

# HAT821 DUAL POWER BUS TIE CONTROLLER USER MANUAL



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# 3 SPECIFICATION

Table 2 – Performance Parameters

Items	Contents	
O a series Valence	1. DC8.0V~35.0V, continuous power supply	
Operating Voltage	2. AC(90~305	i)V power supply A1N1/A2N2
Power Consumption	<7W(Standby r	node:≤2W)
	AC system	
	3P4W (L-L)	(80~530)V
AC Voltage Input	3P3W (L-L)	(80~625)V DC supply
	1P2W (L-N)	(50~305)V
	2P3W (A-B)	(80~530)V
Rated Frequency	50/60Hz	
Programmble Output 1~6	16A AC250V	Volts free output
Relay Capacity	16A AC250V	voits free output
Programmble Output 7~12 8A AC250V Volts free output		olts free output
Relay Capacity	8A AC250V Voits free output	
Digital Input	GND (B-) connect is active.	
Communication	Dual-RS485 isolated interface, MODBUS Protocol	
Communication	2. D-type USB port	
Case Dimensions	260mmx180mmx54mm	
Panel Cutout	242mmx161mm	
W. I. S. O. P.	Temperature: (-	-25~+70)°C;
Working Conditions	Relative Humidity: (20~93)%RH	
Storage Condition	Temperature: (-25~+70)°C	
Protection Level	IP65: when water proof gasket ring inserted between panel and housing.	
	Apply AC1.5k\	voltage between high voltage terminal and low voltage
Insulation Strength	terminal;	
	The leakage current is not more than 3mA within 1min.	
Weight	1.2kg	



## 4 MEASURE AND DISPLAY DATA

Table 3 – Display Parameters

No.	Measure & Display Data Items	
1	S1/S2 Power Phase Voltage (L1-N,L2-N,L3-N)	
2	S1/S2 Power Line Voltage (L1-L2,L2-L3,L3-L1)	
3	S1/S2 Power Frequency	
4	S1 Total Supply Time	
5	S2 Total Supply Time	
6	LOAD1/LOAD2 Continuous Power Supply Time (Present)	
7	LOAD1/LOAD2 Continuous Power Supply Time (Last Time)	
8	LOAD1/LOAD2 Total Power Supply Time	
9	QS1 Total Close Times	
10	QS2 Total Close Times	
11	QTIE Total Close Times	
12	Inp ut/Output Port Status	
13	Real Time Clock	
14	Historical Records & Black Box Records	
15	Communication Status	

Table 4 - Identification & Abbreviations Explanation

No.	Identification & Abbreviations	Explanation
1	S1	S1 power
2	S2	S2 power
3	QS1	S1 side switch
4	QS2	S2 side switch
5	QTIE	Bus-tie switch
6	PF	Ready for close signal
7	СВ	Circuit breaker
8	LOAD1	Load 1
9	LOAD2	Load 2



#### 5 OPERATION



Fig.1 - Penal Indication Drawing

#### 5.1 INDICATORS

Table 5 – Indicators Description

Indicator Type	Description
	Slow flashing (1time per sec) when warn alarm occurs.
Alarm	Fast flashing (5 times per sec) when fault alarm occurs.
Man	Light on when the module is in Manual mode.
Auto	Light on when the module is in Auto mode.
	Illuminated: QS1 closed, QS2 closed, LOAD1 powered by S1, LOAD2
IOI	powered by S2.
	Flashing: status switching
110	Illuminated: QS1 closed, QTIE closed, LOAD1 and LOAD2 powered by S1.
IIO	Flashing: status switching
OII	Illuminated: QS1 closed, QS2 closed, LOAD1 and LOAD2 powered by S2.
OII	Flashing: status switching
100	Illuminated: QS1 closed, LOAD1 powered by S1, LOAD2 disconnect.
100	Flashing: status switching
001	Illuminated: QS2 closed, LOAD2 powered by S2, LOAD1 disconnect.



Indicator Type	Description	
	Flashing: status switching	
	Illuminated: QS1, QS2, QTIE are all open, LOAD1 and LOAD2 are	
000	disconnect.	
	Flashing: status switching	

## 5.2 KEY FUNCTION DESCRIPTION

Table 6 – Buttons Function Description

Icon	Buttons	Function Description	
	IOI	Active in Manual mode.  After pressing this key, QS1 will close, QTIE will open and QS2 will close, which means LOAD1 powered by S1 and LOAD2 powered by S2.	
	IIO	Active in Manual mode.  After pressing this key, QS1 will close, QTIE will close and QS2 will open, which means LOAD1 and LOAD2 powered by S1.	
	OII	Active in Manual mode.  After pressing this key, QS1 will open, QTIE will close and QS2 will close, which means LOAD1 and LOAD2 powered by S2.	
	100	Active in Manual mode.  After pressing this key, QS1 will close, QTIE will open and QS2 will open, which means LOAD1 powered by S1 and LOAD2 disconnect.	
F-1	001	Active in Manual mode.  After pressing this key, QS1 will open, QTIE will open and QS2 will close, which means LOAD2 powered by S2 and LOAD1 disconnect.	
H-4	000	Active in Manual mode.  After pressing this key, QS1 will open, QTIE will open and QS2 will open, which means LOAD1 and LOAD2 disconnect.	
@ @	Man/Auto	Manual mode and Auto mode switching.	
5	Alarm Reset	Pressing this key can reset fault alarm.	
<b>ラ/公</b>	Return/Homepage	When setting parameters, press the key to return back. In main screen, press the key to return the first screen; in other screen, hold and press the key to return to main screen.	
ф/ок	Set/Confirm	In main screen, press the key to enter to menu.  In menu screen, press this key can move cursor and confirm setting information.	



