



AlgoLeak Industrial Acoustic Camera Software
Manual

legal information

About this manual

This manual contains instructions for using and maintaining the product. Photographs, tables, images, and all other information contained herein are for illustrative purposes only. Information contained in this manual may be changed without notice due to firmware updates or other reasons. Please check the AlgoLeak website (<https://nimomakezu.com/>) for the latest version of this manual.

This manual should only be used with the guidance and assistance of a trained professional who supports this product.

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Symbol definitions

The symbols used in this document are defined as follows:




Symbol	explanation
 danger	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
 Note	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance degradation, or other unpredictable results.
 Note	Provides additional information that emphasizes or supplements important points in the main text.

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Chapter 1 Introduction

The client is used to view and analyze images captured by the acoustic imaging camera. As a professional acoustic detection and imaging product, the Acoustic Camera can easily identify gas leaks and partial discharge incidents in industrial environments. Clients analyze acoustic images to detect and identify problems and potential risks, which helps reduce troubleshooting costs and additional costs due to device failure.

1.1 Operating environment

Below are the recommended operating environment for installing the client.

- operating system
 - Microsoft Windows 7 / Windows 8.1 / Windows 10 (64-bit operating systems)
 - Windows Server (64-bit operating system)
- CPU: i5-4590 or higher
- RAM: 4G or more
- Graphics card: RADEON X700 series 256M or above

Chapter 2. Installing, Upgrading, and Uninstalling the Client

2.1 Software Installation

Open the software installation package ,  double-click to run the setup, click **I accept the license terms in the pop-up window**, and choose **One-Click Install** or **Customize** according to your requirements.

One-click installation

By default, the software is installed in the path C:\Program Files.

Customized Installation

 Click to select the installation path.
check the box to **create a desktop icon** if desired .


2.2 Software Upgrades

Before you begin

An earlier version is installed.

Before upgrading your software, make sure that the software is stopped from running.

Steps

1. Open the software installation package and  double-click to run the setup.
Click **Upgrade** in the pop-up window .

Note

The software will be upgraded using the same path as the previous version.

What to do next

check **Create desktop icon** if desired .

2.3 Uninstalling or Modifying the Software

Before you begin

Before uninstalling or modifying software, make sure that the software is stopped from running.

Steps

1. In your Windows operating system,  click > **Control Panel** > **Procedures and Features** .

2. Right-click **LEAK ANALYZER** and select **Uninstall/Change** , or double-click **LEAK ANALYZER** .
 3. In the pop-up window, select:
 - **Uninstall** .
 - **change** .
- A prompt will pop up once the uninstall or modification is complete.

Chapter 3. Client Configuration

3.1 Switch Language


Steps

Click on > **Settings** in the top right corner  and select **Language** .

Note

The new language will take effect after you restart the client.

3.2 Setting units

Sets units that apply across the entire client, such as distance units, currency, etc. To set the units,  go to > **Settings in the top right**.

unit	explanation
currency	The estimated cost of the gas leak will be calculated and displayed in your configured currency.
Distance units	Sets the distance units to be used for display.
Pressure Units	Set it according to the pressure gauge of the target to be detected.
Leak Rate Units	Unit for gas leakage rate display. Used in analysis.
Spillage Cost per Hour	The unit in which costs are calculated for a period, which is relevant for displaying estimated costs.


3.3 User Help

You can view the client's user manual, version information, and find technical support contact information.

3.3.1 Viewing the User Manual

on the top right  to view the manual.

3.3.2 Version Information

Clicking on the top right corner will show you the client version number, open source license, etc. .

Chapter 4 Image Analysis

This chapter introduces the procedures and operations for analyzing acoustic images. The main steps of the analysis are:

1. Import images for analysis. See [Importing Images](#) .
2. Adjust the influence of the grayscale and acoustic palette of the visual image to more accurately identify and display the location of sound sources. See [Image Adjustments](#) .
3. Check the acoustic information of the image and adjust the detection and calculation parameters for further analysis. See [Acoustic Analysis](#) .

Note

In this client version,

- You can check the partial discharge detection results, but detailed analysis is not currently supported.
- Several detection and cost calculation parameters of gas leak detection can be edited for further analysis.

-
4. View and edit annotations on images. See [Viewing and Editing Annotations](#) .
 5. Save a single edited image or save a batch of images. See [Saving Images](#) .

4.1 Importing images

Acoustic images can be imported into the software for analysis.

Steps

Click **Import** in the top left corner .

2. Select one or more acoustic images to import.

The imported acoustic image is displayed on the left.

