

## Programmable 4-20mA Current Signal Generator Simulator

### BRT 420G-HM3

BRT 420G-HM3 4-20mA Current source generator is a low error, high accuracy stable current signal calibration meter, it designed by following industrial standards. Inside the signal generator, there are large power MOS tube, high precision power chips, high speed CPU IC, precision AD chips, current loop circuits, all these make that signal generator much more stable and accurately.

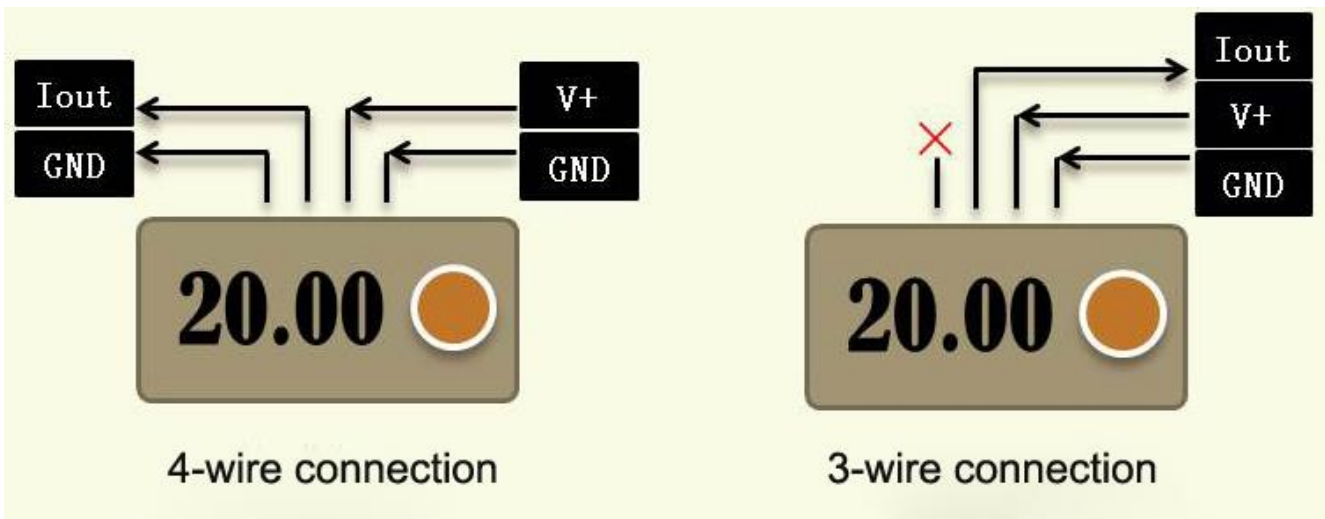
#### Main Features

- 0.5% accuracy grade, high linearity output.
- Using long life span encoder with stepless knob, can rotate and press it.
- Have two types of adjusting mode: rough adjustment and fine adjustment.
- Fine adjustment can be 0.01mA/pulse, rough adjustment can be 5mA/pulse.
- Programmable output, output range can be set into 0-20mA, 4-20mA, 0-22mA
- LED display is settable among current signal value display, 0-100.0 percentage display, etc.
- Min. Changing step can be 0.01mA (the last digit plus or minus 1)
- 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	4-20mA, 0-20mA, 0 - 22mA, 0-24mA
Operating power supply	15-30VDC, 1W. <b>24VDC</b> power supply recommended.
Sampling resistance	10 $\Omega$ to 500 $\Omega$
Output accuracy	0.01mA
Adjusting accuracy	0.01mA
Rotating one turn pulse no count	20 pulses /grids per turn
LED display	current signal value display, 0-100.0 percentage display, 0-50Hz display, programmable.
Output adjustment	Fine adjustment or rough adjustment (default), programmable.
Front view size	79.5x42mm
Back side view size	72.5x39.5mm
Panel cut-out size	77x40mm (panel thickness >1.4mm)
Operating temperature range	-20°C to +60°C
Storage temperature	-20°C to +80°C
Humidity	85% R.H. Non condensation

## Referential Application Circuits



### Wiring Terminal Definition (\*Code printed in the rear cover)

Terminal Code	Description
G	15-30V operating power supply GND-
V+	15-30V operating power supply +
OUT	Signal output +
G	Signal output GND-

### 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.

2. Save Parameters Setting: please refer to [5.Parameters Saving Function -F004](#) in following pages.

#### 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).

3.2 Rotate the knob, 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 knob function definition above.)

3.3 When the referential code (e.g.: F001, F002...) is displayed in LED screen, press 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 below).

