

Leak Detector

Application guide

INTRO

Intro – brief introduction

Welcome to the Kamstrup Water Intelligence platform!

Dear customer

Thank you for choosing us as your preferred Analytics platform. Before you deep dive into data and analysis, we would like to give you a short introduction to the software to give you the best possible start.

What is Water Intelligence?

At Kamstrup, we believe that smart meter data can be used for so much more than just accurate billing. Therefore, we have created our Water Intelligence platform that does exactly that: *turns raw data into value and overview.*

In the following pages, you will become familiar with our solutions and learn how to use them within your own water utility. If you have any questions along the way, please do not hesitate to contact us!

We wish you a great journey through the many possibilities of using smart meter data!



Intro – get access to the application

Log in to the platform

At Kamstrup, we believe in simplicity. Therefore, you only need one login for all our solutions. To access your solutions, please go to <https://apps.kamstrup.com/>, click log in and enter your email and password, the same as you are using for READY, My Kamstrup and Encryption Key Service.

When you are logged in, you can simply choose the application in the dashboard (see picture below). If you cannot access the application, this might be due to insufficient user rights. To solve this, please ask your My Kamstrup superuser to grant you access to “Analytics”. You can find your My Kamstrup superuser by going to “My Profile” under <https://service.kamstrup.com/my-profile>.

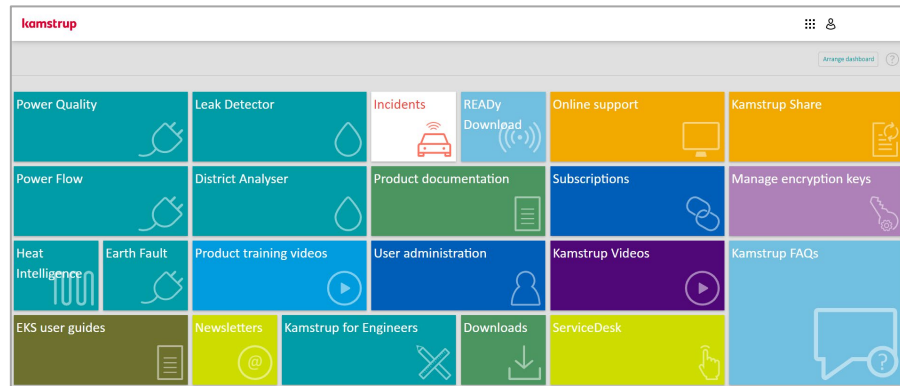


Table of content

01

Understanding your dashboard

What you will learn

- Understanding "Meters of interest"
- Measuring your estimated water loss
- Editing the noise and cost level
- Navigating in Leak Detector

02

Using your map view

What you will learn

- Filtering meters on the map
- Finding relevant meters on the map
- Understanding the data graph
- Tracking a meter
- Ignoring a meter

03

Using your list view

What you will learn

- Filtering meters on the list
- Sorting meters on the list
- Finding relevant meters on the list

04

Creating events for your meters

What you will learn

- Understanding the value of events
- Creating events
- Filling out event information
- Solving events

05

Extracting valuable reports

What you will learn

- Extract weekly noise reports
- Extract monthly noise reports
- Extract monthly reports based on events and Meters of Interest

06

Examples of meter discoveries

What you will learn

- Spotting possible leakages in the network
- Comparing meters to find the relevant cases

Lesson 01

Understanding your dashboard



Lesson 01 – Understanding your Dashboard

The dashboard in Leak Detector gives you a quick overview of your distribution network, which can help you prioritize your leak detection resources in the most efficient way possible.

The screenshot shows the Kamstrup Leak Detector dashboard. At the top left is the Kamstrup logo. In the top right, it says "Leak Detector" and has a user profile icon. Below the header is a "Dashboard" section with a hamburger menu icon. A navigation sidebar on the left contains icons for home, location, and documents. The main content area is divided into two sections:

- Section 1 – Since last login day** (May 26, 2022): This section contains four teal-colored boxes:
 - METERS OF INTEREST:** 0 NO NEW METERS (with a bell icon)
 - METERS IN WARNING LEVEL:** 57 (with a speaker icon and "41 NEW" below)
 - LEAKS AFTER METER:** 46 (with a water tap icon)
 - BURSTS AFTER METER:** 39 (with a water tap icon)
- Section 2 – This year to date:** This section contains three grey-colored boxes:
 - IDENTIFIED LEAKS:** 13 (with a magnifying glass icon)
 - ESTIMATED WATER LOSS:** 332 m³
 - HISTORICAL EVENTS:** 20 (with a clock icon)

Below the historical events box, there is a box for **664 USD** (with a water drop icon) and the text "BASED ON 9 CLOSED LEAK EVENTS".



Lesson 01 – Understanding your Dashboard

The first part of your dashboard breaks down the health of your distribution network into four categories, based on either a meter's registered noise level, or its info codes.

The screenshot shows the Kamstrup Leak Detector dashboard. At the top, the 'kamstrup' logo is on the left, 'Leak Detector' is in the center, and a user profile icon is on the right. Below the header, there is a 'Dashboard' section with a hamburger menu icon. A status bar indicates 'Since last login day. May 26, 2022'. The main content area is divided into four teal-colored cards: 'METERS OF INTEREST' (0, NO NEW METERS, bell icon), 'METERS IN WARNING LEVEL' (57, 41 NEW, speaker icon, gear icon), 'LEAKS AFTER METER' (46, faucet icon), and 'BURSTS AFTER METER' (39, leaf icon). Below these is a 'Year to date' section with four grey cards: 'IDENTIFIED LEAKS' (13, magnifying glass icon), 'ESTIMATED WATER LOSS' (332 m³), 'HISTORICAL EVENTS' (20, clock icon), and '664 USD' (water drop icon). A dark grey text box on the right contains three explanatory paragraphs. Arrows point from the text box to the gear icon in the 'METERS IN WARNING LEVEL' card and the gear icon in the bottom-left sidebar.

