

Reporting Tool

for ii900/ii910

Users Manual

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Introduction

The Fluke ii900-Series Acoustic Imager finds potential problems with a fast, visual scan of the area-of-interest that you can capture as a picture. From these pictures, the Fluke ii900/ii910 Reporting Tool generates reports about leaks, partial discharges, and mechanical deterioration. These reports help you to prioritize any findings for maintenance.

The Imager includes advanced classification and quantification methods: LeakQ™ Mode, PDQ Mode™, and MecQ™ Mode (Q modes). These methods are not required in many situations and a picture or video to locate and communicate the potential issue is adequate. When more information is required, the Q modes are available to add more details to your reports such as leak scaling, cost estimation, or CO₂ emissions.

Software and firmware are available on the Fluke website:

- Online Reporting Tool: www.fluke.com/acousticreporting.
- Firmware for ii900/ii910 Acoustic Imager: www.fluke.com/ii900firmware
- Fluke Connect Desktop software: www.fluke.com/fcsetup

Fluke Connect Desktop vs. Fluke Online Reporting

The Reporting Tool has two options:



- Fluke Connect Desktop
- Fluke Online Reporting

Fluke Connect Desktop is a local PC-installed software application that provides a report template that you can customize for the customer and site. These reports use the information included with pictures at the time of capture.

Fluke Online Reporting is a Web-based solution that uses standardized report templates. These reports use the information included with each picture at the time of capture and can be annotated with additional information such as leak scaling and CO₂ levels.

Table 1 is a list of the features available depending on the platform.

Table 1. Reporting Tool Features

Feature		
LeakQ™	●	●
PDQ Mode™	●	●
MecQ™	●	
Default report template	●	●
Customizable report template		●
Estimated CO ₂ emission	●	
Leak size scaling	●	
File (.csv) export	●	
Online	●	●
Offline use		●

Before You Start

Before you take captures to use in the Reporting Tool, check that the capture mode and settings are correct. Also check that the ii900/ii910 Acoustic Imager firmware is up-to-date.

On the Imager, check your current firmware version:

1. Open the **Menu**.
2. Go to **Settings > Imager Info**.
3. Tap on **OS**.
4. If the version is not the same as what is available from the website, upgrade the Imager offline. See *ii900/ii910 Acoustic Imager Users Manual*.

Note

Windows 10 OS, or higher, is required for ii900/ii910 firmware upgrades.

Depending on the Reporting Tool you choose, use the instructions that follow to access the specific tool.

Fluke Connect Desktop

To install:

1. Go to <https://www.fluke.com/en-us/products/fluke-software/connect>.
2. Download the .msi file for Windows Desktop.
3. Follow the instructions in the Software Install window.

Fluke Online Reporting

Fluke Online Reporting is a cloud-based application that is available on a Web browser.

To generate a report:

1. Move the AS2 files from your Imager to a file folder on your computer.
2. Open the report generator (see [Introduction](#) for website location) and accept the terms and conditions.
3. Drag and drop the AS2 files from your computer to the gray upload box.

All these files will be loaded into the online report generator.

To develop a detailed report, input certain variables such as gas type, pressure in PSI, and the cost of gas per CFM, among others.




4. Once all your variables have been updated, select: Generate Report.

The report is a PDF document with all the input variables, comments, and a summary with all the issues, as well as their individual and annual estimated costs. Each image is also included in the report, along with details.

ii900/ii910 Capture Mode

The ii900/ii910 Acoustic Imager has several capture modes: Image, Video, LeakQ, PDQ, and MecQ. To create analysis reports in the Reporting Tool, the capture mode must be set to the LeakQ, PDQ, or MecQ mode when you save data files. Before you capture the data files, make sure that the capture mode is set correctly on the Imager for the report type you plan to generate.

To select the capture analysis mode:

1. Open the Tool menu on the Imager.
2. Tap the Image icon to open the Capture Mode menu:
 - a. Tap  for the LeakQ mode (ii900 and ii910) for leak quantification.
 - b. Tap  for the PDQ Mode (ii910) for partial discharge.
 - c. Tap  for the MecQ mode (ii910) for mechanical deterioration.

