

XK3190-C8

Weighing Indicator

User Manual

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Manufactured by Shanghai Yaohua Weighing System Co., Ltd.

XK3190-C8

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Dear customer:

Please read carefully the user manual before using the indicator!

Chapter 1 Profile

XK3190—C8 weighing indicator adopts MCS—51 single chip microprocessor and high-speed Σ - Δ /D switch technology, which performs conversion and displays weight, with the maximum conversion speed reaching up to 80 times/second. The display can be easily connected to the resistance strain gauge load cell to form batching scale, quantitative packing scale and control scale etc., which are applicable to various control occasions where high-speed and high precision weighing are required.

Main functions and features of XK3190—C8 weighing indicator:

1. Integration of additive scale, subtracting scale, catchweigher function, with 3-channel input of external control and 3-channel control output;
2. Standard asynchronous serial communication interface (RS232 or RS422/485), with flexible communication mode (continuous send and command response);
3. 0-20mA/4-20mA (or 0-5V/0-10V) DA precision output, adjustable;
4. Upper and lower limit alarm output setting;
5. High-precision A/D conversion with readability up to 1/30000;
6. 5-point nonlinear correction;
7. When changing indicator, re-calibration is not required; and you can use it with parameters of original indicator;
8. Scoreboard output;
9. Flexible peak holding function;
10. Storage, inspection and deletion function of information such as summation of weighing data and accumulated frequency etc.; power-off data protection is provided;
11. It can be connected to serial printer to print weighing record, accumulated amount or parameters; manual or automatic print is optional;
12. It has tare function; when the automatic control is activated, the automatic tare can be selected;
13. The digital filtering intensity of AD data can be changed according to requirements;
14. Many kinds of operating information and error message prompts;
15. Selection of printing unit: kg, t, g, lb;
16. Real-time clock, calendar, automatic leap year, leap month display, which are not affected by power off;
17. Factory defaults recovery function;
18. Strong immunity and high reliability.

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Chapter 2 Main Parameters

1. Type:	XK3190—C8 weighing indicator
2. Accuracy:	Class 3, n=3000
3. Input signal range:	-19mV ~ +19mV
4. Nonlinear:	≤0.01%F.S
5. No. of connected load cell:	1 ~ 8 350Ω load cell
6. Power supply for load cell:	DC: 5V; 350mA
7. Connecting type of load cell:	6 -wire system is adopted, the long line is compensated automatically.
8. Display:	Single-row 7-bit LED, character height 0.5, and 11 status indicating lamps
9. Division:	1/2/5/10/20/50/100 optional
10. Clock:	Display real time and date.
11. Keyboard:	Adopt 5 soft touch buttons
12. Scoreboard interface:	Adopt serial output, 20mA constant current source signal.
13. Communication interface:	Serial RS422/RS422/RS485, optional; baud rate 1200 ~ 9600 optional
14. Print interface:	Shared with serial port, and can be connected to serial printer.
15. Relay output:	Capacity AC: 220V; 0.5A
16. External input:	Switch contact (close control is effective)
17. Power supply:	AC 110 ~ 230V, 50/60Hz 1A
18. Service temperature, moisture:	0 ~ 40℃; ≤90% RH
19. Storage and transportation temperature:	-20 ~ 50℃
20. External dimension:	Housing: 150×76×85mm (width × height × depth) Panel: 172×93×3mm (width × height × thickness)
21. Dead weight:	Approximately 700 gram

Chapter 3 Installation, Interface and Data Format

I. Diagram of Front and Back Function Buttons of Indicator

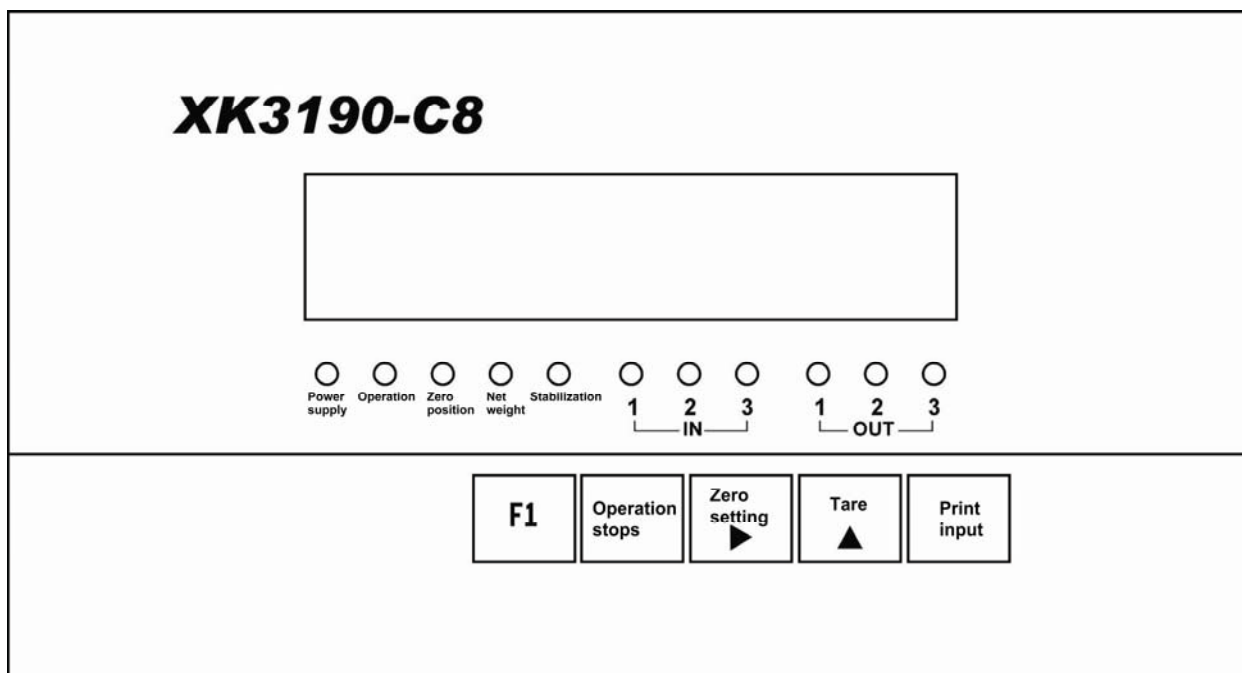


Figure 3 - 1 Diagram of Front Function Buttons

The meanings of the 11 indicating lamps on display panel are showed as follows from left to right:

Power supply: power supply indicating lamp

Operation: automatic operation status

Zero point: zero zone indication

Net weight: net weight status

Stabilization: stabilization status

IN: three input indications (1, 2, 3 represents three inputs respectively)

OUT: three output indications (1, 2, 3 represents three outputs respectively)

The five buttons on display panel has the following meaning respectively:

Symbol	Button name	Meaning
F1	[F1] button	Press [F1] and [Operation] buttons simultaneously to examine the inner code
Operation stops	[Operation] button	It also serves as stop button. It is return button in parameter setting status.
Zero setting	[Zero setting] button	It is shift key in parameter setting status.
Tare	[Tare] button	It is value increase button in parameter setting status.
Print input	[Print input] button	It is print button under the situation of displaying weighing value.

II. Connection of Load Cell and Indicator

The connection with load cell adopts the six wire system connection mode. Please refer to the interfaces in the Diagram of Back Function Buttons, Figure 3-4. Detailed definitions are given below:

- EX+ : Positive load cell excitation
- SEN+: Positive compensation
- SEN-: Negative compensation
- EX-: Negative load cell excitation
- SIG+: Positive signal
- SIG-: Negative signal
- GND: Ground

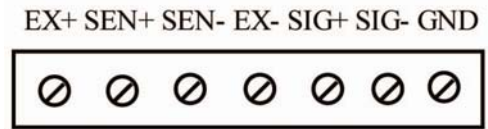


Figure 3-4 Load Cell Interface

Tips: If the long line compensation function (four wire system connection mode) is not used, the pins of “EX+” and “SEN+”, “SEN-” and “EX-” in Figure 3-4 must be short-connected, or otherwise, the indicator can not be calibrated and weigh normally.

III. Input and Output Interface

The indicator has totally three channels of optical isolation input and three channels of relay output. For interfaces, see Figure 3-5.

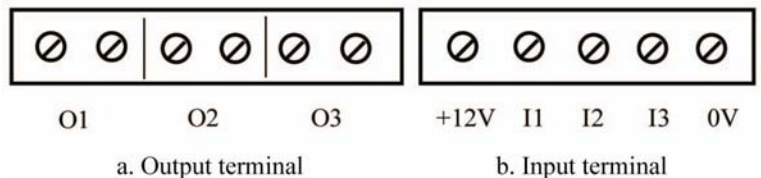


Figure 3-5 Output/ Input Terminal

① The three outputs are connected to the external system respectively according to requirements. O1, O2, O3 terminals have constant ON built-in relay, which can connect the controlled system directly to the two terminals of corresponding interface.

