CE

TÜV SÜD ISO 9001

Notes on operation

OLAS - **T**ouch **P**anel **C**ontroller (OLAS-TPC)

Figure 1: OLAS-Touch-Panel-Controller (OLAS-TPC)

Brief summary:

The OLAS-TPC is a processing and displaying unit, which, in combination with WERNE & THIEL **O**ptical **L**ight **A**bsorption **S**ensor (OLAS), measures the light absorption and temperature of a medium, displays the both quantities and passes them to the process control.

The handling of OLAS-TPC is easy and intuitive and is supported by a big touch screen and high-resolution graphic display (LCD). Thanks to the use of modern SMD-technology the device is very compact.

Eight different calibration curves with up to 40 calibration points each can be programmed by the help of an intuitive teach-in procedure. A linear interpolation is used between the calibration points.

All calibration points are comfortably stored and edited, either by entering the data directly into the calibration table or by directly moving the points of displayed calibration curve on screen.

There are also the two semi-automatic calibration methods “T-calibration” and “0/3-calibration” available, which can be used to enter the calibration curves even more comfortably.

The measuring signal can also be displayed in the “recorder“ mode, similar to a transient recorder, which can be tremendously helpful during the first steps and the calibration procedure.

Additionally, in the “hand setting“ mode an arbitrary signal can be set by hand and emitted at the output of OLAS-TPC.

The OLAS-TPC is standardly emitting 0-10V, optionally 0-20mA / 4-20mA. The OLAS-TPC can also communicate with the process control via the built-in USB-interface.

The OLAS-TPC provides a galvanically isolated RS485-interface, which is connected to the OLAS and which allows the transmission of signals over very long distances.

All cables are connected to the back plane of OLAS-TPC by the help of pluggable clamping bars.

Contents:

1. Safety hints:

The OLAS-TPC is designed to be installed in a control console. So, the device doesn't contain a mains switch. The On-Off-switching must be provided by an external mains switch at the control console.

The device is only allowed to be opened by qualified and authorized personal! And only with unplugged main power cable, of course!

The device must be connected to mains by using a three wire cable, which includes the protective earth wire (PE)!

The OLAS-TPC is designed to be mounted into a switch panel. A rubber gasket supplied with OLAS-TPC seals the device at the switch panel. The back of enclosure contains vent openings and isn't waterproof!

The back of enclosure must be aerated to remove the internally dissipated heat. Because of this, other devices on the switch panel should not be mounted too close to the OLAS-TPC.

The OLAS-TPC is protected against overload by a self-resetting fuse (polyfuse).

2. Order key:

OLAS-TPC - X - X - X

OLAS-TPC	**T**ouch-**P**anel-**C**ontroller (TPC) for the OLAS	

230V	Main power voltage 230V AC	
115V	Main power voltage 115V AC	

U	Signal output (absorption) “0-10V“	
I	Signal output (absorption) “0-20mA“	
I4	Signal output (absorption) “4-20mA“	

U	Signal output (temperature) “0-10V“ (standard)	
I	Signal output (temperature) “0-20mA“	
I4	Signal output (temperature) “4-20mA”	
X	Temperature measurement not available	

Example: **OLAS-TPC-230V-I4-I4**

OLAS-TPC: **T**ouch-**P**anel-**C**ontroller (TPC) for the OLAS

230V: Main power voltage: 230V AC

I4: Signal output (absorption): 4-20mA

I4: Signal output (temperature): 4-20mA (if available)

3. Different measuring modes of OLAS-TPC:

The desired measuring mode is chosen in the “settings“ menu:

3.1 Measuring mode “normal measurement“:

In this factory set mode the measurement runs all the time and the measured value is displayed in real-time. If the display reading appears too noisy a signal filtering (moving average) can be added.

3.2 Measuring mode “start/stop measurement“:

The measurement is controlled by the galvanically isolated switch input “Start-In”.
Wiring: 0V = stop and +24V = start. The status of this switch input is also displayed in the status line of “main menu“.
This useful feature allows the customer to carry out a measurement during a certain period of time, for instance, for the duration of a dosage.
Immediately after the start signal has become active (+24V = start) the measurement begins. For the whole duration of dosage the OLAS-TPC continuously calculates the current average value and displays it.
Immediately after the switch input has become inactive again (0V = stop), the measurement stops and the last calculated average value is permanently displayed, until a new start signal arrives. Also, at the signal output of the OLAS-TPC the last calculated average value is permanently emitted.
By other words, the start-stop-feature allows to run a measurement during a certain period of time. Afterwards the calculated average value can be taken over by the process control.
As long as the last average value is captured, the status line on screen displays “Stop“.

3.3 Measuring mode “start/stop batching“:

In this measuring mode the OLAS-TPC also continuously calculates the current average value for the whole duration of dosage, but here the measurement is not controlled by the switch input but by the measuring signal itself. When there’s no material at the sensor before and after the period of dosage, but only during the dosage, then the begin and end of

material flow can easily be detected from the height of measuring signal: When there's no material at the sensor, then the absorption of the measuring light is very low, of course. So, everything to do is to choose a suited threshold, so that the measurement is started, whenever the measuring signal is higher than the threshold and is stopped, whenever the signal is smaller than the threshold.

A suited threshold for this automatic "start/stop batching", called "lower signal limit", can be set in the "stettings" menu.

During the measurement the message "Auto Start" is displayed in the status line of the "main menu". When the batching is completed the status line displays "Auto Stop".

At the end of the measurement the last calculated average value is permanently displayed and emitted at the signal output, until a new batching begins.

3.4 Start delay with "start/stop" and "start/stop batching" measuring modes:

In the "settings" menu you can additionally set a "start delay", which effects that the measurement does not begin immediately after activation of start signal (or exceeding the threshold), but only at the end of this start delay.

The start delay helps to eliminate irregularities at the begin of material flow, for instance. Or you can suppress a certain "dead time", means the period of time the material eventually needs to flow to the sensor.

4. General notes on operation:

4.1 Unlocking of protected menus:

Some important settings of the OLAS-TPC are locked to protect them against unintentional changes. The only way to change such a setting is by first unlocking the menu by a certain sequence of keystrokes:

1.) Unlocking in the “calibration“ menu:

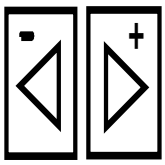


figure 2

2.) Unlocking in the “settings“ menu:

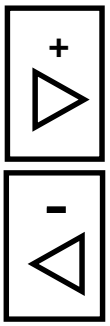


figure 3

First, press the “left arrow button (-)”, then the “right arrow button (+)”, again the “left arrow button (-)” and again the “right arrow button (+)”.

4.2 Verification of successful unlocking:

In the “settings“ menu:

The first setting in this menu becomes highlighted. Press the cursor buttons to choose the settings you want to change.

In the “EDIT“ menu:

New push buttons appear in the “EDIT“ menu.

Without unlocking the “curves list”, “calibration curve” and “calibration table” can only be displayed, but not changed. You need to unlock the menu to be able to make changes.

