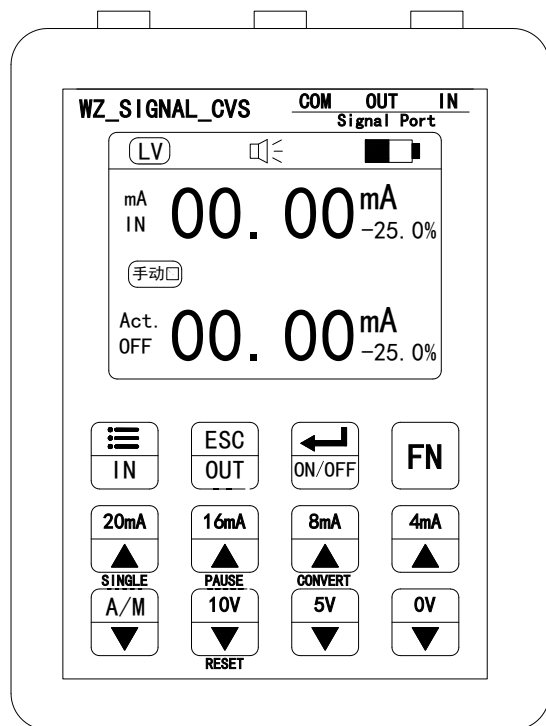


Multifunction Signal Generator

BRT LB03

User Manual



1

BRT LB03 Multifunction signal generator is mainly used for debugging of industrial field PLC, process instrumentation, electric valve, etc. It's easy to use with a friendly English character operation interface. The signal generator is small and light but has a long standby time and high precision.

Technical Parameters

- ◆ Active current output range: 0-24 mA; resolution: 0.01 mA; maximum load: 750Ω
- ◆ Passive current output range: 0-24 mA; resolution: 0.01 mA; external power supply up to 30V
- ◆ Voltage output range: 0-12 V; resolution: 0.01v; maximum current 30mA
- ◆ 24V voltage output: drive current is 24mA.
- ◆ Current input measurement range: 0-24 mA; resolution: 0.01 mA; input impedance:100Ω
- ◆ Voltage input measurement range: 0-30 V; resolution: 0.01 V; input impedance: 2.5 MΩ
- ◆ A single 3.7V lithium battery power supply; the battery life time varies based on the usage (max. about 8-10 hours with 20mA continuous output).
- ◆ Operating environment: 0 °C - 50 °C.
- ◆ USB port power supply and battery recharging.
- ◆ Internal polarity reverse connection and over current protection; protection voltage:30V
- ◆ Automatically output mode is available
- ◆ Size: 90mm*70mm*29mm

2. Operation Panel

(1) Panel indication

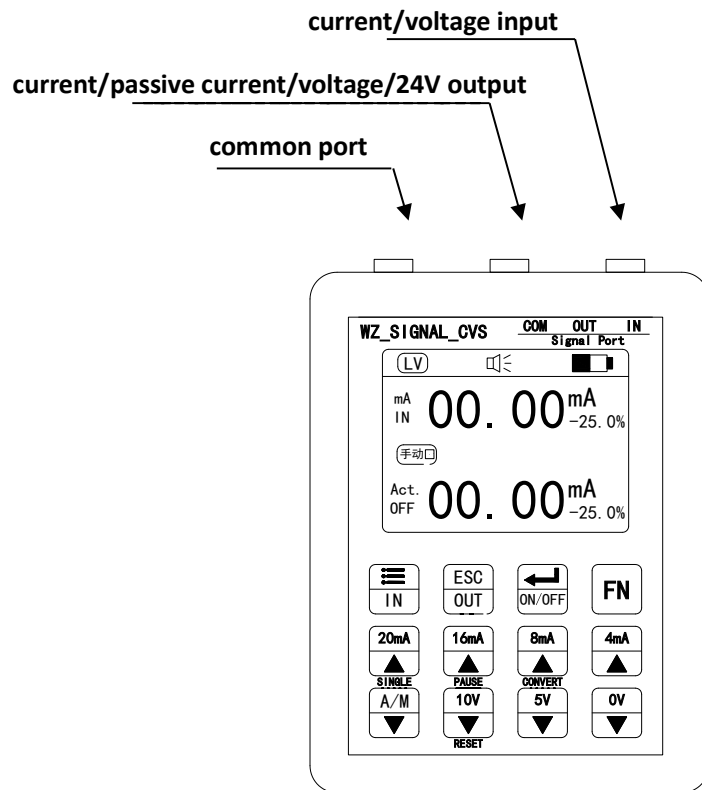


Figure 1

(2) Key Function



parameter setting/cursor movement (valid in the setting parameter interface)/input signal type switching



