DS 500 PM mobile

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1 Intended use

The data logger DS 500 PM mobile with integrated energy meter is used for mobile measurement data acquisition and storage of analogue and digital input signals.

The data logger DS 500 PM mobile is designed and constructed exclusively for the intended use described here and may only be used accordingly.

A check whether the device is suitable for the selected application must be carried out by the user. It must be ensured that the medium is compatible with the parts in contact with the medium. The technical data given in the data sheet are binding.

Improper handling or operation outside the technical specifications is not permitted. Claims of any kind due to improper use are excluded.

2 Scope of delivery

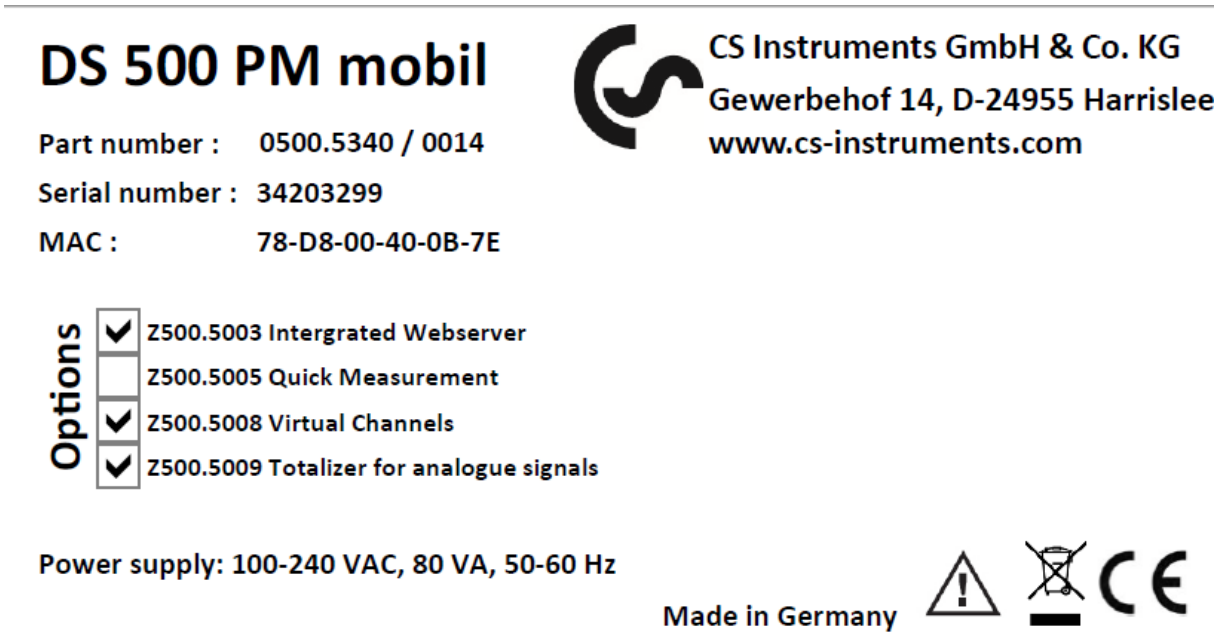
1x DS 500 PM mobile depending on option in 3 channels, 7 channels or 11 channels

3x current transformer

1x measuring cable set with magnetic tips

1x Instruction manual

3 Name plate



4 Safety instructions

4.1 General

Please check whether this manual corresponds with the device type.

Please attend to all notes indicated in this instruction manual. It contains essential information which has to be followed during installation, operation and maintenance. Therefore, this instruction manual has to be read categorically by the technician as well as by the responsible user/qualified personnel before installation, initiation and maintenance.

This instruction manual has to be available at any time at the operation site of the DS 500 PM mobile.

Regional and national regulations respectively, have to be observed in addition to this instruction manual if necessary.

In case of any obscurities or questions with regard to this manual or the instrument please contact CS Instruments GmbH & Co.KG.

Warning!

Inadmissible operating parameters!

