Multifunction Process Calibrator

BRT LB02

BRT LB02 Process calibrator is also used as multifunction signal generator which covers all the functions required in PLC, DCS, ESD, field instrumentation, valves and other maintenance. The copper connectors used makes the contact resistance minimal. Compact and portable case, refined panel layout, easy-to-use for user; V, mV, mA, TC, RTD, resistive input and output has a corresponding button directly make the operation extremely simple. Industrial grade electric safety design, high accuracy, clear LCD display with back light and new ABS flame-retardant material used make it become an essential process calibration tool in industrial site.

Language selection

The instrument has two built-in languages: Chinese and English. The default is Chinese vision. If you want to change language setting, operation as below: press [SET] button till the symbol "C" or "E" is displayed on the LCD screen. Press [↗] [↘] to switch between "C" and "E". "C": Chinese "E": English

Instructions

: measurement symbol : output symbol

[V] [mA] [mV/TC] [Ω/RTD] buttons have both measurement and output function. In the default interface, for example, switch from [V] to [mA], press any one of those 4 buttons for once, it will switch between the measurement and output operation. Note: when switching from one interface to another interface, if return back to the previous interface, it will back to the state of its original interface (status holding function).

1.Voltage measurement In any interfaces, press [V], if the screen displays , press again [V] , wait till the screen displays and " V "symbol, then can measure voltage.

2.Current measurement In any interfaces, press [mA] , if the screen displays , press again [mA] , wait till the screen displays " mA "symbol, then can measure current.

3.mV and Thermocouple temperature measurement

3.1 mV measurement In any interfaces, press [mV/TC] , if the screen displays , press again [mV/TC] , wait till the screen displays and " mV 、E、K、B、S、R、J、T、N" any one of these symbols. In this state, if does not display the "mV "symbol, press [←] or [→] to up/down page , wait till displays " mV" symbol, then can enter mV measurement.

3.2 E type Thermocouple temperature measurement

In any interfaces, press [mV/TC] , if the screen displays , press again [mV/TC] , wait till the screen displays and" mV 、E、K、B、S、R、J、T、N" any one of these symbols. In this state, if does not displays "E " symbol, press [←] or [→] to up/down page, wait till displays" E" symbol, then can enter E type thermocouple temperature measurement. At this moment, it displays the temperature value that E-type thermocouple measured. Note: Thermocouple temperature measurement involves cold-junction compensation, so when do the thermocouple temperature measurement, at the bottom left of the screen displays the cold-junction compensation temperature value, the value displayed is the cold-junction temperature compensation value required. When doing the thermocouple temperature measurement, do ensure that set correct cold junction compensation temperature value. If set it wrongly, it will lead to a big error. The method of setting cold junction compensation temperature value: press [℃], there is one number at both right and left side, left side number

indicates the manually input cold junction compensation temperature value required. When the number is flashing, press ↗ ↘ to increase/reduce it; right side number is the value measured by the inner temperature measurement element of meter, it cannot be changed. Press °C alternately, it will change the flashing order of these 2 numbers. If the number is flashing, it indicates that setting comes into effect.

3.3 Other types of thermocouple temperature measurement

This meter is designed for 8 kinds of regular Thermocouple temperature measurement (E、K、B、S、R、J、T、N), the detailed operating instructions are the same to that of E type thermocouple temperature measurement instruction.

4. Resistance and Pt100, Cu50 temperature measurement

4.1 Resistance measurement In any interfaces, press Ω RTD, if the screen displays ☞, press Ω RTD again, wait till the screen displays ☜ and " Ω、Pt100、Cu50" any one of these symbols. In this state, if does not display the "Ω" symbol, press ← or → to up/down page, wait till displays "Ω" symbol, then can enter into resistance measurement interface.

4.2 Pt100 temperature measurement In any interfaces, press Ω RTD , if the screen displays ☞, press Ω RTD again, wait till the screen displays ☜ and " Ω、Pt100、Cu50" any one of these symbols. In this state, if does not display the "Pt100" symbol, press ← or → to up/down page, wait till displays"Pt100 "symbol, then can enter into Pt100 temperature measurement interface. Because this meter adopts two-wire system measuring method, if Pt100 measuring element is in a long distance, it will bring additional errors. In order to compensate this error, there's compensation option setting. The setting method as below: first using the resistance measurement function to measure the resistance value from three-wire PT100, choose the min. resistance value (normally, only few Ohms), write it down. Press SET button alternately, when it indicates " Ω" symbol, use ↗ ↘ to change the resistance value into the ohm value which measured just now. Then return back to PT100 temperature measurement, measure 2 wires (of these 3-wire pt100) which have higher resistance values, then user can get the correct exact temperature value.

