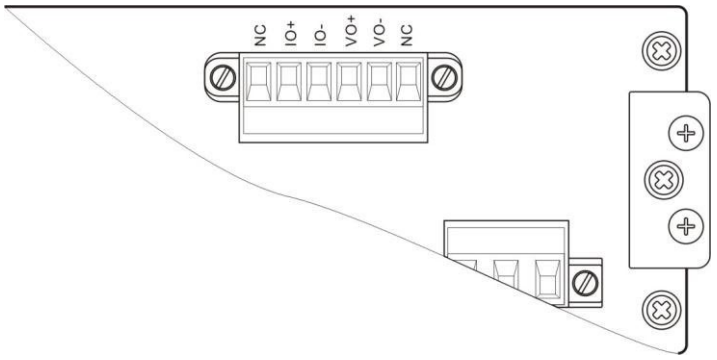
2.3.2 4-wired Connection



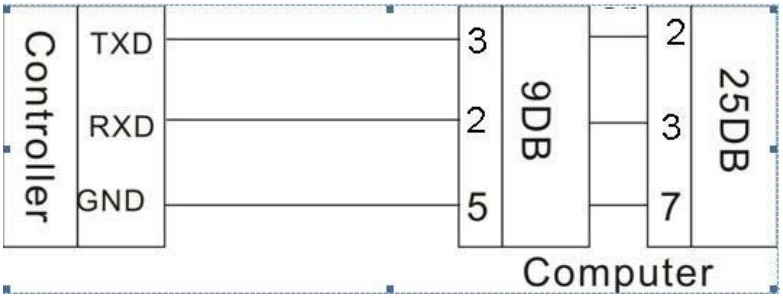
1. The signals from the load cells are low voltage analog signals, which are easily affected by electro-noise, so the cables connecting load cells to indicator should use shielded cables, and not bind with other cables, especially power supply cables.
2. For the application of short-transporting-distance and lower precision, 4-wired connection can be used; otherwise, 6-wired should be used.
3. Make sure EX+ bridges with SN+ and EX- bridges with SN- when 4-wire connection is used.
4. For the application of multi-load cell in parallel connection, the sensitivity of each load cell (mV/V) must be same.

2.4 Connection of Serial Interface

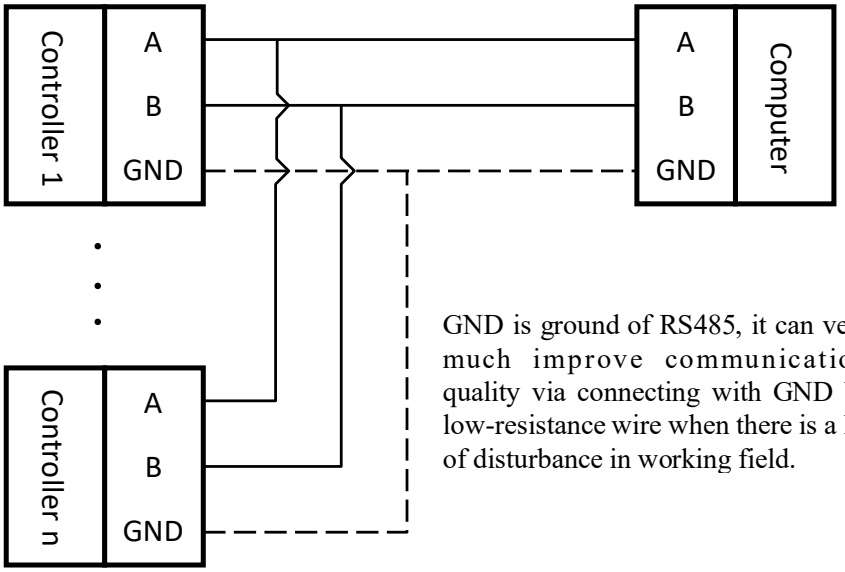
Tuxon-S supplies one serial interface that can be chosen as RS232 or RS485. The definition is as follows:



RS-232 Connection:



RS-485 Connection:



GND is ground of RS485, it can very much improve communication quality via connecting with GND by low-resistance wire when there is a lot of disturbance in working field.

3 Calibration

3.1 Instruction

(1) Calibration procedure must be executed when a Tuxon-S indicator is put in use at the first time, the preset parameters may no longer meet the user's needs, and any part of the weighing system was changed. Position of decimal point, minimum division, maximum capacity, zero, and gain can be set and confirmed through calibration.

(2)During calibration, if you want to skip one parameter to next one, press 

directly. If you want to set only one parameter, please press 

to save parameter's value and then press 

to exit.

(3)Please see section **3.7** for parameters' instruction.

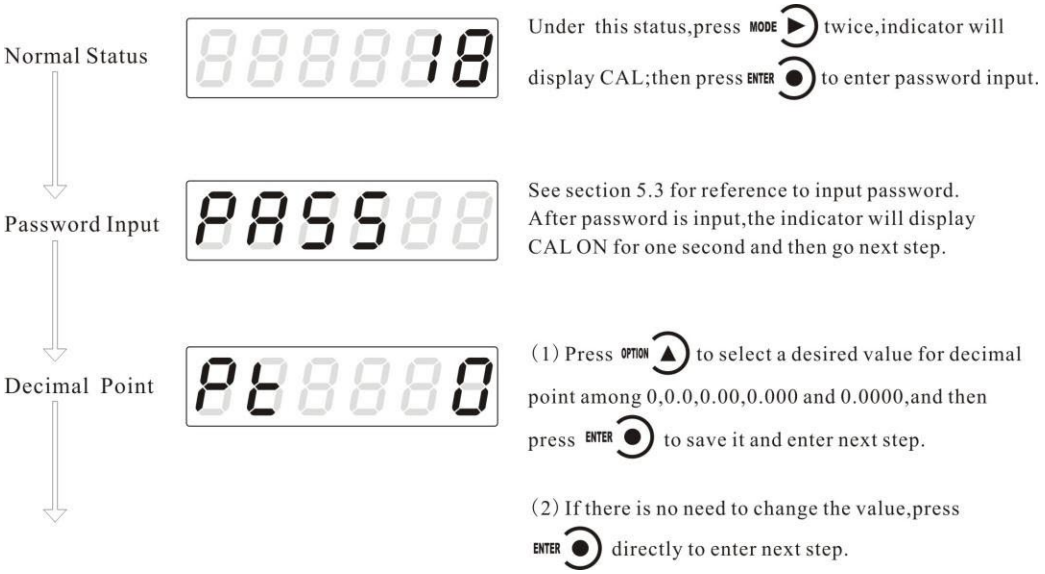
(4)Please record each value in the blank table in section **3.7** during calibration for the

emergency use in future.

(5) See chapter 8 for error alarm message that may be displayed during calibration.

3.2 Flow Chart of Calibration

3.2.1 Flow Chart of Calibration forTuxon-S



Min. Division

(1) Press OPTION ▲ to select a desired value for min. Division among 1,2,5,10,20 and 50 ,and then press ENTER ● to save it and enter next step.

(2) If there is no need change the value,press ENTER ● directly to enter next step.

Max. Capacity

(1) After a desired value of max.capacity is input, press ENTER ● to save it and enter next step.

(2) If there is no need to change the value,press ENTER ● directly to enter next step.

Millivolt Value Display

(1) Under this status,press ENTER ● to enter zero calibration.

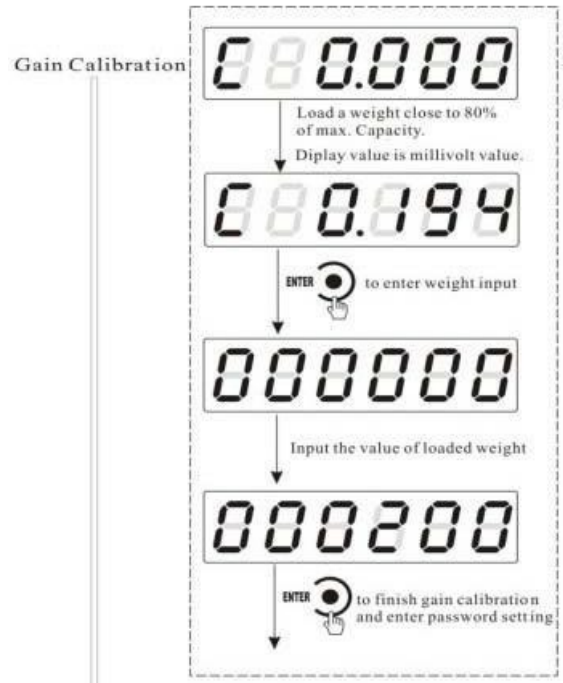
(2) Display value near the output value in millivolt between SIG+ and SIG- of load cell.

See section 3.3 for details about this function.

Zero Calibration

(1) Unloaded scale first,when STAB lamp is on press ENTER ● to finish zero calibration.

(2) If there is no need to calibration zero,press ZERO/ESC ■ directly to enter gain calibration.



(1) the process of gain calibration is shown as left flow chart.

(2) If there is no need to do gain calibration , press ZERO ESC directly to enter password setting.

serial ports calibration switch

S 1OCAL

(1) Press ENTER to enter setting interface,

then press OPTION to choose the switch position.

Press ENTER to set password.

(2) If don't need to set password,

pls press ZERO ESC to back to normal status.

Password Setting

PASS 88

(1) See section 5.4 for reference to set password.

(2) If there is no need to set calibration , press ZERO ESC directly to go back to normal status.

Normal Status

200

Weight Display

3.3 Millivolt Value Display

This function is mainly used for system test, position-error test for weighing mechanism and linearity test for load cell.

1. System Test

(1) If display data changes with loaded weight changes, it shows that connection of load cell is correct and weighing mechanism works well.

(2)If display value is OFL (or –OFL), it means that loaded weight on load cells is too large (or too small). Please unload the weight (or load more), if display value is still OFL (or –OFL), the possible reasons are as follows:

a. There is something wrong with weighing mechanism, please check and clear.

b. The connection of load cell is incorrect, please check and clear.

c. Load cells may be damaged, please replace.

2. Position-error Test for Weighing Mechanism

Load a same weight on each corner of weighing mechanism and record displayed millivolt value respectively. If differences among these values are obvious, please adjust weighing mechanism.

3. Linearity Test for Load Cell

Load same weight for several times, and record displayed value every time. If one or two values are obviously much larger or smaller than any others, it means that the linearity of load cell is bad.

***NOTE: You must use 

to zero display data before weight is loaded for each time.**

3.4 Calibration with Weights

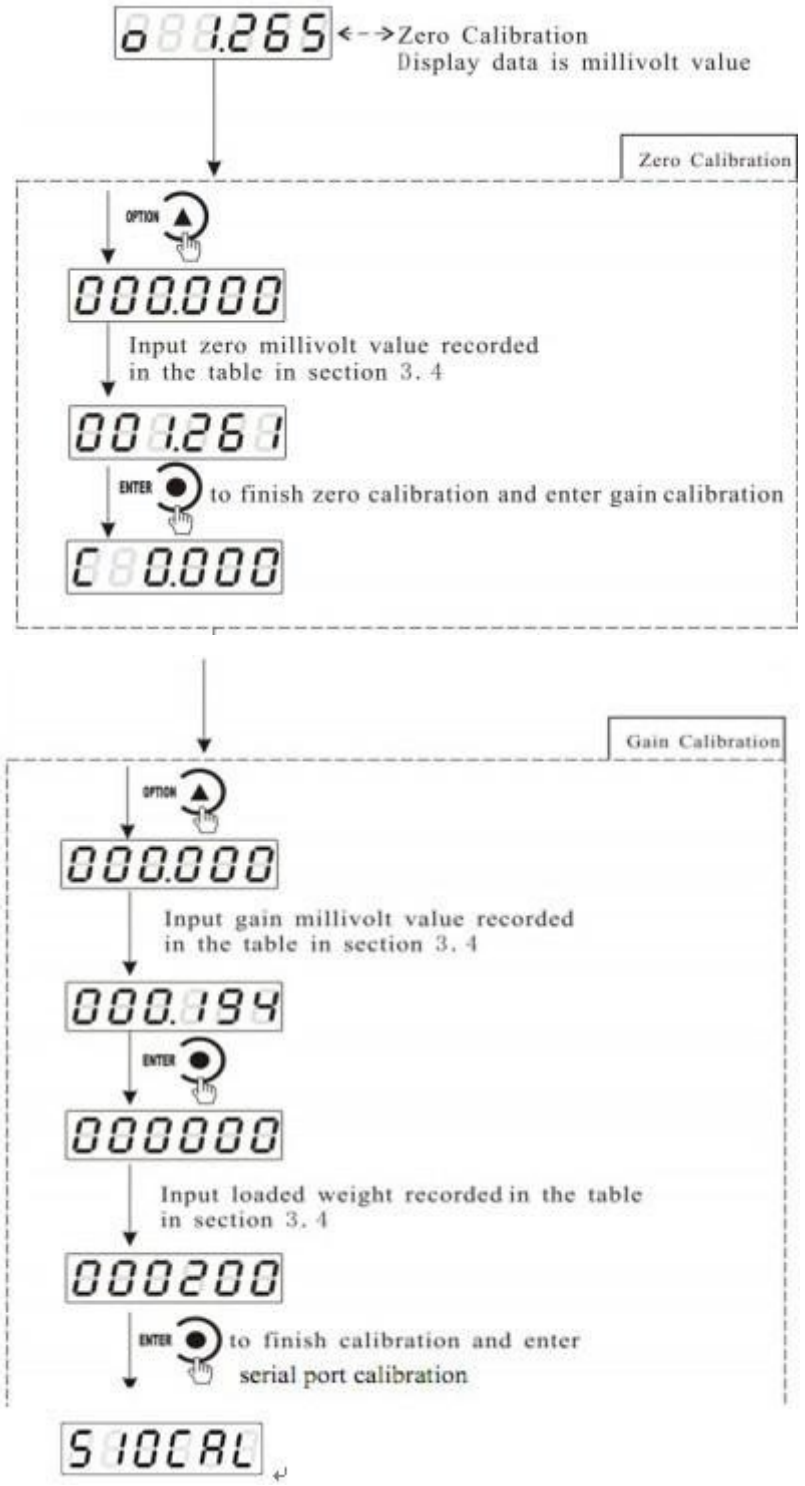
During calibration with weight，please record the zero millivolt value, gain millivolt value and the loaded weight value in the blank table below. If it is not convenient to load a weight to calibrate, these values can be used for calibration without weights.

	Zero millivolt value(mV)	Gain millivolt value(mV)	Loaded Weight	Date	Remarks
1					
2					
3					
4					
5					

3.5 Calibration without Weights

When it is not convenient to load a weight to calibrate, calibration can be done without weights using recorded data in the table in section 3.4. However, this method is just used for some emergencies, it will make calibration result incorrect if load cells, or indicator has been replaced.

3.5.1 Calibration without Weights for Tuxon-S



3.6 Calibration Switch for Communication Interface

When calibrate the transmitter through serial port(Rs、SP1 or Modbus), must set to **"ON"** status for the calibration switch for communication interface.

3.7 Explanation for Calibration Parameters

Symbol	Parameter	Value of parameter	Default
Pt	Decimal Point	0/ 0.0/ 0.00/ 0.000 /0.0000	0
1d=	Min. Division	1/ 2/ 5 /10 /20 /50	1
CP	Max. Capacity	≤Min. Division×30000	10000
t	Millivolt Value		
o	Zero		
c	Gain		
	Switch for Calibration Via Serial Interface (only for Tuxon-S)		
	Password Setting		

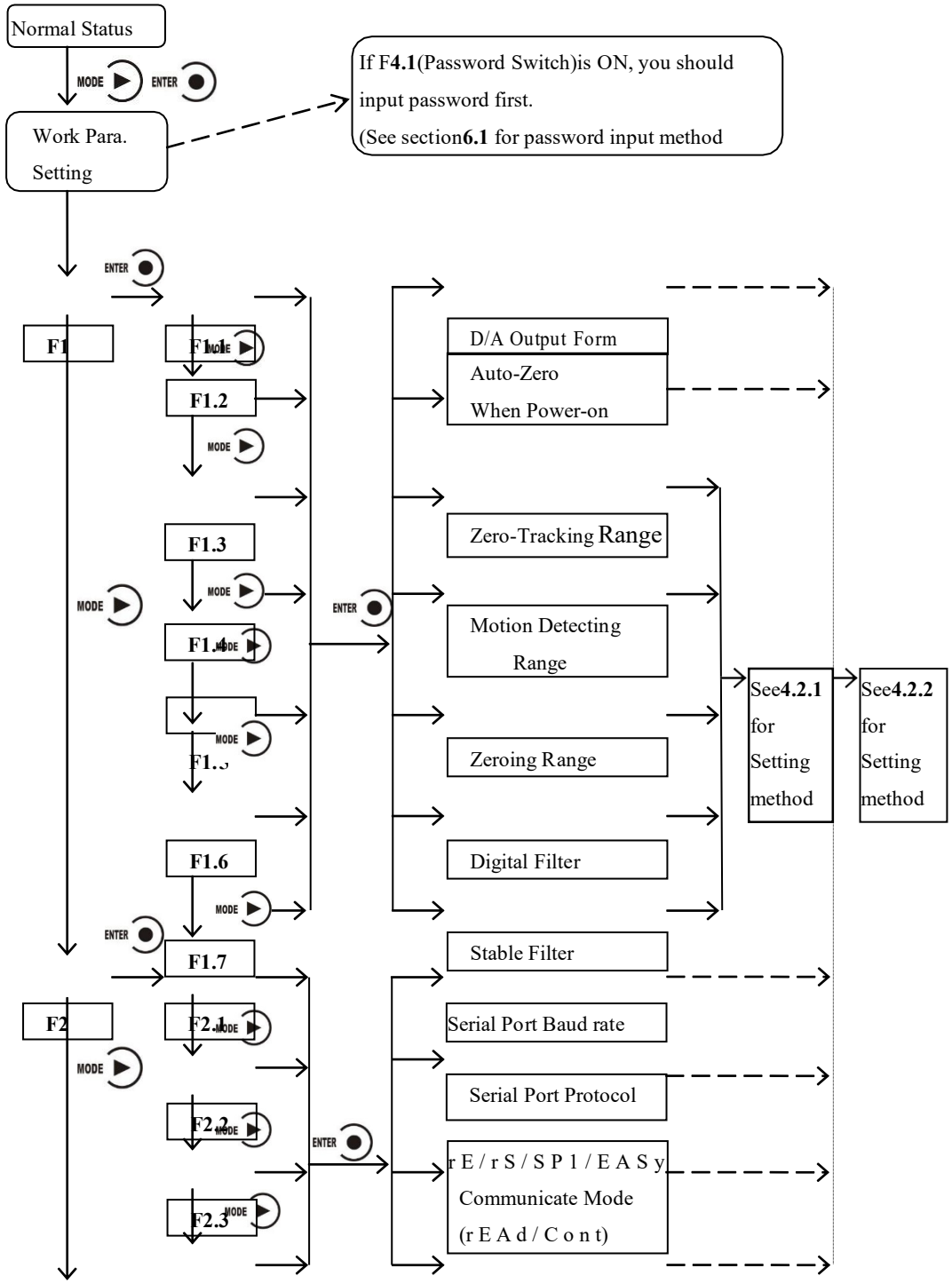
3.8 Log Table for Calibration Parameters

Parameter	Calibrated Value	Date	Remarks
Decimal Point			
Min. Division			
Max. Capacity			
Password			

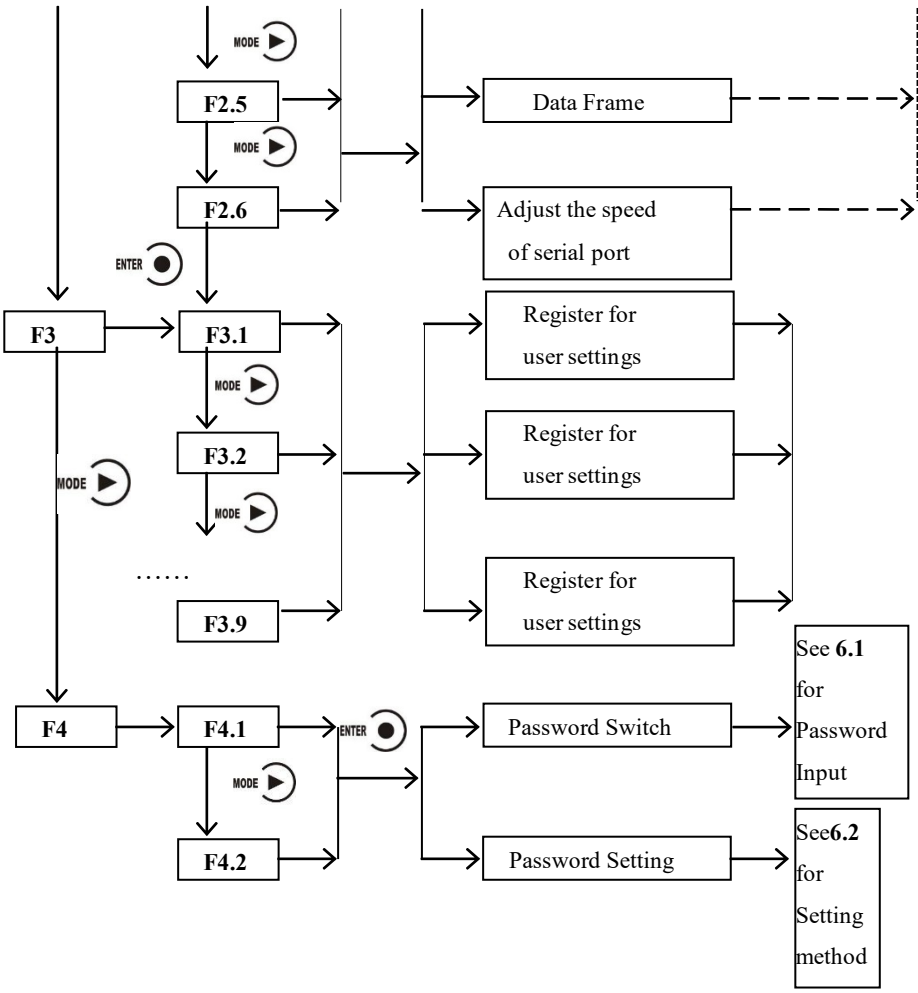
4 Working Parameters Setting

4.1 Flow Chart of Working Parameters Setting

4.1.1 Setting Flow Chart for Tuxon-S

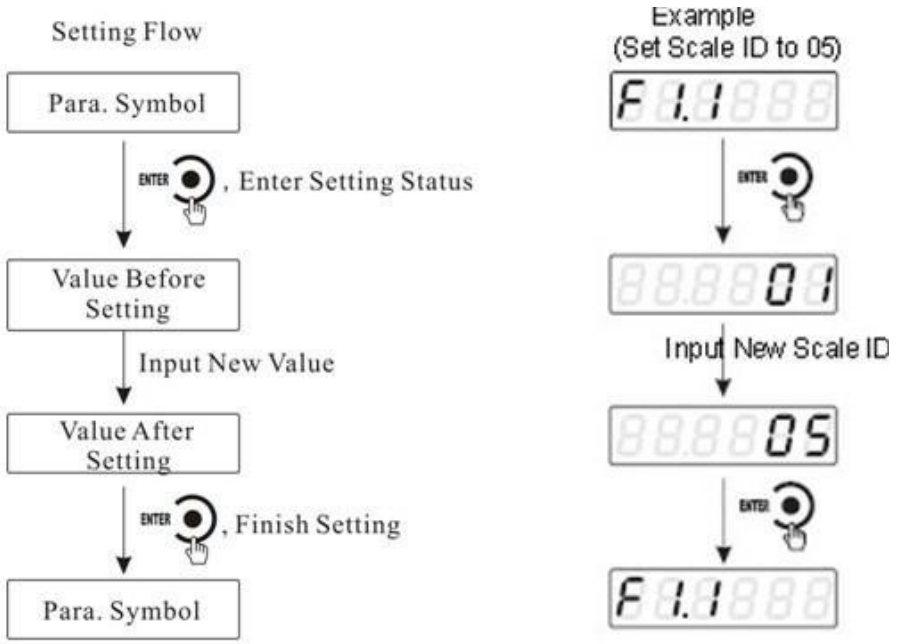


F2.4	Modbus Protocol (r t U / A S C)

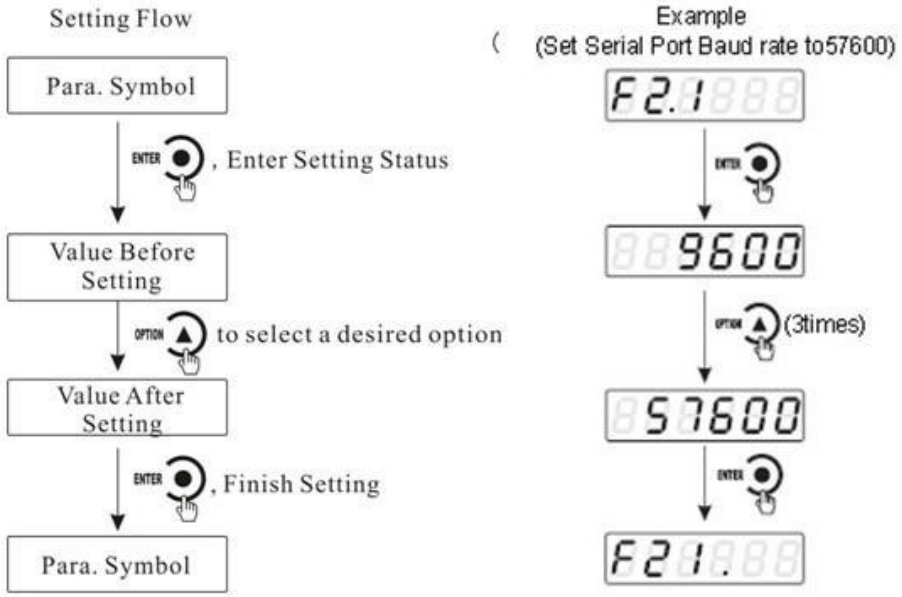

MODE
F2.5
MODE
F2.6
ENTER
F3
F3.1
MODE
F3.2
MODE
MODE
.....
F3.9
F4
F4.1
MODE
F4.2
ENTER
Data Frame
Adjust the speed of serial port
Register for user settings
Register for user settings
Register for user settings
Password Switch
Password Setting
See 6.1 for Password Input
See6.2 for Setting method

4.2 Parameter Setting Method

4.2.1 Data Input Method



4.2.2 Option Selecting Method



5 Serial Communication

Tuxon-S has one serial interface, that can be chosen as RS232 or RS485 through the two switches on the serial interface board.

