Handheldweighingdynamometer aninstructionmanual

■Important matters

Warning

- ◆ do not use in places with inflammable and explosive gas。
- ◆ There is a large capacity lithium battery inside the instrument, do not knock or ignite
- ◆ Please do not disassemble or modify the product. Do not replace the internal battery. Otherwise, electric shock, fire and fault may be caused.
- ◆ This manual is subject to change without notice and is updated at any time. Please refer to the latest version. If you have any questions, please contact us.
- ◆ The company shall not bear any direct or indirect losses other than the product itself.

■Characteristics and typical applications

Characteristic

- ◆ The maximum measurement and control speed is 1920 times / second. Operation, alarm, peak and valley value, capture and other functions are carried out synchronously with measurement and control
- ◆ Real time capture function, suitable for rapid test applications such as tensile test, high-speed stamping, rebound instrument, free falling impact, etc
- ◆ Real time capture data buffer 19200 points, playback or high-speed transmission
- ◆ There are 6144 historical capture data points, which can be recorded, replayed or transmitted at high speed
- ◆ 3.2-inch true color LCD with a resolution of 320 × 240. Waveform and digital display
- ◆ Built in large capacity lithium battery, optional with external power adapter.
- ◆ The communication can set the instrument shutdown or standby mode.
- ◆ It can be used by hand or fixed installation. The screen can be rotated 180 ° for display.

Typical application

- ◆ Continuous workflow

  Use "continuous waveform", "bar graph screen" or "multi-channel numerical screen" to realize the functions of measurement, alarm, communication, and view the measured continuous curve.

- ◆ Intermittent duty cycle

  For example, the process of stamping and material tensile test is not continuous, but has obvious intermittent working cycle. Generally, there are startup conditions (trigger threshold), which need to obtain peak value, valley value or waveform data in the process.

- ◆ High speed short time impact process

For example, free fall impact test and other impact tests are characterized by high speed and need to obtain peak value, valley value or waveform data in the process.

- ◆ High speed continuous waveform observation

For example, for the observation of vibration waveform, the high-speed continuous waveform can be observed in this state by using the characteristics of waveform real-time display when "capture screen" is waiting for triggering. Or as an intermittent working cycle, observe the waveform before capturing the waveform record to determine the reasonable parameter settings.

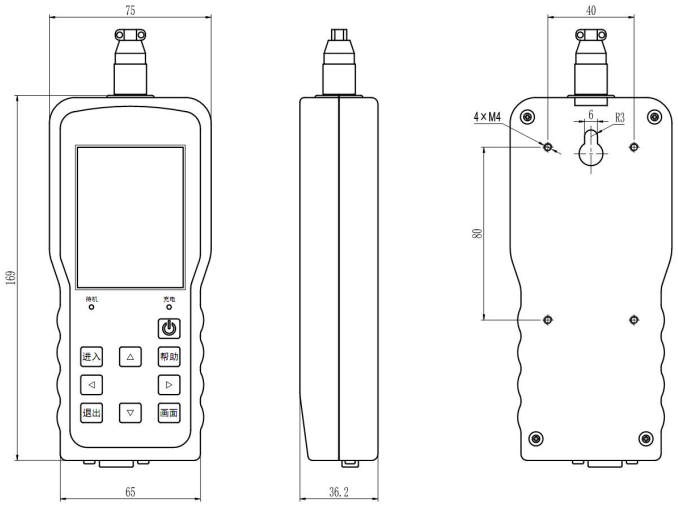
1. Installation

Warning

In order to prevent machine failure, please be sure to shut down the power supply before installing and removing the machine.

1.1 Outline size

All dimensions indicated below are in mm



2. Wiring

Warning

- ◆ To prevent machine failure, follow the wiring instructions in the manual.

★The interface description screen of the instrument describes the port definition in detail

2.1 Precautions for wiring

Please use the matching power adapter for power supply, otherwise it will cause circuit failure or even fire.

Ensure that the instrument power supply is not affected by the noise of power supply when wiring. It is recommended to use noise filter when it is easy to be affected by noise.

-Please twist the wire into a twist. The shorter the twisting distance is, the better the noise defense effect is.

-Please be sure to install the noise filter on the grounded panel, and make the wiring between the output side of the noise filter and the power terminal shortest.

-Please do not install fuses, switches, etc. on the wiring at the output side of the noise filter, otherwise the effect of the filter will be reduced.

Please avoid mixing interference in the measuring circuit

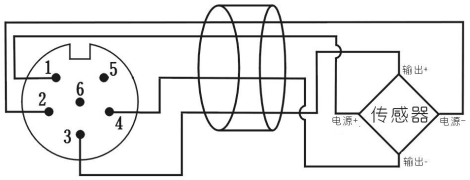
-The measuring circuit is separated from the grounding circuit.

-For the interference caused by static electricity, the shielding wire has a good effect.

In order to prevent misoperation, please do not connect any wires to the unused terminals.

2.2 Input port

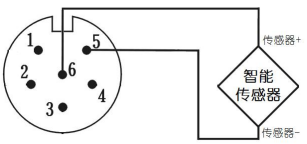
➡ The instrument is equipped with resistance strain bridge sensor. The wiring mode is: four wire system, as shown in the figure below:



★For the application of multi-sensor parallel connection, measures should be taken to make the sensitivity (MV / V) of each sensor connected to the instrument consistent.

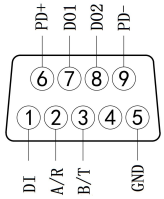
★It is recommended to use shielding wire, and the shielding layer can be connected to the 5th pin

2.3 intelligent sensor

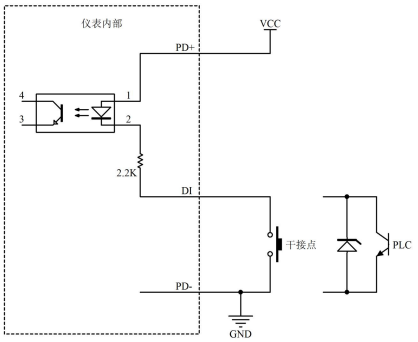


2.4 Output port

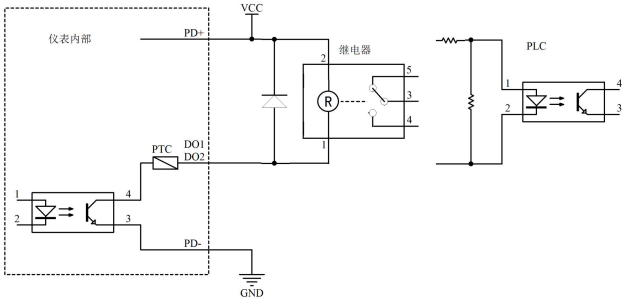
➡ The output port of this instrument includes one channel of communication, one point of input and two points of output of OC door, as shown in the following figure:



➡ 开入接线图如下：



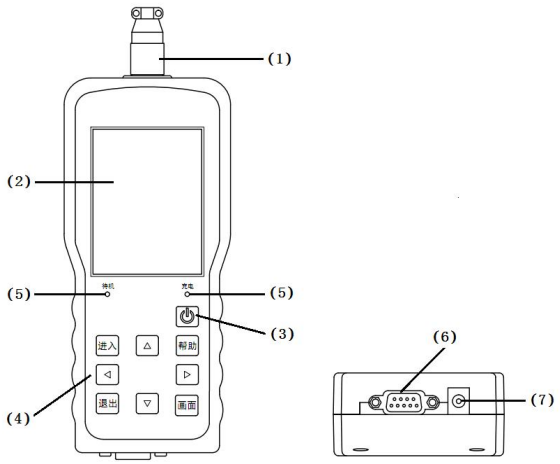
➡ The outgoing wiring diagram is as follows:



Note: the VCC range of external power supply in the figure above is 9-30vdc

3. Component name and operating instructions

■Part name and description



Serial number	Part name		Explain
1	Input port		Connect load cell and intelligent module
2	LCD screen		The display screen is divided into the following types: 1. Main screen 1) Waveform picture 2) All digital picture 2) Description screen 2. Setup screen 3. Help screen 4. Pop up prompt window
3	Opening key	⏻	Long press to turn on or off
4	Function key	进入	Go to settings or next level menu
		退出	Exit or return to previous menu
		帮助	In any screen displayed on the instrument, you can press the help key to query the help description under the screen, and press the help key to exit to the original screen
		画面	Switch between different display screens

		△	Move the cursor up or increase the value Short press to peel under other pictures in "measurement picture"
		▽	Move the cursor down or decrease the value In the "measurement screen", short press to clear, long press to clear peak and valley values
		◁	Move the cursor to the left or to the first page of the description
		▷	Move the cursor to the right or to the end of the description page
5	Charging indicator		The indicator light is on when the instrument is charged with power adapter, and the brightness reflects the charging current
	Power indicator		The indicator light is on when the instrument is turned on and off when it is turned off Flashing indicates standby
6	Output port	communication	RS232 or RS485 communication interface, supporting tc-asc protocol or Modbus RTU protocol
		1 points in	Used for clearing, peeling, allowing alarm, display locking, peak and valley value clearing, capture function (can be selected by parameters)
		2 point OC Gate output	For external control
7	Power jack		Power adapter interface

➡ The key operation is different under different screens. Please refer to the help information of the corresponding screen.

➡ It can be locked or unlocked remotely through the communication command, see the "communication protocol description" screen

4. Parameter list

Group 1 Parameters: alarm settings
This group of parameters is not controlled by "password" 1111, that is, after pressing the Enter key, the instrument displays the "set password" window. At this time, it is unnecessary to enter the password, and directly press the Enter key again to enter the alarm setting parameter group.
If "allow to modify alarm parameters" in "measurement settings" parameter group is set to "disable", this group of alarm parameters can only be modified after the password is set, otherwise this group of parameters can only be viewed

Parameter group	Parameter name		Range of values	Factory settings	address
Alarm settings	Alarm points①	Alarm mode	Upper limit, lower limit, deviation upper limit, deviation lower limit, absolute deviation upper limit, absolute deviation lower limit, standby upper limit, standby deviation upper limit, standby deviation lower limit	上限	02H
		Alarm comparison value	-999999~999999（Decimal point movable）	10000	03H
		Alarm sensitivity	0~999999（Decimal point movable）	0	04H
		Alarm delay	0~60	0	05H
		Deviation comparison value	-999999~999999（Decimal point movable）	0	06H
		Alarm data source	Total value, net value, peak value, Gu Zhi, peak valley value, peak process amount, valley process amount, total value average, net value average, capture maximum value, capture minimum value, capture inflection point 1, capture inflection point 2, capture inflection point 3, capture inflection point 4, capture inflection point 5, capture inflection point 6	总值平均	07H
	Alarm points②	Alarm mode	Upper limit, lower limit, deviation upper limit, deviation lower limit, absolute deviation upper limit, absolute deviation lower limit, standby upper limit, standby deviation upper limit, standby deviation lower limit	上限	08H
		Alarm comparison value	-999999~999999（Decimal point movable）	20000	09H
		Alarm sensitivity	0~999999（Decimal point movable）	0	0AH
		Alarm delay	0~60	0	0BH
		Deviation comparison value	-999999~999999（Decimal point movable）	0	0CH

		Alarm data source	Total value, net value, peak value, valley value, peak process quantity, valley process quantity, total value average, net value average, capture peak value, capture valley value	Total value average	0DH
	Alarm output	Output 1 control	Directly controlled by alarm 1, when alarm 1 is valid and alarm 2 is invalid, when alarm 1 is invalid and alarm 2 is valid, when all alarms 1-2 are valid	Directly controlled by alarm 1	2EH
		Output 2 control	Directly controlled by alarm 2, when alarm 1 is valid and alarm 2 is invalid, when alarm 1 is invalid and alarm 2 is valid, when all alarms 1-2 are valid	Directly controlled by alarm 2	2FH

Group 2 parameters: measurement settings

This group of parameters is controlled by "password" 1111, that is, after pressing the Enter key, the instrument will display the "set password" window. At this time, enter the password by pressing the up and down left and right keys, and then press the Enter key again to enter this group of parameters

Parameter group	Parameter name	Range of values	Factory settings	address
Measurement settings	Company	Kg、T、g、KN、N	Kg	32H
	Zero tracking time	0.0~10.0	0.0	33H
	zero trace	0~200	0	34H
	Coefficient of clearing range	0.00~0.99	0.10	35H
	Times of inertia filtering	1~20	1	36H
	Change detection threshold	1~200（Indexing）	1	37H
	Number of smoothing filtering	1~10	1	38H
	Precompression correction threshold	-999999~999999（Decimal point movable）	0.00000	39H
	Precompression correction value	-999999~999999（Decimal point movable）	0.00000	3AH
	Display rate	10 次/ second、20 次/ second、40 次/ second	10 次/秒	3BH
	Measuring speed	15 次/ second、120 次/ second、240 次/ second、480 次/ second、960 次/ second、1920 次/ second	15 次/秒	3CH
	Peak value threshold	-999999~999999（Decimal point movable）	-999999	3EH
	Peak return error	0~999999（Decimal point movable）	0	3FH
	Valley threshold	-999999~999999（Decimal point movable）	999999	40H
	Valley return error	0~999999（Decimal point movable）	0	41H
	On in function selection	Disable, clear, peel, allow alarm, display lock, clear peak and valley values, capture: wait for trigger	Prohibit	42H
	Allow modification of alarm parameters	Disable, enable	Enable	43H
	Power on automatic reset	Disable, enable	Prohibit	101H

Group 3 parameters: snap settings

This group of parameters is controlled by "password" 1111, that is, after pressing the Enter key, the instrument will display the "set password" window. At this time, enter the password by pressing the up and down left and right keys, and then press the Enter key again to enter this group of parameters

Parameter group	Parameter name	Range of values	Factory settings	address
Capture settings	Capturing time	0.0~1280.0 秒（This parameter setting range is limited by the sampling rate and save mode）	1.6	90H
	Capture unit	Same as unit parameter、KPa、MPa、GPa	MPa	91H
	Stress section	1.00~9999.99	1.00	92H
	Acceleration of gravity	9.7000~9.9000	9.8012	93H
	Threshold of start up	-999999~999999（Decimal point movable）	10000	94H
	Starting criterion	≥Start threshold, bottom-up threshold, bottom-up threshold	≥Threshold of start up	9CH
	End threshold	-999999~999999（Decimal point movable）	0	9DH
	Closing criterion	≤End threshold, bottom-up threshold, bottom-up threshold, end of capture time	End of capture time	9EH
	Preview duration	-1~600 second	600	95H
	Break alarm output	Use alarm output 1, use alarm output 2, no output	No output	96H
	Break alarm threshold	-999999~999999（Decimal point movable）	100000	97H
	Preservation mode	Historical waveform: save after reaching the save threshold Historical waveform: save after capture Historical waveform: key saving Historical waveform: preservation after fracture Single buffer mode: do not save history waveform Double buffer mode: do not save history waveform	waveform: press to save	
	Save peak threshold	0~999999（Decimal point movable）	100000	99H
	Prompt when not saved	Disable, enable	Enable	9AH
	Clear captured data	Disable, enable	Prohibit	9BH
	YCoordinate mode	Numerical range、0~100%、-100%~+100%	-100%~+100%	A0H
	YUpper limit of display	-999999~999999	100000	A1H
	YLower limit of display	-999999~999999	-100000	A2H
	Capture waveform color	60 Color options		A3H
	Enable qualification test	Disable, enable	Prohibit	B0H
	Show qualified results	Disable, enable	Enable	B1H
	Display template waveform	Disable, enable	Enable	B2H
	Qualified upper deviation	0~999999	1000	B3H
	Deviation under qualification	0~999999	1000	B4H
	Qualified range color	60 Color options		B5H
	Color of disqualified area	60 Color options		B6H
	Mutation filter points	0~1000	0	B7H
	Mutation filter threshold	0~999999	0	B8H
	Inflexion analysis points	0~6	0	B9H
	Show analysis results	Disable, enable	Enable	BAH

