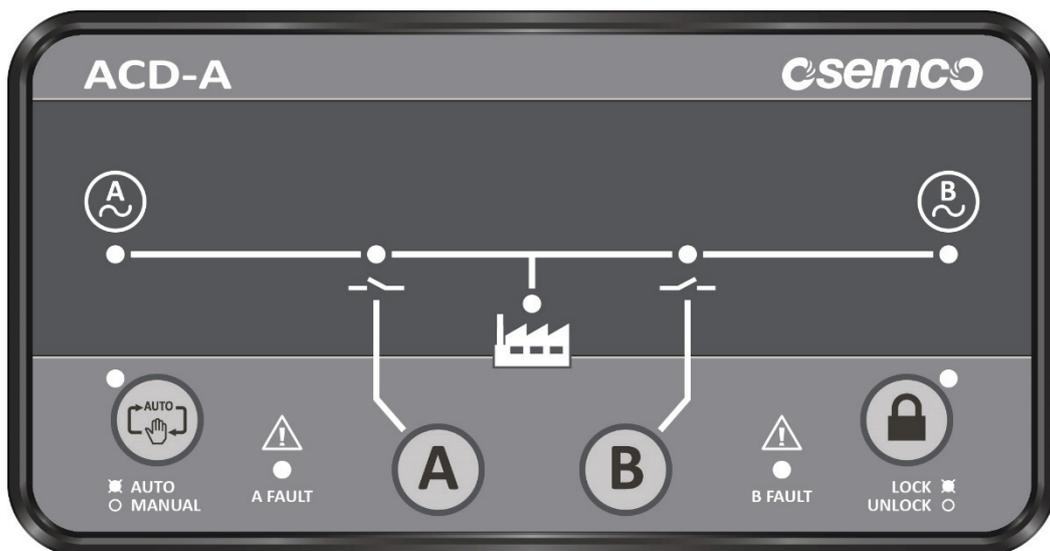


ATS CONTROLLER

[ACD-A]

User's Manual



O-Sung Electric Machinery Co., Ltd.

136, Hataemal-gil, Wollong-Myeon Paju-si, Gyeonggi-do, Korea

Tel : (031) 944-3521 / Fax : (031) 944-3525

<http://www.osemco.com> / ousung@chol.com

- TABLE OF CONTENTS –

1. Safety Notice

- 1.1 Transportation Precaution
- 1.2 Installation Precaution
- 1.3 Operation Precaution
- 1.4 Precaution of Maintenance, Inspection and Replacement

2. Construction of Controller

- 2.1 Specifications
- 2.2 Options
- 2.3 External view
- 2.4 LED Display
- 2.5 Function button
- 2.6 Rear view
- 2.7 Terminal configuration
- 2.8 Setting switches
- 2.9 Time Delay setting
- 2.10 Function of Setting button

3. Time switch setting

- 3.1 Enter the menu and setting
- 3.2 Time delay for A-ON
- 3.3 Time delay for B-ON

4. Communications (Option ACD-A-C)

- 4.1 Enter menu and setting
- 4.2 Communication ID setting (MODBUS communication)
- 4.3 Speed setting of communication (MODBUS Baud rate)

5. ATS control

- 5.1 Local / Remote mode (Option ACD-A-C)
- 5.2 Lock / Unlock Mode (Standard)
- 5.3 Manual operation
- 5.4 Auto operation
- 5.5 By pass function (Option ACD-A-B)
- 5.6 Voltage and Frequency protection

6. Communication protocol (Option ACD-A-C)

- 6.1 Specifications for communication
- 6.2 REQUEST(04h)
- 6.3 COMMAND(05h)
- 6.4 Terminal for RS485 communication

7. Outline dimensions

- 7.1 Dimensions
- 7.2 Panel cutting

8. Wiring Diagram

- 8.1 For T3 & TB3 type
- 8.2 For PC & PSO type
- 8.3 For TN & TBN type
- 8.4 For PCN type

1. Safety Notice

These Safety Notice describes the important information for operator's safety. Before commencing installation or operation of this equipment, please read all notices carefully and note the details.

These safety notice are classified as "Danger" and "Caution" according to the hazard level.



Danger

Emergency situation, which may cause death of serious disaster if there is mistake



Caution

A potentially problematic situation, which may cause slight personal injury and/or damage

1.1 Transportation Precaution



Caution

- Do not throw controller or put heavy weight things on the box.
- Do not use knife or sharp tools once open the box.

1.2 Installation Precaution

- Installation should be performed by qualified persons.
- Prior to commencing any installation, make open the circuit breaker of upstream to isolate all power/voltage sources.

Otherwise, electric shock may occur.



Caution

- Screws of terminal should be tighten as strong as specified torque.
- Controller should be installed solidly on the flat surface.
- Do not install where environmental conditions of high tempered, humid, dusty, noxious gas, vibration, impact.

Otherwise, fire and malfunction may occur.

- Be careful to prevent foreign materials of dust, concrete powder, iron powder and rainwater, salinity from entering into the controller.

Otherwise, fire and malfunction may occur.

1.3 Operation Precaution

- Do not touch the main circuit and control terminal while power activated.



Danger

Otherwise, electric shock may occur.

- Do not store at outdoor non-controlled.

This can cause the electric shock, damage or fire due to penetration of water or water vapor.

1.4 Precaution of Maintenance, Inspection and Replacement.

- Maintenance, inspection or replacement of components should be performed by qualified persons



Caution

- Prior to commencing any works, make open the circuit breaker of upstream to isolate main circuit and control circuit from all power/voltage sources.

Otherwise, electric shock may occur.

- Retighten the terminal screws of main and wiring periodically according to specified torque.

Otherwise, malfunction or fire may occur.

