

# CABLEMANAGER MANUAL

## VERSION 7.2



Overview of cables and cable ways – from design phase to service & maintenance

This document is a quick walk through the functions in Cablemanager version 7.2.

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# THE STRUCTURE OF THE CABLEMANAGER MANUAL

The Cablemanager manual consists of the following parts:

- Part 1: Cablemanager – User Manual
  - How to create cables, cableways and other objects
  - How to perform batch actions
  - Report functions
  - Settings
  - User management and user rights
  
- Part 2: Data structure and Import data
  - Understand the data structure
  - Code tables and Main tables
  - How to use the Import Wizard
  
- Part 3: Installation manual
  - How to install the program
  - How to install the database
  
- Part 4: Miscellaneous documents
  - News version 7 (cable drums and improved 3D viewer)
  - User rights – overview

Description of new functions in ver 7 is found in the ver 7 news document. They will be incorporated in the manual at a later stage.



## PREFACE

The PCSCHMATIC Cablemanager program presents an overview of all cables and cable ways in a construction project – of either infrastructure or machinery – from the preliminary design phase as well as during the subsequent maintenance. Requirements about documentation of parallel cables to avoid excessive heat development are easy to fulfil with this tool.

### Overview of all data for cables and cable ways

PCSCHMATIC Cablemanager keeps track of all data for cables, cable ways, glands, transits and – not least – the location of cables on cable ways.

For each cable, the program shows the dimensions, where it starts and ends, the segments and the transits it goes through.

### Where to pull the cables – during the design phase and during maintenance

When the cable ways are defined in the design phase, the program will show the shortest routes for the cables thereby making it easy to decide the final dimensioning of cable ways. The program maintains an overview of all cable ways and gives an automatic warning when it registers an overload. Different subcontractors can always see their part of the project, so they only need to take their ‘own’ cables into account and so that will be able to manage the cables that are part of their sub project.

During the subsequent maintenance works, the program shows where new cables can be pulled without overloading existing cableways. Cable lengths are calculated automatically.

### Overview of cable status

A status is assigned to all cables in order to ease communication between all involved parties – the status can be created, routed, pulled, terminated or approved. The status assignment makes it easier to maintain an overview for the design engineers, the pulling crew as well as for the installation crew.

### Overview of individual cable ways

The PCSCHMATIC Cablemanager also gives an overview of the number of parallel cables in all cable ways, which makes it easy to manage current correction factors for all cables.

For each cable, the number of parallel cables in any segment on its route is listed.

### See all cables in a 3D view

The built-in 3D viewer lets you see all cables in the project, with a dynamic highlight of overfilled cable ways.

You can see alle cables at once, or select only specific parts of your installation. The 3D tool makes it easy to get an overview of the critical cable ways without going through reports.



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## PART 1 – CABLEMANAGER USER MANUAL

- How to create cables, cableways and other objects
- How to perform batch actions
- Report functions
- Settings
- User management and user rights



## WHAT TO SEE WHERE IN THE PROGRAM (ALL USERS)

This section is a 'guided tour' through the program, and shows what type data is handled in the program. It goes through all windows that can be accessed in the Cablemanager Service program and by a Read-only user.

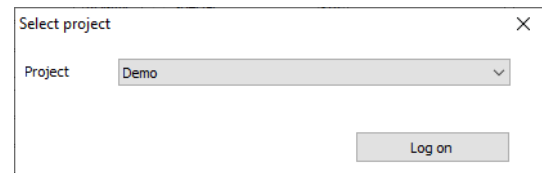
The following sections will take you through how to create and work with the data.

### Open the project

Start by opening the demo project:

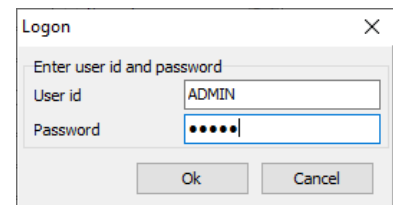
Press the Open icon in the toolbar, and select the Demo project from the dropdown list:

The Demo project contains data from The Factory, and this database is used throughout this manual, whenever there are any examples



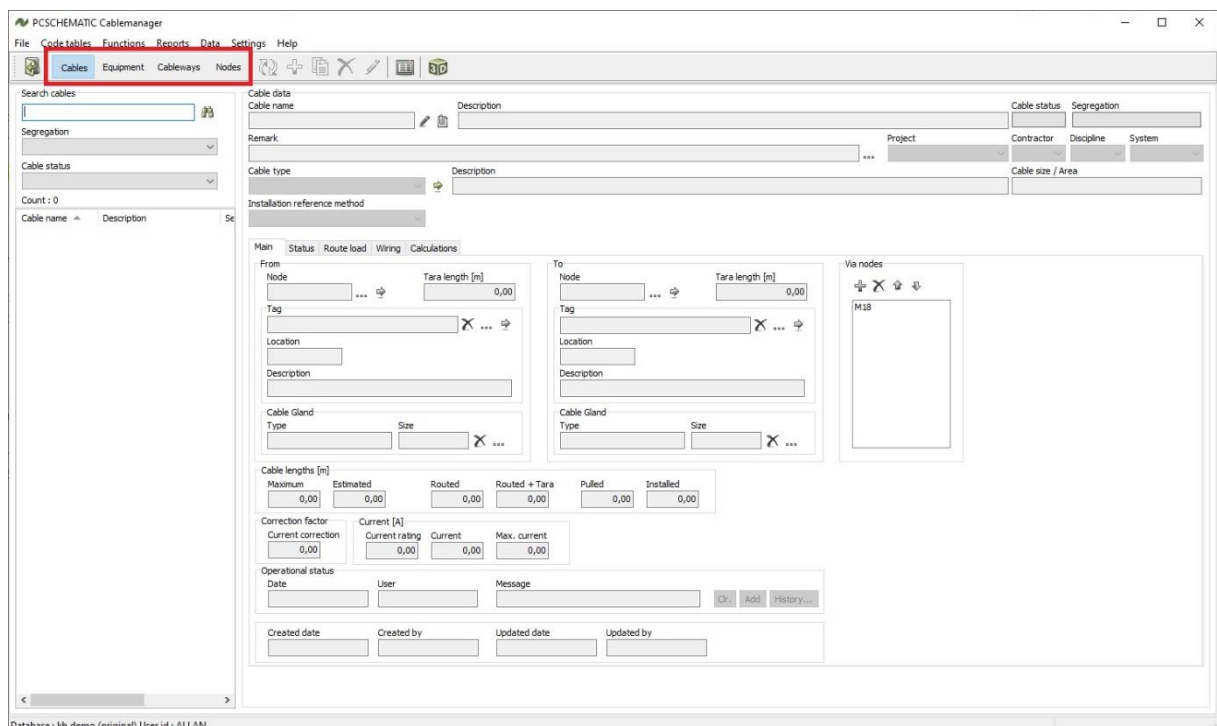
The database is password protected. When opening the program the very first time, there is only the ADMIN user with the password ADMIN.

See how to create more users and about user properties on page 56.




When the program is open, the program window is empty. In the top part, you can now select Cables, Equipment, Cableways or Nodes.

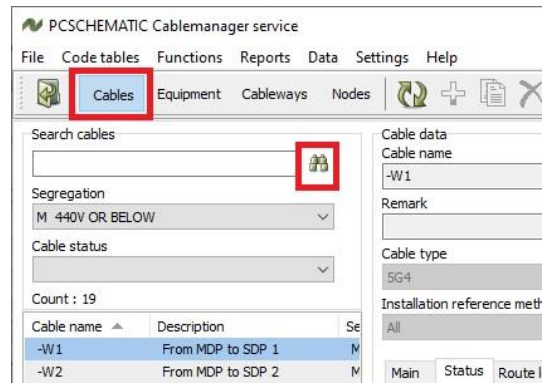
This chapter takes you through the menus and explains the type of data that you see in the different sections.



## Cables

Load cables by pressing the show button   
Search by typing a text in the search window or use the Segregation and/or Cable status for filters, and then press the Show button.

When you have a large project with many cables, the filters become very important, as it makes it easier to find the exact cables.

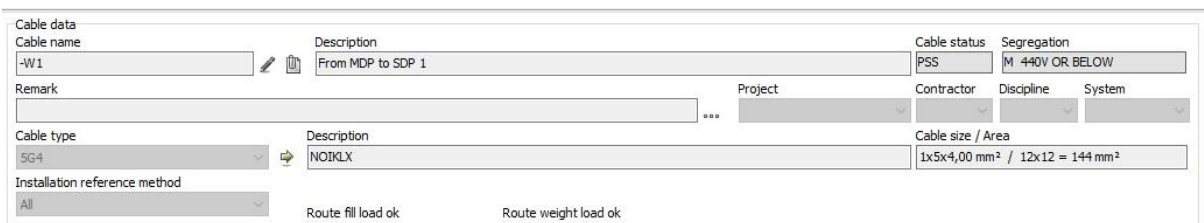



## The top part

Select a cable in the list to the left to see all data for this cable.  
The top part of the window shows the the basic cable data:

- Cable name and description
- Cable status
- Segregation
- Remarks, if any
- Project, Contractor, Discipline and/or System codes

In case there are attached documents to the cable, open them by clicking the clip beside the cable name.



Also shown are the cable type and description of the current cable. If you press the  beside the cable type, you are lead to the code table for cable types which contains more details about the cable type.




## The lower part

The lower part is divided into different tabs: Main tab, Status, Route load, Wiring and Calculations.

### The Main tab

At the top is data about the two Equipments (Tags) that are connected by the cable:

- The nearest node to the equipment, which is where the cable enters the cableway
- Tara length, which is the length of (unrouted) cable from the tag to the cableway
- The tag name (equipment)
- The tag's location
- The tag's description

You can 'jump' to the node or to the equipment by clicking the . If the cable route is forced, you can see a list of nodes, that the route must pass.

Read about Nodes on page 27 and about Tags and Equipment on page 16.

If the cable has Glands at one or both ends, they are listed below each Node.

- You can also see how long the cable is, and depending on its status, you see: estimated, routed, routed + Tara, pulled and installed lengths, all in meters.
- Current correction factor (typed manually), current ratings and values are showed, too, and are based on the Cable specification.
- Second to last is a log of various messages, that users have typed about the cable. The latest remark or action is showed, other remarks can be seen when pressing the History button.
- At the bottom is a box with creation and update info.

## The Status tab

On this tab, you see the status of the cable, who changed it and when the cable changed status. The History button might reveal more information, i.e. if the cable has been reset.

Main Status **Route load** Wiring Calculations

Standard

Created date	09/07/2015	ADMIN
Routed	10/05/2017	ADMIN
Released	Set	
Pulling card sent	Set	
Pulled	Set	
Termination card sent	Set	
Terminated from	Set	
Terminated to	Set	
Tested	Set	
Installed	Set	
Approved	Set	

Special

Suspended	Set		
Spared	Set		
Special	Set		
Defective	Set		
Pre-wired	Set		

History...

## The Route load tab

Here you see a list of which nodes and segments the cable is routed on and details concerning that route, e.g. Cable Count, Segment Type, Length, Allowed and Used width etc.. You can 'jump' to a node or segment by double-clicking its name.

Main Status **Route load** Wiring Calculations

From Node	To Node	Segment	Cable Count	Type	Length [m]	Allowed Width [mm]	Used Width	Allowed Area [mm <sup>2</sup> ]	Used Ar
M1	M2	M1M2	7	CT1	8,50	-	-	42.000	2,3
M2	M3	M2M3	6	CT1	7,50	-	-	42.000	2,2
M3	M4	M3M4	6	TRANSIT1	1,00	-	-	175.000	1,4
M4	M6	M4M6	5	CT1	10,00	-	-	42.000	1,8
M6	M7	M6M7	3	CT1	13,00	-	-	42.000	1,0
M7	M8	M7M8	2	CT1	3,00	-	-	42.000	0,7

## The Wiring tab

Here you can see how each cable conductor is connected to the Equipment terminals, if the terminals are defined.

Connections

From tag : **-MDP** To tag : **-SDP1**

Termrow	Termpoint	Conn.Point	Group	Color	Termrow	Termpoint	Conn.Point
X1	1		001	Blue/Light blue (BU)	X1	1	
X1	2		001	Brown (BN)	X1	2	
X1	3		001	Black (BK)	X1	3	
X1	4		001	Grey (GY)	X1	4	
X1	5		001	Green/yellow (GNYE)	X1	5	

Edit connections



### The Calculations tab


The voltage drop calculations on the selected cable are found in this tab.

Read more about the calculations on page [Error! Bookmark not defined.](#)

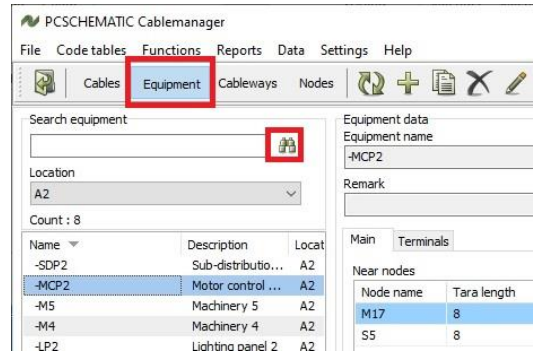
If the voltage drop exceeds the allowed percentage (set in Settings), the field becomes red on this page.

Main	Status	Route load	Wiring	Calculations		
Phases						
1 - Phase		U - Voltage [V]	I - Current [A]	L - Length [m]		
		230	5	67,5		
R20 - Resistance [ $\Omega$ /km]		X20 - Reactance [ $\Omega$ /km]	Temperature coefficient	Power [W]		
4,61		0,099	0,004	1035		
Start / Normal						
<input type="radio"/> Start	SF - Start factor	I - Current [A]	cos( $\varphi$ )	Voltage drop	Voltage drop %	Max voltage drop
	0	0	0	0	0	20 %
<input checked="" type="radio"/> Normal		5	0,9	1,471	1,28	2 %
Voltage drop						
$R = R_{20} * (1 + \alpha * (t - 20)) = 4,61 * (1 + 0,004 * (30 - 20)) = 4,79 \Omega/\text{km}$						
$X = X_{20} * (1 + \alpha * (t - 20)) = 0,1 * (1 + 0,004 * (30 - 20)) = 0,1 \Omega/\text{km}$						
$VD = \frac{I * L * (R * \cos(\varphi) + X * \sin(\varphi))}{1000} = \frac{5 * 67,5 * (4,79 * 0,9 + 0,1 * 0,44)}{1000} = 1,471 \text{ V}$						
$VD\% = \frac{2 * VD * 100\%}{U} = \frac{2 * 1,471 * 100\%}{230} = 1,28 \%$						
						Voltage at endpoint [V]
						228,529

## Equipment

Load all Equipment by clicking the show  button. Search by typing a text in the search window or use the Location filter before clicking show.

When Equipment is loaded, the left side of the window will show a list of equipment and the right, details of the selected equipment.



## The top part

Select an equipment in the list to the left to see all data for it. The top part of the window shows the basic equipment data:

- Equipment name and description
- Location
- Remarks, if any
- Project, Contractor, Discipline and/or System codes

In case there are attached documents to the equipment, open them by clicking the clip beside the cable name. Clip looks like the cable clip on page 12 in case there are attached documents.





## The lower part

The lower part is divided into two tabs: a Main tab and a Terminals tab.

### The Main tab

The lower part of the window shows – for each equipment – its closest node(s) and the Tara length (length of unrouted cable from the node to the cableway).

It also shows a list of the cables connected to the node, as well as their status, their segregations and their node.

And at the bottom of the tab are info of when and who made the last changes.

Near nodes		Cables from/to			
Node name	Tara length	Cable name	Status	Segregation	Node name
M17	8	-W23	ROU	S	S5
S5	8	-W24	ROU	S	S5
		-W6	ROU	M	M17

Created date	Created by	Updated date	Updated by
		10/05/2017 10.18.05	ADMIN

### The Terminals tab


The Terminals tab shows the Equipment's terminal rows – if any – and the cable connections to them – if connected. And again when it last was changed and by whom.

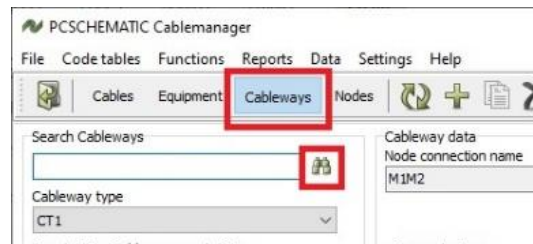
Termrows		Connections	
Row	terminal : connection	Cable : group	wire
X1			
1		-W1 : 001	1
2		-W1 : 001	2
3		-W1 : 001	3
4		-W1 : 001	4
5		-W1 : 001	5
6			
7			
8			
9			
10			

Created date	Created by	Updated date	Updated by
		14/06/2016 11.30.32	ADMIN

## Cableways

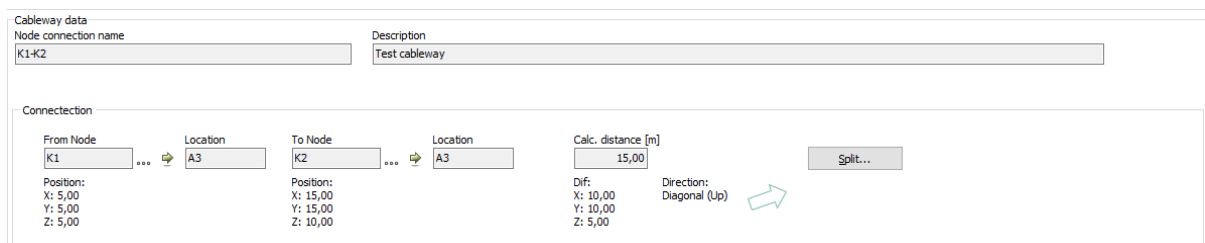
Load cableways by pressing the show button   
Search by typing a text in the search window  
or use the Cableway type filter, and then press the  
Show button.



## The top part

Select a cableway in the list to the left to see all data for it.  
The top part of the window shows the basic cableway data:

- Node connection name and its description
- The FROM node's coordinates and location
- The TO node's coordinates and location
- The calculated length based on coordinates
- An arrow showing the direction



Use the 'jump'  arrows to go to the Node at either end.



## The lower part

The lower part is divided into different tabs: Load tab and Cables tab.

### The Load tab

In the Load tab you can see a list of all cableways and their loads between the two nodes:

- The cableway(s) on the Node connection
  - There can be more parallel cableways between two nodes
  - If the cableways are parralle, you can see the offset – here they are in different heights: Z: 0,5 and Z:1
- The cableway type for each cableway
  - Cableways can physically be cabletrays, ladders etc
- The segment(s) on each cableway
  - Data about the segment

Load	Cables	Type	Segregation	Cable Count	Used Area/Width	Installation Method	Fill Factor	Available Area/Width	Allowed Area/Width	Length [m]	Offset from [m]	Offset to [m]
Cableway 1		CT1						150x400 mm <sup>2</sup>		15	Z:1	Z:1
Segment CW1 - 1			T	0	0 %	Area	1,00	200 mm (50%)	30.000 mm <sup>2</sup>			
Segment CW1 - 2			M	0	0 %	Area	1,00	100 mm (25%)	15.000 mm <sup>2</sup>			
Segment CW1 - 3			S	0	0 %	Area	1,00	100 mm (25%)	15.000 mm <sup>2</sup>			
Cableway 2		CT1						150x400 mm <sup>2</sup>		15	Z:0,5	Z:0,5
Segment - new name			T	0	0 %	Area	1,00	400 mm (100%)	60.000 mm <sup>2</sup>			
Cableway 3		CT1						150x400 mm <sup>2</sup>		15	-	-
Segment			T	0	0 %	Area	1,00	400 mm (100%)	60.000 mm <sup>2</sup>			

### The Cables tab

On the Cables tab, you can see the cables and data on the cables running on the selected node connection.

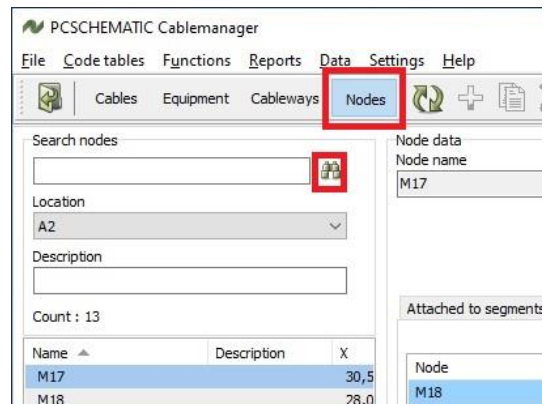
Here, there is only one cableway with one segment; if you have more cableways and/or more segments, you can fold or unfold the groups for better overview.

Load	Cables	Cable name	Type	Segr...	Status	Dia [mm]	Cross Section [mm <sup>2</sup> ]	Correction Factor	Current Rating [A]	Curr [A]	Max Curr [A]
Cableway 1											
Segment											
-W1		5G4		M	PSS	12,00	4,00	1,00	42,00	5,00	42,00
-W7		3G1,5			ROU	8,50	1,50	1,00	18,50	0,00	18,50
-W5		5G4			PW	12,00	4,00	1,00	42,00	0,00	42,00
-W6		5G4			ROU	12,00	4,00	1,00	42,00	0,00	42,00

You can jump to any cable, by double-clicking on it in the list.

## Nodes

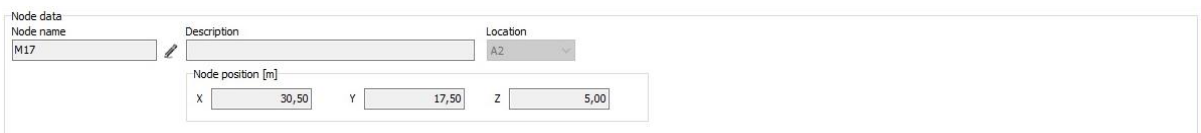
Load nodes by pressing the show button  
Search by typing a text in the search window  
or use the Location filter, and then press the Show button.



### The top part

Select a node in the list to the left to see all data for it.  
The top part of the window shows the basic node data:

- The Node name and a description
- The Node's locations
- And most important: the Node's coordinates

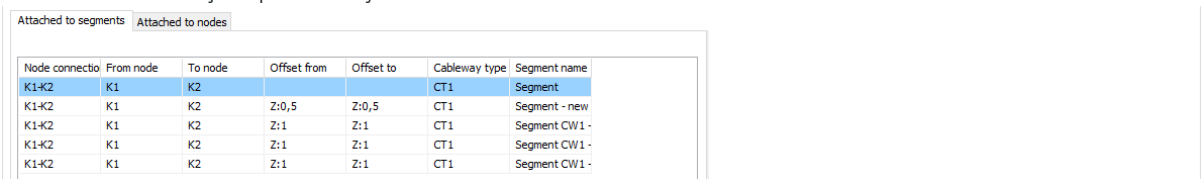


### The lower part

The lower part is divided into two different tabs: Attached to segments and Attached to nodes.

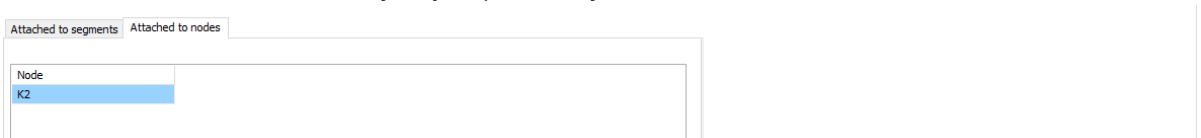
#### The Attached to segments tab

Here you can see which segments that are attached to the selected node. Double-click on a selected one to jump directly to it. <sup>iii</sup>




#### The Attached to nodes tab

On the tab, you can see a list of the nodes, that are attached to the selected node. If you double-click on one of them, you jump directly to it.

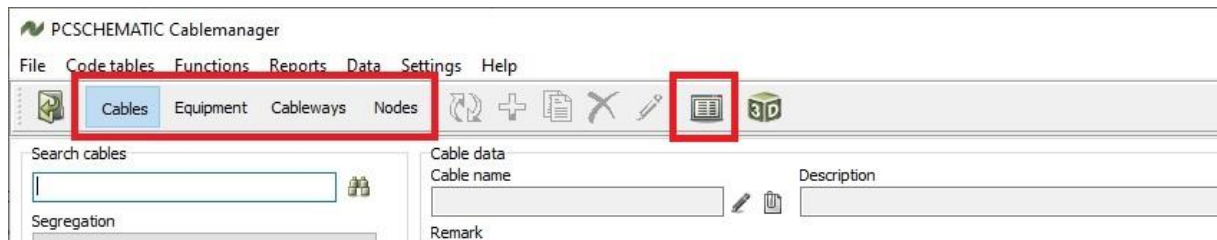


## GENERAL REPORT OPTIONS

(ALL USERS)

There are numerous report options in the program. The icon  means that you can export the current data selection to Excel.

That means, that in the first window (below) you export all Cables to Excel with the current selections. If you selected Cableways and clicked the icon, you would export all Cableways to Excel.



You see the same icon in many other subwindows, where it has the same functionality, i.e. export selected data to Excel.

You also see the report option in many windows: It will generate a report, and in the report it is often possible to export contents to Excel.

Type	Description	Sheath color	Supplier	Supplier ty...	Article	Cable spec code
3G1,5	PVIKJ 3G1,5					3G1,5
3G2,5	PVIKJ 3G2,5					3G2,5
3G4	JMV HF Flex					3G4
4X6	JMV HF Flex					4X6
5G1,5	JMV HF Let					5G1,5
5G10	JMV HF Let					5G10
5G16	JMV HF Let					5G16
5G2,5	JMV HF Let					5G2,5
5G4	NOIKLX					5G4
5G6	PVIKJ 5G6					5G6
S1	YSLY-JZ 3x1.5 mm2					S1

About the Code table for Cable types and below the Cable type report:

Cable Type	Description	Used Count	Estimated	Routed	Pulled	Installed
3G1,5	PVIKJ 3G1,5	8	0,00	172,00	0,00	0,00
3G2,5	PVIKJ 3G2,5	0				
3G4	JMV HF Flex	0				
4X6	JMV HF Flex	0				
5G1,5	JMV HF Let	0				
5G10	JMV HF Let	0				
5G16	JMV HF Let	0				
5G2,5	JMV HF Let	1	0,00	0,00	0,00	0,00
5G4	NOIKLX	11	0,00	324,00	0,00	0,00
5G6	PVIKJ 5G6	0				
S1	YSLY-JZ 3x1.5 mm2	5	0,00	145,00	0,00	0,00



## OVERALL DATA STRUCTURE IN THE CABLEMANAGER

The program contains data for Cables, Equipment, Cableways (Segments and Nodes) and it ties this data together.

The program can route the Cables on Cableways, and in this way ties all this data together and based on routing, it generates Cable lengths and reports for installation, and keeps track of all cables' statuses.

The main data is created and maintained in the main tables.

In order to do so, certain data is needed, e.g. cable type, cableway type etc. and less essential information about locations, contractors etc. can also be added. This data is created and maintained in the code tables.

### Overall workflow when making a project

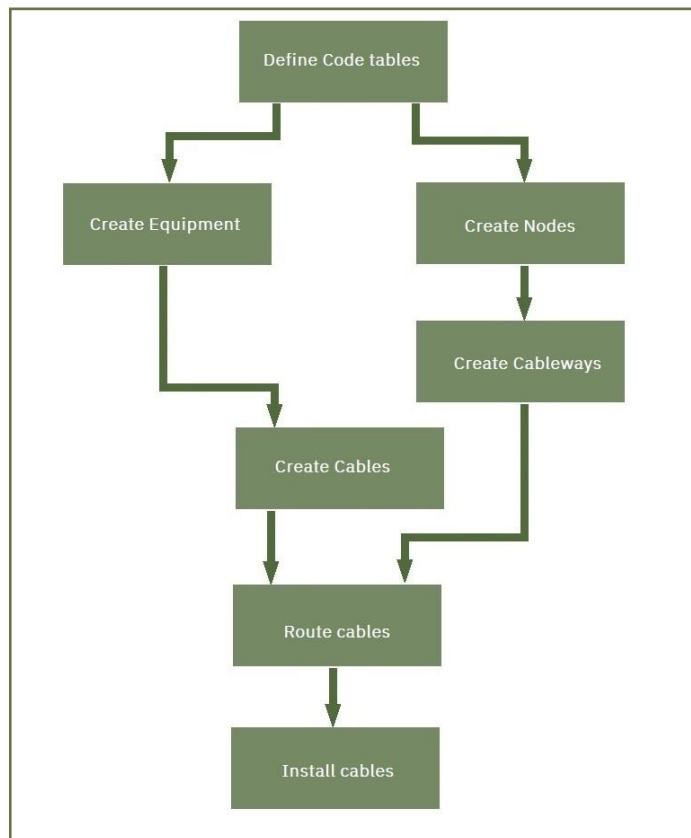
The overall workflow when starting a project follows this figure.

This part of the manual deals with the data structure – where you can find what type data – and how you can change the data to fit your project, either manually or by importing data.

There are sections concerning:

- The Code tables and their data
- How to create data for the main tables (Equipment, Cableways, Cables)
- How to import data from other systems.

You will also find sections that explain concepts and definitions.



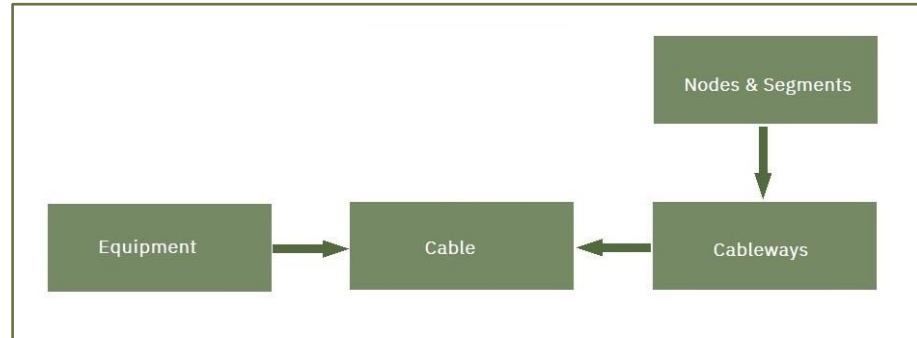
## The code tables

All basic data about e.g. cable types, cableway types, structuring etc. is based on data in the codes tables.

You can read more about the code tables in the Data structure & Import function manual.

## The main tables

All Cablemanager data is stored in a database. The database structure is based on the cables and the equipment that is connected through them. The program



can route the cable and suggests all possible routes. The route that the cables follow is essential for the design of the project, as it decides the length of the cable and thereby the voltage drop. Furthermore, a current correction factor needs to be applied (manually) if there are parallel cables. The program can't do any advanced calculations for cable dimensioning.

### Cables

Cables connect equipment. Cables can be created in the program (or imported from files). Cables contain data about the cable type and the connected equipment.

### Equipment

Equipment can be machinery, panels, lamps etc.. Equipment can be created (or imported from files). Equipment contain data about location and maybe connection terminals.

### Cableways

Cables are running on cableways, which can be cable trays, cable ladders, cable tubes, cable fire transits etc.. All cableways are defined with Start and End nodes (from which the lengths are deducted) and eventually the routes on the cableway creates the cables' lengths. Cableways are collections of Segments that start and begin with Nodes.

### Segment & Nodes

A segment is a part of a cableway. A segment has a segregation code for the installation type that runs in the segment, e.g. 400 kV. You can have more parallel segments on a cableway, one for each installation type.

All segments on the same cableway have the same Start and End nodes. A node is needed where a cableway changes direction and/or a cable can enter or leave. The nodes are named and have XYZ coordinates.





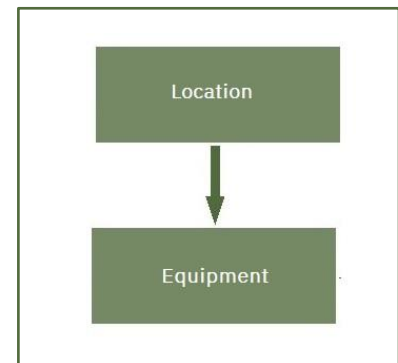
## CREATE AND EDIT PARTS

In this chapter you can see, how you create and edit the parts in the project. Some functions can only be carried out by users with the right user profiles. Read more from page 56.

### Create equipment

Equipment is panels, machinery, lamps etc. that is connected by cables.

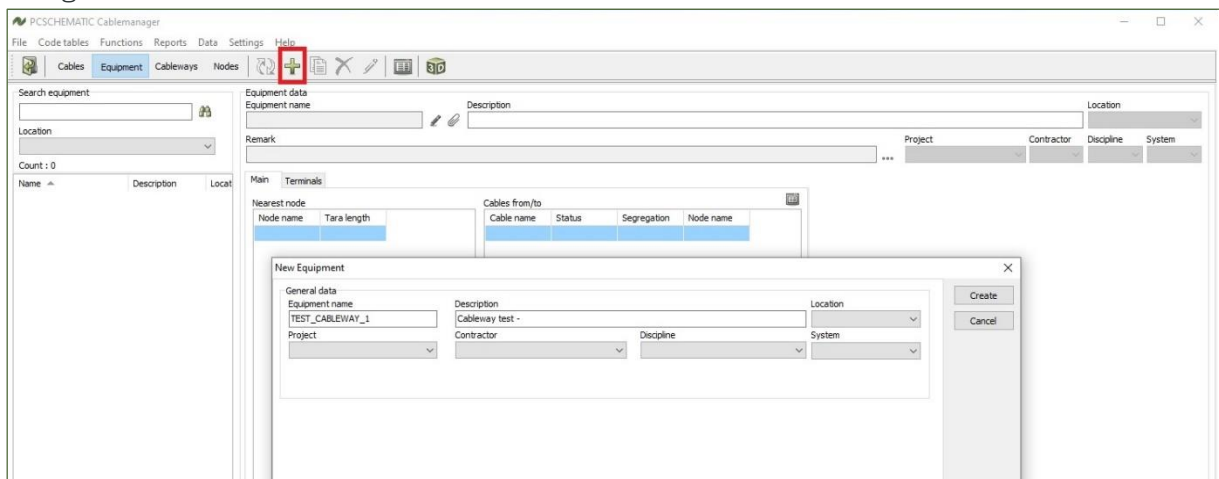
Before routing the cables, the equipment in both ends needs to be defined.




### Create equipment directly in the program

Start creating equipment by pressing  while in the 'Equipment' tab.

This opens a dialog, in which is typed the name of the equipment – the tag no – and a description. It is optional to add structure designations and contractor codes during creation. Designations and codes can also be added later.







### Edit equipment

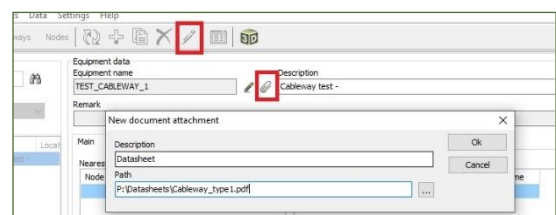
If you want to edit an existing piece of equipment in the project, you need to press the  in the top tool bar.

The name can be changed by using the pen beside the name. You can also change Description, Location, Project, Contractor, Discipline, System.

### Attach documents

It is possible to attach documents to the equipment.

