

# CB Class Automatic Transfer Switching Equipment

## Compact ATNS


### User's Manual

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**Dear Users :**

**Thank you for your selection of our ATNS product. For your safety and correctly application, Please read this manual carefully before Installation, connection, operation and maintenance**

**The signature followed will be used in this manual for your attention on some danger, Simplify process and key operation.**

▲ Caution mark , to warn you that incorrect operation may cause people injury or unrecovery damage to the equipment.

⚡: Key operation, to inform you that incorrect operation may cause controller to work in abnormal state.

☞: offer some other information and simplify operating process.

### **Caution:**

This equipment should only be mounted by professionals. The manufacturer shall not be held responsible for any failure to not comply with the instructions given in this manual.

# 1. Check-up before using

## 1.1 Check after opening the package box

When receive the ATNS automatic transfer switching equipment (ATSE) you ordered , please check the item followed before your installation.

- Check whether the ATSE is intact , and there is no any man-made damage or transport damage
- Check whether the voltage picking up wire connect with the breaker terminal and no wire falling
- Check whether all the accessory is available ( refer to Table 1)

If some problem is found, Please contact with us.

Table 1 List of accessory

Item	Qty.	Note
Certificate Card	1	_____
User's manual	1	_____
Handle	1	For manual operation in emergency
Fuse	2	Standby for broken failure
Connecting wiring	2	Only for B type ATNS
Separated Controller	1	Only for B type ATNS

## 1.2 Operation Environment

- The altitude of installing Location shouldn't be high than 2000m
- Environment tolerance: ATNS could be used in a temperature range from -25°C to 55°C. When it is higher than 40°C, we should consider using them with reduced capacity. It can work in humid environment, even in relative humidity 95% at 55°C.
- Pollution Class : III
- Protection Class: IP20

### 1.3 Operation Voltage

ATNS can work well in a wide range from 85% to 110% of rated voltage, when the voltage is detected out of this range (or pre-set range for B type Controller), automatically source changeover will be happened. Please employ it in the limit range of operation voltage.

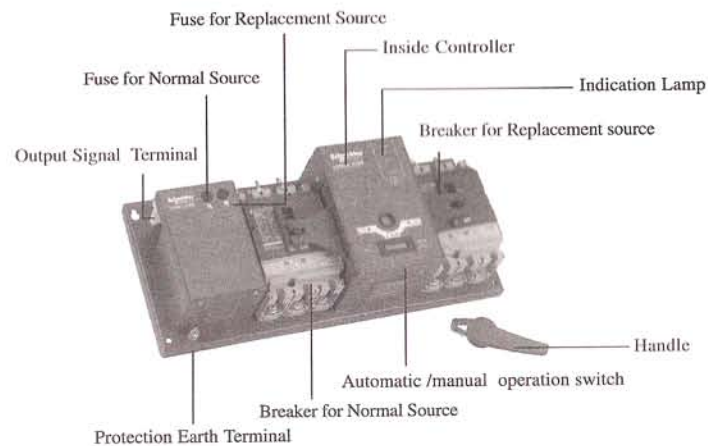
## 2. Installation and Operation

### 2.1 Dielectric Test

⚡: The product have passed the dielectric test before it is output from manufacture . If you want to redo it , please take out the fuse to avoid electronic component damage .