Icon	Buttons	Function Description
<b>A/</b> @	Up/Alarm Mute	In main screen, press the key to scroll up screen.  In menu interface, press this key to up cursor or increase value in setting menu.  Mute the alarm.
<b>▼/</b> ☆	Down/Lamp Test	In main screen, press the key to scroll down screen. In menu interface, press this key to down cursor or decrease value in setting menu. In main screen, press the key for seconds to enter lamp test mode, LCD backlit and all LED lamps are lit and LCD screen display black.





## 6 LCD DISPLAY

## 6.1 MAIN SCREEN

Table 6 – Screen Display

Items	Display Contents	
	S1 status, S2 status, Switch status;	
	Supply system diagram, QS1 is side switch for S1, QS2 is side switch for S2, QTIE is	
Цотородо	bus-tie switch;	
Homepage	S1/S2 voltage and frequency;	
	S1/S2 priority switch;	
	AutoTrans/Restore status	
S1	S1 line voltage, phase voltage and frequency;	
<b>**</b>	S1 total supply time.	
S2	S2 line voltage, phase voltage and frequency;	
<b>**</b>	S2 total supply time.	
LOAD1	LOAD1 continuous power supply time (present);	
لطلا	LOAD1 continuous power supply time (last time);	
	LOAD1 total power supply time.	
LOAD2	LOAD2 continuous power supply time (present);	
المالا	LOAD2 continuous power supply time (last time);	
	LOAD2 total power supply time.	
QF	QS1 Total Close Times;	
1111	QS2 Total Close Times;	
111	QTIE Total Close Times.	
I/O	Programmable digital input status and auxiliary status;	
_/_	Programmable digital output status.	
Comm.	RS485-1 Comm. status and baud rate;	
모그	RS485-2 Comm. status and baud rate;	
	USB Comm. status	
Alarms	Present alarm informations (Warn alarm and fault alarm)	
	Alarm status/working status;	
Status	Real-time clock;	
	Statusline is showed below in every main screen pages.	



## 7.3 DIGITAL INPUT/OUTPUT FUNCTION DESCRIPTION

# 7.3.1 INPUT PORTS FUNCTION

Table 18 – Input Ports Function Description

No.	Item	Description
0	Not Uesd	Invalid
		No matter the genset is in manual mode or auto mode, when the input
1	Forced Open	is active, this will force the breaker to transfer the ATS to OFF
		position. LOAD1 and LOAD2 disconnected.
2	Reserved	
3	Reserved	
		When active, all LED lights on the front panel are illuminated and the
4	Lamp Test	backlight of the LCD is illuminated while the LCD screen is black in
		color.
5	Reserved	
6	Reserved	
7	Reserved	
		Trip failure input, if input is active, controller will initiate "Breaker Trip
8	Breaker Trip Input	Fault" alarm, and forced enter into manual mode at the same time; if
		input is inactive, alarm can be reset manually.
		In Manual mode, S1 manual close is inhibited; if breaker already
9	S1 Close Inhibit	closed, users should open it manually. In Auto mode, if breaker
		already closed, then QS1 disconnect.
		In Manual mode, S2 manual close is inhibited; if breaker already
10	S2 Close Inhibit	closed, users should open it manually. In Auto mode, if breaker
		already closed, then QS2 disconnect.
11	QS1 Breaker PF Input	When the S1 PF input is active, S1 close relay will activated.
12	QS2 Breaker PF Input	When the S2 PF input is active, S2 close relay will activated.
13	Reserved	
14	Reserved	
15	Alarm Reset	Reset the current alarm.
16	Alarm Mute	Silence the audible alarm.
17	Reserved	
18	Reserved	
19	S1 Master Input	Set S1 master use compulsively.
20	S2 Master Input	Set S2 master use compulsively.
21	Forced Manual Mode	Set the controller in Manual mode compulsively.





No.	Item	Description
22	Forced Auto Mode	Set the controller in Auto mode compulsively.
23 P		Panel button operation are inhibited (Except Up, Down, Confirm, and
	Panel Lock	Return keys)
24	Reserved	
25	Reserved	
00		Simulate S1 voltage is normal; the S1 voltage abnormal delay is
26	Simulate S1 OK	deactivated.
0.7		Simulate S2 voltage is normal; the S2 voltage abnormal delay is
27	Simulate S2 OK	deactivated.
28	Reserved	
29	Reserved	
30	Reserved	
31	Reserved	
32	Reserved	
22	Auto Charge/Rec.	Auto charge/recover when the input active, auto transfer/nonrestore
33	-	when invalid.
34	Reserved	
		In Manual mode, QTIE manual close is inhibited; if breaker already
35	QTIE Close Inhibit	closed, users should open it manually. In Auto mode, if breaker
		already closed, then QTIE disconnect.
36	QTIE PF Input	When the QTIE PF input is active, QTIE close relay will activated.
37	Simulate KEY OOO	Same function with Panel OOO Key. Please use reset key to control
31		ATS to transfer to OOO.
38	Simulate KEY OOI	Same function with Panel OOI Key. Please use reset key to control
30		ATS to transfer to OOI.
39	Simulate KEY IOO	Same function with Panel IOO Key. Please use reset key to control
39		ATS to transfer to IOO.
40	Simulate KEY OII	Same function with Panel OII Key. Please use reset key to control
40		ATS to transfer to OII.
41	Simulate KEY IIO	Same function with Panel IIO Key. Please use reset key to control
41		ATS to transfer to IIO.
1	Simulate KEY IOI	Same function with Panel IOI Key. Please use reset key to control
12		ATS to transfer to IOI.
42		
42	Reserved	
42	Reserved Simulate Manual/Auto	



No.	Item	Description
45	Remote Control Inhibit	
46	QS1 Trip Fault	
47	QS2 Trip Fault	
48	QTIE Trip Fault	
49	S1 Supply QTIE Open	
50	S2 Supply QTIE Open	

