USER'S MANUAL

KeyCom 2026.3

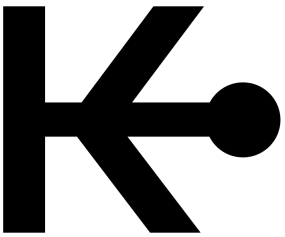


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INTRODUCTION TO KEYCOM

This user's manual describes the functions of the browser-based KeyCom network information system. KeyCom is intended as **a tool for telecommunications operators** for network information management and network planning and maintenance. KeyCom creates consistent documentation of a network's structure and connections. Having exact information on the structure and use of your network enables you to operate the network efficiently.

The first part of this user's manual introduces general tools and buttons, and the rest of this document provides instructions on using various object forms. The forms are used to view, create, and modify network object information with the help of buttons that have the same functions throughout all object forms. **Before reading the instructions on a single object form, we recommend that you read the chapter Buttons on object forms .** The tools introduced in this chapter are related to viewing the properties and location information of objects, and they are similar to the tools used in Keypro's other browser software. This chapter describes button functions on a detailed level. The instructions on using the object forms have been created based on the assumption that users are familiar with the various button functions.

The **Map view** chapter discusses the tools related to using the map view. Tools are located in a separate tool bar called **Map tools** and are used for measuring distances, changing the scale, and printing and viewing information related to map objects. The chapter Map view discusses the following: selecting background maps and object layers, using the map and addresses, and using the coordinate section to change positioning. This chapter is primarily aimed at users who have no previous experience of using map user interfaces. The tools presented in this chapter are commonly used in various types of map software.

The chapter **KeyCom forms** discusses using the object forms for network elements, such as telecom premises and cables. This chapter also describes connections management, the route follower, and the creation of service and exchange areas. It is assumed that users are familiar with the use of the general object form buttons. The KeyCom forms are used in a similar manner, and any deviating functions are presented separately for each object form.

The chapter **KeyNet tools** introduces the tools for managing telecommunication network connections, customer data, and rental contracts.

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The chapter **Other tools** covers all other tools provided by the software. This chapter is aimed at all users and describes topics, such as the creation of plans and annotations, address search, survey management and creation of group displays.

Software overview

KeyCom is used via an **internet browser**, and users are not required to install any other software on their workstations. The network data that is used is stored **on a network server in an Oracle database** from where the browser receives the data.

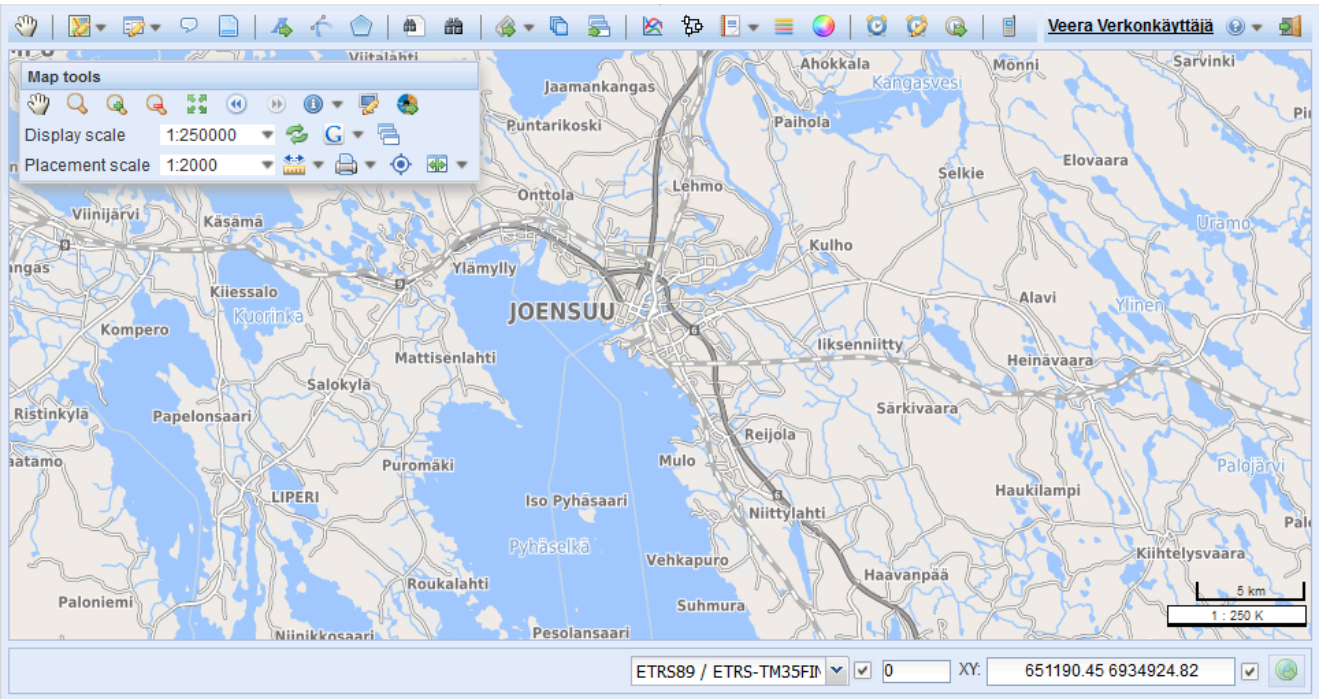
You can handle the network data through object-specific forms for various types of network objects. For example, if you want to modify information concerning a splice, open the **Splice** object form. If you want to create a new cable in the system, use the functions on the **Cable** object form. In other words, you use object forms to view, create and update information on properties and location. You can save information on the structure of a network, such as network topology and information on the objects' properties, including the installation year and usage state. **Your user privileges** define what functions are available to you.

3D compatibility

KeyCom 2026.1 includes a 3D-compatible database as a default, and it enables basic 3D functions through the user interface. In addition to X and Y coordinates, you can also use the elevation coordinate Z. Please note that addresses, print series, and diagrams are still saved in 2D format.

User interface

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The user interface has three main areas. The **toolbar** is displayed at the top of the screen, and you can use it to open object forms to view and edit objects. In addition, this toolbar includes other buttons that enable you, for example, to search for addresses or create lines and text on the map.

The largest component in the display is the **map view**, which also includes the **map toolbar** used for map management and the **Layers** tool.

A **coordinate section** displaying coordinate values is located at the bottom of the screen. In addition, **instructions** are displayed **in the bottom left corner of the instructions bar** when the available buttons and tools are used. You can find further information on these in the chapter Map view and in subsequent chapters.

Note! If the border of the user interface is exceptionally bright, you have most likely logged in to the test environment.

Hardware requirements

You use KeyCom via your web browser, so the minimum requirements and recommended equipment greatly depend on the browser you use:

1. **Browser:** Microsoft Edge or Google Chrome with the latest updates. Firefox is also supported but require the fastest possible CPU (i7, i9). You must also

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enable cookies in the browser.

2. **Operating system:** Should be in accordance with the browser's requirements. Keypro Oy tests the system functionalities with Windows-based equipment. Linux Ubuntu 18 or newer is recommended.
3. **Processor:** The minimum CPU is Intel Core i3. Intel Core i5 or i7 are recommended (or some equivalent from the AMD).
4. **Display:** Minimum resolution of 1366 x 768 pixels (1920 x 1080 pixels recommended).
5. **RAM:** Minimum 8 GB (16 GB recommended, with browser requirements considered).

User roles

Users are assigned a role in the system, and the **user privileges** specified for that role define the functions that are available to the user; in other words, they define the actions that the user can take within the program. **Read-only users** can view both the properties and location information of objects, but they cannot edit or add objects in the system. The buttons required for these functions are not even visible to users with read-only rights. If a user has **read and write rights** to properties or location information, the related buttons are visible. In addition to the above, an **Admin user** can, for example, modify default values.

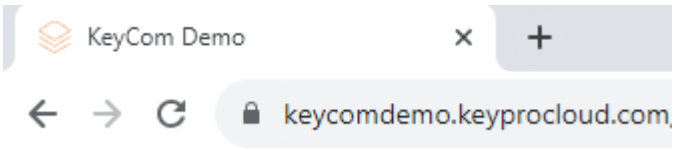
The system also allows the definition of so-called area-specific user privileges that provide users with the right to view and handle objects within a certain area only. Limitations can also be set based on, for example, the owners of objects.

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LOGGING IN AND ACCESSING HELP

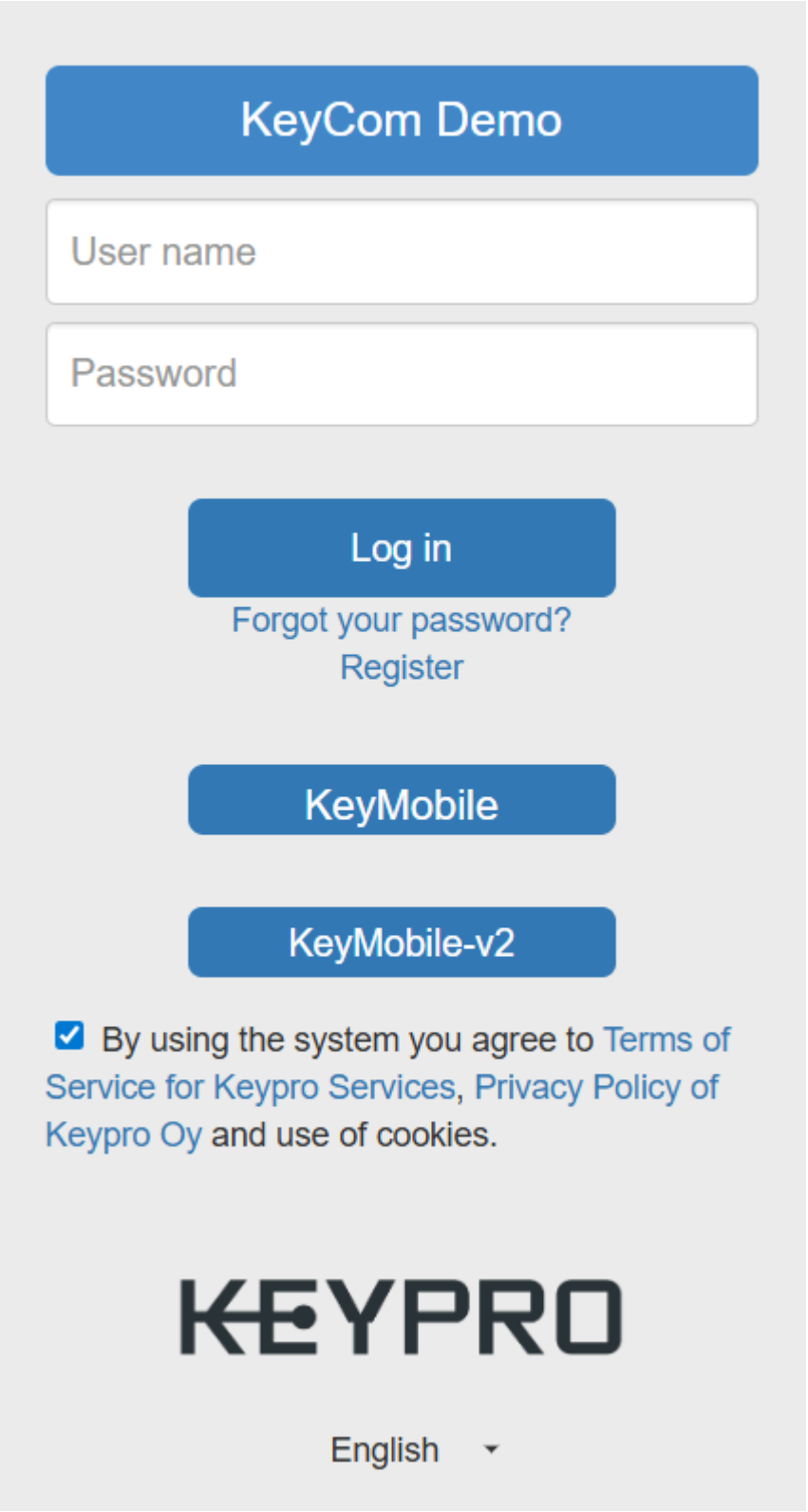
Logging into the system

Enter the URL of the KeyCom instance in the browser's address bar.



When the log-in form is displayed in the browser, enter your personal KeyCom **username** and **password** in the fields. Your session will start when you click **Log in**. You can also select the mobile version for smart devices by clicking the KeyMobile button.

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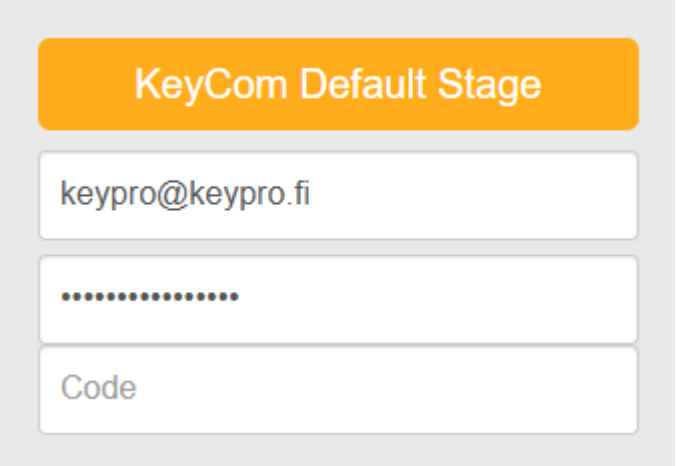
Two phased authentication (This function is subject to a separate order)

Two phased authentication is a function that can be ordered separately. When enabled, the KeyCom application requires a separate pass code in addition to a

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valid username and password.

In two-step identification, first, enter your **username** and **password** in the active fields. Then, click **Log-in** and wait for an SMS or email to be sent to you. The code you must enter into the **Code** field is provided in the SMS or email. After this, click the **Log-in** button again to open the KeyCom application.



Forgotten username and/or password

If you receive the notification **Please enter a correct username and password** (note that the fields are case sensitive), you have entered either a wrong username or a wrong password. Enter the correct information and try again. If you have forgotten your password, click the **Forgot password?** link. Instructions on how to change your password are then displayed. Contact your system administrator if necessary.

User registration

When you open KeyCom for the first time, you can click **Register** and provide your details and other information in the **Register new user** window to register as a KeyCom user. You must accept the terms and conditions of use before you can register. Your information is saved in the system when you click **Register**. After this, you can log into the system.

ADFS support and new password requirements

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You can **change your password** by clicking your name on the toolbar at the top-right corner. First, enter your **old password** in the field in the form that appears and then enter your **new password** twice. Click **Submit**. You will then receive a notification that the password has been **changed successfully**, and you can continue working in the KeyCom environment.

Your **new password** needs to be at least **12 characters** long and it **cannot contain only digits**. If your **new password** does not meet the requirements, you will see a message about it underneath the password text box.

If you already have **an account** in KeyCom created before the **3.4 update**, it is possible that its password **does not fulfill** these new requirements. In that case, you can still log in with your **old password** but will be prompted to change your password once logged in. You will be asked to verify your **old password**. After that you can type in your **new, updated password**.



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ADFS integration

You can get **ADFS** (Active Directory Federation Services) **support** from various **AD** (Active Directory) **sources**. ADFS integration can be used in KeyCom when the customer has a separate access rights management system where access rights configurations and groups are created.

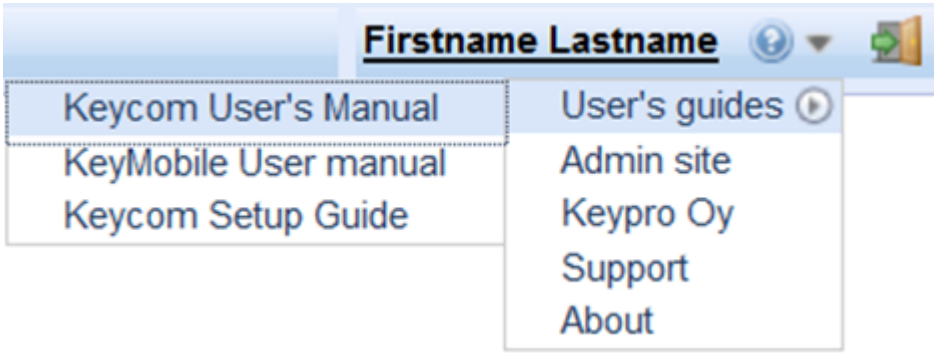
User rights are checked or created based on the rights given before each KeyCom login. AD login creates permissions for automatically assigned roles (viewer users, basic users, etc.). There is also a separate group for KeyCom main users. Roles are assigned between systems based on a separate AD correspondence table.

The integration enables AD login also for new KeyCom users directly without separate registration and activation.

By clicking the **Provider** menu you can see the service providers available. Find out the specific provider your organization has chosen and then select it. Users can also log in to **KeyCom** with **ADFS services** even if they don't belong to any organization. Upon activation, existing/local KeyCom logins will be deleted.

User guides, information, and support

A **Help** button is located in the top-right corner of the main toolbar, and its drop-down menu includes links to user guides and information on the application. (The content of the drop-down menu may vary depending on the installation.)



In the **User guides** drop-down menu, select **KeyCom User Manual** to open this document in PDF format. The **KeyMobile User Manual** is available in the same menu.

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The **About** item in the **Help** menu displays general information on the application, such as the version number and coordinate system that is being used.

Select **Support** to open a pre-configured email message in an email application. You can complete this draft message and submit a support request. The pre-completed information on the application version and settings is useful information for the application support service.

You can access the Keypro website by selecting **Keypro** from the menu.

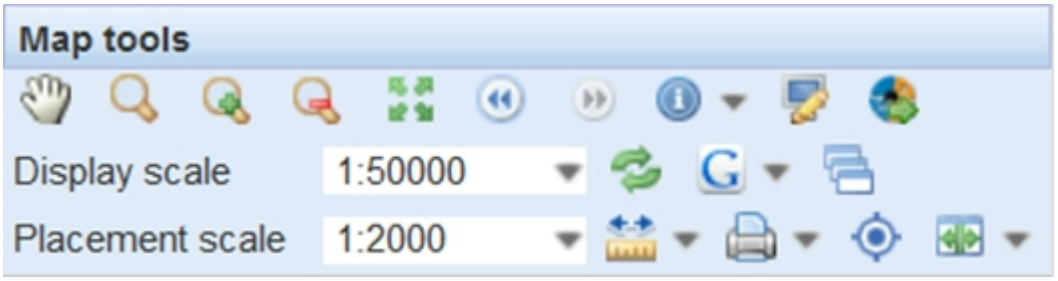
TIP: When you communicate with Keypro's application support service, please be prepared to provide the exact version number of the application. Go to the **Help** menu and click **About** to find this information. The easiest way to create a support request is via the **Support** link.

Logging out of KeyCom

You can end your KeyCom session by clicking **Logout** on the main menu.

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MAP VIEW

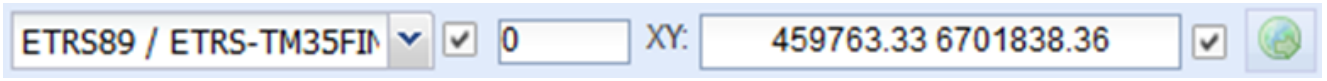


Panning the map

You can pan the map by clicking **Pan** in map tools. Hold down the left button of your mouse and move the mouse pointer across the map to pan the map. This enables you to move the map in the background, for example, when you are drawing a new duct.

Coordinates

The coordinate section displayed in the bottom right corner shows the map coordinates for the **location of the mouse pointer** if **Coordinate reading on/off** to the right of the coordinates is selected. Coordinates are displayed in the **XY** field in the order east-north and are separated by a single space. The **elevation value Z** to the left of the coordinate field defines the object elevation when objects are created.



Centering map on given coordinates

1. Enter (or paste from the clipboard) the coordinate values in the coordinate field. Note that the east and north coordinates are separated by a single space.
2. Deselect the **Coordinate reading on/off** checkbox to prevent the coordinate values from being updated when you move your mouse pointer on the map.

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3. Click **Center map on the given coordinates** .

Placing an object at the given coordinates

1. Deselect the **Coordinate reading on/off** checkbox.
2. Enter (or paste from the clipboard) the coordinate values in the coordinate field.
3. You can now place any point-type object at these coordinates in the following way:
4. On the object form that is created, click **Create** or **Modify** .
5. Click **Center map on given coordinates** .

Picking the coordinates of an object

You can pick the exact coordinates of an object in the following way:

1. Select **Coordinate reading on/off** .
2. Position the mouse pointer over the object. The exact object coordinates are displayed in the coordinate field.
3. Press the space bar on your keyboard to deselect **Coordinate reading on/off** .
4. This prevents changes to the coordinate values, and you can copy the values to your clipboard.

Changing between coordinate systems

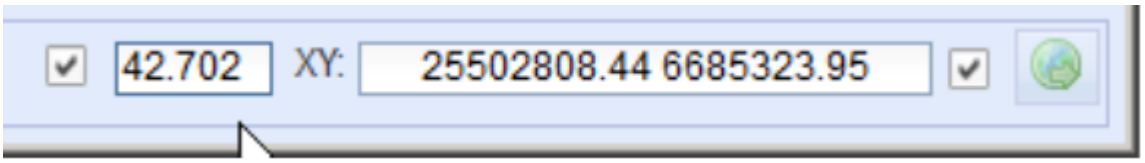
Have the coordinate section display the desired coordinate system by selecting the correct coordinate system from the drop-down menu. The selected coordinate system is used for all functions.

KeyCom uses a default coordinate system that is displayed **in the Coordinate system** drop-down menu **in bold**.

Coordinate elevation (Z coordinate)

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The **value in the coordinate elevation field** to the left of the coordinate field defines the object elevation when objects are created. If the **Active Z lock** checkbox to the left of the elevation field is selected, the field value also defines the coordinate of the new point when snapping to objects. If you want to retain the existing elevation of an object when you edit its location, or if you want to use the elevation of the object you snap to when creating a new one, deselect the **Active Z lock** checkbox. The **Export** function also supports Z coordinates.



You can find further information on snapping to objects and following in the chapter Snapping and following (settings for drawing and modifying).

Snapping and following (settings for drawing and modifying)

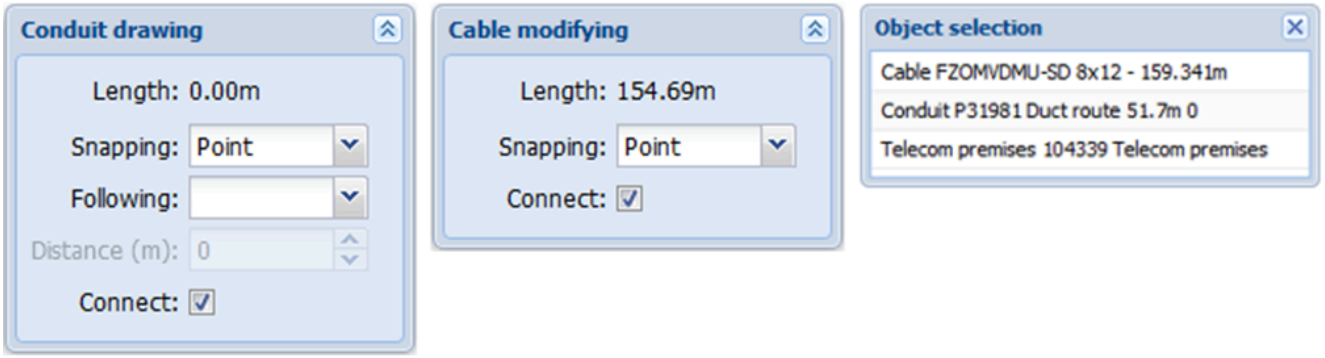
When you create a new object or modify the geometry of an existing object, you can snap to or follow an existing object. When you do that, either the **Drawing options** or **Modifying options** form is displayed.

When you modify an existing geometry, or create a new one, and you press the SHIFT key on your keyboard, the mouse pointer will display the snap search radius. When you hold down the left mouse button while pressing the SHIFT key, the system will search for objects within the snapping radius. If multiple objects are found, a pop-up window for object selection is displayed. You can highlight an object on the map by selecting it from the list in the pop-up window. The object is highlighted on the map in a green colour (). Snap to the object by double-clicking it on the list.

- The **Length** value displays the length of the line object that is drawn or modified.
- The **Snapping** selection list includes two options: **Point** and **Nearest**. If you select **Point**, you can only snap to the existing points of objects. If you select **Nearest**, you can snap to the nearest point on the next object.

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- When you digitize a new line object, you can follow the route of another line object if you select either **Completely** or **Partially** from the drop-down menu for **Following**. You can follow an object by double-clicking it in the Object selection pop-up window.
- If you selected **Completely**, all vertices of the followed object are included in your new object. If you selected **Partially**, you can follow the object for as long as you want. Click on the map to define the point where you want to stop following.
- Change the **Distance (m)** value to follow the route of a line object for the distance you choose. The default distance is 0 metres.
- The **Connect** checkbox enables you to connect a line object while using snapping when starting and ending the drawing of it. When this checkbox is selected, the line object is connected to a point object.



Changing scale

You can zoom the map by clicking **Zoom in**. This zooms the map in while the map center remains the same. Zooming in is carried out one scale level at a time. You can also change the map scale using your **mouse wheel**. When you scroll the mouse wheel away from yourself, the map zooms in, and the map center is the mouse pointer's position on the map.

You can zoom the map out by clicking **Zoom out**. This zooms the map out while the map center remains the same. Zooming out is carried out one scale level at a

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time. You can also zoom out by scrolling the **mouse wheel** towards you. The mouse pointer's position on the map is used as the map center.

You can restore the map view to the default view by clicking **Zoom to max extent**. Click **Zoom to area** to define the area that is used for zooming in. Use the left mouse button to define the area on the map. The map is zoomed in when you release the mouse button.

TIP: You can zoom the map in by holding down the **SHIFT** key and using the left mouse button to select the map area to zoom in. The map is zoomed in when you release the left mouse button. This is a fast way to zoom in to a larger scale.

Using the placement scale for new objects

If you know, when creating an object, that the **printouts** for the area **will be created using a specific scale**, you can use the placement scale when creating the object. For sparsely populated areas, for example, printouts may be created using a smaller scale than the one used for city areas, and, consequently, individual objects may not be clearly visible on the printouts. You can ensure the visibility of objects by using the correct placement scale.

In the **Placement scale menu**, select the scale that will be used for creating printouts. New objects will be created at a size proportional to this scale, and individual objects will thus be visible, for example, in a printout with a 1:2000 scale.



In figure below, a splice on a 1:2000 scale, drawn on a placement scale of 500, 1000, 2000, 5000, 10,000, and 20,000.

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Measuring distance, area size, and perimeter

You can measure distances using the **Distance** tool. Click **Distance** and position the mouse pointer over the starting point on the map to start measuring. Click the **left mouse button** and move your pointer on the map. Enter **points** by clicking the left mouse button. Distance is displayed in the bottom left corner of the screen. The distance information is updated after adding each point. **End** the measuring by **first clicking the left mouse button and then the right mouse button**. Check the total distance.

Measure the area size and perimeter by selecting **Area size and perimeter** on the **Distance** drop-down menu. Add points on the map to view the area and perimeter information for the polygon formed by the points and the mouse pointer. This area information is displayed in the bottom left corner of the screen. Stop drawing by clicking the right mouse button and check the complete area size and perimeter information. Click the left mouse button or **Pan** in **Map tools** to start a new measurement.

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Info tool

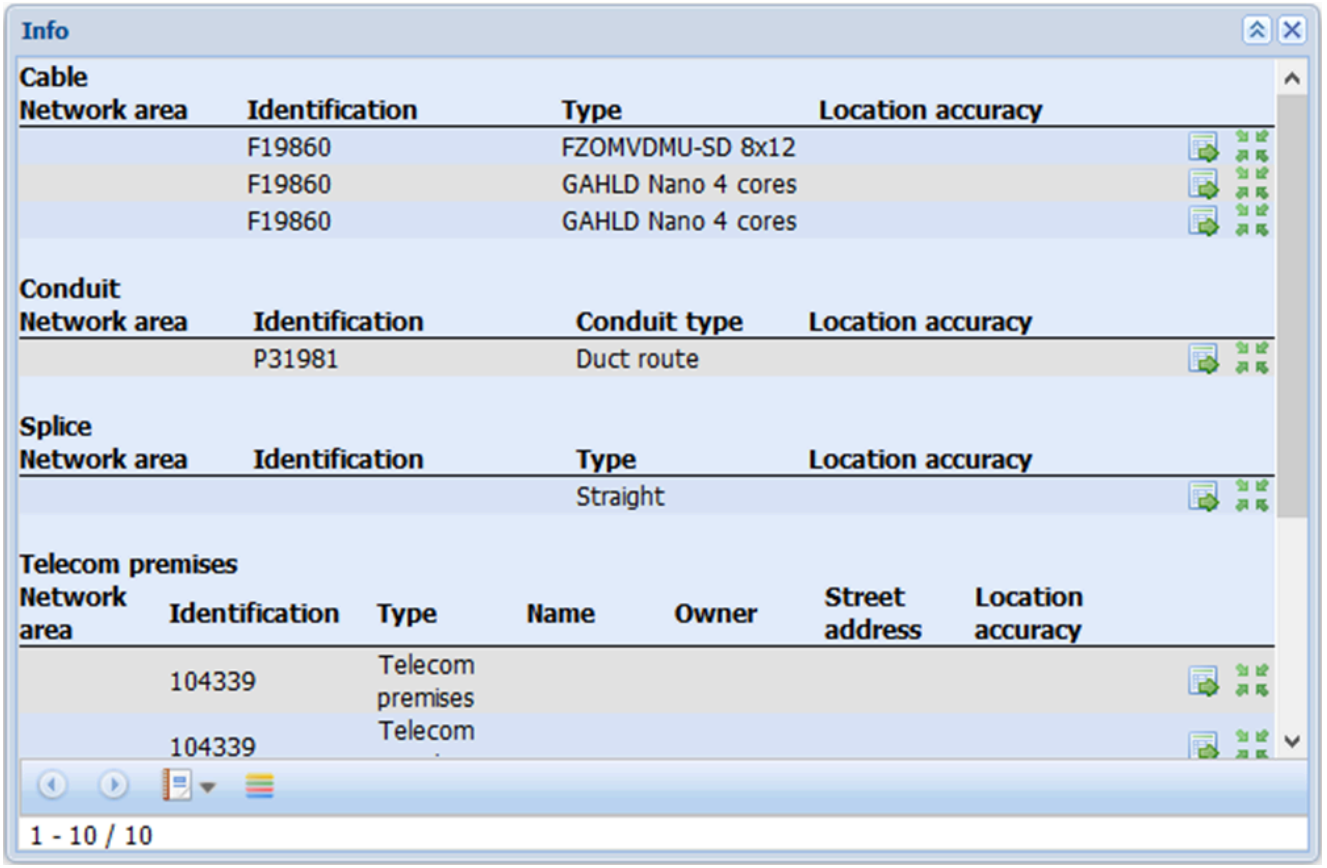
You can use the **Info** tool to view information on map objects. Click **Info** and then use the left mouse button to click the selected **object shown on the map**. You can only select objects that are visible on the map; in other words, only the activated object layers are available. You can retrieve information on more than one object at the same time. There are several possible ways of retrieving information on multiple objects. You can define a rectangular area by selecting the area you want by holding down the left mouse button.

TIP: You can double-click an object on the map using the left mouse button to view the object's information. The application then displays a separate object form on which the object's information is displayed. If there are multiple objects in the area you double-clicked, they are listed, and you can choose the object you want to view.

From the drop-down menu next to the **Info** tool, you can select one of the following three functions: *Map view area*, *Free area*, or *Existing area*. When you select **Map view area**, the software retrieves information on all objects currently displayed on the screen. You can use the **Free area** function to define a free-form area on the map. You can use the **Existing area** function to select an area that has been saved in the system, such as a plan or service area, and to retrieve the objects in that area.

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The query returns an **Info** list in which the **search results are grouped** according to their object type, such as telecom premises and conduits. The information displayed is **basic information** on the network objects, such as ID, type, owner, and usage state. The number of results is displayed at the bottom of the window. If the number of results is large, use the arrow buttons at the bottom of the window to **browse** through them.



Click to center the map on an object of your choosing and to highlight it on the map. Click to modify the object's information on an object form.

TIP: You can limit your search to specific objects by using object layer selection. For example, in the **Layers** tool, select only the **Cables** layer to limit your search to cables.

Exporting data and reports on map objects

1. Select objects on the map as described above.
2. Click **Export** to create a **Bill of materials** for the selected objects. You can also create external file formats using the export function.

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Viewing the results of the Info query in a Group display

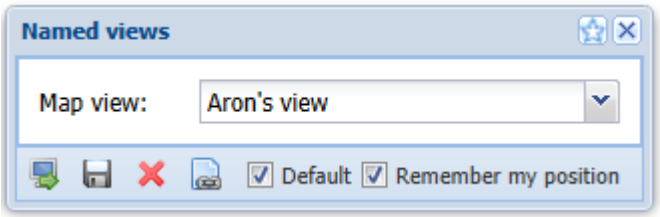
1. Select objects on the map as described above.
2. Click **Show in group display** to view the selected group of objects as **a group of Info tool objects**. The chapter Group display provides further information on the group display.

Map views

You can save the current map view by clicking **Map views**. You can create a new map view using the **Map views** form. You can edit, name, and save map views as necessary, and then return to the map view that you want to view by clicking **Restore view**.You can save several map views and select the map view you need from the drop-down menu. The view you select is then displayed.

Select the **Default** checkbox to define a default map view. The map selected as the default map will be displayed as the initial view the next time you log into the system. When **Remember my position** is selected, the KeyCom application saves the map location, zoom level, open map layers and filter settings. The next time you log in, you can continue from where you were the previous time.

You can also copy the map link of the map view by selecting **Copy map link to clipboard**.



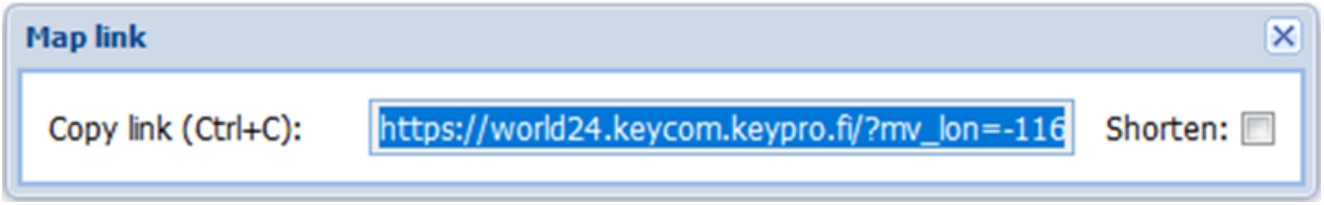
You can also click **Previous view** to return the previous view. This always takes you back to the previous view, one view at a time. Click **Next view** to go to the next view.

Map link

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Copy the current map view and send the URL to, for example, your colleague or co-operation partner.

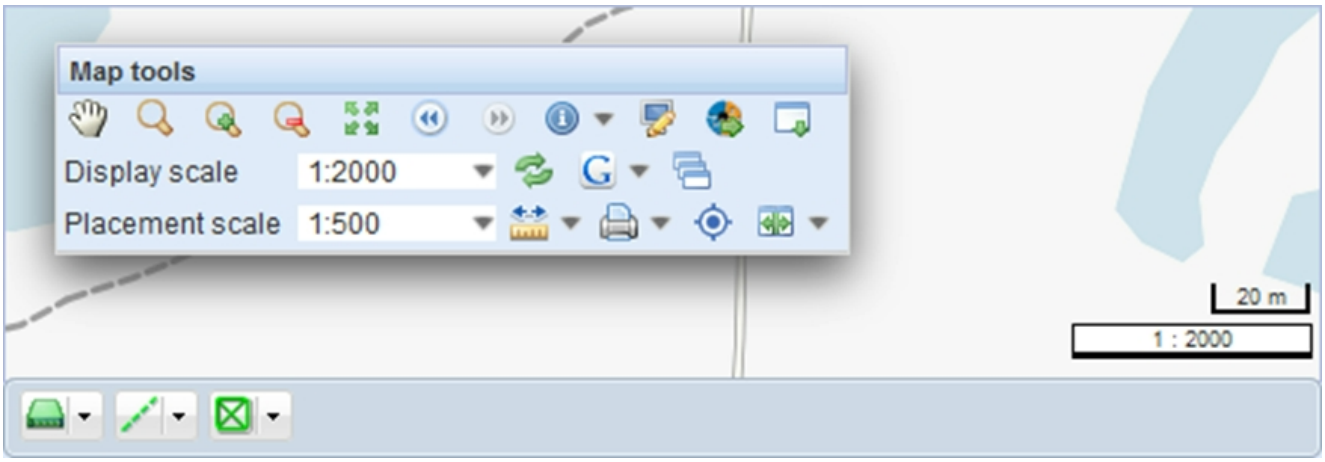
1. Click **Map link** in Map tools.
2. Either select the long form or shorten it by selecting the **Shorten** checkbox.
3. Copy the address.
4. Paste it into an email or add it as a browser bookmark.



To return to the view later, copy the address into your browser's address bar or use the bookmark you saved.

Dock/Undock all windows

Use the **Dock/Undock all windows** option, to dock all open forms to the bar displayed at the bottom of the map view. This tool enables you to clear the map view of all forms in order to get a comprehensive view of the network map. In addition, the toolbar includes user-specific favorites that are introduced in the chapter Favorite tools.



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When you re-click **Dock/Undock all windows**, all docked windows will again be displayed.

Refreshing the map

You can view the changes made to a map by clicking **Refresh map**. This function is useful, for example, when the map data is being updated at the same time **on another workstation**, in which case changes are not necessarily immediately visible in the area that you are viewing.

Google Maps

View the current **map view area** on the Google Maps™ website:

1. Click **Google Maps** to open a new browser tab to view the current KeyCom map view on the Google Maps website.

You can view a **street view** through the Google Maps Street View™ service:

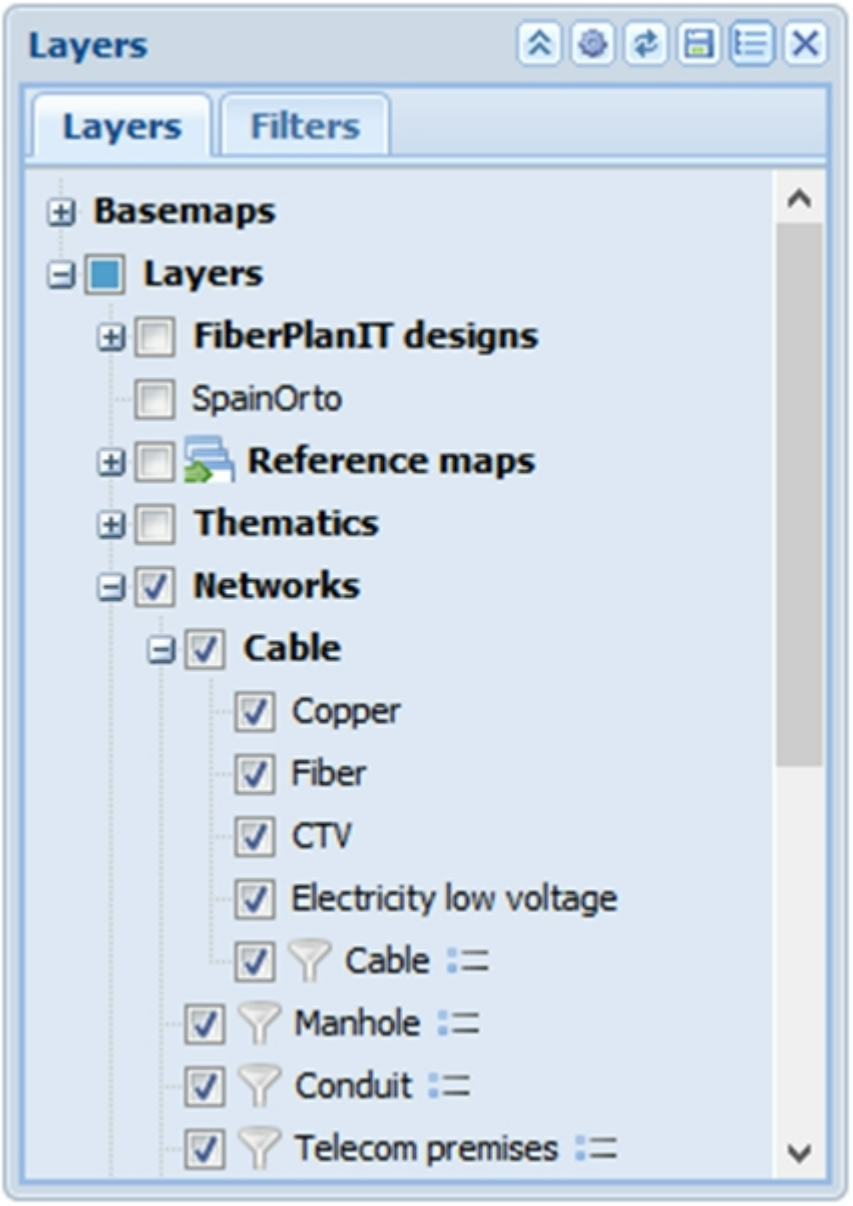
1. In the **Google Maps** drop-down menu, select **Google Maps Street View**.
2. Point to the road/street location that you want to view and click to open the view in question in Google Maps Street View.

These services are provided by Google.

Layers (Layer selection)

You can select the background map and network object layers using the **Layers** tool. Click **Layers** to view the list of objects. The available map layers vary according to what has been agreed.

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You can minimise or maximise the **Layers** tool by clicking the arrow at the top of the form. You can close the form by clicking the cross. You can hide the lists of background maps and lists of object layers by clicking ⊟ in front of the row, and you can expand them by clicking ⊞.

Selecting the background map

The default map is one of the available maps. You can also select some other map as the **default map,** or you can select the option **Empty**, in which case no background map is displayed. Only **one map at a time** can be selected as the background map. The background map helps users understand where the network objects are located, and this map cannot be modified.

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Object layers

The **network object layers** available for selection are listed under object layers. You can select **multiple** layers to be shown **at the same time**. If an object layer is not selected, its objects are not displayed on the map and you therefore cannot pick them from the map for forms. **You should select, as a minimum, those layers that have objects you want to view or edit.**

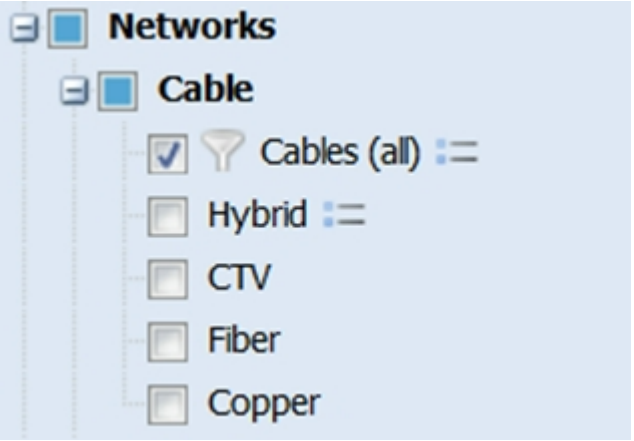
The network objects are layers that are available for selection. In addition, you can select addresses, surveyed objects, highlights, thematics, plans, photos, radio links, annotations, and free texts and lines. Some network objects **cannot be selected if the scale is too small**, that is, if the map is zoomed out too much. Examples of such objects are splices, telecom premises, manholes, and annotations.

The **checkbox** ☑ to the left of an object's name indicates whether the object has been selected. You can remove or add an object by clicking its checkbox. You do not need to refresh the map afterwards as your selections will be applied automatically. If you want to activate all layers at once, select the checkbox for the highest layer (**Layers**).

TIP: The number of objects visible on the map is proportional to the speed with which the map is refreshed. For this reason, we recommend that you only select the layers you need to view on the map.

Sub-layers of the layer hierarchy (This function is subject to a separate order)

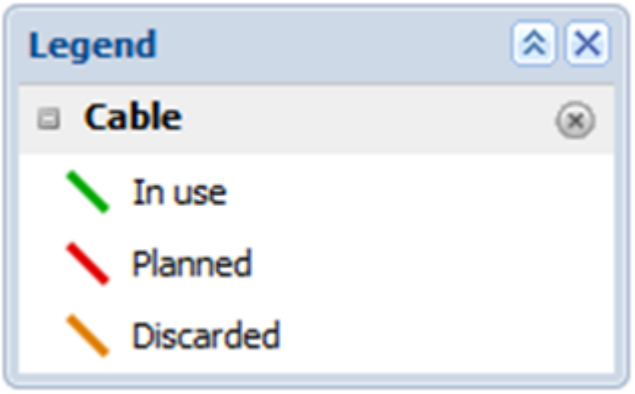
Sub-layers can be added to the layer hierarchy, for example, based on the cable technology. Sub-layers are available as a function that is ordered separately.



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Layer legend and information

The **Legend** of a layer uses symbols and words to describe the type and status of the map objects. To view the **Legend** for a layer, click **Show legend** or use the right mouse button to select **Show legend** from the menu that is displayed. If a legend is not available, the button and the menu item are hidden.



The **Legend** list functions in a manner similar to stacks: when a new legend or thematic is selected in the layer selection, a new group is added on top of the list. You can expand or minimise groups by clicking and or by double-clicking the group header. You can hide a group by clicking .

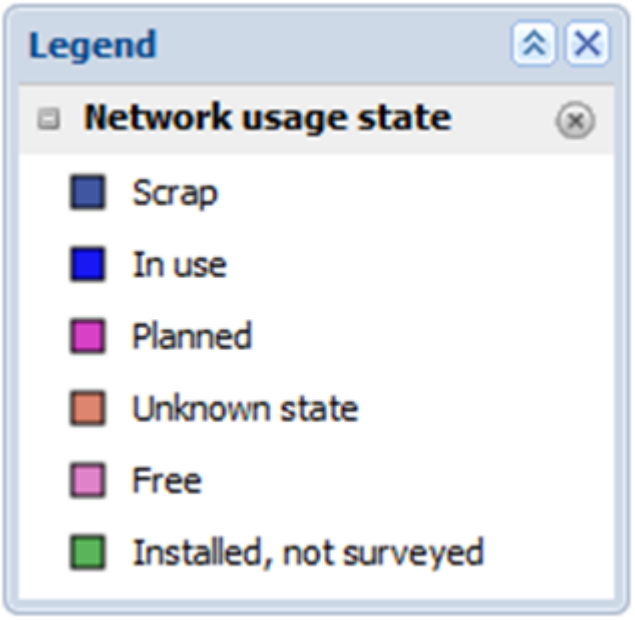
A group is automatically hidden if its layer is not active in the layer selection.

Click **Show details** or select **Show details** in the context menu, which you can open by clicking the right mouse button. As is the case with legends, the button and menu item are hidden if no detailed information is available for the layer.

Thematics

You can view objects on the map based on various object attributes. Thematics highlights objects based on, for example, network usage state or technology. You can view a theme legend by clicking **Show legend** in the context menu or by clicking **Show legend**. The legend displayed shows the colors of the theme and related descriptions, such as information on the various network technologies. Color codes and shapes for legends can be configured through the admin user interface.

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Conduit widths

This layer shows lines of various thicknesses drawn on top of conduits in accordance with the conduit widths.

Survey location accuracy

This layer shows lines drawn on top of line objects (cables, conduits). The width of the lines depends on the **Location accuracy** included in the survey file.

Network usage states

This layer shows KeyCom objects that are colour-coded based on the usage state of each object. You can view the colour codes in the **Thematics legend**. Click the Network usage state level with your right mouse button and select **Show legend**.

Network owners

This layer shows all KeyCom objects that can have Owner as an attribute. Point objects and conduits cannot have an owner, and so they are not shown in this layer.

Network position accuracy

This layer shows lines drawn on top of KeyCom conduits and cables. The width of the lines depends on the location accuracy information available on the **Common settings** tab of the object forms.

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Network technology

This layer shows lines drawn on top of KeyCom cables. The line colour indicates the cable technology. For example, copper cables can be drawn in green while fiber-optic cables are marked in blue.

Cable role

This layer shows lines drawn on top of KeyCom cables, with the line colour indicating the role of the cable.

Installation type

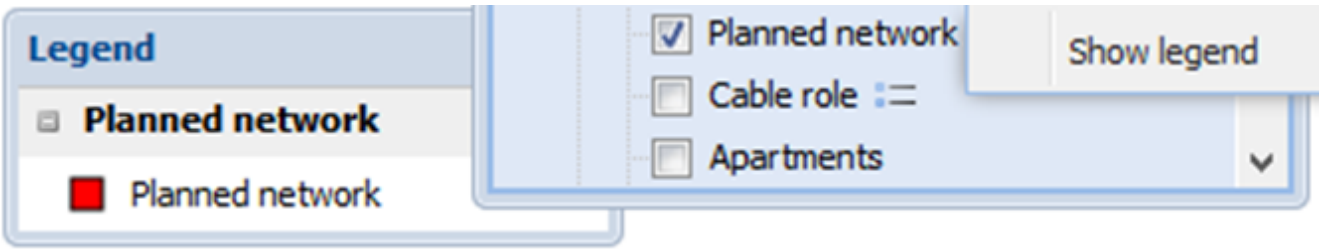
This layer shows lines drawn on top of KeyCom cables. The line colour indicates the type of cable installation.

Cable connections

This layer shows lines drawn on top of KeyCom cables. The line colour indicates the physical state of the cable connection.

Planned network

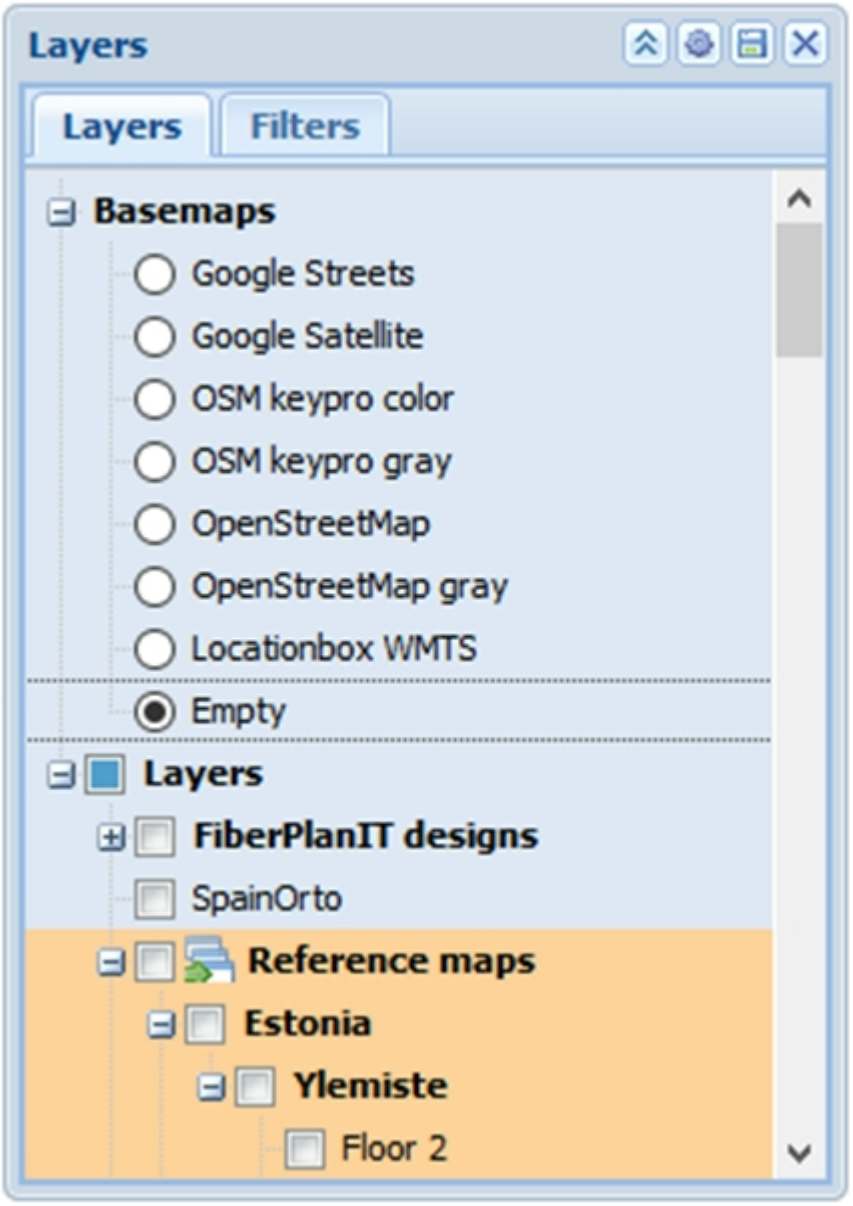
This layer shows all KeyCom objects that have **Planned network** as their **usage state**. The colour coding for planned objects can be seen in the legend. Typically, red is used.



Configuring object layers

You can configure layers into separate groups. You can group similar layers into one group, for example, group all KeyCom objects into one layer, thus making it possible to view or hide them with a single click. Depending on your user rights, you can edit **Layers** by clicking **Configure**. You can configure layers when the background color of the form changes to orange.

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Use your mouse to drag layers to a new location on the list. For example, you can move the **Pole** layer to the **Telecom network** group by grabbing the **Pole** layer with the left mouse button and dragging it to the top of the **Telecom network** group.

You can move layers that you do not use and hide them in the **Ungrouped layers** group. This **Ungrouped layers** group appears at the end of the list when the layer configuration function is activated.

Layer configurations

You can save a **Layer configuration**, i.e. the selected background map and the active layers, by clicking **Save** in the top-right corner of the **Layers** tool. **Layer**

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configurations are saved in the browser cache of the browser that was used and are therefore not available on other computers.

Layer configurations can also be saved in a **database** with a username, in which case the layer configuration is user-specific instead of browser-specific. Save a layer configuration in a database by clicking **Configure**, and wait for the background colour to change to orange. Click **Save** to save the layer configuration in a database.

Upload the saved layer configuration to the **Layers** form by clicking **Reload**. You can restore the original layer configuration settings by clicking **Reset to defaults**.

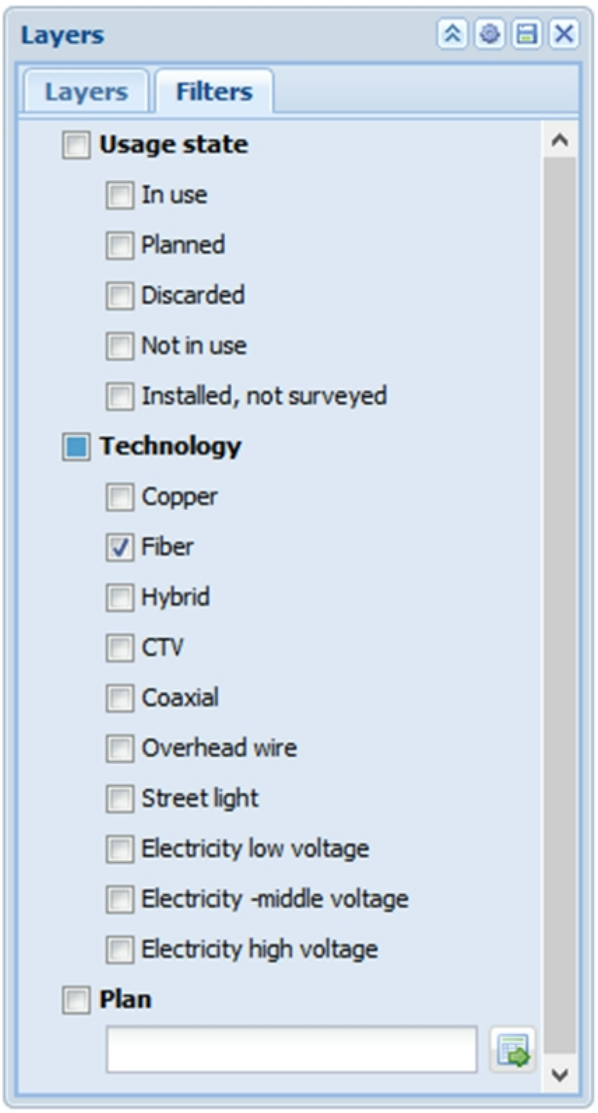
Layer filters

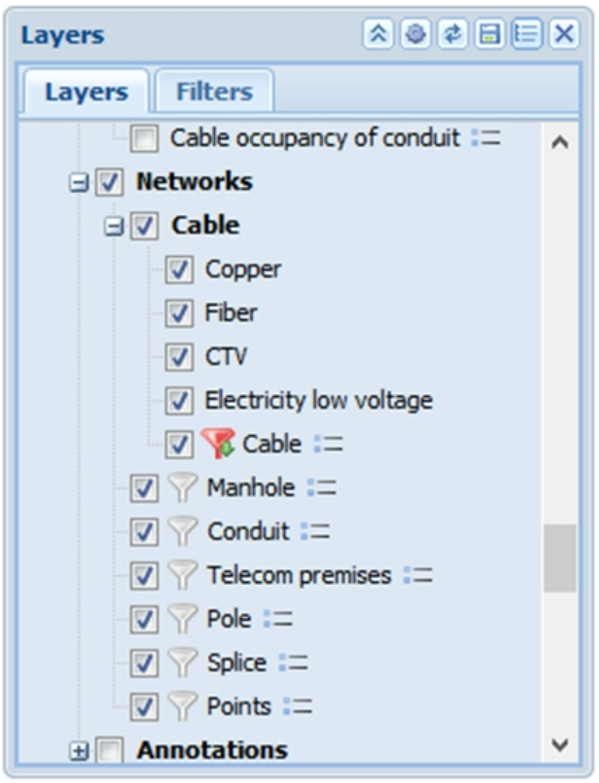
Layer filters are used for limiting the number of objects shown on the map. Objects can be filtered based on **Technology**, **Usage state**, and **Plan**. When filters are used, only the objects selected on the filter form are visible on the map. Only exception comes when filtering telecom premises with technology. Telecom premises which don't contain any devices are shown on the map whether the **Technology** filter is activated or not.

Active filters are marked in the layer selection list: A filtered layer is marked with a highlighted filter symbol. When a filter is not selected, the icon is not highlighted.

For example in the figure, filters for fiber-optic cables are active (left). The icon preceding the filtered layer is highlighted in red (right).

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Printing

Use the **Print** tool for **print series** and **quick print**. **Print series** refers to printouts that consist of one or several parts, whereas **quick print** enables you to quickly create a printout of the map.

Quick print

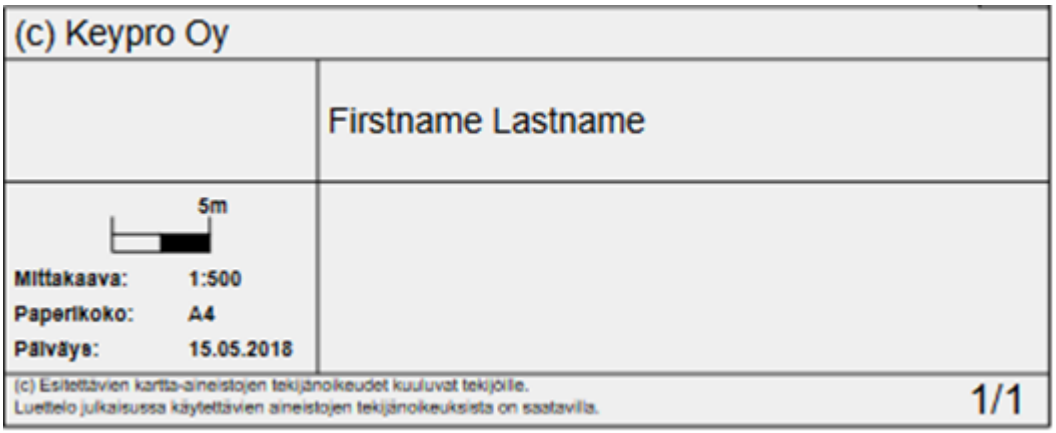
In the Map tools bar, click **Quick print** to access the **Quick print** function. In print settings, you can define settings related to paper size and the display settings for the detailed information to be included in the printout.

Start quick print by filling in the form. The form fields **Paper size** and **DPI** must be completed in accordance with the paper and printer you are going to use. **Paper**

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size means the physical size of the printing paper. In the **Scale 1:** field, Enter the size of the print area as a scale proportion. When the display scale is 1:500, and the same scale is applied to the printout, the printout proportions are the same as in the map view. In addition, you can include a print legend (**Legend**) and a **Theme legend** on the printout. You can also define their **location** on the printout.

The **Print legend** refers to the map legend, which includes information on the paper type, scale, person creating the printout, and date of printing. You can add your own text in the **Note** field.



You can include a **Theme legend** on the printout by going to the **Layers** list and activating those theme levels that you want to include. In the drop-down menu for the theme legend, select the location of the legend. The **Theme legend** on the printout will include the same information as the **Themes** – **Show legend** window.

The borders of the print area (the frame limits) move with the mouse pointer. When you click Quick print, the **Frame digitizing options** and **Frame options** selections are displayed. In **Frame digitizing options**, you can select the snapping point of the movable printing frame by moving it while holding down the SHIFT key. Select **Point** for snapping if you want to move the point to the same location as an existing point. Select **Nearest** for snapping if you want to position the point on top of a line object. This moves the point to the nearest snapping point on the closest line object.

In the **Frame options** window, you can modify the orientation and rotation of the print area on the page. The changes you make are applied immediately to the frame shown on the map.

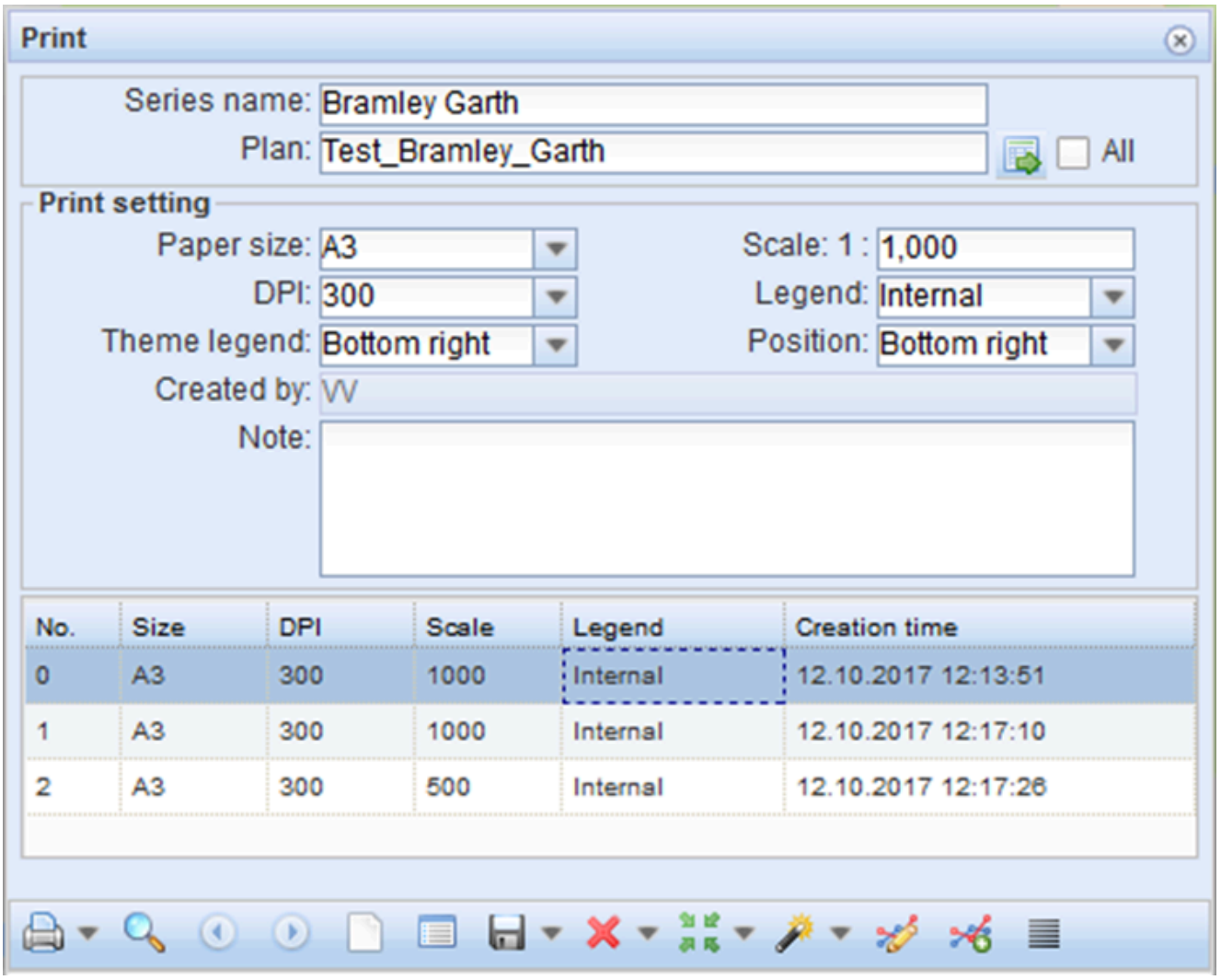
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Use the left mouse button to select the desired location of the frame and print it using the right mouse button or click **Print** on the form to have the browser provide the file in PDF format for downloading.

To relocate the frame, use your left mouse button to point at the red square in the middle of the frame and, while holding the button down, drag the frame to the location you want. Click **Print** to print.

Print series

The difference between **print series** and quick print is that a print series consists of several map printouts (frames). The first page of a **print series** includes an index map showing all the map printouts, and it provides an overview of the individual frames with their numbers and locations. This feature helps to locate the various series printouts on the map. Activate the **Print series** function in the **Print** drop-down menu. The number 0 in the No. field refers to an index map, while the other rows are the created printouts.



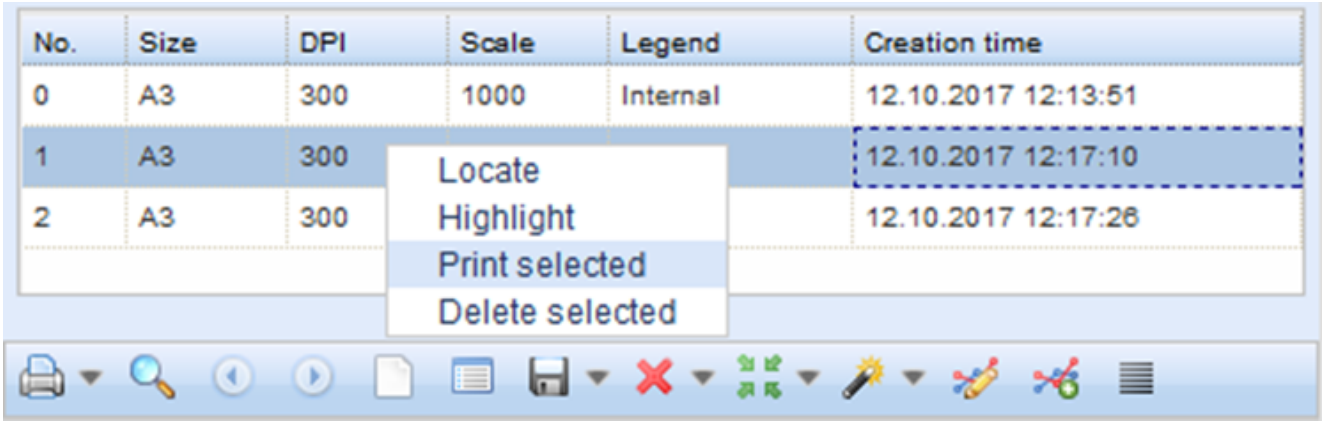
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The **Print series** form includes fields for settings and a field for the printouts (frames). The first row of the **list of frames** is always the title page, and the actual frames are listed below it. The settings information displayed in the form's fields is related to the frame that is active in the list of frames. You can edit and save printout-specific information. You can also create printouts of single frames.

Fill in the form fields as described for quick print. After this, click **Save form** to activate the creation of frames. Click **Create** to start creating map frames. The borders of the print area (frame) move along with the mouse until you select the map location you want by clicking the left mouse button. When you create a print series, the **Frame options** and **Frame digitizing options** are also displayed. Please see the chapter **Quick print** for more details on these.

Click the right mouse button to accept a frame. A new printout line is added to the list of frames on the form. The number of frames is not limited. You can also edit the settings for each frame, for example, modify the scale of the printout.

You can download the **Print series** in PDF format by clicking the **Print** button on the form. The browser will provide a PDF file for download, and this file includes the entire print series. **Print a single frame** by selecting **Print selected** in the drop-down menu for the **Print** button. The frame selected in the list of frames is printed. Alternatively, you can print a frame by clicking a frame on the Print form using the right mouse button and selecting **Print selected**. The menu also includes options for locating, highlighting, and deleting a frame.



You can also use the **Quick print** function on the **Print series** form. The drop-down menu for the **Print** button includes the option **Quick print**.

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Locating yourself

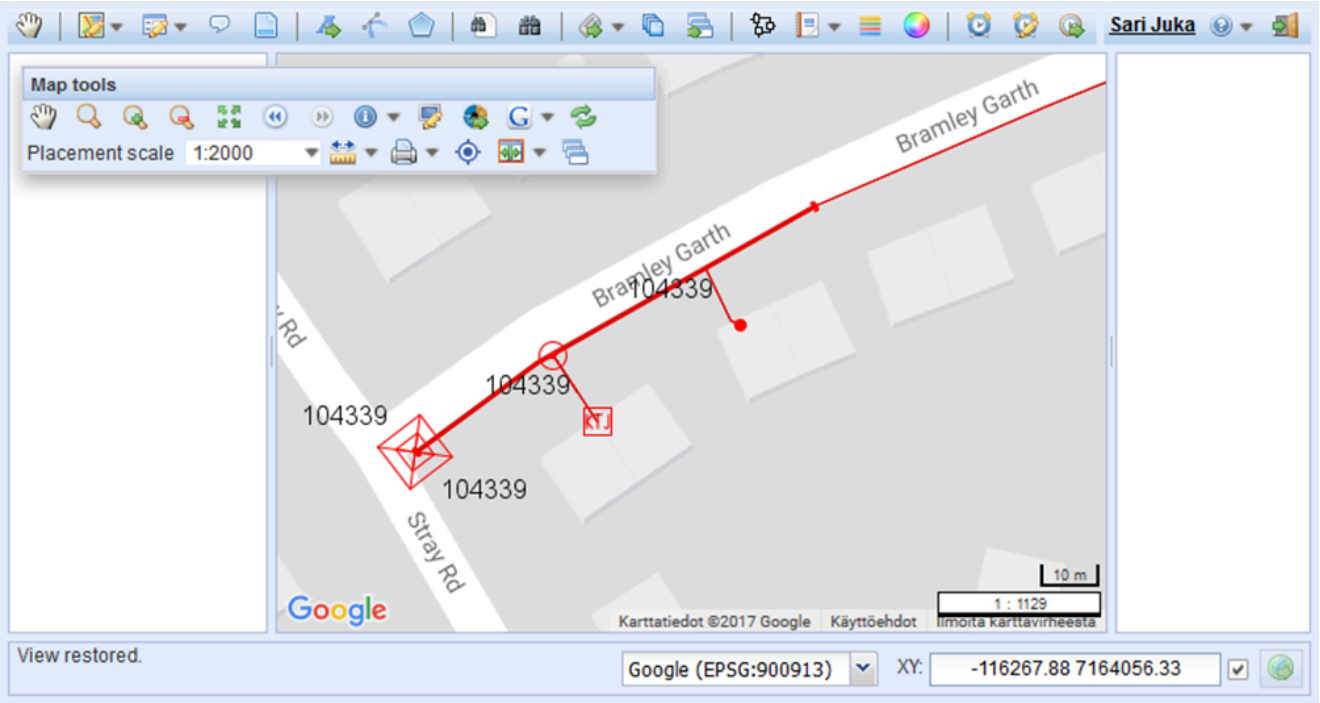
The **Locate** tool enables you to center the map based on the location of your equipment. Depending on the functions of your equipment, your location can be based on, for example, GPS coordinates or the location information obtained from a wireless or fixed network. A cross symbolising the location and a circle representing the margin of error are shown on the map. Please note that the network location information may be extremely inaccurate.



Splitting your display

With the **Split map** tool, you can split your display into two or three sections to view the map in one section and the forms in others, so that they are not on top of the map. Use the tool options to select whether you want to have the new display section on the left or right side of the map view, or on both sides. You can deactivate the **Split map** function using the **Cancel** command in the tool.

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TIP: This is a very useful tool if you are using more than one monitor. For example, you can view the forms on one monitor and the map on another.

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BUTTONS ON OBJECT FORMS

All object forms used for managing objects and events have the **same structure and functions**. Only the **information included** on the object forms varies somewhat depending on the object form. For this reason, each object form can only be used for managing the specific object related to the object form, for example, the Splice form is used for splices and the Telecom premises form is used for telecom premises.

The functions of the buttons displayed at the bottom of object forms are always the same even though the information content of the forms may vary. In other words, the **buttons always function in the same way** for all network objects and on all forms. The buttons that are displayed **depend on the user's privileges**. For example, read-only users cannot update information. If the button is dimmed, it is not available. The button functions are introduced in the next chapters.



In addition to the buttons displayed on an object form, some object forms contain **additional functions** that are used in the same way on all forms. Additional functions are used, for example, for adding dates or address information. These functions are discussed in the chapters Entering a date and Managing address and apartment information on object forms. **The functions of buttons that are not introduced in this Chapter are discussed in connection with the relevant object forms.**

Favorite tools

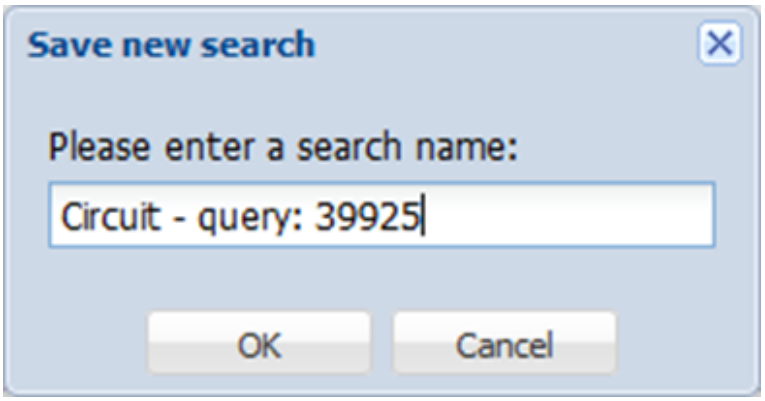
Click **Favorite** in the top-right corner of the form to define the form in question as a favorite. User-defined **favorites** are displayed in the toolbar at the bottom of the map view, from where you can open them quickly. Future version updates may affect your settings concerning your favorites.

You can also save the form's search results as favorites:

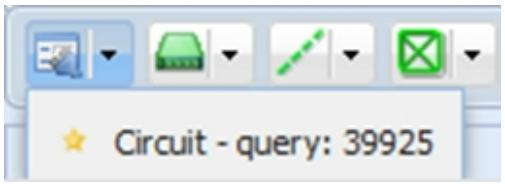
1. Retrieve the required information to the form, as instructed in the Retrieving information to a form and Picking objects from the map chapters.
2. Click the **Favorite** button.

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3. You can enter a name for the search results in the **Save new search** dialogue box.



4. Click **OK**.
5. Your search results are now saved in the **Favorites** toolbar.



Deleting favorites:

Clear the form that you want to remove from your favorites. Click the **Favorites** button at the top. The program will ask you to confirm the deletion of the favorite.

OR:

Right-click the favorite in the bar at the bottom. The program will ask you to confirm the deletion of the favorite.

Note! By deleting the favorite, you delete the search result queries associated with the favorite.

Retrieving information to a form

To retrieve data on all objects to the form, first click **Clear** to clear the form and then click **Search**. If you want to retrieve data on some specific object types, you can define the **search criteria** that are applied to your search. For example, if you want to find information on all telecom premises that are located on Bramley Street, enter **Bramley Street** in the Address field on the **Telecom premises** form and click **Search**. **The number of search results** is displayed in the bottom left corner of the object form. If there is more than one result, you can **browse** through them with the

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arrows. You can enter values in any fields on the form or use a combination of fields to search for objects. If you want to browse through a large number of search results and update information related to some individual search result, the easiest way to do this is to use the **List** function. This function is discussed in more detail in the chapter List.

TIP: You can use **%** as a wildcard character to substitute text when carrying out a search. For example, instead of Bramley Street, enter **Braml%** in the **Address** field to include all addresses starting with **Braml** in the search results. If you enter the character **!** in a field, the search returns objects with no information in that specific field.

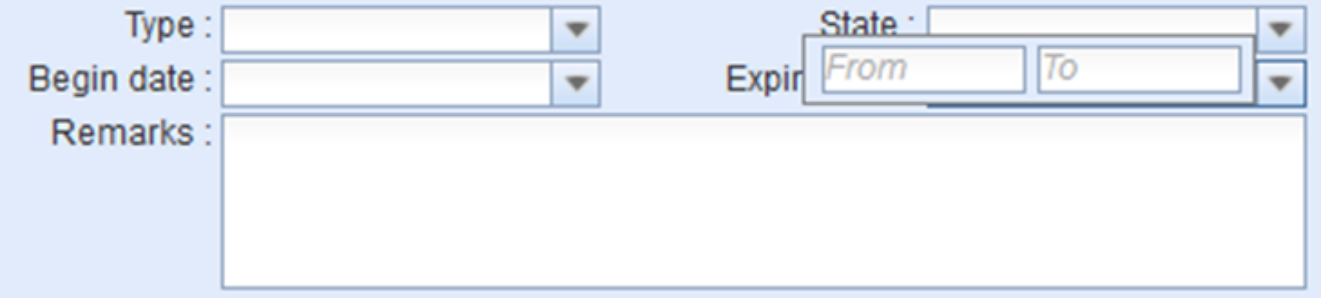
There is an **Identification** field on each object form. Identification refers to the ID of each object. These IDs are automatically generated for each new object. Users can also choose to enter an ID manually. You can use **Identification** as a search criterion when you search an object.

Selecting multiple items

Some forms provide the option to select multiple items for searching. For example, the **Plan** form allows searching for multiple items based on values defined in the **Type** field. Hold the **Ctrl** key down and use the right mouse button to select the values in the **Type** field menu that you want to use as search criteria.

Searching by a date or number range

On some forms, you can search by a date or number range by double-clicking the field for a date or numeric value. When this function is activated, the original date field (or the field for a numeric value) is replaced with two new fields: the start and end values. Enter the relevant search criteria in these fields. When you click **Search** on the object form, all objects with their date (or numeric value) within the entered start and end values (including the entered values) are returned as search results.



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Clearing an object form's fields

You can clear the data in object form fields by clicking **Clear**. This function clears the data in the fields, but it **does not delete the data from the system**. Clear the object form fields before conducting a new search, for example. When you click **Clear**, data on all searched objects for that form is deleted, not only the data related to the object that was displayed on the form. Any highlighting on the map is also removed.

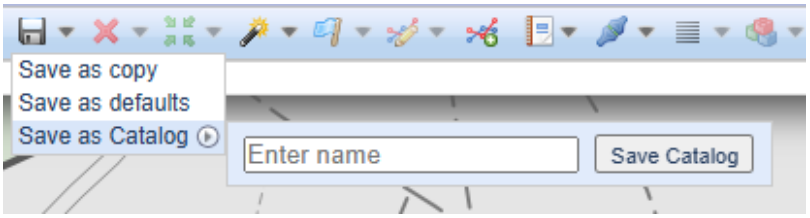
Default form values

You can view the default values for the object form fields by clicking **Defaults**. Values are displayed if they have been entered in the system. Default values can include, for example, the most common property data for an object. Admin users can modify default values. When you add a new object, you can use the **Default** function to speed up the process of entering property values. You can also apply default values when you search a database.

Object template catalogs

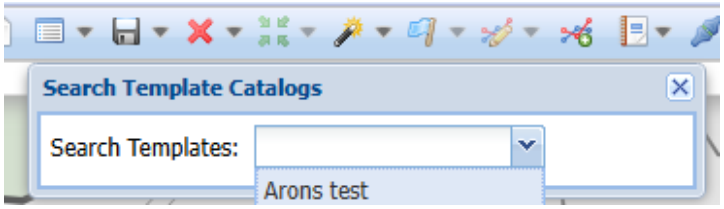
You can also save the values entered in the object form fields and apply them later by selecting a saved template from the **Defaults** drop-down menu under **Template Catalogs**.

1. First, fill the desired object form fields.
2. Then, click **Save as Catalog** and enter a name for the catalog. If the name already exist, the system asks to update the existing catalog.



3. Click **Save Catalog.**

Your template is now saved and can be accessed anytime from the **Defaults** drop-down menu by selecting the correct template.



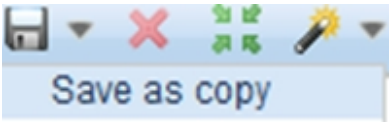
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Updating object data

You can edit an object's information on the form and update the information by clicking **Save form**. For example, if you want to modify the usage state of some telecom premises and add information about the installation year, take the following steps: Open the required telecom premises on the **Telecom premises** form, go to the **Usage state** menu, and select **In use**. Then enter e.g. **2019** in the **Install year** field. Click **Save**.

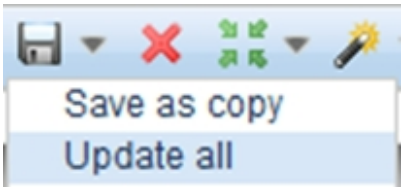
Copying an object as a new object

You can copy an object with the **Save as copy** function. This function creates a new object by using the same property values and location. We recommend using this function, for example, when the intention is to digitize several similar objects in the same place. The Save as copy function is available in the drop-down menu for **Save** .



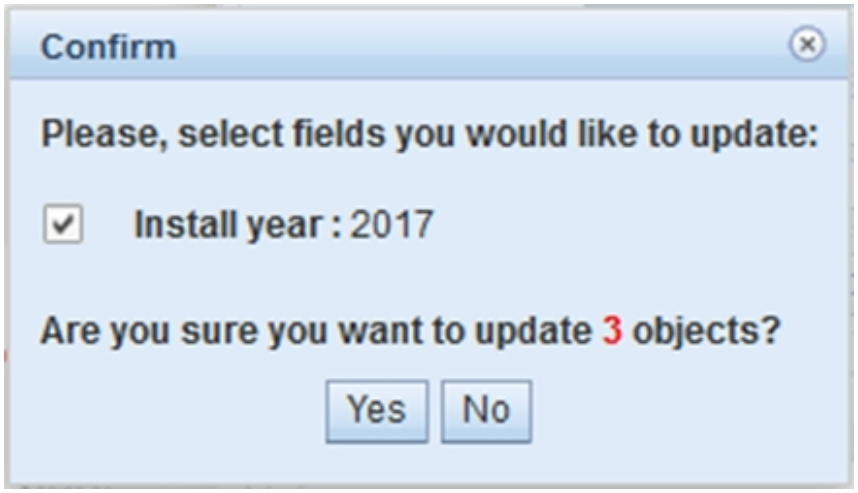
Mass update (Update all)

With Mass update, you can update data for multiple objects at one go. This function is useful in many situations when multiple objects need to be modified simultaneously. The Update all function is available in the drop-down menu for **Save** .



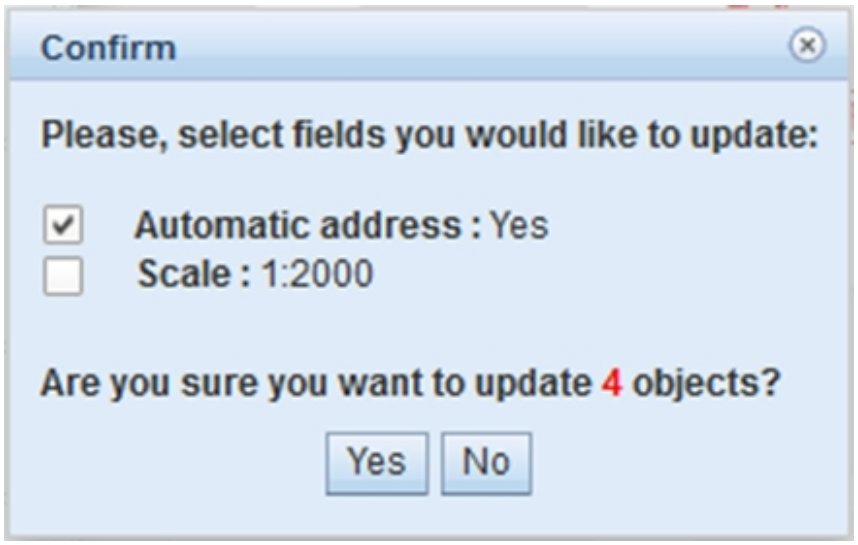
For example, if you want to update the year 2016 as the installation year for all cables in the area, first retrieve information on all the cables in the area (area search) and enter 2016 as the value in the **Install year** field. Then, in the drop-down menu for **Save form**, click **Update all**. On the **Confirm** form, select the information that is to be updated for the objects if you have modified more than one form field.

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Mass update of addresses

On the **Telecom premises**, **Manhole**, **and Splice** forms, you can update addresses to match the nearest address in the search results. First, in the Address section, select the **Autom.** checkbox, then go to the drop-down menu for **Save form** and click **Update all**. The program asks you to confirm the fields that are updated. Click **Yes** to accept changes. You can do this, for example, in order to update incorrect or incomplete addresses of telecom premises.



Deleting objects and mass deletion

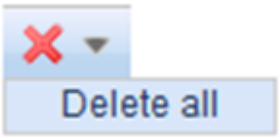
To **delete objects from the system**, retrieve an object through the form and click **Delete** to open the **Confirm** dialogue box. The following dialogue box is displayed: **Are you sure you want to delete this object?** Click **Yes** to delete the object. This

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deletes both the property and location data of the object from the system. In other words, the object is no longer visible on the map and its information is deleted from the database.

You can find an object for deletion by defining search criteria and by clicking **Search** if you have knowledge of some key property value, such as **Identification**. If you know the location of the object, you can pick the object data from the map with the **Pick** function.

A **Delete all** function used by a specific user group may be available to you. This function is form-specific, and you can use it to delete more than one object at the same time. The **Delete all** tool is available in the drop-down menu for **Delete**. **Delete all** is available for objects that have no related circuit reservations or dependencies to other KeyCom objects that would cause problems at the database level. The **Delete all** function will notify the user if an object group includes objects that cannot be deleted.



Locating and highlighting an object

Objects on the form can be **located on the map** by clicking **Locate**. The map is centered on the object that is **highlighted** on the map. Objects can be located if an object's geometry has been stored in the system and it is within the permitted coordinates.

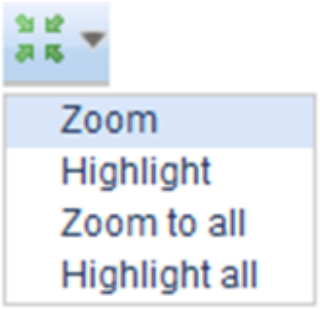
In the example figure, a cable is highlighted on the map.

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The drop-down menu for **Locate** also includes the following options: **Zoom**, **Highlight**, **Zoom to all**, **Highlight all**. These functions are introduced next.

- The **Zoom** selection centers the map on the active object on the form. (Displayed only for objects that have a location.)
- The **Highlight** selection highlights the active object on the map, but the map view does not change. (Displayed only for objects that have a location.)
- The **Zoom to all** selection centers the map so that all objects retrieved to the form fit the map view.
- The **Highlight all** selection highlights all objects downloaded on the form, without changing the map view.



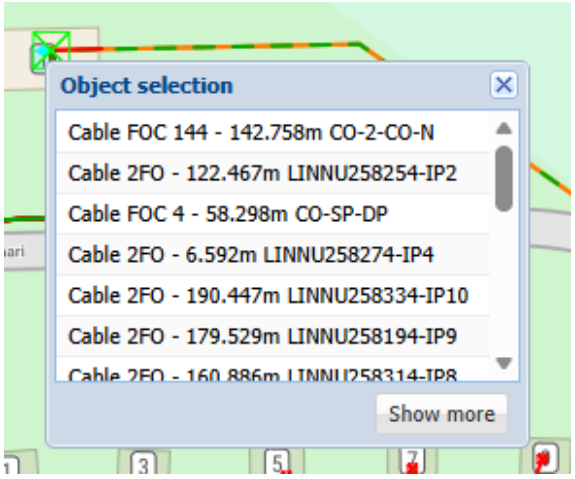
Picking objects

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KeyCom offers several ways to pick objects from the map, depending on what you need: opening a single object's form directly, picking objects through an open form using the **Pick** tool, or searching for multiple objects at once using area searches.

Picking objects by double-clicking

When you double-click an object on the map, KeyCom opens the form for the selected object. If there are multiple objects within the click radius, KeyCom instead displays a pick list so you can choose the object you want to open.



By default, the pick list shows a limited number of results. If there are more objects than fit in the initial list, a **Show more** button appears at the bottom of the list. Clicking **Show more** loads the next batch of results, and you can continue clicking it to load further batches as needed, up to a maximum of 500 objects.

Pick tool on the object form

To pick objects from the map, click **Pick** from any object form and then use the left mouse button to point at the object. The object's information is displayed on the form. You can only pick **objects relevant for the form in question**, that is, if you try to pick telecom premises to a form for splices, the following text is displayed at the bottom of the form: **No matches found.**

TIP: If you want to view the information related to an object whose type you do not know, you can use the **Info** tool. In the **Info** list that is displayed, click **Edit** to access the object's form. The use of the **Info** tool is discussed in more detail in the Info tool chapter.

Area searches

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You can also pick the **data for multiple objects** at once. Click **Pick**. Use the left mouse button to point at the starting point and hold down the mouse button until you have marked the area you want by drawing a rectangular. When you release the left mouse button, the information in the selected area is displayed on the form.

You can also select an area using the functions available in the drop-down menu for **Pick**. **Map view area** retrieves the information on all objects in the map view. You can use the **Free area** function to select the **required free-form area** by placing **points** in required locations using the left mouse button. End the area selection by first clicking the left mouse button and then the right one. The search area is the area within the points you marked on the map.



With the **Existing area** function, you can select a map area that has been created with the **Area** tool (Area, Plan, Service area, Exchange/Telecom area), in which case the search is carried out within the selected area.

If the object form fields are empty when the search is carried out, the search results will include all the objects for the form type. You can use **search criteria** to limit the search results. Enter the search criteria in the fields of the form and click **Pick**. You can then select the **Pick from map** checkbox in the dialogue window that is displayed. Carry out a search as described above for area search functions.

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For example, if you want to view the information on all cables installed in 2016 in a specific area, enter the search criteria on the **Cable** form, that is, enter 2016 in the **Install year** field. After you have defined the search area on the map, the number of search results is displayed in the bottom left corner of the object form. Use the arrow buttons to browse through the search results.

Modifying the geometry of an object

You can modify the geometry of the object on the form, that is, you can edit its location and form by clicking **Modify**. A **Modifying dialogue** is displayed, in which you can select various settings related to modifying the object's geometry. Click **Save form** to update the modified geometry and other form fields.

Modification settings

In the settings for geometry, you can select the snapping point applied to a point that is moved while holding down the **SHIFT** key. Select **Point** for snapping if you want to move the point to the same location as some other point. Use **Nearest** if you want to position a point on top of the line of a line object, meaning the point moves to the nearest point on the nearest straight line.

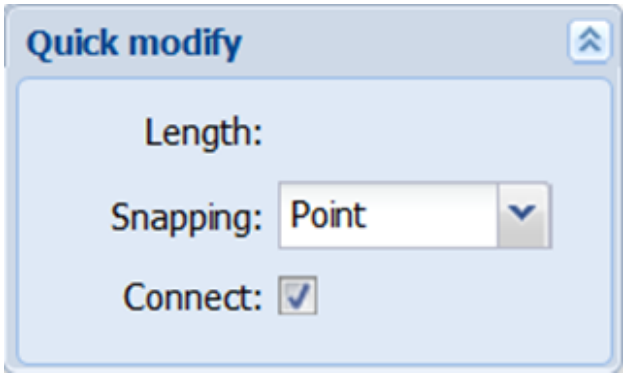
Modifying the geometry of a line object

Line objects can be modified on the **Cable**, **Conduit** and **Line** forms. Select a line object on the map and open its form. Select **Modify** to activate the function for modifying the geometry of the object. Alternatively, you can click on a line object on the map to use the **Quick modify** function.

Quick modify function of a line object

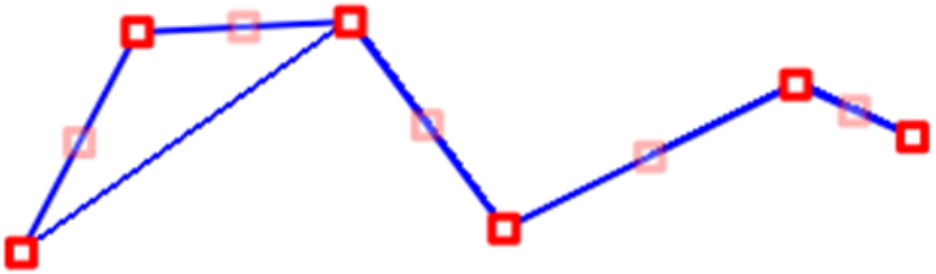
1. Point at the required line object on the map and click the **right mouse button** while holding down the **Control** key. If the map object includes multiple objects, the Object selection window will be displayed. Click the required object with the right mouse button and select **Modify**.
2. Select the required options in the displayed **Quick modify** dialogue box.

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Drag the points highlighted in red to the required location or **remove** them with the **Delete** key. You can snap to another object by holding down the Shift key while releasing the left mouse button.

Click the right mouse button and click **Save** in the **Confirm the move** window to **Save** the changes. Cancel the changes by using the **Cancel** function.

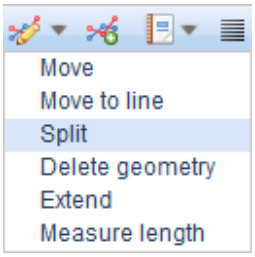


You can use the pink squares to add points. You can move the squares in the same way as the existing points. Position your mouse pointer over a square, grab it while holding the left mouse button down and relocate the square. When you release the left mouse button, the square becomes a **new** point. In addition, new pink squares appear on the line between the new and existing points. These can be used to create further new points.

Splitting a line object

The **Split** tool is displayed in the drop-down menu for **Modify** when an object can be split.

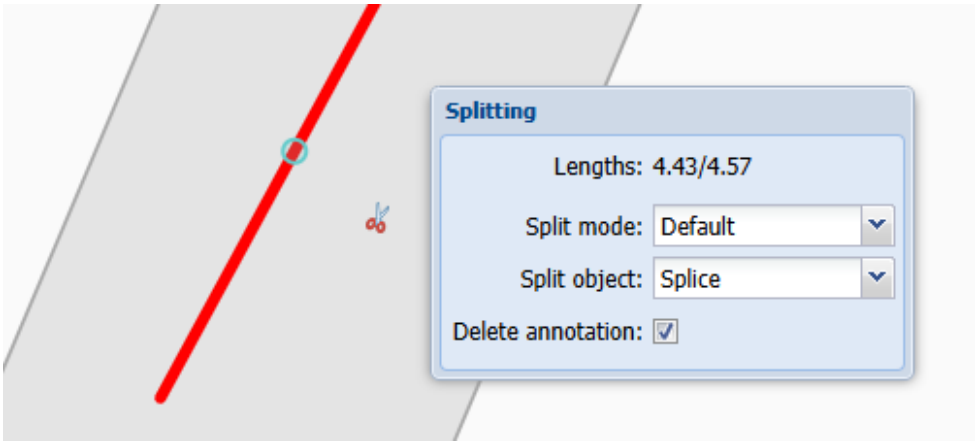
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The function highlights the selected object on the map and displays the **Splitting** dialogue box. The dialogue box displays the **lengths** of the parts to be split. These lengths are automatically updated based on the selected splitting point.

- When splitting a line object, the **Split object** field in the **Splitting** dialog allows you to define the object that will be created at the split location.
- The **Delete annotation** selection is used to automatically remove from the map any annotations related to the object.

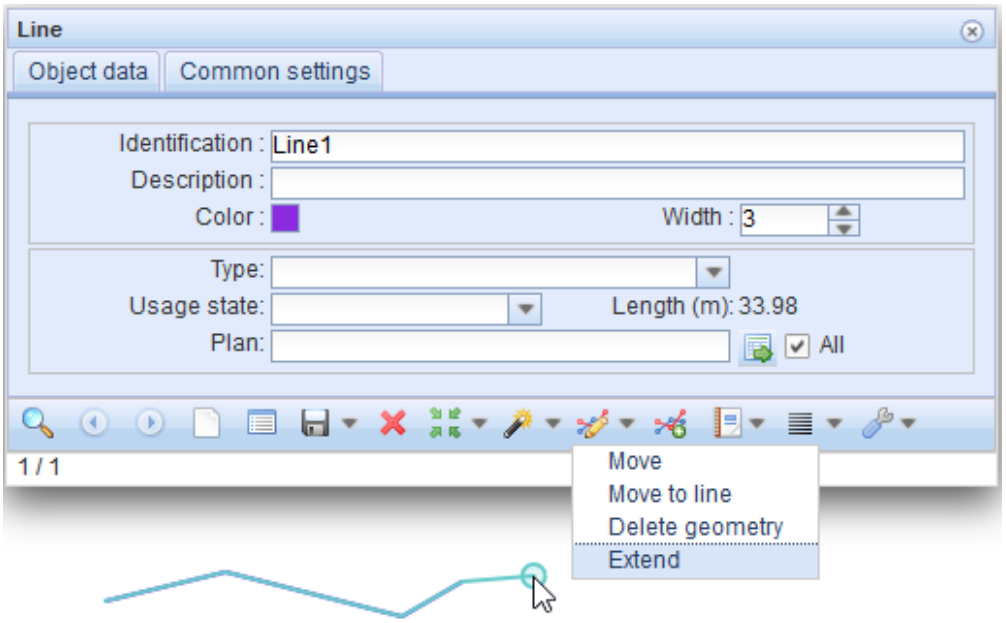
Select the point where you want to split the object and click the left mouse button to accept the split. Both objects created through splitting are now displayed on the form. Use the arrow buttons to browse through the objects.



Extending a line object

A line object (cables, conduits) can be extended from the end that has not been connected. Activate this function in the drop-down menu for **Modify**. The **Drawing options** dialogue is also displayed. The functions of the **Drawing options** dialogue are described in the chapter Snapping and following (settings for drawing and modifying).

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To continue the digitization of the object from its end point, create new **points** in required locations using the left mouse button. Create the **end point** of the object by **first clicking the left mouse button and then the right mouse button**. The object's location and property values are automatically saved in the database.

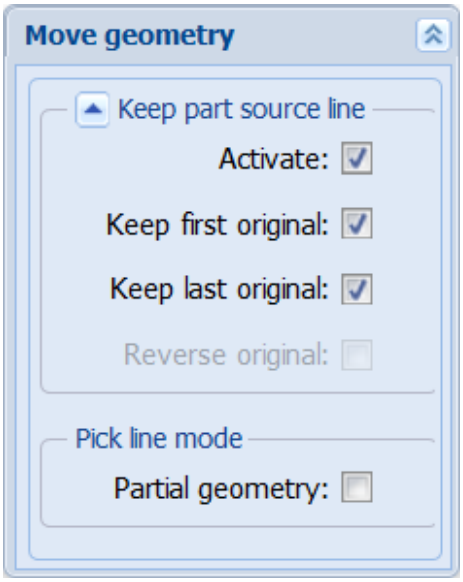
Moving a line object to a line

You can move a line object to match the location of a linear geometry, cable, conduit or any other line object.

1. In the drop-down menu for the **Modify** function on the form, select **Move to line**.
2. Select the required options in the displayed **Move to line** dialogue box:
   - **Activate**: With this option, you can maintain a part of the line's original location, while another part is moved to a new target line. Activate the additional functions for the line that is to be moved:
   - **Keep first original**: Keeps the first part of the line unchanged up to the point where you click the line
   - **Keep last original**: Keeps the last part of the line unchanged from the point where you click the line

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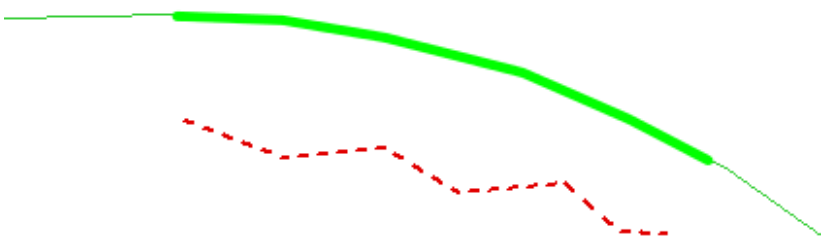
- **Reverse original**: Reverses the order of the start and end points of the line to be moved
- **Pick line mode**: **Partial geometry**: You can choose a part of a route on both lines: the one you want to move and the target line.



3. With the left mouse button, **point** at the line to which you want to move an object.
4. **Stop** the line selection by clicking the right mouse button. The new location of the object to be moved is highlighted in green.
5. **Accept** the object move by clicking **Save** or cancel the move by clicking on **Clear**.

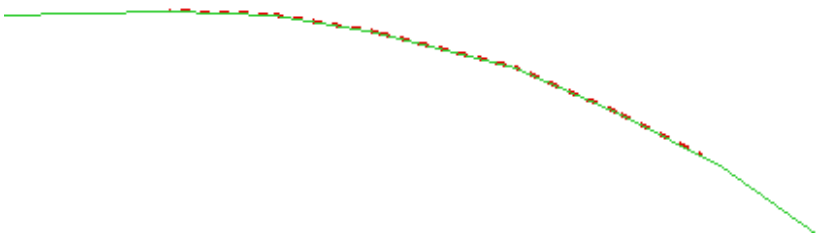
Note! If you have selected functions that keep a part of the original line unchanged, the **Reverse original** function will not be activated before you have selected the start and end points for both the line to be moved and the target line.

The **Move to line** function has been activated. The thin green line is the linear geometry. The thicker green line represents the new location of the object that is moved.



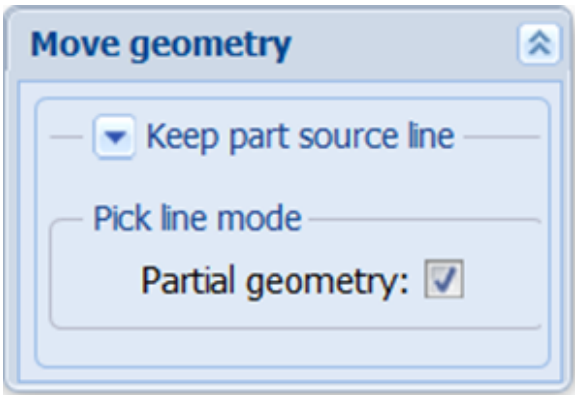
In the example figure below, the move has been accepted.

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Moving a line object partially to a line

1. In the drop-down menu for the **Modify** function on the form, select **Move to line**.
2. In the **Move to line** dialogue box, select the **Partial geometry** checkbox.



3. Point at the map object (line, conduit, cable) to which the line is moved.
4. Select the starting point on the target line.
5. Select the end point on the target line.
6. Repeat items 0–0 if you want the object to follow more than one line.
7. Right-click to end the line selection. The new location of the object to be moved is highlighted in green.
8. Accept the object's move by clicking **Save form** on the form or reject it with the **Clear** button.

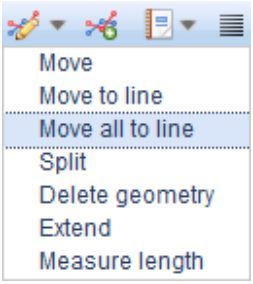
In the example figure, the starting point is displayed as a blue square, while the real-time location is displayed as a light blue circle.

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Mass movement of line objects

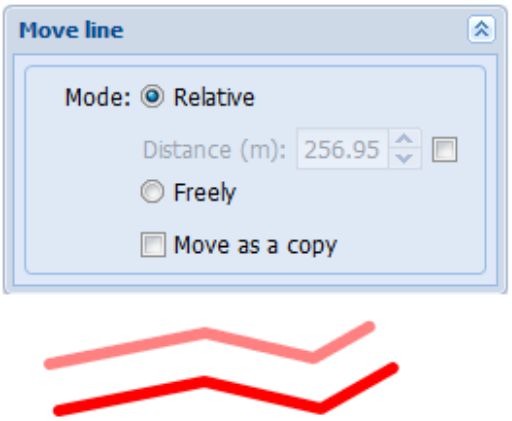
In the drop-down menu for the form's **Modify** function, select **Move all to line** to activate a mass transfer. Note that more than one line object must be retrieved to the form to make mass movement possible. Take same actions as when moving a line object, as explained in the chapters Moving a line object to a line and Moving a line object partially to a line



Moving a line object

You can move a line object on the map either freely by dragging it using the left mouse button or relatively by defining the distance from the original location.

In the drop-down menu for the **Modify** function on the form, select **Move**. The object is highlighted on the map and a **Move** dialogue box is displayed, in which you can select the **Mode** of movement.

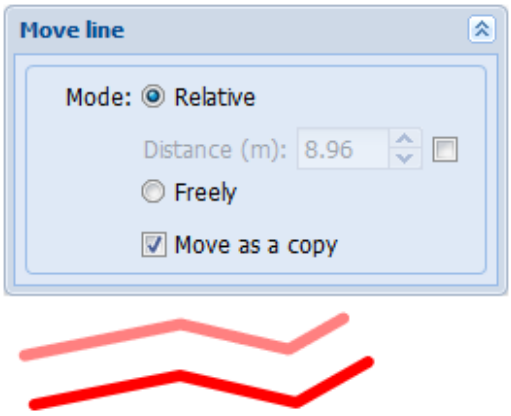


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Select **Relative** to move an object horizontally or vertically for the number of metres displayed in the **Distance** field. Click the left mouse button to accept the location, and click **Save form** to save it.

Select **Freely** to move an object by positioning your mouse pointer **over the red square** and **move** the object to a new location **while holding down the left mouse button**. Release the left mouse button. Click **Save form** on the form to save the new location information.

Selecting the **Move as a copy** checkbox makes it possible to copy the object to a new location.



Measuring the length of a line object

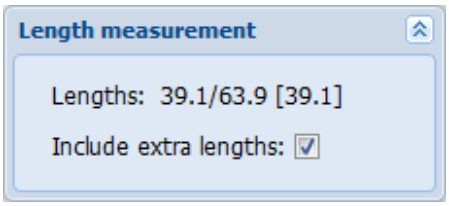
Use the **Measure length** tool to measure line objects. For example, if a fault occurs, you can use the **Measure length** tool to measure the length of a cable on the map.

In the drop-down menu for the **Modify** function on the **Cable** or **Conduit** form, select **Measure length** to activate the tool. Start measuring by following the line object using your mouse. Click the right mouse button to stop measuring. The first figure displayed after **Lengths** is the length from the start of the cable, and the second one is the remaining length to the end of the cable (39.1/63.9 in the example figure). The figure in square brackets refers to the cable reading. When the **Include extra lengths** checkbox is selected, the measurements will also include any loops/coils and their lengths.

TIP: You can use the **Length measurement** function to add an annotation for an object: Click the line object and position the annotation by using the left mouse

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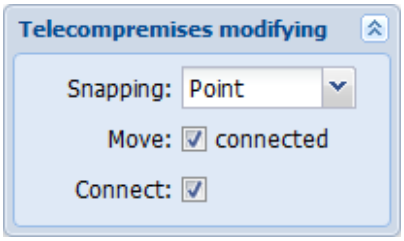
button. Further information on adding annotations is included in the chapter Annotations.



Modifying the geometry of a point object

Modifying the location of a **point object**, such as a pole, is carried out in the same way as for line objects, the only difference being that there is only one point. Click **Modify** to have modified object be highlighted in red on the map. When you position your mouse **over the object**, the mouse pointer changes from an arrow to a cross. Click the object with the left mouse button and **hold the button down** while moving the object to a new location. Release the mouse button. Click **Save form** to save changes.

For some point objects, such as telecom premises, any objects connected to them can also be moved. The modification dialogue box for such objects includes a **Move connected** checkbox. If this **Move connected** checkbox is selected, any objects connected to the point object will also be moved. In addition, you can connect a point object, such as **Telecom premises**, when you make modifications.



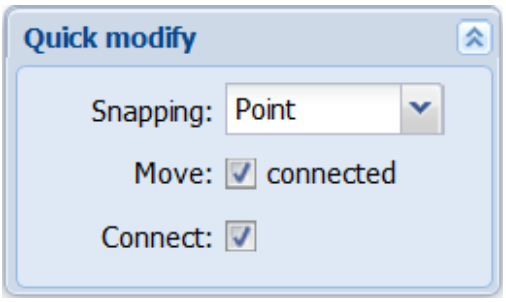
The quick modify function of a point object

1. Point at the required point object on the map and click the **right mouse button** while holding down the **Control** key. If the map object includes multiple objects,

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the Object selection window will be displayed. Click the required object with the right mouse button and select **Modify** .

2. Select the required options in the displayed **Quick modify** dialogue box.

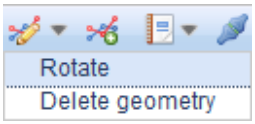


Drag the red square to the required location. You can snap to another object by holding down the Shift key while releasing the left mouse button.

Click the right mouse button and click **Save** in the **Confirm the move** window to **Save** the changes. Cancel the changes by using the **Cancel** function.

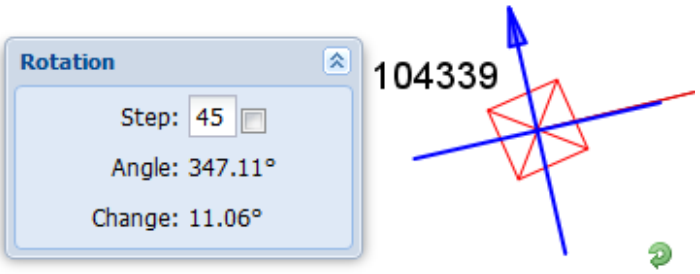
Rotating a point object

You can rotate the symbols of point objects (pole, telecom premises, point object, splice) on the map. You can select the rotation angle of an object by selecting **Rotate**. Click the **Save form** button to save the new rotation angle of the object.



When you click **Rotate**, a **Rotation** form is displayed. You can enter the required angle in the field on this form. You can use the form to define the **steps** as degrees. If Steps is selected, the rotation angle of the selected object changes in steps when you rotate the object. **Angle** displays the rotation angle of the object. You can rotate an object by grabbing the symbol next to the object on the map. Click **Save form** on the form to accept the rotation angle. If you do not want the object to have a rotation angle, cancel it with the right mouse button.

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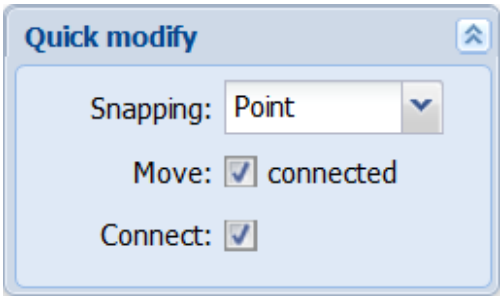


Modifying the geometry of an area

You can modify the geometry of an **Area** (such as a Free area, Service area, Exchange/Telecom area) by clicking **Modify** on the object form. The points of the area are highlighted, and they can be dragged using the left mouse button. To create a new point, click the dimmed square in the middle of a straight line and drag it to a new location. Click **Save form** to save changes.

Quick modify function of an area object

1. Point at the required area object on the map and click the **right mouse button** while holding down the **Control** key. If the map object includes multiple objects, the **Object selection** window will be displayed. Click the required object with the right mouse button and select **Modify** .
2. Select the required options in the displayed **Quick modify** dialogue box.

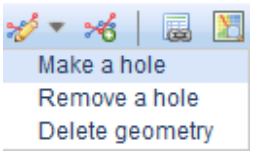


3. **Drag** the points highlighted in red to the required location or **remove** them with the **Delete** key. You can snap to another object by holding down the **Shift** key while releasing the left mouse button.
4. Click the right mouse button and click **Save** in the **Confirm the move** window to **Save** the changes. Cancel the changes by using the **Pan** function.

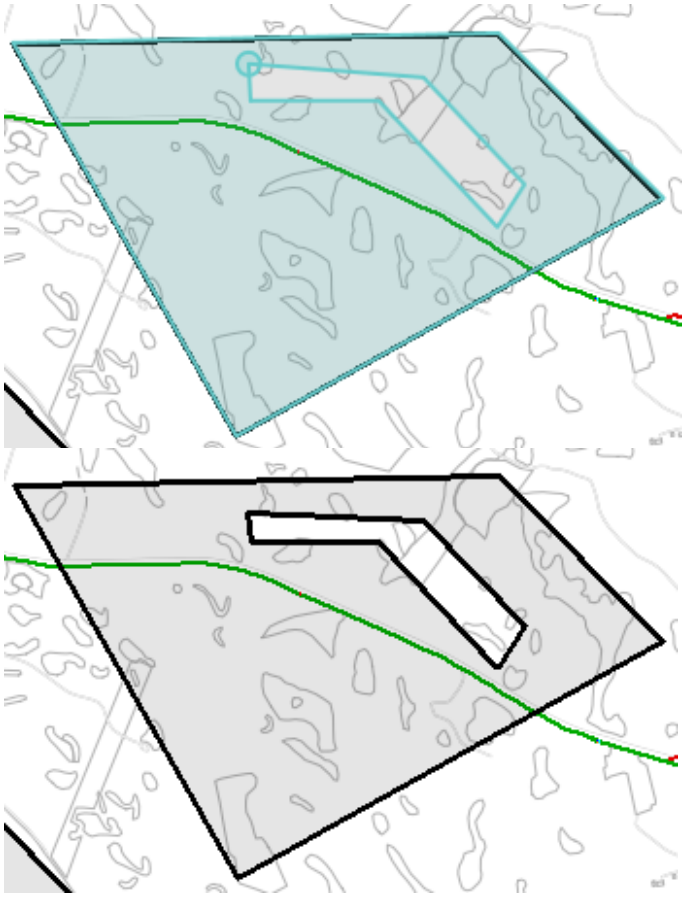
Digitizing a hole in an area object

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1. In the drop-down menu for **Modify**, select **Make a hole**.



2. Within the highlighted area, draw a hole that has the required shape.



When you stop drawing, the form is saved and the hole has been created.

Removing a hole in an area

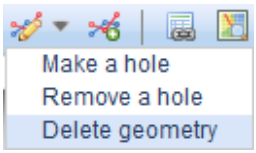
1. In the drop-down menu for **Modify**, select **Remove a hole**.
2. Click the hole you want to remove.
3. Confirm the removal.

Deleting the geometry of an object

You can find the **Delete geometry** function in the drop-down menu next to **Modify**. This function deletes the geometry of the selected object making the object

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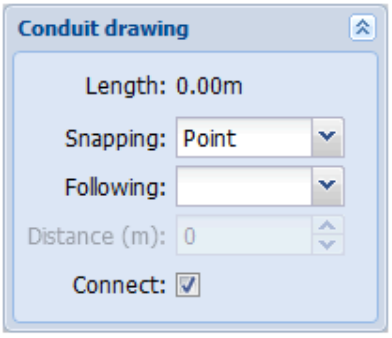
disappear from the map. The property data for the object is not changed.

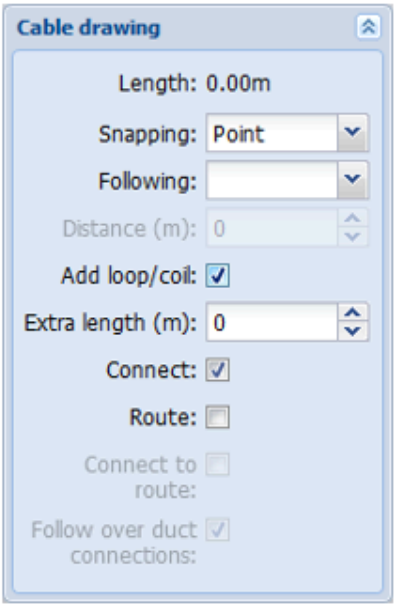


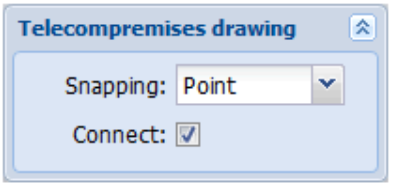
Creating a new object

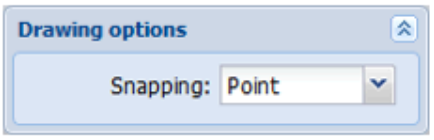
Create a new object by defining its location, that is its geometry. Click **Create** to do this. Always select the correct object form. For example, use the Conduit form to create a new conduit, and the Telecom premises form to create new telecom premises. You are usually required to provide at least some **mandatory information** on the form before you can create an object. You can add other object data either before or after creating a new object. Save the object data by clicking **Save form**.

Click **Create** to open the **Drawing** form, such as the **Cable drawing** form for creating a new cable. This form lets you define various settings related to drawing an object. The drawing settings of both **point objects** and **line objects** include **Snapping**, and you can choose whether the object you create snaps to another object's point or the nearest point. The settings for line objects also include **Follow**. You can follow either Completely or Partially. Further information on following and snapping to objects is available in the Snapping and following (settings for drawing and modifying) chapter. The settings for **Drawing** vary, depending on the object that is drawn. In general, line objects have more setting options than point objects.









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Creating a new line object

The drawing settings for **line objects** include the option **Following**. You can use this function, for example, when you digitize a cable to go through a conduit. When you have selected the option **Completely** for **Following**, point at the starting point of the conduit to have the line object you create follow through all the points of the conduit and to continue digitization from the ending point of the conduit. However, if you want to follow the conduit only partly, you can select the Following option **Partially**. This lets you follow the conduit to the required point, after which you can continue digitizing freely. If you want to follow an object in parallel within a specific distance, define **Distance** in the drawing settings. You can also add loops/coils with defined lengths and measure the length of the cable. Cable lengths are discussed in more detail in the Cable length, extra length and total length chapter.

Start creating the geometry of a **line object** by clicking the required starting point on the map using the **left mouse button**. Next, digitize the required **points** one by one by clicking the left mouse button at the relevant locations. Finally, end the digitization by **first clicking the left mouse button and then the right mouse button**. The object's location and property values are automatically saved in the database. You can select the **Connect** checkbox, for example, to automatically connect a cable to a manhole. Connecting a cable to a manhole has been discussed in the chapter **KeyCom object forms**, in the section Cable connections.



The new cable can be connected to telecom premises or a splice already when the cable is created. When you digitize a cable, you use the so-called **Snapping** function, that is, hold the SHIFT key down while clicking the left mouse button over telecom premises or a splice. This makes it possible to connect the cable to the object, and a text is displayed at the bottom of the display: **Snapping completed.** If a text **Snapping – not snapped** is displayed at the bottom of the display, you have tried to connect the cable to an object it cannot be connected to. If a cable is created to an existing conduit, you can also snap to the points of the conduit. In this case, the conduit and cable are located in exactly the same place. When the **Snapping** function is active, the mouse pointer on the map is displayed as a light-blue circle. End digitizing the cable by first clicking the left mouse button and then the right mouse button at the location where the cable ends. The cable's location and property values are saved in the database.

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Creating a new point object

Create a new **point object** by clicking the **left mouse button** at the required location on the map. The program automatically saves the geometry of the object in the database. If saving succeeds, the following text is displayed at the bottom of the object form: **Saved successfully**. The object's location and property values were saved in the database. The **rotation** function for a point object is activated immediately after the object has been created. A blue compass symbol appears over the object, indicating the rotation angle of the object. If you want to modify the object's rotation angle, grab the symbol using the left mouse button and rotate it to the required angle.

An object can also be placed on the map based on coordinates. First, deselect the **Coordinate reading on/off** checkbox in the bottom right corner of the map view and enter the coordinates for the required location. Then, click the button to create a new object on the map in the desired location. **Save form.**

Creating new objects by using existing objects

You can create new objects based on the location of and information on existing objects:

Retrieve an object's information to the form, for example, by picking an object from the map. After this, either

1. click **Create** to create a new object based on the object information retrieved to the form. The program calculates the length of a line object based on the geometry of the new object.

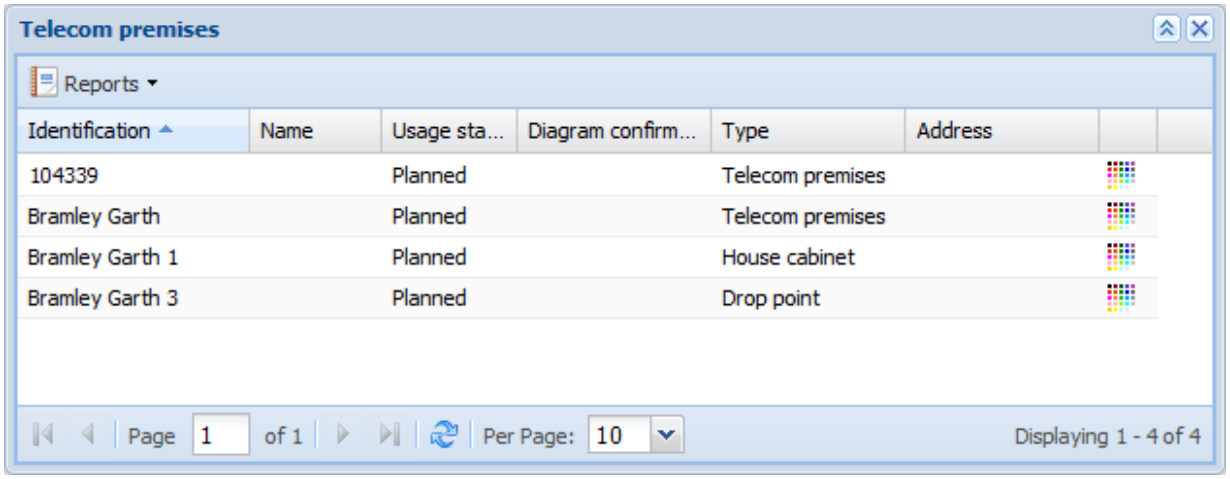
OR

1. In the drop-down menu for **Save form**, click **Save as copy**. A copy of the active object is saved on top of the existing object. This is a useful function, for example, when the same location is used for saving several cables.

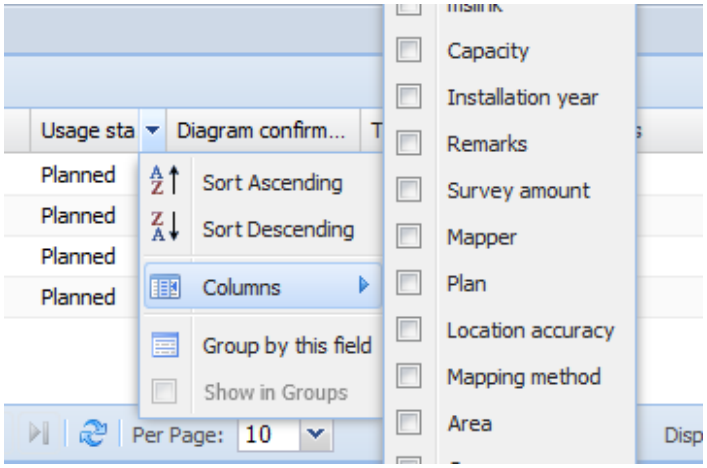
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List

Many object forms include a **List** button. You can use it to view the search result objects in a list view. You can use this function to quickly browse through objects. The number of objects displayed on one page can be modified using the **Per page** selection. Use the arrow buttons to navigate the pages.



To view the tools related to the list, position your mouse pointer over the header field of a column. This displays a drop-down menu for the selected field .

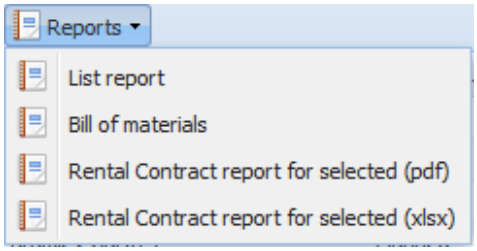


The menu includes an option for sorting the list based on the selected field either in ascending or descending order. The **Columns** function lets you select the columns that are displayed in the list view. The lists include the typical information for the object type as default data. The **Group by this field** function groups the list contents based on the selected field. The grouping can be cancelled by deselecting the **Show in groups** checkbox in the drop-down menu.

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You can open a listed object displayed on the form by clicking the object with the right mouse button and selecting **Edit selected**.

You can use the **Reports** function to create reports on the listed objects. The report includes the same information as the list.



