

使用说明书

OPERATING MANUAL

BST900W DC-DC 数控升压模块 CNC boost module

中文说明书

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2015 年 12 月

杭州均测仪器仪表有限公司

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联系方式

Website: www.junteks.com

开箱检查

当您得到一台新的 BST900WDC-DC 数控升压模块时,建议您按照以下步骤对仪器进行检查。

1. 检查是否存在因运输造成的损坏。

如发现包装纸箱或气泡袋保护垫严重破损,请先保留,直到整机和附件通过测试。

2. 检查包装箱内物品是否齐全。

包装箱的内容如下所述。如果内容不符或者仪器有损坏,请与经销商或本公司联系。

主机: BST900W DC-DC 数控升压模块 1 台

附件: 用户手册(pdf 版) 1 份

3. 检查整机。

如发现仪器外观破损、仪器工作不正常,或未能通过性能测试,请与经销商或本公司联系。

第一章 概述

一、仪器简介

BST900W DC-DC 数控升压模块是一款全数字显示的数控升压模块，体积小，功率大，效率高，工作稳定。加入了高速微控制器的精密测量计算，可以精确调节输出电压电流大小，内置 10 组存储位置，可随时存储、调出参数，方便使用。配有四位八段 LED 数码管，可以实时显示电压、电流、功率、容量等参数。同时，本机具有上电后自动输出，自动轮显参数等功能，可根据使用的需要开启或者关闭。

二、仪器特性

- 1、采用先进的微处理器，可精确调节输出电压、电流；
- 2、带有记忆保存功能，可存储 10 组参数，且可以自由存储、调出；
- 3、采用高品质功率器件，配合外围精密运放构成的 CV 和 CC 环路，极大地提高了模块的整体表现；
- 4、具有输入稳压保护功能；
- 5、具有恒压，恒流功能；
- 6、采用 4 位高亮度数码管，可以实时显示输出电压、电流、功率以及容量等参数；
- 7、自动/手动切换显示电压、电流、功率、容量等参数；
- 8、具有输出 OUT，恒压 CV，恒流 CC 指示灯，可以实时查看工作状态；
- 9、可设定上电后是否自动输出；
- 10、可一键保存当前设定的电压电流值。

三、技术指标

| 项目 | 参数 |
|-------------|-----------------------------|
| 输入电压 | 8V~60V |
| 输入电流 | 0~15A |
| 输出电压 | 10V~120V |
| 输出电流 | 0~15A |
| 转换效率 | 85% |
| 工作频率 | 150KHz |
| 短路保护 | 20A 保险丝 |
| 工作温度 | - 40℃~+85℃ |
| 控制方式 | 数字控制+数码管显示 |
| 电压调节/显示分辨率 | <100V / 0.01V; >100V / 0.1V |
| 功率显示最小分辨率 | 0.001W |
| 电流调节/显示分辨率 | <10A / 0.01A; >10A / 0.1A |
| 容量显示最小分辨率 | 0.001AH |
| 输出纹波 | ≤50mV |
| 重量 | 243g |
| 外围尺寸（长×宽×高） | 110×96×46(mm) |