## 7.3.2 OUTPUT PORTS FUNCTION

Table 17 – Output Ports Function Description

No.	Items	Description
0	Not Uesd	Invalid
1	Custom Combined 1	
2	Custom Combined 2	
3	Custom Combined 3	Output status please to see corresponding custom
4	Custom Combined 4	combination.
5	Custom Combined 5	
6	Custom Combined 6	
7	Reserved	
8	Reserved	
9	Reserved	
10	Reserved	
11	Common Alarm	It includes fault alarm and warn alarm.
12	Common Fault Alarm	It includes "Transition Fault" alarm, "Force Open Fault"
12	Common Fault Alaim	alarm and "Over Current" alarm.
13	Common Warn Alarm	It includes "Force Open Fault" alarm.
14	Transition Fault	It includes "QS1 Fail to Close" alarm, "QS1 Fail to Open" alarm, "QS2 Fail to Close" alarm, "QS2 Fail to Open" alarm, "QTIE Fail to Close" alarm, "QTIE Fail to Open" alarm.
		Action when common alarm occurs. Can be connected
15	Audible Alarm	annunciator externally. When "alarm mute" input is active or
		60s delay has expired, it can remove the alarm.
16	Reserved	
17	Reserved	
18	Reserved	
		Output before the load disconnect or switch transfer. Used
19	Elevator Control	for control the running elevator stop at the nearest floor until
		the switch transfer is terminated.
20	Reserved	
21	Reserved	
22	Reserved	





No.	Items	Description
23	S1 Available	·
		Output when S1 power is normal.
24	S1 Unavailable	Output when S1 power is abnormal.
25	S2 Available	Output when S2 power is normal.
26	S2 Unavailable	Output when S2 power is abnormal.
27	Reserved	
28	Reserved	
29	Reserved	
30	Auto Mode	Output when the genset is in Auto mode.
31	Manual Mode	Output when the genset is in Manual mode.
32	Reserved	
33	Reserved	
34	QS1 Close Control	Control the QS1 switch to close.
35	QS1 Open Control	Control the QS1 switch to open.
36	QS2 Close Control	Control the QS2 switch to close.
37	QS2 Open Control	Control the QS2 switch to open.
38	Reserved	
39	Reserved	
40	Reserved	
41	Reserved	
42	Reserved	
43	QTIE Closed Input	The close status of QTIE switch
44	Reserved	
45	QS1 Closed Input	The close status of S1 switch
46	QS2 Closed Input	The close status of S2 switch
47	Reserved	
48	Reserved	
49	Reserved	
50	Reserved	
51	Reserved	
52	Reserved	
53	Remote Control	Remote control the output via communication command.
54	Input 1 Status	
55	Input 2 Status	
56	Input 3 Status	
57	Input 4 Status	Aux. Input status.
58	Input 5 Status	Ada. input status.
59	Input 6 Status	
60	Input 7 Status	
61	Input 8 Status	
62	Reserved	



		HA 1821 Duai Power Bus Tie Controller User Manual
No.	Items	Description
63	Reserved	
64	S1 Blackout	
65	S1 Over Volt	
66	S1 Under Volt	
67	S1 Over Freq	S1 power supply status
68	S1 Under Freq	
69	S1 Loss Of Phase	
70	S1 Phase Seq Wrong	
71	Reserved	
72	Reserved	
73	S2 Blackout	
74	S2 Over Volt	
75	S2 Under Volt	
76	S2 Over Freq	S2 power supply status
77	S2 Under Freq	
78	S2 Loss of Phase	
79	S2 Phase Seq Wrong	
80	Reserved	
81	Reserved	
82	Reserved	
83	Reserved	
84	Switching	Output during the switch transfer process.
85	Reserved	
86	Reserved	
87	Reserved	
88	Reserved	
89	Breaker Trip Fault	
90	QS1 Trip Fault	
91	Reserved	
92	Reserved	
93	QTIE Trip Fault	
94	QTIE Close Control	Control QTIE to close
95	QTIE Open Control	Control QTIE to open



#### 11 ATS POWER SUPPLY

Switch Power Type can be set as DC Power or AC Power. If DC Power is selected, then the switch can be transferred at any time (even when both S1 and S2 are outage). If AC Power is selected, whether the power is normal or not should be judged according to the AN voltage status of S1 and S2 and AC power voltage.

The controller will intelligent control to supply when the power of ATS switch is from S1 and S2. As long as 1 voltage of S1 and S2 is normal, the controller can ensure ATS voltage power normal and can be transferred properly. When ATS voltage power is from LO and NO, it will send close/open signal only if the controller detects voltage power normal.

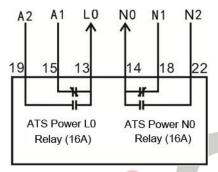


Fig.2 - Internal Wiring of ATS Power LO-NO Output



#### 13 TERMINALS



Fig.3 - Controller Rear Panel Drawing

Table 23 – Inputs/Outputs Function Description

No.	Items	Description	Remark
1			Default: QS1 Close Control
	AUX.OUTPUT1	Relay Output1	Volts free; Relay contact; Normally
2			Open output. Capacity: 250V16A
3			Default: QS1 Open Control
4	AUX.OUTPUT2	Relay Output2	Volts free; Relay contact; Normally
4			Open output. Capacity: 250V16A
5			Default: QS2 Close Control
6	AUX.OUTPUT3	Relay Output3	Volts free; Relay contact; Normally
6			Open output. Capacity: 250V16A
7			Default: QS2 Open Control
	AUX.OUTPUT4	Relay Output4	Volts free; Relay contact; Normally
8			Open output. Capacity: 250V16A
9	AUX.OUTPUT5	Relay Output5	Default: QTIE Close Control