Note: Switch contact; effective close control; contact capacity AC: 220V; 0.5A

② The access mode of three inputs is by connecting I1, I2, I3 with +12V, i.e. signal can be entered at the input terminal. 0V terminal is prepared for customer’s special requirements.

The meaning of interface is different according to different modes. For detailed definition, please see Chapter 5 Section 7 of this manual.

Note: The +12V terminal and 0V terminal can not be short connected.

IV. Scoreboard Display Interface

For large-screen interface, see Figure 3-6: DP+, DP- in the Figure are connected to the large-screen. For the detailed communication format, see Annex 2.

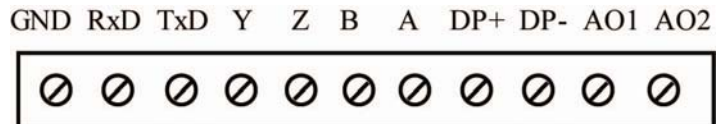


Fig. 3-6 Communication/Large-screen/Analog Interface

V. Serial Communication Interface

Serial communication interface adopts RS232C (standard product). According to customer’s demands, the RS485 interface can be selected through jumper (the output format is the same with RS232C). For the meaning of interface pin connection, see Table 3-1. For the jumper selection mode, see Table 3-2.

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Table 3-1 Definition of Pin Interface

232 communication	485 communication
GND: Grounded RXD: Receiving end of indicator TXD: Sending end of indicator	A: RXD+ receiving positive data B: RXD- receiving negative data Z: TXD- sending negative data Y: TXD+ sending positive data

Table 3-2 Selection of Communication

Selection of communication interface	Selection of jumper	
	JP1	JP2
RS232C (Factory defaults)	Left	Left
RS485C	Right	Right

This indicator can select continuous send or command response mode:

Continuous send mode:

The transferred data is the current weight (gross weight or net weight) displayed on the indicator. Each frame of data is composed of 12 groups of data. The format is as follows:

X th Byte	Contents and notes	
1	02(XON)	Start
2	+ or -	Sign bit
3	Weighing data	High-order bit
:	Weighing data	:
:	Weighing data	:
8	Weighing data	Low-order bit
9	Decimal scale	From right to left (0 ~ 4)
10	XOR check	High four-bit
11	XOR check	Low four-bit
12	03(XOFF)	End

$$\text{NOR} = 2 \oplus 3 \oplus \dots \oplus 8 \oplus 9$$

2. Command response mode: (For detailed format, please see Annex 3)

VI. Analog output

C8 indicator can choose 3 analog output modes: 0 ~ 5V, 0 ~ 10V voltage signal output and 4~20 mA current signal output (It can be also adjusted to 0~20 mA actually). The electric current loop adopts internal electrical power supply mode, the output mode is selected by jumper JM3 ~ JM5 (See Figure 3-3) on main board, and for the setting mode, please see Table 3-3. The factory setting is 4~20 mA electric current loop. The switch of analog output is controlled by the C bit of parameter [H ABC] under parameter [SET 1].

Table 3-3 Setting of Analog output

Analog output	Selection of jumper		
	JM3	JM4	JM5
4—20mA (Factory defaults)	Up	—	Down
0—5V	Down	Right	Up

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0—10V	Down	Left	Up
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Calibration method for analog output

The zero point value of analog output and full scale value are in direct proportion to corresponding DA code (See Table 4-3, instructions of [SEt 1] parameter 12 and 13). The parameter 12 and parameter 13 can be corrected by calculation according to the analog output error.

Note: At the mode of voltage output, short circuit of the analog output terminal is strictly prohibited, and the load of 4-20mA electric current loop output cannot be misconnected, or otherwise the analog output circuit may be damaged.

VII. Print and Storage

Print

The serial port communication RS232 connection mode is adopted. By means of selecting connection to serial printer in indicator parameter Set 1, the weighing data can be printed through the serial port. Mainly hand print and automatic print are available, which are introduced respectively below:

1. Hand print

Single print: In weighing status, press “Input/ Print” button to print the current time, date, net weight, tare weight, accumulated frequency and accumulated weight.

Print record: At the mode of 0, 1, 2, all weighing records, including the time, date, net weight, tare weight, accumulated frequency and accumulated weight for each weighing, can be stored and printed. For concrete operations, see [Set 3].

2. Automatic print

After selecting printer and automatic print in parameter settings, information such as the current time, date, net weight, tare weight, accumulated frequency and accumulated weight will be printed automatically when a process is finished every time during the automatic control process.

Note: new printing cannot be proceeded until it returns to zero after every print; in status such as not selecting printer or in hand peak holding function, the hand print function is invalid; when communication in [Set 1] is not selected or communication is selected but the serial printer is not selected, print is not valid; when the set baud rate is not 9600, [Err P] will be prompted.

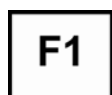
Storage

Storage is often used together with print, and is also divided into hand storage and automatic storage. Automatic storage should be enabled in parameter settings. Attention must be paid to several points during storage:

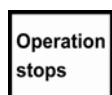
1. Hand storage cannot be conducted in catchweighing mode.
2. The next storage cannot be executed until it returns to zero after every time of storage.
3. After the control mode (i.e. additive scale, subtracting scale, catchweigher) is changed, it needs to enter the parameter setting 0 to eliminate the accumulated results, or otherwise the data may have error.

Chapter 4 Parameter Setting and Calibration

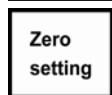
If there is no special instruction for parameter setting, the button functions are as follows:



[F1] button: exit from parameter setting



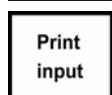
[Operation] button: the current setting is not saved, and return to the previous parameter



[Zero setting] button: move the current flicker bit



[Tare] button: modify the current flickering value



[Input] button: make sure to save the current parameter setting, and enter the next parameter setting

Press [F1] button and [Zero setting] button simultaneously to enter parameter setting selection interface.

The setting catalogues are:

【SEt 0】 : enquiry parameter;

【SEt 1】 : general parameter;

【SEt 2】 : control parameter;

【SEt 3】 : print record (no such function in catchweighing mode)

[Note] Please pay attention to the instruction in remarks for each parameter. Part of parameters will only be displayed under specific mode or conditions.

I. [SEt 0] Enquiry Parameter

Table 4-1 Non-Catchweigher Mode

Parameter	Indicator Display	Parameter Specification	Remarks
1	[n ****]	Accumulated frequency	It can only be inquired, but not changed.
2	[A*****]	Accumulated weight	It can only be inquired, but not changed.
3	[dEL *]	Delete the selection of accumulated frequency and accumulated weight	0: no-operation 1: execute deletion operation

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4	[d**.**.]**	Current date setting	Press [Zero setting] button to move the current flicker bit, press [Tare] button to modify parameter value
5	[t**.**.]**	Current time setting	Press [Zero setting] button to move the current flicker bit, press [Tare] button to modify parameter value
6	[A ****]	Zero position calibration	<p>Restricted parameter. The calibration switch must be opened (turn the calibration switch CAL to the left ON position) when changing, and input the correct password.</p> <p>Press [Input] button to check the parameter value one by one;</p> <p>Before pressing [Tare] button to modify parameter value, first enter the password protection interface in Step 18!</p> <p>These parameters can be modified only by entering the correct password for one time.</p> <p>When only checking the parameters, the indicator will return to weighing status after Step 16 is displayed.</p>
7	[b ****]	CAL Coefficient	
8	[C ****]	Nonlinear correction point 1	
9	[d ****]	CAL Coefficient 2 (nonlinear correction)	
10	[E ****]	Nonlinear correction point 2	
11	[F ****]	CAL Coefficient 3 (nonlinear correction)	
12	[L ****]	Nonlinear correction point 3	
13	[H ****]	CAL Coefficient 4 (nonlinear correction)	
14	[P ****]	Nonlinear correction point 4	
15	[t ****]	CAL Coefficient 5 (nonlinear correction)	
16	[r ****]	Nonlinear correction point 5	
17	[HF *]	Whether to restore factory setting: 0: not restore; 1: restore	If recovery of factory setting is selected, it will come into effect after re-startup, and the calibration parameters will not be changed.
18	[PAS 000]	Password protection status	It is password protection interface. Input the correct password (111) and enter Step 6 to modify parameters. If the password is wrong, it will return to weighing status.

Table 4-2 Catchweigher Mode

Parameter	Indicator Display	Parameter Specification	Remarks
1	[n 1 ****]	Accumulated frequency of Channel 1	It can only be inquired, but not changed.
2	[A*****]	Accumulated weight of Channel 1	Ditto
3	[n 2 ****]	Accumulated frequency of Channel 2	Ditto
4	[A*****]	Accumulated weight of Channel 2	Ditto

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5	[n 3 ****]	Accumulated frequency of Channel 3	Ditto
6	[A*****]	Accumulated weight of Channel 3	Ditto
7	[d**.**]**	Setting of current date	The following parameters are same with the latter part of Table 1.