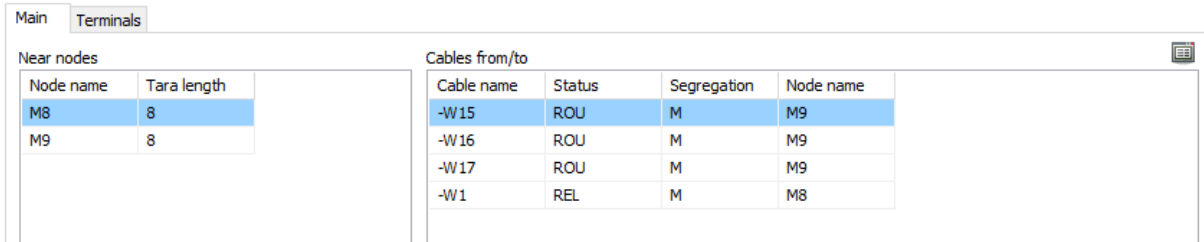
Start by selecting the  (you can only do this on existing equipment), then click the  next to 'equipment name'. When documents are attached the  changes to .



## The main tab

The main tab shows the nearest nodes to the equipment. The Node names come from the Cables table's nearest node to equipment. See page 36 for more info. For each node, you can see the connected cables.

You can 'jump' to the connected cables and the nodes, but you can't edit information here.



The screenshot shows a software window with two tabs: 'Main' and 'Terminals'. The 'Main' tab is active. It contains two tables:

Near nodes	
Node name	Tara length
M8	8
M9	8

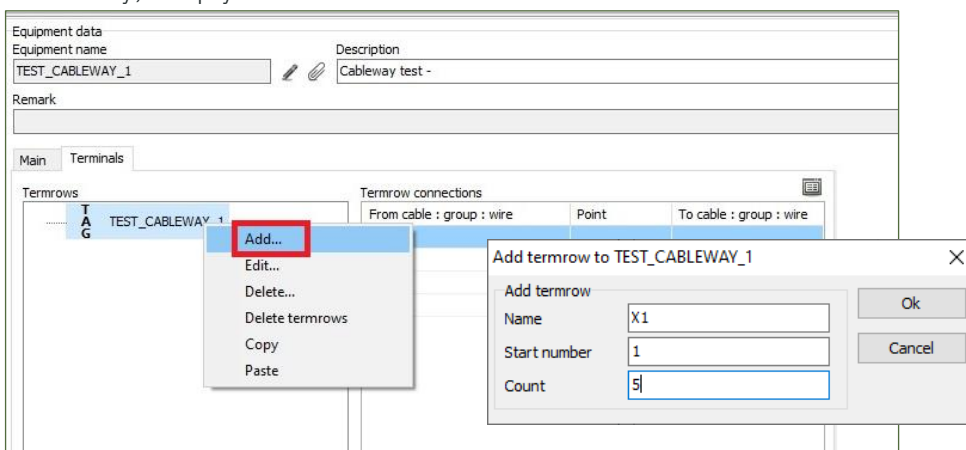
  

Cables from/to			
Cable name	Status	Segregation	Node name
-W15	ROU	M	M9
-W16	ROU	M	M9
-W17	ROU	M	M9
-W1	REL	M	M8

## Create terminal rows on the equipment

Add terminal rows to equipment by right-clicking the present terminal row and clicking 'add...', then add 'name', 'start number' and 'count'.

Here, I have added terminal row X1, and terminals 1 to 5. If they should be named differently, simply edit the terminal row later.



The screenshot shows the 'Terminals' tab in a software window. The 'Equipment data' section shows 'TEST\_CABLEWAY\_1' with a description 'Cableway test -'. Below this, the 'Terminals' table is visible, with a right-click context menu open over the first row. The 'Add...' option is highlighted. A dialog box titled 'Add termrow to TEST\_CABLEWAY\_1' is open, showing the following fields:

- Name: X1
- Start number: 1
- Count: 5

The dialog box has 'Ok' and 'Cancel' buttons.

## Batch functions – Equipment

You can select a lot of equipment in this window. Use the filters to find the desired equipment, and Select all or some of them.

You can export the selected to Excel by clicking the button in the toolbar, or you can delete the selected ones by clicking the Action button.

Equipment batch action

General data

Equipment name:  Description:  Location: A2 Production B

Project:  Contractor:  Discipline:  System:

Count : 8

Equipment Name	Description	Location Code	Project Code	System No	Discipline Code	Contractor No
<input checked="" type="checkbox"/> -E6	Light 6	A2				
<input checked="" type="checkbox"/> -E7	Light 7	A2				
<input checked="" type="checkbox"/> -E8	Light 8	A2				
<input checked="" type="checkbox"/> -LP2	Lighting panel 2	A2				
<input checked="" type="checkbox"/> -M4	Machinery 4	A2				
<input checked="" type="checkbox"/> -M5	Machinery 5	A2				
<input checked="" type="checkbox"/> -MCP2	Motor control panel 2	A2				
<input checked="" type="checkbox"/> -SDP2	Sub-distribution panel 2	A2				

## Import and update equipment

You can import data for equipment from Excel-sheets.

Use the functions in Data|Import.

The equipment's name must be in the sheet, the other data is optional.

Generate Sheet - Insert - Equipment

Mandatory Columns

Field

Tag name

Optional Columns

Field

Description

Location code

Project code

Contractor code


System no

Discipline code

Remark

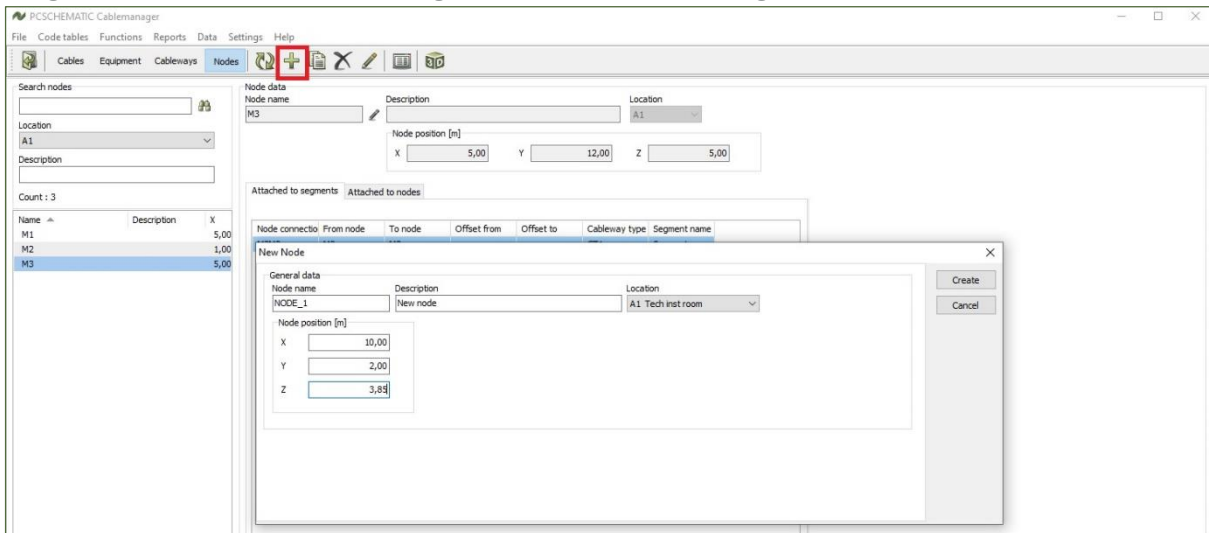
Show DB field names

## Create nodes


Start creating nodes by pressing  in the toolbar while in the 'Nodes'-menu.

This opens a dialog, which requests a node name and XYZ coordinates. Description and location is optional.

Nodes are necessary every time a cableway changes direction. Based on the coordinates, the program calculates Cableway lengths and hence cable lengths.



## Edit nodes

If you want to edit an existing node, you need to press the  in the top tool bar.

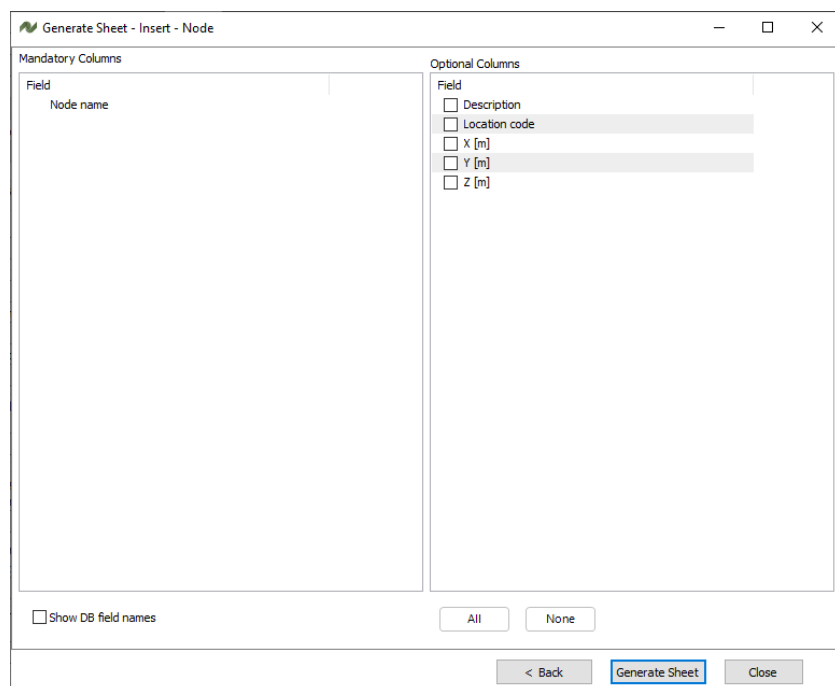
The name can be changed by using the pen beside the name. You can also change Description, Location and the node's coordinates.

## Import and update nodes

You can also use the Import function for importing and/or updating a lot of nodes in one operation.

With the Data|Import function, you can import a list of nodes in one operation.

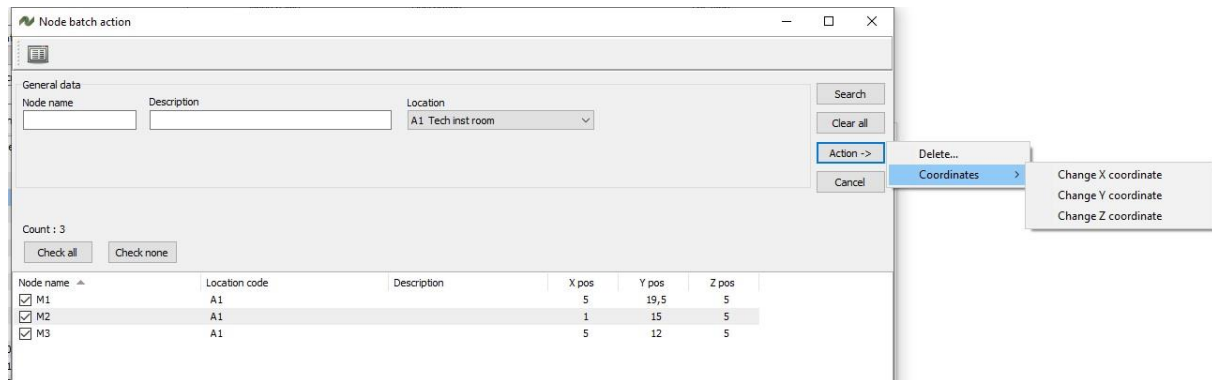
It is also possible to update existing node with the Update function.



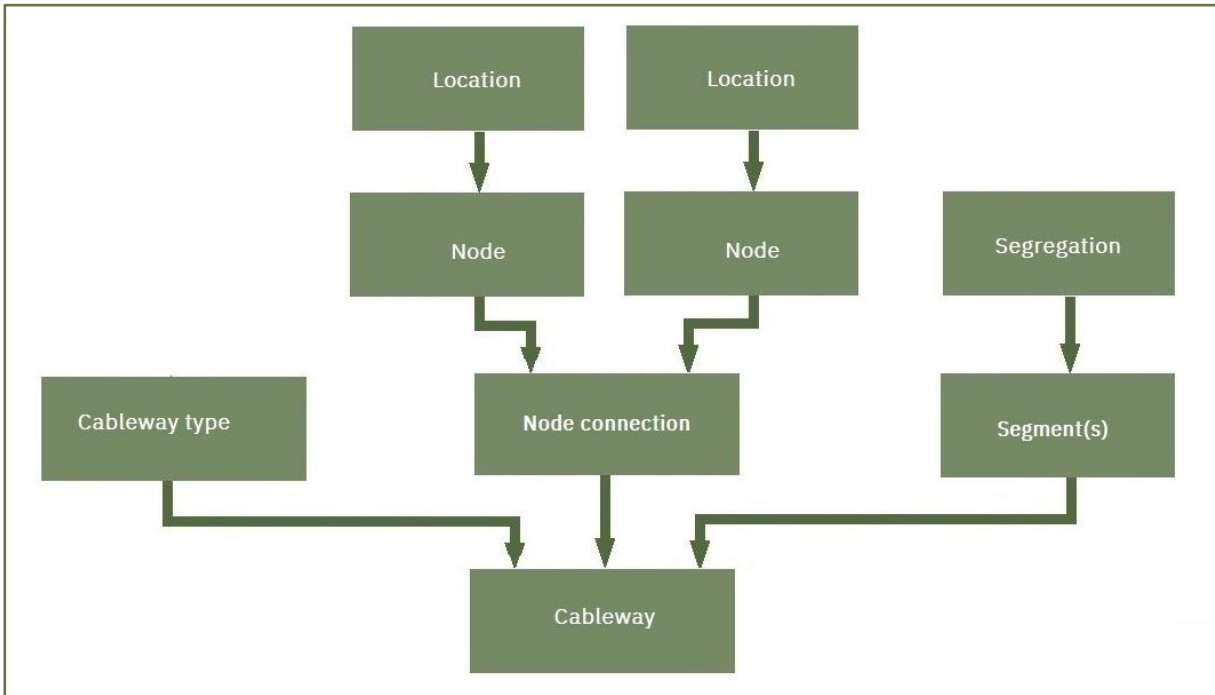
## Batch function – Nodes

There are Node batch functions that let you edit many nodes in one operation:

- One function is to make a selection and delete the selected.
- Another batch function allows you to change coordinates on a selection of nodes.




## Create Cableways



Before creating Cableways, some information is needed, as shown in the figure:

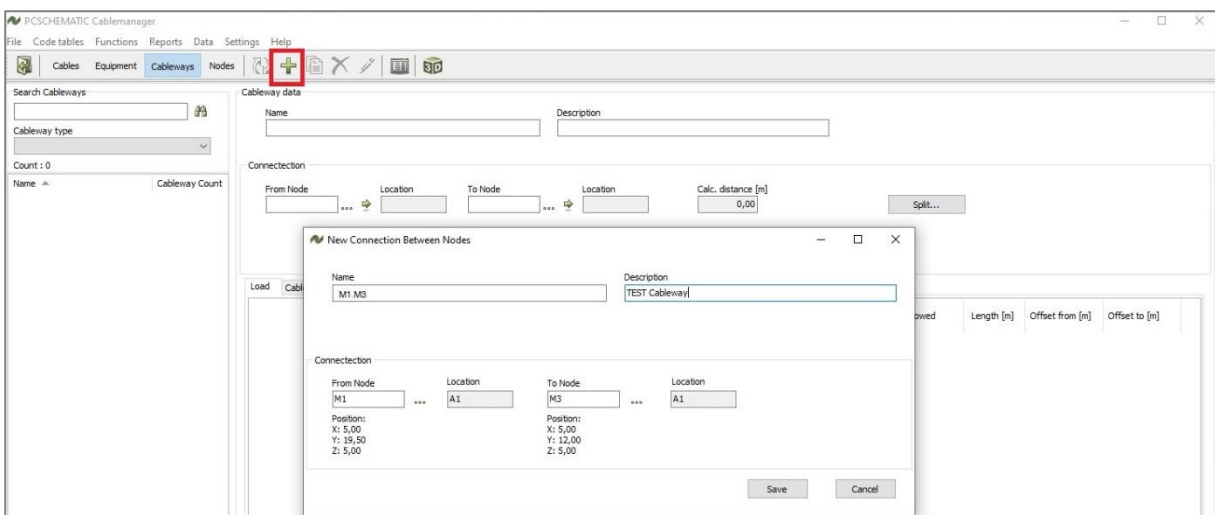
- Cableway types from the code tables
- The nodes – coordinates for cableways' change of directions
- Segregations (to create the segments on the cableway)

## Create a new Cableway

Start the process by pressing the  in the top toolbar. A Cableway consists of a Node connection, with one or more Cableways, that each have one or more Segments.

First you create the Node connection:

Select the two nodes that are at the ends of the Cableway. The Node connection is named automatically after the two nodes – if selected in the Settings – and you can give it a description. If you select two nodes, that already have a connection between them, you get a warning and you can't save it.



When the Node connection is saved, you have to add a Cableway type, that you select from the list.

Finally you add Segment data the Cableway. Segments are the traces in the physical Cableway, so you need to give it a Segregation code.

All Cableways must have at least one Segment on it, so default, the width is set to 100% of the Cableway type.

New Cableway
— □ ×

**Position**

The cableway runs

**From node**       **To node**

Node positions [m]

	From node	To node
X	<input type="text" value="5,00"/>	<input type="text" value="5,00"/>
Y	<input type="text" value="19,50"/>	<input type="text" value="12,00"/>
Z	<input type="text" value="5,00"/>	<input type="text" value="5,00"/>

Offset for cableway [m]

	From node	To node
X	<input type="text" value="0,00"/>	<input type="text" value="0,00"/>
Y	<input type="text" value="0,00"/>	<input type="text" value="0,00"/>
Z	<input type="text" value="0,00"/>	<input type="text" value="0,00"/>

Cableway absolute position [m]

	From node	To node
X	<input type="text" value="5,00"/>	<input type="text" value="5,00"/>
Y	<input type="text" value="19,50"/>	<input type="text" value="12,00"/>
Z	<input type="text" value="5,00"/>	<input type="text" value="5,00"/>

**Cableway data**

Cableway type:       Weight Factor:       Length [m]:

Shape of cableway: Height and width

**Segment data**

Name:

Segregation:

Installation Method:

Fill Factor:

Segment Width:  %  
 mm

Description:

Shape of cableway: Height and width  
Size: 150x400mm<sup>2</sup>

Width for segments in cableway

Available Width	Width of other Segments	Cableway Width
100 %	0 %	100 %
400 mm	0 mm	400 mm

## Edit a Cableway

You have the following options to edit Cableways:

### Change the cableway length

If selected so in Settings, the length is automatically calculated as the distance between the connected nodes. That means, that if the length is wrong, it must be because the nodes' coordinated are wrong. Change them, and Update the cableway.<sup>iv</sup>

### Split cableway

The system needs nodes at all positions where a cable can change direction. So if you add new change of direction in the system, you might need to split a Node connection.

Press the Split button, and you can split the existing Node connection into two new ones.

If automatic naming is selected in Settings, it also works here.

Cables already on the 'old' cableway, will automatically be on the 'new' cableways.

Node connection split

From node: K1, Node connection name: K1-K2, To node: K2

Location: A3, Location: A3

New node: M11, Location: A3

New node connection name, from side: K1-M11, Description: Test cableway

New node connection name, to side: M11-K2, Description: Test cableway

Buttons: Split, Cancel

### Add parallel cableways

You can add parallel cableways by pressing the Add Cableway button.

When in this window, simply type the offset values for the new Cableway, and then select its Cableway type and Segment(s).

See also the picture on next page.

New Cableway

Position

The cableway runs

From node: K1, To node: K2

Node positions [m]

From node	To node
X: 5,00	X: 15,00
Y: 5,00	Y: 15,00
Z: 5,00	Z: 10,00

Offset for cableway [m]

From node	To node
X: 0,00	X: 0,00
Y: 0,00	Y: 0,00
Z: 0,00	Z: 0,00

Cableway absolute position [m]

From node	To node
X: 5,00	X: 15,00
Y: 5,00	Y: 15,00
Z: 5,00	Z: 10,00

Cableway data

Cableway type: [dropdown], Weight Factor: 1,000, Length [m]: 15,00

Segment data

Name: Segment, Description: [text box]

Segregation: [dropdown]

Installation Method: [dropdown]

Fill Factor: 0,000

Buttons: Save, Cancel





## Add Segment

When you create the Cableway, you also add one segment to it. By default, the segment fills out 100% of the Cableway width. You can change that when you create the cableway, or you can change it later:

Type	Segregation	Cable Count	Used Area/Width	Installation Method	Fill Factor	Available Area/Width	Allowed Area/Width	Length [m]	Offset from [m]	Offset to [m]
Cableway 1	CT1					150x400 mm <sup>2</sup>		22,91	Z:1	Z:1
Segment CW1 - 1	T	0	0 %	Area	1,00	200 mm (50%)	30.000 mm <sup>2</sup>			
Segment CW1 - 2	M	0	0 %	Area	1,00	100 mm (25%)	15.000 mm <sup>2</sup>			
Segment CW1 - 3	S	0	0 %	Area	1,00	100 mm (25%)	15.000 mm <sup>2</sup>			
Cableway 2	CT1					150x400 mm <sup>2</sup>		22,91	Z:0,5	Z:0,5
Segment - new...	T	0	0 %	Area	1,00	400 mm (100%)	60.000 mm <sup>2</sup>			
Cableway 3	CT1					150x400 mm <sup>2</sup>		22,91	-	-
Segment	T	0	0 %	Area	1,00	400 mm (100%)	60.000 mm <sup>2</sup>			

Select the Segment, you want to change and press the Edit button.

Then change the percentage of the first segment, ie to 50 %.

Save, and then you can add more segments, for the last 50%,

**Segment**

Segment data

Name:

Segregation:

Installation Method:

Fill Factor:

Segment Width:

Description:

Shape of cableway: Height and width  
Size: 150x400mm<sup>2</sup>

Available Width	Width of other Segments	Cableway Width
100 %	0 %	100 %
400 mm	0 mm	400 mm

## Import and update Cableways

You can also use the Import function for importing and/or updating a lot of cableways one operation.

**Generate Sheet - Update - Cableway/Segment**

Mandatory Columns	Optional Columns
<p>Field</p> <p><input type="checkbox"/> ID (for internal use)</p> <p><input type="checkbox"/> From node</p> <p><input type="checkbox"/> To node</p> <p><input type="checkbox"/> Offset From X [m]</p> <p><input type="checkbox"/> Offset From Y [m]</p> <p><input type="checkbox"/> Offset From Z [m]</p> <p><input type="checkbox"/> Offset To X [m]</p> <p><input type="checkbox"/> Offset To Y [m]</p> <p><input type="checkbox"/> Offset To Z [m]</p>	<p>Field</p> <p><input type="checkbox"/> Node connection name</p> <p><input type="checkbox"/> Length [m]</p> <p><input type="checkbox"/> Cableway type</p> <p><input type="checkbox"/> Max. weight factor</p> <p><input type="checkbox"/> Segment name</p> <p><input type="checkbox"/> Description</p> <p><input type="checkbox"/> Cableway fill pct</p> <p><input type="checkbox"/> Segregation code</p> <p><input type="checkbox"/> Reference installation method</p> <p><input type="checkbox"/> Max. fill factor</p>

Show DB field names

## Batch function – Cableways

The Cableway batch functions are:

- Delete a selection of Cableways in one operation
- Check Fill/Weight factors on a selection of Cableways
- Make a Cableway list report

Make a selection, based on free text, location, cableway type and/or segregation. And select/deselect to get the right selection.

You can delete the selected.

The screenshot shows the 'Cableway/Segment batch action' dialog box in the PCSHEMATIC Cablemanager application. The dialog is used to perform batch operations on selected cableway segments. It includes search filters for 'Node connection name', 'Segment name', 'Segregation', 'From location', and 'Cableway type'. A list of segments is displayed with checkboxes for selection. The 'Action ->' button is highlighted, and a context menu is open over it, showing options: 'Delete...', 'Check', 'Fill / Weight factor...', and 'Cableway list report...'. A table of segment data is visible in the background, showing columns for Node connection name, Segment Name, Type, Segregation, From Node, To Node, and Offset From.

You can check fill and weight factors for the selected cableways:

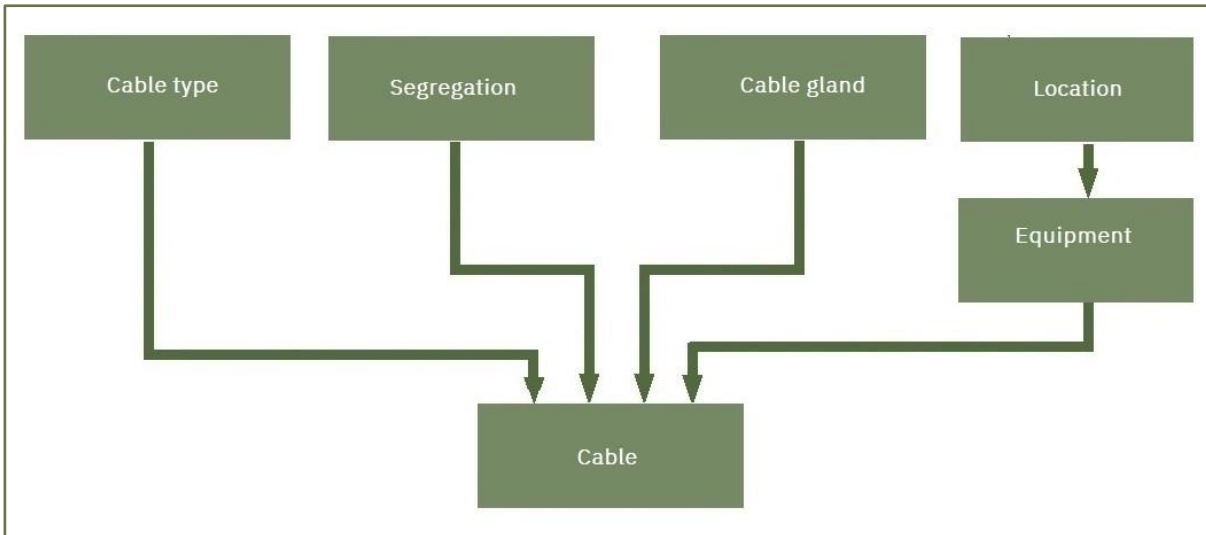
The screenshot shows the 'Cableway/Segment batch action' dialog box with the 'Check all' button pressed. A dialog box titled 'PCSHEMATIC Cablemanager' is overlaid on the main dialog, containing the text: 'Please note: This will check fill/weight factor for all segments listed, chosen or not'. The 'OK' button is highlighted. The main dialog shows a list of segments with checkboxes, and a table of segment data is visible in the background.



You can make a Cableway list report, that generates a pdf-file, that shows the data for the selected cableways as seen below.

Project no: Project name:		Cable Tray / Ladder Installation Location: A1 Tech inst room				Revision: Frat: ADMIN Date: 06/07/2020		
Node connection:	Description:	Cableway:	Segment name:	Cableway type:	No. of Cables:	Fill:	Length (m):	Direction:
M1M2		Cableway 1	Segment	CT1	4	1,2%	6,02	Horizontal
M2M3		Cableway 1	Segment	CT1	3	1%	5	Horizontal
M3M4		Cableway 1	Segment	TRANSIT1	3	0,7%	1	Horizontal
T1-T3		Cableway 1	Segment	CT1	0	0%	2,24	Diagonal
		Cableway 2	Segment	CT1	0	0%	2,24	Diagonal
			Segment	CT1	0	0%	2,24	Diagonal
T3-T2		Cableway 1	Segment	CT1	0	0%	3,16	Diagonal
		Cableway 2	Segment	CT1	0	0%	3,16	Diagonal
			Segment	CT1	0	0%	3,16	Diagonal


## Create Cables



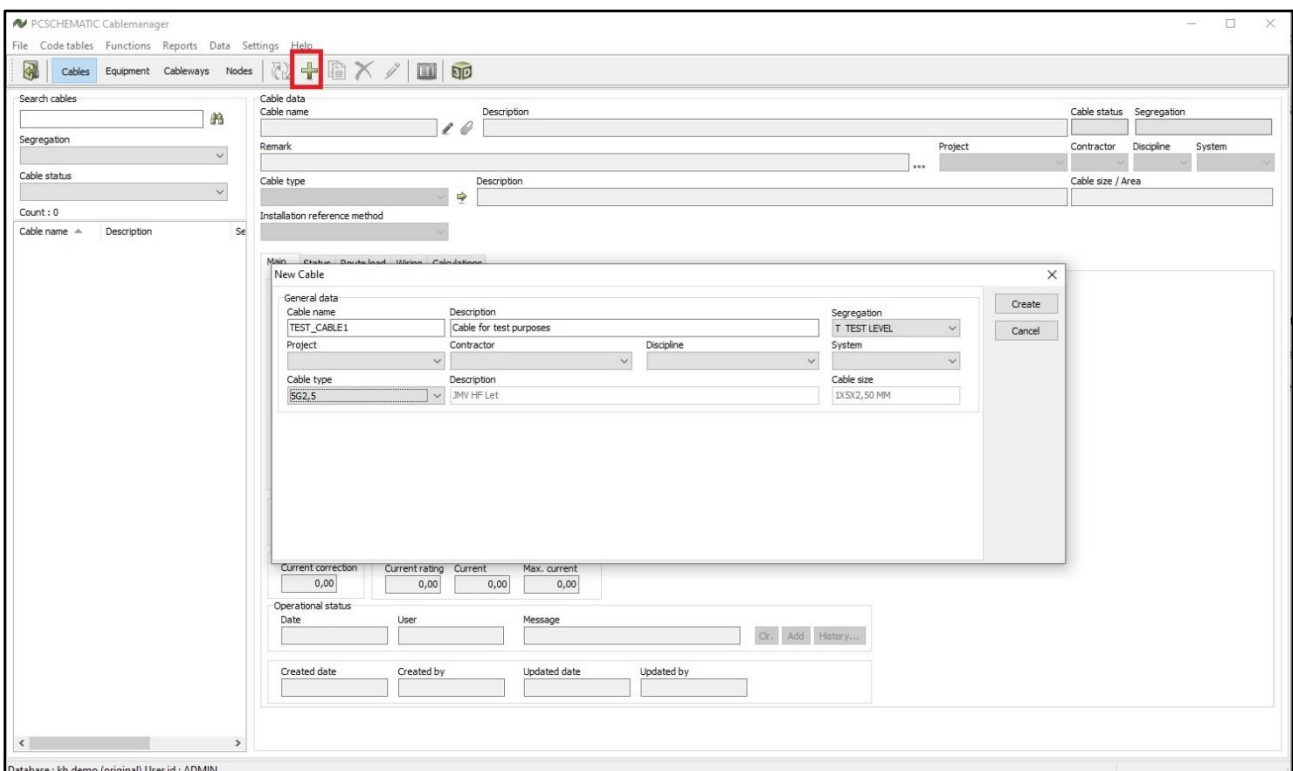
When you create Cables, all specifications and other basic data must be available before you can create the cable.

The figure above illustrates the overall workflow of cable creation, while the process is explained below.

### Create a cable directly in the project

Create a new cable in the project by pressing the  in the main toolbar in the Cables menu. This opens a dialog asking for relevant information. The name, segregation and cable type must be selected. All other data is optional.

Finish the creation by pressing the 'Create' button. The cable is automatically given the status CR – Created (on the Status Tab) See all cable status codes on page 38.



### The Man tab

When the cable has been created, determine and select the Equipment (Tags), Nearest Node, Tara length, possible Glands in both ends of the cable. <sup>v</sup>

When this data is present, the cable can be routed and 'used' by a Normal user.

**Cable data**

Cable name: TTT Description: Cable for test purposes Cable status: CR Segregation: 1KV OR ABOVE

Remark: Project: Contractor: Discipline: System: 00

Cable type: SG2,5 Description: JMV HF Let Cable size / Area: 1x5x2,50 mm<sup>2</sup> / 9,8x9,8 = 96 mm<sup>2</sup>

Installation reference method: All Cable is not routed

**Main** Status Route load Wiring Calculations

**From**

Node: M10 Tara length [m]: 2,00

Tag: -M1

Location: A3

Description: Machinery 1

Cable Gland Type: 111 Size: 2L

**To**

Node: M13 Tara length [m]: 3,00

Tag: -M2

Location: A3

Description: Machinery 2

Cable Gland Type: Size:

**Via nodes**

M11  
M12

**Cable lengths [m]**

Maximum	Estimated	Routed	Routed + Tara	Pulled	Installed
0,00	0,00	0,00	5,00	0,00	0,00

**Correction factor**

Current correction	Current [A]	Current rating	Current	Max. current
1,00	24,00	0,00	24,00	24,00

**Operational status**

Date: User: Message: [Cl. Add History...]

Created date: 30/06/2020 09:40:37 Created by: ADMIN Updated date: 30/06/2020 09:49:11 Updated by: ADMIN

Save Cancel

### Import and update Cables

You can also use the Import function for importing and/or updating a lot of cables in one operation.

You have the following data, that you can import here.

Generate Sheet - Update - Cable

**Mandatory Columns**

Field
ID (for internal use)
Cable name

**Optional Columns**

Field
<input type="checkbox"/> Reference installation method
<input type="checkbox"/> Segregation code
<input type="checkbox"/> Cable type
<input type="checkbox"/> From tag
<input type="checkbox"/> To tag
<input type="checkbox"/> From node
<input type="checkbox"/> To node
<input type="checkbox"/> From gland seq. no.
<input type="checkbox"/> To gland seq. no.
<input type="checkbox"/> Connection remark
<input type="checkbox"/> Phases
<input type="checkbox"/> From tara length [m]
<input type="checkbox"/> To tara length [m]
<input type="checkbox"/> Max. length [m]
<input type="checkbox"/> Estimated length [m]
<input type="checkbox"/> Installed length [m]
<input type="checkbox"/> Power factor (cosφ)
<input type="checkbox"/> Voltage [V]
<input type="checkbox"/> Current [A]
<input type="checkbox"/> Max. voltage drop [%]
<input type="checkbox"/> Current correction factor
<input type="checkbox"/> Start power factor (cosφ)
<input type="checkbox"/> Start current factor
<input type="checkbox"/> Max. start voltage drop [%]
<input type="checkbox"/> Description
<input type="checkbox"/> Project code
<input type="checkbox"/> Contractor code
<input type="checkbox"/> System no
<input type="checkbox"/> Discipline code
<input type="checkbox"/> Remark

Show DB field names

All None

< Back Next > Close

## Cable status codes

The cable status codes are fixed, and shown only for clarification. You find them on the Status tab of a cable.

The codes are used throughout the project when a cable changes status, and are used to filter through the cables in the project.

Some statuses are set automatically, e.g. when you make a Pulling report the status is (or rather, can be) changed to PSS. Other statuses require manual input, which again might be done with batch operations.

Code	Description
CR *	Created date. The cable was created or imported on this date (DD/MM/YYYY)
ROU *	Routed. The cable's route on the cableways has been found and approved.
REL	Released. Released for production, that is that pullings cards can be made.
PSS *	Pulling Card sent. Pulling card has info about TO/FROM, length and route.
PULL	Pulled. The cable has been pulled, and this is noted in the project.
TSS *	Termination card sent. Terminal card has info about termination on term.rows.
TF	Terminated FROM. Info from returned termination card.
TT	Terminated TO. Info from returned termination card.
TFT	Terminated FROM and TO. Info from returned termination card.
TST	Test. Cable is tested
INST	Installed. The cable is installed.
APP	Approved. The connection is ok.
SUS	Suspended. The connection is not ok.
SPA	Spare <sup>vi</sup> . The cable is not used.
SPC	Special. User defined special status
DEF	Defective. The cable is defect
PW	Pre-wired

\* Date is (normally) set automatically by the system. <sup>vii</sup>



## Route a cable

When you create a cable, you select the two pieces of equipment that are connected by the cable, and you select the two nodes, that are closest to the equipment.

You can then route the cable. The cable is routed on a Segment with the right Segregation code and the right reference installation method, as long as there is sufficient space for it.

