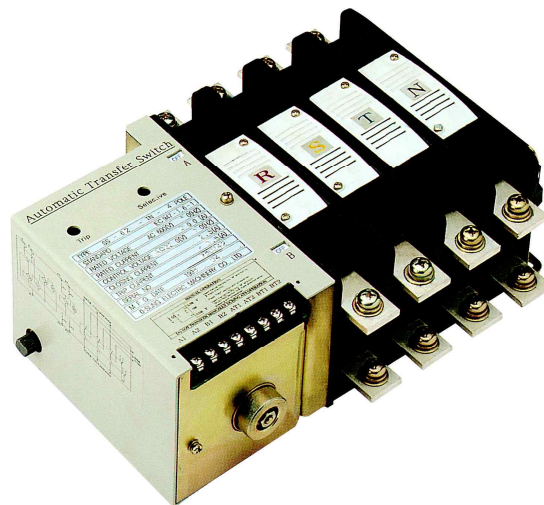


Automatic Transfer Switches

TN - Type

Manual



DATE : 2013. 11.

O-Sung Electric Machinery CO., LTD.

111-3, Yeongtae-ri, Wollong-myeon, Paju-si, Gyeonggi-do, Korea

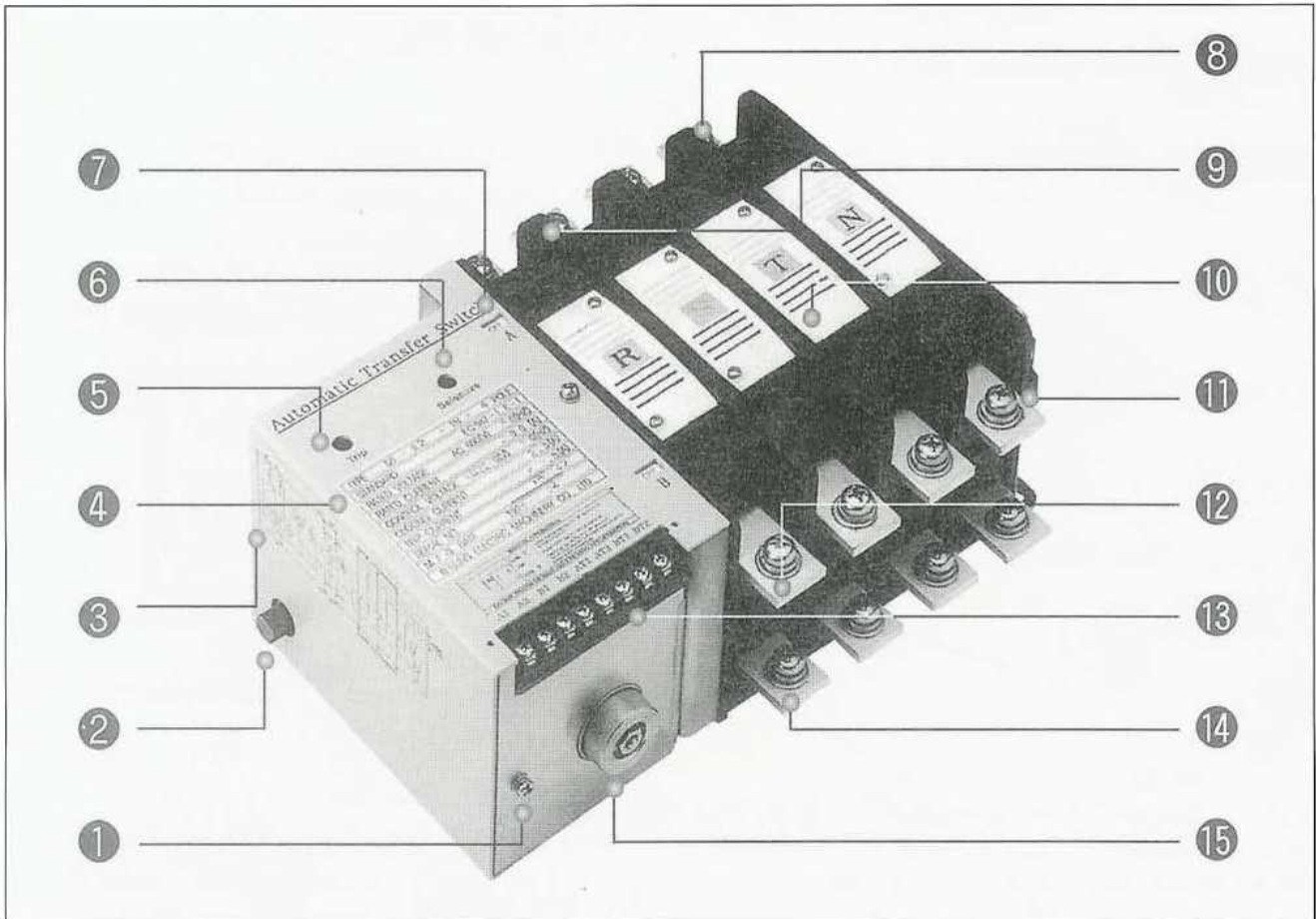
Tel. 82-31-944-3521/3

Fax. 82-31-944-3525

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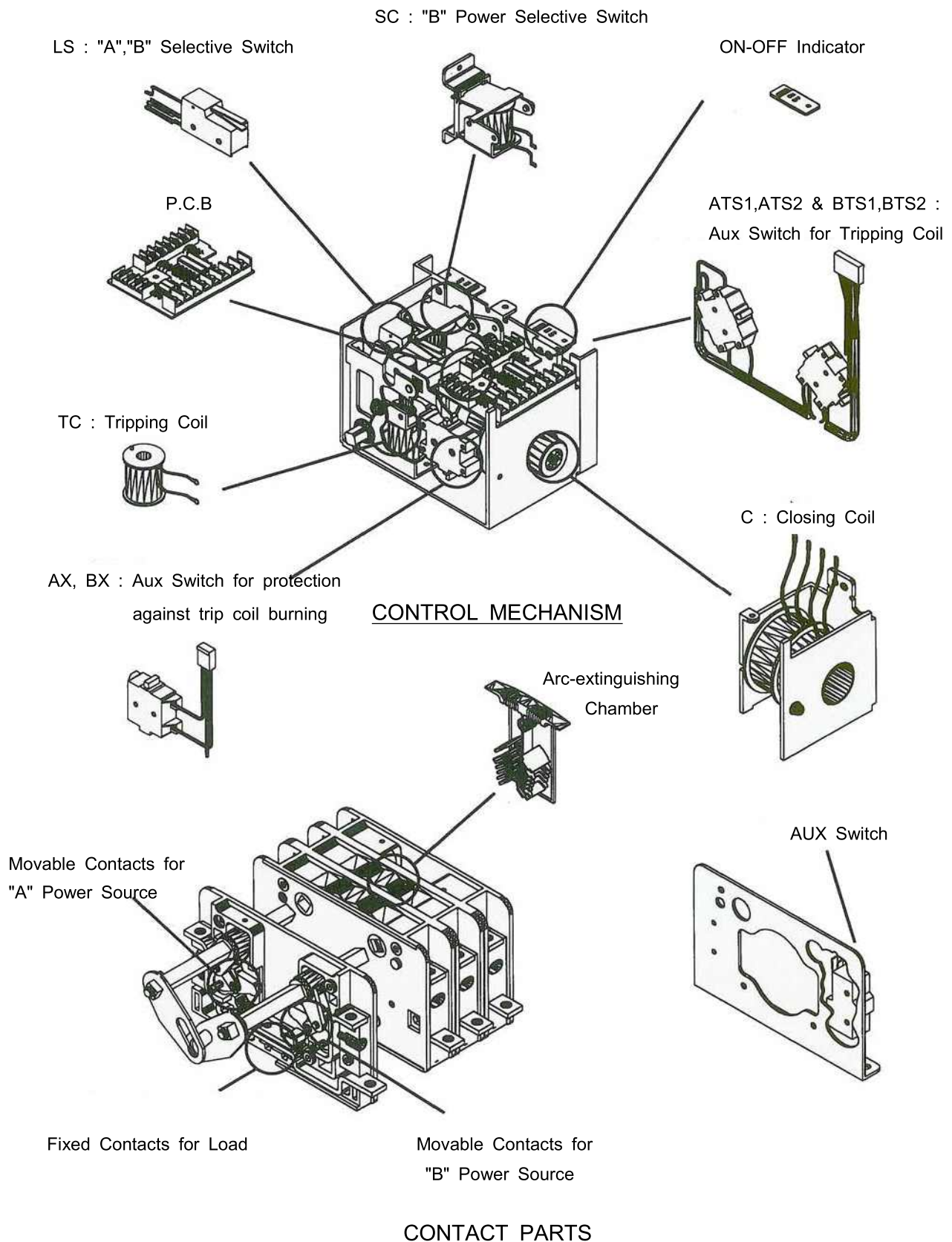
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1. External View



