



PAULWEGENER
MESSTECHNIK SEIT 1921

Operating manual

Data acquisition system

PWBlogg

Type: N6/60



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Design and specifications are subject to change without notice.

General safety precautions

- This device must only be installed and operated in accordance with instructions and warnings of the technical documentation.
- Only qualified personnel is allowed to install and operate this device.
- The data logger's power supply is done by a lithium ion rechargeable battery.
- When installing and operating these devices, please note the following safety instructions:
- Only charging units delivered by manufacturer must be used. Failure to do so will result in serious damage to the device and in accidents.
- Pay attention to the integrity of all connection lines. In the event of cable damage, the device must be deactivated at once. Please contact manufacturer for repair.
- Do not short-circuit the rechargeable battery, do not open it, do not throw it into fire, do not extinguish it with water! **EXPLOSION HAZARD!**
- If fluid from battery pack gets on your skin or into your eyes, rinse with plenty of water and see a doctor.
- Do not use damaged rechargeable batteries!



Attention: The device consists of electrostatically sensitive components. Pay attention to the 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.
- Connecting and disconnecting the plug connectors is 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 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 „online outlet“ for data transmission and data logger configuration must only be used in case of non-existence of an explosive atmosphere. If not used, the „online outlet“ must be closed with the dedicated cap.
- Charging the accumulator must only be done outside potentially explosive areas.
- Check whether there is a necessity of embedding into the potential equalization of the equipment or the metering point! This potential equalization can happen via process (pressure) connection of the data logger or via the dedicated ground connection.

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

All subsequent modifications to the device result in the consequence that a secure use is no more guaranteed within ex-zone 2 and the EU-declaration of conformity loses its validity.

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1 Start-up instruction

Please note the following references during the first initiation of the data logger:

- Install the software PWB-Soft including driver for the USB cable on your PC/laptop.
- Thereafter, connect the data logger to the PC/laptop using the provided PC data cable. For that, take an unused interface of your PC.
- Start the software.
- Set up the serial interface in the dialog box „Settings“ of menu item „File“. You will recognize the interface by the indication (USB).
- Establish connection 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 and start measurement is dated ahead by one year when delivering the device in order to take care of the accumulator.
- After confirming by „OK“, the data logger will be configured again and the memory will be cleared. Measurement can start now.
- Note that measurement starts only when exceeding the preset time of measurement start.

2 Data logger PWBlogg N6/60

The data logger has been particularly developed for logging pressure and temperature readings. Because of its solid stainless steel case, the data logger is particularly suitable for net analysis in the field of gas and water. The measurement range begins at 50 mbar.

Data logger

The data logger has an integrated analog digital converter with high resolution which is responsible for logging and digitizing pressure and temperature readings. A microprocessor stores the readings in the integrated memory. At its highest expansion stage, it can log 3,8 million readings. Data logger parameterizing as well as reading and evaluating performance data is done on any PC, laptop or netbook with Windows operating system by using PWB-Soft 2.1. Just a USB interface for connecting the reading cable is necessary.

Pressure measurement

Pressure can be recorded both relatively and absolutely. Relative pressure measurement is done zero-referenced against ambient air pressure on site. A waterproofed pressure equalization element provides pressure equalization inside the housing. To protect the pressure equalization element optimally from permanent moisture penetration by submergence of the metering point, this element is connected to the data logger by a tube. The pressure equalization element can be optimally positioned by a flexible fastener.

When taking absolute measurement, no pressure equalization is necessary as pressure is measured against vacuum or a fixed pressure. To calculate relative pressure, the absolute reading can be offset against the air pressure metered on-site and, hence, the relative pressure can be determined. But this method is predominantly qualified for pressure reading in the bar range!

2.1 Data logger parameters

Following, relevant settings for recording and saving performance data can be adapted to measurement requirements by means of the configuration dialog of the PWB-Soft on PC/laptop/netbook/pocket PC:

- Identification (eg company address)
- Short text (location, project number)
- Start measurement (date/time)
- Intervall 1 and interval 2
- Threshold defaults for analog channels
- Way to store performance data (ring memory / linear memory)

Start measurement

The start measurement determines date and time of measurement commencement. Hence, this field undertakes two important tasks. On the one hand, a synchronous measurement start for land measuring can be set (all loggers commence measurement at the same time). On the other hand, this field is used for permanent deactivating measurement. As long as start measurement is not reached, the logger is in energy saver mode. When the logger is not used, that way it can be simply deactivated.

Identification/Short text

The fields Identification and Short text can be used for saving any descriptive information eg location or project. The Short text can additionally be useful as default for saving performance data on PC, laptop or netbook.

Interval 1 und interval 2

Two increments (sample rate) for logging and saving performance data can be set. Interval 1 is adjustable from 1s up to 1h and is used for logging performance data during normal operation. Interval 2 can be set from 1s (optional 10ms) up to 1min. It will be activated once a threshold violation is recognized.

