# Programmable 0-5V/10V Voltage Signal Generator Simulator

# BRT 510SG1

**Main Features**

- 0.5% accuracy grade, high linearity output.
- Using long life span pressing buttons, user can use pressing button to set it.
- Have two types of adjusting mode: rough adjustment and fine adjustment.
- Programmable output, output range can be set into 0-3.3V, 0-5V, 2-10V, 0-10V.
- LED display is settable among current signal value display, 0-100.0 percentage display, etc.
- Min. Changing step can be 0.01V
- 4 digits 0.4-inch clear LED display, standard panel-mounted package.
- 4 Pin pluggable wiring terminal blocks, easy to do wire connection.
- Output has short-circuited protection functions.
- Have polarity reverse connection protection circuit in power supply terminals.
- Digital encoder used, long durability, strong anti-interference capability.

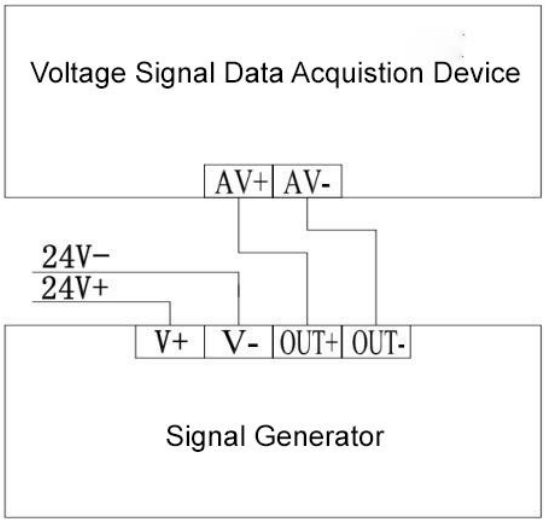
**Technical Parameters**

| Terms | Typical Value |
|---|---|
| **Output current** | 0-3.3V, 0-5V, 2-10V, 0-10V, switchable via buttons |
| **Operating power supply** | 15-28VDC, 1.5W. **24VDC** power supply recommended. |
| **Output Load Capacity** | Max. 20mA |
| **Output accuracy** | 0.01V |
| **Adjusting accuracy** | 0.01V |
| **LED Scree size** | 4 digits, 0.4inch LED tube |
| **LED display** | current signal value display, 0-100.0 percentage display, 0-50Hz display, programmable. |
| **Output adjustment** | Fine adjustment or rough adjustment (default), programmable. |
| **Externa shell size** | 80x42x40mm |
| **Panel cut-out size** | 77x40mm (panel thickness >1.4mm) |
| **Operating temperature range** | -20℃ to +60℃ |
| **Storage temperature** | -20℃ to +80℃ |
| **Humidity** | 85% R.H. Non condensation |

**Wiring Terminal Definition** (*Codes printed on the rear cover)

| Terminal Code | Description |
|---|---|
| **V+** | 15-28V operating power supply GND- |
| **V-** | 15-28V operating power supply + |
| **OUT+** | Signal output + |
| **OUT-** | Signal output GND- |

**Referential Application Circuit**




**Parameters Configuration Operation Instruction:**

**1. Buttons function definition**

**[OK]** : Press the knob, Confirmation function.

**[+]** : Press the button to increase the value

**[-]** : Press the button to decrease the value

**Password + - - + :** Pressing + button, then press – button twice, next press + button, user can enter F002 parameters setting mode.

**Password + - + - :** Pressing + button, then press – button, next press + button, last press – button, user can enter F100 parameters setting mode.

**Password - + - + :** Pressing - button, then press + button twice, next press - button, last press + button, user can enter F200 parameters setting mode.

2. **Save Parameters Setting:** In normally status, short press down the [OK] button, it can save the output value setting, LED screen displays "...", it indicates save it successfully, and user can use it directly next time. In signal calibration process, the parameters will not be saved, if user has not pressed [OK] button.

**3. Parameters setting:**

3.1 In normally operating status, long press the knob for 2 seconds to make the signal generator enter into parameters setting status, the LED screen display F001 (Referential code: 001). Then press [OK] button, User can set output mode: Coarse adjustment, fine adjustment, fast output and automatic voltage signal output in curves mode (Refer to Referential code table 1.1 below).

3.2 Then user needs to enter password: "**+ - - +**" press the [+] and [–] buttons to enter the password, then press [OK] button to enter F002 parameters code.

3.3 When the referential code (e.g.: F002, F003...) is displayed in LED screen, press the [OK] button to enter into parameters setting status, then press [+], [-] buttons to change the parameter value into the value you need (refer to table 1.1).