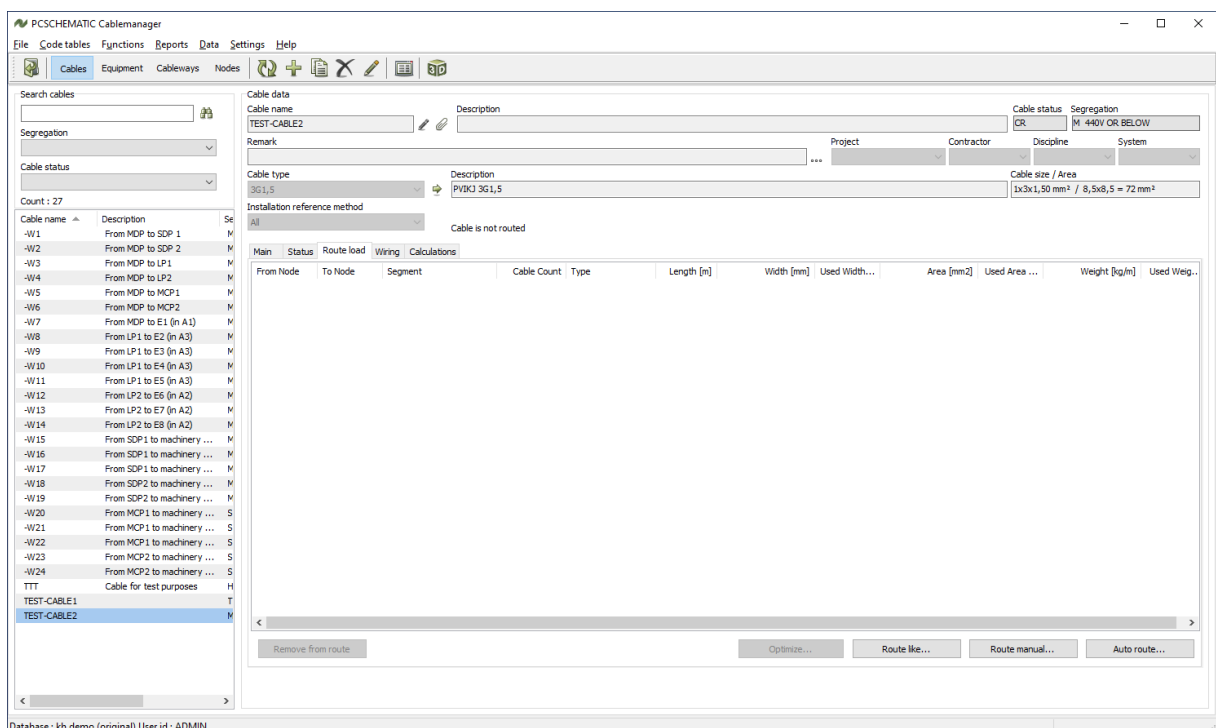
Go to the Route Load tab.

Here you can route the cable in three different ways:

- Route like ...
- Route manual ...
- Auto route ...
- Optimize ...

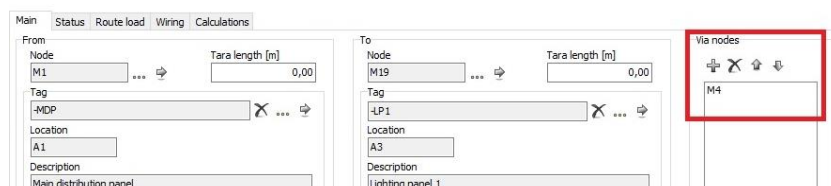
And remove the cable from the route (as long as it isn't pulled).

Remember, that when the cable was created, you could select the cable's installation method (read more about installation methods in Part 3 (Data structure and import functions) of the manual). Also remember, that the Segments on the Cableways were created with ref. installation methods, and that valid cable paths also depend on selected installation methods.



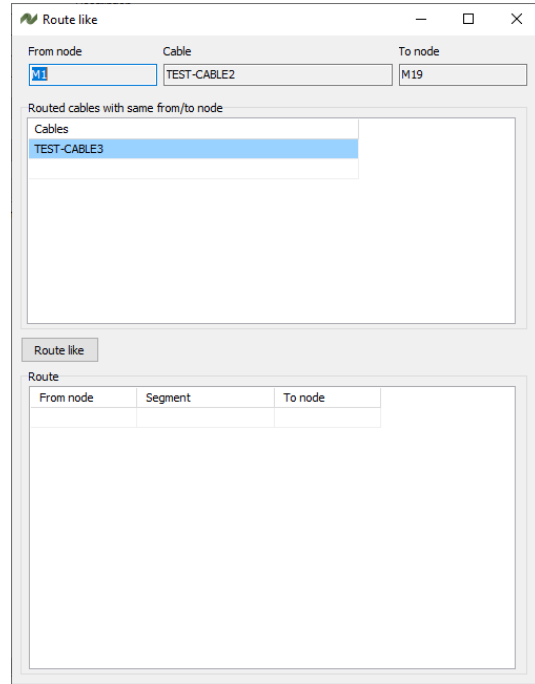
## Force the cable route

On the main tab, you can force the cable route by selecting one or more Via nodes.



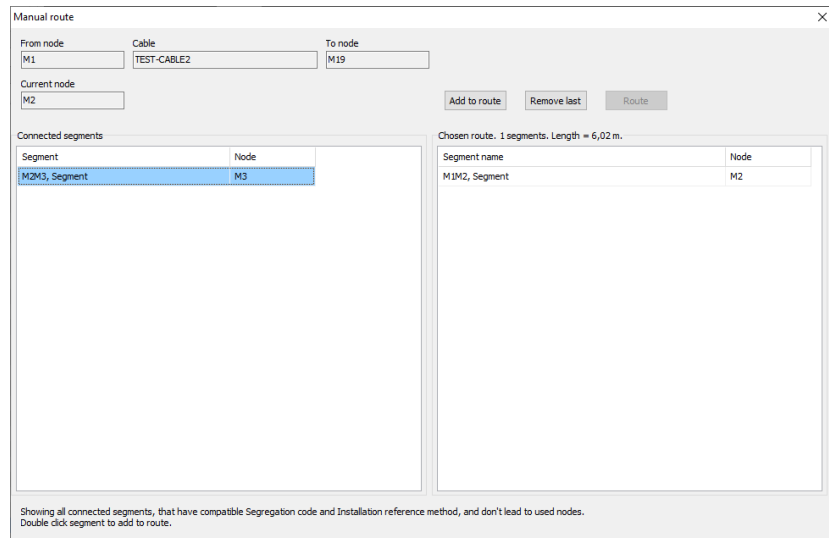
## Route like ...

If you have other cables on the same route or part of the route.



## Route manual ...

You can decide the cable's route totally manually. The possible segments come up when they are selectable, meaning that you can only select one segment at a time, and not the full route at once.



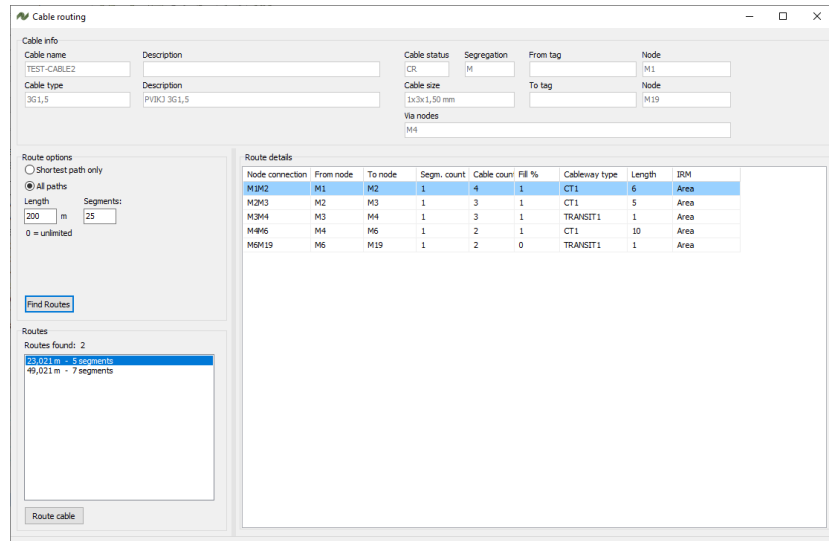
## Auto route ...

The easiest method the Auto route function.

The program can find the possible routes for the cable.

You can search for the shortest path or all possible paths. And you can limit the paths to a max length.

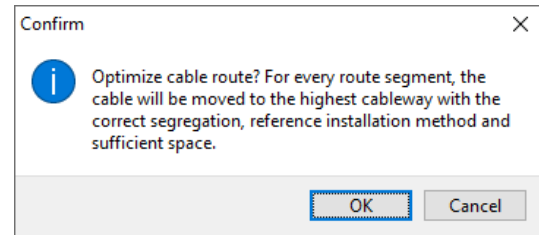
The possible paths can be seen, with a lot of details, and simply select the best one.





## Optimize ...

When you have more parallel cableways – see page 32 – you can optimize the route. Maybe you don't use all parallel routes.

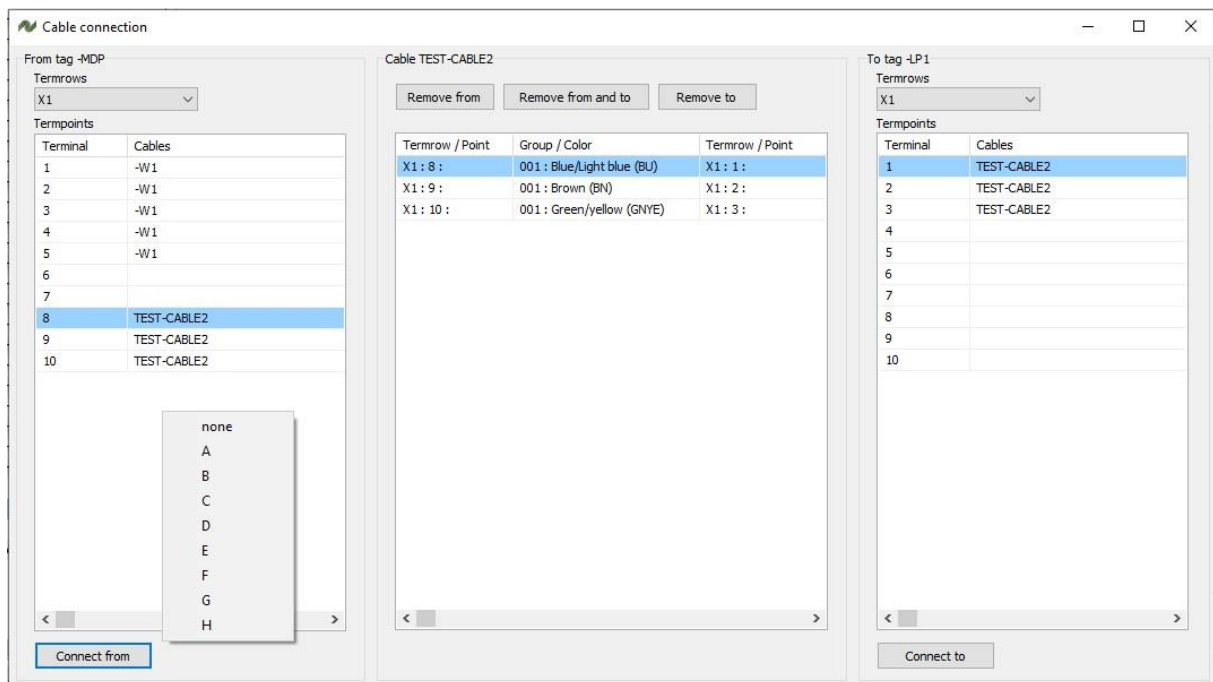


## Wiring

On this tab, you can see how the cable is connected to the equipment. The information is optional.

You may need to generate wires for the cable. The wires are defined in the cable spec code table.

If both equipments have defined terminal rows, you can edit the connections by pressing the Edit connections button. See how to create the terminal row on page 26.



When you connect the cable to the terminal row, you start by selecting a Cable wire, a FROM and a TO terminal, and then click Connect from and to. <sup>viii</sup> You can – optionally – select a letter code for the terminal, ie use it for layer terminals or functionalities.

The wiring information is used on Termination reports.

## Calculations

On this tab, you can make simple voltage drop calculations.

The calculations are based on

- How many phases (1, 2 or 3 phases) are used
- The voltage (230 or 400 V)
- The current consumption
- Cable length comes automatically from the cable route
- Cable values are based on the cable spec
- Default max voltage drops come from project settings

The screenshot displays the PCSHEMATIC Cablemanager software interface. The main window is titled 'PCSHEMATIC Cablemanager' and has a menu bar with 'File', 'Code tables', 'Functions', 'Reports', 'Data', 'Settings', and 'Help'. Below the menu bar is a toolbar with icons for 'Cables', 'Equipment', 'Cableways', and 'Nodes'. The interface is divided into several sections:

- Search cables:** A search bar and a list of cables. The list shows cable names (e.g., -W1, -W2, etc.) and descriptions (e.g., 'From MDP to SDP 1').
- Cable data:** Fields for 'Cable name' (TEST-CABLE2), 'Description', 'Cable status' (ROU), and 'Segregation' (M 440V OR BELOW). There are also dropdowns for 'Project', 'Contractor', 'Discipline', and 'System'.
- Installation reference method:** A dropdown menu set to 'All'.
- Route fill load ok / Route weight load ok:** Two checkboxes.
- Calculations:** A section with input fields for 'U - Voltage [V]' (230), 'I - Current [A]' (2), and 'L - Length [m]' (23,02). It also shows calculated values for 'R20 - Resistance [Ω/km]' (12,1), 'X20 - Reactance [Ω/km]' (0,074), 'Temperature coefficient' (0,004), and 'Power [W]' (2576).
- Start / Normal:** Radio buttons for 'Start' and 'Normal'. The 'Start' option is selected, showing 'SF - Start factor' (7), 'I - Current [A]' (14), 'cos(φ)' (0,8), 'Voltage drop' (3,259), 'Voltage drop %' (2,834), and 'Max voltage drop' (20 %).
- Voltage drop:** A section with mathematical formulas and their results:
  - $R = R20 * (1 + \alpha * (t - 20)) = 12,1 * (1 + 0,004 * (30 - 20)) = 12,58 \Omega/km$
  - $X = X20 * (1 + \alpha * (t - 20)) = 0,07 * (1 + 0,004 * (30 - 20)) = 0,08 \Omega/km$
  - $VD = \frac{I * SF * L * (R * \cos(\phi) + X * \sin(\phi))}{1000} = \frac{2 * 7 * 23,02 * (12,58 * 0,8 + 0,08 * 0,6)}{1000} = 3,259 \text{ V}$
  - $VD\% = \frac{2 * VD * 100\%}{U} = \frac{2 * 3,259 * 100\%}{230} = 2,83 \%$
- Voltage at endpoint [V]:** A text box showing the result '226,741'.
- Buttons:** 'Save' and 'Cancel' buttons at the bottom right.

At the bottom of the window, it says 'Database : kh demo (original) User id : ADMIN'.

You don't make any dimensioning on the tab, only simple voltage drop calculations.

On the main tab, you can – manually – add a current correction factor to the cable's main tab, but it is purely manual and not based on the number of parallel cables and/or reference installation methods.



## Cable batch functions (super user)

There are a lot of Cable batch actions, which lets you do the same to many cables, as you can do to one cable in the previous chapter.

You start out by selecting the relevant cables, and you can select based on:

- Free search on part of name
- Cable type
- Segregation
- Cable's main status and/or Cable's least status
- Cable's length type, and you can filter on max/min lengths
- And more options, see below

Cable Name	Description	Cable Type	Cable Type Description	Cable Status	Segregation
<input checked="" type="checkbox"/> -W7	From MDP to E1 (in A1)	3G1,5	PVIKJ 3G1,5	ROU	M
<input checked="" type="checkbox"/> -W8	From LP1 to E2 (in A3)	3G1,5	PVIKJ 3G1,5	ROU	M
<input checked="" type="checkbox"/> -W9	From LP1 to E3 (in A3)	3G1,5	PVIKJ 3G1,5	ROU	M
<input checked="" type="checkbox"/> -W10	From LP1 to E4 (in A3)	3G1,5	PVIKJ 3G1,5	ROU	M
<input checked="" type="checkbox"/> -W11	From LP1 to E5 (in A3)	3G1,5	PVIKJ 3G1,5	ROU	M
<input checked="" type="checkbox"/> -W12	From LP2 to E6 (in A2)	3G1,5	PVIKJ 3G1,5	ROU	M
<input checked="" type="checkbox"/> -W13	From LP2 to E7 (in A2)	3G1,5	PVIKJ 3G1,5	ROU	M
<input checked="" type="checkbox"/> -W14	From LP2 to E8 (in A2)	3G1,5	PVIKJ 3G1,5	CR	M

The search result can then be selected/deselected, and you can then perform a batch action.

### Batch route

When you batch route, the system automatically selects the shortest path. So here, the forced route – via nodes – can help you to get the best routes.

### Optimize route

You can optimize the route for the selected cables, meaning that you move them upwards to the top routes, when you have parallel cableways.

### Unroute/Reset status

This function lets you unroute, that is remove all selected cables from their routes, and to reset their statuses to Created. See list of cable status on page 38.

### Batch print

Here you can print reports for a lot of cables in one operation:

### Cable status report

One pdf-page per cable – see page 47. <sup>ix</sup>

### Cable pull report

One pdf-page per cable – see page 47. You can automatically update the status for the cables at the same time.

### Cable termination report

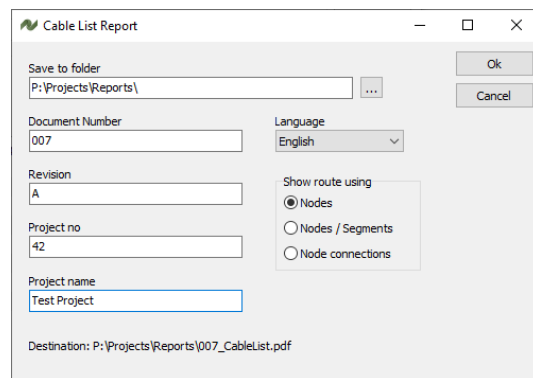
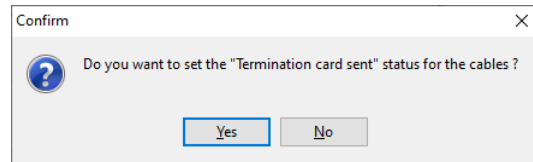
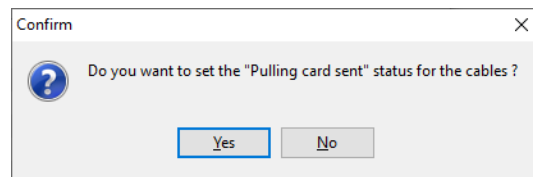
One pdf-page per cable – see page 48. You can automatically update the status for the cables at the same time.

### Cable list report

You can make list reports, based on cable routes. The function generates one pdf-file with the selected information for the selected cables. See page 49.

You can show the route using

- Nodes
- Nodes / Segments
- Node connections



### Generate Pulled Card sent template

The template is used, when you import ... <sup>x</sup>

### Generate wires

You can generate wires on all selected cables in one operation.

### Change cable type

With this function, you can change cable type on all selected cables in one operation.

### Change status

You can change the status on the selected cables.

The rule is, that you can change one status level at the time, ie go from Routed to Released. You can't go from Routed to Terminated, as that would mean that you had skipped status levels. See the list of cable statuses on page 38.

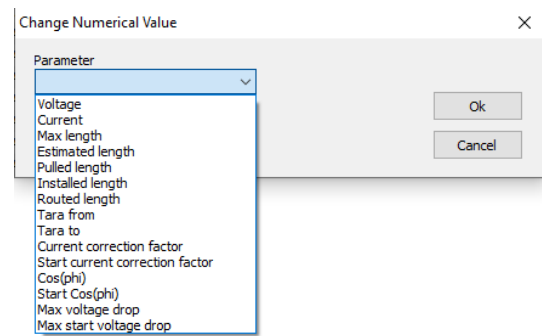
### Change system

You can change the system on the selected cables.



## Change numerical parameter

Here you can change a numerical value in any one of the parameters.



## Change nodes

You can change nodes on selected cables, as long as they are not routed.

## Change reference installation method

Here you change reference installation method for the selected cables. Read more about Ref. installation methods in Part 3 of the manual (Data structure ...).

## Delete ...

Deletes the selected cables.

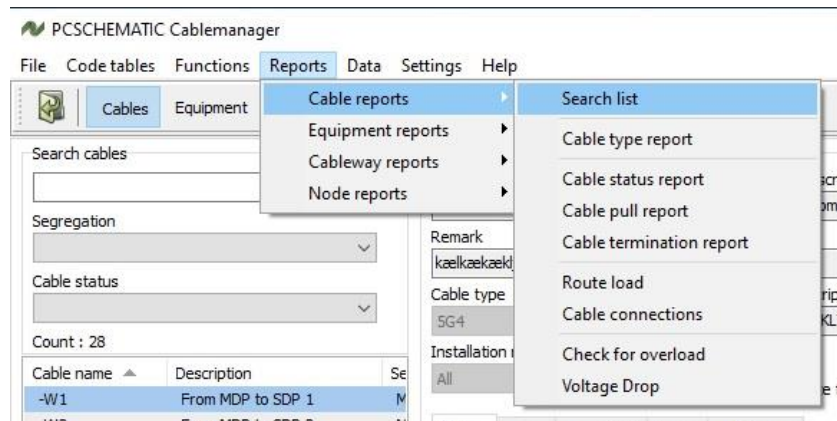
# REPORT OPTIONS (ALL USERS)



Reports can be printed by the program. In the toolbar, the 'list' button exports the list of selected cables, equipment, segments or nodes to Excel according to which tab is open. The same button is present in many different windows, and will then export the cables, equipment, segments or nodes that are selected in the window. This section of the manual contains an example of all reports, also found in the 'Reports'-menu. To access the reports in the menu, the relevant tab (cable, equipment, etc.) must be open.

## Cable reports

Here follows a walkthrough of the different cable reports.



## Search list

This exports all cables and their data to Excel. You can use it to search for specific data.

Tag No	Description	From Tag No	From Tag Description	From Tag Location	From Node No	From Node Location	To Tag No	To Tag Description
-W1	From MDP to SDP 1	-MDP	Main distribution panel	A1	M1	A1	-SDP1	Sub-distribution panel 1
-W10	From LP1 to E4 (in A3)	-LP1	Lighting panel 1	A3	M9	A3	-E4	Light 4
-W11	From LP1 to E5 (in A3)	-LP1	Lighting panel 1	A3	M9	A3	-E5	Light 5
-W12	From LP2 to E6 (in A2)	-LP2	Lighting panel 2	A2	M21	A2	-E6	Light 6
-W13	From LP2 to E7 (in A2)	-LP2	Lighting panel 2	A2	M21	A2	-E7	Light 7
-W14	From LP2 to E8 (in A2)	-LP2	Lighting panel 2	A2	M21	A2	-E8	Light 8
-W15	From SDP1 to machinery M1 (in A3)	-SDP1	Sub-distribution panel 1	A3	M9	A3	-M1	Machinery 1
-W16	From SDP1 to machinery M2 (in A3)	-SDP1	Sub-distribution panel 1	A3	M9	A3	-M2	Machinery 2
-W17	From SDP1 to machinery M3 (in A3)	-SDP1	Sub-distribution panel 1	A3	M9	A3	-M3	Machinery 3
-W18	From SDP2 to machinery M4 (in A2)	-SDP2	Sub-distribution panel 2	A2	M21	A2	-M4	Machinery 4
-W19	From SDP2 to machinery M5 (in A2)	-SDP2	Sub-distribution panel 2	A2	M21	A2	-M5	Machinery 5
-W20	From MDP to SDP 2	-MDP	Main distribution panel	A1	M1	A1	-SDP2	Sub-distribution panel 2

## Cable type report

A report of all cable types with the amounts of each type. This report can be exported to Excel.

Cable Type	Description	Used Count	Estimated	Routed	Pulled	Installed
3G1,5	PVIKJ 3G1,5	8	0,00	168,02	0,00	0,00
3G2,5	PVIKJ 3G2,5	3	0,00	46,04	0,00	0,00
3G4	JMV HF Flex	0				
4X6	JMV HF Flex	0				
5G1,5	JMV HF Let	0				
5G10	JMV HF Let	0				
5G16	JMV HF Let	0				
5G2,5	JMV HF Let	1	0,00	0,00	0,00	0,00
5G4	NOIKLX	11	0,00	293,95	0,00	0,00
5G6	PVIKJ 5G6	0				
S1 YSLY-JZ 3x1.5 mm2		5	0,00	145,00	0,00	0,00



## Cable status report

The cable status report tells the status of the selected cable and by whom and when it was released for various processes.

The report is printed as a .pdf-file.

PCSCHEMATIC Cablemanager - Status report				
<b>Cable tag</b> -W1	<b>Description</b> From MDP to SDP 1		<b>Cable status</b> ROU	<b>Segr.</b> M
<b>Cable type</b> 5G4	<b>Description</b> NOIKLX		<b>Cable size</b> 1x5x4,00 mm	
Cable lengths (m)				
<b>Estimated</b> 0	<b>Routed</b> 43	<b>Routed + Tara</b> 59	<b>Pulled</b> 0	<b>Installed</b> 0
From		To		
<b>Node</b> M1	<b>Tara length (m)</b> 8	<b>Node</b> M8	<b>Tara length (m)</b> 8	
<b>Tag</b> -MDP	<b>Location</b> A1	<b>Tag</b> -SDP1	<b>Location</b> A3	
<b>Description</b> Main distribution panel		<b>Description</b> Sub-distribution panel 1		
Gland		Gland		
<b>Type</b>	<b>Size</b>	<b>Type</b>	<b>Size</b>	
<b>Description</b>		<b>Description</b>		
Standard statuses				
<b>Status</b>	<b>Date</b>	<b>Initials</b>		
Created	09/07/2015	ADMIN		
Routed	20/02/2020	SUPER		
Released				
Pulling card sent				
Pulled				
Termination card sent				
Terminated from				
Terminated to				
Tested				
Installed				
Approved				
Special statuses				
<b>Status</b>	<b>Date</b>	<b>Initials</b>		
Suspended				
Spared				
Special				
Defective				
Pre-wired				

## Cable pull report

The cable pull report contains the data that is necessary to pull the cable. This is data about the 'from' and 'to' nodes, the cable length and the route of the cable.

The report is printed as a .pdf-file.

PCSCHEMATIC Cablemanager - Pull Report				
<b>Cable tag</b> -W1	<b>Description</b> From MDP to SDP 1		<b>Cable Status</b> PSS	<b>Segr</b> M
<b>Cable Type</b> 5G4	<b>Description</b> NOIKLX		<b>Cable Size</b> 1x5x4 mm <sup>2</sup>	
Cable Lengths (m)				
<b>Estimated</b> 0	<b>Routed</b> 59	<b>Routed + Tara</b> 75	<b>Pulled</b> 0	<b>Installed</b> 0
From		To		
<b>Node</b> M1	<b>Tara length (m)</b> 8	<b>Node</b> M8	<b>Tara length (m)</b> 8	
<b>Tag</b> -MDP	<b>Location</b> A1	<b>Tag</b> -SDP1	<b>Location</b> A3	
<b>Description</b> Main distribution panel		<b>Description</b> Sub-distribution panel 1		
Gland		Gland		
<b>Type</b>	<b>Size</b>	<b>Type</b>	<b>Size</b>	
<b>Description</b>		<b>Description</b>		
Route				
<b>Segments</b> 6	<b>Length (m)</b> 43			
M1M2 M2M3 M3M4 M4M6 M6M7 2 2 7 8 . 0 0				

## Cable termination report

The cable termination report shows how all conductors are going to be terminated in each end.

The report is printed as a .pdf-file.

PCSCHEMATIC Cablemanager - Termination report					
<b>Cable tag</b> -W1	<b>Description</b> From MDP to SDP 1	<b>Cable status</b> ROU	<b>Segr.</b> M		
<b>Cable type</b> 5G4	<b>Description</b> NOIKLX	<b>Cable size</b> 1x5x4,00 mm			
Cable lengths (m)					
<b>Estimated</b> 0	<b>Routed</b> 43	<b>Routed + Tara</b> 59	<b>Pulled</b> 0	<b>Installed</b> 0	
From		To			
<b>Node</b> M1	<b>Tara length (m)</b> 8	<b>Node</b> M8	<b>Tara length (m)</b> 8		
<b>Tag</b> -MDP	<b>Location</b> A1	<b>Tag</b> -SDP1	<b>Location</b> A3		
<b>Description</b> Main distribution panel		<b>Description</b> Sub-distribution panel 1			
Gland		Gland			
<b>Type</b>	<b>Size</b>	<b>Type</b>	<b>Size</b>		
<b>Description</b>		<b>Description</b>			
Terminal list					
Termrow	Terminal	Group	Color	Terminal	Termrow
X1	1	1	Blue/Light blue	1	X1
X1	2	1	Brown	2	X1
X1	3	1	Black	3	X1
X1	4	1	Grey	4	X1
X1	5	1	Green/yellow	5	X1

## Route load

This report creates an Excel file with all route loads for the selected cable and can also be found on the 'Route load' tab.

	A	B	C	D	E	F	G	H	I	J	K	L
1	<b>Route load</b>											
2	Record count: 7											
3	<b>From Node</b>	<b>To Node</b>	<b>Segment</b>	<b>Cable Count</b>	<b>Type</b>	<b>Length [m]</b>	<b>Width [mm]</b>	<b>Used Width [mm]</b>	<b>Area [mm<sup>2</sup>]</b>	<b>Used Area [mm<sup>2</sup>]</b>	<b>Weight [kg/m]</b>	<b>Used Weight [kg/m]</b>
4	M1	M2	M1M2	7	CT1	8,50	-	-	42.000	2,3%	180.000	1,2%
5	M2	M3	M2M3	6	CT1	7,50	-	-	42.000	2,2%	180.000	1,2%
6	M3	M4	M3M4	6	TRANSIT1	1,00	-	-	175.000	1,4%	1.000.000	0,2%
7	M4	M6	M4M6	5	CT1	10,00	-	-	42.000	1,8%	180.000	1,0%
8	M6	M7	M6M7	3	CT1	13,00	-	-	42.000	1,0%	180.000	0,6%
9	M7	M18	M7M18	1	TRANSIT1	1,00	-	-	175.000	0,2%	1.000.000	0,0%
10	M18	M17	M17M18	1	CT1	7,50	-	-	42.000	0,3%	180.000	0,2%

## Cable connections

This report creates an Excel file with all cable connections in both ends. This list is also found on the 'Wiring' tab and in the Termination report.

	A	B	C	D	E	F
1	<b>Cable connections</b>					
2	Record count: 5					
3	<b>Termrow</b>	<b>Termpoint</b>	<b>Group</b>	<b>Color</b>	<b>Termpoint2</b>	<b>Termrow2</b>
4	X1	1	1	Blue/Light blue	1	X1
5	X1	2	1	Brown	2	X1
6	X1	3	1	Black	3	X1
7	X1	4	1	Grey	4	X1
8	X1	5	1	Green/yellow	5	X1
9						





### Check for overload

This report lists the cables, among the selected, that are overloaded. It can be exported to Excel.

Cable check. Some cables are overloaded. 1 of 28					
Cable name	Area/Width	Weight	Voltage drop	Start voltage drop	Current
TEST-CABLE2	Ok	Ok	Ok	Overload	Ok

### Voltage Drop

This report creates an Excel file with all calculation data.

	A	B	C	D	E	F	G	H	I	J	K	L
1	<b>Cable voltage drop report. According to DS/CLC/TR 50480</b>											
2	Record count: 25											
3	Cable ID	Cable Type	Segregation	Length	Voltage	Phases	Full Load Current	Cos Phi	Voltage Drop (%)	Start Current	Cos Phi Start	Voltage Drop Start (%)
4	-W1	5G4	M	59,000	230,000	1	5,000	0,900	1,118	0,000	0,000	0,000
5	-W2	4X6	M	52,000	0,000	1	0,000	0,000	0,000	0,000	0,000	0,000
6	-W3	5G4	M	59,000	0,000	1	0,000	0,000	0,000	0,000	0,000	0,000
7	-W4	5G4	M	54,500	0,000	1	0,000	0,000	0,000	0,000	0,000	0,000
8	-WS3	5G4	M	46,000	0,000	1	0,000	0,000	0,000	0,000	0,000	0,000
9	-W6	5G4	M	64,500	0,000	1	0,000	0,000	0,000	0,000	0,000	0,000
10	-W7	3G1,5	M	21,500	0,000	1	0,000	0,000	0,000	0,000	0,000	0,000
11	-W8	3G1,5	M	40,500	0,000	1	0,000	0,000	0,000	0,000	0,000	0,000
12	-W9	3G1,5	M	34,500	0,000	1	0,000	0,000	0,000	0,000	0,000	0,000
13	-W10	3G1,5	M	28,000	0,000	1	0,000	0,000	0,000	0,000	0,000	0,000

### Routing information (from Cable batch functions)

The list reports is based on cable routes. You can show the route using

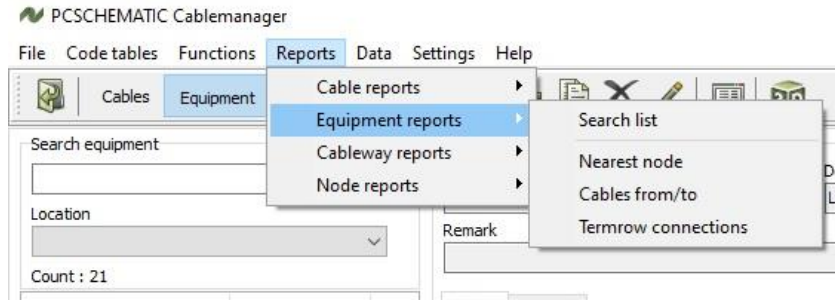
- Nodes
- Nodes / Segments
- Node connections

This report shows the nodes on the cable routes.

Project no: 42	Cable list	Revision: A
Project name: Test Project	Routing information	Init.: ADMIN
	System:	Date: 09/07/2020
Cable name: -W7 Cable type: 3G1,5 Routed: 6,021		
Remark: Tara length in "from" end: 8		
From node: M1 From: -MDP Main distribution panel	Tara length in "to" end: 5	
To node: M2 To: -E1 Light 1	Routed + Tara: 19,021	
Route: M1 - M2		
Cable name: -W8 Cable type: 3G1,5 Routed: 34		
Remark: Tara length in "from" end: 8		
From node: M9 From: -LP1 Lighting panel 1	Tara length in "to" end: 3	
To node: M16 To: -E2 Light 2	Routed + Tara: 45	
Route: M9 - M10 - M11 - M12 - M13 - M14 - M15 - M16		
Cable name: -W9 Cable type: 3G1,5 Routed: 27		
Remark: Tara length in "from" end: 8		
From node: M9 From: -LP1 Lighting panel 1	Tara length in "to" end: 3	
To node: M14 To: -E3 Light 3	Routed + Tara: 38	
Route: M9 - M10 - M11 - M12 - M13 - M14		

## Equipment reports

Here follows a walkthrough of the available equipment reports.



## Search list

This creates an export to Excel of all equipment. You can use it to search for specific data. The sorting of the list is the same as in the program.