cancellation (valid in the setting parameter interface)/output type switching



confirmation (valid in the setting parameter interface)/output ON/OFF



shift key, using for combination keys



increase the value



decrease the value

[SINGLE]: single time; [PAUSE]: pause; [CONVERT]: convert; [RESET]: reset

(3) How to use the shift key (FN)

Combination keys will bring a lot of convenience to the user when debugging. Here's how to use combination keys.

Press the "FN" button on the keyboard, the "Shift" symbol on the right side of the screen will be displayed;

FN + X X X: indicates that press "FN" once and then release it, next press other key buttons.

FN & X X X: indicates that press and hold "FN" while holding down other key buttons.

◆ FN + "4mA / 8mA / 16mA / 20mA" button: the shortcut keys for outputting active current 4mA/8mA/16mA/20mA.

◆ FN + "0V/5V/10V" button: the shortcut key for outputting voltage 0V/5V/10V.

◆ FN + "A/M" button: manual/automatic switching.

◆ FN + "20mA" button: indicates a single run in the automatic function (run only once)

◆ FN + "16mA" button: indicates output pause function in the automatic mode

◆ FN + "10V" button: indicates output reset function in the automatic mode

◆ FN + "IN" button: Enter the system settings, user can set parameters in the menu.

◆ FN & "ON/OFF" button: switch between single and dual interfaces.

◆ FN & "8mA" button: switch VC (conversion function between volt and current)

3. Operating interface and instructions

(1) Operating interface

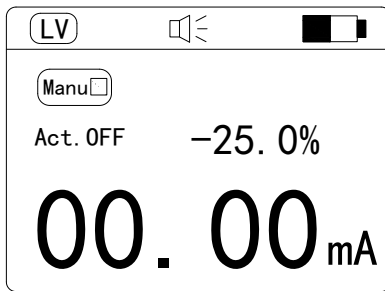


Figure 2

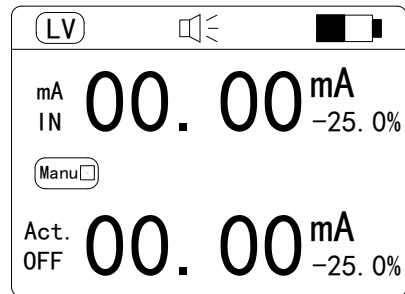


Figure 3

◆ **LV/HV**: indicates low voltage/ high voltage; LV means low voltage and HV is high voltage. This function can be switched in the “Voltage HL Settings” menu in the “System Settings” interface.

◆  : Buzzer Indication; the buzzer is on when this icon lights up. This function can be switched in the “Buzzer Settings” menu in the “System Settings” interface.

◆  : Battery Indicator

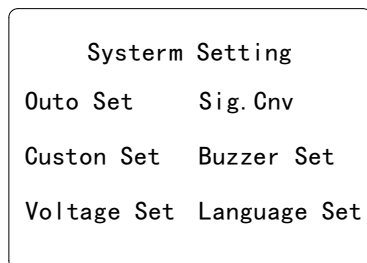


Figure 4

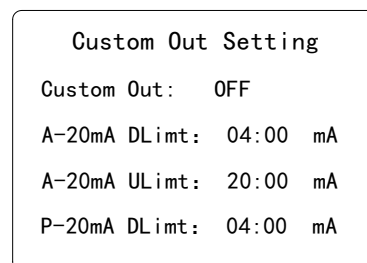


Figure 5

◆ **System Settings**: Figure 4 shows the main menu of system setting. Press the “FN” button in the single/dual interface, the “Shift” will be displayed, and then press the “Set” button to enter into Figure 4. In the main menu, user can set the related functions. When user needs to move the cursor, press the “Set” button; When the cursor moves to the corresponding position, press the “Confirm” button to enter into the setting.

