



Tuner4TRONIC Development User Manual

Please note:

All information in this manual has been prepared with great care. The manufacturer of this hardware and software, however, does not accept liability for possible errors, changes and/or omissions. Please contact your sales partner for an updated copy of this guide. This user manual is for information purposes only and aims to support you in tackling the challenges and taking full advantage of all opportunities the technology has to offer. Individual applications may not be covered and need different handling. Responsibility and testing obligations remain with the luminaire manufacturer/OEM/application planner.

Tuner4TRONIC Development

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About Tuner4TRONIC

Purpose and Application

The Tuner4TRONIC (T4T) software suite allows luminaire manufacturers to program LED drivers via DALI and/or NFC in a simple, fast, reliable and cost-effective way, speeding up the production process.
 Click [here](#) to watch a short video that gives a great overview about Tuner4TRONIC.

This software for Windows consists of four different modules according to the environment of use:

	<p>Tuner4TRONIC Development</p> <p>Luminaire designers can configure LED drivers by setting parameters such as output current, dimming levels, constant lumen output, operating modes and much more. Thanks to its multi-level password system, Configuration Lock protects LED drivers against unauthorized changes while service technicians can still be granted access rights for selected features. Once the configuration has been completed, the settings are exported as an encrypted read-only production file and transmitted to the production line.</p>
	<p>Tuner4TRONIC Production</p> <p>Factory workers can easily load encrypted production files in order to start automatic programming for the fast mass production of LED drivers. Changes to the LED driver configuration are not possible during this stage. Provides a multilingual user interface.</p>

Files Types

The Tuner4TRONIC Development creates and processes different file types, as follows:

- Tuner4TRONIC project file = .osrtul
- Tuner4TRONIC production file = .osrtup
- ECG description file = .osrtud

Workflow between the different T4T Versions

The luminaire product manager/designer creates his desired configuration (e.g. current, CLO, EL) using T4T Development. He saves his project as a *.osrtul file. It is possible to test the configuration by programming individual drivers. When the configuration is finished and ready for production, a read-only *.osrtup production file is exported and sent to the assembly line.

At the assembly line, the production file is loaded using T4T Production and the simplified mass programming can start.

Installation

System Requirements

The minimum system requirements for T4T are:

- A programming interface such as:
 - OSRAM DALI magic
 - NFC programmer (FEIG reader)
- A PC or Notebook with the following specification
 - Pentium M processor
 - 1 GB main memory
 - Windows 7 (both 32 or 64-bit), Window 8 / 8.1 (both 32 or 64-bit) or Windows 10 (both 32 or 64-bit) latest SP installed
 - 100 MB hard disk memory
 - Monitor with a resolution of 1024x768 pixels, the recommended zoom factor is 100%
 - one free USB 2.0 port

Software Installation

NOTE: Always read the "Release Notes" in the zip file before installing the SW.

The installer MUST have Windows administrator rights.

Extract in a folder all files included in the Tuner4TRONIC zip file and then run "Install T4T.exe" available in that folder. By default, both Tuner4TRONIC Development and Tuner4TRONIC Production will be installed, but there is the option to select only one of them.

Tuner4TRONIC Development and Tuner4TRONIC Production can be launched from "Start" => "All Programs" => "Tuner4TRONIC" or by double-clicking the desktop icons.

Follow the instruction included in the Tuner4TRONIC zip file in order to use the components T4T-CMD or T4T-DLL or other possible SW tools.

Hardware Installation

To program luminaries containing LED drivers, it's needed a programming interface suitable for the used ECG(s):

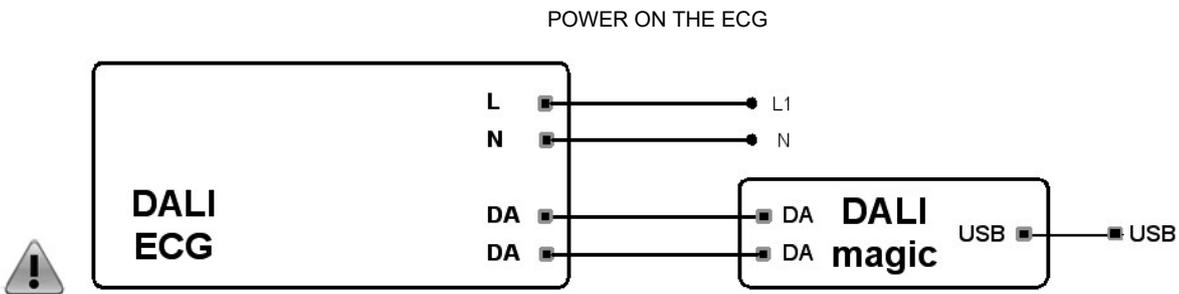
[1]	ECG with DALI interface (multi and/or single programming)	DALI magic	 A rectangular grey device with a USB port on the left and several pins on the top. The label includes 'DALI magic OSRAM', 'DC 6V / 1A', 'USB', and '3DIM'.
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[2]	ECG with NFC interface (only single programming)	FEIG PRH101 FEIG CPR30 FEIG MR102	
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Tuner4TRONIC is capable to handle more than one programming interface connected to the same PC (see Programming interfaces chapter)

ECG with DALI interface:

Step	Activity
1	Connect DALI magic and PC with the enclosed USB cable.
(2)	Connect the external 6V DC power supply to the DALI magic. The use of an external power supply is mandatory in case of more than 4 ECGs connected to the DALI line, anyhow it is strongly recommended to always use the external power supply in order to improve the stability of the DALI communication.
3	Connect the DALI [®] terminals of the DALI magic with the DALI [®] inputs of the ECG(s).
4	Connect the ECG to mains and PE if the related terminal is available in the ECG.

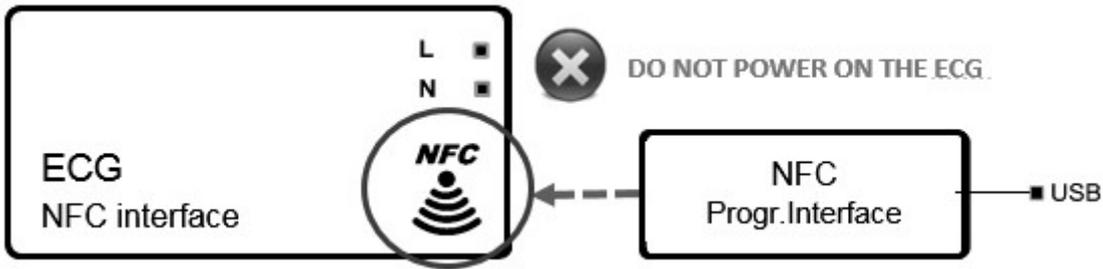


NOTE: most of the DALI LED drivers allow programming when supplied with a low voltage (e.g. 48V) instead of the (full) mains voltage.

For further details, please consult the LED driver's datasheets.

ECG with NFC- Interface

Step	Activity
1	Connect a Programming Interface FEIG PRH101, FEIG CPR30 or FEIG MR102 to the PC with the enclosed USB cable.
2	Put the Programming interface close in contact with the NFC area of the ECG (see logo) and hold still both ECG and programming interface till the process is completed



Important Information:

- Keep the ECG powered OFF during programming via NFC - unless otherwise indicated in the ECG documentation.
- Keep both Programming interface antenna and ECG with NFC in close contact during the complete programming process.
- Switching on/off an ECG with the NFC reader in close proximity may mistakenly terminate the USB connection of the NFC reader's drivers, which leads to T4T complaining that no NFC interface is connected. In this case, please re-connect the reader by opening the Settings / Programming Interfaces Dialog and selecting it again.

Compatibility with previous versions of Tuner4TRONIC

IMPORTANT INFORMATION:

Production files (.osrtup) generated with the previous versions* **from 1.x. to 2.1 cannot be used with the Tuner4TRONIC 3.3 anymore.**

Production files (.osrtup) generated with the previous versions from 2.4 to 3.1 can be opened directly with the Tuner4TRONIC 3.3. However, as a different data model is used in v3.3, Tuner4TRONIC will convert the files on-the-fly to v3.3 while keeping the original older file unmodified. If you wish to use the file in 3.3 we recommend saving a copy of the file as the new format 3.3.*

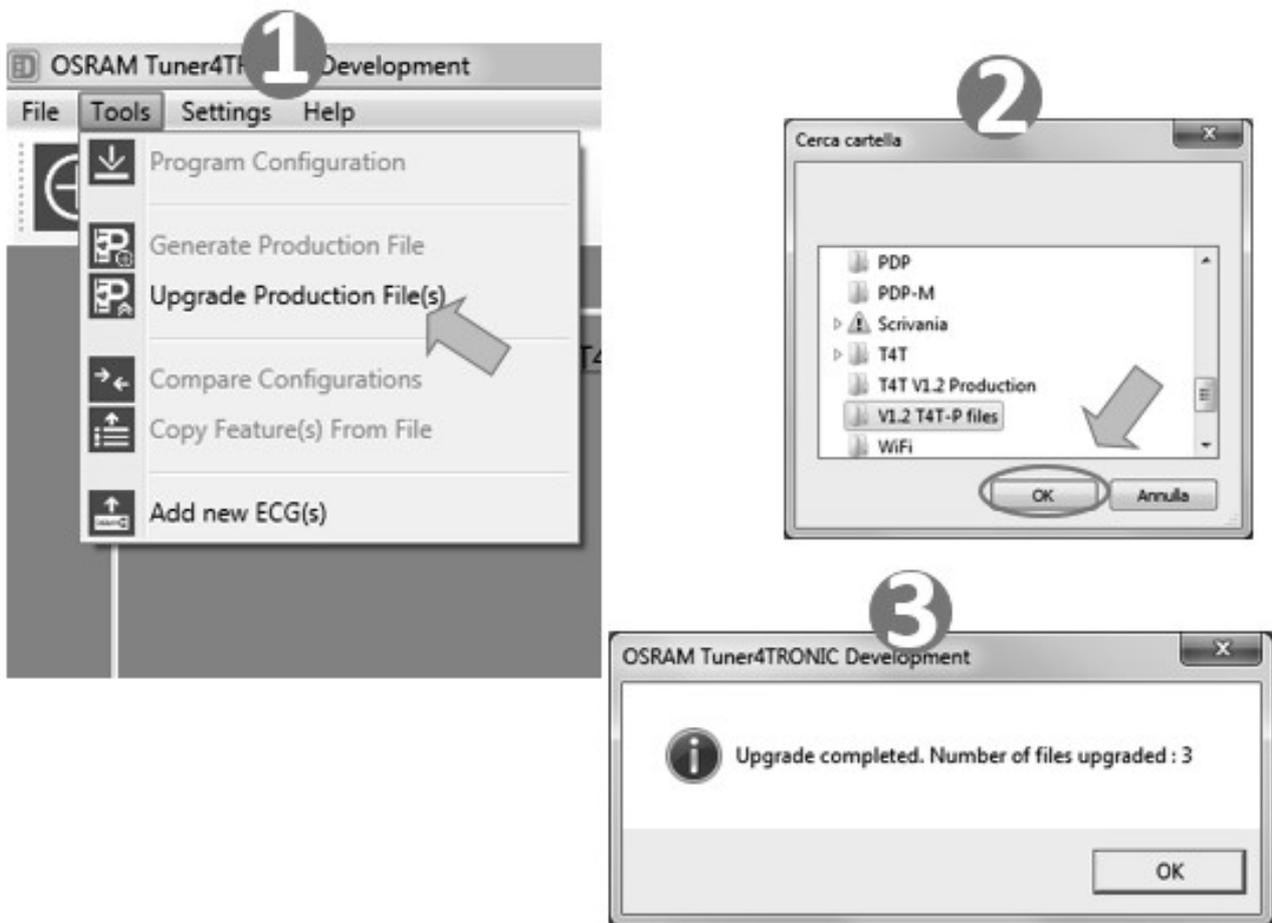
In addition, a conversion utility is available in the Tools menu of Tuner4TRONIC Development: "Upgrade Production Files".

NOTE before proceeding:

It's not possible to downgrade the files from version 3.3 to previous versions. It's strongly recommended to save a backup copy of the files before upgrading them.