Show in group display

In the drop-down menu for **List**, select **Show in group display** to move the current search results from the form to a group display. Group displays are discussed in more detail in the chapter Group display.

Intersected properties

You can list the intersected properties for a network element or an area by selecting **Intersected properties** on the **List** menu. The displayed list includes information on the property IDs and any comments related to the intersected properties. You can also list all intersected properties for network elements or an area by selecting **Intersected properties for all** in the **List** menu. In this case, multiple objects or areas must have been retrieved to the form.

User filters

The **User filters** feature allows you to display only selected KeyCom objects on the map, based on criteria defined in the object forms.

User filters are supported on the following KeyCom forms:

- **Telecom premises**
- **Pole**
- **Conduit**

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- **Splice**
- **Manhole**
- **Cable**
- **Point object**
- **Exchange/telecom are**
- **Contract**

Setting up the user filter

1. Open an object form via the **KeyCom tools** from the main toolbar.
2. Use the **Search** or the **Pick** features to search existing network objects in the system, for more details, see Retrieving information to a form or **alternatively** on an empty form, begin by entering the required information and creating a new object. For more details, see Creating a new object.
3. Once you've chosen an object or defined an object group, click **Add to user filter** on the form's toolbar to set them up part of the filter.

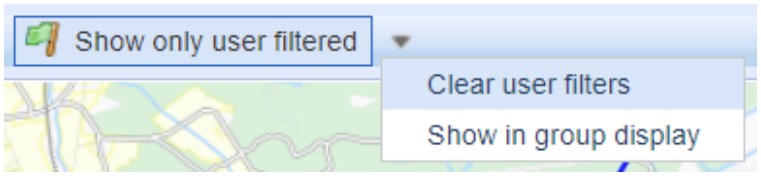


4. To activate the filter, click **Show only user filtered** on the KeyCom's main toolbar. The icon will change from blue to green when active.



5. Only objects that are part of the user filters will appear on the when the filter is active.
6. You can add more objects to your **User filters** at any time by opening their form and repeating the process.

To manage your filters, click Show in group display from the drop-down menu.
To remove all filters, click **Clear user filters**.

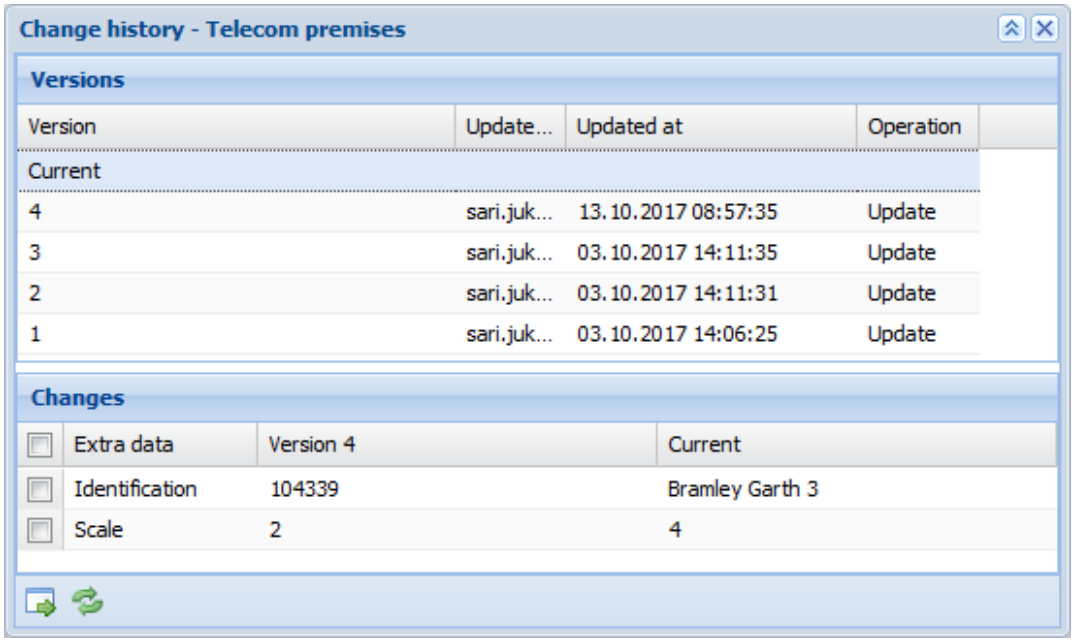


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Change history

To view the change history of the object on the form, select **Change history** in the drop-down menu for Tools. The top section of the displayed form lists the various object versions, while the bottom section displays the changes made to the selected version.

In the figure below, a point object is used as an example.



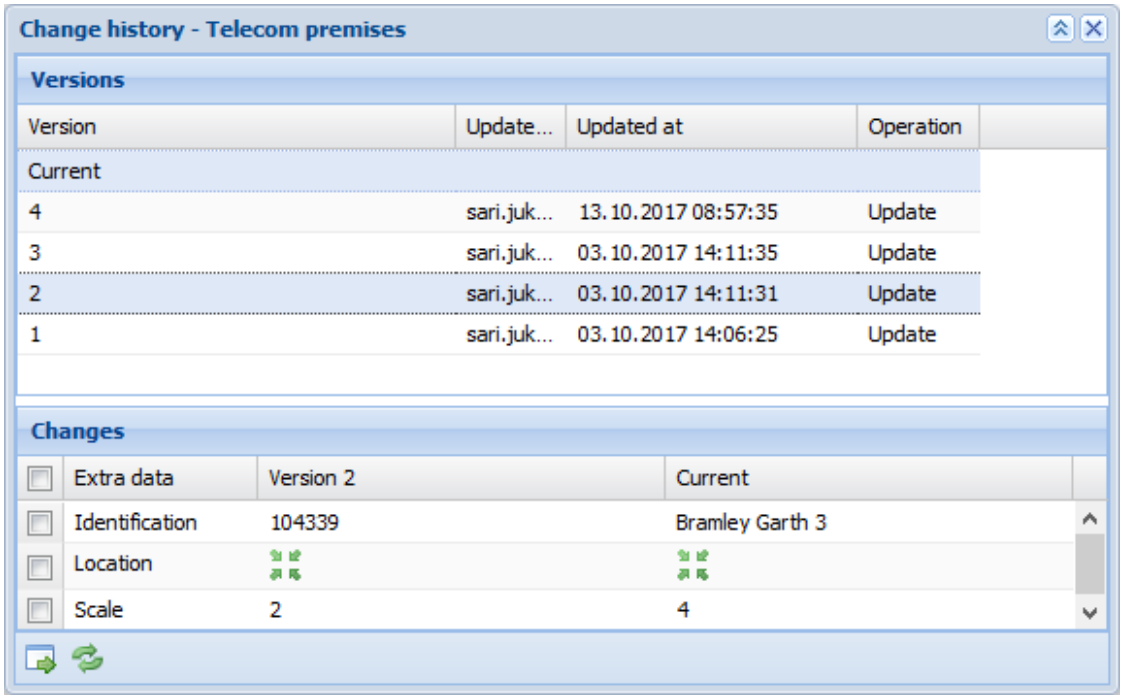
Restoring the values of an object

1. In the **Versions** section, select the row that you want to restore.
2. In the **Changes** section, select the checkboxes for the rows that you want to restore.
3. Click **Restore** to update the selected information on the object form.
4. Click **Save form** on the object form to confirm the changes.

Comparing object versions

In the **Versions** list, select the rows for comparison to see, in the **Changes** list, the current version in addition to the selected versions.

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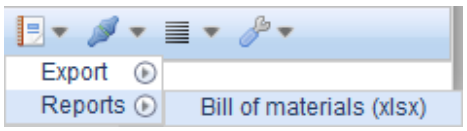
Reports from object forms

Reports can be created from forms, lists, and the main toolbar. Creating a report on objects that are included in a list of search results is discussed in the List chapter. The reports related to the main toolbar are discussed in the chapter Reports. Click **Export** to open the **Reports** menu for an object form.

You can create various types of reports in the system. The information on the search results displayed on the form is used to create a report.

For example, a **Bill of Materials** can be created from all object forms (cable, conduit, splice, pole, manhole, telecom premises, point object) based on data related to the search results displayed on the form. In addition, you can create reports based on the search results of the Info tool and from the Plan form.

In the drop-down menu for **Export**, select **Reports** and click **Bill of Materials** to create a bill of materials. You can save the report as a file or open it directly in Excel.



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Entering a date

Many object forms include date as a property attribute that can be used, for example, to define when a survey was carried out. Adding a date has been standardised using a calendar, so that the same format is always used when dates are entered in the database. This makes it possible to search the database with date as a search criterion, as search results are then not incomplete due to dates entered in various formats.

Position the mouse cursor over the **Date** field and click the left mouse button to open the calendar window. The current date is selected as default. You can browse through months using the arrow buttons at the top of the calendar window. You can browse through years by clicking the year on the right or left. To select a date, click the correct day using the **left mouse button**. The calendar window is closed, and the selected date is displayed in the **Date** field.



Managing address and apartment information on object forms

To add address information on an object form, retrieve the information from the database or use the **Autom.** function. When addresses are retrieved from a database, addresses contain no spelling errors and they can be used as one search criterion.

Click **Address** on the object form to open the Address form. If an address has already been added for the object, the Address form displayed includes that address as a default address. If an address has not been added for the object, the Address form displayed contains no information. When you **search for an address in the**

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database, you can use the following **search criteria**: street name, number, postal code, or parts thereof with **%** used as a wildcard character. Click **Search** to start your search. The search function has been described in more detail in the chapter Adding an address in the database.

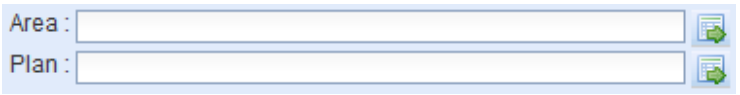
Use the arrow buttons to browse through the search results. When the correct address has been found, you can import it to the object form from which the Address form was opened. Click **Update to form** to do this. You can also locate an address on the map by clicking **Locate** to center the map on the address location.

To enable automatic adding of an address, select the **Autom.** checkbox and click **Save form**. The nearest address is used and the distance to the nearest address is displayed at the bottom of the display.



Using the predictive search field

Some forms have a predictive search field that is used for connecting one object to another object, such as to an **Area** or a **Plan**.



1. Enter in the predictive search field at least the first three characters of a name/identifier.
2. From the displayed search results, select an object or continue typing to limit the number of options.

If you do not know the name/identifier:

1. Click **Edit** to open the object form.

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2. Retrieve the correct object to the form by clicking **Search** or **Pick** .
3. When the correct object is displayed on the form, click **Update to form** .

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KEYCOM OBJECT FORMS

KeyCom tools	

Object types

Telecommunication networks consist of point objects, line objects, area objects, and other objects. You can use the following buttons to open the object forms for managing point objects:

- **Telecom premises**
- **Device**
- **Splice**
- **Pole**
- **Manhole**
- **Point object**

You can use the following buttons to open the object forms for managing line objects:

- **Cable**
- **Conduit**
- **Duct**

Area objects include:

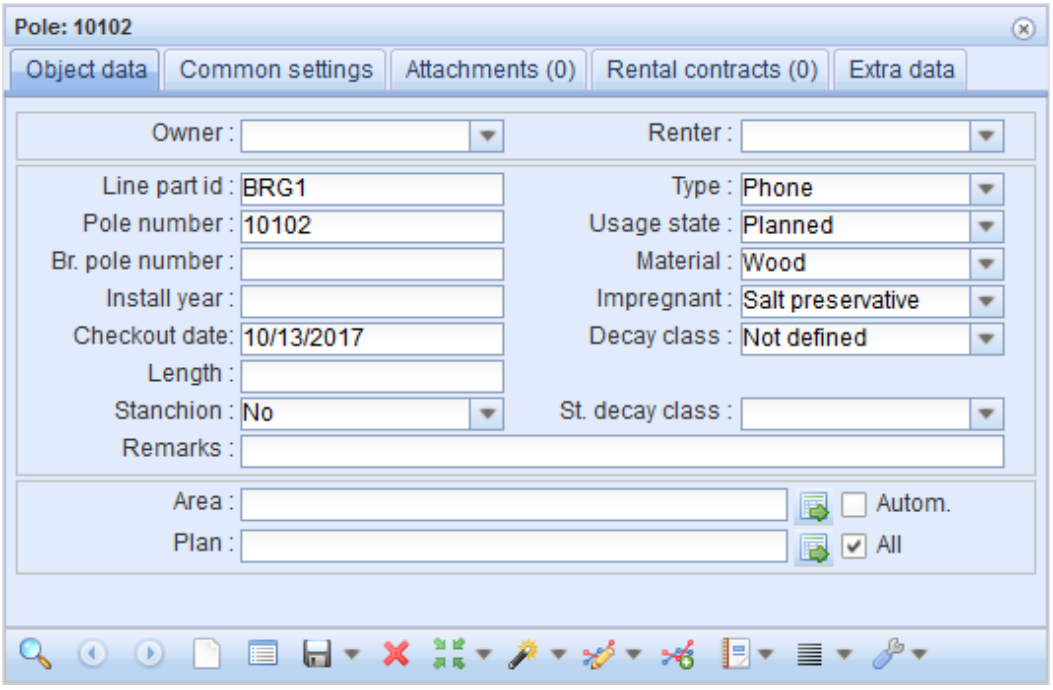
- **Service area**
- **Exchange/Telecom area**
- **Other objects** include:
- **Radio link**
- **Route follower**
- **Connections management**

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The **functions and information content** on the forms are the **same**, meaning that objects are handled in the same way, but the object form is different for each object. **Depending on your user privileges**, you can, for example, search for objects based on search criteria, modify their location and property values, and locate them on the map. The button functions related to forms used for managing objects are introduced in the chapter Buttons on object forms. Some object forms include buttons that have functions not available on other forms. These functions are introduced in this chapter after providing instructions applicable to all forms.

Property attributes

The main difference between various forms is the data that is entered on them. For poles, for example, you can add information on the impregnation method and decay class. Regardless of the applicable type and object form, objects have **similar property attributes**. Such information is related to the object owner, its properties, location, area, and plan.



The information content of forms for service areas and point type objects is less extensive than the content of other forms. On the Service area form, you can create and view service areas, while the form for point objects can be used, for example, for handling traffic signs.

If you want to create a new object, **Type** and **Usage state** are usually mandatory fields. The system can automatically create an identifier for new objects if this feature has been activated in the system settings. For **cables,** the mandatory fields

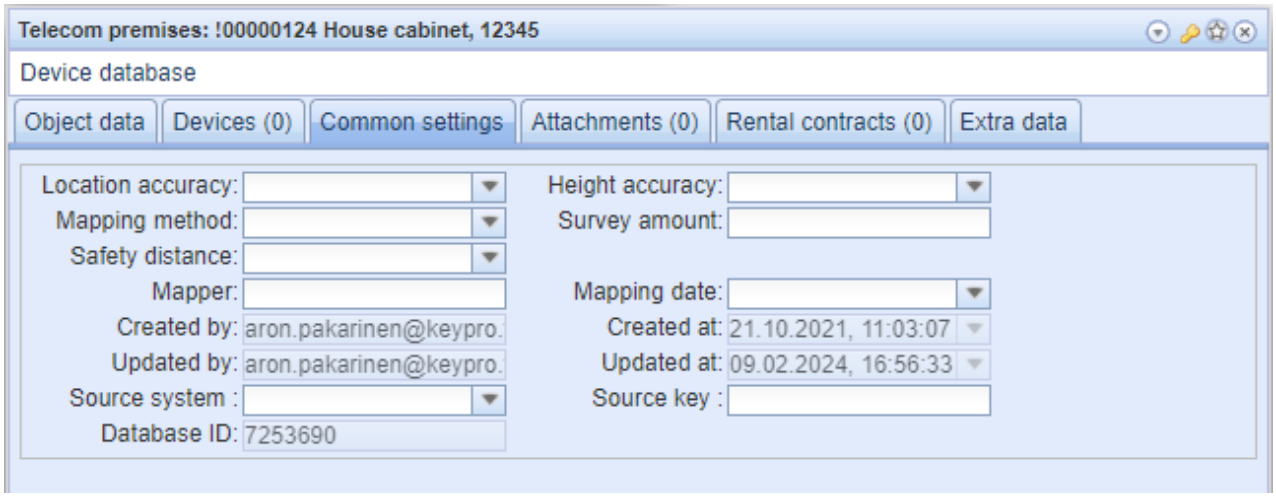
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are **Installation type**, **Usage state**, and **Type**. When you create a new cable, information on its length and measurement method are automatically updated in addition to the identifier.

After entering the mandatory data, click **Create** to create the object on the map. When the object was created successfully, the following text is displayed at the bottom of the form: **Saved successfully**. You can then update other property values for the object and save them in the system by clicking **Save form**.

The property values that can be defined vary depending on the object. For example, you can enter information on a pole's stanchion and material. You can enter the following information for all objects: owner, renter, and installation year. In addition, you can freely include text in the extra data section.

The **Common settings** tab is the same for all objects. On this tab, you can enter information on mapping and its accuracy, in addition to which the tab includes fields for the mapper and the person who updated the data. This information is automatically saved in the system, and it cannot be edited.



Rental contracts

The **Rental contracts** tab is used for handling rental agreements related to the object. If the object on the form has been connected to a rental contract, the number of contracts is displayed in parenthesis after the name of the tab. More information on **Rental contracts** can be found in the chapter Rental contract.

The form includes a list of rental contracts. To open a **Rental Contract** form with the required contract information, select the contract using the right mouse button and click **Open contract**.

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Extra data

You can define free-form property attributes (Extra data) for the following forms: **Cable, Conduit, Telecom premises, Pole, Manhole, Splice, Point object, Exchange/telecom area, Service area**, and **Plan**. If free-from property attributes have been defined, they can be viewed on the **Extra data** tab of the object forms.

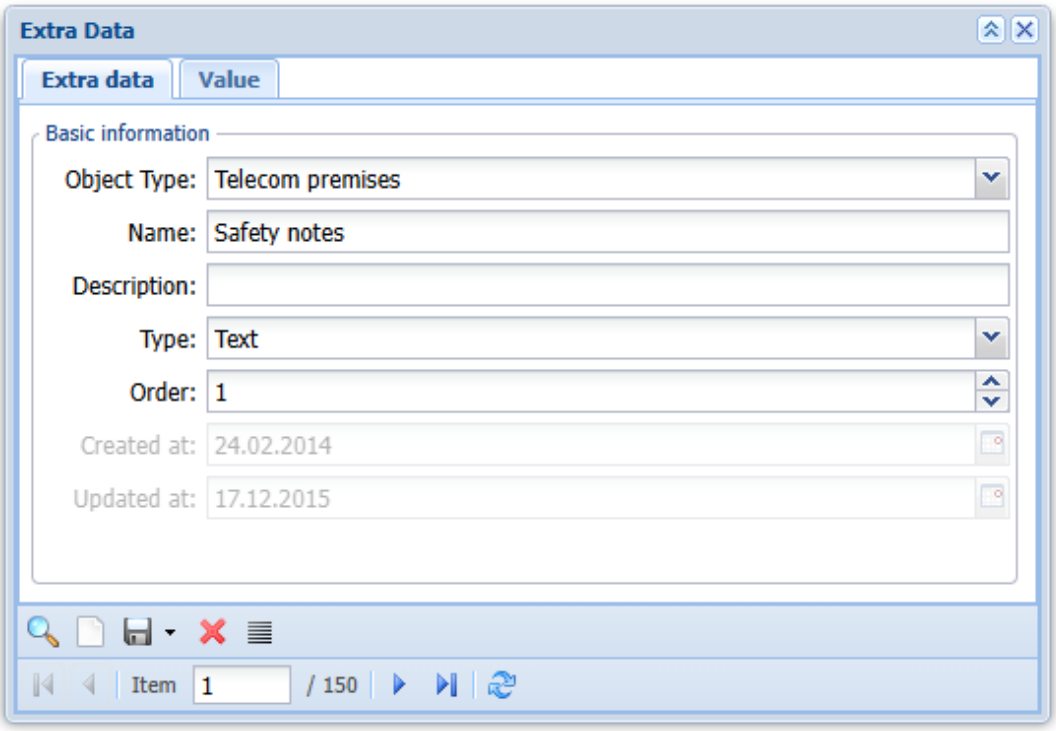
Name	Value
Inspector	
Importance	
Depth	

You can use the free-form property attributes when searching for objects, and they can also be included in the **List** function and the related report.

Defining extra data attributes

You can define free-form property attributes in two ways:

1. In the **Extra data** form that open from the main toolbar.
   - Open the **Extra data** form and fill in the **Basic information**:



     - **Object Type**: the object type whose form the extra attribute is added to.
     - **Name** and **Description**: the name and description of the attribute.

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- **Type**: the data type of the attribute: **Alias**, **Float**, **Integer**, **Link**, **Multiple Choice**, **Multiple line Text**, **Read-only** or **Text**.
- **Order**: the position of the attribute on the **Extra data** tab.

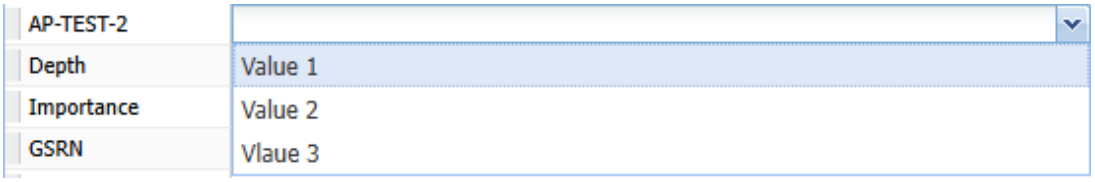
- **Save** the attribute. It then appears on the **Extra data** tab of the selected object type's form where a value can be added.

2. **As an admin user:** The admin user of the system can freely define the free-form property attributes, name them, and select their data type (such as text, figure, and date). The admin user can also add fields marked as set to **Read only**. Such fields cannot be viewed by other users.

For more information, see the chapter Freely defined extra data in the KeyCom Admin Guide.

Multiple choice menu

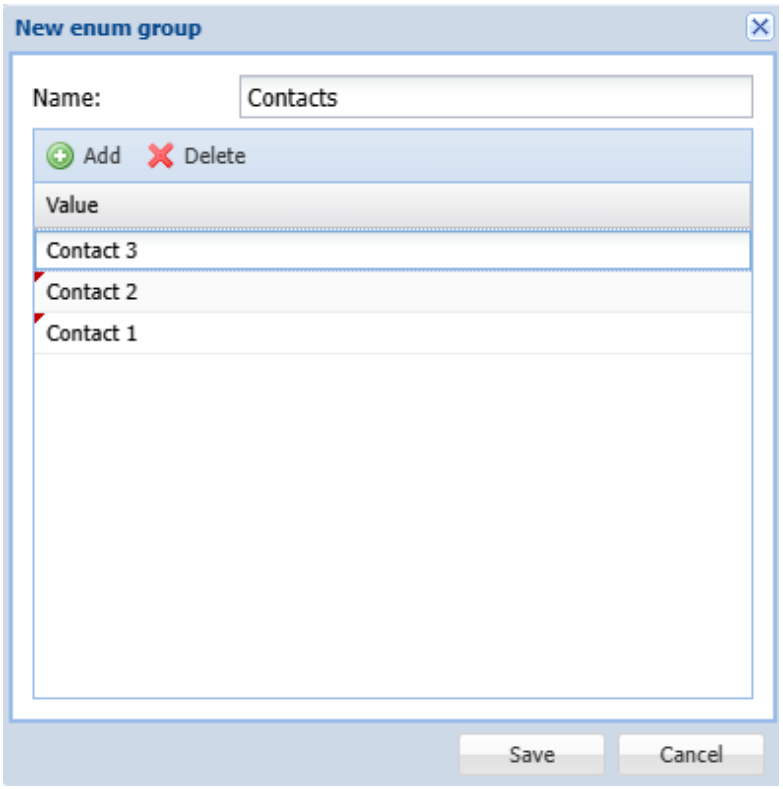
When you select **Multiple Choice** as the **Type** on the **Extra data** form, an **Enum group** field appears. The **Enum group** holds the values that are shown in the multiple choice drop-down menu on the object form. You can select and existing group from the **Enum group** drop-down menu or create a new group by clicking **New group**.



Creating a new group

1. On the **Extra data** form, select **Multiple Choice** as the **Type**.
2. Click **New group** next to the **Enum group** field. The **New enum group** window opens:

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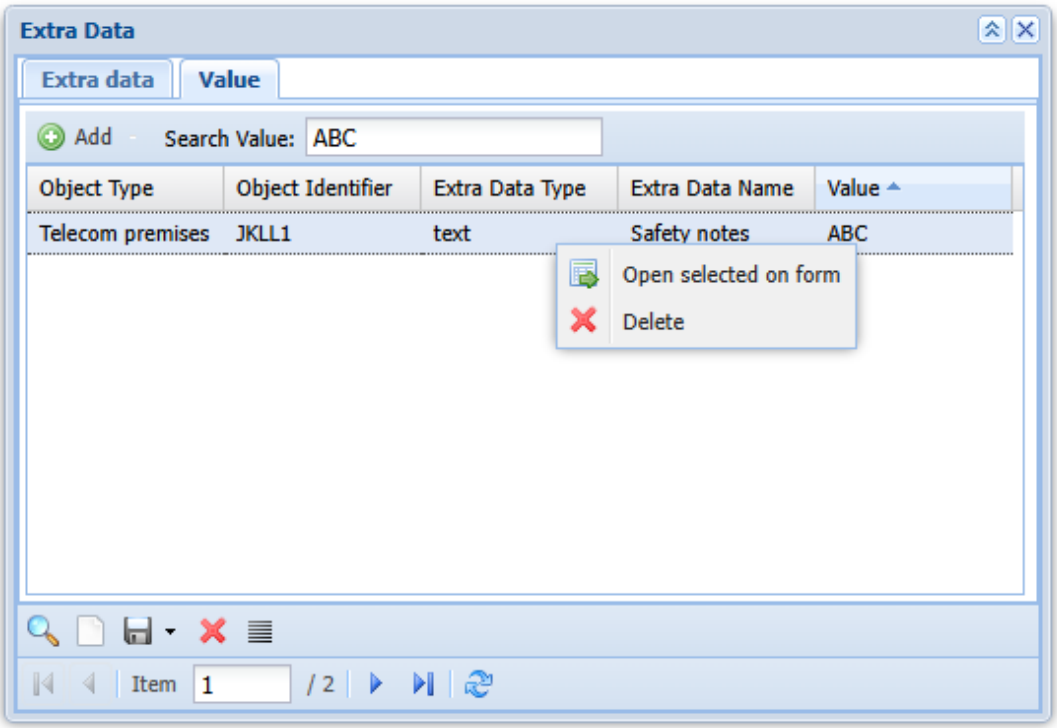
3. Enter a **Name** for the group.
4. Click **Add** to add a row to the list, and type the in the value or text. Repeat for each choice you want in the dropdown. To remove a value, select it and click **Delete** .
5. Click **Save** when all the values needed are added.

Back on the **Extra data** form, check that the new group is selected in **Enum group**, and **Save** .

Value tab

The **Value** tab of the **Extra data** form lists the values that have been entered for the created attribute on the object forms.

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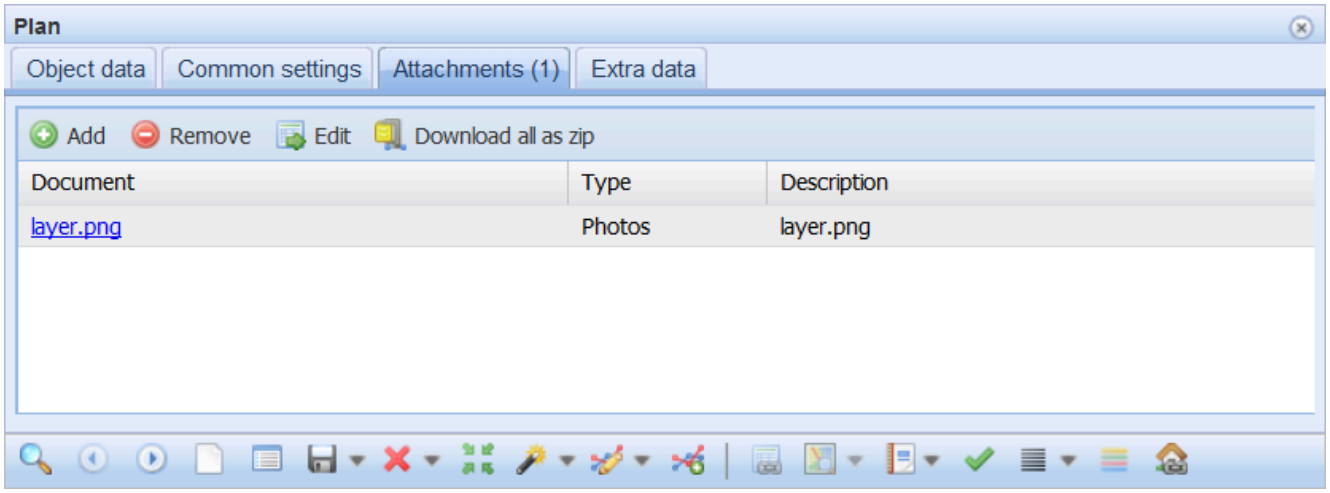


- You can filter the list with **Search Value** and clicking **Search** .
- Open selected value on form by clicking **Open selected on form** .
- Delete selected value from the object by clicking **Delete** .
- Click **Add** to open the object form which the attribute has been assigned to.

Attached documents

On the object form's **Attachments** tab, you can view documents attached to the object. The header of the tab indicates the number of attached documents for the object. The attachments can be **files** or **URL links**, and they are listed based on type. If the object form does not have any external documents, the **Attachments** tab includes no information.

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Viewing attached documents

Click the name of an attached document to open it for viewing. If the attachment is a **URL link**, it is opened on a new tab in your browser. For files, the functions depend on your browser and browser settings. Usually, the browser asks by default whether you want to save or open the file.

Select **Download all as zip** to download all attachments to your device.

Editing the information in attachments

1. On the list, select the attachment you want to edit.
2. Click **Edit** to open the information on the attachment on the **External documents** form (see External documents).
3. Edit information.
4. On the **External documents** form, click **Save form** to save your changes.

Note! The information included in the attachment is updated on the **Attachments** tab only when the object form data is reloaded.

Adding an attachment

1. Click **Add** to open the **External documents** form (see External documents).
2. Choose a document or add a new one (see Adding external documents).
3. Click **Attach document**.

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4. If you want to attach more than one file, go to the drop-down menu for **Attach document** and select **Attach selected documents.**

TIP: If the document you want to attach has no location, you will be asked whether you want to use the same location as the object you want to attach it to.

Removing an attachment

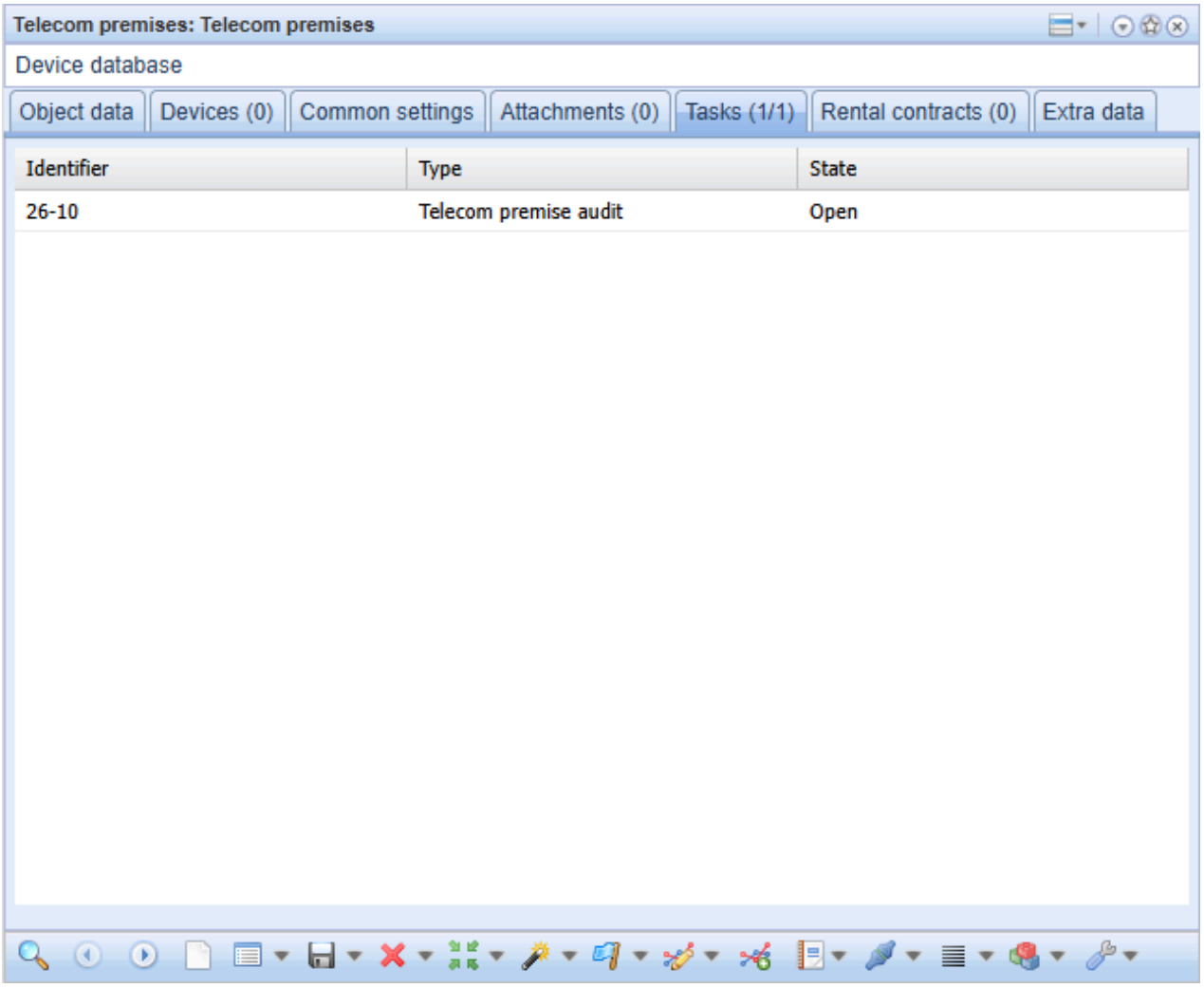
1. On the list, select the attachment you want to remove.
2. Click **Remove**.

The attachment is removed from the object in question, but the document is not completely deleted. You can retrieve it and delete it from the system using the **External documents** form (see Deleting an external document)

Tasks

The **Tasks** tab on a network object form lists the **KeyWork tasks** that are attached to that object. The **Tasks** tab header shows the number of tasks in brackets, for example **Tasks (23/40)**: 23 active tasks out of 40 in total. Double-click the row to open the **Task** form.

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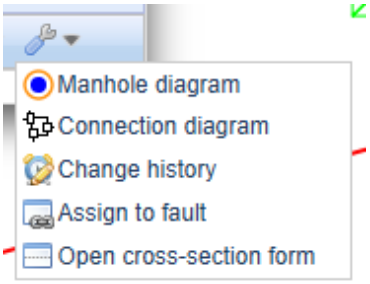


Assign to fault

Use **Assign to fault** to attach a fault (network object) to a task.

1. Open the **Task** form in **KeyWork**. The task can be new or existing.
2. Open the object you want to attach to the task, for example from the map or by searching for it.
3. In the toolbar at the bottom of the object form, open the tools menu and select **Assign to fault** :

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4. Select the faults type, and if you are attaching multiple objects from a search group (**Attach query set**) or a single task (**Attach current**).

The objects are attached as faults to the open task. After this, the task is listed on the object's **Tasks** tab.

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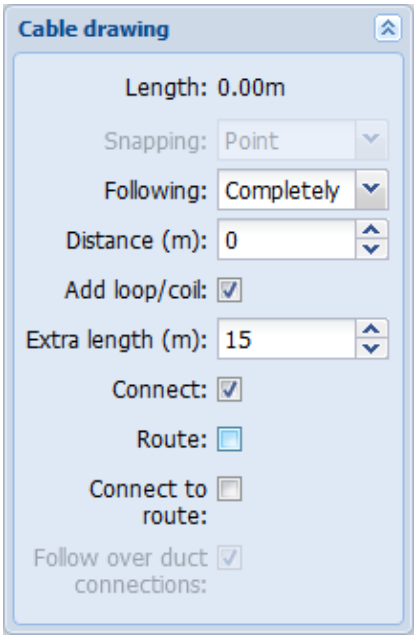
Cables

The **Cable** form can be used to to create and modify cables that are created on the map. Colour codes for various cable types can be defined through an admin user's user interface.

Creating a cable

The cable creation process is very similar to the process of creating any line object. Open the **Cable** form. Click **Create** to open the **Cable drawing** form. The Following and Snapping functions are described in the Snapping and following (settings for drawing and modifying) chapter.

You can follow an existing line object at a **distance** you define. Activating the **Following** field activates the **Distance** field. In the **Distance** field, enter the distance between the new cable and the existing conduit or cable in metres. **You can add a loop/coil** on the cable's route by activating the **Add loop/coil** checkbox. When you are drawing the cable, the program adds a loop/coil at the point you add if the Add loop/coil checkbox has been selected. Define the length of the loop/coil in the **Extra length** field. The figure entered in this field is included in the cable length. You can view the length of the line that you create in real-time in the **Length** field.

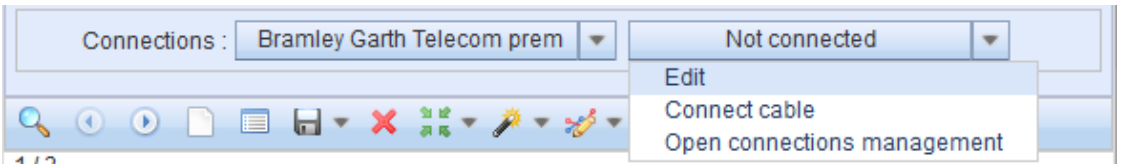


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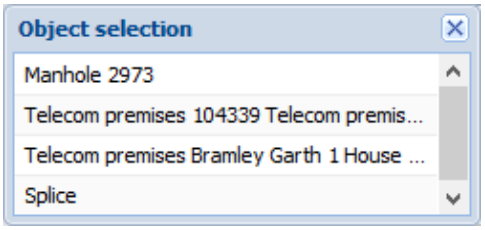
Related chapters: Automatic saving of a route when creating a cable and Connecting a cable to a route when creating a cable.

Cable connections

A cable's **connections** to splices, manholes, and telecom premises are displayed at the bottom of the **Cable** form . Cables can be connected to point objects **from both ends or from one end only**. If a cable is connected, information on the connected object is displayed in the menu. Otherwise, a **Not connected** text will be displayed. You can access the connections in the drop-down menu.



You can connect cables with the **Connect cable** selection. The software automatically searches for point objects within five metres of the start or end of the cable and opens the objects in the **Object selection** window. In addition, you can select the **network element to be connected** by defining an area on the map. If the defined area includes more than one object, an **Object selection** window will be displayed. Click a network element with the left mouse button to highlight the object on the map. This makes it easier to select the correct object. To create a connection, **double-click** or click the object **with the right mouse button** and then select **Connect to cable**. If the connection succeeds, the following text will be displayed on the form: **Cable connected successfully**, and the name of the network element is displayed in the **Connections** menu.



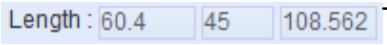
Click **Disconnect cable** to disconnect a connection. When this is successfully carried out, you can see the following text at the bottom of the form: **Cable disconnected successfully**. Select **Edit** to **open the form for the object** in question. You can then view its information or locate it on the map. Use the **Open connections management** to open the **Connections management** form, where you can view the object's

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Physical and **Logical** connections. Connections are discussed in more detail in the chapter Connection management (physical & duct connections).

Cable length, extra length, and total length

The **Cable** form includes four fields that are related to the length of the cable: **Length**, **Measure method**, **Start rdng(m)**, and **End rdng(m)**.

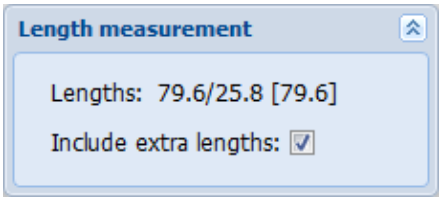
There are three fields for **Length**: 

The figure in the **first** field is the cable length that is derived either based on the map or the actual length of the cable. **The second** field displays the length of loops/coils added to the cable. The **third** field is the **Total length** field. It displays the combined length of the cable and extra lengths. If a safety margin for fiber-optic cable has been specified in the system (for example, 4%), it will be included in this field. The figures in the **Length** field are updated when a loop/coil is created using the **Point object** form, or when the length of a loop/coil in the cable is modified, or when the cable is edited on the **Cable** form by splitting or extending it.

In the drop-down menu for **Measure method**, select either **From map** or **From cable**. When you select **From map**, the system will automatically calculate the cable's length on the map based on its points. The **From cable** method means that the user enters the cable's length manually.

Measuring the length of a cable

You can use the **Measure length** tool available in the **Modify** menu **to measure the length of a cable** on the map. This function can also be used to measure the distance to both ends of the line. For example, the figure below, **Lenghts: Distance from the starting point of the cable/distance to the end of the cable [number of metres measured based on the location of the cable reel].** Select the **Include extra lengths** checkbox to include the lengths of loops/coils in the cable length.



You can add a **Cable annotation with the Length measurement** tool if you click the cable with the left mouse button. Annotation creation is discussed in more detail in the chapter Annotations.

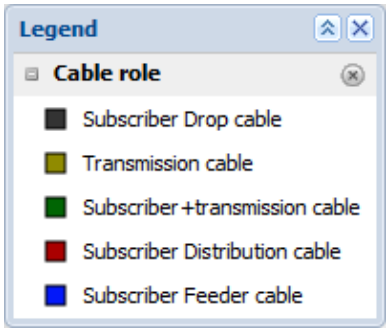
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Cable role

You can define the role of a cable on the **Cable** form in the drop-down menu for **Role**. The default roles are:

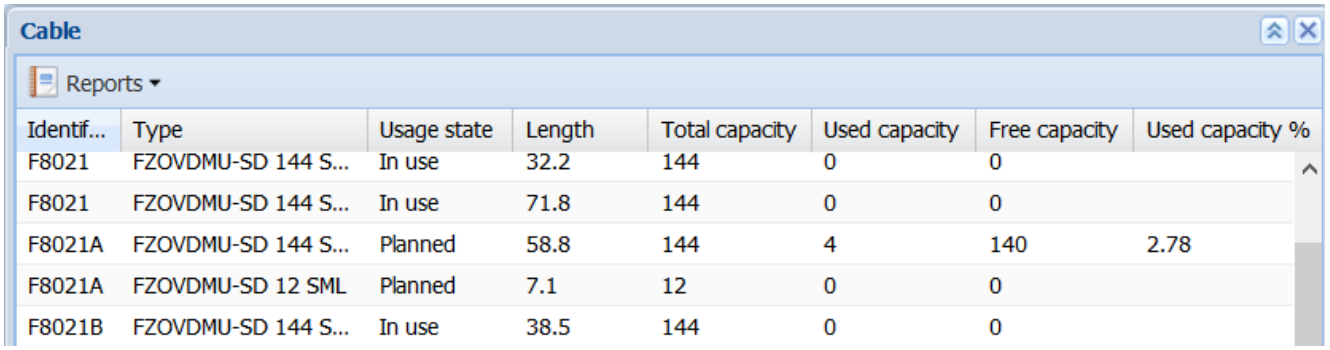
- **Drop**
- **Transmission**
- **Subscriber+Transmission**
- **Distribution**
- **Feeder**

The cable role has its own **Thematics** level. For more information on this, see the chapter Layers (Layer selection).



Cable occupancy

Cable occupancy (%) is based on the usage state of cable threads, construction state and information on its owner and the related right of use. Modelling the cable occupancy does not require separate physical circuit reservations. Click the **List** tool on a **Cable** form to view the cable occupancy for a cable. Add **Used capacity** as a column in the displayed view. You can also add total capacity and free capacity columns, which will provide more extensive information for the monitoring of the cable utilization rate.



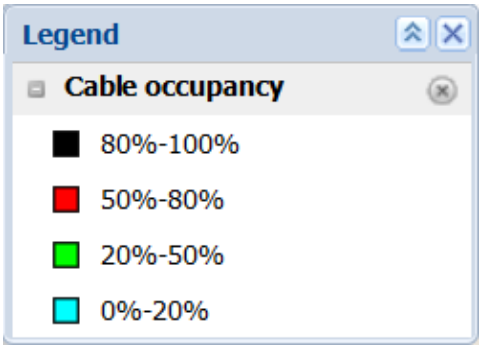
Identif...	Type	Usage state	Length	Total capacity	Used capacity	Free capacity	Used capacity %
F8021	FZOVDMU-SD 144 S...	In use	32.2	144	0	0	
F8021	FZOVDMU-SD 144 S...	In use	71.8	144	0	0	
F8021A	FZOVDMU-SD 144 S...	Planned	58.8	144	4	140	2.78
F8021A	FZOVDMU-SD 12 SML	Planned	7.1	12	0	0	
F8021B	FZOVDMU-SD 144 S...	In use	38.5	144	0	0	

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Columns in the cable list and settings for calculating the occupancy rate (defined through the KeyCom admin interface):

- **Total capacity** provides information on the total number of cable threads.
- **Connected capacity** is calculated based on information on the construction state of a thread and the owner or, alternatively, right of use.
- **Free capacity** is based on the same information as connected capacity, but it also takes into account **fiber threads with the usage state Free**.
- **Used capacity** is based on the same information as connected capacity, but it also takes into account **fiber threads with the usage state In Use**.
- **Used capacity %** provides information on the percentage of connected threads in actual use.

You can use the data on **used cable capacity** to create a map theme. In the sub-menu of **Thematics**, select **Cable occupancy** to highlight cables on the map in accordance with the colour defined for each occupancy category. **Cable occupancy of conduit** is another theme that can be used to highlight conduits and their cables in accordance with the used capacity.



Cable batch and cable ID information

You can use the **Batch** and **Cable ID** information to identify different cable delivery batches. If quality defects are discovered after cables have been installed, you can use this information to locate the cables in question.

Modifying the geometry of a cable

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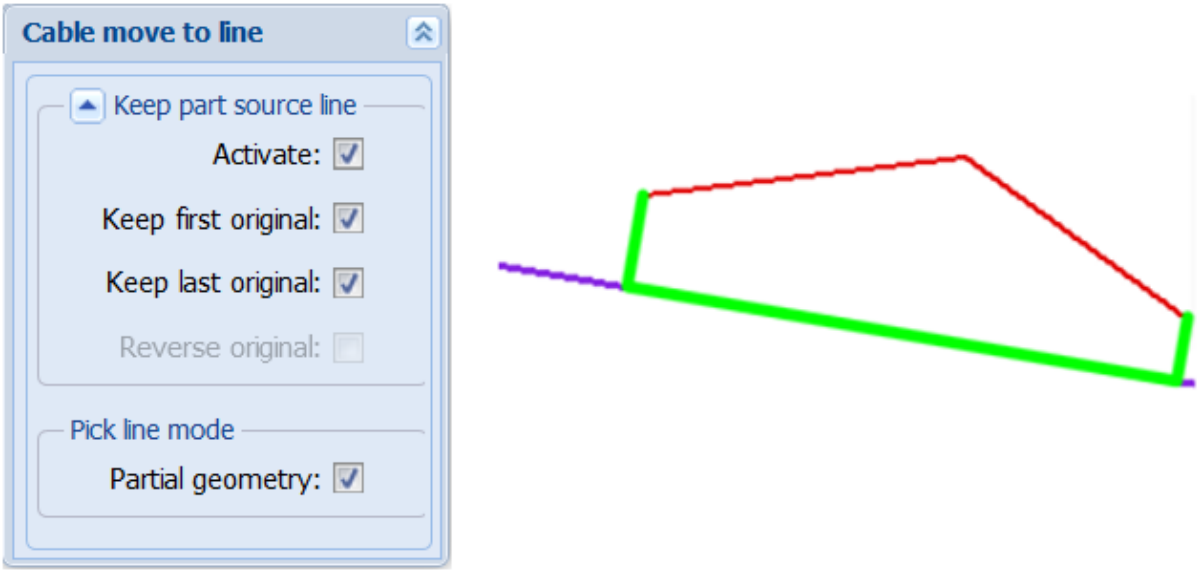
Modifying the geometry of line objects, such as conduits and cables, is discussed in the chapter Modifying the geometry of a line object.

Moving a cable

Cables are moved in the same way as other line objects. This function is described in more detail in the following chapters: Moving a line object, Moving a line object to a line, Moving a line object partially to a line and Mass move of line objects.

When you partially move a line object to a line, you can keep the cable ends at their original locations by selecting the **Keep first original** and **Keep last original** checkboxes in the dialogue box for **Move to line**. When moving partially to a line, select the start and end points of the cable to be moved, and then select the line to which you want to move the cable. You can also specify the route start and end points for the cable to which a cable is partially moved. Take the steps displayed in the bottom left corner of the map view.

In the example figure below, the user is moving a cable partially to a line while keeping the start and end points of the cable at their original locations.



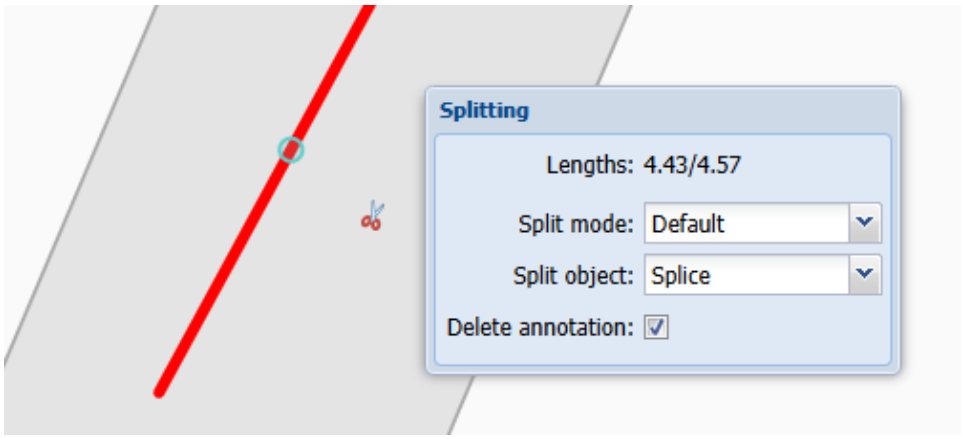
Splitting a cable

Cable splitting is carried out in the same way as the splitting of other line objects. This function is discussed in more detail in the chapter Splitting a line object.

When splitting a cable, the **Split object** field in the **Splitting** dialog allows you to define the object that will be created at the split location. The cable threads are then automatically connected. Available options are:

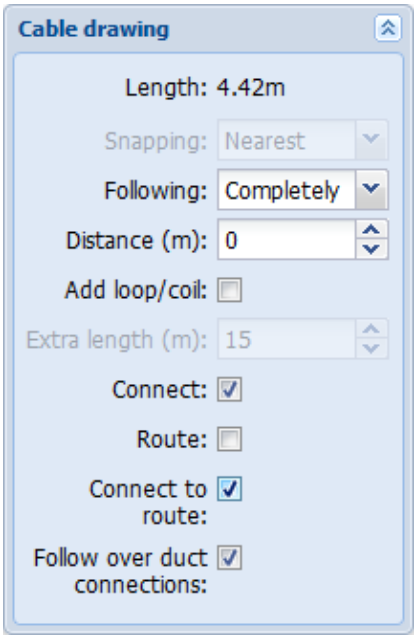
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- Telecom premises
- Splice
- Manhole



Connecting a cable to a route when creating a cable

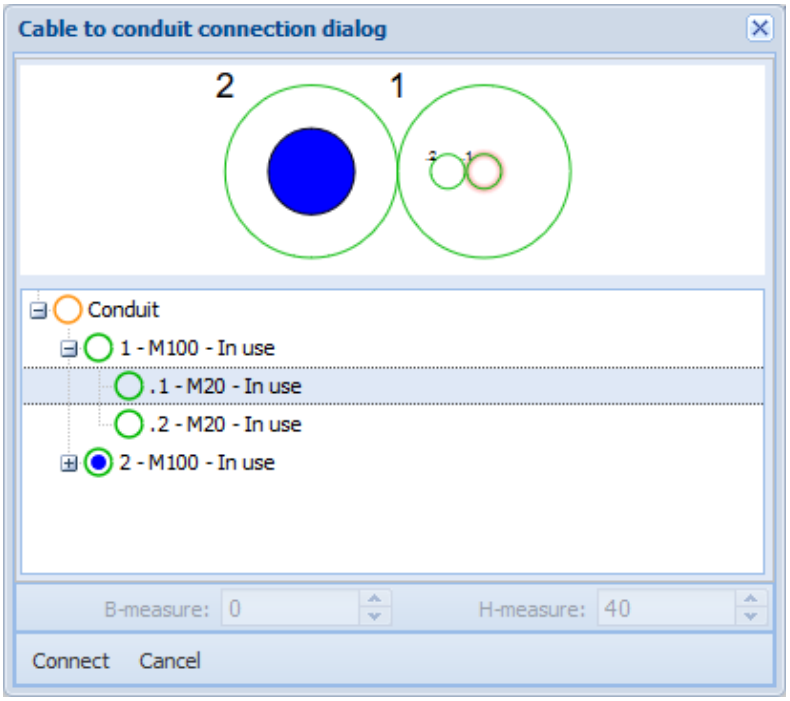
1. Start the standard procedure to create a cable.
2. In the drop-down menu for **Following**, select **Completely.**
3. Select **Connect to route**. This activates the **Follow over duct connections** function, which means that the proposed routes cross duct connections.



4. Snap to a conduit on the map. (See Snapping and following)

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5. In the displayed **Cable to conduit connection dialog window** , select the conduit and/or one of its ducts.



6. Click **Connect**.
7. When the **Follow over duct connections** checkbox is selected, and if the route branches, select the route you want to follow from the list displayed.
8. Continue drawing the cable or stop drawing. The cable is then saved.

Automatic saving of a route when creating a cable

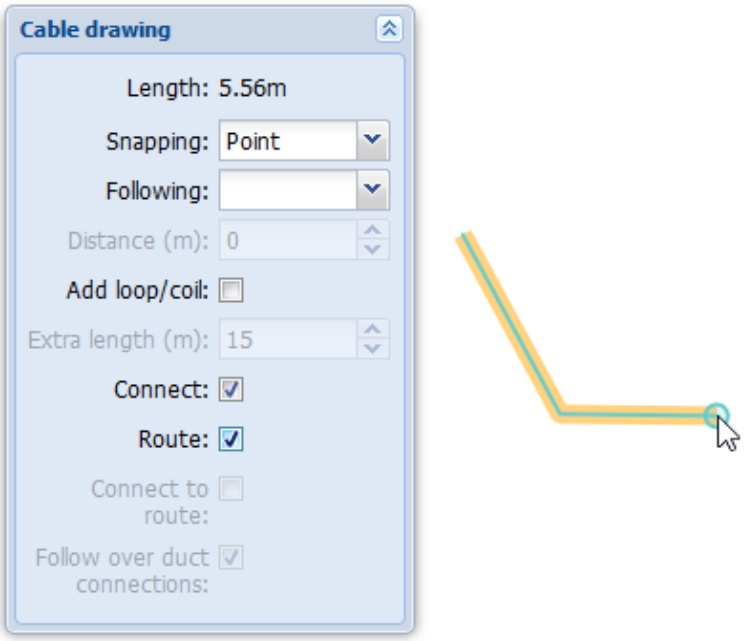
When you are drawing a cable, you can automatically add a **route** that is appropriate for the cable location (e.g. a conduit).

In the **Cable drawing** dialogue box, select the **Route** dialogue box. When drawing a cable, a route will be created only for the section for which the **Route** checkbox is selected. If you deselect the **Route** checkbox while drawing, the route created up to that point is ended, and re-selecting the **Route** checkbox will start a new route. Routes and cables are saved when you stop drawing the cable.

The information applied to the route that is being created is obtained directly from the **Conduit** form. If the Conduit form includes no information, the **default settings of the Conduit form are used**.

In the example figure below, t he created routes (conduits) are marked in orange in the figure. Cables are marked in blue.

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A new cable is always automatically connected to the route drawn. If the route drawn is a conduit with a duct selected, the application places the drawn cable directly in the selected duct.

This function creates added value, for example, regarding planning. Based on the created routes, it is possible, for example, to calculate how many metres of ditch-digging is required for the plan. In addition, plan reports provide information on which cable is connected to which route, and it also provides the related length data (the Cable route metres).

In addition, for fiber-optic network plans, it is essential to be able to calculate how many metres of cable are required for the trunk network and the subscriber network (Cable role).

Cable tools

The bottom section of the Cableform includes a **Tools** button, with various **KeyCom** functions available in its drop-down menu:

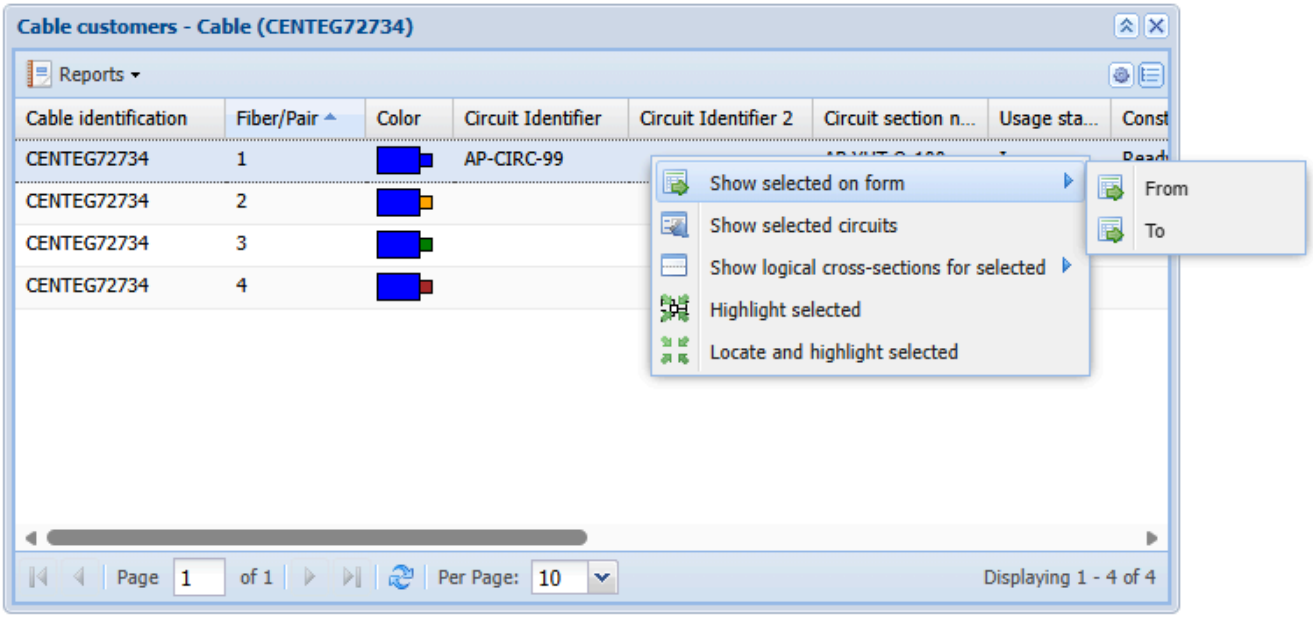
- **Customers**: Opens the **Cable customers** list. More information is provided in the chapter Cable customers.
- **Network diagram**: Opens the **Fiber/pair options** dialogue box, in which you can select the information you want to include in the diagram. Click **OK** to open a **Diagram** form on which the pairs/fibers you selected are displayed. More information is provided in the chapter Diagrams.

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- **Tree diagram:** Opens the **Tree diagram options** dialogue box, in which you can select the fiber or pair range for the diagram. **A Tree diagram** includes the cable connections followed either completely or partially for a selected connector/pair range. More information is provided in the chapter Tree diagram.
- **Route follower**: Opens the **Route follower** form that includes the cable in question. More information is provided in the chapter Route follower.
- **Thread details**: Displays the **Threads for cable** form, with which you can enter additional details on the cable threads and view, for example, the circuit identifiers and customer information. Further information is provided in the chapter Thread details for cables.
- **Tasks:** Opens the **Tasks for object** form, on which you can view the tasks created for the parent object.
- **Change history**: Opens the **Change history** form, on which you can view the changes made to the object. For further information, see the chapter Global change history.

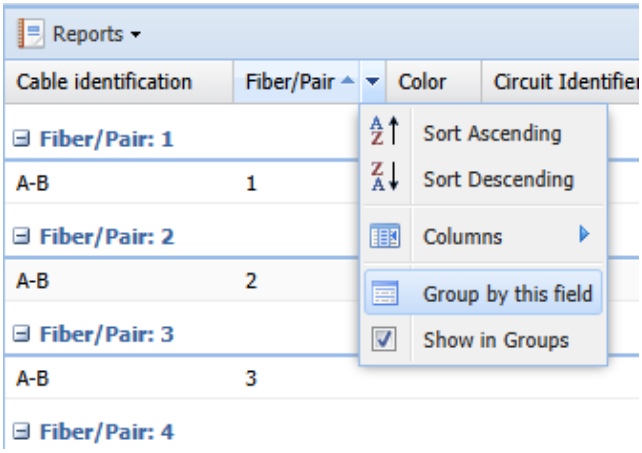
Cable customers

On the **Cable** form, in the **Tools** menu, click **Customers** to see a list of the customer connections that pass through the cable in question.



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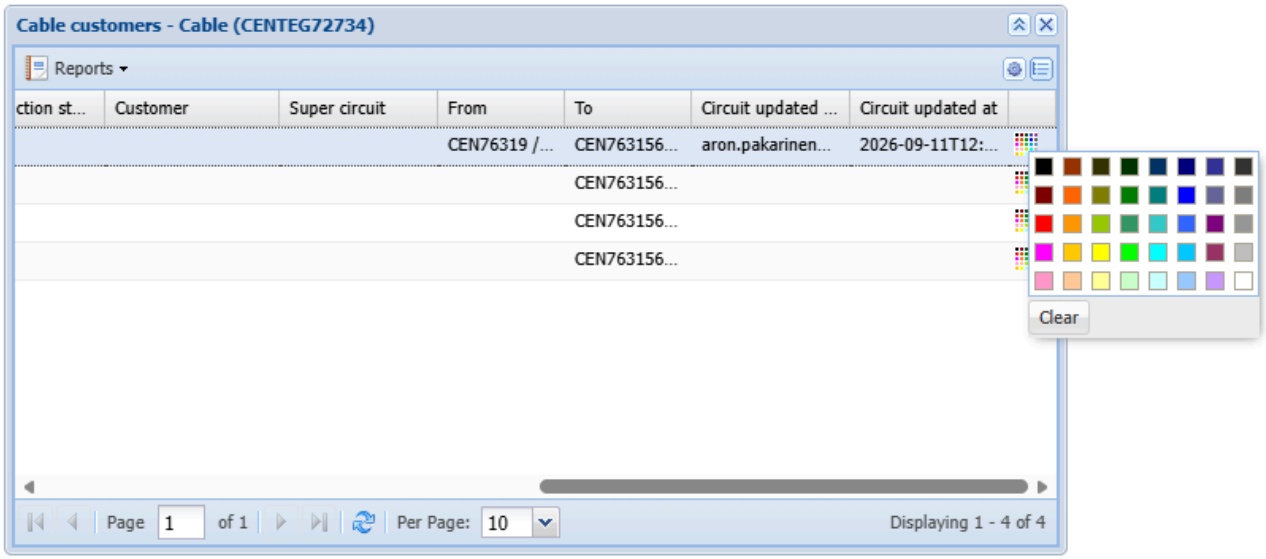
Form information columns can be shown or hidden by opening the drop-down menu next to any column and selecting **Columns**. Column information can also be grouped by selecting a column and clicking **Group by this field** . To disable grouping, click the **Show in Groups** checkbox.



You can see the telecom premises device at the A end, the telecom premises device at the B end and the connector in the **Device** from the **From**, **To** and **Active/Passive devices** columns.

1. **Open the context menu**: Right-click a row in the **Cable customers** list.
2. **View related information**: From the pop-up menu, select one of the following:
   - **Show selected on form**: Opens the **Telecom premises** form at the **A end (From)** or **B end (To)**.
   - **Show selected customers**: Opens **Customer** form with the selected customer.
   - **Show selected circuits**: Select Show selected circuits to open the **Circuit** form. (for further information, see the chapter Circuits).
   - **Show logical cross-sections for selected**: Opens the **Cross-section** form for the telecom premises at either end.
3. **Highlight or locate the route(optional)**: Choose the option to highlight or locate and highlight the route on the map:

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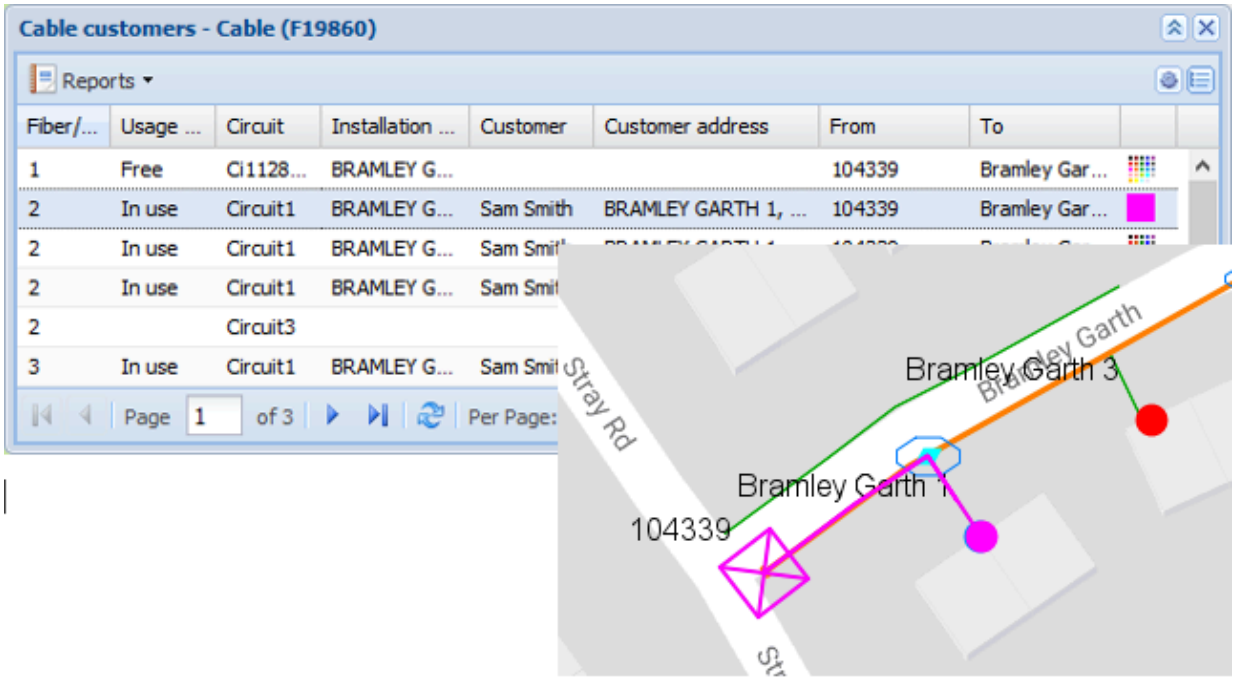


Highlighting a circuit on Cable customers list

If you want to highlight a circuit on the map

1. **Select a circuit:** Click a circuit in the **Cable customers** list using the left mouse button.
2. **Select multiple circuits(optional)**: Hold down CTRL or SHIFT and click additional circuits with the left mouse button.
3. **Open the context menu:** Right-click on one of the selected rows.
4. **Highlight the circuits:** Select **Highlight selected** or **Locate and highlight selected** from the menu.
5. **Change highlight colour(optional)**: Click the colour selection box at the end of a row or choose a new colour in the window that appears.

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Customers for all list

On the **Cable** form, in the **Tools** menu, click **Customers for all** to open a list of customer connections for all cables included in the current search group of cables. The list includes the same information as the **Customers** list.

Thread details for cables

With the **Thread details** function, you can add cable thread information, for example, their owners, usage state and right of use. The **Threads for cable** form also displays any circuit identifiers and customer information.

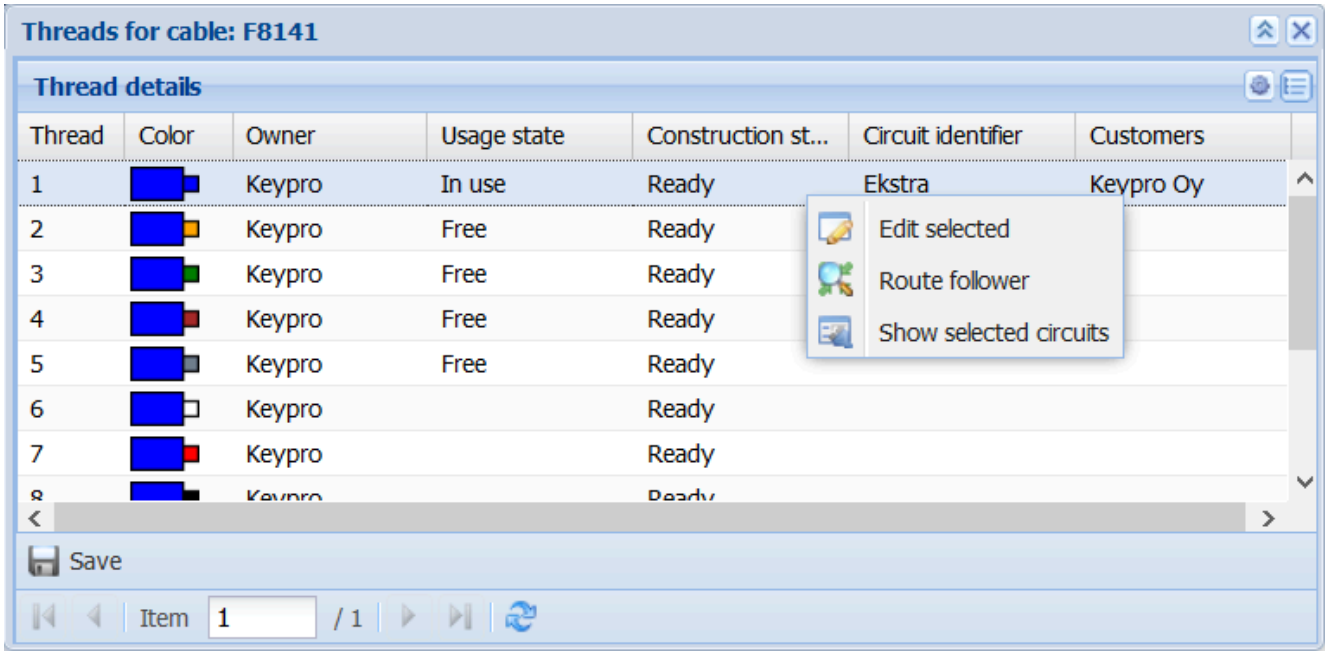
Double-click a thread row to edit the information in a column. Click a thread row with the right mouse button to open a dialogue box. A mass update of threads can be performed by selecting the required rows with the left mouse button while holding down the Shift key.

Edit selected: Edit the information of the selected thread row or rows. You can update the owner, usage state, construction state, details, right of use, and the validity dates of right of use for each row.

Use the **Route follower** to go to the **Route follower** form.

Click **Show selected circuits** to go to the **Circuit** form where you can review the circuit for which the thread is reserved.

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You can modify the **column view** by clicking the arrow button next to a column header. This lets you select more columns to be displayed. For example, you can add a Thread type column to be displayed. Click the **Details** row in a column to freely add comments related to the thread.

Do not forget to click **Save** to save your changes. Unsaved information is marked with .

Note! The **Threads for cable** form includes the **Circuit identifier** and any **customer** information when physical reservations have been made on the **Circuit** form.

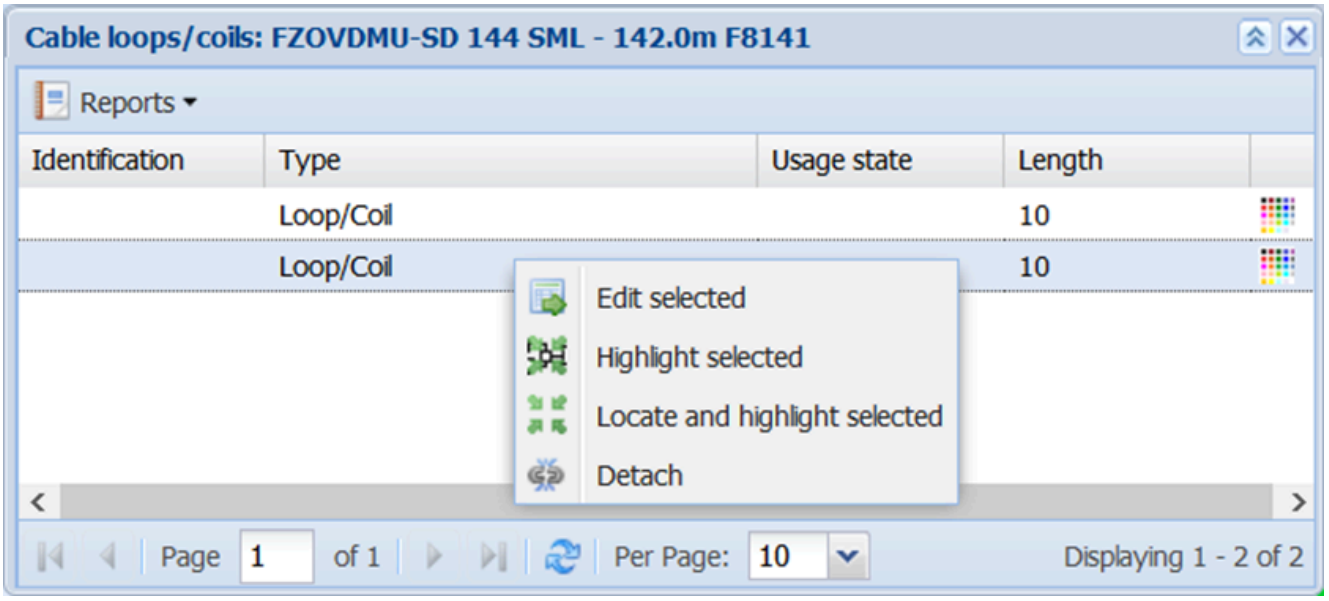
Cable loops

Use the **List** -> **Show loops** function on the **Cable** form to view a list of the loops/coils of the cable. This list will display any loops and coils connected to the cable and their basic information. You can select the objects you want and highlight them on the map, or you can open them on an object form (click the right mouse button). Use the **Highlight color** button to select the colour you want to use for highlighting a loop.

You can remove a cable loop with the **Detach** function. If you remove a loop, its length will be removed from the total cable length.

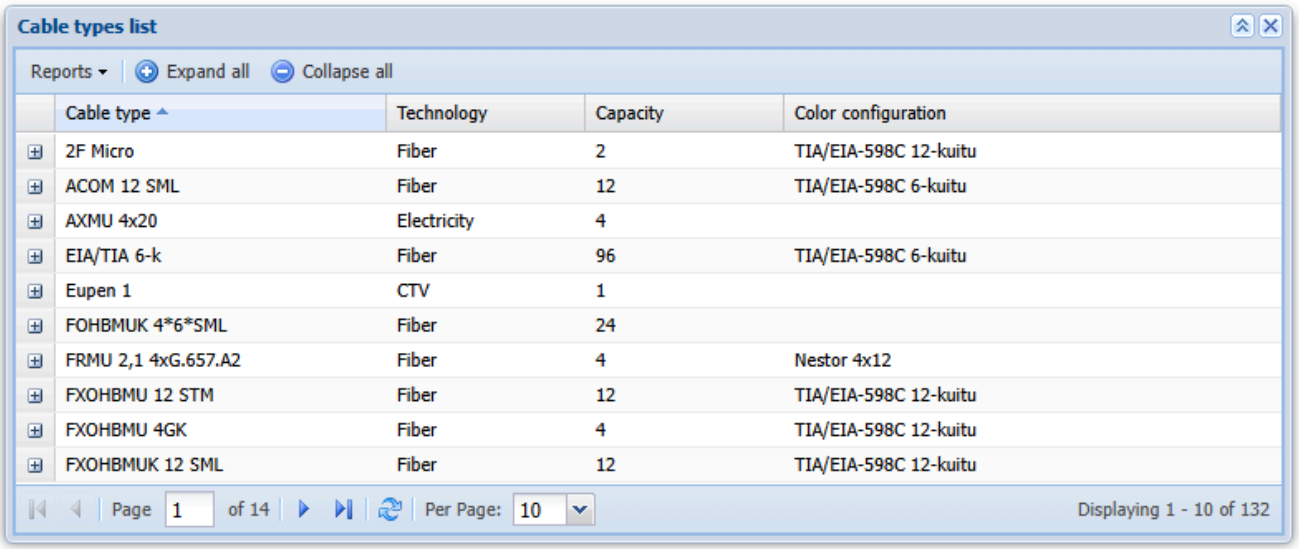
Click **Reports** to create a **List report** on loops/coils (in Excel format).

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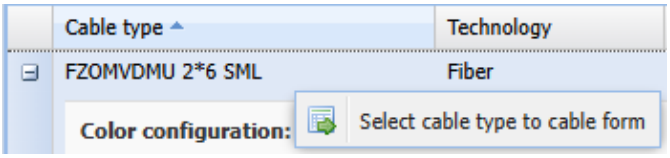
Cable types list

The **Cable types list** provides a view of all cable types available in KeyCom, including some of their details and associated color configuration definitions.



The **Cable types list** can be accessed with two different ways:

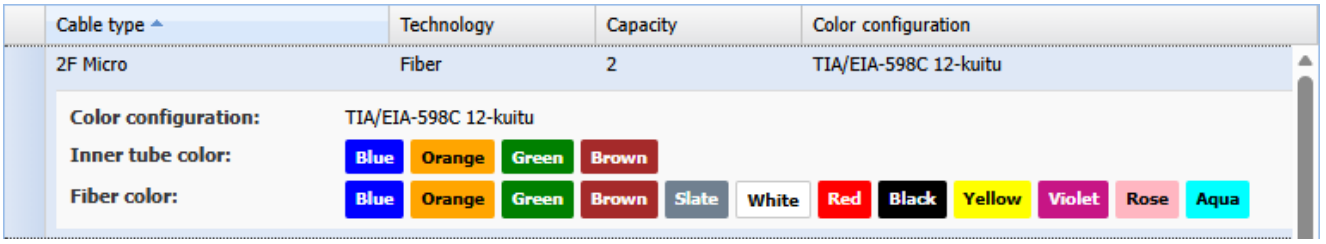
- From the **Cable** menu on the toolbar **KeyCom tools** and clicking
- From the **Cable** form by clicking the **Cable type list** button next to the **Type** field. This method also enables the possibility to select a cable type from the **Cable types list** grid and copy it to the **Cable** form's **Type** field.



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Color configuration details

To view a detailed color configuration for a specific cable type, click the + icon to expand or collapse that entry. The **Expand all** and **Collapse all** buttons allow you to open or close all entries simultaneously.

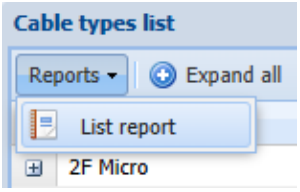


Each cable type has a color configuration linked to it. The configuration defines:

- **Color configuration:** defines identification of the applied color configuration
- **Inner tube color:** defines the applied inner tube colors
- **Fiber color:** defines the applied fiber colors

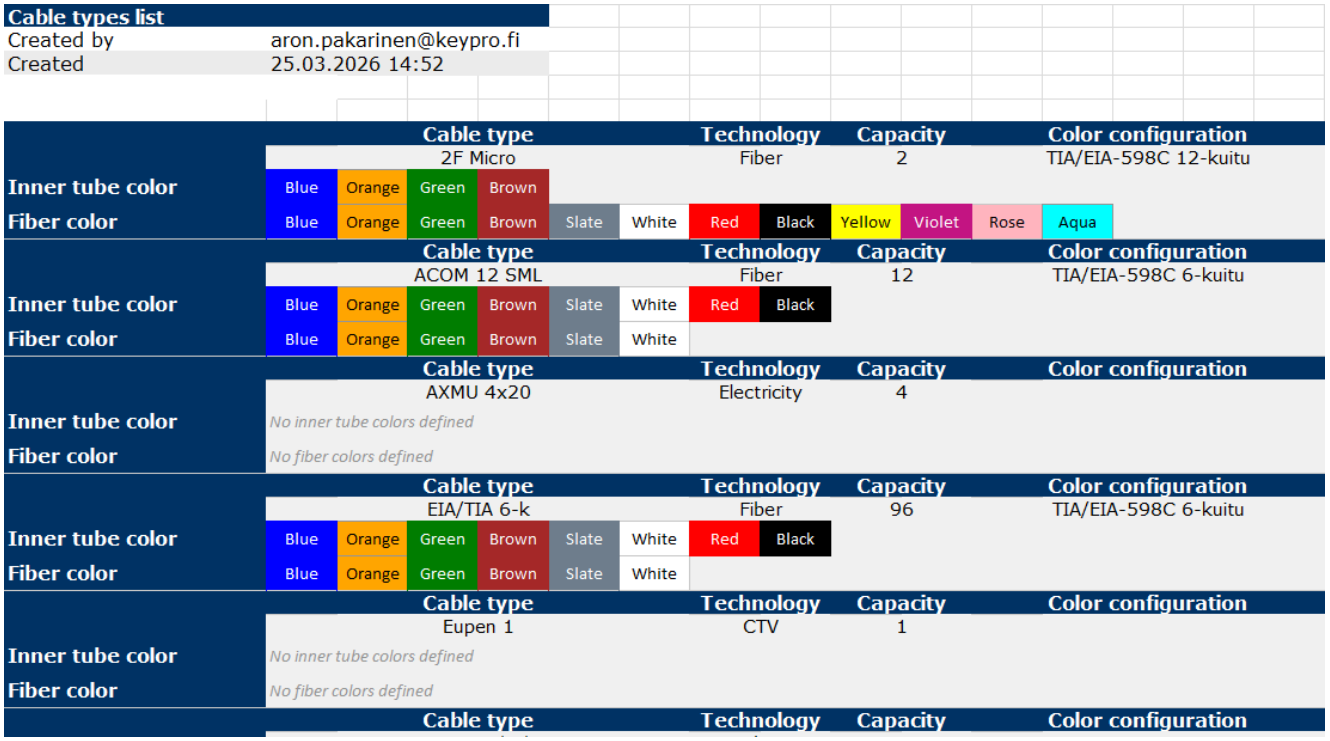
Cable type list report

It is also possible to generate a report that includes all cable types together with their associated color configuration definitions. Click **Reports** and select **List report** to create the report.



The report is in excel format and presents the information available on the **Cable types list** form.

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Cable types list	
Created by	aron.pakarinen@keypro.fi
Created	25.03.2026 14:52

	Cable type	Technology	Capacity	Color configuration
	2F Micro	Fiber	2	TIA/EIA-598C 12-kuitu
Inner tube color	Blue, Orange, Green, Brown			
Fiber color	Blue, Orange, Green, Brown, Slate, White, Red, Black, Yellow, Violet, Rose, Aqua			

	Cable type	Technology	Capacity	Color configuration
	ACOM 12 SML	Fiber	12	TIA/EIA-598C 6-kuitu
Inner tube color	Blue, Orange, Green, Brown, Slate, White, Red, Black			
Fiber color	Blue, Orange, Green, Brown, Slate, White			

	Cable type	Technology	Capacity	Color configuration
	AXMU 4x20	Electricity	4	
Inner tube color	*No inner tube colors defined*			
Fiber color	*No fiber colors defined*			

	Cable type	Technology	Capacity	Color configuration
	EIA/TIA 6-k	Fiber	96	TIA/EIA-598C 6-kuitu
Inner tube color	Blue, Orange, Green, Brown, Slate, White, Red, Black			
Fiber color	Blue, Orange, Green, Brown, Slate, White			

	Cable type	Technology	Capacity	Color configuration
	Eupen 1	CTV	1	
Inner tube color	*No inner tube colors defined*			
Fiber color	*No fiber colors defined*			

	Cable type	Technology	Capacity	Color configuration

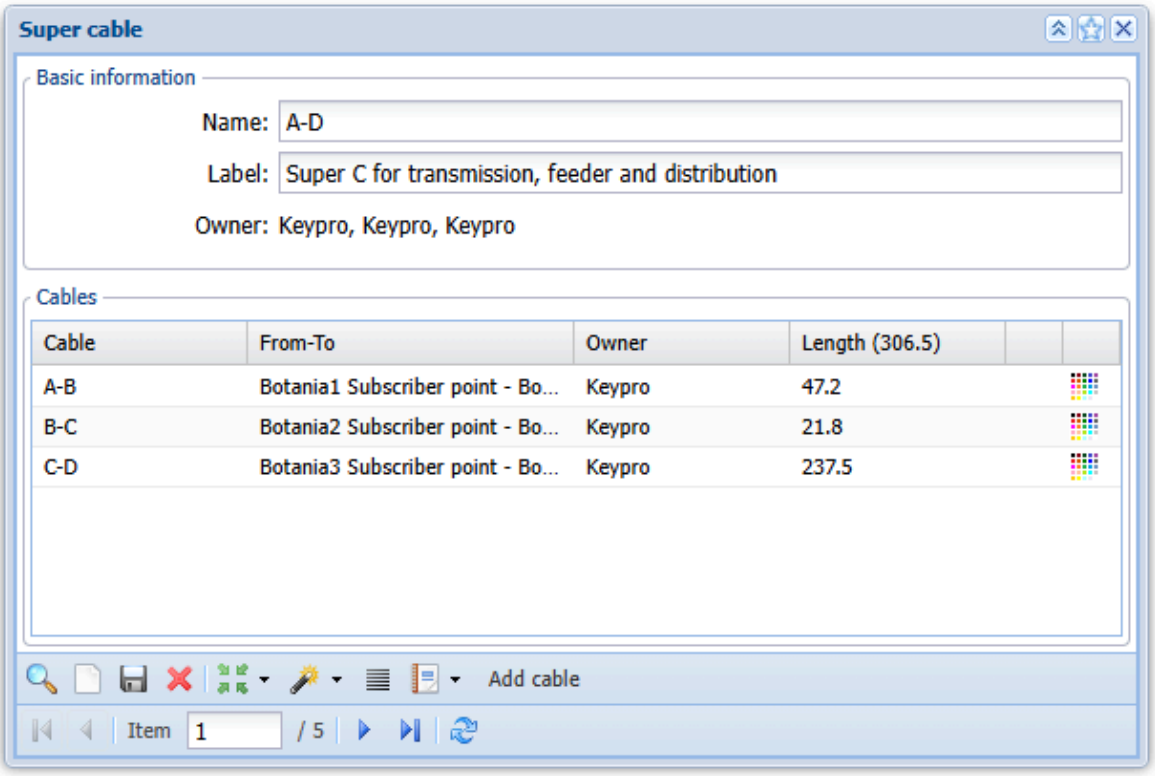
Super cable

The **Super cable** form is used to combine multiple existing cables into a one single group. This allows managing several cables together without editing their details or geometry. Super cables can be used when documenting parallel cable routes, bundled routes, or any set of cables that should be handled as one. A super cable does not create new physical cables and it only groups existing ones.

The **Super cable** form can be accessed from the **KeyCom tools** by opening the **Cable** drop-down **menu on the toolbar.**

Regular object form tools **can be accessed from the toolbar. Read more in BUTTONS ON OBJECT FORMS.**

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Creating a super cable

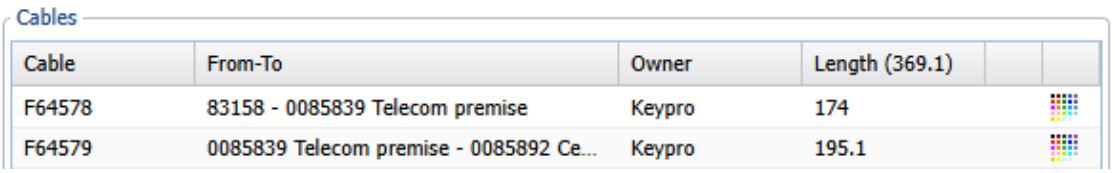
1. Open the **Super cable** form.
2. In **Basic information:**
   a. Enter the **Name**.
   b. Fill in **Label** if needed.
   c. **Owner** field is automatically populated based on the owners of the selected cables.
3. Click **Add cable** from the toolbar.
4. Pick a cable from the map.
5. Repeat the action and add all the necessary cables.
6. Verify the cables and their details in the **Cables** list.
7. **Save** the super cable.

Super cable list

The **Cables** list displays all cables that have been added to the super cable. It provides an overview of their details and helps to verify that the correct cables are included.

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Right-clicking a cable in the **Cables** list opens a context menu that provides additional actions for managing and inspecting the selected cable. These tools allow you to edit, add, remove, highlight, locate, or reorder cables.



The list includes the following columns:

Column	Description
Cable	The cable's **Identification**.
From-To	The connected start and end objects of the cable. This may show telecom premises, splices, manholes or other point objects.
Owner	The owner of the individual cable. This column is informational only and does not change when cables are grouped into super cable.
Length	The measured geometric length of the cable. The column header also shows the total combined length of all cables in the list, displayed in parentheses.
Order number	The sequential number of the cable within the Super cable. This number reflects the cable's position in the list and updates automatically when cables are added, removed, or reordered.

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Conduits and attached ducts

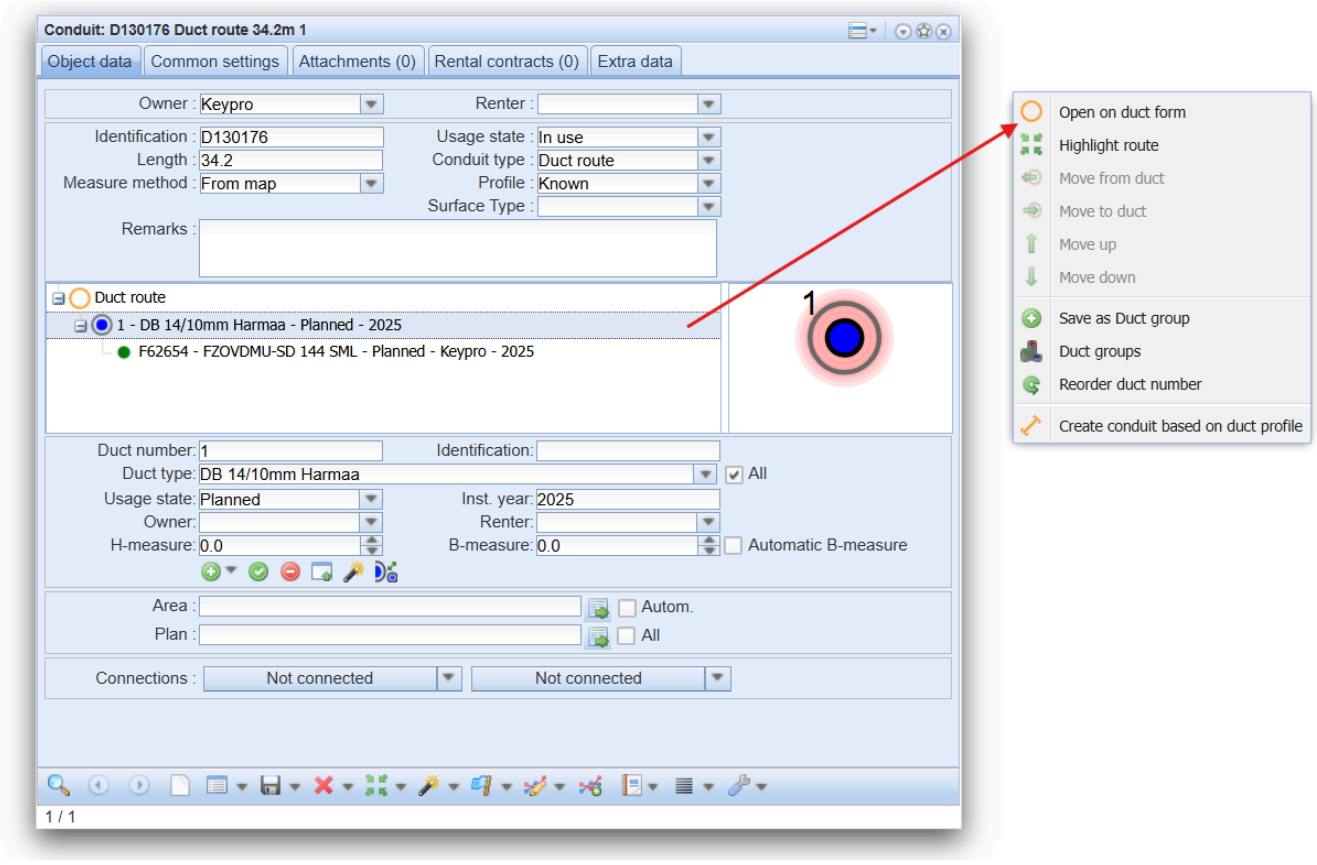
Information on the Conduit form

In addition to the basic functions that were discussed in the chapter Buttons on object forms, the **Conduit** form is used to manage cables and ducts connected to conduits and any cables that are connected to them.

ALWAYS remember to **SAVE** your changes by clicking the **Save button** . For example, if you add ducts to a conduit, you must click save while doing this in order to be able to add a cable to the duct.

TIP: You can search conduits by using duct attributes as search criteria.

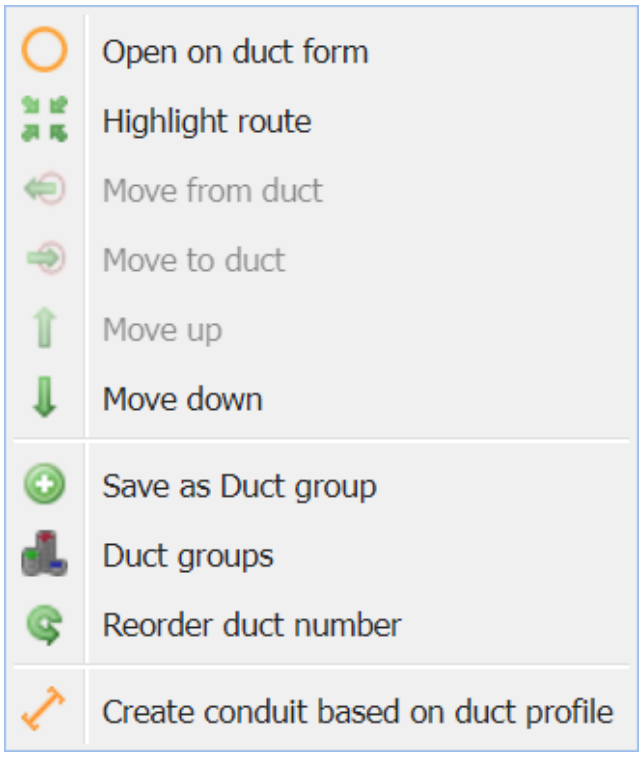
In the example figure below, you can view both a list and a cross section of the ducts and cables connected to the conduit. Manage the ducts and cables of a conduit with the functions available in the context menu that is displayed when you click the right mouse button.



Functions of the context menu

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You can manage the ducts on the **Conduit** form by opening the context menu. You can open the menu by right clicking the duct column.



1. **Open on duct form:** This function allows to open the selected duct on the **Duct** form.
2. **Highlight route:** This function locates and highlights the selected duct on the map with the blue highlight color.
3. **Move from duct:** This function moves the selected duct out of the parent duct and displays it in the list at the level same level.
4. **Move to duct:** This function moves the duct inside the previous duct on the list. The desired parent duct must be on the same level in the hierarchy before moving a new duct into it. The duct location on the cross-section image moves inside that duct.
5. **Move up:** This function moves the position of the duct up by one step.
6. **Move down:** This function moves the position of the duct down by one step.
7. **Save as Duct group:** This function saves the **Duct group**.
8. **Duct groups:** This function opens the **Duct group** form.
9. **Reorder duct numbers:** This function updates the number of the selected duct in the form to the new number selected by the user and rearranges the ducts in

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the list based on the new numeric order.

10. **Create conduit based on duct profile:** This function splits the chosen conduit or duct selected from the form based on duct profile. Read more Creating a conduit based on a duct profile.

Secondary length (this function is subject to a separate order)

Secondary length indicates the eligible length of the conduit. The **Secondary length** is calculated from the total length of the conduit, minus the parts of the conduit that run within the **Unsubsidised areas**. More about **Unsubsidised areas** in the paragraph Adding a point buffer.

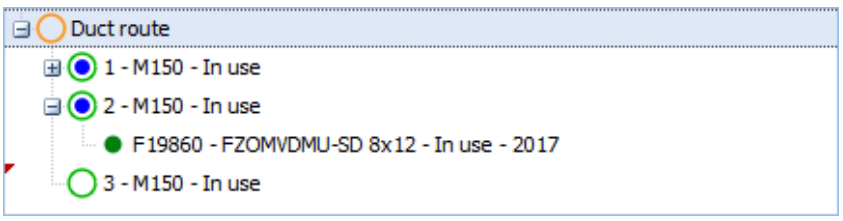
Next to the **Secondary length** field is the **Autom.** check box, which when checked, the program calculates the **Secondary length** with each save, if the geometry has been changed. If you do not select the **Autom.** check box, you can define the **Secondary length** yourself or leave the field empty.

You can view the **Secondary lengths** of the conduit with the **Reports** tool of the **Plan** form, if the conduits are connected to a plan. More about the report in Plan report.

The properties of ducts and cables in a conduit

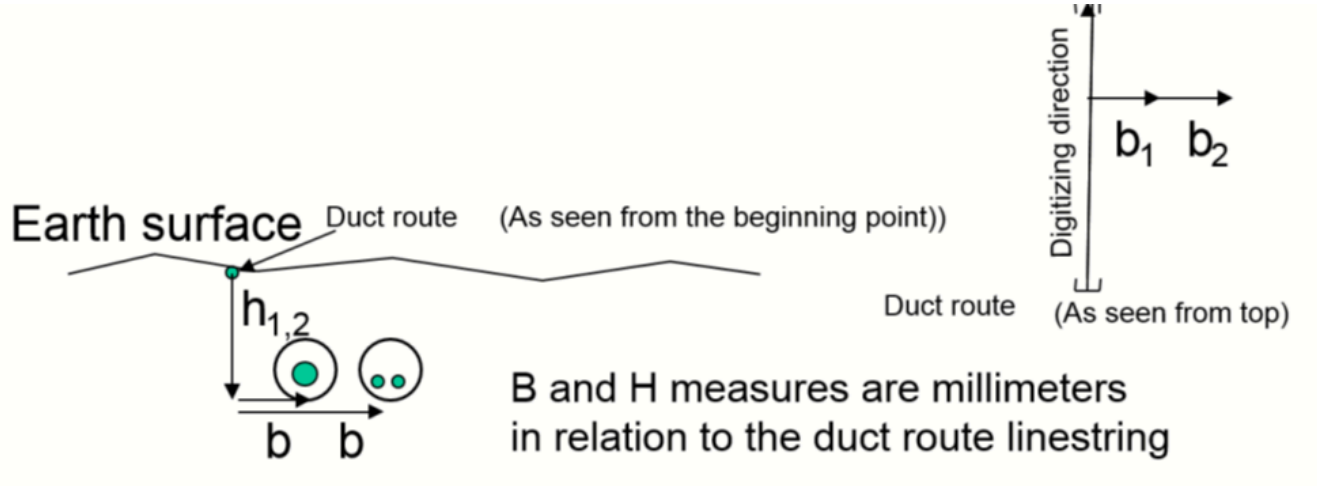
In addition to the information on the properties of a conduit, the **Conduit** form lists the ducts and cables that the conduit includes. For **ducts**, the information includes the duct number (displayed in the cross-section figure in the top left corner of the duct), duct identification, duct type, usage state, owner, renter, and installation year. For **cables**, the property information includes the type, ID, state, owner, and installation year.

The information on ducts (the circle symbol) and cables (green dot symbol) in a conduit can be viewed on the form.

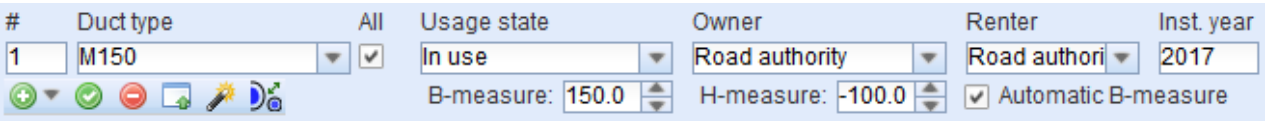


The B and H measures of ducts and cables in a conduit

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The information related to a duct can be edited in active state. The information on B and H measures is provided in millimetres in relation to the conduit's location on the map. The **B measure** indicates the horizontal location of a duct in relation to the conduit location. The **H measure** indicates the depth of the duct in relation to the conduit location. This can be a negative figure if the conduit has been measured at ground level, and it can be positive if the conduit has been measured at the bottom of the ditch. The B and H measures can be indicated to one decimal place.

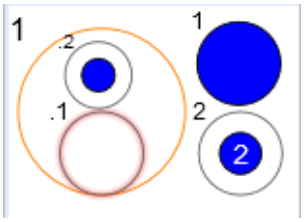


A cross-section of the conduit's ducts and cables

The **location** of ducts and cables in a conduit is illustrated with a separate **cross-section illustration**. Ducts are illustrated as hollow circles, with the **duct number** displayed in the upper-left corner. The colour of a duct depends on the colour defined for the **duct type** in question. If no colour has been defined for the duct type, the duct is marked in grey.

Fo example, the duct selected on the list is highlighted in the cross-section in the figure below. The cross-section illustrates ducts with type-specific colours. In this illustration, the empty sub-duct ".1" has been selected, and it has been placed in the orange duct "1" with the sub-duct ".2". A cable has been installed in the sub-duct ".2". If a duct contains several cables, the number of cables is displayed in the middle of the cable symbol. For example, duct "2" contains two cables. A cable can be installed directly in a conduit, in which case the cable number is displayed in the cable's top left corner. Cable "1" has been installed directly in a conduit.

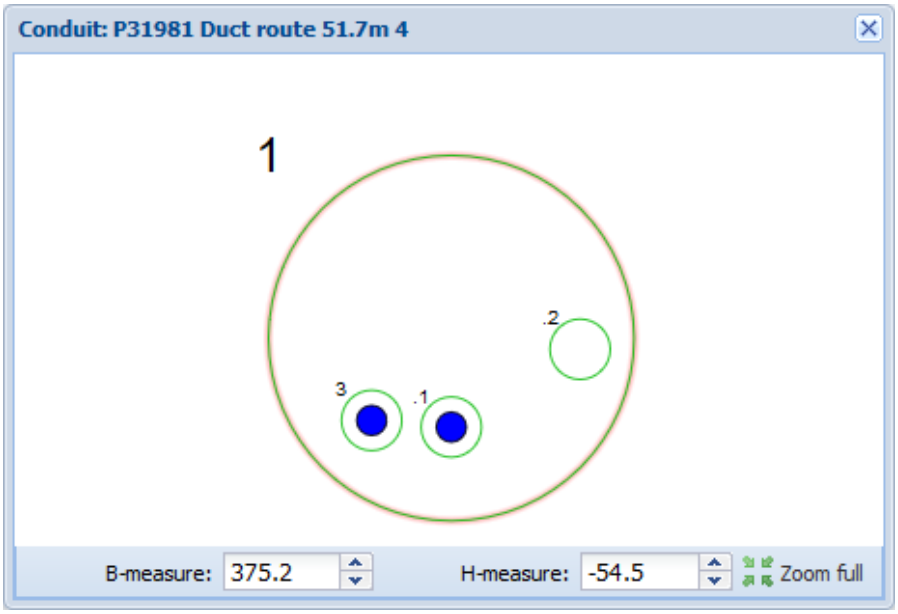
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Cables are illustrated as blue circles and if a duct contains several cables, the number in the middle of the cable symbol indicates the **number of cables in the duct**. If a cable is installed directly in a conduit, and not in a duct, the cable's sequence number, which is automatically assigned and cannot be edited, is displayed in the top left corner of the cable. The **location and size** of ducts and cables is illustrated **in proportion to each other**, meaning that a duct of the same size may be illustrated in various sizes in different cross-sections depending on the conduit's size and the number of ducts and cables in the cross-section illustration. The size of the blue cable symbol is not equivalent to the actual shape or diameter of a cable.

The ducts and cables in a conduit can also be opened in a new window by clicking **Open conduit profile in a new window** on the **Conduit** form. On this form, you can modify the location of the highlighted ducts and sub-ducts by dragging them to a new location or by changing the B and H measures.

In the example figure below, a conduit profile opened in a new window. The conduit contains one duct, which has three sub-ducts, with cables installed in the sub-ducts .1 and .3.



Viewing a cable installed in a conduit or duct

1. Select the cable you want to view.

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2. In the context menu, which you can open by clicking the right mouse button, select:
   - **Open cable** to view the Cable form displaying the information on the cable in question.
   - **Zoom to cable** to center the map on the selected cable.

Conduit reports

Click Reports under the **Export** tool on the **Conduit** form to create reports. You can create Excel reports on intersected properties linked to a conduit and reports on all intersected properties or you can create a bill of materials on the conduit elements.

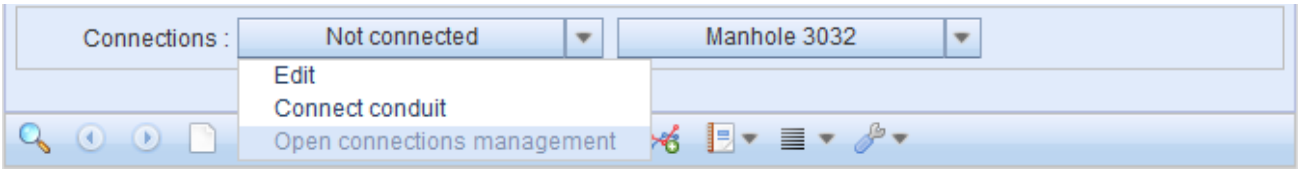
Click **List** to open the **Conduit** dialogue box, which displays information on all the conduits that were retrieved to the form. You can edit the information in the columns. The options under **Reports** enable the creation of reports on rental contracts, bills of materials and lists. Click the **List** tool and select the appropriate option to create a group display and reports on intersected properties.

Modifying conduits

Connecting a conduit, modifying, moving, and disconnecting a geometry, and measuring length are discussed in the following chapters.

Connecting a conduit

A conduit's connections are displayed at the bottom of the **Conduit** form. A conduit can be connected to a manhole **at both ends or only at one end**. If a conduit is connected, the menu displays the information on the connected objects, such as **Manhole 1082**. If a conduit is not connected, the text on the menu is **Not connected**. You can access the connections in the drop-down menus.



To connect a conduit, select **Connect conduit**. The software automatically searches for point objects within five metres of the start or end of the conduit and opens the

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objects in the **Object selection** window. In addition, you can select the **network element to be connected** by defining an area on the map. If the defined area includes more than one object, an **Object selection** window will be displayed. Click a network element with the left mouse button to highlight the object on the map. This makes it easier to select the correct object. To create a connection, **double-click** or click the object **with the right mouse button** and then select **Connect to conduit**. When the connection has been successfully made, the following text will be displayed on the form: **Conduit connected successfully**, and the name of the connected object appears in the **Connections** field.



Click **Disconnect conduit** to disconnect a connection. When this has been successfully carried out, you can see the following text at the bottom of the form: **Conduit disconnected successfully**. Select **Edit** to **open the form for the object** in question. You can then view its information or locate it on the map.

Moving a conduit

Moving a conduit is carried out in the same way as moving other line objects. This function is discussed in more detail in the chapter Moving a line object to a line.

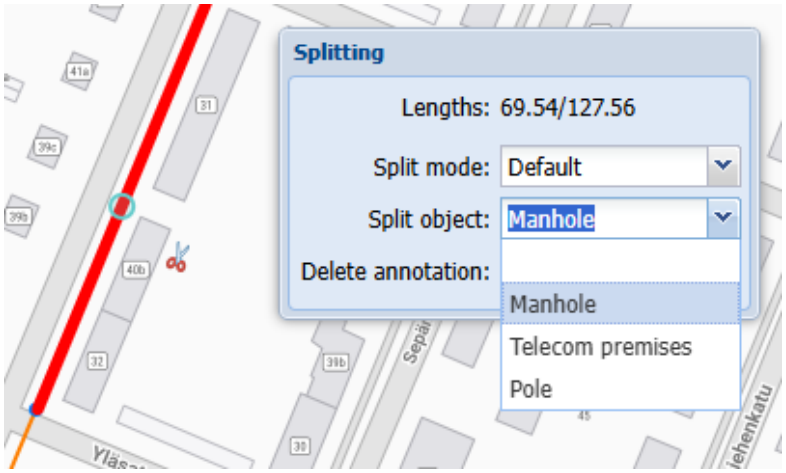
Splitting a conduit

Conduit splitting is carried out in the same way as splitting other line objects.

When splitting a conduit, the **Split object** field in the **Splitting** dialog allows you to define the object that will be created at the split location. The cables in the conduit remain unchanged after the splitting. Available options are:

- Telecom premises
- Pole
- Manhole

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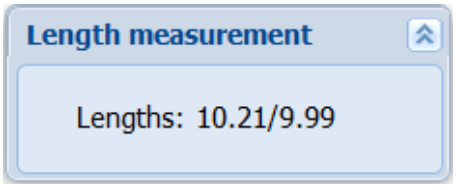


Modifying the geometry of a conduit

Modifying the geometry of line objects, such as conduits and cables, is discussed in the chapter Modifying the geometry of a line object.

Measuring the length of a conduit

You can use the **Measure length** tool in the **Modify** menu **to measure the length of a conduit** on the map. This function enables the distance to both ends of the conduits to be reviewed. For example, in the example figure below, the length from the start of the conduit/length to the end of the conduit.



You can add a **Conduit annotation** with the **Length measurement** tool if you click the conduit with the left mouse button. Annotation creation is discussed in more detail in the chapter Annotations.

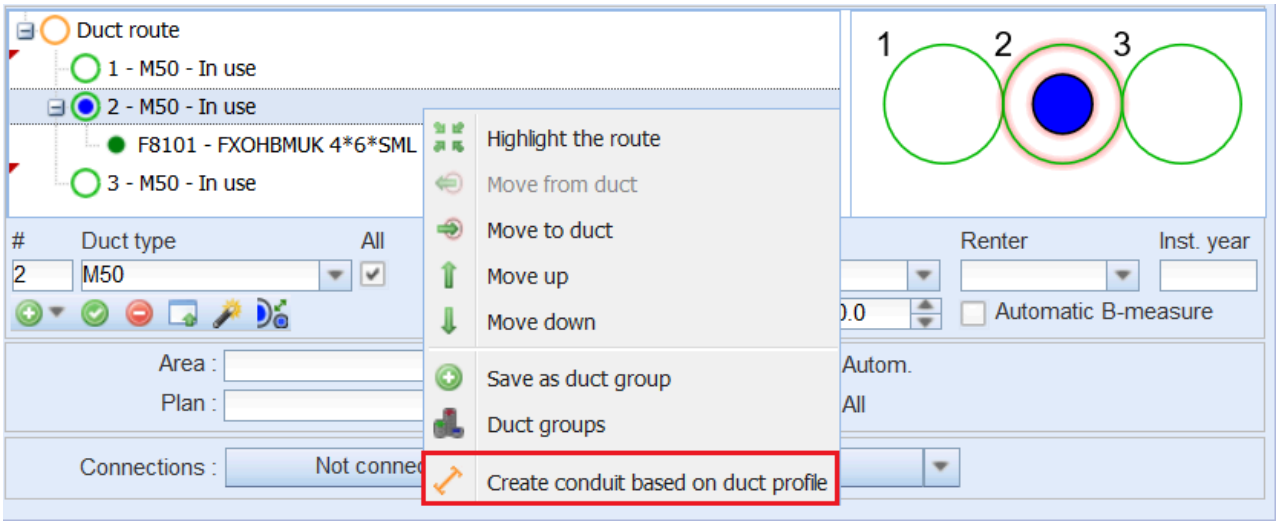
Creating a conduit based on a duct profile

Use the **Conduit** form to create a new conduit based on an existing duct profile.

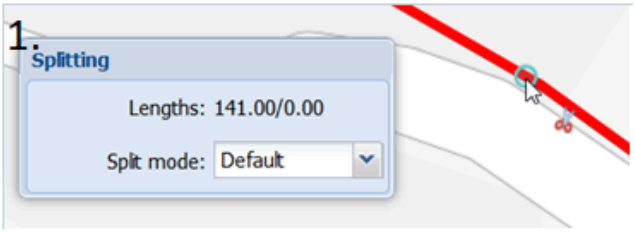
1. From the list of ducts, select the first duct of a series from which you want to copy ducts to a new conduit.

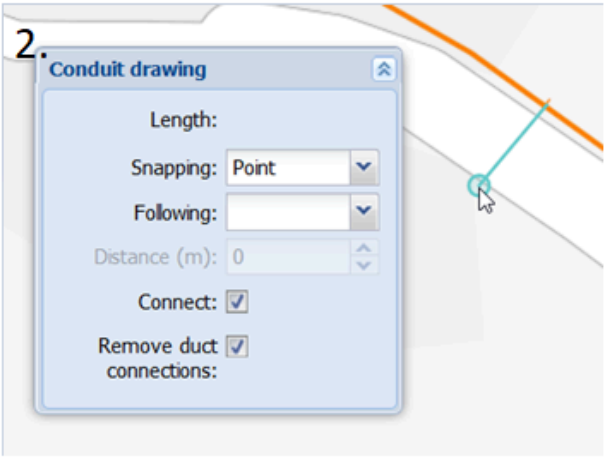
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2. Click a duct with the right mouse button and select **Create conduit based on duct profile.**



3. Select the drawing settings for the required conduit and split the conduit as necessary. Select **Remove duct connections** to remove any existing cross connections for ducts if there are no cables in the duct. The **Split conduit** option lets you select the point of splitting the conduit if the starting point of the new conduit is in the middle of the original conduit. After the split has been performed, select the conduit for which the automatic duct cross connections should be created. A profile change is added to the point of splitting.





4. In the example figure below, dialogue boxes for Conduit drawing based on duct profile: 1. Split the chosen conduit 2. Digitize a new conduit using **Conduit drawing** settings.

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5. Digitize a new conduit on the map. You can create a new conduit from the manhole or telecom premises to which the selected original conduit is connected. If both ends of the original conduit are connected to a manhole or telecom premises, the user can separately select the end to which the new conduit is created and connected.
6. The function has automatically created a new conduit, the conduit profile of which displays the duct hierarchy from the selected row on the duct list to the end of the duct rows. Based on this hierarchy, duct cross connections are automatically created with the selected duct and its sub-ducts.

Connecting a cable to a conduit or duct

When you have created a conduit, you can connect a cable to the conduit or its duct. Select the conduit or duct on the list that you want to use for connecting a cable.

Pick a cable:

either a)

1. Click **Pick cable from map** .
2. Define the area where the cable is located.
3. If there are several cables in the area, select the correct cable from the list.

or b)

1. Open the **Cable** form.
2. Check if the form includes the required cable. If necessary, retrieve the cable to the form.
3. On the **Conduit** form, click **Pick cable from cable form** .

Adding and modifying ducts on Conduit form

Ducts and sub-ducts can be added to conduits, and the related information can be modified. The following sections introduce different ways to add and modify ducts.

Adding a duct to a conduit

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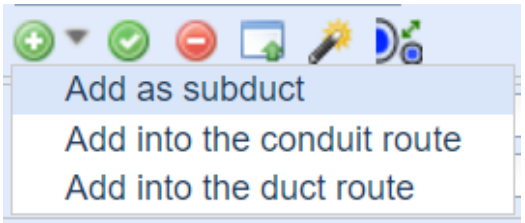
1. Enter the duct information. **Duct type** and **Usage state** are mandatory fields.
2. Select the **Automatic B-measure** checkbox if you want to add more than one duct and want the **B measure** automatically calculated based on the diameters of the added ducts.
3. Click **Add new duct** to add the duct to the list. The duct then appears in the figure and at the selected level of the list.
4. Click **Add new duct** as many times as you need to create new ducts. Edit the duct information if you want to add ducts of different type. If the **Automatic B-measure** checkbox is selected, the **B measure** of a new duct is automatically calculated based on the duct's diameter.
5. When you are ready, click **Save form** to save changes.

Mass insertion of microducts

It is possible to add a new duct type or an existing duct profile at once to the entire conduit/duct route. The function is available on the **Conduit** form.

Activating the functionality

1. Open the **Conduit** form.
2. Open the drop-down menu next to the **Add new duct** button. With the **Add into conduit route** and **Add into the duct route** functions that open from the drop-down menu, you can choose whether a new duct is added to a topologically connected conduit route or to a duct route formed by duct cross-connections.



Note! The new duct type/profile is always automatically placed at the end of the existing conduit-specific duct numbering order.

Adding a duct type into a conduit route

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1. Adding the duct type to the conduit route is done with the **Add into to the conduit route**.
2. Choose the desired channels from the map. They will open on a separate conduit list form. The connection status shown in the list will indicate if some selected conduits are not topologically connected to telecom premises or manhole. It is also possible to completely reorder the conduits in the list, if all the selected conduits are not topologically connected to each other or the conduits were selected from the map in the wrong order. You can delete channels with the **Delete** function.
3. Click the **Create ducts** button to create ducts for the conduits you selected.

Adding a duct type into a duct route

1. First, open the **Duct connection dialog** by selecting a conduit from the map.
2. The **Duct connection dialog** form has the option to choose whether the selected duct type is placed next to or inside an existing duct route (the system also allows selection of a partial duct route).
3. With the **Inside** function, a new duct or duct group can be added in the middle of every duct on the route. If that choice is not made, the B and H dimensions can be used to give values for new pipes. The new pipes are placed based on the dimensions given in the profile.
4. Click the **Create** button to create the ducts.

Updating the property values for ducts

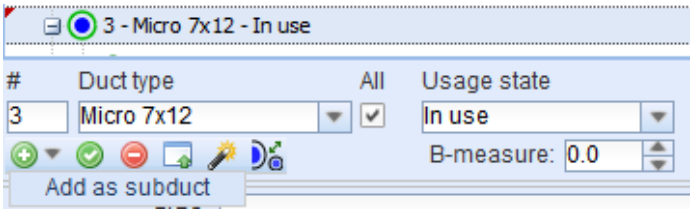
1. In the list or the cross-section illustration, select the duct you want to update.
2. Edit the fields as necessary.
3. Apply the changes to the conduit structure by clicking **Apply changes**.
4. Click **Save** to save changes.

TIP: To change the usage state of all the ducts in a conduit to **In use**, select **In use** as the usage state of the duct and click **Save form**. The software will ask the user to confirm the usage state change.

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Adding a sub-duct to a duct

1. Select the duct you want to use for adding a sub-duct.
2. Define the information on the duct that is added. When adding a sub-duct, the fields for **B** and **H measures** are not relevant, because they are defined based on the outer duct in which the sub-duct is automatically installed.
3. In the drop-down menu for **Add new duct**, click **Add as sub-duct** to create a sub-duct.



Removing a sub-duct from a duct

1. Select the sub-duct you want to remove from another duct.
2. In the context menu, select **Move from duct** to move the sub-duct from the duct. It is then displayed on the list at the same level as the outer duct, but in the cross-section illustration it remains within the outer duct.
3. If necessary, change the duct location by editing the **B** and **H measures**.

Removing ducts from a conduit

1. Select the duct you want to remove.
2. Click **Remove duct or cable**.
3. Click **Save** to save the changes.

Note! If a cable is also connected to a duct, the cable will also be removed from the conduit.

Transforming a duct into a sub-duct in another duct

1. Select the duct you want to transform into a sub-duct.

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2. On the list, the duct you want to transform **into a sub-duct** must be below the duct you want to use as the outer duct. To move the duct to the correct place, click the right mouse button and, in the context menu, select **Move up** or **Move down**.
3. In the context menu, select **Move to duct** to make the duct on the list a sub-duct of the previous duct at the same level. In the cross-section illustration, the duct that is made a sub-duct is then placed inside the duct that was above it on the list.

Note! The physical size of the duct that you want to change into a sub-duct must be such that it fits inside the outer duct.

Mass modification of ducts

From the list of ducts, you can select more than one duct to be modified. To do this, click the Ctrl key while you select the duct rows.

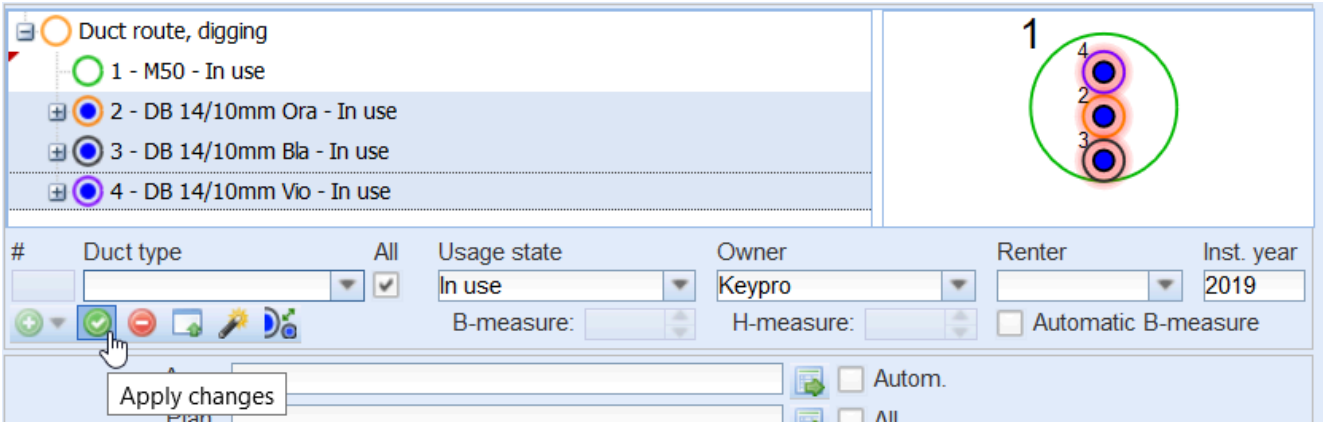
1. You can **modify** the properties of more than one duct, excluding the duct number and the B and H measures. To do this, select the data you want to update and click **Apply changes**.

Or:

1. You can **move** several ducts simultaneously in a duct group by right-clicking and selecting one of the available **Move** options.

