



DP 500/ DP 510

Portable dew point meters with data logger

The new instruments **DP 500/ DP 510** are the ideal portable service instruments for dew point measurement for all types of driers down to -80°Ctd dew point.

The 3.5" graphic display with touch screen makes the operation very easy.

The graphic indication of colored measuring curves is unique. Ideal for measurement of the current dew point and for

graphic indication of the dew point curve/ the switching behavior of the dryer over a longer period of time.

Up to 100 million measured values can be stored with date and measuring site name. The measured data can be transferred to the computer via USB stick. The data can be evaluated comfortably by means of the software CS Soft Basic.

Measured data and service reports can be issued easily and quickly.

DP 510 additionally disposes of one further freely assignable sensor input.

Apart from the internal dew point measurement one further optional sensor can be connected like for example:

- Pressure sensors
- Flow sensors, VA 500/520
- Temperature sensors Pt 100, 4...20mA
- Further dew point sensors
- Effective power meters
- Optional third-party sensors with the following signals: 0...1/10 V, 0/4...20 mA, Pt 100, Pt 1000, pulse, Modbus

Special features:

- Precise dew point measurement down to -80°Ctd
- Quick response time
- 3.5" graphic display / easy operation via touch screen
- Integrated data logger for storage of the measured values
- USB interface for reading out via USB stick
- Calculates all necessary moisture parameters like g/m^3 , mg/m^3 , ppm V/V, g/kg , $^{\circ}\text{Ctdatm}$
- 2nd freely assignable sensor input for third-party sensors (only DP 510)
- International: Up to 8 languages selectable



2nd freely assignable sensor input for third-party sensors (only DP 510)

Application ranges:

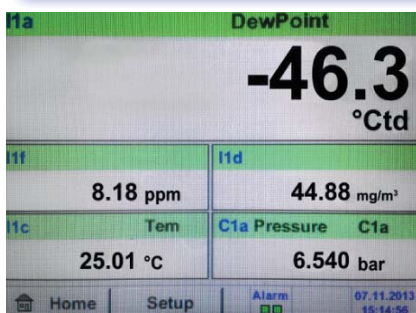
- Compressed air: Examination of refrigeration, membrane, desiccant driers
- Technical gases: Residual moisture measurement in gases like N_2 , O_2 and so on
- Plastics industry: Examination of granulate driers
- Medical compressed air/breathing air



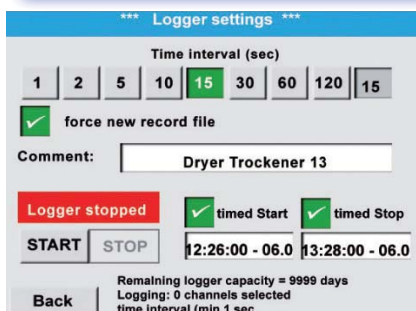
Everything at a glance



Measurement curves are indicated graphically and thus the user can see at a glance the behavior of the dryer since the start of the measurement.



All physical parameters of moisture measurement are calculated automatically. In case of DP 510 the measured values of the third-party sensor are indicated additionally.



It is possible to store up to 100 million measured values.

Each measurement can be stored with a comment, e.g. measuring site name. The time interval can be freely determined.



Quick installation by means of measuring chamber and quick connector



Ideal for service technicians - everything in one case



Dry container - for sensor protection and quick adaptation time

Technical data:

Display:	3.5" touch screen
Measuring range:	-80...+50°Ctd -20...+70°C 0...100 % RH
Accuracy:	± 0,5°Ctd at -10...+50°Ctd typ. ± 2°Ctd remain. range
Moisture-parameters:	g/m³, mg/m³, ppm V/V, g/kg, °Ctdatm, %RH
Pressure range:	-1...50 bar standard -1...350 bar special version
Interface:	USB interface
Data logger:	2 GB SD memory card (100 million values)
Power supply for sensors:	Output voltage: 24 VDC ± 10 % Output current: 120 mA continuous operation
Power supply:	Internal rechargeable Li-Ion batteries, ap- prox 12 h continuous operation, 4 h charg- ing time
Screw-in thread:	G 1/2" stainless steel
Surrounding temperature:	0...+50°C
EMV:	DIN EN 61326