II. 【Set 1】 General Parameters

Table 4-3

Parameter	Indicator Display	Parameter Specification	Remarks																								
1	[H ABC]	Hardware selection A - Communication (0: communication is not required, 1: communication is required) B - Large-screen (0: large-screen is not required, 1: large-screen is required) C - Analog (0: analog is not required, 1: analog is required)	For example: When communication is required, large-screen and analog are not required, set it to [H 100]. Note: This setting will affect the following display menu.																								
2	[n ABC]	Relevant Parameters of Zero Zone A - zero setting range upon startup (0 ~ 5) B - zero setting range by hand (0 ~ 5) C - zero tracking range (0 ~ 8) When it is set to 0, the tracking function is closed. For other values, see the following table:	For example: if set the zero setting range upon startup to 20%, the zero setting range by hand to 4%, and the zero tracking to 0.5e, it will be set to [n 421].																								
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="8" style="text-align: center;">AD Filtering Intensity (0 ~ 4)</td> </tr> <tr> <td>Value</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td colspan="2"></td> </tr> <tr> <td>Filtering Intensity</td> <td>weak</td> <td>Comparatively weak</td> <td>medium</td> <td>Comparatively strong</td> <td>Strong</td> <td colspan="2"></td> </tr> </table>	AD Filtering Intensity (0 ~ 4)								Value	0	1	2	3	4			Filtering Intensity	weak	Comparatively weak	medium	Comparatively strong	Strong			The smaller the value is, the faster the weight changes, but the stability is worse; The bigger the value is, the slower the weight changes, but the stability is better. The user should adjust proper parameter according to requirements.
AD Filtering Intensity (0 ~ 4)																											
Value	0	1	2	3	4																						
Filtering Intensity	weak	Comparatively weak	medium	Comparatively strong	Strong																						
3	[FLt *]																										
4	[Adr **]	Communication Address of Indicator (01 ~ 26) When several indicators send data to the same PC, this communication address is required to distinguish each of the indicators.	It won't be displayed when communication is not required.																								
5	[bt *]	Communication Baud Rate (0 ~ 4) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td></td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>BPS</td> <td>600</td> <td>1200</td> <td>2400</td> <td>4800</td> <td>9600</td> </tr> </table>		0	1	2	3	4	BPS	600	1200	2400	4800	9600	It won't be displayed when communication is not required. BPS												
	0	1	2	3	4																						
BPS	600	1200	2400	4800	9600																						

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6	[tod *]	Communication Mode: 0 - command response mode (Refer to Chapter 3); 1 - continuous send mode 2 - connect to serial printer	It won't be displayed when communication is not required.
7	[AtP *]	Automatic accumulated print: 0 - automatic accumulation 1 - automatic accumulation without print 2 - automatic accumulation and automatic print	Accumulation and print conditions should be satisfied.
8	[Unit *]	Print Unit: 0 - kg (kilogram) 1 - g (gram) 2 - t (ton) 3 - lb (lbs)	It's effective only when printing. It won't be displayed when communication is not required.
9	[F *]	Peak Holding: 0 - Peak holding is closed. 1 - Peak holding is effective, and the holding will be cancelled automatically after returning to zero. 2 - Peak holding is effective; press the button manually to cancel holding.	Hand mode includes pressing the input button and input terminal to obtain input signal.
10	[AL*****]	The corresponding weight of analog output zero point	It won't be displayed when analog output is not required.
11	[A*****]	The corresponding weight of analog output full range	It won't be displayed when analog output is not required.
12	[PL ***]	DA inner code (0-30000) when analog output is at zero point (Output 4-20mA signal is about 12520; output 0-5V/0-10V is 0)	The zero point for calibration analog output of this parameter can be modified.
13	[PH ***]	DA inner code (30000-65535) when analog output is at full range (4-20mA output is about 62590; 0-5V/0-10V output is about 65200)	The zero point for calibration analog output of this parameter can be modified.
14	[Prt *]	Whether to print this set parameter: 0: No. 1: Yes.	This item won't be displayed when there is no printer.

III. [SEt 2] Control Parameters

Table 4-4

Parameter	Indicator Display	Parameter Specification	Remarks
1	[CP *]	Control Mode 0: 1 kind of additive mode of batching 1: 1 kind of subtraction mode of batching 2: 2 kinds of additive mode of batching 3: catchweighing mode	For work flows of all kinds of mode, see Chapter 6.
2	[Pt 0]	Number of cycles	The number of control process (0 ~ 99, 0 stands for indefinite times)
Please select the corresponding parameter setting according to the set [Control Mode].			

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Mode 0, 1 (Additive mode or subtraction mode for 1 kind of batching material)

3	[C ABCDE]	<p>Advanced Control Parameters</p> <p>A – quick or slow feed status 0: When quick feeding, only the quick feed is opened. 1: When quick feeding, both the quick and slow feed are opened simultaneously.</p> <p>B – automatic tare status before feeding 0: no automatic tare 1: automatic tare</p> <p>C – self-correction selection for lead 0: no correction 1: correction</p> <p>D – out-of-tolerance treatment selection 0: no treatment, the cycle continues 1: wait for treatment until qualified</p> <p>E – material shortage gradual feed 0: no gradual feed 1: gradual feed</p>	This parameter will change the control flow, so generally no modification should be made. Some parameters are invalid at subtraction mode.
4	[A*****]	Batching value	
5	[b*****]	Quick feed lead	
6	[c*****]	Slow feed lead	
7	[d*****]	Allowance	
8	[L*****]	Zero zone	<p>1. When the indicator is discharging, if the net weight is less than that of zero zone value, it will be deemed as discharge completion;</p> <p>2. The indicator print and accumulation cannot be conducted until the gross weight is greater than the zero zone value.</p>
9	[t0 **]	0.0 ~ 9.9 seconds feed measurement delay	To avoid weight misjudgment caused by weight impact when starting.
10	[t1 **]	0.0 ~ 9.9 seconds delay of quick feed over	
11	[t2 **]	0.0 ~ 9.9 seconds delay of slow feed over	
12	[t3 **]	0.0 ~ 9.9 seconds gradual feed output time	It won't be displayed when there is no gradual feed.
13	[t4 **]	0.0 ~ 9.9 seconds gradual feed interval time	It won't be displayed when there is no gradual feed.

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14	[t5 **]	0.0 ~ 9.9 seconds time Mode 0: discharge over delay Mode 1: qualified output time	
15	[t6 **]	0.0 ~ 9.9 seconds re-feed delay	
16	[Prt *]	Whether to print this parameter: 0:No. 1: Yes.	It won't be displayed when there is no printer.
Mode 2 (Additive mode for 2 kinds of batching)			
3	[C ABCD]	Advanced Control Parameters A - automatic tare status before feeding 0: no automatic tare 1: automatic tare B - self-correction selection for lead 0: no correction 1: correction C - out-of-tolerance treatment selection 0: no treatment, the cycle continues 1: wait for treatment until qualified D - material shortage gradual feed 0: no gradual feed 1: gradual feed	This parameter can change the control flow, so it should be modified according to the actual control needs.
4	[A*****]	Material 1 quantitative value.	
5	[b*****]	Material 1 feed lead.	
6	[C*****]	Material 1 allowance.	
7	[P*****]	Material 2 quantitative value.	
8	[d*****]	Material 2 feed lead.	
9	[t*****]	Material 2 allowance.	
10	[L*****]	Zero zone	1. The gross weight is judged when the indicator is discharging, if the net weight is less than the zero zone value, it will be deemed as discharge completion; 2. The indicator print and accumulation cannot be conducted until the gross weight is greater than the zero zone value.
11	[t0 **]	0.0 ~ 9.9 seconds feed measurement delay	To avoid weight misjudgment caused by weight impact during startup.
12	[t1 **]	0.0 ~ 9.9 seconds material 1 feed over delay	

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13	[t2 **]	0.0 ~ 9.9 seconds material 2 feed over delay	
14	[t3 **]	0.0 ~ 9.9 seconds gradual feed output time	This item won't be displayed when there is no gradual feed.
15	[t4 **]	0.0 ~ 9.9 seconds gradual feed interval time	It won't be displayed when there is no gradual feed.
16	[t5 **]	0.0 ~ 9.9 seconds discharge finish delay	
17	[t6 **]	0.0 ~ 9.9 seconds re-feed delay	
18	[Prt *]	Whether to print this parameter: 0: No. 1: Yes.	It won't be displayed when there is no printer.

