

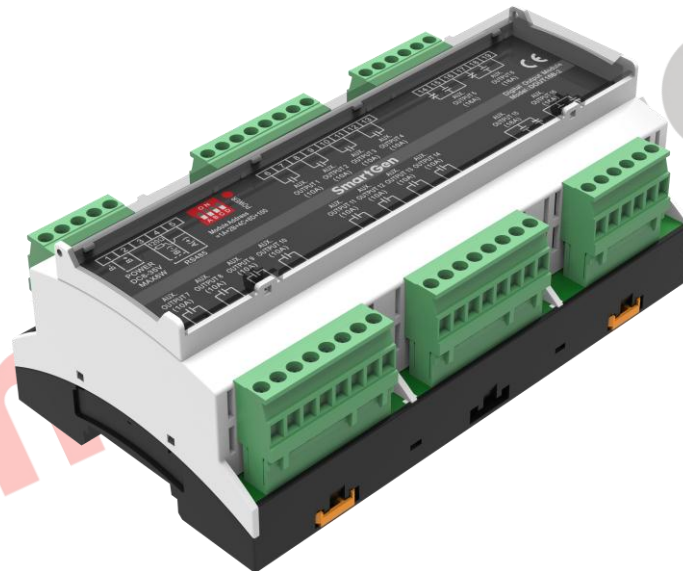


**SmartGen**  
ideas for power

**DOUT16B-2**

**DIGITAL OUTPUT MODULE**

**USER MANUAL**



**SMARTGEN (ZHENGZHOU) TECHNOLOGY CO., LTD.**



Chinese trademark

**SmartGen** English trademark

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**Table 1 Software Version**

Date	Version	Note
2020-10-16	1.0	Original Release
2020-12-15	1.1	Replaced the panel drawing.



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## 1 OVERVIEW

**DOUT16B-2 Digital Output Module** is an expansion module which has 16 auxiliary digital output channels. Expansion module status is transmitted to DOUT16B-2 by main control board via RS485.

## 2 TECHNICAL PARAMETERS

**Table 2 Technical Parameters**

Items	Contents
Working Voltage	DC8.0V~ DC35.0V continuous power supply
Power Consumption	<6W
Aux. relay output port 1-16	10A relay for output port 1~4, 7~14. 16A relay for output port 5~6, 15~16.
Case Dimension	161.6mm x 89.7mm x 60.7mm
Installation Way	35mm guide-rail installation or screw installation
Working Conditions	Temperature: (-25~+70)°C Humidity: (20~93)%RH
Storage Conditions	Temperature: (-30~+80)°C
Weight	0.4kg



### 3 Module Address

This is a 4-bit in-line DIP switch with 16 coding status, namely 16 module addresses (from 100 to 115). When it is turned to ON, the status is 1. The module address formula is  $\text{Module Address} = 1A + 2B + 4C + 8D + 100$ . For example, when ABCD is 0000, the module address is 100. When ABCD is 1000, the module address is 101. When ABCD is 0100, the module address is 102. Similarly, when ABCD is 1111, the module address is 115. The corresponding module addresses

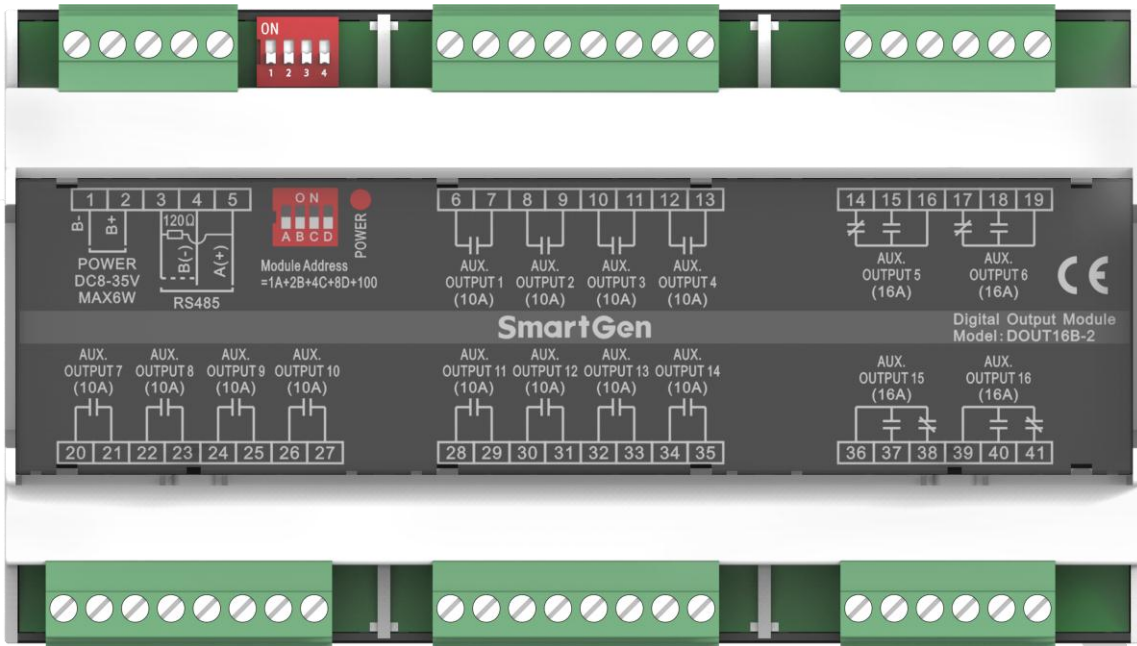
of DIP switch  are as follows.

