Tuner4TRONIC® Production 4

Please note:
All information in this guide has been prepared with great care. INVENTRONICS, however, does not accept liability for possible errors, changes and/or omissions. Please check www.inventronics-light.com or contact your sales partner for an updated copy of this guide. This technical application guide 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. Please note that this guide is based on own measurements, tests, specific parameters and assumptions. Individual applications may not be covered and need different handling. Responsibility and testing obligations remain with the luminaire manufacturer/OEM/application planner.

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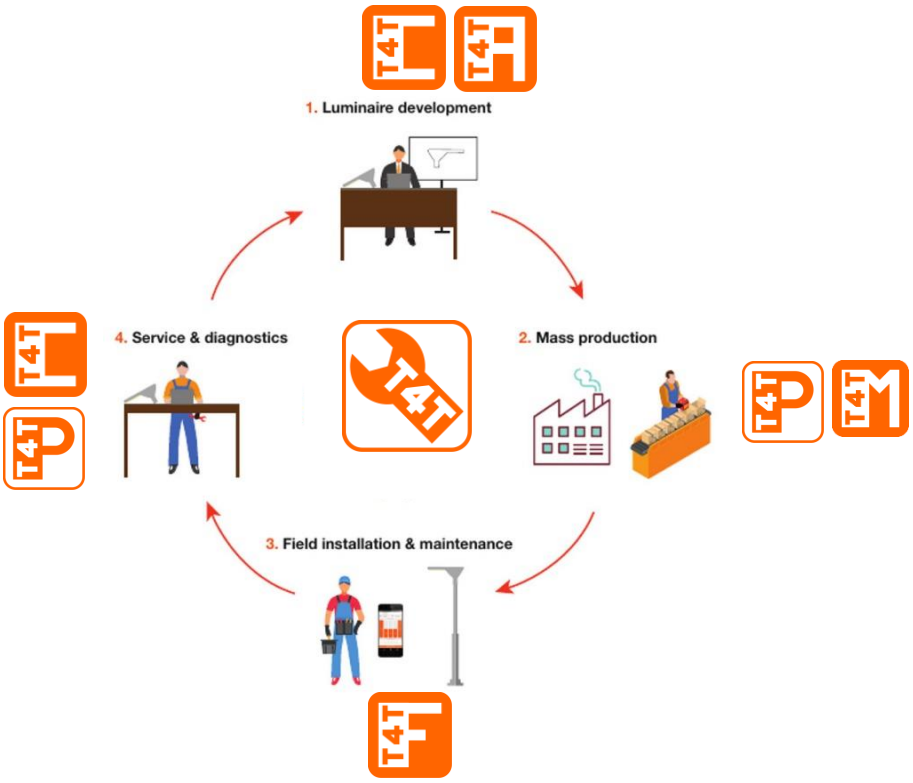
1 About Tuner4TRONIC

1.1 Purpose and Application

The Tuner4TRONIC (T4T) software suite allows luminaire manufacturers to program INVENTRONICS drivers via DALI and/or NFC in a simple, fast, reliable and cost-effective way, speeding up the production process.

Tuner4TRONIC tools can be downloaded from www.inventronics-light.com/tuner4tronic.

Click here to watch a short video that gives a great overview about Tuner4TRONIC.

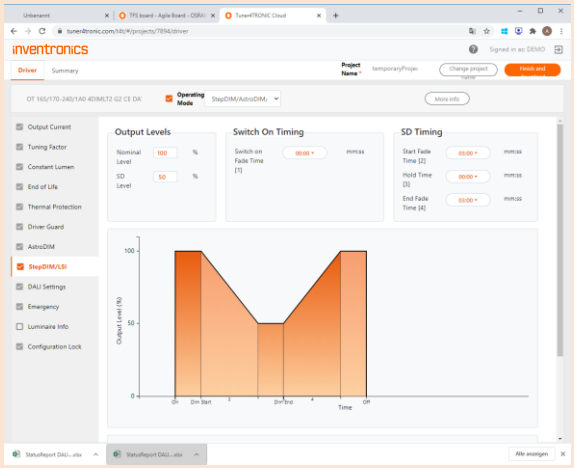


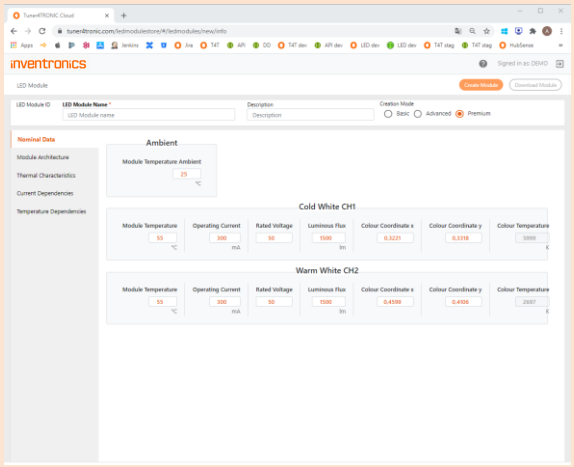
The Tuner4TRONIC software suite consists of different modules according to the environment of use:

Tuner4TRONIC Configurator
This web based browser application enables luminaire designers to 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 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.

www.tuner4TRONIC.com

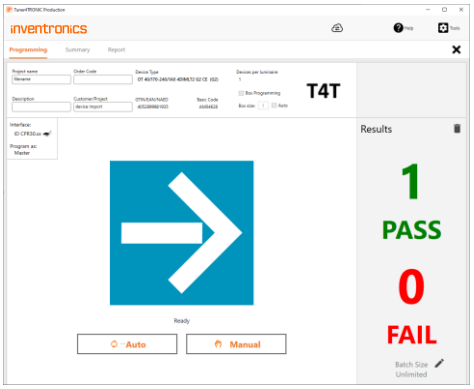
Same URL also provides a **Tuner4TRONIC TW LED Module Editor** to create settings for customized TW LED modules





Tuner4TRONIC Production
In luminaire production encrypted production files from the T4T-Configurator can be uploaded into the LED drivers for the fast mass production.

T4T Production also allows reading data from drivers (to be displayed and edited in T4T-Configurator)



Tuner4TRONIC Field

T4T-Field is an app for smartphones that can program INVENTRONICS outdoor as well as indoor LED drivers via NFC - wireless and without mains-voltage. The app trims light output, CLO and dimming profiles of the driver. T4T-Field also allows uploading production files created by T4T-Configurator and copy data from one driver to another for on-site replacement.

Click here to download the app from Google Play (Android version)
Click here to download the app from the App Store (iPhone version)
Click here to download the dedicated manual for T4T-Field

Tuner4TRONIC REST API

While the T4T-Configurator provides the users an intuitive graphical interface, the API („Application Programming Interface“) allows software developers a collection of functions and tools to create luminaire configurations automatically. Typically, the API is used to create luminaire files when a new order is available in the ERP system. The API is based on modern standards (REST) standards and comes with comprehensive documentations.

Tuner4TRONIC Machine

The DLL and command line tools enable to integrate INVENTRONICS LED driver programming into automatic programming stations in the production line.

1.2 Files Types

Tuner4TRONIC Development uses different file types:

- Tuner4TRONIC production file = .osrtup
- Driver description file = .osrtud
- Driver data (readback) = .osrtur

1.3 Workflow between the different T4T Tools

The luminaire product designer creates his desired configuration (e.g. setting the operating current, CLO and dimming) using T4T Configurator. When the configuration is finished, he creates and downloads an read-only *.osrtup file that goes to T4T Production on the assembly line in mass production.

For testing and diagnostics, data can be read back from the driver by T4T Production and import the *.osrtur file for visualization in T4T Configurator

Our optional API allows to create luminaire and production files directly from an ERP system removing the need to create those files manually.

1.4 System Requirements

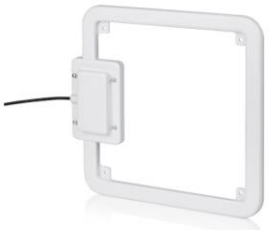
The minimum system requirements:

- 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 for Programming Interface

1.5 Programming Interfaces

To program a luminary containing an INVENTRONICS driver, a programming interface (suitable for the used driver) is needed:

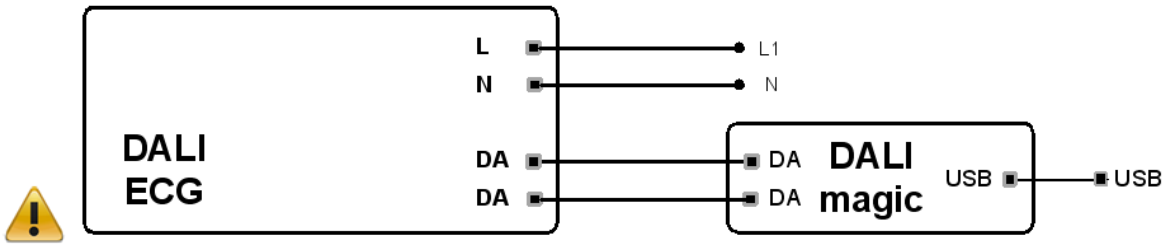
[1]	Driver with DALI interface (multi and/or single programming)	DALI Magic	
[2]	Driver with NFC interface	FEIG ISC.PRH101	
		FEIG CPR30	
		FEIG ISC.MR102 (separate antenna ISC.ANT310/310 needed)	
		FEIG ISC.LR1002 (separate antenna ISC.ANT310/310 or ISC.ANT800/600 needed)	
		ID ECCO Smart HF.BLE FEIG order code: 5738.000.00 ID BLE USB-Dongle FEIG order code: 5903.000.00 required for BT connection w/ ECCO Smart	