Meters of interest: Shows the most interesting meters based on a noise pattern algorithm developed by Kamstrup.

Meters in warning level: Shows the meters with a noise level above a certain threshold, which is configured in the "Settings" menu, accessed via either of the shown wrench icons.

LEAKs & BURSTs after meter: Shows the number of meters with active "LEAK" or "BURST" alarms (info codes).



Lesson 01 – Understanding your Dashboard

In the Settings menu, you can alter the “Meters in warning level” threshold value.



Lesson 01 – Understanding your Dashboard

The second part of your dashboard breaks down the health of your distribution network into three categories tracking your registered events and your estimated water loss.

kamstrup Leak Detector

Dashboard

Since last login day: May 26, 2022

METERS OF INTEREST 0 NO NEW METERS	METERS IN WARNING LEVEL 57 41 NEW
LEAKS AFTER METER 46	BURSTS AFTER METER 39
IDENTIFIED LEAKS 13	ESTIMATED WATER LOSS 332 m ³
HISTORICAL EVENTS 20	664 USD

Year to date

LEAKS: Shows the number of events registered as a “Leak” via Leak Detector’s event formula.

EVENTS: Shows the total number of events registered via Leak Detector’s event formula. Event types = “District heating”, “Leak”, “Other noise”, “Pump”, or “Undetermined”.

WATER LOST: Shows the estimated amount of water lost (m3) with an associated cost. The cost is configured in the “Settings” menu, accessed via either of the shown wrench icons. The estimate is based on a start date, end date, and an estimated rate of flow (L/h) registered via Leak Detector’s event formula (see lesson 3).



Lesson 01 – Understanding your Dashboard

In the Settings menu, you can change the cost and currency used to calculate the water loss presented in the Leak Detector dashboard.

kamstrup Leak Detector

SETTINGS

- MAP ADDITIONS
 - Pipes layer upload
- DASHBOARD
 - Warning level
 - Water loss

Cost of water loss

Here you can fill in the cost of water production

Cost per 1 m³

3 USD

- USD
- EUR
- SEK
- DKK
- NOK
- SGD
- CHF
- ZAL

The "Water loss" settings menu allows you to change the cost of producing one m³ water (or one gal if you are a US Leak Detector user) to fit your actual production cost.

Additionally, you can choose from a variety of currencies for the water loss calculation to best reflect your circumstances.



Lesson 01 – Understanding your Dashboard

The dashboard in Leak Detector works as an entrance to the rest of Leak Detector. Via the map view, you can get an overview of the meters you find relevant.

You can click any of the different teal-colored tiles to see the location of the meters on a map or a list, or you can navigate to the map by using the menu to the left.



Lesson 01 – Understanding your Dashboard

Clicking any of the teal-colored dashboard tiles takes you to the map view. This view is filtered based on the tile you clicked.

The screenshot shows the Kamstrup Leak Detector interface. On the left is a dark sidebar with a search bar, filter options, and a list of highlighted meters. The main area is a map with several teal-colored meter icons. A callout box on the map explains that new meters are highlighted with a blue ring. Another callout box points to the 'Meters in warning level' filter in the sidebar, explaining that clicking it filters the map.

Search address or serial nr

Show values by:
Latest values

Thresholds
Set thresholds for displayed meters and meters with highest values

7.32

0 385

High 0 (218)

Medium 0 (295)

Low 0 (73)

HIGHLIGHTED METERS

In warning level 31 (33)

INCLUDE

- Active events 0 (23)
- Closed events 0 (92)
- Meters with info codes 0 (65)
- Missing data last 30 days 0 (123)
- Ignored meters (17)

Map List 17/11/2021 → 17/11/2022

New “Meters of interest” or new “Meters in warning level” that appeared after you last login have a blue ring around them.

Existing meters New meters

If you click on, for example, “Meters in warning level” in the dashboard, you will be transferred to this map.

The chosen filter has been automatically applied, and the relevant meters have been highlighted.

© Mapbox © OpenStreetMap Improve this map

Lesson 02

Using your map view



Lesson 02 – Using your map view

The map view in Leak Detector gives you a simple visual overview of your distribution network with meters represented as colored dots.

Show values by:
Latest values

Thresholds
Set thresholds for dis...
and meters with high

52 146

0 385

High 10 (11)

Medium 53 (78)

Low 0 (497)

HIGHLIGHTED METERS
None

INCLUDE

- Active events 0 (23)
- Closed events 0 (92)
- Meters with info codes 0 (62)
- Missing data last 30 days 0 (123)
- Ignored meters 1 (17)

Leak Detector

Map List 18/11/2021 → 18/11/2022

Search address or serial no

The map view contains all of the meters you have imported to Leak Detector. The meters are represented as coloured dots, and the colour depends on the meter's noise level.

A meter's location is based on its GPS coordinates. Meters that have the same GPS coordinates are visually represented in Leak Detector as a larger dot, also called a cluster.

The colour of this larger dot equals the color of the meter in the cluster with the highest noise value.

Zooming in on a cluster makes a figure appear, indicating the number of meters present in the cluster.

Clicking a cluster in the map view expands the cluster. From here, each meter can be individually examined.

A digital copy of your pipe network can also be uploaded to Leak Detector to give you the best possible overview.



Lesson 02 – Using your map view

Applying a filter is a great way to find a meter that has a potential leakage. If you had to target every single meter every time, you would never get anything done, which is why filters are useful.



Lesson02 – Using your map view

Before we get into what Leak Detector can really do, you need to understand the filtering system. The filtering system is quite simple as it consists of four different filters in the left sidebar.