4.3 Storing the changes of settings:

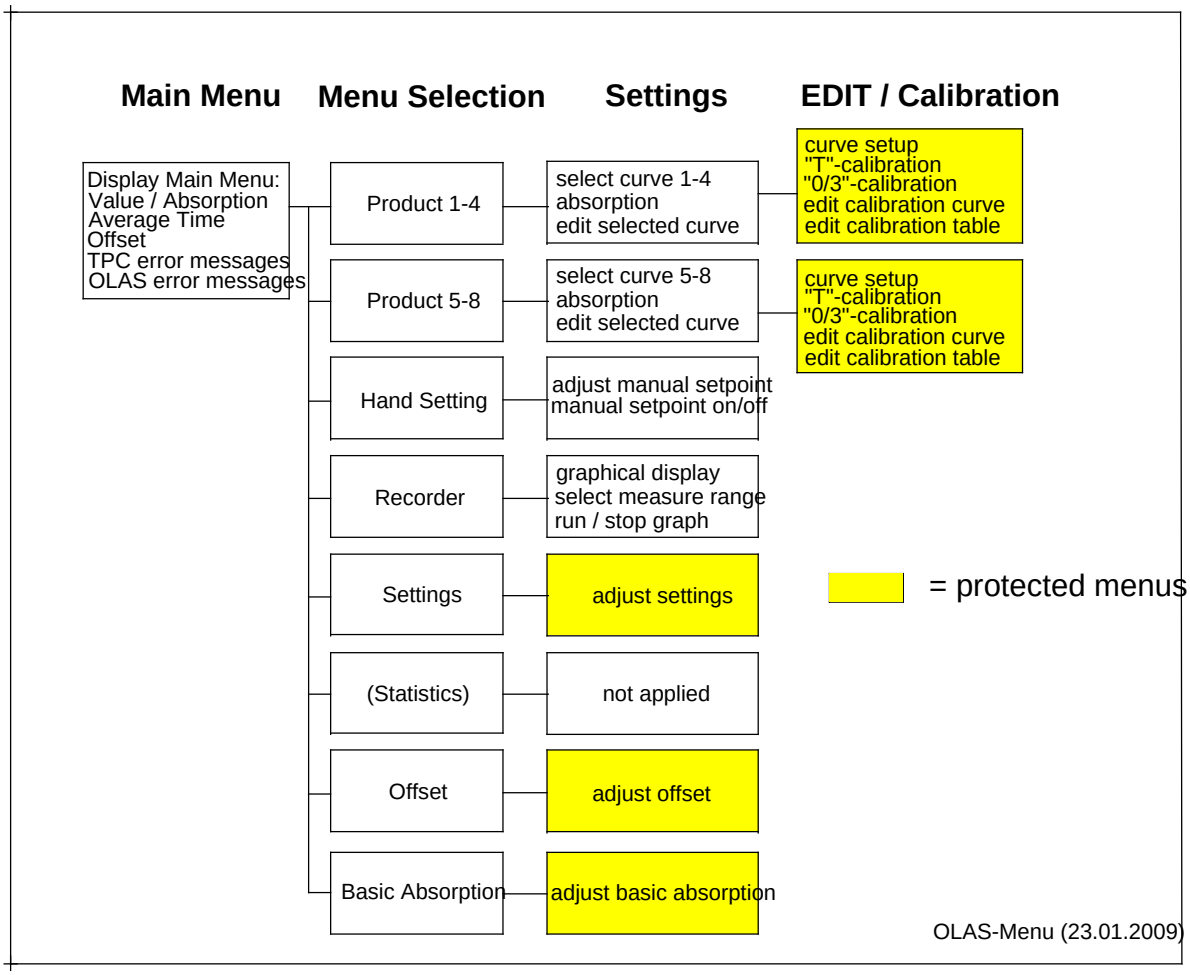
You must press the "**ENTER**" button to store the change of each setting.

4.4 Some notes on the measuring range ("LRL", "URL"):

When setting up a new calibration curve in the "curve setup" menu you must always set the according measuring range by defining a lower and upper range limit ("LRL", "URL"). The chosen measuring range does not only effect the displaying of measured value but also defines the output signal: A measuring value equalling the "LRL" gives 0V (0/4mA) and a measuring value equalling the "URL" gives 10V (20mA).

Finally, this measuring range, defined by "LRL" and "URL", also determines the available range for the signal limits and alarm thresholds in the „settings" menu.

5. Summary of menus:



(By pressing the "**ESCAPE**" button you get back to the former menu.)

According to the above figure, there are the following menus:

Main Menu Standard display window of the measuring.

Menu Selection For selecting the menus "product 1-4", "product 5-8", "hand setting", "re-corder", "settings", "statistics", "offset" and "basic absorption".

Product 1-4 Menu to select one of the products 1-4. Pressing the "**EDIT**" button in this menu allows the customer to go to the "calibration" menu, where the curves can be edited.

	Pressing the button “**Absorption**“, on the other hand, results in displaying of the internal signal of OLAS (“0“...“700“).
Product 5-8	Menu to select one of the products 5-8. Pressing the “**EDIT**“ button in this menu allows the customer to go to the “calibration“ menu, where the curves can be edited. Pressing the button “**Absorption**“, on the other hand, results in displaying of the internal signal of OLAS (“0“...“700“).
Hand Setting	Useful feature, which allows the signal to be set by hand.
Recorder	Displaying mode, very similar to a transient recorder. Helps a lot during the calibration, when the OLAS-TPC is put into operation.
Settings	In this menu important main settings are handled.
Statistics	(not applied so far, for future use)
Offset	The “offset“ setting allows to compensate for changes of the absorption characteristics of optical components of OLAS, without the need to change the calibration curves.
Basic Absorption	Absorption signal without medium (minimum absorption). Important calibration setting.
Calibration	In this menu the calibration curves of the products are stored and edited. Being in the “main menu“ you can reach the “calibration“ menu by pressing the button “**Product 1-4**“ (“**Product 5-8**“) and then the button “**EDIT**“. By pressing the corresponding buttons the curves list and the selected calibration curve can be displayed, as graph and table. All the calibration data settings here can only be changed after unlocking this menu.

6. “Main menu“:

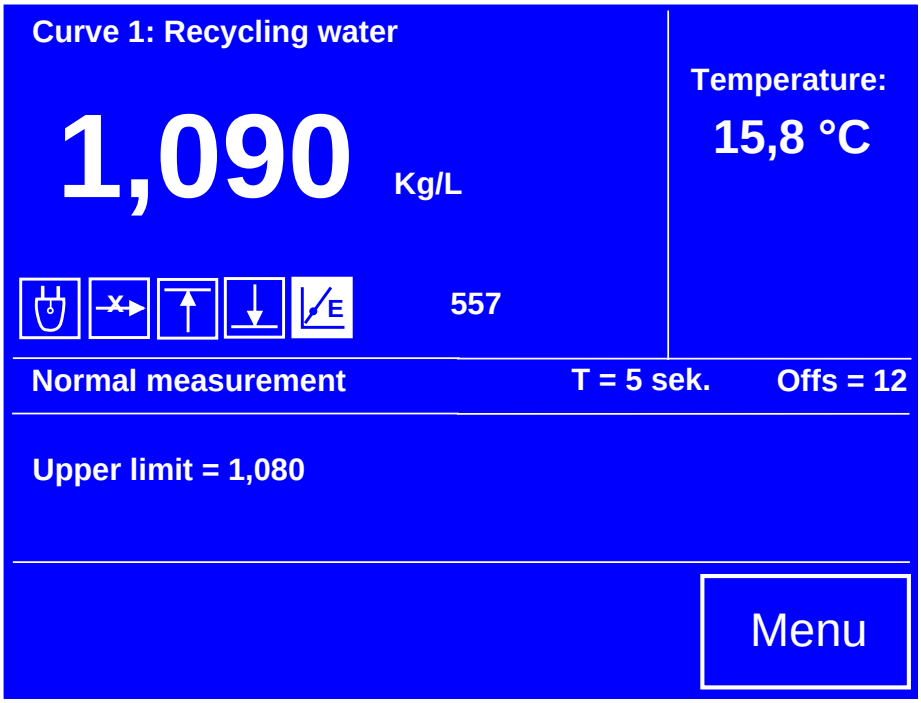


Figure 4: “Main menu“

The “main menu“ is also the standard display window of the measuring. Here, the result of absorption and (optional) temperature measurement is displayed. If there’s no temperature sensor connected to the OLAS-TPC, the temperature reading isn’t displayed.

At the top of display window the name of selected curve (product) is displayed. The editing of curve name (product), is done in the “curve setup“ submenu of “calibration“ menu. Below the measured values the measuring mode and the signal averaging time is displayed.
Below of that you will find the status lines. Here status and error messages (alarms) are displayed.
Right at the bottom you will find the “**Menu**“ button, which leads to the “menu selection“.

6.1 Status flags of OLAS:

Immediately below the absorption measurement reading you will find five status flags, which inform about important operating conditions of the OLAS. Additionally to the activated status flag a message is displayed at the bottom of display window. The status flags are in detail:

"OLAS power failure":

This message appears, if the data transmission of RS485-interface is interrupted for a longer period, as during a OLAS power failure.