Description	Order No.
Set DP 500 in a case - consisting of:	0600 0500
- Portable dew point meter DP 500 for compressed air and gases	0560 0500
- Mobile measuring chamber up to 16 bar	0699 4490
- Diffusion-tight PTFE hose with quick connector, length 1 m	0554 0003
- Power supply for DP 500/510	0554 0009
- Control and calibration set 11.3 % RH	0554 0002
- Quick-lock coupling	0530 1101
- Dry container for CS dew point sensors	0699 2500
- Transportation case (small) for DP 500	0554 6500
Further options, not included in the set	
CS Soft Basic - data evaluation in graphic and table form- reading out of the measured data of DP 500/510 via USB	0554 7040
Precision calibration at -40°Ctd or 3°Ctd with ISO certificate	0699 3396
Additional calibration point freely selectable in the range between -80...+20°Ctd	0700 7710
High pressure measuring chamber up to 350 bar	0699 3590
Measuring chamber for atmospheric dew point	0699 3690
Measuring chamber for granulate driers with minimum overpressure	0699 3490
Portable dew point meter DP 500 for compressed air and gases (high pressure version up to 350 bar)	0560 0501



DP 500 / DP 510

Flexible data recording and transfer via USB cable or USB stick



WORLD DEBUT

Photo key stores current screen as image file



USB-Stick



The stored measured data can be easily transferred to the computer via a USB stick or via a USB cable.

The time periods are freely selectable or you just read out the whole memory.

The data can be evaluated by means of the software CS Soft Basic in table and in graphic form.

World debut screen-shot key

Ideal for documentation of the measured values/measurement curves on site. Colored measurement curves can be sent by e-mail or integrated into a service report. By means of the screen-shot key the „current screen“ can be stored as an image file and printed out at the computer or edited without any additional software.

In the past mini thermo transfer printers were used frequently. The lifetime of the printout is temporary and it cannot be used in the computer. Therefore the printout was glued onto a paper very often.



DP 510 Portable dew point meter with data logger and third-party sensor

Performing measuring tasks with one instrument

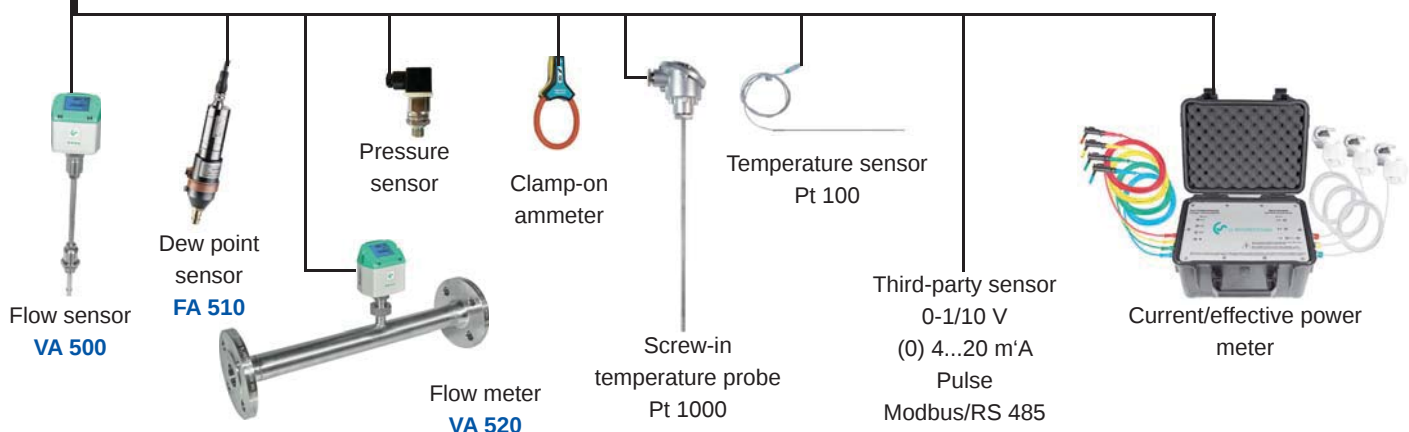
DP 510 disposes of all functions of DP 500 and has an **additional freely assignable sensor input**.