No. Items Description Remark  Volts free; Relay contact; Normally Open output. Capacity: 250V16A  11		lideas for power	HAT821 Dual Power Bus Tie Controller User Manual		
Open output. Capacity: 250V16A	No.	Items	Description	Remark	
Copen output. Capacity: 250V16A	10			Volts free; Relay contact; Normally	
AUX.OUTPUT6 Relay Output6 Volts free; Relay contact; Normally Open output. Capacity: 250V16A  LO ATS Power L  ANO ATS Power N  S1 A1  S1 AC System 3P4W voltage input  Voltage input  Power supply for ATS switching  For single phase, only connect A1, N1  Por single phase, only connect A2, N2  C2 S2 AC System 3P4W voltage input  Por single phase, only connect A2, N2  C2 N2  Relay Voltage input  For single phase, only connect A2, N2  C2 N2  Power supply for ATS switching  For single phase, only connect A1, N1  For single phase, only connect A2, N2  C2 N2  C3 Connect to DC negative pole  Ground terminal  C3 Close B4  C3 Close Status Input  C4 Close Status Input  C5 Close Status Input  C6 Close Status Input  C7 Close Status Input  C8 Close Status Input  C8 Close Status Input  C7 Clound connected is active.  C8 Close Status Input  C7 Clound connected is active.  C8 Close Status Input  C7 Clound connected is active.  C8 Close Status Input  C8 Close Status Input  C8 Close Status Input  C8 Close Status Input  C9 Close Status, volts free, relay contact.  C8 Close Status, volts free, relay contact.  C9 Close Status, volts free, relay contac	-			Open output. Capacity: 250V16A	
12 Open output. Capacity: 250V16A 13 LO ATS Power L 14 NO ATS Power N 15 A1 16 B1 S1 AC System 3P4W 17 C1 voltage input 18 N1 19 A2 20 B2 S2 AC System 3P4W 21 C2 voltage input 27 B- 28 B+ 29 Connect to DC negative pole INPUT 29 QS1 Close Status Input 30 QS2 CLOSE INPUT 31 QTIE CLOSE INPUT 31 QTIE CLOSE INPUT 32 NC 33 AUX. INPUT 1 34 AUX. INPUT 2 35 AI 15 A1 16 B1 S1 AC System 3P4W 17 C1 voltage input 31 Power supply for ATS switching 32 For single phase, only connect A1, N1 4 For single phase, only connect A2, N2 5 For single phase, only connect A2, N2 5 For single phase, only connect A2, N2 6 For single phase, only connect A2, N2 6 For single phase, only connect A2, N2 7 For s	11			Default: QTIE Open Control	
Open output. Capacity: 250V16A  13 LO ATS Power L  14 NO ATS Power N  15 A1  16 B1 S1 AC System 3P4W  17 C1 voltage input  18 N1  19 A2  20 B2 S2 AC System 3P4W  21 C2 voltage input  28 B- Connect to DC negative pole  B- Connect to DC positive pole  CS1 CLOSE INPUT  AS2 Close Status Input  CS2 Close Status Input  CTIE CLOSE INPUT  AUX. INPUT 1  Digital Intput2  Open output. Capacity: 250V16A  Power supply for ATS switching  Por single phase, only connect A1, N1  For single phase, only connect A2, N2  Power supplied by contend terminal  For single phase, only connect A2, N2  Power supplied by contend terminal  For single phase, only connect A2, N2  Power supplied by contend terminal  For single phase, only connect A2, N2  Power supplied by contend terminal  For single phase, only connect A2, N2  Power supplied by contend terminal  For single phase, only connect A2, N2  Power supplied by contend terminal  For single phase, only connect A1, N1  For single phase, only connect A2, N2  Power supplied by contend terminal  For single phase, only connect A1, N1  For single phase, only connect A1, N1  For single phase, only connect A2, N2  Power supplied by contend terminal  For single phase, only connect A1, N1  For single phase, only connect A1, N1  For single phase, only connect A2, N2  For single phase, only connect A1, N1  For single phase, only connect A2, N2  For	12	AUX.OUTPUT6	Relay Output6	Volts free; Relay contact; Normally	
14	12			Open output. Capacity: 250V16A	
14 NO ATS Power N 15 A1 16 B1 S1 AC System 3P4W voltage input 17 C1 voltage input 18 N1 19 A2 20 B2 S2 AC System 3P4W voltage input 21 C2 voltage input 22 N2 23 N2 24 Connect to DC negative pole 25 B- Connect to DC positive pole 26 B+ Connect to DC positive pole 27 B- Connect to DC positive pole 28 B+ Connect to DC positive pole 29 QS1 CLOSE INPUT 29 QS2 CLOSE INPUT 20 QS2 CLOSE INPUT 30 QTIE CLOSE INPUT 40 QS2 Close Status Input 41 QTIE CLOSE INPUT 42 QTIE Close Status Input 43 AUX. INPUT 1 44 Digital Intput2 45 Default: QS2 Trip Fault Ground connected is active. 46 Default: QS2 Trip Fault Ground connected is active. 47 Default: QS2 Trip Fault Ground connected is active. 48 Default: QS2 Trip Fault Ground connected is active. 49 Default: QS2 Trip Fault Ground connected is active. 50 Default: QS2 Trip Fault Ground connected is active. 51 Default: QS2 Trip Fault Ground connected is active. 52 Default: QS2 Trip Fault Ground connected is active. 53 Default: QS2 Trip Fault Ground connected is active. 54 Default: QS2 Trip Fault Ground connected is active. 55 Default: QS2 Trip Fault Ground connected is active.	13	LO	ATS Power L	Power supply for ATS switching	
Stack System 3P4W   Voltage input   For single phase, only connect A1, N1	14	NO	ATS Power N	1 ower supply for A13 switching	
TO C1  18 N1  19 A2  20 B2  21 C2  N2  18 Por single phase, only connect A1, N1  19 A2  20 B2  21 C2  N2  19 Por single phase, only connect A2, N2  22 N2  23 Por single phase, only connect A2, N2  24 Por single phase, only connect A2, N2  25 Por single phase, only connect A2, N2  26 Por single phase, only connect A2, N2  27 B-  Connect to DC negative pole  Connect to DC positive pole  Connect to DC positive pole  Connect QS1 close status, volts free, relay contact.  Ground connected is active.  Detect QS2 close status, volts free, relay contact.  Ground connected is active.  Detect QTIE close status, volts free, relay contact.  Ground connected is active.  Detect QTIE close status, volts free, relay contact.  Ground connected is active.  Detect QTIE close status, volts free, relay contact.  Ground connected is active.  Detect QTIE close status, volts free, relay contact.  Ground connected is active.  Defeault: Forced Open  Ground connected is active.  Default: QS1 Trip Fault  Ground connected is active.  Default: QS2 Trip Fault  Ground connected is active.	15	A1			