"Data transmission error":

Here, data is transmitted, but data transmission errors occur.

"OLAS overdriven":

This situation occurs, if the optics of OLAS is blinded by a considerable amount of ambient light. Or, if the optics was manipulated in a way, that the receiver now gets much more intensity than normally and is overdriven.

"OLAS underdriven":

This situation occurs, if the light source of measuring process shows a failure (which is highly unlikely, because the light source was designed for a working life of more than 100,000 hours).

"Value not reliable":

This is not an error message like the messages above, but only an information for the operator, that the measured signal is very small and the measuring process begins to become nonlinear.

This status information was implemented, because this measuring situation could easily be overlooked if the averaging is activated.

This status information is especially useful during the calibration, done by the customer: When determining the calibration points of calibration curve, take care, that the measured value is always "reliable".

7. "Menu selection":

Figure 5: "Menu selection"

You can reach the "menu selection" by pressing the "**Menu**" button in the "main menu".
In the "menu selection" you can select the following menus:

Product 1-4	Menu to select one of the products 1-4. Alternatively, the internal signal ("absorption") can be selected.
Product 5-8	Menu to select one of the products 5-8. Alternatively, the internal signal ("absorption") can be selected.
Hand Setting	Signal set by hand
Recorder	Displaying mode, similar to a transient recorder
Settings	Main settings menu
Statistics	(not applied so far)
Offset	Option to compensate for changes of optical characteristics of OLAS
Basic Absorption	Minimum absorption, important calibration setting
ESCAPE	Going back to the former menu

8. "Product 1-4" and "product 5-8" menu:

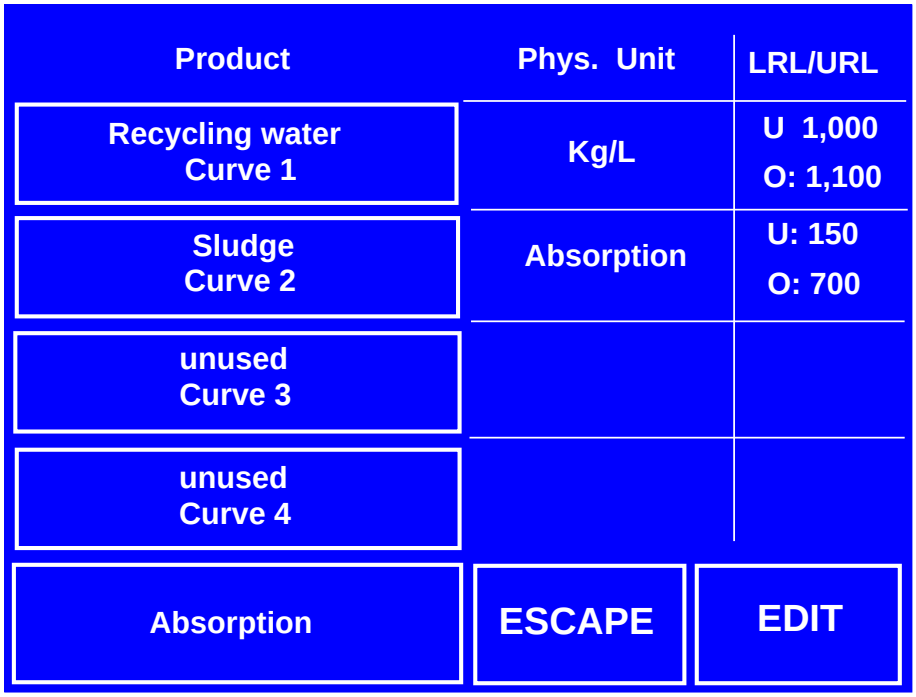


Figure 6: "Product 1-4" menu

The "product 1-4" ("product 5-8") menu can be reached from the „menu selection" by pressing the button "**Product 1-4**" ("**Product 5-8**"). In this menu you can select the products 1-4 (5-8) or the internal signal ("absorption").

To the right of each product the "physical unit" and measuring range is displayed. The measuring range is defined by the lower and upper range limit ("LRL", "URL"). (See also chapter 4.4)

Press the "**ESCAPE**" button to go back to the "main menu". Here, the measurement is displayed then with the profile of selected product (calibration curve, measuring range, etc.)

Press the "**EDIT**" button to go to the "calibration" menu, to edit the curve you have selected.

9. “Hand setting“ menu:

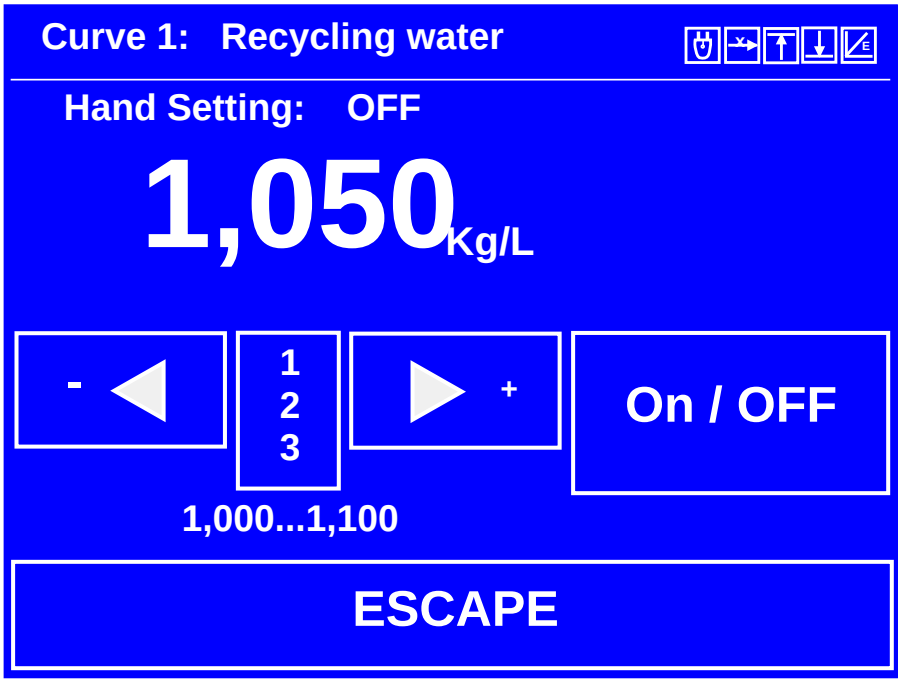


Figure 7: “Hand setting“ menu

This option allows the customer to set the signal by hand and send it to the output of OLAS-TPC (0-10V or 0/4-20mA, whatever is available).
Standardly the output emits the measured signal. But when the “hand setting“ is activated, the output emits the value set by hand. In this case the current measuring signal is only displayed in the “main menu“, but not emitted at the output.

The “hand setting“ option allows the customer to simulate certain measuring situations and helps to analyze and optimize the process control.
This option also allows to send a signal to the process control, if the OLAS is disconnected for some reason.

To remember the operator that the signal is set by hand, a message is displayed in the status line of “main menu“, informing about the current “hand setting”.

