



SCHEDULED MAINTENANCE PROGRAM

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1. Overview

To ensure the safety and the life span of the Battery Energy Storage BESS (BESS), proper maintenance is needed and necessary. TROES provides the Scheduled Maintenance Program (SMP) for its BESS products.

This SMP covers an annual maintenance service on BESSs manufactured by TROES. Following terms and conditions applied to the TROES SMP:

1. The BESS Owner can request and purchase the TROES SMP within six (6) months after BESS commissioning if not procured with the BESS. Site inspection with cost adder may be needed per TROES service team's evaluation.
2. This SMP only covers the equipment manufactured by TROES, installed, and operated per the installation manual and operation manual from TROES.
3. The completion of the maintenance work per this SMP is mandatory for the warranty claim.
4. Only the TROES service team and its authorized entities are eligible to perform the maintenance service.
5. If the project is in a harsh environment, some service parts should be replaced more frequently. After a successful site evaluation, the TROES service team will determine if an alternative maintenance frequency is required based on and a mutually agreed upon schedule.
6. If the BESS requires corrective action after the maintenance service, then any repairing or replacements not excluded from the coverage of the BESS's warranty agreement shall be handled per the warranty documentation.
7. The fulfillment of the SMP will request the connection from TROES remotely monitoring system: MiGrid-Monitor™.
8. SMP might be modified based on the data collected by MiGrid-Monitor™.
9. All terms are subject to an executed warranty agreement associated with the BESS.

2. Safety Precautions

Safety precautions listing below are very crucial to perform maintenance safely on the BESS:

1. Strictly follow Lock-Out Tag-Out procedures.
2. Cautious about the hazardous voltages in the BESS even when not in operating. Check the voltage (using a multimeter or other device) of possible live parts and make sure they are in the safety range conditions are safe before attempting to perform the maintenance work on the BESS.

3. DO NOT wear metal jewelry such as necklaces, rings, or wristwatches when working on the BESS.
4. Before performing maintenance services on the BESS, read through the operations manual, and follow the SMP procedures.

3. TROES Rights and Responsibilities

1. TROES shall retain the right of doing a site inspection prior to signing the SMP contract if the SMP is not included in the initial purchase order of the BESS and the right to deny the SMP request if the BESS was not properly maintained per the system manual and this document.
2. Ensure that BESS maintenance personnel are trained and familiar with the equipment and with the contents of this manual.
3. Performing the maintenance per the work and interval listed in Exhibit A.
4. Notifying the BESS Owner at least five (5) business days ahead of the scheduled on-site visit.
5. Performing the maintenance as per this SMP.
6. Preparing and submitting the SMP service report to the BESS Owner.
7. Following all safety procedures as required.
8. Recoding any defect found during the maintenance service which requires corrective actions.
9. Documenting the results of the service in the maintenance report and share the report to the current holder of the BESS's warranty ("BESS Owner") after the SMP service.

4. BESS Owner's Rights and Responsibilities

1. The right to keep the TROES service team following this SMP to perform the maintenance service.
2. Sharing the safety plan of the BESS site for the maintenance personnel.
3. Scheduling the date and time with the TROES service team to perform the maintenance.
4. Providing site access for SMP personnel.
5. Providing site network connection with MiGrid-Monitor™.
6. Providing the BESS site point of contact who has the authorization to make decisions on behalf of the BESS Owner such as shutdown and de-energizing the BESS as needed.
7. Providing on-site assistance as needed.

8. Informing TROES of any changes or retrofitting to the BESS or any unusual phenomenon in the past.
9. The right to review and/or obtain the SMP report.

5. After Maintenance

With AC power reapplied, SMP personnel shall perform the following:

1. Confirming all the BESS settings are set appropriately per the configuration list.
2. Confirming all indicators are illuminated properly. i.e. indicators on PCS/inverter, BCP, switchgear, and BESS. Charging or discharging the BESS for 5 minutes at 5kW, confirming all indicators in the BESS are functional during this period.
3. Restore the BESS to normal operation.
4. Notify the BESS Owner/operator that the BESS is operational.
5. Securely lock all BESS doors and following proper lock-out tag-out procedures.