Threshold monitoring

The data logger provides specifying thresholds and records threshold violations by means of a second sample rate. Additional to the threshold, a hysteresis can be specified

Furthermore, the data logger has an implemented sniff-mode. This mode is enabled in case alarm limits have been adjusted. Whenever the device is not used, the sniff-mode saves energy and starts measurement automatically.

Data logging starts in this mode only if the adjusted alarm limits are not exceeded or fallen below. If e.g. for the device's pressure channel a lower threshold of 20 mbar is adjusted, data logging will not start until the pressure value is above 20 mbar.

Note: The sniff-mode only takes effect at measurement start! When removing the device at the end of measurement, logging does not stop automatically! The sniff-mode will only be activated again after reading and restarting the device.

Important parameters to monitor thresholds are described as follows:

Storage mode

The storage mode specifies whether performance data are supposed to be always recorded or in case of an alarm only. That way it provides event-driven data recording.

Sample mode

The sample 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 will be 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!

Shorted alarm storage

In case of a threshold violation normally data recording will be 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 (eg 2 x 5 min). Subsequently, it is continued to measure in interval 2 but recorded just with the cycle of interval 1.

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.

2.2 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 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	reading 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

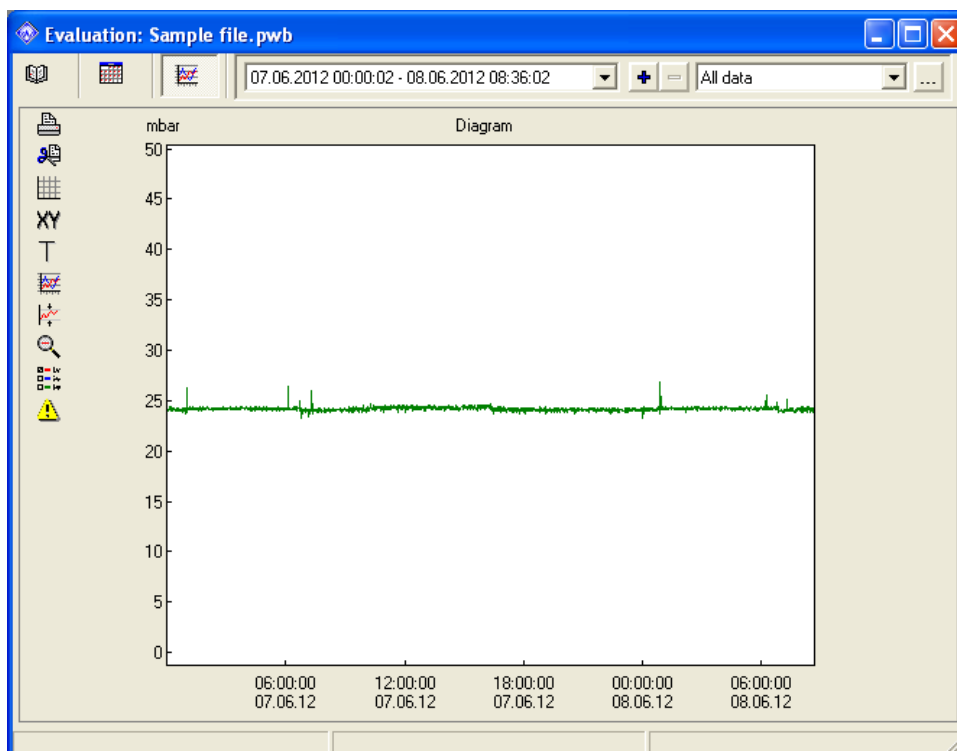
Potential error sources are non-linearities of AD converter which are irrelevant on resolution of 8 bit or 12 bit. However, another important one is the digital step at small resolutions. At the limit of two sequent digital values, the tolerance between the measured (in digital steps presentable) and the real value (other sources of error excluded) already amounts $\frac{1}{2}$ 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.

2.3 Data communication

The specially developed software PWB-Soft provides data communication with the data logger N6/60. Any necessary parameters on measurement are set here. For that purpose this software provides different dialog windows.

Performance data evaluation can be done in tabular form or as chart.

Date/Time	Pressure (mbar)
07.06.2012 00:00:02	24,15
07.06.2012 00:01:02	24,15
07.06.2012 00:02:02	23,89
07.06.2012 00:03:02	24,17
07.06.2012 00:04:02	24,00
07.06.2012 00:05:02	24,08
07.06.2012 00:06:02	24,15
07.06.2012 00:07:02	24,09
07.06.2012 00:08:02	24,09
07.06.2012 00:09:02	24,09
07.06.2012 00:10:02	24,37
07.06.2012 00:11:02	24,36
07.06.2012 00:12:02	24,23
07.06.2012 00:13:02	23,99
07.06.2012 00:14:02	24,19
07.06.2012 00:15:02	23,97
07.06.2012 00:16:02	24,27
07.06.2012 00:17:02	24,10
07.06.2012 00:18:02	24,13
07.06.2012 00:19:02	23,97
07.06.2012 00:20:02	24,13
07.06.2012 00:21:02	24,07
07.06.2012 00:22:02	24,07



Individual periods can be enlarged by the integrated zoom function.

