BY-PASS ATS

OSS-PSB-PCN

INSTRUCTION AND MAINTENANCE MANUAL

osemco
O-Sung Electric Machinery CO.,LTD.
136 Hantaemal-gil, Wollong-Myeon, Paju-City, Kyungki-Do, KOREA
Tel : (82-31)944-3521/3 Fax : (82-31)944-3525
http://www.osemco.com

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1. Safety Notice

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

These safety notices are devided as “Danger” and “Caution” according to the hazard level.

Danger

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

Caution

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

1.1 Transportation Precaution

Danger

- Do not enter the area under the By-pass ATS when it is lifted or suspended using a lifter or chain block. The By-pass ATS may suddenly drop.
  The By-pass ATS is heavy. Entering such an area may cause serious injury.

1.2 Installation Precaution

Caution

- Installation should be performed by qualified persons.
- Prior to commencing any installation, open the upstream circuit breaker to isolate all power/voltage sources.
  Otherwise, electric shock may occur.
- Tighten terminal screws securely according to the specified torque.
  Otherwise, a fire may occur.
- Fix the By-pass ATS firmly on a flat level using mounting screws.
- Do not place the SMART-A Controller in such area of high temperature, high humidity, dusty air, corrosive gas, strong vibration and shock or other unusual condition.
  Otherwise, a fire or malfunction may occur.
- Be careful to prevent foreign material of debris, concrete powder, iron powder, etc and rainwater from entering into the SMART-A Controller.
  Otherwise, a fire or malfunction may occur.

1.3 Operation Precaution

Danger

- Do not touch the live terminal parts.
  Otherwise, electric shock may occur.
- Do not leave the By-pass ATS in the drawout position.
  The By-pass ATS is heavy. Dropping the By-pass ATS could cause serious injury.

Caution

- When By-pass ATS will be drawn-in or drawn-out, Draw-in or draw-out after confirming Open status.
  Otherwise, This may cause the damage or fire.

1.4 Maintenance and Inspection Precaution

Caution

- Maintenance, inspection or components replacement should be performed by qualified persons.
- Prior to commencing any work, open the upstream circuit breaker to isolate all power/voltage sources.
  Otherwise, electric shock may occur.
- Retighten the terminals of main circuit with standard torque periodically.
  Loosening may cause a fire.
- Retighten the terminals of control circuit periodically.
  Loosening may cause malfunction.
- Be sure to reinstall the arc chute if removed.
  Failure to do so or incorrect installation may result in a fire or cause of burns.

2. Normal/Special Service Condition

2.1 Normal Service Condition

By-pass ATS should be used under following normal condition unless otherwise specified.

a) Ambient temperature ;
-10℃ ~ +60℃

b) Altitude ;
Below 2,000m

c) Environmental conditions ;
Relative humidity shall be less than 85% at max. temp. +40℃, less than 90% at 20℃. It shall not be allowed to use or store within the area of petrochemicals, ammonia or corrosive gas. (H2S $\leq$ 0.01ppm, SO2 $\leq$ 0.01ppm, NH3 $\leq$ a few ppm)

