

OPERATION & MAINTENANCE

PV Cleaning & System Maintenance Report

Report no.

Complete one report for every site visit. Fill in every section on site, attach the before and after photos, and ask the customer to sign before the team leaves. Write "N/A" where an item does not apply.

A Site & System Details

Customer / site name

Visit type

☐ Scheduled ☐ Cleaning only ☐ Corrective ☐ Warranty

Site address

Customer contact (name, phone)

System size (kWp) / no. of modules

Module brand / model

Inverter brand / model / serial no.

Battery (if installed)

Commissioning date

Previous service date

Contract / PO reference

Monitoring platform / plant ID

1 Service Team

Officer in charge

Position

Phone

Number of staff on site

#	Team member	Role	Qualification / licence no.	Signature
1				
2				
3				
4				
5				

Qualification: e.g. electrician skill certificate (DSD level), engineering licence (ภ.ร.), working-at-height or Solar ESS installer certification, with certificate no. and expiry date.

2 Operation Time & Site Conditions

Date	Arrival	Work start	Work finish	Total duration (h)

Weather

☐ Sunny ☐ Partly cloudy ☐ Overcast ☐ Rain

Ambient temp. (°C)

Irradiance (W/m²)

3 Scope of Work

- | | | | |
|---|--|---|--|
| ☐ PV module cleaning | ☐ Visual inspection | ☐ Roof inspection (leaks, fixings, drainage) | ☐ Electrical testing (V, I, insulation) |
| ☐ Thermal scan (MDB, inverter, DC) | ☐ Torque check of terminals | ☐ Inverter / monitoring check | ☐ Corrective repair |
| ☐ Other: _____ | | | |

OPERATION & MAINTENANCE

PV Cleaning & System Maintenance Report

Report no.

4 Safety & Isolation

TICK BEFORE WORK STARTS

- | | |
|--|---|
| ☐ Site permit / customer approval obtained | ☐ PPE worn: helmet, safety glasses, insulated gloves, safety shoes |
| ☐ Fall protection fitted for roof work | ☐ Shutdown sequence completed (order recorded below) |
| ☐ Lock-out / tag-out applied to every switched-off device | ☐ Absence of voltage verified before touching |
| ☐ Cleaning water: clean or soft water, low pressure, no detergent | ☐ Panels cleaned early morning or late afternoon (not hot glass) |

Shutdown sequence: write the order you follow (1 = first)

Switch OFF inverter Order	Switch OFF main breaker of existing MDB Order	Switch OFF RCBO / AC MCCB from inverter Order	Switch OFF battery (if applicable) Order	Switch OFF DC breakers / fuses Order
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Supervisor check: ☐ Correct order ☐ Incorrect, corrected on site Checked by: _____

Write a number from 1 to 5 in each box to show the order you switch off. Verify absence of voltage before touching any equipment. Restore power in reverse order after work is complete.

5 Photo Record: Before / After

SUBMITTED AS A SEPARATE FILE

Send the before and after photos as a separate file with this report. Take each pair from the same angle with the date and time stamp on. Name the file: **Report no._Site name_Photos_YYYYMMDD**.

Photo file name / link	Number of photos	Sent to / date sent

Before/after pairs included in the photo file (tick)

- | | | |
|--|--|--|
| ☐ 1. PV array, overall view | ☐ 2. Module surface, close-up (worst soiled area) | ☐ 3. Inverter and display / alarm screen |
| ☐ 4. MDB, door open (solar breaker, SPD, terminals) | ☐ 5. DC isolator / combiner box | ☐ 6. Cable runs, conduit and roof condition |

6 Overall Situation of the Site

Item	Good	Fair	Needs action	Remarks
Soiling on modules (dust, bird droppings, leaves, moss)	☐	☐	☐	
Shading (trees, new structures, antennas)	☐	☐	☐	
Module glass, frames and back sheet (cracks, burn marks, delamination)	☐	☐	☐	
Mounting structure, rails and clamps (rust, loose bolts)	☐	☐	☐	
Roof and waterproofing around fixings	☐	☐	☐	
Cable management, ties and conduit	☐	☐	☐	
Inverter and chamber (ventilation, dust, insects)	☐	☐	☐	
MDB and switchgear	☐	☐	☐	
Earthing system and bonding	☐	☐	☐	
Labels and safety signs	☐	☐	☐	
Monitoring / internet connection	☐	☐	☐	

OPERATION & MAINTENANCE

PV Cleaning & System Maintenance Report

Report no.

