DS 500

Intelligent chart recorder for compressed air and gases

Measurement - control - indication - alarm - recording - evaluation

Advantages at a glance:

- **Clear layout:** 7“ colour screen with touch panel...
- **Versatile:** Up to 12 optional sensors can be connected...
- **Suitable for industrial applications:** Metal housing IP 65 or panel mounting
- **Data available though world wide web:** Network-compatible and remote transmission via webserver
- **Intelligent:** Daily/weekly/monthly reports...
- **Mathematical function** for internal calculations
- **Totalizer function** for analogue signals
- **... Saves time and costs during installation**

DS 500 - the intelligent chart recorder of the next generation

For more than 20 years CS Instruments has been developing, manufacturing and marketing measuring instruments for compressed air and gases.

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

All measured values, measured curves and threshold exceedings are indicated. The curve progressions from the beginning of the measurement can be viewed by an easy slide of the finger.

Daily/weekly/monthly reports with costs in € and counter reading in m³ for each consumption sensor are completing the sophisticated system concept.

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

Mathematical function for internal calculations, e.g. the typical figures of a compressed air plant:

- costs in € per generated m³ air
- kwh/m³ generated air
- consumption of single lines including summation

Totalizer function for analogue signals (e.g. 0/4...20 mA, 0...10 V). In case of third-party sensors which e.g. only give a 4...20 mA signal for the actual flow in m³/h a total counter reading in m³ can be generated by means of the totalizer function.

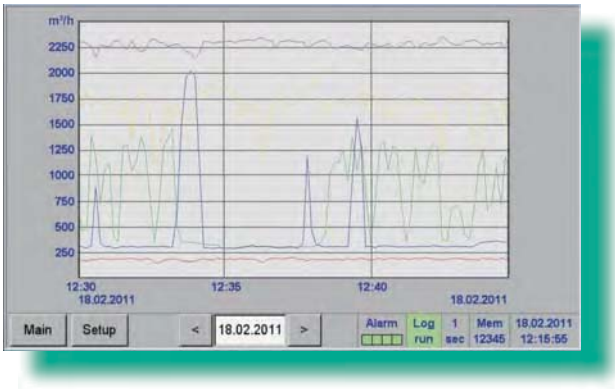
No time consuming studying of the instruction manual**... this saves time.** Internal voltage supply of all sensors, no wiring of external mains units **... this saves additional costs.**

All important information at a glance

Measured values, statistics, curves with the 7” colour screen touch panel

Real time measured values

All measured values can be seen at a glance. Threshold exceeding are indicated in red colour.
A „measuring site name“ can be allocated to each sensor.

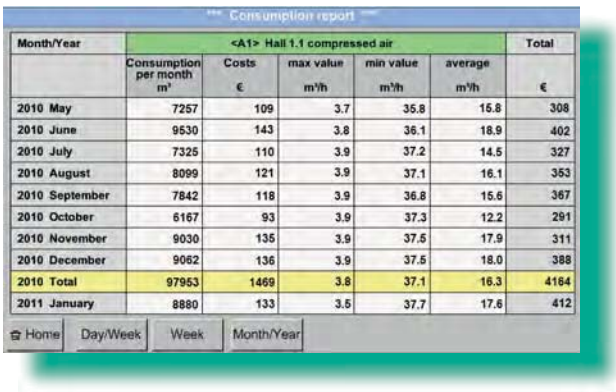


Graphic display

This display replaces the former evaluation of ordinary paper chart recorders and offers lots of advantages. The time axis can be moved by a finger slide. The „zoom function by finger movement“ which enables an analysis of peak values is unique.

Real time measured values and graph

Additionally to the measurement curves the real time value is indicated as well.