Take "custom parameter settings" as an example (Figure 5):

Enter into “Custom Settings”, press “Confirm” button, move the cursor to the setting parameter, press “plus/minus” button to modify the parameters. After completing the modification, press “Cancel” or “Confirm” button, “Do you confirm to change?” will appear on the screen. And then press the "Setting" button to move the cursor, select "Yes" or "No", and then press the "Confirm" button to save or not save the settings.

(2) Output / Input interface

◆ **Signal Output Interface**: Press **[OUT]** to select output signal type, then press **[ON/OFF]** output switch, the meter can output the pre-set output value.

There are four prompts on the output interface: “Manual/Auto”, “VCA/VCP/CV Transform”, “Custom”, “FN”; when the corresponding function is valid, it is highlighted, otherwise it is gray.

◆ **Signal Input Interface**: Press **[IN]** to select input signal type, when the meter detects a current or voltage input, the matched parameter is highlighted, otherwise it is gray, indicating there's no input signal.

(3) Single/Dual interface

For the convenience of users, it can be switched between the single and dual interface. FN & “ON/OFF” button: switch between single and dual interfaces.

◆ single interface

Only one input or output interface (as shown in Figure 2) can be displayed. The purpose is to increase the font size for user debugging.

◆ dual interface

Simultaneous display of the input and output interfaces (as shown in Figure 3), suitable for applications where input and output are required, such as regulating valves and some special applications.

4. Function Introduction

(1) Customize setting

In order to facilitate on-site debugging, the upper and lower limits of the output signal can be set according to the requirements of the equipment. The active 4-20mA output upper and lower limits, passive 4-20mA output upper and lower limits, and 0-12V output upper and lower limits can be set separately, and this function can be freely set on and off for field application.

Refer to the previous "System Setting" operation to enter into the custom settings menu to set the relevant parameters. The meaning of each parameter is as follows (*Press **[IN]** select main menu, **[ON/OFF]** select sub-menu):

- ◆ Custom Out: turn on or off customized output function
- ◆ A-20mA DLimit: the allowable output lower limit value
- ◆ A-20mA ULimit: the allowable output upper limit value
- ◆ P-20mA DLimit: the allowable output lower limit value
- ◆ P-20mA ULimit: the allowable output upper limit value
- ◆ 0-12V DLimit: the allowable output lower limit value
- ◆ 0-12V ULimit: the allowable output upper limit value

(2) Automatic Output

This function can automatically change the output mode according to the program. It can be automatically output only by setting the parameters, which is used for aging and automatic testing of valves and other equipments.

This function consists of the following parts: automatic mode, cycle number, initial value, incremental value, decrement value, incremental time, decrement time, starting point delay, endpoint delay, and end value. For active current, passive current, and voltage output, there are separate setting parameters to facilitate the setting of various output signals.

Refer to the previous "System Setting" operation to enter into the automatic setting menu, user can set the active current, passive current and voltage output respectively. The meaning of each parameter is as follows:

- ◆ Auto. Mode: There are three modes: cycling, rising and descent modes
- ◆ Cycle T: The number of cycles to test (when the number is 0, it outputs unlimitedly)

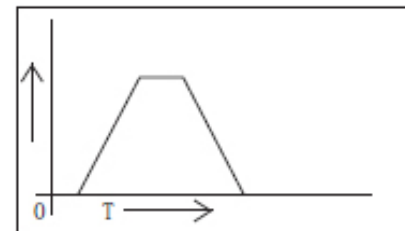
- ◆ Initial: the starting value of the test output
- ◆ INC. Value: automatic incremental step value
- ◆ DEC. Value: automatic decrement step value
- ◆ INC. Time: interval between increments
- ◆ DEC. Time: the interval between reductions
- ◆ S. Delay: Starting point Delay: starting point output retention time
- ◆ E. Delay: Endpoint Delay: endpoint output retention time
- ◆ E. Value: endpoint Value: the ending output value of the test

After completing the setting, return to the main interface, light up the "FN" button, press the "Auto" button to enter the automatic mode, press the "Switch" button to turn on the automatic output.