11 Procedure to upgrade the files from version 2.4 and 3.1:

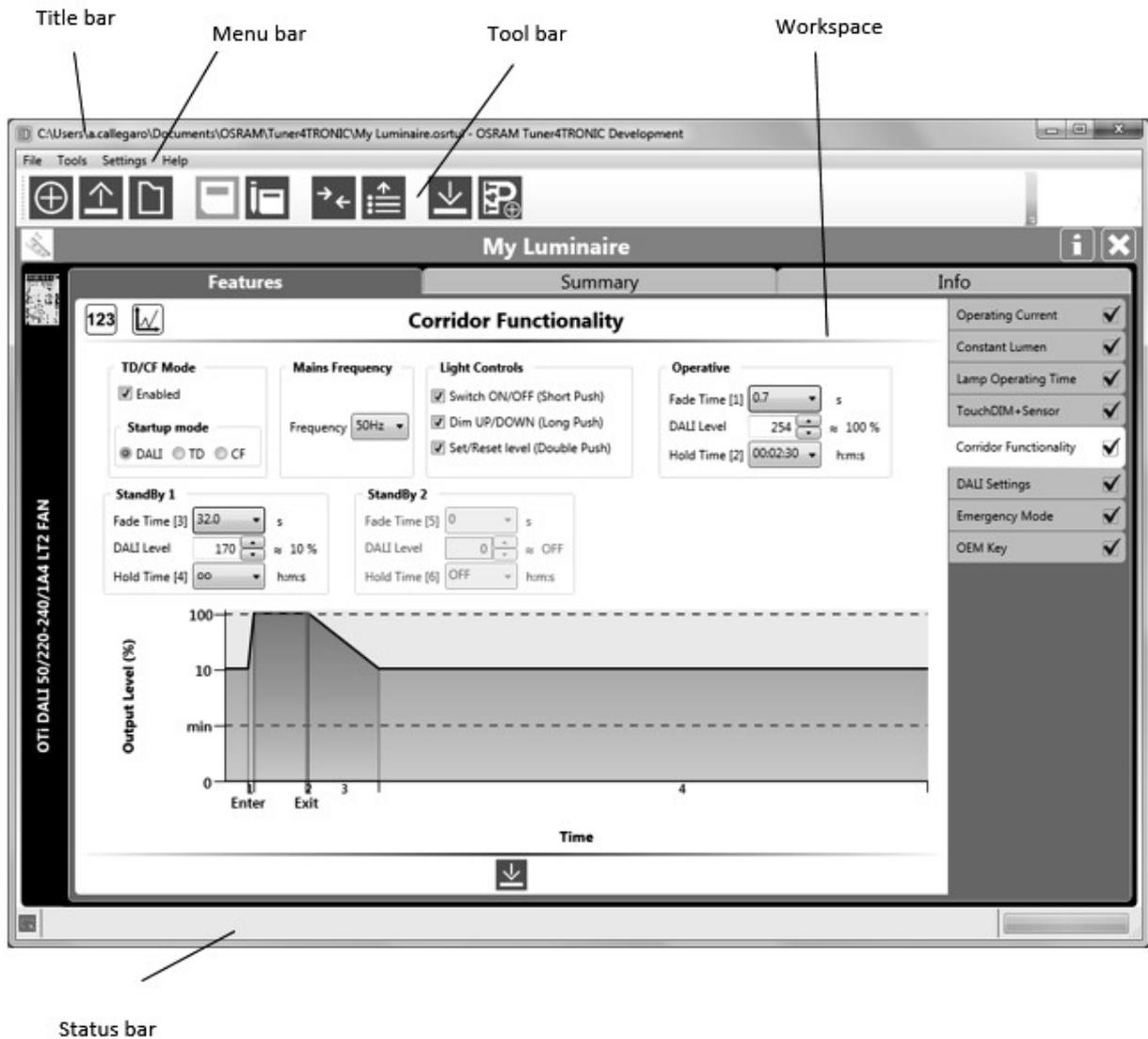
2



1. Select "Upgrade Production File(s)" in the Tools menu of T4T Development.
2. Select the folder containing the T4T-P (.osrtup) files made with T4T-D versions 2.4 or 3.1 and confirm by pressing the "OK" button the utility will upgrade all files included in the folder and possible sub-folders.
3. A confirmation message will display the number of files upgraded. Now the files can be used with T4T-Production version 3.3

User Interface

Basic Layout



Menu Bar

The basic functions are available via the menu bar. Submenus or dialogs are opened by clicking an entry in the menu bar. The menu contains the following elements, each with the listed sub items.

File Menu

New	Creates a new Luminaire configuration. By default the loaded configuration will not be saved and the default file name will be "Untitled.osrtul*".
New From Luminaire...	Creates a new Luminaire configuration loading the parameters from the connected Luminaire. By default The loaded configuration will not be saved and the default file name will be "Untitled.osrtul*".

New From Production File	Creates a new Luminaire configuration loading the parameters from a Production file. The loaded configuration will not be saved and the default file name will be "Untitled.osrtul**".
Open	Loads an existing Luminaire configuration.
Save Changes	Saves the current Luminaire configuration.
Save As	Saves the current Luminaire configuration under a new name.
Recently Used Files	List of the recently used Luminaire configurations
Close	Close Tuner4TRONIC.

Tools Menu

Program Configuration	Writes the current Luminaire configuration to the connected Luminaire
Generate Luminaire Production File	Creates the Luminaire Production File for the Tuner4TRONIC Production; the file extension is: .osrtup
Upgrade production file(s)	Makes T4T-P files (.osrtup) of versions 1.x usable with T4T-P version 2.4 or higher.
Compare configuration(s)	Compare actual configuration with the connected luminaire
Copy Feature(s) from File	Copy into actual configuration a feature of a saved project
Add new ECG(s)	Load a previously saved ECG configuration file

Settings Menu

Programming Interface	Visualize, the connected programming interface(s) and enables the selection of the default one (for each types) to be used only for programming. For reading luminaire's configurations the user has to select the programming interface every time if more than one is available.
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About Menu

Help	Shows Tuner4TRONIC User Manual
Info	Opens the Info dialog
Updates	Tuner4TRONIC Remote Updates – Allows the user to Enable or disable Automatic Updates, Check for updates manually, download Tuner4Tronic installer and configure the path to download Tuner4Tronic installer.

Toolbar

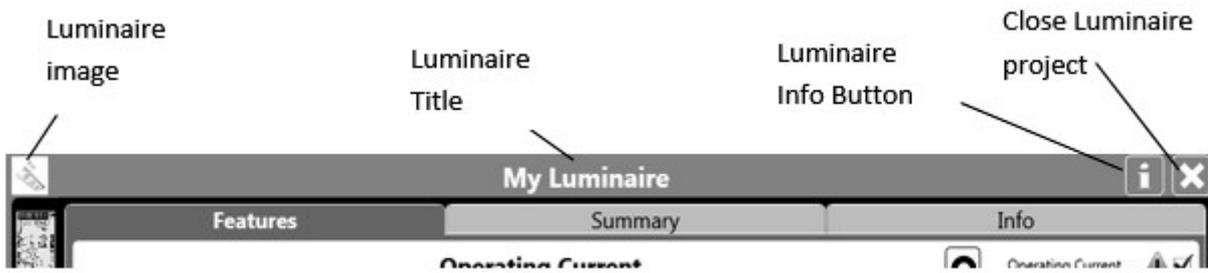
The toolbar provides instant access to the most important actions.

	New	Creates a new Luminaire configuration. By default the loaded configuration will not be saved and the default file name will be "Untitled.osrtul**".
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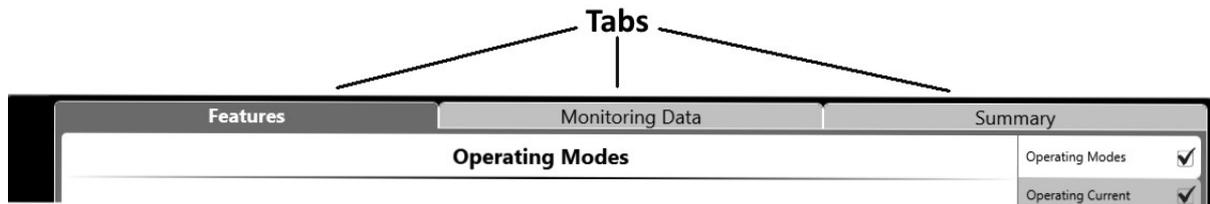
	New From Luminaire	Creates a new Luminaire configuration loading the parameters from the connected Luminaire. By default the loaded configuration will not be saved and the default file name will be "Untitled.osrtul**".
	Open	Loads an existing Luminaire configuration.
	Save	Saves the current Luminaire configuration.
	Save As	Saves the current Luminaire configuration with a new name.
	Compare Configuration(s)	Compare actual configuration with the connected luminaire.
	Copy Feature(s) from File	Copy into actual configuration a feature of a saved project
	Program Configuration	Writes the current Luminaire configuration to the connected Luminaire
	Generate Luminaire Production File	Creates the Luminaire Production File for the Tuner4TRONIC Production; the file extension is: .osrtup