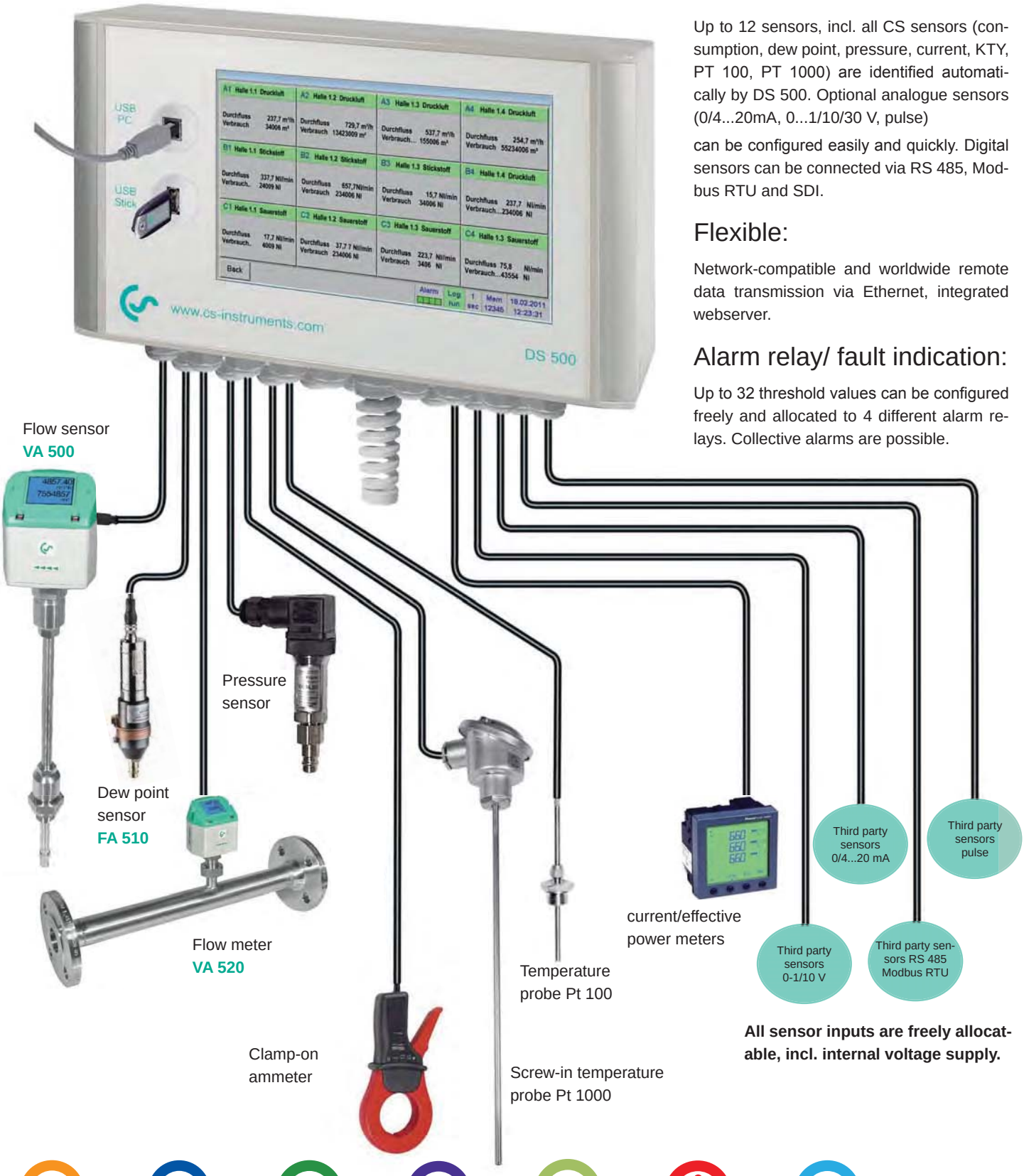


Statistics and reports

Different to ordinary chart recorders the DS 500 offers not only the recording of the measured data but also the evaluation of all flow sensors optionally as daily/weekly/monthly report at the push of a button. It is no longer necessary to read-out the counter and transfer the values manually into a list. The reports can be imported to every PC into Excel® by means of a USB stick and after that they can be printed out without any additional software. This saves time and money and simplifies the evaluation enormously.

DS 500

Intelligent chart recorder for compressed air and gases



Versatile:

Up to 12 sensors, incl. all CS sensors (consumption, dew point, pressure, current, KTY, PT 100, PT 1000) are identified automatically by DS 500. Optional analogue sensors (0/4...20mA, 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 webserver.

Alarm relay/ fault indication:

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

All sensor inputs are freely allocatable, incl. internal voltage supply.

Flow sensors
for compressed air and gases

- Installation and removal under pressure via standard 1/2” ball valve
- A safety ring avoids the uncontrolled ejection in case of installation/removal under pressure
- Usable for different gases: compressed air, nitrogen, argon, CO2, oxygen

Dew point sensors

- Extremely long-term stable
- Quick adaption time
- Large measuring range (-80° to +20° Ctd)
- For all driers: Desiccant driers, membrane driers, refrigeration driers
- Easy installation under pressure via the standard measuring chamber with quick coupling