17 C1 18 N1 19 A2 20 B2 21 C2 22 N2 27 B-  Connect to DC negative pole  Connect to DC positive pole  B+  Connect to DC positive pole  QS1 CLOSE INPUT  QS2 CLOSE INPUT  QS2 CLOSE INPUT  QS2 Close Status Input  QTIE CLOSE Status Input  QTIE CLOSE INPUT  QTIE Close Status	16	B1	S1 AC System 3P4W	For single phase, only connect A1, N1	
Section   Sect	17	C1	voltage input	For single phase, only connect A1, N1	
S2 AC System 3P4W voltage input   For single phase, only connect A2, N2	18	N1			
21 C2 22 N2 23 N2 24 Connect to DC negative pole 25 Part of DC (8-35)V; Power supplied by controller. 26 Part of DC (8-35)V; Power supplied by controller. 27 Part of DC (8-35)V; Power supplied by controller. 28 Part of DC (8-35)V; Power supplied by controller. 29 Part of DC (8-35)V; Power supplied by controller. 29 Part of DC (8-35)V; Power supplied by controller. 29 Part of DC (8-35)V; Power supplied by controller. 29 Part of DC (8-35)V; Power supplied by controller. 29 Part of DC (8-35)V; Power supplied by controller. 20 Pattern of DC (8-35)V; Power supplied by controller. 20 Pattern of DE (8-35)V; Power supplied by controller. 20 Pattern of DE (8-35)V; Power supplied by controller. 20 Pattern of DE (8-35)V; Power supplied by controller. 20 Pattern of DE (8-35)V; Power supplied by controller. 21 Pattern of Detect QS1 close status, volts free, relay contact. 22 Pattern of Detect QS2 close status, volts free, relay contact. 23 Pattern of Detect QTIE close status, volts free, relay contact. 24 Pattern of Detect QS2 close status, volts free, relay contact. 25 Pattern of Detect QS2 close status, volts free, relay contact. 26 Pattern of Detect QS2 close status, volts free, relay contact. 27 Pattern of Detect QS2 close status, volts free, relay contact. 28 Pattern of Detect QS2 close status, volts free, relay contact. 29 Pattern of Detect QS2 close status, volts free, relay contact. 29 Pattern of Detect QS2 close status, volts free, relay contact. 29 Pattern of Detect QS2 close status, volts free, relay contact. 29 Pattern of Detect QS2 close status, volts free, relay contact. 20 Pattern of Detect QS2 close status, volts free, relay contact. 20 Pattern of Detect QS2 close status, volts free, relay contact. 20 Pattern of Detect QS2 close status, volts free, relay contact. 20 Pattern of Detect QS2 close status, volts free, relay contact. 21 Pattern of Detect QS2 close status, volts free, relay contact. 22 Pattern of Detect QS2 close status, volts free, relay contact. 23 Pattern of Detect QS2 close status, volts free,	19	A2			
21 C2 22 N2 23 N2 26 Re- 27 Connect to DC negative pole 28 B+ 29 Connect to DC positive pole 29 INPUT 29 QS1 CLOSE INPUT 29 QS2 CLOSE INPUT 20 QS2 CLOSE INPUT 20 QS2 CLOSE INPUT 20 QS2 CLOSE INPUT 20 QS2 CLOSE INPUT 21 QS2 Close Status Input 22 QS3 Close Status Input 23 QS3 CLOSE INPUT 24 QS3 Close Status Input 25 QS4 Close Status Input 26 QS5 CLOSE INPUT 27 QS5 Close Status Input 28 QS5 Close Status Input 29 QS5 CLOSE INPUT 29 QS5 Close Status Input 29 QS5 Close Status Input 29 QS5 Close Status Input 20 QS5 CLOSE INPUT 20 QS6 Close Status Input 20 QS6 Close Status Input 21 QS7 Close Status Input 22 QS7 Close Status Input 23 QTIE Close Status Input 24 QTIE Close Status Input 25 QTIE Close Status Input 26 QTIE Close Status Input 27 QTIE Close Status Input 28 QTIE Close Status Input 29 QS6 Close Status Input 29 QS6 Close Status Input 20 QS6 Close Status Input 20 QS6 Close Status Input 20 QTIE Close Status Input 20 QTIE Close Status Input 20 QTIE Close Status Input 21 QTIE Close Status Input 22 QTIE Close Status Input 23 QTIE Close Status Input 24 QTIE Close Status Input 25 QTIE Close Status Input 26 QS6 Close Status Input 26 QS6 Close Status Input 27 QTIE Close Status Input 28 QS6 Close Status Input 29 QS6 Close Status Input 20 QS6 Close Status Inp	20	B2	S2 AC System 3P4W	For single phase, only several A2 N2	
B- Connect to DC negative pole Ground terminal  B+ Connect to DC positive pole Controller.  QS1 CLOSE INPUT  QS1 CLOSE Status Input  QS2 CLOSE INPUT  QS2 CLOSE INPUT  QS2 CLOSE INPUT  QS3 CLOSE INPUT  QS3 CLOSE INPUT  QS4 CLOSE INPUT  QS5 CLOSE INPUT  QS5 CLOSE INPUT  QS5 CLOSE INPUT  QS6 CLOSE INPUT  QS7 CLOSE INPUT  QS7 CLOSE INPUT  QS8 CLOSE Status Input  QS8 CLOSE INPUT  QS9 CLOSE Status Input  QS9 CLOSE Status Input  QS9 CLOSE INPUT  QTIE CLOSE INPUT  QTIE CLOSE INPUT  QTIE CLOSE Status Input  QTIE Close Status Input  AUX. INPUT 1  Digital Intput1  Default: Forced Open Ground connected is active.  Default: QS1 Trip Fault Ground connected is active.  Default: QS2 Trip Fault Ground connected is active.  Default: QS2 Trip Fault Ground connected is active.	21	C2	voltage input	For single phase, only connect A2, N2	
B- pole  B+ Connect to DC positive pole  QS1 CLOSE INPUT  QS2 CLOSE INPUT  QS2 CLOSE INPUT  QS2 CLOSE INPUT  QS3 Close Status Input  QS4 Close Status Input  QS5 Close Status Input  QS5 Close Status Input  QS5 Close Status Input  QS6 Close Status Input  QS7 Close Status Input  QS8 Close Status Input  QS8 Close Status Input  QS9 Close Status Input  QTIE CLOSE INPUT  QTIE Close Status Input  Defect QTIE close status, volts free, relay contact.  Ground connected is active.  This terminal is not defined.  Default: Forced Open  Ground connected is active.  Default: QS1 Trip Fault  Ground connected is active.  Default: QS2 Trip Fault  Ground connected is active.	22	N2			
B+ Connect to DC positive pole Controller.  QS1 CLOSE QS1 Close Status Input Pole INPUT  QS2 CLOSE INPUT  QS2 CLOSE INPUT  QS2 CLOSE INPUT  QS2 Close Status Input  QS3 Close Status Input  QS3 Close Status Input  QS3 Close Status Input  QS4 Close Status Input  QS5 Close Status Input  QS5 Close Status Input  QS5 Close Status Input  QS5 Close Status Input  QTIE Close Status Input  QTIE Close Status Input  QTIE Close Status Input  QTIE Close Status Input  AUX. INPUT 1  Digital Intput1  AUX. INPUT 2  Digital Intput3  Digital Intput3  Digital Intput3  DC(8-35)V; Power supplied by controller.  Detect QS1 close status, volts free, relay contact.  Ground connected is active.  Detect QTIE close status, volts free, relay contact.  Ground connected is active.  Default: Forced Open Ground connected is active.  Default: QS1 Trip Fault Ground connected is active.  Default: QS2 Trip Fault Ground connected is active.	07	B-		Convert to make a	