Additionally to the internal dew point measurement one further optional sensor can be connected.

So the user can meet nearly all industrial measuring tasks like for example:

- [Separate pressure measurement](#)
- [Dew point distance via external temperature sensor](#)
- [Compressed air consumption measurement](#)
- [Active power in kWh/kW](#)

Description	Order No.
Set DP 510 in a case - consisting of:	0600 0510
- Portable dew point meter DP 510 with one additional sensor input	0560 0510
- Mobile measuring chamber up to 16 bar	0699 4490
- Diffusion-tight PTFE hose with quick connector, length 1 m	0554 0003
- Power supply for DP 500/510	0554 0009
- Control and calibration set 11.3 % RH	0554 0002
- Quick-lock coupling	0530 1101
- Dry container for CS dew point sensors	0699 2500
- Transportation case (big) for DP 510 as well as further sensors	0554 6510
Further options, not included in the set	
Option „Mathematics calculation function“ for 4 freely selectable channels, (virtual channels): addition, subtraction, division, multiplication	Z500 5107
Option „Totalizer function for analogue signals“	Z500 5106
CS Soft Basic - data evaluation in graphic and table form - reading out of the measured data via USB stick	0554 7040
Precision calibration at -40°Ctd or 3°Ctd with ISO certificate	0699 3396
Additional calibration point freely selectable in the range between -80...+20°Ctd	0700 7710
High pressure measuring chamber up to 350 bar	0699 3590
Measuring chamber for atmospheric dew point	0699 3690
Measuring chamber for granulate driers with minimum overpressure	0699 3490
Portable dew point meter DP 510 for compressed air and gases (high pressure version up to 350 bar)	0560 0512