Pressure sensors

- Large selection of pressure sensors with different measu-ring ranges for each measuring purpose
- Quick installation under ressure by quick coupling
- Pressure sensors 0-10/16/40/100/250/400/600 bar overpressure
- Pressure sensors -1 - +15 bar (under-/overpressure)
- Differential pressure 1.5 mbar up to 4.2 bar
- Absolute pressure 0-1.6 bar (abs:)

Temperature sensors

- Large selection of temperature sensors e.g. for measurement of the ambient temperature or gas temperature
- Pt100 (2-wire or 3-wire)
- Pt1000 (2-wire or 3-wire)
- KTY sensors
- Temperature sensors with measuring transducer (4-20 mA output)

Heat meters-/ water and gas meters

- For direct measurement of the heat volume (in kWh)
- Customary heat meters e.g. at heating systems, heat exchangers, district heating networks and so on can be connected to DS 500 either via pulse signals or 4 -20 mA

Current/effective power meters

- CS PM 210 current/effective po-wer meters for panel mounting with external current transformer for big machines and plants
- External current transformers for clamping around the phases (max. 2000 A)
- Measures KW, kWh, cos phi, kVar, kVA
- Data transfer DS 500 via Modbus

By means of the intelligent chart recorder **DS 500**, all measuring data of a compressor station can be recorded, indicated and evaluated.

At **12 freely assignable sensor inputs** all CS Instruments sensors can be connected as well as any optional third-party sensors and meters **with the following signal outputs:**

4-20 mA, 0-20 mA I 0-1 V / 0-10 V / 0-30 V I Pt 100 (2- or 3-wire), Pt 1000 (2- or 3-wire), KTY I pulse outputs (e.g. of gas meters) frequency output I Modbus protocol

Technical data DS 500

Dimensions of housing:	280 x 170 x 90 mm, IP 65
Connections:	18 x PG 12 for sensors and supply, alarm relays 1 x RJ 45 Ethernet connection
Version panel mounting:	Cutout panel 250 x 156 mm
Weight:	7.3 kg
Material:	Die cast metal, front screen polyester
Sensor inputs:	• 4/8/12 sensor inputs for analogue and digital sensors freely allocatable. See options • Digital CS sensors for dew point and consumption with SDI interface FA/VA series, digital third-party sensors RS 485 / Modbus RTU, other bus systems realizable on request. • Analogue CS Sensors for pressure, temperature, clamp-on ammeters pre-configured. • Analogue third-party sensors 0/4...20 mA, 0...1/10/30V, pulse, Pt 100 / Pt 1000, KTY
Power supply for sensors:	24 VDC, max. 130 mA per sensor, integrated mains unit max. 24 VDC, 25 W. In case of version 8/12 sensor inputs, 2 integrated mains units each max. 24 VDC, 25 W.
Interfaces:	USB stick, USB cable, Ethernet / RS 485 Modbus RTU / TCP, SDI other bus systems on request, WEB server optionally
Outputs:	• 4 relays (changeover contact 230 VAC, 6 A), alarm management, relays freely programmable, collective alarm • Analogue otuput, pulse in case of sensors with own signal output looped, like e.g. VA/FA series
Memory card:	Memory size 4 GB SD memory card standard
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:	Webserver
Optionally:	Quick measurement with 10 ms sampling rate for analogue sensors, Max/Min indication per second
Optionally:	Option „energy and flow report“ statistics, daily/weekly/monthly report

Description	Order No.
DS 500 - intelligent chart recorder in basic version (4 sensor inputs)	0500 5000
Option 4 additional sensor inputs for DS 500	Z500 5001
Option 8 additional sensor inputs for DS 500	Z500 5002
Option Integrated webserver	Z500 5003
Option „energy and flow report“ statistics, daily/weekly/monthly report	Z500 5004
Option „quick measurement with 10 msec sampling rate“ for analogue sensors	Z500 5005
Option version for panel mounting	Z500 5006
Option power supply 24 VDC (instead of 100...240 VAC)	Z500 5007
Option „mathematics calculation function“ for 4 freely selectable „virtual“ channels, (mathematical functions: addition, subtraction, division, multiplication)	Z500 5008
Option „Totalizer function for analogue signals“	Z500 5009
External Gateway Profibus	Z500 3008
CS Soft Basic - data evaluation in graphic and table form, reading out of the measured data via USB or Ethernet	0554 7040
CS Soft Network - Database Client/Server Solution (up to 5 DS 500) - database (MySQL) to Server - data evaluation via Client-Software	0554 7041
CS Soft Network - Database Client/Server Solution (up to 10 DS 500) - database (MySQL) to Server - data evaluation via Client-Software	0554 7042
CS Soft Network - Database Client/Server Solution (up to 20 DS 500) - database (MySQL) to Server - data evaluation via Client-Software	0554 7043
CS Soft Network - Database Client/Server Solution (> 20 DS 500) - database (MySQL) to Server - data evaluation via Client-Software	0554 7044