### 2.2 Structure of ATNS

#### 2.2.1 ATNS with A type Controller

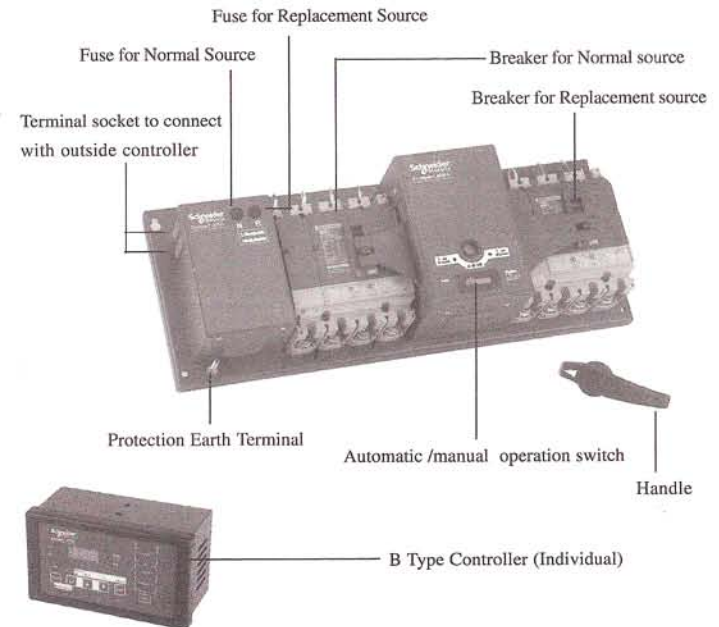


#### ☞ Introduction of Indication Lamp

- N ( Normal power source) Indicator ( Yellow LED):  
Light up — Voltage of normal power source is ok ;

- Flickery — there is voltage deviation for normal power source
- R ( Replacement power source) Indicator ( Yellow LED):  
Light up — Voltage of replacement power source is ok ;  
Flickery — there is voltage deviation for replacement power source
- N breaker indicator ( Green LED) : Light up — Normal source breaker is closed
- R breaker indicator ( Green LED) : Light up —Replacement source breaker is closed
- N breaker tripped indicator ( Red LED) : Light up — Normal source breaker is tripped for current fault
- R breaker tripped indicator ( Red LED) : Light up —Replacement source breaker is tripped for current fault

#### 2.2.2 ATNS with B type Controller



### 2.3 Form and Installation Dimensions

- For form and dimension of ATNS, please refer to the Fig.2 , and Table 2
- For form and dimension of B type controller(Individual), please refer to the Fig.1

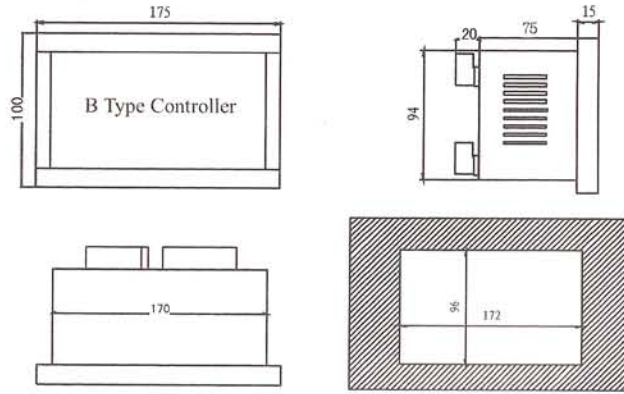


Fig. 1 Form of B type controller and Hole dimension

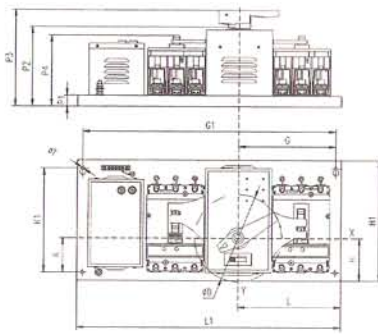


Fig .2 ATNS 100/ 160 / 250 / 400 / 630

Table 2 Form and installation dimension of ATNS

Type	Form Dimension (mm)										installation dimension (mm)			
	D	G(3P/4P)	H	H11	K	L(3P/4P)	L1(3P/4P)	P1	P2	P3	P4MAX	G1(3P/4P)	K1	T
ATNS 100	162	177/212	78	220	63	187/222	480/550	20	145	176	131	460/530	190	6.5
ATNS 160	162	177/212	78	220	63	187/222	480/550	20	145	176	131	460/530	190	6.5
ATNS 250	162	177/212	78	220	63	187/222	480/550	20	145	176	131	460/530	190	6.5
ATNS 400	280	242/287	97	285	82	257/302	610/710	20	180	232	188	580/670	255	9
ATNS 630	280	242/287	97	285	82	257/302	610/710	20	180	232	188	580/670	255	9



## 2.4 Connection

### ■ Notice for connection:

- It is prefer to tap or solder bolt on the backplate When you fix the ATNS in power distribution cupboard
- State indication of Normal power source, Replacement power Source ,breaker closed and breaker failure trip are provided. For ATNS with A type controller, these signal (with Power)are provided to customer by external terminal,you can use these external signal according Fig.3—Fig.4

