PAULWEGENER
MESSTECHNIK SEIT 1921

Operating manual

Data acquisition system

PWBlogg

Type: N7

Paul Wegener GmbH
Marienstraße 24
D-06493 Ballenstedt

14. Edition 2022, Editing Date 06/22

© Paul Wegener GmbH, Ballenstedt

All rights reserved. No section of the operating manual may be replicated or processed, duplicated or distributed using electronic systems in any way (print, photocopy, microfilm or other methods) without prior written permission of the Paul Wegener GmbH.

Design and specifications are subject to change without notice.

General safety precautions

- 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 maufacturer 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 (EPL Gc)

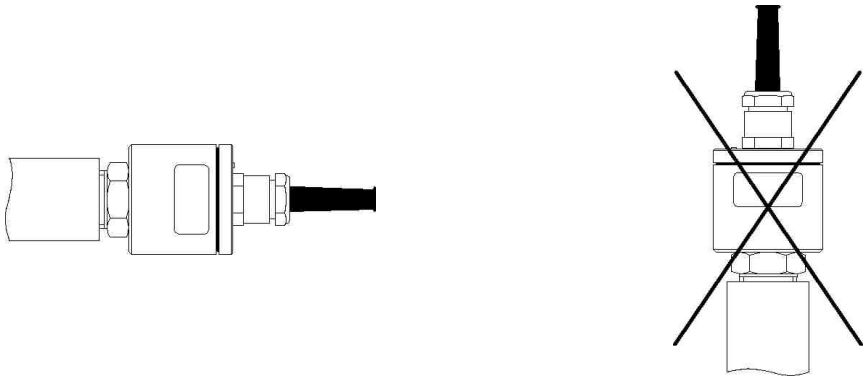
- Mounting and connecting the device must only be done if there is no potentially explosive atmosphere.
- This device must only be used in areas with pollution level 2 as defined in IEC60991-1.
- This device is only suitable in areas with low risk of mechanical hazards.
- Connecting and disconnecting 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.
- 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.

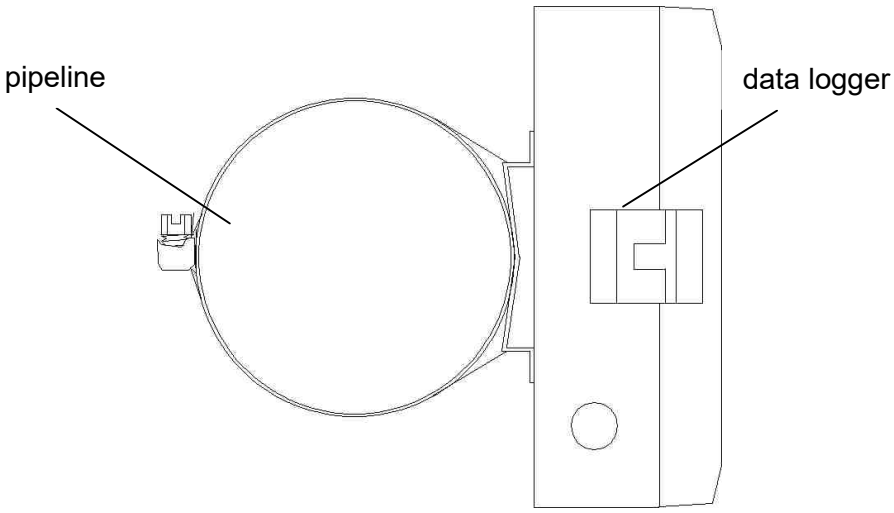
Note: The data logger‘s battery circuit is operatively grounded at its case.

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.

Contents

1	Start-up instruction	6
2	Data acquisition system PWBlogg	6
2.1	Components of data logger PWBlogg N7	6
2.2	Optional equipment features	7
2.3	Transducers	7
2.4	Settings	8
2.5	Threshold indication	9
3	Operating the Datenlogger N7	9
3.1	References on keypad operation	9
4	Main menu of the data logger	10
4.1	Menu items	10
4.2	Password protection	14
5	Measurement	14
5.1	Activating	14
5.2	Alarm message at threshold exceeding	15
5.3	Deactivating	15
6	Backup on MMC/SD	15
6.1	Using the MMC/SD	15
6.2	Generated files	16
7	Notes on use of printer PORTI-W 25	16
8	Battery	17
8.1	Battery check	17
8.2	Battery change	17
9	Accumulator power supply	18
9.1	General safety instructions	18
9.2	Charging the built-in accumulator	19
10	Technical specifications	19
10.1	Data logger	19
10.3	EMV	20
10.3	Standard transducers	20
10.4	Data memory	20
11	Recycling of batteries and old appliances	21
12	Troubleshooting	23

1 Start-up instruction

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

Attention: 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!**

Attention: 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.

