

LR-Cal



DRUCK & TEMPERATUR LEITENBERGER

Operating manual

Data acquisition system

LDL

Device alternatives:
LDL540/550/560/570



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Design and specifications are subject to change without notice.

General safety instructions

- This device must only be installed and operated in compliance with the instructions and warning notices of the dedicated technical documentation.
- Only qualified personnel must install and operate this device.
- The data logger's power supply is done by a lithium primary battery. This can optionally be done by a power supply unit too. In this case the internal lithium battery supplies the data logger during temporary power failure.

Please note the following safety advice before you install and operate the devices:

- The power supply units and batteries delivered by manufacturer must exclusively be used. Failure to do so may result in severe damage and accidents.
- Please pay attention to intactness of all connection cables. If there are cable damages, put the device out of operation immediately. Contact manufacturer for repair.
- Do not charge lithium batteries, throw them into fire or expose them to heat, as this can lead to battery explosion and result in personal injury and/or material damage.
- If fluid from battery pack gets into your eyes, rinse them with plenty of water and see a doctor.
- Never use water to extinguish burning batteries! EXPLOSION HAZARD!
- Do not use damaged batteries!
- Do not short-circuit batteries!



Attention: The electronics consists of electrostatic sensitive components. Pay attention to ESD-operation instructions when handling with this electronics!

Special conditions for use in potentially explosive gas atmospheres of the zone 2

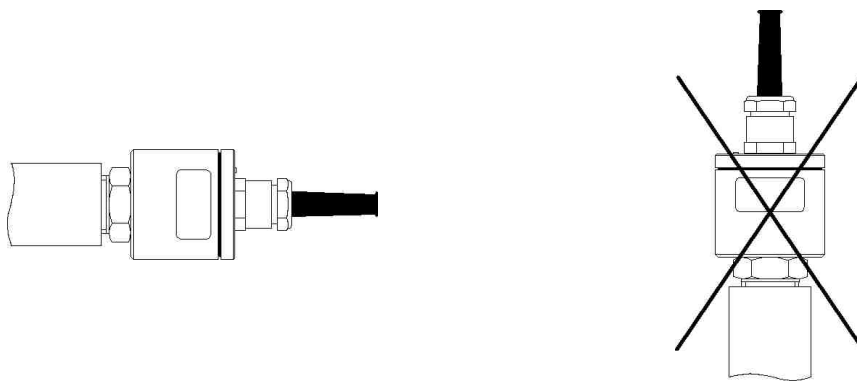
- Mounting and connecting the device must only be done if there is no potentially explosive atmosphere.
- This device must only be used in areas with pollution level 2 as defined in IEC60991-1.
- This device is only suitable in areas with low risk of mechanical hazards.
- Connecting and disconnecting the plug connectors are only permitted if there is no explosive atmosphere. Unused sockets must be closed with dedicated protective caps.
- Unplugged connectors are not permitted in hazardous areas. Always remove unplugged connectors from hazardous areas!
- Opening the case (e.g. for battery change) must only be done if there is no potentially explosive atmosphere.
- The case must only be cleaned by using wet cloths, otherwise there is the danger of spark ignition by electrostatic discharge.
- The memory card (SD memory expansion) must be put in or removed only in case of nonexistence of an explosive atmosphere. This interface must be closed thereafter by the dedicated protective cap.
- The „online outlet“ for data transmission and data logger configuration must only be used in case of nonexistence of an explosive atmosphere. If not used, the „online outlet“ must be closed with the dedicated cap.
- If the online outlet is permanently used, make sure that the connected devices are with voltage rating no more than 60V AC or 75V DC. Furthermore make sure that there is a transient protection and that it is set to a value that does not exceed 140% of the rated voltage.

- If the data logger is supplied by external voltage, the power supply unit delivered by manufacturer must exclusively be used. This is always connected with the supply voltage outside of the explosion-hazard area. Use the power supply unit only at the intended supply voltage. Supplying the data logger using different power supply units and additional equipment is not permitted.
- If the device is equipped with a lithium ion battery, charging this battery must be done outside the potentially explosive areas.
- For integration into the system's potential equalization use the dedicated port at the data logger's case. The pressure transducer are grounded via process connection.

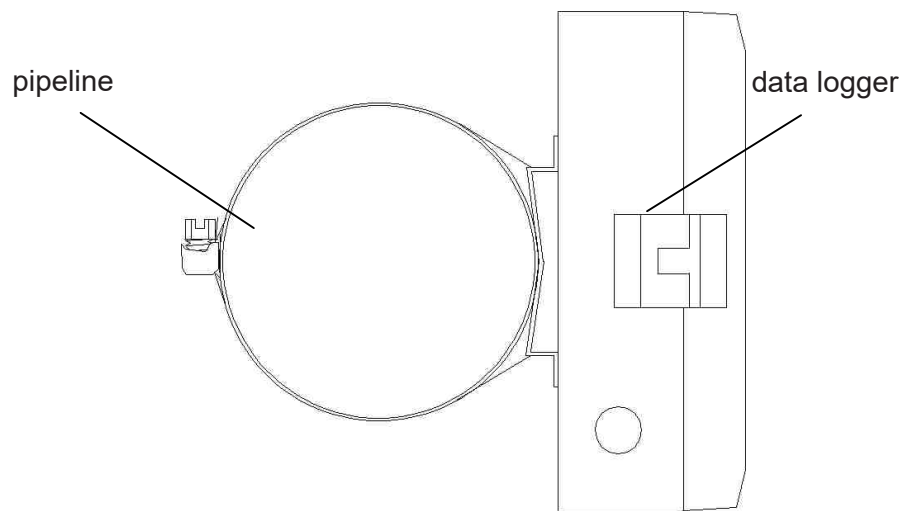
Note: The data logger's battery circuit is operatively grounded at its case.

Any subsequent modification to the device results in the consequence that a secure use is no more guaranteed within ex-zone 2 and the EC declaration of conformity loses its validity.

Mounting notes:



Relative pressure transducers contain a venting device and should be horizontally positioned.



Data loggers (side view) can optionally be mounted on pipelines or the like by band clamp.

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1 Start-up instruction

Please note the following references during the first initiation of data measuring- and storage devices:

- Install the software LDL(PWB)-Soft first.
- Then connect data logger at a serial interface (RS232/USB) of the PC by means of data cables for online connection.
- Start software.
- Set up serial interface in the dialog box „Settings“ of menu item „File“.
- Establish a communication between PC and data logger via „Connection“.
- Make all necessary settings in dialog field „Configuration“. In particular, note that a **1 minute sample rate** is adjusted at the delivery of the device in order to take care of the battery.
- After pressing „OK“, the controller is configured again and the memory is cleared. Measurement can start now.
- Note that the data logger must be turned on for activating measurement and the adjusted measurement start time must be reached!

Note: The relative pressure transducer on devices with delivery date from July 2005 are equipped with venting device in mint condition. This small circular-shaped venting device is on the sealing cap of the transducer. **Pay attention that the venting device is not removed or damaged!**

Note: Connecting Namur transducers at the data logger must only be done in zero potential state, otherwise, when short circuits occur, the internal protective circuit may releases and hence the input becomes disable! When using pluggable input leads, alternatively, transducers can be connected in unplugged state.

Note: The firmware 3.1.35 provides that digital transducers which could not be queried 10 times in succession, are excluded from query. This way battery power is saved if individual transducers are activated but not plugged. If transducers are not queried (anymore), a „-“ is shown as reading. To put a transducer into operation after plugging, there are two options:

1. Deactivating and activating measurement.
2. Calling the channel in online view, thereafter long pressing Esc key.

Both options provide query ban release and the transducer will be measured again.

2 Data acquisition system LDL 5xx

The data acquisition system LDL 5xx is deployed in industrial process control or at storage and freight room monitoring in accordance with EU guidelines or while recording of climate data, at building monitoring, at pipeline building or in transit of food or slightly perishable products.

2.1 Components of data logger LDL 5xx

Data loggers LDL 5xx consist of following units. These allow in their entirety reading acquisition and -storage, evaluation of measuring data on PC/laptop/PDA and adaptation to specific measuring problems. Figure 1 describes components at data logger LDL 570.

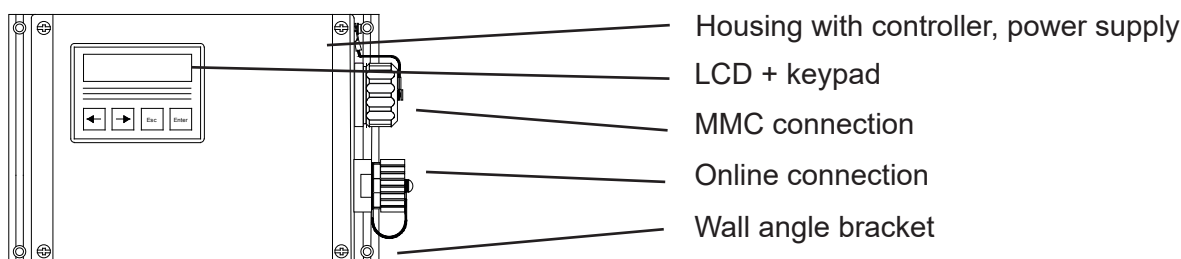


Figure 1 type LDL 570

Controller

It controls all features of the data logger such as data acquisition and -storage, display control and evaluation of keypad commands, backup by MultiMediaCard as well as activation of peripherals (PC, printer or modem). The controller contains an internal memory which can store approx. 260.000 up to 500.000 readings, independent of MultiMediaCard.

Transducers

The transducers record physical measurement quantities such as pressure or temperature and convert them into electrical signals which can be processed by measuring system. All LDL standard transducers are suitable for battery-operating. Transducers with standard signal output (e.g. 4-20 mA) can also be connected, either firmly with the measuring system or contacted by plug-in connectors. The data logger LDL 570 also provides to integrate up to 2 pressure transducers inside the housing of the logger. A pressure equalization element makes sure that there is the necessary pressure equalization.

LCD and keypad

The control of data logger functions is menu-driven by LCD and keypad. In addition to the online feature of checking current readings, numerous settings can be made on data logger directly.

Online connection

The communication of the data logger to a connected PC/laptop/Pocket-PC, modem or printer is done by online connection. It is equipped with a sealing cap to keep the degree of protection of the housing.

MMC connection

The transmission of measuring data from internal memory to the MultiMediaCard is done by menu command or automatically at full memory as well as in case of power failure of data logger. The MMC can also be used for configuration of the data loggers. The memory card is used like a drive (floppy disk/HDD) on PC/laptop. Measuring data are stored in files and can be copied, opened and deleted.

Software

The software LDL(PWB)-Soft 2.1 is used for readout of measuring data, for configuring measurement and erasure of memory. Data can be represented in tabular form and graphic. Data acquisition can also be observed online at PC.

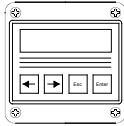
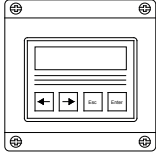
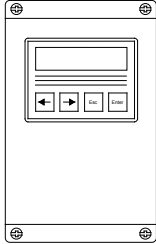
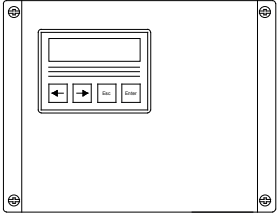
2.2 Device types

The basic version of data loggers LDL 5xx consists of following components:

- Aluminium housing
- Up to 496kB data memory
- 9V-lithium battery (1200mAh)
- Backup battery for data backup
- LCD with keypad

The data loggers can be equipped with different menu versions. Currently there are two versions available:

- Standard menu
- RLBK menu, in particular for pipeline construction test case

Typ	Bauform
LDL 550 – Housing 80x80x60 mm – Degree of protection IP 67 – Lithium battery with 2100 mAh, 4200 mAh (optional) – Logging of up to 4 Measurement signals	
LDL 560 – Housing 100x100x60 mm – Degree of protection IP 67 – Lithium battery with 2100 mAh, 4200 mAh, 7200 mAh (optional) – Logging of up to 4 Measurement signals	
LDL 540 – Housing 100x160x65 mm; mobile and stationary deployment – Degree of protection IP 65 – Lithium battery with 16500 mAh (optional) – MultiMediaCard port (optional) – Measurement signal converter for standard signals – Logging of up to 6 Measurement signals	
LDL 570 – Housing 180x140x80 mm; mobile and stationary deployment – Degree of protection IP 65 – Lithium battery with 16500 mAh or Ex 1-Li-BP (optional) – MultiMediaCard port (optional) – Measurement signal converter for standard signals – Logging of up to 8 Measurement signals	

The types differ with regard to design and possible equipment.

Further optional equipment features of all device types:

- Battery-operated mini printer for report printout (graphic and numeric)
- Alarm output, threshold signalling devices (according to customer request)
- Portable case (plastic) with foam insertions
- Remote data transmission via iModem (analog, GSM)
- Alarm report as SMS to mobile phone or fax machine (only via iModem)
- Mains adapter 230 VAC / 12 VDC
- Wall angle bracket
- Model for Ex-zone 2
- On/Off-switch

Further customer requirements can be realised on request.

2.3 Transducers

The possibility of flexible adaptation to most different measurement tasks is a characterising for the data acquisition system LDL 5xx. For this purpose, we offer specific transducers which are supplied directly by the measuring system without additional power supply.

Standard transducers and/or measuring inputs are available for following measurement quantities:

- Pressure
- Temperature
- Counting input
- Status input
- Standard signal input

Measurement signal converters are available for connection of any transducers with standard signal output such as 0..20mA, 4..20mA, 0..10V, 0..1V. 8 transducers can be connected at the same time.

Analog inputs

Up to 4 analog transducers (pressure, temperature etc.) can be connected. For each transducer the resolution 8 bit, 12 bit, 14 bit or 16 bit can be adjusted separately. For example, a temperature signal can be recorded with 8 bit and a pressure signal can be processed with 16 bit at the same time. For each analog input can be adjusted a lower and an upper limit as well as a hysteresis. By means of a hysteresis can be prevented an oscillation of the alarm output within the threshold between adjusted limit value and standard operating range. So that simple control tasks can be put into effect.

Status inputs

There are up to 4 status inputs available. These allow logging of switching contacts (eg safety shut-off valve). For recording the state of contacts, switches etc., the input is configured as status input. Now, the operator can assign a text with up to 5 characters to any state. Thus, e.g. it is possible to mark a SAV with „open“ or „closed“. The state can be read easily on display of the data logger and on tabular evaluation. A freely selectable status can be indicated as alarm status. This quality can be used to fulfill an event-driven recording.

Counting inputs

Data loggers of type series N6/x can acquire up to 4 pulse signals. The operator can freely adjust the pulse value. Pulses can be recorded in terms of meter reading as well as flow signal or as combination of both. A voltage pulse, an open collector or a dry reed contact can be used as pulse signal.

Counting inputs can be operated as NF-inputs (< 5 Hz) or as HF-inputs (> 5 Hz). According to this configuration, the flow is acquired from medium number of pulse per interval 2 or from time lag of 2 successive pulses.

The measuring ranges of the transducers connected to the data logger PWBlogg are configured by manufacturer and can not be changed.

2.4 Settings

Following settings to the requirements of measurement can be adapted on site by means of configuration dialog of LDL(PWB)-Soft on PC/laptop/Pocket-PC:

- Identification (eg company address)
- Abbreviation (location/time)
- Measurement start (date/time)
- Sample rate (min 1ms; max 1h)
- Alarm rate (if required)
- Threshold defaults for analog channels
- Way of data storage (ring memory/linear memory)

Following settings can be changed on device:

- Start measurement
- Interval 1 and 2 (sample rate)
- Memory type (ring memory/linear memory)
- Abbreviation
- Module time

In standard menu adjustable only:

- Memory mode (store at all times/in case of alarm only)
- Sample mode (permanent threshold monitoring/standard mode)

In RLBK menu adjustable only:

- W400 parameters

Devices with MMC interface can additionally store parameter changes in a file and transfer them by MMC.

Start and interrupt measurement

The reading recording can be started or interrupted by Enter key or switch. Once the measurement is activated, it started once as the adjusted start time is reached.

When using Enter, an authentication mechanism (activated by respective configuration) prevents switching-off of measuring by mistake.

Interval 1 and Interval 2

Two interval increments (sampling rate) to acquire measuring values can be set. Interval 1 can be set from 1s to 1h and is used for recording of readings during standard operation. Interval 2 can be adjusted from 1ms to 1min and is activated once a threshold violation is detected.

Threshold monitoring

The data logger provides specifying thresholds and records threshold violations by means of a second sample rate. This leads to improved logging and evaluation of such events. Additional to the threshold, a hysteresis can be specified. Therefore, it is possible when using an alarm output to realise a simple control. At digital channels (status) an alarm can be triggered at any status change of the signal.

Parameters to monitor thresholds are described as follows:

Memory saving mode

The memory saving mode specifies if measuring data are always recorded or in case of an alarm only. So it provides event-driven data recording.

Sample mode

The sampling mode can be set to „limit value monitoring“ or „standard“. At „standard“ mode, interval 1 values are measured and recorded (depending on memory saving mode). In case of a threshold violation a redirection to interval 2 is done where measuring is carried out as long as the threshold violation is cancelled (in consideration of adjusted hysteresis values).

The setting „permanent limit value monitoring“ means permanent sampling in interval 2. This leads to an immediate identification of threshold violations. Thereafter, the memory interval 1 is redirected to interval 2. Please note that frequent sampling of transducers increases power consumption of data logger and decreases economic life-time of the battery!

Digital signals and pulses are always monitored in interval 2, independent of adjusted sampling mode because of a low power consumption. That means e.g. if there is a threshold violation of flow rate or a monitored safety valve operates, the alarm mode is switched on directly. Now, all data are measured and recorded in interval 2.

RLBK devices: The storage mode should be set to ‚permanent‘ and the sample mode to ‚standard‘. RLBK devices support both parameters in the software only!

Shorted alarm storage

In case of a threshold violation normally data recording is continued with interval period 2. The period of data recording can be much shorter than expected. To avoid it, the option „shorted alarm storage“ can lower that period of time where interval 2 for storage is used. The storage is limited to a maximum of 2 x interval 1 (e.g. 2 x 5 min). Subsequently, it is continued to measure in interval 2 but recorded just with the cycle of interval 1.

Reading recording and backup on MMC

Reading recording occurs optionally at ring memory or at linear memory mode. The measurement ends at linear memory mode as soon as memory is filled completely. At full memory at ring memory mode, the oldest data in each case are overwritten with current values so that continuous recording is possible.

In case of full memory at devices with MMC interface, all stored data are transferred to the memory of the MMC before overwriting the oldest data. **But it is only possible at ring memory mode!** The MMC creates a reading file which can be opened and evaluated by software LDL-Soft.

Depending on type and factory setting, data backup can be done in day files and in one year file!

Note: RLBK devices do not provide automatic backup at full memory! Backup can only be done after calling the menu function ,Backup'!

Password protection

The configuration can be protected via password against unauthorized access. Without knowledge of password, it is not possible to clear stored data or to change configuration of the data acquisition system. This also applies to configuration changes on device.

Note that the password on data logger can only be entered as numeric string. Shall it be possible to change configuration on data logger, the password must be entered as numeric string as well.

Error sources

The analog signals of transducers are converted into a digital value with resolution of 8 bit, 12 bit, 14 bit or 16 bit. The following table demonstrates the difference between resolutions by means of a 16 bar transducer. The values, represented in LDL(PWB)-Soft program or on LCD must be rounded to the defaulted number of decimal places so that the increment between two neighbouring values is not always identical.

ADU	digital steps	resolution
8 bit	256	62,5 mbar
12 bit	4096	4 mbar
14 bit	16384	1 mbar
16 bit	65535	0,25 mbar

Table: AD conversion, resolution

Potential error sources are non-linearities of AD-converter which are irrelevant on resolution of 8 bit or 12 bit. However, another important one is the digital step at small resolutions. At the limit of two sequent digital values, the tolerance between the measured (in digital steps presentable) and the real value (other sources of error excluded) already amounts ½ resolution step. As in the table 8 bit is equivalent to 31,25 mbar. Additionally, there are device-dependent sources of error such as temperature drop or deterioration of components. At resolutions as 14 bit and 16 bit, they have much importance.

2.5 Threshold signalling

If there is an exceeding of the threshold or it falls below, an online-presentation (triangle symbols) will appear on display. Furthermore, the data loggers possess 2 separate alarm outputs for signalling threshold violations. If there is an identification of an exceeding of the limit or the opposite way round, so the respective alarm output is activated. Once the signal is in regular range again (in consideration of hysteresis), the respective alarm output is deactivated again. While alarm state is on, it is switched over from interval 1 to interval 2 so that in case of an alarm state the measurement signal can be terminably finer resolved.

Shall the alarm state be signalled far from measuring location, there are different options:

- Use of floating switch and activation of available monitoring equipment
- Alarm message by SMS to a mobile phone via connected GSM-modem
- Alarm message by voice output by a threshold signalling device

At locations without telephone jack or any other connection to the place of alarm signalization, the wireless transmittance of the alarm message via GSM modem can be used. An alarm signalling by voice output is possible everywhere, where a phone connection is available. The threshold signalling device is connected to the phone and must be supplied via delivered AC-adapter. Subsequently, the configuration in accordance with separate instruction is done. Four telephone numbers which are dialed in alarm case can be entered at the most. While answering the phone, a speech alarm up to 20 sec is sent. If a complete device system is available consisting of data logger, threshold monitoring system and optional modem, the threshold signalling device is supported on a short-duration with the battery of the data logger to keep the entered data.







Further technical solutions of the alarm message can also be implemented to customer requirement.

3 Operating the data logger LDL 5xx

Controlling data logger functions is done by keypad and LCD. Different functions are arranged in a menu structure with several levels which facilitates retrieving of features desired as well as expanding of the existing system to customer specifications.

3.1 Notes on key operation

Standard key functions

	previous menu item, previous channel ...
	next menu item, next channel ...
	short: one menu level back, cancel
	long: input break
	short: calls menu item
	long: input confirmation

Special key functions at input/setting of text/periods

		cursor keys
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The character to be entered / value to be set can be reached by bidirectional paging within one character selection. If the respective cursor key is pressed longer, the selection of characters runs by themselves till the key is released.

	- key short:	= cursor to the right
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Short pressing Enter completes the entire input of the character selected and moves to the next digit. When entering text, the next character can be entered this way. If time is entered, the next place will be positioned.