4.3 Cu50 temperature measurement

Measurement method is the same to that of Pt100 temperature measurement.

5.Range Conversion

Two types: 24V feedback current measurement and the current measurement. Operating method: In the current measurement or 24V feedback current measurement state, press ← or →, at the bottom of the screen will appear SCL symbol, it indicates entering into range conversion function interface. If user uses this function, user must set correct parameters. First, must set correct current range, for example, user wants to convert 4-20ma current to 0-10000 data, these related two parameters must be set correctly. Setting method: press the SET button, the default interface displays 04 and 20 two numbers, there is mA symbol at bottom of LCD, these two numbers indicate current range value, user can use ↗ ↘ ⌐ ¬ to change them. Press SET button alternately, symbol S-H appears at the bottom of the screen, this one represents the upper range, which should be set to 10000, press SET button again, appears "S-L" symbol at the bottom of the screen, this represents the lower limit of the range, it should be set to 0. Press again SET button, the screen bottom will appear "SQU" sign, this indicates if it needs to extract a root of signal value. Usually, it requires to do extraction when do flow measurement. If extraction needed, set this option value into 1. All setting steps are completed. Return to the corresponding range conversion interface, input current signal, the screen will display

corresponding engineering unit data directly.

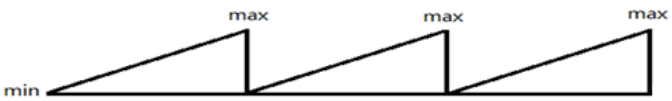
Output function instruction

1. Voltage output In any interfaces, press[V] , if the screen displays☞ , press [V]again, wait till the screen displays ☞ and“ V ”symbol, then enters into voltage output interface. Output voltage can be set by[↗][↘][⌐][¬] . [↗][↘] control that increase / reduce value in small steps, and are used with “STEP” button to change step into 0.1V once or 0.01V once, the default step is 0.1V. Press "STEP" button, the related symbols are flashing. These 2 buttons [⌐][¬]control that increase/reduce step in big steps, the step is 1V.

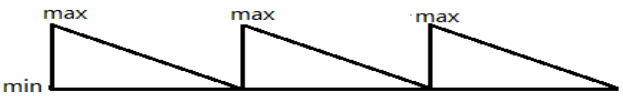
2. Current output

2.1. Active current output In any interfaces, press [mA] , if the screen displays ☞ , press [mA] again , wait till the screen displays☞ , check if the screen displays “source", “ mA ” symbols, but does not display “Prog 1”,“Prog 2”,“Prog 3" . If does not display “source”,“ mA ” symbols, press[←] or[→] to enter up/down page, until displays “source”,“ mA ”, then enter into active current output state. Output current can be set through[↗][↘][⌐][¬]. These 2 buttons [↗][↘]control that increase/reduce step in small steps, and are used with “STEP” button to change step into 1mA, 0.1mA once or 0.01mA once. Press "STEP" button, the related symbols are flashing. These 2 buttons [⌐][¬]control that increase/reduce value in big steps, the step is 4mA.

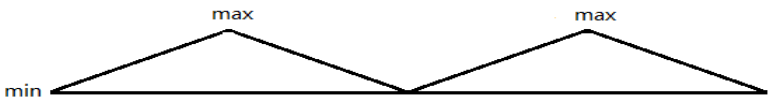
2.2. Active current programmed output



"Prog 1" state: Curve of current change



"Prog 2" state: Curve of current change



"Prog 3" state: Curve of current change

There are 3 types of programming for active current programmed output, detail output sequence shown as above curves. The setting methods as below:

"Prog 1" programmed output: In any interfaces, press[mA] , if the screen displays☞ , press [mA]again, wait till the screen displays☞ , check if the screen displays “source”, “Prog 1” and “ mA ” symbols. If not, press [←]or[→] to enter up/down page, until displays “source”, “Prog 1”, “ mA ”, then enter into active programmed 1 current output state. In this state, the current step is 1mA, but the step range and changing speed can be set manually. The method of setting the max and min steps as below: press[SET], displays 2 numbers, left number represents the min current value, right number represents the max current value, use[↗][↘][⌐][¬] those 4 buttons can revise the min, and max values. These 2 buttons [↗][↘]can revise the range of the min value. These 2 buttons [⌐][¬]can revise the range of the max value. Note: the min value can't be less than 0, the max can't be higher than 24, the min can't be higher than the max. Press again[SET], the symbol displayed is "S", then enter into the changing speed setting option. Use[↗][↘] these 2 buttons to revise range of changing speed range, the setting range can be 0.5~5s .“Prog 2”, “Prog 3” programmed output setting methods is the same to the setting method of “Prog 1”.

