

QUICK USER GUIDE

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This quick reference guide summarizes the key components of the MeteorCalc SL software and explains the basics of using the software.

MeteorCalc SL supports the 230/400V (TN) voltage systems in street lighting networks and the metric system of units in dwg-files. The nominal voltage is adjustable within 220/380V - 250/440V according to regional standards.

1. After installation

Check the main settings

We recommend you to check the main settings of the program and, if necessary, to change them according to your regional standards. To do this use the “**Program Options**” command and call the “General Settings” window.

Output language. Set the output language which MeteorCalc SL will use in information tables in dwg-files.

Prefix for distribution panel boards. MeteorCalc SL will add this prefix automatically to the name of a distribution panel board on plans and tables.

Prefix for earthing devices. MeteorCalc SL will use this prefix to designate earthing devices on plans.

Check the calculation settings

We strongly recommend you to check and set the settings of electrotechnical calculations. Use the “**Program Options**” command and call the “Calculation Settings” window.

Default value of nominal voltage in street lighting networks. A nominal voltage of low voltage networks directly affects the results of current and voltage drop calculations.

Voltage tolerance in street lighting networks. This parameter defines the voltage factors used in short-circuit calculations. A voltage factor (as the part of an equivalent voltage source) directly affects the results of short-circuit currents calculations.

When MeteorCalc SL is installed, a new panel is added to the CAD ribbon and a new item is added to the CAD main menu. The ribbon is a main interface element of the program. In case the User does not use the ribbon, it is possible to run the program through the main menu or the command line.

Voltage factors c according to the IEC 60909-0 (2016) are shown in the table.

Nominal voltage U_n	c_{max}	c_{min}
Low-voltage systems (up to 1kV) with a tolerance of $\pm 6\%$	1,05	0,95
Low-voltage systems (up to 1kV) with a tolerance of $\pm 10\%$	1,10	0,90

Default value of a conductor temperature for max SCC calculations. According to the IEC 60909-0, a conductor temperature of 20 °C is assumed for the calculation of the maximum short-circuit current.

Default value of a conductor temperature for min SCC calculations. According to the IEC 60909-0, when calculating minimum short-circuit currents, the value of the cable resistance has to be introduced at a higher temperature. This temperature usually is defined by regional standards.

Default value of a conductor temperature for voltage losses calculations. This temperature usually is defined by regional standards. The long-term permissible operating temperature of power cable may be used in the absence of such a standard.

Also you can set **default values of additional cable length** and select cable designation mode on plans and schemes. For this purpose, use the “**Program Options**” command and call the “Cables Settings” window.

2. To start work

The work with MeteorCalc SL can be organized by two different ways:

- **Method A.** Model of street lighting network is directly in DWG file of the street lighting project.
- **Method B.** Model of street lighting network is in the separate DWG file (this method is recommended for large projects).

In order to start work, you should receive a template file of the program in both cases. For this purpose, enter the "MTR-GET-TEMPLATE" command to the command line and save the file under the appropriate name (this command is used very rarely; therefore, it is not in the ribbon and menu).

3. Video tutorials and examples

The easiest way to start with the MeteorCalc SL is to watch the video tutorials on our website <https://meteorcalc.com/videos> before you start to work. These videos are available on youtube too. (Please, watch in full screen mode with quality set to 1080p).

We especially recommend watching the following video:

MeteorCalc SL features overview	https://www.youtube.com/watch?v=1qN6aVMzKe8
Creation of a street lighting model	https://www.youtube.com/watch?v=7jThjPSh53w
Audit a street lighting model	https://www.youtube.com/watch?v=YIn6IzBFH2M
Data Library Manager. Add new item	https://www.youtube.com/watch?v=26xxEryU594

All videos have English narrations.

For first start you can use the "**MeteorCalc_SL_Example_1_Street_Lighting.dwg**" file. This step by step example is adapted for the trial version. The street lighting model in this file is made according to the Method A. (Model of street lighting network is directly in DWG file of the street lighting project). Please, refer to the "**Getting Started (Beginners Guide)**" brochure to study the example #1.

4. Method A. Model of street lighting network is directly in the project DWG file

Template file of the street lighting network plan

We advise you to add all elements (blocks, layers and styles) required to work with MeteorCalc SL to the template file of the street lighting plan of your company.

You will find them in the program template file on the "Objects for template" tab. Just copy and insert them in the appropriate place of your street lighting plan template.

Usage of blocks of poles and street lighting luminaries

At the beginning, your work with the street lighting network plan hardly differs from the usual course of the designing. The only difference is that the special blocks extracted from the program template file should be used to designate the poles and luminaries on the plan. The blocks of street lighting units, with which the program works, should have the „MTR-„ prefix and should be located on the "**mtr-calc-sl-units**" layer.