Localization/Operating Conditions

The variables that you set on the ii900/ii910 will affect what is viewable on the Imager and generated in a report. Set these variables before you take any captures.

To set variables:

1. Tap on screen to show the Menu.
2. Select **Settings** menu.
3. Select **Localization**.
4. Set unit system to **Metric** or **Imperial**.
This sets the default in the system for Operating Conditions.
5. Select the **Operating Conditions** menu.

LeakQ Operating Conditions:

- a. Set the default values for any leak captures.
- b. Scroll down to **Show Leak value in**.
- c. Set the items to display on device.

Note

You can toggle on/off the Scale, Rate, and Cost.

For more information, go to Online Reporting Tool: www.fluke.com/acousticreporting.

PDQ Mode Operating Conditions:

- d. Choose operating frequency.

Note

The PRPD plot shows on the display only when 50 Hz or 60 Hz is selected.

For more information, go to Online Reporting Tool: www.fluke.com/acousticreporting.

Acoustic Menu

The Acoustic menu is a set of variables that toggle on/off:

- dB scale
- auto scaling
- profiles
- high frequency mode (2-100 kHz)*
- multiple source mode

Depending on the Capture mode, these items also show in the Acoustic menu:

- In PDQ Mode*, PDCount
- In MecQ Mode*, MecQ Mode 1, Mode 2, Mode 3

* Fluke ii910 only.

Tags

After a capture, variables can be set for each capture in the Memory/Tags menu. This menu has fields appropriate to General, Leaks, Electrical, and Mechanical reports.

To view and update Tags, Capture Notes, and Photo Notes, select and open the capture from the menu window.

For more information about how to add Tags to the data, see the ii900/ii910 Users Manual.

Reports with Fluke Connect Desktop

Fluke Connect Desktop is an application installed on a local PC desktop.

Import Captures

To import captures:

1. Start the Fluke Connect Desktop application on your PC.
2. Turn off the ii900/ii910 Acoustic Imager.
3. Connect the Imager to the PC with a USB/USB-C cable.
4. Turn on the Imager.
5. Open Fluke Connect Desktop on the PC.
The Fluke ii900 Series shows in the **TOOLS** tab.
6. Select **DOWNLOAD**.
7. Select **DOWNLOAD ALL** or **SELECT FILES** to transfer all or a selection of captures to Fluke Connect Desktop.
8. Select the destination folder and select **OK**.
9. Confirm deletion of downloaded files from the Imager or select **CANCEL** to proceed and keep the files in the Imager.

Downloaded images are now available in the **MEASUREMENT** tab.

Generate a Report

To create a report:

1. Go to the **REPORTS** tab.
2. Select **CREATE REPORT**.
3. At the prompt, select **BASIC ACOUSTIC** and select **CONTINUE**.
4. Select the applicable images and select **ADD MEASUREMENTS**.

The report offers multiple options:

- Editing Fields: change logo, author, date, as well as other fields
 - Operating conditions
 - Field list: select variables
5. Select **SAVE**, **EXPORT**, or **PRINT**.

Reports with Online Tool

The Online Reporting Tool is a web-based solution for report creation.

Transfer Files to PC

To transfer files from the Imager to a PC:

1. Connect the Imager to a PC with a USB/USB-C cable.
2. Turn on the Imager.
3. Find your Imager (**FLK-ii900 Series**) in Windows File Explorer.
4. Go to **User Data > Storage**.
5. If applicable, select the default or custom created folder.
6. Copy the required .as2 files to a (temporary) folder on your PC.
7. Go to Fluke Online Reporting Tool: www.fluke.com/acousticreporting

Supported Browsers are Google Chrome™, Mozilla® Firefox®, and Microsoft® Edge Chromium

8. Review and **Accept** the Terms of Service.
9. To upload your selection of measurements:
 - a. Click **Drag and drop AS2 files here or click**.
A new Windows File Explorer opens.
 - b. Select the measurement files (.as2) and click **Open**.
The selected measurements upload to the online tool.

