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# TraLux SW manual

## v1.1

Version: v1.0 (30.7.2022),  
Revision: r1 (22.8.2022)

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# 1 SW general description

The Tralux software is the control measurement and evaluation software of the photometric system for measuring, recording and automatic processing of the illuminance time waveform. The system is designed on the basis of virtual instrumentation, where the sensing of luminous flux/illuminance/luminance, signal digitization, data transfer to PC and evaluation is performed in real time. Simultaneously, the data is stored for independent evaluation. The hardware part of the system is represented by the LIGHT SCOPE LSxx series instrument (see Technical documentation of the LIGHT SCOPE LSxx type instrument with LMxx sensor) for which the TraLux SW is designed. The assembly of the LIGHT SCOPE LS03 with LM03 sensor with PC is shown in Fig. 1. The front panel of the SW TraLux is shown in Fig. 2.



Fig. 1. Assembly of LIGHT SCOPE LS03 with LM03 sensor and PC

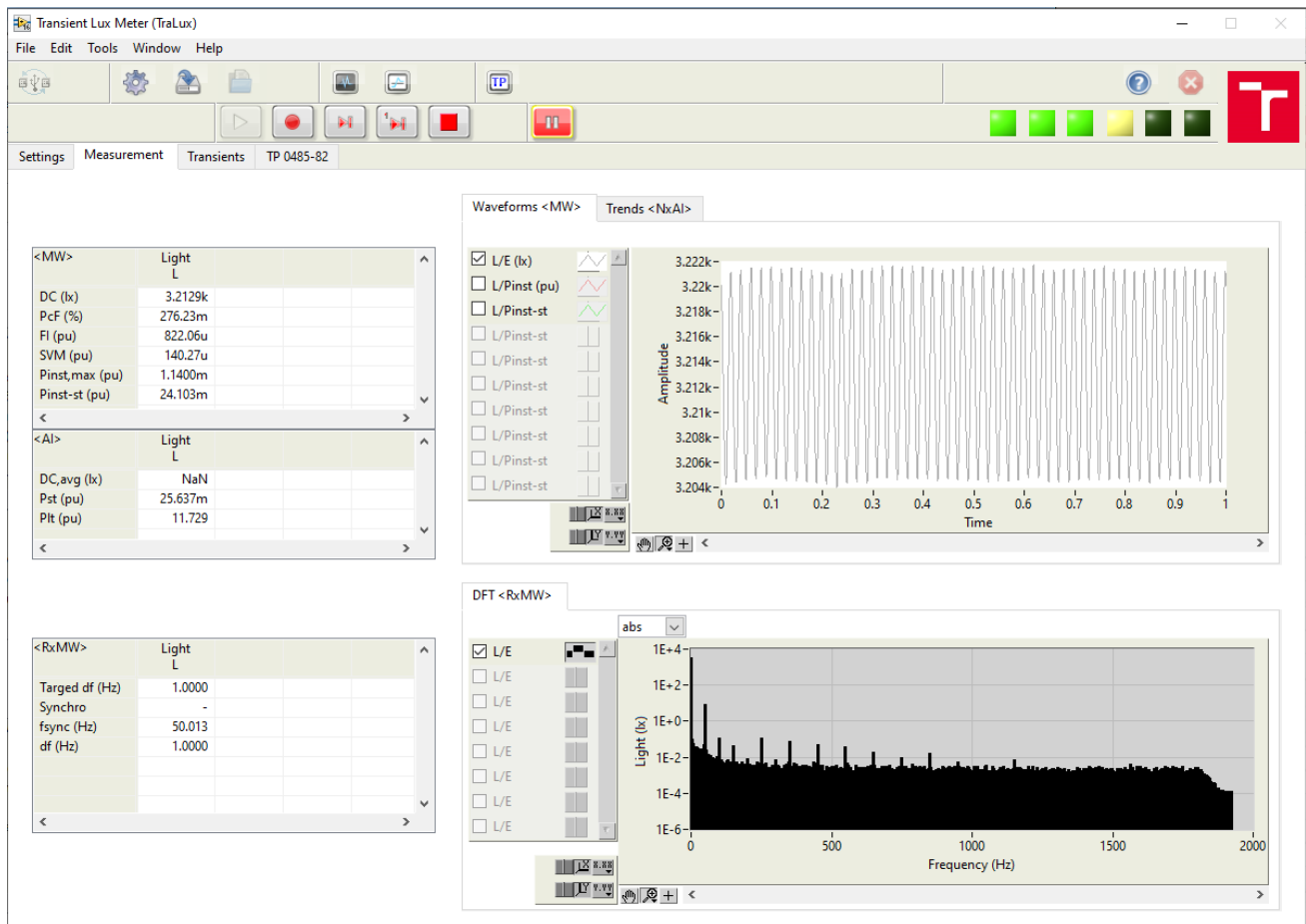


Fig. 2. Front panel of the SW TraLux

## 2 Installation and SW, HW requirements

### 2.1 SW Installation

This section documents installation instructions for the TraLux SW.

1. If a previous version of the SW is already installed, deinstall it using your OS tools first.
2. Open instalation volume and run setup.exe file.
3. Follow the installer instalation instructions.
4. Restart PC if asked and then run TraLux.exe file.

The installation path of the SW, if the default one is kept, is C:\Program Files\TraLux. The SW creates auxiliary data folders "Doc" (for program data when installed), "Data" (for records once they are created) and "Reports" (for reports, again once they are created). These folders are located in the program installation directory (usually C:\Program Files\TraLux\). If the OS does not allow folders to be created in the "Program Files" partition (typically in the case of Win10), these folders are created and all program data is stored in the user's documents directory (typically C:\Users\

### 2.2 SW inicialization and activation

If calibration of the instrument is required, separately delivered calibration file (calibration.cal) has to be munually copied into a SW folder (..\Doc\) where the SW is installed. Usually, the destination folder is as follows: C:\Program Files\TraLux\Doc\.

The SW has to be activated using delivered Activation Key, that is metter of License. The activation process is described in the TraLux SW manual. Without activation, an instrument is not possible to connect and any measurement cannot be performed.

### 2.3 Minimal system requirements

RAM	Processor	Hard drive space	Graphics and Display res.
8 GB at minimum	2 GHz or better, The SW is optimized for Intel processors; special settings in OS has to be done if an AMD processor is used.	500 MB for instalation 5 GB of space on system disk for data swapping	1366x768 or bigger

### 2.4 Software Support in the TraLux SW

#### 2.4.1 Operating System Support

The following operating systems are supported in TraLux v1.1:

- Windows 7 (64-bit)
- Windows 8 (64-bit)
- Windows 8.1 (64-bit)
- Windows 10 (64-bit)

**Note** The SW is tested on Win 10 64-bit only and is distributed in a volume for 64-bit operating systems.

#### 2.4.2 NI Application Software Support

The following table lists the NI application software versions supported in TraLux SW v1.1.

OS version	NI Application Software	Supported Versions
64-bit OS	NI LabVIEW Runtime	2016 SP1 f7 (64-bit)
64-bit OS	NI-DAQmx Runtime	17.6

**Note** All of those packages are part of installation distribution.

## 2.5 Instrument HW installation and PC-SW interconnection

The assembly of the LIGHT SCOPE LS03 with the LM03 sensor and PC and their interconnection is shown in Fig. 3.

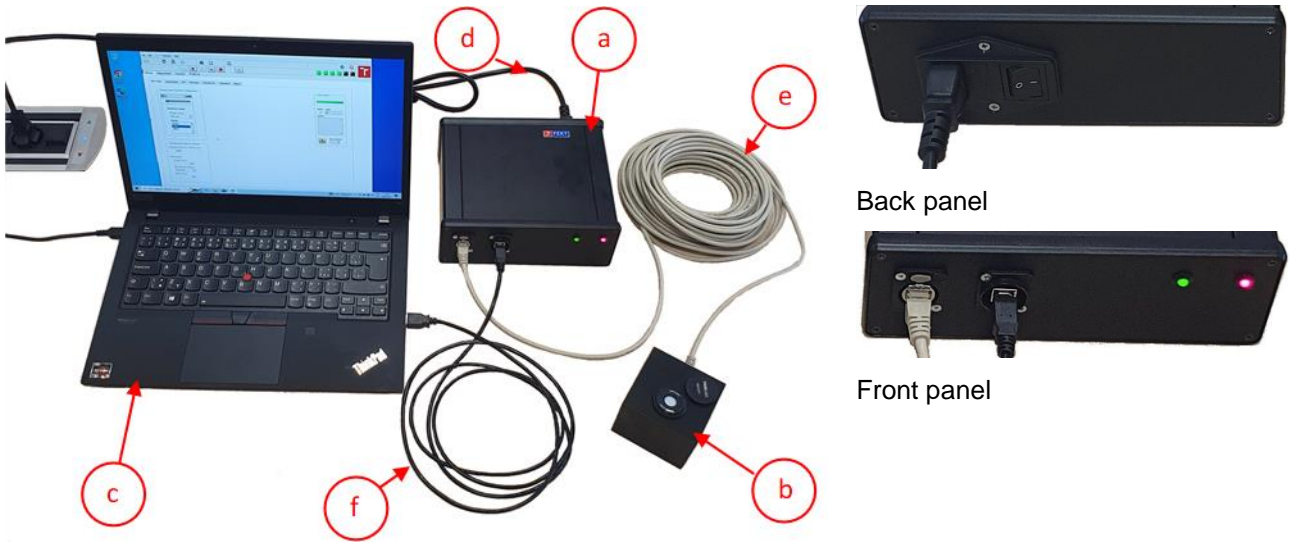


Fig. 3. Assembly of the LIGHT SCOPE LS03 with the LM03 sensor and PC and their interconnection

Legend:

- a. Instrument LIGHT SCOPE LS03;
- b. Sensor LM03;
- c. PC;
- d. Power cord: 3x min 0.75 mm<sup>2</sup>; IEC-320-C13 plug (instrument) - Schuko plug (based on country) 10 A/250 V;
- e. Patch cable: UTP RJ45 - RJ45 Cat.6; max length 20 m;
- f. USB cable: USB 2.0; USB-B (instrument) - USB-A (PC); max length 2 m.

