

8 Troubleshooting

This chapter only lists the common troubleshooting methods on the transformer side. For more specific information, refer to the relevant transformer and switchgear user manual.

Fault	Possible Reason	Measures
Pressure relief trip	1. The internal short circuit of the transformer is faulty.	1. If it is a short circuit fault, take an oil sample for oil sample chromatography to further determine the cause of the fault. It is strictly forbidden to put the transformer into operation before the cause of the fault is not ascertained and the fault has not been resolved. (Note: If it is determined that the internal fault is serious, the inside of the transformer has been damaged, contact Sungrow for replacement.)
	2. The pressure relief valve is faulty.	2. The pressure relief valve elastic element expander internal jam, or the bolt torque of the fastening film is too large, resulting in damage to the film, contact Sungrow Power Co., Ltd. for replacement.
	3. Improper oiling operation before servicing or installing the transformer. If the pressure relief valve on the tank is not opened as required.	3. After power off, open the oil hole to release the pressure inside the tank.
Low oil level trip	1. The secondary circuit causes a false alarm of low oil level.	1. Check the secondary circuit to confirm if it is malfunctioning.
	2. The transformer leaks oil or leaks for a long time. After the oil was drained due to maintenance or test reasons, the oil was not replenished to the normal oil level in time.	2. Fill the transformer with oil.

Fault	Possible Reason	Measures
Oil temperature alarm	1. Transformer overload operation. Overload operation may result in a high oil temperature alarm.	1. Check if the transformer is overloaded.
	2. The heat dissipation channel is blocked.	2. Check the transformer heat dissipation channel for foreign matter jams.
	3. The secondary circuit causes a false alarm.	3. Check the actual oil temperature of the transformer to see if it is a false alarm.
Oil temperature trip	1. The transformer is overloaded.	1. Check if the transformer oil level is too low.
	2. Internal fault of the transformer.	2. Check if the temperature sensor is abnormal.
	3. Transformer secondary circuit failure. Long-term overload operation will cause the transformer temperature to continue to rise, resulting in overcurrent and high voltage tripping.	3. Check the load on the transformer. Check the load through the internal current meter of the low voltage cabinet. If the trip occurs due to an overload, it is recommended to reduce the running load.

9 Routine Maintenance

Due to ambient temperature, humidity, dust, and vibration, the MV Station and the inner components will age and wear. To ensure the system safety and maintain the efficiency of the MV Station, it is necessary to carry out routine and periodic maintenance.

All measures, which can help the MV Station work in good conditions, are within the maintenance scope.

9.1 Safety Instructions

WARNUNG

Lethal voltage inside the MV Station!

Wait at least 10 minutes after MV Station stops before opening the cabinet door.

Make sure the device internal is completely voltage free before any work on the MV Station.

WARNUNG

Only qualified personnel can perform the work described in this chapter.

Do not leave any screws, washers or other metallic parts inside the MV Station to avoid damages to the MV Station.

WARNUNG

Sand and moisture penetration may affect the performance of electric devices inside the MV Station!

- **Do not perform electrical connection in sandy season or when the ambient relative humidity is above 95%.**
- **Perform electrical connection at fine weather days.**

WARNUNG

Voltages may still be present on cable connection terminals inside the MV Station even though the switches are disconnected. To avoid electric shock hazard, perform the following operations before starting maintenance work,

- **Disconnect all the switches of the MV Station;**
- **Disconnect the upstream and downstream switches of the MV Station.**

Safety Rules

Respect the following five rules in maintaining or servicing the MV Station to ensure the safety of the maintainer.

- Avoid any accidental re-connections.
- Verify that no voltage or current is present with appropriate measurement instrument.
- Ground and short-circuit whenever necessary.
- Cover possible live parts to avoid accidental contact.
- The escape routes must be kept clear off any obstruction.
- Wait at least 10 minutes after the device stop completely to operate the MV Station inside. Ensure that the MV Station is completely voltage-free.

