

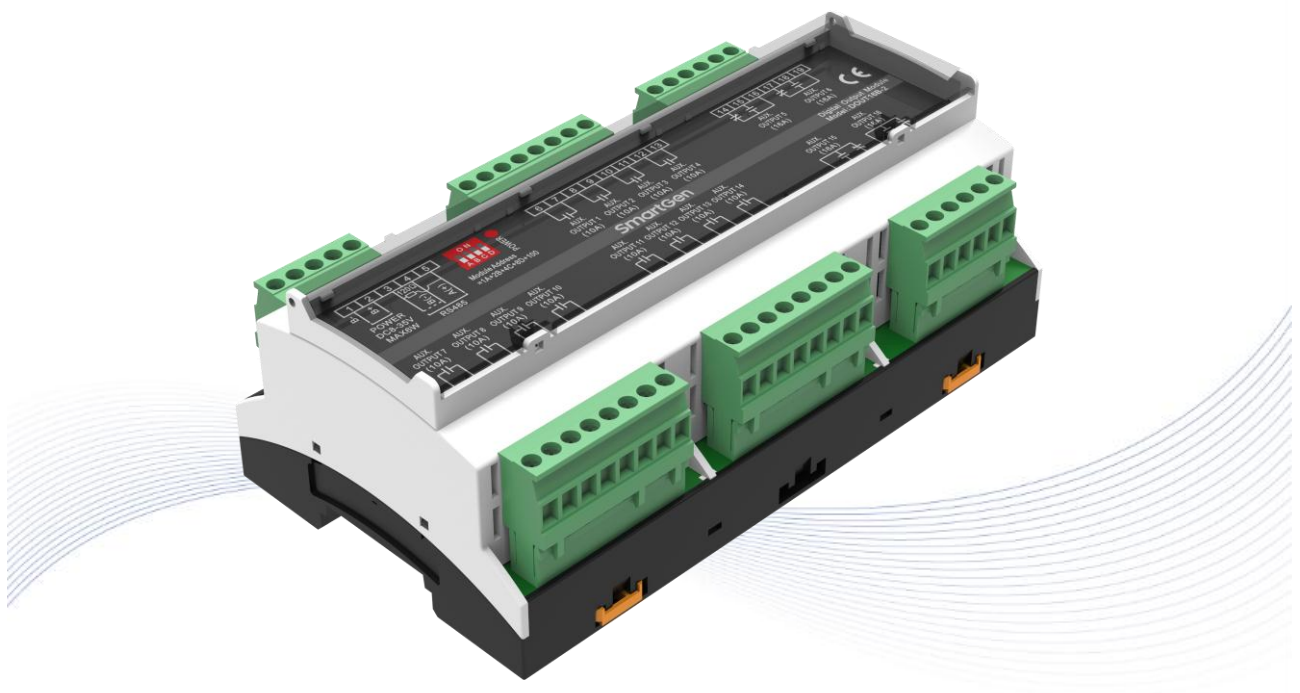
SmartGen

MAKING CONTROL SMARTER

DOUT16B-2

DIGITAL OUTPUT MODULE

USER MANUAL



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SMARTGEN(ZHENGZHOU)TECHNOLOGY CO.,LTD.

SmartGen 众智 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. |
| 2022-08-22 | 1.2 | Update company logo and manual format. |
| | | |

CONTENTS

| | | |
|--------|--|----|
| 1 | OVERVIEW | 4 |
| 2 | TECHNICAL PARAMETERS | 4 |
| 3 | MODULE ADDRESS | 5 |
| 4 | TERMINAL DIAGRAM | 6 |
| 5 | COMMUNICATION CONFIGURATION AND MODBUS COMMUNICATION PROTOCOL..... | 8 |
| 5.1. | RS485 COMMUNICATION PORT | 8 |
| 5.2. | INFORMATION FRAME FORMAT EXAMPLE | 8 |
| 5.2.1. | FUNCTION CODE 01H | 8 |
| 5.2.2. | FUNCTION CODE 03H | 9 |
| 5.2.3. | FUNCTION CODE 05H | 10 |
| 5.2.4. | FUNCTION CODE 06H | 11 |
| 5.3. | CORRESPONDING ADDRESS TO FUNCTION CODE..... | 12 |
| 6 | INSTALLATION | 13 |

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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 Temperature | (-25~+70)°C |
| Working Humidity | (20~93)%RH |
| Storage 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