28 B+ Connect to DC positive pole controller.  29 QS1 CLOSE INPUT  QS2 CLOSE INPUT  QS3 CLOSE INPUT  QS3 CLOSE INPUT  QS3 CLOSE INPUT  QS4 CLOSE INPUT  QS5 CLOSE INPUT  QS5 CLOSE INPUT  QS5 CLOSE INPUT  QS6 CLOSE INPUT  QS7 CLOSE INPUT  QS7 CLOSE INPUT  QS8 CLOSE Status Input  QS8 CLOSE Status Input  QS8 CLOSE INPUT  QS9 CLOSE Status Input  QS9 Close Status, volts free, relay contact.  Ground connected is active.  Detect QTIE close status, volts free, relay contact.  Ground connected is active.  This terminal is not defined.  Default: Forced Open  Ground connected is active.  Default: QS1 Trip Fault  Ground connected is active.  Default: QS2 Trip Fault  Ground connected is active.	27			Ground terminal	
QS1 CLOSE INPUT  QS1 CLOSE INPUT  QS2 CLOSE INPUT  QS2 CLOSE INPUT  QS2 CLOSE INPUT  QS2 CLOSE INPUT  QS3 Close Status Input  QS4 Close Status Input  QS5 Close Status Input  QS5 Close Status Input  QS5 Close Status Input  QS6 Close Status Input  QS8 Close Status Input  QS8 Close Status Input  QS9 Close Status Input	28	D.	Connect to DC positive pole	DC(8-35)V; Power supplied by	
29 INPUT  QS1 CLOSE INPUT  QS2 Close Status Input  QS3 Close Status Input  QS4 Close Status Input  QS5 Close Status Input  QS5 Close Status Input  QS5 Close Status Input  QS5 Close Status Input  QS6 Close Status Input  QS8 Close Status Input  QS9 Close Stat	20	D1	Connect to Bo positive pole	controller.	
Ground connected is active.  QS2 CLOSE INPUT  QS2 CLOSE QS2 Close Status Input  QS2 CLOSE INPUT  QS2 CLOSE Status Input  QTIE CLOSE QTIE Close Status Input  INPUT  QTIE CLOSE QTIE Close Status Input  INPUT  QTIE Close Status Input  AUX. INPUT 1  Digital Intput1  AUX. INPUT 2  Digital Intput2  AUX. INPUT 3  Digital Intput3  Ground connected is active.  Default: Forced Open Ground connected is active.  Default: QS1 Trip Fault Ground connected is active.  Default: QS2 Trip Fault Ground connected is active.			QS1 Close Status Input	Detect QS1 close status, volts free,	
OS2 CLOSE INPUT  QS2 Close Status Input  QS2 Close Status Input  QS2 Close Status Input  QTIE CLOSE INPUT  QTIE CLOSE INPUT  QTIE Close Status Input  AUX. INPUT 1  Digital Intput1  Digital Intput2  Default: QS2 close status, volts free, relay contact.  Ground connected is active.  Default: Forced Open  Ground connected is active.  Default: QS1 Trip Fault  Ground connected is active.  Default: QS2 Trip Fault  Ground connected is active.  Default: QS2 Trip Fault  Ground connected is active.	29			relay contact.	
30				Ground connected is active.	
30 INPUT QS2 Close Status Input relay contact. Ground connected is active.  Detect QTIE close status, volts free, relay contact. Ground connected is active.  Detect QTIE close status, volts free, relay contact. Ground connected is active.  This terminal is not defined.  Default: Forced Open Ground connected is active.  Default: QS1 Trip Fault Ground connected is active.  Default: QS2 Trip Fault Ground connected is active.  Default: QS2 Trip Fault Ground connected is active.			QS2 Close Status Input	Detect QS2 close status, volts free,	
Ground connected is active.  Detect QTIE close status, volts free, relay contact. Ground connected is active.  This terminal is not defined.  Default: Forced Open Ground connected is active.  Default: QS1 Trip Fault Ground connected is active.  Default: QS2 Trip Fault Ground connected is active.  Default: QS2 Trip Fault Ground connected is active.	30				
31 QTIE CLOSE INPUT  QTIE Close Status Input  relay contact. Ground connected is active.  This terminal is not defined.  Default: Forced Open Ground connected is active.  AUX. INPUT 1  Digital Intput1  Digital Intput2  Default: QS1 Trip Fault Ground connected is active.  Default: QS2 Trip Fault Ground connected is active.  Default: QS2 Trip Fault Ground connected is active.				Ground connected is active.	
31 INPUT QTIE Close Status Input relay contact.  Ground connected is active.  This terminal is not defined.  Default: Forced Open Ground connected is active.  AUX. INPUT 1 Digital Intput1 Default: QS1 Trip Fault Ground connected is active.  AUX. INPUT 2 Digital Intput2 Default: QS2 Trip Fault Ground connected is active.  Default: QS2 Trip Fault Ground connected is active.			QTIE Close Status Input	Detect QTIE close status, volts free,	
Ground connected is active.  NC Null This terminal is not defined.  Default: Forced Open Ground connected is active.  Default: QS1 Trip Fault Ground connected is active.  Default: QS2 Trip Fault Ground connected is active.  Default: QS2 Trip Fault Ground connected is active.	31			relay contact.	
AUX. INPUT 1  Digital Intput1  Default: Forced Open Ground connected is active.  Default: QS1 Trip Fault Ground connected is active.  Default: QS2 Trip Fault Ground connected is active.  Default: QS2 Trip Fault Ground connected is active.	1141 01			Ground connected is active.	
AUX. INPUT 1  Digital Intput1  Ground connected is active.  Default: QS1 Trip Fault Ground connected is active.  Default: QS2 Trip Fault Ground connected is active.  Default: QS2 Trip Fault Ground connected is active.	32	NC	Null	This terminal is not defined.	
Ground connected is active.  Default: QS1 Trip Fault Ground connected is active.  Default: QS2 Trip Fault Ground connected is active.  Default: QS2 Trip Fault Ground connected is active.	33	AUX. INPUT 1	Digital Intput1	Default: Forced Open	
34 AUX. INPUT 2 Digital Intput2 Ground connected is active.  35 AUX. INPUT 3 Digital Intput3 Ground connected is active.  Ground connected is active.				Ground connected is active.	
Ground connected is active.  Default: QS2 Trip Fault Ground connected is active.  Ground connected is active.	34	AUX. INPUT 2	Digital Intput2	Default: QS1 Trip Fault	
35 AUX. INPUT 3 Digital Intput3 Ground connected is active.				Ground connected is active.	
Ground connected is active.	35	AUX. INPUT 3	Digital Intput3	Default: QS2 Trip Fault	
36 AUX. INPUT 4 Digital Intput4 Default: QTIE Trip Fault				Ground connected is active.	
	36	AUX. INPUT 4	Digital Intput4	Default: QTIE Trip Fault	



