3SERIES
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User manual

HDQ3S

Transfer Switching Equipment (TSE)

□ Please carefully read this User Manual before installing and operating the product, and keep this manual properly for future reference

Himel

Safety Notice

Before installation, operation, maintenance and inspection, please read this instruction carefully, and install and use this product accurately according to contents of the instruction.

Warning:

- It is forbidden to operate the machine with wet hands.
- It is forbidden to touch conductive parts while the machine is running;
- It is necessary to ensure that the product is not charged when maintaining and repairing;
- It is strictly prohibited to test products by means of short circuit;
- For the automatic operation of ATSE/RTSE, remove the manual operation handle first.

Note:

- Please install and maintain the machine by professionals only;
- Install, debug and use the machine according to the instruction;
- Before use, please confirm whether the operating voltage, rated current, frequency and characteristics of the machine meet working requirements.
- During installation, remember to distinguish the position of Normal incoming terminal, Alternative incoming terminal, and outgoing terminal; otherwise, short circuit may occur.
- During installation, ensure the consistency of phase sequence of Normal and Alternative Source; otherwise, it may lead to reverse rotation of lower load motor.
- Make sure both three-pole and four-pole ATSE/RTSE products must be connected to the null line at the N pole of the incoming terminal; it is forbidden to share N pole; otherwise, the leakage protector will act.
- In order to prevent interphase short circuit, the incoming and outgoing copper bars shall be isolated by interphase isolation barrier (such plate is not required for 2P products);
- The undervoltage of P-type controller shall not be lower than 184V (phase voltage) under working state; otherwise the product may fail to convert normally;
- Do not operate the machine manually under automatic working state; otherwise the automatic transfer switch will reset to its original position;
- Under ATSE/RTSE manual operation, enter manual mode (automatic and manual buttons are at OFF position) and use matching handle. Use manual operation to achieve Normal closing, Alternative closing, and OFF Position.
- To test ATSE/RTSE insulation resistance or power frequency withstand voltage, disconnect the electronic components (including the controller) between the current circuits; otherwise the product performance will be damaged;
- When the product is scrapped, please dispose product waste.

Contents

1 Introduction to HDQ3S TSE

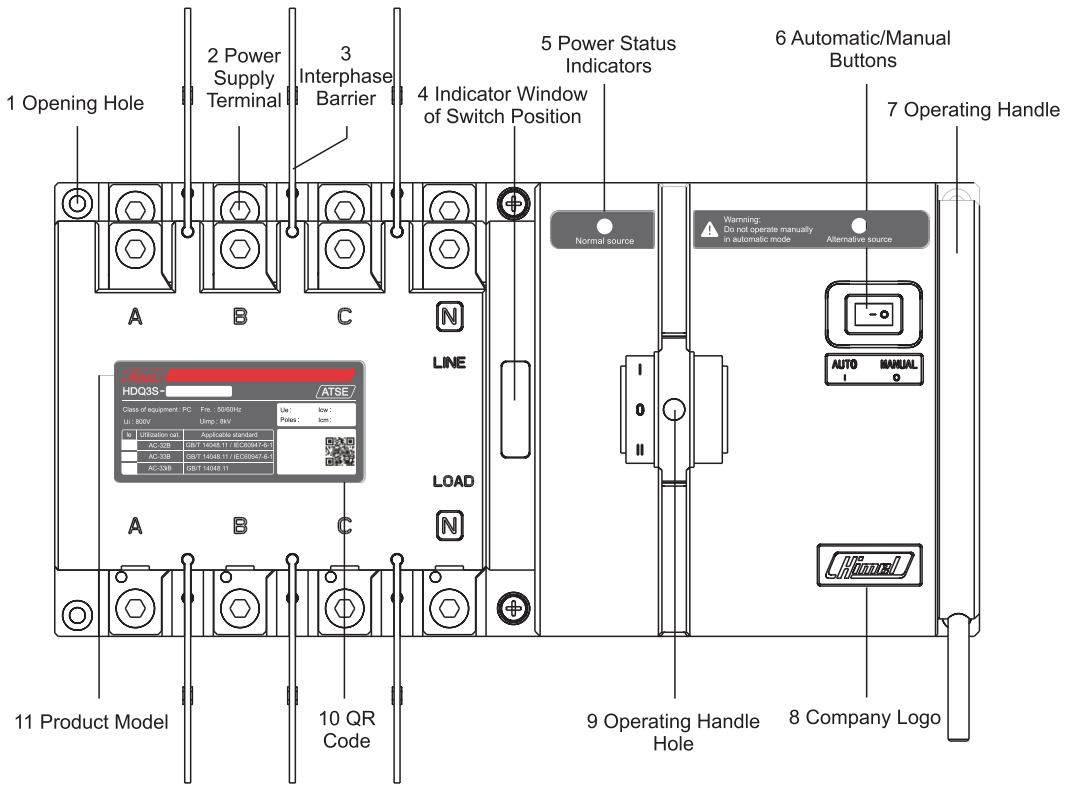
1.1 Packing List

Table 1

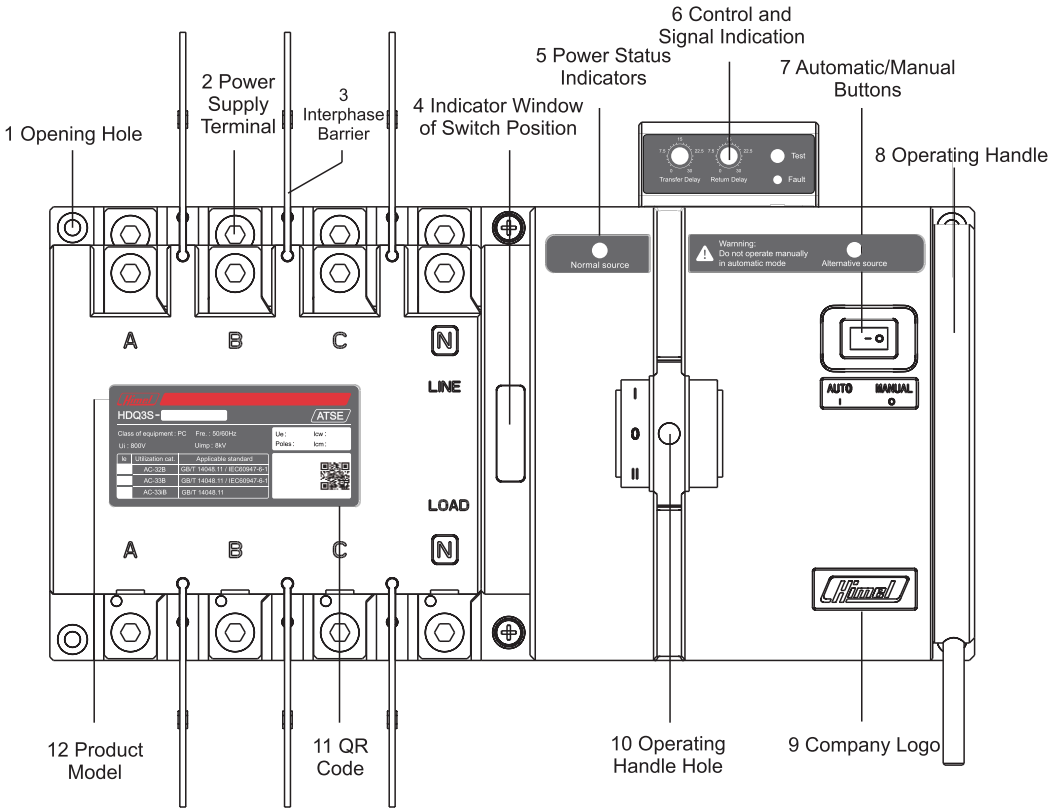
No.	Name	Unit	Qty.
1	Transfer switching equipment (TSE)	Pcs	1
2	Handle	Pcs	1
3	Mounting screws, nuts and flat washers	Bag	1
4	Safety Warning Instructions	Pcs	1
5	Interphase isolation barrier	Pcs	2P: No, 3P/4P 6 pcs
6	Terminal block	Pcs	Six-pin terminal 1; Three-pin terminal 1 (G/R type controller)