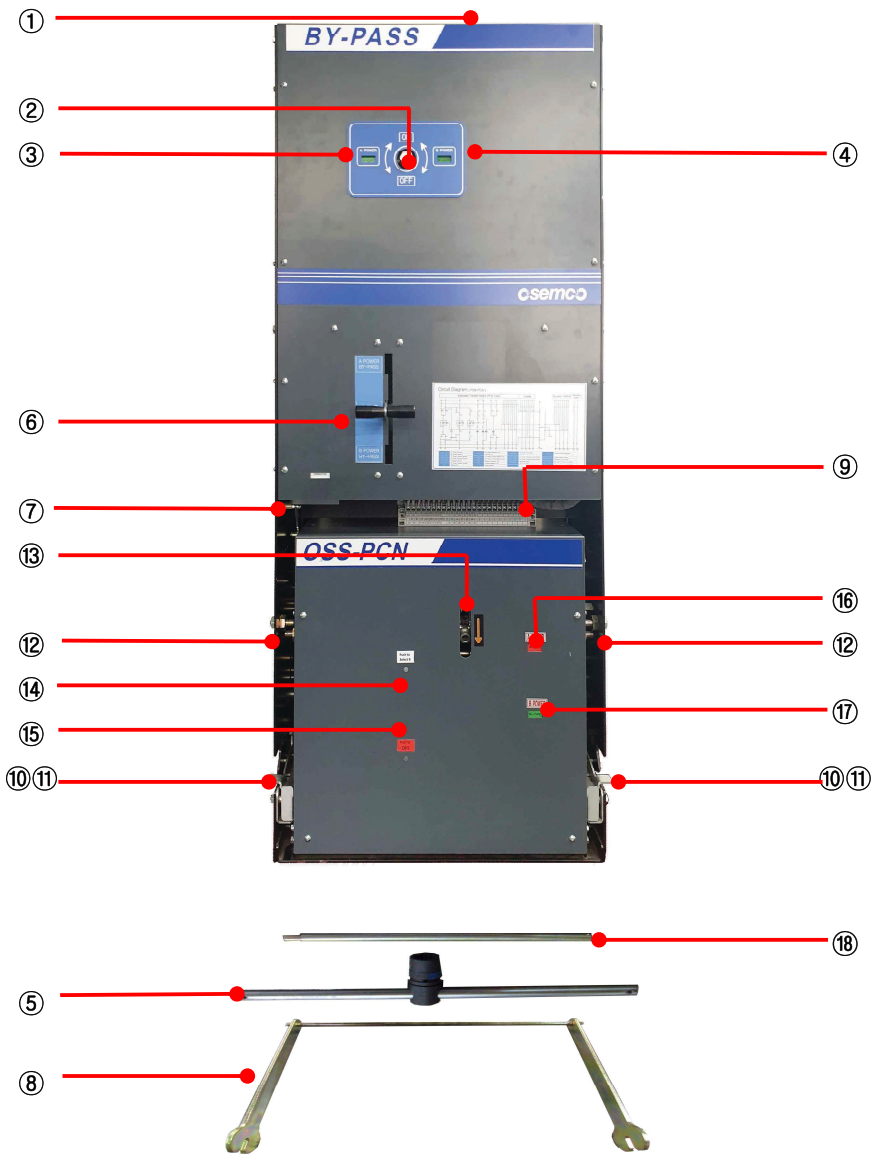
d) Storage temperature ;
-20℃ ~ +60℃

2.2 Special Service Condition

In the case of special service condition, Modified By-pass ATS are available.
Please specify when ordering. Service life may be reduced depending on the service condition.

- Where ambient temperature or altitude is severe than conditions in above 2.1.
- Where heavy offshore wind blows.
- Where always high humid.
- Where are excessive water vapor or oil vapor.
- Where are explosive, flammable or noxious gas.
- Where are heavily dusty.
- Except above condition, Where are abnormal or strange condition.

3. External View



By-pass Switch		Main ATS (PCN)	
①	Auto Connection Terminals	⑩	Drawout Lever
②	Manual Handle Lever	⑪	Drawout Lever Cover
③	"A" Power ON-OFF indicator	⑫	Drawout Pin
④	"B" Power ON-OFF indicator	⑬	Manual Handle Inlet
⑤	Manual Handle	⑭	"B" Power Selective Button
⑥	Operating Lever	⑮	Neutral position Manu Handle Inlet
Main ATS Drawout		⑯	"A" Power ON-OFF indicator
⑦	Drawout Position Indicator	⑰	"B" Power ON-OFF indicator
⑧	Drawout Handle	⑱	Manual Handle
⑨	Auto Connection Terminals		

4. OSS-PCN Rated Specification

TYPE			606-PCN	608-PCN	610-PCN	612-PCN	616-PCN
Rated Operational Voltage (VAC) Ue			400				
Rated insulation Voltage (VAC) Ui			800				
Rated impulse withstand Voltage (VAC) Uimp			8000				
Rated Current Ie			630A	800A	1000A	1250A	1600A
Neutral Phase Current			630A	800A	1000A	1250A	1600A
Kind of Throw			Double Throw				
Connection			Fixed , Draw out				
Number of poles			3P / 4P				
Rated Short-time Withstand Current (1sec) Icw			50kA				
Rated Short-circuit Making Capacity Icm			105kA				
Switching Capacity			AC-33A				
Switching Frequency			60Time / Hour			20Time / Hour	
Operating Current peak	AC 220V	Making	30A				
		Breaking	12A				
Operating Time	"A" Power	Making	≤ 150ms				
		Breaking	≤ 45ms				
	"B" Power	Making	≤ 200ms				
		Breaking	≤ 45ms				
Number of Operating Cycles	Without Current		10,000				
	With Current		5,000				
Cautions	1. For complete operation, Be sure to provide control source for more than 0.5sec 2. When control source will be provided to A side and B side simultaneously, Coil may be damaged.						