**Table 3 Module Addresses**

A	B	C	D	Module Addresses
0	0	0	0	100
1	0	0	0	101
0	1	0	0	102
1	1	0	0	103
0	0	1	0	104
1	0	1	0	105
0	1	1	0	106
1	1	1	0	107
0	0	0	1	108
1	0	0	1	109
0	1	0	1	110
1	1	0	1	111
0	0	1	1	112
1	0	1	1	113
0	1	1	1	114
1	1	1	1	115



#### 4 TERMINAL DIAGRAM



**Fig.1 DOUT16B-2 Panel Diagram**

**Table 4 Description of Rear Panel Terminal Connection**

No.	Name	Description	Cable Size	Remarks
1.	B-	DC power supply negative input	1.5mm <sup>2</sup>	DC power supply negative input.
2.	B+	DC power supply positive input	1.5mm <sup>2</sup>	DC power supply positive input.
3.	120Ω	RS485 communication port	0.5 mm <sup>2</sup>	Twisted shielded line is used. If the terminal needs to match 120Ω resistance, terminal 3 and 4 need to be short circuited.
4.	RS485B (-)			
5.	RS485A (+)			
6.	Aux. output port 1	Volt free relay N/O output	1.5 mm <sup>2</sup>	Capacity 250VAC/10A.
7.				
8.	Aux. output port 2	Volt free relay N/O output	1.5mm <sup>2</sup>	Capacity 250VAC/10A.
9.				
10.	Aux. output port 3	Volt free relay N/O output	1.5mm <sup>2</sup>	Capacity 250VAC/10A.
11.				
12.	Aux. output port 4	Volt free relay N/O output	1.5mm <sup>2</sup>	Capacity 250VAC/10A.
13.				
14.	Aux. output port 5	N/C	2.5mm <sup>2</sup>	Capacity 250VAC/16A.
15.		N/O		
16.		Common		
17.	Aux. output port 6	N/C	2.5mm <sup>2</sup>	Capacity 250VAC/16A.
18.		N/O		
19.		Common		



No.	Name	Description	Cable Size	Remarks
20.	Aux. output port 7	Volt free relay N/O output	1.5mm <sup>2</sup>	Capacity 250VAC/10A.
21.				
22.	Aux. output port 8	Volt free relay N/O output	1.5mm <sup>2</sup>	Capacity 250VAC/10A.
23.				
24.	Aux. output port 9	Volt free relay N/O output	1.5mm <sup>2</sup>	Capacity 250VAC/10A.
25.				
26.	Aux. output port 10	Volt free relay N/O output	1.5mm <sup>2</sup>	Capacity 250VAC/10A.
27.				
28.	Aux. output port 11	Volt free relay N/O output	1.5mm <sup>2</sup>	Capacity 250VAC/10A.
29.				
30.	Aux. output port 12	Volt free relay N/O output	1.5mm <sup>2</sup>	Capacity 250VAC/10A.
31.				
32.	Aux. output port 13	Volt free relay N/O output	1.5mm <sup>2</sup>	Capacity 250VAC/10A.
33.				
34.	Aux. output port 14	Volt free relay N/O output	1.5mm <sup>2</sup>	Capacity 250VAC/10A.
35.				
36.	Aux. output port 15	Common	2.5mm <sup>2</sup>	Capacity 250VAC/16A.
37.		N/O		
38.		N/C		
39.	Aux. output port 16	Common	2.5mm <sup>2</sup>	Capacity 250VAC/16A.
40.		N/O		
41.		N/C		
POWER	Power indicator			Light when power supply is normal, distinguish when abnormal.
Module Address	Module address			Select module address by DIP switch.