	- key long (approx. 2s)	= OK
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Long pressing ‚Enter‘ completes the entire input and after confirmation request, it adopts changes as the case may be.

	- key short	= cursor to the left
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The Esc key moves the input cursor one digit backward. If the time is entered, thereby the cursor is moved only. If text is entered (short text, password), the ‚Esc‘-key operates as delete key as well. It deletes the character at cursor position.

Esc - key long (approx. 2s) = cancel

Long pressing ‚Esc‘ cancels input and rejects all changes.

Setting predefined parameters / options

If parameters / settings are selected from a list (e.g. sample rate), the call of the respective dialog is identified by a check mark. To change the setting, the new value is shown by using the arrow keys. Thereafter, it has to be marked (check mark) by short ‚Enter‘. That setting will be adopted as the dialog is quitted by continuous ‚Enter‘. Two subsequent questions have to be confirmed by ‚yes‘.

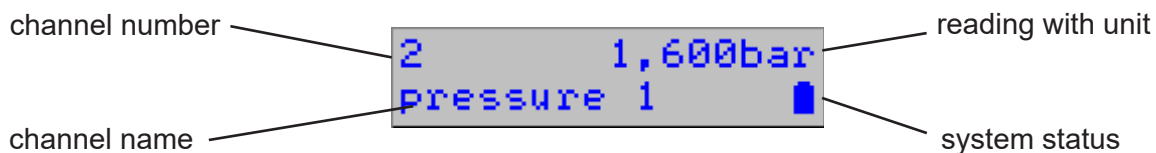
3.2 Online display

Controlling the data logger functions is done by keypad and LCD. The different functions are arranged in a menu structure to facilitate retrieving them and to upgrade the existing system according to customer's specifications.

3.2.1 Online display when measurement is activated

When enabling display (if measurement is on), the current reading of the last selected channel will be displayed. Change-over between transducers connected is done by arrow keys. Special information on reading can be displayed by ‚Enter‘ and ‚Esc‘.

Example display:



The Online display consists of real reading display with unit and channel number as well as of an infoline of several layers (line 2 of display).

Channel number and reading

The first line of the online display shows channel number and reading. The channel number corresponds to the number of the channel indicated on the type plate. The reading is shown including dedicated unit.

Status signals display the respective status text (as specified in configuration) instead of a value.

A current threshold exceeding/falling below at the channel displayed is indicated by an arrow symbol (up, down) after the channel number!

If transducers with Live-Zero-Signal (e.g. pressure transducer) are used, the reading flashes in case the transducer is not connected or defect.

Infoline

Channel name and system status are shown in the Infoline of the main level. The next level can be called by ‚Enter‘. The previous one is activated again by ‚Esc‘. The Infoline consists of 5 levels:

- description of the transducer displayed
- current reading difference to the first value since last reset of minima and maxima or since activating measurement (delta-value); in particular helpful e.g. when pressure tests are carried out!
- measuring period since last reset of minima and maxima or after activating measurement, the ♥ symbol indicates the ongoing measuring (symbol frequency equates to sample rate)
- minimum reading with dedicated measuring period (is indicated by turns)
- maximum reading with dedicated measuring period

The Infoline is also used to indicate following warning messages:

- in case of a threshold violation: ,!!! Alarm !!!' is indicated and the transducer which triggered it will be displayed
- if the battery is lower than 10%, every time if the display is activated, the message ,!!! Battery !!!' will be shown!

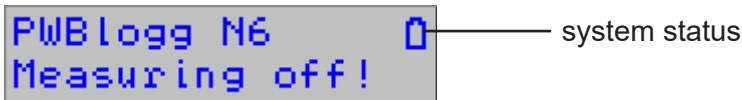
The warning messages can be switched-off by ,Esc'.

3.2.2 Online display when measuring is deactivated

If measuring is off, the device type is displayed in the upper line. The current status is displayed in the second line.

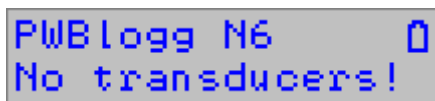
Measuring can (still) be deactivated, because:

1. the on/off switch of the device is in off-position or measuring was switched off by menu



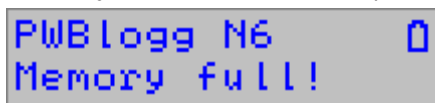
→ In this case measuring can only be acticated by user!

2. all transducers are deactivated



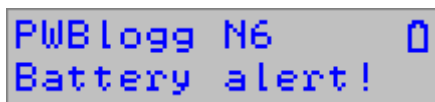
→ To start measuring, at least one transducer has to be activated by PWB-Soft!

3. memory of the device is full (at storage mode ,linear memory')



→ The memory of the device has to be read out and the device has to be restarted.

4. the battery of the device has been removed or recognized as entirely discharged



→ Battery has to be replaced or recharged (RLBK devices with rechargeable battery only) and the battery date has to be refreshed if necessary!

5. start time for the measuring not reached yet (start time is displayed by turns)



→ Measuring starts automatically once start time is reached.

3.2.3 System status

The system status indication is used to display most important pieces of status information of the data logger. Normally, the battery symbol is displayed here. Following further symbols are shown flashing:

- ☐ PC/printer etc. connected
- GSM level indication if iModem is connected (the taller the bar the better the reception)
- ☐ Access to MMC/SD card - do not remove the card!

3.3 Menu

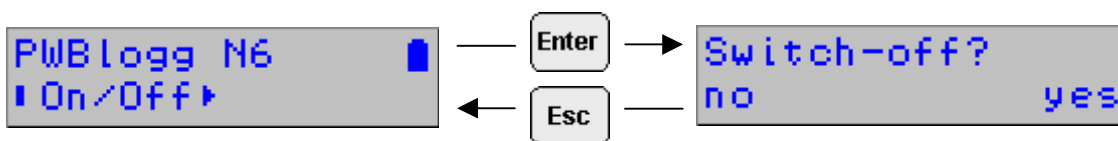
Special settings and function calls are made by the menu of the device. The menu can be reached from reading display by pressing ,Esc' or ,Enter'. The menu can be quitted by ,Esc' to return to the online display.

The menu appears in the second line of the display and provides following functions:

- On/Off
- Set to zero
- Reset Min/Max
- Print
- Parameter
- Settings
- Backup

Change-over between several menu items (in several submenus too) is done by arrow keys!

Ein/Aus



The menu item ,On/Off' enables switching on/off measurement.

Please note: This menu item is not provided at devices with On/Off switch!

If measurement is on, the question ,Switch off?' will appear. The query can be confirmed and measurement can be switched off by ,Enter', quitted without saving by ,Esc'.

If measurement is off, it can be activated in the same menu item. The question ,Switch on?' will appear.

Please note: If a password is activated, engaging/disengaging can only be done after the correct password is entered.

Set to zero

After confirmation by user, the current channel displayed will be set to zero, provided that it is a relative pressure channel which is calculated from absolute pressure connected to a device!

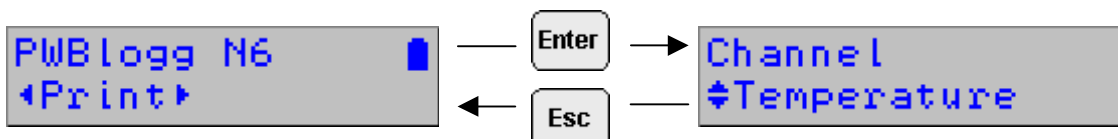
The transducer can be set to zero if it is pressureless and indicates a value different from zero or if based on current reading e.g. a potential pressure drop shall be logged (it is recommended to use the difference display in the infoline!).

Reset Min/Max

All minima and maxima of active channels are reset here to the current reading. At the same time the initial value of the difference display in the infoline is set and the measurement period is set to 00:00:00.

Print

Provides printout of the values by a connected printer (DPU414 / W25)



First of all, the choice between normal-, enlarged printout (zoom) or status reading is made. Subsequently, the channel to be printed has to be selected by arrow keys.

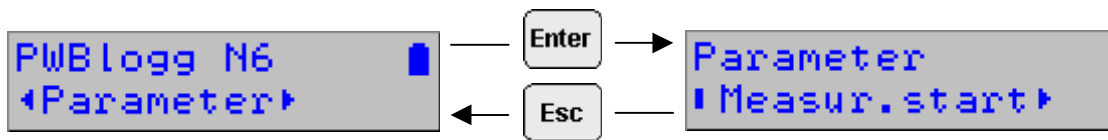
For further information on printing, in particular on W400 see also at **section 4**.

The ,Enter' key actuates print operation, ,Esc' cancels it at any time!

Parameters

The parameter entry for the data logger comprises primary parameters which can be set at measuring point. The dialog is password protected to prevent unauthorised access.

The information given at section 3.1 applies to setting the parameters!



Start measurement

The time of start measurement is set here. This parameter can be used e.g. for running measurement at several data loggers synchronously! The single fields (day, month, year, hour, minute) are selected by ‚Enter‘/‚Esc‘ and set by arrow keys. Long pressing (2s) ‚Enter‘ confirms input. The menu item is quitted without saving by pressing ‚Esc‘.

Interval 1

The period between two reading samples at normal operation (no threshold violation) is set here.

Interval 2

This interval determines the period between two reading samples in case of an alarm and serves as time basis for calculation and display of current flow values as well as for query status signals.

The connection between interval 1 and interval 2 requires that interval 1 is always an integer multiple of interval 2. The increments for setting interval 2 result therefrom. Interval 2 can not be longer than interval 1.

Storage type

Provides selection between linear memory and circular buffer. The linear memory stops reading logging once the memory is full. If circular buffer is used, the oldest readings are overwritten at full memory.

Storage mode (in standard menu only)

The storage mode determines at what time data are stored. It can be selected between ‚Store always‘ and ‚Alarmvals only‘ (threshold violations are logged only).

Sample mode (in standard menu only)

The sample mode defines sampling permanently in interval 2 in case of standard operation (alarm monitoring) or if it is switched over to sampling and logging in interval 2 only in case of alarm.

W400 (RLBK only)

This menu item is designed for setting/checking the W400 parameters. It is only activated at devices which were set up for realisation of a W400 test.

Short text

The ‚short text‘ entered can be changed here. Please note the details on entering texts (section 3.1).

Load from MMC

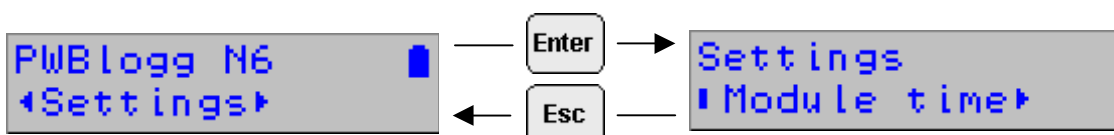
If data loggers are equipped with MMC interface, a parameter record can also be loaded from a MultiMedia-Card. For this purpose a configuration data file (kfg-file) has to be created initially. This menu item enables reading the file into the data logger.

Please note that the measurement start is not stored in the file. Hence a measurement start specification can only be done using measurement start dialog in parameter menu or online on PC!

Restart

Restart saves changed parameters and deletes data memory. Before data are deleted, an authentication mechanism appears to be confirmed by ‚Enter‘.

Settings



Module time

The system time of the data logger is set here (see also section 3.1).

Note: The memory contents of the data logger have to be deleted in order to set time! Hence the new time will be saved not until the authentication mechanism is confirmed and a password is entered (if set).

LCD

If turn-on-time is 90s, display automatically turns off 90s after last keypress. If 'Permanent' is set, display remains on as long as measurement is on. This option leads to higher power consumption and should only be activated at devices which are intended for short-term deployment (e.g. pressure tests).

LCD contrast

The contrast of the LCD is slightly dependent on temperature and can directly be set on the data logger by means of the arrow keys. This setting is displayed in percent.

Printer

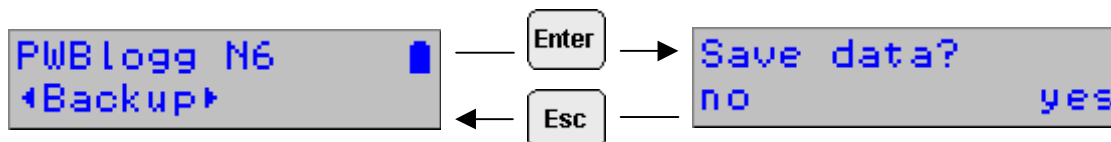
The type of printer to be used for optional printout of a thermal printer is set here.

Battery

Status is set to 100% here after battery change.

Backup

After authentication mechanism, a backup of measurement data on the memory card will be started. A flashing memory card symbol is displayed while saving. Access to submenu items is denied during storage process!



'Save data started...' appears as confirmation message on display. The memory card symbol flashes in the system status display of the online dialog while saving (3.2.3.).

Submenus can not be called while saving!

Status

Most important system conditions are displayed here. Each piece of information can be shown by means of the arrow keys.

Displayed are:

- Module time
- Memory (internal, entire- and free memory)
- MMC (memory available on MMC/SD and free memory)
- Operating hours
- Battery date and calculated remaining capacity
- Serial number of the data logger
- Year of manufacture
- Hardware version
- Firmware state

4 Output and calculation of W400 protocol files

Devices with RLBK menu allow input and change of W400 parameters as well as calculation of the resulting checking parameters. When printing out data (normal, zoom or status), the data logger automatically verifies if valid W400 parameters has been set. In that case most important W400 parameters are calculated by means of preset data and printed out on the thermal printer!

4.1 Contraction method

On the basis of the single check sections the specified pressure lowering ,dPerf' as well as the allowable volume change ,dVzul' are calculated and displayed. If dimensions of several section are different, the values of pressure lowering specified in table 6 of the W400 standard are weighted! The allowable volume change is calculated by using the formula specified in appendix A section A4 of the standard, without consideration of pipe tolerances!

4.2 Normal method

The normal method specifies fixed testing periods, testing pressures and allowable pressure drops for different materials and pipe dimensions (table 8 of standard W400).

The validity of parameters entered is verified. All sections have to feature comparable materials and dimensions! If all data are valid, the specified testing periods, the maximum allowable amount of drain relating to 1 bar measured pressure drop (total value has to be calculated on site!) as well as the allowable pressure drop are displayed.

4.3 Accelerated normal method

This method is only allowed for cast iron and steel with cement lining up to DN600! The amount of drain dVerf in ml as well as the minimum pressure drop dPmin which has to be set itself when drawing are displayed.

For all methods proceed as follows:

1. Entering general parameters on PC (test location, client etc.). These fields can alternatively be left blank to be able to fill in an on-site protocol.
2. Data transfer into a configuration file on MMC or straight into the device.
3. Input correction on device on site.
4. Printout of a ,status' protocol before test procedure which enables reading of test parameters on thermal printer protocol.
5. Test itself is carried out.
6. Printout of all relevant charts on site and evaluation of the test if necessary.
7. Postprocessing of the test at office including printout of a complete protocol.

Note: If several tests are carried out, a data backup has to be done before each test. For that purpose data are stored on MMC or read out by PC/laptop.

Reading of test parameters from MMC

The MMC allows reading of test parameters from a kfg-file. This file can be created on PC/PDA and stored on MMC. The menu item ,parameter'/'read from MMC' on the data logger enables data transfer into it. A kfg-file can comprise several parameter records. The selection of a parameter record is done by means of its number! So it is possible to prepare several tests on PC and transfer them into the data logger in succession to be carried out there.

5 Battery

5.1 Battery check

Two different battery types can be used for power supply of a data logger:

1. 9V E-block lithium battery PP3 with capacity of 1200 mAh
2. 7,2V lithium battery pack

The battery state is checked by the firmware of the data logger. All activities of peripherals are taken into consideration, i.e. the length of times in which the display is on or the data logger is online. The activities are acquired and included to evaluation of battery capacity. **The influence of very low temperatures to the available capacity of the battery pack can not be considered in respect of evaluation.**

The manufacturer gives an estimate of durability of the measuring system on request.

Measurement is stopped after falling below minimum voltage and the data logger is operated by energy-saving mode. Thereafter, a back-up battery provides power supply to avoid loss of data over a longer period (even if battery is changed). If battery capacity falls below 20%, battery should be replaced. Recycling of used batteries/rechargeable batteries is described in the paragraph „Recycling of batteries and old appliances“.

5.2 Battery change

We recommend, battery change should be carried out by manufacturer. Please consider following procedure if you want to change it by yourself.

- The battery you need is provided by manufacturer. The 7,2V-battery pack is equipped with a special pin-and-socket connector.
- Read out the stored data and deactivate measurement.
- Unscrew the cross-head screw of the housing.
- Loose pin-and-socket connector on battery pack carefully and remove the old battery.
- Place the new battery in the battery tray and fit it with the adhesive pad which is designed for it.
- Connect battery with pin-and socket connector of data logger.
- Close the housing again without crimping the connecting cable inside.
- Refresh battery date on menu of the data logger or by means of the oftware LDL-Soft.

General information note for battery change

The battery change should be carried out without any loss of data when back-up battery is intact. Reading out of data is only used as guarantee in case of a discharged back-up battery. A change of the back-up battery can only be carried out by manufacturer!

Please note:

When changing battery type (e.g. from BP2.1N5 to BP4.2N5), you must enter the different battery capacity in the data logger! Otherwise the battery state can not be correctly monitored!

6 Accumulator power supply

6.1 General safety instructions

Power supply of the data measurement and storage devices is done by a built-in lithium-ion accumulator. Take notice of the following safety instructions:

- Use the provided charger exclusively.
- Do not charge within explosive hazard areas.
- Do not charge near easily inflammable items.
- Do not short-circuit the lithium ion accumulator.
- Never extinguish burning accumulators by use of water. EXPLOSION HAZARD!
- Do not throw it into fire! EXPLOSION HAZARD!
- Do not charge unattended.
- Never open the cells. EXPLOSION HAZARD!
- Do not use damaged accumulators!
- When having skin contact to the electrolyte, rinse it at once by use of much water and soap and consult a doctor.
- When having eye contact to the electrolyte, rinse it at once by use of much water and soap and consult an eye doctor.
- Dispose of entirely discharged accumulators only.

6.2 Charging the built-in accumulator

- Use only the delivered original charger for charging the accumulator.

- Make sure that the input voltage, specified at the charger, equals the local supply voltage.
- The used power socket must be accessible during the entire charging process.
- While charging, the temperature must be between +10°C and +45°C.
- After use, separate the device from power network. Do not leave the device connected to the power network e.g. for several days. The device is principally intended for use with the internal accumulator.
- During charging process, the status LED's at the charger indicate the state of charge (red = charging, green = charging finished).
- An entirely discharged accumulator needs approximately 3 hours to be charged.
- You can get information about the accumulator's residual capacity via PC software PWB-Soft. To take care of the accumulator, you should deactivate measurement if you do not use it for a while by setting measurement start ahead. Ideally, you store the data logger with residual capacity of approximately 20 %, but never with discharged accumulator.

Note: Depth discharge leads to permanent damage of the accumulator!

When falling below minimum voltage, reading recording stops and the data logger is used in energy saver mode.

If its residual capacity falls below 20 %, then the accumulator should be charged at the latest. We recommend 100% charging prior to any use.

The accumulator must not be replaced by user. If a new accumulator is necessary for your data logger, send the device to the manufacturer for replacing it.

7 Use of MultiMediaCard (MMC/SD)

7.1 The MMC/SD in general

The optional MultiMediaCard (MMC) provides a backup option for data saved in the logger into a non-volatile external storage medium. As the MMC is automatically recognised by PC/laptop as removable medium, so measured data transmission is wireless.

Backup on memory card is optionally done by menu command or automatically. If an error occurs while saving data, the operation is stopped and an error message is shown. The result of the last automatical storage appears as error- or success message if measurement is engaged again.

If automatical storage is used, after 5 minutes the data logger tries to transfer data to the memory card again. This procedure is repeated 10 times at most. If no successful access possible, the card will be highlighted as invalid!

In order to rewrite the card, it has to be removed (if necessary after checking on PC) and inserted into the data logger again.

For purpose of evaluation of a reading file, the memory card including backup has to be inserted into the card reader of the PC/laptop. The reading file desired can be opened on your removable medium by means of the program LDL(PWB)-Soft.

7.2 Notes on avoidance of data loss

- When removing the card from the data logger, make sure that there is no access to the card at that moment (flashing card symbol on display)!
- Do not forget to use the Windows feature ‚Eject‘ before removing the memory card from your PC/laptop!
- A correct storage of collected measuring data on the external memory card is only guaranteed if memory cards supplied by Paul Wegener GmbH are used!

7.3 Use on data logger

The card should be formatted before using on data logger e.g. by means of the Windows feature ‚Format‘ in ‚My computer‘/‚File explorer‘.

Please note that the cards are only formatted using format FAT and FAT 32 respectively! Other file systems are not recognised by the data logger. Furthermore, older data loggers can only handle the FAT format. If the card shall also be used on older loggers, only FAT should be used.

After formatting, the card can be used on the data logger without any further preparations. Optionally, it is possible to transfer a configuration file (‚*.kfg‘ which belongs to the data logger) to the memory card.

When inserting the card into the data logger, the free memory space on the card is automatically determined.

Note: As this piece of information has to be determined by searching the free sections on the card, it can take some minutes, in particular, if cards with large memory capacity are used! During that time a flashing card symbol is shown on system status display.

You should not remove the card while searching!

7.4 Created files

Creating reading files on N6 devices is different depending on type. Devices with standard menu store data consecutively. It can be done manually or automatically in day- and year files.

In order to create reading files manually on the data logger, the menu item ‚Backup‘ is provided (section ‚Menu‘). Each data logger uses a dedicated directory for its files which corresponds to its serial number. Files of type ‚*.PWB‘ are created within this directory. The filenames are automatically created by the current date (year, month, day - e.g. ‚20071015.PWB‘).

For devices with standard menu only:

File names are automatically created after the current date (year/month/day - e.g. ‚20071015.PWB‘).

It is advantageous that the file can be definitely assigned with the option of a simple sorting as well as a definite creation of the filename. If data are manually or automatically stored several times a day, new data are attached to the already created file!

If the option ‚Storage daily‘ is set (preset), last data are written into the day file at midnight every day. Subsequently, a new file is created. Otherwise a new file will only be created at full memory.

Additional to the day files where all readings are stored, a year file is created on the memory card where readings every 15 minutes are written into or in case of a threshold violation current readings are written into. This file is named after the year (e.g. ‚2007.PWB‘).