- | | |
|---|---------------------------------------|
| ① Earthing Terminal | ⑪ Aux Switch |
| ② Manual Operating Shaft (Anti-Clockwise) | ⑫ Main Circuit Terminal for "B" Power |
| ③ Circuit Diagram | ⑬ Control Circuit Terminal Block |
| ④ Name Plate | A1 , A2 : "A" Power Source-Closing |
| ⑤ Trip Button | B1 , B2 : "B" Power Source-Closing |
| ⑥ Selective Button for "B" Power-Closing | AT1,AT2 : "A" Power Source-Tripping |
| ⑦ On/Off Indicator | BT1,BT2 : "B" Power Source-Tripping |
| ⑧ Main Circuit Terminal for "A" Power | |
| ⑨ Contacts | ⑭ Main Circuit Terminal for Load |
| ⑩ Arc-extinguishing Chamber | ⑮ Amateur for Closing Coil |

2. Parts Description



3. Precautions

3.1 Points to check after receiving :

- 1) Please check the ratings of rated current and control voltage, etc specified in name plate whether ATS is delivered in accordance with ordered specification.

3.2 Storage :

ATS is recommended to install and use as soon as possible after receiving. If not in immediate use, Please pay attention on following points so that ATS can be stored in good condition.

- 1) Please avoid any place of high temperature and high humidity.
- 2) Please avoid any place of noxious gases and dust. Particularly, Please avoid mixture of cement with moisture because these causes corrosion on various parts.
- 3) Please put ATS on horizontal plane.
- 4) Please do not put ATS on the ground.

3.3 Caution during moving :

When moving ATS, Please pay attention on following points.

- 1) Please choose horizontal plane where ATS will be placed.
- 2) Please avoid any impact during moving.

4. Installation & Connection

4.1 Method

- 1) Please place ATS so that name plate can be clearly read from the front.
- 2) Please install ATS horizontally on vertical plane in accordance with below Fig 1.
- 3) When fitting connectors, Please do not over-fix so that connectors of main circuit should be kept horizontally.