1	Equipment report													
2	Record count: 20													
3	TAG SEQ NO	TAG NO	TAG CATEGORY	DESCRIPTION	TAG TYPE	PROJECT CODE	LOCATION CODE	CONTRACTOR CODE	SYSTEM NO	DISCIPLINE CODE	REMARK	INSERTED DATE	INSERTED BY	UPDA
4		2-MDP	PL	Main distribution panel			A1							14/06/2
5		3-LP1	PL	Lighting panel 1			A3							14/06/2
6		4-LP2	PL	Lighting panel 2			A2							14/06/2
7		5-M1	PL	Machinery 1			A3							14/06/2
8		6-M2	PL	Machinery 2			A3							14/06/2
9		7-M3	PL	Machinery 3			A3							14/06/2
10		8-M4	PL	Machinery 4			A2							14/06/2
11		9-M5	PL	Machinery 5			A2							14/06/2
12		10-SDP1	PL	Sub-distribution panel 1			A3							14/06/2
13		11-SDP2	PL	Sub-distribution panel 2			A2							14/06/2
14		12-E1	PL	Light 1			A1							14/06/2
15		13-E2	PL	Light 2			A3							14/06/2
16		14-E3	PL	Light 3			A3							14/06/2
17		15-E4	PL	Light 4			A3							14/06/2
18		16-E5	PL	Light 5			A3							14/06/2
19		17-E6	PL	Light 6			A2							14/06/2
20		18-E7	PL	Light 7			A2							14/06/2
21		19-E8	PL	Light 8			A2							14/06/2
22		20-MCP1	PL	Motor control panel 1			A3							10/05/2

## Nearest node

This report creates a list of the nearest nodes to the selected Equipment and can be exported to Excel. This list is also found on the 'Main' tab.<sup>xi</sup>

Nearest node	
Node name	Tara length
M1	0
M10	0
M11	0

Count = 3



## Cables from/to

This report creates a list of the cables that go from the selected equipment. It contains information about the cable status, lengths and the connected equipment. It can be exported to Excel and the list is also found on the 'Main' tab. <sup>xii</sup>

Cable name	Description	Cable type	Cable status	Segregation code	From tag	From tag desc	From tag location	From node
-W1	From MDP to SDP 1	5G4	ROU	M	-MDP	Main distribution	A1	
-W2	From MDP to SDP 2	4X6	ROU	M	-MDP	Main distribution	A1	
-W3	From MDP to LP1	5G4	ROU	M	-MDP	Main distribution	A1	
-W4	From MDP to LP2	5G4	ROU	M	-MDP	Main distribution	A1	
-WS3	From MDP to MCP1	5G4	ROU	M	-MDP	Main distribution	A1	
-W6	From MDP to MCP2	5G4	ROU	M	-MDP	Main distribution	A1	
-W7	From MDP to E1 (n	3G1,5	ROU	M	-MDP	Main distribution	A1	

## Termrow connections

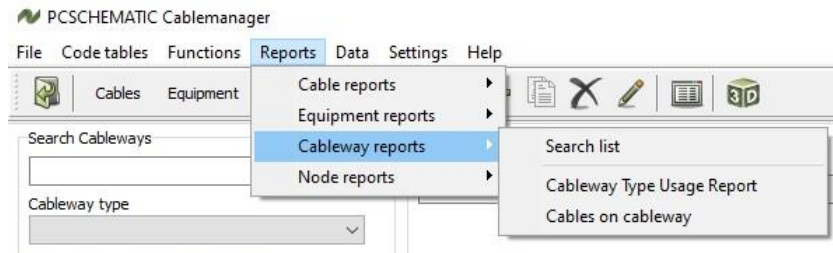
This report creates a list of the terminal connections on the equipment and can also be found on the 'Main' tab. Select an equipment in the list, and the report will show the connections to its terminal row(s).

1	<b>Termrow connections</b>	
2	Record count: 11	
3	Row : terminal : connection	Cable : group : wire
4	X1 : 1 :	-W1 : 001 : 1
5	X1 : 10 :	TEST-CABLE2 : 001 : 3
6	X1 : 2 :	-W1 : 001 : 2
7	X1 : 3 :	-W1 : 001 : 3
8	X1 : 4 :	-W1 : 001 : 4
9	X1 : 5 :	-W1 : 001 : 5
10	X1 : 8 :	TEST-CABLE2 : 001 : 1
11	X1 : 9 :	TEST-CABLE2 : 001 : 2
12	X2 : 1 :	TEST-CABLE1 : 001 : 1
13	X2 : 2 :	TEST-CABLE1 : 001 : 2
14	X2 : 3 :	TEST-CABLE1 : 001 : 3

## Cableway reports

Here follows a walkthrough of the segment reports.

xiii



## Search list

This creates an export to Excel of all Segments on Cableways. You can use it to search for specific data. The sorting of the list is the same as in the program.

1	Export of Cableways												
2	Record count: 42												
3	Node connection name	From Node	To Node	Segment name	Cableway Type	Segregation	Cable count	Used area/width	Reference installation method	Fill factor	Avail area/width	Max ar	
4	K1-K2	K1	K2	Segment	CT1	T	0	0,000 Area		1,000	60000,000	6	
5	K1-K2	K1	K2	Segment - new name	CT1	T	0	0,000 Area		1,000	60000,000	6	
6	K1-K2	K1	K2	Segment CW1 - 1	CT1	T	0	0,000 Area		1,000	30000,000	3	
7	K1-K2	K1	K2	Segment CW1 - 2	CT1	M	0	0,000 Area		1,000	15000,000	1	
8	K1-K2	K1	K2	Segment CW1 - 3	CT1	S	0	0,000 Area		1,000	15000,000	1	
9	M10M11	M10	M11	Segment	CT1	M	6	648,750 Area		0,700	42000,000	6	
10	M11M12	M11	M12	Segment	CT1	M	5	504,750 Area		0,700	42000,000	6	
11	M12M13	M12	M13	Segment	CT1	M	4	432,500 Area		0,700	42000,000	6	
12	M13M14	M13	M14	Segment	CT1	M	3	288,500 Area		0,700	42000,000	6	
13	M14M15	M14	M15	Segment	CT1	M	2	216,250 Area		0,700	42000,000	6	
14	M15M16	M15	M16	Segment	CT1	M	1	72,250 Area		0,700	42000,000	6	
15	M17M18	M18	M17	Segment	CT1	M	1	144,000 Area		0,700	42000,000	6	
16	M18-M11	M18	M11	Segment	CT1	M	0	0,000 Area		1,000	30000,000	3	
17	M18-M11	M18	M11	Segment	CT1	M	0	0,000 Area		1,000	30000,000	3	

## Cableway Type Usage report

Here you get a list of the cableway types that are in use in the project. The list can be exported to Excel.

Cableway type	Description	Length	Count
CT1	Cable tray	241,21	34
TRANSIT1	Transit	3,00	3

## Cables on Node connection (Cableway/segment)

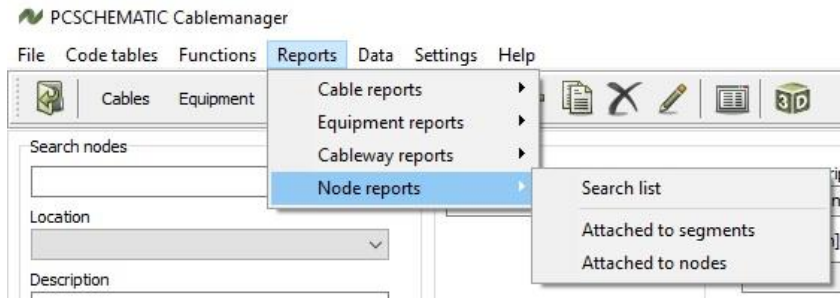
This is a list of the cables on a selected Node connection/Cableway. It can be exported to Excel.

Cableway	Segment	Cable name	Type	Status	Diameter [mm]	Cross section	Current correction	Current rating [A]
Cableway 1	Segment	-W1	5G4	PSS	12,00	4,00	1,00	42
Cableway 1	Segment	-W7	3G1,5	ROU	8,50	1,50	1,00	18
Cableway 1	Segment	-W5	5G4	PULL	12,00	4,00	1,00	42
Cableway 1	Segment	-W6	5G4	ROU	12,00	4,00	1,00	42
Cableway 1	Segment	TEST-CABLE2	3G2,5	ROU	10,00	2,50	1,00	25
Cableway 1	Segment	TEST-CABLE3	3G2,5	ROU	10,00	2,50	1,00	25



## Nodes reports

Her follows a walkthrough of the node reports.



## Search list

This exports a list of all nodes to Excel and is used to search for specific data. The sorting of the list is the same as in the program.

	A	B	C	D	E	F	G	H	I	J	K	L
1	<b>Node report</b>											
2	Record count: 33											
3	NODE SEQ NO	NODE NO	DESCRIPTION	LOCATION CODE	SEGREGATION CODE	x	y	z	INSERTED DATE	INSERTED BY	UPDATED DATE	UPDATED BY
4	11	M1		A1	M	5,000	19,500	5,000			10/05/2017 12.20.05	ADMIN
5	1	M10		A3	M	27,000	7,000	5,000			10/05/2017 12.25.51	ADMIN
6	2	M11		A3	M	20,500	7,000	5,000			10/05/2017 12.25.32	ADMIN
7	3	M12		A3	M	15,000	7,000	5,000			10/05/2017 13.58.36	ADMIN
8	4	M13		A3	M	11,500	7,000	5,000			10/05/2017 12.24.13	ADMIN
9	5	M14		A3	M	8,500	7,000	5,000			10/05/2017 12.23.46	ADMIN
10	6	M15		A3	M	5,000	7,000	5,000			10/05/2017 12.21.27	ADMIN
11	7	M16		A3	M	2,500	7,000	5,000			10/05/2017 12.23.20	ADMIN
12	8	M17		A2	M	30,500	17,500	5,000			10/05/2017 12.30.05	ADMIN
13	9	M18		A2	M	28,000	12,000	5,000			10/05/2017 12.30.33	ADMIN
14	10	M19		A2	M	15,000	12,000	5,000			10/05/2017 12.31.02	ADMIN
15	20	M2		A1	M	1,000	15,000	5,000			10/05/2017 12.22.12	ADMIN
16	13	M20		A2	M	12,000	19,500	5,000			10/05/2017 12.29.16	ADMIN
17	14	M21		A2	M	14,000	19,500	5,000			10/05/2017 12.28.53	ADMIN

## Attached to segment

This report creates an Excel file that shows which segments the node is attached to and can also be found in the 'Attached to segments' tab.

	A	B	C	D	E
1	<b>Attached to segments</b>				
2	Record count: 2				
3	Segment name	Spec	Subtype	From node	To node
4	M10M11	CT1	TRAY	M10	M11
5	M9M10	CT1	TRAY	M9	M10

## Attached to nodes

This creates an Excel file that shows which nodes are attached through the neighbouring segments and can also be found in the 'Attached to segments' tab.



	A	B	C
1	<b>Attached to nodes</b>		
2	Record count: 2		
3	Node	Segment name	To node
4	M10	M10M11	M11
5		M9M10	M9



## 3D viewer

Based on the coordinates from Nodes and Cableways, you see a generated 3D view of the project.

In the top tool bar, you can use the icons to navigate:

- The  lets you move the view – drag the mouse to move
- The  lets you pan and tilt the view – drag the drawing to tilt

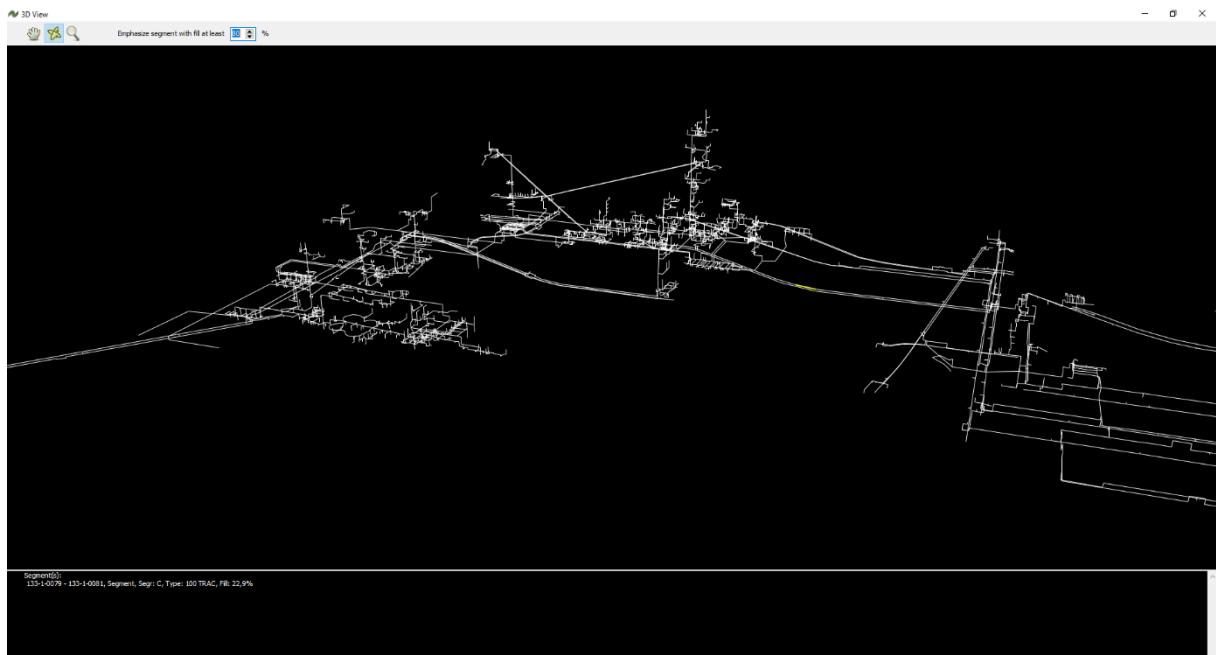
Select the control icon and the mouse to navigate on the page. You can also use the mouse

Emphasize segment with fill at least  %

This function lets you highlight the segments that are overloaded, here with more than 80%, but you simply type another figure, if you want that.

You can also select individual segments, and at the bottom of the drawing, you can see the segment's name, type, segregation and fill.

Or you can zoom in, and select a specific node, and see the node name at the bottom of the page.



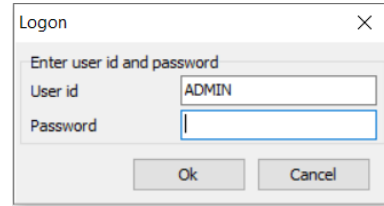
# USER ADMINISTRATION (ADMIN)

After installing the program only one user is registered – ADMIN. With the password ADMIN.

All users and passwords belong to a project as they are stored in the project database.

That means that the users are defined in the project in Cablemanager, also the users that only work in the Cablemanager Service program.

It also means, that the relevant users must be created with every new project.

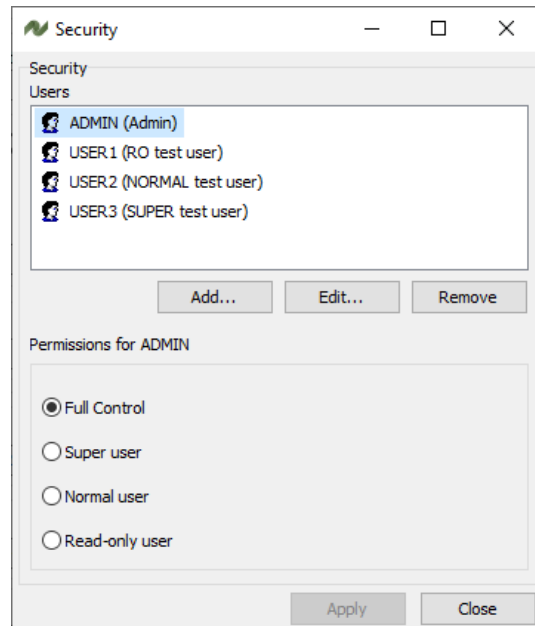


## Create, change, or delete a user

This is done by going to the settings menu and choosing 'Users...'.  
xiv

The function is only available for ADMIN.

A user name must be at least five characters long.

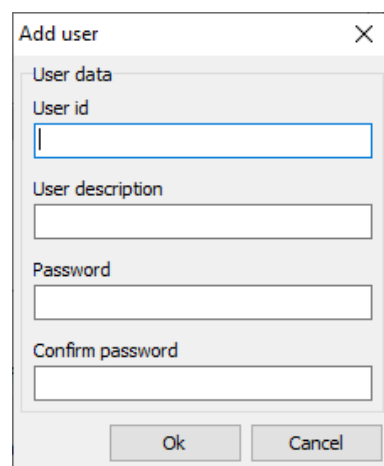


## Create a user

Click the Add button to create a new user.

Type the necessary data and click 'Ok'.

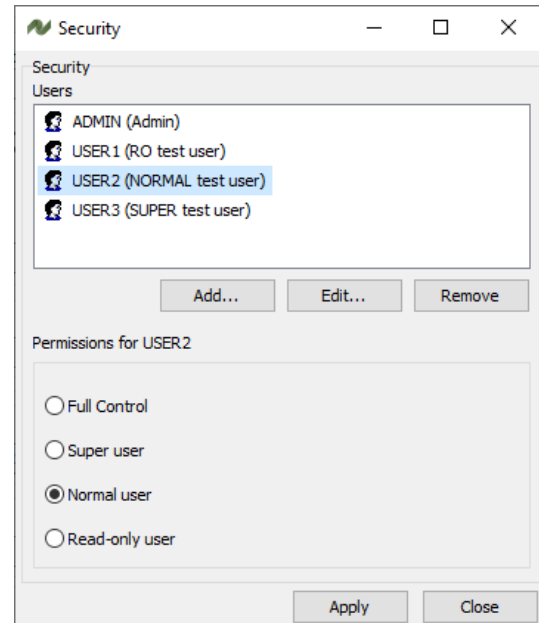
New users are always created as Read-only users.





## Change user rights

Change user rights by selecting the user and select the user rights that should apply to the user and then click the Apply button.



## User rights

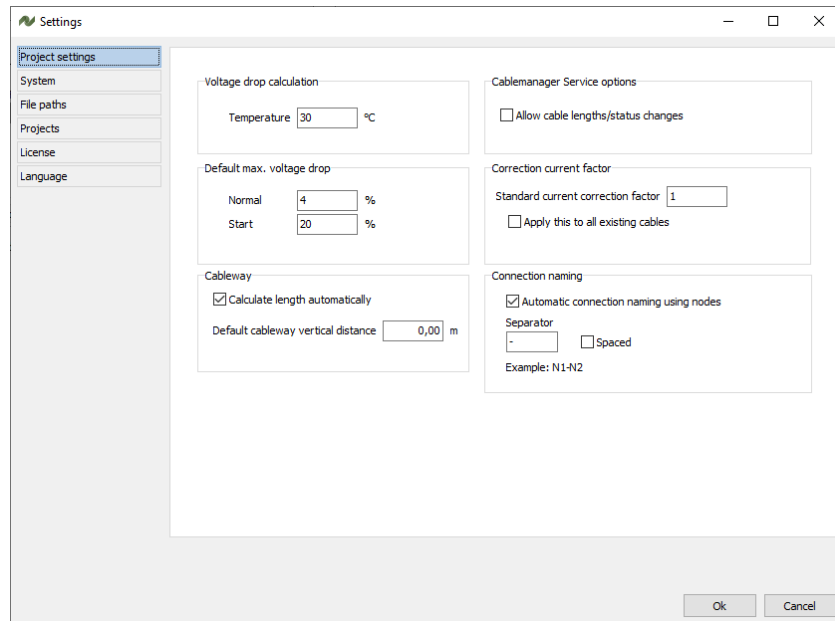
User type	Description
Read-only user	User with lowest rights The user can <ul style="list-style-type: none"> <li>■ View data, but cannot change anything</li> <li>■ Print various lists by using the icon present in most windows</li> <li>■ Batch operation: Print cable status, pulling and installation reports</li> </ul>
Normal user	The user has the same rights as described above, and an also <ul style="list-style-type: none"> <li>■ Route individual cables</li> <li>■ Change status on routed cables</li> <li>■ Add comments</li> </ul>
Super user	The user has the same rights as described above, and an also <ul style="list-style-type: none"> <li>■ Create and change equipment, cables and segments</li> <li>■ Batch operation: All batch operations (route, change cable type, print, generate wires, unroute, remove status)</li> </ul>
Full control (Admin)	The user has the same rights as described above, and an also <ul style="list-style-type: none"> <li>■ Import data</li> <li>■ Edit segment names and data</li> <li>■ Create, edit and delete other users</li> </ul>
Automation Service user	Users for the Automation Service program are created in the normal Cablemanager program. They can be the same users, but the rights in the program are limited to <ul style="list-style-type: none"> <li>■ View data, but cannot change anything</li> <li>■ Print various lists by using the icon present in most windows</li> <li>■ Batch operation: Print cable status, pulling and installation reports<sup>xv</sup></li> </ul>

# SETTINGS

The settings in the program can be set to fit the project's requirements. This chapter gives an overview of the options.

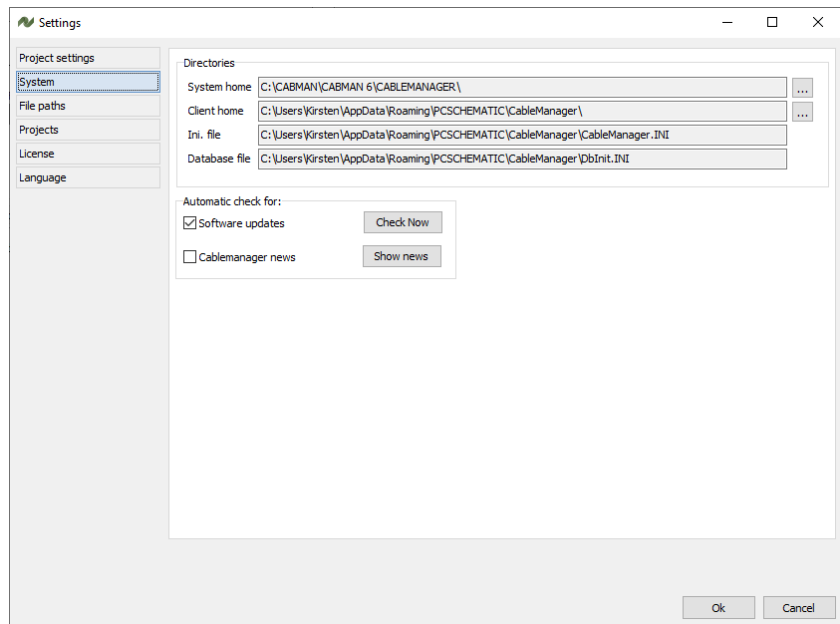
## Project settings

- Voltage drop calculation: The temperature can be changed for the project
- Default voltage drops can be set. Larger voltage drops will result in red fields in the voltage drop tab. And the cables can be found in reports.
- Cableway lengths can be calculated automatically, based on the nodes' coordinates
- Default distance?<sup>xvi</sup>
- Cablemanager Service users can be allowed to change cable lengths and status. This setting is needed, if you want the Service program to be a workshop program.
- Current correction factor <sup>xvii</sup>. This is a factor, that applies to parallel cables according to the rules found in IEC 60364. The Cablemanager cannot make cable dimensioning, so this is a manual factor, that can be typed into the system. When the factor is 1, the cable's current rating follows the cable specification. When you have parallel cables, you are not allowed to load the cable fully, so you set a Correction factor, which multiplies with the current rating and show you the allowed max current for the cable. In case you overload your cable, the Current field on the cable's main tab turns red.
- Connection naming: Node connections (first level of cableways) can be named automatically according to these settings.



## System settings

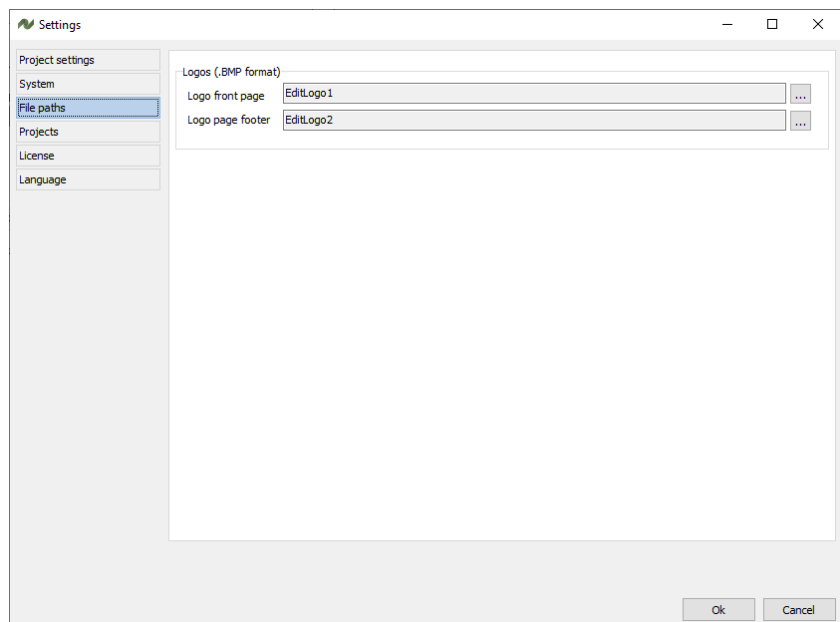
- Directories: here you can see the directories for the system's files. The directories are selected during installation
- Check for program updates and news



## Report logos

- File paths to logos that are on reports. The logo must be a \*.bmp type.
- In this way you can personalize your pull, termination and status reports.

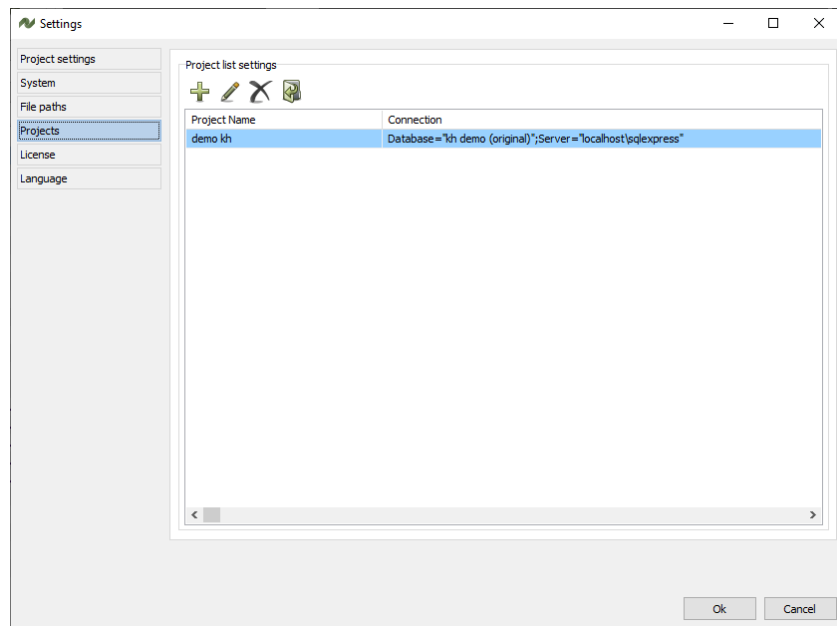
xviii



## Projects

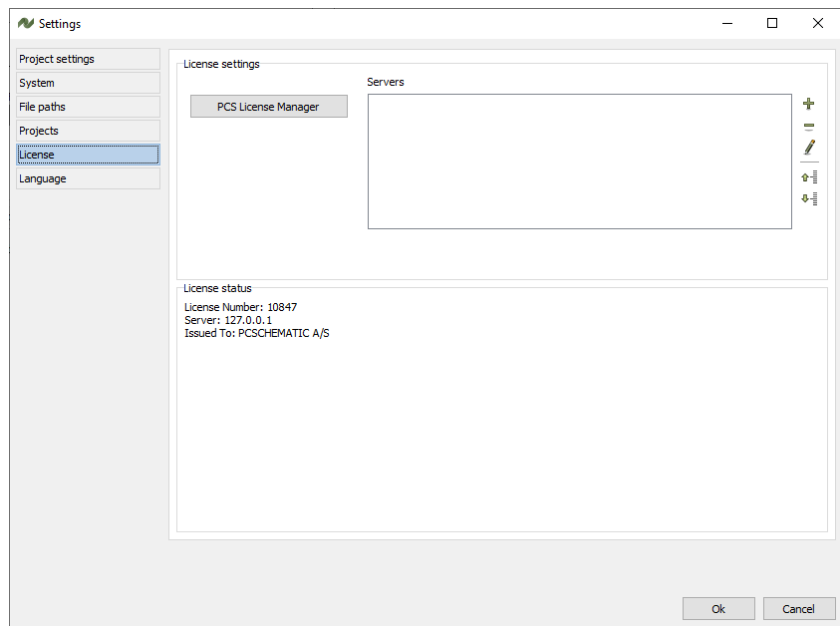
Here you see a list of the projects that you have access to.

The list can be edited by using the icons in the top toolbar.



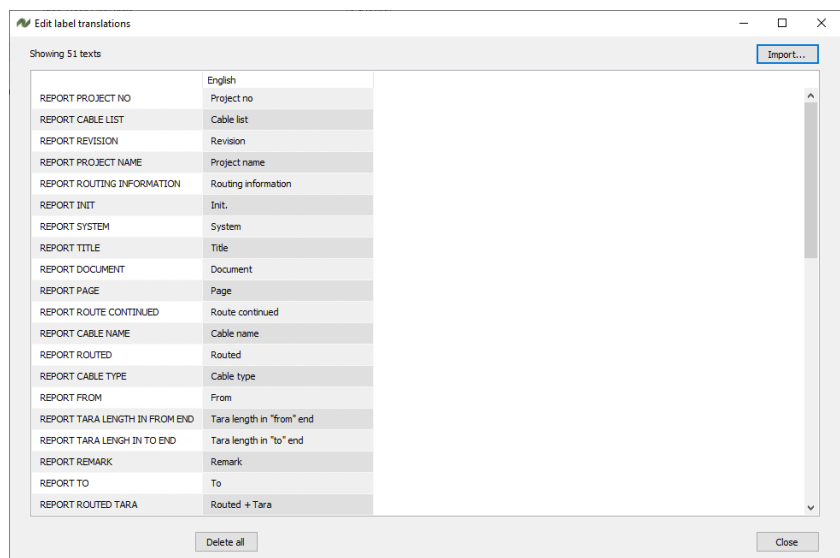
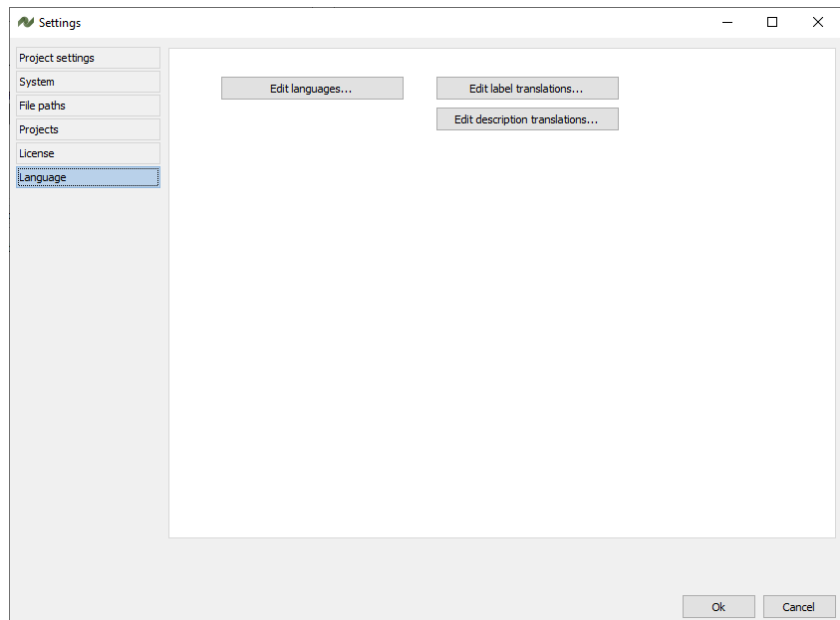
## License

Here you can see which license, you are using. You can also access the License Manager, change the license selections, etc..



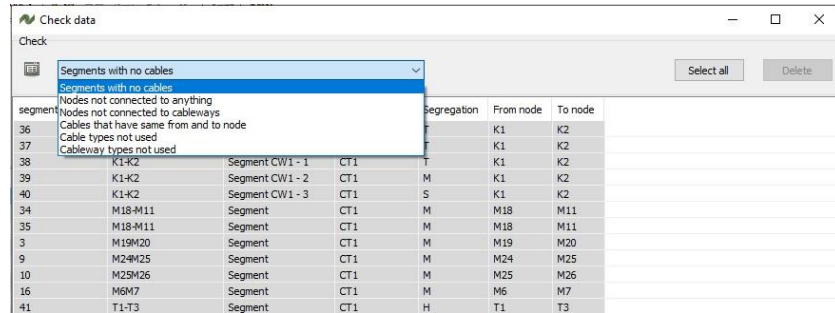
## Language

You can change the user language in the program. You can add (and delete) languages to the system. You can edit all labels in the program, and in that way make your own language settings.



# CHECK DATA

It can be necessary from time to time to check data in the database. In Data|Check data, you have the following options:



- Segments with no cables
- Nodes not connected to anything
- Nodes not connected to cableways
- Cables that have the same from and to node
- Cable types not used
- Cableway types not used

For all checks, you can make export to Excel of the result. For some options – e.g. not used cable types – you can delete one or more.

## Check Cable routes

In the Data menu, you can also Check cable routes.

This function xxxxxxxx???



## PART 2 – DATA STRUCTURE AND IMPORT FUNCTIONS

- Understand the data structure
- Code tables and Main tables
- How to use the Import Wizard





## OVERALL DATA STRUCTURE IN THE CABLEMANAGER

The program contains data for Cables, Equipment, Cableways (Segments and Nodes) and it ties this data together.

The program can route the Cables on Cableways, and in this way ties all this data together and based on routing, it generates Cable lengths and reports for installation, and keeps track of all cables' statuses.

The main data is created and maintained in the main tables.

In order to do so, certain data is needed, e.g. cable type, cableway type etc. and less essential information about locations, contractors etc. can also be added. This data is created and maintained in the code tables.

### Overall workflow when making a project

The overall workflow when starting a project follows this figure.

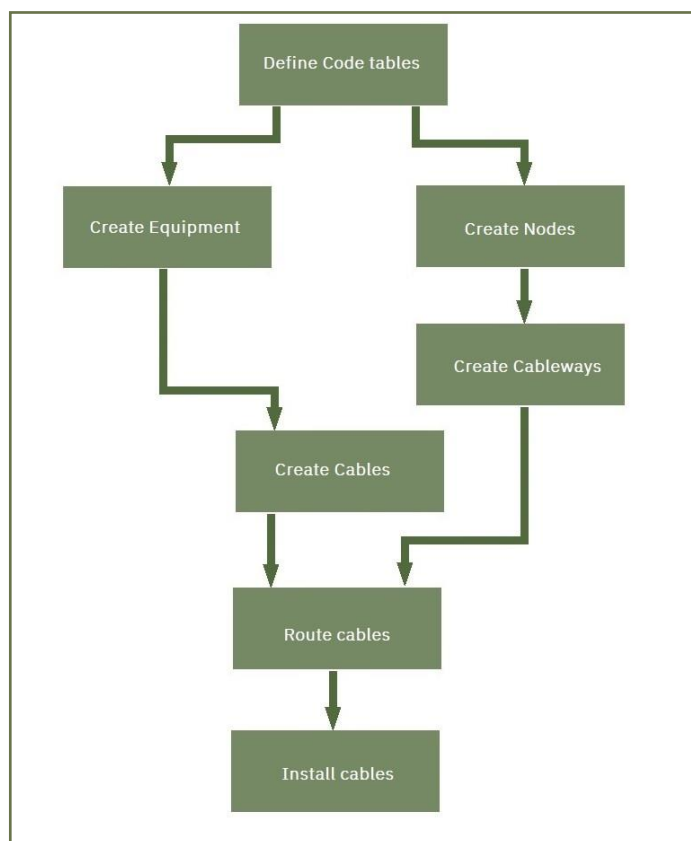
This part of the manual deals with the data structure – where you can find what type data – and how you can change the data to fit your project, either manually or by importing data.