Group 4 parameters: communication settings

This group of parameters is controlled by "password" 1111, that is, after pressing the Enter key, the instrument will display the "set password" window. At this time, enter the password by pressing the up and down left and right keys, and then press the Enter key again to enter this group of parameters

Parameter group	Parameter name	Range of values	Factory settings	address
Communication settings	Local mailing address	0~99	1	48H
	Baud rate	2400、4800、9600、19200、38400、57600、115200、128000、230400	9600	49H
	Check bit selection	No check, odd check, even check	No check	4AH
	Communication control alarm	Disable, enable	Prohibit	4BH
	Communication protocol selection	TC-ASCII、MODBUS/RTU、XSJ	MODBUS/RTU	4DH
	Local active transmission	Disable, gross, net, peak, valley, peak valley, peak process, valley process, gross average, net average, capture data	Prohibit	4EH
	Communication stop bit	1、2	1	100H

Group 5 parameters: polyline correction

This group of parameters is controlled by "password" 1111, that is, after pressing the Enter key, the instrument will display the "set password" window. At this time, enter the password by pressing the up and down left and right keys, and then press the Enter key again to enter this group of parameters

Parameter group	Parameter name	Range of values	Factory settings	address
Broken line correction	Number of broken line correction points	0~10	0	4FH
	Measured value before correction 1	-999999~999999（Decimal point movable）	0.0001	50H
	Corrected display value 1	-999999~999999（Decimal point movable）	1	51H
	Measured value before correction 2	-999999~999999（Decimal point movable）	0.0002	52H
	Corrected display value 2	-999999~999999（Decimal point movable）	2	53H
	Measured value before correction 3	-999999~999999（Decimal point movable）	0.0003	54H
	Corrected display value 3	-999999~999999（Decimal point movable）	3	55H
	Measured value before correction 4	-999999~999999（Decimal point movable）	0.0004	56H
	Corrected display value 4	-999999~999999（Decimal point movable）	4	57H
	Measured value before correction 5	-999999~999999（Decimal point movable）	0.0005	58H
	Corrected display value 5	-999999~999999（Decimal point movable）	5	59H
	Measured value before correction 6	-999999~999999（Decimal point movable）	0.0006	5AH

	Corrected display value 6	-999999~999999（Decimal point movable）	6	5BH
	Measured value before correction 7	-999999~999999（Decimal point movable）	0.0007	5CH
	Corrected display value 7	-999999~999999（Decimal point movable）	7	5DH
	Measured value before correction 8	-999999~999999（Decimal point movable）	0.0008	5EH
	Corrected display value 8	-999999~999999（Decimal point movable）	8	5FH
	Measured value before correction 9	-999999~999999（Decimal point movable）	0.0009	60H
	Corrected display value 9	-999999~999999（Decimal point movable）	9	61H
	Measured value before correction 10	-999999~999999（Decimal point movable）	0.0010	62H
	Corrected display value 10	-999999~999999（Decimal point movable）	10	63H
	MV broken line correction	Disable, enable	enable	80H

Group 6 parameters: waveform screen

This group of parameters is controlled by "password" 1111, that is, after pressing the Enter key, the instrument will display the "set password" window. At this time, enter the password by pressing the up and down left and right keys, and then press the Enter key again to enter this group of parameters

Parameter group	Parameter name	Range of values	Factory settings	address
Waveform picture	Waveform y coordinate mode	Numerical range、0~100%、-100%~+100%	-100%~+100%	800H
	Waveform Y display upper limit	-999999~999999	100000	801H
	Waveform Y display lower limit	-999999~999999	-100000	802H
	Enable cursors	Disable, enable	enable	803H
	Display alarm status	Disable, enable	enable	804H
	Waveform 1 data source	Disable, total value, net value, peak value, valley value, peak value process quantity, valley value process quantity, total value average, net value average, capture maximum value, capture minimum value, capture inflection point 1, capture inflection point 2, capture inflection point 3, capture inflection point 4, capture inflection point 5, capture inflection point 6	Total value average	805H
	Wave 1 color	60 种颜色可选		806H
	Waveform 2 data source	Disable, total value, net value, peak value, valley value, peak value process quantity, valley value process quantity, total value average, net value average, capture maximum value, capture minimum value, capture inflection point 1, capture inflection point 2, capture inflection point 3, capture inflection point 4, capture inflection point 5, capture inflection point 6	Disable	807H
	Wave 2 color	60 colors available		808H
	Waveform 3 data source	Disable, total value, net value, peak value, valley value, peak value process quantity, valley value process quantity, total value average, net value average, capture maximum value, capture minimum value, capture inflection point 1, capture inflection point 2, capture inflection point 3, capture inflection point 4, capture inflection point 5, capture inflection point 6	Disable	809H
	Wave 3 color	60 colors available		80AH
	Waveform 4 data source	Disable, total value, net value, peak value, valley value, peak value process quantity, valley value process quantity, total value average, net value average, capture maximum value, capture minimum value, capture inflection point 1, capture inflection point 2, capture inflection point 3, capture inflection point 4, capture inflection point 5, capture inflection point 6	Disable	80BH
	Wave 4 color	60 colors available		80CH

Group 7 parameters: bar graph screen

This group of parameters is controlled by "password" 1111, that is, after pressing the Enter key, the instrument will display the "set password" window, at this time, input through the up and down left and right keysPassword, and then press the Enter key again to enter this group of parameters

Parameter group	Parameter name	Range of values	Factory settings	address
Bar chart	Display mode of bar graph y	Numerical range、0~100%、-100%~+100%	-100%~+100%	900H
	Bar graph Y display upper limit	-999999~999999	100000	901H
	Bar graph Y display lower limit	-999999~999999	-100000	902H
	Show percentage	Disable, enable	Enable	903H
	Bar chart data source	Disable, total value, net value, peak value, valley value, peak value process quantity, valley value process quantity, total value average, net value average, capture maximum value, capture minimum value, capture inflection point 1, capture inflection point 2, capture inflection point 3, capture inflection point 4, capture inflection point 5, capture inflection point 6	Total value average	904H
	Alarm indicator 1 color	60 Color options		980H
	Alarm indicator 2 color	60 Color options		981H

Group 8 parameters: numerical screen

This group of parameters is controlled by "password" 1111, that is, after pressing the Enter key, the instrument will display the "set password" window. At this time, enter the password by pressing the up and down left and right keys, and then press the Enter key again to enter this group of parameters

Parameter group	Parameter name	Range of values	Factory settings	address
Numerical picture	Value 1 data source	Total value, net value, peak value, Gu Zhi, peak valley value, peak process amount, valley process amount, total value average, net value average, capture maximum value, capture minimum value, capture inflection point 1, capture inflection point 2, capture inflection point 3, capture inflection point 4, capture inflection point 5, capture inflection point 6	Total value average	A00H
	Value 2 data source	Disable, total value, net value, peak value, valley value, peak value process quantity, valley value process quantity, total value average, net value average, capture maximum value, capture minimum value, capture inflection point 1, capture inflection point 2, capture inflection point 3, capture inflection point 4, capture inflection point 5, capture inflection point 6	Prohibit	A01H
	Value 3 data source	Disable, total value, net value, peak value, valley value, peak value process quantity, valley value process quantity, total value average, net value average, capture maximum value, capture minimum value, capture inflection point 1, capture inflection point 2, capture inflection point 3, capture inflection point 4, capture inflection point 5, capture inflection point 6	Prohibit	A03H
	Value 4 data source	Disable, total value, net value, peak value, valley value, peak value process quantity, valley value process quantity, total value average, net value average, capture maximum value, capture minimum value, capture inflection point 1, capture inflection point 2, capture inflection point 3, capture inflection point 4, capture inflection point 5, capture inflection point 6	Prohibit	A04H

