User Manual

XK315A2-9 Weighing Transmitter

Contents

Chapter 1 Specifications

Conversion Principle	Sigma Delta A/D convertor
Display accuracy	1/3000
A/D Resolution	1,000,000
A/D Conversion Speed	10 times/second / 80 times/second
Load Cell Excitation Voltage	Uexc = 5 V
Max Number Of Load Cells	12 x 350 Ω load cells / 24 x 700 Ω load cells
Display	5-bit Display: 0.32 inches LED
Display Resolution	1/2/5/0.1/0.2/0.5/0.01/0.02/0.050.001/0.002/0.005/10/20/50 100/200/500/0.10/0.20/0.50/0.010/0.020/0.050
External power supply	DC24V 0.3A (working range: DC18V-DC35V)
Operating Temperature	-10℃~40℃
Storage Temperature	-25℃~55℃
Relative Humidity	85%RH
Housing Dimensions	105×72×27(mm)
Communication interface	Isolated RS485 serial interface
Communication protocol	● Modbus RTU ● single byte command response ● continuous output
Analog output	● 0-20mA / 4-20mA analog current output ● 0-10V / 2-10V analog voltage output
Digital input	Two isolation digital inputs

Chapter 2 External Interfaces

A. Load cell connector

1	2	3	4	5	6	7	8	9
Excitation+	Sense+	GND	Sense-	Excitation-	None	Signal+	Signal-	None

B. Power and output connectors

1	2	3	4	5	6	7	8	9	10
0-10V analog voltage output		4-20mA analog current output		RS485		Switch inputs		Power（DC24V）	
+	-	+	-	A	B	IN1	IN2	-	+

Chapter 3 Keys and LEDs

A. Keys

【*****】 function and confirm key 【→**T**←】 tare and move flashing digit to right key

【→**0**←】 zero, and increase the value key (Long press the key to decrease the value)

B. LEDs

〖◣ ◢〗 light when weighing is stable

〖→**T**←〗 Lights when the tare weight is removed, means the weighing is net weight

〖**POWER**〗 Working power light

Chapter 4 Basic Functions

A. **ON and OFF** Turn on the external power supply, the transmitter will display the software version, and then self-test, display "00000"- "99999". After the self-test is completed, the weighing is displayed.

B. **Zero** 1.zero key: In weighing state and the weight is within ±2%FS, press 【→**T**←】, the display value is set to zero, and 〖→**T**←〗 lights. If the weight is more than +2% FS, "HHHHH" is displayed; if the weight is less than-2% FS, "LLLLL" is displayed.

2. The external contact (external button) is set to zero: between **IN1** (pin 7) and the positive of power supply (pin 10), when the contact is connected, and the contact is jogged once to perform the zeroing operation. Note: The contacts cannot be closed all the time, otherwise the zeroing is repeated.

C. **Tare** in weighing state, display is the gross weight (〖→**T**←〗 light is off). When the weighing is more than zero and stable (〖◣◢〗 light is on), press 【→**T**←】, the display value is set to zero, and the 〖→**T**←〗 lights.

D. **Remove tare** In weighing state, the net weight is displayed (〖→**T**←〗 lights), press【→**T**←】 to clear the tare weight, and the 〖→**T**←〗 light is off.

E. **Digital input** Connect one end of the input contact to the positive terminal of the power supply (pin 10) and the other end to **IN1** (pin 7) / **IN2** (pin 8).

IN1: Zero setting function, requires jog (cannot be closed for a long time).

IN2: User-use, the status of the switch can be obtained through ModbusRTU.

Chapter 5 Configuration

Enter, and exit parameter settings

Press 【*****】 and 【→**0**←】 at the same time to display “00000”. Press 【→**T**←】 and 【→**0**←】 and then enter the password: 2003. Press 【*****】 to display “St on”, transmitter parameter has been entered. Set the status. Press 【*****】 to perform parameter setting and weight calibration. Press 【*****】 and 【→**T**←】 at the same time to display “StoFF”, transmitter parameter setting status has been exited. Press 【*****】 to enter weighing state.

OPERATION	DISPLAY	DESCRIPTION
	〖 50.02〗	Weighing state
Press 【*****】	〖CAL SP〗	Calibrate state
Press 【*****】	〖-SEt- 〗	Setting status
Press 【→**T**←】	〖d 0.01〗	Setting division
Press 【→**T**←】	〖d 0.05〗	Select division
Press 【*****】	〖 100.00〗	Setting full scale weithing (FS)
Press 【→**T**←】	〖 00000〗	The highest bit flashes, waiting for input data
Press 【→**T**←】 Or 【→0←】	〖 030.00〗	Press 【→**T**←】 to move the digit to right Press 【→**0**←】 to increase digit, and long press 【→**0**←】 to decrease digit
Press 【*****】	〖FL 2〗	Setting filter, FL=0-2 The digit is smaller, the weighing speed is fast; the digit is bigger, the weighing speed is slow, and it is easy to be stable
Press 【→**T**←】	〖FL 1〗	Select filter