9.2 Maintenance

9.2.1 Introduction

With IP54 protection degree, the MV Station can be installed outdoors. Harsh environment condition or long-time operation, however, may cause aging and damage to the MV Station. Check and maintain the MV Station periodically and replace the aged components, so as to effectively extend the service life and increase the device performance inside the MV Station.



Unscheduled maintenance is also required, especially when the system performance is poor.

9.2.2 Maintenance Interval

Maintain the MV Station and internal electric devices periodically to ensure the good performance of the MV Station.

The maintenance interval described in this chapter is indicative only. The actual interval depends on the on-site environment condition. If the MV Station is located in harsh environment places, for example desert arrears, the maintenance interval shall be shortened. Particularly, cleaning and anti-corrosion processing should be performed more frequently.

If the MV Station is located in desert areas, it is advisable to check thoroughly the MV Station inside and outside and clean completely after the sand storm.

Tabelle 9-1 Maintenance (once every two years)

Check Item	Check Method
Cable connection	Check whether power cables are loose. If so, properly connect them according to specified torques.

Check Item	Check Method
	Check whether power cables and control cables are damaged and whether the cable exterior in contact with the metallic surface is scratched.
	Check whether the insulation binding tapes on the wiring terminals of power cables are flaked.
	Clean or replace the dust-proof network.

Tabelle 9-2 Maintenance (once every half to one year after that.)

Check Item	Check Method
Fan / heat exchanger	Check the working status of the fan / heat exchanger.
	Check whether the fan/ heat exchanger produces abnormal sounds during operation.

Tabelle 9-3 Maintenance (Once a month)

Check Item	Check Method
	Check whether the equipment and internal equipment are damaged or deformed.
	Check whether there is any abnormal sound or vibration when the equipment is running.
	Check whether the temperature inside the equipment or the temperature of the equipment shell is too high.
System running status and cleanness	Check whether warning labels are clear and replace them if necessary.
	Check whether the humidity and dust in the equipment are heavy, and clean the equipment.
	Check whether the surface of the container has been corroded. If so, repaint the corroded area by referring to "9.5 Appearance Repair"
MV switchgear	Check the SF6 air pressure meter to see whether the pointer is in the green range. If the pointer is close to red, stop running it in time and supply it with gas.
	Check the electric indicator to see whether the L1/L2/L3 indicator is normal. If not, replace the L1/L2/L3 indicator under power off condition.
Transformer	Check the oil level meter indication of the transformer. If the oil level is low, power off the transformer and refill it in time.
	Check whether there is oil leakage around the pressure release valve. If yes, tighten the valve.

Check Item	Check Method
	Check whether there is oil leakage on the phase bushings of the high-voltage and low-voltage cabinets. If yes, tighten the valve.
	Check whether there is oil leakage on the joint between the heat sink of the transformer and the flange of the oil tank. If yes, tighten the valve in time.
	Check whether the real-time temperature of the oil temperature indicator is normal. If abnormal, measure the resistance of PT1\PT2 and PT3 by multimeter. If the result is not qualified, the temperature controller is faulty and needs to be repaired in time.
	Check whether the sound of the transformer is normal during operation.
LV cabinet	Check whether the surge protection device indicator is normal (green) or faulty (red).
	Check whether there is condensation on the internal side panel and top cover.

Tabelle 9-4 Maintenance (If necessary)

Check Item	Check Method
Other equipment	Replace the damaged lights in time.
	Replace the damaged smoke sensor and fire extinguisher in time.
	Replace the temperature and humidity controller in time.
Device maintenance	For the maintenance of various equipment inside, refer to the related manuals.

⚠ WARNING

Before performing maintenance, remove the internal protective grid. Make sure to reassembly the grid and fasten all the screws after the maintenance work. Make sure all bolts are securely fixed.

⚠ WARNING

Repair immediately any anomalies found during routine maintenance. If there are any doubts, contact Sungrow.