Workspaces

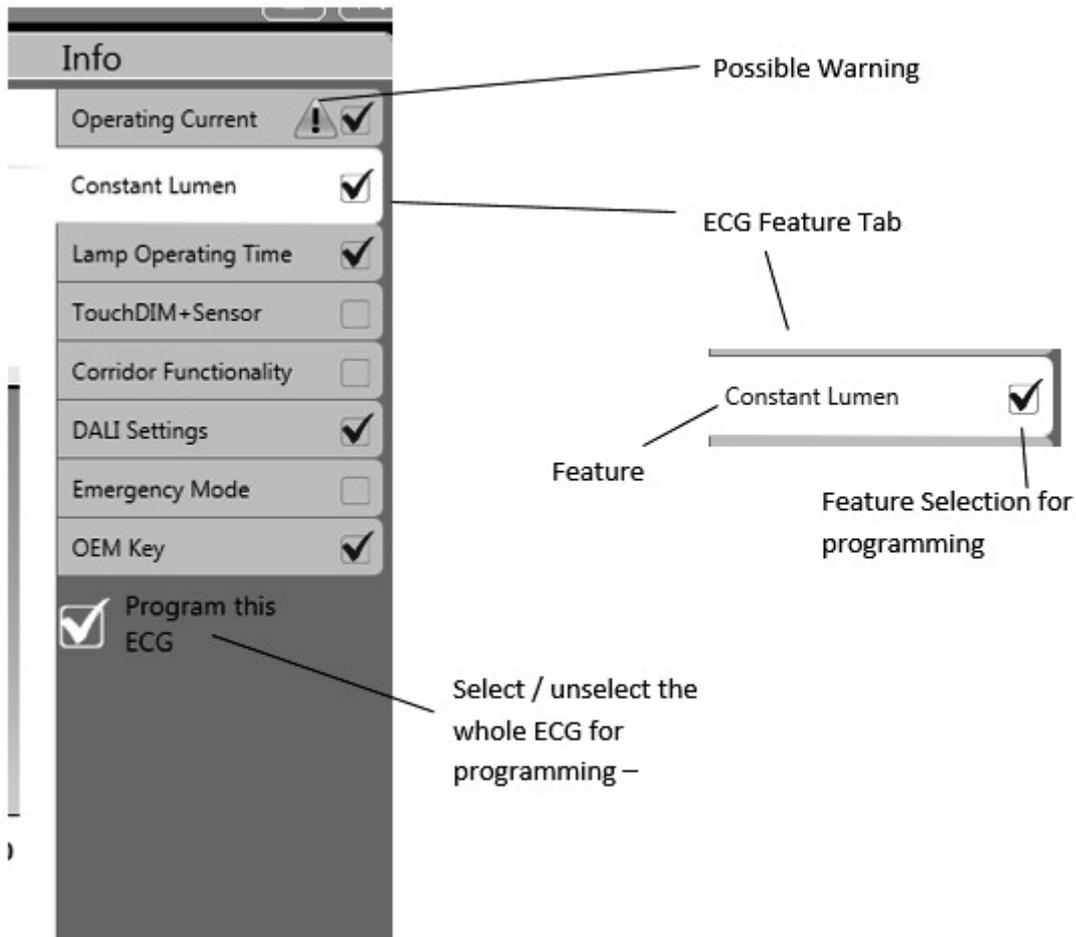
Luminaire Area



ECG Tab Control



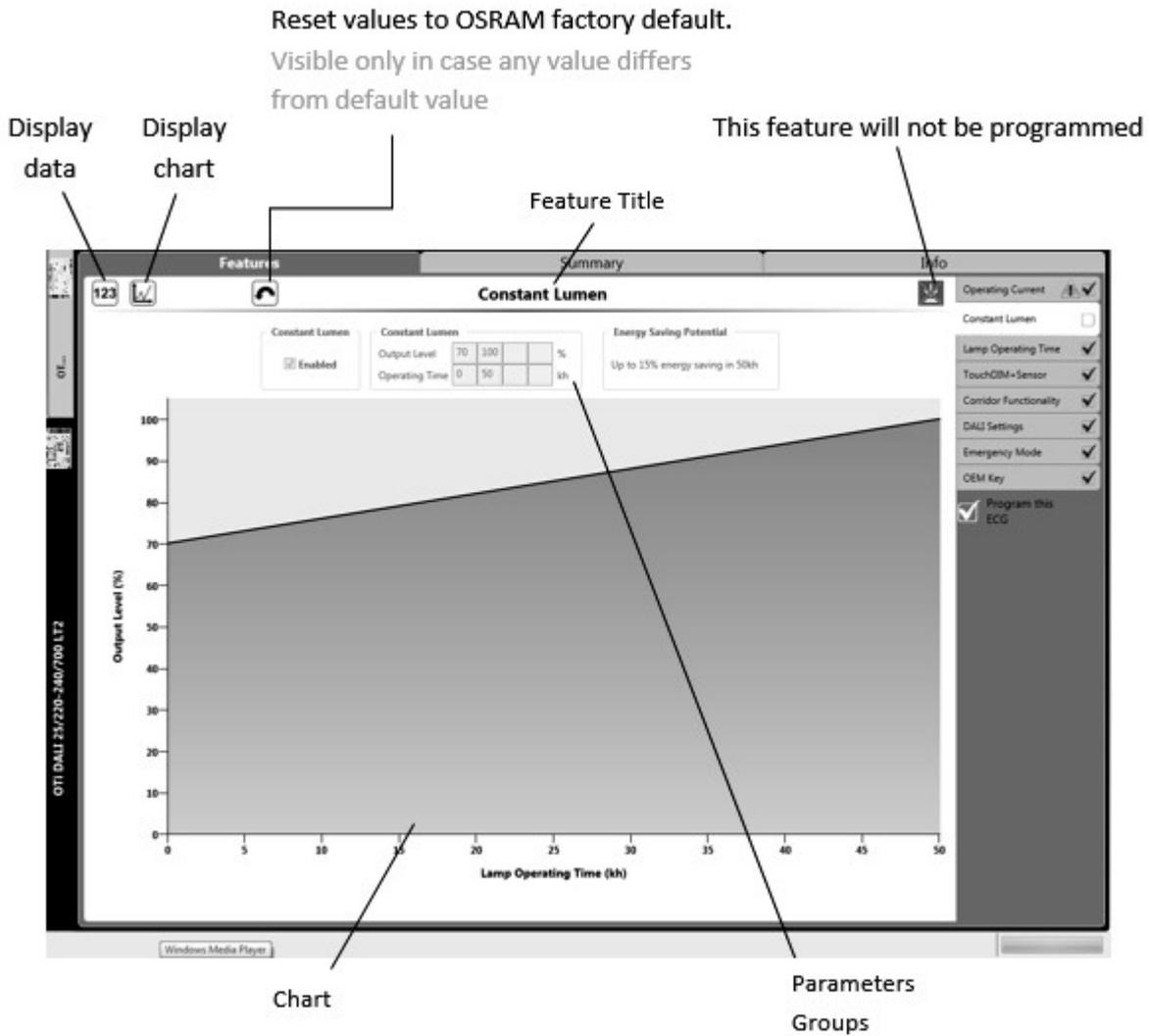
Features Tab Control



The Features list contains only the features supported by the selected ECG. Always refer to the ECG's technical documentation for the supported features.

NOTE: unselecting a feature from programming does not mean *deactivating* it.

Feature Area



Parameter Groups

The parameters of the feature are collected into Parameter Groups.

Feature Selection State

This symbol is displayed only in case the feature is not selected to be programmed (through the check box in the feature tab).

Chart

Displays in a graphical way the values input in the parameters (optionally available).

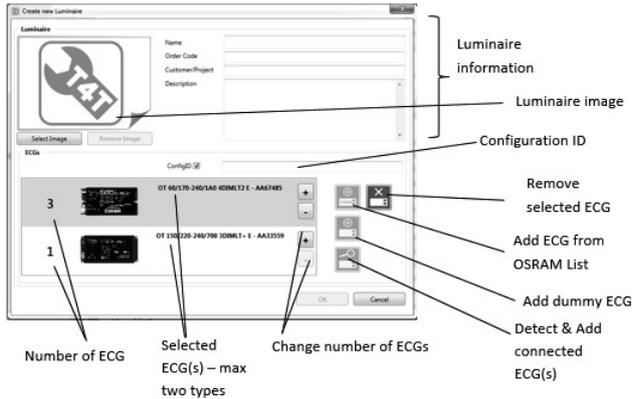
Status and Progress Bar

It displays the progress of the currently executed task, like read/program luminaire.

General Operation

Create a new Luminaire Configuration

Scope: create a new project starting from factory new ECGs.

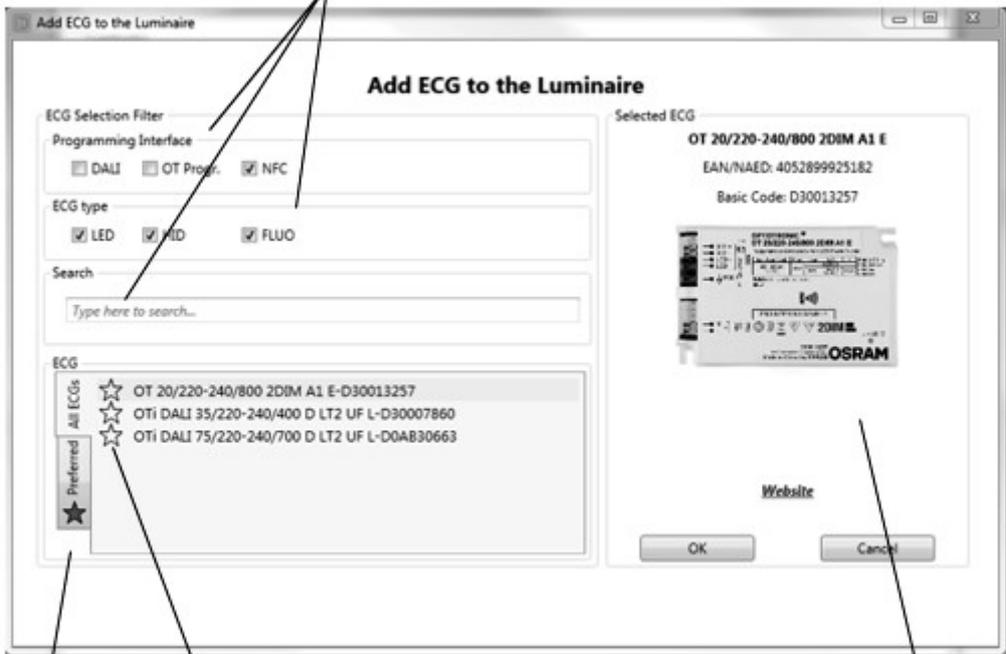
Step	Activity
1	<p>Click "File", "New..." in the menu bar or use the  button in the toolbar.</p>  <p>NOTE: this window is always accessible using the Luminaire info  button</p>
2	Set luminaire image (optional).
3	Fill Luminaire information.
4	<p>Config ID-Enter a ConfigID to be programmed to the device. Config ID checkbox-Option to select whether the ConfigID is to be programmed or not. If the Config ID is not selected for programming then Config ID text box will be hidden.</p> 
5	

	<p>Select ECG(s) using the buttons:  or </p> <p>Remove possible unwanted ECG using the button </p> <p>NOTE: a luminaire could contain more than one ECG; up to two different types are allowed and the multiplicity of each type depends on the used programming interface (so far only multiple DALI ECGs are allowed up to 64 in total)</p>
6	<p>Click OK button to create the project. This button is active only if all the mandatory information was entered correctly. The project will not be saved on Click of OK button and the default file name will be "Untitled".</p>
7	<p>If the luminaire has a Config ID, the default luminaire name will be the "luminaire name-Config ID".</p>

LED drivers list ()

LED drivers are listed according to the Programming Interface and ECG types and also Search text. It's possible to define preferred ECG(s) in order to speed up the selection of the most used ones.

ECGs lists according to Programming Interface and ECG types selections and Search text if any



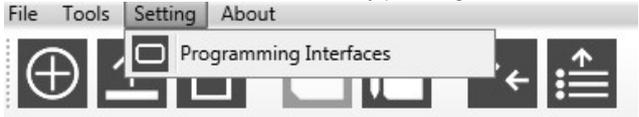
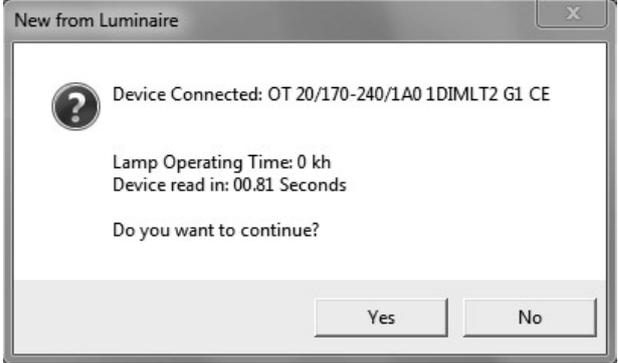
Click on the star to set/clear ECG as preferred

Info of selected ECG

ECGs lists: All or Preferred only

Create new Luminaire Configuration from Luminaire

Scope: create a new project by reading the whole configuration of the connected luminaire.

Step	Activity
1	<p>Select from the Settings menu which programming interface has to be used to readout the luminaire, in case more than one is connected to the PC. Please confirm by pressing "OK" button.</p> 
2	<p>Click "New from Luminaire"  in the toolbar or in the File menu.</p>
3	<p>On successful read, a dialog will display the following information.</p> <ul style="list-style-type: none"> • Device connected with Device type name • The time taken to read from the device. • The encrypted OEM key, if the ECG is password protected • The Lamp operating time, if the feature is supported in the ECG.  <p>On click of "Yes", the Main window shall be loaded with all features and the file will be named "Untitled.osrtul" else will remain in the same screen. A production file cannot be generated if the configuration is not saved.</p>
4	<p>Continue as described in previous "Create new Luminaire Configuration" paragraph on click of Save or Save As.</p>

Open a Luminaire Configuration

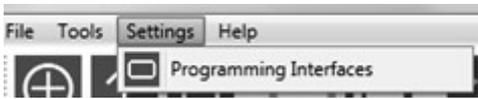
Step	Activity
1	<p>Click "Open"  in the toolbar or in the File menu.</p>
2	<p>Select the proper file with extension .osrtul.</p>
3	<p>Open the configuration by double-clicking. The name of the loaded configuration appears in the header of the Tuner4TRONIC.</p>

Add ECG(s)Scope: add new EGC to the list without the need to reinstall the whole SW.

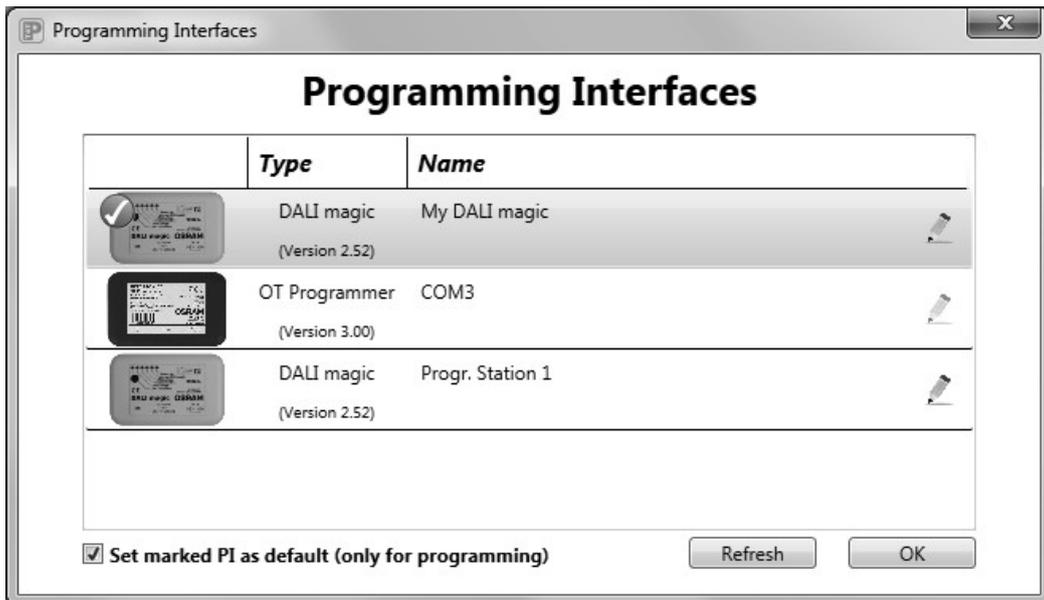
Step	Activity
1	Click "Add new ECG(S)" in the in the Tools menu.
2	Select the proper file with extension .osrtud.
3	Open the file by double-clicking. When loaded the ECG will appear on the ECG list

Setting the Programming Interface

Scope: This dialog shows all current connected ECG programmer to the PC and allows each type to define the default one for programming. Go to the Settings menu and select Programming Interfaces.