Undercutting and exceeding respectively of limit values may cause danger to persons and material and may lead to functional and operational disturbances

Measures:

- Make sure that the DS 500 PM mobile is only operated within the admissible limit values indicated on the type label.
- Strict observance of the performance data of the DS 500 PM mobile in connection with the application.
- Do not exceed the admissible storage and transportation temperature.

Further safety instructions:

- Attention should also be paid to the applicable national regulations and safety instructions during installation and operation.
- The DS 500 is not allowed to be used in explosive areas.

Additional remarks:

- Do not overheat the instrument!
- Change of battery or SD-Card are only allowed to be carried out by authorized qualified personnel. and in strainless state.

Attention!

Malfunctions at the DS 500 PM mobile!

Faulty installation and insufficient maintenance may lead to malfunctions of the DS 500 PM mobile which may affect the measuring results and which may lead to misinterpretations

4.2 Installation

Warning!

Supply voltage!

Contact with supply voltage carrying non-insulated parts may cause an electric shock with injury and death.

Measures:

- Note all applicable regulations for electrical installations (e.g. VDE 0100)!
- **Carry out maintenance only in strain less state!**
- All electric works are only allowed to be carried out by authorized qualified personnel.

Danger!
Missing earth connection!

If earthing (protective earth) is missing, there is a danger that in the event of a fault, touchable conductive components may carry mains voltage. Touching such parts leads to electric shock with injury and death. It is essential that the installation is earthed or that the protective earth is connected according to regulations.
Do not use intermediate plugs at the mains plug.
If necessary, have the mains plug replaced by qualified personnel.

The plug of the power supply cord is used as a separator. This separator must be clearly recognizable and easily accessible by the user. A plug connector with a CEE7/7 system is necessary.

All the electrical lines carrying supply voltage or another voltage that is dangerous in the case of contact (power supply cord, alarm and indicator relays), must additionally be equipped with double or reinforced insulation (EN 61010-1). This can be ensured by using plastic-sheathed cables, a second insulation (e.g. flexible insulating tubing), or correspondingly suitable lines with reinforced insulation.
The connecting cables can be equipped, for example, with flexible insulating tubing.
The additional flexible insulating tubing must withstand the electrical and mechanical stresses which can occur during the intended use (see EN 61010-1, Clause 6.7.2.2.1).

