HIKMICRO Analyzer Acoustic

User Manual

Legal Information

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The Manual includes instructions for using and managing the Product. Pictures, charts, images and all other information hereinafter are for description and explanation only. The information contained in the Manual is subject to change, without notice, due to firmware updates or other reasons. Please find the latest version of this Manual at the HIKMICRO website (*http://www.hikmicrotech.com*).
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Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
 Danger	Indicates a hazardous situation which, if not avoided, will or could result in death or serious injury.
 Caution	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance degradation, or unexpected results.
 Note	Provides additional information to emphasize or supplement important points of the main text.

Contents

Chapter 1 Introduction

The client is used to view and analyze images captured by the acoustic imaging cameras.

The acoustic imaging camera as a professional sound detecting and imaging product can easily locate gas leak and partial discharge incidents in industrial environments.

The client analyzes the acoustic images for problem and potential risk detecting and locating, which is helpful in reducing trouble shooting cost, and extra cost from device breakdowns.

1.1 Running Environment

The followings are the recommended running environments for installing the client.

- Operating System
  - Microsoft Windows 7 / Windows 8.1 / Windows 10 (64-bit operating system)
  - Windows server (64-bit operating system)
- CPU: i5-4590 or above
- RAM: 4G or above
- Graphics Card: RADEON X700 series 256M or above

Chapter 2 Install, Upgrade and Uninstall Client

2.1 Software Installation

Open the software installation package, and then double-click to run the setup, click **I agree to the terms in License Agreement** in the pop-up window. Select **One-Click Installation** or **Customize** according to your requirement.

One-Click Installation

The software is installed in the path by default: C:\Program Files.

Customize Installation

Click and select the installation path.

After installation, you can check **Create a Desktop Icon** as needed.

2.2 Software Upgrade

Before You Start

An earlier version have been installed.

Before upgrading the software, please make sure you have stopped running the software.

Steps

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

Note

The software will be upgraded to the same path of the earlier version.

What to do next

After upgrade, check **Create a Desktop Icon** as needed.

2.3 Uninstall or Modify Software

Before You Start

Before uninstalling or modifying the software, please make sure you have stopped running the software.

Steps

1. Click **> Control Panel > Procedures and Functions** in the Windows operating system.
2. Right-click **HIKMICRO Analyzer** and then select **Uninstall/Modify**, or simply double-click **HIKMICRO Analyzer**.
3. In the pop-up window, select:
   - **Uninstall**.

- **Modify**.

A prompt will pop up after the uninstallation or modification is completed.

Chapter 3 Client Settings

3.1 Switch Language

Steps

1. On the top right corner, click > **Preference** and select **Language**.

Note

New language takes effect after you restart the client.

3.2 Unit Settings

Set units work for the whole client, for example, distance unit, currency, etc.

On the top right corner, go to > **Preference** for unit settings.

Unit	Description
Currency	The estimated cost of gas leak is calculated and displayed in the set currency.
Distance Unit	Set the preferred distance unit for display.
Pressure Unit	Set according to the target pressure system for detection.
Leak Rate Unit	The unit for gas leak rate display. Used in analysis.
Leak Cost Time Unit	The unit for calculating cost in a time period. It is related to estimated cost display.

3.3 User Help

You can view the client user manual, version information and get the contact of technical support.

3.3.1 View User Manual

On the top-right corner, click to view the manual.

3.3.2 About

On the top right corner, click to view the client version No., open source license, etc.

Chapter 4 Image Analysis

This part introduces the procedure and the operation of analyzing an acoustic image.

The main procedure of analyzing is as follows.

1. Import images for analysis. See ***Import Image*** .
2. Adjust the affect of visual image grayscale and acoustic palette for better locating and displaying a sound source. See ***Adjust Image*** .
3. Check the acoustic information of an image, adjust its detection and calculation parameters for further analysis. See ***Acoustic Analysis*** .

   Note

   With this client version,

   - You can check the detection result of partial discharge detection, but further analysis is currently not supported.
   - You can edit several detection and cost calculation parameters of gas leak detection for further analysis.
4. Check and edit the notes of the images. See ***View and Edit Notes*** .
5. Save one edited image or save images in batch. See ***Save Images*** .

4.1 Import Image

You can import acoustic images to the software to analyze them.

Steps

1. In the top-left corner of the client, click **Import** to open a local folder.
2. Select one or more acoustic images to be imported.
   - Import single image: click the selected image, and choose **Open**.
   - Import multiple images: press and hold **ctrl** key while clicking several images, and choose **Open**.

