Automotive
Energy & Power Analysis
Aerospace & Defense
Transportation
General Test & Measurement

DEWE-x38-PNA

User Manual

ISO9001

Re-inventing Data Acquisition

MARLIN POWER MEASUREMENT

worldwide DEWETRON

www.dewetron.com

Table of content

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Power Network Analyzer and Fault Recorder

DEWE-638-PNA and DEWE-838-PNA

Current inputs are allowed to be used only with current clamps which are Type A. That means there is double insulation between conductor being measured and clamp circuit. If the current clamp is not insulated from conductor measured then there is risk of electric shock at interfaces. The current clamp can be used to measure current through conductor at 250 Vac OVC IV. Current input must not be connected to supply voltage.

Voltage range is 400 V CAT III, 300 V CAT IV. If the unit is used in a manner not defined by manual, degree of protection can be impaired.

Input fuse: F 2A, used lithium battery on motherboard Panasonic BR2632A 3V

1.1 Safety Informations

Observe precautions for handling electrostatic sensitive devices!

Indicates hazardous voltages.

Indicates the chassis terminal.

WARNING Calls attention to a procedure, practice, or condition that could cause bodily injury or death.

CAUTION Calls attention to a procedure, practice, or condition that could possibly cause damage to equipment or permanent loss of data.

General safety and hazard warnings.

Appliance class II symbol.

1.2 General safety and hazard warnings

Your safety is our primary concern!

- Use this system under the terms of the specifications only to avoid any possible danger. If the unit is used in a manner not specified by the manufacturer the protection can be impaired!

- This product is intended for use in industrial locations. As a result, this product may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interferences to the reception of radio and television broadcasts.

- Maintenance will be executed by qualified staff only.

- During the use of the system, it might be possible to access another parts of a more comprehensive system. Please read and follow the safety instructions provided in the manuals of all other components regarding warning and security advices for

using the system.

- With this product, only use the power cable delivered or defined for the host country.

- Do NOT connect or disconnect sensors, probes or test leads, as these parts are connected to a voltage supply unit.

- Please note the characteristics and indicators on the system to avoid fire or electric shocks. Before connecting the system, please carefully read the corresponding specifications in the product manual.

- The power cord separates the system from the power supply. Do not block the power cord, since it has to be accessible for the users.

- DO NOT use the system if equipment covers or shields are removed.

- Any use in wet rooms, outdoors or in adverse environmental condition is not allowed!
  Adverse environmental conditions are:
  - Moisture or high humidity
  - Dust, flammable gases, fumes, or dissolver
  - Thunderstorm or thunderstorm conditions (except assembly PNA)
  - Electrostatic fields, et cetera.

- Any direct voltage output is protected with a fuse against short cut and reverse-polarity, but is NOT
  galvanically isolated (except it is explicit marked on the system).

- The system must be connected and operated to an earthed wall socket at the AC mains power supply
only (except for DC systems).

- Any other use than described above may damage your system and is attended with dangers like shortcut, fire or electric shocks.

- The whole system must not be changed, rebuilt or opened.

- If you assume a more riskless use is not provided anymore, the system has to be rendered inoperative and should be protected against inadvertent operation. It is assumed that a more riskless operation is not possible anymore, if

- the system is damaged obviously or causes strange noises.

- the system does not work anymore.

- ❑ system has been exposed to long storage in adverse environmental.
- ❑ the system has been exposed to heavy shipment strain.

❑DO NOT touch any exposed connectors or components if they are live wired. The use of metal bare wires is not allowed. There is a risk of short cut and fire hazard!

❑Waranty void if damages caused by disregarding this manual. For consequential damages NO liability will be assumed!

❑Waranty void if damages to property or persons caused by improper use or disregarding the safety instructions.

❑ Unauthorized changing or rebuilding the system is prohibited due to safety and permission reasons (CE).

❑The assembly of the system is equivalent to protection class I. For power supply, only the correct power socket of the public power supply must be used, except the system is DC powered.

❑Be careful with voltages >25 V**AC** or >35 V**DC**! These voltages are already high enough in order to get a perilous electric shock by touching the wiring.

❑The product heats during operation. Make sure there is adequate ventilation. Ventilation slots must not covered!

❑Only fuses of the specified type and nominal current may be used (F 2A). The use of patched fuses is prohibited.

❑Prevent using metal bare wires! Risk of short cut and fire hazard!

❑Make sure that your hands, shoes, clothes, the floor, the system or measuring leads, integrated circuits and so on, are dry.

❑DO NOT use the system in rooms with flammable gases, fumes or dust or in adverse environmental conditions.

❑Avoid operation in the immediate vicinity of:
- ❑ high magnetic or electromagnetic fields
- ❑ transmitting antennas or high-frequency generators

❑For exact values please refer to enclosed specifications.

❑Use measurement leads or measurement accessories aligned to the specification of the system only. Fire hazard in case of overload!

- ❑Do not switch on the system after transporting it from a cold into a warm room and vice versa. The thereby created condensation may damage your system. Acclimatize the system unpowered to room temperature.

- ❑Do not disassemble the system! There is a high risk of getting a perilous electric shock. Capacitors still might charged, even the system has been removed from the power supply.

- ❑The electrical installations and equipments in industrial facilities must be observed by the security regulations and insurance institutions.

- ❑The use of the measuring system in schools and other training facilities must be observed by skilled personnel.

- ❑The measuring systems are not designed for use at humans and animals.

- ❑Please contact a professional if you have doubts about the method of operation, safety or the connection of the system.

- ❑Please be careful with the product. Shocks, hits and dropping it from already lower level may damage your system. For exact values please refer to enclosed specifications.

- ❑Please consider the security advices of the connected systems.

This product has left the factory in safety-related flawless and proper condition. In order to maintain this condition and guarantee safety use, the user has to consider the security advices and warnings in this manual!

EN 61326-3-1:2008
IEC 61326-1 applies to this part of IEC 61326 but is limited to systems and equipment for industrial applications intended to perform safety functions as defined in IEC 61508 with SIL 1-3.

The electromagnetic environments encompassed by this product family standard are industrial, both
indoor and outdoor, as described for industrial locations in IEC 61000-6-2 or defined in 3.7 of IEC 61326-1. Equipment and systems intended for use in other electromagnetic environments, for example, in the process industry or in environments with potentially explosive atmospheres, are excluded from the scope of this product family standard, IEC 61326-3-1.

Devices and systems according to IEC 61508 or IEC 61511 which are considered as

“operationally well- tried”, are excluded from the scope of IEC 61326-3-1.

Fire-alarm and safety-alarm systems, intended for protection of buildings, are excluded from the scope of
IEC 61326-3-1.

1.3 Trainings

DEWETRON offers training at various offices around the world several times each year. DEWETRON headquaters in Austria have a very large and professional conference and seminar center, where training classes are conducted on a regular basis starting with sensors and signal conditioning, A/D technology and software operation. For more information about training services, please visit: http:// www.dewetron.com/support/training

Dewetron Inc. in the USA also has a dedicated training facility connected to its headquarters, located in Rhode Island. For more information about training services in the US, please visit: http://www.dewamerica.com/support/trainingsclasses

1.4 Calibration

Every instrument needs to be calibrated at regular intervals. The standard norm across nearly every industry is annual calibration. Before your DEWETRON data acquisition system is delivered, it is calibrated at our DEWETRON headquater. Each of this system is delivered with a certificate of compliance with our published specifications. Detailed calibration reports from our calibration system are available for purchase with each order. We retain them for at least one year, so calibration reports can be purchased for up to one year after your system was delivered.

1.5 Support - Service and repairs

DEWETRON has a team of people ready to assist you if you have any questions or any technical difficulties regarding the system. For any support please contact your local distributor first or DEWETRON directly.

Only the team of DEWETRON is allowed to perform any kinds of repairs to your system to assure a safe and proper operation in future. For information regarding service and repairs please contact your local distributor first or DEWETRON directly.

Any spare parts (screws, backplanes, cables,...) must be obtained from DEWETRON only.

2 General

The small Power Network Analyses are the new generation of Instruments for Power Quality Analysis and Power Fault monitoring. The Interface is based on an internal Web Server and the instruments can be operated with any PC or tablet device, even a small smart phone with integrated web browser. Evaluating exactly according the PQ standard EN50160 and fulfilling the measurement requirements of IEC61000-4-30 Class A are on one hand side the needs for an up to date network analyzer. On the other hand they need a modern user interface combined with newest IT-technology.

The File services allow a quick and simple report generation. With the SQL Server interface it is possible to build a large scaled monitoring system to maintain a complex power grid.Both instruments include the complete functionality in terms of measurement functions and communication interfaces.

The DEWE-638 is the portable version with connectors for Rogowsky Coils, clamps or direct current inputs. The DEWE-838 is the one for permanent installations to use on the secondary side of VTs and CTs.

Key Features

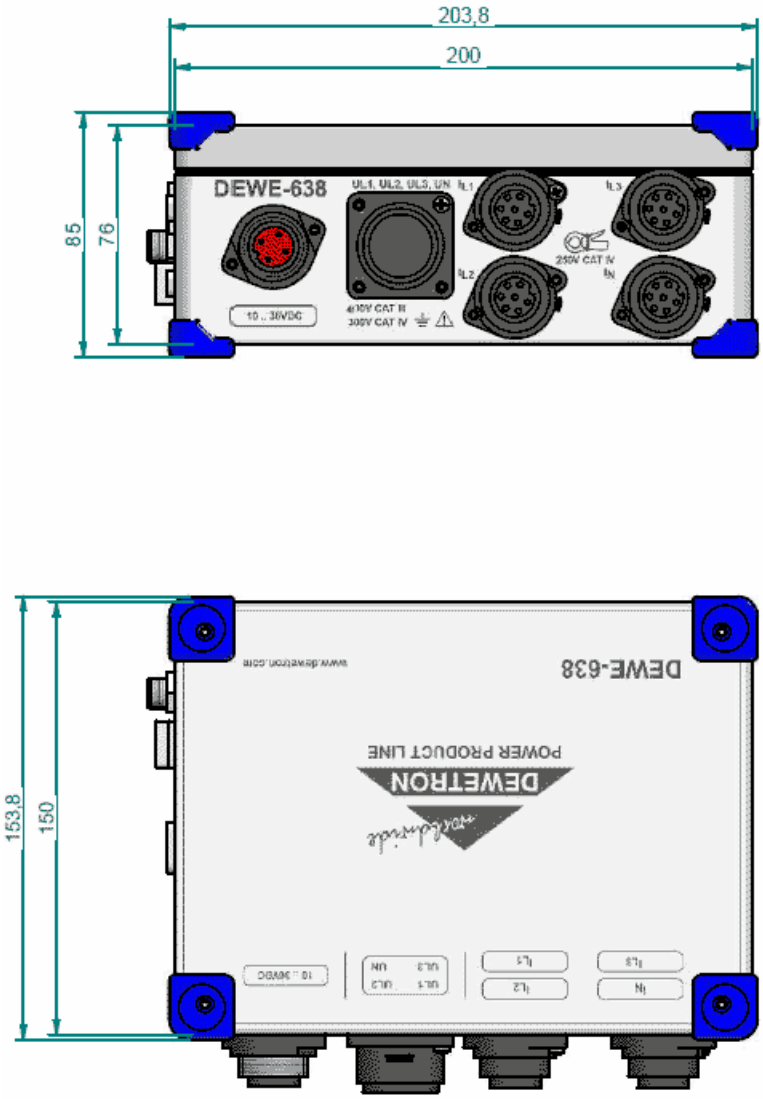
- ❑Monitoring of power supply systems
- ❑EN50160
- ❑IEC 61000-4-30 Class A
- ❑10 cycles RMS and half periodic values
- ❑Harmonics, THD
- ❑Flicker, unbalance
- ❑P, Q, S, D, PF, cos(phi)
- ❑Phase + line voltages
- ❑Voltage variations, sags, swells
- ❑WEB interface
- ❑Local storage and distributed SQL database system

2.1 DEWE-638-PNA

In the following chapters you will find technical information's about DEWE-638-PNA.

2.1.1 Mounting and dimensions

The following figures show the housing and dimensions (millimeters) of DEWE-638-PNA.



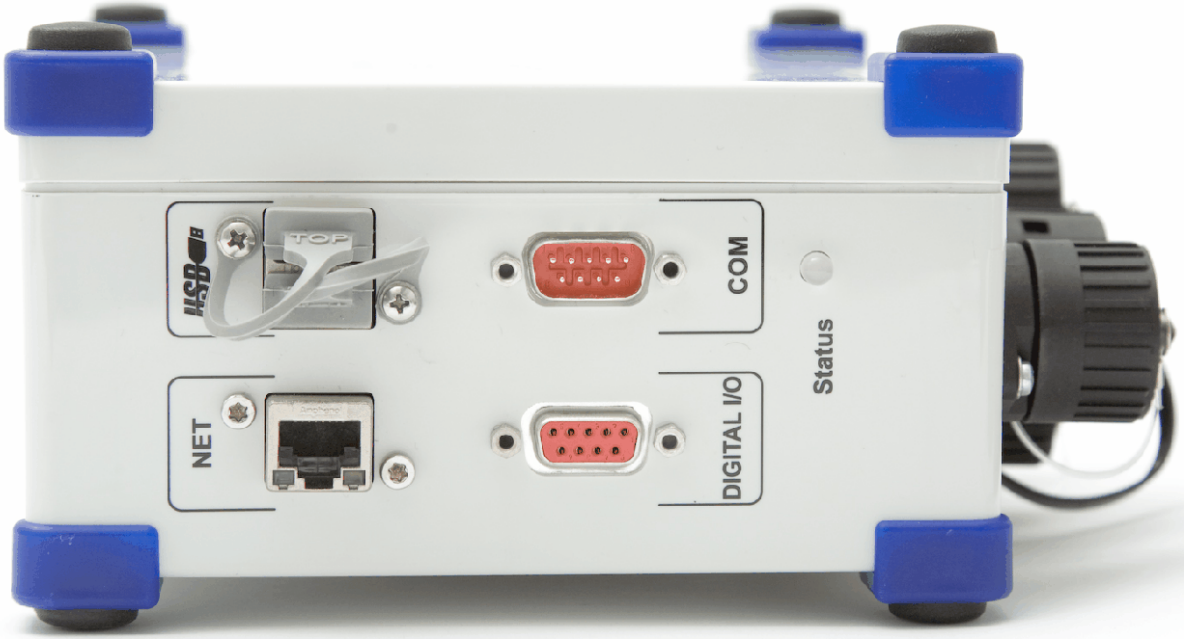
Dimensions DEWE-638-PNA

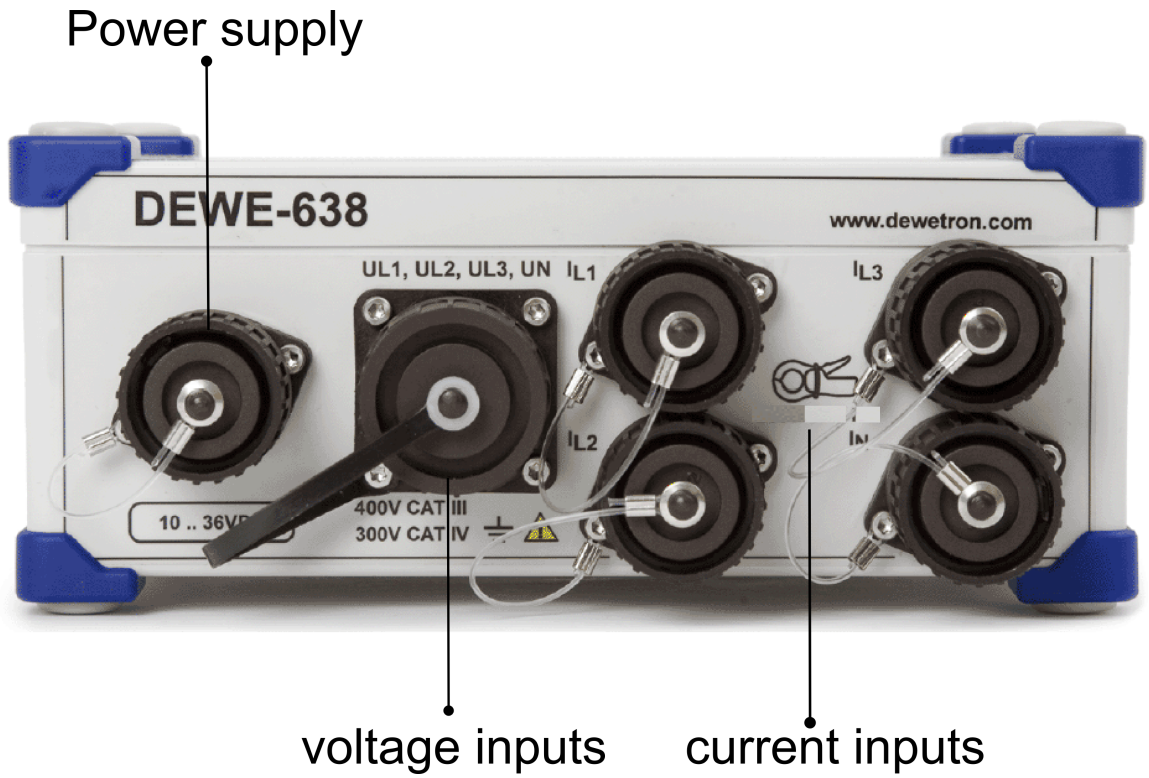
Further information to housing and dimensions are shown in the Datasheet.