2. Construction of Controller

2.1 Specifications

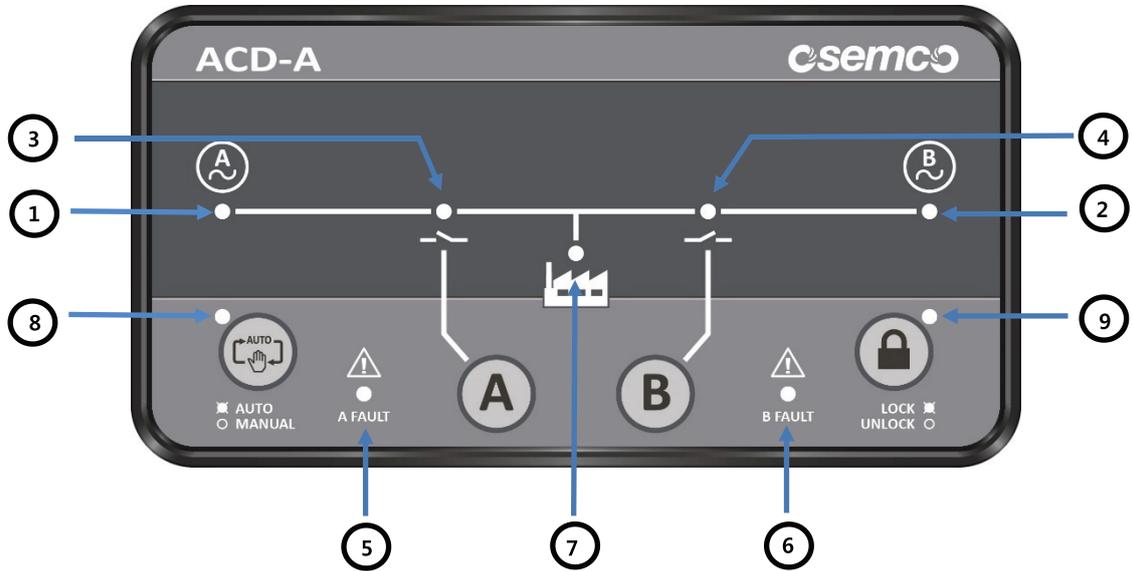
- | | |
|---------------------------|--|
| 1) Overall dimensions | : (W) 169.3mm x (H) 88.7mm X (D) 56.8mm |
| 2) Weight | : 1.0 kg |
| 3) Ambient temperature | : -25°C ~ 70°C |
| 4) LED display | : High brightness LED |
| 5) Voltage input | : L-N 110[V] ~ 270[V] / 50[Hz] ~ 60[Hz]. |
| 6) ATS control relay | : 250[VAC] 16[A] 2a. |
| 7) Contacts input | : (2) contacts for ATS status. (2) contacts for ATS BYPASS 18[VDC] |
| 8) Communication protocol | : RS485 |

2.2 Options

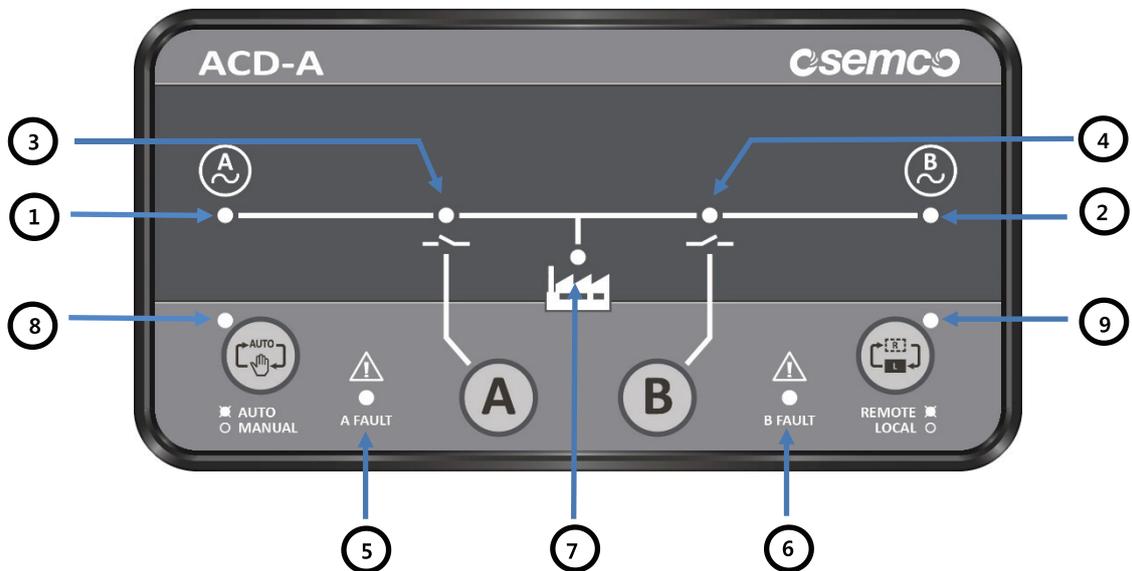
- 1) **ACD-A** : Standard(ATS A <-> B Control Controller)
- 2) **ACD-A-C** : Standard + 485 Communication Option
- 3) **ACD-A-B** : Standard + By-Pass ATS Interlocked Control Option
- 4) **ACD-A-CB** : Standard + 485 Communication + By-Pass ATS Interlocked Control option

2.3 External View

2.3.1 ACD-A (Standard)



2.3.2 ACD-A-C (485 Communication Option)



2.4 LED Display

No	LED	Color	Functions
①	A-POWER	Green	Indicating lamp lights while A-Power is normal Indicating lamp off when A-Power is blackout Indicating lamp flickering in 0.1sec interval when A-Power is abnormal(Over/under voltage, Over/under frequency)
②	B-POWER	Red	Indicating lamp lights while B-Power is normal Indicating lamp off when B-Power is blackout Indicating lamp flickering in 0.1sec interval when B-Power is abnormal(Over/under voltage, Over/under frequency)
③	A ON	Green	Lamp lights while A-Power of ATS is closed, and lamp off when B-Power is closed. Lamp flickering in 0.25sec interval when ATS is synchronized transferring from B-Power to A-Power.
④	B ON	Red	Lamp lights while B-Power of ATS is closed, and lamp off when A-Power is closed. Lamp flickering in 0.25sec interval when ATS is synchronized transferring from A-Power to B-Power.
⑤	A FAULT	Red	Lamps lights under A-Power is abnormal condition(Over/under voltage, Over/under frequency) Lamp flickering once failure of closing or open A-Power, or fail in synchronized transferring.
⑥	B FAULT	Red	Lamps lights under B-Power is abnormal condition(Over/under voltage, Over/under frequency) Lamp flickering once failure of closing or open B-Power, or fail in synchronized transferring.
⑦	LOAD	White	Lamp lights while ATS is closed to normal power source.
⑧	AUTO / MANUAL	Green	Lamp lights under auto operation mode, and lamp off under manual operation mode Lamp flickering in 0.5sec interval while ATS is transferring under BY-PASS function selected.
⑨	LOCK / UNLOCK	White	Lamp lights under Locked control status, and Lamp off under Unlocked control status
	LOCAL / REMOTE (Option ACD-A-C)	White	Under local control status, lamp lights, and lamp off while remote control selected