[3]	Antenna with FEIG ISC.LR1002	FEIG ISC.ANT310/310	
[4]	Driver with Prog+/Prog- interface	OT Programmer (COM Box)	
[5]	Driver with DA+(P+)/DA-(P-) interface	PRG-MUL2	

Tuner4TRONIC Production is capable to handle more than one programming interfaces connected to the same PC

1.6 Preparing a driver with DALI interface for programming

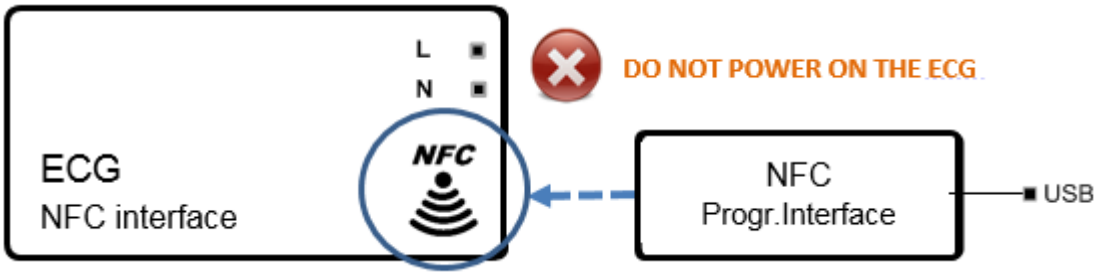
Step	Activity
1	Connect DALI magic and PC with the enclosed USB cable.
2	Connect the external 6V DC power supply to the DALI magic. The use of the external power supply is mandatory in case of more than 4 drivers connected to the DALI line, anyhow it is strongly recommended to always use the external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



NOTE: most of the DALI LED drivers allow programming when supplied with a low voltage (e.g. 48V) in place of the mains voltage. For further details, please consult the LED driver's datasheets.

1.7 Preparing a driver with NFC interface for programming

Step	Activity
1	Connect a NFC reader to the PC with the enclosed USB cable.
2	Place the driver (see logo on the driver) close to the NFC reader



Important Information:
Keep the driver powered OFF during programming via NFC unless otherwise indicated in the documentation of the driver. Keep both NFC reader and driver in close contact during the complete programming process.

1.8 Preparing a driver with Prog+/Prog- interface for programming

1. Connect the OT Programmer to the PC with an USB cable.
2. Connect the +/- terminals of the OT Programmer with the Prog+ / Prog- terminals/cables of the driver.

Important Information:

DO NOT POWER ON THE DRIVER! Programming of the driver via Prog+ and Prog- is NOT allowed when the driver is powered with mains on terminals L/N.

1.9 Preparing a driver with DA+(P+)/DA-(P-)- interface for programming

1. Connect the MUL-PRG2 to the PC with an USB cable.
2. Connect DA-(P-) to Return (gry), DA+(P+) to Programming (pur) and Vaux/Aux+ to Vaux (blk/wht).

Important Information:

DO NOT POWER ON THE DRIVER! Programming of the driver is NOT allowed when the driver is powered with main.

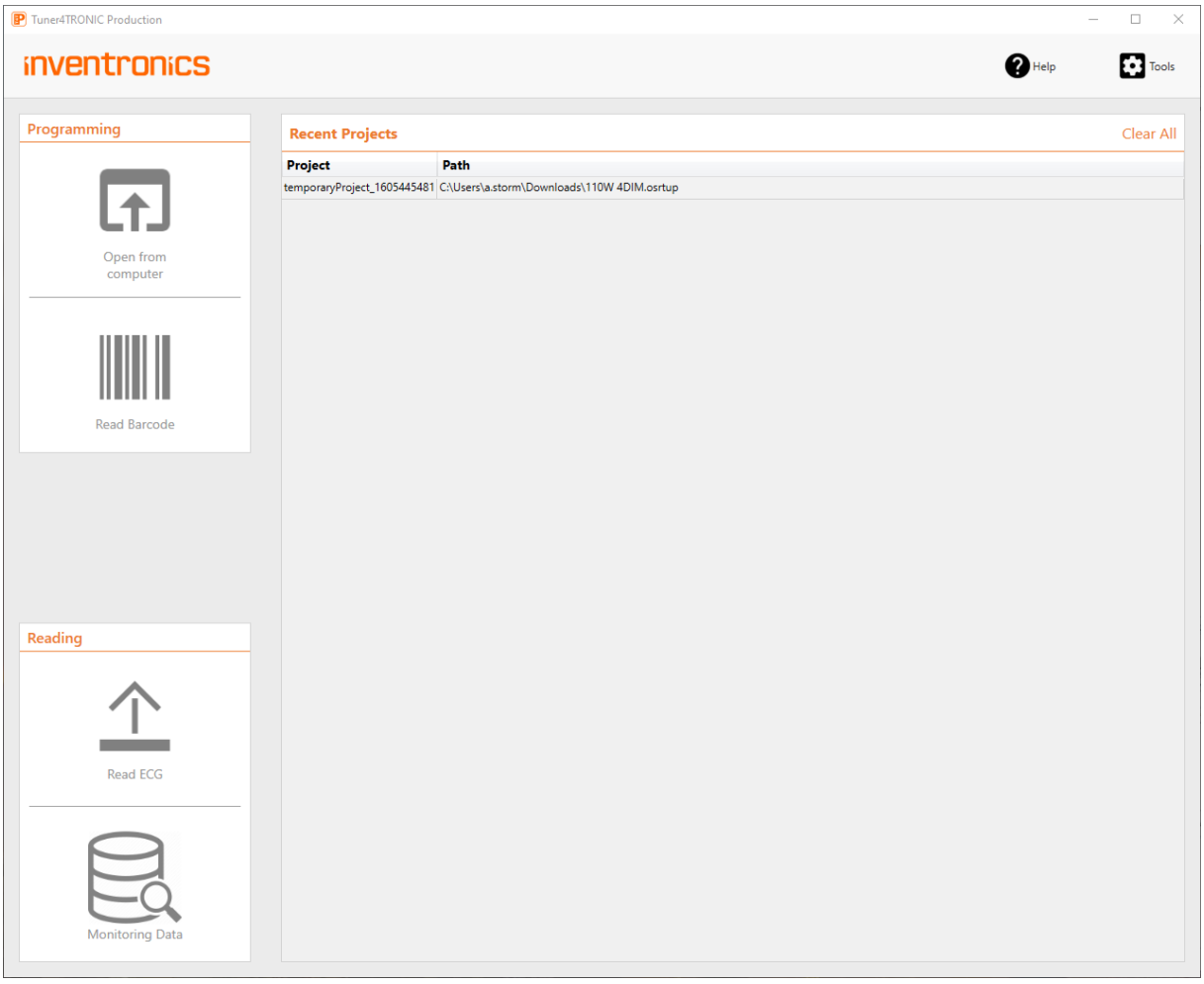
1.10 Software Installation

To install the file you must have Windows administrator rights. Extract the Tuner4TRONIC zip file into your local hard drive (use short path name, e.g. c:\temp) and then run "Install T4T.exe" located in that folder. **Running the Installer from inside the zip file will cause a faulty installation!**

Tuner4TRONIC Production can be launched from "Start" => => "Tuner4TRONIC 4" or by double-clicking the desktop icons.