2.1.2 Hardware 638-PNA

2.1.2.1 Connectors, versions of DEWE-638-PNA

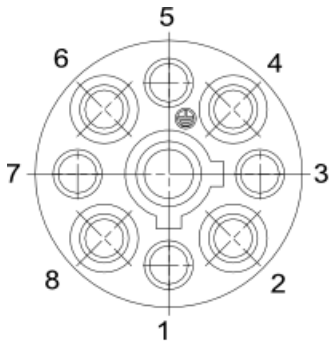
The DEWE-638-PNA is available in two versions. The standard version is equipped with four inputs for voltages and four currents. To measure currents you can choose different transducers (direct current input, PNA-Clamp-5, Flexcoil). You can setup the transducers and inputs in the Analogue setup.





Connectors and housing - DEWE-638-PNA

The DEWE-638-PNA comes with two USB-interfaces, one Network interface (LAN) and one DSUB-connector for the digital in- and output.

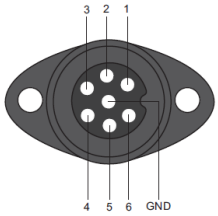


1...U1+(UL1)
2...U1- (UN1)
3...U2+ (UL2)
4...U2- (UN2)
5...U3+ (UL3)
6...U3- (UN3)
7...U4+ (N)
8...U4- (PE)

voltage input

Current connector for current clamps

7-pin AMPFLEX connector (male)



Schematic

Pin assignment
1: (+) Current input (max. 10 A)
2: (-) Current input (max. 10A)
3: (+) AmpFLEX Input
4: (-) AmpFLEX Input
5: n.c.
6: (+) Current clamp
GND: (-) Current clamp

CAUTION: The Voltage input of the current connector is not isolated!
Do not use this for any shunt measurement!

Information to the digital in- and outputs can be found in Analogue setup.

2.1.2.2 Datasheet

DEWE-638-PNA	
4 voltage 4 current	SD Card 2 GB
Internal	
-	-
-	Low power CPU
	-
	1x USB, 1x Ethernet, 1x RS-232
5 A	85 to 265 V_{AC} 50 / 60Hz internal 10 - 36 V_{DC}
10000 A	-
10 kS/s	
	Portable instrument
	200 x 150 x 75 mm (7.9 x 5.9 x 3 in.)
2 x DI for alarm in	Typ. 2.5 kg (5.5 lb.)

	IEC 61000-4-5: 4 kV
	IEC 61000-4-4: 4 kV
	IEC 61000-4-5: 4 kV
	IEC 61000-4-4: 4 kV
	-
	-
	EN 60068-2-27
	EN 60068-2-6, EN 60721-3-2 class 2M2
	-20 to +50 °C

2.1.2.3 Network

To connect the device to a local network (LAN) there is a LAN- Interface provided on the top of the DEWE-638-PNA.

LAN-Interface

Most customers are using special security settings at their company side. Ask your IT-administrator to connect the instrument to the LAN. He will also provide you with the correct settings for database storing (SQL).

Further information's for the network setup can be found in Network configuration.

2.1.2.4 Modem

The DEWE-638-PNA is equipped with an GPRS-Modem. Based on the location of usage and the quality of the radio network connect the included Antenna.

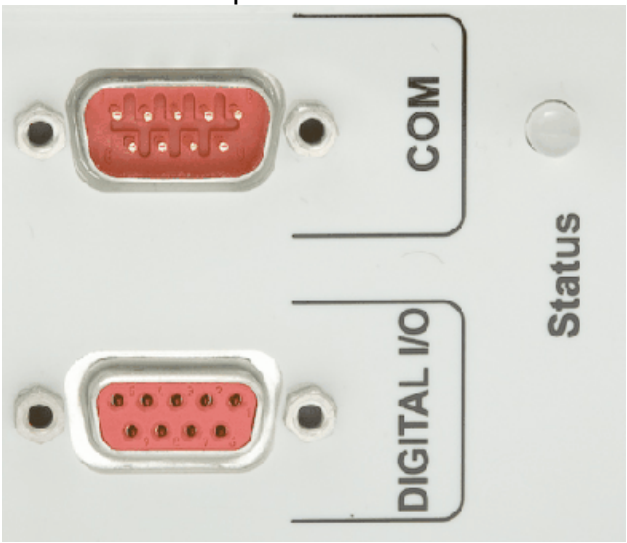
For detailed Information about the Modem and the configuration please refer to the chapter Modem Configuration.

2.1.2.5 Alarm and status Relais

The DEWE-638 is equipped with two Relais (depending on the version). The alarm-relais is used for the output of alarms and events. You will find **NC** *normally closed* contacts and **NO** *normally open* contacts as well. With the status-relais the current status of instrument is shown. The status relais is also equipped with both an normally open contact and an normally closed contact. If the DEWE-638 is storing data the relais is switching.

2.1.2.6 Status indication

The indication LED is based on the top of the instrument.



Status indication

The LED indicates different operation states:

- dark LED The instrument is not in operation mode.
- red The instrument is booting.
- red flashing The instrument is in the configuration mode.
- green The instrument is measuring data but data is not stored (running mode).
- green flashing The instrument is measuring data and stores the data (recording mode, 30 seconds after start, the LED is flashing).

2.2 DEWE-838-PNA

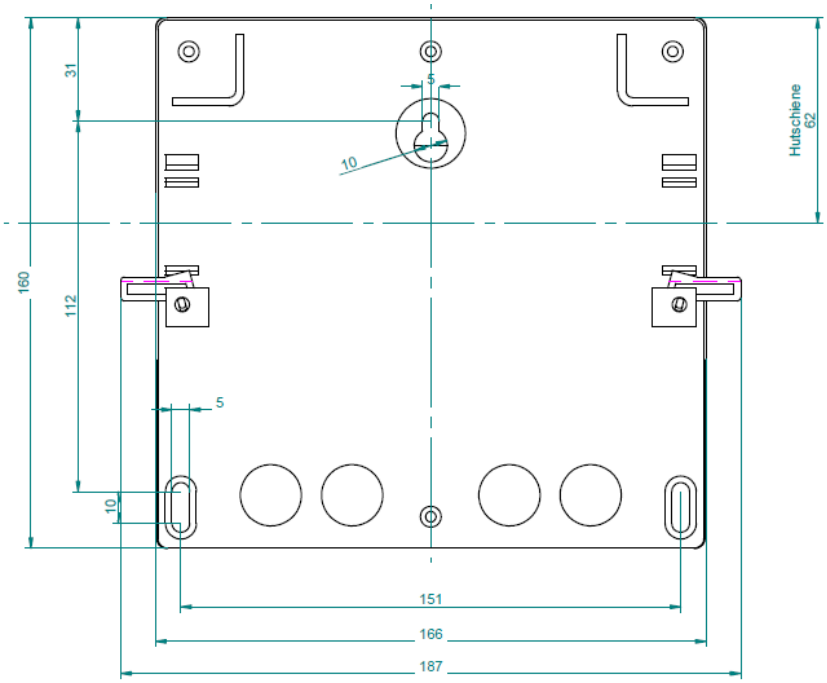
In the following chapters you will find technical information's to the DEWE-838-PNA.

2.2.1 Mounting and dimensions

The DEWE838 designed for wall mounting, panel or DIN-rail mounting.

For wall mounting or mounting on a panel you will find different mounting holes on the backside of the DEWE-838-PNA.

Wall mounting

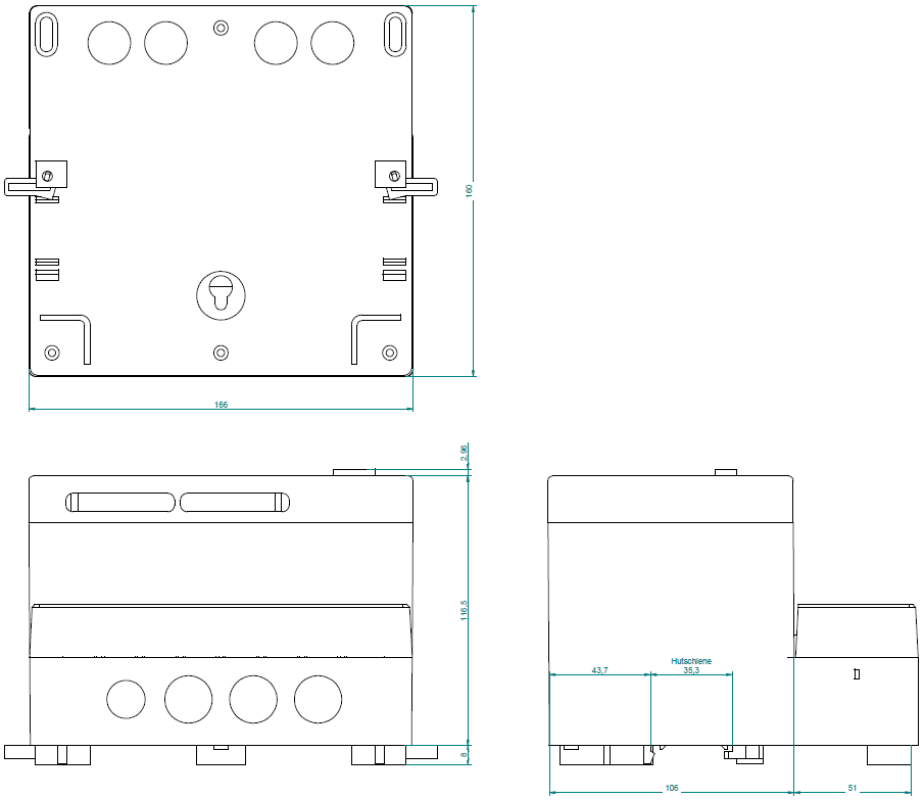


Dimensions for wall mounting

For wall mounting please use the slots at the bottom of the DEWE-838 and the mounting hole in the middle of the backside.
It is possible to seal the wiring cover. For sure you can mount the DEWE-838 on different panels.

Panel mounting

DIN-rail mounting



Dimensions DIN-rail mounting

2.2.2 Hardware 838-PNA

2.2.2.1 Connectors, versions of DEWE-838-PNA

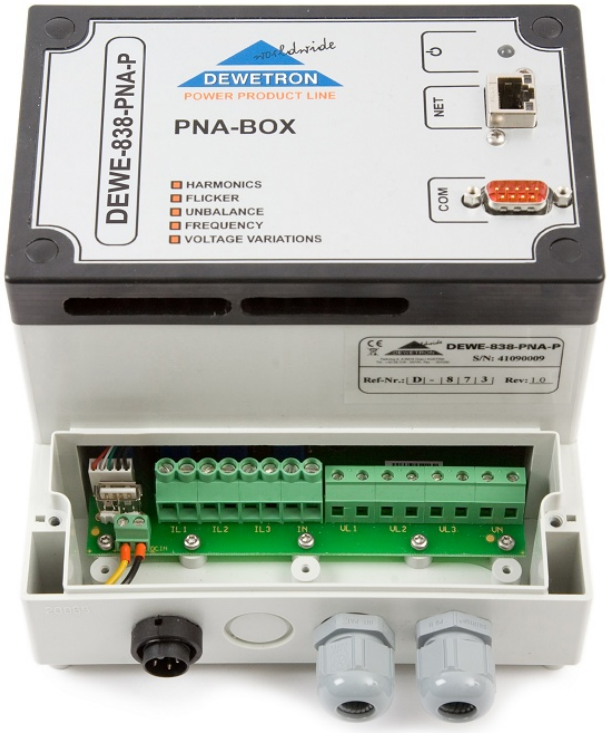
There are different versions of DEWE-838-PNA available.

DEWE 838 PNA-V (Voltage)	DEWE 838 PNA-P (Power)	DEWE 838 PNA-W (Wind)
4 Voltages	4 Voltages, 4 Currents	3 Voltages, 3 Currents
PQ-Parameters	PQ-Parameters	2 Windsignals (direction, speed)
IEC 61000-4-30 Class A	POWER Calculation	PQ Parameters and POWER Calculation

The DEWE-838-V is equipped with an eight pole connector for connecting four voltages (U_{L1}, U_{L2}, U_{L3}, U_N) to the System.

DEWE-838-PNA-V

The power version has an additional connector for the current input.



DEWE-838-PNA-P

The connector of the wind version is equal to the power version. On the bottom right you find the connector for the voltage input (U_{L1}, U_{L2}, U_{L3} ,U_N). On the bottom left there is the connector for the current Input (I_{L1}, I_{L2}, I_{L3},I_N).

Attention!