There are sections concerning:

- The Code tables and their data
- How to create data for the main tables (Equipment, Cableways, Cables)

- How to import data from other systems.

You will also find sections that explain concepts and definitions.



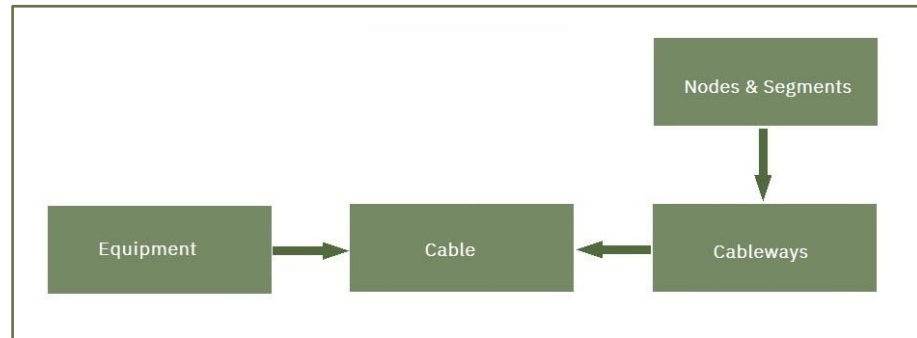
## The code tables

All basic data about e.g. cable types, cableway types, structuring etc. is based on data in the codes tables.

Read more about the code tables in the following chapter from page 67.

## The main tables

All Cablemanager data is stored in a database. The database structure is based on the cables and the equipment that is connected through them. The program



can route the cable and suggests all possible routes. The route that the cables follow is essential for the design of the project, as it decides the length of the cable and thereby the voltage drop. Furthermore, a current correction factor needs to be applied (manually) if there are parallel cables. The program can't do any advanced calculations for cable dimensioning.

## Cables

Cables connect equipment. Cables can be created in the program (or imported from files). Cables contain data about the cable type and the connected equipment.

## Equipment

Equipment can be machinery, panels, lamps etc.. Equipment can be created (or imported from files). Equipment contain data about location and maybe connection terminals.

## Cableways

Cables are running on cableways, which can be cable trays, cable ladders, cable tubes, cable fire transits etc.. All cableways are defined with Start and End nodes (from which the lengths are deducted) and eventually the routes on the cableway creates the cables' lengths.

Cableways are collections of Segments that start and begin with Nodes.

## Segment & Nodes

A segment is a part of a cableway. A segment has a segregation code for the installation type that runs in the segment, e.g. 400 kV. You can have more parallel segments on a cableway, one for each installation type.

All segments on the same cableway have the same Start and End nodes. A node is needed where a cableway changes direction and/or a cable can enter or leave. The nodes are named and have XYZ coordinates.



## THE CODE TABLES

The mandatory code tables need to be defined before defining equipment and segments, because it creates the basis for further work. Some of the code tables are predefined and locked while other code tables only have a ready structure, but are lacking data.

A super user can create, edit and delete values in (most of) the tables by using the toolbar and a user with ADMIN rights can import the tables from Excel files. Read more about import of data from page 91 and more about user rights from page 75.

Below is a list and a small description of the code tables in the program.

Code table	Description
Cable specifications ***	Cable types are generic types, because many article numbers may the same technical specifications. This is the reason why the specification is created before the actual cable. The table is always used, and it is possible to add specifications and edit existing ones. Read more from page 36.
Cable type ***	Use this table to create the actual cables with article numbers. The cables are connected to a specification. The table is always used, and it is possible to add cables and edit existing ones. Read more from page 36.
Cable wire color ***	Cable conductor colors are selected from this table. The table is always used, and it is possible to add conductor colors and edit existing ones. Read more from page 70.
Cable wire cross section **	A table with available sizes of cable wire cross section. The list can be edited, and new values can be added.
Contractor code *	Optional. Each contractor – the responsible contractor for a cable – can have a specific code, which makes it easy to get an overview of the responsible contractors for pulling and terminating specific cables. Read more on page 79.
Cableway type ***	This table contains the specifications of the various cableway types. When creating a cableway, you will also be asked about segments, which are parts of cableways. Read more from page 73
Discipline code *	Optional. Discipline codes can be used to structure a project. Read more on p. 79.
Glands *	This table contains all gland specifications and is based on the Gland type table. Read more on p. 72
Gland type *	This is the table containing all gland types, read more on page 72.
Location code *	Optional. Location codes can be used to structure a project. Read more on p. 79.
Project code *	Optional. Project codes can be used to structure a project. Read more on p. 79.
Segregation code ***	Segments can be divided into segregations. See how to use them on p. 76.
System no *	Optional. System no.s can be used to structure a project. Read more on p. 79.
Cable status code **	A hidden code table, for cable status. The cables have different statuses depending on whether they are created, routed, terminated, etc. Status codes are fixed/locked in the program. Read more on page 38.

\* Optional

\*\* Mandatory. Contains fixed values, only

\*\*\* Mandatory. Values can be added and edited



## Cable code tables

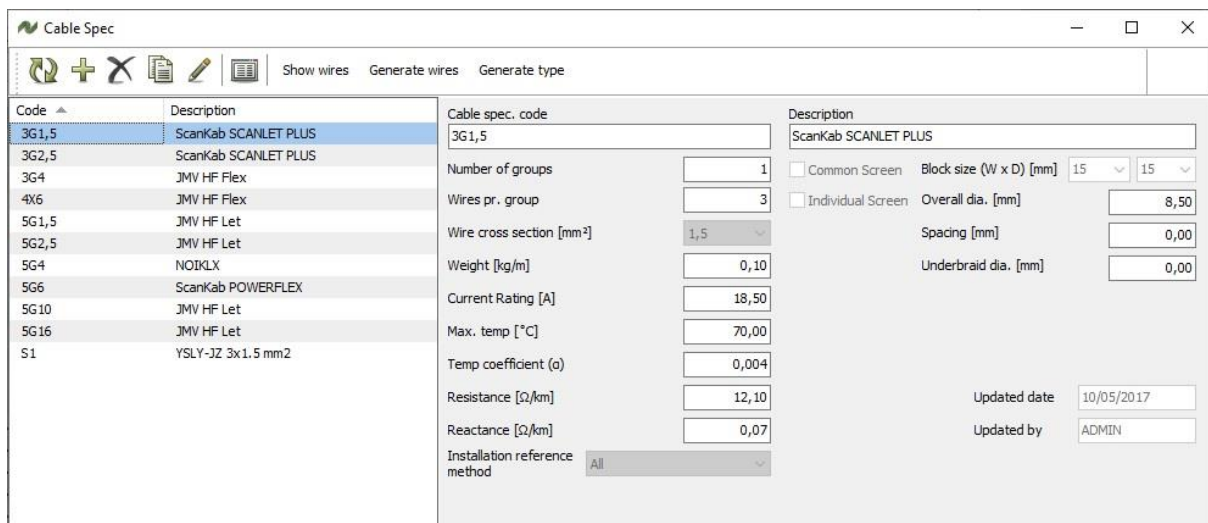
The basic 'component' data for cables come from the code tables that are in the actual project. The data is split into Cable specifications and Cable types: into technical 'general' data, and types with (possible) article numbers and suppliers. See how to create cables on page 36 and in the User manual.

## Cable specifications

Cable specs are technical data for a certain type of cable, and the same specification can be used for many different cables from various manufacturers. When making the specification, article numbers are not assigned.

Cable specs are created with a code that is also used in the program when selecting a cable, so make it indicative or memorable.


Start creating a new specification by pressing  in the code table or edit an existing one by pressing .



Code	Description
3G1,5	ScanKab SCANLET PLUS
3G2,5	ScanKab SCANLET PLUS
3G4	JMV HF Flex
4X6	JMV HF Flex
5G1,5	JMV HF Let
5G2,5	JMV HF Let
5G4	NOIKLX
5G6	ScanKab POWERFLEX
5G10	JMV HF Let
5G16	JMV HF Let
S1	YSLY-JZ 3x1.5 mm2

Cable spec. code	3G1,5	
Number of groups	1	
Wires pr. group	3	
Wire cross section [mm <sup>2</sup> ]	1,5	
Weight [kg/m]	0,10	
Current Rating [A]	18,50	
Max. temp [°C]	70,00	
Temp coefficient (α)	0,004	
Resistance [Ω/km]	12,10	
Reactance [Ω/km]	0,07	
Installation reference method	All	

Description	ScanKab SCANLET PLUS	
<input type="checkbox"/> Common Screen	Block size (W x D) [mm]	15 15
<input type="checkbox"/> Individual Screen	Overall dia. [mm]	8,50
	Spacing [mm]	0,00
	Underbraid dia. [mm]	0,00
Updated date	10/05/2017	
Updated by	ADMIN	

Type data into the relevant fields and click  to save. Not all fields are relevant for all specifications.

## Show wires

Show the wire colors for the specification.

## Generate wires

Generate the wires for the specification: The function allows you to select the colors for each cable wire in this specification.

## Generate type

Short cut to the Cable type code table, where you create types based on specification.



The cable specification contains the following data:

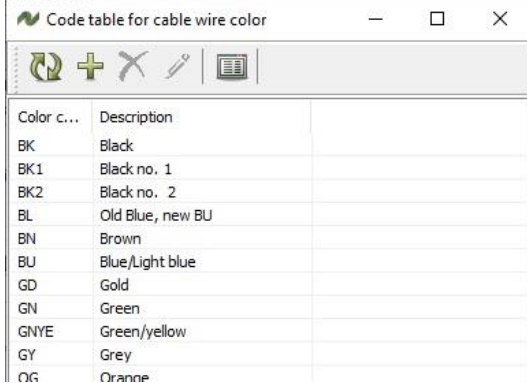
Data field	Description
Cable spec. code	Cable designation, not (necessarily) type name. Give it a code, that makes sense to those who will need to use it, i.e. 3x1.5. The code is used in all cable dialogs.
Number of groups	Cable wires may be grouped, that may have separate shields (see below)
Wires pr. group	How many wires in every group
Wire cross section (mm <sup>2</sup> )	Cross section of individual wires, all in mm <sup>2</sup> .
Weight (kg/m)	The cable's weight per running meter.
Current rating (A)	The cable's maximum current load in A.
Max. temp. (°C)	The cable's maximum working temperature.
Temp coefficient (α)	The percentage the resistance will rise per increase in temperature.
Resistance (Ω/km)	The resistance value of the cable.
Reactance (Ω/km)	The reactance value of the cable.
Reference Installation method	It is possible to create a cable spec and in the specification select valid installation methods. Default is 'All'. See page 77 for further information about Reference installation methods.
Description	Cable description. Helps you select the right cable and it is shown in the cable dialogs.
Common screen	Tick the box if the cable has a common screen.
Individual screen	Tick the box if the individual wire groups have individual screens.
Block size (mm x mm)	Size of the fire transit block, required for the cable. The block size is the required space for the cable, when it passes a Transit-segment. See also page 75.
Overall diameter (mm)	The cable's outer diameter. The value is used to calculate the segments' fill factor. See more on page 77
Spacing (mm)	Add spacing to a cable if the cable should be routed without any adjacent cables in the segment. The spacing is only used when choosing to route in one layer. If no spacing is defined, the program will use 2 x overall diameter when spacing is required. Read more about the Reference Installation methods on page 77.
Underbraid dia. (mm)	The cable's diameter under the braid and possible screen. The value is used when selecting glands for the cable.
Show wires	Get a list of the cable wires. Choose different colors in the list.
Generate wires	When creating a new cable spec, you can generate the cable's wires by pressing th button. Using this option on an existing cable spec will reset all existing color choices.
Generate type	A shortcut to create a cable type based on the current cable specification.

### Cable wire colors and cross sections

The abbreviated color codes are found in the Cable wire color table.

You can create, edit or delete existing colors by using the buttons in the toolbar.

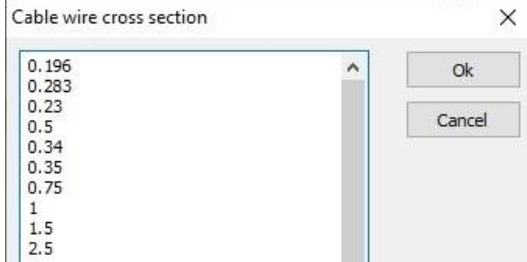
The colors can't be deleted, if they are used in the project.



Color c...	Description
BK	Black
BK1	Black no. 1
BK2	Black no. 2
BL	Old Blue, new BU
BN	Brown
BU	Blue/Light blue
GD	Gold
GN	Green
GNYE	Green/yellow
GY	Grey
OG	Orange

Valid wire cross sections are found in the other table, and the values are also used in the cable specification.


More values can be added by simply typing them in the list.



0.196
0.283
0.23
0.5
0.34
0.35
0.75
1
1.5
2.5



## Cable types



These are the cable types that will be used when creating cables in the project. Pressing the  will open the cable specification code table to let you see it.

Cable types are ‘real’ cables, as you can add article nos. and suppliers.

Creating cable specifications in one table and the actual cables in another table should make it easy to change to another cable with the same dimensions – only from another supplier.<sup>xix</sup>

Type	Description	Sheath color	Supplier	Supplier ty...	Article	Cable spec code
3G1,5	PVIKJ 3G1,5					3G1,5
3G2,5	PVIKJ 3G2,5					3G2,5
3G4	JMV HF Flex					3G4
4X6	JMV HF Flex					4X6
5G1,5	JMV HF Let					5G1,5
5G10	JMV HF Let					5G10
5G16	JMV HF Let					5G16
5G2,5	JMV HF Let					5G2,5
5G4	NOIKLX					5G4
5G6	PVIKJ 5G6					5G6
S1	YSLY-JZ 3x1.5 mm2					S1

Count : 11

Create a type by pressing the  button in the toolbar. The edit button  prompts the same dialog box. Cable types *must* contain a type and a cable specification. All other entries are optional.

Cable type ✕

Type

Description

Color

Supplier

Supplier type no.  Article

Cable spec

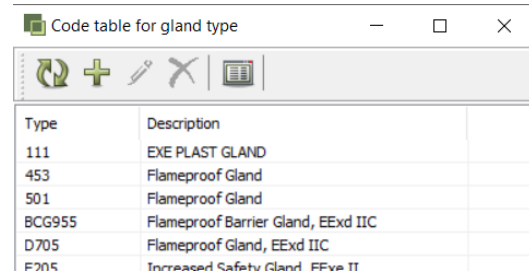
## Gland code tables

When routing cables between panels and other equipment, you may need to add glands at one or both ends of the cables. In order to do so, the gland types must be created in the code tables.

### Gland type

The Gland type code table contains the overall gland types.

Create new ones, or delete or edit existing ones by using the icons in the toolbar.



Type	Description
111	EXE PLAST GLAND
453	Flameproof Gland
501	Flameproof Gland
BCG955	Flameproof Barrier Gland, EExd IIC
D705	Flameproof Gland, EExd IIC
F205	Increased Safety Gland, FFve II

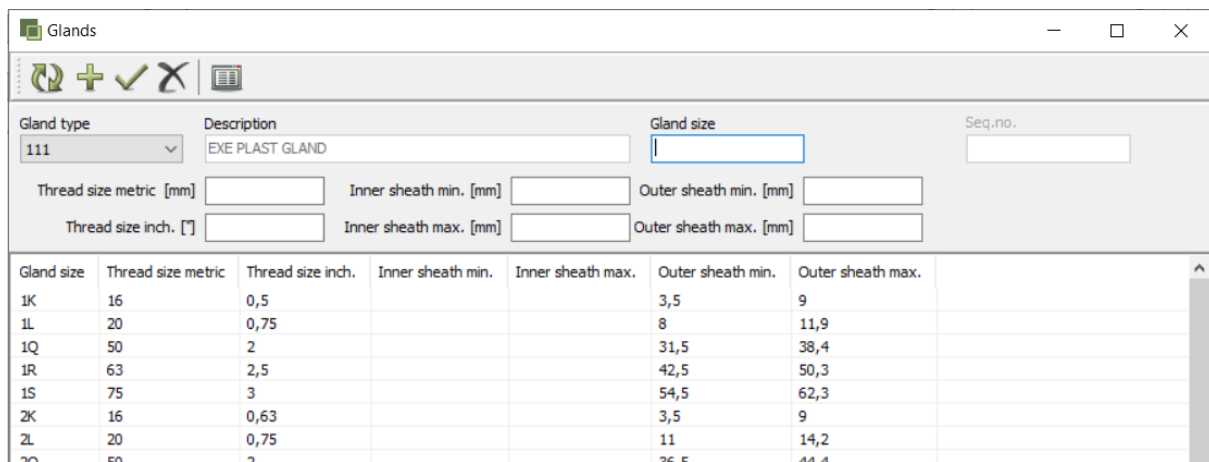
### Glands

The Gland code table contains all glands in the database, sorted by type.

When creating glands, press the  button to clear the data fields.

Select a 'Gland type', type in a 'Gland size' and subsequently type in the rest of the values.

Save the new gland by pressing the  button.



The 'Glands' window contains a form for creating a gland. The form has the following fields:

- Gland type:** A dropdown menu with '111' selected.
- Description:** A text field containing 'EXE PLAST GLAND'.
- Gland size:** An empty text field.
- Seq.no.:** An empty text field.
- Thread size metric [mm]:** An empty text field.
- Thread size inch. ["]:** An empty text field.
- Inner sheath min. [mm]:** An empty text field.
- Inner sheath max. [mm]:** An empty text field.
- Outer sheath min. [mm]:** An empty text field.
- Outer sheath max. [mm]:** An empty text field.

Below the form is a table of existing glands:

Gland size	Thread size metric	Thread size inch.	Inner sheath min.	Inner sheath max.	Outer sheath min.	Outer sheath max.
1K	16	0,5			3,5	9
1L	20	0,75			8	11,9
1Q	50	2			31,5	38,4
1R	63	2,5			42,5	50,3
1S	75	3			54,5	62,3
2K	16	0,63			3,5	9
2L	20	0,75			11	14,2
2Q	50	2			36,5	44,4

Data field	Description
Gland size	Size for each individual gland.
Thread size metric (mm)	Thread size in mm. Used for cables with metric sizes.
Thread size inch (")	Thread size inches ("). Used for cables with inch sizes. Figures are converted to mm in the following data fields.
Inner sheath min. (mm)	Minimum inner sheath measure.
Inner sheath max. (mm)	Maximum inner sheath measure.
Outer sheath min. (mm)	Minimum outer sheath measure.
Outer sheath max. (mm)	Maximum outer sheath measure.





## Cableway code tables

Cableways refer to the physical type of cable routes: they can be cable trays, cable ladders, cable ducts etc.

Cableway types are defined in a code table, that contains the necessary technical data for various load calculations.

When you create a cableway, it is based on routing type and on dimensions, loads etc..

See more about routing on page 77.

The following data is contained in the cableway type code table:

Data field	Description
Cableway type	Type designation for the cableway. The type and description are used in all dialogs where you see the cableway.
Description	Description of the cableway.
Routing info Cableway shape	You can choose between: Undefined, Diameter, Width/Height, Frame, Width, Unlimited. Segments on the cableway will inherit the cableway shape, but it can be changed on the individual segment in the project. Each shape has related data – see below.
Width (mm)	For cable trays and ladders:
Height (mm)	The dimensions for the cableway type, e.g. width and height in mm. The length is applied to each cableway in the main table, that means when it is used, which again can consist of several physical parts.
Frame width (mm)	For transits:
Frame height (mm)	Dimensions for the transit, i.e. width and depth in mm
Frame count (mm)	Frame count refers to the number of same size frame in the same unit, see below.
Diameter	For ducts/pipes: diameter
Normal span (m)	Distance between tray bearing.
Normal load (kg/m)	Allowed weight per meter. Used to calculate fill %.
Default fill factor	Standard fill factor. Allowed used space in the segment, the ratio between Possible area and Filled area. Can be changed on the individual segment in the project.
Default weight factor	Standard weight factor. Allowed weight on the segment; the ratio between Possible weight and Actual weight on the segment. Can be changed on the individual segment in the project.

Your first window: Type a Name and a Description and select a shape.

The screenshot shows the 'Cableway Type' dialog box. The 'Type' field contains 'TEST' and the 'Description' field is empty. Under the 'Routing' section, the 'Cableway shape' dropdown is set to 'Undefined'. The 'Size [mm]' section is empty. On the right, the following fields are present: 'Normal span [m]' (0,00), 'Normal load [kg/m]' (0,00), 'Def. fill factor' (1,000), and 'Def. weight factor' (1,000). The 'Calculated area' field is empty. A text box on the left states: 'To change size information for this Cableway type, change the shape in Code tables > Cableway spec.' 'Save' and 'Cancel' buttons are at the bottom right.

For ducts/pipes, you need to type a diameter.

The screenshot shows the 'Cableway Type' dialog box. The 'Type' field contains 'TEST' and the 'Description' field is empty. Under the 'Routing' section, the 'Cableway shape' dropdown is set to 'Diameter'. The 'Size [mm]' section has a 'Diameter' field with the value '0,0'. On the right, the following fields are present: 'Normal span [m]' (0,00), 'Normal load [kg/m]' (0,00), 'Def. fill factor' (1,000), and 'Def. weight factor' (1,000). The 'Calculated area' field shows the formula  $\text{Pi} * (\text{diameter} / 2)^2 = 0 \text{ mm}^2$ . 'Save' and 'Cancel' buttons are at the bottom right.

If you want to be able to route in several layers, you must define height and width for the cableway.

The screenshot shows the 'Cableway Type' dialog box. The 'Type' field contains 'TEST' and the 'Description' field is empty. Under the 'Routing' section, the 'Cableway shape' dropdown is set to 'Width/Height'. The 'Size [mm]' section has 'Width' and 'Height' fields, both with the value '0,0'. On the right, the following fields are present: 'Normal span [m]' (0,00), 'Normal load [kg/m]' (0,00), 'Def. fill factor' (1,000), and 'Def. weight factor' (1,000). The 'Calculated area' field shows the formula  $\text{Height} * \text{Width} = 0 \text{ mm}^2$ . 'Save' and 'Cancel' buttons are at the bottom right.

If you want to route in one layer only, you select width – height is irrelevant here.

The screenshot shows the 'Cableway Type' dialog box. The 'Type' field contains 'TEST' and the 'Description' field is empty. Under the 'Routing' section, the 'Cableway shape' dropdown is set to 'Width'. The 'Size [mm]' section has a 'Width' field with the value '0,0'. On the right, the following fields are present: 'Normal span [m]' (0,00), 'Normal load [kg/m]' (0,00), 'Def. fill factor' (1,000), and 'Def. weight factor' (1,000). The 'Calculated area' field shows the text 'N/A - Cableway shape is defined as width'. 'Save' and 'Cancel' buttons are at the bottom right.



It is also possible to create an unlimited size. You use it for cable jumps.

The screenshot shows the 'Cableway Type' dialog box. The 'Type' field contains 'TEST'. Under the 'Routing' section, the 'Cableway shape' dropdown is set to 'Unlimited'. To the right, there are input fields for 'Normal span [m]' (0,000), 'Normal load [kg/m]' (0,000), 'Def. fill factor' (1,000), and 'Def. weight factor' (1,000). The 'Calculated area' is displayed as 'N/A - Defined as unlimited'. 'Save' and 'Cancel' buttons are at the bottom right.

If you define a Frame for a fire transit, you define the full frame's size and how many frames of that size that make up the full Cableway. See below.

The screenshot shows the 'Cableway Type' dialog box with 'Frame' selected in the 'Cableway shape' dropdown. A 'Size [mm]' section is expanded, showing input fields for 'Frame width' (0,0), 'Frame height' (0,0), and 'Frame count' (0). The 'Calculated area' is shown as the formula:  $\text{Frame Height} * \text{Frame Width} * \text{Frame count} = 0 \text{ mm}^2$ . 'Save' and 'Cancel' buttons are at the bottom right.

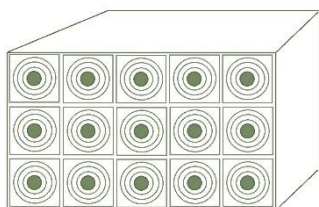
### More on transits, frames, and blocks

When routing a cable from one room to the other, it can be routed through a transit. A transit is a defined 'hole' in the wall, which for fire protection reasons are filled up with transits, with blocks in which the cables run; one cable block per cable.



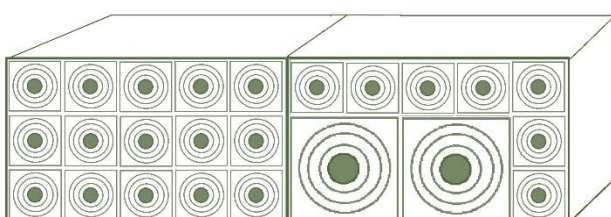
When creating a cable specification, you can to define the block size that fits the cable.

Cable blocks are intended to fit the cable tightly, to prevent fire going through a wall. The concentric circles are a bit similar to onions – simply peel layers off until it fits.



In the Cableway specification, there is Width and Height (mm) for the type, here a transit.

The length of the transit – could be the wall thickness – is defined, when creating a segment based on the specification.



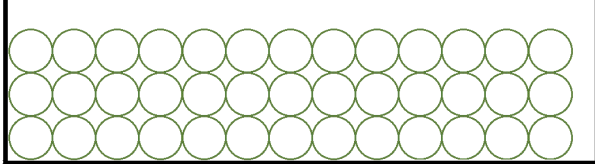

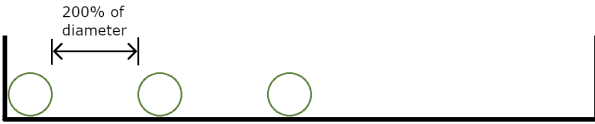

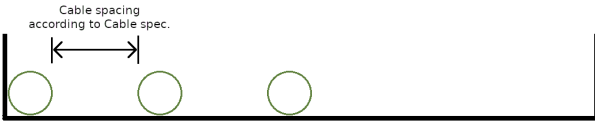
When you create the Cableway type, you can have a frame count – here the frame count is 2.

The blocks don't need to be the same size, but the frames must the same size.



## Reference Installation Methods

Each segment has an Installation reference method, which controls how the cables are allowed to route on the segments, and it also controls how the fill % is calculated.

Reference installation method	How to calculate fill %
	<p>If 'Area' is chosen, the fill % is calculated as follows:</p> <p>The cross section area of each cable = diameter<sup>2</sup>.</p> <p>Fill = (Sum of cable cross section areas) / (Segment cross section area * fill factor) * 100%</p>
	<p>If 'One layer' is chosen, the fill % is calculated as follows:</p> <p>Fill = (Sum of cable diameters) / (Segment width * fill factor)</p>
	<p>If 'One layer with spacing' is chosen, the fill % is calculated as follows:</p> <p>The space between each two cables is assumed to be 200% of the cable diameter.</p> <p>Fill = (3 * Sum of cable diameters - 2 * Last cables diameter) / (Segment width * fill factor) * 100%</p>
	<p>If 'One layer triplex' is chosen, the fill % is calculated as follows:</p> <p>The cables are divided into groups of 3.</p> <p>Group width = 2 * cable diameter</p> <p>Space between groups = 2 * cable diameter.</p> <p>If the number of cables is not divisible by 3, the number of groups is rounded up.</p> <p>Fill = (No of groups * Group width + (No of groups - 1) * Space) / (Segment width * fill factor) * 100%</p>
	<p>Regardless of Installation reference method, the Used weight is calculated as follows:</p> <p>Used weight = (Sum of cables weight pr length) / (Normal load * weight factor) * 100%</p> <p>If 'One Layer incl. Cable spacing' is chosen, the fill % is calculated as follows:</p> <p>The space between each two cables is assumed to be 200% of the cable diameter.</p> <p>Fill = (Sum of cable diameters + Sum of cable spacings (except the last)) / (Segment width * fill factor) * 100%</p>

## Area calculations

The possible Segment shape and its calculated area are as follow:

Shape	Area
Diameter	$\pi * r^2$ or $\pi * d^2 / 4$
Height and Width	Height * Width
Frame	Height * Width * FrameCount
Width	No Area – only width
Unlimited	Unlimited Area

## Cableway shapes and possible Reference installation methods

The shape of the Cableway/Segment defines in which way it is possible to fill a Segment.

The following list shows what is possible:

Shape	Possible Reference installation method for different shapes
Diameter	Area
Height and Width	Area (Default)
	One Layer
	One Layer with spacing
	One Layer Triplex
	One Layer incl. Cable spacing
Frame	Area (Integer)
Width	One Layer (Default)
	One Layer with spacing
	One Layer Triplex
	One Layer incl. cable spacing
Unlimited	(Area)



## Structuring the project (Location, Project and/or Discipline)

There are different structuring methods in the program to structure the project. The structure is used to filter when selecting multiple cables, when printing reports, routing cables etc..

It is optional to use the codes, but it is recommended to use at least one set of them.

The program contains the following code tables that can be used:

- Project code
- System code
- Location code
- Discipline code

Below, you can see examples of the code tables in the program:

Code	Description
00	GENERAL
01	Ventilation
02	Light
03	Emergency light
04	Pumping
05	Surveillance
06	UPS
07	Telecommunication
08	SCADA
09	Power supply >= 1000V
10	Power supply =< 440V
11	Instrument power

Code	Description
A	ENGINEERING GENERAL (O...
B	DRILLING ENGINEERING
D	RESERVED FOR DRAFTING
E	ELECTRICAL ENGINEERING
F	PIPELINE ENGINEERING
G	HVAC ENGINEERING
H	MARINE ENGINEERING
J	INSTRUMENTATION ENGIN...
K	MODEL BUILDING ENGINEE...
L	PIPING ENGINEERING
M	MECHANICAL ENGINEERING
N	STRUCTURAL ENGINEERING
P	PROCESS DISCIPLINE
Q	CIVIL ENGINEERING
R	SURFACE PROTECTION EN...
S	LOSS PREVENTION AND SA...
T	TELECOMMUNICATION ENG...
U	INSULATION ENGINEERING
V	QUALITY ASSURANCE/CON...
W	WEIGHT CONTROL ENGINE...
X	METALLURGY
Y	GEOSCIENCE ENGINEERING
Z	ARCHITECTURAL/BUILDING...

Code	Description	Position
A1	Tech inst room	
A2	Production B	
A3	Production A	

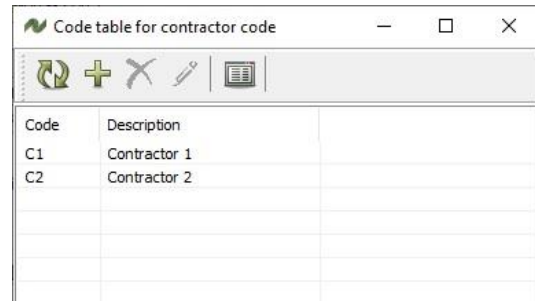
Code	Description

Data field	Description
Code	For all four structuring code tables, you can add, edit or delete codes. The codes can be added freely, and may be according to eg ISO/IEC 81346 or any company standard. In ISO/IEC 81346 codes are called designations.
Description	A description for each code/designation.

## Contractor code

It is possible to create codes for contractors, which will make it possible to maintain an overview of who is carrying out the work on each cable.

Create, edit and delete contractors by using the toolbar.



Code	Description
C1	Contractor 1
C2	Contractor 2





## Cable status codes

The cable status codes are fixed and shown only for clarification. You find them on the Status tab of a cable.

The codes are used throughout the project when a cable changes status, and are used to filter through the cables in the project.

Some statuses are set automatically, e.g. when you make a Pulling report the status is (or rather, can be) changed to PSS. Other statuses require manual input, which again might be done with batch operations.

Code	Description
CR *	Created date. The cable was created or imported on this date (DD/MM/YYYY)
ROU *	Routed. The cable's route on the cableways has been found and approved.
REL	Released. Released for production, that is that pullings cards can be made.
PSS *	Pulling Card sent. Pulling card has info about TO/FROM, length and route.
PULL	Pulled. The cable has been pulled, and this is noted in the project.
TSS *	Termination card sent. Terminal card has info about termination on term.rows.
TF	Terminated FROM. Info from returned termination card.
TT	Terminated TO. Info from returned termination card.
TFT	Terminated FROM and TO. Info from returned termination card.
TST	Test. Cable is tested
INST	Installed. The cable is installed.
APP	Approved. The connection is ok.
SUS	Suspended. The connection is not ok.
SPA	Spare. The cable is not used.
SPC	Special. User defined special status
DEF	Defective. The cable is defect
PW	Pre-wired

\* Date is (normally) set automatically by the system.



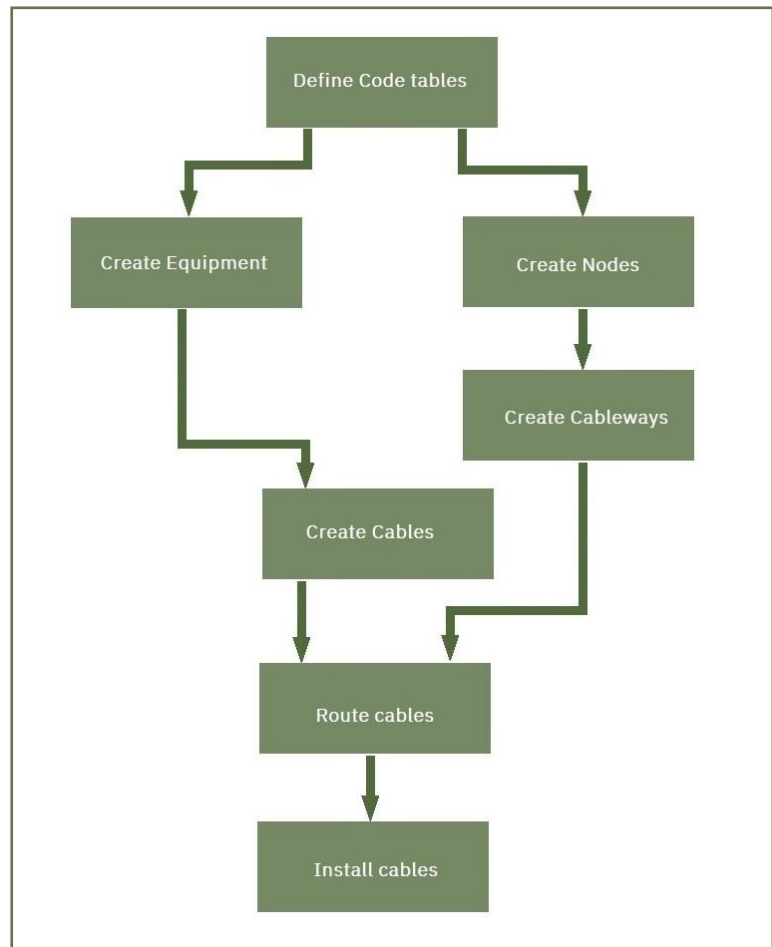
## THE MAIN TABLES

In this chapter, you can see how to create one new part in the project. This will show the relations between the parts in the main tables and the data from the code tables.

Remember the overall work flow!

The main purpose for having the information here is to show the relations between the different data types.