Reports

After you upload the measurements to the online tool, a Report Preview shows.

To add more files or update the report:

1. Enter (optional):
 - Survey Name
 - Company Name
 - Survey Comments
2. Enter the variables in the **Operating Conditions** menu.
3. Select the unit system between Imperial or Metric.
4. Enter the **Currency**. Input either a symbol (\$) or a code (USD), this selection does not affect the results.
5. For a gas cost report, select the **Gas Type** and input the **Cost** of the gas.

For this report type, set the electricity cost to zero. For a compressed-air electricity cost estimate, input the cost of electricity and set the gas cost as zero. The report considers only one type and cost of gas for each report.

6. Enter the variables:
 - Pressure of the system. This value is for documentation purposes only and not used in the leak rate calculation.
 - Cost of electricity for the kW/hour.
 - System Specific Power ratio (kW for each CFM or kW for each 100 l/min). The Specific Power at certain pressure is a value typically indicated on compressor data sheets.
 - Number of hours the system operates in a year (for example, 8760 hours for plants that operate 24 hours, 7 days/week).
 - Leak size estimation. Choose Low, Medium, or High.

After the report-wide conditions are entered, you have the option to review each individual capture and update capture-specific settings and annotations.

If these capture-specific settings are set through the camera, this information is included in the .as2 file and shows in the Report Preview. In the Report Preview, you can scroll down each capture page and adjust the settings for each capture. For LeakQ captures, the **Adjust Operating Conditions** button enables selection of .as2 file conditions and you can enter report conditions or manual conditions.

In the preview, you can scroll back to the report operating conditions section to use one of two buttons:

Apply Report Operating Conditions

or

Apply imager settings to all available measurements

These allow the user to revert back to .as2 file settings for all measurements or apply report operating conditions globally across the entire report regardless of what was changed at the individual capture pages.

A status for the applied operating conditions shows below each capture photo (from report, from Imager, or manual).

7. Click **GENERATE REPORT**. A pop-up window prompts for a print location.
8. Select a destination:
 - a. **PRINT** to a specific printer location.
 - b. **SAVE** as PDF file to a file folder location.
9. Click **Export (.CSV)** to generate a .csv file of the report data.

The new .csv file is exported to the Downloads folder on your desktop.

LeakQ Mode CO₂ Emission (Online Tool only)

Based on (by ii900-series) estimated leak size and (by end-user) provided operating variables, the Report Tool calculates the estimated electricity consumption in relation to the identified leak. Based on the selected country/region/grid, or manually provided CO₂ emission value, the Report Tool calculates the CO₂ emission estimates.

To calculate:

1. Capture leak.
2. Upload capture to LeakQ reporting site.
3. Enter operating variables (by end-user):
 - Back-end does classification and quantification of leak size and costs (based on step 3 input).
 - Reverse calculation of estimated leak costs to kwh (leak costs/electricity price kwh = kwh)
 - Lookup table: CO₂ (kg/kwh) by country/kwh
 - $kwh \times co2/kg-kwh = co2 \text{ kg of leak}$

More About Reports

This section has additional information about the reports.

LeakQ

LeakQ Reports are estimates of air flow based on the sound it produces. The flow depends on the system pressure and the actual pressure at the point of the leak that depends on back pressure. This flow and pressure at the leak will vary due to several factors, such as the load of other tools or subsystems on the same line. The efficiency in converting electrical kW to compressed air CFM of a system is a variable in time that depends on the overall load and operating point that the compressors are working. All those elements add variance or uncertainty to the estimated cost of a leak.

Typical tools only measure dB on a narrow frequency band. LeakQ does an automatic scan of the full frequency spectrum and captures the actual frequency range that the leak is generating. This makes the estimations more representative of the real leak rate than traditional tools.

The input for specific power is generally 30 kW/100CFM. The specific power is the power needed to generate a certain volume of compressed air and is a measure of system efficiency.