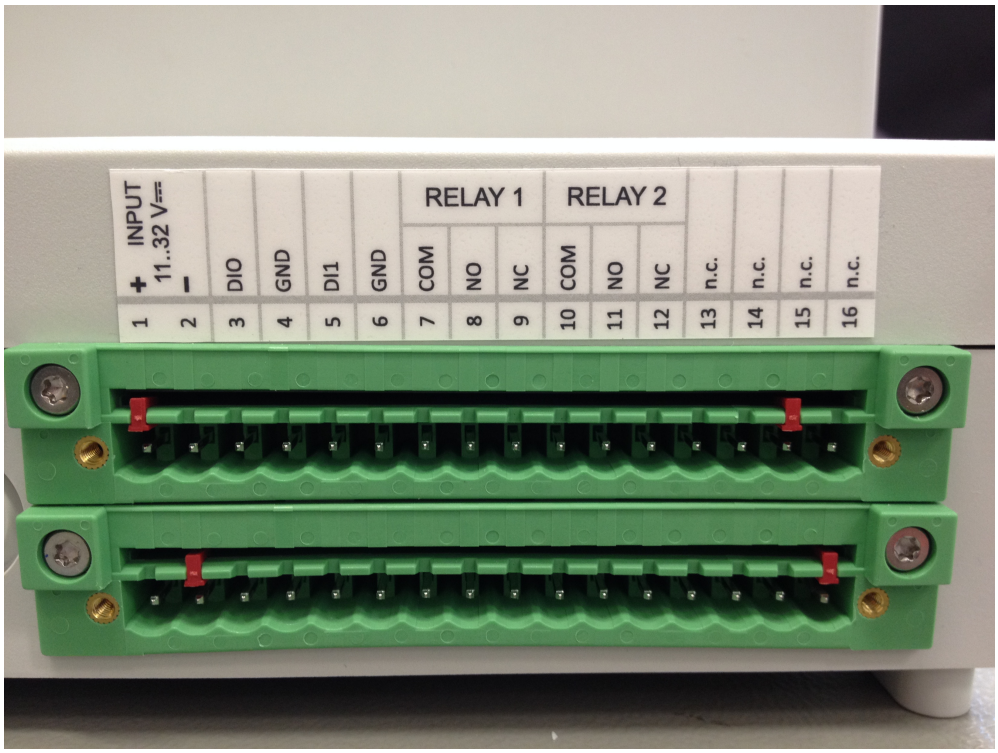
Keep in mind that the secondary side of the transducer is always closed/connected! If the transducer is open then it is possible to demage the transducer until it is destroyed completely!

The connector "U_N" is used to connect the wind speed input.
The connector "I_N" is used to connect the wind direction input (+/- 10V).

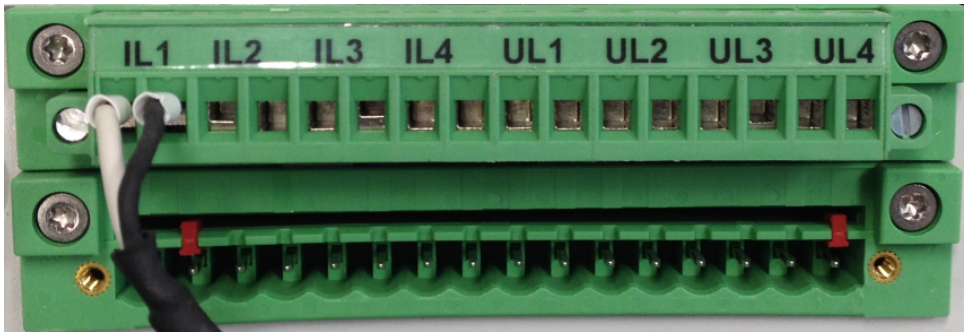
DEWE-838-PNA-W

Depending on the version of your instrument, there are different input signal connectors available.

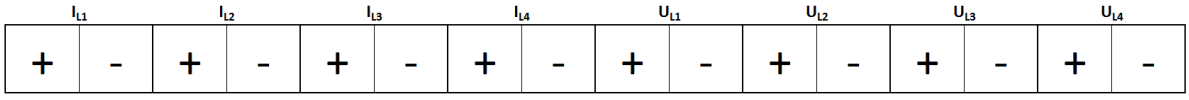
The next pictures shows the connections of the DEWE-838-PNA-P using four voltages and four currents.



DEWE-838-PNA-P with Phoenix-connector



DEWE-838-PNA-V with Phoenix-connector. UL and IL describtion can be found on the plug itself (cable)



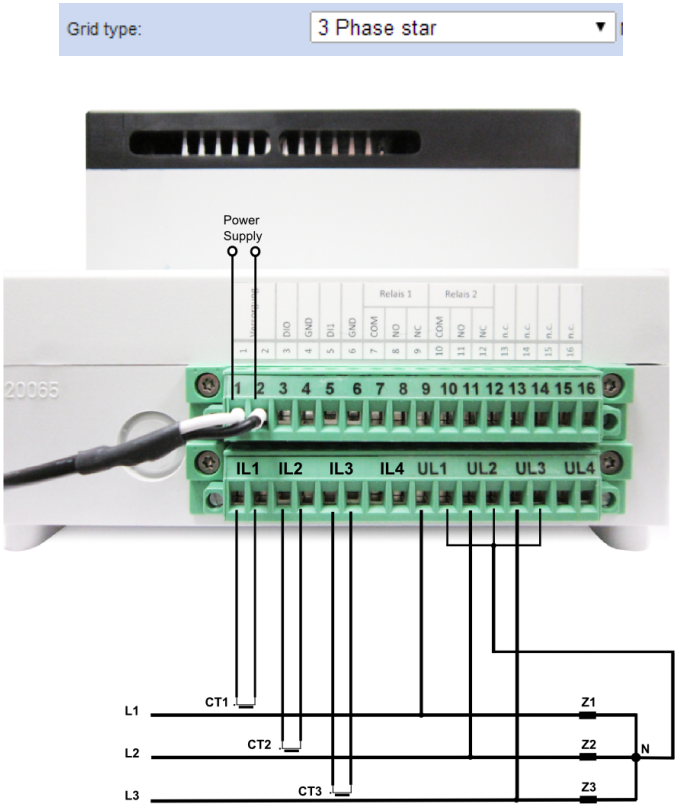
polarity of phoenix plug

- DI0 digital input number 0
- GND ground of digital input 0
- DI1 digital input number 1
- GND ground of digital input 1
- COM root of the alarm-relais e.g. status-relais
- NO normally open contacts
- NC normally closed contacts
- n.c. not connected

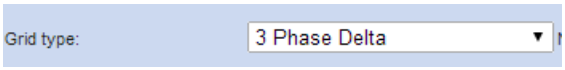
- Relais1 status-relais
- Relais2 alarm-relais
- IL1 ... IL4 current inputs
- UL1 ... UL2 voltage inputs

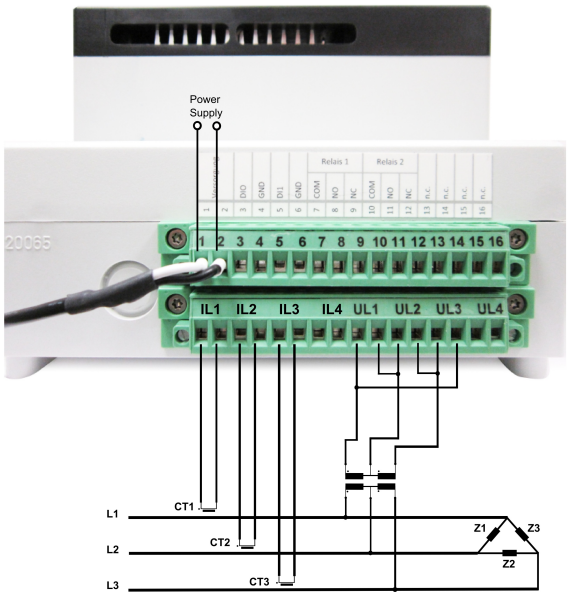
Use UL4 and IL4 for the neutral line (UN, IN).

2.2.2.2 3 Phase star connection



2.2.2.3 3 Phase delta connection





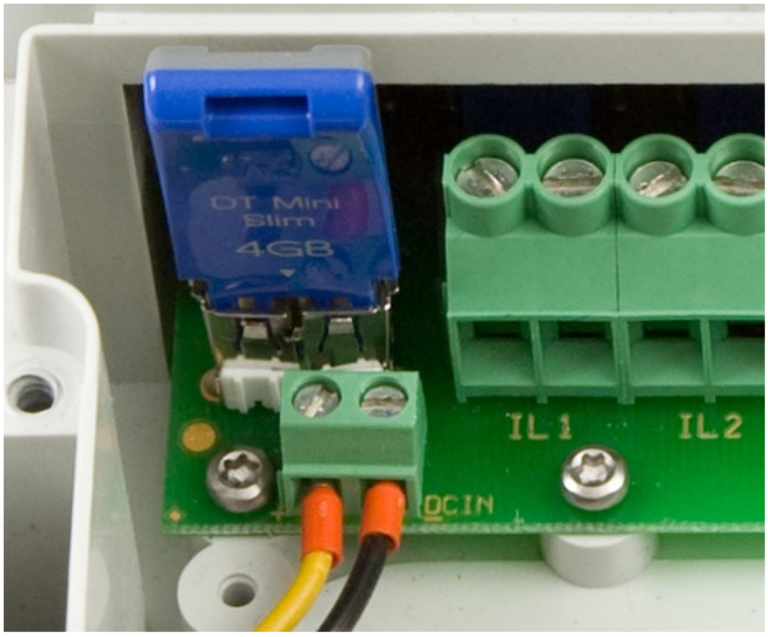
(Transformer in the shemata is only an option.)

2.2.2.4 MLI - Measurement Location Identification

In the housing of the signal connectors you will find an USB-Interface for the MLI-Technology (Measurement Location Identification) (picture below).

An USB-Stick is assigned to a measurement location. On the USB-Stick are stored information's of the measurement and the measurement location (instrument name, ID,storage intervals, dataserver, scales of the transducers, ...). If you exchange an instrument, remove the USB-Stick from the old instrument and plug it into the slot of the new device. Then start the measurement device. Now it is possible to start the measurements using the configuration and the settings of the old instrument.

Further information's to setup and configuration of the instrument are provided in the chapter Projectsetup.



MLI USB-Stick

2.2.2.5 Datasheet



DEWE-838-PNA-V (opt. -Ph)	DEWE-838-PNA-P (opt. -Ph)	DEWE-838-PNA-W
4 voltage	4 voltage 4 current	3 voltage, 3 current 1 wind speed, 1 wind direction
-		
PNA-Browser Application + PMT		
DC to 300 kHz		
-	5 A	± 5 V
-		
-		
-	-	± 5 V wind speed ± 5 V wind direction
10 kS/s		
16 bit		
For option -Ph (phoenix connectors) 2 x DI for alarm in		-
-		-
For option -Ph (phoenix connectors) 2 x relais		-
EN -61010-1		
EN 61000-6-2 / EN 61000-6-4		
EN 61000-4-5: 4 kV		
EN 61000-4-4: 4 kV		
EN 61000-4-5: 4 kV		
EN 61000-4-4: 4 kV		
Fixed installation only		
Fixed installation only		
-20 to +50 °C		
-20 to +70 °C		
10 to 80 % non cond., 5 to 95 % rel. humidity		
SD Card		
2 GB		
Low power CPU		
1x Ethernet, 1x RS-232		
External clock, NTP		
95 to 260 V_{AC} (internal 11 to 32 V_{DC})		
-		
Counter panel mount chassis Wall mount DIN rail		
160 x 166 x 125 mm (6.2 x 6.5 x 4.9 in.)		
Typ. 2 kg (4.4 lb.)		

2.2.2.6 Network

On the top of the DEWE-838-PNA, there is a LAN (Local Area Network) interface provided.

LAN-Interface

Most customers are using special security settings at their company side. Ask your IT-administrator to connect the instrument to the LAN. He will also provide you with the correct settings for database storing (SQL).

Further information's for the network setup can be found chapter Network configuration.

2.2.2.7 Alarm and status relais

DEWE-838 is equipped with two relais (depending on the version). The alarm-relais is used for the output of alarms and events. You will find **NC** *normally closed* contacts and **NO** *normally open* contacts as well. With the status-relais the current status of instrument is shown. The status relay is also equipped with both an normally open contact and an normally closed contact. If the DEWE-838 is storing data the relais is switching.

2.2.2.8 Status indication

The indication LED is base on the top of the instrument.

Status indication

The LED indicates different operation states:

- dark LED The instrument is not in operation mode.
- red The instrument is booting.
- red flashing The instrument is in the configuration mode.
- green The instrument is measuring data but data is not stored (running mode).
- green flashing The instrument is measuring data and stores the data (recording mode, 30 seconds after start, the LED is flashing).

3 Software and Configuration

3.1 First Usage

Connect your DEWE-x38-PNA with the power supply.

DEWE-838-PNA connected to the power supply

The status indication shows the operation mode at any time. Connect the instrument to the local network. Tue the factory standards, the configuration of the network connection is already done. Please open your Browser (Google Chrome, Internet Explorer, Mozilla Firefox, etc.) to connect to the DEWE-x38-PNA herzustellen. Just type in the IP-Address of your instrument.

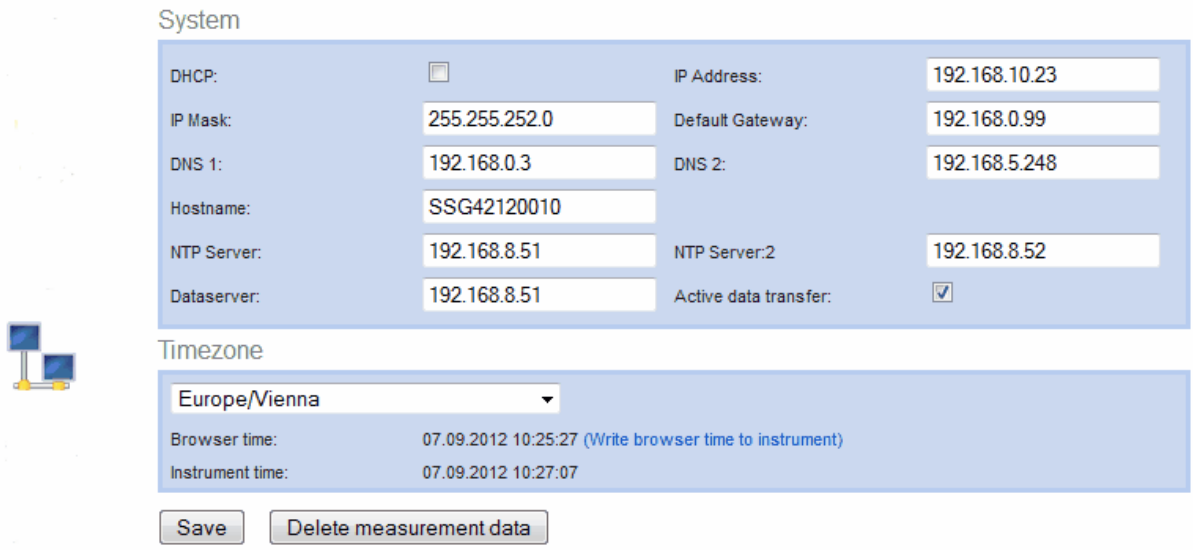
Connect to the DEWE-x38-PNA and login

Basically there are two users preconfigurated (admin and viewer). To use your DEWE-x38-PNA login with the username "admin" and the password "admin". The user "viewer" is used to show the measured values and data (Login with username "viewer" and password "viewer").

To create a new user or edit the standard users, read throw the chapter User administration. After the correct login you will see the Homescreen of your DEWE-x38-PNA.