No.	Items			l Power Bus Tie Controller User Manual Remark
INU.	items	Description		
				Ground connected is active.
37	AUX. INPUT 5	Digital Intp	out5	Default: Not Used
				Ground connected is active.
38	AUX. INPUT 6	Digital Intput6		Default: Not Used
				Ground connected is active.
39	AUX. INPUT 7	Digital Intput7		Default: Not Used
				Ground connected is active.
40	AUX. INPUT 8	Digital Intput8		Default: Not Used
		- 1911-1114		Ground connected is active.
41	B-(GND)	Ground te	rminal	Connect to B- internally.
42				Default: Costom Combined 1
43	AUX. OUTPUT 7	Relay Out	put7	Volts free; Relay contact; Normally
45				Open output. Capacity: 250V8A
44				Default: Common Alarm
45	AUX. OUTPUT 8	Relay Out	put8	Volts free; Relay contact; Normally
45				Open output. Capacity: 250V8A
46		Relay Output9		Default: Not Used
47	AUX. OUTPUT 9			Volts free; Relay contact; Normally
47				Open output. Capacity: 250V8A
48				Default: Not Used
40	AUX. OUTPUT 10	Relay Output10		Volts free; Relay contact; Normally
49				Open output. Capacity: 250V8A
50		СОМ		
-1		Normally		Default: Not Used
51	AUX. OUTPUT 11	Close	Relay Output11	Volts free; Relay contact; Normally
		Normally		Open/Close output. Capacity:
52		Open		250V8A
53		СОМ		
		Normally		Default: Not Used
54	AUX. OUTPUT 12	Close	Relay Output12	Volts free; Relay contact; Normally
		Normally	· ·	Open/Close output. Capacity: 250V8A
55		Open		250V8A
62	RS485-2 B(-)	RS485-2 communication port		120Ω impedance matched resistance
,-	( )			should be connected according to the
63	RS485-2 A(+)			different situation.
64	PE	Ground terminal		
<u> </u>	· <b>-</b>	Ground tellillial		