表 1-1 BST900W 技术指标

第二章 仪器说明

一、模块说明

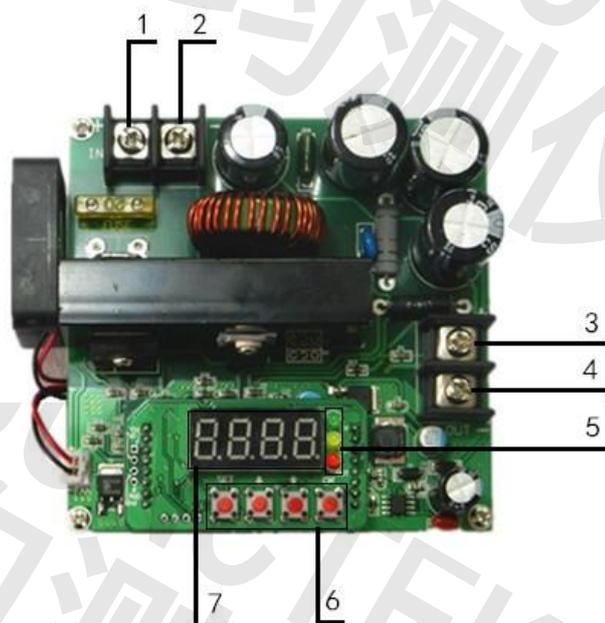


图 2-1 BST900W DC-DC 数控升压模块图示

| 标号 | 说明 | 标号 | 说明 |
|----|-------|----|---------|
| 1 | 输入端正极 | 5 | 工作状态指示灯 |
| 2 | 输入端负极 | 6 | 操作按键 |
| 3 | 输出端正极 | 7 | LED 数码管 |
| 4 | 输出端负极 | | |

表 2-1 BST900W DC-DC 数控降压模块说明

二、显示说明

| 数码管显示内容 | 内容说明 |
|-------------------------|---|
| 00.00/000.0 | 电压值, 00.00~120.0V |
| 0.00A/00.0A | 电流值, 0.00A~15.0A |
| P.000、P0.00、P00.0、P000. | 功率值, 单位 W, 小数点的位置随着功率的变化而改变位置。例如: P.123 表示 0.123W, P1.23 表示 1.23W, P12.3 表示 12.3W, P102.表示 102W |
| C.000、C0.00、C00.0、C000. | 容量值, 单位 AH, 小数点的位置随着容量的变化而改变位置。例如: C.123 表示 0.123AH, C1.23 表示 1.23AH, C12.3 表示 12.3AH、C123.表示 123AH |
| --0- | 特殊功能0 |
| --1- | 特殊功能1 |
| --2- | 特殊功能2 |
| --y- | 开启特殊功能 |
| --n- | 关闭特殊功能 |
| SA.-* (*表示 0~9) | 保存参数到存储位置 0~9 中的某个存储位置 |
| Lo.-* (*表示 0~9) | 调出存储位置 0~9 中的某一组参数 |
| ---- | 保存参数 |
| U00.0 | 设定输入稳压保护阈值 |

表 2-2 BST900W DC-DC 数控降压模块显示说明

第三章 操作说明

本模块有两种工作模式：简约模式和全功能模式，出厂默认是简约模式，如果需要使用全功能模式，可自行开启。

一、简约模式使用方法：

1、正确连接输入、输出，保证输入电压在要求的范围内，严禁反接。输入电压须高于最低输入电压。

注：输入电压范围：8V~60V；

输入电流范围：0A~15A

输出电压范围：10V~120V；

输出电流范围：0A~15A。

2、设定所需的电压电流值。需要注意的是，电压的显示没有单位，电流的显示最后一位为R，电压显示值的小数点在第二位或者第三位（如00.00/000.0），电流显示值的小数点在第一位或者第二位（如0.00R/00.0R）。设定电压电流值的方法如下：

上电后默认显示的是电压设定值，电压值显示的格式是“00.00”，按下“SET”按键可以切换到电流设定值，电流值显示的格式是“0.00R”，按下▲按键增大设定值，按下▼按键减小设定值，小数点会随着设定数值大小移动，短按精确设定，长按可以快速设定。电压或者电流值发生变化后，按下“SET”键后会显示“----”，表示保存了当前设定的电压或者电流值，本仪器默认的存储位为M0。若没有改变电压或者电流值，按“SET”键会切换到电流或者电压值。

3、设定完成后按下“OK”按键就可以输出了。

4、输出状态下，在显示电压值时按下▲按键可以增大输出电压，按下▼按键可以减小输出电压，在显示电流值时按下▲按键可以增大电流设定值，按下▼按键可以减小电流设定值，短按精确设定，长按可以快速设定。输出状态下短按“OK”按键可以切换显示电压、电流，长按3秒可以自动轮显，再次长按可以取消轮显。在轮显状态下，按▲▼按键无效。

