# PowerMax-Pro Cleaning Guide

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## Introduction

The new PowerMax-Pro sensor technology introduces a great deal of new features into power measurements beyond what thermopile power sensors have historically been able to provide. Along with features such as faster measurement speed, time-resolved pulse measurements and peak power measurements, the PowerMax-Pro sensor introduces a new maintenance capability that has not been possible in the past. This new capability allows users to clean the sensor's absorbing surface without causing damage to the product.

Historically, clean compressed air is the recommended method to remove debris from the thermopile sensor's absorbing surface. This is because the coating on the sensor's surface is fairly porous and can absorb cleaning solutions, potentially leading to corrosion or damage on the sensor. As a result, contaminants (dust, oil, etc.) that collect on the surface of a thermopile often cannot be cleaned off, which can result in measurement drift or damage of the sensor coating.

The PowerMax-Pro sensors have an entirely new absorbing surface which does not have this same challenge. The following information covers some of the basic recommendations when considering cleaning the surface of a PowerMax-Pro sensor. This information applies to both the HD and BB coatings available on these products.

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## Apply standard optical cleaning techniques to the PowerMax-Pro

The procedure for cleaning the surface of a PowerMax-Pro sensor follows very similar steps to other optical cleaning techniques used with lenses, mirrors, or fibers. Familiarity with other optical cleaning procedures can be beneficial when dealing with the PowerMax-Pro sensors. To start with, it is recommended that any sensor cleaning be done in a relatively clean environment using clean tools to help avoid getting any additional contaminants on the sensor surface. As with any other type of optical cleaning procedure, it is recommended to avoid any skin contact with the surface being cleaned. This helps avoid getting any oils or additional moisture on the sensor surface. Wearing cotton or nitrile gloves during cleaning can help avoid contact with skin.

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## Method 1: Use forced air or inert gas to blow debris off the sensor surface

The first method to try with most optical cleaning procedures is using forced air or some other inert gas to blow any debris off the sensor surface. This can be used to remove dust or other loose contaminants from the sensor. This forced air can come from pressurized filtered air or nitrogen that is piped through the building or from a canister as long as care is taken to avoid any moisture coming from the canister. Short blasts of forced air can be used to try and dislodge any dust or debris that has collected on the sensor surface. This also helps remove any larger contaminants from the sensor surface prior to attempting any cleaning procedures using physical contact with the sensor.

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## Method 2: Use clean wipes and optical grade solvents

If forced air isn't enough to remove debris from the sensor or if there is oil or other contaminants that are stuck to the sensor surface, clean wipes and optical grade solvents can be used as an alternate method. For wiping the sensor surface, pure cotton, lens tissue, or cotton-tipped swabs can be used to apply a cleaning solution. Some recommended swab types are shown in the images below.

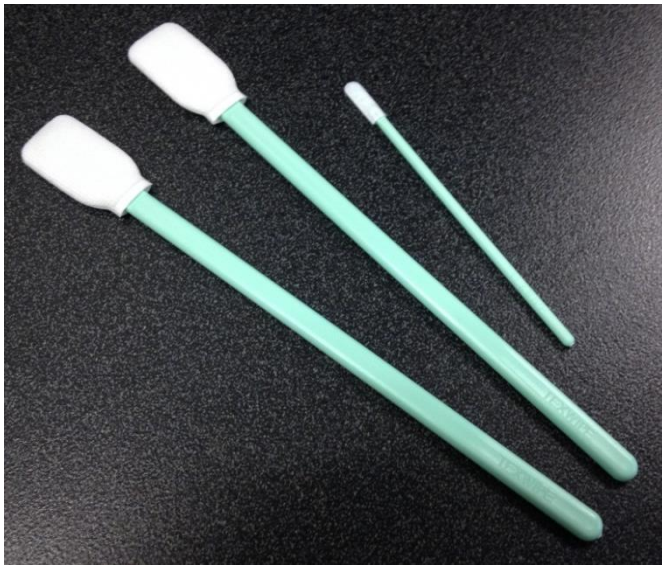

***Figure 1***
***Cleanroom swabs***

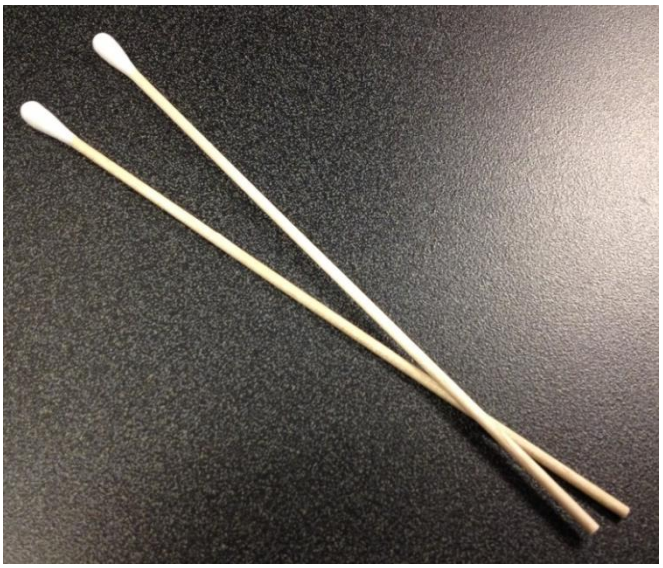

***Figure 1***
***Optical cotton swabs***

The cleaning solution should be optical grade isopropyl alcohol, methanol, or acetone. Typically starting with isopropyl alcohol is recommended and then moving up to other solvents if needed. Applying a cleaning solution to the sensor should follow other similar optical cleaning procedures. The goal is to remove any contaminants from the sensor surface without leaving streaks or excess liquid on the sensor. The cleaning solution should be applied to the wipe to the point where it is damp, but not dripping.

Any wiping procedure should use the least amount of pressure possible to effectively remove the contaminants. Do not forcefully scrub the sensor surface. It should be a gentle cleaning that is performed. The "drag and drop" method for cleaning optics could also be employed with these sensors, although it is sometimes difficult to implement on a recessed surface like on the PowerMax-Pro sensors. Plan a wiping path that will help remove contaminants from the sensor surface without dragging debris entirely across the sensor. This helps avoid any unnecessary contact with the

sensor surface or scratches from debris being carried off the sensor. This process should be repeated using clean wipes until any contaminants and streaks have been removed from the sensor surface.

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### Keep a clean absorbing surface for optimal performance

Keeping a clean absorbing surface that is free from contaminants, burn marks, or other damage can help keep the PowerMax-Pro products in good working condition. Storing the sensor in a safe clean environment with its protective cap attached can help avoid contaminants and the need for additional cleaning on the sensor.

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