There are five communication protocols : rS protocol; rE protocol; Modbus protocol ; EASy protocol; SP1 protocol.

5.1 EASy Protocol

Communication mode can be set as continuous mode “Cont” or command mode ”Read”. The communication protocol as follows:

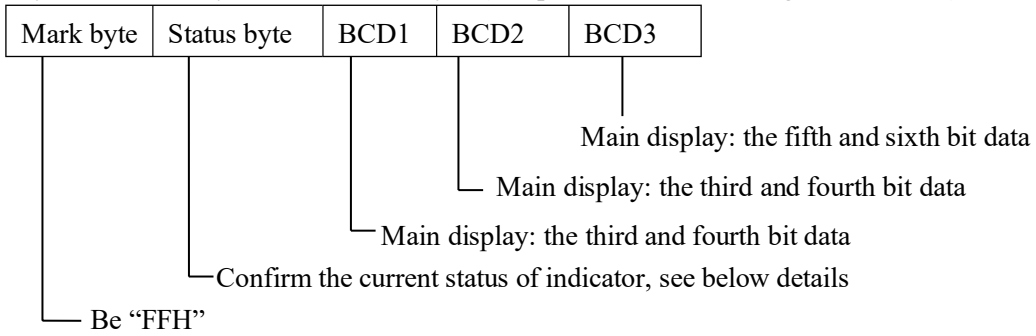
Data Frames：	8data bits, 1 stop bit, Even parity (8 E-1)
	8data bits, 1 stop bit, Odd Parity (8 O-1)
	8data bits, 1 stop bit, No Parity (8 n-1)
	8data bits, 2 stop bit, No Parity (8 n-2)

Baud Rate：**1200**,**2400**, **4800**, **9600**, **19200**, **38400**, **56700(Optional)**

Code：binary system

5.1.1 Continuous Mode “Cont”

Under this mode, the indicator will transmit collected data to upper computer automatically without command. A complete data frame consists of five bytes: one Mark byte; one status byte and three data bytes(compressed BCD code, high-order ahead)



The definition of “Status byte”:

Status byte(binary system)									
D7	D6	D5	D4	D3	D2 D1 D0				
no	zero	overflow	stable	plus-minus	current decimal position				
Fixed” 0”	0:not zero 1:zero	0:normal 1:overflow	0:stable 1:unstable	0:plus 1:minus	0 -4 bit				
					100	011	010	001	000
					4 bits	3 bits	2 bits	1 bit	0 bit

For example:

When the transmitter sends out hexadecimal data as below:

Data frames: FF 03 00 12 34

Refer to data frame form, we know the main display of the indicator will be:1234 the status byte will be:03	Status byte:03 hexadecimal binary 03 ←----→ 0 0 0 0 0 01 1 Refer to the above form, we know the current status of indicator: not zero、not overflow、stable、current decimal 3bits

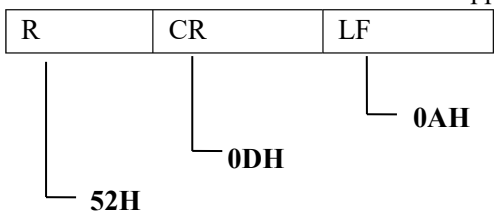
From the above，it indicates the current indicator:

Not zero、not overflow、stable status、current main display is: 1.234

5.1.2 Command mode ”Read”

Under this mode, the indicator will transmit collected data to upper computer only when receive command.

The command data frame format from upper computer is as following:



Response from the indicator:

The data frame is just the same as that when Continuous Mode .

For example:

Command data frame from upper computer: 52 0D 0A

Response data frame from indicator: FF 03 00 12 34

Then we know the current status of indicator:

Not zero、not overflow、stable status、current main display is: 1.234

5.2 rE Protocol

Communication mode can be set as continuous mode “Cont” or command mode ”Read”. The communication protocol as follows:

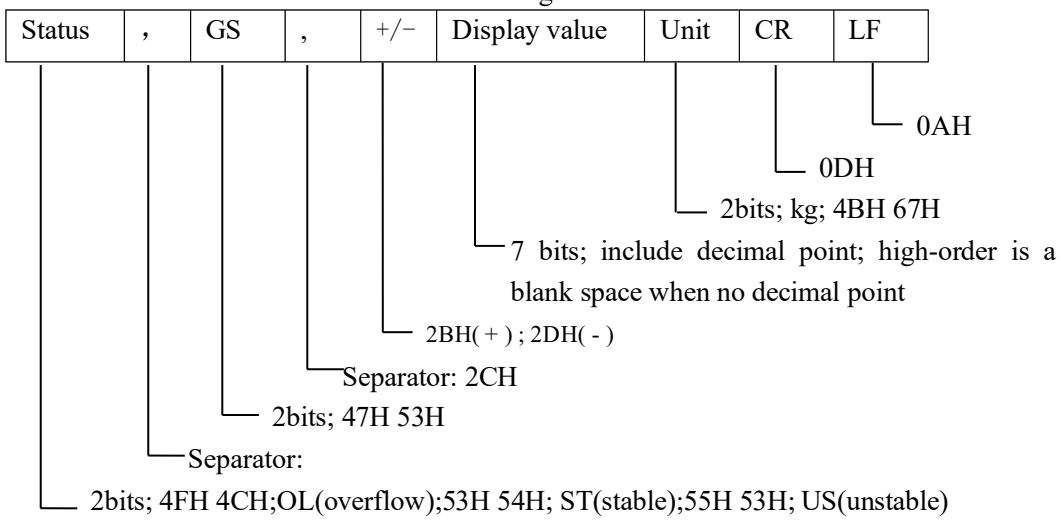
Data Frames：	8data bits, 1 stop bit, Even parity (8 E-1)
	8data bits, 1 stop bit, Odd Parity (8 O-1)
	8data bits, 1 stop bit, No Parity (8 n-1)
	8data bits, 2 stop bit, No Parity (8 n-2)
	7 data bits, 1 stop bit, Even parity (7 E-1)
	7 data bits, 1 stop bit, Odd parity (7 O-1)
	7 data bits, 2 stop bit, No Parity (7 n-2)

Baud Rate：**1200**,**2400**, **4800**, **9600**, **19200**, **38400**, **56700(Optional)**

Code：ASCII Code

5.2.1 Continuous Mode “Cont”

Under this mode, the indicator will transmit collected data to upper computer automatically without command. The data frame as following:



For example:

When the transmitter sends out a date sequence as below:

53 54 2C 47 53 2C 2B 30 31 31 2E 31 32 30 4B 67 0D 0A

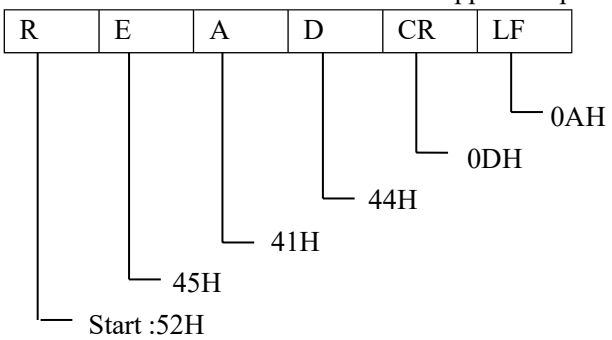
Then we know the current status of indicator is:

Stable; data is positive number; current weight value is11.120kg

5.2.2 Command mode ”Read”

Under this mode, the indicator will transmit collected data to upper computer only when receive command.

The command data frame format from upper computer is as following:



Response from the indicator:

The data frame is just the same as that when Continuous Mode .

For example:

Command data frame: 52 45 41 44 0D 0A

Response data frame: 53 54 2C 47 53 2C 2B 30 31 31 2E 31 32 30 4B 67 0D 0A

Then we know the current status of indicator:

Stable; data is positive number; current weight value is11.120kg

5.3 rS protocol

Communication mode can be set as continuous mode “Cont” or command mode ”Read”. The communication protocol as follows:

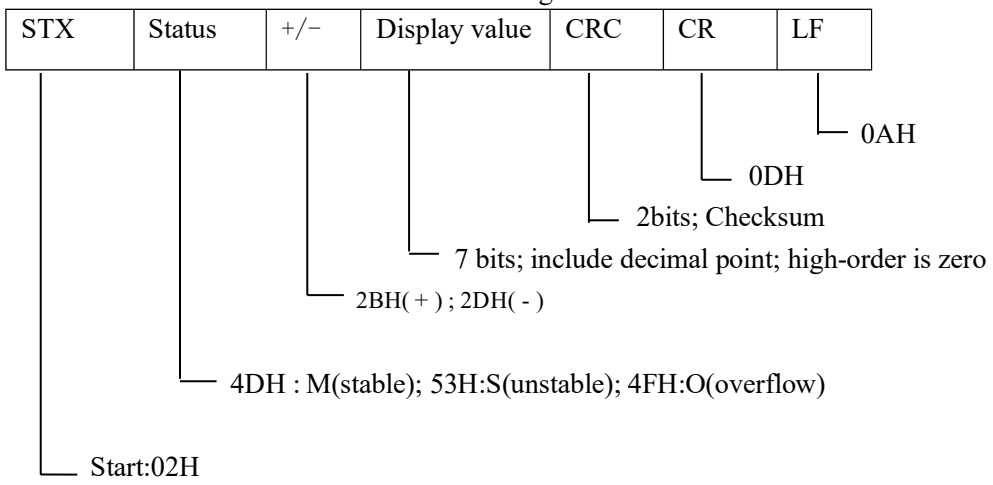
Data Frames：	8data bits, 1 stop bit, Even parity (8 E-1)
	8data bits, 1 stop bit, Odd Parity (8 O-1)
	8data bits, 1 stop bit, No Parity (8 n-1)
	8data bits, 2 stop bit, No Parity (8 n-2)
	7 data bits, 1 stop bit, Even parity (7 E-1)
	7 data bits, 1 stop bit, Odd parity (7 O-1)
	7 data bits, 2 stop bit, No Parity (7 n-2)

Baud Rate：**1200**，**2400**，**4800**，**9600**，**19200**，**38400**，**56700(Optional)**

Code：ASCII Code

5.3.1 Continuous Mode “Cont”

Under this mode, the indicator will transmit collected data to upper computer automatically without command. The data frame as following:



For example:

When the transmitter sends out a date sequence as below:

02 4D 2B 30 31 30 2E 37 36 30 37 30 0D 0A

Then we know the current status of indicator is:

Stable; data is positive number; current weight value is10.760

5.3.2 Command mode ”Read”

Under this mode, the indicator will transmit collected data to upper computer only when receive command.

5.3.2 .1 Reading the current status of transmitter

Reading Command:

STX	Scale ID	R	S	CRC	CR	LF

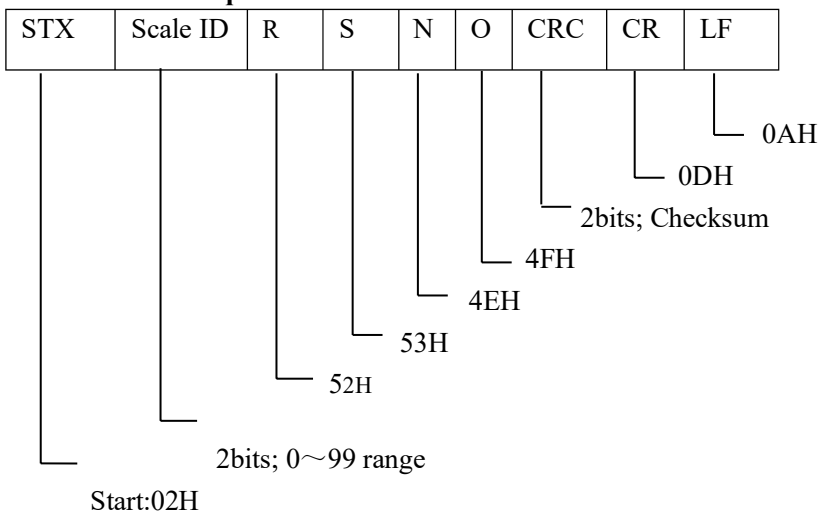
- LF: 0AH
- CR: 0DH
- CRC: 2bits; Checksum
- S: 53H
- R: 52H
- Scale ID: 2bits; 0～99 range
- STX: Start:02H

Received data sequence is correct:

STX	ScaleID	R	S	000	Status	Display value	CRC	CR	LF

- LF: 0AH
- CR: 0DH
- CRC: 2bits; Checksum
- Display value: 6bits; include decimal point; high-order is "-" when display value is minus
- Status: 4DH:M(stable); 53H:S(unstable); 4FH:O(overflow)
- 000: 3bits;30H 30H 30H
- S: 53CH
- R: 52H
- ScaleID: 2bits; 0～99 range
- STX: Start: 02H

Received data sequence is incorrect:



For example:

Reading command:

02 30 31 52 53 36 34 0D 0A

Response when received data is correct:

02 30 31 52 53 30 30 30 4D 2D 30 32 32 35 35 38 34 0D 0A

Indicates the status of transmitter:

1#scale;stable status; main display is:2.255

Reading command:

02 30 31 52 53 36 34 0D 0A

Response when received data is incorrect:

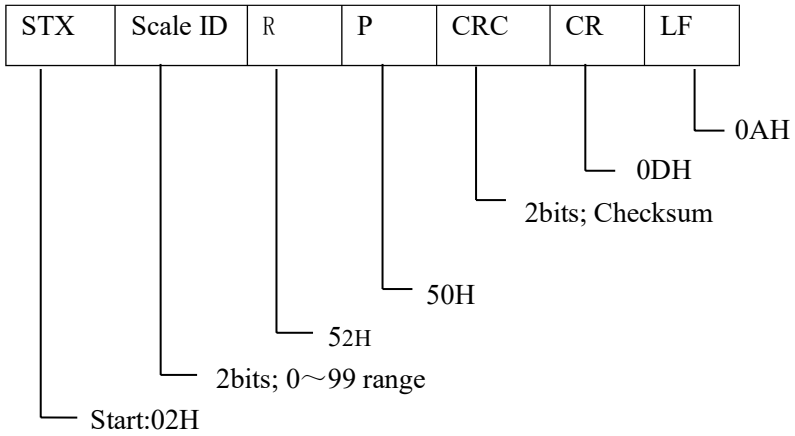
02 30 31 52 53 4E 4F 32 31 0D 0A

Indicates:

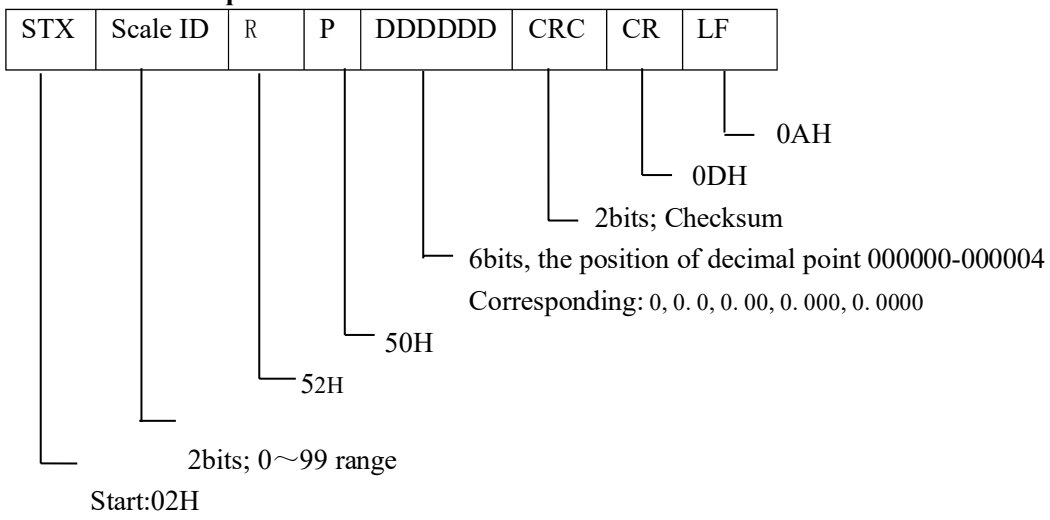
1#scale received data is wrong.

5.3.2 .2 Reading decimal point

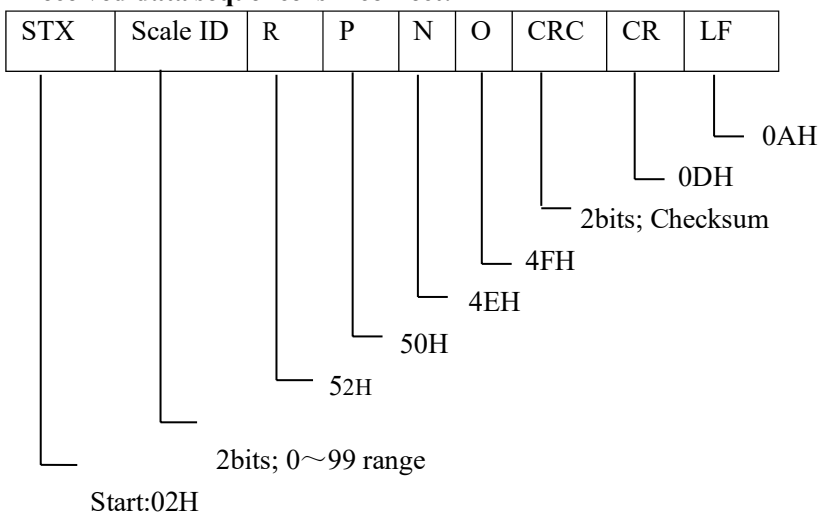
Reading command:



Received data sequence is correct:



Received data sequence is incorrect:



For example:

Reading command:

02 30 31 52 50 36 31 0D 0A

Response when received data is correct:

02 30 31 52 50 30 30 30 30 30 33 35 32 0D 0A

Indicates :

The position of decimal point: 3

Reading command:

02 30 31 52 50 36 31 0D 0A

Response when received data is incorrect:

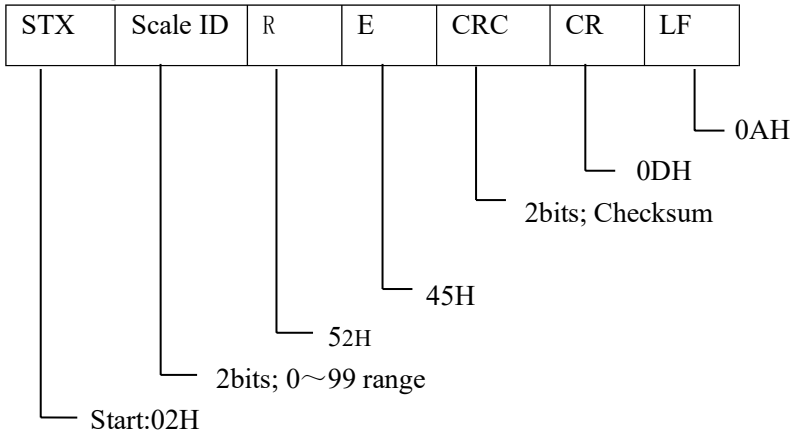
02 30 31 52 50 4E 4F 31 38 0D 0A

Indicates:

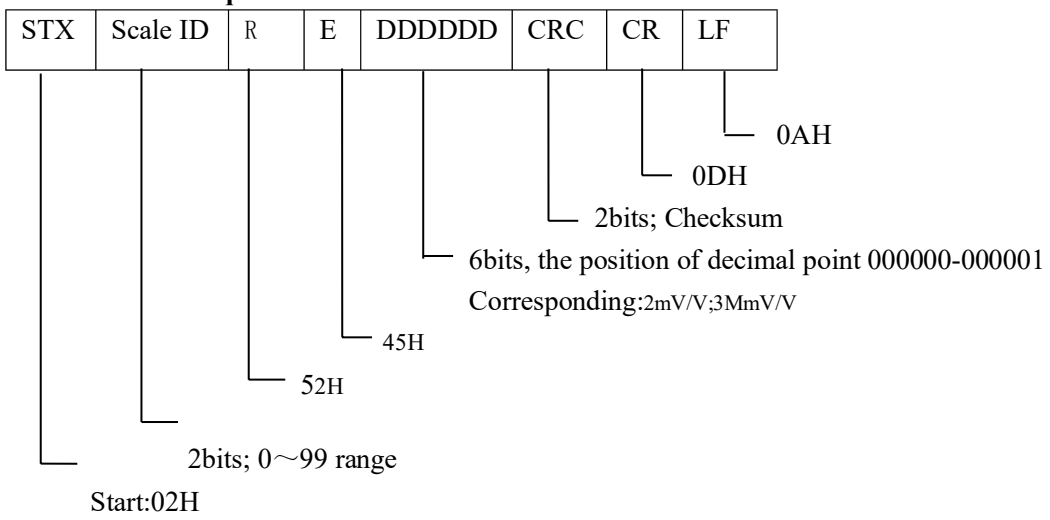
1#scale received data is wrong.