Search address or serial nr

Show values by:
Latest values

Thresholds
Set thresholds for displayed meters and meters with highest values
15
47
0 300

High 75 (120)
Medium 187 (258)
Low 0 (195)

HIGHLIGHTED METERS
None

INCLUDE

- Active events 0 (71)
- Closed events 0 (74)
- Meters with info codes 0 (65)
- Missing data last 30 days 0 (44)
- Ignored meters (11)

Map List 12/10/2021 → 12/10/2022

“Latest values”: Finds the newest noise value within the specified date range for all meters.

“Maximum values”: Finds the maximum noise value for all meters within the specified period.

“Average values”: Finds the average noise value for all meters within the specified period.

“Thresholds”: is a slider that can be dragged by clicking it with your mouse, to filter out meters with a low noise level. Or you can click on the numbers above the slider (e.g., 47) and change them.



Lesson 02 – Using your map view

You can filter your view based on noise category, and you can choose to highlight specific meters depending on what you want to investigate.

kamstrup Leak Detector 21 → 12/10/2022

Search address or serial nr

Show values by: Latest values

Thresholds

Set thresholds for displayed meters and meters with highest values

15 47 0 300

High 84 (120)

Medium 202 (258)

Low 0 (195)

HIGHLIGHTED METERS

Leaks after meter 34 (36)

INCLUDE

- Active events 0 (71)
- Closed events 0 (74)
- Meters with info codes 0 (65)
- Missing data last 30 days 0 (44)
- Ignored meters (11)

Based on the values of the slider (Thresholds), the meters are grouped into a "Low", "Medium" or "High" noise level, which can be used to filter your meters.

You can choose to highlight "Tracked meters", "Meters of interest", "In warning level", "Leaks after meter" or "Bursts after meter". Highlighted meters have rings around them.

Mapbox © OpenStreetMap Improve this map



Lesson 02 – Using your map view

Apart from filtering on noise categories and highlights, you can also choose to include/exclude certain meters in/from your map view.

The screenshot shows the Kamstrup Leak Detector web interface. At the top, the title 'Leak Detector' is centered. On the right, there are navigation icons for a grid and a user profile, and a date range selector set to '17/11/2021' to '17/11/2022'. The main area is a map of a residential neighborhood with numerous colored dots representing meters. A dark teal overlay box is positioned over the map, containing a list of filter options. The left sidebar contains several control panels: 'Show values by:' with a dropdown set to 'Latest values'; 'Thresholds' with a range from 52 to 385 and a slider; 'HIGHLIGHTED METERS' with a dropdown set to 'None'; and an 'INCLUDE' section with a list of filterable categories. A teal arrow points from the 'INCLUDE' header to the 'Meters with missing data' option in the overlay box.

Show values by:
Latest values

Thresholds
Set thresholds for displayed meters and meters with highest values
52 182
0 385

High 10 (10)
Medium 91 (91)
Low 0 (485)

HIGHLIGHTED METERS
None

INCLUDE

- Active events 23 (23)
- Closed events 92 (92)
- Meters with info codes 65 (65)
- Missing data last 30 days 123 (123)
- Ignored meters (17)

You can choose to include/exclude meters with:

- **Active events:** An event is a way to report findings back to Leak Detector. If they have not been closed, they remain “active”.
- **Closed events:** Events that you have updated with a “solved date” appear as “closed events”.
- **Meters with info codes:** A meter can have an info code such as a LEAK or a BURST.
- **Meters with “missing data”:** A meter is categorized as having missing data if it has not received any data for the last 30 days.
- **Ignored meters:** An ignored meter will not appear in your map view, unless you actively choose to include it.



Lesson02 – Using your map view

When you have applied your filters, you can drill down into the data, and figure out if there is something that you must investigate further.

Search address or serial no.

Show values by: Latest values

Thresholds
Set thresholds for displayed meters and meters with highest values

52 182

0 385

High 7 (10)

Medium 65 (91)

Low 0 (485)

HIGHLIGHTED METERS
None

INCLUDE

- Active events 0 (23)
- Closed events 0 (92)
- Meters with info codes 0 (65)
- Missing data last 30 days 0 (123)
- Ignored meters (17)

Leak Detector

Map List 17/11/2021 → 17/11/2022

SELECTED METERS

ACQUSTIC NOISE

300
250
200
150
100
50
0

2022 Mar May Jul Sep Nov

Address and serial no. Event date Event type Comment Ignore Track Info code

1 selected Deselect all Export

Just click a meter on the map and the data is automatically presented to you.

Interactive graph with the "Threshold" markers that you specified in the left sidebar.



Lesson 02 – Using your map view

A meter can have multiple comments attached to it, and special attention can be directed towards problematic meters.

The screenshot displays the Kamstrup Leak Detector interface. On the left, a sidebar contains navigation and filter options. The main area shows a map with various colored markers representing meters. On the right, a 'SELECTED METERS' panel features a line graph of acoustic noise over time and a table of meter data.

Map View: The map shows a residential area with streets like 'Rugårdsvägen' and 'Kronhjortlökken'. Meters are represented by colored dots: red for high, blue for medium, and grey for low. A green dot is highlighted.

SELECTED METERS Table:

Address and serial no.	Event date	Event type	Comment	Ignore	Track	Info code
[Redacted]	[Redacted]	[Redacted]	[Redacted]	<input type="checkbox"/>	<input checked="" type="checkbox"/>	[Redacted]

Below the table, it indicates '1 selected' and provides a 'Deselect all' button. An 'Export' button is located at the bottom right of the table area.

If the meter demands special attention, you can check off the "Track" box. After having done this, you can follow tracked meters via the highlighted meters section by choosing "Tracked meters".