No.	Items	Description	Remark
65	RS485-1 B(-)	D0405 4iii	120Ω impedance matched resistance
66	RS485-1 A(+)	RS485-1 communication port	should be connected according to the different situation.
USB	USB	D-type USB communication port	Parameters setting and software upgrading via PC

NOTE: When the external connected lead of the digital input port exceeds 5 meters, it is recommended to extend the input lead through an external relay.





#### 14 TYPICAL WIRING DIAGRAM

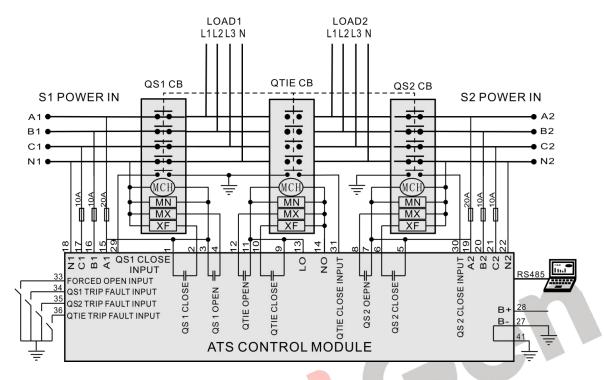


Fig.4 –Breaker Application Diagram

MCH: Stored Energy Motor; MN: Under Voltage Trip; MX: Open Relay; XF: Close Relay; In the drawing, MCH, MN and MX/XF are all AC220V.

Table 24 - Corresponding Settings

Partial Parameters Setting			
Aux. Output 1	QS1 Close		
Aux. Output 2	QS1 Open		
Aux. Output 3	QS2 Close		
Aux. Output 4	QS2 Open		
Aux. Output 5	QTIE Close		
Aux. Output 6	QTIE Open		
Aux. Input 1	Forced Open		
Aux. Input 2	QS1 Trip Fault		
Aux. Input 3	QS2 Trip Fault		
Aux. Input 4	QTIE Trip Fault		

In actual application, three breakers need to add external electric interlock circuits to avoid three breakers are closed at the same time in accident.

61mm



#### 15 INSTALLATION

Controller is panel built-in design; it is fixed by clips when installed.

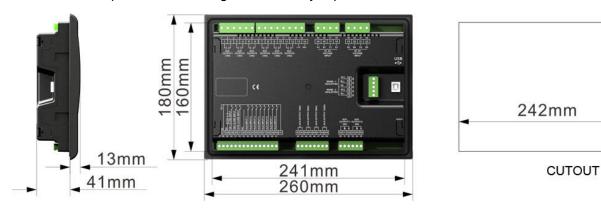


Fig.5 - Overall & Cutout Dimensions

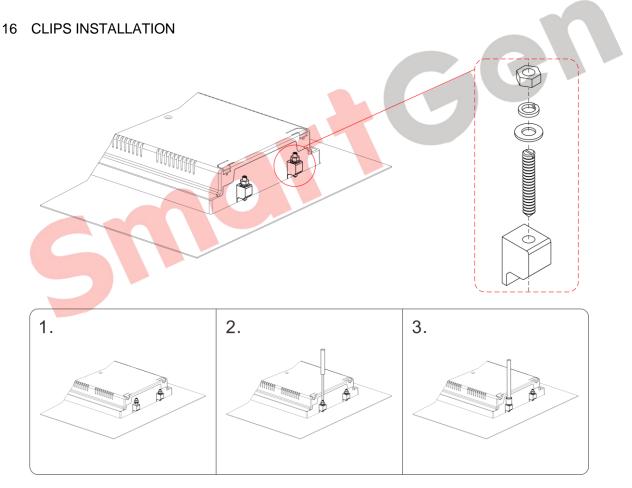


Fig.6 - Clips Installation Drawing

## Installation Steps:

- 1. Install these 4 clips (put into grooves in front panel) in turn.
- 2. Tighten the screws by using straight screwdriver.
- 3. Tighten the 4 hex nuts by using M4 sleeve.



# 17 TROUBLE SHOOTING

Table 25 - Troubleshooting

Symptoms	Possible Solutions
Controller no reapones with	Check DC voltage.
Controller no response with	Check DC fuse.
power.	Check AC Power supply.
	Check RS485's connections of A and B is reverse connect or not.
RS485 communication is	Check RS485 transfer model whether damage or not.
abnormal	Check the module address.
abnomai	If above methods can't solve the problem, parallel connection $120\Omega$
	resistor between RS485 A terminal and B terminal is recommended.
	Check auxiliary output connections, pay attention to normally open
Auxiliary Output Error	contact and normally close contact.
	Check the output settings in parameters settings.
	Ensure that the auxiliary input is soundly connected to GND when it's
	active, while hung up when it is inactive.
Auxiliary Input Abnormal	(ANote: The input port will be possibly destroyed when connected with
	voltage)
	Check the input settings in parameters settings.
O a maret municipal valida ATO	Check ATS.
Genset running while ATS	Check the connection wirings between the controller and the ATS.
not transfer	Check ATS parameter settings.