5.3.2.3 Reading the sensitivity of sensor

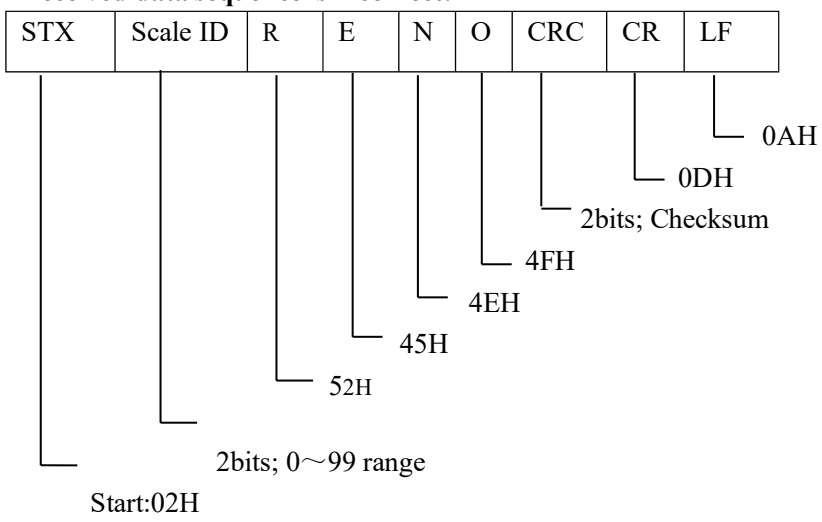
Reading command:



Received data sequence is correct:



Received data sequence is incorrect:



For example:

Reading command:

02 30 31 52 45 35 30 0D 0A

Response when received data is correct:

02 30 31 52 45 30 30 30 30 30 30 33 38 0D 0A

Indicates :

1#scale;current millivolt of sensor is: 2mV/V

Reading command:

02 30 31 52 45 35 30 0D 0A

Response when received data is incorrect:

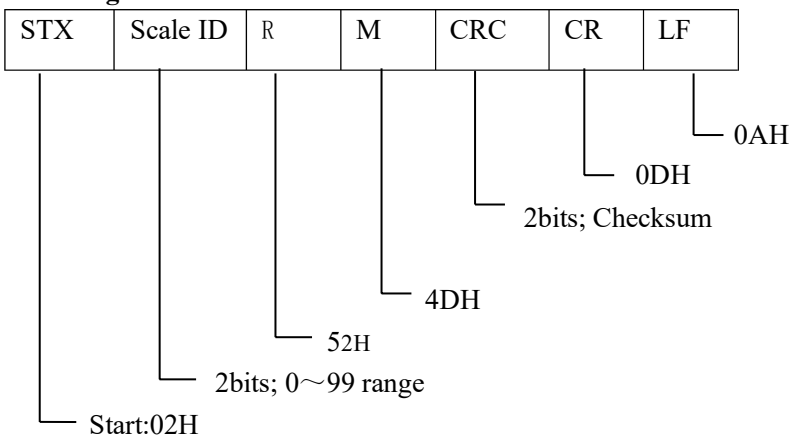
02 30 31 52 45 4E 4F 30 37 0D 0A

Indicates:

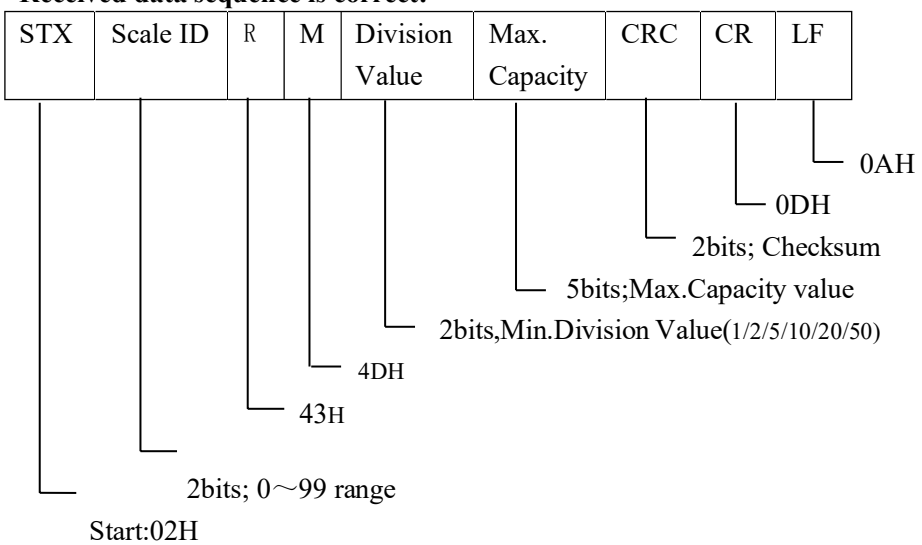
1#scale received data is wrong.

5.3.2.4 Reading Division Value and Max. Capacity

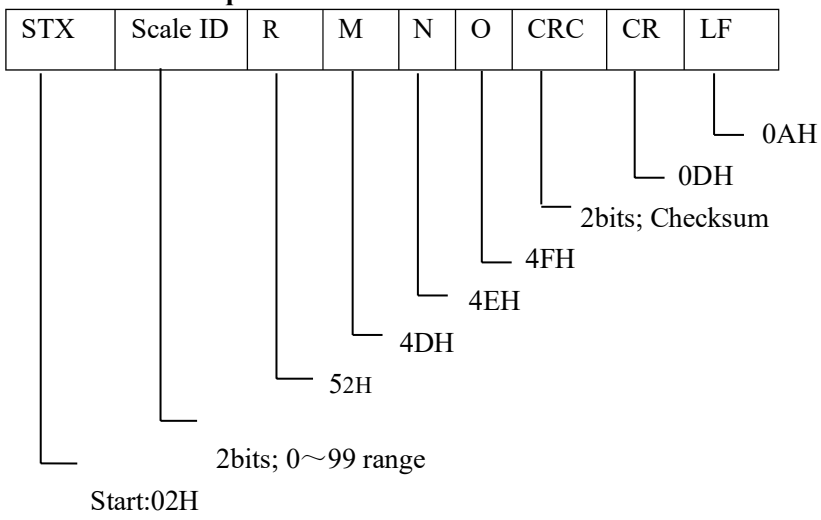
Reading command:



Received data sequence is correct:



Received data sequence is incorrect:



For example:

Reading command:

02 30 31 52 4D 35 38 0D 0A

Response when received data is correct:

02 30 31 52 4D 30 35 30 35 30 30 30 30 35 32 0D 0A

Indicates :

1#scale;current Min. division value is 5;

Max. capacity is 50000

Reading command:

02 30 31 52 4D 35 38 0D 0A

Response when received data is incorrect:

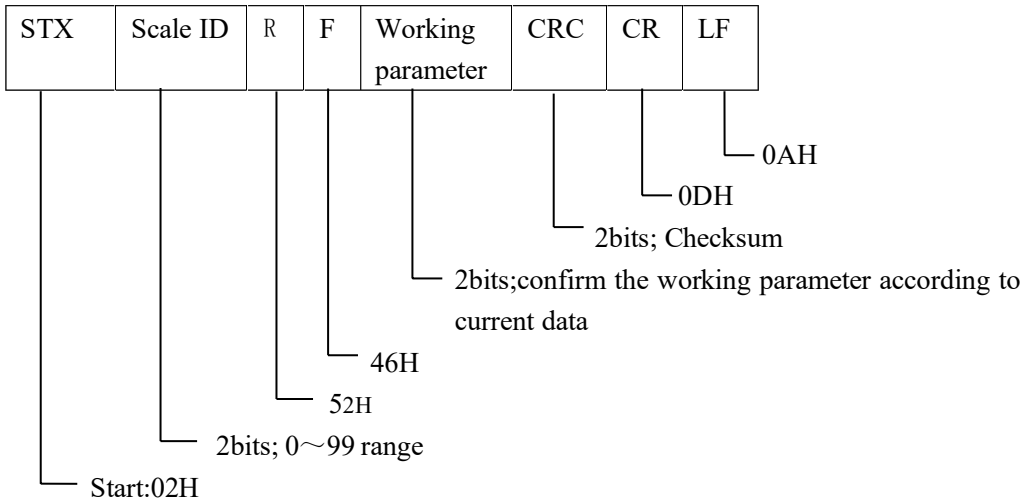
02 30 31 52 4D 4E 4F 31 35 0D 0A

Indicates:

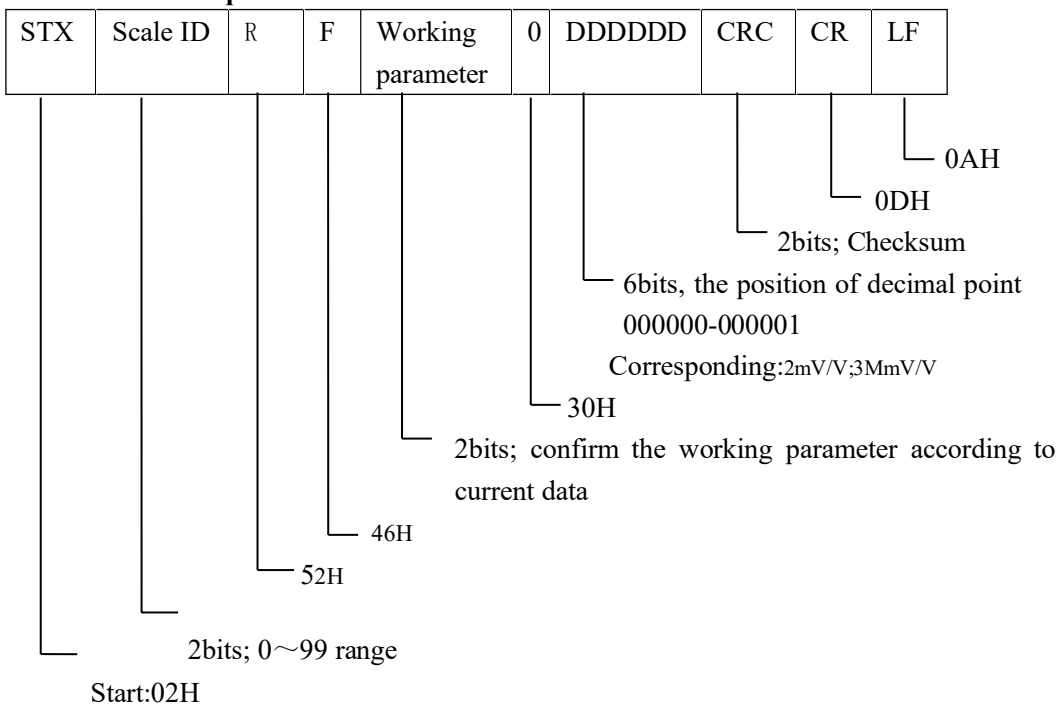
1#scale received data is wrong.

5.3.2.5 Reading the working parameters

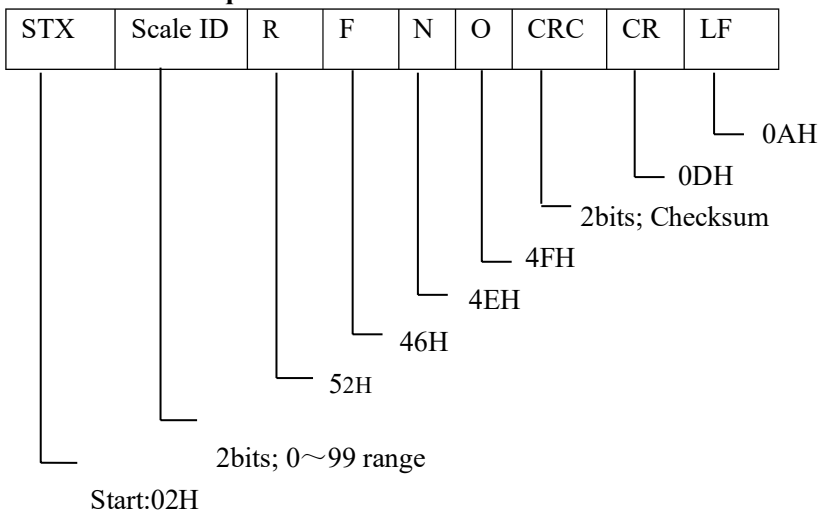
Reading command:



Received data sequence is correct:



Received data sequence is incorrect:



For example:

Reading command:

02 30 31 52 46 31 34 30 30 30 0D 0A

1#scale;working parameter **1.4** item (Range of Motion Detecting) is:**5**

Response when received data is correct:

02 30 31 52 46 31 34 30 30 30 30 30 30 35 39 33 0D 0A

Indicates :

Reading command:

02 30 31 52 46 31 34 30 30 30 0D 0A

Response when received datais incorrect:

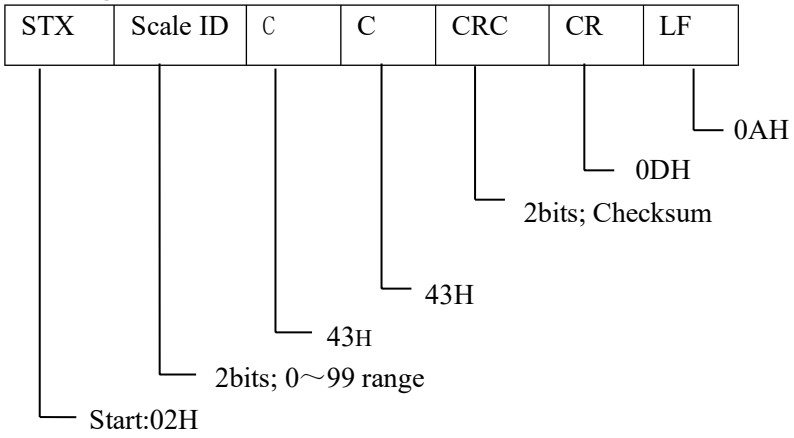
02 30 31 52 46 4E 4F 30 38 0D 0A

Indicates:

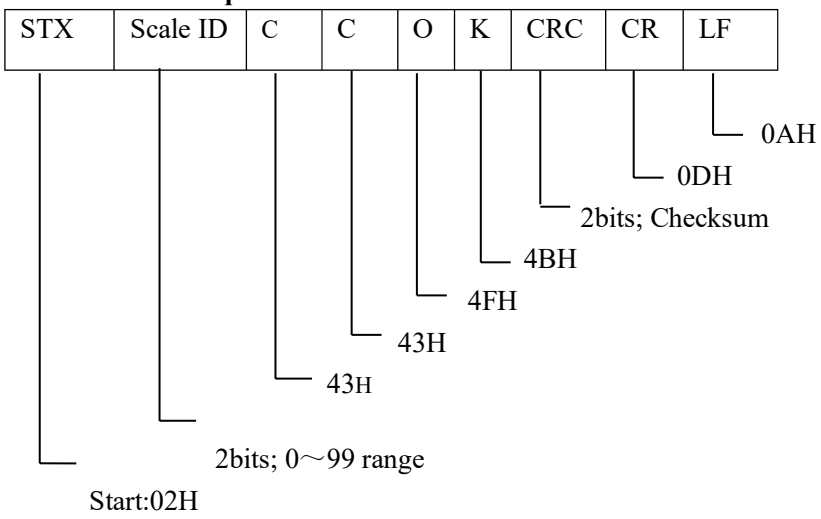
1#scale received data is wrong.

5.3.2.6 Zeroing

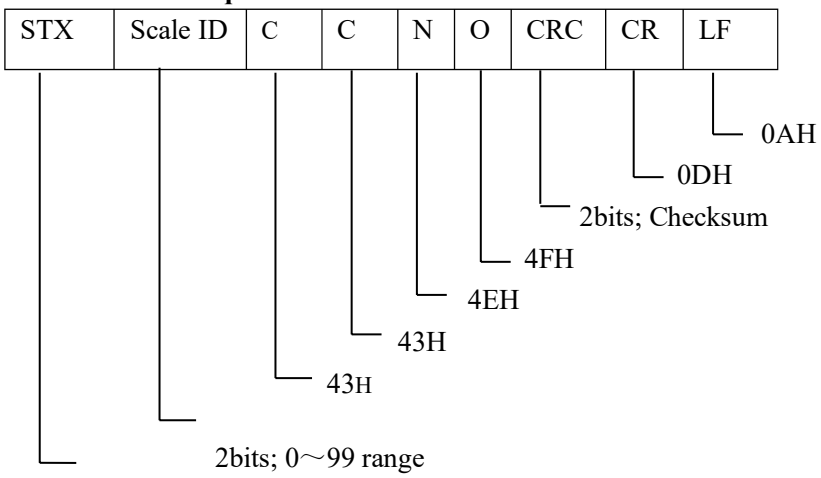
Zeroing command



Received data sequence is correct:



Received data sequence is incorrect:



Start:02H

For example:

Zeroing command:

02 30 31 43 43 33 33 0D 0A

Response when received data is correct:

02 30 31 43 43 4F 4B 38 37 0D 0A

Indicates :

1#scale;main display zeroing (within zeroing rang)

Zeroing command:

02 30 31 43 43 33 33 0D 0A

Response when received data is incorrect:

02 30 31 43 43 4E 4F 39 30 0D 0A

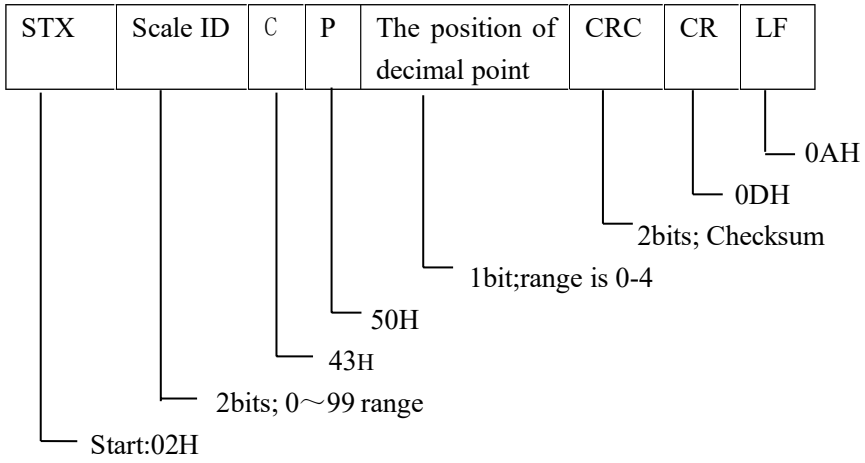
Indicates:

1#scale can't carry out this command

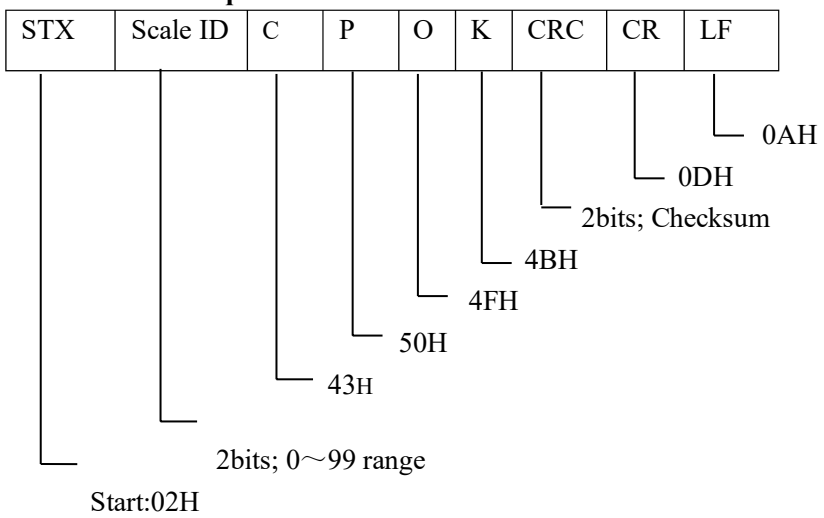
5.3.2.7 Calibration

5.3.2.7.1 Calibration for the position of decimal point

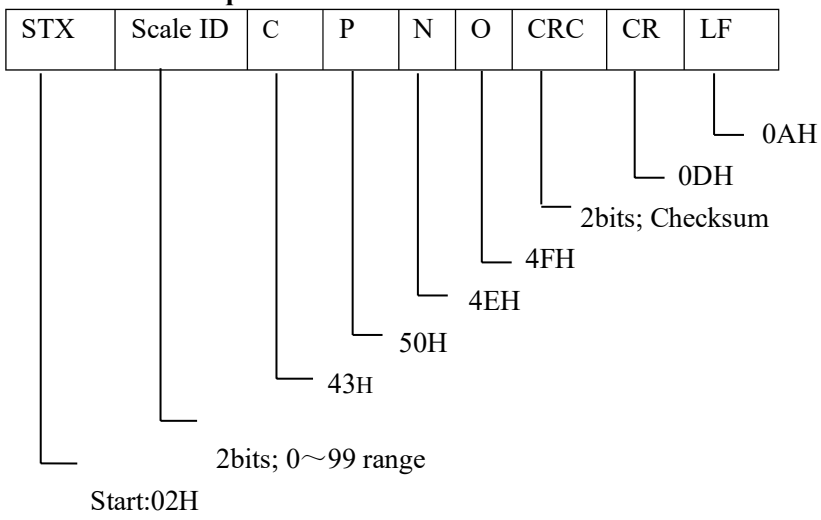
Calibration command:



Received data sequence is correct:



Received data sequence is incorrect:



For example:

Calibration command:

02 30 31 43 50 32 39 36 0D 0A

Response when received data is correct:

02 30 31 43 50 4F 4B 30 30 0D 0A

Indicates :

Write data(the position of decimal point) in 1#scale;2)be saved correctly.

Calibration command:

02 30 31 43 50 32 39 36 0D 0A

Response when received data is incorrect:

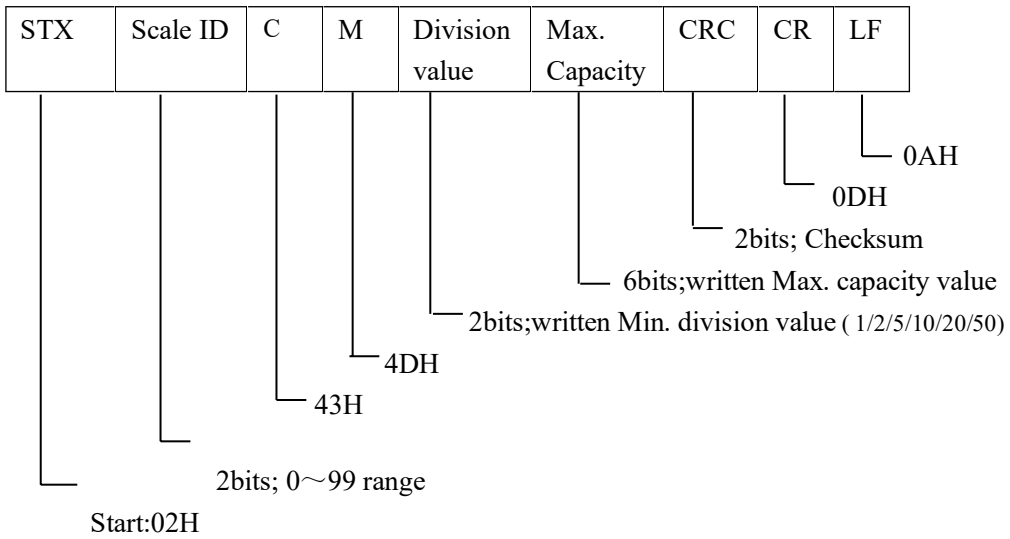
02 30 31 43 50 4E 4F 30 33 0D 0A

Indicates:

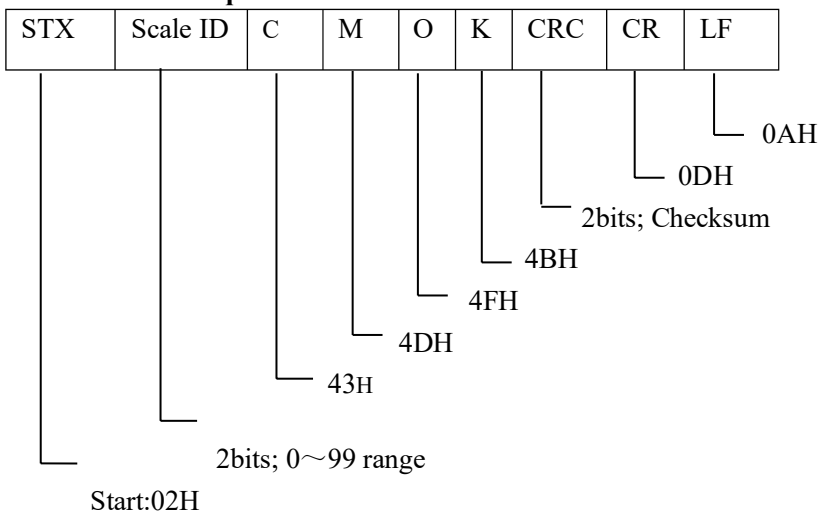
Write wrong data in 1#scale;

2)can't be saved.

