Installation and operating instructions

Intelligent paperless recorder
DS 500 mobile

I. Foreword

Dear customer,

thank you very much for deciding in favour of the DS 500 mobile. Please read this installation and operation manual carefully before mounting and initiating the device and follow our advice. A riskless operation and a correct functioning of the DS 500 are only guaranteed in case of careful observation of the described instructions and notes.

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II. Table of contents

1 Safety instructions

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.

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.

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 strainless state!**
- All electric works are only allowed to be carried out by authorized qualified personnel.

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 is only operated within the admissible limit values indicated on the type label.
- Strict observance of the performance data of the DS 500 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!

Attention!

Malfunctions at the DS 500!

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

2 Application area

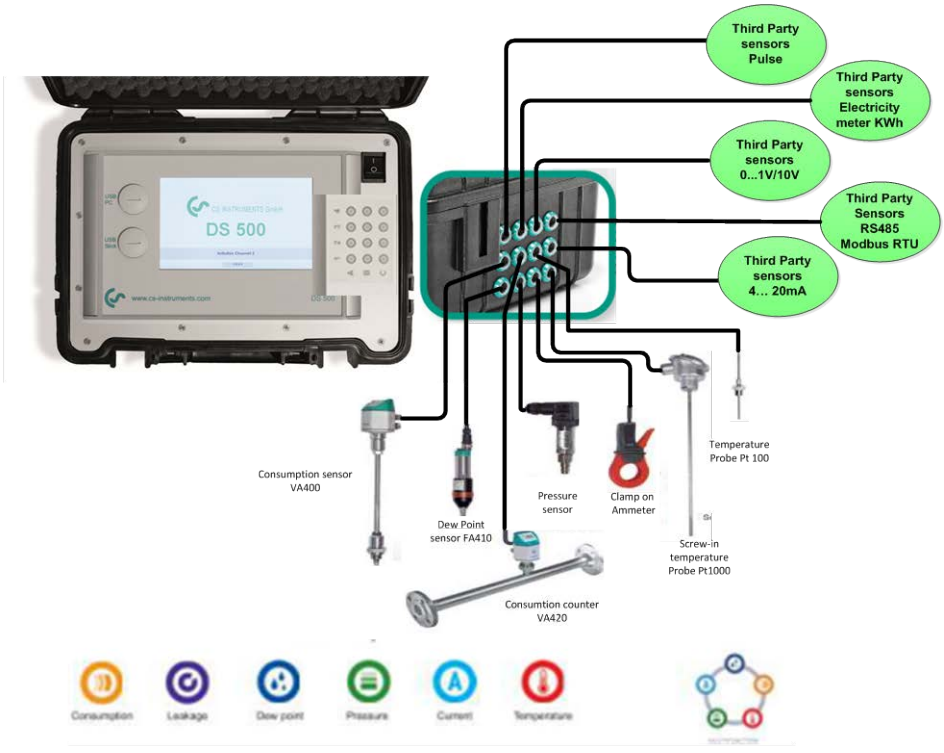
Our long-term hands-on experience in measurement and control technology was implemented in the new DS 500.

From recording of the measured data, automatic sensor identification, indication on a big colour screen, alerting, storage up to remote read-out via web server, all that is possible with DS 500. By means of the CS-Soft, software alarms can be sent via SMS or e-mail.

On the big 7' colour screen with touch panel all information is available at a glance.
The operation is very easy. All measured values, measured curves and threshold exceedings are indicated. The progression of the curve, since the beginning of the measurement, can be viewed by an easy slide of the finger.

Daily, weekly and monthly reports, with costs in € and counter reading in m^3, for each consumption sensor are completing the sophisticated system concept.

The huge difference to ordinary paperless chart recorders reveals in the easy initiation as well as in the evaluation of the measured data. All sensors are identified directly and powered by DS 500. Everything is matched and tuned.



Versatile:
Up to 12 sensors, incl. all CS sensors (consumption, dewpoint, pressure, current, KTY, PT 100, PT 1000) are identified automatically by DS 500. Optional analogue sensors (0/4 - 20 mA, 0 - 1/10/30 V, pulse) can be configured easily and quickly. Digital sensors can be connected via RS 485, Modbus RTU and SDI.

Flexible:
Network-compatible and worldwide remote data transmission via Ethernet, integrated web server.

Alarm relay / fault indication:

Up to 32 threshold values can be configured freely and allocated to 4 different alarm relay. Collective alarms are possible.

Remark:
Not accessible at DS 500 mobile only at DS500 stationary.

3 Technical data DS 500

CE	
Dimensions of housing	360x270x150 mm
Connections	4/8/12 x PG 12 for sensors and supply 1 x RJ 45 Ethernet connection
Weight	4.5 kg
Material	impact resistant HDPE/HWU –plastic (ABS), front screen polyester.
Sensor inputs	4/8/12 sensor inputs for analogue and digital sensors freely allocatable. Digital CS sensors for dew point and consumption with SDI interface FA/VA 400 Series. Digital third-party sensors RS 485/Modbus RTU, other bus systems realizable on request. 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, KTY.
Power supply for sensors	Output voltage: 24 VDC ± 10% galvanically 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 Maximum power input with - one power supply: 25VA - two power supplies: 50VA
Interfaces	USB stick, USB cable, Ethernet/RS 485 Modbus RTU/TCP, SDI other bus systems on request, web server optionally
Outputs	Analogue output, pulse in case of sensors with own signal output looped, like e. g. VA/FA Series.
Memory card	Memory size 2 GB SD memory card standard, optionally up to 4 GB
Power supply	100 - 240 VAC/50 - 60 Hz, special version 24 VDC
Colour screen	7" touch panel TFT transmissive, graphics, curves, statistics
Accuracy	See sensor specifications
Operating temperature	0 - 50 °C
Storage temperature	-20 - 70 °C
Optionally	Web server
Optionally	Quick measurement with 10 ms sampling rate for analogue sensors, Max/Min indication per second.
Optionally	Option "consumption report" statistics, daily/weekly/monthly report.

4 Input signal

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
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 at -100 - 400 °C ± 0,3 °C (further range)
RTD Pt1000	Measuring range	-200 - 850 °C
	Resolution	0,1 °C
	Accuracy	± 0,2 °C at -100 - 400 °C ± 0,3 °C (further range)
Pulse	Measuring range	minimal pulse length 100 µs frequency 0 - 1 kHz max. 30 VDC

5 Cable cross-section

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

AWG12 – AWG24, cable cross-sections: 0,2 - 2,5 mm^2

5.2 Sensor circuit points/Output signal:

AWG26, cable cross-sections: 0,14 mm^2

6 Connection diagrams of the different sensor types

6.1 Connector pin assignment for all sensors A.1 – A.4, B.1 – B.4, C.1 – C.4

The interface connector to be used is a ODU Medi Snap 8 pin – Reference: K11M07-P08LFD0-6550
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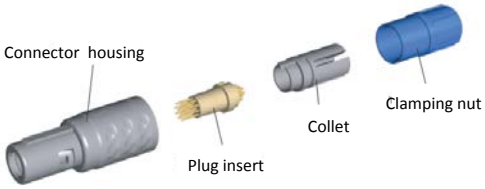
Available connection cables at CS-Instruments are:

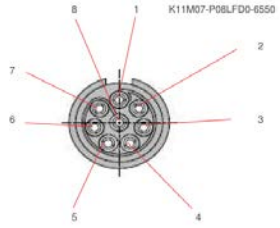
ODU with Open ends: Order no 0553 0501, cable length: 5 m.
Order no 0553 0502, cable length: 10 m.

ODU with M12 Connector: Order no 0553 0503, cable length: 5 m.

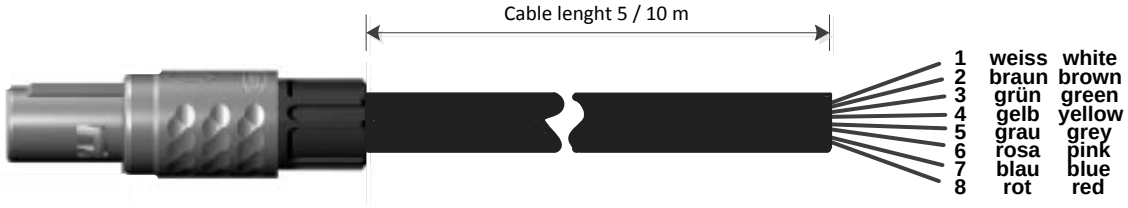
Extention cable (ODU/ODU): Order no 0553 0504, cable length: 10 m.

Connection scheme:





View on welding pins of Medi Snap Connector



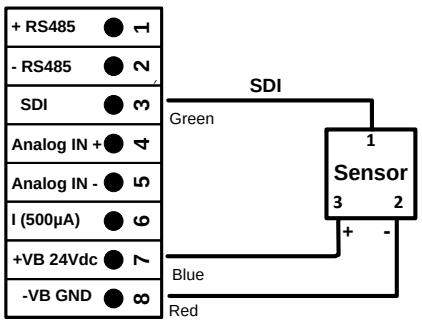
A.1 – A.4 **B.1 – B.4** **C.1 – C.4**		
+ RS485 ● 1	**White**	**+ RS485**
- RS485 ● 2	**Brown**	**- RS485**
SDI ● 3	**Green**	**SDI** (CS-internal data transfer for all dew point and consumption sensors)
Analog IN + ● 4	**Yellow**	**ANALOGUE IN +** (current signal and voltage signal)
Analog IN - ● 5	**Grey**	**ANALOGUE IN** – (current signal and voltage signal)
I (500µA) ● 6	**Pink**	**CURRENT SOURCE 500 µA**
+VB 24Vdc ● 7	**Blue**	**+VB, 24V DC sensor power supply**
-VB GND ● 8	**Red**	**- VB-, GND sensor**

6.2 Connection diagrams

The following connection diagrams in Chapter 7 apply to A.1 to C.4!

FA serial: dew point sensors from CS Instruments
VA serial: consumption sensors from CS Instruments

6.2.1 Connection CS dewpoint sensors, serial FA 415/FA 300



DS 500

FA 300
FA 415

The digital data transmission between DS 500 and the dewpoint sensors FA 415 and FA 300 occur via the SDI bus line.

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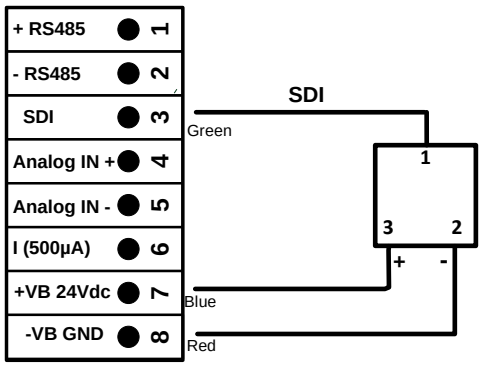
6.2.2 Connection for dew point- and consumption sensors, serial FA/VA 400

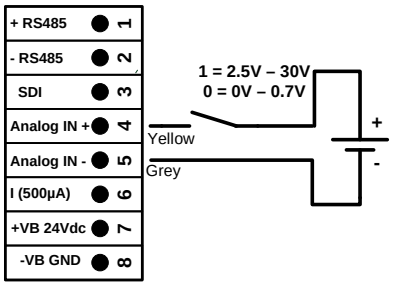
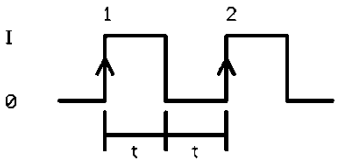
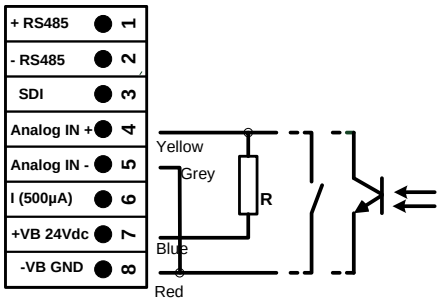
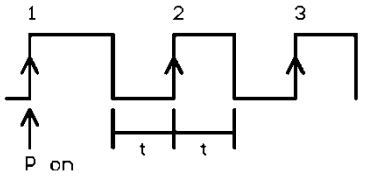
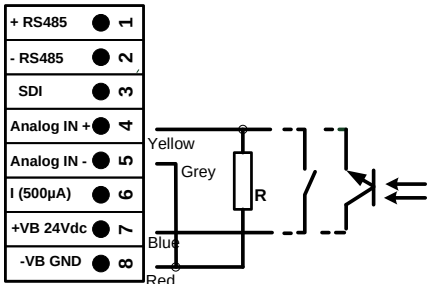
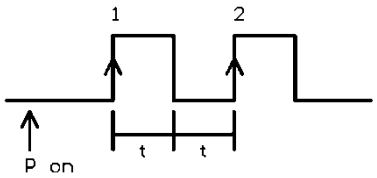
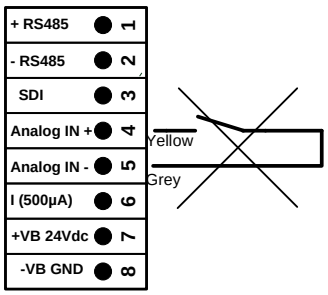


DS 500

FA 410
FA 400
VA 400
VA 420

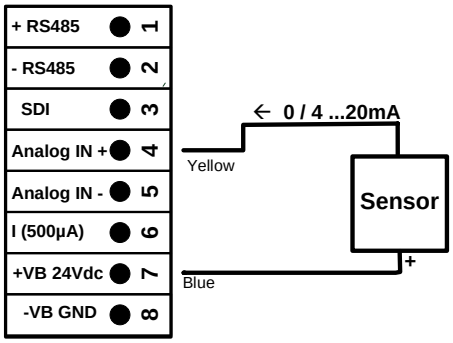
The digital data transmission between DS 500 and the sensors FA 400/410 and VA 400/420 occurs via the SDI bus line.

6.2.3 Connection pulse sensors

		signal level 0: low = 0 – 0,7 VDC signal level 1: high = 2,5 – 30 VDC t = 400 µs max. frequency (duty cycle 1:1) = 1000 Hz input resistance: min. 100 kilo ohm
		external essential R = 4K7 **<u>Attention</u>:** The DS 500 is counting a consumption unit, by switching „power on“.
		external essential R = 4K7
		It won’t work!

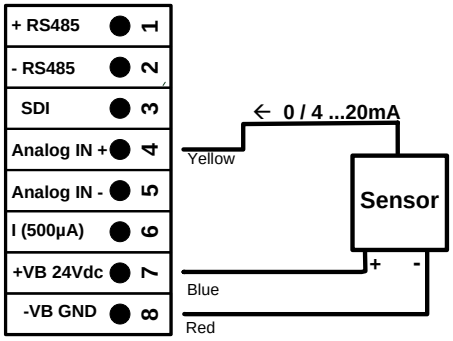
6.2.4 Analogue two-, three-, and four-wire current signal

Sensors with 4 - 20 mA output in 2-wire technology



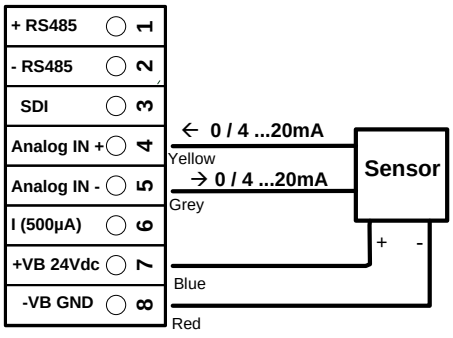
DS 500

Sensors with 4 - 20 mA output in 3-wire technology



DS500

Sensors with 4 - 20 mA output in 4-wire technology



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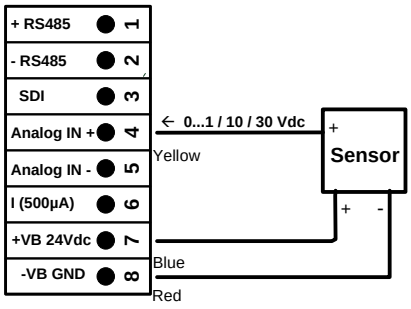
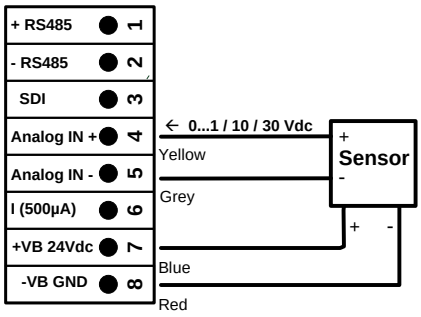
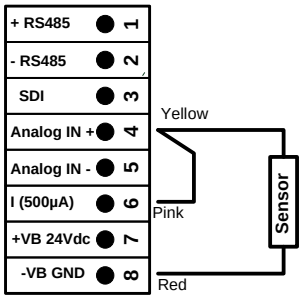
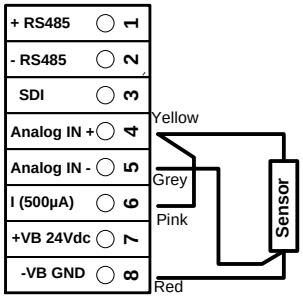
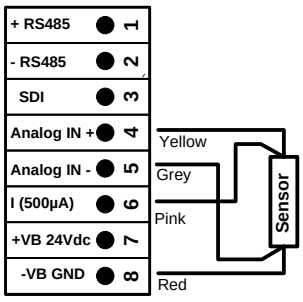
DS500

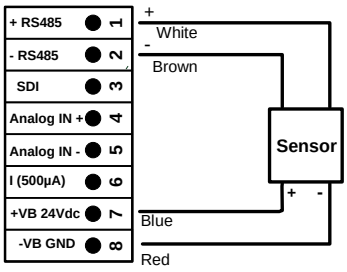
6.2.5 Three- and four-wire power supply 0 - 1/10/30 VDC

	**Sensor with voltage output in 3-wire technology**
	**Sensor with voltage output in 4-wire technology**

6.2.6 Two-, three-, and four-wire connector pin assignments for PT100/PT1000/KTY81

	**2-wire PT100/PT1000/KTY81**
	**3-wire PT100/PT1000/KTY81**
	**4-wire PT100/1000/KTY81**

6.3 Connection with RS485

	**Sensor with RS485 interface**

7 Connect the DS 500 with a PC

Important:

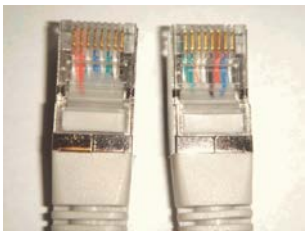
The IP addresses of PC and DS 500 must be statically assigned (DHCP off) and have to be in the same network.

If the IP-address of the DS 500 has changed, you have to reboot!

Remark:

IP-address of the DS 500: See chapter, 12.2.4.3 Network settings
Reboot the DS 500: See chapter, 12.2.4.7 Factory Reset

The DS 500 can be connected with the PC by a crossover cable, which has a RJ45 plug on each side, or an Ethernet cable with a crossover adapter.



Crossover cable with RJ45-plug

Crossover-Adapter

After connecting the DS 500 via a suitable cable to the PC, you can make graphical and tabular data evaluations with the CS Soft Basic software.

Windows PC's, network settings:

Windows 7:

Start ➔ Control Panel ➔ Network and Sharing Center ➔ adapter ➔ Networking ➔ Properties ➔ Internet Protocol Version 4 (TCP/IPv4) ➔ Use the Following IP address ➔ enter IP address and Subnet mask

After this: OK ➔ OK ➔ Close

Windows Vista:

Start ➔ Control Panel ➔ Network and Sharing Center ➔
Network connection ➔ Networking➔ Properties ➔ Internet Protocol Version 4 (TCP/IPv4) ➔ Use the Following IP address ➔ enter IP address and Subnet mask

After this: OK ➔ OK ➔ Close

Windows XP:

Start ➔ Properties ➔ Control Panel ➔ Network connection ➔ Networking ➔ Properties ➔ Internet Protocol Version 4 (TCP/IPv4) ➔ Use the Following IP address ➔ enter IP address and Subnet mask

After this: OK ➔ OK ➔ Close

8 Operation DS 500

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.

8.1 Main menu (Home)

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

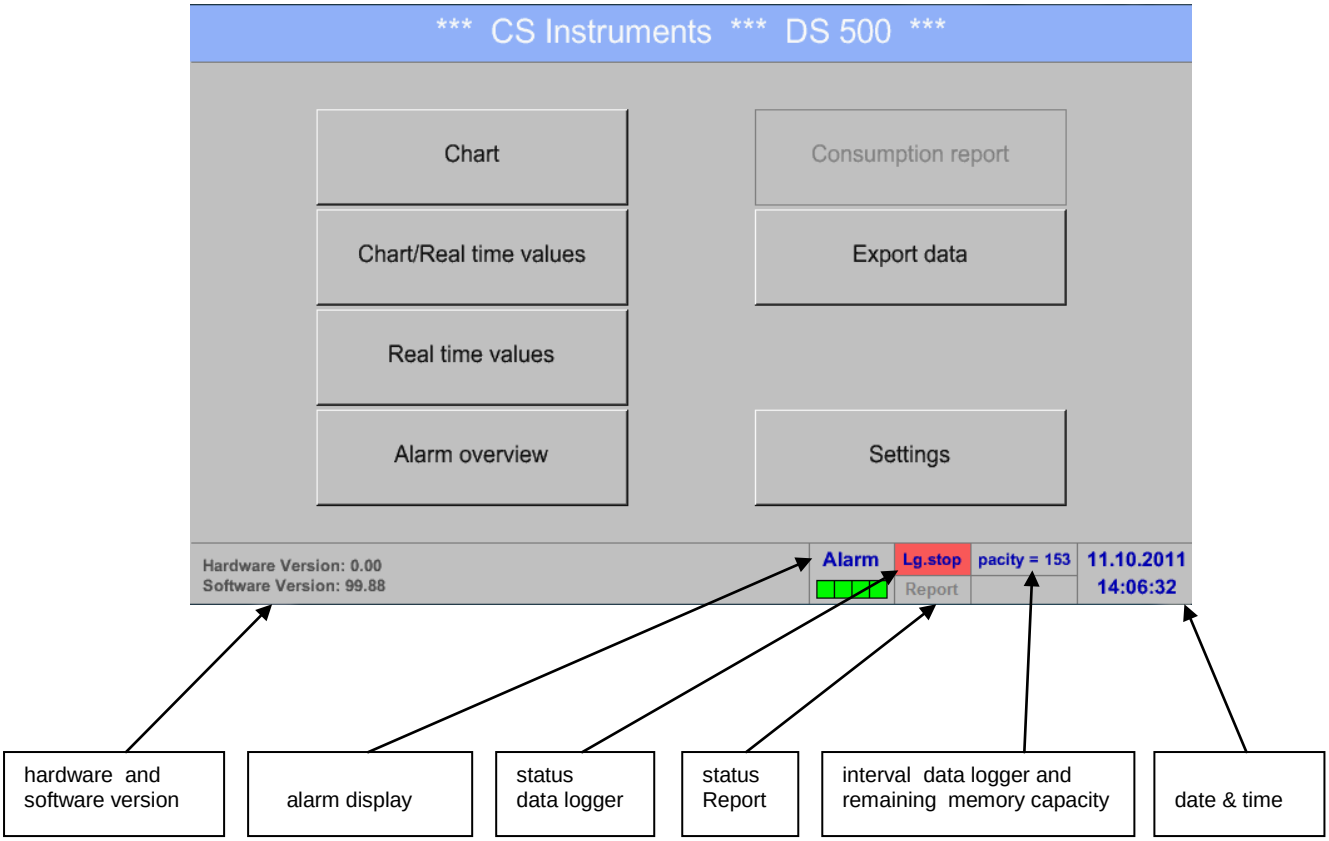
8.1.1 Initialization

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!