Input signals

Current signal internal or external power supply	(0...20mA/ 4...20mA)
Measuring range	0...20 mA
Resolution	0.0001 mA
Accuracy	± 0.03 mA ± 0.05 %
Input resistance	50 Ω
Voltage signal	(0...1 V)
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
Resolution	0.5 mV
Accuracy	± 2 mV ± 0.05 %
Input resistance	1 MΩ
RTD Pt 100	
Measuring range	-200...850°C
Resolution	0.1°C
Accurancy	± 0.2°C (-100...400°C) ± 0.3°C (further range)
RTD Pt 1000	
Measuring range	-200...850°C
Resolution	0.1°C
Accuracy	± 0.2° (-100...400°C)
Pulse	min pulse length 100 µs frequency 0...1 kHz
Measuring range	max. 30 VDC

Suitable **probes** from the **CS Instruments** product range

Flow sensors VA 500:	**Order No.**	
VA 500 flow sensor in basic version: Standard (92.7 m/s), sensor length 220 mm, without display	0695 5001	
Option for VA 500:		
Max. version (185 m/s)	Z695 5003	
High Speed version (224 m/s)	Z695 5002	
Sensor length 120 mm	ZSL 0120	
Sensor length 160 mm	ZSL 0160	
Sensor length 300 mm	ZSL 0300	
Flow meters VA 520:		
Flow meter VA 520 with integrated measuring section, (R 1/4“ DN 8)	0695 0520	
Flow meter VA 520 with integrated measuring section, (R 1/2“ DN 15)	0695 0521	
Flow meter VA 520 with integrated measuring section, (R 3/4“ DN 20)	0695 0522	
Flow meter VA 520 with integrated measuring section, (R 1“ DN 25)	0695 0523	
Flow meter VA 520 with integrated measuring section, (R 1 1/4“ DN 32)	0695 0526	
Flow meter VA 520 with integrated measuring section, (R 1 1/2“ DN 40)	0695 0524	
Flow meter VA 520 with integrated measuring section, (R 2“ DN 50)	0695 0525	
Dew point sensors:		
FA 510 dew point sensor, -80...+20 °Ctd incl.inspection certificate	0699 0510	
FA 510 dew point sensor, -20…+50°Ctd, incl.inspection certificate	0699 0512	
Standard measuring chamber for compressed air up to 16 bar	0699 3390	
Connection cables for flow sensors / dew point sensors:		
Connection cable 5 m	0553 0104	
Connection cable 10 m	0553 0105	

Pressure sensors:	**± 1 % accuracy of full scale**	**± 0,5 % accuracy of full scale**
Standard pressure sensor CS 16 from 0…16 bar	0694 1886	0694 3555
Standard pressure sensor CS 40 from 0…40 bar	0694 0356	0694 3930
Standard pressure sensor CS 1.6 from 0...1.6 bar abs.		0694 3550
Standard pressure sensor CS 10 from 0...10 bar	0694 3556	0694 3554
Standard pressure sensor CS 100 from 0…100 bar		0694 3557
Standard pressure sensor CS 250 from 0…250 bar		0694 3558
Standard pressure sensor CS 400 from 0…400 bar		0694 3559
Precision pressure sensor CS -1...+15 bar, ± 0.5 % accuracy of full scale	0694 3553	
Precision differential pressure sensor CS 400, 0...400 mbar differential pressure, 0.075% accuracy of full scale, static pressure max. 40 bar	0694 3560	
Precision differential pressure sensor for further measuring ranges, e.g. 0...75 mbar, 0...2 bar, 0...8 bar, 0...21 bar, 0...70 bar, 0...200 bar, 0...420 bar	on request	