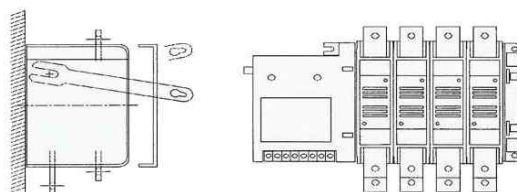


Fig 1

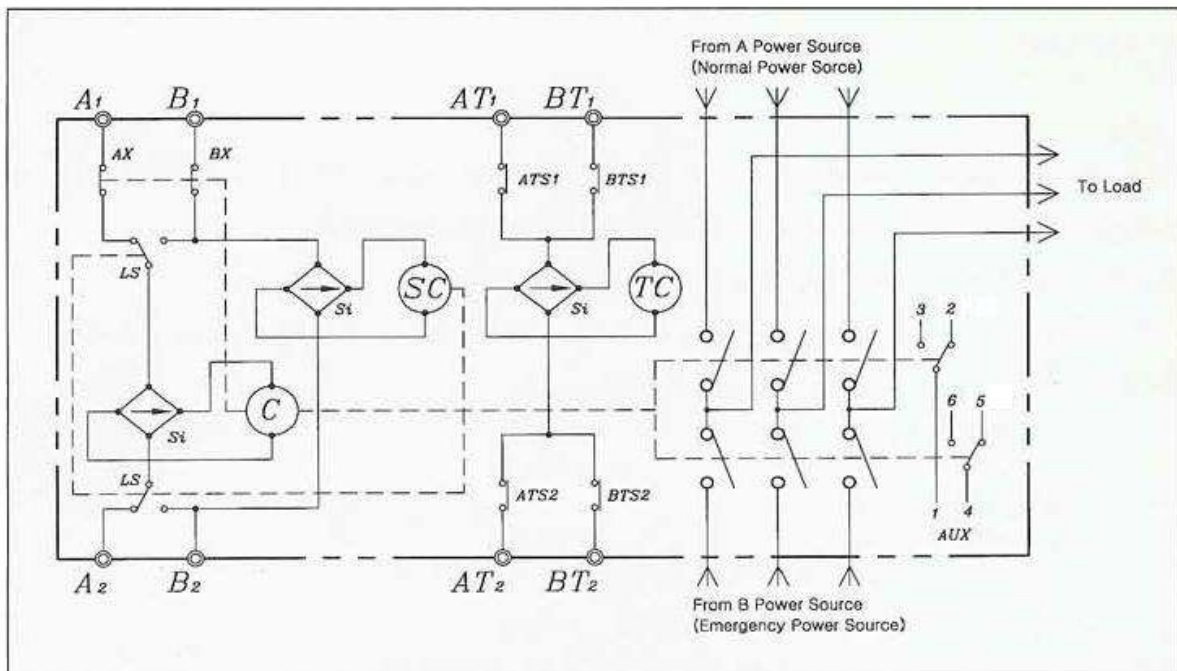
4.2 Caution

The construction and characteristics of ATS is designed according to constant mounting direction. If mounting direction is changed, Characteristic might be changed and following malfunction might be occurred.

- 1) When switching, Operating current can be increased because mechanical Characteristic is not corresponding to design criteria.
- 2) Switching time and switching capacity can be changed.
- 3) In worst case, Switching can not be made and "Again" might be indicated.

5. Operating Method

5.1 Sequence Diagram for SS-TN Type



Description					
C	Closing Coil	AX, BX	Control Switch	A ₁ -A ₂	"A"Power-Closing Terinal
Si	Silicon Rectifier	SC	Selective Coil	B ₁ -B ₂	"B"Power-Closing Terminal
LS	Selective Switch	TC	Tripping Coil	AT ₁ -AT ₂	"A"Power-Tripping Terminal
ATS1, ATS2 BTS1, BTS2	Trip Control Switch	AUX	Auxiliary Switch	BT ₁ -BT ₂	"B"Power-Tripping Terminal

- 1) The above sequence diagram is internal circuit diagram.
- 2) When "A" Power Source will be exchanged with "B" Power Source according to customer's requirement, Be sure to exchange Control Power & Tripping Source of "A" Power Source and "B" Power Source also.

5.2 Manual Operation Method

When manual operation will be needed, Proceed following procedures after checking tripped condition at all times.

("A" Power Source : Off "B" Power Source : Off)

- 1) For tripping, Put screwdriver into Trip aperture ① and press. After tripping, Remove Manual Switching Lever from Manual Operation Shaft.
- 2) According to Fig 2, Put Manual Switching Lever into Manual Operation Shaft and turn 45° anticlockwise direction. Then, "A" Power Side closing will be completed.
- 3) If closing to "B" Power Side is required, Put screwdriver into Selective aperture ② and press.
(Follow procedures in above 2). Do not draw out screwdriver until manual operation is completed.