9.3 Checking and Cleaning the Filter

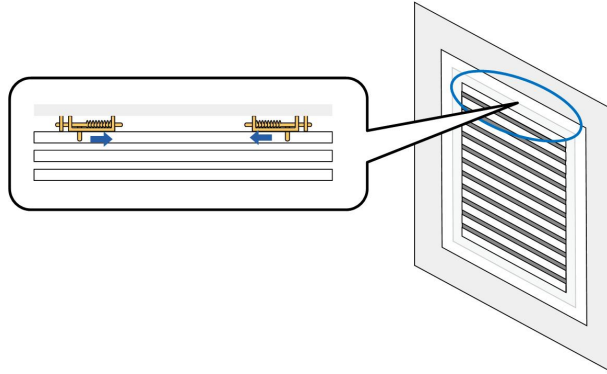
It is recommended to clean the filter every six months to one year. If the product works in harsh environments, such as desert areas, the maintenance cycle should be shortened to three months.

9.3.1 Checking and Cleaning the Air Inlets



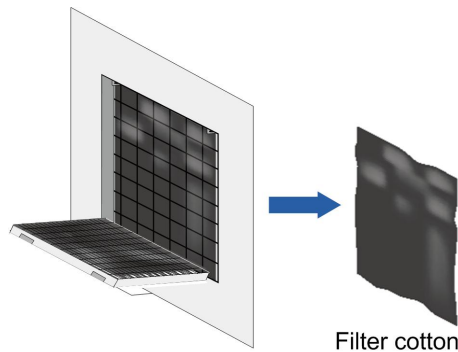
The maintenance interval should be shortened if the dust deposition is heavy.

Schritt 1 Push the two spring latches at the same time to the middle of air inlets to take off the shutters.



Schritt 2 Remove the air filter cotton inside the air inlet window, and shake the dust off.

Schritt 3 Clean the filter screen with warm water and degreaser and then dry it in the air if necessary.



Schritt 4 If the filter is broken, replace it. Put a proper new one when the old filter is removed.

Schritt 5 When the filter cotton and screen are clean and dry, reassemble them in reverse order.

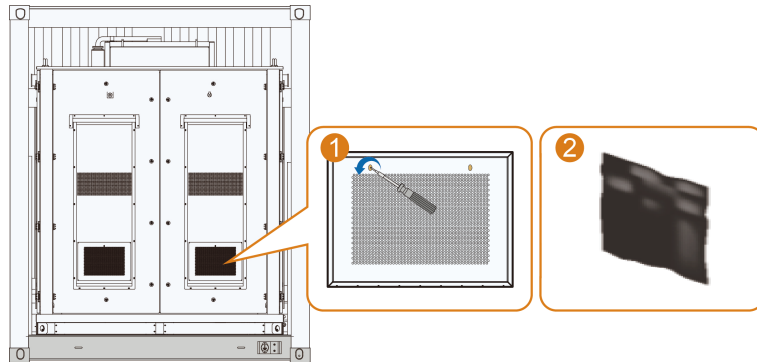
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Do not pull hard during cleaning and replacing of the filter cotton and filter screen.
The cotton and the screen may be damaged if otherwise.
Contact Sungrow to order the filter. You can cut proper filters out of the larger filter.

9.3.2 Cleaning the Heat Exchanger Air inlets

Schritt 1 Loosen the air inlet screws of the heat exchanger and remove the air inlet grid cover.



Schritt 2 Take out the filter cotton and clean it.

Schritt 3 Reinstall the filter.

Schritt 4 Restore the grid cover of the air inlet.