4.2 Image Adjustment

Image adjustments include changing the grayscale of the visual image, and the color combination, opacity, and size of the acoustic palette.

4.2.1 Acoustic Palette

The acoustic palette is a colored shape overlaid on the visual image that indicates the location and intensity of detected sound sources. You can adjust the palette color, opacity,

and palette intensity range.

Palette color settings

Select the palette type from the drop-down list in the upper right corner (see [Figure 4-1](#)).

Adjust the opacity of the sound palette

You can adjust the opacity of the acoustic palette to see more of your target. Click the percentage in the top right and drag the slider to adjust the opacity.

Adjusting the sound intensity of the acoustic palette

The acoustic palette is a continuum of colors that represents the range of acoustic intensities to display.

Drag the sliders as needed to adjust the range of sound intensity (see [Figure 4-1](#)). The sound palette resizes accordingly.

4.2.2 Setting the Grayscale of the Visual Image

Enabling grayscale images will change the color visual image to black and white. In black and white visual images, the acoustic palette stands out more than in color images, making it easier to observe.

Toggle **the grayscale image on/off** in the top right .

4.3 Acoustic analysis

View the acoustic analysis results of your image and adjust parameters for specific image types for further analysis.

This client version supports partial discharge (PD) and gas leak (LD) detection result display, as well as detailed analysis and cost calculation of LD incidents.

Partial Discharge Detection (PD)

Displays basic acoustic information about the detected sound source (selected frequency range, sampling distance, etc.).

Displays the active partial discharge type.

Displays **the signal** , **FFT** , and **PRPD diagram** of the sound source .

Gas Leak Detection (LD)

Displays basic acoustic information about the detected sound source (selected frequency range, sampling distance, etc.).

Displays **the signal** and **FFT** of the audio source .

View and edit sampling distance, pressure of the system under test, leak type, gas leak mode, etc. for detailed analysis and cost calculation.