Temperature sensors:		
Bendable temperature probe, Pt100 Class B, length 300 mm, 2 m probe connection cable glass fibre/stainless steel open end wires	0604 0107	
Screw-in temperature probe Pt 100 Class A, length: 300 mm with measuring transducer 4 to 20 mA = -50 to +500 °C (2-wire technology)	0693 0002	
Indoor/outdoor temperature probe, -50...+100°C	0604 0101	
Temperature probe cable Pt 100, Class A, length: 300 mm, Ø 6 mm, -50...+180°C, with 5 m connection cable with open ends	0604 0102	
Temperature probe cable Pt 100, Class A, length: 150 mm, Ø 6 mm, -50...+180°C with 5 m connection cable with open ends	0604 0100	
Clamp screwing 6 mm, G 1/2“, PTFE clamping, pressure-tight up to 6 bar	0554 6003	
Clamp screwing 6 mm, G 1/2“, VA clamping, pressure-tight up to 10 bar	0554 6004	
Connection cables for pressure sensors / temperature sensors:		
Connection cable 5 m	0553 0108	
Connection cable 10 m	0553 0109	
Clamp-on ammeters:		
Clamp-on ammeter 0...1000 A TRMS incl. 5 m connection cable with open ends	0554 0518	
Clamp-on ammeter 0...400 A TRMS incl. 3 m connection cable with open ends	0554 0510	
Optional third-party sensors 0/4...20 mA, 0...1/10/30 V, Pt 100 / Pt 1000, KTY, pulse, RS 485 Modbus connectable.		

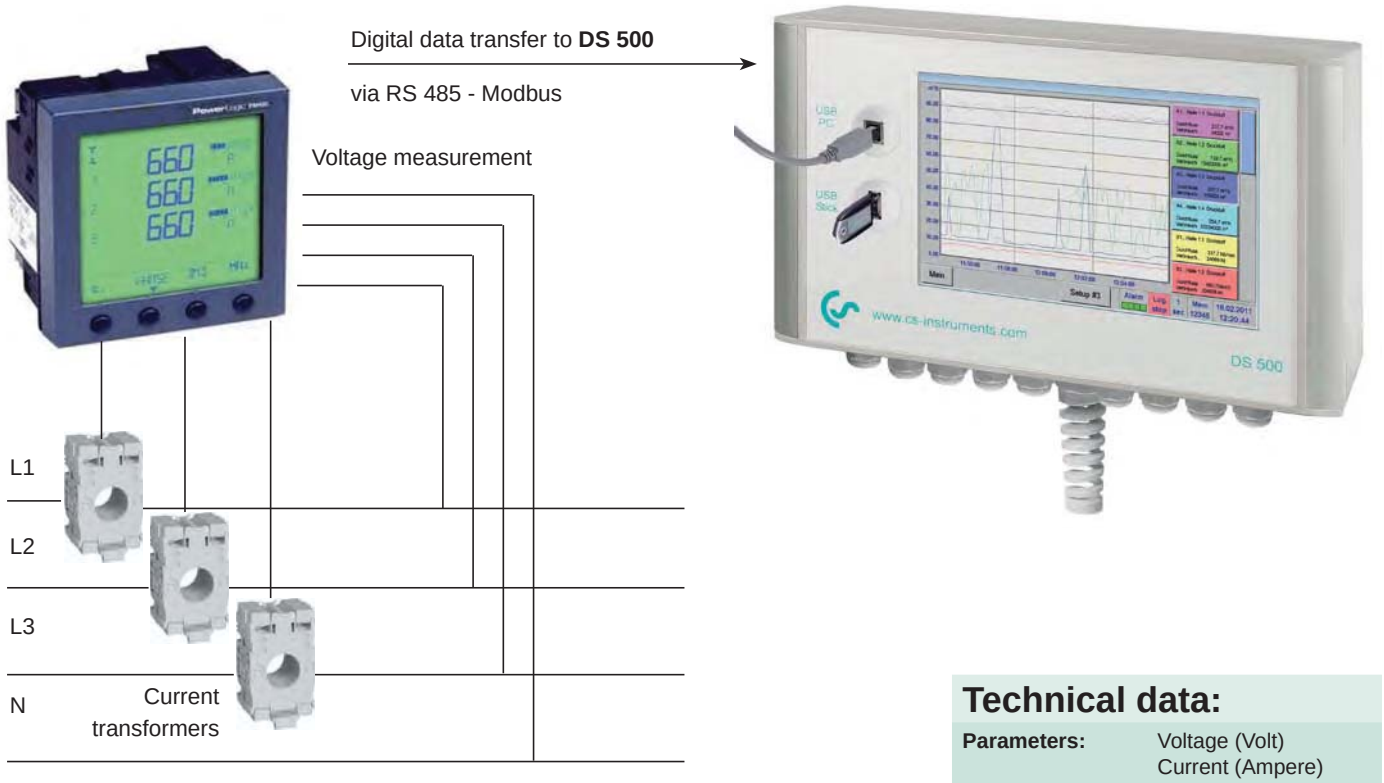
CS PM 210

Current/effective power meter for panel mounting

Measures voltage, current and calculates:

Active power	[kW]
Apparent power	[kVA]
Reactive power	[kVar]
Active energy	[kWh]
cos phi	

All measured data are transferred digitally (Modbus) to DS 500 and can be recorded there.