2 Data acquisition system PWBlogg

Das Datenmess- und Speichersystem PWBlogg findet seinen Einsatz in der Prozess-überwachung in der Industrie, bei der Lager- und Frachtraumüberwachung nach EU-Richtlinien, bei der Aufzeichnung von Klimadaten, bei der Gebäudeüberwachung, im Rohrleitungsbau oder beim Transport von Lebensmitteln oder leicht verderblichen Gütern.

2.1 Components of data logger PWBlogg N7

The data acquisition system PWBlogg 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.

Figure 1 type N7/180

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

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 PWBlogg 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 N7/180 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/SD connection
The transmission of measuring data from internal memory to the MMC/SD is done by menu command or automatically at full memory as well as in case of power failure of data logger. The MMC/SD can also be used for reconfiguration 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 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 as chart. Data logging can also be observed online at PC.

2.2 Optional equipment features

- 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 message 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
- Type for 19“ rack mounting

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 PWBlogg. 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. 64 transducers can be connected at the same time (depending on type). If it is not feasible to connect all transducers inside the data logger case, external transducer modules can be used for further signals.

Analog inputs
Analog transducers record analog signals such as pressure, temperature etc. For each transducer the resolution 8 bit, 12 bit, 14 bit or 16 bit can be adjusted separately. For each analog input can be adjusted a lower and an upper limit as well as a hysteresis. Fluctuations of the alarm output within the threshold between the adjusted limit value and the standard operating range can be prevented by means of a hysteresis. So that simple control tasks can be put into effect.

Status inputs
The status inputs 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 N7 are able to record pulse signals (eg via Open Collector, Namur, Reed Contact. 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.
Counting inputs can be operated as NF inputs (< 5 Hz) or as HF inputs (> 5 Hz). NF inputs are debounced on the part of the software. HF pulses are not debounced.
Measuring ranges of the transducers connected to the data logger are configured by manufacturer and can not be changed by user.

2.4 Settings

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

- Identification (e.g. company address)
- Abbreviation (location/time)
- Measurement start (date/time)
- Sample rate (min 1ms; max 1h)
- Alarm rate (if required)
- Threshold defaults for analog channels
- Storage mode

Following settings can be altered on device:

- Start measurement
- Interval 1 and 2 (sample rate)
- Storage mode
- Channel parameters
- Abbreviation
- Time

Parameters important for threshold monitoring are described as follows.

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.

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 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 indication

If there is a threshold exceeding or if it falls below, arrow symbols will appear on display. Furthermore, the data loggers have 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 Datenlogger N7

The data logger function are controlled by keypad and LCD. Different functions are arranged in a menu structure.

3.1 References on keypad operation

F5 / On/Off
Special key for activating/deactivating measurement or calling main menu.

F1 to F4
Function keys which respective meanings are described in the menu by softkeys. The keys F1 and F4 normally operate as cursors. The respective direction for navigation in the menu is shown on display. Further functions are shown in the menu items.

Enter
Enter opens submenus and alterations accepted.

Esc
Submenus are quitted as well as alert messages are hidden by pressing Esc key.

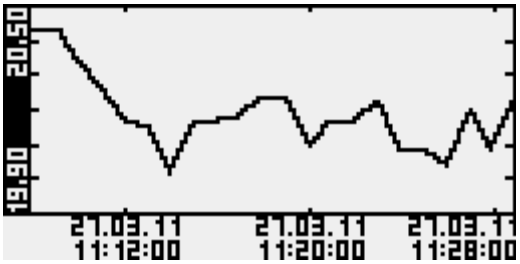
4 Main menu of the data logger

4.1 Menu items

The measurement menu is the top display level. If measurement is deactivated, the message „No measurement planned“ appears. Short pressing F5 or Enter opens the main menu which contains following submenu items:

Evaluation

Chart
The values are displayed grafically here. A cursor menu can be activated by pressing F1 and F4. F1 switches over from first to second cursor there. The cursors can be moved to the left and right using F2 and F3. The cursor area will be accepted and displayed by Enter. Furthermore, the displayed area in the cursor menu can be printed out by pressing F4. After pressing F5, the whole measurement area will be shown again.