Mode 3 (Catchweighing Mode)

Parameter	Indicator Display	Parameter Specification	Remarks
3	[FodE *]	Catchweighing Mode: 0 - Self-testing mode 1 - External control mode 2 - Upper and lower limit mode	Self-testing mode: When the weight is greater than zero zone value, it starts catchweighing automatically. External control mode: Only when the external control signal is triggered, the indicator begins catchweighing. Upper and lower limit mode: The real-time upper, medium, lower limit relay output.
4	[H*****]	Upper limit setting: Input a weight value that is between zero and full range.	When the weight value is smaller than the lower limit, O1 is output; When the weight value is between the lower limit and upper limit, O2 is output; When the weight value is greater than the upper limit, O3 is output.
5	[L*****]	Lower limit setting: Input a weight value that is between zero and full range.	
6	[Lq*****]	Zero zone	1. Enter the next cycle only after sending out the catchweighing signal and the indicator weight is less than this value; 2. Enter t1 only when the indicator weight is greater than this value at self-checking mode.
7	[t0 **]	Judgment Delay (0 ~ 9.9) Seconds: At external control mode, data calculation is conducted only after the external control is triggered for t0 second; At self-checking mode, data calculation is conducted after the weight leaves zero zone for t0 second.	
8	[t1 **]	Calculation Time for Average Weight (0 ~ 9.9) Seconds: The indicator will accumulate, average the weight within t1 after t0, and the obtained value will serve as catchweighing basis.	

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9	[t2 **]	Calculation Delay (0 ~ 9.9) Seconds: The indicator has no action within t2 after t1 is calculated, wait with delay.	
10	[t3 **]	Signal Sending Time (0 ~ 9.9) Seconds: The indicator sends catchweighing signal, with duration of t3 second.	
11	[Prt *]	Whether to print this parameter: 0: No. 1: Yes.	It won't be displayed when there is no printer.

★Please confirm H≥L during setting, or otherwise the indicator cannot work normally, and may cause unexpected errors. The above time does not take reaction time such as relay action into consideration.

IV. Record Print [SEt 3]

(This function is only effective at Mode 0, 1, 2)

Table 4-5

Parameter	Indicator Display	Parameter Specification	Remarks
1	[n ***]	The sequence number of records to be printed	The sequence number of records is corresponding to accumulated frequency.
2	[Prt *]	Whether to print record: 0: No. 1: Yes.	It won't be displayed when there is no printer.

The form of printed record sheet is shown as Table 4-6:

Table 4-6

Date:	Feb 11, 2009
Time:	16:18:36
Net Weight:	5.00kg
Gross Weight:	0.00kg
Accumulated Frequency:	0011
Accumulated Weight:	115.00kg

V. Calibration

Turn the calibration switch CAL to the left ON position to open the calibration switch. Then press [F1] button and [Input] button simultaneously, the indicator displays [--CAL--], indicating entering calibration status. Press [Input] button to enter. For specific calibration parameter instructions and operation, refer to the following table (* stands for the original set value):

Table 4-7

Step	Parameter Display	Parameter Instruction	Operation Instruction
1	[E *]	Division: 1/2/5/10/20/50/100 optional	Press [Input] after modifying parameters
2	[dC *]	Digits of decimal point (0-3)	Press [Input] after modifying parameters

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3	[F*****]	Full value (The alarm limit set automatically is full value plus 9 division)	Press [Input] after modifying parameters
4	[r 0]	Save the original zero position: 0: the current zero position needs to be reconfirmed; 1: skip over the current zero position confirmation.	Input 0 to enter Step 5 (recommended), Input1 to enter Step 7.
5	[noLoAd]	Zero position confirmation	Confirm that the current weighing platform has no load and the stability lamp is ON, then press [Input].
6	[*****]	Display the current AD code	Press [Input] after the AD code is stable.
7	[AdLoAd1]	Load weights	Press [Input] after the weight is loaded.
8	[*****]	Display the current AD code	Press [Input] after the AD code is stable.
9	[*****]	The weight of current loaded weights	Change to the weight value of current weights, press [Input] button to enter Step 12 and complete the calibration; Change to the weight value of current weights, press [F1] button to enter the nonlinear correction flow of Step 10;
10	[AdLoAd*]	Load weights, calibrate the weight of n th point (n<=5)	Press [Input] to enter the next step after weights are loaded.
11	[*****]	Display the current AD code	Press [Input] to enter Step 9 cyclically after the AD code is stable. (At most five-point nonlinear correction can be conducted)
12	[*****]	Display the current weight value	The calibration is finished. Return to weighing status.

Please put the calibration switch at OFF position after calibration is finished

Chapter 5 Operating Instructions

I. Startup and zero setting upon startup

After connected with the power, the display performs self-check of strokes “0-9”, then shows the version No.. After that, it enters into weighing mode. After startup, if the weight of empty scale deviates from zero point, but remains within the zero range, the display will perform zero setting upon startup. If the weight is out of the zero setting range, the display shows the weight based on the calibrated zero point. For the zero setting upon startup, please refer to the setting of parameter B in the parameters 1: [n ABC] as described in Chapter 1 **【SEt 1】**.

II. Zero setting manually

When the display value deviates from zero point, but remains within the range of zero setting manually, ad the light is steady on, please press the button **【Zero setting】** to make the display value reset to zero. The zero point light is ON. For the range of zero setting manually, please refer to the setting of parameter A in the parameters 1: [n ABC] as described in Chapter 1 **【SEt 1】**.

III. Tare

Under weighing status, when the displayed weight is a positive value and weighing is stable, press the button **【Tare】** to deduct the displayed value as tare. Then the displayed net weight is 0, with the net weight indicator light ON.

IV. Setting of date and time

Set the date through the contents [d**.**.]** and the time through [t**.**.]** in parameters setting **【SEt 0】**. Press the button **【Zero setting】** to change the flicker bit, and **【Tare】** to change the size. After completion of setting, press the button **【Input】** for setting of other parameters or exit from setting by pressing the button **【F1】**.

V. Startup/stop

For startup or stop, press directly the button **【Run】** on key board, or input an impulse signal from the “Startup” end of back panel, the indicator is ready to enter into control mode or exit from control mode.

VI. Peak holding

By means of setting the parameter [F *] in parameters **【SEt 1】**, select the peaking holding mode:
 0 – peak holdings is off.
 1 – peak holding is valid, and it is cancelled automatically after zero setting.
 2 – peak holding is valid. Press the button **【input】** to enable peaking holding; press the button **【input】** once again to disable peaking holding (under this status, the button **【input】** has no save manually/print function).

VII. Input and output function

The input and output has the following meanings under different modes:

Mode	Input			Output		
	I1	I2	I3	O1	O2	O3
Mode 0	startup/stop	feed	discharge	Quick feed	Slow feed	discharge
Mode 1	startup/stop	discharge	—	Quick discharge	Slow discharge	complete
Mode 2	startup/stop	feed	discharge	Feed material 1	Feed material 2	discharge
Mode 3	startup/stop	External control input	—	Net weight ≤ lower limit	Lower limit < net weight < upper limit	Net weight ≥ upper limit

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Input and output test:

Press simultaneously the button **【F1】** and **【Run】** to enter internal code status. At this moment, if level signal is given to the input end 1, 2 and 3, the output end 1, 2, and 3 will output corresponding signal, and corresponding indicating light on front panel of indicator is on.

VIII. Inquiry of common parameters

Press the button **【 F1 】** under weighing mode to enquire the following parameters respectively:

Mode 0, 1: batching value, date, time

Mode 2 : batching value 1, batching value 2, date, time

Mode 3 : upper limit, lower limit, date, time

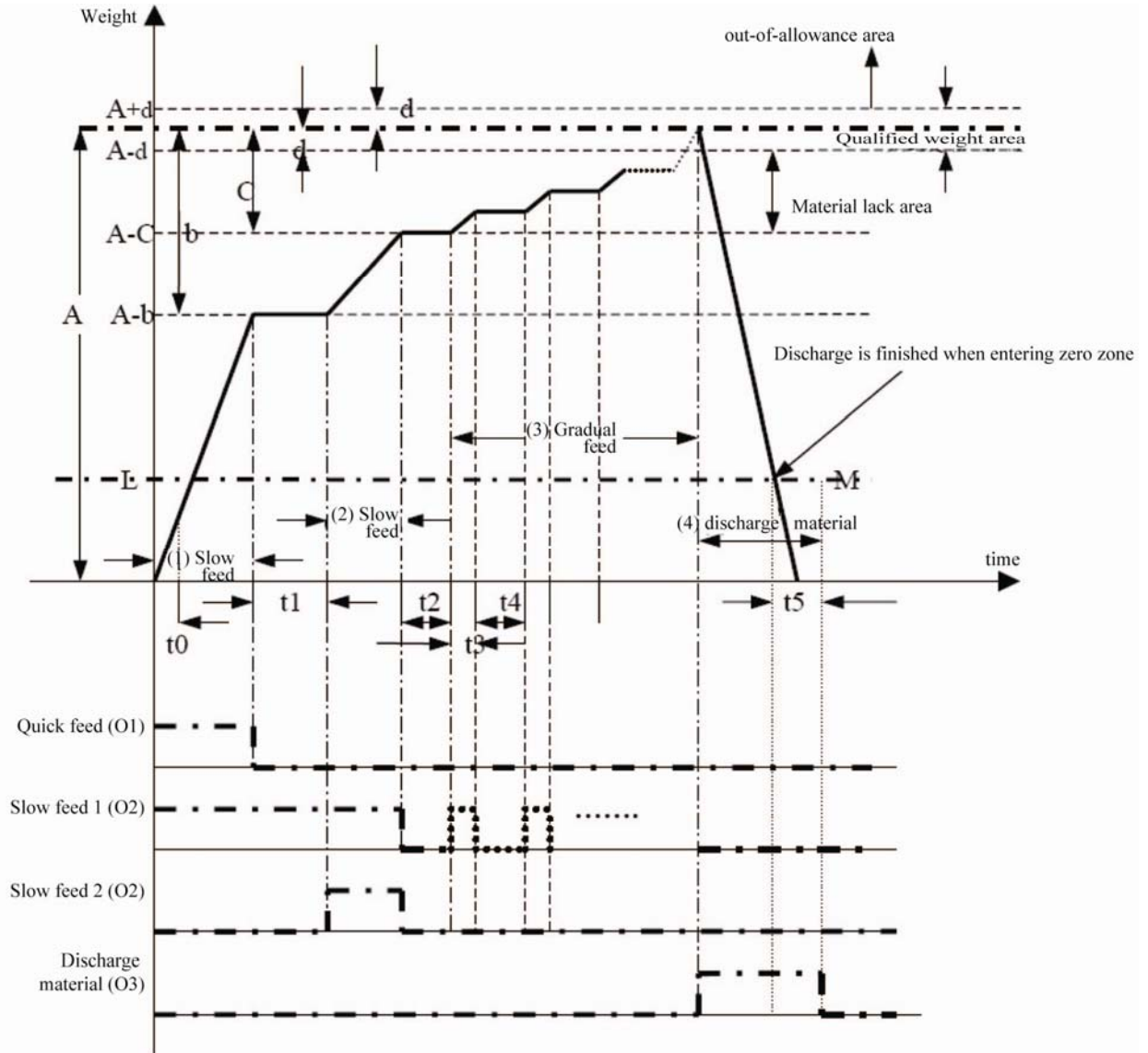
Chapter 6 Explanations of Control Procedure

The four working modes of the indicator are explained in details as below:

I. Mode 0 (additive mode with 1 batching material)

The double-speed batching of 1 kind of material mainly involves the following parameters: batching value A , quick feed lead b , slow feed lead C , allowance, zero value L . Please refer to the following figure for understanding of the functions, meanings and time sequence of control input and output of various parameters during the process:

Additive mode of 1 batching material:



Schematic diagram of control process 1

Note: A —batching value; b —quick feed lead value; C —slow feed lead value; L —zero zone value.

t_0 —measurement delay; t_1 —quick feed over delay; t_2 —slow feed over delay; t_3 —gradual feed output time; t_4 —interval time of gradual feed; t_5 —discharge over delay.

The schematic diagram of slow feed 1 shows the slow feed output when both the quick feed and slow

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feed are ON during quick feed process, and gradual feed exists.

The schematic diagram of slow feed 2 shows the slow feed output when only the quick feed is ON during quick feed process, and without gradual feed.

The control procedure in the above diagram is composed of 4 processes including quick feed, slow feed, gradual feed and discharge.

- (1) Quick feed-- When the control procedure starts, the quick feed output gives out a signal, and the corresponding O1 relay is closed. When the weight is added to the quick feed stop value A-b, the quick feed output signal is cancelled, the corresponding O1 relay is switched off.
- (2) Slow feed-- After a period of delay time t1 (quick feed over delay), the slow feed output gives out a signal, and the corresponding O2 relay is closed. When the weight is added to the slow feed stop value A-C, the slow feed output signal is cancelled, the corresponding O2 relay is switched off. If the parameter is set to both quick feed and slow feed ON, the slow feed output gives out a signal since the beginning, and the corresponding O2 relay is closed until the weight reaches up to the slow feed stop value A-C.
- (3) Gradual feed-- If the parameter is set with gradual feed, the O2 relay corresponding to slow feed will be closed for a period of t3, and switched off for a period of t4. Gradual feed is carried out through such repeated cycle, until the weight reaches up to the allowance range of batching value, i.e. the qualified area.
- (4) Discharge-- Discharge output sends out a signal, and the corresponding O3 relay is closed. After the weight is less than the value L in zero zone, the discharged is considered completed, which corresponds to point M in the figure. At this moment, after another delay of t5, the discharge output signal is cancelled, and the corresponding O3 relay is switched off. A complete control procedure is finished.

Note: during the above process, if the slow feed lead is bigger than that of quick feed lead, i.e. $C > b$, then the slow feed output won't give out signal, and the corresponding O2 relay remains switched off. If no gradual feed is set for parameters, the above gradual feed process (3) is not included. The turning off of discharge should meet the conditions that the weight is less than zero zone value.

II. Mode 1 (subtracting mode of 1 batching material)

Please refer to the following figure for understanding of the functions, meanings and time sequence of control input and output of various parameters during the process:

Note: A—batching value; b—quick subtraction lead value; C—slow subtraction lead value;

t1—quick subtraction over delay; t2—slow subtraction over delay; t3—gradual feed output time;
t4—interval time of gradual feed; t5—discharge over delay

The schematic diagram of slow subtraction 1 shows the slow subtraction output when both the quick subtraction and slow subtraction are ON during quick subtraction process, and gradual feed exists.

The schematic diagram of slow subtraction 2 shows the slow subtraction output when only the quick

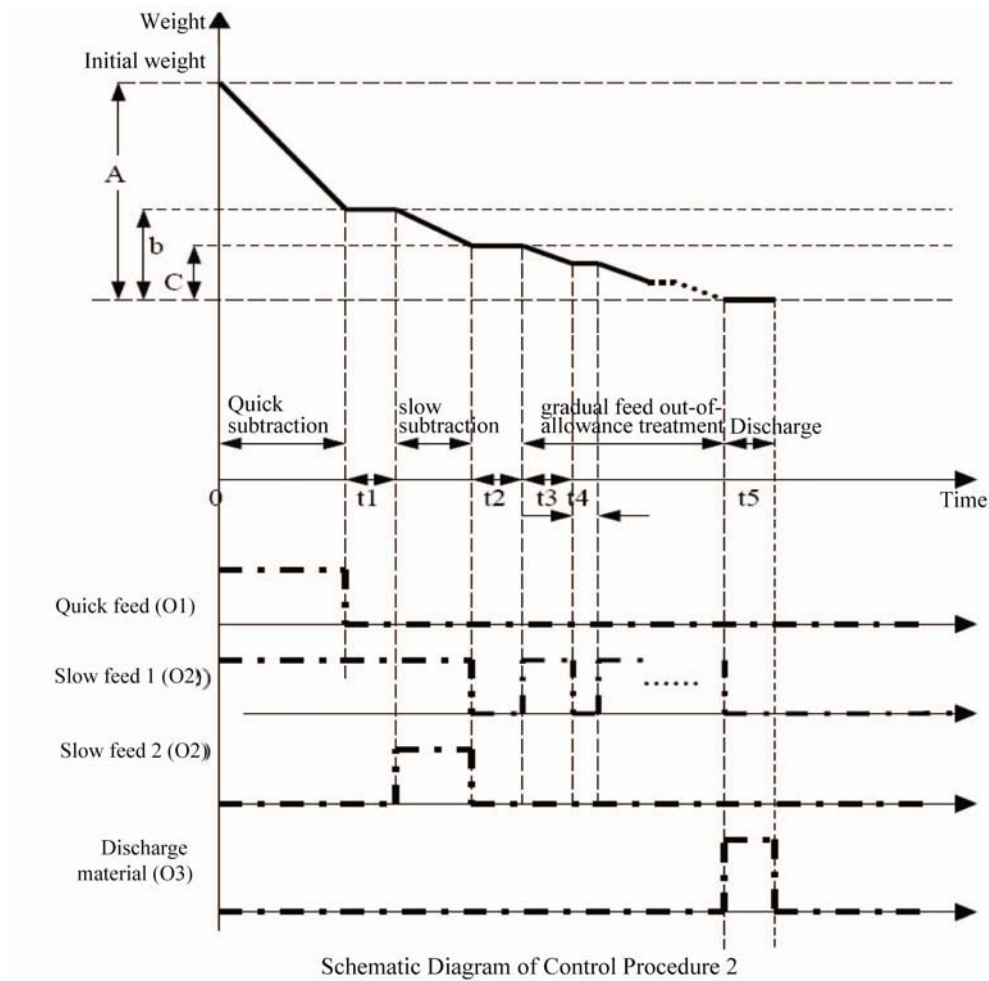
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subtraction is ON during quick subtraction process, and without gradual feed.

The control procedure in the above diagram is composed of 4 processes including quick subtraction, slow subtraction, gradual feed allowance treatment and discharge.