2.5 Function Button

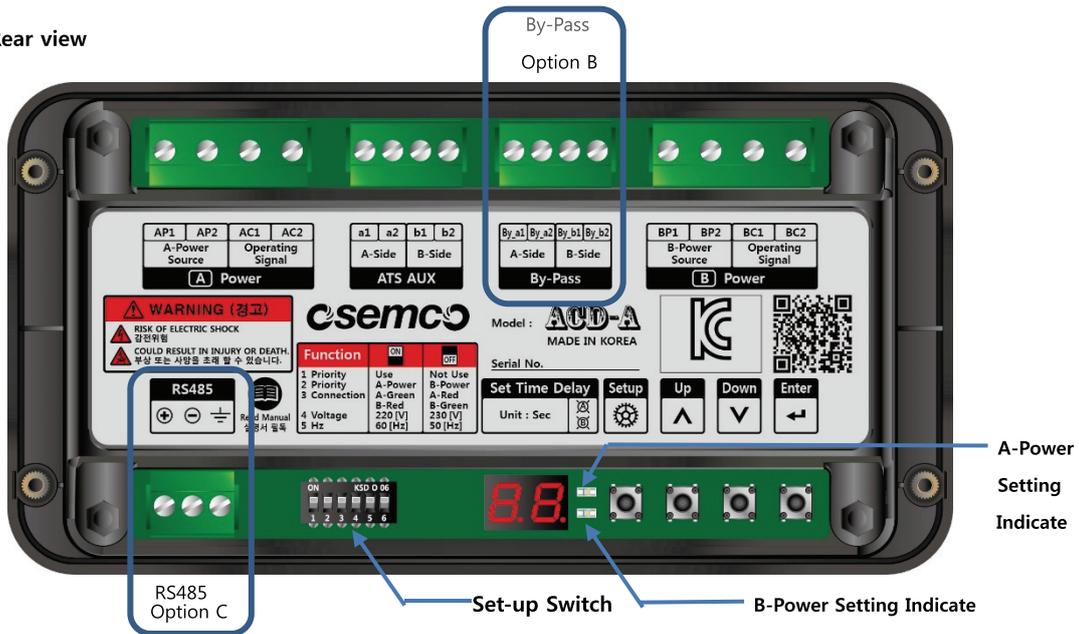
Button	Name	Function
	A-POWER ON	A-Power closing ^{note 1)}
	B-POWER ON	B-Power closing ^{note 1)}
	AUTO/MANUAL	Auto/Manual operation change
	LOCK/UNLOCK	Lock/Unlock operation change
	LOCAL/REMOTE	Local/Remote control change ^{note 2)}

Note 1) Button should be pressed for 0.5sec in minimum.

Note 2) If Remote selected, control and set up shall be available over the remote control while RS485 protocol activated.

Communication operation is an option, choose ACD-A-C option when you make reservation.

2.6 Rear view



2.7 Terminal configuration

A Power																						
<table border="1"> <tr> <td>AP1</td> <td>AP2</td> <td>AC1</td> <td>AC2</td> </tr> <tr> <td colspan="2">A-Power Source</td> <td colspan="2">Operating Signal</td> </tr> <tr> <td colspan="4" style="text-align: center;">A Power</td> </tr> </table>		AP1	AP2	AC1	AC2	A-Power Source		Operating Signal		A Power				<table border="1"> <tr> <td>AP1</td> <td rowspan="2">A Power voltage input*</td> <td rowspan="2">Input A power sensed voltage (AC 220V or 230V)</td> </tr> <tr> <td>AP2</td> </tr> <tr> <td>AC1</td> <td rowspan="2">A Power closing output</td> <td rowspan="2">Output ATS A Power closing command (A power AC voltage out)</td> </tr> <tr> <td>AC2</td> </tr> </table>	AP1	A Power voltage input*	Input A power sensed voltage (AC 220V or 230V)	AP2	AC1	A Power closing output	Output ATS A Power closing command (A power AC voltage out)	AC2
AP1	AP2	AC1	AC2																			
A-Power Source		Operating Signal																				
A Power																						
AP1	A Power voltage input*	Input A power sensed voltage (AC 220V or 230V)																				
AP2																						
AC1	A Power closing output	Output ATS A Power closing command (A power AC voltage out)																				
AC2																						

* Please do not voltage withstand test because surge protective varistor is built.

ATS AUX																						
<table border="1"> <tr> <td>a1</td> <td>a2</td> <td>b1</td> <td>b2</td> </tr> <tr> <td colspan="2">A-Side</td> <td colspan="2">B-Side</td> </tr> <tr> <td colspan="4" style="text-align: center;">ATS AUX</td> </tr> </table>		a1	a2	b1	b2	A-Side		B-Side		ATS AUX				<table border="1"> <tr> <td>a1</td> <td rowspan="2">Contact input</td> <td rowspan="2">Connect auxiliary contacts of ATS A power closing status*</td> </tr> <tr> <td>a2</td> </tr> <tr> <td>b1</td> <td rowspan="2">Contact input</td> <td rowspan="2">Connect auxiliary contacts of ATS B power closing status*</td> </tr> <tr> <td>b2</td> </tr> </table>	a1	Contact input	Connect auxiliary contacts of ATS A power closing status*	a2	b1	Contact input	Connect auxiliary contacts of ATS B power closing status*	b2
a1	a2	b1	b2																			
A-Side		B-Side																				
ATS AUX																						
a1	Contact input	Connect auxiliary contacts of ATS A power closing status*																				
a2																						
b1	Contact input	Connect auxiliary contacts of ATS B power closing status*																				
b2																						

* Do not connect other circuit than ATS AUX because self-power is generated. Otherwise malfunction or damage may occur.