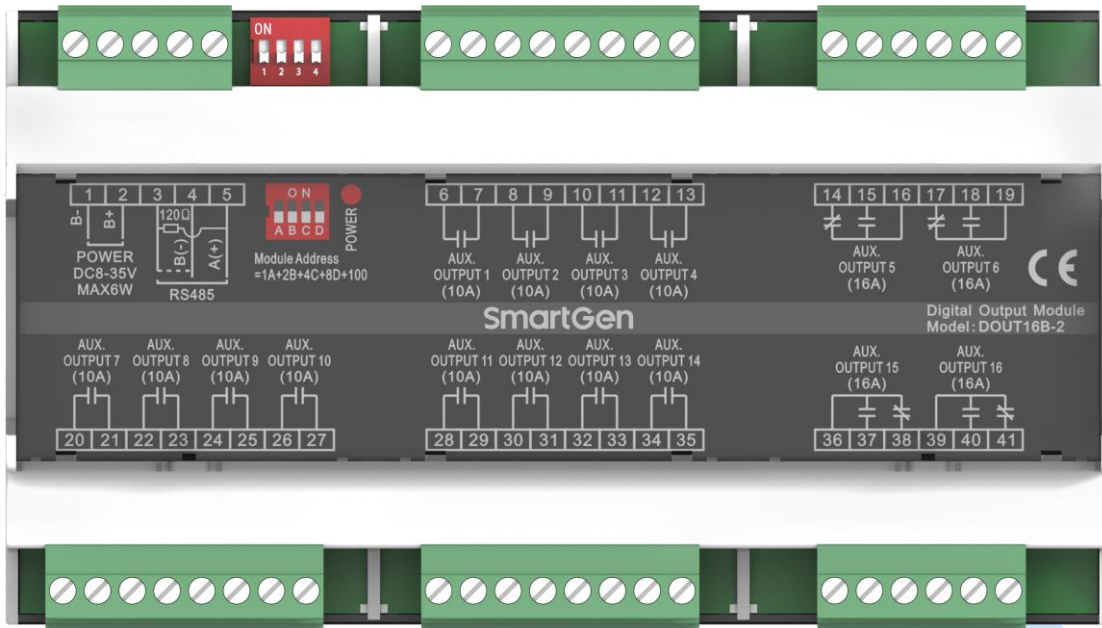


Fig.1 DOUT16B-2 Panel Diagram

Table 1 Description of Rear Panel Terminal Connection

| No. | Name | Description | Cable Size | Remarks |
|-----|--------------------|--------------------------------|---------------------|---|
| 1. | B- | DC power supply negative input | 1.5mm ² | DC power supply negative input. |
| 2. | B+ | DC power supply positive input | 1.5mm ² | DC power supply positive input. |
| 3. | 120Ω | RS485 communication port | 0.5 mm ² | 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 ² | Capacity 250VAC/10A. |
| 7. | | | | |
| 8. | Aux. output port 2 | Volt free relay N/O output | 1.5mm ² | Capacity 250VAC/10A. |
| 9. | | | | |
| 10. | Aux. output port 3 | Volt free relay N/O output | 1.5mm ² | Capacity 250VAC/10A. |
| 11. | | | | |
| 12. | Aux. output port 4 | Volt free relay N/O output | 1.5mm ² | Capacity 250VAC/10A. |
| 13. | | | | |
| 14. | Aux. output port 5 | N/C | 2.5mm ² | Capacity 250VAC/16A. |
| 15. | | N/O | | |
| 16. | | Common | | |
| 17. | Aux. output port 6 | N/C | 2.5mm ² | Capacity 250VAC/16A. |
| 18. | | N/O | | |
| 19. | | Common | | |
| 20. | Aux. output port 7 | Volt free relay N/O output | 1.5mm ² | Capacity 250VAC/10A. |
| 21. | | | | |

| No. | Name | Description | Cable Size | Remarks |
|----------------|---------------------|----------------------------|--------------------|---|
| 22. | Aux. output port 8 | Volt free relay N/O output | 1.5mm ² | Capacity 250VAC/10A. |
| 23. | | | | |
| 24. | Aux. output port 9 | Volt free relay N/O output | 1.5mm ² | Capacity 250VAC/10A. |
| 25. | | | | |
| 26. | Aux. output port 10 | Volt free relay N/O output | 1.5mm ² | Capacity 250VAC/10A. |
| 27. | | | | |
| 28. | Aux. output port 11 | Volt free relay N/O output | 1.5mm ² | Capacity 250VAC/10A. |
| 29. | | | | |
| 30. | Aux. output port 12 | Volt free relay N/O output | 1.5mm ² | Capacity 250VAC/10A. |
| 31. | | | | |
| 32. | Aux. output port 13 | Volt free relay N/O output | 1.5mm ² | Capacity 250VAC/10A. |
| 33. | | | | |
| 34. | Aux. output port 14 | Volt free relay N/O output | 1.5mm ² | Capacity 250VAC/10A. |
| 35. | | | | |
| 36. | Aux. output port 15 | Common | 2.5mm ² | Capacity 250VAC/16A. |
| 37. | | N/O | | |
| 38. | | N/C | | |
| 39. | Aux. output port 16 | Common | 2.5mm ² | 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 2 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 3 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 4 Example Data Address

| Address | Data (Hex) |
|---------|------------|
| 64H | 1 |

Table 5 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 6 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 7 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 8 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 9 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 10 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 11 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 12 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 13 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 14 Function Code 03H, 06H