2.3. Passive current programmed output In any interfaces, press mA , if the screen displays , press mA again, wait till the screen displays , check if the top of the screen displays “sink”,“ mA ” symbols but does not display “Prog 1”, “Prog 2”, “Prog 3”. If does not display “sink”,“ mA ” symbols, press ← or → to up/down page, until displays “sink”,“ mA ”, then enter into sink current output state. The output current can be set through those 4 buttons ↗ ↘ ⌐ ¬ . These 2 buttons ↗ ↘ control that increase/reduce step in small steps, and are used with “STEP” button to change step (increase/reduce) step into 1mA, 0.1 mA or 0.01 mA once. The default step is 0.1mA. These 2 buttons ⌐ ¬ control that increase/reduce value in big steps , the step is 4mA.

Note: In all current output state, if the probes are open-circuited, the setting value on the screen is flashing.

3. mV output and Thermocouple temperature output

3.1. mV output In any interfaces, press mV TC, if the screen displays , press mV TC again , wait till the screen displays and “ mV 、E、K、B、S、R、J、T、N” any one of these symbols. In this state, if does not display “mV ”symbol, press ← or → to up/down page, wait till the screen displays “ mV“ symbol, then enter into mV output. The output can be set through these 4 buttons ↗ ↘ ⌐ ¬ . These 2 buttons ↗ ↘ control that increase/reduce step by small steps, and are used with “STEP" button to change step to 1 mV or 0.1 mV once, the default step is 1 mV. These 2 buttons ⌐ ¬ control that increase/reduce step in big steps , step is 10 mV.

3.2. E type Thermocouple temperature output

In any interfaces, press mV TC, if the screen displays , press mV TC again, wait till the screen displays and “ mV 、E、K、B、S、R、J、T、N” any one of the symbols. In this state, if does not display “E ” symbol, press ← or → to up/down page, wait till the screen displays“ E“ symbol, then enter into E type thermocouple temperature output interface. At this moment, it will show the value of thermocouple temperature output. The output can be set through these 4 buttons ↗ ↘ ⌐ ¬. These 2 buttons ↗ ↘ control that increase/reduce step by small step, and are used with “STEP” to change steps in to (increase/reduce) 10 ℃ or 1 ℃ once, the default step is 10 ℃. These 2 buttons ⌐ ¬ control that increase/reduce step in big steps, the step is 100℃ .

Note: Thermocouple temperature output is related to cold junction compensation issue. In Thermocouple temperature output state, there is cold junction compensation temperature indication at the bottom left of the screen. The value displayed is the cold junction compensation value required. In Thermocouple temperature output state, user must set correct cold junction compensation temperature value. If set wrongly, then it will bring big errors. The setting method of cold junction compensation temperature: press °C, there are numbers in the left and right side, the left number is the cold junction temperature value that is to be input manually. When that number is flashing, use can use these 2 buttons ↗ ↘ to increase or reduce it; The right number is the value that measured by internal temperature element of the meter, that number can't be changed. Press °C alternately, it can change the flashing sequence of the left and right numbers. The number which is in flashing state, it indicates its setting comes into effect.

3.3. Other types of Thermocouple temperature output:

This meter is designed for 8 kinds of commonly used Thermocouple（E、K、B、S、R、J、T、N）temperature output, the setting method is the same to that of E type Thermocouple temperature output setting method. Do not set a value that lower than cold junction compensation temperature value.

4. Resistance and Pt100, Cu50 temperature output

4.1. Resistance output In any interfaces, press RTD , if the screen displays , press RTD again, wait till the screen displays and " Ω、Pt100、Cu50" any one of the symbols. In this state, if it does not display "Ω" symbol, press ← or → to up/down page, wait till the screen displays "Ω" symbol, then enter into resistance output interface. The output can be set by these 4 buttons ↗↘⌐¬. These 2 buttons ↗ ↘ control that increase/reduce step in small steps, and are used with "STEP" button to change steps (increase/reduce) into 10Ω or 1Ω once. The default step is 10 Ω. These 2 buttons ⌐ ¬ control that increase/reduce step in big step, the step is 100Ω.

4.2. Pt100 temperature output In any interfaces, press RTD , if the screen displays , press RTD again, wait till the screen displays and" Ω、Pt100、Cu50" any one of the symbols. In this state, if it does not display "Pt100" symbol, press ← or → to up/down page, wait till the screen displays "Pt100 "symbol, then enter into Pt100 temperature output interface. The output can be set through these 4 buttons ↗↘⌐¬. These 2 buttons ↗ ↘ control that increase/reduce step in small steps, and are used with "STEP" button to change steps into (increase/reduce) 10 ℃ or 1℃ once, the default step is 10℃. These 2 buttons ⌐ ¬ control that increase /reduce step in big steps, the step is 100℃. The setting method of Cu50 temperature output is the same to that of Pt100 temperature output setting method.

