

Process Calibrator

LT32-760H



operating instruction

Preface

Thank you for purchasing our products!

This user manual provides essential instructions for the correct use of this product and serves as a must read resource for both users and maintenance personnel.

To ensure the correct use of this instrument, please read this user manual before use. Please keep this manual in a safe place and in a location where it can be easily accessed.

Precautions for using this manual:

- * If there are any changes to this user manual, no prior notice will be given; updates will be made at our discretion. When consulting this manual, please refer to the version number at the bottom of the cover page for the most up-to-date version.
- * If you find any errors or omissions in the user manual, please contact our company.
- * The Company shall not be liable for any accidents or damages arising from user error.
- * The functions described in this user manual are not intended as a justification for using the product for special purposes.



Warning: Before using this instrument, please read the Introduction first.

safety instruction



safety instruction

To prevent electric shock, injury, or damage to the generator or other equipment, please strictly adhere to all safety regulations for this equipment!

- * The generator shall be used in an environment with a temperature range of 0–50 °C, humidity between (30–80)% RH, and no condensation. When the ambient humidity at the instrument's location is below 30 % RH, effective anti-static measures must be implemented before using the MMB.
- * Do not use this product in flammable or explosive environments; furthermore, it must not be used on equipment involving human life, such as nuclear power equipment or medical devices.
- * After completing the switch between generator signal types, first connect the black test probe, then connect the red test probe.

When disconnecting the signal, first disconnect the red test probe, then disconnect the black test probe. Only after all probes have been disconnected can you switch the signal type.
- * When using the device with a battery power supply, if the generator's signal output becomes unstable, please replace the battery promptly. When the generator will not be used for an extended period, remove the battery to prevent potential damage to the generator. When using an AC/DC power supply, do not operate the device under thunderstorm conditions to ensure personal safety. Please use the company's dedicated AC/DC power supply.
- * Except when using the electronic load current signal mode or the collector–open pulse signal mode, do not apply any voltage signal between the red and black test leads; otherwise, the generator may be damaged.
- * The Company shall not be liable for any direct or indirect damages arising from anything other than the product itself; the Company reserves the right to modify the product without prior notice.

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1、Instrument Overview

The handheld multifunctional process signal generator (hereinafter referred to as the "generator") is a handheld high-precision signal source powered by either a battery or an external AC/DC power adapter, designed to output various types of industrial signals. Please refer to the table below: "Summary of Output Functions."

In addition to the functions listed in [Table 1], the generator also possesses the following characteristics and features:

- * Automatic power switching: The device can continue operating by connecting to an external AC/DC power adapter; when no external power source is available, it automatically switches to battery power (using 5 × 1.5 V AA batteries).
- * Battery Power Monitoring: Provides real-time monitoring of the battery power supply and alerts the user to their current battery level.
- * Save frequently used outputs: Up to 64 sets of frequently used outputs can be stored and retrieved.
- * Multi-information LCD display: contains output values, signal type, power supply information, and memory information
Various prompts such as information; the dual-row display at the top and bottom facilitates setting and accessing commonly used output values.
- * Combination Keys: Not only can output values be entered using the numeric keys, but directional keys can also be used to conveniently adjust the output value.

Function	Output
DC Voltage (DCV)	3 Voltage settings: 100 mV, 1 V, 10 V
Direct Current (DCA)	2 modes: Output (Source), Analog transmitter (Sink)
Resistance	2 Resistance values: 400 Ω , 4000 Ω
Resistance Temperature Detector (RTD)	Pt100, Pt1000, Cu 50 (Supports 2-, 3-, and 4-wire resistive output)
Thermocouple (TC)	K, E, J, T, R, B, S, N
Impulse	Continuous pulse output and pulse counting mode; output frequency range: 2 Hz – 10kHz
Switching value	Switching analog output and switching count output; frequency range: 2 Hz – 10kHz
Other Functions	24V external power supply mode, memory, logging

Table 1: Summary of Output Functions

2、Instrument Technical Specifications

External dimensions: Width 96 × Height 196 × Thickness 44 (mm); Weight:≈400 g (excluding battery). Power supply: 5 AA (Type 5, 1.5 V) batteries or powered via a power adapter.

Power adapter input voltage range: 110–220 VAC; Operating environment: temperature 0°C–50°C, humidity ≤80% RH; no condensation; Storage environment: temperature –25°C–60°C, humidity ≤90% RH; no condensation; Operating altitude: ≤2,000 m.