For devices with RLBK menu only:

Devices with RLBK menu basically store on demand via menu only. Consecutively numbered files are created here (e.g. ‚DAT_0000.PWB‘). The file number increments consecutively up to 9999 after every successful storage process.

Note: If the memory card is accessed, a flashing memory card symbol appears on display. The card should remain inserted in the device as long as this symbol flashes! Otherwise, the card can be damaged!

It is recommended to assign definite names to the subdirectories (principle of the data logger) when transferring data to PC, so file names can easily be assigned to the respective data logger and hence the risk of having similar file names is reduced.

8 Notes on use of printer PORTI-W 25

Additional to the printer PORTI-W25, there are a paper roll, a connecting cable to the data logger and a charger. Interfaces for power supply and communication are at the printer.

The printer must be switched off before cables are plugged!

Changing paper roll

Please make sure that paper dedicated to the thermal printer is used only.

1. Switch off the printer.
2. Open the cover of the paper roll. For that purpose, press at both sides until the locking device is loosened.
3. Remove the blank roll.
4. Insert the new roll.
5. Be sure to note the correct running direction.
6. Pull a small amount of paper and then close the cover.
7. Tear off the paper.
8. If the last printing process was incomplete, print again.

The configuration of the printer was done by manufacturer and it must not be modified.

Operating the printer

The paper is advanced on line by pressing the FEED button. The POWER LED is on whenever the printer is on. When the battery is almost exhausted, the LED flashes with red colour occasionally. In this case, you must recharge the battery by using the power supply unit. A flashing ERROR LED indicated an error such as paper end, cover open etc.

Self test

The self test checks whether the printer has any problems and checks the following:

1. Make sure paper roll has been installed properly.
2. Turn on the power while holding down the FEED button.
3. The self test prints the current printer status, which provides the control ROM version and the communication method setting.
4. After printing the current printer status, self test printing will print a pattern using the built-in character set.
5. The self test automatically ends. Now the printer is ready to receive data.

Miscellaneous notes

1. Do not pull the paper out when the cover is closed.
2. Because the thermal elements of the print head are easy to break, so do not touch them with any metal objects.
3. Since the areas around the print head become very hot during and just after printing, do not touch them.
4. Do not use the cover open button except when necessary.
5. Do not touch the surface of the print head because dust and dirt can stick to the surface and damage the elements.
6. Only dedicated thermal paper should be used.

Chemicals on thermal paper as well as touching the prints with metal objects can cause discoloration. When storing thermal paper in a card case or sample notebook, be sure to use only products made of polyethylene, polypropylene or polyester. If thermal paper touches diazo copy paper immediately after copying, the printed surface may be discolored. Thermal paper must not be stored with the printed surface against each other because the printing may be transferred between the surfaces. **The thermal paper should be protected from high temperature, humidity and light.**


Specifications

Print methode	direct thermal line printing
Dot density	203 DPI
Printing width	104 mm
Paper width	117 mm
Characters per line	80
Printing speed	35 mm / sec
Receive buffer size	10 KByte

Note: Printing speed may be slower, depending on the data transmission speed and the combination of control commands.

Supply voltage	AC adapter: 8.6 DCV / 1.2 A Battery: 7.2 V / 1.2 A
Ambient conditions	Temperature: 0°C - 40°C (operating) -10°C - 50°C (storage) Humidity: 30% - 80% (operating) 10% - 90% (storage) (does not apply to the paper)

9 Technical specifications

Analog inputs	max. 4 inputs 0..3 V, optional 0..20 mA, 4..20 mA, 0..1 V or 0..10 V recording when sampling interval is adjusted
Counting inputs	max. 4 inputs for floating distance contact or voltage pulse pulse width > 10ms, max. 50 pulses per second, logging of meter readings and flows
Data memory	256kB, optional up to 496kB optional changeable memory card (MultiMediaCard up to max. 2GB)
Limit value	adjustable upper and lower limit value for each analog channel
Sampling rate	freely adjustable 1s to 1h
AD converter	8 bit (256 digital levels, $\pm\frac{1}{2}$ LSB) 12 bit (4096 digital levels, ± 1 LSB) 14 bit (16384 digital levels, ± 1 LSB) 16 bit (65536 digital levels, ± 1 LSB)
Real time clock	deviation 5 ± 23 ppm ($\Delta f/f_0$) at 25°C
Storage mode	ring memory mode(overwrites oldest data at full memory or linear memory mode (stops at full memory)
Interface	RS232-interface or RS485 (full duplex), 9600 Bd maximum 57600 Bd at reading data minimum 2400 Bd at printing via mini printer 8 data bits, 1 start bit, 1 stop bit, no parity check
LCD display	2 x 16 characters, contrast and display duration adjustable
Power supply	9V E-block lithium battery PP3 (capacity 1200 mAh) or 7,2V lithium battery pack (capacity 16500 mAh)
• Explosion protection	 II 3G Ex ec [ic Gc] IIC T4 Gc X (optional)
• Environment	-20°C ≤ Ta ≤ 60°C pollution level 2

Electrical parameters for intrinsically safe status and counting inputs (maximum values per circuit):

Voltage U0: 9,2 V
 Current I0: 9,3 mA
 Power P0: 21,4 mW
 Capacitance Ci: 1 nF
 Inductance Li: insignificant

Maximum allowed external capacitance and inductance at ignition protection Ex ic IIC:

Capacitance C0: 36 µF
 Inductance L0: 925 mH

Please note the regulations for the wiring of intrinsically safe circuits!

9.1 EMC

In accordance with EN 61000-6-3 (emitted interference in living quarters) and with EN 50081-2 (interference resistance in industrial field).

9.2 Standard transducers

Transducer type, dimensions	Measuring ranges	Class / Deviation
Temperature transducer, integrated in controller	-40..40 °C to -20..60 °C	±1 K
Temperature transducer Ø 6 mm	-20..60 °C	±1 K
Pressure transducer, Ø 40 mm, connection G½	0..50 mbar to 0..70 bar	±1,0%
Pressure transducer, Ø 25 mm, connection G½	0..40 bar to 0..400 bar	±1,0%
Pressure transducer, Ø 25 mm, connection G½	0..1 bar to 0..400 bar	± 0,5%
Counting/status input	(potential-free contact;	max. 50 Hz)

All transducers are delivered with 1m cable. Longer connecting cables are possible.

9.3 Data memory

Storage times of the internal memory result from the number of channels occupied, from preset sample intervals 1 and 2 as well as from storage and sample mode. If the reading resolution is > 8 bit (12, 14 or 16 bit), possible storage times will halve themselves. The signal inputs cause different memory requirements (analog-, state- and pulse inputs). We can do the preliminary work for you for each of the combinations of those parameters occupied.

10 Recycling batteries and old appliances

Used electric appliances, batteries and rechargeable batteries are subject to particular statutory provisions. Batteries, rechargeable batteries and electric appliances must not be disposed with the household waste. The end user is obligated to return them by the law. Used electric appliances, batteries and rechargeable batteries can be disposed at collecting points, municipal disposal areas or by manufacturer / supplier.

The DRUCK & TEMPERATUR Leitenberger GmbH as seller of batteries and electric appliances fulfills its take-back obligation and disposes used batteries and old electric appliances free of charge. This take-back obligation, however, limits itself to used electric appliances, batteries and rechargeable batteries which belong or belonged to the product range of the Leitenberger GmbH and the amount which was delivered by the DRUCK & TEMPERATUR Leitenberger GmbH. The end user bears the forwarding charges.

EU-DECLARATION OF CONFORMITY

Product name:

LDL 5xx

The specified products are in compliance with following European directives.

2014/30/EU electromagnetic compatibility

2014/34/EU equipment and protective systems intended for use in potentially explosive atmospheres

and have been developed and tested using the following standards:

EN 61000-6-3:2011-09 subject basic standard for emitted interference – emitted interference for living quarters, business- and trade areas as well as small firms

EN 61000-6-2:2011-06 subject standard for interference resistance – industrial sector

EN 60079-0:2019-09 electrical equipment for potentially explosive atmospheres, section 0: general requirements

EN 60079-7:2016-08 potentially explosive atmospheres - section 7: equipment protection by increased safety „e“

EN 60079-11:2012-06 explosive atmosphere - section 11: equipment protection by intrinsic safety „i“

Marking as category 3 - equipment for use in gas explosion-hazard areas of the zone 2:

 **II3G Ex ec [ic Gc] IIC T4 Gc X**
-20 °C ≤ Ta ≤ +60 °C

Manufacturer:

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The safety advice of the product documentation must be followed!

Kirchentellinsfurt, 07.10.2022



Managing Director

11 Troubleshooting

Problem	Measure
Software reports: „No modules found!“	Check the following: <ul style="list-style-type: none"> • if correct interface chosen • if cable to data logger and PC is connected properly
No data stored in controller	Check, if: <ul style="list-style-type: none"> • a pre-set starting time is reached and measuring is activated • battery is functional • all transducers and cable are functional • readings are shown on LCD • moisture is intruded in the data logger
Battery is low	Change battery or have it changed by manufacturer
Password forgotten	Read out measuring data, send reading file to manufacturer
No connection possible via modem	Check on PC as well as on data logger if: <ul style="list-style-type: none"> • power supply of the modem is functional • modem and data logger or PC are connected properly • modem is initialized correctly on PC or on data logger • correct type of modem was selected in dialog „settings“ when configuring If you use a GSM modem, check in addition if: <ul style="list-style-type: none"> • the correct PIN number entered into configuration of data logger and/or in settings on PC In case of error messages in modem dialog of software, check if: <ul style="list-style-type: none"> • initialization parameters are supported by your modem
Software does not read measuring data completely or reports errors when reading out the data	Check, if: <ul style="list-style-type: none"> • all cable connections are made properly • moisture is intruded in the data logger • battery of data logger is functional Connect it directly again (menu item „module/connect“) and start reading measuring data again Modern computers have power management functions. During shutdown of hard disk or change into standby mode the CPU can be busy temporarily, so that it „oversleeps“ the sent characters. This leads to abort of reading out. If necessary, stretch times for activating standby functions or switch off the power management.
Not enough memory	Data backup has to be done. Delete or rather format the card.
Could not create MMC file	General error message if write/read problems on the card occur. Maybe wrong file system or card is not readable.



DRUCK & TEMPERATUR Leitenberger GmbH

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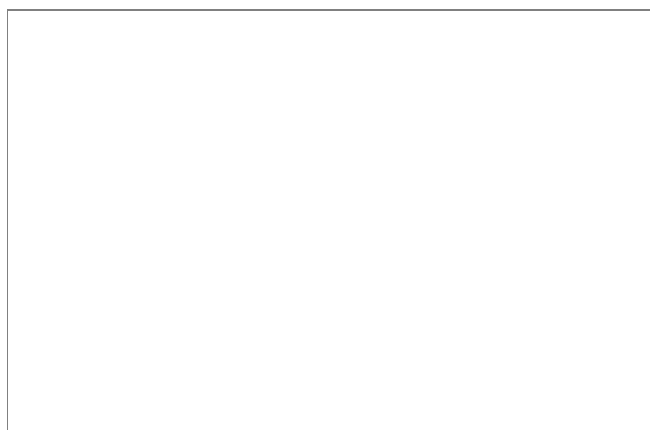
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DRUCK & TEMPERATUR LEITENBERGER

Operating manual

Data acquisition system

LDL 5xx

PC Software

PWB-Soft 3.0 Basic

PWB-Soft 3.0 Plus

PWB-Soft 3.0 Pro

For Windows

for data logger LDL 540 and LDL 550

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1 Setup

To be able to operate the Windows software PWB-Soft, the following requirements must be met:

- Windows as of version Windows XP or newer version
- CD-ROM drive

The present quickstart instruction applies to following current software versions:

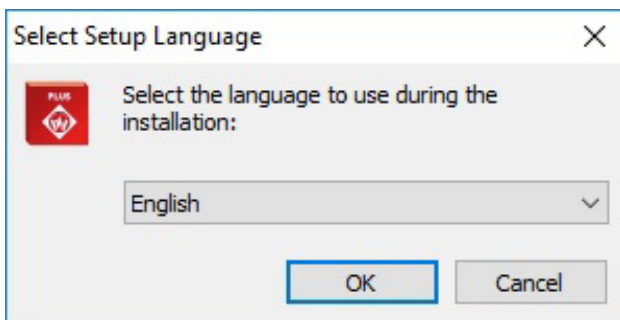
PWB-Soft 3.0 Basic

PWB-Soft 3.0 Plus

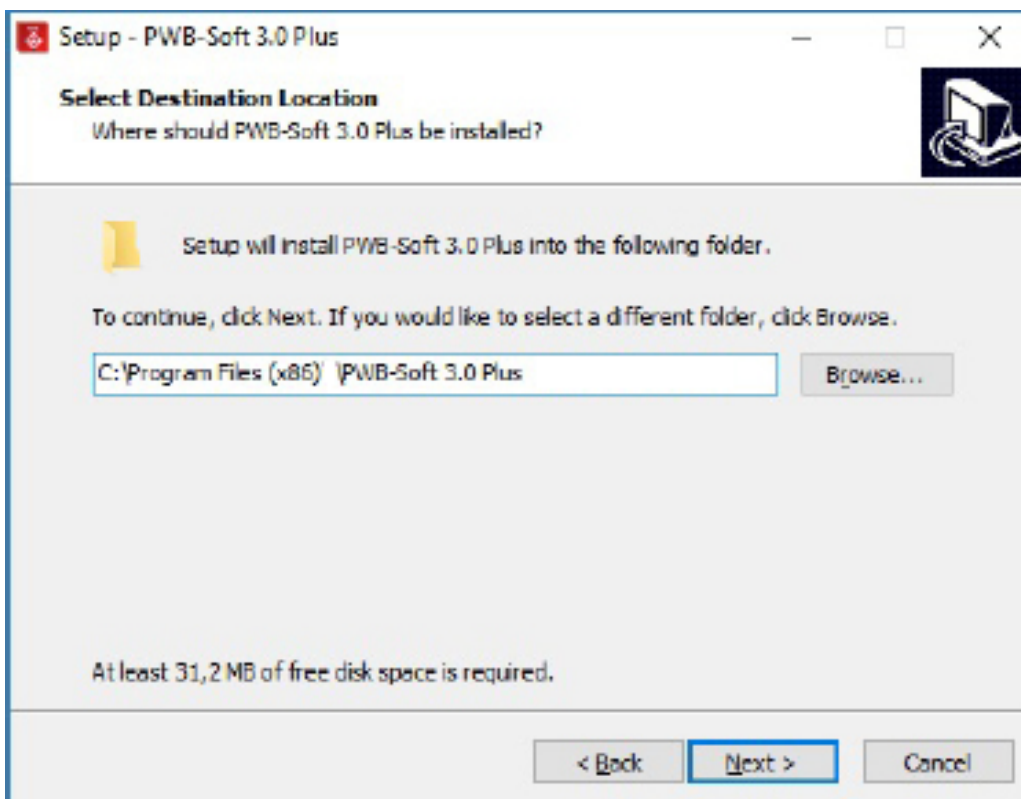
PWB-Soft 3.0 Pro

1.1 Software setup

Please insert the CD and start the program Setup PWB-Soft 3.0.



After confirming by „OK“, the setup assistant will appear which leads you through setup. When using the dialogue for selecting the license file PWB.ini, ensure that you select the correct file. Confirm the individual dialogues. The path to the destination folder can be changed (not recommended).



Finally, verify your specifications and start setup using the button „Install“.

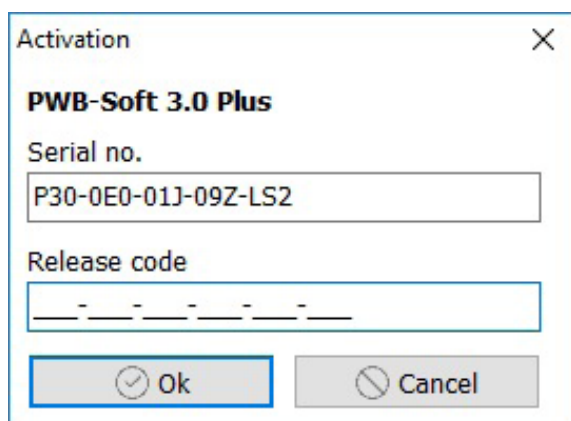
After setup has been done, you can get the software started automatically.

Instructions für subsequent software updates without administrator rights:

1. Do not install the software in the Windows program folder, but e.g. under C:\PWB-Soft.
2. The administrator must enable the software and the update program in the firewall (e.g. calling the function „update“ once after installation).
3. The program option „execute as administrator“ must be deactivated.

1.2 Software activation

When starting the program the first time, you must activate the software via dedicated activation code. You will find the code in the delivery note and as label inside your CD cover.



The screenshot shows a dialog box titled "Activation" with a close button (X) in the top right corner. The dialog contains the following text and fields:

- PWB-Soft 3.0 Plus**
- Serial no. field containing the text: P30-0E0-01J-09Z-LS2
- Release code field containing a series of dashes: _ _ _ _ _
- Two buttons at the bottom: "Ok" (with a checkmark icon) and "Cancel" (with a circle and slash icon).

If you do not have the code to hand, you can start the software in the demo mode via „Cancel“. You can open and evaluate a file there. But reading and parameterising devices can not be done there.

1.3 USB online cable installation

You find the link for the driver in the email on your order. Download it and start start the executable file and follow the instructions.

If you ave received a CD, you will find the driver in the folder „USB Drivers“. Open the subfolder „Driver USB - FTDI 2.12.xx“ and start the program „CDM212xx_Setup.exe“.

You also have the option to find the latest driver for your operating system on <http://www.ftdichip.com>.

Select the link „Drivers“ here and under it the link „VCP Drivers“. You will find the appropriate driver for your operating system in the table „Currently Supported VCP-Drivers“. The column „Comments“ provides a link to an executable file in each case („setup executable“). When using this link, you only need to download the provided file. The driver will install itself automatically and your cable will be automatically recognized when plugging it next time.

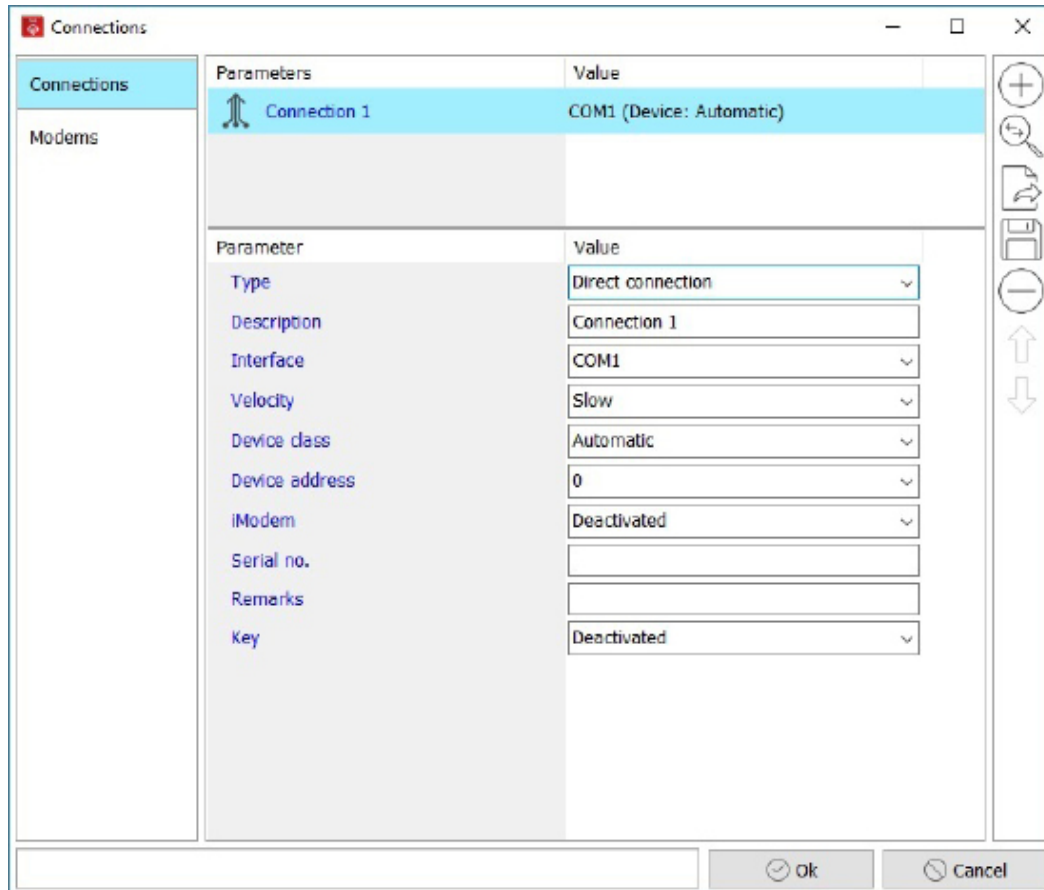
2 First steps

After software and online cable installation have been done, the software must be customised for the first use. For this purpose, plug the USB cable at any USB port of the PC and start the software.

2.1 Setting a connection

To configure the software, open the settings dialog (menu „Program“ → „Settings“ → „Connections“).

Following window will open itself:



Initially, an entry for the USB online cable must be made. Leave the other settings unchanged for the time being.

You can get any available interface established by the software (pressing the button „Automatic“, or make the entries manually. When automatically setting, any available interface will be entered, even if it is not used for connection to a device!

Manual setting connections:

Select „Connections“ and thereafter push the button 


A list including the parameters of the new connection will open itself.

Type	Direct connection
Description	Connection 1
Interface	COM1
Velocity	Slow
Device class	Automatic
Device address	0
iModem	Deactivated
Serial no.	
Remarks	
Key	Deactivated

Description

Enter a description text on the interface here. The connection is named as „Connection 1“ as example. The description „USB online cable“ would also be useful.

After entry confirmation, the new description will also be used as node description.

Parameters	Value
 USB Online Cable	COM1 (Device: Automatic)


Parameter	Value
Description	USB Online Cable

Type

The connection type is specified here. The default „Direct connection“ is the correct setting for an USB online cable.