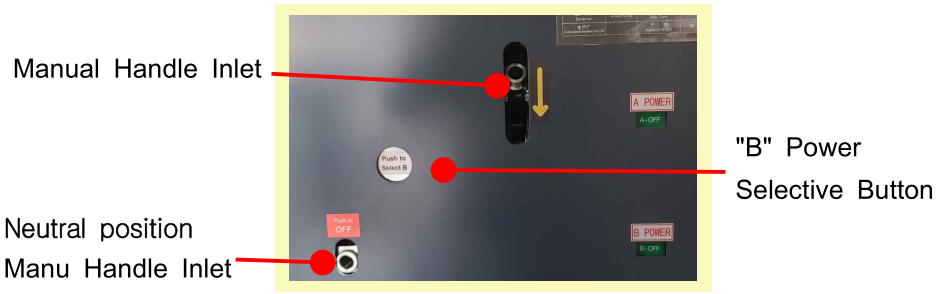
TYPE			620-PCN	625-PCN	632-PCN	640-PCN	650-PCN	663-PCN
Rated Operational Voltage (VAC) Ue			400					
Rated insulation Voltage (VAC) Ui			600					
Rated impulse withstand Voltage (VAC) Uimp			8000					
Rated Current Ie			2000A	2500A	3200A	4000A	5000A	6300A
Neutral Phase Current			2000A	2500A	3200A	4000A	5000A	6300A
Kind of Throw			Double Throw					
Connection			Fixed , Draw out					
Number of poles			3P / 4P					
Rated Short-time Withstand Current (1sec) Icw			50kA			65kA		
Rated Short-circuit Making Capacity Icm			105kA			143kA		
Switching Capacity			AC-33A					
Switching Frequency			10Time / Hour					
Operating Current peak	Closing coil	DC110~125V	30A			50A		
		AC100~110V	12A			12A		
Operating Time	"A" Power	Making	≤ 150ms			≤ 150ms		
		Breaking	≤ 45ms			≤ 65ms		
	"B" Power	Making	≤ 200ms			≤ 200ms		
		Breaking	≤ 45ms			≤ 65ms		
Number of Operating Cycles	Without Current		5,000			3,000		
	With Current		3,000			1,500		
Cautions	1. For complete operation, Be sure to provide control source for more than 0.5sec 2. When control source will be provided to A side and B side simultaneously, Coil may be damaged.							

5. Operation Method

5.1 Mechanical Manual Operation of Main ATS (PCN)

Main ATS can be mechanically manual operated for the purpose of periodic checking, maintenance or emergency action.

5.1.1 For manual operation, please check the status of the “B” selection button on the Main ATS. (See section 5.3)



Manual control panel

5.1.2 Switching using manual handle

- Transfer to “A” power : If you insert the manual handle into the manual handle insertion hole and lower it as indicated by the arrow, the Main ATS will be switched. After switching, check the A-ON status of the indicator on the “A” power side.

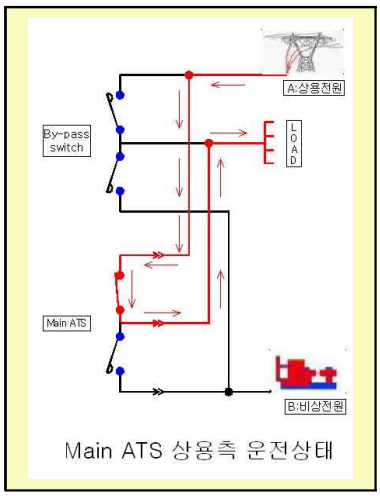
- Transfer to “B” power : While pressing the 'B" selective button, If you insert the manual handle into the manual handle insertion hole and lower it as indicated by the arrow, the Main ATS will be switched. After switching, check the A-ON status of the indicator on the “A” power side.

5.1.3 If Main ATS has been switched to “A” power or “B” power, insert the manual handle into the neutral position(TRIP) manual handle insertion hole and raise it to turn Main ATS is A/B-OFF. Manually transfer to the desired power source.

5.2 Manual Operation of By-pass Switch

When working under uninterruptible power is needed for the purpose of periodic checking and maintenance of Main ATS, By-pass of power line is required. In this case, By-pass Switch should be operated.