Vibration shock: Randomness: 2G, 5–500 Hz (testing at distances below 1 meter)

Calibration Interval:

To ensure accuracy, the recommended calibration interval is 1 year.

preheating time: Recommended startup warm-up time: 15 minutes

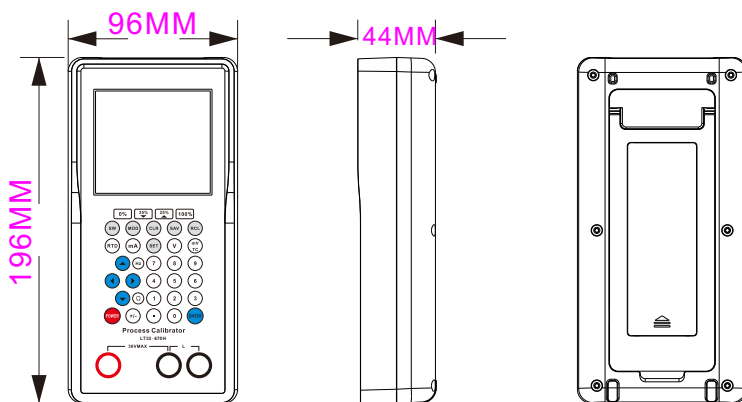
Instrument power Power consumption depends on the output signal type and the load consumption: size.

Powered by 5 standard AA 1.5V alkaline batteries:

Under a 4 VDC/1 kΩ load, 5 × 1.5 V AA alkaline batteries will provide approximately 4 hours of operation.

When operating under a 5VDC/10KΩ load, 5 × 1.5V AA alkaline batteries will provide approximately 21 hours of runtime.

When connected to a 24 mA/50 Ω load, 5 × 1.5 V AA alkaline batteries will provide approximately 4 hours of operation.



dimensional drawing

3、 Main Technical Specifications

3.1 DC Voltage Signal

Range	Output range	Resolution	Accuracy (25℃±10℃)	Remarks
100mV	(-10.00~110.00)mV	10uV	±(0.01%+10uV)	
1V	0~1.2000V	0.1mV	±(0.01%+0.1mV)	Maximum output current: 0.25 mA
10V	0~12.000V	1mV	±(0.01%+2mV)	Maximum output current: 2.5 mA

3.2 DC Current Signal

Type	Output range	Resolution	Accuracy (25℃□10℃)	Remarks
Constant-current source	0~24.000mA	1uA	±(0.02%+2uA)	Forward voltage: 19V
Electronic load	0~24.000mA	1uA	±(0.02%+2uA)	External power supply (5~28 V)

3.3 Resistive Signal

Range	Output range	Resolution	Accuracy (25℃±10℃)	Remarks
400Ω	0~400.00Ω	0.01Ω	±(0.015%+0.1Ω)	0.1~0.5 mA excitation current
4kΩ	0~4000.0Ω	0.1Ω	±(0.015%+0.3Ω)	0.05~0.3 mA excitation current

Note: For the 400 Ω range, the maximum additional error at an excitation current of 0.1 mA is ≤0.25 Ω; for the 4 kΩ range, the maximum additional error at an excitation current of 0.05 mA is ≤0.5 Ω. The stated accuracy does not include errors arising from lead resistance.

3.4 Resistance Temperature Detector (RTD) Scale Division Value

Range	Output range	Resolution	Accuracy (25℃±10℃)	Remarks
Pt100	(-200～850)℃	0.1℃	(-200～0)℃:≤0.3℃	The ±1 mA excitation current; for the Pt1000 sensor, the ±0.1 mA excitation, current accuracy does not include errors arising from lead resistance.
			(0～400)℃:≤0.4℃ (400～850)℃:≤0.5℃	
Pt1000	(-200～850)℃	0.1℃	(-200～100)℃:≤0.2℃ (100～300)℃:≤0.3℃ (300～850)℃:≤0.4℃	
Cu50	(-50～150)℃	0.1℃	(-50～150)℃:≤0.5℃	