After unpacking, user needs to check whether the machine is intact, whether the exposed metal is rusty, and whether the product is damaged during transportation and storage. If any of the problems above is found, do not use the machine and contact the supplier in time.

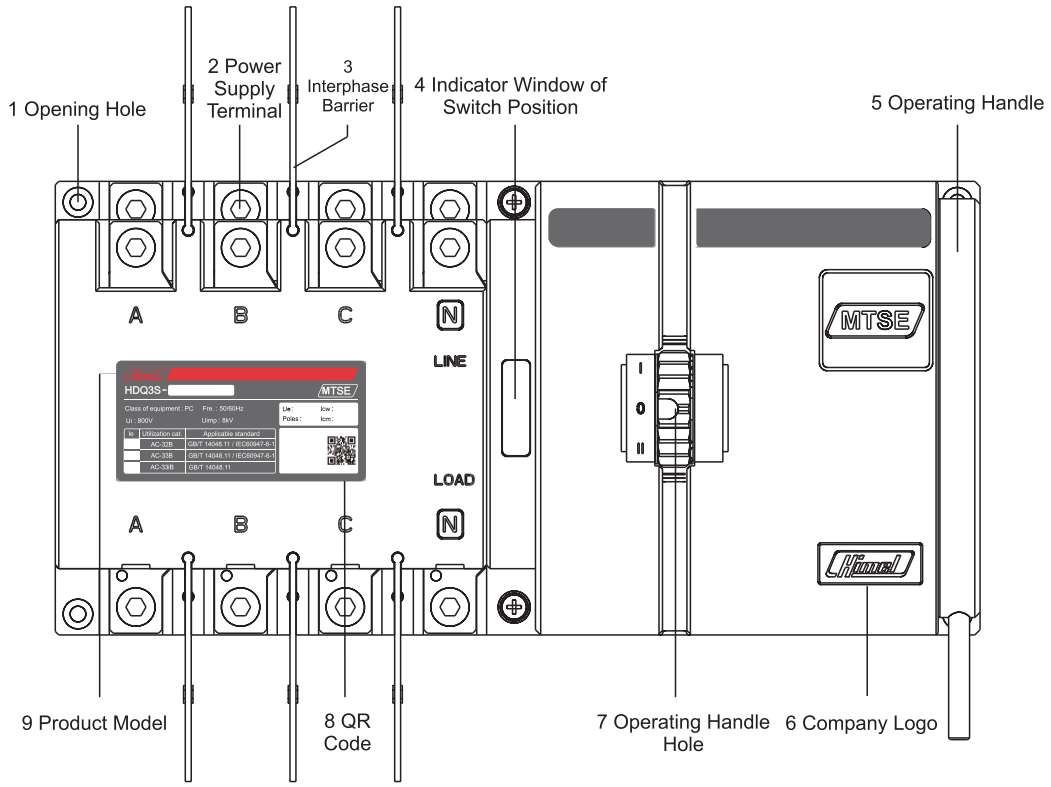
1.2 Structure



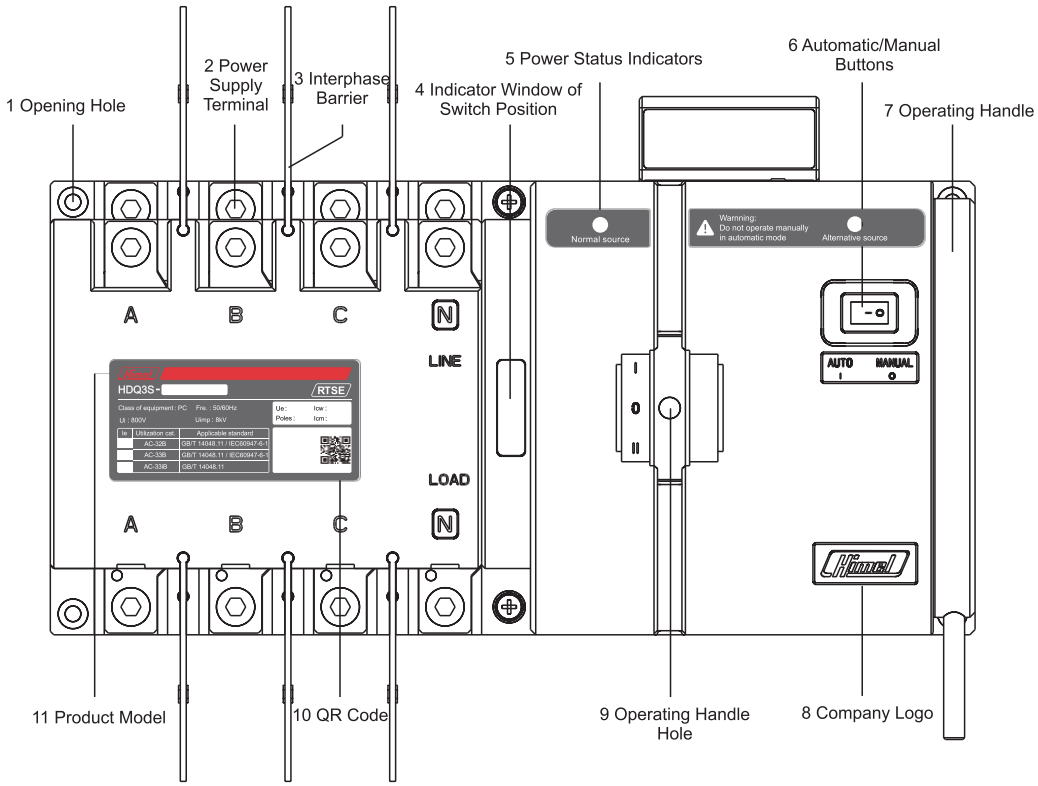
ATSE-P



ATSE-G



MTSE



RTSE

Figure 1 Schematic Diagram of the TSE

1.3 Features

HDQ3S series TSE comply with GB/T 14048.11 and IEC 60947-6-1. They are mainly used in the power supply system (AC 50Hz/60Hz, rated operating voltage 400V/230V, rated operating current 16~250A) for switching the Normal and Alternative Source supplies automatically/manually.