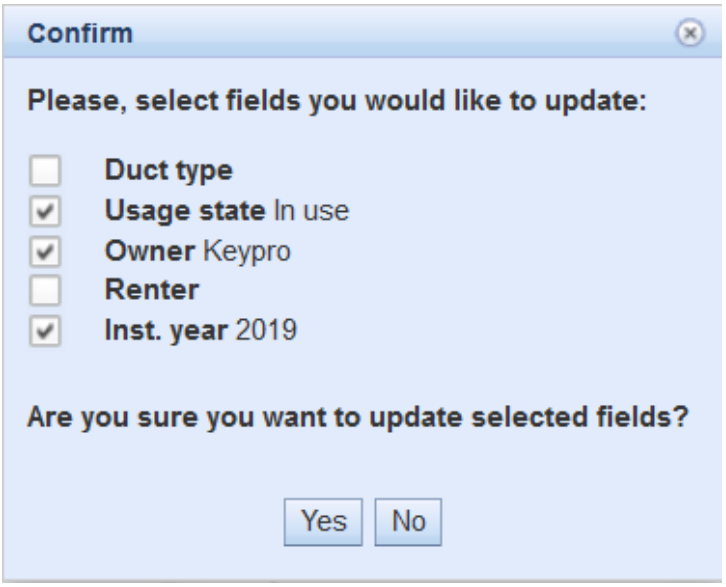
Or:

1. To **remove** several ducts at once, click **Remove duct or cable**.



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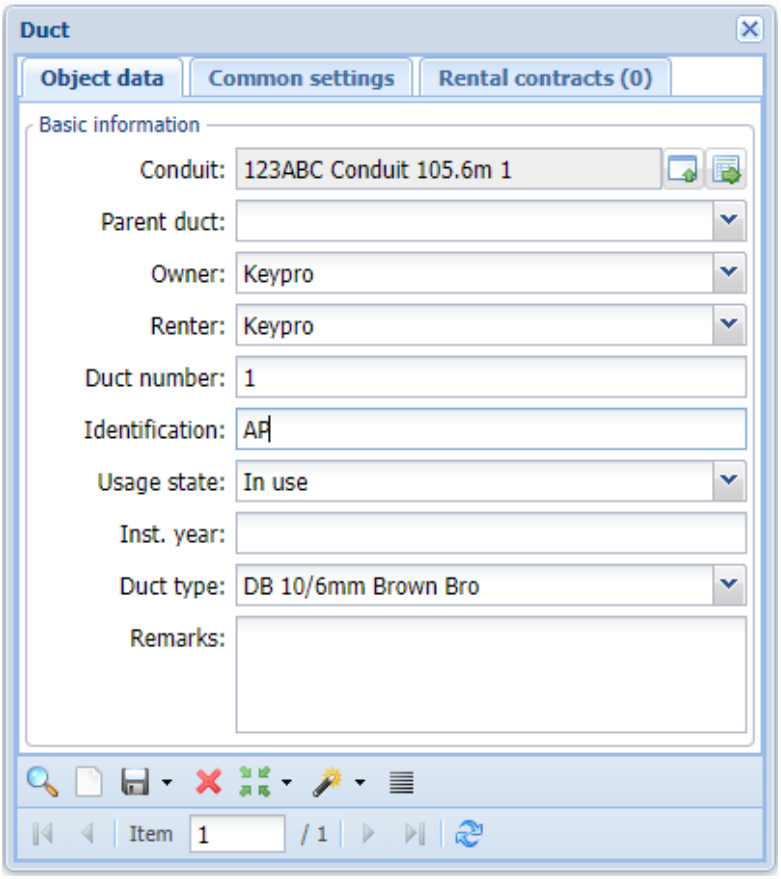
You will be asked for a separate confirmation when you carry out mass deletions and updates.



Duct form

The **Duct** form can be used to create and edit ducts and sub-ducts, in addition to the basic functionalities that were introduced in the chapter four, Buttons on object forms. The information in the **Duct** form can also be edited in the **Conduit** form.

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Adding ducts on Duct form

Ducts and sub-ducts can be added to conduits, and their information is editable. The following paragraphs introduce different ways of adding and editing ducts.

1. Fill in the mandatory information. Mandatory fields are **Type** and **Usage state**.
2. Choose a conduit for the duct by clicking the **Pick conduit from form** button from the **Conduit** field.
3. Create or select an existing conduit and click the **Update to form** button in the right corner of the **Conduit** form toolbar. The ID and Length of the conduit can now be found in the **Conduit** field of the **Duct** form, which means that the conduit has been connected successfully.
4. Save the changes with **Save**.

Note! You can place a duct into the parent duct from the Duct form. Select the **Parent duct** field from the **Objects data** and open the options from its drop-down menu.

Updating duct information on Duct form

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1. Select the duct that needs to be updated.
2. Make the wanted changes on the fields.
3. Save by clicking **Save** .

Duct groups

You can create and add various duct groups to conduits. Adding and modifying duct groups is discussed in the following sections.

Adding a duct group in a conduit or duct

You can add a duct group by selecting a) a group **as the duct type** (marked with ***** on the drop-down list for Duct type) **or** b) by importing a group from the **Duct groups** form.

1. When you use the **Duct type** selection; select a type marked with *** as the **duct type**.
2. Click **Add new duct** to add a new duct group in the illustration and at the selected level on the list.
3. Click **Save form** to save changes.
4. When you use the **Duct group** form:
5. On the duct list, position your mouse pointer over the conduit and select **Duct groups** .
6. Select a duct group for the form based on its name and/or attached comment.
7. On the **Conduit** form, select the duct next to which you want to create a duct group.
8. Click **Create ducts to conduit** to add the new duct group in the illustration and at the selected level on the list.
9. Click **Save** to save the changes.

Creating a duct group

1. Create ducts to conduit without saving the data, as instructed for Adding a duct to a conduit.

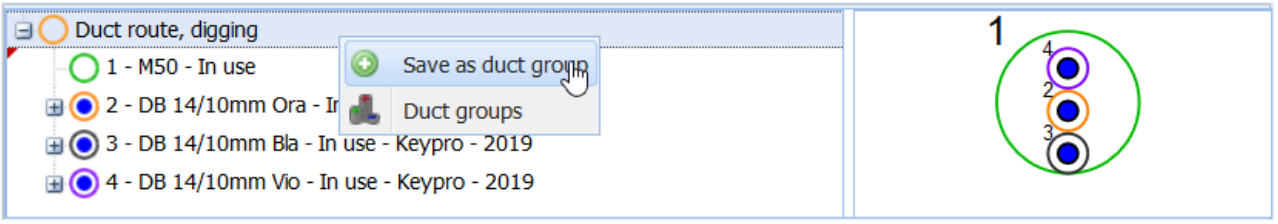
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2. Save the new duct group using the right mouse button to select **Save as duct group** while your mouse pointer is over a duct.
3. You can also retrieve an existing conduit to a form and save it as a duct group for the duct structure.

Creating a duct group based on duct profiles

You can create duct groups based on duct groups created on the **Conduit** form.

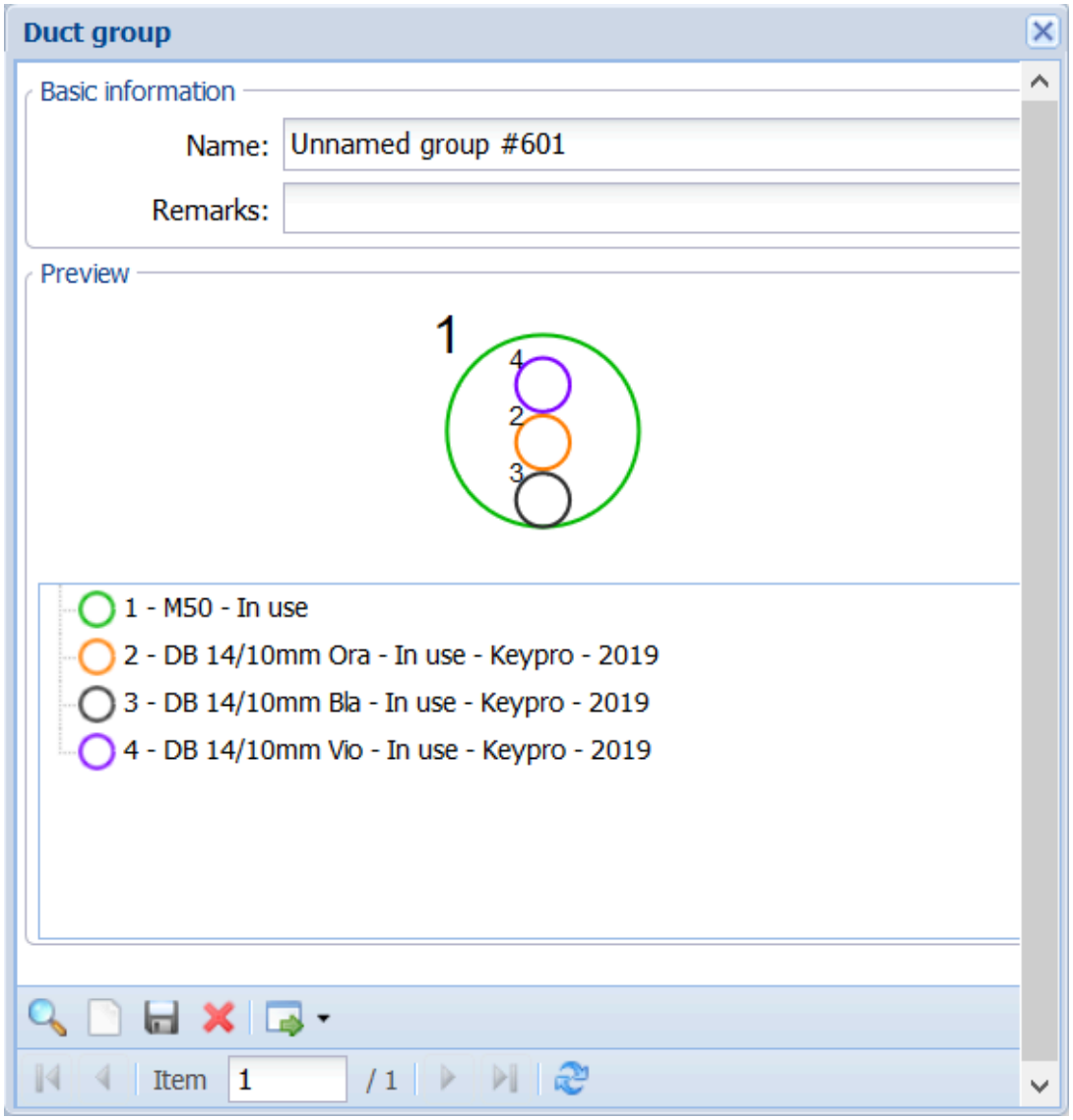
1. On the list, select the **duct or conduit row** that you want to use to create the new duct group. The new duct group is formed in accordance with the duct profiles that belong to the selected row.



2. Right-click and select **Save as duct group**.

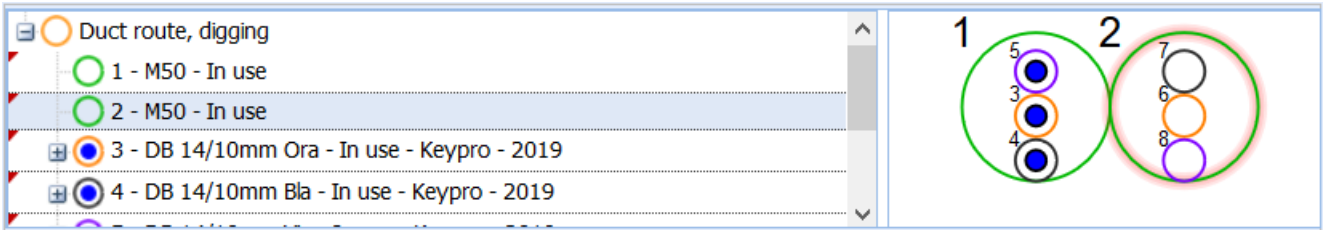
Name the duct group in the **Duct group** dialogue box that is displayed.

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You can either click **Save** to save the duct group or click **Create ducts to conduit** to create the duct group in question in the open **Conduit** form. You can add the duct group you created as a sub-duct to the **Conduit** form by using the **Create ducts to conduit** sub-selection.

In the figure below, the duct group that was added is included in the list and marked with the number 2 in the figure.



Save the **Conduit** form.

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Modifying a duct group

You cannot actually modify a duct group, but you can use a duct group to create a new, modified duct group on the **Conduit** form.

1. Add the duct group you want to modify to an empty **Conduit** form, according to instructions provided in the chapter Adding a duct group in a conduit or duct.
2. Make the required changes.
3. Save the new duct group using the right mouse button to select **Save as duct group**.

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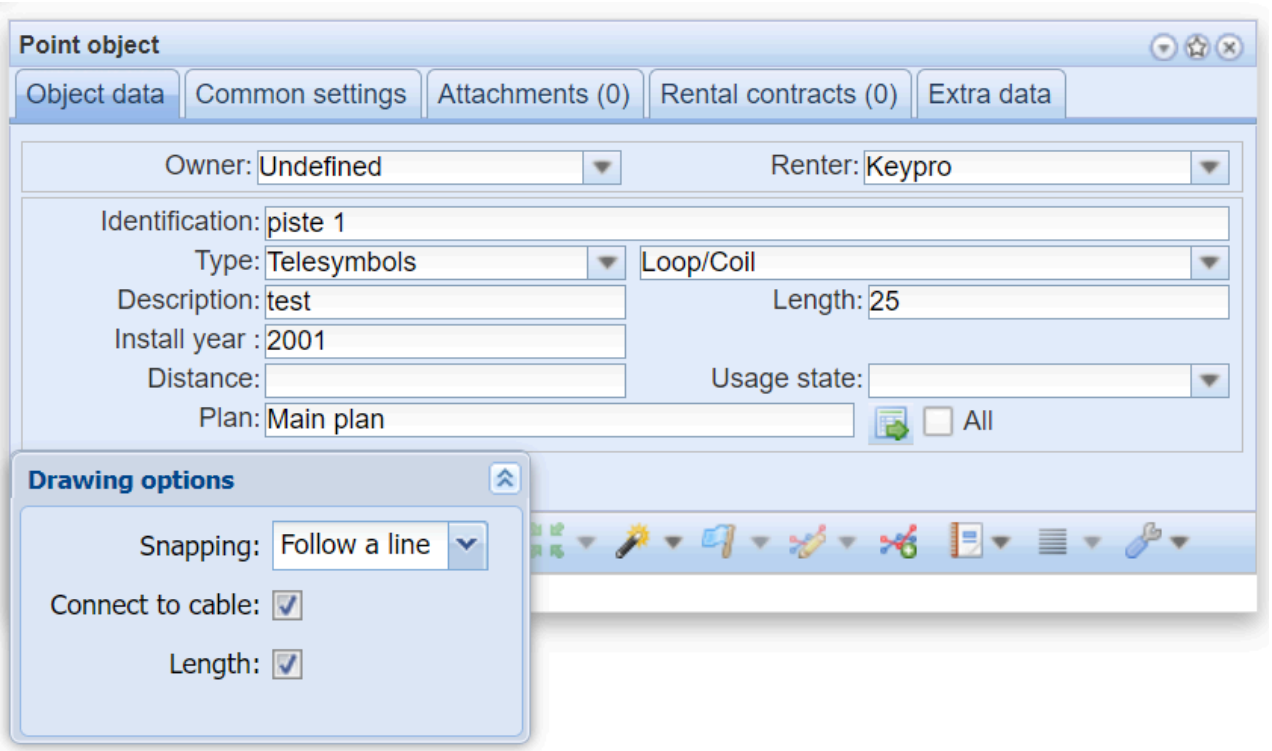
Point objects

The **Pont object** form and its functions work as described for point objects in the chapter Buttons on object forms.

Loop/coil

A loop/coil is not **created** in the same way as other point objects. You can draw loops/coils to the cable route when you digitize a cable or you can connect a **loop/coil** to a cable afterwards by taking the following steps:

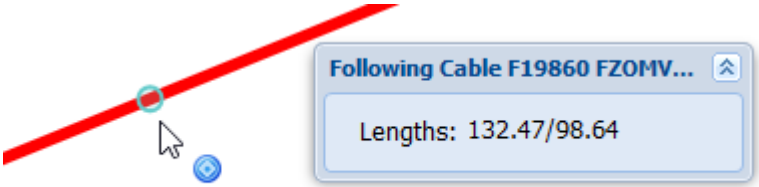
1. In the KeyCom menu, click **Point object** to open the **Point object** form.
2. Enter the information in the fields: **Type**, **Length**, and **Usage state**. The length of the loop/coil is added to the total cable length on the **Cable** form.
3. Click **Create**.
4. In the **Drawing options** window that is displayed, in the menu for **Snapping,** select **Follow a line**.



5. Hold down the SHIFT key and click the correct point on the cable with the left mouse button to place the loop/coil.

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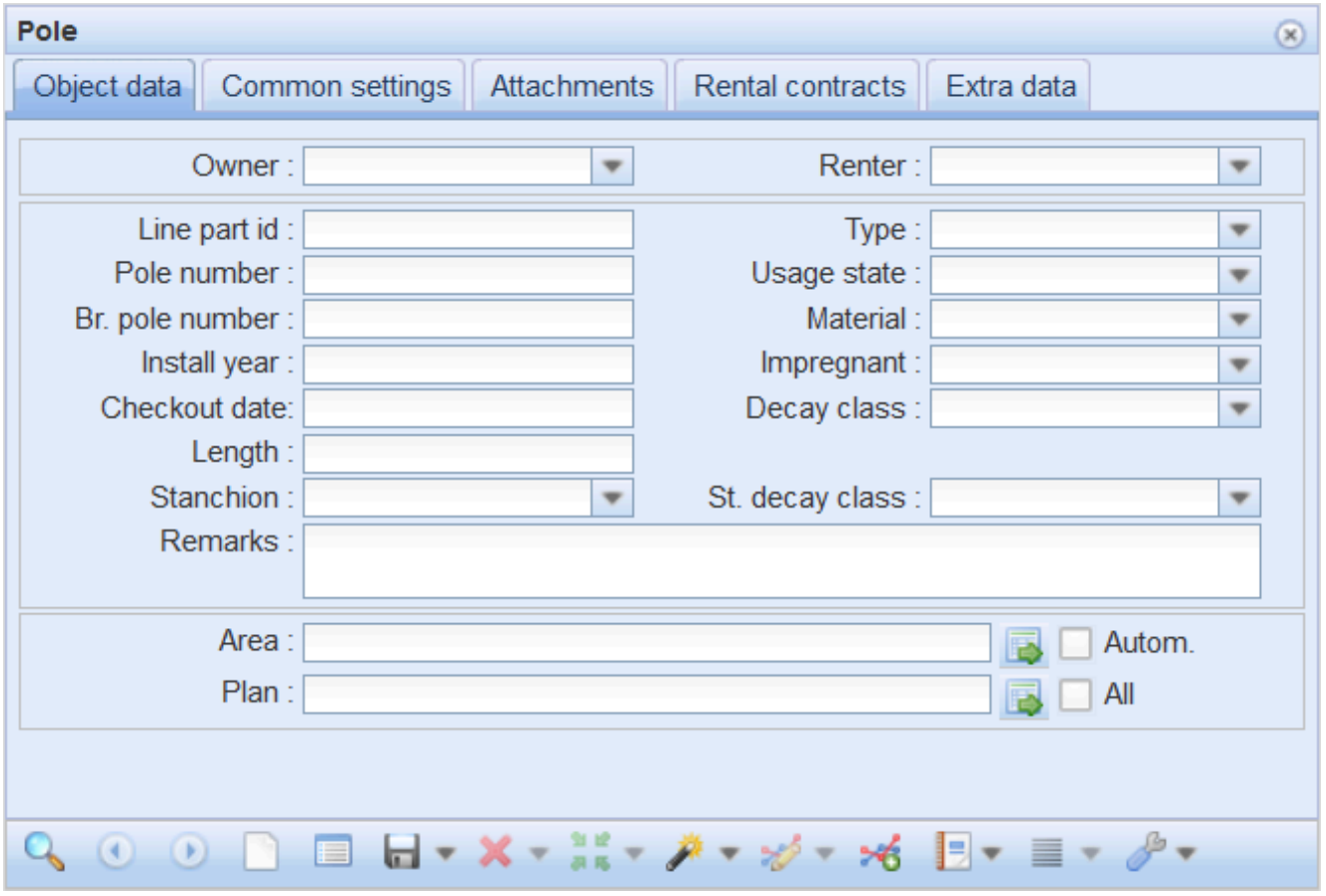
6. You can see the distance to the cable's starting and ending point in the **Following cable** window in the **Lengths** field. If you have selected the **Length** checkbox, the length of the loop/coil (if provided) is added to the cable's length.



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Poles

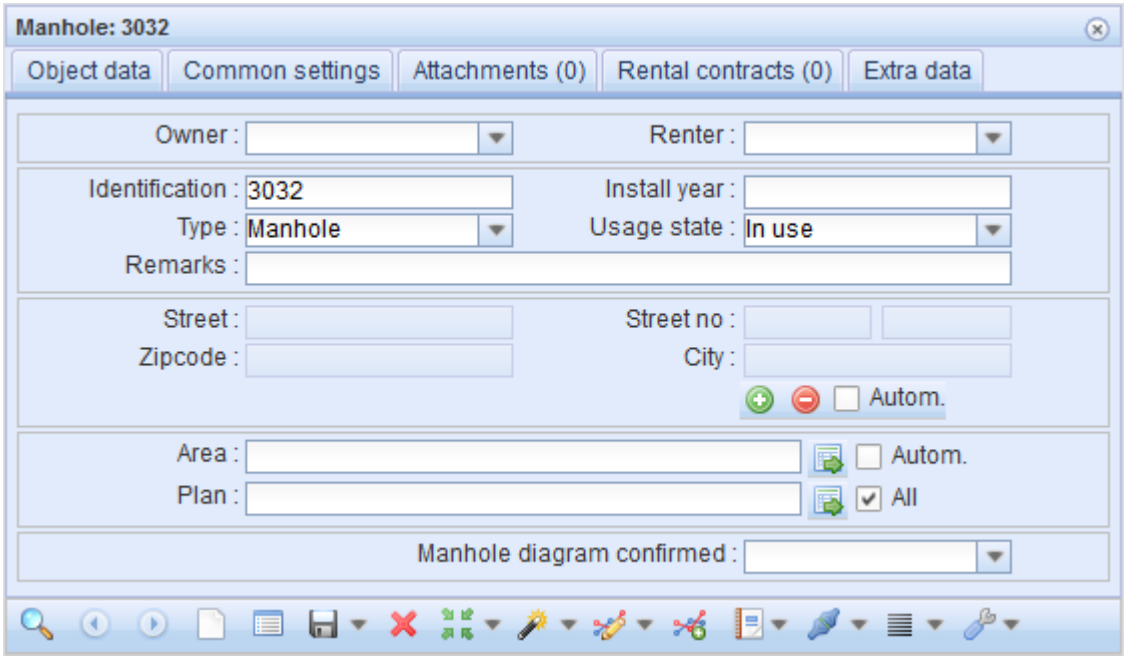
The **Pole** form functions in the same way as described for other point objects in the chapter Buttons on object forms.



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Manholes

The **Manhole** form functions mainly in the same way as described for other point objects in the chapter Buttons on object forms.



Managing manhole connections

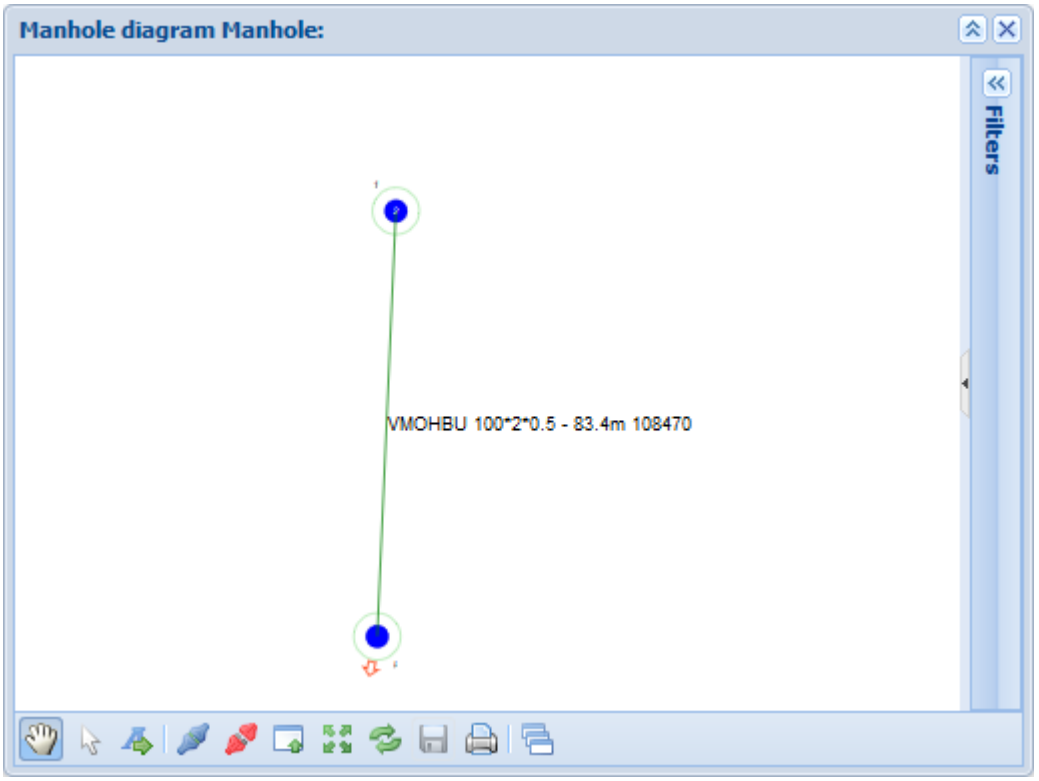
A manhole has physical connections and duct connections. Click **Connections management** to view and edit them. The **Connections management** form is displayed, on which you can view **Duct connections**. Duct connections are discussed in more detail in the chapter Duct connections management. In the **Duct connections** menu, you can also select **Physical connections**. More information on them is provided in the chapter Connections management (physical and duct connections)

Manhole diagram

A manhole diagram illustrates the connections inside a manhole. In the drop-down menu for **Tools**, click **Manhole diagram** to open the manhole diagram. The manhole diagram illustrates the various network elements (manholes, splices, ducts) with colours and symbols.

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The **Manhole** form includes the field **Manhole diagram confirmed**. In the drop-down menu, select **Yes**/**No** according to the situation. If this field is empty, no actions have been taken regarding the manhole diagram related to this manhole.



Saving a manhole diagram

Click **Save diagram** to save the diagram.

Locating and highlighting the objects of the diagram on the map

When your mouse pointer is positioned over an object, select **Locate** or **Highlight** in the context menu.

Viewing and editing the information on the diagram objects

When your mouse pointer is positioned over an object, select **Edit (object)** to open the form on a separate form. The general functions of the object forms have been described in the chapter Buttons on object forms.

Moving and rotating the objects of the manhole diagram

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You can move and rotate the objects of the diagram by clicking **Pick**. Click to rotate, and move by grabbing the square over the object. Click **Save diagram** to save changes.

Printing a manhole diagram

Click **Print** to print the diagram. The diagram is then opened on a new tab/window in the browser, and the browser's printing function is initiated. Follow the browser's instructions to print. You might have to choose the printer and other print options and click **OK**.

Adding text to the manhole diagram

1. Click **Add text** .
2. Enter your text in the **Enter new text** field that is displayed when you click on the diagram.
3. Click **OK**.
4. Position your text in the diagram.
5. Click **Save diagram** to save changes.

Creating connections in a manhole diagram

1. Click **Connect** .
2. In the diagram, select the cable you want to connect.
3. Select the splice you want to use for the connection.
4. The following notification is displayed: Cable successfully connected to a manhole.
5. Click **Save diagram** to save changes.

Disconnecting connections in a manhole diagram

1. Click **Disconnect** .
2. In the diagram, select the cable you want to disconnect.

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3. You will be asked the following question: Are you sure you want to remove this connection? Select **Yes**.
4. The system provides a notification that the cable connection to the splice has been disconnected, and has been connected to a manhole.
5. Click **Save diagram** to save changes.

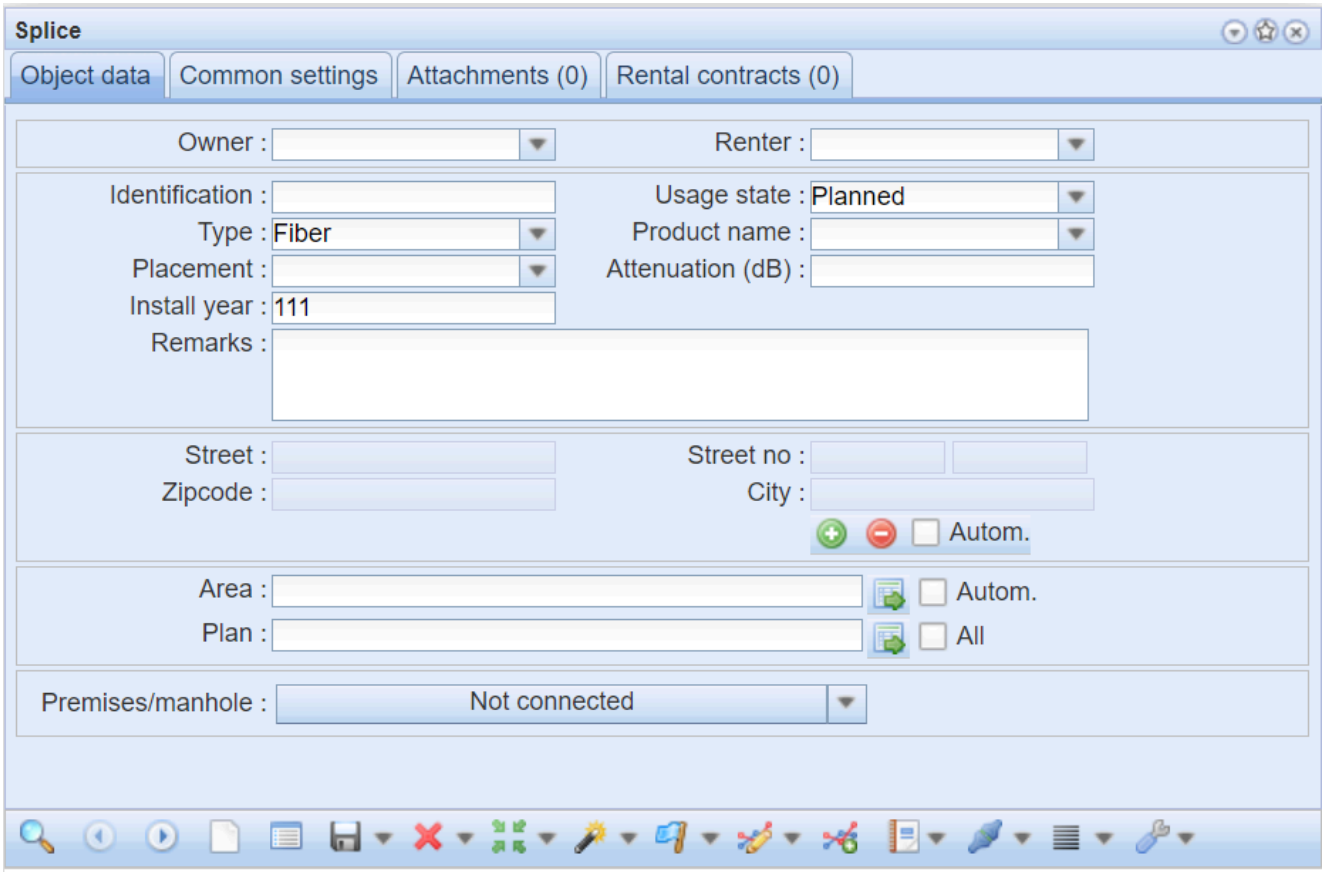
Importing a splice to a manhole diagram

1. Click **Import splice from form** .
2. If the **Splice** form contains a splice, it will be imported to the manhole in the manhole diagram.
3. Add the splice to the desired location in the manhole diagram by clicking.
4. If the **Splice** form is empty, the system notifies you that there are no splices that can be imported.
5. Click **Save diagram** to save changes.

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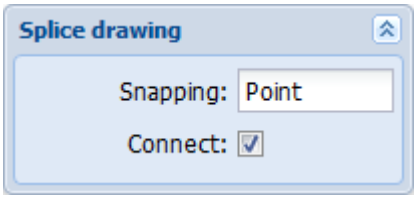
Splices

The **Splice** form functions mainly in the same way as described for other point objects in the chapter Buttons on object forms.



Creating a splice

You can create a splice on the map in the same way as any other objects. The only exception is that when you create a splice, you can connect it to telecom premises or a manhole. When the **Connect** checkbox in the **Splice drawing** window is selected, the splice is automatically connected to the selected manhole or telecom premises. **Save** the form after you have updated the information.

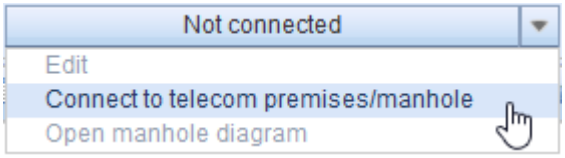


Connecting a splice to telecom premises or a manhole

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When you place a splice on the map, you can also connect it to telecom premises or a manhole, as described in the previous chapter. To connect an existing splice, take the following steps:

1. Retrieve the splice information to the form by clicking either **Search** or **Pick** .
2. In the drop-down menu for the **Premises/manhole** field, select **Connect to telecom premises/manhole**.
3. Pick the object you want to use for the connection from the map. After you have selected the object, the connection is made automatically, and the object's information appears in the Premises/manhole field.



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Telecom premises

Telecom premises information

In **KeyCom**, the **telecom premises** object refers to a point object that may be connected to equipment and cables. In addition, house cabinets and manholes are typically also considered telecom premises. The basic functions of the **telecom premises** form are the same as those used for managing other point objects. More information on the basic functions is provided in chapter Buttons on object forms.

- The **Telecom premises** form includes the field **Manhole diagram confirmed**. In the drop-down menu, select **Yes**/**No** according to the situation. If this field is empty, no action has been taken regarding the manhole diagram related to this manhole.
- The number of circuits that are used and connected to the telecom premises is displayed on the **Telecom premises** form in the **Active circuits** field.
- The **Technical info field** is for documenting detailed technical information related to the **telecom premises**. For example, you may want to mention that the t**elecom premises** are located on top of a hill or in a basement.
- The **importance classification** is determined in accordance with the guidelines provided by **Traficom** (Finnish Transport and Communications Agency). Components that belong to a public communications network or a communication service are classified according to type, geographic scope, and number of users. The importance classification ranges from 1 to 5. The more important a service is, the higher the number. The **importance classification** of telecom premises is determined based on the component with the highest importance classification.

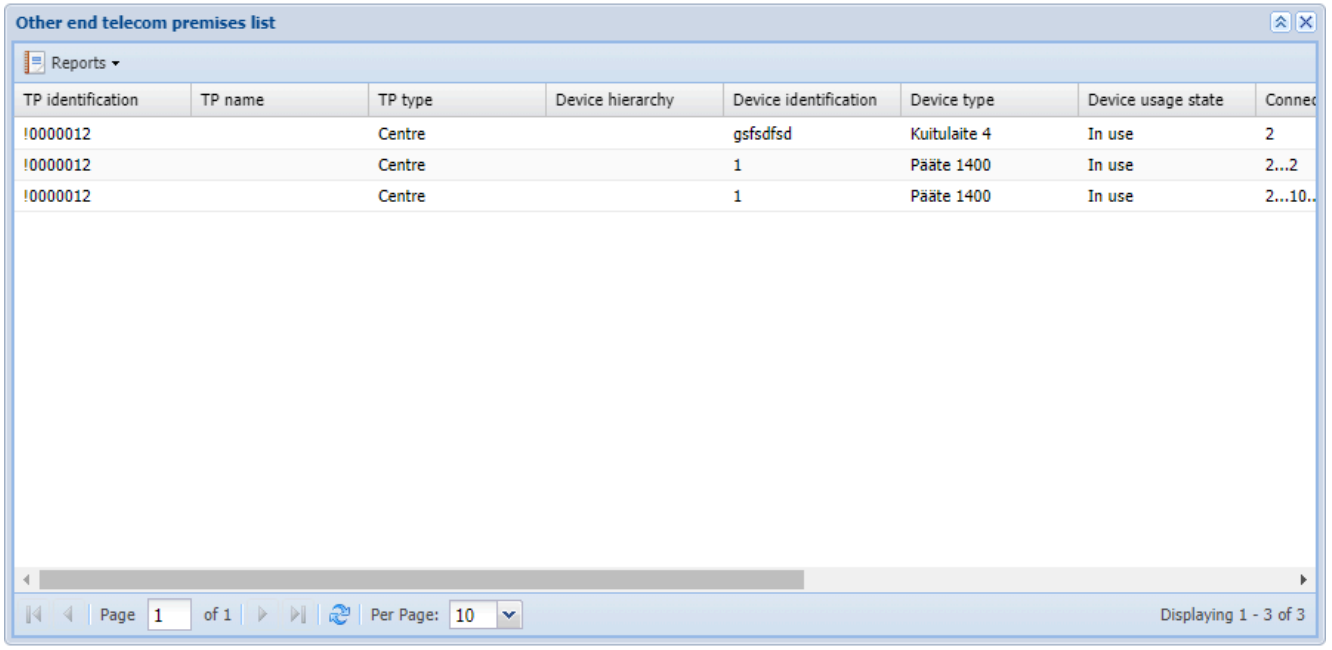
Other end telecom premises list

In the **Other end telecom premises list**, you can generate other end telecom premises information by selecting a device with possible sub-devices. The information on the list consists of the logical other end connections between the connectors of the devices located in the selected telecom premises. Each other end connection, which leads to consecutive connectors of the same other end telecom premises, is presented as a separate row on the **Other end telecom premise list**.

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The **Other end telecom premises list** can be used to find the right device in large telecom premises, for example, in cases where you only know the address of the other end telecom premises and you want to know the device and the connector that leads to the desired other end telecom premises with other end connections.

The **Other end telecom premises list** can be opened from the context menu that opens above the selected device from the **Cross-section**, **Telecom premises**, **Device** and **Connection management** forms by clicking **Open Other end telecom premises list**. In addition, the form can be opened for all devices in a telecom premises from the drop-down menu of the **List** function of the **Telecom premises** form's toolbar by clicking the **Other end list** button.



The columns of the Other end telecom premises list

By default, the information presented in the counterpart status list is presented in the same way as in the device list of the **Cross-section** form. The list does not show those devices that do not have connectors, such as switchboards or device racks. The logical counterpoint bundles related to the devices' connectors are presented in the list in the order in which they are formed, including the devices' successive connectors and their counterpoint connections.

- TP identification
- TP name
- TP type **(column hidden by default)**
- TP address
- TP address postal code and post office **(column hidden by default)**

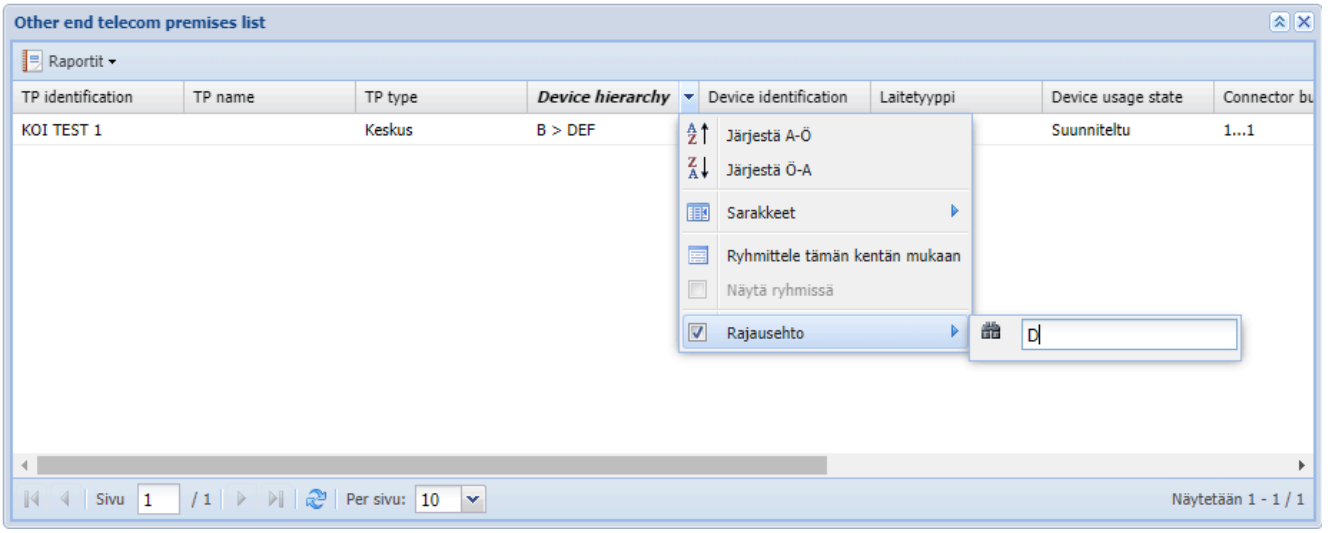
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- TP address municipality **(column hidden by default)**
- TP comment **(column hidden by default)**
- TP technical info **(column hidden by default)**
- Device hierarchy (for example, parent devices of a fiber panel, "A > B > C")
- Device identification
- Device type
- Device class **(column hidden by default)**
- Device usage state
- Connector bundle (identifier of the first and last connector of the bundle, separated by three dots, e.g. "1-2-3-14...1-2-7-85")
- Length (the length of the logical other end connection in meters)
- Free (the number of free connectors in a single bundle like shown on the Cross-section form)
- OE TP identification
- OE TP name
- OE TP type **(column hidden by default)**
- OE TP address
- OE TP address postal code and post office **(column hidden by default)**
- OE TP address municipality **(column hidden by default)**
- OE TP comment **(column hidden by default)**
- OE TP technical info **(column hidden by default)**
- OE device hierarchy **(column hidden by default)**
- OE device identification **(column hidden by default)**
- OE device type **(column hidden by default)**
- OE device class **(column hidden by default)**
- OE device usage state **(column hidden by default)**
- OE device connector bundle (identifier of the first and last connector of the bundle separated by three dots, e.g. "1-2-3-14...1-2-7-85") **(column hidden by default)**
- Device id **(column hidden by default)**
- OE device id **(column hidden by default)**

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Filtering on Other end telecom premises

The information in the **Other end telecom premises list** can be filtered in the columns. The user can choose to display in the list, for example, only the connector bundles leading to the desired address of the other end telecom premises according to **free text** filtering. The column header is ***highlighted*** if it is subject to a separate filtering condition.



Other end telecom premises list context menu functions

With the functions of the context menu, you can switch to viewing the device selected from the other end telecom premises list and the connections of the connected bundle in other forms.

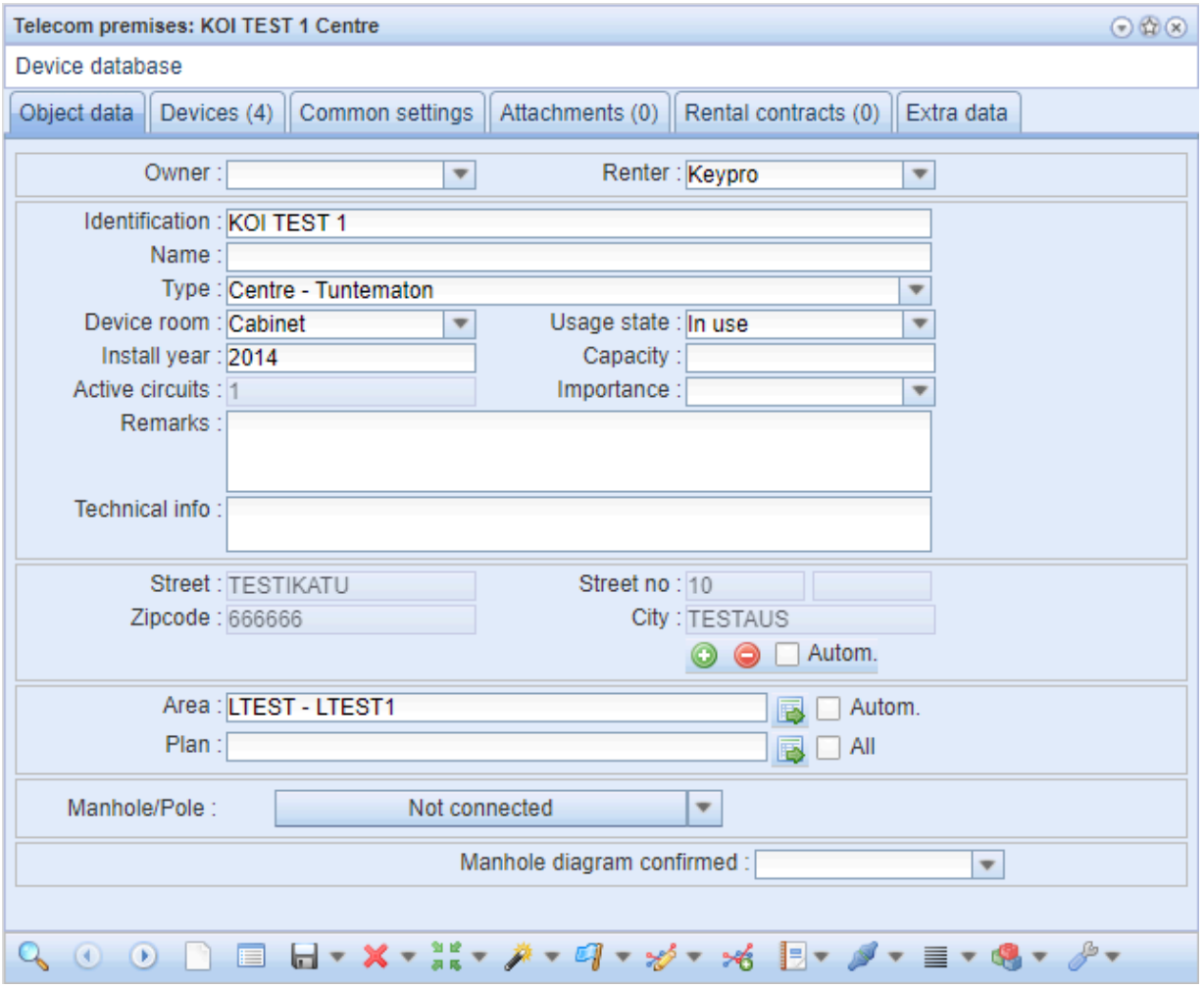
- **Open in cross section form** : synchronize the first connector of the selected device and connector group and opens the **Cross-section** form.
- **Open in telecom premises device list** : synchronize the selected device and the first connector in the bundle and opens the **Devices** tab.
- **Open in connections management form** : synchronizes the selected device and the first connector in the group and opens the **Connections management** form.
- **Open in Telecom premises form** : opens the **Telecom premises** form with the telecom premises and other end telecom premises data.
- **Open in Device form** : opens the **Device** form with the device and other end information.
- **Open in Address form** : open the **Address** form with the address and other end telecom premises address information.

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- **Edit connection** : opens the **Edit connections** from which the logical connections related to the connector bundle can be updated at once for all logical other end connections.

Creating telecom premises

You can create new telecom premises by providing the mandatory information: **Type** and **Usage state**. It is not mandatory to place the premises on the map. The program automatically creates an **Identification** number for the object by applying consecutive numbering.

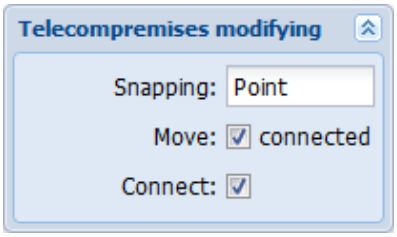


Moving telecom premises

The principles for **moving telecom premises** are mainly the same as those described in the chapter Modifying the geometry of a point object. Select **Modify**, and when

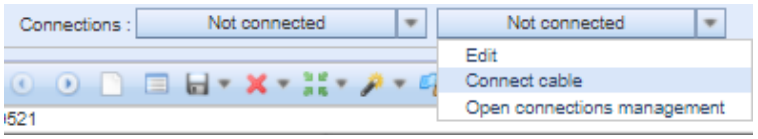
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the **Move: connected** checkbox is selected, the cables, conduits, annotations, splices and other telecom premises connected to it are also moved with the telecom premises. By selecting the **Connect** checkbox, the telecom premises object will be connected to a manhole/pole/premises when it is modified. Information on the connection is then displayed in the **Manhole/Pole/Premises** field on the **Telecom premises** form. You can choose the manhole/pole/premises from the map afterwards by selecting **Connect to manhole/pole/premises** in the drop-down menu for **Manhole/Pole/Premises**.



Connecting to a cable

On the **Cable** form, in the drop-down menu for **Connections**, select **Connect cable** to connect telecom premises to a cable. On the map, use your mouse to define an area by using the **Pick** tool in order to select the **manhole** or **pole to be used for the connection**. If the area includes more than one network element, select the correct object by **double-clicking** it on the **Object selection** list. The cable will then be connected to the selected object. You can also create the connection by clicking the network element with the **right mouse button** and selecting **Connect to cable**. If the connection succeeds, the following text will be displayed on the form: **Cable connected successfully,** and the name of the network object appears in the **Connections** menu.



Devices

You can view the devices and services of telecom premises on the **Telecom premises** form's **Devices** tab. When a device has been selected, its information is displayed at the bottom of the form. In addition, there is a separate button for **Devices and device groups** in the **KeyCom tools**.

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The Devices tab of telecom premises displays a list of the telecom premises on top and its devices in a tree-like list under it. Use the plus and minus signs to view and hide the devices on the telecom premises in question. You can view more detailed information on a device by clicking it with the left mouse button. Information on the device's connectors are then displayed at the bottom of the object form. The tab's header indicates the number of devices connected to the telecom premises in parenthesis, for example **Devices (6)**.

Via the KeyCom admin interface, you can filter device types based on device class.

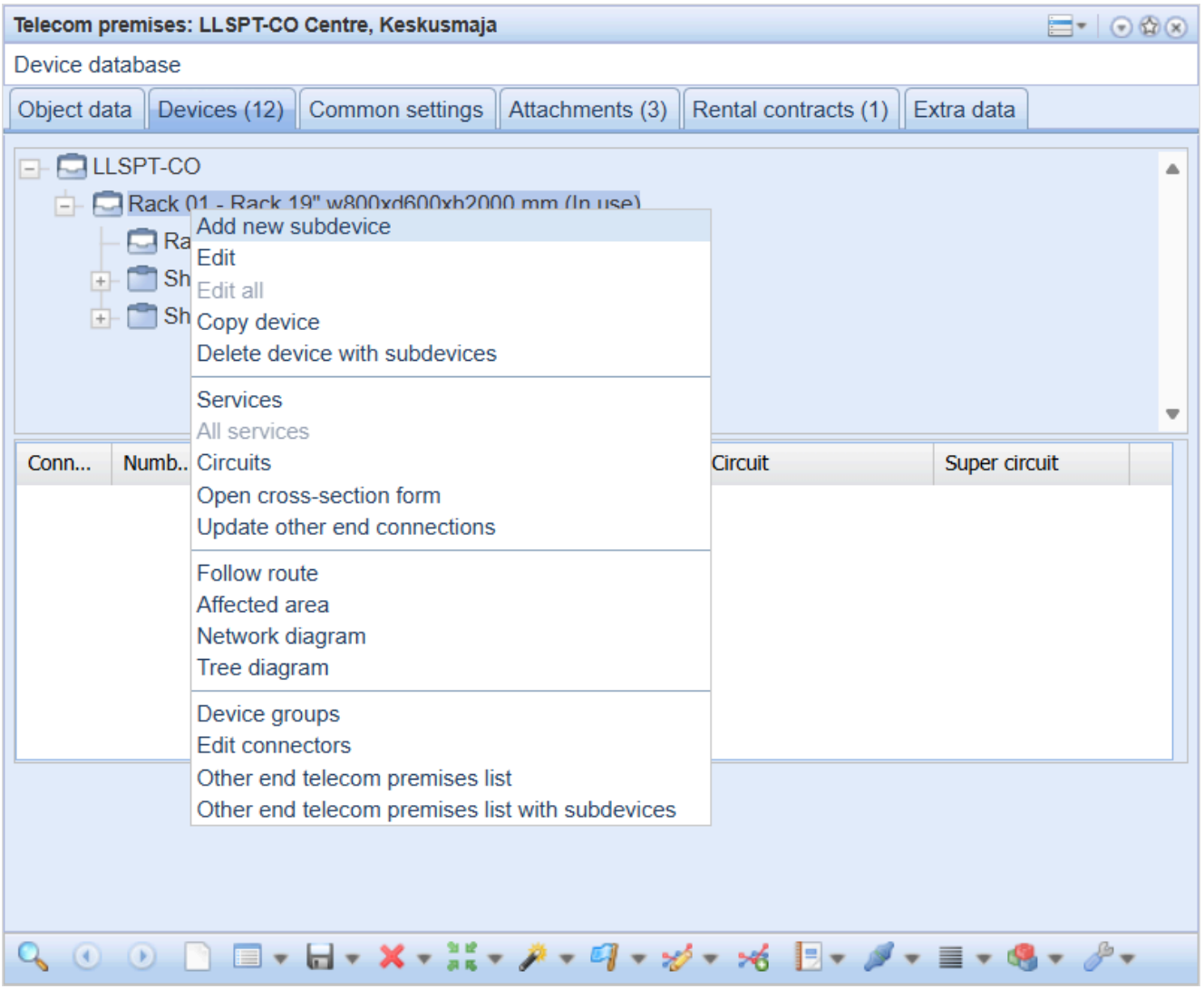
The Device list menu on the Telecom premises form includes the following functions (click the right mouse button over the device row):

- **Add** for adding a new device (opens a device form with the selected device as the parent device). For more information: Adding a device to telecom premises.
- **Edit** for editing device information. More information is available in the chapter Editing a device.
- **Edit all** for editing the information on all devices on the telecom premises. More information: Mass update (Update all).
- **Remove** for removing a device. More information is available in the chapter Removing a device from telecom premises.
- **Services** for defining the services provided by the device's ports. More information: Services.
- **All services** for viewing the services provided by all the devices on the telecom premises in question. More information is provided in the chapter Services.
- **Circuits** for viewing the circuits that use the connections of the selected device. More information is provided in the chapter List of circuits on the telecom premises.
- **Open logical cross-section form** for viewing a device's logical connections and circuit reservations. More information is provided in the chapter Cross-section.
- **Update other end connections** for updating the logical connections of the selected device connections by following cable connections. More information is provided in the chapter Update logical connections.
- **Follow route** for activating route following from the selected device. Further information is provided in the chapter Route follower.

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- **Affected area** opens a **Route follower** form pre-completed with the selected device's connectors and cables connected to the connectors. The route follower highlights the connection routes that are connected to the selected device either directly or over logical cross-connections.
- **Network diagram** for presenting the connections of the selected device in a network diagram. More information is provided in the chapter Diagrams.
- **Tree diagram** for presenting the connections of the selected device in a tree diagram. More information is provided in the chapter Tree diagram.
- **Device groups** for managing device groups (a group of devices with their connectors and connections. More information is provided in the chapter Device groups.
- **Edit connectors** for managing the connectors of a device. More information is provided in the chapter Managing connectors.
- **Other end telecom premises list**
- **Other end telecom premises list with subdevices**

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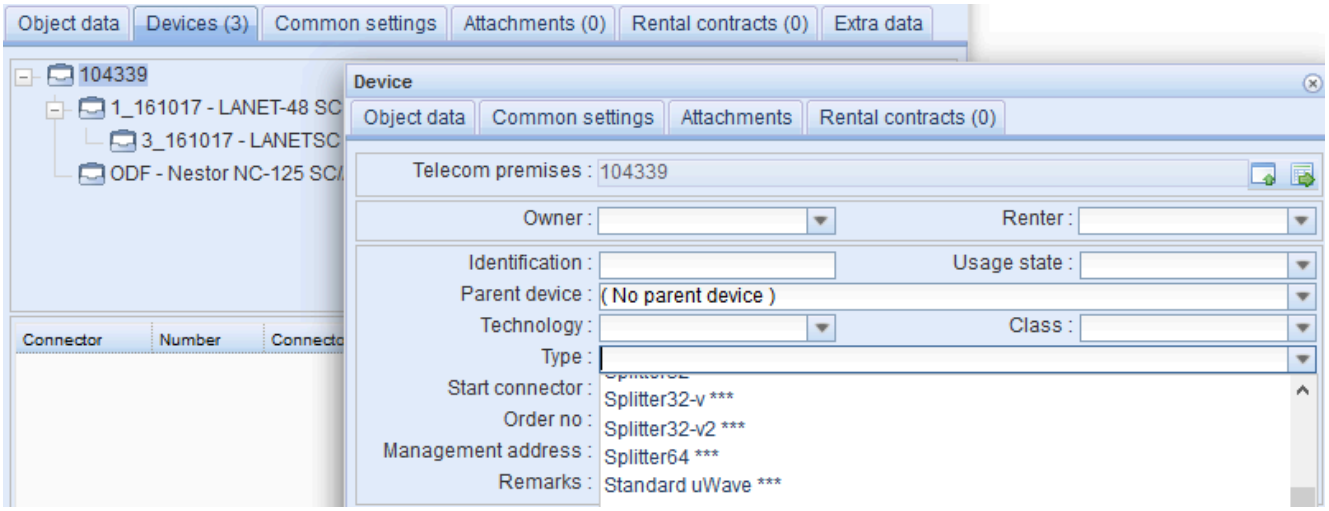
Adding a device to telecom premises

On the **Devices** tab, select the Telecom premises or an existing Device for which you want to add a sub-device.

1. Click the right mouse button to open the device list menu and select **Add** to open the **Device** form.
2. Enter the property values. Device **Type** is a mandatory field.
3. Click **Save form** to add the new device to the selected telecom premises.

You can also use the **Device** form to add all the devices of the device group at once, including their connectors and the internal connections of the telecom premises. In the drop-down menu for **Type,** device groups have been marked with ***. More information is provided in the chapter Device groups.

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On the **Device** form, you can also edit a device's connectors, create diagrams, follow routes, add tasks related to a device, monitor the change history of a device and open the **Cross-section** form.

You can retrieve devices to the **Device form**, for example, based on existing areas. From the drop-down menu for **Pick**, select one of the following three functions: **Map view area**, **Free area**, or **Existing area**.

You can also create a copy of an existing device by selecting **Save as copy** in the drop-down menu for the **Save form** button. The device's connectors and their properties are then also copied.

Removing a device from telecom premises

1. Select the device you want to remove from the device list for the telecom premises.
2. Select the correct object on the list and click the right mouse button. Select **Remove**.
3. Confirm the removal to remove the device in question.

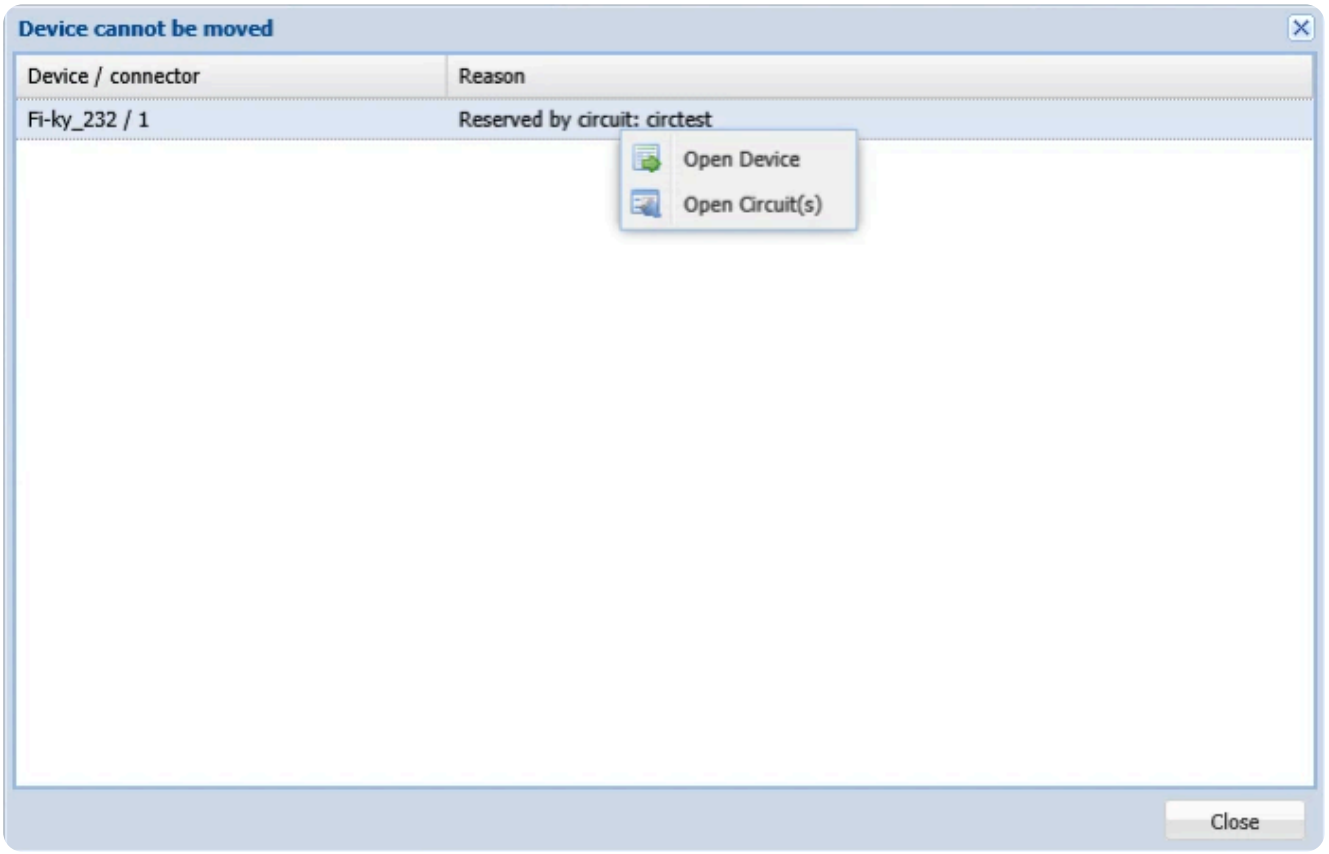
If you remove a device to which sub-devices are connected, these devices are also removed at the same time. However, the deletion of hierarchical devices is prevented if the set of devices includes, for example, customer circuit reservations or other dependencies related to database integrity.

The removal of the parent device and related sub-devices must be confirmed in a separate **Device cannot be moved** form related to device removal. The form provides a detailed list of devices and connectors that are blocking the operation.

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Right-clicking an item in the list opens a context menu with actions:

- **Open Device** – Opens the selected device or connector.
- **Open Circuit(s)** – Opens the circuit(s) associated with the blocking item.



Note! If the device's connector or connection has been reserved for a **Circuit** (see the Circuits chapter), you cannot remove the connector or device. If you want to remove such a device, you must first edit the connections reserved for the circuits so that no connectors of the device are reserved for circuits.

Editing a device

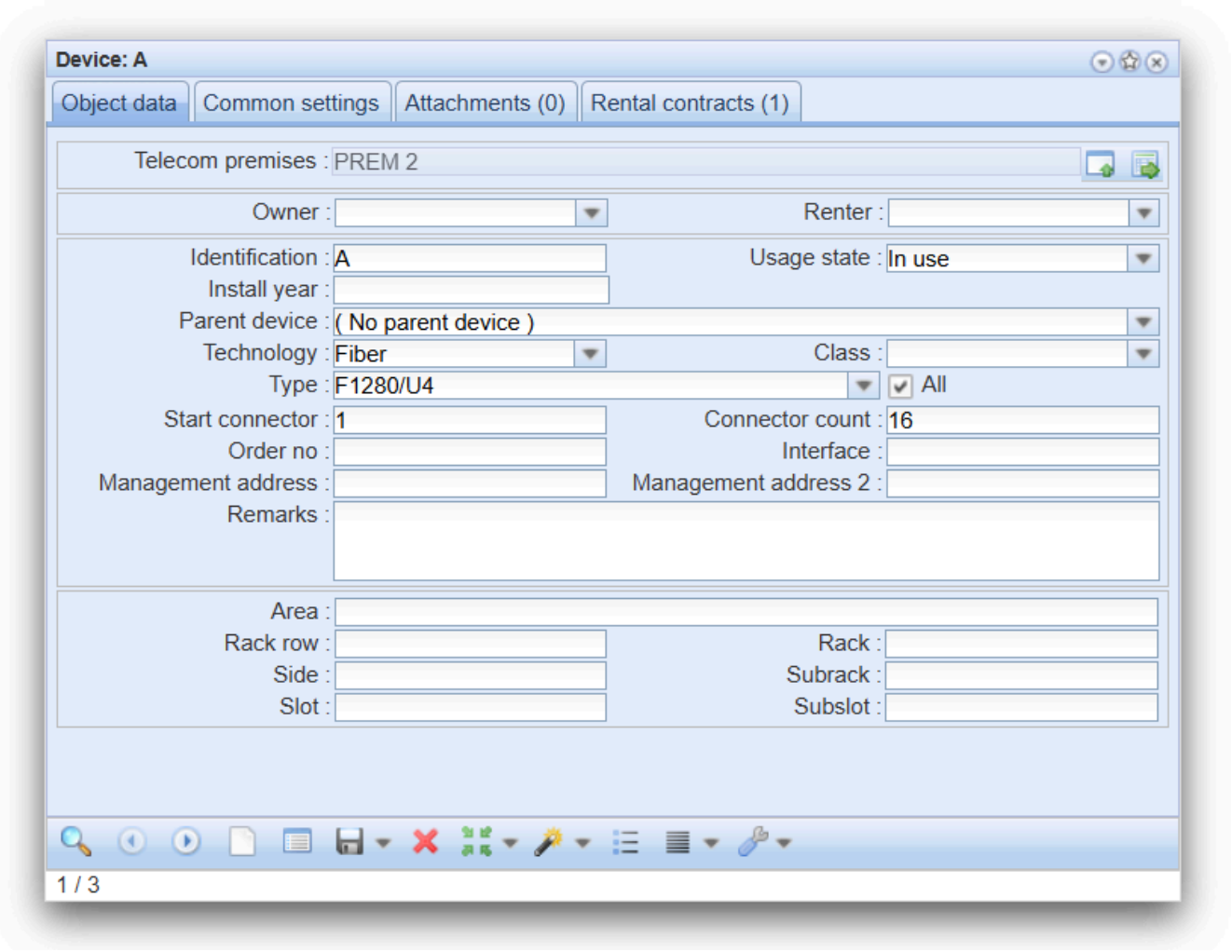
1. On the device list, select the device you want to edit.
2. In the drop-down menu for the device list, select **Edit** to open the **Device** form that includes the information on the device in question.
3. Edit the information you want to change.
4. Click **Save form**.

You can automatically place an added or edited device on the **Devices** list on the **Telecom premises** form. Select the **Parent device** on the list to add the device

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under it. Please note that you must first retrieve the correct **Telecom premises** to the **Device** form.

For the lower half of the **Device** form, you can document the physical location of the devices to the **Area, Rack Row, Rack, Side, Subrack, Slot and Sub slot** fields. The fields can also be activated in the **Logical reservations** table on the **Circuit** form from the **Columns** menu, which can be opened by clicking on one of the already activated columns. These columns can also be activated on the **Connection management** form.



Note! You can view CATV devices but editing options have been limited: you cannot edit the **Technology**, **Class**, **Type**, **Start connector** and **Connector count** values.

Copy a device to telecom premises

1. Select the device you want to copy and open it for editing, as described in points 1–2 in Editing a device.

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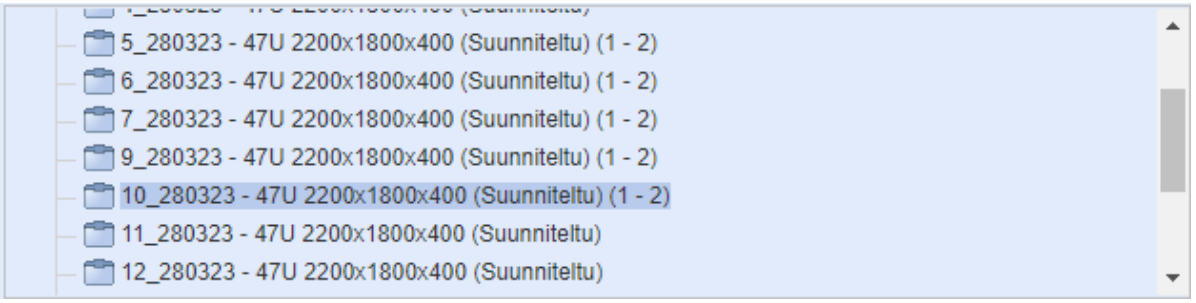
2. Retrieve or pick to the **Device** form the telecom premises you want to copy the device to.
3. On the Device form, in the drop-down menu for **Save** form, click **Save as copy.**
4. The device has now been copied to the telecom premises and its connectors have the same identifiers as the copied device.

Moving a device to other telecom premises

1. Select the device you want to move and open it for editing, as described in points 1–2 in Editing a device.
2. Retrieve or pick to the **Device** form the telecom premises you want to move the device to.
3. On the Device form, click **Save** form.
4. The system asks you to confirm the move (and the moving of cables if cables have been connected to the device). When you confirm it, the device is moved to the new telecom premises.

Open from the Telecom premises form

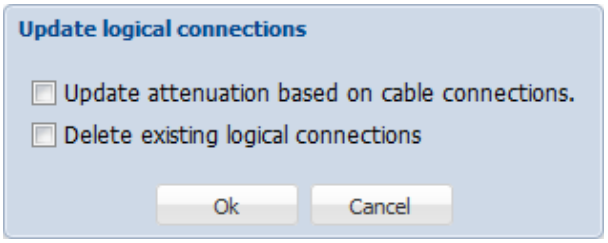
Open the **Devices** tab on the **Telecom premises** form by clicking **Show telecom premises in form** button. The form opens directly to the **Devices** tab, where you can see the telecom premises and the devices connected to it in a tree-like list. The device opened from the **Device** form in question is **highlighted** in the list.



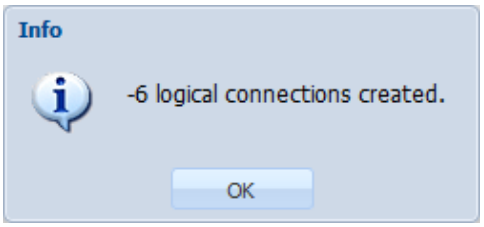
Update logical connections

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1. On the device list, select a device or telecom premises depending on where you want to update the logical connections.
2. In the drop-down menu for the device list, select **Update logical connections.**
3. Select the applicable logical connections and click **OK** in the displayed dialogue box when the system wants you to confirm whether the existing logical connections should be deleted and attenuation updated based on cable connections.



4. Make a note of the number of updated logical connections and click **OK.**



5. Logical connections are discussed in the chapter Connections management (logical).

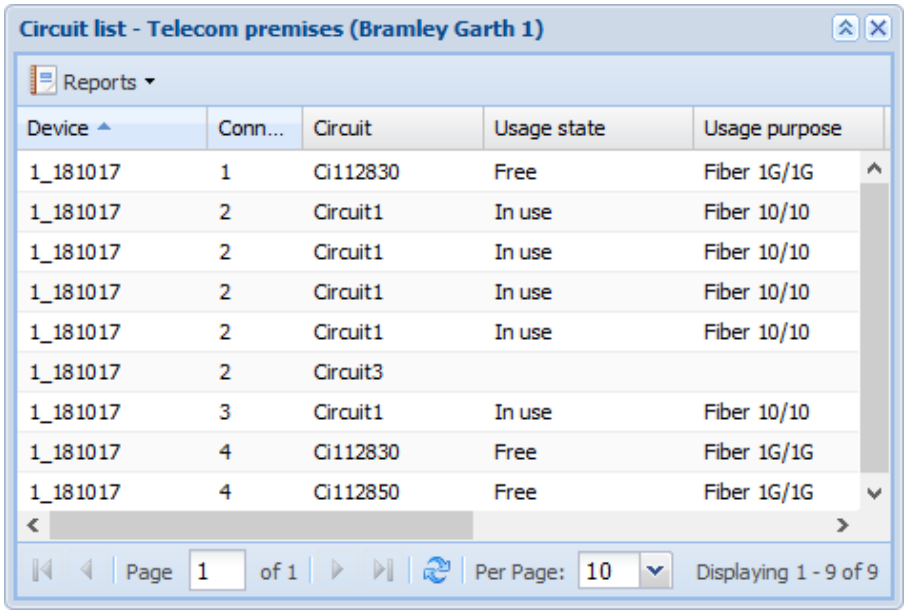
List of circuits on the telecom premises

The list of circuits on the telecom premises includes all circuits of the telecom premises or the circuits of a device and the sub-devices under it in the device hierarchy.

1. Open the **Devices** tab.
2. With the mouse pointer positioned over either telecom premises or a device, select **Circuits** from the context menu for the device list.

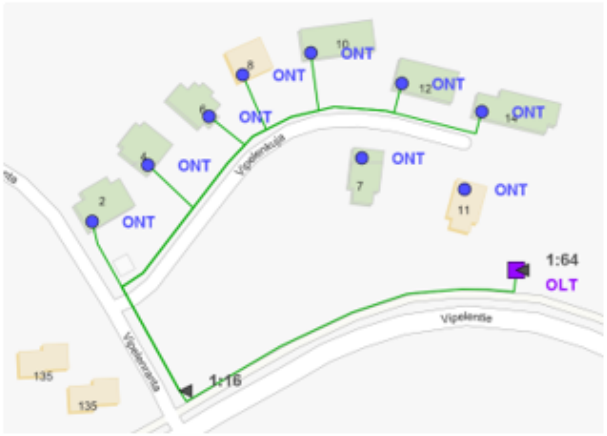
The list of circuits is a list view. More information is available in the chapter List.
Circuits are introduced in the chapter Circuits.

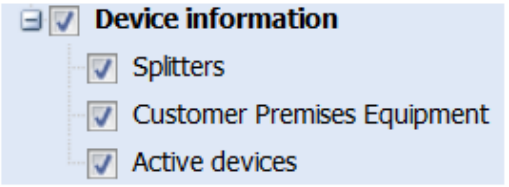
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Device information on the map

Device information is available as a separate layer, with the sub-layers **Splitters**, **Customer Premises Equipment,** and **Active devices**. The device classes and device types are classified by admin users through the admin user interface. The abbreviation for the device type is displayed on the network map.





Device groups

A device group is a set of devices, their connectors and the connections between the connectors. With device groups, you can harmonize the device documentation and decrease the effort required for creating new device premises. For example, you can create standard equipment set-ups for various network nodes, such as the **Fiber**

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subscriber (an ODF panel and the optical active device) or Fiber Optical distribution box (ODF Panels and PON Splitters including the device-internal connections and cross connections between the devices).

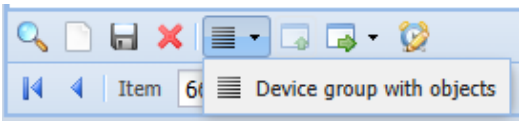
Device group tool is available in the KeyCom toolbar, in the drop-down menu for **Device** . You can also access the **Device group** form from the **Telecom premises** form's **Devices** tab by clicking **Device group** in the context menu for the device list.

You can use the **Device group** form to create, edit and view device groups. You can also view the device groups on the **Device** form in the same way as you view any other device types. The only difference is that, in the menu for **Type**, the **Type** of device groups is marked with ***.

The **Common settings** tab displays read-only details about the device group, including who created and last updated it, along with the corresponding dates and database ID.

Device group lists

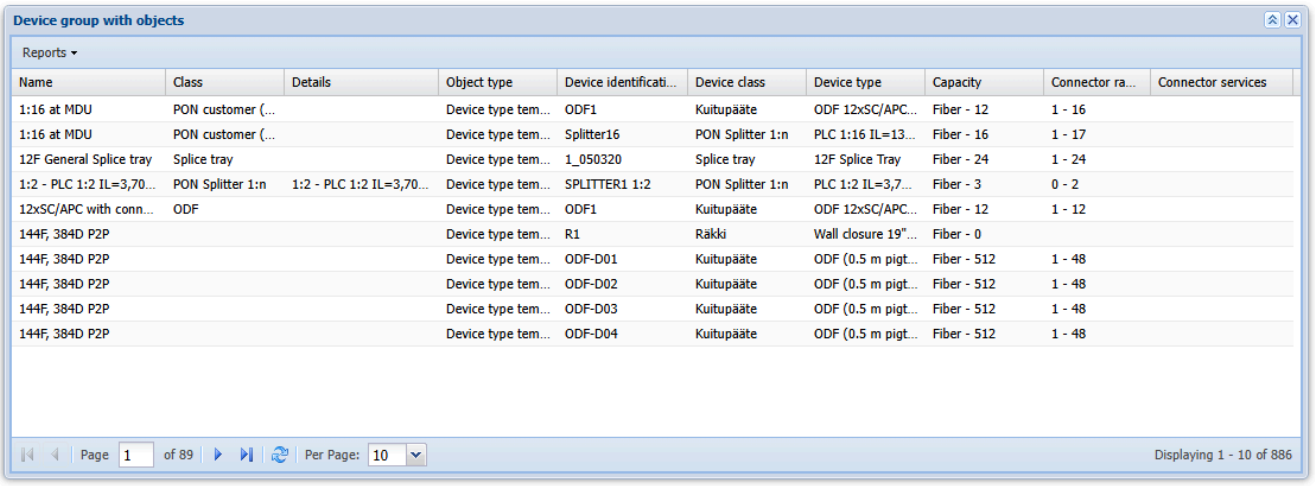
The **Device group** form supports both standard **List** tool and the **Device group with objects** list.



The **Device group with objects** list can be accessed from the **List** drop-down menu. It displays all device group's devices that are currently on the form together.

Each row represents a device within a group, showing both group-level information (such as **Name**, **Class**, and **Details**) and device-specific data (including **Object type**, **Device identification**, **Device class**, **Device type**, **Capacity**, **Connector range**, and **Connector services**), enabling detailed inspection of individual devices directly within the group context.

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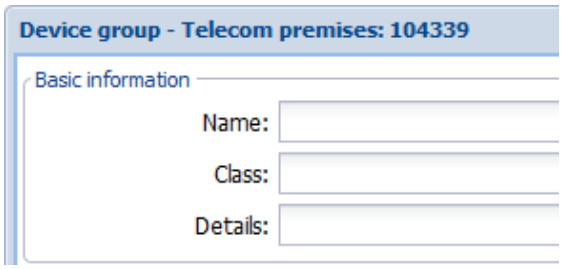


Create a device group

Create a device group by providing the group a **Name**, **Class**, and **Details**. Then click the **Save** button on the **Device group** form. This creates a new device group of the devices, connectors and their cross-connections that are active on the **Telecom premises** form.

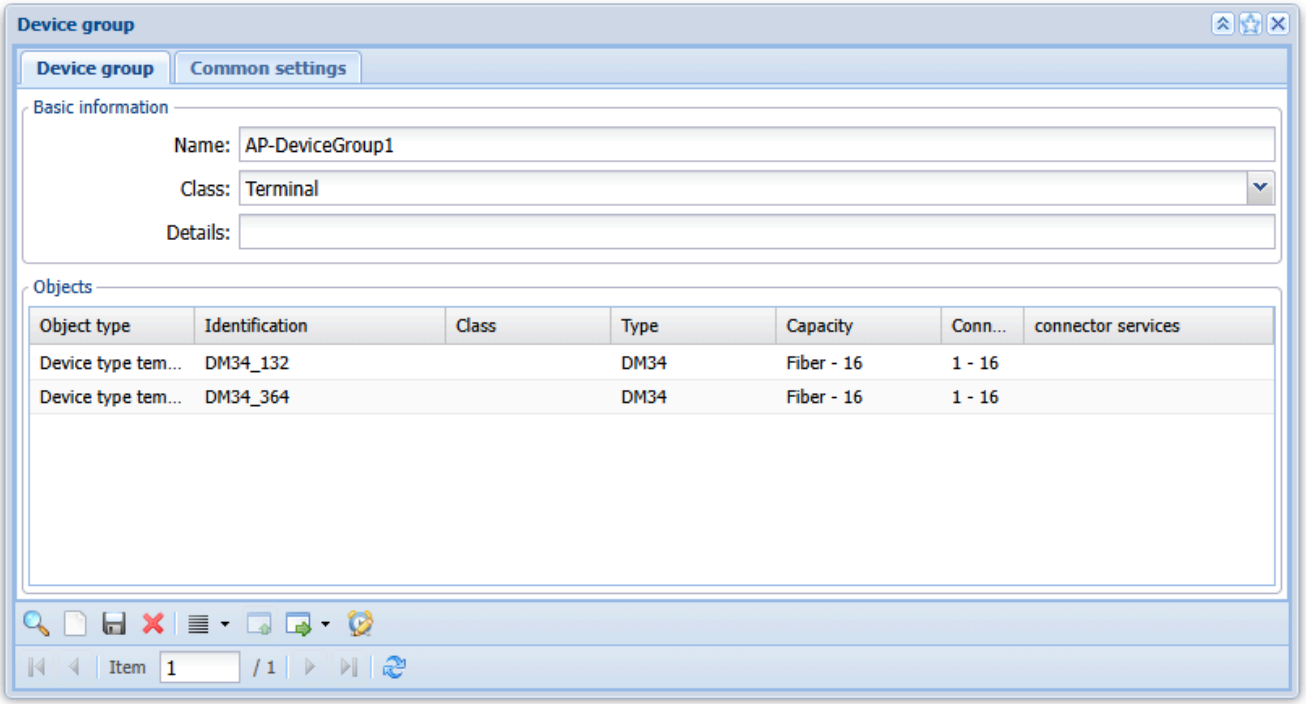
Note that when you create a device group, it must be linked to some telecom premises. To do this, click **Pick from telecom premises form** when the required telecom premises object has been retrieved to the form.

In the example figure below, a device group that is linked to the telecom premises (104339).



In the example figure below, a new device group (AP-DeviceGroup1) has been created on the **Device group** form.

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To edit a device group's **name**, **class**, and **details**, edit the property information and then click **Save** . You can edit the information on the devices that belong to a device group only by creating a new device group. Click **Delete** to delete a device group.

You can add a device group's devices to telecom premises through either the **Device** form or **Device group** form.

Adding devices to telecom premises through the Device group form

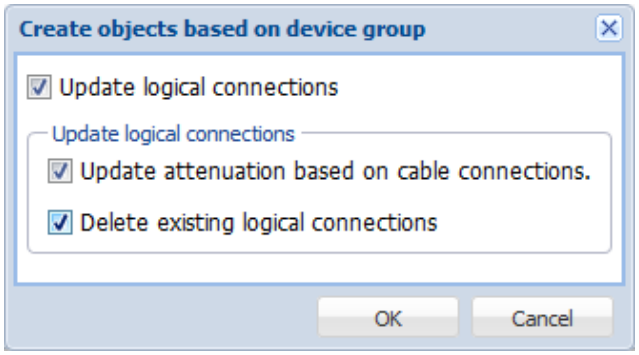
1. To start adding the devices of a device group to telecom premises, retrieve the telecom premises to which you want to add the device group's devices to the **Telecom premises** form.
2. Open the **Device group** form and retrieve the information on the device group you want to add.
3. On the **Device group** form, click **Create devices to telecom premises**. The devices of the selected device group will then be added to the telecom premises displayed on the **Telecom premises** form.

Note! You can add the same device group to several telecom premises at the same time. In the drop-down menu for **Create devices to telecom premises**, click **Create**

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devices to all telecom premises. You will be asked to confirm the adding of the device group to all the telecom premises on the telecom premises form. Confirm in order to add the device group to the telecom premises on the form.

Support for automatic cable connections is enabled for the device group devices. Automatic connections are created based on the cable role, and the connection data for cables and splices is created on the new telecom premises with the devices.

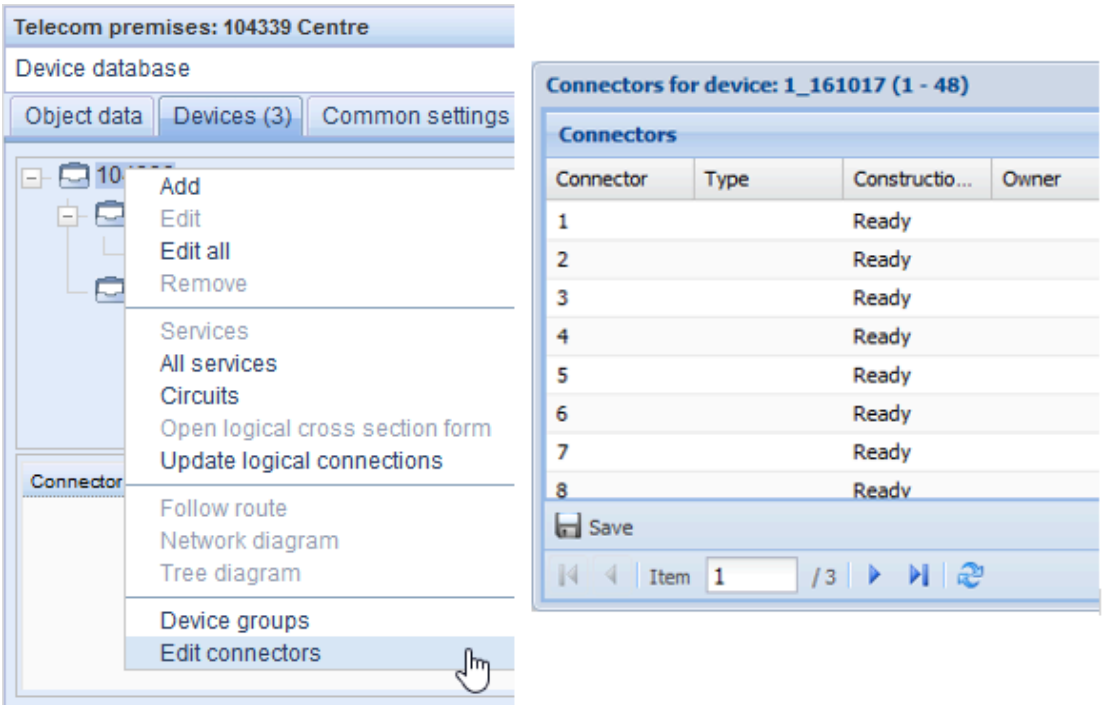


Managing connectors

The property values and mass naming of **Connectors** are managed through a separate form that displays the connectors of the selected device and the properties of the connectors, such as connector, type, construction state, owner, speed, details, and priority. To open the **Connectors for device** form, go to the **Device** object form and click **Edit connectors** or select **Edit connectors** in the pop-up menu for the device list. When you select **Edit connectors** in the pop-up menu, you can browse through all the device connectors on the telecom premises one device at a time.

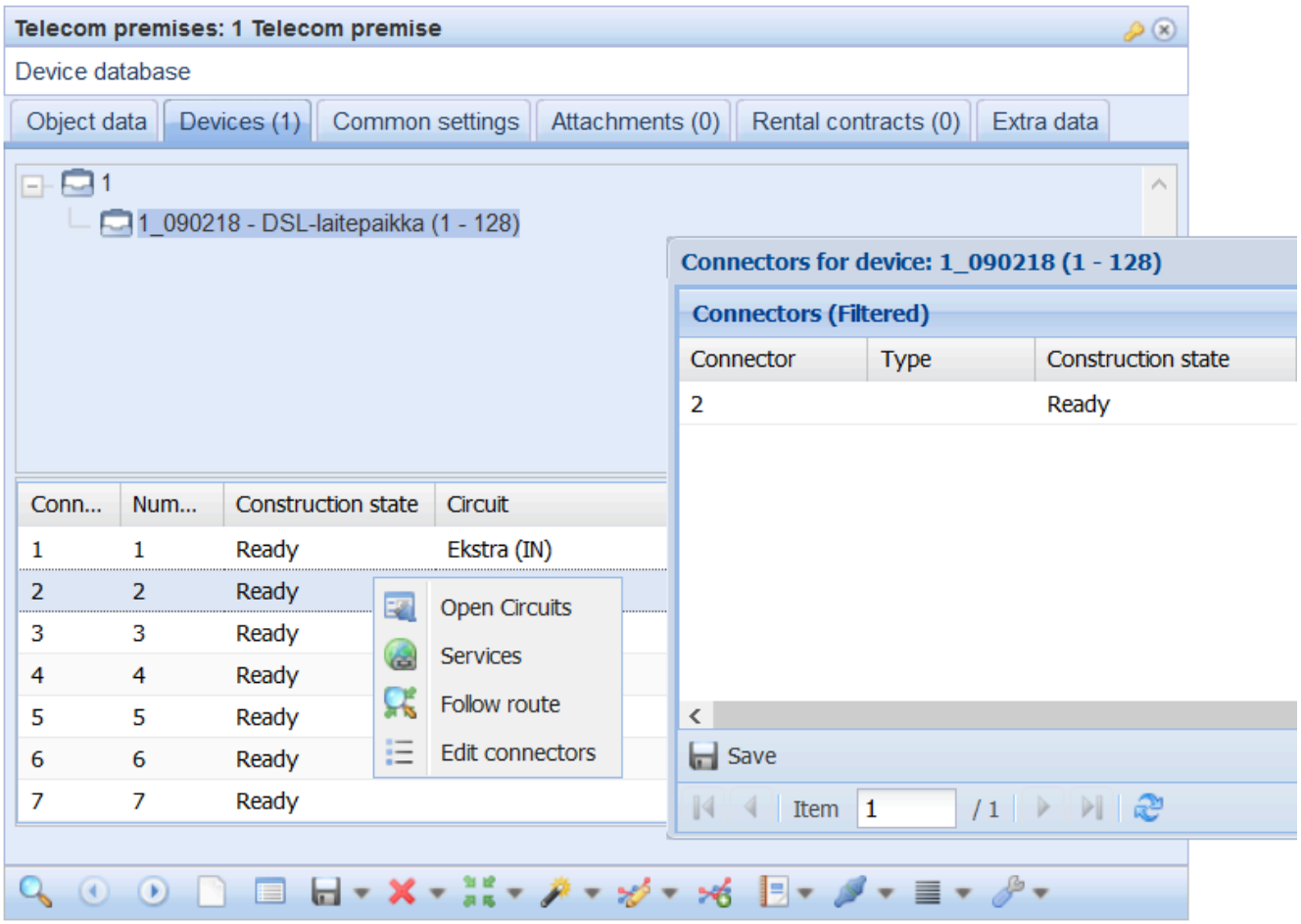
The connector number column is hidden by default. You can activate it in the drop-down menu for columns by ticking the **Columns** – **Number** checkbox.

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You can also open the **Connectors for device** form through the connector list for **Devices** by selecting connectors and using the right mouse button to open a pop-up menu with the option **Edit connectors**. This opens the **Connectors for device** form for the selected connectors. Note that the displayed form may be empty if other filters are applied to the form. More information on the filters: Using filters for connectors.

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On the **Connectors** list, you can also click **Open circuits** to open the **Circuit** form with information on the connector's circuit. The form has no pre-completed information if no connector has been reserved for the circuit.

Services opens the **Services: Device** form pre-completed with information on the device. You can add the service type information for the connector.

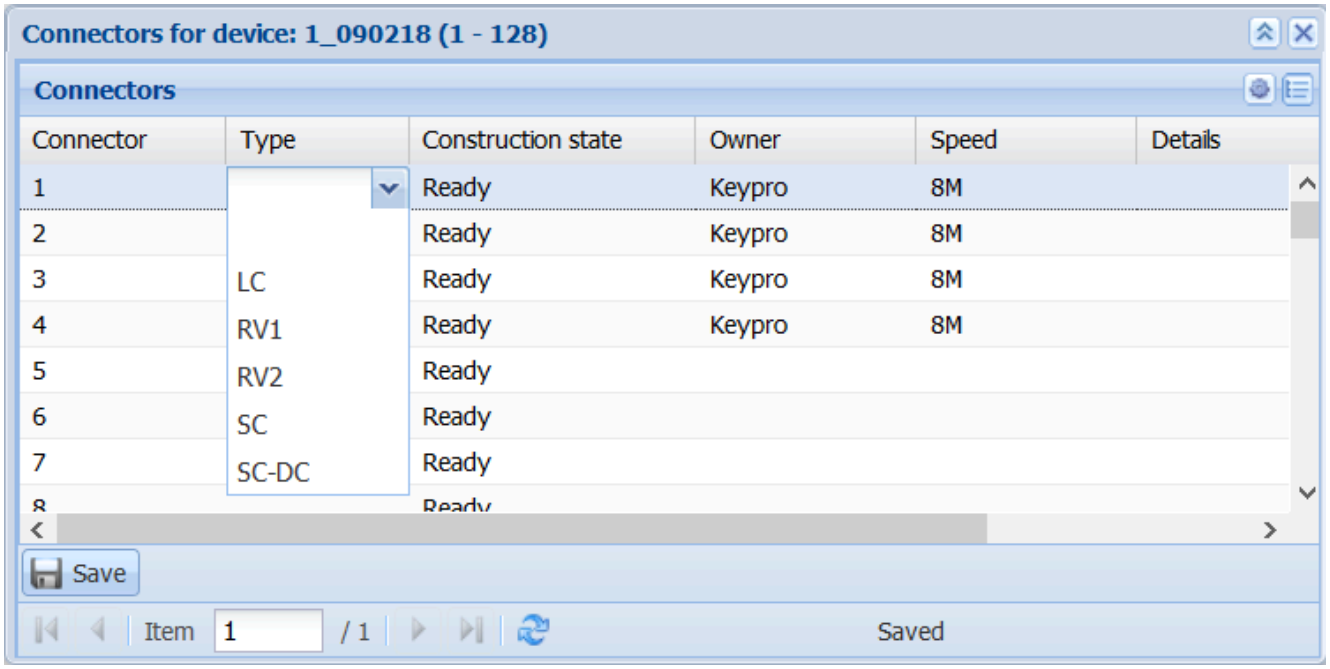
Follow route can be selected by clicking a connector row with the right mouse button. This opens the **Route follower** form with information on the thread in question.

Editing connectors

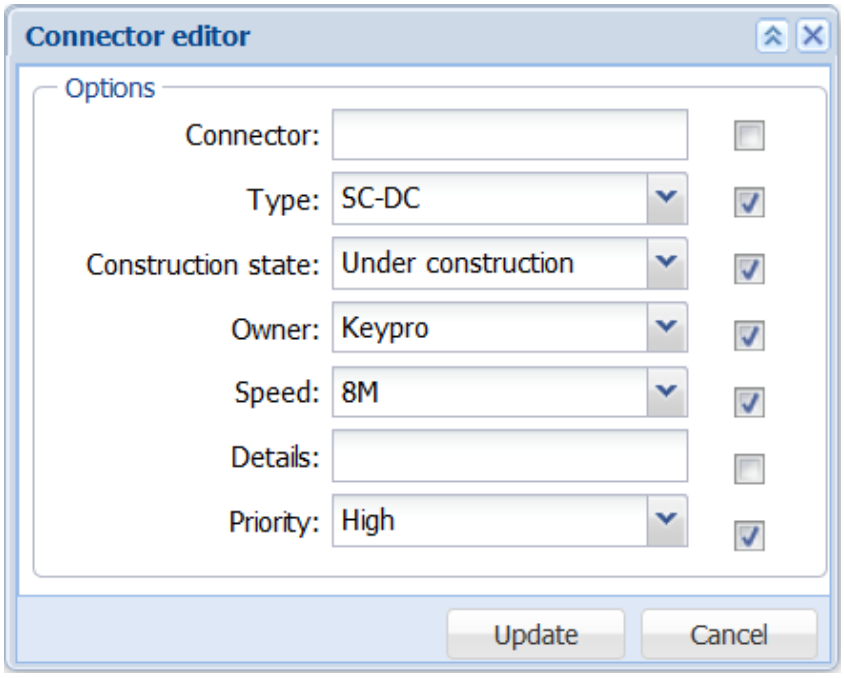
You can edit the property values of the connectors on the list either individually or as a group.

To edit a single property value of a connector, double-click the cell on the list and update the property value. Click **Save** to accept the change. To cancel the changes before saving, click **Refresh** on the form.

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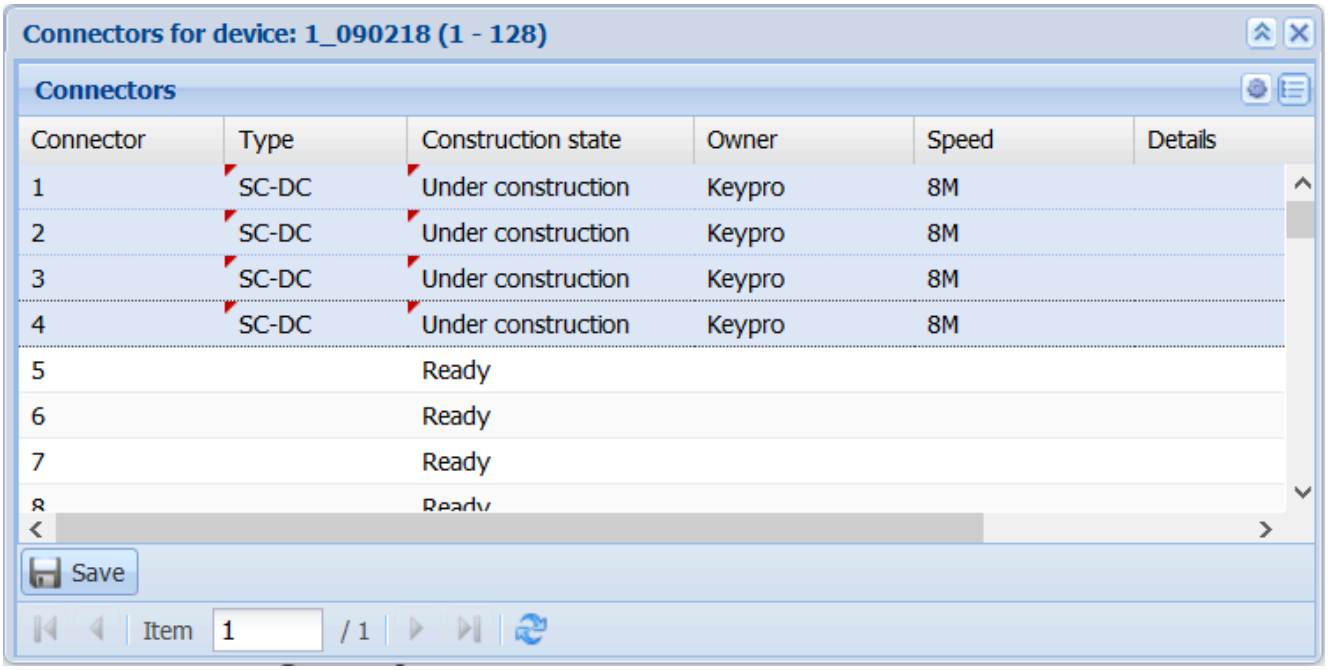
To edit several connectors at the same time, select the required connector rows using the left mouse button while holding down the Ctrl or SHIFT key. In the pop-up menu available by clicking the right mouse button, select **Edit selected**. **Update** the required property values for the selected group of connectors.



Note! Names within a device must be unique. The naming of a connector group is discussed in the chapter Naming a connector group.

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Click **Update** on the sub-form to confirm the changes. Data that has not been saved is marked with a small red triangle. On the Connector form, click **Save** to save your changes.



> Note:
>
> If the construction state of a connector is changed to **Faulty**, the construction state of all related connectors will automatically be updated to **Faulty other end** state. Similarly, if the construction state is changed from **Faulty** to **Ready**, and any related connector is in the **Faulty other end** state, those connectors will also be updated to **Ready**.

Naming a connector group

Start naming a set of connectors either in the same way as you would edit several connectors, or use the right mouse button to view the context menu and select **Rename selected** or **Rename all**. Naturally, you can also rename individual connectors.

Naming is carried out based on naming rules. The basic format is the following:

- *%<start value>:<end value>,<number of characters>+<stepping>%*

for example:

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- *%1:6,2+2%*

returns the names:

- 01, 03, 05.

Table. Naming rules for a connector group.

LP1-	A standard text that is applied to all connectors
%1:10%	A running number sequence, where the first connector receives the value 1, the second 2, etc.
%1:10%-%1:10%	Two running number sequences. Numbering starts with 1-1, 1-2...1-10, after which 2-1, 2-2...2-10, 3-1, 3-2, etc.
%1:10,2%	Otherwise same as above, but two numbers are used (01, 02, etc.)
%1:10,2+2%	As above, but 2 is always added to the previous figure. In other words, the numbers produced are 01, 03, 05, 07, and 09

Within the % characters, the parameter sequence is the following:

1. Defining the running series range (1:10)
2. Optional zero padding (,2)
3. Optional stepping +2

Names are only given to as many connectors as the rules can create. In this case, the first three connectors at the most. If more connectors have been selected, the rest of them are not named.

The basic format can be used with other characters and for multiple times, for example:

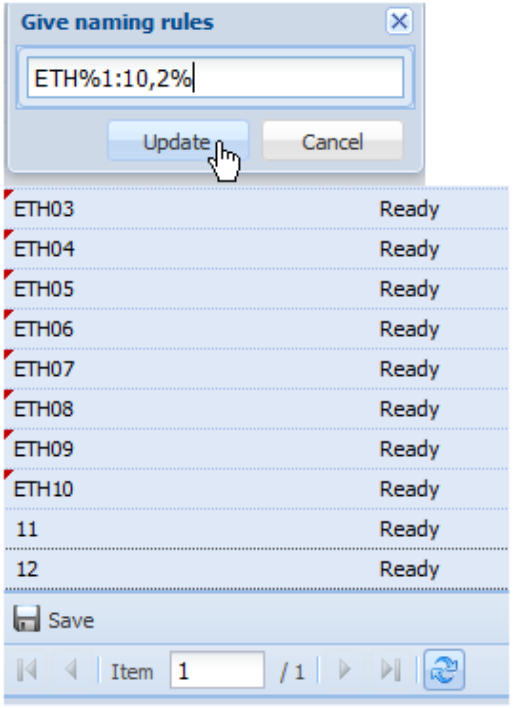
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- *a%1:6,2+2%-b%1:3,2%*

creates nine names:

- a01-b01, a01-b02, a01-b03,
- a03-b01, a03-b02, a03-b03,
- a05-b01, a05-b02, a05-b03.

Enter the naming rule in the text field and update the connector list with the names created based on the rule by clicking **Update**. Click **Save** to accept the changes. To cancel the changes before saving, click **Refresh** on the form.



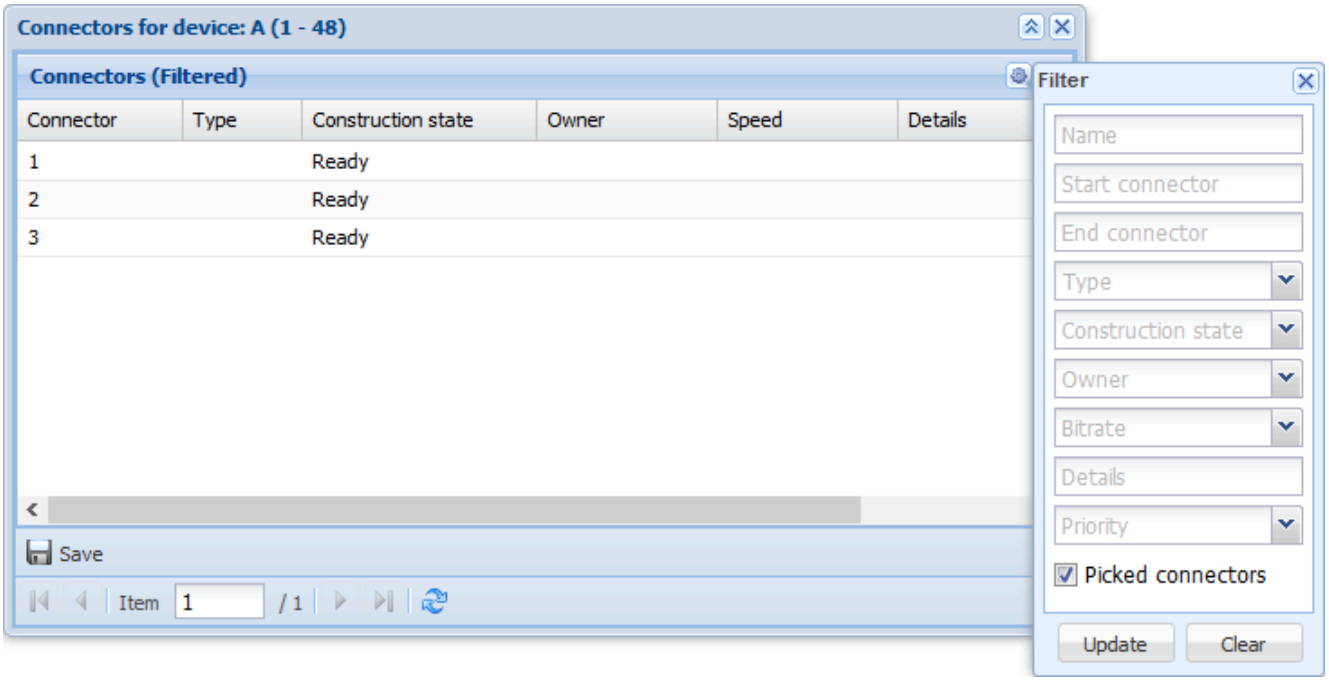
Note! When filters are applied, the **Rename all** function only renames the filtered group.

Using filters for connectors

To open the filters, click **Filters** in the top-right corner of the form.

In the example figure below, filtering a connector list based on name, start and end connector, type, construction state, owner, bit rate, details, or priority.

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Enter the filters or select them in the drop-down menu. Click **Update** to accept them. The connector list is updated and only the filtered connectors are displayed. The filters remain valid when you open the form for another device or view some other device by clicking the navigation buttons on the connector form. The **Clear** button for filters clears the filters, but it does not remove them from the form until you click **Update**.

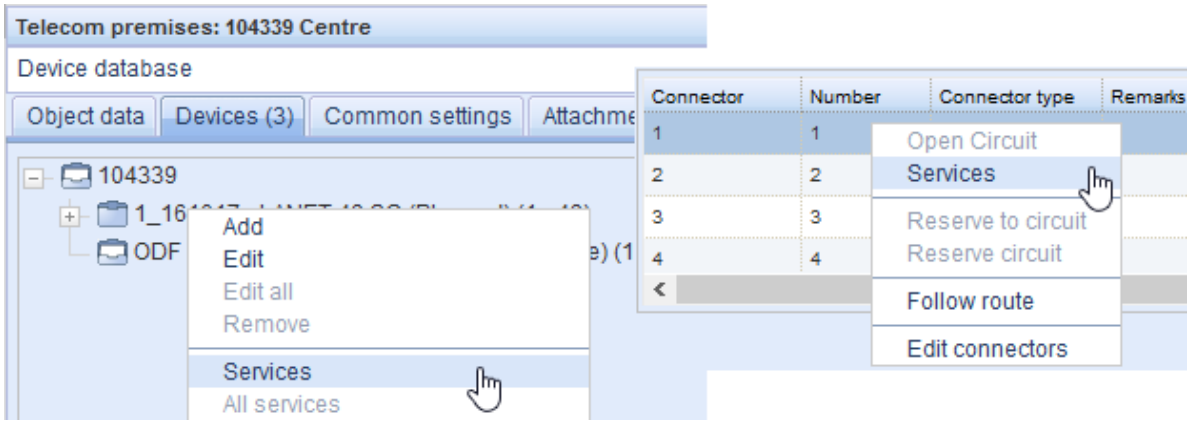
The **filters for connectors** are applied when the **Connector for device** form has been opened for the selected connectors.

To clear the filters, click **Clear filter** in the top-right corner of the form.

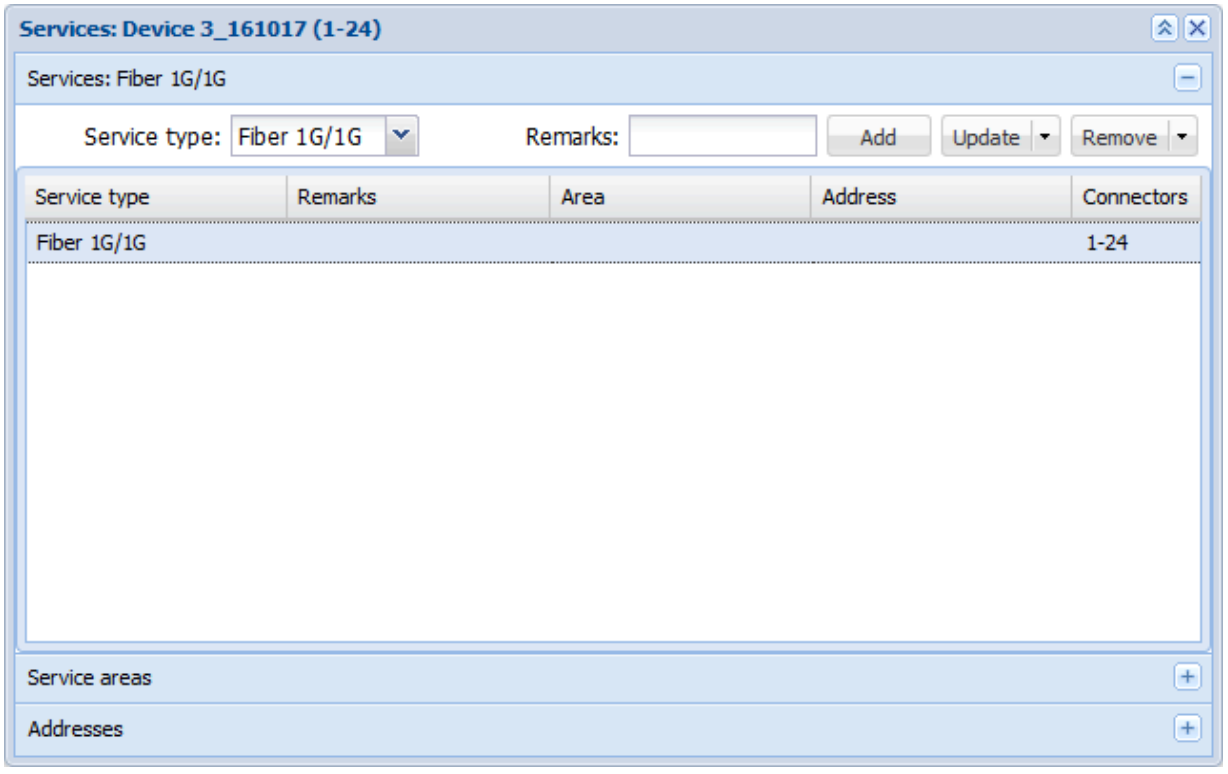
Services

To open a new **Services for device** form through the **Devices** tab, click the right mouse button over a device. Then select **Services**. The form lists all the services for the device in question. Broadband is one example of services. You can also open the **Services** form through the connector menu by using the right mouse button to select the required connector row.

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The sections in the **Services for device** form are the following: **basic information**, **service areas** related to the device, **addresses**, and **service type's connectors**. You can add services by clicking **Add**. Then choose the correct **Service type** and enter **Remarks** if necessary. The **Service areas** and **Addresses** fields are activated when you use the left mouse button to select an added service type on the list. Click **Update** to save the service. Click **Remove** to remove the service. These functions also have the option **Update all** and **Remove all**.

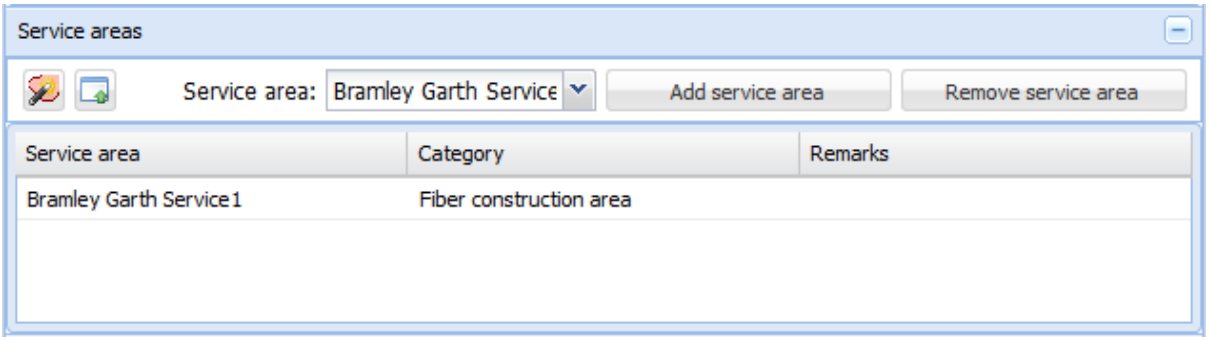


After this, in the drop-down menu, select **Service area** and **Address**.

Click **Pick service area** to add a service area to the drop-down menu for **Area**. Another way to retrieve the information from the **Service area** form is to click **Pick from service area form**. Note that the correct **Service area** form must be open in the KeyCom environment.

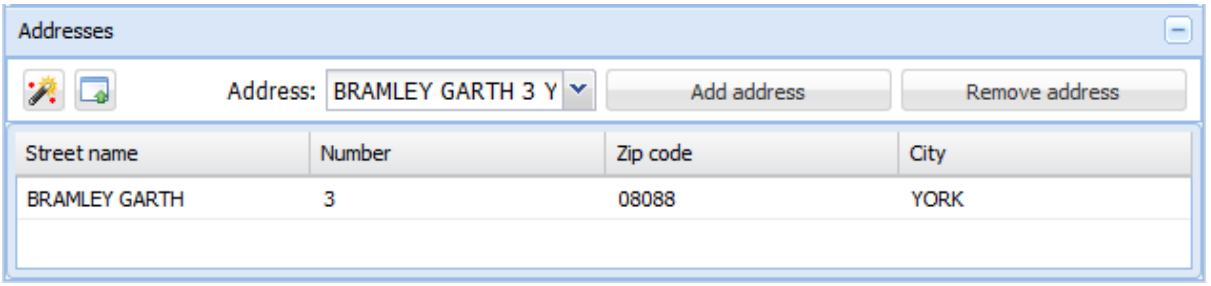
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If you use the **Pick service area** tool, the **Service areas** layer must be active in the layer selection. Point at the required service area with the left mouse button, or define several areas on the map while holding down the left mouse button. The selected area/areas appear in the **Service area** menu, and you can then use them for the service.



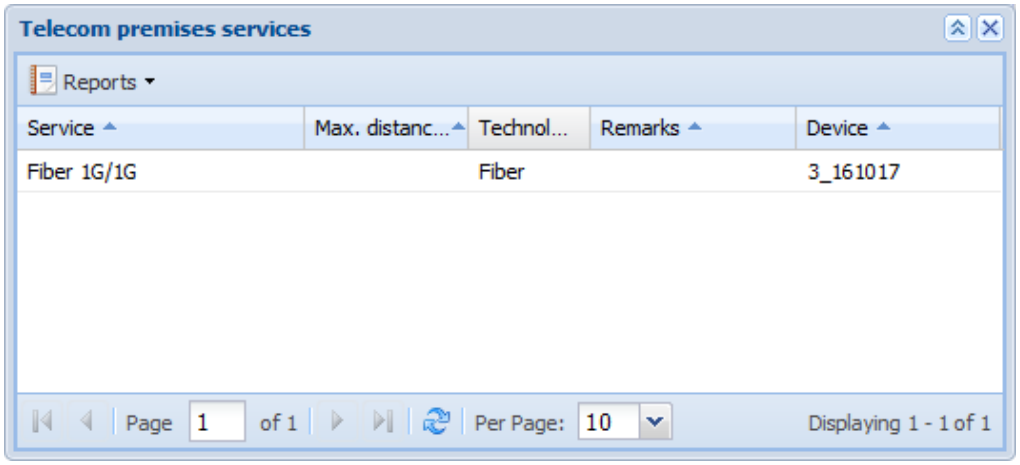
Pick addresses functions in the same way as the **Pick service area** tool. Add the required addresses to the drop-down menu for Address by clicking an address on the map with the left mouse button. The **Addresses** layer must be active in the layer selection. Because addresses are small point objects, it is easier to select the required address on the map if you define an area on the map while holding down the left mouse button. The address/addresses found appear in the **Address** menu, and you can then use them for the service.

Information can be retrieved from the **Address** form by clicking **Pick from address form**. Note that the correct **Address** form must be open in the KeyCom environment.

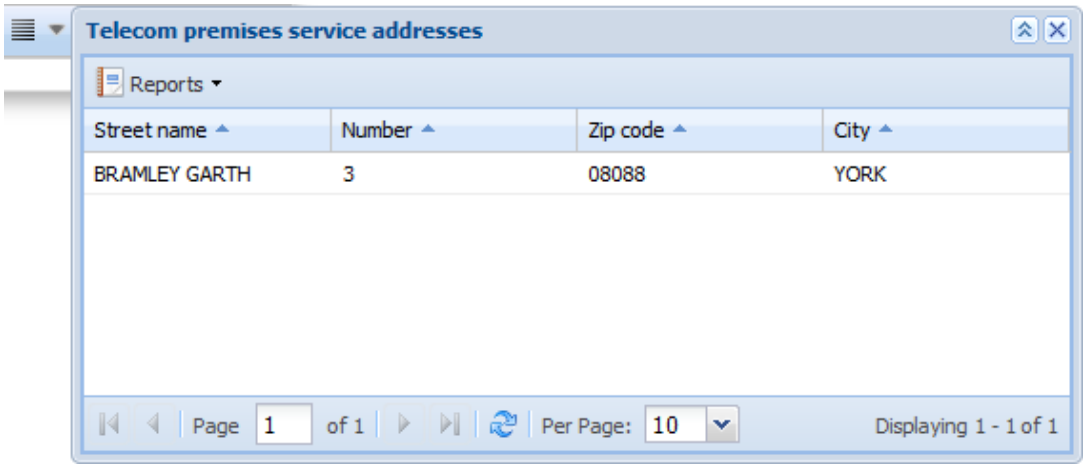


To list the services for all the devices on the telecom premises, go to the **Devices** tab of the telecom premises, select **All services** in the context menu for the telecom premises. A list of the services for all the devices on the telecom premises is then displayed.

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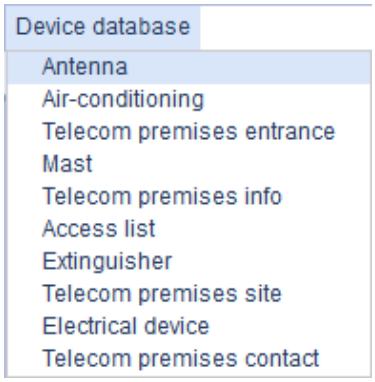
To view the service addresses related to the telecom premises, click the drop-down menu for **List** and select **Telecom premises service addresses**. The addresses linked to the telecom premises services are listed at an apartment level. You can print a report of the list in Excel format.



Device database

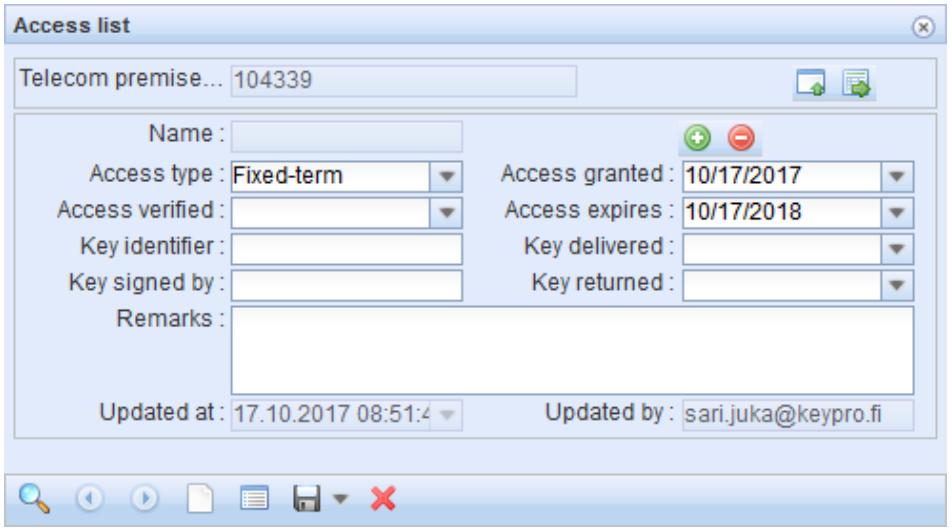
The **Device database** menu on the Telecom premises form is available only for users that belong to the DeviceDB_Access group. Click the **Device database** button on the Telecom premises form to open forms that are related to the telecom premises. These forms are used, for example, for editing information related to masts, air conditioning, antennas, and contact persons.

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Most of the **property attributes** on forms are **form-specific**. The forms are introduced in the appendix Device database forms. You can use the form functions in the same way as the functions of other forms, but the number of functions is limited: you can **search, update, and delete** information.

In the example figure below, one of the device database forms, an Access list, you can use search criteria to search for information, and you can update or delete information.



In addition to the form functions, the common denominator for all forms is that a form must be linked to telecom premises. To do this, click **Pick telecom premises from telecom form**. The ID of the telecom premises on the Telecom premises form then appears on the form. If no telecom premises information has been retrieved to the Telecom premises form, you cannot link the form. Click **Show telecom premises** to open the object form of the telecom premises in question and to view its information. The **Updated at** and **Updated by** dates will automatically appear on all forms when information is saved in the database by clicking **Save form**.

On some **Device database** forms, you can add **information on the customer, rental contract, and address** by clicking.

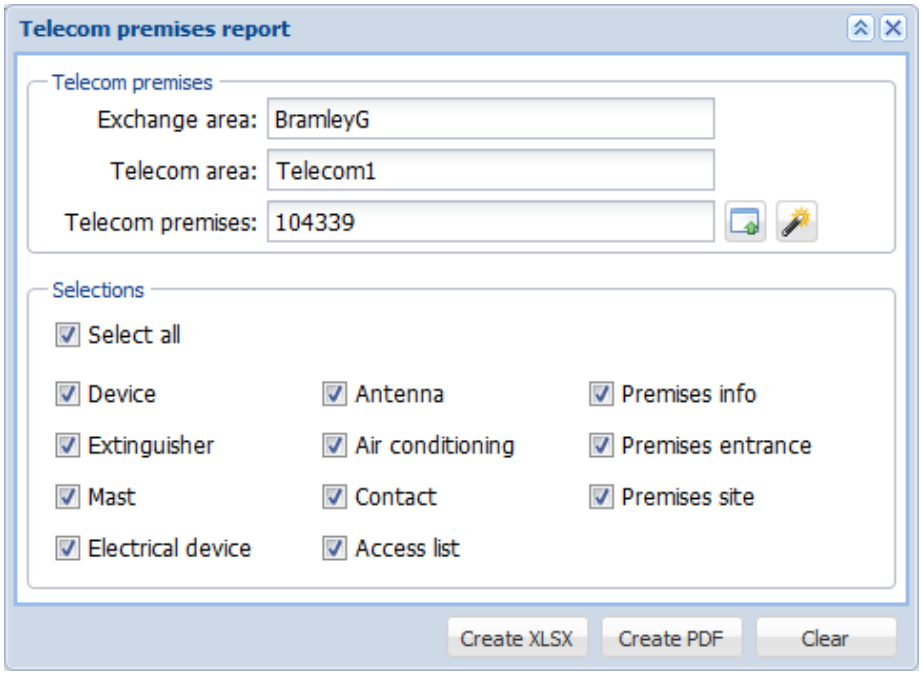
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Use search criteria to search information that is already stored in a database. For example, if you want to retrieve customer information to the **Access list** form, click to open the **Customer** form. Enter the customer's information in the **Name** field and click **Search**. If there are several results, use the arrow buttons to browse through them in order to find the correct customer. Click **Update to form** to add the information to the object form. To save the retrieved information on the object form, click **Save form**. Click **Clear** to clear the information from the form.

To view the list of objects related to the customer, click **List related objects** on the **Customer** form. The list includes the type and name of the objects. Click the right mouse button over the target row to access the **Show on the form** button. This takes you to the object form.

Telecom premises report

To create a telecom premises report, click **Reports** and then select **Telecom premises report**. You can choose whether to create an Excel table or a PDF of the devices on the telecom premises and the object in the device database.



On the telecom premises report form, you can create an Excel report on the devices and extra features of the telecom premises.

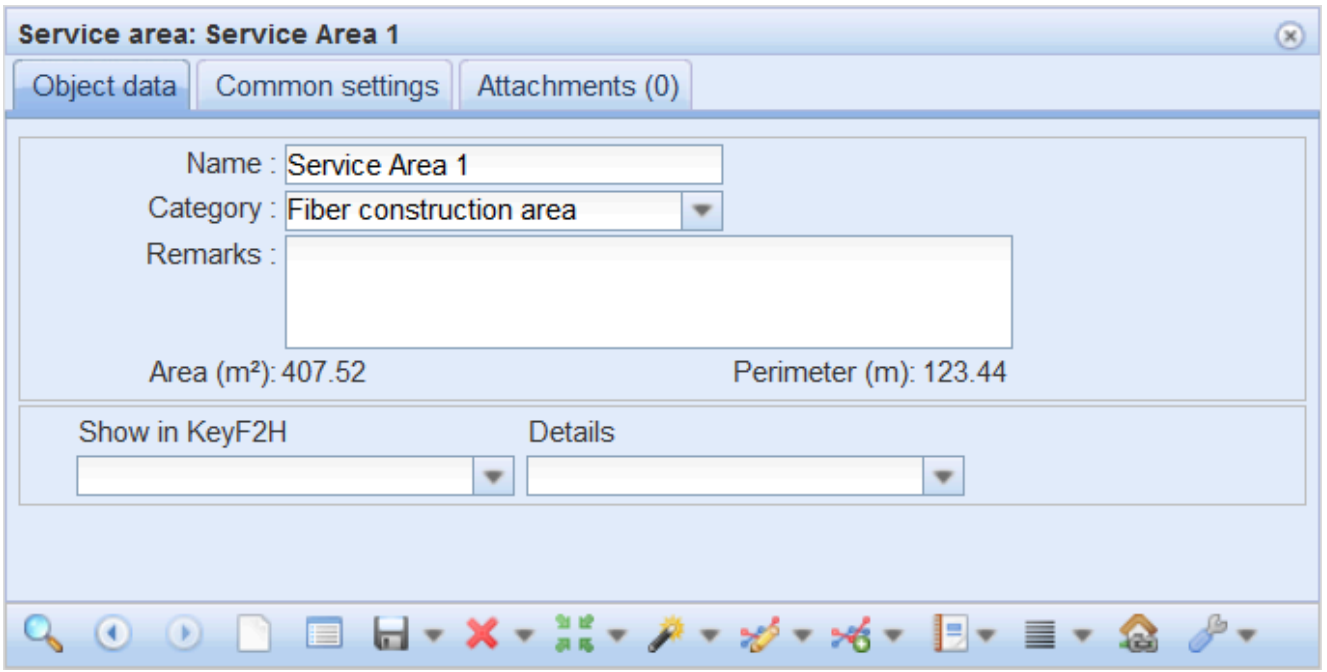
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Service area

Click **Service areas** to open the form for managing service areas. You can search for service areas based on search criteria or pick their information from the map and, for example, locate them on the map. The **Service areas** layer is not selected by default in the **Layers selection**.