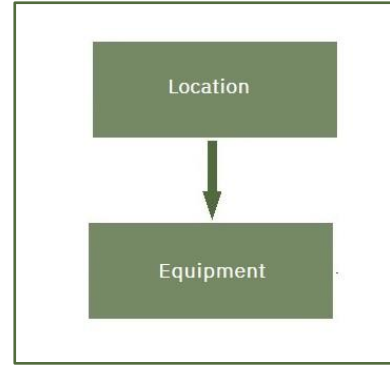
You can read more about import and other batch functions later in this manual and in the User manual.



## Create equipment

Equipment is panels, machinery, lamps etc. that is connected by cables.

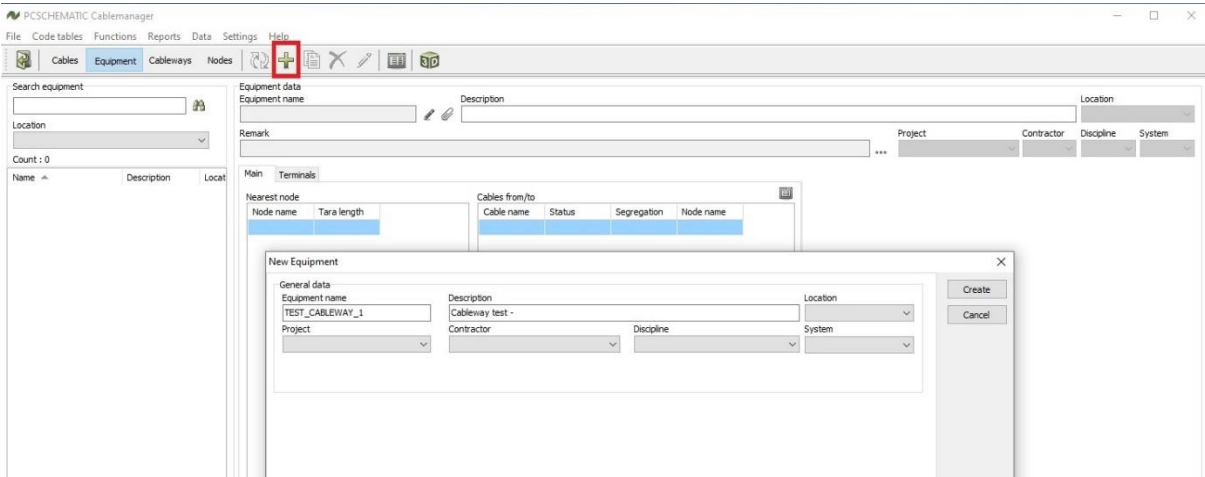
Before routing the cables, the equipment in both ends needs to be defined.



## Create equipment directly in the program

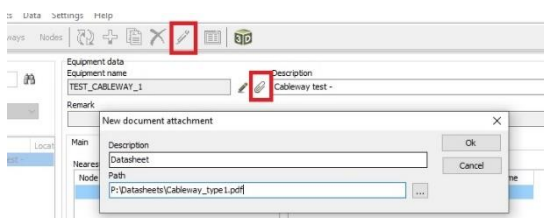
Start creating equipment by pressing while in the 'Equipment' tab.

This opens a dialog, in which is typed the name of the equipment – the tag no – and a description. It is optional to add structure designations and contractor codes during creation. Designations and codes can also be added later.



## Attach documents

It is possible to attach documents to the equipment.



Start by selecting the (you can only do this on existing equipment), then click the next to 'equipment name'. When documents are attached the changes to .



## The main tab

The main tab shows the nearest nodes to the equipment. The Node names come from the Cables table's nearest node to equipment. See page 36 for more info. For each node, you can see the connected cables.

Equipment data		Description	
Equipment name	NEW_PART	Description	New equipment - example for manual
Remark			

Nearest node		Cables from/to			
Node name	Tara length	Cable name	Status	Segregation	Node name
M23		TEST1	CR	H	M23

## Create terminal rows on the equipment

Add terminal rows to equipment by right-clicking the present terminal row and clicking 'add...', then add 'name', 'start number' and 'count'.

Here, I have added terminal row X1, and terminals 1 to 5. If they should be named differently, simply edit the term.row later.

Equipment data		Description	
Equipment name	TEST_CABLEWAY_1	Description	Cableway test -
Remark			


  

Termrows		Termrow connections		
From cable : group : wire	Point	To cable : group : wire		
TEST_CABLEWAY_1				

Add termrow to TEST_CABLEWAY_1			
Name	X1	Ok	
Start number	1	Cancel	
Count	5		

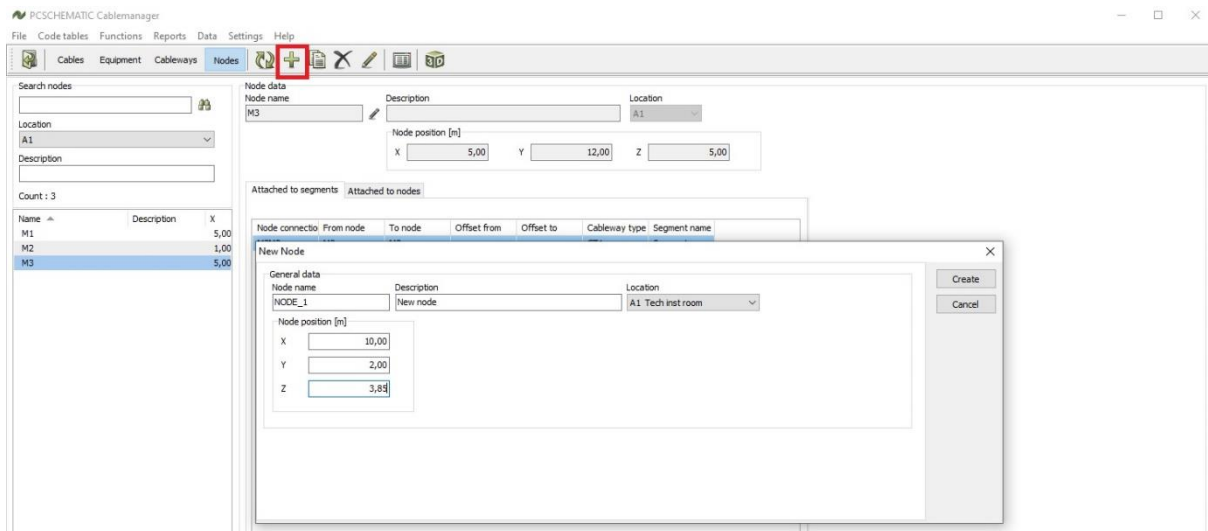
## Create nodes

Start creating nodes by pressing  in the toolbar while in the 'Nodes'-menu.

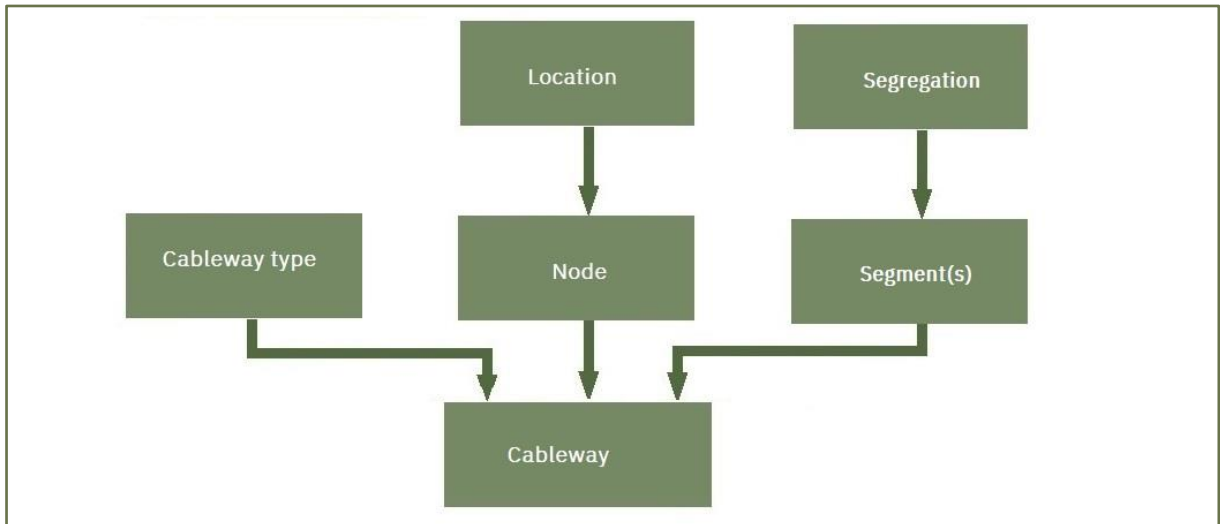
This opens a dialog, which requests a node name and XYZ coordinates. Description and location is optional.

Nodes are necessary every time a cableway changes direction. Based on the coordinates, the program calculate Cableway lengths and hence cable lengths.

Read more about Nodes in the User manual.



## Create Cableways



Before creating Cableways, some information is needed, as shown in the figure:

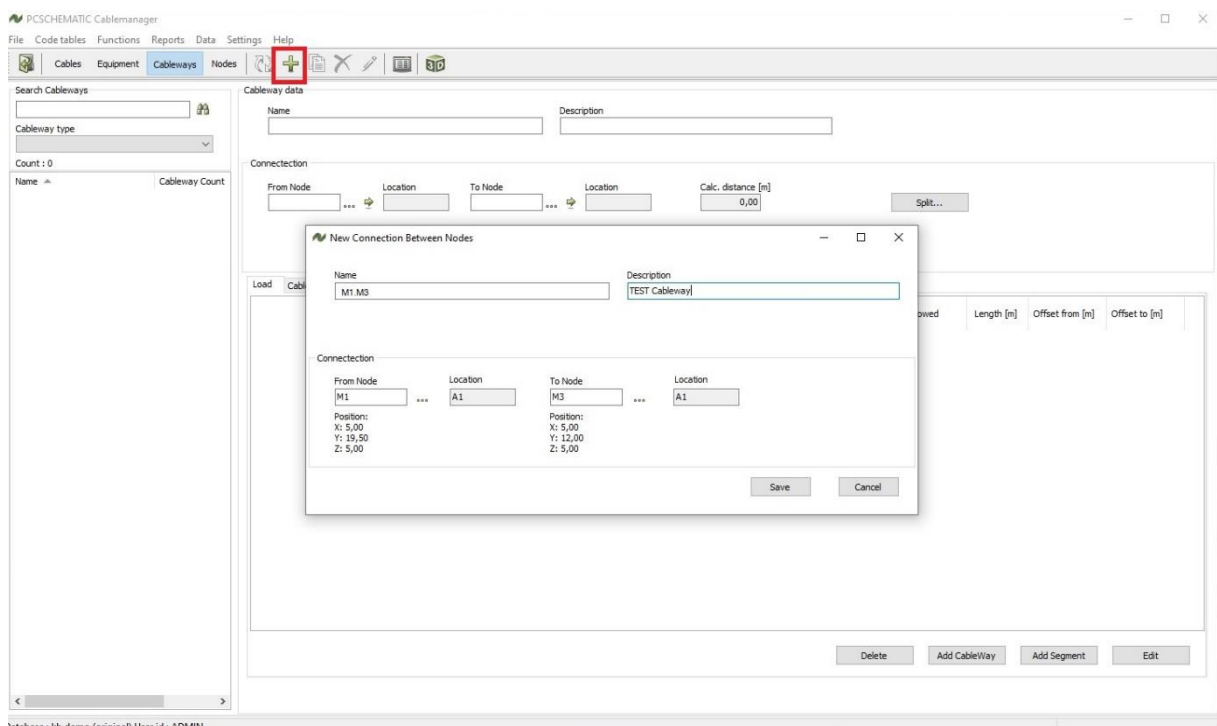
- Cableway types from the code tables
- The nodes – coordinates for cableways' change of directions
- Segregations (to create the segments on the cableway)

## Create a new Cableway

Create a new Cableway, by pressing the  in the top toolbar.

First you create the Node-connection by selecting the two nodes, at the ends of the Cableway. The Cableway is named automatically after the two nodes – if selected in the Settings – and you can give it a description.

If you select two nodes, that already have a connection between them, you get a warning and you can't save it.



When the Connection is saved, you create the actual Cableway by adding a Cableway type. You then select the (first) Segment on the Cableway. The Segment must have a Segregation and an Installation method.

By default, the Segment is 100% of the Cableway, meaning that you only have one type of installation on the Cableway. You can add more Segregations, but only after this first window is saved and closed.

You can also add more Cableways to the connection. Cableways can run in parallel, so the next Cableway on the node connection will be offset from the original values.

New Cableway
— □ ×

---

**Position**

The cableway runs

**From node**       **To node**

**Node positions [m]**

	From node	To node
X	<input type="text" value="5,00"/>	<input type="text" value="5,00"/>
Y	<input type="text" value="19,50"/>	<input type="text" value="12,00"/>
Z	<input type="text" value="5,00"/>	<input type="text" value="5,00"/>

**Offset for cableway [m]**

	From node	To node
X	<input type="text" value="0,00"/>	<input type="text" value="0,00"/>
Y	<input type="text" value="0,00"/>	<input type="text" value="0,00"/>
Z	<input type="text" value="0,00"/>	<input type="text" value="0,00"/>

**Cableway absolute position [m]**

	From node	To node
X	<input type="text" value="5,00"/>	<input type="text" value="5,00"/>
Y	<input type="text" value="19,50"/>	<input type="text" value="12,00"/>
Z	<input type="text" value="5,00"/>	<input type="text" value="5,00"/>

---

**Cableway data**

Cableway type:       Weight Factor:       Length [m]:

Shape of cableway: Height and width

---

**Segment data**

Name:

Segregation:

Installation Method:

Fill Factor:

Segment Width:  %  
 mm

Description:

Shape of cableway: Height and width  
Size: 150x400mm<sup>2</sup>

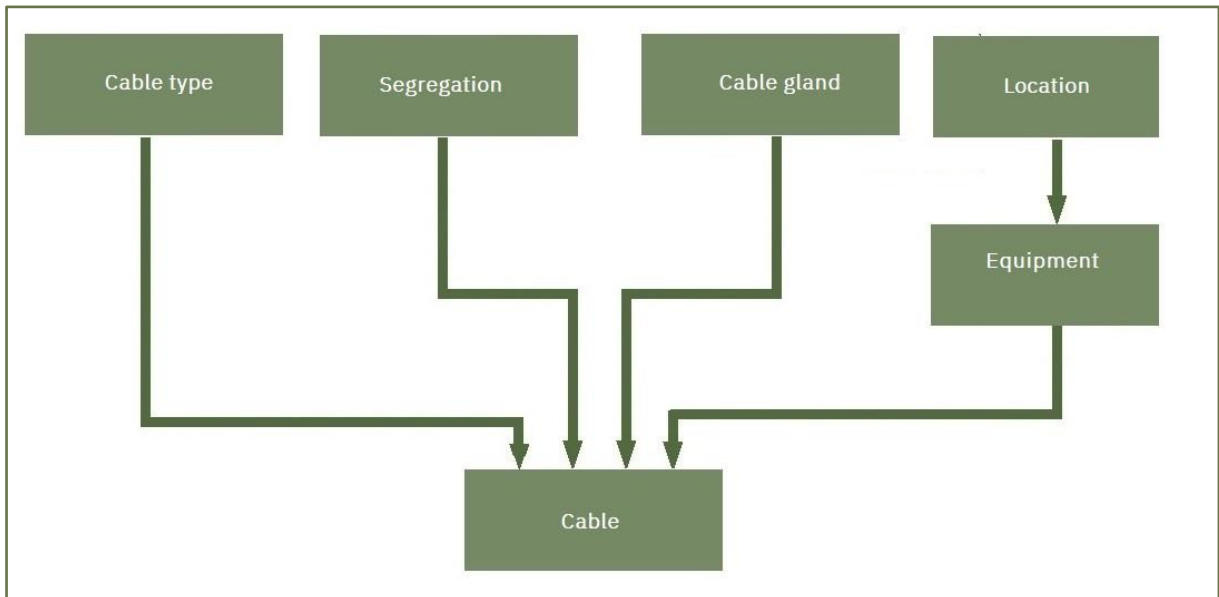
Width for segments in cableway

Available Width	Width of other Segments	Cableway Width
100 %	0 %	100 %
400 mm	0 mm	400 mm





## Create Cables




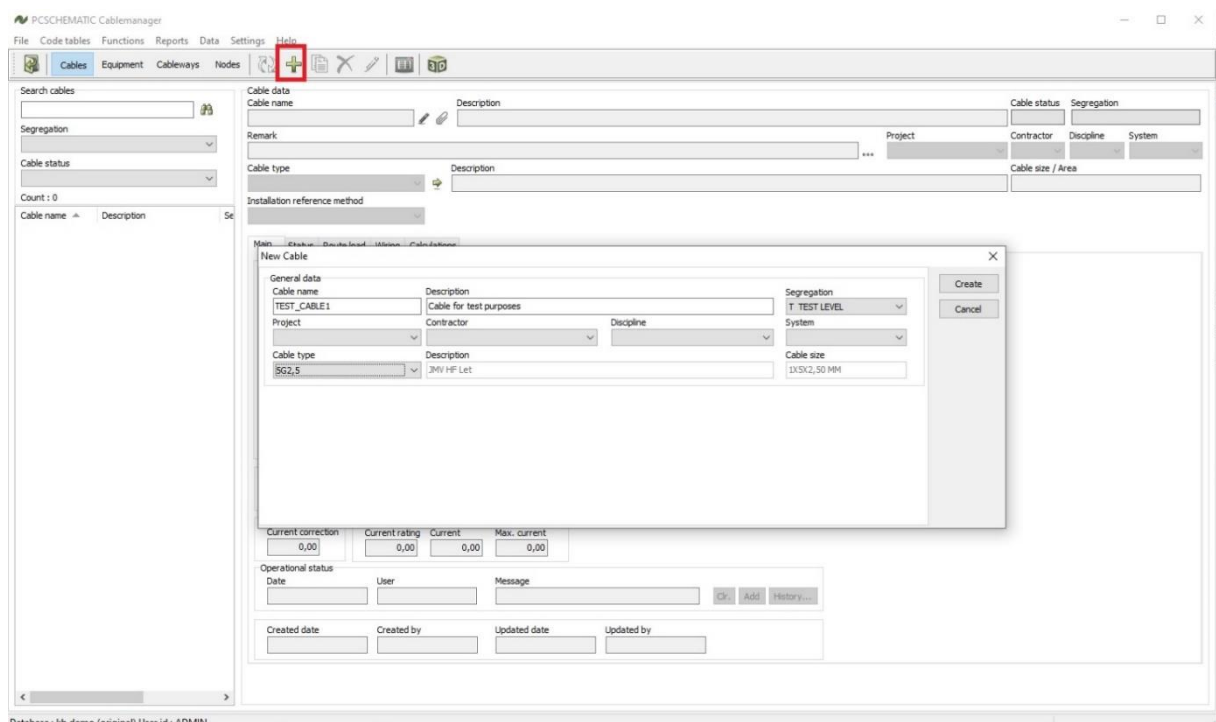
When you create Cables, all specifications and other basic data must be available before you can create the cable.

The figure above illustrates the overall workflow of cable creation, while the process is explained below.

Read much more in the User manual, this only shows the basics of creating one cable.

### Create a cable directly in the project

Create a new cable in the project by pressing the  in the main toolbar in the Cables menu. This opens a dialog asking for relevant information. The name, segregation and cable type must be selected. All other data is optional. Finish the creation by pressing the 'Create' button. The cable is automatically given the status CR – Created (seen on the Status Tab).



## The Main tab

When the cable has been created, determine and select the Equipment (Tags), Nearest Node, Tara length, possible Glands in both ends of the cable.

When this data is present, the cable can be routed and 'used' by a Normal user.

Cable data		Cable status	Segregation
Cable name TTT	Description Cable for test purposes	CR	H 1KV OR ABOVE
Remark		Project	Contractor Discipline System
Cable type 5G2,5	Description JMV HF Let		00
Installation reference method All		Cable size / Area 1x5x2,50 mm <sup>2</sup> / 9,8x9,8 = 96 mm <sup>2</sup>	
Cable is not routed			
Main Status Route load Wiring Calculations			
From		To	
Node M10	Tara length [m] 2,00	Node M13	Tara length [m] 3,00
Tag -M1		Tag -M2	
Location A3		Location A3	
Description Machinery 1		Description Machinery 2	
Cable Gland Type 111	Size 2L	Cable Gland Type	Size
Cable lengths [m]			
Maximum 0,00	Estimated 0,00	Routed 0,00	Routed + Tara 5,00
Pulled 0,00		Installed 0,00	
Correction factor		Current [A]	
Current correction 1,00	Current rating 24,00	Current 0,00	Max. current 24,00
Operational status			
Date	User	Message	Clr. Add History...
Created date 30/06/2020 09.40.37	Created by ADMIN	Updated date 30/06/2020 09.49.11	Updated by ADMIN

Save Cancel



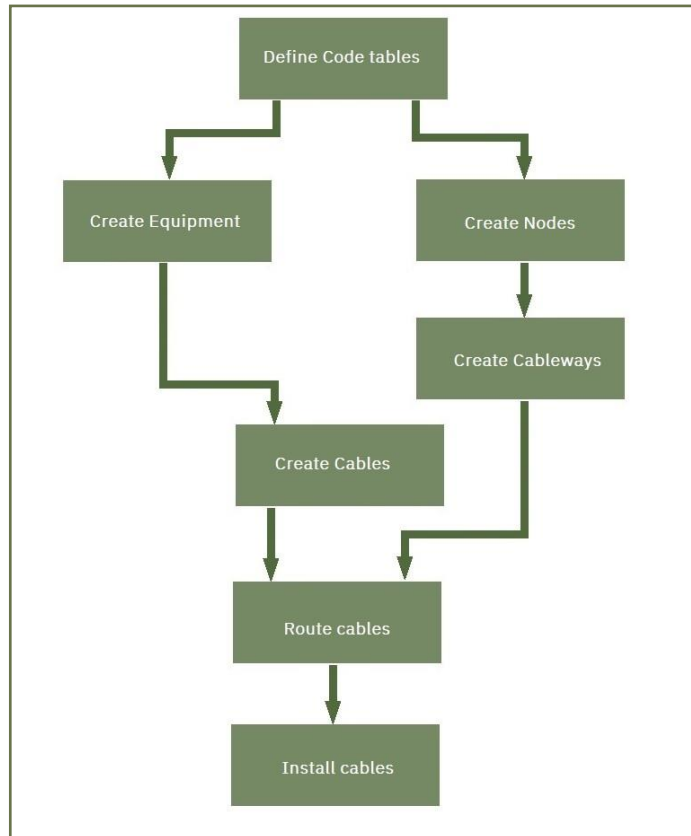
## IMPORTING DATA TO THE PROJECT

The previous chapters in this part of the manual have described the data structure of Code tables and Main tables, respectively.

It is possible to create objects one by one, but as the main function of this program is to tie data from various other systems together, it is logical to have to have an import function that allows you to reuse data in an easy way.

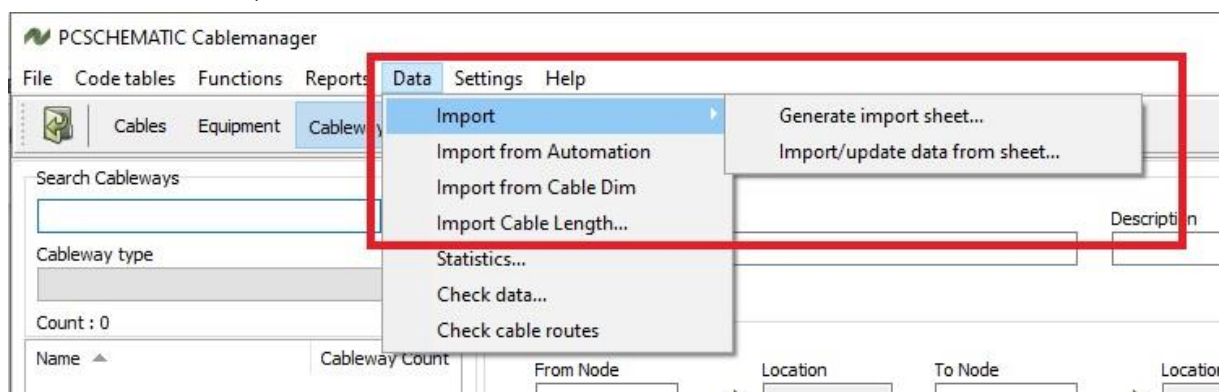
This chapter will take you through the necessary steps when importing large amounts of data into the project.

Remember the overall workflow – you need to import to the code tables first (e.g. Cable specifications), before you can import to the main tables (e.g. the Cables in the project).



### Import wizard

In the Data menu you find the import functions. This first section describes the import functions in the Import Wizard. <sup>xx</sup>



You start your imports by generating Import sheets. Import sheets are Excel sheets, that have the necessary – and the selected optional – data fields as headers.

## What can be imported

When you open the 'Generate import sheet' you meet this dialog.

You can generate sheets for importing data of the listed kinds . see the picture – or update sheets for the same types.

You can also import data from other systems.

Generate Sheet

Choose which type of sheet to generate

Update Sheet

Create New Sheet

Choose the data type to generate sheet for

Location

Cable Spec

Cable Type

Cableway Type

Cable

Equipment

Cableway / Segment

Node

Next > Close

## Select which data fields to import to

Here I have selected to import Cable specifications.

In the section Cable spec code table (see page 68) you can see a description of, what the various data fields contain.

Some data fields are mandatory, others are optional when you import – as well as if you create the spec's manually.

Make your selections, and generate the sheet.

Generate Sheet - Insert - Cable spec

Mandatory Columns

Field
Cable spec
Number of groups
Wire cross section [mm <sup>2</sup> ]
Current Rating [A]
Max. temp [°C]
Default installation reference method
Overall dia. [mm]

Optional Columns

Field
<input checked="" type="checkbox"/> Description
<input checked="" type="checkbox"/> Wires pr. group
<input checked="" type="checkbox"/> Common Screen
<input checked="" type="checkbox"/> Individual Screen
<input checked="" type="checkbox"/> Block Width [mm]
<input checked="" type="checkbox"/> Block Depth [mm]
<input checked="" type="checkbox"/> Underbraid dia. [mm]
<input checked="" type="checkbox"/> Weight [kg/m]
<input checked="" type="checkbox"/> Resistance [Ω/km]
<input checked="" type="checkbox"/> Spacing [mm]
<input checked="" type="checkbox"/> Reactance [Ω/km]
<input checked="" type="checkbox"/> Temp coefficient (α)

Show DB field names

All None

< Back Generate Sheet Close

## The import sheet

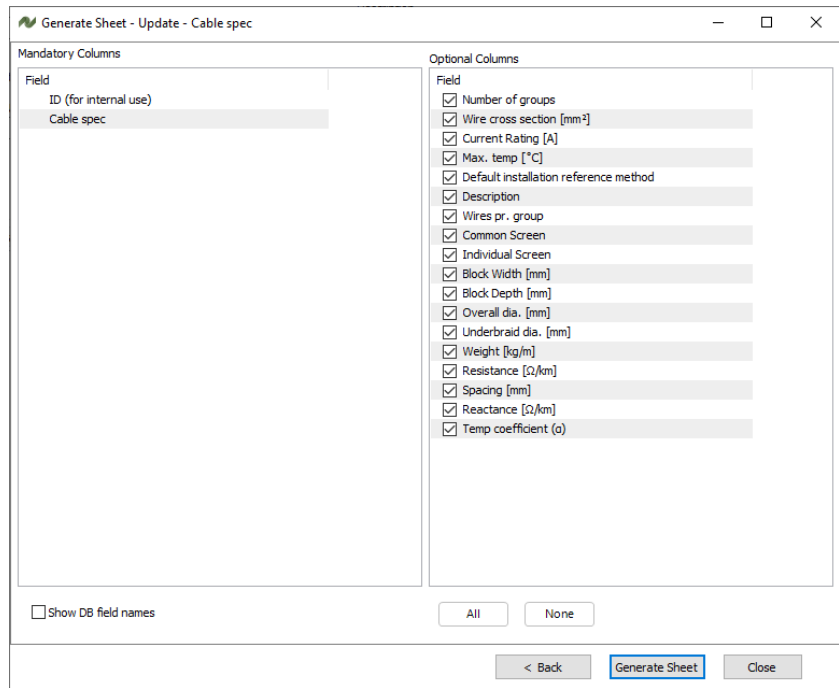
Below, you can see (part of) the import sheet. Next step is to write/paste data into it, so that it can be imported into the program.

	A	B	C	D	E	F	G	H
1	Cable spec	Number of groups	Wire cross section [mm <sup>2</sup> ]	Current Rating [A]	Max. temp [°C]	Default installation reference method	Overall dia. [mm]	Description
2								
3								
4								



## Update functions

When you need to update existing data, you make Update sheets.



The generated sheet contains the existing parts and the selected data.

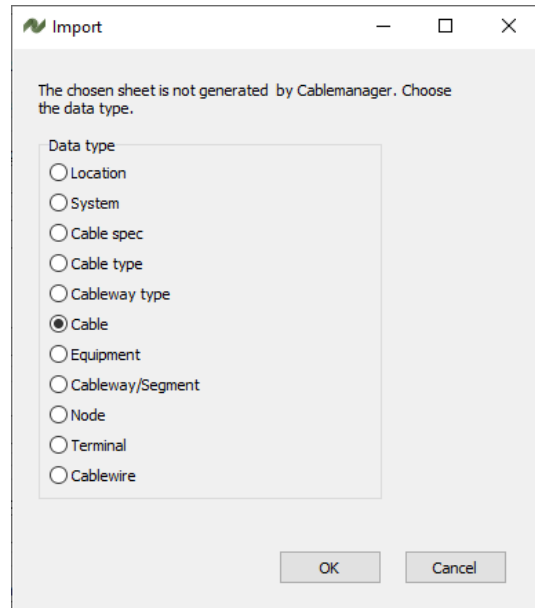
	A	B	C	D	E	F	G	H
1	ID (for internal use)	Cable spec	Number of groups	Wire cross section [mm <sup>2</sup> ]	Current Rating [A]	Max. temp [°C]	Default installation reference method	Description
2		1 3G4	1	4	42	90	All	JMV HF Flex
3		2 5G4	1	4	42	90	All	NOIKLX
4		3 S1	1	1,5	18,5	70	All	YSLY-JZ 3x1.5 m
5		4 4X6	1	6	54	90	All	JMV HF Flex
6		5 5G1,5	1	1,5	17,5	70	All	JMV HF Let
7		6 5G10	1	10	57	70	All	JMV HF Let
8		7 5G16	1	16	76	70	All	JMV HF Let
9		8 5G2,5	1	2,5	24	70	All	JMV HF Let
10		9 5G6	1	6	54	70	All	ScanKab POWE
11		10 3G1,5	1	1,5	18,5	70	All	ScanKab SCANL

## Import lists in other formats

A lot of times, you might have data in other systems, and the data doesn't fit exactly into the templates above.

In that case, you go through the following functions.

Start by selecting Data|Import. If the file format is not recognized, you get this window. Select the data type, and click ok.

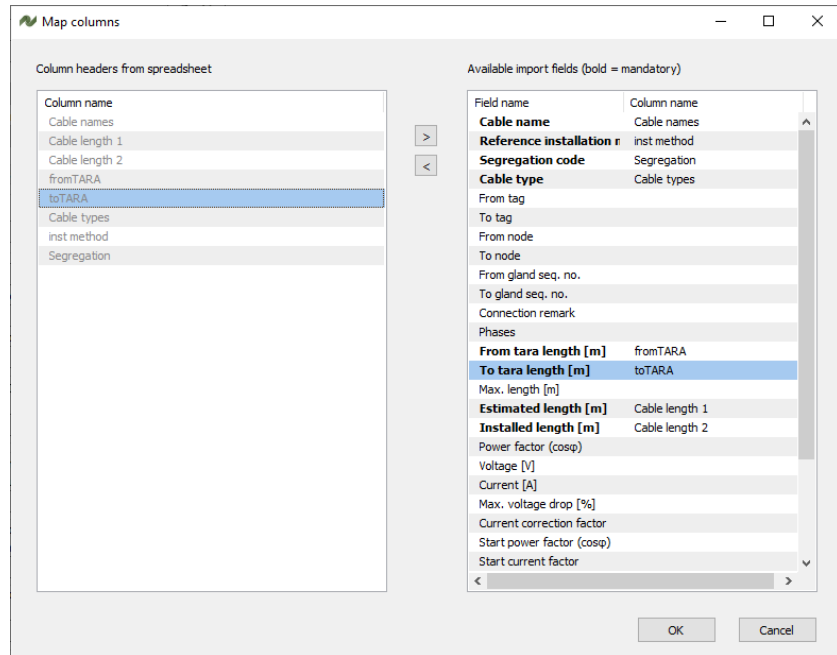


In the next window, you map the data fields:

Select a header in the left column, select the header in the right column, and press the > to map the two headers together.

When mapped, you can see 'your' header beside the import field.

All **bold** fields are mandatory for the selected import!



After import, the list is opened, and you can see in the list, whether the import went well or not. Here, the cable, the equipment, their term.rows and connections must be created, AND the wire color in the import sheet MUST comply with the cable's specification.

	A	B	C	D	E	F	G	H	I	J	K
1	Cable name	Cable wire color	From equip	From termrow	From termi	From connection	To equip	To termrow	To termi	To connection	
2	test-cable1	BK	Panel1	x1	1	1	Panel2	x1	1	1	Imported
3	test-cable1	BU	Panel1	x1	2	1	Panel2	x1	2	1	Imported
4	test-cable1	OG	Panel1	x1	3	1	Panel2	x1	3	1	Error: Wire with color OG not found.
5	test-cable1	PK	Panel1	x1	4	1	Panel2	x1	4	1	Error: Wire with color PK not found.
6											



## Imports from other PCSCHEMATIC programs

The import functions above, are generic to some extent.

The program also allows import directly from our other programs: PC|Automation and PC|Cabledim.

Those two functions will import files generated from either one of the programs and update Cablemanager with the data.

## Import cable length data

This import function allows you to update

- Cable status –  
according to Pulled  
Card Sent
- Pulled lengths –  
according to filled  
out pulling cards
- Installed lengths –  
according to filled  
out installation card.

You can see the three  
templates below:

	A	B	C
1	Cable name	Date	Status (output)
2			
3			
4			
5			
6			
7			

	A	B	C	D
1	Cable name	Pulled Length	Date	Status (output)
2				
3				
4				
5				
6				
7				

	A	B	C	D
1	Cable name	Installed Length	Date	Status (output)
2				
3				
4				
5				
6				

When filled out, the sheets can be imported into the system again.





## PART 3 – INSTALLATION MANUAL

- How to install the program
- How to install the database



## THE INSTALLATION PROCESS

### Minimum requirements to the pc running the program

- 1 GHz processor
- 1 GB RAM
- 200 MB of available disk space
- Screen resolution of a minimum of 1280 x 800
- Windows 7 SP1 or above operating system

The Cablemanager application is a 2-tier windows program, designed to run with few external requirements.

The 2 tiers consist of UI and BI in the Cablemanager executable, and data storage on a SQL Server.

The Cablemanager application needs to check against a PCS License service for validating license. The license service can be run locally or remotely.

### Runtime libraries

A PCS License service is included in the Cablemanager setup.

When connecting to the SQL Server through a firewall, the SQL Native client is required.

If there is no firewall, the “direct” mode can be used to connect to the database, and no SQL server client is required.

To be able to export data in DXF format, a DWG component is required. This component is included in the Cablemanager setup.