Please see chapter 12.2.2 Sensor settings, then select appropriate configurations and set!

8.1.2 Main menu after initialization



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

Remark:
Chapter 12.2.4.1 Set language
(*Main menu ➔ Settings ➔ Device Settings ➔ Set Language*)

Chapter 12.2.4.2 Date & Time
(*Main menu ➔ Settings ➔ Device Settings ➔ Date & Time*)

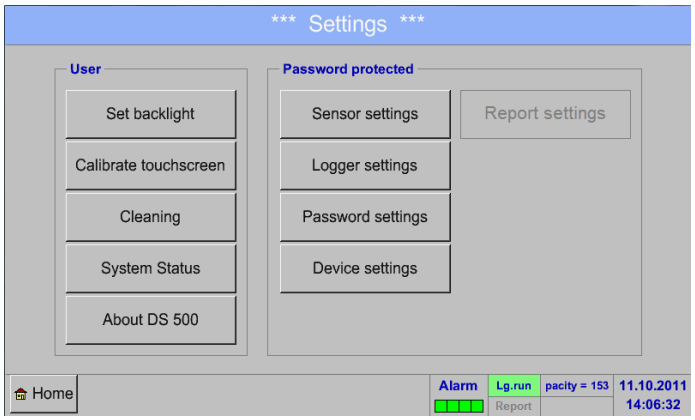
8.2 Settings

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

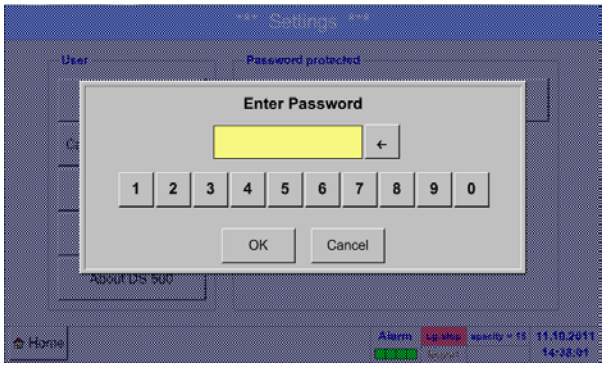


Overview of the *Settings*

The optional *Report settings* and the appendent *Cost settings*, you will find in chapter 12.2.5 Report settings (optional) and 12.8.2 Cost Settings (optional). The out of it resultant summary table, you can see in the *Consumption report* in chapter 12.8.1 Consumption report (optional).

8.2.1 Password settings

Main menu ➔ Settings ➔ Password settings



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

If required, the password can be changed in the *Password settings*.

The new password must be entered two times in a row and in each case confirmed with *OK*.

If an incorrect password is entered there appears *Enter password* or *New password repeat* in red font.

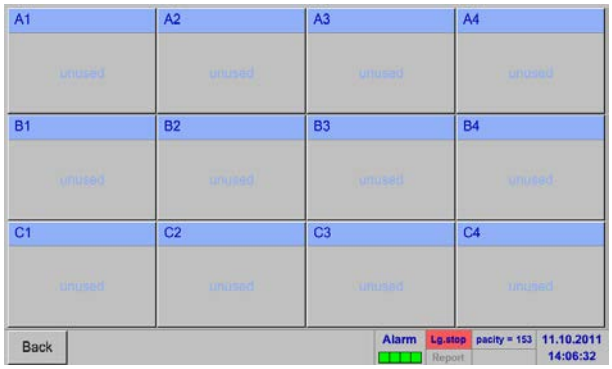
If you can't remember the password, please use Master password in order to enter a new password.

Remark:
The master password is supplied together with the instrument's documentation.

8.2.2 Sensor settings

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

Main menu ➔ Settings ➔Sensor settings



An overview of the available channels appears after entering the password.
Depending on the version, 4, 8 or 12 channels.

Remark:
Usually no channels preset!

Remark:
Depending on the DS 500:

No extension board	➔	4 channels/setups
One extension board	➔	8 channels/setups
Two extension boards	➔	12 channels/setups

8.2.2.1 Choice of the sensor type (For example type CS-Digital sensor)

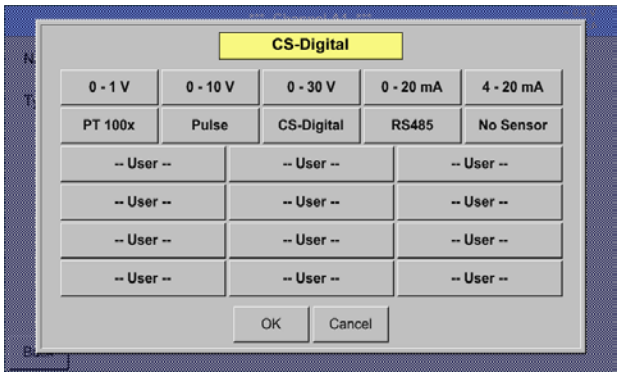
Main menu ➔ Settings ➔ Sensor settings ➔ A1

If still no sensor has been configured, the *Type* ***No Sensor*** appears.

By pushing the description field *Type* ***No Sensor*** the list of sensor types appears (see next step).

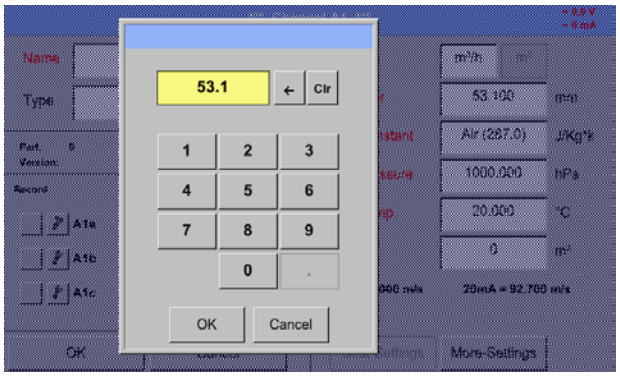
Choice of the sensor type (For example type CS-Digital sensor)

Main menu ➔ Settings ➔ Sensor settings ➔ A1 ➔ Type description field ➔ CS-Digital



Now the *Type* ***CS-Digital*** **is** elected for the VA/FA 400 series.

Main menu ➔ Settings ➔ Sensor settings ➔ A1 ➔ diameter description field



Important:

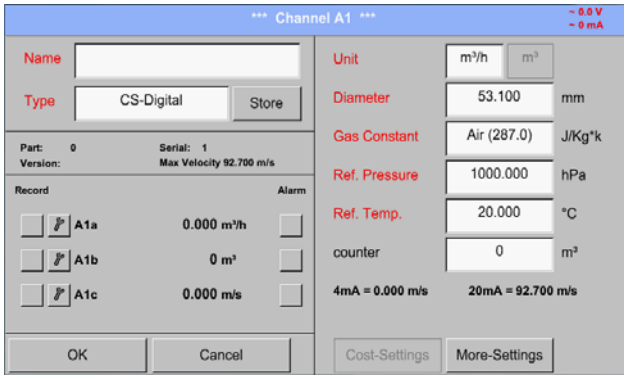
The *inner diameter* of flow tube can be entered here, if this was not automatically correctly set.

Important:

The *inner diameter* should be entered as precisely as possible, because otherwise the measurement results are not correct!

There is no uniform standard for the tube inner diameter!
(Please, inquire at the manufacturer or measure by your own !)

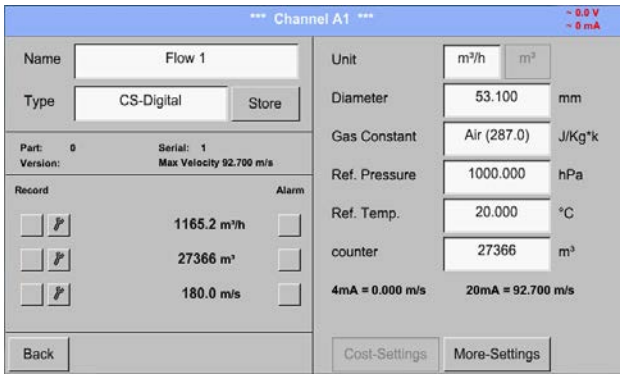
Main menu ➔ Settings ➔ Sensor settings ➔ A1



Now you can enter a *Name* and the *counter* status of the old sensor, if the sensor was changed.

This completes the configuration of the sensor.

Choice of the sensor type (For example type CS-Digital sensor)



After label and confirm with *OK*.

More **options of sensor settings**, see chapter 12.2.2.5 to 12.2.2.8!

See also chapter 12.2.2.7 Label and setting the description fields.

Attention:

Reference temperature and reference pressure (factory setting 20 °C, 1000 hPa):
All volume flow values (m³/h) and consumption values indicated in the display are related to 20 °C, 1000 hPa (according to ISO 1217 intake condition)
0 °C and 1013 hPa (= standard cubic meter) can also be entered as a reference.
Do not enter the operation pressure or the operation temperature under reference conditions!

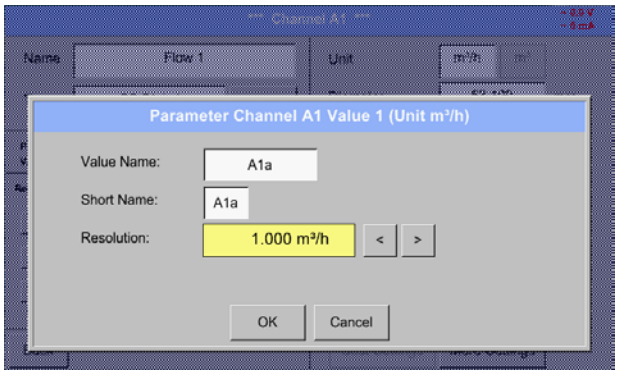
Remark:
After confirm with *OK*, the font is black again and the values and settings are accepted.

8.2.2.2 Name the measurement data and define the decimal places

Remark:
The *Resolution* of the decimal places, the *Short Name* and *Value Name* are found under the **Tool button**!

Tool button: 

Main menu ➔ Settings ➔ Sensor settings ➔ A1 ➔ Tool Button



For the recorded *Value* there can be entered a *Name* with 10 characters and later in menu item *Graphics/Real time values* it is easier to identify it.
Otherwise the *Name* is, for example, A1a.
The channel name is *A1* and *a* is the first measurement data at the channel,
the Second *b* and the Third *c*.
The *Resolution* of the decimal places is simply adjustable by pushing right and left
(0 to 5 decimal places).

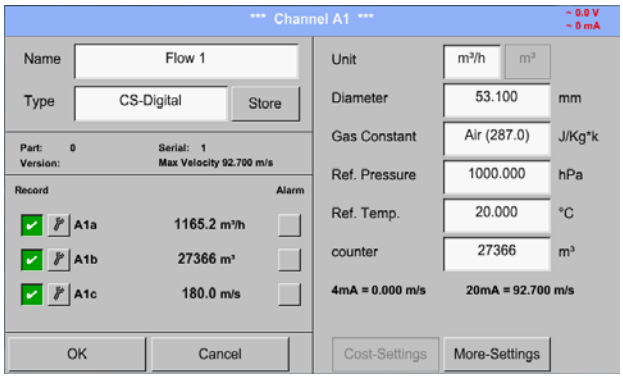
See also chapter 12.2.2.7 Label and setting the description fields

Important:

In the menu items *Main ➔ Settings ➔ Sensor settings* and *Main ➔ Real time values*, the *Value Name* displayed only by the DS 500 standard version with 4 channels!
The *Short Name* is used only in these two menu items, by the DS 500 versions with one or two extension boards (8 or 12 channels).

8.2.2.3 Recording measurement data

Main menu ➔ Settings ➔ Sensor settings ➔ A1 ➔ Record Button



.

Use the *Record* buttons to select the measurement data that will be stored by **activated data logger**.

Attention:

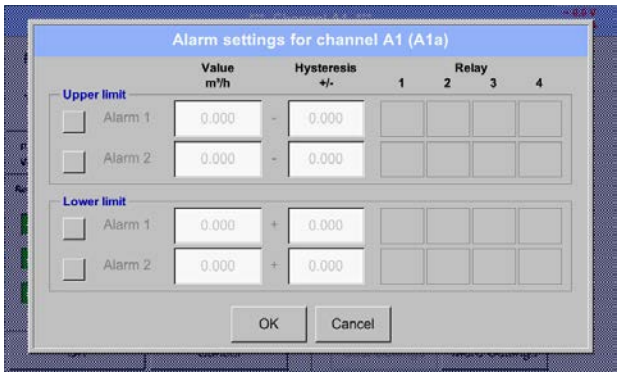
Before the selected measurement data are recorded, the data logger must be activated after the settings(See chapter 12.2.3 Logger settings (data logger))**.**

8.2.2.4 Alarm settings

Remark:
For DS500 mobile only the alarm-warnings on the display are available, alarm-relays are not accessible.

Main menu ➔ Settings ➔ Sensor settings ➔ A1 ➔ Alarm Button

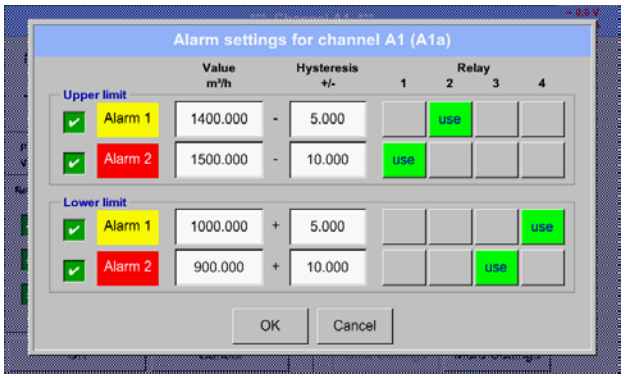
By pushing an alarm button, the following window appears:



In the alarm settings an *Alarm 1* and *Alarm 2* incl. *Hysteresis* can be entered for each channel.

In the menu *Alarm overview* (can be reached from the main menu), the alarm settings are clearly represented.

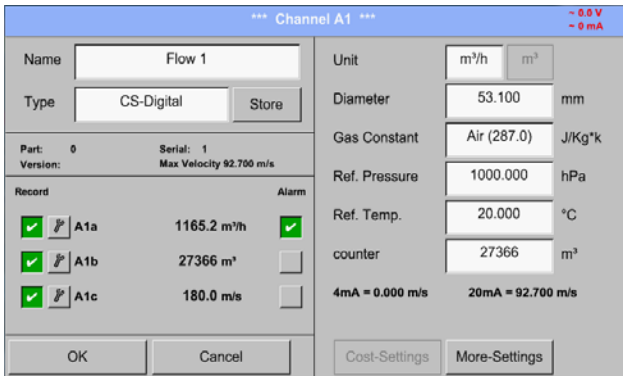
Main menu ➔ Settings ➔ Sensor settings ➔ A1 ➔ Alarm Button ➔ Alarm 1 and 2 Buttons ➔ Relais Buttons



E.g. set the *Alarm 1* to relay 2 and relay 4 and the *Alarm 2* to relay 1 and relay 3.

Remark: It can be set one of any relay as *Alarm 1* or *Alarm 2* thirty-two times.

Main menu ➔ Settings ➔ Sensor settings ➔ A1



After the alarm activation at channel A1.

The settings finished by pushing the OK button!

8.2.2.5 More-Settings (scale analogue output)

Main menu ➔ Settings ➔ Sensor settings ➔ A1 ➔ More-Settings

In *More-Settings*, you can define whether the 4 - 20 mA analogue output of the sensor based on the flow rate or velocity.

The green highlighted description field is selected!

In addition, you can push the *scale manual* button and set the measuring range.

After confirming with *OK*, the settings are assumed.

Remark:
More-Settings only for type **CS-Digital** available!

The settings finished by pushing the OK button!

Remark:

After confirming with *OK*, the font is black again and the values and settings are accepted.

8.2.2.6 Dewpoint sensor with type CS-Digital

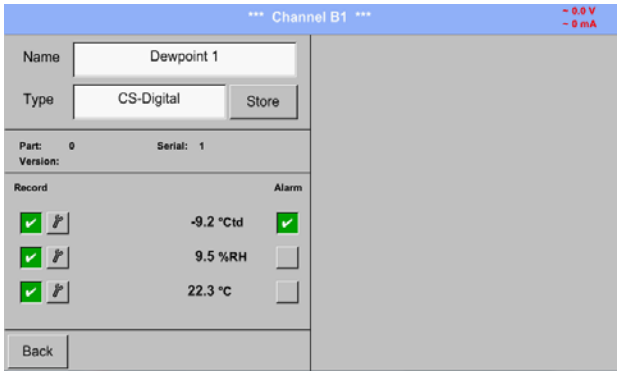
First step: choose an unused sensor channel
Main menu ➔ Settings ➔ Sensor settings ➔ B1

Second step: choose type CS-Digital
Main menu ➔ Settings ➔ Sensor settings ➔ B1 ➔ Type description field ➔ CS-Digital

Third step: confirm with *OK* two times

Now, a *Name* (See chapter 12.2.2.7 Label and setting the description fields)**, the alarm settings** (See chapter 12.2.2.4 Alarm settings) **and recording settings** (See chapter 12.2.2.3 Recording measurement data)**, and the *Resolution* of the decimal places** (See chapter 12.2.2.2 Name measurement data and define the decimal places) **can be determined.**

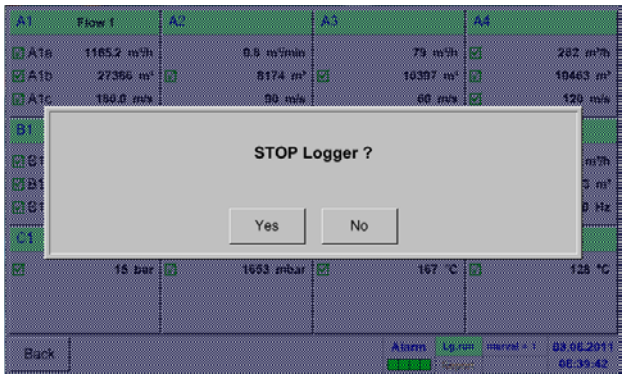
Main menu ➔ Settings ➔ Sensor settings ➔ B1



The DS 500 detects, if the connected sensor is a flow or dewpoint sensor of **CS Instruments** and set the CS-Digital subtype automatically correct.

8.2.2.7 Label and set the description fields

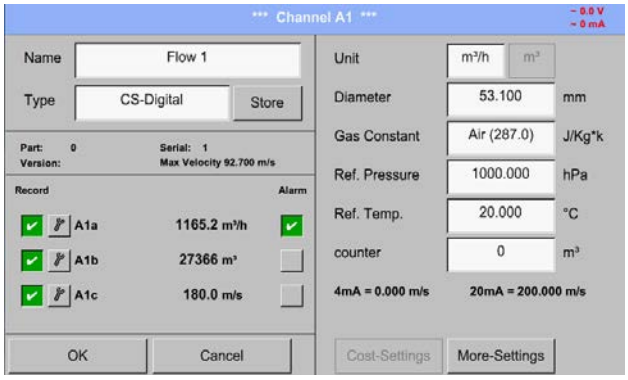
Main menu ➔ Settings ➔ Sensor settings ➔ A1



If the data logger is activated, the following window will appear and via pushing *Yes* it can be disabled.

(Only activated, if already settings and recordings are made)

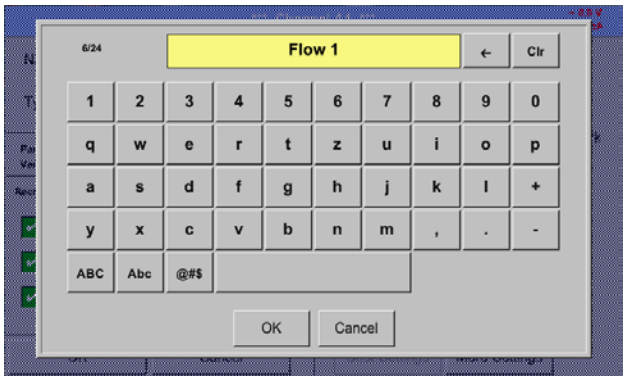
Remark:
If sensor settings are defined or changed, the data logger must be stopped.



Changes or entries can be made by pressing the highlighted white fields.

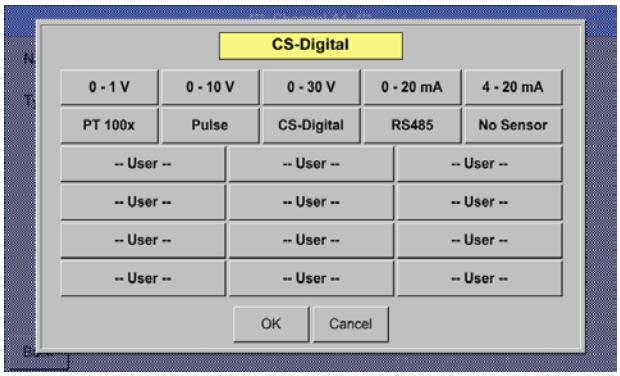
The *Alarm* (See chapter 12.2.2.4 Alarm settings) **and *Record* buttons** (See chapter 12.2.2.3 Recording measurement data)**, the *Resolution* of the decimal places and *Short Name* or *Value Name*** (See chapter 12.2.2.2 Name measurement data and define the decimal places)**, and the *More-Settings*** (See chapter 12.2.2.5 More-Settings (scale analogue output)) **are all described in chapter 12.2.2 Sensor settings.**

Main menu ➔ Settings ➔ Sensor settings ➔ A1 ➔ name description field



It is possible to enter a name with 24 characters.