5 Technical data DS 500 PM mobile

<table>
<tr><td>Dimensions</td><td colspan="5">420 x350 x 210, IP 65</td></tr>
<tr><td>Connections</td><td colspan="5">3/7/11 Channel inputs Odu medi Snap 8 pole for Sensor
4x Voltage for L1, L2, L3 and N
3x Current transformer for L1, L2, L3 (ODU- 3-pol)
1x RJ45 Ethernet s
USB for data export to USB Stick</td></tr>
<tr><td>Weight</td><td colspan="5">8,5 kg</td></tr>
<tr><td>Case material</td><td colspan="5">impact resistant ABS plastic</td></tr>
<tr><td>Sensor inputs</td><td colspan="5">3/7/11 sensor inputs for analogue and digital sensors freely allocatable.
Digital third party sensor with RS 485/ModBus RTU
Analogue CS sensors for pressure, temperature, clamp-on ammeters preconfigured.
Analogue third-party sensors 0/4 – 20 mA, 0 - 1/10/30 V, pulse,Pt100/Pt1000</td></tr>
<tr><td>Power supply for sensors</td><td colspan="5">Output voltage: 24 VDC ± 10% galavanically isolated
Output current: 130 mA by continuous operation, peak 180mA
Maximum output current over all channels with
- one power supply: 400mA
- two power supplies: 1Ampere</td></tr>
<tr><td>Current transformerr</td><td colspan="5">100A/1A → max. wire diameter 24mm
600A/1A → max. wire diameter 36mm
1000A/1A → max. wire diameter 52mm</td></tr>
<tr><td>Measurments</td><td colspan="5">Voltage (V) , Current (A)
Active Power (KW), Apparent power (kVA), Reactive power (KVar),
Active energy (KWh), Frequency (Hz), Cos Phi,</td></tr>
<tr><td rowspan="2">Measurement ranges</td><td>Voltage measurement</td><td colspan="4">max. 415 V</td></tr>
<tr><td>Current measurment</td><td colspan="4">max. 100 A, 600 A or 1000 A
depending on used current transformer</td></tr>
<tr><td rowspan="5">Accuracy</td><td rowspan="4">Current measurment</td><td colspan="4">IEC 60044-1 Class1</td></tr>
<tr><td colspan="4">Stromabweichung in % bei In</td></tr>
<tr><td>120%</td><td>100%</td><td>20%</td><td>5%</td></tr>
<tr><td>1</td><td>1</td><td>1.5</td><td>3</td></tr>
<tr><td>Active power</td><td colspan="4">IEC 62053-21 Class1</td></tr>
<tr><td></td><td>Sensors</td><td colspan="4">Siehe Kapitel 6</td></tr>
<tr><td>Memory card</td><td colspan="5">Memory size 8 GB SD memory card standard, optional up to 32 GB</td></tr>
<tr><td>Power supply</td><td colspan="5">100 – 240 VAC / 50 – 60 Hz</td></tr>
<tr><td>Colour screen</td><td colspan="5">7“-Touchpanel TFT transmissive</td></tr>
<tr><td>Operating temperature</td><td colspan="5">0 – 50 °C</td></tr>
<tr><td>Storage temperature</td><td colspan="5">-20 b- +70 °C</td></tr>
<tr><td>Optionally</td><td colspan="5">Webserver</td></tr>
<tr><td>Optionally</td><td colspan="5">Mathematics calculation function</td></tr>
<tr><td>Optionally</td><td colspan="5">Totaliser function</td></tr>
</table>

6 Input signals analogue

Input signal		
Current signal (0 – 20 mA / 4 – 20 mA) internal or external power supply	Measuring range	0 – 20 mA / 4 – 20 mA
	Resolution	0,0001 mA
	Accuracy	± 0,003 mA ± 0,05 %
	Input resistance	50 Ω
6.1.1 Voltage signal (0 - 1V)	Measuring range	0 – 1 V
	Resolution	0,05 mV
	Accuracy	± 0,2 mV ± 0,05 %
	Input resistance	100 kΩ
Voltage signal (0 - 10 V / 30 V)	Measuring range	0 – 10 V/30 V
	Resolution	0,5 mV
	Accuracy	± 2 mV ± 0,05 %
	Input resistance	1 MΩ
RTD Pt100	Measuring range	-200 – 850 °C
	Resolution	0,1 °C
	Accuracy	± 0,2 °C bei -100 – 400 °C ± 0,3 °C (further range)
RTD Pt1000	Measuring range	-200 – 850 °C
	Resolution	0,1 °C
	Accuracy	± 0,2 °C bei -100 – 400 °C ± 0,3 °C (further range)
Pulse	Measuring range	Minimum pulse length 100 µs frequency 0 - 1 kHz max. 30 VDC

7 Cable cross-section

7.1 Power supply 100 - 240 VAC, 50 - 60 Hz, special version 24 VDC:

Cable cross section power supply: 0,75 mm²

7.2 Sensor circuit points/Output signal:

AWG16 – AWG28, cable cross-sections: 0,14 - 1,5 mm²

Cable gland clamping Range: 4-8mm

8 Connection diagrams

8.1 Pin assignment of the sensor inputs

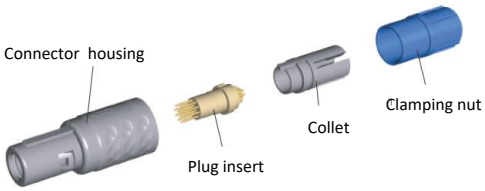
8.1.1 Pin assignment for sensor plugs A2 – A4, B1 – B4, C1 – C4

