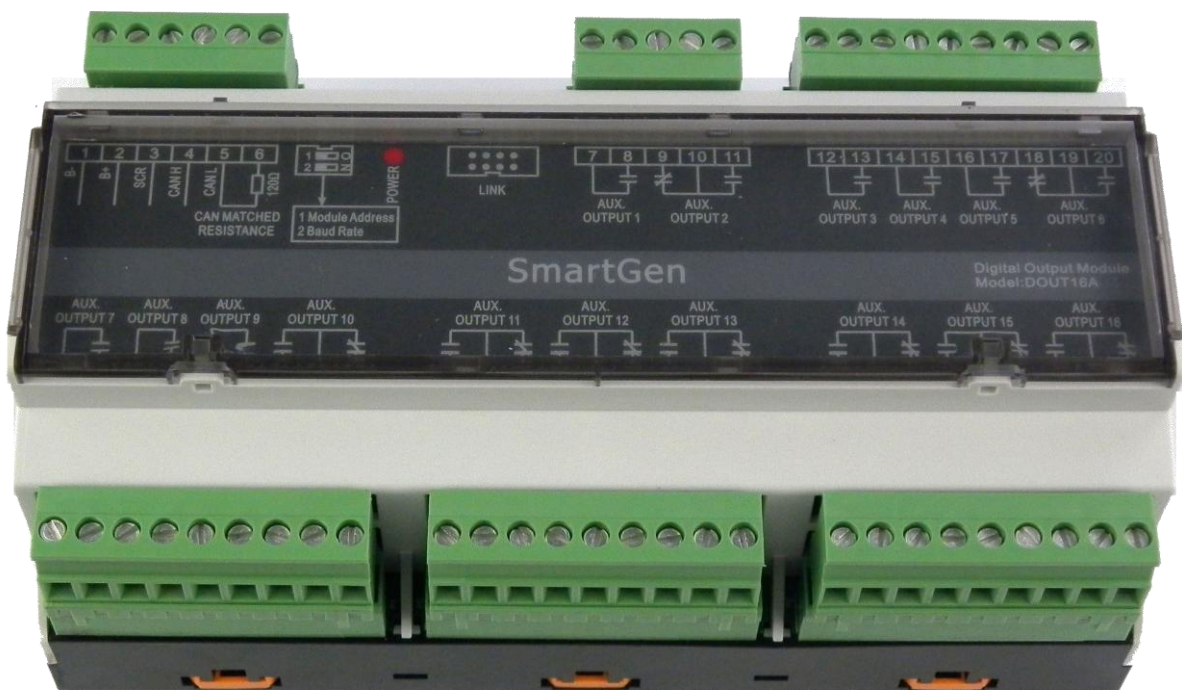


Smartgen®

DOUT16A DIGITAL OUTPUT MODULE

USER MANUAL



Smartgen Technology



众智电子 Chinese trademark

Smartgen[®] English trademark

Smartgen — make your generator *smart*

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If the colors of actual products are different from the manual, please take the actual product as the standard.

Software Version

Date	Version	Content
2014-06-10	1.0	Original release

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1 OVERVIEW



DOUT16A Digital Output Module is an expansion module which has 16 configurable digital output channels. DOUT16A data is transmitted to DOUT16A output module by HMC9000 for processing via CANBUS.

2 TECHNICAL PARAMETERS

Parameter	Contents
Working Voltage	DC18.0V~ DC35.0V continuous power supply.
Power Consumption	<5W
Auxiliary relay output 1-16	7A Connected to common output port.
Case Dimension	161.6mmX89.7mmX60.7mm
Guide Rail Dimension	35mm
Working conditions	Temperature: (-25~+70)°C Humidity: (20~93)%RH
Storage conditions	Temperature: (-25~+70)°C
Weight	0.60kg

3 PARAMETERS CONFIGURATION

The parameters of DOUT16A module can be set via HMC9000. Pressing  for 3 seconds will enter into configuration menu that allows setting all parameters, as follows.

 Note: Pressing  can exit setting directly during setting.