Note: To accelerate the works at this stage, we recommend using the following program commands: “**Insert Block**” and “**Multi Insert**”.

The User can (having taken the block from the program template file as a basis) define any new blocks to model the street lighting units, taking into account the following:

- ✓ A new block should have all attributes that the original block has;
- ✓ A block name should begin with the „**MTR-**„ characters;
- ✓ A base point of the block should be designated within the block body (a logical position of the base point is a pole axis).

When the blocks of street lighting units (they are a part of the both street lighting plan and model) and the cable run are mainly ready, one can go on creating the network model.

Main stage of the network model creating

The model of street lighting network is created by the following simple rules:

- ✓ All model elements (excluding the blocks of street lighting units) should be on the “**mtr-calc-sl-model**” layer;
- ✓ The distance between the neighboring blocks of street lighting units should be at least 1m;
- ✓ The model is created in compliance with the real tree structure of the street lighting feeder. Each street lighting unit should have one and only power cable and can have an unlimited number of branches. The block of street lighting units should be at the end of each cable line.
- ✓ Each distribution panel board should have one transformer power cable. One distribution panel board can have up to 10 feeders.

The distribution panel boards are modeled with the special „**MTR_SL_CABINET**“ blocks when the

transformers are modeled with the „**MTR_SL_TRANSFORMER**“ blocks. In order to insert the blocks, we recommend using the “**Insert Block**” command. The block will be immediately inserted into the required layers using this command.

The cables are modeled on the plan with LW polylines on the “**mtr-calc-sl-model**” layer. In order to draw the polylines, we recommend using the “**Draw Model Line**” command. The polylines will be drawn on the required layer using this command.

Note: The length of the modeling polyline is equal to the length of the cable routing on the plan. The cable data has a special “Additional Length” field that allows taking into account the vertical runs of cable, assembly and other reserves for every section. MeteorCalc SL always uses the value of full cable length ($L_{pline} + L_{add}$) when calculating specifications and making electric calculations.

Use the “**Isolate Program Layers**” command and “**Turn All Layers On**” command for quick managing layers in the drawing.

Use the “**Audit SL-Model**” command to check and correct the model structure.

Data assignment

When all model elements (street lighting units, distribution panel boards, power sources and cables) are installed, one can begin to assign data in accordance with the design option. For the individual data assignment (and view or change), use the “**Object Data**” command.

In order to assign data to all feeder objects (street lighting units and cables) at once, use the “**Feeder Objects Data**” command. Using this command, one can assign data to the objects of main line and branch lines individually.

In order to accelerate the work, we recommend using the “**Copy Data**” command. Using this command, you can copy the data from the sourcing object to a great number of similar objects.

Note: All model elements (with/without data) can be moved and copied with the CAD platform in-built tools regardless of the program operation (including to other files using Copy-Paste).

Numeration of street lighting units of feeder

You can number the street lighting units in the feeder and assign a number to the feeder only if all feeder objects have data.

The “**Feeder Numbering**” command allows numbering the street lighting units in the feeder and distributes them by the phases evenly. The numbers are assigned to the elements of the main line of the feeder in the first place and then to all branches.

Electrotechnical calculations

It is possible to make electrotechnical calculations only if all feeder objects have data, are numbered and distributed by the phases.

Use the “**End Point Calculation**” command to calculate the minimum SC current and voltage loss at the feeder end points.

Use the “**Feeder Calculation**” command to calculate power and operating current of the feeder.

Use the “**DPB Calculation**” command to calculate maximum and minimum SC currents at the buses of the distribution panel board and to calculate voltage loss in the power cable of the distribution panel board.

The feeder configuration is adjusted and/or the cable cross-sections are specified at this stage when the calculation results are analyzed.

Note: In order to control the course of the calculation process step-by-step, use the “**Detailed report**” option in the appropriate calculation window.

Drawing of the street lighting feeder schemes

Use the “**Draw Scheme**” command to draw the single-line schemes of the street lighting feeders. It is recommended to begin with the drawing of the main line of the feeder and then draw branch lines. When drawing, the program calculates SC current and voltage loss in the specified end point.

We advise you to begin to draw schemes only when the feeder configurations and all parameters of the

model elements will be completely determined. If any changes are introduced in the model or feeder scheme, one should delete it and draw a new one.

Reports

Use the “**Feeder Specification**”, “**DPB Specification**” or “**All Objects Specification**” command to receive the specifications and explications of the model elements.

Use the “**Used Units**” command to receive the tables with the detailed descriptions of the street lighting units used in the model file.

Data library of street lighting units

The data of the street lighting units planned to be used in the project should be determined and saved in the Data Library. Use the “**Data Library**” command to edit the Data Library. The street lighting unit code assignment recommendations are provided in the „MeteorCalc_SL_units_coding.pdf“.