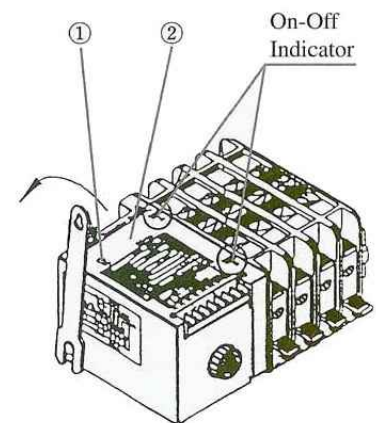
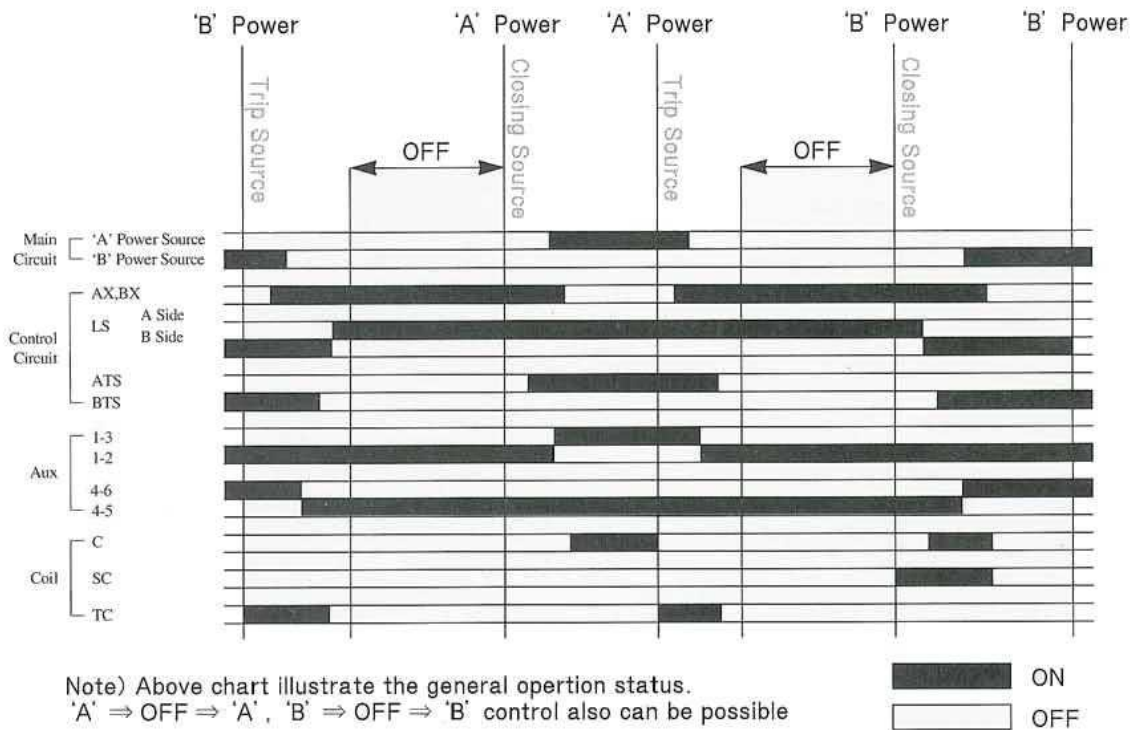
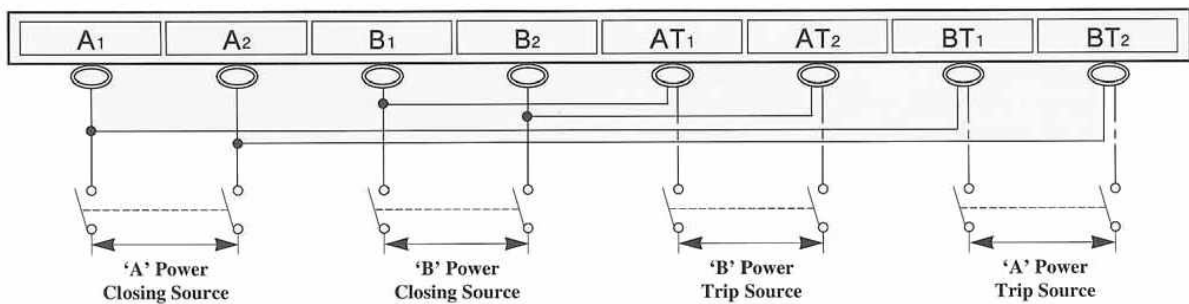