3.2 Network configuration

In this menu the network settings and the basic information's for database storing is defined.



Network configuration

- IP Address The IP-Address of your DEWE-x38-PNA.
- IP Mask The subnet mask of your network.
- DNS1/DNS2 Domain Name System of your network.
- NTP Server Server for time synchronization.
- Hostname Name of the DEWE-x38-PNA in your network.
- Data Server Server for storing the measurement data.
- Active data transfer Activation/Deactivation of database storing.
- Timezone Time zone selection.

With „Write browser time to instrument“ the actual time of your PC is synchronized to the DEWE-x38-PNA.

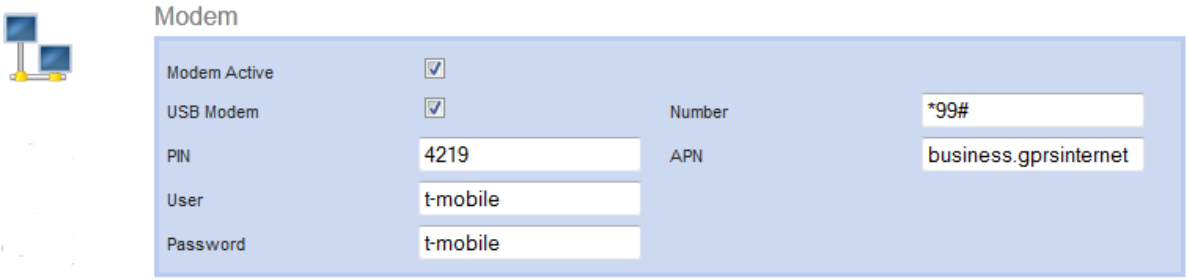
Please choose the timezone in which the instrument is used.

Please click „**Delete Measurement Data**“ to delete **all the local stored measurement** data of your instrument.

3.3 Modem Configuration

In this chapter you will learn more about the integrated GPRS modem an for sure about the configuration.
Please note that **ONLY DEWE 638 PNA with modem option** includes the GPRS modem! By default the 638 PNA does not include a GPRS modem.

The GPRS modem is used to transfer the measured data to a Microsoft SQL-Database.

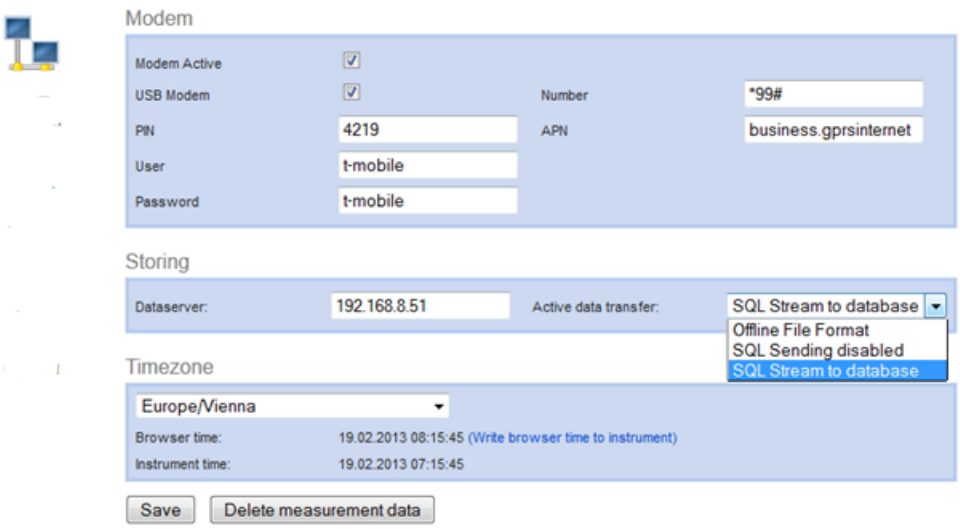


Modem Setup

If there is no SIM card inserted in the instrument, call DEWETRON´s support for further information and help.

3.4 Storing Options

The following chapter will give you an overview about the different storing options of the DEWE-x38-PNA series.
Please open the "**storing**" menu to choose one of the options.



Storing Options

Insert the IP-Address of your dataserver in the provided field. Depending on the chosen storing option the data will be sent to the database automatically. Make sure that the DEWE-x38-PNA is connected directly to the LAN or mobile network.

For more information please refer to the chapters Modem Configuration and Network configuration.

1. **Offline File Format.**
   The "**Offline File Format**" is a special file format which is unattached to a Database (SQL DB).
   Using this format it is possible to evaluate data without using a database. Data will be stored locally on the DEWE-x38-PNA itself and can be loaded with PMT4 (Power Monitoring Tool) after your measurements. If this storing option is chosen, a new icon will appear on the "**Homescreen**" of your DEWE-x38-PNA. For more information please refer to the chapter Offline File Format.

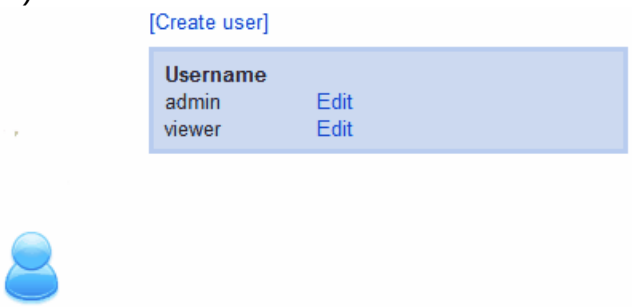
2. **SQL Sending disabled.**
   If this storing option is chosen, data will be stored compressed on the unit. After the measurement, the data could be loaded with the "dataloader" to an SQL-Database. The evaluation of the measured data will be done with PMT4.

3. **SQL Stream to Database.**
   Data will be sent to a SQL-Database, weather this DB is located on the unit itself or on an external server. Data can be displayed and reported directly with PMT4.

3.5 User Management

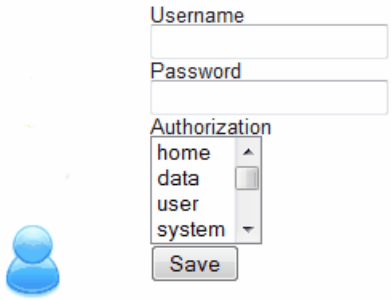
Basically there are two users preconfigurated (admin and viewer). To use your DEWE-x38-PNA login with the username "admin" and the password "admin". The user

"viewer" is used to show the measured values and data (login with username "viewer" and password "viewer").



User administration

Click on „**create user**“ to add a new user. The rights of the new user depends on the chosen authorization.



Add a new user

These authorizations are available:

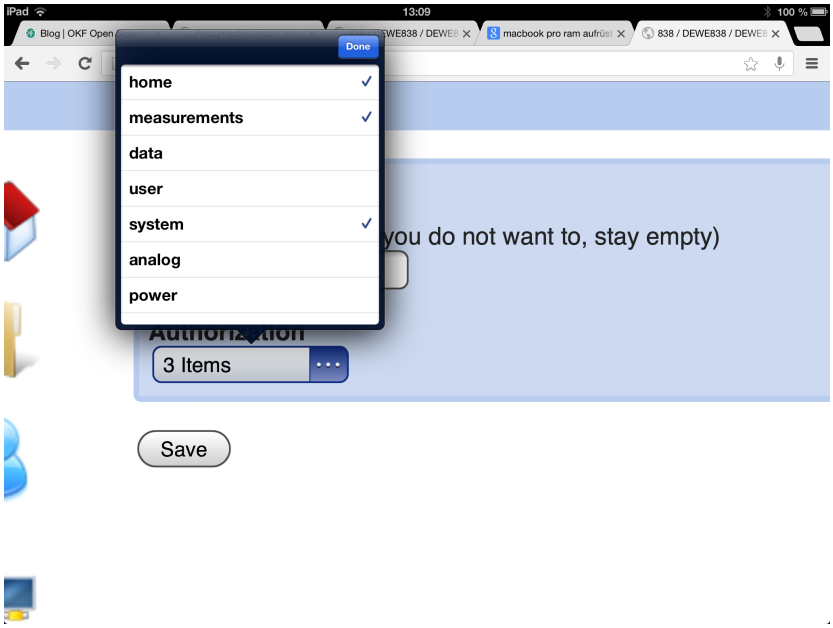
home	The User can start measurements, download data and generate reports.
measurements	The User can start measurements, download data and generate reports.
data	The User can start measurements, download data and generate reports.
user	The User can start measurements, download data and generate reports. He also can manage all users.
system	The User can start measurements, download data and generate reports. He also can manage the network configuration and the storing options.
analog	The User can start measurements, download data and generate reports. He also can manage the channel setup and digital ports.
power	The User can start measurements, download data and generate reports. He also can manage the POWER Settings (ID, Harmonics, THD, Flicker).

alarms | The User can start measurements, download data and generate reports.

He also can manage all alarm settings (Voltage, Current, Power, Digital).

To change the authorization, **hold the STRG key down** and choose by using the left mouse button.

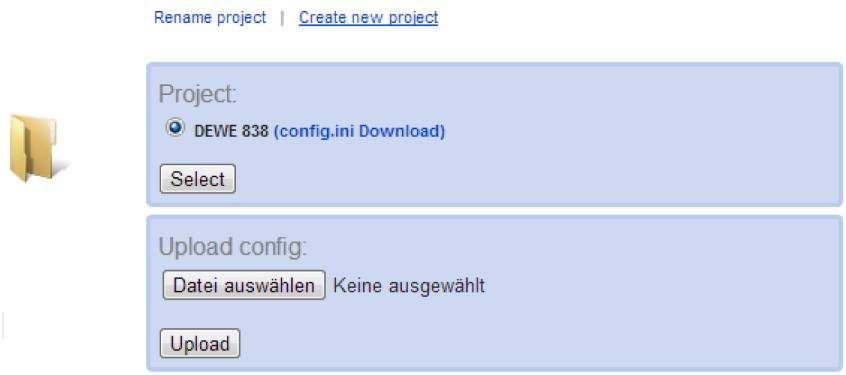
If you are using a smart phone or a tablet computer it is a bit easier to choose the authorization.



Add a new user on a smart phone or tablet PC

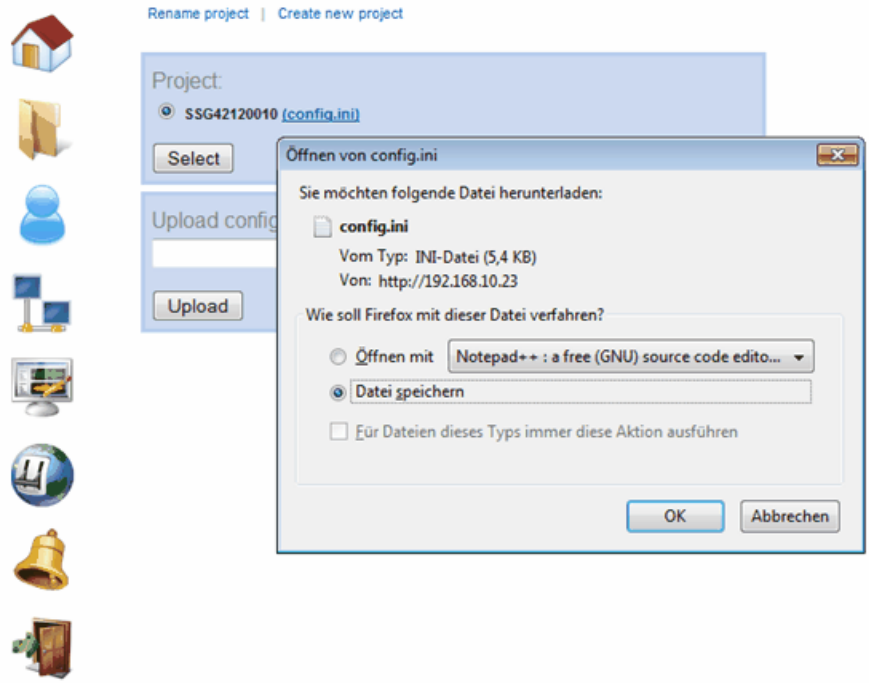
3.6 Projectsetup

In the project menu you can choose between the existing projects e.g. you can also create a new project for your measurement.
If you add a new project, a configuration file would be stored locally on your DEWE-x38-PNA and on your MLI-Stick (DEWE-838). In this file all the configuration data **for** your measurement and instrument will be stored (Network settings, Ranges, Scales, Alarm settings, ...).



Project manager

To save the config-file click on the filename of your project. So you can store the configuration of your instrument on your PC locally.

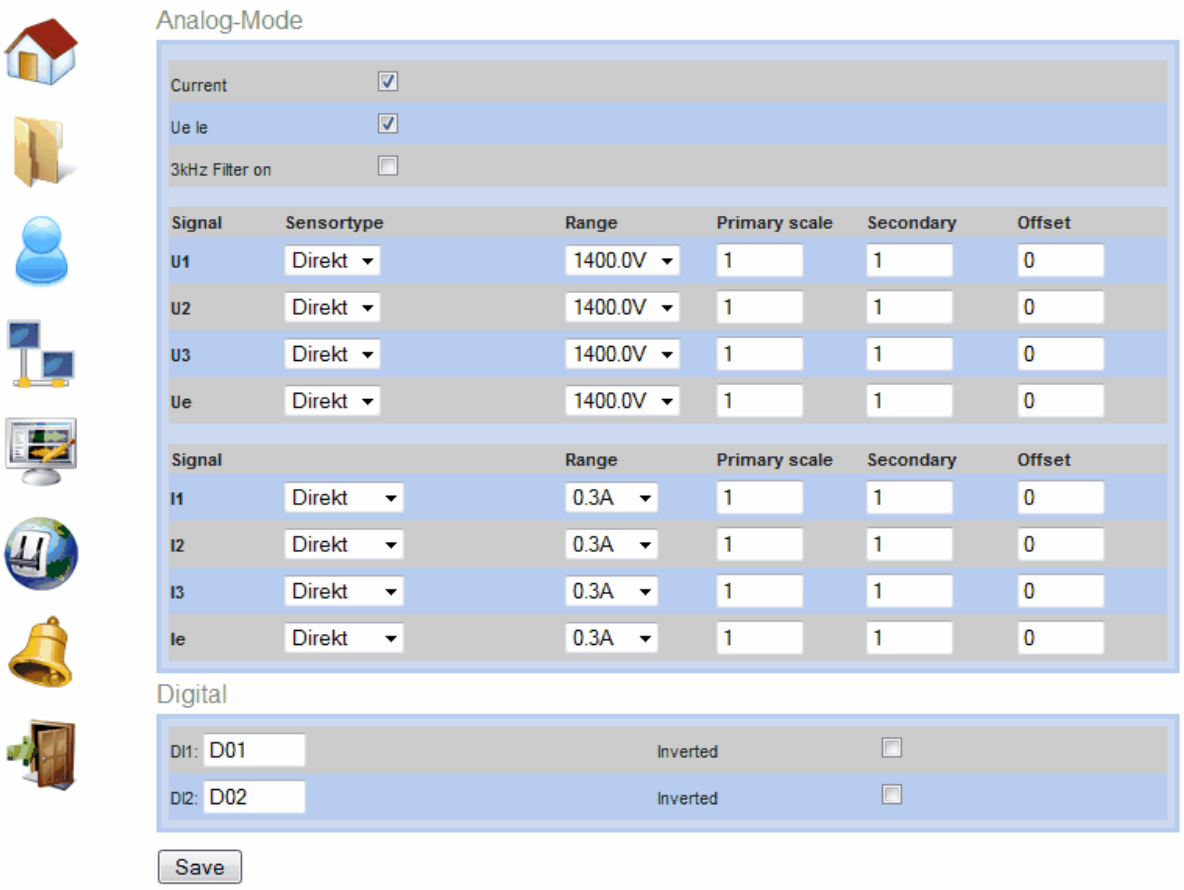


Save a configuration on your PC

It is possible to upload stored config-files from your PC to the DEWE x38 PNA.