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

6 INSTALLATION

Unit: mm

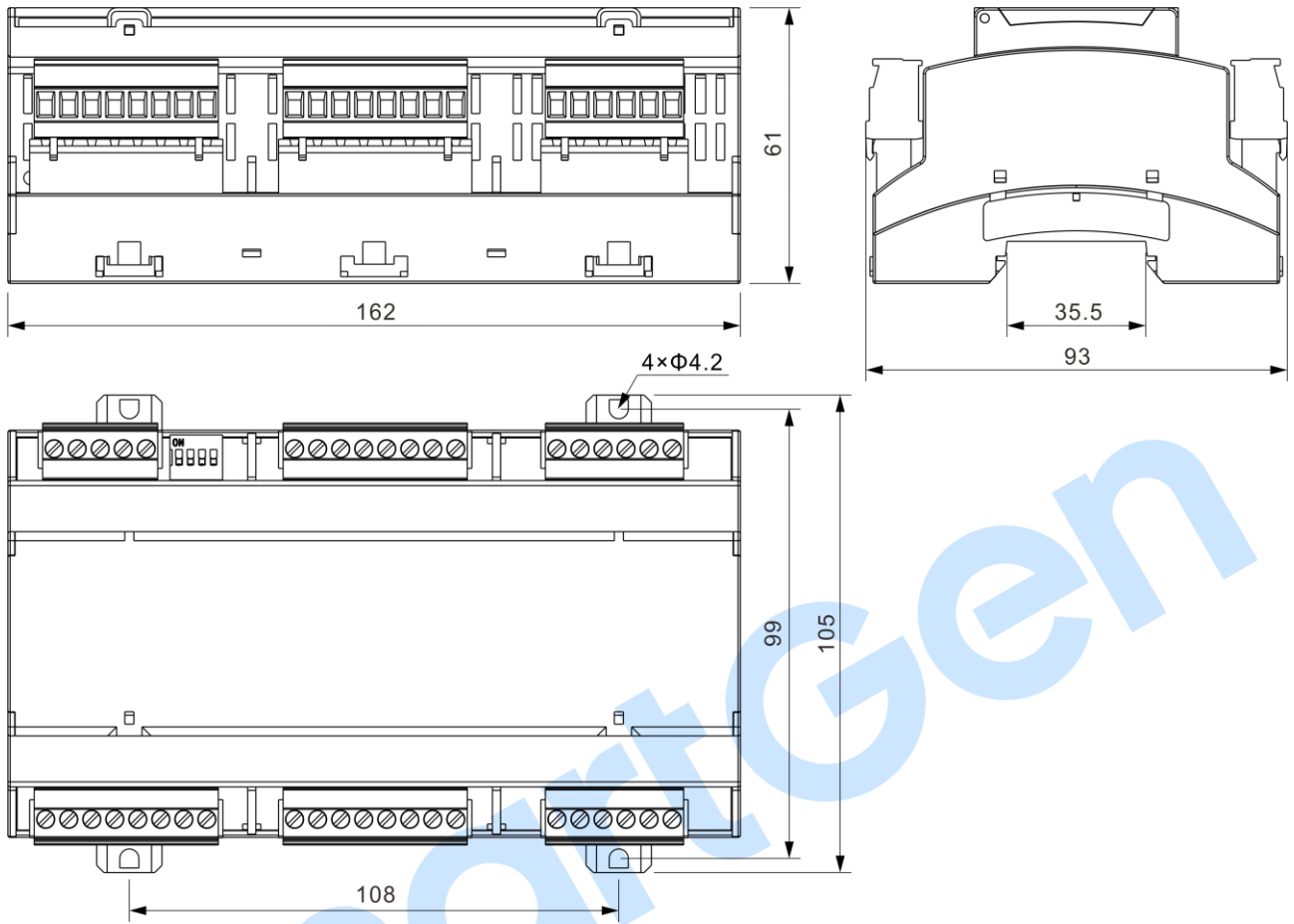


Fig.2 Case Dimensions