Press 【*】	〖AUP XY〗	Set zero tracking and start zero range X: start zero range 0: zero range when turn on the indicator is 0% 1: zero range when turn on the indicator is 2%FS 2: zero range when turn on the indicator is 10%FS 3: zero range when turn on the indicator is 20%FS 4-9: zero range when turn on the indicator is 50%FS Y: zero tracking 0：none 1：0.4d 2：0.8d 3：1.2d 4：1.6d 5：2.0d 6：2.4d 7：2.8d 8：3.2d 9：3.6d
Press 【→T←】	〖AUP10〗	Select AUP value
Press 【*】	〖Adr 00〗	Setting transmitter communicate address
Press 【→T←】	〖Adr 12〗	Select Adr value
Press 【*】	〖b 2400〗	Setting communicate Baud Rate
Press 【→T←】	〖b 9600〗	Select baud rate value
Press 【*】	〖CHE 0〗	Setting serial communication byte check
Press 【→0←】	〖CHE 1〗	0：8n1，1：7e1，2：7o1，3：7S1，4：7M1
Press 【*】	〖F 0〗	Setting serial communication
Press 【→0←】	〖F 2〗	0: continuous output 1: single byte command response 2: Modbus RTU
Press 【*】	〖Io 0〗	Setting analog current output 0: 0-20mA analog current output 1: 4-20mA analog current output
Press 【*】	〖L0800〗	Calibrate 4-20ma analog current output, L is the DAC value when the current output is equal to 4ma If Io=0, then no this item
Press 【→T←】	〖L0810〗	Change the L value and calibrate the analog output current to 4ma
Press 【*】	〖H4000〗	Calibrate 4-20ma analog current output, H is the DAC value when the current output is equal to 20ma
Press 【→T←】	〖H3923〗	Change the H value and calibrate the analog output current to 20ma
Press 【*】	〖rA 0〗	Setting AD sampling rate 0 is 10 times/second and 1 is 80 times/second
Press 【→0←】	〖rA 1〗	Select AD sampling rate
Press 【*】	〖 50.02〗	Back to weighing status

Chapter 6 Calibration

OPERATION	DISPLAY	DESCRIPTION
	〖 50.02〗	Weighing state
Press 【*】	〖CAL SP〗	Calibrate state
Press 【→T←】	〖CAL 00〗	Remove of objects from the scale, emptying the weighing platform

Press 【*】	〖- - - - - -〗	Zero confirm
	〖 100.00〗	Load calibration weight, it must be more then 30%FS
Press 【→T←】	〖002000〗	Enter the weight of the loaded weight
Press 【*】	〖- - - - - -〗	Calibration
	〖 20.00〗	Back to weighing status

Chapter 7 Inquire ADC Internal Code and Restore Factory Settings

OPERATION	DISPLAY	DESCRIPTION
	〖 50.02〗	Weighing state
Press 【*】	〖CAL SP〗	Calibrate state
Press 【*】	〖-SEt- 〗	Setting status
Press 【*】	〖-A-d- 〗	Inquire ADC internal code
Press 【→T←】	〖365235〗	ADC code
Press 【*】	〖 50.02〗	Back to weighing status
Press 【*】	〖CAL SP〗	Calibrate state
Press 【*】	〖-SEt- 〗	Setting status
Press 【*】	〖-A-d- 〗	Inquire ADC internal code
Press 【*】	〖FACt 〗	Reset to factory setting
Press 【→T←】	〖 50.02〗	Reset has been restored, and back to weighing status Factory setting: D=0.01, FS=150.00, FL=2, AUP=00,Adr=00 B=2400, CHE=0, F=0, Io=0, L=0800, H=4000, ra=0

Chapter 8 Serial Port Format

A. continuous output (F=0)

=	6	5	.	4	3	2	1	S

S：symbol, the weight is a space, and the negative is "-".

B. single byte command response (F=1)

Commands are: P、G、B、N、Z、T、C

COMMANDS	ANSWER	DESCRIPTION
P	GROSS: 24.02 kg TARE: 4.01 kg NET: 20.01 kg	Get gross weight, tare weight, and net weight
G	GROSS: 24.02 kg	Get gross weight
B	TARE: 4.01 kg	Get tare weight
N	NET: 20.01 kg	Get net weight
Z		Zero operation
T		Tare operation
C		Remove tare operation

C. Modbus RTU（F=2）

Please See "A2-9 Communication Protocol Modbus RTU"

Chapter 9 Maintenance and Precautions

A. In order to ensure the service life of the instrument, it should not be used under direct sunlight, and the placement should be relatively flat.
B. It should not be used in places with dust and vibration.
C. Weighing (including tare weight) is strictly prohibited.
D. Do not use strong solvents (such as benzene, nitric acid) to clean the case.
E. Do not inject water into the instrument to prevent electric shock and electronic components from being damaged.
F. If the instrument fails during use, the power should be turned off immediately. Generally, the manufacturer of the non-weighing device should send the display back to the company for repair, and it is not allowed to repair it by itself to avoid further damage.