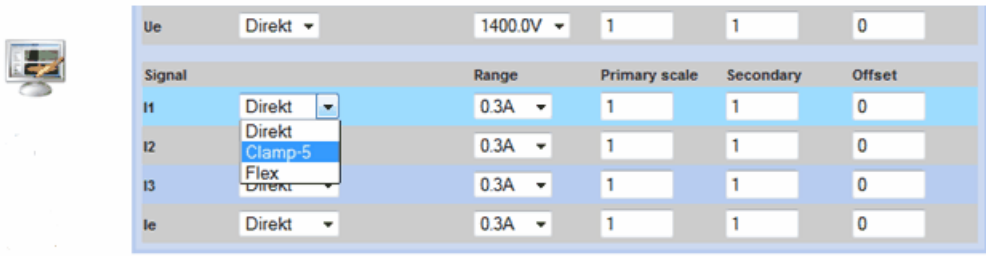
3.7 Analogue setup

In the analogue setup you find settings to the analogue inputs especially sensor types, the ranges, and the scale of the analogue inputs.
On the upper left of this menu you will find check boxes to enable the current inputs, the 4. voltage/current (Ue/Ie) and the 3kHz filter (hardware filter).



Analogue setup

In the analogue setup you can choose different transducers for your measurement too. The following picture shows the selection as an example.

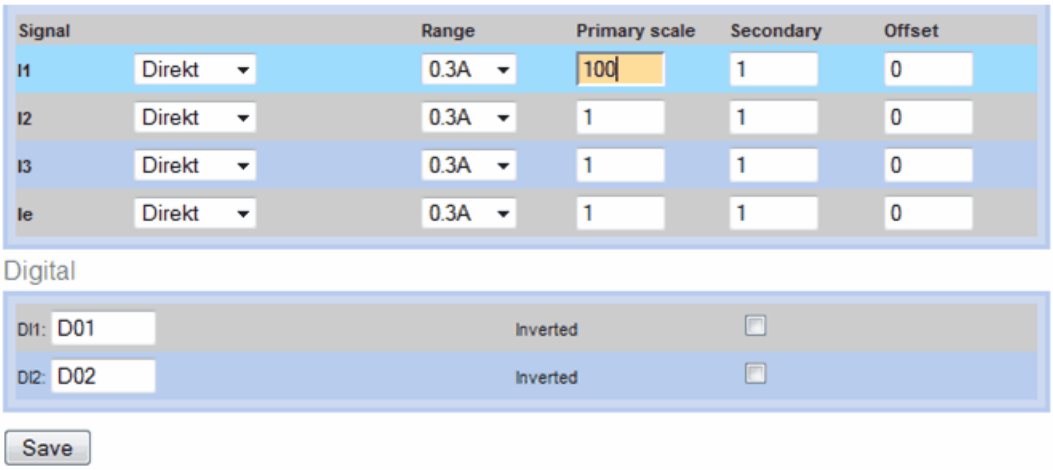


Transducer selection

There are differnt transducers available:

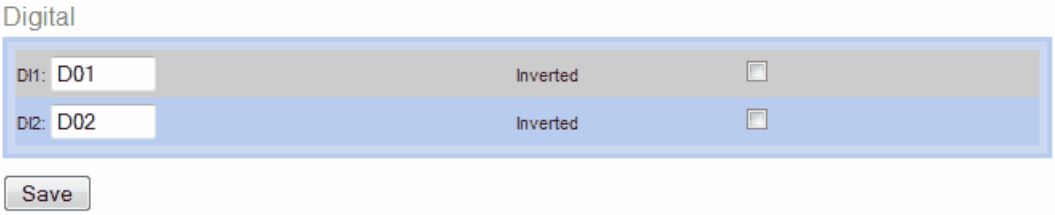
Direkt	Direct current input 10A max.
Clamp-5	Current Clamp.
Flex	Rogowsky coil.

Its also possible to change the primary and secondary scale of your inputs.



Edit Scales of the input channels

On the bottom of this menu you will find settings to the digital inputs of the DEWE-x38-PNA. You can rename your digital's for your own needs.



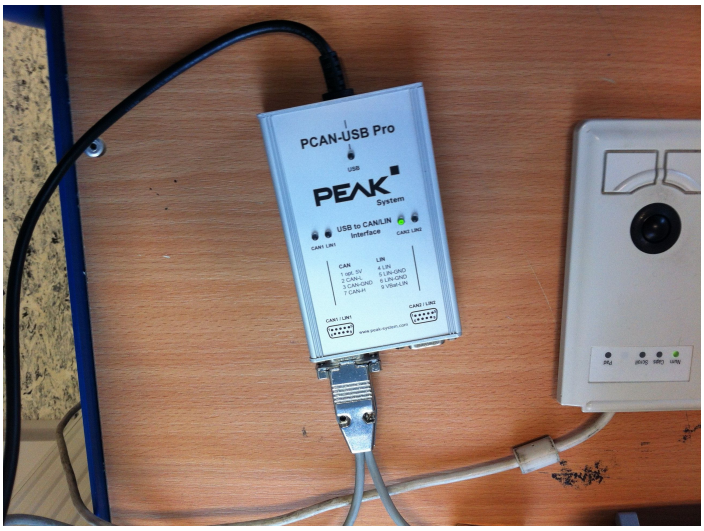
Setup of the digital inputs

3.8 Wind Extension & CAN

For special applications the PNA Software can be extended with a special wind feature. This wind application will catch additional data used by the CAN-Bus and is able to generate reports according to **EN 61400-12-1**. To get more information about how getting the wind extension for your application, contact the POWER Team by writing to **power@dewetron.com**

This chapter will provide only information about the wind extension. If you don´t use DEWETRONs wind extension you can leave this chapter beside.

The CAN interface is an external interface connected via USB to the DEWE-638-PNA.



The CAN interface is provided separately

In the GUI you will find an additional CAN Setup beyond the Digital Inputs.

Digital

DI1:	DI1	Inverted	☐
DI2:	DI2	Inverted	☐
DI3:	DI2	Inverted	☐
DI4:	DI4	Inverted	☑
DI5:	DI5	Inverted	☐
DI6:	DI6	Inverted	☐
DI7:	DI7	Inverted	☐
DI8:	DI8	Inverted	☐

CAN Channels

CAN Baudrate [kBaud]: 500

Title	CAN ID	Startbit	Bits	Type	Can Mode	Factor	Offset
Wind speed	5	0	16	uint16	Intel	0.00030517578	-7
Wind Direction	5	32	16	uint16	Intel	0.01098632812	-360
Temperature	1	0	16	uint16	Intel	0.000305175781	10
Air Pressure	5	16	16	uint16	Intel	0.003051757	99900

Can Channel setup

Digital I/O

Depending on your hardware configuration, there are up to eight channels selectable.

CAN Channels

By now there are four CAN channels provided.

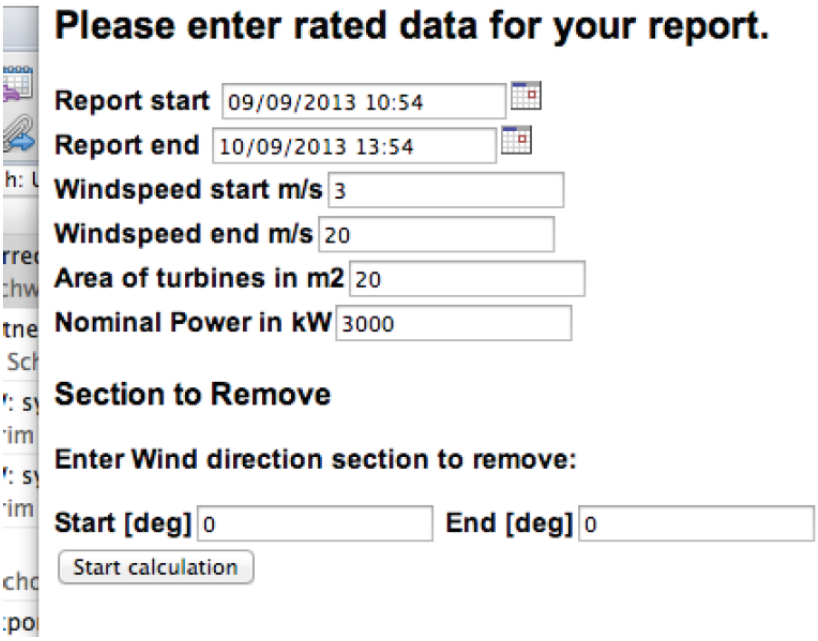
Wind speed Data from an external wind speed sensor like an anemometer.
Wind Direction Data from an external wind direction sensor.
Temperature Data from an external temperature sensor.
Air Pressure Data from an external air pressure sensor.

According to the CAN Standard, the following specifications can be provided by the user himself.

CAN ID Message ID of the used CAN
Startbit Startbit of the message
Bits Length of the message
Type Meassgae type (uint16,..)
Can Mode Intel
Factor Multiplication factor, depending on the CAN data of the sensor
Offset Offset depending on the CAN data of the used sensor

Information: All used CAN Interfaces have to use the same CAN Baudrate [kBaud]!

At the time an EN 61400-12-1 is generated by the user, he has to input some additional information.



Additional information for report generation of EN 61400-12-1

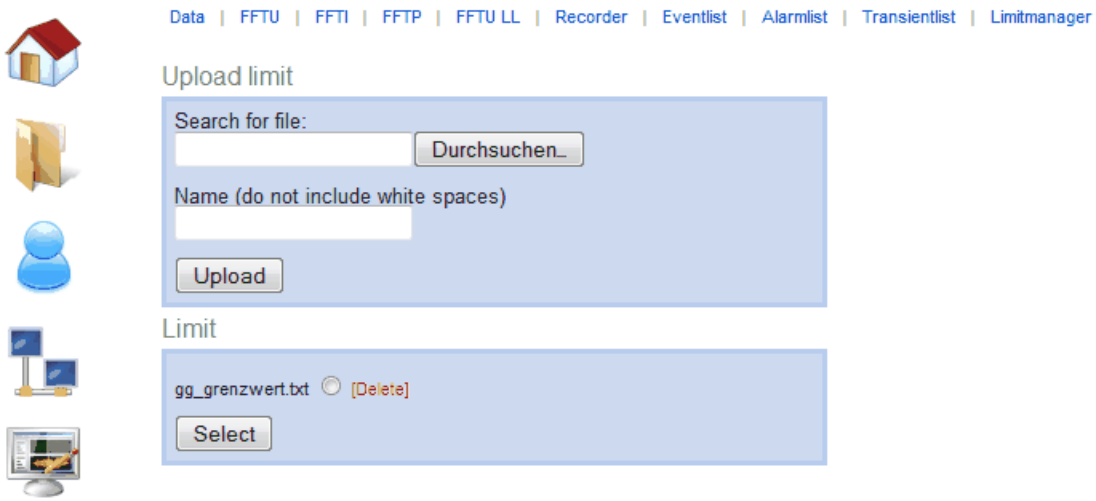
Report start Will be filled in automatically by the system.
Can be changed individually by the user.

Report end Will be filled in automatically by the system
Can be changed individually by the user.
Wind speed start Starting wind speed
Wind speed end Final wind speed
Area of turbines Entered in m^2
Nominal Power Nominal Power of the wind plant, entered in kW
Start [deg] / End [deg] One section of the wind direction can be entered in degree and will be removed in the calculation

For simulation or test purposes consider to use values which are physical correct.

3.9 Limitmanager

The limit manger is used to set your own limits for the harmonics. If the harmonics exceed the defined limits this would be shown in PMT reports and visualizations.



Limit manager

There is already a limit-file stored on your DEWE-x38-PNA device. To upload your own limits choose a file and click upload.

The file to define limits should be a standard *.txt file.

Example of a limit file.