   Note

   Press and hold **shift** while clicking an image to select images continuously.

Result

The imported acoustic images will be displayed on the left panel.

4.2 Adjust Image

Image adjust includes changing the visual image grayscale, and the color combination, opacity and size of the acoustic palettes.

4.2.1 Acoustic Palette

Acoustic palette is the shaped colors overlaying on visual image indicating the location and strength of detected sound source. Palette color, opacity and intensity range of palettes are adjustable.

Set Palette Color

In the top-right corner, select a palette type in the drop-down list (see *Figure 4-1*).

Adjust Acoustic Palette Opacity

You can adjust acoustic palette opacity to see more details of a target.

In the top-right corner, click the percentage and drag the slider to adjust the opacity.

Adjust Sound Intensity of Acoustic Palette

The acoustic palette is a color-continuum representing the sound intensity range for display.

Drag the slider to adjust the sound intensity range as needed (see *Figure 4-1*). The size of the acoustic palette changes with adjustment.

4.2.2 Set Grayscale of Visual Image

The colored visual image turns to black and white if grayscale image is enabled.

The black and white visual image makes colored acoustic palettes more prominent for observation.

Switch on/off **Grayscale Image** in the top-right corner.

4.3 Acoustic Analysis

View the acoustic analysis result of the images and adjust parameters of certain image type for further analysis.

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

Partial Discharge Detection (PD)

View basic acoustic information of detected sound source, for example, selected frequency range, sampling distance, etc.

View the possibility of partial discharge types.

View the **Signal**, **FFT**, and **PRPD** diagram of the sound source.

Gas Leak Detection (LD)

View basic acoustic information of detected sound source, for example, selected frequency range, sampling distance, etc.

View the **Signal** and **FFT** of the sound source.

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

4.3.1 Window Navigation: Partial Discharge

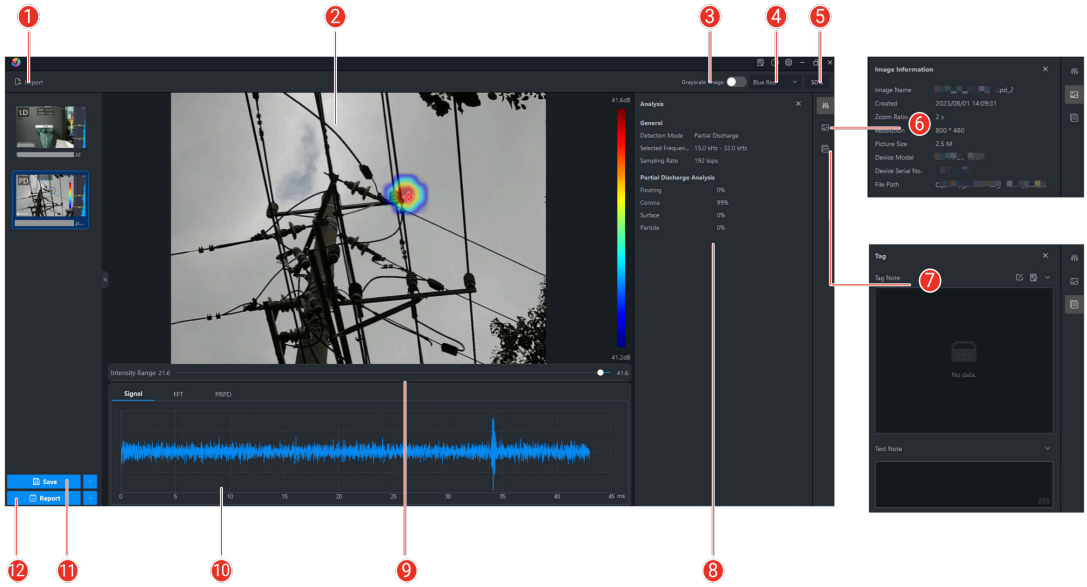

Figure 4-1 Window Navigation

1. Import Images: Import acoustic images for analysis. Imported images are listed in the left panel of the window.
2. Active Image Panel: Display the image in analyzing.
3. Grayscale Image: Enable/disable the grayscale image function.
4. Acoustic Palette: Select acoustic palette color from the drop-down list.
5. Acoustic Palette Opacity.
6. Image Information: Image name, created time, etc.
7. Image Note: Display and edit tag note and text note.
8. Analysis Result: Display general acoustic information of partial discharge analysis.
9. Intensity Range: Intensity range of displayed acoustic palette.
10. Diagrams: Signal, FFT and PRPD. Drag the top edge of the diagram window to adjust its size.