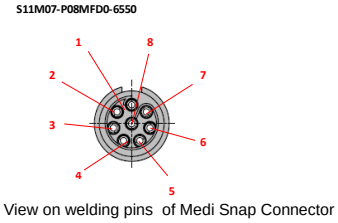
An ODU Medi Snap 8 Pin is used as sensor interface connector. **Reference:** K11M07-P08LFD0-6550

Available connection cables from CS-Instruments are:

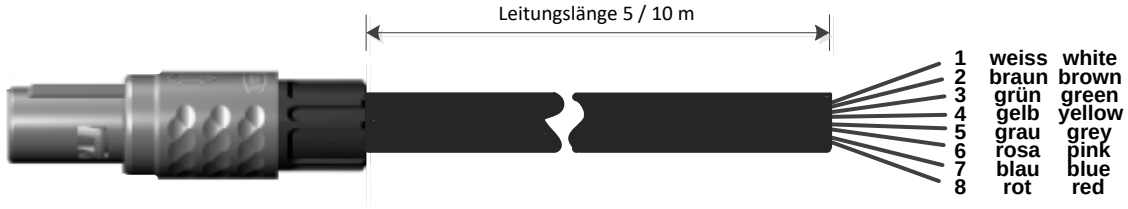
ODU connectors with open ends:	Order no. 0553 0501, cable length 5 m. Order no. 0553 0502, cable length 10 m.
ODU connector with M12 connector:	Order no. 0553 1503, cable length 5 m.
Extension cable (ODU/ODU):	Order no. 0553 0504, cable length 10 m..

Connector and cable design for cables with open ends:





View on welding pins of Medi Snap Connector



8.1.2 Pin Assignment CH: A2–A4, B1–B4, C1–C4.

CH
A2 – A4
B1 – B4
C1 – C4

+ RS485	1
- RS485	2
SDI	3
Analog IN +	4
Analog IN -	5
V Pt	6
+VB 24Vdc	7
-VB GND	8

RS485-A (+)

RS485-B (-)

SDI (**S**ingle wire **D**igital **I**nterface for VA/FA Sensors 4xx)

ANALOG IN + (current signal and voltage signal)

ANALOG IN – (current signal and voltage signal)