Main menu ➔ Settings ➔ Sensor settings ➔ A1➔ Type description field

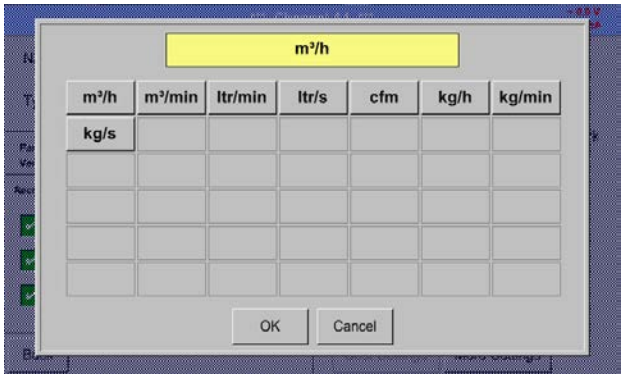


You can choose the following options, after pushing the *Type* description field.

(shown in figure)

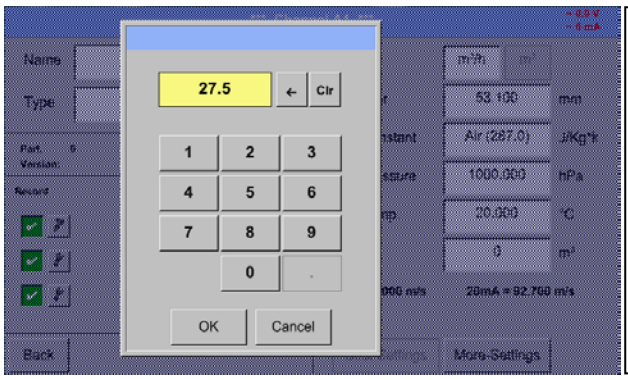
See also chapter 12.2.2.8 Configuration of analogue sensors

Main menu ➔ Settings ➔ Sensor settings ➔ A1 ➔ Unit description field



A preset selection of suitable *Units*.

Main menu ➔ Settings ➔ Sensor settings ➔ A1 ➔ description field of numerical value



Important:

The *inner diameter* of flow tube can be entered here, if this was not automatically correctly set.

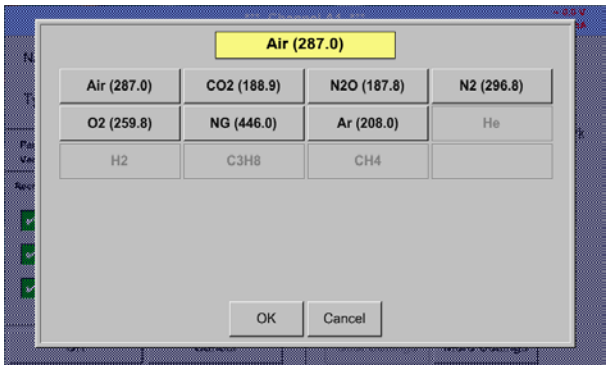
Inner *diameter* is entered here for example 27.5 mm.

Important:

The *inner diameter* should be entered as precisely as possible, because otherwise the measurement results are not correct!

There is no uniform standard for the tube inner diameter!
(Please, inquire at the manufacturer or measure by your own!)

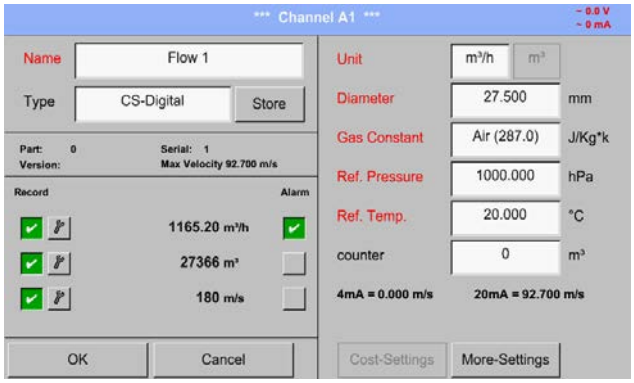
Main menu ➔ Settings ➔ Sensor settings ➔ A1 ➔ Gas Constant description field



A preset selection of suitable *Gas Constants*.

In the same way as here in chapter 12.2.2.7 Label and set the description fields described, the remaining description fields can be labeled.

Main menu ➔ Settings ➔ Sensor settings ➔ A1



The red labeled description fields indicate, that different values, such as the *Diameter* and the *Name,* have been changed or added.

The three parameters of flow, consumption and velocity will be recorded (green hook) after the data logger has been activated.

See also chapter 12.2.2.1 Choice of the sensor types (For example type CS-Digital sensor)

Attention:

Reference temperature and reference pressure (factory setting 20 °C, 1000 hPa):
All volume flow values (m³/h) and consumption values indicated in the display are related to 20 °C, 1000 hPa (according to ISO 1217 intake condition)
0 °C and 1013 hPa (= standard cubic meter) can also be entered as a reference.
Do not enter the operation pressure or the operation temperature under reference conditions!

Remark:
After confirming with *OK*, the font is black again and the values and settings are accepted.

8.2.2.8 Configuration of analogue sensors

A brief overview of the possible *Type* of settings with examples.

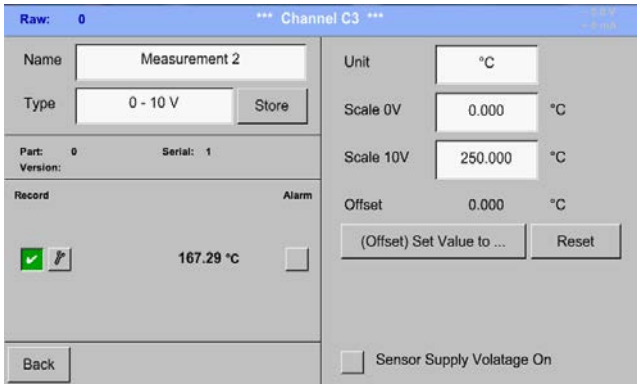
Except *CS-Digital*, see chapter 12.2.2.1 Choice of the sensor types (For example type CS-Digital sensor) and 12.2.2.6 Dewpoint sensor with type CS-Digital.

The *Alarm* (See chapter 12.2.2.4 Alarm settings) **and *Record* buttons** (See chapter 12.2.2.3 Recording measurement data)**, the *Resolution* of the decimal places and *Short Name* or *Value Name*** (See chapter 12.2.2.2 Name measurement data and define the decimal places) **are all described in chapter 12.2.2 Sensor settings.**

The caption of description fields, see chapter 12.2.2.7 Label and setting the description fields.

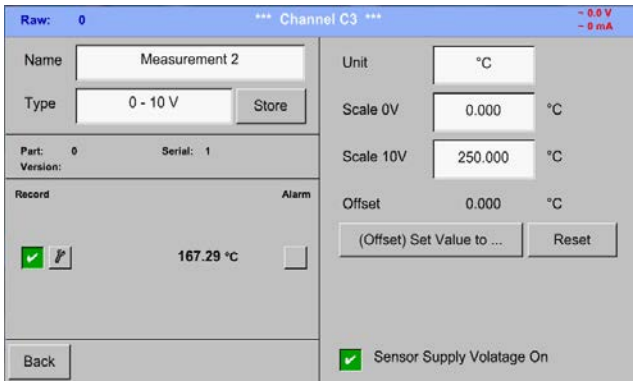
8.2.2.8.1 Type 0 - 1/10/30 Volt and 0/4 - 20 mA

Main menu ➔ Settings ➔ Sensor settings ➔ A1 ➔ Type description field ➔0 - 1/10/30 V



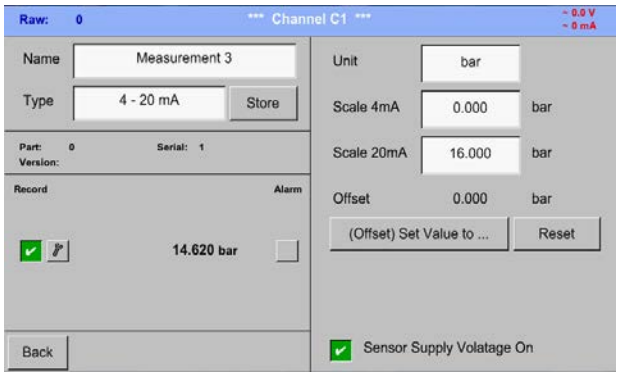
Please see the scale of the sensor (here for example Type **0 - 10V** corresponds to 0 - 250 ° C) from the data sheet of the connected sensor.

By *Scale 0V* enter the lower and by *Scale10V* the upper scale value.



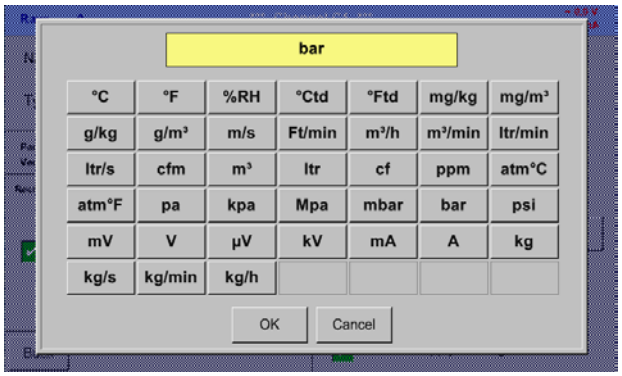
The *Sensor Supply Voltage* is switched On, if it´s required by the sensor type, otherwise off (no green hook).

Main menu ➔ Settings ➔ Sensor settings ➔ A1 ➔ Type description field ➔0/4 - 20 mA



Here for example *Type* **4 - 20 mA**.

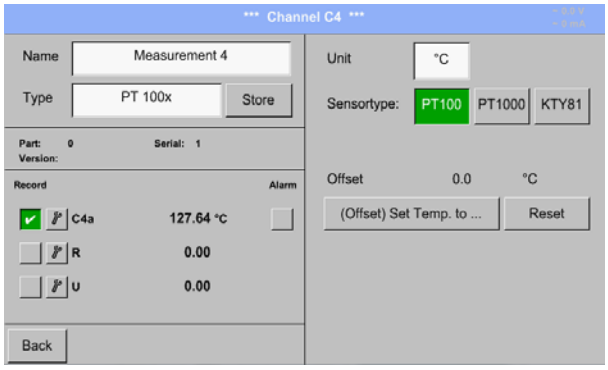
Main menu ➔ Settings ➔ Sensor settings ➔ A1 ➔ Unit description field



A preset selection of suitable units by ***Type*** *0 - 1/10/30 V* and *0/4...20 mA*.

8.2.2.8.2 Type PT100x and KTY81

Main menu ➔ Settings ➔ Sensor settings ➔ A1 ➔ Type description field ➔ PT 100x

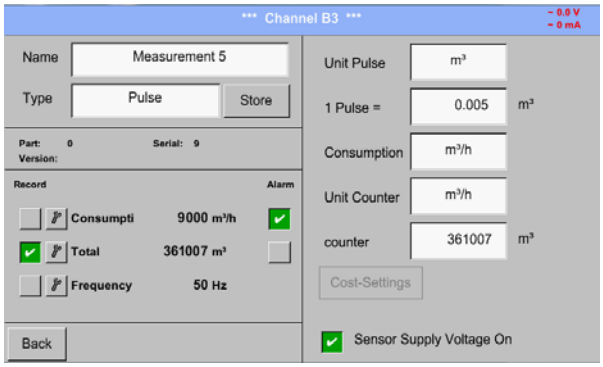


Here the sensor type *PT100* and the *Unit* in °C are chosen, alternatively the sensor types *PT1000* and *KTY81*, as well as the Unit °F can be selected.

More setting options, see chapter 12.2.2.8.1 Type 0 - 1/10/30 Volt and 0/4 - 20 mA!

8.2.2.8.3 Type Pulse (Pulse ration)

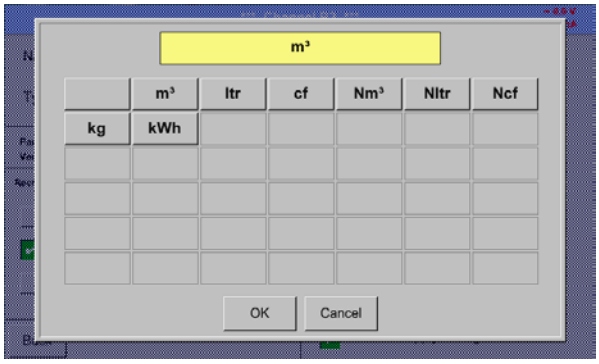
Main menu ➔ Settings ➔ Sensor settings ➔ B3 ➔ Type description field ➔ Pulse



Typically the value with unit of **1 Pulse** is standing on the sensor and can directly entered to the ***1 Pulse =*** description field.

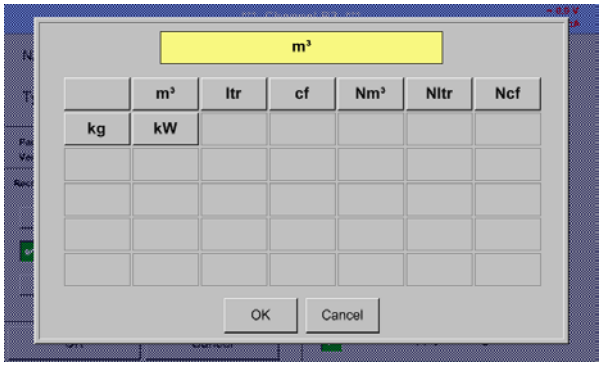
Remark:
Here, all description fields are already labeled or occupied.

Main menu ➔ Settings ➔ Sensor settings ➔ B3 ➔ Unit Pulse



By *Unit Pulse* you can choose between a flow volume or a power consumption unit.

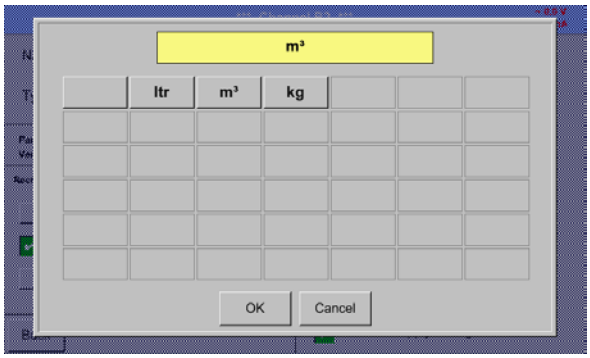
Main menu ➔ Settings ➔ Sensor settings ➔ B3 ➔ Consumption



Unit of current *Consumption* by *Type* **Pulse**

Remark:
Example with the unit cubic meters.

Main menu ➔ Settings ➔ Sensor settings ➔ B3 ➔ Consumption



The available Units for the Unit of Counter by *Type* **Pulse**

The **counter** can be set any time to any value you need.

More setting options, see chapter 12.2.2.8.1 Type 0 - 1/10/30 Volt and 0/4 - 20 mA!

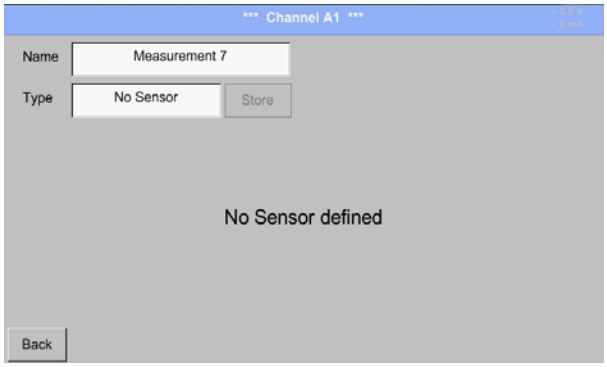
8.2.2.8.4 Type RS485

Main menu ➔ Settings ➔ Sensor settings ➔ A1 ➔ Type description field ➔ RS485

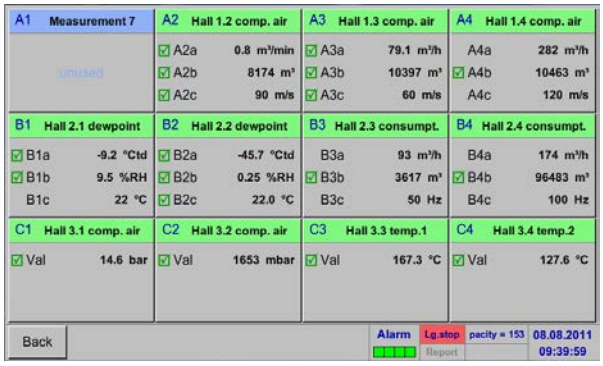
With the *RS485* bus/interface, customer-specific systems (conventional,PLC, SCADA) can be connected with the DS 500.

8.2.2.8.5 Type No Sensor

Main menu ➔ Settings ➔ Sensor settings ➔ A1-C4 ➔ Type description field ➔ No Sensor



Is used to declare a not currently needed channel as *No Sensor defined*.



If you go to *Type **No Sensor** Back*, channel A1 will appear as *unused*.

8.2.3 Typ Modbus

8.2.3.1 Auswahl und Aktivierung des Senortypes

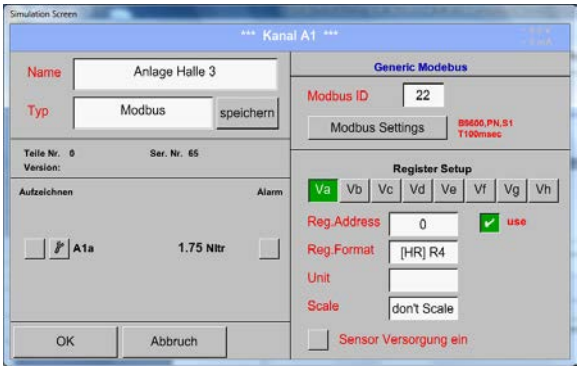
First step: choose an unused sensor channel
Main menu ➔ Settings ➔ Sensor settings ➔ B3

Second step: choose type Modbus
Main menu ➔ Settings ➔ Sensor settings ➔ B3 ➔ Type description field ➔ Modbus

Third step: confirm with *OK* .

Now, a *Name* (See chapter 12.2.2.7 Label and setting the description fields)**, can be determined.**

Main menu ➔ Settings ➔ Sensor settings ➔ B3 ➔ Va ➔ use

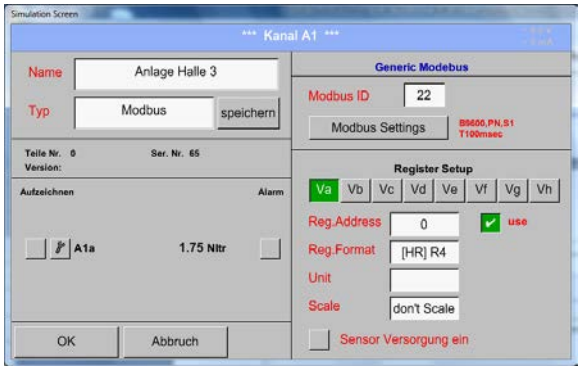


Via Modbus it is possible to read out up to 8 Register-Values (from Input or Holding Register) of the sensor.

Selection by the Register Tabs *Va –Vh* and activation by pressing of the corresponding *Use* button.

8.2.3.2 Modbus settings

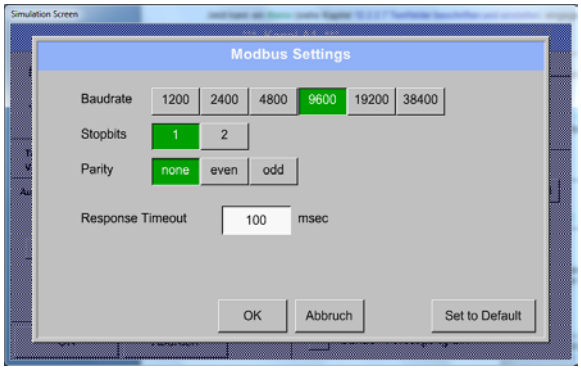
Main menu ➔ Settings ➔ Sensor settings ➔ B3 ➔ Modbus ID description field



Please insert here the specified *Modbus ID* of the sensor, allowed values are *1 -247*, (e.g.. here *Modbus ID = 22)*

For setting the Modbus ID on the sensor please see sensor-datasheet.

Main menu ➔ Settings ➔ Sensor settings ➔ B3 ➔ Modbus Settings

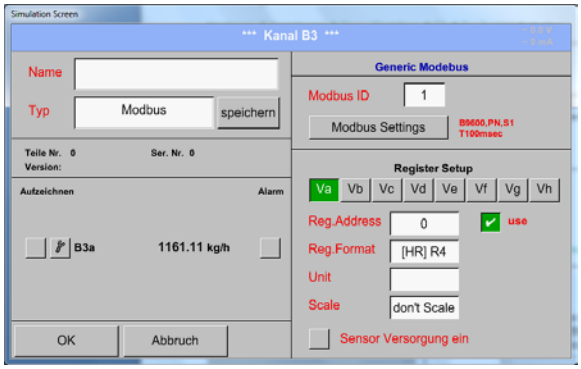


Here I the menu are the serial transmission settings *Baudrate, Stopbit, Paritätsbit* and *Timeout* time to define.
For the required settings please see the sensor datasheet.

Confirmation by pressing ***OK*** button.

For resetting to the default values please press *Set to Default.*

Main menu ➔ Settings ➔ Sensor settings ➔ B3 ➔ Reg. Address description field

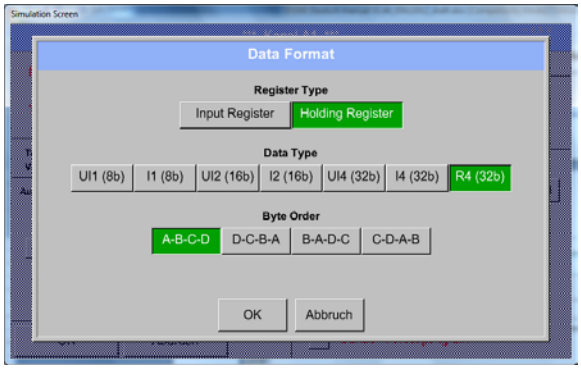


The measurement values are kept in the registers of the sensor and can be addressed via Modbus and read by the DS500.
This requires to set the desired register addresses in the DS500.