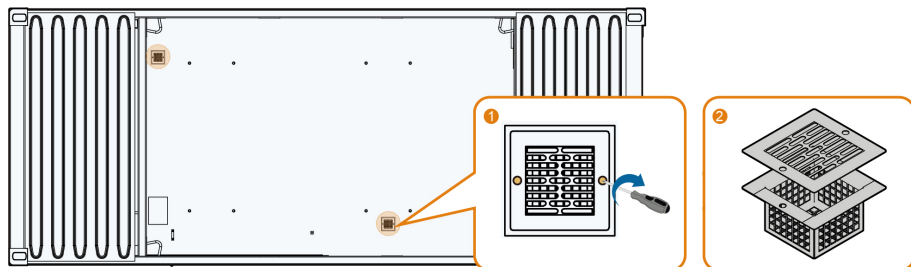
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9.4 Cleaning the Floor Drain

Schritt 1 Remove the two M6 fixing bolts on the floor drain.

Schritt 2 Take out the floor drain. Then, open its cover, and clean the dirt and debris inside.

Schritt 3 Close the cover, put the floor drain back, and tighten the fixing bolts.



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9.5 Appearance Repair

[Check the appearance of the product:](#)

Check the appearance of the product:

Case 1: Erasable traces

Case 2: Indelible traces

Case 3: Broken primer



- Check whether the protective paint sprayed on the casing of the product fell off or peeled off. If so, repair it timely.
- Spray a special protective paint to the exterior of the product every 5 years.

9.5.1 Erasable Traces

Tools

No.	Name	Source
1	Cleaning cloth	Beyond the scope of supply
2	Water	
3	Alcohol or other non-corrosive detergents	

Schritt 1 Wet the cleaning cloth (or other scrubbing tools) with water, and scrub the dirty parts on the surface.

Schritt 2 If the dirt cannot be cleaned with water, scrub with 97% alcohol till the surface is acceptable. (Or try to use non-corrosive detergents that are generally used locally)

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9.5.2 Indelible Traces

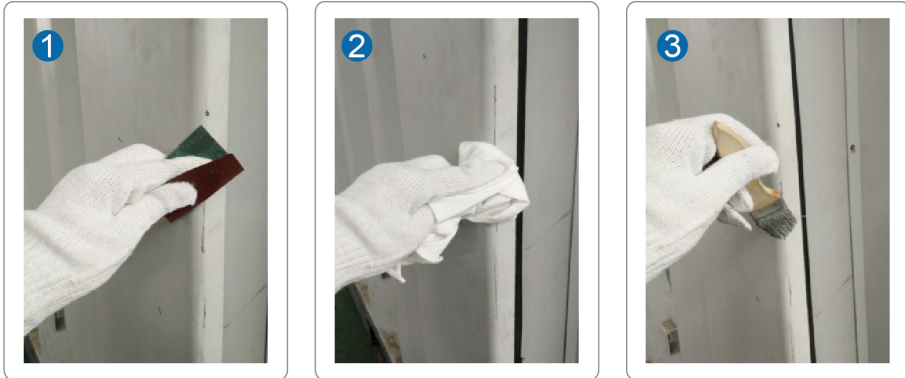
Tools

No.	Name	Source
1	Abrasive paper	Beyond the scope of supply
2	Cleaning cloth	
3	Water	
4	Alcohol	
5	Brush	
6	RAL7035 oil paint	

Schritt 1 Polish the paint surface with blistering or scratches with abrasive paper for a smooth surface.

Schritt 2 Wet the cleaning cloth with water or 97% alcohol, and scrub the damaged parts to remove surface stains.

Schritt 3 Perform paint repair for the scratched parts with a soft brush after the surface is dried; brush the paint as uniform as possible.



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9.5.3 Broken Primer

Tools

No.	Name	Source
1	Abrasive paper	Beyond the scope of supply
2	Cleaning cloth	
3	Water	
4	Alcohol	
5	Zinc primer	
6	Brush	
7	RAL7035 oil paint	

Schritt 1 Polish the damaged parts with abrasive paper to remove rust and other burrs for a smooth surface.

Schritt 2 Wet the cleaning cloth with water or 97% alcohol, and scrub the damaged parts to remove surface stains and dust.

Schritt 3 Spray the parts with base material exposed with zinc primer for protection after drying the surface. Ensure to spray to cover the bare base material completely.