LeakQ mode automatically determines the distance to the target (a leak that shows inside the circle on the display). The distance measurement is up to 5 m (16 ft) depending on the environmental conditions. When a leak is detected and the Imager can determine the distance, the LeakQ value on the display gives an indication of the size of the leak. The value is based on the measured dB SPL value and the distance.

LeakQ estimates are based on the average sound generated by average leaks. Fluke has measured a large number of leaks types, at different flow rates, and at different pressures, and uses a regression model to estimate a flow rate out of a dB. No direct mathematical model to obtain flow from the sound signature of a leak exists.

PDQ Mode

PDQ Mode (ii910) captures data from a Partial Discharge (PD) that enables further analysis such as type of discharge and pulse count. The PD must be inside the circle on the display. When a PD is detected, the PD Count value on the display gives an indication of the pulses generated by that partial discharge.

MecQ

MecQ (ii910) provides a method to filter and trend dB level data at both preset and custom frequency bands. While in any of the three sub-modes, locate the largest sound inside the circle on the display. When a sound source is detected and the Imager can determine the distance, the distance shows on the display and is used in the capture. If distance is not automatically detected, enter it manually.

Tips

Table 2 is a list of common problems and solutions.

Table 2. Troubleshooting Guide

Problem	Solution
ii900/ii910 firmware update failed.	<ul style="list-style-type: none"> Make sure the new firmware file is located in the top (root) level of ii900 folder. Make sure the file extension (.swu) is correct. Make sure the original filename is used, for example, (1) cannot be included as part of the filename.
Report shows zero for LeakQ.	Set the mode to LeakQ (rather than image or video mode).
Values seem too high for air.	You may be double-counting energy cost of air and cost of air lost. Cost of gas lost should be used for gases which have a finite cost, such as, oxygen, nitrogen, and hydrogen.
Values are lower than what shows on an ultrasonic single-point tool.	Both are estimates. Fluke estimates are often more conservative.
Capture in PDQ Mode is saved as only an image.	The partial discharge is too weak to capture additional information about the partial discharge.

LeakQ™ Variables

Table 3 is a list of additional information about LeakQ variables.

Table 3. LeakQ Variables

Variable	Explanation	Comment
System pressure	LeakQ estimation is based on acoustic measurement of the actual leak flow. Estimated flow rate is not dependent on system pressure.	Input of pressure here is for documentation purposes only.
Leak type	Based on the acoustic characteristics of the identified leak, LeakQ will automatically classify the leak type at the time of capture. The Leak type is saved in the .as2 file.	The leak type affects the leak rate estimate. You can change the type with the Online Report Tool.
Specific ratio of power to flow rate	<p>Specific Power is the ratio of total energy used by the compressor and its compressed air output (at a stated pressure).</p> <p>The lower the Specific Power of your compressor, the greater the efficiency, and the higher the energy and money savings.</p>	<p>Typically indicated on compressor data sheets.</p> <p>Default is:</p> <ul style="list-style-type: none"> Imperial=kwh for each CFM = 30 Metric=kwh for each 100l/min=1.05

Table 3. LeakQ Variables (cont.)

Variable	Explanation	Comment
Costs of electricity	Variable to estimate the costs of electricity based on estimated leak flow rate and compressor specific ratio of power to flow rate.	Make sure cost of gas is set to zero for energy cost calculations.
Costs of gas	Variable to estimate the gas leak costs based on leak rate (volume). Use to estimate the cost of gas lost due to leak.	Make sure cost of electricity is set to zero for calculations of gas cost.
Operating hours/year	Variable to calculate electricity consumption and CO ₂ emission on yearly basis.	Default is 8760 hours.
Leak size estimation setting	Low, Medium, High adjusts the flow rate estimate.	Medium is the recommended default.
Selected Operating Conditions	The ii900-Series reporting platform provides different Operating Condition sources for individual captures: <ul style="list-style-type: none"> • From Imager • From Online Reporting Tool • Manual 	

