

9 System Maintenance

9.1 Routine Maintenance

9.1.1 Clean the Chassis

 DANGER	• Before performing any operation, disconnect the AC and DC power supply and wait for 5 minutes after the system is powered off. • Wipe the dust off the chassis and clean the chassis with a moistened cloth.
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- 1) Check periodically that the humidity is within the acceptable range and keep it away from dust;
- 2) Check the ventilation and heat dissipation of the equipment regularly. For details, see Section 9.1.2.

9.1.2 Fan Maintenance

 DANGER	• Only qualified and trained electrical technicians are allowed to perform operations. Technicians must observe instructions in this manual and comply with local regulations. • Before performing any operation, disconnect all power supplies and wait for 5 minutes until the residual voltage is completely discharged.
 WARNING	• Do not use the air pump to clean the fan. Otherwise, the fan may be damaged.

Ventilation and heat dissipation is essential to protect the WIT Inverter from performance de-rate due to excess heat. The fan in the WIT Inverter works to cool the components and the heat sink when the temperature is too high. Check the following possible causes and measures when an exception occurs:

- 1> The fan is stuck with foreign objects or there is dust accumulation on the heat sink; clean the fan cover, fan blades and the heat sink.
- 2> The fan is damaged and needs to be replaced.
- 3> The installation position of the WIT Inverter is not well-ventilated. Select an appropriate installation position that meets the basic installation requirements.

Cleaning and replacing the fan:

- 1> Before cleaning or replacing a fan, disconnect the DC and AC power supply and wait for at least 5 minutes.
- 2> Remove the fan fixing plate using a cross-head screwdriver, as shown in Fig 9.1:

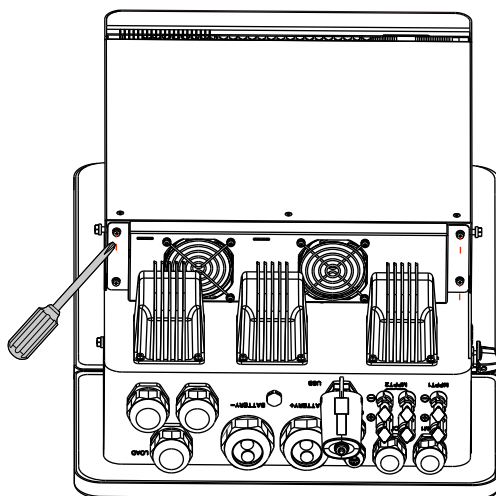


Fig 9.1

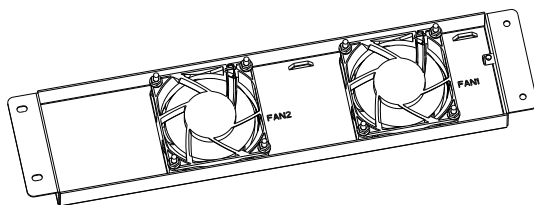


Fig 9.2 Position of the fan fixing plate

3> Disconnect the fan connector, remove the fan fixing plate with a screwdriver, and remove the fan.

4> Clean the fan cover, fan blades, and the heat sink, or replace the fan.

- (1) Use an air pump to clean the heat sink, and use a brush or wet cloth to clean the fan and the its cover;
- (2) Remove the fan for cleaning if necessary;
- (3) Remove the fan that needs to be replaced using a cross-head screwdriver and install a new fan.
- (4) Bind the cables and fix them with a cabletie.
- (5) Reinstall the fan, the fan fixing plate, and the WIT inverter.

9.2 Troubleshooting

 DANGER	• It must be operated by trained and professional electrical technicians. Technicians must observe instructions in this manual and local regulations. • If the WIT Inverter reports the "PV Isolation low" alarm, do not touch the equipment as a ground fault might have occurred. • Beware of high voltages which can cause electric shocks.
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9.2.1 Warning

Warnings indicate abnormal situations of WIT 4-15K-HU Hybrid Inverters, leading to a reduction in the output power. The warning sign will disappear once the fault is rectified by restarting the inverter or reconfiguring the system. The warning codes are shown in Table 9.1:

Table 9.1Warning codes

Warning	Description	Suggestion
Warning 200	String fault	1. Check if the PV panels are normal after shutdown. 2. If the error message persists, contact Growatt support.
Warning 201	PV string/PID quick-connect terminals abnormal	1. Check the wiring of the string terminals after shutdown. 2. If the error message persists, contact Growatt support.
DC SPD Warning	DC SPD function abnormal	1. Check the DC SPD after shutdown. 2. If the error message persists, contact Growatt support.
Warning 203	PV1 or PV2 short circuited	1. Check if PV1 or PV2 is short circuited. 2. If the error message persists, contact Growatt support.
Boost Warning	PV Boost driver abnormal	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
AC SPD Warning	AC SPD function abnormal	1. Power off the system and check the fuse. 2. If the fault persists, contact Growatt.
Warning 208	DC fuse blows	1. Power off the system and check the fuse. 2. If the fault persists, contact Growatt.