3.5 Thermocouple Reference Interval

Type	Output range	Resolution	Accuracy (25℃±10℃)	Remarks
R	(-40～1760)℃	1℃	(-40～100)℃:≤1.5℃ (100～1760)℃:≤1.1℃	1、Uses the ITS-90 temperature scale 2、The accuracy does not include cold junction compensation error; the cold junction compensation error ≤±2℃. 3、When cold-end compensation is not applied, the cold-end reference temperature is 0℃.
S	(-20～1760)℃	1℃	(-20～100)℃:≤1.5℃ (100～1760)℃:≤1.1℃	
K	(-200～1370)℃	0.1℃	(-200～-100)℃:≤0.6℃ (-100～400)℃:≤0.5℃ (400～1200)℃:≤0.6℃ (1200～1370)℃:≤0.7℃	
E	(-200～1000)℃	0.1℃	(-200～-100℃):≤0.5℃ (-100～600℃):≤0.5℃ (600～1000℃):≤0.4℃	
J	(-200～1200)℃	0.1℃	(-200～-100)℃:≤0.5℃ (-100～800)℃:≤0.4℃ (800～1200)℃:≤0.6℃	
T	(-200～400)℃	0.1℃	(-200～400)℃:≤0.4℃	
N	(-200～1300)℃	0.1℃	(-200～-100)℃:≤0.6℃ (-100～900)℃:≤0.5℃ (900～1300)℃:≤0.6℃	
B	(400～1800)℃	1℃	(400～600)℃:≤1.5℃ (600～800)℃:≤1.1℃ (800～1800)℃:≤0.7℃	

3.6 Pulse Frequency Signal

3.6.1 Rectangular Wave Signal Generator

Range	Resolution	Accuracy (25℃±10℃)	Remarks
(2~10000) Hz	(2.00 ~99.99)Hz 0.01Hz	±0.01Hz	Rectangular wave amplitude: 1.00–10.00 V _{p-p} adjustable, low level: 0 V, duty cycle: 50% , load> 100 kΩ.
	(100.0~999.9)Hz 0.1Hz	±0.5Hz	
	(1000~10000)Hz 100Hz	±10Hz	

3.6.2 Counting Pulse Signal Generator

Counter range	Resolution	Accuracy (25℃±10℃)	Remarks
(10–99,999) pulses	1 A pulse	±2 pulses	Pulse frequency: 2–10,000 Hz; pulse amplitude: adjustable from 1–10 V _{p-p} ; low-level voltage: 0 V; duty cycle: 50% ; load resistance> 100 kΩ.

3.6.3 Collector-Open Collector Pulse Signal Generator

Range	Resolution	Accuracy (25℃±10℃)	Remarks
(2~10000)Hz	(2.00 ~99.99)Hz 0.01Hz	±0.01Hz	Transistor polarity: NPN; V _{CE} ≤+28 V; I _{CE} ≤ 50 mA; duty cycle: 50% .
	(100.0~999.9)Hz 0.1Hz	±0.5Hz	
	(1000~10000)Hz 100Hz	±10Hz	

3.7 Distribution Output

DC 24V voltage output, maximum current capacity of 25 mA, and short-circuit protection feature.

4、 Method of Operation

4.1 Startup & Shutdown

- 4.1.1 When the generator is off, press :  Pressing the button once will initiate the power-on process, and the display will show the settings from before the previous shutdown.
- 4.1.2 When the generator is powered on, press the button.  Press the button once, and the generator will complete its shutdown process.
- 4.1.3 Before performing the power-on operation, ensure that the generator is equipped with batteries or an AC/DC power supply; additionally, verify that the red test probe is inserted into the red H terminal of the generator, and that the black test probe is inserted into the black L terminal of the generator. Except for signals requiring two black test probes (such as resistance and RTD calibration signals), any single black test probe may be used for all other signals.
- 4.1.4 After powering on, please first verify the generator's power supply status. The battery symbol and power plug symbol located in the lower-left corner of the generator's display screen indicate the current battery level and power supply status:  (battery powered) 
(Powered by AC/DC power adapter).

Battery symbols display different visual effects depending on the battery level:

 (Always lit): Battery power is normal.

 (Always lit): Battery level is below 60%

 (Always illuminated): Battery level is below 30% , but the device can still operate normally.  (Indicator flashing): Battery power is very low;

please replace the battery.