Commissioning procedure:

1. Switch the main power switch on the instrument a) to OFF (O);
2. Connect the power cord d) to the instrument a) and then to the 1φ 230 V/50 Hz socket;
3. Connect the patch cable e) between the instrument a) and the sensor b);
4. Connect USB cable f) between instrument a) and PC c);
5. Turn the main switch on the instrument a) to the ON (I) position;
6. Correct operation of the instrument power supply is indicated by the red LED on the front panel of the instrument a); all is well when on;
7. Start the PC (if not already running) and run the TraLux software;
8. Initiation and proper communication link between instrument a), PC c) and running software is indicated by a green LED on the front panel of instrument a); all good when on.

In a case any part equipped with a) to f) is visibly damaged or the correct operation is not indicated by the LEDs in accordance with 6) and 8), and at the same time the TraLux SW diagnostics does inform about a possible error, please contact the producer.

Further information about the instrument is available in the technical documentation.

### 3 SW control

After the program is started, an automatic procedure is performed to connect and initialize the HW, with the appropriate calibration loaded. If the attempt to connect and load the calibration is unsuccessful, the user is informed by dialogs. It is then possible to make the connection manually from the main icon menu via the Connect button.

In the following, the icon indicates the data type of the indicator or control, followed by its name in bold and then a description.

#### 3.1 Main ribbon – main icon menu

Main icon menu is shown on

Fig. 4.

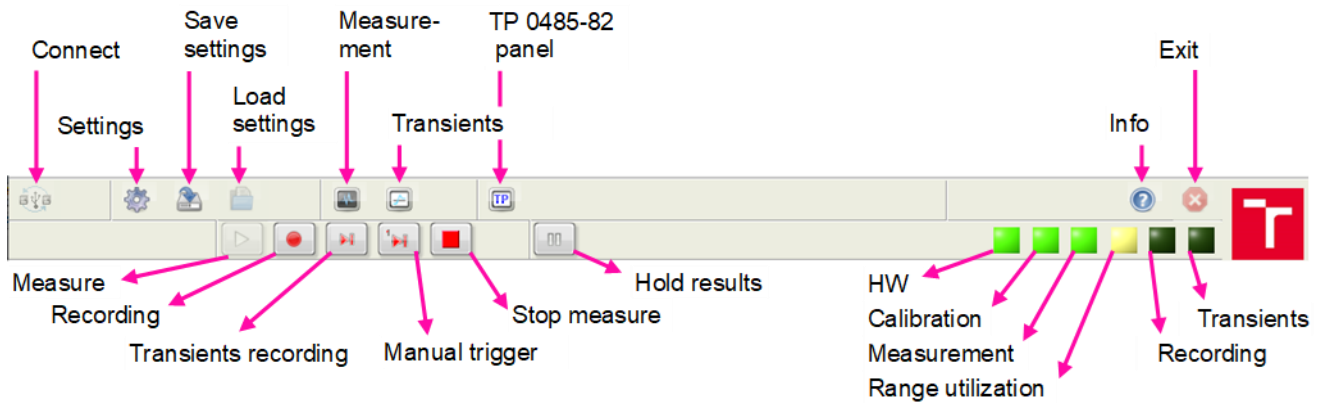




Fig. 4. Main icon menu


Main bar icons:

-  **Connect** Connect button. It connects HW and the button is disabled if already connected.


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-  **Settings** Settings button. It provides access to configuration and settings menu.


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-  **Save settings** Save settings button. It allows to save all SW settings accessible in Settings tab. List of setting is useful as complementary information to recordings.


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-  **Load settings** Load settings button. It provides selection and loading of previously stored settings. The option is available in stand-by state only. Once the measurement is in progress, the button is deactivated.


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-  **Measurement** Measurement button. It provides access to measurement screen.


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-  **Transients** Transients button. It provides access to transients' panel.


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-  **TP 0485-82 panel** Application TP 0485-82 panel button. It provides access to TP 0485-82 panel.


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-  **Info** Info button. It provides access to the application description, licence agreement, SW activation and help.

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-  **Exit** Terminate program button. Termination is available only if measurement is in stop state.

Bar of measurement actions:

-  **Measure** Start measurement. Measurement is allowed to be initiated if at least one measuring channel is properly configured. The HW state is indicated by light indicator in bar of light indicators. HW configuration is available on panel "Settings" – "HW config". Once the measurement is in progress, the button is deactivated.

**TF** **Recording** Recording ON/OFF button. It controls recording of measured and aggregated quantities according to recorder setup (“Setting” – “Recorder” panel). Recording is initiated or stopped once pressed based on previous state. The state is indicated by the button background color and by light indicator in bar of light indicators. Each recording activation will create a new data file.

**TF** **Transients recording** Transients autonomous monitoring and recording ON/OFF button. It controls autonomous monitoring and recording of transients according to transients’ recorder setup. The control is available if at least one valid triggering condition is configured in transient recorder setup menu (“Setting” – “Transient rec” panel). Autonomous monitoring and recording of transients is initiated or stopped once pressed based on previous state. The state is indicated by the button background color and by light indicator in bar of light indicators.

**TF** **Manual trigger** Manual trigger button. It triggers transient recorder ones and records single transient according to transient recorder setup. The control is available if measurement is running. The state is indicated by light indicator in bar of light indicators.

**TF** **Stop measure** Measurement OFF button. By pressing, measurement in progress is stopped and recordings (of aggregated values and transients) are interrupted if active.

**TF** **Hold results** Hold results button. If pressed, update of all output results indicators is frozen, while measurement including recording remains in progress. In order to indicate that results’ indicators, i.e. tables and graphs, are not temporarily updated, the button is blinking.

Bar of indicators:

**TF** **Indicator of HW** Hardware status indicator. It indicates state of HW. 1) It is OFF when any HW task is not defined; 2) lights green when HW runs properly; 3) becomes red if an error in HW based loop appears; and 4) it starts to blink if an attention or action related to active HW setup or definition is required.

**TF** **Indicator of calibration** Calibration status indicator. Indicates whether the calibration is correctly loaded or not.. 1) It is disabled if no HW task is defined; 2) lights green when the calibration is correctly loaded; 3) becomes red if calibration process is invalid.

**TF** **Indicator of measurement** Measurement status indicator. It indicates state of measurement process. 1) It is OFF when measurement is OFF; 2) lights green when measurement is running; and 3) becomes red if an error in measurement loop appears.

**TF** **Indicator of range utilization** Utilization of input range indicator. It indicates utilization of the input range. It is yellow when utilization is bellow 10 % and red when over 95 %, otherwise it is green.

**TF** **Indicator of recording** Recording status indicator. The indicator is yellow once regular recording of aggregated values is started and becomes green when first record is finished and remains green until recording is active.

**TF** **Indicator of transients recording** Transients recording status indicator. The indicator is yellow once recording waiting for valid trigger is initiated and becomes green when trigger is registered and remains green until recording of triggered transient is in progress.

## 3.2 Settings

The data is loaded into the settings after the program is started from the initialization file, which corresponds to the settings when the program is terminated. If the initialization file does not exist (..\Doc\iniset.txt), the default settings are loaded.

### 3.2.1 HW config

HW config panel is on Fig. 5.