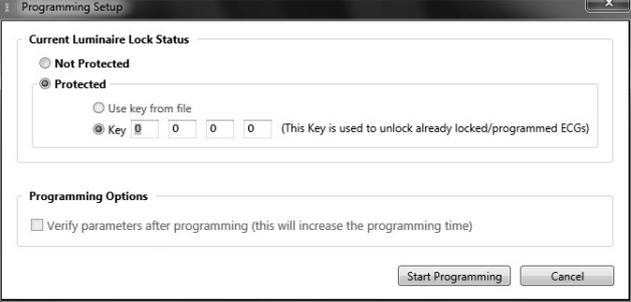


Click on the pencil icon  to change the name of the programming interface (only for DALI magic), then press "enter" key on the keyboard.



Programming a Luminaire

Scope: Lab test of the luminaire; write configuration into the luminaire, for the engineering purposes without generating the production file and without using the Tuner4TRONIC Production.

Step	Activity
1	<p style="text-align: right;"></p> <p>Click "Program configuration" in the toolbar or in the Tools menu.</p> 
2	<p>Set Luminaire Lock Status</p> <ol style="list-style-type: none"> Unprotected. The Luminaire has no Configuration Lock Master Key or OEM key set. Protected. The Luminaire is locked thus it is needed to unlock it before proceeding with the programming: <ul style="list-style-type: none"> Use Key form file. Use this option if the code needed to unlock equals the one set in the Configuration Lock or OEM Key feature. Key _____. Input in the field the code to unlock (which can be different from the one in the Configuration Lock or OEM Key feature). If the Configuration Lock or OEM Key feature is selected, after programming, the Luminaire will be locked using the code of the Configuration Lock or OEM Key feature. <p>Important Information about the protection of luminaire configurations We strongly advise to set a password to avoid unintentional or unauthorized adjustment of crucial parameters that might lead to damage or non-safe operation of a luminaire. Please also consider the required luminaire certifications and the effect of parameter adjustments on the validity of such certifications.</p>
3	<p>Other settings:</p> <ol style="list-style-type: none"> Single Luminaire only: select this option if the programming station processes only one luminaire at a time, this will speed up the programming (less time to detect the luminaire). Multiple Luminaires: select this option if the programming station processes more than one DALI luminaire at a time (automatic sequential programming); DALI addressing is performed before programming, then after programming is completed all short addresses are cleared. These two previous settings are only available for devices with DALI terminals only. Verify parameters after programming: after programming, the configuration is read back and compared with the one just programmed. This slow down

the overall programming speed. This option is not available in case a NFC Reader is selected as the programming interface.

4. Disable Family Programming

The term "Family Programming" refers to the capability of T4T to be able to program LED drivers within the same or later generation of one product family using the same production file, thus simplifying the production workflow. A product family is defined as a group of related LED driver models of the same target application and similar physical characteristics, but can differ in the name, firmware version, current and/or power. Generations typically differ in the set of included features.

Family Programming will fail when the capability of the target driver are not sufficient for the configuration defined in the production file. For example, if a driver supports only 1A, but the original configuration has selected 1,2A then the program must (and will) fail.

Moreover, Family Programming only works forward (e.g. from a G2 device to a G3 device), not backward (e.g. from a G2 device to a G1 device). The reason is that later generations introduce new features that may not be available in the older generation. Therefore the usage of a production file created for a newer generation for programming of an old driver is not possible.

When devices of different generations are mixed in the production, the recommended usage is to create a projects / production files based on the older devices of a family. When newer features shall be used, a new production file has to be created and only the newer drivers can be used.

Family programming was introduced to Tuner4TRONIC in version 3.3.

By default, family programming is turned on. Turning off this option means that T4T will only program the exactly specified driver model (i.e. only drivers with the same name and firmware version will be programmed).

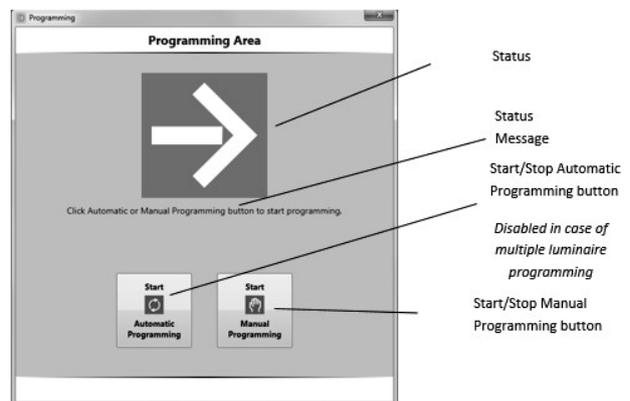
In T4T-Development the Family Programming can be disabled during creation of the Production file in the Programming Setup:



A list of all supported and unsupported drivers of family programming is provided at the Appendix 1 of this document.

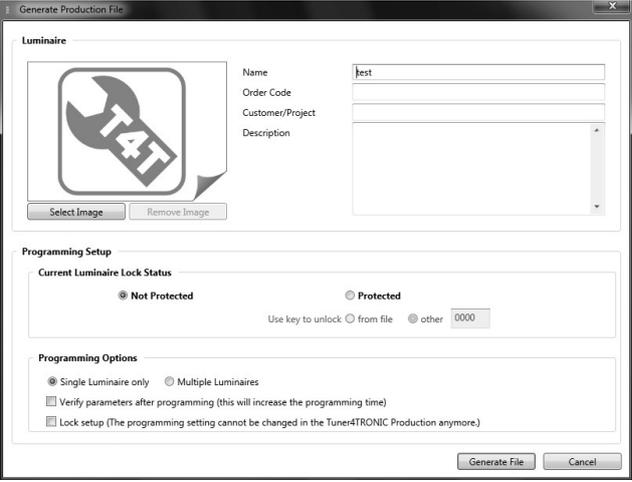
4

Click OK to move to the programming dialog.



Create the Luminaire Production File

Scope: ready for mass production; provide the shop floor with the configuration file (.osrtup) to be programmed into the luminaires by operators using Tuner4TRONIC Production, or using a third party SW based on T4T-DLL or T4T-CMD (see related user manuals for further details) .

Step	Activity
1	<p>Click "Generate Production File..." from the Tools menu in the menu bar select the  button in the main toolbar.</p> 
2	<p>Luminaire Fill in the Luminaire information here (name is mandatory), including an image. This info will be available in the reports and also displayed in the operator's mask of Tuner4TRONIC Production to help the programming activity (visual aid).</p>
3	<p>Set Luminaire Lock Status</p> <ol style="list-style-type: none"> Unprotected. The Luminaire has no Configuration Lock Master Key or OEM key set. Protected. The Luminaire is locked thus it is needed to unlock it before proceeding with the programming: <ul style="list-style-type: none"> Use Key form file. Use this option if the code needed to unlock equals the one set in the Configuration Lock or OEM Key feature. Key ____ _ . Input in the field the code to unlock (which can be different from the one in the Configuration Lock or OEM Key feature). If the Configuration Lock or OEM Key feature is selected, after programming, the Luminaire will be locked using the code of the Configuration Lock or OEM Key feature. <p>Important Information about the protection of luminaire configurations We strongly advise to set a password to avoid unintentional or unauthorized adjustment of crucial parameters that might lead to damage or non-safe operation of a luminaire. Please also consider the required luminaire certifications and the effect of parameter adjustments on the validity of such certifications.</p>
4	Other settings:

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3. **Verify parameters after programming:** after programming, the configuration is read back and compared with the one just programmed. This slows down the overall programming speed. This option is not available in case a NFC Reader is selected as the programming interface.
4. **Disable Family Programming** The term "Family Programming" refers to the capability of T4T to be able to program LED drivers within the same or later generation of one product family using the same production file, thus simplifying the production workflow. A product family is defined as a group of related LED driver models of the same target application and similar physical characteristics, but can differ in the name, firmware version, current and/or power. Generations typically differ in the set of included features.

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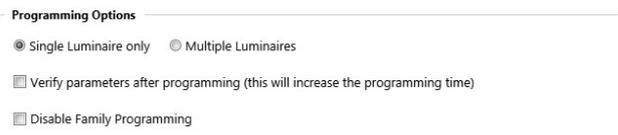
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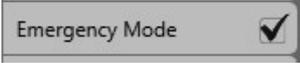
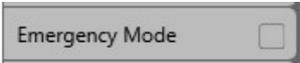


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5

When completed, click "OK" button to proceed: select folder for saving the file and click on "SAVE" button.

Select/Unselect a Feature for Programming

Step	Activity
1	<p>Selected Feature.</p>  <p>The selected features will be programmed with the settings on screen. NOTE:</p> <ul style="list-style-type: none"> • at least one feature shall be selected in order to be able to create a Luminaire Production File, • some features can be selected / unselected only together with others because of restrictions which varies according to the ECG type.
2	<p>Unselected Feature.</p>  <p>The unselected features will NOT be programmed, thus after the programming process is completed, the unselected features have the same settings as before programming. NOTE: unselecting a feature does not mean deactivating it. Example: if only the Operating Current is selected for programming, only the operating current settings is updated during programming, all remaining features keep their previous values and status.</p>

ECG Features

The following chapter explains how the ECG features are displayed. Depending on the ECG you use, only specific features will be available.

Always refer to the ECG's technical documentation for the available features and detailed operating instructions.

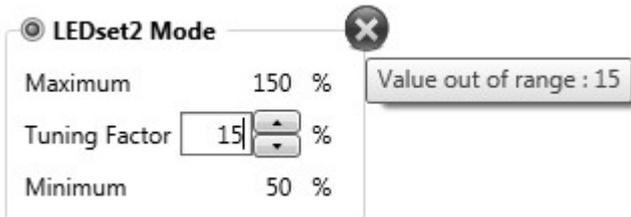
Important notice:

- Some parameters can be set out of the rated range: In that case, the value is displayed in red. Always refer to the ECG technical documentation to understand the consequence of a parameter set out of the rated range.
- Some parameters settings are not compatible with others in the same or different features. In case that happens, a warning message or symbol is displayed. For example in 2DIM ECGs the LEDset mode is not compatible with Temperature Protection Feature.

Operating Current



- An error icon is displayed on the respective group boxes with tooltip indicating the cause of error in case the values are out of the specified range (e.g. 4DIM ECG with a Tuning factor below the minimum value of 50%).



Operating Mode(s)

The first choice the user has to make is the Operation Mode , i.e. how the ECG shall dim and operate, e.g. MidNight, Power Reduction or Mains Voltage Dim for outdoor. There are standard modes (e.g. DALI) and proprietary modes. Which mode is available depends on the selected ECG.

Operating Current

This feature is used to adjust the output current of the LED driver. Different ways of current settings are possible according to the LED driver interface type (LEDset / LEDset2). LEDset2 is a multi-vendor LED module interface which allows to set the correct operating current for the LED module by resistor coding, without the necessity to reprogram the constant-current LED driver, if an LED module has to be replaced by a newer generation. This ensures optimal efficacy and the right amount of light at all times

Compared to setting the current by using the LEDset2 interface, a higher current accuracy can be achieved by using the fixed current mode, and no resistor is necessary on the LED module.

LEDset(1)

For drivers with the LEDset interface (1st generation) the **Maximum Operating Current** can be set via this dialog between the **Maximum Rated Current** and the **Minimum Rated Current**.

For some LED drivers, the operating currents lower than the **Minimum Rated Current** can be set; in this case the **Max. Operating Current** is displayed in red color, to highlight that the value is out of the rated range of the driver.

The check box **LEDset Protection** enables the LEDset protection behavior. Please consult the LEDset application guide (1st generation) for further information.

LEDset		
Maximum Rated Current	700	mA
Max. Operating Current	100	mA
Minimum Rated Current	350	mA
LEDset Protection	<input type="checkbox"/>	

LEDset2

For drivers with the LEDset2 interface (2nd generation) two operation modes can be selected: Fixed Current Mode or LEDset2 Mode

Fixed Current Mode			LEDset2 Mode		
Maximum Rated Current	700	mA	Maximum	100	%
Operating Current	100	mA	Tuning Factor	100	%
Minimum Rated Current	350	mA	Minimum	70	%

Fixed Current Mode

In the fixed current mode the output current is set to the **Operating Current** value between the **Maximum Rated Current** and the **Minimum Rated Current**. In this mode the LEDset2 interface is disabled.