a) The main contact has three positions (Normal, Alternative, and OFF Position). OFF Position is used for the maintenance of lower circuit after power-off. It also meets the function requirements of transferring the electrical equipment manually.

b) P-type controller supports automatic switching and recovery, normal power phase failure and voltage loss protection of Normal/Alternative source, and Power-Power function.

c) G-type controller supports automatic switching and recovery, Normal source phase failure and voltage loss protection of Normal/Alternative source and Power/Solar-Power/Generator function.

d) R-type controller supports remote control (including automatic switching and recovery logic) and controls the switching between Normal and Alternative source through external power supply signal. It is a set of dedicated device for the external controller in generator industry;

e) Utilization Category: AC-32B, AC-33B and AC-33iB.

f) The machine comes with the structure of upper incoming line (Normal source and Alternative source) and lower outgoing line (load outgoing).

1.4 Main products select code

HDQ3S 0080 4 0080 G

Product name	Frame size	Pole	Rated Current (@ AC-32B/AC-33iB)	Controller
HDQ3S	0080:80AF	2:2P 3:3P 4:4P	0016/0020/0025/0032/0040/0050/0063/0080	P: ATSE (Power-Power) G: ATSE (Power-Generator) M: MTSE (wo. Controller) R: RTSE (Remote control)
	0125:125AF		0050/0063/0080/0100/0125	
	0250:250AF		0080/0100/0125/0140/0160/0200/0250	

1.5 Main Technical Parameters

Main technical parameters are shown in Table 2:

Table 2 Main Technical Parameters

■: Standard □ : Optional -: Without

General data	HDQ3S-80	HDQ3S-125	HDQ35-250
Poles	2P/3P/4P		
Standard	IEC 60947-6-1 GB/T 14048.11		
Equipment Class	PC		
Rated insulation voltage Ui (V)	800		
Rated impulse withstands voltage Uimp (kV)	8(2.5 for control circuit)		
Rated operation voltage Ue (V)	400±20%(230±20% for 2P)		
Frequency (Hz)	50/60		
Rated short-time withstand current Icw (kA)	5 @30ms	10 @30ms	10 @200ms
Rated short-circuit making capacity Icm(kA)	7.65	17	17
Mechanical life (1-O-II cycles)	8000	8000	8000
Electrical life (1-O-II cycles)	2000	2000	1500
EMC Level	Environment B		
IP Degree	IP30(IP00 for Wiring terminal)		
Direct rotary handle	■		
Extended Rotary Handle	□(MTSE only)		
Product Dimension (WxHxD)	245x120x100	265x130x106	340x170x137
Installation Dimesion (WxH)	232x97	252x118	325x155
Phase to phase dimension (mm)	25	30	40

Controller	P	G	M	R
Auto.transfer and recover	■	■	–	■
Manual	■	■	■	■
Auto and Manual switch	■	■	–	■
Normal source 3 phases monitor	■	■	–	–
Alternative source phase A monitor	■	■	–	–
OFF, Normal, Alternative ON status indicate	■	■	■	■
Normal source loss phase protection	■	■	–	–
Normal& Alternative source No-voltageprotection	■	■	–	–
Under-Voltage Protection	–	■(act 172V,rec 178V)	–	–
Over-Voltage Protection	–	■(act 276v,rec 271V)	–	–
Transfer time(s)	1.5±20%	0-30s(adjustable)	–	1.5±20%(Auto)
Return time(s)	1.5±20%	0-30s(adjustable)	–	1.5±20%(Auto)
Test button	–	■	–	–

2 Storage and Transportation

a) During transportation and installation, handle the machine with care, do not invert it, avoid severe collision and vibration, and make sure the free fall height during transportation does not exceed 0.4m;

b) Avoid rain and snow and long-term direct exposure to sunshine;

c) Ambient temperature -25˚C and +70˚C；relative humidity ≤90%.

3 Installation

3.1 Installation Environment

a) The ambient temperature does not exceed +50˚C and its average temperature within 24h does not exceed +35˚C. The lower limit of ambient air temperature is -5˚C；

b) The altitude of the installation site does not exceed 2,000m;

c) The relative humidity shall not exceed 50% when the maximum temperature is +50˚C. A higher relative humidity may be allowed at lower temperature, for example, 90% at +20˚C; special measures shall be taken for occasional condensation due to temperature changes;

d) Contamination level is Level 3. The machine causes conductive contamination, or condensation may make dry nonconductive contamination conductive;

e) Installation category is IV; horizontal power incoming terminal;

f) Environmental category is B. Install the machine by avoiding rain and snow, and obvious vibration.

3.2 Appearance and Dimensions

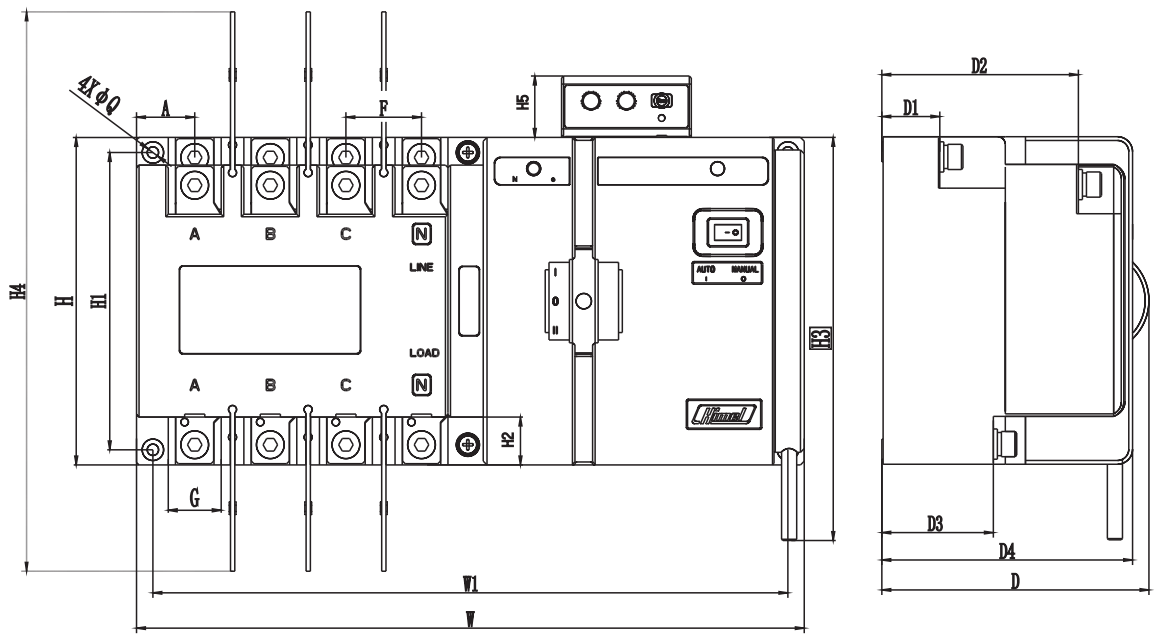


Figure 2 HDQ3S 80-250/2P, 3P and 4P body shape

Table 3 Appearance and Installation Size of Switch (mm)