4.3.1 Window movement: partial discharge

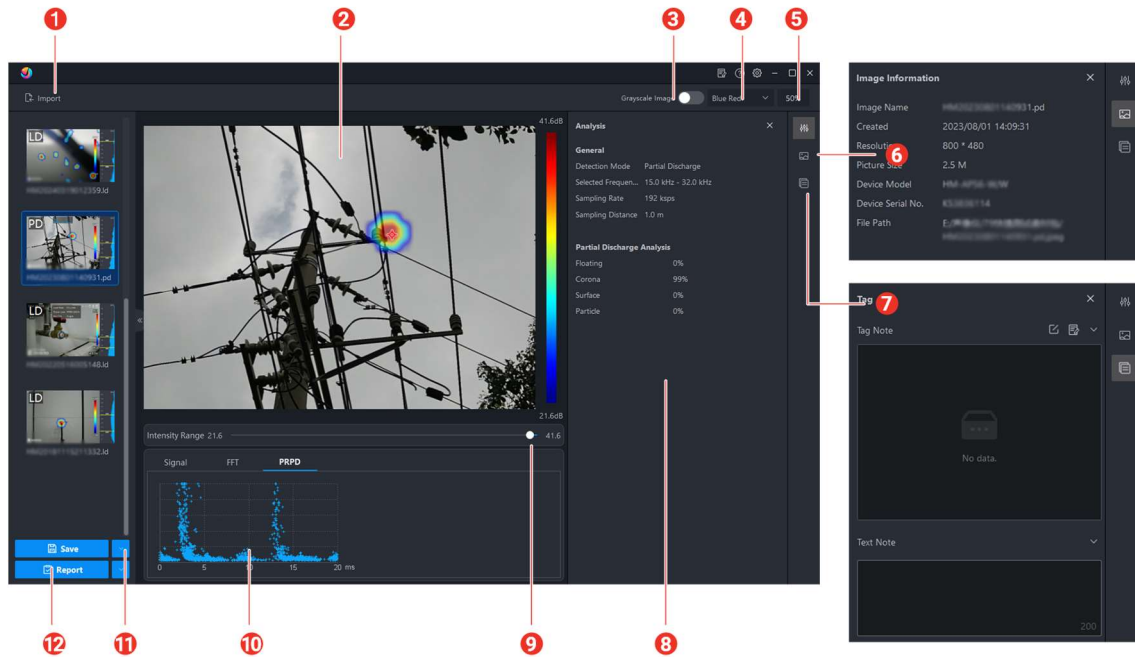


Figure 4-1 Moving a window

1. Import Images: Import acoustic images for analysis. Imported images are listed in the left panel of the window.
2. Active Image Panel: Displays the image currently being analyzed.
3. Grayscale Image: Enable/disable the grayscale image function.
4. Acoustic Palette: Select an acoustic palette color from the drop-down list.
5. The opacity of the sonic palette.
6. Image information: Image name, creation time, etc.
7. Image Annotations: View and edit tag annotations and text annotations.
8. Analysis Results: Displays general acoustic information of the partial discharge analysis.
9. Intensity Range: The intensity range of the displayed acoustic palette.
10. Figures: Signal, FFT and PRPD. Drag the top edge of the figure window to resize it.
11. Save and Bulk Save: Image saving control.
12. Report: Export analysis reports for a single image or multiple images in bulk.

4.3.2 Window movement: gas leak

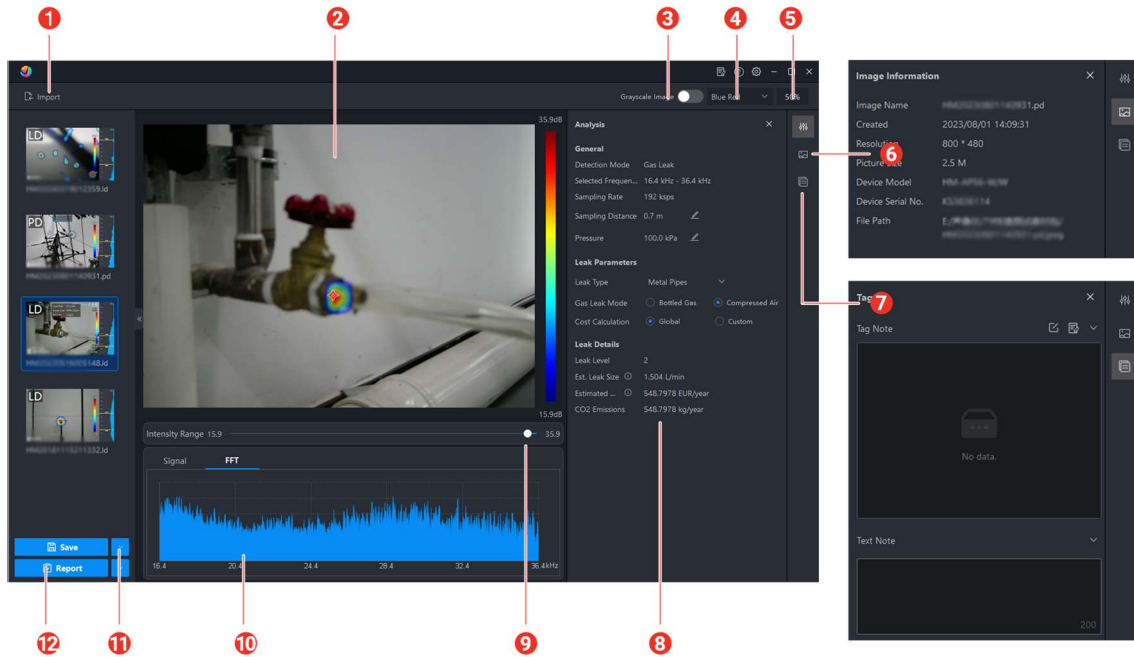


Figure 4-2 Moving a window

1. Import Images: Import acoustic images for analysis. Imported images are listed in the left panel of the window.
2. Active Image Panel: Displays the image currently being analyzed.
3. Grayscale Image: Enable/disable the grayscale image function.
4. Acoustic Palette: Select an acoustic palette color from the drop-down list.
5. The opacity of the sonic palette.
6. Image information: Image name, creation time, etc.
7. Image Annotations: View and edit tag annotations and text annotations.
8. Analysis Results: View general acoustic information for gas leak analysis. Edit detection parameters and perform cost calculations. For instructions, see "[Cylindereed Gas Leak and Cost Calculation](#)" and "[Compressed Air Leak and Cost Calculation](#)."

Note

The leakage amount is an estimate and is affected by various factors, such as detection distance accuracy, noise, detection angle, etc. The estimated value may differ from the actual value. The estimated leakage cost is calculated based on the leakage rate and is for reference purposes only.

9. Intensity Range: The intensity range of the displayed acoustic palette.
10. Diagram: Signal and FFT. Drag the top edge of the diagram window to resize it.
11. Save and Bulk Save: Image saving control.
12. Report: Export analysis reports for a single image or multiple images in bulk.