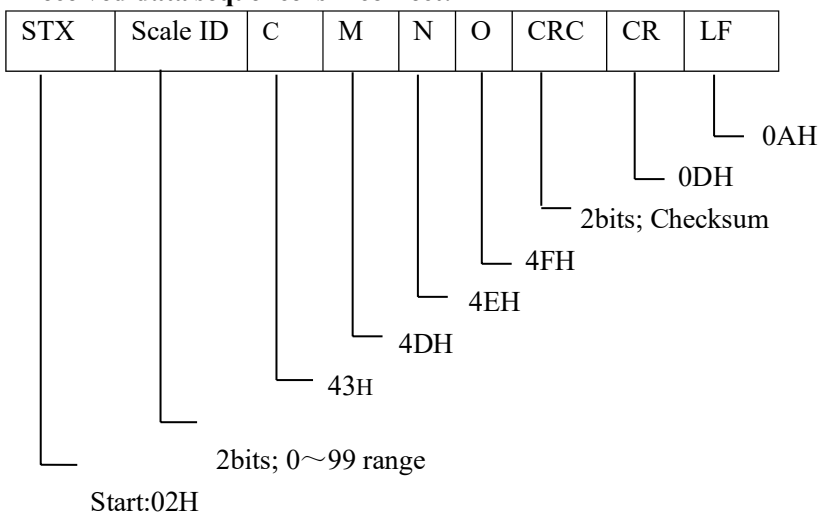
5.3.2.7.2 Calibration for the Division value and Max. capacity value



Received data sequence is correct:



Received data sequence is incorrect:

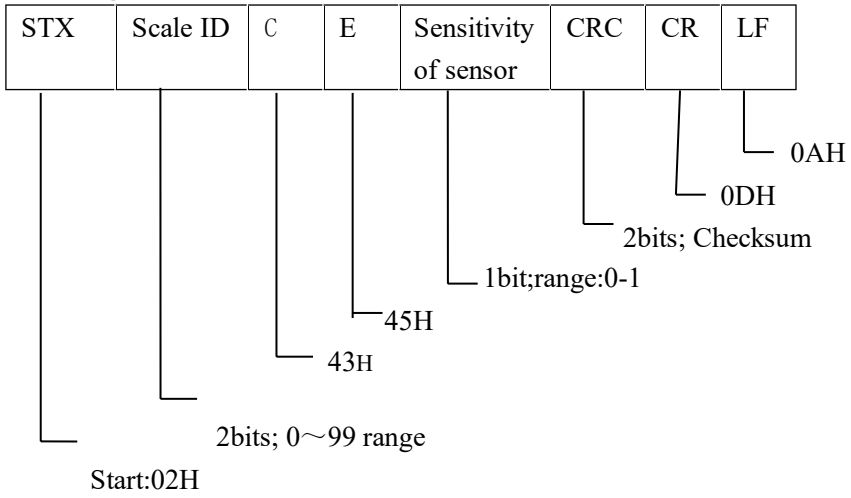


For example:

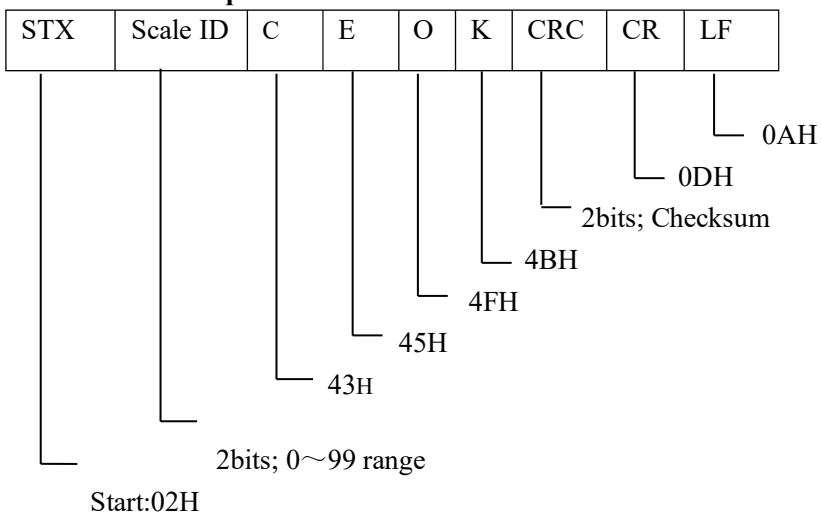
Calibration command: 02 30 31 43 4D 30 35 30 31 34 30 30 30 33 37 0D 0A	Calibration command: 02 30 31 43 4D 30 35 30 31 34 30 30 30 33 37 0D 0A
Response when received data is correct: 02 30 31 43 4D 4F 4B 39 37 0D 0A	**Response when received data is incorrect:** 02 30 31 43 4D 4E 4F 30 30 0D 0A
Indicates : Write data(the position of decimal point) in 1#scale;2)be saved correctly.	Indicates: Write wrong data in 1#scale; 2)can't be saved.

5.3.2.7.3 Calibration for the sensitivity of sensor

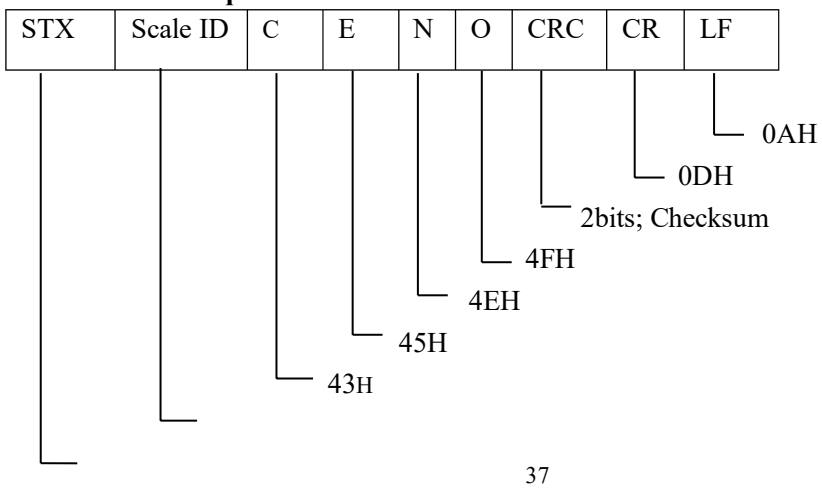
Reading command:



Received data sequence is correct:



Received data sequence is incorrect:



2bits; 0～99 range

Start:02H

For example:

Calibration command:

02 30 31 43 45 30 38 33 0D 0A

Response when received data is correct:

02 30 31 43 45 4F 4B 38 39 0D 0A

Indicates :

Write data(the sensitivity of sensor) in 1#scale;2)be saved correctly.

Calibration command:

02 30 31 43 45 30 38 33 0D 0A

Response when received data is incorrect:

02 30 31 43 45 4E 4F 39 32 0D 0A

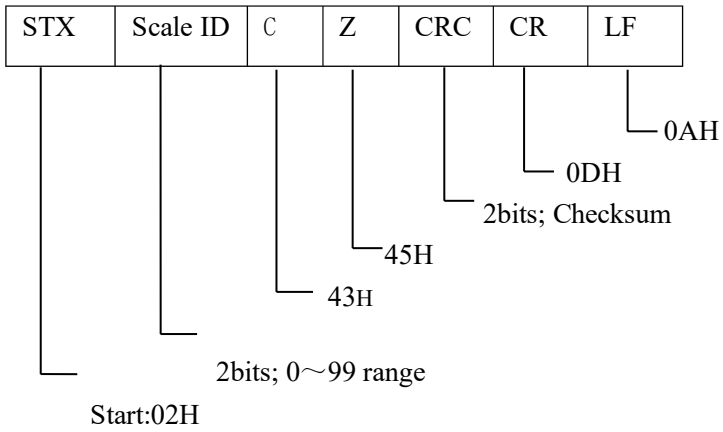
Indicates:

Write wrong data in 1#scale;
2)can't be saved.

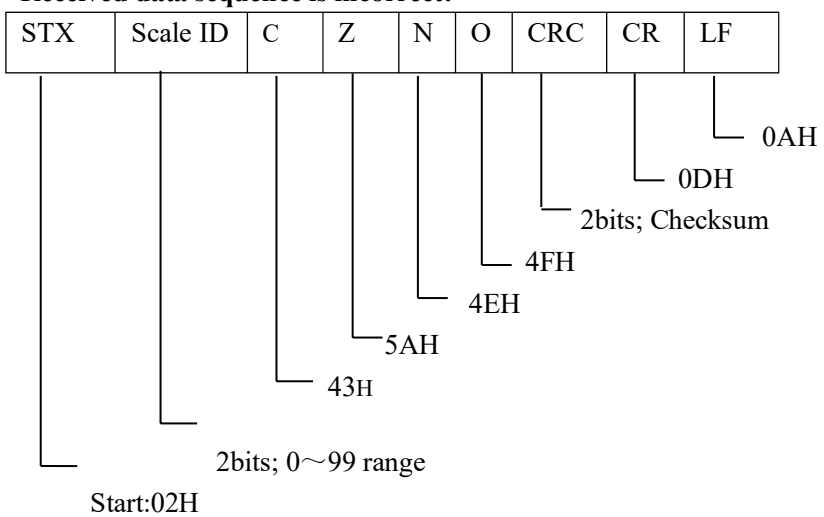
5.3.2.7.4 Zero Calibration

1. Zero Calibration with Standard Weight

Calibration command:



Received data sequence is incorrect:



For example:

Calibration command:

02 30 31 43 5A 35 36 0D 0A

Response when received data is correct:

02 30 31 43 5A 4F 4B 31 30 0D 0A

Calibration command:

02 30 31 43
5A 35 36 0D
0A

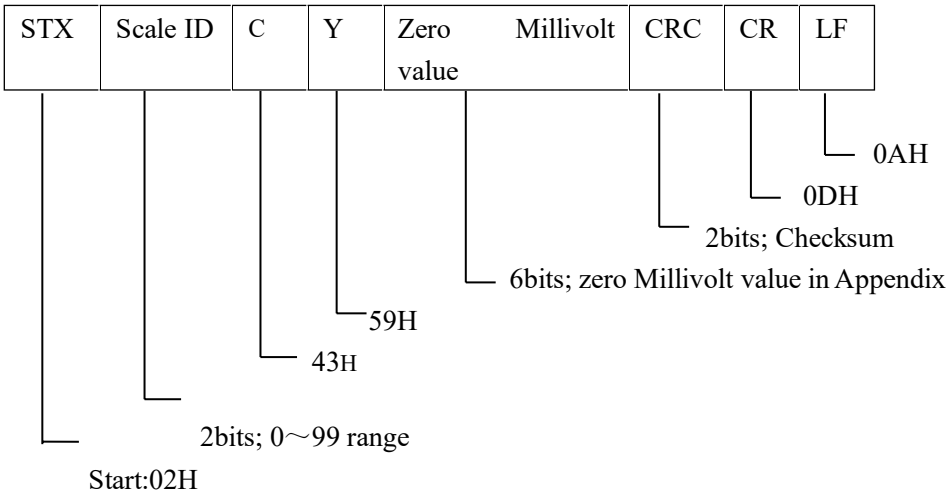
Response when received data is incorrect:

02 30 31 43 5A 4E 4F 31 33 0D 0A

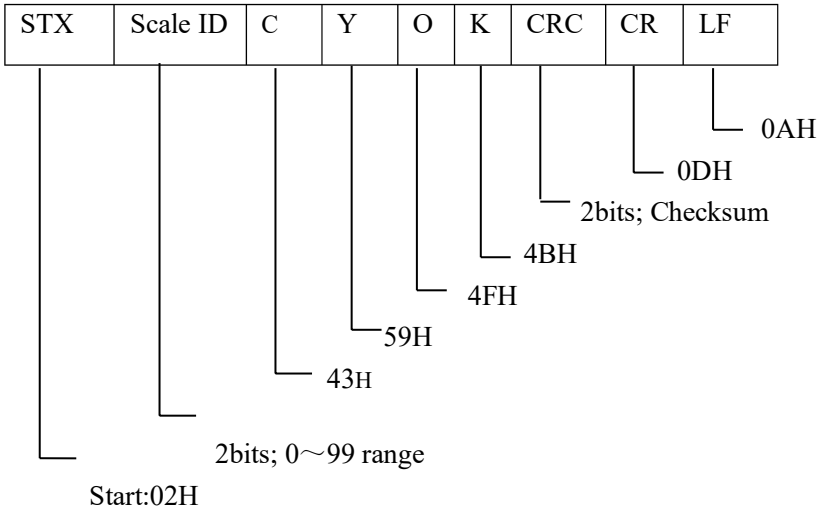
Indicates : Zero calibration of scale No.1 is performed.	Indicates: Zero calibration of scale No.1 can't be performed.

2. Zero Calibration without Standard Weight

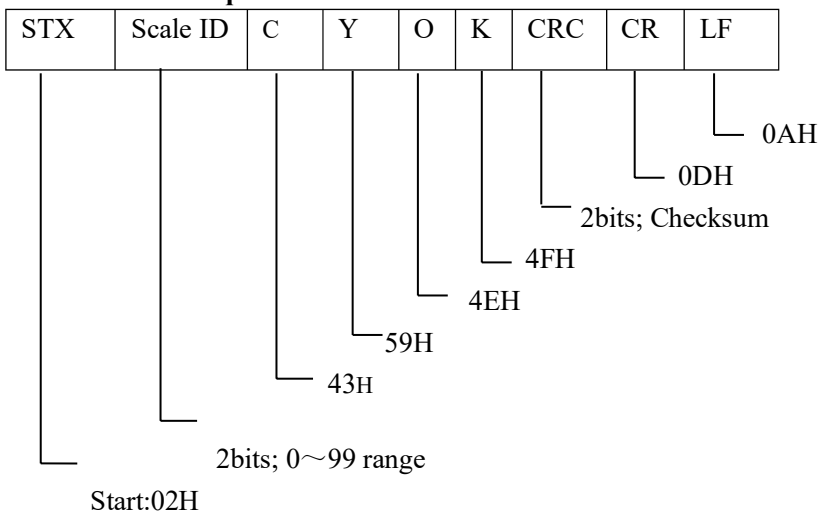
Calibration command:



Received data sequence is correct:



Received data sequence is incorrect:



For example:

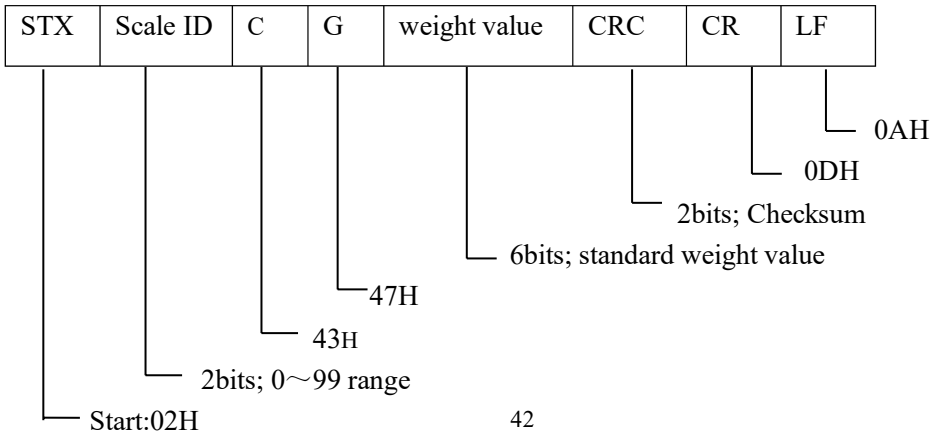
Calibration command:	Calibration command:
02 30 31 43 59 30 30 31 32 36 31 35 33 0D 0A	02 30 31 43 59 30 30 31 32 36 31 35 33 0D 0A
Response when received data is correct:	**Response when received data is incorrect:**
02 30 31 43 59 4F 4B 30 39 0D 0A	02 30 31 43 59 4E 4F 31 32 0D 0A
Indicates :	Indicates:
Write values in scale No.1 and be saved correctly.	Written values in scale No.1 is wrong and can't be saved correctly.

5.3.2.7.5 Gain Calibration

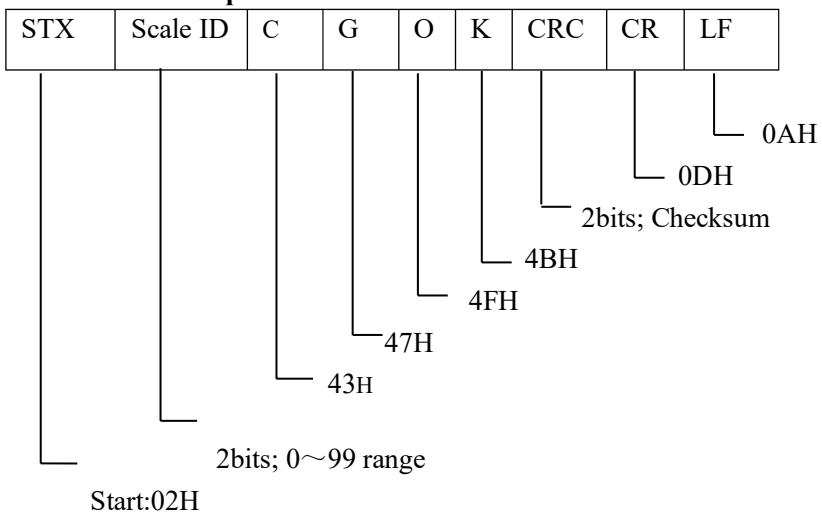
1. Gain Calibration with Standard Weight

Add a standard weight which is near to 80% of the Max. capacity ,then write in the current value of the standard weight to achieve the gain calibration.

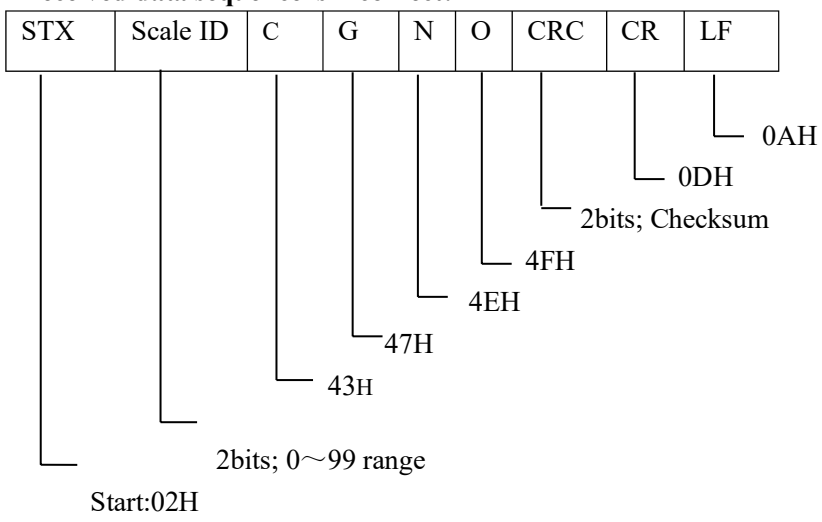
Calibration command:



Received data sequence is correct:



Received data sequence is incorrect:



For example:

Calibration command:

02 30 31 43 47 30 30 30 32 30 30 32 37 0D 0A

Response when received data is correct:

02 30 31 43 47 4F 4B 39 31 0D 0A

Indicates :

Write values(weight value:200) in scale No.1 and then save it correctly.

Calibration command:

02 30 31 43 47 30 30 30 32 30 30 32 37 0D 0A

Response when received data is incorrect:

02 30 31 43 47 4E 4F 39 34 0D 0A

Indicates:

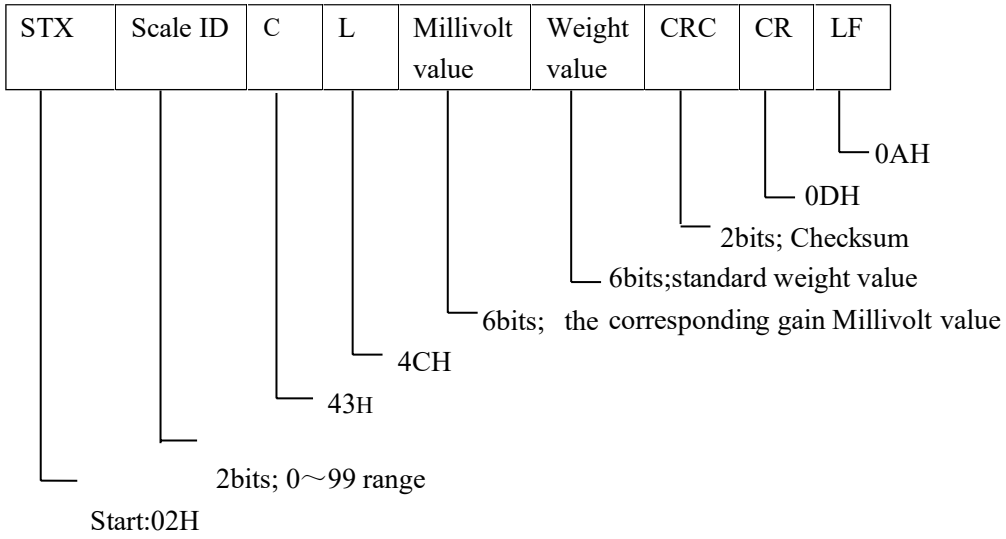
Written values in scale No.1 is wrong and can't be saved correctly.

2. Gain Calibration without Standard Weight

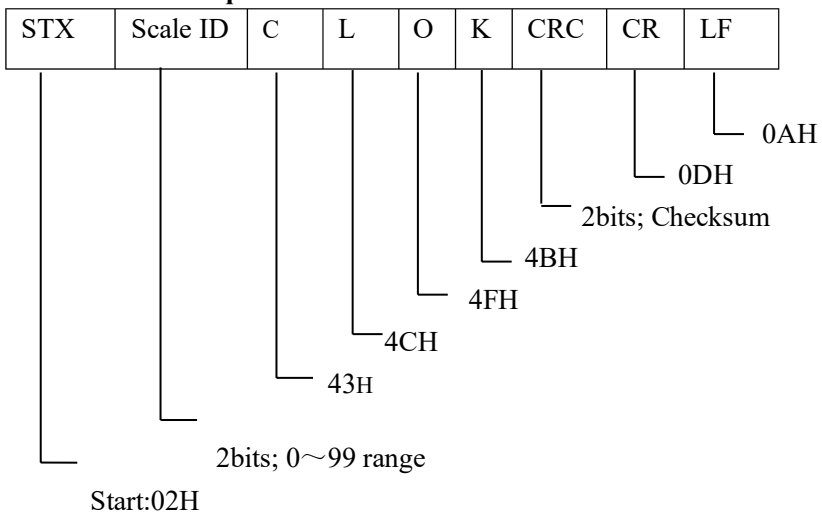
Input the standard weight value in Appendix and the corresponding gain Millivolt

value to achieve gain calibration.

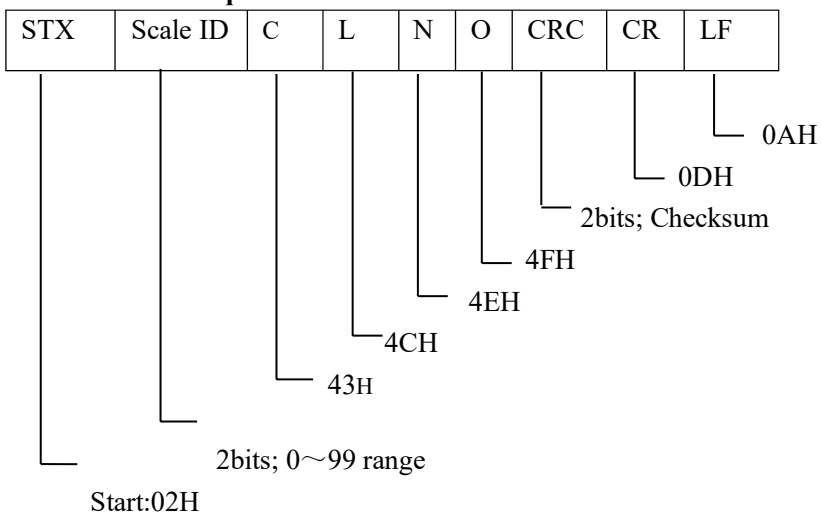
Calibration command:



Received data sequence is correct:



Received data sequence is incorrect:



For example:

Calibration command:

02 30 31 43 4C 30 30 30 31 39 34 30 30 30 32 30 30 33 34 0D 0A

Response when received data is correct:

02 30 31 43 4C 4F 4B 39 36 0D 0A

Indicates :

Write values(weight value:200; corresponding gain Millivolt value:0.194) in scale No.1 and then save it correctly.