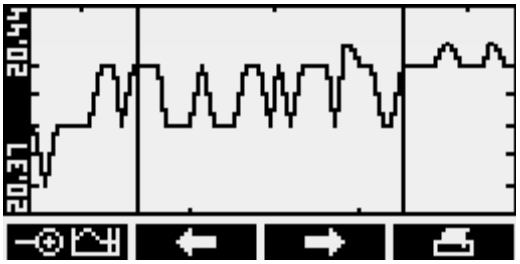
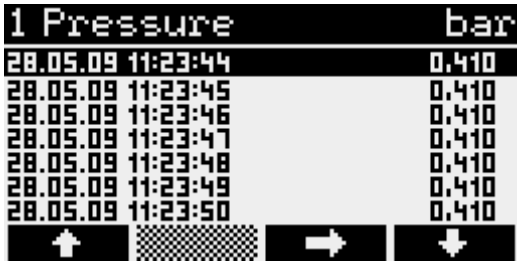
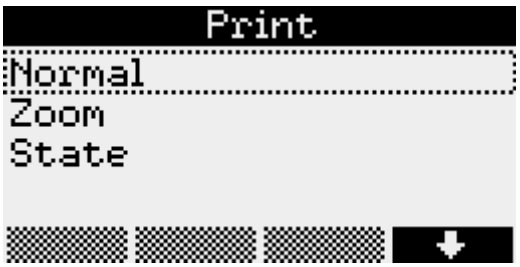


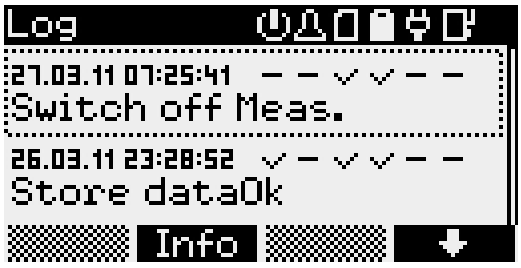
Table
Values are shown in tabular form here. F1 and F4 navigate between data records. Channels can be selected by F2 and F3.



Print
Readings can be printed out here on a connected thermal printer. Graphic output can be done normally or enlarged (zoom). Over and above, current state information can be displayed.



Logbook
Any recorded events eg activated/deactivated measurement are displayed here. You can navigate between entries by F1 and F4.

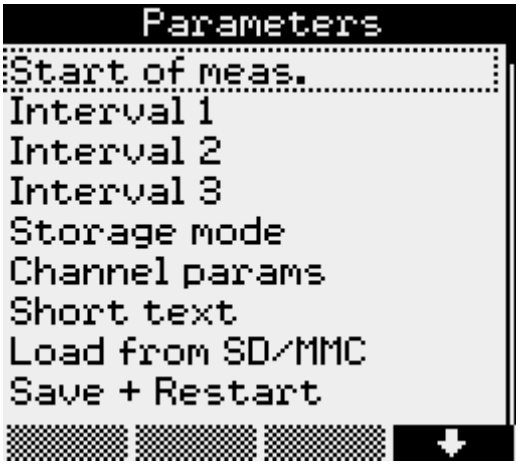


The respective state can be read under the symbols for activated measurement ( ), alarm ( ), memory card ( ), battery ( ), power supply unit ( ) and iModem ( ). Over and above, the information menu can be retrieved by F2.

Backup
This menu item provides the backup function. Data are saved on MMC/SD card. After pressing Enter, the question „Store data?“ will appear. Subsequently, backup can be started by pressing F1.

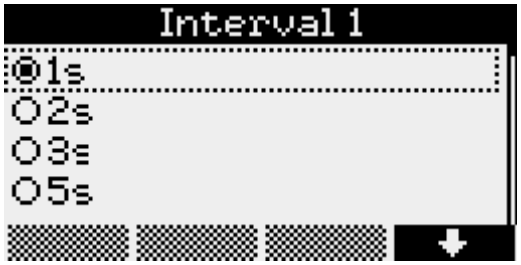
Parameters

Following settings are in the parameters menu:



Start of measurement
You can determine the measurement start under Start meas. The cursor position can be changed by pressing F1 and F4. The respective value can be increased/decreased by F2 and F3.