Warning	Description	Suggestion
Warning 209	DC input voltage exceeds the upper threshold	1. Turn off the DC switch immediately and check the DC voltage. 2. If the DC voltage is within the specified range and the error message persists, contact Growatt support.
PV Reversed	PV string is reversely connected	1. Check the polarity of the PV terminals. 2. If the error message persists, contact Growatt support.
Warning 219	PID function abnormal	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Warning 220	PV string disconnected	1. Check if the PV string is properly connected. 2. If the error message persists, contact Growatt support.
Warning 221	PV string current unbalanced	1. Check if the PV panels of the corresponding string are normal. 2. If the error message persists, contact Growatt support.
Warning 300	No utility grid connected or utility grid power failure	1. Check if the grid is down. 2. If the error message persists, contact Growatt support.
Warning 301	Grid voltage is beyond the permissible range	1. Check if the grid voltage is within the specified range. 2. If the error message persists, contact Growatt support.
Warning 302	Grid frequency is beyond the permissible range	1. Check if the grid frequency is within the specified range. 2. If the error message persists, contact Growatt support.
Warning 303	Overload	1. Please reduce the load connected to the EPS output terminal. 2. If the error message persists, contact Growatt support.
Warning 308	Meter disconnected	1. Check if the meter is properly connected. 2. If the error message persists, contact Growatt support.

Warning	Description	Suggestion
Warning 309	Meter is reversely connected	1. Check if the L line and the N line of the meter are reversely connected. 2. If the error message persists, contact Growatt support.
Warning 310	The voltage difference between the N line and the PE cable is abnormal	1. Check if the PE cable is reliably connected after shutdown. 2. If the error message persists, contact Growatt support.
Warning 311	Phase sequence error	No operation is required. The PCS will automatically adjust the phase sequence.
Warning 400	Fan failure	1. Check if the fan is properly connected after shutdown. 2. If the error message persists, contact Growatt support.
Warning 401	Meter abnormal	1. Check if the meter is turned on. 2. If the meter is correctly connected to the inverter.
Warning 402	Communication between the optimizer and the inverter is abnormal	1. Check if the optimizer is turned on. 2. If the optimizer is correctly connected to the inverter.
Warning 407	Over-temperature	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Warning 407	overtemperature alarm	1. Restart the inverter 2. If the fault message persists, contact the manufacturer
Warning 408	NTC temperature sensor is broken	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Warning 411	Sync signal abnormal	1. Check if the sync cable is abnormal. 2. If the error message persists, contact Growatt support.

Warning	Description	Suggestion
Warning 412	Startup requirements of grid connection are not met	1. Check if the grid voltage is within the specified range and check if the grid-connection startup voltage configuration is correct. 2. Check if the PV voltage is within the specified range. 3. Restart the inverter. If the error message persists, contact Growatt support.
Warning 500	The inverter failed to communicate with the battery	1. Check if the battery is turned on. 2. Check if the battery is correctly and securely connected to the inverter.
Warning 501	Battery disconnected	1. Check if the battery is properly connected. 2. If the error message persists, contact Growatt support.
Warning 502	Battery voltage too high	1. Check if the battery voltage is within the permissible range. 2. Check if the battery is correctly connected. 3. If the error message persists, contact Growatt support.
Warning 503	Battery voltage too low	1. Check if the battery voltage is within the permissible range. 2. Check if the battery is correctly connected. 3. If the error message persists, contact Growatt support.
Warning 504	Battery terminals are reversely connected	1. Check if the positive and negative terminals of the battery are reversely connected. 2. If the error message persists, contact Growatt support.
Warning 505	Temperature sensor of the lead-acid battery is disconnected	1. Check if the temperature sensor of the lead-acid battery is installed or not. 2. Check if the temperature sensor is well-connected. 3. If the error message persists, contact Growatt support.