Schritt 4 Perform paint repair for the damaged parts with a soft brush after the primer is dried, and brush the paint uniformly.

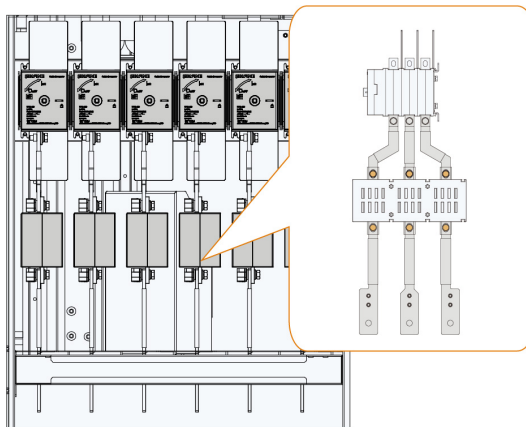


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9.6 Replace the Fuse of LV Cabinet

Overview

The fuse position of LV cabinet is shown in the figure below.



Tools

No.	Name	Source
1	Ratchet wrench	Scope of supply
2	Torque wrench	
3	Load switch operating handle	
4	New fuse	Beyond the scope of supply
5	Screwdriver (M5)	
6	Multimeter	
7	Insulating gloves	
8	safety helmet	
9	Insulated shoes	

Preparations

WARNING

Check and ensure that the MV Station has been shut down and disconnected from all connected inverters.

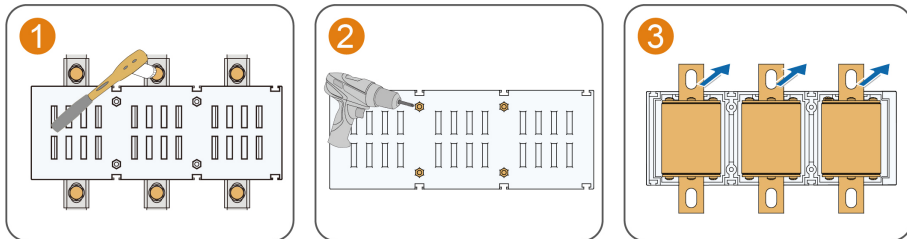
- Check and confirm safety helmet, insulating shoes, working clothes and insulating gloves have been worn.
- Open the LV cabinet door, place one side of the door limit bracket in the limit socket to realize the opening limit.

- Check the fuse fault indicator through the transparent window above the fuse box to determine the fault branch.
- Measure with a multimeter to confirm that there is no power in the branch.
- Insert the extension rod into the end of the wrench handle to extend the wrench.

Procedure

Schritt 1 Remove a total of 6 fixing bolts from the top and bottom of the fuse in turn, slide the fuse box to the right and take it out forward.

Schritt 2 Remove the fixing bolts (M5) of the fuse box, open the fuse box, and replace the faulty fuse.



The fuse failure indicator should be facing the transparent window of the fuse box.

Schritt 3 Close the fuse box and fasten the fixing bolts.

Schritt 4 Put the fuse box into the maintenance branch from front to back.

Schritt 5 Tighten 6 fixing bolts on the fuse box. The recommended torque is 25N. m.

Schritt 6 Close the load switch of the fault branch

Schritt 7 Place the door limit bracket at the initial position and lock the door.

Schritt 8 Power on the MV Station again.