Interval 1, the period between two reading samples during normal operation, can be set from 1 second up to 60 minutes.

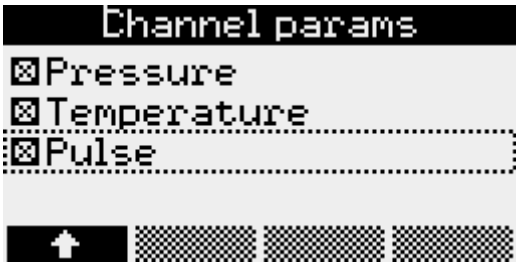


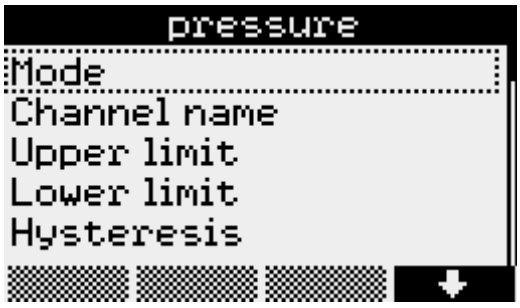
Intervall 2 determines the period between two reading samples in case of alert and provides setting options between 1 second and 1 minute. This period must always set lesser than Interval 1. Readings are logged in Interval 1 during normal operation (depending on storage mode). If a threshold violation is detected, sampling will be switched over to Interval 2 and logged there till the threshold violation is over (under consideration of preset hysteresis values). If „Alarm watching“ is preset, sampling will be done permanently in Interval 2. Thereby threshold violations are quicker detected. Switching over storage interval from Interval 1 to Interval 2 will be done promptly. Please note that frequent sampling increases power consumption of the data logger and hence battery lifetime diminishes!

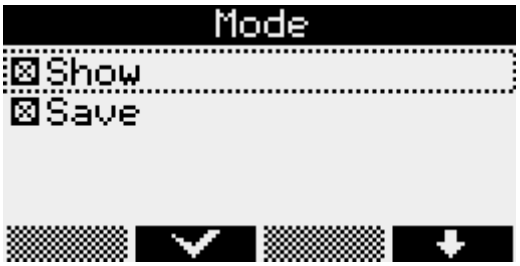
If Gazmodem 2 protocol is activated, the smallest sample rate will be 1 min. This parameter can be customized via entry Interval 3.

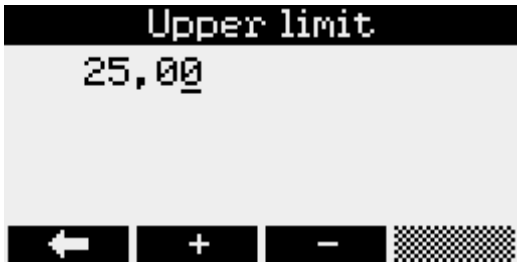
In *Storage mode* can be determined whether Cycle memory shall be activated, so that existing values will be overwritten at full memory, if only alarm values shall be stored, if permanent monitoring shall be done or if alarm values shall only be stored within a limited period to use memory more efficiently.

Channel-specific parameters for all channels of the data logger are set under Channel params. Pressing Enter will open the menu items such as the mode where „Show“ and „“Save“ are set, the „Channel name“ which can be individually allocated, the „Upper“- and „Lower limit“ where, if exceeded, the alert message will be shown as well as the hysteresis which inhibits permanent switching over in case of fluctuations of the reading. These settings can be altered by the navigation keys F1 to F4.





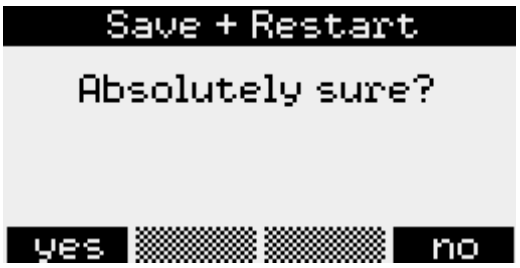




Short text
The cursor position can be changed by F1 and F4 in menu item Short text. Selecting characters of the provided ones can be done by F2 and F3.