Warning	Description	Suggestion
Warning 506	Battery temperature is out of range	1. Check if the ambient temperature of the battery is within the specified range. 2. If the error message persists, contact Growatt support.
Warning 507	BMS reported a fault; both charging and discharging failed	1. Figure out the cause according to the BMS error code. 2. If the error message persists, contact Growatt support.
Warning 508	Lithium battery overload protection	1. Check if the power of the load exceeds the BAT rated discharge power. 2. If the error message persists, contact Growatt support.
Warning 509	BMS communication abnormal	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Warning 510	BAT SPD function abnormal	1. Check the BAT SPD after powering off the device. 2. If the error message persists, contact Growatt support.
Warning 600	Output DC component bias abnormality	1. Restart the inverter 2. If the fault message persists, contact the manufacturer
Warning 601	DC component over high in output voltage	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Warning 602	Off-grid output voltage too low	1. Restart the inverter 2. If the fault message persists, contact the manufacturer
Warning 603	Off-grid output voltage too high	1. Restart the inverter 2. If the fault message persists, contact the manufacturer
Warning 604	Off-grid output current overcurrent	1. Detect whether the load is out of specification 2. Restart the inverter, if the fault message still exists, contact the manufacturer

Warning	Description	Suggestion
Warning 605	Off-grid bus voltage too low	1. Check if the load power exceeds the upper limit. 2. Restart the inverter. If the error message persists, contact Growatt support.
Warning 606	Off-grid output overload	1. Detect whether the load is out of specification 2. Restart the inverter, if the fault message still exists, contact the manufacturer
Warning 609	Balanced circuit abnormal	1. Restart the inverter. 2. If the error message persists, contact Growatt support.

9.2.2 Error

The error code indicates that the device is damaged or the configurations are abnormal. Only qualified and trained electrical technicians are allowed to rectify the faults. The error message will disappear after the fault is rectified. If the problem persists, please contact Growatt.

Table 9.2 Error codes

Error Code	Description	Suggestion
AFCI Fault	An arc fault has been detected	1. After shutdown, check the connection of the PV string. 2. Restart the inverter. 3. If the error message persists, please contact Growatt support.
GFCI High	An excessively high leakage current has been detected	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
PV Voltage High	DC input voltage exceeds the upper threshold	1. Disconnect the DC switch immediately and check the voltage. 2. If the DC input voltage is within the permissible range and the error message persists, please contact Growatt support.

Error Code	Description	Suggestion
PV Isolation Low	PV panels have low insulation resistance	1. Check if the PV strings are properly grounded. 2. If the error message persists, please contact Growatt support.
PV Reversed	PV string reversely connected	1. After shutdown, check if the PV string is reversely connected to the inverter. 2. Restart the inverter. 3. If the error message persists, please contact Growatt support.
AC V Outrange	Grid voltage is beyond the permissible range	1. Check the grid voltage. 2. If the grid voltage is within the permissible range and the error message persists, please contact Growatt support.
No AC	No utility grid connected or utility grid power failure	1. After shutdown, check the AC wiring. 2. If the error message persists, please contact Growatt support.
PE Abnormal	The voltage difference between the N line and the PE cable is abnormal	1. After shutdown, check if the ground cable is reliably connected. 2. If the error message persists, please contact Growatt support.
AC F Outrange	Grid frequency is beyond the permissible range	1. Check the grid frequency and restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 309	Grid ROCOF (Rated of Change of Frequency) abnormal	1. Check the grid frequency and restart the inverter. 2. If the error message persists, please contact Growatt support.
NE Fault	Neutral-to-Ground voltage is too low	1. Check whether the N line on the inverter side with PV negative grounding is short-circuited with the ground cable and whether the output side is isolated with a transformer. 2. If the error message persists, please contact Growatt support.
Error 311	Export limitation fail-safe	1. After shutdown, check the connection of the CT and the meter. 2. If the error message persists, please contact Growatt support.

Error Code	Description	Suggestion
Error 400	DCI bias abnormal	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Error 402	High DC component in output current	1. Restart the inverter. 2. If the error message persists, contact Growatt support.
Error 404	Bus voltage sampling abnormal	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 405	Relay fault	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 408	Over-temperature	1. After shutdown, check the temperature of the inverter and restart the inverter after the temperature is within the acceptable range. 2. If the error message persists, please contact Growatt support.
Error 409	Bus voltage abnormal	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 411	Internal communication failure	1. Check the wiring of the communication board after shutdown. 2. If the error message persists, please contact Growatt support.
Error 412	Temperature sensor disconnected	1. Check the wiring of the communication board after shutdown. 2. If the error message persists, please contact Growatt support.
Error 413	IGBT drive fault	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 414	EEPROM error	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 415	Auxiliary power supply abnormal	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 416	DC/AC overcurrent protection	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.

Error Code	Description	Suggestion
Error 417	Communication protocol mismatch	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 418	DSP and COM firmware version mismatch	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 419	DSP software and hardware version mismatch	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 421	CPLD abnormal	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 422	Redundancy sampling inconsistent	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 423	PWM pass-through signal failure	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 425	AFCI self-test failure	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 426	PV current sampling abnormal	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 427	AC current sampling abnormal	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 429	BUS softboot failure	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 430	EPO fault	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 431	Monitoring chip BOOT verification failed	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.