Parameter Configuration List

Parameter	Range	default value	Remarks
1. Output 1 Set	(0-190)	0: Not used	DOUT16A settings
2. Output 1 Type	(0-1)	0: Normally open	DOUT16A settings
3. Output 2 Set	(0-190)	0: Not used	DOUT16A settings
4. Output 2 Type	(0-1)	0: Normally open	DOUT16A settings
5. Output 3 Set	(0-190)	0: Not used	DOUT16A settings
6. Output 3 Type	(0-1)	0: Normally open	DOUT16A settings
7. Output 4 Set	(0-190)	0: Not used	DOUT16A settings
8. Output 4 Type	(0-1)	0: Normally open	DOUT16A settings
9. Output 5 Set	(0-190)	0: Not used	DOUT16A settings
10. Output 5 Type	(0-1)	0: Normally open	DOUT16A settings
11. Output 6 Set	(0-190)	0: Not used	DOUT16A settings
12. Output 6 Type	(0-1)	0: Normally open	DOUT16A settings
13. Output 7 Set	(0-190)	0: Not used	DOUT16A settings
14. Output 7 Type	(0-1)	0: Normally open	DOUT16A settings
15. Output 8 Set	(0-190)	0: Not used	DOUT16A settings
16. Output 8 Type	(0-1)	0: Normally open	DOUT16A settings
17. Output 9 Set	(0-190)	0: Not used	DOUT16A settings
18. Output 9 Type	(0-1)	0: Normally open	DOUT16A settings
19. Output 10 Set	(0-190)	0: Not used	DOUT16A settings
20. Output 10 Type	(0-1)	0: Normally open	DOUT16A settings
21. Output 11 Set	(0-190)	0: Not used	DOUT16A settings
22. Output 11 Type	(0-1)	0: Normally open	DOUT16A settings
23. Output 12 Set	(0-190)	0: Not used	DOUT16A settings
24. Output 12 Type	(0-1)	0: Normally open	DOUT16A settings
25. Output 13 Set	(0-190)	0: Not used	DOUT16A settings
26. Output 13 Type	(0-1)	0: Normally open	DOUT16A settings
27. Output 14 Set	(0-190)	0: Not used	DOUT16A settings
28. Output 14 Type	(0-1)	0: Normally open	DOUT16A settings
29. Output 15 Set	(0-190)	0: Not used	DOUT16A settings
30. Output 15 Type	(0-1)	0: Normally open	DOUT16A settings
31. Output 16 Set	(0-190)	0: Not used	DOUT16A settings
32. Output 16 Type	(0-1)	0: Normally open	DOUT16A settings

4 OUTPUT PORTS CONFIGURATION

4.1 OUTPUT PORT 1-16 CONFIGURATION

NO.	Items	Contents	Remarks
1	Feature set	(0-190)	
2	Active type	0: Close to activate 1: Open to activate	
3	Button output	0 Not used 1 Start button 2 Stop button 3 Reset button 4 Mute button 5 Local mode button 6 Remote mode button	If "feature set" is set as "User Configured", then the contents of items No.3~No.6 can be set via PC software.
4	Active period	Bit0: Not used Bit1: At rest Bit2: Preheating Bit3: Fuel on Bit4: Cranking Bit5: Crank rest Bit6: Safety on Bit7: Start idle Bit8: Warming up Bit9: Wait for load Bit10: Normal running Bit11: Cooling down Bit12: Stop idle delay Bit13: ETS hold Bit14: Wait For Stop Bit15: Fail to stop	
5	Output delay	(0-100.0)s	
6	Output time	(0-3600)s	

4.2 FUNCTION SETTING

NO.	Items	Description
00	Not used	
01	User Configured	See chapter 4.1.
02	Air flap	Action when over speed shutdown and emergence stop. It also can close the air inflow to stop the engine as soon as possible.
03	Audible alarm	Action when warning alarm or shutdown alarm occurs. Can be connected annunciator externally. When "alarm mute" configurable input port is active, it can remove the alarm.
04	ECU Power	Used for ECU engine.
05	ECU Stop	Used for ECU engine.
06	Crank Relay	Action when genset is starting and disconnect when crank success.
07	Fuel Relay	Action when genset is starting and disconnect in "wait for stop" delay.
08	ETS Hold	Action period: ETS hold delay.
09	Reserved	
10	Fuel Pump Control	It is controlled by fuel pump of level sensor's limited threshold.
11	Reserved	
12	Louver Control	Action when genset is starting and disconnect when stop is completed.
13	Loss of Speed	After safety on delay, the controller active when the engine speed is 0.
14	Heater Control	The controller disconnect when water temperature lower than minimum setting threshold value or higher than maximum setting threshold value.
15	Pre-lubricate	The controller output when the engine is in standby mode (user-defined output delay) if pre-lubrication input is active.
16	Remote PC Output	The controller output when remote control is active however disconnect when inactive.
17	Over Control	The controller output when it is in override mode.
18	Ready Go	The controller output when it is in standby mode and no alarms.
19	Reserved	
20	Idle Control	Action from "crank delay" to "start idle delay" and from "stop idle delay" to "wait for stop delay".
21	Pre-Supply Fuel	Action from "crank delay" to "safety on delay".
22	Raise Speed	Mechanical Governor: The controller output when Raise Speed Output is active however disconnect when inactive. ECU Governor: Users can govern speed via this port. User-defined rate.