Load from SD/MMC
This function facilitates data transmission to the data logger via memory card. Selecting the file to be transmitted is done by F1 and F4. Pressing Enter starts data transmission.

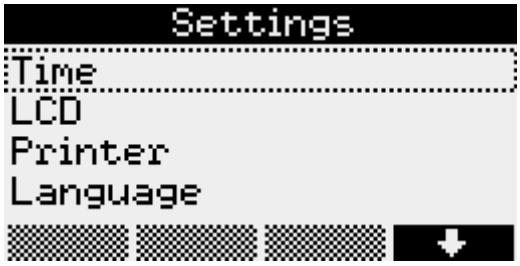
Save + Restart accepts all parameters changed and deletes data memory. The confirmation prompts must be confirmed by Enter.



All parameters will be initially buffered and accepted not until pressing Save + Restart.

Settings

The current time of the data logger is entered here under Time. F1 and F4 are used for that purpose. Changings of values must be confirmed by Enter. After confirmation prompt has appeared, changings can be saved by F1 or undone by F4.



LCD

The period, where after last key pressing the display and illumination shall be switched off automatically, can be set in the menu item LCD time. Furthermore, the display contrast can also be set here. Changings will be saved by pressing Enter. +/- changes for F1 and F4 between input mode for the values to be set and cursor function.

Printer

The printer type to be used can be determined under the menu item Printer and must be confirmed by Enter.

Language

This menu item enables adapting the language of menu navigation. The options include German, English and Polish.

State

This menu item shows currently adjusted Time, the current position (if GPS module is provided only), the Short text entered, free internal Memory, free memory of an inserted MMC/SD card, Operating hrs. of the data logger, state of the Battery, Serial-No of the logger, Built in as well as the Hardware and Firmware version used.

4.2 Password protection

The menu items „Parameters“, „On/Off“ and „Time“ can optionally be protected from unauthorized access. The software PWB-Soft 2.1 provides in its configuration dialog a dedicated input box where a password can be set. Subsequently, that password can be transmitted to the data logger via data cable. If thereafter the menu items „Parameters“, „On/Off“ and „Time“ are called, a prompt for entering that password will appear.

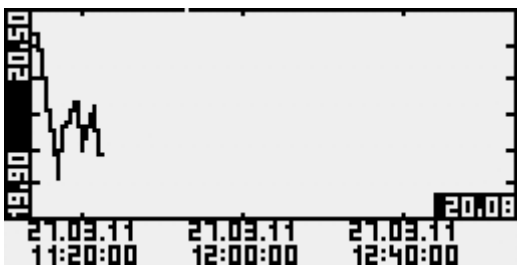
5 Measurement

5.1 Activating

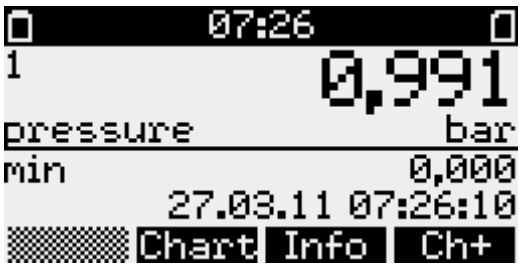
Long pressing F5 key activates measurement. If the main menu is already open, measurement can be started by **short** pressing F5. After confirming the question „Switch on?“ by F1, measurement will start. The current reading will appear on display.

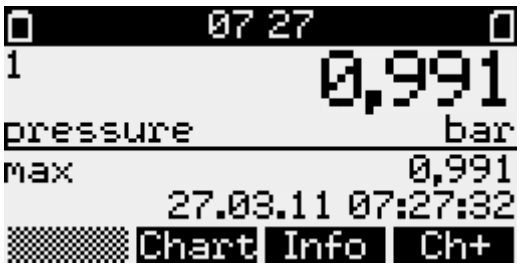
In the top line of this online display are a symbol on battery state, the current time as well as the memory card symbol if an MMC/SD is inserted. The menu item are visible below. If measurement is activated, the additional menu item Reset Min/Max will appear. Minimum and maximum values can be reset here.