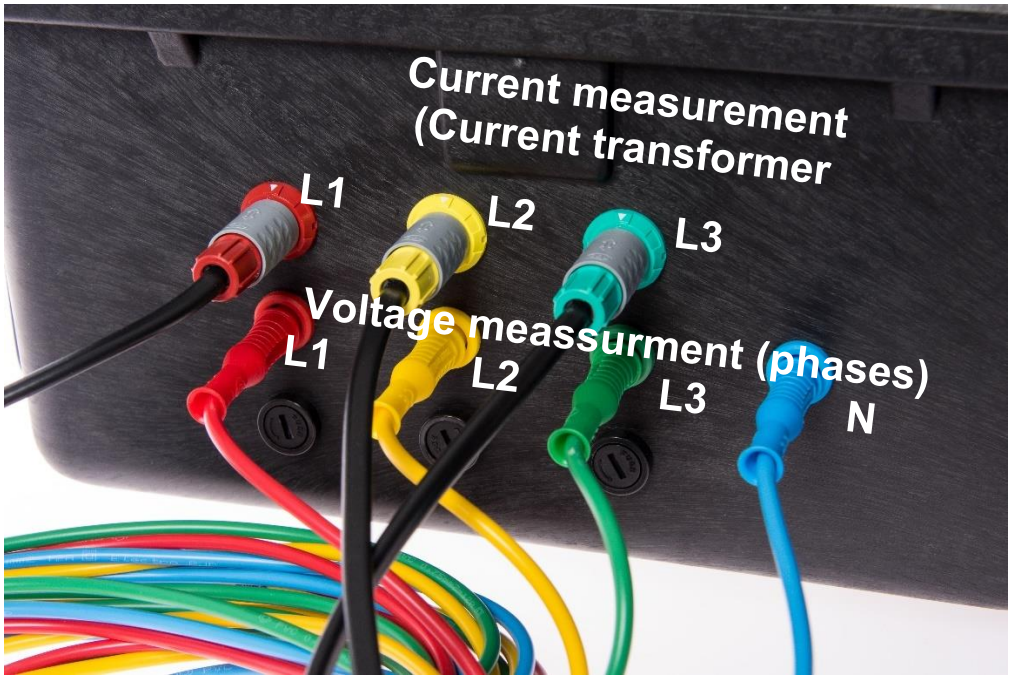
CURRENT SOURCE Pt Sensors

+VB, 24 VDC sensor power supply

-VB, GND Sensor

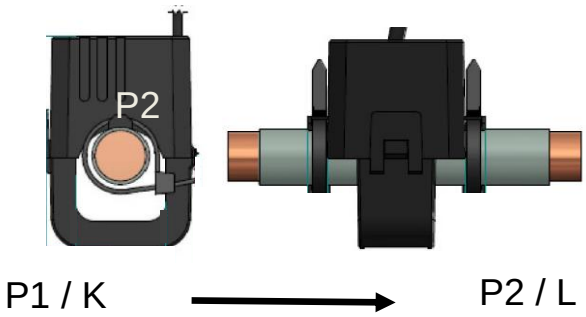
8.2 Pin assignment for energy measurement

8.2.1 Inputs for current and voltage measurement



⚠	**Only for 50 / 60Hz measurements.** **Not approved for measurements after frequency converter** **Please ensure that the current and voltage phases match, otherwise there is a risk of incorrect or missing measured values.**
⚡	**Warning!** **Supply volatge!** **First connect the measuring cables and current transformers to the DS 500 PM mobile before applying the voltage measuring tips and the current transformers.** Contact with non-insulated parts carrying mains voltage may result in the risk of electric shock, which can cause serious injury and death.

8.2.2 Current transformer installation



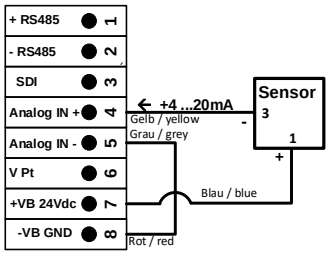
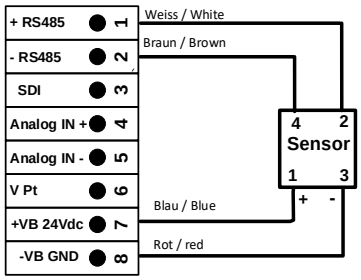
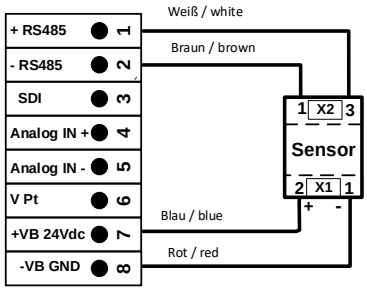
P1 / K = power source side P2 / L = consumer side

Please make sure that the current transformers are securely closed (2x Click)

9 Connection diagrams for CS- Instruments Sensors

When using connection cables 0553 0501 and 0553 0502 (ODU plugs with open cable ends), the following connection diagrams apply for CH A2 to C4!

FA Series: Dew point sensors from CS Instruments
VA Series: Consumption sensors from CS Instruments

	**FA 515** The FA 515 is an analogue sensor in 2-wire technology (4...20 mA). Measuring range / scaling see type plate FA 515.
	**FA 500 / FA 510** **VA 500 / VA 520 / VA 525 / VD 500** The digital data transmission between DS 500 PM mobile and the sensors takes place via RS 485 (Modbus).
	**VA 550 / VA 570** The digital data transmission between DS 500 PM mobile and the sensors takes place via RS 485 (Modbus).

<u>Note</u>
For further sensor connection diagrams, see operating instructions DS 500 mobile.