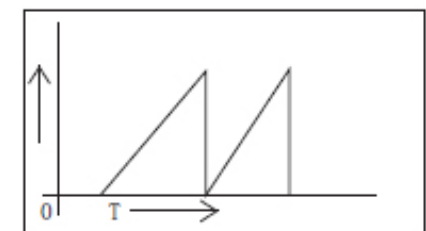
- ◆ FN+ "20mA" button: single run (run only once)
- ◆ FN+ "16mA" button: output pause
- ◆ FN+ "10V" button: output reset

(* Press **[IN]** select main menu, **[ON/OFF]** select sub-menu)

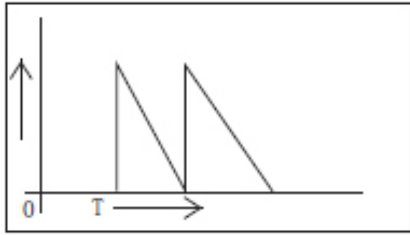
Special output waveform time series can be obtained through parameters.



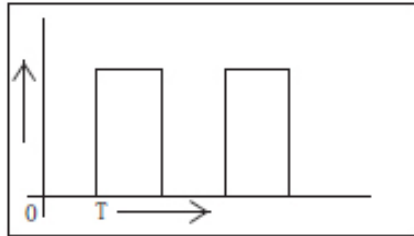
Normal Output Time Series



Rising Sawtooth



Descent Sawtooth Wave



Square Wave Output Time Series

Take the rising sawtooth wave as an example:

Set the decrement value, endpoint value to get the same value. For example, the starting value is 4mA and the endpoint value is 20mA. In this case, user only needs to set the decrement value to 16, so that it can be reduced to 0 to get sawtooth output.

If you need other waveforms, you can set them yourself by referring to the sawtooth setting method.

(3) VC Conversion

This function is mainly used for some temporary voltage and current conversion, such as converting 0-10V input to 4-20mA output.

VC active conversion: converts the voltage signal input into an active current signal output

VC passive conversion: converts the voltage signal input into a passive current signal output

CV conversion: converts the current input signal into a voltage signal output

The function rules consist of several parts: VC conversion switch, conversion mode, voltage upper limit, voltage lower limit, current upper limit, current lower limit, and over range.

Refer to the previous "System Setting" operation to enter into the VC conversion setting menu to set the relevant parameters. The meaning of each parameter is as follows:

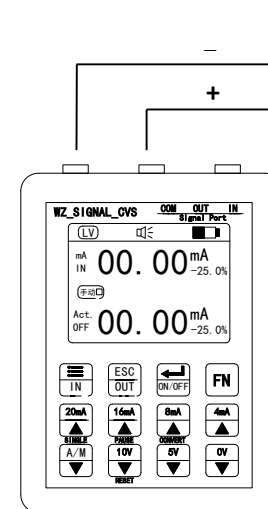
- ◆ VC Con.: conversion switch, in the main interface, user can also use the shortcut to switch (FN & "8mA" button)
- ◆ Con. Mode: conversion modes: VC active conversion, VC passive conversion and CV conversion;
- ◆ V ULimt.: Upper Voltage Limit: the upper limit of the input voltage or the upper limit of the output voltage

- ◆ V DLimt.: lower limit of input voltage or lower limit of output voltage
- ◆ mA ULimt: the upper limit of the input current or the upper limit of the output current
- ◆ mA DLimt: lower limit of input current or lower limit of output current
- ◆ Over ran.: Over range, If the input signal is set to be 4-20mA, the output signal is 1-5V, when the over-range is off and the input signal is less than 4mA, the output is still 1V; when the over-range is on, the output still varies with the input change. But it will not exceed the limit value of the output. For example, if the voltage output exceeds the limit by 12V, the output will still be 12V.

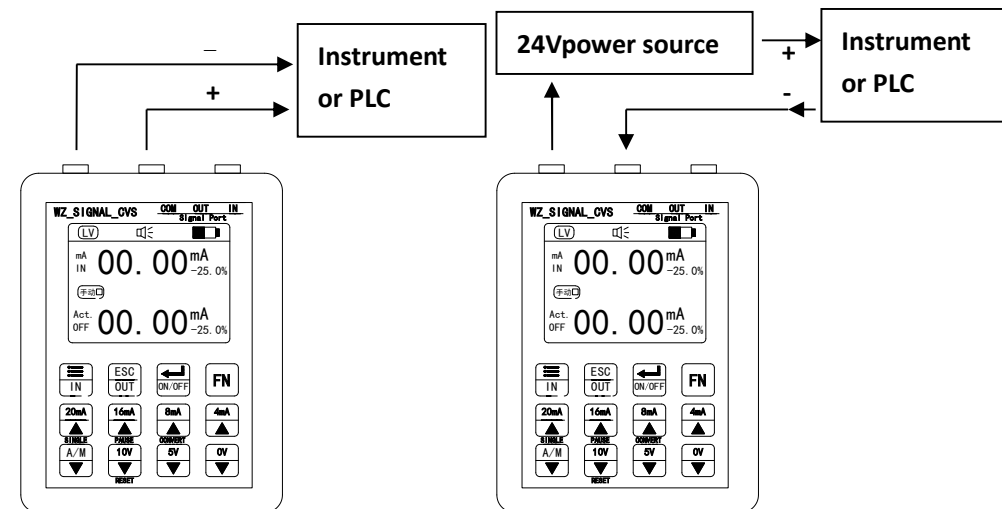
(* Press [IN] select main menu, then press [ON/OFF] select sub-menu.)