Fig 2

6. Timecharts of Contacts



7. ATS Self-testing Method



- 1) The above diagram shows the changeover circuit of $A \Rightarrow B$, $B \Rightarrow A$.
- 2) Pay attention that control voltage of "A" Power Side and "B" Power Side are supplied simultaneously.
- 3) When control voltage will be supplied to "A" Power Side, Power to BT1 and BT2 will be supplied and tripped. Then, Power to A1 and A2 will be supplied and "A" Power Side will be closed.
- 4) When control voltage will be supplied to "B" Power Side, Power to AT1 and AT2 will be supplied and tripped. Then, Power to B1 and B2 will be supplied and "B" Power Side will be closed.

- 5) When ATS will be transferred in accordance with above procedures, ATS is under normal condition. If not transferred properly, Refer To "Checkpoint for Trouble" in this Manual.
- 6) If test of Neutral Point type is required, Disconnect the circuit to AT1, AT2, BT1 & BT2 and connect according to the dotted lines. Test of Neutral Point type enables the changeover as follows. A ⇒ Off ⇒ B, B ⇒ Off ⇒ A, A ⇒ Off ⇒ A, B ⇒ Off ⇒ B.

8. Checkpoint for Trouble

8.1 When switching to "A" Power Side & "B" Power Side are not electrically made :

- 1) Check whether control voltage are supplied to A1,A2 or B1,B2
- 2) When control voltage are supplied to A1,A2 or B1,B2, Remove the cover according to Fig 3 and check whether AX & BX are operating.
- 3) When AX & BX are properly operating, Check whether the voltage between ① & ② in Fig 4 should be DC 110V or DC 220V regardless of control voltage.
- 4) If DC voltage is not measured, LS(Selective Switch of "A" Power and "B" Power)is malfunctional. If DC voltage is measured, Check whether Closing Coil is burnt.

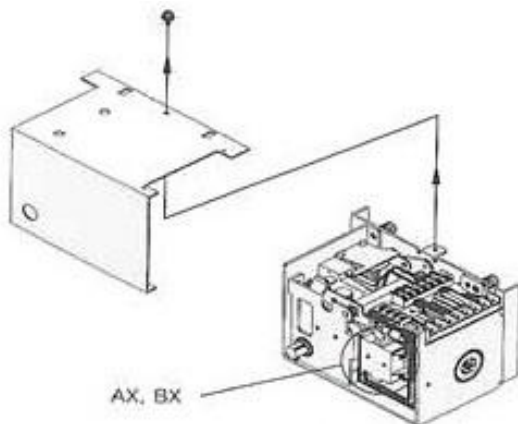


Fig 3

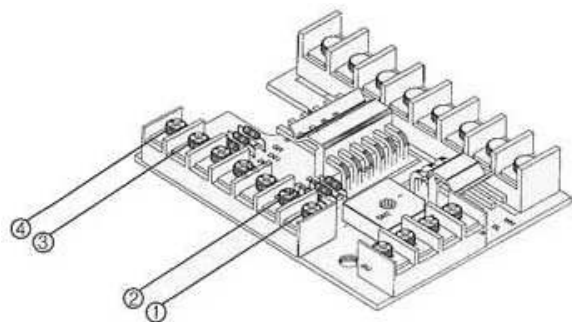


Fig 4

8.2 When switching to "B" Power Side, Changeover is made to "A" Power Side :

- 1) Check whether control voltage are supplied to B1, B2.
- 2) When abnormal condition will not be checked in accordance with procedures in above 8.1.3, Check whether Selective Coil is burnt.