Referential Code Definition (Table 1.1)

Code	Description	Code value function description	Default
F001	Coarse or fine tuning	0: Coarse tuning mode, "F002" to modify the addition and subtraction multiples 1: Fine tuning mode, "F003" to modify addition and subtraction multiples 2: Automatic curve output (parameter F200 > 0 should be set first) (for aging test products)	0
F002	Coarse tuning of addition and subtraction multiples	1-100 (x 10)	1
F003	Fine tuning of addition and subtraction multiples	1-100	1
F004	Press function	0: Manually save the output value (fixed startup value); 1. Quickly switch coarse tuning and fine tuning; 2: Output OFF/ON; 3. Quick return to zero (minimum value); (Function 1-3 is automatic storage of output value: 3 seconds after knob tuning)	1
F005	Output range(mA)	0:0-20 1:4-20 2:0-22 3:0-24 -1:user-defined	
F006	user-defined out low side	0-24.00	0
F007	user-defined out high side	0-24.00	20.00
F008	Display mode	0:Real Current 1: 0-100.0% 2:0-50.0Hz -1:user-defined	
F009	user-defined disp low side	Ignore the decimal point from 1999 to 9999. Set in F011	0
F010	user-defined disp high side	Ignore the decimal point from 1999 to 9999. Set in F011	1000
F011	Decimal point position	0-4 0/1: None 2: 999.9 3: 99.99 4: 9.999	3
F012	Nixie luminance	0—7( bright)	
F013	4mA calibration value	-999--+999 for internal reference only, please be careful when modifying	
F014	12mA calibration value	-999--+999 for internal reference only, please be careful when modifying	
F015	20mA calibration value	-999--+999 for internal reference only, please be careful when modifying	
F200	Curve number	0: Automatic curve output mode does not need; 1-9: number of sections	0
Ft01	Section 1 curve time	0-999 seconds Set as many values as there are sections of "F200"	
FA01	Section 1 starting voltage	0.00-24mA	
Fb01	Section 1 end voltage	0.00-24mA	
Ft02	Section 2 curve time	0-999 seconds	

...	...	...	
Fb09	Section 9 end voltage	0.00-24mA	

**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 LED screen displays F002, the signal generator will be returned into normally operating status after setting and changing the parameters of referential code F001.

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

**3.6** Rotate the knob till the LED screen displays FEnd, 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.

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

#### 4. Knob Rotation Turns Setting

Pressing down the knob for 2 seconds till the LED screen display **F001**, the press down it, next rotate the knob to set the code value into 0 (Coarse turning) or 1 (Fine turning). Then rotate the knob, user can set the multiples of changing step through code **F002** and **F003**.

**Example of Knob Turns Calculation (\*20 grids per turn)**

Setting Examples	F001	F002	F003	Description
0-20mA shows 0-20.00, and the knob is adjusted for 1 turn	0	10	x	Set coarse tuning 10, with a grid change of 1mA
0-20mA shows 0-20.00, and the knob is adjusted for 10 turns	0	1	x	Set coarse tuning 1, with a grid change of 0.1mA
4-20mA shows 4-20.00, and the knob is adjusted for 80 turns	1	x	1	Set fine tuning 1, with a grid change of 0.01mA
4-20 shows 4-20.00, and the knob is adjusted for 8 turns	0	1	x	Set coarse tuning 1, with a grid change of 0.1mA

#### 5. Parameters Saving Function -F004

**F004=0** : Press down the knob manually to save the parameters

**F004=1** : Press down the knob shortly to switching between Fine turning or Coarse turning mode.

**F004=2** : Press down the knob shortly to switch ON /OFF the signal output.

**F004=3** : Press down the knob shortly to make the LED display and output 0.

## 6. Output Range and Display Mode Setting

Setting Examples	F005	F006	F007	F008	F009	F010	F011
4-20mA->display 4-20.00(mA value)	1	X	X	0	X	X	X
4-20mA ---> 0-100.0 (%)	1	X	X	1	X	X	X
4-20mA ---> 0-50.0 (HZ)	1	X	X	2	X	X	X
0-20mA ---> 0-20.00(mA value)	0	X	X	0	X	X	X
0-20mA ---> 0-100.0 (%)	0	X	X	1	X	X	X
0-20mA ---> 0-50.0 (HZ)	0	X	X	2	X	X	X
4-20mA ---> 0-5000(rpm)	1	X	X	-1	0	5000	0
4-20mA ---> -40 to 80(°C)	1	X	X	-1	-40	80	0
4-20mA ---> 0-250( Welder current)	1	X	X	-1	0	250	0
4-20mA ---> 0-90.0(° valve opening)	1	X	X	-1	0	900	2
4-20mA ---> 0-1.600(MPa)	1	X	X	-1	0	1600	4

\*X ---None, indicates value setting is not required.