Calibration command:

02 30 31 43 4C 30 30 30 31 39 34 30 30 30 32 30 30 33 34 0D 0A

Response when received data is incorrect:

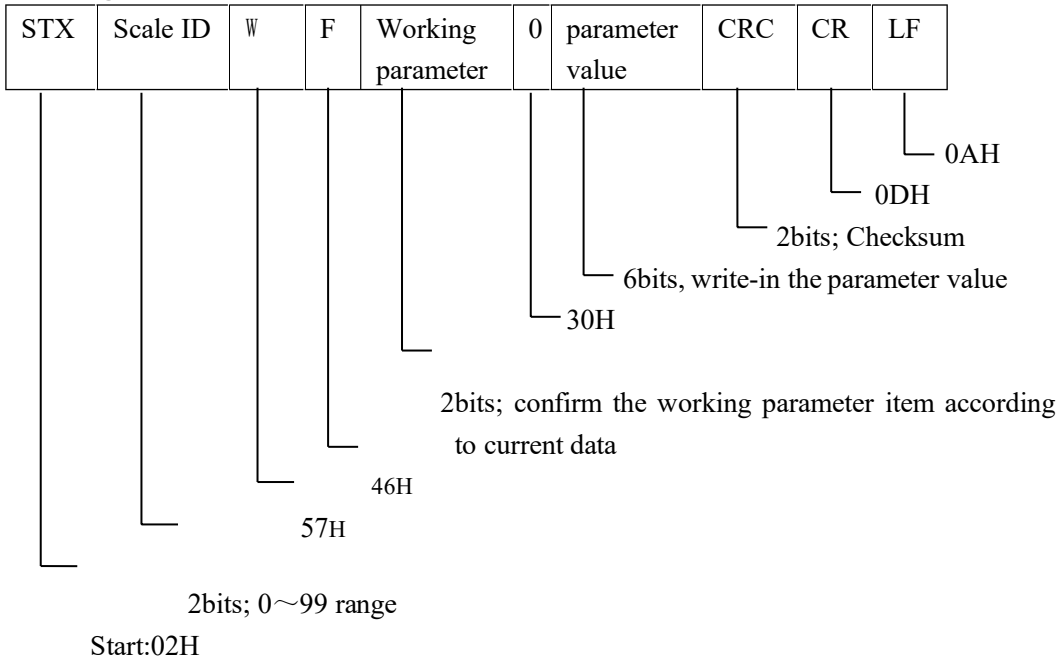
02 30 31 43 4C 4E 4F 39 39 0D 0A

Indicates:

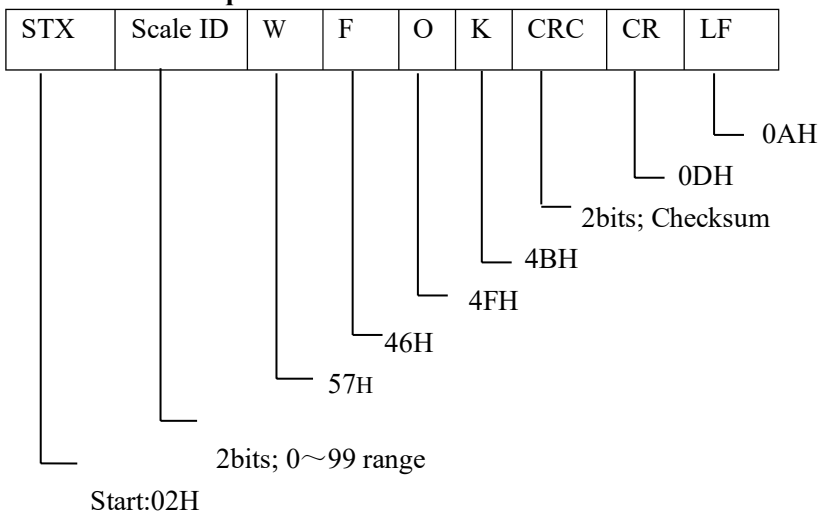
Written values in scale No.1 is wrong and can't be saved correctly.

5.3.2.8 Writing Working Parameter

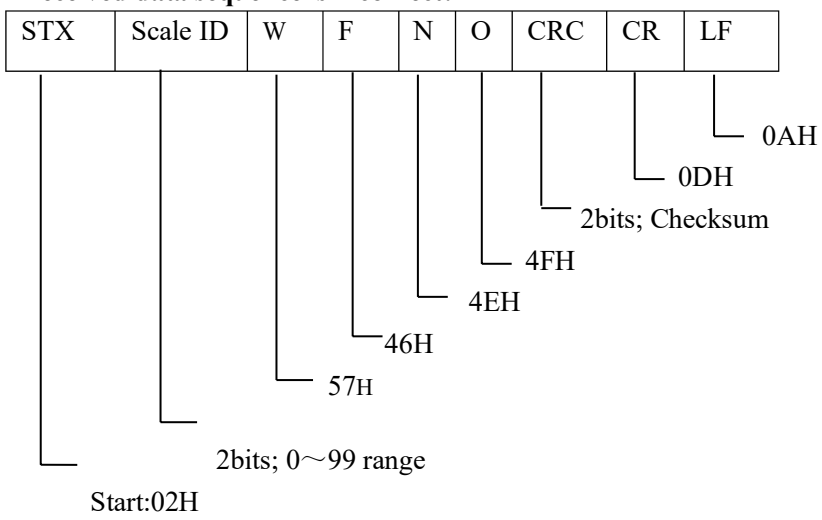
Writing command:



Received data sequence is correct:



Received data sequence is incorrect:

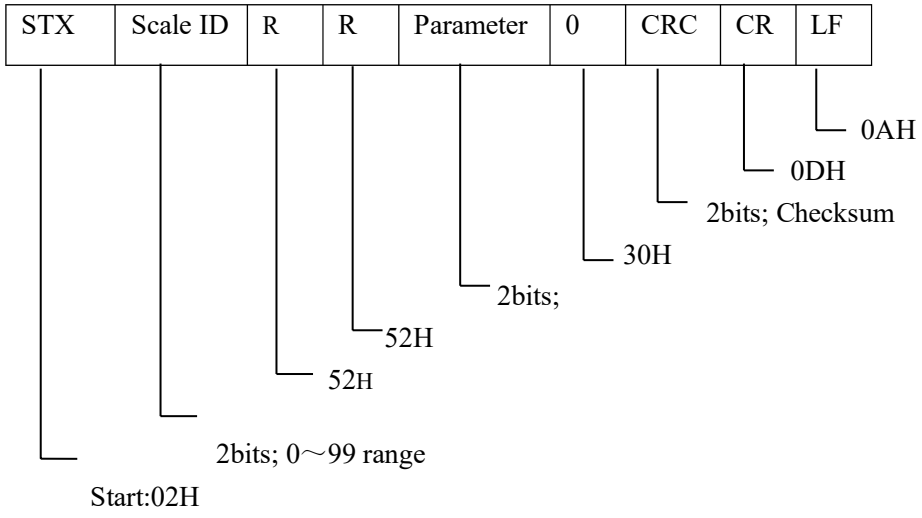


For example:

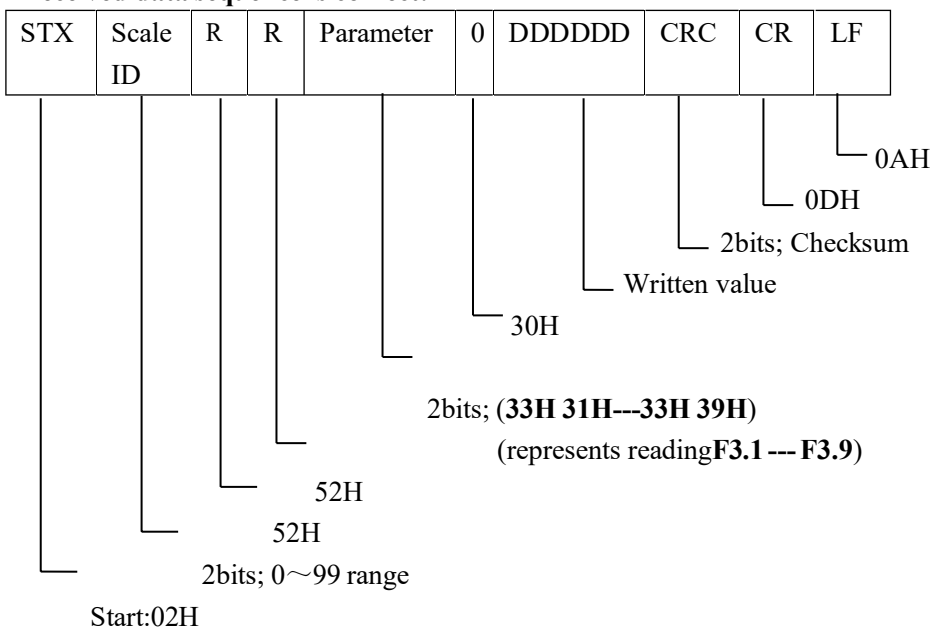
Writing command:	Writing command:
02 30 31 57 46 31 34 30 30 30 30 30 30 35 39 38 0D 0A	02 30 31 57 46 31 34 30 30 30 30 30 30 35 39 38 0D 0A
Response when received data is correct:	**Response when received data is incorrect:**
02 30 31 57 46 4F 4B 31 30 0D 0A	02 30 31 57 46 4E 4F 31 33 0D 0A
Indicates :	Indicates:
Write Range of motion detecting **(F1.4):5** in scale No.1 and then save it correctly.	Written values in scale No.1 is wrong and can't be saved correctly.

5.3.2.9 Add 9 Registers for user settings

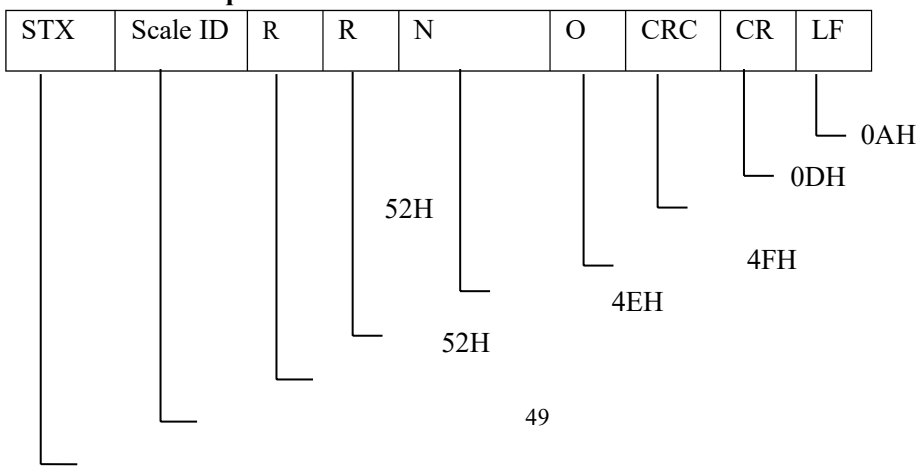
1Reading Protocol



Received data sequence is correct:



Received data sequence is incorrect:

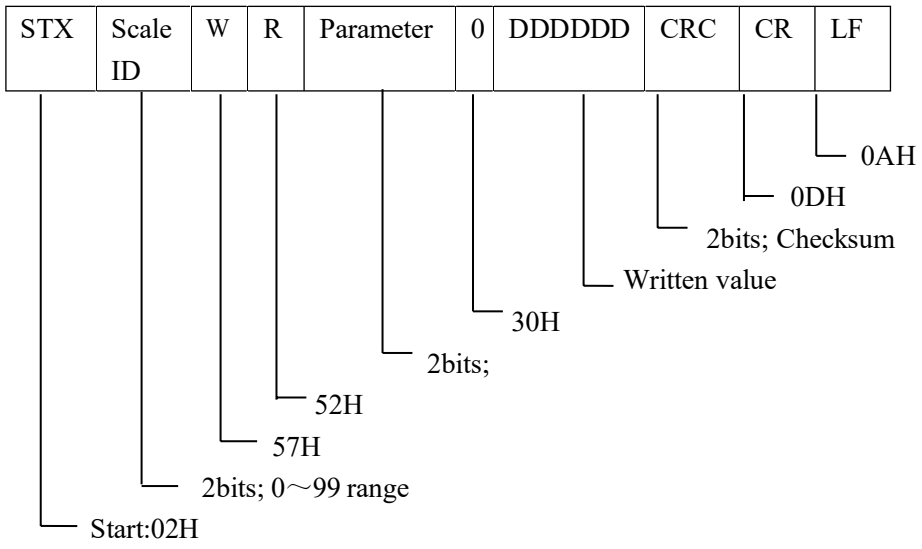


2bits; Checksum

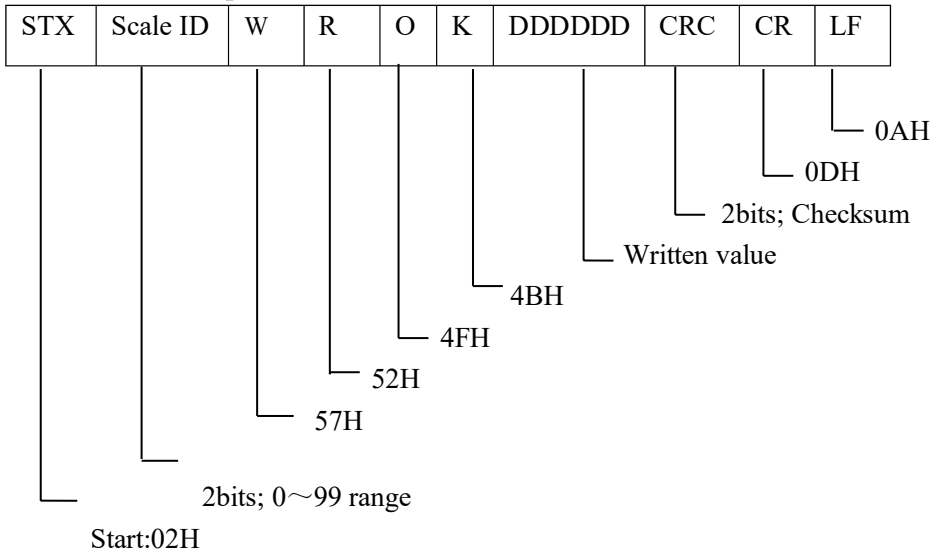
2bits; 0～99 range

Start:02H

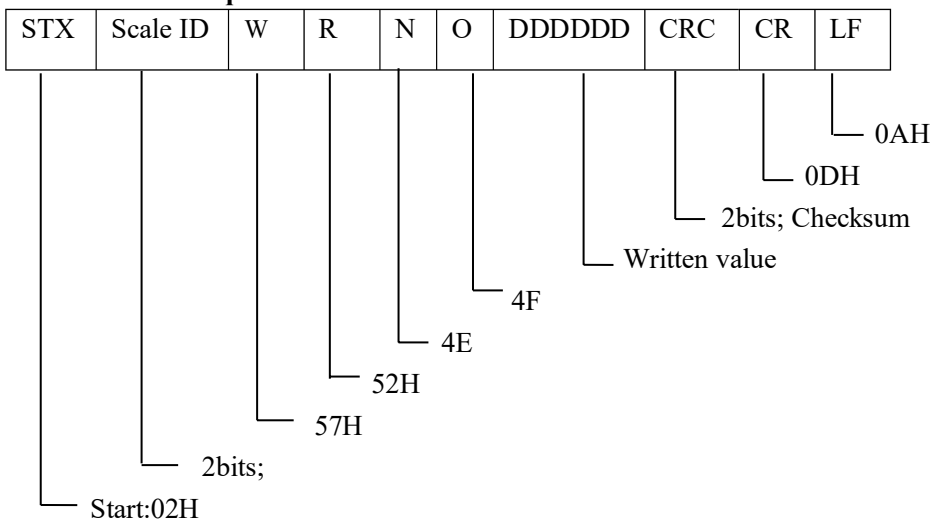
2 Writing Protocol



Received data sequence is correct:



Received data sequence is incorrect:

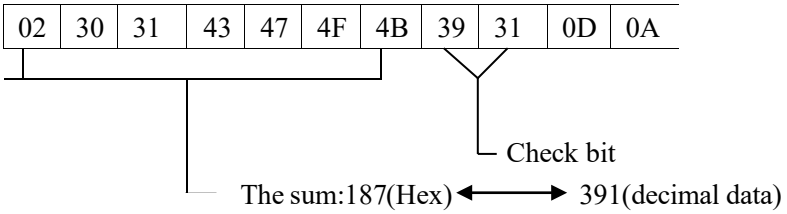


5.3.3 CRC (Check sum)Count for rS Protocol

Count the sum of all the left bytes and convert the sum to be decimal data, and then convert the 2 low-order digits of the decimal date to ASCII code.

For example:

See below data frame:



※Then work out: the check code of the above data frame is :39 31

5.4 SP1 Protocol

Communication mode can be set as continuous mode “Cont” or command mode ”Read”. The communication protocol as follows:

Data Frames：	8data bits, 1 stop bit, Even parity (8 E-1)
	8data bits, 1 stop bit, Odd Parity (8 O-1)
	8data bits, 1 stop bit, No Parity (8 n-1)
	8data bits, 2 stop bit, No Parity (8 n-2)
	7 data bits, 1 stop bit, Even parity (7 E-1)
	7 data bits, 1 stop bit, Odd parity (7 O-1)
	7 data bits, 2 stop bit, No Parity (7 n-2)

Baud Rate：**1200，2400，4800，9600，19200，38400，56700(Optional)**

Code：ASCII Code

Operation code: W, writing operation; R reading operation; C, calibration; O, zeroing

5.4 .1Explanation form for parameter code

Operation code	**Parameter code**	**Parameter name**	**Characters**
R	WT	Reading current status and weight value	8
W	DC	Writing Max. capacity and Min. division	8
R/W	PT	Decimal point digits	1
R/W	SE	Sensitivity of sensor	1
R	DD	Min. division	2
R	CP	Max. capacity	6
R/W	AC	Automatically zeroing switch	1
R/W	TR	Range of Zero-Tracking	1
R/W	MR	Range of motion detecting	1
R/W	ZR	Range of zeroing	2
R/W	FL	Digital filter parameter	1
R/W	VC	Steady state filter	1
R	AM	Absolute Millivolt value	7bits: D6D5D4D3D2D1D0; D6:+;D5-D0:ASCII code of 6bits corresponding Millivolt value Decimal point:4bits
R	RM	Millivolt value of relative zero	7bits: D6D5D4D3D2D1D0; D6:+/ - ;D5-D0: ASCII code of 6bits corresponding Millivolt value; Decimal point:4bits
C	ZY	Zero calibration with weight	
C	ZN	Zero calibration without weight	6
C	GY	Gain calibration with weight	6
C	GN	Gain calibration	12

		without weight	
O	CZ	Zeroing	
R/W	R 1 …… R 9	Register 1 …… Register 9	6

5.4 .2Explanation form for wrong code

Under communication mode, if the transmitter received wrong data frame, there will be a wrong code as below:

1.CRC check error 2. Operation code error

3.Parameter code error 4.Writing data error

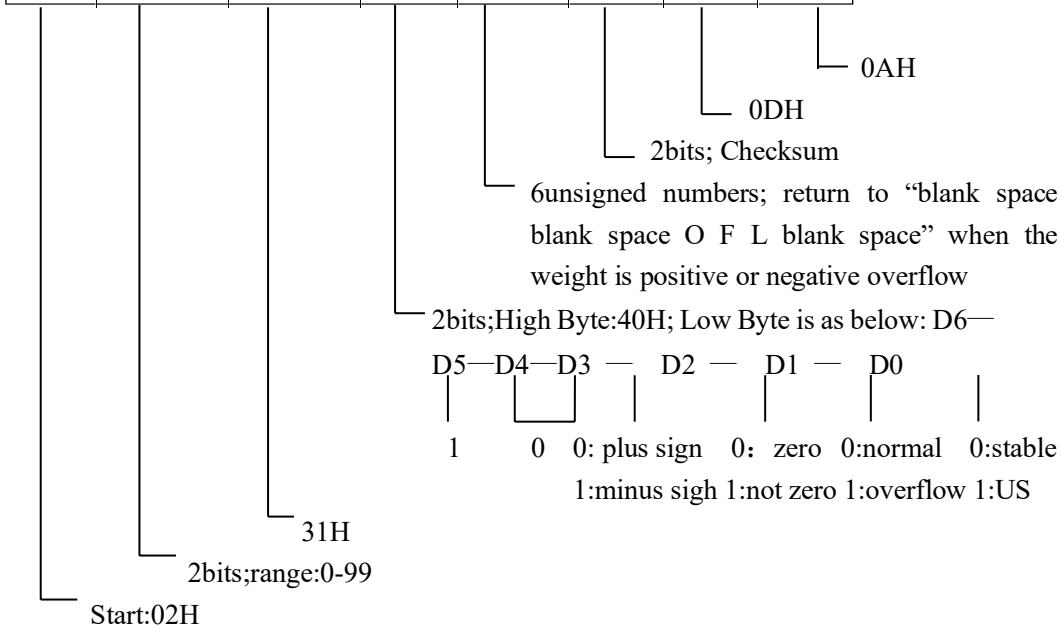
5.Operation can't be performed 6.channel number error

Remark: the default channel number is: **1（31H）**

5.4 .3 Continuous Mode "Cont"

Under this mode, the indicator will transmit collected data to upper computer automatically without command. The data frame as following:

STX	Scale ID	Channel NO	Status	Weight value	CRC	CR	LF



For example:

When the transmitter sends out a date sequence as below:

02 30 31 31 40 40 30 30 32 31 36 35 37 38 0D 0A

Then we know the current status of indicator is:

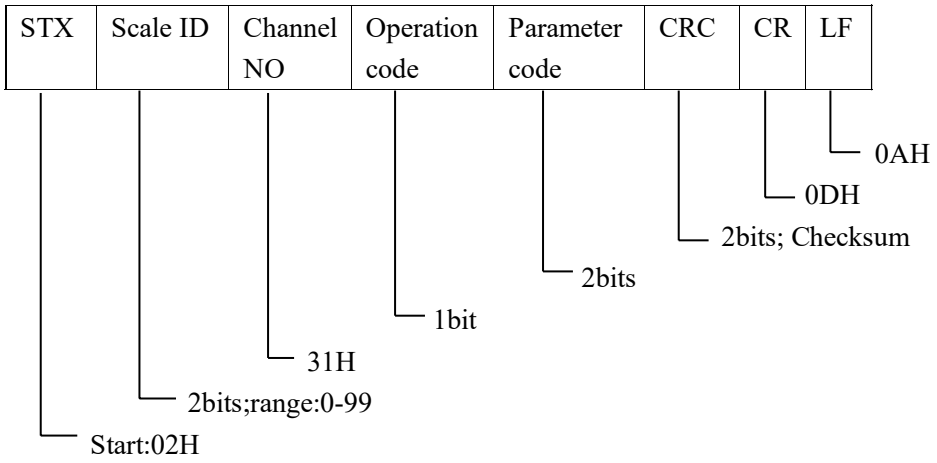
Stable; data is positive number; current weight value is 2.165

5.4 .4 Command mode ”Read”

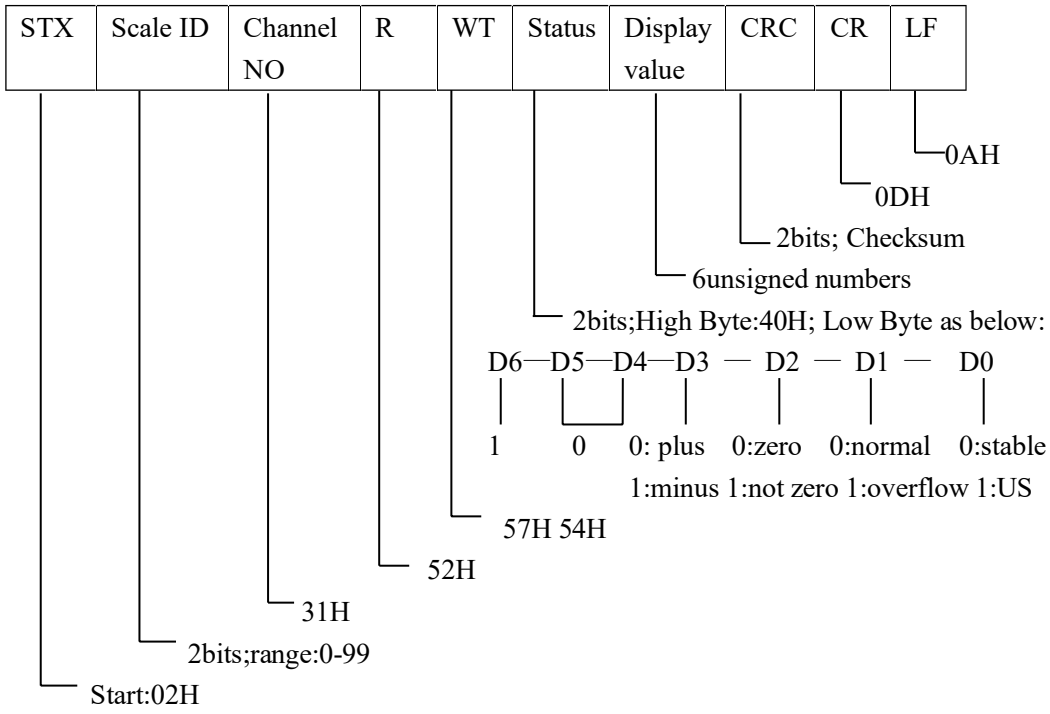
Under this mode, the indicator will transmit collected data to upper computer only when receive command.