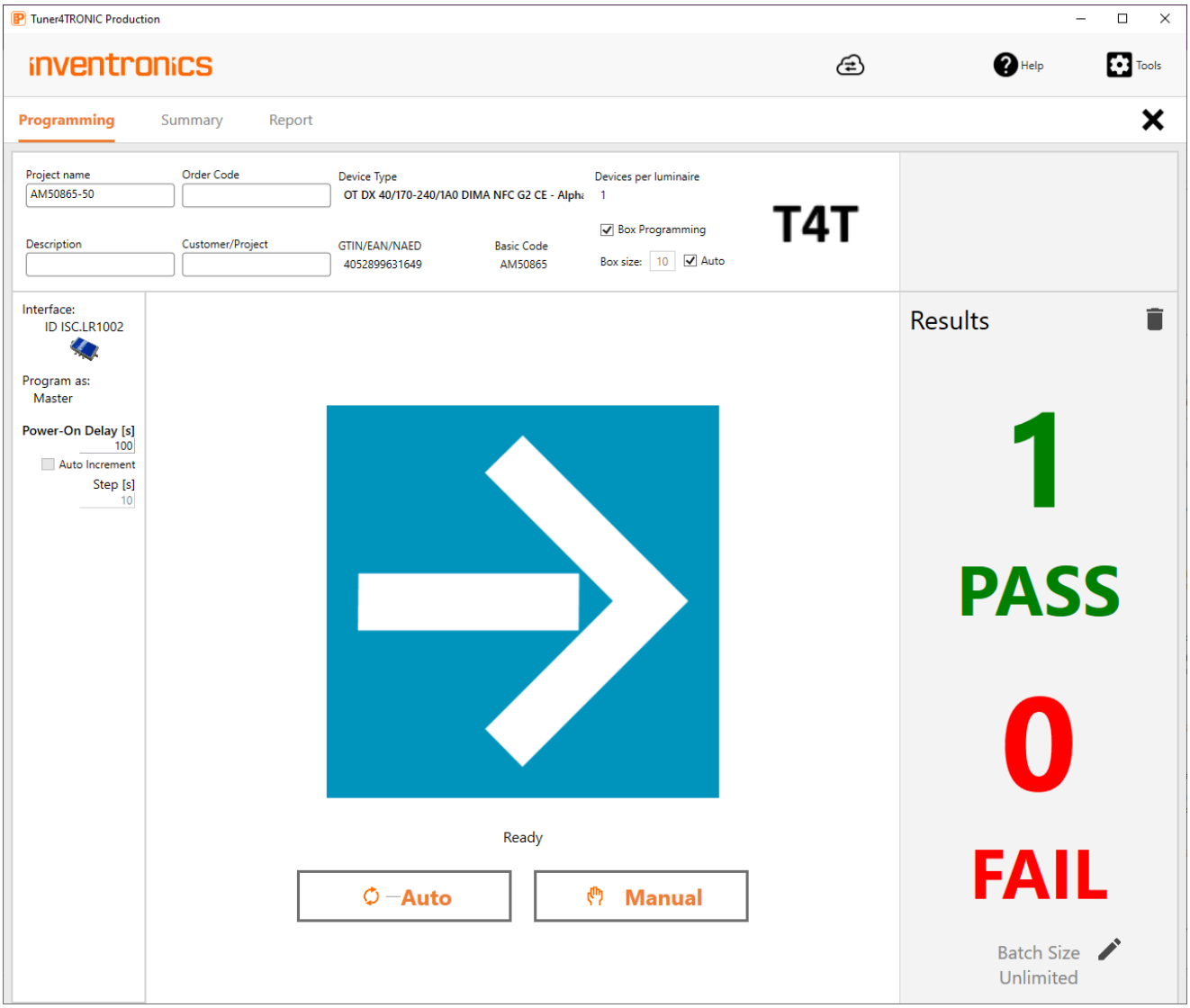
2 Using T4T Production

2.1 Start Page



Open from computer	Load an existing production file (*.osrtup). This file has been created by Tuner4TRONIC Cloud, Tuner4TRONIC API or Tuner4TRONIC Development. After selecting a production file, the program will switch to the programming page. Recently loaded production files can also be loaded from the recent projects list by double click.
Read Barcode	Load production file from barcode
Read ECG	Read data from driver connected by a programming interface
Monitoring Data	Read and display Monitoring Data (PMD, D4i) from driver
Recent Projects	Load a production file from list of recently opened projects. List can be cleared by “Clear All”
Tools	Open tools page
Help	Open help and about pages

2.2 Programming Page



For programming devices select “Programming” on the navigation bar

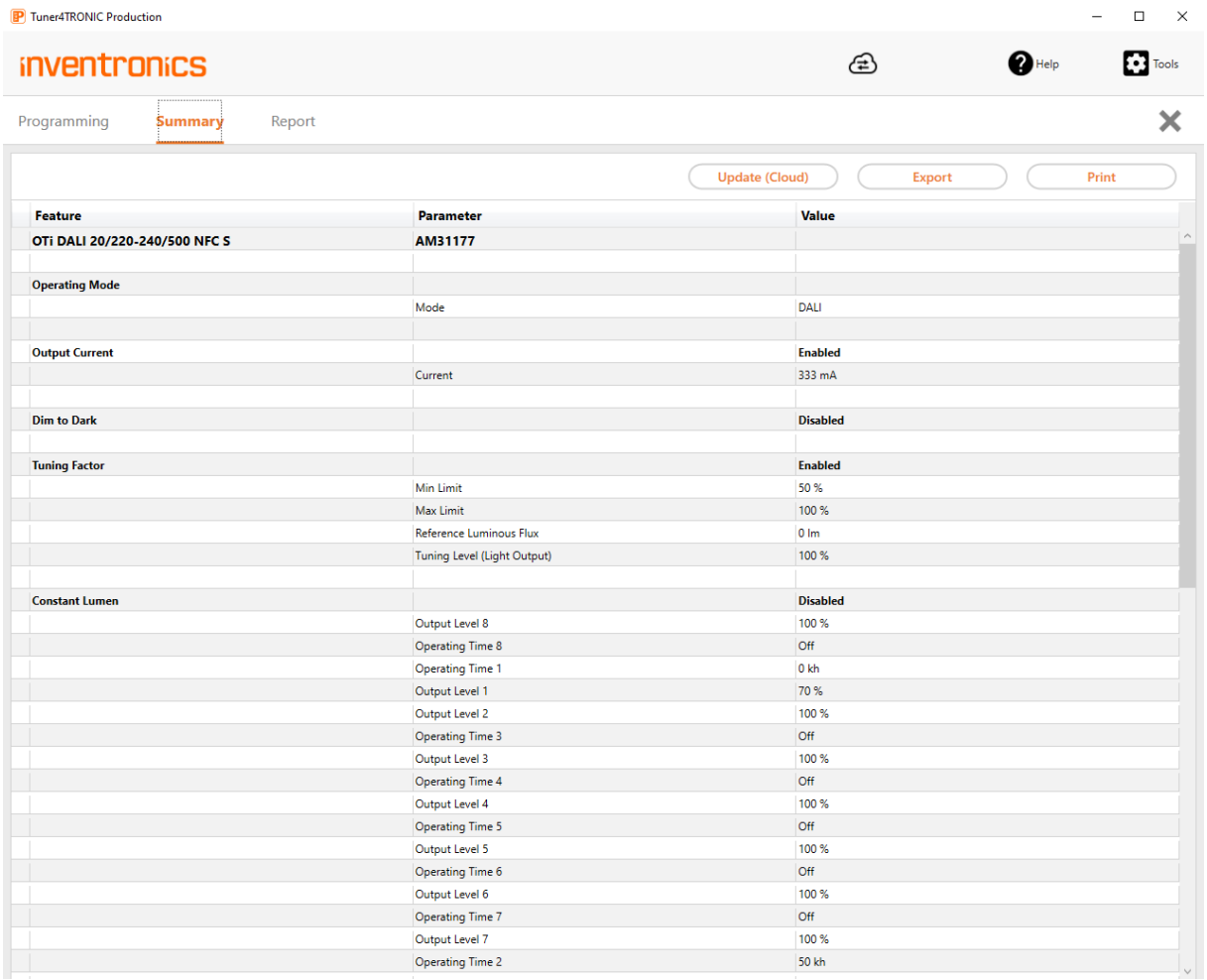
Project Data	Project related data, that has been loaded from production file is displayed and can be edited in the project data section
Devices per Luminaire	Shows the number of devices in the luminaire, that will be programmed. Data is received from loaded production file
Box Programming	Select “Box Programming” to program drivers in the box via NFC. Box programming can only be activated after having selected a programming interface that is suitable for box programming If the driver is released for box programming, Auto checkbox will enter number of drivers by default. Default setting loaded from production file and can be edited. Programming will not start before number drivers detected matches the target number of drivers. In case of verification error on one or more drivers, all drivers will be marked as failed. In this case, the hole box must be programmed again. Reprogramming drivers that have been programmed with the same production file before will be overwritten in the report (no increment of the total number of passes)
Detected Devices	Shows the number of detected drivers (displayed after pressing programming buttons)
Start Programming	Programming is started by pressing either — Manual: Programming drivers in one single luminaire or one box — Auto: Starts programming drivers after being connected to the programming interface. Auto mode continues until batch size is reached. In box programming mode, programming starts when number of identified drivers match the box size
Status	Programming status is indicated by a symbol (see table Programming Status Indicators), a completion bar and text message
Results	The number of passed and failed programmings is displayed. The same driver may be programmed multiple times. Only the last pass/fail will be counted and logged in the production file. The programming log can be viewed in the “Report” tab.
	Press delete icon to delete the programming report in the production file and reset programming counter.
	Press edit icon to edit the batch size
Interface	Display connected programming interface

Program as	Display programming role defined in production file. Master: Allows programming of all features (assuming, master key matches key in target device) Service: Allows partial programming of features protected by service key (assuming, service key matches key in target device) and non-protected features User: Allows partial programming of non-protected features
Power-On Delay	If Power-On Delay feature is enabled in the production file, Power-On Delay time [s] will be displayed. User can overwrite Power-On Delay time by editing the value. User can also tick the Auto Increment and assign a value for step size [s]. This will increment the Power-On Delay time by the step size with every single programming. Please note, that Auto Increment is not available with Box Programming
Additional DALI Options	**Single driver programming:** If DALI Magic has been selected as programming interface, a single driver compatible to the driver in the production file connected to the DALI line can be programmed and data from any single driver can be read out. If driver in production file does not match driver on the DALI line, T4T-P will execute family programming service (either online or from offline database). DALI address in the driver will follow settings in production file (either keep when disabled, unassign or assign new DALI address). **Batch programming:** If multiple drivers are connected to the DALI line, all drivers compatible to the driver in the production file will be programmed. **DALI addresses will be deleted in the drivers after programming.** Programming from production files with DALI Addressing enabled will be rejected. T4T-P4 will execute family programming service. **Selective programming:** “Selective Programming” can be enabled to program one or more specific drivers in a DALI installation identified by their DALI short addresses. Press “Search” to search for drivers in the DALI installation. All compatible drivers will be highlighted in green, and the ones to program can be selected by checking the box. To find the luminaire in the installation, tick “blink” to let the luminaire blink. Short addresses to program are separated by comma, ranges (e.g. “2-9”) are also accepted. DALI bus will be scanned before programming to avoid creating doubles. Selective programming is rejected with drivers in multi-channel operating mode. Switching operation mode in multi-channel drivers not possible in selective DALI programming. Please either program via NFC or connect a single driver only.
	The cloud icon is displayed, online services are available (connected) Online services allow automated updating of device description files with latest drivers from DD-store and notifications in case of T4T-P updates.