- (1) Quick subtraction -- When the control procedure starts, the quick subtraction output gives out a signal, and the corresponding O1 relay is closed. When the weight is reduced to the quick subtraction stop value A-b, the quick subtraction output signal is cancelled, the corresponding O1 relay is switched off.
- (2) Slow subtraction -- After a period of delay time t1 (quick subtraction over delay), the slow subtraction output gives out a signal, and the corresponding O2 relay is closed. When the weight is reduced to the slow subtraction stop value A-C, the slow subtraction output signal is cancelled, the corresponding O2 relay is switched off. If the parameter is set to both quick subtraction and slow subtraction ON, the slow subtraction output gives out a signal since the beginning, and the corresponding O2 relay is closed until the weight reaches up to the slow subtraction stop value A-C.
- (3) Gradual feed -- If the parameter is set with gradual feed, the O2 relay corresponding to slow subtraction will be closed for a period of t3, and switched off for a period of t4. Gradual feed is carried out through such repeated cycle, until the weight reaches up to the allowance range of batching value, i.e. the qualified area.

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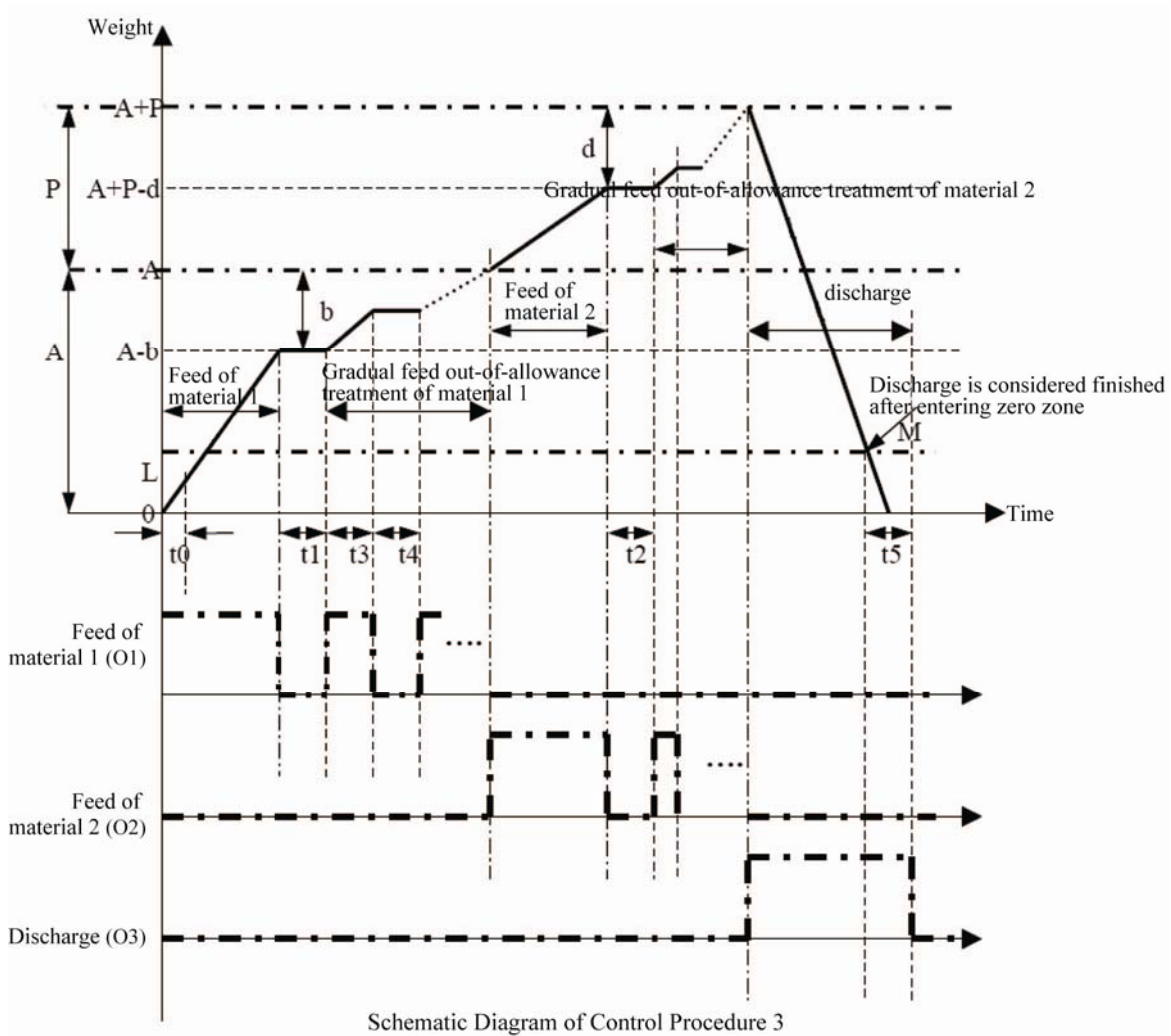
- (4) Discharge-- Discharge output sends out a signal, and the corresponding O3 relay is closed. After the delay of t_5 , the discharge output signal is cancelled, and the corresponding O3 relay is switched off. A complete control procedure is finished.

Note:

1. During the above process, if the slow subtraction lead value is bigger than the quick subtraction lead value, i.e. $C > b$, the slow subtraction output won't give out signal, and the corresponding O2 relay maintains switched off. If no gradual feed is set for parameters, the above gradual feed process (3) is not included.
2. When the residual weight doesn't reach to the batching value, the indicator stops subtraction, and wait for feed signal. After receiving feed signal, the indicator starts to feed material, and make judgment to the weight during feeding process. When the batching value is obtained, material feeding is stopped. At this moment, the weight can finish a subtraction cycle, then material subtraction is continued. For example, if the batching value is 50Kg, when the remaining material in the hopper is only 20kg, no subtraction will be performed until the hopper is added with material up to 50Kg.
3. The discharge process in the subtracting scale can be used to remove the container loaded with

material, just like a discharge process.

III. Mode 2 (additive scale for two materials)



Note: A—batching value of material 1; b—lead value of material 1; P—batching value of material 2; d—lead value of material 2; L—zero zone value.

t₀—measurement delay; t₁—feed over delay of material 1; t₂—feed over delay of material 2; t₃—gradual feed output time; t₄—interval time of gradual feed; t₅—discharge over delay time.

The control procedure in the above diagram is composed of 5 processes including feed of material 1, gradual feed out-of-allowance treatment of material 1, feed of material 2, gradual feed out-of-allowance treatment of material 2 and discharge.

- (1) Feed of material 1-- When the control procedure starts, the feed output of material 1 gives out a signal, and the corresponding O1 relay is closed. When the weight is added to the feed stop value of material 1 A-b, the feed output signal of material 1 is cancelled; the corresponding O1 relay is switched off.

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- (2) Gradual feed out-of-allowance treatment of material 1-- After the delay for a period of t1 (feed over delay of material 1), if the parameter is set with gradual feed, the O2 relay corresponding to feed of material 1 will be closed for a period of t3, and switched off for a period of t4. Gradual feed is carried out through such repeated cycle, until the weight reaches up to the allowance range of batching value of material 1, i.e. the qualified area.
- (3) Feed of material 2-- The feed output of material 2 gives out a signal, and the corresponding O1 relay is closed. When the weight is added to the feed stop value of material 2 P-d, the feed output signal of material 2 is cancelled, the corresponding O1 relay is switched off
- (4) Gradual feed out-of-allowance treatment of material 2 -- After the delay for a period of t2 (feed over delay of material 2), if the parameter is set with gradual feed, the O2 relay corresponding to feed of material 2 will be closed for a period of t3, and switched off for a period of t4. Gradual feed is carried out through such repeated cycle, until the weight reaches up to the allowance range of batching value of material 2, i.e. the qualified area.
- (5) Discharge -- Discharge output sends out a signal, and the corresponding O3 relay is closed. After the weight is less than the value L in zero zone, the discharged is considered completed, which corresponds to point M in the figure. At this moment, after another delay of t5, the discharge output signal is cancelled, and the corresponding O3 relay is switched off. A complete control procedure is finished.

Note: If no gradual feed is set for parameters, the above gradual feed process (2), (4) is not included.