5.4 .4.1 Reading the current status of transmitter

Reading command:

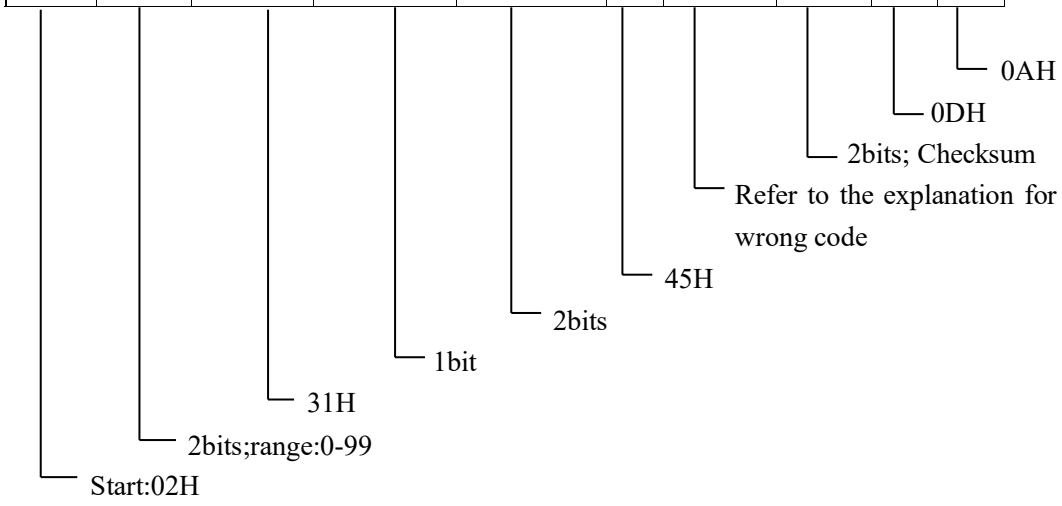


Received data sequence is correct:



Received data sequence is incorrect:

STX	Scale ID	Channel NO	Operation code	Parameter code	E	Wrong code	CRC	CR	LF



For example:

Reading command:

02 30 31 31 52 57 54 30 31 0D 0A

Response when received data is correct:

02 30 31 31 52 57 54 40 40 30 30 30 31 33 32 32 33 0D 0A

Indicates :

1#Scale:stable status; main display:0.132

Reading command:

02 30 31 31 52 57 54 30 32 0D 0A

Response when received data is incorrect:

02 30 31 31 52 57 54 45 31 31 39 0D 0A

Indicates:

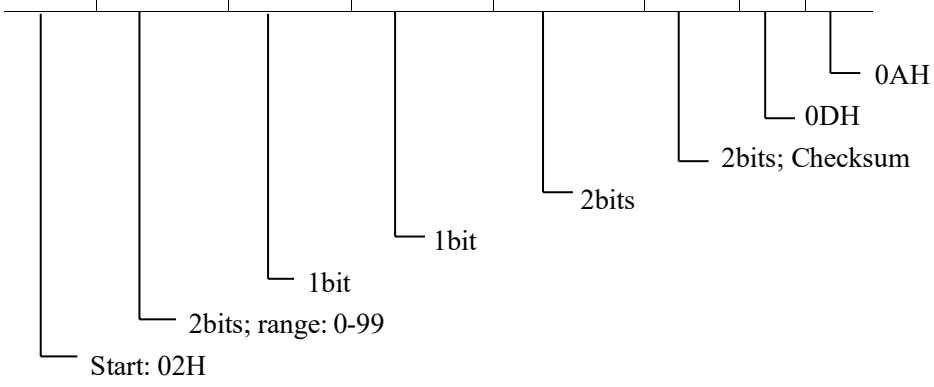
Error occurs when receiving data.

Wrong code:**1**

5.4 .4.2 Reading other parameters

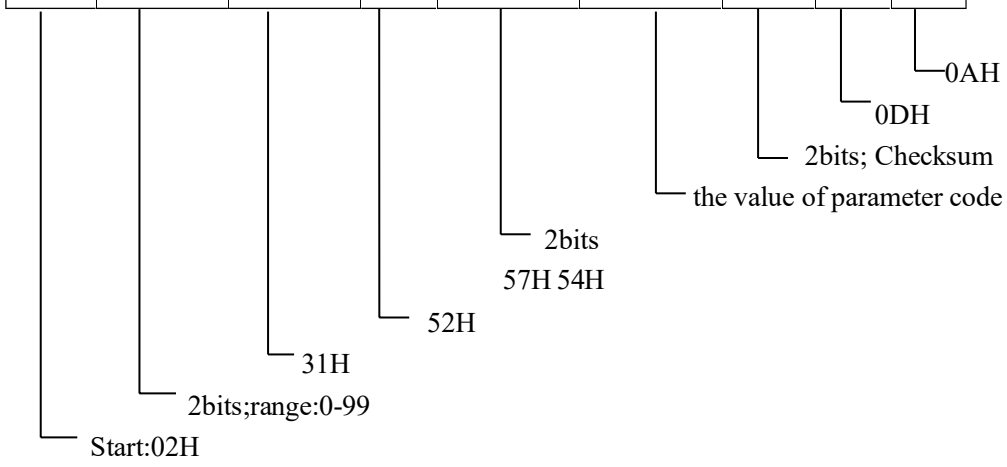
Reading command:

STX	Scale ID	Channel NO	Operation code	Parameter code	CRC	CR	LF



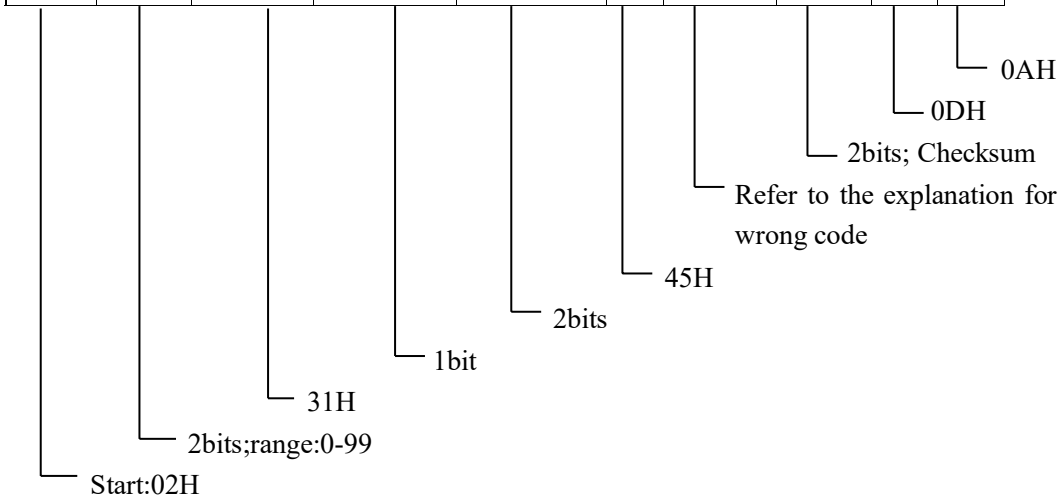
Received data sequence is correct:

STX	Scale ID	Channel NO	R	Parameter code	Parameter value	CRC	CR	LF



Received data sequence is incorrect:

STX	Scale ID	Channel NO	Operation code	Parameter code	E	Wrong code	CRC	CR	LF



For example:

Reading command:

02 30 31 31 52 4D 52 38 39 0D 0A

Response when received data is correct:

02 30 31 31 52 4D 52 35 34 32 0D 0A

Indicates :

Current range of motion detecting:**5**

Reading command:

02 30 31 31 52 4D 52 38 38 0D 0A

Response when received data is incorrect:

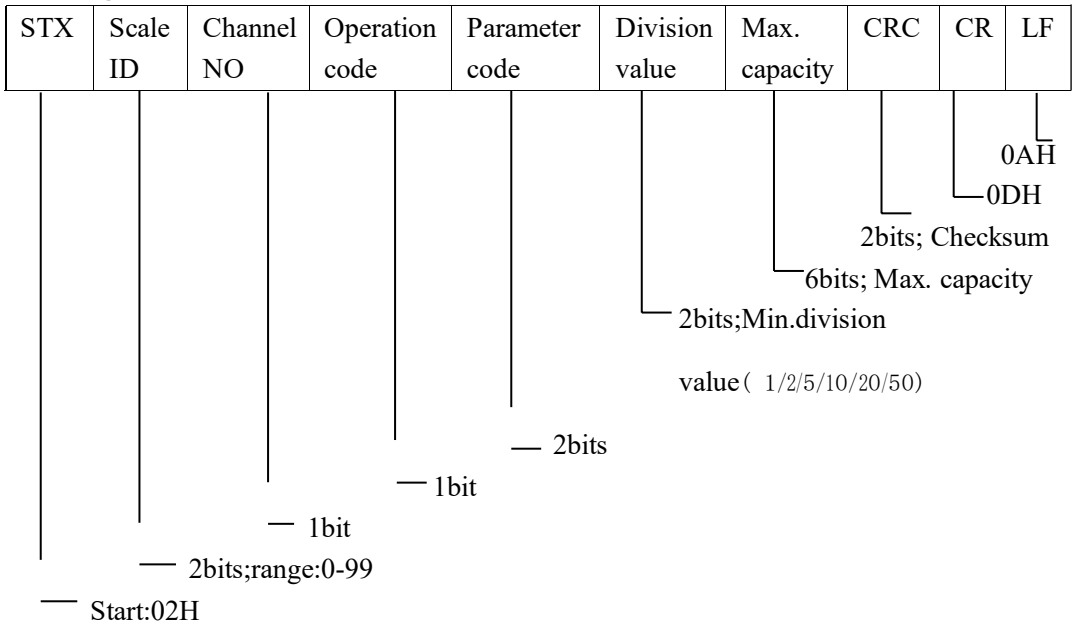
02 30 31 31 52 4D 52 45 31 30 37 0D 0A

Indicates:

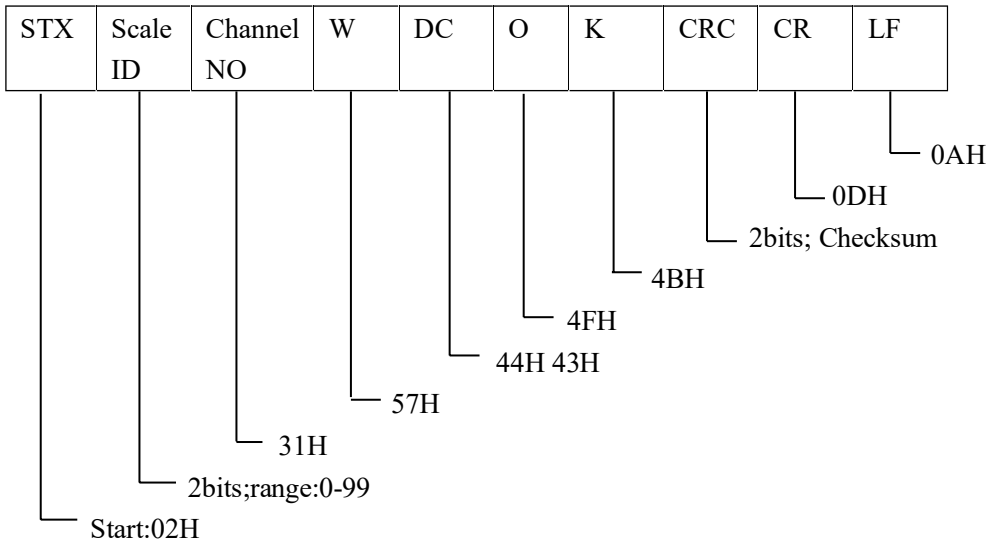
Error occurs when receiving data.Wrong code:**1**

5.4 .4.3 Writing Max. capacity and Min. division

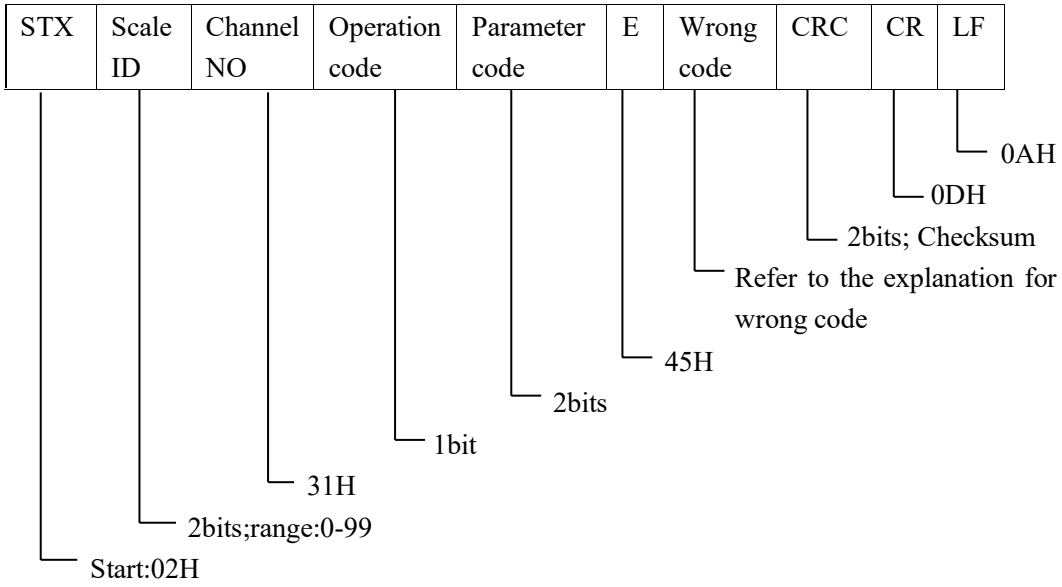
Writing command:



Received data sequence is correct:



Received data sequence is incorrect:



For example:

Calibration command:

02 30 31 31 57 44 43 30 35 30 31 30 30 30 30 36 30 0D 0A

Response when received data is correct:

02 30 31 31 57 44 43 4F 4B 32 34 0D 0A

Indicates :

Write data(division value:5; Max. capacity: 10000) in scale No.1 and then save it correctly.

Calibration command:

02 30 31 31 57 44 43 30 35 30 31 30 30 30 30 36 30 0D 0A

Response when received data is incorrect:

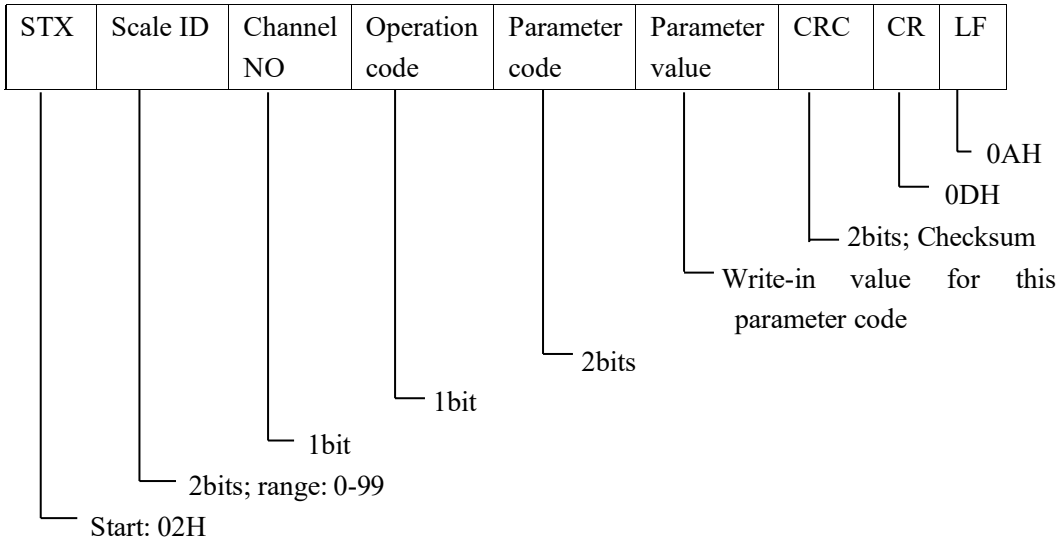
02 30 31 31 57 44 43 45 35 39 32 0D 0A

Indicates:

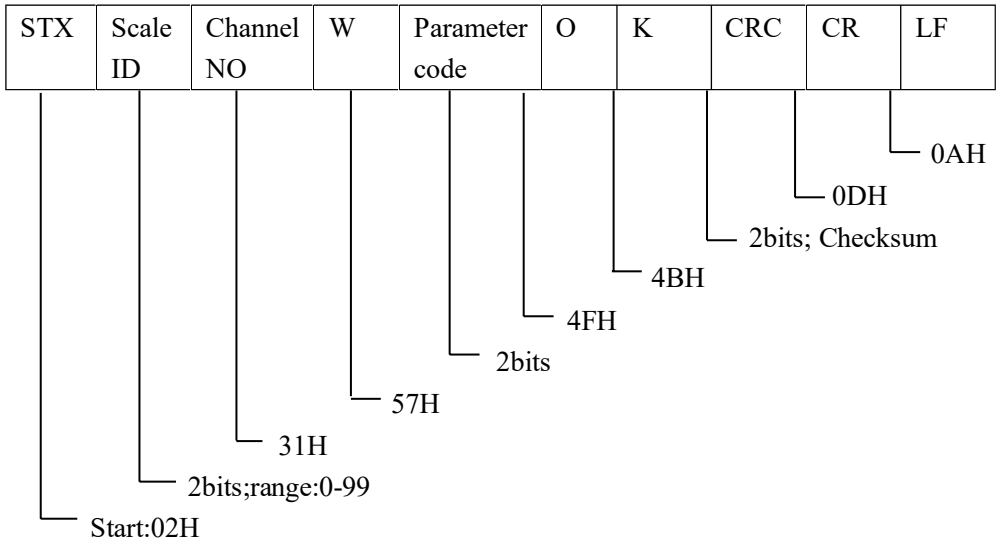
Written values in scale No.1 is wrong and can't be saved correctly. Wrong code:**5**

5.4 .4.4 Writing other parameters

Writing command:

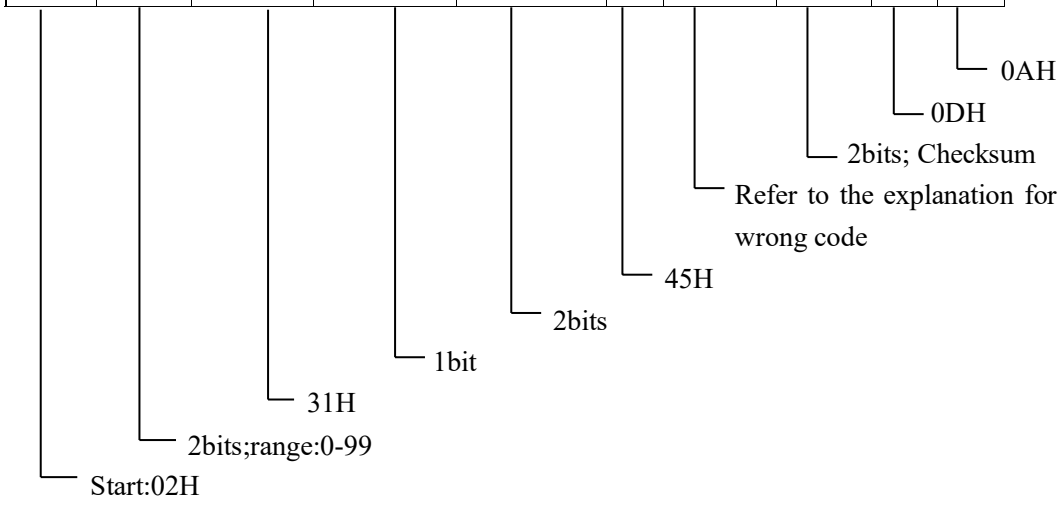


Received data sequence is correct:



Received data sequence is incorrect:

STX	Scale ID	Channel NO	Operation code	Parameter code	E	Wrong code	CRC	CR	LF



For example:

Reading command:

02 30 31 31 57 5A 52 35 30 30 38 0D 0A

Response when received data is correct:

02 30 31 31 57 5A 52 4F 4B 36 31 0D 0A

Indicates :

Write the range of zeroing to Scale NO.1 and save it correctly.NO.1

Reading command:

02 30 31 31 57 5A 52 35 30 30 37 0D 0A

Response when received data is incorrect:

02 30 31 31 57 5A 52 45 31 32 35 0D 0A

Indicates:

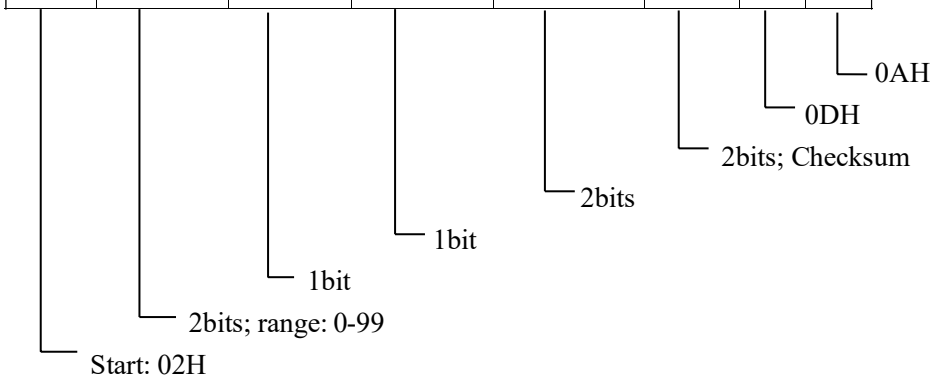
Error occurs when writing data in Scale and can't be saved ;Wrong code:**1**

5.4 .4.5 Zero Calibration

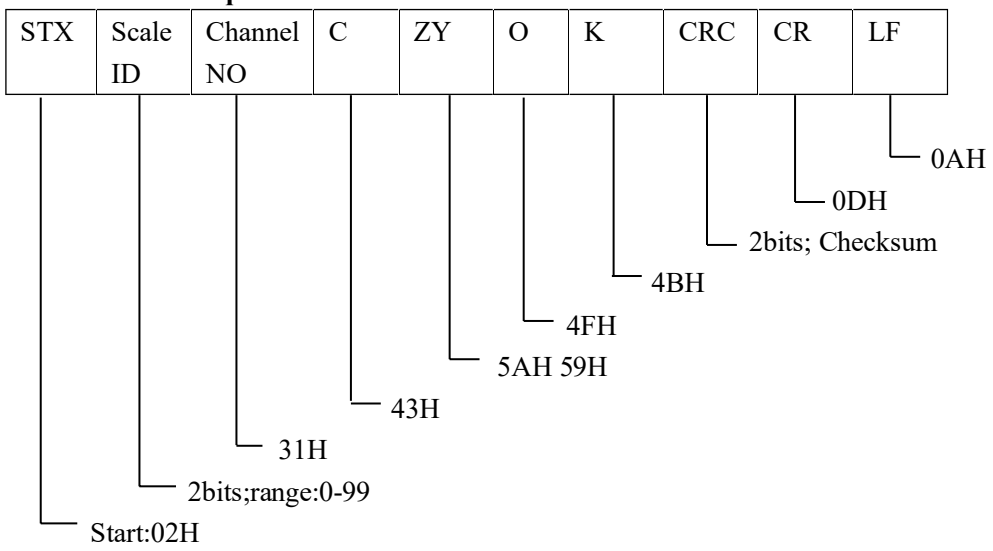
1.Zero calibration with standard weight

Calibration command:

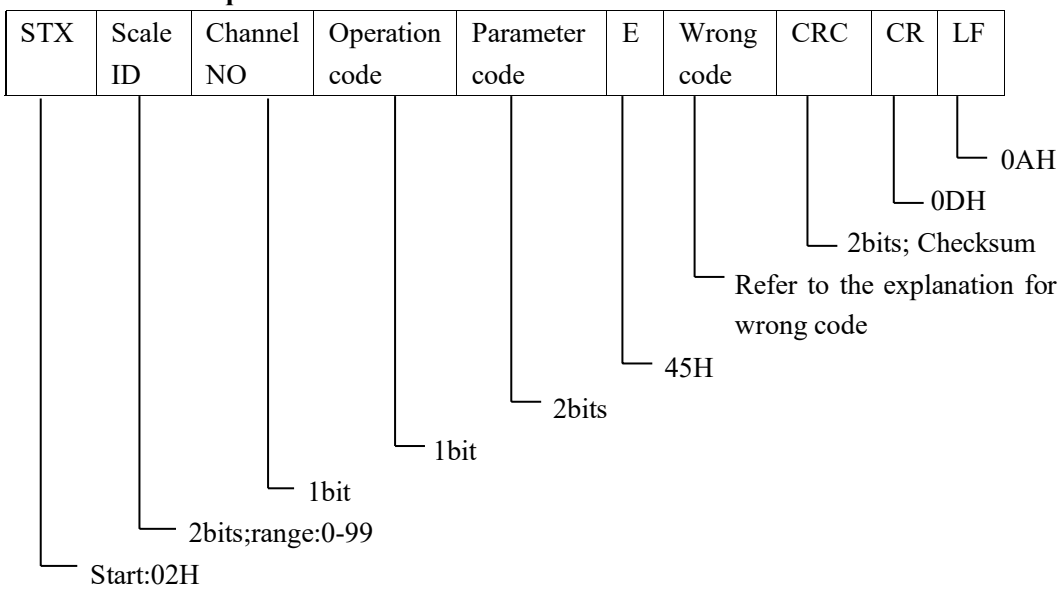
STX	Scale ID	Channel NO	Operation code	Parameter code	CRC	CR	LF



Received data sequence is correct:



Received data sequence is incorrect:



For example:

Calibration command:

02 30 31 31 43 5A 59 39 34 0D 0A

Response when received data is correct:

02 30 31 31 43 5A 59 4F 4B 34 38 0D 0A

Indicates :

Zero calibration of scale No.1 is performed.