### Database

Cablemanager can be used with the following versions of Microsoft SQL Server:

- SQL Server SQL Server 2014 (or newer. The Express edition works fine)

The user connected to the SQL Server must have minimum database owner rights for the database connected to.

When creating new projects, an empty backup database (supplied with the installation) must be restored into the database. The user importing the database must have sufficient rights to do a restore on the SQL Server.

### SQL Server User

To be able to create new projects, the user connected to the SQL Server must have Create Database rights.

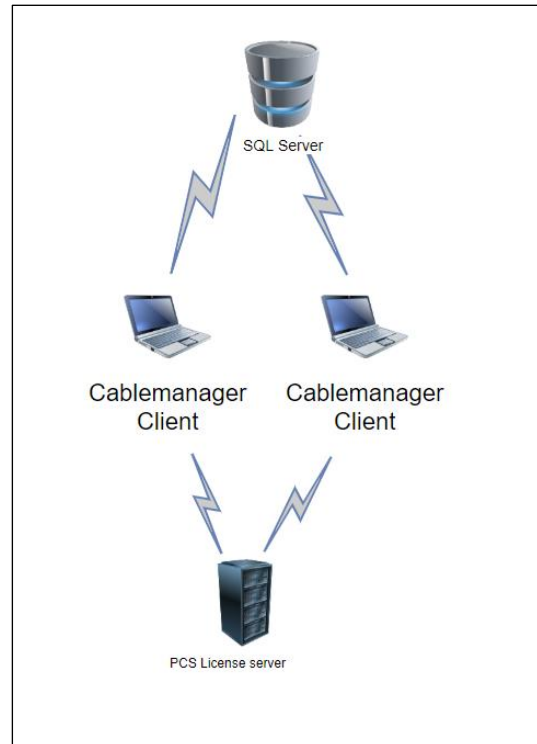
New projects can also be imported to the database using the supplied SQL Server backup file enclosed in the installation files.

## Installation

To install SQL Server Express on a computer, the user must have Local Administrator Rights.

### Estimated size of the databases

- A database with 30 cables is ~ 20 MB.
- A database with 15.000 cable is ~ 200 MB.



### Installing SQL server

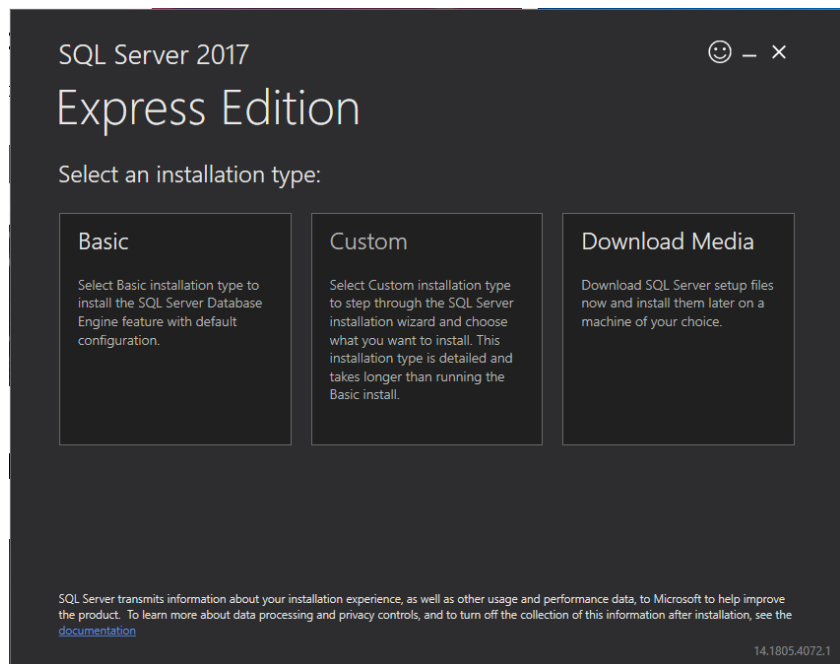
Cablemanager requires access to a SQL server database, which can either be a SQL Server instance, or a SQL Server Express database. The SQL Server Express is a free edition of the SQL Server, available from Microsoft.

To install the SQL Server Express, download the newest version of SQL Server express from Microsoft. Currently it is version 2017. If version 2014 is installed, that should also work.

A direct link to the download location can be [found here](#).

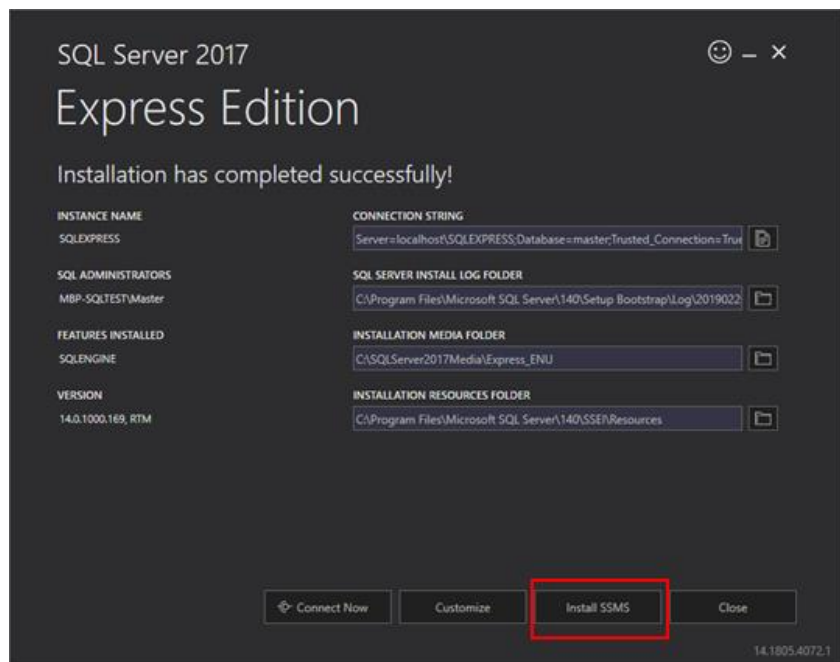


When installing, chose the 'Basic' edition:



When the server is installed, make sure to install the Server Management Studio (SSMS), newest version. This is also available from Microsoft.

During setup, the program ask for a computer restart. After this open the file SSMS-SETUP-ENU.exe again to finsih installement.



## Setup server to allow SQL Users to log in

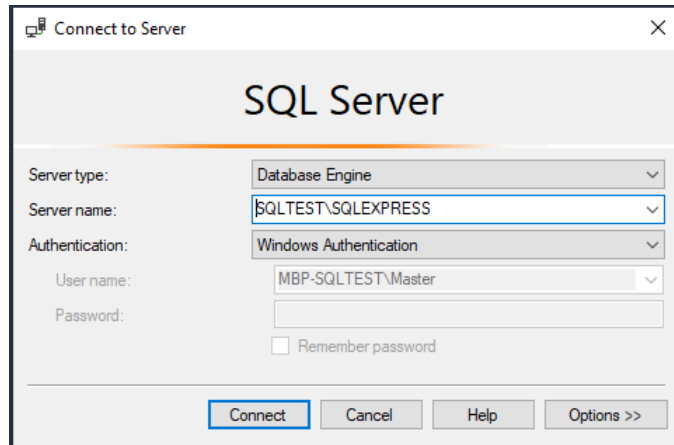
As standard the SQL Express server only allows users to log in using 'Windows Authentication Mode'.

The user login using Cable Manager must have the 'db Creator' right.

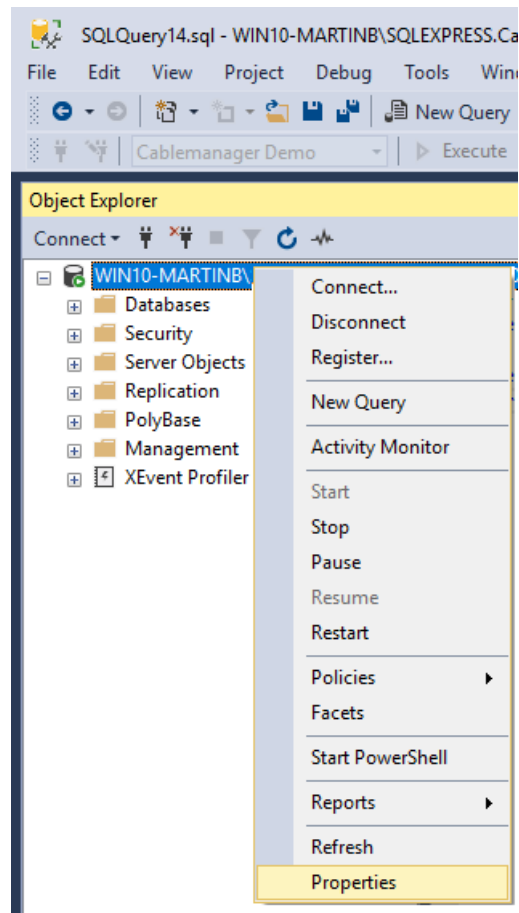
If not familiar with SQL Server Express, follow these next steps to setup a user on the server with the appropriate rights:

First of all, the server must be set up to allow SQL Server Logins to log in.

Start SSMS and connect to your server:

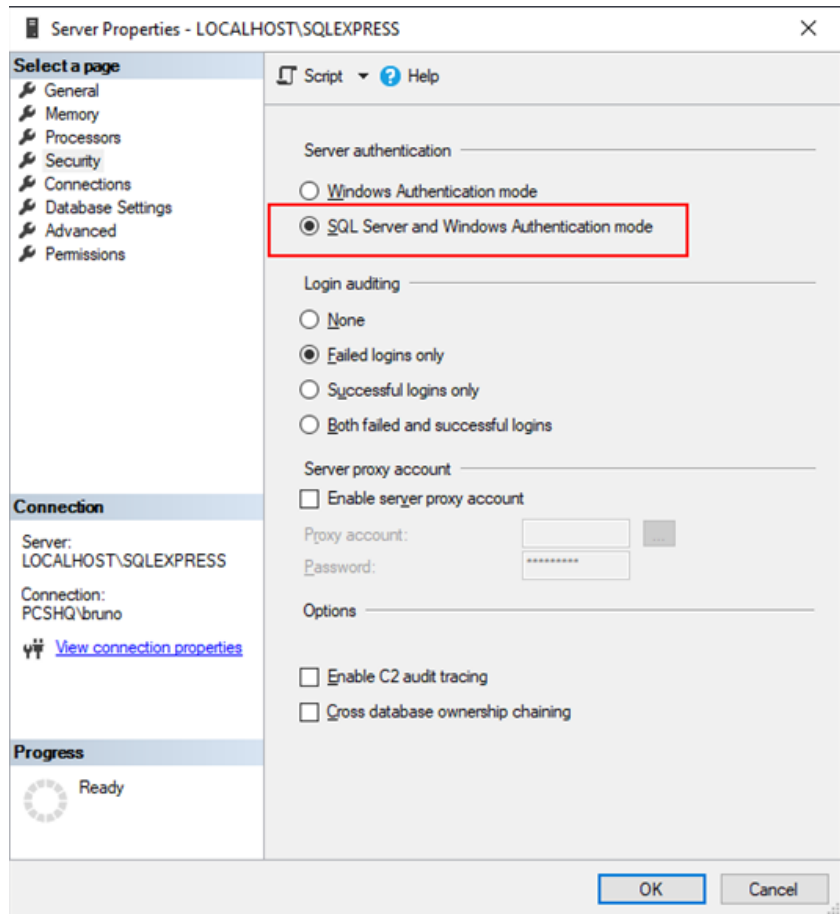


In the object explorer menu, right click on the server and choose 'Properties'.

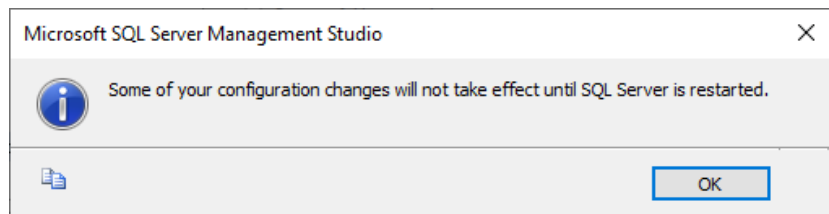


Choose the 'Security' page, and mark 'SQL Server and Windows Authentication mode'

Press the OK button.

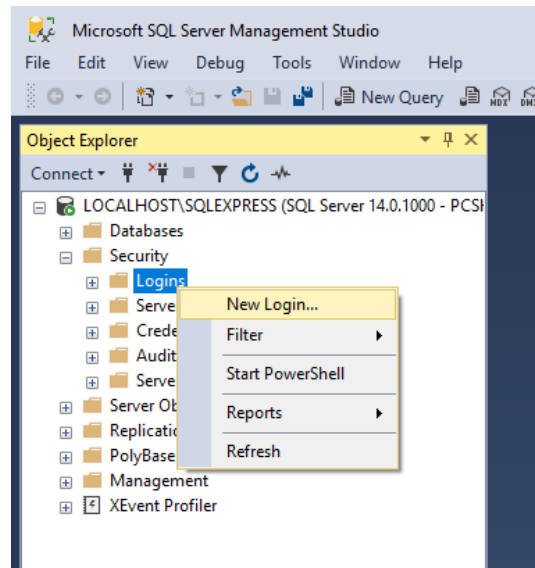


Restart the service or computer if prompted.

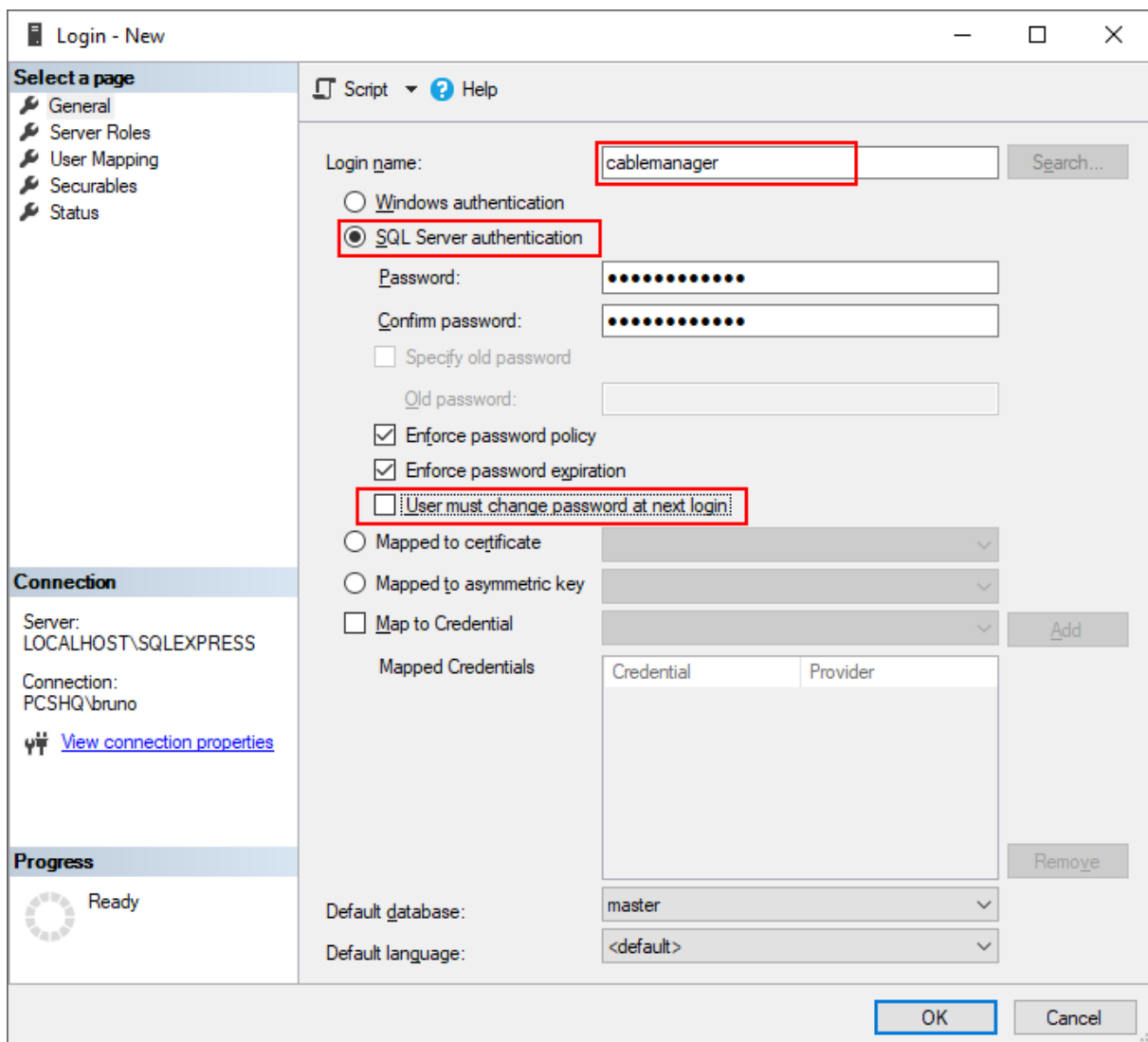


## Create a Cablemanager user

In the object explorer menu, under 'Security', right click on 'Logins' and choose 'New Login'.



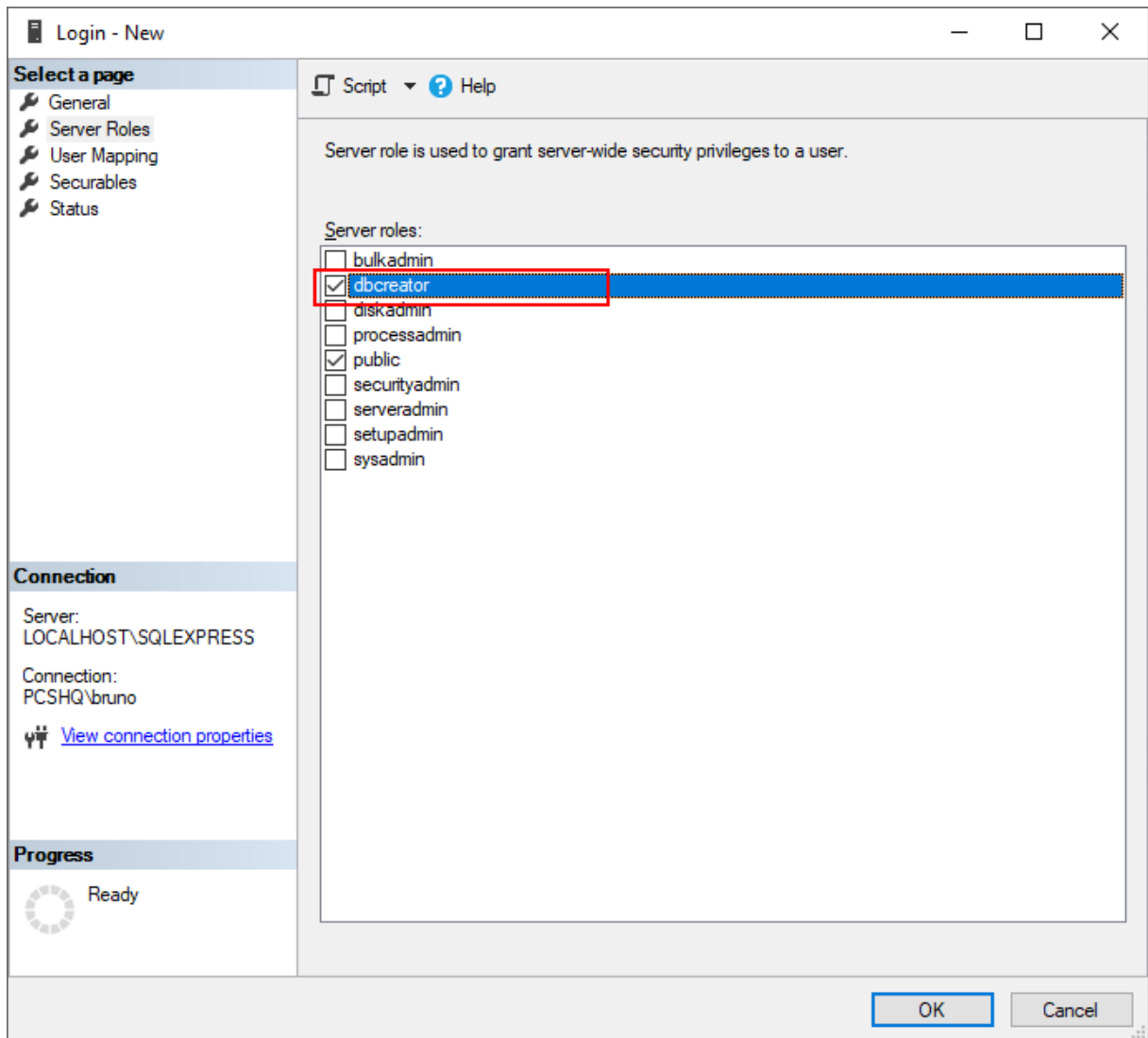
On the General page, type in a user name, eg. Cablemanager, mark SQL Server authentication, enter a password for the user and make sure to uncheck the 'User must change password at next login!'.





On the 'Server Roles' page, make sure to check the Server Role 'dbcreator'

Press ok. In the Object Explorer menu, right click the server and choose restart.



# IN CABLEMANAGER

## File access

When running the application, Cablemanager needs write access to the %APPDATA%\PCSchematic folder.

This folder is created during setup and is used for storing a number of .ini files.

## Creating a Cablemanager project

Each cablemanager project has it's own database on a SQL Server.

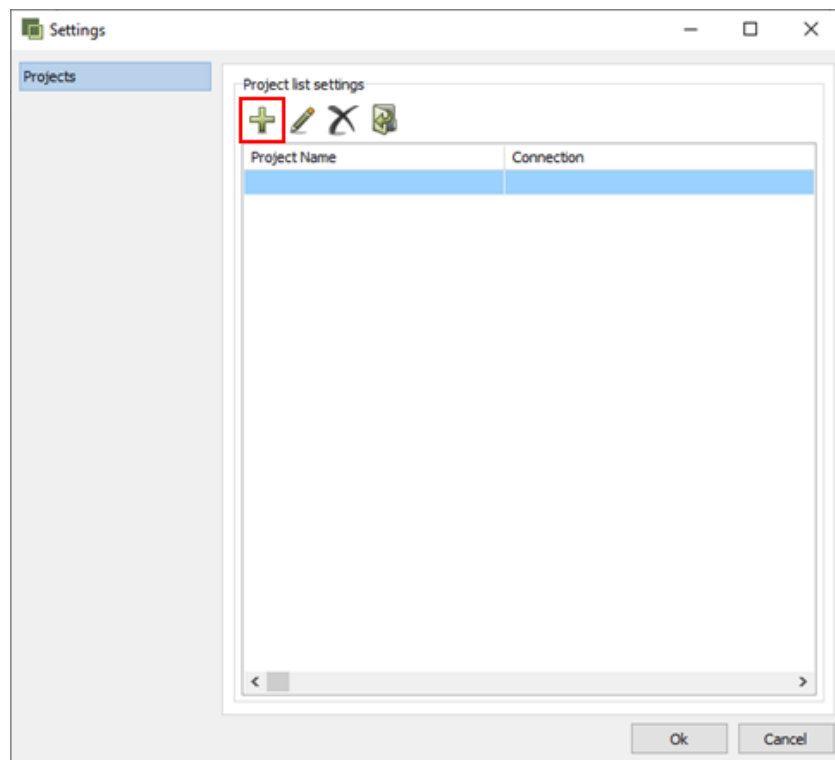
It is possible for more than one user to connect to the same project (database).

First of all: Start Cablemanager

When no projects are defined, the project overview page will be shown.

It can also be found in the main menu: Settings -> Project List

Press the Add Project button:



Make sure that the server is the right server typed in. Default is 'localhost\sqlexpress'.

Change the 'Authentication' to 'SQL Server', and type in the username and password for the Cablemanager user.

To test the connection, press the 'Test Connection' button.

On successful test login, this page will be shown.

The screenshot shows the 'Create new Connection' dialog box for SQL Server. The 'Server' field is highlighted with a red box and contains 'localhost\sqlexpress'. The 'Port' field contains '1433'. The 'Driver' dropdown is set to 'SQL Native Client'. The 'Authentication' dropdown is highlighted with a red box and set to 'SQL Server'. The 'Username' field contains 'cablemanager' and the 'Password' field is masked with dots. The 'IP version' dropdown is set to 'IPv4'. There are checkboxes for 'Encrypt connection' and 'Trust Server Certificate', both of which are unchecked. A 'Test Connection' button is located at the bottom right of the dialog. At the bottom of the window, it says 'Not connected to a SQL Server' and has 'Next >' and 'Close' buttons.

When SQL server info is correctly entered, press the 'Next' button.

## Connect to an existing project on the SQL Server

If you already have created a project on the SQL Server, access it by choosing the database in the drop down list.

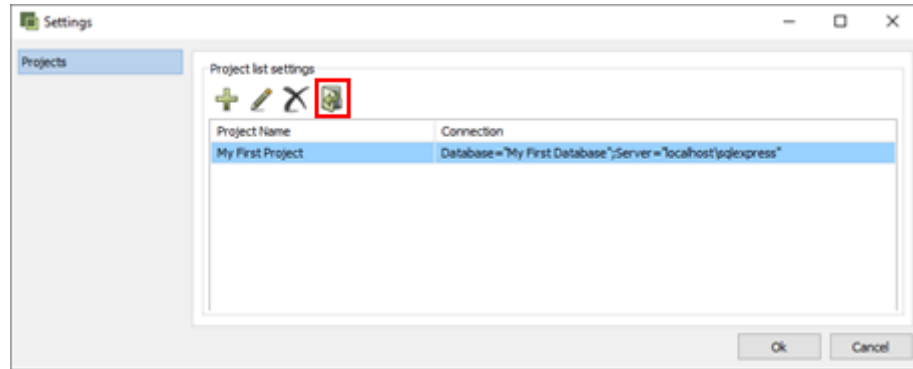
Give the project a project name, and click 'Connect to database'.

If you want to play around in the demo, under 'create new project', give a database name and press 'create demo project'.

The screenshot shows the 'Create new Connection' dialog box with the 'Connect to Project on SQL Server' section active. The 'Project Name' field contains 'My First Project'. The 'Database Name on SQL Server' dropdown is set to 'My First Database'. A 'Connect to database' button is highlighted with a red box. Below this, there is a 'Create New Project' section with a 'Project Name' field and a 'Database Name on SQL Server' field. There are two buttons: 'Create Empty Project' and 'Create Demo Project'. At the bottom of the window, it says 'Connected to a SQL Server @localhost' and has '< Back' and 'Close' buttons.

When the program has connected to the SQL database, it will be shown in the project list.

Start working with the database by clicking on the 'Logon' button.



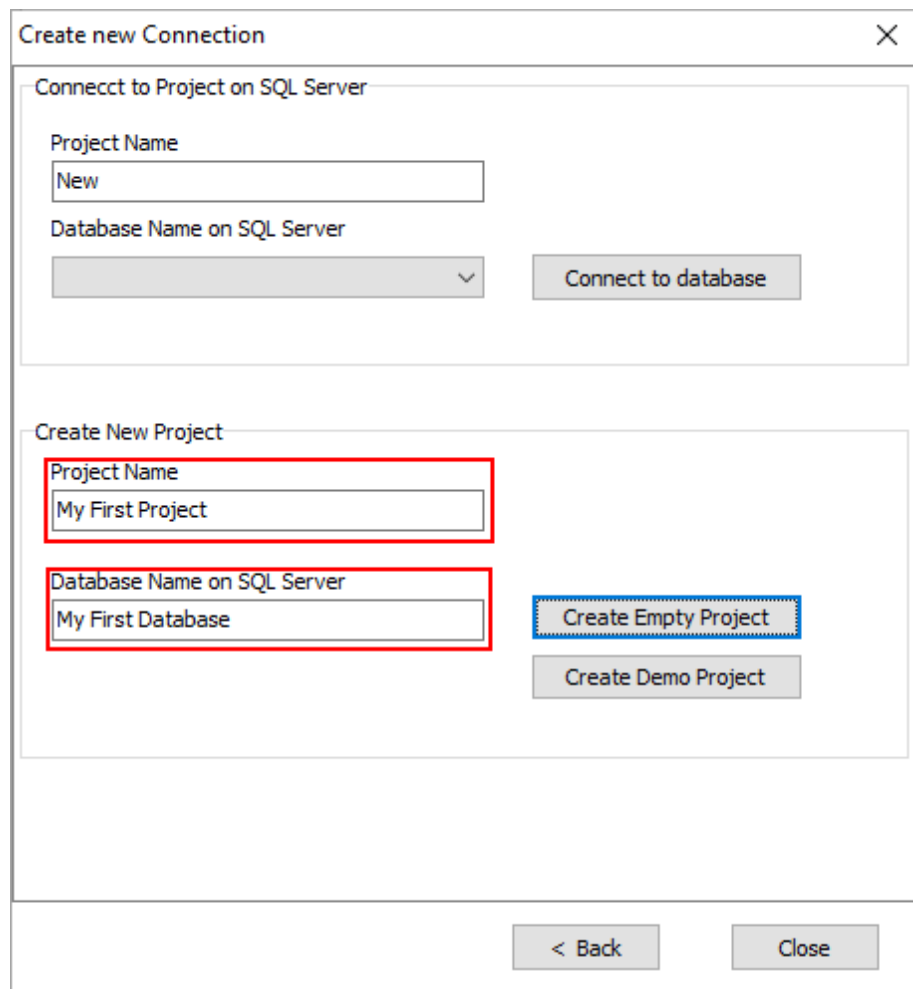
### Create a new project on the SQL Server

To create a new project, type in a Project Name.

Then type in a name for the new database name on the SQL Server.

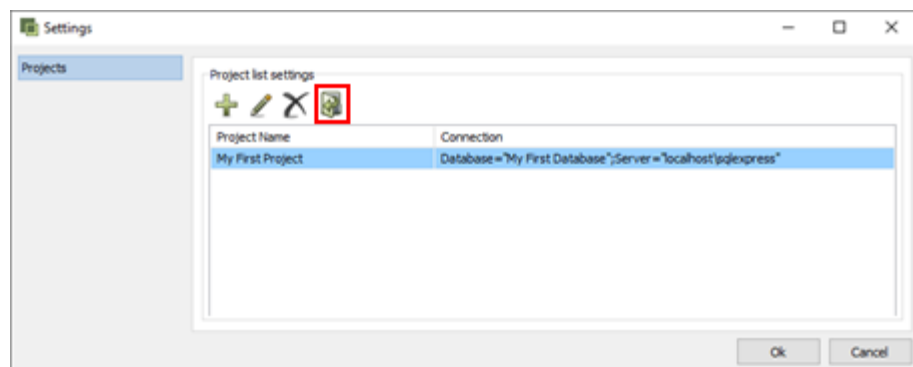
To create an empty project, press the 'Create empty project'.

To create a demo project with some Nodes, Cables and Segments in, press the 'Create Demo Project'.



Once the database is created or there is a connection to a database, it is shown in the project list:

Start working with the database by clicking on the 'Logon' button.



## INSTALLING THE LICENSE

When buying PC|Cablemanager, a mail is sent with a download link. Start the installation by clicking this link. During the installation process, answer various questions, among them where to install the program.

The Cablemanager comes with a software license. The license can be tied to a single pc (stand-alone) or it can be a floating license, which is a server solution, where many different user can use the license. The license has a limitation of the number of simultaneous users. Installation of the software license is described in the book Software License, which is found in Help in the Licens Manager program. Installation of the license is also mainly answering questions during the process.

### License types

Licenses comes in different sizes depending on the number of cables.

We sell licenses for

- 200 cables
- 1000 cables
- 2000 cables
- Unlimited number of cables

### Cablemanager Service

It is possible to buy a service edition of the Cablemanager. The program allows Read-only and Print functions for the project.

The user rights are the same as a Read-only user in an ordinary Cablemanager installation AND the option to print Pull and Termination reports and change the cables' statuses and lengths after pulling and installation.



## PART 4 – MISCELLANIOUS INFO

- News version 7 (cable drums and improved 3D viewer)
- User rights - overviewHow to create cables, cableways and other objects

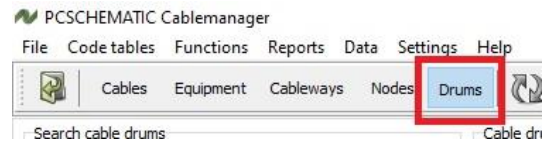




## CABLE DRUMS

Version 7 of Cablemanager contains a new function – Cable Drums – which makes it possible to keep track of planned and used cable drums.

Drums have their own section in the program:<sup>xxi</sup>



The Cablemanager program keeps track of cables and cableways in projects' full life cycle:

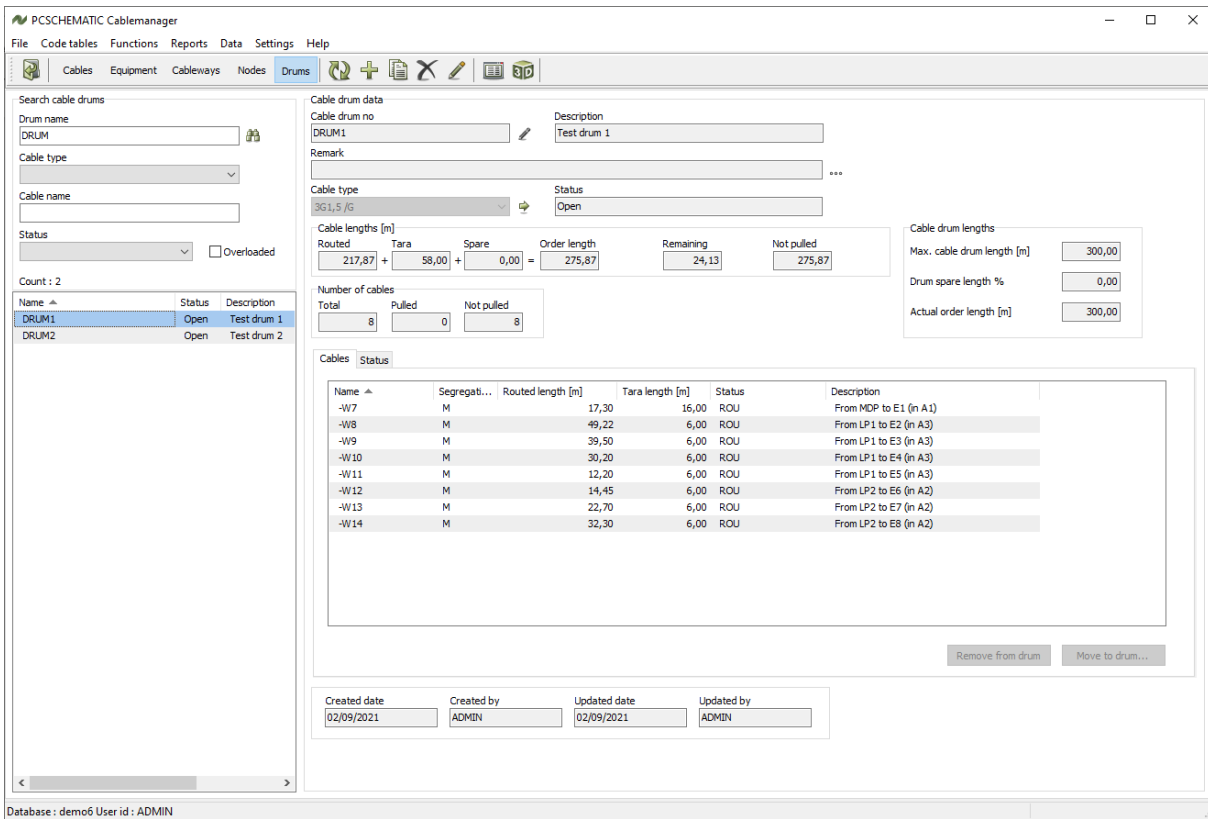
- starting from the planning phase
- through the installation phase
- and finally in the maintenance phase

Information of Cable drums is part of

- Procurement planning
- Installation planning
- Preventive maintenance

# Cable drum window

The cable drum window looks like this:



At the right, you see a search window, where you can search for cable drums in the project.