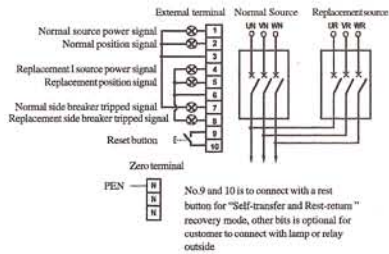


Fig.3 Three Poles ATNS with A type Controller

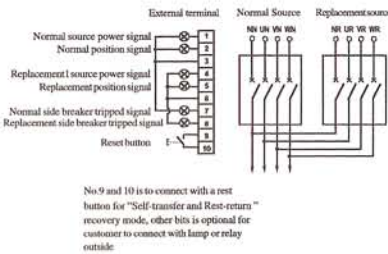


Fig.4 Four Poles ATNS with A type Controller

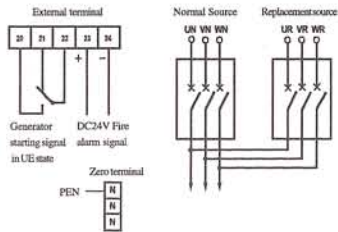


Fig.5 Three Poles ATNS with B type Controller

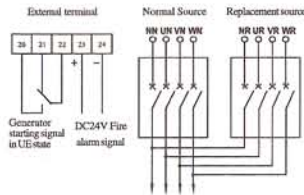


Fig.6 Four Poles ATNS with B type Controller

- For ATNS with B type controller, a group of float Contact (terminal 20,21,22) is provided to start generator, you can connect It into generator start circuit. A fire alarm signal input terminal (23,24) is also provided , when a DC24V fire alarm signal input into the terminal, the ATNS will transfer to OFF position, and cut power supply of load. you can use these external signal according Fig.5-Fig.6
- ⚡ The phase sequence connect to normal source breaker and replacement source breaker should be consistent, and for 3 poles ATNS the zero line should be connected to Zero terminal
- ⚡ TO generator starting terminal (B type Controller) , when normal power source is ok, the “normal closed contact (terminal 21)” disconnect with the “Common Contact(terminal 22)”. And when the voltage of normal source is abnormal, the “normal closed contact” connect with the “Common Contact”, which will start the generator . To the “normal opened contact(terminal 20)” the work state is opposite to the “normal closed contact”
- ⚠ The protection earth line should be well connected to assure safety of operator

Table 3 Electrical parameter of output terminal

Terminal Name	Controller Type	Rated Voltage	Rated Current
Terminal for Indication Lamp	A	220VAC	1 A
Fire alarm Input terminal	B	24VDC	—
Generator startup terminal (Float)*	B	250VAC/30VDC	3 A

\* It means rated load capacity for float contact

## 2.5 Controller

### 2.5.1 Main Function

ATNS decide to perform power supply switchover or not based on whether voltage of Power supply is normal and the pre-set working mode. The main function of ATNS is up to its controller, we provide two kind of controller A type and B type, the function of both controller can be refer to Table 4 .

Table 4 Function List of ATNS CB Class ATSE

Controller	A (Internal)	B (External and individual)
Rated operational Voltage <sup>①</sup>	220V AC	220V AC
Rated Frequency	50/60Hz	50/60Hz
<b>3 working positions</b>		
Normal Position	■	■
Replacement Position	■	■
OFF Position	■	■
<b>3 operational modes</b>		
Automatic Operation	■	■
Local Forced Operation		■
Manual Operation <sup>②</sup>	■	■
<b>Automatic Operation</b>		
Normal source Voltage detection and automatic changeover	■ (Phase failure, power loss detection)	■ (Phase failure, power loss, under-Voltage, over-voltage detection)
Replacement source Voltage detection and automatic changeover		■ (Phase failure, power loss, under-Voltage, over-voltage detection)
Generator Control		■
Chain action for fire protection (DC24V), cut power supply to non-priority loads	□	■

Self-transfer and Self-return <sup>③</sup>	■	■
Self-transfer and Fault-return <sup>③</sup>	■	■
Self-transfer and Rest-return <sup>③</sup>	■	■
<b>Local Forced Operation</b>		
Forced work on Normal Position		■
Forced work on Replacement Position		■
Forced work on OFF Position		■
<b>Test</b>		
With local forced operation button		■
<b>Indication</b>		
Circuit breaker status indication (open or closed)	■	■
Normal source and Replacement source indicator	■	■
Tripped indicator	■	■
Pre-set Parameter Display		■
<b>Other Function</b>		
Transfer Time Delay	0s、5s、15s、30s accuracy ≤ 5%	0-255s (1s as a step)
Return transfer Time Delay	0s、5s、15s、30s accuracy ≤ 5%	0-255s (1s as a step)
Protection and alarm for wrong connection of phase wire with Neutral pole	■	■
Time limit for changeover process (5s self-protection for motor)	■	■
Modbus Communication		□