5.2.1 Manual control of By-Pass switch to “A” power when “A” Power of Main ATS is activating.

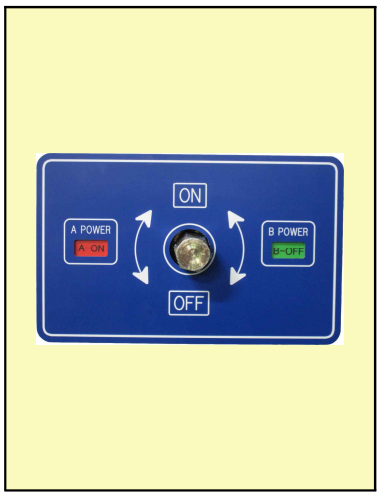


- Main ATS "A" Power Normal Condition

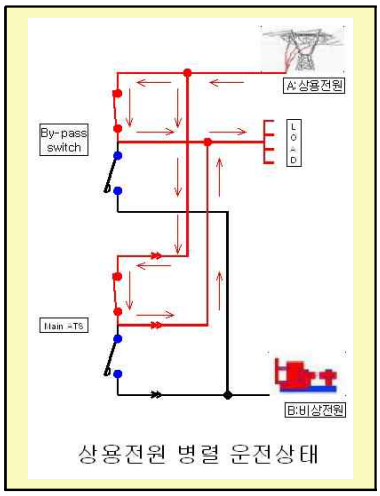
⇒

- Move the operating lever to the “A” power By-pass position.

⇒

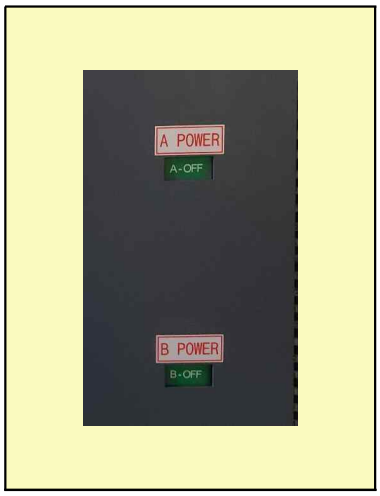


- Rotate Manual Handle toward clockwise, then “A” Power indicator displays A-ON



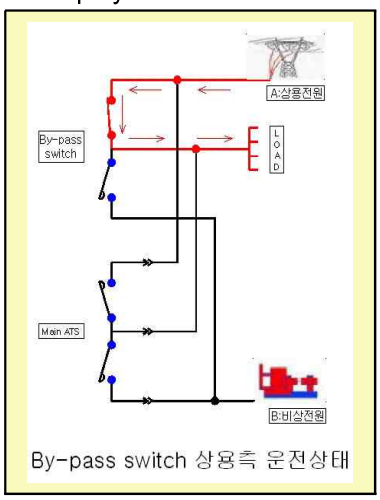
- "A" Power Parallel Condition

⇒



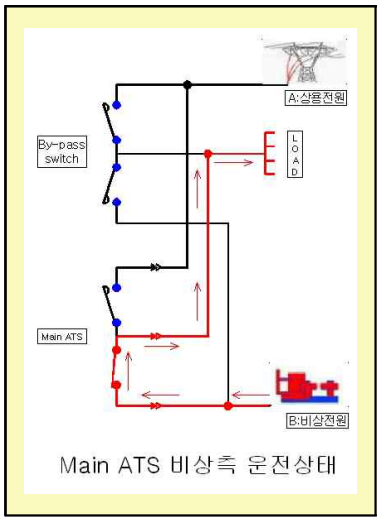
- Insert the manual handle into the Neutral position (TRIP) hole and lift it to turn A-OFF.

⇒



- drawout the Main ATS to initiate maintenance.
- Read 5.4 for Draw-out Method of Main ATS