Interface

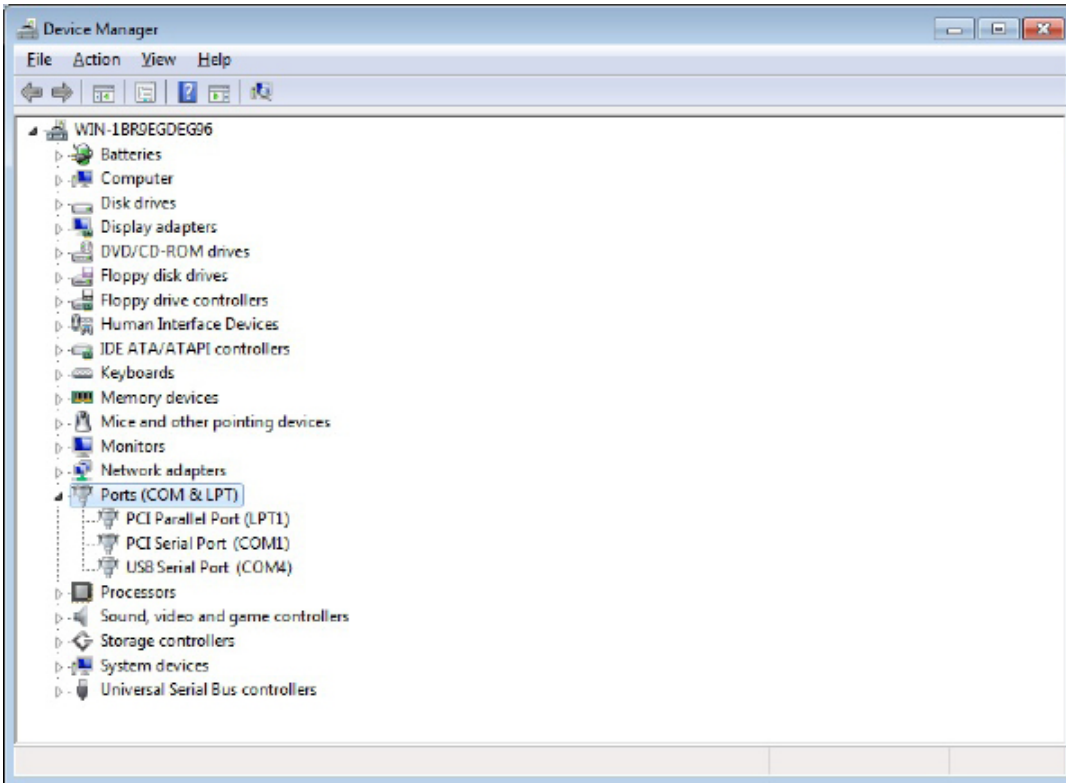
Here is specified which interface number is used by the USB online cable. The choice is created as drop down menu and includes the entries „COM1“ up to „COM50“. When, upon software start, a USB online cable was found, then the respective COM number in the list will be marked as USB port. The following example shows the connection to „COM 10“. Select the valid entry for your PC.

Parameters	Value
 USB Online Cable	COM1 (Device: Automatic)

Parameter	Value
Type	Direct connection
Description	USB Online Cable
Interface	COM1
Velocity	COM1
Device class	COM2
Device address	COM3 (USB)
iModem	COM4
	COM5
	COM6
	COM7
	COM8

Note:

The COM number for the USB cable can also be seen in the PC’s system control. When using Windows 7, simply enter „Device Manager“ in the description field of the start menu and confirm it with „Enter“. When using Windows 8, press the „Windows key“ and „X“ to call the system menu where you can start the „Device Manager“.



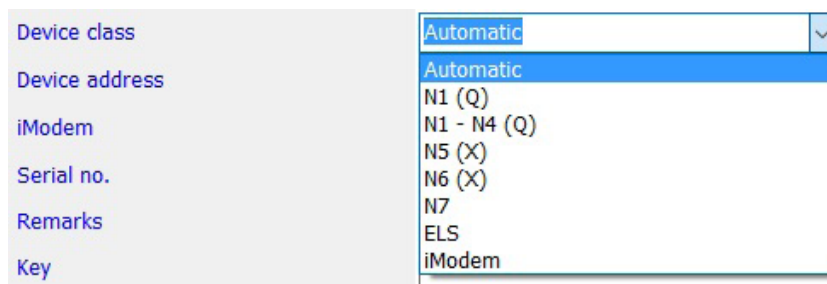
You will find the entry „USB Serial Port“ including the dedicated COM number under „Ports (COM & LPT)!

Velocity

You can specify the data reading velocity of a device connected at the respective interface. When using N6 data loggers, you can set the velocity to „very fast“. Older ones or loggers equipped with infrared interface can only be read with „normal“ velocity“.

Device class

Selecte the type of the connected logger here. If you have different devices in use, set the device class to „automatic“. Otherwise, you can specify the device type here (e.g. N6).



Device address

Any data logger has a device address, which enables connecting several data loggers within a logger network. This one is factory-adjusted and „0“ in general. For individual loggers, always specify „0“ or „automatic“ here. Different settings should only be made within a logger network.

iModem (versions Plus, Pro)

If devices are supposed to be connected to an iModem, then you can select the iModem type (iModem or iModem3/4) under „iModem“. There is also an „Automatic“ choice possible. If you select *iModem* under „device class“ as you intend to parameterise an individual iModem, then you only have to select the modem type here.

Note:

Leave „iModem“ deactivated if you don't want to make modem settings or if you connect devices without an iModem. Otherwise, the software unnecessarily tries to read parameters of the not connected modem! Hence, establishing connection would take longer!

Serial no.

The serial number is just a comments field at present, which you can use to enter the serial number of the logger to be connected. This entry has no further use in the program at the moment.

Remarks

This field is available to store information on the interface. When using modem connection, duty cycles of the receiver can be entered here.

Key

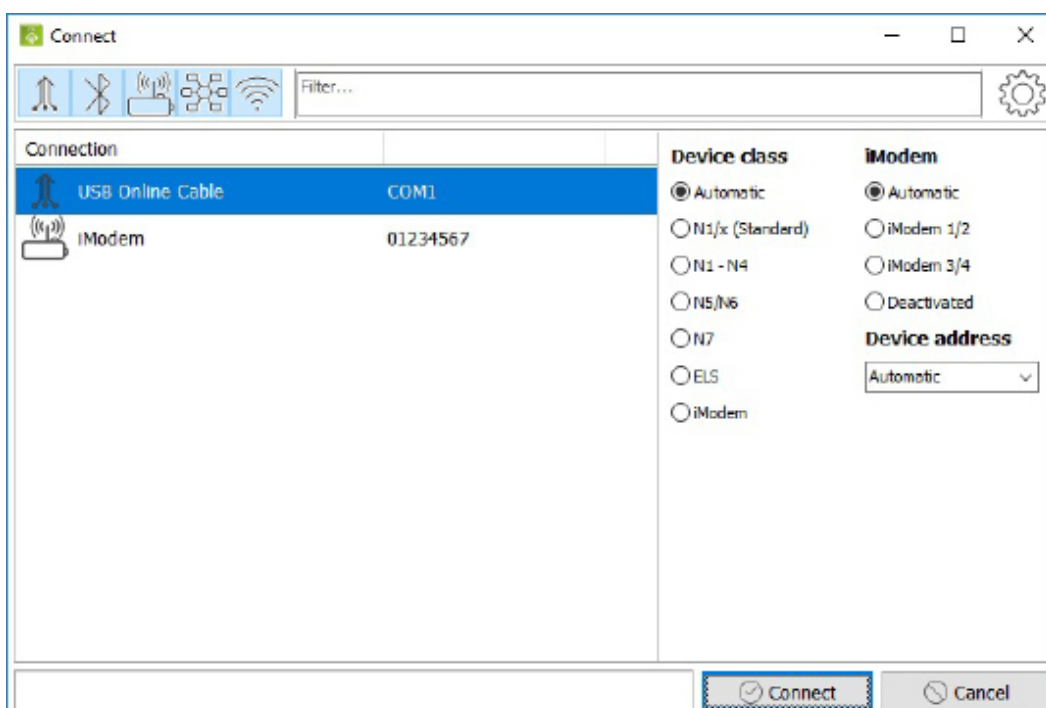
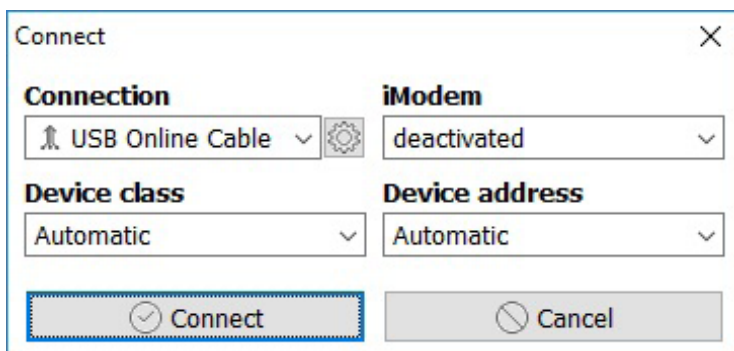
You can assign a quick start key to the connection. The numeric keys 0...9 can be occupied for this purpose. When pressing one of these assigned keys, then the software will start a connecting attempt using the specified connection!

The here introduced settings are only for the new installation of the software and for preparing data logger connection. Further advice on software settings are described in the chapter „Settings“ of this manual.

After setting your 1. connection, quit the settings dialog via „OK“

2.2 Connecting and reading data logger

A standard dialog and an advanced dialog are available here. After setting the connection, the data logger can be connected and read at the specified interface. Push the button „Connect“.

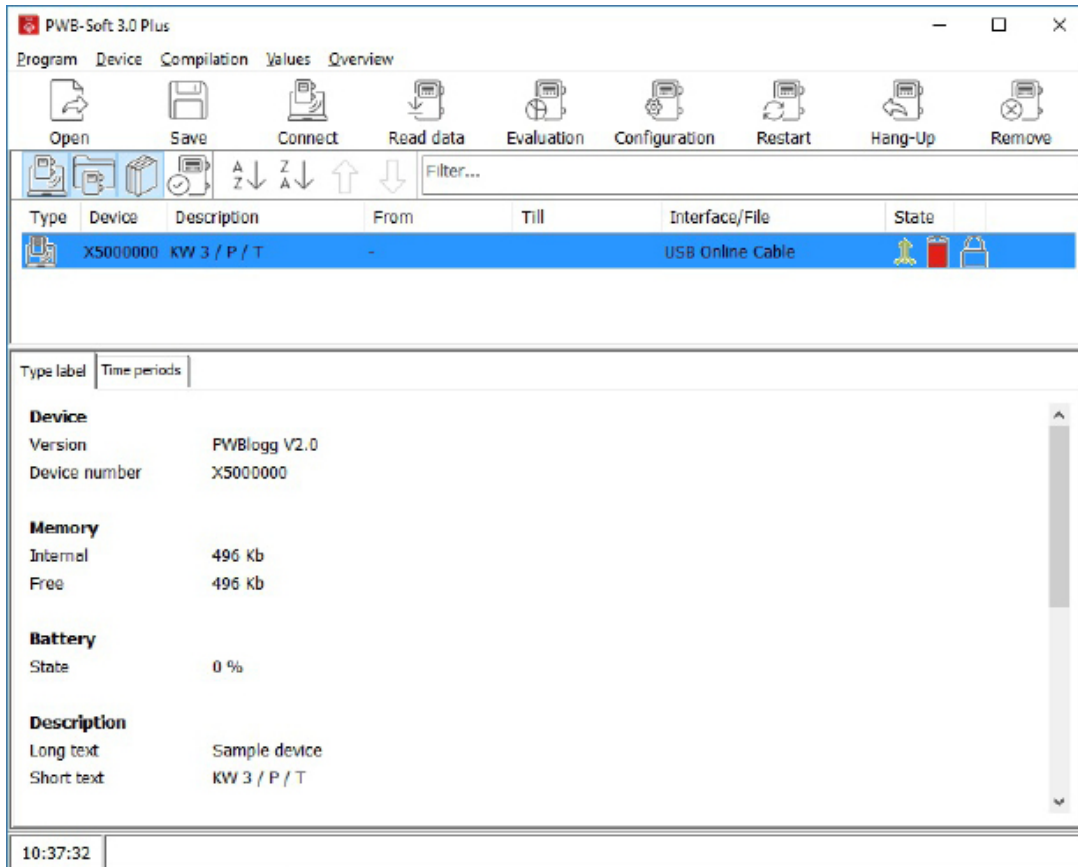


Initially, the chosen connection dialog will appear showing important defaults which can be specified again and adapted. Changes made here become defaults for the next connecting attempt.

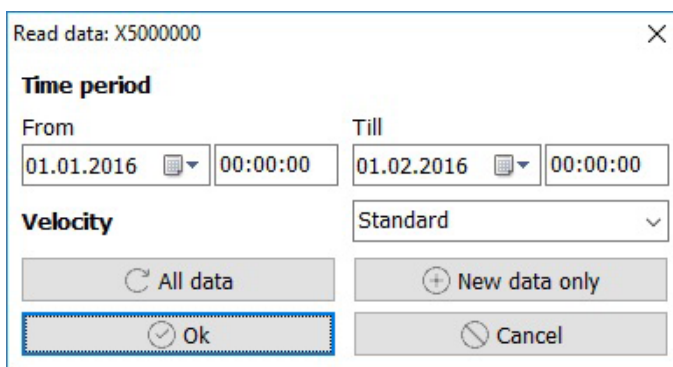
The drop down menu „Connection“ includes any connection specified in the settings dialog. The example shows the just now specified connection „USB Online Cable“.

If you use the button „Connect“, a data logger will be searched at the specified interface.

After establishing connection, the data logger will appear in the device list. The below shown type label shows information on specified logger parameters and current status information.

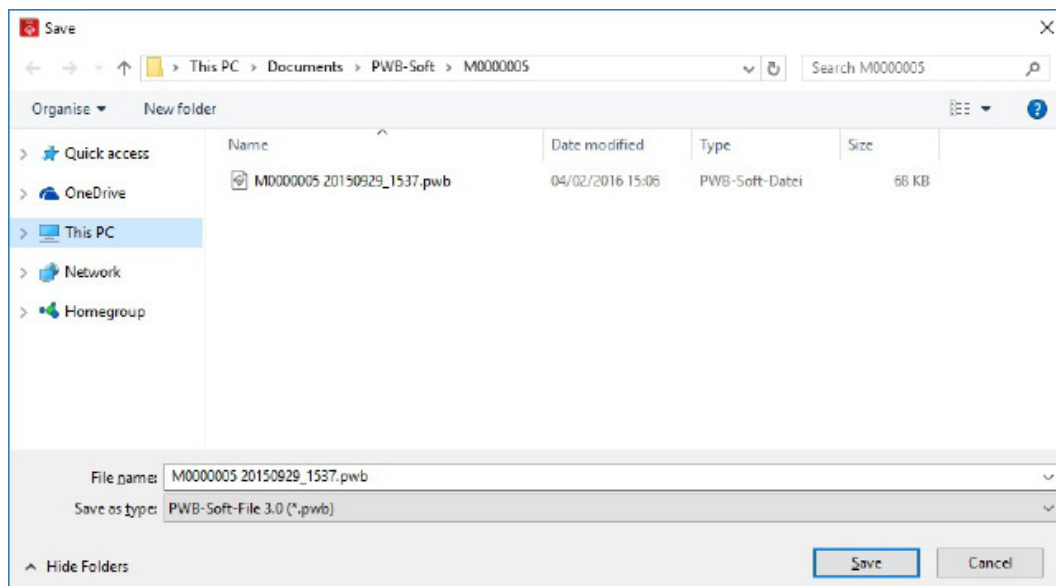


After successfully establishing connection, performance data of the logger can be read. For this purpose, use the button „Read data“.



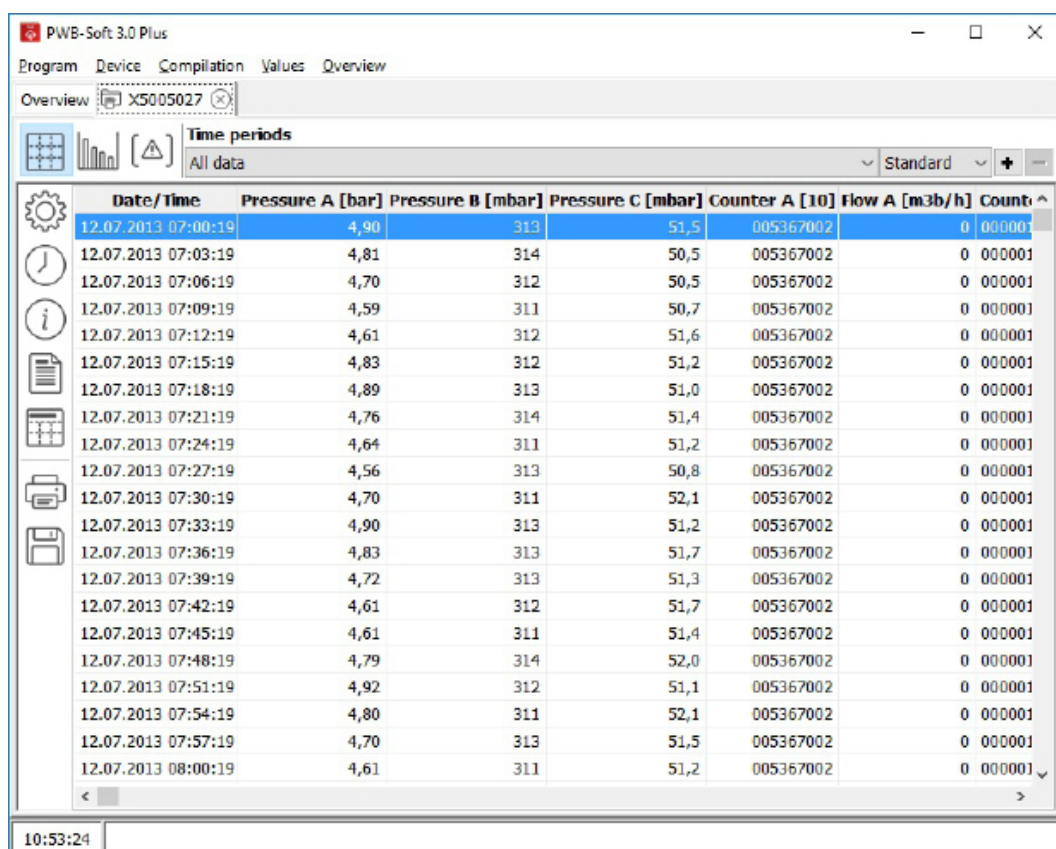
The dialog on reading the device shows the found data range. Clicking on „OK“ starts reading the data of the shown period. The period can also be restricted to read part of the saved data only. You will find further information in chapter „6 Reading and restarting data logger“.

The dialog „Save“ appears after any reading process. The just read data can be saved in a file here. If the saving process is not necessary, you can quit the dialog by „Cancel“. Anyway, data will be available for evaluation.



2.3 Data evaluation

After data reading, you can evaluate them tabularly and graphically using the button „Evaluation“. A register will open itself showing the read data tabularly.



The button  opens the chart.

You will find notes on using the evaluation dialog in chapter „6 Reading and restarting data logger“.

3 General notes on the software PWB-Soft

3.1 Comparing the software versions

There are 3 PWB-Soft 3.0 versions currently available. All of them are fully capable to parameterise and read data loggers of the PWBlogg family.

The elementary version is the PWB-Soft 3.0 Basic. This can be used for parameterising, reading and evaluating individual data loggers. It is suitable for normal station monitoring including regular readout on site or for further simple measurement tasks.

The version PWB-Soft 3.0 Plus can be used, in addition to operating and evaluating data loggers, for remote data transmission. This software provides options on parameterisation of PWB-iModems as well as for establishing remote data transmission connections to station loggers equipped with modem. Furthermore, this software, if necessary, creates an overview of several files or connections, so that performance data of important loggers can always be retrieved after program start. New performance data can simply be added to already existing ones.

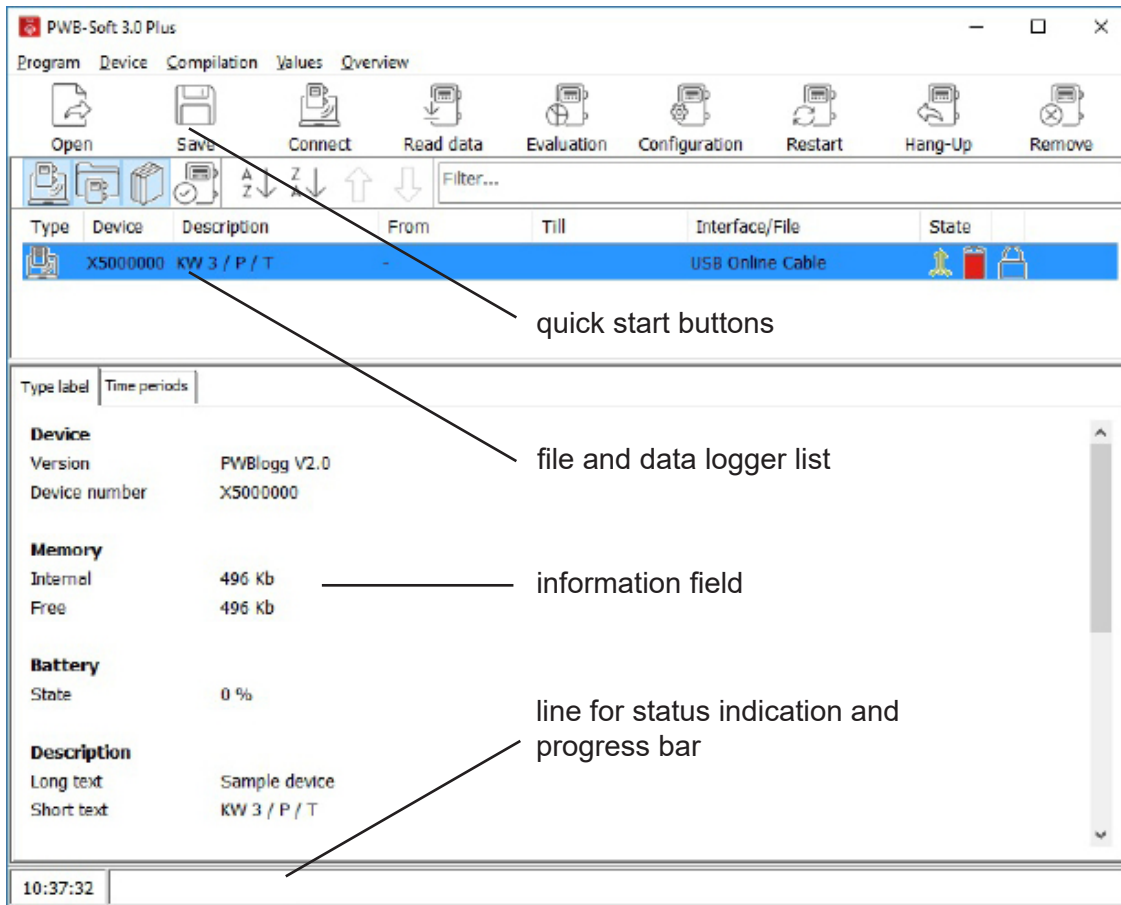
The version PWB-Soft 3.0 Pro also provides the comfortable availability of data records in form of data library entries. These entries can be used for convenient data evaluation e.g. data history of the last 4 weeks. Furthermore, the „Pro“ version includes „compilations“ which are able to create virtual data loggers which can obtain data from data library entries of different loggers. So e.g. flow channels of different loggers can be compiled in one „virtual“ logger. Even calculated channels can permanently be created this way. Reports (e.g. as spreadsheet files) on available data can once or regularly be created.