Group 9 parameters: user calibration

This group of parameters is controlled by "password", that is, after pressing the Enter key, the instrument will display the "set password" window. At this time, enter the password through the up, down, left and right keys, and then press the Enter key again to enter this group of

parameters				
Parameter group	Parameter name	Range of values	Factory settings	address
User calibration	Calibration mode selection	Weight calibration, no weight calibration, automatic calibration	Weight calibration	64H
	Calibration effective time	1~120	20	65H
	Sensor sensitivity	0.40000~4.00000	2.00000	66H
	zero calibration	-100000~100000	0.0000	67H
	Gain calibration	0.00001~999999.	10.0000	68H
	Gain calibration weight	0.00001~999999. （Decimal point movable）	100000	69H
	Zero correction value	-199999~199999（Decimal point movable）	0	6AH
	Full correction value	0.50000~2.50000	1.00000	6BH
	Indexing selection	1、2、5、10、20、50	1	6CH
	Maximum range	0.00001~999999. （Decimal point movable）	100000	6DH
	Lock calibration parameters	Disable, enable	Disable	6EH

Group 10 parameters: system settings

This group of parameters is controlled by "password" 1111 or "backup password" 2027, that is, after pressing the Enter key, the instrument will display the "set password" window, at this time, enter the password through the up, down, left and right keys, and then press the Enter key again to enter this group of parameters.

Some parameters of this group (replacement backup password, ad reset times, parameter reset times) are visible only when backup password is set

Parameter group	Parameter name	Range of values	Factory	address
System setup	Replace parameter password	0~999999	1111	1100H
	Replace backup password	0~999999	2027	1101H
	Start screen selection	Continuous waveform picture, single channel bar graph picture, multi-channel numerical picture, capture waveform picture	Capture waveform picture	1102H
	Show color scheme	Black background, white background	Black background	1103H
	Rotate 180 degrees to display	Disable, enable	Disable	1104H
	Backlight holding time	0~20 score	10	1105H
	Prompt hold time	2~20 seconds	10	1106H
	Enable key tone	Disable, enable	Disable	1107H
	Sound prompt in case of overload	Disable, enable	enable	1108H
	Error inhibit time	1~30 score	3	1109H
	Clock setting			2001H
	Show brief description	Disable, enable	enable	110AH
	Power management tips	Disable, enable	enable	110BH
	Display description screen	Disable, enable	Disable	1112H
	Automatic shutdown time	0~120 score	30	1113H
	Prompt key lock	Disable, enable	Disable	1114H
	Backlight highlight setting	70~100	85	1115H
	Backlight protection settings	33~50	35	1116H
	Language choice	Chinese, English	Chinese	1117H
	Battery voltage	Non modifiable		110CH
	Firmware version			110DH
	Local serial number	Among them, "ad reset times" and "parameter reset times" are used for instrument maintenance and viewing		110EH
	Ad reset times			110FH
	Number of parameter resets			1110H
	Display boot screen	Disable, enable	enable	1111H
	Results of automatic calibration	It can't be modified and can only be viewed during instrument maintenance		1304H
	Automatic calibration operation	No operation, write operation, read operation	No operation	1305H
	Enable TEDS	Disable, enable	Disable	1306H

Group 11 parameters:

This group of parameters is controlled by "backup password" 2027, that is, after pressing the Enter key, the instrument will display the "set password" window. At this time, enter the password through the up and down left and right keys, and then press the Enter key again to enter this group of parameters.

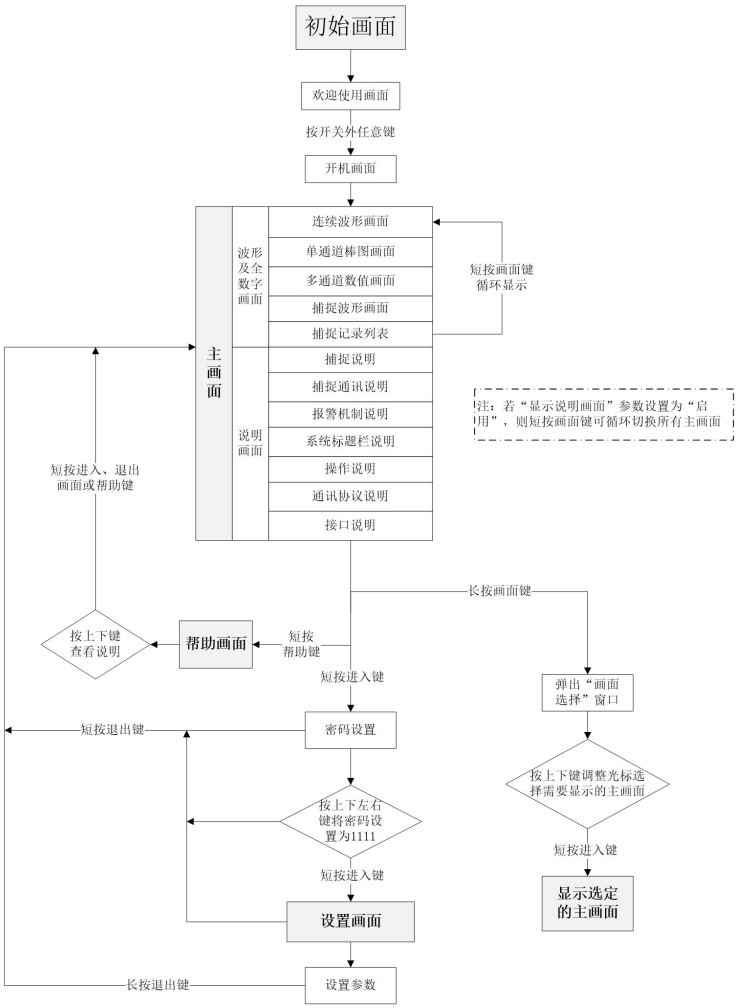
Parameter	group	parameter	name	value
Parameter backup	Save current parameters	Disable, enable	Disable	1300H
	Restore backup parameters	Disable, enable	Disable	1301H
	Restore factory parameters	Disable, enable	Disable	1302H

➡ If you do not know the function of a parameter, you can short press the help key when viewing the parameter, and the instrument will pop up the detailed function description of the parameter.

➡ If the color of a parameter name is dark and the value is flashing, it means that the parameter cannot be modified and is controlled by the flashing parameter 制。

5. Instrument screen

■Instrument screen switching



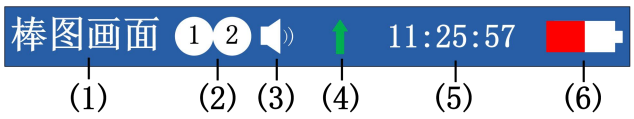
■Main screen function description

Main picture / function	Continuous	waveform	bar	graph
Trigger	no			yes
No	record			● Historical waveform: the storage conditions can be set, the maximum is 6144 points, and the power down is maintained ● Capture peak and valley value record: displayed in the "capture record" screen, 167 maximum, power down and hold ● Single buffer mode: longer capture time, up to 19200 points, no power down ● Double buffer mode: faster working cycle, 9600 points maximum, power failure not maintained
show contents	Total value, net value, peak value, valley value, peak valley value, peak process quantity, valley process quantity, total value average and net value average are optional			● Waiting for trigger status: display the real-time data curve after unit conversion ● Capturing status ● Waveform preview status: restore the captured waveform ● History waveform status: History waveform playback
Display the number of channels	0~4 When it is 0, the channel screen will not be displayed	0~1	1~4	1
Display rate	10 times / s, 20 times / s, 40 times / s optional	About 10 times / sec.		Synchronization with measurement rate
Company	Kg、T、g、KN、N			Same as measurement unit or kPa, MPa, GPA optional
Call the	2 configurable alarms			2-point configurable alarm and break alarm

police		
Functional application	Non capture mode of operation 1. Peak and valley value detection 2. Press the key or switch in to clear the zero and peak valley values 3. Press the key or open to peel 4. Press the key or enter to clear the peak and valley values	Capture working mode 1. Peak and valley value detection 2. Capture process judgment 3. Capture peak and valley value record (Communication readable) 4. Capture process data record (Communication readable) 5. Break alarm (occupy 1 point OC door output)
Record	无	1. Capture peak and valley value record: 167 groups at most, power down hold 2. The capture and save mode is to record historical data: 6144 points maximum ★ data retention after power failure 3. The capture data saving mode is not to record historical data: Single buffer mode: longer capture time, up to 19200 points Double buffer mode: faster duty cycle, 9600 points maximum ★ data is not maintained after power failure