Entering the register / data address is here in decimal with 0-65535

Important:
Required is the correct *register-address***.**
It should be noted that the register-number could be different to the register-address (Offset).
For this please consult the sensor data sheet.

Main menu ➔ Settings ➔ Sensor settings ➔ B3 ➔ Reg. format description field



With the buttons *Input Register* and *Holding Register* the corresponding Modbus-register type will be selected.

The number format and transmission order of each value needs to be defined by *Data Type* and *Byte Order.* Both have to be applied in correct combination.

Supported Data types:

Data Type:	UI1(8b)	= unsigned Integer	=>	0 -	255
	I1 (8b)	= signed integer	=>	-128 -	127
	UI2 (16b)	= unsigned Integer	=>	0 -	65535
	I2 (16b)	= signed integer	=>	-32768 -	32767
	UI4 (32b)	= unsigned Integer	=>	0 -	4294967295
	I4 (32b)	= signed integer	=>	-2147483648 -	2147483647
	R4 (32b)	= floasting point number			

Byte Order:

The size of each Modbus-register is 2 Byte. For a 32 bit value two Modbusregister will beread out by the DS500. Accordingly for a 16bit Value only one register is read.

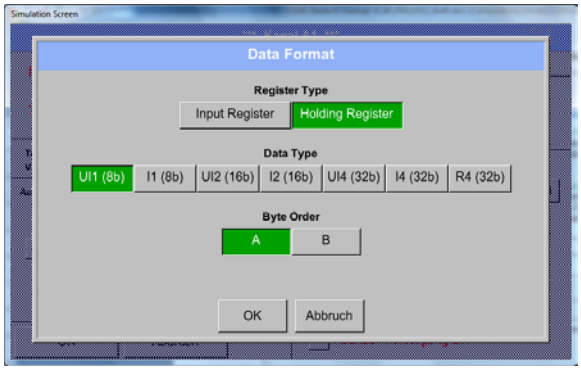
In the Modbus Specification the sequence of the transmitted bytes is not defined clearly. To cover all possible cases, the byte sequence in the DS500 is adjustable and must adapted to the respective sensor. Please consult here for the sensor datasheet.

e.g.: High byte before Low Byte, High Word before Low Word etc

Therefore the settings have to be made in accordance to the sensor data sheet.

Examples :

Holding Register - UI1(8b) - value: 18



Selection Register Type *Holding Register*,
Data Type *U1(8b)* und Byte Order *A / B*

	HByte	LByte
18 =>	00	12

Data Order	1. Byte	2. Byte
A	00	12
B	12	00

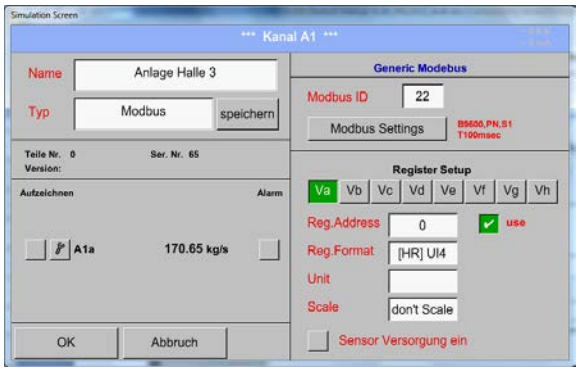
Holding Register – UI4(32) - Value: 29235175522 → AE41 5652

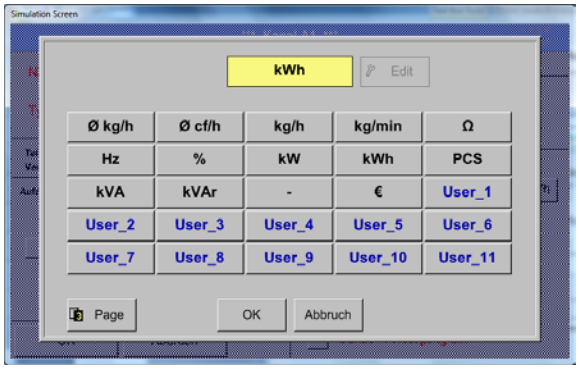
Selection Register Type *Holding Register*,
Data Type *U1(32b)* und Byte Order *A-B-C-D*

	HWord		LWord	
	HByte	LByte	HByte	LByte
29235175522 =>	AE	41	56	52

Data Order	1.Byte	2.Byte	3.byte	4.Byte
A-B-C-D	AE	41	56	52
D-C-B-A	52	56	41	AE
B-A-D-C	41	AE	52	56
C-D-A-B	56	52	AE	41

Main menu → Settings → Sensor settings → B3 → Unit- description field

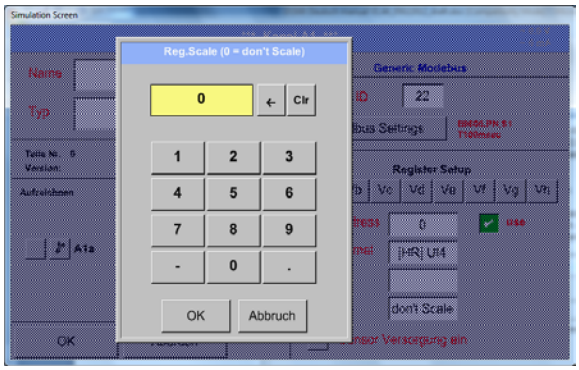




By pressing the description field *Unit*
the list with the available units appear

Please select the unit by pressing the respective button e.g. *m³/h.*
For validation of the unit please push the button *OK*
To move through the list please press the button *Page.*
In case the unit is **not** available it is possible to create a user defined unit.
Therefore please select one of the *User_X* buttons..

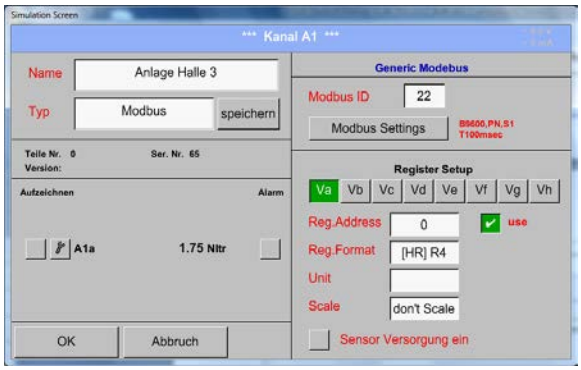
Main menu ➔ Settings ➔ Sensor settings ➔ B3 ➔ Scale- description field



The use of this factor allows to adapt the output value by the same.

By default or value = 0 no scaling is applied and displayed in the field is *don't scale*

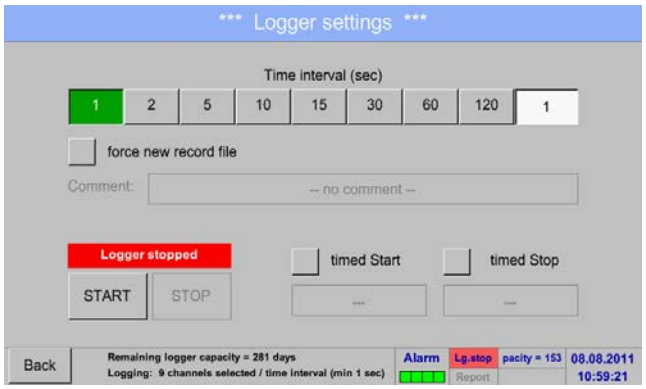
Main menu ➔ Settings ➔ Sensor settings ➔ B3 ➔ OK



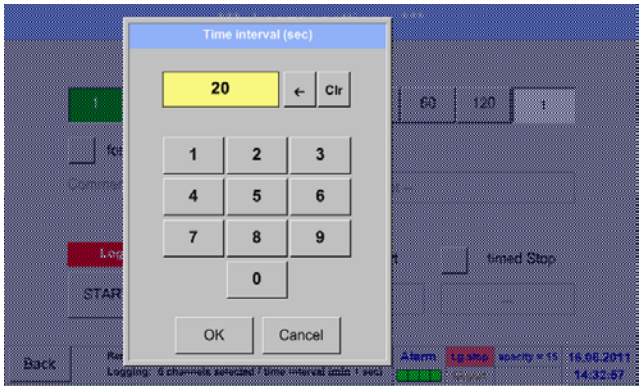
By pressing the *OK* button the inputs are confirmed and stored.

8.2.4 Logger settings (data logger)

Main menu ➔ Settings ➔ Logger settings



In the top row you can select the predefined *Time intervals* 1, 2, 5, 10, 15, 30, 60 and 120 seconds for recording.



A different, individual *Time interval* can be entered in the highlighted white description field right at the head, where the currently set *Time interval* is always displayed.

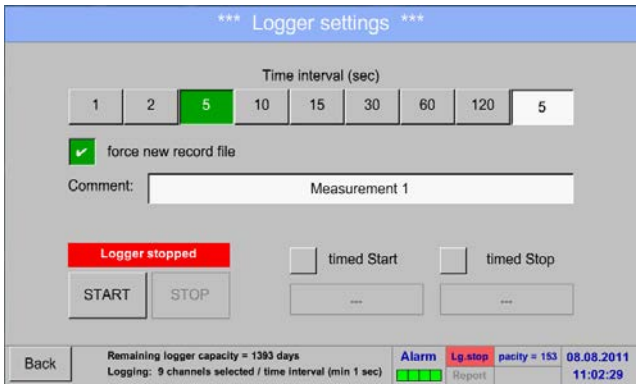
Remark:
The largest possible *Time interval* is 300 seconds.

Remark:

If more than 12 measurement data are recorded at the same time, the smallest possible time interval of the data logger is 2 seconds.

And if more than 25 measurement data are recorded at the same time, the smallest possible time interval of the data logger is 5 seconds.

Main menu ➔ Settings ➔ Logger settings ➔ force new Record File button
and
Main menu ➔ Settings ➔ Logger settings ➔ force new Record File button ➔ Comment description field



A new recording file will be created by pushing the *force new record file* button and a name or comment can be entered by the choice of the *Comment* description field.

<u>Important</u>:

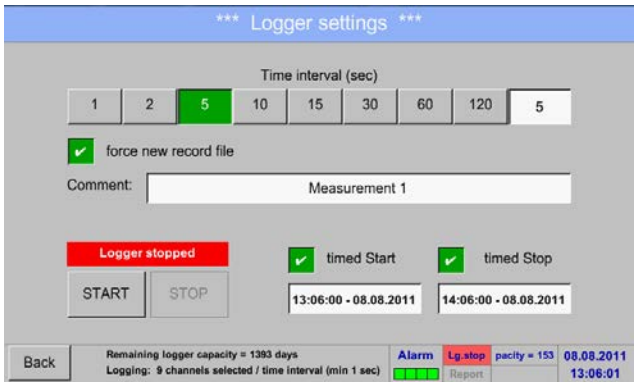
If a new recording file should be created, the *force new record file* button must be activated.
Otherwise, the last applied recording file is used.

Main menu ➔ Settings ➔ Logger settings ➔ timed Start button

By pushing the *timed Start* button and then the date/time description field below, the date and the start time can be set for a data logger recording.

Remark:
If the start time is activated, it will automatically be set at the current time plus a minute.

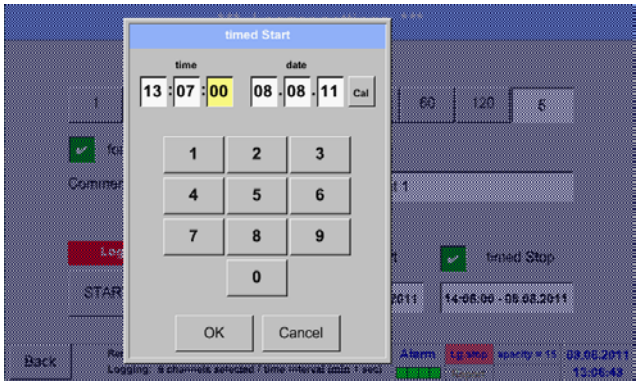
Main menu ➔ Settings ➔ Logger settings ➔ timed Stop button



By pushing the *timed Stop* button and then the date/time description field below, the date and the stop time can be set for a data logger recording.

Remark:
If the stop time activated, it will automatically be set to the current time plus an hour.

Main menu ➔ Settings ➔ Logger settings ➔ timed Start button/timed Stop button ➔ Date/Time description field

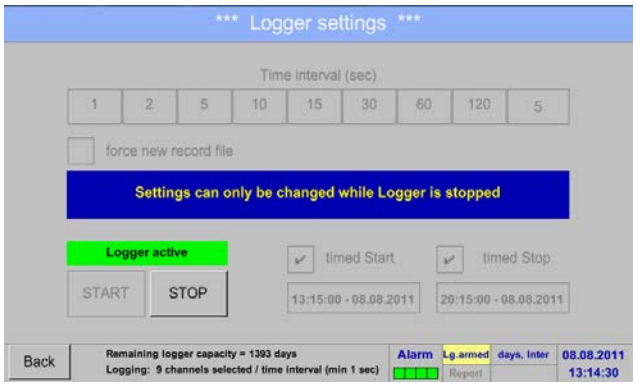


After pushing the *date/time description field* a window will appear where the yellow marked area of the time or date can always be set and changed.

Main menu ➔ Settings ➔ Logger settings ➔ timed Start button/timed Stop button ➔ Date/Time description field ➔ Cal button

With the *Cal* button the desired date can be easily select from the calendar.

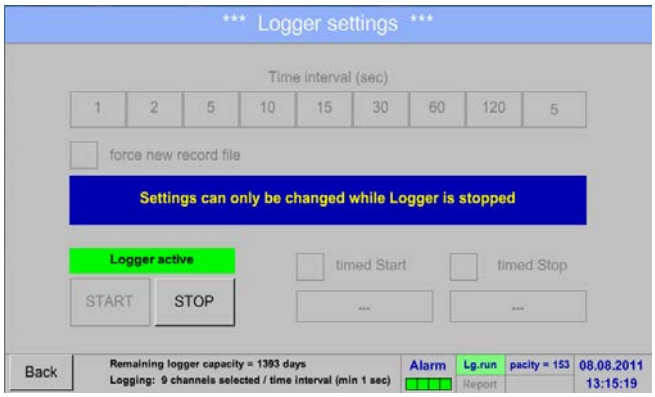
Main menu ➔ Settings ➔ Logger settings ➔ Start button



After the start and stop time activation and the created settings, the *Start* button will be pushed and the data logger is armed.

The data logger starts the recording at the set time!

Main menu ➔ Settings ➔ Logger settings ➔ Start button/Stop button



The data logger can be started without activated time settings, use the *Start* and *Stop* buttons for activate and disable. Left below there will be shown how many values are recorded and how long there still can be recorded.

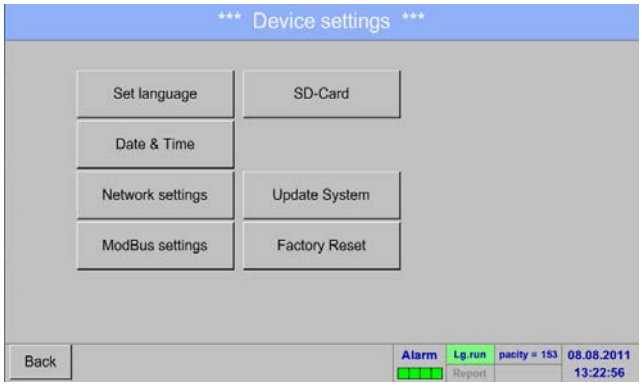
Remark:
The settings cannot be changed, if the data logger runs.

<u>Important</u>:

If a new recording file should be created, the *force new record file* button must be activated. Otherwise, the last applied recording file is used.

8.2.5 Device settings

Main menu ➔ Settings ➔ Device settings



Overview of *Device settings*

8.2.5.1 Set language

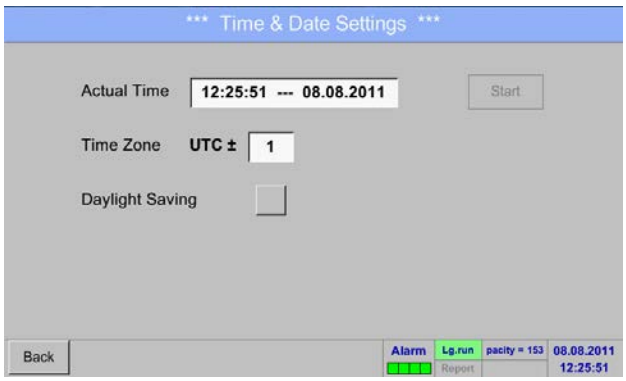
Main menu ➔ Settings ➔ Device settings ➔ Set language

Here you can select one of 12 languages for the DS 500.

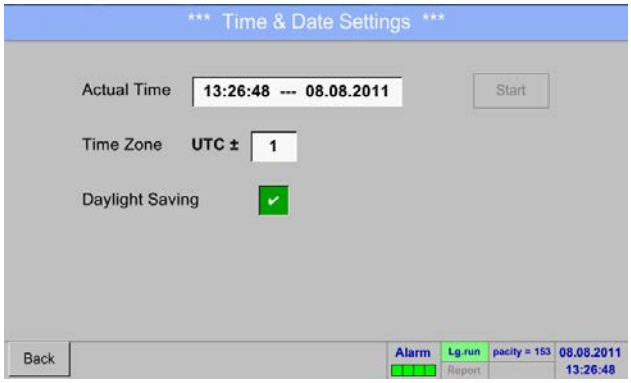
Remark:
Currently only German and English!

8.2.5.2 Date & Time

Main menu ➔ Settings ➔ Device settings ➔ Date & Time



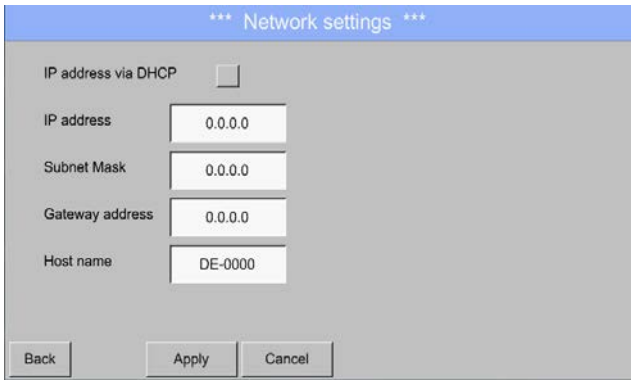
By pushing the *Time Zone* description field and enter the correct *UTC*, you can set the correct time all over the world.



The summer and winter time switchover is realized by pushing the *Daylight Saving* button.

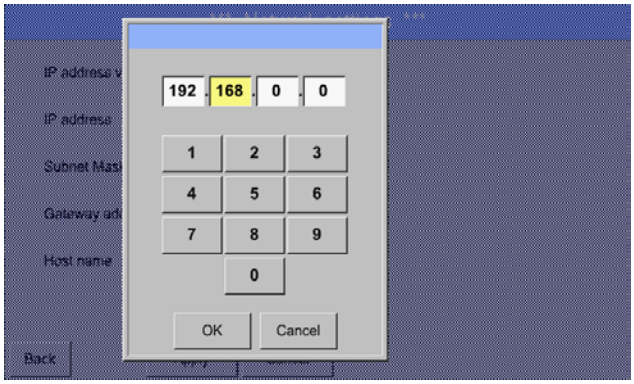
8.2.5.3 Network settings

Main menu ➔ Settings ➔ Device settings ➔ Network settings



Here you can set up and made a connection, with or without *DHCP*, to a computer.

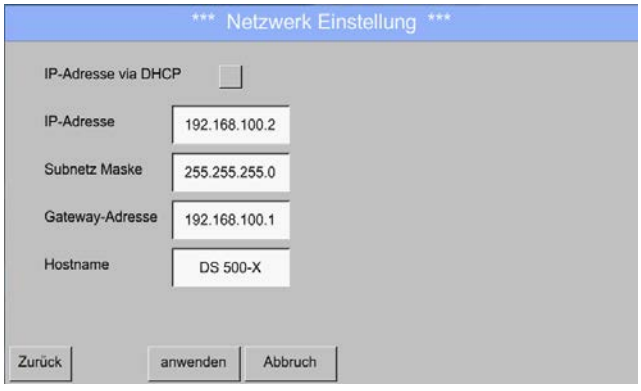
Remark:
With activated DHCP (green hook), the automatic integration of the DS 500 in an existing network is possible, without a manual configuration.



After pushing, for example the *IP address* description field, the command window appears, where in the selected yellow area a partial *IP address* can be entered manually.

The *Host name* can be entered or changed by pushing the description field.

Subnet Mask and Gateway address are entered in the same way!
Label Host name, see chapter 12.2.2.7 Label and setting the description fields**!**

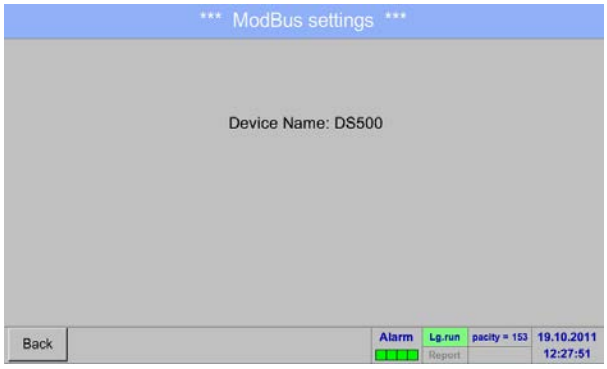


For example a *IP-Address* out of address range of the class C-Net

Remark:
Private Address range Class A-Net
10.0.0.0 bis 10.255.255.255
Private Address range Class B-Net
72.16.0.0 bis 172.31.255.255
Private Address range Class C-Net
192.168.0.0 bis 192.168.255.255
Subnetz Mask: e. g. 255.255.255.0

8.2.5.4 ModBus settings

Main menu ➔ Settings ➔ Device settings ➔ ModBus settings



Interface for the CS software to exchange and process data.