Model / Specification	W	W1	H	H5	H1	A	F	G	H2	H3	H4	D	D1	D2	D3	D4	Q
HDQ3S-80(P/M)	245	232	120	-	97	21	25	17	15.5	155	132	100	24.5	63.5	40	91	4.5
HDQ3S-125(P/M)	265	252	130	-	118	23	30	21.5	19	160	158	106	23	78	44.5	99.5	4.5
HDQ3S-250(P/M)	340	325	170	-	155	31.5	40	30.5	25	210	219	137	27	97	54.5	122.5	5.5
HDQ3S-80(G/R)	245	232	120	25	97	21	25	17	15.5	155	132	100	24.5	63.5	40	91	4.5
HDQ3S-125(G/R)	265	252	130	25	118	23	30	21.5	19	160	158	106	23	78	44.5	99.5	4.5
HDQ3S-250(G/R)	340	325	170	25	155	31.5	40	30.5	25	210	219	137	27	97	54.5	122.5	5.5

3.3 Product Wiring Diagram

3.3.1 Main circuit wiring diagram

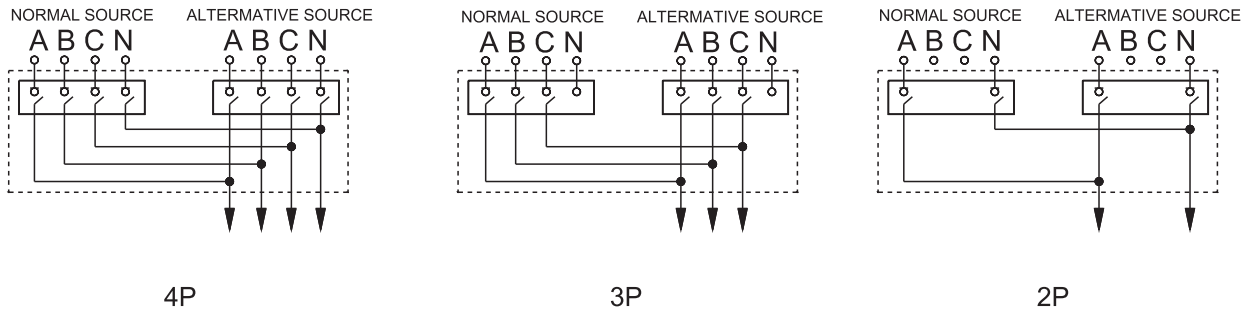
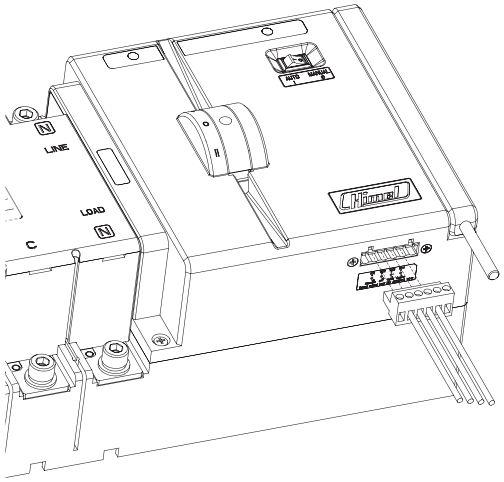
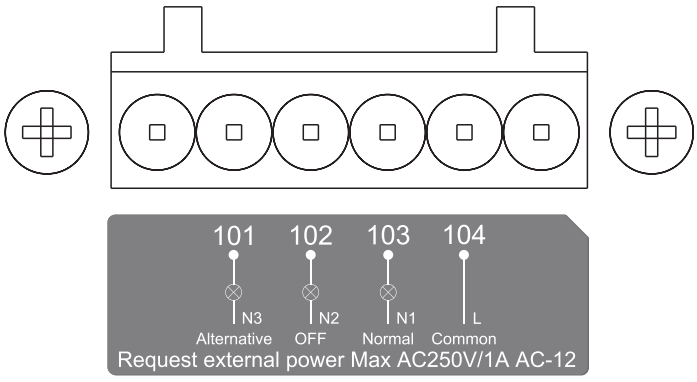


Figure 3 Product Wiring Diagram

3.3.2 The position signal (Dry contact) output terminal of ATSE

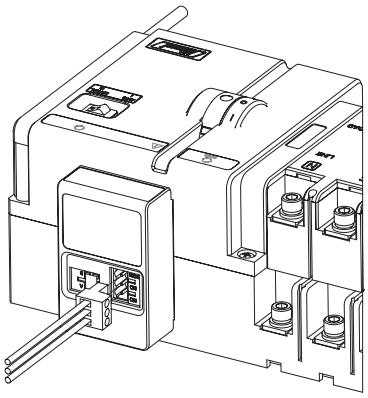


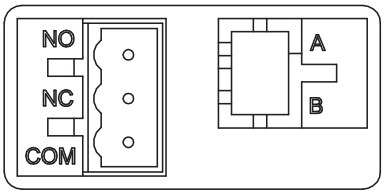


101、104 Alternative source ON indication
102、104 OFF indication
103、104 Normal source ON indication

Figure 4 Terminal Wiring Diagram

3.3.3 The position signal (Dry contact) output terminal of ATSE-G





COM, NO, NC terminal is designed to start generator:

Normal source energized for 15s: COM closes with NO contact

Normal source failure for 15s: COM closes with NC contact, NO contact opens, ATSE outputs generator start signal

Normal source restored for 15s: COM re-closes with NO contact, NC contact opens

Terminals A and B are reserved communication terminals.