Programming Status Indicators

	Waiting for Luminaire	Connect a luminaire/driver(s) to start/continue programming.
	Programming in progress	Do not remove the connected luminaire/drivers(s) until programming process is completed.
	PASS	Programming process has completed successfully. Remove luminaire/drivers(s)
	FAIL	Programming process has stopped by user or due to errors. Fix the problem then start programming again. Check message on screen for further details.

2.3 Summary Page

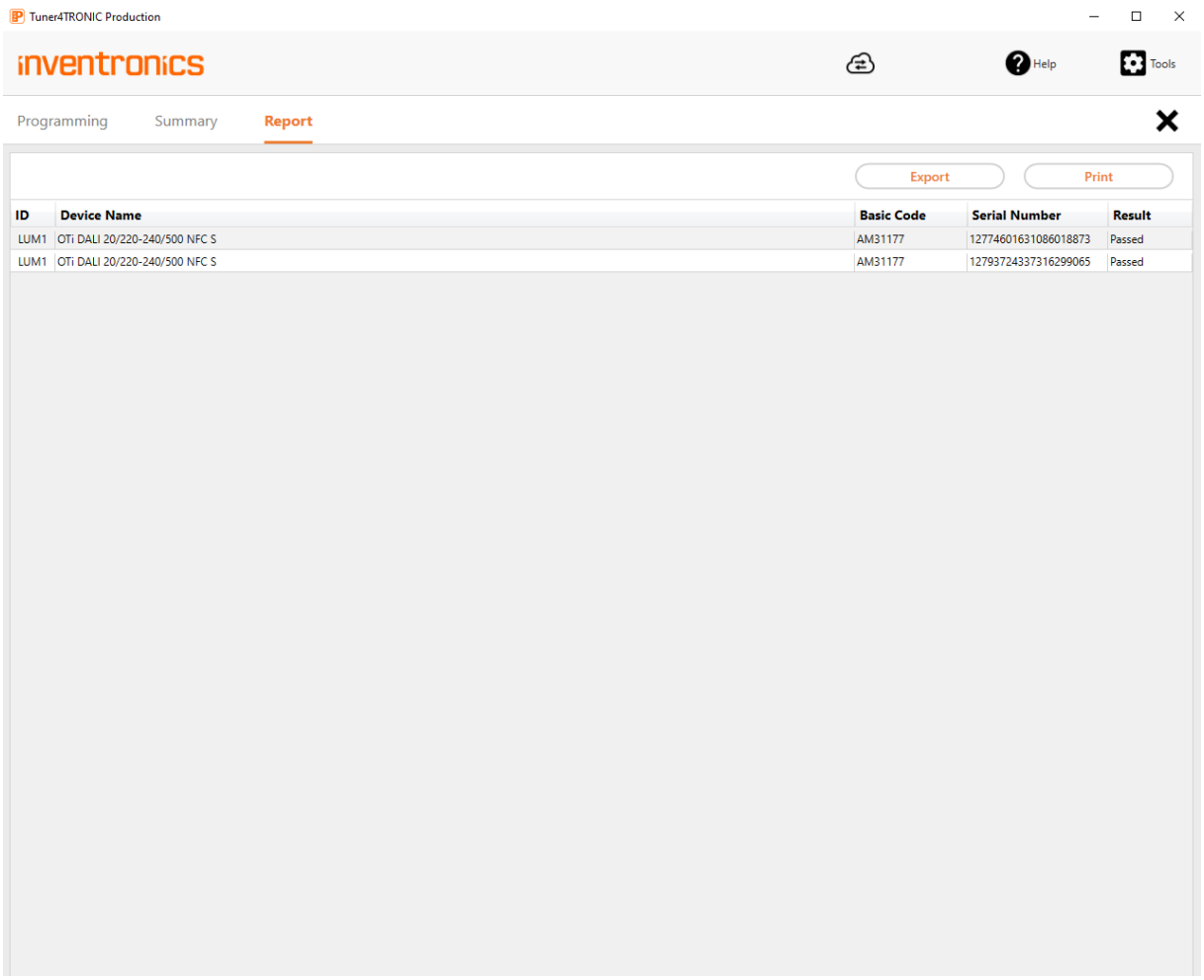


Feature	Parameter	Value
OTi DALI 20/220-240/500 NFC S	**AM31177**	
Operating Mode		
	Mode	DALI
Output Current		**Enabled**
	Current	333 mA
Dim to Dark		**Disabled**
Tuning Factor		**Enabled**
	Min Limit	50 %
	Max Limit	100 %
	Reference Luminous Flux	0 lm
	Tuning Level (Light Output)	100 %
Constant Lumen		**Disabled**
	Output Level 8	100 %
	Operating Time 8	Off
	Operating Time 1	0 kh
	Output Level 1	70 %
	Output Level 2	100 %
	Operating Time 3	Off
	Output Level 3	100 %
	Operating Time 4	Off
	Output Level 4	100 %
	Operating Time 5	Off
	Output Level 5	100 %
	Operating Time 6	Off
	Output Level 6	100 %
	Operating Time 7	Off
	Output Level 7	100 %
	Operating Time 2	50 kh

For displaying list of parameters in production file select “Summary” on the navigation bar.

Update (Cloud)	Press Update (Cloud) to convert values in report to clear text by using cloud services. Required, if data from production file **does not include report in clear text**
Export	Press “Export” to create an html file with parameters
Print	Press “Print” to print the list of parameters