11. Save and Batch Save: Image save controls.
12. Reports: Export analysis report for one image or images in batch.

4.3.2 Window Navigation: Gas Leak

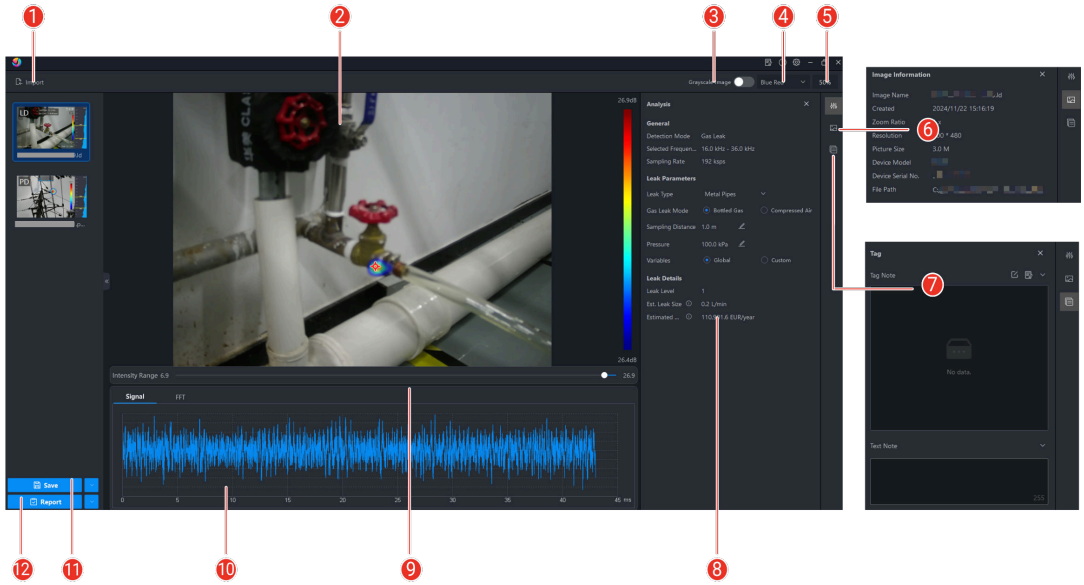

Figure 4-2 Window Navigation

1. Import Images: Import acoustic images for analysis. Imported images are listed in the left panel of the window.
2. Active Image Panel: Display the image in analyzing.
3. Grayscale Image: Enable/disable the grayscale image function.
4. Acoustic Palette: Select acoustic palette color from the drop-down list.
5. Acoustic Palette Opacity.
6. Image Information: Image name, created time, etc.
7. Image Note: Display and edit tag note and text note.
8. Analysis Result: Display general acoustic information of gas leak analysis. Editing detection parameters and conduct cost calculation. See ***Bottled Gas Leak and Cost Calculation*** and ***Compressed Air Leak and Cost Calculation*** for instructions.

Note

The leak size is an estimated value affected by many factors, such as the accuracy of the detection distance, the noise, and the angle of detection. The estimated value may be deviated from the actual one. The estimated leak cost is calculated based on the leak rate and is for reference only.

9. Intensity Range: Intensity range of displayed acoustic palette.
10. Diagrams: Signal and FFT. Drag the top edge of the diagram window to adjust its size.

11. Save and Batch Save: Image save controls.
12. Reports: Export analysis report for one image or images in batch.

Bottled Gas Leak and Cost Calculation

Leak rate detection of bottled gas 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.

Before You Start

Note

Cost of bottled gas = gas price * leak rate

Steps

1. In the **Analysis** panel (on the right of the active image panel), set **Gas Leak Mode** as **Bottled Gas**.
2. Adjust gas leak detection parameters to increase the detection accuracy.

Parameters	Description	Settings Path
Sampling Distance	Sound intensity decreases with distance increases when traveling in a media.	Click on the right of **Sampling Distance**, and adjust the distance.
Pressure	The pressure of inspected container or tube.	Click on the right of **Pressure**, and adjust the parameter.
Leak Type	Set leak type according to the suspected location of a leaking point.	Click drop-down menu on the right of **Leak Type**, and choose a type.

Note

- Distance unit, pressure unit and leak rate unit and can be changed at > **Preference** .
- For the images captured by acoustic imaging cameras of early firmware version (versions before V5.5.79), **Sampling Distance**, **Pressure** or **Leak Type** are not allowed to change. Upgrade your camera to the latest version for new features on image capture and analysis.

Check the number change in **Leak Rate**.