Exhibit A

BESS Scheduled Maintenance Checklist



Prior to any maintenance procedures/actions, follow the shutdown procedures in the system manual and wait for the completion of de-energization of power electronic components/equipment.

#	MAINTENANCE WORK	Method	INTERVAL
2	Visually check if there is any physical damage on the enclosure, rack, battery pack/drawer, cable connection and control boxes. Check all the labels and nameplates.	Photo/video based. TROES engineer will do the inspection remotely according to the photos/videos	Every 6 Months
3	MiGrid-Monitor™ connection checking.	TROES will remotely monitor the data and check the monitoring system.	Every 6 Months
4	Perform a one cycle of charge and discharge test.	Make sure the system is placed in proper environment. Performed locally by qualified technician, TROES will monitor data remotely	Every 6 Months
5	Check the charging/discharging time, and if the degradation of battery capacity within normal range.	TROES will remotely monitor the data simultaneous with charge/discharge on site	Every 6 Months
6	Check the temperature of each cell and make sure the temperature difference is within normal range.	TROES will remotely monitor the data simultaneous with charge/discharge on site	Every 6 Months
7	Check the voltage of each cell and voltage difference of the cells.	TROES will remotely monitor the data simultaneous with charge/discharge on site	Every 6 Months
8	HVAC performance inspection, HVAC filter replacement. Inspect radiators for any dust/sand blocks. Clean any blocks with water or blower.	Photo/video based. TROES engineer will do the inspection remotely according to the photos/videos	Every 6 Months
9	Fire-suppression system inspection, sound and light alarm system testing, smoke/heat detection system testing. Agent pressure checking.	Photo/video based. TROES engineer will do the inspection remotely according to the photos/videos	Every 6 Months
10	Lighting system inspection.	Photo/video based. TROES engineer will do the inspection	Every 6 Months

		remotely according to the photos/videos	
11	PCS function inspection (fans, noises, indicator lights, panel etc.)	Photo/video based. TROES engineer will do the inspection remotely according to the photos/videos	Every 6 Months
12	MiGrid-Operator™ function checking (optional, up to different site)	TROES will remotely monitor the data and check the monitoring system.	Every 6 Months
1	Visually check if there is any physical damage on the enclosure, PCS, rack, battery pack/drawer, cable connection and control boxes. Check all the labels and nameplates are still existed.	TROES will send technician or contractor on site to check	Every 12 months
2	MiGrid-Monitor™ connection checking (optional, up to different site).	TROES will remotely monitor the data and check the monitoring system.	Every 12 months
3	Check the main circuit, cable circuit, cable connection stability, cable connection reinforcement if required.	TROES will send technician or contractor on site to check	Every 12 months
4	Perform a one cycle of charge and discharge test. Perform energy storage battery insulation and grounding resistance test.	Performed locally by TROES technician or contractor, TROES will monitor data remotely	Every 12 months
5	Check the charging/discharging time, and if the degradation of battery capacity within normal range.	TROES will remotely monitor the data simultaneous with charge/discharge on site	Every 12 months
6	Check the temperature of each cell and make sure the temperature difference is within normal range.	TROES will remotely monitor the data simultaneous with charge/discharge on site	Every 12 months
7	Check the voltage of each cell and voltage difference of the cells.	TROES will remotely monitor the data simultaneous with charge/discharge on site	Every 12 months
8	Charge the single cell separately if required.	Performed locally by TROES technician or contractor, TROES will monitor data remotely	Every 12 months (If required)
9	Circuit breaker inspection, disconnecter inspection.	Performed locally by TROES technician or contractor	Every 12 months
10	HVAC performance inspection, HVAC filter replacement. Inspect radiators for any dust/sand blocks. Clean any blocks	Performed locally by TROES technician or contractor	Every 12 months