Creating a service area

Define a name and category for the area on the **Service area** form together with any comments you may have.

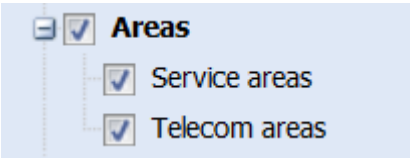


You can create an area in the same way as you create other area objects. Click the left mouse button to define the area's points and click the right mouse button to stop drawing. You can define the shape of the **Service area** by using the functions available under **Create**: **Create point buffer** and **Create line buffer**. Creating point and line buffers is discussed in the chapter Adding an area.

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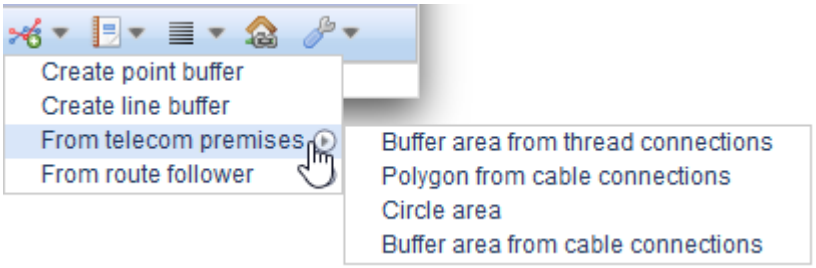
The **Service areas** object layer is automatically activated in the layer selection when you create a new service area Zoom the map to see the names of the areas.



New service area from telecom premises

You can also define a **service area** automatically in the **Create new** menu. A service area can be created based on, for example, telecom premises.

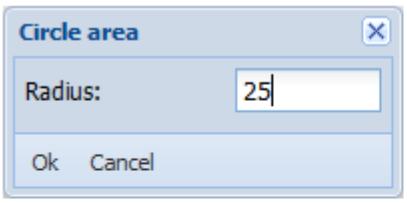
Retrieve the telecom premises to the **Telecom premises** form. The area creation uses it for service creation. The telecom premises are used as the starting point for area creation.

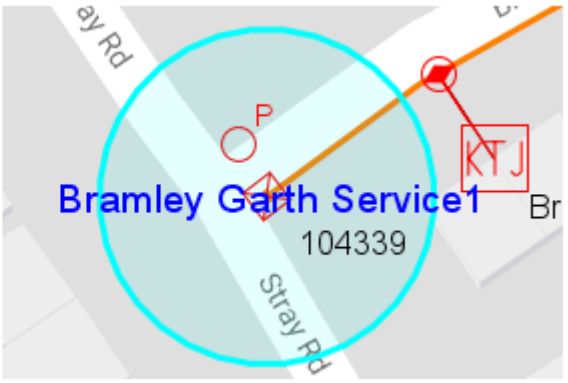


Circle area from telecom premises

In the **telecom premises menu**, select **Circle area** to create a circle around the telecom premises retrieved to the **Telecom premises** form. Create the area by defining its radius (in metres) as illustrated in the figure below.

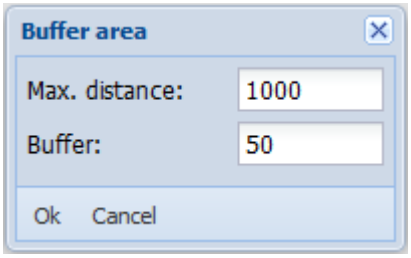
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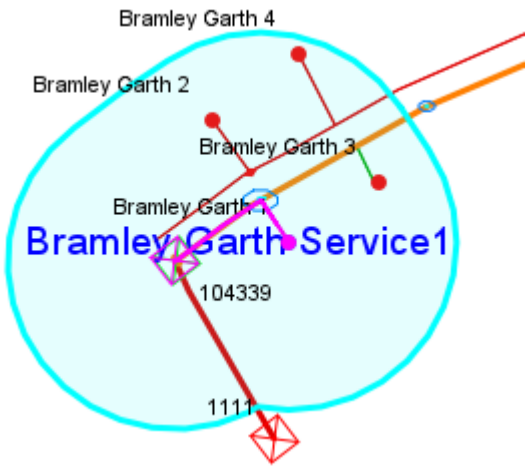
Buffer area from thread connections

Buffer area from thread connections creates an area originating from the selected telecom premises by following the cables **along the cable level connections**. The following does not require pair-level connections. To create the **service area**, define the maximum distance for following the cable network and define the width of the buffer area to be created (metres).



The cable network will be followed for the defined **maximum distance**. When the maximum distance is reached at some branch, the previously found telecom premises will be used for defining the area. The branches found using this method form a sausage-like area, where the buffer defines the width of the service area over the cables.

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Buffer area from cable connections

The functions of the **Buffer area from cable connections** option are otherwise identical to those of the **Buffer area from thread connections**, but the following is carried out **based on pair-level connections** and cross-connections between devices. The use of this function requires network connections to have been documented in detail.

Polygon from cable connections

As is the case with the **Buffer area**, the **Polygon from cable connections** option is based on following cables through **thread-level connections**. This function uses the telecom premises located through following in order to create a polygon that covers all the telecom premises that were located.

A new buffer area from route follower

You also have the option to create a service area based on the results of the route follower.

1. Name the service area, for example, “Buffer area from route follower”.
2. In the drop-down menu for **Create**, select **From route follower** and then click **Buffer area**.
3. On the Route follower form, specify the device or cable to be used for following a route.

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4. On the **Route follower** form, select **Create buffer area based on the route follower results**. You can cancel the creation of a buffer area by clicking **Cancel creating of buffer area**.
5. Define the buffer distance in metres in the **Buffer** dialogue box that is displayed. Click **OK**.
6. A buffer area has now been created on the map based on the route follower results. (Do not forget to activate **Areas** in Layers)



A new polygon service area from the route follower

You can create a polygon service area based on the results of the route follower.

1. Enter a name for the service area.
2. In the drop-down menu for **Create**, select **From route follower** and then click **Polygon**.
3. On the Route follower form, specify the device or cable to be used for following a route.
4. On the **Route follower** form, select **Create buffer area based on the route follower results**. You can cancel the creation of a buffer area by clicking **Cancel creating of buffer area**.
5. A polygon service area has now been created on the map based on the route follower results. (Do not forget to activate **Areas** in Layers)

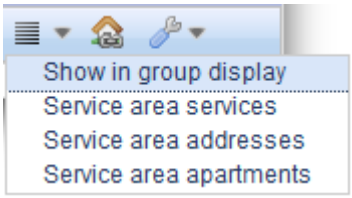
Viewing a service area in a group display

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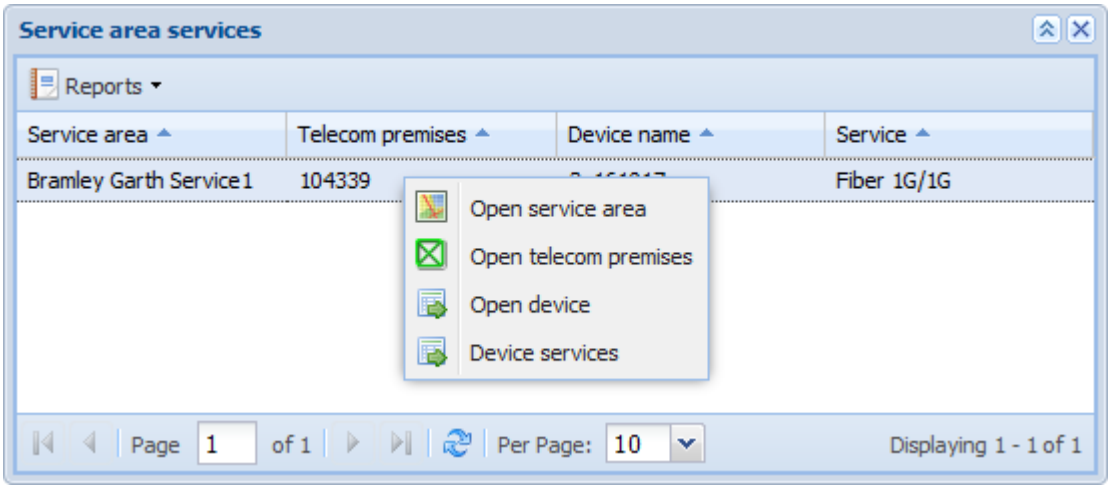
In the drop-down menu for **List**, select **Show in group display** to view the service area in a group display.

Service area services

In the drop-down menu for **List**, select **Service area services**.



In the context menu for the **Service area services,** you can open the **service area** in question, the related **telecom premises** and **device,** and the **services** related to the device.

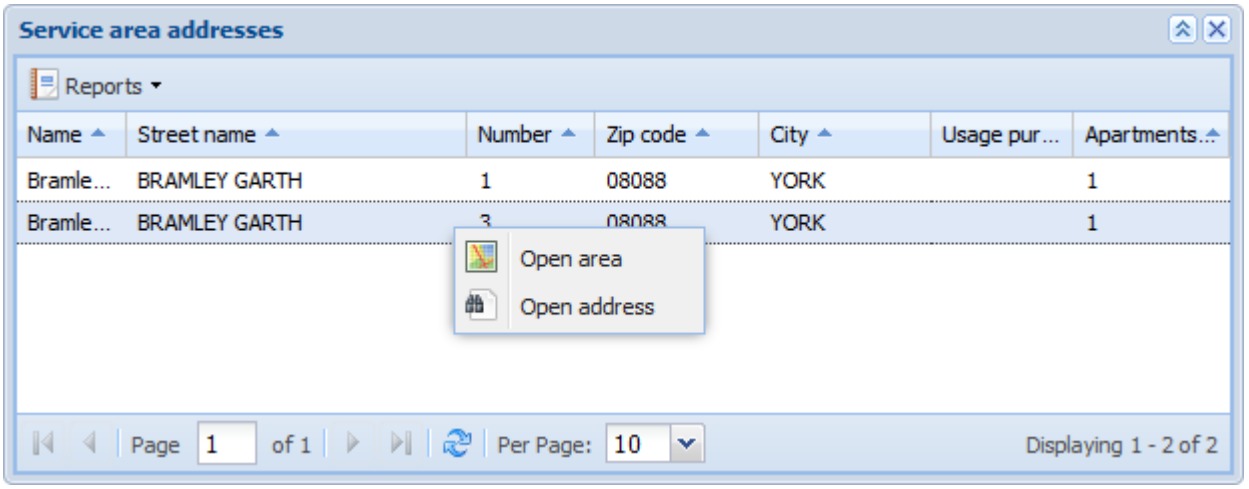


Service area addresses

To list the addresses located in the service area , go to the drop-down menu for **List**and select **Service area addresses**. The form that is displayed is equivalent to the form's **List** function that is discussed in the chapter List.

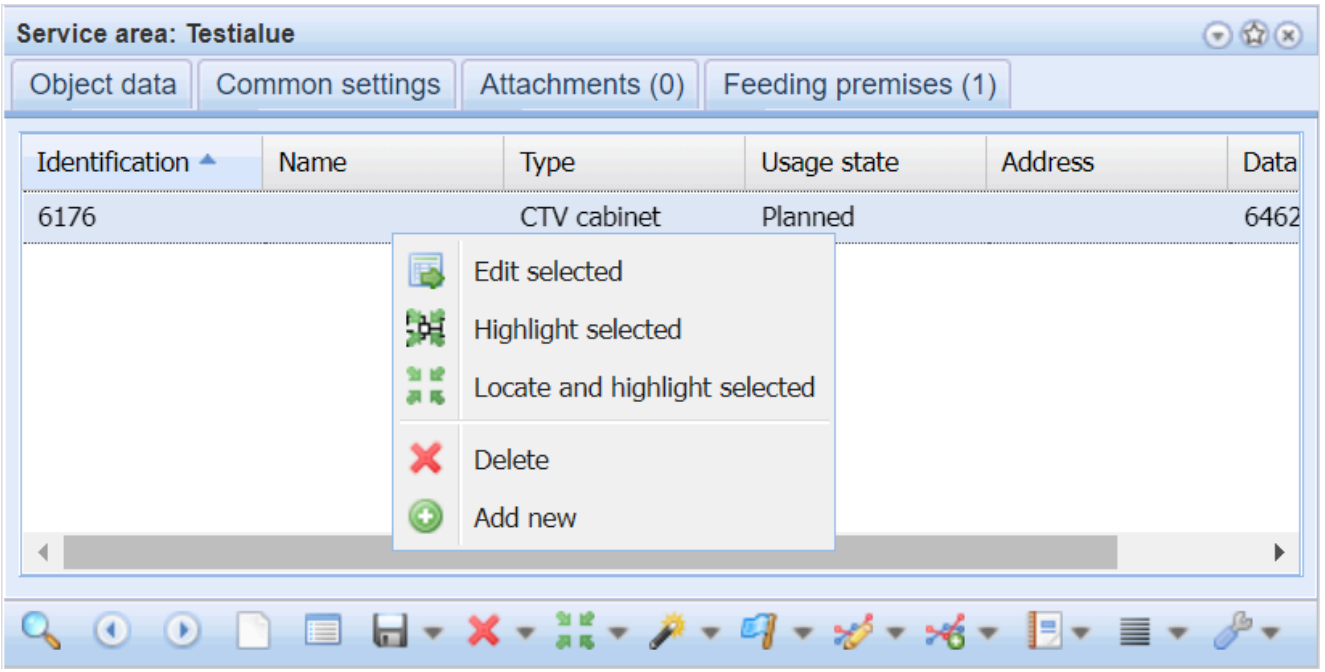
Use the context menu for **Service area addresses** to go to the service area and address in question.

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Feeding premises

You can view the feeding premises of the service area from the **Feeding premises** tab. In the title of the tab, the number of feeding premises is indicated in parentheses, which is updated when new telecom premises are added or deleted.

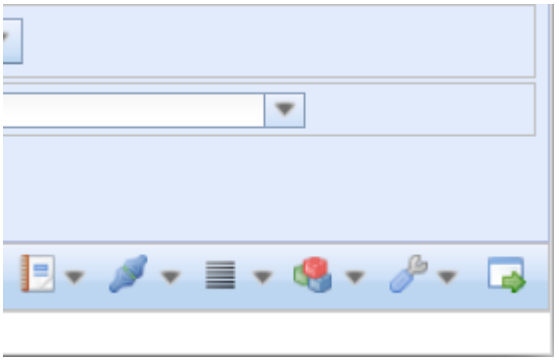


You can manage the **Feeding premises** from their context menu. Right click on the grid to open a menu. You can edit telecom premises with their own forms, zoom and highlight telecom premises on the map and delete and add new feeding premises to the service area.

Adding and deleting feeding premises

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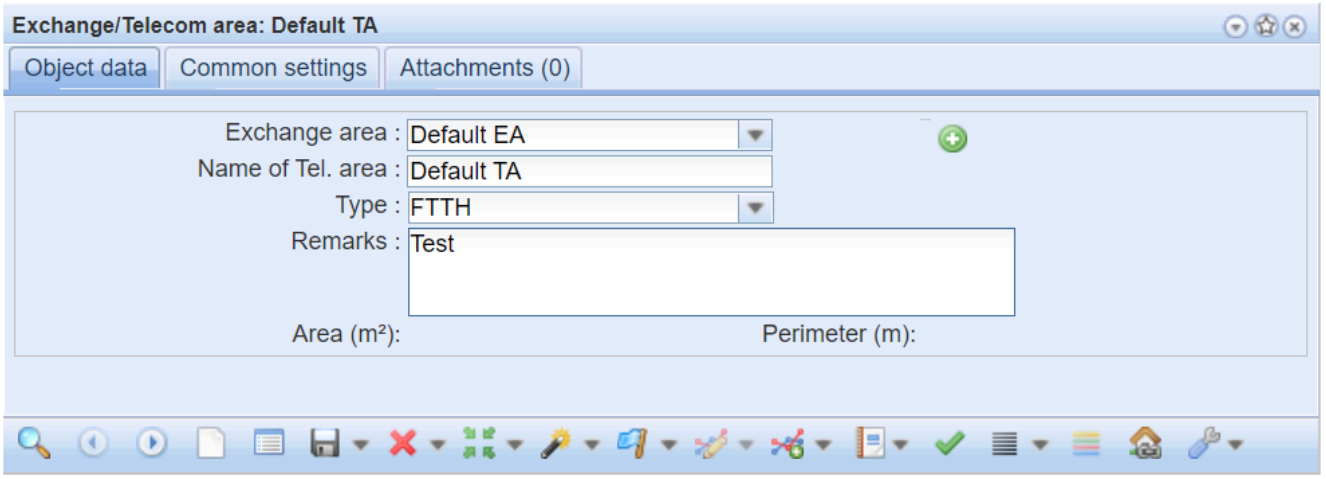
1. Start adding a new feeding premise by clicking the **Add new** button in the context menu.
2. Search or add the necessary information on the **Telecom premises** form and click the **Export to form** button from the toolbar.
3. **Telecom premises** can then be found in the **Feeding premises** tab.
4. Remove the telecom premises with the **Delete** button in the context menu if you need to.



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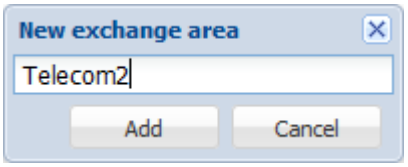
Exchange/Telecom area

In the **KeyCom tools**, click **Exchange/Telecom area** to open a form for managing exchange areas.



To create a new exchange area, take the following steps:

1. In the drop-down menu, select **Exchange/Telecom area**.
2. If you cannot find the area in the menu, click **Add new exchange area** to create a new area.
3. On the form that is displayed, enter the name of the new exchange area and click **Add**.

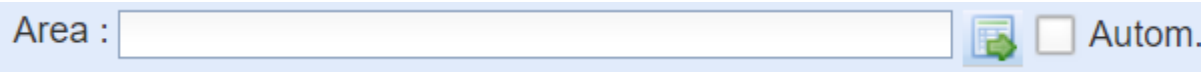


When you have entered the **name of the telecom area**, click **Save form** or **Create** to create the exchange area on the map. If you try to create an exchange area with a name that already exists, the program notices this and uploads it to the form without creating a copy.

In the **Type** field, different network solutions can be defined on a customer-specific basis. Defaults are FTTH and FWA networks.

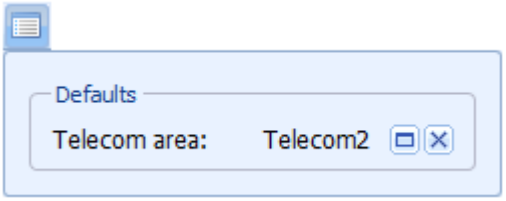
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If the network area has been given a location, it can be automatically selected for the object forms. The objects must be geographically located within the network area. On the object form, select the **Autom.** check box, after which the area information is updated when saving. If the network area has not been given a location on the map, it must be selected manually by pressing the **Open form button** and searching for the correct network area.



Set as a default area

To set an exchange/telecom area on the form as the default area, click **Set as default telecom area**. After this, when you click **Defaults** on object forms, the default area is automatically entered in the **Area** field. Read also the chapter Managing settings defined by a user.

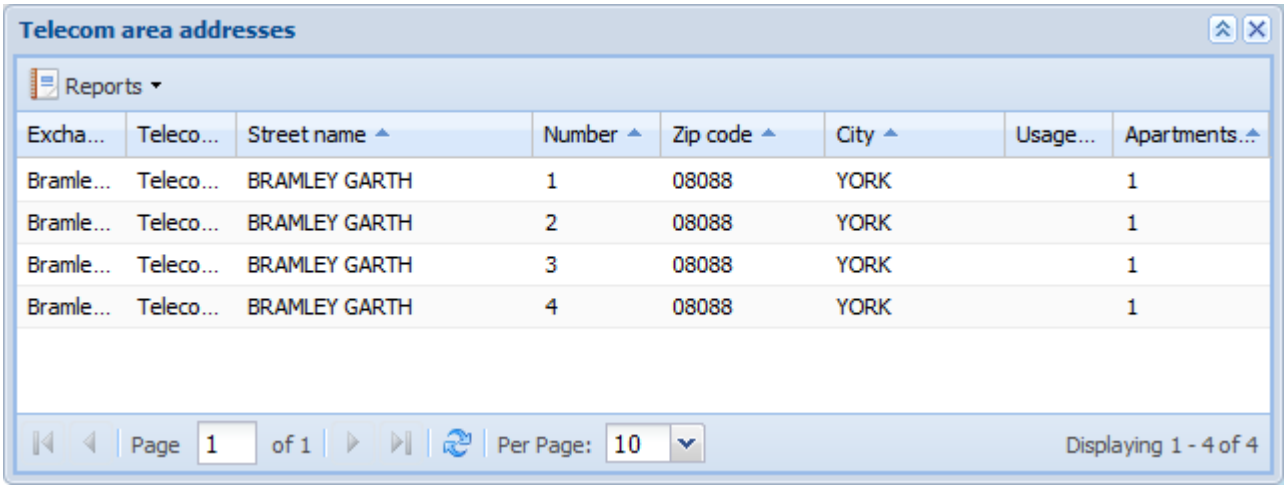


Exchange/telecom area addresses

To list the addresses located in the exchange/telecom area , go to the drop-down menu for **List** and select **Exchange/telecom area addresses**. The **List** function is discussed in more detail in the List chapter.

Click the right mouse button to use the context menu for the **Exchange/telecom area addresses** list to go to the exchange/telecom area and address in question.

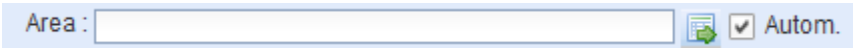
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Linking an object to an exchange area

Use the objects' own forms to add objects to an exchange area.

1. Open an object form.
2. Retrieve the object you want to add to the form (Retrieving information to a form, **or** Picking objects from the map), **or** fill in the information on the new object.
3. Select the **Autom.** checkbox next to the **Area** field to automatically define the area based on location, or enter the required area in the **Area** field (Using the predictive search field).



4. Click **Save form** .

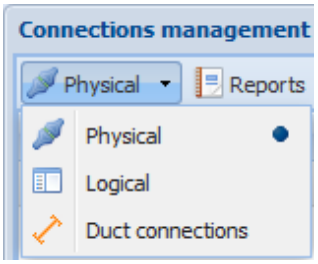
View the exchange area's objects in a group display

1. Click **Show current in group display** to open the exchange area's objects in a group display. More information on the group display is available in the chapter Group display.
2. **Note!** The **Show in group display** function in the drop-down menu for the **List** button displays the search results in a group display if you have retrieved more than one exchange/telecom area to the form.

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Connections management (physical & duct connections)

View the **physical**, **logical** and **duct** connections on the **Connections management** form. You can open this form from the **KeyCom** and **KeyNet** toolbars and by clicking **Connections management** on the **Splice**, **Manhole,** and **Telecom premises** forms. You can view the various connections by selecting the required state in the drop-down menu in the top left corner.



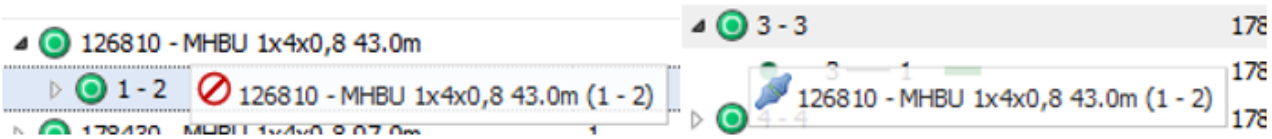
Creating connections

You can create a connection by either a) dragging or b) clicking **Connect**.

a) Drag to create a connection:

1. Select the object on the list on the left.
2. Drag it to the list on the right and position it over the object you want to connect.

Creating a connection by dragging. On the other list, select the objects you want while holding down the left mouse button. If the dragging function is available, the **Connect** icon will be displayed. If the symbol is displayed next to the icon, the connection will not be made. Drag the icon to the other list while holding down the left mouse button, and then release it.



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b) Click Connect to create a connection:

1. Select the object on the list on the left.
2. On the list on the right, select the object you want to connect.
3. Click **Connect**.

Note! The program will display a warning if the user is trying to connect objects that have already been connected. You can define additional settings if you create the connections with the **Connection options** checkbox is selected, or by dragging objects while holding down the SHIFT key. More information on physical connection options is available in the chapter Physical connection options.

Picking objects to the connections management form

1. Click **Pick from map** .
2. Define the map area that you want to use for picking objects.
3. On the selection list for the object, select the required object. If there is only one object in the defined area, it is automatically picked to the **Connections management** form.

Disconnecting connections

You can disconnect connections either individually or by selecting at the higher list level all connections related to the selection (such as all the connections of a device).

1. Select from which or what is disconnected.
2. Click **Disconnect** .

Or

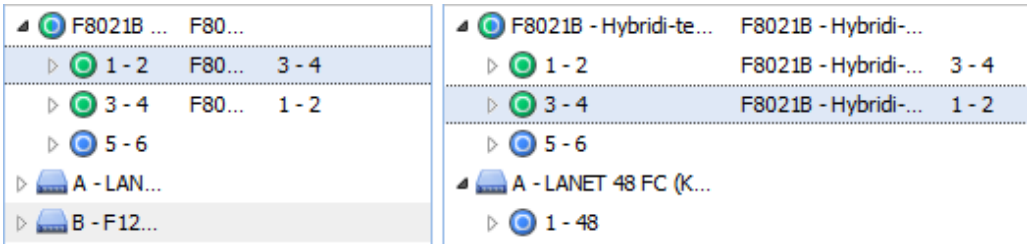
1. In the context menu, select **Disconnect** .
2. You will be asked to confirm the disconnection. You can either accept or reject the disconnection.

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Note! The software will notify you if the thread or thread connection has been reserved for a circuit. The form that is opened prompts you to choose which connections to disconnect. **Confirm** the disconnection or click **Cancel**.

Synchronize

Use synchronization if you want to illustrate the connections between the objects. Select a device a cable on the list and click **Synchronize** or click the object with the right mouse button and select **Synchronize**. When an object has been synchronized, the object connected to it is highlighted on the list.



Refresh

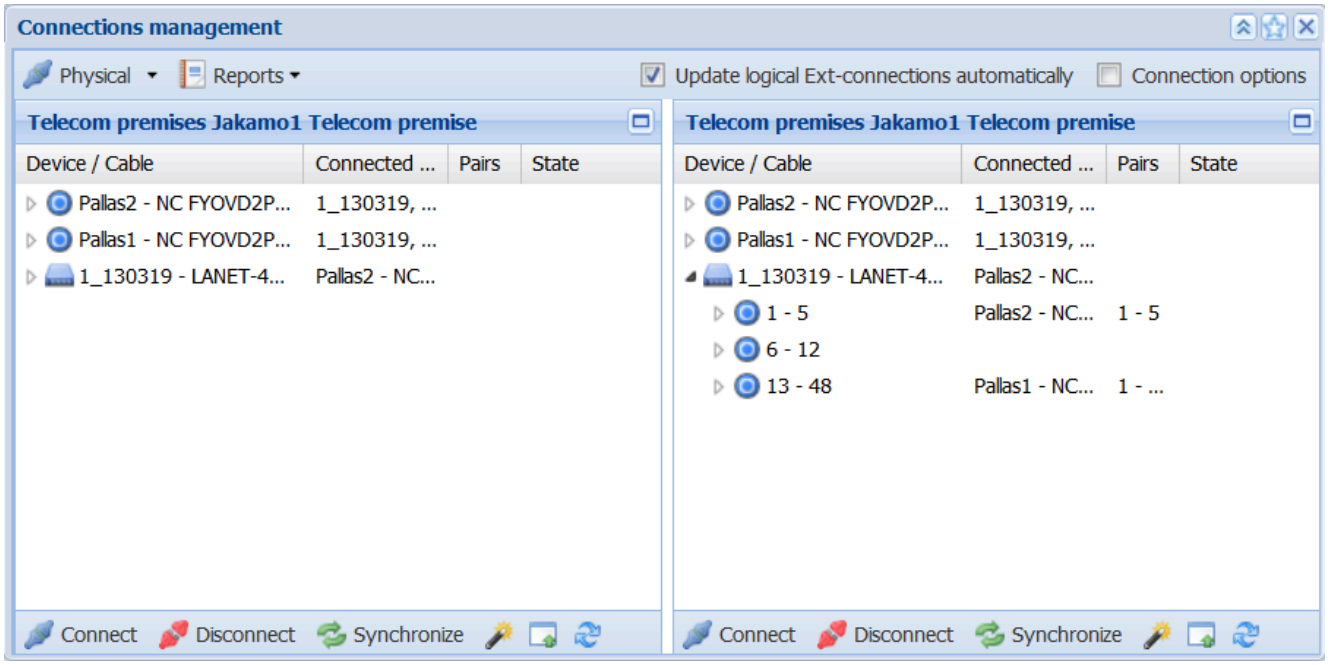
Use the **Refresh** tool to refresh the connection tree content to match the changes you made on the **Telecom premises**, **Device**, and **Connections management** forms.

Managing physical connections

The button for managing physical connections is available under the **KeyCom** menu and on the **Telecom premises**, **Manhole**, and **Splice** forms. Click it to open the **Connections management** form.

The two lists on the form include the devices and cables. The information content of the lists is similar, but the list views may be different. The related tools **Disconnect** and **Synchronize** are applied to the object selected in the list above them. **Connect** requires information on two objects in order to create a connection.

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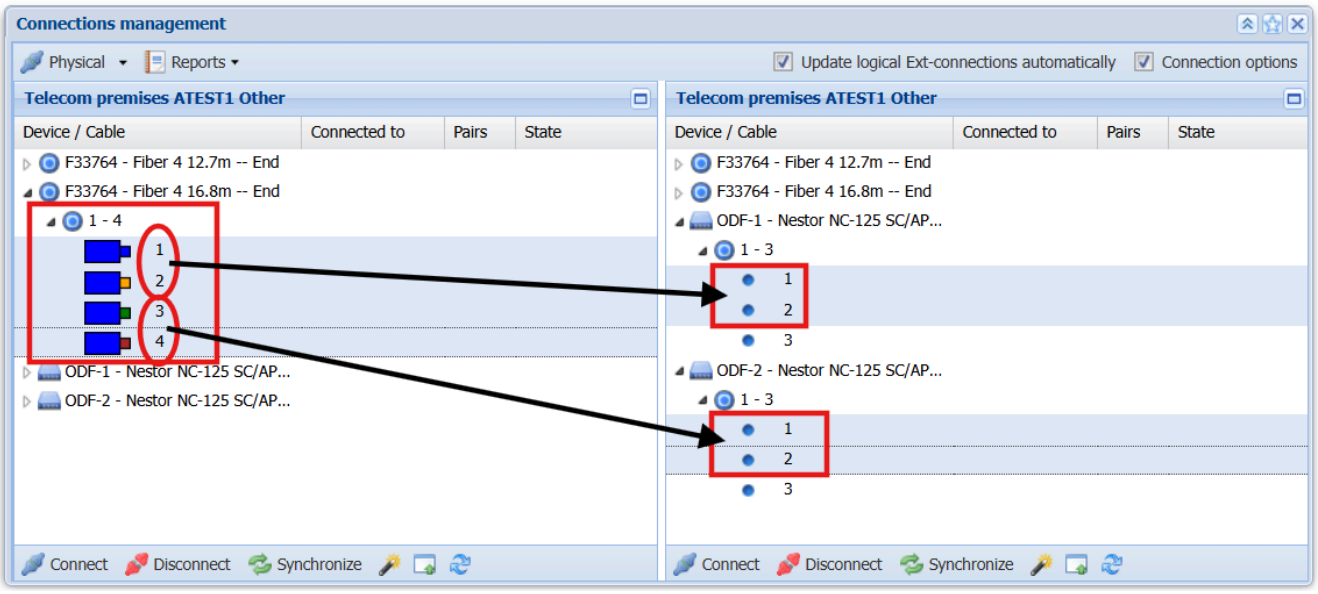
Each cable or device ID is preceded by a symbol that indicates whether it is a **cable** (a round symbol) or a **device** (an angular symbol). Objects in copper or electrical networks are marked in green colour, while blue colour is used for fiber-optic networks. Hybrid networks are marked with both colours. Click the arrow in front of the symbol to view the devices and threads connected to the object in question. You can hide the objects by clicking the same arrow. The **Connected to** column displays the ID of the device or cable to which the device or cable in question is connected.

Click a cable or device using the **right mouse button** to open a menu that includes the form functions and enables highlighting or locating the listed cables and devices.

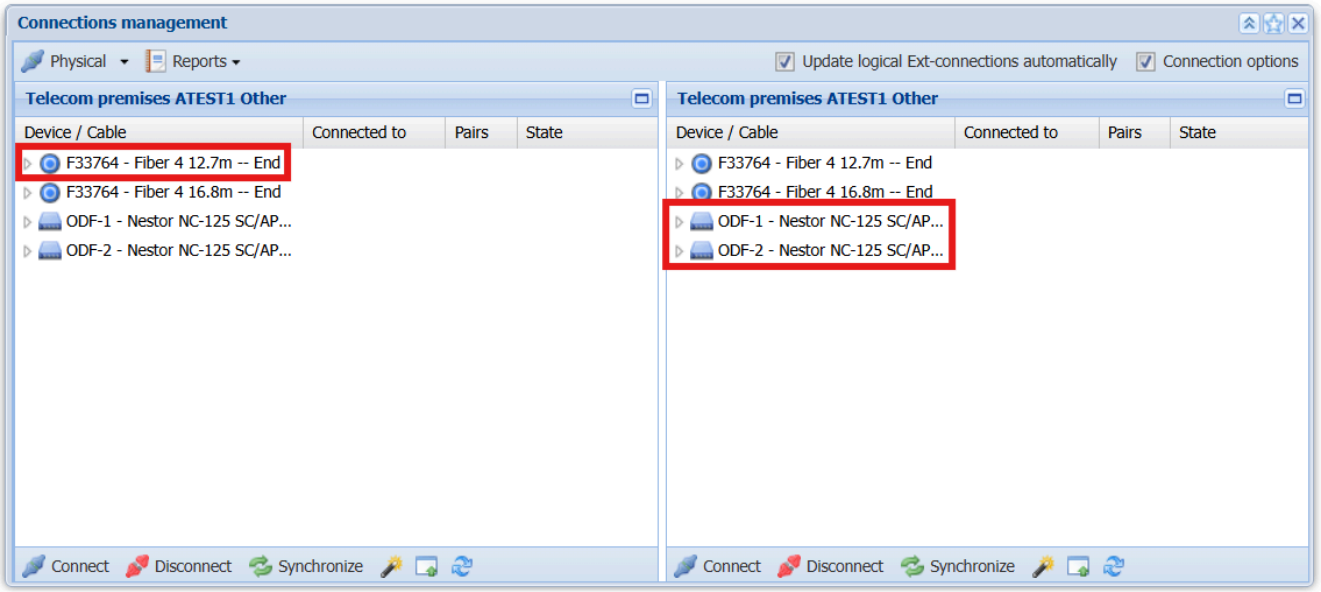
Creating multiple cable and device connections at once

Connections can be made by selecting multiple threads and connectors from the left and right side of the connections management windows by clicking the **Ctrl**-button while selecting. Connections will be created in the order they have been selected from both sides.

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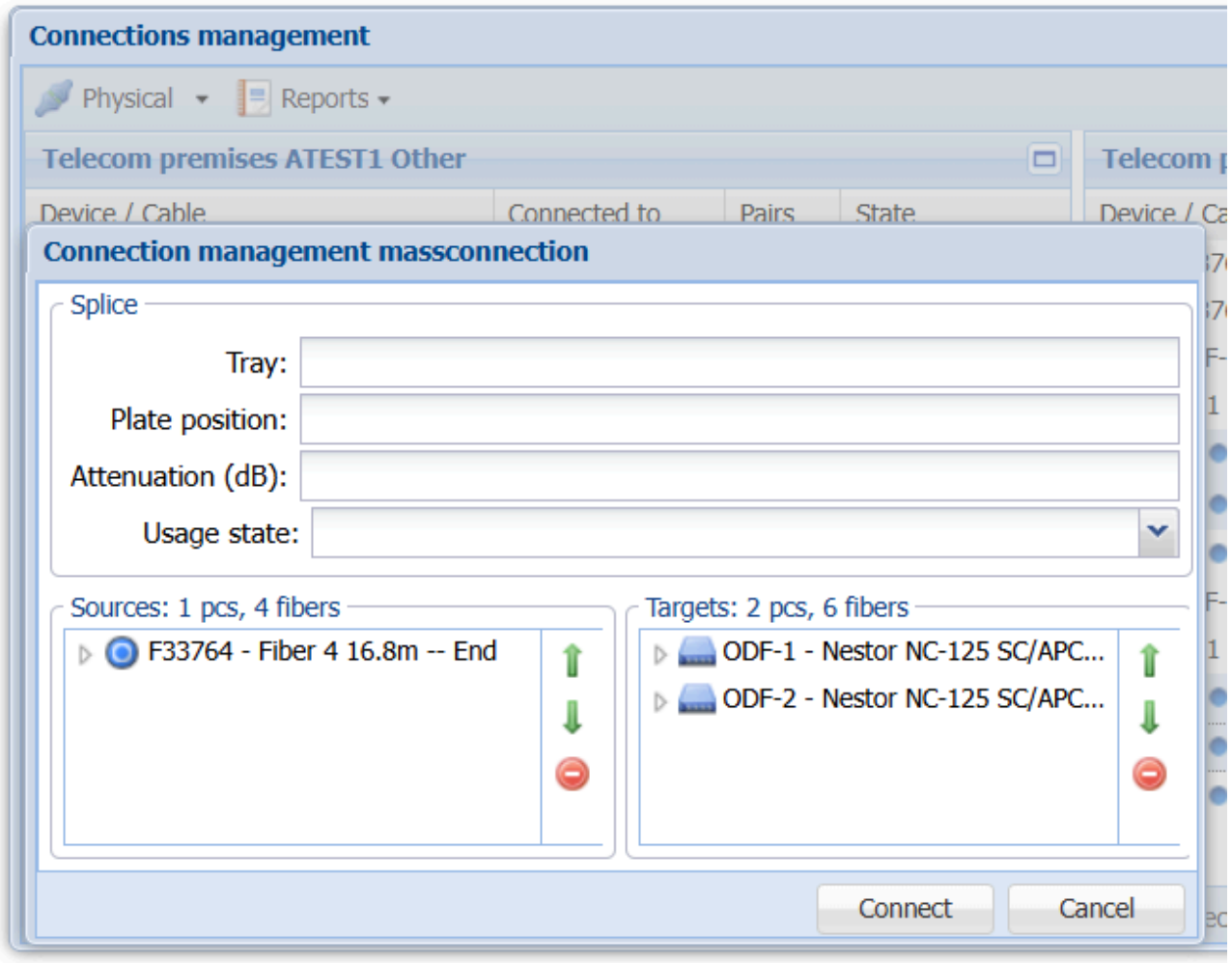


This function also supports object level connectivity which means that there's a possibility to connect multiple objects at once. In the example below, the connections are made to ODF-1 device first until it's fully connected. Then the remaining connections are made to ODF-2 as long as there is free capacity left in the cable.



If the **Connection options** checkbox is checked, the **Connections management mass connection** window will open. Here it's possible to preview connections and, for example, change the order of selected connections by using the green up and down arrows on each grid. There's also the possibility to edit usage stage of the object.

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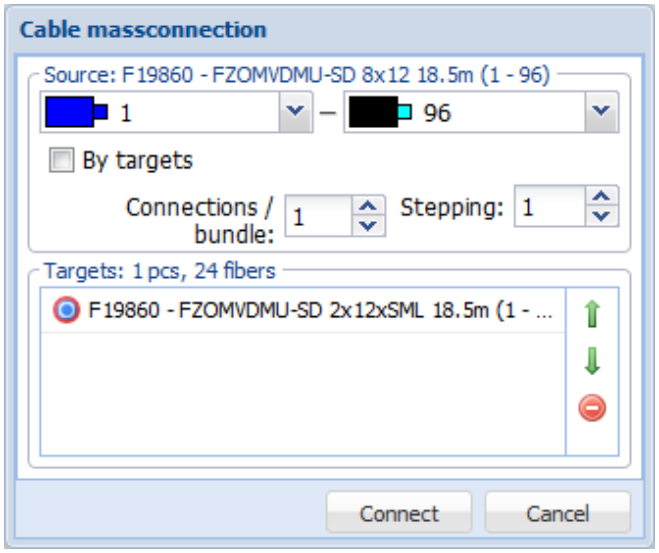


Physical mass connection

Select multiple items to carry out a cable mass connection:

1. In the **Connections management** window, select the **Connections options** checkbox.
2. Select the source cable on the list on the left.
3. Select the cables you want to connect on the list on the right.
4. Click **Connect**.
5. In the **Cable mass connection** form, define the settings for a mass connection.
6. Click **Connect**.

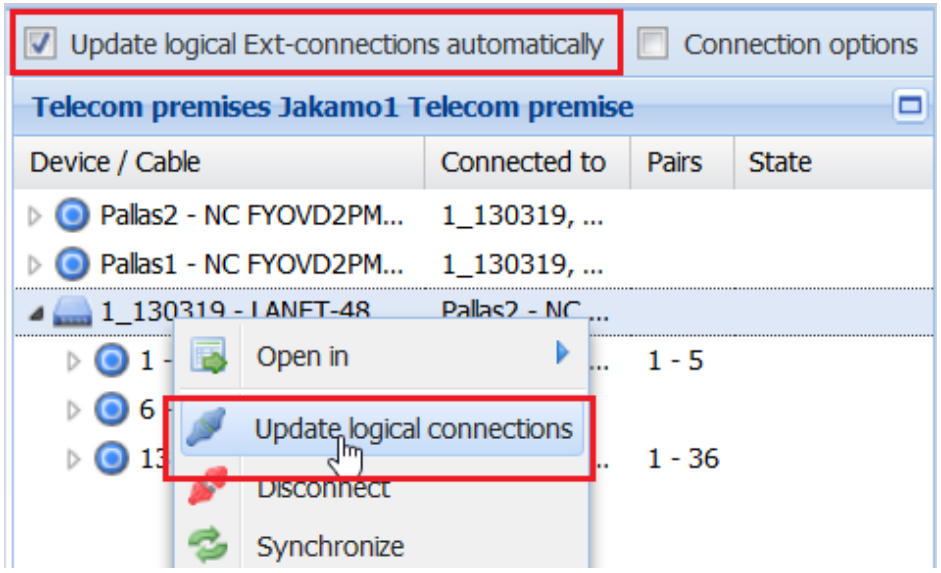
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Update logical connections automatically

When physical connections are created with the **Update logical Ext-connections automatically** option enabled, the program will also update the logical connections that are not reserved for circuits and the attenuations based on cable connections. This function is used to automate the **Update logical connections** function, which is available when right-clicking a device.

Note! The functionality does not extend to cable connections that are not connected to devices (for example, splices).

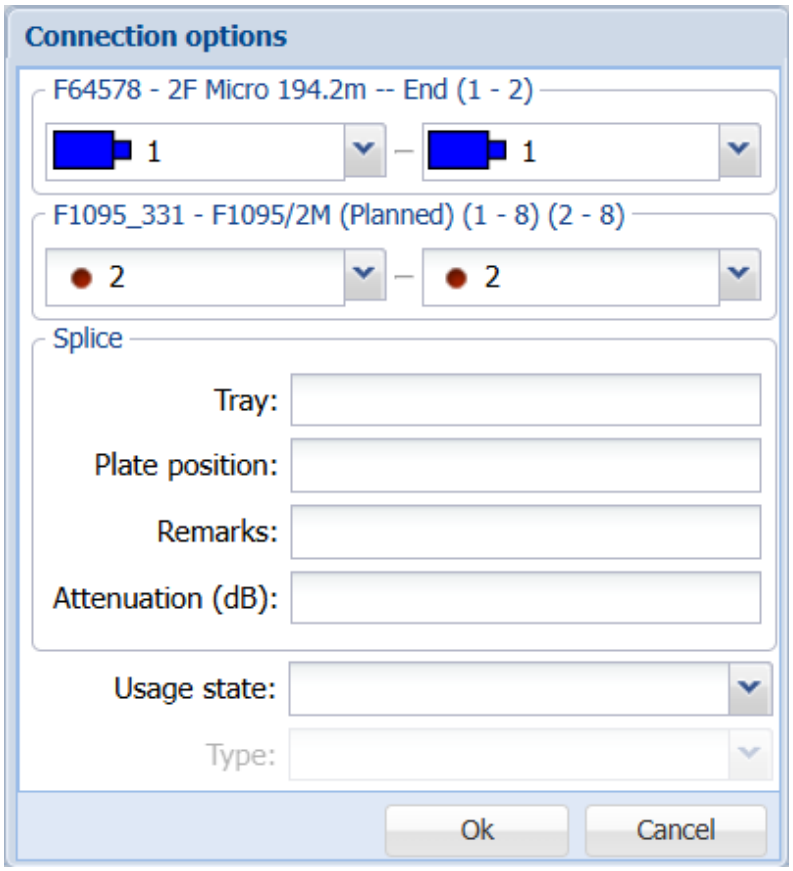


Physical connection options

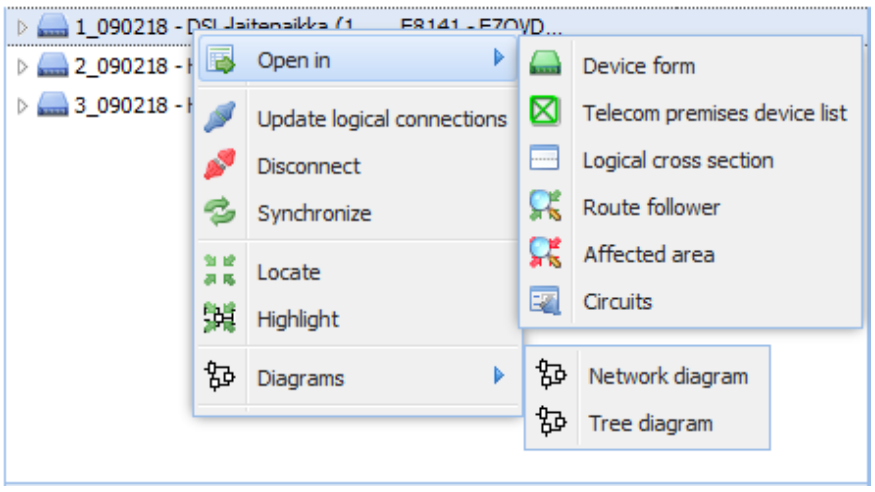
You can open the **Update connections** form if you create the connections while the **Connection options** checkbox is selected (in the top-right corner of the form), or by

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dragging while holding down the SHIFT key. On the form, you can define the connections of the various threads in a cable bundle and you can enter additional information on the connections in the following fields: **Tray, Position, Remarks** and **Attenuation (attenuation in a fiber-optic cable).** In addition, in the **Usage state** drop-down menu, you can define the usage state of the connection.



Context menu functions for devices



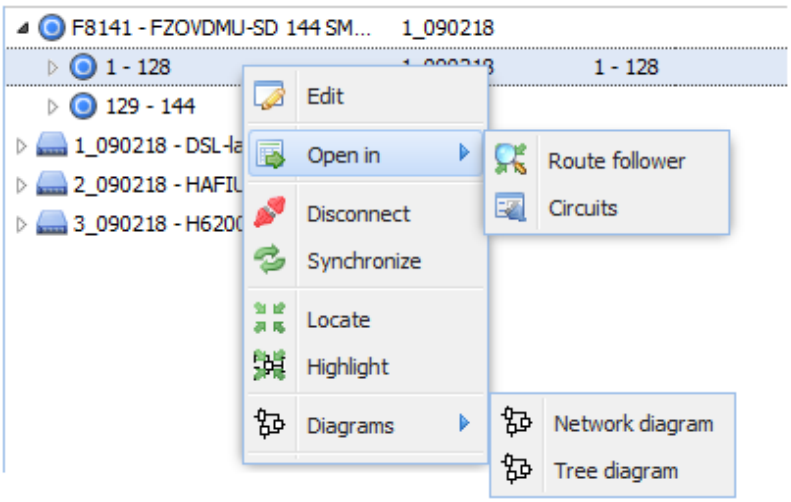
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You can find the following functions in the context menu that you can open when clicking a device with the right mouse button:

- **Open in Device form:** Opens the **Device** form. More information on devices is provided in the chapter Devices.
- **Telecom premises device list:** Opens the **Telecom premises** form and displays the **Devices** tab. More information is provided in the chapter Devices.
- **Logical cross section**: Opens the device on the **Logical cross section** report of the telecom premises and selects the correct device from the list. See the chapter Cross-section.
- **Route follower**: Opens the **Route follower** form that has been set up for route following. See the chapter Route follower.
- **Affected area**: Opens a **Route follower** form pre-completed with the selected device's connectors and cables connected to the connectors. The route follower highlights the connection routes that are connected to the selected device either directly or over logical cross-connections.
- **Circuits**: Opens all circuits related to the device's connectors.
- **Update logical connections**: Creates or updates the logical connections for the device selected based on the physical cable connections.
- **Disconnect**: Disconnects all the connections of the device.
- **Locate**: Locates the device on the map based on the telecom premises.
- **Highlight**: Highlights the telecom premises of the device on the map.
- **Diagrams**: Creates a **network diagram or a tree diagram.** More information is available in the chapter Diagrams.

Context menu functions for connection bundles

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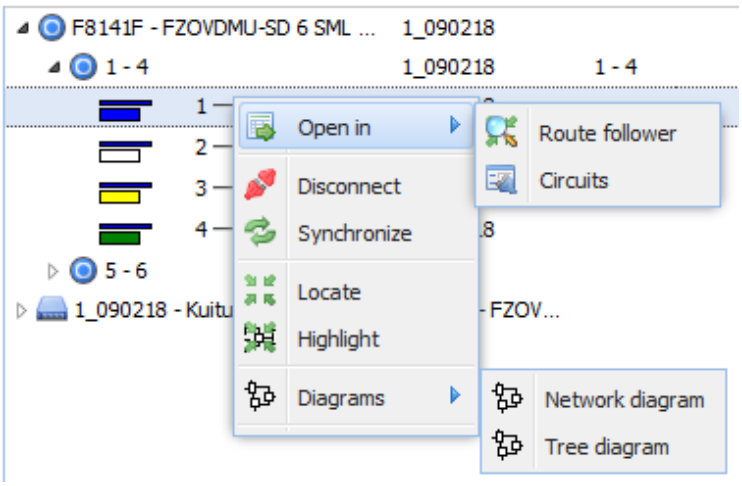


You can find the following functions in the context menu that you can open when clicking a connection bundle with the right mouse button:

- **Edit**: Opens **Update connections** form where you can edit the splice tray, position, attenuation (dB) and usage state.
- **Open in – Route follower**: Opens the **Route follower** form that has been set up to find routes based on the bundle range. See the chapter Route follower.
- **Open in – Circuits**: Displays all circuits of a connection bundle.
- **Disconnect**: Disconnects a connection.
- **Synchronize**: Synchronizes one of the lists to display the other end of the connection.
- **Locate**: Locates an object on the map.
- **Highlight**: Highlights an object on the map.
- **Diagrams**: Creates a **network diagram** or a **tree diagram.** More information is available in the chapter Diagrams.

Context menu functions for a fiber-optic cable/pair/connector

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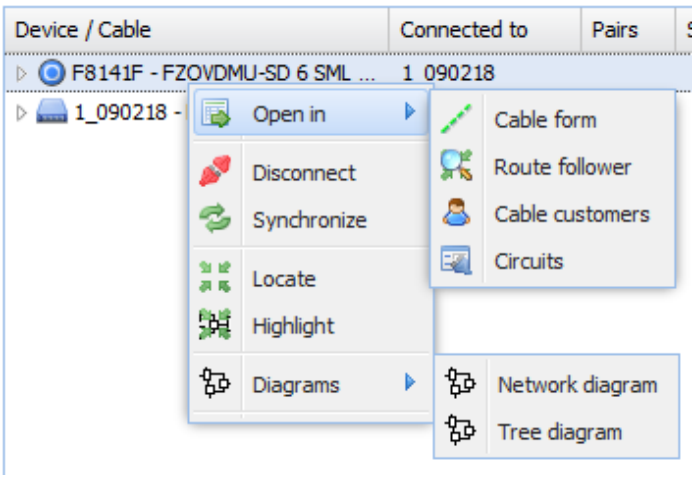


You can find the following functions in the context menu that you can open when clicking a fiber-optic cable/pair/connector with the right mouse button:

- **Open in – Route follower**: Opens the **Route follower** form that has been set up for route following using the selected fiber-optic cable/pair/connector. See the chapter Route follower.
- **Open in – Circuits**: Displays the circuits related to the thread or connector.
- **Disconnect**: Disconnects the connection for the selected pair, fiber-optic cable or connector.
- **Synchronize**: Synchronizes one of the lists to display the other end of the connection.
- **Locate**: Locates an object on the map.
- **Highlight**: Highlights an object on the map.
- **Diagrams**: Creates a **network diagram** or a **tree diagram.** More information is available in the chapter Diagrams.

Context menu for a cable

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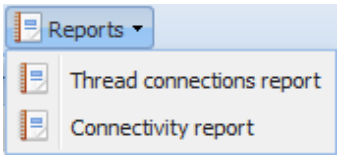
You can find the following functions in the context menu that you can open when clicking a cable with the right mouse button:

- **Open in** – **Cable form**: Opens the Cable form.
- **Open in** – **Route follower**: Opens the **Route follower** form that has been set up for route following based on a cable. See the chapter Route follower.
- **Open in** – **Cable customers:** Opens the **Cable customers** form on which you can view the customer information for the fibers of the cable/pairs.
- **Open in** – **Circuits**: Displays all circuits related to a cable's threads.
- **Disconnect**: Disconnects all connections for the cable in question.
- **Synchronize**: Synchronizes one of the lists to display the other end of the connection.
- **Locate**: Locates the cable on the map.
- **Highlight**: Highlights the cable on the map.
- **Diagram**: Creates a **network diagram or a tree diagram.** More information is available in the chapter Diagrams.

Thread connections report

On the **Connections management** form, in the state **Physical**, click **Reports**, and select **Thread connections report** (* MERGEFORMAT). The report is created in Excel format, and it includes tabs on which the connections are presented **with** and **without connectors**. If you are using a fiber-optic cable for which colour coding has been defined in the database, this colour coding is also visible in the report.

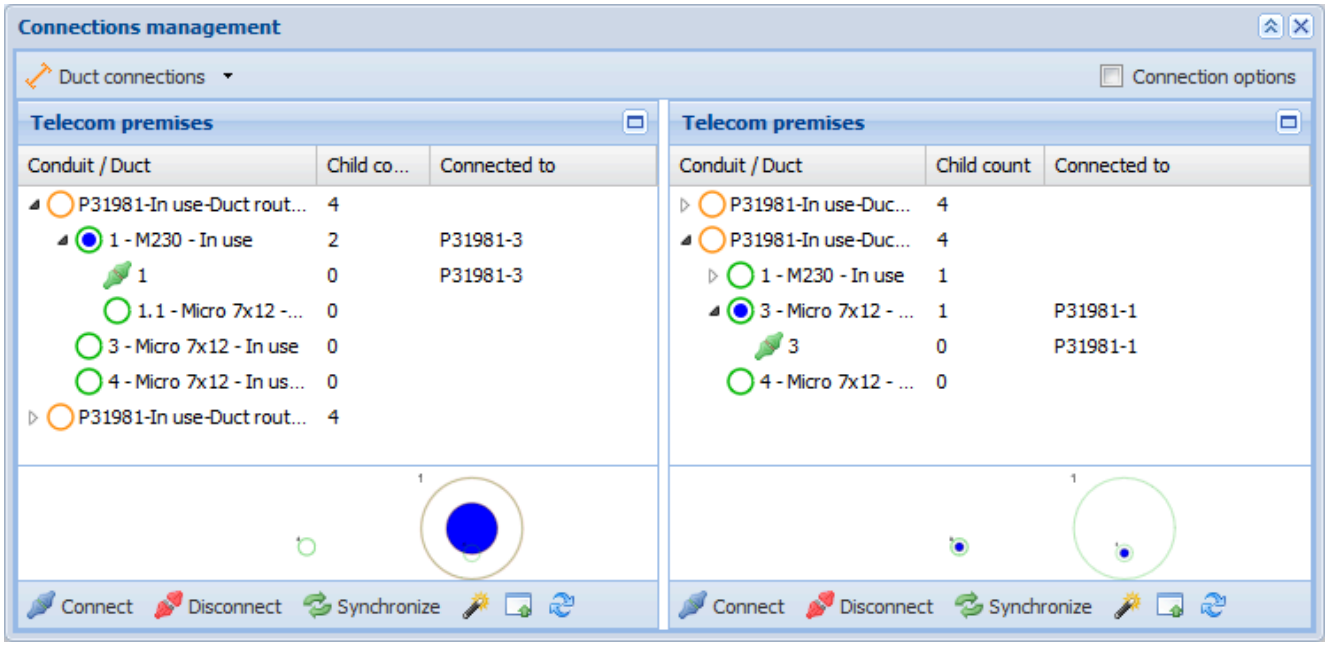
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Duct connections management

Use the **Duct connections** function to connect ducts to other ducts or sub-ducts in a manhole. This is often required when there is a branch in a duct line or the duct profile changes. You can manage duct cross-connections on the **Connections management** form with the **Duct connections** function.

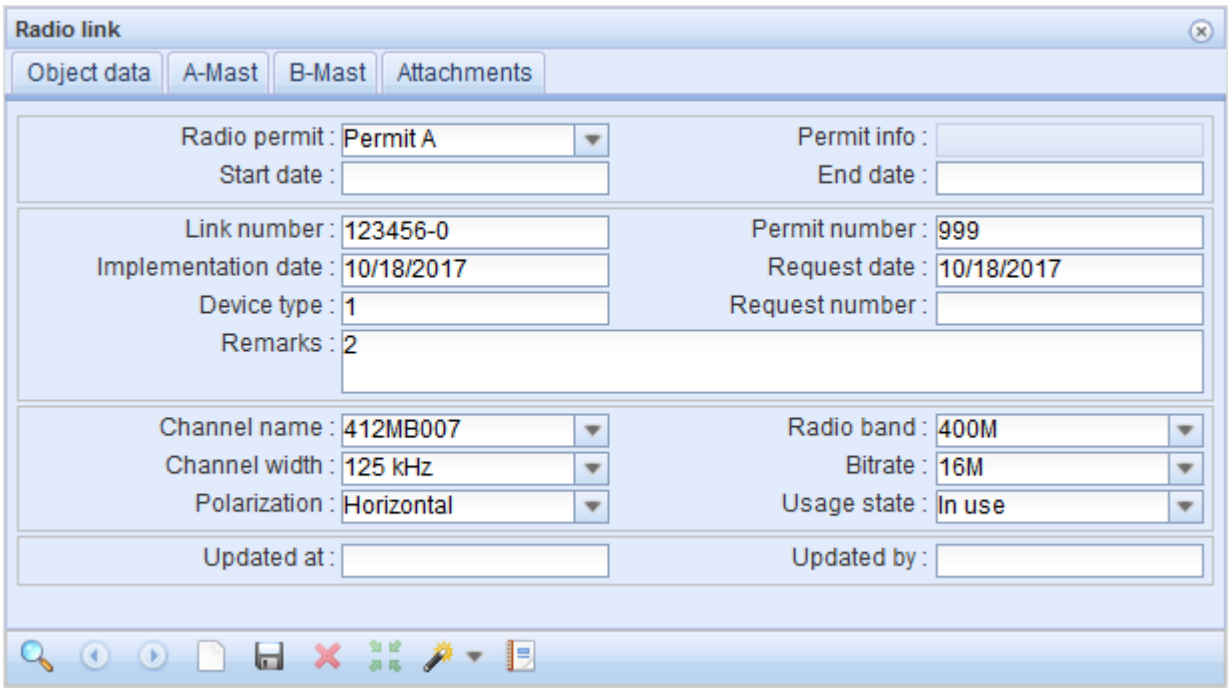
1. Open **Connections management** form.
2. In the menu for the form, select **Duct connections**, if its not already open.
3. Below the conduit/duct list, there is a cross-section of the selected conduit, in which the selected duct is highlighted.



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Radio links

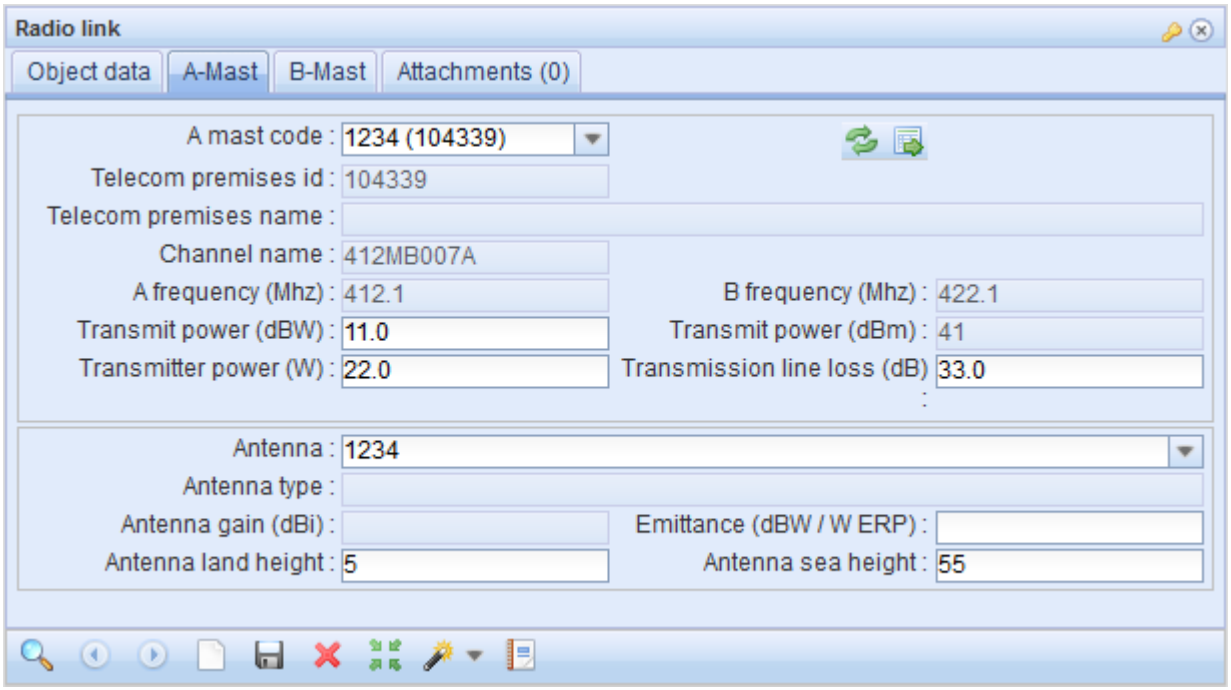
Radio links are line objects that are drawn between two telecom premises. Click **Radio link** to open a form on which you can create, view, and update information related to a radio link. The first tab includes information that is related to the radio permit, link, and channel. It also includes the only mandatory field on the form: **Usage state**.



The contents of the second and third tabs are identical, and they are used for viewing and updating information related to the A and B masts. The information on these tabs is related to, for example, A and B frequencies, the telecom premises, and the antenna.

The **mast code list** displays the THK codes of various masts. You can add a mast and its THK code to telecom premises through its device database, as instructed in the chapter Device database. In addition, the example **Antenna** illustrated in the figure below can be added to telecom premises through its device database. In this case, the Antenna list will include the name of the antenna that was created.

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If the list includes a large number of mast codes, or if they have the same name, you can click **Populate with prem id**. When you click this button, the mast code list only displays the mast codes applicable to the telecom premises downloaded on the **Telecom premises** form.

You can create a PDF report on the radio link by clicking **Report**. You can either save the document or print it using the browser's printing tools. The document includes mast-specific information on the two masts and common data applicable to both.

Permit numberPermit A

Link number	Implementation day	Request day	
123456-0	18.10.2017	18.10.2017	
Premises id	Premises name		
104339			
Channel number	Transmission frequency	Receiving frequency	Polarization
412MB007A	412.1	422.1	Horizontal
Antenna and type			Antenna gain
1234			

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Route follower

Select one of the available options to go to the **Route follower** form to view a route you created:

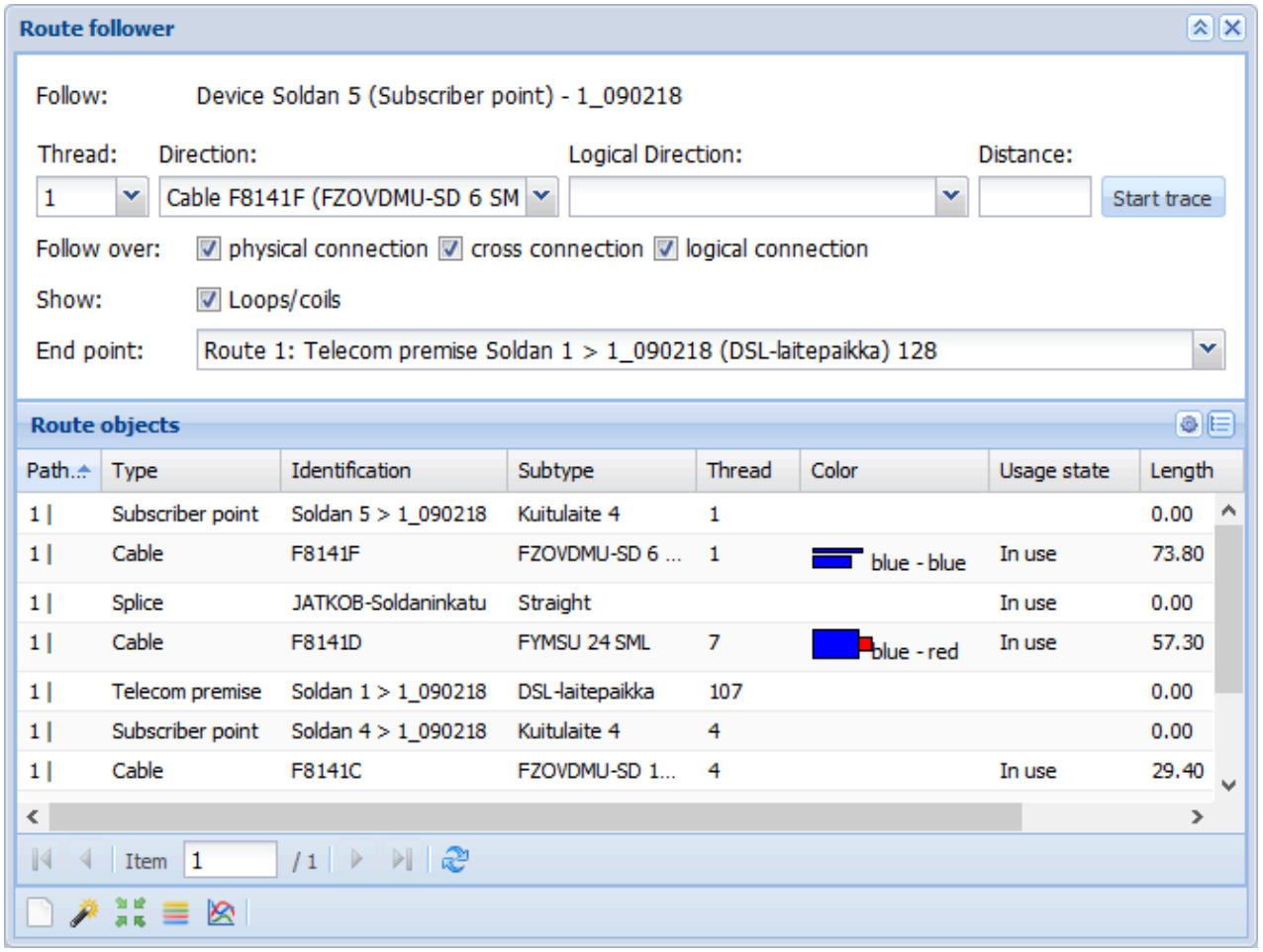
1. In the **KeyCom tools** menu, click **Route follower**.
2. On the **Cable** form, go to the **Tools** menu and select **Route follower** or **Thread details**. On the displayed **Threads for cable** form, click the right mouse button to access the **Route follower**.
3. On the **Device** form, in the **Tools** menu, select **Route follower**.
4. Go to the **Devices** tab of the **Telecom premises** form, click the right mouse button over the device row, and select **Follow route** in the context menu.
5. On the **Service area** form, click **Create** to access the route follower options.
6. Click the physical or logical reservation rows on the **Circuit** form or use the **Reserve connection** drop-down menu.
7. On the **Connections management** form, click a cable or device with the right mouse button.
8. Click a device or connector row on the **Logical cross-section** form.

Initiate Route follower

Start following using an empty **Route follower** form by using the **Pick object** tool. After you have downloaded the object used for starting the route following to a form, information on the object will be displayed after the text **Follow**. If you have entered the **Route follower** form via the **Device** or **Cable** form, the element in question will automatically be the object that is followed.

Route following can be used, for example, to locate the affected area of a device in the event of an incident or fault situation. The Distance tool can be used to define the exact cable location in metres.

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Define the criteria for the route follower

On the **Route follower** form, you can define the criteria according to which the route following is carried out:

- In the **Thread** field, you can define the thread or device connector that is followed. You can select more than one thread or connector by holding down the Shift or Control key.
- In the **Direction** field, you have the option to define the direction for following in accordance with the physical network. This field also allows multiple selections.
- In the optional **Logical direction** field, you can define whether the direction of logical connections is ascending or descending.
- In the **Distance** field, you can define the maximum distance (in metres) to be applied to route following starting from its starting point. The Route objects list displays the **End point** row, which can be used to locate the defined route length

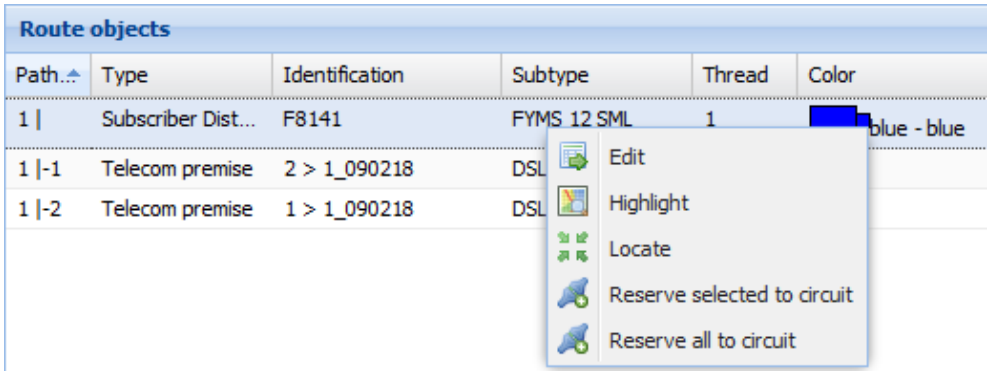
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marked on the map by a red cross. This function is useful, for example, when locating faults.

- **Follow over – physical connection**: Following continues over existing physical connections.
- **Follow over – cross connection**: Following continues over the device's cross-connections.
- **Follow over – logical connection**: Following continues over existing logical connections.
- **Show – Loops/coils:** This selection displays the loops/coils and their lengths in the Route objects list.
- The **End point** menu lets you select all routes or a single route to be displayed in the Route objects list.
- Click **Start trace** to start route following. The located routes and their objects are displayed in the **Route objects** list.

Route follower results

The route follower results are listed in the **Route objects** view.



Click a route row with the right mouse button to access the menu through which you can edit the selected object by clicking **Edit**. Click **Highlight** to highlight an object on the map. Click **Locate** to center the map on the route and to highlight the route on the map. If you want to reserve route objects for a circuit, use the **Reserve selected to circuit** or **Reserve all to circuit** functions. Further information on these functions is available in the chapter Connection reservations for a circuit.

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You can add and remove displayed columns by clicking located on the right. The displayed menu lets you define the information content of the column.

You can browse the route follower results by using the arrow buttons at the bottom.



The first page of **Route objects** displays all the followed routes. The subsequent pages display the located routes in the order: route 1, route 2 etc. If **Distance** has been defined for the route, the route options with their end points are displayed from page 2 onwards.

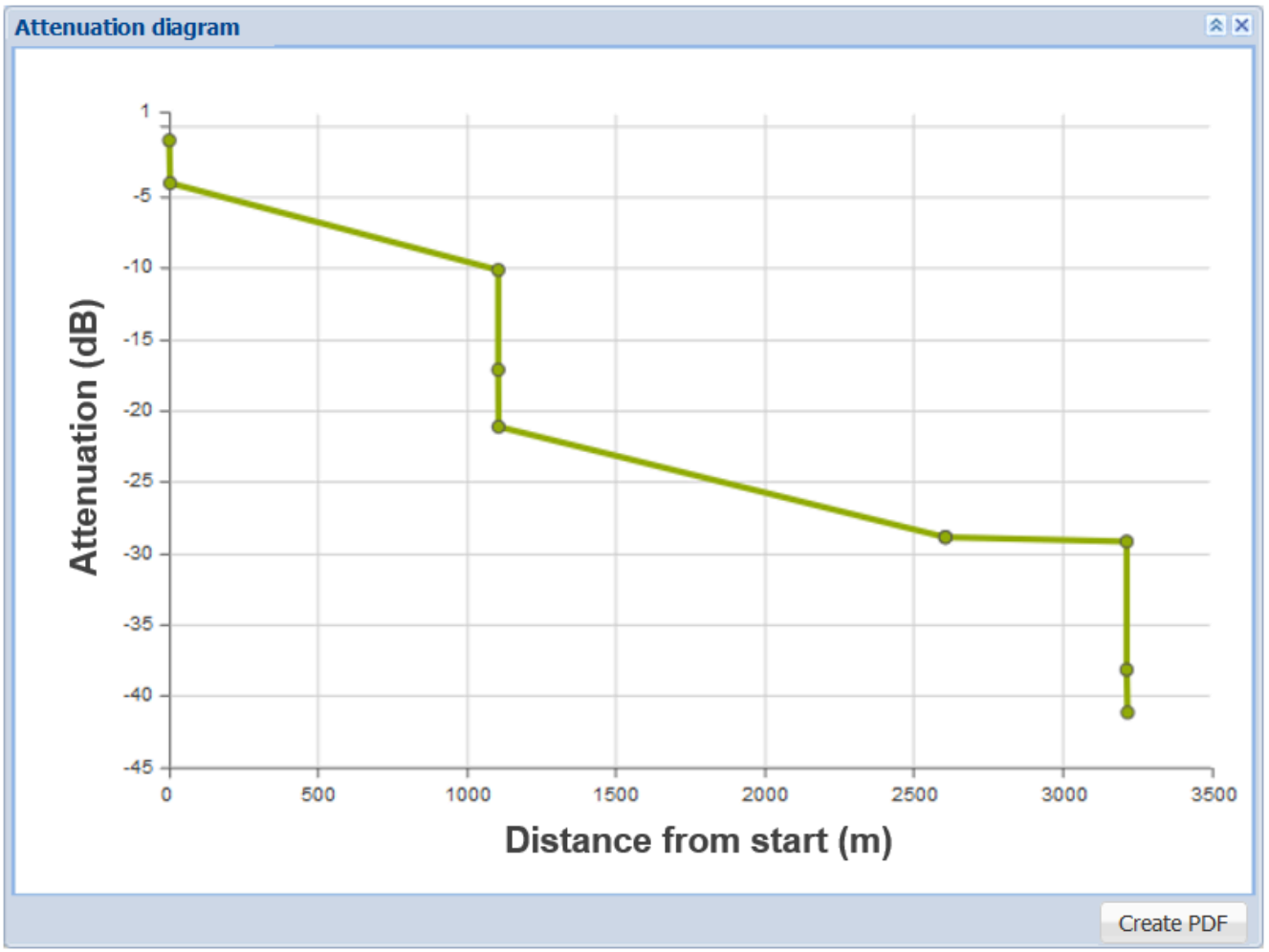
Viewing route follower results in group display

You can view the results of route following in the group display by clicking **Show components of the route in group display**. Further information on the group display is available in the chapter Group display.

Attenuation diagram

You can create an illustrative **Attenuation diagram** from the route follower results. Click **Attenuation diagram** on the required page for route follower results. The displayed Attenuation diagram window illustrates the **attenuation** (dB) of the network elements and their connections on the Y-axis and the **distance from start** (m) on the X-axis.

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Click **Create PDF** to create a PDF report on the attenuation diagram. The **Attenuation report** includes the attenuation diagram and the route follower results in accordance with the selected columns.

Creating a buffer area from the route follower

You can create a buffer area based on the results of route following. Instructions for buffer area creation are included in the chapter discussing **Service area:** A new buffer area from route follower.

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KEYNET TOOLS

KeyNet tools	

KeyNet tools are primarily meant to be used for managing the logical connections of telecommunications networks and the circuits using them. The following chapters introduce the various forms and related tools that are displayed when you click **KeyNet**.

Telecommunication networks consist of the following forms which are used for managing the logical connections of telemcommunications networks:

Circuit

Cross-section (logical)

Connection management

Customer

Automatic route search

The Logical other end connection report

The Logical circuit mass creation

Logical mass connection change

Rental contract

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Circuits

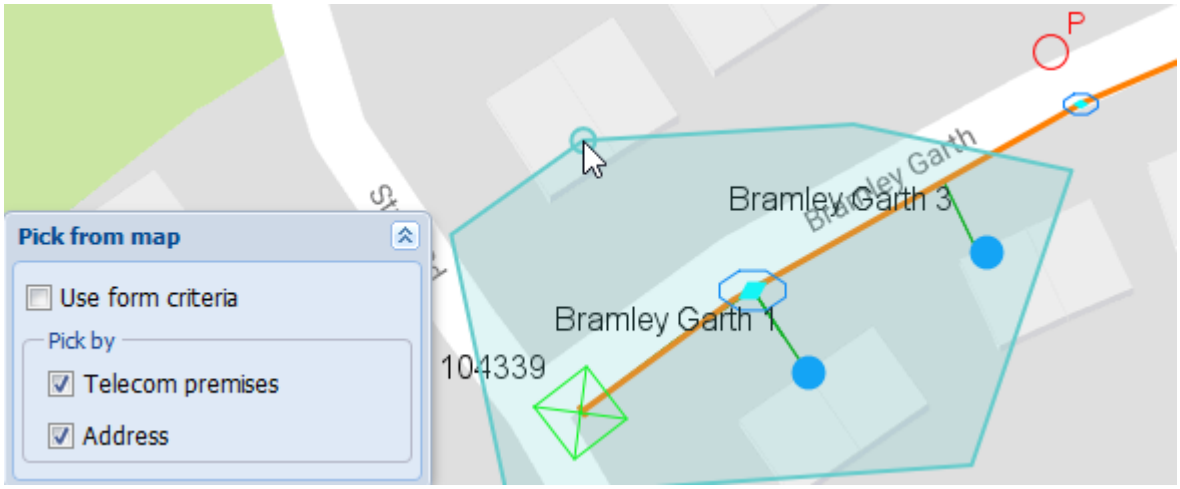
Use the **Circuit** form to manage circuits, connection sections, and connections. This form can be used for creating new circuits and deleting old ones, and for editing and viewing existing circuits. You can also use the form to create a **work order**, to add a **fault history** for a circuit, and to view **sub-circuits.**

In the KeyNet tools, click Circuit to open the Circuit form. You can also open this form through the list of cable customers, the list of circuits on the telecom premises, the connector list for telecom premises, or the list of customer's circuits by clicking the right mouse button and selecting it in the displayed menu. In addition, you can open the Circuit form by clicking the Open circuit button on the Logical circuit mass creation form.

Picking circuits from the map

Use the **Pick from map** drop-down menu to pick circuits from the map:

- **Map view area** picks the circuits in the map view.
- **Free area** lets you define an area on the map from which the circuits are picked.
- **Existing area** option is for picking an existing area, for example, circuits within a plan or service area.
- **Use physical reservations** option is for picking circuits with physical connections to the objects defined on the map.



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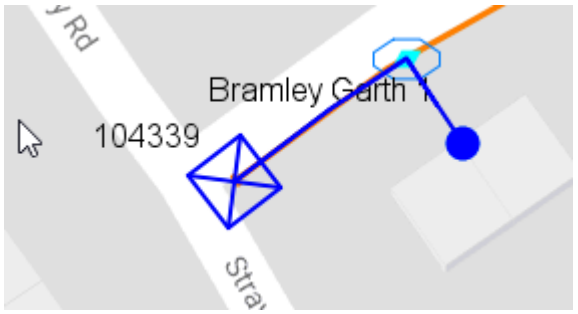
When you click **Pick from map** , a dialogue box is displayed in which you can choose whether to search for circuits based on telecom premises or an installation address (both are selected as a default).

- **When the search is based on telecom premises reserved for a circuit**, the telecom premises in the defined area will be compared with the information stored in the database concerning telecom premises reserved by circuits, and all circuits with telecom premises reserved for circuit connections matching the telecom premises in the defined area will be displayed on the **Circuit** form.
- **When the search is based on an installation address**, the addresses in the defined area are compared with the circuit addresses in the database, and all circuits with an address matching the addresses in the defined area are displayed on the **Circuit** form.

The functions related to the **Pick from map** tool are discussed in the chapter Picking objects from the map.

Locating and highlighting a circuit

To highlight the cables connected to the connectors reserved for the circuit, click **Locate and highlight** at the bottom of the **Circuit** form, and use the functions available in the drop-down menu for the button. If several circuit sections have been defined for the circuit, the **Highlight** function is applied to all of them. The **Highlight all** function highlights all the circuits on the form.



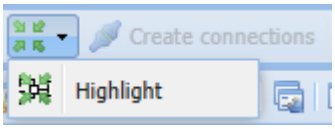
TIP: You can use the **List** function to highlight the circuits on a map using different colours. The List function is introduced in the chapter List. To view the components of the **Circuit section**, click **Show components of the section in**

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group display . Group display is discussed in more detail in the chapter Group display.

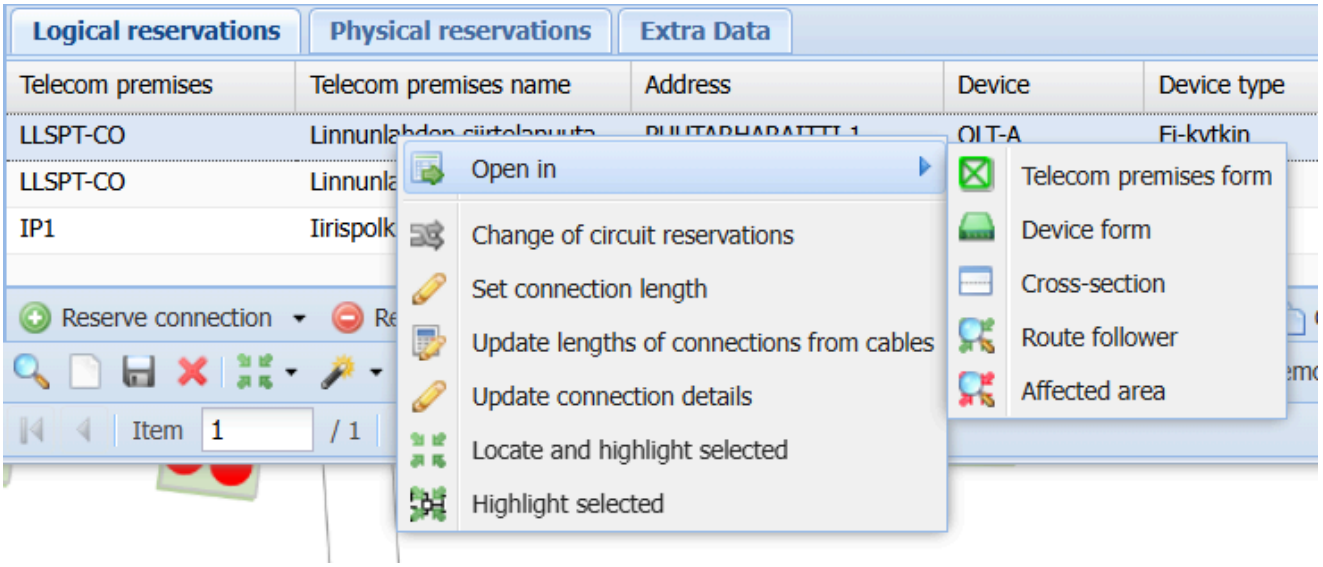
Highliting a circuit section

You can highlight an individual circuit section by clicking the **Locate and highlight** button at the bottom of the circuit section toolbar.



If you want to highlight a circuit section only partially, select the rows you want to highlight in the circuit section by clicking with the left mouse button while holding down the Ctrl or SHIFT key. Next, in the menu that opens when you click the right mouse button, select **Highlight selected** or **Locate and highlight selected** .

Also, from the same drop-down menu, click **Open in** to access additional functions for selected circuit rows. You can view the **telecom premises**, **device**, **cross-section** or **affected area** related to a circuit's connectors by clicking **Open in**. In addition, you can use the **Route follower** function to follow the route of a circuit's connector. You also have the option of selecting several circuit reservation lines to be viewed.

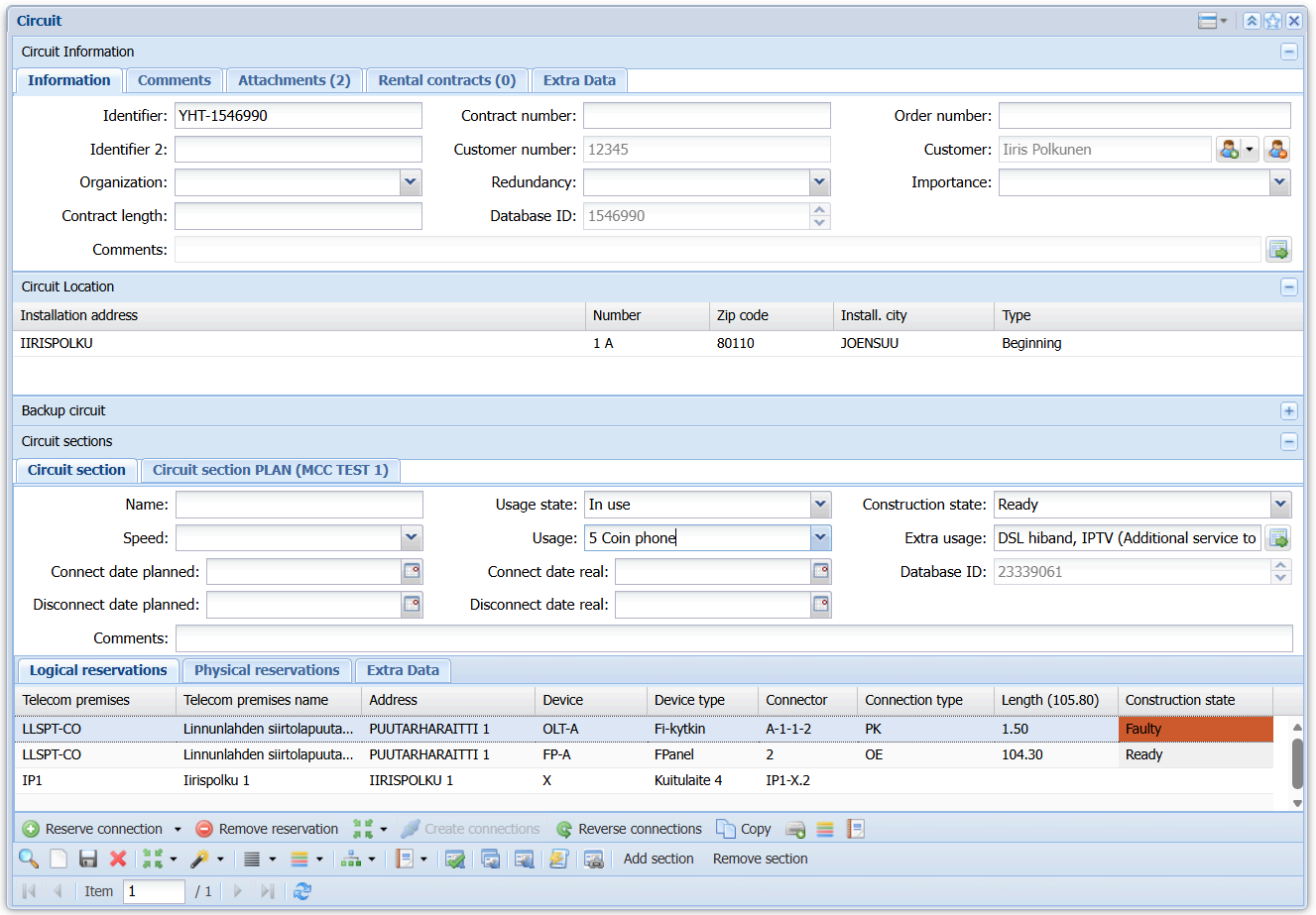


Information on circuits

The content of the **Circuit** form consists of the following: basic data (**Circuit information**), installation address information (**Circuit location**), backup circuit

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information (**Backup circuit**), information related to circuit sections and circuit section reservations (**Circuit sections**).



The **Circuit information** section is divided into four tabs (**Information, Comments, Attachments, Rental contracts** and **Extra data**).

- On the **Information** tab, you can add basic data on the circuit: **Identifier, Identifier 2, Contract number, Order number, Customer number, Customer, Organization, Redundancy, Importance, Contract length, Database ID** and **Super circuit**.
- You can add additional comments in the **Comments** tab.
- The **Attachments** tab is used for creating and viewing attachments.
- The **Rental contracts** tab is used for viewing any rental contracts related to the circuit. To add a new rental contract, go to the **Rental contracts** tab, which is discussed in more detail in the Rental contract chapter.
- **Extra data** tab allows you to define free-form property attributes. Read more in the chapter Extra data.

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Circuit's installation addresses are added in the **Circuit location** section. Read more in Installation addresses.

Backup circuits are managed in the **Backup circuit** section. Read more in Circuit backup.

A circuit can have more than one **Circuit section**, and these sections may have different purposes and different routes. Connection reservations are made in the **Logical reservations** and **Physical reservations** sections. Read more in Circuit sections.

Always remember to save your changes by clicking **Save**!

Note! Click to restore the original state of the fields for any information on the form that has not been saved.

Redundancy and importance classification

Use the fields at the top section of the form to define **Redundancy** and **Importance** for a circuit. **Redundancy** and **Importance** values can be defined on the admin user's administration site.

In the **Redundancy** field, you can choose whether the circuit has partial or full redundancy or no redundancy at all. Redundant circuits have back-up components that enable the functioning of the circuit, for example, in the event that a cable is damaged.

The **importance classification** is determined in accordance with the instructions provided by **Traficom** (Finnish Transport and Communications Agency). Components that belong to a public communications network or a communication service are classified according to type, geographic scope, and number of users. The importance classification ranges from 1 to 5. The more important the service is, the higher the number.

Circuit customers

Click **Pick customer** to open the **Customer** form, on which you can add the customer data for the circuit. More information on the **Customer** form is

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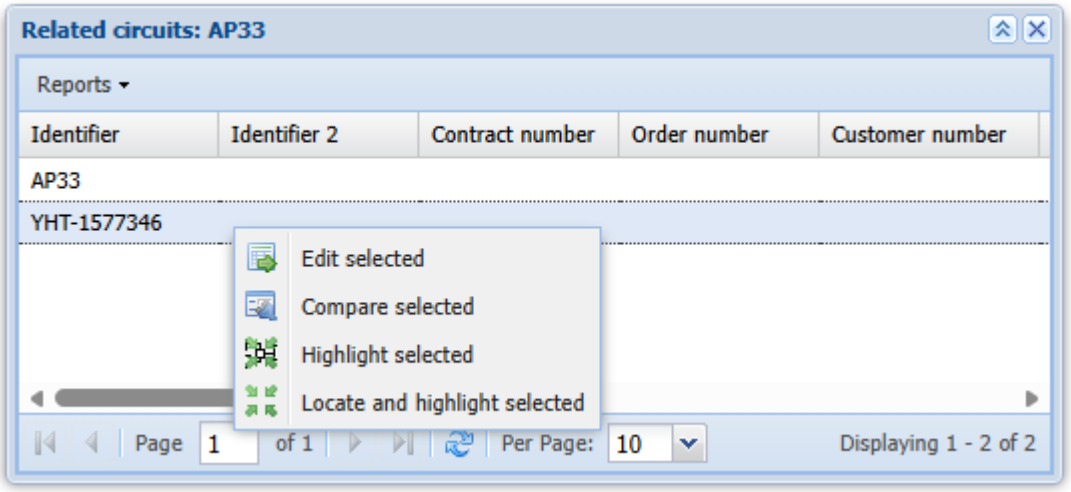
available in the chapter Customer. Click **Clear customer** to clear the customer data for the circuit.

TIP: You can use the **Circuit** form's **Customer number** and **Customer** fields as search criteria when you pick a customer. The **Customer** form is opened, and it displays the data for a customer picked earlier or the customers matching the search criteria in the fields. If the fields are empty, the **Customer** form is opened without performing a new search.

Related circuits

The **Related circuits** list allows to view details of other circuits that have multi-use or shared connectors. The connections are identified through logical or physical reservations associated with multi-use connectors.

The list can be opened from the **Circuit** form **List** drop-down menu.



From the context menu of the list, the following actions are available:

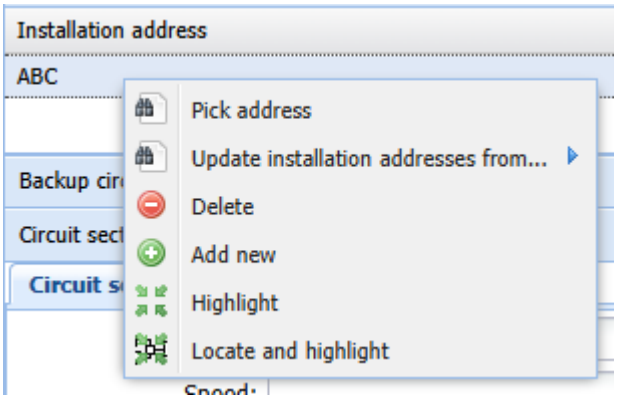
- **Edit selected** opens the selected circuit in the **Circuit** form for viewing or editing.
- **Compare selected** opens selected circuits in separate forms, enabling side-by-side comparison.
- **Highlight selected** highlights the selected circuits.
- **Locate and highlight selected** locates and highlights the selected circuits.

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Installation address

Circuit's installation addresses are added in the **Circuit location** section. If an installation address is not entered when a customer is added, the program will automatically select the customer's address as the installation address.

You can manage added installation addresses on the grid through the **Address** form. To open it, right-click in the installation address row and select **Pick address** . For more information, see the Address chapter.



- To add a new installation address manually, right-click and select **Add new** .
- To delete an installation address, select **Delete** .
- To change the address type, double-click the **Type** field and choose the appropriate value.

Installation address	Number	Zip code	City	Type
Bramley Garth	100		YORK	Beginning

- Click **Save** on the **Circuit** form toolbar to store your changes.

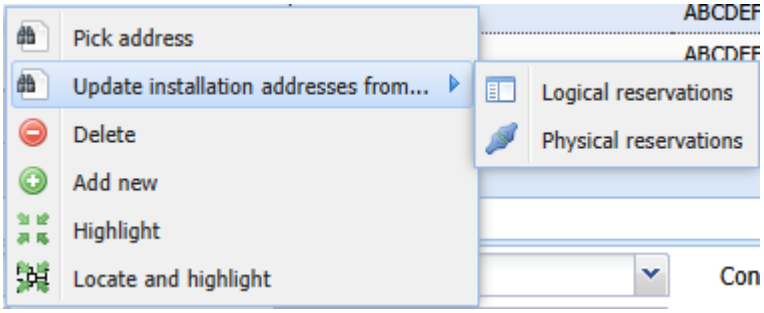
TIP: The fields in the **Installation address** section on the **Circuit** form can be used as search criteria after clearing the form. Double-click to activate the fields.

Updating installation addresses from reservations

Installation addresses can also be updated automatically based on circuit section reservations. If a circuit contains multiple addresses or multiple circuit sections, and the first and last connection reservations differ between sections, multiple

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installation addresses are created as needed, with the address type **Beginning** and/or **End** assigned based on the differences between the reservations of the circuit sections.



1. Right-click in the list of circuit installation addresses.
2. In the context menu, select **Update installation addresses from....**
   - **Logical reservations**
   - **Physical reservations**
3. The system will update the installation addresses according to the selected reservation type.

If the circuit already contains installation addresses, an **Installation address update** window is displayed when performing the update. You can choose to **Replace previous addresses** (existing addresses are removed and replaced with those from the selected reservations), **Add new addresses** (new addresses are added alongside existing ones), or **Cancel update** (no changes are made).

Circuit sections

A circuit may have one or several **circuit sections**. The basic data in the circuit section includes **Name, Usage, Usage state, Construction state, Speed, Extra usage**, **Comments** and **Created By, Created At, Updated By, Updated At** and actual and planned dates for connecting and disconnecting. Each circuit section may have different purposes of use and different connection reservations.

- To create a new circuit section, click **Add section** from the **Circuit** form's toolbar.
- To remove an existing section, click **Remove section** from the **Circuit** form's toolbar.

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- Click **Copy** to copy a circuit section.

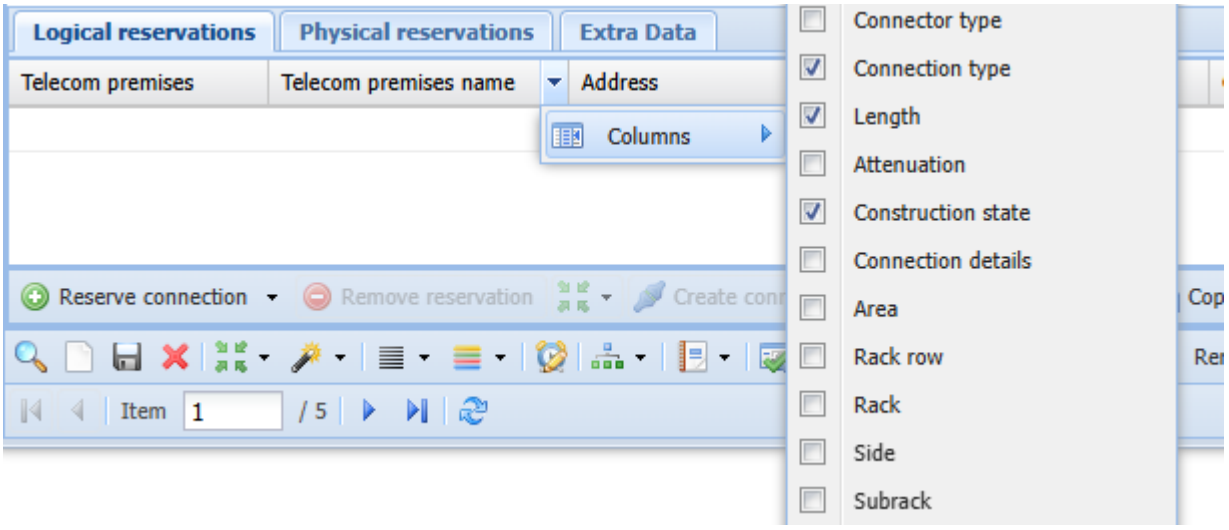
Note! You must click **Save** to accept the adding and removing of circuit sections.

Circuit section list

To view all circuit sections of all circuits in the current search group select **Circuit section list** from the **List** drop-down menu. The **Circuit section list** can be used in cases when you need to gather details of circuit sections, such as name, usage, usage state, construction state, or speed.

Circuit section columns

To change the order of the circuit section columns, point at a column header with your mouse, and drag it while holding down the left mouse button. You can modify the displayed columns by positioning the mouse cursor over a column header. This activates the menu. The **Columns** option displays a menu with functions for viewing and hiding columns. The selected columns and column widths are maintained when you browse through the circuits on the **Circuit** form.

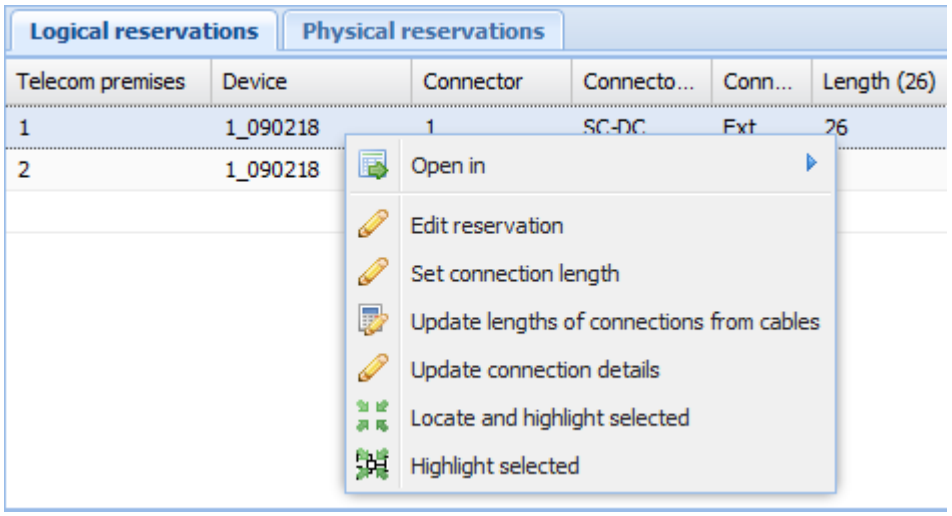


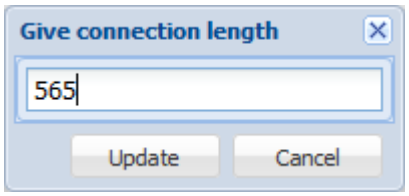
Updating connection details and setting connection length

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In the circuit section, position the mouse pointer over a connection and click the right mouse button to open a menu in which you can find the function **Update connection details** . This function opens a form on which you can update the details of the connector reserved for the circuit. The updated information appears in the **Connection details** column.

Click **Set connection length** to open a form on which you can manually update the required length for the selected connection. The total length of connections is displayed in parenthesis on the header of the **Length** column.





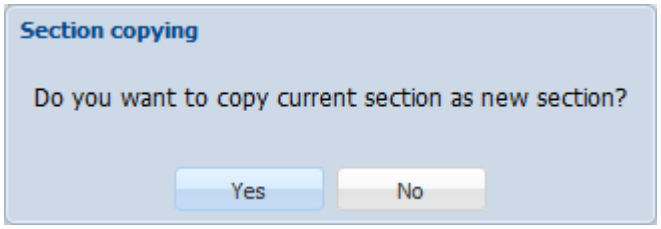
Use the **Update lengths of connections from cables function** to update the lengths of all the logical connections reserved for the circuit section based on the actual cable lengths. The program asks you to confirm the mass update of logical connections.

Copying a circuit section

Take the following steps to copy a circuit section and its connections:

1. In the circuit section toolbar, select **Copy** .
2. Confirm the copying.

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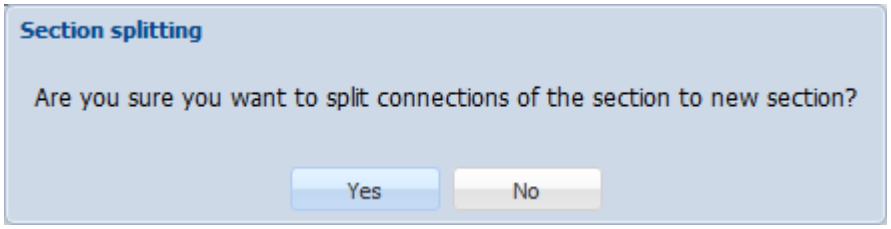


This creates a new tab in the circuit section. The tab is named. When a circuit section is copied, the name of the copy includes “_copy”.



Splitting the connections in a circuit section

1. Select the connection starting from which you want to split connections to a new section.
2. In the context menu, select **Split to new section** .
3. Confirm section splitting.



The new circuit section is named:

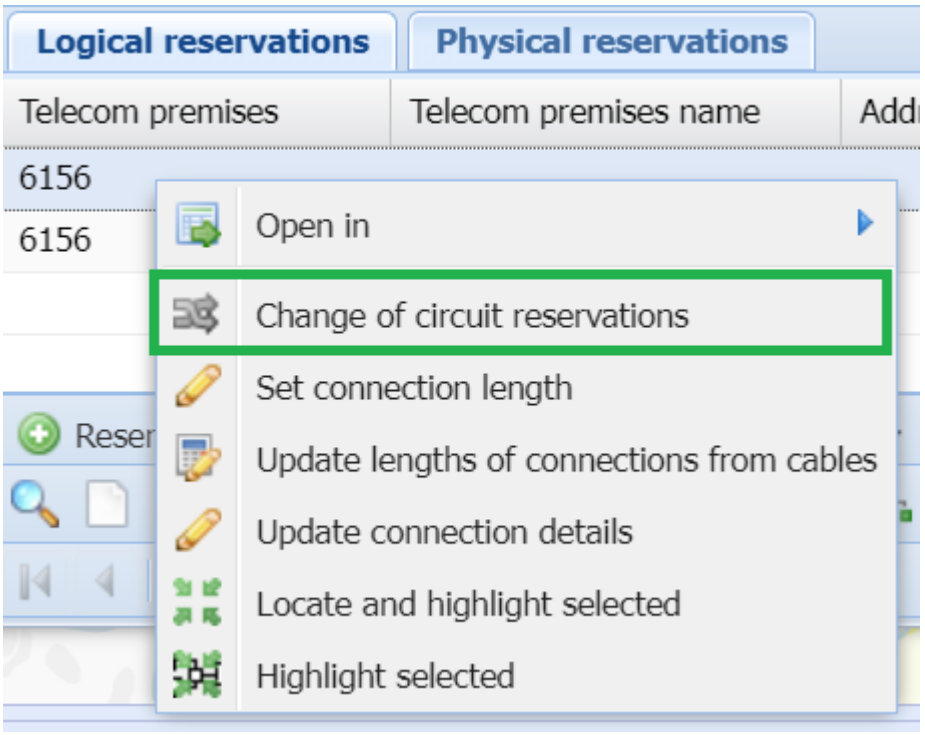


Change of circuit reservation

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Sometimes there might be a need to change the existing circuit reservation, for example due to a faulty circuit, to use some other free **port/fiber** to make the circuit function again. With the **Change of circuit reservation** functionality, you change the device port to some other port in the same device, or to a separate device located in the same telecom premises.

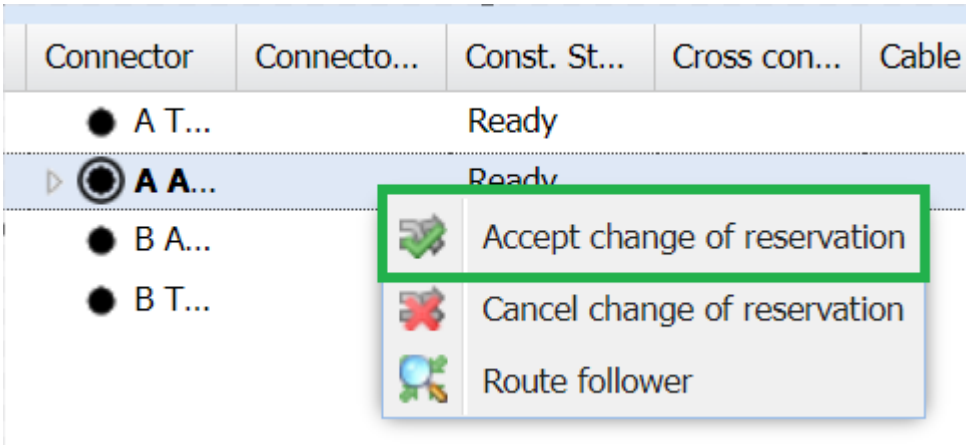
1. Activate the **Change of circuit reservation** functionality from the **Logical connections** grid drop-down menu:



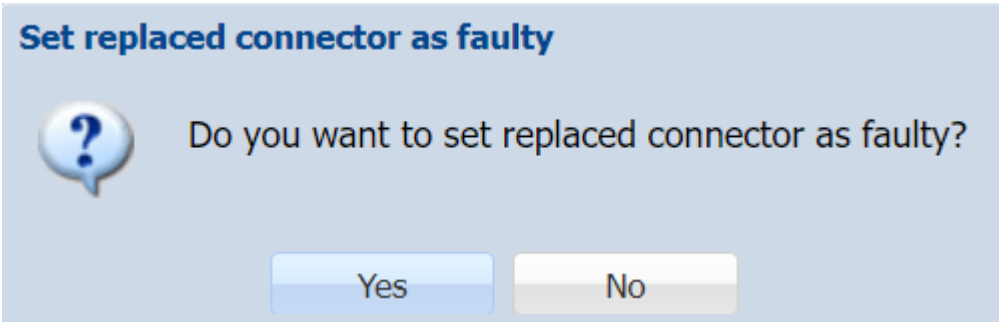
2. The **Cross-section** form opens and the system automatically populates the selected device and connector information that was originally selected from the **Logical reservations** grid.
3. Right click the connector that you want to assign as the new replacement connector and select **Accept change of reservation** . At this point, if you

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want to cancel the change, click **Cancel change of reservation** .



4. After accepting the changes the system will allow to set the **construction state** of the replaced connector as **faulty**.



5. The changes are applied into the **Logical reservations** grid in the **Circuit** form and the **Cross-section** form will close.

> **Note:**
>
> A permanent connection and related other end connections are treated as a one connection chain. When a permanent connection is changed, the related other end connections are also updated—up to the point where a cross-connection is encountered.

Viewing the components of a section in group display

View the components of a circuit section in **Group display** by clicking **Show components of the section in group display**. Group displays are discussed in

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more detail in the chapter Group display.

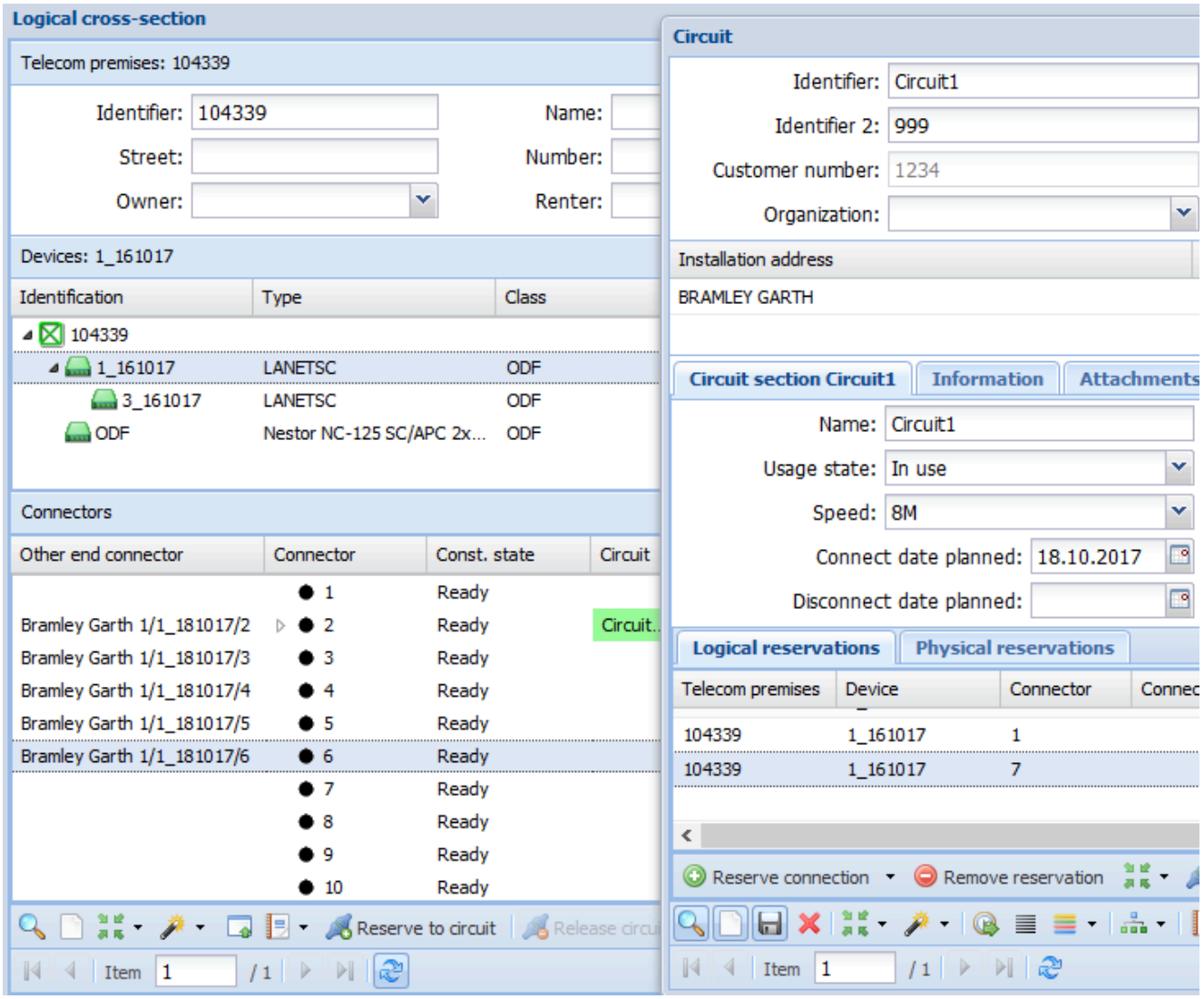
Connection reservations for a circuit

A circuit consists of the points of connection (connectors) of the devices located in various telecom premises and the logical connections between them. However, highlighting a circuit also requires that the **physical connections** between the devices' connectors have been digitized in KeyCom.

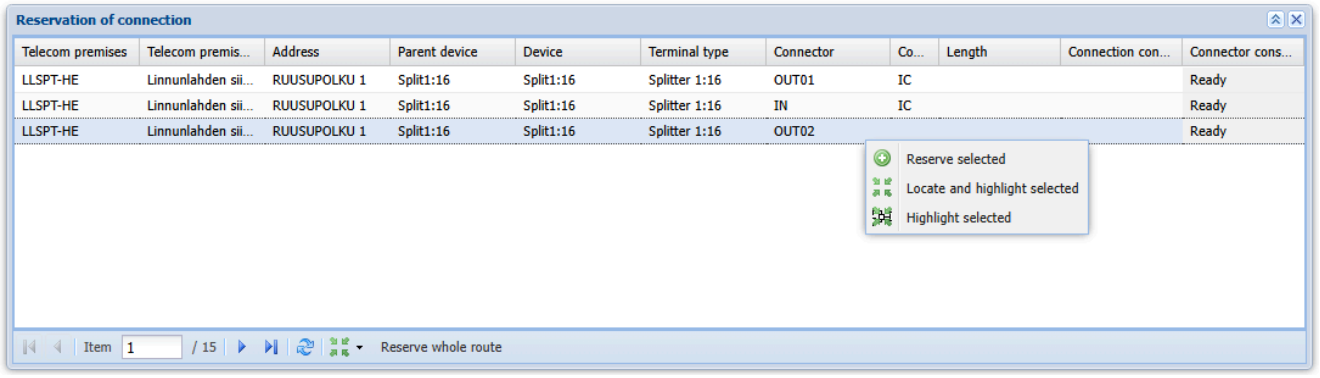
Reserve a connection (connector)

1. To select a connector, click **Reserve connection** to open the **Cross-section** form.
2. Pick the required **Telecom premises** to the form by using the **Pick** tool.
3. Then, on the **Devices / Cables** tab, select the device with the required connector.
4. After select the required connector on the **Connectors** list using the left mouse button, and click **Reserve to circuit** (the right mouse button can also be used for making the selection).
5. After this, the connector in question will appear on the **Logical reservations** list on the **Circuit** form.

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If one or several connection routes can be reserved for the connector that is being reserved, the route options are displayed on the circuit's **Reservation of connections** form.



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Before making the final reservation, you can highlight on the map the cables and telecom premises that are connected to connectors. To do this, click **Locate and highlight** on the **Reservation of connections** form. This button is used to highlight the cable routes related to all connectors, as was the case with the highlight function in the circuit section on the **Circuit** form.

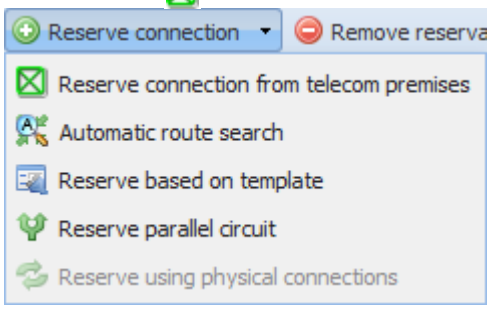
You can highlight a connection route only partially. To do this, select the required rows with the left mouse button while holding down the Ctrl key and, with the right mouse button, select **Highlight selected** or **Locate and highlight selected** in the menu.

To reserve the entire connection route, click **Reserve whole route**. If you want to reserve only a part of the route, select the required connection rows with the left mouse button while holding down the Ctrl or SHIFT key. Next, in the menu that opens when you click the right mouse button, select **Reserve selected**.

Reserve a connection in telecom premises

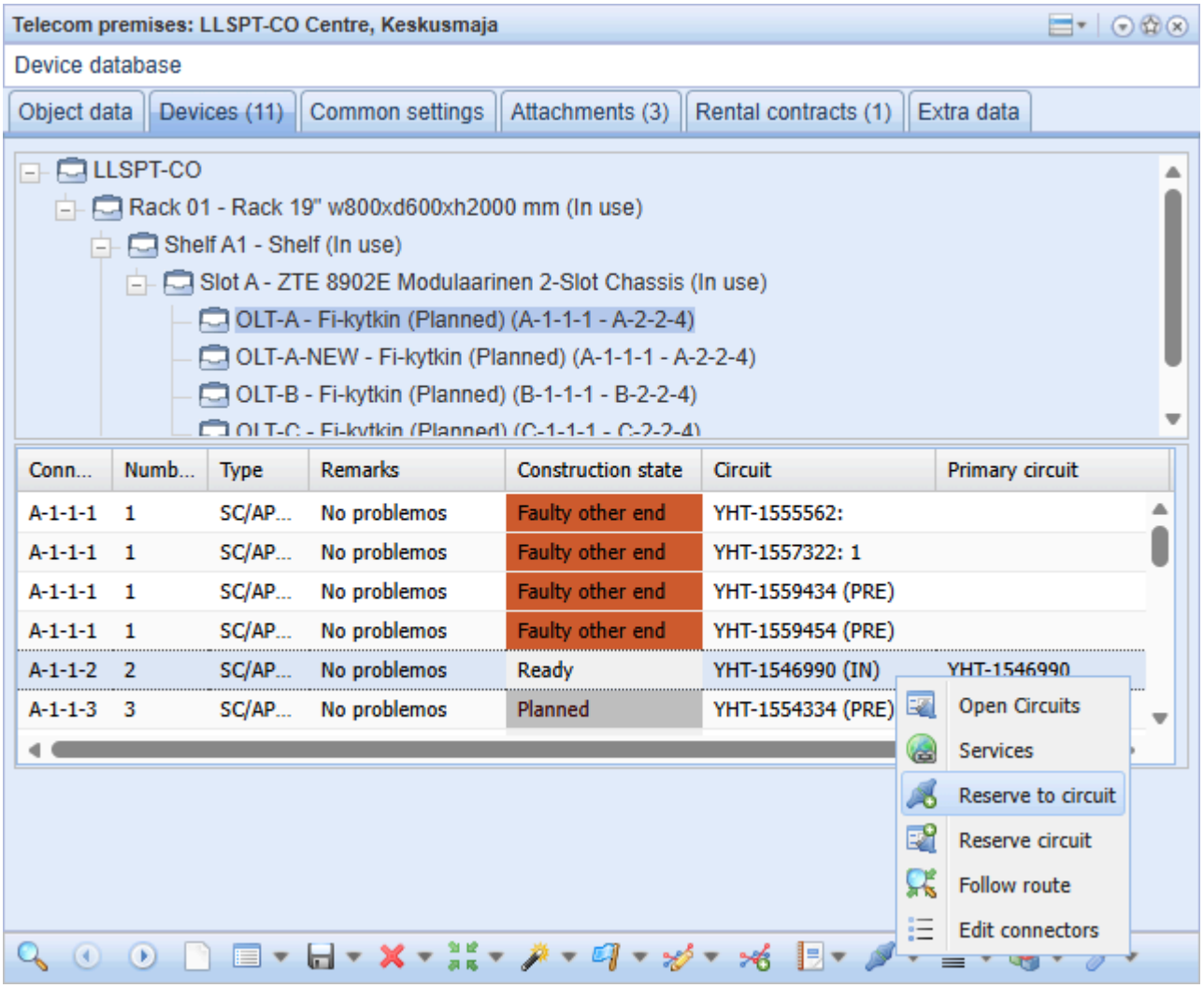
You can also choose a connector on the **Telecom premises** form.

1. Select **Reserve connection from telecom premises** on the **Circuit** form, in the drop-down menu for **Reserve connection** . This opens the **Telecom premises** form.



2. On the form, open the telecom premises where the required connector is located.
3. Then, on the **Devices** tab, select the device with the required connector.
4. After this selection, go to the connector list of the **Telecom premises** form and select the required connector using the right mouse button. Click **Reserve to circuit** .

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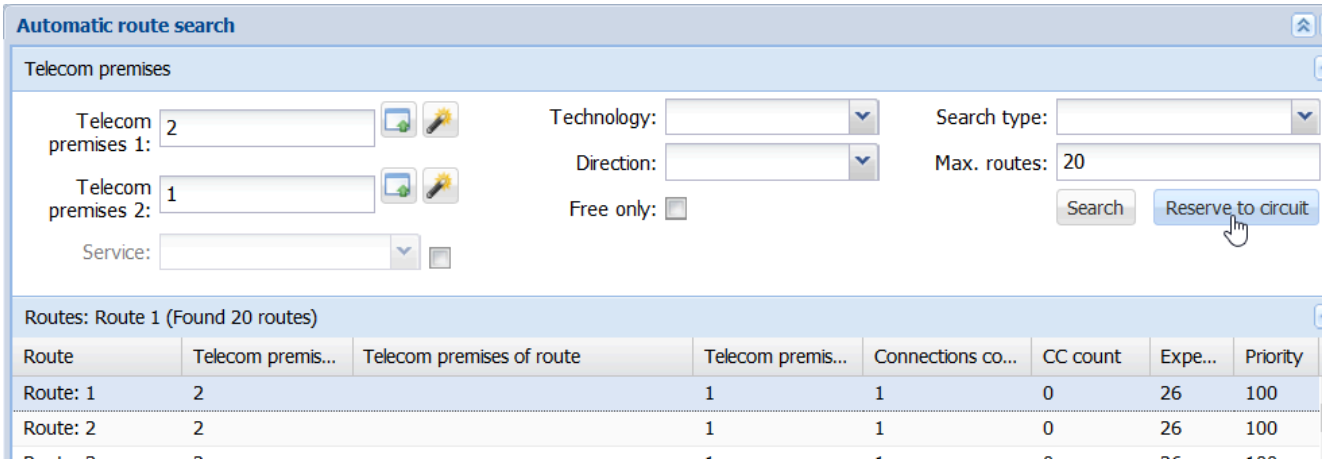


When all the connectors of a circuit have been added to the circuit section, click **Create connections**. The tool creates logical KeyNet connections between the listed connectors.