■Display screen and function description

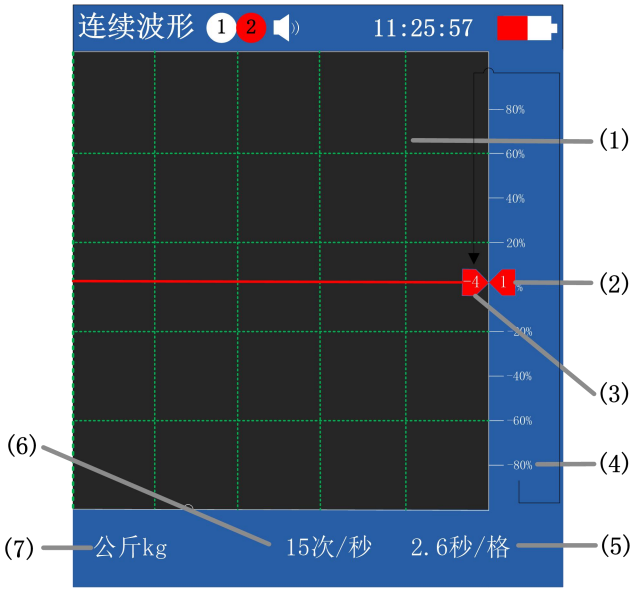
- **Title Bar**



Serial number	Function description
(1)	Under normal condition, the screen name will be displayed. If the test value is changing, the display will flash between "screen name" and "changing". If the external input lock display is displayed, display lock is displayed
(2)	Output channel status of the 1st and 2nd alarm points, red for output closed, white for output open. When "××" is displayed, it means the external input is invalid and the input function is selected to allow alarm
(3)	Key tone enable status, if "X", it means the key tone is off
(4)	Current communication status, ↑ indicates active data transmission, ↓ indicates data reception
(5)	Clock display (hour: minute: Second)
(6)	Clock display (hour: minute: Second)

➧ Key tone, communication, clock and battery are all optional functions. If there is no such function when ordering, the corresponding title bar will not display this icon

- **Continuous waveform screen**

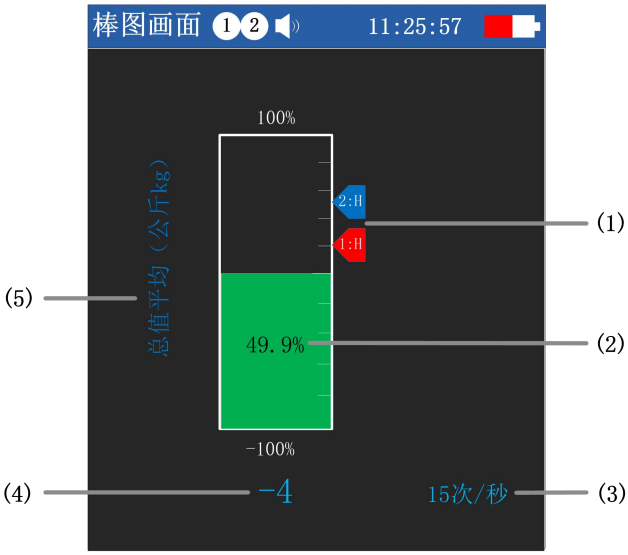


Serial number	Function description
(1)	Waveform picture
(2)	Channel number
(3)	Measurement value of current channel
(4)	The waveform scale can also be modified to the value range or 0 ~ 100%,
(5)	Modify by "waveform y coordinate mode" in "waveform screen" parameter group
(6)	Sampling rate
(7)	Company

📖 Key and function description

1. Press the left and right keys to adjust the cursor position and the measurement value corresponding to the cursor will change accordingly.
2. When "disable" is selected for all channel data sources, the instrument does not display this screen

Single channel bar graph screen



Serial number	Function description
(1)	2-point alarm set point, indicating the position as a percentage of the set point in the bar chart
(2)	Measure the percentage, and use the background color to distinguish two alarm states, that is, when any alarm reaches the alarm state, the background color of the percentage is red, otherwise it is green

(3)	Sampling rate
(4)	Measurement value of current channel
(5)	Current channel name and unit

Function description

➡ When "disable" is selected for data source, the instrument does not display this screen

- **Multi channel numerical picture**



Serial number	Function description
(1)	Point 1 and 2 alarm mode. If the alarm state is reached, the corresponding alarm point will flash
(2)	Measurement value of current channel
(3)	Point 1 and 2 alarm mode (with Chinese characters). If the alarm state is reached, the corresponding alarm point will display "in alarm"
(4)	Sampling rate
(5)	Current channel name and unit

Function description

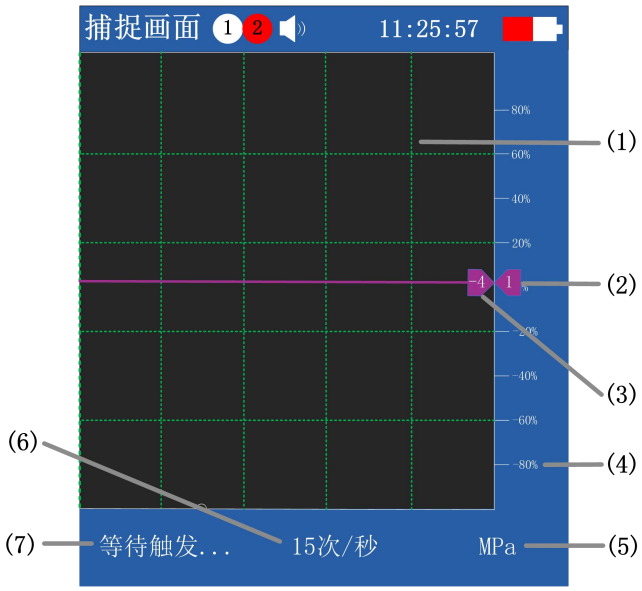
This window supports up to 4 channels of numerical display, and automatically adjusts the size of the display font according to the number of channels.

when "disable" is selected for all channel data sources, the instrument does not display this screen

the above figure is only a single channel numerical screen. If it is displayed as a multi-channel numerical screen, the alarm status in the lower left corner of the display window will not be displayed

the alarm status corresponding to each channel of the instrument can be distinguished by different background colors. When the alarm state is reached, the background color of the channel is red, otherwise it is green

- **Capture waveform picture**



Serial number	Function description
(1)	Capture screen
(2)	Channel number
(3)	Measurement value of current channel
(4)	The waveform scale can also be modified to the value range or 0 ~ 100%, Modify by "waveform y coordinate mode" in "waveform screen" parameter group
(5)	Capture unit
(6)	Sampling rate
(7)	Capture state

Function description

the captured waveform can be roughly divided into four display states: waiting for triggering (as shown in the above figure), capturing, waveform preview and historical waveform.

to view the "historical waveform", set the parameter "capture time length" to 0.