Some LED drivers allow also a current set lower than the **Minimum Rated Current**. In this case the **Operating Current** value is displayed in red, highlighting it is out of the rated operating range of the LED driver.

For further information please consult the device specific technical description; for example concerning the allowed operating current range and tolerance.

NOTE: in some LED driver this value defines also the output current "LEDset2 Mode" is selected and a short circuit is applied on LEDset2 terminals

LEDset2 Mode

In the **LEDset2 Mode** the **output current** is defined via the LEDset2 interface and can be adjusted by the **Tuning Factor** between the **Maximum** and **Minimum** values, if supported by the ECG. This factor can be used to fine-tune the light output for modules with a predefined lumen package.

$$\text{Output current [mA]} = \text{LEDset2 current [mA]} \times \text{Tuning factor [\%]}$$

Tuning Factor

This feature allows to adjust the light level of a luminaire within certain limits (set up by the luminaire manufacturer), which ensure safety, lifetime and performance. This feature allows an adjustment of the amount of light in the field or in production. Thus, one luminaire can manage different lumen packages. Also helpful for those cases where people are not familiar with the "current mA" values but prefer to use percentage or lumen value instead of mA. In such cases, activate the option "Set Luminaire reference light output at 100%" and enter the appropriate value in lumen. In the Configuration Lock, the Tuning Factor Level and the Limits can be protected separately.

Tuning Factor

Tuning Factor

Enabled

Limits and Reference Lumen

Maximum Limit %

Minimum Limit %

Set Luminaire reference light output at 100%

Tuning Level

%

Soft Switch Off

As soon as the device receives a switch-off command by a control interface (e.g. Touch DIM or DALI), this feature dims the device down to zero nearly logarithmically, and with pre-defined delay times. This function is supposed to simulate the behavior of traditional halogen lamps. If supported by a driver, Soft Switch Off is available when one of the following Operating Modes is selected: "DALI & Enhanced Options", "TouchDIM" or "Corridor Functionality".

Enhanced Options

Soft Switch Off

Enabled

Time s

This feature can be selected by the Enabled check box. The Soft Switch Off time can be selected from the values in the drop down. The value 0 indicates feature off and the values 0.7s / 1.0s / 1.4s / 2.0s / 2.8s / 4.0s / 5.7s indicate switch off times.

Dim to Dark

Depending on the driver used, different lowest dimming levels can be achieved. Please refer to the documentation of the used driver for specific information.

Dim to Dark

Dim to Dark

Enabled

Dimming below 1% Dimming below 1% enables steady dimming down to the final switch-off of the device. This feature is suitable for theaters, movie theaters or other special applications. For LED drivers with pure amplitude dimming, the minimal dimming value in percent is determined by the ratio of minimal output current to rated current.

Dimming below 10% Dimming below 10% allows to reach lower illuminances in the dimmed state. For LED drivers with pure amplitude

dimming, the minimal dimming value in percent is determined by the ratio of minimal output current to rated current. Please note that the physical min level (DALI PHY MIN) will be adjusted as soon as the "operating current" is modified or in case of the LEDset Mode, after Start-up phase of the device and if the value has changed more than +/-3.1% to the previous one.

OEM Key

This feature enables luminaire manufacturers (OEMs) to safeguard certain predefined setting parameters (e.g. the safety relevant features) in the LED driver against unintentional access and not authorized users. The features, that can be protected, are shown in the **Lockable Feature(s)** box.

Some ECGs have also the possibility to lock the ECG completely or only partially. The locked features are listed in the box "Locked Feature (s):

The image shows a user interface for configuring the OEM Key. On the left, there is a section titled 'Lock' with a checked checkbox. Below it is a 'Key' input field containing the number '1234'. At the bottom of this section are two radio buttons: 'All' (unselected) and 'Partial' (selected). To the right of this section is a box titled 'Locked Features(s)' which contains a list of features: 'Constant Lumen', 'Thermal Protection', and 'Operating Current'.

The locking of these features can be activated by enabling the check box **Lock**. To lock the ECG a four digits **Code (former PIN)** needs to be entered.

The allowed codes are all numbers in the range 0001-9999 (the Code 0000 is reserved to indicate that the ECG is not locked). In the example above the user input the code 1234.

Please note that in new generation drivers, the OEM key has been replaced by the Configuration Lock protection system (see below).

Configuration Lock

This feature is an advancement of the OEM Key, which allows controlling the access rights for individual features within the LED driver and to assign different rights to the luminaire manufacturer, to the service team and to the general user. Assigning user rights also allows offering "light as a service" and still maintaining total control over who may change what within the device or luminaire. The Configuration Lock is a new multi-level password protection designed to protect drivers against unauthorized changes which could lead to serious safety problems.

By enabling and setting up a Master Key in the driver, the driver can be locked to avoid any changes by anyone that can access the driver. Only people that know the Master Key are able to modify the driver settings. In addition, a Service Key can be set up to allow an additional user group to modify certain driver settings without having to hand out the Master Key. A Service Key can only be set if there is a Master Key available. The Service Key feature requires a license key to be activated. There is also the possibility to give write access to everyone.

For each key, the user has to enter 4 numbers (and each number can have a value from 0 to 255) to set it up.

The features that can be protected are shown in the *Write access to features*.

Define Key(s)

Master Key 255 200 190 180

Service Key 3 9 123 255

Write access to features

	Everyone	Service and Master	Only Master
Operating Current	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Tuning Factor: Limits / Lumen	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Tuning Factor: Level	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Constant Lumen	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Lamp Operating Time	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Thermal Protection	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Driver Guard	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Operating Modes	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Diming Levels	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Select all	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Driver Guard

By default, the internal safety mechanisms of the LED driver are designed for maximum temperature, however, not for those of the luminaire. By means of this feature, you can adjust the temperature derating of the LED driver so that it not only matches the luminaire, but also leads to a higher reliability of the luminaire. The thermal performance of an electronic control gear (driver) impacts its lifetime and cost. The LED technology creates a demand of flexible driver (window driver) regarding power and operating conditions. In seldom cases, the driver is operated at its maximum and therefore the thermal performance is not optimized to the system and application. When enabled, the "Prestart Derating" provides an offset to the maximum allowed temperature of the driver.

Driver Guard

Driver Guard

Enabled

Thermal Settings ⓘ

Prestart Derating °C

End Of Life

By means of the connected LED module, the LED driver can visualize that the preprogrammed lifetime of the connected LED module is reached and the LED module should be replaced. This feature allows indicating the guaranteed lifespan of the lamp or the whole system in case the lamp is not exchanged. The **End Of Life** indication is reference to the lamp operating time.

End Of Life <input checked="" type="checkbox"/> Enabled	End Of Life Indication Life time <input type="text" value="100"/> <input type="button" value="▲"/> <input type="button" value="▼"/> kh
--	--

This feature can be selected by the **Enabled** check box.
The end of **life time** range is between 0 and 254kh. The way of indication will differ according to the ECG type. For further information please consult the ECG specific technical description.

Lamp Operating Time

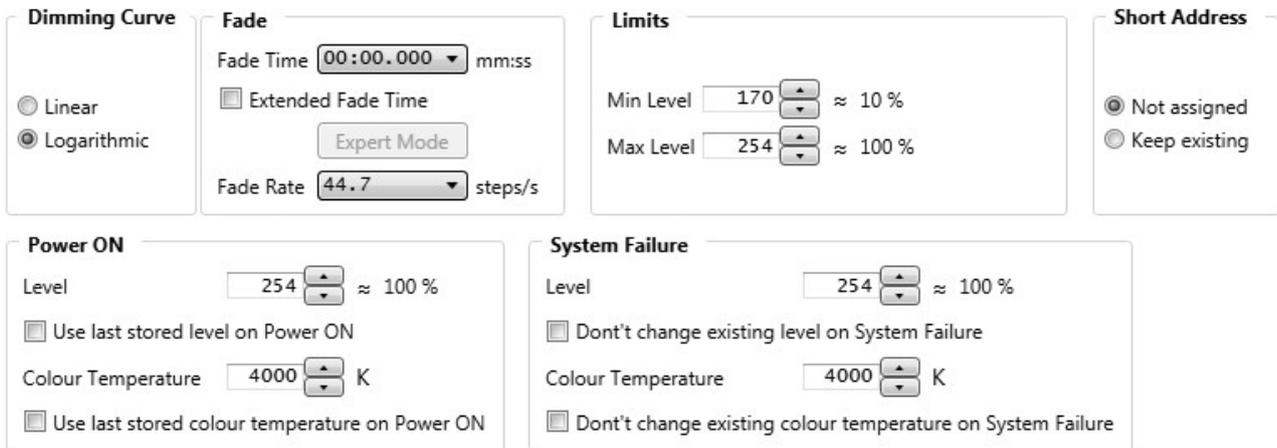
This feature allows to set and reset the *lamp operating time*. The current value of the lamp operating time is used for the constant lumen output function. In case of a lamp replacement the *constant lumen* and also the *End of Life* function could be reset, if those features are supported by the control gear.



The *Lamp Operating Time* can be set between 0 – 254kh.

DALI Settings

In DALI mode, the driver can be controlled by an application controller via the bidirectional DALI interface and it supports status request queries. Through the DALI application controller, the driver can be integrated into a light management system. DALI version-1 drivers support stepless dimming, status requests, and addressing of each individual light point.



Dimming Curve: set the dimming behavior of the output level with respect to the dimming value.

Fade: set the fade time and rate associated to the related DALI commands.

Limits: Min Level – Max Level is the allowed output range when dimming up and down.

Power ON Level is the output level set when the mains voltage is supplied to the driver.

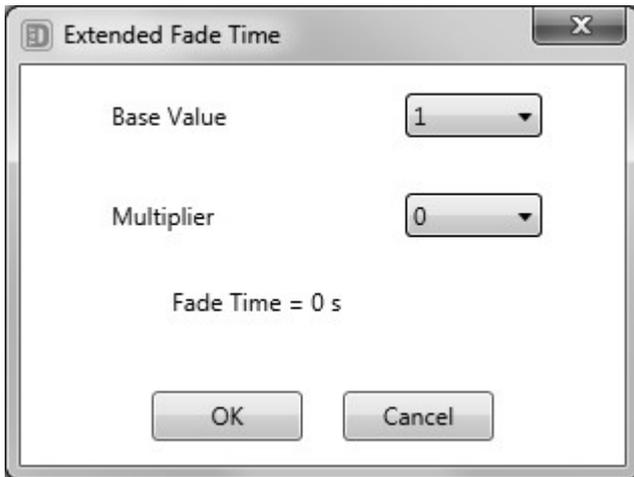
System Failure Level is the output level when DALI line is disconnected or malfunctioning.

Short Address: Enables a possibility to reset or keep DALI addresses in case of single ECG programming (default setting = reset). For multiple programming all DALI addresses will be reset.

A warning icon on the group box with a tooltip "Cannot keep the DALI address if the programming setup is multiple luminaire" will indicate this information when the "Keep existing" option is selected.

DALI-2

For ECGs that support DALI-2, there is a possibility to select either Standard fade time or Extended fade time. By default standard fade time will be selected. By checking the extended fade time checkbox, extended fade time value can be selected. On click of the "Expert mode" button, the below dialog is displayed, which will enable the user to select a dedicated base value and a multiplier value and hence sets the extended fade time value.

**Note about mismatch in DALI Min Level**

According to the DALI standard, a device must not reply a DALI Min Level below the Physical Min Level.

If the DALI min Level has been programmed at a lower level, then a higher Physical Min Level temporary caps the programmed DALI Min Level.

The Physical Min Level may be higher if no LEDset resistor is connected and will become lower when the resistor gets connected.