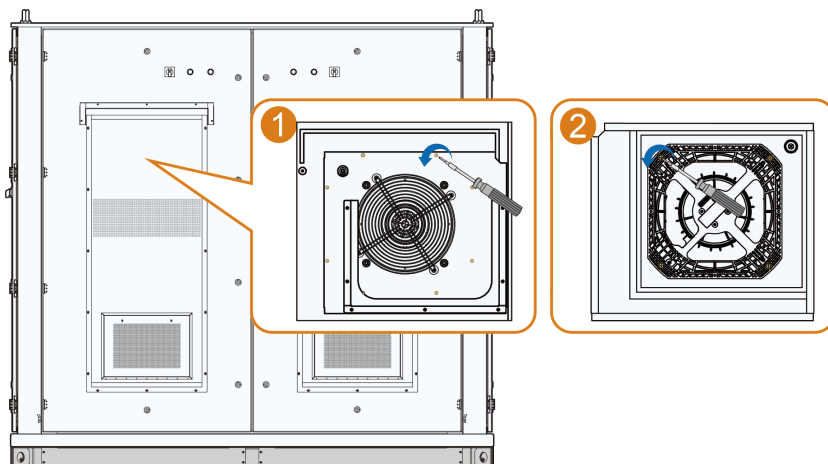
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9.7 Replace the Fans of LV Cabinet

This section gives instructions on how to replace the fans.

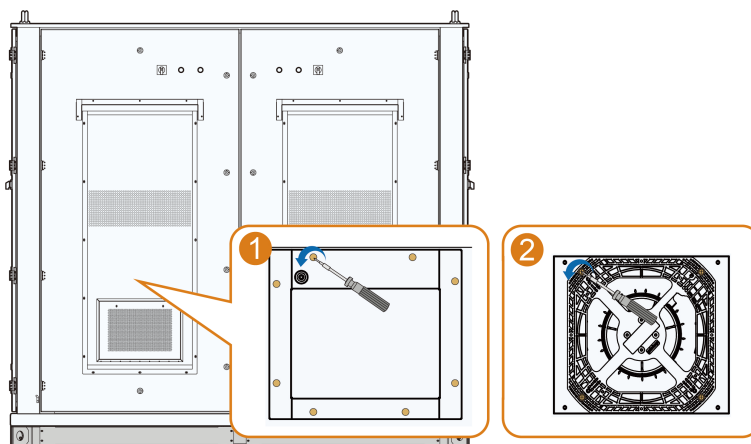
Replace the upper centrifugal fan

- 1 Open the front door of the LV cabinet, unscrew the eight M5 fixing bolts on the air baffle, and take down the air baffle.
- 2 Unscrew the four M5 fixing bolts on the fan.
- 3 Disconnect the wiring terminals, and take out the fan.
- 4 Install the new fan into the LV cabinet, by completing the above steps in reverse.



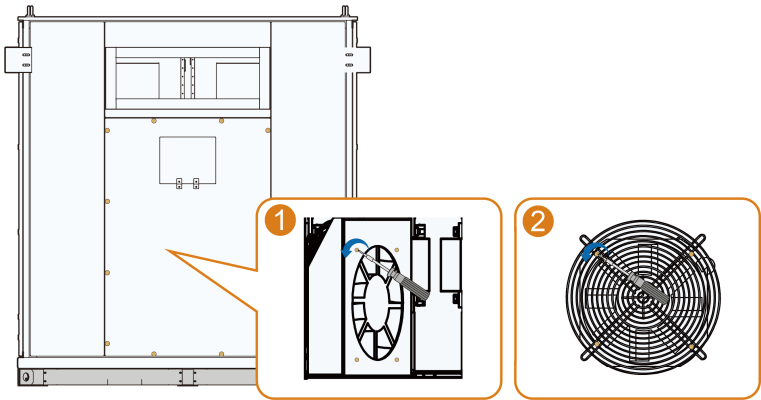
Replace the bottom centrifugal fan

- 1 Open the front door of the LV cabinet, Unscrew the eight M5 fixing bolts on the lower sealing plate, and take down the lower sealing plate.
- 2 Unscrew the four M5 fixing bolts on the fan.
- 3 Disconnect the wiring terminals, and take out the fan.
- 4 Install the new fan into the LV cabinet, by completing the above steps in reverse.



Replace the lower disturbed flow fan

- 1 Unscrew the twelve M5 fixing bolts on the back panel of the LV cabinet and remove the back panel.
- 2 Unscrew the four M5 fixing bolts on the fan and disconnect the wiring terminals.
- 3 Unscrew the fixing bolts of the fan mesh cover and take out the fan.
- 4 Install the new fan into the LV cabinet, by completing the above steps in reverse.