Description	Order No.
CS PM 210 current/effective power meter for panel mounting, current transformer from 100 A to 2000 A connectable	0554 5353
Current transformer 100/5 A connectable to current/effective power meter for panel mounting (for cabels up to Ø 21 mm)	0554 5344
Current transformer 200/5 A connectable to current/effective power meter for panel mounting (for cabels up to Ø 21 mm)	0554 5345
Current transformer 300/5 A connectable to current/effective power meter for panel mounting (for cabels up to Ø 22 mm)	0554 5346
Current transformer 500/5 A connectable to current/effective power meter for panel mounting (for cabels up to Ø 22 mm)	0554 5347
Current transformer 600/5 A connectable to current/effective power meter for panel mounting (for cabels up to Ø 22 mm)	0554 5348
Current transformer 1000/5 A connectable to current/effective power meter for panel mounting (for current bar up to 65 x 32 mm)	0554 5349
Current transformer 2000/5 A connectable to current/effective power meter for panel mounting (for current bar up to 127 x 38 mm)	0554 5350
Connection cable to DS 500, 5 m, with open ends	0553 0108
Connection cable to DS 500, 10 m, with open ends	0553 0109

Technical data:

Parameters:	Voltage (Volt) Current (Ampere) Cos phi Active power (kW) Apparent power (kVA) Reactive power (kVar) Active energy (kWh) Supply frequency (Hz) All parameters are transferred digitally to DS 500
Accuracy current measurement:	± 0,5% of 1 to 6 A
Accuracy voltage:	± 0,5% of 50 V to 277 V
Accuracy active energy:	IEC 62053-21 Class 1
Interfaces:	RS 485 (Modbus protocol)
Measuring range:	Voltage measurement max. 480 Volt
Dimensions:	96 x 96 x 69 mm (W x H x D)
Operating temperature:	-5...+55°C

Software

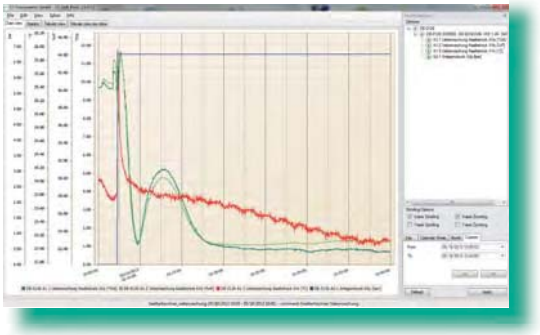
CS Soft Basic - evaluation of measured data for single computers

USB-Stick

Ethernet

The measured data stored in the data logger integrated in DS 500 can be read-out via USB stick.

If DS 500 has the optional Ethernet interface the measured data can also be read-out over big distances via the computer network



Graphic evaluation

All measurement curves are indicated in different colours. All necessary functions like free zoom, selection/deselection of single measured curves, free selection of time periods, scaling of the axis, selection of colours and so on are integrated:
This view can be stored as a pdf file and sent by e-mail. Different data can be merged in one million file.

Table view

All measured points are listed with the exact time interval. The desired measuring channels with the measuring site name can be selected via the diagram explorer.

Statistics

All necessary statistics data are apparant at a glance. So the user can quickly see which minimum or maximum measured values occurred at which time and for how long.

Energy and flow evaluation

The software carries out on energy and flow analysis for all connected flow sensors optionally as daily, weekly or monthly report.