Lesson 02 – Using your map view

Apart from putting special attention to a meter, you can also choose to ignore a meter if you, for example, have validated that there is no problem with it, even though it shows a high noise level.

When a meter is ignored, it is “removed” from the regular filters as it is not relevant to you anymore.

If you need to find an ignored meter, you can use the “Ignored meters” filter.

Ignoring a meter can be done by clicking the check box. You cannot “Ignore” and “Track” a meter at the same time.

Lesson 03

Using your list view



Lesson 03 – Using your list view

The list view in Leak Detector gives you a simple overview of your distribution network with meters represented as rows in the table. You can filter your view based on different filters.

The screenshot displays the Kamstrup Leak Detector interface. On the left, there is a sidebar with a search bar and several filter sections: 'Show values by:' (set to 'Latest values'), 'Thresholds' (with a range from 0 to 385 and three levels: High (18), Medium (86), Low (482)), 'HIGHLIGHTED METERS' (set to 'None'), and 'INCLUDE' (with checkboxes for Active events, Closed events, Meters with info codes, Missing data last 30 days, and Ignored meters). The main area shows a table of meters with columns: Address, Serial number, Latest reading, Latest value, Average value, Max value, Info code, Active events, Closed events, Meters of int..., Ignore, and Track. A teal callout box on the right explains that the list view contains all imported meters with important information. Another teal callout box at the bottom explains that filtering options can be used to adapt the view, and a note states that the list updates and color-codes meters based on the 'Thresholds' settings.

Address	Serial number	Latest reading	Latest value	Average value	Max value	Info code	Active events	Closed events	Meters of int...	Ignore	Track
...	...	02/06/2022 04:00 AM	51	129	700				District heating		
...	...	10:41 AM	-	-	-						
...	...	02/06/2022 04:00 AM	51	129	700						
...	...	11/21/2022 09:00 AM	16	42	139						
...	...	11/21/2022 09:00 AM	17	43	300						
...	...	11/21/2022 09:00 AM	141	23	141						
...	...	11/21/2022 09:00 AM	78	26	85						
...	...	11/21/2022 09:00 AM	112	21	112						
...	...	11/21/2022 09:00 AM	14	26	70				Leak		
...		Leak		District heating,...		
...				Leak		
...				Undetermined, ...		
...				Other noise, Pu...		
...				Pump		

Lesson 03 – Using your list view

You can sort your list view in descending or ascending order, or you can filter the different columns to find the exact meters you are searching for.

The screenshot displays the Kamstrup Leak Detector interface. On the left, there is a sidebar with search and filter options. The main area shows a table of meters with columns for Address, Serial number, and various status indicators. A 'Columns' dialog box is open, showing a list of columns and a filter operator. A 'Value' field is also visible. A 'Show by:' dropdown is set to 'Latest values'. The table shows a list of meters with their respective serial numbers, addresses, and status indicators. A 'Rows per page' dropdown is set to 20, and the total number of rows is 341. An 'Export' button is located at the bottom right.

Show by: Latest values

Thresholds
Set thresholds for displayed meters and meters with highest values

52 146

0 385

High 18 (18)

Medium 86 (86)

Low 0 (482)

HIGHLIGHTED METERS
None

INCLUDE

- Active events 24 (24)
- Closed events 92 (92)
- Meters with info codes 60 (60)
- Missing data last 30 days 123 (123)
- Ignored meters 17

Columns

- Serial number
- Operator contains
- Value Filter value

Table Data:

Address	Serial number	02/06/2022 04:00 AM	51			
		10:58 AM				
		02/06/2022 04:00 AM	51			
		11/21/2022 09:00 AM	16			
		11/21/2022 09:00 AM	17			
		11/21/2022 09:00 AM	141	23	141	
		11/21/2022 09:00 AM	78	26	85	
		11/21/2022 09:00 AM	112	21	112	
		11/21/2022 09:00 AM	14	26	70	Leak
		11/21/2022 09:00 AM	161	21	161	
		11/21/2022 09:00 AM	68	26	136	Leak District heating,...
		11/21/2022 09:00 AM	17	30	161	Leak
		11/21/2022 09:00 AM	16	31	236	Undetermined, ...
		11/21/2022 09:00 AM	32	27	100	Other noise, Pu...
		11/21/2022 09:00 AM	47	35	263	Pump

Rows per page: 20 1–20 of 341 < >

Export

You can filter and sort the list view by clicking the three dots next to the column header (they will appear when you hover over the header).

You can also sort the column by clicking on the header, by which the arrow will indicate whether the column is sorted in ascending or descending order.

You can filter a number of columns in Leak Detector by using different operators to find the exact meters you need to investigate.

Lesson 03 – Using your list view

From the list view, you can click a meter to get a detailed graph overview of that specific meter. This allows for deeper analysis of the noise development.

The screenshot displays the Kamstrup Leak Detector interface. On the left, a sidebar contains search and filter options. The main area shows a table of meters with columns for Address, Latest reading, Latest value, Average value, Max value, and Meters of int... A teal callout box points to a row in the table, stating: "Clicking a specific meter prompts Leak Detector to open the graph view on the right side." Below this, another callout box explains: "This view reduces the number of columns from 14 to 8 columns as the data in the remaining 6 columns becomes available in the graph view on the right side (such as 'Ignore', 'Track', and 'Info code')." On the right, the "SELECTED METERS" section shows a line graph of acoustic noise over time, with a peak in late February. Below the graph is a table of events for the selected meter, including columns for Address and serial no., Event date, Event type, Comment, Ignore, Track, and Info code.