If the descriptions of the street lighting units used in the current drawing were changed in the Data Library, use the “**Update Data**” command to update the street lighting unit data of the current drawing.

Note: The database of street lighting units with examples is installed on the User’s computer in the course of the first installation.

Note: When the User applies to the street lighting unit Data Library for the first time, the User will be offered to register his/her name. The registered user name is preferred to include only English characters.

Help system

For reference, use the “**MeteorCalc SL Help**” command or press the “Help” button in the active dialog window. Video tutorials and examples are available on the MeteorCalc SL website.

5. Method B. Model of street lighting network is in the separate DWG file

Template file of the street lighting network plan

When using Method B, we advise you to create a separate template file of the street lighting model where all required elements (blocks, layers, tabs, styles, etc.) of your company and all elements (blocks, layers and styles) required to work with MeteorCalc SL are located.

Your work with the street lighting network plan does not differ from the ordinary designing course. When the blocks of poles and luminaries and the cable runs are mainly ready, you can begin to create the network model.

For this purpose, open the model template file and save it in the project fold under the appropriate name. The further work will be performed in the model file.

Import of post blocks from the project file

At first, place the blocks of street lighting units in the model file in accordance with the project file. You can do it manually or automatically. To import the blocks automatically, you should do the following:

- Switch to Model Space. It is desirable that there would be no entities in the Model Space.
- Attach the street lighting network plan as an external reference (overlay Xref). You can also add the external references of the road project plan and geo basis. We recommend leaving visible only those layers that help to better understand the drawing.
- Use the **“Import SL Blocks”** command and determine from which external reference one should import the objects (for this purpose, specify any entity in the appropriate external reference).

- Select the block from the list that will replace the blocks of poles from the external reference file in the model file. We recommend using the **“MTR-UNIT”** block that has only the base point and attributes for the data indication (such block will not cover the pole block on the street lighting plan).
- When **OK** button is pressed, the post blocks from the external reference will be doubled in the model file by the selected block, saving X and Y coordinates and rotation angles. If the block of street lighting unit is present in the model file in any place, the block will not be inserted again.

Note: The program works only with those blocks of street lighting units that have the „**MTR-**„ prefix. It is referred to the both blocks of street lighting units in the model and blocks of poles in the street lighting plan file, from which it is supposed to import the blocks. If required, use the CAD **“Rename”** command to rename the blocks in the plan file (you should add 4 „**MTR-**„ characters to the beginning of the block name).

The blocks will be successfully imported if the following conditions are met:

- ✓ the blocks of poles and luminaries in the street lighting plan file should have the „**MTR-**„ prefix;
- ✓ The word coordinate system (WCS) must be set in the both files;
- ✓ the blocks of poles and luminaries in the street lighting plan file should be determined so that the block base point will be within the block body;
- ✓ the blocks of poles and luminaries in the street lighting plan file should not be dynamic blocks.

In the model file, the blocks of street lighting units should always be on the **“mtr-calc-sl-units”** layer.

In the street lighting plan file, the imported blocks of poles and luminaries can be placed on any layers.

Import of cables from project file

Use the “**Import SL Cables**” command. When using the command for the first time, you should designate the external reference and layer on which the program will search for polylines, determining the cable run. For this purpose, you should specify any polyline, being in the required file on the required layer. From now, you can always change the search parameter by clicking the “**Set**” button.

The command has 2 operation modes:

1. The User specifies the start block and finish block every time,
2. The User specifies the start block only once and then only the next block.

In both cases, the program tries to find a path on the cable run between the specified blocks in the external reference file and to draw the polyline on the found path in the model file.

If the distances between the blocks of street lighting units in the street lighting plan file is not very long (for example, in the case of park lighting), we recommend reducing the search area radius. For this purpose, select “Small” or “Very Small” values in the “**Search Area**” list.

There are some configurations of cable network of street lighting not supported by this command. It can be connected with the fact that the cable runs in the external reference are placed on the different layers or there are numerous concurrences of polylines, etc.

If the command cannot determine the cable run between the specified blocks, use the “**Draw Model Line**” command and draw this cable section manually.

Creation of network model

When the blocks of street lighting units are imported in the model file, you can continue creating the network model. The further steps of work with the program do not differ from the steps provided in the description of Method A, beginning with the “Main stage of network model creation” section.

Note: Using Method B, it is very easy to create an auxiliary package of drawings called “Schematic plan of street lighting network”. It is a separate file, containing all model elements with the results of calculations, explication and equipment specification, as well as a description of street lighting units. Besides, the street outlines and land plot boundaries are visible.

We provide free online support for all our products, including trial versions. If you have any questions about the MeteorCalc SL, please contact support: support@meteorcalc.com

MeteorOwl Ltd.

Tallinn Estonia
info@meteorcalc.com



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