Automatic route search

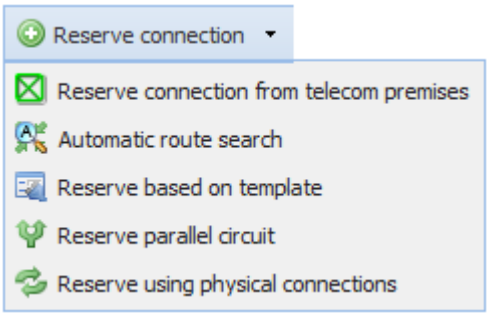
Use the **Automatic route search** tool to automatically search for a logical route for a circuit. This function opens the **Automatic route search** form, on which you can search for routes between two telecom premises. Pick Telecom premises 1 and Telecom premises 2 on the form and then click Search to search for the possible routes that can be reserved for the circuit. Select the suitable route and click **Reserve to circuit**.

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Reserve based on a template

You can use a template circuit to reserve connections for a selected circuit section on the Circuit form . In practice, **Reserve based on template** means that the function tries to find unreserved connections between the reserved devices of the circuit section that is used as a template. In the drop-down menu for **Reserve connection**, select **Reserve based on template**.



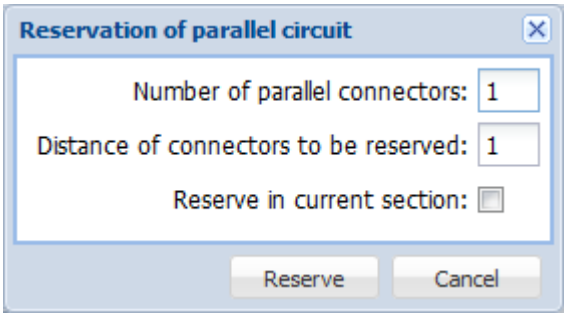
When you click **Reserve based on template**, a new **>Circuit form** is opened. The new **>Circuit** form is used for retrieving the circuit used as a template and for selecting the circuit section based on which connections should be reserved. At the bottom of the **>Circuit** form, click **Reserve template** to have the program reserve any free connections it finds and add them at the end of the original circuit section. The **>Circuit form** is closed after this. The reserved connections are displayed in the circuit section of the original Circuit form. A text **Reserved Successfully** is displayed at the bottom of the form to confirm that the reservation based on a template has been successfully carried out. The **Information** tab will display the name of the person who updated the connection and the related date.

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When all the connectors of a circuit have been added to the circuit section, click **Create connections**. The tool creates logical KeyNet connections between the listed connectors.

Reserve parallel circuit

1. In the drop-down menu for the circuit section's **Reserve connection**, select **Reserve parallel circuit**.
2. Enter the following information on the form that is displayed: the number of circuit sections with related connections that you want to reserve along the same circuit route and the number of threads/pairs between the reservation and the connections of the original section.
3. If you want to reserve the parallel connectors in one circuit section, select the **Reserve in current section** checkbox. By default, all reservations are made in separate sections.

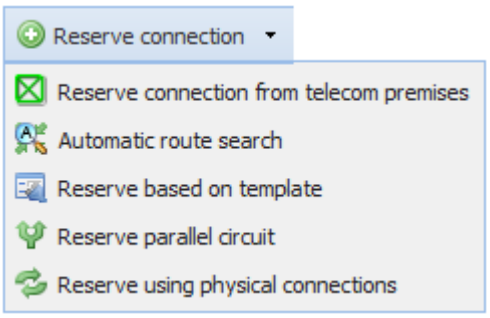


When all the connectors of a circuit have been added to the circuit section, click **Create connections**. The tool creates logical KeyNet connections between the listed connectors.

Reserve using physical connections

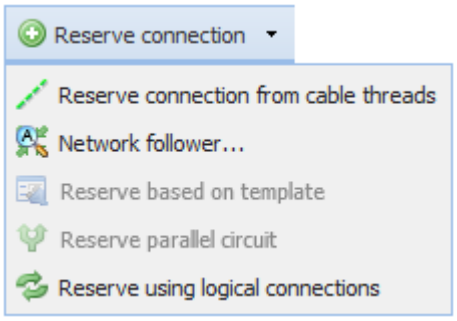
The drop-down menu for **Reserve connection** includes the option **Reserve using physical connections** if physical reservations have been made. Logical reservations are made based on physical reservations. Further information on physical reservations and circuits is available in the Making physical network reservations chapter.

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Making physical network reservations

It is also possible to make physical network reservations for a circuit. You can find the **Physical reservations** tab next to the **Logical reservations** tab on the **Circuit** form. There are three alternative ways to make physical reservations: 1) reserving single threads, 2) making reservations based on route following and 3) automatic reservations based on logical reservations. You can find the options in the drop-down menu for **Reserve connection**:



1. **Reserve connection from cable threads:** This function opens the **Cable** form. In **Tools**, select **Thread details**. On the displayed form, click the thread row with the right mouse button and select **Reserve thread to circuit**. The thread you selected is now linked to the connection and visible on the **Physical reservations** tab.
2. **Network follower:** This function opens the **Route follower** form. Click **Start trace** to find the route for the thread or connector you selected. The list of route objects includes the network elements related to the selected thread or connector. To select the required row or rows for the circuit, click the right

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mouse button and select **Reserve selected to circuit** or **Reserve all to circuit**. Further information on **Route follower** is provided in the chapter Route follower.

3. **Reserve using logical connections**: This function is available if logical reservations have been made for the circuit. In this case, the physical connection will be reserved based on logical connection reservations.

Note! Reserve based on template and **Reserve parallel circuit** are not available for making physical network reservations.

After making the physical connection reservations, you can view your reservations on the **Physical reservations** tab. The columns display various kinds of information such as the identification of telecom premises, device and cable, as well as reserved threads with colour codes and construction state. The **Connection state** column displays a symbol illustrating the connection state.

Telecom premises	Cable / device	Fiber / connector	Construction st...	Length (335...	Connection...
KeyTeletila 5	A	48	Ready		
KeyTeletila 4	A	1	Ready		
	F8021B	5		49.50	
KeyTeletila 5	A	47	Ready		
	F8021B	6		49.50	
KeyTeletila 5	A	46	Ready		
KeyTeletila 6	A	46	Ready		

Connection state:

OK: Connections are in order. The connector/thread on the row has no unnecessary outside connections in addition to the physical connections reserved for the circuit.

No connection reserved: There is a connection between the connector/thread on the row in question and the subsequent row, but it has not been reserved for a circuit.

Deviating connections: The connector/thread on the row in question has connections to external objects, which cause conflicts.

No cable level connection: There is no cable level connection for the connector/thread on the row in question and the subsequent row (there is no cable between the telecom premises, or there is a cable between them, but its

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thread/connector has not been connected at the cable level to the same object as the other thread/connector).

No thread connection/no cross-connection/no internal connection: A thread connection, cross-connection, or an internal connection is missing for the thread/connector on the row in question and the subsequent row.

Removing reservations

Both physical and logical reservations can be removed from a circuit by selecting the physical or logical connection row and clicking **Remove reservation** . You can also select multiple rows at once by holding down the Control or Shift key.

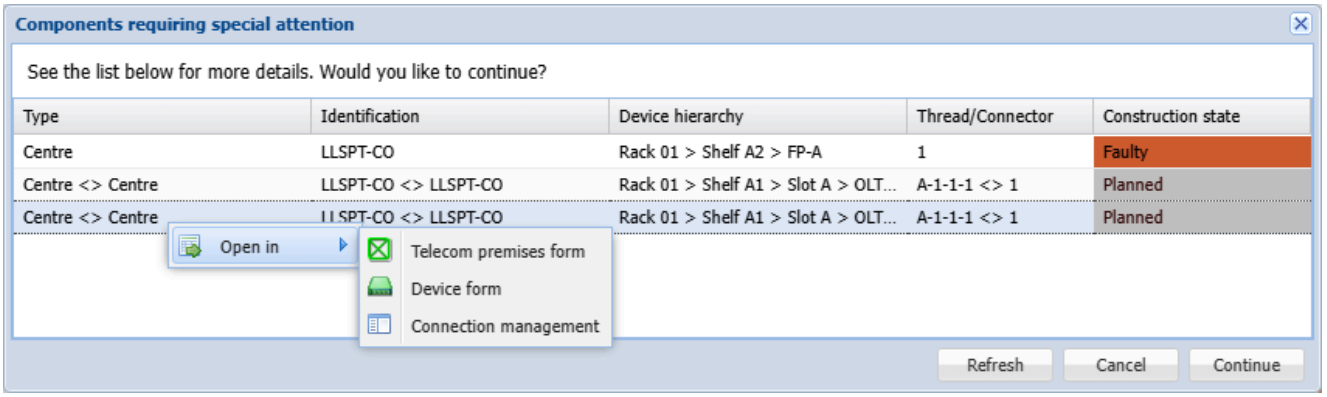
Faulty components when reserving a connection

When attempting to **reserve a connection** that includes connectors or threads that are in **Faulty, Planned**, **Under construction**, or in any other non-operational state, the system displays the **Components requiring special attention** dialog. It alerts you that one or more component may affect the reservation.

The dialog also lists all the connectors that have logical connections to faulty connectors. For example, an entry **A-1-1-1 <> 1** would appear on the dialog because **Connector 1** has logical connection to **Connector A-1-1-1**.

Right-clicking a row in the grid opens a drop-down menu that provides an access to the **Telecom premises** , **Device** , and **Connections management** forms.

Review or take action on the listed components and decide whether to **Continue** or **Cancel** the process. Click **Refresh** to update the dialog with the latest information.



The columns contain information about each affected component:

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- **Type:** Indicates the type(s) of the component.
- **Identification:** Shows the identifier(s) of the component(s) requiring attention.
- **Device hierarchy:** Displays the component's location within the device structure.
- **Thread/Connector:** Identifies the connector(s) or thread(s) involved.
- **Construction state:** Indicates the construction state.

Reserving a provisioning port automatically

The toolbar on the Circuit form includes the **Reserve provisioning port** button. This function checks a circuit section's purpose of use, the installation address of a circuit, and, based on the service availability saved in the system, the provisioning port. It also reserves the port if it finds one. Devices that belong to the provisioning port class can be defined on the admin user's administration site. Automatic reservation of a provisioning port is made either at the beginning of a connection chain or for a new circuit section. This function notifies the user if no installation address or purpose has been selected for the circuit section.

There are three ways to search for service availability for circuits that are pre-connected, partially pre-connected or in use:

Option 1. Determine the installation addresses of a circuit sorted according to the **installation addresses** type. Search the database primarily for the best possible **pre-connected** item based on installation addresses. As a secondary option, search for the best possible **partially pre-connected** item. The best possible option is such that it provides a provisioning port that fulfils requirements. The second-best option does not directly provide a provisioning port, but there is one that can be used through a cross connection. The third-best option does not directly provide a provisioning port, but one can be found somewhere on the telecom premises for the **pre-connected** item (primarily those that are actually free). If no route fulfilling the conditions listed above can be found for the circuit, a device with similar device technology is located on the telecom premises at the circuit's installation address, and the first available provisioning port of that device is reserved.

Option 2. The provided address is used as a criterion to search for point availability (telecom premises at the given address are searched). A device with similar device technology as the product's technology is located on the matching

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telecom premises, and the first available provisioning port of that device is reserved. The line length of the product is compared to the distance between the addresses of the customer and the telecom premises. The distance between addresses is calculated using Digiroad-based road network data and by following the road network.

Option 3. The provided address is used to search for area availability to determine whether the address is within some pre-defined service area. A device with similar device technology as the product's technology is located in the matching device or telecom premises, and the first available provisioning port of that device is reserved. The line length of the product is compared to the distance between the addresses of the customer and the telecom premises. The distance between addresses is calculated using Digiroad-based road network data and by following the road network.

Create connections

On the **Circuit** form, click **Create connections** to create or reserve the required cross-connections and internal connections. If there is a cross-connection between connectors, it is reserved for the circuit. If there is no cross-connection, this function creates a cross-connection and reserves it for the circuit. By default, only cross-connections and internal connections can be created in the system. Logical connections cannot be created.

Complete the circuit

Use the **Complete circuit** function to mark the circuit and its connections as **Completed**. When you click **Complete circuit**, you will be asked: **Are you sure you that you want to complete circuit?** After confirming this, the circuit's Usage state is **In use**, and its Construction state is **Ready**.

Additional settings for the completion of circuits

When completing a circuit, you can ensure, for example, that reservations are not removed by default from **GPON** and **Cable TV** circuit types for connectors that have been reserved for the circuit that is to be completed. Cable TV and GPON are so-called **Point-to-Multipoint** circuits, which typically have several circuits that reserve the same connection route all the way up to the splitter device.

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When completing pre-connected VSDL-type (Point-to-Point) circuits, you can disconnect all reservations for connectors that have been reserved for other pre-connected P2P circuits. At the same time, the **Usage state** of these circuits is determined to be **“Free”** and the **Construction state** “**Faulty**”. **Point-to-Point** circuits typically function so that each circuit uses a separate connection route from the exchange all the way to the customer.

The settings related to the purpose of use of the circuit section are defined by admin users on the admin site.

Connection direction

In the circuit section’s toolbar, click **Reverse connections** to reverse the order of connection reservations. This function reverses the order of reservations in the circuit section.

Saving a circuit

When a circuit is **Saved** , information on the person who updated it and the date of updating is maintained even when changes are made, for example, to circuit sections, the connections reserved for a circuit, additional usage or the attachments related to the circuit.

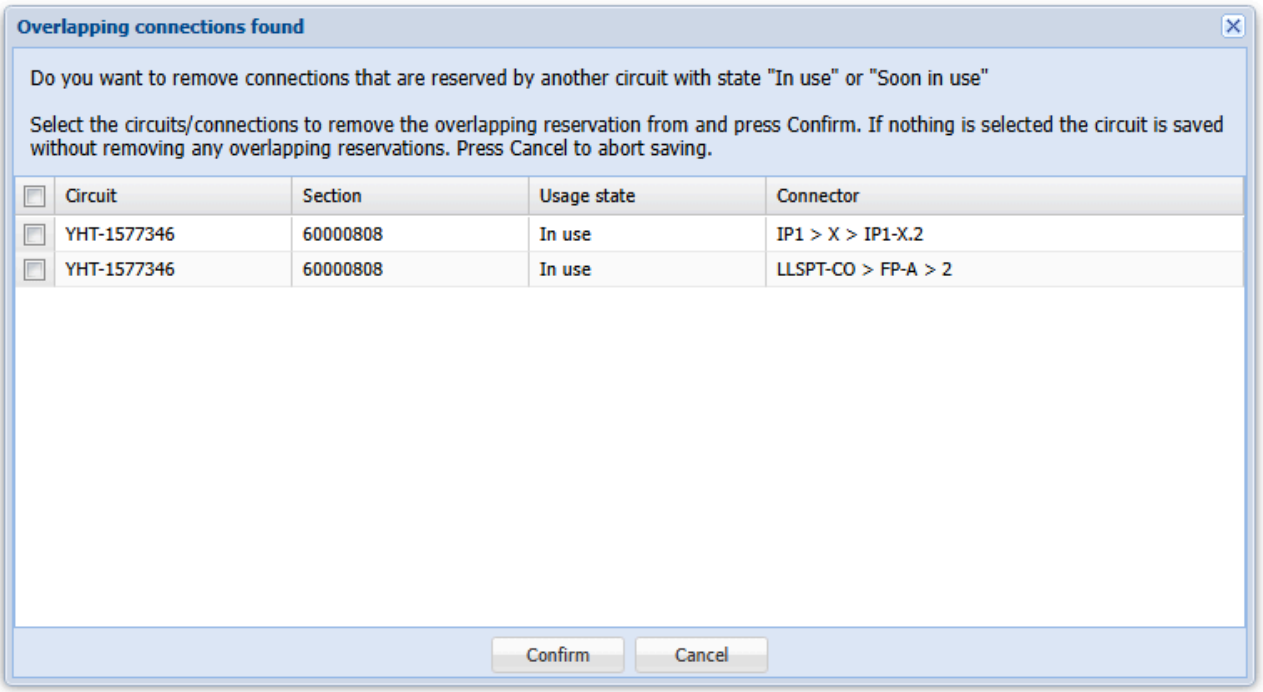
Saving a circuit in case of multi-use / shared connectors

When a circuit is **Saved** , the connector reservations related to other circuits are taken into account, and the states of the reserved components are taken into account in the following cases:

- Saving the construction state of a circuit section as **Ready** updates the construction state of the components (connectors and connections) related to the circuit section as **Ready**.
- When the usage state of a circuit section is saved as **Free**, **Pre-connected**, **or Partially pre-connected**, it is checked whether some other circuit with the status **In use** or **Soon in use** has reserved the same components. If the components reserved for the circuit have been reserved for some other circuit with the status **In use** or **Soon in use**, you will be asked the following

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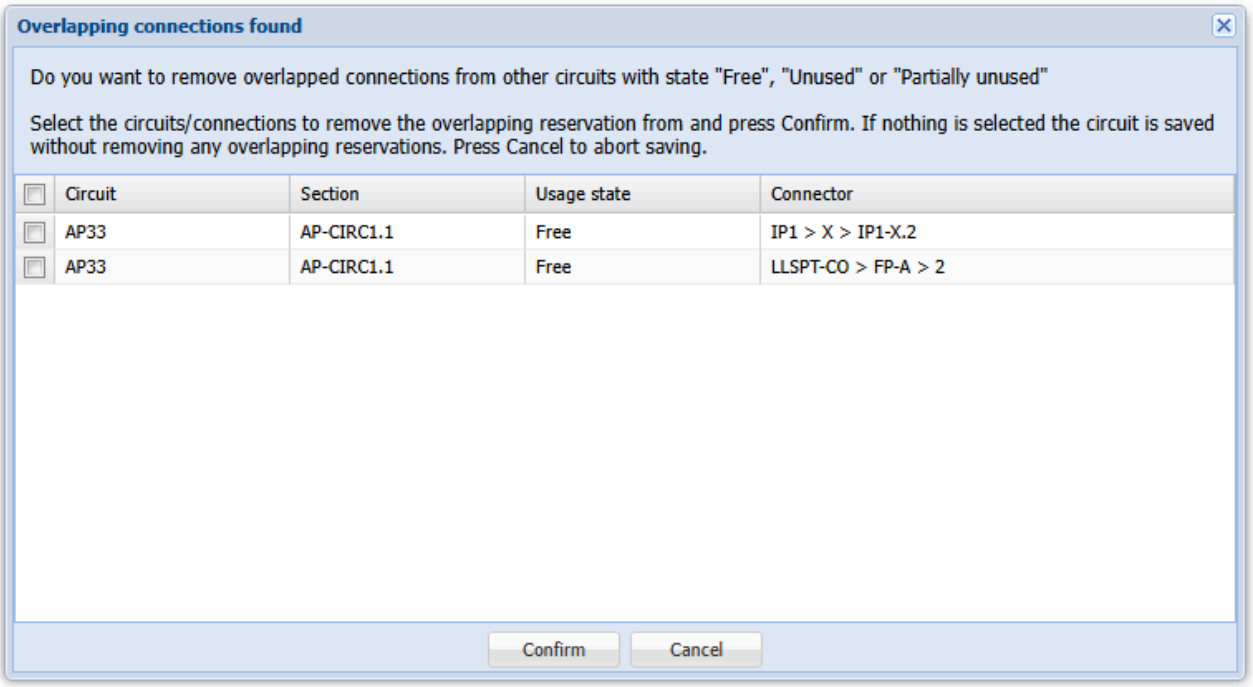
question: **Do you want to remove connections that are reserved by another circuit with state “In use” or “Soon in use? Select the circuits/connections to remove the overlapping reservation from and press Confirm. If nothing is selected the circuit is saved without removing any overlapping reservations. Press Cancel to abort saving.**



- When the usage state of a circuit section is saved as **In use**, **Soon free,** or **Soon in use**, whether some other circuit with the status **Free**, **Pre-connected,** or **Partially pre-connected** has reserved the same components is checked. If the components reserved for the circuit have been reserved for some other circuit with the status **Free**, **Pre-connected,** or **Partially pre-connected**, you will be asked the following question: **Do you want to remove overlapped connections from other circuits with state “Free”, “Unused”, or “Partially unused”? Select the circuits/connections to remove the overlapping reservation from and press Confirm. If nothing is selected the circuit is saved without removing any overlapping reservations. Press**

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Cancel to abort saving.



Deleting a circuit

When a circuit is **Deleted** , the following is considered:

- Whether or not the usage state of all the circuit sections of the circuit is **Free** is checked. If not, the following notification is displayed: **Circuit cannot be deleted since saved usage states of all sections are not "Free".**
- The system checks that other circuits are not using the circuit. If they are, the following notification is displayed: **Circuit cannot be removed since it has subcircuit(s).**

Backup circuits

You can set **Backup circuits** for the **Primary circuits** in KeyCom environment. In the middle of the **Circuit** form, there is the **Backup circuit** column. The info of the backup circuit will appear there.

Start by right-clicking an empty section and then click **Link backup circuit**. This will open a new >**Circuit** form, in which you can add the necessary info. Choose **Use as a backup circuit** in the toolbar. It is located at the bottom right

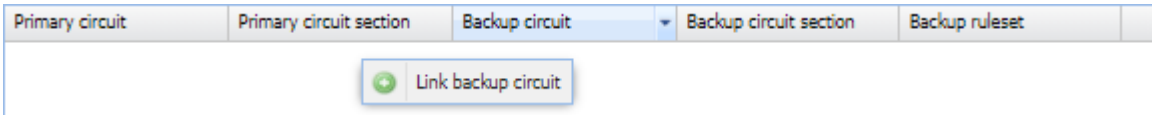
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corner of the **>Circuit** form. This will assign the selected backup circuit to the primary circuit in question.

You will find the following columns in the Backup circuit section:

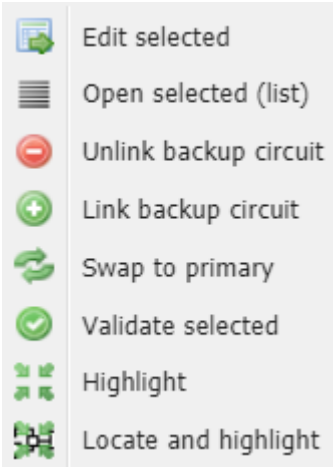
1. Primary circuit
2. Primary circuit section
3. Backup circuit
4. Backup circuit section
5. Backup ruleset (A list showing the rules that can be set for each environment).

   Note! Double-click the section to open the dropdown menu to choose a rule.



Functions of the context menu

You can find all functions of this feature in the context menu Open it by **right-clicking** the column after you have added a **Backup circuit**.



1. **Edit selected:** Open a circuit on a backup circuit form and edit it.
2. **Open selected (list):** Open the primary circuit and the selected backup circuits (with circuit sections) into a separate circuit section list.

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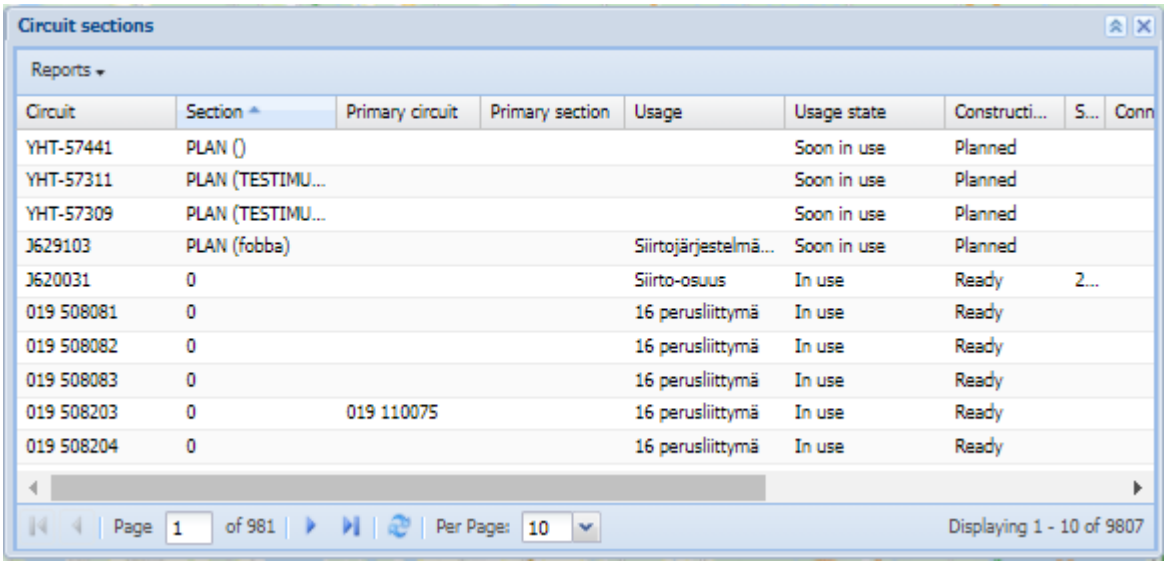
3. **Unlink backup circuit**: Unlink a backup circuit from a primary circuit.
4. **Link backup circuit:** It links a backup circuit to a primary circuit. If the selected circuit is already linked to a primary circuit, this action is not available.
5. **Swap to primary:** Swap the selected backup circuit a primary circuit and make any changes related to the existing relationships between other primary and backup circuits**.**
6. **Validate selected:** Validate the rules for the selected backup circuits in relation to the primary circuit.
7. **Highlight:** Highlight the selected circuits on the map in the default highlight color (blue) based on the components assigned to the circuits.
8. **Locate and highlight:** Locate the selected circuits on the map and highlight them in the default highlight color (blue).

Backup circuit section list

Open the **Circuit sections** list by clicking the **Open selected (list)** from the **Context menu** or in the submenu of the **Circuit** form. The list shows both the primary circuit and the backup circuit with the selected circuit sections. The **Circuit section list** will be automatically populated based on the search set of the **Circuit** form with all basic information of the circuit section.

If the link between **primary/backup circuit** was not originally made at the circuit section level, the **Circuit section list** will show both the primary and the **backup circuit** with all circuit sections and their basic information.

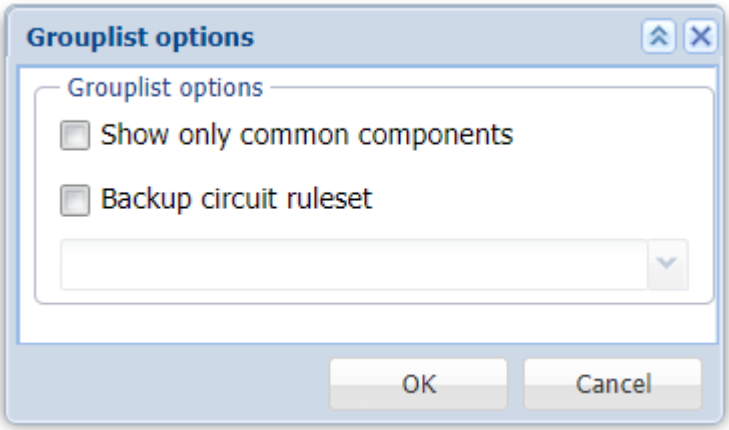
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Grouplist display list options

When you choose to show all the components on **Group display list** you can also decide whether you want to show common components only or not. First, select **multiple** circuit sections in the **Circuit section list** to open the **Grouplist options** window. To select multiple rows, hold down **Shift** on the keyboard while selecting the rows. Then right-click and click **Show components of the circuit in group display** .

- **Show only common components**: Lists all telecom premises and cables that can be found in the logical and physical reservations for all selected circuits/circuit sections.
- **Backup circuit ruleset**: Activates a selection list where the user can select environment-specific configured backup rules. Read more about the Backup circuit rulesets.



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Backup circuit rules

It is possible to set up environment-specific **Backup rules** for validation in the **Circuit backup rule manager**. The **Backup circuit ruleset** function opens a list where you can choose rules for the **Backup circuits**. You can access these rules in two different ways:

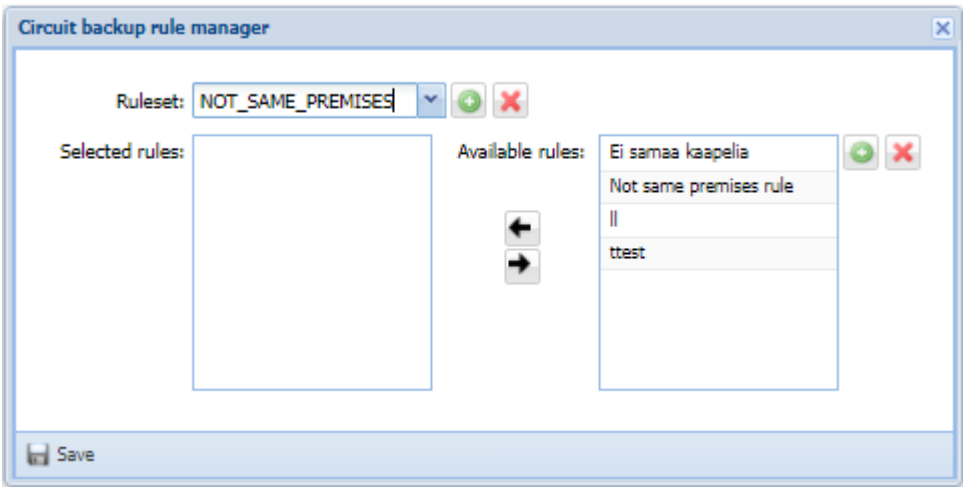
Option 1: Double-click the field under the **Backup ruleset** section on a **Circuit** form to open a drop-down menu.

Option 2: Open Grouplist options.

Managing circuit backup rules

To manage the circuit backup rules, click the **Manage circuit backup rules** tool on the toolbar of the **Circuit** form. Using this tool, you can create or choose preconfigured rulesets for the backup circuits.

To create a new circuit backup rule, click **Add new** in the **Available rules** field. It will open a **Create circuit backup rule** form. Specify a label for the rule and choose the rule type.



You can also create a new rule type by clicking **Add new** on the **Create circuit backup rule** form. When creating a new rule type, you must at least fulfil the **Rule** function and **Txt** fields. Click **Save** to save your work and return to the **Create circuit backup rule** form where you can now select the rule in the dropdown menu. When you click **Save**, the new **Backup rules** can be found in the **Available rules** section.

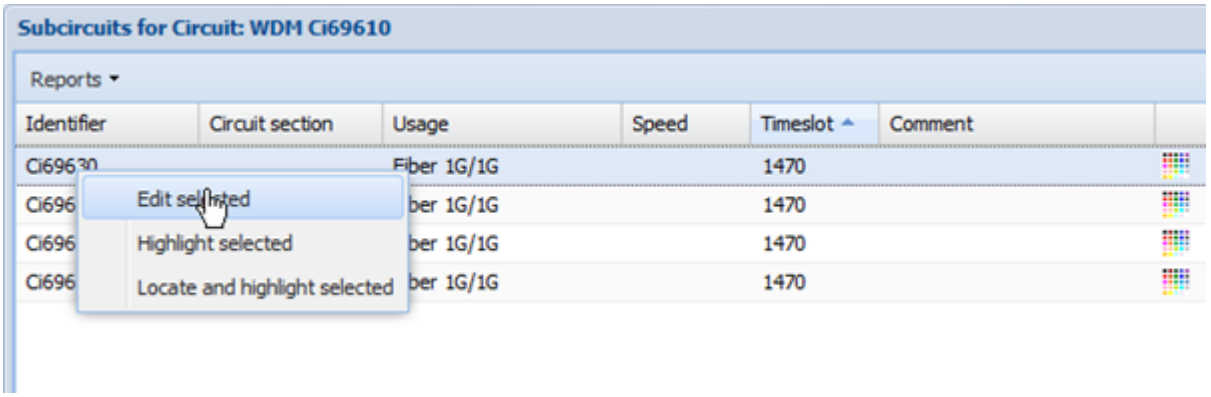
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To activate a **Ruleset** on the **Circuit** form, click **Add new** or choose a pre-existing **Ruleset** in the drop-down menu. To move rules from the **Available rules** field to the **Selected rules** field, right-click the rule(s) that you want to add. Then click the arrows in the middle of the form, depending on which direction you want to move the rule between the fields.

Read more about activating **Backup circuit rulesets** on the **Circuit** form in Backup circuit rules.

Sub-circuits

You can view sub-circuits on the Sub-circuit form. On the **Circuit**, click **Sub-circuits** to open the sub-circuits of the selected circuit. This function opens a circuit-type form that displays basic information on the selected circuit, such as identifier, name of the circuit section, usage, speed, time slot, and comments. The parent circuit's identifier is displayed in the header of the sub-circuit form.



You can activate a circuit/circuits selected on the sub-circuit list and open them on the **Circuit** form by clicking the right mouse button and selecting **Edit selected**.

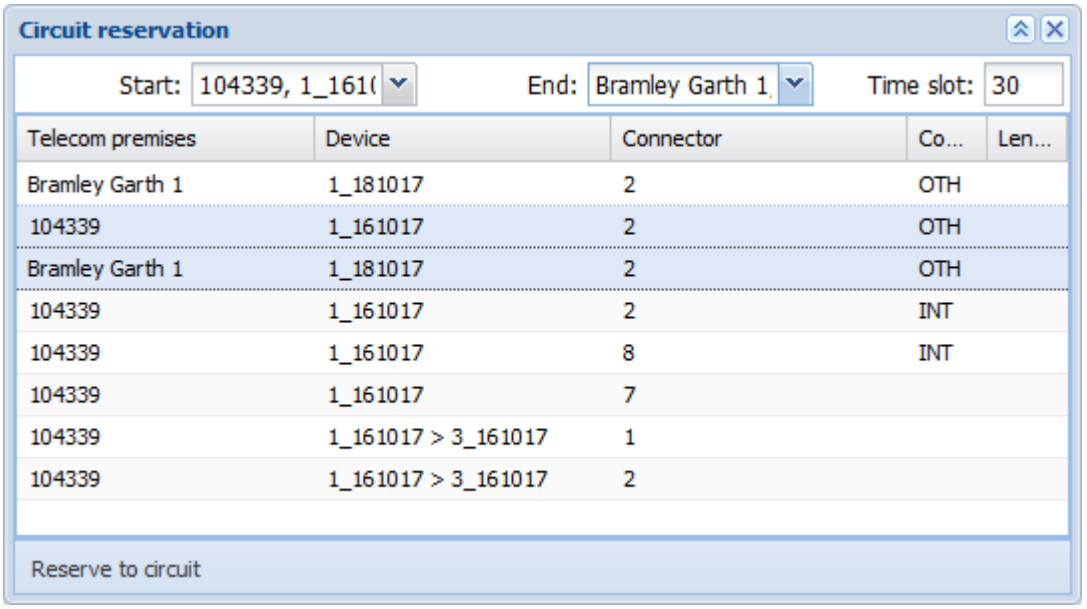
You can locate/highlight the selected sub-circuits on the list and define the highlighting colour as was the case with the circuit list. In the **Reports** menu of the sub-circuit form, you can print a list report and a report on a circuit's sub-circuits.

Creating sub-circuits

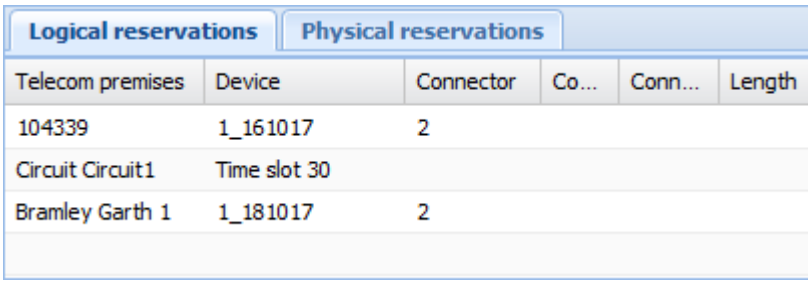
You can reserve a sub-circuit for a circuit and define the time slot applied to the circuit route. To reserve a sub-circuit, start by creating a **new circuit** and click **Reserve connection** on the **Circuit** form. **Cross-section** form is displayed, on

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which you can select the required telecom premises, device and connector that is used for creating a sub-circuit for the circuit to be reserved. Click **Reserve circuit** to open the **Circuit reservation** form. The form displays the connection chain of the circuit that is to be used as the sub-circuit, and displays the connectors reserved for the circuit in separate menus.

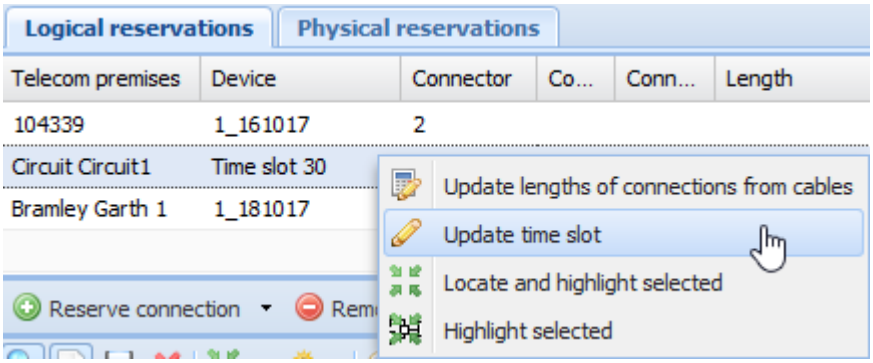


On the **Reservation of circuit** form, select the start and end points. The connection chain between them is reserved for the circuit. Enter the time slot applied to the sub-circuit. Click **Reserve to circuit** to reserve a sub-circuit for a circuit. The sub-circuit is now displayed on the connection list for the circuit section. The first and last component (start and end points) and the time slot of the circuit reserved as a sub-circuit are displayed.

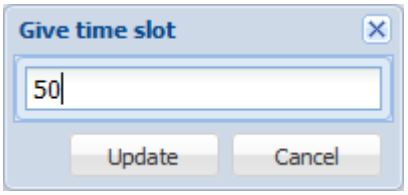


You can update the time slot reserved for a circuit. Click the right mouse button over the **Time slot** row and select **Update time slot**.

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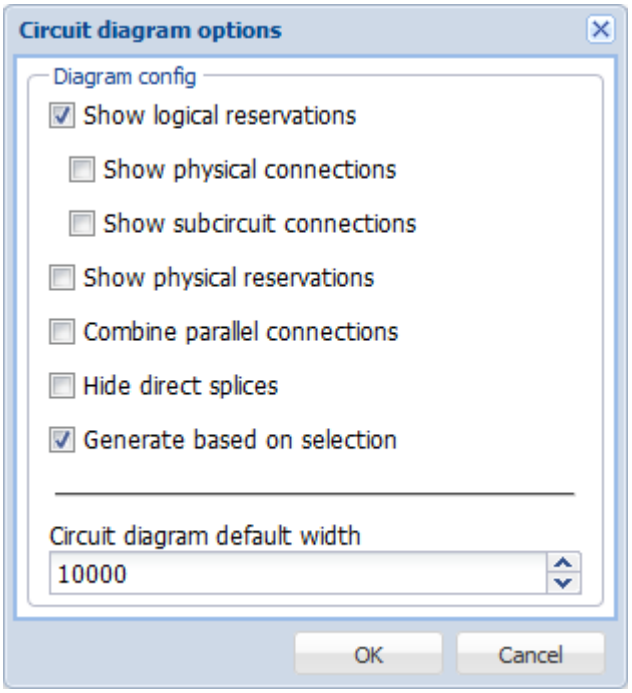
This opens the **Enter time slot** menu, in which you can enter the new value.



Click **Update** to save the time slot for the sub-circuit, or click **Cancel** to cancel the action.

Circuit diagram

You can create a **Circuit diagram** of the connections reserved by the circuit. This diagram is created based on your selections.



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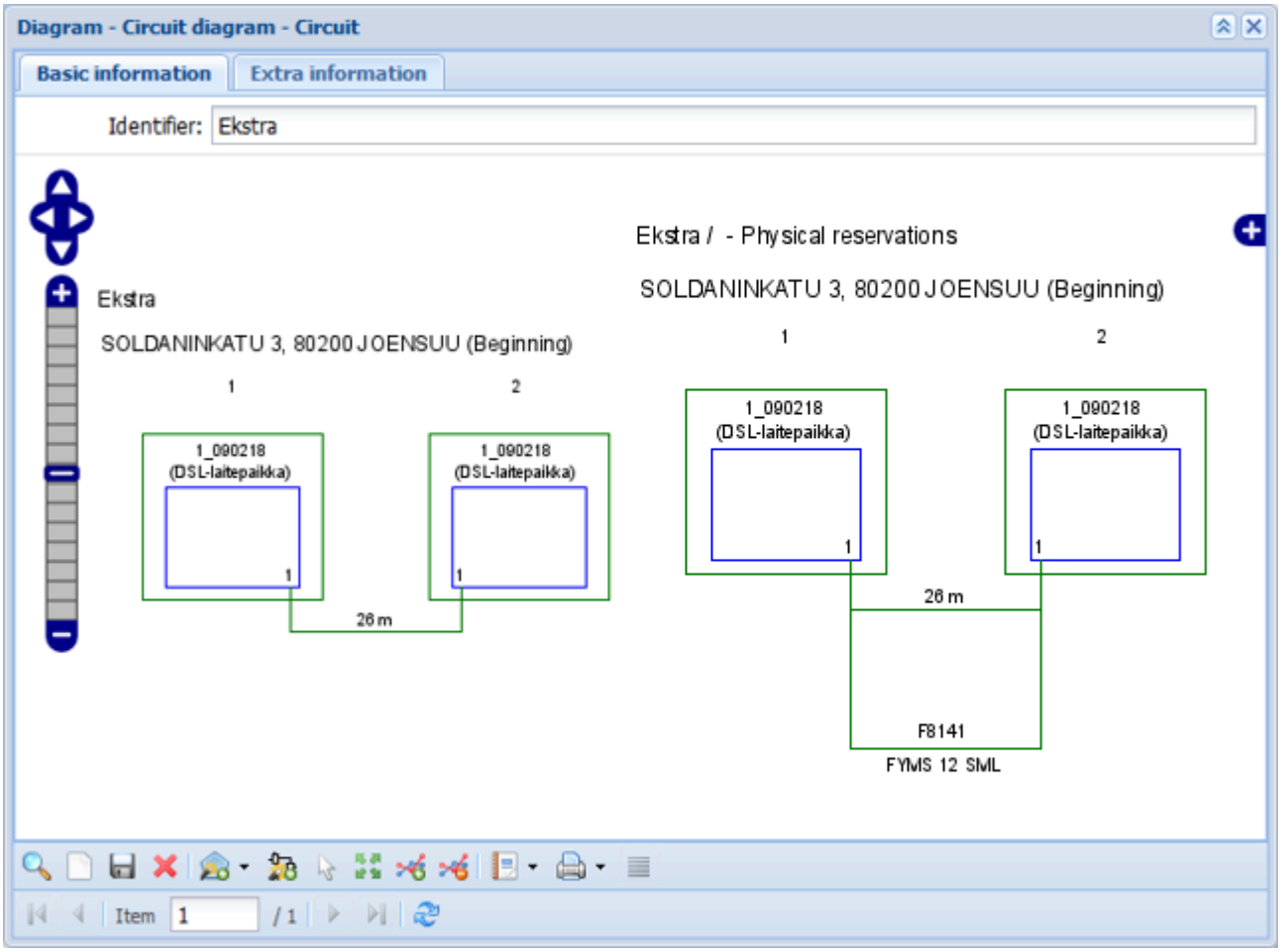
Circuit diagram settings:

- **Show logical reservations**: Illustrates the circuit's logical reservations in a diagram.
- **Show physical connections**: Illustrates the physical network between the logical reservations.
- **Show sub-circuit connections**: Illustrates the sub-circuit connections of the sub-circuit that the circuit uses.
- **Show physical reservations**: Illustrates the circuit's physical reservations in a diagram.
- **Combine parallel connections**: Combines the physical reservations of one circuit into one diagram, when the entire reservation chain is parallel (the diagram displays, for example, connectors 1–3 as numbers instead of three diagrams).
- **Hide direct splices:** Direct splices between cables are hidden in the diagram.
- **Generate based on selection**: Creates a circuit diagram based on the reservation rows you have selected.

You can also define the **default width** of the diagram.

After you have defined the diagram settings, click **OK** to view the **Circuit diagram** form. The diagram also includes more detailed information on the identifiers and addresses of telecom premises, as well as information on the colour coding of cables and their usage state.

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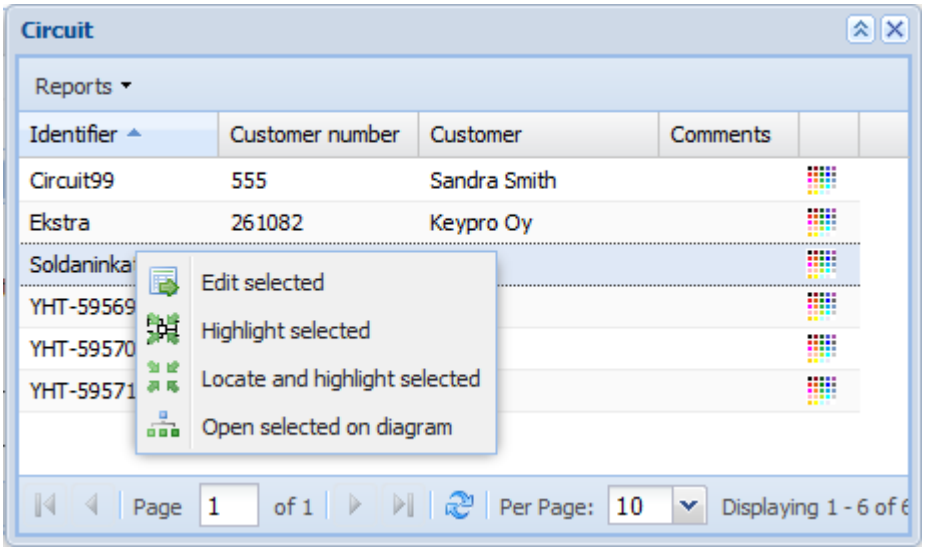
View all circuits in a diagram

In the drop-down menu for **Circuit diagram**, click **Show all circuits in diagram** to create a circuit diagram based on multiple circuits. This function creates a diagram of all the circuits that have been retrieved to the form.

Display selected in a diagram

You can select the required circuits for the circuit diagram from search results. When several circuits have been retrieved to the **Circuit** form, click **Show in list**. In the displayed dialogue box, select the circuits that you want to include in the diagram. When a row is selected, click the right mouse button and select **Open selected on diagram**.

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In the displayed **Circuit diagram options**, define your settings and click **OK** to create a diagram.

Reports

You can create various reports from the **Circuit** form, for example, circuit reports, bill of materials, and work order reports.

Circuit report

You can create separate reports on a circuit section's logical and physical connections.

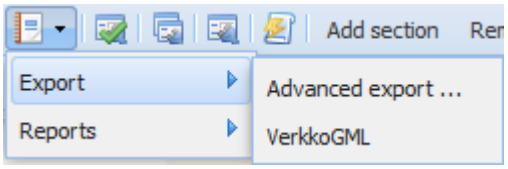
Click **Reports** to open the **Circuit section's connections** dialogue box. Select either **Logical reservations** or **physical reservations** as the report type. Based on the reservation type, a circuit report will be created with logical or physical reservations and their start and end points.

Bill of materials

Use the **Bill of Materials** function in the **Reports** menu to create a bill of materials for the circuit's connections. The bill of materials lists all network elements that the circuit is using. You can save the report as a file or open it directly in Excel. The components included in the bill of materials can also be saved in Finnish **VerkkoGML** format by using the **Export** function. Exporting to

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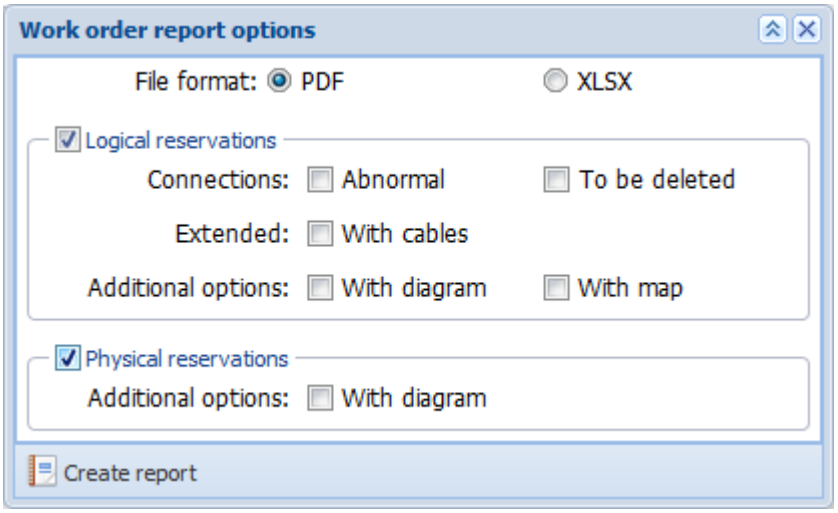
Finnish VerkkoGML is described in more detail in the chapter Exporting to VerkkoGML.



A work order report

You can print a **Work order** for the circuit through the **Reports** menu. A **work order report** is a report on the circuit's logical and physical reservations in either Excel or PDF format. On the Work order report options form, you can define the logical and physical reservation information that you want to include in the **extended work order**:

1. **Abnormal** reservations and reservations **to be deleted**
2. Cable information
3. Additional diagram information and map extract If you select the **With map** checkbox, the printout will include an additional page with the circuit highlighted on the map.
4. Physical reservations diagram



Exporting circuit reservations

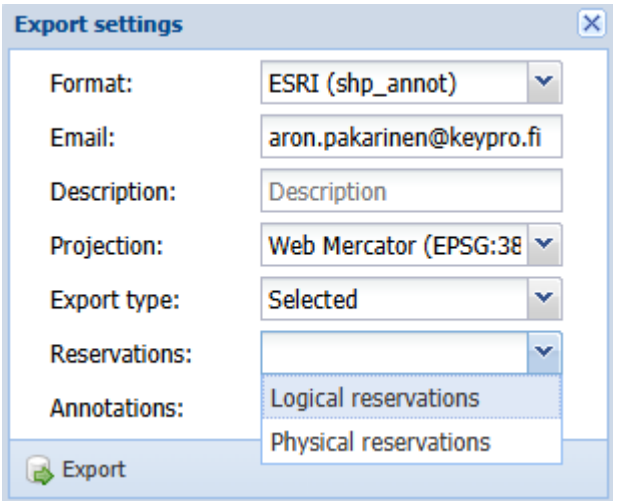
It is possible to export the circuit's reservations. In this case, an additional **Reservations** field becomes available in the **Export settings** dialog. This allows

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you to select which type of circuit reservation information will be included in the exported file.

To export reservations:

1. Open the required **Circuit** form.
2. Select **Export - Advanced export...** from the **Reports** menu
3. Fill in the export settings as required.
4. In the **Reservations** field, select the reservation information to include:



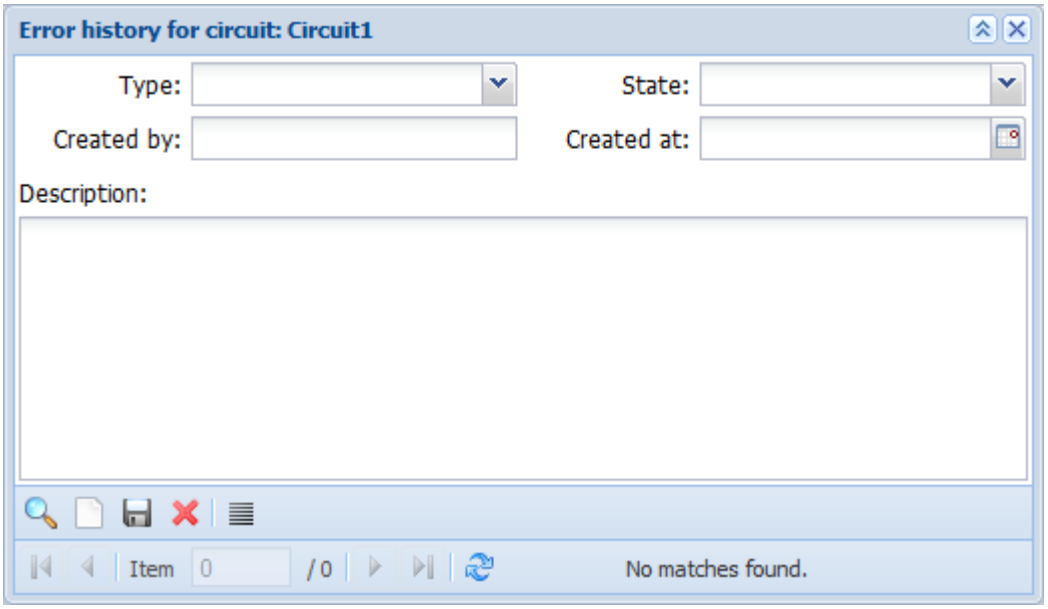
5. Click **Export** .

The exported file will be processed in the same way as other exports, and a download link will be sent to the user's email address when processing is complete.

Error history for a circuit

You can activate the circuit error history function in the toolbar of the **Circuit** form. Click **Circuit error report** to open a new form for entering the error history of the circuit.

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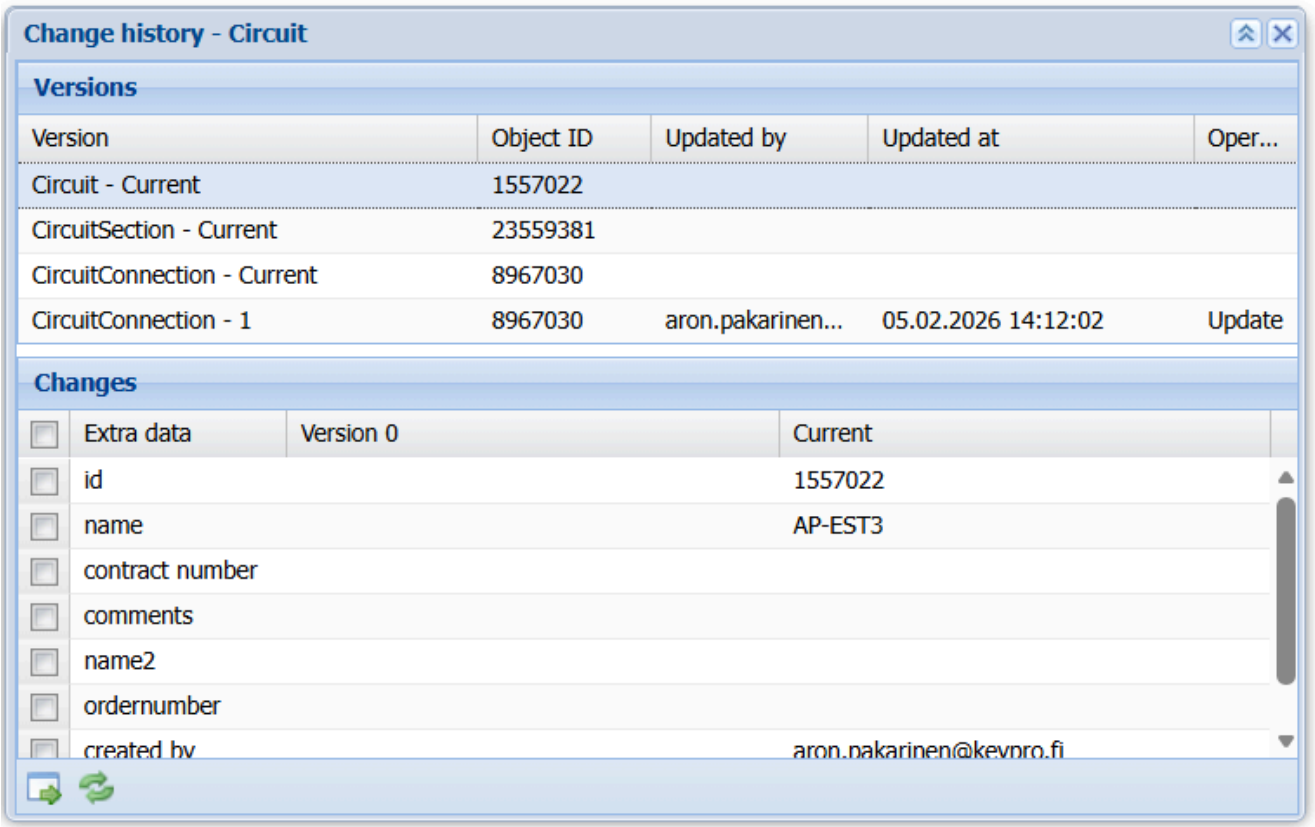
On this form, you can enter information on the error type, state, creator, and creation date as well as provide more details as free-form text. These fields can also be used as the search criteria for the form. In addition, the header of the form displays the identifier of the circuit that the error is related to. Click **Show in list** to open the Circuit error history list for the circuit in question.

The **Circuit error history** form is by default pre-populated with the error history details related to the circuit and organised by creation date, error type, and state. You can search the form based on this information. For example, you can retrieve all errors of the circuit based on type. Click **Clear** to clear all information on the Circuit error history form. Click **Save** to create a new error history row and to update existing information. Click **Delete** to delete the selected error history detail.

Change history of a circuit

To view the change history of a circuit, select **Change history** in the **Circuit** form's toolbar. The top section of the displayed form lists the various circuit versions, while the bottom section displays the changes made to the selected version.

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Restoring the values of an object

1. In the **Versions** section, select the row that you want to restore.
2. In the **Changes** section, select the checkboxes for the rows that you want to restore.
3. Click **Restore** to update the selected information on the object form.
4. Click **Save form** on the **Circuit** form to confirm the changes.

Click **Refresh** to update the view with the latest background changes.

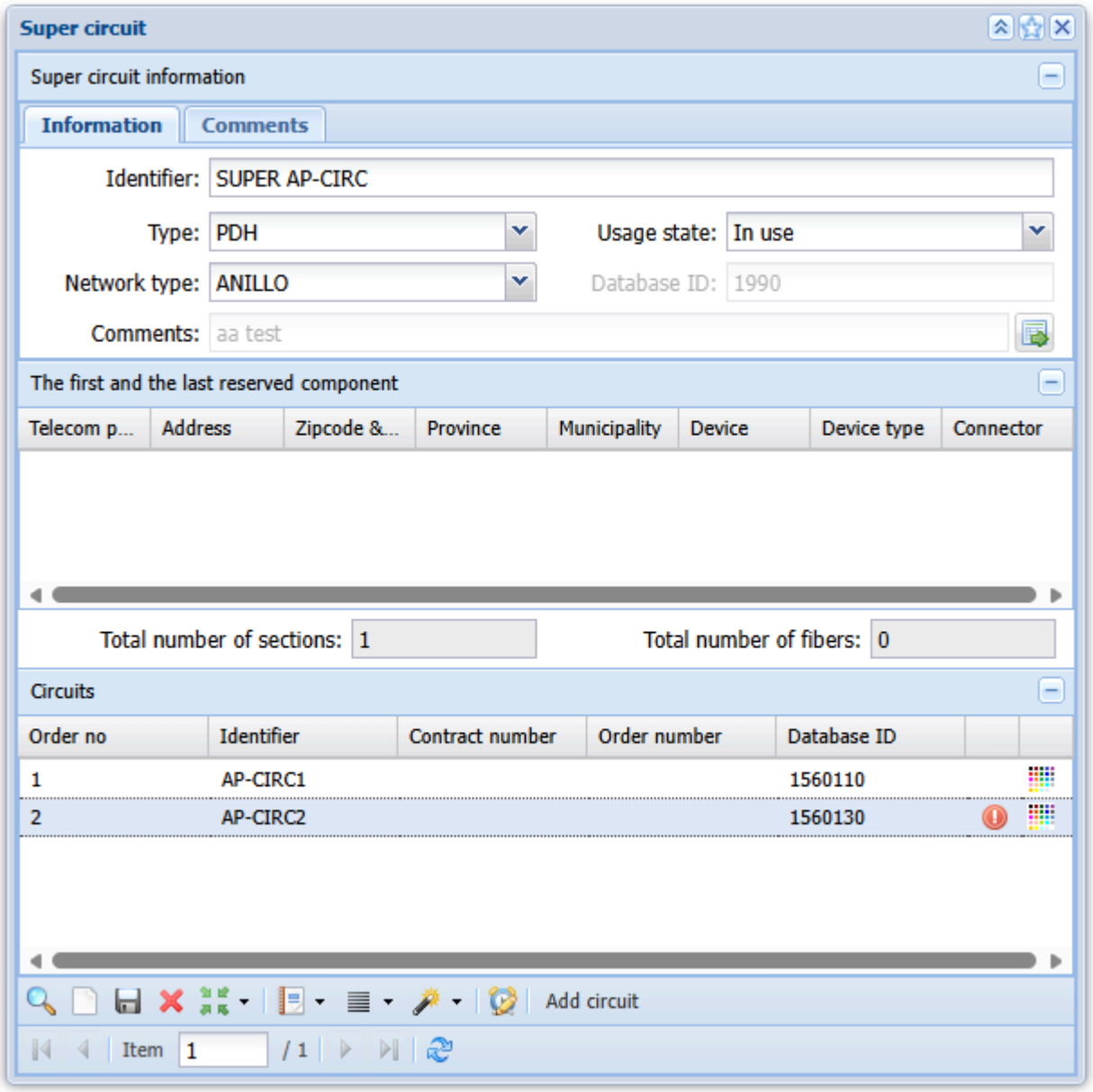
Comparing object versions

In the **Versions** list, select the rows for comparison to see, in the **Changes** list, the current version in addition to the selected versions.

Supercircuit

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The **Super circuit** form provides a way to collect multiple circuits under a single group. The **Super circuit** form is available from the **Circuit** menu on the main **KeyCom toolbar**.



The **Super circuit** form allows to:

- Group several related circuits into one managed group
- Summarize circuit information using lists
- Locate and highlight super circuit routes across the map view
- View reservation details for the first and last reserved objects

Note! A Super circuit form does not create new circuits to the system and is only used to group existing circuits.

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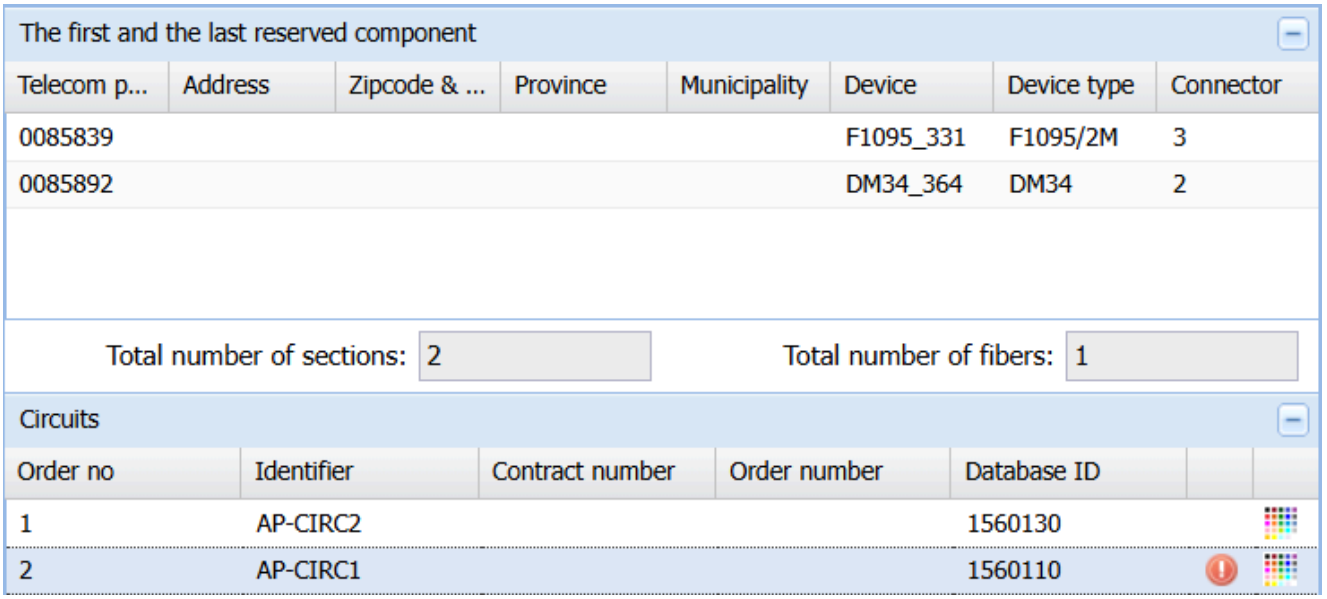
Creating a super circuit

1. Open the **Super circuit** form from the main toolbar under the **Circuit** menu.
2. In **Information** tab:
   a. Enter the **Identifier** for the super circuit.
   b. Select the **Type**.
   c. Select the **Usage state**.
   d. Select the **Network type**.
   e. Add comments if needed by switching to **Comments** tab.
3. Click **Add circuit** from the toolbar.
4. **Search** or **Pick** a circuit on the **Circuit** form.
5. Click **Update to form** on the **Circuit** form's toolbar.
6. Repeat the action and add all required circuits.
7. Verify all circuits and related information in the **Circuits** list.
8. Review **The first and last reserved component** section to confirm that system has correctly identified the network objects and check the automatically calculated totals:
   a. Total number of sections
   b. Total number of fibers
9. **Save** the super circuit.

Managing super circuits

The **Super circuit** form provides tools for reviewing all circuits included in the super circuit and understanding how they are connected across the network. This includes both the **Circuits** list and the automatically generated **The first and last reserved component** section. If logical or physical reservations exist, the total number of sections and fibers are presented in **Total number of sections** and **Total number of fibers** fields.

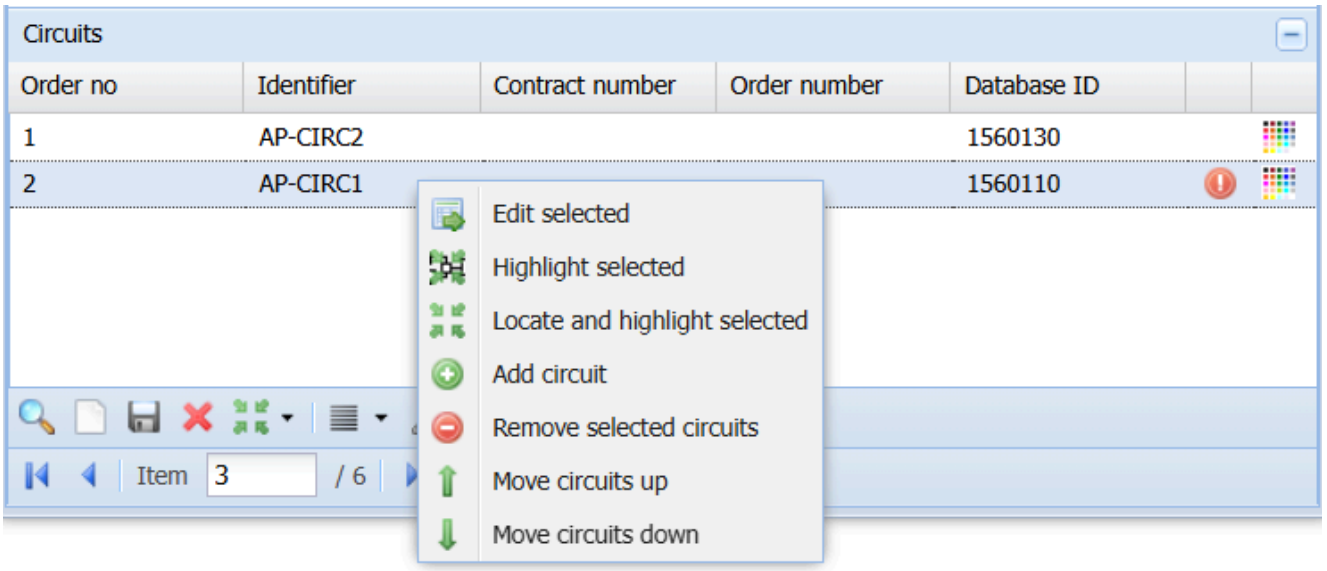
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Note! If a connection listed in the **Connections** grid is marked with a symbol , the system indicates that two consecutive connections in the list are linked to the same telecom premises. This means that at least one of the endpoint reservations (logical or physical) of both connections (either the first or the last reservation) is allocated to the same telecom premises.

Context menu tools

Right-clicking a circuit in the **Circuits** list opens a context menu with tools for editing, highlighting, and organizing circuits:



- **Edit selected** – Opens the circuit in its own form.
- **Highlight selected** – Highlights the circuit on the map in the chosen color.

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- **Locate and highlight selected** – Moves the map to the circuit's location and highlights it.
- **Add circuit** – Opens the **Circuit** form.
- **Remove selected circuits** – Detaches circuits from the super circuit without deleting them.
- **Move circuits up / down** – Reorders circuits and updates order numbers.

All related circuits can be highlighted at once by clicking **Locate and highlight selected** from the **Super circuit** form's toolbar.

Editing a super circuit

1. **Search** a super circuit on the form or **Pick** a related circuit from the map.
2. Next, review and edit the **Information** fields as needed.
3. In the **Circuits** section, use the toolbar or right-click menu to:
   a. Add circuits
   b. Remove circuits
   c. Reorder circuits
4. Verify that the **The first and last reserved component** section has updated automatically based on changes to the **Circuits** list.
5. When all changes are complete, click **Save** to store the updated super circuit.

List view

The **Show in list** drop-down menu provides two different kind of list views:

- The **Network objects of super circuit** list displays all network objects related to the circuits in the super circuit.
- The **Extended network objects of super circuit** list displays information about all network objects reserved for the related circuits in logical or physical reservations, with the details of the infrastructure that is used by the reserved network object.

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KeyCom service availability and scheduled CSV batch runs (This function is subject to a separate order)

The system can generate service availability information as separate scheduled CSV files. The basis of service availability information is always the address and property data. This data can be produced using five different methods:

1. KeyCom service availability based on connection residential addresses
2. KeyCom service availability based on the address
3. KeyCom service availability based on service areas
4. KeyCom service availability based on telecom premises addresses
5. KeyCom service availability based on potential availability

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Cross-section

The **Cross-section** form displays the connections between connectors in the selected telecom premises and devices, as well as the connections between threads and cables. It also provides information on the related circuits. The form is also used for reserving a connector or sub-circuit for a circuit, creating new circuits, switching pairs, and releasing reservations.

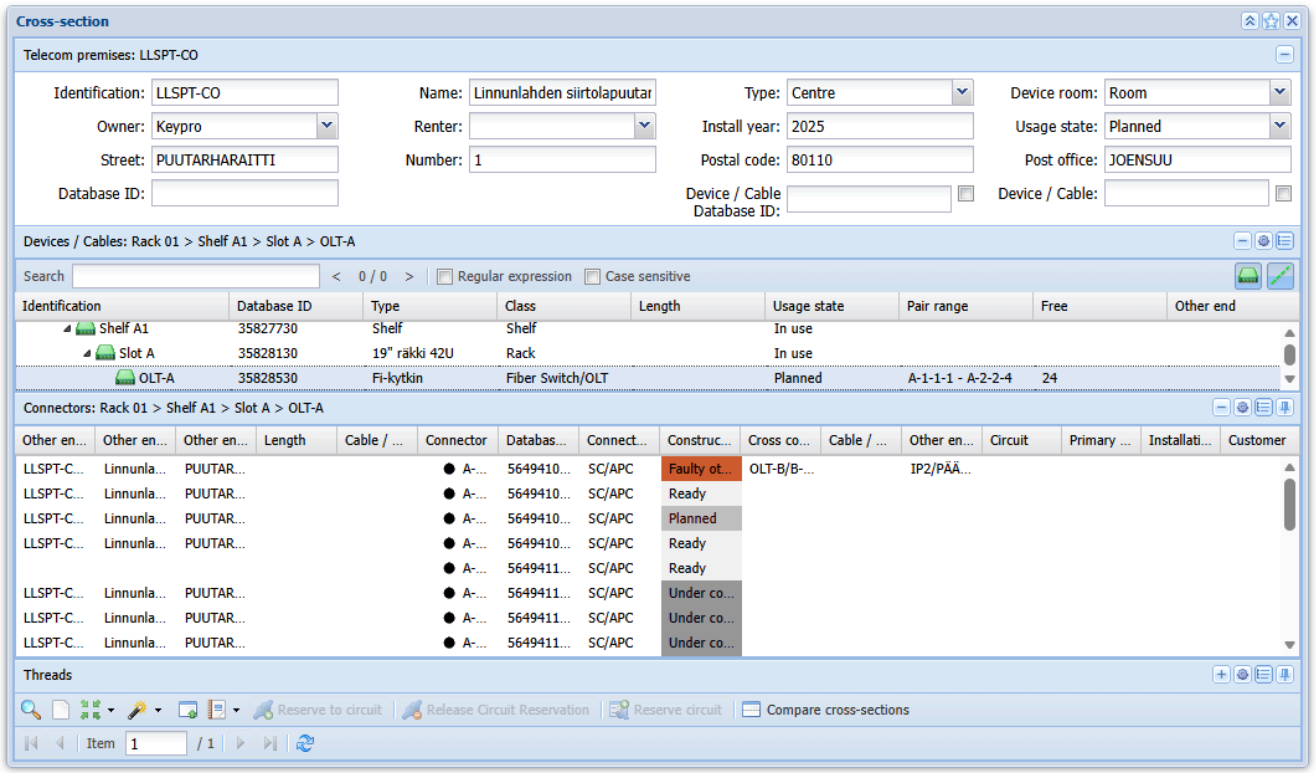
In the **KeyNet** toolbar, click **Cross-section** to open the **Cross-section** form. You can also open this form through the telecom premises' list of **Devices** or through the list of **Telecom premises of the circuit section** by clicking the right mouse button and selecting it in the displayed menu.

Cross-section form

The **Cross-section** form displays information on the selected telecom premises, such as **Identification**, **Name**, **Type**, **Device room**, **Owner**, **Renter**, **Install year**, **Usage state, Street, Number (Street), Postal code, Post office, Database ID** and the **Device / Cable and Device / Cable Database ID** filters.

The connectors and related connections of an activated device are listed in a separate **Connectors** list on the form. Cable's threads details can be examined on the **Threads** list.

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Search functions on the Cross-section form

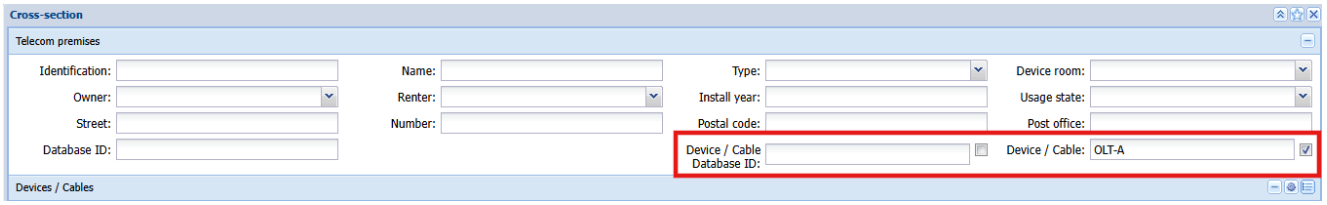
There are several ways to open telecom premises and its related content in the **Cross-section** form:

- By entering the premises **Identifier** directly.
- By using the **Pick from map** tool.
- By clicking **Pick from telecom premises** . You can search using any field available in the **Telecom premises** form. Search criteria can be entered either fully or partially, using the % character as a wildcard.
- To load possible changes, click **Refresh** on the form.

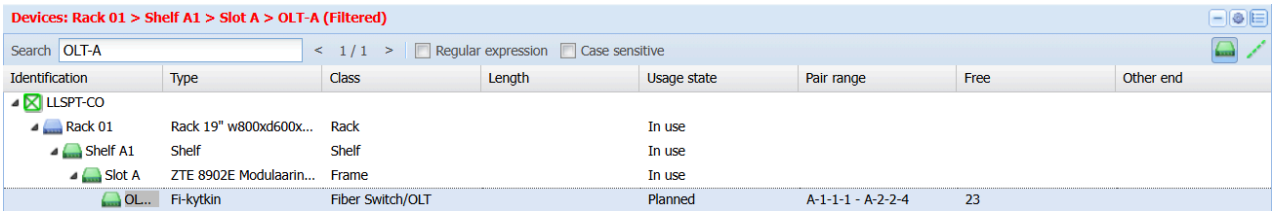
Searching based on a device or cable identifier/database ID

Additionally, you can retrieve telecom premises based on a device or cable identifier or database ID. To do this, enter the identifier in the **Device / Cable** or the **Device / Cable Database ID** field on the **Cross-section** form . This will return all telecom premises containing the specified device or cable to the **Cross-section** form.

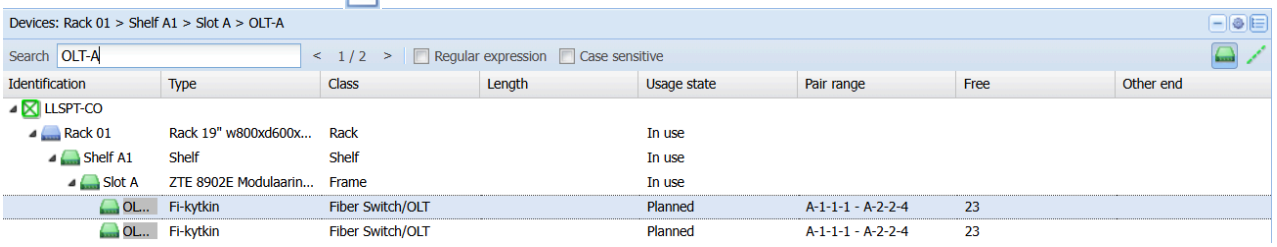
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a. If the **Device / Cable** or the **Device / Cable Database ID** checkboxes are enabled, the search conditions are applied to the Device / Cable filtering and list, automatically highlighting and preselecting matching rows.



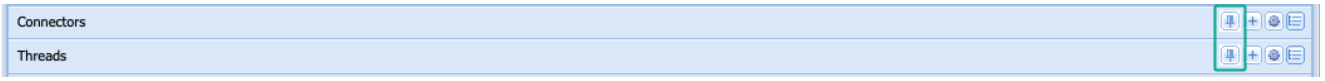
b. If a checkbox is disabled, the search criteria do not affect the **Device / Cable filter** list or the identifier fields, but conduct a normal search based on the provided information. All the rows matching the search criteria are highlighted in the **Devices / Cables** list, and the first match is automatically selected. If results are found in multiple different telecom premises, they can be browsed in the **Cross-section** form toolbar at the bottom of the form (**Item**).



Note! The search field for the **Devices / Cables** list is always automatically populated when the user searches for existing telecom premises locations using a device or cable identifier/database ID.

Pin/Unpin toggle

The Pin/unpin toggle buttons manage whether the **Connector** and/or **Thread** lists are open automatically.



- **Pin selected** pin: The system respects the user's choice to keep the lists open or closed. They will not be automatically enabled when a device or cable

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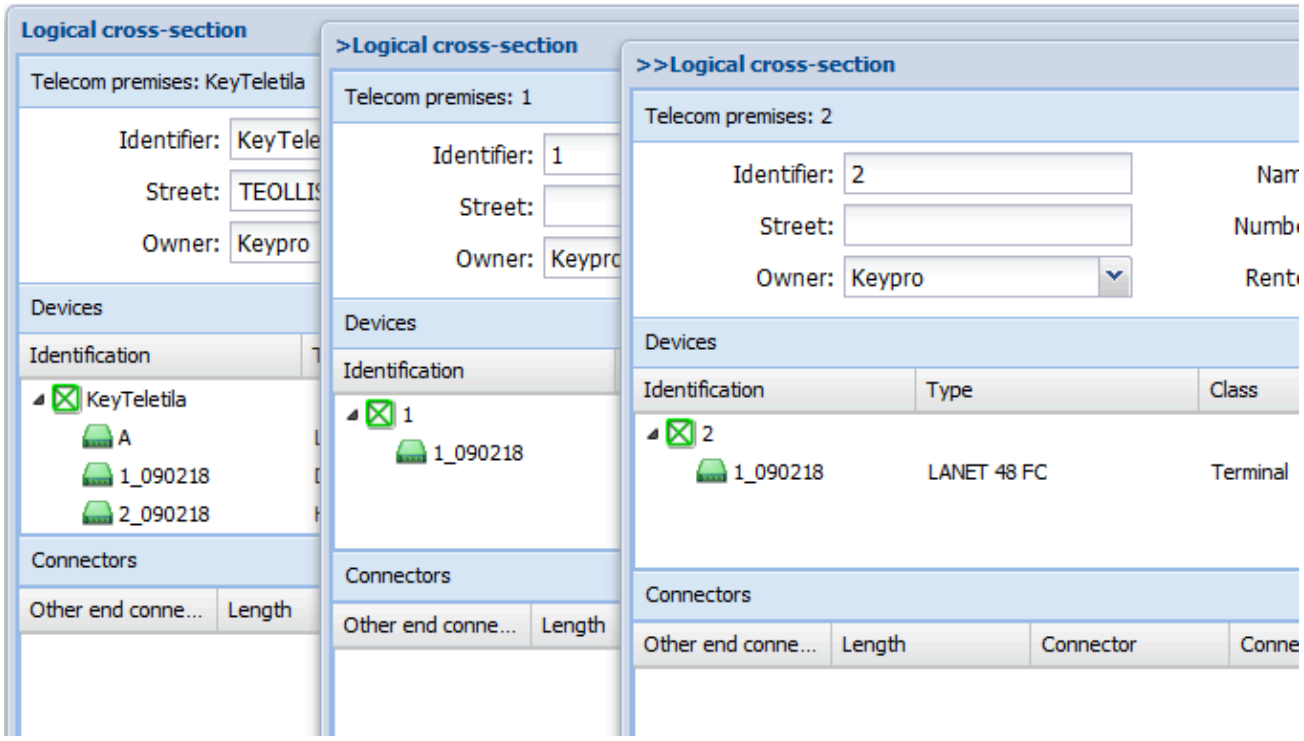
is selected.

- **Unpin selected** unpin: The system will automatically display the content of the associated **Connectors** and/or **Threads** lists whenever a device or cable is selected in the **Cross-section** form.

Compare logical cross-sections

You can view several different cross-sections at the same time by using the **Compare cross-sections** tool which can be enabled from the form's toolbar.

This tool enables simultaneous comparisons such as comparisons between various devices, their connectors, and circuits in some specific telecom premises. The **Cross-section** from which the **Compare logical cross- sections** function is activated will become a so-called primary form, and the **Cross-section** forms used for comparison will be named in accordance with the header **>Cross-section.**



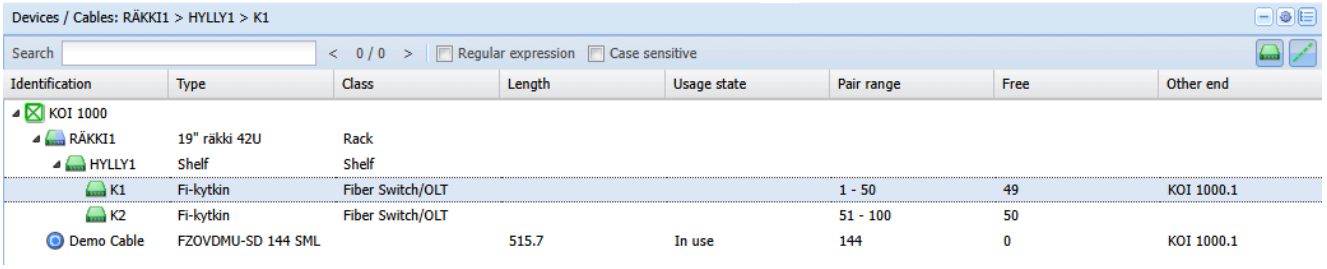
Devices / Cables

The **Devices / Cables** list includes information on the device, such as the device **identification**, **type**, **class**, **usage state**, and **pair range**. The column named **Free** indicates how many connectors in the device in question are

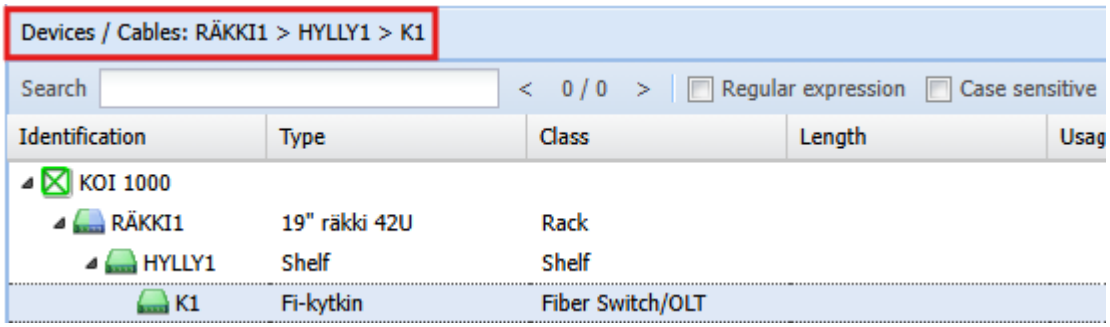
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available. The **OE** telecom premises column displays the telecom premises that the device in question can access.

The visibility of devices and cables in the **Devices / Cables** grid can be determined before a search by using the **Show devices** and **Show cables** buttons in the upper right corner of the grid. Only **Show device** is activated by default.



The **Devices / Cables** displays the hierarchy of the selected device next to the list title.



You can also use the **Search** functionality to look for devices and cables related to the telecom premises. The corresponding text written in the field is highlighted on the hierarchy below. Turning to next page of the form resets the **Search** functionality.

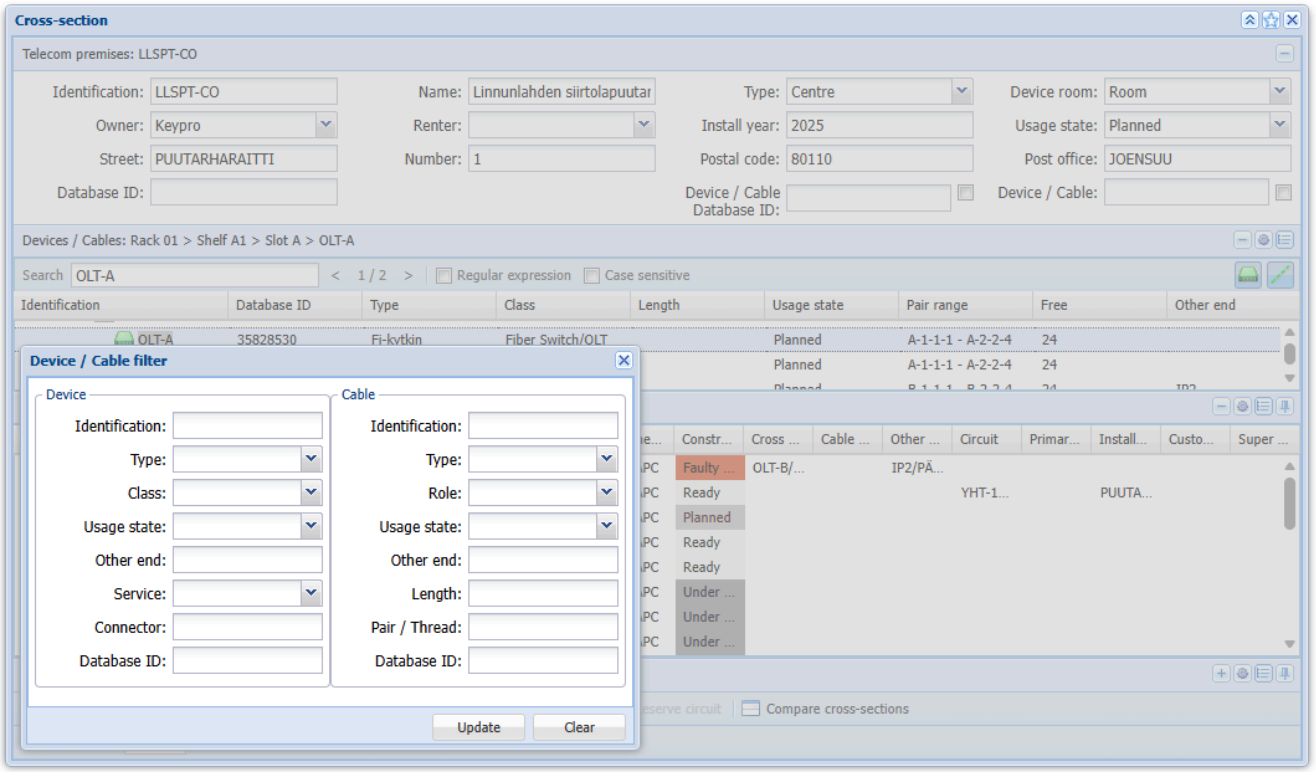
- Turning on **Case sensitive** activates a search that have strict checking of lower and upper cases. For example, if you search the word "in use" the system will only search for that desired word and will exclude words like "In use" from the search because it has an upper case letter.
- The **Regular expression** allows you to search for specific patterns, as opposed to certain terms and phrases.

Device / Cable filtering

In the top-right corner of the **Devices** list, click **Device/Cable** filter . Filter devices based on **Identification, Type, Class, Usage state, Other end, Service** and **Connector** and cables based on **Identification, Type, Class, Usage state,**

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Other end, Length and Pair / Thread. Select or enter the filters and click **Update** to view the filtered devices on the **Devices /Cables** list.

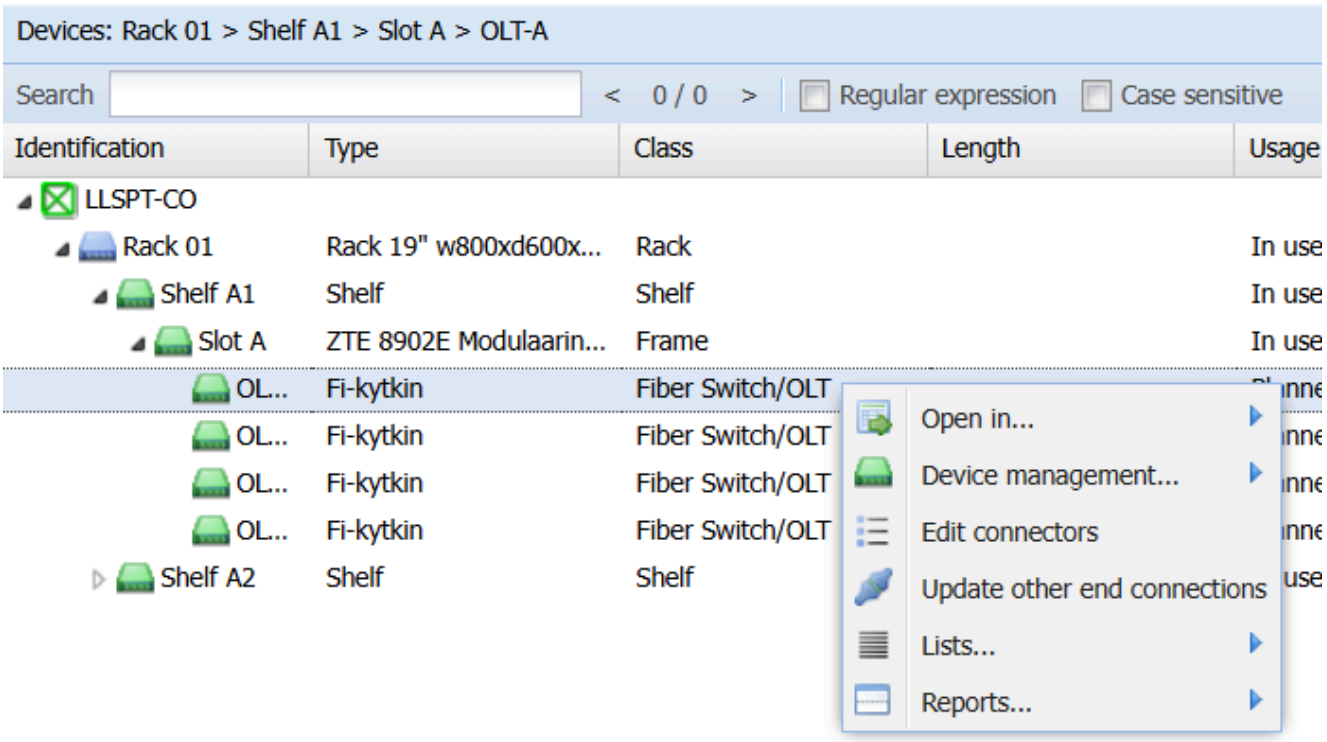


When devices are filtered, the form functions are applied to a limited group of devices. In the top-right corner of the **Devices / Cables** list, click **Clear device filter** to remove filters.

Functions of the Devices / Cables context menu

On the **Devices / Cables** list, click telecom premises or a device using the right mouse button. The displayed context menu includes the following functions:

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- Click **Open in...**
  - **Open telecom premises** to open the **Telecom premises** form for the telecom premises in question.
  - **Device form** to open the **Device** form that includes the information on the selected device.
  - **Telecom premises device list** to open the **Devices** tab of the **Telecom premises** form and to view information on the selected device.
  - **Route follower** to open the **Route follower** form with information on the telecom premises in question.
  - **Affected area** to open the **Route follower** form pre-completed with the selected device's connectors and cables connected to the connectors. The route follower highlights the connection routes that are connected to the selected device either directly or over logical cross-connections.
- Click **Device management...**
  - **Add new subdevice** to create a new subdevice under the selected device. The **Device** form opens for entering the subdevice information,

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and clicking **Save** finalizes the creation of the new subdevice.
    - **Copy device** to create a duplicate of the selected device, including its main properties, and open the **Device** form for modifying the copied information. Clicking **Save** on the **Device** form completes the creation of the copied device.
    - **Delete device** to remove the selected device from the system.
    - **Move device** to move the selected device to another location or parent device. The system opens a list of devices that have circuit reservations. Right-click on the target device to complete or cancel the operation.
- Click **Edit connectors** to open the connectors for form, on which you can name and edit the connectors of the device.
- Click **Update other end connections** to create or update a device's other end connections.
- Click **Lists...**
    - **Circuits** to open the **Circuit** list of device's connections.
    - **Open other end telecom premises list** to open a list of other end telecom premises to separate window.
    - **Open other end telecom premises list with subdevices** to open a list of other end telecom premises with subdevices to separate window.
- Click **Reports...**
    - Click **Print cross-section report (pdf) / (xlsx)** to create an **Excel** or **PDF** report on the connectors and circuits of the selected device (also with related sub-devices).
- **Expand/collapse** opens/closes the devices in the device's sub-hierarchy.

Connectors

The connectors and related connections of a selected devices are listed in the **Connectors** list. The **Connectors** list includes the following columns:

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Other end connector	The connector to which the viewed connector has a logical connection. Displayed in the column: **telecom premises/device/connector**
Other end name	The name of the other end connector
Other end type	The type of the other end connector **(column hidden by default)**
Other end technical info	The technical information of the other end connector **(column hidden by default)**
Other end address	The address of the other end connector
Other end zipcode & city	The zipcode and city of the other end connector **(column hidden by default)**
Other end municipality	The municipality of the other end connector **(column hidden by default)**
Length	The total length between the connectors.
Cable / Thread	Indicates which strand the device is connected to in the cable
Connector	The name of the connector. **(cannot be disabled)**
Database ID	The unique database id of the connector.
Connector number	The connector number **(column hidden by default)**

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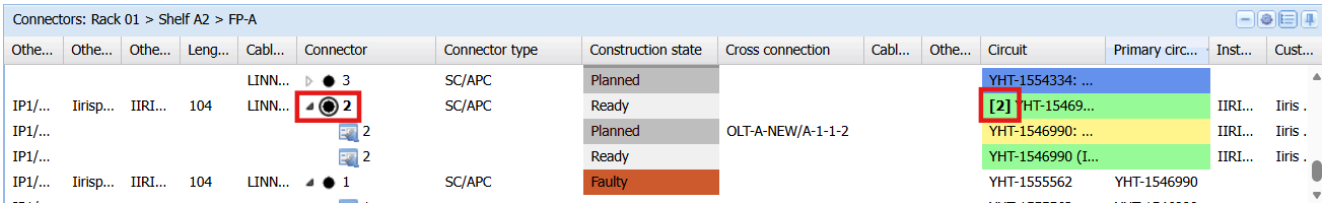
Connector type	The abbreviation of the connector type.
Const. state	The construction state of the connector. If the construction state is **not built**, it is not shown on the connector list.
Owner	The name of the circuit's owner. Access to the Customer form **(column hidden by default)**
Connector remarks	Additional free-form details related to the connector **(column hidden by default)**
Cross connection	The connector to which the connector of the row viewed has a cross-connection. Displayed in the column: **device/connector.**
Cable / Thread	Indicates which thread the device is connected to in the cable
Other end connector	The other end connector of the cross-connection. Displayed in the column: **telecom premises/device/connector**
Other end name	The other end name of the cross connection **(column hidden by default)**
Other end type	The other end type of the cross connection **(column hidden by default)**
Other end technical info	The other end technical info of the cross connection **(column hidden by default)**
Other end address	The other end address of the cross connection **(column hidden by default)**
Other end zipcode & city	The other end zipcode and city of the cross connection **(column hidden by default)**
Other end municipali	The other end municipality **(column hidden by default)**

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ty	
Circuit	The circuit that has been reserved for the connector. Displayed as: circuit **(abbreviation of the usage state)**.
Circuit Identifier 2	The second identifier of the circuit **(column hidden by default)**
Primary circuit	Used as a primary circuit
Installation address	The street name and number of the customer's installation address (the address of the starting point is used by default, and the selection between the starting/ending point can be defined in the database)
Installation address (2nd)	Secondary installation address **(column hidden by default)**
Customer	The name of the customer linked to the circuit. Access to the **Customer** form.
Super circuit	The identifier of the related super circuit

Connectors list

The **Connectors** list highlights those device connectors that involve a multi-use (meaning two or more circuits reserve the same device connector) with the  symbol. On the **Circuit** column, you can also see the amount of reservations in brackets:



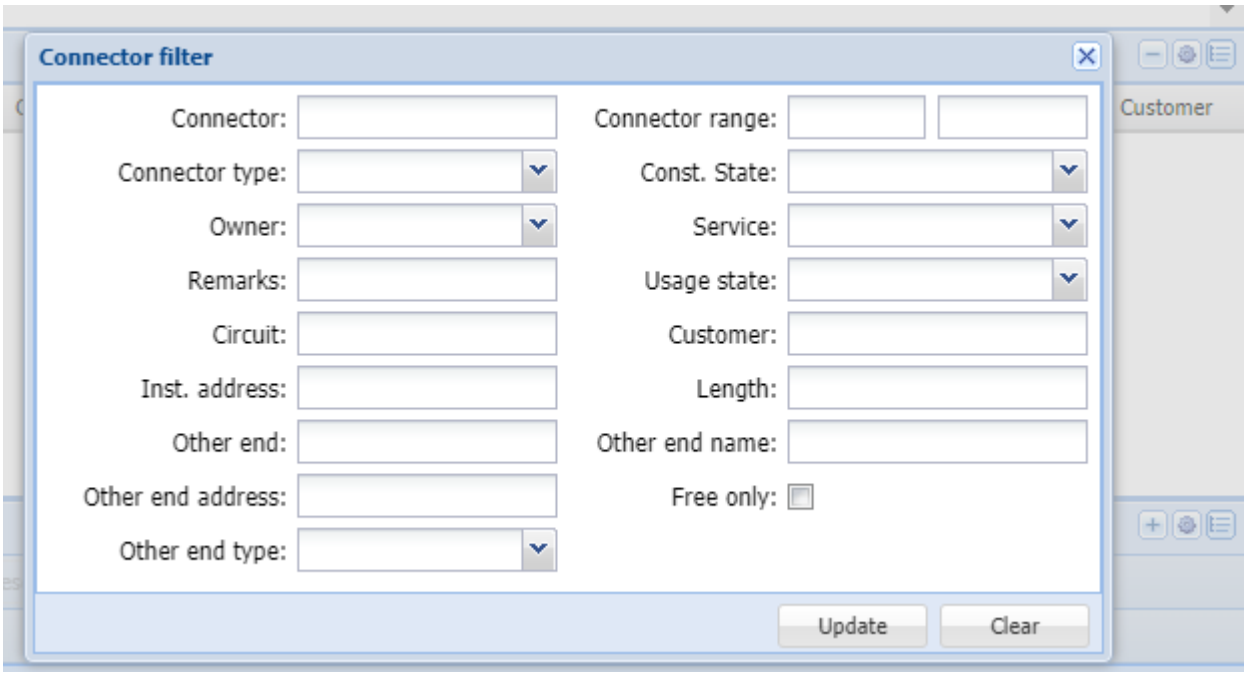
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The colours on the list indicate the usage state of the connector in question (**Ready to be connected** is used if the **TTMi interface** is in use):

In use
Pre-connected
Partially pre-connected
Soon in use, Soon free
Free

Filtering connectors

In the top-right corner of the **Connectors** list, click **Connector filter** . Filter connectors based on the **Connector**, **Connector type**, **Owner**, **Remarks, Circuit**, **Inst. address**, **Other end**, **Other end address**, **Other end type**, **Connector range**, **Const. State, Service, Usage state, Customer, Length and Other end name.** To view only connectors that are not reserved for circuits, select the **Free only** checkbox. Select or enter the filters and click **Update** to view the filtered connectors on the **Connectors** list.

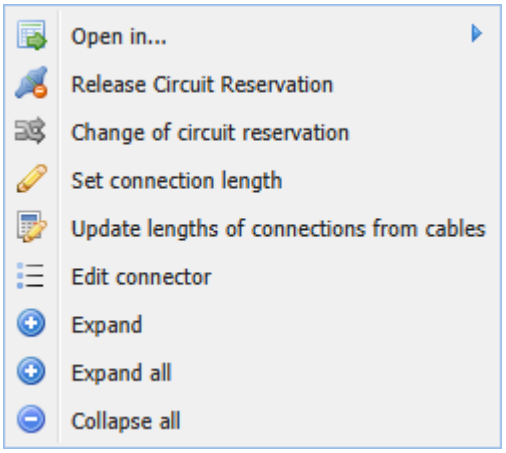


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When devices are filtered, the form functions are applied to a limited group of devices. In the top-right corner of the **Connectors** list, click **Clear connector filter** to remove filters.

Functions of the Connectors context menu

On the **Connectors** list, click a connector using the right mouse button. The displayed context menu might include some of the following functions:



- Click **Open in...**
  - **Circuit** to open the circuit on **Circuit** form.
  - **Other end telecom premises** to open the other end telecom premises on **Telecom premises** form.
  - **Other end telecom premises on crossreport** to open the other end telecom premises on **Cross-section** form.
  - **Route follower to open the Route follower form with information on the telecom premises in question.**
- Click **Release circuit reservation** to release the selected connector. Read more in Releasing a connector reservation.
- Click **Change of circuit reservation** to change logical reservation for connectors. Read more in Changing logical reservations for connectors.
- Click **Set connection length** to define the length of a connection. Read more in Updating lengths of connections

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- Click **Update length of connections from cables** to update the lengths of all logical connections based on the actual cable lengths.
- Click **Edit connecter** to **edit the values of the connectors on the list. Read more in Editing connectors.**
- Click **Create circuit using...**
  - **Logical reservations** to create a circuit with the selected connector reserved as a logical reservation, optionally continuing via the **Reservation of connection** form if logical connections exist.
  - **Physical reservations** to create a circuit with the selected connector reserved as a physical reservation, optionally continuing via the **Route follower** form if physical connections exist.
- Click **Split connectors** to split the selected connector. Read more in Connector splitting.
- Click **Expand to open a drop-down menu with connector's reserved circuits.**
- Click **Expand all to open all circuit drop-down menus on the grid.**
- Click **Collapse all** to collapse all circuit drop-down menus on the grid.

Releasing a connector reservation

To start the release of a circuit reservation, select the reserved connector on the list and click **Release circuit reservation** in the tool bar at the bottom of the form. You can also activate this function by clicking a connector with the right mouse button and selecting **Release circuit reservation** or selecting a connector and clicking **Release circuit reservation** from the **Cross-section** form's toolbar.

You will see the following question: **Are you sure you want to release the circuit ´s reservation?** If you answer **Yes**, the reservations for the selected connector and connection will be removed from the circuit in question.

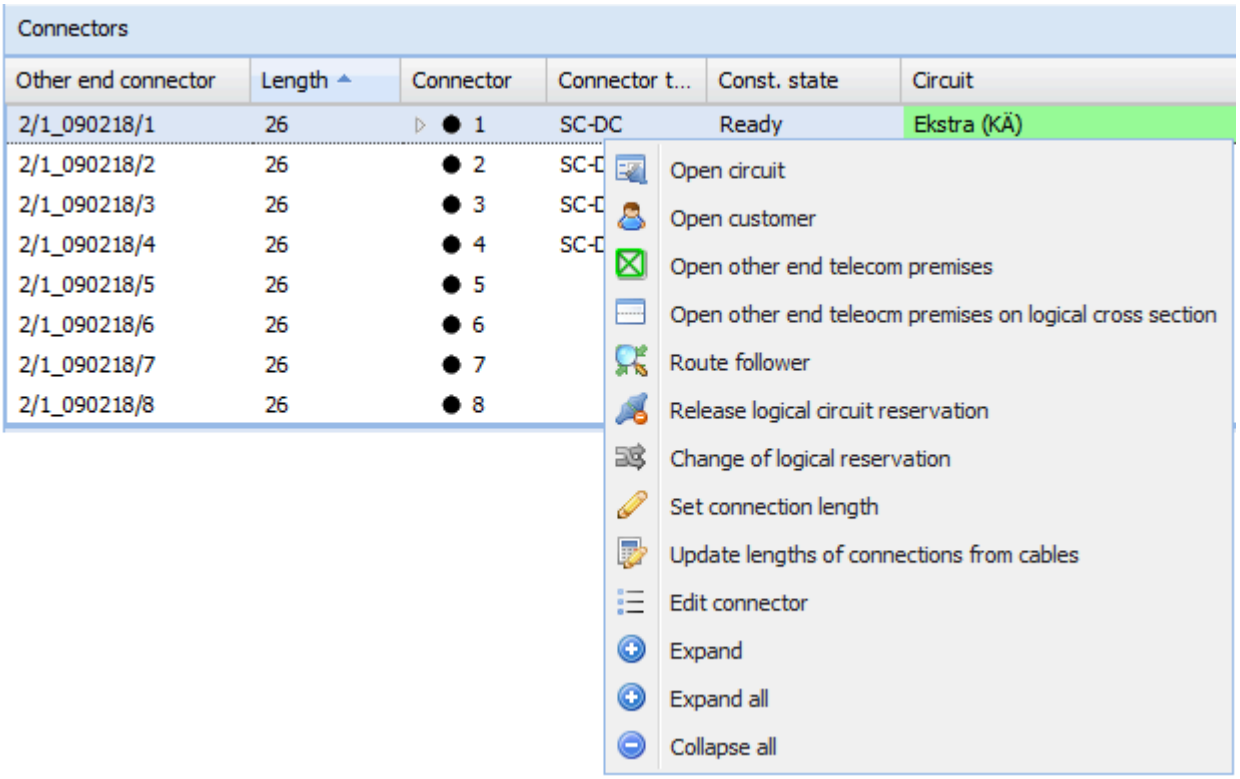
Changing logical reservations for connectors

On the **Cross-section** form, you can change the circuit reserved for a device's connector, or you can change the circuits to go through the same device's other connector that has no circuits.

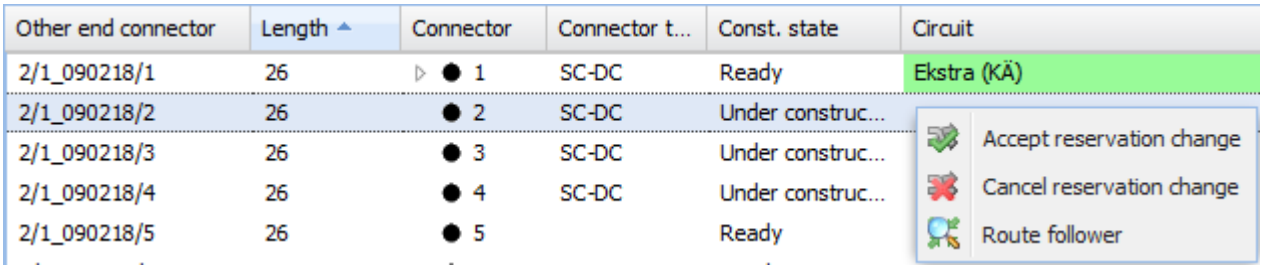
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On the form, select the connector with a circuit or circuits. Alternatively, you can also select an individual circuit row by opening the connector's circuits for viewing.

Then, click **Change of logical reservation** in the menu displayed when you click the right mouse button. Except for the **Connectors** list, all other lists on the **Cross-section** form will be disabled.



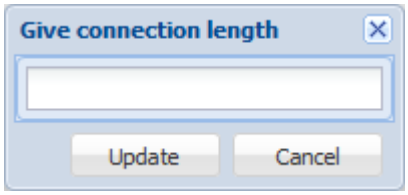
Next, in the same device, select a connector that has no reservations. Click the right mouse button and select either **Accept reservation change** or **Cancel reservation change**. Select **Route follower** to check the route.



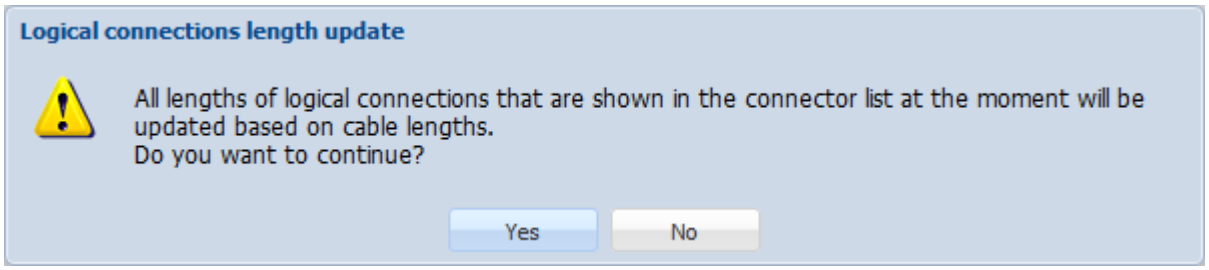
Updating lengths of connections

Define the length of a connection by choosing **Set connection length** in the context menu, while the mouse pointer is positioned over the required connector.

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Use the **Update lengths of connections** from cables functions to update the lengths of all logical connections based on the actual cable lengths.



Editing connectors

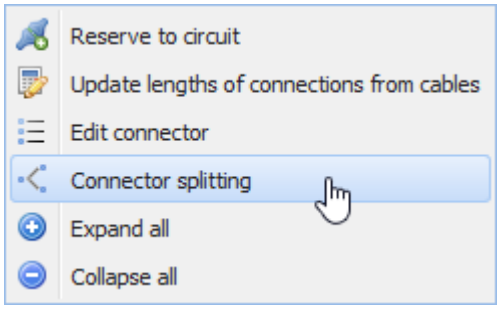
You can open the **Connector** form for editing from the **Cross-section** form or **Telecom premises** form. More information on editing connectors is provided in the chapter Managing connectors.

Click the right mouse button and select in the context menu **Edit connectors** either in the **Devices / Cables** list (the connectors of all devices on the telecom premises **or** all the connectors of a device) **or** in the **Connectors** list (individual connectors). To activate the numbering of connectors in the view, go to the drop-down menu for **Columns** and select **Number**. The connector number column is hidden by default.

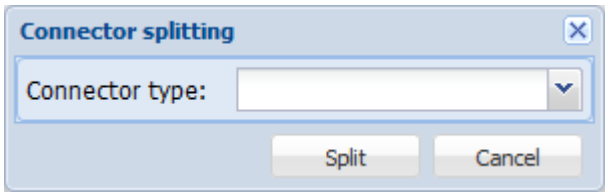
Connector splitting

1. In the **Connectors** list, select the connector you want to split. Note that you cannot split a reserved connector.
2. In the context menu, select **Connector splitting**.

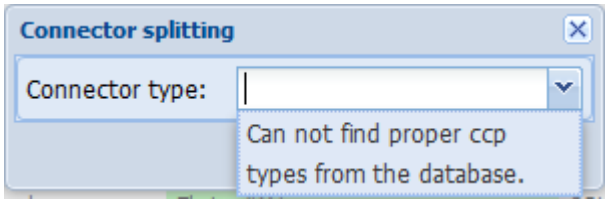
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3. Select the type of the new connector in the drop-down menu for **Connector type**.



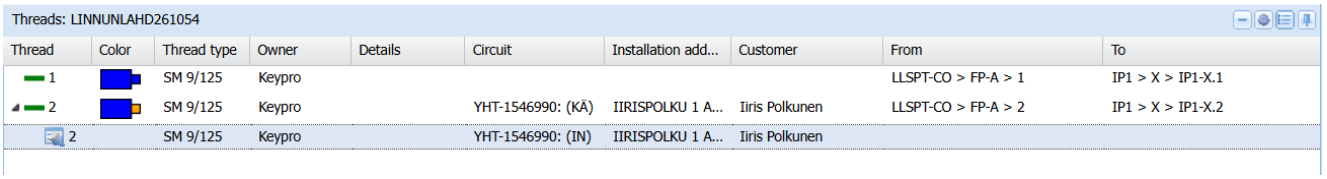
4. **TIP:** If no suitable connectors can be found in the database, check that the connector type has been defined for the connector you selected. More information on defining connector types is provided in the chapter Editing connectors.



5. Click **Split** to split the connector.

Threads

The **Threads** list in the **Cross-section** form displays information about fiber cable threads and related connections. The list is located at the bottom of the form and provides an overview of each thread and its properties.



The columns in the **Threads** list includes the following:

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Column	Meaning
Database ID	
Thread	Indicates the selected thread on the list **(cannot be disabled)**
Color	Indicates the usage state of the thread with color
Thread type	Indicates the type of the thread
Owner	Indicates the owner of the thread
Details	Additional details on the cable thread
Circuit	The circuit that has been reserved for the thread
Circuit Identifier 2	The second identifier of the circuit **(column hidden by default)**
Installation address	The street name and number of the customer’s installation address
Construction state	The construction state of the thread **(column hidden by default)**
Usage state	Usage state of the thread **(column hidden by default)**
Customer	The name of the customer linked to the circuit
From	Indicates the starting point of the fiber connection

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Column	Meaning
To	Indicates the destination point of the fiber connection
Super circuit	The identifier of the related super circuit

Functions of the Threads context menu

On **Threads**, click a thread from the grid using the right mouse button. The displayed context menu includes the following functions:

- Click **Route follower** to open the **Route follower** form with information on the telecom premises in question.
- Click the **Edit threads** function, to add cable thread information, for example, their owners, usage state and right of use. The **Threads for cable** form also displays any circuit identifiers and customer information.
- Click **Expand all** to open all circuit drop-down menus on the grid.
- Click **Collapse all** to collapse all circuit drop-down menus on the grid.

The displayed context menu also includes the following function if the thread has circuit reservations:

- Click **Open circuit** to open the circuit on the **Circuits** form.
- Click **Customers** to open the customer information on **Customer** form.

Releasing a thread reservation

To start the release of a circuit reservation, select the reserved thread on the list and click **Release circuit reservation** in the tool bar at the bottom of the form. You can also activate this function by clicking a thread with the right mouse button (**Release Circuit Reservation**).

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You will see the following question: **Are you sure you want to release the circuit ´s reservation?** If you answer **Yes**, the reservations for the selected connector and connection will be removed from the circuit in question.

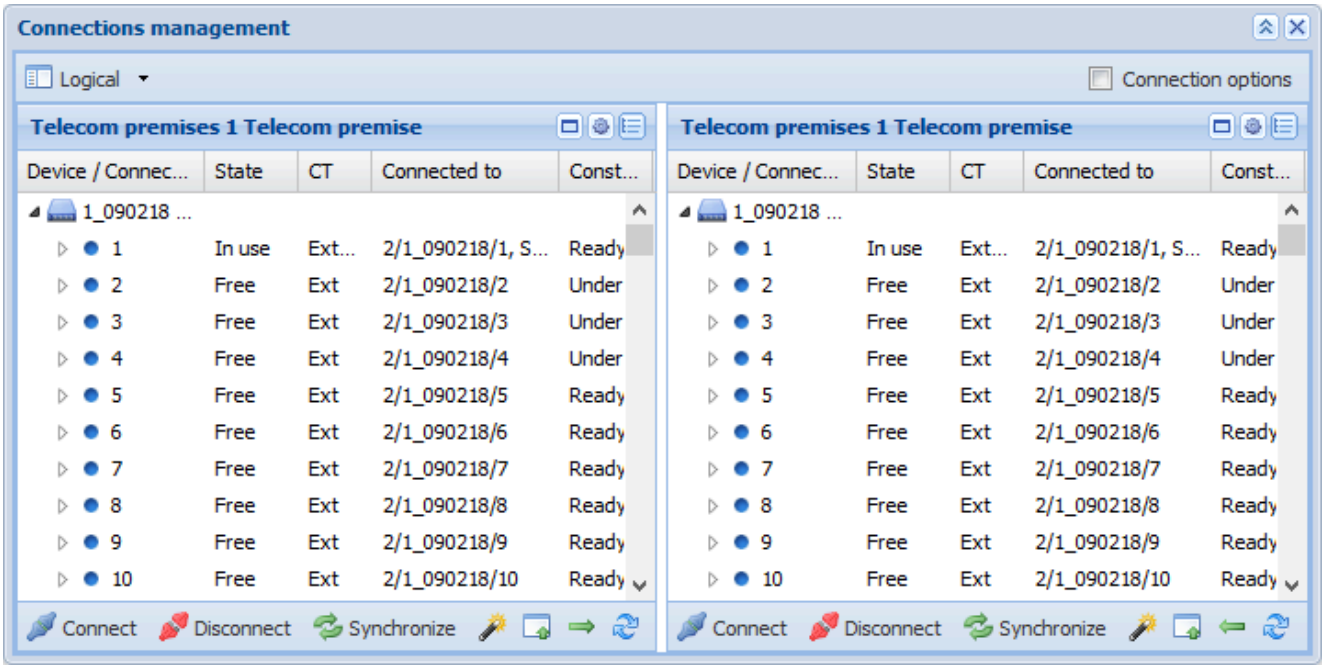
Reserving a thread reservation

After you click **Reserve connection** from the **Circuit** form, select the thread on the **Threads** list using the left mouse button, and click **Reserve to circuit** from the toolbar (the right mouse button can also be used for making the selection). After this, the thread in question will appear on the **Physical reservations** list on the **Circuit** form.

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Connections management (logical)

On the **Connections management** form, with the **Logical** state being selected, you can create, cancel and edit KeyNet connections. **Logical connections** are connections between the connectors of devices in telecom premises. The two windows (lists) of the **Connections management** form display the devices in telecom premises. You can select different telecom premises to be displayed on the lists. Browse through the tree diagram to find all possible connectors and the connections below them.

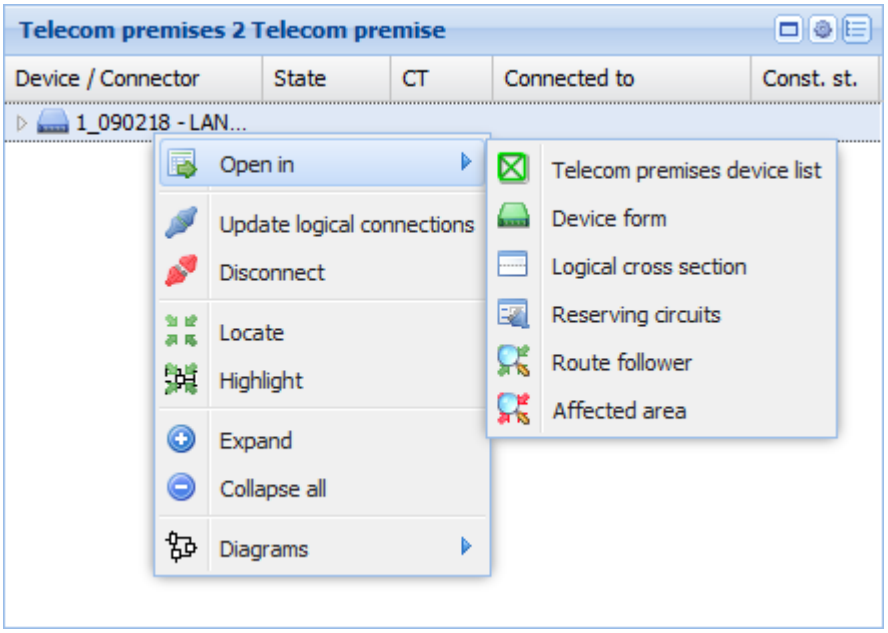


CT means connection type. The various connection types include **Cross-connection (CC)**, **Internal connections (INT)**, and **External connections (EXT)**.

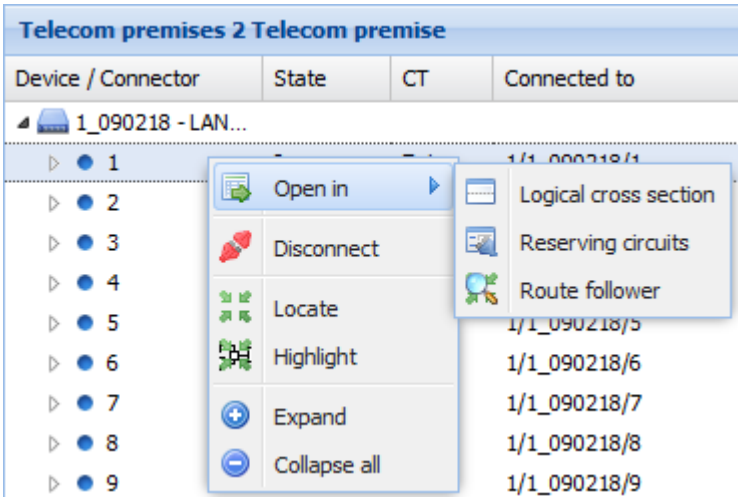
The available functions depend on whether you open the context menu (with the right mouse button) over a device, connector, or connection. From the **Open in menu**, you can access the **Device form, Telecom premises device list, Logical cross-section, Route follower,** or the **Circuit form** for reserving circuits. Click **Affected area** to open a **Route follower** form pre-completed with the selected device's connectors and cables connected to the connectors. The route follower highlights the connection routes that are connected to the selected device either directly or over logical cross-connections.

In the figure below, the context menu when opened over **Device**.

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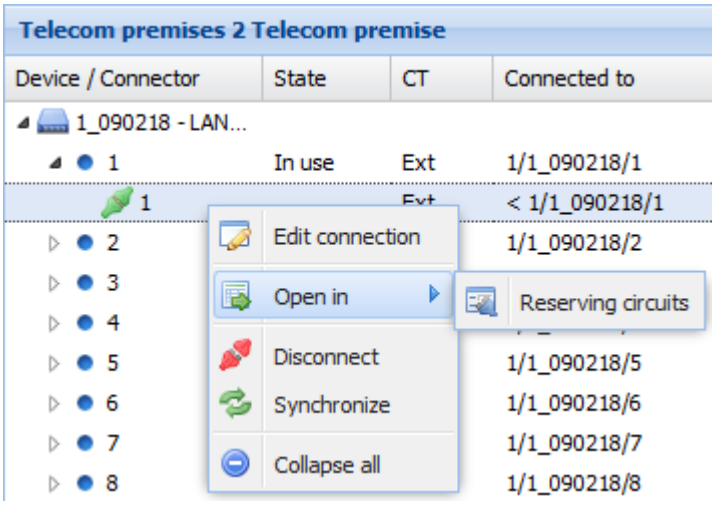


In the figure below, the context menu when opened over **Connector**.



In the figure below, the context menu when opened over **Connection**.

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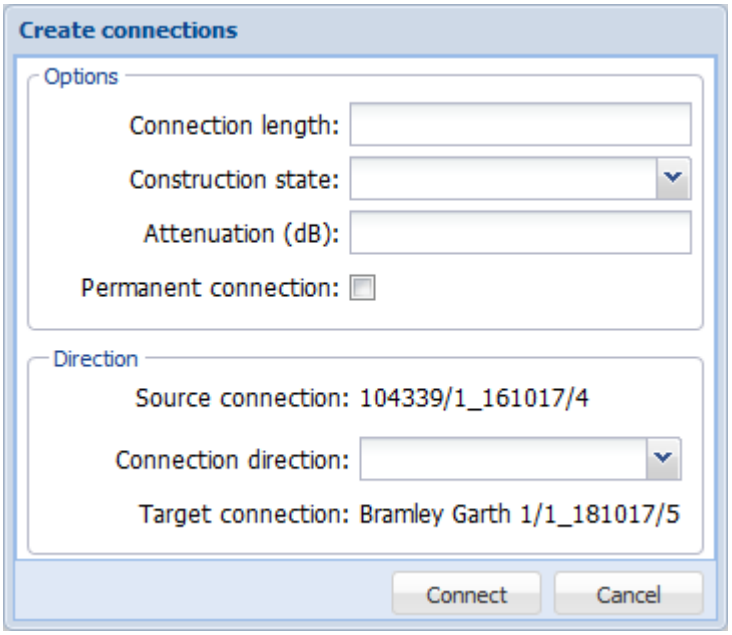
Internal connections

If you want to create internal connections, click **Copy telecom premises to left ⇦ /right⇨**. The devices of the telecom premises in question are then also displayed on the other list, after which you can create internal connections in the same way as other connections (see the chapter Creating connections).