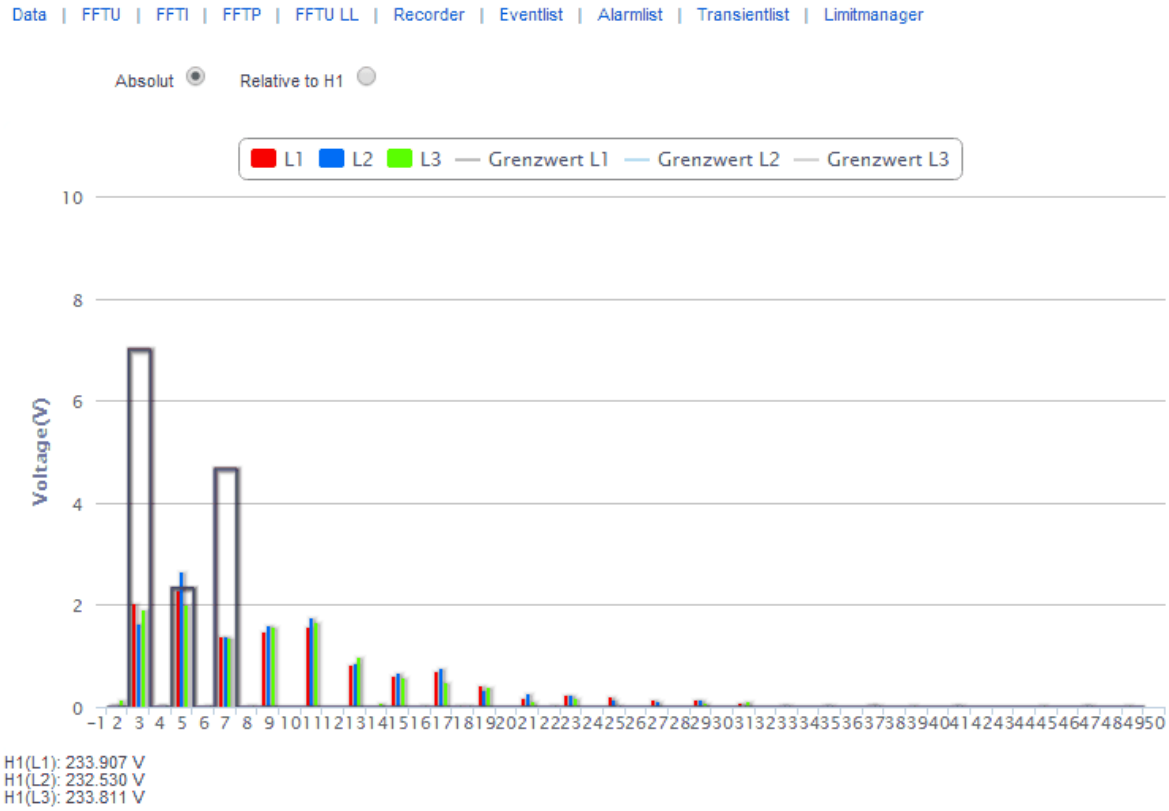
```
H3=3
H4=0
H5=1
H6=0
H7=2
```

H8=0

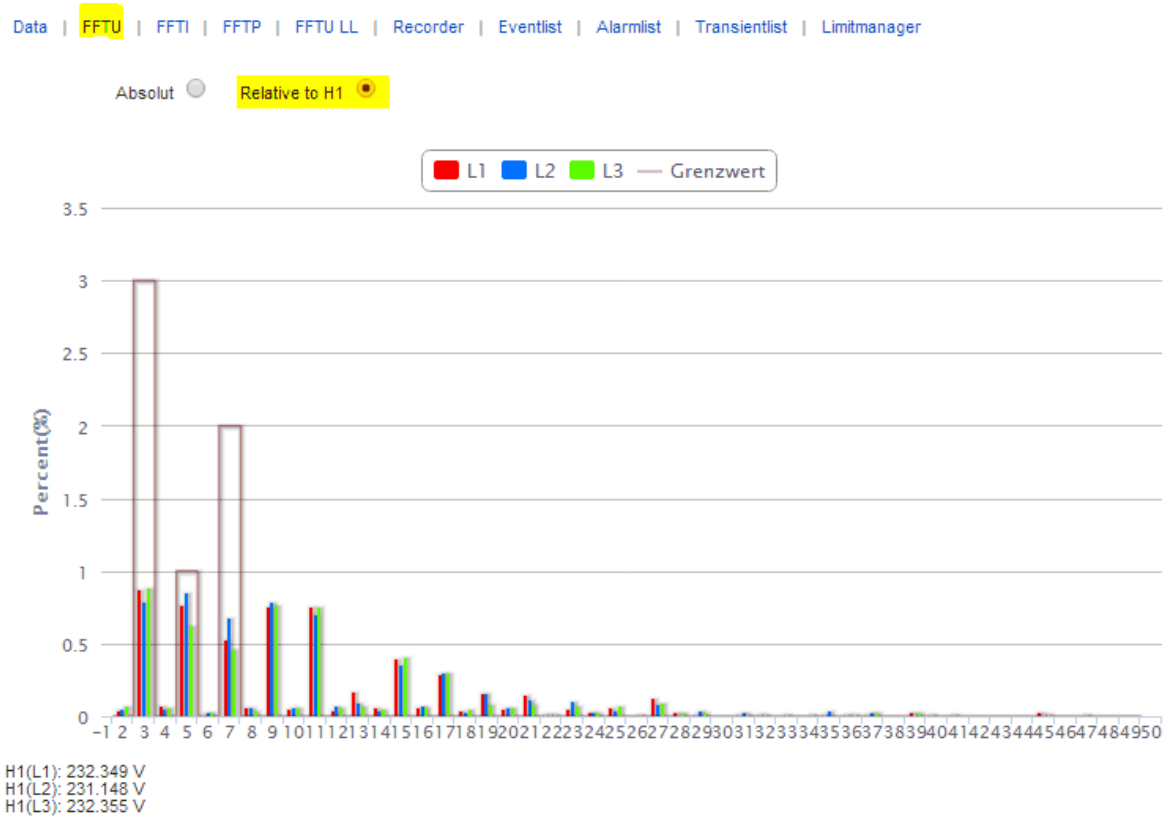
The values are defined in percent (%) based on the fundamental harmonic (H1). In the FFT graph it is possible to view the harmonics in absolute or relative values based on the fundamental harmonic. Based on the limit txt-file, the absolute values would be calculated automatically.

Store the example to test_limits.txt file and search for the file via Marlin interface. You can redefine the file name by entering a name in the input field. It is possible to save more than one limit *.txt file on the instrument. Then select the limit definition you want.

The result is shown in the FFT graph.



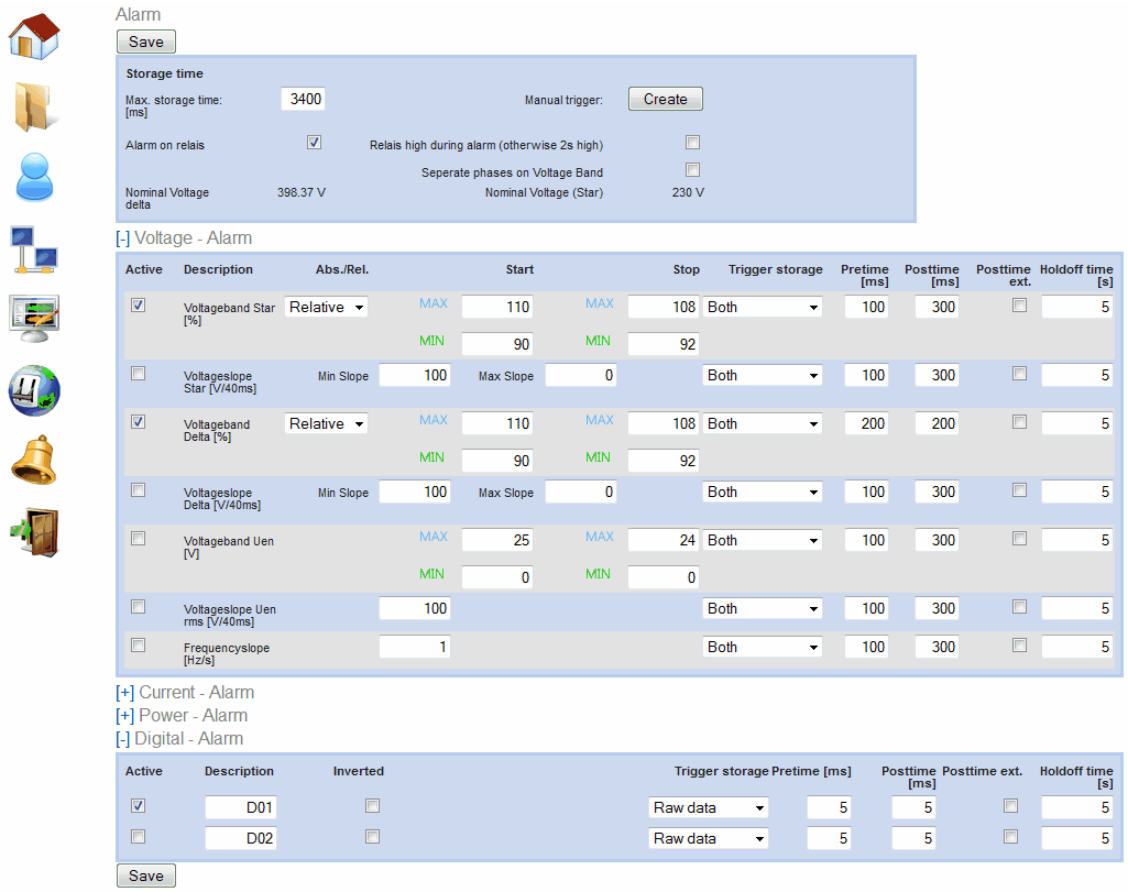
Example limits used in FFT graph - absolute values based on fundamental harmonic



Example limits used in FFT graph - relative values based on fundamental harmonic

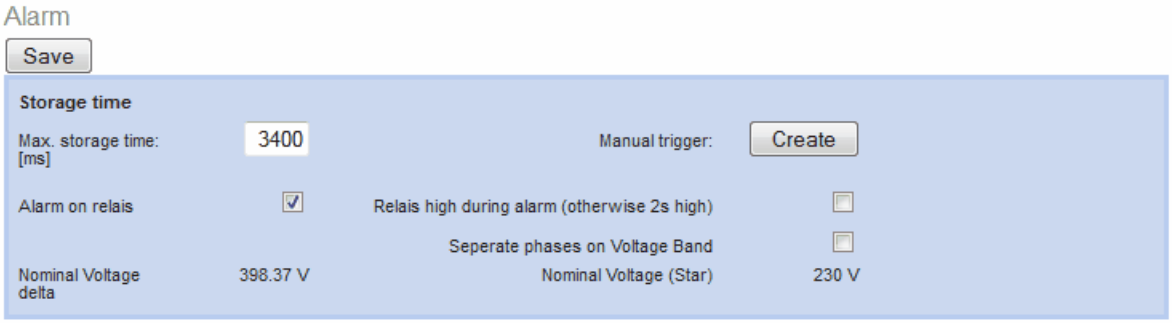
3.10 Alarm Setup

The alarm setup menu is used to enable and to setup alarms. Depending on your DEWE-x38-PNA you can define voltage-, currents, power- and digital alarms.



Voltage alarms /Digital alarm setup

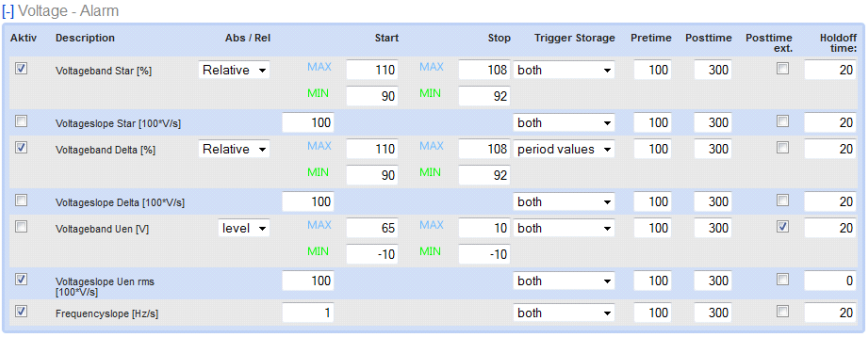
As already mentioned in the chapter project setup, you can load your settings with an existing configuration file.
On the top left of the menu you can set the maximum storage time of the alarms and relais as well.



Generell Alarm setup

If the option "Alarm on relais" is activated, a pending alarm switch the digital outputs. So you can use the alarms or outputs for your external control. The enabled option „Relais high during alarm (otherwise 2s high)“ means that during an alarm the relais is continuously on high. If you don´t select this option the relais is low after two seconds. To create a manual trigger push the button „Manual Trigger“. The alarm is transmitted to PMT4 and listed in the alarmlist/eventlist, so you can test your configuration.

The setup for the alarms is separated depending on your DEWE-x38-PNA in voltage-, current-, power- and digital alarms.


[-] Voltage - Alarm

Aktiv	Description	Abs / Rel		Start		Stop	Trigger Storage	Pretime	Posttime	Posttime ext.	Holdoff time:
☑	Voltageband Star [%]	Relative	MAX	110	MAX	108	both	100	300	☐	20
			MIN	90	MIN	92					
☐	Voltageslope Star [100*V/s]			100			both	100	300	☐	20
☑	Voltageband Delta [%]	Relative	MAX	110	MAX	108	period values	100	300	☐	20
			MIN	90	MIN	92					
☐	Voltageslope Delta [100*V/s]			100			both	100	300	☐	20
☐	Voltageband Uen [V]	level	MAX	65	MAX	10	both	100	300	☑	20
			MIN	-10	MIN	-10					
☑	Voltageslope Uen rms [100*V/s]			100			both	100	300	☐	0
☑	Frequencyslope [Hz/s]			1			both	100	300	☐	20

Voltage alarm setup

- **Voltageband Star [%]** Activate the voltageband alarm in star connection.
- **Voltageslope Star [100*V/s]** Activate the voltage slope in star connection.
- **Voltageband Delta [%]** Activate the voltageband alarm in delta connection.
- **Voltageslope Delta [100*V/s]** Activate the voltage slope in delta connection
- **Voltageband Uen [V]** Activate the voltageband alarm of U_{earth}.
- **Voltageslope Uen rms [100*V/s]** Activate the voltageslope of U_{earth} (RMS value).
- **Frequencyslope [Hz/s]** Activate the frequencyslope.

Following you will find a detailed description to the parameters of the alarms:

- **Abs / Rel** Trigger on the absolute or relative (procentual) value.
- **Start (MAX,MIN)** Upper- and lower limit of your start condition.
- **Stop (MAX,MIN)** Upper- and lower limit of your stop condition.
- **Trigger Storage** Select witch data you would like to store in database.
- **No values** Only the event will be stored in database, no values.
- **Period values** The period values will be stored in database.
- **Raw data** The raw data will be stored in database..
- **Both** Both, the period and raw data will be stored in database.
- **Pretime** Time of recording before the beginning of the trigger.
- **Posttime** Time of recording after the trigger .
- **Posttimeextension** Extend the recording with posttime if the same event during posttime occurs once again
- **Holdofftime** Period of time within no reaction of the same event.

These parameters are the same for all alarm groups (voltage, current, power)!

Keep in mind: All setting are effective after the start of a new

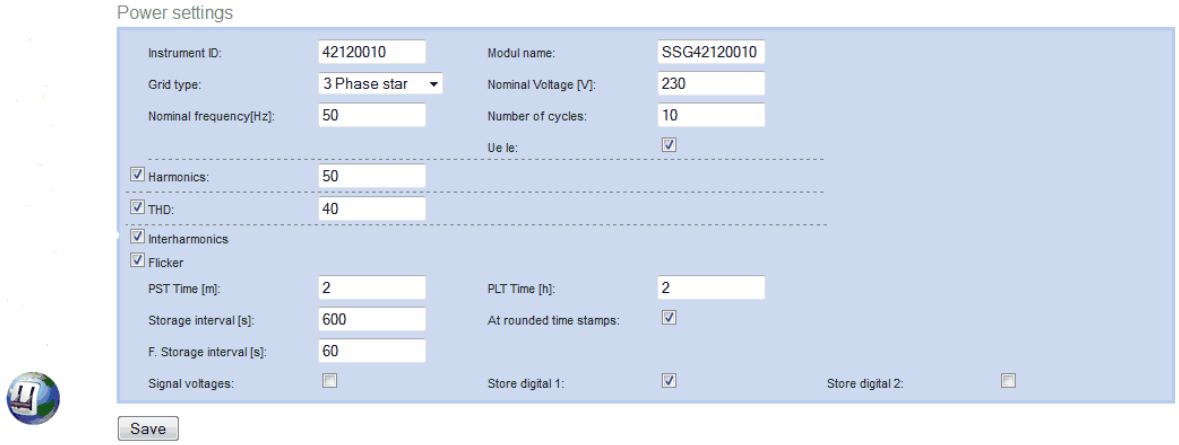
measurement/recording!

3.11 Summary of alarm functions

1. All alarms are independently.
2. Posttime starts if alarm condition ends.
3. If alarm occurs within posttime once again:
    a. Posttime extention activated -> Posttime will be extended with posttime.
    b. Posttime extention deactivated -> Event will be ignored.
4. Holdofftime starts with the end of the alarm condition.
5. During holdofftime all events will be ignored except voltage band alarms (star, delta) if the alarm pattern are alternating.

3.12 PMT settings

In this menu you can set the parameters for database storing. You can choose the storage intervals, set the ID of your instrument and choose different options for storing harmonics, flicker and so on. Further information about PMT and database storing, can be found on our homepage and in the PMT-Manual.