Overview of the crucial functions of the software versions

	Basic	Plus	Pro
Data logger read/ parameterise	x	x	x
Files open/save/ export	x	x	x
Evaluation/tabular graphical	x	x	x
Online view of logger data	x	x	x
Remote data transmission via modem/TCP/IP	-	x	x
Station management	-	x	x
Several files/data records evaluation at once	-	x	x
Data storage in data libraries	-	-	x
Creating virtual data loggers (compilations)	-	-	x
Report (automatable)	-	-	x
Attaching documents	-	-	x

3.2 Central operating window

When starting the software, its main dialog will open (all versions resemble each other). The „Plus“ version is shown below.


















The operating buttons „Open“, „Save“, „Connect“, „Read data“, „Evaluation“ and „Configuration“, as in the example, provide (in all software versions) quick access to most important software functions on reading files and reading and parameterising data loggers.

After establishing connection to a logger or after opening files, the information field will include the „type label“ of a data logger with essential parameters and status information. The „Plus“ and „Pro“ version also have a list view where any opened file, data logger, data library entry and compilation are shown. Choose one of the entries, then any relevant information on it will be shown at the type label area.

When using the „Basic“ software, only one data logger can be connected or only one file can be opened. The file and data logger list is not applicable here. Only the type label is shown.

After using the button „Evaluation“, the „Basic“ version will open a separate evaluation dialog, whereas the „Plus“ and „Pro“ version's evaluation window of a chosen entry is in the main dialog integrated as register. Thus, if necessary, changing between several devices can quickly be done here.











If one entry in the list is highlighted and the right mouse button is used, a popup menu will appear including crucial menu functions on the chosen entry (e.g. to call „Configuration“, „Evaluation“ or to „Save“ performance data).

Type	Specifies, whether data are from a reading file (), from a connected device () or from the data library () (PWB-Soft 3.0 Pro) or whether it is a compilation() (PWB-Soft 3.0 Pro). Clicking on ▼ opens a selection of listed types.
Device	The serial number of the device.
Description	The short text or the station description of the device.
From/till	The period where readings of the device are available in the program.
Interface/file	The interface which connects the program with the device, or the name of the reading file.
Status	Connection status: the program is connected with the device (  green) or not connected ( red). Double click on connecting status changes it.
  	Battery status of the device.
	An evaluation window is opened for the device.
 	Specifies, whether the device is locked () or whether it can be removed (). If nothing different is selected, unlocked devices will be removed from the overview at the end of the program.

A double click on a device opens a list of existing reading periods. In the first place there is always the range above *all data*, thereafter the periods developed from measurements on the device, as well as the additionally defined ones. A double click on a period opens the dedicated evaluation window.



A right mouse click opens a command menu to administer the periods, to add device groups, compilations and data library entries. Overview entries can be highlighted and moved while having pressed the left mouse button.

When activated, there will be a sorting bar at the top border of the overview.

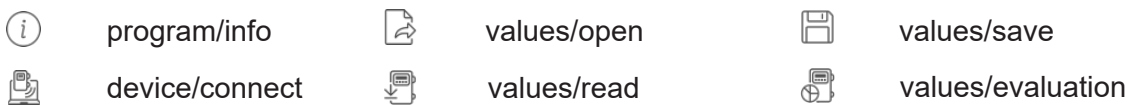
	Shows/removes connected devices of the overview.
	Shows/removes devices of the reading files in the overview.
	Shows/removes devices of the data library in the overview (PWB-Soft 3.0 Pro).
	Shows/removes compilations in the overview (PWB-Soft 3.0 Pro).
	Sorts overview ascending as per chosen information column.
	Sorts overview descending as per chosen information column.
	Moves device position up by 1 (alternative: Ctrl + arrow up).
	Moves device position down by 1 (alternative: Ctrl + arrow down).
Filter	When entering text in the filter, only those devices are shown where the text is included in <i>device</i> , in the <i>description</i> or in <i>interface/file</i> . The filter can also be called without shown sorting bar by Ctrl + F.
	Resets the filter.
	When activated, hidden entries are also shown in the overview.

To facilitate administration, devices can be grouped (version „Pro“).

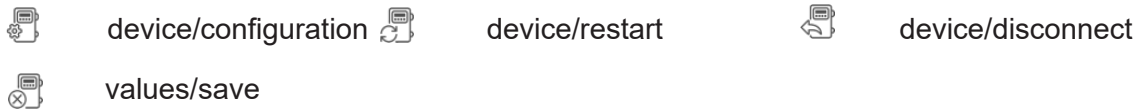
Buttons in the status bar:

	activates/deactivates the report
	switches data library update over between manual and automatic

The freely combinable toolbar at the top of the dialog window contains most frequently used menu commands. When moving the mouse pointer over the buttons, a legend on the respective function will appear:

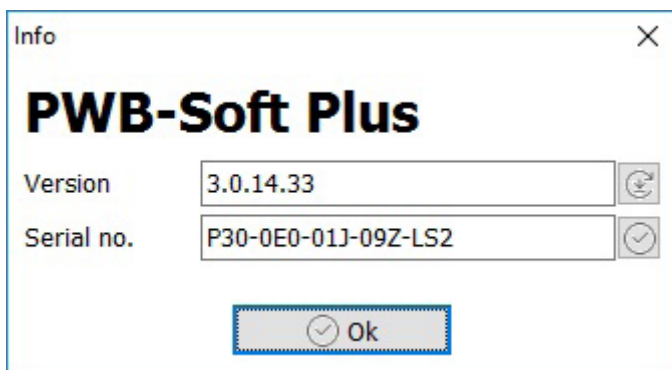



PWB-Soft 3.0 Plus, PWB-Soft 3.0 Pro only:



3.3 Program version, updating

The „Info“ dialog (menu „Program“ → „Info“ or via PWB symbol in the quick launch toolbar) is available in all software versions and, besides program type and serial number, it also shows the software version number.



The button  starts searching for a current program version which can be automatically loaded and installed (having necessary rights).

4 Settings

The menu item „Program“ → „Settings“ calls the settings dialog of the software. Any important setting is made here. The range of setting options varies, depending on the software version. Settings which are only possible as of version PWB-Soft 3.0 Plus, are hereinafter marked with „(Plus)“. The ones which can only be made in the version PWB-Soft 3.0 Pro are marked with „(Pro)“!

4.1 General

The parameters to be adjusted here include the time basis (*program time*) used in the program. The system time (PC time) or a defined time basis (UTC - universal time coordinated) can be set here. UTC+1 corresponds to the wintertime in Germany. If data loggers are supposed to be operated using wintertime only, then it would make sense to set the program time to UTC+1. When transmitting the time to a data logger, the wintertime is used even on a PC where daylight saving time is set.

View

Here can be selected the parameters to be seen in the dialog.

Formatting

This menu item includes the settings on font and dialog colour.

Device

When connecting

Selection	The standard dialog or the advanced one can be chosen here.
Device	Synchronizes the time of a connected logger to the PC time. Time deviations only up to 2,5 min are corrected. Most logger types and firmware versions support this correction function, but some do not!
Measuring	When connecting, device time and program time are compared to each other. If the data logger time differs from PC time by more than 15 min, then time differences can automatically be corrected!
Battery alert	Upon establishing connection to a device, it specifies whether a warning shall be displayed in case the battery falls below particular values.

Reading

Method	Choice between different methods for reading devices in case of problems.
Allowed number of errors	Specifies the number of allowed errors when reading out before the process is cancelled (if <i>limit data read error</i> is activated).
Restart	Specifies, whether the device shall be restarted after successfully reading.
Restart: method	Choice between different methods for restating devices in case of problems.

Battery status

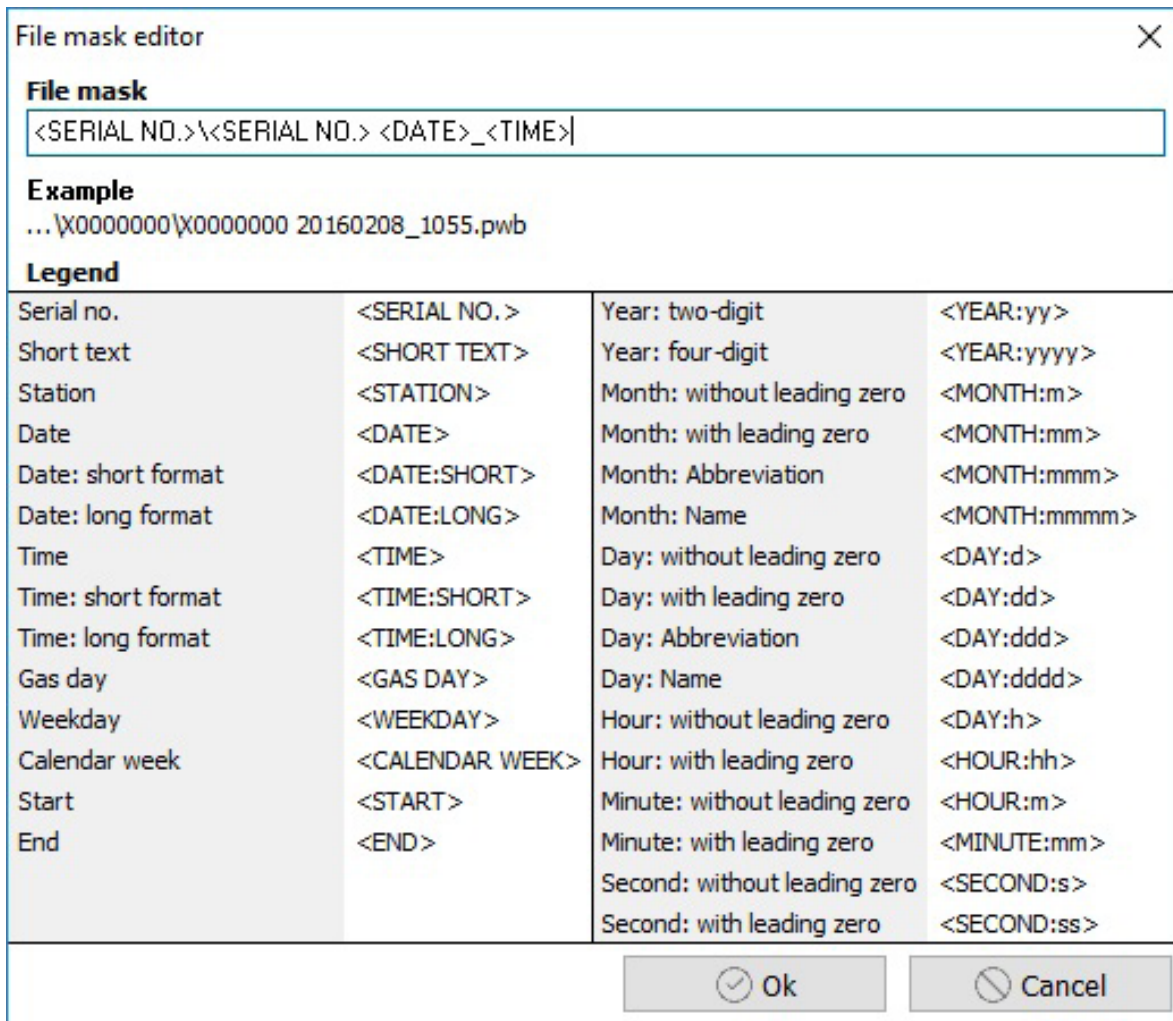
Method	Automatic - method is determined by program. Status - verifying by means of battery charge. Date - verifying by means of battery date.
Warning level yellow from [%]	First warning when battery charge < specified percentage.
Warning level yellow from [months]	First warning when battery is longer in the device than specified number of months.
Warning level red from [%]	Second warning when battery charge < specified percentage.
Warning level red from [months]	Second warning when battery is longer in the device than specified number of months.

Data storage

Files

Standard data path	Concerning the following settings, the standard data path is the selectable folder path for opening and saving as default. Individual options provide different path specifications too.
Filemask	When saving read performance data, the filename suggestion can be adapted to own defaults using the filemask. The above-mentioned standard data path is used as basis path! The filemask is adjustable via different variables. When using the arrow sign right, a dialog will open for comfortable filemask input with sample path output.

When opening the dialog on Opening/saving files, the above specified standard path will always be shown.



Individual variable names define themselves. The sample text always specifies „X0000000“ as serial number. Subfolders are specified by backslash (see sample). Own fixed texts or characters (as shown space character and underscore) can also be used in the name suggestion.

Compiling files when opening

When opening several files of one device, there is the option to specify files in an overview list or to compile them for combined evaluation.

Different criteria can be used for this compilation:

Manual: When opening a new file, the user must decide whether these data shall be added to an already opened file.

Automatic: The program decides whether data are suitable to an already opened file and adds them automatically if necessary. But number and constitution of the channels of both files must correspond.

Having equal short text only: Not only the number and channel types of both files must be equal, but also the short text.

Type plate

When opening and saving, specifies whether additional information on the selected reading file shall be used.

Evaluation

Table+chart

Specifies whether table or chart shall be shown at the same time.

Buttons

The button of the chart view can be activated/deactivated here. Their function will be explained in detail in the chapter „8.3 Chart view“.

Setting „Time period“ with the options:

„Manual“: A dialog for selecting time period appears before evaluation.

„Day“, „Week“, „Month“, „Year“: No dialog appears, but current day, week etc. will automatically be taken.

„Measuring“: No dialog appears, but the period of the current measuring will automatically be taken.

Interval

If „Time period“ is not set to „Manual“, this way default can be selected whether any data or just certain mean values are supposed to be shown in the evaluation.

Required memory

If this setting is activated, a warning message will be issued in case the estimated memory requirements for evaluation exceed a certain value (within measuring range).

Clipboard

Specifies, whether the copied picture into the clipboard shall have a particular size and, if yes, which one.

Program

The here specified parameters include the release codes of the modules. The currentness of the software can be checked. If needed, an update can be done via the specified options.

4.2 Connections

Connections define the interface to the devices. To establish connection to a device, the dedicated interface (e.g. serial interface COM1 or modem) must be selected and set. The necessary settings are saved in „Connections“.

The *description* is used for clear connection specification. Instead of the USB cable COM number, e.g. the description „USB online cable“ can be selected here. Using a modem connection where the call number of a station is saved, the station name can be meaningful.

The different program versions provide different setting options as physical interfaces (*type*):

	<u>Basic</u>	<u>Plus/Pro</u>
Direct connection	x	x
Modem		x
Bluetooth		x
UDP		x
TCP/IP		x

- The direct connection describes direct available PC interfaces such as serial ones or USB online cables.
- The setting „modem“ enables using an analogue or a GSM modem for connection to an also with modem equipped station data logger.
- Bluetooth is used to connect a data logger via Bluetooth module.
- UDP and TCP/IP can be used in connection with a GPRS modem including fixed IP address or when using RS232 on Ethernet adapter (with/without RFC2217).

Device class

Used for clear selection of the device to be connected. Data logger types N1 to N7, ELS and iModem are available. If a RS232 interface is set where different device types shall be connected, the setting „automatic“ is recommended. In this case, the software will search automatically for any device type after calling the connection. As this can take time, if possible, the device type should be specified. When using the connection types „Modem“, TCP/IP“ and „UDP“, you save data of a particular station in the connection and, hence, of a known data logger. The device class can easily be specified.

Device address

The address is important only when using data logger networks. Devices are not generally networked during normal operation. They have the address „0“. If there are doubts, the setting „automatic“ can also be selected here.

Serial number

The serial number is just a wild-card character for a potential function extension. No entry is needed here at the moment.

Remarks

Any text can be entered here, e.g. for saving activating times of a station modem.

Key

A quick operating key can be assigned to the connection. The numerical keys 0...9 can be used for quick operating. If one of the assigned key are confirmed, then the software including saved connection will start a connecting attempt at once!

Depending on connection type, further settings are possible:

Type direct connection

Velocity

The „velocity“ specifies what data rate shall be used when reading performance data from a connected logger. When using direct connection with USB cable, the setting „very fast“ can be selected. Older logger types or the ones equipped with infrared interface should be read using „normal“.

Type Bluetooth

The same settings as for direct connection also apply when selecting „Bluetooth“. Just the velocity selection does not apply.

Connecting can be done as type „Bluetooth“ or as „Bluetooth“ (internal). The „outgoing“ interface adjusted for the adapter must be entered as „interface“ in the COM settings. The adapter can be addressed based on its explicit BT-MAC address in the setting „Bluetooth“ (internal).

RFC mode

If the RFC mode is supported by the device's Bluetooth adapter, then this option facilitates faster data transmission, in particular when reading devices. If the RFC mode is not used, the velocity setting of the connection will be ignored!

Coupled device („Bluetooth (internal“ only)

Selecting the device's BTA using this type is done via dialog which shows any potential active coupled Bluetooth device.

The selection made there can permanently be saved using the option „remember“. Hence, new search is not necessary. If „keep“ is not activated, the interface can e.g. be used with different BTA's. This is useful for example if the Bluetooth interface is firmly fitted in the data logger.

Type modem

Modem

When using modem connection, you make settings on the modem used on the PC side. The modems specified under the setting „Modems“ (4.1.10) are in the list where entered own descriptions can be selected.

Call number

The call number of the station must be saved which shall be called when establishing connection.

Type UDP

Host/port

The connection type UDP can be selected to via GPRS under a fixed baud rate reachable iModems. The port of the UDP connection is adjusted in the iModem. This port must be recorded in the connection. The fixed IP address of the modem is entered as host.

Type TCP/IP

Host/port

The connection type TCP/IP provides the connection to an iModem via GPRS and fixed IP address (like the UDP protocol). Furthermore, customary *Seriell to Ethernet adapters* can be addressed using this connection type. In addition to the host address of the device to be connected and the used device port, the setting *RFC mode* in the TCP/IP protocol can also be activated. The RFC mode supports the RFC2217 protocol, which facilitates setting the remote interface by the calling computer.

Note: Deactivate the RFC mode when having TCP/IP connection to a iModem!

Data library

A data library is a data base which includes any performance data of one data logger with similar configuration characteristics (e.g. number of channels and channel types). The data library is comparable to a file. File management is exclusively done by the software. The data library has a specified storage location and an internally administered name and, hence, can be read and written at any time by the program without user intervention. So saved data of the library are also available for creating virtual data loggers in which data of different loggers can be combined.

Data root directory

Like the standard path for saving in a file. The root directory specifies the path for saving the data library files. The path can even be in a network and be used by different workstations.

Compilations/reports

Specifies the directory in which the data for compilations and reports are saved. Further notes on report generation and work on compilation are written in detail in the chapters 9.1 and 9.4.

Add new data

Specifies, when adding new data into the data library, in what way performance data are allocated to already existing ones of a device with compatible configuration.

Manual: user specifies allocation.

Automatical: program specifies allocation.

Interruptions

Specifies whether interruptions in the performance data are considered when entering them into the data library. Specifies the time to be set, as of when an interruption will be considered.

Update

New data can be added to a data library during operation. The option "Update" specifies whether the software automatically searches for new data or whether the verification shall be called by user.

Grouping devices

If data of different configurations on one logger are found when importing, then these data can possibly not be saved in a data library. When grouping automatically, any data library entry of one logger will be saved in a joint folder (group). A clearly arranged view can be created this way in case of many data library entries.

Import data

Here is defined how the program shall react when calling the import function („Values“ → „Import data“). Automatic data library entries are created or data of already existing data libraries are re-freshed when importing data.

Include subfolders: Specifies whether subfolder data shall also be imported.

Copy original files: Specifies whether data to be imported shall also be copied.

Copy to: Specifies the directory where copies of the imported files shall be saved.

Filemask

Specifies the filemask for the copied files.

Delete original files: Specifies whether files shall be deleted after importing.

4.3 Stations (versions Plus, Pro)

Add

Manual: the user must create a station for each device.

Automatic: One station will be created automatically for each device. If this device is not yet existing in the station management, the short text will be taken as station description.

Consider short text

Specifies, when selecting a station, whether the program also considers the short text. Otherwise, selection is done just via serial number.

You will find notes on function and use of station names in the chapter „Stations“ paragraph 5 of this manual.

4.4 Modems (Plus/Pro)

Lists the modems installed in the present operating system. The modems can be used for setting a remote data transmission connection under „Connections“.

Device

The connected device.

Description

The modem name in the program.

Mode

Modem type (analogue or GSM).

External access code

The „trunk“ of the telephone system (if available, normally „0“).