Connection options

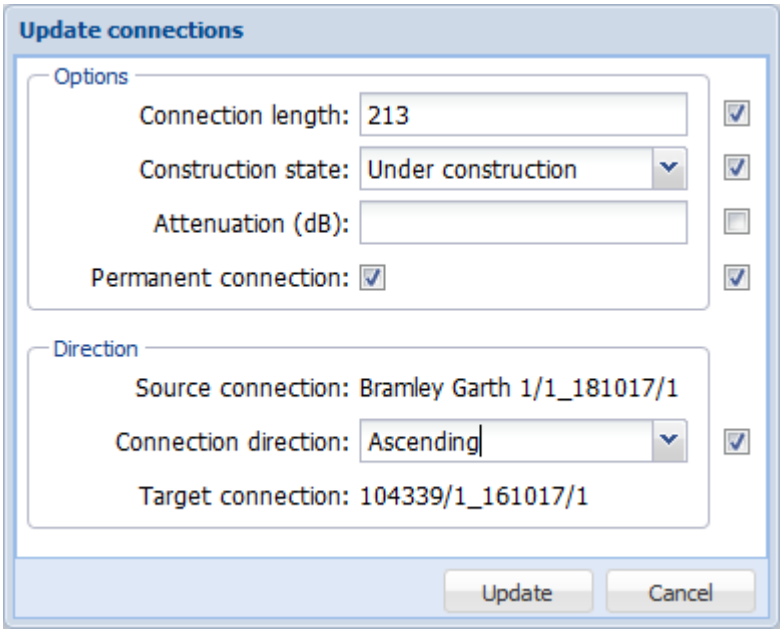
When creating logical connections, you can define the connection length, construction state, attenuation (dB) and create a permanent connection, as well as define the direction of the connection. First, select the **Connection options** checkbox in the top-right corner of the **Connections management** form.

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Editing a logical connection

Edit the logical connection by selecting **Edit connection** in the context menu that is displayed when you click the right mouse button. When you make changes, the checkbox to the right of a field is selected and the **Update** button is activated. Click **Update** to accept the changes. You can cancel any changes by deselecting the checkbox for the field before you click **Update**.



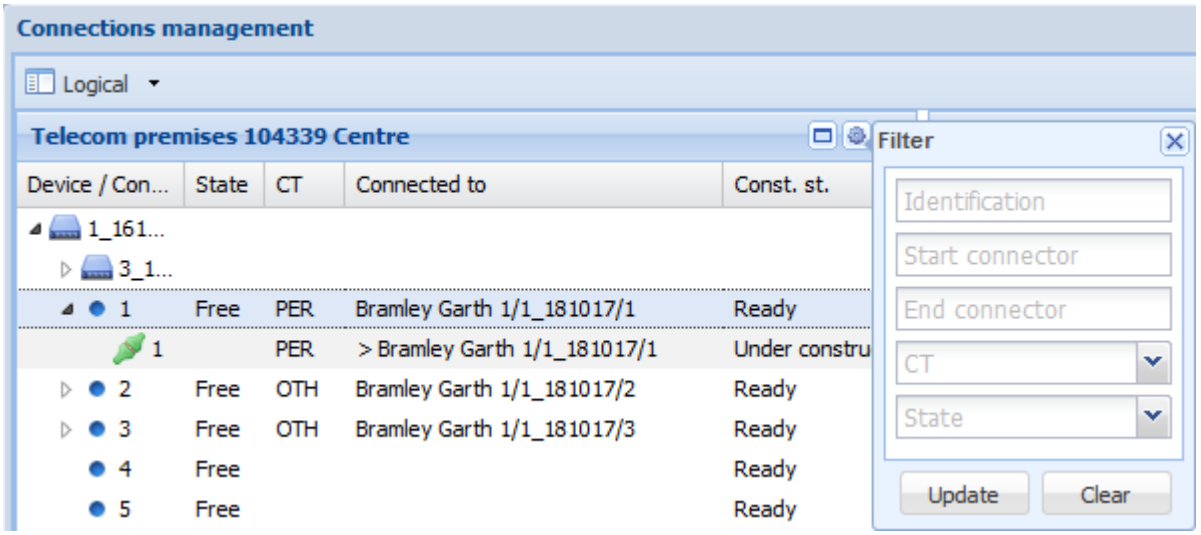
In addition, the following functions are available, when you click the right mouse button over a connection: **Open in – Reserving circuits**, **Disconnect**, **Synchronize**,

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and **Expand/Collapse all**.

Filtering the displayed logical connections on the form

1. Click **Filter** .
2. Enter/select filters.
3. Click **Update** in the Filter window.



To remove filters, either click **Clear filter** or first click **Filter** , then click the **Clear** button and after that click **Update**.

Viewing reserving circuits

1. Select the row for which you want to view the reserving circuits.
2. In the context menu, select **Open in – Reserving circuits** to open the **Circuit** form with the reserving circuits displayed. If there are no reserving circuits, the Circuit form will not be opened, and the following text will be displayed in the bottom left corner of the KeyCom window: Selected is not reserved by any circuits.

Updating the logical connections of a device

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1. Position the mouse pointer over a **device**, click the right mouse button and select **Update logical connections**.
2. In the dialogue box displayed, select the checkbox if you want to delete existing logical connections. **Do not** select the checkbox if you want to create the required connections while maintaining the existing ones.
3. After the connections have been created, the number of created logical connections will be displayed.
4. Note! Logical connections can also be updated automatically. This is discussed in more detail in the Update logical connections automatically chapter.

Route follower for managing logical connections

Position the mouse pointer over a device, click the right mouse button and select **Open in Route follower**. The **Route follower** form is opened with the selected device displayed. If your mouse pointer is positioned over a connector and you use the right mouse button to select **Route follower**, the form is opened with one connector displayed. More information on **Route follower** is provided in the chapter Route follower.

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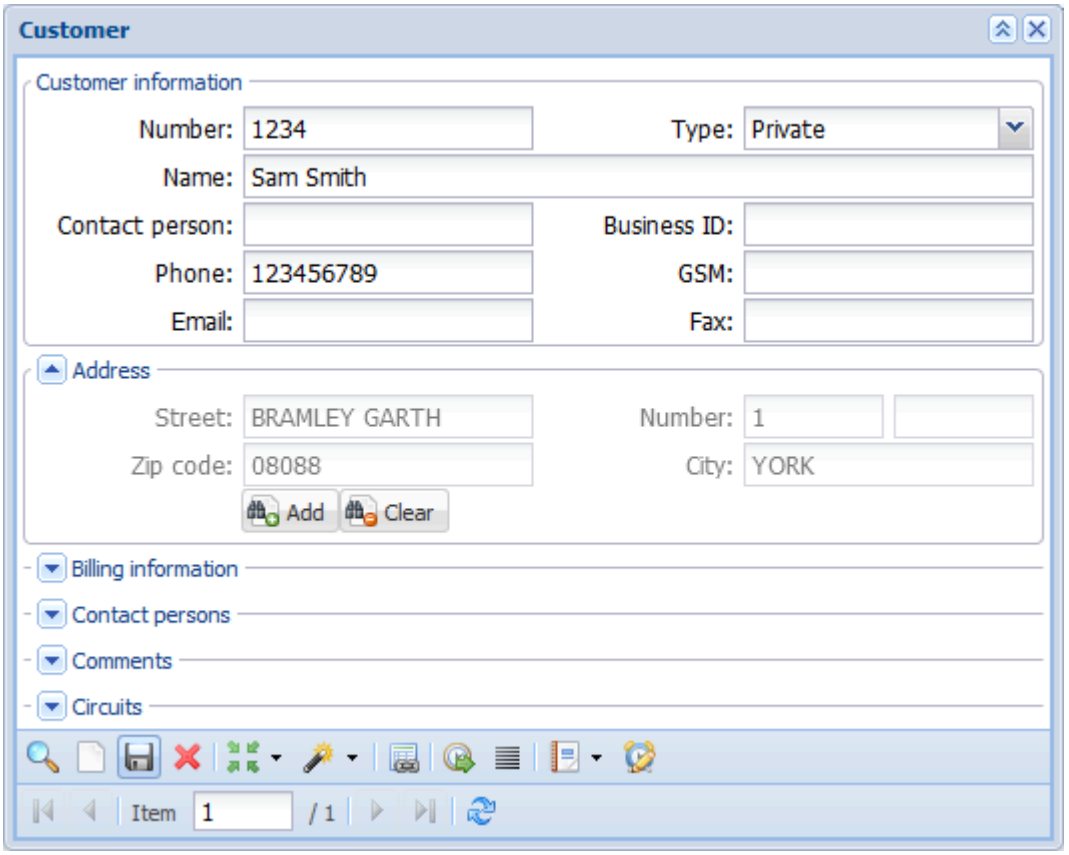
Customer

Customer information is added and viewed on the **Customer** form. In the KeyNet tools, click **Customer** to open the **Customer** form. There are also other ways to access this form: click **Customers** in the tools on the **Cable** form; open it from the **Device database** section on the **Telecom premises** form; or click **Pick customer** on the **Circuit** form.



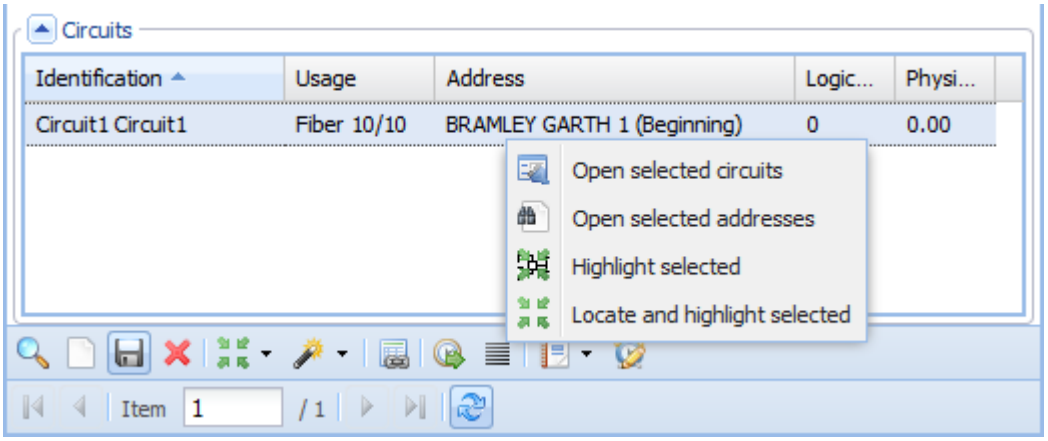
On the **Customer** form you can enter information on a new customer or retrieve customer infiormation to the form in the same way as you would retrieve information to any other form. The **Customer** form consists of **Customer information**, **Addresses**, **Billing information**, **Contact persons**, **Comments**, and **Circuits**. The **Billing information** and **Comments** sections are hidden, and you can open them by clicking . Enter the information or retrieve the required **customer information** to the form. Click **Add** to open the **Address** form for adding an **address**. The functions of the **Address** form are introduced in the chapter Address. You can add an address to the **Billing information** section in the same way. Do not forget to enter the **name** of the billed party.

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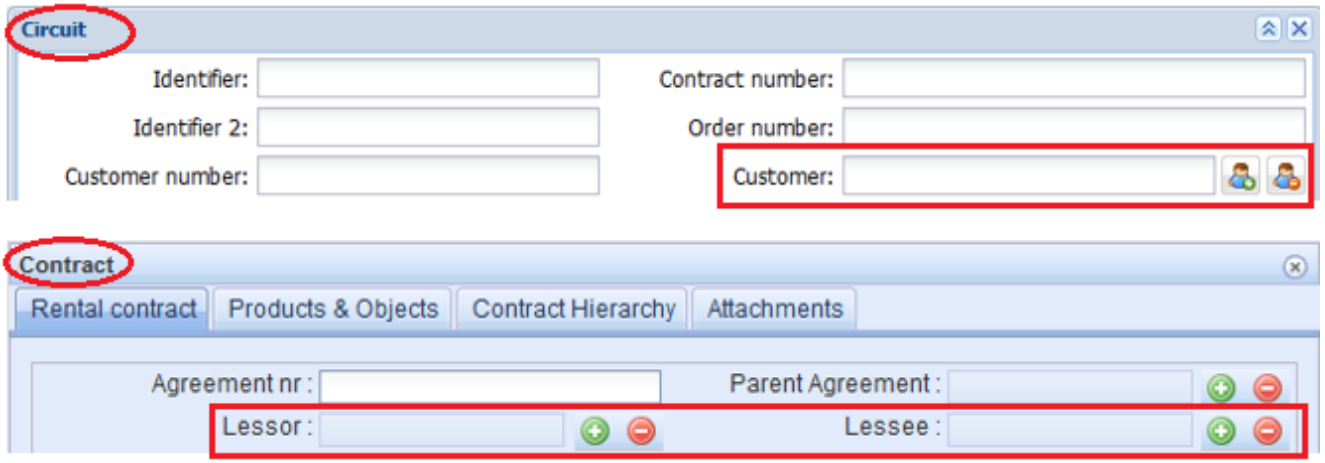
Customer's circuits

The **Circuits** section on the **Customer** form displays the circuits that have been created for the customer. Click a row in the **Circuit section** with the right mouse button to open the **Circuit** or **Address** form, or to **highlight** a route on the map. You can sort circuits based on the columns: click the column you want to use for sorting the circuits.



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On some forms, you can add **information on the customer**. Click or to add information on such forms. You can transfer information from the **Customer** form to an object form by clicking **Update to form**.



To view a list of objects related to the customer, such as circuits or the objects on the telecom premises' device database, click **List related objects** on the **Customer** form. The list includes the type and name of the objects. Select the object by clicking **Show on the form** in the context menu.

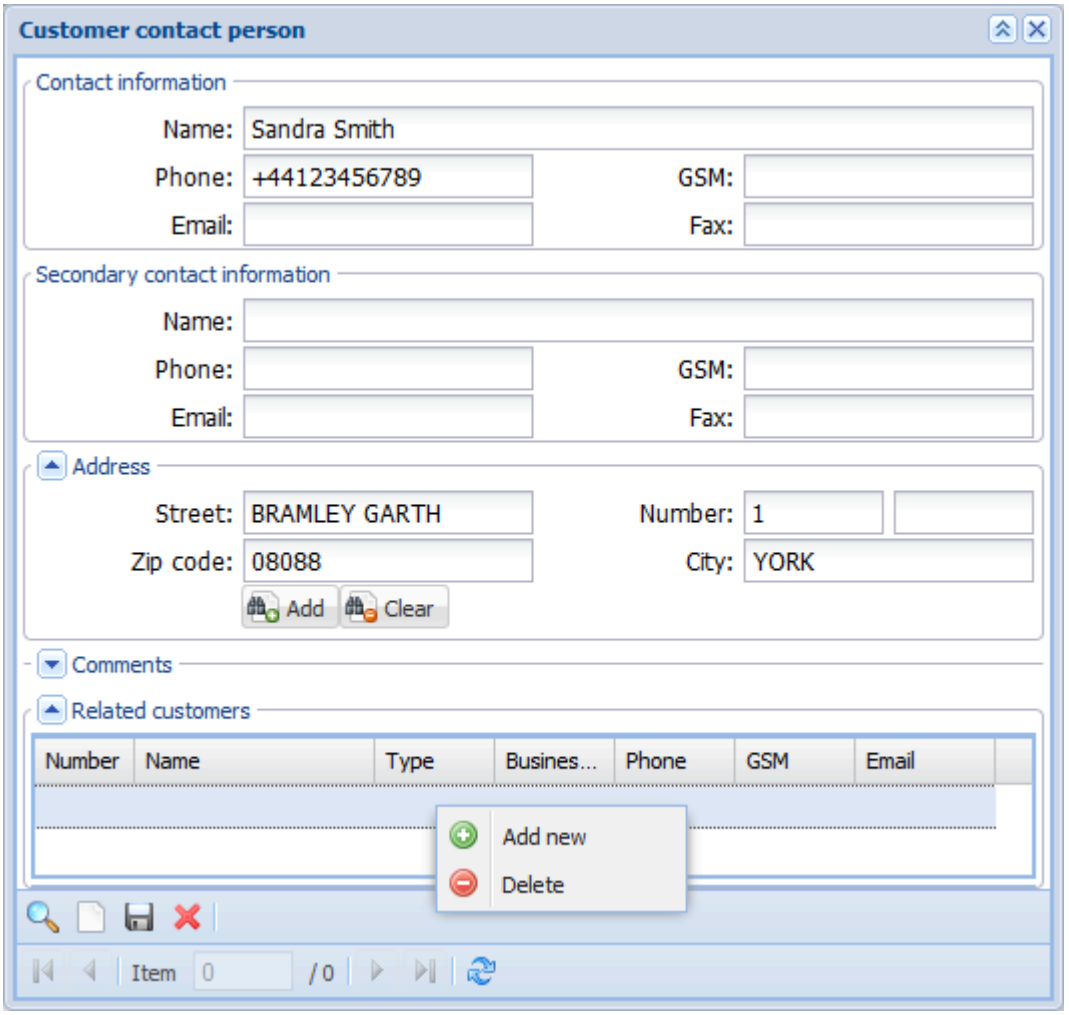
Customer's contact person

You can enter information on the customer's contact person. In the drop-down menu for **Customer**, select **Contact person**. You can also open this **Contact person** form by right-clicking the correct person in the **Contact persons** section on the **Customer** form if contact persons have been defined.

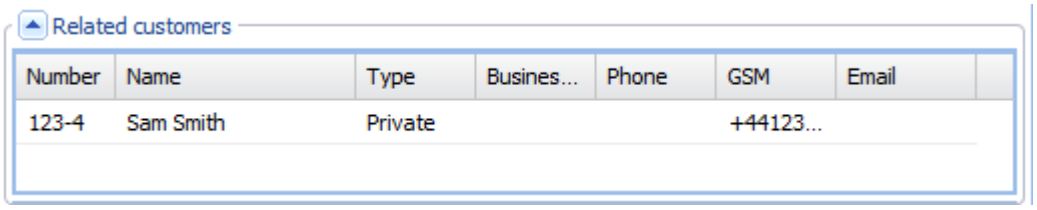


Enter the information on a contact person and, if necessary, a secondary contact person. To select an address for the contract person, click **Add** to open the **Address** form. Search and select the correct address for the form. More information on the **Address** form is available in the chapter Address.

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In the **Related customers** section, you can add or view existing related customers. You can add one by right-clicking the **Related customers** field and by clicking **Add new**. The **Customers** form is then opened. Click **Update to form** to add a **Customer**. The customer you selected appears on the **Related customers** list.



Right-click a customer row to select one of the options in the menu: **Open customer**, **Add new**, or **Delete**. These functions allow you to open the **Customer** form and add or delete customers.

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On the **Rental contract** form, information on the **customer** is displayed in the field **Lessor** or **Lessee**. **Contact persons** defined for each party can be selected in the fields **Lessor contact** and **Lessee contact**. More information on rental contracts can be found in the chapter Rental contract.

Customer’s reports

To create customer-specific reports, click **Reports** and select **Customer’s circuits** in either PDF or XLSX format, or select **Customer’s circuits logical OE connections**, which displays the logical connections for the customer’s circuits.

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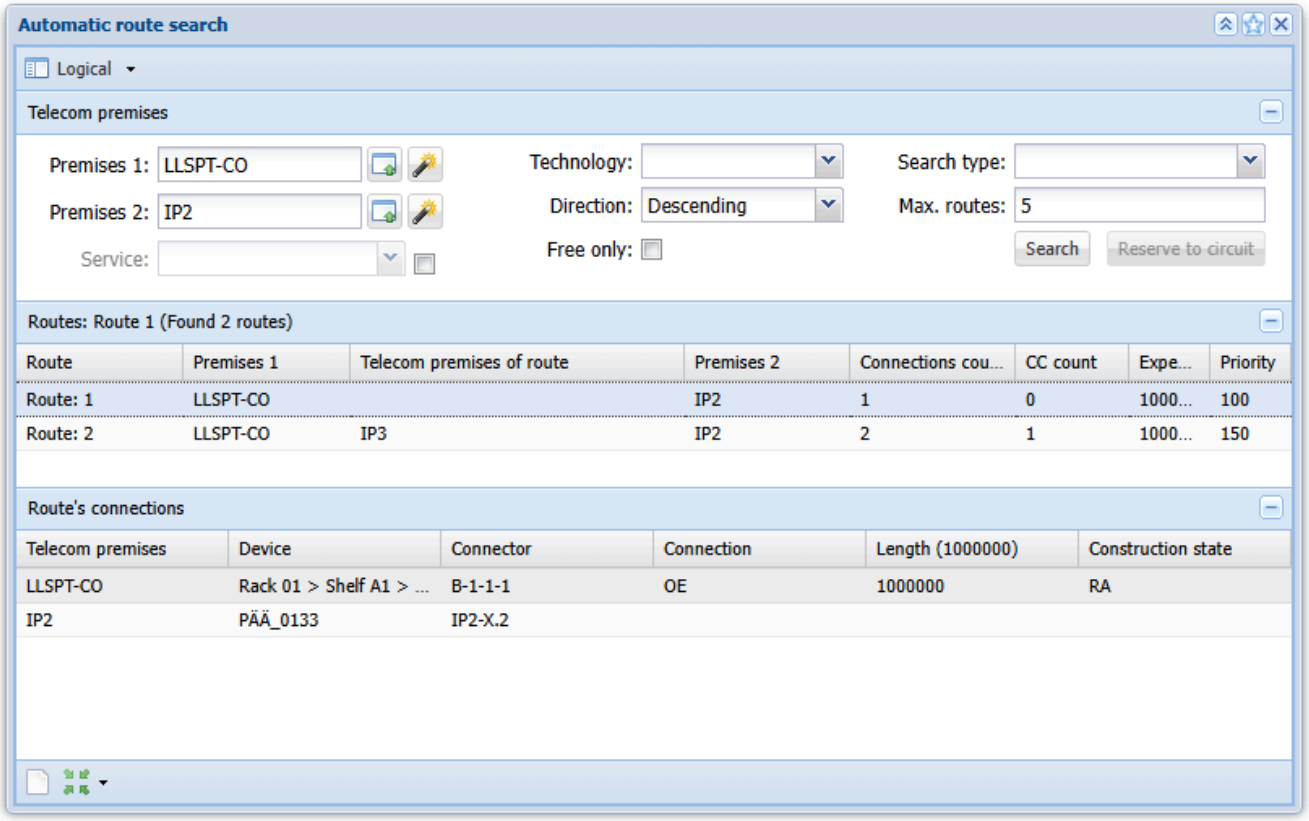
Automatic route search

The **Automatic route search** tool provides an automated method for finding optimal routes between network objects. It supports two different networks:

- **Logical** – for device/circuit-level routes.
- **Physical** – for conduit, cable, and fiber-level topology routes.

Automatic route search (Logical)

The **Automatic route search** for logical network is used only when there is a need to know the shortest possible reserved or free route including logical connections between two telecom premises. Information on the telecom premises at the start and end of the route is required for the search. If no route between the selected telecom premises can be found, the application notifies the user.



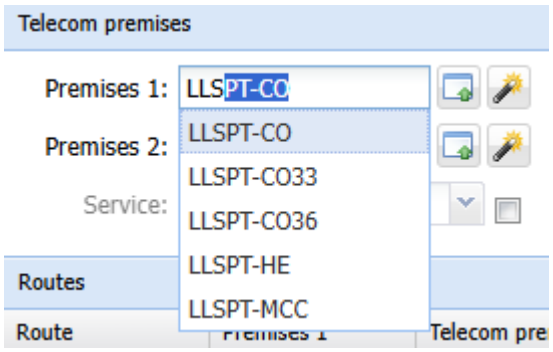
Searching a route

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Information on the telecom premises at the start (**Premises 1**) and end (**Premises 2**) of the route is required for the search. You can select telecom premises by using one of the following methods:

- Click **Pick from telecom premises form** .
- Use the **Pick from map** function.
- Search by using the identifier. When you enter a part of the searched identifier in the applicable text field, a list of search results appears below the field.

  Select the required identifier using the left mouse button.



The **Service** selection defines the services provided by the connectors of devices that are accepted and part of the route. Services are viewed from the customers direction to the exchange. If the **Service** checkbox is not selected, the service offered by the connectors is not taken into account when searching for the shortest route.

The **Technology** selection defines the technology of devices that are accepted and part of the route. If **Technology** has not been selected, the technology of the devices is not taken into account when searching for the shortest route.

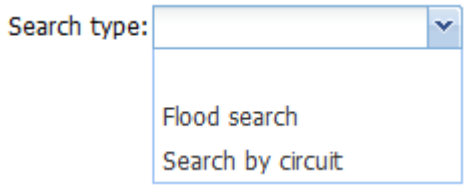
The **Direction** selection defines the direction of the EXT connections of the devices that are accepted and part of the route. If direction has not been chosen, or if direction information has not been saved for connections, the direction of the connection is not taken into account.

The **Free only** selection limits the search to connection chains between the telecom premises 1 and 2 that are free from circuits.

Before searching for routes, you can limit the search by defining filters. You can do this by selecting the **Search type**. This field is empty by default (meaning a full search is carried out). The actual filters are **Flood search** and **Search by circuit.** Flood search searches for all routes with complete connections, meaning the route includes all required external connections and cross connections. Search by

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circuit searches for all routes with circuits between the premises and tries to find the connections using the same route as the circuit(s) found. Full search (nothing selected in the menu) searches for routes using both methods.



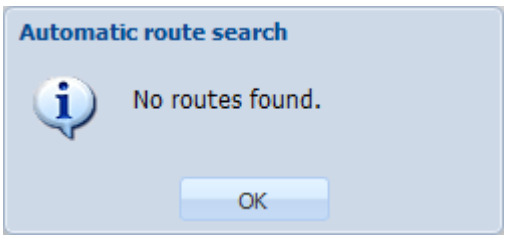
You can limit the number of displayed search results (routes) by defining the appropriate number in the **Max. routes** field. The default value in the field is 20, and if no value has been defined, all routes found based on the search criteria and filter are displayed on the form.

Starting the logical route search

Click the **Search** button on the form to start automatic route search. Route search is carried out based on the selected telecom premises and using the defined filters. If the capacity of the end premises (**Premises 2** on the form) is smaller than that of the start premises (**Premises 1** on the form), the direction is automatically reversed so that it is from the premises with smaller capacity to the premises with larger capacity. In the case of **Premises 1** and **Premises 2** are switched on the form, and the switch is also applied to the direction of the displayed routes.

When a search has been successfully carried out, the application displays information on the start and end premises for the route and the telecom premises between them that are part of the route. In addition, the number of connections and cross-connections required for forming the route is displayed on the form, along with the related costs and priority.

If the search returns no routes for the selected telecom premises, the application will notify the user.



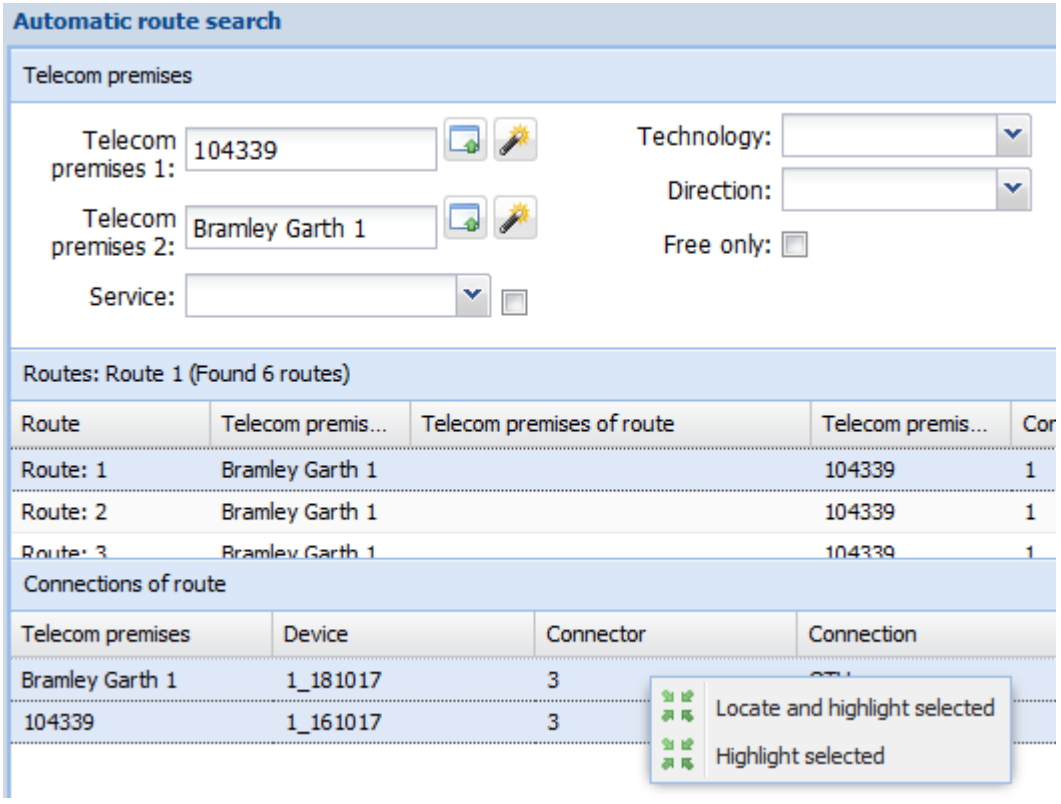
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Highlighting a route

You can highlight a route in the network map. To do this, click **Locate and highlight** on the form. This highlights all cable routes related to the connectors that are part of the connection route. You can also right-click the route row to access the locate and highlight functions.

To highlight a specific route with its connections, select the required route option in the **Routes** section on the form. Next, in the **Route's connections** section, select the required rows with the left mouse button while holding down the Ctrl key, and, with the right mouse button, select **Locate and highlight selected** or **Highlight selected** in the menu.

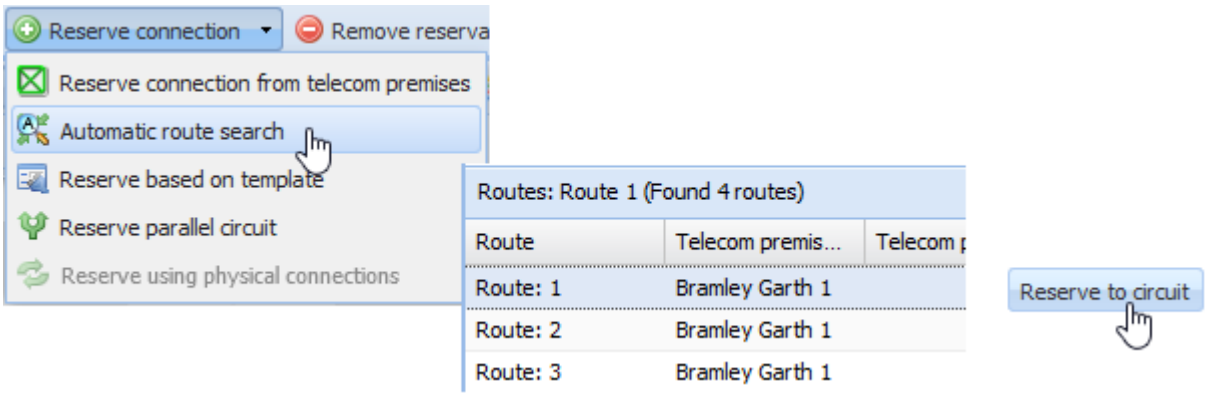
Note! The **Route's connections** section lists the devices in a hierarchical order. This means that the host device is the first device listed on the row, with the sub-device(s) shown next, depending on the connections found by the automatic search.



Reserve to circuit

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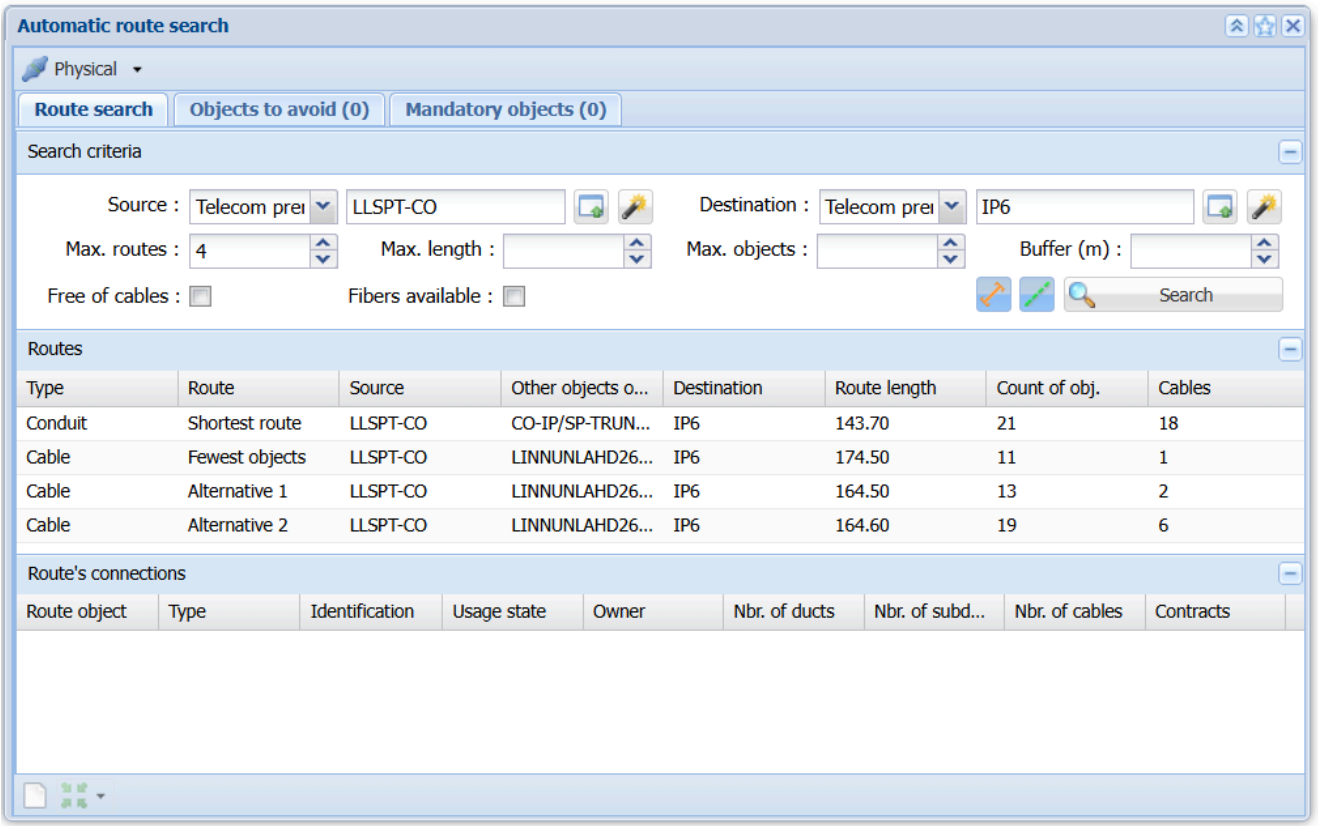
The routes of the search results can be reserved for the circuit that is being edited if you start the **Automatic route search** from the **Circuit** form. You can find the function in the drop-down menu for **Reserve connection** . After a successful route search, a **Reserve to circuit** button appears on the **Automatic route search** form. Select the appropriate route option and click **Reserve to circuit** .



Automatic route search (Physical)

The **Automatic route search** for physical network is used when there is a need to know the shortest possible connectable route or route with the fewest objects including physical connections between two network objects (telecom premises, manhole or splice).

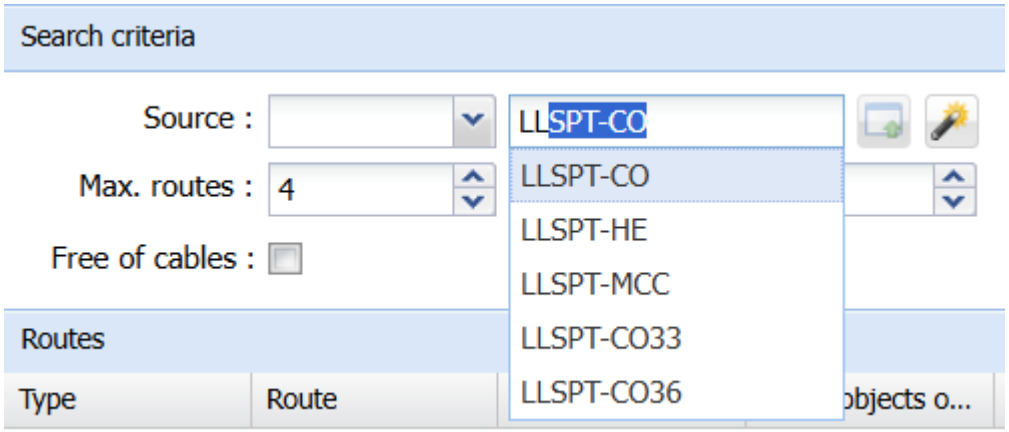
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Searching a route

To run the route search, you must first specify the **Source** and **Destination** objects. These may be telecom premises, manholes, or splices. The objects can be selected using one of the following methods:

- Click **Pick source from form** .
- Use the **Pick from map** function.
- Search by using the identifier. When you enter a part of the searched identifier in the applicable text field, a list of search results appears below the field. Select the required identifier using the left mouse button.



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Search criteria

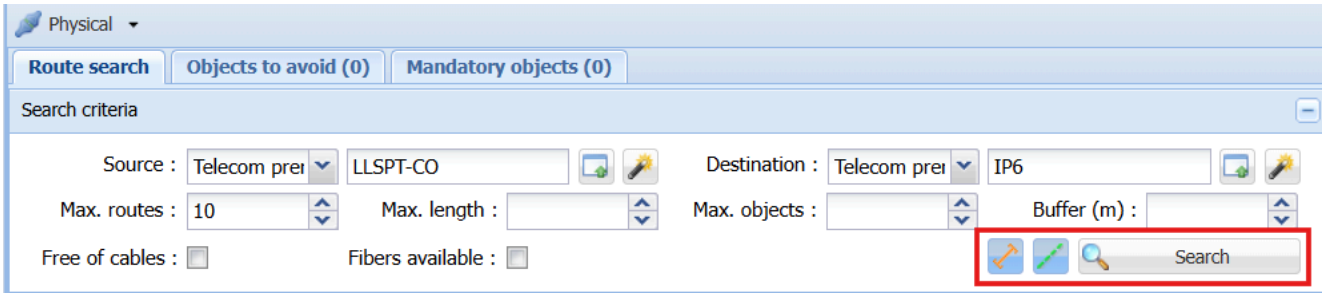
Additionally, you can define search criteria and how physical topology routes are searched.

- **Max. routes**: You can limit the number of searched routes by defining the appropriate number in the **Max. routes** field. If no value has been defined, all routes found based on the search criteria and filter are displayed on the form.
- **Max. objects**: You can limit the number of searched objects by defining the appropriate number in the **Max. objects** field. If no value has been defined, all objects found based on the search criteria and filter are displayed on the form.
- **Max. length**: You can limit the maximum length of searched routes by defining the appropriate number in meters in the **Max. length** field. If no value has been defined, all routes found based on the search criteria and filter are displayed on the form.
- **Buffer (m)**: You can create a buffer area to limit which objects are included in the search between **Source** and **Destination**.
- **Free of cables**: When selected, only routes that contain no cables are returned. Can be used in situations where one wants to find topologically connected duct routes that do not contain cables.
- **Fibers available**: When selected, the search returns only routes that include at least one available fiber. Can be used in situations where one wants to find topologically connected cable routes that have fibers available/free from physical reservations.
- **Show search radius**: When selected, a search radius is displayed on the map to visualize the route search algorithm after the **Search** has been run.

Starting the physical route search

After selecting the **Source** and **Destination** objects with the appropriate search criteria, click **Search** to run the route search. If needed, you may exclude conduits or cables from the end results by switching off the corresponding **Conduit** or **Cable** icons.

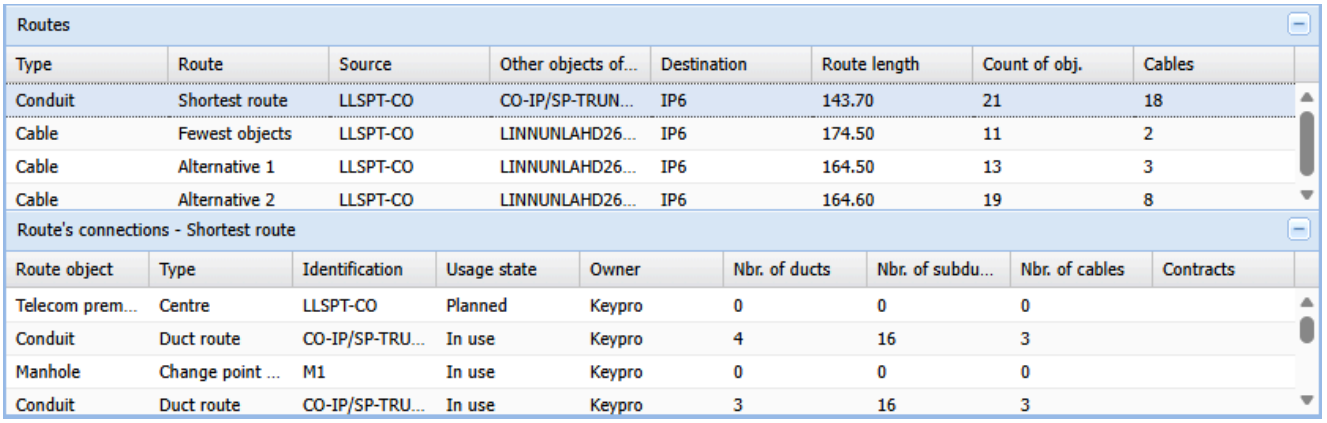
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When a search has been successfully carried out, it lists several route options in the **Routes** section; the shortest route, the route with the fewest connected objects, and other valid alternative routes.

Note! The shortest route and the route with the fewest objects may be the same, but the system still reports them as separate options for clarity.

Clicking any of these routes lists the connected objects in the **Route's connections** section.



To start a new search, edit the **Source** and **Destination** objects or clear the form by clicking **Clear** .

Highlighting a route

You can highlight routes in the network map:

- To highlight all routes that are part of the route's connections, click **Locate and highlight** on the form's toolbar.

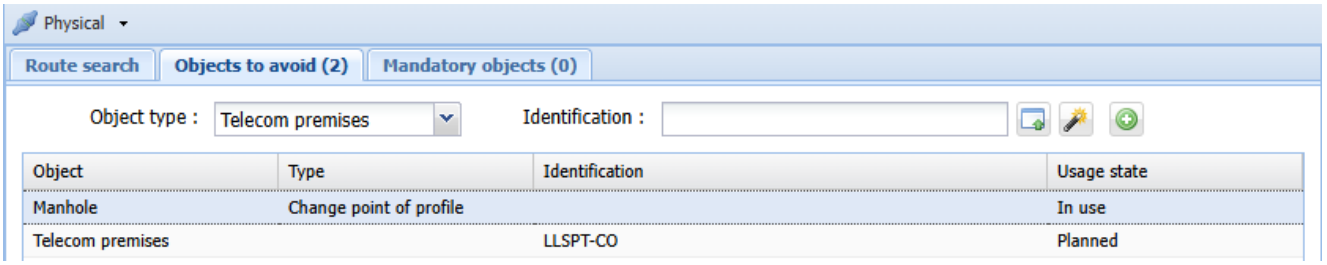
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- To highlight a specific route with its connections, select the required route option in the **Routes** section on the form. Next, in the **Route's connections** section, select the required row with the left mouse button, and with the right mouse button select **Locate and highlight selected** or **Highlight selected** .

Note! The **Route's connections** section lists the devices in a hierarchical order based on the type of route has been selected.

Objects to avoid

The **Objects to avoid** tab allows you to define network objects that must be excluded from the route search. Any object added to this list will prevent the route from passing through it, prompting the system to find an alternative path.



The objects can be selected using one of the following methods:

- Click **Pick from form** .
- Use the **Pick from map** function.
- Search by using the identifier. When you enter a part of the searched identifier in the applicable text field, a list of search results appears in a drop-down menu below the field. Select the required identifier from the drop-down menu and add it to the **Objects to avoid** list by clicking **Add to list** .

Additional functions can be opened from the drop-down:

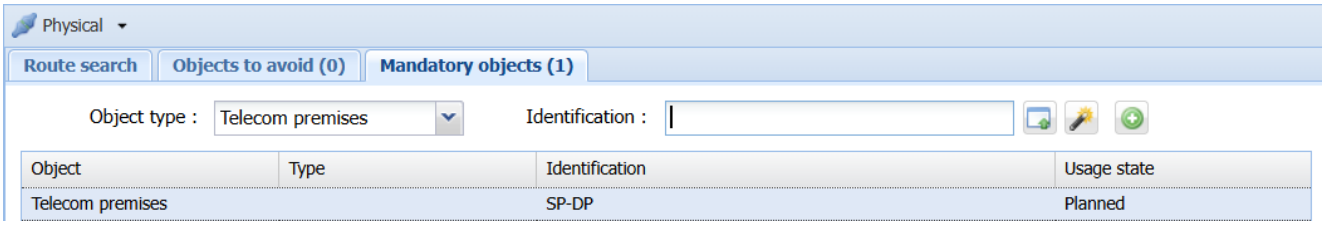
- To remove an object from the list, right-click the entry and choose **Delete** .
- To locate selected object from the list, right click the entry and choose **Locate selected** .
- To highlight selected object from the list, right click the entry and choose **Highlight selected** .

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- To locate and highlight selected object from the list, right click the entry and choose **Locate and highlight selected** .

Mandatory objects

The **Mandatory objects** tab allows you to define network objects that must be included in the route. Any object added to this list ensures that only routes containing all mandatory objects are shown in the results.



The objects can be selected using one of the following methods:

- Click **Pick from form** .
- Use the **Pick from map** function.
- Search by using the identifier. When you enter a part of the searched identifier in the applicable text field, a list of search results appears in a drop-down menu below the field. Select the required identifier from the drop-down menu and add it to the **Mandatory objects** list by clicking **Add to list** .

Additional functions can be opened from the drop-down:

- To remove an object from the list, right-click the entry and choose **Delete** .
- To locate selected object from the list, right click the entry and choose **Locate selected** .
- To highlight selected object from the list, right click the entry and choose **Highlight selected** .
- To locate and highlight selected object from the list, right click the entry and choose **Locate and highlight selected** .

Exporting routes

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The **Automatic route search** form includes a **Reports** button in the bottom toolbar when used in **Physical** mode. This feature provides a way to export data for the selected route.

- By choosing **Current route to Excel**, you can export route data to an Excel file.
- Selecting **Export current route** enables the standard **Advanced export** functionality available in KeyCom and allows exporting ESRI (shp_annot), Microstation (dgn), AutoCAD (dxf), AutoCAD (dwg) and KML (kmz). Read more in EXPORTING OBJECTS.

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Logical other end connection report

The **Logical other end connection report** displays the logical connections for connectors defined based on the search criteria. In addition, the report includes information on any defective connections and whether a connection has been created without a physical cable.

You can use an **Exchange** and **Telecom area** as search criteria for the telecom premises included in the report, or you can search based on the name of the telecom premises and device. In the drop-down menu for **Technology**, select the network technology that you want to use. **Show incorrect connections** and **Show reserved to circuits** selections are used to limit the report to incorrect connections or connectors reserved for circuits only.



Click **Reports** to create the **Logical other end connection report** in either PDF or XLSX format. You can either save the document or print it using the browser's printing tools. The **Logical other end connection report** includes the information defined on the Logical other end connection report form, such as exchange area, telecom area, telecom premises, device, and connectors. In addition, the report includes the other end connectors for connectors, any cable and other end cable used for the connection, and the end points of the cable and other end cable if there are defects in the connections. When connections are in order, the following columns are marked with OK: Cable, Cable end point, Other end circuit, Other end cable, and Other end cable end point.

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Other end connection info

Exch	Rivertown	Telecom area:	River1
Tele	Soldan 1	Device:	1_090218 (1->)

CCP	Circuit	Cable	Cable end point	Other end ccp	Other end circuit	Other end cable	Other end cable end point
100	Soldaninkatu 2/Soldaninkatu 2 - 1 (In use)	FZOVDMU-SD 144 SML 90.2m F8141B p. 50	Premise: Varasl 1, 1_090218, 50	Rivertown - River1 Soldan 2, 1_090218, 1	ERROR: Soldaninkatu 2/Soldaninkatu 2 - 1 (In use), Soldaninkatu 2/Soldaninkatu 2 - 1 PLAN (Massa22) (Soon in use)	FZOVDMU-SD 24 SML 25.4m F8141A p. 1	Premise: Soldan 1, 1_090218, 113
108	Soldaninkatu 3/ (In use)	FZOVDMU-SD 6 SML 73.8m F8141F p. 2	Premise: Soldan 5, 1_090218, 2	Rivertown - River1 Soldan 3, 1_090218, 1	ERROR: Soldaninkatu 3/ PLAN (Massa22) (Soon in use),	FYMSU 24 SML 57.3m F8141D p. 1	Premise: Soldan 1, 1_090218, 101
109	Soldaninkatu 3/ PLAN (Massa22) (Soon in use),	FZOVDMU-SD 6 SML 73.8m F8141F p. 3	Premise: Soldan 5, 1_090218, 3	Rivertown - River1 Varasl 1, 1_090218, 109	ERROR:	FZOVDMU-SD 144 SML 122m F8141 p. 109	Premise: Varaslammen keskus, 1_090218, 109

When the connections between connectors that fulfil the search criteria and the other end connectors are in order, and the connections have been created using physical cables, the Logical other end connection report will include the connectors and other end connectors, as well as information on the related exchange area, telecom area, telecom premises, and devices.

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Logical mass connection change

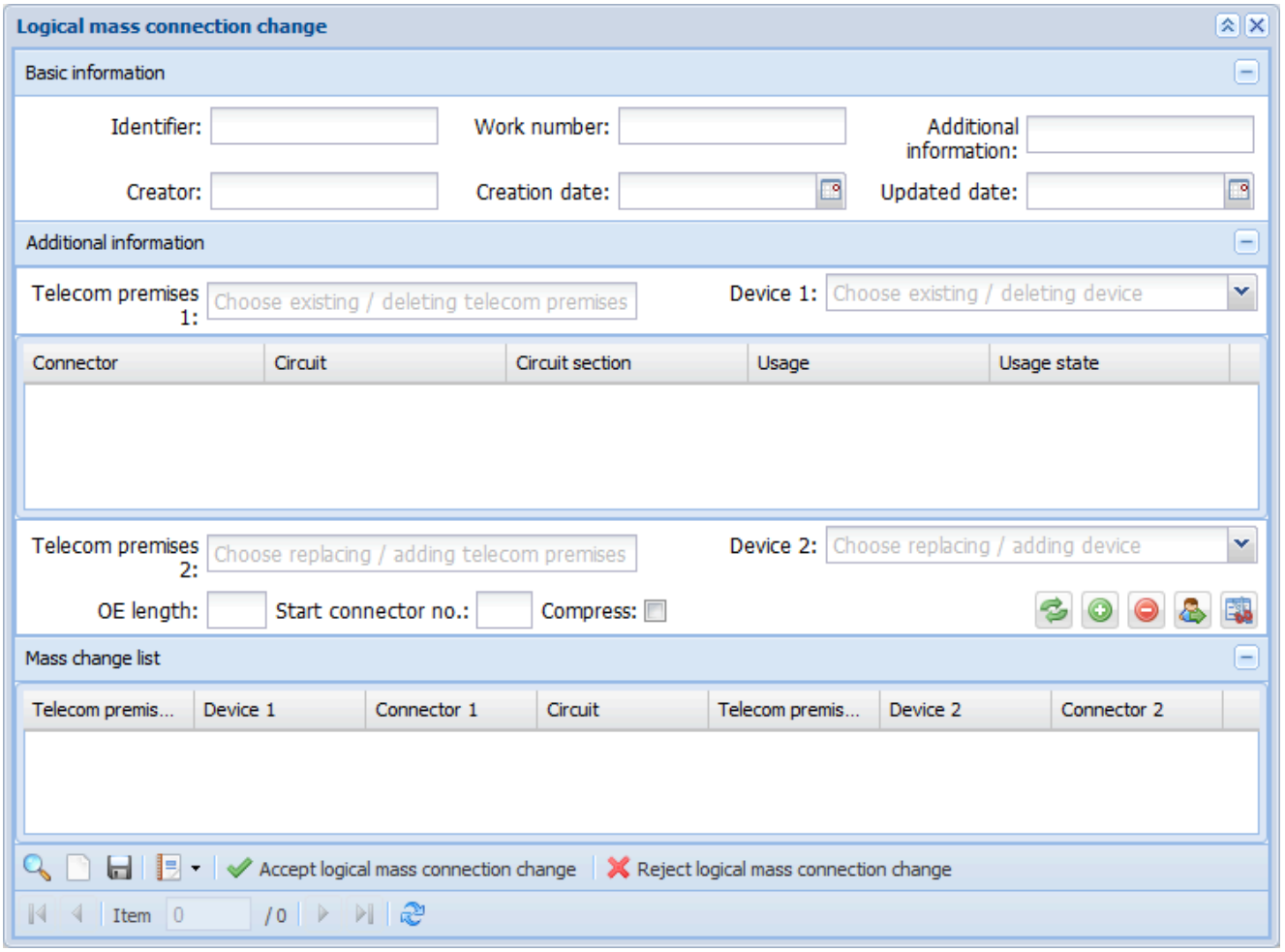
On the **Logical mass connection change** form, you can implement mass connection changes to the connectors of the telecommunication network devices and related circuits.

The basic principle of this function is that you choose the telecom premises, device and connectors whose reservations you want to edit. In addition, you choose the telecom premises that are used as a replacement or added, and the device on which the changes are implemented. The device with the connectors that are used as replacements can be located either on the same telecom premises (cross-connection) or on entirely different telecom premises (logical connection), and connections can also be transferred from certain connectors to others within the same device (internal connection). The Logical mass connection change form can also be used to replace or disconnect a circuit's connections.

A **logical mass connection change** can have one of the following statuses: planned, accepted, or rejected. A planned mass connection change can be edited later. An accepted mass connection change replaces the previous connections of the connectors in question with new connections, and saves the previous connection information as historical data in the database. The planned changes of a rejected logical mass connection change are removed from the database.

You can create a mass connection change report on a planned logical mass connection change in PDF or XLSX format. This report makes it possible to compare the situation with the starting point before you accept or reject a plan.

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On the **Basic information section,** you can add an identifier, work number, and additional information. The **identifier** is a mandatory field and a mass connection change will not be added unless this information has been entered.

You can use the Identifier, Work number, and Additional information fields as search criteria for a logical mass connection change. You can edit the information related to a mass connection change and save changes by clicking **Save**.

Additional information

The **Telecom premises 1** (existing/deleting telecom premises) field displays the telecom premises location of the connectors that are to be modified. The search function for telecom premises is activated when you start entering text in the field. On the displayed list of search results, select the required telecom premises by clicking the left mouse button. The **Telecom premises 2** (replacing/adding telecom premises) is searched in the same way.

The devices on the selected telecom premises are listed in the menu for **Device 1** (existing/deleting device). The active selection in the Device 1 menu defines the

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content of the connector list. In the menu for **Device 2** (existing/deleting device), select the replacing/adding device on the telecom premises 2.

The **Connector** list displays the connectors of the device that is selected in the existing/deleting device menu. Each connector is displayed on a separate row. Each connector row displays the connector name, circuit identifier, circuit section, usage, and usage state.

You can select the connectors for the logical mass connection change either all at once or one-by-one, for example, based on the circuit identifier. To select connector rows, click with the left mouse button while holding down the Ctrl or SHIFT key.

Enter the length of the new other end connection in the **OE length** field. In the **Start connector no.** field, enter the connector number from which the compressing/placement functions are started. Select the **Compress** checkbox to activate/deactivate the compressing function.

Adding changes to the logical mass change list

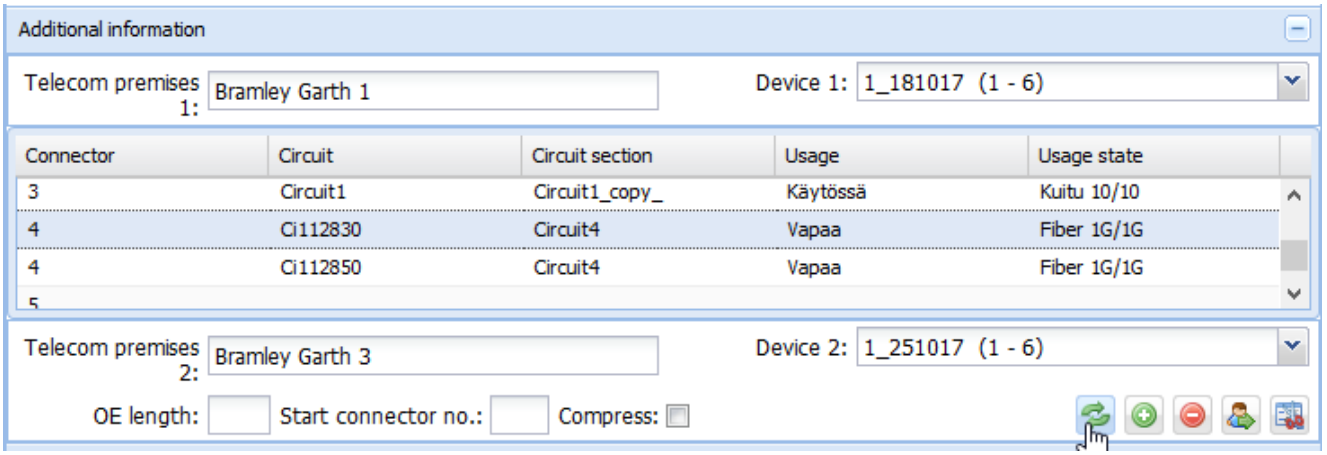
To add new change data to the mass change list, select the required additional information in the **Additional information** section of the Logical mass connection change form. Then, depending on the situation, click either **Replace logical mass connection change item**, **Add logical mass connection change item**, **Delete logical mass connection change item**, **Replace circuit connections**, or **Cut circuit connections**.

Replace logical mass connection change item

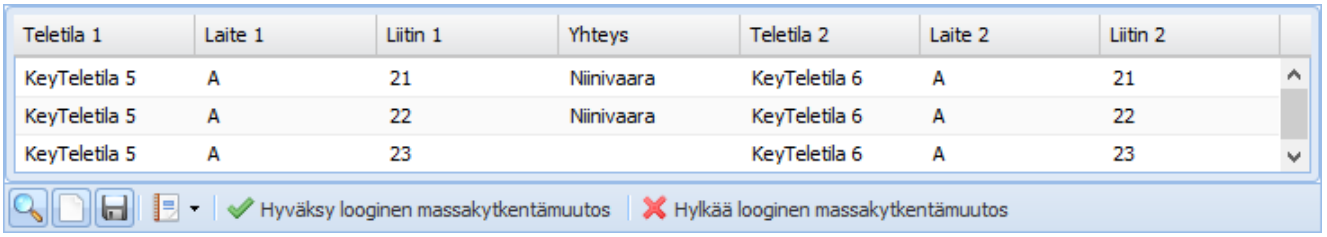
If you **replace a logical mass connection change item** while leaving the **Start connector no.** field empty and you do not select the **Compress** checkbox, the connectors selected in the current device will be placed on the connectors with the equivalent numbers in the replacing device.

In the example figure below, the connector 4 of Device 1 in the telecom premises Bramley Garth 1 are replaced with connector 4 of Device 2 in the telecom premises Bramley Garth 3.

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In the example figure below, the mass change list displays the planned changes.



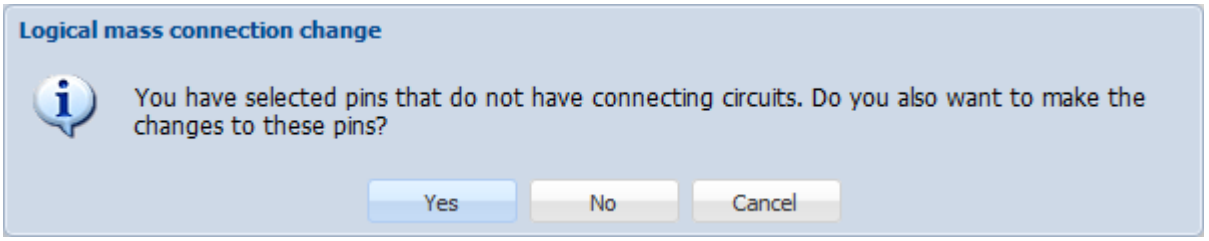
If you enter a connector number in the **Start connector no. field,** the connectors selected in the current device will be transferred to the replacing device using the same connector ranges as in the current device, starting from the connector that you defined as the start connector.

If you apply compressing to the replacement logical mass change that you implement, the connectors with circuits that you selected in the current device will be compressed in the replacing device in the order of available connectors and starting from the connector defined as the start connector (*the order of the connectors reserved for a circuit is not necessarily the same as in the original device*).

The application guides you by providing notifications if, for example, you select an already reserved connector as the starting point for compressing.

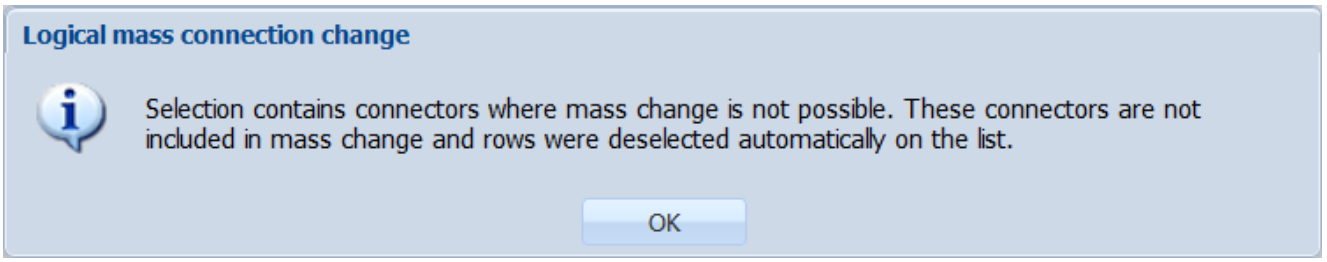
If you implement a mass change using the replacement function, and connectors with no circuits have been selected on the Connectors list, the following notification will be displayed:

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- Select **Yes** to apply the change to all connectors selected on the connector list.
- Select **No** to apply the change only to connectors with circuits.
- Select **Cancel** to cancel the mass change in question.

If you implement a mass change using the compress function and connectors with no circuits have been selected on the **Connectors** list, the following notification will be displayed:



When you select **Yes**, the program will ask you for a confirmation: **Only pins that are reserved to circuit can be changed by using compress. Do you want to continue? These connectors are not included in mass change, and rows were deselected automatically on the list.** Click **OK** to accept the change.

Add logical mass connection change item

Use the **Add logical mass connection change item** function to connect a connector of a new replacement device (Start connector no.) to a connector in a circuit's connection chain and to select whether the connection chain is to be continued in the same direction as in the original connection, or if the direction is to be changed. Click **Choose** to confirm your selection.



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Delete logical mass connection change item

The connector selected on the Connector list in the **Additional information** section is deleted from the circuit with the **Delete** logical **mass connection change item** function.

Replace circuit connection

The **Replace circuit connection** function transfers circuits from the connectors of an existing device to the connectors of another existing device without disconnecting logical connections. In this case, the previous connection chain of the circuit is replaced with the route of the selected connector.

The application follows the connections of the connector selected as the replacement only in the direction of the OE connection, and it reserves the connection chain it finds for the circuit. If several logical connections are found, the process will be discontinued at the connector in question.

When you accept a logical mass connection change, the reservations of the original circuit will be deleted, and the new ones will be applied. Any unused cross-connections that remain for the original circuit will be deleted.

Cut circuit connection

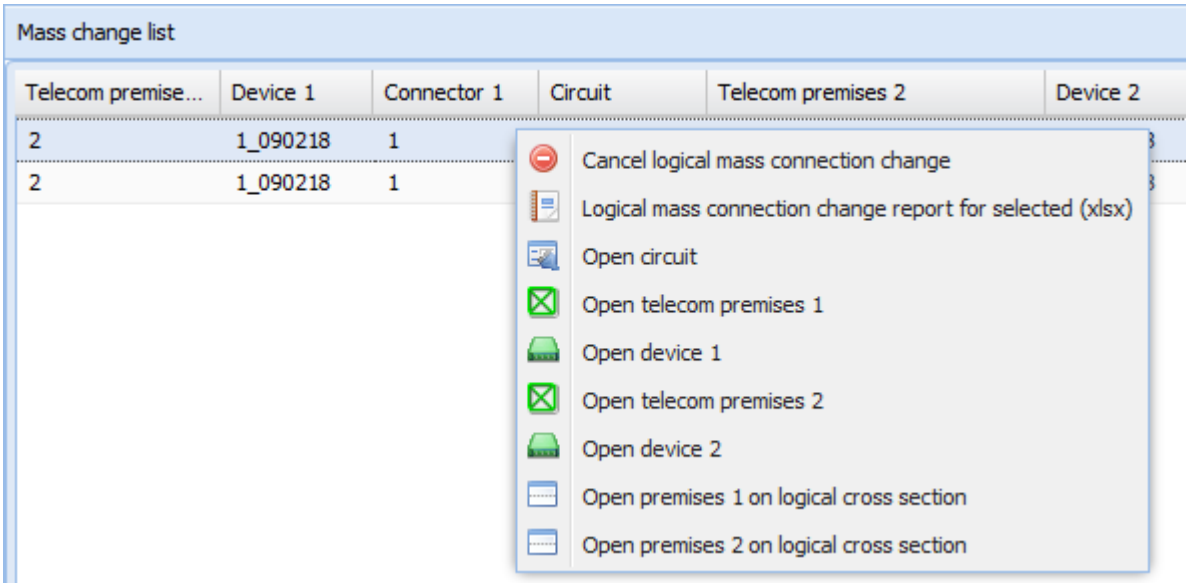
The **Cut circuit connection** function is used to cut the circuit's route from the connection selected for the mass connection change, and the remaining part is replaced with the connector connections that are used as replacements. In the planning phase, before accepting the change, a circuit has two circuit sections–the original and the planned route change (1 PLAN).

The replacing connector cannot contain more than one logical connection. If the replacing connector has a logical connection and a cross-connection, the cross-connection is disconnected, and the route that is defined by following the logical connection is selected as the route for the rest of the circuit.

Deleting a mass connection change item

To delete a row (and the related changes) that has been selected on the mass change list, click the right mouse button and select **Cancel** logical **mass connection change**.

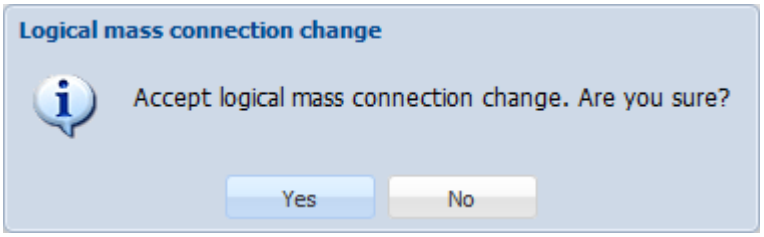
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If a circuit is linked to a connector, you can also use the following functions by using the context menu on the mass connection change list: **Logical mass connection change report for selected** and **Open circuit**. The other available functions can be used to **open the telecom premises and devices related to the mass connection change and open the telecom premises on a logical cross-section form.**

Accepting and rejecting a logical mass connection change

To accept changes planned on the mass change list, click **Accept logical mass connection change**. After you have clicked this button, you will be asked to confirm that you want to accept the mass connection changes.



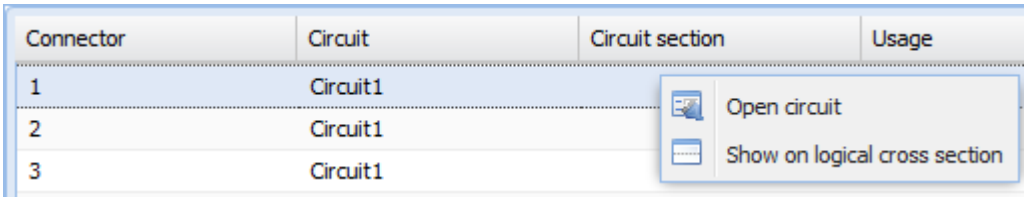
Click **Yes** to implement the planned changes and to remove the basic information on the logical mass connection change from the database. The original set-ups before changes are stored in history tables in the database. Click **No** to cancel the acceptance of changes.

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To reject changes planned on the mass change list, click **Reject logical mass connection change**. You will be asked to confirm that you want to reject the logical mass connection changes: Click **Yes** to reject the planned changes and to remove the basic information on the mass connection change from the database. Click **No** to cancel the rejection of changes.

Opening a circuit on the form

To view the circuit identifiers on the **Connector** list or mass change list, right-click a row and select **Open circuit**. This function opens a **Circuit** form with the information on the circuit in question. Click **Show on logical cross section** to go to the **Cross-section** form.



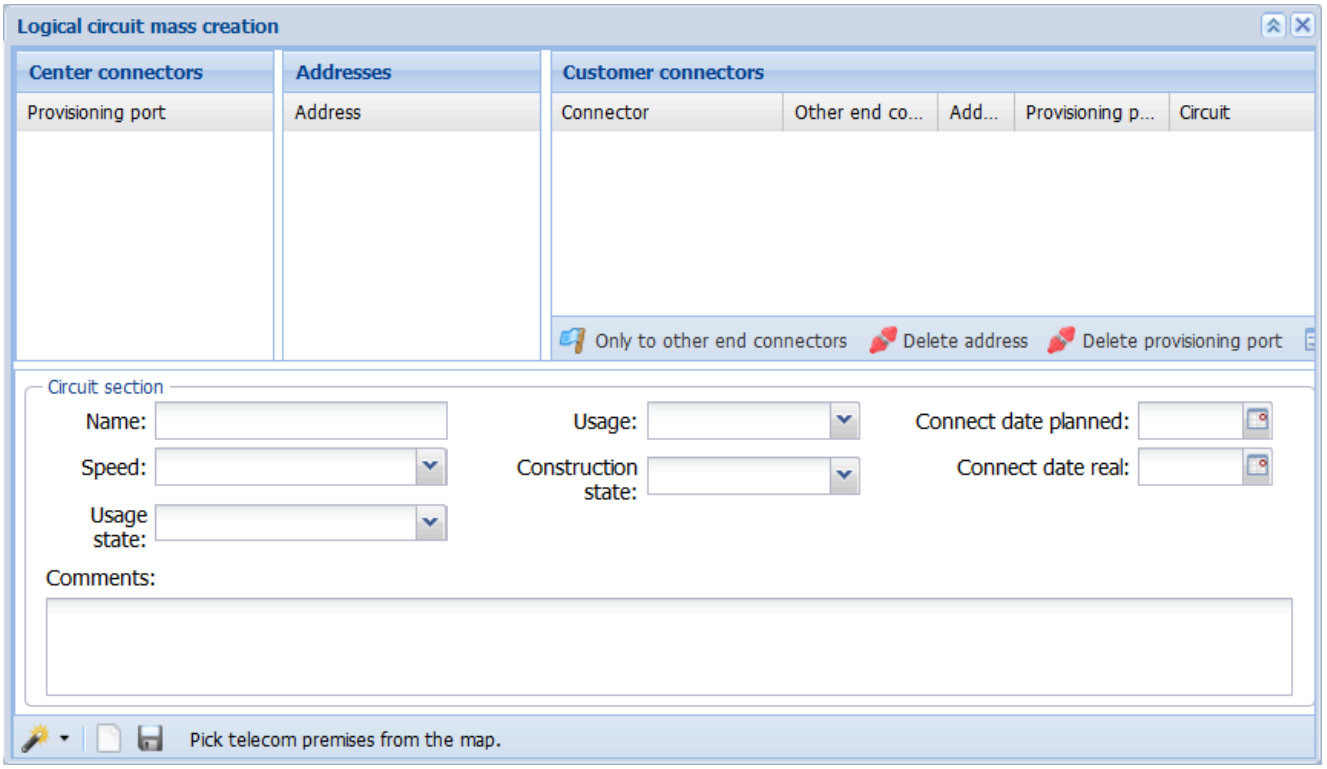
Logical mass connection change report

You can create a **Logical mass connection change report** for the planned logical mass connection change. You can create a report either as a PDF or an Excel document and print or save the report for further use. Click **Reports** to create a report.

A **logical mass connection change report** provides information on both the original circuit and the planned circuit. In addition, this report includes basic information related to the mass connection change. In the report, the connection on which the planned change will have an effect is marked with the symbol ***** at the beginning of the change row for connections.

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Logical circuit mass creation



The **Logical circuit mass creation** form is available in the **KeyNet** toolbar. The purpose of the **Logical circuit mass creation** form is to enable easy and fast circuit mass creation, for example, for new residential areas with detached houses. This form consists of three tree-like sections: **Center connectors**, **Addresses**, and **Customer connectors.** In addition, the form includes **Circuit section** information.

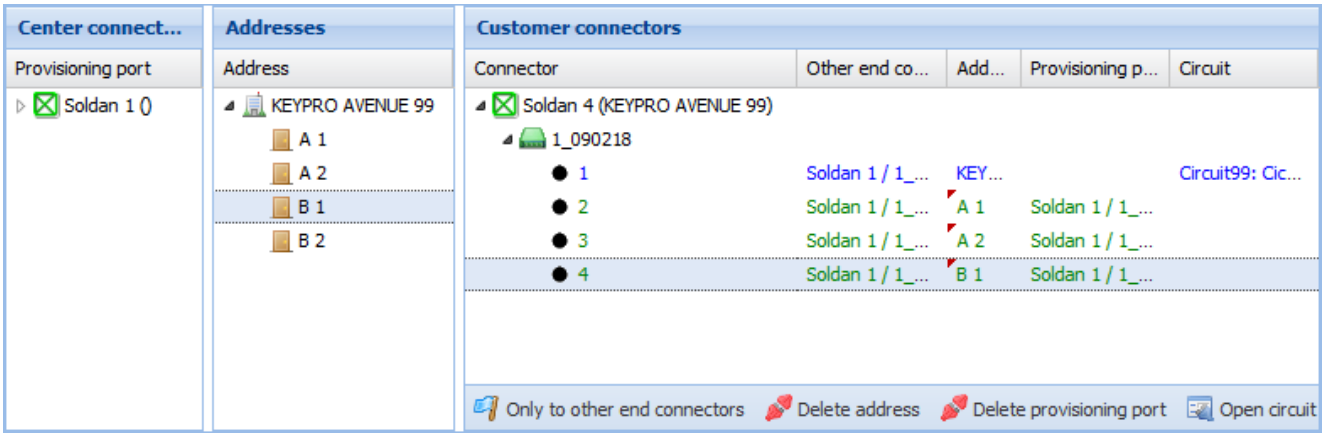
Start logical circuit mass creation by defining the area, such as a new residential area, using the **Pick from map** function. The telecom premises and the related devices and connectors within the selected area are listed on the **Connector** column in the **Customer connectors** section.

In circuit mass creation, the automatic connection reservation is based on existing logical connections and, for this reason, the last connector in a logical connection chain is displayed in the **Other end connector** column. If the connector displayed in the **Other end connector** column is classified as a center connector, it is automatically listed in the **Provisioning port** column. Similarly, the address information for telecom premises that are within the selected area is listed in the **Addresses** section, and the center connectors on the telecom premises that are

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included in the **Other end connector** column are listed in the **Center connectors** column at the telecom premises, device, and connector level.

If the connectors listed in the **Customer connectors** section have already been reserved for circuits, these rows are marked in blue and the circuit identifier is displayed in the Circuit column. To view the information related to a circuit, activate the required row by selecting it and then click **Open circuit** (you can also right-click to access the **Open circuit** function in the context menu). The edited lines are marked in green.



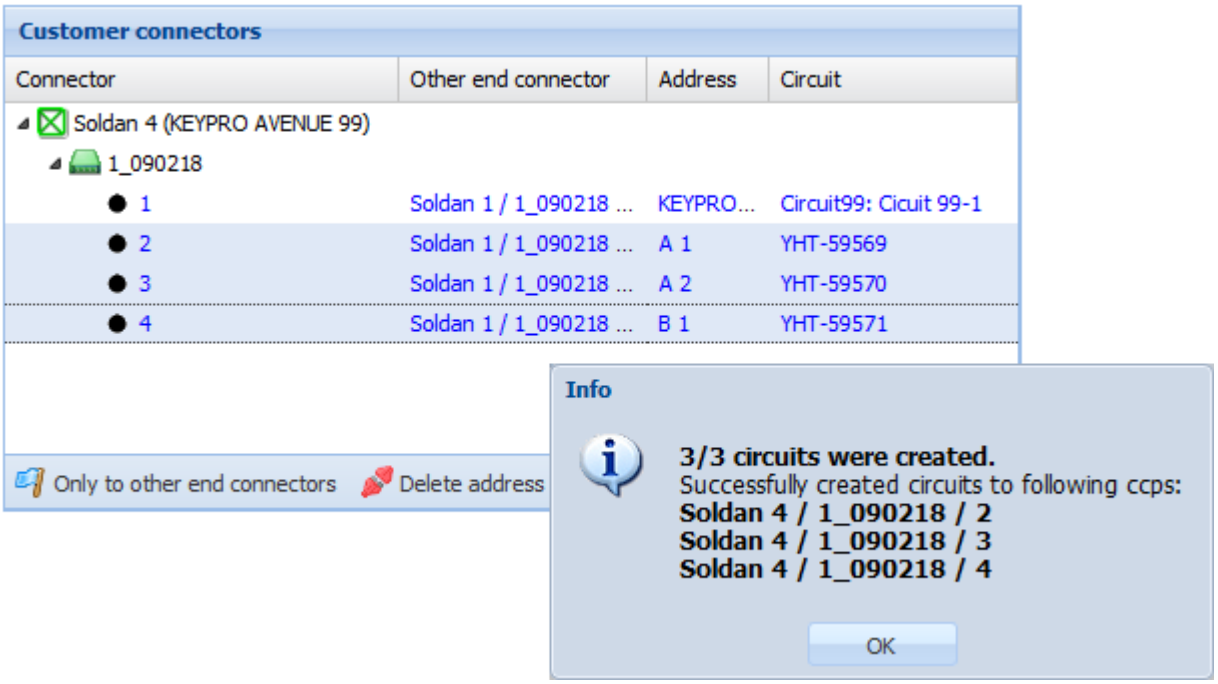
Start the circuit mass creation by dragging the **addresses** over to the connectors in the equivalent telecom premises either one-by-one or as a mass. If the connector at the customer end has related connections, and these connections lead to telecom premises that also provide provisioning ports, provisioning ports can also be dragged over to the equivalent customer end connector rows either one-by-one or as a mass. The dragged addresses and center connectors are displayed in the **Addresses** and **Provisioning port** columns in the **Customer connectors** section. Information on modified rows is marked in green.

Note! When items are dragged as a mass, dragging can only be carried out for rows that have information in the **Other end connector** column. Click Only to other end connectors to activate this function.

To delete the dragged addresses and provisioning ports, select the required rows in the **Customer connectors** section and click either **Delete address** or **Delete provisioning port**. You can also activate the Delete address and Delete provisioning port functions by selecting them in the menu that is displayed when you right-click a row.

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To create a **new circuit**, provide the appropriate basic information in the circuit section and then click **Create**. A new identifier is generated for the circuit, the dragged address is defined as the installation address, and the basic information fields in the section are completed with the selected information on the circuit section. Circuits are created for connectors and connection routes related to the connectors that are marked in **green** in the **Customer connectors** section. When a circuit is created, the dragged provisioning ports are automatically added at the beginning of the connection chain. After you click **Create**, you see a notification displaying the number of circuits and the related connectors.



After successful circuit creation, the connectors in question will be displayed in blue in the Customer connectors section. If no active usage state has been selected in the drop-down menu for the **Usage state** field in the circuit section, the Logical circuit mass creation tool will create, by default, a circuit with the usage state **Pre-connected** when its connections extend to a provisioning port. If no provisioning port has been defined, the tool will automatically create a circuit with the usage state **Partially pre-connected**.

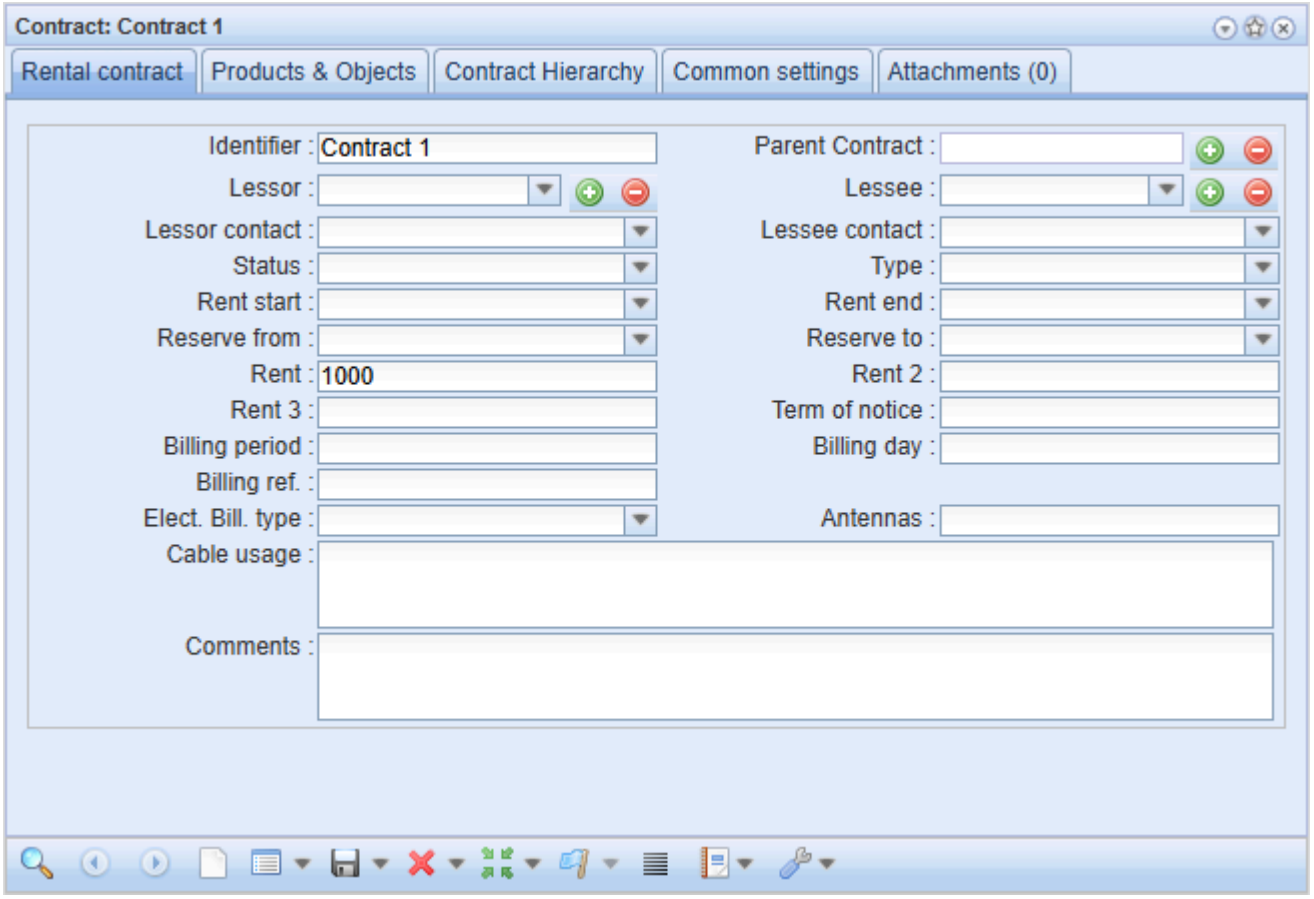
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Rental contract

The **Rental contract** function is available in the KeyNet toolbar. The **Contract** form consists of four tabs: **Rental contract, Products & Objects, Contract hierarchy, Common settings** and **Attachments.** This chapter introduces the functions on each tab.

Rental contract information

This tab includes information related to a rental contract. You can define a **Parent contract**, the **Lessor**, and the **Lessee**. These items are different from the other information content of the form in that they always refer to some other object. These are introduced in the next sections.



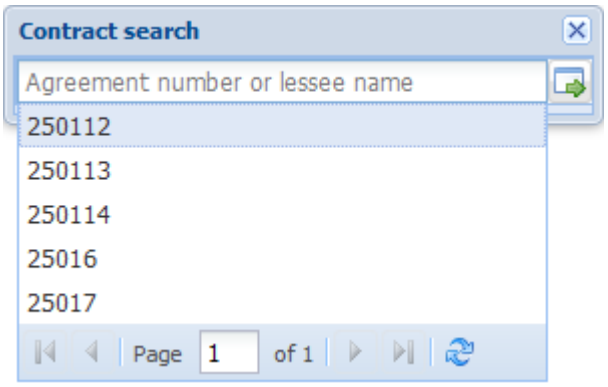
To create a new **rental contract**, complete the only mandatory field on the form which is **Identifier.** Save the form. Add new objects on the **Products & Objects tab**. On the **Contract hierarchy** tab, you can browse through objects that are related to the contract hierarchy.

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Adding a parent contract

Click **Upper Level Contract** to activate the contract search function. The **Contract search** dialogue box is opened. In the text field, enter a part of the contract number you want to search. When you start typing, filtering is activated automatically, and a list of search results is displayed. Select the appropriate rental contract on the list with the left mouse button. You can then click **Add this as parent contract** to import the search result to the Rental contract form. The contract you selected appears in the **Parent contract** field.

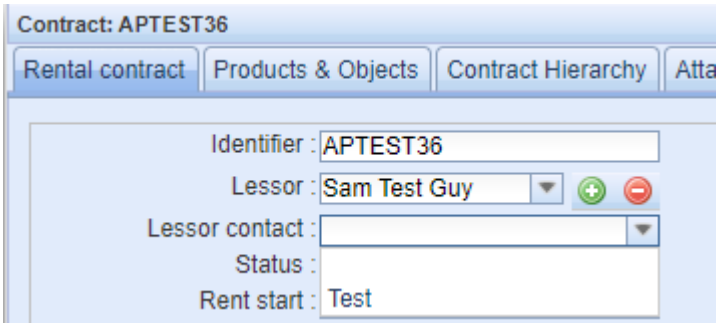
In the example figure below, the number “12” has been entered in the contract search field. The contract search function will find all contracts with the number sequence “12” included in the agreement number.



Adding a lessor

Click **Lessor** to open the **Customer** form, on which you can create, edit, and delete lessors. Open the required lessor on the form, or create a new one, and click **Update to form** to complete the **Lessor field**. You can search existing lessors by typing in the name in the field.

Once you have defined the lessor for the rental contract, you can go to the **Lessor contact** field and select a contact person that has been linked to the lessor (customer).



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Adding a lessee

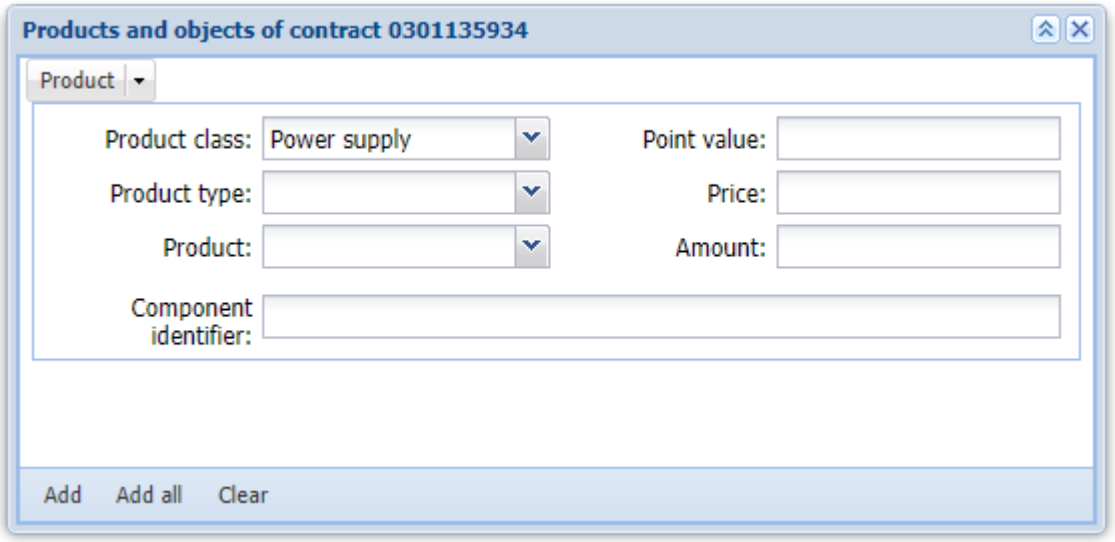
Click Lessee to open the **Customer** form, on which you must open the appropriate customer, and click **Update to form** to complete the **Lessee field**. You can search existing lessees by typing in the name in the field.

As is the case with lessors, you can also select a contact person for lessees in the **Lessee contact** menu if contacts have been defined for the lessee on the **Customer** form.

Products & Objects

On the **Products & Objects** tab, you can browse, add, locate and remove objects attached to the rental contract. This tab includes an object list and the **Attach new object** button that opens the **Attaching of products and objects** form.

Products are objects that you cannot create for the rental contract through other forms. To **add a product**, select **Product** in the drop-down menu.

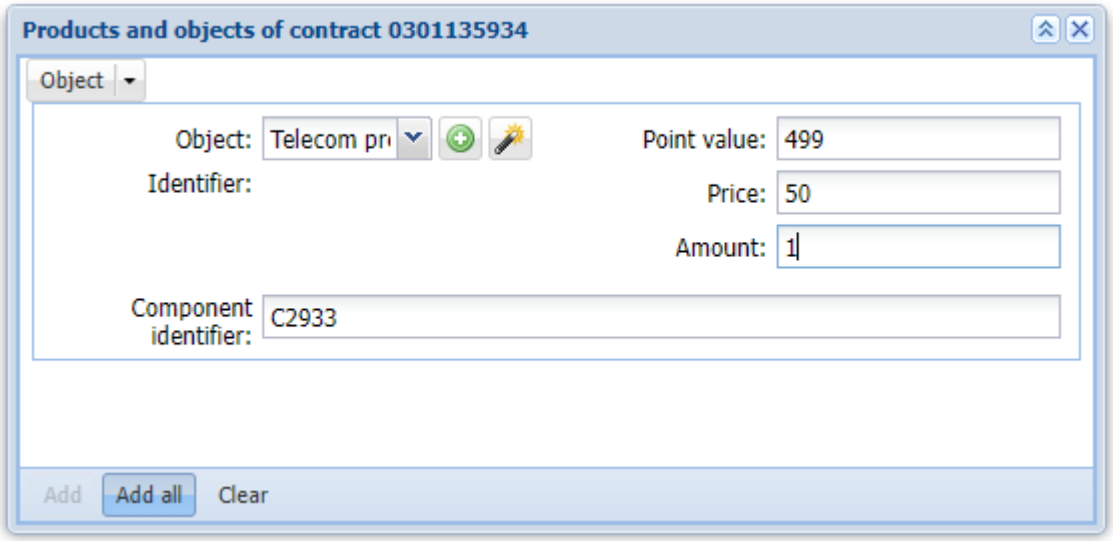


You can filter the products in the **Product** menu by selecting the **Product class** and **Product type** before you open the **Product** menu. You can also fill in the following fields: **Point value**, **Price**, **Amount**, and **Component identifier**. Click **Add**. Once you have added a **Product**, it appears on the rental contract's **Products & Objects** field.

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When you add an **object** or **multiple objects**, KeyCom objects that have already been digitized in the system are attached to the rental contract. **Start** by selecting an object in the drop-down menu for **Object**. Then decide how you want to attach the object. **There are three ways**:

1. Click **Open target form** to open the required object on the form that is opened and click **Update to form**.
2. Use the **Pick from map** tool. On the map, define the area that includes the required object. When you have selected the object, the object's identifier appears in the **Identifier** field. Then click **Add** to add the object to the rental contract.
3. **Add multiple objects at once**. First, click the **Add all** button to activate the functionality. Proceed as described in the example **A** and click the **Open target form** button to open the required objects. Open the dropdown menu linked to the **Update to form** and click **Export all to form**. The objects that were selected on the form will be transferred to the **Products & Objects** list.



Note! After the object has been added, the **rental contract** is displayed on the **Rental contracts** tab of the object in question, such as telecom premises.

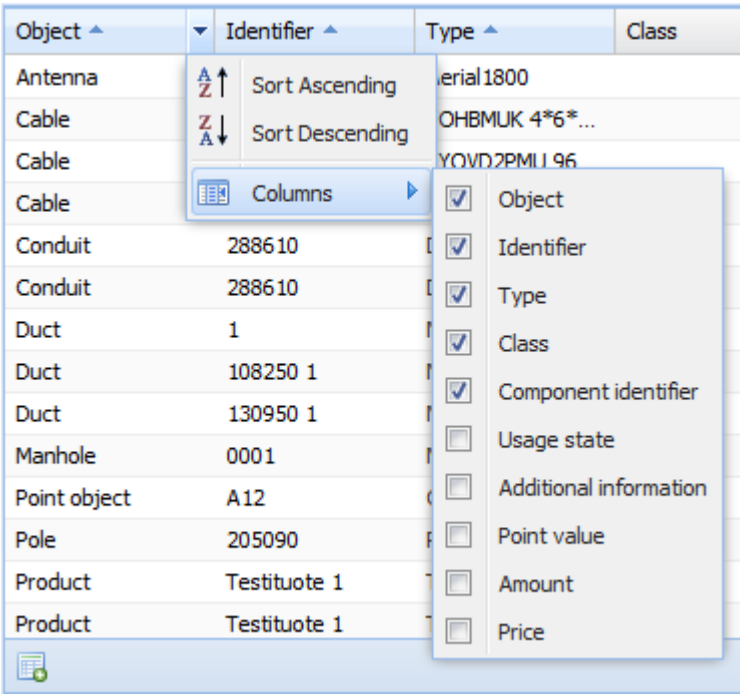
The functions of the object list:

View the functions of an object on the object list by right-clicking the row in question. The functions include: **Edit**, **Open target**, and **Delete**. Click **Edit** to edit

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the object on the **Attaching of products and objects** form. **Open target** opens the form for the object in question. **Delete** removes the row from the object list, and the object is no longer attached to the rental contract in question. You can also delete multiple objects at once select the required rows while holding down the Control or Shift key. Then click **Delete**, like normally.

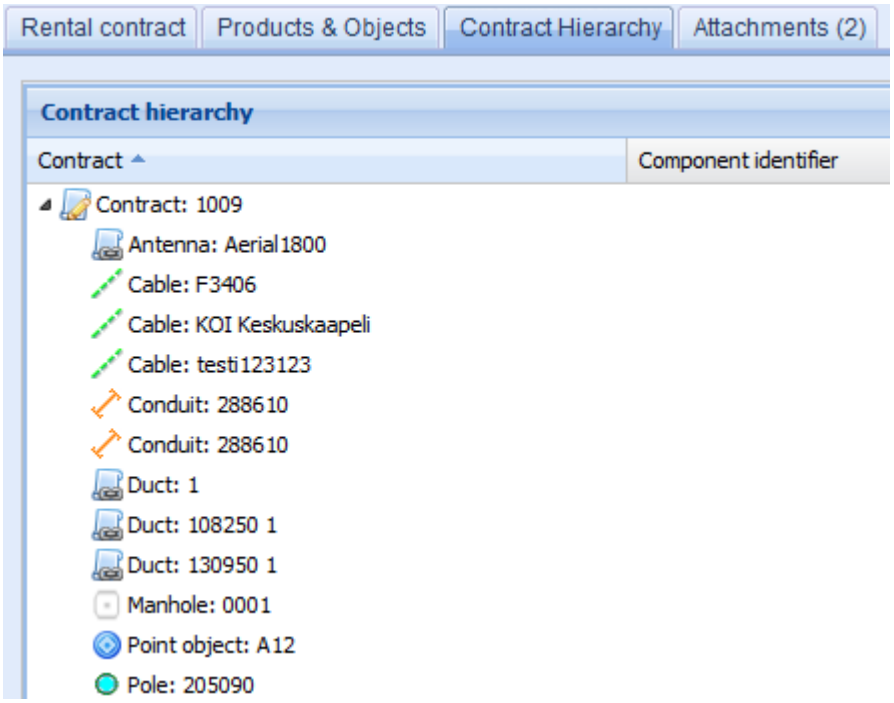
You can modify the **Products & Objects** columns by positioning the mouse cursor over a column header. This activates the menu. The **Columns** option displays a menu with functions for viewing and hiding columns. The menu is the same for all headers.



Contract hierarchy

On the **Contract hierarchy** tab, you can view contracts, the relationships between them, and the objects they include. You need this tab to view the relationship between the contract on the form and other contracts.

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Click the right mouse button to view the options available for the list objects. These options include: **Open target** and **Delete**. Deleting deletes the object from the rental contract in question without deleting the object from the map or database.

Attachments to the rental contract

You can add attachments to a rental contract on the **Attachments** tab. More information on adding and managing attachments is provided in the chapter Attached documents.

Rental contract reports

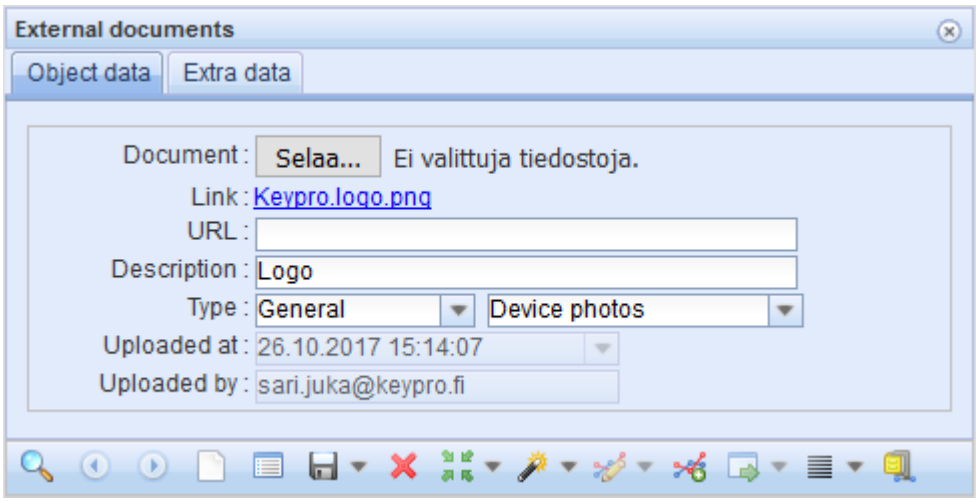
You can create reports on a rental contract. In the drop-down menu for **Export**, select **Reports** and then select the appropriate report:

- **Rental contract – report:** You can create and print a **PDF** or **Excel** file that includes information on the rental contract and the attached objects.
- **Contract objects – report:** This creates an Excel file that lists all the objects attached to the rental contract on the form.

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EXTERNAL DOCUMENTS

External documents can be **files** or **URL links** that can be positioned on the map and attached to network objects. To open the form, click **External documents** in the toolbar or on the **Attachments** tab on the forms. For more information, see the chapter Attached documents.



Viewing external documents

To open a document, click the link below the **Choose files** button. If the attachment is a **URL link**, it is opened on a new tab in your browser. The function for opening a file depends on your browser and browser settings. Usually, the browser asks whether you want to save or open the file.

TIP: If an external document includes **both a file and a URL link**, you can open the URL link by copying it to the address field in a new browser window.

Adding external documents

1. If you want to add a file, click **Choose files**.
2. Select the file or files that you want to attach as external documents.
3. Save the information on the form (**Type** is a mandatory field).
4. Click **Save**, or if you are attaching documents to an object, click **Attach document**

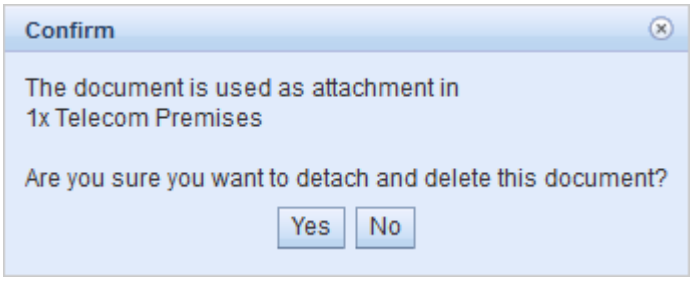
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If you selected several files, a separate external document is created for each file.

TIP: If you want to attach a **web address**, enter it in the URL text field or copy the address from the browser. If you also select a file, the URL is additional information to the document.

Deleting an external document

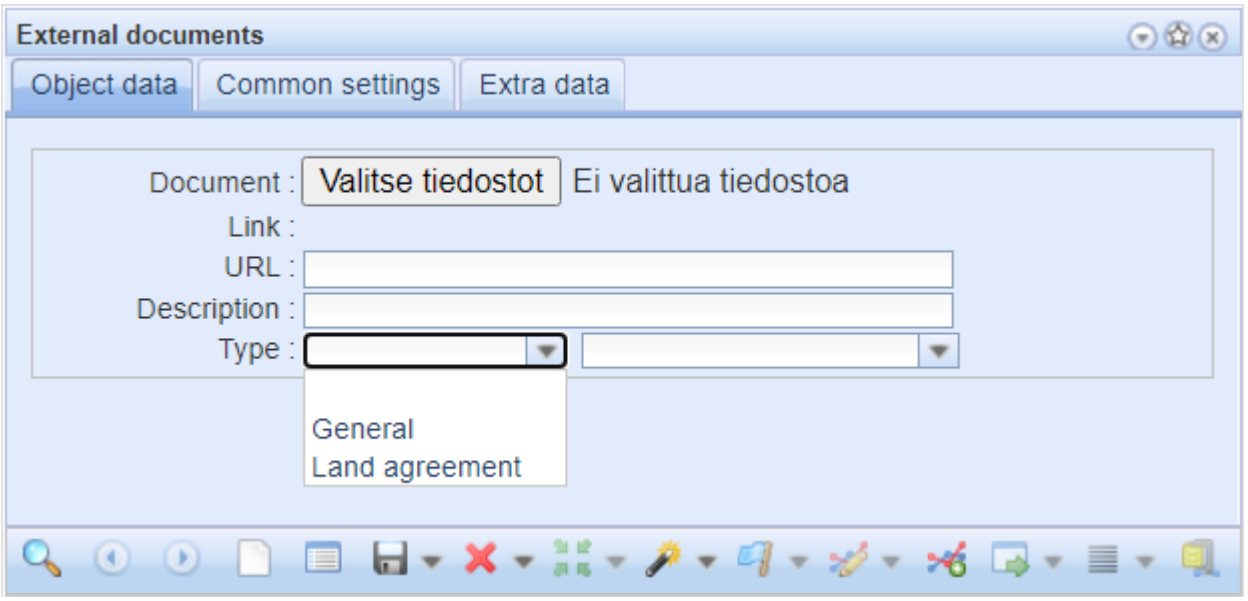
1. Retrieve to the form the document you want to delete.
2. Click **Delete**. If the document has been attached to an object, you will be asked to confirm the deletion.



Restrictions for deleting an external document

If you want to make sure that the external documents you added are not deleted by accident, you can restrict their usage rights. Click **External documents** -form from the toolbar and then select for example, **Land agreement** as the new type for the document. These types of documents cannot be deleted from the **External documents** -form. The term **Land agreement** can be changed from the admin user interface.

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ANNOTATIONS

Use the tools in the **Annotations** toolbar to create various annotations for map objects. The form that is displayed when you click the **Annotations** button includes tools for deleting an annotation and for creating an annotation for a single object or multiple objects simultaneously.



Annotations are updated automatically when object data is updated. The maximum number of **mass update** and **deletion** of annotations is 100: you can delete or update a maximum of 100 annotations at a time. This setting can be changed through the admin user interface. The annotations that are updated are highlighted on the map. You can select annotations for updating on a separate annotation list, which includes information on the annotation's type and text.

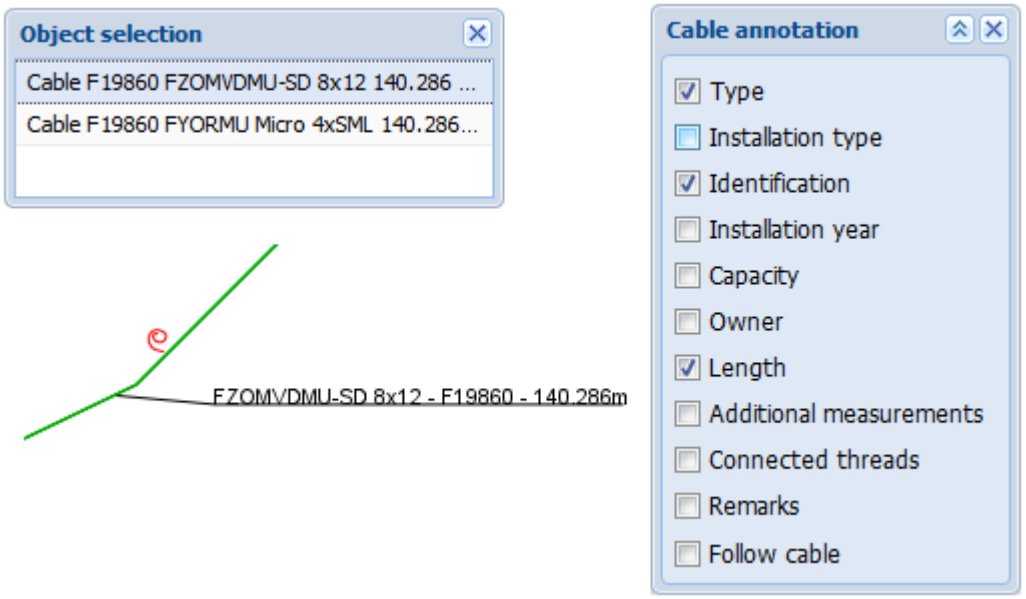
You can filter annotations so that they are displayed or hidden with the plan. If even one of the objects included in a group annotation is linked to a plan, the entire annotation will be displayed. When you select layers in the **Layers** tool, select **Filters** – **Plan**.

Creating an annotation

1. Use the **Annotate object** tool to create an annotation for any objects that support annotations. The object's own settings are used.
2. On the map, select the object you want to annotate. If there are multiple objects that can be selected, **double-click or right-click** to select the appropriate object on the list and select **Annotate**. Left-click to highlight the object on the map.
3. In the dialogue box for **Annotation**, select the required items. Note that the available options vary depending on the selected annotation tool. Below you can see a **Cable annotation** as an example.

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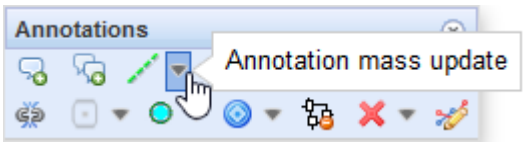
4. Use the left mouse button to position the annotation on the map. During the creation and positioning of an annotation, the annotation text is displayed on the map. This makes it easier to find an appropriate location for it.



Mass update of annotations

You can perform a mass update of annotations (excluding group annotations and sheath annotations). This function is particularly useful when you change the placement scale menu or want to change the information content of annotations.

You can find the Mass update of annotations function in the drop-down menu for each annotation object (cable, conduit, splice, telecom premises, manhole, pole or point object.



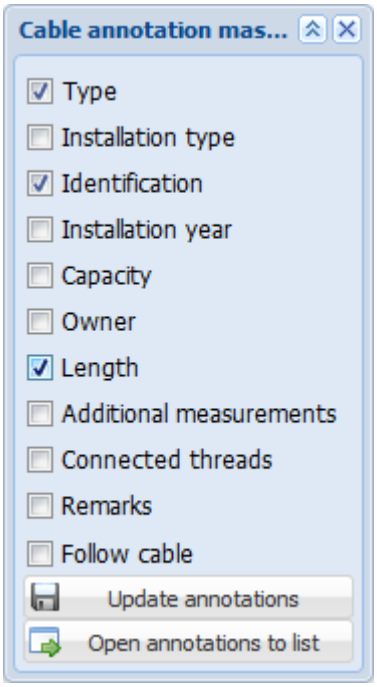
You can perform the mass update of annotations based on either 1) **Map view area**, 2) **Free area**, or 3) **Existing area**:

1. **Map view area**: Annotations that are displayed in the map view are updated.

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2. **Free area**: Use the left mouse button to draw an area within which annotations are updated. Click the right mouse button to end drawing.
3. **Existing area**: Use the left mouse button to click a point within an existing area to open the **Object selection** window. Double-click an area's name on the list to select the required area. **Please note** that you must have **Areas** active in Layers in order to have the areas displayed on the map!

Select the information content you want to view on the map. Then, click **Update annotations** to mass update all annotation information on the map. Alternatively, you can click **Open annotations to list** to open the **Annotations** form. On the **Annotations** form, you can select the annotations that you want to update. The **Annotations** form is discussed in more detail in the chapter Selecting annotations.



Deleting annotations

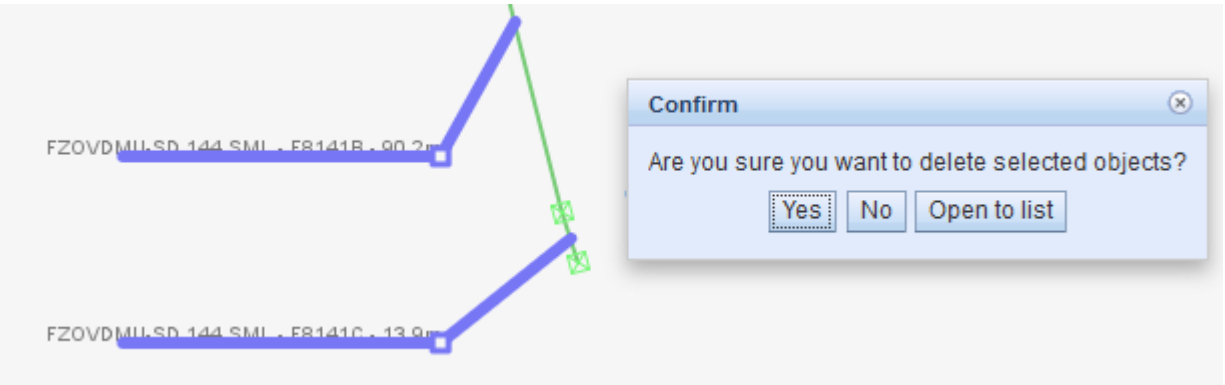
You can delete annotations one-by-one or as a mass deletion based on the map view or a defined area. In addition, you can also select the annotations you want to delete from the **Annotations** list.

1. To delete an annotation, first click **Delete annotation** .

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2. On the map, select the annotation you want to delete. If you want to delete multiple annotations, use the left mouse button to draw a rectangle on the map, within which annotations are to be deleted. The annotations that will be deleted are highlighted on the map.

The program will ask you to confirm the deletion of the annotation. If you want to view the annotations that are to be deleted, click **Open annotations to list**. On the displayed **Annotations** list, you can delete or update annotations as required. Additional options provided by the **Annotations** list are discussed in the chapter Selecting annotations.



TIP: An annotation is automatically deleted when its object is deleted. A group annotation is deleted when all the related objects have been deleted.

Mass deletion of annotations

Go to the drop-down menu of **Delete annotation** to activate the mass deletion of annotations. You can perform a mass deletion of annotations based on either 1) **Map view area**, 2) **Free area**, or 3) **Existing area**:

- **Map view area**: Annotations that are displayed in the map view will be deleted.
- **Free area**: Use the left mouse button to draw an area within which annotations are deleted. Click the right mouse button to end drawing.
- **Existing area**: Use the left mouse button to click a point within an existing area to open the **Object selection** window. Double-click an area's name on the list to select the required area.

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> **Please note that you must have Areas active in Layers in order to have the areas displayed on the map**

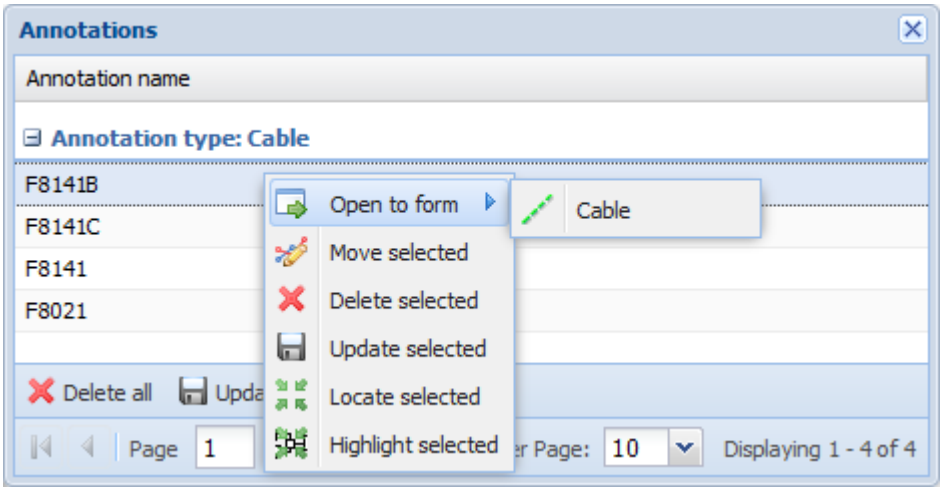
The annotations that will be deleted are highlighted on the map. The program will ask you to confirm the deletion. In addition, you can open the annotations to be deleted on the list view by clicking **Open annotations to list**.

Selecting annotations

When performing a mass update or mass deletion, you can select the annotations you want to delete by first defining the area within which annotations are to be deleted and then picking from this group the objects and annotations that you want to update:

1. When performing a **mass update**, click **Open annotations to list**.
2. When performing a **mass deletion**, click **Open to list**.

Both options take you to the **Annotations** form. On the **Annotations** form, you can select the annotations that you want to update (**Update all**) or delete (**Delete all**). Please note that you cannot select the **Update all** function when performing a mass deletion.



On the list of annotations, select the required rows while holding down the Control or Shift key. Click the right mouse button to access the following functions: open the selected objects on their forms and delete, update, locate, or highlight the selected objects.

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Use the **Move selected** function to move annotations on the map to a new location. Further information on this function is available in the chapter Edit annotation location.

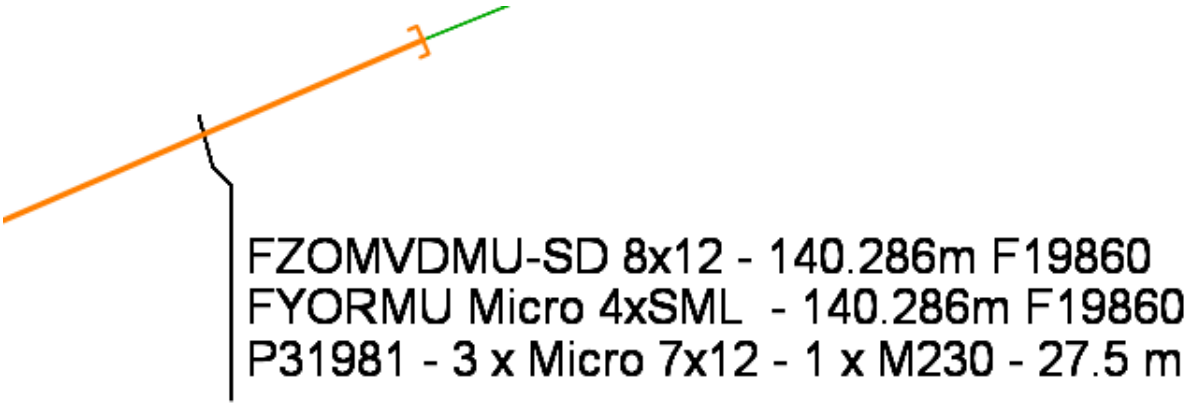
Edit annotation location

Use the **Edit annotation location** tool to change the location of annotations.

1. On the map, define the area containing the annotations you want to move.
2. Click the map to initiate the moving of annotations.
3. Move annotations by dragging the red square on the map. The annotations will be moved relative to the location of the point.
4. Accept the new location by clicking the right mouse button. In the displayed window, click **Save**. Click **Cancel** to cancel the move.

Group annotations

1. **Annotate group** lets you combine the information on several cables (type, length, and identifier) and conduits (conduit identifier, duct types, and conduit length) into one annotation.
2. To select the **cables and conduits** you want to include in an annotation, click on both sides of the required objects in order to include in the annotation the information on the cables and conduits between the points you clicked.
3. Position the annotation on the map.



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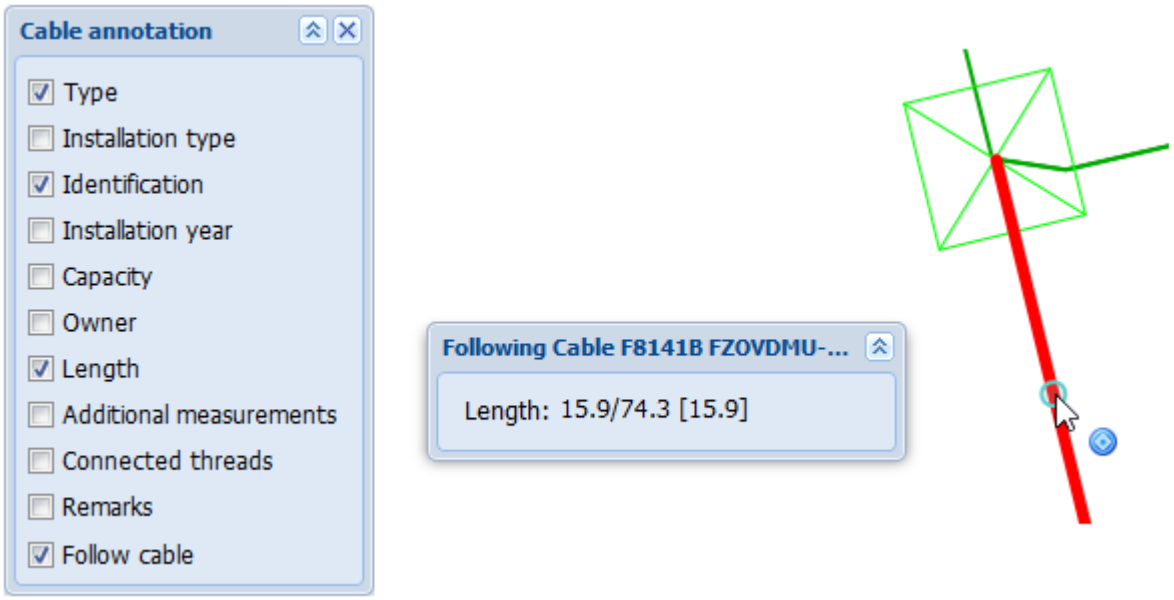
Group annotations are used to combine information on several conduits and cables into one annotation. To create an annotation, a cable was selected first (lower line), and then a conduit was selected (upper line). If there were other cables or conduits between the selected objects, information on them would also be added into the annotation.

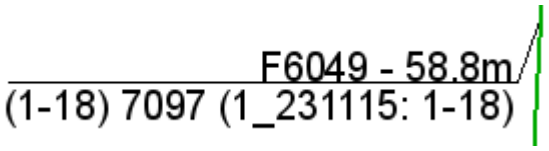
Cable annotations

Click **Cable annotation** to annotate a cable. Creating an annotation is carried out mainly as described in the chapter Creating an annotation. However, **note** the **Follow cable** setting that is illustrated below. The settings available for cable annotations are illustrated.

- **Type:** The annotation includes the cable type
- **Installation year:** Cable installation year
- **Installation type:** The cable installation type (buried, aerial, submarine, tunnel, etc.)
- **Capacity:** The maximum capacity of the cable
- **Owner:** Owner of the cable
- **Length:** The length of the cable
- **Additional measurement:** Distance from both ends of the cable, and the cable reading at the annotated point. Takes into account the provided additional lengths (loops/coils)
- **Connected threads:** The logical connections of the cable
- **Remarks:** Comments related to the cable
- **Follow cable:** Select the cable that is highlighted on the map. Cable lengths are displayed in the **Following Cable** window. Position the cable annotation at the appropriate point on the cable route. Cable lengths are discussed in more detail in the chapter Cable length, extra length, and total length.

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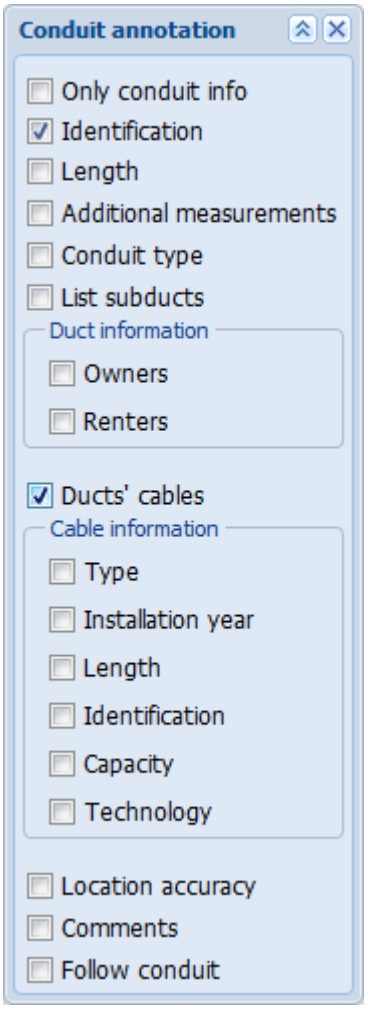


The Connected threads function of the cable annotation displays the connected pairs of the cable, the identifier of the telecom premises/splice, the identifier of the device and connectors.

Conduit annotations

Click **Conduit annotation** to annotate a conduit as described in the chapter Creating an annotation. Take into account the settings available for conduit annotations:

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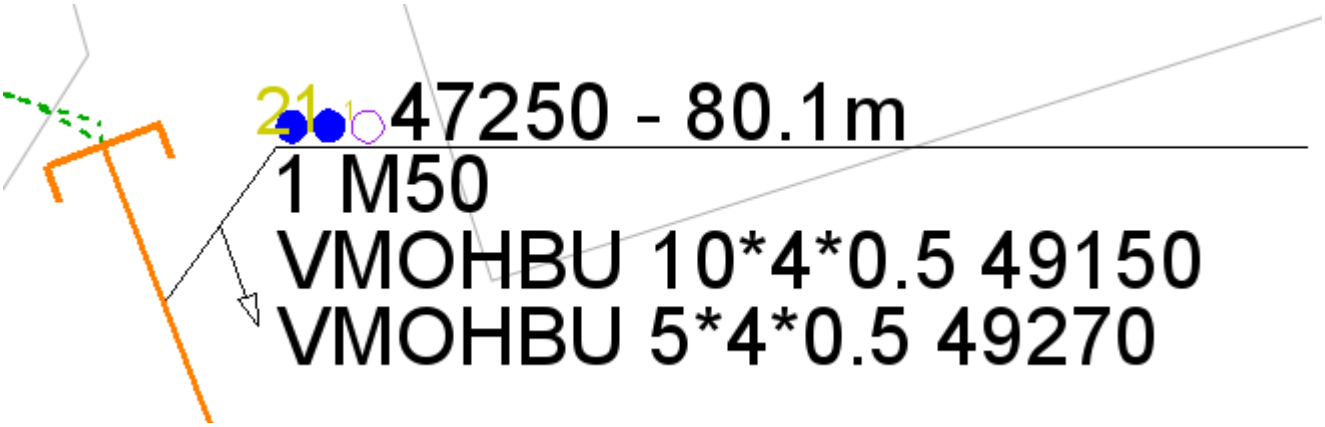


- **Only conduit info:** The annotation only includes the selected conduit information
- **Identification:** Conduit identifier
- **Length:** The conduit's length
- **Additional measurements:** The distance from both ends of the cable and the cable reading at the annotated point. Take into account the entered additional lengths (loops/coils)
- **Conduit type:** The conduit's type
- **List sub-ducts:** Sub-ducts in the conduit
- **Duct information – Owners:** Owners of the duct
- **Duct information – Renters:** Renters of the duct
- **Cables in a duct:** The annotation includes information on the cables located in the conduit's ducts.
- **Cable information – Type:** Cable type

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- **Cable information – Installation year:** The cable installation year
- **Cable information – Length:** Cable length
- **Cable information – Identification:** Cable identifier
- **Cable information – Capacity**: Maximum capacity of the cable
- **Cable information – Technology:** Cable technology
- **Location accuracy:** The location accuracy of the conduit
- **Remarks:** Comments related to the conduit
- **Follow conduit:** Select the conduit that is highlighted on the map. Conduit lengths are displayed in the **Following Conduit** window. Position the conduit annotation at the appropriate point on the conduit route. See Cable length, extra length, and total length.

