# Intelligent Panel-mounted 0-+/-10V Signal Generator Controller

## BRT 10VG-M6

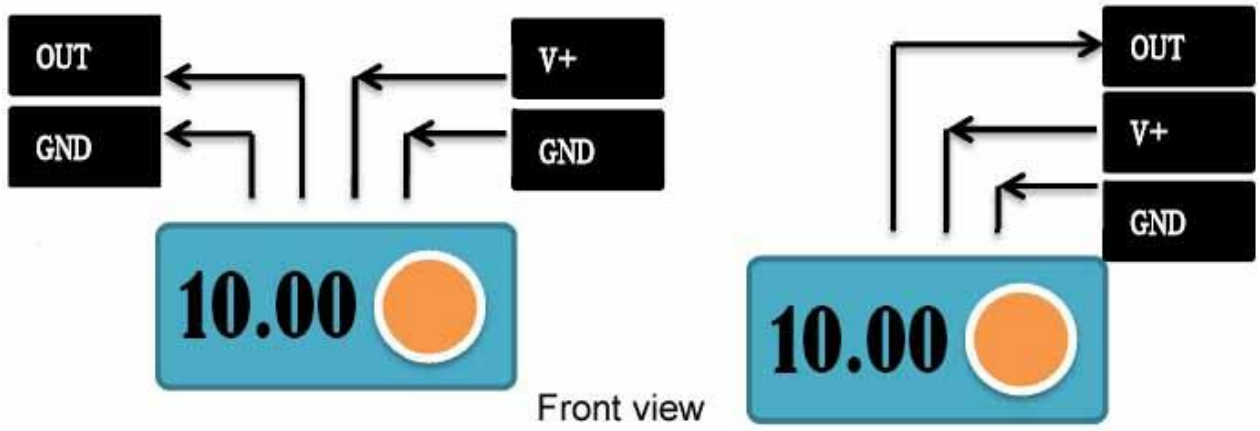
### Main Features

- Stable and steady output: 0.1mV fluctuation, very low ripple output.
- Have much better performance if add some capacitor in output terminal (connect it in right polarity).
- Multiple output: ±10.00V/±5.00V or 0-10.00V/2-10.00V/0-1.00V, etc.
- Single output can be 0V to 1V, it is ideal to used it in small signal application.
- Digital encoder used, high precision output adjustment.
- Have fine and coarse adjustment setting, max, adjusting turns can be 1-100 turns.
- 4 digits LED display, 0.01V changing steps.
- Have automatic parameters setting saving function in case of power off.

### Technical Parameters

| | |
|---|---|
| **Output** | Max. range -10V to +10VDC. (0-5V,0-1V, 0-10V, -5V-+5V settable) |
| **Max. output load current** | 20mA |
| **Output accuracy** | 0.01V |
| **Operating power supply** | DC7-28V, 5Watt. (*NOT recommend using 10V power from the inverter) |
| **Encoder pulse** | Rotate one turn 20 x pulses |
| **LED display** | 4 digits, 0.4 inch |
| **Front view size** | 79.5x42x24 mm (L x H x D) |
| **Panel cut-out size** | 77x40mm (+/-1mm error), panel height 1.4mm recommended |
| **Operating temperature** | -10 ℃ to +50 ℃ TYP |
| **Storage temperature** | -20 ℃ to +60 ℃ TYP |
| **Humidity** | 85% R.H. non-condensation |

### Wiring Drawing



## Wiring Terminals Definition


Backside View

| Terminal code | Description |
|---|---|
| **G** | Power supply - |
| **V+** | Power supply + |
| **OUT** | Output + |
| **G** | Output - |

## Parameters Configuration Operation Instruction

**1. Knob function definition**

**[Confirm/OK]** : Press the knob

**[+/Add]** : Rotate the knob in clockwise direction

**[-/Subtract]** : Rotate the knob in counter-clockwise direction

**Password + - - + :** Rotate the knob in **clockwise** direction **once**, then rotate the knob in **counter-clockwise** direction **twice**, next rotate the knob in **clockwise** direction **once**.