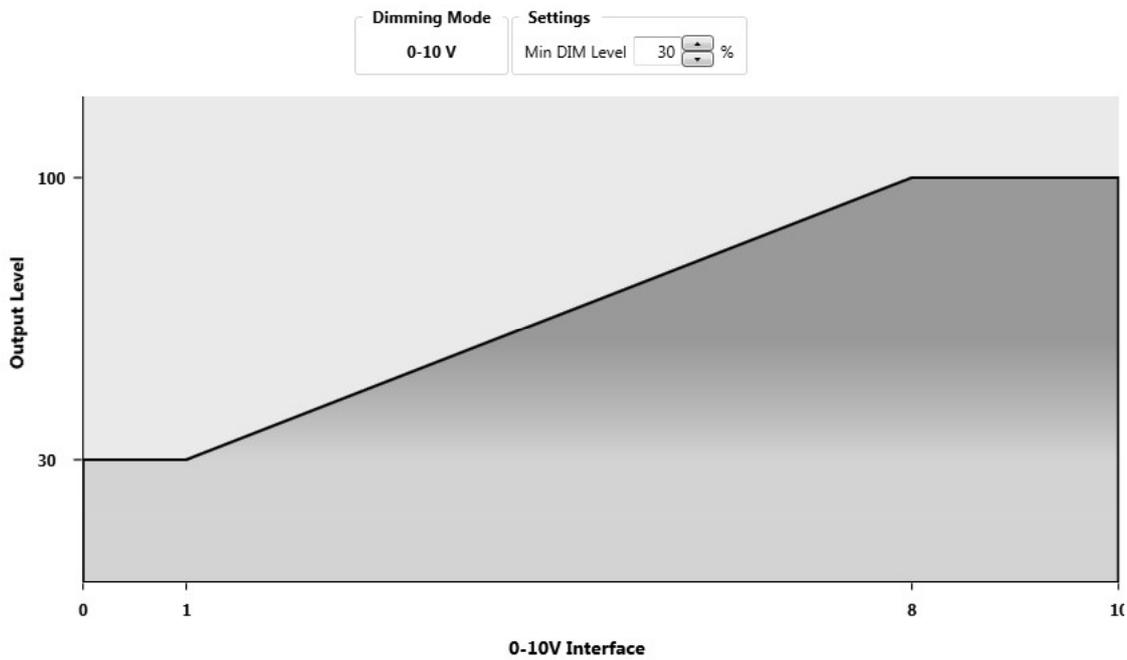
Thus reading the DALI min level only reflects the momentary state of the driver, but it may change after deploying the driver in the luminaire.

If the DALI Min Level was accidentally set below Physical Min Level, please note that device cannot dim down to the desired level!

0-10V Settings

Drivers with a 0-10 V Interface can be integrated into light management systems. This unidirectional interface allows adjusting the light output of the system, adjusting the dimming behavior via the 0-10V control port.

0-10 V



0-10 V feature to be programmed

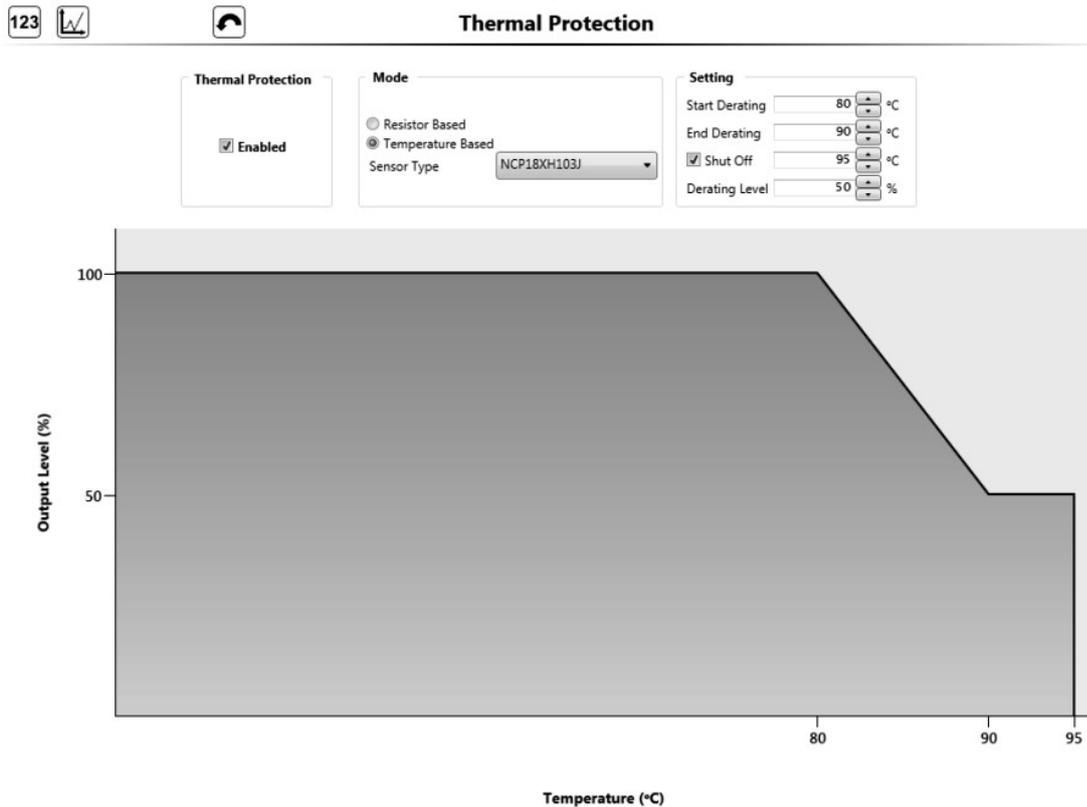
Min DIM Level: set the dimming level for an input voltage below 1V.

Thermal Protection

This feature allows to adjust the thermal management of the LED module or of a complete luminaire for high ambient temperatures by controlling the output level based on the temperature/resistor value measured at an external sensor (e.g. NTC, negative temperature coefficient resistor) connected to the driver. There are two modes for thermal protection:

- 1) *Resistor Based*
- 2) *Temperature Based*

(not applicable for all control gears with thermal protection feature)
Either of those can be selected, depending on the control gear type.



This feature can be switched on by the **Enabled** check box.

The desired thermal protection mode, either **resistor based** or **temperature based** needs to be selected if supported by the ECG. In case of temperature based mode also the **sensor type** has to be defined. The predefined sensor types are typically used NTCs.

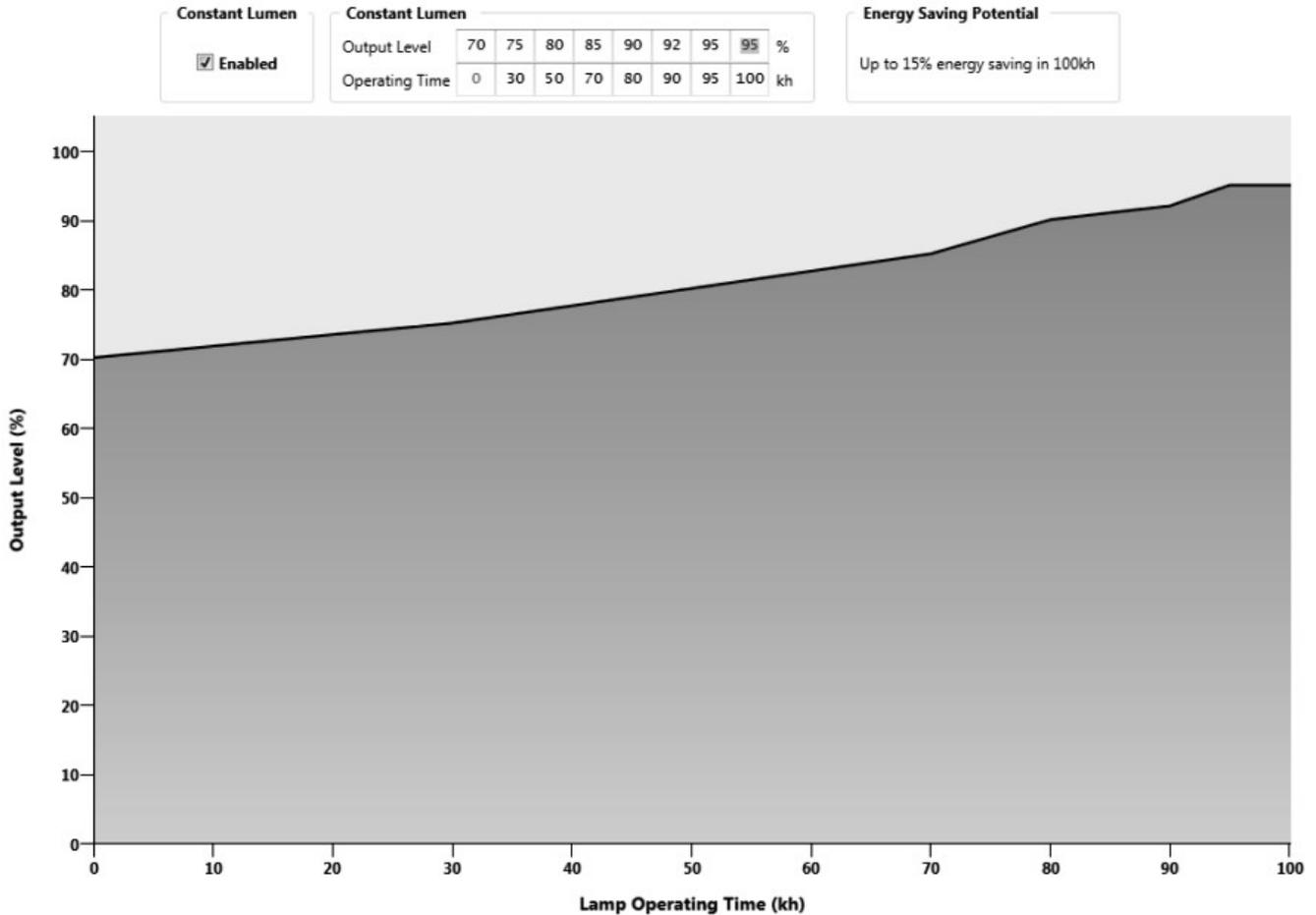
In **Settings** group box the following parameters can be set:

- **Start Derating:** This parameter (°C, Ohm) defines the start point for derating the output level
- **End Derating:** This parameter (°C, Ohm) defines the end point for derating the output level
- **Shut Off:** If the control gear supports a complete switch off the shut off point can be defined. In case the *Shut Off* is not enabled the control gear will not switch off.
For control gears not supporting a switch off, the *Shut Off* check box is disabled and not editable.
- **Derating Level:** This parameter defines the output level at the end derating point until shut off, if supported.

Note: The derating level between the start and end derating point could vary to the derating line, which is displayed in the software. For further information please consult the device specific technical description.

CLO

To ensure the maintenance interval of the system, the light level must be achieved also at the end of the entire lifetime. Due to lumen depreciation of the light source over time, the system usually needs to be overpowered at the beginning, which leads to increased energy cost. This is not necessary thanks to the constant lumen function, as the operating output is adjusted continuously to compensate for the lumen loss. A *schedule* needs to be created that continuously increases the *output level* of the lamp. Reliable lifetime data of the lamp / LED module is necessary for best performance of this function.