8.3 When tripping is not made :

- 1) Check whether control voltage is supplied to AT1, AT2 or BT1, BT2.
- 2) When control voltage is supplied, Remove the cover according to Fig 3 and check whether voltage between ③ & ④ should be DC 110V or DC 220V. (③ : +, ④ : -)
- 3) If DC voltage is not measured, Check whether Tripping Coil is burnt.

8.4 Phase-failure is occurred :

- 1) Check whether voltage is between "A" Power Side, "B" Power Side and Main Circuit Terminal is normally supplied.
- 2) When voltage to Main Circuit Terminal is normally supplied, Check whether voltage to Load Side Main Terminal is normally supplied.
- 3) If voltage of Main Circuit Terminal is not normally supplied, Dismantle Arc-extinguishing Chamber and check the connection of Main Contacts. (In order to prevent any electric-shock, This should be done power-off)

8.5 Others :

- 1) Check whether control voltage is under voltage or voltage dropped.
- 2) Check whether frequency and voltage of generator is normal.
- 3) Check whether capacity of Transformer is sufficient.
- 4) When battery is used for power source, Check whether connecting cable size is sufficient enough considering the connecting distance.

8.6 A/S

- 1) TEL : 82-31-944-3521/3
FAX : 82-31-944-3525

9. Maintenance

Reasonable care in preventive maintenance will ensure high reliability and long life of ATS. Please note this article in details and do maintenance according to following instruction. Safety caution is required during maintenance.

9.1 Every 6 month, clean the dust and oil which residue on the ATS.

9.2 Visual inspection for distortion or discolour of contacts area.

9.3 Do ON-OFF operation of ATS one(1) time for a year to check rust, oxidation or dust placed.

9.4 Check loose of bolts and nuts.

9.5 Checking requirement

Checking Class	Checking Interval	
	General Environmental	Severe Environmental
Instantaneous	1 time 6 month	1 time 1 month
Periodic	1 time 1 year	1 time 6 month
Temporary	If necessary	

9.6 Instantaneous checking.

Checking Class	Check Point
Visual Checking	<ul style="list-style-type: none"> • Over heat and discolour of terminal • Rusts • Dusts • Abnormal smell • Damage, breakage, distortion and discolour of insulation materials.

10. Periodic Checking

Checking item		Checking requirement	Solution and trouble shooting
Insulation Materials	Contacts enclosure & Insulation Frame.	• No damage or crack on Insulation materials ?	• Stop operation and consider to replace parts.
		• No humidity and dust is found on surface ?	• If serious humidity and dust, stop operation and clean it up.
		• Any loosen of bolts ?	• Retighten bolts as specified torque. Bolts fixing should be balanced.
	Arching Chamber	• Nor arcing scratch on insulation barrier ?	• If serious, assume damage of contacts and arching chamber. Then consider to replace those parts.
		• Serious damage on arching chamber ?	• Considered normal condition if discolour of arching chamber inside. but if insulation barrier is broken, must consider to replace those parts.
Insulation Resistance	• Serious damage of arching barrier ?	• Consider to replace those parts.	
		• Between phase and Ground • Insulation resistance of operation circuit	• 5MΩ over • 20MΩ over
Conductive Parts	Contacts	• Any damage of auxiliary contacts ?	• Light discolour, clean up busing by sand paper or file in high density. If serious, replace those parts.
		• Keep good contacts ?	• Bad contacts may cause over heating.
		• Any wrinkles or scratch on contacts ?	• As a result of over heating, discolour, flashing and smelling founded.
		• Discolouring due to over heating on contacts ?	• If serious, deep discolour and distortion occurred.
		• Any loosen bolts on contacts ?	• Loosen bolt may cause over heating, re-fixing as much as specified torque.
Driving and operation	Mechanical Drive	• Rotating and lubricant device is keeping smooth?	• Do lubricant
		• No damage or rust on rotating and lubricant device ?	• Cause incorrective operation
		• No rust and damage on springs ?	• Replace damaged parts
		• No loosen on bolts and nuts ?	• Retighten again as specified torque
		• No loosen and damage on E-ring and stopper pins ?	• Replace or fix it on right position