***F001, F002....F008**: Referential code, refer to ***Function Code Definition Table 1.1*** below.

**2. Save output value parameters setting:** Please refer to function code **F004** to set it.

**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: F001, refer to the Table 1.1 below).

3.2 Rotate the knob, next enter password: "**+ - - +**", user can change referential code from F001 to F002 and next referential code. (When entering into F002 referential code, please enter password: "**+ - - +**" rotate the knob to enter that password, refer to password above.)

3.3 When the referential code F002 (e.g.: F002, F003...) is displayed in LED screen, next press down the knob to enter into parameters changing status, then rotate the knob to change the parameter value to the value you need *(refer to table 1.1)*.

3.4 Press the knob 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 "**+--+**" when enter into F002 setting, the signal generator will be returned back into normally operating status after setting and changing the parameters of referential code F001.

3.5 Referential code F004, F005....F008 setting methods are the same to that above (refer to table 1.1).

3.6 Rotate the knob till the LED screen displays last referential code, then press the knob to complete the parameters setting and return to normally operating status.

3.7 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.

**Function Code Definition Table (Table 1.1)**

| Referential code | Parameters Setting | Value Description | Default factory setting value |
|---|---|---|---|
| **F001** | Fine or Coarse tuning | 0: Rough/Coarse tuning, refer to F002 to set adding /subtracting values.<br>1: Fine tuning, refer to F003 to set adding /subtracting values. | 0 |
| **F002** | Coarse adjustment adjusting steps times | 1 – 100(x10) | 1 |
| **F003** | Fine adjustment adjusting step times | 1 – 100 | 1 |
| **F004** | Pressing down knob functions | 0: Manually save the output value (save the current output signal value for next startup.)<br>1: Quickly switching among fine tuning and coarse tuning mode<br>2: Output signal ON/OFF<br>3: Quickly return to the minimum value<br>(If set value into 1, 2, 3, the signal output value is saved automatically in 3 seconds if there is no any knob tunning.) | 1 |
| **F005** | Output range | 0: 0 to +/-10V; 1: 0 to +/-5V; 2: 0-10V;<br>3: 2-10V; 4: 0-5V; 5: 1-5V; 6:0-3.3V;<br>7: 0-2.5V 8: 0-1V; 9: -10V -0V | 0 |
| **F006** | User-defined maximum output value | -10V to 10V | 0 |
| **F007** | User-defined minimum output value | -10V to 10V | 10.00 |
| **F008** | Display mode | 0: voltage value display 1: 0-100.0 percentage display 2: 0-50Hz display<br>3: 0-90 4: 0-100<br>5: 0-200 6: 0-400 7: 0-600 8: 0-1000<br>9: 0-1300 10: 0-1500 11: 0-2000<br>12: 0-2500 -1: User defined value | 0 |
| **F009** | User-defined maximum display value | -1999 to 9999, set decimal point in F011 | 0 |
| **F010** | User-defined minimum display value | -1999 to 9999, set decimal point in F011 | 1000 |
| **F011** | Decimal point setting | 0-4 0/1: none 2: 999.9 3: 99.99<br>4: 9.999 | 3 |
| **F012** | LED luminance level adjustment | 0---7 (dark to light) | 3 |
| **F013** | -10V Output calibration | -99 to +99 , not recommend change that value. if it must be changed, that function is only for internal reference. | |

| | | | |
|---|---|---|---|
| **F014** | 0V Output calibration | -99 to +99 , not recommend change that value. if it must be changed, that function is only for internal reference. | |
| **F015** | +10V Output calibration | -99 to +99 , not recommend change that value. if it must be changed, that function is only for internal reference. | |
| **F200** | Automatic curves mode output | 0: automatic cycling 1: Curves mode runs one when power on, then outputs 0V, press down knob again, curves mode runs again.<br>2: Curves mode runs one when power on, then outputs the last curve, press down knob again, curves mode runs again.<br>3: Same as value 1 above, but not run when power on.<br>4: Same as value 2 above, but not run when power on. | 0 |
| **F201** | Curves amount | 0: No curves 1-9: amount of curve | 0 |
| **Ft01** | The first curve starting time | 0-999 seconds (The value depends on F201 amount of curve) | |
| **FA01** | The first curve starting voltage value | -10.00 to 10.00V | |
| **Fb01** | The first curve ending voltage value | -10.00 to 10.00V | |
| **Ft02** | The second curve starting time | 0-999 seconds | |
| **….** | …. | …. | …. |
| **Fb09** | The 9th curve ending voltage value | -10.00 to 10.00V | |