Address	Latest reading	Latest value	Average value	Max value	Meters of int...
...	02/06/2022 04:00 AM	51	129	700	
...	01:19 PM	-	-	-	139
...	02/06/2022 04:00 AM	51	129	700	300
...					70
...					157
...					127
...					136
...					267
...	11/21/2022 11:00 AM	73	30	161	
...	11/21/2022 11:00 AM	68	32	149	
...	11/21/2022 11:00 AM	8	31	236	
...	11/21/2022 11:00 AM	20	43	250	

Address and serial no.	Event date	Event type	Comment	Ignore	Track	Info code
...	10/21/2021 10/22/2021	District heating		<input type="checkbox"/>	<input type="checkbox"/>	

Lesson 04

Creating events for your meters

Lesson 04 – Creating events for your meters

If you have visited a meter, and checked if there was a leakage or not, or if you have discovered something else, you can report your findings back to Leak Detector.

Search address or serial no.

Show values by: Latest values

Thresholds
Set thresholds for displayed meters and meters with highest values

54 237

0 672

High 35 ()

Medium 588 ()

Low 0 ()

HIGHLIGHTED METERS
Meters of interest (16)

INCLUDE

- Active events 11 (11)
- Meters with info codes 286 (286)
- Missing data last 30 days 0 (46)
- Ignored meters (0)

Leak Detector

Map List 12/11/2020 → 12/11/2021

SELECTED METERS

500
400
300
200
100
0

Sep 2021 Oct 2021 Nov 2021

Address and serial no.	Event date	Event type	Comment	Ignore	Track	Info code
+ ✎ ✕ ☐ ✓						

1 selected **Remove all** **Export**

To create a new event, click on a meter, and then click the “+” sign.

Lesson 04 – Creating events for your meters

The way to report back is through events. An event is for instance a leak, and when you create one, there is a possibility to also put in e.g., meter location, pipe size, etc.

The screenshot displays the Kamstrup Leak Detector interface. On the left is a sidebar with filters and a search bar. The main area is split into a map on the left and a 'SELECTED METERS' panel on the right. The map shows a residential area with a red pin on Ballerup Øvej. The 'SELECTED METERS' panel features a line graph of 'ACOUSTIC NOISE' from August to November, showing a sharp increase in late October. Below the graph is a 'New event' form with fields for event date, type, comment, meter location, pipe size, pipe material, and a 'Solved' checkbox.

Show values by:
Latest values

Thresholds
Set thresholds for displayed meters and meters with highest values

91 369

0 1,221

High 35 ()

Medium 393 ()

Low 0 ()

HIGHLIGHTED METERS

Meters of interest (32)

INCLUDE

- Active events 0 (79)
- Meters with info codes 0 (725)
- Missing data last 30 days 0 ()
- Ignored meters (51)

Leak Detector

Map List 12/11/2020 → 12/11/2021

SELECTED METERS

ACOUSTIC NOISE

550
500
400

Aug Sep Oct Nov

New event

Event date 5/9/2022 13:22

*Type of event Please select

Comment

Meter location Please select

Pipe size (mm) Please select

Pipe material Please select

Solved

Cancel Save

The first step in creating the actual event is to choose the “Type of event”.

By choosing the type of event, you can indicate whether the noise comes from “District heating”, a “Leak”, a “Pump”, “Other noise”, or if its “Undetermined”.

Lesson 04 – Creating events for your meters

Filling out information about investigated events creates additional value for you! By filling in relevant information, Leak Detector will, over time, become better than ever to find and suggest actual leaks.

The screenshot displays the Kamstrup Leak Detector web application. On the left is a sidebar with search and filter options. The main area shows a map with meter locations. A graph on the right shows a sharp increase in flow for a selected meter. Below the graph is a form to create a new event, with a callout box explaining that additional information is needed for leaks.

Search and Filters: Search address or serial no. Show values by: Latest values. Thresholds: Set thresholds for displayed meters and meters with highest values. 54 237. 0 672. High 35 () High. Medium 588 () Medium. Low 0 () Low. HIGHLIGHTED METERS: Meters of interest (16). INCLUDE: Active events 8 (8), Meters with info codes 287 (287), Missing data last 30 days 0 (46), Ignored meters (0).

Map: Leak Detector. Map List 12/11/2020 → 12/11/2021. Mapbox © OpenStreetMap Improve this map.

SELECTED METERS: Graph showing flow over time. A red line indicates a sharp increase in flow, reaching approximately 450 units. A dashed red horizontal line is at approximately 250 units.

New event: Event date: 11/12/2021 11:28. Type of event: Leak. Service (selected), Main. Comment: [Empty]. Meter location: Please select. Pipe size (mm): Please select. Pipe material: Please select. Estimated size of leak (L/h): Please select. Pressure of leak (bar): Please select. Distance to leak (m): Please select. Cancel Save.

Callout boxes:

- By filling out information about an identified leak, you help improve Leak Detector's ability to find future leakages.
- If the event is in fact a leak, additional information will be needed, such as if it is in the service or main line.

Lesson 04 – Creating events for your meters

The “This year to date” section in Leak Detectors dashboard (see lesson 01) depends on the events that you have registered. If you have not registered any events, no water loss calculations are being done.

Show values by:
Latest values

Thresholds
Set thresholds for displayed meters and meters with highest values

54 237

0 672

High 35 ()

Medium 588 ()

Low 0 ()

HIGHLIGHTED METERS
Meters of interest (16)

INCLUDE

- Active events 8 (8)
- Meters with info codes 287 (287)
- Missing data last 30 days 0 (46)
- Ignored meters (0)

Leak Detector

Map List 12/11/2020 → 12/11/2021

SELECTED METERS

500
400
300
200
100
0

Sep 2021 Oct 2021 Nov 2021

New event

Event date: 11/12/2021 11:28

Type of event: Leak (Service, Main)

Comment: [Text area]

Meter location: Please select | Pipe size (mm): Please select | Pipe material: Please select

Estimated size of leak (L/h): Please select | Pressure of leak (bar): Please select | Distance to leak (m): Please select

Cancel Save

To create the water loss estimates seen in your dashboard (see lesson 01), you need to fill in the following about a leak:

- Estimated size of leak (L/h)
- Event date
- Solved date (see next slide)



Lesson 04 – Creating events for your meters

Closing, or solving, an event, helps you gain an overview of your distribution network, and it enables Leak Detector to calculate an estimated water loss.