3.4 Installation Instructions

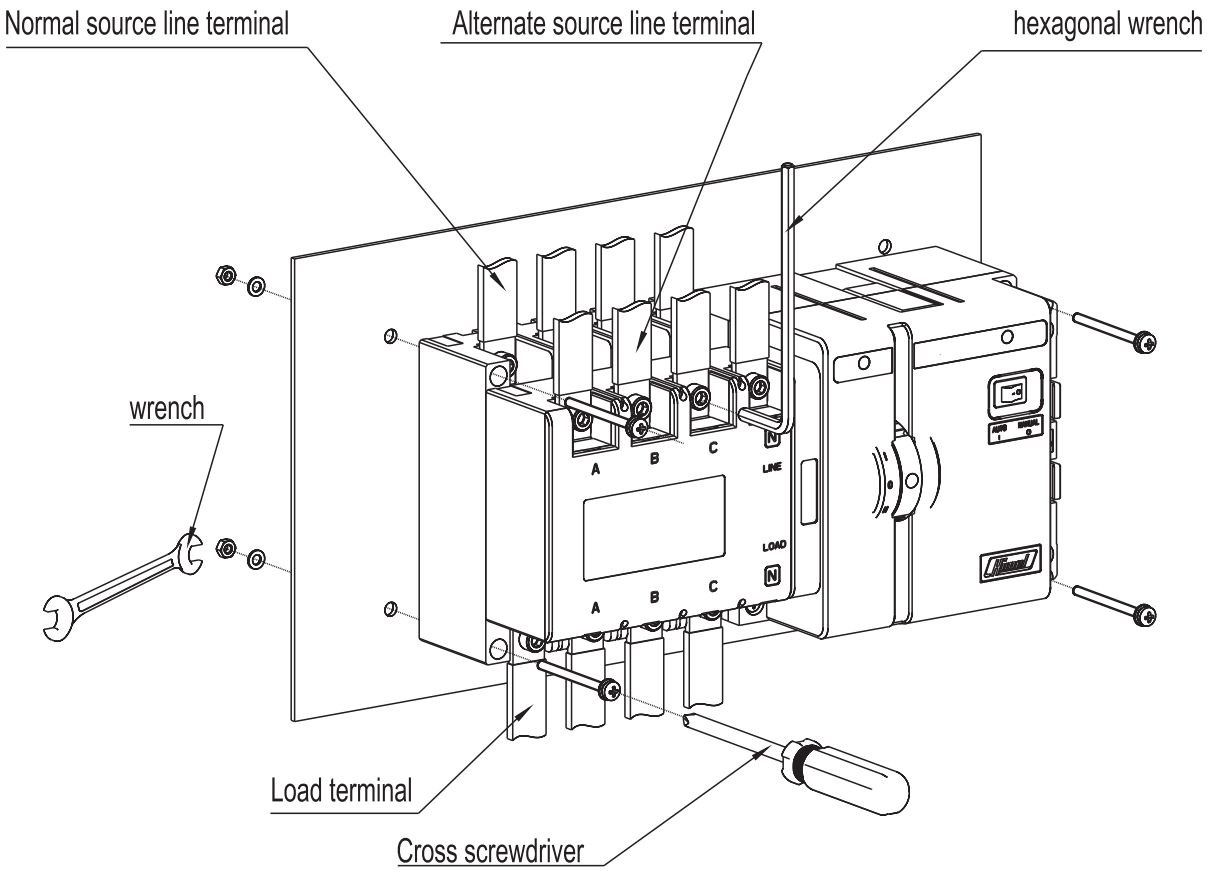


Figure 5 HDQ3S80~250 Normal Power, Alternative Power, Outgoing Side Wiring and Product Installation

Table 4 Torque Table

Frame	Cross recessed mounting screw		Hexagon socket terminal screw	
	Specification	Torque N.m	Specification	Torque N.m
80	M4X40	1.2	M6X16	6–7
125				
250	M5X55	2	M8X20	9.5 ~ 10.5

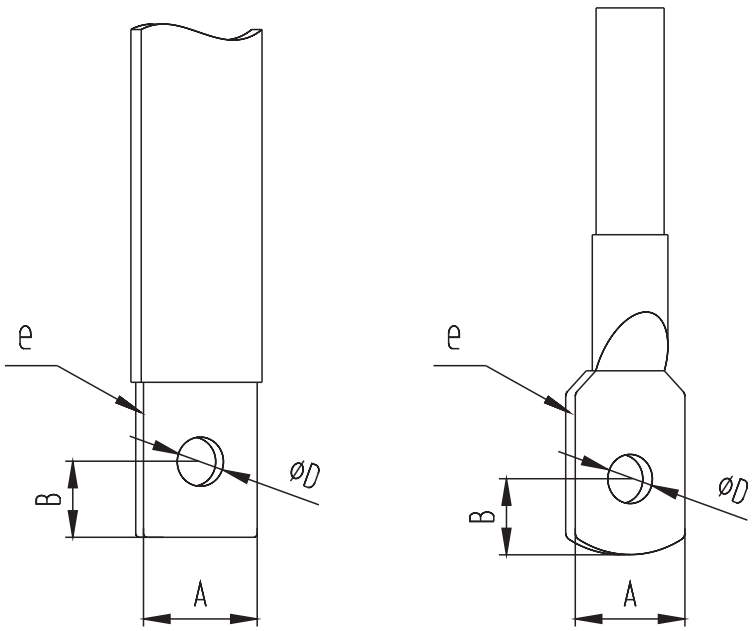


Figure 6 Specification Diagram of Copper Bar and Conductor

Table 5 Cross-sectional Area of Connecting Conductor (mm2)

Rated current A	10	16/25	25	32	40/50	63	80	100	125/140	160	200/225	250
Wire cross-sectional area mm 2	1.5	2.5	4	6	10	16	25	35	50	70	95	120

Table 6 Recommended Copper Bar and Wire Specification (mm)

Model / Specification	A	B	e	φD
HDQ3S-80	15	9	⩾2	6.5
HDQ3S-125	20	11	⩾2.5	6.5
HDQ3S-250	30	15	⩾4	8.5

3.5 Safety Distance

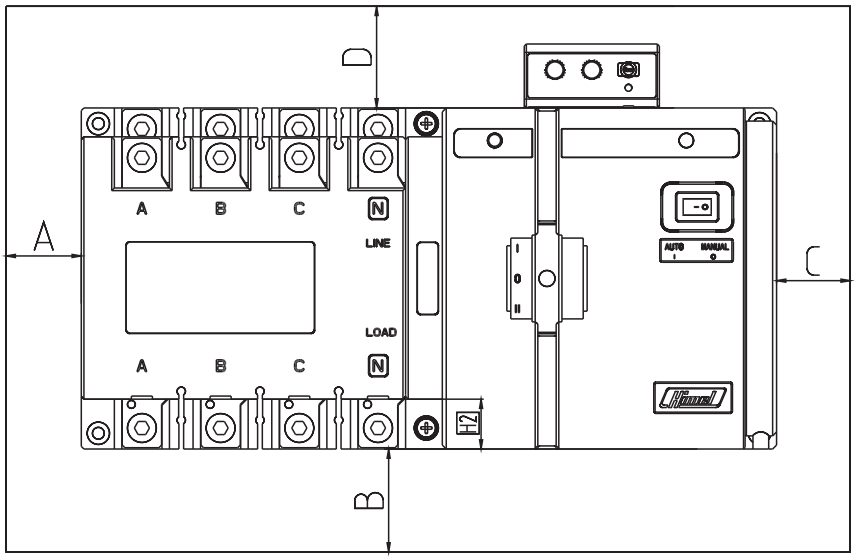
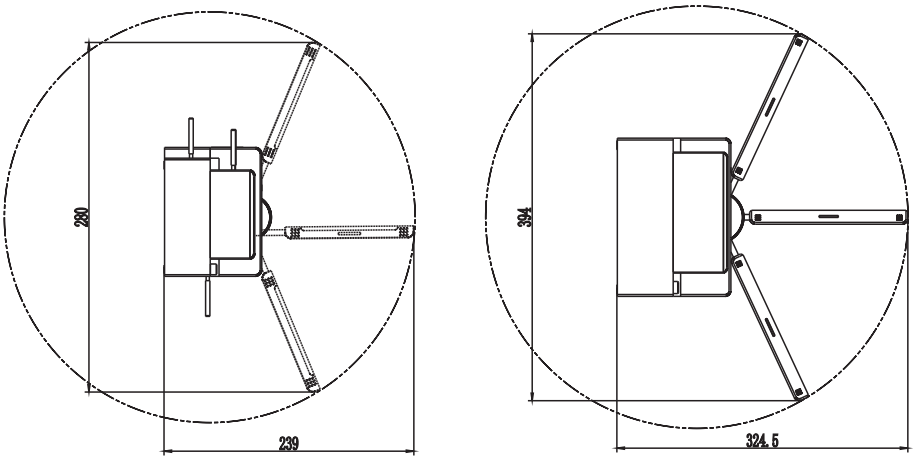