By-Pass (Option B)																						
<table border="1"> <tr> <td>By_a1</td> <td>By_a2</td> <td>By_b1</td> <td>By_b2</td> </tr> <tr> <td colspan="2">A-Side</td> <td colspan="2">B-Side</td> </tr> <tr> <td colspan="4" style="text-align: center;">By-Pass</td> </tr> </table>		By_a1	By_a2	By_b1	By_b2	A-Side		B-Side		By-Pass				<table border="1"> <tr> <td>By_a1</td> <td rowspan="2">Contact input</td> <td rowspan="2">Connect By-pass contacts of ATS A power*</td> </tr> <tr> <td>By_a2</td> </tr> <tr> <td>By_b1</td> <td rowspan="2">Contact input</td> <td rowspan="2">Connect By-pass contacts of ATS B power*</td> </tr> <tr> <td>By_b2</td> </tr> </table>	By_a1	Contact input	Connect By-pass contacts of ATS A power*	By_a2	By_b1	Contact input	Connect By-pass contacts of ATS B power*	By_b2
By_a1	By_a2	By_b1	By_b2																			
A-Side		B-Side																				
By-Pass																						
By_a1	Contact input	Connect By-pass contacts of ATS A power*																				
By_a2																						
By_b1	Contact input	Connect By-pass contacts of ATS B power*																				
By_b2																						

* Do not connect other circuit than ATS AUX because self-power is generated. Otherwise malfunction or damage may occur.

B Power																						
<table border="1"> <tr> <td>BP1</td> <td>BP2</td> <td>BC1</td> <td>BC2</td> </tr> <tr> <td colspan="2">B-Power Source</td> <td colspan="2">Operating Signal</td> </tr> <tr> <td colspan="4" style="text-align: center;">B Power</td> </tr> </table>		BP1	BP2	BC1	BC2	B-Power Source		Operating Signal		B Power				<table border="1"> <tr> <td>BP1</td> <td rowspan="2">B power voltage input*</td> <td rowspan="2">B power sensed voltage input (AC 220V or 230V)</td> </tr> <tr> <td>BP2</td> </tr> <tr> <td>BC1</td> <td rowspan="2">B power closing output</td> <td rowspan="2">Closing command output for ATS B power (B power AC volts output)</td> </tr> <tr> <td>BC2</td> </tr> </table>	BP1	B power voltage input*	B power sensed voltage input (AC 220V or 230V)	BP2	BC1	B power closing output	Closing command output for ATS B power (B power AC volts output)	BC2
BP1	BP2	BC1	BC2																			
B-Power Source		Operating Signal																				
B Power																						
BP1	B power voltage input*	B power sensed voltage input (AC 220V or 230V)																				
BP2																						
BC1	B power closing output	Closing command output for ATS B power (B power AC volts output)																				
BC2																						

* Please do not voltage withstand test because surge protective varistor is built.

2.8 Setting switches

No	PARAMETER SETTING		
1	Priority	Use※	Use Power priority or not
		Not Use	
2	Priority	A-Power※	A power or B power priority
		B-Power	
3	Connection to ATS	A-Green / B-Red※	ATS bus-bar: A-Utility(Green), B-Emergency(Red)
		A-Red / B-Green	ATS bus-bar: A-Emergency(Red), B-Utility(Green)
4	Voltage	220[V] ※	Input voltage
		230[V]	
5	Hz	60[Hz] ※	Input frequency
		50[Hz]	
6	No use	No Function	Set-up Emergency switch

Note: ※ is factory configured default

2.9 Set Time Delay Function



FND Function

- At normal mode [--] shall be shown, and when setting is begin the set time be shown with sec.

LED Function

- Consist with A power set and B power set, and lamp offed at normal mode, and when setting is begin

shall be lights as below.

- > A power time delay setting: A lamp lights
- > B power time delay setting: B lamp lights
- > Communication ID setting: A lamp flickering
- > Communication speed setting: B lamp flickering

2.10 Function of setting button

No	Button		
1		Normal status	When you press manual operation button for 1sec then you may enter setting status note 1)
		Setting status	Go to next menu without record a set value
2			Increase value (99sec max)
3			Decrease value (0sec min)
4		Normal status	Lamp test will be done when button pressed for 1set under manual operation mode
		Setting status	Go to next menu after record a set value

Note 1) When you press Setup + Down button for 1sec, you may go to setting of communication function.

3. Time switch setting

3.1 Enter menu and setting

- 1) With pressing [Setup] for 1sec under manual operation mode then you may enter time delay menu.
- 2) If you want to record data and go to next menu please press [Enter] button, and you will go to normal mode at last menu.
- 3) If you press [Setup] button while setting, you may go to next menu without data record.
- 4) Order of menu: [Local Manual mode] → [A-power closing time delay] → [B-power closing time delay] → [Synchronizing time delay] → [Local Manual mode]

3.2 A power closing time delay

- 1) Light A power lamp, B power lamp if off, and current set value shown on FND window.
- 2) Make increase/decrease time set using by [Up], [Down] button.
- 3) By pressing [Enter] button, data is recorded and go to next menu.
- 4) If you press [Setup] button, you will go to next menu without data record.
- 5) Time range settable is 0sec to 99sec.
- 6) Factory configured default is 5sec.

3.3 B power closing time delay

- 1) A power lamp if off, B power lamp lights, and current set value shown on FND window.
- 2) Make increase/decrease time set using by [Up], [Down] button.
- 3) By pressing [Enter] button, data is recorded and go to next menu.
- 4) If you press [Setup] button, you will go to next menu without data record.
- 5) Time range settable is 0sec to 99sec.
- 6) Factory configured default is 5sec.

4. Communication setting (485 Communication Option ACD-A-C)

4.1 Enter menu and setting

- 1) By pressing [Setup]+[Down] button at manual operation mode you may go to menu.
- 2) If you press [Enter] button while value setting, data will be recorded and move to next menu. At last menu you will go to normal(initial) mode.
- 3) When press [Setup] button, the data did not record and move to next menu.
- 4) Order of menu: [Local manual mode] → [Communication ID setting] → [Communication speed setting] → [Local manual mode]

4.2 Communication ID setting (MODBUS)

- 1) ID will be shown on FND window as in code while A power lamp lights, and B power lamp off.
- 2) Make increase and decrease ID value using by [Up] & [Down] button.
- 3) If you press [Enter] button, set value will be recorded and move to next menu.
- 4) You may go to next menu without data recording once you press [Setup] button.
- 5) Setting range is 1 and 99 in maximum.
- 6) Factory default is 1.