Error Code	Description	Suggestion
Error 500	BMS failed to communicate with the inverter	1. Check the connection of the RS485 cable between the inverter and the battery. 2. Check if the battery is in the sleep mode. 3. If the error message persists, please contact Growatt support.
Error 501	The BMS reports that the battery failed to charge/discharge	1. Figure out the fault based on the BMS error code. 2. If the error message persists, please contact Growatt support.
Bat Voltage Low	The battery voltage is below the lower threshold	1. Check the battery voltage. 2. If the error message persists, please contact Growatt support.
Error 503	The battery voltage exceeds upper threshold	1. Check the battery voltage. If it is within the permissible range, please restart the inverter. If not, please replace the battery. 2. If the error message persists, please contact Growatt support.
Error 504	The battery temperature is beyond the range for charging / discharging	1. Check the temperature of the battery. 2. If the error message persists, please contact Growatt support.
Bat Reversed	Battery terminals reversed	1. Check if the battery terminals are reversely connected. 2. If the error message persists, please contact Growatt support.
Error 506	Battery open-circuited	1. Check the wiring of the battery terminals. 2. If the error message persists, please contact Growatt support.
Error 507	Battery overload protection	1. Check if the power of the load exceeds the battery rated discharge power. 2. If the error message persists, please contact Growatt support.
Error 508	BUS2 Volt Abnormal	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.

Error Code	Description	Suggestion
Error 509	BAT Charge OCP (Overcurrent Protection)	1. Check if the PV voltage is oversized. 2. If the error message persists, please contact Growatt support.
Error 510	BAT Discharge OCP (Overcurrent Protection)	1. Check if the battery discharge current configuration is proper. 2. If the error message persists, please contact Growatt support.
Error 511	BAT soft start failed	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
EPS Output Short	Off-grid output short-circuited	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 601	Off-grid BUS Volt Low	1. Check if the battery is working properly or the battery experiences capacity loss. 2. If the error message persists, please contact Growatt support.
Error 602	Abnormal Volt at the off-grid terminal	1. Check if a voltage is present at the AC port. 2. If the error message persists, please contact Growatt support.
Error 603	Soft start failed	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 604	Off-grid output voltage abnormal	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 605	Balanced circuit self-test failed	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 606	High DC component in output voltage	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
OverLoad	Off-grid output overload	1. Restart the inverter. 2. If the error message persists, please contact Growatt support.
Error 608	Off-grid parallel signal abnormal	1. Check if the communication cables are properly connected. 2. If the error message persists, please contact Growatt support.

Product Specifications 10

Table 10.1 WIT 4/5/6/8/10/12/15K-HU Specifications

Model Specifications	WIT 4K-HU	WIT 5K-HU	WIT 6K-HU	WIT 8K-HU	WIT 10K-HU	WIT 12K-HU	WIT 15K-HU
Input data(PV)							
Max. recommended PV power(for module STC)	6.4kW	8kW	9.6kW	12.8kW	16kW	19.2kW	24kW
Max. DC voltage	1000V						
Start voltage	180V						
Nominal voltage	600V						
MPP voltage range	150V-850V						
Full Load DC Voltage Range	200V- 750V	200V- 750V	240V- 750V	320V- 750V	400V- 750V	320V- 750V	400V- 750V
No. of MPP trackers	1			2			
No. of PV strings per MPP tracker	2			1+1		2+1	
Max. input current per MPP tracker	40A			20A+20A		40A+20A	
Max. short-circuit current per MPP tracker	50A			25A/25A		50A/25A	
Battery data (DC)							
Battery voltage range	40-60V						
Full load battery voltage range	40-60V	42-60V	42-60V	42.6- 60V	48.4- 60V	51.6- 60V	55-60V
Recommended battery voltage	51.2V						
No. of battery input	1						
Max. charging / discharging current	110A	125A	150A	200A	220A	250A	290A
BMS communication	RS485/CAN						
AC Input/Output (GRID)							
AC input/output nominal power	8kW/ 4kW	10kW/ 5kW	12kW/ 6kW	16kW/ 8kW	20kW/ 10KW	24kW/ 12kW	30kW/ 15kW
Max. AC input/output apparent power	8.8kVA /4.4kVA	11kVA /5.5kVA	13.2kVA/ 6.6kVA	17.6kVA/ 8.8kVA	22kVA/ 11kVA	26.4kVA/ 13.2kVA	33kVA/ 16.5kVA