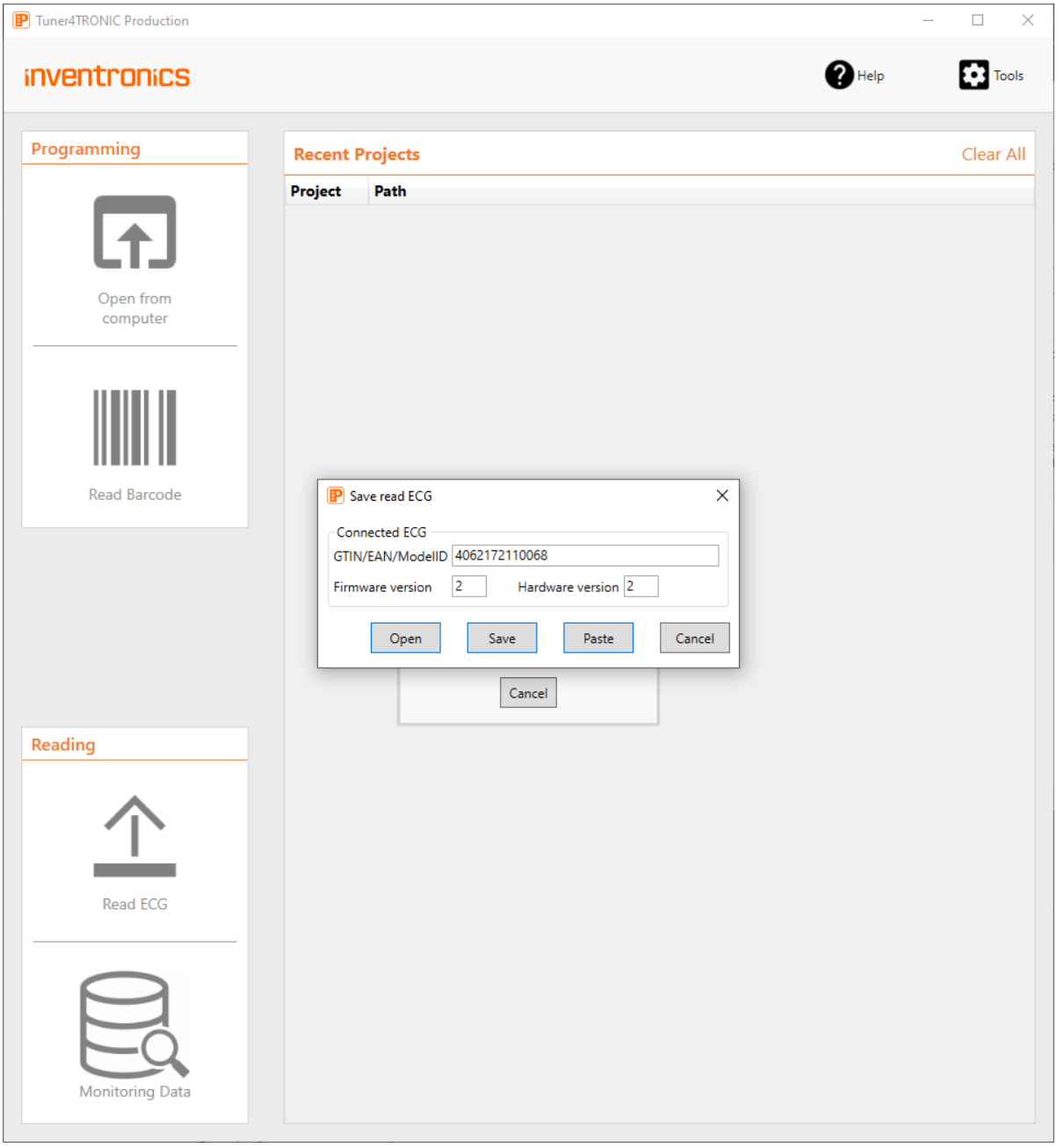
2.4 Report Page



For displaying the programming report select “Report” on the navigation bar

Export	Press export to create an html reporting file. Each line represents programming result one driver, luminaire or box
Print	Press Print to print the report

2.5 Read ECG

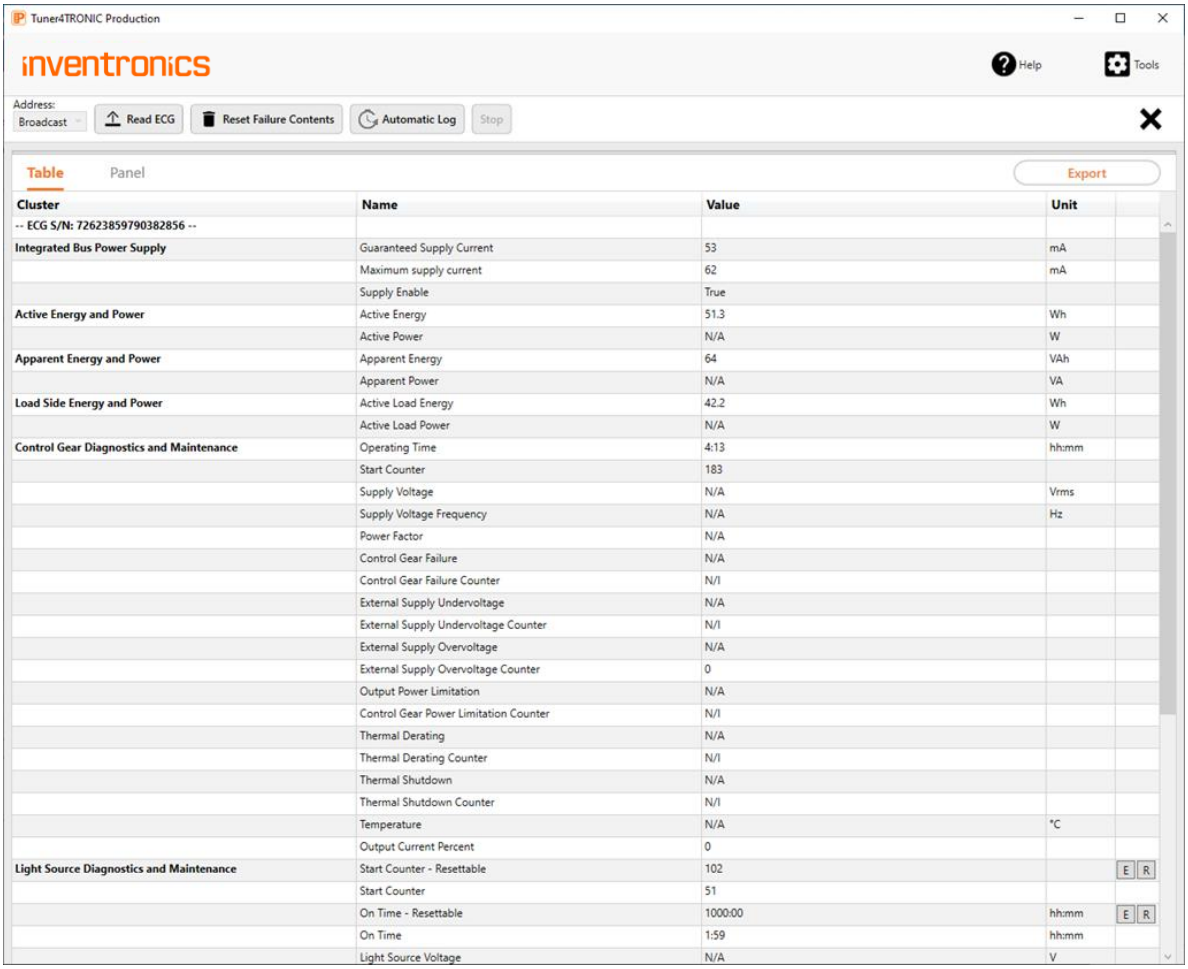


After having pressed Read ECG button from the main page, T4T-P4 will read data from the driver connected via a programming interface (NFC, DALI, OT-Programmer). When DALI Magic has been selected as programming interface, a specific driver can be selected from the DALI network by entering its DALI short address.

A modal window will offer the following options:

Open	Open T4T Configurator in a new tab in your standard browser and create a new project with data received from the driver. Please note, that the passwords are not copied when reading data from drivers. Instead, the encrypted master password is returned to indicate, that the driver is protected. PWs need to be re-entered when creating a production file.
Save	Save the readback file (*.osrtur) created from the data received from the driver on your local computer. This file can be imported in T4T-C for displaying data and creating new production files for programming. Saving readback files is useful, when T4T-P4 is offline. Please note, that the passwords are not copied when reading data from drivers. Instead, the encrypted master password is returned to indicate, that the driver is protected. PWs need to be re-entered when creating a production file.
Paste	Create new production file with data received from the driver and import in T4T-P4. This feature is useful to create clones when replacing drivers in luminaires. The paste feature uses cloud services and hence required access to internet- Please note, that the new production file includes PW (not visible to user) to unlock and protect new drivers

2.6 Monitoring Data



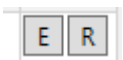
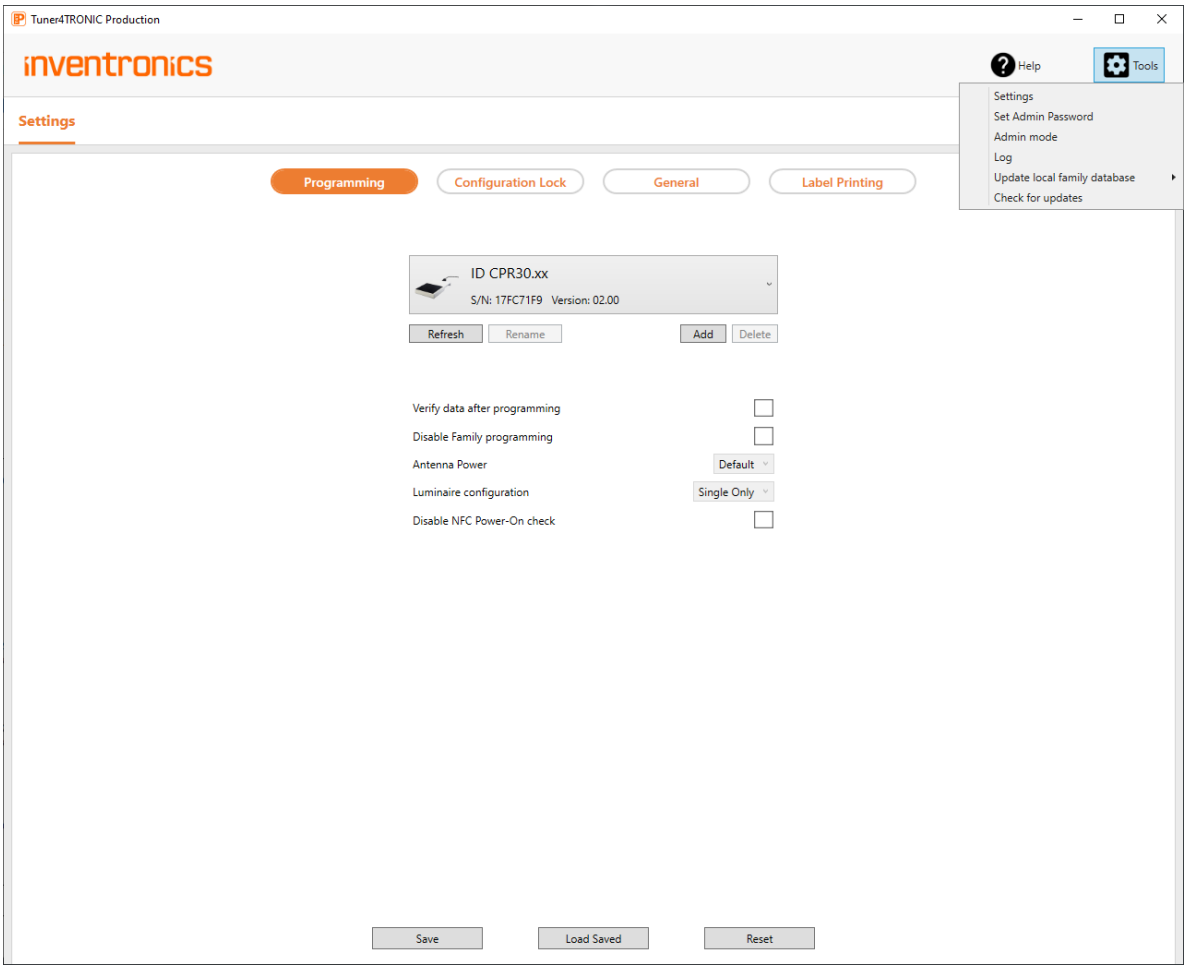
Address	If programming interface DALI magic is selected, broadcast will read the one and only driver connected to the DALI network. If more than on driver is connected, a specific driver on a DALI network can be selected by DALI short address.
Read ECG	Press “Read ECG“ to read content of Monitoring Data from driver connected via the selected programming interface.
Resettables 	Press “E” to edit values Press “R” or to reset Changes will be be affective after next driver power on
Automatic Log	Reads Monitoring Data recurrently from driver and logs data
Stop	Stop reading Monitoring Data