* When entering into F002 parameters setting status, user must rotate the knob to enter password: **+ - - +**

**Table 1.1**

**4. The example of knob turns setting and calculation:**

Examples of number of turns calculated: Knob encoder 20 grids per turn

| Setting example | F001 | F002 | F003 | Description |
|---|---|---|---|---|
| 0-10V shows 0-10.00, and the knob is adjusted for 1 turn | **0** | **5** | x | Set coarse tuning 5, with a grid change of 0.5V |
| 0-10V shows 0-10.00, and the knob is adjusted for 50 turns | **1** | x | **1** | Set fine tuning 1, with a grid change of 0.01V |
| 0-5V shows 0-5.00, and the knob is adjusted for 5 turns | **1** | x | **5** | Set fine tuning 5, with a grid change of 0.05V |

**5. Examples of Accuracy Calibration**

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.

3. A high precision multimeter needed when doing output 0V, -10V, +10V precision calibration.
4. Rotate the knob in one turn (360 degree): 20 pulses, rotate once, one pulse.
5. Fine adjustment from -10V to 10V: max. 100 turns.

## Parameters Configuration Examples:

### Example #1: Modify F001 Fine/Coarse Adjustment

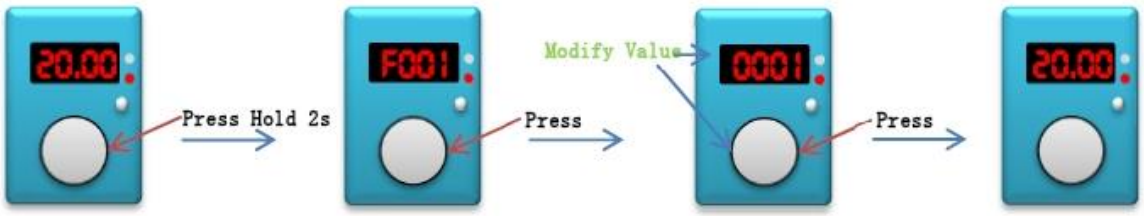



Figure 1→2:Press And Hold The Knob 2 Seconds To Display “F001”;
Figure 2→3:Press“OK”, Set The Value Of ”F001”, Rotate The Knob To Change The Value;
Figure 3→4:Press“OK”,Exit The Setting State And Enter The Normal Adjustment Mode;