4.3 Communication speed setting (MODBUS Baud rate)

- 1) Set value will be shown on FND window while A power off, and B power lights.
- 2) Make increase and decrease number by [Up] & [Down] button.
- 3) If you press [Enter] button, set value will be recorded and move to next menu.
- 4) You may go to next menu without data recording once you press [Setup] button.
- 5) Set value shall be indicated with code of b1 = 9,600 bps, b2 = 19,200 bps, b3 = 38,400 bps.
- 6) Factory default is b1 = 9,600 bps.

5. Control of ATS

5.1 Local/Remote mode (485 Communication Option ACD-A-C)

- 1) You may select by [**Local/Remote**] button.
- 2) Current selected mode shall be recorded on EEP of inter controller. Keep current selected mode once you make re-booting controller again.

5.1.1 Local mode

- 1) LOCAL/REMOTE LED is off.
- 2) Using by ACD-S controller, you may control and operate ATS.

5.1.2 Remote mode

- 1) White color of LOCAL/REMOTE LED lights.
- 2) ACD-A control may not control and operate ATS. (Remote control over RS485 is available)

5.2 LOCK/UNLOCK Mode (Standard)

- 1) You may change the mode with prssing [**LOCK/UNLOCK**] button.
- 2) Current mode may be saved in EEP memory which locates in the controller.
When the controller is reboot, LOCK/UNLOCK maintains previous condition.

5.2.1 UNLOCK Mode

- 1) The white light off in UNLOCK mode
- 2) Using button of ACD-A, You may operate and control

5.2.2 LOCK Mode

- 1) The white light on in LOCK Mode
- 2) Using button of ACD-A, You may operate and control

5.3 Manual operation

5.3.1 Availability of manual operation

- 1) Available to make ATS A power ON and B power ON by button operation or RS485 communication.
- 2) Manual synchronized transferring is available when both power is activated in service normally.

5.3.2 Manual control

1) A power ON

- ① A power ON is available once only A power is normal status.
- ② While **[A-POWER ON]** button pressed over 0.5sec, ATS transfer power from B-power to A-power.

2) B power ON

- ① B power ON is available once only B power is normal status.
- ② While **[B-POWER ON]** button pressed over 0.5sec, ATS transfer power from A-power to B-power.

3) Synchronized transferring of ATS

- ① Manual synchronized transferring is available when both power is activated in service normally.
- ② Once **[B-POWER ON]** button pressed over 0.5sec, ATS shall be switched to B power after time delay set.
- ③ Once **[A-POWER ON]** button pressed over 0.5sec, ATS shall be switched to A power after time delay set.
- ④ Time delay for synchronizing is 5minute max, and if fail within 5min, manual synchronizing shall be cancelled.

5.4 Automatic operation

1) The controller make ATS A-power or B-power ON, or synchronized switching after time delay while sensing of power condition.

2) Automatic operation:

- ① According to **[Power Priority]** set, ATS will make switching when both power is normal condition.
- ② Once serviced power line is abnormal, and standby power is normal condition, ATS shall be switched to standby line after time delay set.
- ③ If fail to switch, output command again 3times every 3sec, after this controller judge that ATS is failure (FAULT lamp lights)
- ④ Output of closing command shall be kept for 0.5sec.

3) Operation on **[Power Priority]** set

When ATS I synchronized switching according to **[Power Priority]**, controller wait for phase synchronize of both power for 5minute. If fail to synchronizing, controller will make ATS non-synchronized switching.

① **[Power Priority] A power selected**

: During B power closed, if A power become a normal condition, ATS will synchronized switch to A power from B power.

② **[Power Priority] B power selected**

: During A power closed, if B power become a normal condition, ATS will synchronized switch to B power from A power

5.5 By-pass function (By-Pass Option ACD-A-B)

When ATS by-pass operation is activated by manually, ACD-S controller change to manual operation mode, and then only by-passed power line could be controlled manually.

1) Input **By-a1, By-a2** contacts

: Operation mode changed to manual mode by force, and AUTO/MANUAL lamp lights, and only manual A-ON operation is available.

2) Input **By-b1, By-b2** contacts

: Operation mode changed to manual mode by force, and AUTO/MANUAL lamp lights, and only manual B-ON operation is available.

5.6 Voltage & Frequency protection function

1) Voltage protection range

220V basis (tolerance $\pm 2V$)	
Over voltage	Pick up 242V, Return 237V
Under voltage	Pick up 187V, Return 191V

230V basis (tolerance $\pm 2V$)	
Over voltage	Pick up 253V, Return 248V
Under voltage	Pick up 187V, Return 191V

2) Frequency protection range (Synchronizing used)

60Hz basis (tolerance $\pm 0.2Hz$)	
Over frequency	Pick up 62.0Hz, Return 61.0Hz
Under frequency	Pick up 58.0Hz, Return 59.0Hz

50Hz basis (tolerance $\pm 0.2Hz$)	
Over frequency	Pick up 52.0Hz, Return 51.0Hz
Under frequency	Pick up 48.0Hz, Return 49.0Hz

6. Communication protocol (485 Communication Option ACD-A-C)

6.1 Specifications for communication

- 1) Type : 2-WIRE RS485 1port
- 2) Protocol : MODBUS / RTU
- 3) Function : REQUEST(04h), COMMAND(05h)
- 4) Channel : 0~99
- 5) Baud rate : 9600[bps], 19200[bps], 38,400[bps]
- 6) Parity : NONE
- 7) Data bit : 8[Bit]
- 8) Stop bit : 1[Bit]
- 9) Minimum communication interval : 250[ms]
- 10) Packet termination time: 5[ms]

6.2 REQUEST(04h)

TX Example: 01 04 00 00 00 14 CRC16 → (20) data from the address 30001.