5.2.2 Manual control of By-Pass switch to “B” power when “B” Power of Main ATS is activating.

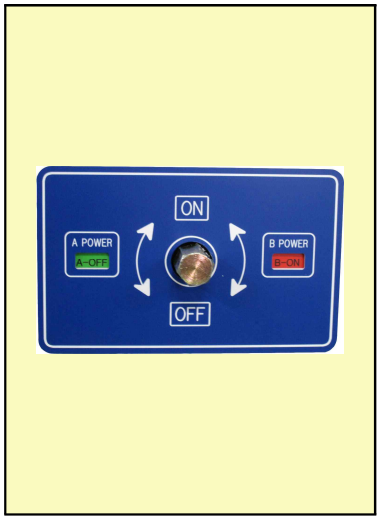


- Main ATS "B" Power Normal Condition

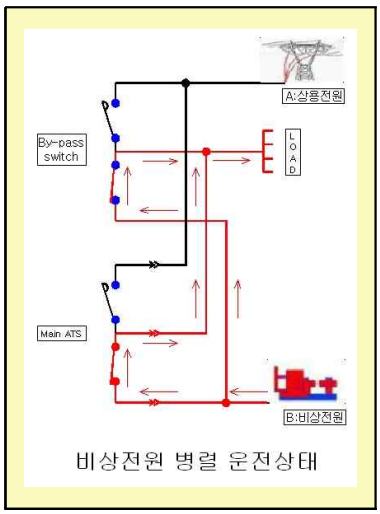
⇒

- Move the operating lever to the “B” power By-pass position.

⇒

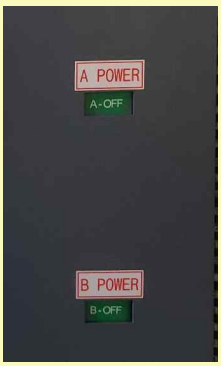


- Rotate Manual Handle counterclockwise, the “B” power indicator will display B-ON.



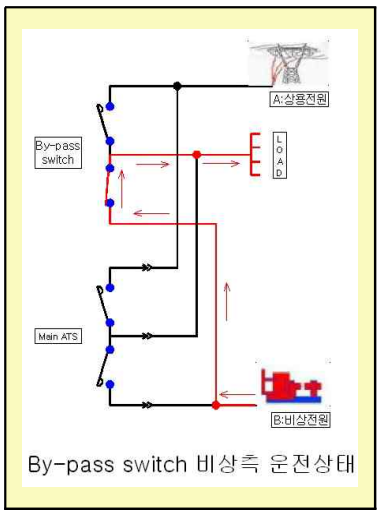
- "B" Power Parallel Condition

⇒



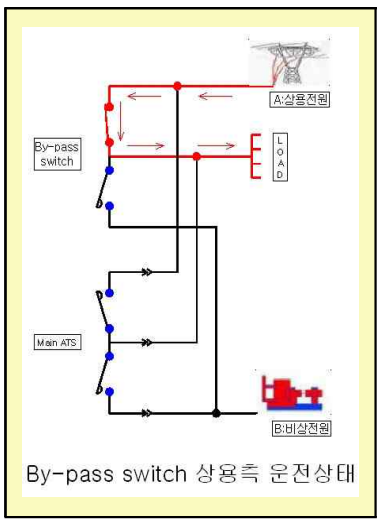
- Insert the manual handle into the Neutral position (TRIP) hole and lift it to turn B-OFF.

⇒



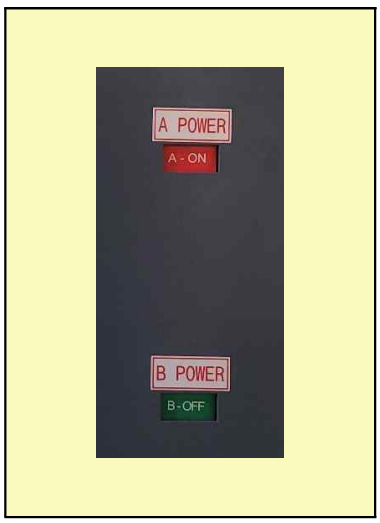
- drawout the Main ATS to initiate maintenance.
- Read 5.4 for Draw-out Method of Main ATS

5.2.3 Manual control of Main ATS to “A” Power when “A” Power of By-pass switch is activating.



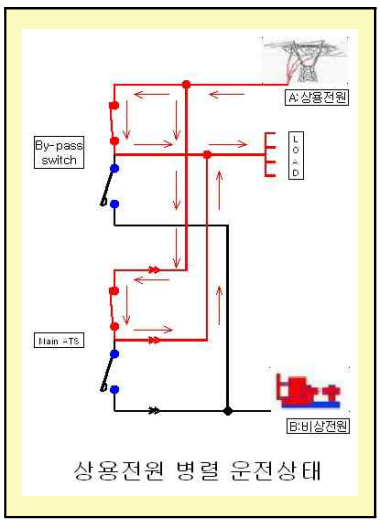
- Read 5.4 for Draw-in Method of Main ATS

⇒



- When you insert the manual handle into the manual handle insertion hole of the main ATS and lower it, the “A” Power indicator shows A-ON.