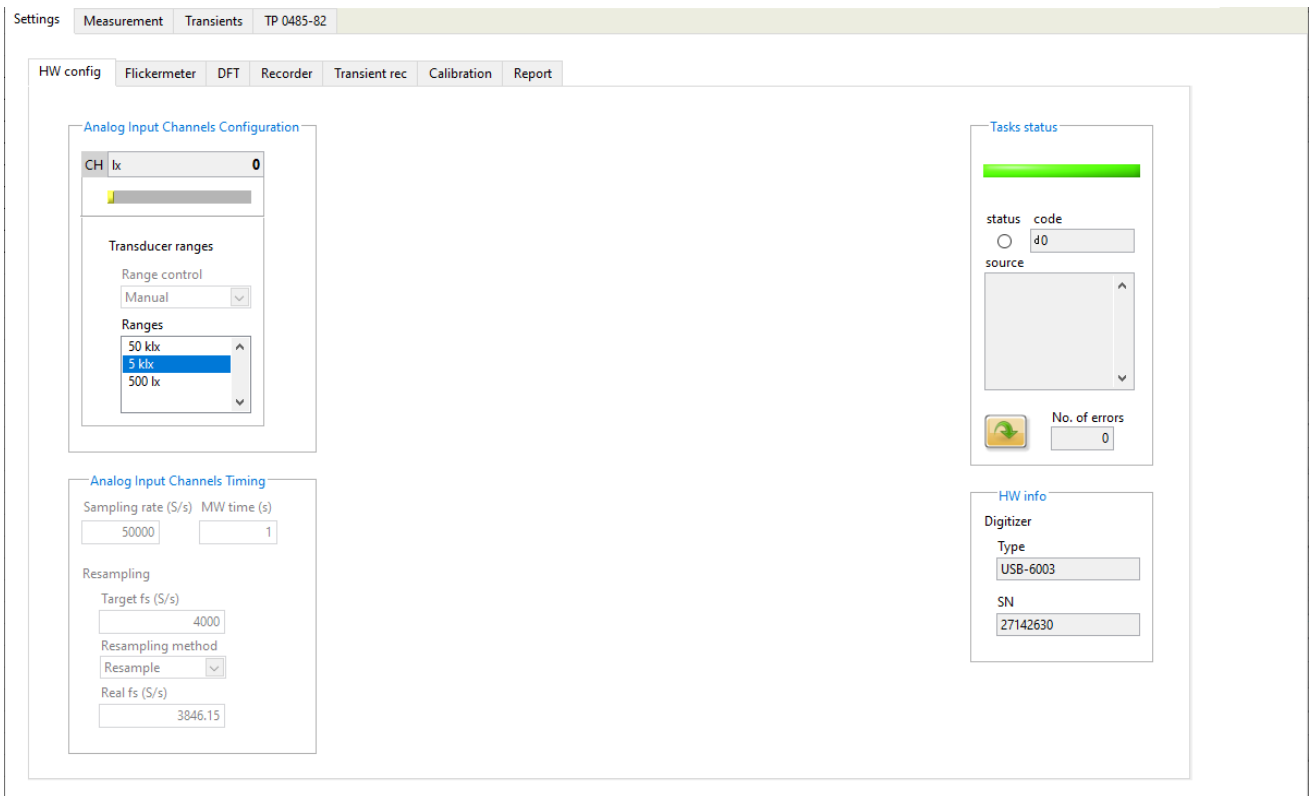


Fig. 5. HW config panel

Analog input channel configuration:



**Actual DC value** Measured actual DC value.



**Range utilization info bar** Bar indicates utilization of the input range. It is yellow when utilization is below 10 % and red when over 95 %, otherwise it is green.



**Transducer ranges**



**Range control** Selection of connected transducer range control mode. Manual control mode is preset. Auto ranging is available and possible to choose if it is supported by HW and properly configured.



**Ranges** Selection of connected transducer range. Options are available if 1) it is supported by the transducer HW, and 2) it is allowed by choosing manual control mode. If range is selected independently on a transducer setup, it must fit with set range on the transducer in order to ensure correct scaling of measured signal.

Analog input channel Timing (informative only – control is not allowed):



**Sampling rate (S/s)** Sampling rate of AI channels is preset to maximal value supported by chosen DAQ board. Sampling rate can be reduced down to values allowed by DAQ system. If the chosen rate does not match supported values, the entry is automatically corrected after measurement is started. When measuring, the value cannot be changed anymore, unit measurement is stopped.




**MW time (s)** Measuring window (MW) time/length defines timing of the application execution. It corresponds to update of data stream as well. The optimum value regarding amount of analyze data vs. computation demand vs. update of all indicators is of 1 s. Nevertheless, a range of entries is permitted with correction.




 **#S per MW (S)** Number of samples per measuring window based on set sampling rate and length of measuring window.


## **Resampling**

 **Target fs (S/s)** Targeted sampling rate after resampling. Resampling is introduced to reduce computing demand if possible. In most cases, the ADC card sampling rate representing also the available bandwidth of measured signal is too high, therefore it can be reduced. Resulting signal bandwidth will be half of the real set sapling rate/frequency after resampling.


Setup is available if the measurement is stopped only, i.e. blocked if measurement is running.


 **Resampling method** Resampling method selection. Two methods of resampling are supported if available. 1) "Down/Up-sampling - integral decimation or interleaving of samples with filtration; 2) "Resampling" - rational resampling with final filtration to achieve target value of sampling rate as close as possible.

Option is available if the measurement is stopped only, i.e. blocked if measurement is running.

 **Real fs (S/s)** Sampling rate after resampling set in real. The real value of indicator is shown and updated once measurement is activated/running. It corresponds to setting based on adjusted targeted sampling rate and on chosen resampling method, to as close to the target value as possible.


## Task status:

 **HW status** The indicator indicates status of defined tasks. If everything is correct, the light is on, if not, the fail details are described in the error status located below.


 **HW error** Error or warning information from measurement task. It passes error or warning information out of measurement loop. Right-click the indicator on the front panel and select **Explain Error** or **Explain Warning** from the shortcut menu for more information about the error.

 **Status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.

Right-click the **error out** indicator on the front panel and select **Explain Error** or **Explain Warning** from the shortcut menu for more information about the error.


 **Code** is the error or warning code.

Right-click the **error out** indicator on the front panel and select **Explain Error** or **Explain Warning** from the shortcut menu for more information about the error.

 **Source** string describes the origin of the error or warning.

Right-click the **error out** indicator on the front panel and select **Explain Error** or **Explain Warning** from the shortcut menu for more information about the error.


 **Auto handling of errors** Auto handling of errors in HW loop.

 **No. of errors** No. of errors indicated in HW task loop.

## HW info:

 **Digitizer** Digitizer info.

 **Type** Digitizer Type.

 **SN** Digitizer serial number.

### 3.2.2 Flickermeter setup panel

Flickermeter setup panel is on Fig. 6.

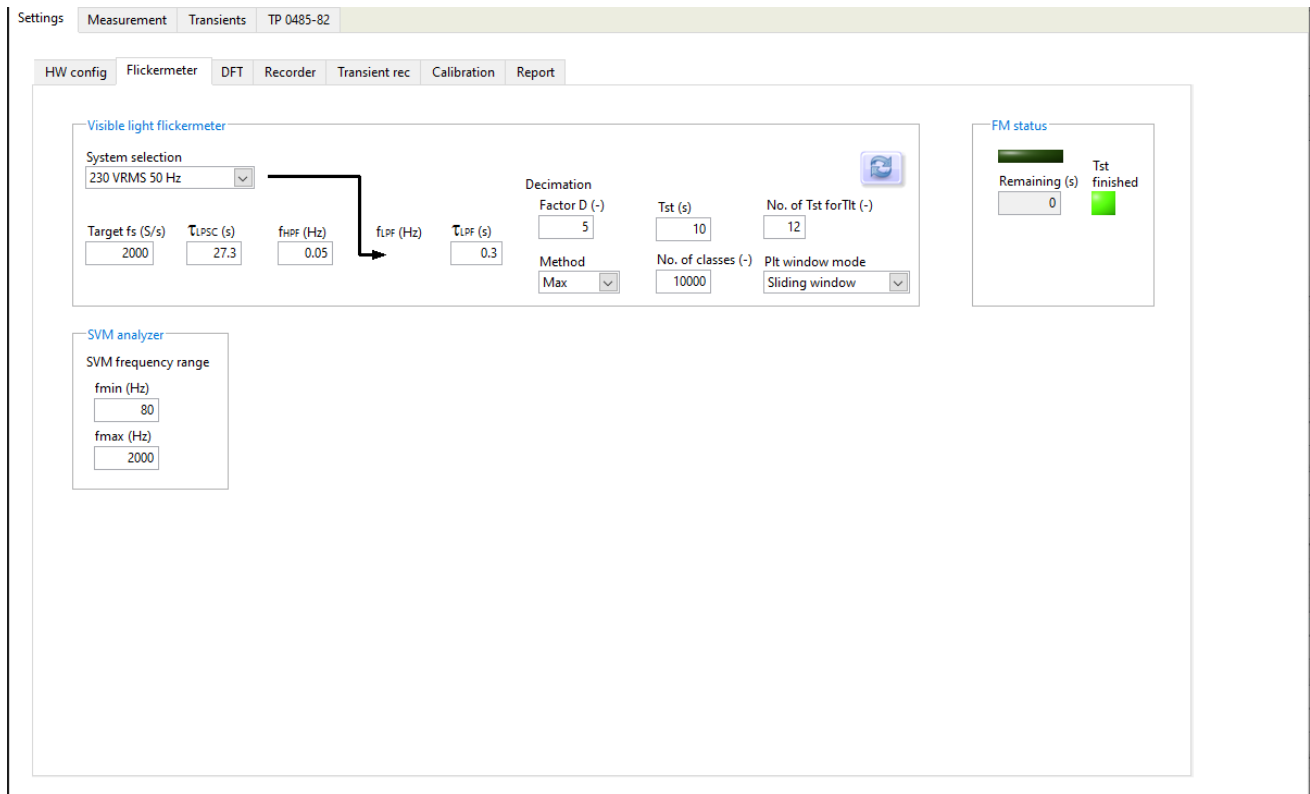














Fig. 6. Flickermeter setup panel

Visible light flickermeter:

Flickermeter parameters Light or even standard flickermeter setup. Setup of the flickermeter evaluating severity of temporal light luminance changes caused by lamps at visible frequencies according to the standard IEC 61547-1 or IEC 61000-4-15.



Setup is available until recording is initiated. Nevertheless, it is necessary to take into account that any change might introduce changes in the flickermeter output.