The screenshot displays the Kamstrup Leak Detector interface. On the left is a sidebar with filters: 'Show values by: Latest values', 'Thresholds' (High: 35, Medium: 393, Low: 0), 'HIGHLIGHTED METERS' (Meters of interest: 32), and 'INCLUDE' (Active events: 0, Meters with info codes: 0, Missing data last 30 days: 0, Ignored meters: 51). The main area shows a map with a red pin on a street. A teal text box with an arrow pointing to the 'Solved' checkbox in the event form contains the text: "When you have identified and fixed a leakage in your distribution system, it is important to mark the event as 'solved'". To the right, the 'SELECTED METERS' section shows a line graph of 'ACOUSTIC NOISE' from July to November, with a red line showing a sharp increase in October. Below the graph is the 'New event' form with fields for 'Event date' (5/9/2022 13:22), '*Type of event' (Please select), 'Comment', 'Meter location' (Please select), 'Pipe size (mm)' (Please select), 'Pipe material' (Please select), and a checked 'Solved' checkbox with a date of 5/9/2022 13:39.



Lesson 04 – Creating events for your meters

Events and comments are attached to the individual meter.

kamstrup Leak Detector

Search address or serial no.

Show values by: Latest values

Thresholds
Set thresholds for displayed meters and meters with highest values

54 237

0 672

High 35 ()

Medium 588 ()

Low 0 ()

HIGHLIGHTED METERS

Meters of interest (16)

INCLUDE

- Active events 11 (11)
- Meters with info codes 286 (286)
- Missing data last 30 days 0 (46)
- Ignored meters (0)

Map List 12/11/2020 → 12/11/2021

SELECTED METERS

500
400
300
200
100
0

Sep 2021 Oct 2021 Nov 2021

Address and serial no.	Event date	Event type	Comment	Ignore	Track	Info code
Undetermined	Vi følger op for ...	+		<input type="checkbox"/>	<input checked="" type="checkbox"/>	

1 selected Remove all Export

When an event has been added, it is shown for that specific meter in the list.

You can always add a new event or edit an existing one in case you mistyped.

Lesson 04 – Creating events for your meters

A meter can have multiple comments attached to it, and special attention can be directed towards problematic meters.

The screenshot displays the Kamstrup Leak Detector web interface. On the left is a sidebar with search and filter options. The main area is split into a map and a data visualization. The map shows a residential area with several meters marked by colored dots. A red dot is highlighted with a red pin. A teal callout box points to a small arrow icon on the map, stating: "When there are multiple comments on a meter, a small arrow will become clickable to expand the view with all the events." To the right of the map is a line graph titled "SELECTED METERS" showing a sharp increase in values starting in late October. Below the graph is a table of events for the selected meter.

Address and serial no.	Event date	Event type	Comment	Ignore	Track	Info code
		Other noise	test	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
		Undetermined	Vifølger op for ...	<input type="checkbox"/>	<input type="checkbox"/>	

Lesson 05

Extracting valuable reports



Lesson 05 – Extracting valuable reports

You can extract valuable reports (in .pdf format) from Leak Detector or have them send directly to whichever mail you would prefer.

kamstrup Leak Detector

Dashboard

Since last login day, May 26, 2022

METERS OF INTEREST 0 NO NEW METERS	METERS IN WARNING LEVEL 57 41 NEW
LEAKS AFTER METER 46	BURSTS AFTER METER 39

Year to date

IDENTIFIED LEAKS 13	ESTIMATED WATER LOSS 332 m ³
HISTORICAL EVENTS 20	664 USD BASED ON 9 CLOSED LEAK EVENTS

You can navigate to the Leak Detector “Reports” tab by using the menu to the left.



Lesson 05 – Extracting valuable reports

Two different types of reports can currently be generated by Leak Detector – a LEAK and a USAGE report.

The screenshot shows the 'Leak Detector' interface. On the left is a dark sidebar with a 'REPORTS' section containing 'Archive', 'LEAK' (with 'Weekly Leak report' and 'Monthly Leak report' toggles), and 'USAGE' (with 'Activity report' toggle). The main area is titled 'Reports' and includes an 'Archive' section with instructions and filters for Year (2022), Month (June), and Report (All). A table lists reports, with one 'Weekly' report highlighted. Two callout boxes provide instructions: one points to the 'Activity report' toggle, and another points to the 'Weekly Leak report' and 'Monthly Leak report' options.

Activate or deactivate a report by clicking the toggle switch.

**The first report is a LEAK report, which can be sent on a weekly or a monthly basis.
The second report is a USAGE report, which can only be sent on a monthly basis.**

Lesson 05 – Extracting valuable reports

The LEAK reports lets you get an overview of potentially problematic meters in your network based on both meters of interest and on a high noise level threshold set by you.

The screenshot shows the 'Leak Detector' configuration page in the Kamstrup interface. On the left, a sidebar contains a 'REPORTS' section with 'Archive', 'LEAK', and 'USAGE' categories. Under 'LEAK', 'Weekly Leak report' and 'Monthly Leak report' are both enabled. Under 'USAGE', 'Activity report' is also enabled. The main content area is titled 'Reports' and features a 'Weekly Leak report' section. It includes a description, a list of report contents with input fields for noise value (150) and days (5), a note about drive-by readings, and a checkbox for 'Remove ignored meters from this report.' Below this is the 'Add report recipient' section, which includes a table with columns for 'Recipient' and 'Email', and a '+ Add' button with a trash icon. Two callout boxes provide additional context: one points to the report content list, and another points to the recipient management controls.