Capture process

1. After the instrument is powered on, the capture waveform will display the waiting trigger screen, and the capture status in the screen will display "etc." To be triggered... ".
2. When the measured value reaches the "start threshold" or the automatic start threshold, the capture is started. At this time, the capture status in the screen
The status display is the countdown of the capture time, and the display format is "rest ☐ ☐ minute ☐ ☐ second".
3. When the countdown is over or the breaking alarm threshold is reached, the capture process is over and the display of the instrument will be automatically cut off
Change to the "waveform preview" screen, at this time, the capture status in the screen shows the capture time where the cursor is located, and the display format is "☐ ☐: ☐. ☐ ☐" (Min: S. MS).
4. The instrument will select different ways to save the historical waveform according to the "save mode" parameter.
5. If the duration of "waveform preview" is set to 0, the instrument will no longer display the "waveform preview" screen, and after processing process 4, start capturing process 1 again.
6. Press the up key to exit the "waveform preview" screen and restart the capture process.

Keynote description

1. Under the "waveform preview" screen, press the up key to start the capture process again.
2. Press the left and right keys to adjust the cursor position and the measurement value corresponding to the cursor will change accordingly.

3. Under the "capture screen" or "waveform preview" screen, short press the up key to enter or restart the capture (if the capture is in progress, it will be abandoned and not saved).

4. In the "waveform preview" screen, press the key briefly to save the current waveform to "historical waveform".

5. Under the "capture screen" or "waveform preview" screen, long press the up key to automatically adjust the waveform to the maximum position.
6. Under the "capture screen" or "waveform preview" screen, long press the key to automatically adjust the waveform to the minimum position.
7. Under "capture screen", during the capture process, press the exit key to end the capture in advance.

- **Capture record list**



Serial number	Function description
(1)	Record data captured each time

Function description

The instrument can record up to 167 groups of capture results, including capture time, units, peak and valley values.

record data with power down holding function.

- **Setting up picture**



Password settings

1. In the main screen, short press the Enter key to display the pop-up password setting window.
2. Press the left and right keys to move the cursor to the left and right, and press the up and down keys to increase or decrease the value of the cursor.
3. Change the display value to 01111 under the cooperation of up, down, left and right keys.

4. Short press the Enter key again to enter the parameter "setting screen".

alarm parameters can not be controlled by password. In the main screen, the user can directly press the Enter key twice to enter the "alarm setting" parameter group.

Parameter setting

1. Enter "setting screen" according to password setting process
2. Under the "setting screen", move the cursor to the parameter group to be modified through the cooperation of up, down, left and right keys.
3. Short press the Enter key to enter the group parameter list or sub parameter group screen.
4. After entering the parameter list, press the up and down keys to move the cursor to the parameter to be modified.
5. Press the Enter key briefly to enter the screen for modifying the value of the parameter.
6. Change the parameter to the value to be set through the cooperation of up, down, left and right keys.
7. Press the Enter key twice to save the parameters.
8. If you do not want to modify the parameter, press the exit key briefly to exit the parameter modification screen.
9. Under "setting screen", short press the exit key to "set screen".
10. Press exit key for a long time in any sub window under "setting screen" to exit "setting screen".

"setting screen", "parameter group screen" and "parameter list screen" can be viewed by pressing the help key briefly

in the modify value screen, short press the help key to view the key operation and parameter description.

when saving parameters, short press the Enter key to save parameters, and a confirmation dialog box will pop up to avoid misoperation.

➡ The function of "description screen" is relatively simple, so it will not be described in detail.

6. calibration

When the user uses the instrument for the first time, or any part of the measurement system changes, and the calibration parameters of the current equipment cannot meet the user's requirements, the instrument shall be calibrated.

Calibration parameters in "user calibration" parameter group

6.1 Calibration process

■ 6.1.1 Calibration method and process

Calibration methods include weight calibration, weightless calibration and automatic calibration.

Calibration with weights: use weights to calibrate zero point and gain.

Weightless calibration: do not calibrate the gain, but calculate the gain through the input sensor sensitivity.

Automatic calibration: external intelligent module is required, and relevant parameters will be automatically calculated and calibrated after the instrument is powered on

when it is not convenient to load weights on site for system calibration, the weightless calibration can be used. When the sensor or instrument is replaced, or the weighing system mechanism changes, please recalibrate.

Calibration process

1. Before calibration, enter the "measurement setting" parameter group, and set the unit selection to the unit to be displayed.
2. Press the key to enter the "user calibration" parameter group, and select the calibration mode to be used in the "calibration mode selection" parameter. After selecting the corresponding option, press the Enter key to save the parameters, and then set the "graduation selection" and "maximum range" to the required value. The maximum range is generally the maximum weighing range of the connected sensor.

The following details the calibration process for weighted calibration or weightless calibration respectively:

For example: sensor range 0 ~ 10000kg, sensor sensitivity 2.00010 MV / V

Weighted calibration

(continued process 2 above)

1. First calibrate the zero point:

Press the key to enter the parameter "zero point calibration", and the instrument displays the current real-time measured MV value (constantly refreshing).

2. Empty the scale platform, and press the Enter key to save the zero MV value after the display is stable.

3. Then calibrate the gain:

Press the key to enter the parameter "gain calibration", and the meter will display the current real-time measured MV value (continuously refresh).

4. Add 8000kg weight to the platform (other weights are OK, but the weight of the added weight cannot be too low). After the display is stable, press the Enter key to save the gain MV value.

5. Then set the weight display value corresponding to the gain:

Press the key to enter the parameter "weight corresponding to gain calibration", and change the value to the weight just timed for gain calibration. Press the Enter key to save the parameters.

Weightless calibration

(continued process 2 above)

1. Input sensor sensitivity first:

1. Press the key to enter the parameter "sensor sensitivity", and change it to the sensitivity marked by the sensor of 2.00010 MV / v. Press the Enter key to save the parameters.

Verification and calibration effect:

Add the weight of the same weight on the platform. If the instrument displays correctly, there is no need to calibrate again. If there is any deviation, the display can be corrected by "zero correction value" and "full correction coefficient".

2. The calculation formula of zero point and full correction value is as follows:

Display value = measured value before correction × "full correction coefficient" + "zero correction value"

Note: zero point calibration can also be carried out when there is no weight calibration, and the calibration correction is the same as the calibration with weight

■ 6.1.2 calibration precautions

MV value display:

Under the calibration parameters, the instrument displays the MV value measured by the real-time sensor when the zero point and gain are calibrated. This value can be used to check whether the sensor works normally, to detect the four corner error of the force transmission mechanism, to detect the linearity of the sensor, etc

◆ check whether the sensor works normally:

When the number of MV changes with the load weight, it indicates that the sensor wiring is correct and the transmission mechanism works normally;

When MV is ol (or - OL), it means that ad measurement overflows, indicating that the pressure on the sensor is too large (or too small),

After unloading weight (or loading weight) treatment, if it is still ol (or - OL) after treatment, it may be caused by the following reasons:

a) Please check and eliminate the power transmission mechanism fault

b) Sensor wiring error, please check and eliminate

c) The sensor is damaged, please replace it

◆ check the four corner error of the force transmission mechanism:

Respectively load at the four corners of the scale platform (or scale bucket) and record the corresponding MV number. If there is obvious error, please adjust the force transmission mechanism.

7. Function description

7.1 measure

■ 7.1.1 Zero tracking, zero clearing and change detection

➧ Zero tracking: to overcome the zero drift of the sensor.

If the measurement is within the "zero tracking range" at or above the "zero tracking time", the reading will be tracked to zero.

reset: in the measurement state, when the original measurement value is within the range × "reset range coefficient", press the key (or switch in is effective) for a short time to reset the displayed value. (if you want to clear through input, you need to set the parameter "input function selection" to "clear"). When the "power on auto clear" parameter is set to "enable", the instrument will perform an auto clear once after power on (stillControlled by the "clear range factor").

change detection: when the change of the measured value within one second exceeds the set "change detection threshold", the instrument considers that the force value is changing, and at this time, it does not carry out zero clearing, zero tracking and other operations.

★ the zero clearing function is effective for both gross value and net value.

■ 7.1.2 filtering

inertial filtering: the force value measuring device will generate random vibration due to the influence of its own natural frequency and the conduction of external vibration, thus making the display value of the instrument unstable. According to the magnitude of its vibration, an appropriate inertial filter is selected to make the display stable.