This feature can be switched on by the *Enabled* check box.
 The custom **schedule** is defined by the following parameters:

- **Operating Time:** The value range is between 0 and 254 kh. The values needs to be continuously increasing from the first to last data set
- **Output level:** The value range of the output level is depending on the driver type. The values needs to be continuously increasing from the first to last data set or at least equal

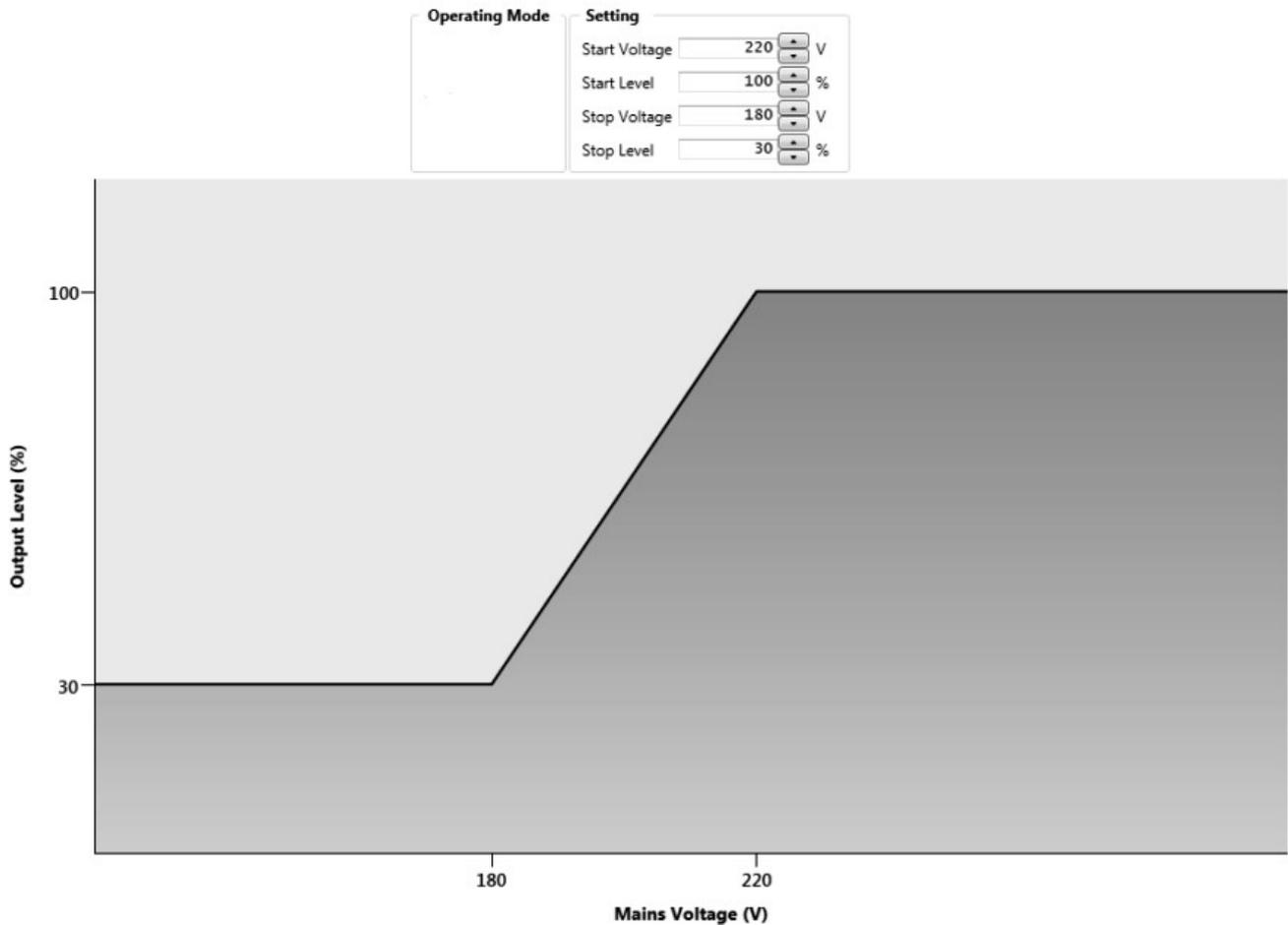
Depending on the driver type the number of the data sets of the *schedule* can vary. The maximum number is 8. For some drivers it is necessary to fill in the complete table.

In the graph the actual lamp operating time is indicated as a vertical dotted line (not applicable for certain gear types)

By pressing the **Savings** button the approximate energy savings is calculated until the last entered operating time value. The result appears in a separate **Energy Saving Potential (Constant Lumen)** dialog box.

Mains Voltage Dim

This dimming method is mainly used in combination with magnetic ballasts for existing street light installations. The light output is reduced by lowering the mains voltage. The reduction of the mains voltage is carried out by a controller in the distribution cabinet. This functionalities allow to reproduce this behavior also for electronic control gears.



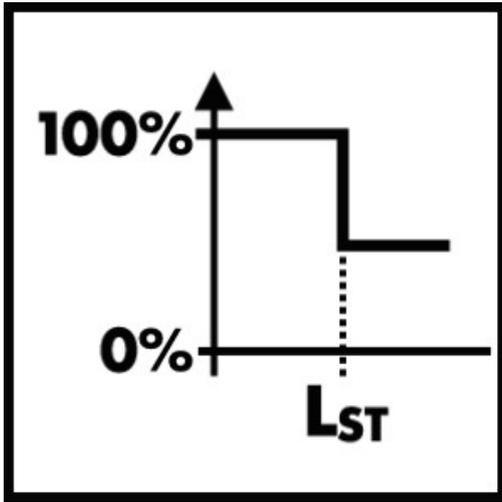
This feature can be selected by the *Operating Mode* feature tab.

The dimming characteristics can be defined by the following four parameters:

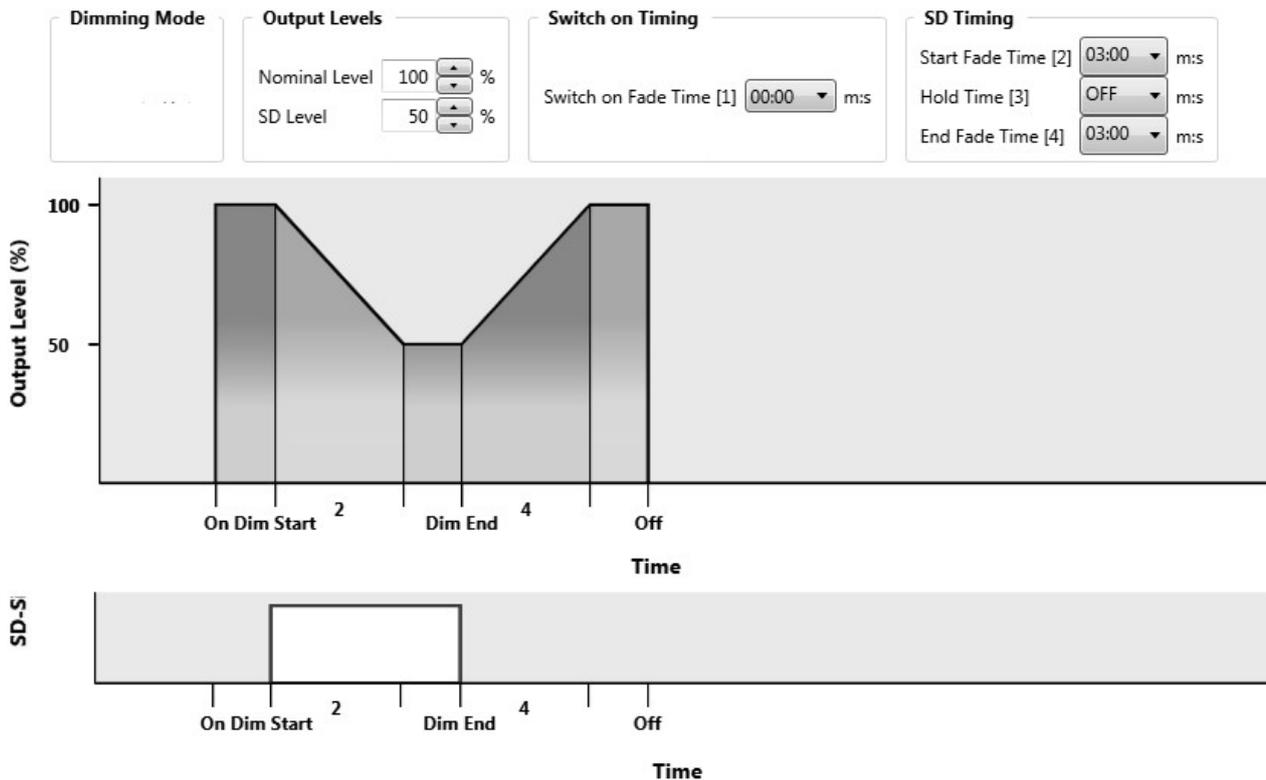
- **Start Voltage:** This parameter defines the start point for derating the output level
- **Start Level:** This parameter defines the output level until the start point of derating
- **Stop Voltage:** This parameter defines the end point for derating the output level
- **Stop Level:** This parameter defines the output level after the end point of derating

For further information please consult the device specific technical description.

Power Reduction



The Power Reduction (bi-power) mode allows switching between two output levels, the "normal" mode and the "reduced load" mode, by means of an additional switched phase or the control via an external sensor (like presence detection sensor or photocells). In the "reduced load" mode, the driver reduces the lighting level and therefore the energy consumption. The light levels can be preprogrammed flexibly. In the **Operating Mode** feature tab the option Power reduction, Power reduction inverse (polarity of the signal) or Autodetect needs to be chosen. The selected mode is shown in the Dimming Mode group box.



This feature can be selected by the **Operating Mode Mode Feature** tab. The dimming characteristics can be defined by the following six parameters:

- **Nominal Level/(Power on Level):** This parameter defines the output level when the SD port is not triggered. (Power reduction) / triggered (Power reduction inverse)
- **SD Level/(Dim Level 1):** This parameter defines the *output level* when the SD port is triggered. (Power reduction) / not triggered (Power reduction inverse)

- **Switch on Fade Time:** This parameter allows the adjustment of the *fade time* at power on (not applicable for certain gear types)
- **Start Fade Time/(DIM Fade Time):** This parameter defines the *fade time* after the SD port is triggered (Power reduction)/not triggered (Power reduction inverse) (not applicable for certain gear types)
- **Hold Time:** This parameter defines the *hold time* after the SD port is not triggered (Power reduction)/triggered (Power reduction inverse) (not applicable for certain gear types)
- **End Fade Time/(DIM Fade Time):** This parameter defines the *fade time* after the hold period (not applicable for certain gear types).

For further information, please consult the device's specific technical description.

MidNight



This feature provides multi-stage night-time power reduction based on an internal timer referenced to the power ON/OFF time. There is no need for an external control infrastructure. The unit automatically performs a dimming profile based on the prede fined scheduled reference to the midpoint, which is calculated based on the power ON/OFF times. Two modes are available:

- **Time Based** (not applicable for certain gear types):

If the *Time Based Mode* is selected the dimming profile can be adjusted in the *Reference Schedule* based on the switch on point of the mains.

In this mode the *Switch off Fade Time* is not selectable.

- **Astro Based:**

In this mode the dimming profile is executed referenced to the half operating on time of the driver. It is assumed that there is a correlation between the half operating on time (virtual middle of the night) and midnight, expressed by the midnight shift.

Midnight Shift min

The virtual middle of the night is calculated based on the theoretical sunset (Power on) sunrise (Power off) and the *Time Zone* depending on the selected *Location*. It is assumed that the driver is powered-on at the theoretical sunset and powered-off at the theoretical sunrise. The average annual midnight shift is used to convert the time steps of the reference scheduler to time values reference to the half one time. Certain predefined locations can be selected by the *Location* drop down menu and also custom locations can be defined by clicking on the **world symbol**. In the *Reference Schedule* the output level as well as the time for each dimming step can be given for up to five dimming levels (steps).

When working with Locations, please make sure to select a location from the menu first and then edit the Reference Schedule. Working the other way around (first editing the Reference Schedule and then a Location) will reset the parameters of the Reference Schedule.

Operating Mode

Submode

Astro based
 Time based
 SD triggered

Location

Location:

Latitude: Longitude:

Time Zone:

Fade Timing

Switch On Fade Time: mm:ss

AstroDIM Fade Time: mm:ss

Switch Off Fade Time: mm:ss

Reference Schedule

Step	1	2	3	4	5	6	
Output Level	100	50	50	50	100	0	%
Time	ON	22:00	00:00	02:00	04:00	OFF	hh:mm

Schedule

Step	1	2	3	4	5	6	
Output Level	100	50	50	50	100	0	%
Time	17:57	21:57	23:57	01:57	03:57	05:57	hh:mm

Sunrise/Sunset based Manual

Show Daylight Saving Energy Saving: up to 25% per year

By Day **By Year**

The graph displays the output level percentage over a 24-hour period. The y-axis represents Output Level (%) from 0 to 100. The x-axis represents Time (h) from 12 to 13. The profile shows 100% output from 00:00 to 04:00, 50% output from 04:00 to 17:57, 50% output from 17:57 to 01:57, and 100% output from 01:57 to 05:57. A vertical dashed line is positioned at approximately 02:00, indicating a time shift.

The **Schedule** group shows the dimming profile for a specific day, when **Sunrise/Sunset based** is selected. The values are only valid within a certain tolerance, if the driver is powered on at the time step1 and powered off at time step 6 at this date.

Some countries use the daylight saving time. If this needs to be considered in the visualization of the graph and the schedule, the check box **Show Daylight Saving** needs to be enabled. Note that the control gear cannot compensate the time shift related to the daylight saving time. In addition it is possible to enter custom switch on and off times by selecting the **Manual** option.

Note: If switch on and off times are entered manually, these values are only used to calculate the estimated dimming behavior of the ECG if it is powered on/off at these times. The device does not switch on and off by itself.

The **Energy savings** information is only visible in *Astro Based* mode. The approximate energy savings will be indicated with the assumption that the real switch on and off time match with the calculated sunset and sunrise times. The result is shown in a separate **Energy Saving Potential (MidNight)** dialog box.