REPORTS

- Archive
- LEAK**
 - Weekly Leak report
 - Monthly Leak report
- USAGE**
 - Activity report

Reports

Weekly Leak report

Receive a report once per week - every first day of the week.

The report will contain:

- All devices that have had a noise value over for more than day(s).
- All identified meters of interest. These meters are the most interesting meters based on noise patterns algorithms developed by Kamstrup.

Note: Weekly Leak reports are not recommended for readings collected via drive-by. In this case, we recommend the monthly report.

Remove ignored meters from this report.

Add report recipient

If you activate this type of report, you can find all the generated reports in the [Archive](#). If you want to receive the report as an email, you can add recipients below.

Recipient	Email	
Somebody @	@kamstrup.com	<input type="button" value="+"/>
		<input type="button" value="✎"/> <input type="button" value="🗑️"/>

The LEAK reports contain the meters of interest and the meters with a noise level above a certain threshold set by you, for more than a set number of days, also set by you.

Add, change, or remove recipient mail addresses here.

Lesson 05 – Extracting valuable reports

The LEAK report comes in a weekly and monthly version and contains both meters of interest and meters in high noise level.

This section includes your meters of interest (read more in lesson 01).

Meters of interest

18 meters

Address	Serial number	Start date	End date
Rådstrøketten 126, Odense, 5210	12190402	June 18, 2022	June 22, 2022
Rådstrøketten 126, Odense, 5210	12190402	June 13, 2022	June 15, 2022
Rådstrøketten 126, Odense, 5210	12190402	June 16, 2022	June 17, 2022
Rådstrøketten 126, Odense, 5210	12190402	May 24, 2022	June 01, 2022
Bennedstrøketten 68, Odense, 5210	12579192	June 19, 2022	June 22, 2022
Bennedstrøketten 68, Odense, 5210	12579192	June 11, 2022	June 14, 2022
Kvæstingstrøketten 232, Odense, 5210	13122379	June 20, 2022	June 22, 2022
Rådstrøketten 97, Odense, 5210	11566486	June 22, 2022	June 22, 2022
Rådstrøketten 97, Odense, 5210	11566486	June 10, 2022	June 11, 2022
Rådstrøketten 97, Odense, 5210	11566486	June 02, 2022	June 09, 2022
Rådstrøketten 98, Odense, 5210	14812325	June 03, 2022	June 06, 2022
Rådstrøketten 98, Odense, 5210	14812325	June 11, 2022	June 12, 2022
Rådstrøketten 98, Odense, 5210	14812325	June 07, 2022	June 09, 2022
Rådstrøketten 98, Odense, 5210	14812325	June 19, 2022	June 22, 2022
Rådstrøketten 98, Odense, 5210	14812325	June 14, 2022	June 18, 2022
Rådstrøketten 98, Odense, 5210	14802938	June 22, 2022	June 22, 2022
Bennedstrøketten 106, Odense, 5210	17056464	June 20, 2022	June 22, 2022
Bennedstrøketten 106, Odense, 5210	17056464	June 17, 2022	June 19, 2022

This section includes your meters with a high noise level.

Meters in high noise level

38 meters

Address	Serial number	High	Average value	Latest reading	Ignore	Track
Ladstov 17, Odense, 5210	10184776	117	117	117	✓	



Lesson 05 – Extracting valuable reports

The USAGE report lets you get an overview of potentially problematic meters in your network based on events and on “meters of interest”.

kamstrup Leak Detector

REPORTS

- Archive
- LEAK**
- Weekly Leak report
- Monthly Leak report
- USAGE**
- Activity report

Reports

Activity report

Find monthly and year-to-date information on the events related to your utility's insights.

- **Events in total:** The total number of events registered via the event form in Leak Detector. Event types are District heating, Leak, Other noise, Pump or Undetermined.
- **Leak-classified events:** Total number of leaks registered via the event form in Leak Detector.
- **Meters of Interest:** The total number of identified meters of interest. These meters are the most interesting meters based on noise patterns algorithms developed by Kamstrup.

Add report recipient

See and download the activity report in the [Archive](#) section. Get the report as an email by adding the recipients below.

Recipient	Email	
Tommy Test Monthly	tom@kamstrup.dk	+ 👤 🗑️
Henrik@gmail	henrik@gmail.com	+ 👤 🗑️

The “Activity report” consists of a range of items as seen here. The report contains data for both the current month and for the current year to date on each item.

Add, change, or remove recipient mail addresses here.

Lesson 05 – Extracting valuable reports

The “Activity report” (USAGE) contains data on leak classified events, meters of interest, and on the total number of registered events, both on a monthly and year-to-date basis.