Figure 7 Safe Distance



HDQ3S-80/125 HDQ3S-250

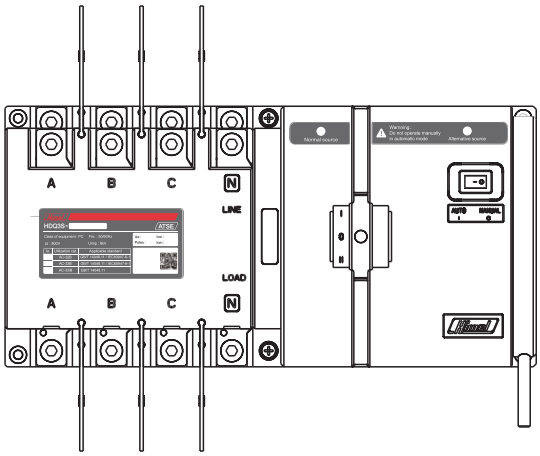
Figure 8 Operating Range of Handle

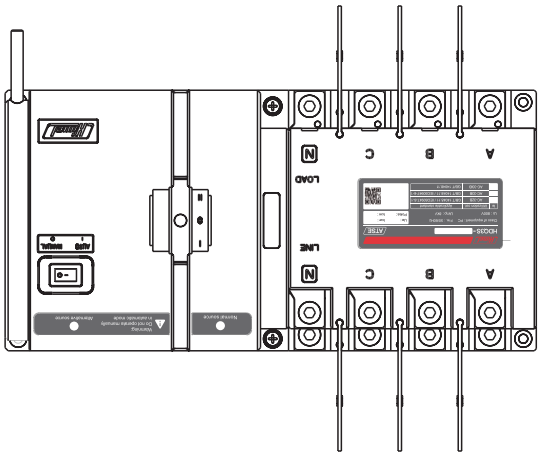
Note: Barrier is forbidden within the operating range of the handle.

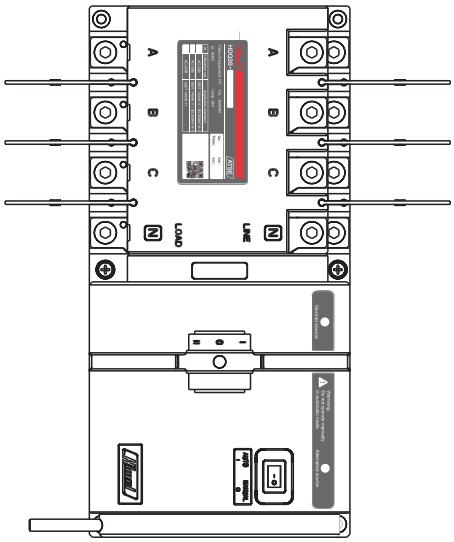
Table 7 Safe Distance

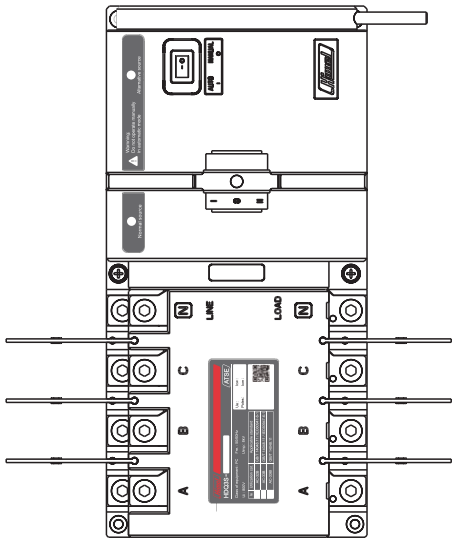
Safe distance (mm)	A	B	C	D
Insulation	0	50	0	50
Metal/charged conductor	0	60	0	60

3.6 Installation Direction









4 Operation

4.1 Operation Sequence

4.1.1 Automatic Switching Flow (P-type Controller)

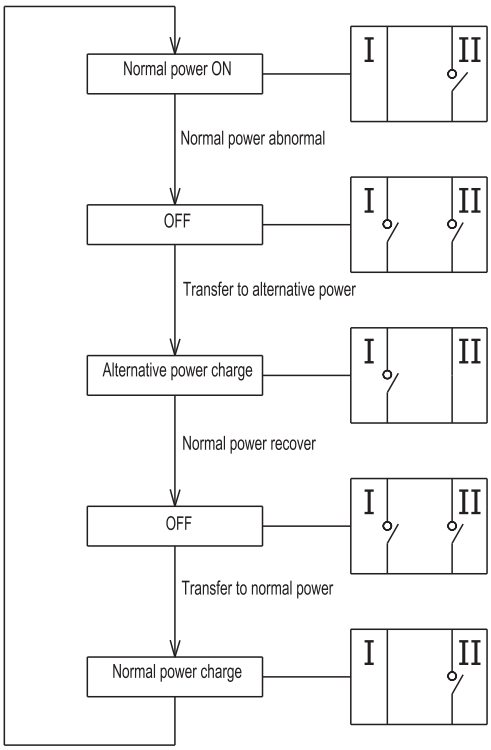


Figure 9 Power-Power

4.1.2 Automatic Switching Operation Flow (G-type Controller)

Descriptions of over-voltage and under-voltage protection function:

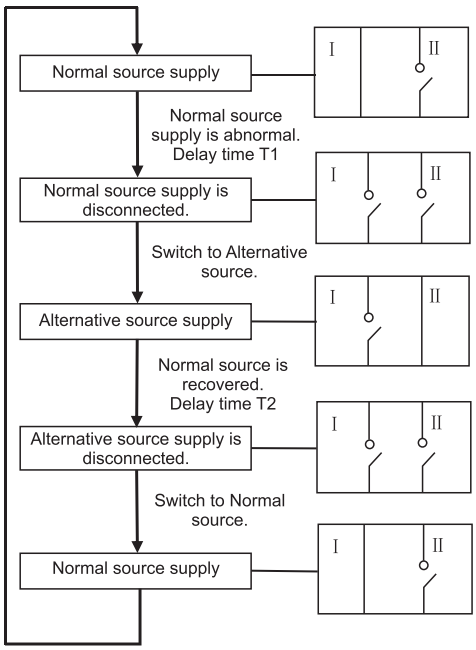
If the undervoltage of G-type controller (phase voltage) is less than 172V under working status, the product will trigger undervoltage protection； only the voltage recover to 178V, controller will recognize undervoltage fault was eliminated.