## 7. Automatical Signal Output Waveform Setting (\*F200 Code Setting requires Password: - + - +)

**7.1** 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).

**7.2** 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.)

**7.3** Then set code F200 – the sections amount of the signal output waveform; maximum value is 9 sections.

**7.4** 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 starting current value;




**Fbxx** ---- refers to ending current value.

**7.5** 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.

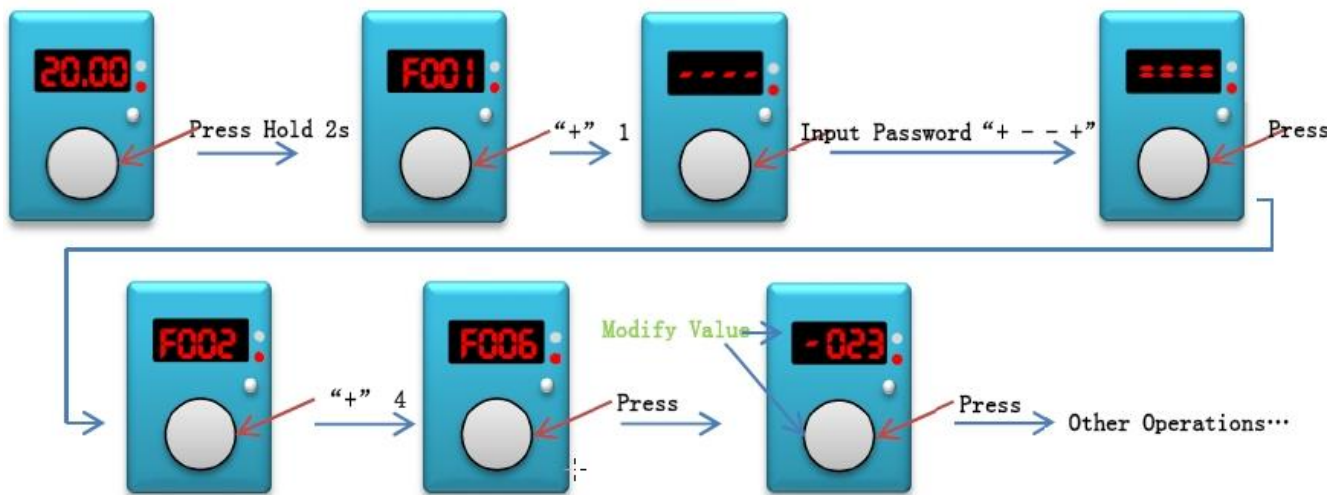
\* Turn off / Disable the automatically output mode: Set Code **F001** value into **0** or **1**

### 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.

Waveform Examples	Number of sections	Section 1	Section 2	Section 3	Section 4	...	
 Triangular wave	F200 = 2	Ft01 = 10 FA01 = 2.00 Fb01=9.00	Ft02=10 FA02=9.00 Fb02=2.00				
 Square wave	F200 = 2	Ft01 = 10 FA01 = 6.00 Fb01=6.00	Ft02=10 FA02=3.00 Fb02=3.00				
 Sine wave	F200 = 6	Ft01 = 4 FA01 = 3.00 Fb01=5.00	Ft02=3 FA02=5.00 Fb02=6.00	Ft03=3 FA03=6.00 Fb03=5.00	Ft01 = 4 FA01 = 5.00 Fb01=3.00	Ft01=3 FA01 = 3.00 Fb01=2.00	Ft01=3 FA01 = 2.00 Fb01=3.00

**Output Accuracy Calibration Example: Calibrate F014 - 12mA Output Accuracy**



- 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 “F014”.
- Figure 6→7: Press down the knob “OK” to set parameters of “F014”, and then modify the value to make its actual output equals to 12.00mA (a high precision multimeter required); **(Connect the multimeter to BRT 420G-HM3 signal generator output terminals, rotate the generator knob till the multimeter displays 12.00 mA accurately.)**
- Figure 7→ : Press down knob to save the setting, or automatically save if no operation for more than 10 Seconds.

\*Specification is subject to change without notice. For more information or setting video, please visit:

<https://www.brightwinelectronics.com>