## 5 COMMUNICATION CONFIGURATION AND MODBUS COMMUNICATION PROTOCOL

### 5.1. RS485 COMMUNICATION PORT

DOUT16B-2 is an expansion output module with RS485 communication port, which follows Modbus-RTU communication protocol.

#### Communication Parameters

Module Address	100(range 100-115)
Baud Rate	9600bps
Data Bit	8-bit
Parity Bit	None
Stop Bit	2-bit

### 5.2. INFORMATION FRAME FORMAT EXAMPLE

#### 5.2.1. FUNCTION CODE 01H

Slave address is 64H (decimal 100), read 10H (decimal 16 ) status of starting address 64H (decimal 100).

**Table 5 Function Code 01H Master Request Example**

Request	Bytes	Example (Hex)
Slave address	1	64 Send to slave 100
Function code	1	01 Read status
Starting address	2	00 Starting address is 100 64
Count number	2	00 Read 16 status 10
CRC code	2	75 CRC code which calculated by master EC

**Table 6 Function Code 01H Slave Response Example**

Response	Bytes	Example (Hex)
Slave address	1	64 Respond slave address 100
Function code	1	01 Read status
Read count	1	02 16 status (total 2 bytes)
Data 1	1	01 The content of address 07-00
Data 2	1	00 The content of address 0F-08
CRC code	2	F4 CRC code which calculated by slave. 64

The value of status 07-00 is indicated as 01H in Hex, and 00000001 in binary. Status 07 is the high-order byte, 00 is the low-order byte. The state of status 07-00 is OFF-OFF-OFF-OFF-OFF-OFF-OFF-ON.





### 5.2.2. FUNCTION CODE 03H

Slave address is 64H (decimal 100), starting address is 1 data of 64H (decimal 100)(2 bytes per data).

**Table 7 Example Data Address**

Address	Data(Hex)
64H	1

**Table 8 Function Code 03H Master Request Example**

Request	Bytes	Example (Hex)
Slave address	1	64 Send to the slave 64H
Function code	1	03 Read point register
Starting address	2	00 Starting address is 64H 64
Count Number	2	00 Read 1 data (total 2 bytes) 01
CRC code	2	CC CRC code which calculated by master. 20

**Table 9 Function Code 03H Slave Response Example**

Response	Bytes	Example (Hex)
Slave address	1	64 Respond to the slave 64H
Function code	1	03 Read point register
Read count	1	02 1 data (total 2 bytes)
Data 1	2	00 The content of address 0064H 01
CRC code	2	35 CRC code which calculated by slave. 8C



### 5.2.3. FUNCTION CODE 05H

Slave address is 64H (decimal 100), starting address is one status of 64H (decimal 100). Set 64H unit as 1.

**Table 10 Example Status Data Address**

Address	Data(Hex)
64H	1

Illustration: Hex value FF00 forced status is 1. 0000H is forced as 0. Other values are illegal and do not affect the status.

**Table 11 Function Code 05H Master Request Example**

Request	Bytes	Example (Hex)
Slave address	1	64 Send to the slave 64H
Function code	1	05 Forced status
Starting address	2	00 Starting address is 0064H 64
Data	2	FF Set status as 1 00
CRC code	2	C4 CRC code which calculated by master. 10

**Table 12 Function Code 05H Slave Response Example**

Response	Bytes	Example (Hex)
Slave address	1	64 Send to the slave 64H
Function code	1	05 Forced status
Starting address	2	00 Starting address is 0064H 64
Data	2	FF Set status as 1 00
CRC code	2	C4 CRC code which calculated by master. 10



#### 5.2.4. FUNCTION CODE 06H

Slave address is 64H (decimal 100), set one point content of starting address 64H (decimal 100) as 0001H.

**Table 13 Function Code 06H Master Request Example**

Request	Bytes	Example (Hex)
Slave address	1	64 Send to the slave 64H
Function code	1	06 Write single register
Starting address	2	00 Starting address is 0064H 64
Data	2	00 Set 1 point data (total 2 bytes) 01
CRC code	2	00 CRC code which calculated by master. 20

**Table 14 Function Code 06H Slave Response Example**

Response	Bytes	Example (Hex)
Slave address	1	64 Send to the slave 64H
Function code	1	06 Write single register
Starting address	2	00 Starting address is 0064H 64
Data	2	00 Set 1 point data (total 2 bytes) 01
CRC code	2	00 CRC code which calculated by master. 20