If the undervoltage of G-type controller (phase voltage) is greater than 276V under working status, the product will trigger overvoltage protection; only the voltage recovers to 271V, controller will recognize overvoltage fault was eliminated.

Adjustable range of Transfer delay: 0s ~ 30s

Adjustable range of return delay: 0s ~ 30s

The delay knob is stepless adjustment. The indication scale is only for reference.



T1: Transfer delay, the time from source I abnormality to source I disconnection.
T2: Return delay, the time from source I recover to source II disconnection.
T3: Generators start delay, the time from source I abnormality to output generator start signal.
T4: Generators stop delay, the time from transfer to source I to stop output generator start signal.

I: Normal source.
II: Alternative source.
Note: T3 and T4 are 15s±1s.

Figure 10 Power/Solar-Power/Solar

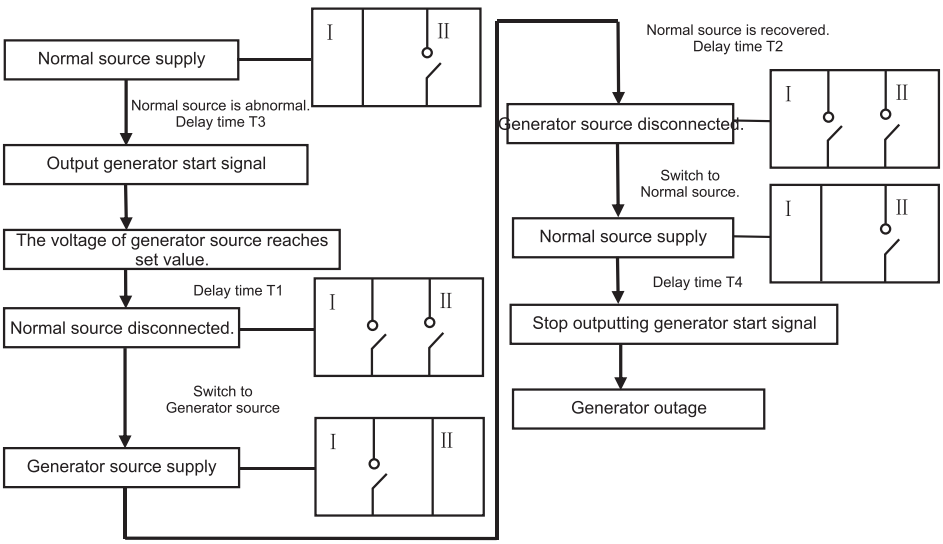


Figure 11 Power/Solar-Generator

4.13 RTSE Operation Flow

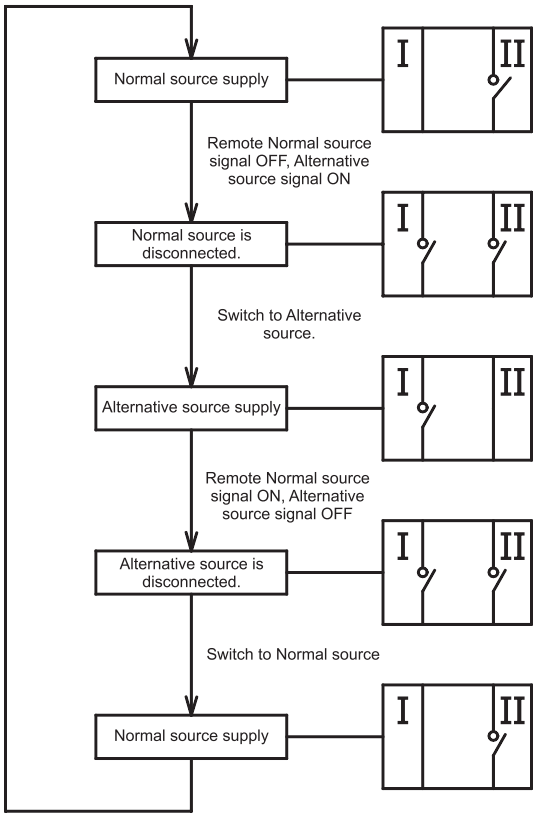


Figure 12 Remote control

Note: When Normal source and Alternative source both receive remote signal, the RTSE will stay at Normal source position.

4.2 Operating Mode

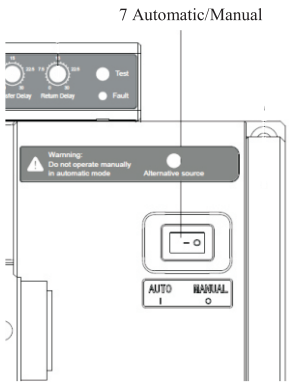


Figure 13 Auto/Manual Button

Automatic operation: AUTO/MANUAL Button on AUTO position, and the controller of dual power supply equipment will detect the status of Normal and Alternative Source and automatically switch between the two Source.

Manual operation: AUTO/MANUAL Button on MANUAL position, take out the handle on the right side of dual power supply equipment, insert it into the rotating position of the handle of the main body, manually rotate it to the required power position, and put the handle back to the original position after switching.

MTSE has no switch button and can only be operated manually.

Remote control: AUTO/MANUAL Button on AUTO position, and the switching between Normal and Alternative Source is controlled by external power signal. The wiring of dual-power control signal is shown in the figure below.