Chapter 10 Warranty and Service

In the next year from the date of sale, in the case of correct use, non-human failure is covered by the warranty. The company implements lifelong service for the instrument.
Note: In the process of using the company's products, the weighing system is abnormal or faulty. The company is only responsible for the quality of the company's own products!

Chapter 11 Common Problem

Display 〖 **OUEr**〗 means over load. The weight is more than 100%FS+9d;
Display 〖**-OUEr**〗 means minus over load. The weight is less than-20d;
Display 〖**HHHHH**〗 means the weight is more than zero range;
Display 〖**LLLLL**〗 means the weight is less than zero range;
Display 〖**CALEr**〗 means wrong calibrate.

Note:

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A. Modbus RTU

The following function codes are supported: 01H、02H、03H、05H、06H、10H

a) Read relay status (function code 01H)

Address	Coil No.	Data	Remarks	Description
0000H	D01			
0001H	D02			
0002H	D03			
0003H	D04			
0004H	D05			
0005H	D06			
0006H	D07			
0007H	D08			
0008H	D09	0: Dynamic 1: Stable	Read only	Stable weight
0009H	D10	0: ＞1/4d 1: ≤1/4d	Read only	Zero (1/4d)
000AH	D11			
000BH	D12			
000CH	D13			
000DH	D14			
000EH	D15	0: gross 1: net	Read only	Net weight
000FH	D16			

Example: reading data from D01--D08.

Send command:

Addr	Fun	Do start reg hi	Do start reg lo	Do of reg hi	Do of reg lo	CRC16 hi	CRC16 lo
4EH	01H	00H	08H	00H	08H	B2H	31H

Response:

Addr	Fun	Byte count	Data	CRC16 hi	CRC16 lo
4EH	01H	01H	01H	86H	9CH

The data [01H] means that D09=1, the weight is stable.

b) Read input status (function code 02H)

Address	Coil No.	Data	Remarks	Description
0000H	DI1	0: None 1: Yes	Read only	Zero operation / IN1
0001H	DI2	0: None 1: Yes	Read only	IN2

Example: reading data from DI1--DI2. Send command:

Addr	Fun	Do start reg hi	Do start reg lo	Do of reg hi	Do of reg lo	CRC16 hi	CRC16 lo
4EH	02H	00H	00H	00H	02H	F7H	F4H

Response:

Addr	Fun	Byte count	Data	CRC16 hi	CRC16 lo
4EH	02H	01H	02H	36H	9DH

The data [02H] means DI2=1, there is an IN2 input signal.

c) Read register data (function code 03H): The register data is defined in (3, register),

and the data of up to 4 registers can be read at a time. Send command:

Addr	Fun	Data start addr hi	Data start addr lo	Data #of reg hi	Data #of reg lo	CRC16 hi	CRC16 lo
4EH	03H	00H	00H	00H	04H	4AH	36H

Response:

Addr	Fun	Byte count	Data1 hi	Data1 lo	Data2 hi	Data2 lo
4EH	03H	08H	01H	90H	00H	00H
Data3 hi	**Data3 lo**	**Data4 hi**	**Data4 lo**	**CRC hi**	**CRC lo**	**Data3 hi**
61H	02H	00H	4EH	9FH	CFH	61H

Data [0000 0190] means a net weight of 400, and [02] in the data [6102] means a 2-digit decimal number, and the net weight is 4.00 kg.

d) Forced single coil (function code 05H):

Address	Coil No.	Data	Remarks	Description
0020H	D33	0000H: No operation FF00H: Operation	Write only	Zero
0021H	D34	0000H: No operation FF00H: Operation	Write only	Tare
0022H	D35	0000H: No operation FF00H: Operation	Write only	Remove tare
0023H	D36			
0024H	D37			
0025H	D38	0000H: No operation FF00H: Operation	Write only	Zero calibration
0026H	D39	0000H: No operation FF00H: Operation	Write only	Full scale calibration**
0027H	D40	0000H: No operation FF00H: Operation	Write only	Save data to EEROM***
0028H	D41			
0029H	D42	0000H: No operation FF00H: Operation	Write only	Reset to factory setting

** Full scale calibration: first write the weight of the calibration to [005EH], [005FH].
Such as: the calibrate weight is 2000, [005EH]=07D0H, [005FH]=0000H, Then to calibrate
*** Save data to EEROM: Write the data that is allowed to be written in the register to the EEROM.