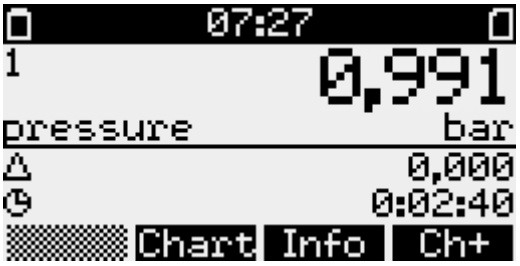
The numbers of the channels are shown on the left. Selecting one of them can be done by F1 and F4. The chart can be displayed by pressing F2. This one adapts itself optimally to the fluctuation range of the values shown.

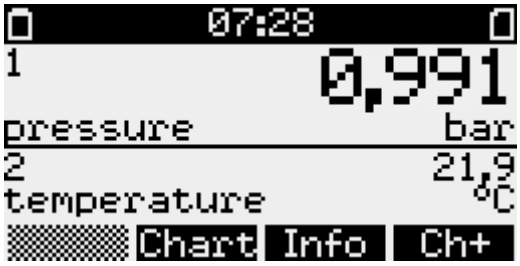


Further information on current channel displayed are provided by pressing the info key F3. There can be navigated between minimum- maximum-, delta value and multi display of all channels.









The delta value is the difference of the current value to the one which was visible when activating measurement last time. Below this difference value you can see the elapsed time since last activating measurement or reset minimum/maximum. When using external transducers (sensor modules), the symbol „*“ after the channel number indicates that the transducer reading could not be retrieved. In this case the reading will be created from the last known one.

5.2 Alarm message at threshold exceeding

If an upper or lower limit preset in the menu item Channel params is exceeded, the message „!!!Alarm!!!“ will appear on display. The alarm message will be hidden by pressing Esc. The arrow symbol after the channel number indicates that the alarm is still recorded. That symbol disappears not until the reading is beyond the alarm range again.

5.3 Deactivating

After pressing F5, the question „Switch off?“ will appear. The measurement can be deactivated by the F1 key. This action can be cancelled by F4.
After deactivating measurement, data will be automatically saved on MMC/SD card. Subsequently, the successful storage process will be shown on display.

6 Backup on MMC/SD

6.1 Using the MMC/SD

The MMC/SD card is in a dedicated slot outside of the data logger and provides data backup and transmitting them wirelessly to PC/laptop.
Backup can be done manually by menu command „Backup“ as well as automatically when deactivating measurement. The memory card should not be removed during storage process, to avoid potential loss of data.
The MMC/SD card can be directly inserted into the slot of the PC/laptop, or, if not provided, plugged in an USB port by means of a card reader. The memory card will be automatically recognized as removable medium. Clicking on the respective drive letter will make data visible. They can be evaluated now by the software PWB-Soft.

Before you remove the MMC/SD card, open the context menu by right mouse click on the drive letter of the memory card and use the function „Remove“.

Correct storage of accumulated data on the external memory card can only be guaranteed if memory cards supplied by the Paul Wegener GmbH are used! Those cards are formatted when delivered, so that they can be used promptly without any further preparations. If, however, there was the necessity to format, the context menu could be opened by right mouse click on the drive letter of the memory card and the function „Format“ could be used. Please note that formatting can only be done using FAT or FAT32, since other file systems are not recognized by the data logger.

6.2 Generated files

When saving the first time, a file will be automatically created on MMC/SD which corresponds to the serial number of the data logger. All reading files will be consecutively stored there, beginning with „DAT_0000. PWB“.

7 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 te built-in character set.
5. The self test automaically 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)

8 Battery

8.1 Battery check

The following battery type can be used for power supply of a data logger:

- 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.
If the battery power falls below 10%, the warning message **“!!!Battery!!!”** will be displayed whenever activating the display.

8.2 Battery change

We recommend, battery change should be done by manufacturer. Please consider following notes if you want to change it by yourself.

General information note on battery change:
Battery change should be carried out without any loss of data when the backup battery is intact. Reading out data prior to battery change is only used as guarantee in case of a discharged backup battery. Changing the backup battery can only be done by manufacturer!

From firmware version 2.1.27 onwards (as of 01/2013), the battery change of N7 devices is facilitated by an own menu item. For this purpose, the menu „settings“ provides the submenu item „battery“, which allows monitoring battery status and battery change.