-  **System selection** Selection of appropriate supply system. Choice is matter of tested lamp rated parameters and supply system voltage parameters. It designates topology and parameters of the flickermeter Low-Pass filter. The LPF is employed in order to remove frequency components out of visibility range, i.e. 35/42 Hz.
-  **Target fs (S/s)** Target sampling rate for signal processing by the flickermeter. Optimal samplig rate is between 3 to 5 kS/s. The target fs is maintained using down/up sampling according to the analog input channel sampling rate (including resample procedure for light channel).
-  **τLPSC (s)** Low-pass smoothing filter time constant. The LPF is used to assess signal magnitude for its normalization. Standard defined value is of 27.3 s.
-  **fHPF (Hz)** High-pass filter cut-off frequency. The HPF is used to remove signal dc component. Standardized value is of 0.05 Hz.
-  **τLFP (s)** Time constant of 4th block low-pass filter
-  **Factor D (-)** Signal sampling rate decimation factor setting. Since the input sampling rate is too high for statistical analysis over short-term evaluation/observation interval, the signal is futhermore down-sampled usig simple decimation method with appropriate decimation factor in order to reach output sampling rate no more than 1000 S/s.




-  **Method** Selection of decimation method. Method for required decimation is possible to choose. Max method keeping maximum value over range of decimated samples is recommended.
-  **No. of classes (-)** Number of classifier classes. It should not be less than 100; any value of range from 500 to 5000 is optimal, while higher numbers are of higher computing demand.
-  **Tst (s)** Short term interval definition. Observation interval in which short term severity flicker index Pst is calculated. According to the flickermeter standardized specification, the short term interval Tst should be 10 minutes taking into account stochastic nature of variations. If the variations are periodical, or for testing purposes, shorter interval of integral multiple of variations period can be chosen. The default value is of 10 s. Tst period is used for initial aggregation interval as well and in opposite, set Tst interval is substituted by aggregation interval when recording is started.
-  **No. of Tst for Tlt (-)** Number of short-term intervals Tst for long-term interval Tlt specification. Standardized number is 12 representing, in case of Tst=10 minutes, an interval of 2 hours, in which long-term flicker Plt from Pst values is calculated. If Tst is different then Tlt is proportional.
-  **Plt window mode** Long-term flicker window mode selection. Two options are offered, 1) calculation of Plt in consecutive Tlt intervals, i.e. Plt is updated at the end of every Tlt interval; 2) calculation in sliding interval Tlt with shift for Tst interval, i.e. once first Plt is available the Plt value is updated at the end of each Tst interval.
-  **Reset FM filters** Re(pre)set flickermeter filters. This can be used to speed up initial settlement of filter's response, when sensor is suddenly illuminated during test bench preparation. Be aware to push it when testing is in progress. It will force a numerical transient in Pinst output, therefore recording initiation, if matter, will be blocked for a certain time.

SVM analyzer:

SVM frequency range

-  **fmin (Hz)** Lower frequency range of SVM. It limits frequency range of light components taken for SVM (Stroboscopic Visibility Measure) assessment. The metric is normally defined starting from 80 Hz.
-  **fmax (Hz)** Upper frequency range of SVM. It limits frequency range of light components taken for SVM (Stroboscopic Visibility Measure) assessment. The metric is normally defined up to 2000 Hz.

FM status:

-  **Flickermeter filters settling** Settling of filters indication. It indicates by red light initial transition of filters.
-  **Remaining (s)** Remaining time to finish next Tst interval indication.
-  **Tst finished** Finished Tst interval light indicator.

### 3.2.3 DFT analysis setup panel

DFT analysis setup panel is on Fig. 7. Definition of DFT parameters is applied on all measured signals being analyzed.

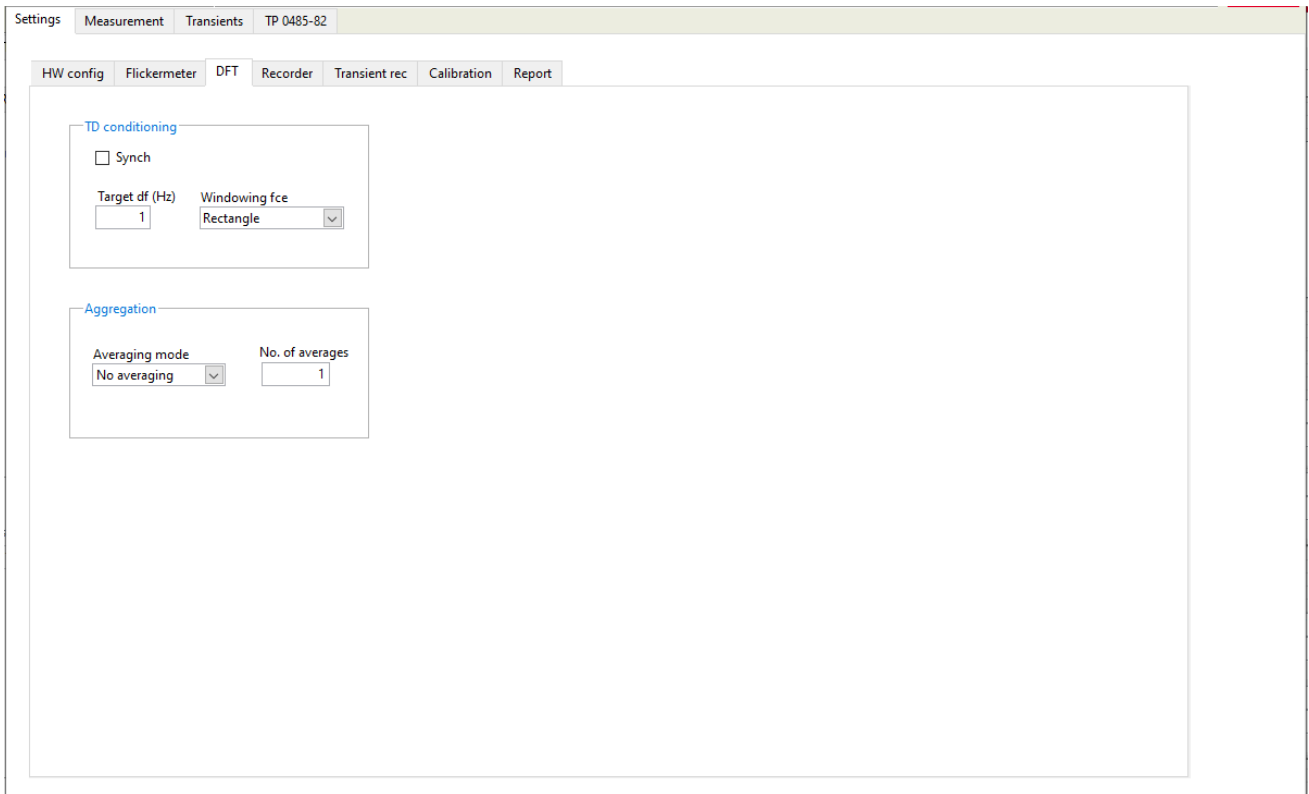


Fig. 7. DFT analysis setup panel

TD conditioning:



**Synch** Synchronization of time window for DFT. When ON, time waveform length taken for DFT is synchronized on dominant frequency component of synchronization signal selected in HW config menu. Moreover, targeted frequency resolution of resulting spectra is respected.



**Target df (Hz)** Target frequency resolution of DFT. Length of time domain signal window is adjusted to meet requested target frequency resolution of performed DFT. In a case the filled in value is smaller than previous one, measured samples are continuously accumulated until required window length is reached. When synchronization of window on synchronizing signal is ON, the final spectra frequency resolution will differ from requested one.



**Windowing fce** Windowing function selection. It controls which type of window function is applied on time domain signal before DFT is performed. Naturally, the Rectangular window is applied on TD signals taken to DFT, which is also default option.

Aggregation:



**Averaging mode** Averaging method selector. Selection of averaging method applied on resulting consecutive spectra.



**No. of averages** Number of averages. Option is effective if any averaging method is chosen.

### 3.2.4 Recorder setup panel

Recorder setup panel is on Fig. 8.