■ Standard Function □ Optional function

**Note:**

① Power is supplied to controller through isolation module, If the working voltage is consistent with rated voltage , ATNS can be used directly, but if not an BC type or equal isolation transformer is needed

② In manual operation mode , the electrical circuit is cut off and all automatic function is not available

③ Normal source has high priority to Replacement Source, when both power supply is ok , ATNS work on normal side , If voltage deviation of normal source is detected , ATNS will transfer to Replacement side and supply with replacement source (when replacement source is ok) . When normal source is recovery, ATNS will return to normal side automatically, the transfer time delay and return time delay is adjustable

④ Normal source and replacement source has same priority . The source powered up firstly is work side, when the voltage deviation of working source is detected , ATNS will transfer to other side

⑤ Normal source has high priority to Replacement Source, when both power supply is ok , ATNS work on normal side, If voltage deviation of normal source is detected , ATNS will transfer to Replacement side and supply with replacement source(when replacement source is ok) . ATNS won't return to normal side until manually press the reset button , even normal source recovery

**2.5.2 A type Controller**

■ Mode switchover between Automatic (Electrical) / Manual operation

Automatic operation: put “Automatic /manual operation switch” on “Auto” position

Manual operation: put “Automatic /manual operation switch” on “Manual” position

■ Setting of transfer time delay and working mode(recovery mode), please adjust the position of DIP switch refer to Table 5

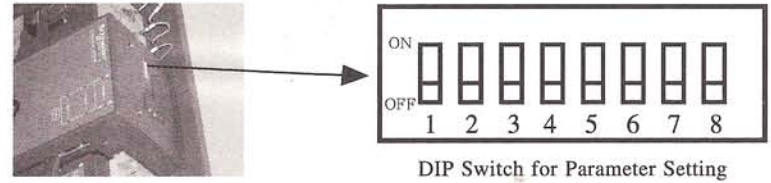


Table 5 Operation Parameter Setting of A Type Controller

Setting of Transfer time delay				Setting of Return time delay				Setting of Recovery mode		
1	2	3	Time delay(s)	4	5	6	Time delay(s)	7	8	Recovery mode
OFF	OFF	OFF	0	OFF	OFF	OFF	0	OFF	OFF	Self-transfer and Self-return
ON	OFF	OFF	5	ON	OFF	OFF	5	ON	OFF	Self-transfer and Fault-return
ON	ON	OFF	15	ON	ON	OFF	15	ON	ON	Self-transfer and Reset-return
ON	ON	ON	30	ON	ON	ON	30	ON	ON	Self-transfer and Reset-return

☞ : Please preset the DIP switch before powering up

**2.5.3 B type Controller**





## ■ Introduction of Digital LED Display and Indication Lamp

### Digital LED display

U(V) Indicator: light up – automatically and alternatively display phase voltage of normal source and replacement source with digital LED

Un Indicator: light up – digital LED display the phase voltage of normal power source

Ur Indicator: lights up – digital LED display the phase voltage of replacement power source

t(s) Indicator: lights up -digital LED display countdown of pre-set time delay remained.

N (Normal power source) Indicator for normal source( Yellow LED): Light up — Voltage of normal power source is ok ;

Flickery — there is voltage deviation for normal power source

R (Replacement power source) Indicator for replacement source( Yellow LED): Light up — Voltage of replacement power source is ok ; Flickery — there is voltage deviation for replacement power source

N breaker indicator (Green LED) : Light up — Normal source breaker is closed

R breaker indicator ( Green LED) : Light up —Replacement source breaker is closed

N breaker tripped indicator (Red LED) : Light up — Normal source breaker is tripped for current fault

R breaker tripped indicator (Red LED) : Light up —Replacement source breaker is tripped for current fault

Fire protection indicator: light up— fire alarm signal has been received

Automatic operation indicator: Light up—controller works in automatic operation mode; Flickery —Both power supplies have fault in automatic operation mode