After confirming the prompt „Change battery?“, the data logger will save the current system status and it will deactivate measurement. The prompts „Change battery!“ and „Press any key“ will appear on display.

Now the battery of the device can be replaced by a new one as follows.

- A corresponding battery type is obtainable from manufacturer. The 7,2V-battery pack is equipped with a special pin-and-socket connector.
- Unscrew the cross-head screw of the housing.
- Loose the pin-and-socket connector at 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 the new battery with the pin-and socket connector of the data logger.
- Close the housing again without crimping the connecting cable inside.

After subsequent arbitrary keypress, the enquiry „Battery changed?“ will appear. If this is confirmed by „yes“, the current date will be entered and the battery status will be reset to 100%.

If the device deactivates itself when changing battery, then the internal clock battery is discharged!
Though, battery change can be done safely. However, it is recommended, as the case may be, to have the battery changed by manufacturer within the scope of the scheduled maintenance.

To refresh the battery date, even if the backup battery is discharged, the menu item „settings/battery“ can be called again. When doing so, confirm any prompts in the same way as you do when changing battery, without removing it again!

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!

9 Accumulator power supply

9.1 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, 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.

9.2 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.

10 Technical specifications

10.1 Data logger

Housing	180x140x80 mm; mobile and stationary application, degree of protection IP 65
Signal inputs	up to 64 signals can be registered
Analog 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	floating distance contact, optional: Namur or other signal forms pulse width > 10ms, max. 50 pulses per second, logging of meter readings and flows
Data memory	256kB, optional 512kB, 1024kB or 2048kB optional changeable memory card (MMC/SD up to 4GB)
Limit value	adjustable upper and lower limit value for each analog channel
Sampling rate	adjustable using discrete steps from 1s to 1h (optional: from 10ms)
AD-converter	8 bit (256 digital levels, ±½LSB) 12 bit (4096 digital levels, ±1LSB) 14 bit (16384 digital levels, ±1LSB) 16 bit (65536 digital levels, ±1LSB)
Real time clock	deviation 5 ± 23 ppm Δf/f0) at 25°C
Storage mode	cycle memory mode (overwrites oldest data at full memory) or straight memory mode (stops at full memory)

Interface	USB, RS232, 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	128x64 pixels, 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)
Operating temperature	-20..60°C
Storage temperature	-20..70°C

- Explosion protection ⟨Ex⟩ II 3G Ex ec nC [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!

10.3 EMV

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

10.3 Standard transducers

Transducer type, dimensions	Measuring range	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.

10.4 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.

11 Recycling of 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 N7/180, N7/360, N7/400

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
2014/53/EU radio equipment (RED)

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	potentially explosive atmospheres - section 0: equipment - general requirements
EN 60079-7:2016-08	potentially explosive atmospheres - section 7: equipment protection by increased safety „e“
EN 60079-11:2012-06	potentially explosive atmospheres - section 11: equipment protection by intrinsic safety „i“
EN 60079-15:2020-03	explosive atmosphere - section 15: equipment protection by ignition protection type „n“

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

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

Manufacturer:

Paul Wegener GmbH
Marienstraße 24
D-06493 Ballenstedt
Tel.: +49(0)39483 96 300
Fax.: +49(0)39483 96 400
Internet: www.paul-wegener.de
e-mail: info@paul-wegener.de

The safety advice of the product documentation must be followed!

Ballenstedt, 21.07.2022

Wegener
Managing Director

12 Troubleshooting

Problem	Measure
Software reports: „No modules found!“	Check the following: • if correct interface chosen • if cable to data logger and PC is connected properly
No data stored in controller	Check, if: • 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: • 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 • orrect type of modem was selected in dialog „settings“ when configurating If you use a GSM modem, check in addition if: • 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: • initialization parameters are supported by your modem
Software does not read measuring data completely or reports errors when reading out the data	Check, if: • all cable connections are made properly • moisture has been intruded in the data logger • battery of data logger is functional Connect it directly again (menu item „module/connect“) and start reading out 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, 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.

PAULWEGENER
MESSTECHNIK SEIT 1921

Paul Wegener GmbH
Marienstraße 24
D-06493 Ballenstedt
Tel.: +49 (0) 39483 96 300
Fax: +49 (0) 39483 96 400
Internet: www.paul-wegener.de
e-mail: info@paul-wegener.de

Most recent amendment: 17.06.2022