Table	Select “Table” for table data view
Panel	Select “Panel” for panel data view
Export	Press “Export” to create an html file with parameters

Please find a list of monitoring data in the appendix.

2.7 Tools Page

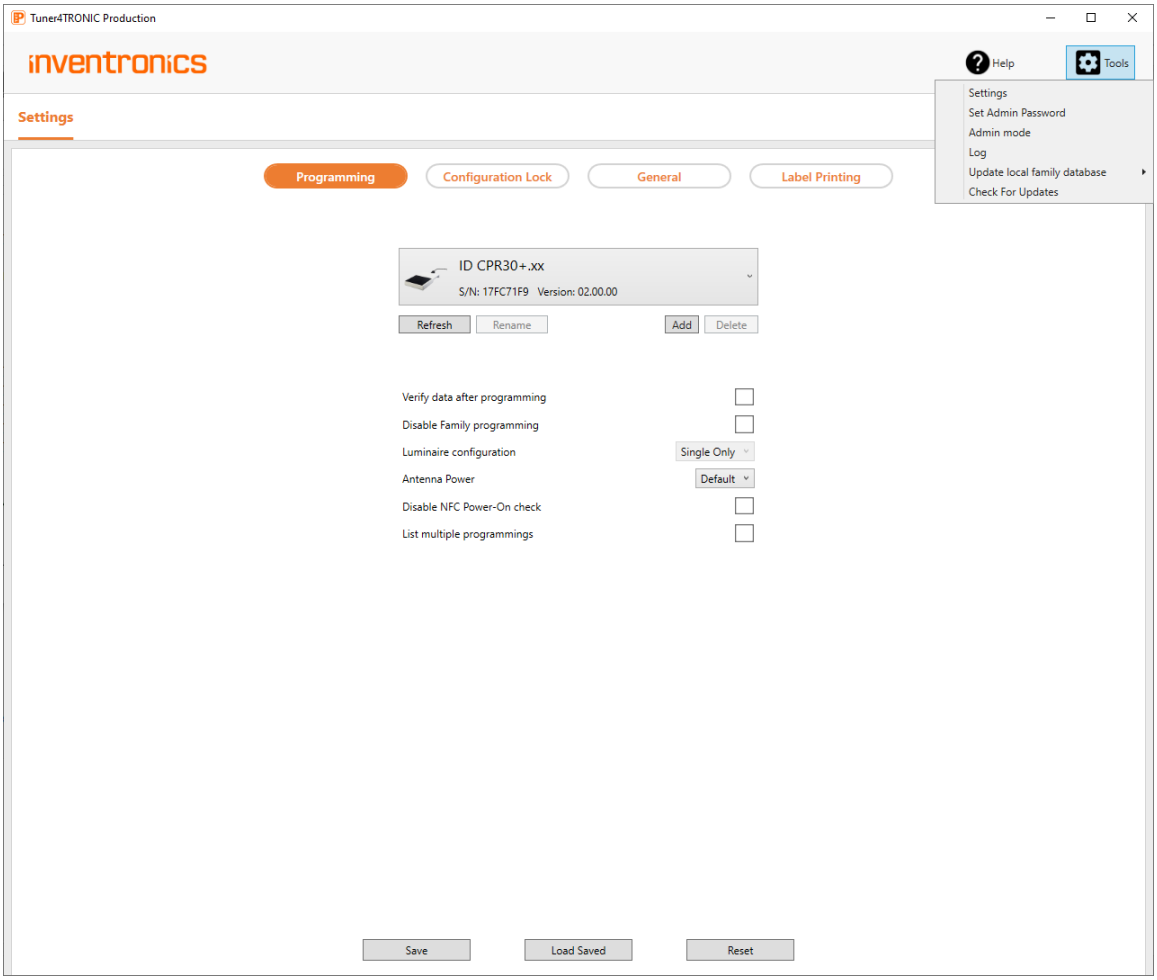


Press Tools and select tools from drop down list

Settings: see Settings page

Set Admin Password	Enter or delete password to use T4T-P in admin mode
Admin Mode	Toggle Admin Mode on/off. If admin mode is activated, production file cannot be reloaded and project data cannot be edited
Log	View log for debugging purposes. Press right mouse on log window to export csv log file
Update local family database	Updates database for family programming – either from cloud or from local zip file, if no internet connection. Zip file can be downloaded from https://www.inventronics-light.com/tuner4tronic → Software Downloads
Check for updates	Select “Check for Updates” to check for new T4T-P versions from download center. Updates affect T4T-P4 and T4T-S simultaneously.

2.8 Settings – Programming



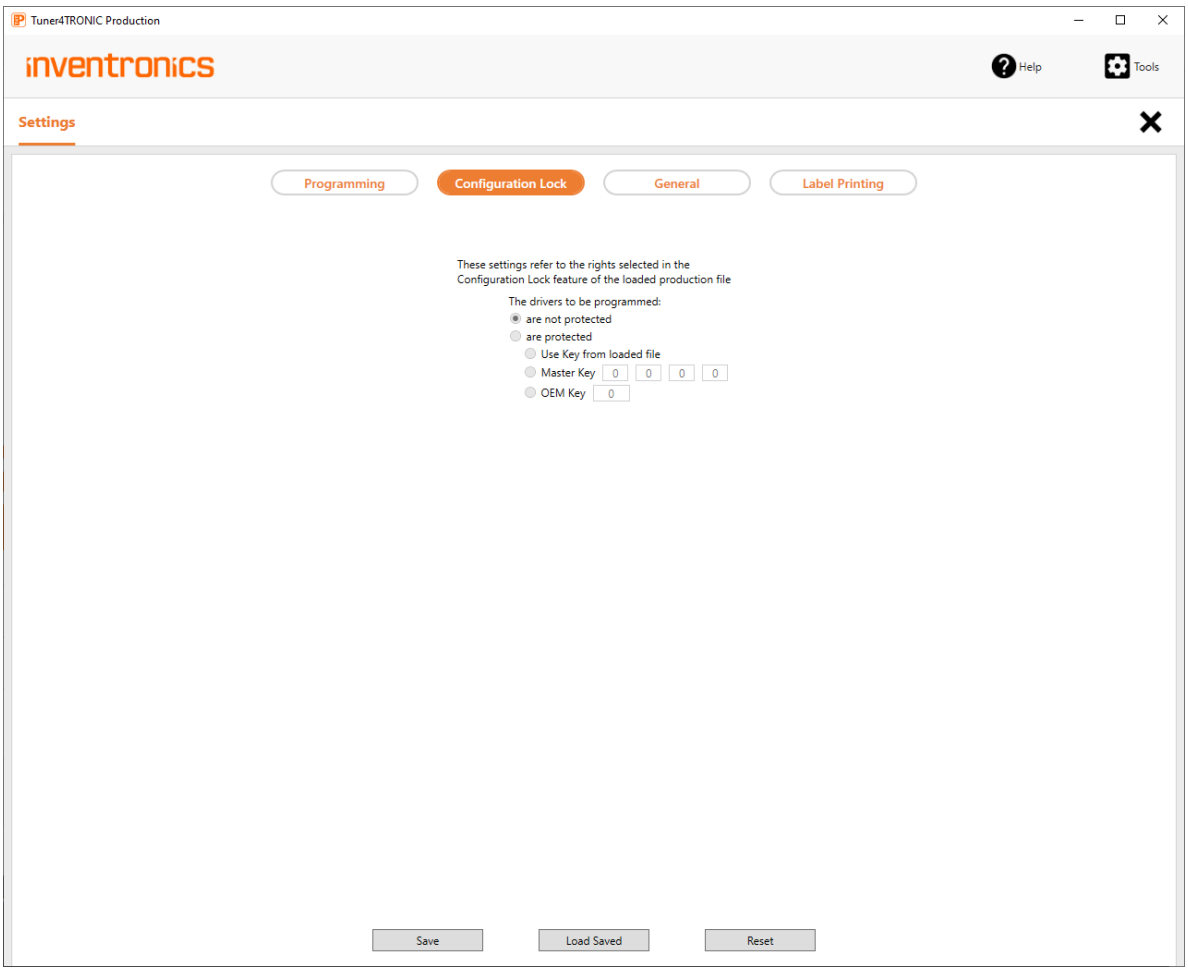
Select Tools/Settings and press Programming to select programming options

