

# ABB central inverters PVS800 Preventive Maintenance and Reconditioning



**ABB's Preventive Maintenance and Reconditioning services help control and minimize operating costs associated with ABB central inverters. On-site preventive maintenance is designed around the ABB central inverter maintenance schedule and significantly reduces the risk of failure while increasing the lifetime of an inverter. Reconditioning in an authorized ABB service workshop should be considered when major components need replacing according to the maintenance schedule. Both services contribute to higher reliability of the installed plant which in turn helps maintain high productivity.**

## **The importance of maintenance**

Although designed with a life expectancy in excess of 20 years, ABB central inverters, like all other industrial products with electronic components, are susceptible to failure over time. The main reason for failure is aging of electronic components, but it is also greatly affected by the operational conditions. A demanding environment, such as high ambient temperature, humidity, dirt, dust and cyclic heavy loads, can shorten component lifetime as well as maintenance and component replacement intervals.

A component failure may cause consequential damage to other parts of the ABB central inverter, including power semiconductors.

A maintenance schedule provides a systematic and functional means of maintaining a specific inverter type and is based on ABB's extensive experience and know-how of manufacturing and maintaining frequency converters.

## **Preventive maintenance – the lifeblood of an ABB central inverter**

ABB central inverter preventive maintenance consists of annual inverter inspections and component replacements according to the product specific maintenance schedule. Specifications of component suppliers are carefully observed, while the environmental and operational conditions of the ABB central inverter are also considered.

Preventive maintenance is carried out during planned production shutdowns. It should be planned well in advance and the required resources and service parts reserved. Parts and materials used in preventive maintenance are bundled into Preventive Maintenance kits which are delivered to a lead-time, unlike normal spare parts.

The success of preventive maintenance depends on the information recorded in the service reports provided by the end-user. The more thorough the information provided, the greater the benefit.

## All labor and service parts included

The Preventive Maintenance service includes labor, if not agreed otherwise, and the service parts to perform the work according to the maintenance schedule.

Included are inspections of the:

- ABB central inverter and its environmental conditions
- connections
- ribbon and fiber optic cables
- fans, filters and cooling system
- emergency stop circuit
- fault logger
- parameters

Tests include:

- functional testing of the inverter under normal conditions

In addition, the following can be purchased as options:

- ESD protected cleaning of the inverter
- reforming of the spare module capacitors
- inverter spare part inventory

A detailed service report, including recommendations for future actions, is provided once the maintenance work is completed and the inspection data fully analyzed.

Recommended actions by the user	Annually
<b>Connections and environment</b>	
Cabinet door filters IP54	R
Quality of supply voltage	P
<b>Spare parts</b>	
Spare parts	I
DC circuit capacitors reforming, spare modules and spare capacitors	P
<b>Inspections by user</b>	
IP22 and IP42 air inlet and outlet meshes	I
Tightness of terminals	I
Dust, corrosion and temperature	I
Heat sink cleaning	I

Cooling	Years from startup																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
<b>Main cooling fan</b>																					
Main cooling fan inverter unit	I	I	I	I	I	R	I	I	I	I	I	R	I	I	I	I	I	R	I	I	I
Cooling fan, LCL filter unit	I	I	I	I	I	R	I	I	I	I	I	R	I	I	I	I	I	R	I	I	I
<b>Cabinet cooling</b>																					
Roof	I	I	I	I	I	R	I	I	I	I	I	R	I	I	I	I	I	R	I	I	I
Door	I	I	I	I	I	R	I	I	I	I	I	R	I	I	I	I	I	R	I	I	I
<b>Aging</b>																					
<b>Inverter unit</b>																					
DC circuit electrolytic capacitors + discharg. resistors *)																				R	
Main circuit interface board *)												R									
Flat ribbon cables												R									
<b>Control</b>																					
Memory backup battery in the data logger unit (APBU)						R						R						R			
Cabinet temperature measurement sensor and transmitter check (DRMU-W)			I			I			I			I			I			I			I
24 V DC buffer **)									R			R						R			
<b>Connections and environment</b>																					
Cabinet door filters	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Quick connector of converter module									R			I						R			
Checking and cleaning of power connections			I			I			I			I			I			I			I
Tightness of main circuit terminals			I			I			I			I			I			I			I
Cleaning of heatsink			I			I			I			I			I			I			I
Dust, corrosion and temperature			I			I			I			I			I			I			I
<b>Improvements</b>																					
Based on product notes			I			I			I			I			I			I			
<b>Spare parts</b>																					
Spare parts			I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
DC circuit capacitors reforming and spare units	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

**Notice!** The schedule is based on the solar power production operations. Using the reactive power compensation option decreases the maintenance intervals.