10 OperationDS 500 PM mobile

The operation is largely self-explanatory and menu-driven via the touch panel.
The selection of the respective menu items occur via short "tapping" with the finger or a soft round pen.

Attention: Please use no pens or other objects with sharp edges!
The foil can be damaged!

After sensors are connected, they also have to be configured.

Inputs or changes can be made with all white deposit fields.
The measured values can be represented as a curve or values.

Words in green font refer mainly to the pictures in the section of the chapter, but also on important menu paths or menu items that are related to are in green font.

The menu navigation is generally in a green font!

The table of contents and chapter references in blue font contain links to the respective chapter title.

10.1 Main menu (Home)

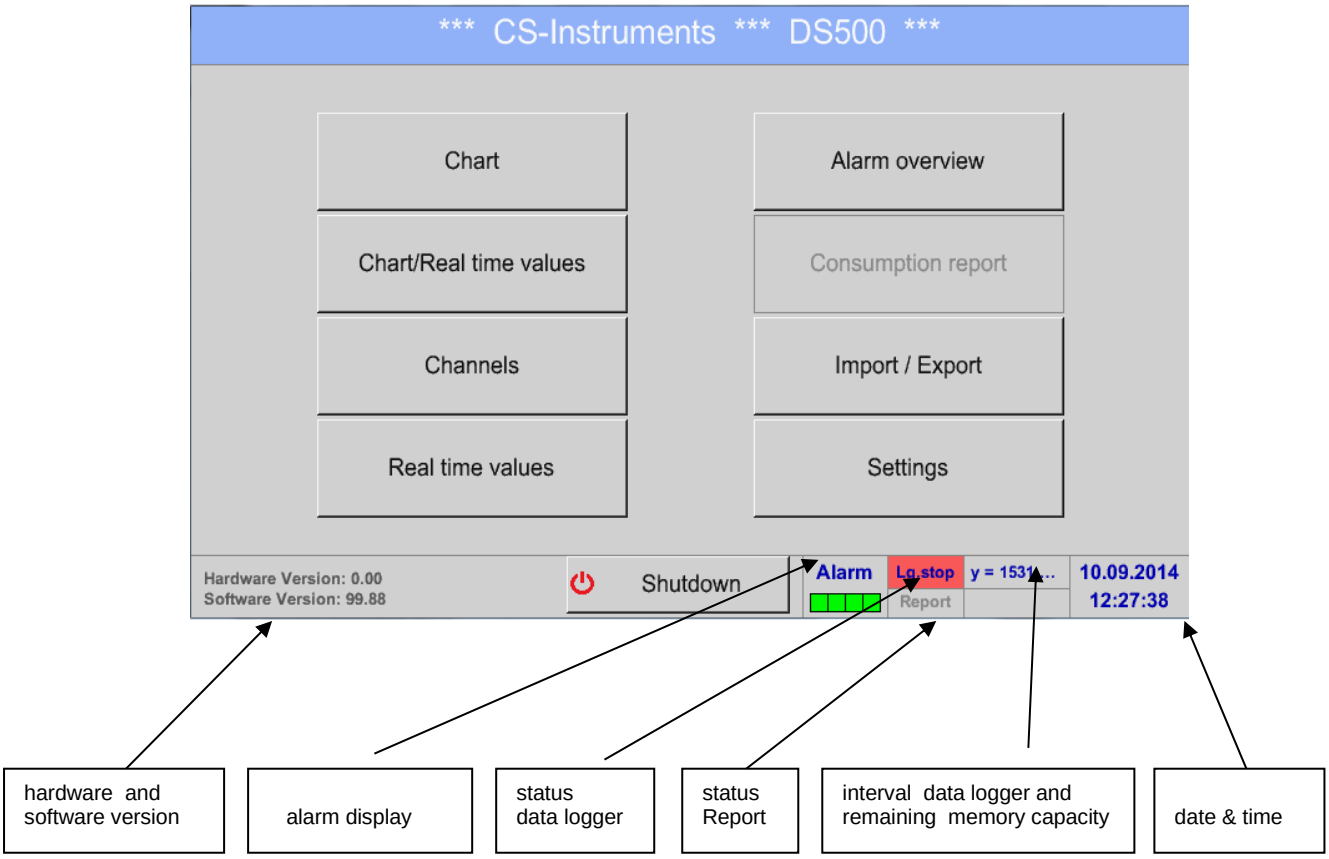
From the main menu, you can reach every available item.