5. Referential Wiring Circuits

(1) active two-wire output wiring



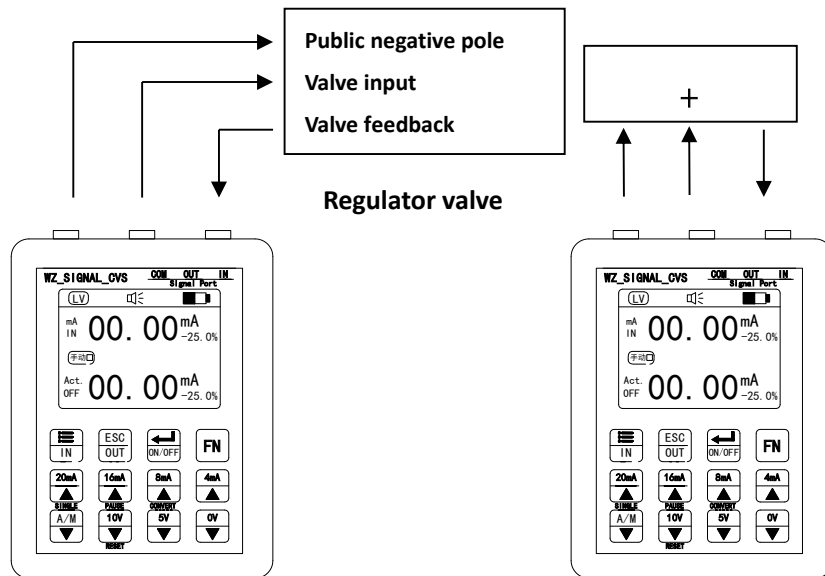
(2) Passive current output two-wire



◆ **Signal Output:** Press [OUT] button to change output signal type alternatively to select the output signal type: Active, Passive, 24V, Voltage, or press FN + "4mA / 8mA / 16mA / 20mA", then press [ON/OFF] button to enable output.

◆ **Signal Input:** Press [IN] button to change input signal type alternatively to select the input signal type: current signal, voltage signal, then input signal to measure.

(3) adjusting valve connection method (4) three-wire sensor testing method



The fourth method is to use the 24V output of the instrument to supply power to the sensor and simultaneously measure the signal output from the sensor. But do note that the operating current of the sensor should not exceed 24 mA, otherwise it may cause insufficient power issue.

6. Battery recharging notice

In the power-on state, plug in the **5V 1A(500mA)** USB charger, the generator is powered by the charger, can be used for a long time, and the signal generator will be recharged simultaneously. When the power is off, plug in the 5V USB charger to charge the battery. Make sure that the charger's output current is NOT higher than or equal to 1000mA.

* The user manual is subject to change without notice. If technical support required,

Warnings:

- * **DO NOT** recharging battery or use the generator in high temperature conditions; do not use or charge it for a long time without being guarded!
- * **DO NOT Run out of battery.** Recharge the battery before automatic power off.
- * **DO NOT use Quick Charger** to recharge battery, it may cause permanent damage due to sudden high voltage or current.
- * The generator USB port charging voltage is DC5V, please do not use a charger with higher than 5.5V voltage to recharge battery, it may cause instrument failure or accident!
- * This instrument is mainly designed to do debugging test. It can be used for PLC signal debugging and calibration, process instrument debugging, valve positioning test calibration, but is NOT suitable for high-precision instrument calibration. Please use it in suitable applications!
- * Any damages or other problems caused by improper operation or not following the instrument manual, we do not provide quality warranty service.