**4. Referential Code Definition (Table 1.1)**

| Referential code | Parameters Setting | Value Description | Default factory setting value |
|---|---|---|---|
| **F001** | Signal output modes setting | 0: Coarse/Rough adjustment (set parameters in F004).<br>1: Fine adjustment (set parameters in F005).<br>2: Fast output points (Needs to set it refer Table1.2).<br>3: Automatic signal output in curves mode (Need to set F200, refer to Table 1.3). | 0 |
| **F002** | Output range | 0: 0-10V<br>1: 0-5V<br>2: 0-3.3V<br>3: 2-10V | 0 |
| **F003** | Display mode | 0: Actual voltage signal value display<br>1: 0-100.0 percentage display<br>2: 0-50.0Hz display | 0 |
| **F004** | Add or subtract value in rough adjustment per pulse | 1 to 50: the output value changing step for each pulse. No decimal points. Press the button once equals 10 pulses. Can be ten times 10 x (1 to 50). | 1 |
| **F005** | Add or subtract value in fine adjustment per pulse | 1 to 50: the output value changing step for each pulse. No decimal points. Press the button once equals 10 pulses (1 to 50). | 1 |
| **F006** | None | No functions | ----- |
| **F007** | 0.1V output accuracy calibration | -999 to +999, 0.1V ±1V. NOT recommend to change this value, if it must be changed, user must have a precision multimeter. | 0 |
| **F008** | 10V output accuracy calibration | -999 to +999, 10V ±1V. NOT recommend to change this value, if it must be changed, user must have a precision multimeter. | 0 |
| **F009** | Product version code | Only for internal reference | |

4.1 Press the [OK] button to save the parameters which have been set and exit current referential code setting status. Then the signal generator will display next referential code (e.g.: F003). If user has not entered the password "**+--+**" correctly, the signal generator will be returned into normally operating status after setting and changing the parameters of referential code F001.

4.2 Referential code F004, F005 setting methods are the same to that above (refer to table 1.1).

4.3 Press the [+] button till the LED screen displays **FEnd**, then press the [OK] to complete the parameters setting and return to normally operating status.

4.4 In parameters setting procedures, if there are no any actions taken, the signal generator will exit parameters setting status and return to normally operating status.

**5.Referential Code Table F100 (Table 1.2)**

**After setting the F001 Code, user needs to enter password + - + - :** Pressing + button, then press – button, next press + button, last press – button, user can enter F100 parameters setting mode.

| Code | Description | Code value description | Default setting |
|---|---|---|---|
| **F100** | The amount of fast output point | 0: Disable fast output<br>2-9: two to nine fast output points | 0 |
| **F101 …. F109** | The voltage signal output value for the nine fast output points | Value range: 0-10V, set the value for each output point | |

**6.Referential Code Table F200 (Table 1.3)**

**After setting the F001 Code, user needs to enter Password - + - + :** Pressing - button, then press + button twice, next press - button, last press + button, user can enter F200 parameters setting mode.

| Code | Description | Code value description | Default setting |
|---|---|---|---|
| **F200** | The amount of voltage signal output curves | 0: Disable curves output mode function<br>1-9: The amount of output curve segment | 0 |
| **Ft01** | The first curve segment time | 0-999 (seconds) | |
| **FA01** | The first curve segment starting volt. value | 0.00 -10.00V | |
| **Fb01** | The first curve segment ending volt. value | 0.00 -10.00V | |
| **Ft02** | The second curve segment time | | |
| **….** | …. | …. | |
| **Fb09** | The nineth curve segment ending volt. value | 0.00 -10.00V | |

**Notes**

1.Please disconnect the power supply firstly, then connect the wires.

2.Please use it by following the rated parameters in the user manual, otherwise it may cause permanent damages.

## Example#1: Calibrate F008 – 10V output accuracy

***User needs to adjust BRT 510SG1 signal generator to make it displays 10.00V firstly and connect the multimeter to BRT 510SG1 signal generator output terminal, then do following steps:**

Figure 1→2: Press the [OK] button for 2 Seconds till it displays “F001”;

Figure 2→4: Input Password "+ - - +" (refer to Password definition above), display "+--+";

Figure 3→5: Press down button [OK], if password is right, display "F002", otherwise displays "Err" and exit;

Figure 4→6: Press [+] button till it displays "F008";

Figure 5→7: Press down the button [OK] to set parameters of "F008", and then modify the value to make its actual output equals to 10.00V (a high precision multimeter required); (Connect the multimeter to BRT 510SG1 signal generator output terminal, press [+] [-] buttons till the multimeter displays 10.00V accurately.)

Figure 6→ : Press down [OK] to save the setting, or automatically save if no operation for more than 10 Seconds;

Figure 7→: 10V output accuracy calibration completed.

*Specification is subject to change without notice. More information, please visit: www.brightwinelectronics.com