### Example#2: F013 -10V Output Accuracy Calibration

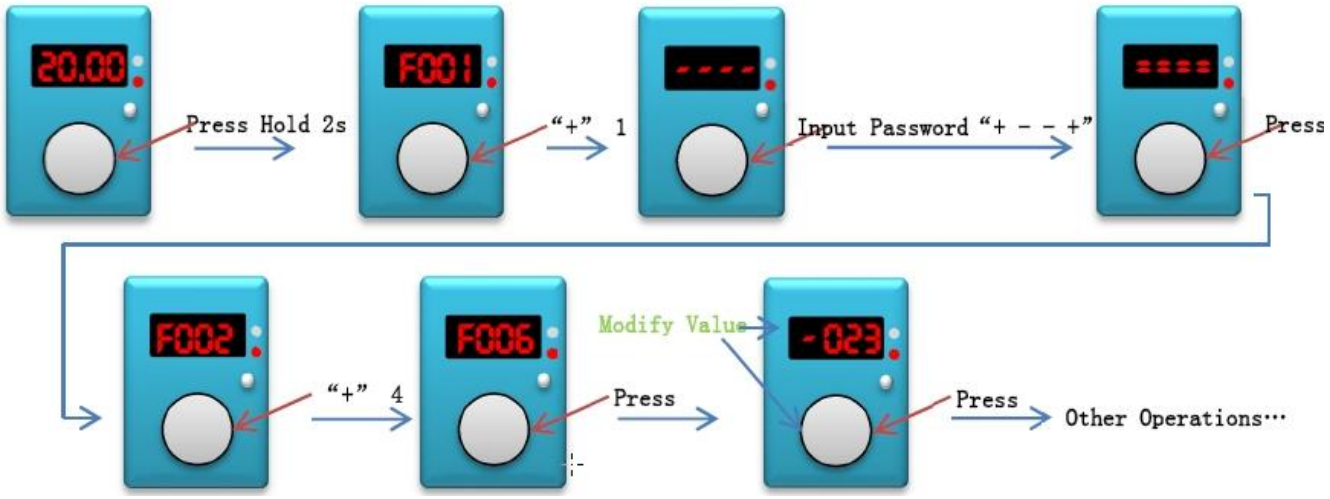



Figure 1→2: Press and hold the knob for 2 Seconds till it displays “F001”.
Figure 2→3: Rotate knob "+" clockwise one Pulse, Display "- - - -".
Figure 3→4: Input Password "+ - - +" (refer to Password definition above), display "+--+";
Figure 4→5: Press down knob "OK", If password is right, display "F002", otherwise displays "Err" and exit.
Figure 5→6: Rotate the Knob till it displays "F013".
Figure 6→7: Press down the knob "OK" to set parameters of "F013", and then modify the value to make its actual output equals to -10V (a high precision multimeter required); (*Connect the multimeter to BRT 10VG-M6 signal generator output terminals OUT, GND, rotate the knob till the multimeter displays -10V accurately.)
Figure 7→ : Press down “OK” to save the setting, or automatically save if no operation for more than 10 Seconds.

## 6. Examples of automatic curves output setting (*F200 Code Setting requires Password: - + - +)

6.1 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: F001).

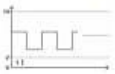
6.2 Rotate the knob, enter password: "- + - +", user can change referential code from [**F001**] to [**F200**] and next referential code. (*When entering into [F200] referential code, please enter password: "- + - +" rotate the knob to enter that password.)

6.3 Then set code F200 value (Refer to ***Function Code Definition Table 1.1 above***).

6.4 Set the curve working time, starting current value, ending current value for each section.
**Ftxx** ---- refers to time setting, 1-999 seconds.
**FAxx** ---- refers to staring current value.
**Fbxx** ---- refers to ending current value.

6.5 Last return back to Code F001, and set **F001** code value into **2**, then the signal automatically output mode has been turned on. The signal generator has been set into automatically output mode.
* Turn off / Disable the automatically output mode: Set Code **F001** value into **0** or **1**

Step 1. Set F200 curve run mode;
Step 2. Set F201 = number of sections, with a maximum of 9 sections, and automatically change the cycle output for aging TEST products. . ;
Step 3、setting each section: FtXX= time 1-999 sec/FAXX= start voltage/FbXX= end voltage;
Step 4、 finally setting F001=2, switching from manual tuning mode to automatic curve output mode;
Turn off automatic loop output mode: F001=0 or 1;

| Example of waveform | Mode | Number of sections | Section 1 | Section 2 | Section 3 | Section 4 | . . . | |
|---|---|---|---|---|---|---|---|---|
| Triangular wave  | F200 = 0 | F201 = 2 | Ft01 = 10<br>FA01 = 2.00<br>Fb01=9. 00 | Ft02=10<br>FA02=9. 00<br>Fb02=2. 00 | | | | |
| Square wave  | F200 = 0 | F201 = 2 | Ft01 = 10<br>FA01 = 6.00<br>Fb01=6. 00 | Ft02=10<br>FA02=3. 00<br>Fb02=3. 00 | | | | |
| Sine wave  | F200 = 0 | F201 = 6 | Ft01 = 4<br>FA01 = 3.00<br>Fb01=5. 00 | Ft02=3<br>FA02=5. 00<br>Fb02=6. 00 | Ft03=3<br>FA03=6. 00<br>Fb03=5. 00 | Ft01 = 4<br>FA01 = 5.00<br>Fb01=3. 00 | Ft01=3<br>FA01 = 3.00<br>Fb01=2. 00 | Ft01=3<br>FA01 = 2.00<br>Fb01=3. 00 |

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