3 Charging the built-in accumulator


- For charging the accumulator, use the provided original charger exclusively
- Make sure that the charger's specified input voltage corresponds to your local supply voltage.
- The used power socket must be accessible throughout entire charging process.
- While charging, temperature must be between +10°C and +45°C.
- The status LED's of the charger indicate charge state during process (red = charging, green = charging finished)
- Charging an empty accumulator takes about 3 hours.
- You can inform yourself on accumulator's residual capacity by means of the PC software PWB-Soft.
- To preserve the accumulator, you should deactivate measurement when not needed for some time by setting measurement start ahead. The ideal storage residual capacity is about 20%, never store with an empty accumulator.

Note: Depth discharge damages the accumulator permanently.

When falling below minimum voltage, data logging will be stopped. The data logger will be operated in power-saving mode. If the accumulator's residual capacity falls below 20%, then, at the latest, it should be recharged. We recommend 100% charging prior to any operation.

The accumulator must not be replaced by user. If for your N6/60 a new accumulator is needed, forward the device to the manufacturer for replacement.

4 Technical specifications

Case	stainless steel, approx. Ø 60 x 177 mm
Degree of protection	IP67
Transducers	pressure transducer DS1/40 0...50 bar up to 0...70 bar optional: temperature transducer (internal/external) -20...60°C
Data memory	256kB, up to 3,8 MB
Threshold	adjustable upper and lower limit value and hysteresis
Sample rate	freely adjustable 1s up to 1h
AD converter	8 bit (256 digital levels, $\pm 1/2$ 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	serial interface, 9600 Bd, max. 115200 Bd when reading data
Power supply	7,2V lithium ion accumulator (3100 mAh) 7,2V lithium battery (2100mAh), optional
Operating/storage Temperature	-20..60°C
• Explosion protection	 II 3G Ex ec [ic Gc] IIC T4 Gc X (optional)
• Environment	$-20^{\circ}\text{C} \leq T_a \leq 60^{\circ}\text{C}$

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 μ F
Inductance L0:	925 mH

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

4.1 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.

4.2 Estimation of accumulator service life

Following table contains accumulator durations depending on preset sample rate and based on following assumptions:

- constant ambient temperature of 20°C
- constant power consumption of built-in components
- no capacity loss by aging of the accumulator/self-discharge
- no fault current due to defective components

As the above-mentioned exceptions are unrealistic, to be on the safe side, we assume 60% of the real accumulator capacity is provided only. For calculation, the underlying standby current of the system will be increased by factor 2. Though deviations (positive, negative) can not be excluded from mentioned duration!

Sample rate in s	Battery service life in days
1	131
2	202
5	297
10	352
15 and more	approx. 1 year

5 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 Paul Wegener 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 Paul Wegener GmbH and the amount which was delivered by the Paul Wegener GmbH.

The end user bears the forwarding charges.

EU-DECLARATION OF CONFORMITY

Product name:

PWBlogg N6/60

The specified product is 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 has 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

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The special conditions for use in gas explosion-hazard areas must be observed!

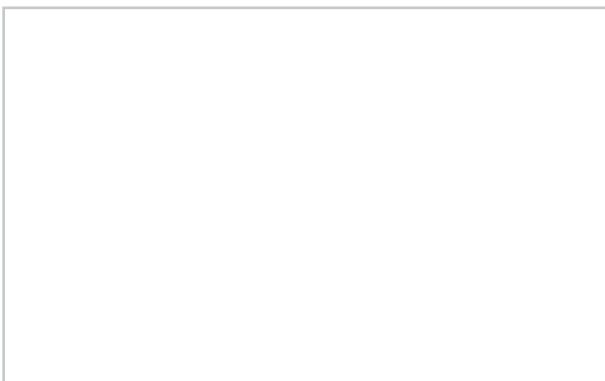
Ballenstedt, 09.05.2022



Wegener
Managing Director

6 Troubleshooting

Problem	Measure
Software reports: „No modules found!“	Check the following: <ul style="list-style-type: none"> • whether the correct interface has been chosen • whether the cable to data logger and PC is connected properly • A defective accumulator can not be charged, not even by mains adapter. The data logger can not be connected without power supply! In this case, have the accumulator replaced by manufacturer.
No data stored in controller	Check, whether: <ul style="list-style-type: none"> • a preset start time has been reached • all transducers and cables are functional Have checked by manufacturer, whether: <ul style="list-style-type: none"> • accumulator is functional • moisture has been intruded into the data logger
Accumulator is low	Have it replaced by manufacturer
Password forgotten	Read out performance data, send reading file to manufacturer
Software does not read performance data completely or reports errors when reading out the data	Check, whether: <ul style="list-style-type: none"> • the PC data cable is properly connected Have checked by manufacturer, whether: <ul style="list-style-type: none"> • moisture is intruded in the data logger • accumulator of the data logger is functional Connect it directly again (menu item „module/connect“) and start reading performance 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, extend periods for activating standby functions or switch off the power management.



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