5、输出状态下，按下“SET”按键可以关闭输出。

二、全功能模式使用方法：

本模块有三项特殊功能，默认都处于关闭状态，如有需要，可自行开启。

功能 0：上电后自动输出

功能 1：保存与调出设定的参数，显示功率和容量，设定输入稳压阈值

功能 2：输出后自动轮显参数

开启/关闭方法：

长按“OK”按键，然后给模块通电，数码管会在“--0-”、“--1-”、“--2-”之间循环显示，在显示“--0-”时松开“OK”按键会开启或者关闭功能 0，在显示“--1-”时松开“OK”按键会开启或者关闭功能 1，在显示“--2-”时松开“OK”按键会开启或者关闭功能 2。若松开“OK”按键后数码管显示“--y-”表示已开启当前的功能，显示“--n-”表示已关闭当前的功能。

1、启用功能 0 后上电之后会自动输出。

2、启用功能 1 之后，在未输出状态下，按下“SET”按键可以在电压“00.00”，电流“0.00R”，调出参数“Lo.-0”，保存参数“SA.-0”和设定输入稳压阈值 $U_{00.0}$ 之间循环切换。

(1) 设定参数保存调出功能：

例如需要把 10V，1.5A 保存在存储位置 1 并且调出存储位置 1 的参数。

① 按下“SET”按键切换到电压值，设定电压值为 10.00V，按下“SET”按键保存当前设定的电压值。

② 按下“SET”按键切换到电流值，设定电流值调为 1.500A，按下“SET”按键保存当前的电流值。

③ 按下“SET”按键切换到“SA.-0”，按▲▼按键选择存储位置，这里需要调整到“SA.-1”，按下“OK”按键就可以把设定的“10V，1.5A”保存在存储位置 1。

④ 按“SET”按键调整到“Lo.-0”，按▲▼按键选择需要调出的存储位置的参数，这里需要调整到“Lo.-1”，按下“OK”按键就可以调出存储位置 1 的参数。

⑤ 本机共有 0~9 共 10 组存储位置，每组存储位置都可以任意设定电压电流值，各个存储位置互相独立，互不影响。

(2) 设定输入稳压保护功能：

输入稳压保护功能主要应用在太阳能电池板作为供电电路中，其设定如下：启动特殊功能 1，按下“SET”按键切换到 $\text{U}00.0$ ，按上下键设定电压值，按下“SET”按键保存当前设定的电压值。

例如你的太阳能电池板工作电压是 34V 电流 8A（假设此时为最大输出功率点），你想用这个电源把电压升到 48V、4.5A，给电池充电，在理想环境下电池板肯定能够满足供电需要，当电源输出电流继续增大时，太阳能电池板输出电压会降低，此时太阳能电池板输出功率会急剧下降；假设此时把 $\text{U}00.0$ 设置为 30V，当输入电压下降到 30V 时，电源会自动调节输出以确保电压不会被拉低到 30V 以下（即最大限度索取功率）。

- 3、启用功能 2 后在输出时会自动轮显电压、电流、功率、容量、等参数。
- 4、恢复出厂设置：电源上电后，长按 SET 键，电源会自动恢复出厂设置。

注意事项

1、本模块是升压模块， $V_{\text{OUT}} \geq V_{\text{IN}}$ 。给模块通电后，在未输出的情况下，输出端有电压，输出端的电压等于输入电压；若设置的输出电压低于输入电压，输出后输出端的电压也等于输入电压，这都是正常现象，在使用的时候输入电压一定要低于输出电压或者电子电器设备的额定电压。

2、给大功率用电器供电时，请关闭自动输出功能，连接好输入输出之后，然后按下“OK”按键输出，待电压升到设定的电压之后，最后再打开用电器。

3、给蓄电池充电时，请关闭自动输出功能，设定好合适的充电电压和电流，连接好蓄电池，然后按下“OK”按键输出，即可给蓄电池充电。

4、有效功率 $P = \text{输入电压 } V * 15A$ ，标称的 900W 是指该模块在特定工作条件下的最大功率，在不同输入电压情况下，最大输出功率受输入最大电流限制有所下降。比如，