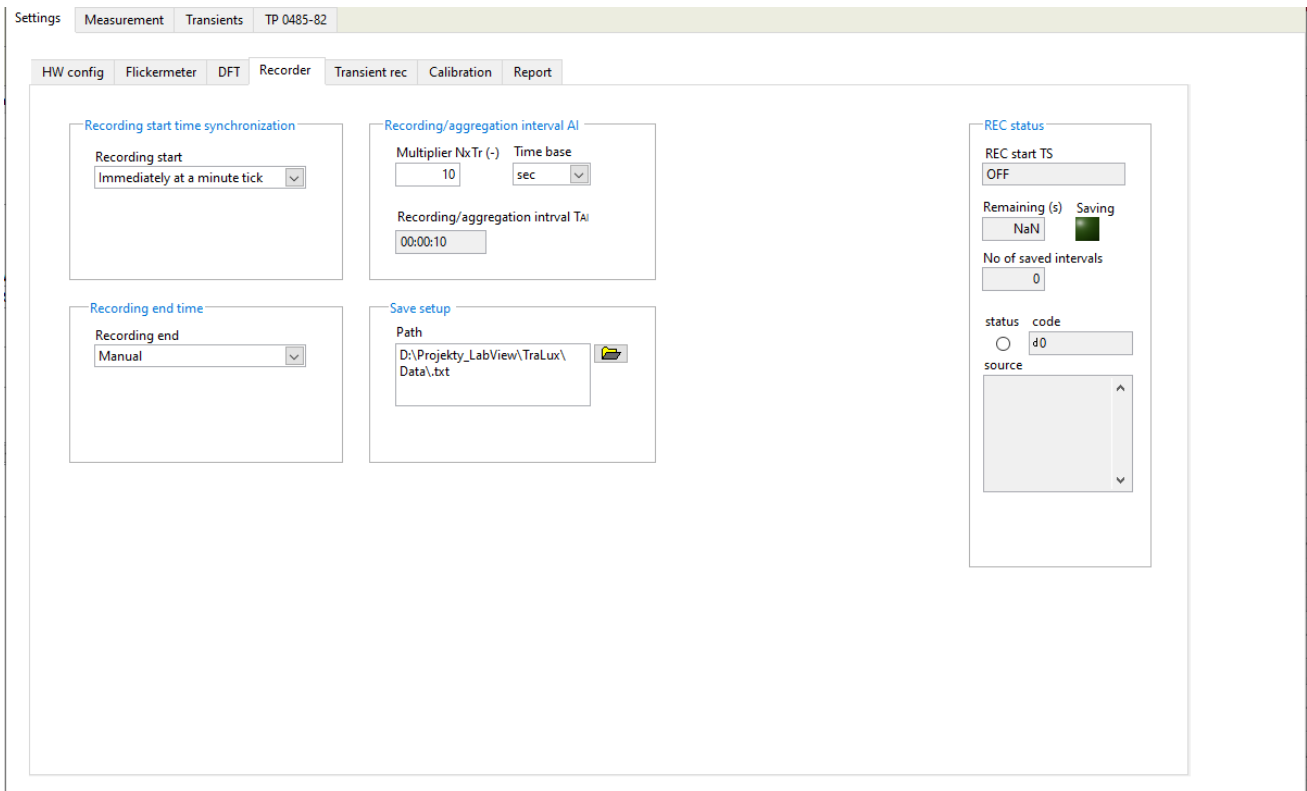









Fig. 8. Recorder setup panel

Recorder parameters:

Definition of regular recording parameters. Setup defines most common parameters used to specify recording of measured and aggregated quantities.

- 
**Recording start** Recording start time definition. Start time of recording is specified by means of preselector without necessity to set specific time stamp if not required. There are four options available: 1) Immediately - it forces recording as fast as possible without synchronization on a specific time stamp; 2) Immediately at a minute tick - recording is started in incoming full minute tick; 3) Immediately at a 10 minute tick - recording is started in incoming full 10 minute tick; 4) At a time stamp - dialog to select start time stamp is shown.
  
- 
**Start time stamp** Recording start time stamp definition. In a case a past or even present time stamp is selected, that could not be reached, recording will start as soon as possible.
  
- 
**Recording end** Recording end method selection. Recording can be finished manually by pressing recording control button in ribbon of controls, if option manual is chosen, or at specified time - at a time stamp. Then a dialog to select end time stamp is shown.
  
- 
**End time stamp** Recording end time stamp definition. In a case a past or even present time stamp is selected, that could not be reached, recording will be finished as soon as possible.
  
- 
**Multiplier NxTr (-)** Multiplier of time base. The recording/aggregation time interval is defined by means of the multiplier and time base. Resulting time of aggregation interval is shown bellow.
  
- 
**Time base** Time base selection. The recording/aggregation time interval is defined by means of the multiplier and time base. Resulting time of aggregation interval is shown bellow.
  
- 
**Recording/aggregation interval TAI** Resulting recording/aggregation interval. The interval is presented in following format: HH:MM:SS.



**Path** Specification of path to save regular records. There are few setting methods possible to follow.

1) The path and file name, to which recorded data should be saved, can be specified by pressing right-side browse button. The file name extension is added automatically. Moreover, a suffix is added to the file name. The suffix is composed of three components: a) time stamp -yearmonthday- of file creation, b) REC suffix and c) automatical index - four digit number starting at 0001. The final file name format including suffix is as follows:

<defined file name>\_<yyyymmdd>\_REC<NNNN>.txt

2) A file name is filled in the path dialog only. In such a case default data file folder in the application directory is set and the typed file name is completed by the previously described suffix. Therefore, the final file name format including suffix is as follows:

<defined file name>\_<yyyymmdd>\_REC<NNNN>.txt

3) The file path remains empty. Then, default data file folder in the application directory is set and the file name is composed of the previously described suffix only. Therefore, the final file name is as follows:

<yyyymmdd>\_REC<NNNN>.txt

Note: The file name index number is increased automatically if the file going to be saved is of the same root name as previously saved in the same location.

Recorder status:



**REC start TS** Recording start time stamp indicator. It shows set start time stamp of regular recording when initiated.



**Remaining (s)** Remaining time to finish next aggregation/recording interval. Not a number (NaN) is displayed, when recording is OFF.



**Saving** Saving data indicator. It lights green when data are just saving.



**No of saved intervals** Number of already saved data points indicator.



**REC file error** Error or warning information from REC data saving task. It passes error or warning information out of saving loop. Right-click the indicator on the front panel and select **Explain Error** or **Explain Warning** from the shortcut menu for more information about the error.



**status status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.

Right-click the **error out** indicator on the front panel and select **Explain Error** or **Explain Warning** from the shortcut menu for more information about the error.



**code code** is the error or warning code.

Right-click the **error out** indicator on the front panel and select **Explain Error** or **Explain Warning** from the shortcut menu for more information about the error.



**source source** string describes the origin of the error or warning.

Right-click the **error out** indicator on the front panel and select **Explain Error** or **Explain Warning** from the shortcut menu for more information about the error.

### 3.2.5 Transient recorder setup panel

Transient recorder setup panel is on Fig. 9. Definition of transient recording parameters. Setup defines most common parameters used to specify triggering and recording of transients.

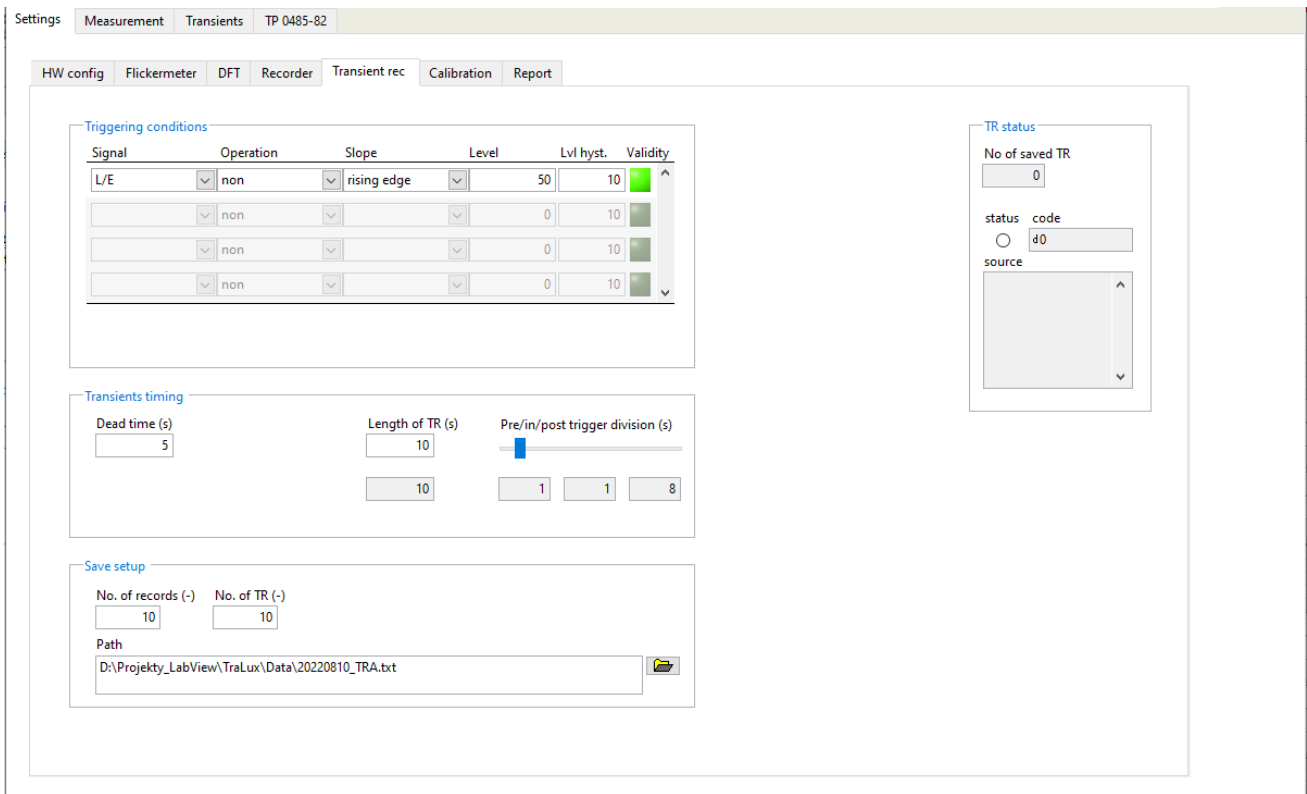


Fig. 9. Transient recorder setup panel

Triggering conditions:



**Triggering conditions table** Table of triggering conditions. Click right-button to control table items.



**Trigger signal** Trigger signal selection. Active signals are shown only, therefore if measurement is already activated.



**Signal operation** Signal operation definition.



**Slope** Trigger slope specification.



**Trigger level** Trigger level. The value is in measure of the trigger signal.



**Trigger level hysteresis** Trigger level hysteresis in % of lvl. The hysteresis setup prevents from repetitive triggering if the trigger signal is swinging around trigger level. In a case the trigger level is set to 0, the hysteresis value meaning is changed to absolute unit of the level. In any case, if 0 is set, triggering is controlled by level purely.



**Trigger validity** Validity of set trigger condition. Valid conditions are considered only as active triggers.






Transients timing:






**Dead time (s)** Dead time between triggers/records. It defines additional blocking time interval in (s) that is applied after just finished transient record than new record is allowed. Dead time settings is of no effect if 0 is set.