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23	Drop Speed	Mechanical Governor: The controller output when Speed Droop Output is active however disconnect when inactive. ECU Governor: Users can govern speed via this port. User-defined rate.
24	Crank Again	The relay outputs when controller start failed and start secondary if the configuration is active (expansion relay is needed).
25	Power Change	Action when battery 1 voltage has fallen below the transfer value. Deactivate when battery 1 voltage has exceeded the transfer value.
26	Warming Up Control	The controller act from warming up delay to cooling down delay. (contrary to idle speed output)
27	Common Alarm	Action when genset common warning, common shutdown alarm.
28	Common Shutdown	Action when common shutdown alarm.
29	Common Warn	Action when common warning alarm.
30	Aux. Input 1 Active	Action when input port 1 is active.
31	Aux. Input 2 Active	Action when input port 2 is active.
32	Aux. Input 3 Active	Action when input port 3 is active.
33	Aux. Input 4 Active	Action when input port 4 is active.
34	Aux. Input 5 Active	Action when input port 5 is active.
35	Aux. Input 6 Active	Action when input port 6 is active.
36	Aux. Input 7 Active	Action when input port 7 is active.
37	Aux. Input 8 Active	Action when input port 8 is active.
38	Aux. Input 9 Active	Action when input port 9 is active.
39	Aux. Input 10 Active	Action when input port 10 is active.
40	Aux. Input 11 Active	Action when input port 11 is active.
41	Aux. Input 12 Active	Action when input port 12 is active.
42	Aux. Input 13 Active	Action when input port 13 is active.
43	Aux. Input 14 Active	Action when input port 14 is active.
44	Aux. Input 15 Active	Action when input port 15 is active.
45	Aux. Input 16 Active	Action when input port 16 is active.
46	Aux. Input 17 Active	Action when input port 17 is active.
47	Aux. Input 18 Active	Action when input port 18 is active.
48	Reserved	
49	Crank Success	The genset start when the engine speed reaches requirements.
50	Normal Running	The genset is normal running when the speed reaches rated requirements.
51	Remote Mode	The controller output in remote control mode.
52	Local Mode	The controller output in local mode.
53	Waiting For Load	The controller output in Waiting For Load delay.
54	Reserved	
55	Reserved	
56	Pulse Stop	Action during stop delay while deactivate after the delay.
57	AIN16 Com Fail	Action when the controller detects communication