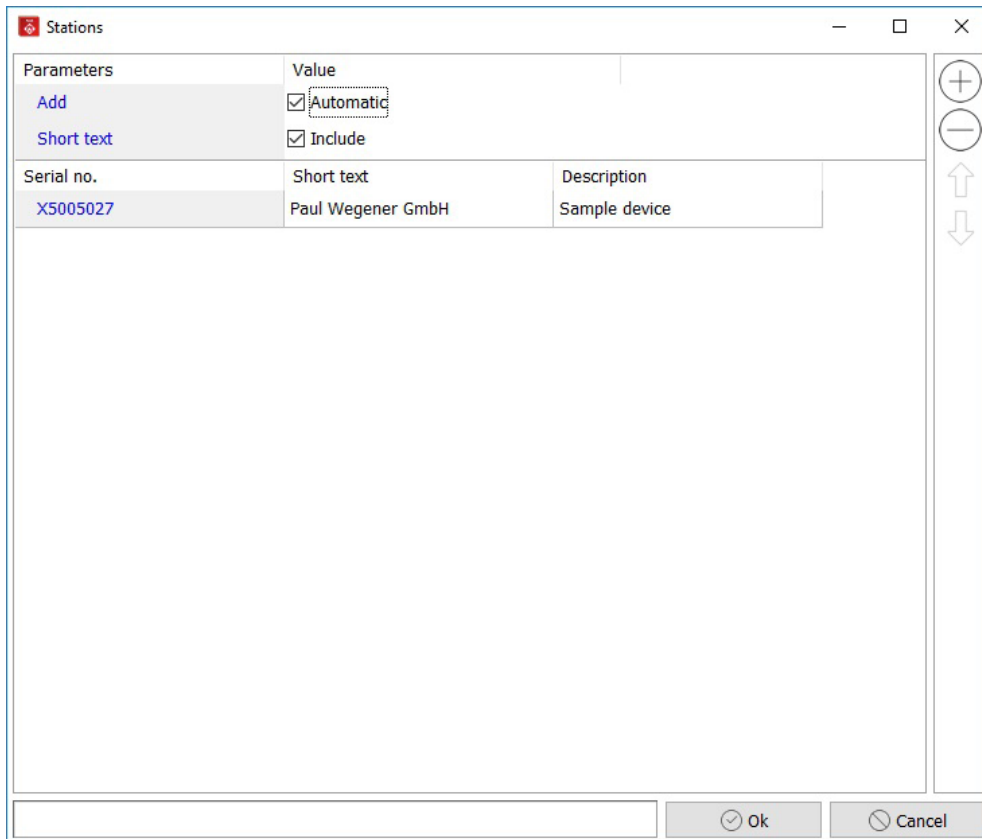
PIN

PIN of the GSM modem.

5 Station management

The overview shows newly connected devices with their short texts as description text initially. Depending on the logger's pre-configuration, this description makes sense or not.

A description text different from the short text can be selected by means of a station name („Program“ → „Stations“) which can be assigned to a logger on the basis of its serial number.



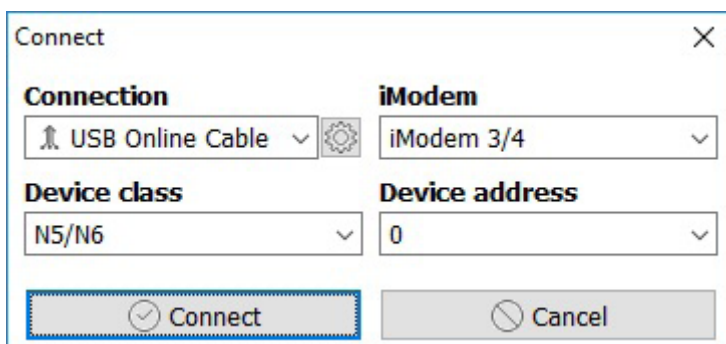
The setting „Add“ provides whether a station name shall automatically be created for each logger on the basis of its short text or whether an entry in the station name list shall only manually be created if needed.

Over and above can be specified by *Short text* whether different names on a logger can be saved by considering even the short text besides serial number for selecting the shown name.

6 Read and restart data logger

First of all, a „Connection“ to the device must be established (see chapter 2.2) for reading and making settings of data loggers.

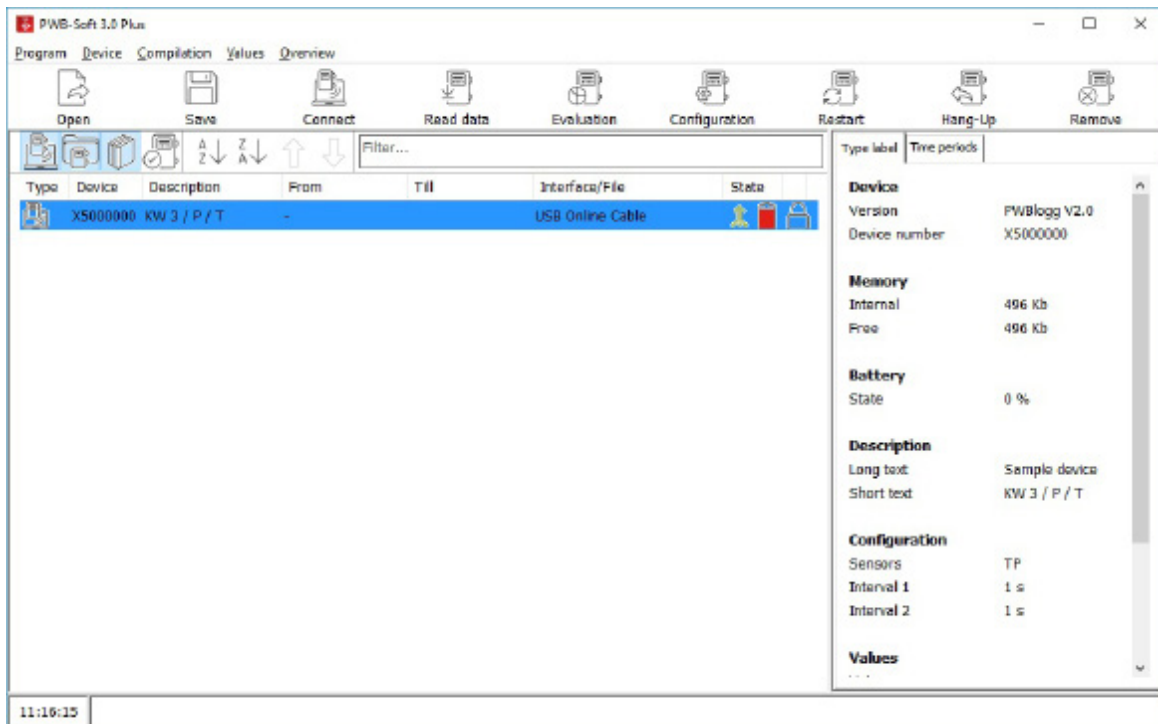
After using the button „Connect“ or the menu item „Device“ → „Connect“, a dialog will open itself for selecting the connection.



The choice box „Connection“ lists any „Connection“ registered in the settings dialog. If the field is empty, please create a connection in the settings dialog first!

After the connection has been selected, the settings on the chosen connection will be selected in the choice fields „ Device class“, „iModem“ and „ Device address“. The settings can be adapted here. If e.g. an N7 instead of an N5 or N6 data logger shall be connected, this can be shifted in the setting „Device class“. The changings will be saved.

Clicking on „Connect“ starts search for the device. The device will be called in case of a modem connection. After establishing connection, the device will appear in the device list of the „Pro“ and „Plus“ software. The „Basic“ software shows the type plate.



The opened connection will be marked in the column „Status“ of the device list by a green LED symbol. A double click on this LED symbol or using the menu function „Device“ → „Disconnect“ separates the connection. Thereby a modem connection will be disconnected or a serial interface will be closed. The device itself remains in the list. If applicable, the already read data can be evaluated further. „Device“ → „Reconnect“ calls the connection to the device again. Thereby status information and parameters will be newly imported.

After establishing connection, logger data can be read using the button „Read“ or by the menu item „Values“ → „Read data“. Initially, a selection dialog will open for choosing the data to be imported.

Read data: X5000000

Time period

From: 25.02.2013 11:33:28 Till: 28.06.2013 11:33:53

Velocity: Standard

Buttons: All data, New data only, Ok, Cancel

The example shows the saved performance data from 20.08.2014 10:36 to 29.08.2014 11.54. These data will be read by clicking „Ok“. The period can also be restricted to read a part of the saved data only.

The maximum period is set by the button „All data“ and, hence, any available data will be read. If the logger has already been read and current data should be added only, you can just have missing data found and read by „New values only“.

The dialog „Save“ appears after every reading process. The just read data can be saved in a PWB file here. If saving in a file is not necessary, the dialog can be quitted by „Cancel“. Nevertheless, these data are available for later evaluation and storage. However, it is recommended to save important performance data in a file just after importing them!

If performance data have been imported and, if applicable, saved, the data logger can be configured for the next measurement task or just restarted. When restarting (menu „Device“ → „Restart“ or button „Restart“), device parameters remain unchanged. The memory of the device will be deleted, the device time will be set to the software system time and, if necessary, the moment for measurement will be set.

Restart

Start of measurement: 08.02.2016 11:18:21

Measuring: Activate

All data in the device will be deleted! Continue?

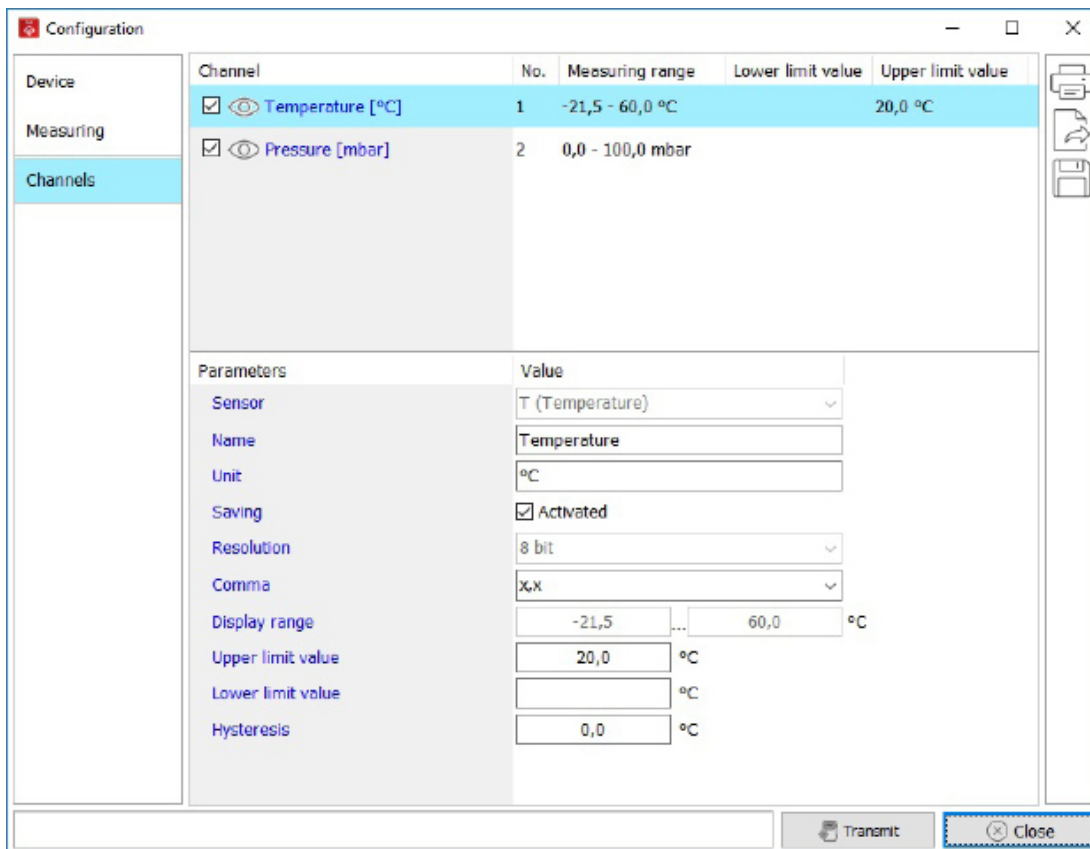
Buttons: Ok, Cancel

Thereby, the data logger can be activated/deactivated using the choice boxes „activate“ and „deactivate“.

7 Configuration

7.1 Configuring data loggers

Settings of the data logger can be changed and logging can be restarted in the menu item *device/configuration*. If a password for the data logger is specified, the window will appear after the correct password has been entered!



Configuration window

If the button *transmit* is pressed, after confirmation prompt, any data saved in the logger will be deleted. Data are also deleted if no parameter change has been made (restart).

The buttons „open“ and „save“ are for saving parameters in a file or for loading saved parameters. Only parameter files of the connected data logger can be read! Saving parameters can be used to facilitate entering frequently used ones. This function is also used to transmit parameters via SD card at data loggers which have a appropriate SD interface.

Adjusted device parameters can be printed out via button „Print“.

7.1.1 Device

Address

The *address* of the data logger is factory-set and can not be changed. It is important for operating a data logger network (RS485). A unique address must be allocated to each data logger here.

Password

A password can be allocated to a data logger by *password*. If a valid password is specified, configuring and deleting data can only be done by authorized persons. When entering a new password, the old one must be known. N5 data loggers have the password „0“ factory-set.

Clock change

Daylight-saving time/wintertime change can be activated here.

Description

Long text

The arbitrary description of the data logger. There are 160 characters allowed at most.

Short text

The arbitrary short description of the data logger. There are 20 characters allowed at most.

Battery

Date

The installation date of the battery is shown here. It should be refreshed by user at any battery change.

Type (only N4 and lesser)

Selection of battery type (9 or 7,2 volt).

Capacity [mAh] (only N5 and higher)

The battery capacity.

State [%]

Current battery state.

LCD

Permanent (N7 only)

Deactivated: the LCD deactivates itself after a while.

Activated: the LCD is permanently activated.

Turn-on time

N6 and lesser: The *turn-on time* specifies the period where the LCD is on. It can be selected between permanent display (increases permanently power consumption) and runtime of 1,5 minutes.

N7: Period for activating the LCD in seconds.

Contrast

The field *contrast* facilitates the display contrast of the data logger. Changing contrast should be done step by step. Too high adjusted contrast leads to so-called black blocks. Too little adjusted contrast pretends a defect.

Infoline (only N4 and lesser)

Infoline provides which additional information shall be shown in the second LCD line of the data logger during online display.

7.1.2 Measurement

Measurement start

The measurement start determines when the device shall start recording. If the current or a time in the past is specified, measurement starts at once. Otherwise, measurement will start at the adjusted time, **provided that measurement is activated!**

Interval 1

The time interval for logging readings. It is done in form of hours:minutes: seconds or as selection of predefined intervals (N5 and higher).

Interval 2

The alarm interval. Specifies what sample interval is used for reading recording if an alert threshold is exceeded.

Interval 2 permanent

Determines, whether the data logger shall switch over to the alarm interval only in case of limit violation (deactivated) or shall operate permanently using the alarm interval (activated).

Economical storage mode (only N4 and lesser)

If *economical storage mode* is activated, a data record will only be saved (without information loss) if it differs from the last saved one.

Store only during alarm (only N5 and higher)

If *store only during alarm* is activated, a data record will only be saved in case of alarm state.

Overwrite oldest data

If *overwrite oldest data* is activated, in case of full memory, oldest readings will be overwritten by new ones. Otherwise, when reaching memory capacity, saving process will not continue.

Short alert saving

If *short alert saving* is activated, in case of alert, N5 data loggers only log in the first two periods of interval 1 using interval 2. That means, transition from normal to troubled operation will only be temporary logged using the short interval 2. Thereafter, logging will be continued by interval 1. This process allows a sufficiently verified statement on temporal memory depth of the data logger, even if during operation an alert state occurs.

7.1.3 Channels

Configurations of individual channels are listed here. The shown parameters depend on sensor type.

Save activates/deactivates the channel.

Sensor shows the sensor type.

Name specifies the sensor name.

Unit specifies the reading unit.

Resolution means sensor resolution in bit.

Comma shows displayed commas.

Display range means lower limit of measuring range.

Limit values

An upper and lower threshold can be specified for each channel. An alert will be triggered and shown on display when exceeding/falling below this threshold.

When using N7 devices, this alert incident can be linked with an „event“. This way, in case of an alarm, different outputs can be switched or alert messages can be generated via modem.

When using status channels, an alert will be allocated to a status change.

Thereby, the hysteresis inhibits fluctuations of the alarm output if the reading is within the threshold range.

Upper limit value is the value where its exceeding activates alarm.

Lower limit value is the value where falling below it activates alarm.

Hysteresis - tolerance value. Thereby, it inhibits fluctuations of the alarm output when exceeding/falling below thresholds.

Turn-on value - threshold for activating measurement.

Characteristics for pulse channels

The pulse value of devices up to N6 is entered as decimal (e.g. 2,5l/Imp). When using N7 devices, pulse value is entered as numerator and denominator in whole numbers. 2,5l/Imp must be entered here as 25 (numerator) and 10 (denominator) (25 liters per 10 pulses)!

Puls value - The pulse value as decimal.

When using N7, the unit of the pulse value is always quantity unit/pulses. When using N5/N6 devices, there the unit can be switched over between pulses/quantity unit and quantity unit/pulses. Depending on pulse value, this way very small and very big decimals can arise.

In order that input, even when using N7, with fixed pulse value unit is possible, numerator and denominator are separately entered here!

Type - Type of pulse value.

Numerator - Integer, which determines the numerator of the pulse value.

Denominator - Integer, which determines the denominator of the pulse value.

Pulse frequency - Specifies type of frequency of a pulse channel.

Characteristics for status channels

Status channels have only two states which are saved and shown in the device as text. So a door contact can signal „Closed“ and „Open“.

Time base

Time basis for flow calculating.

Time base: comma - decimal places of the time basis for calculating flow.

State 1

Text for the first state.

State 2

Text for the second state.

Alert if changing: 1 → 2 specifies whether alert shall be triggered when the state of one sensor switches over from state 1 to state 2.

Alert if changing: 2 → 1 Specifies whether alert shall be triggered when the state of one sensor switches over from state 2 to state 1.

Characteristics for standard signal transducers

Standard signal transducers provide a standardised output signal in the viewable effective range. This can be 0...10V, 0...20mA as well as 4...20mA. The input signal's value range will be indicated by the output signal. During pressureless state, a pressure transducer 0...16bar with 4...20mA output provides an output signal of 4mA, 16 bar equates to 20mA.

As PWB usually does not know the value range of the input signal, standard signal transducers are generally delivered with effective range of 0...100%. To adapt the range to the real effective range of the transducer, the display range of these transducers is adjustable. The transducer's effective range can be entered this way and the number of displayed decimal places (0...3) too.

Please note:

The first value equates to the initial value of the transducer's effective range (hence e.g. 0bar. The second one equates to the final value of the transducer's effective range (hence e.g. 16bar). If the device is connected to a different transducer, hence both parameters must be adapted to the new transducer.

Standard signal channels are checked and factory-adjusted by calibrators which are able to show the standard signal with high accuracy. Transducer-provided errors or inaccuracies during conversion of the physical input signal into the standard signal can only be determined by comparing the reading provided by the data logger and a calibrator or by a comparative gauge. The this way determined deviations can be minimised by modification the effective range of the channel. Appropriate calculations can be done by PWB by request if comparative values are provided.

7.1.4 Events**Visible only if a device is connected.**

Events include actions which can trigger the channels of the logger in case of alert.

Allow external activation: facilitates triggering this event e.g. via modem.

Switch port: When the event is occurring, an output will be switched which is declared including the fields „Address“ and „PIN“. Address = 0 provides the pins of the data logger switch themselves. When using Addresses > 0, pins can be switched according configured external digital output modules.

Send alert SMS: Transmitting alert messages (e.g. as SMS) via connected PWB-iModem.

Data backup to MMC/SD: Saving performance data on MMC/SD.

Description: Arbitrary event description. Will be shown in the channels when selecting.

7.1.5 Modem settings for N3 and N4 data loggers

N3 and N4 data loggers provide additional configuration options such as the category *Modem*.

Type - The *Type* determines the modem connected to the data logger. (analogue modem, GSM modem).

PIN - When using a GSM modem, the PIN of the used SIM card is entered in the field *PIN*.

Initialization - AT command for modem initialization.

Init baud rate - Baud rate for modem initialization.

Dial command - AT command for a call.

Data baud rate - Baud rate for data transmission.

SMS type - The field *SMS type* is used to switch over between text mode and PDU mode. PWB modems master text mode which facilitates SMS reception at any mobile phone.

Service-Center - The *Service-Center* address is necessary for transmitting SMS! It depends on provider.

E-Mail-Dispatch - The provider-depending phone number is entered in the field *e-mail dispatch* which is necessary for sending SMS as e-mail. For that purpose, the e-mail address has to be entered in the field *centre 4*! A space character must be entered after address!

Activation - The choice box *activation* is important with a battery-supplied GSM modem. Here is set whether the modem is supposed to send just SMS (power-saving operation) or whether also a time frame shall be activated where the modem is accessible for query of performance data.

From - Specifies period start where the modem shall be accessible.

Till - Specifies period end where the modem shall be accessible.

Phone number - Using a time frame, upon activating instant a daily SMS will be sent to the receiver, specified under *phone number*. That way it can be signaled that the time frame is reached and the modem is activated. If this function is not supposed to be used, this field should not be used for entering a phone number (enter „0“).

Centre 2 - Second SMS receiver.

Centre 3 - Third SMS receiver.

Centre 4 - If a valid number is entered in the field *e-mail transmission*, then the field centre 4 will be used for entering an e-mail address! In such case the alarm SMS will be forwarded to the specified e-mail receiver. The alarm note appears in the subject field of the message.

7.2 Configuring data loggers

If the selected device is a modem, following dialog will appear above the menu item *Device/configuration*:

Parameters	Value
iModem	Update
Device	[Dropdown]
Searching	<input checked="" type="radio"/> Automatic <input type="radio"/> Manual
Address	0
Uart	<input checked="" type="radio"/> RS232 <input type="radio"/> Infrared
Velocity [Baud]	<input checked="" type="radio"/> 9600 <input type="radio"/> 115200
Short text	N7 Sample
Modem	Update
Type	GSM
PIN	****
Initialization	AT
Dial command	ATDT
Timeout	180 s
Roaming	<input type="radio"/> Deactivated <input checked="" type="radio"/> Activated
SMS	
Service-Center	+491722270333
E-Mail-Number	3400
DSFG	
ID	M000120
Password	***

7.2.1 iModem (versions Plus, Pro)

The button *Update* opens a file dialog for selecting a new firmware for the iModem.

Device

There are two iModem versions. The standard version is just a protocol converter for the different data loggers which can be selected as device. The advanced version provides the ELS function where the ELS is selected as device and hence can not be modified.

Searching

Automatic: automatic data logger search.

Manual: Datalogger searches at the specified address only.

Address

Fixed module number of the connected data logger (0...63).

Uart

Interface type between data logger and modem.

Velocity

Baud rate provided by device.

Short text

The short text is an arbitrary description which can be used for identifying the modem.

7.2.2 Modem (versions Plus, Pro)

The button *Update* opens a file dialog for selecting a new firmware for the hardware modem inside the iModem.