10. “Recorder“ menu:

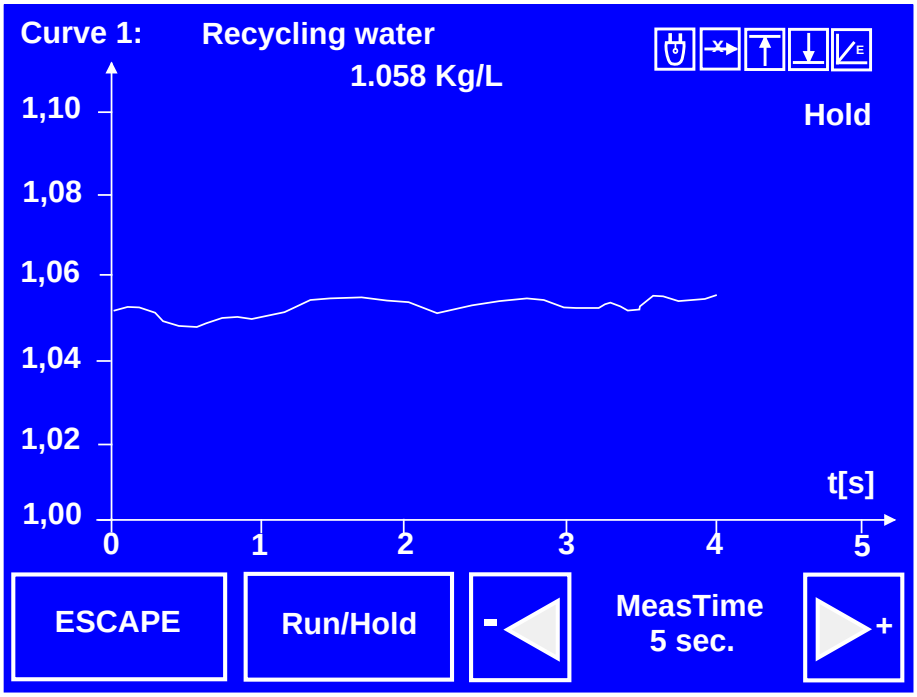


Figure 8: “Recorder“ menu

In the “recorder“ menu the measured signal can be displayed in a way very similar to a transient recorder. Here, the signal “runs“ from the left to the right side of screen. Having reached the right side, the signal starts again at the left.
The time period needed to run from the left to the right side can be set in steps of 5, 25, 50 and 100 seconds.

This option allows to display the progress of measuring during the whole dosage period and helps to analyze the dosage process.

This displaying option, by the way, enormously helps to find an optimum averaging time constant, if desired.

11. "Settings" menu:

11.1 General notes:

To enter the "settings" menu press in the "main menu" the "**Menu**" button and in the "menu selection" the button "**Settings**". Here, the main settings of OLAS-TPC are stored.

Attention: Like the "calibration" menu this menu is locked, to prevent important settings from being changed unintentionally. To change the settings, the menu must first be unlocked by a certain sequence of keystrokes:

First, press the "left arrow button (-)", then the "right arrow button (+)", again the "left arrow button (-)" and again the "right arrow button (+)".

By the help of arrow buttons you can select and edit the settings. To store the changes, press the "**ENTER**" button.

11.2 Setting options in the "settings" menu:

Software version: The software can be updated in the future by the help of an internal connector.

Language: You can select the following menu languages: **German**, **English**, **French** and **Spanish**. Other languages are optional.

Averaging time: **0 … 100 sec**onds. The averaging time plays only a role with the continuous measuring. With the "start / stop -measurement" and "start / stop -batching" the average is taken over the whole dosage period, of course.

Measuring mode: Three measuring modes are available:

Normal measurement (continuous measurement)

Start / stop - measurement (Activation via the external “Start-In” switch input: Start = +24V, stop = 0V.)

Start / stop - batching (Starting and stopping of measurement is controlled by the signal itself.)

Start delay: **0 ... 100 sec**onds. Only available for the measuring modes “start / stop - measurement“ and “start / stop - batching“. The start of measurement is delayed by the “start delay”.
The “start delay” helps to eliminate irregularities of material flow immediately after the start, for instance.

Test-In: The “Test-In“ switch input supports three modes:
”**Off**“: No function
”**Limit test**“: When the signal at “Test-In“ input switches from +24V to 0V, the OLAS-TPC checks whether the measuring value is above the “inpurity limit“, indicating that the optics is contaminated by dirt. If so, the message “Please check the sensor“ appears on screen.
The “limit test“ can be delayed by the value of “alarm delay“.
Example: The medium to be measured is pumped through a conduit and fills the senor gap only during the pumping. The absorption of measuring light during the pumping is high. After turning-off the pump the medium is no longer filling the sensor gap and the absorption of measuring light is low, but only if the optics isn’t contaminated by dirt. So, by connecting the pump control signal coming from process control (+24V = “Pump-On“, 0V = “Pump-Off“) to the “Test-In“ switch input a “limit test” (impurity check) can very easily be carried out.
”**Sensor test**“: When the signal at “Test-In“ input switches from 0V to +24V, the averaging of signal is turned-off and the current measuring value is directly displayed on screen and emitted at output. When the signal at “Test-In” input switches to 0V again, the

OLAS-TPC continues the signal averaging with the old, stored values. So, the sensor test will not affect the averaging!
Example: The “Test-In“ switch input is activated for a few seconds and at the same time a high pressure water jet is injected into the sensor gap. The (transparent!) water jet presses the medium to be measured out of the sensor gap and the measuring value abruptly drops, but only if the optics isn’t contaminated by dirt. So, by connecting the water jet control signal coming from process control (+24V = “Water-On“, 0V = “Water-Off“) to the “Test-In“ switch input a “sensor test” (impurity check) can very easily be carried out.

Alarm delay: **1 ... 60 sec**onds. The “limit test“ is delayed by this “alarm delay“. The “alarm delay” helps to compensate for the period of time the medium to be measured needs to leave the sensor gap, after turning-off a pump, for instance.

Keyboard clicks: **On** / **Off**

OLAS alarm buzzer: **On** / **Off**

Display brightness: Brightness setting (**20% ... 100%**)

Display contrast: Contrast setting (**50% ... 90%**)

3 lines text: Customer-specific text for displaying. Name and address of company, for instance.

Alarm limits: By the help of alarm limits you can set certain signal thresholds, which activate individual alarms when being exceeded. These alarms are not only displayed in the status line of “main menu“, but can also activate the alarm relays.
For each curve (product) a **lower alarm limit** and an **upper alarm limit** can be set. The limit alarm is deactivated when setting the lower and upper alarm limit both to “0“.

Signal limits: By the help of signal limits you can limit the displayed and emitted value of measurement. For each curve a **lower signal limit** and an **upper signal limit** can be set. The signal limiting is deactivated when setting the lower and upper signal limit both to “0“.
(In the measuring mode “start / stop - batching“ the lower signal limit is used to set the start / stop threshold.)

Impurity limit: An alarm can be activated when exceeding the impurity limit. See above, at “Test-In”.

Alarm relay selection: The OLAS-TPC contains two independent alarm relays, which can be assigned to any of the following alarms:

Lower alarm limit	Exceeding of “lower alarm limit”
Upper alarm limit	Exceeding of “upper alarm limit”
Lower / upper alarm limit	Combination of alarms ***Lower alarm limit*** and ***Upper alarm limit***
Lower signal limit alarm	Exceeding of “lower signal limit”
Upper signal limit alarm	Exceeding of “upper signal limit”
Lower / upper signal limit alarm	Combination of alarms ***Lower signal limit alarm*** and ***Upper signal limit alarm***
Lower temperature alarm	Exceeding of “lower temperature limit”
Upper temperature alarm	Exceeding of “upper temperature limit”
Lower / upper temperature alarm	Combination of alarms ***Lower temperature alarm*** and ***Upper temperature alarm***
Hand setting	“Hand setting” is activated
Test function	The internal signal (“absorption“) is displayed and emitted

Batching finished	The batching period is finished
Impurity limit	The signal exceeds the “impurity limit”
OLAS power failure	Longer lasting interruption of data stream
Data transmission error	Data is transmitted, but transmission errors occur
OLAS overdriven	The optics of OLAS is overdriven
OLAS underdriven	Electronic failure (e.g. malfunction of measuring light)
Value not reliable	Signal processing begins to become nonlinear. Don’t use this value for calibration.
OLAS collective alarm	Combination of all alarms, every single individual alarm activates the relay

Temperature alarm: **On / Off**

Lower temperature limit: **- 45°C(-49°F) ... + 200°C(392°F)**

Upper temperature limit: **- 45°C(-49°F) ... + 200°C(392°F)**

Temperature Compensation: Thanks to the extraordinary construction of OLAS we never observed any relevant temperature dependency of the measuring process until this day. Nevertheless, we have implemented an optional second order correction curve in the OLAS-TPC, which can be defined via a table.

12. "Offset" menu and "basic absorption" menu:

Sometimes, optical components have to be replaced or changed after the OLAS-TPC has already been calibrated by the customer. Has the OLAS-TPC to be recalibrated afterwards?

Not necessarily: If the distance between emitter and receiver afterwards is exactly the same as before (from window to window), then the OLAS-TPC offers an unique offset adjust method, which only needs later carried out changes to be compensated. The involved calibration curve remains valid and doesn't need any change!