10.1.1 Initialization

After switching on the DS 500 all channels are initialized and the main menu will appear.

Attention:
For the first initiation, there may be no channels preset!

10.1.2 Main menu after initialization



Important:
Before the first sensor setting is made, the language and time should be set!

Remark:
Chapter 13.5.1 Set language
(*Main menu ➔ Settings ➔ Device Settings ➔ Set Language*)

Chapter 13.5.2 Date & Time
(*Main menu ➔ Settings ➔ Device Settings ➔ Date & Time*)

10.2 Shutdown

Important: **In case the DS500 has to be set into a strainless state, it needs a defined termination / storage of the recorded data by a proper shutdown**

Main menu ➔ Shutdown

This process must always be confirmed by entering the password.

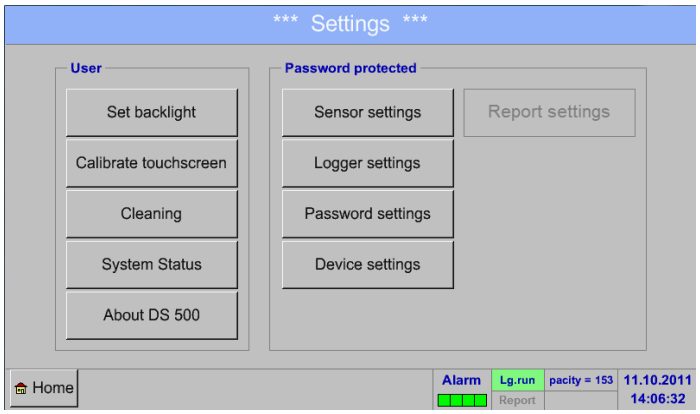
10.3 Settings

The settings are all protected by a password!

Settings or changes are generally confirmed with OK!

Remark:
If you go back to main menu and then again one of the setting menus is called, you must enter the password again.

Main menu ➔ Settings



Overview of the *Settings*

10.3.1 Password settings

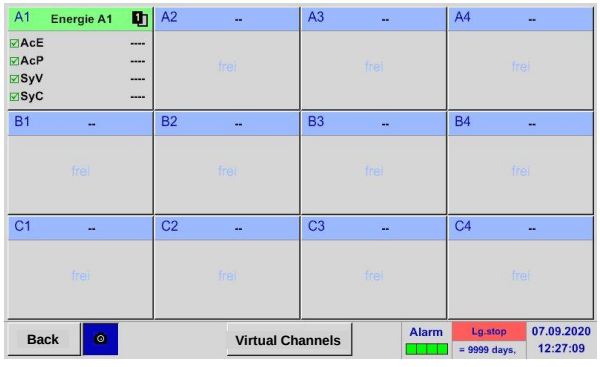
Main menu ➔ Settings ➔ Password settings

Factory settings for password at the time of delivery: 0000 (4 times zero).

10.3.2 Sensor-Settings

<u>Important</u>:
Sensors from CS Instruments are generally pre-configured and can be connected directly to a free sensor channel!

Main menu ➔ Settings ➔Sensor settings



After entering the password, an overview of the available channels appears.
3, 7 or 11 channels depending on the model.

Note:
On channel A1 the energy measurement is pre-defined.

Remark:
Depending on the DS 500 PM mobile:

No extension board ➔ 3 channels/setups
One extension board ➔ 7 channels/setups
Two extension boards ➔ 11 channels/setups

Note
For details on sensor settings and operation, refer to the DS 500 mobile User's Guide.