Type

The iModem can work with different modem types. Even operation without modem is possible if the device shall only operate as protocol converter via online connection. The used modem type is specified in the field *type*. Settings are factory-made and should not be altered!

PIN

The four digit PIN belongs to the used SIM card for data transmission via GSM modem.

Initialization

Dedicated modem settings. Standard setting is „AT“.

Dial command

Dedicated modem settings. Standard setting is „ATDT“.

Timeout [s]

The *timeout* specifies the period after which a modem connection is automatically disconnected if there is no further data transmission.

7.2.3 SMS (versions Plus, Pro)

Service-Center

The *Service-Center* address is necessary for sending SMS! It depends on provider.

E-Mail-Number

The provider-dependent phone number which is needed to send the SMS as e-mail is specified in the field *e-mail-number*.

7.2.4 DSfG (versions Plus, Pro)

Protocol

The setting *protocol* specifies which protocol is used when querying data via modem. The iModem operates as protocol converter which turns arriving commands into PWB commands and sends the response in a necessary protocol frame. The protocol is set to „PWB“ for data querying via PWB software. If there are other protocols specified, then there is also always the PWB protocol allowed, so that remote enquiry via PWB software is also possible!

When using N5 data loggers, only the PWB protocol is supported.

State

Activates/deactivates the DSfG protocol.

ID

12 digit login ID.

Password

Password with 16 characters at most.

7.2.5 PWB (N5 data loggers only)

State

Activates/deactivates the PWB protocol.

7.2.6 Time frame (versions Plus, Pro)

Individual activating periods, in particular for battery-operated modems, can be specified in the category *time frame*. There are two time frames per weekday and two daily ones possible.

On

Period specification in form of „hour:minute“ where the modem is activated.

Duration

Period specification on form of „hour:minute“ concerning how long the modem remains activated.

The duration „00:00“ deactivates the dedicated time frame.

Digital input [min]

The modem optionally provides four digital inputs which can be used for triggering SMS's. The parameter digital input specifies here how long the modem shall remain activated in case of actuating a digital contact.

7.2.7 Receiver (versions Plus, Pro)

Type

Messages can be sent as *SMS*, *e-mail* or as *call to a centre*.

Attempts

The number of attempts when unsuccessfully establishing connection are specified in the field *attempts*. The attempts are without meaning for *SMS* and *e-mail*.

Description

The field *description* is an arbitrary parameter on describing the receiver.

Phone number

The field *phone number* includes the phone number of the SMS receiver, the centre or the e-mail address of the mail receiver.

7.2.8 Events (versions Plus, Pro)

Lists any event with following configuration options:

State

Activates/deactivates message upon incidence of an event.

Message

The message text sent when triggering the event. In addition to the arbitrary contents, device information can be placed in the message. This information is selected via character „#“ with subsequent character. Any available information will be faded in a key when editing the message.

Send to

Selects receivers where the message is sent to.

Events to be available:

Data message

Is triggered within a particular period or if the modem is activated after reaching a specified activating time. This can be corrected in the field „point in time“.

Battery failure

Is triggered if the modem battery falls below a particular voltage level.

Power failure

Is triggered if the external power supply of the modem fails. The message can only be sent if the modem has a sufficiently dimensioned backup battery!

Device alert

The device alert is triggered once the iModem is not able to establish connection to the connected data logger! The connection is regularly verified, at least every 30 minutes.

Alert message

If at the connected data logger a limit violation is recognised, then the modem will receive a respective message from the data logger. Thereafter, the modem will query the data logger and forward the specified message text e.g. as SMS to the specified receivers. The message receivers („send to“) for the events „device alert! and „alert message“ are jointly specified!

Digital input 1..4

These event fields are linked with optional digital contacts of the iModem and, independent of a data logger, they can be used e.g. to generate an event message when activating a switch contact.

Threshold

Is triggered after a threshold has been reached and measurement is activated.

7.2.9 GPRS (versions Plus, Pro)

The category *GPRS* includes any necessary parameter for using the „GPRS“ function. A respective GPRS modem modul is necessary for using GPRS. If applicable, make request to the SIM provider on respective specifications.

State

Activates/deactivates the GPRS function.

Server

URL or IP address of the server.

User name

User name

Password

Password

DNS server 1

GPRS parameters.

DNS server 2

GPRS parameters.

TCP: port

GPRS parameters.

UDP: port

GPRS parameters.

7.2.10 SMTP (versions Plus, Pro if GPRS function is active only)

These data are necessary that the modem is able to send e-mails.

State

Activates/deactivates the SMTP function.

Server

URL or IP address of the SMTP domain.

User name

User name

Password

Password

Description

Arbitrary description.

Own e-mail address

The address of the own mail account.

7.2.11 FTP (versions Plus, Pro if GPRS function is active only)

The connection data to the FTP server where the modem shall load.

State

Activates/deactivates the FTP function.

Interval

Specifies the upload time.

Server

URL or IP address of the FTP server.

User name

User name

Password

Password

Port

The FTP access port.

Data upload

Data upload to any FTP server for further processing the performance data e.g. into a control system.

File

Specifies the file format in which data are written in the server. Web database, PWB files and CSV files are available.

7.2.12 Battery

Capacity

Battery capacity in mAh.

Limit value

Limit value on battery discharge in mAh.

State

Battery state in %.

8 Evaluation

Performance data as opened file, read data, data library entries or compilations can be shown as chart. For this purpose, select the respective entry in the overview list, or click on the button „Evaluation“ use the menu „Values“ → „Evaluation“ and the evaluation will be started.

The „Basic“ version has a separate evaluation dialog, whereas the „Plus“ and „Pro“ version provide the evaluation as register in the main window. Thereby there is the option opening several evaluation windows at the same time and to switch over between them.

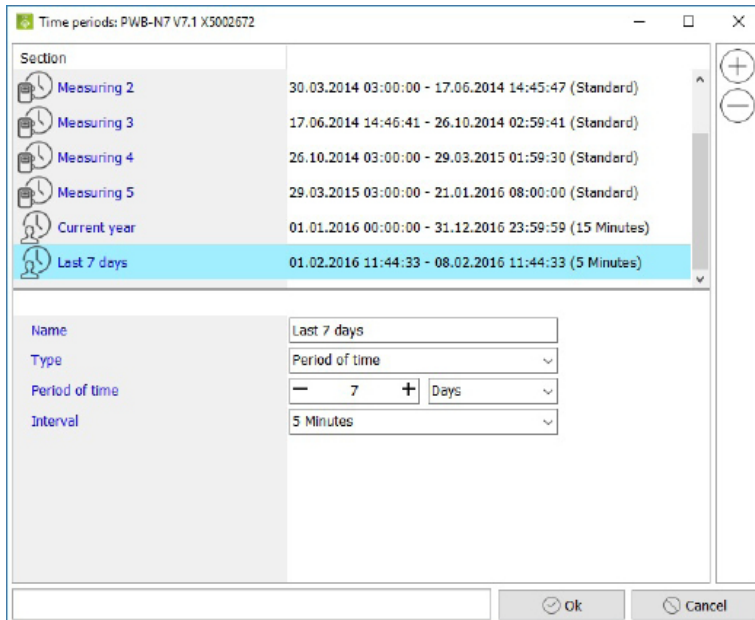
8.1 Time periods

Data logging of a logger can be subdivided into individual time periods (e.g. measurements at different locations) by activating/deactivating measurement. Opening the menu „Time periods“ can be done by right mouse click on the entry or via menu „Device“. A dialog opens above „Overview“ where the recognised time periods are listed.

Parameters	Value
Name	Time period
Type	Absolute
From	01.01.2016 00:00:00
Till	01.02.2016 00:00:00
Interval	Standard

Ok Cancel

Own time periods can be defined by „Add“. This is e.g. meaningful if only a particular period of a long data record matters. When using data library entries which are automatically be refreshed, a dynamic period (e.g. „data of the last 7 days“) can be managed.



For this purpose, a new period will be created via „Add“. This period will appear at the end of the list which includes already existing ones. Initially, a useful name should be given to this period (e.g. „the last 7 days“), Thereafter, the type of the period will be specified.

The type can be determined absolutely (including fixed start and end time), recently (number of recent hours, days, weeks or months), currently (today, this week, current month, this year) or beginning as of a particular point in time. If you select such periods, only the there included data will be used for showing table and chart.

Even specified periods can be changed or deleted in the dialog. Periods of the data record recognised by the software can not be changed or modified! But it is possible to select the time interval for displaying the data in any time period. Data of the setting „Standard“ are shown in the way they are available in the memory. If e.g. „15 min“ as interval is selected, then 15 min average values will be created of the data.








8.2 Table

The screenshot shows the 'Evaluation window' in PWB-Soft 3.0 Plus. The 'Time periods' section is active, and the data is filtered for the 'Last 7 days' period. The table displays the following data:

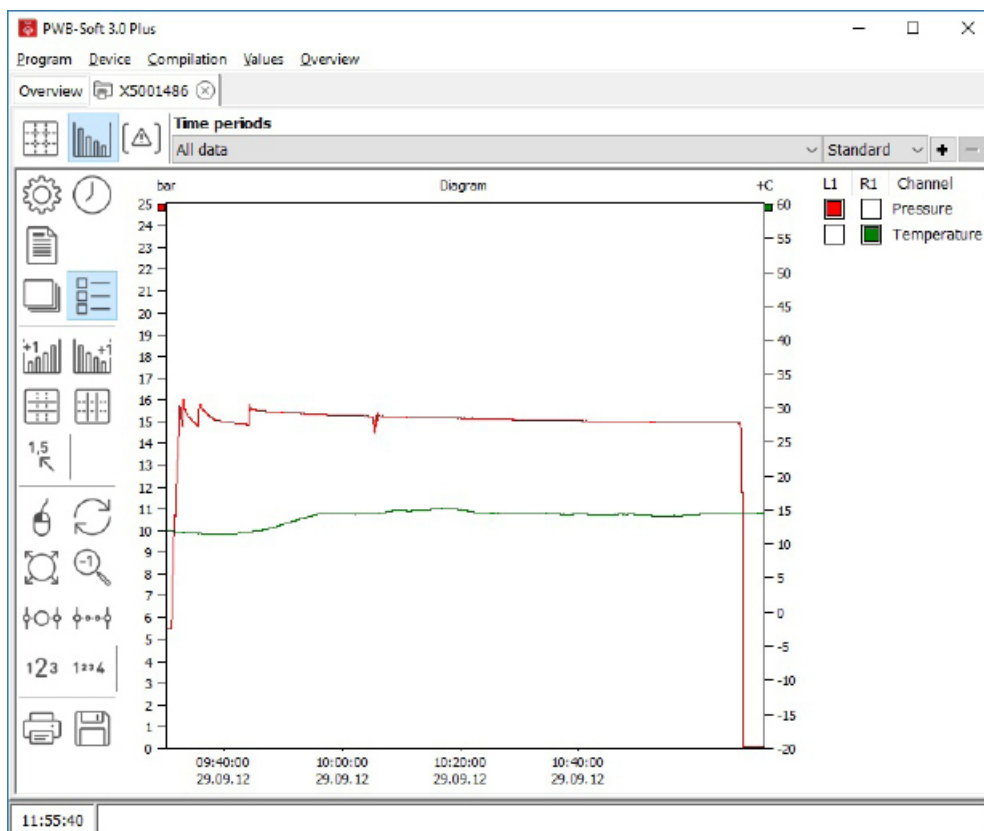
	Date/Time	Pressure A [bar]	Pressure B [mbar]	Pressure C [mbar]	Counter A [10]	Flow A [m3b/h]	Counter B
Minimum value		4,56	311	50,2	005367002	0	000001
Maximum value		4,99	321	54,9	005367002	0	000001
Mean value		4,78	316	51,8	005367002	0	000001
Delta value		-0,15	1	-1,0	000000000	0	000000
	12.07.2013 07:00:19	4,90	313	51,5	005367002	0	000001
	12.07.2013 07:03:19	4,81	314	50,5	005367002	0	000001
	12.07.2013 07:06:19	4,70	312	50,5	005367002	0	000001
	12.07.2013 07:09:19	4,59	311	50,7	005367002	0	000001
	12.07.2013 07:12:19	4,61	312	51,6	005367002	0	000001
	12.07.2013 07:15:19	4,83	312	51,2	005367002	0	000001
	12.07.2013 07:18:19	4,89	313	51,0	005367002	0	000001
	12.07.2013 07:21:19	4,76	314	51,4	005367002	0	000001
	12.07.2013 07:24:19	4,64	311	51,2	005367002	0	000001
	12.07.2013 07:27:19	4,56	313	50,8	005367002	0	000001
	12.07.2013 07:30:19	4,70	311	52,1	005367002	0	000001
	12.07.2013 07:33:19	4,90	313	51,2	005367002	0	000001
	12.07.2013 07:36:19	4,83	313	51,7	005367002	0	000001
	12.07.2013 07:39:19	4,72	313	51,3	005367002	0	000001
	12.07.2013 07:42:19	4,61	312	51,7	005367002	0	000001
	12.07.2013 07:45:19	4,61	311	51,4	005367002	0	000001
	12.07.2013 07:48:19	4,79	314	52,0	005367002	0	000001
	12.07.2013 07:51:19	4,92	312	51,1	005367002	0	000001
	12.07.2013 07:54:19	4,80	311	52,1	005367002	0	000001

Evaluation window, page table

The upper area of the version PWB-Soft 3.0 Basic shows the currently selected period of the value set. Further periods can be defined or removed here by \oplus and \ominus . Furthermore, there can be selected whether any data or just particular mean values are shown. Moreover, the versions PWB-Soft 3.0 Plus and PWB-Soft 3.0 Pro provide choice boxes where the period to be evaluated can be adjusted.

-  Opens the setting dialog for evaluation.
-  Switches over between absolute and relative time display.
-  Activates/deactivates display of info values on the selected period.
-  Opens the header data submenu.
 - Show: shows/hides header data above the table and chart respectively.
 - Load: loads header data from a file.
 - Save: saves header data to a file.
-  Shows a title for the table which can be edited by double click.
-  Prints the displayed values. You can have printed out as table, chart or both combined.
-  Exports alternatively evaluation data in an Excel table, in a PWB-Soft file or in a text file.

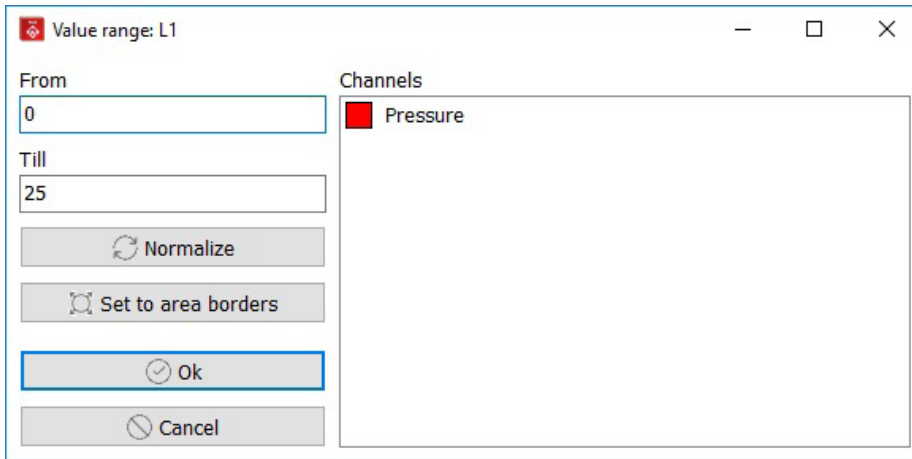
8.3 Chart view



Evaluation window, page chart

The chart provides a zoom by drawing up a frame using left mouse key. This detail can be moved by pressed right mouse key. Drawing a frame on one of the axes leads to a zoom of this channel value or the time, but leaves the remaining axes in initial state.






















Selecting the channels to be displayed is done by activating/deactivating in the legend. If the mouse pointer is within the chart, the time will be shown in the status bar and the values at mouse position. A double click on the axis legend opens a dialog to enter area borders.



Dialog value range

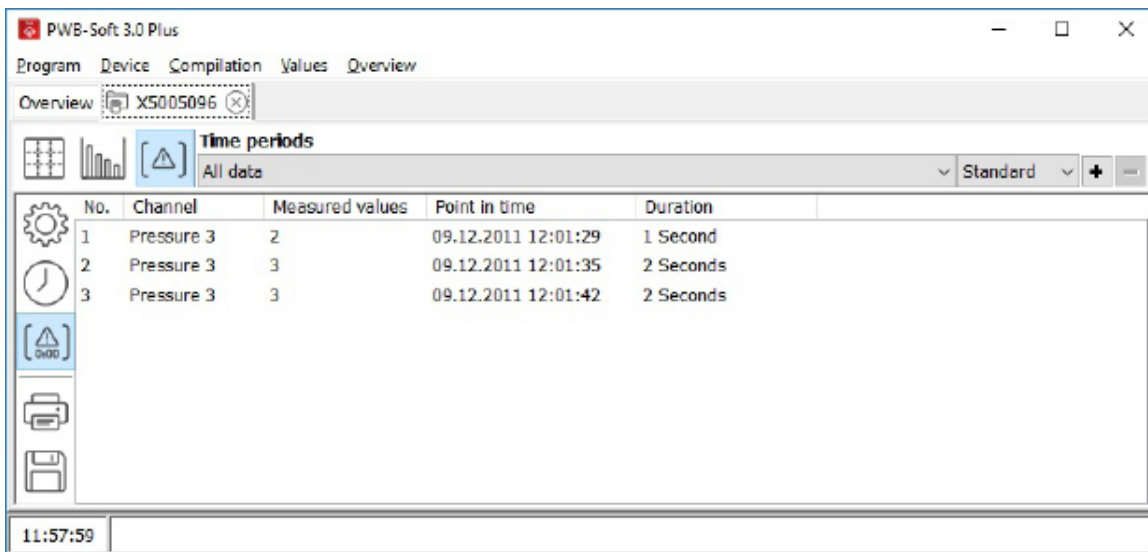
„Normalize“ sets value area to values between highest and lowest value within the shown period, „Set to area borders“ on the highest one which is determined by measurement ranges of the shown channels and a double click in the list on the measurement range of the respective channel.

Right click on a highlighted channel in the legend opens a setting dialog for displaying the channel.

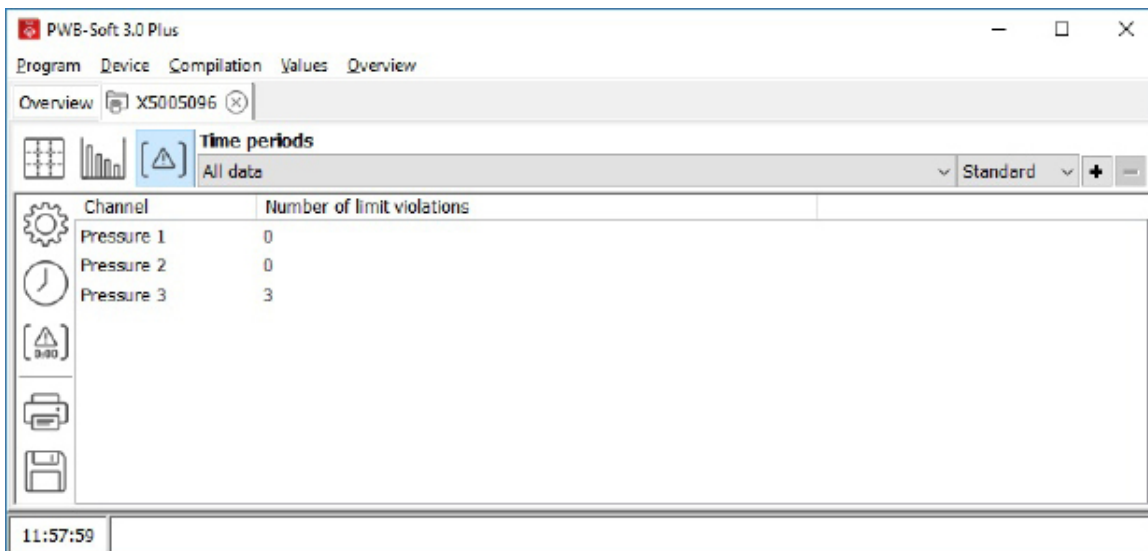
-  Opens the setting dialog for evaluation.
-  Opens the header data submenu.
 - Show: shows/hides header data above the table and chart respectively.
 - Load: loads header data from a file.
 - Save: saves header data to a file.
-  Switches over between absolute and relative time indication.
-  Copies chart into clipboard (alternative: Ctrl+C).
-  Shows/hides the legend.
-  Shows/hides a second y-axis on the left side.
-  Shows/hides a second y-axis on the right side.
-  Shows/hides horizontal auxiliary lines.
-  Shows/hides vertical auxiliary lines.
-  Shows/hides a reticle at mouse position in the chart. If the reading view at mouse position is not activated, an auxiliary value line can be set by double-click on the chart.
-  Shows/hides a text within the chart which shows the reading at mouse position.
-  Activates/deactivates moving the chart when pressing left mouse key.
-  The value range for each axis will be set to the ones between the highest and lowest value within the shown period.
-  Sets area borders to highest possible area.
-  Resets zoom by one step.
-  Enlarges the detail only related to time axis.
-  Minimizes the detail only related to time axis.
-  Enlarges the detail only related to the value axes.
-  Minimizes the detail only related to the value axes.
-  Prints displayed values. You can have printed out table, chart or both combined.
-  Exports alternatively evaluation data in an Excel table, in a PWB-Soft file or in a text file.

8.4 Page limit violations






This page provides an overview of occurred limit violations during the selected period.



Evaluation window, page limit violation, view channels



Evaluation window, page limit violation, view point in time

-  Opens setting dialog for evaluation.
-  Switches over between absolute and relative time indication.
-  Switches over between view of number of limit violations per channel and chronology of limit violations.
-  Prints shown values. You can have printed out as table, chart or both combined.
-  Exports alternatively evaluation data in an Excel table, in a PWB-Soft file or in a text file.

8.5 Online view

Measured data of the selected device are continuously enquired and shown via *Measured data/Online*. After activating the data logger and establishing connection between logger and PC, current performance data can be online displayed on PC as table or chart.

Measurement at data logger must be activated as basis for online view! When evaluating connected devices, current device data can be recorded „online“ and displayed as table or chart. The view is done analogue to the above described graphical/tabular view.