Calibration command:

02 30 31 31 43 5A 59 39 34 0D 0A

Response when received data is incorrect:

02 30 31 31 43 5A 59 45 35 31 36 0D 0A

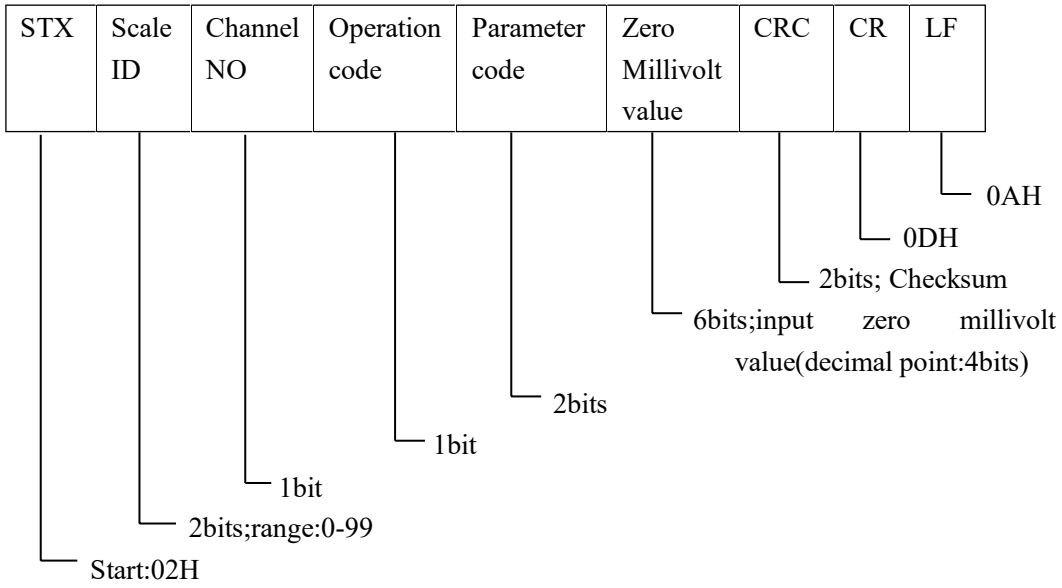
Indicates:

Zero calibration of scale No.1 can't be performed.

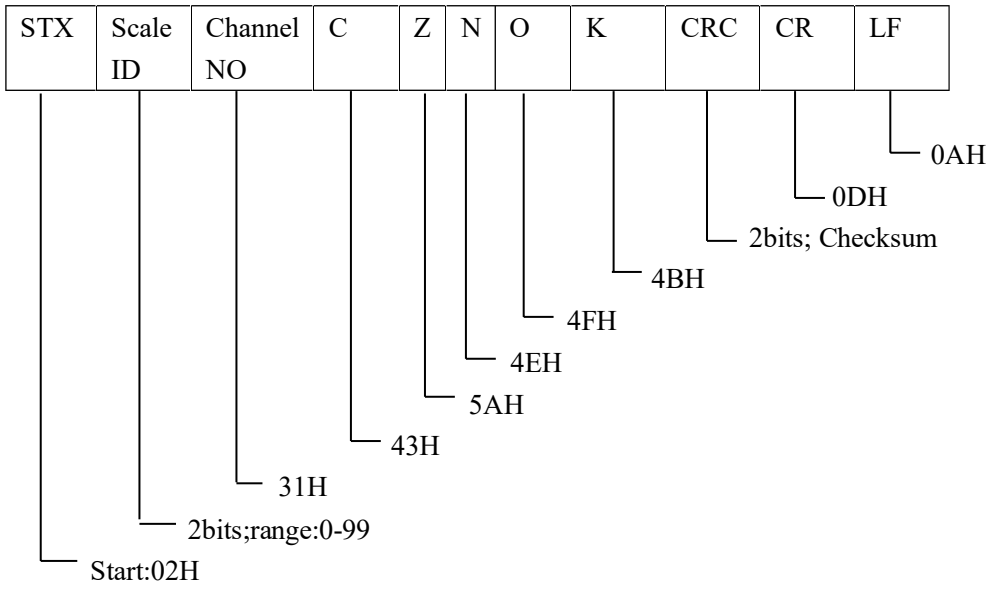
Wrong code:5

2.Zero calibration without standard weight

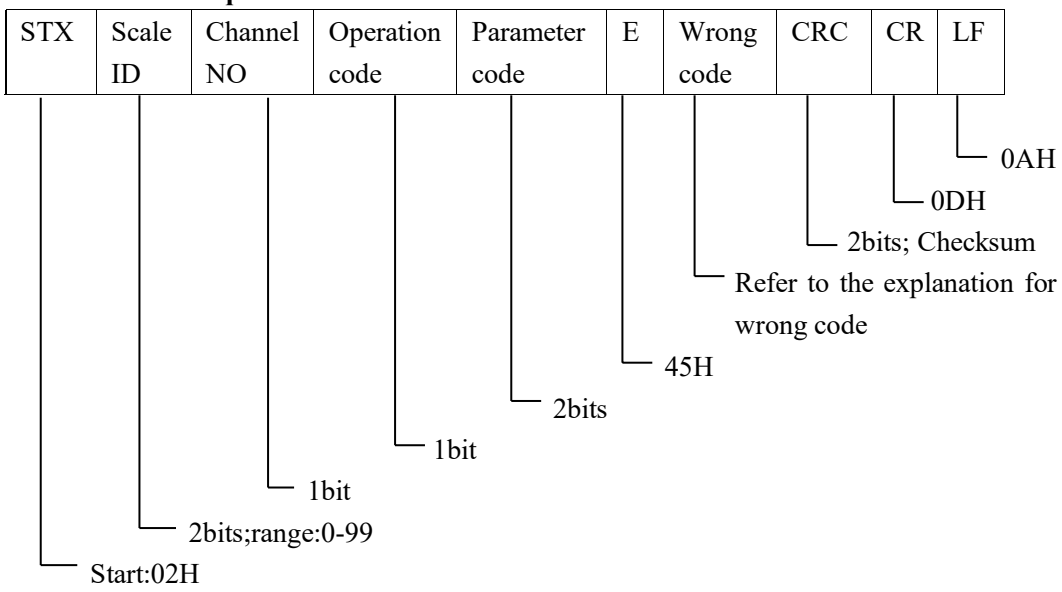
Calibration command:



Received data sequence is correct:



Received data sequence is incorrect:



For example:

Calibration command:

02 30 31 31 43 5A 4E 30 31 32 36 31 30 38 31 0D 0A

Response when received data is correct:

02 30 31 31 43 5A 4E 4F 4B 33 37 0D 0A

Indicates :

Zero calibration of scale No.1 is performed.

Calibration command:

02 30 31 31 4D 5A 4E 30 31 32 36 31 30 39 31 0D 0A

Response when received data is incorrect:

02 30 31 31 4D 5A 4E 45 32 31 32 0D 0A

Indicates:

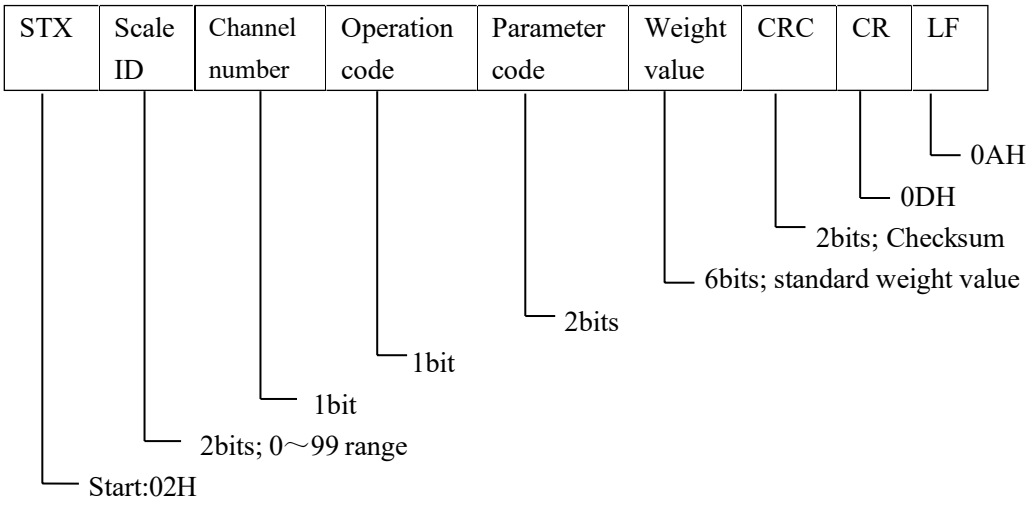
Zero calibration of scale No.1 can't be performed. Wrong code:**2**

5.4 .4.6 Gain Calibration

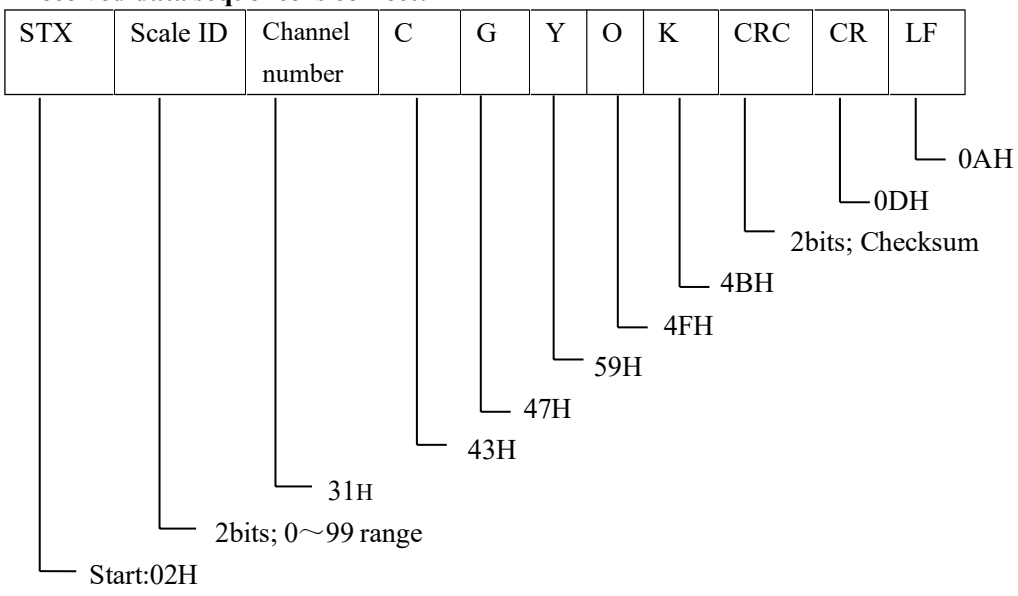
1.Gain calibration with standard weight

Add a standard weight which is near to 80% of the Max. capacity(such as standard weight:200) ,then write in the current value of the standard weight to achieve the gain calibration.

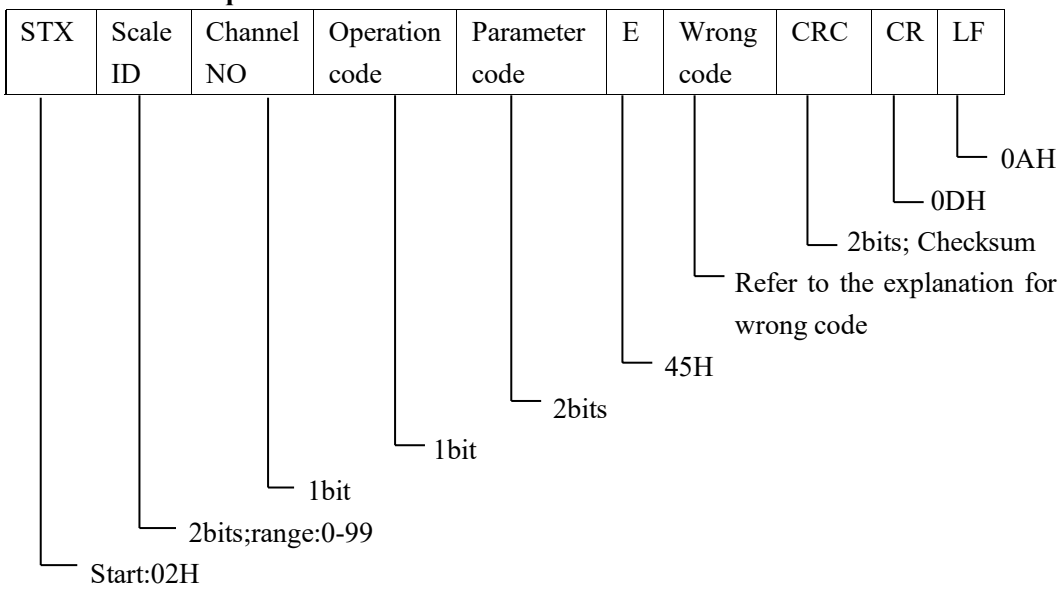
Calibration command:



Received data sequence is correct:



Received data sequence is incorrect:



For example:

Calibration command:

02 30 31 31 43 47 59 30 30 30 32 30 30 36 35 0D 0A

Response when received data is correct:

02 30 31 31 43 47 59 4F 4B 32 39 0D 0A

Indicates :

Write the weight value**:200** into Scale NO.1 and save it correctly.

Calibration command:

02 30 31 32 43 47 59 30 30 30 32 30 30 36 36 0D 0A

Response when received data is incorrect:

02 30 31 32 43 47 59 45 36 39 39 0D 0A

Indicates:

Error occurs when writing data in Scale NO.1 and can't be saved ;Wrong code:**6**

2.Gain Calibration without Standard Weight

Input the standard weight value in Appendix and the corresponding gain Millivolt value to achieve gain calibration.

Calibration command:

STX	Scale ID	Channel NO	Operation code	Parameter code	Gain millivolt value	Weight value	CRC	CR	LF

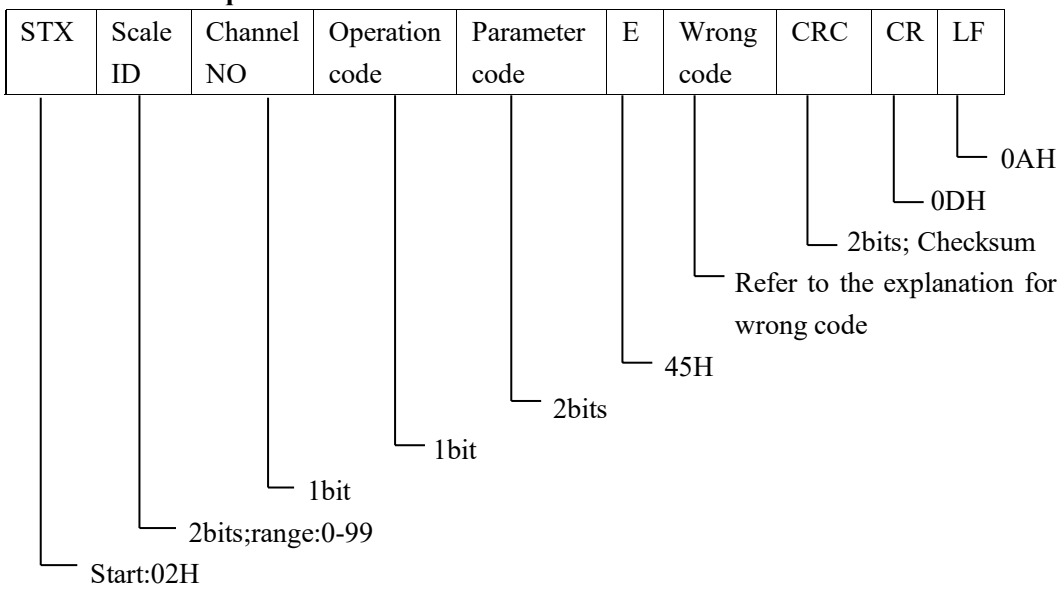
Start:02H
2bits;range:0-99
1bit
1bit
2bits
6bits;corresponding gain millivolt value (decimal point:4bits)
6bits;standard weight value
2bits; Checksum
0DH
0AH

Received data sequence is correct:

STX	Scale ID	Channel number	C	G	N	O	K	CRC	CR	LF

Start:02H
2bits; 0～99 range
31H
43H
47H
4EH
4FH
4BH
2bits; Checksum
0DH
0AH

Received data sequence is incorrect:



For example:

Calibration command:

02 30 31 31 43 47 4E 30 30 31 39 34 30 30 30 30 32 30 30 35 36 0D 0A

Response when received data is correct:

02 30 31 31 43 47 4E 4F 4B 31 38 0D 0A

Indicates :

Write data(weight value**:200**;corresponding gain millivolt value:**0.194)** into Scale NO.1 and save it correctly.

Calibration command:

02 30 31 31 43 5A 52 30 30 31 39 34 30 30 30 30 32 30 30 37 39 0D 0A

Response when received data is incorrect:

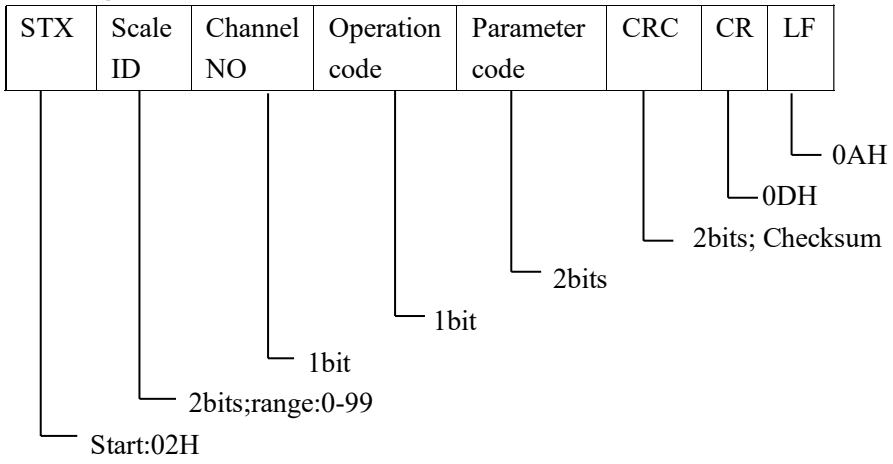
02 30 31 31 43 5A 52 45 33 30 37 0D 0A

Indicates:

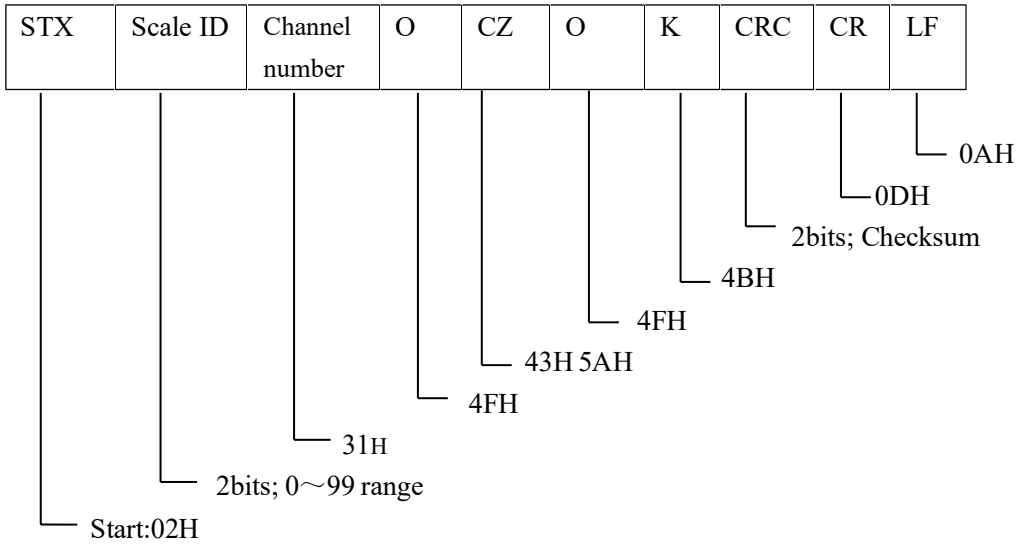
Error occurs when writing data in Scale NO.1 and can't be saved ;Wrong code:**3**

5.4 .4.7 Zeroing Operation

Zeroing command:

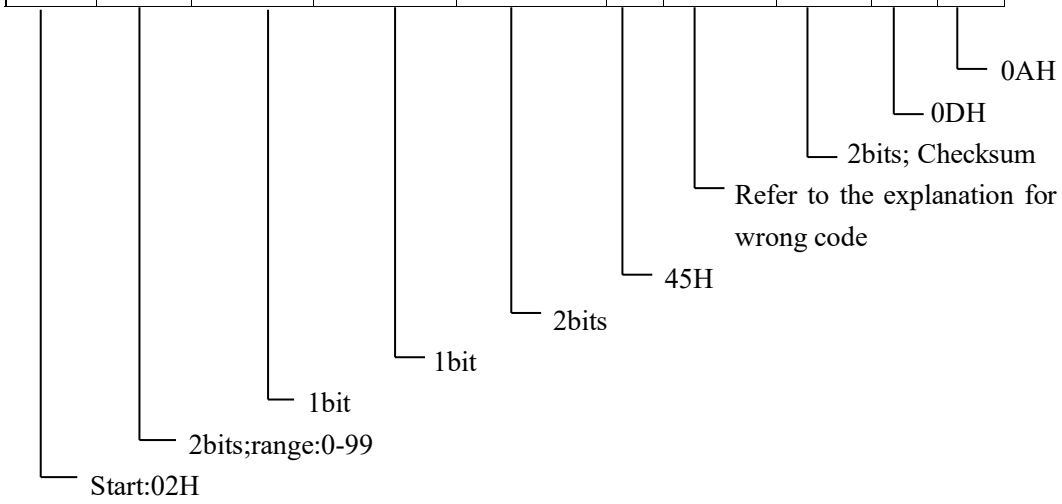


Received data sequence is correct:



Received data sequence is incorrect:

STX	Scale ID	Channel NO	Operation code	Parameter code	E	Wrong code	CRC	CR	LF



For example:

Zeroing command:

02 30 31 31 4F 43 5A 38 34 0D 0A

Response when received data is correct:

02 30 31 31 4F 43 5A 4F 4B 33 38 0D 0A

Indicates :

Zeroing of scale No.1 is performed.

Zeroing command:

02 30 31 31 4F 43 5A 38 34 0D 0A

Response when received data is incorrect:

02 30 31 31 4F 43 5A 45 35 30 36 0D 0A

Indicates:

Zeroing of scale No.1 can't be performed. Wrong code**:5**

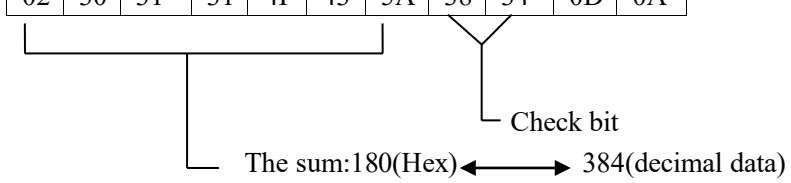
5.3.3 CRC Count

Count the sum of all the left bytes and convert the sum to be decimal data, and then convert the 2 low-order digits of the decimal date to ASCII code.

For example:

See below data frame:

02	30	31	31	4F	43	5A	38	34	0D	0A



※Then work out: the check code of the above data frame is :38 34

5.5 Modbus Protocol

5.5 .1 Modbus Communication Mode

RTU Mode

Under this mode, each 8 figure byte is divided into 2 units 4 figure hexadecimal character to transmit. The data frame as below:

Data Frames：	8data bits, 1 stop bit, Even parity (8 E-1)
	8data bits, 1 stop bit, Odd Parity (8 O-1)
	8data bits, 1 stop bit, No Parity (8 n-1)
	8data bits, 2 stop bit, No Parity (8 n-2)

Baud Rate：**1200**，**2400**，**4800**，**9600**，**19200**，**38400**，**56700(Optional)**

Code：binary system

ASCII Mode

Under this mode, each 8 figure byte is transmitted as 2 ASCII characters.