### 5.3. CORRESPONDING ADDRESS TO FUNCTION CODE

**Table 15 Function Code 01H**

Address	Item	Description
100	Output Port 1 Status	1 for active
101	Output Port 2 Status	1 for active
102	Output Port 3 Status	1 for active
103	Output Port 4 Status	1 for active
104	Output Port 5 Status	1 for active
105	Output Port 6 Status	1 for active
106	Output Port 7 Status	1 for active
107	Output Port 8 Status	1 for active
108	Output Port 9 Status	1 for active
109	Output Port 10 Status	1 for active
110	Output Port 11 Status	1 for active
111	Output Port 12 Status	1 for active
112	Output Port 13 Status	1 for active
113	Output Port 14 Status	1 for active
114	Output Port 15 Status	1 for active
115	Output Port 16 Status	1 for active

**Table 16 Function Code 05H**

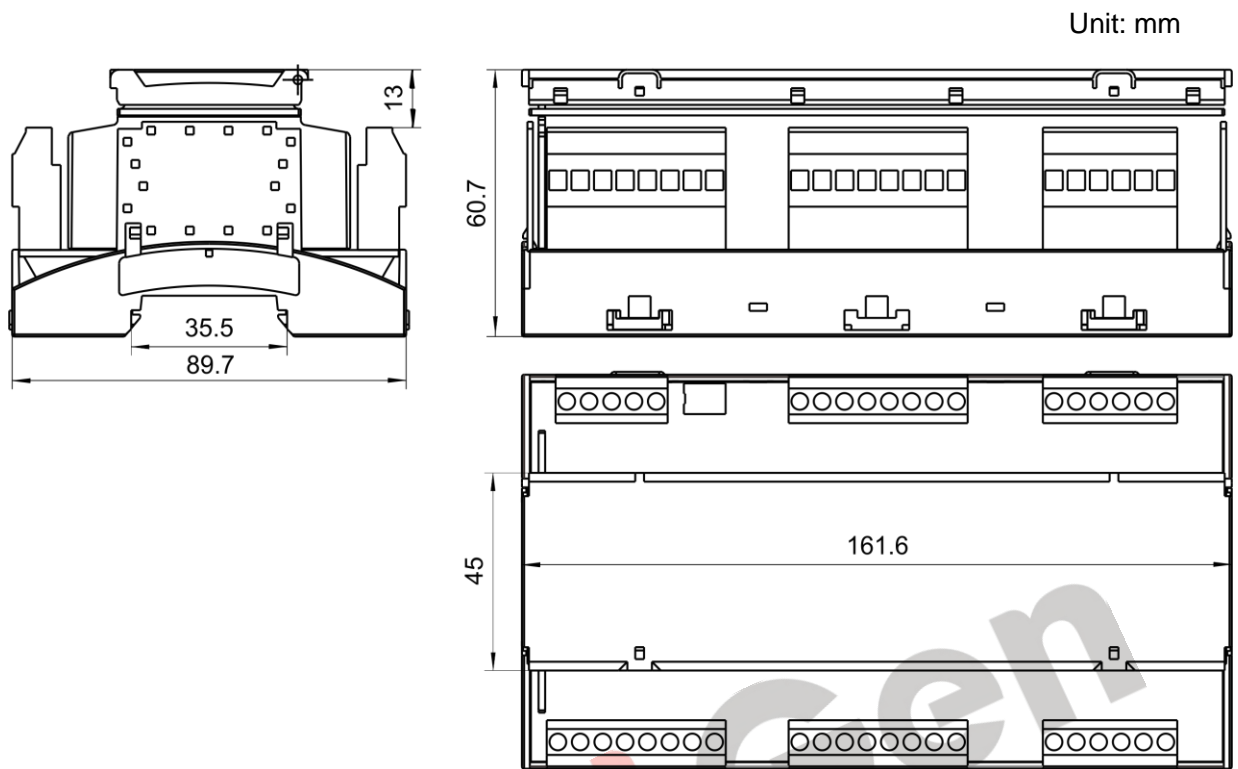
Address	Item	Description
100	Output Port 1 Status	1 for active
101	Output Port 2 Status	1 for active
102	Output Port 3 Status	1 for active
103	Output Port 4 Status	1 for active
104	Output Port 5 Status	1 for active
105	Output Port 6 Status	1 for active
106	Output Port 7 Status	1 for active
107	Output Port 8 Status	1 for active
108	Output Port 9 Status	1 for active
109	Output Port 10 Status	1 for active
110	Output Port 11 Status	1 for active
111	Output Port 12 Status	1 for active
112	Output Port 13 Status	1 for active
113	Output Port 14 Status	1 for active
114	Output Port 15 Status	1 for active
115	Output Port 16 Status	1 for active

**Table 17 Function Code 03H, 06H**

Address	Item	Description	Bytes
100	Output Port 1-16 Status	Unsigned	2Byte



## 6 INSTALLATION



**Fig.2 Case Dimensions**