This offset adjust method requires the determination of an additional characteristic parameter of your OLAS application, called "basic absorption", when setting up the calibration curve: Bring the optics of your OLAS into a defined medium of well known absorption (e.g. clear water) and enter the "basic absorption" menu of OLAS-TPC. Unlock the menu and store this basic absorption ("new value") by pressing the "**ENTER**" button:

Figure 9: "Basic absorption" menu (unlocked)

When adjusting the "offset" afterwards, as consequence of a later change or replacement of components of OLAS, bring the optics of OLAS again into this defined medium and en-

ter the “offset“ menu of OLAS-TPC. After unlocking this menu the OLAS-TPC automatically calculates the difference (“offset“) to the original “basic absorption“. Press the “**ENTER**” button to store this “new offset“:

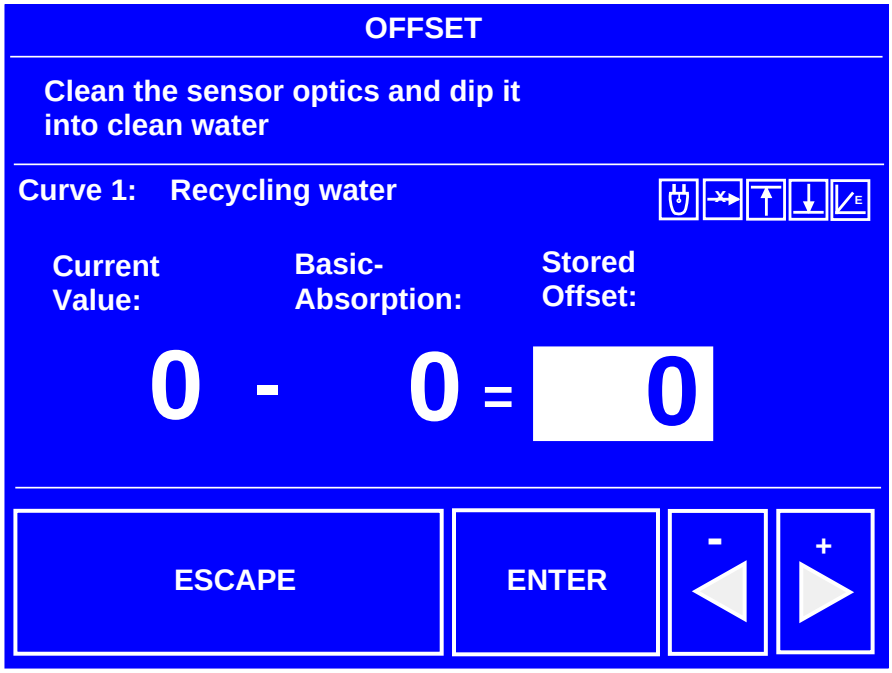


Figure 10: “Offset“ menu (unlocked)

All following measurements are then corrected by automatically subtracting this “offset“ from the measured value. The involved calibration curve remains valid!

Of course, this offset adjust method can also be used, for instance, to compensate for the additional and unwanted absorption of measuring light by heavy scratches on the optics. The crucial point of this offset adjust method is, that the distance between emitter and receiver (concretely spoken the thickness of screened medium) must always be exactly the same. If the distance between emitter and receiver is changed for any reason, then the original calibration curve is no longer valid.
This offset adjust can be done as often as you like.

13. "Calibration" menu:

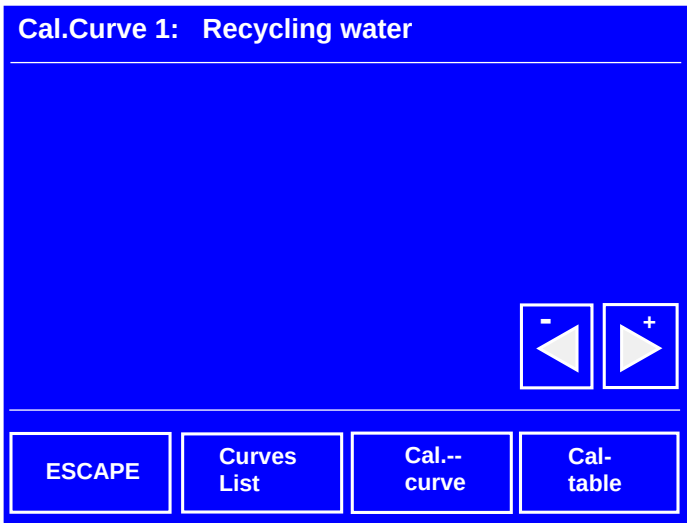


Figure 11: Locked "calibration" menu

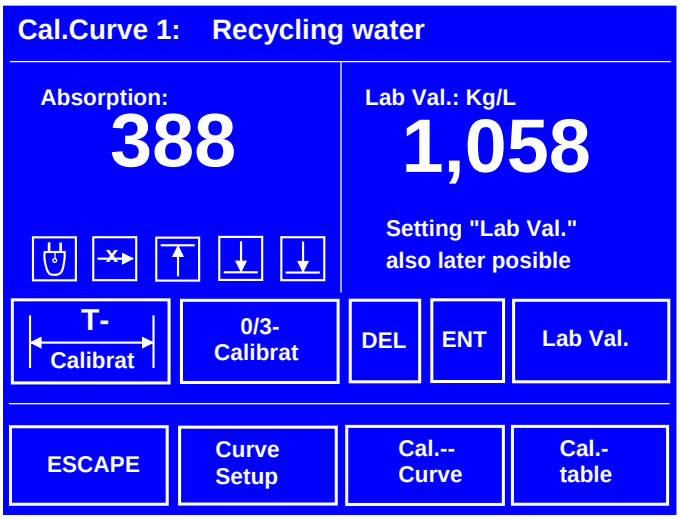


Figure 12: Unlocked "calibration" menu

From the "menu selection" you can reach the "product 1-4" ("product 5-8") menu by pressing the button "**Product 1-4**" ("**Product 5-8**"). In this menu a calibration curve ("product") can be selected. From here you can enter the "calibration" menu by pressing the "**EDIT**" button, to edit the selected calibration curve. In the "calibration" menu you can also set up new calibration curves or delete existing ones.

Each calibration curve can contain up to 40 different calibration points. Between the points a piece wise linearization is provided, or by other words, neighboured points are connected by straight lines.

13.1 Unlocking the "calibration" menu:

When pressing the "**EDIT**" button you will enter the locked "calibration" menu (see figure 11). "Locked" means, that the "curves list" and the selected "calibration curve" and "calibration table" can be displayed, but not changed.

In the locked “calibration“ menu some buttons are missing, which become only visible after the unlocking (see figure 12).
To unlock the “calibration“ menu a certain sequence of keystrokes is needed, as already mentioned above, in the “general notes on operation”:

First, press the “left arrow button (-)”, then the “right arrow button (+)”, again the “left arrow button (-)” and again the “right arrow button (+)”.

The unlock feature shall prevent important settings from being changed by non authorized persons.