输入电压为 20V：最大输出功率 $P=20V*15A=300W$

输入电压为 40V：最大输出功率 $P=40V*15A=600W$

输入电压为 60V：最大输出功率 $P=60V*15A=900W$

5、转换效率：约 85%（输入电压、电流及输出电压、电流影响转换效率）

保修及售后服务

感谢您购买明禾电子的产品。为最大限度地利用您的新产品的功能，我们建议您采取以下简单几项步骤：

1. 阅读安全及有效使用指南。
2. 阅读保修条款和条件。

保修条件：

仪器自发货之日起保修期为一年。在保修期内本公司根据情况选择对故障仪器进行维修或更换。如需维修，请将本产品邮寄到我公司。

下列情况不在保修范围：

使用者操作或维护不当；使用用户自己提供的软件或接口；未经许可对仪器进行修改。

OPERATING MANUAL

BST900W DC-DC NC Buck Module

December 2015

Hangzhou Junsi Instrument Co., Ltd.

3. Summary

3.1 the instrument Introduction

900W DC-DC boost module is a fully digital display NC boost module, small size, high power, high efficiency, stable. Joined the high-speed microcontroller precision measurement and calculation, it can accurately adjust the output voltage and current size, built-in 10 groups memory location can be stored at any time, call up parameters, convenient to use. Equipped with four eight LED digital tube, it can display the voltage, current, power, capacity and other parameters in real time. At the same time, this machine has an automatic output after power on, auto rotate function parameters can be turned on or off as needed use.

3.2 Main function

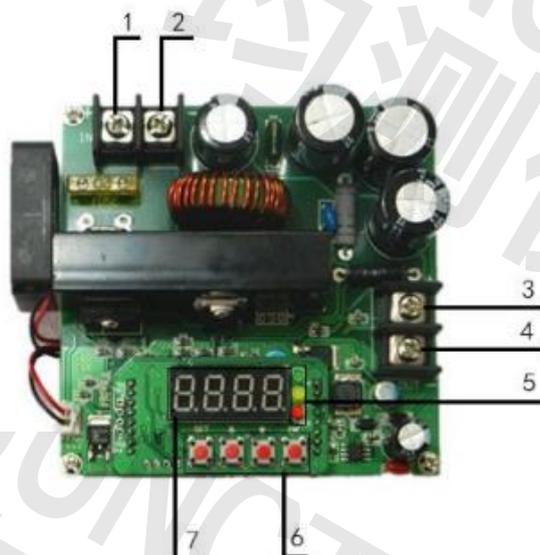
- 1, the use of advanced microprocessors, can precisely regulated output voltage and current;
- 2, with memory save function, can store 10 groups of parameters, and can be freely stored, transferred out;
- 3, high-quality power devices, with the periphery of precision op amps CV and CC loop configuration, which greatly improves the overall performance of the module;
- 4, with an input voltage protection;
- 5, having a constant voltage, constant current function;
- 6, using 4 high brightness LED, can display the output voltage, current, power and capacity and other parameters in real time;
- 7, automatic / manual switching display voltage, current, power, capacity and other parameters;
- 8, with the output OUT, constant voltage CV, constant current CC indicator, you can view real-time job status;
- 9, can be set whether to automatically output after power;
- 10, can be a key to save the voltage and current values for the current setting.

Third, technical indicators

| Item | Parameter |
|--|-------------------------------|
| The modular nature | 8V~60V |
| Input Voltage | 0~15A |
| Output Current | 10V~120V |
| Output voltage | 0~15A |
| Conversion efficiency | 85% |
| Frequency | 150KHz |
| Short circuit protection | Constant Current |
| Operating Temperature | - 40℃~+85℃ |
| Control method | Digital control + LED display |
| The voltage regulator / display resolution | <100V / 0.01V; >100V / 0.1V |
| The minimum resolution of power Display | 0.001W |
| The current regulator / display resolution | <10A / 0.01A; >10A / 0.1A |
| The minimum resolution of capacity | 0.001AH |
| Output Ripple | ≤50mV |
| Weight | 243g |
| Dimensions(W*H*D) | 110×96×46(mm) |