10 Appendix

10.1 Technical Parameters

MVS6400–LV

Transformer	
Transformer type	Oil immersed
Rated power	6400 kVA @ 40 °C
Max. power	7040 kVA @ 30 °C
Vector group	Dy11y11
LV / MV voltage	0.8 - 0.8 kV / 10 – 35 kV
Maximum input current at nominal voltage	2540 A * 2
Frequency	50 Hz / 60 Hz
Tapping on HV	0, $\pm 2 \times 2.5\%$
Efficiency	$\geq 99\%$
Cooling type	ONAN (Oil Natural Air Natural)
Impedance	8 % (± 10 %)
Oil type	Mineral oil (PCB free)
Winding material	Al / Al
Insulation class	A
MV Switchgear	
Insulation type	SF6
Rate voltage	24 kV – 36 kV
Rate current	630 A
Internal arcing fault	IAC AFL 20kA/1s
Qty.of feeder	3 feeders
LV Panel	
ACB specification	4000 A / 800 Vac / 3P, 2 pcs
Disconnecter specification	260 A / 800 Vac / 3P, 20 pcs
Fuse specification	400 A / 800 Vac / 1P, 60 pcs
	350 A / 800 Vac / 1P, 60 pcs
Protection	
AC input protection	FUSE+Disconnecter
Transformer protection	Oil-temperature, oil-level, oil-pressure
Relay protection	50 / 51,50N / 51N
LV overvoltage protection	AC Type II (optional: AC Type I + II)

General Data	
Dimensions(WxHxD)	6,058x2,896x2,438 mm
Approximate weight	22 T
Operating ambient temperature range	-30 to 60 °C
Auxiliary power supply	5 kVA / 400 V (optional: max. 40 kVA)
Degree of protection	IP54
Allowable relative humidity range (non-condensing)	0 – 95 %
Operating altitude	1000 m (standard) / > 1000 m (optional)
Communication	Standard: RS485, Ethernet; Optional: optical fiber
Compliance	IEC 60076, IEC 62271-200, IEC 62271-202, IEC 61439-1, EN50588-1

MVS7040–LV

Transformer	
Transformer type	Oil immersed
Rated power	7040 kVA @ 40 °C
Max. power	7744 kVA @ 30 °C
Vector group	Dy11y11
LV / MV voltage	0.8 - 0.8 kV / 10 – 35 kV
Maximum input current at nominal voltage	2794 A * 2
Frequency	50 Hz / 60 Hz
Tapping on HV	0, $\pm 2 \times 2.5\%$
Efficiency	$\geq 99\%$
Cooling type	ONAN (Oil Natural Air Natural)
Impedance	8 % ($\pm 10\%$)
Oil type	Mineral oil (PCB free)
Winding material	Al / (Option:Cu)
Insulation class	A
MV Switchgear	
Insulation type	SF6
Rate voltage	24 kV – 40.5 kV
Rate current	630 A
Internal arcing fault	IAC AFL 20kA/1s
LV Panel	
ACB specification	4000 A / 800 Vac / 3P, 2 pcs
Disconnecter specification	260 A / 800 Vac / 3P, 22 pcs

Fuse specification	400 A / 800 Vac / 1P, 66 pcs
Protection	
AC input protection	FUSE+Disconnecter
Transformer protection	Oil-temperature, oil-level, oil-pressure, Buchholz
Relay protection	50 / 51, 50N / 51N
LV overvoltage protection	AC Type I + II
General Data	
Dimensions(WxHxD)	6,058x2,896x2,438 mm
Approximate weight	22 T
Operating ambient temperature range	-20 to 60 °C(optional: -30 °C to 60 °C)
Auxiliary power supply	15 kVA / 400 V (optional: max. 40 kVA)
Degree of protection	IP54
Allowable relative humidity range (non-condensing)	0 – 95 %
Operating altitude	1000 m (standard) / > 1000 m (optional)
Communication	Standard: RS485, Ethernet; Optional: optical fiber
Compliance	IEC 60076, IEC 62271-200, IEC 62271-202, IEC 61439-1, EN50588-1