Cylinder gas leaks and cost calculations

Bottled gas leak rate detection is affected by factors such as sampling distance, system

pressure, and leak type. Adjust the factors to fine-tune the leak rate and leak level. The cost of bottled gas is equal to the gas fee multiplied by the leak rate.


Steps

1. In the **Analysis** panel (to the right of the active image panel), set **Gas Leak Mode to Bottled Gas** .
2. Adjust the gas leak detection parameters and check the changes in the **[Estimated Leak Volume]** value.

Sampling Distance

Since sound intensity decreases as it travels through a medium, setting the detection distance correctly can provide a more accurate leak rate.


the option to the right of  **Sampling Distance** to adjust the distance.

You can change the distance units in  **> Settings > Distance Units** .

pressure

The pressure of the container or tube being inspected. This parameter allows for increased accuracy in detecting low leak rates.


the option to the right of  **Pressure** and adjust the parameters.

You can change the pressure units in  **> Settings > Pressure Units** .


Leak Type

Depending on the location of the suspected leak point, you set the leak type, which invokes different algorithms to improve accuracy.

Note

- The leak rate units  can be changed in **> Settings > Leak Rate Units** .
 - For images captured with acoustic imaging cameras with older firmware versions (prior to V5.5.79), it is not possible to change the sampling distance, pressure, or leak type. To take advantage of new features related to image capture and analysis, upgrade your camera to the latest version.
-

3. Adjust the leakage level.


The **Leak Level** display  in **Leak Details** is a converted number according to the level setting in **> Leak Level** .

The higher the number, the more severe the leak.



4. Adjust the cost calculation parameters and check the amount under **Estimated Cost** .

Cost of leaking cylindered gas = Gas price x Leak rate. Gas price is set in **Cost Calculation** .

There are two modes for cost calculation: **global** and **custom** .

- **Global** : The calculation adopts the settings from  **> Cost Calculation** and the settings work for all images.
- **Custom** : Setting gas fees only works with the current image calculation.

 **Note**

- You can change your currency in  **Settings > Currency** .
 - The period for cost calculation  can be changed in **Settings > Time Unit for Spillover Costs** .
-

Compressed Air Leaks and Cost Calculation


The leakage cost caused by compressed air leaks is the energy waste of the air compressor, which is affected by factors such as the leakage rate, the specific power of the air compressor, and the electricity cost. The detected leakage rate is affected by factors such as the sampling distance, the pressure of the system being inspected, and the type of leak. Adjust the parameters to reanalyze the leakage rate, level, and estimated cost.


Steps

1. In the **Analysis** panel (to the right of the active image panel), set **Gas Leak Mode to Compressed Air** .
2. Adjust the gas leak detection parameters and check the changes in the **[Estimated Leak Volume]** value.

Sampling Distance

Since sound intensity decreases as it travels through a medium, setting the detection distance correctly can provide a more accurate leak rate.


the option to the right of  **Sampling Distance** to adjust the distance.

You can change the distance units in  **Settings > Distance Units** .

pressure

The pressure of the container or tube being inspected. This parameter allows for increased accuracy in detecting low leak rates.


the option to the right of  **Pressure** and adjust the parameters.

You can change the pressure units in  **Settings > Pressure Units** .


Leak Type

Depending on the location of the suspected leak point, you set the leak type, which invokes different algorithms to improve accuracy.

 **Note**

- The leak rate units  can be changed in **Settings > Leak Rate Units** .
 - For images captured with acoustic imaging cameras with older firmware versions (prior to V5.5.79), it is not possible to change the sampling distance, pressure, or leak type. To take advantage of new features related to image capture and analysis, upgrade your camera to the latest version.
-

3. Adjust the leakage level.

The **Leak Level** display  in **Leak Details** is a converted number according to the level


setting in > **Leak Level** .




The higher the number, the more severe the leak.

4. Adjust the cost calculation parameters and check the amount under **Estimated Cost** .

The leakage cost caused by compressed air leakage is the energy waste of the air compressor. It is affected by factors such as the leakage rate, the specific power of the air compressor, and the electricity price. Set the parameters in **[Cost Calculation]** .

There are two modes for cost calculation: **global** and **custom** .

- **Global** : The calculation adopts the settings from  > **Cost Calculation** and the settings work for all images.
- **Custom** : **The Electricity Cost** and **Air Compressor Specific Power** settings apply only to the calculation of the current image.

parameter	explanation
Electricity bill	Electricity tariff of the plant being inspected. Use global or custom settings. You can change your currency in  > Settings > Currency .
Air compressor specific power	The specific power of an air compressor, which indicates the operating efficiency of an air compressor, is the ratio of input power to the flow rate of compressed air at a specific pressure. This will be stated on the air compressor datasheet. Use global or custom settings.
Spillage Cost per Hour	The period for cost calculation, which  can be changed in > Settings > Spillover Cost Time Units .
runtime	The number of hours per day the air compressor operates, which affects the estimated cost display. This  can be changed under > Cost Calculation > Runtime .