**Length of TR (s)** Desired length of a transient record in (s).




-  **TR time length (s)** Indicator of real length of a transient record in (s).
-  **Pre/in/post trigger division (s)** Control of pre-/post-trigger partitions in transient record.
-  **Pre-trigger time length (s)** Indicator of real pre-trigger length of a transient record in (s).
-  **In-trigger time length (s)** Indicator of real in-trigger length of a transient record in (s).
-  **Post-trigger time length (s)** Indicator of real post-trigger length of a transient record in (s).



Save setup:

-  **No. of records (-)** Maximal number of recorder/saved transients. This option is related to autonomous triggering of transients and allows to limit number of recorded transients being saved. If the number of already saved transients reaches this maximum number, autonomous monitoring and recording of transients is deactivated. For unlimited option insert -1.
-  **No. of TR (-)** Number of most recently recorded transients to be presented. This option is related to all recently recorded transients and is limited up to 20.
-  **Path** Specification of path to save recorded transients. There are few setting methods possible to follow.
  - 1) The path and file name, to which recorded transient data should be saved, can be specified by pressing right-side browse button. The file name extension is added automatically. Moreover, a suffix is added to the file name. The suffix is composed of three components: a) time stamp -yearmonthday- of file creation, b) TR suffix and c) automatical index - four digit number starting at 0001. The final file name format including suffix is as follows:  
<defined file name>\_<yyyymmdd>\_TR<NNNN>.txt
  - 2) A file name is filled in the path dialog only. In such a case default data file folder in the application directory is set and the typed file name is completed by the previously described suffix. Therefore, the final file name format including suffix is as follows:  
<defined file name>\_<yyyymmdd>\_TR<NNNN>.txt
  - 3) The file path remains empty. Then, default data file folder in the application directory is set and the file name is composed of the previously described suffix only. Therefore, the final file name is as follows:  
<yyyymmdd>\_TR<NNNN>.txt

Note: The file name index number is increased automatically if the file going to be saved is of the same root name as previously saved in the same location.

Transient recorder status:

-  **No of saved TR Number of already saved transients indicator.**
-  **TR file error** Error or warning information from TR data saving task. It passes error or warning information out of saving loop. Right-click the indicator on the front panel and select **Explain Error** or **Explain Warning** from the shortcut menu for more information about the error.
  -  **status status** is TRUE (X) if an error occurred or FALSE (checkmark) to indicate a warning or that no error occurred.

Right-click the **error out** indicator on the front panel and select **Explain Error** or **Explain Warning** from the shortcut menu for more information about the error.
-  **code code** is the error or warning code.
- Right-click the **error out** indicator on the front panel and select **Explain Error** or **Explain Warning** from the shortcut menu for more information about the error.
-  **source source** string describes the origin of the error or warning.
- Right-click the **error out** indicator on the front panel and select **Explain Error** or **Explain Warning** from the shortcut menu for more information about the error.



### 3.2.6 Calibration setup panel

Calibration setup panel is on Fig. 10.

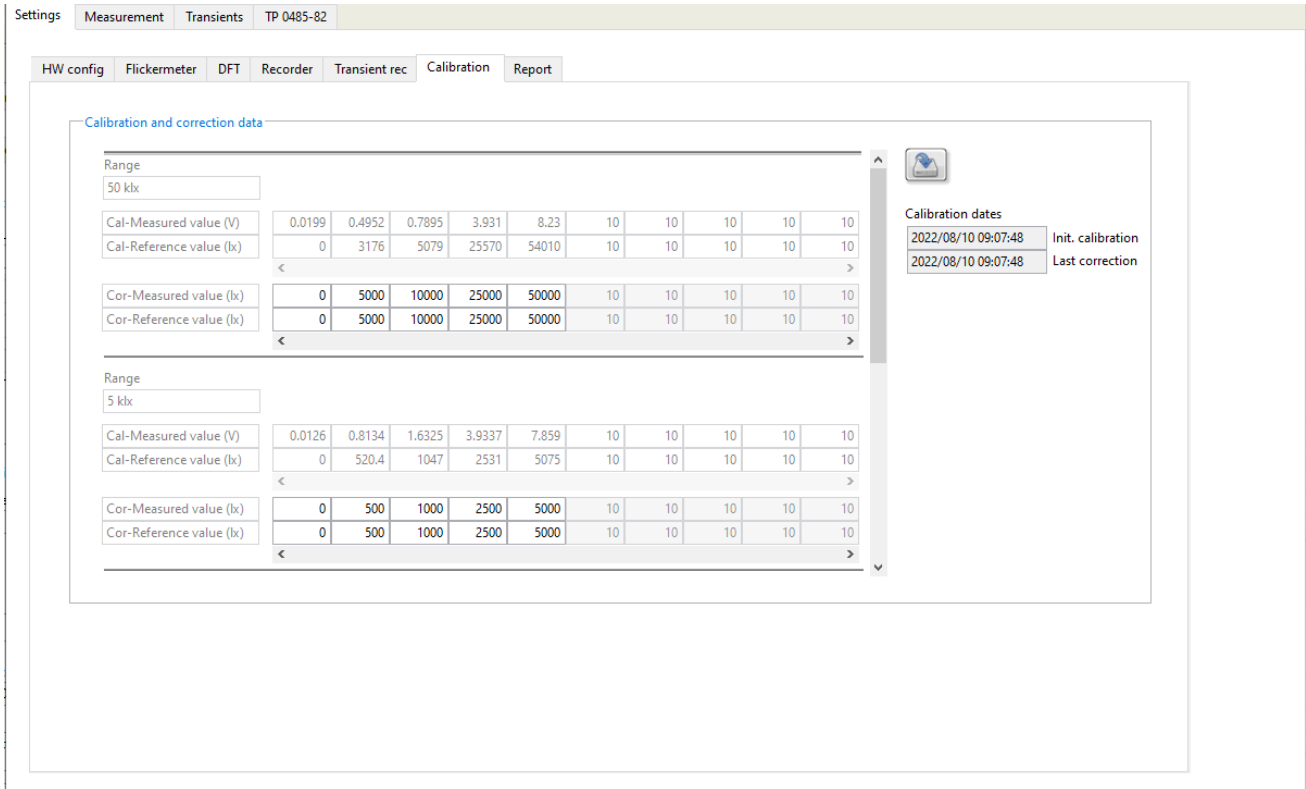


Fig. 10. Calibration setup panel

Calibration and correction data:



**Calibration data** Calibration data table. Collects the instrument calibration data. Linear interpolation for signal scaling between the calibration and correction data points is applied. Final scaling "yi" of signal "xi" is as follows:

$$y_i = x_i * \text{Cal}(\text{Ref}(lx, \text{interp}(xi)) / \text{Meas}(V, \text{interp}(xi))) * \text{Cor}(\text{Ref}(lx, \text{interp}(xi)) / \text{Meas}(lx, \text{interp}(xi)))$$



**Range calibration table** Range calibration table. Collects calibration data for a specific range.



**Range** Range label. It shows the range label.



**Calibration data points** Calibration data points. At least 1 data point is stored while there is usually 5 to 10 calibration data points per range.



**Calibration correction data points** Calibration correction data points correct the initial calibration. At least 1 data point has to be set while there is usually 5 to 10 data points per range. Values are independent on calibration data. Correction data points has to be set in order to cover the specific range. Measured and Reference values have to be increasing monotonically and full pairs of Measured and Reference values must be provided.



**Store calibration data** Store calibration data. Allows you to save a correction table. Make sure that the correction data entered for the calibration of each range is correct! Corrections can be adjusted at any time.



**Calibration dates** Calibration dates. Initial calibration and last calibration correction dates.

### 3.2.7 Report setup panel

Report setup panel is on Fig. 11.

Fig. 11. Report setup panel

Report optional data:



**Company address** Test laborator address.



**Report number** Report item. If empty, report number will be generated automatically based on the data file name.



**Operator** Name of the operator performing the test.



**Test sample data** Optional items of the test sample description. All of the items will appear in the report once generated. The table is fully editable including headers. Three columns are available.



**Test setup and conditions** Optional items of test and setup conditions. All of the items will appear in the report once generated. The optional items will be automatically extended with the following items:

- Test date
- Photometric distance (m)
- Instrument
  - Type
  - Ser. No.
  - SW/version
  - Last calibration/recalibration
- Measurement data file



**Result comments** Report item. If not empty, the comment will appear in the report.



**Reports directory** Specification of main directory path for saving test reports. Separate directory for each report is created. The report directory name, file name and its extension is added automatically. The report directory name and the file name is the same as the report number. There are few setting methods possible to follow.

- 1) The path to which the report should be saved, can be specified by pressing right-side browse button.
- 2) The path remains empty. Then, default reports folder in the application directory is set

Note: Pay attention on the report number to prevent for overwriting past reports of the same number.

### 3.3 Measurement panel

Measurement panel is reported on Fig. 12.