Small digital filter value is selected when vibration is small, and large digital filter value is selected when vibration is large.

The larger the set value, the stronger the filtering effect, but the slower the response to the change of the input signal. The optional range is 1-20, and the factory setting is 1.

smooth filtering: take n consecutive sampling values as a queue, and the queue length n is the value set by "smooth filtering times". Each time a new data is sampled and placed at the end of the queue, the data of the original queue at the beginning of the queue is replaced (first in, first out principle), and the arithmetic average of all the data in the queue is taken as the filtering result. The advantage of sliding filter is that it has a good suppression effect on periodic interference and high smoothness. The optional range is 1-10, and the factory setting is 1.

display rate: indicates the rate at which the instrument displays an update for one second. 10 times / second, 20 times / second and 40 times / second are optional.

★ in the instrument, the sliding average filter is carried out first to overcome the influence of periodic vibration change, and then the inertial filter is carried out to overcome the influence of sudden noise. If the display is not as good as expected, and the stable display requirements are not met, the display update rate can be set appropriately, the display update will be slower, and the average value processing can be conducted again, so as to obtain a better stable display.

★ invalid for peak value, valley value or peak valley value, capture display average.

■ 7.1.3 preloading correction

precompression correction: when the measured value is less than "precompression correction threshold", the measured value = the measured value before correction

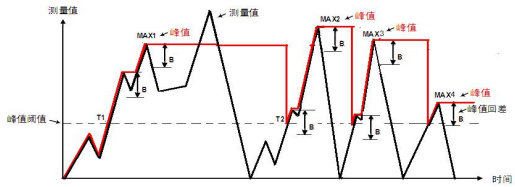
When the measured value ≥ "precompression correction threshold", the measured value = the measured value before correction + "precompression correction value"

■ 7.1.4 measuring speed

measurement speed: the measurement speed of instrument ad can be selected as: 15 times / second, 120 times / second, 240 times / second, 480 times / second, 960 times / second, 1920 times / second. The control cycle of alarm output is consistent with the measurement speed.

7.2 Peak and valley value judgment process

📖 Peak detection



As shown in the figure above, when the measured value exceeds the "peak threshold" (T1 in the figure), the instrument starts to detect the peak value; when the measured value falls back more than the "peak return difference" (B1 = Max1 - peak return difference in the figure), the instrument completes the peak detection. The peak value Max1 was obtained.

★ the measured value shall not exceed the set value of peak threshold value, and peak detection shall not be triggered.

★ from TN to maxn in the above figure is the peak process quantity.

★ after the peak value is detected, only when the measured value falls back less than the set value of the peak threshold value, and then exceeds the set value of the peak threshold value again, restart the peak detection, and cover the previous peak value.

★ the instrument always refreshes the latest peak / valley value, please note. (to maintain the maximum / minimum value, set the peak / valley difference parameter to - 999999 / 9999).

valley detection is similar to peak detection and will not be described separately.

★ manually clear peak / valley value: press the key for a long time to clear the peak / valley value.

7.3 Open into

1 The point switch value input function supports user-defined function selection, which can be modified by the "input function selection" in the "measurement settings" parameter group. The specific function description is as follows:

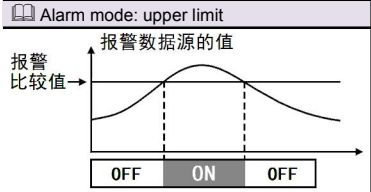
Parameter	value	option
0	Prohibit	No use
1	Zero clearing	Reset, peak and valley value: in the measurement state, when the measured value is within the range of reset, the displayed value and peak and valley value can be reset
2	Peel	Peeling: in the measurement state, the peeling function can be used at any time
3	Allow alarm	Allow comparison output: when this function is enabled, the instrument performs the normal comparison output function only when the switch value input is valid. Otherwise, the comparison output status is locked to the current output status.) ★ when the comparison output is prohibited, the unit indicator flashes to prompt
4	Display lock	Lock display: in the measurement state, the display measurement value can be locked
5	Clear peak and valley values	Peak and valley value clearing: if the switching value is valid, the peak / valley value clearing function can be realized
6	Catch	Under the capture waveform screen, the switch value is valid, enter and restart the capture

7.3 Alarm output

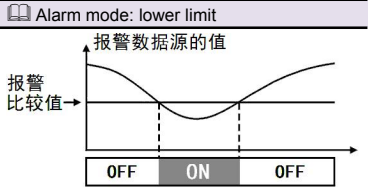
The instrument is equipped with 2-point OC door alarm output, each alarm is controlled by a separate parameter group (the alarm mode, comparison value, sensitivity, delay, deviation comparison value and data source of this alarm can be set independently). The corresponding relationship between 2 groups of alarms and 2-point OC door can be set by the "alarm output" parameter group

The specific judgment methods of two groups of alarm output are as follows:

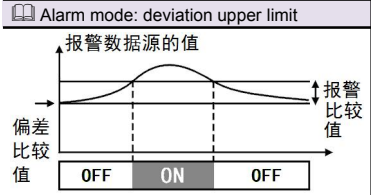
📖 Alarm mode: upper limit



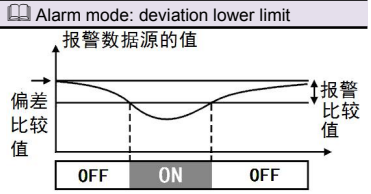
📖 Alarm mode: lower limit



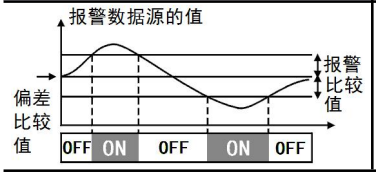
📖 Alarm mode: deviation upper limit



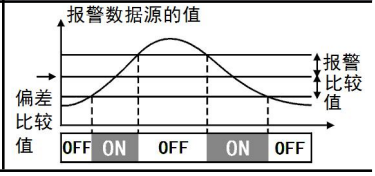
📖 Alarm mode: deviation lower limit



Alarm mode: upper limit of deviation absolute value

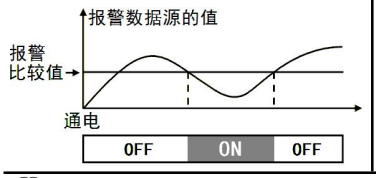


Alarm mode: deviation absolute value lower limit



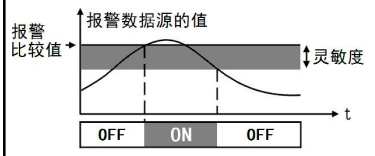
Standby mode:

以待机下限输出为例：



Alarm mode: comparative sensitivity

以上限输出为例：



Alarm mode: the capture screen also has a break alarm mode.

Compare output by switch input control

The switch value input can be set to "allow alarm" function:

When the input is closed, the alarm output function takes effect; when the input is open, the alarm output status is locked

7.4 Communication instructions

The communication interfaces RS232 and RS485 are optional, and support two communication protocols (through parameter setting) Tc ASCII and Modbus RTU.

When the instrument leaves the factory, the communication mode is slave mode, that is, the instrument receives and responds the communication instructions sent from the upper computer, and each received instruction will return corresponding data to the upper computer

. if it is necessary for the instrument to send data to the upper computer automatically and continuously (no longer respond to receiving instructions), the parameter "local active transmission" in "communication settings" can be modified from "disable" to other values (different data content can be selected).

➡ The instrument only supports TC ASCII protocol when it is set as active sending. If the instrument is RS485 communication interface, it will not respond to receiving instructions and the baud rate of active sending cannot be lower than 9600bps.