Will be available with coming updates!

8.2.5.5 SD-Card

Main menu ➔ Settings ➔ Device settings ➔ SD-Card

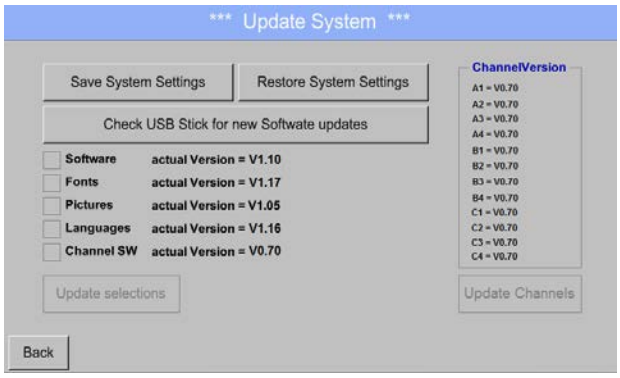
Will be available with coming updates!

8.2.5.6 Update System

<u>Important</u>:
Before the update, save the *System setting* on a USB stick!

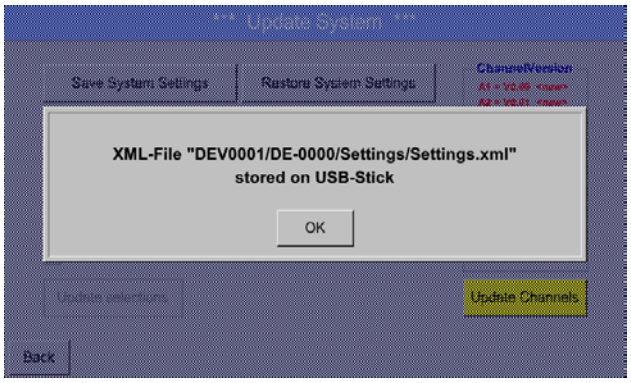
Remark:
The highlighted yellow fields shows, which kind of update is available!

Main menu ➔ Settings ➔ Device settings ➔ Update System



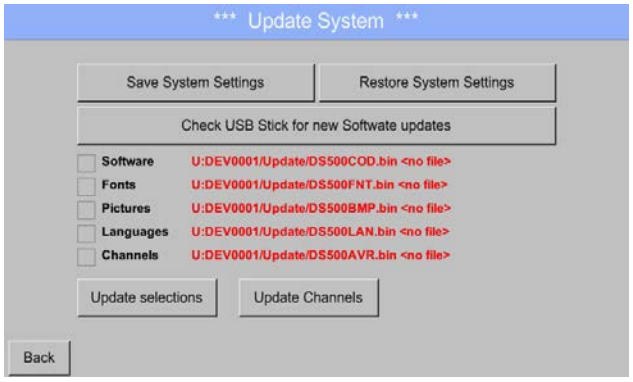
Overview of the Update System features

Main menu ➔ Settings ➔ Device settings ➔ Update System ➔ Save System Settings

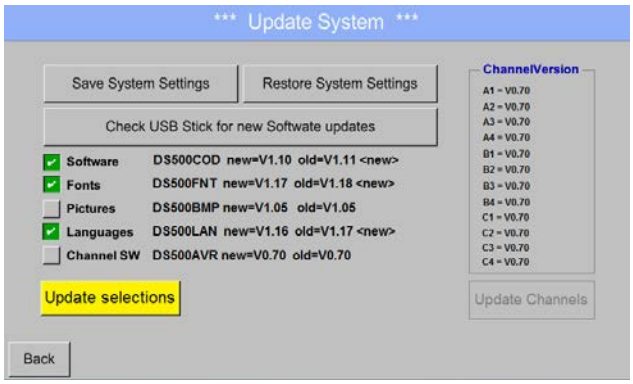


Stores the *channel* and *system settings* in XML format on a USB stick.

Main menu ➔ Settings ➔ Device settings ➔ Update System ➔ Check USB Stick for …



If after pushing the *Check USB Stick for new Software updates* button the following messages in the window appears, the DS 500 is not connected properly with the USB stick or no files are available.



If the DS 500 is correctly connected to USB, the font will be black and left the different update options (with a green hook) are showed.

And right aside it shows the current (old) and another (new) available versions.

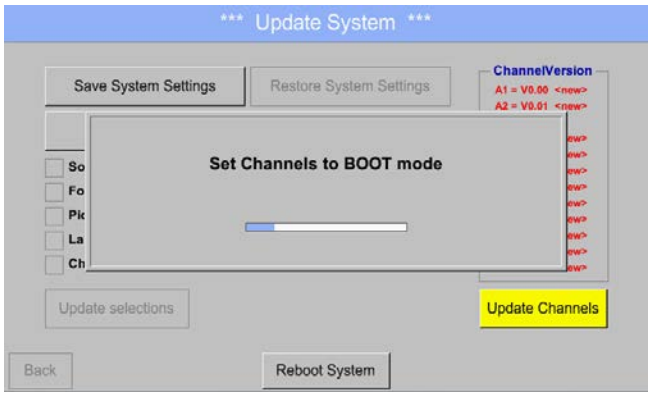
If you want to install an older software version, you must push the *Check USB Stick for new Software updates* button and select an older version to install.

Main menu ➔ Settings ➔ Device settings ➔ Update System ➔ Update selections

DS 500 update for all selected options (software, fonts, etc.).

Important:
If the *Reboot system* button after the update appears, he must be pushed to restart the DS 500!

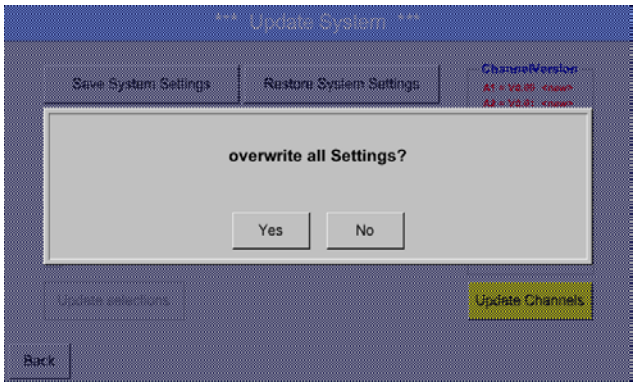
Main menu ➔ Settings ➔ Device settings ➔ Update System ➔ Update Channels



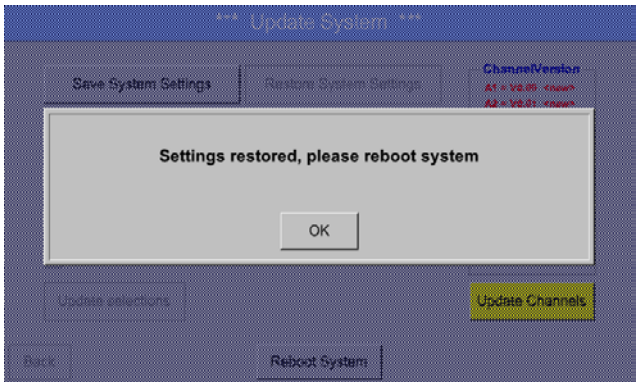
Update for the available *channels* of the DS 500.

Important:
If after the channel update the *Reboot system* button appears, it has to be pushed to restart the DS 500!

Main menu ➔ Settings ➔ Device settings ➔ Update System ➔ Restore System Settings



With the help of the *Restore System Settings* button the channel and system settings can be reset to the last saved version.

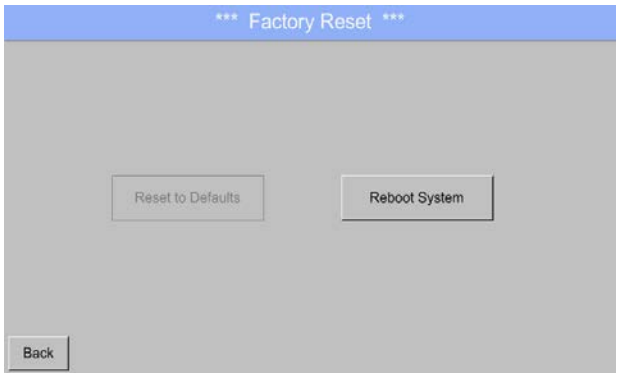


Important:
If the channel and system settings have been reset you have to push *OK* and then the *Reboot system* button.

Important:
If after the Restore System Settings the *Reboot system* button appears, it has to be pushed to restart the DS 500 mobile!

8.2.5.7 Factory Reset

Main menu ➔ Settings ➔ Device settings ➔ Factory Reset

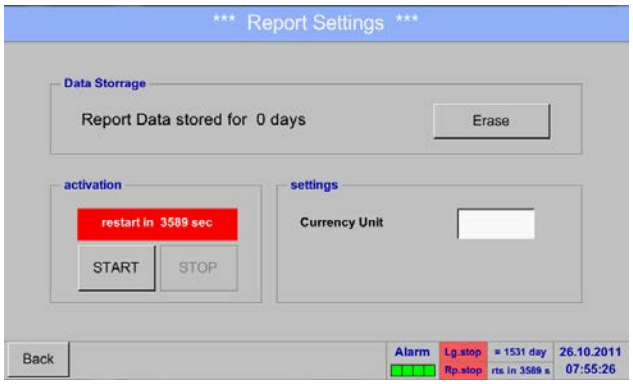


Reboot the *System* here, if you need it!

The Rest to Defaults button will be in all probability available with coming updates!

8.2.6 Report settings (optional)

Main menu ➔ Settings ➔ Report settings

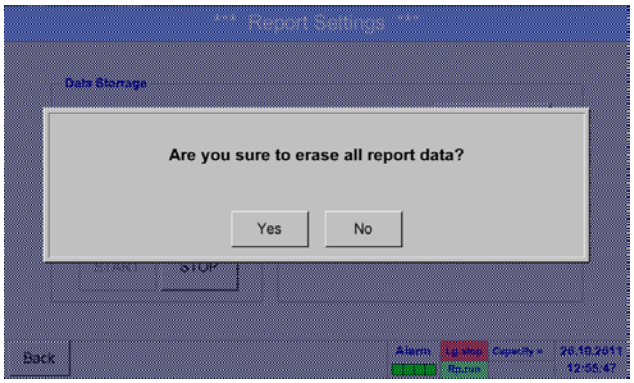


You can *Stop* and *Start* the **report** with the buttons.

Remark:

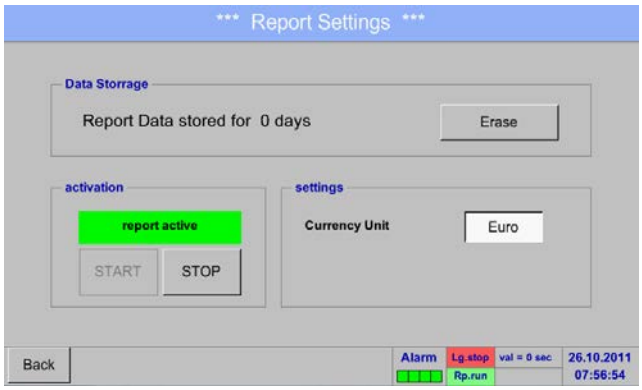
After pushing the *Stop* button, the **report** will restart in one hour, if the Start button is not pushed, before!

Main menu ➔ Settings ➔ Report settings ➔ Erase button



All stored *report data* can be erased by pushing *Yes*.

Main menu ➔ Settings ➔ Report settings ➔ Currency Unit description field



By pushing of the *Currency Unit* description field, a currency may be entered, which is applied to the **Consumption report** and the **cost settings**.

Remark:
Is no currency entered, the accordant fields remain empty.

See also chapter 12.8.1 Consumption report (optional) and 12.8.2 Cost Settings (optional).

8.2.7 Virtual Channels (optinal)

The option „Virtual Channels“ offers 4 additional channels (no HW Channels) where it is possible to display calculations of each single HW-Channel, virtual channels and free defined constants as well. For each „Virtual Channel“ are 8 calculations each with of 3 operands and 2 operations possible.

Possible cases are calculation of:

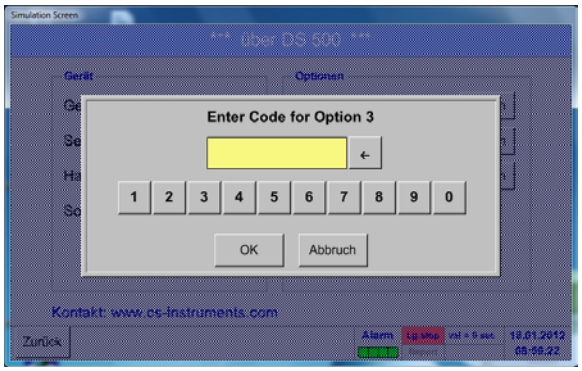
- Specific performance of a compressor(s)
- Complete consumption of a compressor(or the sum of several compressors)
- Energycost etc.

An example for a specific performance calculation see chapter 12.2.6.6

8.2.7.1 Option „Virtual Channels“ activation

After purchasing of the option „Virtual Channels“ the functionality have to be activated first.

Main menu ➔ Settings➔ about DS 500

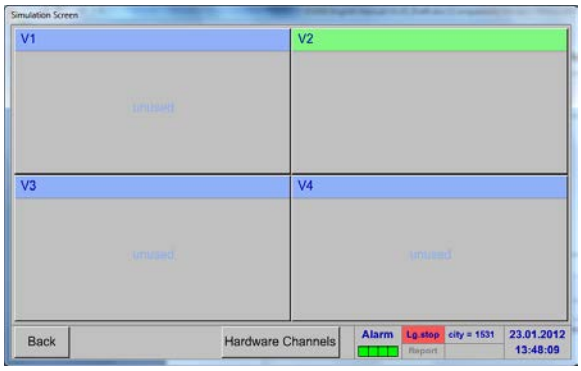


Please push the button Buy for „Virtual Channels“ and you will requested to insert the key-code received

Please enter the Key-Code in the text-field and activate the option by pushing the button *OK.*

8.2.7.2 Virtual Channels Settings

Main menu ➔ Settings➔ Sensor Settings ➔ Virtual Channels

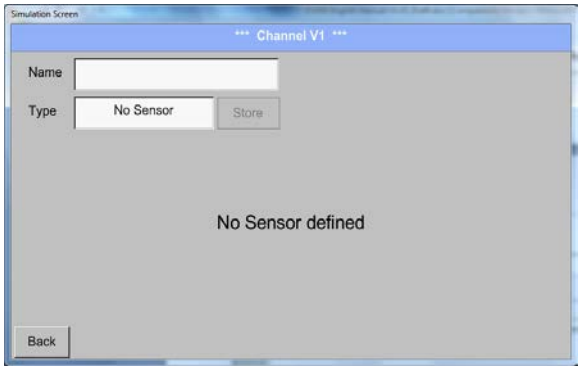


After pushing the button „*Virtual Channels*“ in the Sensor Settings menue an overview with the 4 available “*Virtual Channels*” is displayed.

Remark:
By default all channels are without settings.

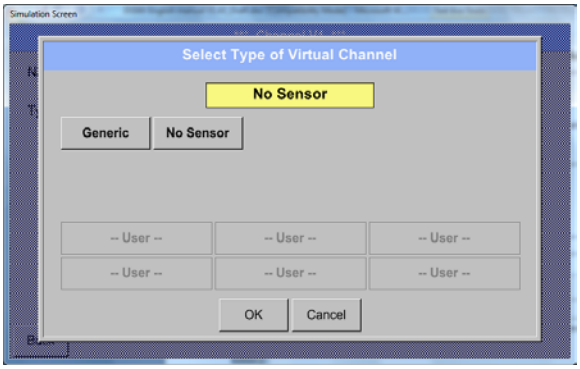
8.2.7.3 Selection of Senor-type

Main menu ➔ Settings➔ Sensor Settings ➔ Virtual Channels ➔ V1



By pushing the description field *Type **No Sensor*** the list of sensor types appears (see next step).

Main menu ➔ Settings➔ Sensor Settings ➔ Virtual Channels ➔ V1 ➔Type text field



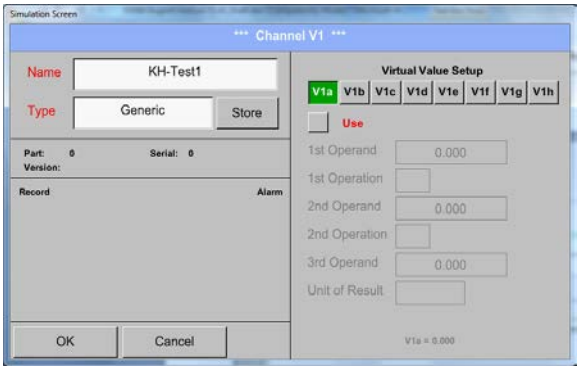
If still no sensor has been configured, the *Type **No Sensor*** appears.

By pushing the button **Generic** the virtual channel is selected.
Pushing the button **No Sensor** will reset the virtual channel.

Confirmation of selection is done by pressing the button **OK.**

Main menu ➔ Settings➔ Sensor Settings ➔ Virtual Channels ➔ V1 ➔Name text field

By pushing the Text field *Name* a Sensor name could be inserted..



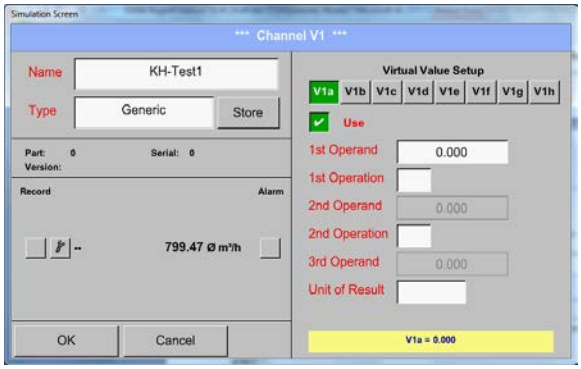
The button *Store* is implemented for a future function but actual **not** in use.

8.2.7.4 Configuration of each single virtual value

Each virtual channel includes 8 individual calculated values where every value has to be activated separately.

8.2.7.4.1 Activation of a single virtual value

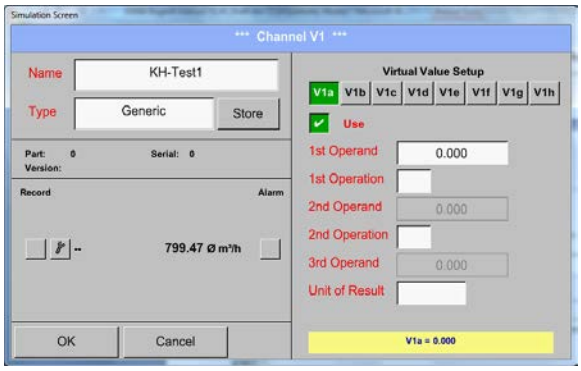
Main menu ➔ Settings➔ Sensor Settings ➔ Virtual Channels ➔ V1 ➔ V1a➔ Use



Every virtual value has to activated by selecting the respective *Value-Button* e.g. *V1a* and pushing of the *Use Button*.

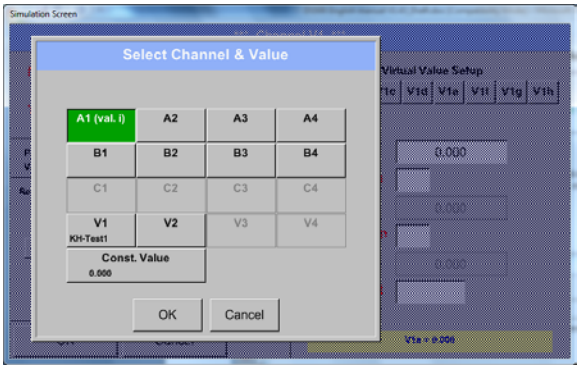
8.2.7.4.2 Definition of Operands

Main menu ➔ Settings➔ Sensor Settings ➔ Virtual Channels ➔ V1➔ 1stOperand

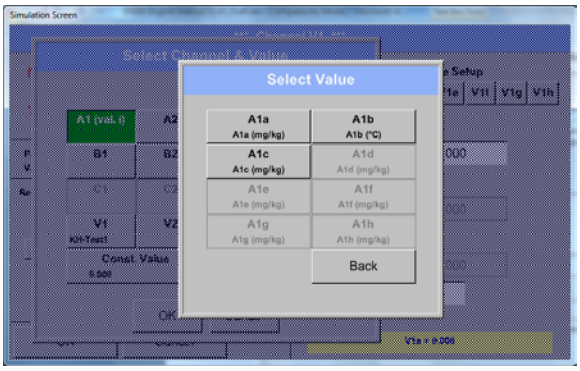


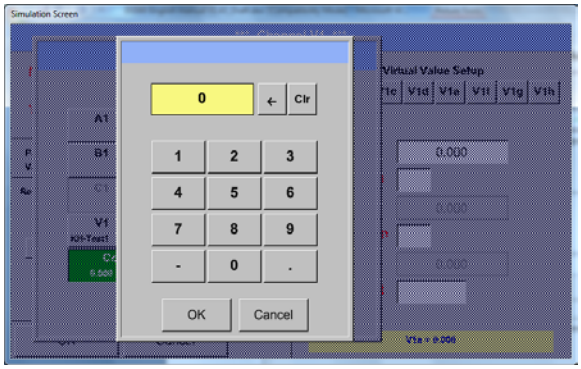
By accessing the text field *1st Operand* The list with all channels (HW and virtual channels) and const. Value appears.

Main menu ➔ Settings➔ Sensor Settings ➔ Virtual Channels ➔ V1➔ 1stOperand ➔ A1



By pressing a button either for HW-, virtual channel or const. Value e.g. *A1* a list of all available measurement channels or measurement values will appear.





Pressing the respective channel button e.g. *A1b* will select the measurement channel

Pressing the button *const. Value* requests the input of the *const. Value* into the text field.
With button *OK* the value will validated

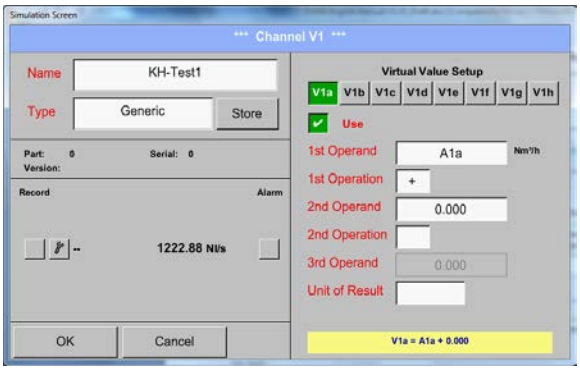
With the buttons ← and *Clr* it is possible to correct the input.