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		failure with AIN16. (3s overtime)
58	DIN16A Com Fail	Action when the controller detects communication failure with DIN16A. (3s overtime)
59	RPU560A Com Fail	Action when the controller detects communication failure with RPU560 safeguard module. (1s overtime)
60	Reserved	Reserved
61	Reserved	Reserved
62	LA16 Com Fail	Action when the controller detects communication failure with LA16. (3s overtime)
63	ECU Com Fail	Action when the controller detects no ECU connection after ECU powered on.
64	ECU Warn	Action when the controller receives warning alarm from ECU.
65	ECU Shutdown	Action when the controller receives shutdown alarm from ECU.
66	Bat 1 Under Volt	Action when the controller detects that the battery 1 voltage has fallen below the set value.
67	Bat 2 Under Volt	Action when the controller detects that the battery 2 voltage has fallen below the set value.
68	Under Speed Warn	Action when under speed warning.
69	Under Speed Shutdown	Action when under speed shutdown alarm.
70	Over Speed Warn	Action when over speed warning.
71	Over Speed Shutdown	Action when over speed shutdown alarm
72	Emergency Stop	Action when emergency stop alarm.
73	Charge Alt Fail	Action when charge failure warning.
74	Reserved	
75	Failed To Start	Action when failed stop alarm.
76	Reserved	
77	Reserved	
78	Sensor 1 Open	Action when sensor 1 is open circuit.
79	Sensor 1 Warn	Action when sensor 1 warning alarm.
80	Sensor 1 Shutdown	Action when sensor 1 shutdown alarm.
81	Sensor 2 Open	Action when sensor 2 is open circuit.
82	Sensor 2 Warn	Action when sensor 2 warning alarm.
83	Sensor 2 Shutdown	Action when sensor 2 shutdown alarm.
84	Sensor 3 Open	Action when sensor 3 is open circuit.
85	Sensor 3 Warn	Action when sensor 3 warning alarm.
86	Sensor 3 Shutdown	Action when sensor 3 shutdown alarm.
87	Sensor 4 Open	Action when sensor 4 is open circuit.
88	Sensor 4 Warn	Action when sensor 4 warning alarm.
89	Sensor 4 Shutdown	Action when sensor 4 shutdown alarm.
90	Sensor 5 Open	Action when sensor 5 is open circuit.
91	Sensor 5 Warn	Action when sensor 5 warning alarm.
92	Sensor 5 Shutdown	Action when sensor 5 shutdown alarm.
93	Sensor 6 Open	Action when sensor 6 is open circuit.
94	Sensor 6 Warn	Action when sensor 6 warning alarm.
95	Sensor 6 Shutdown	Action when sensor 6 shutdown alarm.

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96	Sensor 7 Open	Action when sensor 7 is open circuit.
97	Sensor 7 Warn	Action when sensor 7 warning alarm.
98	Sensor 7 Shutdown	Action when sensor 7 shutdown alarm.
99	Sensor 8 Open	Action when sensor 8 is open circuit.
100	Sensor 8 Warn	Action when sensor 8 warning alarm.
101	Sensor 8 Shutdown	Action when sensor 8 shutdown alarm.
102	AIN16-1 Sensor 1 Open (expansion 1)	Action when sensor 1 opening circuit. (expansion 1)
103	AIN16-1 Sensor 1 Warn (expansion 1)	Action when sensor 1 warning alarm. (expansion 1)
104	AIN16-1 Sensor 1 Stop (expansion 1)	Action when sensor 1 shutdown alarm. (expansion 1)
105	AIN16-1 Sensor 2 Open (expansion 1)	Action when sensor 2 opening circuit. (expansion 1)
106	AIN16-1 Sensor 2 Warn (expansion 1)	Action when sensor 2 warning alarm. (expansion 1)
107	AIN16-1 Sensor 2 Stop (expansion 1)	Action when sensor 2 shutdown alarm. (expansion 1)
108	AIN16-1 Sensor 3 Open (expansion 1)	Action when sensor 3 opening circuit. (expansion 1)
109	AIN16-1 Sensor 3 Warn (expansion 1)	Action when sensor 3 warning alarm. (expansion 1)
110	AIN16-1 Sensor 3 Stop (expansion 1)	Action when sensor 3 shutdown alarm. (expansion 1)
111	AIN16-1 Sensor 4 Open (expansion 1)	Action when sensor 4 opening circuit. (expansion 1)
112	AIN16-1 Sensor 4 Warn (expansion 1)	Action when sensor 4 warning alarm. (expansion 1)
113	AIN16-1 Sensor 4 Stop (expansion 1)	Action when sensor 4 shutdown alarm. (expansion 1)
114	AIN16-1 Sensor 5 Open (expansion 1)	Action when sensor 5 opening circuit. (expansion 1)
115	AIN16-1 Sensor 5 Warn (expansion 1)	Action when sensor 5 warning alarm. (expansion 1)
116	AIN16-1 Sensor 5 Stop (expansion 1)	Action when sensor 5 shutdown alarm. (expansion 1)
117	AIN16-1 Sensor 6 Open (expansion 1)	Action when sensor 6 opening circuit. (expansion 1)
118	AIN16-1 Sensor 6 Warn (expansion 1)	Action when sensor 6 warning alarm. (expansion 1)
119	AIN16-1 Sensor 6 Stop (expansion 1)	Action when sensor 6 shutdown alarm. (expansion 1)
120	AIN16-1 Sensor 7 Open (expansion 1)	Action when sensor 7 opening circuit. (expansion 1)
121	AIN16-1 Sensor 7 Warn (expansion 1)	Action when sensor 7 warning alarm. (expansion 1)
122	AIN16-1 Sensor 7 Stop	Action when sensor 7 shutdown alarm. (expansion 1)