The completed conduit annotation displays the conduit profile, and an arrow points in the viewing direction of the profile.



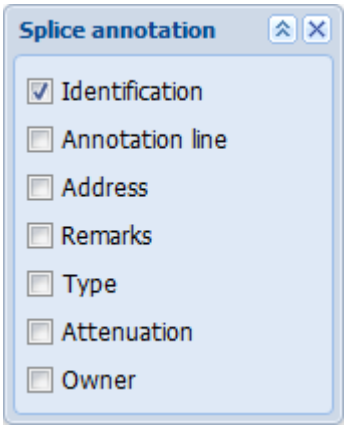
Splice annotation

Click **Splice annotation** to annotate a splice. This annotation is created mainly as described in the chapter Creating an annotation. The settings available for splice annotations are as follows:

- **Identification:** Splice identifier
- **Annotation line:** Select whether an annotation line is drawn
- **Address:** Address of the splice

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- **Remarks:** Comments related to the splice
- **Type:** Splice type
- **Attenuation:** Splice's attenuation in decibels
- **Owner:** Owner of the splice

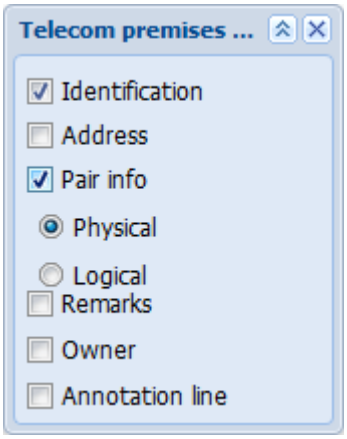


Telecom premises annotations

Click **Telecom premises annotation** to annotate telecom premises. This annotation is mostly created as described in chapter Creating an annotation. The settings available for telecom premises annotations are as follows:

- **Identification:** Identifier of the telecom premises
- **Address:** Address of the telecom premises
- **Type:** Type of the telecom premises
- **Device room:** Device room of the telecom premises
- **Pair info:** The fibers/pairs on the next telecom premises when the cable is followed. Information on the logical network can also be selected to be included in the annotation
- **Remarks:** Comments related to the telecom premises
- **Owner:** Owner of the telecom premises
- **Annotation line:** Select whether to draw an annotation line

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Sheath annotations

Click **Sheath annotation** to create annotations from the pair connections of network objects.

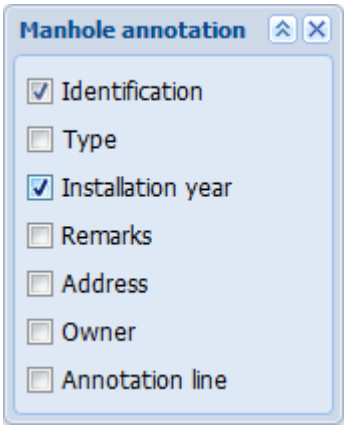
1. In the **Annotations** menu, select **Sheath annotation** .
2. On the map, select the object you want to annotate.
3. Position the annotation on the map.

Manhole annotations

Click **Manhole annotation** to annotate a manhole. This annotation is created mainly as described in the chapter Creating an annotation. The settings available for manhole annotations are as follows:

- **Identification:** Manhole identifier
- **Type:** Manhole type
- **Installation year:** Manhole's installation year
- **Remarks:** Comments related to the manhole
- **Address:** Manhole's address
- **Owner:** Owner of the manhole
- **Annotation line:** Select whether an annotation line is drawn

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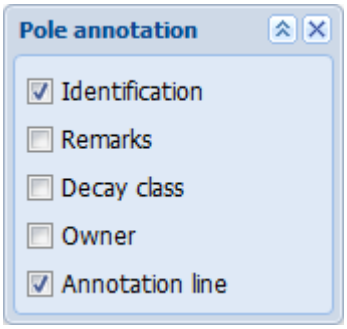
Pole annotations

Click **Pole annotation** to annotate a pole. This annotation is created mainly as described in the chapter Creating an annotation. The settings available for pole annotations are the following:

- **Identification:** A combination of the pole's line section identifier and pole number. If these are not defined, the identification information cannot be added to an annotation.
- **Remarks:** Comments related to the pole
- **Decay class:** Decay class of the pole

Owner of the pole

Annotation line: Select whether an annotation line is drawn



Point annotations

Click **Point annotation** to annotate a point object. This annotation is created mainly as described in the chapter Creating an annotation. The settings available

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for point annotations are the following:

- **Identification:** Identifier of the point object
- **Distance:** The distance represented by the point object (e.g. for a milestone)
- **Length:** The length represented by the point object
- **Description:** The description of the point object
- **Annotation line:** Select whether an annotation line is drawn

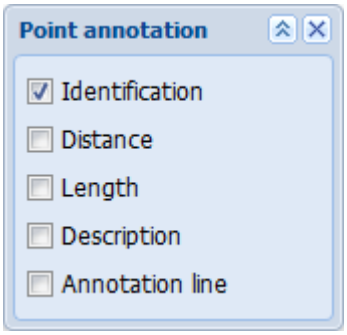


Diagram removal tool

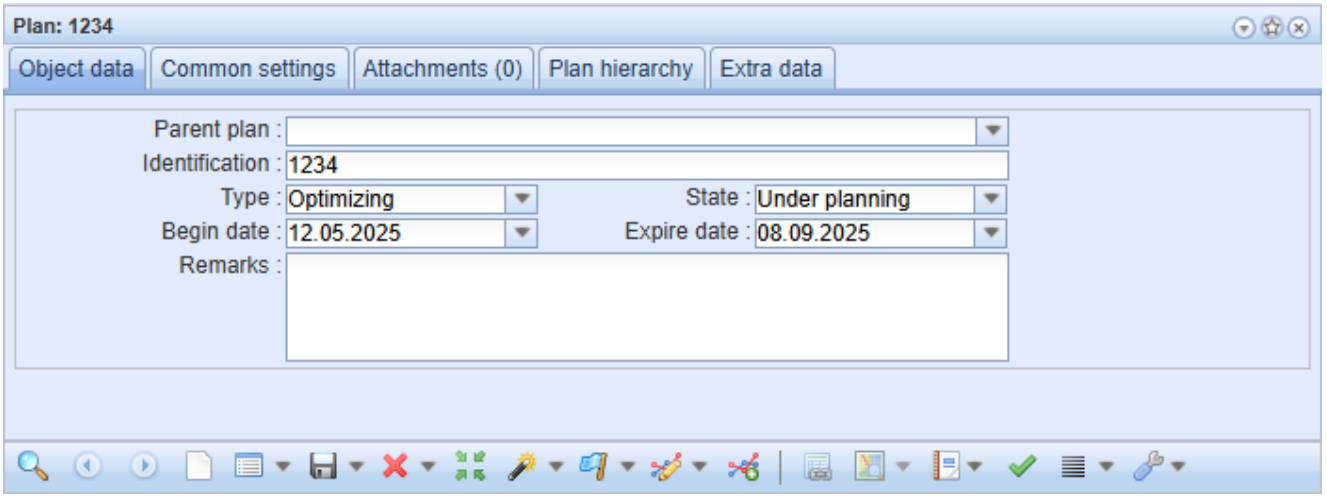
1. In the Annotations menu, select **Diagram removal tool** .
2. To remove a diagram, click its area on the map.
3. If you want to remove multiple diagrams, activate the **Diagram removal tool** separately for each diagram.

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PLANS

You can use the **Plan** field of an object form to attach the object to a **Plan**. If a plan does not yet exist, you can create one on the **Plan** form. The mandatory fields for a new plan are **type**, **state**, and **identification**. Give an identifiable name for you plans, because plans are selected to other forms based on their identification. It is important to save an area for a plan. Saving an area is a prerequisite for using a plan as input for automatic fiber-optic planning. For more information, see the chapter ntegration with FiberPlanIT™ by Comsof (This function is subject to a separate order).

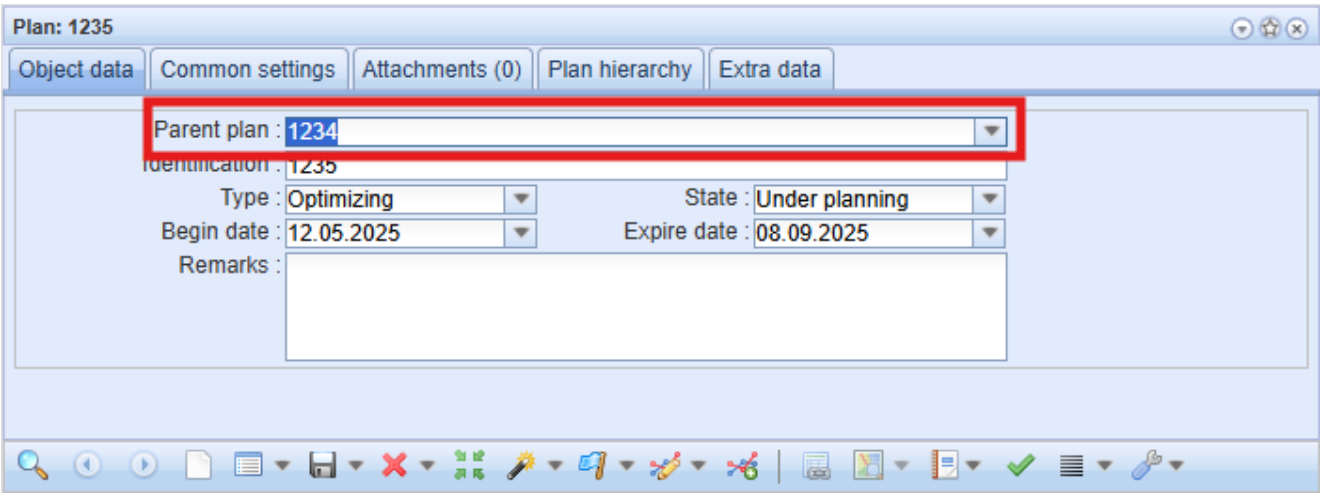
Click **Create** and digitize the border of the area. Instructions on this are available in the chapter Modifying the geometry of an area. Stop digitizing and save by clicking the right mouse button. After you have created the plan and saved it in the system by clicking **Save form**, it is available for selection in the **Plan** field of object forms.



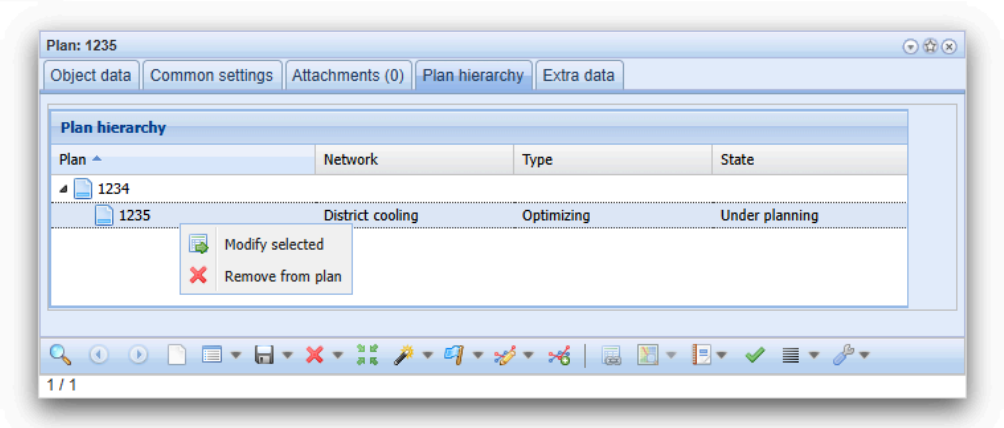
Plan hierarchy

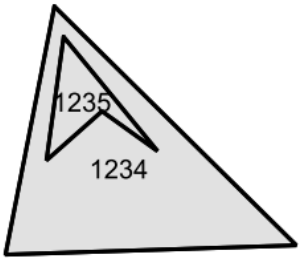
To add a plan as a sub-plan for another plan, simply select the desired parent plan from the **Parent plan** field located on the **Object data** tab. You can add multiple sub-plans under the same parent plan, or extend the hierarchy by adding a new plan under a sub-plan.

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Open the **Plan hierarchy** tab to view the parent plan and the sub-plans. To modify or remove a sub-plan, right-click its corresponding row in the table.





Set as the default plan

Click **Set as default Plan** to set a plan retrieved to a form as the default plan. When you click **Defaults** on object forms, the default plan is automatically added to the form. You can cancel the **Default plan** setting in the **Defaults** menu. See the chapter Managing settings defined by a user.

Locating a plan

Click **Locate** to locate a plan and the related objects.

TIP: Define the location of the plan so that you position the plan on the map already before adding any objects to it.

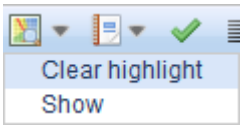
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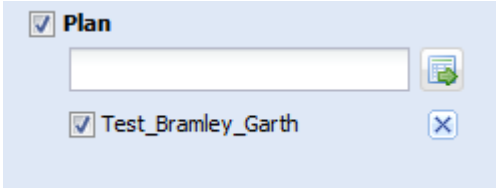
Highlighting objects

Objects that are part of a plan can be highlighted on the map by clicking **Highlight**. This centers the map on the objects included in the plan and highlights the objects on the map.



To view a plan's objects on the map, select **Show** in the drop-down menu for **Highlight** to activate the **Plan** filter in the **Layers** (Filters) selection and to display only the objects of this plan on the map. More information on filters is available in the chapter Layer configurations.





You can save a **Layer configuration**, that is the selected background map and the active layers, by clicking **Save** in the top-right corner of the **Layers** tool. Layer configurations are saved in the browser cache of the browser that was used, and they are, therefore, not available on other computers.

Layer configurations can also be saved in a database with a user name, in which case the layer configuration is user-specific instead of browser-specific. Save a layer configuration in a database by clicking **Configure** and wait for the

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background colour to change to orange. Click **Save** to save the layer configuration in a database.

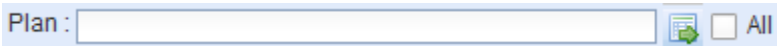
Upload the saved layer configuration in the Layers form by clicking **Reload** . You can restore the original layer configuration settings by clicking **Reset to defaults** . The program displays the following notification: **User preferences will be deleted and default configuration will be loaded.**

TIP: You can view all objects by removing the **Plan** filter on the **Filters** tab of the **Layers** form.

Adding an object to a plan

Use the objects' own forms to add objects to plans.

1. Open an object form.
2. Retrieve to the form of the object you want to add (Retrieving information to a form**or** Picking objects from the map), **or** fill in the information on the new object.
3. Select the required plan from the drop-down menu in the **Plan** field **OR:**
4. Retrieve the appropriate plan to the **Plan** field (Using the predictive search field).



5. Click **Save form** .

TIP: Plans that are marked to be **ready** are displayed as search results for the predictive search field if you select the **All** checkbox.

Maintenance state of plan objects (This function is subject to a separate order.)

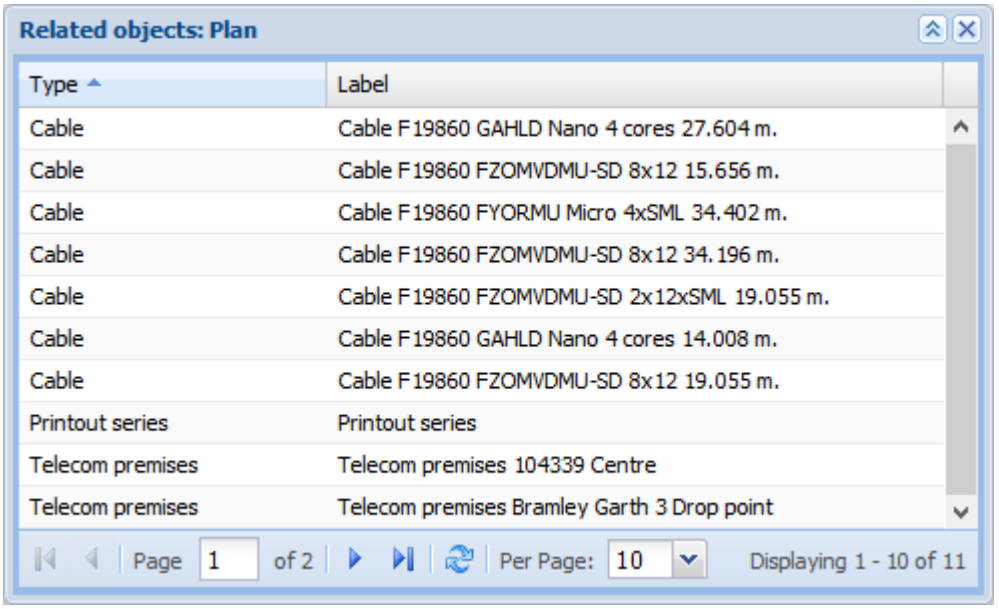
The usage state of objects that belong to a plan can be locked if the related function has been enabled on the basis of a separate order. If a plan is in the maintenance state, users cannot update the network object included in the plan, and they cannot delete the plan. Network objects that can be locked include cables, conduits, ducts, telecom premises, devices, splices, manholes, poles, and other point objects and connections at the cable and device levels.

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The admin site is used to specify the user group with the right to set plans to the maintenance state. However, all users can modify the property attributes and location information of plans in the maintenance state, excluding the usage state of the plans.

List the objects of the plan

Click **List objects of the plan** to view information on a plan's objects. Clicking this button opens a list of the objects related to the plan, including the **type**, **identification** and **description** of the objects. Click the right mouse button over the target row to click **Show on the form**. This takes you to the object form. You can view or edit an object's information on the object form.

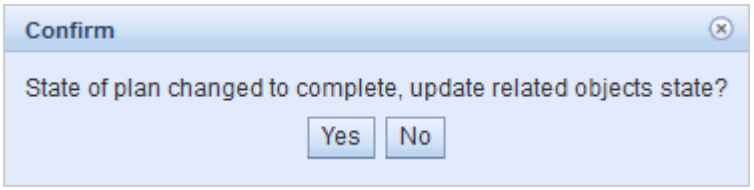


Completing plans

When you edit the **State** of a plan, you can update the objects related to the plan.

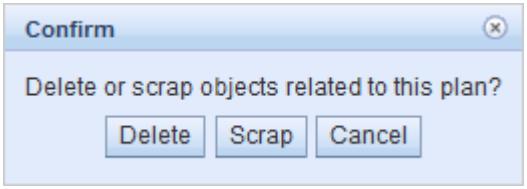
Use this function when a network with objects in the **Planned** state has been planned on the map. When the plan is implemented and completed, the usage state of its objects should be updated to **In use**. Open the appropriate plan on its form and change the usage state to **Ready**. Then click **Save form**. The program will then ask: **State of plan changed to complete, update related objects state?** Click **Yes** to update the state of the related objects to **In use**.

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Deconstructing a plan

You can also use the Plan tool for planning the deconstruction of a plan. To plan the deconstruction of a plan, select **Deconstruction** as the **Type** of the plan. **Deconstruction plans** function in the same way as normal plans, in addition to which any objects linked to the plan when it was completed can automatically be removed from the map (deconstructed), or their usage state can be set to scrap. Note that you must mark the **State** of the plan as **Ready**.



List the apartments and addresses in the plan

In the drop-down menu for **List**, select **Plan apartments** to view a list of the plan's addresses and apartments. This list displays the number of apartments and all the basic information on the **Address** and **Apartment** forms can be selected for a column view. In the menu for the **Reports** button, click **List report** to create a list report.

In addition, you can list the addresses related to the plan (**Plan addresses**), the properties related to the plan (**Intersected properties**), or the properties related to all plans retrieved to the form (**Intersected properties for all**).

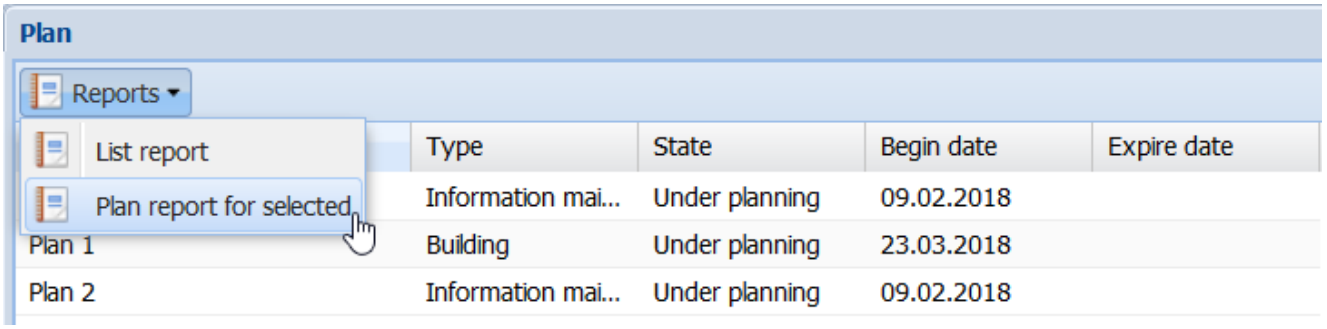
Further information on the list view is provided in the List chapter.

Plan report

The plan report (an Excel document) includes all the objects related to the plan. Furthermore, the plan report includes the role of the cable and the number of connected threads.

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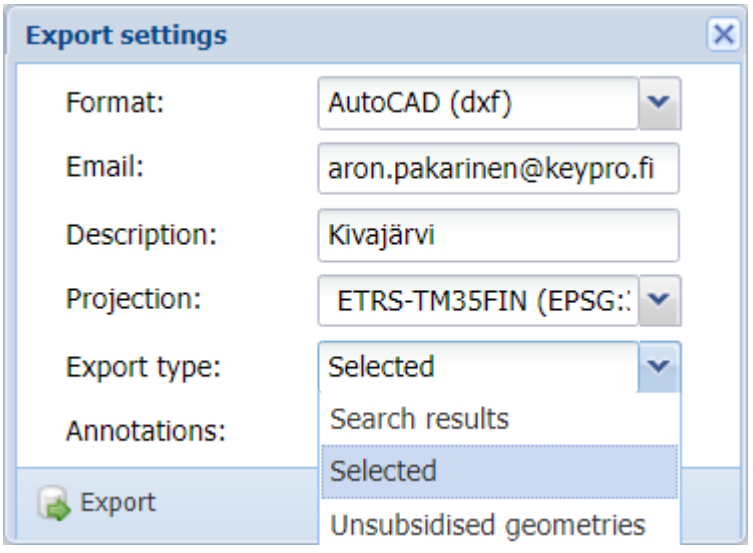
You can create a plan report for more than one plan. On the Plan form, select **List** . On the displayed form, select the required plans by clicking the rows with the left mouse button while holding down the Control/Shift key. Open the **Reports** drop-down menu and select **Plan report for selected**. The header field of the Excel report includes the names of the selected plans.



Exporting unsubsidised geometries

You can export **Unsubsidized geometric** locations of cables and conduits to an external file format. Click **Export** on the toolbar to open the submenu. Then choose **Advanced export** to open **Export settings**. Click **Export type** and select **Unsubsidized geometries** in the submenu.

The Unsubsidized location of the cables and conduits will be formed from the parts that go through the Unsubsidized geometric areas.



Show in group display

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Click **Show current in group display** to open the plan's objects in a group display. More information on the group display is available in the chapter Group display.

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ADDRESS

Quick address search

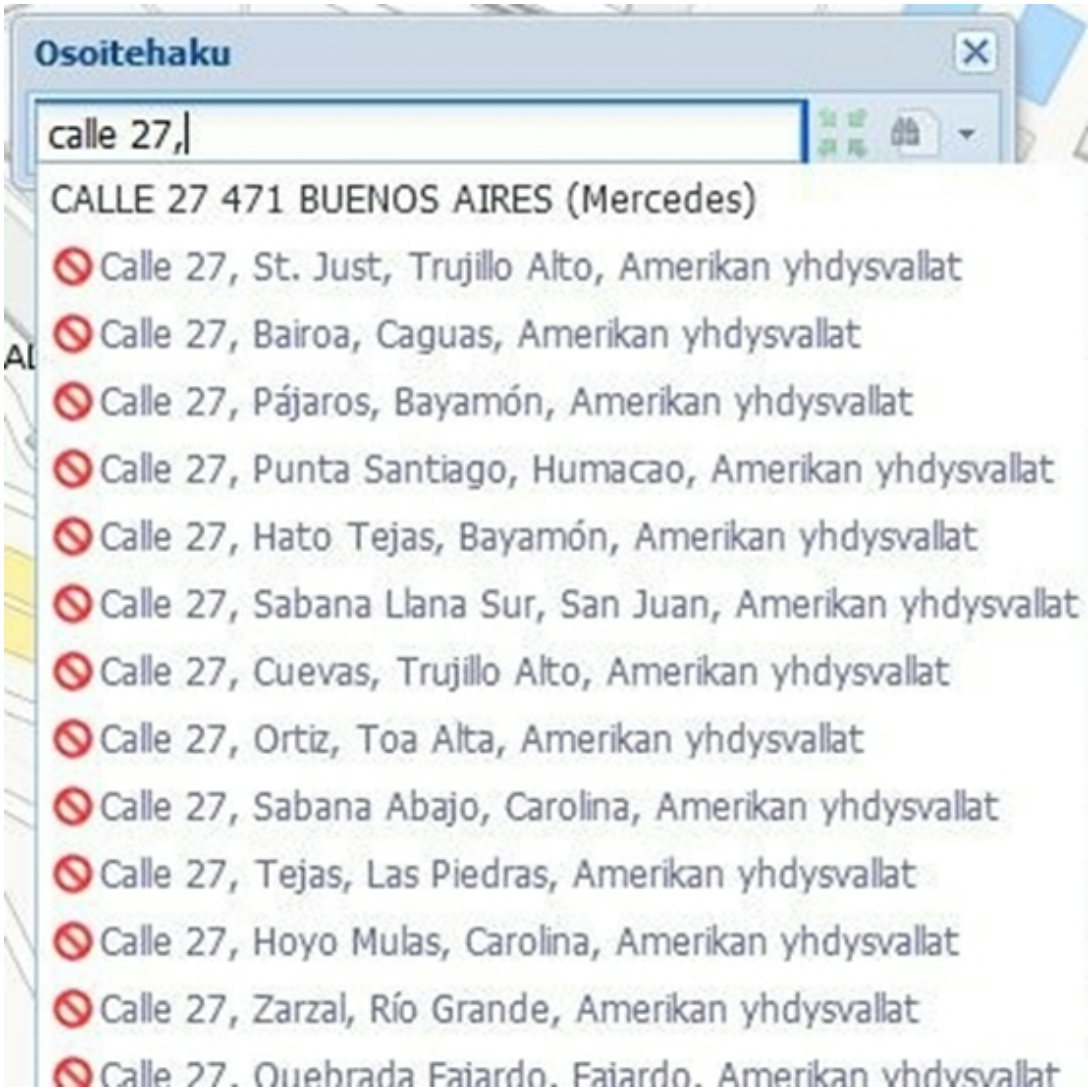
Use the **Quick address search** tool in the toolbar to **locate addresses on the map**. For example, if you want to view a cable located on a specific street, you can go to the location in question by using the quick address search and locate the address by clicking the **Locate** button. Enter the complete address in the text field or select it from the list of search results.

You can also update multiple objects at the same time by using object-specific forms. More information on mass updates is provided in the chapter Mass update of addresses.



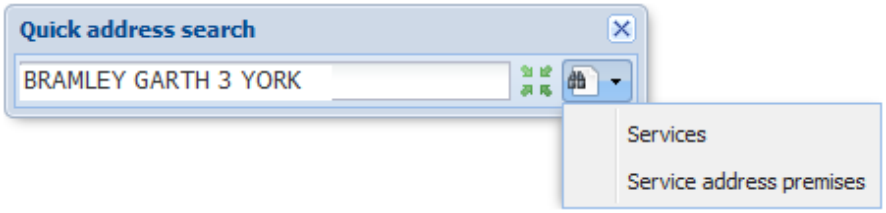
It is usually enough if you enter four characters in the text field, as the addresses matching the search criteria are listed below the search field. However, **Quick address search** supports **","** a comma when you need to separate the street name and the street number from each other. For example, the database might have an address named "Calle 27 471" with the street name "Calle 27" and the street number "471". If you only type "Calle 27" in the search box, address search will find you all the streets named "Calle" with a street number "27" like in a normal search.

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You can browse through the pages using the arrow buttons, go directly to the first or last page, or enter the page number in the **Page** field. Select the required address using the left mouse button. Click **Address** to open the form used for editing the address. Note that the **Address** tool does not list addresses that have no location attached. Such addresses can be searched on the actual address form (**Address**).

Click **Services** to view a list of the services related to the address with the following options:



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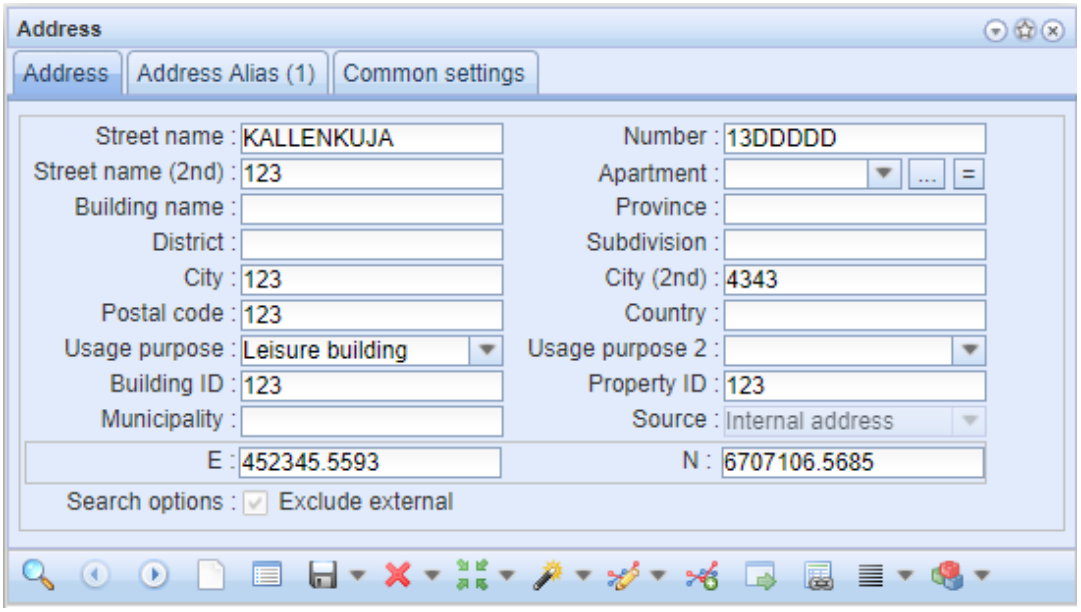
If an address belongs to some service area, the services provided by the area are listed. If an address is the address of telecom premises, the services provided by the telecom premises in question are listed. If an address is the installation address of a circuit, the services provided by all the telecom premises in the connection chain are listed. If an address is related to a service, the services are listed.

The **Service address premises** function retrieves all the telecom premises to the form with device services to which the address in question has been connected. Use the arrow buttons on the telecom premises form to browse through the results.

Address search in the database

In addition, you can use the **Address** tool to search, locate and update address information and add new addresses. When you click the button, the **Address** form is displayed. On this form, enter the address you want to search and click **Search** to have the program search the database for addresses matching the **search criteria**.

Alternatively, you can use the **Pick from map** tool and its functions to search for an address. Your application may include the **Existing area** option, which enables addresses to be searched in existing areas, such as a service area (maximum number of address lines is 100,000).



You can use all the fields on the form as search criteria. For example, a search based on a city will return all the addresses in that city as search results. You can

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use **%** as a **wild card** character that replaces a part of a search term. In this case, the search results include all addresses matching the text that precedes the **%** character. You can limit the number of search results by selecting the **Exclude Digiroad** checkbox. The Digiroad material is then not available, and only addresses added in KeyCom are retrieved to the form. The number of results fulfilling the search criteria is displayed in the bottom left corner of the form. Use the **arrow buttons** to browse through the search results. Click **Locate** to center the map on the address you found.

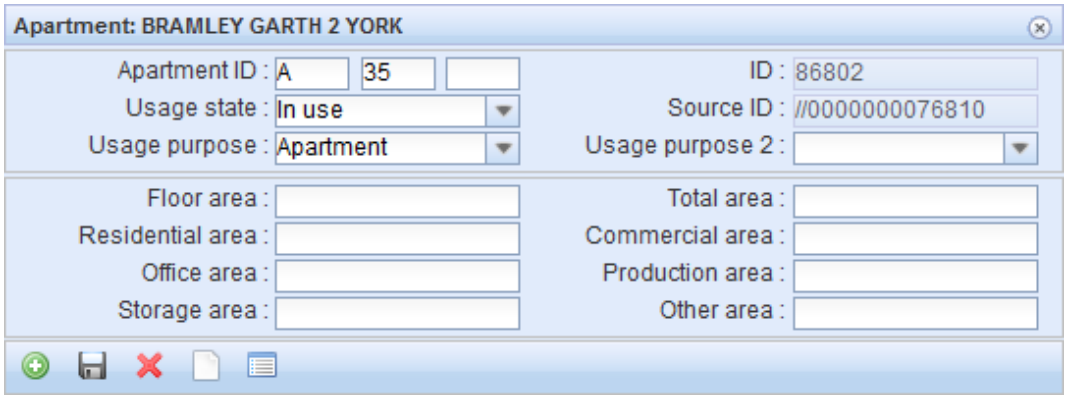
TIP: You can import the address you found to an object form that includes the **Update to form** button applicable to the Address form.

Adding an address to the database

If an address is not yet in the database, and you want to add it there, use the **Address** form to create an address. **Street** and **City** are **mandatory property attributes**. When you have entered this information on the form, click **Create**, and then click the left mouse button to create the location information on the map. Alternatively, you can click **Save** to create the address.

Apartment information for an address

The Address form includes a field for information on an apartment. Click **Apartment...** to add this information. On the **Apartment** form displayed, you can add and update information on the apartment identifier, purpose of use, and floor areas.



You can view the property values of an apartment on the Apartment form. No other information except the apartment ID is displayed on the Address form.

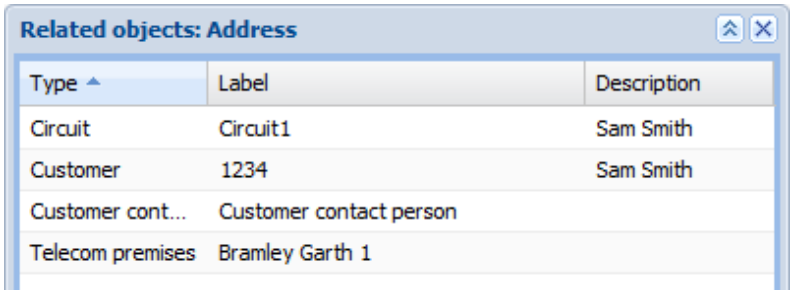
The apartment ID displayed on the **Address** form is added, for example, in the following format: A and 1, that is A as the identifier for the entrance door of the

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building and 1 as the apartment number. When you have added the required information on the form, click **Add** to make the apartment information available for selection on the **Address** form and to simultaneously save the information in the database. The apartment ID you added can now be selected in the drop-down menu for **Apartment**. Click **Save** to save the **Apartment** information on the **Address** form. The example information is now displayed in the format A1. You can later update the information on the **Apartment** form by clicking **Update**. You can delete information by clicking **Delete**.

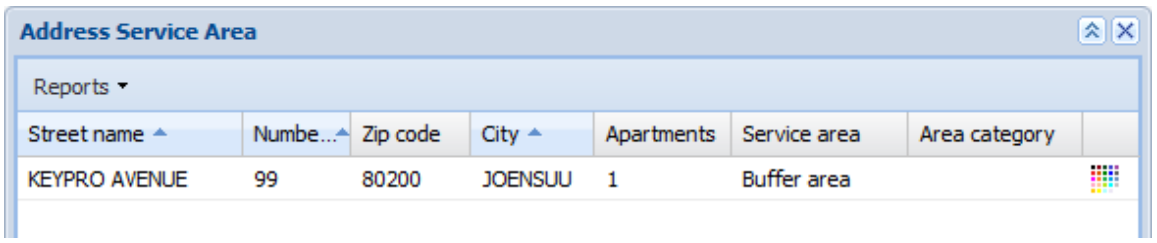
Objects related to an address

Click **List related objects** to view the **Related objects:** The **address** list listing objects **located at the address** in question. The list includes the following information on the objects: **type, object**, and **description**. Open the object form by first clicking the left mouse button and then the right button over the target row, and then select **Show on the form**.



Service areas for an address

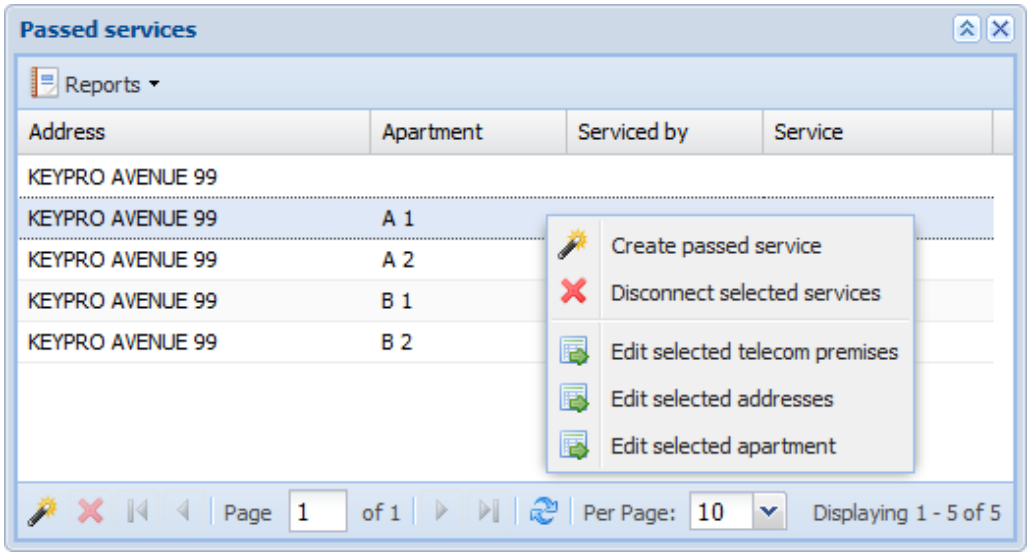
When you want to view the Service areas related to an address or addresses, go to the drop-down menu for **List** and click **Show service areas for all**. The displayed **Address service area** form includes all the service areas related to the address or addresses. Service areas are discussed in more detail in the chapter Service area.



Passed services for an address

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The address form includes the **Passed services** tool. With this tool, you can view the apartments, service providers and services for the selected address. The **Passed services** form also enables you to create new passed services and disconnect existing services.



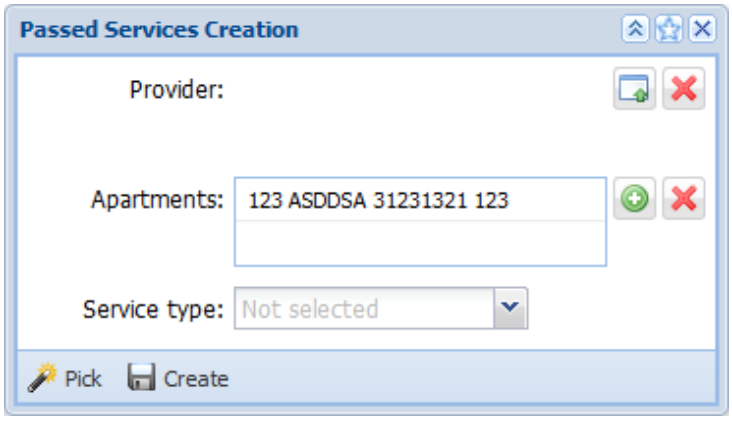
Select rows from the list on the **Passed services** form and click the right mouse button to access the menu:

- **Create passed services** – creates a new passed service, such as a broadband connection.
- **Disconnect passed services** – disconnects existing services for the object.
- **Edit selected telecom premises** – opens the Telecom premises form for the selected object group.
- **Edit selected addresses** – opens the Address form.
- **Edit selected apartment** – opens the Apartment form.
- Use **Passed services for all** function in the drop-down menu for **Passed services** to create passed services for all addresses that have been retrieved to the **Address** form.

Creating passed service

Click **Create passed service** to open the **Passed services creation** form.

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Click **Pick** to define the **provider** and pick the required telecom premises from the map. The telecom premises information will then be displayed in the **Provider** field.

Click **Pick apartments** to add new apartments to the list with the help of an Address-form. To remove apartments, click **Remove apartments** button.

In the drop-down menu, select the available **service type** and click **Create**. The program will display a notification of the successful creation of a passed service, and the new address and related services will be displayed on the **Passed services** list.

Disconnecting passed service

When you want to disconnect a service, use the **Disconnect selected services** function. The program will ask you to confirm that you want to disconnect the services. Click **Yes** to disconnect the passed service. The service will then no longer be included in the list on the **Passed services** form.

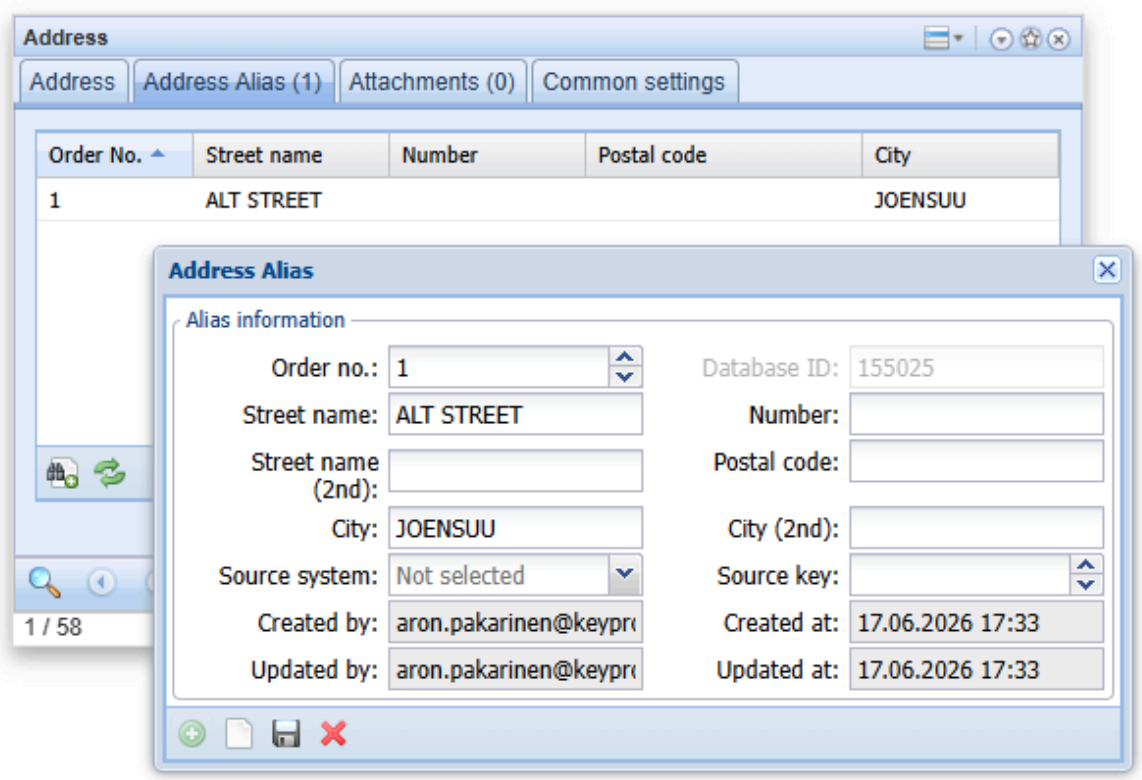
Address alias

Sometimes there might be two different addresses for a street. In addition to **official address**, there might be an **Address alias**. You can add information about the **Address alias** to its own form.

- Open the **Address Alias** tab and click **Add Address alias** button. Input the necessary address alias information on the form and click **Add** .
- You can change the address alias details by right-clicking the section on the grid and selecting **Edit** . Click **Save** to save the changes you made.

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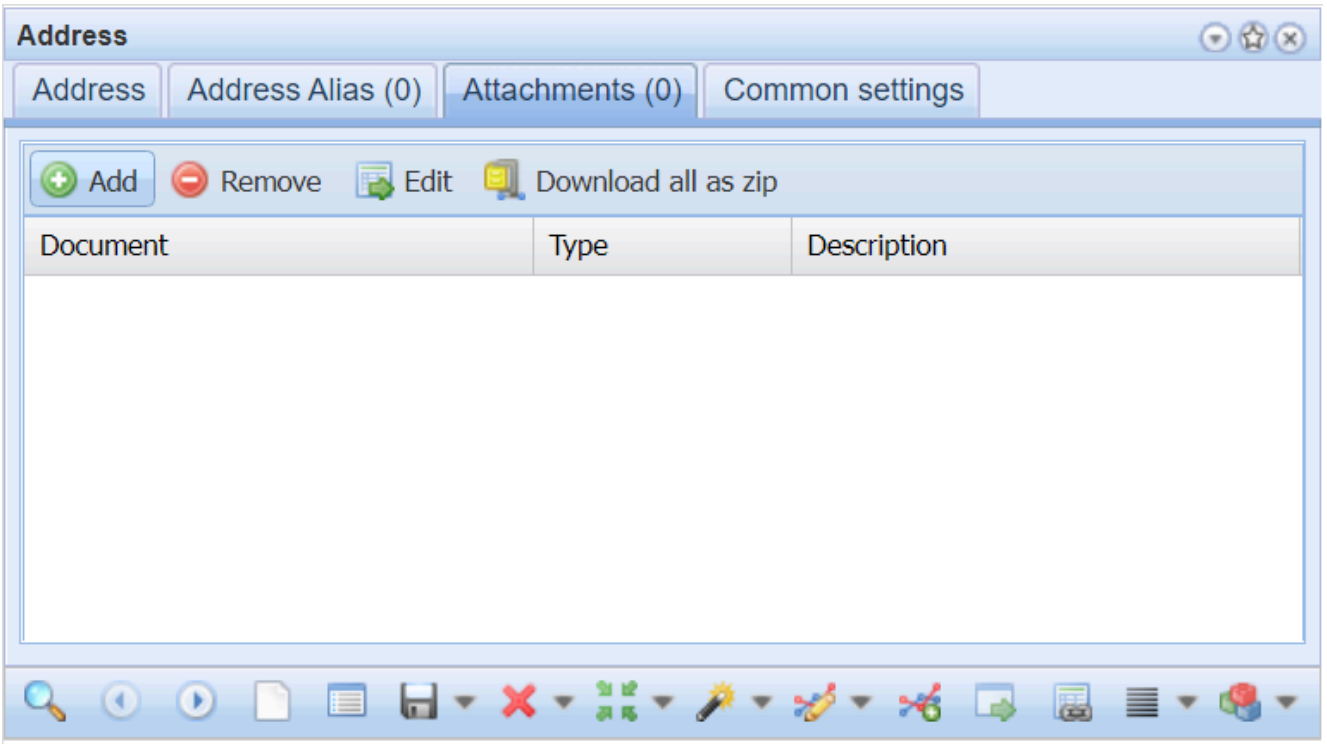
- Address alias can be deleted by clicking **Delete** .



Attached documents on the Address form

Via the **Attachments** tab, you can view documents attached to the **Address** form. The title of the tab indicates the number of attached documents for the object. The attachments can be **files** or **URL links**, and they are listed based on type. If the object form does not have any external documents, the **Attachments** tab includes no information. Click **Add External documents** - to open the **Add External documents** form, where you can download the documents. Read more about External documents

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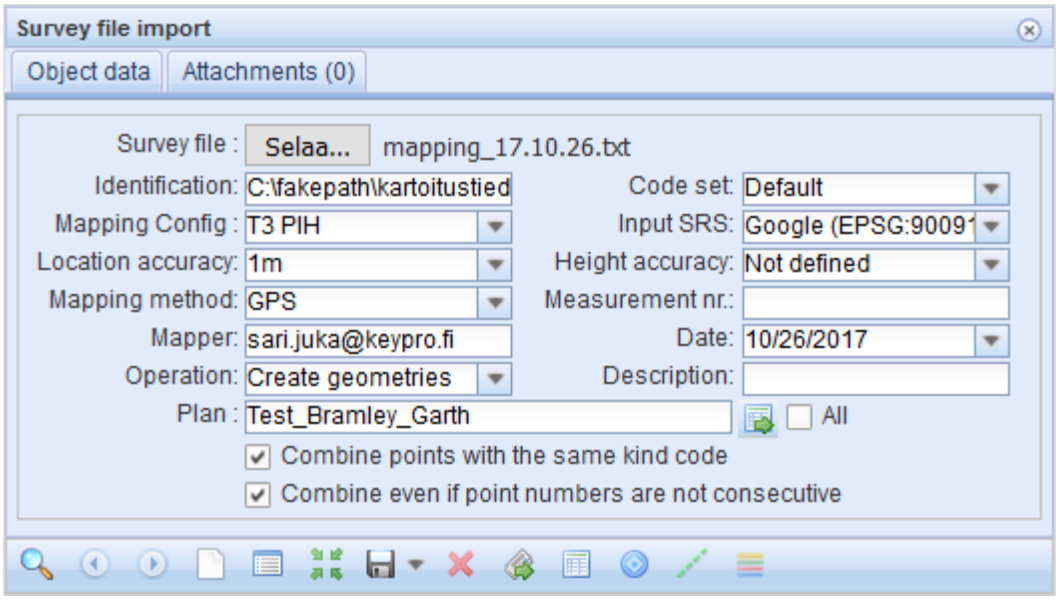


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SURVEY FILE IMPORT

Use the **Survey file import** tool in the toolbar to import to the system any land surveys carried out in the field, to view and edit created survey objects, and to transform survey objects into network objects.

TIP: The structure and terminology of land survey files is discussed later in this document in the chapter Survey file description.



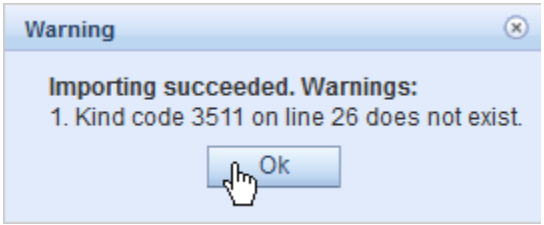
Importing a survey file

1. In the main toolbar, click **Survey file import**.
2. Click **Choose file** to select the file for reading.
3. Select the **Code set** used in the survey file.
4. Select the **Mapping configuration** that is appropriate for the survey file structure.
5. Select the correct **input SRS** for the survey file:
   a. KKJ (such as KKJ / Finland zone 1)
   b. Shortened GK (such as ETRS89 / ETRS-GK19FIN (EPSG:3126))
   c. Standard GK (2010) (such as ETRS89 / ETRS-GK19FIN 2010 (EPSG:3873))

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d. Local coordinate systems (such as ANC Finland)
e. WGS (such as WGS84 (EPSG:4326))

6. Select **Operation**:
   a. **Create objects:** If you select **Create objects**, the mapped ducts, manholes, valves, and so on, are created on the map. The survey geometries include point and line objects, and the **Surveys** layer is activated in the **Layer selection** when these are applied.
   b. **Create geometries:** The survey geometries include point and line objects, and the **Surveys** layer is activated in the **Layer selection** when these are applied.
   c. **Create both:** If you select **Create both**, the system creates both the objects (such as ducts, manholes, valves, etc.) and their associated survey geometries. As the geometries are applied, the **Surveys** layer is activated in the **Layer** selection.
7. Select the **Combine points with the same kind code** checkbox to form lines based on consecutive points.
8. Select the **Combine even if point numbers are not consecutive** checkbox to join lines with non-consecutive point numbers.
9. Fill in the rest of the fields as necessary.
10. Click **Convert** in the form's toolbar. The survey file is automatically saved after the conversion.
11. Any errors and warnings are displayed on the list. Usually, these errors are related to the structure of the survey file and are displayed to help locate the possible errors in the file.



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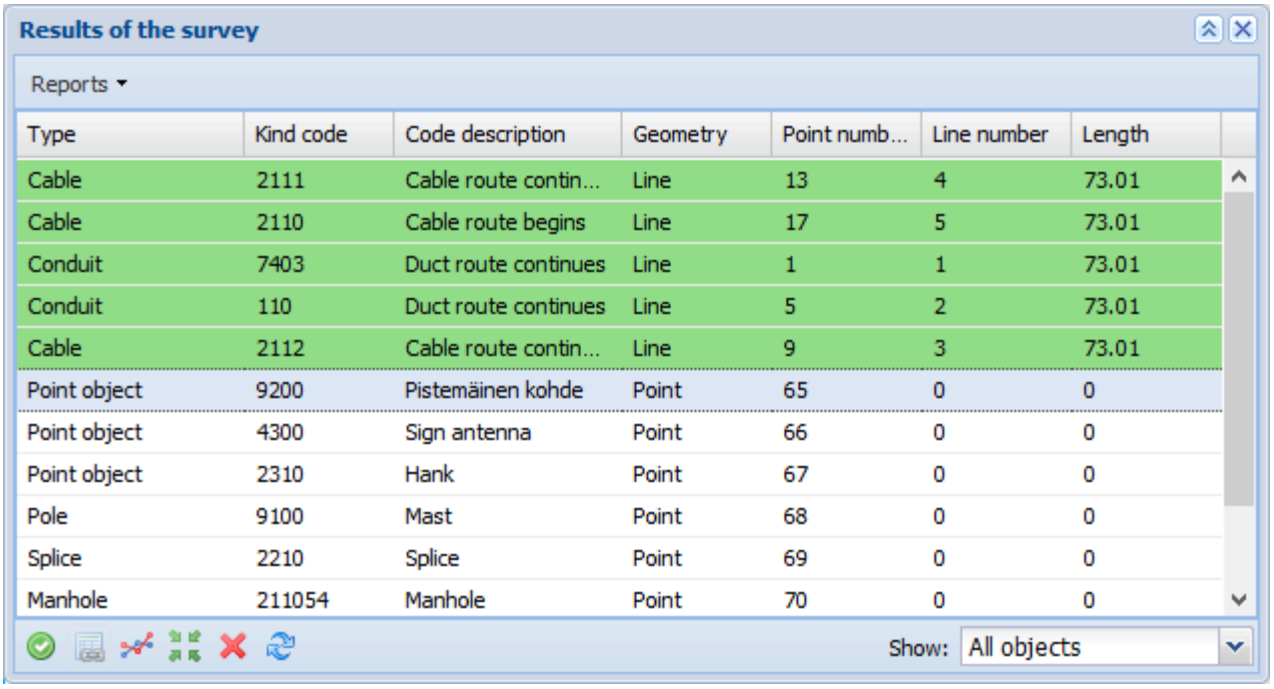
Results of the survey

Click **Show results** to view the survey objects on a list.

The **Results of the survey** form includes information on survey objects that were created in the conversion. There are three types of objects: points, lines, and unknown. Unknown objects are created only if the kind code in the file has not been defined in the selected code set.

The list has seven columns by default: Type, Kind code, Code description, Geometry, Point number, Line number, and Length. The columns displayed depend on the survey setting that is applied.

The **Show** menu includes the following options for displaying the Results of the Survey list: **All objects**, **Created objects**, and **Not created objects.** Update the **Results of the Survey** list by clicking **Refresh**.



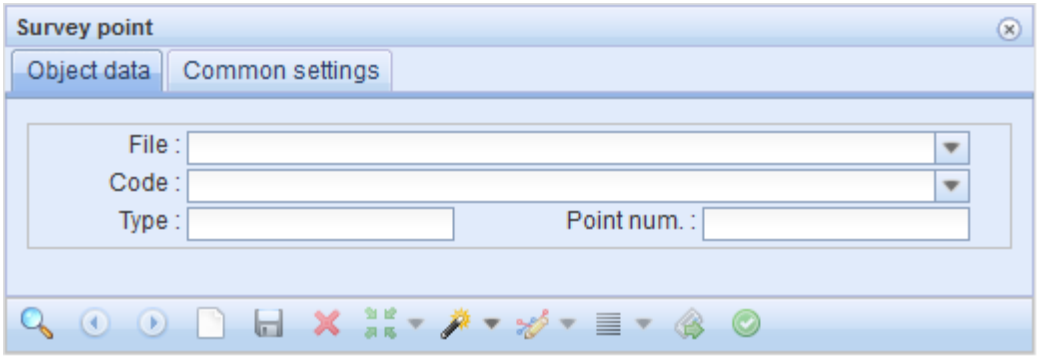
Filter the objects by selecting the appropriate option in the drop-down menu for **Show** at the bottom of the form.

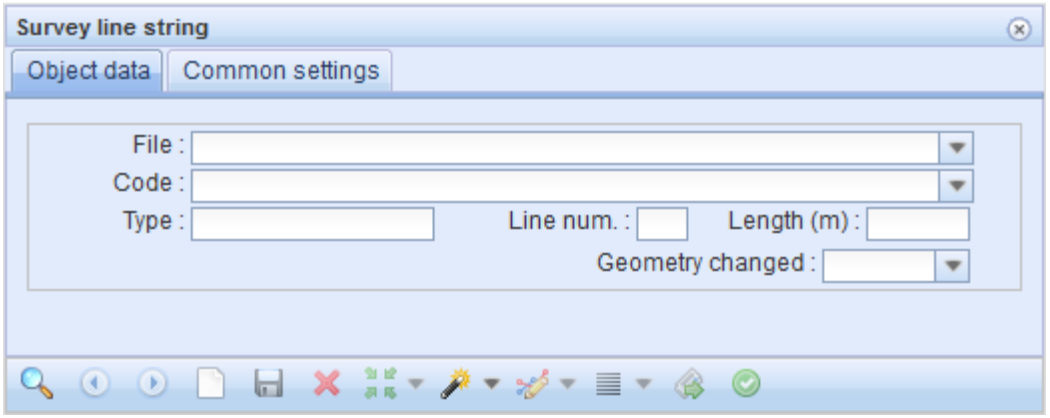
Rows from which network objects have been created are displayed in **green**. For more information, see the related chapter: Creating network objects.

You can view survey objects on the **Survey Point** and **Survey Line string** forms that are available in the drop-down menu for **Survey file import**. The main

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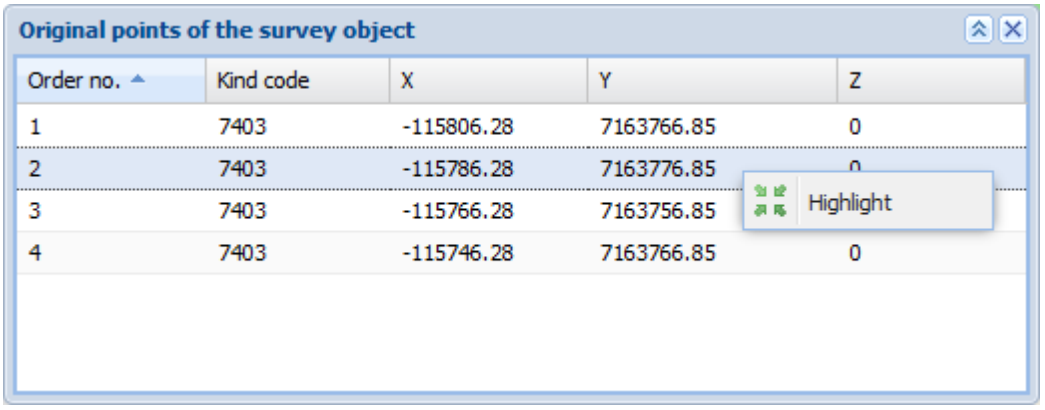
purpose of these forms is to provide tools for editing the location and geometry of the objects. You cannot create new survey objects on these forms.





Viewing the single points of a survey line

To view the points of a single survey line, go to the **Survey Line string** form and, in the drop-down menu for **List**, click **Survey line points.**



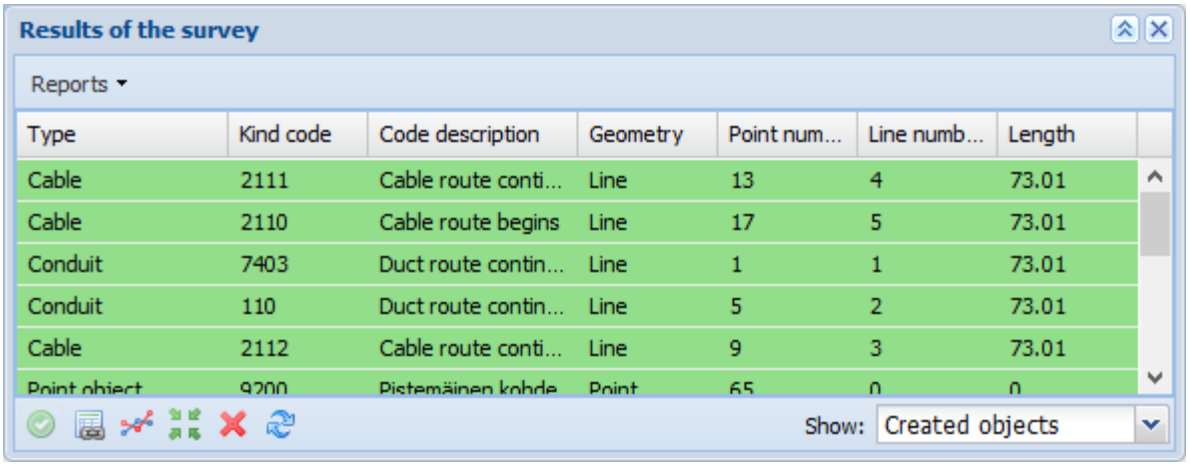
To locate a point, click a row using the left mouse button and then select **Highlight** in the menu that is displayed when you click the right mouse button.

TIP: Double-click a point to locate it.

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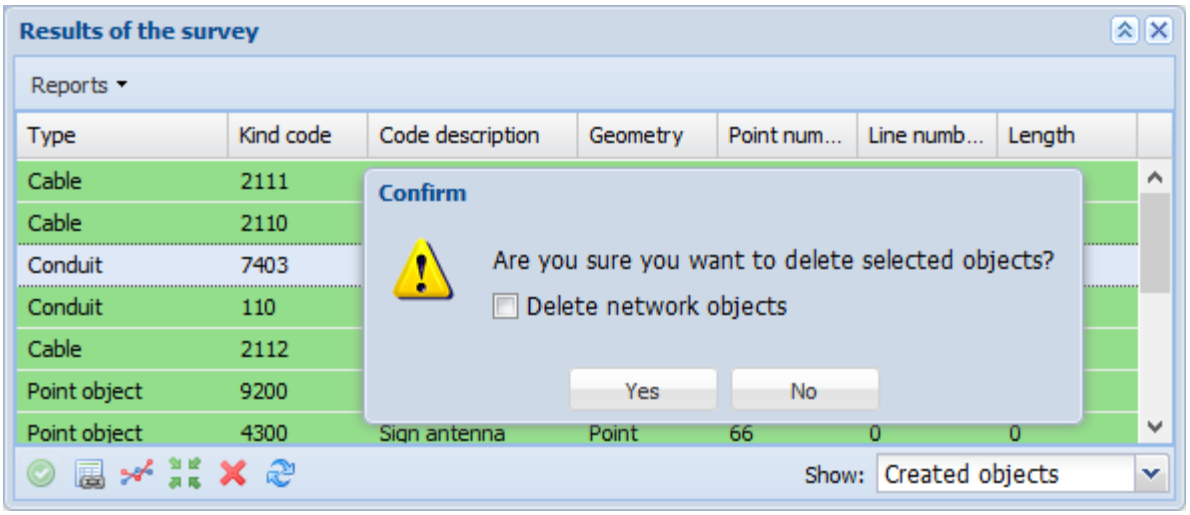
Creating network objects

1. Select the rows that you want to use for creating network objects.
2. In the tool bar at the bottom of the form, click **Create network object**.
3. The rows of created objects are marked in green.



Deleting survey objects

1. Select the rows you want to delete.
2. Click **Delete** in the form's toolbar.
3. In the dialogue box for confirming the deletion, select **Delete network objects** if you also want to delete the network objects created based on the objects.
4. Click **Yes** to confirm.



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Locating survey objects

1. Select the row you want to locate (multiple selection is not supported).
2. Click **Locate**.

Survey report

You can create an **Excel** report on the survey objects, including the applicable codes, their number, and the total length per code.

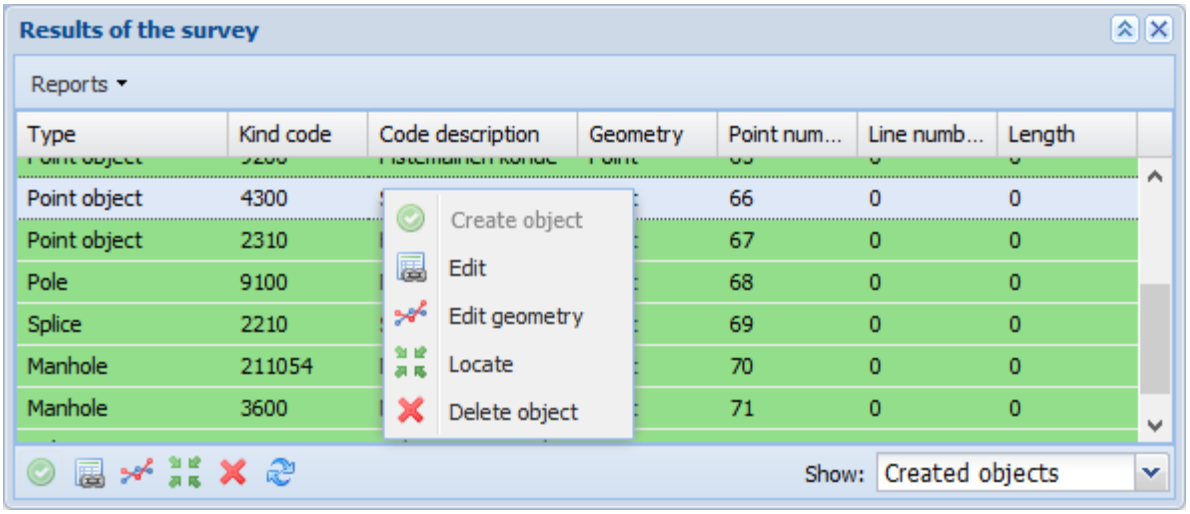
Start creating a report by clicking **Survey results report** in the **Reports** menu.

Code	Code description	Amoun	Length (m)
110	Duct route continues	1	73,01
2110	Cable route begins	1	73,01
211054	Manhole	1	0
2111	Cable route continues	1	73,01
2112	Cable route continues	1	73,01
2210	Splice	1	0
2310	Hank	1	0
3510	Telecom premise/distributor	1	0
3600	Manhole	1	0
4300	Sign antenna	1	0
9100	Mast	1	0

Editing the created network objects.

1. Select the created object (green) that you want to edit.
2. In the toolbar at the bottom, select **Edit**, or click the right mouse button and select **Edit** in the menu.
3. The form for the created network object is displayed. For example, if the object's type is **Cable,** the object is opened on the **Cable** form.

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Editing the geometry of survey objects

1. Select the object whose geometry you want to edit.
2. In the context menu, click **Edit geometry**, or select **Edit geometry** in the toolbar at the bottom.
3. Depending on the geometry type of the object, the **Survey Point** or **Survey Line string** form will be displayed.
4. Edit the geometry as instructed in the Modifying the geometry of an object chapter.
5. Do not forget to click **Save** to save your changes. Note that you cannot edit the original survey coordinates in this connection. You can view them as described in the chapter Viewing the single points of a survey line.

Mapping configurations

Select the mapping configuration that is appropriate for the survey file structure. Coordinates can be in the order **North-East-Height (PIH)** or **East-North-Height (IPH)**, this can be defined on **Mapping Config** field.

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T3 PIH format

The so-called GT format **T3 PIH** (Pohjoinen, Itä and Height) is discussed next. The GT file is a text file that consists of columns. Each row has 7 or 8 columns. These are called **T1–T8**. Columns are separated using space or tabulation characters. The data in a column must not include space or tabulation characters and, apart from column **T2**, the column cells cannot be empty.

An example of a land survey file in the figure below. The land survey file includes one manhole (3600), one duct route (2510), and two cables (2111), as illustrated in the code set on the next page.

```
9       0     3600       1    6928056.458    3601047.489        33.230
9       0     2510       2    6928110.768    3600973.089        33.330
9       0     2510       3    6928127.305    3600965.519        33.217
9       0     2510       4    6928057.033    3600989.882        33.371
9       0     2510       5    6928056.119    3601047.476        32.217
9       0     2510       6    6928056.762    3601047.280        33.217
9       0     2510       7    6928035.609    3601002.283        33.217
9       0     2510       8    6928035.633    3601002.528        33.217
9       1     2111       9    6928057.119    3600989.852        33.217
9       1     2111      10    6928057.281    3600988.209        33.217
9       1     2111      11    6928059.221    3600986.229        33.217
9       1     2111      12    6928066.109    3600982.931        33.217
9       1     2111      13    6928077.171    3600977.830        33.217
9       1     2111      14    6928086.852    3600973.691        33.217
9       1     2111      15    6928095.727    3600970.387        33.217
9       1     2111      16    6928100.522    3600968.236        33.217
9       2     2111      17    6928100.540    3600968.314        33.217
9       2     2111      18    6928102.333    3600967.980        33.217
9       2     2111      19    6928105.390    3600968.861        33.217
9       2     2111      20    6928108.454    3600971.387        33.217
9       2     2111      21    6928110.244    3600972.999        33.217
9       2     2111      22    6928110.764    3600973.094        33.217
```

T8 data model:

The file has information on one coordinate point on each row. The first four numbers are the point identifiers **T1...T4**, and **T3** is typically the survey code. Survey code refers to a “key” that is used to link the description and property values to a certain coordinate point. The applied code set defines the kind codes that are used in a land survey file. These can be edited via the admin user interface.

- **T1 - Surface code**: contains information about surface (for example ground, wetland, peatbog, unknown, etc.). If you are not sure, use “0”.
- **T2 - Line code**: is used to separate line object lines. For point objects, **T2** is 0. If it's different number than zero – it is a line. The same number needs to appear for all vertices belonging to one line.

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- **T3 - Survey code**: contains information about KeyCom specific code of the object. With this KeyCom identifies what network object is created. The used **Code set** defines what kind codes are to be used when doing the land survey. The land survey code set can be modified from the admin interface.
- **T4 - Point number**: ID number of a surveyed point. The **identifier T4** is usually the **point number** defining the order in which points have been measured.
- **T5 - North coordinate:** the north coordinate.
- **T6 - East coordinate:** the east coordinate.
- **T7 - Height (Z):** height from the sea level.
- **T8 - Comments**: comments related to survey point or line.

The following code set is applied to the example:

Point	2210	Splice
Point	2310	Loop/coil
Point	3100	Pole
Point	3510	Telecom premises
Point	3600	Manhole
Point	4100	Sign pillar
Point	4300	Sign antenna
Point	4400	Cable sign
Point	4500	Sign plate
Point	4600	Direction sign
Point	9100	Mast
Point	9200	Point of reference
Point	211054	Manhole

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Line	110	Duct route continues
Line	2110	Cable route begins
Line	2111	Cable route continues
Line	2112	Cable route continues
Line	2510	Duct route begins
Line	2511	Duct route continues
Line	2512	Duct route continues
Line	7403	Duct route continues
Line	212052	Duct route continues

T3 PIH T11 format

The GT file is a text file that consists of the same eight columns as the T8 format and has additional four columns which are **Depth**, **Location accuracy, Height accuracy** and **Depth accuracy**. Each row has total of 12 columns. Columns are separated using space or tabulation characters. The data in a column must not include space or tabulation characters and, apart from column T12, the column cells cannot be empty.

T11 data model

- **T1 - Surface code**: contains information about surface (for example ground, wetland, peatbog, unknown, etc.). If you are not sure, use “0”.
- **T2 - Line code**: is used to separate line object lines. For point objects, **T2** is 0. If it's different number than zero – it is a line. The same number needs to appear for all vertices belonging to one line.
- **T3 - Survey code**: contains information about KeyCom specific code of the object. With this KeyCom identifies what network object is created. The used

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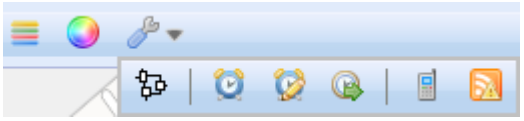
Code set defines what kind codes are to be used when doing the land survey. The land survey code set can be modified from the admin interface.

- **T4 - Point number**: ID number of a surveyed point. The **identifier T4** is usually the **point number** defining the order in which points have been measured.
- **T5 - North coordinate:** the north coordinate.
- **T6 - East coordinate:** the east coordinate.
- **T7 - Height (Z):** height from the sea level.
- **T8 - Depth (from the ground level or from the open trench)**: the depth value is always entered by the surveyor based on how deep the cable is from ground level. Whether measurement is taken from ground surface or from an open ditch it does not affect the depth value.
- **T9 - Location accuracy**: according to the measuring device, to 2 decimal places.
- **T10 - Height accuracy**: according to the measuring device, to 2 decimal places.
- **T11 -Depth accuracy**: if an exact value cannot be interpreted for a measurement point in a survey mapping situation, the accuracy value of the depth must be inserted. The value is in meters, e.g., 1.0; the value can be zero; the field must not be empty.
- **T12 - Comments**: comments related to survey point or line.

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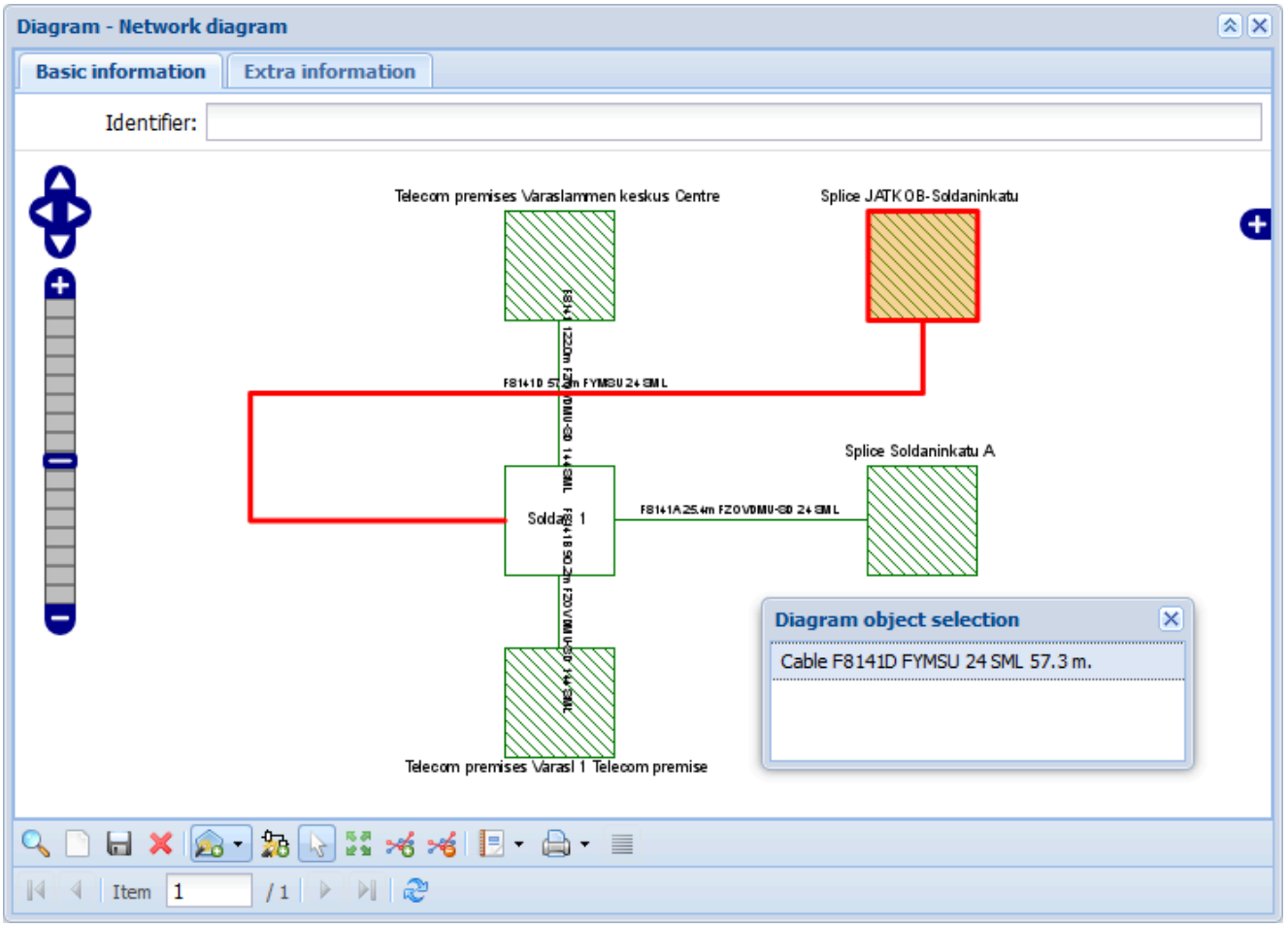
DIAGRAMS

Diagram form can be found from the **Tools** in the main toolbar by opening the sub menu. Use the **Diagram** form to create diagrams of the links between various objects.



You can create, search, and delete diagrams, and add or delete diagrams on the map. On the form, you can create **network diagrams of a specific area** and a **connection diagram for one or multiple objects selected on the map**. Click **Print diagram** or **Print part of diagram** to print the diagram or a part of it. You can highlight threads using the **Pick diagram objects** button. To highlight a circuit, click a circuit point or a cable thread/fiber with the left mouse button. This function makes it easier to follow a route in the diagram.

In the figure below, a connection diagram and a highlighted object in the diagram.



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- **Network diagram:** Illustrates the physical connections **between** telecom premises, splices, manholes and cables.
- **Connection diagram:** Describes the thread connections of some **specific** telecom premises, splice, or manhole.
- **Tree diagram:** Illustrates the connections of a device or cable either completely or partially for a selected connector/pair range.

Creating a diagram

To start creating a new diagram, click **Clear** on the form. Next, click **Create a network diagram from selected area** and select the area on the map (alternatively, you can create a diagram from a map view area, free area, or an existing area), or click **Create diagram based on object**. Then select the telecom premises, splice, or manhole on the map. A diagram of the selected object/objects is displayed on the form. Finally, enter an identifier for the diagram and click **Save** to save it in the database. You can then add the diagram on the map. Adding a diagram on the map is discussed in the next chapter.

Adding a diagram on the map

To add a diagram on the map, open a diagram on a form, or create a new saved diagram, and then click **Place on map**. Then place the diagram on the map by clicking the left mouse button. You can modify the size of the diagram while you are placing it on the map. To do this, hold down the SHIFT key and move your mouse.

Deleting a diagram

You can delete a diagram and any illustrations of it on the map. First, open the diagram on the form and then click **Delete**. To delete only the illustration of a diagram, click **Delete diagram from map** and point at the diagram with the left mouse button.

Tree diagram

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Activate the **Tree diagram** function from the device list on the **Telecom premises** form, **Device** form, **Cable** form, **Connections management** form, or through the **Route follower**. The **Tree diagram** function lets you follow the connections of a device or cable either completely or partially for a selected connector/pair range. The connections reserved by the selected circuit section are illustrated in a diagram format.

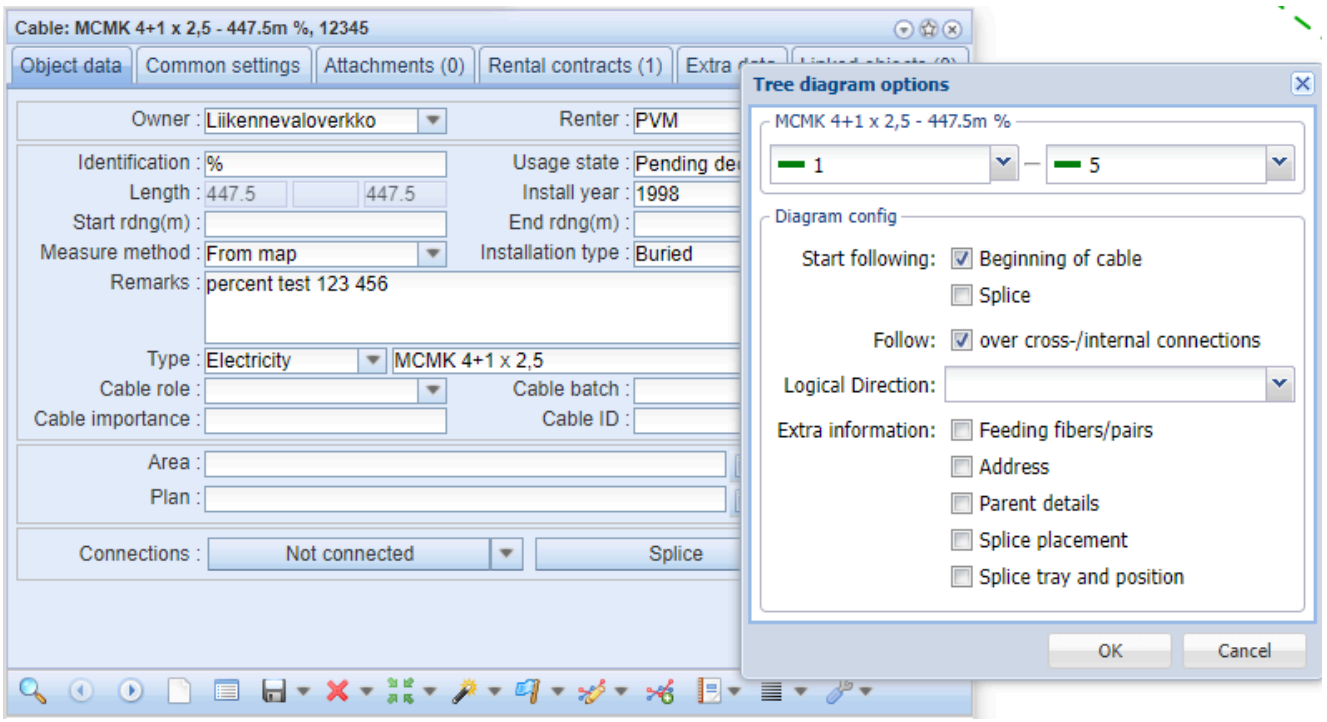
A **tree diagram** illustrates the following objects: telecom premises, manholes, splices, and cables. In a tree diagram, the connections of splices and manholes are illustrated as bundles. Internal connections on telecom premises are not illustrated in a tree diagram.

If there are no cross-connections between the devices in the telecom premises that were found using the route follower, no diagram will be drawn between them. You can highlight the diagram objects on the map or open them on a form.

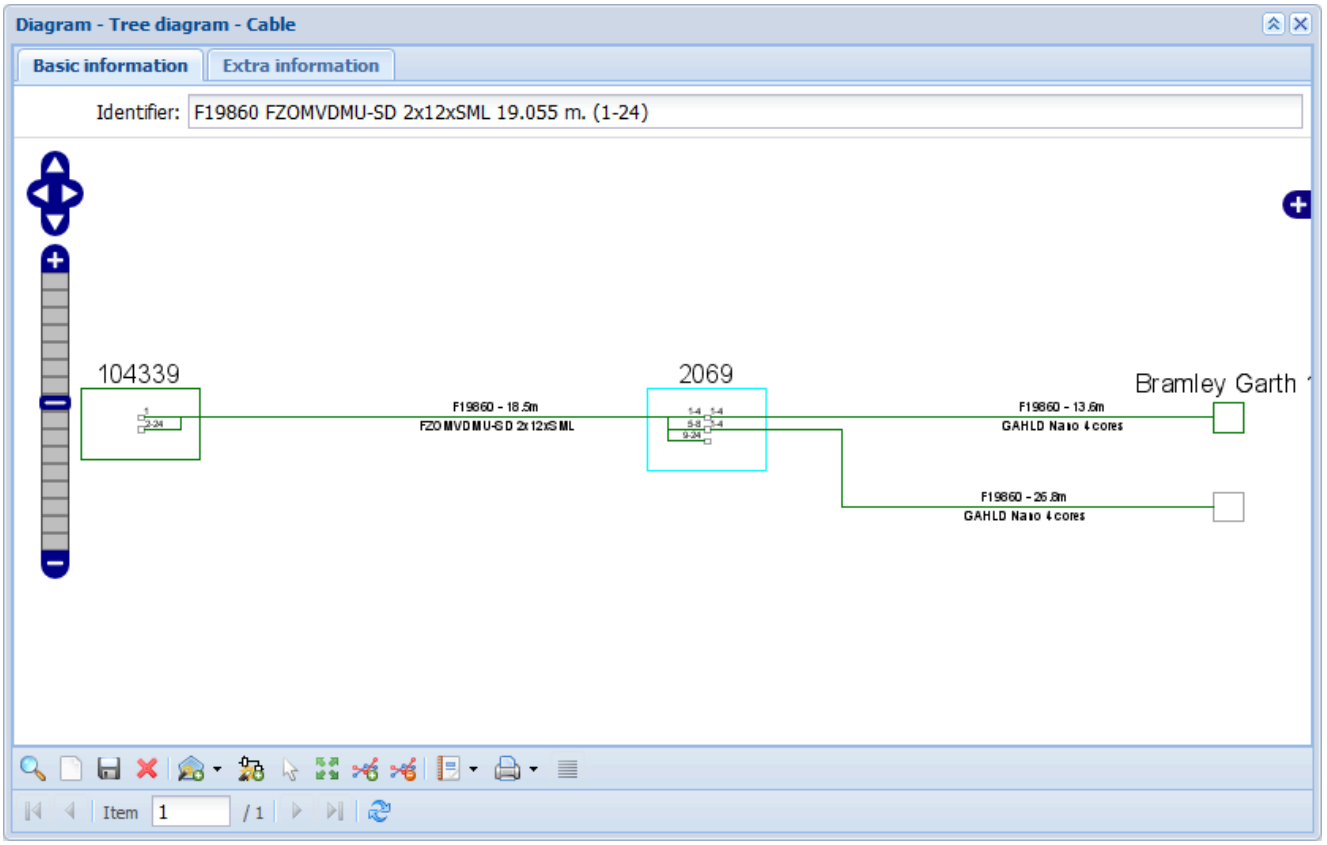
Tree diagram options

The settings for a tree diagram can be defined in the **Tree diagram options** form. The connector/pair range is determined first in top part of the form. In the **Diagram config** section you can determine the direction for following the cable and whether following is continued across cross-connections or not. When the **Follow** checkbox is activated, you can also define whether the direction of logical connections is ascending or descending in the **Logical direction** drop-down menu. **Extra information** section includes whether the splice tray and position, or the feeding fibers/pairs are displayed or not. The details of the parent object can be displayed in the **Tree diagram** by selecting the **Parent details** option from the **Extra information** section. When **Address** field is activated in the **Tree diagram options** the **Tree diagram** now shows address data from Telecom premises, Splice and Manhole forms. Splice placement field shows placement information for splices when activated.

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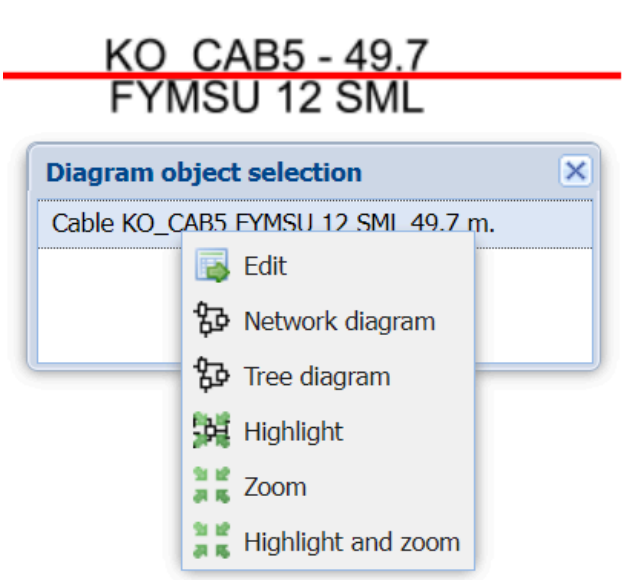


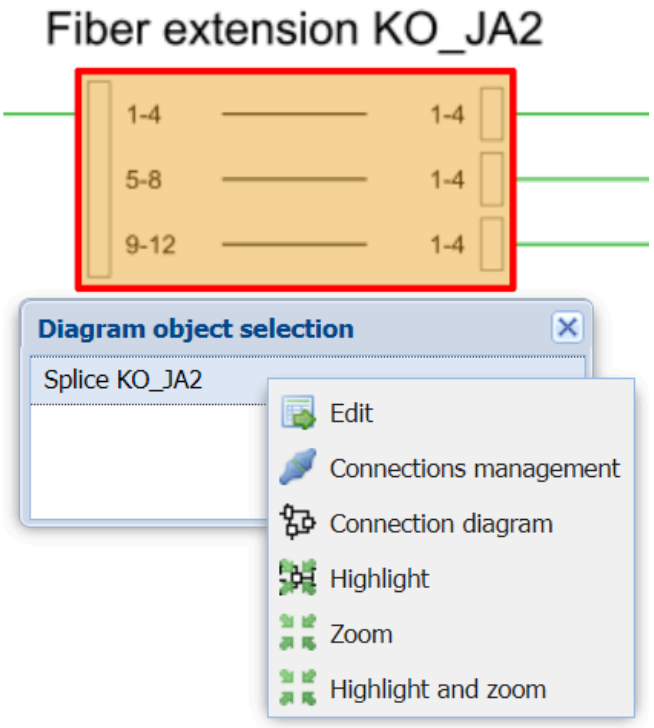
In the figure below, an example of a tree diagram:



Click **Pick diagram objects** to highlight the objects of a tree diagram. In the **Diagram object selection** list displayed, click an object with the left mouse button to highlight the object in the diagram. To edit an object, or to locate and highlight it on the map, click the right mouse button, and then select the required function.

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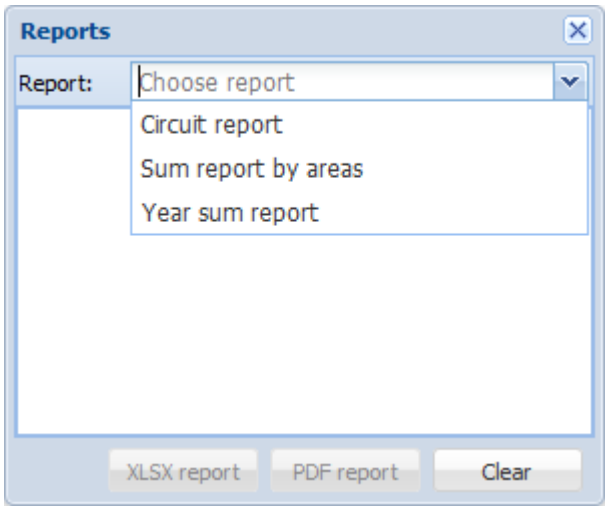
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REPORTS

Reports

KeyCom has an integrated reporting function, and separate report servers are therefore not required. This enables faster creation of information content for reporting. In addition to PDF, reports can be created in Excel format (xlsx). Reports in Excel format can be edited: For example, you can define column widths and add comments. In addition, you can save Excel reports as PDF files. Logos and identifiers for reports can be defined through KeyCom's admin interface.

1. Open the **Reports** form by clicking **Reports** in the main toolbar. In the drop-down menu for **Reports**, select **Traficom availability information** to view the network availability information.
2. On the **Reports** form, in the drop-down menu for **Reports**, select the required report.



3. Fill in the search criteria and click **XLSX report** or **PDF report** to download the report as an **Excel** file.

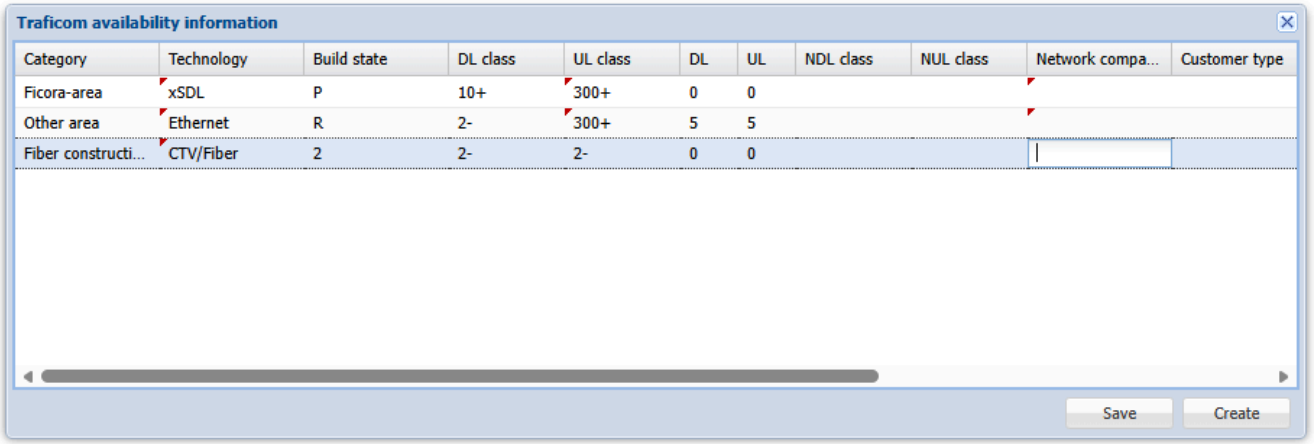
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	A	B	C	D	E	F	G	H
3	**Sum report by areas**							
4	Created by	Creator						
5	Created	23.10.2017 16:19						
6								
7	**Search criteria**							
8	Exchange area:	Bram%	Owner:	%	Technology:	%	Usage state:	%
9								
10	**Telecom premises**							
11	**Area**	**Type**	**Manufacturer**	**Usage state**	**Owner**	**Amount**		
12	BramleyTelecoms	Centre		In use		3		
13	**Sum**					**3**		
14								
15	**Devices**							
16	**Area**	**Type**	**Manufacturer**	**Usage state**	**Owner**	**Connectors**	**Amount**	
	BramleyTelecoms	Fiber	Nestor NC-125 SC/APC 2xSMT	In use		2	1	
17								
18	BramleyTelecoms	Fiber	LANETSC	In use		24	1	
19	BramleyTelecoms	Fiber	LANETSC			24	1	
20	**Sum**						**3**	
21								
22	**Point objects**							
23	**Area**	**Type**	**Usage state**	**Amount**				
24	BramleyTelecoms	Detail drawing		128				
25	BramleyTelecoms	Grounding		192				
26	BramleyTelecoms	Loop	In use	1024				

Traficom availability information

The **Traficom availability information** (for Finnish clients) creates a network availability report based on the service area categories that have been saved in KeyCom.

When you are launching the report, you define the service area categories corresponding with the information the report requires, such as service area technology, construction phase, and DL, UL, NDL and NUL categories. At this point, you can also define categories you want to exclude from the report. These definitions are saved for later use.



Asynchronous reports

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When reports are created for a large number of search results, reporting is carried out asynchronously, that is, in a reporting mode that is run in the background when report creation exceeds the time limit specified for the environment in question. Typically, this time limit is defined to be one minute. The report will then be sent as an attachment to the email address specified for the username. The program will notify the user if the report has been sent to the user by email.

Customer-specific reports (This function is subject to a different order)

KeyCom enables the creation of customer-specific reports if this function has been ordered separately. With the help of Keypro's experts, the admin user interface is used to create a Report group that defines the fields to be displayed in the report and the applicable search criteria.

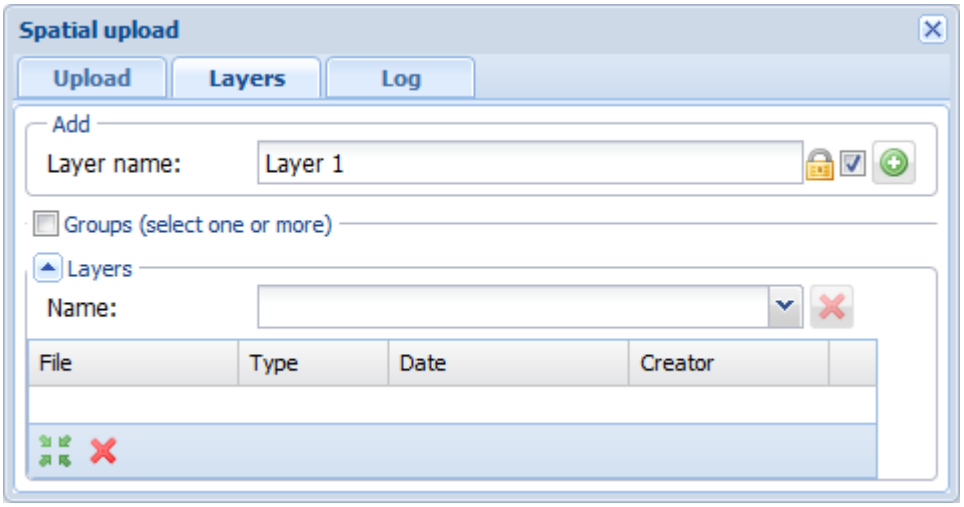
Customer-specific reports are available in the **Reports** menu in the main toolbar. A report is processed in the background and sent to the user's email.

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SPATIAL UPLOAD (this function is subject to a separate order)

Importing by using the Spatial upload tool (this function is subject to a separate order)

Add background maps using the **Spatial upload** tool. Organize and add new background maps to the background layer levels and specify the symbology* for imported files (*Esri™ SHP only). Background maps imported into the system are shared or available for a specific group or user. First, in the main toolbar, click **Spatial upload**.



The **Spatial upload** tool supports the following file formats for creating background maps:

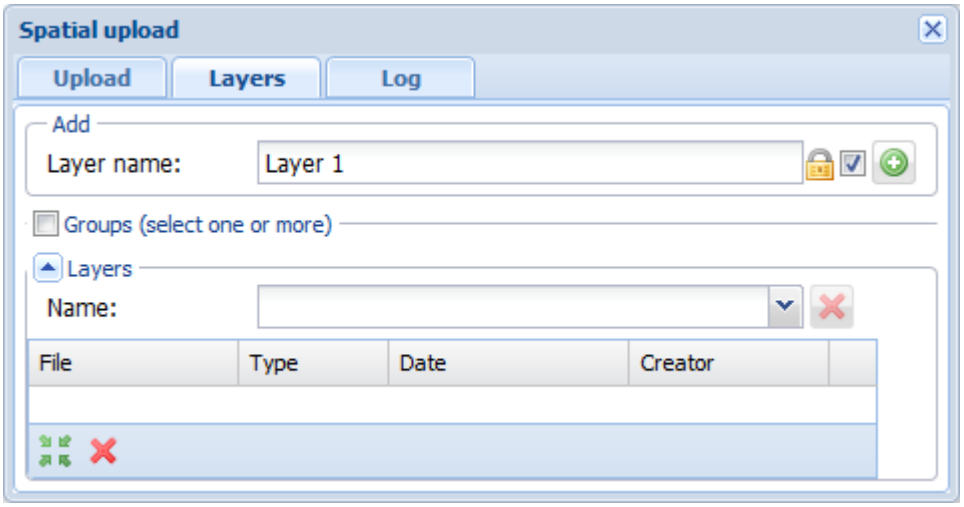
- Esri™ SHP
- Bentley MicroStation™ DGN (V8)
- Autodesk AutoCAD™ DWG
- CSV files (X;Y; name; color; size), see the chapter CSV file format.

In addition, you can create network objects directly from files in the Esri™ SHP format (network). More information on this is provided in the Uploading network objects (Settings must be configured through the admin user interface).

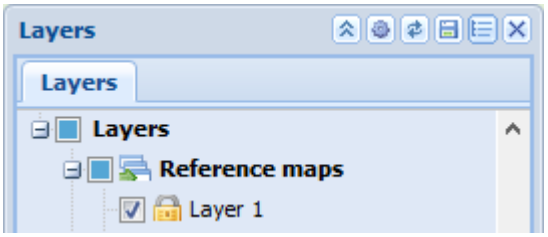
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Managing layers

To upload background maps, select an existing layer or create a new background layer on the **Layers** tab. To create a background map layer, enter its name in the **Layer name** field and click **Add layer**. The layer appears in the **Reference maps** section on the **Layers** form. You can organize the background map layers and their hierarchy.



The user-created layer is now visible under the Reference maps layer.

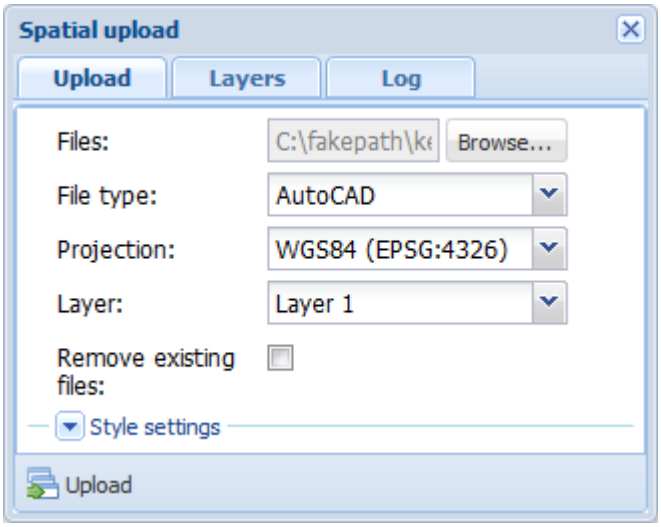


You can create user-specific or group-specific background maps. Any layers you create will be shared by default and will be marked with the unlocked lock icon. You can define a layer as private by selecting the checkbox. The icon will be replaced with a locked lock and the layer you created will not be visible to others. When you have defined the level you created as private, the **Groups** checkbox will be activated. If you want a specific group to see the background map you created, select the name of the group in the drop-down menu for **Group**. Admin users can create groups and add users to the groups.

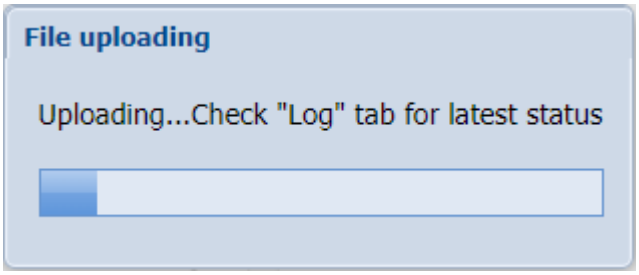
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Spatial upload

1. Select the **Upload** tab.

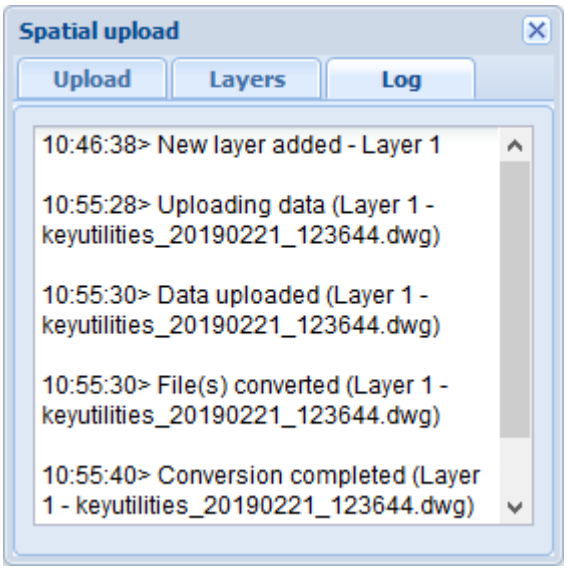


2. Click **Browse** and select the file you want to upload.
3. If you are uploading an ESRI **shp** file, also select the **dbf** file.
4. Check the file type before uploading. This field is usually filled in automatically so that it matches the file you selected.
5. Select the projection applicable to the file that is uploaded.
6. Select the background map layer to which your file is added.
7. Select **Remove existing files** if you want the layer to include only the data included in the files you are uploading (as if you would first delete all files from the layer in question, see the chapter Deleting reference maps).
8. Define the style settings applicable to the object types **(Esri™ SHP only).**
9. Click **Upload**. The progress bar indicates the status of the file upload. Note that it could take several minutes to upload a large file. **TIP:** If your file includes objects with various style settings, you might have to separate them into different files based on their symbology.



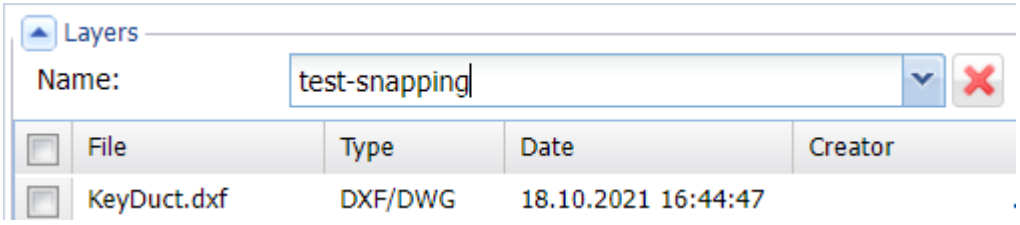
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10. Browse the the Log tab for a file upload.



11. When the file upload is complete, the following notification is displayed: **Data is ready, zoom to extent?** Click **Zoom** and check the result on the map.

When the file has been uploaded, it appears in the **Layers section** on the Layers tab of the Spatial upload form:

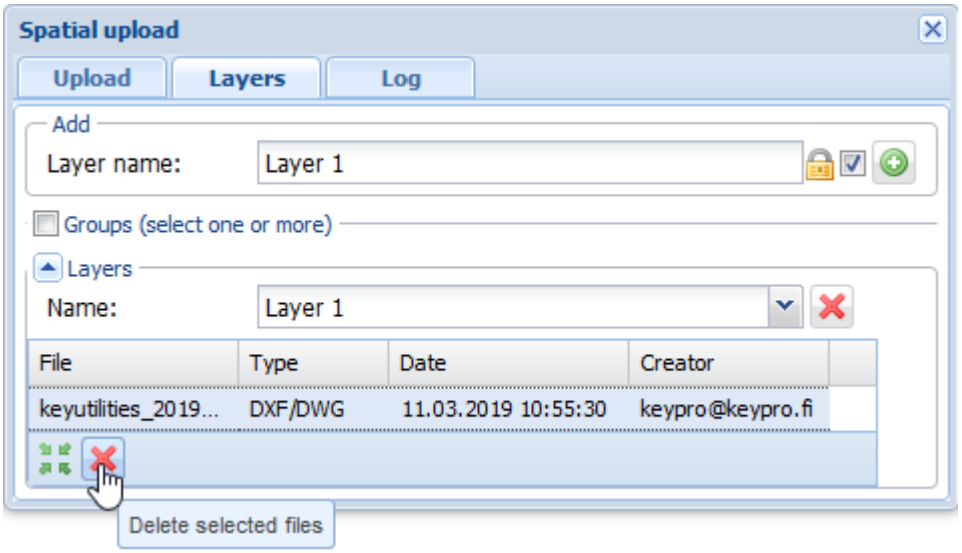


Note! When you create new network objects, you can use the snapping function on the background map.

Deleting background maps

1. Select the **Layers** tab.
2. Expand the **Layers** section if it is hidden.
3. In the drop-down menu for **Name**, select the layer where the background map you want to delete is located.
4. Select the file you want to delete and click **Delete selected files**.

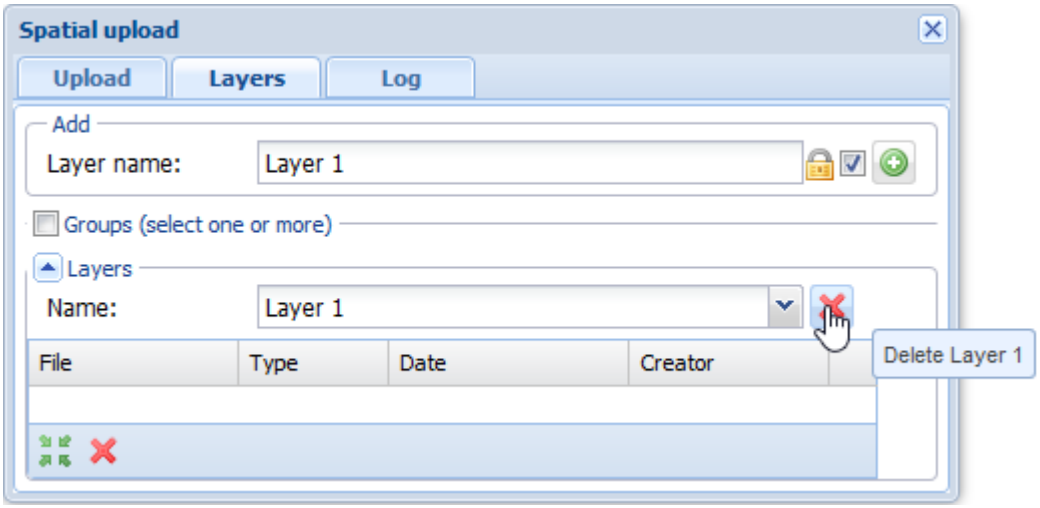
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5. Confirm and check the result on the map.

Deleting a background map layer

1. Select the **Layers** tab.
2. In the drop-down menu for **Name**, select the layer you want to delete.
3. Click Delete
4. If there are files attached to the level, the following notification will be displayed: **Layer** If you are sure that you know what you are doing and you still want to delete the layer, click **Delete** to confirm the action.



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Material in CSV format

Rules for importing CSV files:

1. Fields are separated by semicolons (*;*).
2. No column headers are used.
3. Rows are in the following format: X;Y;[TEXT];[COLOUR];[SIZE]
4. The TEXT, COLOUR, AND SIZE columns can be empty.
5. If TEXT is empty, a point object is created. Otherwise, free text is created.
6. If COLOUR or SIZE is empty, default values are applied.
7. COLOUR is an RGB value, such as “255 255 0”.

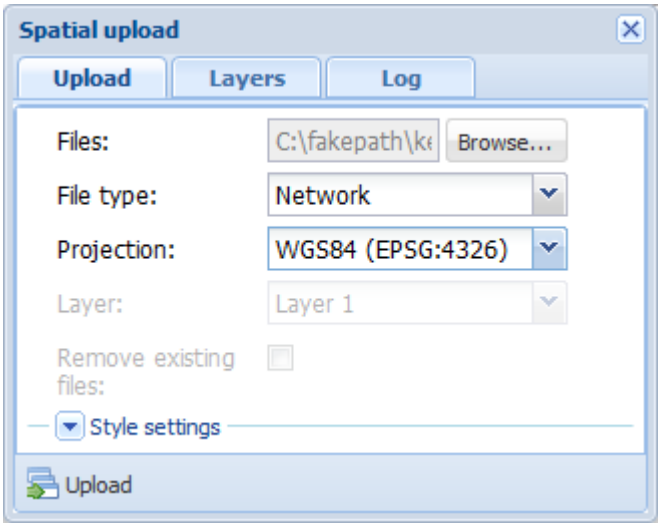
```
3458126;6705024;teksti1;255 255 0;10
3458226;6705024;teksti2ööäöä;255 255 0;10
3458226;6704924;;255 255 0;10
3458126;6704924;;255 255 0;
3458126;6704824;;;
3458226;6704824;teksti3;;
3458226;6704724;teksti3;;20
```

TIP: If you want to create both point objects and free text, create two versions of the file – one containing the texts and another where text boxes are empty – and upload both files to the same layer.

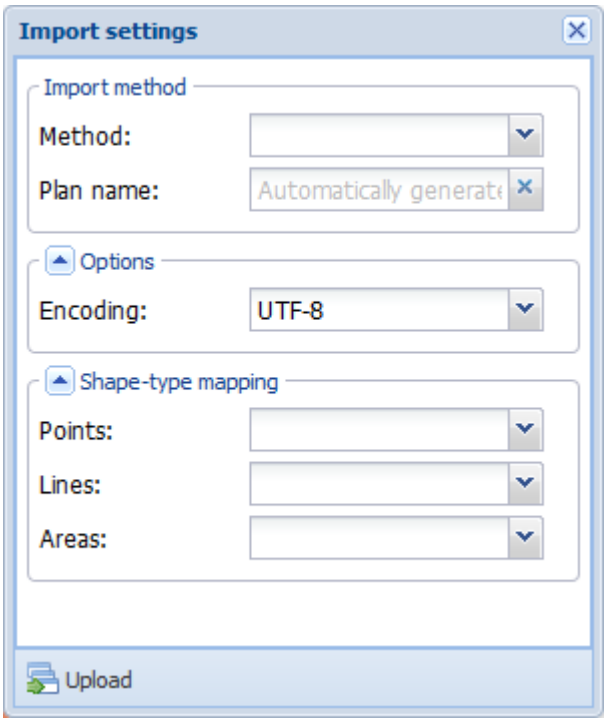
Uploading network objects (Settings must be configured through the admin user interface)

1. Select **shp** and **dbf** files, or a **zip** file containing such files, as these files.
2. Select **Network** as the file type.

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3. Click **Upload**.
4. On the **Import settings** form, select **Method**.



5. Check that the mappings are correct.
6. Click **Upload**. The progress bar indicates the status of the file upload. Note that it could take several minutes to upload a large file.
7. When the file upload is complete, the following notification is displayed: **Data is ready, zoom to extent?**Click
8. **Zoom** and check the results.

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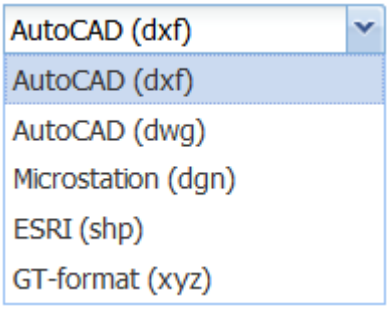
EXPORTING OBJECTS

Exporting objects to external file formats

You can export **KeyCom** objects to **AutoCAD** (dwg, dxf), **ESRI** (shp), **Microstation** (dgn), and **GT** (xyz) formats. You can also export **area objects** and the **area borders of plans** to these formats.

Use either the **Info** form or the **object forms** to export network and annotation data to one of the formats listed above. The link for downloading is sent to the user's email address.

1. In the drop-down menu for **Export**, select **Export – Advanced export...** to export the objects to another file format.
2. On the **Export settings** form that appears, select the export **Format**.

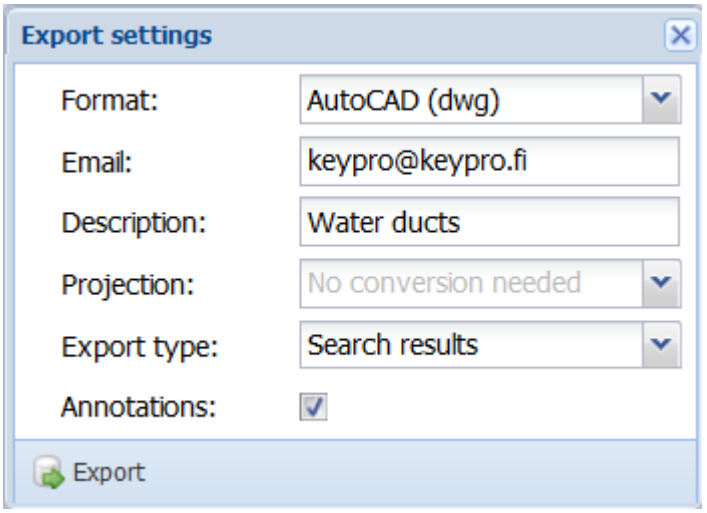


3. Enter a **Description** for the export and select the required coordinate system (**Projection**) for the file that is created.
4. Use the **Clip results** option to select whether to crop objects along the borders of area objects.
5. Select whether **annotations** are exported.

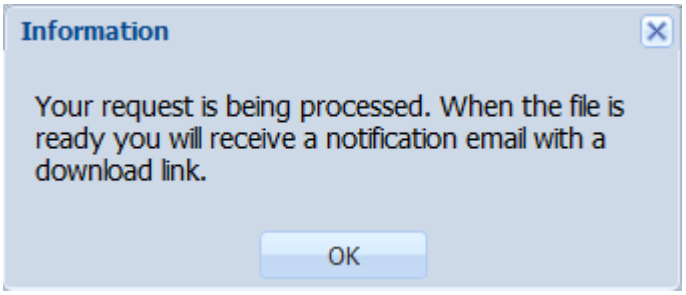
Note! Email addresses are defined/linked to user IDs through the admin user interface. If the intention is that a user does not have rights to use this function, the email address field must be left empty.

Admin users can edit the email address to which the link for downloading data is sent.

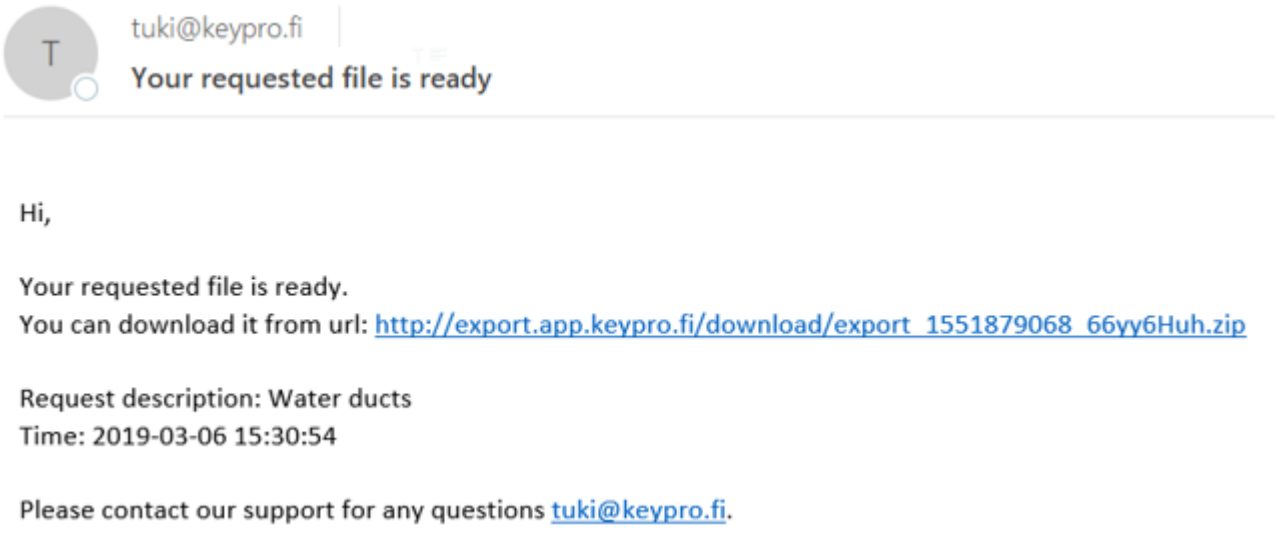
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Click **Export** to **accept the data export**. The system displays a notification that your request is being processed. In the picture below, request is pending.



When the file has been processed, the system will email the user a link for downloading the file.

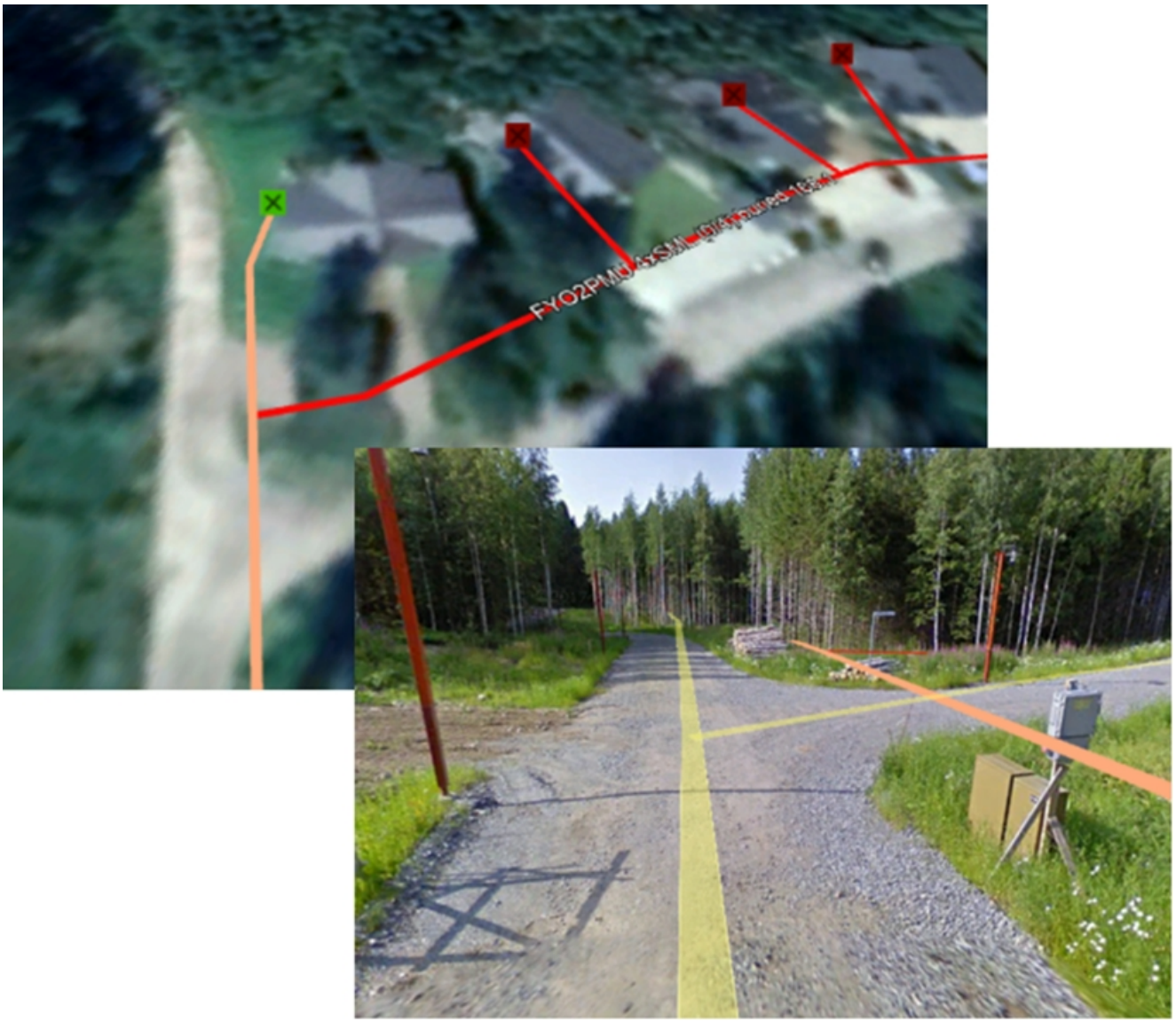


KML/KMZ export

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Keyhole Markup Language (**KML**) is an **XML**-based mark-up language. **KMZ** is a compressed KML file, or a set of files. Google Earth and Google Maps support KML and KMZ files, enabling the use of the file content, for example, when checking the location of cables. Exports to these file formats can also be viewed, for example, in QGIS, which displays the basic information on the object properties.

KML exports are enabled for the following network objects: cables, ducts, telecom premises, splices, manholes, poles, and point objects. Various symbols are used for displaying point objects, with different colours used for line objects.



TIP: If you want to view the exported material in **Google's** map applications, we recommend that you select **WGS84** as the coordinate system. In addition, please note the **service terms** applicable to material loaded to Google.