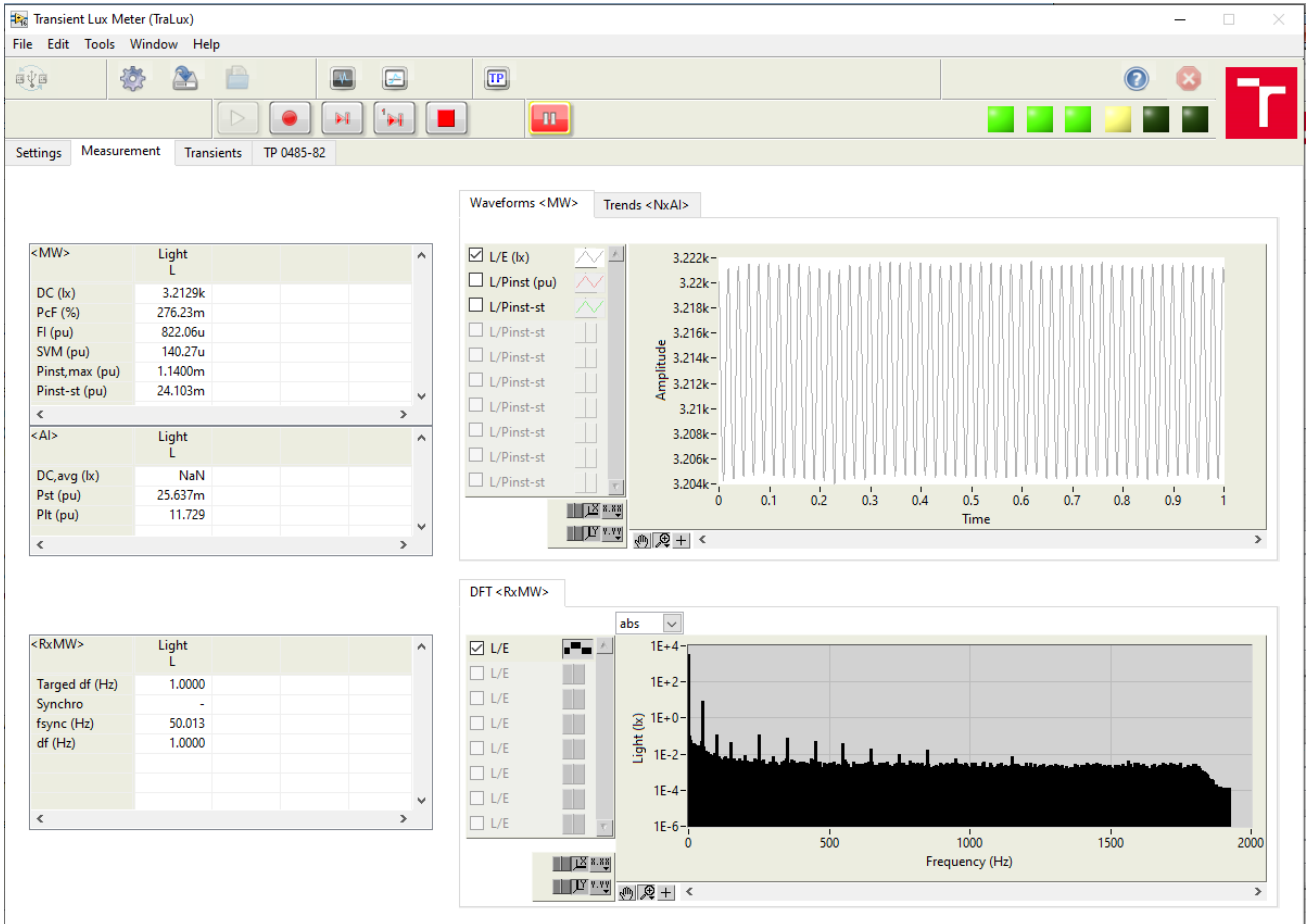


Fig. 12. Measurement panel

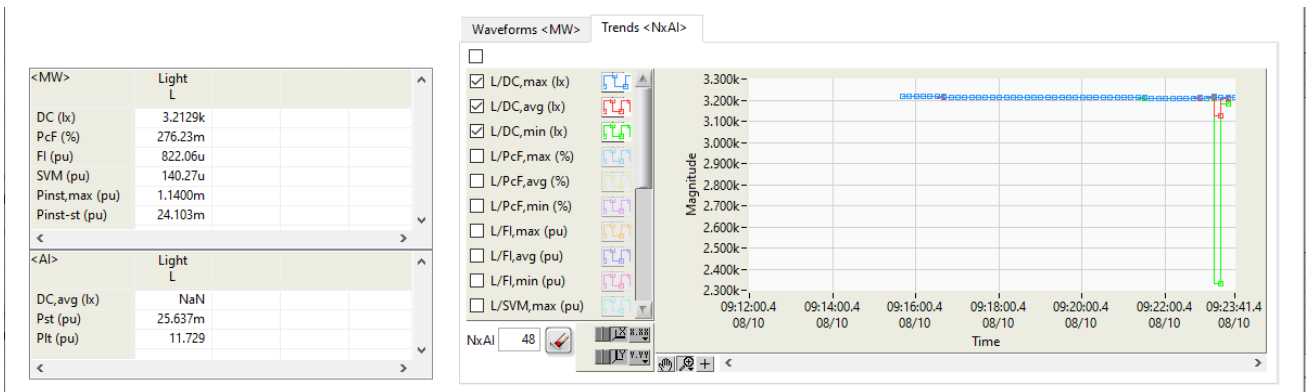


Fig. 13. Measurement panel, Trends table selected



**Table of results in MW** Table of significant quantities updated every measuring window <MW>.

DC - dc value of measured light signal

PcF - Percent flicker

FI - Flicker Index

SVM - Stroboscopic Visibility Measure, limit value is 1

Pinst,max - Instantaneous visible temporal flicker, maximal value in MW

Pinst-st - Flicker severity index estimated from Pinst in MW, limit is 1



**Table of results in AI** Table of significant quantities updated every aggregation interval <AI>.

DC - average dc value of measured light signal in AI

Pst - Short-term Flicker severity index in Tst/AI interval, limit is 1

Plt - Long-term Flicker severity index in Tlt interval, limit is 1



### Tab (WF, Plots, Trends)



**Waveforms graph** Waveforms graph. It shows sampling interval based waveforms in range of a single measuring window <MW>.

Right-click the graph to access presentation options.



**Trends graph** Trends graph. It shows aggregation interval based plots in range of integral multiple of aggregation interval<NxAI>.

Right-click the graph to access presentation options.



**Signals (de)selector** All graph signals ON/OFF



**ClearAIgr** Press to clear graph data points.



**NxAI** Number of shown data points. When increased, new empty positions are added and continuously fulfilled based on update interval. When decreased, the newest data points are kept only.



**Table of DFT in MW** Table of significant quantities of performed DFT updated every measuring window <MW>.

Target df - desired DFT frequency resolution

Synchro - indication of (de)synchronized DFT

fsync - synchronization frequency if relevant

df - real DFT frequency resolution



### Tab (DFT)



**Spectra graph** Spectrum graph. It shows spectra of magnitudes obtained by means of DFT of time-domain signals in range of rational multiple of measuring window <RxMW>.

Right-click the graph to access presentation options.



**Spectra norm. selector** Selection of spectra normalization.

### 3.4 Transients panel

Transients panel is shown on Fig. 14.

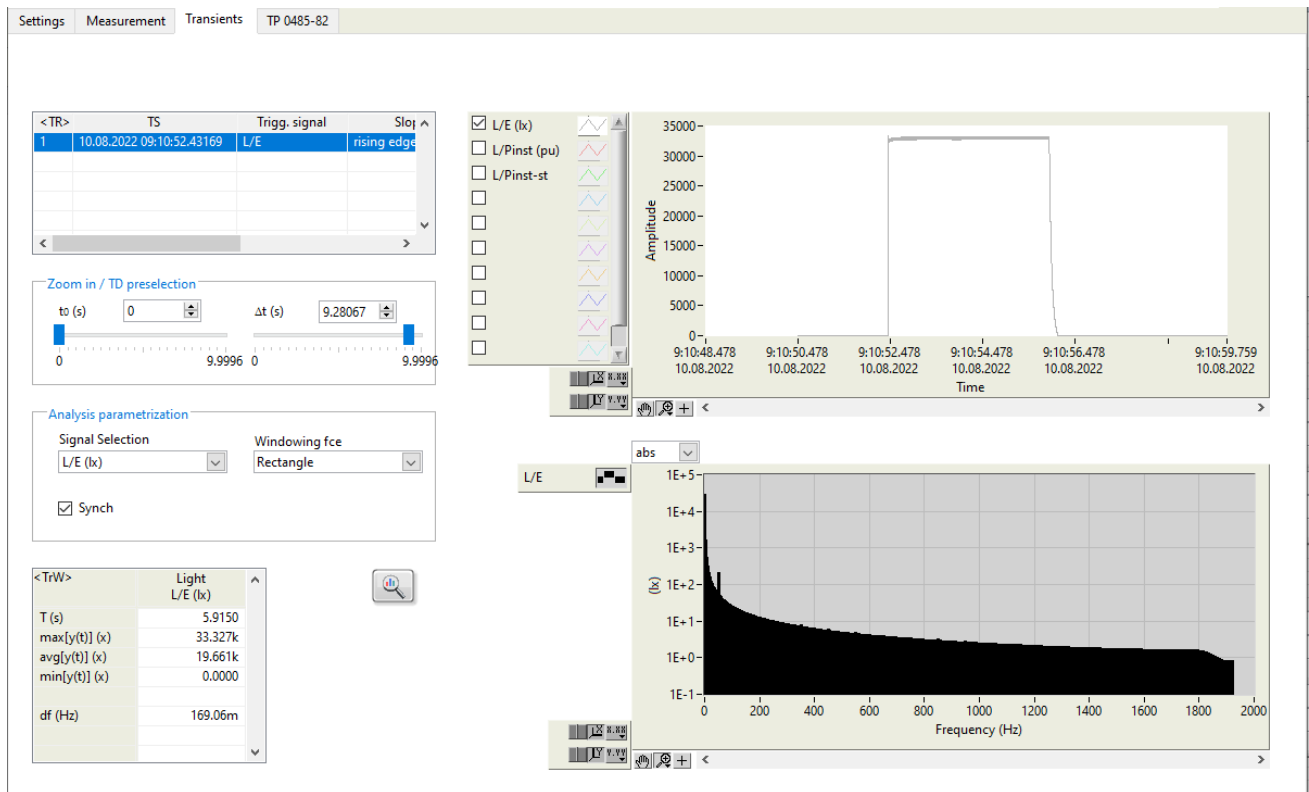


Fig. 14. Transients panel

**TF** Upload transient data from a file Upload transient data from a file. It leads to selection and uploading of a single transient data file. Allowed in a standby mode of the SW only. Transient data compatibility is required (data are uploaded correctly if saved by the SW only). Corresponding settings file has to be present in the same location and is uploaded together with a transient data automatically.