The fade time characteristics can be defined by the following three parameters:

- **Switch on Fade Time:** This parameter defines the *fade time* at power on. (not applicable for certain gear types)
- **Astro Fade Time / (DIM Fade Time):** This parameter defines the *fade time* between the different output levels. There are different ranges and levels allowed for the various types of control gear.
- **Switch off Fade Time:** This parameter defines the fade time for the switch off. (not applicable for certain gear types)

Depending on the selected control gear the available parameters will appear as active. For further information please consult the device specific technical description.

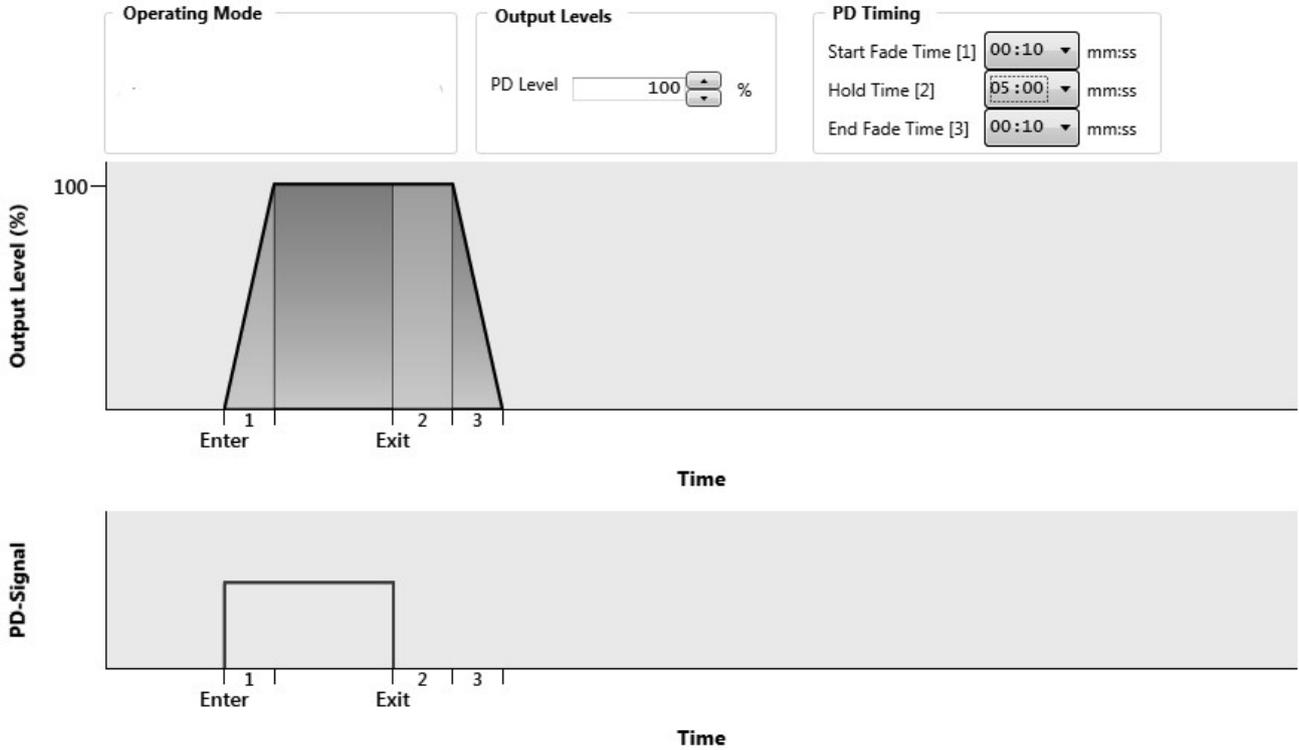
Note: When switching between **Time Based** and **Astro Based** or vice versa the Reference Schedule will be set to default.

- **SD triggered:**

In this mode, the start of the dimming profile is triggered by the SD Port (Half night Switch). This ensures that the luminaires can be dimmed at the same time triggered by an external clock timer using the SD interface and are not affected by the time shift during the year in the standard "MidNight based" feature.

Presence Detection

In the MidNight mode, this feature allows to adjust the output light level to the activity around each light point with an additional external sensor connected to the SD port and powered by the mains, regardless of the actual dimming level of the MidNight mode. The presence detection profile has a higher priority than the output level defined by another dimming mode during presence detection (except for DALI).



This feature could be selected by the *Operating Mode* feature *tab*.
The dimming profile can be defined by the following four parameters:

- **PD Level:** This parameter defines the *output level* when the SD port is triggered.
- **Start Fade Time:** This parameter defines the *fade time* after the SD port is triggered
- **Hold Time:** This parameter defines the *hold time* after the SD port is deactivated
- **End Fade Time:** This parameter defines the *fade time* after the hold period

For further information please consult the device specific technical description.

Emergency Mode

In addition to DALI-compliant functions, such as system failure level (disconnecting the control line), DALI LED drivers with this feature offer the automatic detection of DC voltage supply. When DC voltage is detected, a preprogrammed luminous flux level between 0 and 100 % is implemented. Typically, the factory setting for indoor LED drivers is 15 %. This luminous flux value can be additionally protected from unintentional overwriting by setting a locking bit.

Emergency Mode



DC mains -> Emergency Mode: enables the driver to activate the Emergency operation when a DC supply voltage is detected and consequently switches to the related **Output Level**.

Refer to the driver's technical documentation to see which further features are affected by the Emergency operation.

Other Settings:

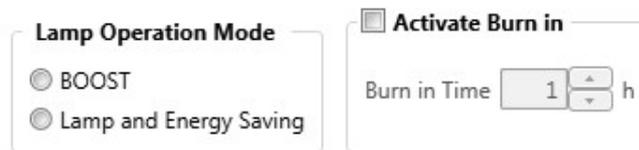
Lock DC Light Level: enable this option to avoid that the Output Level (input in the DC mains -> Emergency Mode field) is changed in application by the DALI controller.

Lock DALI Parameter: enable this options avoid that any standard DALI parameter could be changed by a controller during DC operation. A warning icon on the group box shows the tooltip: "Locked DALI parameters may cause problems with control devices.".

Note: ECGs which have this feature setting capability are not always compliant by default for emergency application. The functionality could be limited for pure DC grid environment. Please consult the ECG specific technical description.

Lamp and Energy Saving

Lamp and Energy Saving



Lamp Operation Mode: for Quicktronic ECGs, select the lamp type here.

Activate Burn in: for Quicktronic drivers, enable this option to perform the burn-in process of the fluorescent lamps. The duration of the burn-in process is defined by the **Burn in Time** field.

Refer to the driver's technical documentation for further details.

Luminaire Info

The term "Luminaire info" defines a set of parameters that describes the characteristics of a specific luminaire: luminaire name, brand, power, lumen, expected lifetime, etc.

This data can be stored in the luminaire's driver and can be read by Light Management Systems (LMS) to simplify the commissioning of the luminaire as well as for service purposes.

With the luminaire information, a better description of the luminaire can be obtained and the luminaire's end of life information can be used for predictive maintenance.

To activate Luminaire Info, a license key is required.

Luminaire Info

Luminaire Basic Info

- GTIN
- Identification Number
- Additional luminaire information
- Maximum nominal input power W
- Initial luminous flux lm
- Correlated color temperature K
- Color rendering Index

Alert Criteria

- Expected life time lamp(s) (median useful life) khrs
- Expected life time luminaire ballast (abrupt failures) khrs
- Maximum lamp switching/dimming cycles kcycle
- Input power error at nominal input power. %
- Minimum input AC voltage V
- Maximum Input AC voltage V

This feature is deactivated by default to avoid longer programming times if the feature is not used. To activate it please make sure to activate the corresponding checkbox on the feature list.

Luminaire Info

In addition, each parameter of the Luminaire info can be activated individually. Please deactivate the parameters that are not needed by deactivating the corresponding checkboxes to optimize the programming times.

Additional luminaire information

Monitoring Data

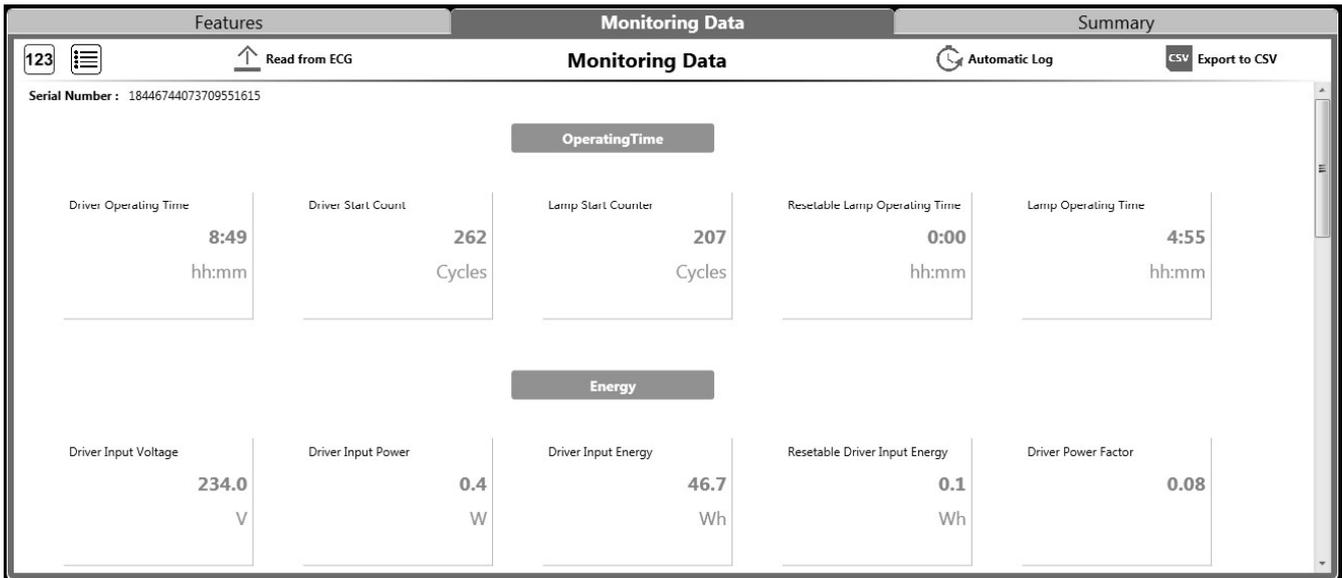
Monitoring Data is a new mode in Tuner4TRONIC that allows to read the operational data of a driver e.g. operating times, power, voltage, temperatures, failures.

These parameters stored in the luminaire's driver can be used for service/diagnostic purposes, for predictive maintenance and to feed a Light Management System (LMS) with status information in real time or/and with "history data" of the luminaire.

Only drivers supporting Monitoring Data can show this mode. Monitoring Data can be found as a new tab between the Features and Summary tabs.

To start, click the "Read from ECG" Button on the upper left part of the screen. If the driver was locked you will need to enter the driver's password to continue.

After reading the device, T4T will show the devices unique serial number as well as the available parameters.



On the upper left corner, it is possible to toggle the display of the parameters from dashboard view to table view.

The automatic log function allows to enter a time value, after which the data will be refreshed automatically.

In addition, the parameters can be exported as a CSV file. The unique serial number of the device will be used as the file name.

Please note: Reading the Monitoring Data of a driver using the NFC interface will not show all parameters in comparison as using the DALI interface, as some parameters are not available when reading through NFC (e.g. power).

While the basic set of parameters is always displayed, the premium parameter set requires a license key to be displayed.

Disclaimer: As far as features of the Tuner4TRONIC-Tool are used to readout data of LED drivers, the provided data has the usual limitations regarding accuracy and reliability due to technical reasons based on the current state of art and technology and is only meant as clue and aid for diagnostic purposes. Therefore, the manufacturer of the software and the driver shall not be liable for the accuracy and reliability of the provided results including any incorrect data or their incorrect technical interpretation due to the current state of technology

License Key(s)

To activate certain additional functionalities in Tuner4TRONIC it is necessary to introduce a license key, e.g.

- Monitoring Data - Premium parameters+
- Luminaire Info
- Tunable White - Premium parameters
- Service Key in Configuration Lock

The license key management can be found in the menu Help About License Key(s).

In that window, the unique machine ID of the computer will be displayed.

When ordering a license it is necessary to copy this machine ID by clicking on the "Copy to clipboard" button and send it to your sales contact. A license key specifically designed for that machine ID (i.e. the license can't be used on another computer) will be generated. Entering the license into the "License Key" field and clicking the "Add Key" button will activate the license and the corresponding feature will be available for use in Tuner4TRONIC.

All entered licenses are displayed in the list below together with their expiration date.

Please contact your sales representative to obtain licenses.