PMT settings

- **Instrument ID** Identification of the DEWE-x38-PNA in PMT. Must be unique!
- **Modul name** The name of your instrument in PMT.
- **Grid type** The grid type (Star, Star with delta value calculation or singlephase).
- **Nominal Voltage [V]** The nominal voltage of the grid.
- **Number of cycles** Number of cycles for the RMS value calculation.
- **Harmonics** Activates the storing of harmonics.
- **THD** Activates the storing of THD (Total Harmonic Distortion).
- **Interharmonics** Activates the storing of the interharmonics.
- **Flicker** Activates the storing of flicker .
- **PST Time** Interval of the short time flicker calculation.
- **PLT Time** Interval of the long time flicker calculation.
- **Storage interval** Interval for the storing of the measurement data.

- **At rounded time stamps** Storing at rounded time stamps e.g. every full minute.
- **F. Storage interval** Storage interval of the frequency (separate to other storage intervals).
- **Signal voltages** Activates the storing of signal voltages.

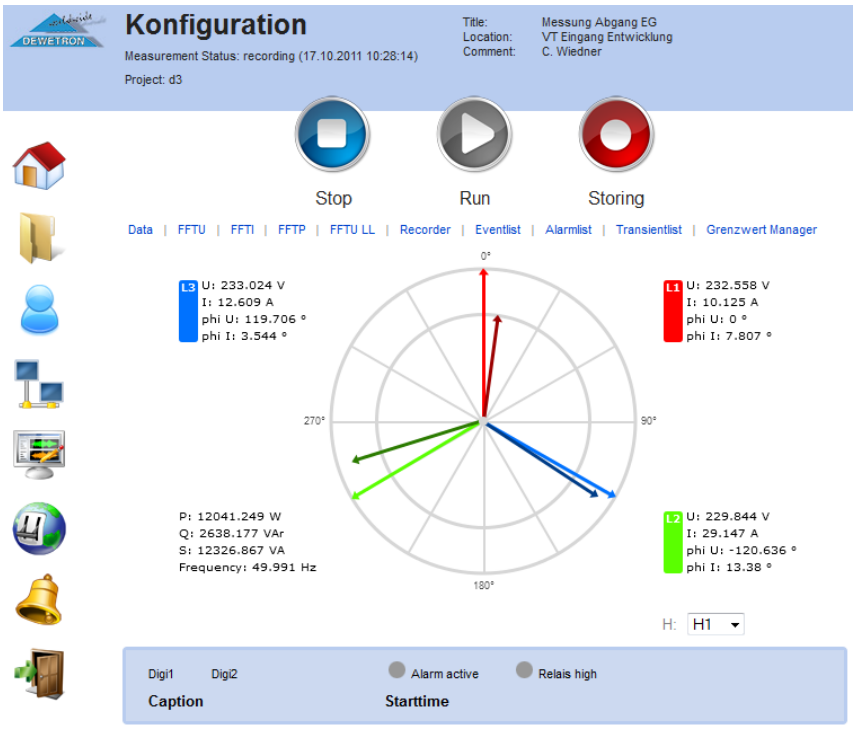
Keep in mind: The ID of the DEWE-x38-PNA must be unique! Otherwise it is impossible to differ the stored data by device!

3.13 Functions of DEWE-x38-PNA

This chapter will tell you more about the different possibilities of your DEWE-x38-PNA.

3.13.1 Homescreen

After a successful login (User: admin, pass: admin) you see the Homescreen oft the DEWE-x38-PNA, also called the start page. The Homescreen is used to visualize the measured values and the vectorscope. On the bottom of the Homescreen you will find information about the current alarms and the status of the digital input/outputs.



Homescreen DEWE-x38-PNA

The vectorscope displays the voltages and currents with their phase angle and amplitude. With the buttons on the top of the menu you can **start or stop** the recording.

Stops the measurement or recording of your instrument.

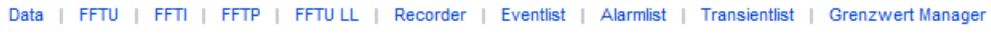
Run

Starts the measurement. You will find the actual values in the vectorscope and under the view "**Data**".

Storing

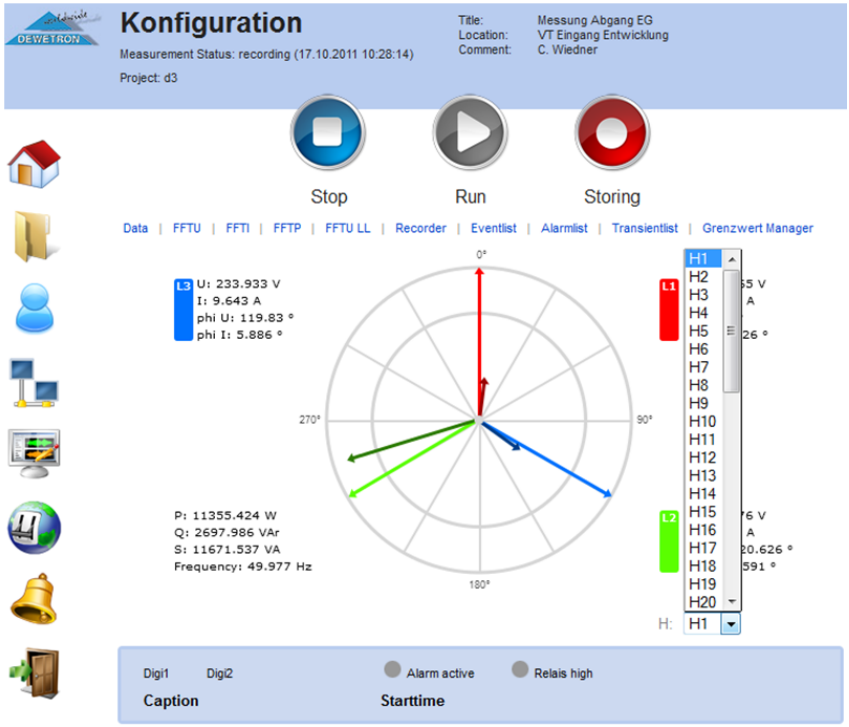
Starts the recording of the data. If recording is started, the button is flashing red. If all the setting are correct data will be transferred to the database.

Please make sure that the data transfer is activated in the menu Network setup.
Further information to storing data you will find in the chapter Storing data.
The operation and configuration of the DEWE-x38-PNA is done with the buttons on the left site and the menubar top of the Homescreen.



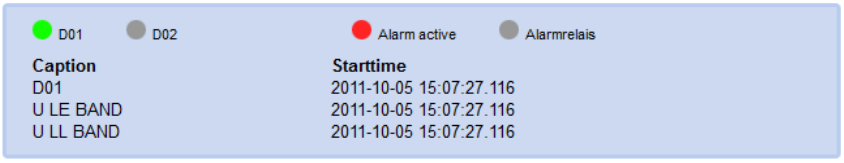
Menu bar

Menu buttons of the DEWE-x38-PNA



Homescreen, selection of the harmonics

The vectorscope displays the actual values and phase angels. With the drop down field on the bottom of the Homescreen you can choose which harmonic should displayed in the vectorscope. Below the scope you will get information to the status of the alarm-relais, the digital contacts and the pending alarms.



The pending alarms are displayed in a list view ordered by start time.An alarm is always indicated with the red LED above the start time.
The "high" status of the digital, is displayed with a green LED.

3.13.2 Data

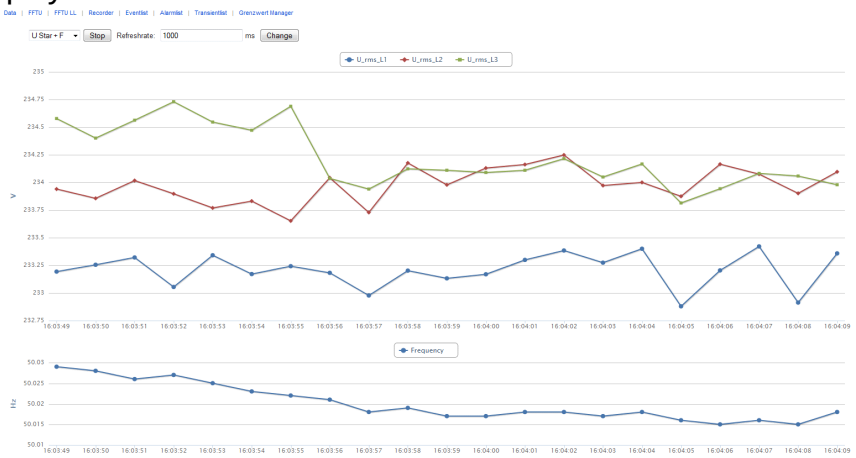
In the view „**Data**“ all the actual values are displayed. Depending on your instrument you will find measured values of voltage, current, power THD and Flicker.

Overview of the recorded data

- **Frequency** The calculated frequency.
- **u2_1** Unbalance factor in %.
- **U Star** Line voltage.
- **U Delta** Line-Line voltage.
- **phi UU** Phaseangle.
- **THD** Total Harmonic Distortion in %.
- **THD Even** THD of even Harmonics.
- **THD Odd** THD of odd Harmonics.
- **PST** Short time flicker.
- **PLT** Long time flicker.

3.13.3 Recorder

The recorder displays actual values of star voltage, frequency, unbalanced factor, Flicker, THD and U_{earth}. With the combination control you can choose witch values should be displayed in the recorder view.

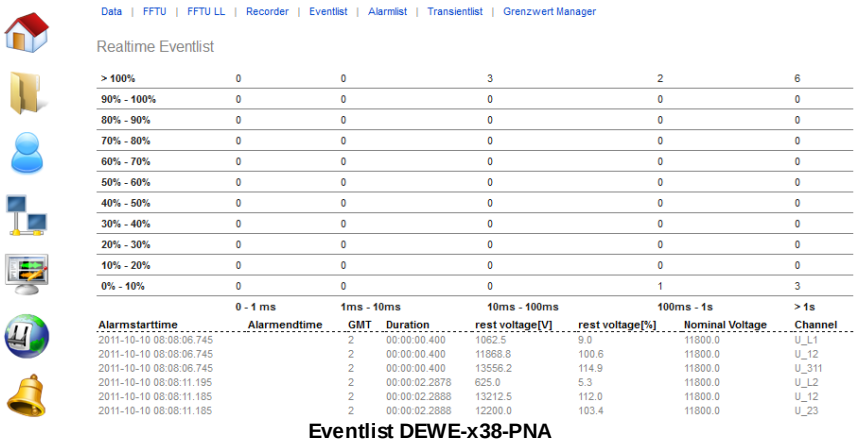


Recorder, voltages, frequencies

To change the „refresh rate“ enter a value and click on the "Change" button.

3.13.4 Eventlist, Alarmlist, Transientlist

Those Lists shows all the alarms and events during the measurement. All actual events are collected in the list view. The alarms are displayed with caption, start- and end time. The following picture shows the table view of the events. This table view is also used to classify the events by duration.



Data | FFTU | FFTU LL | Recorder | Eventlist | Alarmlist | Transientlist | Grenzwert Manager

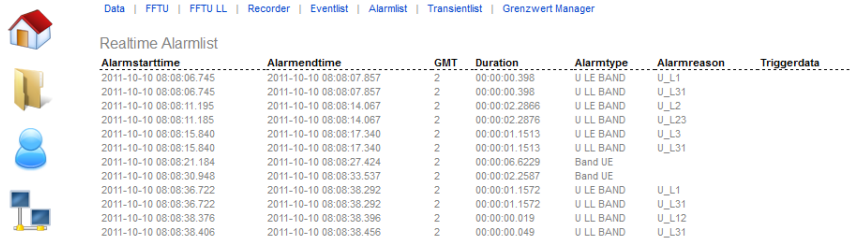
Realtime Eventlist

> 100%	0	0	3	2	6
90% - 100%	0	0	0	0	0
80% - 90%	0	0	0	0	0
70% - 80%	0	0	0	0	0
60% - 70%	0	0	0	0	0
50% - 60%	0	0	0	0	0
40% - 50%	0	0	0	0	0
30% - 40%	0	0	0	0	0
20% - 30%	0	0	0	0	0
10% - 20%	0	0	0	0	0
0% - 10%	0	0	0	1	3
	0 - 1 ms	1ms - 10ms	10ms - 100ms	100ms - 1s	> 1s

Alarmstarttime	Alarmendtime	GMT	Duration	rest voltage[V]	rest voltage[%]	Nominal Voltage	Channel
2011-10-10 08:08:06.745		2	00:00:00.400	1062.5	9.0	11800.0	U_L1
2011-10-10 08:08:06.745		2	00:00:00.400	11868.8	100.6	11800.0	U_12
2011-10-10 08:08:06.745		2	00:00:00.400	13556.2	114.9	11800.0	U_311
2011-10-10 08:08:11.195		2	00:00:02.2878	625.0	5.3	11800.0	U_L2
2011-10-10 08:08:11.185		2	00:00:02.2888	13212.5	112.0	11800.0	U_12
2011-10-10 08:08:11.185		2	00:00:02.2888	12200.0	103.4	11800.0	U_23

Eventlist DEWE-x38-PNA

All the alarms are collected in the alarmlist ordered by start time.



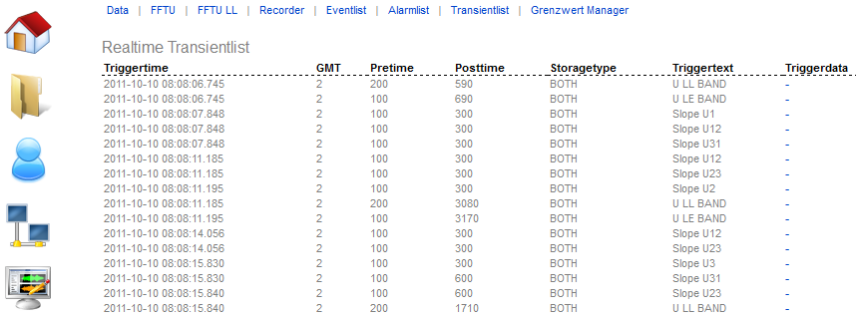
Data | FFTU | FFTU LL | Recorder | Eventlist | Alarmlist | Transientlist | Grenzwert Manager

Realtime Alarmlist

Alarmstarttime	Alarmendtime	GMT	Duration	Alarmtype	Alarmreason	Triggerdata
2011-10-10 08:08:06.745	2011-10-10 08:08:07.857	2	00:00:00.398	U LE BAND	U_L1	
2011-10-10 08:08:06.745	2011-10-10 08:08:07.857	2	00:00:00.398	U LL BAND	U_L31	
2011-10-10 08:08:11.195	2011-10-10 08:08:14.067	2	00:00:02.2866	U LE BAND	U_L2	
2011-10-10 08:08:11.185	2011-10-10 08:08:14.067	2	00:00:02.2876	U LL BAND	U_L23	
2011-10-10 08:08:15.840	2011-10-10 08:08:17.340	2	00:00:01.1513	U LE BAND	U_L3	
2011-10-10 08:08:15.840	2011-10-10 08:08:17.340	2	00:00:01.1513	U LL BAND	U_L31	
2011-10-10 08:08:21.184	2011-10-10 08:08:27.424	2	00:00:06.6229	Band UE		
2011-10-10 08:08:30.948	2011-10-10 08:08:33.537	2	00:00:02.2587	Band UE		
2011-10-10 08:08:36.722	2011-10-10 08:08:38.292	2	00:00:01.1572	U LE BAND	U_L1	
2011-10-10 08:08:36.722	2011-10-10 08:08:38.292	2	00:00:01.1572	U LL BAND	U_L31	
2011-10-10 08:08:38.376	2011-10-10 08:08:38.396	2	00:00:00.019	U LL BAND	U_L12	
2011-10-10 08:08:38.406	2011-10-10 08:08:38.456	2	00:00:00.049	U LL BAND	U_L31	

Alarmlist DEWE-x38-PNA

The Transientlist is a visualization of all transients during a measurement.