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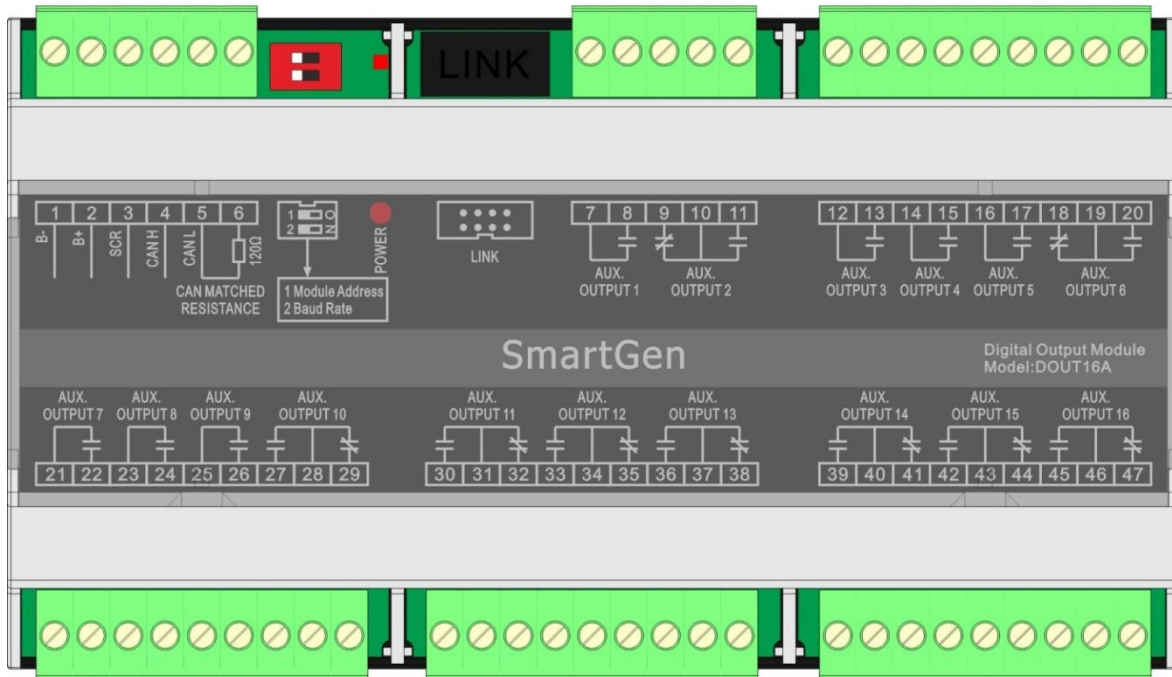
	(expansion 1)	1)
123	AIN16-1 Sensor 8 Open (expansion 1)	Action when sensor 8 opening circuit. (expansion 1)
124	AIN16-1 Sensor 8 Warn (expansion 1)	Action when sensor 8 warning alarm. (expansion 1)
125	AIN16-1 Sensor 8 Stop (expansion 1)	Action when sensor 8 shutdown alarm. (expansion 1)
126	AIN16-1 Sensor 9 Open (expansion 1)	Action when sensor 9 opening circuit. (expansion 1)
127	AIN16-1 Sensor 9 Warn (expansion 1)	Action when sensor 9 warning alarm. (expansion 1)
128	AIN16-1 Sensor 9 Stop (expansion 1)	Action when sensor 9 shutdown alarm. (expansion 1)
129	AIN16-1 Sensor 10 Open (expansion 1)	Action when sensor 10 opening circuit. (expansion 1)
130	AIN16-1 Sensor 10 Warn (expansion 1)	Action when sensor 10 warning alarm. (expansion 1)
131	AIN16-1 Sensor 10 Stop (expansion 1)	Action when sensor 10 shutdown alarm. (expansion 1)
132	AIN16-1 Sensor 11 Open (expansion 1)	Action when sensor 11 opening circuit. (expansion 1)
133	AIN16-1 Sensor 11 Warn (expansion 1)	Action when sensor 11 warning alarm. (expansion 1)
134	AIN16-1 Sensor 11 Stop (expansion 1)	Action when sensor 11 shutdown alarm. (expansion 1)
135	AIN16-1 Sensor 12 Open (expansion 1)	Action when sensor 12 opening circuit. (expansion 1)
136	AIN16-1 Sensor 12 Warn (expansion 1)	Action when sensor 12 warning alarm. (expansion 1)
137	AIN16-1 Sensor12 Stop (expansion 1)	Action when sensor 12 shutdown alarm. (expansion 1)
138	AIN16-1 Sensor 13 Open (expansion 1)	Action when sensor 13 opening circuit. (expansion 1)
139	AIN16-1 Sensor 13 Warn (expansion 1)	Action when sensor 13 warning alarm. (expansion 1)
140	AIN16-1 Sensor 13 Stop (expansion 1)	Action when sensor 13 shutdown alarm. (expansion 1)
141	AIN16-1 Sensor 14 Open (expansion 1)	Action when sensor 14 opening circuit. (expansion 1)
142	AIN16-1 Sensor 14 Warn (expansion 1)	Action when sensor 14 warning alarm. (expansion 1)
143	AIN16-1 Sensor 14 Stop (expansion 1)	Action when sensor 14 shutdown alarm. (expansion 1)
144	AIN16-1 Sensor 15 Open (expansion 1)	Action when sensor 15 opening circuit. (expansion 1)
145	AIN16-1 Sensor 15 Warn (expansion 1)	Action when sensor 15 warning alarm. (expansion 1)
146	AIN16-1 Sensor 15	Action when sensor 15 shutdown alarm. (expansion