5. Optional: You can convert the wasted energy into CO2 emissions. After setting, check the value in **[CO2 Emissions]** .

 > Enter **the CO2 emissions per kWh** in **[Cost Calculation]** .


The CO2 emissions per kWh (carbon emissions from electricity generation) depends on the type of energy source used to generate electricity and is affected by factors such as the efficiency of the generating equipment. This can be obtained by querying the carbon emission factor for your local electricity grid.

4.4 Viewing and Editing Annotations

Images may have user annotations attached that can be read and edited in the client.

4.4.1 Text annotations


Text annotations are information that can be freely entered by the user.

Annotations appear when you select to the right of the active image panel ( see **Figure 4-1**). Enter or edit the text in the **Text Annotation field**.

4.4.2 Tag Annotations

If your report requires a large amount of additional information, you can add and configure tag annotations. Currently, this feature is only supported for images.










Managing tag annotation templates

1. Click in the top right corner of the client to open the Tag Annotation Template Settings window. 

Note

The default template file name is General.json.

2. **New** in the top right corner of the window to create a new template, enter a template name, and click **Confirm** .
The template you created will appear in the template list.
3. Select the template you created and click **Edit on the right**.

icon	function
	Add a new category.
	Set the category type as single select, multiple select, or text.
	Once you have set the category type, add the corresponding category choices or text. For single-select or multiple-select categories, you can move a selection up or down by selecting it and  clicking / 
	select a category, selection, or text  and click to edit the content. You can also double-click a category, selection, or text to edit the content.
	 Click to add a fault rate. You cannot edit the fault rate categories.

4. Once you have configured the template, click **Save** . **The saved template can be used for image analysis.**

 **Note**

You can delete or rename any templates you add, as well as the default templates. Tag annotation templates can be imported and exported as needed.

Managing tag annotation templates locally

The default templates and newly added templates are saved in the specified path (Public\ LEAK ANALYZER \TextRemarkTemplate). You can also add and configure templates using a text editor on your local PC.

Template files that are in JSON format and comply with the relevant protocol are automatically read by the client. The template list is updated when you reopen the Tag Annotation Template Settings window or add/remove/import templates.

Setting tag annotations for images


On the Analyze page, you can select a template that has been added to the current image, or you can configure tag annotations for the image directly. If you have configured tag annotations for an image and you replace it with another existing template, the configured tag annotation information will be overwritten and lost. For more information, see



Configuring Tag Annotations for a Single Image .

On the right side of the Analysis page,  click . For information about how to configure tag annotations, see Managing Tag Annotation Templates .

Configuring tag annotations

Setting tag annotations for a single image

The Annotations panel supports setting tag annotation content and templates for a single image.  Click to save the settings to the image.

-  : Edit the tag annotation content. When you're done editing, click **Save** .
-  : Change the tag annotation template. For more information about managing tag annotations, see Tag Annotations .

4.5 Saving images

There are four types of save operations available in this version. See Figure 4-1 for the operation buttons.

- To save changes to the current active image, select **Save** .
- To save the current active image as a new file, select the dropdown icon next to **Save** and select **Save As** .
- To save multiple edited images, select the dropdown icon next to **Save** , select **Save all** , and check the images.
- To save multiple edited images, select the dropdown icon next to **Save** , select **Bulk Save As** , and then select a save action.

Chapter 5. Exporting Reports

Image analysis results can be exported to a report file for further use.

This client version supports exporting reports for a single image or multiple images. See **Figure 4-1 for the function operation buttons.**

Single Image Report

1. Select an image from the image list on the left and select **Report** .
2. the report parameters, **logo** , **report format** , **file name** , **location** (save path) and confirm export.

Multiple Image Summary Report

1. Select the dropdown icon next to **Reports and** select **Bulk Reports** .
2. **Image Type** , check Report Image, and select **OK** .
3. the report parameters, **logo** , **report format** , **file name** , **location** (save path) and confirm export.

Logo and format report

This version allows you to change the file logo: select **+ Add New next to the Logo parameter and** upload the image of **the logo you want**.

The file formats available are *.pdf and *.otd. Files in *.otd format can be opened and edited in Microsoft Word or similar software.