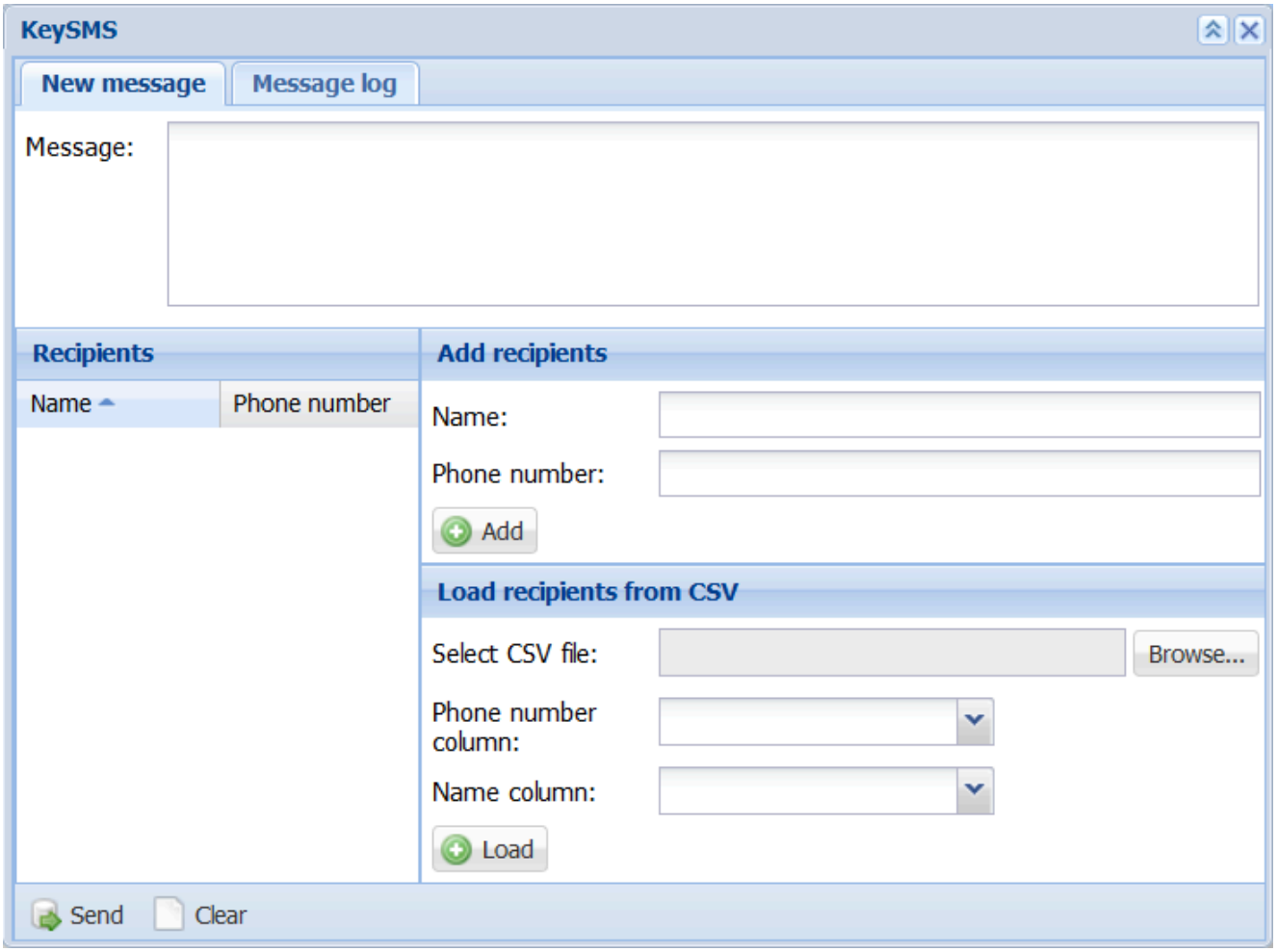
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KEYSMS (this function is subject to a separate order)

KeyCom's KeySMS service is used for sending notifications to customers included in KeyCom's customer register, for example, in the event of errors or incidents. You can send a notification to a maximum of 500 recipients at a time.

The **KeySMS** icon can be found in the main toolbar.

The KeySMS form has two tabs: **New message** and **Message log**. SMSs are sent through the first tab. Add customers/phone numbers to the form for sending the text message. Enter your message in the **Message** field and click **Send**. Information on sent messages is stored on the **Message log** tab.



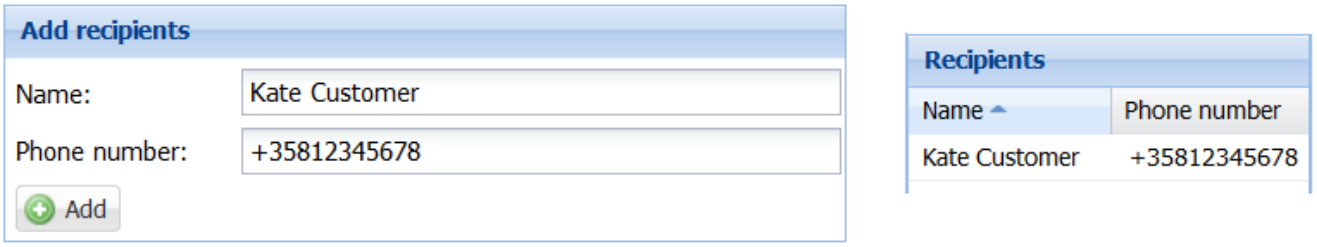
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Adding recipients to the form

There are various ways to create a group of recipients: Each group of new phone numbers is added to the existing phone numbers on the form. If a phone number is already included in the list, only one SMS will be sent to it.

Adding individual recipients

Go to the **Add recipients** section to add recipients. Complete the **Name** and **Phone number** fields and click **Add** next to the fields. The added customer information is displayed in the list of **Recipients**. Phone number information is mandatory, but adding a name will help you distinguish one phone number from another on the object list.

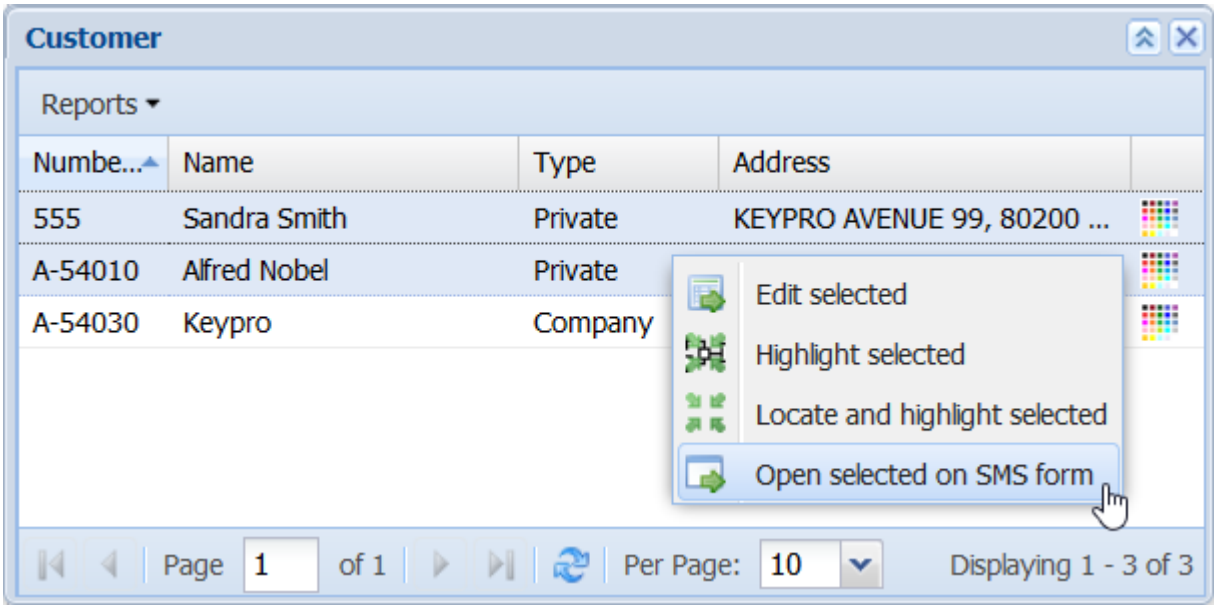


To delete recipients, use the right mouse button to click a row on the list of **Recipients** and click **Remove selected**. You can select multiple rows by holding down the Shift or Control key.

Importing recipients from the Customer form

You can import recipients to the KeySMS form through the Customer form. You can retrieve **Customers** to the **Customer** form by using the available tools for searching and picking. When you have picked a target group to the **Customer** form, click **Show in list**. On the displayed **Customer** list, select the contact rows that you want to use for sending an SMS. Click the right mouse button and select **Open selected on SMS** form.

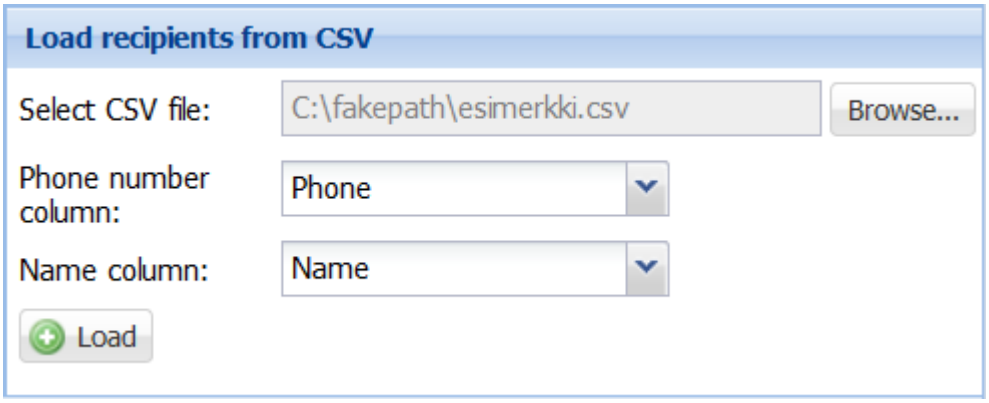
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Importing recipients from an external file

You can import a group of recipients to the SMS form from an external **CSV file**.

1. Click **Browse** to search a local disk for the file to be loaded.
2. In the **Phone number column** and **Name column** fields you must define the column in which the names and phone numbers of the target persons can be found in the CSV file.
3. On the SMS form, click **Load** to import.



4. The list of **Recipients** now includes the contact information you added.

For example, the format of the CSV file can be: Name;Address;Phone number:

- Example person 1;Teollisuuskatu 13;0401234567
- Example person 2;Horsmakuja 8;0501234567

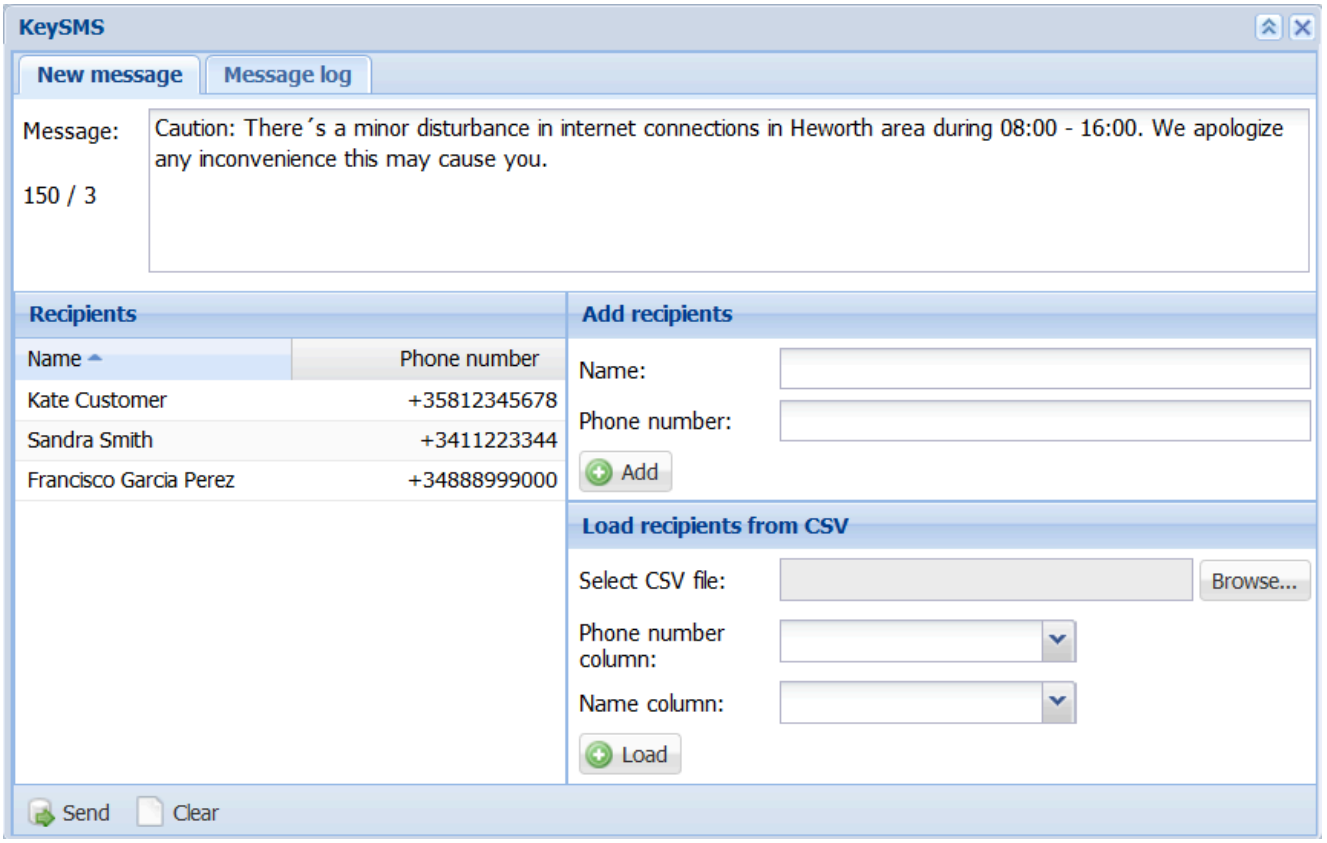
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In this example, the following selections are used: The **Phone number column** is “Phone number” and the **Name column** is “Name”.

Note! CSV files must use **UTF-8** encoding. You can ensure this, for example, by saving the file with the Save as function of the **Notepad** program and by selecting UTF-8 in the Encoding field.

Writing and sending messages

When you have created a recipient group on the **KeySMS** form, you can write and send messages. Enter your message in the **Message** field and click **Send**. A notification of the approved recipients is displayed at the bottom of the form. Additional information is available on the **Message log** tab.



When you write an SMS, please note that the maximum number of characters in one SMS is 70. If the message has more characters, it will be sent in several parts. The figures displayed next to the message field provide information on the number of messages **175/3**. The latter number is the number of messages, whereas the first number is the number of the used characters.

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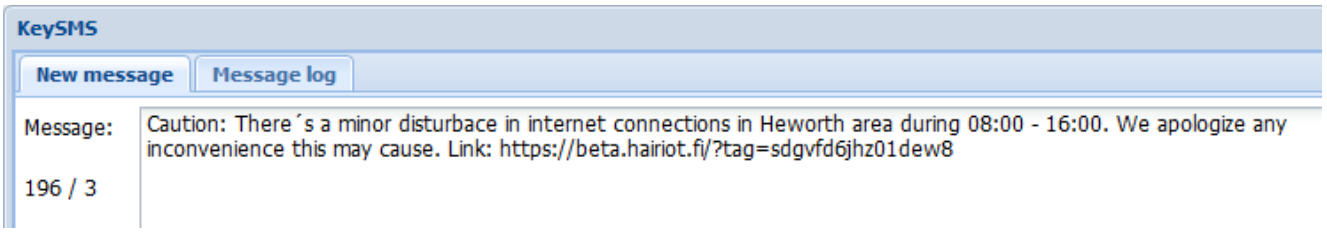
For example, there are 50 recipients, and the text requires 3 messages. This means that 3 * 50 = 150 messages will be sent.

Note! If a specific number occurs several times, the message will be sent only once to this number.

Linking alert information sites to text messages

After completing the message and contact details on the KeySMS form, as instructed in the Writing and sending messages chapter, click **Alert** to continue with the creation of an Alert. **Please note that if the function is not activated in your system as an additional service, the button will not be available!**

On the **Alerts** form that is displayed, the Description fields have been pre-filled in accordance with the message on the KeySMS form. Create an alert, as instructed in the Creating alerts chapter. After you have created and saved an alert, a link to it will automatically be added in the Message field:

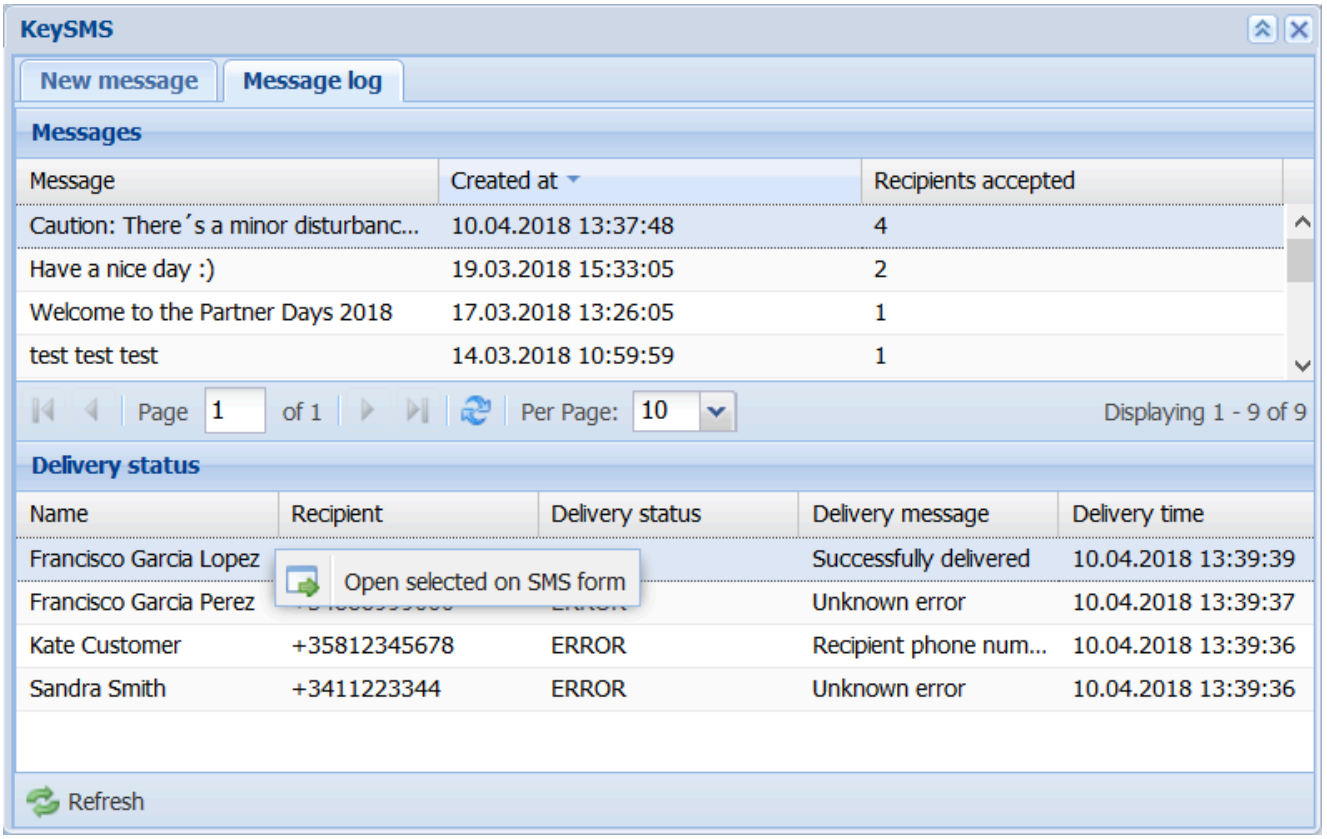


Click **Send** to send the text message.

Message log

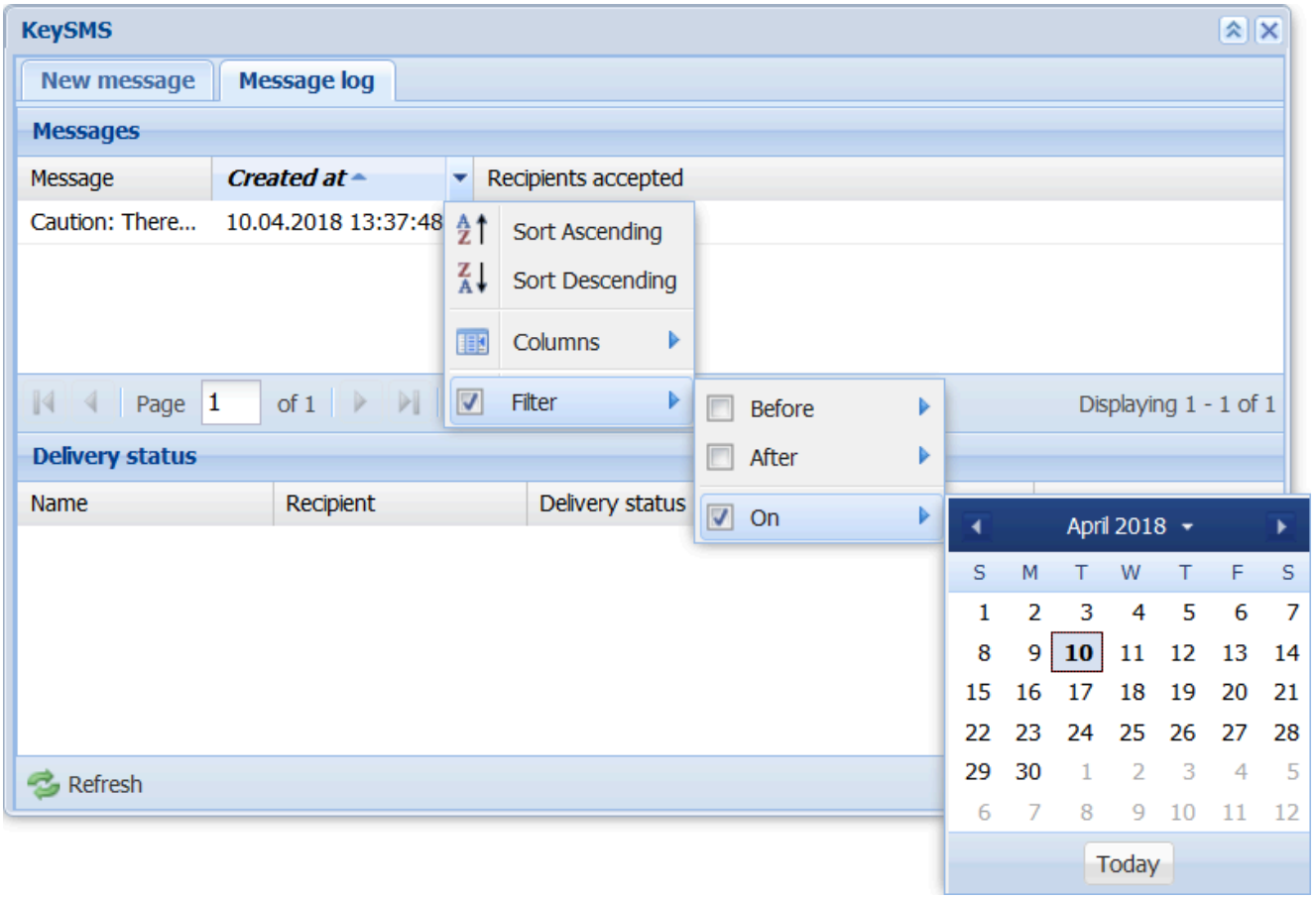
Information on sent text messages will be displayed on the **Message log** tab of the **KeySMS** form. Click a single message in the **Messages** section of the tab view to view the detailed delivery information in the **Delivery status** table at the bottom of the tab. Click a row with the right mouse button and select **Open selected on SMS form** to open the selected rows on a **New message** form. You can then send a new message using the contact details you selected.

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Add or delete columns to edit the log view. In addition, you can use filtering criteria to filter the displayed information based on the **requester**, **message** content, **creation date** or **approved recipients**.

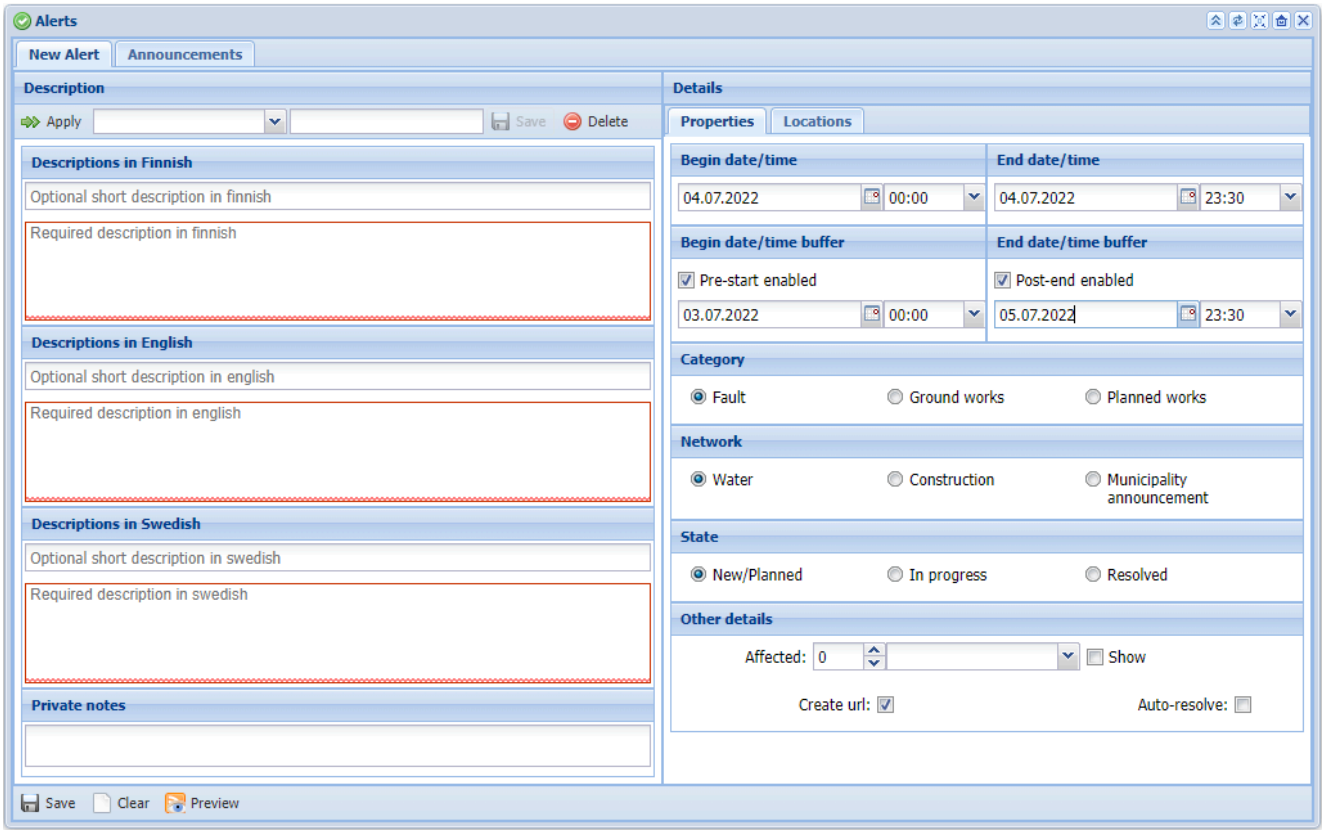
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ALERTS (this function is subject to a separate order)

Click **Alerts** to open a separate form that is used for managing the affected areas and alerts. On the form, you can specify and save information on future construction, distribution breaks, and other disruptions, as well as their start and end times. The form is used to record information about the category and status of the alert and the network type. The form can be used to determine the number of customers affected by the alert.



Click **Clear** to clear the form of all information.

Creating alerts

1. Create a new message or search for an existing message template, as instructed in the Creating new messages and templates chapter.

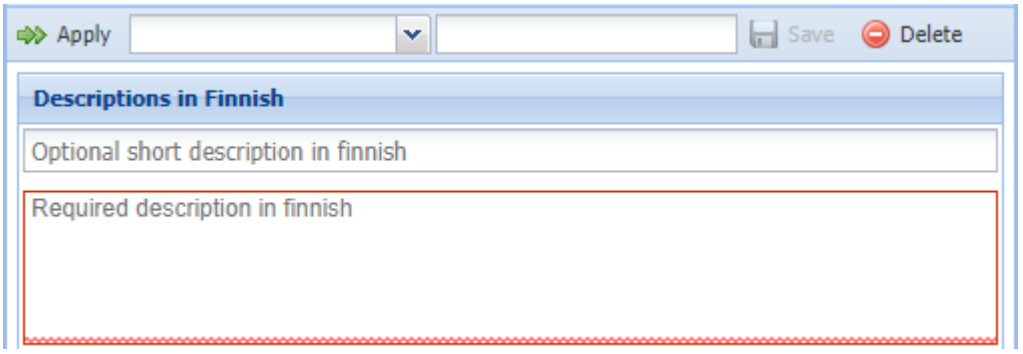
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2. Complete more specific information in the **Details** section of the alert. This section is discussed in the Details chapter.
3. Complete the location information for the alert, as instructed in the Locations chapter.
4. Click **Save** in the bottom left corner to save the new alert.
5. The alerts that you create can be viewed on the **Announcements** tab.

Creating new messages and templates

You can complete the alert text in the **Description** section of the alert. Information can be provided in Finnish, English, and Swedish, as the public alert information website supports these languages.

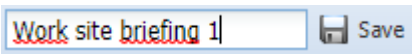
Note! A description in Finnish is also copied to the fields for texts in English and Swedish. You can also translate the text into those languages.



1. **Enter the alert title.** This field is optional.
2. **Type a description** in the fields below the headings. You cannot save the form without completing the Description field. If you do not want to save the message template continue to the Details section without saving the form.

OR:

To save a new template, name the template and click **Save**:



Note! In the **Private** field, you can enter organisation-internal information related to the alert. The contents of this field are not published to customers.

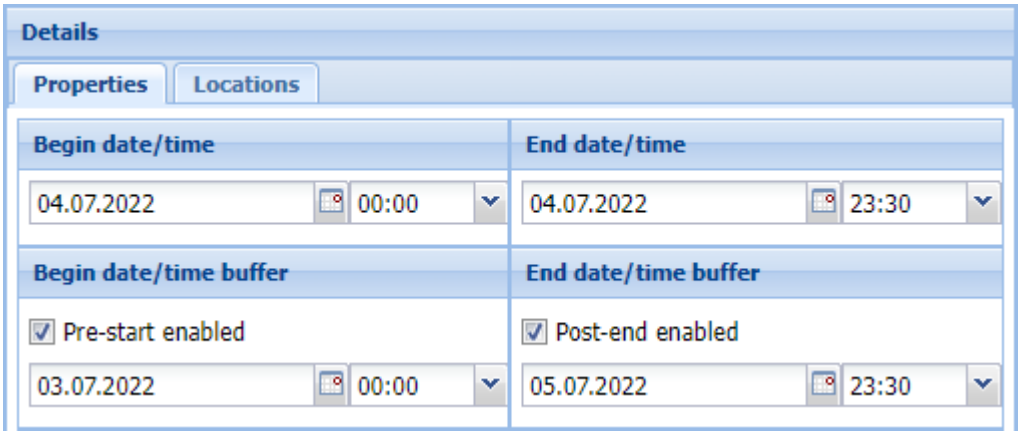
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Details

The **Details** section is used for providing more detailed information on the alert.

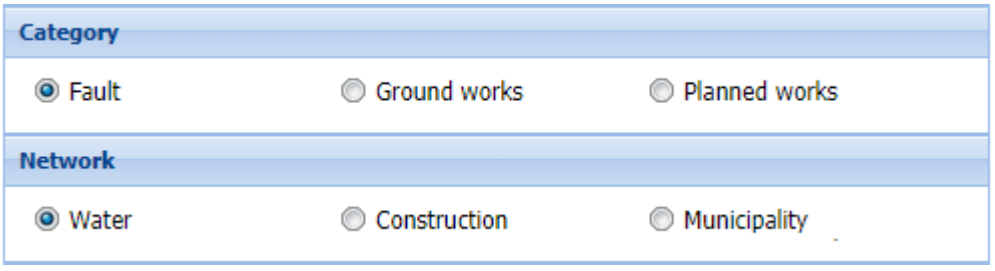
Begin date/time + buffer and **End date/time + buffer:** Specify the start and end dates of the alert using the calendar and time menus in the top section.

If you tick the checkboxes **Pre-start enabled** and **Post-end enabled**, the lower date and time fields will also be activated. Enabling pre-start means that you inform customers in advance of any disruptions, construction, or planned interruptions. In addition, you can inform customers after a disruption by selecting the Post-end enabled checkbox, in which case the alert will be displayed for the period you define.



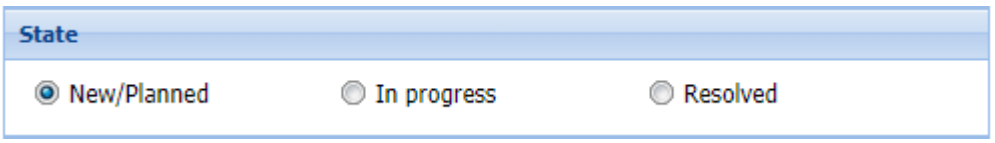
Alert category and Alert type

Select either **Fault**, **Ground works,** or **Planned works** as the alert category. In addition, select the network type that the alert is related to:



Alert status

Specify the alert status: **New/Planned**, **In progress,** or **Resolved**:



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Alerts with the status **Open** and **In progress** are displayed on the map. Alerts with the status **Resolved** are not displayed on the map.

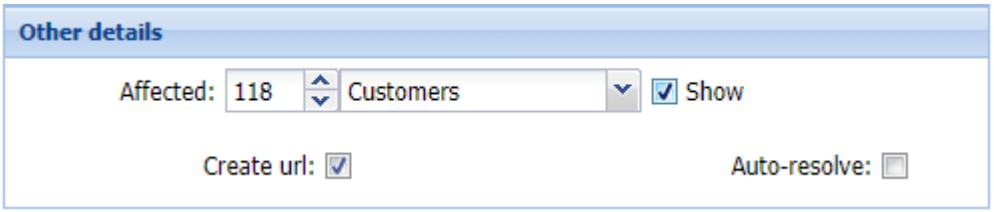
Other details

Use the **Other details** section on the alert form to provide more detailed information :

In the **Affected** field, specify the number of **customers** who will be affected by the construction, disruption, or planned interruption.

The **Show** checkbox determines whether or not the information is published in the alert.

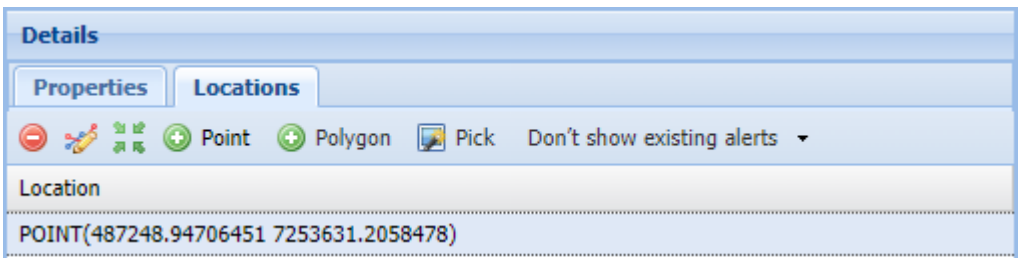
The **Create URL** checkbox creates a link to the alert for the notification. The link allows customers to see the alert text and maps on a separate alert information website. For further information on alerts, please see the Notifications on disruptions chapter.



Locations

Use the **Locations** section to define the location of the disruption, construction, or planned interruption on the map. Open the **Locations** menu from the bottom-right corner of the Alert form.

In the picture, both a point and polygon location have been defined for the alert, with the polygon being selected.



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Point: Click on the map to add a point-type location for the alert within your operational area. You can add several points.

Polygon: Click on the map to add a polygon-type location for the alert within your operational area. You can add several polygons.

Pick: Pick an existing area geometry from the map.

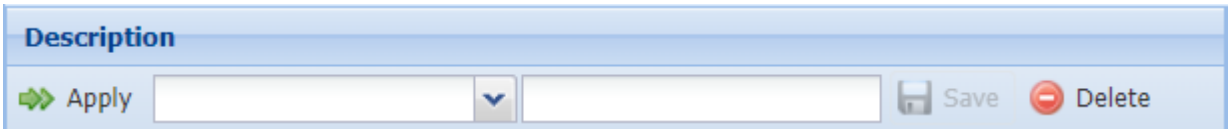
None menu:

- **None**: Alerts are not displayed on the map.
- **Active**: Active alerts are displayed on the map.
- **All**: All alerts that have been created are displayed on the map.

You can **modify** a location, **locate** it, or **delete** it.

Editing and deleting templates

1. **Choose** a template from the drop-down menu based on its description:



2. Click **Apply** to have the template information completed in the fields below for you to edit.

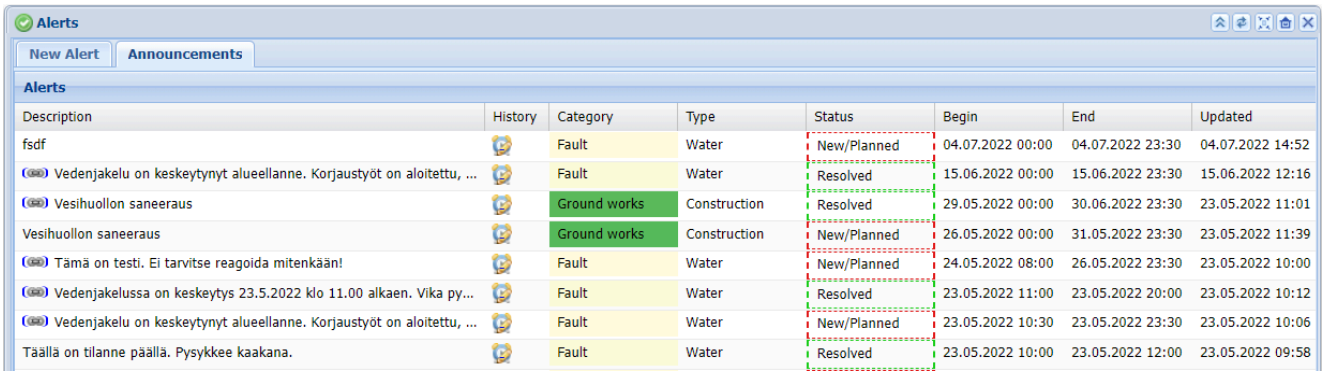
OR:

Click **Delete** to delete the template.

Saved alerts

The alerts are stored on the **Announcements** tab. The table presents the alert description, category, type, status, begin date, end date, and the date the alert was updated.

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Each category **type** (fault/ground works/planned interruption) may be assigned a background color that is used when displaying the information on the alert information map. Similarly, the alert state (open/in progress/resolved) can be assigned a color that is also used when displaying information on the alert information map.

Edit alert

Select the alert you want to edit and click **Edit alert**. The warning will open on a separate **Edit alert** tab, where you can edit the information. When you are ready, click **Save** to save changes.

Deleting alerts

Select the alert(s) you want to delete. Click **Delete**. The program will ask you to confirm the deletion.

New URL

You can **create a new URL** for one or several alerts. Use the Shift or Ctrl key to select the alert rows for which you want to create a new URL. Then click **New URL**.

This is a useful function when you want to link more than one alert so that they are available through the same link.

Linking

You can add additional alerts to the selected alert link. In the Links section, click the link to which you want to add existing alerts. Use the Shift or Ctrl key to

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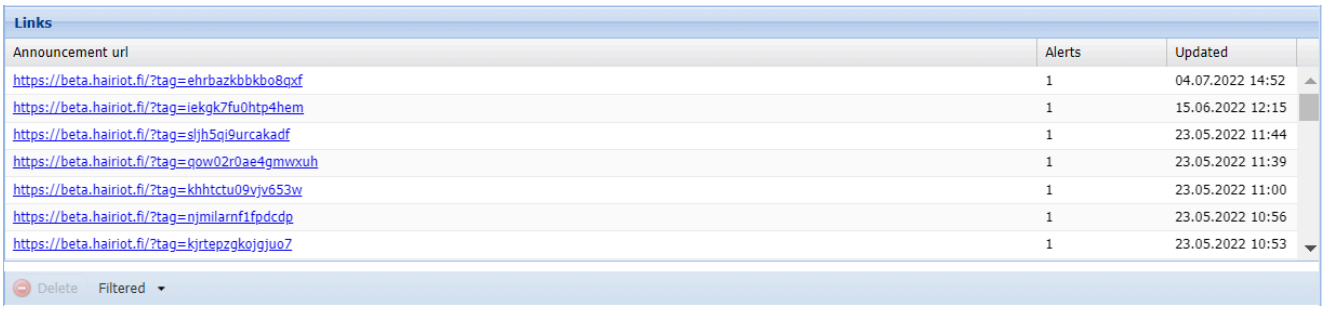
select from the Alerts list the alerts that you want to link. Click **Link**.

Unlink

If you have created a link to an alert and want to remove it, click **Unlink**. If the function is not available, the alert has no linking.

Links section

In the **Links** section, you can see the alert links, the number of alerts, and the dates for alert updates.



DeleteSelect a link and click **Delete** to delete the link. The program will ask you to confirm the deletion. After the deletion of the link, the alert will no longer be displayed on the public alert information website.

FilteredUse the **Filtered** menu to select whether the **Links** section displays only the link for the selected alert (**Filtered**) or the links of all alerts (**All**).

Quick buttons on the form

The quick buttons in the top-right corner of the **Alerts** form include the following functions:

You can minimise the form to the **Favorites** bar by clicking .

The **Reload config** button is useful when the **Alerts** form cannot connect to a server. In this case, you can see the symbol in the top-left corner of the form. The settings have been reloaded when you can see the symbol .

The **Zoom to operational area** button centers the map to your operational area.

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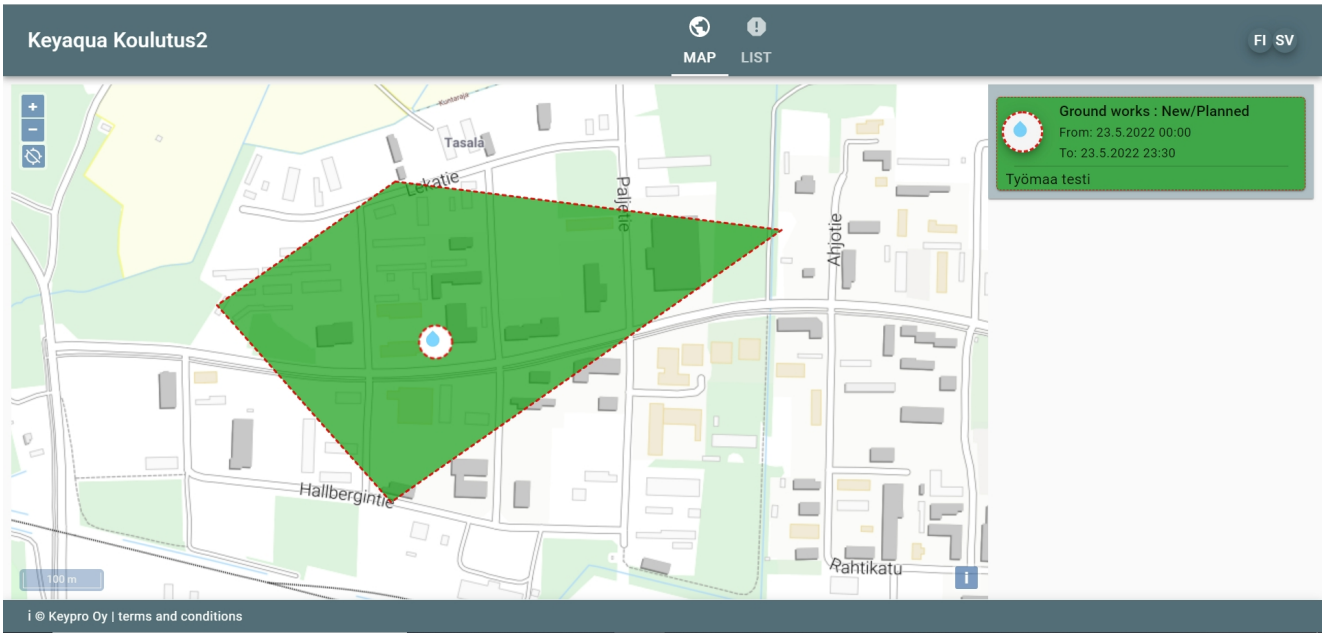
Click **Show tenant URL** to open an alert map, which displays all alerts with the status **Open** and **In progress**.

Click to **close** the form.

Sharing information concerning disruptions

The **Alerts** tool is linked to a separate public website on which the actual information sharing takes place. The link to the **Alert information website** can be published on the websites of operators. Alerts can be customer- and operator-specific with information including the affected services, the start time, the estimated repair time, the affected area, and phone numbers for on-call technical support.

An example of a public alert information website.



Customers located in the affected areas can also be informed by using **text messages**, which can include a link to the alert information website. Further information is available in the Linking alert information sites to text messages chapter.

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AUTOMATED PLANNING TOOLS

Automated planning refers to the tools available in KeyCom that plan networks automatically. Currently, these tools include Comsof FiberplanIT™ and Setics STTAR.

Automated planning works by exporting the plan and the associated address data from KeyCom to an external system. The transferred data is processed either in the service provider's online service or in a desktop application with the service provider's automated planning extension. The processed results are then brought back to KeyCom for the user to review. The user can then choose to accept the imported files. As a result, various KeyCom network objects (cables, devices and telecom premises) appear on the map.

Setics STTAR (This function is subject to a separate order)

KeyCom's support for Setics STTAR covers exporting the **Plan** and related objects, exporting the data to the Setics STTAR desktop application, creating the network and importing the final network into the Keycom system using the **Spatial upload** tool.

If the Setics STTAR integration is configured in the KeyCom environment, the usage method is the same as the other background data import methods.

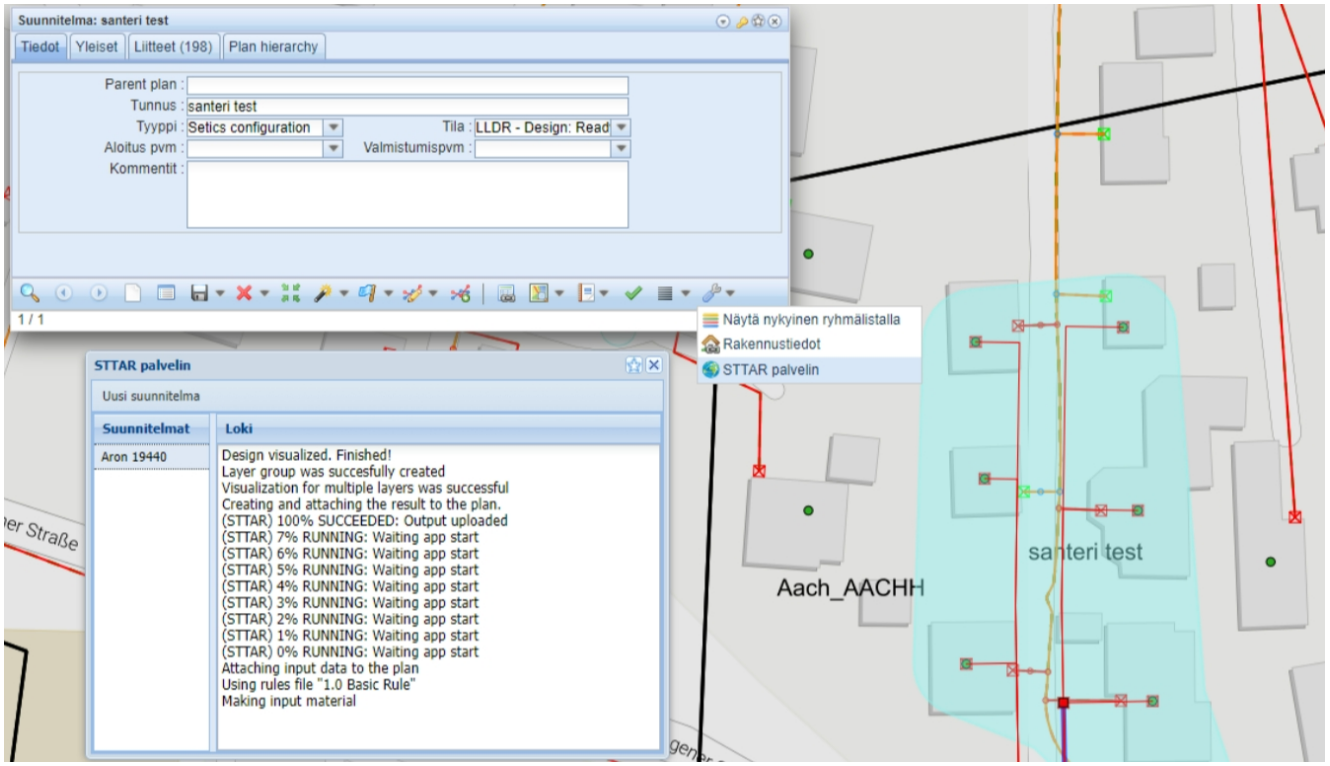
1. Select **Spatial upload** 
2. Select **Network** as the **File type**
3. Download files
4. Select **Setics STTAR**

Enabling the automated planning

Start automated planning with Setics STARR integration by first creating a new plan for it.

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1. Open the **Plan** form and create a plan with all the necessary network objects attached to it (Read more in chapter Plans).
2. Open the **Setics STARR service** form from the **Plan** form toolbar.
3. Create a new **Setics STARR** plan within the area of the plan you already created by using the **STTAR server** form.



Custom preview layer (this function is subjects to a separate order)

Custom **Setics STTAR** preview layers can be created in KeyCom, which can be defined with text constants in the admin interface.

When creating a new plan, the system creates a completely new layer, which name is defined in the **Abbreviation** field when creating the text constant (Read more about how to setup **Setics STTAR** integration and custom preview layers from the **KeyCom 3.8.0 setup guide, chapter 21. Automated planning**)

Note! The new preview layer is only available for plans created after the feature was enabled.

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FiberPlanIT™ by Comsof integration (This function is subject to a separate order)

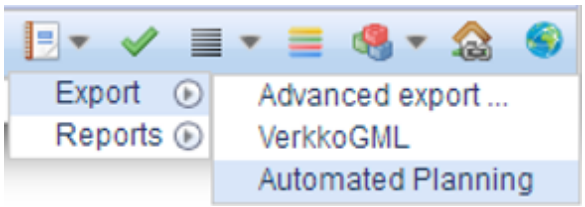
If the KeyCom system you are using includes the optional FiberPlanIT™ function, you can use it to:

- Export KeyCom network plan data to FiberPlanIT as source information.
- Use the FiberPlanIT software to create an optimised network plan for your area.
- Import the optimised network plan into KeyCom.
- Carry out simple fiber-optic planning using the FiberPlanIT server.

FiberPlanIT is a registered trademark of Comsof N.V. **More information** on FiberPlanIT is available from your KeyCom retailer, FiberPlanIT user guides, and the following website: http://www.fiberplanit.com.

Exporting a KeyCom network plan to FiberPlanIT

1. Open the **Plan** form in the **KeyCom tools**, as described in the chapter Plans.
2. Create a new network plan or retrieve an existing network plan to the form. When the plan is open on the form, make sure that the area geometry has been created for the plan. If there is no geometry, create it. For more information, please see the chapter Creating a new object.
3. In the form menu, select **Reports > Export > FiberPlanIT (or FiberPlanITServer...)**. This creates a zip file with the following information:



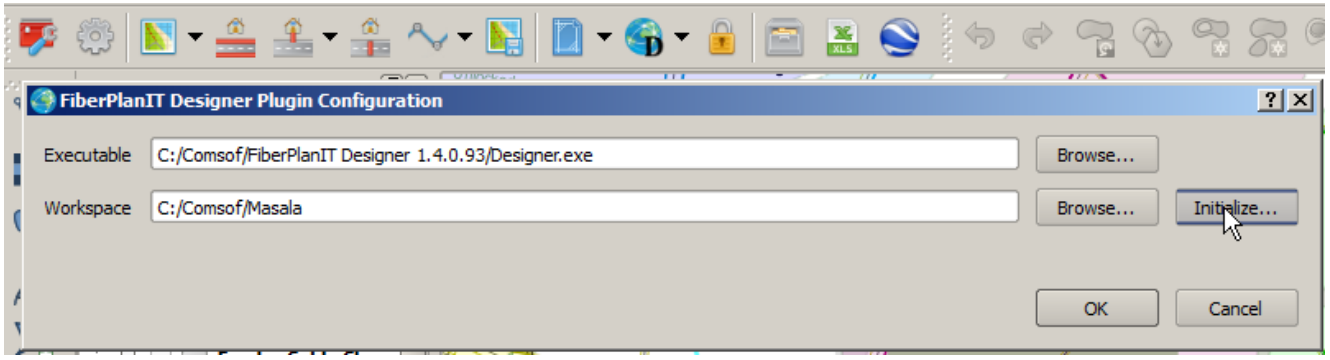
- The address points within your area (IN_DemandPoints.shp)
- The street center lines crossing your area (IN_StreetCenterLines.shp)

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- The existing network pipes crossing your area (IN_ExistingPipes.shp)
- Any exchange telecom premises within your area (IN_CentralOffice.shp)
- The poles within your area (IN_Poles.shp)

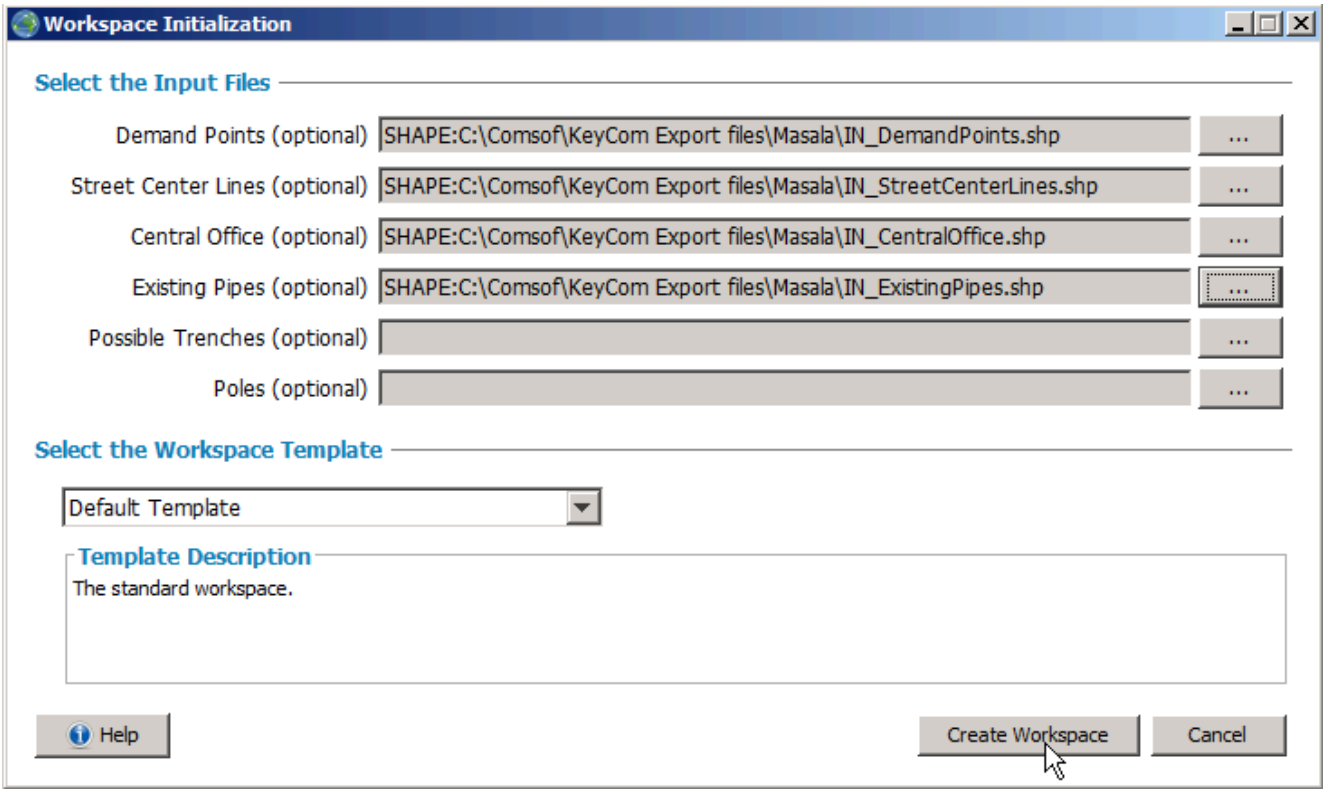
Using KeyCom data in FiberPlanIT

1. Start Quantum GIS.
2. In the toolbar, click **Configure FiberPlanIT Designer**.
3. Browse and select the installed Designer.exe if necessary.
4. Select an empty workspace folder for your network plan.
5. Click **Initialize**.



This opens a new browser window. Define the source files as illustrated in the figure. Click **Create Workspace**.

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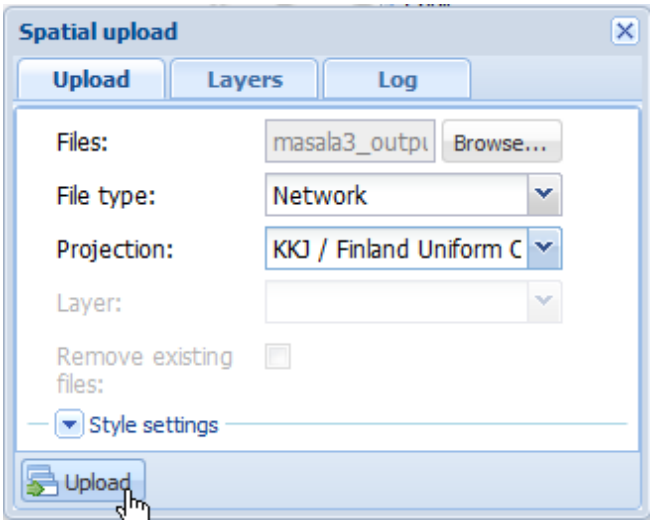
Import is complete. You can use FiberPlanIT software's advanced planning automation. When your plan is ready, you can import it back to KeyCom, as described in the chapter Importing a FiberPlanIT network plan to KeyCom.

Importing a FiberPlanIT network plan to KeyCom

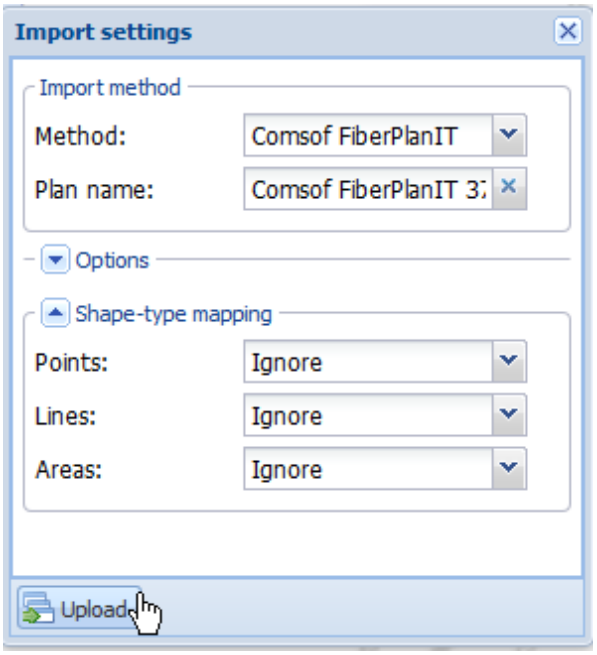
Create a zip file of all the files in the **output** folder of your FiberPlanIT workspace.

1. In the toolbar, click **Spatial upload** to manage KeyCom background maps. More information is provided in the chapter Spatial upload.
2. Click **Browse...** on the form. Select the **zip file** you created as described in the chapter Using KeyCom data in FiberPlanIT.
3. Select the **coordinate system** you used in the FiberPlanIT project. Click **Upload** on the form.

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4. This opens a new **Import settings** form. In the **Method** list, select **Comsof FiberPlanIT**. You can edit the name of the **Plan** if you want.
5. Click **Upload** on the form to have the import function to create a new network plan with this name.



The file is uploaded in the background without preventing other KeyCom use. It could take dozens of minutes to import a large network plan. When importing is complete, a pop-up window is displayed. Click **Yes** to zoom the map to the area of the imported plan.

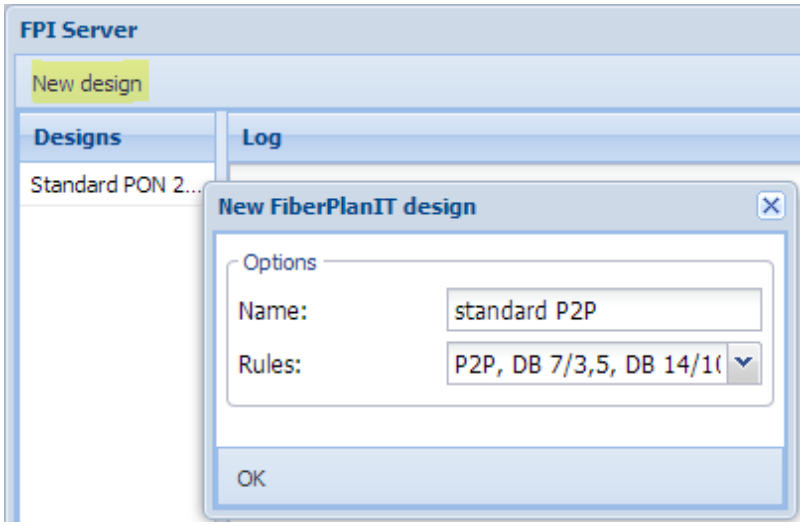
If you want to remove a network plan that was imported from FiberPlanIT to KeyCom, you must first change the **plan type** to network deconstruction, as described in the chapter Deconstructing a plan. This may be necessary if you want

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to compare various implementation options in KeyCom. Layer filters are a useful tool when making comparisons. More information on them is provided in the chapter Layer filters.

FiberPlanIT server

You can carry out simple fiber-optic planning using the FiberPlanIT server. This server is used through a form that you can open by clicking **FiberPlanIT server** on the **Plan** form.

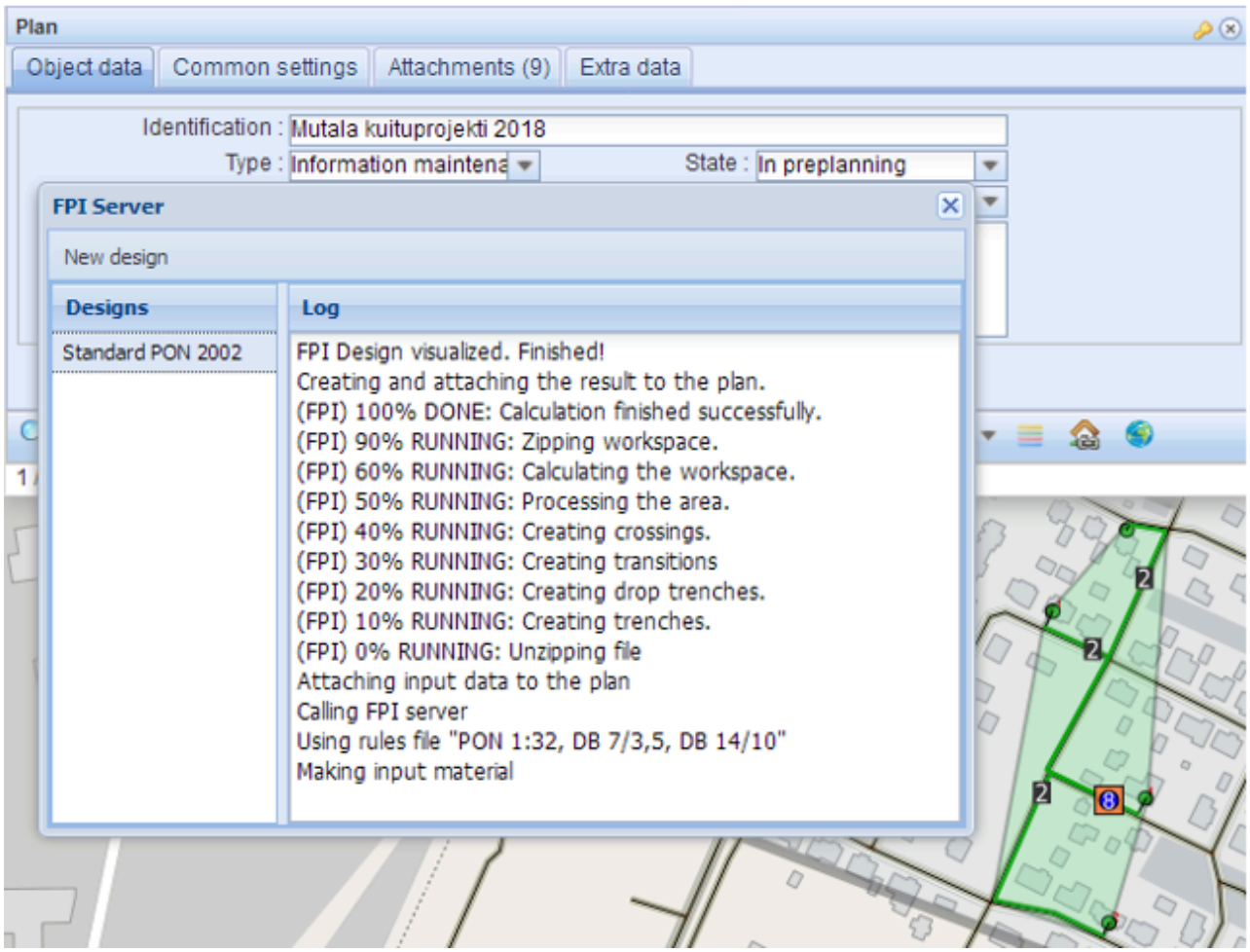


The FiberPlanIT server form lists all fiber-optic planning related to the plan on the left, whereas the event log for active planning is displayed on the right. Start a new plan by clicking the **New design** button. You can name the planning and define the rule set that is applied. The rule set is for FiberPlanIT, and it includes the applicable parameters. Rule sets can be created and managed through administration.

A valid area licence is a prerequisite for planning. Licences are managed by Comsof. A plan with content that fulfils the requirements described in the chapter Exporting a KeyCom network plan to FiberPlanIT is used as the basis for planning.

The FPI planning is calculated using the applicable rule sets and other default values. A preview of the fiber-optic plan is displayed on the map.

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Completed planning can be managed through the context menu for the list on the left:

- You can view or hide the preview layer
- You can delete planning (users can only delete their own plans)
- You can open the bill of materials report that FiberPlanIT calculated for the plan
- You can import a plan as a KeyCom network, as described in the chapter Importing a FiberPlanIT network plan to KeyCom.

You can view the preview layers for all planning under **Layers/FiberPlanIT plans** in Layers.

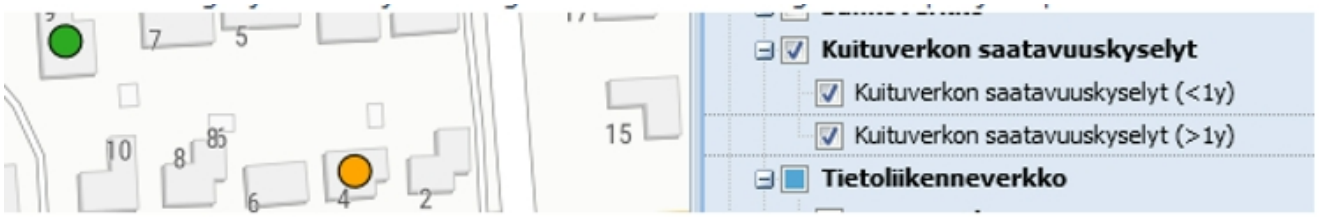
Consumers interested in fiber services

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On KeyCom's user interface, it is possible to present location information about customers interested in fiber services transmitted from a third-party system. This information can be presented on the map to support planning and guide construction. The REST API interface is used to collect interest information from consumers.

It is possible to implement specific KeyCom fiber network availability layers, which illustrate consumers' interest in fiber services on the KeyCom network map.

In the figure below are fiber network availability queries within less than a year and fiber network availability queries over a period of more than a year are shown on the KeyCom network map in different colors.



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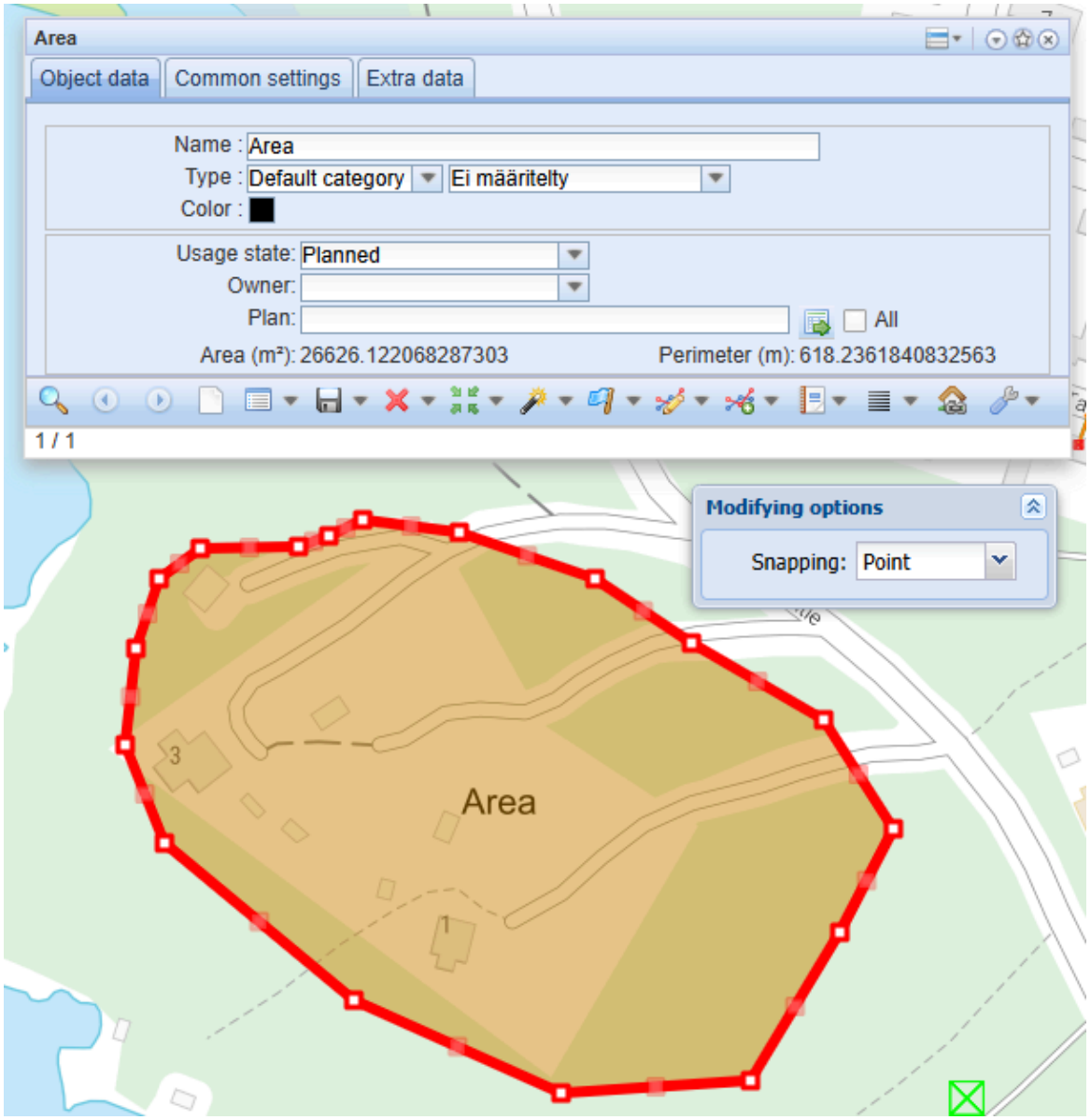
OTHER TOOLS

Adding an area

To add an area with the required shape on the map, go to the main tool bar at the top and click **Area**. You can add an area on the map, for example, for a print-out. You can define the **name**, **type**, **colour**, and **usage state** of an area, and you can attach it to a **plan**. To start the creation of an area, click **Create**. Move your mouse pointer across the map and click the left mouse button to enter **points** at appropriate locations. Enter the final point by first clicking the left mouse button and then the right mouse button. The area is automatically saved in the database.

The area in the illustration has been selected for modification. The points of the area have been highlighted.

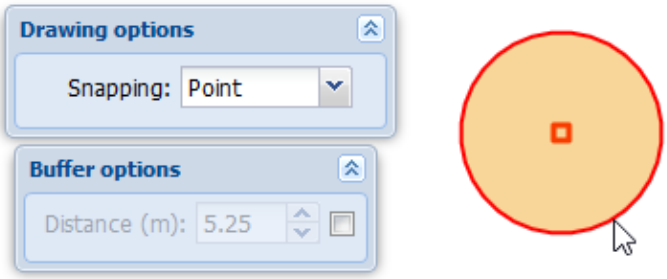
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Adding a point buffer

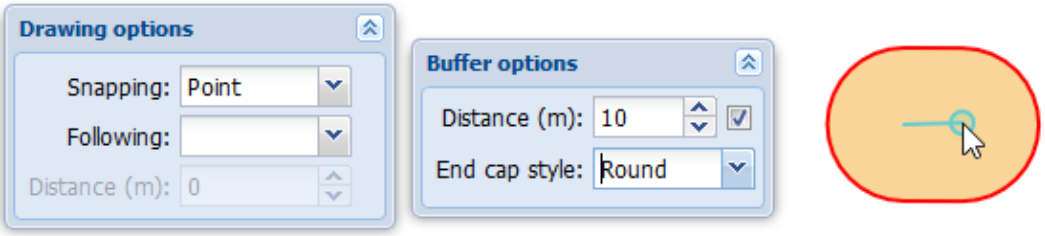
1. In the drop-down menu for **Create**, select **Create point buffer**.
2. Position the center of the point buffer on the map. You can use the **Snapping** options Point and Nearest. Hold down the SHIFT key and click the left mouse button to snap.
3. Move the mouse pointer to define the distance.
4. Finalise by clicking the left mouse button. The area is now saved.

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Adding a line buffer

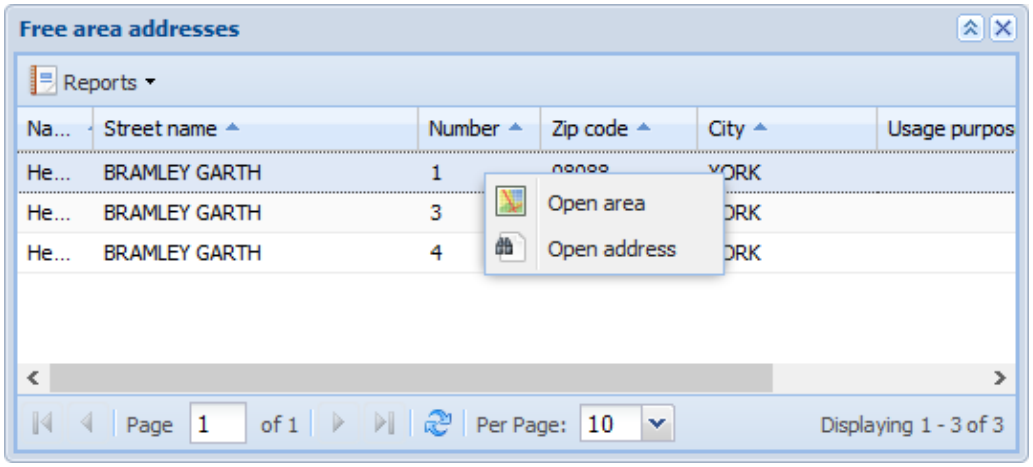
1. In the drop-down menu for **Create**, select **Create line buffer**.
2. Define the distance in metres, or deselect the checkbox next to the **Distance** field.
3. Select the **End cap style** for the line's end points: **round**, **flat**, or **square**.
4. Draw the line on the map.
5. If you cleared the checkbox for distance, define the distance by moving the mouse.



Addresses and apartments in an area

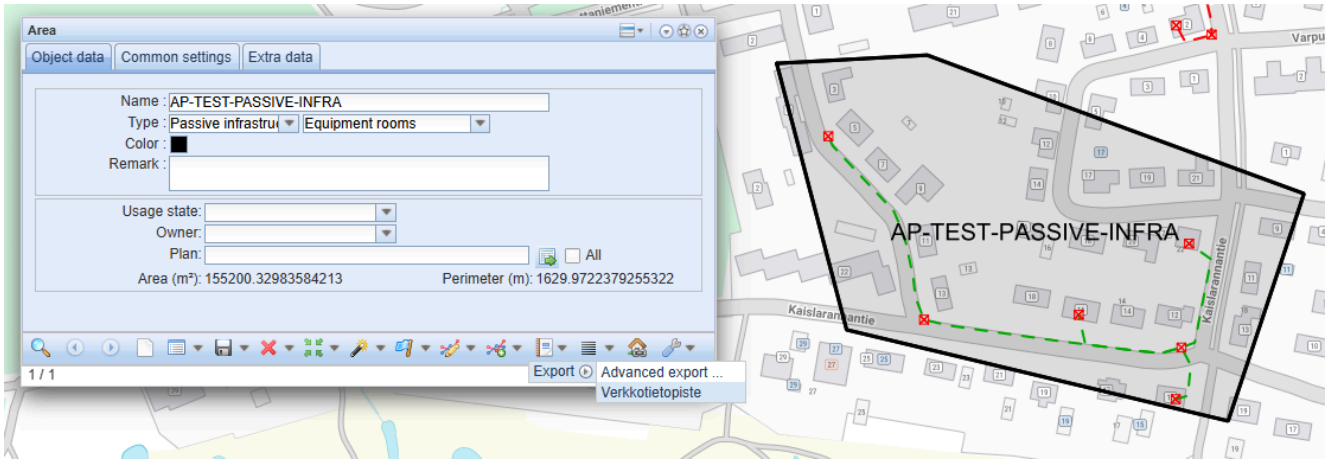
To list the addresses located in the area, go to the drop-down menu for **List**, and select **Free area addresses** or **Free area apartments**. The form type displayed is similar to the form in the List chapter. **The Free area apartments** form provides information on the number of apartments at the addresses. To create a list report on the apartments or addresses in the area, select **Reports – List report**. Right-click to edit an area, address, or apartment on the appropriate form.

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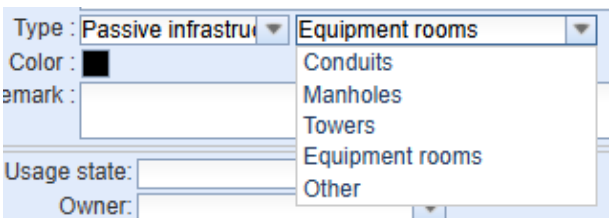
Passive infrastructure and Verkkotietopiste export

You can report passive infrastructure to Verkkotietopiste by drawing it as an **Area** with the type **Passive infrastructure**.



Creating a passive infrastructure area

1. Open the **Area** form and create a new area.
2. In **Type**, select **Passive infrastructure** in the first dropdown. Then select the kind of infrastructure in the second dropdown: **Conduits**, **Manholes**, **Towers**, **Equipmentrooms** or **Other**:



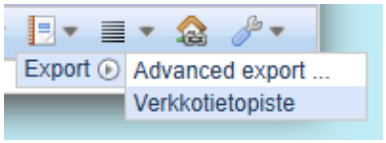
3. Fill in **Name**, **Owner** and **Usage state,** they are needed for the **Verkkotietopiste** export. If you select the **Other** type, you must also fill in **Remark**.

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4. Save the area.

Exporting to Verkkotietopiste

Select the area, then in the toolbar open **Export** and choose **Verkkotietopiste.**



The following information is sent:

Area form	**Verkkotietopiste**
Owner	name
Type	type
Usage state	isInUser
Geometry	geometry
Remark	freeText

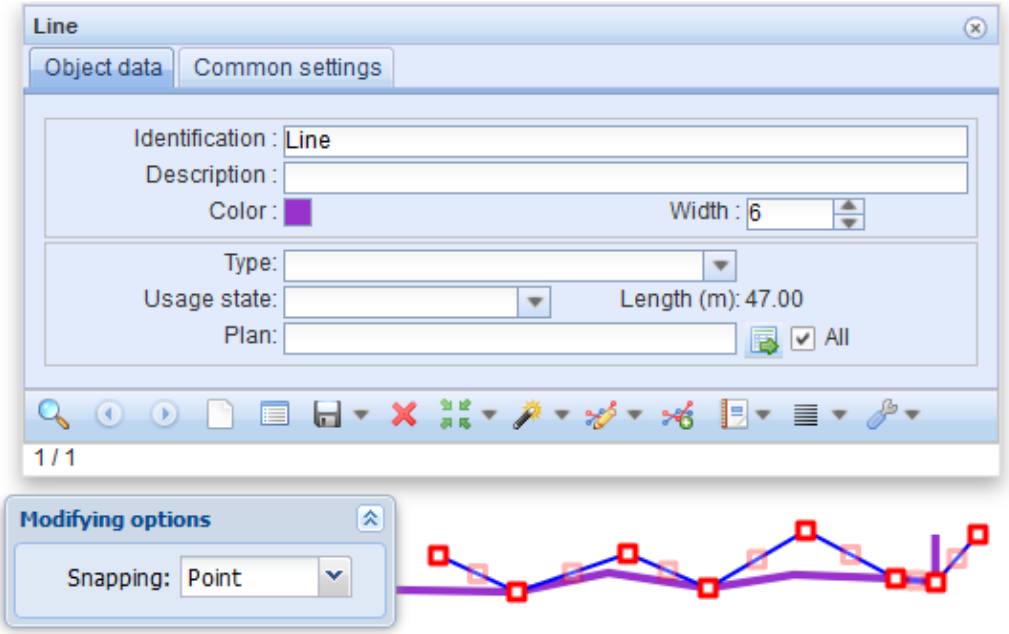
To update an area in **Verkkotietopiste**, edit it in KeyCom and export it again. The existing record is updated and no duplicate is created.

Adding a line

You can freely add lines of various size and colour on the map, for example, for a print-out. To do this, click **Line**. The buttons on the **Line** form function like the buttons on other forms, as described in the chapter Buttons on object forms. For example, you can search existing lines on the map by clearing the form and clicking **Search**. You can also locate and highlight lines. You can **modify the colour or thickness of the lines** you searched and picked from the map. Click **Save form** to apply the changes to the map. The **Lines** layer is activated in the **Layers** selection when the **Create** and **Pick** tools are used.

The line in the illustration has been selected so that it can be modified. The points of the line are highlighted.

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If you want to create a new line, **first** select the **colour and thickness**. To start the creation of a line, click **Create**. Then move your mouse pointer across the map and click the left mouse button at the appropriate location to create the **starting point** of the line. To create the end point, first click the left mouse button and then the right one. The line is automatically saved in the database. When you click the **Create** button, the **Drawing options** dialogue box is displayed. The functions of this dialogue box have been described in the chapter Creating a new object.

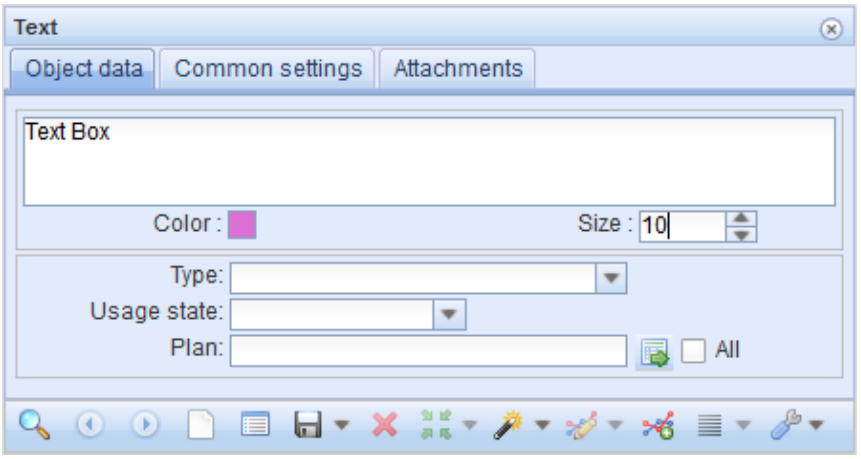
You can define the **usage state** of a line, and you can attach it to a **Plan**. Click **Save form** to save changes.

You can reposition the line by clicking **Modify**. The line in question is then highlighted on the map. When you **click the line using the left mouse button**, the line can be modified. You can move the line's **points** by **dragging** them while holding down the left mouse button. Create more points by dragging the dimmed squares that are located between the actual line points. When you move these squares, you create more points. When you modify a line, you can also use the **Snapping** functions **Point** and **Nearest**. Click **Save form** to save changes.

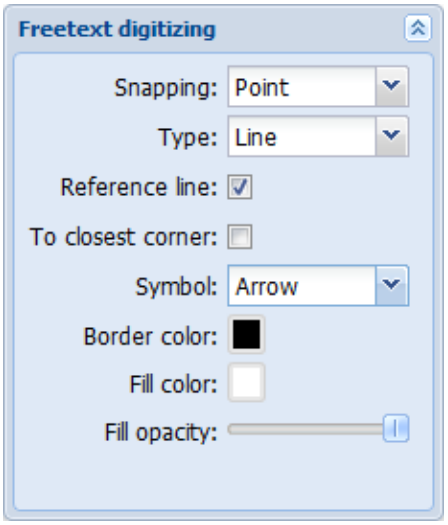
Adding text

To add text on the map, such as comments or observations, use the **Text** tool in the toolbar at the top of the screen. Apart from the **Create** and **Modify** functions, the **Text** form functions as described in the chapter Buttons on object forms.

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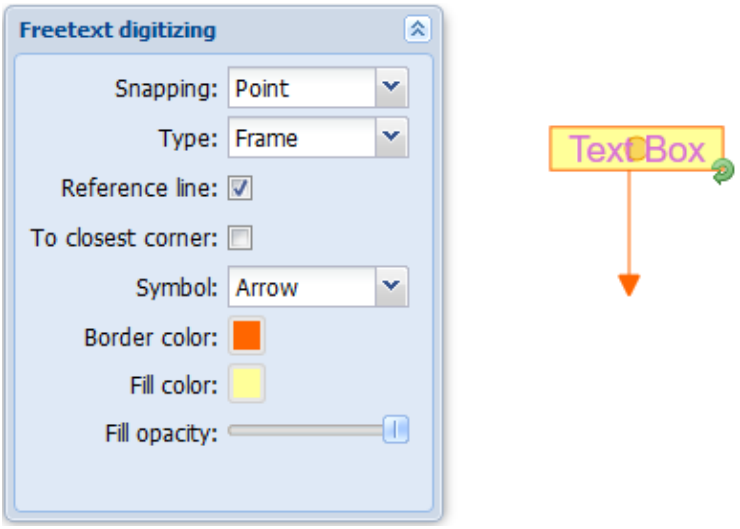


1. Open the **Text** form by clicking **Text** in the main toolbar.
2. In the text field, enter the text you want to add.
3. Select the **Colour**, (font) **Size,** and other information. Note that the placement scale does not affect the size of the text – only the font size does.
4. Click **Create** in the form's toolbar.
5. In the **Freetext digitizing** dialogue box that is displayed, select **Type**.
    a. **Text**: Only text on the map.
    b. **Frame**: Text with frames.
6. Select the **Border** colour.
7. Select the **Fill** colour.
8. Adjust opacity using the **Fill opacity** selector.
9. **Line**: underlined text.
    a. Select the **Border colour** (colour used for underlining).



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10. Position the text at the appropriate location on the map.
11. Use the tool to rotate to the appropriate angle.



> **Tip:**
>
> You can edit the text, colour, and size at any time when creating text.

Complete the process by right-clicking, or click **Save form** on the form.

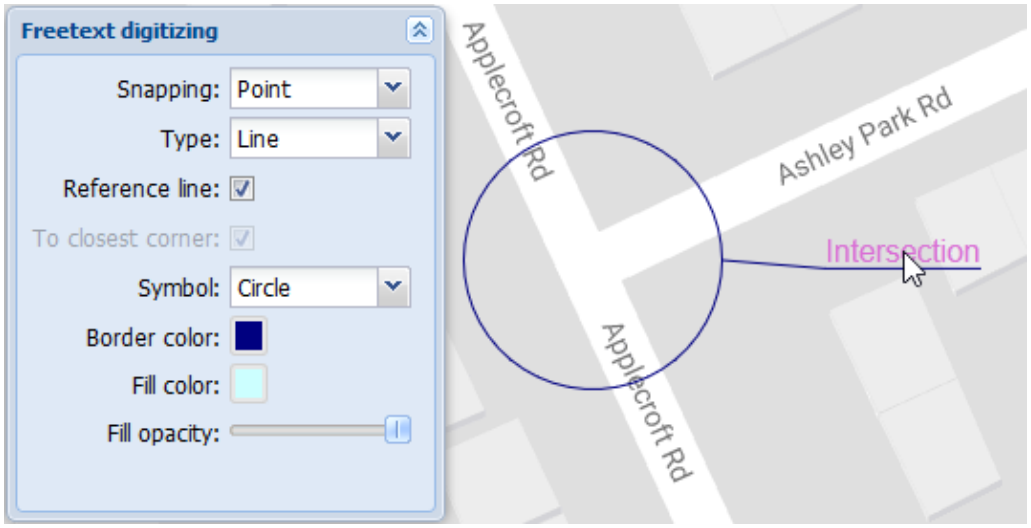
Note! The drawing options you selected are session-specific. With this, adding texts using the same style will be quicker.

Adding text with an annotation line on the map

Steps 1–5 as described above, but select **Frame** or **Line** as the type.

1. Select the **Reference line** checkbox.
2. Select the **To closest corner** checkbox if you want to connect the reference line to the nearest corner instead of the nearest point.
3. Select **Symbol**
   - **None**: the line has no symbol.
   - **Arrow:** The line is an arrow pointing to a point.

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Position the starting point of the reference line on the map and move the mouse to see the line attached to the text.

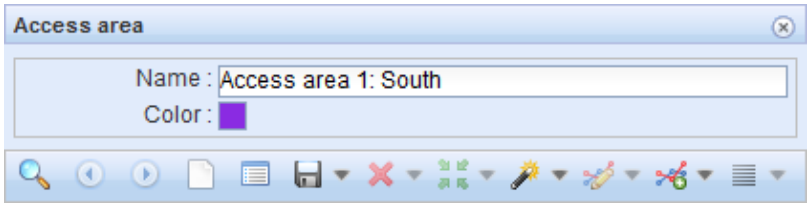
1. Position the text at the appropriate location.
2. Rotate using the function.
3. Complete the process by right-clicking, or click **Save form** on the form.

Access area (This function is subject to a separate order)

Use the **Access area** tool to limit the network in which objects are displayed to various users or user groups. The right to use network objects can be defined, for example, based on area, the owner, or the creator of the object. You can also restrict the right of use to specific network objects, such as telecom premises or cables. The settings are discussed in more detail in the Admin user guide.

Click **Access area** to create a new permitted area on the map. Continue as instructed in the Adding an area chapter.

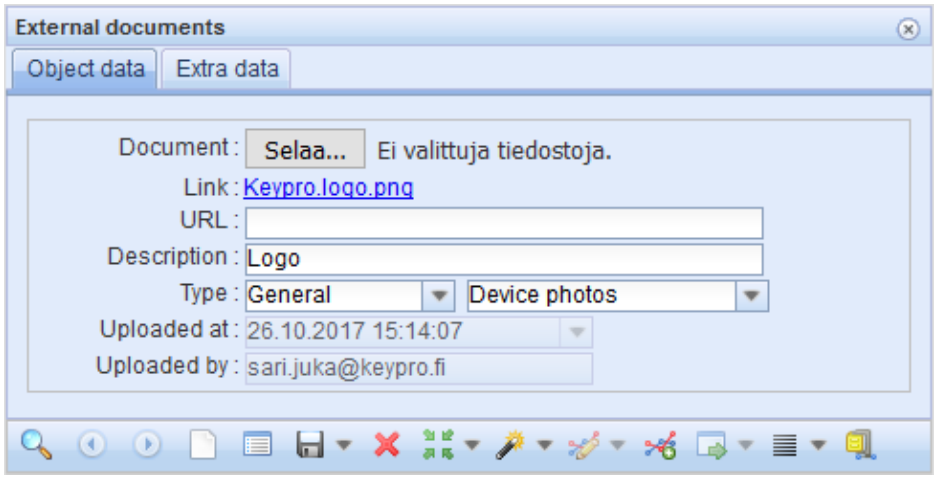
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Use the **List** function to create a list report on permitted areas and to modify the access areas and the related addresses and apartments in the list view. Access areas can also be exported to a group display.

External documents

External documents can be **files** or **URL links** that can be positioned on the map and attached to network objects. To open the form, click **External documents** in the toolbar or on the **Attachments** tab on the forms. For more information, see the chapter Attached documents.



Viewing external documents

To open a document, click the link below the **Choose files** button. If the attachment is a **URL link**, it is opened on a new tab in your browser. The function for opening a file depends on your browser and browser settings. Usually, the browser asks whether you want to save or open the file.

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TIP: If an external document includes **both a file and a URL link**, you can open the URL link by copying it to the address field in a new browser window.

Adding external documents

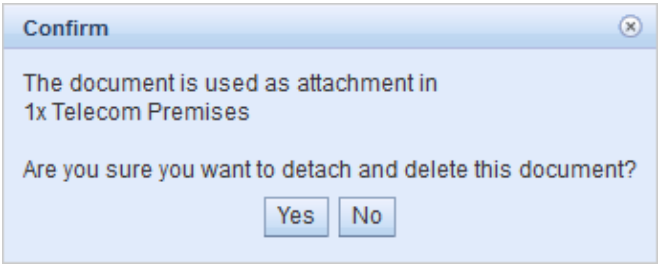
1. If you want to add a file, click **Choose files**.
2. Select the file or files that you want to attach as external documents.
3. Save the information on the form (**Type** is a mandatory field).
4. Click **Save**, or if you are attaching documents to an object, click **Attach document**

If you selected several files, a separate external document is created for each file.

TIP: If you want to attach a **web address**, enter it in the URL text field or copy the address from the browser. If you also select a file, the URL is additional information to the document.

Deleting an external document

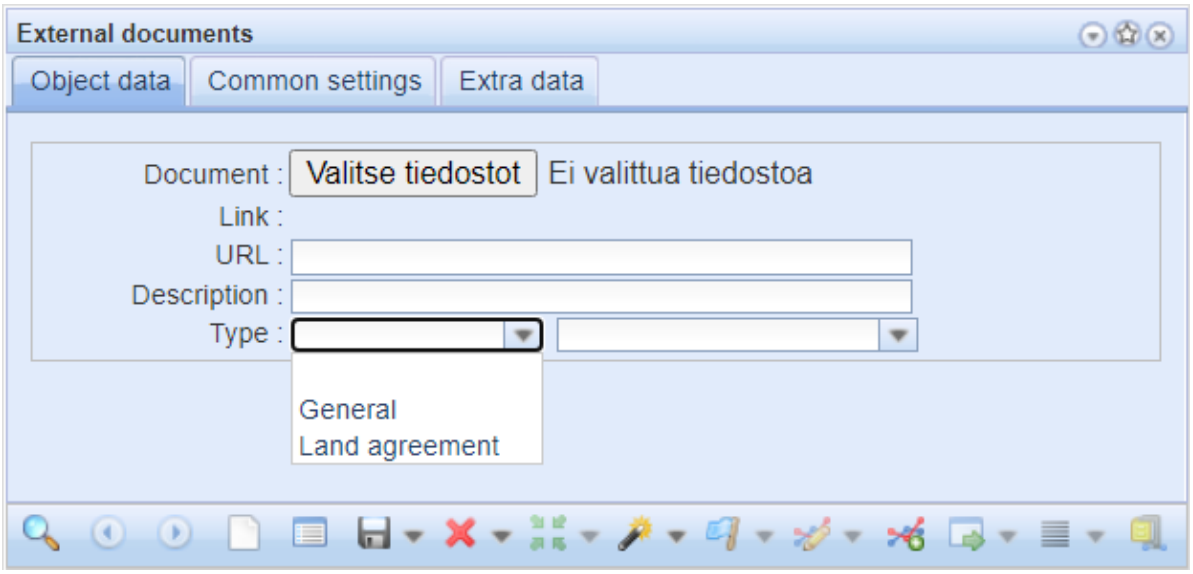
1. Retrieve to the form the document you want to delete.
2. Click **Delete**. If the document has been attached to an object, you will be asked to confirm the deletion.



Restrictions for deleting an external document

If you want to make sure that the external documents you added are not deleted by accident, you can restrict their usage rights. Click **External documents** -form from the toolbar and then select for example, **Land agreement** as the new type for the document. These types of documents cannot be deleted from the **External documents** -form. The term **Land agreement** can be changed from the admin user interface.

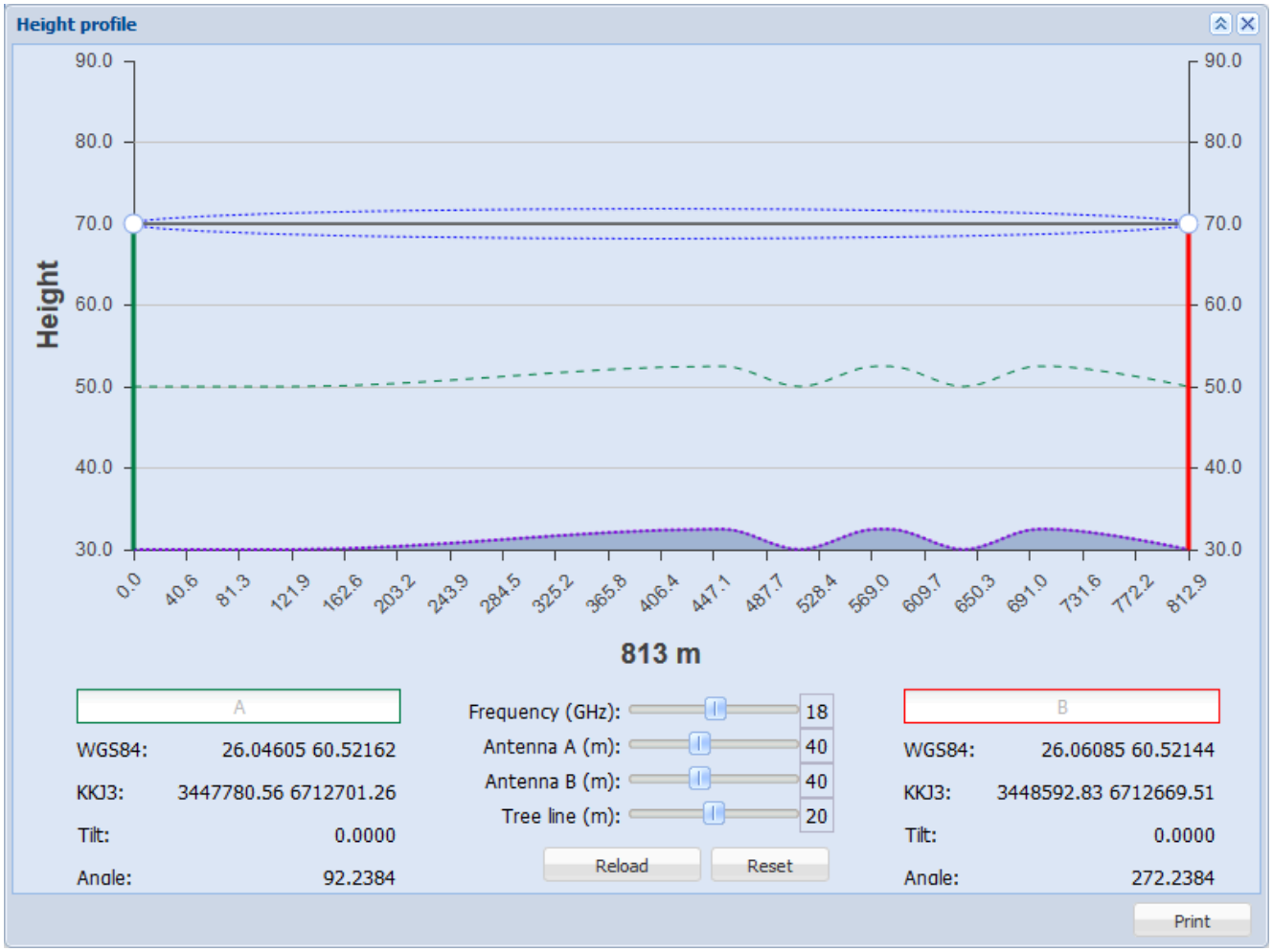
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Height profile (This function is subject to a separate order)

The **Height profile** tool needs to be purchased separately. This function makes it possible to create a **height profile** on the form based on the contour lines in the database of the National Land Survey of Finland. The **Height profile** tool illustrates the radio link between masts and the ellipse illustrating the related first Fresnel zone for the selected frequency. This function includes the height profile of masts and the profile of trees at the given height above ground level. In addition, the curvature of the Earth is taken into account.

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Creating a line of sight profile

Open the form by clicking **Height profile** in the toolbar at the top. The program then asks you to enter the start and end points of the profile. First, click to enter the location of the antenna A on the map and then enter the location of the antenna B. After you have entered the location information, the height profile is displayed.

Use the sliding controls on the form to modify the look of the automatically created height profile. **Frequency** controls the frequency applied to the profile. **Antenna A**, **Antenna B**, and **Tree line** are used to define the distance between these objects and the ground level in metres.

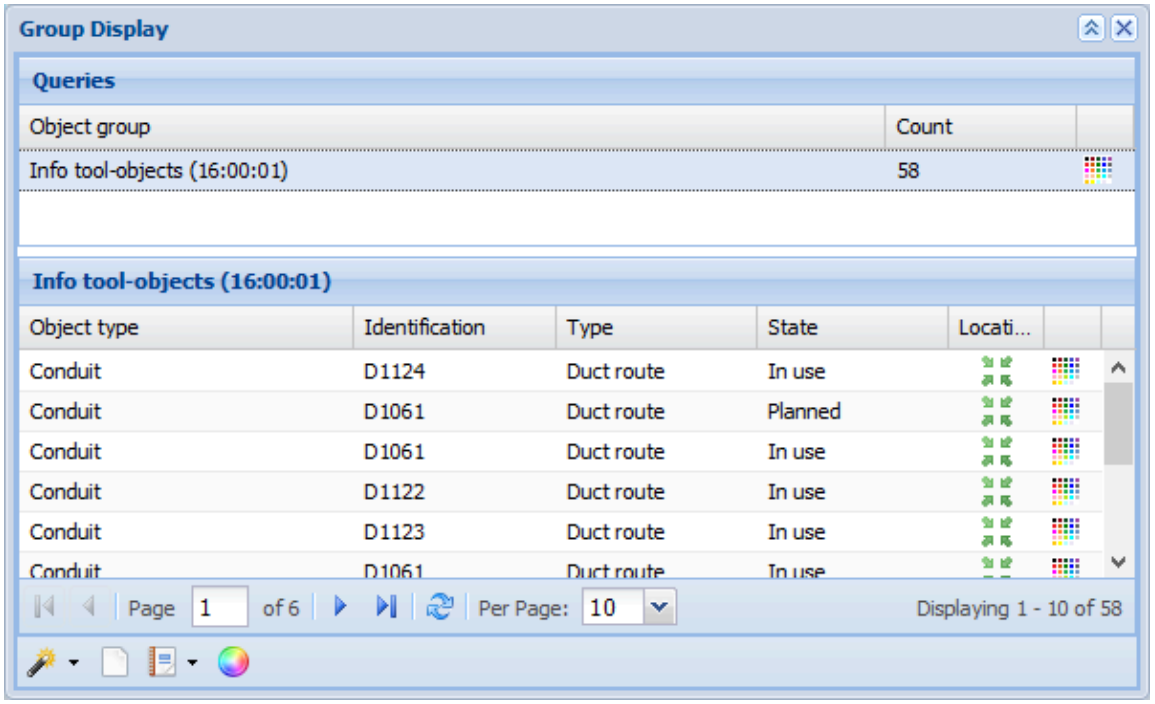
When you edit the original values of these sliding controls, click **Reload** to update the profile on the form. Click **Reset** if you want to restore the sliding controls to the original settings.

Click **Print** to create a printable version of the height profile.

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Group display

The **Group display** function helps you view various object groups. You can use it to edit and highlight a group or its objects, or to combine a group with another group. In addition, you can open objects in a group on their own object forms and on object form lists.



Groups are groups of searched objects or combinations of them.

Creating groups

Groups can be created in many ways:

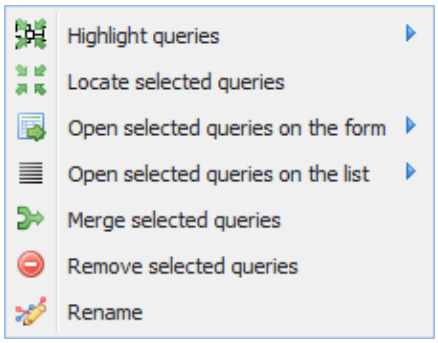
1. Add object form search results as a group to a list using the **Show in group display** function in the drop-down menu for **List**. More information on this function is provided in the chapter Show in group display.

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2. Pick objects from the map through the **Group display** form, as described in the chapter Picking objects from the map.
3. View the results of the Info query in a Group display.
4. Retrieve the objects of a **Plan**. This is discussed in more detail later in this document in the chapter of Show in a group display.

Renaming an object group

1. Right-click the (context) menu for the Group display .
2. To rename an object group, either double-click a group or select **Rename** in the context menu, in which case you do not need to select the row.
3. Enter the new name in the **Object group** field.
4. Complete editing by clicking outside the field.



Merging object groups

1. Select the groups you want to merge on the list.
2. In the context menu, select **Merge selected queries**.
3. Enter the new name in the **Object group** field.
4. Complete editing by clicking outside the field.

Highlighting groups

1. Select the colours used for highlighting the groups.
2. In the context menu, select **Highlight queries** to highlight the selected groups and groups for which you assigned a colour. Groups with no colour assigned are

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highlighted using the default colour. To apply a specific highlight colour for the selected groups, select the colour in the sub-menu. The items outside the selection are then highlighted using the default colour.

Locating queries

1. Select the group(s) you want to locate.
2. In the context menu, select **Locate selected queries**.

Opening groups on forms and lists

1. Select the group or groups you want to open.
2. a) Open all search results by selecting Open selected queries on the form or Open selected queries on the list. Or:

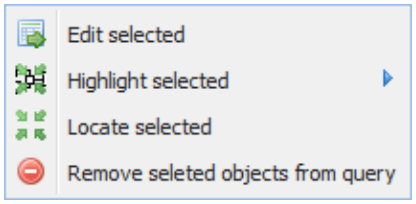
b) In the sub-menu, open a single group of search results.

Removing groups

1. Select the group you want to remove.
2. In the context menu, select **Remove selected queries**.

Opening a group's objects on forms and lists

1. Right-click the (context) menu for the **Group display** .
2. Select the objects.
3. In the context menu, select **Edit selected**.



The selected objects are opened on their own object forms.

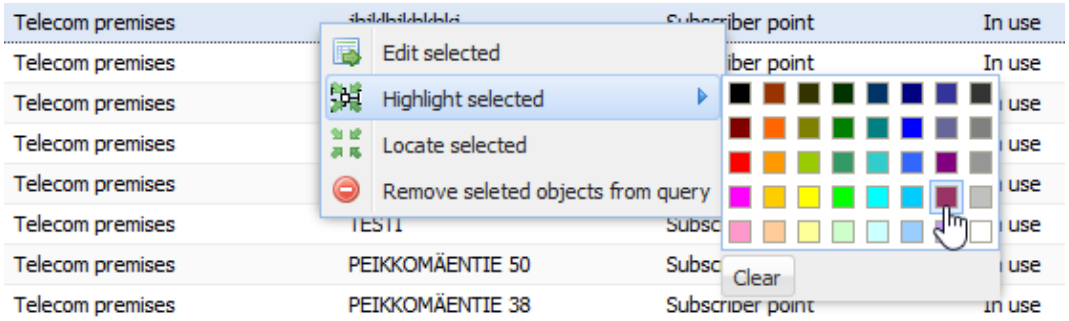
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Highlighting individual objects in a group display

Highlighting options: Select the highlight colour separately for each row, select the same colour for all, or use the default highlight colour.

1. Select the objects you want to highlight.
2. a) In the context menu, select **Highlight selected** to highlight the objects using the default colour, unless you have defined a colour for the row in question.

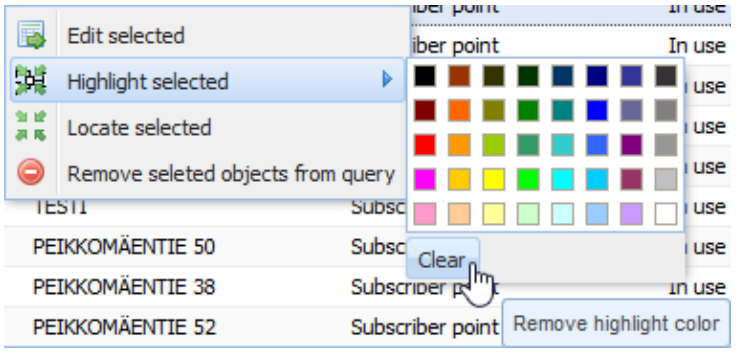
b) Highlight all selected objects using the same colour by selecting the colour in the sub-menu.



Note! The next time highlighting is applied, the current highlighting is removed. For this reason, if you want to highlight additional objects, you must include the currently highlighted objects in the selection.

Clearing the highlighting of group objects

To clear the highlighting of objects, select **Clear** in the context menu for **Highlight selected**.



The highlighting of objects is cleared when you switch to another group or delete objects.

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Locating individual objects in a group display

In the **Location** column, click **Locate** to center the map on the object and highlight the object. If there is no **Locate** button visible on the object's row, the object in question has no location defined. Locating multiple objects: First, select the objects you want to locate. Then, in the context menu, select **Locate selected queries**.

Removing an object from a group

1. Select the objects you want to remove.
2. In the context menu, select **Remove selected objects from query** .

Group reports and exporting a group to an external file format

To create an **Excel** report on the group opened on the object list, click **Reports**. In the drop-down menu, select **Reports Current query to Excel**. A new browser window is opened. The Excel file is handled in accordance with the device and browser settings. Follow the instructions displayed.

In the drop-down menu for **Reports**, select **Export** **Export current query to...** to export the current group to an external file format. This opens the **Export settings** dialogue box. See the instructions in the chapter Exporting objects to external file formats (This function is subject to a separate order).

Creating user themes

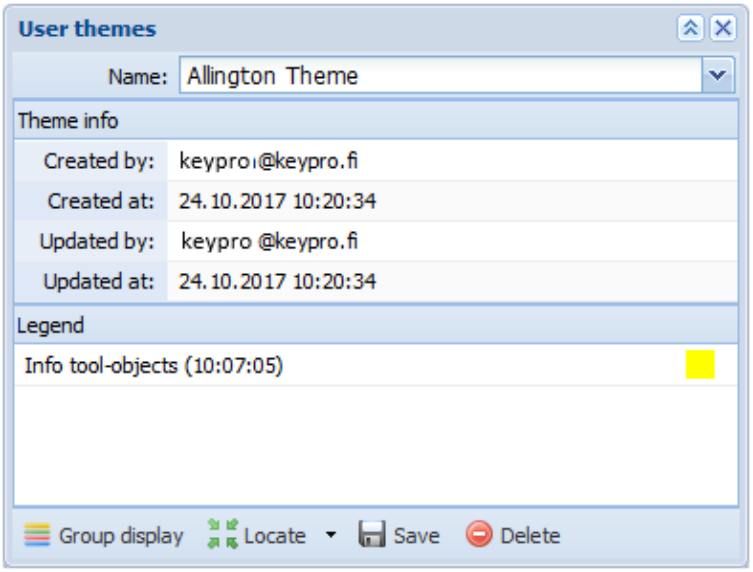
1. Create object groups in the **Group display**. For more information, see the chapter Creating groups.
2. Select the highlight colour for each group.
3. Click **Save** as new theme .
4. In the dialogue box that is displayed, enter a **name** for the theme and click **OK**.

More information on user themes is provided in the chapter User themes.

User themes

Open the **User themes** form by clicking in the toolbar at the top. First, plan the highlighting applied to **the group display** and save it as a **User theme** for later use.

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Viewing user themes

1. Open the **User themes** form by clicking **User themes** in the toolbar.
2. In the **Name** field, select the theme you want to view.
3. Click **Locate** and **Highlight** to view the selected theme. The map is then centered on the theme and objects are highlighted using the selected colours.
4. To view the content of the theme, click **Group display** and select in the Group display the group you want to view. The functions of the Group display are described in the chapter Group display.

Editing user themes

1. In the **Name** field, select the theme you want to edit.
2. **To change the highlight colour**, click the **Highlight colour** icon and select the colour you want to use.
3. Click **Save** to save changes.

TIP: Edit the contents of the theme by updating groups in the **Group display** and by saving/replacing a **User theme** using the same name.

Deleting user themes

1. On the **User themes** form, on the list in the **Name** field, select the theme you want to delete.

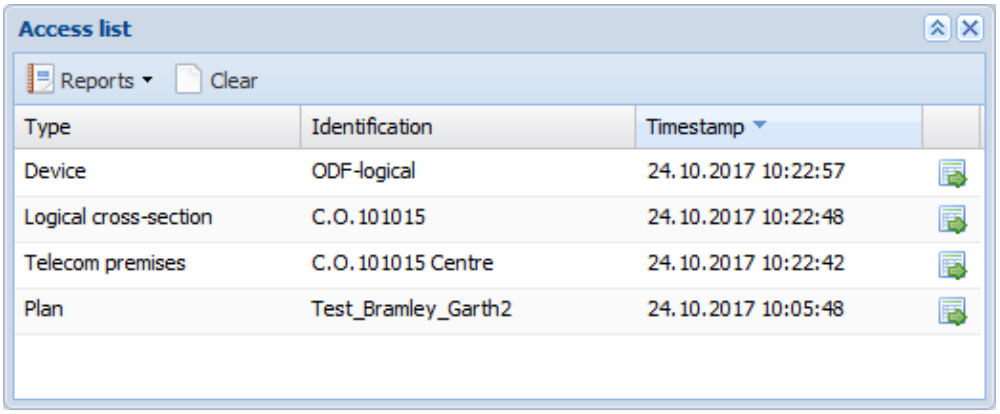
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2. Click **Delete** . You will be asked to confirm the deletion of the theme. Click **Yes** to delete the theme.

Access list

The **Access list** function keeps a record of forms that were opened during a session and the objects retrieved to the forms. This makes it easier to return to the objects. Select a row on the list and click **Open** to open the object form.

On the Access list, you can view the type and identification of objects and the time when a specific object was handled.



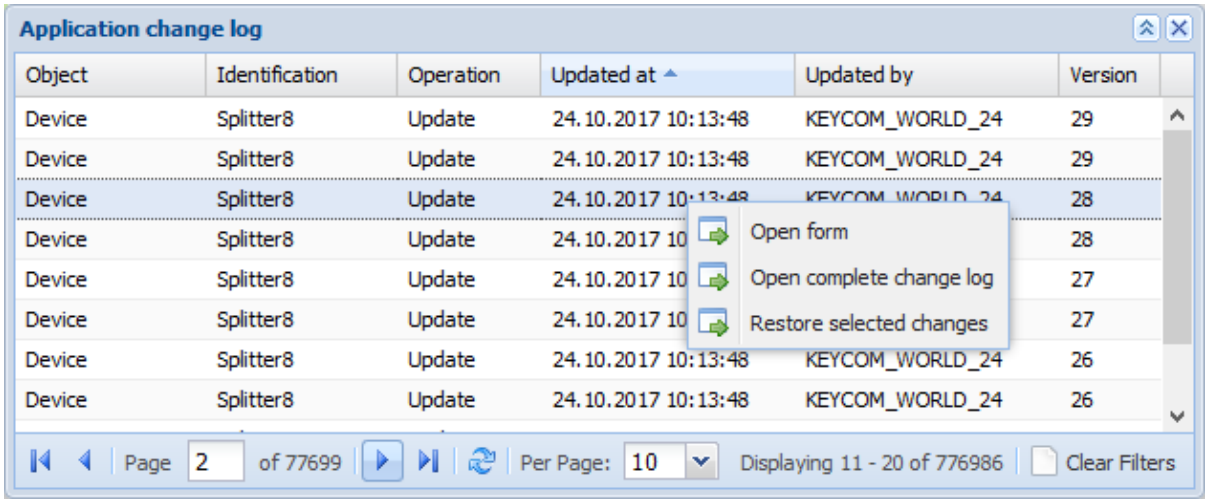
TIP: If you have deleted an object, you cannot retrieve it to an object form by clicking the Open button. Instead, use the Global change history function.

You can create an Excel report on the access list information by selecting **History report** in the drop-down menu for **Reports** . Click **Clear** to clear the access list. The **Access list** is automatically cleared when you log out from **KeyCom**.

Global change list

To view the global change history, click **Global change list**. The **Global change list** function lists all saved changes starting from the most recent one. Click a column header to sort the list or select the sorting order in the menu for a column. View the current version of an object by clicking **Open form** in the context menu.

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Viewing changes made to an object

In the context menu, click **Open complete change log** to view the full change history of an object. The **Application change log** form is displayed with the row in question pre-selected.

Restoring changes

To restore changes, take the following steps:

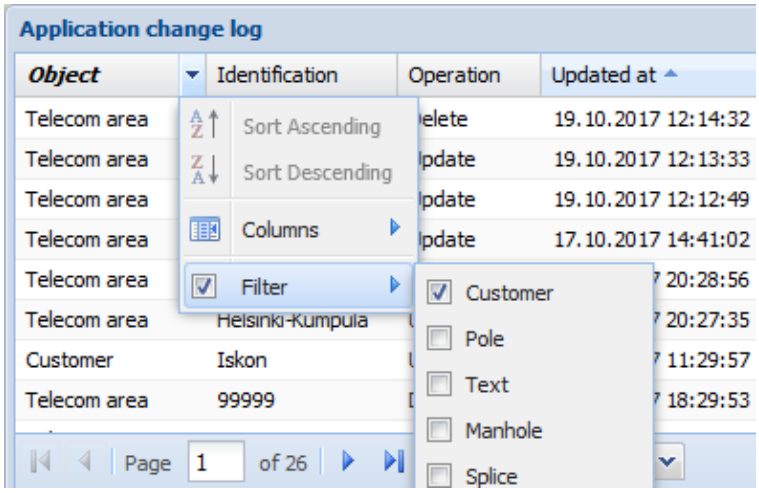
1. On the list, select the changes you want to restore.
2. In the context menu, select **Restore selected changes**.
3. In the **Report on restored changes** that is displayed and that includes separate fields for **Restored** and **Failed**, check that the change was restored successfully.

Note! If you selected more than one version of the same object, only the most recent version is restored.

Using filters

You can filter the changes displayed on the **Global change list** list by activating the required filters in the drop-down menu for a column header. When filters are activated, the related column headers are marked in ***bold and italics***.

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Clear a filter by deselecting it in the drop-down menu for a column header, or click **Clear filters** in the bottom right corner of the form. This clears all filters.

Managing defaults

Default values can be defined for most objects, and users can use these values as the basis when they create a new object. For more information, see the chapter: Default form values.

Managing settings defined by an admin user

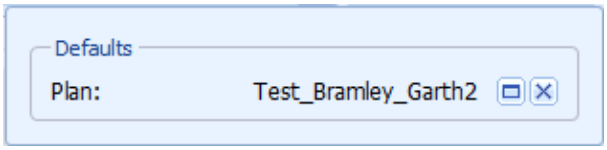
Admin users can save default values for an object by clicking **Save as default** in the menu for **Save**. The defaults are then available to all users. The **Save as default** function is only displayed for admin users, and it is active when a form has been cleared or an unsaved object is open on the form.

Managing settings defined by a user

On the **Plan** and **Exchange/Telecom area** forms, you can define the object in question as the default for the duration of the session. Click to do this. After this, in addition to other default settings, the **Plan** and **Area** fields are filled in on various forms when you click **Defaults**. For further information, see the chapter Set as the default plan.

The defined defaults are displayed in the **Defaults** dialogue box in the top-right corner of the screen.

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Click **Show on the form** to **open** the default object on its own form. Click to **remove** the default setting.

TIP: If there is no **Defaults** button in the top-right corner, the user has no active default settings.

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GLOSSARY

B measure

The B measure indicates the horizontal location of a duct in a conduit as measured from its left side.

Digitizing

Objects are created in electronic format by digitizing them, meaning location information is created using a computer application.

Geometry

The geometry data of an object means the coordinate points and information on the geometric shape (point, line, area, or a group of such shapes).

H measure

The H measure indicates a duct's vertical location in a conduit, as measured from the ground level. In other words, the H measure is a negative figure.

Search criterion

A search criterion is an attribute value that is entered on a form or selected in a menu and then used for searching for a specific object type in the database. You can use one search criterion, such as an address, or several, such as the material and installation year of a cable.

Object

Objects that can be located on the map, such as telecom premises, splices, poles, areas, exchange/telecom areas, annotations, and text.

Field

Reserved space on forms for entering property values, such as an identifier or a comment.

Centering the map

When an object is located on the map, it is used as the map center. The map is also zoomed in to the object.

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Object layer

Objects on the map view are presented on various layers. For example, conduits and cables are on their own layers, as are items such as addresses, land survey objects, and annotations. Object layers can be activated and deactivated as required for various purposes.

Coordinate

Coordinates indicate an object's location on the earth or in a map coordinate system. Map coordinates are coordinate values, and in a projected coordinate system they are defined as X and Y values, meaning the northing and easting.

Zooming out

Changing the map view so that it covers a larger area. In other words, zooming out changes the map scale so that it is smaller, and the map objects are, therefore, displayed in smaller size.

Form

Network objects are created, viewed, and edited on forms. Forms are used for creating an object on the map and for adding property values to the object. There is a separate form for each network object, and objects are managed using these object-specific forms. See also Property value.

Form button

At the bottom of each form, there are buttons for managing the object, and the functions of these buttons are similar on all forms. The buttons can be used, for example, to locate an object, update object data or geometry, or delete an object from the database.

Zooming in

Changing the map view so that it covers a smaller area. In other words, zooming in changes the map scale so that it is larger, and the map objects are, therefore, displayed in a larger size.

Scale

Scale indicates the proportion of the object representation's size to the actual object. Maps are scaled when the objects are too small or large to be presented life-size.

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Default values

Default values are an object's property values that have been defined in the system. They are pre-completed on a form, or they can be restored to a form from the system. Default values defined in the system can include, for example, the most common property values for an object.

Property value

Property values provide information on an object's properties, such as what the object is or what it is like. The property values of objects can be edited on forms. For example, information on an object's construction year or address can be added.

PDF document

Printouts and some reports are created as documents in PDF format that are opened in a new browser window. These documents can be saved or printed using the browser's printing tools. PDF documents saved on a workstation can be opened using a program such as Adobe Acrobat Reader.

Point object

A point object refers to an object called a **Point object**, or it can mean network objects whose location is indicated with one coordinate point. Examples of such objects are splices, telecom premises, manholes, and photos.

Location information

Location information refers to information on a geographical location defined based on coordinates, address, or other location data (such as an area name). The location of objects can be indicated in various ways. For example, an object may have been created on the map, in addition to which its address has been defined.

Database

A database is a collection of data. Data has been organised so that it can easily be managed, and the required information can be found quickly. The data in a database has been organised in a specific logical way, in order to make data retrieval as efficient as possible.

Identifier

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Each network object is assigned a unique identifier. Even though objects may have identical property values, they can be identified based on their identifier.

Type

Network objects are managed on object-specific forms, such as the form for splices or the form for conduits. More detailed type information can be added to each object's property values. For example, the type of pole can be defined as phone, electricity, or streetlight.

Menu

Reserved space on forms for selecting property values based on pre-defined options. Examples of such information include location accuracy and material.

Line object

Network objects whose location is defined using at least two coordinate points are line objects. Cables and conduits are examples of such objects.

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