3. Adjust leak level. Larger numbers indicate more severe leaking.

   The **Leak Level** displayed in **Leak Details** is a transformed number according to the level settings at > **Leak Level** .

   Check the number change in **Leak Level**.
4. Adjust time period for cost calculation via > **Preference** > **Leak Cost Time Unit** .
5. Adjust *Price of Gas* to get leakage cost.

1) Set a unit for *Price of Gas*. It depends on **Currency** and **Leak Rate Unit**. Go to > **Preference** to adjust it.

   Example

   When you set **Currency** as **EUR-Euro** and **Leak Rate Unit** as **L/min**, the unit of *Price of Gas* is **EUR/L**.
2) Select a mode in **Variables** pane.
   - Global: Set gas price that works for the calculation of all images.
   - Custom: Set gas price that only works for the calculation of current image.
3) Adjust the value of *Price of Gas*.
   - Global: Input the value in the box via > **Bottle Gas Parameters** , then click **Save**.
   - Custom: Input the value in the box under the custom mode.

Check the amount at **Estimated Cost**.

Compressed Air Leak and Cost Calculation

The leak cost caused by compressed air leaking is the energy waste of air compressor. It is affected by the factors such as, leak rate, air compressor specific power, and price of electricity. Detected leak rate is influenced by factors such as sampling distance, pressure of the inspected system, and leak type. Adjust the parameters to re-analyze the leak rate, level and estimated cost.

Steps

1. In the **Analysis** panel (on the right of the active image panel), set **Gas Leak Mode** as **Compressed Air**.
2. Set units for the parameters of compressed air leak.
   1) Go to > **Preference** to adjust the unit.
   2) Click **Save** to confirm the settings.
   3) Click to close the setting window.
3. Adjust gas leak detection parameters to increase the detection accuracy.

Parameters	Description	Settings Path
Sampling Distance	Sound intensity decreases with distance increases when traveling in a media.	Click on the right of **Sampling Distance**, and adjust the distance.
Pressure	The pressure of inspected container or tube.	Click on the right of **Pressure**, and adjust the parameter.
Leak Type	Set leak type according to the suspected location of a leaking point.	Click drop-down menu on the right of **Leak Type**, and choose a type.

Note

- Distance unit, pressure unit and leak rate unit and can be changed at > **Preference** .
- For the images captured by acoustic imaging cameras of early firmware version (versions before V5.5.79), **Sampling Distance**, **Pressure** or **Leak Type** are not allowed to change. Upgrade your camera to the latest version for new features on image capture and analysis.

Check the number change in **Leak Rate**.

4. Adjust leak level. Larger numbers indicate more severe leaking.

   The **Leak Level** displayed in **Leak Details** is a transformed number according to the level settings at > **Leak Level** .

   Check the number change in **Leak Level**.

5. Select a formula according to the required air compressor parameters already known or easily accessed. Go to > **Compressed Air Parameters** > **Calculation Formula** .

Table 4-1 Recommended Formula for Compressed Air Leak

Already Known/Available Parameters	Recommended Formula
Air Compressor Specific Power (Y)	Formula1 Leak Cost= T*X*Y*A CO2 Emission= T*X*Y*B
• Air Compressor Out Flow Rate (Q) • Air Compressor Power Consumption (P)	Formula2 Leak Cost= T*X*P*A/Q CO2 Emission= T*X*P*B/Q
• Air Compressor Output Pressure (p) • Air Compressor Motor Efficiency (η)	Formula3 Leak Cost= T*(p*X*A)/(η*60) CO2 Emission=T*(p*X*B)/(η*60)

Table 4-2 Parameters Description in Cost Calculation Formula

Formula	Parameter	Description
All formulas	T	Working hours of the air compressor per day/ month/year. Its unit depends on **Leak Cost Time Unit**.
	X	Leak rate of the target. It is an automatic measured value. The unit depends on **Leak Rate Unit**.
	A	The price of 1 kWh electricity. Its unit depends on **Currency**.

Formula	Parameter	Description
	B	CO2 emissions per kWh (carbon emissions from electricity). It can be obtained by querying the carbon emission factor of the local power grid.
Formula1 Leak Cost= T*X*Y*A CO2 Emission= T*X*Y*B	Y	Air compressor specific power, indicating the working efficiency of an air compressor, is the ratio of input power to compressed air flow rate at a given pressure. It can be found in the data sheet of the air compressor.
Formula2 Leak Cost= T*X*P*A/Q CO2 Emission= T*X*P*B/Q	P	Air compressor power consumption (Unit: kW).
	Q	Air compressor out flow rate, indicating gas quantity output by air compressor.
Formula3 Leak Cost= T*(p*X*A)/(η*60) CO2 Emission=T*(p*X*B)/(η*60)	p	Air compressor output pressure, indicating generated pressure of the compressed air ventilated through air compressor.
	η	Air compressor motor efficiency.