The screenshot shows the Kamstrup Activity report interface. The report is titled "Activity report" and "LeakDetecDemo" with a date of "June 01, 2022". It displays three data cards:

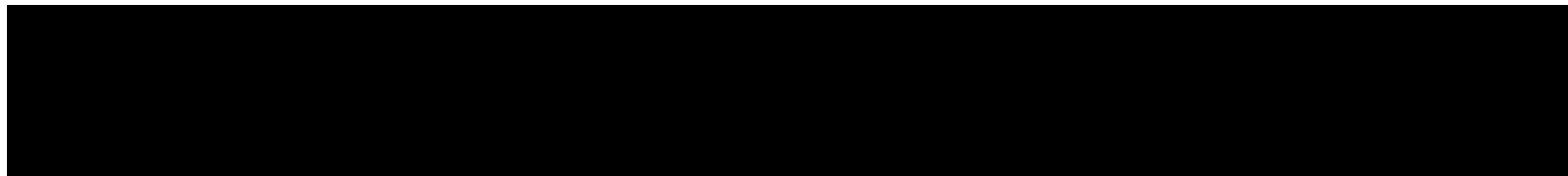
EVENTS IN TOTAL	LEAK-CLASSIFIED EVENTS	METERS OF INTEREST
THIS MONTH 5 3 LESS THAN PREVIOUS MONTH	THIS MONTH 5 2 LESS THAN PREVIOUS MONTH	THIS MONTH 0 NO CHANGES
YEAR TO DATE 21	YEAR TO DATE 14	YEAR TO DATE 0

Callout boxes provide additional context:

- The total number of events registered in Leak Detector (read more in lesson 01 and 03).
- The number of events registered as “Leak” in Leak Detector (read more in lesson 01 and 03).
- The number of meters of interest suggested in Leak Detector (read more in lesson 01).

Lesson 06

Examples of meter discoveries



Lesson 06 – Examples of meter discoveries

Leak Detector provides graphical insight into the noise development of a meter.

The screenshot displays the Kamstrup Leak Detector interface. On the left is a sidebar with search and filter options. The main area is split into a map and a graph. A red pin on the map is linked to a red noise curve graph on the right. A text box with an arrow points to the rising part of the curve.

Search and Filter Options:

- Search address or serial no.
- Show values by: Latest values
- Thresholds: Set thresholds for displayed meters and meters with highest values. Range: 54 to 728.
- High, Medium, Low: 0 () [toggle]
- HIGHLIGHTED METERS: Meters of interest (14)
- INCLUDE: Active events (0/7), Meters with info codes (0/288), Missing data last 30 days (0/47), Ignored meters (0)

Map: Shows a street map with a red pin indicating a meter location. Labels include BAGSVÆRD, GLADSA, RØDOVRE, Herstedøster, and Risby.

Graph (SELECTED METERS): Shows a noise curve from Sep 2021 to Oct 2021. The y-axis ranges from 0 to 160. A horizontal dashed line is at approximately 55. The curve shows a steady upward trend from near 0 to over 140.

Text Box: "If a noise curve rises steadily, it oftentimes indicates a leakage." with an arrow pointing to the rising curve.

Table:

Address and serial no.	Event date	Event type	Comment	Ignore	Track	Info code
		Leak	Privat brud! Vi ...	<input type="checkbox"/>	<input type="checkbox"/>	

1 selected [Remove all](#) [Export](#)

Lesson 06 – Examples of meter discoveries

A varying noise curve often means that a pump or the like is nearby.

The screenshot shows the Kamstrup Leak Detector interface. On the left is a sidebar with filters: 'Show values by: Latest values', 'Thresholds' (High, Medium, Low), 'HIGHLIGHTED METERS' (Meters of interest: 14), and 'INCLUDE' (Active events: 0, Meters with info codes: 0, Missing data last 30 days: 0, Ignored meters: 0). The main area features a map with several red location pins. A black text box with a white border is overlaid on the map, containing the text: 'After further investigation, it turned out that the cause of the noise was a gas furnace. Please note this in Leak Detector to help improve "meters of interest" going forward.' An arrow points from this text box to a red line graph on the right. The graph, titled 'SELECTED METERS', shows a highly volatile red line representing noise levels from April 2021 to October 2021, with a dashed red horizontal line at approximately 220. Below the graph is a table with columns: 'Address and serial no.', 'Event date', 'Event type', 'Comment', 'Ignore', 'Track', and 'Info code'. The table contains one entry: 'Other noise: Det var støj fra ...'. At the bottom right, there is a '1 selected' indicator, a 'Remove all' button, and an 'Export' button.

Lesson 06 – Examples of meter discoveries

Three leaks with different graphs.

The screenshot displays the Kamstrup Leak Detector interface. On the left, a sidebar contains filters for 'Show values by' (Latest values), 'Thresholds' (High, Medium, Low), 'HIGHLIGHTED METERS' (Meters of interest: 30), and 'INCLUDE' (Active events, Meters with info codes, Missing data last 30 days, Ignored meters). The main area features a map of a residential area with several meters marked by colored dots. A text box with an arrow points to three specific meters on the map. To the right, a 'SELECTED METERS' section shows a line graph of 'ACOUSTIC NOISE' from August to October 2021. The graph has three data series: a blue line that stays relatively flat around 300, a red line that shows a gradual increase from 0 to about 150, and an orange line that shows a sharp spike from 0 to 500 in late September. Below the graph is a table of events.

All three meters have a potential leakage, but their graphical patterns look very different. Common to them, however, is that they do not have large variations over time.

Address and serial no.	Event date	Event type	Comment	Ignore	Track	Info code
ⓧ		Leak	Der er privat br... + 🗑️ ✕	<input type="checkbox"/>	<input type="checkbox"/>	
ⓧ		Leak	Der er privat br... + 🗑️ ✕	<input type="checkbox"/>	<input type="checkbox"/>	✖️
ⓧ		Leak	Privat brud på f... + 🗑️ ✕	<input type="checkbox"/>	<input type="checkbox"/>	

3 selected [Deselect all](#) [Export](#)



Lesson 06 – Examples of meter discoveries

If you need any other help – Do not hesitate to reach out to us at Kamstrup.

kamstrup



Do you need to know anything else? We stand ready with the following:

- Contact our support via My Kamstrup.
- Reach out to us to get a copy of our "Guideline for Leak Verifications".
- See our portfolio of service offerings related to Leak Detector here:
<https://www.kamstrup.com/en-en/water-solutions/services/ald-service-offerings>