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	Stop (expansion 1)	1)
147	AIN16-1 Sensor 16 Open (expansion 1)	Action when sensor 16 opening circuit. (expansion 1)
148	AIN16-1 Sensor 16 Warn (expansion 1)	Action when sensor 16 warning alarm. (expansion 1)
149	AIN16-1 Sensor 16 Stop (expansion 1)	Action when sensor 16 shutdown alarm. (expansion 1)
150	DIN16-1 Input 1 Active (expansion 1)	Action when input port 1 is active (expansion 1)
151	DIN16-1 Input 2 Active (expansion 1)	Action when input port 2 is active (expansion 1)
152	DIN16-1 Input 3 Active (expansion 1)	Action when input port 3 is active (expansion 1)
153	DIN16-1 Input 4 Active (expansion 1)	Action when input port 4 is active (expansion 1)
154	DIN16-1 Input 5 Active (expansion 1)	Action when input port 5 is active (expansion 1)
155	DIN16-1 Input 6 Active (expansion 1)	Action when input port 6 is active (expansion 1)
156	DIN16-1 Input 7 Active (expansion 1)	Action when input port 7 is active (expansion 1)
157	DIN16-1 Input 8 Active (expansion 1)	Action when input port 8 is active (expansion 1)
158	DIN16-1 Input 9 Active (expansion 1)	Action when input port 9 is active (expansion 1)
159	DIN16-1 Input 10 Active (expansion 1)	Action when input port 10 is active (expansion 1)
160	DIN16-1 Input 11 Active (expansion 1)	Action when input port 11 is active (expansion 1)
161	DIN16-1 Input 12 Active (expansion 1)	Action when input port 12 is active (expansion 1)
162	DIN16-1 Input 13 Active (expansion 1)	Action when input port 13 is active (expansion 1)
163	DIN16-1 Input 14 Active (expansion 1)	Action when input port 14 is active (expansion 1)
164	DIN16-1 Input 15 Active (expansion 1)	Action when input port 15 is active (expansion 1)
165	DIN16-1 Input 16 Active (expansion 1)	Action when input port 16 is active (expansion 1)
166~190	Reserved	

5 BACK PANEL

Panel drawing of DOUT16A:



Description of terminal connection:

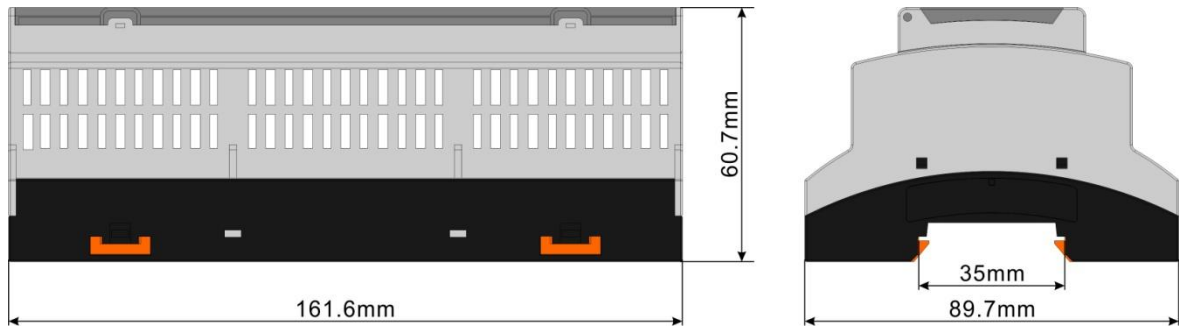
No.	Function	Cable Size	Description
1.	B-	2.5mm ²	DC power supply negative input.
2.	B+	2.5mm ²	DC power supply positive input.
3.	SCR (CANBUS)	0.5mm ²	Connect CANBUS communication port to expansion CAN port of HMC9000. Impedance-120Ω shielding wire with its one end grounded is recommended. There is 120Ω terminal resistance inside already; if needed, make terminal 5, 6 short circuits.
4.	CAN(H) (CANBUS)		
5.	CAN(L) (CANBUS)		
6.	120Ω		
7.	AUX OUTPUT 1	Auxiliary output port 1	Volts free output; rated current is 7A.
8.			
9.	AUX OUTPUT 2	Auxiliary output port 2	Volts free output; rated current is 7A.
10.			
11.	AUX OUTPUT 3	Auxiliary output port 3	Volts free output; rated current is 7A.
12.			
13.	AUX OUTPUT 4	Auxiliary output port 4	Volts free output; rated current is 7A.
14.			
15.			

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No.	Function	Cable Size	Description
16.	AUX OUTPUT 5	Auxiliary output port 5	Volts free output; rated current is 7A.
17.			
18.	AUX OUTPUT 6	Auxiliary output port 6	Volts free output; rated current is 7A.
19.			
20.			
21.	AUX OUTPUT 7	Auxiliary output port 7	Volts free output; rated current is 7A.
22.			
23.	AUX OUTPUT 8	Auxiliary output port 8	Volts free output; rated current is 7A.
24.			
25.	AUX OUTPUT 9	Auxiliary output port 9	Volts free output; rated current is 7A.
26.			
27.	AUX OUTPUT 10	Auxiliary output port 10	Volts free output; rated current is 7A.
28.			
29.			
30.	AUX OUTPUT 11	Auxiliary output port 11	Volts free output; rated current is 7A.
31.			
32.			
33.	AUX OUTPUT 12	Auxiliary output port 12	Volts free output; rated current is 7A.
34.			
35.			
36.	AUX OUTPUT 13	Auxiliary output port 13	Volts free output; rated current is 7A.
37.			
38.			
39.	AUX OUTPUT 14	Auxiliary output port 14	Volts free output; rated current is 7A.
40.			
41.			
42.	AUX OUTPUT 15	Auxiliary output port 15	Volts free output; rated current is 7A.
43.			
44.			
45.	AUX OUTPUT 16	Auxiliary output port 16	Volts free output; rated current is 7A.
46.			
47.			
PO- WER	Power Indicator		It is illuminated when the power supply is normal; otherwise, it is extinguished.
LINK	Upgrade Port		Upgrade program port
SWI- TCH	Function Selection		Address selection: It is module 1 when the switch 1 is connected to terminal 12 while module 2 when connect to ON terminal. Baud rate selection: It is 250kbps when the switch 2 is connected to terminal 12 while 125kbps when connect to ON terminal.

6 INSTALLATION

Case dimensions:



7 TROUBLESHOOTING

PROBLEM	POSSIBLE SOLUTION
Controller no response with power.	Check controller connection wirings.
CANBUS communication failure	Check wiring.
No output from output port	Check if output port settings are active.