Note

- The units of **Air Compressor Specific Power (Y)** and **Air Compressor Out Flow Rate (Q)** depend on **Leak Rate Unit**.
- The unit of **Air Compressor Output Pressure (p)** is consistent with **Pressure**.

6. Adjust the value of cost calculation parameters in the box on the right.

Note

If **Formula1** is selected, users can customize the value of **Price of Electricity** and **Air Compressor Specific Power**, only working for the current image.

7. Click **Save** to confirm the settings.
8. Click to close the setting window.

   Check the amount at **Estimated Cost**.

4.4 View and Edit Notes

There are may be user notes attached with images that can be read and edited in the client.

4.4.1 Text Note

Text note is the information user can input freely.

Select on the right of the active image panel to show the notes (see *Figure 4-1*). Input or edit texts in the **Text Note** field.

4.4.2 Tag Note

When the report requires a large amount of extra information, you can add and configure the tag note. This feature is currently supported by images only.

Tag Note Template Management

1. On the top right corner of the client, click to open the Tag Note Template Settings window.

   Note

   There will be a default template file named General.json.
2. On the top right corner of the window, click **New** to create a new template. Enter the template name and click **Confirm**.
   The created template will be displayed in the template list.
3. Select the created template and click **Edit** on the right.

Icon	Function
	Add new Category.
/ /	Set the category type as single-choice, multi-choice or txt.
	After setting the category type, add choices or text for the corresponding category. For single-choice or multi-choice category, you can select a choice and click / to move the choice up/down.
	Select a category, choice, or text, and click to edit the content; or double-click the category, choice, or text to edit the content.
	Click to add fault rating. The category of fault rating cannot be edited.

4. After the template is configured, click **Save**. The saved template can be used for image analysis.

   Note

   For added and default templates, you can delete them or rename them.

Tag note templates can be imported or exported as needed.

Local Management of Tag Note Template

The default template and newly-added template will be saved to the path (Public \HIKMICRO Analyzer\TextRemarkTemplate). You can also add and configure templates via any text editor on the local PC.
Template files which are in JSON format and comply with relevant protocols will be automatically read by the client, and the template list will be refreshed after you re-open the Tag Note Template Settings window, or add/delete/import any template(s).

Image Tag Note Configuration

On the Analysis page, you can select an added template for the current image, or directly configure a tag note for the image specifically. With the specifically configured tag note for the image, if you want to replace it with another existing template, the configured tag note information will be overwritten and lost. See details in ***Set Tag Note for a Single Image*** .
On the right side of the Analysis page, click . For how to configure tag note, refer to ***Tag Note Template Management*** .

Set Tag Note

Set Tag Note for a Single Image

In Annotations panel, supports setting the tag note content and template of a single image. Click to save settings to the image.

- : Edit tag note content. After editing, click **Save**.
- : Change the tag note template. For details about tag note management, refer to ***Tag Note*** .

4.5 Save Images

This version offers 4 kinds of saving operations. See ***Figure 4-1*** for the operation buttons.

- To save the changes of the current active image, select **Save**.
- To save the current active image as a new file, select the drop-down icon next to **Save** and select **Save As**.
- To save multiple edited images, select the drop-down icon next to **Save**, select **Batch Save**, and tick the images.
- To save multiple edited images as new files, select the drop-down icon next to **Save**, select **Batch Save As**, tick the images, and select saving.

Chapter 5 Export Report

Analysis result of images can be exported in a report file for other usages.

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

Report of One Image

1. Select an image from the image list on the left, and select **Report**.
2. Set report parameters, **LOGO**, **Report Format**, **File Name**, and **Location** (saving path), and confirm exporting.

Summary Report of Multiple Images

1. Select the drop-down icon next to **Report**, and select **Batch Report**.
2. Select **Picture Type**, tick images for the report, and select **OK**.
3. Set report parameters, **LOGO**, **Report Format**, **File Name**, and **Location** (saving path), and confirm exporting.

Report LOGO and Format

File logo changing is available in this version. Select **+ Add New** next to the **LOGO** parameter and upload a desired logo image.
For file format, *.pdf and *.otd are supported. A *.otd format file can open and edit with Microsoft Word or similar software.

HIKMICRO

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