Date/Time	Temperature [°C]	Pressure [mbar]
19.02.2013 11:14:28	20,0	0,4
19.02.2013 11:14:53	20,0	0,0
19.02.2013 11:14:53	19,7	0,0
19.02.2013 11:15:03	20,4	0,0
19.02.2013 11:15:13	20,4	0,4
19.02.2013 11:15:23	19,4	0,0
19.02.2013 11:15:33	20,4	0,0
19.02.2013 11:15:43	19,7	0,0
19.02.2013 11:15:53	20,4	0,0
19.02.2013 11:16:03	20,4	0,0
19.02.2013 11:16:13	20,4	0,4
19.02.2013 11:16:23	20,0	0,4
19.02.2013 11:16:33	19,4	0,0
19.02.2013 11:16:43	20,0	0,4
19.02.2013 11:16:54	19,7	0,0
19.02.2013 11:17:04	20,0	0,4
19.02.2013 11:17:14	20,4	0,4
19.02.2013 11:17:24	20,4	0,4
19.02.2013 11:17:34	20,0	0,0

Online evaluation, version PWB-Soft 3.0 Pro

☞ Activates/deactivates online query

☞ Deletes existing values

Interval

Determines the query rate.

Display range

Restricts the maximum number of displayed values, either to a particular number (range: values) or to particular period (range: time).

Display

Current value: reading.

Delta value: difference of readings.

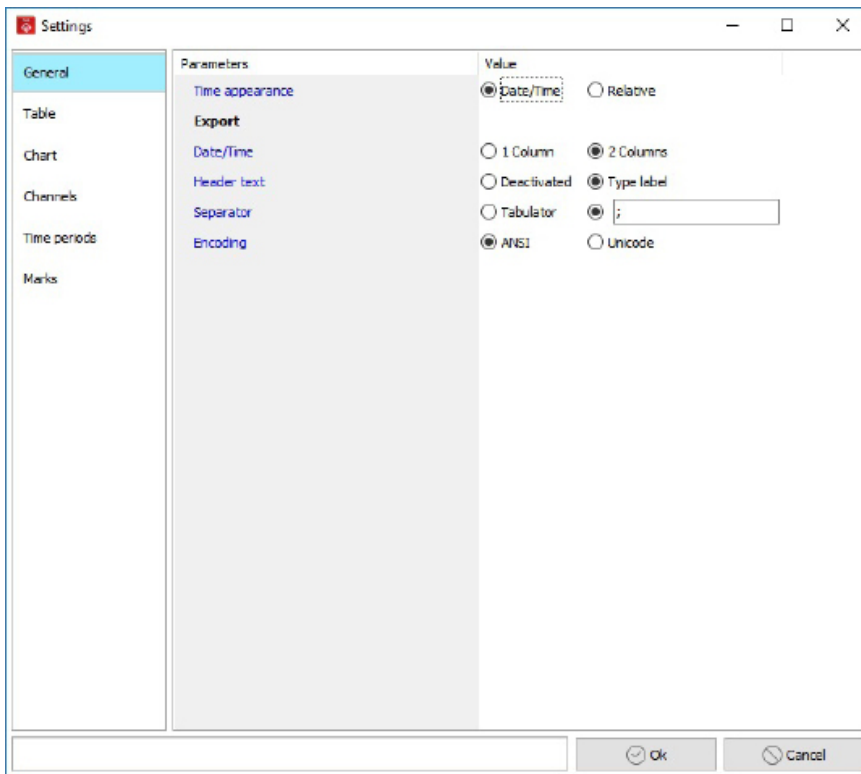
Delta value range

Determines the period between current reading and the one which is used for calculation the delta value.

The other functions correspond to the ones of the → evaluation window.

8.6 Evaluation settings

The  symbols in each evaluation dialog open the evaluation settings.



Evaluation dialog, settings

General

Time appearance Date/time: absolute time display.
Relative: relative time display.

Online Online evaluation settings.

Export Export settings.

Table

Caption Caption for the table.

Info values Particular values for the selected period.

Chart

Caption Caption for the chart.

Show legend Deactivated, show legend on right/left border.

Alternative axis Option right/left.

Grid Shows/hides auxiliary lines.

Zoom: scale up [%] Enlargement factor of the detail by pressing $\uparrow\uparrow$ and 1^{23} .

Zoom: scale down [%] Minimizing factor of the detail by pressing $\downarrow\downarrow$ and 1^{234} .

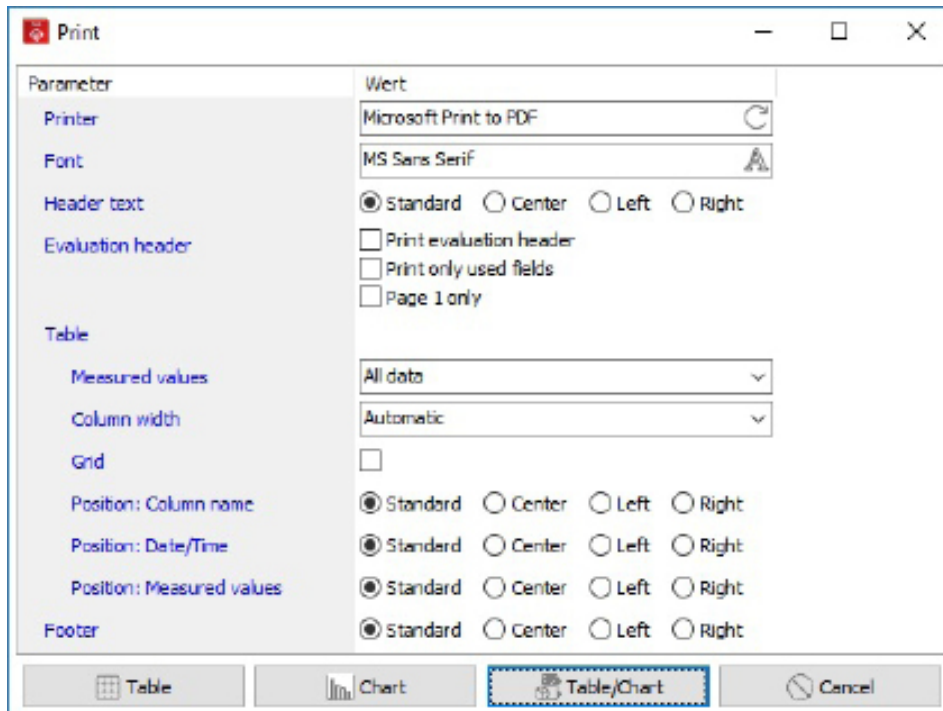
Move Activates/deactivates moving the chart by pressed left mouse key.

Display: status Options: reading curve or histogram.

Show value at mouse position Shows/hides a text in the chart which shows the reading at mouse position.

Time mark control mode	Shows time marks.
Buttons	Specified options are available.
Channels	Lists existing channels. Additional to the original channels of the device, calculated channels can be added and removed here.
Name	The name of the channel in the evaluation.
Unit	The unit of the channel in the evaluation.
Comma	Decimal places for display.
Colour	Channel colour in the chart.
Auxiliary value 1/2	Two auxiliary values can be specified per channel.
- Show	Specifies whether the chart shall include a horizontal line for the value and whether this value shall receive attention in the table view.
- Value	The auxiliary value.
- Highlight values	Specifies, whether and how values are highlighted in the table („=“, „>“, „>=“, „<“ and „<=“ refer to the auxiliary value).
Symbol	The formula symbol which refers to this channel when calculating.
Formula	Specifies the calculation rules of calculated channels. Formula symbols are: K[x] value of channel x. SV[x] start value of channel x. DEA[x] end-start difference of channel x. D[x] difference between value and previous value of channel x. SQRT() root of the term in brackets. + - * / () The general rules for the four basic arithmetics and parenthesis apply.
Marks	Individual sections of the chart can be marked („+“ → add „-“ → remove marks). Any number of position marks can be shown in the chart to mark particularly relevant points of a measured curve. These can be minima, maxima or even values at a particular point in time. Each position mark consists of a circle around the reading and a text display which includes reading, time data and optionally two freely definable text lines. Circle and point can be moved to an arbitrary position in the chart by pressed right mouse key.
Channel	The selected channel to be marked.
State	Selection: deactivated, activated, minimum and maximum value.
Show	The selected axes to be shown.
Text1	The entered text which shall be shown at the mark.
Text2	The entered text which shall be shown at the mark.

8.7 Print options



Settings dialog on printing

Printer

Name The name of the printer to be used. Even the native printer settings dialog can be called here.

Font The font for the printout.

Header text

Position Determines the alignment of the header.

Evaluation header Deactivated: no header data will be printed.
Activated: all header data will be printed.
Print only used fields: only header data which include texts will be printed.

Footer

Determines the alignment of the footer.

Table

Measured values All data: any performance data of the selected time period are printed.
Adapt to page: between start and end of the selected time period stepwise only so many performance data are printed as there is space in one page.

Column width Automatic: the column width is determined by the length of the column caption. Adapt to page: the column width is determined by the page width.

Grid Specifies, whether table lines shall also be printed.

Position: column name Determines the alignment of the column name.

Position: date/time Determines the alignment of the time text.

Position: Measured values Determines the alignment of the measured value text.

Logo

Print	Specifies, whether the printout includes a logo.
File	The image file which includes the logo.
Position	Standard: the logo is adapted to the side width. Top: the logo is centered. Left: the logo is aligned at the left border. Right: the logo is aligned at the right border.

9 Advanced evaluation functions of the Pro software

9.1 Compilation

Several devices can be compiled to one virtual device via „Compilation“. Thereby, e.g. in a water supply area, any influx recorded by individual devices can be displayed together. When using calculated channels, it is also possible e.g. to calculate the sum of any influx or to make any other calculation. Compilations remain permanently saved and will be available at next program start! They can be created from channels of currently read data, from files or data library entries, whereas it is most reasonable to use data library entries as they are permanently available, other than files and devices! If data sources of the compilations are updated, then the current data will be available for evaluation at once. The dialog for entering compilation data opens via menu „Device“ → „Add compilations“. If you want to modify a compilation, mark the one and open the settings dialog via the button „Configuration“.

Device

Password A password can be assigned to the compilation. If a valid password is specified, alterations of the configuration can only be saved after the password has been entered. When entering a new password, the old one must be known. Newly created compilations have no default password.

Measuring data

Interval 1 The minimum time interval for readings summing-up in the evaluation.

Description

Long text The arbitrary description of the compilation.

Short text The arbitrary short description of the compilation.

Channels

Lists the combined channels of the compilation.

Name The channel name.

Unit Reading unit.

Comma Shown commas.

Visible Specifies whether the channel shall be shown in the evaluation.

Source/Device Connected devices, opened files or data library entries can be selected as data source. If „Calculated“ is selected as source, then the channel will be calculated as under „Formula“ specified. After specifying the data source unde „Source“, under „Device“ you can select one of the available devices there.

Note: If „File“ is specified as source, only opened files will be shown in „Device“ at choice. To use the type „Device“, you must have connected a device before!

Channel The source channel of not calculated channels.

Symbol The formula symbol which refers to this channel when calculating.

Formula Specifies the calculating rule of calculated channels.

Formula units are:

K[x]

Value of channel x.

SV[x]

Start value of channel x.

DEA[x]

End-start-difference of channel x.

D[x]

Difference between value and previous value of channel x.

SQRT()

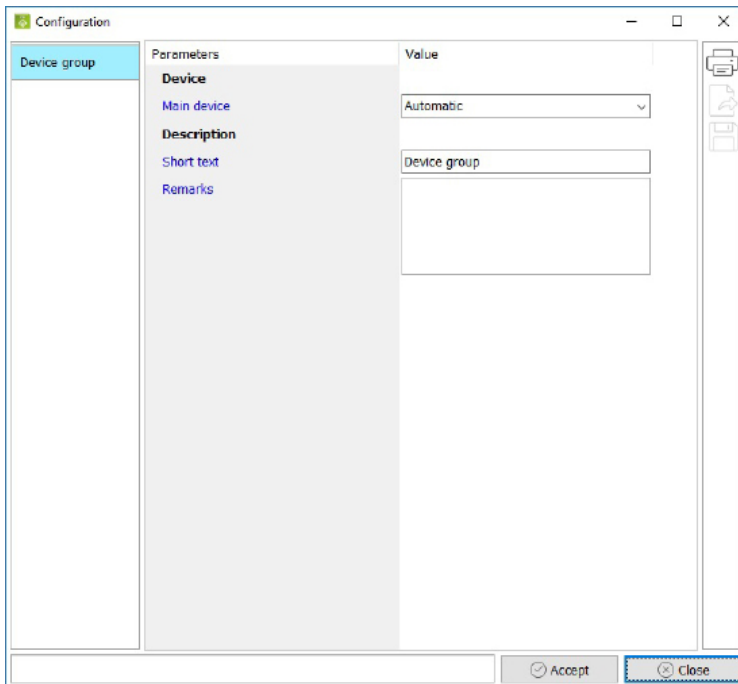
Root of the term in brackets.

+ - * / ()

General rules of the four basic arithmetics and parenthesis apply.

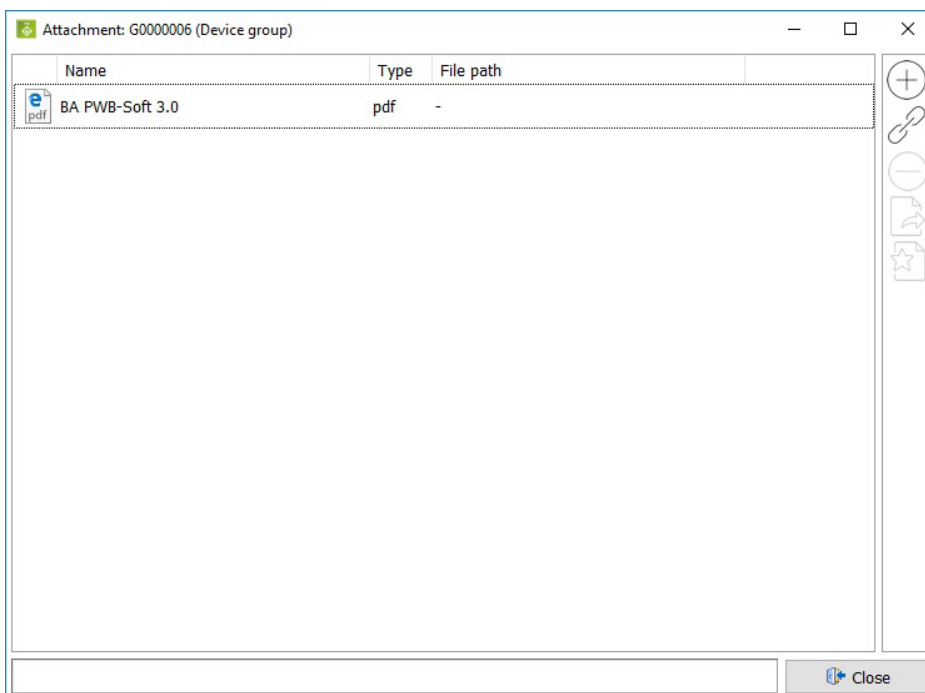
9.2 Device groups

Device groups combine several devices, files, data library entries or compilations in the device overview to one entry. This group can include a combined long and short text as needed. If there is a large number of data library entries, files and compilations, a clearly arranged view can happen this way.



9.3 Attaching documents

It is possible to attach documents to data library entries, compilations and device groups for managing external documents. For this purpose, you have to mark the respective overview entry and to open the menu „Device“ → „Attachment“. A dialog appears here which facilitates adding a document or a folder.

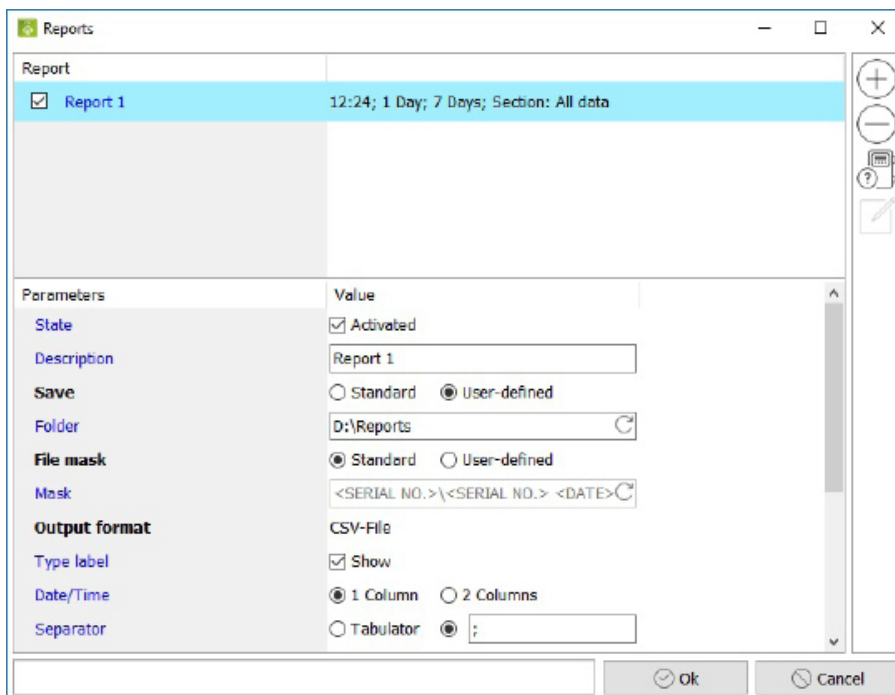


The documents can be linked or directly copied in the data path of the chosen entry. When using a link, it will be necessary that the file remains at the origin. The documents also appear in the type label of the chosen entry and can be directly opened there.

Add	Copies one file into the device's attachment directory.
Link	Adds one link to one file as attachment.
Remove	Deletes the selected attachment entry.
Open	Opens the selected attachment file.
Open file path	Opens the directory where the attachment file is included.
Close	Closes the dialog.

9.4 Report

The report facilitates data export as Excel, CSV or text files once or regularly. So existing data in internal PWB format can be displayed in a form which can be read by other programs. If e.g. data are automatically refreshed by the software PWB-Soft 3.0 Terminal, the report can be set in a way that a regular data export occurs.

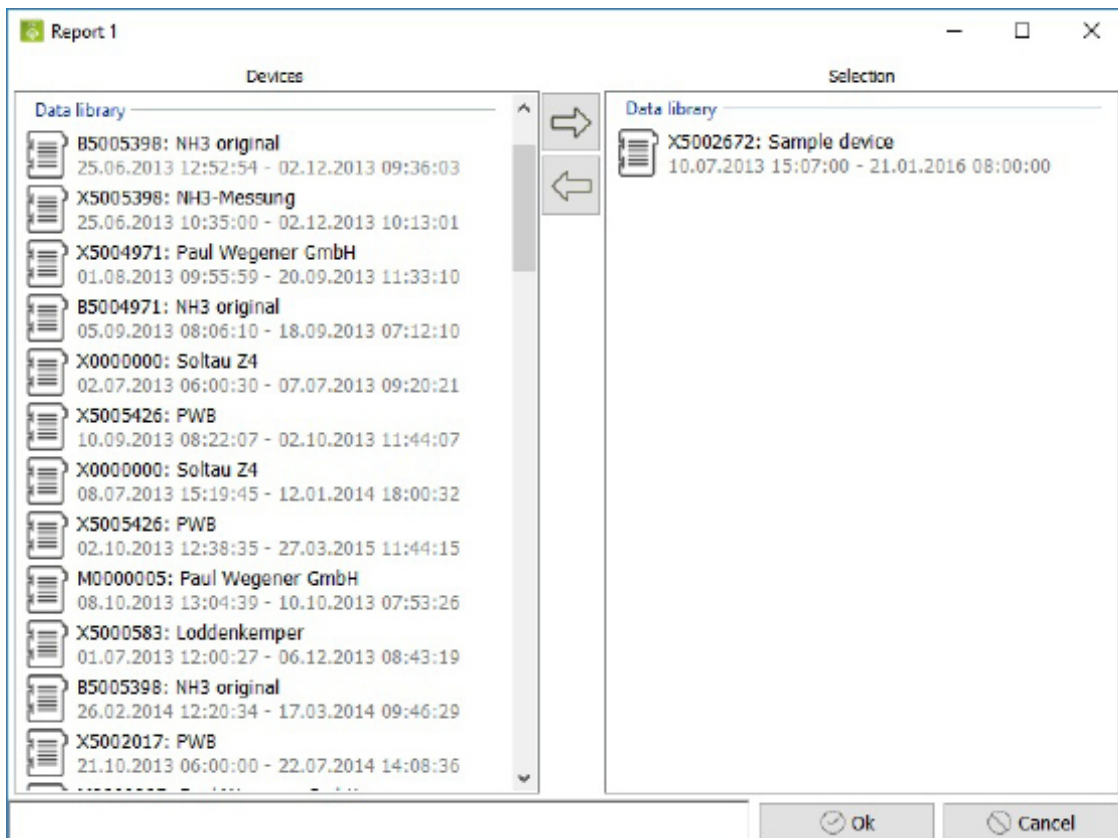


Report dialog

Opens the report dialog which includes a list of the specified reports. It is for setting automatic export of performance data at a specified time and over a specified period.

Add	Adds a new report in the list.
Remove	Removes the chosen report from list.
Devices	Opens a dialog for selecting the devices for which the selected report shall be executed.
Execute	Performs the chosen report immediately.

State	Specifies whether the report shall be done or not.
Name	A description of a report.
Save	Determines output directory.
- Status	Standard: Output directory is the standard data path. User-defined: Output directory is the user-defined folder.
- Folder	The user-defined folder.
Filemask	Determines the mask which specifies how the filename shall be created.
- Status	Standard: Standard filemask is used User-defined: A user-defined filemask is used.
- Filemask	The user-defined filemask.
- Sample	Preview, how a filename with selected filemask looks like.
Output format	Determines the file formats where the report is displayed.
- CSV file	Specifies, whether the report shall be saved as CSV file.
Date/time	Specifies, whether date and time shall be in one or separate columns.
Type label	Specifies, whether the type label shall also be written in the file.
Separator	Specifies the separator in CSV files.
Point in time	Determines the moment where the report is created. This can be a non-recurring or a recurring event.
Time period	Specifies the period of performance data for the report. This one can be entered absolutely or relatively to the particular report time.
Section	Determines, whether only a particular section of the period shall appear in the report (e.g. only data from 06.00 to 18.00 of a particular week are required).
Devices	Includes the selection of devices where the report shall be carried out for.





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