**I32** Table of available TRs Table of lastly recorded transient. Selected record will be displayed. No. of shown records can be changed in panel Settings>>Transients rec>> [item] No. of TR.

**f** Transients graph Transients graph. It presents sampling interval based waveforms of last/selected transient record. Right-click the graph to access presentation options.

Zoom in / TD preselection:

**DBL** t0 (s) Transient zoom start time selection.

**DBL** Δt (s) Transient zoom length selection.

Analysis parametrization:

**U16** Signal Selection Transient signal selection for analysis.

**U32** Windowing fce Windowing function selection. It controls which type of window function is applied on time domain signal before DFT is performed. Naturally, the Rectangular window is applied on TD signals taken to DFT, which is also default option.

**TF** Synch Synchronization of time window for DFT. When ON, time waveform length taken for DFT is

synchronized on dominant frequency component of synchronization signal selected above. Moreover, window length is corrected to contain integral number of fundamental frequency periods, therefore it determines frequency resolution of resulting spectra.



**Analyze TR** Analyses of preselected signal will be performed. The analyses applies for single signal and for its time window of the transient record that is selected.



**Table of DFT in TrW** Table of significant quantities in analyzed transient window <TrW>. T - time interval

max - minimum value of analyzed light signal  
 avg - average value of analyzed light signal  
 min - minimum value of analyzed light signal

df - real DFT frequency resolution



**Spectra graph** Spectrum graph. It shows spectra of magnitudes obtained by means of DFT of pre-selected transient signals. Right-click the graph to access presentation options.



**Spectra norm. selector** Selection of spectra normalization.

### 3.5 TP 0485-82 report panel

Specific application panel. The TP 0485-82 report panel is documented on Fig. 15.

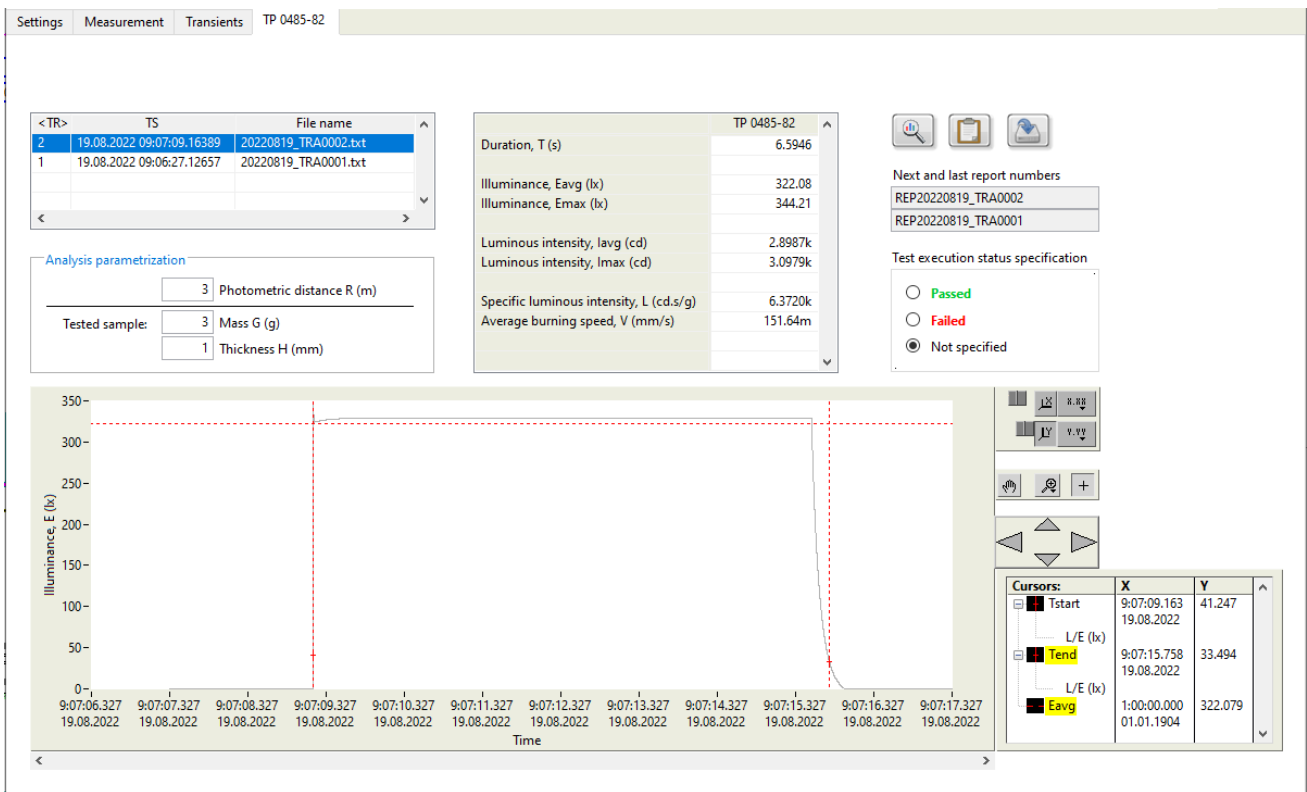


Fig. 15. TP 0485-82 report panel





**Table of available TRs** Table of lastly recorded transient. Selected record will be displayed. No. of shown records can be changed in panel Settings>>Transients rec>> [item] No. of TR.





**TP input parameters** The TP report input parameters.

 **Photometric distance R (m)** Photometric distance R (m).

 **Mass G (g)** Mass of the test compound G (g).

 **Thickness H (mm)** Sampling rate after resampling set in real. The real value of indicator is shown and updated once measurement is activated/running. It corresponds to setting based on adjusted targeted sampling rate and on chosen resampling method, to as close to the target value as possible.

 **Transients graph** Transients graph. It presents sampling interval based waveforms of last/selected transient record.  
Right-click the graph to access presentation options.

 **Table of TP 0485-82 indices** Table TP 0485-82 indices. The indices are identified (from measured transients) and calculated automatically or can be adjusted manually by changing the position of the graph cursors.

T - Time duration between Tstart (ignition time) and Tend (burn-out time), T (s)

Eavg - Average illuminance,  $E_{avg} = \text{avg}[E(t < T_{start}, T_{end})]$  (lx)


E<sub>max</sub> - Peak illuminance,  $E_{max} = \text{pk}[E(t < T_{start}, T_{end})]$  (lx)

Iavg - Average luminous intensity,  $I_{avg} = E_{avg} \cdot R^2$  (cd)

I<sub>max</sub> - Peak luminous intensity,  $I_{max} = E_{max} \cdot R^2$  (cd)

L - Specific luminous intensity,  $L = I_{avg} \cdot T / G$  (cd.s/g)


V - Average burning speed,  $V = H / T$  (mm/s)

 **Test execution status specification** Test execution status specification. Selection will appear in the test report if one of "Passed" or "Failed" options are chosen.

 **Passed**


 **Failed**


 **Not specified** (default)


 **Next and last report numbers** Last and next report numbers. Next report number blinks if the same as the last one or if report of the same name already exist indicating that the last report is going to be overwritten by the new one. The new report number can be set in the "Settings" - "Report" panel. In a case the report number is not user defined in the "Report" panel, the the report number is automatically generated based on the transient data file name.


 **Last report number** Last report number.

 **Next report number** Next report number.

 **Analyze TR-TP 0485-82** Perform automatic analysis. It performs an automatic analysis of the selected transient in accordance with TP 0485-82. Calculated ignition time (Tstart), burn-out time (Tend) and average illuminance in between are going to be set in the output table and are shown in the transient graph by means of cursors.

 **Test execution status specification** Test execution status specification. Selection will appear in the test report if one of "Passed" or "Failed" options are chosen.

 **Report TP 0485-82 preview** Report compilation and preview. A report will be prepared with the test results in accordance with TP 0485-82. The report items can be edited in "Settings" - "Report". Finally, the report will be open in a default browser.

 **Report TP 0485-82 save** Report compilation, save and preview. A report will be prepared with the test results in accordance with TP 0485-82. The report items including path can be edited in "Settings" - "Report". Next, the report is stored to defined path (the report file name is based on the report number, see card "Settings" - "Report"). Finally, the report will be open in a default browser.

### 3.6 Info/about dialog

Dialogové okno se otevře po stisknutí tlačítka info. Dialog obsahuje základní informace o SW společně se základem licenčních podmínek. Další volby v dialogu jsou následující:



**OK.** It closes the dialog.



**Licence.** It turns to open the licence agreement in preferred html browser.



**Manual.** It opens the SW manual in preferred html browser.



**Activate.** It releases activation dialog to fill in the SW activation code.