e) Preset single register (function code 06H): Send command:

Addr	Fun	Data start reg hi	Data start reg lo	Value hi	Value lo	CRC16 hi	CRC16 lo
4EH	06H	00H	5AH	12H	52H	2AH	BBH

Response:

Addr	Fun	Data start reg hi	Data start reg lo	Value hi	Value lo	CRC16 hi	CRC16 lo
4EH	06H	00H	5AH	12H	52H	2AH	BBH

f) Preset multiple registers (function code 10H):

Example: to write [005AH]=2300H、[005BH]=2510H、[005CH]=1808H

Addr	Fun	Data start	Data start	Data #of	Data #of	Byte count

		addr hi	addr lo	reg hi	reg lo	
4EH	10H	00H	5AH	00H	03H	06

Value1 hi	Value1 lo	Value2 hi	Value2 lo	Value3 hi	Value3 lo	CRC16 hi	CRC16 lo
23H	00H	25H	10H	18H	08H	29H	72H

Response:

Addr	Fun	Data start reg hi	Data start reg lo	Data #of reg hi	Data #of reg lo	CRC16 hi	CRC16 lo
4EH	10H	00H	5AH	00H	03H	AEH	24H

B. Register

Address	Data Range	Read/Write	Description	Remarks
0000H 0001H	FFF0BDC1H-000F423FH （-999999~999999）	Read only	net weight	
0002H	0000H-FFFFH	Read only	B15-B8: Status B7-B0: decimal point position	See *
0003H	0000H-007DH（0-125）	Read only	transmitter address	
0004H 0005H	00000000H-000F423FH （0-999999）	Read only	Tare weight	
0006H 0007H	FFF0BDC1H-000F423FH （-999999~999999）	Read only	Gross weight	
0008H 0009H	00000000H-000F423FH （0-999999）	Read only	division number	
000AH	0000H-0002H	Read/Write	Filter	
000BH	0000H-00FFH	Read only	division value	
000CH 000DH	00000000H-000F423FH （0-999999）	Read only	full scale	
000EH				
000FH				
0010H	0000H-0063H(0-99)	Read only	Start zero zero tracking	See *
0011H				
0012H	0000H-0001H	Read/Write	AD sampling 0: low speed 1: high speed	
0013H	0000H-270FH（0-9999）	Read only	Current output 4mA zero correction	
0014H	0000H-270FH（0-9999）	Read only	Current output 20mA zero correction	
0015H	0000H-0008H	Read/Write	Serial communication baud rate	See *
0016H	0000H-0004H	Read/Write	Serial communication byte check	See *

0017H	0000H-0002H（0-2）	Read/Write	Serial communication format	See *
0018H				
0028H				
0029H	100	Read only	Software version	
002AH				
0056H	0000H-000FH	Read only	Input status	See **
0059H				
005AH	0000H-FFFFH	Read/Write	Write buffer	
005BH	0000H-FFFFH	Read/Write	Write buffer	
005CH	0000H-FFFFH	Read/Write	Write buffer	
005DH	0000H-FFFFH	Read/Write	Write buffer	
005EH	0000H-FFFFH	Read/Write	Write buffer	
005FH	0000H-FFFFH	Read/Write	Write buffer	

* [0002] description

B15	B14	B13	B12	B11	B10	B9	B8
1: in the zero zone 0: out of zero zone	1: net weight 0: gross weight					in the 1/4d	1: stable 0: dynamic
B7	**B6**	**B5**	**B4**	**B3**	**B2**	**B1**	**B0**
						00:XXXXXX 01:XXXXX.X 10:XXXX.XX 11:XXX.XXX	

[0010] description: Set zero tracking and start zero range

[0010]=000XY (decimal number)

X: start zero range

0: none　　1: start zero range is 2%FS

2: start zero range is 10%FS　　3: start zero range is 20%FS

4-9: start zero range is 50%FS

Y: zero tracking

0: none　　1: 0.4d　　2: 0.8d　　3: 1.2d　　4: 1.6d

5: 2.0d　　6: 2.4d　　7: 2.8d　　8: 3.2d　　9: 3.6d

[0015] description: serial communication baud rate

0: 1200　　1: 2400　　2: 4800　　3: 9600

[0016] description: Serial communication byte check

0: 8n1　　1: 7e1　　2: 7o1　　3: Highest position 1　　4: Highest position 0

[0017] description: Serial communication format

0: continuous output　　1: single byte command　　3: Modbus RTU

**[0056] description: I/O input status. Only the low byte is valid

B7	B6	B5	B4	B3	B2	B1	B0
						IN2	IN1
						1: Yes 0: no	1: Yes 0: no