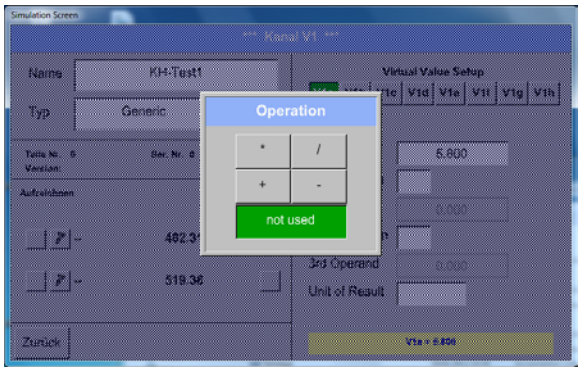
Button ← deletes the last figure
Button *Clr* clears the whole field

This approach is analogous to the other operands. (1st Operand, 2nd Operand and 3rd Operand) .

8.2.7.4.3 Definition of Operations

Main menu ➔ Settings➔ Sensor Settings ➔ Virtual Channels ➔ V1 ➔ 1st Operation





By accessing the text field *1st Opation* the list with all available operands appears.

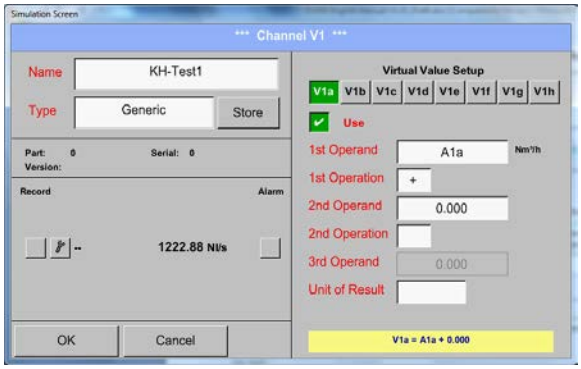
Selecting and validation of the operand by pressing the respective operand.

Pressing of the button *not used* deactivates the operation of the dedicated operand.

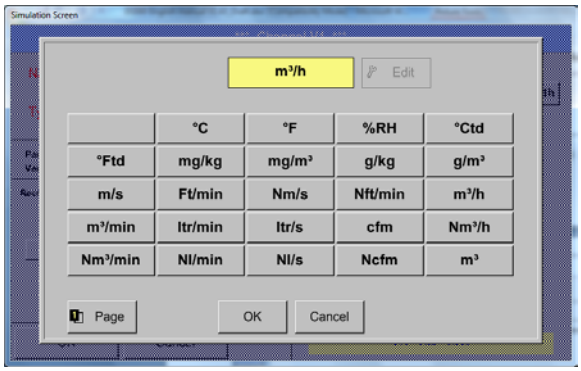
This approach is analogous for both operations (1st Operation and 2nd Operation)

8.2.7.4.4 Definition of Unit

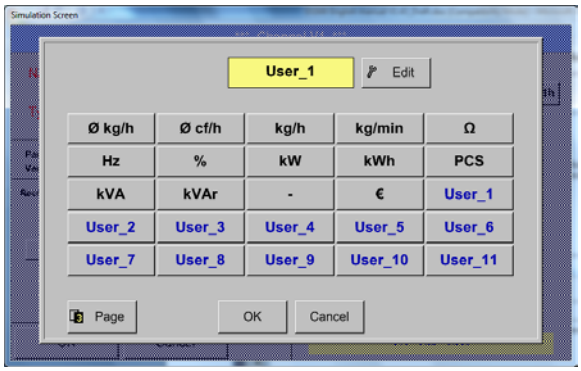
Main menu ➔ Settings➔ Sensor Settings ➔ Virtual Channels ➔ V1 ➔ Unit of Result



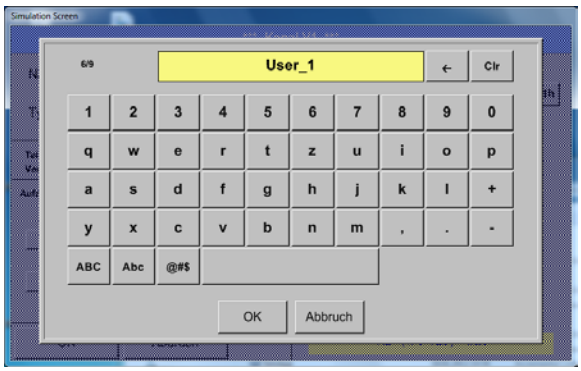
By accessing the text field *Unit of Result* the list with all available units appears



Please select the unit by pressing the respective button e.g. *m³/h.*
For validation of the unit please push the button *OK*
To move through the list please press the button *Page.*
In case the unit is **not** available it is possible to create a user defined unit.
Therefore please select one of the *User_X* buttons..



By pressing the button *Edit* you enter the menu for inserting the new Unit.



Then define the unit and confirm it with the button *OK* .

With the buttons ← and *Clr* it is possible to correct the input.

Button ← deletes the last figure
Button *Clr* clears the whole field

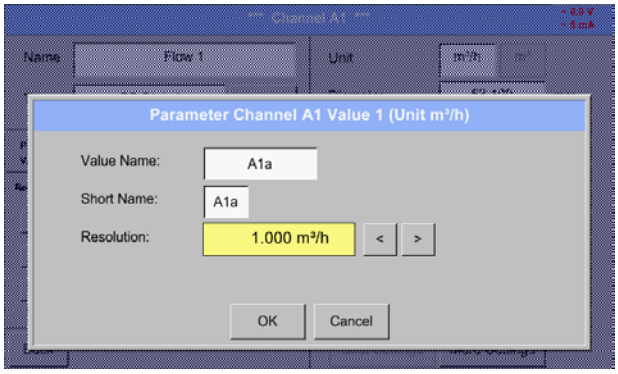
Important

Each calculation allows you the use of maximum 3 operands and 2 operations.
The calculation is then based on following formula:
Example:
V1a = (1st Operand 1st operation 2nd Operand) 2nd operation 3rd Operand
V1a = (A1c – A2a) * 4.6

8.2.7.5 Value name, resolution of decimal places and recording of values

Main menu ➔ Settings➔ Sensor Settings ➔ Virtual Channels ➔ V1 ➔ Tool-Button

The *Resolution* of the decimal places, the *Short Name* and *Value Name* are found under the **Tool button**



For the recorded *Value* there can be entered a *Name* with 10 characters and later in menu item *Graphics/Real time values* it is easier to identify it.
The *Resolution* of the decimal places is simply adjustable by pushing right and left
(0 to 5 decimal places).

Main menu ➔ Settings➔ Sensor Settings ➔ Virtual Channels ➔ V1 ➔ Record Button

.

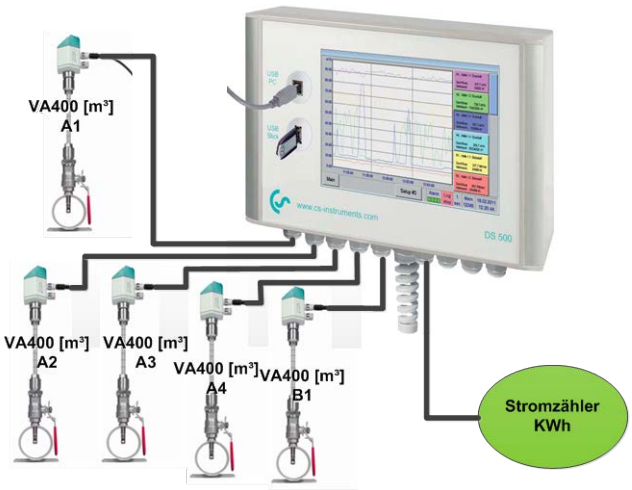
Use the *Record* buttons to select the measurement data that will be stored by **activated data logger**.

Attention:

Before the selected measurement data are recorded, the data logger must be activated after the settings(See chapter 12.2.3 Logger settings (data logger))**.**
See also chapter 12.2.2.2 Name the measurement and 12.2.2.3 Recording measurement data

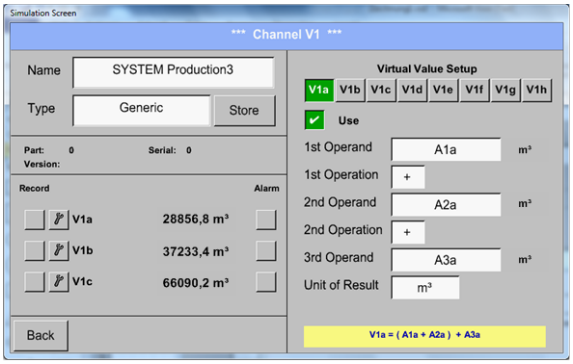
8.2.7.6 Calculation Example „Specific Performance“

As an example we assume a compressor system with 5 single compressors.
The consumption measurements are done with consumption sensors VA400 at the inputs A1 - A4 & B1 and an electric meter at input B2.



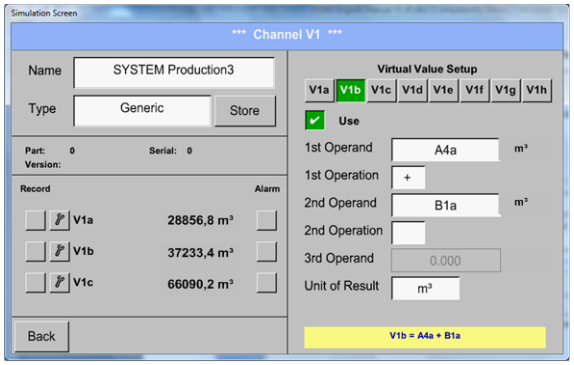
Calculated are the complete consumption of air and energy as well as the "specific performance" of the entire system .

Main menu ➔ Settings➔ Sensor Settings ➔ Virtual Channels ➔ V1 ➔ V1a➔ Use



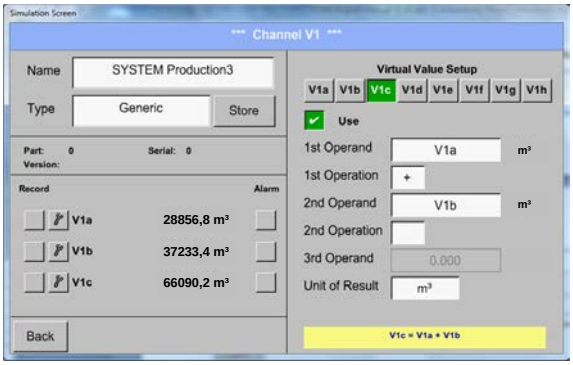
Selection and Input of the operands and operations see chapter 12.2.6.4.2 and chapter 12.2.6.4.3.

Result in *V1a* is the sum of consumption sensor *A1* + *A2* + *A3* see range “result”.
For this example it is *28856,8 m³*



Selection and Input of the operands and operations see chapter 12.2.6.4.2 and chapter 12.2.6.4.3.

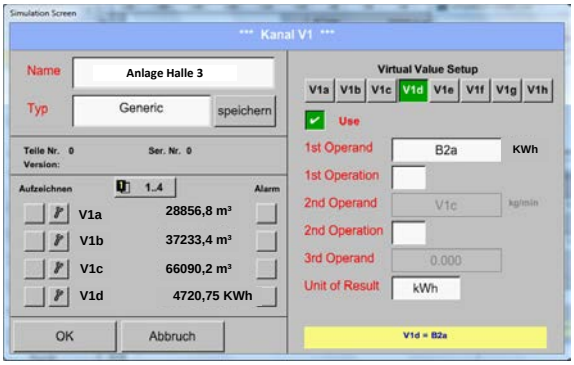
Result in *V1b* is the sum of consumption sensor *A4* + *B1* see range “result”.
For this example it is *37233,4 m³*



Selection and Input of the operands and operations see chapter 12.2.6.4.2 and chapter 12.2.6.4.3.

Result in *V1c* ist complete consumption with *V1a* + *V1b* see range “result”.
For this example it is *66090,2 m³*

Alternativly the complete consumption could be calculated already in *V1b*, this using the 3. operand in *V1b* with *V1b* = *A4* + *B1* +*V1a* -> not shown



For a complementation we added in *V1d* the total sum of consumed energy.
Read out of electric meter at input B2.

V1c → complete Air consumption
V1d → energy consumption

Calculation of the *specific. Perfor.* Is done in *V1e* with *V1e* = *B2* / *V1c*
For this example it is 0,072 KWh/m³

Cost calculation in *V1f* with *V1f* = *B2* * *0.21*
For this example it is 991,36 €
.
Due to more as 4 values used in virtual channel V1 the result range is splitted into 2 pages. To move between the pages please press the *page button*

8.2.8 Analog Total (optional)

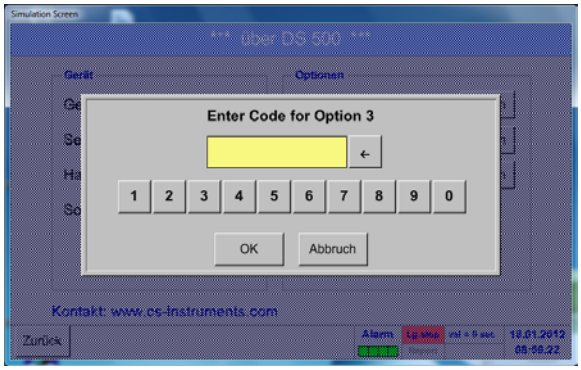
The Option „**Analog Total**“ offers the possibility of a consumption measurement also for sensors with analogen outputs e.g.: 0-1/10/30V and 0/4 – 20mA.

8.2.8.1 Option „Anaolg Total“ activation

After purchasing of the option „Analog Total“ the functionality have to be activated first.

Hauptmenü ➔ Einstellungen ➔ über DS 500

Please push the button Buy for „Virtual Channels“ and you will requested to insert the key-code received

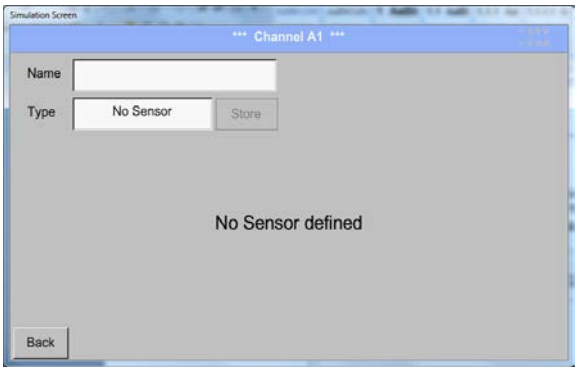


Please enter the Key-Code in the text-field and activate the option by pushing the button *OK.*

8.2.8.2 Selection of sensor type

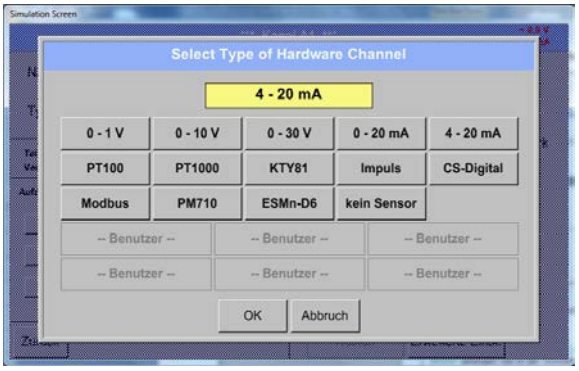
See also chapter 12.2.2.8 Configuration of analogue Sensors

Main menu ➔ Settings ➔ Sensor Settings ➔ A1



By pushing the description field *Type **No Sensor*** the list of sensor types appears (see next step).

Main menu ➔ Settings ➔ Sensor Settings ➔ A1➔ Type Textfield

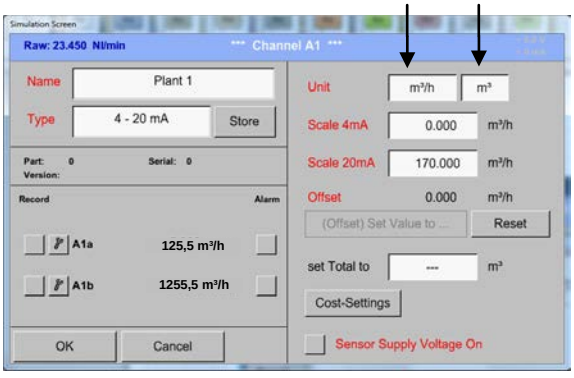


If still no sensor has been configured, the *Type **No Sensor*** appears.

By pushing the button of the required sensor button e.g. 4 -20mA the sensor is selected. Pushing the button **No Sensor** will reset the selection.

Confirmation of selection is done by pressing the button **OK.**

Units
Measurement Consumption



Selection of the units by pushing the text fields for the corresponding measurement and consumption units.
In addition, you can push the *scale buttons* for the min. and max. scaling values and set the measuring range.

Here we have *0 m³/h* for 4 mA and *170m³/h* for 20mA

Confirmation of the inputs by pushing button *OK*

Remark:

The textfield „Unit-Consumption“ is only editable in case of measurement values(Units) with volume per time unit and thus also the consumption calculation.

For labeling and setting of the description fields see also chapter 12.2.2.7 Label and set the description fields

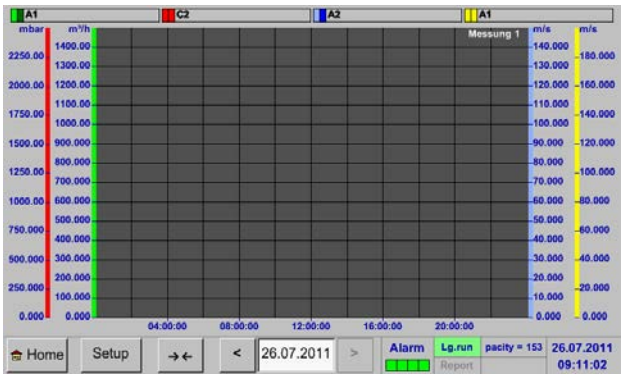
8.3 Chart

Main menu ➔ Chart

Attention:
In the *Chart* there can be represented only records that have already finished!

Current records can be seen in *Chart/Real time values*.

(See chapter **12.4 Chart/Real time values***)*



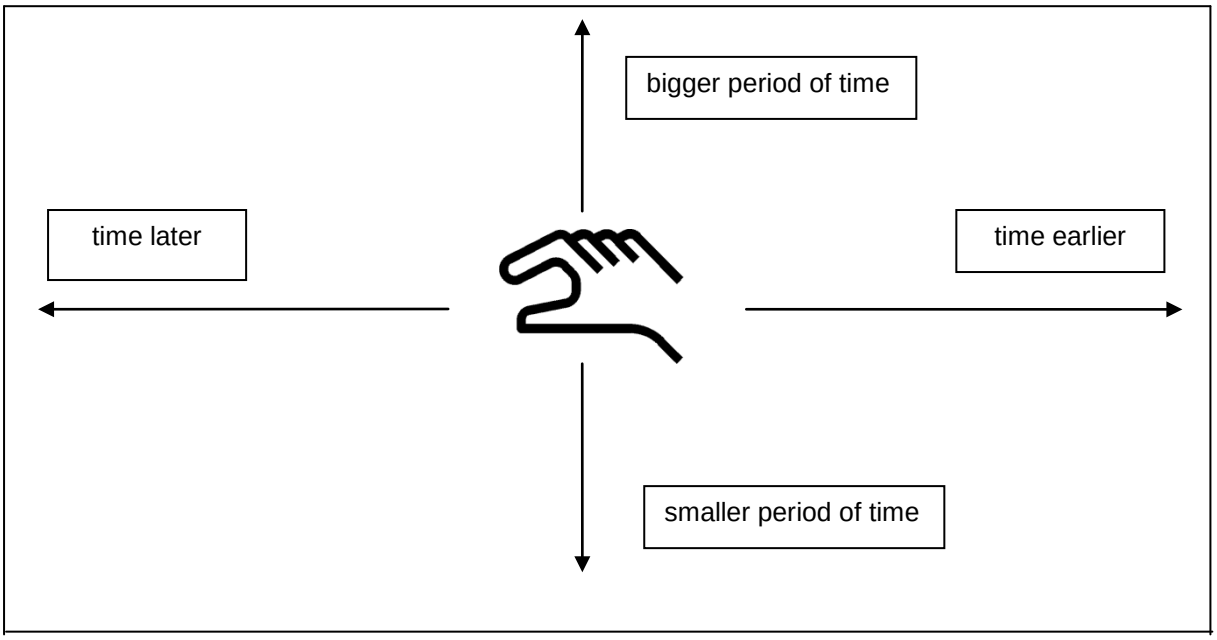
Running measurement, there are no values represented!

Zoom and scroll options in the time domain of the *Chart*:

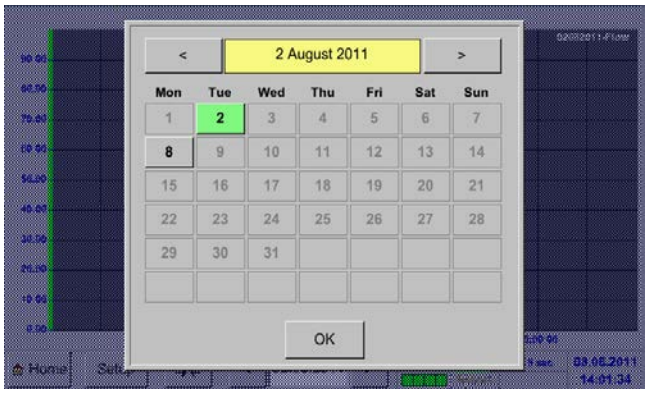
Maximal an entire day can be represented (24h).