Connection to Bus system

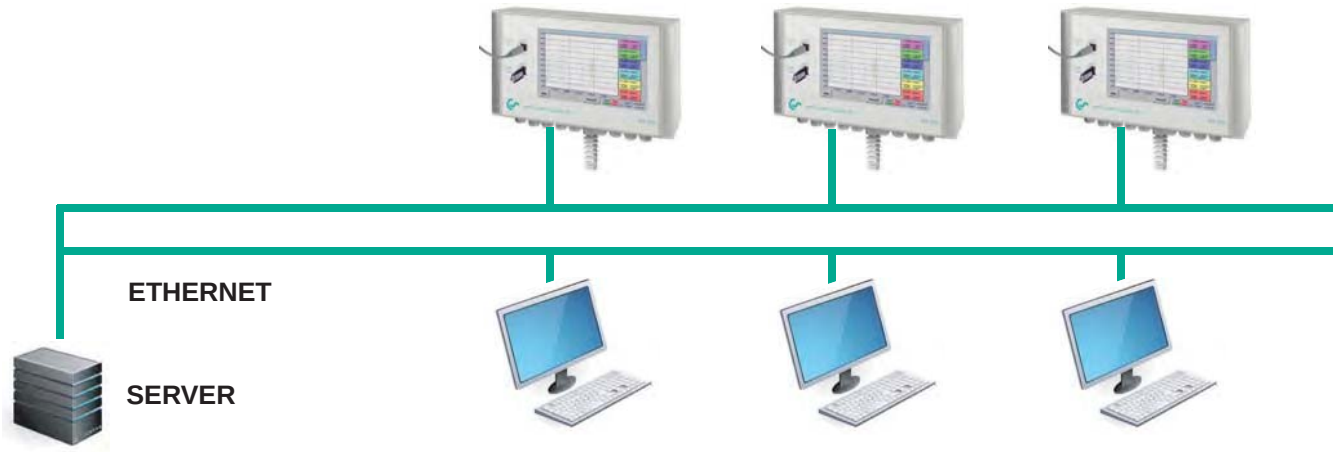
RS 485 network (Modbus RTU)
or Ethernet (Modbus/TCP)

With the „Ethernet / RS 485 - interface“ DS 500 can be connected to customer-owned Bus system (e.g. PLC, building management system BMS, central control system, SCADA,...).

The measured values of all sensors can be retrieved via Modbus protocol. A detailed protocol description is enclosed with each DS 500 instrument. When using the Ethernet interface the IP address at DS 500 can be freely adjusted. As an alternative DS 500 waits for the address allocation by a DHCP server.

CS Soft Network - evaluation of the measured data for several computers in the network

By means of the CS Soft Network an optional number of DS 500/ DS 400 instruments can be evaluated via Ethernet. The software stores the measured data of all DS 500 / DS 400 cyclically (cycle freely selectable) in a SQL database on the server. In case of an exceeding of the stored alarm values the software automatically sends an SMS or an e-mail. Furthermore, different user levels can be defined in the server software so that single staff members only can access the measured data of certain DS 500 / DS 400. The evaluation of the measured data can be carried out by means of the client software from each PC within the company.



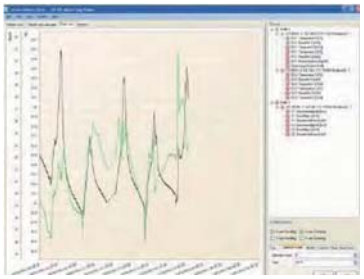
WORLD WIDE WEB

Functions of the CS Soft Network (Server):

- Automatic data storage in My SQL database (cycle freely programmable)
- User administration
- Configuration alarm message, transmission via SMS/e-mail
- Configuration backup generation

Functions of the CS Soft Network (Client):

- Indication of current measured values
- Graphical chart with zoom function
- In table form
- Report generation (standard report with Min-Max values, number of alarm exceedings, moment of alarm exceeding)
- Automatic consumption report



Graphical chart with zoom function

- Selection of the measuring channels to be indicated
- Easy zoom in and zoom out
- Up to 8 y-axis
- Quick access to day, week, month view

View: Current measurement values

- Load background image
- Place/fix window with measurement values
- Red measurement values in case of alarm exceeding

Channel	Unit	Description	Jan	Feb	Mar	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez	Total
CS-COMP (DS500)															
A3 VA 420 SDI	m³	start count	9.560	18.440	26.550	34.502	43.201	50.458	59.988	67.313	75.412	83.254	89.421	98.451	
	m³	end count	18.440	26.550	34.502	43.201	50.458	59.988	67.313	75.412	83.254	89.421	98.451	107.513	
	m³	**total**	**8.880**	**8.110**	**7.952**	**8.699**	**7.257**	**9.530**	**7.325**	**8.099**	**7.842**	**6.167**	**9.030**	**9.062**	**97.953**
	m³/h	average	17,6	16,1	15,8	17,3	15,8	18,9	14,5	16,1	15,6	12,2	17,9	18,0	16,2
	m³/h	min	3,5	3,5	3,7	3,7	3,7	3,8	3,9	3,9	3,9	3,9	3,9	3,9	
	m³/h	max	37,7	38,0	38,5	35,1	35,8	36,1	37,2	37,1	36,8	37,3	37,5	37,5	
	Euro	**costs**	**133**	**122**	**119**	**130**	**109**	**143**	**110**	**121**	**118**	**93**	**135**	**136**	**1.469 €**
	m³	start count	24.750	57.002	87.541	113.245	113.245	138.451	167.865	195.354	219.874	248.798	279.477	312.313	
	m³	end count	57.002	87.541	113.245	113.245	138.451	167.865	195.354	219.874	248.798	279.477	312.313	345.554	