Address	Item	Data indicate	Data type													
30001	ACD controller model 0 : ACD-A 1 : ACD-S 2 : ACD-NA 3 : ACD-NS	X	16bit UNSIGNED INT													
30002	A-power voltage	XXX [V]	16bit UNSIGNED INT													
30003	B-power voltage	XXX [V]	16bit UNSIGNED INT													
30004	A-power frequency	XX.X [Hz]	16bit UNSIGNED INT													
30005	B-power frequency	XX.X [Hz]	16bit UNSIGNED INT													
30006	Phase angel difference between alternate power source	XXX [°]	16bit SIGNED INT													
30007	ACD controller status	-	16bit UNSIGNED INT													
	<table border="1"> <tr> <td>Bit 0 : AUTO MODE</td> <td>Bit 8 : A power By-Pass status</td> </tr> <tr> <td>Bit 1 : REMOTE STATUS</td> <td>Bit 9 : B power By-Pass status</td> </tr> <tr> <td>Bit 2 : A-power status</td> <td>Bit 10 : A power protective relay contact input</td> </tr> <tr> <td>Bit 3 : B-power status</td> <td>Bit 11 : B power protective relay contact input</td> </tr> <tr> <td>Bit 4 : A closing status</td> <td>Bit 12 : Reserved</td> </tr> <tr> <td>Bit 5 : B closing status</td> <td>Bit 13 : Reserved</td> </tr> <tr> <td>Bit 6 : A fault status</td> <td>Bit 14 : Reserved</td> </tr> <tr> <td>Bit 7 : B fault status</td> <td>Bit 15 : Reserved</td> </tr> </table>			Bit 0 : AUTO MODE	Bit 8 : A power By-Pass status	Bit 1 : REMOTE STATUS	Bit 9 : B power By-Pass status	Bit 2 : A-power status	Bit 10 : A power protective relay contact input	Bit 3 : B-power status	Bit 11 : B power protective relay contact input	Bit 4 : A closing status	Bit 12 : Reserved	Bit 5 : B closing status	Bit 13 : Reserved	Bit 6 : A fault status
Bit 0 : AUTO MODE	Bit 8 : A power By-Pass status															
Bit 1 : REMOTE STATUS	Bit 9 : B power By-Pass status															
Bit 2 : A-power status	Bit 10 : A power protective relay contact input															
Bit 3 : B-power status	Bit 11 : B power protective relay contact input															
Bit 4 : A closing status	Bit 12 : Reserved															
Bit 5 : B closing status	Bit 13 : Reserved															
Bit 6 : A fault status	Bit 14 : Reserved															
Bit 7 : B fault status	Bit 15 : Reserved															
30008	Fault status	-	16bit UNSIGNED INT													
	<table border="1"> <tr> <td>Bit 0 : A-power under voltage</td> <td>Bit 8 : B-power under voltage</td> </tr> <tr> <td>Bit 1 : A-power over voltage</td> <td>Bit 9 : B-power over voltage</td> </tr> <tr> <td>Bit 2 : A-power under frequency</td> <td>Bit 10 : B-power under frequency</td> </tr> <tr> <td>Bit 3 : A-power over frequency</td> <td>Bit 11 : B-power over frequency</td> </tr> <tr> <td>Bit 4 : A-power protective relay contact input.</td> <td>Bit 12 : B-power protective relay contact input</td> </tr> </table>			Bit 0 : A-power under voltage	Bit 8 : B-power under voltage	Bit 1 : A-power over voltage	Bit 9 : B-power over voltage	Bit 2 : A-power under frequency	Bit 10 : B-power under frequency	Bit 3 : A-power over frequency	Bit 11 : B-power over frequency	Bit 4 : A-power protective relay contact input.	Bit 12 : B-power protective relay contact input			
Bit 0 : A-power under voltage	Bit 8 : B-power under voltage															
Bit 1 : A-power over voltage	Bit 9 : B-power over voltage															
Bit 2 : A-power under frequency	Bit 10 : B-power under frequency															
Bit 3 : A-power over frequency	Bit 11 : B-power over frequency															
Bit 4 : A-power protective relay contact input.	Bit 12 : B-power protective relay contact input															

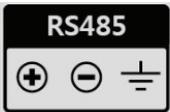
	Bit 5 : A closing fault Bit 6 : A open fault Bit 7 : B→A sync switching fault	Bit 13 : B closing fault Bit 14 : B open fault Bit 15 : A→B sync switching fault		
30009	A-power closing time delay set value		XX [sec]	16bit SIGNED INT
30010	B-power closing time delay set value		XX [sec]	16bit SIGNED INT
30011	A-power open time delay set value		XX [sec]	16bit SIGNED INT
30012	B-power open time delay set value		XX [sec]	16bit SIGNED INT
30013	Synchronized switching time delay set value		XX [sec]	16bit SIGNED INT
30014	DIP S/W status		-	16bit UNSIGNED INT
	Bit 0 : PRIORITY USE	Bit 8 : Reserved		
	Bit 1 : PRITORITY SET	Bit 9 : Reserved		
	Bit 2 : CONNECTION SET	Bit 10 : Reserved		
	Bit 3 : VOLTAGE	Bit 11 : Reserved		
	Bit 4 : FREQUENCY	Bit 12 : Reserved		
	Bit 5 : SYNC USE	Bit 13 : Reserved		
	Bit 6 : Reserved	Bit 14 : Reserved		
Bit 7 : Reserved	Bit 15 : Reserved			
30015	Over voltage pick up set value		XXX [V]	16bit SIGNED INT
30016	Over voltage return set value		XXX [V]	16bit SIGNED INT
30017	Under voltage pick up set value		XXX [V]	16bit SIGNED INT
30018	Under voltage return set value		XXX [V]	16bit SIGNED INT
30019	Over frequency pick up set value		XX.X [Hz]	16bit SIGNED INT
30020	Over frequency return value		XX.X [Hz]	16bit SIGNED INT
30021	Under frequency pick up set value		XX.X [Hz]	16bit SIGNED INT
30022	Under frequency return set value		XX.X [Hz]	

6.3 COMMAND(05h)

TX Example: 01 05 00 02 FF 00 CRC16 → ATS A power manual switching on address 0003

Address	Item	Data
0001	Manual operation mode	0xFF00 auto clear
0002	Auto operation mode	
0003	A power manual transferring	
0004	B power manual transferring	
0005	Open (for ACD-N & ACD-NS only)	