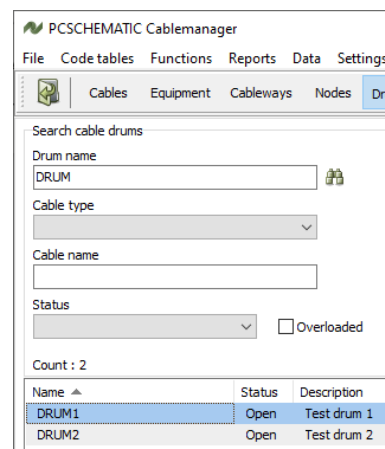
At the left, you see Cable drum data, which shows information about the selected drum: Cable type, planned and used quantities, a list of cables from the drum, and finally a status for the drum.

## Search for drums

You can search for drum by

- Drum name
- Cable type – one or all cable types in the project
- Cable name – search for drum with a specific cable
- Status – drum status

You get a list of drums with the selected data.



## Cable drum data

**Cable drum data**

Cable drum no:   Description:

Remark:

Cable type:  Status:

**Cable lengths [m]**

Routed:  + Tara:  + Spare:  = Order length:  Remaining:  Not pulled:

**Number of cables**

Total:  Pulled:  Not pulled:

**Cable drum lengths**

Max. cable drum length [m]:

Drum spare length %:

Actual order length [m]:

**Cables** | Status

Name ^	Segregati...	Routed length [m]	Tara length [m]	Status	Description
-W7	M	17,30	16,00	ROU	From MDP to E1 (in A1)
-W8	M	49,22	6,00	ROU	From LP1 to E2 (in A3)
-W9	M	39,50	6,00	ROU	From LP1 to E3 (in A3)
-W10	M	30,20	6,00	ROU	From LP1 to E4 (in A3)
-W11	M	12,20	6,00	ROU	From LP1 to E5 (in A3)
-W12	M	14,45	6,00	ROU	From LP2 to E6 (in A2)
-W13	M	22,70	6,00	ROU	From LP2 to E7 (in A2)
-W14	M	32,30	6,00	ROU	From LP2 to E8 (in A2)

Created date:  Created by:  Updated date:  Updated by:

For each drum, you have a window like this:

Basic data, such as name and cable type, and information about how the cable drum contents are used.

At the bottom, you get a list of the cables that use the selected drum, with their individual statuses.

### Cable lengths

#### Cable drum lengths

The assigned cables' lengths, split into the different kinds of lengths.

**Cable lengths [m]**

Routed:  + Tara:  + Spare:  = Order length:  Remaining:  Not pulled:

#### Number of cables using the drum

An overview of the number of assigned cables and their statuses.

**Number of cables**

Total:  Pulled:  Not pulled:

#### Cable drum lengths<sup>xxii</sup>

Cable drum lengths – nominal length (optionally this is defined in the cable type table) and actual length.

**Cable drum lengths**

Max. cable drum length [m]:

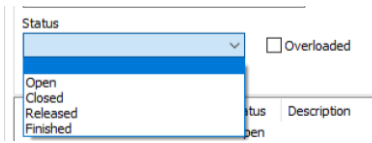
Drum spare length %:

Actual order length [m]:

## Cable drum status

When planning how to use the contents of the cable drums, you need to give the drums status.

Status is also part of the search criteria.



A screenshot of a software interface showing a 'Status' dropdown menu. The menu is open, displaying four options: 'Open', 'Closed', 'Released', and 'Finished'. To the right of the dropdown is a checkbox labeled 'Overloaded'. Below the dropdown, there are labels for 'Status' and 'Description'.

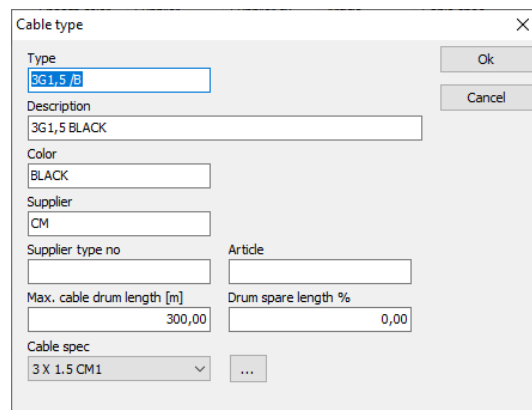
Cable status can be<sup>xxiii</sup>:

- Open: new cables can be assigned to the drum
- Closed: no new cables can be assigned to the drum. Same level as cable's 'routed'
- Released: released for cable pulling
- Finished: cables have been pulled

## Create a new drum

You can create drums in two ways: either manually or automatically.

For either method, the cable type definition can contain a default Max cable drum length.



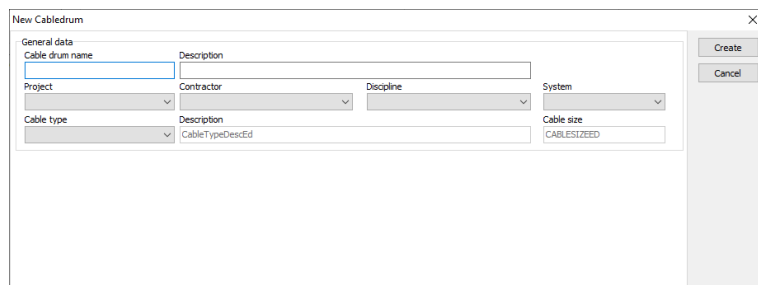
A screenshot of a 'Cable type' dialog box. It contains several input fields: 'Type' with the value '3G1,5/B', 'Description' with '3G1,5 BLACK', 'Color' with 'BLACK', 'Supplier' with 'CM', 'Supplier type no' (empty), 'Article' (empty), 'Max. cable drum length [m]' with '300,00', and 'Drum spare length %' with '0,00'. At the bottom, there is a 'Cable spec' dropdown menu showing '3 X 1.5 CM1' and a button with three dots. 'Ok' and 'Cancel' buttons are on the right.

## Create a new drum manually

Press the + in the toolbar to create a new drum:

The drum must have a Name and a Cable type. Other datafields are optional<sup>xxiv</sup>.

You can assign any name to the drum. Cable type is selected from the list.



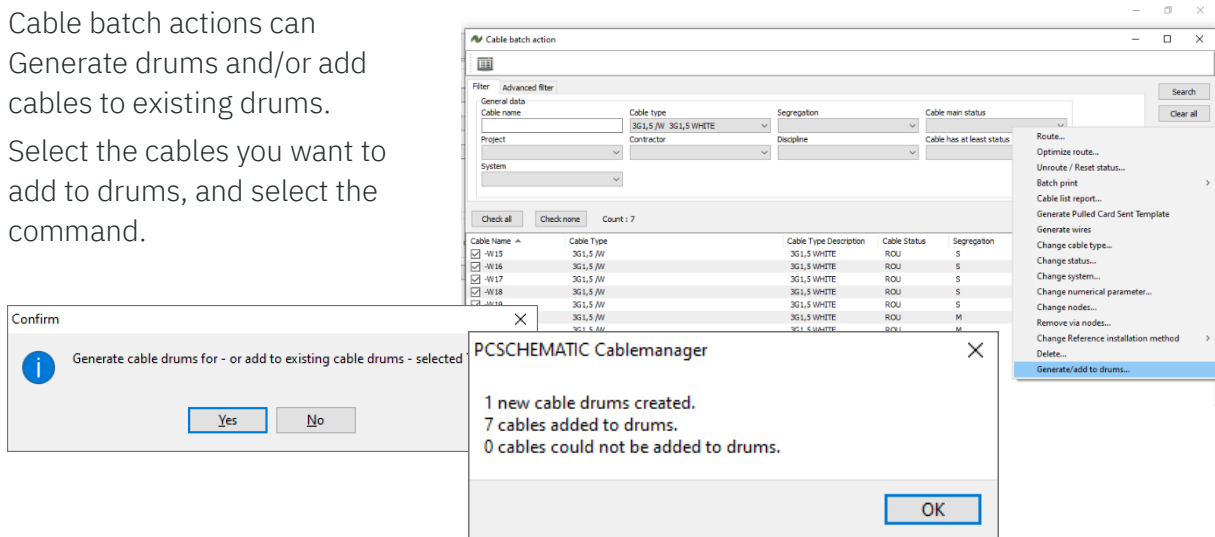
A screenshot of a 'New Cabledrum' dialog box. It has a 'General data' section with fields for 'Cable drum name', 'Description', 'Project', 'Contractor', 'Discipline', and 'System'. Below this are 'Cable type' and 'Cable size' fields. 'Cable type' is set to 'CableTypeDescEd' and 'Cable size' is 'CABLESIZEED'. 'Create' and 'Cancel' buttons are on the right.



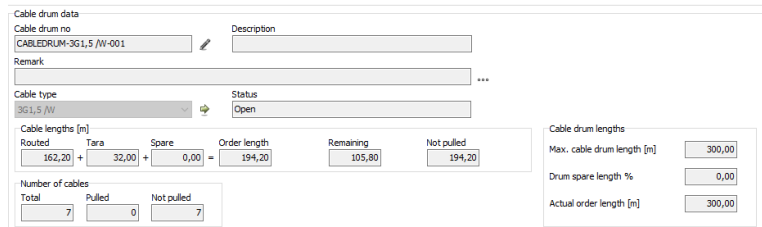
## Create a new drum automatically

Cable batch actions can generate drums and/or add cables to existing drums.

Select the cables you want to add to drums, and select the command.



The automatically created drums get automated names.



## Cable drum is part of Pull Report

Cable drum name is part of the Pull Report. In that way, you make sure that the cable is taken from the right drum.

PCSCHEMATIC Cablemanager - Pull Report

PC   SCHEMATIC		Init ADMIN	Date 13/09/2021 12.40.04
<b>Cable name</b> -W13	<b>Description</b> From LP2 to E7 (in A2)	<b>Cable status</b> PSS	<b>Segregation code</b> M
<b>Cable type</b> 3G1,5 /G	<b>Description</b> 3G1,5 GREY	<b>Cable size</b> 1x3x1,5 mm <sup>2</sup>	<b>Cable drum</b> DRUM 2
<b>Remark</b>			
<b>Cable Lengths</b>			
<b>Estimated</b> 0,00 m	<b>Routed</b> 27,74 m	<b>Routed + Tara</b> 33,74 m	<b>Pulled</b> 0,00 m
<b>Installed</b> 0,00 m			
<b>From</b>		<b>To</b>	
<b>Node</b> M39	<b>Tara length</b> 1,00 m	<b>Node</b> M30	<b>Tara length</b> 5,00 m
<b>Tag</b> -LP2	<b>Location</b> A2	<b>Tag</b> -E7	<b>Location</b> A2

## 3D VIEWER

The 3D viewer lets you see all data in a 3D view.

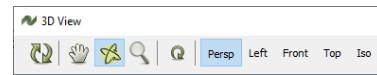
The viewer has a lot of functions, that has not been described properly in the former news documents and manuals.

The following is based on the included demofile.

### Open the 3D-viewer

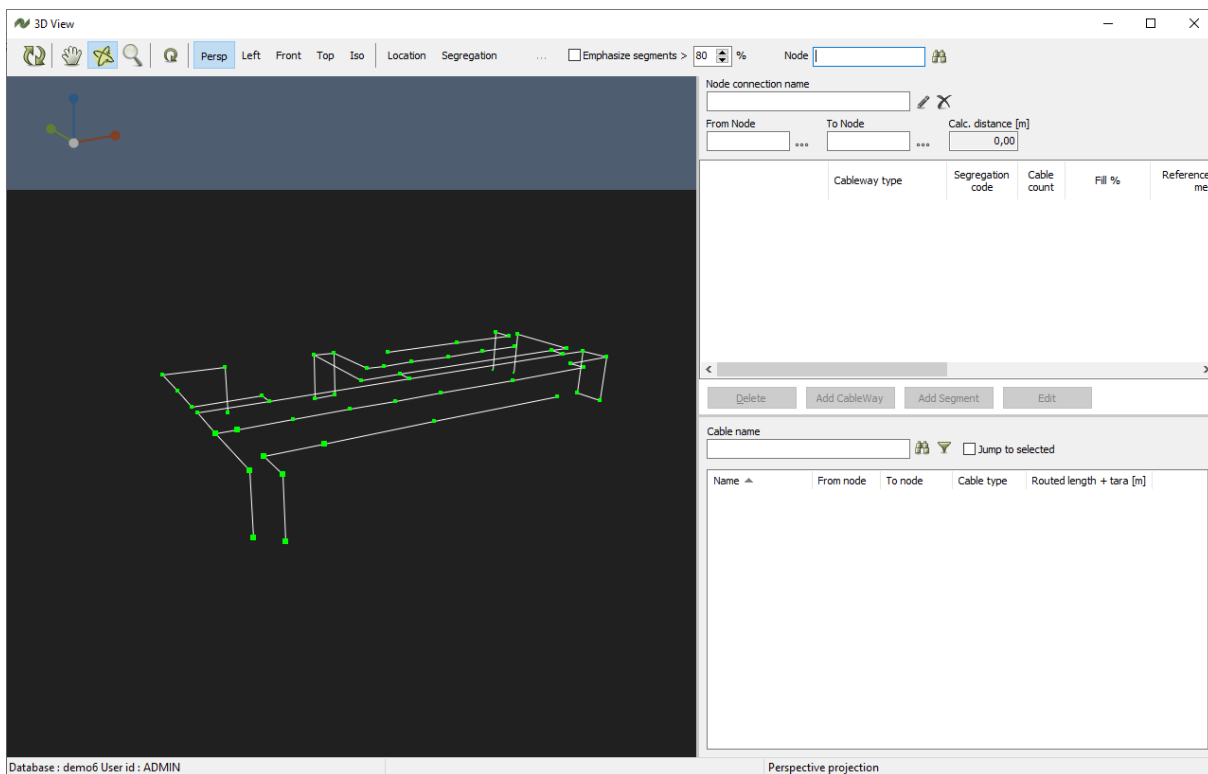
When you open the viewer, you see all cableways in the system.

You can shift between Move, Rotate and Zoom. Zoom is also available directly on your mouse.



When you see it in Perspektive view, you can move it around vertically or horizontally.

In Left,Right,Top and ISOmetric, you can't Rotate.

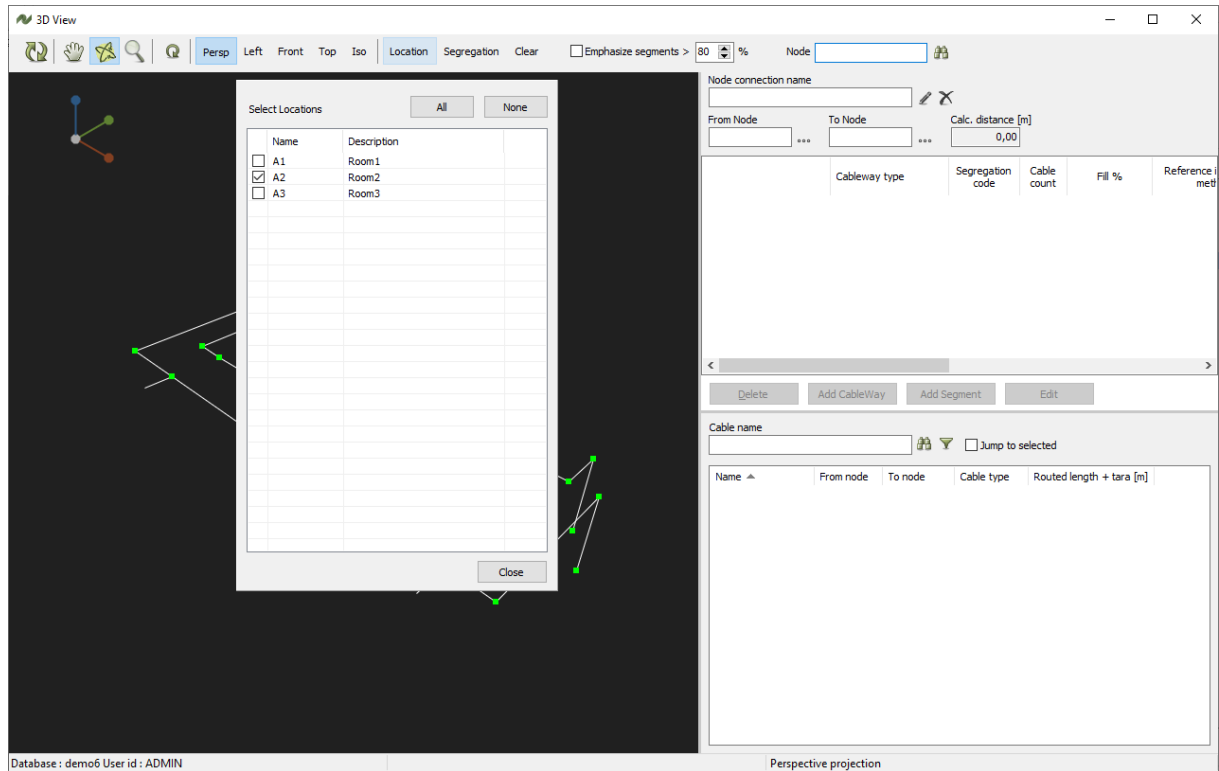


The 3D viewer can also be used for other tasks apart from the pure viewing of the structure. Below is a walkthrough of those features.



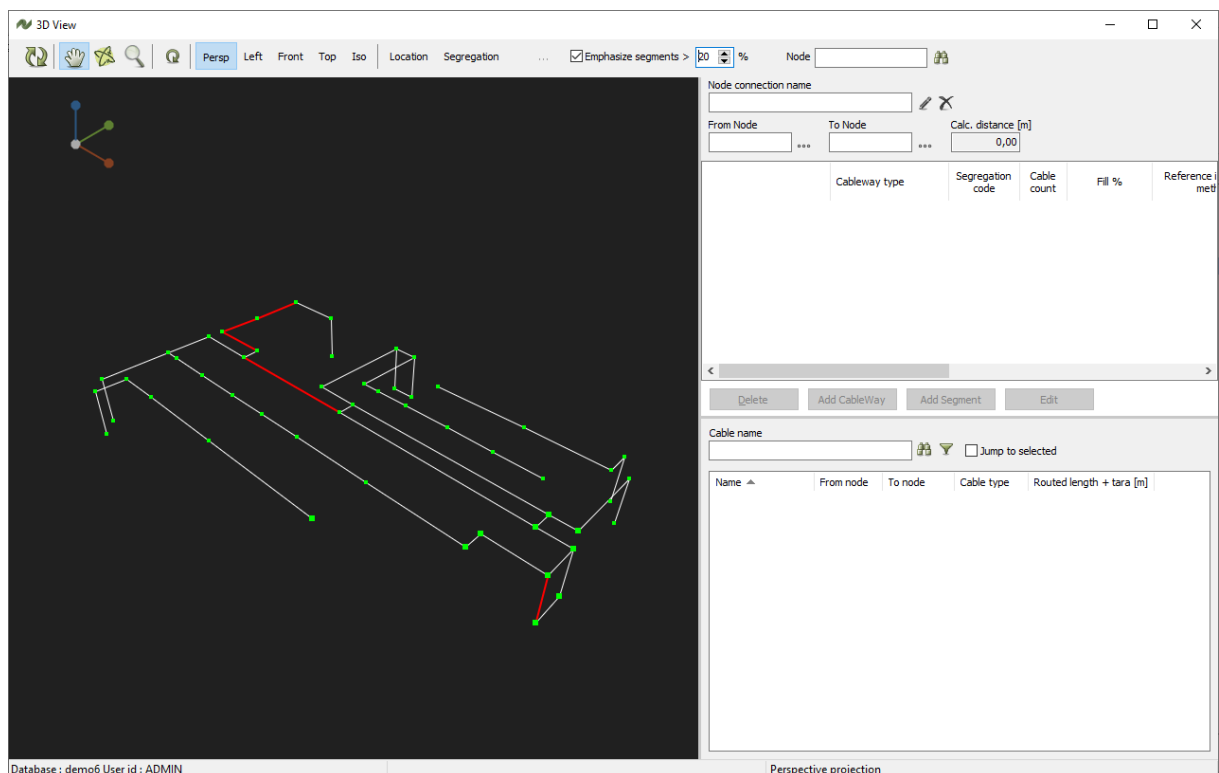
## Filter functions

You can set up filters for what you see. For that you use Locations and/or Segregations for that. When you press Clear, you clear all filters.



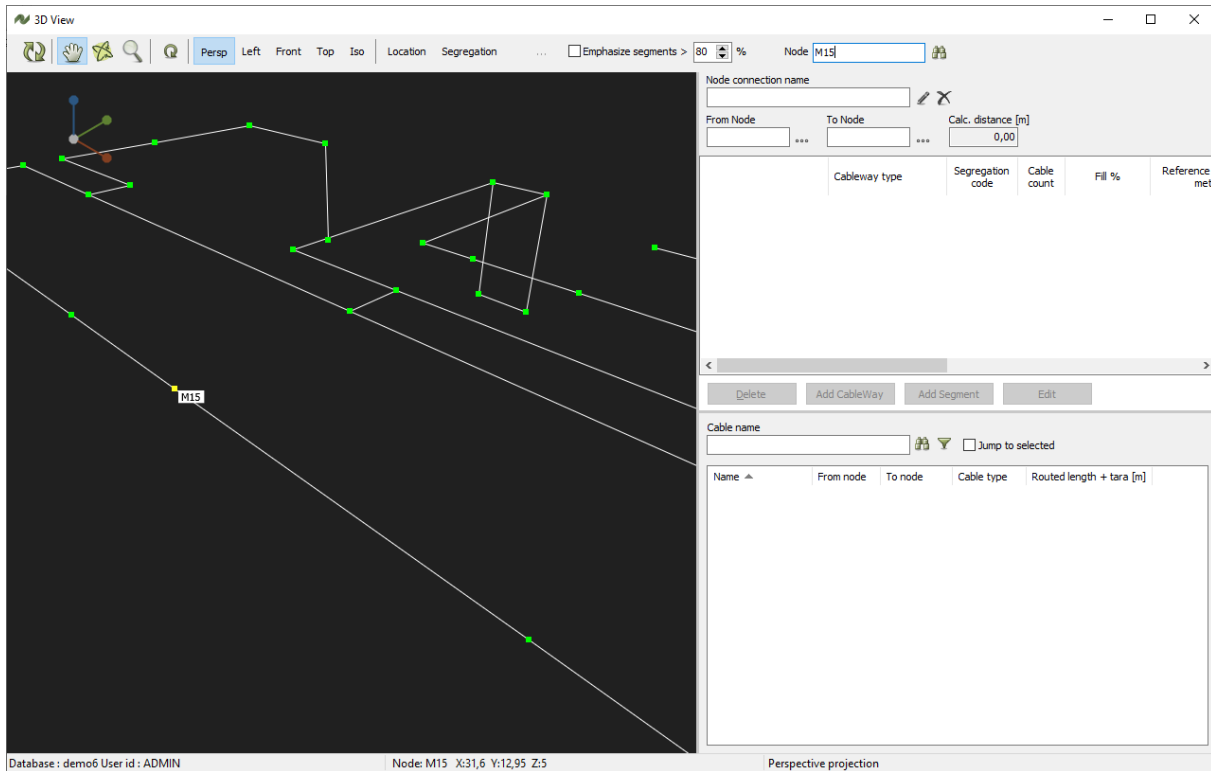
## Highlight overfilled cableways

Using the Emphasize segments function, makes it easy to identify overloaded cableways,



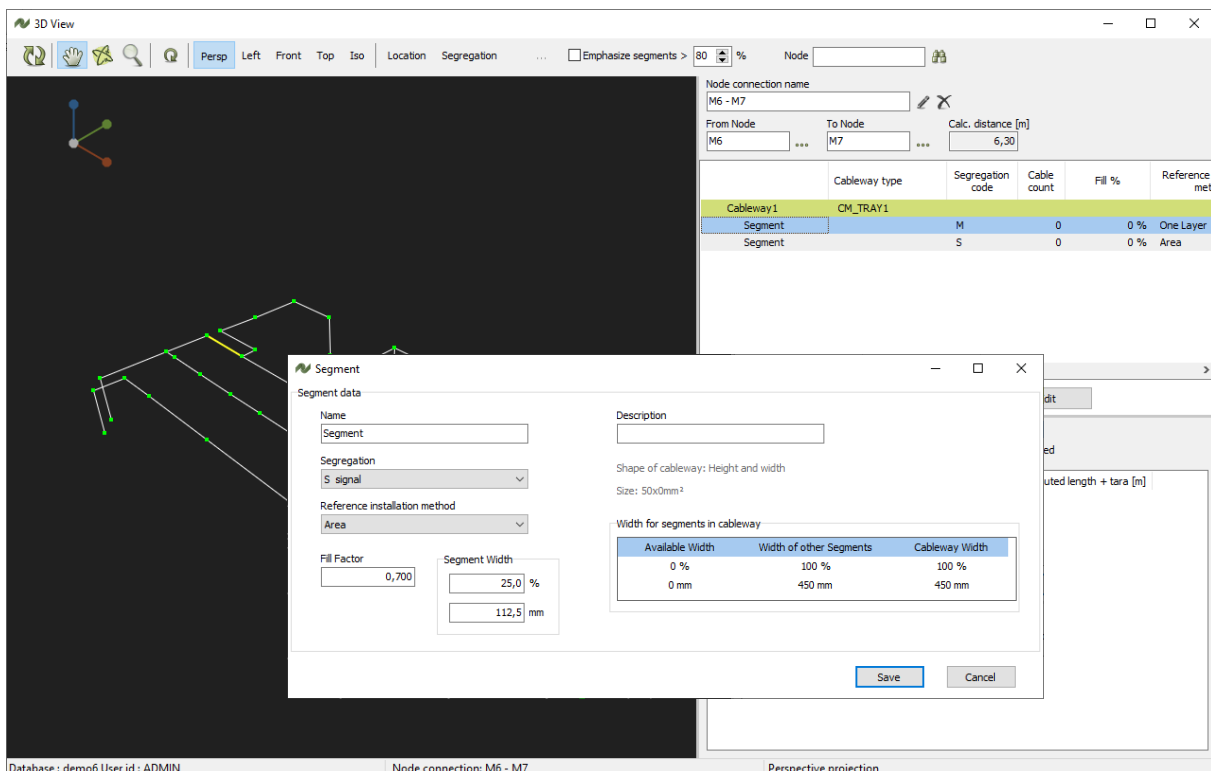
## Find a specific Node

In the Node-field, you can type in a Node name. You jump to it, when you press the button.<sup>XXV</sup>



## Direct access to Cableway commands

You can select a cableway directly in the 3D view. At the right side, you have access to cableways' edit functions, meaning that you can add/edit Cableways and add/edit segments directly on the screen.





## Find a specific cable on the cableways

In the Cables section, you can search for specific cables. You can select filters on lengths.

The screenshot displays the PC Schematic software interface. On the left, a 3D perspective view shows a network of cableways (lines) connecting various nodes (dots). One cableway is highlighted in yellow. The right side of the interface contains a search and filter panel.

**Node connection name:** From Node: [ ] To Node: [ ] Calc. distance [m]: 0,00

**Table Headers:** Cableway type, Segregation code, Cable count, Fill %, Reference i met

**Buttons:** Delete, Add CableWay, Add Segment, Edit

**Cable name:** [ ] Jump to selected:

**Cable length type:** [ ] **Operator:** [ ] **Length [m]:** [ ]

Name	From node	To node	Cable type	Routed length + tara [m]
-W10	M38	M15	3G1,5 /G	36,20
-W11	M38	M17	3G1,5 /G	18,20
-W12	M39	M28	3G1,5 /G	20,45
-W13	M39	M30	3G1,5 /G	28,70
-W14	M39	M32	3G1,5 /G	38,30
-W15	S10	S3	3G1,5 /W	16,92
-W16	S10	S4	3G1,5 /W	26,52
-W17	S10	S5	3G1,5 /W	39,72
-W18	S11	S6	3G1,5 /W	29,10
-W19	S11	S7	3G1,5 /W	19,50
-W2	M33	M36	5G6 /G	84,35
-W20	M40	M12	5G10 /W	53,90
-W21	M40	M14	5G10 /W	44,30

Database : demo6 User id : ADMIN      Cablecount: 23      Perspective projection

# USER RIGHTS - OVERVIEW

Function	Can be carried out by				
	Service Specielt program!	Read-Only	Normal user	Super user	Admin
<b>Cables</b>					
Create individual cable <sup>xxvi</sup>			x	x	x
Edit/Copy/Delete individual cable	x (if selected in Project Settings)		x	x	x
Edit cable name			x	x	x
Attach document			x	x	x
Open attached document	x	x	x	x	x
Create/Edit remark	x		x	x	x
See remark	x	x	x	x	x
Jump to node	x	x	x	x	x
Jump to tag	x	x	x	x	x
Jump to gland	x	x	x	x	x
Show cable type	x	x	x	x	x
Jump to cable spec	x	x	x	x	x
Cable report (excel) 'search list'	x	x	x	x	x
Cable type list report (excel) 'Code table for cable type'	x	x	x	x	x
Cable type report	x	x	x	x	x
Change status	x (if selected in Project Settings and Status > rel.)		x	x	x
See Status History	x	x	x	x	x
<b>Route load</b>					
Remove from route			x	x	x
Optimize (dvs flytte til andre kabelbakker/etager for bedre at udnytte pladsen)			x	x	x
Route like			x	x	x
Route manual ...			x	x	x
Auto route ...			x	x	x
<b>Wiring</b>					
Generate wires			x	x	x
Remarks <sup>xxvii</sup>	x		x	x	x
Edit connections			x	x	x
Termination report	x		x	x	x
Cable connections to excel	x	x	x	x	x
Calculations – set values			x	x	x
<b>Equipment</b>					
Create individual equipment			x	x	x
Edit/Copy/Delete individual equipment			x	x	x
Edit equipment name			x	x	x
Attach document			x	x	x
Open attached document	x	x	x	x	x
Create/Edit remark	x		x	x	x
See remark	x	x	x	x	x
Cables from/to 'equipment'	x	x	x	x	x
Equipment report (excel)	x	x	x	x	x
Add terminal rows			x	x	x
Edit terminal rows			x	x	x



Function	Can be carried out by				
	Service Specielt program!	Read-Only	Normal user	Super user	Admin
Delete terminal rows			x	x	x
Copy terminal rows			x	x	x
Term row connections (excel)	x	x	x	x	x
<b>Cableways</b>					
Create individual cableway			x	x	x
Edit cableway description			x	x	x
Split cableway			x	x	x
Delete (segment or cableway)			x	x	x
Add Cableway (on node connection)			x	x	x
Add Segment (on Cableway)			x	x	x
Edit (cableway type and offset or segment descript., inst.method, fill factor and width)			x	x	x
Move (cable) to segment			x	x	x
Unroute (selected cable)			x	x	x
Unroute all (cables)			x	x	x
Cables on node connection (excel) <sup>xxxiii</sup>	x	x	x	x	x
<b>Nodes</b>					
Create individual node			x	x	x
Edit/Copy/Delete individual node			x	x	x
Edit node name			x	x	x
Change node description			x	x	x
Change node location			x	x	x
Change node coordinates			x	x	x
<b>Code tables</b>					
Code tables – edit/add/delete				x	x
Cable spec – show wires				x	x
Cable spec – generate wires				x	x
Cable spec – generate type				x	x
Cable spec – list to excel	x	x	x	x	x
Cable type – report for all types	x	x	x	x	x
Cable type – list to excel	x	x	x	x	x
Cable wire color – list to excel	x	x	x	x	x
Cable wire cross section <sup>xxxix</sup>				x	x
Contractor code – list to excel	x	x	x	x	x
Cableway type – list to excel	x	x	x	x	x
Discipline code – list to excel	x	x	x	x	x
Glands – list to excel	x	x	x	x	x
Gland type – list to excel	x	x	x	x	x
Location code – list to excel	x	x	x	x	x
Project code – list to excel	x	x	x	x	x
Segregation code – list to excel	x	x	x	x	x
System no – list to excel	x	x	x	x	x
<b>Batch functions</b>					
<b>Batch functions – Cables</b>					
Route				x	x
Optimize route				x	x
Unroute / reset status				x	x

Function	Can be carried out by				
	Service Specielt program!	Read-Only	Normal user	Super user	Admin
Batch print... cable status report	x			x	x
Batch print... cable pull report	x			x	x
Batch print... cable termination report	x			x	x
Cable list report	x			x	x
Generate Pulled Card Sent Template ***				x	x
Generate wires				x	x
Change cable type				x	x
Change status	x			x	x
Change system				x	x
Change numerical parameter				x	x
Change nodes				x	x
Change Reference Installation Method				x	x
Delete				x	x
<b>Batch functions – Equipment</b>					
Delete				x	x
<b>Batch functions – Cableways</b>					
Delete				x	x
Check fill /weight factor	x	x	x	x	x
Cableway list report	x	x	x	x	x
<b>Batch functions – Nodes</b>					
Delete				x	x
Change x-coordinate				x	x
Change Y-coordinate				x	x
Change Z-coordinate				x	x
<b>3D view</b>					
3D view	x	x	x	x	x
3D til dxf	x	x	x	x	x
<b>Rapporter</b>					
<b>Cable reports</b>					
Search list	x	x	x	x	x
Cable type report	x	x	x	x	x
Cable status report	x	x	x	x	x
Cable pull report	x		x	x	x
Cable termination report	x		x	x	x
Route load	x	x	x	x	x
Cable connections	x	x	x	x	x
Check for overload	x	x	x	x	x
Voltage drop	x	x	x	x	x
<b>Equipment report</b>					
Search list	x	x	x	x	x
Nearest node	x	x	x	x	x
Cables from/to	x	x	x	x	x
Termrow connections	x	x	x	x	x
<b>Cableway reports</b>					
Search list	x	x	x	x	x
Cableway type usage report	x	x	x	x	x



Function	Can be carried out by				
	Service Specielt program!	Read-Only	Normal user	Super user	Admin
Cables on cableway	x	x	x	x	x
<b>Nodes report</b>					
Search list	x	x	x	x	x
Attached to segments	x	x	x	x	x
Attached to nodes	x	x	x	x	x
<b>Data</b>					
Import					x
Generate import sheet ...					x
Import/update data from sheet ...					x
Import from Automation					x
Import from Cabledim					x
Import cable length	x (if selected in Project Settings)				x
Statistics	x	x	x	x	x
Check data	x	x	x	x	x
Segments with no cables	x	x	x	x	x
Nodes not connected to anything	x	x	x	x	x
Nodes not connected to cableways	x	x	x	x	x
Cables that have same from and to node	x	x	x	x	x
Cable types not used	x	x	x	x	x
Cableway types not used	x	x	x	x	x
Check cable routes	x	x	x	x	x
<b>Settings</b>					
Project settings – change				x	
License – look for at select license	x		x		
System directories – select/change directories	x		x		
Select automatic checks (for updates)	x		x		
File paths (for logos)	x		x		
Project list	x		x		
Add a new project to the list	x		x		
Edit project link	x		x		
Delete project from the list	x		x		
Logon to	x		x		
Language settings - edit					x
Users					x
Change password	x		x		