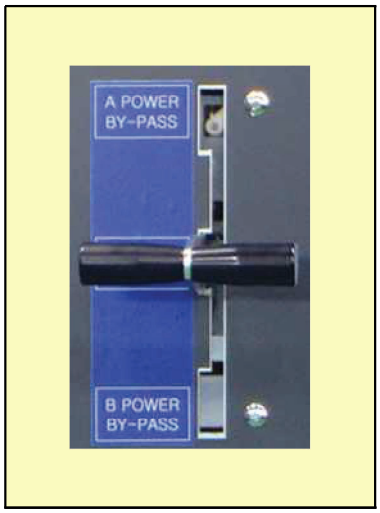
⇒



- "A" Power Parallel Condition

- Rotate Manual Handle counterclockwise, the “A” power indicator will display A-OFF.

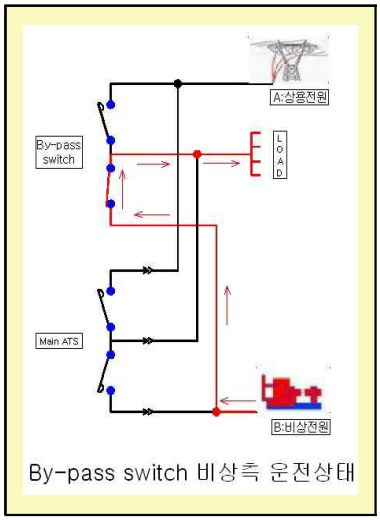
⇒



- Move the operating lever to the ATS position.

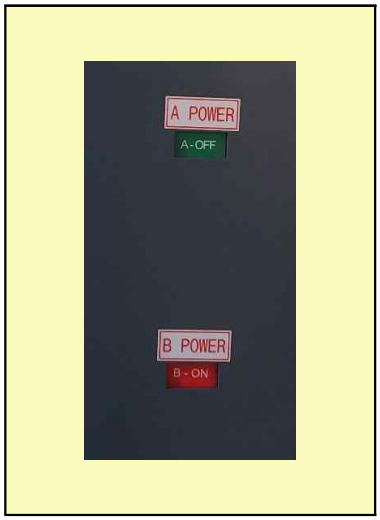
Caution) If the By-pass switch is not turned OFF, the operating lever cannot be operated to the ATS position.

5.2.4 Manual Control of Main ATS to “B” Power when “B” Power of By-pass switch is activating



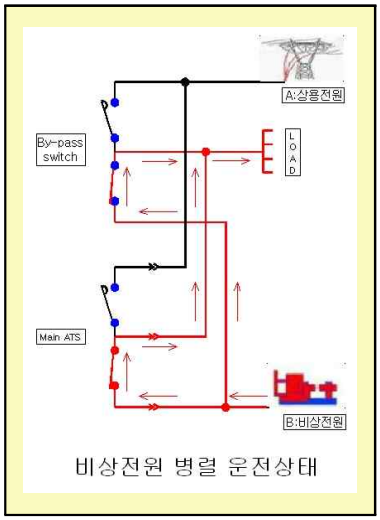
- Read 5.4 for Draw-in Method of Main ATS

⇒



- While pressing the "B" selective button on the Main ATS, insert the manual handle into the manual handle insertion hole and lower it, the "B" Power indicator will display B-ON.

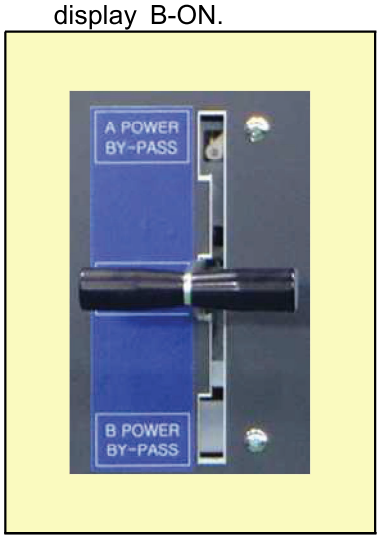
⇒



- "B" Power Parallel Condition

- Rotate Manual Handle toward clockwise, then “B” Power indicator displays B-OFF

⇒



- Move the operating lever to the ATS position.

Caution) If the By-pass switch is not turned OFF, the operating lever cannot be operated to the ATS position.