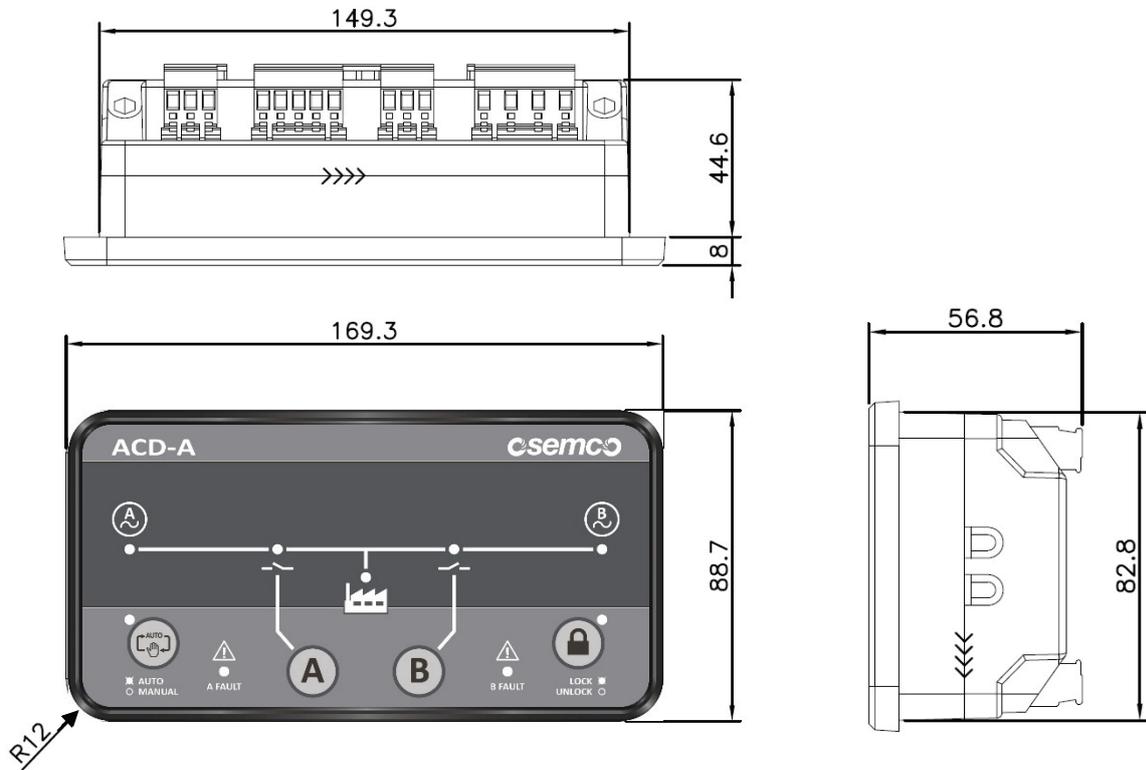
6.3 Terminal for RS485 communication

RS485 (Optional C)		
		RS 485 + communication terminal
		RS 485 - communication terminal
		System grounding terminal (Shielded cable grounding)

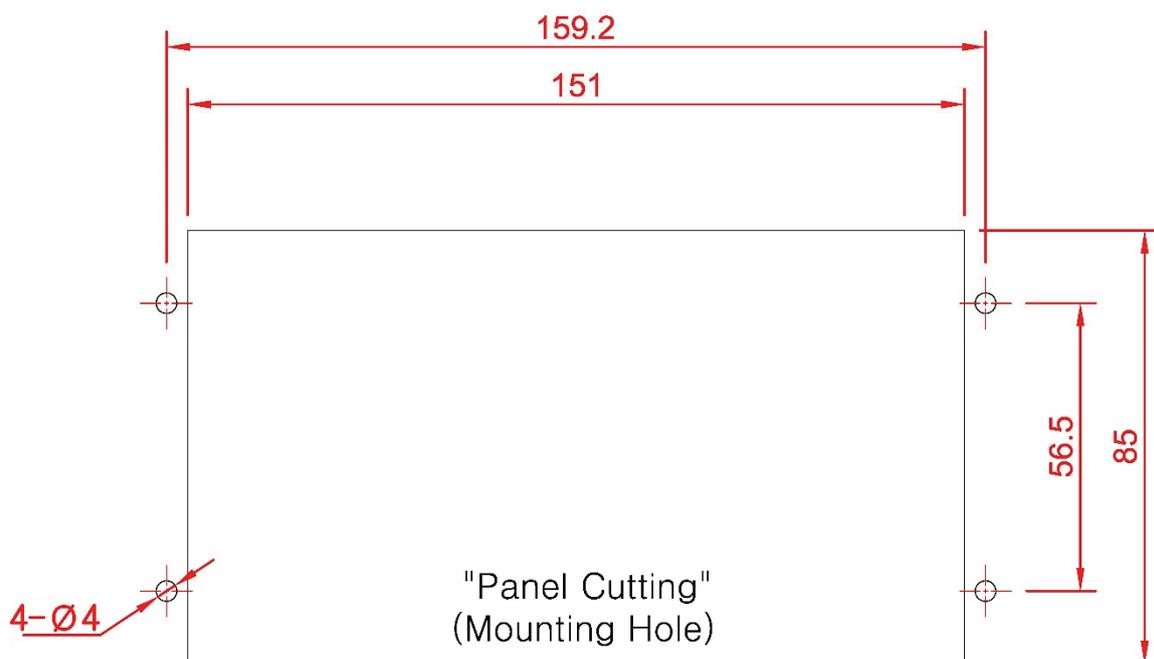
※ Shielded cable shall be used for RS485 communication, and shall be installed at place 1.2m distance from the power cable.