IV. Mode 3 (catchweighing mode)

1. Self-check mode of catchweigher

Application examples:

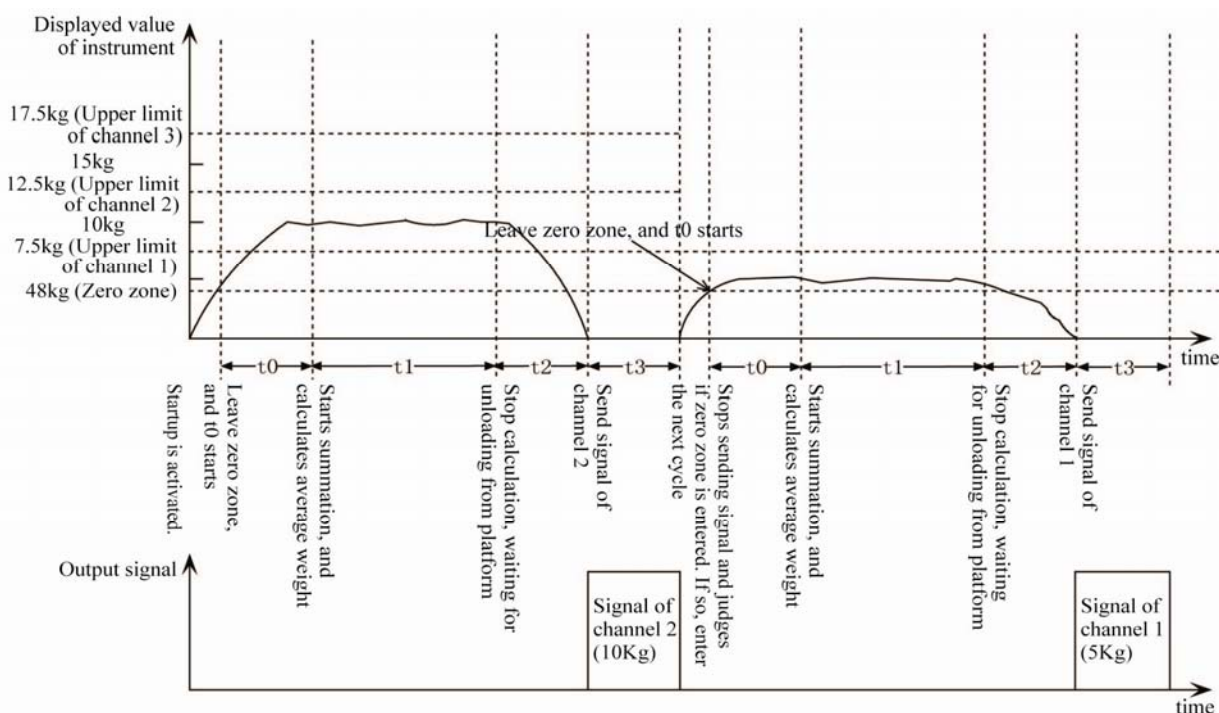
Supposing belt weigher is provided at the site, 3 kinds of cargoes of different weight 5Kg, 10Kg and 15Kg respectively need to be catch weighed through the belt user, which are transferred by the belt once every 10 seconds; the time for loading and unloading the weighing platform is about 2seconds, and the cargoes stay on the platform for about 4 seconds, based on these conditions, we can make the following parameters setting in **【SET--2】** (2-digit decimal number is assumed to set during calibration). The cargoes less than 7.5kg are sorted to channel 1, the cargoes between 7.5kg and 12.5kg are sorted to channel, while those more than 12.5kg are sorted to channel 3.

Parameters	Indicator display	Parameters setting	Setting instructions
1	[CP *]	3	3 catchweighing modes are set hereof.
2	[Pt 0]	00	the times of control process (0 ~ 99, 0 means indefinite times)
Mode 3 (catchweighing mode)			

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Parameters	Indicator display	Parameters instructions	Remark
3	[FodE *]	0	Self-check mode: automatic catchweighing is started when the weight is bigger than that in zero zone Upper and lower limit mode: real time upper limit, intermediate limit and lower limit relay output
4	[H*****]	12.50	Set to the intermediate value of 2 cargoes to facilitate catchweighing
5	[L*****]	7.50	Set to the intermediate value of 2 cargoes to facilitate catchweighing
6	[Lq*****]	4.00	A bigger value in zero zone to remove other interference
7	[t0 **]	20	about 2 seconds for loading the weighing platform
8	[t1 **]	40	about 4 seconds in staying on weighing platform
9	[t2 **]	20	about 2 seconds waiting for the cargoes to be unloaded from weighing platform
10	[t3 **]	20	send a channel signal with duration of 2 seconds

Please refer to the following diagram for control time sequence:



Time Sequence Diagram of Self-check Mode

Schematic Diagram of Control Process 4

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Brief description of control process (please understand in combination with the time sequence diagram):

- (1) The indicator is put into operation and judge if the weight is bigger than the value in zero zone. If so, t0 delay is started, waiting for cargo to be loaded on the weighing platform.
- (2) The time t0 is over, and starts to calculate the average weight of cargoes, with time duration of t1. The value obtained from calculation serves as foundation for later catchweighing signal.
- (3) The time t1 is over, t2 delay starts, waiting for the cargo to be unloaded from the weighing platform.
- (4) The time t2 is over, and the catchweighing channel signal is sent, to make the cargo enter into the corresponding channel. The time for sending channel signal is t3.
- (5) The time t3 is over, and signal is sent, and the indicator judges once again if the weight returns to zero zone. The next cycle can't be started only when the weight stays within zero zone.

2. External mode of catchweigher

Application example:

It is assumed that high speed catchweigher is used at site: the industrial control PLC together with this indicator performs quick catchweighing to the cargo. PLC controls the transportation of cargo to the weighing platform, and gives out a trigger signal to the indicator when it reaches there to make it calculate the weight. The weight range of the qualified product of user is between 9.90Kg ~ 10.10Kg. Channel signal is sent as per weight, to make the PLC control and send to different channels. About 3-5 seconds is taken during 1 cycle. The indicator and PLC should coordinate well. We can set the parameters in **【SET-2】** according to the following table (2-digit decimal is assumed during calibration).

Parameter	Indicator display	Parameter setting	Setting instruction
1	[CP *]	3	3 is set, catchweighing mode
2	[Pt 0]	00	Times of control procedure (0 ~ 99, 0 for indefinite times)
3	[FodE *]	1	External control mode: only when the external control signal is triggered will the indicator start the catchweighing
4	[H*****]	10.10	Qualified upper limit
5	[L*****]	9.90	Qualified lower limit
6	[Lq*****]	5.00	Zero area is big, other interference can be removed
7	[t0 **]	02	The cargo is on the weighing platform when receiving the trigger signal, no long delay is required.
8	[t1 **]	20	2 seconds are sufficiently enough to calculate the weight.
9	[t2 **]	00	After completing the calculation, PLC can be notified at once to remove the cargo. No delay is required.
10	[t3 **]	10	The channel signal with duration of 1 second is sent to ensure the receipt by PLC.

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Please refer to following diagram for control of time sequence

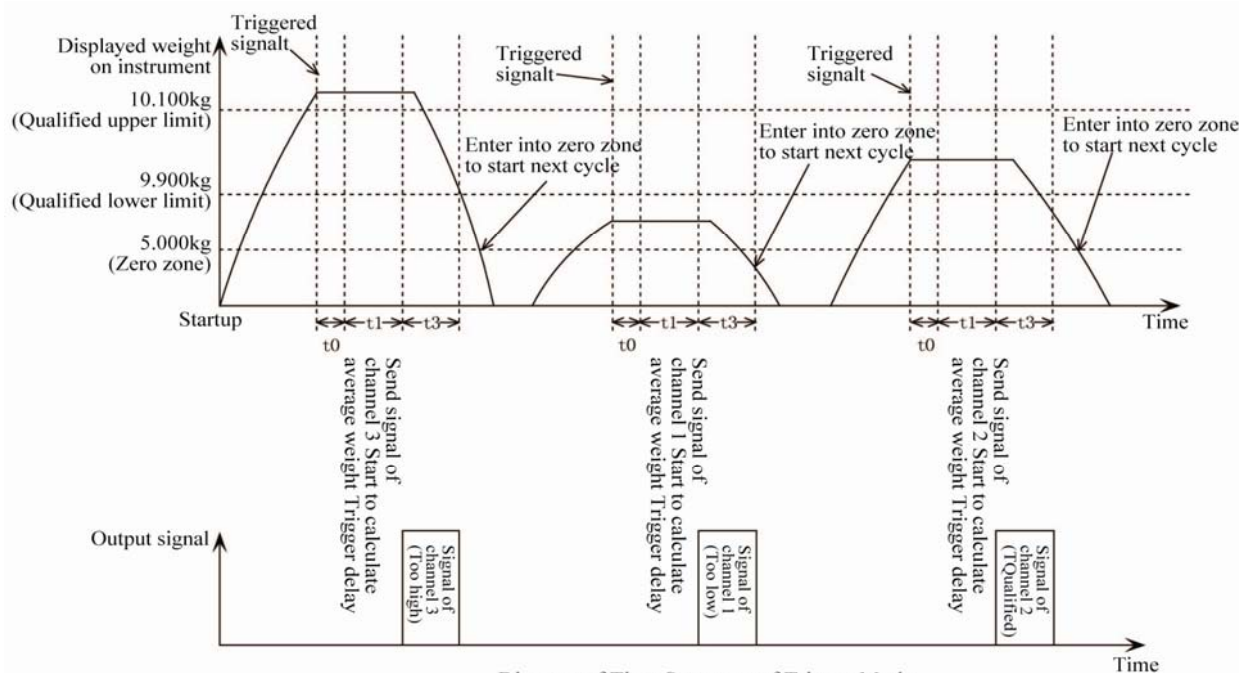


Diagram of Time Sequence of Trigger Mode
Schematic Diagram of Control Process 5

Brief description of control process (please understand in combination with the time sequence diagram)