Note: Through these four buttons, ↗↘⌐¬ you can set positive and negative temperature output. When the external exciting current doesn't exist or connect is reversed, the setting value is flashing.

5. 24V output with current measurement

In any interfaces, press 24V, enter 24V output with current measurement state. This state indicates the external equipment provides the 24V power supply, output current can't be less than 24mA (this is determined by equivalent internal resistance of the external equipment). In output 24V voltage state, current that flows through the 24V power supply to be measured will display on the screen.

OUTPUT FUNCTIONS

FUNC.	OUT UNIT	SETTING RANGE	SET STEPS
DC.VOLT.	V	0~11.00V	0.01/0.1/1
DC.mV	mV	0~110.00mV	0.1/1/10
Ω	Ω	20~400Ω	1/10/100
DC.mA	mA	0~24.00mA	0.01/0.1/1/4
TC	R	0~1700℃	1/10/100
	S	0~1600℃	
	B	500~1800℃	
	K	-200~1370℃	
	E	-200~1000℃	
	J	-200~1200℃	
	T	-200~400℃	
	N	-200~1300℃	
RTD	Pt100	-200~850℃	1/10/100
	Cu50	-50~150℃	
24V	24V mA	24V: Cannot be set. Current measurement: 0~24.000 mA	None

MEASUREMENT FUNCTIONS

FUNC.	MEASURE. UNIT	MEASUREMENT RANGE	ACCURACY
DC.V	V	0~30.000V	0.001V
DC.mV	mV	0~150.00mV	0.01mV
Ω	Ω	0~999.9Ω	0.1Ω
DC.mA	mA	0~30.000mA	0.001mA
TC	R	0~1700℃	1℃
	S	0~1600℃	
	B	500~1800℃	
	K	-200~1370℃	
	E	-200~1000℃	
	J	-200~1200℃	
	T	-200~400℃	
	N	-200~1300℃	
RTD	Pt100	-200~850℃	1℃
	Cu50	-50~150℃	
Range Conversion	mA	0~99900 engineering unit (Applicable to current measurement and current of 24V output measurement)	Max.: 4, Min.: 1. (Related to engineering quantity)

Other functions introduction:

1. If there are no any operations for a long time (about 30 minutes), the meter will automatic shutdown. In battery charging status, auto-shutdown function is disabled. The meter will not automatically shutdown.

2. Battery charging and status indication. The meter can be re-charged in any status. In the operating state, if the battery power is not full, power capacity bar will scroll when charging battery; if battery power is full or in shutdown state, there will be no scroll in power capacity bar. The charging time required is 5-6 hours, when the battery is fully charged, the charging operation will be stopped. This meter is embedded with lithium polymer battery. Do not use up the battery power, otherwise, the calibrator cannot operate normally. If do not use it for a long time, please do fully charged battery.

3. Replace fuse. This instrument uses 5 * 20mm 200mA littelfuse one-time high-speed fuse. If replacement required, please use the littelfuse brand fuse, it must be replaced to 250V/200mA fuse.

****Important Cautions****

1. Inside this instrument, four units of resettable fuse and an one-time high-speed fuse are embedded to ensure the safety of user. This instrument can withstand 30V DC or AC voltage below 20V for 5 seconds in case of there is an error operation. But DO NOT connect it to 220VAC power grid. If violating the security alerts above may cause personal injury or damages to the instrument.

2. When using the meter, heat dissipation internally may affect the measurement accuracy of the embedded temperature measuring components inside to some extent. The measurement error grade is highly related to the ambient temperature, active output current value, load resistance, temperature of the operator's hand. And any other internally integrated temperature measuring instruments cannot avoid such kind of errors. To reduce the error grade, we recommend using an external Pt100 temperature probe.

3. Resistance output accuracy grade is related to the current of external excitation source, if the current is too low, the output resistance will have a certain degree of error. Thus, if use commonly-used multi-meter to check the output resistance, it is normal that there is a little bit error.

4. User must use 5V, 1A (or less than 1A) output AC to DC Power adapter to re-charge the battery. Otherwise, it may cause damages to battery embedded. Do not use up the battery power, otherwise, the calibrator cannot operate normally.

*The specification is subject to change without notice.

*Technical support: info@brightwinelectronics.com Web: www.brightwinelectronics.com