4.2 Voltage Signal Output

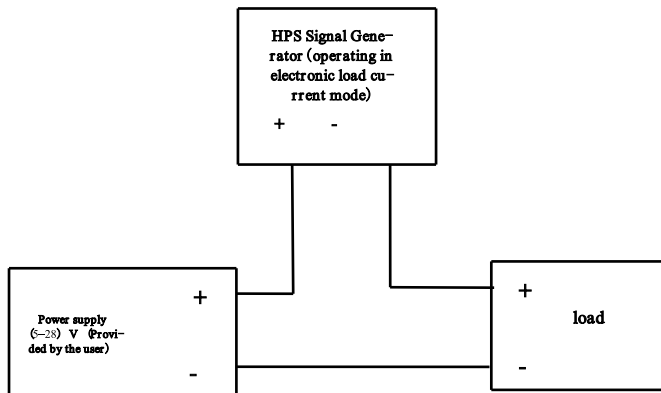
- 4.2.1 Continuous press (V) Press the buttons to select the 1V, 10V, or 24V voltage ranges.
- 4.2.2 press (0-9) And (.) Press the equal key, set the desired output voltage value, then press [Enter]. (ENTER) The key generator outputs the set voltage value. The 24V setting is limited to this option only.
Fixed output: 24V voltage value.
- 4.2.3 The positive voltage signal is output from the red test probe, and the negative voltage signal is output from the black test probe.

4.3 Constant Current Source Signal Output

- 4.3.1 Continuous press (mA) Press the key to display the "Source" character below the display screen.
- 4.3.2 press (0-9) And (.) Press the equal key, set the desired output current value, then press [Enter]. (ENTER) The key generator outputs the set current value.
- 4.3.3 The positive current signal is output from the red test probe, and the negative current signal is output from the black test probe.

4.4 Electronic Load Current Signal Output

- 4.4.1 Continuous press (mA) Press the key to display the "Sink" character below the display screen.
- 4.4.2 press (0-9) And (.) Press the equal button, set the value for the electronic load current to be output, and then press [Enter]. (ENTER) The key generator outputs the set current value.
- 4.4.3 The electronic load provides a current signal output; the user must supply a DC power supply of (5-28) V; the specific wiring connections are as follows:



4.5 Resistive Signal Output

- 4.5.1 Continuous press  Press the buttons to select the 400Ω and 4kΩ resistance ranges, respectively.
- 4.5.2 press  And  Press the equal sign key, enter the value for the output resistance, then press [Enter].  The key generator outputs the preset resistance value.
- 4.5.3 Resistive signals do not have positive or negative terminals; select one or two black test leads as needed.

4.6 mV Signal and Thermocouple Graduation Value Output

- 4.6.1 Continuous press  Select the "100 mV voltage signal" option, as well as the thermocouple scale types: K, E, J, T, R, B, S, and N.
- 4.6.2 press ,  And  Set the equalizer; specify that output should be in mV.
- Voltage signal or the individual thermocouple scale values, according to  The key generator outputs a set mV signal or the thermocouple's scale value.
- 4.6.3 For the output thermocouple calibration value: if cold junction compensation is required, insert the cold junction compensation sensor (optional accessory) while the generator is off; after powering on, under the thermocouple calibration operating condition, press the corresponding button.  Press once: the "AUTO" character will appear in the upper-left corner of the display; at this point, the output graduation value has already undergone room-temperature compensation; if room-temperature compensation is not required, press again.  Pressing the "AUTO" key causes the "AUTO" character to disappear, indicating that cold-end compensation has been disabled. When no compensation is applied, the reference temperature for the scale division value is 0°C.

4.6.4 The 4.6 mV signal and the scale division positive signal are output from the red test lead, while the negative signal is output from the black test lead.

4.7 Resistance Temperature Detector (RTD) Graduation Value Output

4.7.1 Continuous press  Select the Pt100, Pt1000, or Cu50 thermistor scale type.

4.7.2 press 、 And  Set the equal keys and configure the output for each thermoelectric element.

Resistance scale division value, according to:  The key generator outputs the specified graduation value of the thermistor.

4.7.3 The RTD graduation value signal does not distinguish between positive and negative terminals; to eliminate lead resistance errors, two black test leads should be used for the RTD graduation value signal.

4.8 Rectangular Wave Signal Generator

4.8.1 Continuous press  The key; above the display, the characters "-F-" and "Hz" are displayed.

4.8.2 press  And  Press the key to set the frequency of the rectangular wave signal generator.  The key generator outputs the configured rectangular wave signal, with a default amplitude of 1 V_{p-p}.

4.8.3 Under the aforementioned conditions, the generator operates as follows:  Press once to display the screen

The upper display shows the "Pu" and "Hz" characters, allowing you to set the output amplitude of the rectangular wave generator.

4.8.4 press  And  Press the button to set the output amplitude of the rectangular wave generator.  The key generator outputs a rectangular wave signal with the set amplitude.

4.8.5 The positive terminal signal of the rectangular wave generator is output from the red test probe, and the negative terminal signal is output from the black test probe.