Save	Save options on local computer and in production file where applicable. If settings have not been saved, any changes will be ignored when restarting T4T-P
Load Saved	Load options from local computer and from production file where applicable
Reset	Reset options to factory settings and to data from production file where applicable

Select programming interface	Select programming interface from drop-down list. Make sure that the programming interface is connected and not used by other tools. Press Refresh to refresh list of USB programming interfaces. For programming interfaces, that use a COM port (e.g. OT Programmer, Feig ECCO w/ BT dongle, PRG-MUL2), press Add Serial, scan COM ports by pressing the Detect button, select a device and assign an name and finally press the Add button to add the programming interface to the drop down list. For programming interfaces connected via TCP/IP (e.g. LR1002), press Add TCP, enter IP address and press Detect. Once installed as described before, the programming interfaces will be available on the drop down list also after re-opening the application.
Verify data after programming	Select verify data after programming, if you want to verify data after each programming automatically. Default is set from production file.
Disable Family programming	Family programming allows programming drivers of the same driver family and drivers from the next generation with the loaded production file. Family programming does not allow programming drivers from previous driver generations (no backwards compatibility). Select disable family programming to reject programming of any drivers other than the one specified in the production file. Default is set from production file. Family programming is a cloud service. If no internet connection available or cloud service is deactivated, family programming service installed with T4T-P4 locally on the computer will be used. Please ensure, that local service is updated any time. Please use updated features data base update from tools menu to update local family programming service.
Antenna Power	Select antenna power to adapt power to specific setup. Please note, that Feig launched an updated reader CPR30+ that allows operation at high antenna power for drivers with weak NFC antenna.
Luminaire Configuration	Select single programming or multiple programming. Multiple programming allows programming multiple drivers connected via DALI (test rack application or multiple drivers in one luminaire). Default setting is derived from production file.
Disable NFC Power-On check	In general, T4T-P4 does not allow programming drivers that are connected to mains, since NFC data might get corrupted. In worst case, T4T-P4 may acknowledge programming, though data has not been programmed correctly. To avoid this failure, LED drivers set a power-on flag in the NFC tag to communicate to T4T-P4, that the LED driver is powered. T4T-P4 will then reject NFC programming. Due to a recent bug in LED driver production, the power-on flag has been set in some production lots by mistake, though the driver is not physically connected to mains. LED

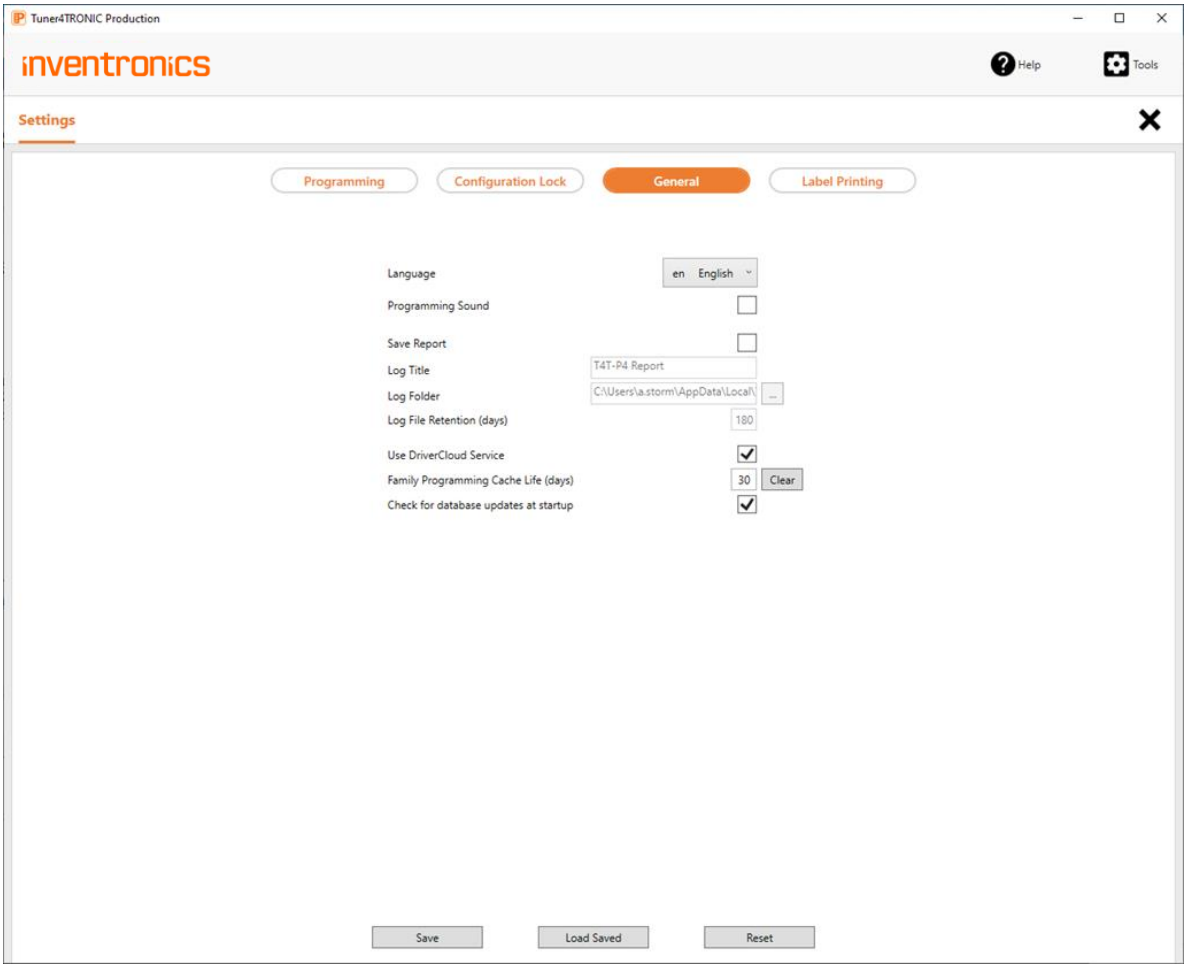
	drivers can be repaired by disabling NFC power-on check. In this case, the user needs to ensure, that the driver is not powered, since there is no check in T4T-P4. Therefore, this option should not be used by default.
List multiple programmings	If same driver (identified by its serial number) is programmed twice, programming counter will not be incremented and will be overwritten by latest programming event. By ticking “List multiple programmings”, counter will be increased also when programming same driver multiple times and report will show all programmings (differentiated by time stamps).

2.9 Settings – Configuration Lock



Select Tools/Settings and press Configuration Lock to overwrite password settings defined in the production file to allow programming protected drivers. Master Key is used in drivers with two level PW protection. OEM key is used in drivers with single level PW protection.