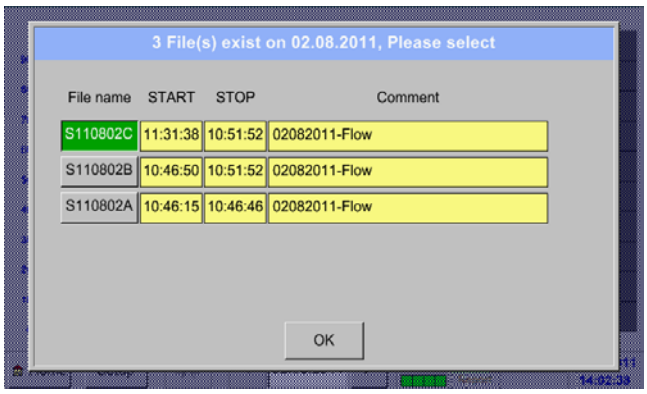
The smallest possible range is represented, depending on the time interval of the recording.

Additional zooming and scrolling options in *Chart* and *Chart/Real time values:*



Main menu ➔ Chart ➔ Date description field





By pushing the date description field (center bottom) the calendar, from which the appropriate date can be selected conveniently, appears.

Stored measuring data can be select here by *time* (*START* and *STOP*), *Comment* and *File name* (contains English date).

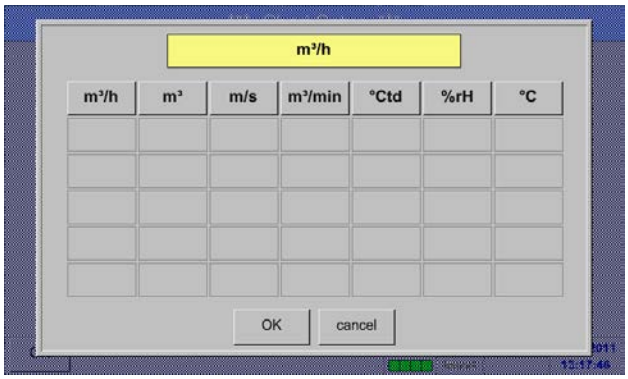
Main menu ➔ Chart ➔ Setup

In the *Setup,* you can make up to four different y-axis labels and in addition choose a *Unit*, the grid (*min*, *max*, *step*) and several channels (*Plots*) and a *Colour*.

1.
The y-axis *left 1.* is already enabled, you can choose a *Colour* for it.

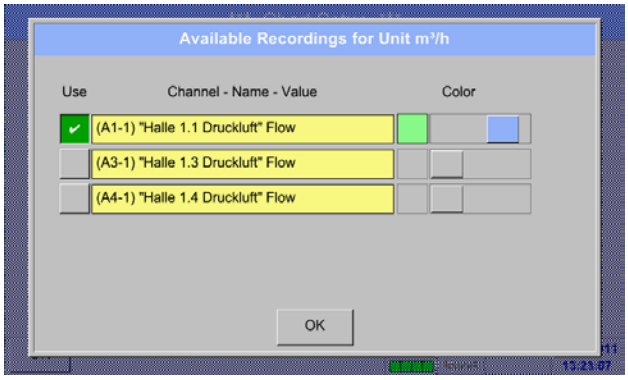
Remark:
Grid setting is already possible at this point, but later when a record is selected it is more reasonable!

Main menu ➔ Chart ➔ Setup ➔ Unit description field



2.
Select the *Unit* of the represented recording from the menu.

Main menu ➔ Chart ➔ Setup ➔ Plots description field

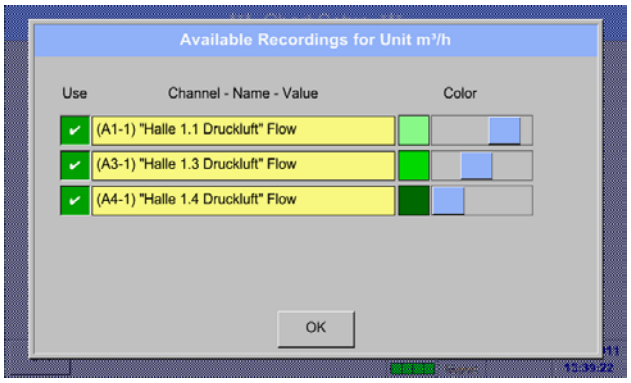


3.
Now, you can choose the desired recording and colour intensity (in *Colour*).

Main menu ➔ Chart ➔ Setup

4.
Now, the grid can be set with *min*, *max*, and *step*.

Main menu ➔ Chart ➔ Setup ➔ Plots description field



5.
Several recordings with the same unit can be represented in one y-axis, with the help of various colour intensities.

Main menu ➔ Chart ➔ Setup

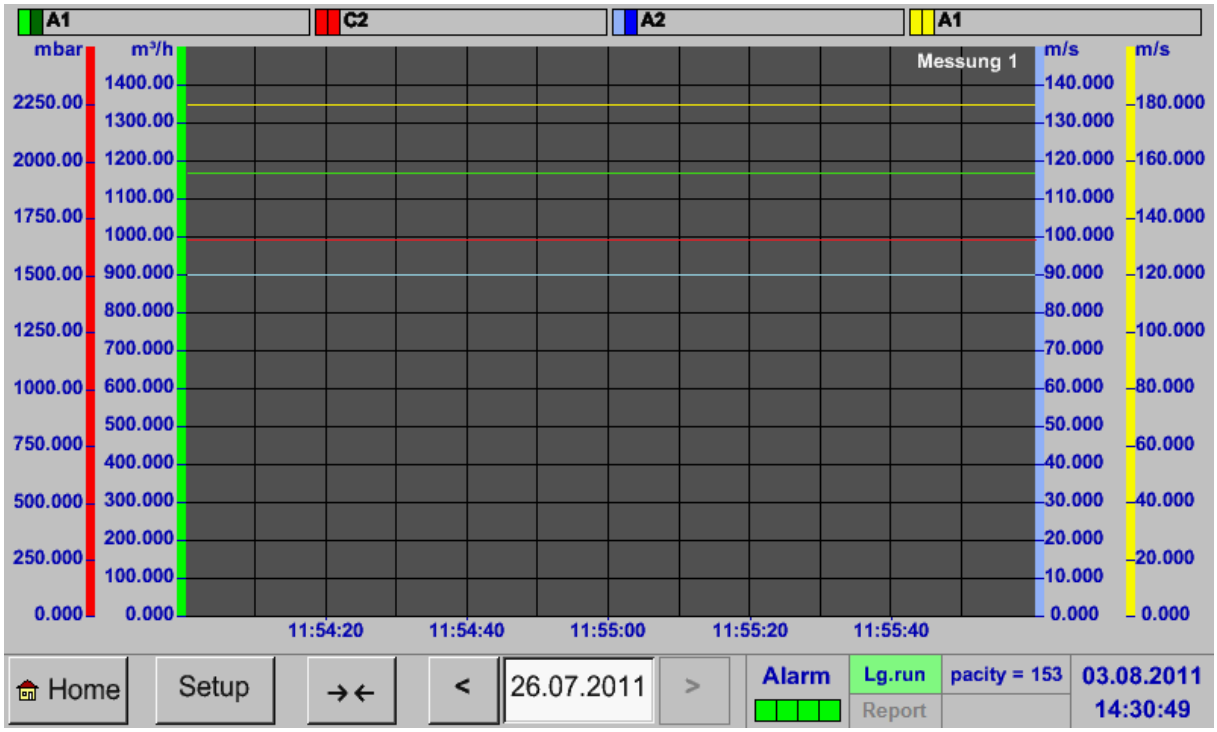
6.
The *Plots* description field shows on what channel the measured data were recorded and there can be seen how much recordings on one y-axis are represented.

In the same way the remaining y-axes can be labeled!

Four different grid settings with various *Units* and *Colours*.

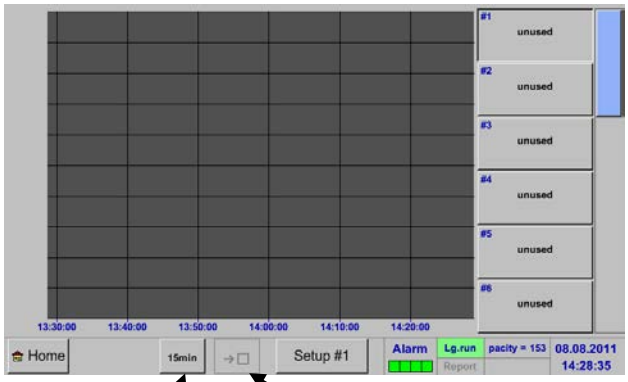
Chart

Main menu ➔ Chart



8.4 Chart/Real time values

Main menu ➔ Chart/Real time values

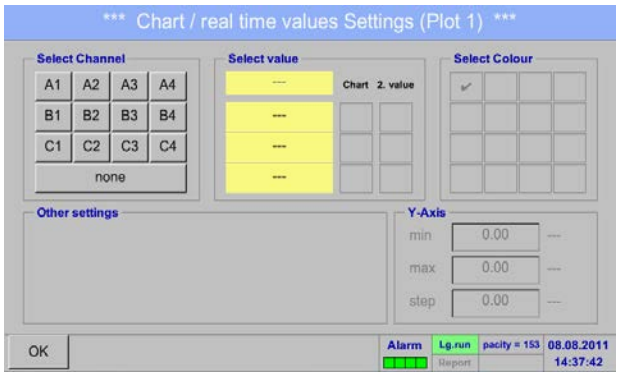


One or more channels for the recording and presentation of measured data can be selected here, such as a dewpoint sensor or several different sensors.

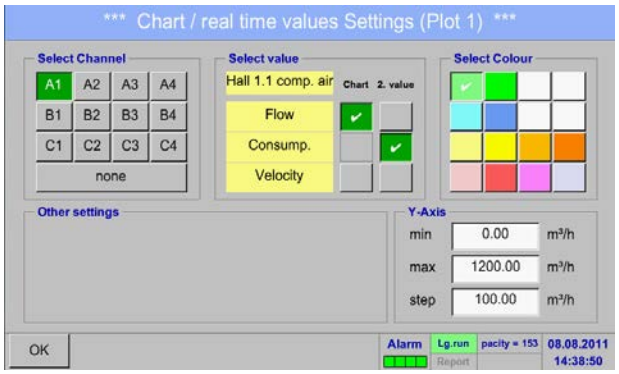
After pushing this button currently recorded measurement data in the current time range are represented.

Quick access to predefined time periods 24 h, 8 h, 1 h, 15 min and 2 min. At the push of a button the chart for the selected time range is displayed.

Main menu ➔ Chart/Real time values ➔ Setup #1 - #12



In this menu item, up to twelve channels (depending on the version of the DS 500) can be activated at the same time and viewed in *Main ➔ Chart/Real time values*.



Here the channel A1 chosen.

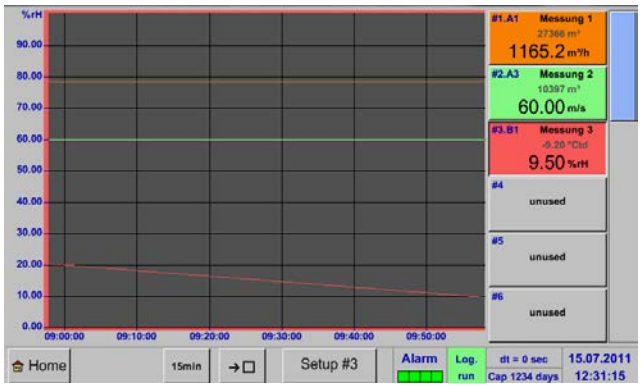
For each channel, you can select a value to be represented in the *Chart* and one to display (2. values).

In addition, it can be set, like in *Main ➔ Chart*, a *colour* and the grid (*min*, *max*, *step*) of the y-axis.

Main menu ➔ Chart/Real time values

Channel A1:
Elected the flow as *Chart* and consumption as *2. values* (number with the smaller font size) and the *colour* orange.

If several channels are clogged (here: 2 channels), all charts will be represented. But there is only the y-axis of the selected channel represented (here: Setup #2).

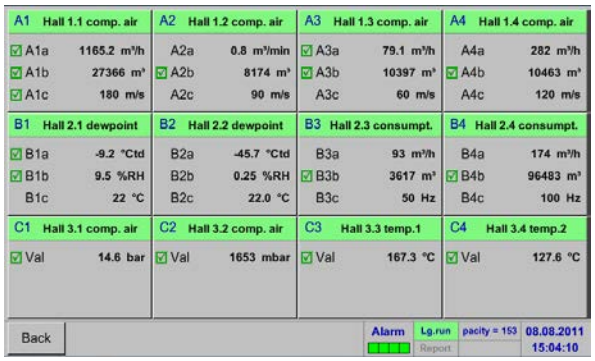


If there is no grid entered in the setup , *min* will be 0, *max* 100 and *step* 10 (Setup #3).

In the same way the remaining setups can be set!

8.5 Real time values

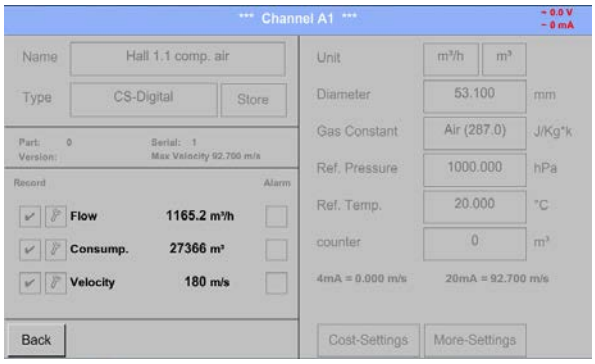
Main menu ➔ Real time values



The overview of *Real time values* shows the current measured values of all connected sensors.

Exceeds or falls below the set alarm limits, the respective measured value flashes yellow (*alarm 1*) or red (*alarm 2*).

Main menu ➔ Real time values ➔ A1



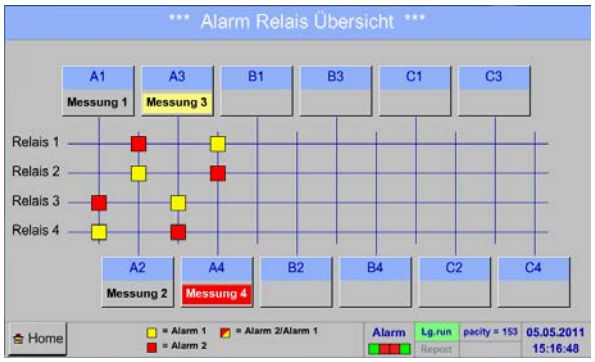
Each channel can be selected and the settings viewed and checked, but no changes can be made here.

Remark:
Please, make changes in the *Settings*!

8.6 Alarm overview

Remark:
For DS500 mobile only the alarm-warnings on the display are available, alarm-relays are not accessible.

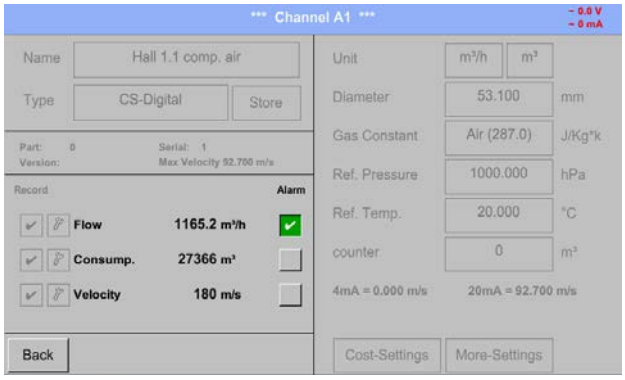
Main menu ➔ Alarm overview



In the Alarm overview, you can immediately see whether there is an *alarm 1* or *alarm 2*.
You can see also in other menu items:
Main ➔ Real time values and
Main ➔ *Settings* ➔ *Sensor settings*
The channel name will appear yellow invers (*alarm 1*) or inverse red (*alarm 2*).
In addition, you can see which relay had been set for the channel as the *alarm 1* or *alarm 2*.
This is indicated by the yellow and red or red/yellow squares on the intersections between measuring channel and relay.

HERE: *Alarm1* for channel A3 and *alarm 2* for channel A4

Main menu ➔ Alarm Overview ➔ A1



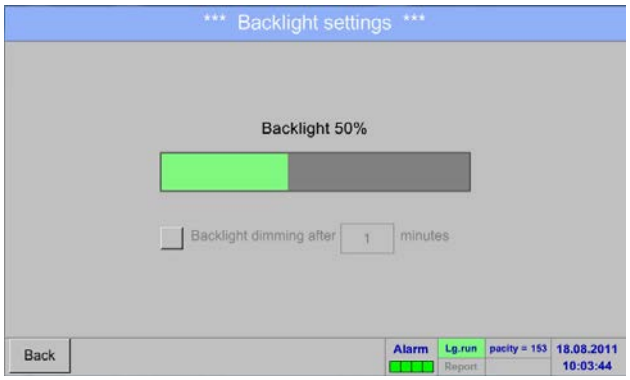
Like in *Main* ➔ *Real time values*, individual channels can be selected here,
to detect which and how much the value has exceeded or below the alarm range.

Remark:
The alarm parameters can be set and/or modified here.

8.7 Further setting options

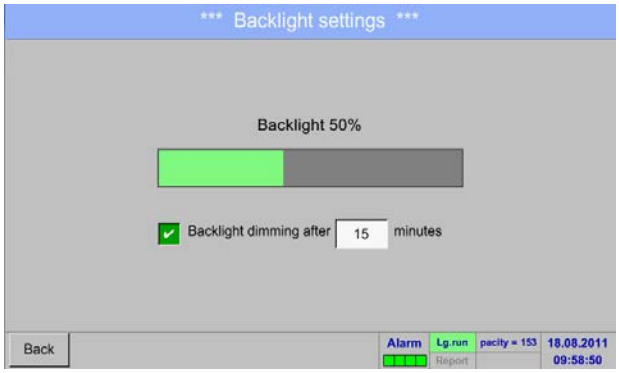
8.7.1 Set backlight

Main menu ➔ Settings ➔ Set backlight



Here you adjust the desired *Backlight* (15-100%) of the display directly.

e.g. *Backlight* to 50 %



With the help of the *Backlight dimming after* button, after a definable time interval (here after 15 minutes), the *Backlight* can be reduced to the minimum.

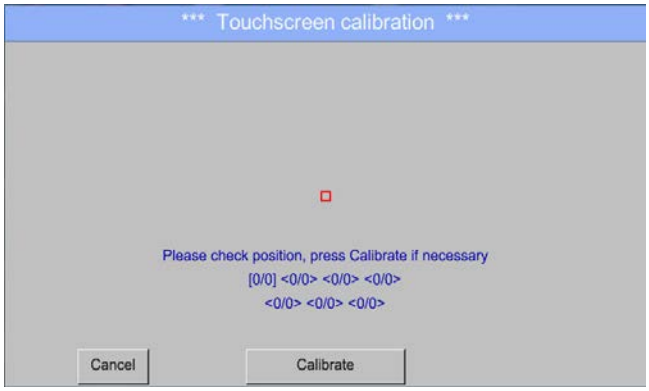
As soon as the dimmed screen is operated again, the *Backlight* is committed automatically on the last set value before dimming.

Remark:
At the first touch, the *Backlight* in our example is reset to 50%, after that a "normal" function operation is possible.

Important:
If the *Backlight dimming after* button is not activated, then the *Backlight* stays permanently on, in the currently set brightness.

8.7.2 Calibrate touch-screen

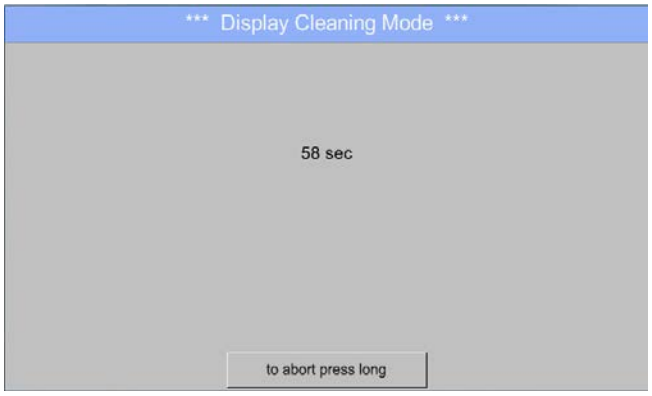
Main menu ➔ Settings ➔ Touchscreen calibration



If necessary, the touch-screen calibration can be changed here.
Push *Calibrate* and it appears, 1. left above, 2. bottom right and 3. in the middle, a calibration cross that must be pushed consecutively.
If the calibration finished and the touch-screen display averaged, you can confirm with *OK*.
Is this not the case, so you can repeat the calibration with the help of the Cancel and *Calibrate* buttons.

8.7.3 Cleaning

Main menu ➔ Settings ➔ Cleaning



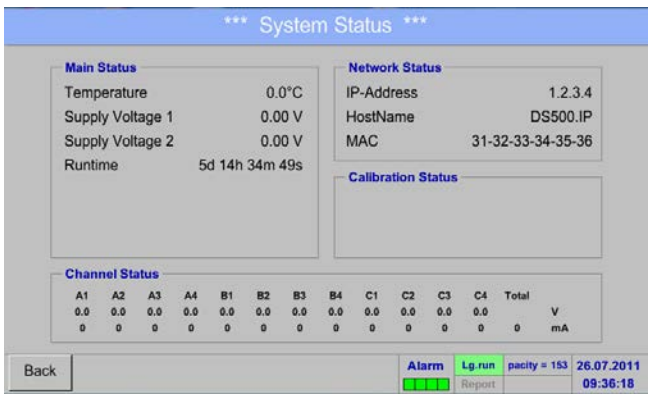
This function can be used for cleaning the touch panel during running measurements.

If one minute is not enough time to clean, the process can be repeated at any time.

Is the cleaning faster finished, then you can push the *to abort press long* button (for one or two seconds) to cancel.

8.7.4 System Status

Main menu ➔ Settings ➔ System Status



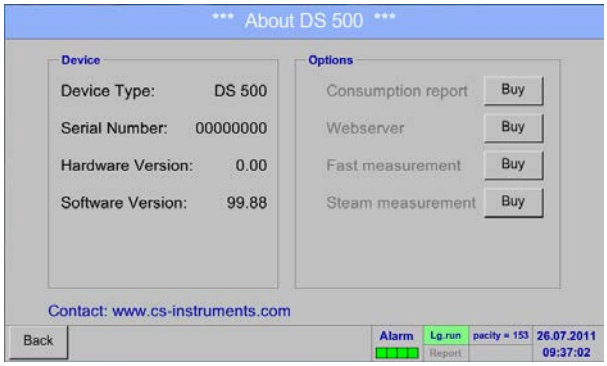
The function System Status offers an overview, fitting voltages and currents on the individual and the entire channels, as well as the power supply of the power supply units.