- (1) The indicators starts to run, waiting for trigger signal;
- (2) The trigger signal is received, t_0 delay occurs, waiting for cargo to be loaded stable.
- (3) The time t_0 is over; the indicator starts to calculate the average weight of cargo, with time duration of t_1 . The value obtained from calculation serves as foundation for later catchweighing signal
- (4) The time t_1 is over, waiting for activation of t_2 .
- (5) The time t_2 is over, the channel signal for catchweighing is sent to make the cargo enter into corresponding channels. The time for sending channel signal is t_3 .
- (6) The time t_3 is over, and the signal is sent and the indicator judges once again if the weight returns to zero zone. The next cycle can't be started only when the weight stays within zero zone

3. Upper and lower limit mode

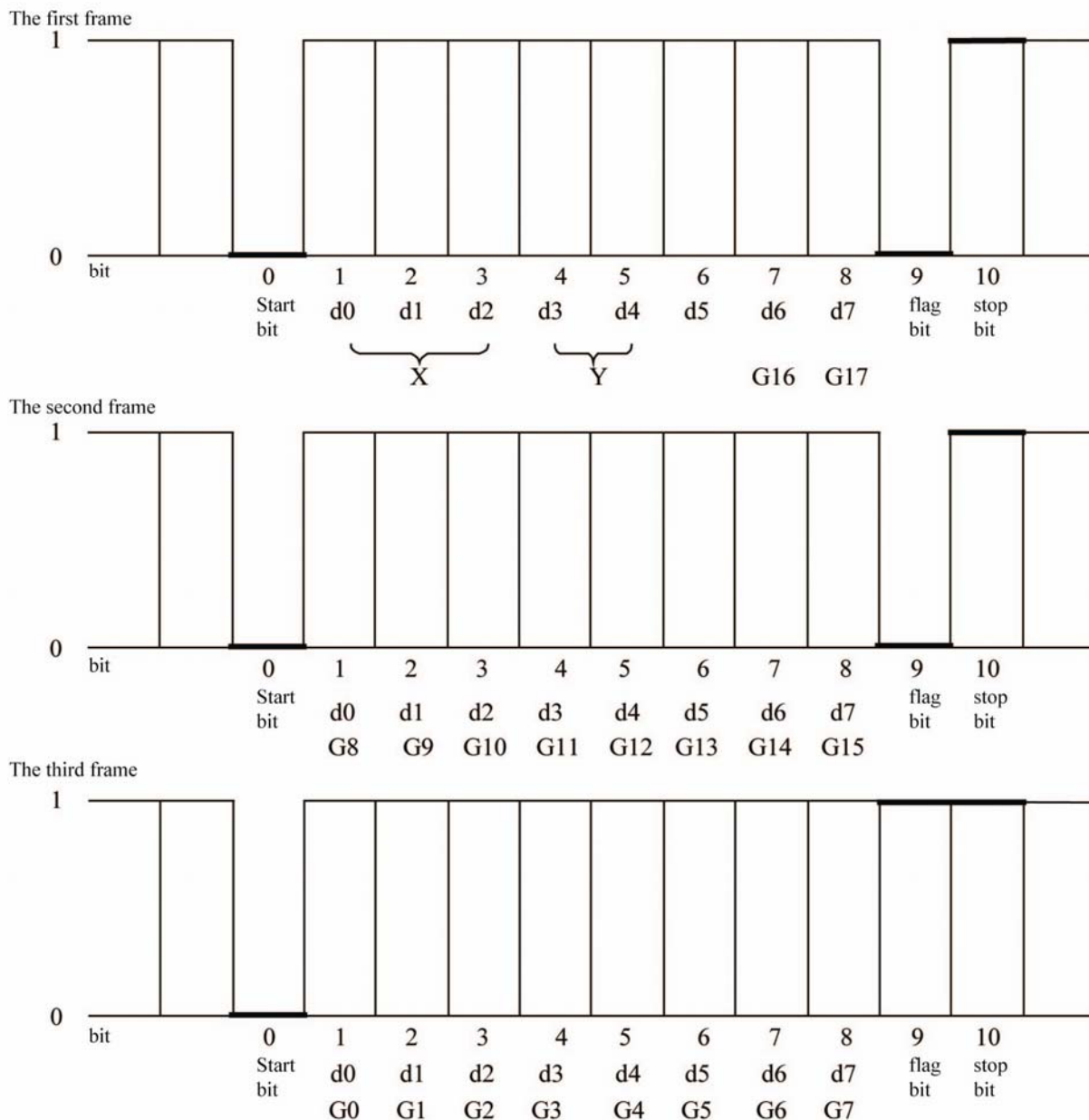
After setting the upper and lower limit value, the instruction under operation will send real time the signal at the output end according to the actual weight.

Annex 1 Error Message Prompt

Err 01	Fail to meet tare requirements
Err 02	Fail to zero setting requirement
Err 03	The weight upon startup exceeds zero setting range
Err 04	Memory storage is full
Err 05	The input full value is 0 during calibration
Err 06	The calibrated loaded weight is too small
Err 07	The calibration switch is invalid
Err 08	Wrong input time or date
Err P	The baud rate setting does not meet requirements during printing
OL	The weight exceeds the full value

Annex 2 Large Screen Data Waveform Diagram and Format

1. The large screen signal is the 20mA constant current loop signal, with binary code serial output, and baud rate of 600. Every frame of data has 11 bits, including 1 start bit (0), 8 data bits (low-order bit in front), 1 flag bit, and 1 stop bit (1).
2. A set of data is set every 100ms. Every set of data includes 3 frames of data, with meaning as follows:



Large Screen Data Frame Waveform Diagram

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The first frame data: flag bit is 0;

X: d0, d1, d2 are position of decimal point (0 - 3);

Y: d3 - weight signal (1 - negative; 0 - positive);

d4 - gross/net weight (1 - net weight; 0 - gross weight);

G17, G16: binary data;

The second frame data: flag bit is 0;

G15 ~ G8: binary data;

The third frame data: flag bit is 1;

G7 ~ G0: binary data;

G0 ~ G17: 18-bit binary code of weight in order from low to high

Annex 3 Serial Communication – Data Format of Command Response Mode

AD: indicator address (for example: A(ASCII code is41))

XH: check high four-bit;

XL: check low four-bit.

Note:

- (1) The address is 1 ~ 26 when setting the indicator, and the corresponding address during communication is A ~ Z;
- (2) The command A ~ H is also sent in ASCII format.

Please refer to the following table in respect of the meaning of various letter command and their communication format:

Command		Meaning	Format	Example
A	Send by PC	Handshake	02 AD 41 XH XL 03	02 41 41 30 30 03
	Send by indicator	Handshake	02 AD 61 XH XL 03	02 41 61 32 30 03
B	Send by PC	Read gross weight	02 AD 42 XH XL 03	02 41 42 30 33 03
	Send by indicator	Send gross weight	02 AD 62 * * * * * * * * * * * * * * XH XL 03	02 41 62 2B 30 30 31 2E 30 30 30 32 37 03(1.000)
C	Send by PC	Ret net weight	02 AD 43 XH XL 03	02 41 43 30 32 03
	Send by indicator	Send net weight	02 AD 63 * * * * * * * * * * * * * * XH XL 03	02 41 63 2B 30 30 30 2E 30 30 30 32 37 03(0.000)
D	Send by PC	Read tare	02 AD 44 XH XL 03	02 41 44 30 35 03
	Send by indicator	Send tare	02 AD 64 * * * * * * * * * * * * * * XH XL 03	02 41 64 2B 30 30 31 2E 30 30 30 32 31 03(1.000)
E	Send by PC	Tare	02 AD 45 XH XL 03	02 41 45 30 34 03
	Send by indicator	Tare	02 AD 65 XH XL 03	02 41 65 32 34 03
F	Send by PC	Zero setting	02 AD 46 XH XL 03	02 41 46 30 37 03
	Send by indicator	Zero setting	Zero setting successful: 02 AD 66 XH XL 03 Zero setting conditions not satisfied: 02 AD 69 XH XL 03	Zero setting successful: 02 41 66 32 37 03 Zero setting conditions not satisfied: 02 41 69 32 38 03
G	Send by PC	Startup	02 AD 47 XH XL 03	02 41 47 30 36 03
	Send by indicator	Startup	02 AD 67 XH XL 03	02 41 67 32 36 03
H	Send by PC	Stop	02 AD 48 XH XL 03	02 41 48 30 39 03
	Send by indicator	Stop	02 AD 68 XH XL 03	02 41 68 32 39 03

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