2.10 Settings – General

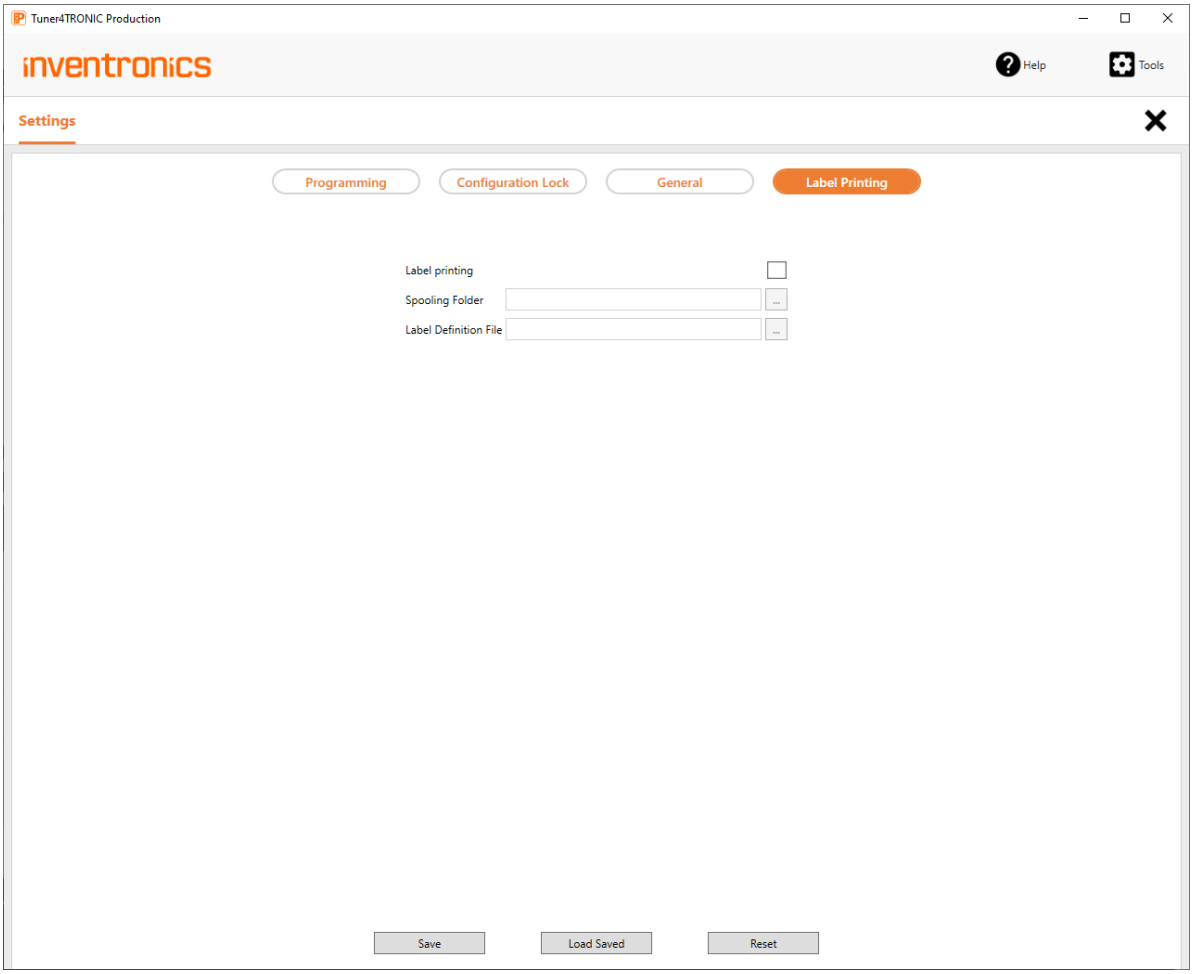


Select Tools/Settings and press General edit general parameters

Programming sound	Makes a sound after each programming
Logging	Creates HTML programming log files (title and folder below)
Log Files Retention (days)	Deletes log files after expiry period to free memory on local computer

Cloud Service	Enables access to cloud services, e.g. used for — family programming — automated data base updates for family programming in offline mode — T4T update notification — creating report files in clear text — driver registry
Family programming cache	Deletes cached family programming files after expiry period to free memory on local computer
Check for database updates at startup	If ticked, T4T-P will check for data base updates at each startup

2.11 Settings – Label Printing



With Tuner4TRONIC Production you can trigger printing of labels instantly after programming of each individual driver. This way you can create a label and stick it on the luminaire with luminaire information incl. barcodes or QR codes for later identification.

Tuner4TRONIC Production itself does not design nor print labels. A third party label printing software (e.g. Nice Label, Bartender. Note: the automation version is required) is needed to create and layout the label design template (incl. barcode or QR code creation) and to start the actual printing.

After activating the label printing functionality in the T4T Production settings, T4T creates a csv file after each driver programming with all driver parameters that were written by T4T into the driver (all the parameters that can be found in the report e.g. operating current, dimming, luminaire name, luminaire info, individual serial number, GTIN). The csv file (Output.csv) is saved on the spooling folder specified in the label printing settings after each successfull driver programming. The third party label printing software must be set up to monitor the spooling folder and whenever a new Output.csv file is created by T4T, the

printing software triggers the printing combining the driver data inside the Output.csv file and the predefined label design template (label definition file *.nlbl).

The Output.csv file hold only the data of the last programmed driver, i.e. after each driver programming, the Output.csv file is overwritten with the data of the latest driver. In this way, after each driver is programmed with T4T-Production, the corresponding label is printed instantly and fully automatically.

Select Tools/Settings and press Label Printing enable/disable label printing and browse for label definition file and spooling folder. If a local folder is selected as Spooling folder, a csv file is created and overwritten with each programming.

When label printing is enabled w/ box programming, one label per driver will be created (i.e. 20 labels for a box of 20 pcs).

Appendix

List and description of parameters of Monitoring Data v2:

Energy	Active Energy & Power	Active EnergyActive	The integral of the instantaneous power over a time interval, measured in units of watt hour.
		Power*	Under periodic conditions, mean value, taken over one period of the instantaneous power, measured in watt.
	Apparent Energy & Power	Apparent Energy	The integral of Apparent Power over a time interval, measured in units of VA hour.
		Apparent Power*	The product of the rms voltage between the terminals of a two-terminal element or two-terminal circuit and the rms electric current in the element or circuit.
	Load Side Energy & Power	Active Energy Loadside	The integral of Load side Power over a time interval, measured in units of watt hour
		Active Power Loadside*	The input power minus the sum of power used for the DALI bus power supply (if present) and the power used for the AUX power supply (if present). Note: the losses for both power supplies (if present) may be neglected in the measurement
Diagnostic & Maintenance	Driver	Operating Time	Counts the control gear operating time in seconds if the control gear is powered regardless of the status of lampOn bit.
		Start Counter	Counts the number of control gear starts that are induced by a power cycle of the external supply. A power cycle shall be counted if the power on time is at least 600ms.
		External Supply Voltage*	RMS value of external supply voltage
		External Supply Voltage Frequency*	Frequency of external supply voltage. Indication as follows: 0 in case of 0 Hz (pure DC or rectified AC voltage). Examples for frequency indication: 17 in case of 16,7 Hz, 50 in case of 50 Hz
		Power Factor*	ControlGearPowerFactor = 100 means: the control gear has a power factor of 1.00
		Overall Failure Condition*	Shows if the LED driver experienced a failure or not.
		OverallFailureConditionCounter	Counts the number of overall failure conditions.
		External Supply Undervoltage*	Shows if the LED driver experienced a voltage below the lower end of the specified input voltage range.
		ExternalSupplyUndervoltageCounter	Counts the number of times the External Supply experienced Undervoltage
		External Supply Overvoltage*	Shows if the LED driver experienced a voltage above the higher end of the specified input voltage range.
		ExternalSupplyOvervoltageCounter	Counts the number of times the External Supply experienced Overvoltage
		Output Power Limitation*	Shows if the output power of the driver was higher than the output power limit.
		OutputPowerLimitationCounter	Counts the number times the output power was higher than the output power limit.
		Thermal Derating*	Shows if the temperature of the LED driver was reduced by reducing the output current of the driver due to reaching a temperature that could affect the lifetime and/or performance of the driver.
		ThermalDeratingCounter	Counts the number of times the temperature was reduced due to thermal derating
		Thermal Shutdown*	Shows if the output current of the LED driver was reduced to zero due to reaching a temperature that could affect the lifetime and/or performance of the driver and is higher than the Thermal Derating Temperature threshold.
		ThermalShutdownCounter	Counts the number of thermal shutdowns
		Temperature (internal)*	Indicates the internal temperature of the control gear. Example: A value of 60 means 0 °C, a value of 0 means – 60 °C.
		Output Current Percent*	Driver output current in % related to the nominal output current setting of the control gear. It includes all driver internal reductions of output current except reduction by constant lumen functionality.

Diagnostic & Maintenance	Lamp	StartCounterResettable	Counts the starts of the light source. The parameter can be resetted.
		Start Counter (Total)	Counts the total starts of the light source.
		On Time Resettable (CLO)	Counts the light source operating time in seconds. CLO profile is following On Time Resettable value. The parameter can be resetted or edited to any value.
		On Time (Total)	Counts the total light source operating time in seconds.
		Output Voltage*	Indicates the actual driver output voltage
		Output Current*	Indicates the actual driver output current
		Overall Failure Condition	Shows if the luminaire experienced a failure ("Lamp failure") or not
		Overall Failure Condition Counter	Counts the number of lamp failures
		Short Circuit	Shows if the light source has a lamp failure with short circuit
		Short Circuit Counter	Counts the number of short circuits of the lamp
		Open Circuit	Shows if the light source has a lamp failure with open circuit
		Open Circuit Counter	Counts the number of open circuits of the lamp
		Thermal Derating	Shows if the temperature of the Lamp was reduced by reducing the output current of the driver due to reaching a temperature that could affect the lifetime and/or performance of the lamp
		Thermal Derating Counter	Counts the number of times the temperature was reduced due to thermal derating
		Thermal Shutdown*	Shows if the output current of the LED driver of the lamp was reduced to zero due to reaching a temperature that could affect the lifetime and/or performance of the lamp and is higher than the Thermal Derating Temperature threshold
		Thermal Shutdown Counter	Counts the number of thermal shutdowns
		Temperature*	Indicates the temperature of the light source. Example: A value of 60 means 0 °C, a value of 0 means – 60 °C. The temperature should be measured by an external sensor that is thermaly coupled to the light source. The interface between sensor and driver is manufacturer specific and is configured in a manufacturer specific way.

*Please note: Reading the Monitoring Data of a driver using the NFC interface will not show all parameters in comparison to using the DALI interface, as some parameters are not available when reading through NFC (e.g. power). Parameters marked with an asterisk on the table above can only be read via DALI.

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