Local Forced operation indicator: Light up—controller works in Local Forced operation mode ; Flickery —Both power supplies have fault

in local forced operation mode

Running indicator: lights up—controller is in normal operation state

System setting indicator: lights up—controller is in state of parameter setting

## ■ Operational Keyboard

Reset Key: controller reset, to return to normal source side in Rest return working mode or when controller is abnormal

$\leftarrow$  Enter Key: In Running state —operation mode switch key between automatic operation mode and local forced operation mode; In System setting state —key of confirmation , when you press it the parameter you set is saved in memory and step into next parameter setting item

$\uparrow$  Up Key(Non): In local forced operation mode—press it to command to supply power with normal power source; In System setup state —Press to increase the number you set

$\downarrow$  Down Key(Ron): In local forced operation mode—press it to command to supply power with replacement power source; In System setup state —Press to decrease the number you set

OFF Key: In local forced operation mode—press it to command to open both of two breaker and no power supply to load, ATNS work in off position

## ■ Electrical operation and manual operation switching

Electrical operation mode : push the “manual /electrical operation switch” to “Automatic” position

manual operation mode : push the “manual /electrical operation switch” to “Automatic” position , and it will make the electrical circuit to be open

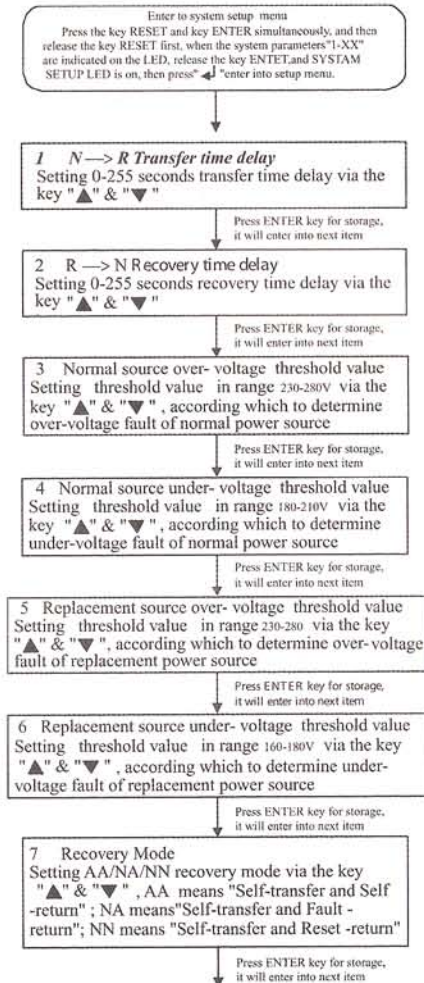
## ■ Parameter setting procedure

☞: In the parameter setting procedure , if the followed parameter item needn't to be adjusted , you can press Reset button to go back to running state directly after press Enter button to save the last setting.

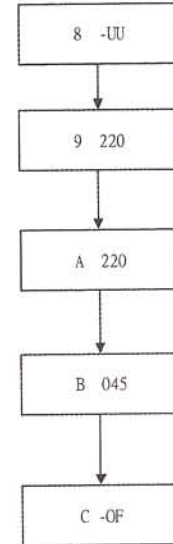
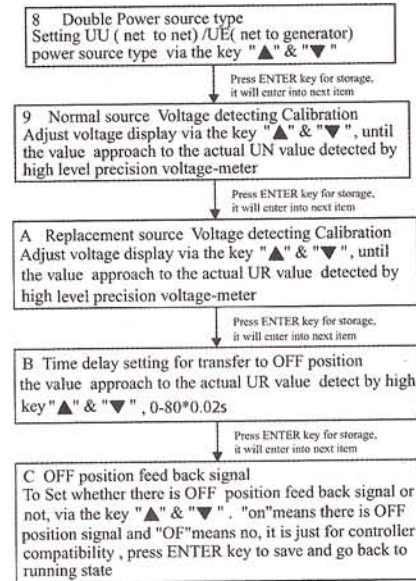
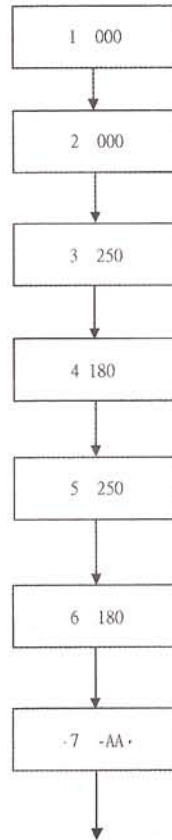
☞: In the procedure above, the number inside rectangle provide the

default parameter setting (except item 9&10 base on actual voltage value)