Consumption analysis (in connection with option “consumption report”)

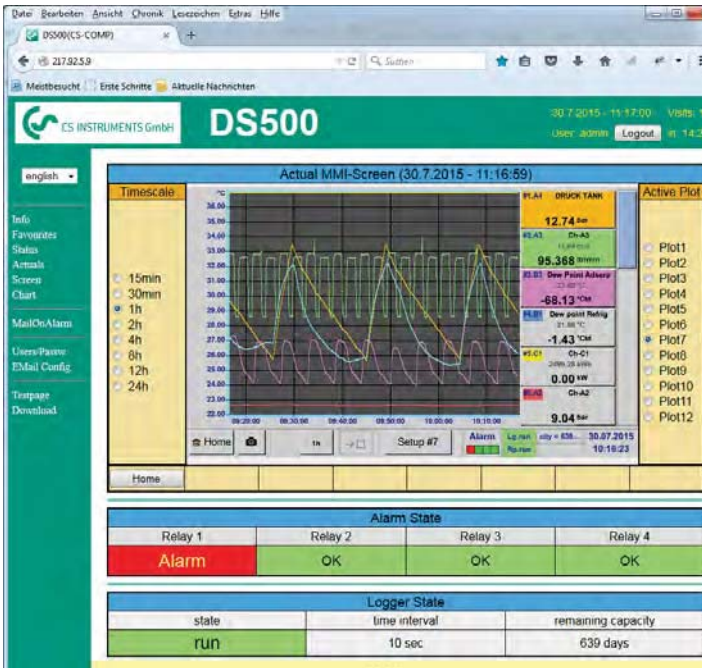
Webserver

The new webserver with extended features for the chart recorders DS 500 and DS 400 is available with immediate effect. Users can get direct access to their measuring values worldwide (current and historic measuring values) and display the measuring values on their smart phone, tablet or computer. For monitoring of threshold values users can receive an automated „alarm E-mail“.

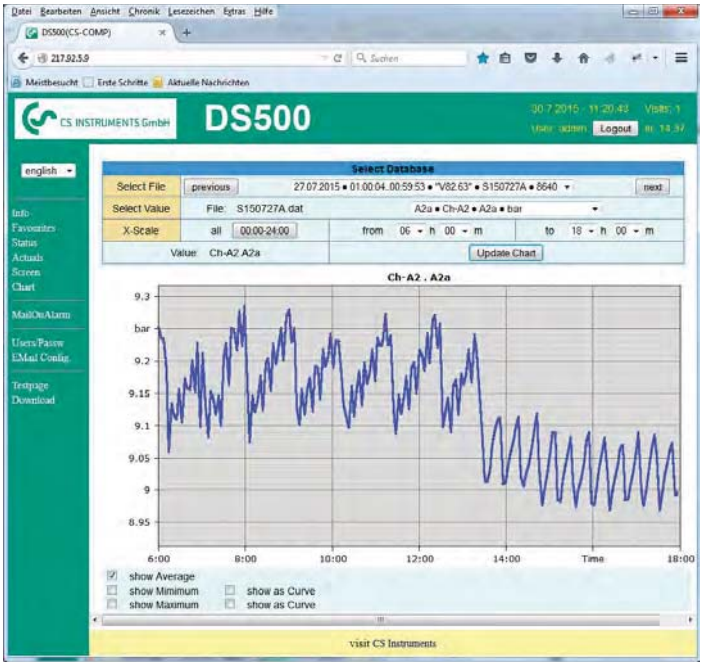
The new webserver can be ordered as an option with each stationary DS 500/400, but also for their mobile counterparts. For using the features of the webservers, the DS 500/400 must be set up with it’s own IP address within the network.

The webserver provides a website, which displays the measuring values. This website can be accessed from any web browser on each smart phone, tablet or computer via it’s unique IP address. This is all possible without the installation of any new or additional software.

View of the real time measuring values (graphic and table view)



View of the historic measuring values as a single chart (time period freely selectable)



Automated „alarm e-mail“ for threshold value exceedance:

Access authorization
Different groups with different users/passwords can be assigned to different access levels.

Starting the data logger
In case of a stopped data logger the group operator or administrator can start the data logger remotely, via the web server.

PS: The new webserver can be retro fitted to any DS 500/ DS 400 already in use.