4.9 Counting Pulse Signal Generator

- 4.9.1 In the operating mode of the rectangular wave signal generator, press:  Press the key once; the "CYCLE" character will appear above the display screen to set the count pulse value.
- 4.9.2 press  Key: Set the count pulse quantity; press.  The key generator outputs the preset pulse quantity.
- 4.9.3 The positive pulse signal is output from the red test lead, while the negative signal is output from the black test lead.

4.10 Collector Open Collector Pulse Signal Generator

- 4.10.1 Continuous press  Keys: The F and SW keys are displayed above the display screen. character 。
- 4.10.2 press  And  Press the button to set the collector open-collector pulse output frequency value.  The key generator outputs a set collector-open pulse signal.
- 4.10.3 The collector is connected to the red test probe, and the emitter is connected to the black test probe. (Transistor polarity: NPN)

4.11 Signal Storage and Retrieval Operation Method

Commonly used signals can be stored in the generator's memory (with the exception of frequency pulse signals); when needed, these signals can be read directly for use. Even after the device is powered off or loses power, the stored information remains permanently preserved, with a maximum capacity of 64 signal entries.

4.11.1 Signal Storage Operation Method

- 4.11.1.1 When the signal is in a normal output state, press:  Press the key once; the "SAVE" character will appear above the display screen. Use this function.  And  Modify the value of "NO." (which can be adjusted between 1 and 64) to indicate that the currently output signal will be saved in the corresponding unit.
- 4.11.1.2 Long press  Hold down the key until the display shows "0" for the set value, indicating that the corresponding signal has been successfully stored. If the selected unit already contains a signal, it will be overwritten.

4.11.2 Signal Reading Operation Method

- 4.11.2.1 The generator does not operate when a pulse frequency signal is applied; press the button.  Press the button once; the "LoAd" character will appear above the display screen.
-  And  Modify the value of "NO.", and the display will show the corresponding signal type and value; press [Enter].  The key generator outputs the corresponding signal.
- 4.11.2.2 need  And  When modifying the value of "NO.", if the display shows the characters "——", it indicates that this unit has no stored signal information.
- 4.11.3: To exit the signal storage and reading operation state, press the following button:  key .

4.12 Method for Rapid Increase or Decrease of Signal Output Values

When the generator is not operating under a pulse frequency signal, it can achieve rapid increasing or decreasing output of the signal value.

- 4.12.1 Regardless of the magnitude of the signal value output by the generator, follow  The key generator immediately outputs the zero-point range value of this signal.
- 4.12.2 Regardless of the magnitude of the signal value output by the generator, follow the instructions.  The key generator immediately outputs the full-scale value of this signal.
- 4.12.3 Regardless of the magnitude of the signal value output by the generator, follow the instructions.  Key event occurred
- The generator will immediately increase the original output value by 25% of the full-scale output range; if this increment exceeds the full-scale range, the generator will output the full-scale value.
- 4.12.4 Regardless of the magnitude of the signal values output by the generator, according to  The key generator immediately reduces the original output value by 25% of the full-scale range; if this reduction exceeds the zero-range limit, the generator will output a zero-range value.

4.13 Method for Fine-Tuning the Signal Output Value Increment/decrement Operations

When the generator is not operating under a pulse frequency signal, it enables fine-tuning of the signal output value to increase or decrease the output.

- 4.13.1 When the generator is operating under normal signal output conditions, press:  Key or 

Press the key to keep the cursor on a specific digit of the set value on the display, indicating that you intend to change the value of that digit.

- 4.13.2 Yes  Key or  When a key is pressed, the value at the position where the cursor is currently positioned will be increased by 1 or decreased by 1, and the set value will undergo carry or borrow operations.
- 4.13.3 During the process of setting the setpoint by +1 or -1, the output signal will also increase or decrease accordingly.

5、 Calibration

- * Calibration environmental conditions: Ambient temperature: 23 ± 5 °C;
Relative humidity: 35% –70% RH
- * Preheating: The generator must be powered on for preheating for more than 20 minutes in a calibrated environment.
- * For a calibration generator, a high-precision digital multimeter with a precision class higher than that of the generator—such as a six-digit half-range high-precision digital multimeter—is required to ensure that the accuracy transfer process meets the output accuracy specifications of the generator.
- * For each signal output setting of the generator, the output accuracy is calibrated using two calibration points: high and low.
- * For the calibration of resistive signals, you may independently select between a 2-wire, 3-wire, or 4-wire wiring configuration based on your specific requirements.