⚠: For parameters from 1-8 , customer can adjust freely according your requirement ; but for parameters from 9-C is just for professionals or our service people



Digital LED Display  
(Default setting)



## 2.6 Operation

ATNS is easy to use , To customer, you just need to connect the wiring of input side (power source side) and output side( load side), and adjust the parameter according chapter 2.5.2( for A type controller) or chapter 2.5.3( for B type controller), if the default value not fit for your requirement . Of cause the adjustment operation can be omitted if you accept the default value. Then to check the whether the "Automatic /manual operation switch" is on "Auto" position , if no, change it to "Auto" position , After powering on the ATNS can work automatically .

### ■ Automation Operation

To choose "Self-transfer and Self return" working mode as an example. After assembling all the wiring of power source side and load side according the correspond Figure of Chapter 2.4 . When everything is ready, including the wiring is well connected , the "Automatic / manual operation switch" is on "Auto" position , controller is pre-setted on " Self-transfer and Self return "



working mode . After powering on , if the normal source is ok , ATNS will work on normal position , otherwise ATNS will transfer to replacement position (when replacement source is ok) , when the normal source power recovery , ATNS will return to normal position after preset return time delay.

■ Local forced operation ( only for ATNS with B type controller )

When either source power is ok and “Automatic / manual operation switch” on “Auto ” position . You can press the “↵” button to switch the operation mode between two kind of electrical operation “ Automatic operation mode ” and “ Local forced operation mode ” . In the “ Local forced operation mode ” ( the Local Forced operation indicator will light up ) , you can press “ ↑ (Non)” key to close the normal side breaker or press the “ ↓ (Ron)” key to close the replacement side breaker , or press “ OFF ” key to open two breaker and make ATNS work on “ OFF ” position

■ Manual Operation

Push the “Automatic / manual operation switch ” to “ Manual ” position , which will cut off the electrical driving circuit , then to insert the Handle and press it to bottom , after that you can rotate the handle to close the breaker and choose the power source you want . The manual operation just for maintenance or emergency

⚠: When breaker is tripped for overload or short circuit , first to remove the failure, then re-trip the breaker manually , push the “Automatic / manual operation switch ” to “Auto” position and press the Rest button, then the controller will recovery to normal running state

⚠: After manual operation , if you want return to automatic operation state, please take out the handle and push the “Automatic /manual operation switch” on “Auto” position ,then press the Rest button

- ▲ Don't plug in or took out the terminal when power is on
- ▲ Don't close the breaker when both power source are fault

### 3. Maintenance and common troubleshooting

■ Maintenance

To assure the reliability of ATNS , please have routine source changeover test in fixed interval (every 3 month is preferred) . It will benefit to keep continuity of power supply to important loads.

■ Common Troubleshooting

When you find ATNS works in abnormal state, please press the Reset button first to see whether the fault could be removed, then to check whether the state of main circuit and Voltage picking up wire is normal and well connected . The table 6 is useful for fault diagnose and removing. After checking refer to the table , if you still can't remove the fault , please contact with our company or local service department .

Table 6 Common Troubleshooting

Fault	Fault Diagnose		Fault Removing
ATNS is Powered on But Doesn't work well	Source indicator of the controller is off	Voltage Picking up wire fall off from input terminal of breaker	Well connected the wire
		To 3 Poles ATNS , the zero wire hasn't been connected to Zero terminal	
		The related fuse is broken	Change related fuse
	Source indicator is lighting on	“Automatic /manual operation switch” on the manual position	Push the switch to Automatic position
	Source indicator is flickering	The voltage of related power source is abnormal or the wire connection is not well	Maintain the power source or wire connection
		Buzzer alarm , that means neutral Pole (or terminal ) is wrong connected with phase pole	Modify the wrong connection
Breaker tripped indicator lights up	The related breaker is tripped , when the current failure have been removed, re-trip the breaker manually, and press the Reset button		
Automatic operation indicator or Local forced operation indicator flickers	Both of the two power source are failure, check and remove the failure		