4. Instrument Introduction

4.1 Structure Description



| Item | Introduction | Item | Introduction |
|------|-----------------|------|--------------------------|
| 1 | Positive input | 5 | Indicator of work status |
| 2 | Negative input | 6 | Button |
| 3 | Positive output | 7 | LED |
| 4 | Negative output | | |

4.2 Display Introduction

| Digital display content | Description |
|-------------------------|--|
| 00.00/000.0 | Voltage value, 00.00~120.0V |
| 0.00A/00.0A | Current value, 0.00A~15.0A |
| P.000、P0.00、P00.0、P000. | Power value, unit W, the decimal point position with the power of change and change position. For example: P.123 represents 0.123W, P1.23 represents 1.23W, P12.3 represents 12.3W, P102 represents 102W. |
| C.000、C0.00、C00.0、C000. | Capacity values, units AH, the decimal point is changed with the change of the capacity position. For example: C.123 represent 0.123AH, C1.23 represents 1.23AH, C12.3 represents 12.3AH, C123 represents 123AH. |
| --0- | Special features 0 |
| --1- | Special function 1 |
| --2- | Special function 2 |
| --y- | Open Special Function |
| --n- | Close Special features |
| SA.* (* represents 0~9) | Save parameters to the storage location of a storage location 0-9 |
| Lo.* (* represents 0~9) | Adjust the position of a given set of parameters stored in the 0 to 9 |
| --- | Save parameters |
| ∩00.0 | Set the input voltage protection threshold |

5. Operation

The module has two kinds of usage: one is simple mode, another is fully functional mode. The default is simple mode, if you need fully functional mode, you can open it by yourself.

5.1 Simple mode

1, Connect the input and output, to ensure that the range of input voltage requirements, the non-reverse. Input voltage must be higher than the minimum input voltage.

Note: Input voltage range: 8V ~ 60V;

Input Current Range: 0A ~ 15A

Output voltage range: 10V ~ 120V;

Output Current Range: 0A ~ 15A.

2, Set the desired voltage and current values. It should be noted that no units display the voltage and current displays last digit decimal point R, the voltage display value in the second or third decimal place (such as 00.00 / 000.0), the current value is displayed in the first or second place (such as 0.00R / 00.0R).

Setting voltage and current values as follows:

After power on the default display format of the voltage setpoint is the voltage value shown is "00.00" and press the "SET" button to switch to the current set value, the current value display format is "0.00R", press the button Increasing the setting, press the button to reduce the set value, the decimal point will move along with the size of the set value, press accurately set, long press can be quickly set. After the voltage or current value is changed, press the "SET" key will display "----", indicating that save the voltage or current value of the current setting, the instrument default storage location for the M0. If there is no change in the voltage or current value, press "SET" button will switch to the current or voltage values.

3. After setting press the "OK" button you can export.

4, lower output state when the voltage value is displayed pressing the key to increase the output voltage, the output voltage can be reduced by pressing the button, you can press the button to increase the current set value when displaying the current value, you can press the button Save small current setpoint, a short press accurately set, press can quickly set. Output state short press "OK" button you can switch the display of voltage, current, long press 3 seconds can automatically round display, press again to cancel long wheel significant. In the next round of significant state, press the button invalid.

5, the next output state, press "SET" button to turn off the output.

5.2 Fully functional mode

This module has three special functions, the default is closed, if necessary, you can open them by yourself.

Function 0: After electricity, it will output automatically.

Function 1: Save and bring up the parameters, display the power and capacity.

Function 2: Take turns to show the parameters after output automatically.

5.2.1 Open/close method

Press the "OK" button for a while, then electricity, the LED will take turns to show among "--0-", "--1-" and "--2-". When displaying "--0-", release the "OK" button, it will open or close the function 0. When displaying "--1-", release the "OK" button, it will open or close function 1. When displaying "--2-", release the "OK" button, it will open or close function 2. After releasing the "OK" button, the "--y-" displays in the digital tube indicates that you have already open the current function, the "--n-" means that you have closed the current function.

1, the output enable function 0 automatically after power-up.