13.2 “Curve setup” menu:

Before entering calibration points you must first set up a new curve by pressing the “curve setup“ button in the unlocked “calibration“ menu:

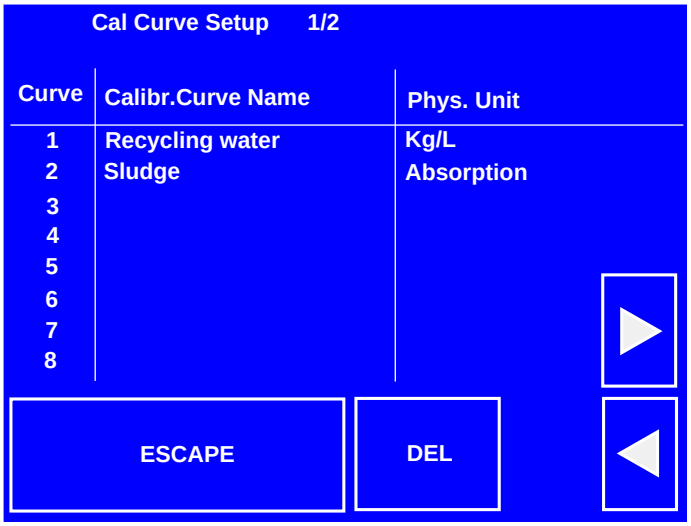


Figure 13: “Curve setup“ menu (1/2)

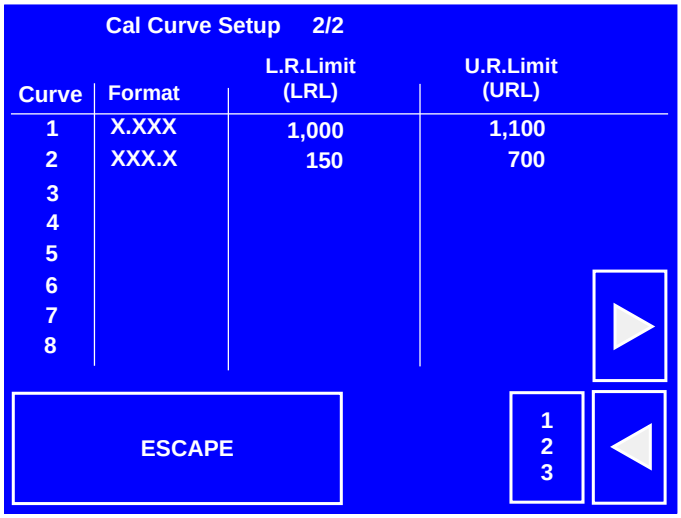


Figure 14: “Curve setup“ menu (2/2)

“Curve setup“ means to enter the curve name, the physical unit, the displaying format of measured value and the lower and upper range limit (“LRL”, “URL”). Press the “**ENTER**“ button to store these “curve setup“ settings.

You can change the “curve setup“ settings later, whenever you want, by re-entering the “curve setup“ menu.

In the “curve setup“ menu the selected calibration curve can also be deleted by moving the cursor to the curve number and pressing the “**DEL**“ button. You can undo the deletion by the help of “**UNDO**“ button.
Press the “**ESCAPE**“ button to go back to the “calibration” menu. Now you can enter the calibration points, either by directly entering them into the “calibration table“ or by using the calibration modes “T-calibration“ and “0/3-calibration“.

Attention: You cannot open the “calibration curve“ menu in the “calibration“ menu, unless at least two calibration points have already been entered, because otherwise the corresponding calibration curve doesn’t exist yet.

13.3 “Calibration curve“ menu:

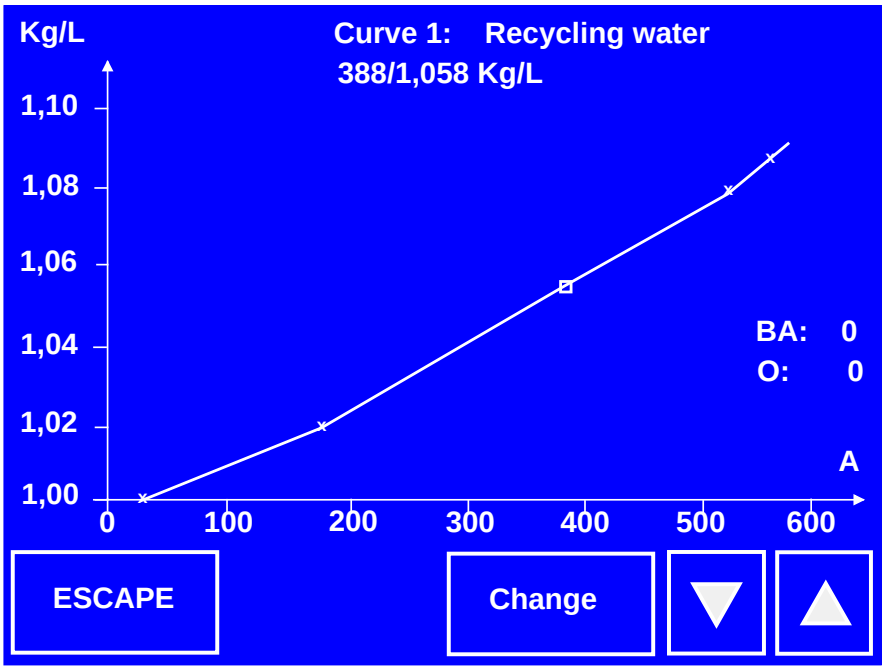


Figure 15: “Calibration curve“ menu (unlocked)

In the “calibration curve“ menu the graph of selected calibration curve is displayed. In addition, the values of each calibration point can be displayed, after selecting it by the help of arrow buttons.

In the unlocked “calibration” menu the calibration points can additionally be changed: First, select one of the calibration points by the help of arrow buttons. Then, press the “**Change**” button. Now, you can change the selected calibration point by pressing the arrow buttons. Press the “**ENTER**” button to store the changed calibration point. To undo the change, press the “**UNDO**” button.

Press the “**ESCAPE**“ button to go back to the “calibration” menu.

Attention: You cannot open the “calibration curve“ menu in the “calibration“ menu, unless at least two calibration points have already been entered, because otherwise the corresponding calibration curve doesn’t exist yet.

13.4 “Calibration table“ menu:

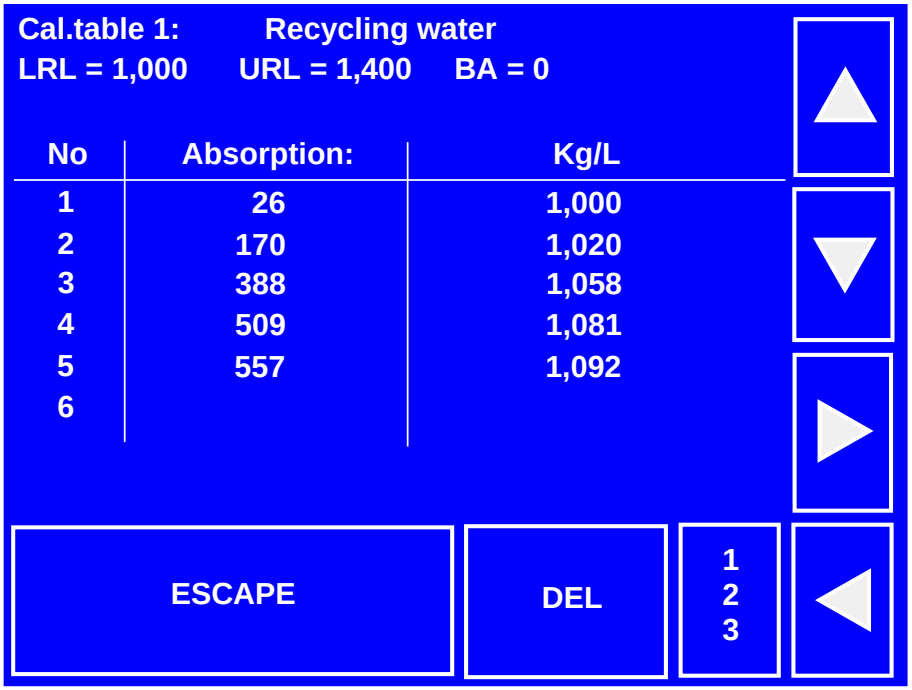


Figure 16: “Calibration table“ menu (unlocked)

In the “calibration table” menu the values of all calibration points of selected calibration curve are listed. Additionally, at the top of display window the lower and upper range limit (“LRL”, “URL”) and the basic absorption (“BA”) is displayed.

In the unlocked “calibration table” menu the values of calibration points of selected calibration curve can additionally be changed and even new calibration points can be entered: First, move the cursor to the entry you want to change, by the help of arrow buttons. Then, press the “**123**” button to enter new data. To undo the change, press the “**UNDO**” button.

Calibration points can also be deleted by pressing the “**DEL**” button. You can undo the deletion by the help of “**UNDO**“ button.

Press the “**ESCAPE**“ button to go back to the “calibration” menu.