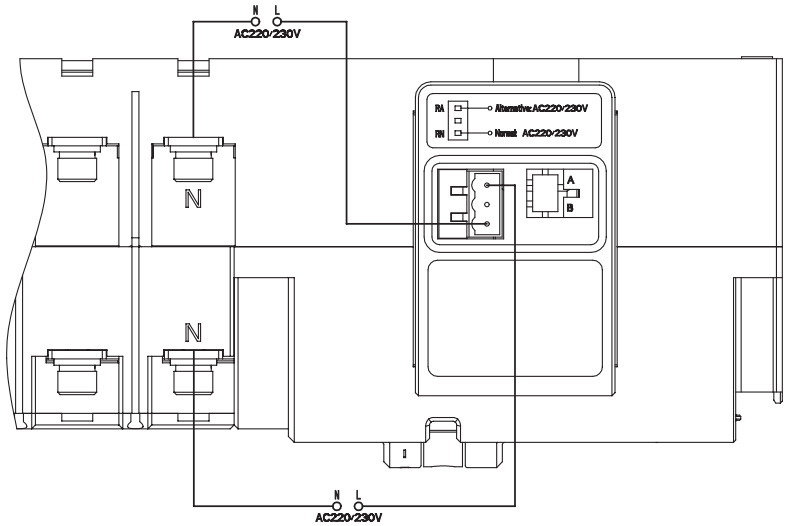


Figure 14 Terminal Diagram

4.3 Handle

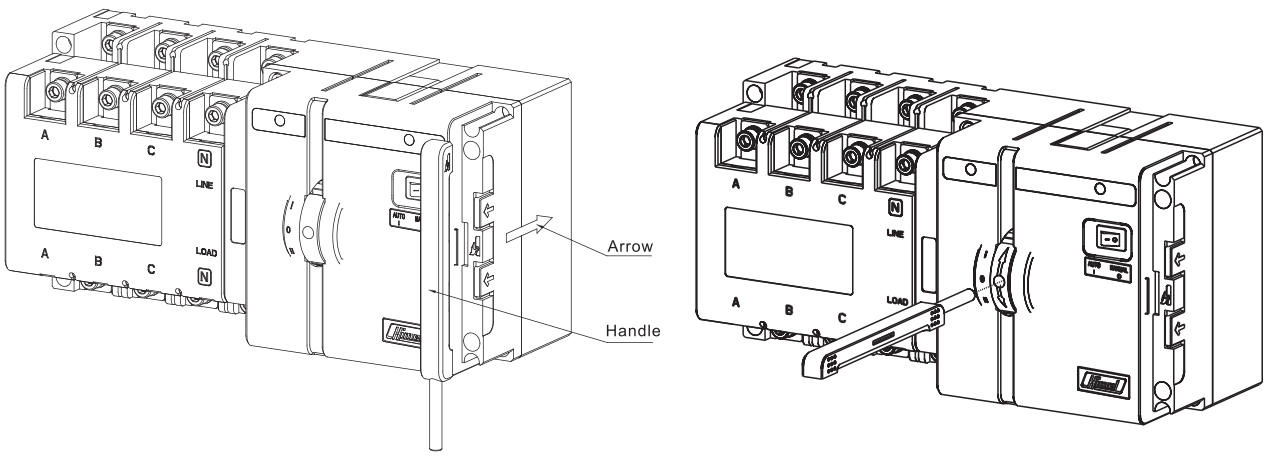


Figure 15 Handle

After finishing installing and debugging the ATSE, knock the handle into the product according to the direction shown in the figure above.

If manual opening and closing is required, insert the handle into the handle wheel according to the direction shown in the figure above, and open and close according to the direction shown in the arrow.

4.4 Indications and Adjustment

See Table 9 and Table 10 for the indication of indicators:

Table 9 Descriptions of Indicators (ATSE)

No.	Indication	Description
1	Normal source	ON: Normal source is normal OFF: Normal source A B C N is in voltage loss or lack of phase
2	Transfer Delay	0-30s adjustable
3	Return Delay	0-30s adjustable
4	Test button	After right connection, with correct power input, in both sources, push the Test Button, ATSE will transfer to another source
5	Power status indicator	Flashing: Abnormal status of Normal source or alternative source OFF: Normal power supply
6	Alternative source	ON: Alternative source is normal OFF: Alternative source A N is in voltage loss

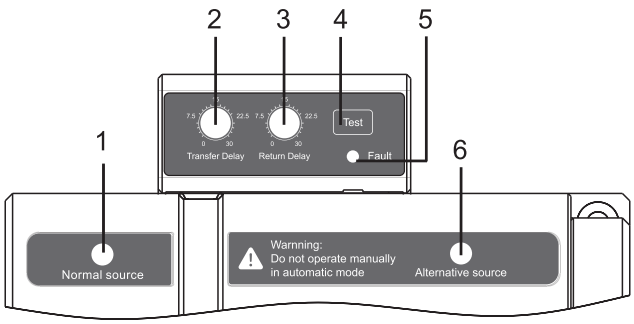


Figure 16 Indicator Position Diagram

Table 10 Descriptions of Indicators (RTSE)

No.	Indication	Description
1	Normal source	ON: Normal source is normal OFF: Normal source is in voltage loss
2	Alternative source	ON: Alternative source is normal OFF: Alternative source is in voltage loss

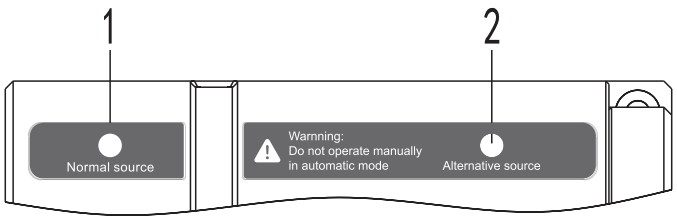


Figure 17 Indicator Position Diagram

4.5 Attention before Use

In addition to the "Danger" and "Caution" on the first page, please also ensure:

a) This product can reliably work under rated voltage (80%~120%) Ue. When installing and wiring the machine, distinguish the incoming and outgoing terminals and N-phase and do not share the neutral wire

b) Do not use this product beyond normal conditions of use, e.g. the environment with persistent moisture or condensation but without appropriate precautions. Combustible or corrosive dust, expected short-circuit current out of range, ultra-high or ultra-low voltage, current higher than the rated value, too high altitude, etc.

c) This product is designed with plastic shell insulation structure and requires no earthing;

d) If the protective appliance is disconnected by line or load fault, remove faults first before supplying power to load.

e) Carry out regular inspection for the machine when it is in service (such as every three months of operation); manually convert the power supply to confirm the intactness of the machine.

5 Troubleshooting

See Table 11 for Normal fault analysis of ATSE:

Table 11 Fault Analysis

Faults	Cause analysis	Solution
The machine does not automatically convert (in case of fault, commissioning)	1.The connection between the power line and the switch body may become defective; 2.Automatic and manual buttons are in manual state; 3.Undervoltage at product site exceeds 20%(phase voltage). (P/R-type controllers only) 4.Failure to connect N pole incoming terminal of 3P product.	1.Check whether the power line is connected properly and whether the bolt is tightened; 2.Check whether the automatic manual button is in automatic state; 3.Maintain onsite grid 4.Connect N pole.
Backpack dysfunction	5.The connection cable between backpack and motherboard is loose or falls off; 6.The connection between the terminals on the backpack and the external terminals is loose or falls off	5.Reinstall cable; 6.Reinsert the terminals.

6 Commitment

The Company agrees to repair or replace the instrument free of charge, if the instrument is damaged or cannot be used normally by manufacturing problems on the premise of user's normal use and storage, and complete company seal within 36 months since the date of production. We also provide charged repairing services after expiration of the warranty period. However, damage caused by the following circumstances shall be repaired for payment even within the warranty period:

a) Damages ascribed to improper use, maintenance and storage;

b) Damages ascribed to unauthorized modification or improper maintenance;

c) Damages ascribed to falling and installation process after purchasing;

d) Damages ascribed to force majeure events such as earthquake, fire, lightning, abnormal voltage and secondary disasters.

For any questions, please feel free to contact the dealer or our customer service department.