5.3 Mechanical Interlocking to prevent from Electric Crash

In order to prevent from electric crash on main circuit, Mechanical Interlocking is fitted between Main ATS and By-pass Switch.

5.3.1 Interlock device for Main ATS

a. When the “B” power selection button is in the non-pressed position
   - Check “A” Power switchover condition of By-pass switch.

b. When the “B” power selector button is in the pressed position
   - Check “B” Power switchover condition of By-pass switch.

5.3.2 By-pass switch Interlock Device

Manual Handle operation is not possible.

a. When the “A” Power side transfer operation does not work
   - Check the ATS or B Power Bypass position on the operating lever.

b. When the “B” Power side transfer operation does not work
   - Check the ATS or A Power Bypass position on the operating lever.

5.3.3 Interlock device of operating lever

a. If the operating lever does not go to the A Power Bypass position
   - Check the transfer status of the “B” power side of the Main ATS.

b. If the operating lever does not go to the B Power Bypass position
   - Check the transfer status of the “A” power side of the Main ATS.

c. If the operating lever does not go to the ATS position
   - Check the switching status of By-pass switch

5.4 How to draw-in or draw-out

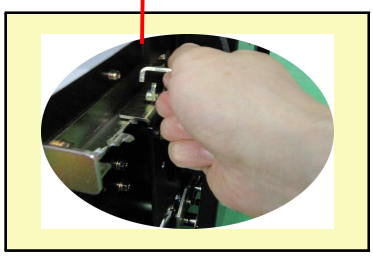
For the purpose of inspection or maintenance, Main ATS can be drawn-out and drawn-in.

Danger

Draw-in & Draw-out of Main ATS should be activated on TRIP Condition.
Short circuit and fire may occur from Cradle.

5.4.1 How to draw-in Main ATS

a. Check the Rated current



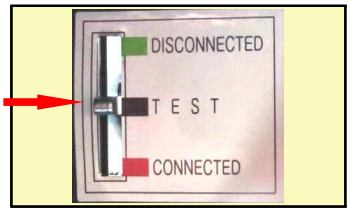
b. Lift up the drawout lever. (2 on both right and left)

Caution) Do not input and output without lifting up the drawout lever.

c. Push the Main ATS until drawout lever gets inside of Cradle compartment.

d. Lift up the both side of drawout lever, and push the Main ATS until location indicator of input and output displays TEST.

- Make sure the drawout lever drops (It may cause malfunction during testing.)

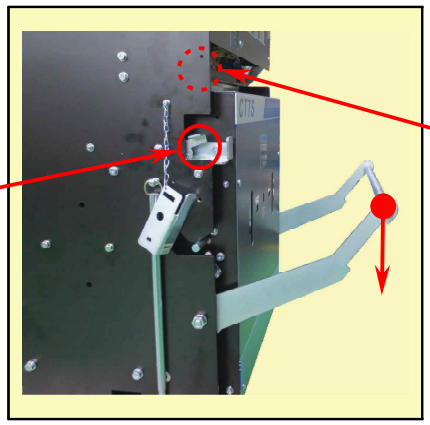


e. After checking TRIP condition of Main ATS on TEST location, lift up the both sides of both sides of drawout levers.

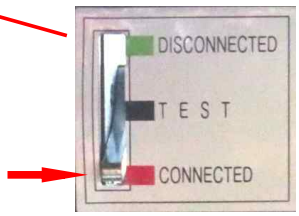
Caution) Input and Output of Main ATS can be possible only both powers are on OFF condition.

f. Put Handle into the hole and pull down until draw-in & draw-out indicator displays CONNECTED

- Pull up the drawout lever.

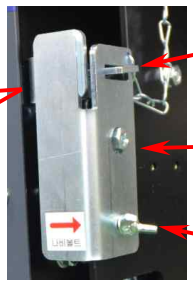


- Pull down the handle.



- Check CONNECTED

g. Fix the Draw-in and draw-out lever cover with the butterfly bolts.