13.5 “T-calibration“ and “0/3-calibration“:

“T-calibration“ and “0/3-calibration“ are semi-automatic calibration modes, which automatically enter calibration points into the calibration table. There are two ways to measure the corresponding absorption:

„T-calibration“:
The absorption is measured as long as the “**T-Calibration**” button is pressed. After releasing the button the OLAS-TPC automatically calculates the average value and displays it. After pressing the ”**ENT**“ button or additionally entering the corresponding “calibration value” this average value is automatically entered into the “calibration table”.

„0/3-calibration“:
In this mode the absorption is measured three times in a row by three times pressing the “**0/3-Calibration**“ button. Afterwards, the OLAS-TPC automatically calculates the average value from the three single measurements and displays it. After pressing the ”**ENT**“ button or additionally entering the corresponding “calibration value” this average value is automatically entered into the “calibration table”.
(You can also carry out only one or two single measurements by pressing the “**ENT**” button after the last input to stop the automatic sequence. Afterwards, press again the “**ENT**” button for storing or additionally enter the corresponding “calibration value”.)

To enter the corresponding “calibration value” press the “**Calibration Value**” button (instead of “**ENT**” button), immediately after finishing the “T-calibration” or ”0/3-calibration”

sequence. After numerically entering the “calibration value” press the “**ENT**” button for storing. By this procedure the complete calibration point has automatically been entered into the “calibration table”.

You can enter the corresponding “calibration value” also later, then directly into the “calibration table”.

You can quit the „T-calibration“ and „0/3-calibration“ sequence by pressing the „**DEL**“ or „**ESCAPE**“ button.

14. Technical data:

Main power:

Available options:	230V AC ±10%, 50-60 Hz (optional)
	115V AC ±10%, 50-60 Hz (standard)
Mains connection:	3-pole IEC power connector, on the backside

Operating environment:

Temperature range:	Ambient temperature: -5°C (23°F to +45°C(113°F)

Signal input (absorption):

Type:	RS-485 interface, connected to OLAS
Wiring:	Twisted pair, shielded
Isolation:	Galvanic isolation provided
Baud rate:	19200 Baud

Signal input (temperature):

Type:	PT100
Wiring:	4 wire, shielded
Connection:	Pluggable clamping bar (X1)
Mounting:	Preferably in the medium

"Start-In" and "Test-In" switch inputs:

Input signal:	Stop / Off = 0V
	Start / On = +24V (±10%)
Isolation:	Galvanic isolation provided
Connection:	Pluggable clamping bar (X3)

Analogue signal outputs:

Signal output (absorption):	4-20mA (0-20mA / 0-10V, optional)
Connection:	Pluggable clamping bar (X3)
Signal output (temperature):	4-20mA (0-20mA / 0-10V, optional)
Temperature range:	-45°C to +199,9°C (-50°C(-58°F) = 0V, +200°C(392°F) = +10V, 40mV / °C)
Connection:	Pluggable clamping bar (X3)

Relay outputs:

Type:	Two relays, one switching contact each
Rating:	60V AC/DC 1A max.
Connection:	Pluggable clamping bar (X1, X2)

Digital serial interface:

USB interface:	Transmission of measured values and control of the OLAS-TPC by a PC or SPS, by the help of custom designed software. There's a simple DOS program ("OLAS-TPC_TEST") available for testing.

Further specifications:

Face frame:	W x H: 213 mm x 125 mm
Mounting depth:	ca. 130 mm, without clamping bar ca. 160 mm, including clamping bar
Operating elements:	Touch screen, IP67
Display:	Monochrome LCD graphic with LED backlight
Resolution of display:	320 x 240 pixels

15. Installation hints:

The OLAS-TPC is designed to be installed into a control panel. It has to be protected against humidity and dirt. A rubber gasket supplied with OLAS-TPC seals the device at the control panel.

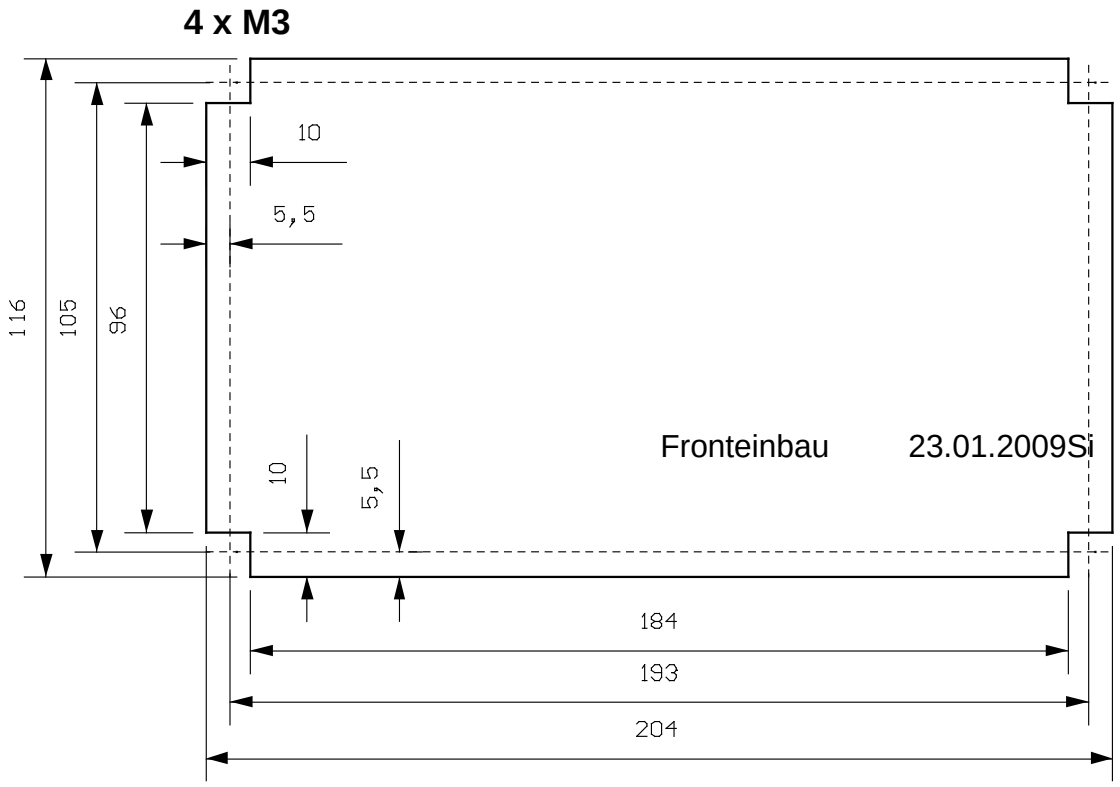
The ambient temperature must be within the specified limits. Also, the device must be aerated to allow the remove of internally dissipated heat.

Due to the design the OLAS-TPC needs an external power switch.

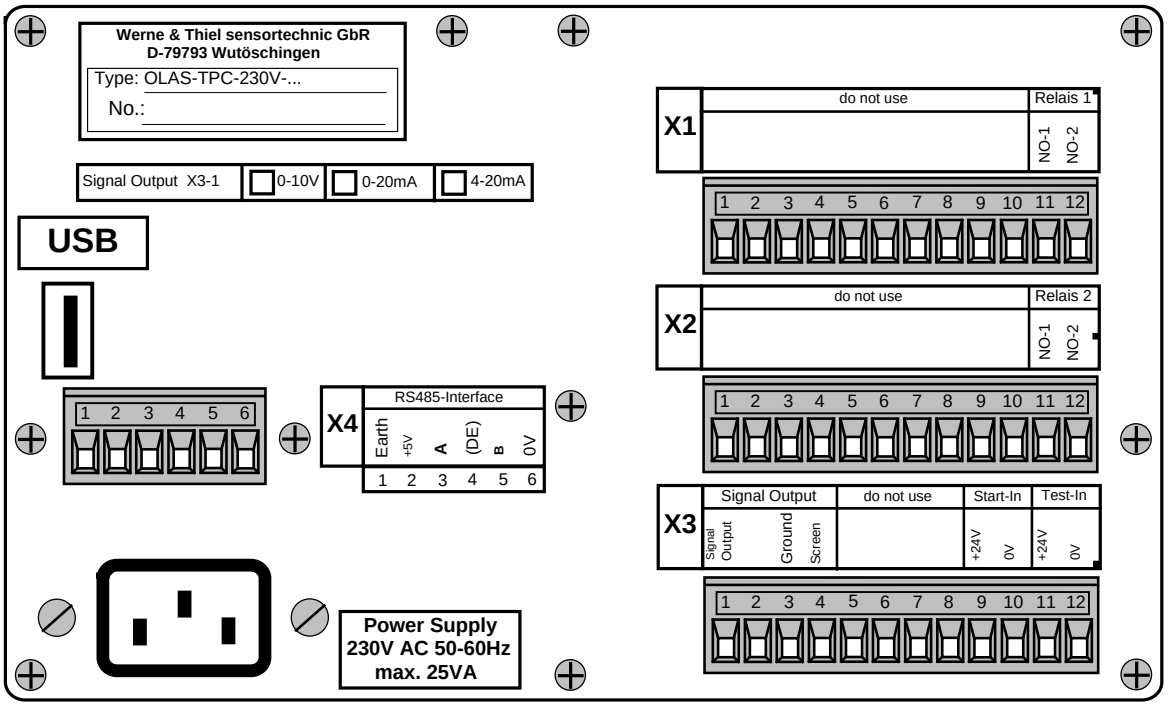
16. Face frame mounting dimensions:

Mounting depth without clamping bars: ca. 120 mm

Mounting depth with clamping bars: ca. 160 mm

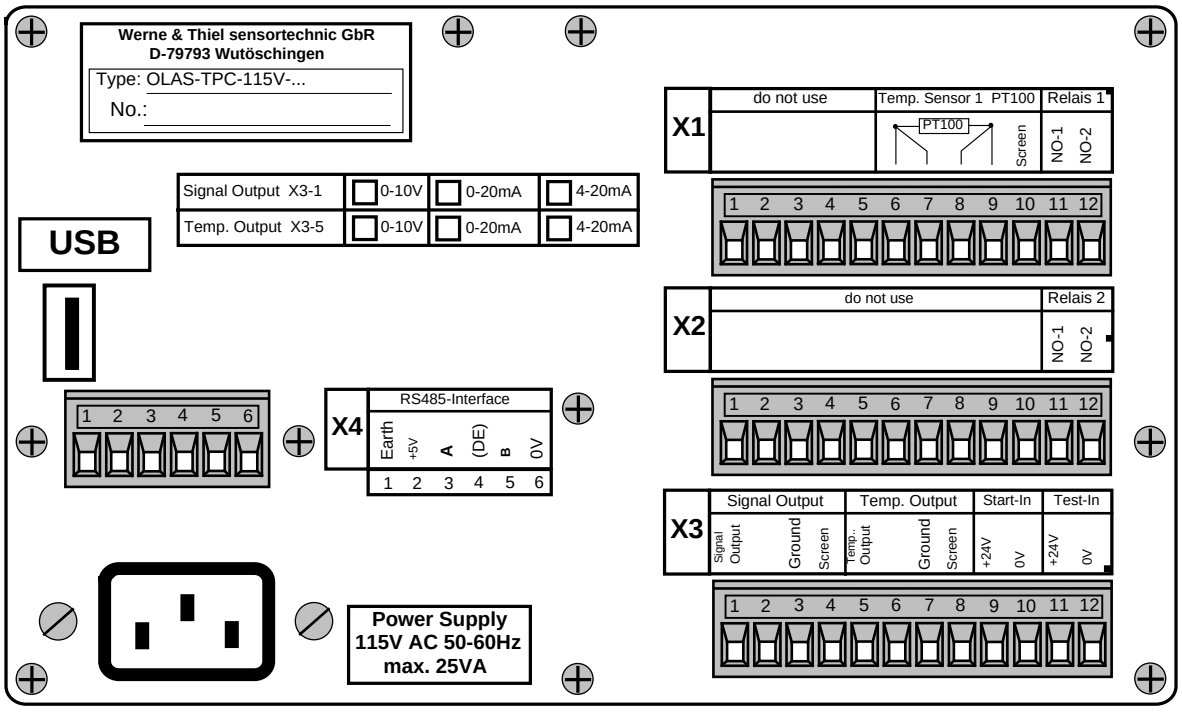


17. Backside of OLAS-TPC / Pin assignement:



OLAS-TPC-e-Rück.dsf

Back view of OLAS-TPC: 230VAC main power **without** PT100-option



OLAS-TPC-e-Rück.dsf

Back view of OLAS-TPC: 115VAC main power **with** PT100-option

18. Quick start: Setting up a curve:

In the following we want to carry out a “0/3-calibration”. Then, at the end of this chapter, we will briefly discuss the “T-calibration“. (Please have a look at the “summary of menus“ in chapter 5, to find the various menus.)

Adjusting the distance between emitter and receiver:

First, the distance between emitter and receiver has to be adjusted. So, take a representative sample of the medium to be measured, providing the highest occurring absorption. Now, bring the optics of OLAS into this sample and adjust the distance until the absorption signal is in the range between “600” and “650”.

(To display the absorption signal, press in the “main menu” the “**Menu**” button, press in the “menu selection” the “**Product 1-4**” (“**Product 5-8**”) button, press in the “Product 1-4” menu the “**Absorption**” button and finally the “**ESCAPE**” button.)

Setting up a new calibration curve:

Before entering calibration points you must first set up a new calibration curve:

Press in the “main menu” the “**Menu**“ button, press in the “menu selection“ the “**Product 1-4**“ (“**Product 5-8**“) button, press in the “product 1-4” (“product 5-8”) menu an “**unused Curve**” button, press then the “**EDIT**” button, unlock the “calibration” menu (as shown in chapter 4.1) and press the “**Curve Setup**” button.

Now, enter the curve name, the physical unit, the displaying format of measured value and the lower and upper range limit (“LRL”, “URL”, as explained in chapter 4.4). Press the “**ENTER**“ button to store these settings. By pressing the “**ESCAPE**“ button you will go back to the “calibration” menu and can now enter the calibration points.

Entering of calibration points by the help of „0/3-calibration“ method:

To enter a calibration curve you need at least two different samples of the medium to be measured. From each sample the exact calibration value must be known, of course. (The calibration value can easily and accurately be determined by the help of an areometer, for instance.)

Are the calibration samples prepared in buckets, then the medium should be properly stirred before taking a measurement. The “0/3-calibration” allows three measurements to be carried out in a row. Afterwards the average is automatically calculated from these to minimize unavoidable fluctuations caused by the stirring:

Stir the first sample. Bring the optics of OLAS into this sample. Press the “**0/3-Calibration**” button. Stir the sample again, bring the optics again into the sample and press again the “**0/3-Calibration**” button. Repeat this procedure a third time.

Now, press the “**Calibration Value**” button. After numerically entering the “calibration value” press the “**ENT**” button for storing. By this procedure the complete calibration point has automatically been entered into the “calibration table”.

Repeat this procedure also for the other calibration samples.

To display the whole calibration curve now, press the „**Calibration Curve**“ button . Or press the „**Calibration Table**“ button to display the calibration table with the listed calibration points.

Entering of calibration points by the help of „T-calibration“ method:

Sometimes, it’s a better idea to carry out the calibration in the actual application instead of having samples prepared in buckets. For instance, if the OLAS is used in a mixing and stirring plant.

Nevertheless, caused by unavoidable fluctuations of the mixing and stirring the signal can appear to be noisy. Here, the “T-calibration” helps:

The absorption is measured as long as the "**T-Calibration**" button is pressed. After releasing the button the OLAS-TPC automatically calculates the average value. After pressing the "**ENT**" button or additionally entering the corresponding "calibration value" this average value is automatically entered into the "calibration table".

Measuring and storing of "basic absorption":

At the end of calibration procedure the basic absorption has to be measured and stored: Clean the optics of OLAS and bring it into clear water or another reference medium. Quit the "calibration" menu by pressing the "**ESCAPE**" button and press in the "menu selection" the button "**Basic Absorption**". Unlock this menu and press the "**ENTER**" button to store the basic absorption.

Now, the OLAS is fully calibrated.