The data frame as below:

Data Frames：	8data bits, 1 stop bit, Even parity (8 E-1)
	8data bits, 1 stop bit, Odd Parity (8 O-1)
	8data bits, 1 stop bit, No Parity (8 n-1)
	8data bits, 2 stop bit, No Parity (8 n-2)
	7 data bits, 1 stop bit, Even parity (7 E-1)
	7 data bits, 1 stop bit, Odd parity (7 O-1)
	7 data bits, 2 stop bit, No Parity (7 n-2)

Baud Rate：**1200**，**2400**，**4800**，**9600**，**19200**，**38400**，**56700(Optional)**

Code：ASCII Code

5.5 .2 Modbus Communication Address

PLC address	**Transmitter address**	**Explanation**
Below Contents are Read-Only Register(function code is0x03)		
40001	0000	Current weight value(4bytes with sign digits, high-order ahead)
40002	0001	
40003	0002	D115—D14.....D4—D3 —D2 — D1 — D0 0 0: plus 0:zero 0:normal 0:stable 1:minus 1:not zero 1:overflow 1:US
40004	0003	

.... 40007	 0005	Reserve（allow reading out, read out"0"）
Below Contents are 2 bytes for Writing and Reading (Writing function code: 0x06) Reading function code: 0x03)		
40008	0007	Automatically zeroing when power on (0: OFF;1:ON)
40009	0008	Range of Zero-Tracking （0- 9)
40010	0009	Range of motion detecting (1- 9)
40011	0010	Range of zeroing （ 0% - 99% ）
40012	0011	Filter Level(0- 9)
40013	0012	Steady status filter (0- 9)
40014 … 40016	0013 … 0015	Reserve（read out"0"）
40017	0016	Position of decimal point (0- 4)
40018	0017	Min. division value(0- 5) represents: 1/ 2/ 5/ 10/ 20/ 50)
40019	0018	Sensor sensitivity (0- 1)represents：2mV/V、3mV/V)
40020	0019	Zero calibration with weight: write-in data"1",achieve zero calibration with current weight value. Sensor sensitivity is 2 m V / V:Range of Millivolt value is （0.000- 9.000mV）; (sensor sensitivity is 3 m V / V:Range of Millivolt value is (0.000- 13.000mV)
40021	0020	Zero calibration without weight, input zero Millivolt value. Input range is: Sensor sensitivity is 2 m V / V:Range of Millivolt value is （0.001- 9.000mV）; (sensor sensitivity is 3 m V / V:Range of Millivolt value is (0.001- 13.000mV)
40022 … 40030	0021 … 0029	Reserve（read out"0"）
Below Contents are 4 bytes for Writing and Reading (Writing function code: 0x10; Reading function code: 0x03)		
40031 40032	0030-0031	Max. capacity; Input range is(Max. capacity≤Min. division*30000)
40033-40034	0032-0033	Gain calibration with weight; Input standard weight value(≤ Max. capacity)

40035 40036	0034-0035	Gain calibration without weight; Input gain Millivolt value(sensor sensitivity is 2mV/V:0.000＜millivolt value≤10.000mV－zero millivolt value); (Sensor sensitivity is3mV/V:0.000＜millivolt value≤15.000mV－zero millivolt value)
40037 40038	0036-0037	Gain calibration without weight; Input gain weight value(≤ Max. capacity)
40039 40040 …… 40055 40056	0038 0039 …… 0054 0055	F3.1 storage address …… F3.9 storage address
Below are Read-Only Contents (function code: 0 x 0 1)		
00041	0040	0：Stable; 1: Unstable
00042	0041	0: Normal; 1: Overflow
00043	0042	0: Zero;　1: Not zero
00044	0043	0: ‘+’;　1: ‘-’
00045 ……. 00046	0044 ……. 0045	Reserve（read out”0”）
Write and Read Contents (Reading function code: 0x01;Writing function code: 0x05)		
00057	0056	Zeroing.(inputFF00:zeroing) ; returnto0 when reading coil.

5.5 .3 Explanation for Function Code

There are 5 function code in above Modbus communication protocol:01 Reading the status of the coil;03 Reading holding register; 05 Force single coil;； 06 Preset single holding register; 16 (10 Hex) Preset multiple holding registers.

01 Reading the Status of the Coil

Query

Query information assigns the starting coil and the quantity of coil.

Response

(1) Each status of the coil corresponds to each data: 1=ON;0=OFF. The LSB（Least Significant Bit）of the first byte is the start address during query, the other coils are arranged from low bit to high bit till the eighth coil, the next byte is also arranged from low bit to high bit.

(2) If the return coil is not the multiple of 8,then set “0”for the bits from the rest bits of the last bits to the highest bit ,the byte district represents all the byte number.

For example: Request to read 40 43 coil from Transmitter 01

1) Under RTU Mode for communication:

Query command:

Transmitter Address	Function Code	Start Address	The Number of Coils	CRC Check
1 byte	1 byte	2 byte	2 byte	2 byte

Received data sequence is correct:

Transmitter Address	Function Code	Counting Byte	Data Field	CRC Check
1 byte	1 byte	1 byte	1 byte	2 byte

Query command: 01 01 00 28 00 04 BD C1

Received data sequence is correct: 01 01 01 02 D0 49

The corresponding status of coil 43 40: 0 0 1 0

2) Under ASCII Mode for communication:

Query command:

Start	Transmitter Address	Function Code	Start Address	The Number of Coils	LRC Check	End
1 character	2 character	2 character	4 character	4 character	2 character	2 character

Received data sequence is correct:

Start	Transmitter Address	Function Code	Counting Byte	Data Field	LRC Check	End
1 character	2 character	2 character	2 character	2 character	2 character	2 character

Query command: 3A 30 31 30 31 30 30 32 38 30 30 30 34 44 32 0D 0A

Received data sequence is correct: 3A 30 31 30 31 30 31 30 32 46 42 0D 0A

The corresponding status of coil 43 40: 0 0 1 0

03 Reading Holding Register

Query information assigns the start address and number of the registers.

Response

Response information assigns the byte number of the reading register, each register corresponds to 2 bytes; there is also the data value of each reading register in the response information.

For example: Reading register 0007、0008

1) Under RTU Mode:

Query command:

Transmitter Address	Function Code	Start Address	Query the number of Registers	CRC Check
1 byte	1 byte	2 byte	2 byte	2 byte

Received data sequence is correct:

Transmitter Address	Function Code	Counting Byte	Register (0007)Data	Register (0008)Data	CRC Check
1byte	1byte	1byte	2byte	2byte	2byte

Query command：01 03 00 07 00 02 75 CA

Received data sequence is correct：01 03 04 00 00 00 05 3A 30

The data for Register (0007)and Register (0008): ：0（Hex：0000H）、5（Hex：0005H）

2) Under ASCII Mode:

Query command:

Start Address	Transmitter Address	Function Code	Start Address	Query the number of Registers	LRC Check	End
1 character	2 character	2 character	4 character	4 character	2 character	2 character

Received data sequence is correct:

Start	Transmitter Address	Function Code	Counting Byte	Register (0007)Data	Register (0008)Data	LRC Check	End
1 character	2 character	2 character	2 character	4 character	4 character	2 character	2 character

Query command：3A 30 31 30 33 30 30 30 37 30 30 30 32 46 33 0D 0A

Received data sequence is correct：3A 30 31 30 33 30 34 30 30 30 30 30 30 30 35 46 33 0D 0A

The data for Register (0007)and Register (0008): ：0（Hex：0000H）、5（Hex：0005H）

05 Force single coil

Query

Query information assigns the address of the coil that need to be forced； A constant in query data field decides the ON/OFF status for the requested coil: FF00 value for ON status,0000H value for OFF status. Other value is ineffective to the coils.

Response

The coil being force status returns to normal response.

For example: Force the 0056 coil of Transmitter01 is ON status

1) Under RTU Mode:

Query command:

Transmitter Address	Function Code	Coil Address	Forced Data	CRC Check
1 byte	1 byte	2 byte	2 byte	2 byte

Received data sequence is correct:

Transmitter Address	Function Code	Coil Address	Forced Data	CRC Check
1 byte	1 byte	2 byte	2 byte	2 byte

Query command：3A 30 31 30 35 30 30 33 38 46 46 30 30 43 33 0D 0A

Received data sequence is correct：3A 30 31 30 35 30 30 33 38 46 46 30 30 43 33 0D 0A

The coil0056 is set to be “ON” status.

06 Preset Single Holding Register

Query

Query information assigns the address of the register need to be preset, the request preset value is in the query data field.

Response

The register returns to normal response after presetting.

For example:

1) Under RTU Mode:

Query command:

Transmitter Address	Function Code	Preset Register Address	Preset Value	CRC Check
1 byte	1 byte	2 byte	2 byte	2 byte

Received data sequence is correct:

Transmitter Address	Function Code	Preset Register Address	Preset Value	CRC Check
1 byte	1 byte	2 byte	2 byte	2 byte

Query command：：01 06 00 09 00 05 99 CB

Received data sequence is correct：01 06 00 09 00 05 99 CB

The register 0009: 5（Hex：0005H）

16 (10 Hex)Preset multiple Holding Registers

Query

Query information assigns the address of the register need to be preset, the preset value of the register is in the query data field.

Response

Normal response: Return to the transmitter address、function code、start address and the number of preset registers.

For example: Request to put the preset value into 2 registers of Transmitter01,the start register:0030; preset value: 0001H and 7318H

1) Under RTU Mode:

Query command:

Transmitter Address	Function Code	Start Address	The number of Registers	Counting byte	Preset value	CRC Check
1 byte	1 byte	2 byte	2 byte	1 byte	4 byte	2 byte

Received data sequence is correct:

Transmitter Address	Function Code	Start Address	The number of Registers	CRC Check
1 byte	1 byte	2 byte	2 byte	2 byte

Query command：01 10 00 1E 00 02 04 00 01 73 18 07 D5

Received data sequence is correct：01 10 00 1E 00 02 21 CE

2) Under ASCII Mode:

Query command:

Start	Trans-mitter Address	Function Code	Start Address	Number of Registers	Count-ing Byte	Preset Value	LRC Check	End
1char-acter	2 char-acter	2 char-acter	4 char-acter	4 char-acter	2 char-acter	8char-acter	2 char-acter -	2 char-acter -

Received data sequence is correct:

Start	Transmitter Address	Function Code	Start Address	Number of Registers	LRC Check	End
1 character	2 character	2 character	4 character	4 character	2 character	2 character

Query command：

3A 30 31 31 30 30 30 31 45 30 30 30 32 30 34 30 30 30 31 31 43 39 36 31 38 0D 0A

Received data sequence is correct：3A 30 31 31 30 30 30 31 45 30 30 30 32 43 46 0D 0A

5.5 .4 Error Message during Communication

The transmitter sends message back to host when detecting error except check code(CRC or LRC). The highest bit of function code is **"1"**, I t means that the function code which is sent by transmitter is 128 more than the function code which is sent by host（for example: reading register command,03H will be changed to 83H）.

Abnormal code:

02: illegal data address: the received data address is the unallowed address of transmitter.

03: illegal data: the value of query data field is the unallowed value of transmitter.

The data frame of error message:

1) Under RTU Mode:

Transmitter Address	Function Code	Abnormal Code	CRC Check
1 byte	1 byte	1byte	2 byte

2) Under ASCII Mode:

Start	Transmitter Address	Function Code	Abnormal Code	LRC Check	End
1 character	2 character	2 character	2 character	2 character	2 character

For example:

Upper computer: Reading coil(0040) using function code:03"

1) Under RTU Mode:

Query command：01 03 00 28 00 01 04 02

Received data sequence is incorrect：01 83 02 C0 F1

2) Under ASCII Mode:

Query command：3A 30 31 30 33 30 30 32 38 30 30 30 31 44 33 0D 0A

Received data sequence is incorrect：3A 30 31 38 33 30 32 37 41 0D 0A

According to the response data sequence, we know that the current error code is"02".It means that the current received data address is illegal and it's the unallowed address of transmitter.

5.6 tt TOLEDO Protocol

The Tuxon-S Transmitter will send data continuously through tt TOLEDO protocol.

The continuous mode "Cont" format of tt protocol as below：

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
STX																**CR**	

‿ **A B C** display weight value(**6**bits) **6**pcs **30H** Check sum

Here: ASCII Start character:02(STX)

Status Word A is defined as below:

D0	**0**	**1**	**0**	**1**	**0**
D1	**1**	**1**	**0**	**0**	**1**
D2	**0**	**0**	**1**	**1**	**1**
Position of decimal point	**x**	**.x**	**.xx**	**.xxx**	**.xxxx**

D3 D5:"1"(invariant); **D4 D6: "0"** (invariant); **D7**: Even parity **(7 E-1)**

Status Word B is defined as below:

D7	**D6**	**D5**	**D4**	**D3**	**D2**	**D1**	**D0**
Even parity	Status of transmitter		Unit	Stable	Overflow		
Data frame **(7 E-1)**	0 (invariant)	1 (invariant)	0 (invariant)	1:Unstable 0: Stable	1:Overflow 0:Normal	1:Minus 0:Plus	0 (invariant)

Status Word C(Reserve)

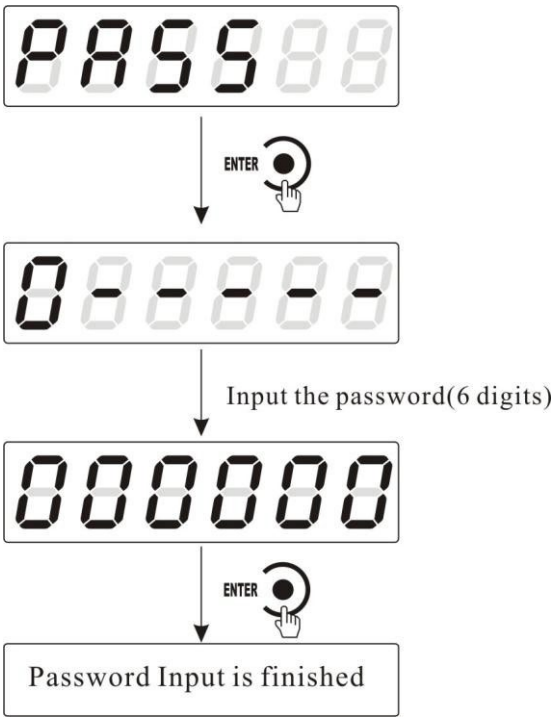
6 Password Input and Setting

6.1 Password Input

(1) The default passwords of calibration and working parameters setting are: **000000**

(2) As being protected by password, you must input the password before calibration.

(3)When working parameter setting, If **F3.1**(password switch) is **"ON"**, then must input password when enter the working parameter interface.



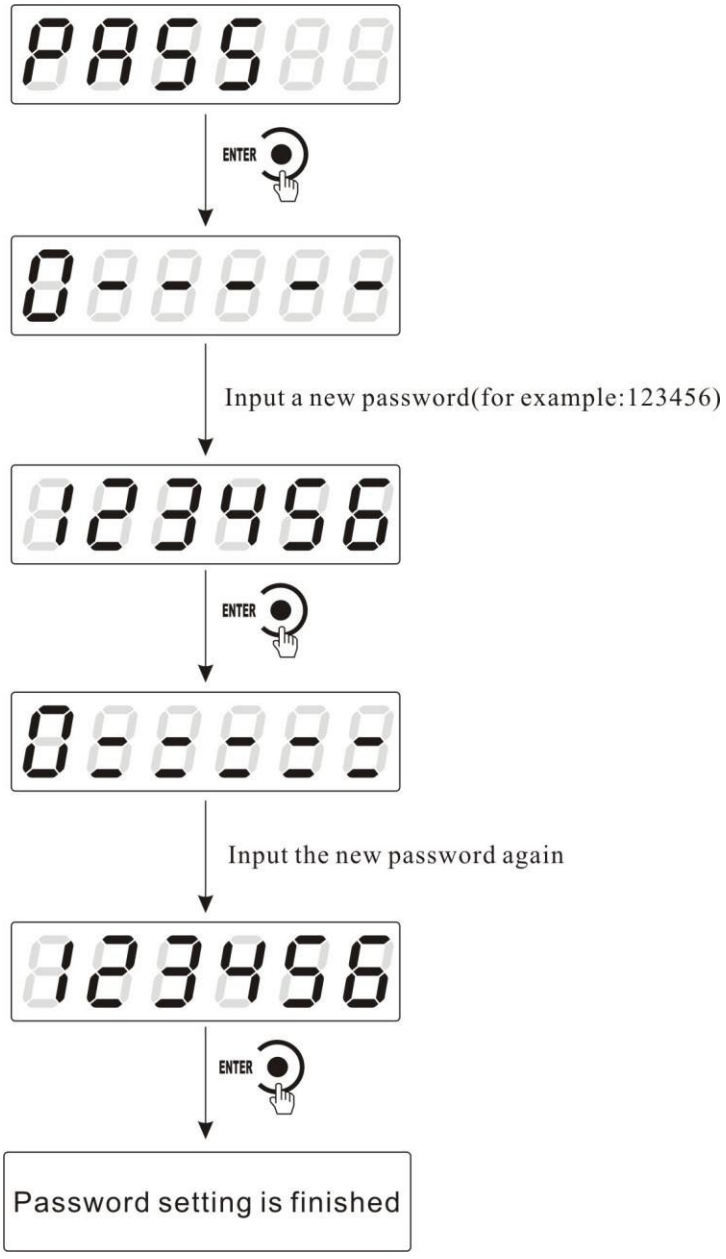
During password inputting procedure, indicator will display "0 ＝＝＝＝＝" after a wrong password is input once, and will display "0 ≡ ≡ ≡ ≡ ≡" after twice, and will display "Error 4" and be locked after 3 times.

You must reboot the indicator to unlock it and make it work well when it displays "Error 4".

6.2Password Setting

(1) There is password setting item both in calibration and working parameter(when working parameter, the **F3.1**(password switch) must be set to **"ON"**).

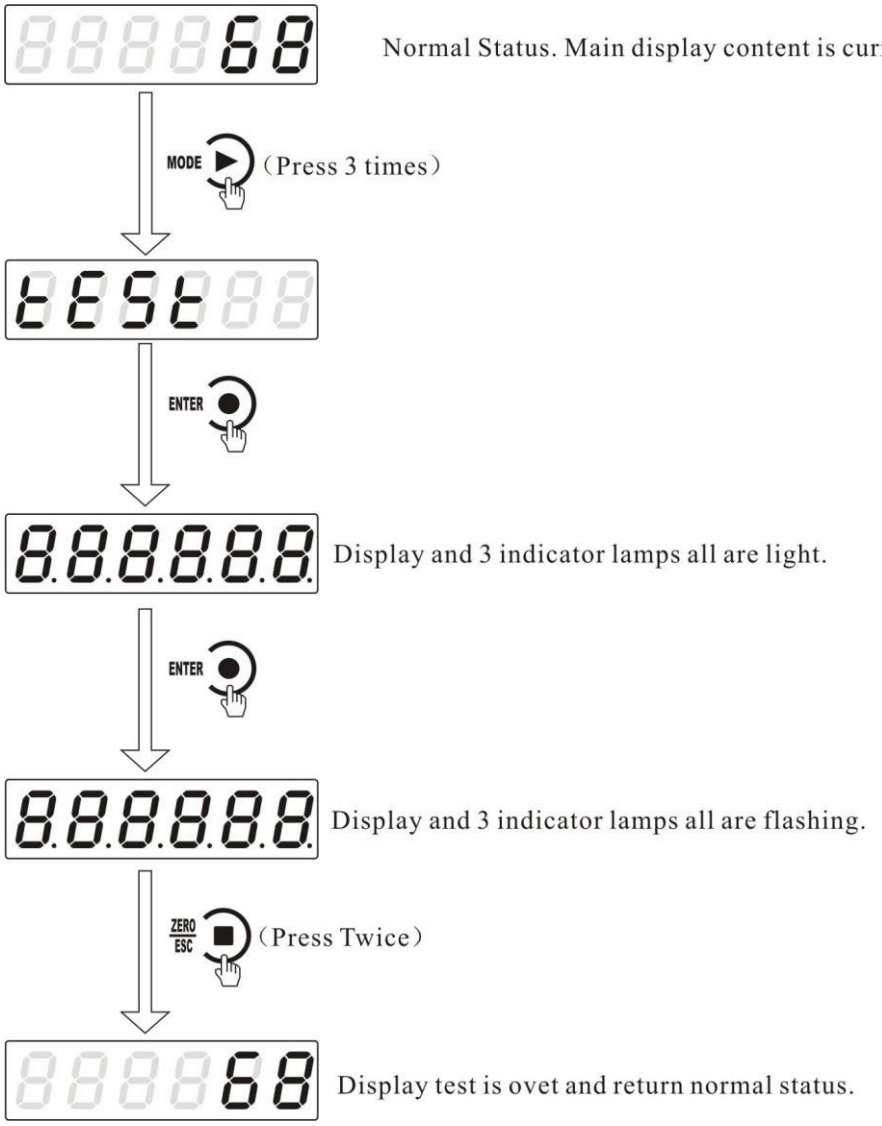
(2) When password setting, request to input password two times. The setting will be successful only when the two passwords are the same; If not, the transmitter will display "Error" for one second, then return to the password setting interface("PASS").



***Note: If passwords input second time does not match the first time, indicator will display "Error" for one second and return to "PASS" interface.**

7 Display Test

Under normal status, display test is shown in flow chart below. If the test result is the same as flow chart, it means that display and indicator lamps all work well.



8 Error and Alarm Messages

ERROR : Incorrect data input.

ERROR2: Current weight is not within the zeroing range when zeroing.

ERROR3: Display (system) is not stable when zeroing

ERROR4: Password input is wrong for **3** times.

-OFL/ OFL: Weighing result overflows

OVER: The output signal of load cell is too large while doing zero calibration.

UNDER: The output signal of load cell is too small while doing zero calibration.

Appendix

1. Explanation of Working Parameter for Tuxon-S

Symbol	Parameter	Values	Default	Explanation
F1				**Item 1**
F1.1	Scale ID	0 99	1	Scale ID: the current Transmitter NO.
F1.2	Auto-Zero When Power On	OFF/ON	OFF	If it is set to ON, the indicator will clear display data to zero when powered on.
F1.3	Zero-Tracking Range	0-9	0	Function of zero tracking is mainly used to adjust zero-drift. If it is set as 0, zero tracking is disabled.
F1.4	Motion Detecting Range	1-9	1	If continuous weight changes all are within this range during motion detecting time,indicator will judge system is stable.
F1.5	Zeroing Range	0-99	50	0%-99% of max. capacity. When indicator performs zeroing, it will display “ERROR 2” if present weight is not within this range.
F1.6	Digital Filter	0-9	5	0: no filter 9: best digital filter effect
F1.7	Stable Filter	0-9	0	Based on the digital filter 0: no filter 9: best filter effect
F2				**Item2**
F2.1		1200:2400 4800:9600 19200:38400 57600	9600	Serial ports Baud rate
F2.2		r S ; r E ; E A S y S P 1 ; b u s; tt	bus	Serial port protocol

F2.3		r E A d ; C o n t	r E A d	r E A d or Cont; r E (r S / S P 1 or E A S y. Ineffective When F2.2 is set to “bus”.
F2.4		r t U ; A S C	r t U	r t U or ASCII; Specially for Modbus protocol. Ineffective When F2.2 is set to” r E / r S / S P 1 / E A S y”
F2.5		7 - E - 1 ; 7 - O - 1 7 - n - 2 ; 8 - E - 1 8 - O - 1 ; 8 - n - 1 8 - n - 2	8 - E - 1	data frames format
F2.6	Adjust the speed of serial port	nonE/10/20/30/40/50		1)When **F2.6**=nonE, the interval for Tuxon-S transmitter serial ports continuously sending two data frames is the 1 byte time under the current Baud rate. 2)When **F2.6**=10~50, the interval for Tuxon-S transmitter serial ports continuously sending two data frames is 10~50ms。
F3				**Item 3**
F3.1	Register for user settings	0～999999	0	F3.1～F3.9 There are total 9 registers for using which can be set freely.
F3.2	Register for user settings	0～999999	0	F3.1～F3.9 There are total 9 registers for using which can be set freely.
F3.3	Register for user settings	0～999999	0	F3.1～F3.9 There are total 9 registers for using which can be set freely.
F3.4	Register for user settings	0～999999	0	F3.1～F3.9 There are total 9 registers for using which can be set freely.
F3.5	Register for user settings	0～999999	0	F3.1～F3.9 There are total 9 registers for using which can be set freely.
F3.6	Register for	0～999999	0	F3.1～F3.9 There are total 9

	user settings			registers for using which can be set freely.
F3.7	Register for user settings	0～999999	0	F3.1～F3.9 There are total 9 registers for using which can be set freely.
F3.8	Register for user settings	0～999999	0	F3.1～F3.9 There are total 9 registers for using which can be set freely.
F3.9	Register for user settings	0～999999	0	F3.1～F3.9 There are total 9 registers for using which can be set freely.
F4				**Item 4**
F4.1	Password Switch	OFF/ON	OFF	If it is set as **"ON"**, you should input the password before entering parameters setting.
F4.2	Setting Password			When **F4.1** is **"OFF"**, it is invisible.