**NOTE!** Recommended maintenance intervals and component replacement are based on specified operational and environmental conditions. Long-term operation near the maximum specified ratings or different environmental conditions may require shorter maintenance intervals for certain components. ABB recommends annual solar inverter inspections to ensure the highest reliability and optimum performance. More detailed information can be found in maintenance instructions, product manuals and on the ABB website at [www.abb.com/solarinverters](http://www.abb.com/solarinverters), or consult your local ABB Service for maintenance recommendations.

You can find the contact information of your nearest service provider at [www.abb.com/searchchannels](http://www.abb.com/searchchannels).

Legend:

I = Inspection (visual inspection and maintenance action if needed)

P = Performance of on-site work (commissioning, tests, measurements or other work)

R = Replacement

\*) = Estimated maintenance interval in ideal conditions; ambient temperature between 0 to 40 °C and indoor conditioned (IEC62109), non-cyclic heavy load

\*\*) = If operating temperature is continuously below 40 °C, replacement after 12 years. If above 40 °C, replacement after 9 years



Components which are included in 6 years' Preventive Maintenance kit for PVS800-57-630 kW.



Components which are included in 6 years' Preventive Maintenance kit for PVS800-57-100 kW.

### Preventive Maintenance kits

Preventive Maintenance kits contain all the necessary replacement parts for a scheduled maintenance. The content of each kit is carefully selected to match the maintenance schedule and the size and other characteristics of a specific solar inverter.

Preventive Maintenance kits can be selected and ordered according to the number of solar inverters in use and their age, ensuring that all the required parts are available for maintenance.

The parts contained within a Preventive Maintenance kit cost less than parts sourced individually. Therefore, engaging in a proactive preventive maintenance plan will prove more cost effective than sourcing spares as a result of an emergency or general repair job. Preventive Maintenance kits are available from [www.online.abb.com](http://www.online.abb.com) for component replacements marked "R" in the maintenance schedule. The local ABB representative can define, select and deliver the correct parts and help plan preventive maintenance. Visit [www.abb.com/solarinverters](http://www.abb.com/solarinverters) to find your nearest ABB representative.

Preventive Maintenance kits for	Every year	Every 6 <sup>th</sup> year	Every 12 <sup>th</sup> year	Every 20 <sup>th</sup> year
Door filter	X			
Cooling fan (module, LCL-filter, door)		X		
AINT board			X	
DC-capacitors				X

## Reconditioning – giving solar inverters a new life

While, within preventive maintenance, component replacements can be carried out on-site, ABB offers reconditioning of ABB central inverters to their original factory condition. This should be considered in case of major damage or in demanding environmental conditions when major components, such as electrolytic capacitors, need replacing according to the maintenance schedule.

The ABB solar inverter Reconditioning service is carried out at an authorized ABB service workshop within a clean environment and with suitable testing facilities. The service includes a full inspection, thorough cleaning and the analysis of individual components, as well as part replacements according to a product specific maintenance schedule. The reconditioned inverter is then fully tested.

With on-site preventive maintenance, only the replaced parts come with a warranty whereas with reconditioning the entire ABB central inverter module or inverter carries a warranty.

## Reconditioning - giving an inverter a new life

When the ABB central inverter arrives at the ABB workshop, the following is carried out:

- visual inspection
- electronic boards are dismantled and cleaned ultrasonically
- mechanical parts are washed
- after drying, individual components are analyzed and replaced according to a product specific maintenance schedule
- software is updated

Tests include:

- functional testing
- a load test

Once all stages are complete, a service report is compiled and a warranty issued for the complete inverter module or ABB central inverter.

Exchange units may be available during the reconditioning period. The ABB service engineer or local sales office will be able to advise.

## Non-repairable ABB central inverters

Following reconditioning, ABB returns the ABB central inverter with its functionality fully restored. However, if at the workshop the inverter is examined and fails to meet ABB's quality standards, ABB can declare it non-repairable. Common reasons for an inverter to be declared non-repairable include heavy mechanical damage and corrosion considered when major components, such as electrolytic capacitors, need replacing according to the maintenance schedule.

If an item is declared non-repairable, ABB informs the customer without delay and offers alternative solutions.

## Summary

The advantages and benefits of preventive maintenance include:

Advantage	Benefit
Use of genuine service parts	Increased reliability leading to longer component lifetime
Timely part replacements in accordance with maintenance schedule	Increased reliability leading to reduced inverter and power plant operational lifetime costs
Economical kit pricing compared to individual part price	Lower operational lifetime costs
Maintenance schedules help long term maintenance budget planning	Schedules help define whether to continue maintenance or to upgrade, retrofit or replace a inverter
Updating to the latest software version	Ensures optimum inverter performance

In addition to the above, reconditioning includes the following advantages and benefits:

Advantage	Benefit
Work performed in clean service workshop environment. Washing facilities, ESD protected working conditions and comprehensive testing arrangements to maximize the reconditioning quality.	Inverter module returned to its original condition and delivered with one year warranty in case reconditioning is carried out during post warranty time.

For more information please contact your local ABB representative or visit:

[www.abb.com/solarinverters](http://www.abb.com/solarinverters)

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