➡ In the active transmission mode, the period of transmitting data is also related to the measurement period and communication rate of the instrument, i.e. the instrument cannot realize the complete synchronization of measurement and communication transmitting data under different measurement and control speeds and different communication rates, and the specific corresponding relationship is as follows (the value in the table is "actively sending data every n measurement communications"):

Measuring speed / Communication rate	15 times / sec	120 times / sec	240 times / sec	480 times / sec	960 times / sec	1920 times / sec
9600bps	1	2	3	6	12	24
19200bps	1	1	2	3	6	12
38400bps	1	1	1	2	3	6
57600bps	1	1	1	1	2	4
115200bps	1	1	1	1	1	2
128000bps	1	1	1	1	1	2
230400bps	1	1	1	1	1	1

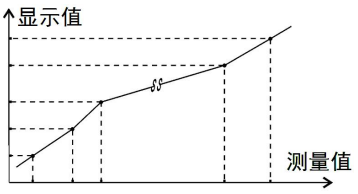
➡ Refer to the "communication protocol description" screen of the instrument for specific communication protocol. See [4. Parameter list] for parameter address.

7.5 Broken line correction

The broken line correction function can select different correction data sources through the parameter "MV broken line correction". When it is set to disabled, the corrected data source is the displayed measured value; when it is set to enabled, the corrected data source is the measured MV value

Application environment: when the input signal and display data are monotonically nonlinear, and the data cannot be determined when ordering, it needs to be corrected during calibration, and the broken line operation function of the instrument can be used.

Monotonic rise refers to the increase of input signal and display data in the whole range of input signal. The input signal will not increase, but the display data will decrease.



For the measured value less than the measured value 1 before correction, the instrument will push down according to the data in the next section

If the measured value is greater than the measured value 10 before the correction, the instrument will recurs upward according to the data of the previous section

Broken line correction

- Setup method
- The polyline operation needs to be carried out after adjustment.
- First, set the selection parameter of the number of polyline segments of the channel to be modified to 0, and turn off the polyline operation function.
- After the instrument is connected with the input signal, the input signal is increased from small to large, and the measured value and standard value of each broken line point are recorded in the process.

Set the selection parameter of the number of broken line segments as the actual number of correction segments required, and set the measurement value and standard value of each broken line point.

➡ The number of polyline segments selection parameter should be set to be greater than 3, otherwise the number of polyline correction points is too small, and the algorithm is not effective.

7.6 Catch

The capture function of this instrument can be roughly divided into 4 application modes.

1) Continuous measurement mode

That is to say, the instrument is equivalent to a standard instrument or module, which can realize the measurement, alarm and communication functions, as well as view the real-time measurementCurve, no capture process requirements, no capture related parameters need to be set at this time, only according to the actual use on siteQuantity, alarm, communication and other relevant parameters.

note that this application mode does not affect the standard alarm function, and the "break alarm output" in the "capture setting" parameter group needs to be set to "no output"

2) Result judgment method

That is to say, the instrument is required to automatically determine the peak value, valley value and fracture value in a measurement process. It is suitable for stamping monitoring, springback tester, testing machine and other applications. In this way, fast measurement speed and upload judgment results are generally required.

Working process: waiting for triggering - > reaching start threshold - > starting capture process - > end of capture time or maximum minimum value in capture process is greater than break alarm threshold - > capture end - > display waveform preview (if break alarm output is set, synchronous output relay) or waiting for triggering

In this application mode, the relevant parameters of the instrument can be set as follows:

Parameter	group	parameter
Measurement settings	Measuring speed	1920 times / sec
Capture settings	Capturing time	Set according to actual application
	Threshold of start up	
	Preview duration	
	Break alarm output	
	Break alarm threshold	
	Preservation mode	No preservation

➡ The user can read the peak value and valley value of the last capture process in the waveform preview or wait for the trigger state communication.

2) Long interval process record and result judgment

That is to say, the function of uploading capture curve is added on the basis of "result judgment method".

Working process: waiting for triggering - > reaching start threshold - > starting capture process - > end of capture time or (maximum minimum value in capture process) > breaking alarm threshold - > end of capture - > display waveform Preview - > upper computer reading capture curve data - > end of preview time - > waiting for triggering

Parameter group	Parameter name	content
Measurement settings	Measuring speed	Set according to actual application
Capture settings	Capturing time	
	Threshold of start up	
	Break alarm output	
	Break alarm threshold	
	Preview duration	The value should be greater than the time for the upper

		computer to read a complete capture curve
	Preservation mode	No preservation

➡ In this way, the recording capacity of the instrument is 19200 points, i.e. when the measuring speed is 1920 times / s, the instrument capture time is set to 10 seconds at most

1) Short interval process record and result judgment

That is, if the time between the two capture processes is too short to use mode 3), this judgment mode can be used at this time.

Working process: waiting for triggering - > reaching start threshold - > starting capture process - > end of capture time or (maximum minimum value in capture process) > breaking alarm threshold - > end of capture - > display waveform Preview - > upper computer reading capture curve data - > end of preview time - > waiting for triggering

Parameter group	Parameter name	content
Measurement settings	Measuring speed	1920 times / sec
Capture settings	Capturing time	Set according to actual application
	Threshold of start up	
	Break alarm output	
	Break alarm threshold	
	Preview duration	0 or -1
	Preservation mode	Double buffer mode

➡ When the preview time is set to - 1, the capture process can be restarted automatically.

➡ In this way, the recording capacity of the instrument is 9600 points, i.e. when the measuring speed is 1920 times / s, the instrument capture time is set to 5 seconds at most

8. Common problems and grounding treatment

➡ Phenomenon and analysis:

- Phenomenon: the instrument cannot be started
- Solution: 1. When the internal battery is used for power supply, the battery may be insufficient, please charge in time
- 2. Short circuit the positive and negative excitation of the sensor by mistake
- 3. The excitation current of the sensor exceeds the limit value.
- Phenomenon: the charging indicator flashes or the instrument restarts when charging

Solution: 1. The external power adapter does not meet the specification, please use the power adapter matched with the instrument

9. Specifications

■Basic specification

project	Specifications
External power adapter	Input: AC 90 ~ 260V, 50Hz or 60Hz Output: DC 12V / 2a, positive inside and negative outside the interface Note: do not use the power adapter not provided with the machine
Built in battery	The continuous use time is about 18-36 hours, which is related to the use mode Charging time is about 4-8 hours Standby time about 4-8 days The service life shall not be less than 1000 full charge and discharge cycles
insulation resistance	≥ 100m Ω (500V DC Mega reference). Not applicable when powered by built-in battery
Insulation strength	2000V AC (test condition: 50 / 60Hz, 1 minute). Not applicable when powered by built-in battery
Anti-interference	IEC61000-4-2 (electrostatic discharge), class III Iec61000-4-4 (Electrical fast transient pulse group), class III Iec61000-4-5 (surge), class III. Not applicable when powered by built-in battery
Protection level	IP65 (product front panel protection) (GB / t42-2008)

■Input specification

project	Specifications
Input signal	Proportional measurement with 4-wire strain sensor -14 ~ 14mV
Input sensitivity	0.1uV / d
Zero adjustment range	－10～10 mV
Gain input range	1 ～12 mV
Transformation mode	Sigma－Delta
Speed of measurement and control	15、120、240、480、960、1920 Times / sec（Through parameter setting）
Nonlinear	±0.01%F•S（Measuring speed 15 times / S）
Gain drift	＜ 10 ppm / ℃ (When connecting the sensor, the matching terminal connector must be used, otherwise the temperature drift
	characteristic will be deteriorated)
Maximum display accuracy	1 / 100000
Contact input	1 point external switch input, which can be used for clearing, peeling, allowing alarm, display locking, peak and valley value clearing, capture function (can be selected by parameters)

■Output specification

project	Specifications
Sensor power supply	DC 5V±2%，100mA（MAX）
Alarm output	2spotOCGate output, ≤35mA

■Selection specification

project		Specifications	
communication interface	M1	RS232 Interface , Modbus-RTUandTC ASCIIAgreement	Photoelectric isolationResponse time ： 500μS（Measured value）
	M2	RS485 Interface , Modbus-RTUandTC ASCIIAgreement	
Power specification	V0	No built-in battery	
	V1	With built-in battery	
Real time clock	T0	No real-time clock function	
	T1	Real time clock function	