	with water or blower.		
11	Fire-suppression system inspection, sound and light alarm system testing, smoke/heat detection system testing. Agent pressure checking.	Performed locally by TROES technician or contractor	Every 12 months (For container system)
12	Inspect the interior of the PS to check whether all cable connections are loose, whether the connection terminals and insulation are discolored or peeled off, replace damaged or corroded connection terminals	Performed locally by TROES technician or contractor	Every 12 months
13	Lighting system inspection	Performed locally by TROES technician or contractor	Every 12 months
14	MiGrid-Operator™ function checking.	TROES will remotely monitor the data and check the monitoring system. On-site equipment inspection would be performed by TROES technician or contractor	Every 12 months
1	Visually check if there is any physical damage on the enclosure, rack, battery pack/drawer, cable connection and control boxes. Check all the labels and nameplates.	TROES will send technician or contractor on site to check	Every 5 years
2	MiGrid-Operator™ connection checking.	TROES will remotely monitor the data and check the monitoring system.	Every 5 years
3	Check the cable connection stability, cable connection reinforcement if required.	TROES will send technician or contractor on site to check	Every 5 years
4	Replace the aging cables if required.	TROES will send technician or contractor to replace	Every 5 years
5	Enclosure components inspection, including doors, locks, painting, insulation.	TROES will send technician or contractor on site to check	Every 5 years
6	Perform a one cycle of charge and discharge test.	Performed locally by TROES technician or contractor, TROES will monitor data remotely	Every 5 years
7	Check the charging/discharging time, and if the degradation of battery capacity within normal range.	TROES will remotely monitor the data simultaneous with charge/discharge on site	Every 5 years
8	Check the temperature of each cell and make sure the temperature	TROES will remotely monitor the data	Every 5 years

	difference is within normal range.	simultaneous with charge/discharge on site	
9	Check the voltage of each cell and voltage difference of the cells.	TROES will remotely monitor the data simultaneous with charge/discharge on site	Every 5 years
10	Charge the single cell separately if required.	Performed locally by TROES technician or contractor, TROES will monitor data remotely	Every 5 years
11	Replace the defective battery cells if required.	Performed locally by TROES technician or contractor, TROES will monitor data remotely	Every 5 years
12	Circuit breaker inspection, disconnect inspection.	TROES will send technician or contractor on site to replace	Every 5 years
13	BMS hardware inspection. BMS function testing	TROES will send technician or contractor on site to check	Every 5 years
14	HVAC performance inspection, HVAC filter replacement. Inspect radiators for any dust/sand blocks. Clean any blocks with water or blower.	TROES will send technician or contractor on site to check	Every 5 years
15	Replace the HVAC pip, seals if required.	TROES will send technician or contractor to replace	Every 5 years
16	Fire-suppression system inspection, sound and light alarm system testing, smoke/heat detection system testing. Agent pressure checking.	TROES will send technician or contractor on site to check	Every 5 years
17	Lighting system inspection	TROES will send technician or contractor on site to check	Every 5 years
18	MiGrid-Operator™ function checking.	TROES will remotely monitor the data and check the monitoring system. On-site equipment inspection would be performed by TROES technician or contractor	Every 5 years

Exhibit B

Maintenance Spare Part

	Spare part	Qty	INTERVAL
Incl.	HVAC filter	2	6 Months
Incl.	HVAC Filter	2	12 Months
Excl.	HVAC components	As required	12 Months
Incl.	DC cables	As required	5 Years
Incl.	AC cables	As required	5 Years
Incl.	Communication cables	As required	5 Years
Excl.	Enclosure parts	As required	5 Years
Excl.	Battery packs	As required	5 Years
Incl.	HVAC filter	2	5 Years
Excl.	HVAC components	As required	5 Years