In addition, it offers the most important network information, such as *IP*, *host name* and *MAC*.

By the *Runtime,* you always know how long the DS 500 was in total in operation.

8.7.5 About DS 500

Main menu ➔ Settings ➔ About DS 500



Brief description of the Hardware and Software Version, as well as the Serial Number of the DS 500.

Under options, you can buy four additional, different functions, if you haven't done this by ordering.

8.8 Consumption report with cost settings, export data and webserver

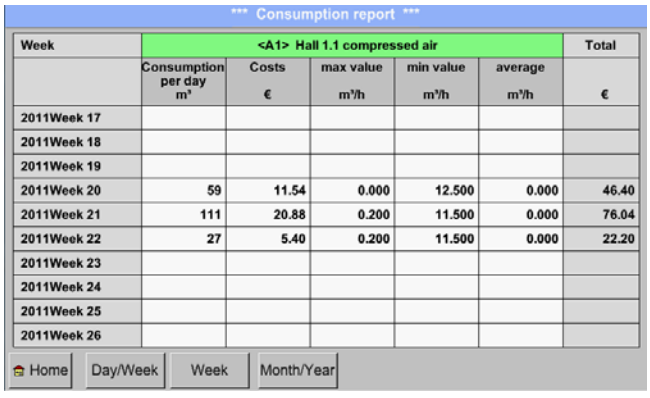
The daily, weekly, monthly and yearly total consumption can be calculated and displayed with the **optional** function *Consumption report*.

The currency will be entered in the report settings (chapter 12.2.5 Report settings (optional)) and the consumption costs in chapter 12.8.2 Cost settings (optional).

Via the **optional** function *Webserver* you can see the actual values of your DS 500 worldwide.

8.8.1 Consumption report (optional)

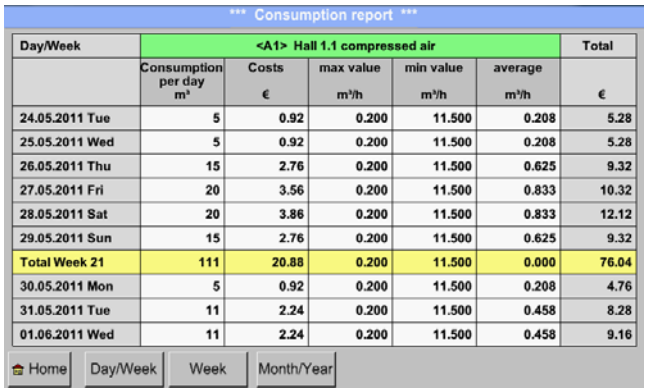
Main menu ➔ Consumption report



After opening the *Consumption report* the weekly overview is displayed automatically.

Remark:
The *Costs* relate to the set channel (here A1) and the costs of all documented channels are to find in *Total*.

Main menu ➔ Consumption report ➔ Day/Week



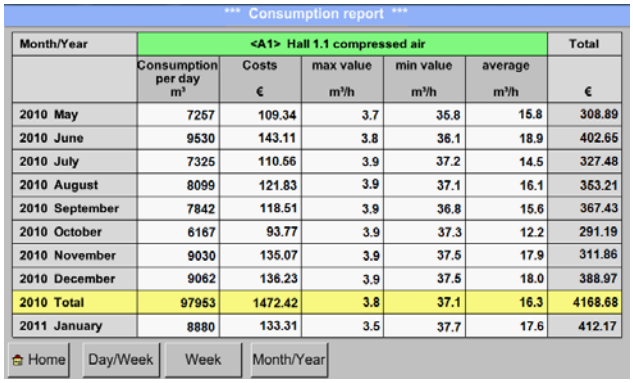
*** Consumption report ***

Day/Week	<A1> Hall 1.1 compressed air					Total
	Consumption per day m³	Costs €	max value m³/h	min value m³/h	average m³/h	€
24.05.2011 Tue	5	0.92	0.200	11.500	0.208	5.28
25.05.2011 Wed	5	0.92	0.200	11.500	0.208	5.28
26.05.2011 Thu	15	2.76	0.200	11.500	0.625	9.32
27.05.2011 Fri	20	3.56	0.200	11.500	0.833	10.32
28.05.2011 Sat	20	3.86	0.200	11.500	0.833	12.12
29.05.2011 Sun	15	2.76	0.200	11.500	0.625	9.32
Total Week 21	111	20.88	0.200	11.500	0.000	76.04
30.05.2011 Mon	5	0.92	0.200	11.500	0.208	4.76
31.05.2011 Tue	11	2.24	0.200	11.500	0.458	8.28
01.06.2011 Wed	11	2.24	0.200	11.500	0.458	9.16

Home | Day/Week | Week | Month/Year

Another option is the daily and weekly Consumption report.

Main menu ➔ Consumption report ➔ Month/Year



*** Consumption report ***

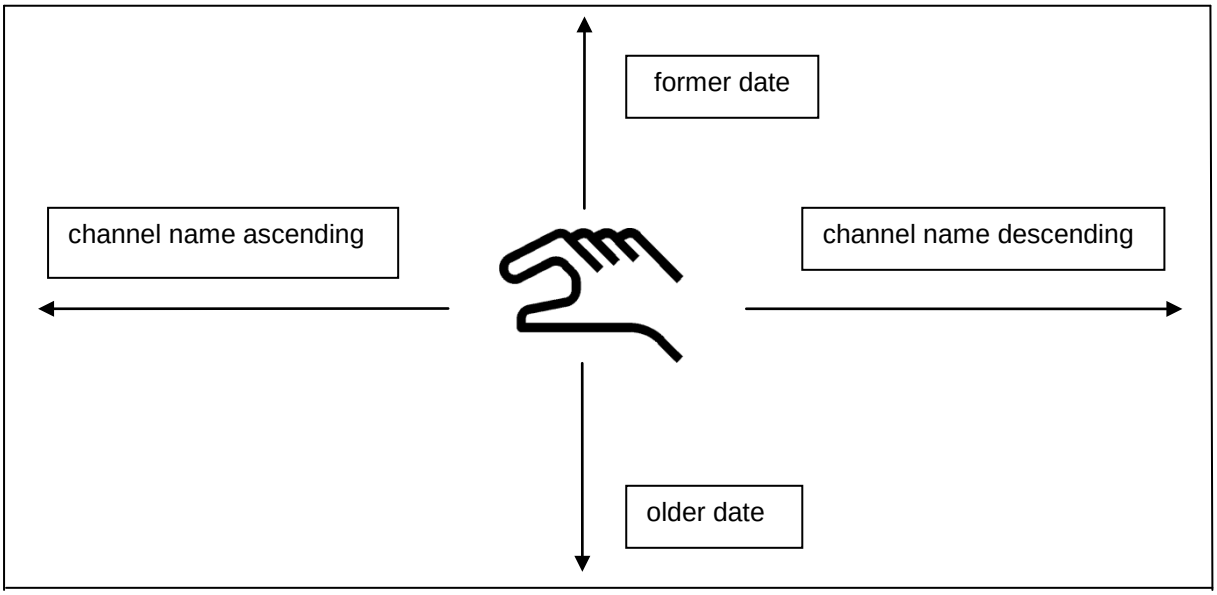
Month/Year	<A1> Hall 1.1 compressed air					Total
	Consumption per day m³	Costs €	max value m³/h	min value m³/h	average m³/h	€
2010 May	7257	109.34	3.7	35.8	15.8	308.89
2010 June	9530	143.11	3.8	36.1	18.9	402.65
2010 July	7325	110.56	3.9	37.2	14.5	327.48
2010 August	8099	121.83	3.9	37.1	16.1	353.21
2010 September	7842	118.51	3.9	36.8	15.6	367.43
2010 October	6167	93.77	3.9	37.3	12.2	291.19
2010 November	9030	135.07	3.9	37.5	17.9	311.86
2010 December	9062	136.23	3.9	37.5	18.0	388.97
2010 Total	97953	1472.42	3.8	37.1	16.3	4168.68
2011 January	8880	133.31	3.5	37.7	17.6	412.17

Home | Day/Week | Week | Month/Year

In addition, there is a monthly and yearly Consumption report.

Touch panel opertion by Consumption report:

By the *Consumption report*, with the help of touch panel, you can easily consider the consumption and the cost of a channel in the desired period or at a certain date.



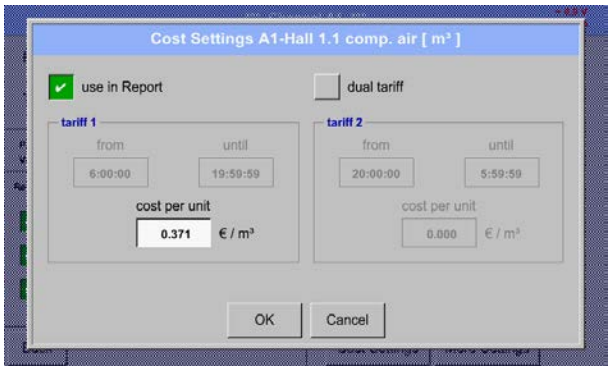
Remark: The channel selection in *Consumption report* is marked in green!

8.8.2 Cost settings (optional)

Main menu ➔ Settings ➔ Sensor settings ➔ A1 ➔ Cost Settings

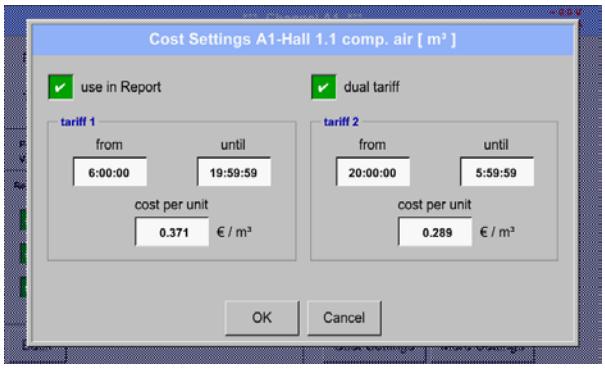
In the *Sensor settings* for the *Type* **CS-Digital** and **Pulse** you can enter the costs per unit in the *Cost Settings*.

Main menu ➔ Settings ➔ Sensor settings ➔ A1 ➔ Cost Settings ➔ *use in Report* button



Here you can enter the consumption costs per unit for a specific tariff.

Main menu ➔ Settings ➔ Sensor settings ➔ A1 ➔ Cost Settings ➔ *use in Report + dual tariff* button



It can be entered here, for example, a day and night tariff with time.

Label of the description fields, see chapter 12.2.2.7 Label and setting the description fields and 12.2.3 Logger settings.

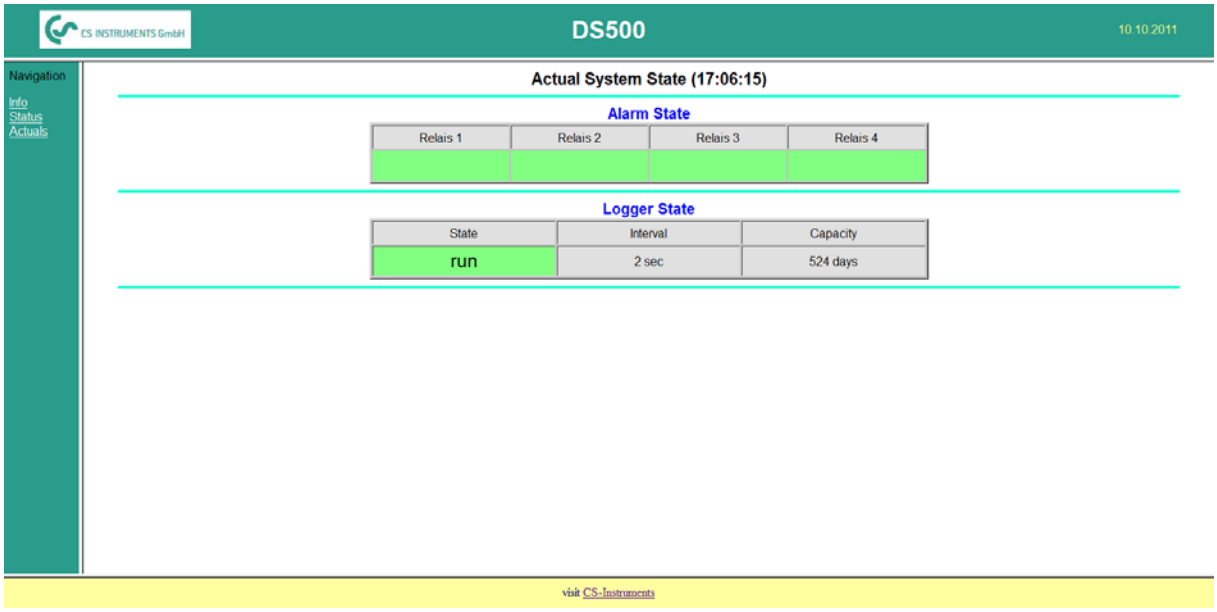
8.8.3 Webserver (optional)

With an Internet-Explorer and the IP-address of your DS 500, you can check the following options worldwide:

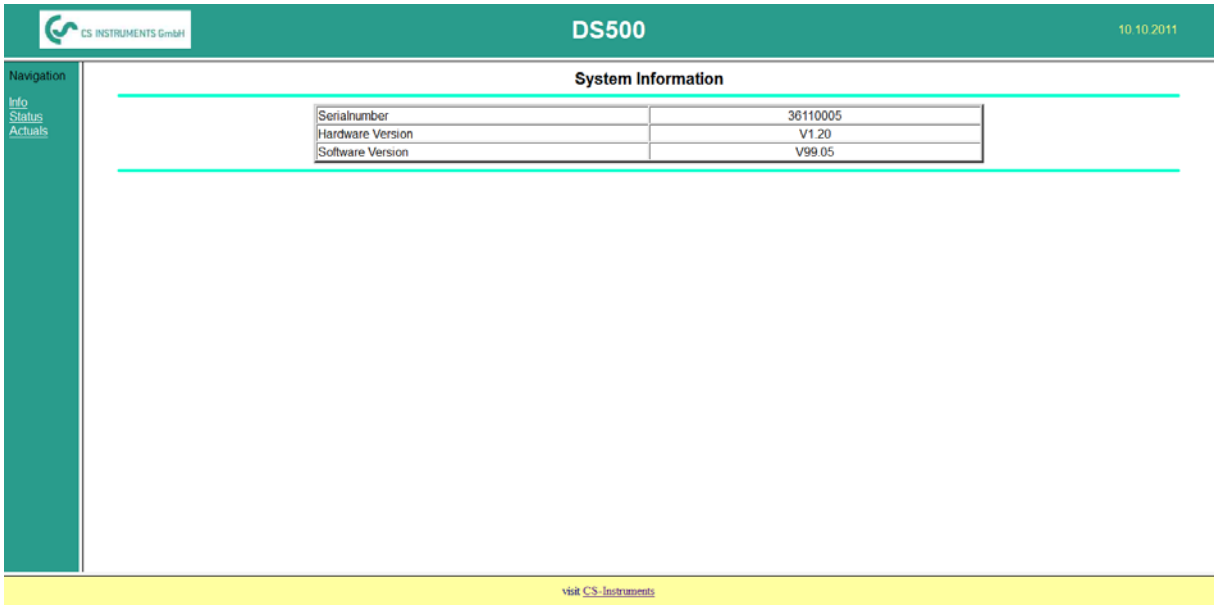
http:// <IP-address of the DS 500>

Remark:
The IP-address of the DS 500 yon can see in the chapters 12.7.4 System Status and 12.2.4.3 Network settings.

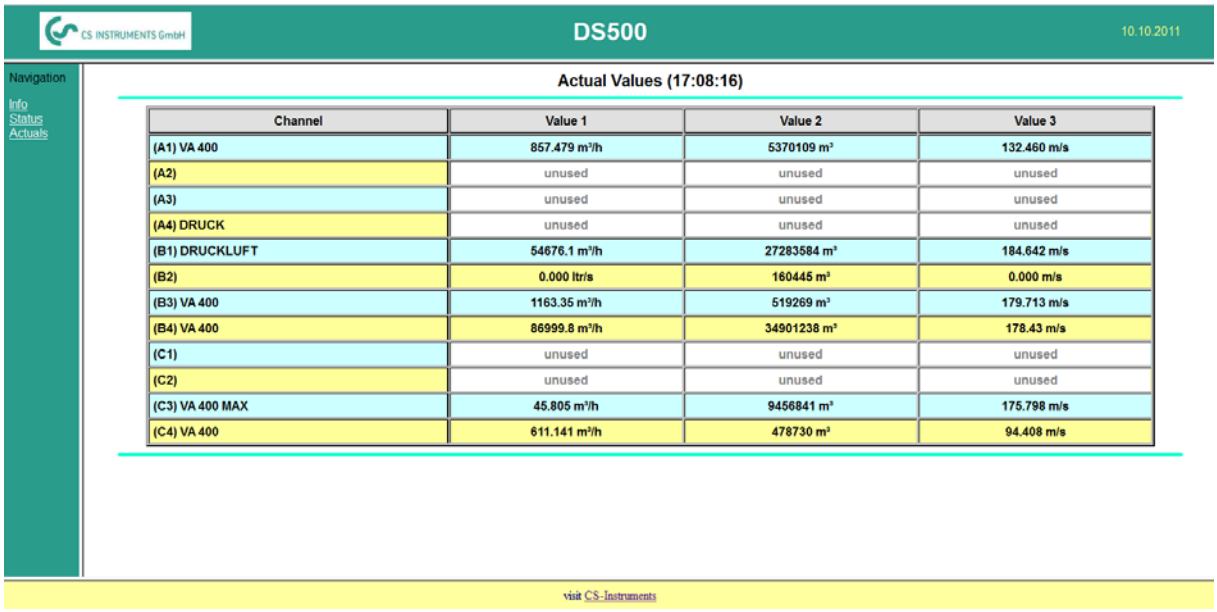
Info:



Status:



Actuals:



Channel	Value 1	Value 2	Value 3
(A1) VA 400	857.479 m³/h	5370109 m³	132.460 m/s
(A2)	unused	unused	unused
(A3)	unused	unused	unused
(A4) DRUCK	unused	unused	unused
(B1) DRUCKLUFT	54676.1 m³/h	27283584 m³	184.642 m/s
(B2)	0.000 ltr/s	160445 m³	0.000 m/s
(B3) VA 400	1163.35 m³/h	519269 m³	179.713 m/s
(B4) VA 400	86999.8 m³/h	34901238 m³	178.43 m/s
(C1)	unused	unused	unused
(C2)	unused	unused	unused
(C3) VA 400 MAX	45.805 m³/h	9456841 m³	175.798 m/s
(C4) VA 400	611.141 m³/h	478730 m³	94.408 m/s

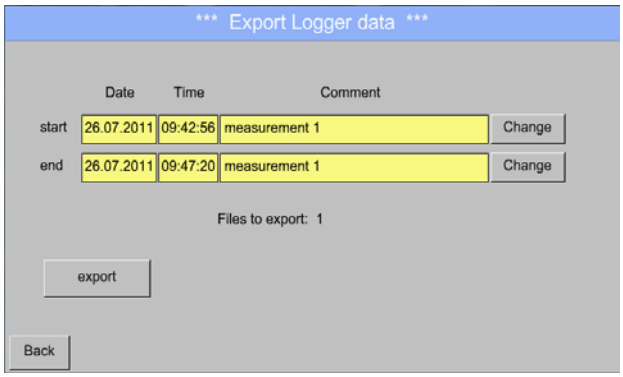
8.9 Export data

Recorded data can be transferred to a USB stick, by using *Export Data*.

Main menu ➔ Export data

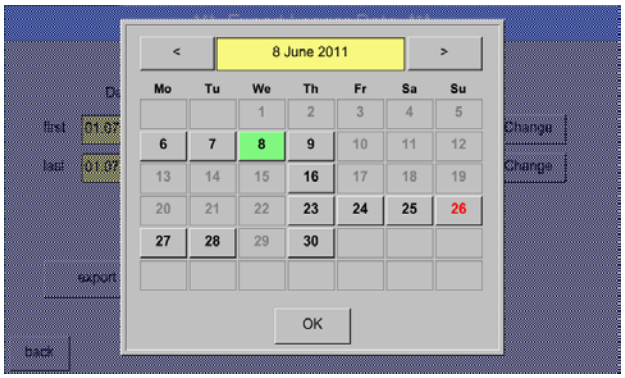
With *Export Logger data*, *Export system settings* and *Export Report* the recorded measurement data and saved settings can be transferred to a USB stick.

Main menu ➔ Export data ➔ Export Logger data



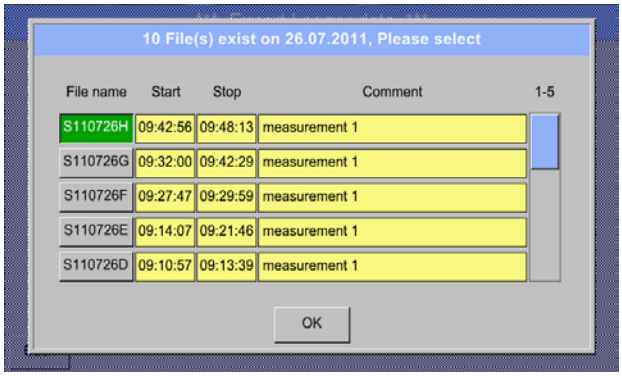
Use the *Change* buttons to adjust a period between *start* and *end*. Stored measurement data in this period are exported.

Main menu ➔ Export data ➔ Export Logger data ➔ Change



The selected date is always green, and the date numbers of the Sundays are red, like in the calendar.

On days, where measurement data were recorded, the date numbers are optical highlighted.



If there have been recorded several measurements on the same date, they appear after the date selection with *OK*.

Now a recording can be selected comfortable.

Main menu ➔ Export data ➔ Export Logger data ➔ export

The measurement data of the selected period are exported to a USB stick.

Main menu ➔ Export data ➔ Export system settings

By using *Export system settings*, all existing sensor settings can be exported to a USB stick.

Main ➔ Export data ➔ Export Report

By using Export Report, all existing **reports** can be exported in CSV-format to a USB stick.

Stand: 2012/03/16, version 1.45