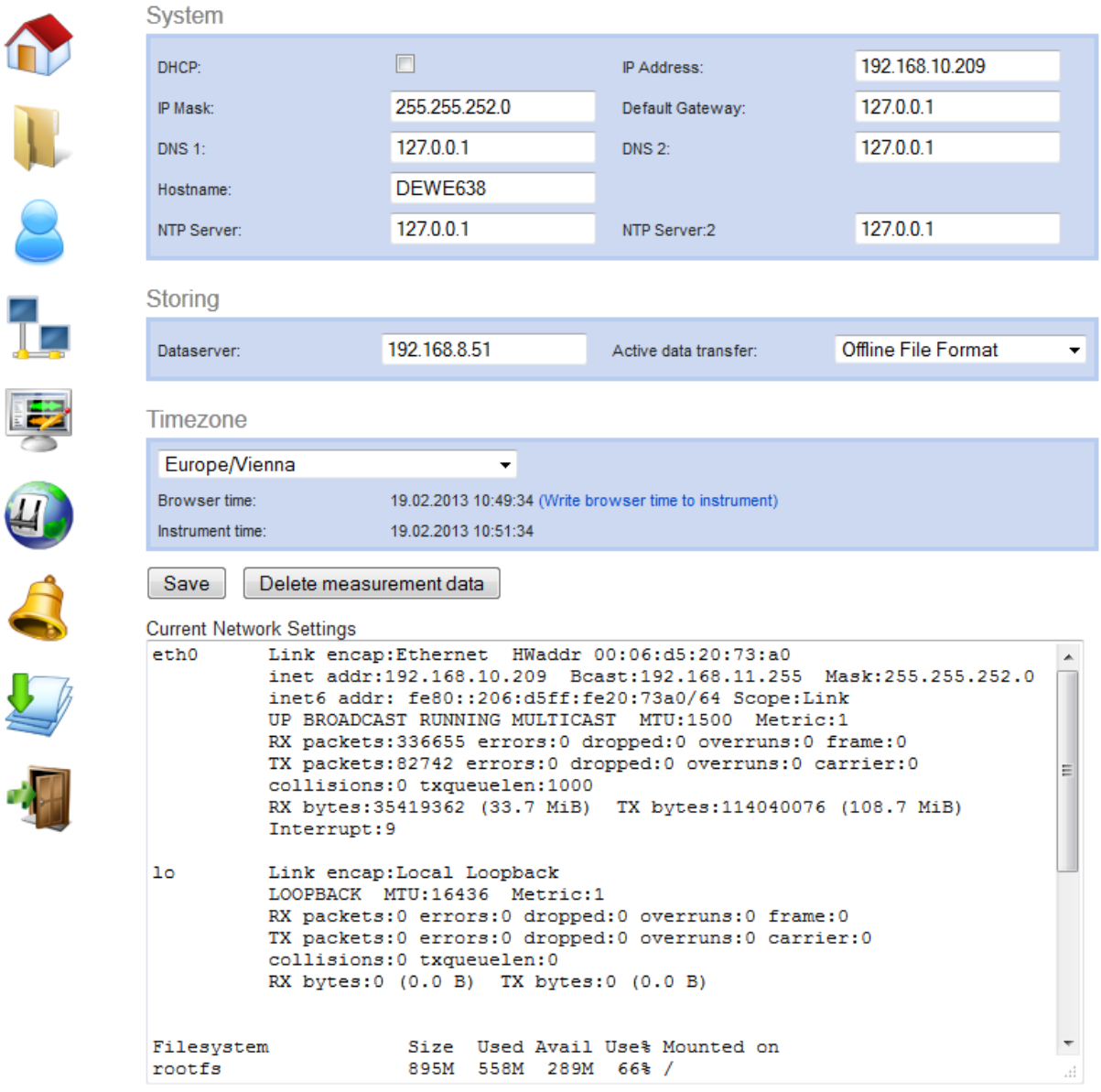
Triggertime	GMT	Pretime	Posttime	Storagetype	Triggertext	Triggerdata
2011-10-10 08:08:06.745	2	200	590	BOTH	U LL BAND	-
2011-10-10 08:08:06.745	2	100	690	BOTH	U LE BAND	-
2011-10-10 08:08:07.848	2	100	300	BOTH	Slope U1	-
2011-10-10 08:08:07.848	2	100	300	BOTH	Slope U12	-
2011-10-10 08:08:07.848	2	100	300	BOTH	Slope U31	-
2011-10-10 08:08:11.185	2	100	300	BOTH	Slope U12	-
2011-10-10 08:08:11.185	2	100	300	BOTH	Slope U23	-
2011-10-10 08:08:11.195	2	100	300	BOTH	Slope U2	-
2011-10-10 08:08:11.185	2	200	3080	BOTH	U LL BAND	-
2011-10-10 08:08:11.195	2	100	3170	BOTH	U LE BAND	-
2011-10-10 08:08:14.056	2	100	300	BOTH	Slope U12	-
2011-10-10 08:08:14.056	2	100	300	BOTH	Slope U23	-
2011-10-10 08:08:15.830	2	100	300	BOTH	Slope U3	-
2011-10-10 08:08:15.830	2	100	600	BOTH	Slope U31	-
2011-10-10 08:08:15.840	2	100	600	BOTH	Slope U23	-
2011-10-10 08:08:15.840	2	200	1710	BOTH	U LL BAND	-

Transientlist DEWE-x38-PNA

All views and lists are updated in real-time!

3.13.5 Storing data

Recorded data will be stored locally on your DEWE-x38-PNA (If no connection to a data server is available, data transfer is deactivated or Offline Format is activated) or in a connected database. To activate or deactivate the data transfer please read throw the chapter Network configuration. The data transfer will automatically start after the start of the recording in the Homescreen. To delete the local data on your DEWE-x38-PNA please click on "Delete Measurement Data" in the menu Network configuration.



Delete local stored Data

To store data in a database the user has to define a dataserver and activate the data transfer. If all the settings are correct, the measured values, alarms, events and transients are stored in the database. Further information how to store data and

generate reports you will find in PMT settings and in the Manual of PMT4.

3.13.6 Offline File Format

"Offline Format" is used to store the data locally on your DEWE-x38-PNA in a special file format. Now it is possible to evaluate data without PMT4 directly on your instrument or with PMT4.

Tipp: Please note that a Database is not longer necessary!

To store data "Offline" please choose the "Offline File Format" in the Menu Storing Options.
Click on "Save" to save your settings before leaving the Menu.

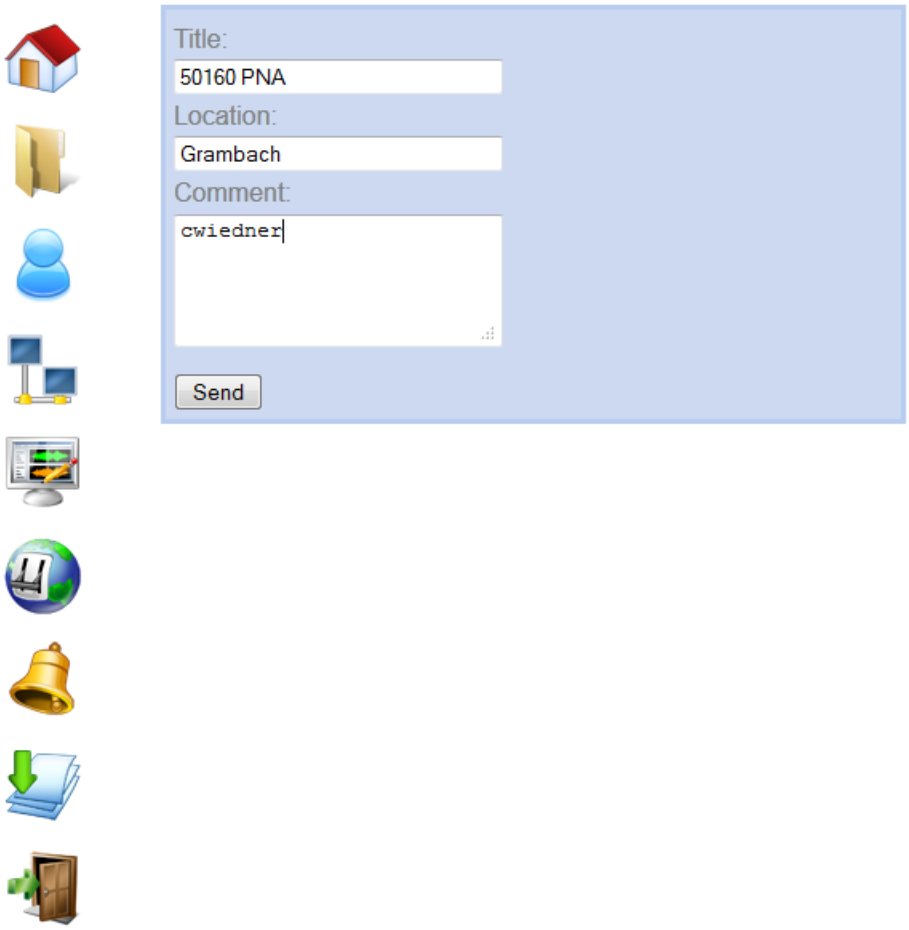
Move to the homescreen of your instrument. You will find a new icon on the left.

Offline Files

To view all available and stored files click on the icon shown in the picture above. You can download the files to your PC to evaluate the data with PMT4-Offline! Please click "Download" to load the file to your PC. For easy handling of your files please define a basic folder or directory for your downloaded files (e.g. "Offline Files" on the "C:\" drive of your Windows based PC)!

Furthermore it is possible to generate EN50160 reports online with the browser. If you got the additional wind plugin you can generate EN 61400-12-1 reports too. Just click on the "EN50160 Star" or "EN50160 Delta" to generate an online report. Automatically a report based on the standard appears.

Note that it´s necessary to fill in the measurement information by starting a new measurement. This information is used to generate the report!



Information to a Measurement

3.13.7 EN50160 Reports

As already mentioned in the previous chapter its possible to generate EN50160 reports automatically. Click on "EN50160 Star" or "EN50160 Delta" to generate a report based on the standard. For sure it is possible to print out the report or store it in portable document format (PDF).

Back

DEWE EN 50160

Star Calculation

Measurement start: Fri Feb 15 2013 12:44:17 GMT+0100
Measurement end: Tue Feb 19 2013 10:00:00 GMT+0100
Title: weekend
Location: ""
Comment: "PMT4 vs X38"
Module: Wienstrom Offline
Report date: Tue Feb 19 2013 10:29:03 GMT+0100
Nominal Voltage: 230.9 V

95 % Quantile

Name	Value	Limits	Result
Frequency 99.5 %	50.06 Hz	49.5 to 50.5	Ok
Unbalance	0.25 %	0.0 to 2.0	Ok
U RMS L1	236.56 V	207.8 to 254.0	Ok
U RMS L2	236.69 V	207.8 to 254.0	Ok
U RMS L3	236.03 V	207.8 to 254.0	Ok
FFT U	FFT Spec 95 % Quantilwerte Ok		
THD L1	2.29 %	0.0 to 8.0	Ok
THD L2	1.89 %	0.0 to 8.0	Ok
THD L3	2.11 %	0.0 to 8.0	Ok
Pst L1	NAN		
Pst L2	NAN		
Pst L3	NAN		
plt L1	NAN		
plt L2	NAN		
plt L3	NAN		

100 % Values

Name	Value	Limits	Result
Frequency 100 %	50.10 Hz	47.0 to 52.0	Ok
U RMS L1	237.27 V	196.3 to 254.0	Ok
U RMS L2	237.41 V	196.3 to 254.0	Ok
U RMS L3	237.01 V	196.3 to 254.0	Ok

Disdip

> 120%	0	0	0	0	0
110% - 120%	0	0	0	0	
80% - 90%	2	0	0	0	0
70% - 80%	6	0	0	0	0
40% - 70%	2	0	0	0	0
5% - 40%	1	0	0	0	0
	10 - 200 ms	200ms - 500ms	500ms - 1s	1s - 5s	5s - 60s

Abstract of a EN50160 Report

4 EN50160

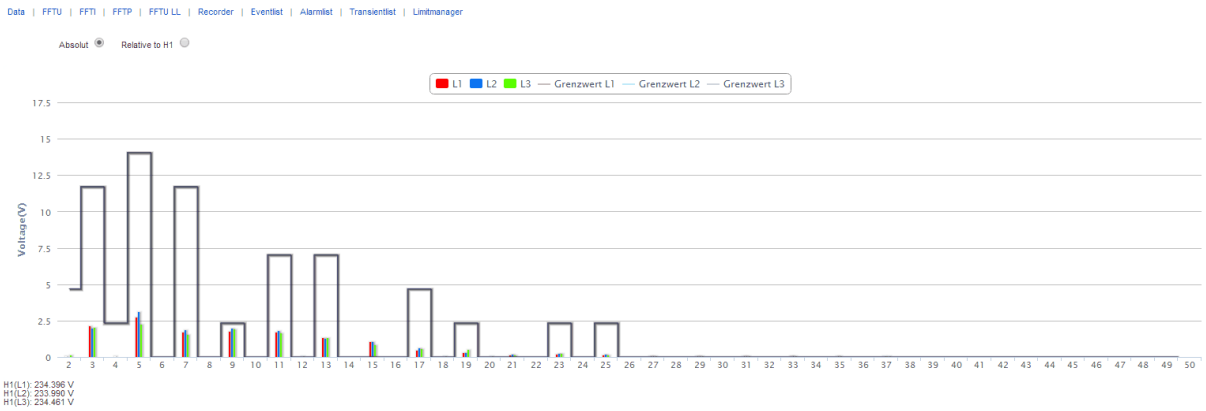
Setting the x38 instrument to fullfill the EN50160 standard. The standard describes the measurement of power quality. In a view steps your instrument monitors the power quality.

4.1 Limitmanager EN50160

Generate a txt file and input the EN50160 limits of the harmonics up to 25th order. The limits are shown below.

All values are in percent (%) based on the fundamental harmonics.
Input these limits to a *txt-file and upload it to the instrument via limitmanager.
H2= 2
H3= 5
H4= 1
H5= 6
H6= 0,5
H7= 5
H8= 0,5
H9= 1,5
H10= 0,5
H11= 3,5
H12= 0,5
H13= 3,5
H14= 0,5
H15= 0,5
H16= 0,5
H17= 2,0
H18= 0,5
H19= 1,5
H20= 0,5
H21= 0,5
H22= 0,5
H23= 1,5
H24= 0,5
H25= 1,5

Result of the view in FFT graphs:



Example limits used in FFT graph - absolute values based on fundamental harmonic