Drawout Lever

Drawout lever cover

Butterfly bolt

Caution

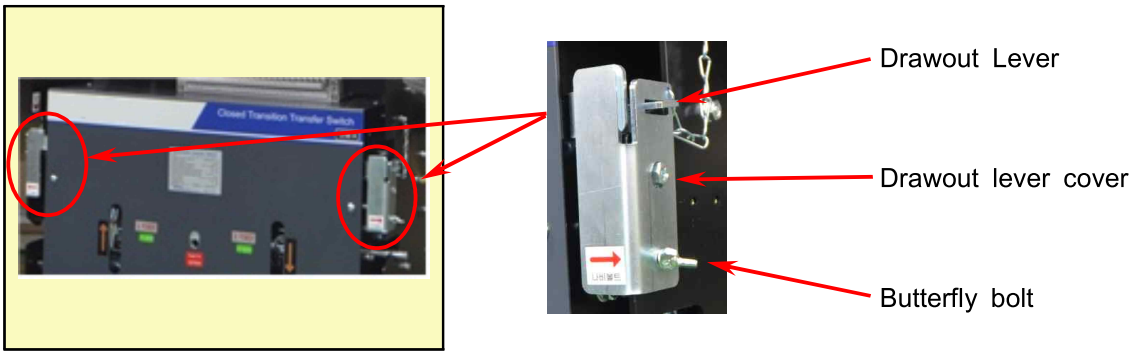
Make sure fixing the drawout lever cover.

It may cause draw-in/out interlocks and electrical malfunctions.

5.4.2 How to draw-out Main ATS

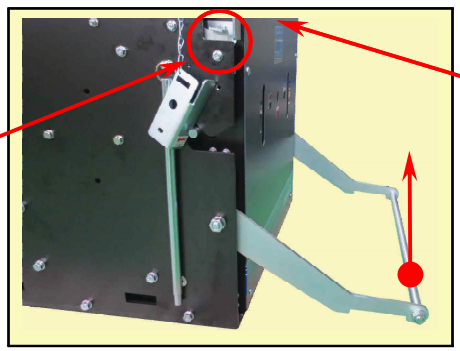
a. Check the TRIP condition of Main ATS.

b. Remove the drawout lever cover by loosen the butterfly bolt.

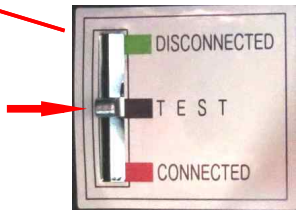


c. After lifting up the both side of drawot lever, put the draw-in & draw-out handle into the hole and lift up until the input and output location indicator displays “TEST”.

- Lift up the drawout lever.



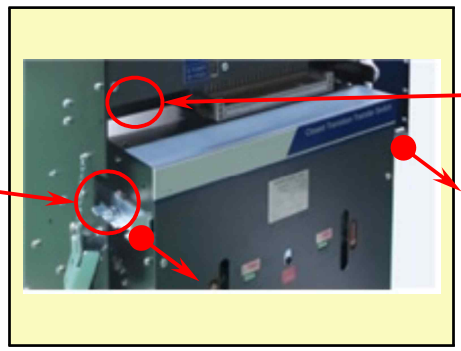
- Lift up the handle



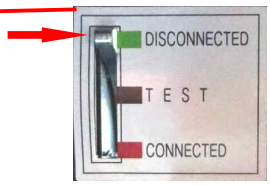
- Check TEST sign.

d. After lifting up the both side of drawout lever on TEST mode, pull the body of Main ATS until the draw-in & draw-out indicator displays DISCONNECTED.
drawout lever drops at this moment.

- Lift up the drawout lever.



- Pull the body of Main ATS.



- Check DISCONNECTED sign.

e. After lifting up the both side of drawout levers on Disconnected condition, pull the body of Main ATS to separate from Cradle.

Use lifter to prevent danger of falling-down when you draw out ATS from Cradle
The By-pass ATS is heavy. Entering such an area may cause serious injury.

6. Maintenance

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

6.1 Every 6 month, clean the dust and oil which residue on the By-pass ATS.

6.2 Visual inspection for distortion or discolour of contacts area.

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

6.4 Check loose of bolts and nuts.

6.5 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	

6.6 Instantaneous checking.

Checking Class	Check Point
Visual Checking	• Over heat and discolour of terminal • Rusts • Dusts • Abnormal smell • Damage, breakage, distortion and discolour of insulation materials.

7. 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.
		• Nor arcing scratch on insulation barrier ?	• If serious, assume damage of contacts and arching chamber. Then consider to replace those parts.
	Arching Chamber	• 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.
		• Serious damage of arching barrier ?	• Consider to replace those parts.
	Insulation Resistance	• Between phase and Ground • Insulation resistance of operation circuit	• 5㏁ over • 20㏁ 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