2, enable the function after 1, in the non-output state, press the "SET" button in voltage "00.00", the current "0.00R", call up the parameter "Lo.-0", save the parameters "SA.-0" and set the input voltage switching between \square 00.0 threshold cycle.

(1) Set parameters are stored Recall function:

Such as the need to 10V, 1.5A stored in the memory location 1 and bring up the storage location 1 parameters.

- ① Press "SET" button to switch to the voltage value, the set voltage value 10.00V, press the "SET" button to save the current set voltage value.
- ② Press the "SET" button to switch to the current value, the current value is set the tone for 1.500A, press the "SET" button to save the current current value.
- ③ Press the "SET" button to switch to "SA.-0", press $\uparrow\downarrow$ the button to select the storage location, where the need to adjust to "SA.-1", press the "OK" button you can set "10V, 1.5A" stored in the storage location 1.
- ④ Press the "SET" button to adjust to the "Lo.-0", press $\uparrow\downarrow$ the button to call up the parameters to select the desired storage location, where the need to adjust to "Lo.-1", press the "OK" button brings up the storage location 1 parameters.
- ⑤ Native 0 to 9 groups of 10 storage locations, each storage location can be arbitrarily set voltage and current values, each storage location are independent of each other.

(2) Set the input voltage protection:

Input voltage protection function is mainly used in solar panels as a power supply circuit, which is set as follows: Start special function 1, press "SET" button to switch to $\uparrow 00.0$, press the arrow keys to set the voltage value, press the "SET" button Save the current set voltage value.

For example, your solar panels working voltage is 34V current 8A, you want to use this power supply the voltage to 48V, 4.5A, to recharge the battery, in bright light panels can certainly meet the power needs (assuming this is the maximum power point) But when the sunlight becomes weak, the solar panel voltage drops, assuming $\uparrow 00.0$ at this time is set to 30V, when the input voltage drops to 30V, the power supply will automatically adjust the output voltage to ensure that will not be pulled down to 30V or less (ie, to obtain the

maximum power).

3, enable the function after 2 output will auto rotate voltage, current, power, capacity, and other parameters.

Restore factory settings: the power supply is powered on, press the SET button, power is automatically restored to factory settings

Precautions

1, the module is boosting module, $V_{OUT} \geq V_{IN}$. To the module is powered, in the absence of output voltage output terminal voltage, output voltage equal to the input terminal; if the set output voltage lower than the input voltage, output voltage is also equal to the output of the input voltage, which is a normal phenomenon, When in use the input voltage must be lower than the output voltage or the rated voltage of electrical and electronic equipment.

2, high-power electrical appliances to power, turn off the automatic output function, and then connect the input and output, and then press the "OK" button output, and wait until the voltage rises to a set voltage, and finally opened appliances.

3, to charge the battery, turn off the automatic output function, set up the appropriate charging voltage and current, connect the battery, and then press the "OK" button output, you can charge the battery.

4, the effective power $P = \text{input voltage } V * 15A$, 900W nominal refers to the maximum power the module under specific operating conditions, at different input voltage, the maximum output power is limited by the maximum input current limit decline. such as,

The input voltage is 20V: Maximum output power $P = 20V * 15A = 300W$

The input voltage is 40V: Maximum output power $P = 40V * 15A = 600W$

The input voltage is 60V: Maximum output power $P = 60V * 15A = 900W$

5, conversion efficiency: about 85% (input voltage, current and output voltage,

current affect the conversion efficiency)

7. Warranty and service

Thank you for purchasing our products. To maximize the use of the new product features, we recommend that you take the following steps:

1. Read safe and efficient use instruction.
2. Read the warranty terms and conditions.

We warrants to the original purchaser that its product and the component parts thereof will be free from defects in workmanship and materials for a period of one year from the data of purchase.

We will repair or replace, at its' option, defective product or component parts. Returned product must be accompanied by proof of the purchase date.

Exclusions: This warranty does not apply in the event of misuse or abuse of product or as a result of unauthorized alternations or reapers. It is void if the serial number is alternated, defaced or removed.