5.1 press  Press the key to enter password modification mode; the corresponding modification field will flash; press the key to proceed.   Key shift; press   Key Modification
Setpoint: Yes  Press the confirm button; if the password is correct, the system will enter the corresponding parameter group; otherwise, it will return to the password verification state. Set the password to "1111"; after confirmation, the instrument will enter the output calibration state.

5.2 Press button     Switch to the desired signal type and setting.

5.3 Press the button for the signal type and range that require calibration.  Key: Cut

Replace the high and low calibration points (H/L) for the corresponding signal type. The flashing indicator:  The prompt is used to indicate the current modified parameters.

5.4 Yes  Press the button to enter the calibration value modification state for the high or low calibration points under the corresponding signal type.

- 5.5 While in the calibration value modification state, press:  Press this key to switch between modifying the DA code value of the current calibration point (upper row of parameters) or modifying the corresponding physical quantity value (lower row of parameters).
- 5.6 Modify the values of the lower row physical quantities: Press "OK"
Use the keys to modify the physical quantity value of the current calibration point. If the set value exceeds the upper or lower limits, the display will automatically switch to showing the upper or lower limit values. When modifying the set value, the display status will be .
- 5.7 Modify the upper DA code value: OK   Key shift; press   The button can be used to modify set values, toggle the modification indicator, or reset the value; these operations can be performed freely within the range of 0–65535.
- 5.8 Press the Output Confirm key  The instrument outputs according to the modified DA code value.
Output the signal. Once the output has stabilized, check whether the measured value displayed on the high-precision digital meter connected to the measurement generator matches the physical quantity value of the current calibration point set in "5.6". Repeat step "5.7" by fine-tuning the DA code value until the output value is as close as possible to the measured display value.
- 5.9 press on  Press the button until the display returns to the calibration parameter menu state (different signal types return to their respective calibration parameter menu states), at which point the calibration parameters for the current calibration point are saved and take effect.
- 5.10 If you wish to abandon the calibration process midway and exit the calibration modification state directly, press:  Press the key. The display will immediately return to the calibration parameters menu state.
- 5.11 In the calibration parameters menu, hold down  Press the button for 2 seconds to return to the normal operation mode.

- * The above signal calibration does not include the calibration of frequency-based signals. The frequency values of frequency-based signals do not require calibration; however, for pulse signals, the pulse amplitude shall be calibrated according to the calibration results obtained using the 10V voltage range.
- * When used as a standard signal source, the generator should generally be calibrated once per year, or in accordance with the relevant regulations of the user organization. The accuracy requirements for the reference standards and measuring instruments used for calibration shall comply with applicable national regulations; if the generator's signal output exceeds the specified tolerance during calibration, please contact your local supplier or manufacturer.

6、fault treatment

Fault phenomenon	Failure cause	Terms of settlement
Unable to power on or experiencing automatic shutdown	Insufficient battery power (not powered by a power adapter)	Replace with 5 new 1.5V AA batteries
	The power adapter plug is not making proper contact with the generator's power adapter socket (when battery power is not being used).	Tighten the power output plug of the power adapter to the power adapter socket of the generator.
The device will automatically shut down when a signal is output.	Insufficient battery power (not powered by a power adapter)	Replace with 5 new 1.5V AA batteries
Meter display "ERROR" marking	Insufficient battery power (not powered by a power adapter)	Replace with 5 new 1.5V AA batteries
Instrument reset or output signal dip	Insufficient battery power (not powered by a power adapter)	Replace with 5 new 1.5V AA batteries
Signal output Intermittence	The test leads have poor contact.	Securely insert the test leads into the test probe clamps, and securely connect the test leads to the output port of the generator.

Note: If the instrument issue cannot be resolved using the above methods, please contact your local supplier or manufacturer promptly.

7、Standard Factory Equipment and Accessories

7.1 Standard Factory Configuration

Standard factory configuration	Model	Quantity
Main engine	Handheld Generator: Multifunctional Process Signal Generator	1
User's guide		1
Test lead (length: 1 meter)	Black	2
	Red	1
Table Pen Clip	Black	2
	Red	1

7.2 Accessories (For Purchase)

Fittings of a machine	Quantity
AC/DC Power Adapter	1
Cold-end sensor	1

8、Maintenance and Quality Assurance

Under normal operating conditions, the generator does not require special maintenance; ensure protection against moisture and static electricity.

For faults caused by product quality issues, the product may be replaced or returned within three months from the date of manufacture; a free warranty is provided for up to 18 months from the date of manufacture; paid maintenance services are available after 18 months; and lifetime repair services are offered.