MVS7320–LV

Transformer	
Transformer type	Oil immersed
Rated power	7320 kVA @ 40 °C
Max. power	7320 kVA @ 30 °C
Vector group	Dy11
LV / MV voltage	0.8 kV / 20 kV – 35 kV
Maximum input current at nominal voltage	2640 A * 2
Frequency	50 Hz / 60 Hz
Tapping on HV	0, $\pm 2 \times 2.5\%$
Efficiency	Tier2
Cooling type	ONAN (Oil Natural Air Natural)
Impedance	8 % ($\pm 10\%$)
Oil type	Mineral oil (PCB free)
Winding material	Al / Al
Insulation class	A
MV Switchgear	
Insulation type	SF6

Rate voltage	24 kV – 36 kV
Rate current	630 A
Internal arcing fault	IAC AFL 20kA/1s
Qty.of feeder	3 feeders
LV Panel	
ACB specification	4000 A / 800 Vac / 3P, 2 pcs
Disconnecter specification	260 A / 800 Vac / 3P, 24 pcs
Fuse specification	350 A / 800 Vac / 1P, 72 pcs
Protection	
AC input protection	FUSE+Disconnecter
Transformer protection	Oil-temperature, oil-level, oil-pressure
Relay protection	50 / 51,50N / 51N
LV overvoltage protection	AC Type II (optional: AC Type I + II)
General Data	
Dimensions(WxHxD)	6,058x2,896x2,438 mm
Approximate weight	21 T
Operating ambient temperature range	-20 to 60 °C(optional: -30 °C to 60 °C)
Auxiliary power supply	5 kVA / 400 V (optional: max. 40 kVA)
Degree of protection	IP54
Allowable relative humidity range (non-condensing)	0 – 95 %
Operating altitude	1000 m (standard) / > 1000 m (optional)
Communication	Standard: RS485, Ethernet; Optional: optical fiber
Compliance	IEC 60076, IEC 62271-200, IEC 62271-202, IEC 61439-1, EN50588-1

10.2 Tightening Torques

To avoid poor contact caused by the loosening of copper cable lugs due to stress, and to prevent heat or even fire due to increased contact resistance, make sure to tighten the screws on the cable lugs at the recommended torques:

Bolt	Torque(N·m)	Bolt	Torque(N·m)
M3	0.7–1	M8	18–23
M4	1.8–2.4	M10	34–40
M5	4–4.8	M12	60–70
M6	7–8	M16	119–140

*Torque values listed in the table are intended for the bolt and nut assembly, and do not apply to riveted nuts or riveted screws, etc. The torque to be adopted should depend on the actual situation.

**Secure the cable at a proper point to reduce the stress on the cable lug.

10.3 Exclusion of Liability

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Guarantee or liability claims for damages of any kind are excluded if they are caused

- Improper or inappropriate use or install of the product
- Install or operate the product in unintended environment
- Install or operate the product without observing relevant safety regulations in the deployment location
- Ignore the safety warnings or instructions contained in all documents relevant to the product
- Install or operate the product under incorrect safety or protection conditions
- Alter the product or supplied software without authority
- Product malfunctions due to operation attached or neighboring devices running out of the allowed limit values
- Unforeseen calamity or force majeure

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- Software used for commercial purposes is prohibited.
- Decompiling, decoding or destroying the original program, including Software and the embedded software, is prohibited.

10.4 Contact Information

In case of questions about this product, please contact us.

We need the following information to provide you the best assistance:

- Model of the device
- Serial number of the device

- Fault code/name
- Brief description of the problem

For detailed contact information, please visit: <https://en.sungrowpower.com/contactUS>