7. Outline dimensions

7.1 Outline dimensions



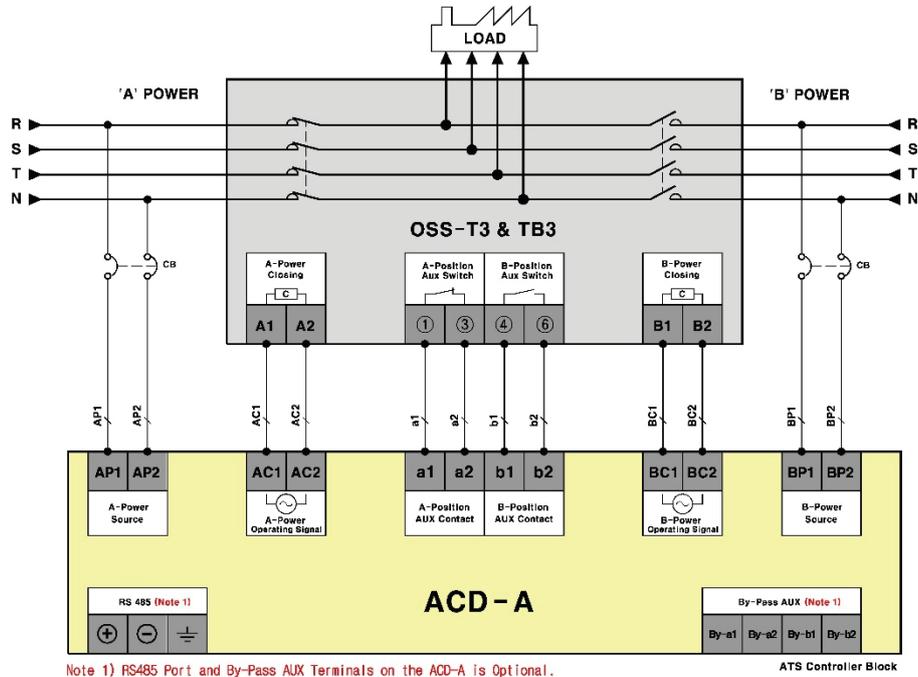
7.2 Panel cutting



8. Wiring diagram

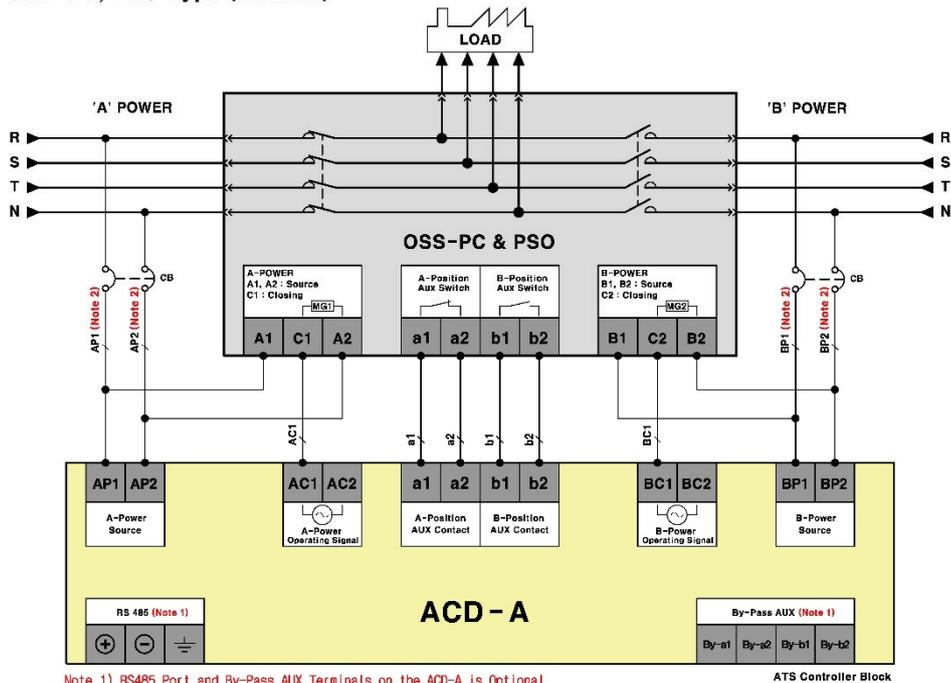
8.1 For T3 & TB3 type

ACD - A 3 ϕ 4W 380/220V
OSS-T3, TB3 Type (AC220V)



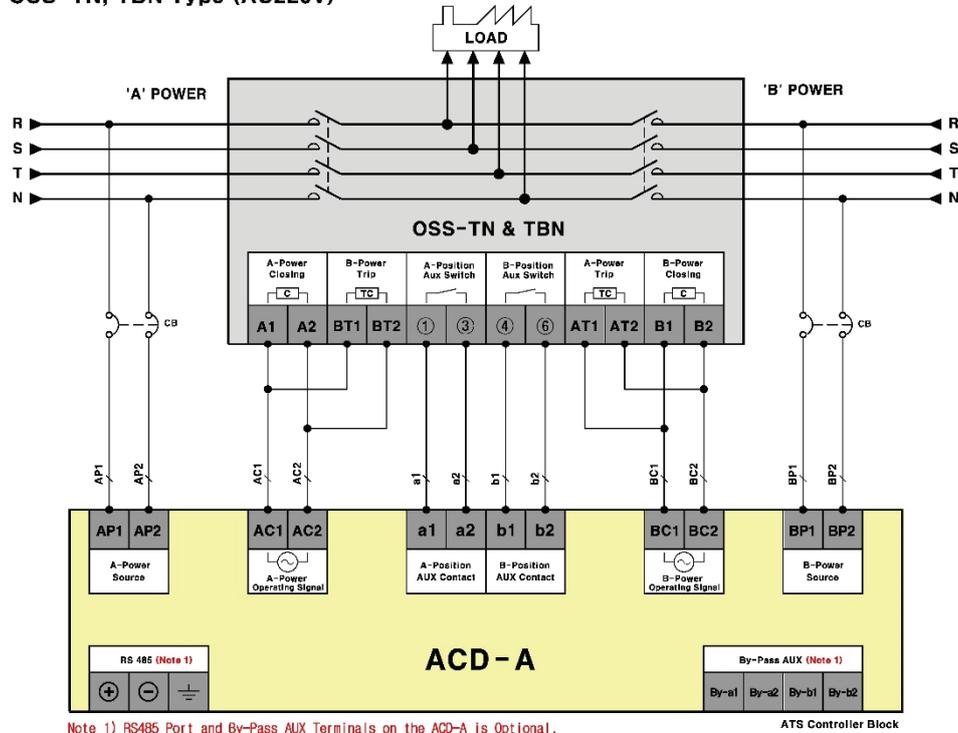
8.2 For PC & PSO type

ACD - A 3 ϕ 4W 380/220V
OSS-PC, PSO Type (AC220V)



8.3 For TN, TBN type

ACD - A 3 ϕ 4W 380/220V
OSS-TN, TBN Type (AC220V)



8.4 For PCN type

ACD - A 3 ϕ 4W 380/220V
OSS-PCN (800A ~ 1,600A) Type (AC220V)