6 (cont.) Summary of overall site condition

6.1 Observation & Testing

#	Check	Pass	Fail	Remarks
1	All electrical connection points are tightened to the specified torque	☐	☐	
2	No burn marks or hot spots at any MDB connection point or along the wiring runs	☐	☐	
3	No MC4 connectors lying on the roof or floor; all connectors clipped and secured	☐	☐	
4	No roof leaks at panel fixings or cable entries	☐	☐	
5	No damage to IMC or EMT conduit, fittings or supports	☐	☐	
6	No damage to cable insulation	☐	☐	
7	Breakers and DC isolators operate correctly	☐	☐	
8	SPD status indicators healthy (no tripped or red flag)	☐	☐	
9	RCD / ELCB trips on test button	☐	☐	
10	Inverter shows no active alarms; event log reviewed	☐	☐	
11	Monitoring online and reporting live data	☐	☐	

7 Technical Measurements

7.1 Test instruments

Instrument	Brand / model	Serial no.	Calibration due
Digital multimeter			
Clamp meter (AC/DC)			
Insulation tester			
Earth resistance tester			
Thermal camera			
Irradiance meter			

OPERATION & MAINTENANCE

PV Cleaning & System Maintenance Report

Report no.

7.2 DC side: string voltage and current

String	Modules in string	Voc before (V)	Voc after (V)	Current before (A)	Current after (A)	Remarks
S1						
S2						
S3						
S4						
S5						
S6						
S7						
S8						

Strings with equal module counts should read within about 5% of each other. A low string points to a faulty module, connector or cable.

7.3 AC side and output

Measurement	Before cleaning	After cleaning	Change (%)
Voltage L1-N (V)			
Voltage L2-N (V)			
Voltage L3-N (V)			
Current L1 (A)			
Current L2 (A)			
Current L3 (A)			
Inverter output power (kW)			
Irradiance at reading (W/m ²)			

7.4 Insulation resistance

Circuit	Test voltage (V DC)	Measured (MΩ)	Minimum	Pass	Fail
PV array (+) to earth			≥ 1 MΩ	☐	☐
PV array (-) to earth			≥ 1 MΩ	☐	☐
AC cable, inverter to MDB (L-E)			≥ 1 MΩ	☐	☐
AC cable, inverter to MDB (N-E)			≥ 1 MΩ	☐	☐

Test PV circuits at 500 V DC (systems up to 500 V) or 1,000 V DC (above 500 V), per IEC 62446-1. Isolate the inverter before testing.

7.5 Earthing

Earth electrode	Measured (Ω)	Target	Result
Main earth (MDB)		≤ 5 Ω	☐ Pass ☐ Fail
PV array / structure earth		≤ 5 Ω	☐ Pass ☐ Fail

OPERATION & MAINTENANCE

PV Cleaning & System Maintenance Report

Report no.

7.6 Thermal scan: MDB and inverter chamber

Location	Max (°C)	Ambient (°C)	ΔT (°C)	Image no.	OK	Monitor	Repair
MDB: main breaker and busbar					☐	☐	☐
MDB: solar breaker and cable terminals					☐	☐	☐
Inverter body / heat sink					☐	☐	☐
Inverter AC and DC terminals					☐	☐	☐
Inverter chamber air					☐	☐	☐
DC isolator / combiner box					☐	☐	☐

ΔT = rise over a similar part under the same load. Under 4 °C: OK · 4–15 °C: monitor, repair when possible · over 15 °C: repair immediately (NETA MTS). Scan under at least 40% load.

7.7 Inverter status

Firmware version

Active alarms / error codes

Total yield (kWh)

Yield today (kWh)

8 Findings & Further Suggestions

#	Finding	Recommendation	Priority	Est. cost (THB, excl. VAT)
1			☐ H ☐ M ☐ L	
2			☐ H ☐ M ☐ L	
3			☐ H ☐ M ☐ L	
4			☐ H ☐ M ☐ L	
5			☐ H ☐ M ☐ L	
6			☐ H ☐ M ☐ L	
7			☐ H ☐ M ☐ L	

Recommended cleaning interval

☐ 3 months ☐ 6 months ☐ 12 months

Next service due

9 Customer Comments

10 Sign-off

Prepared by · Solar ESS

Name

Position

Date

Signature

Acknowledged by · Customer

Name

Position

Date

Signature