Suitable sensors for DP 510

Flow sensors VA 500:	Order No.
Flow sensor VA 500 Max. Version (185 m/s) sensor length 220 mm, incl. 5 m cable to mobile instruments	0695 1124
Flow sensor VA 500 High-Speed Version (224 m/s), sensor length 220 mm, 5 m cable to mobile instruments	0695 1125
Options for VA 500: (see page 81)	
Flow measuring range VA 520 for compressed air: (ISO 1217: 1000 mbar, 20°C)	
Flow meter VA 520, 0,8... 90 l/min, (R 1/4" DN 8)	0695 0520
Flow meter VA 520, 0,2... 90 m³/h, (R 1/2" DN 15)	0695 0521
Flow meter VA 520, 0,3... 170 m³/h, (R 3/4" DN 20)	0695 0522
Flow meter VA 520, 0,5... 290 m³/h, (R 1" DN 25)	0695 0523
Flow meter VA 520, 0,7... 480 m³/h, (R 1 1/4" DN 32)	0695 0526
Flow meter VA 520, 1,0... 550 m³/h, (R 1 1/2" DN 40)	0695 0524
Flow meter VA 520, 2,0... 900 m³/h, (R 2" DN 50)	0695 0525
Dew point sensors:	
FA 510 dew point sensor for mobile instruments, -80...+20°Ctd, incl. mobile measuring chamber, 5 m cable and perforated cap	0699 1510
FA 510 dew point sensor for mobile instruments, -20...+50°Ctd, incl. mobile measuring chamber, 5 m cable and perforated cap	0699 1512
Connection cable for VA/FA sensors:	
Connection cable for VA/FA series on mobile instruments, ODU / M12, 5m	0553 1503
Extension cable for mobile instruments ODU/ODU, 10m	0553 0504
Pressure sensors: (further pressure sensors, please see on page 24)	
Standard pressure sensor CS 16 from 0...16 bar, ± 1 % accuracy of full scale	0694 1886
Standard pressure sensor CS 40 from 0...40 bar, ± 1 % accuracy of full scale	0694 0356
Temperature sensors:	
Bendable temperature probe PT 100 (2-wire) class A, length: 300 mm, d=3 mm, -70°C to +500°C, connection cable PFA, 2 m with ODU-plug (8 pole) to mobile instruments	0604 0200
Screw-in temperature probe PT 100 class A, length: 300 mm, d=6mm, with integrated transducer 4...20 mA = -50°C...+500°C (2-wire)	0604 0201
Cross-band surface temperature probe, thermocouple Type K, with integrated transducer 4...20 mA = 0°C...+180°C, 2 m connection cable (PVC) with ODU-plug (8-pole) to mobile instruments	0604 0202
Temperature probe PT 100 class A (4-wire) with cable, length: 300 mm, d=6 mm, -70°C to +260°C, 5 m connection cable (PFA) with open ends	0604 0205
Temperature probe PT 100 class A (4-wire) with cable, length: 100 mm, d=6 -70°C to +260°C, 5 m connection cable (PFA) with open ends	0604 0206
Temperature probe PT 100 class A (4-wire) with cable, length: 200 mm, d=6 -70°C to +260°C, 5 m connection cable (PFA) with open ends	0604 0207
Surface temperature probe, magnetic, magnet dimensions 39x26x25 mm, PT 100 class B (2-wire), -30 to +180°C, 5 m connection cable (PFA) with open ends	0604 0208
Clamp screwing 6mm; G 1/2" PTFE clamp ring pressure tight up 10 bar material: stainless steel, temperature range: max. +260°C	0554 0200
Clamp screwing 6mm; G 1/2" stainless steel clamp ring pressure tight up to 16 bar, material: stainless steel, temperature range: max. +260°C	0554 0201
Temperature calibration certificate 2 measuring points	0520 0180
Connection cables for pressure sensors / temperature sensors:	
Connection cable for pressure, temperature or external sensors on mobile instruments, 5 m	0553 0501
Connection cable for pressure, temperature or external sensors on mobile instruments, 10 m	0553 0502
Mounted Odu plug for connection on mobile instruments	Z604 0104
Clamp-on ammeters:	
Clamp-on ammeter 0...400 A TRMS incl. 5 m connection cable	0554 0511
Clamp-on ammeter 0...1000 A TRMS incl. 5 m connection cable	0554 0519
Calibration certificate for clamp-on ammeter	0554 3333
Current/effective power meter up to 100 A	0554 5341
Current/effective power meter up to 600 A	0554 5342
- Mobile current/effective power meter with 3 external current transducers for big machines and plants, - External current transformers for clamping on cables (100 or 600 A), - External magnetic measuring tips for measuring the voltage, -Measures kW, kWh, cos phi, kVar, KVA, - Data transfer for DP 510 via Modbus, - incl. connection cable for mobile current/effective power meter to DP 510, 5 m	





DP 400 mobile with integrated dew point and pressure measurement

For measurement of all humidity parameters under pressure up to 16 bar.

The portable dew point meter with integrated, rechargeable battery has been developed especially for the field use. Besides a highly precise dew point sensor the device also contains a precise pressure sensor up to 16 bar. So in addition to the dew point in °Ctd, the temperature in °C and the line pressure in bar also further moisture parameters (% RH, mg/m³, g/m³) as well as pressure-dependent measuring values (g/kg, ppm v/v, atm, dew point °C) can be calculated.



Sensor protected during transport or storage.



6 mm plug connection for measuring gas / compressed air feed

Option:
2 further sensor inputs (for flow, pressure, dew point, 4...20 mA, Modbus RTU...)



Special features:

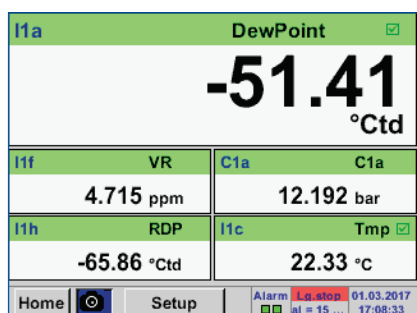
- Precise dew point measurement down to -80°Ctd
- Robust case for field use
- Integrated pressure measurement up to 16 bar
- Integrated measuring chamber with integrated dry container protects the dew point sensor during transport and grants a quick adaptation time
- Long-time stable humidity sensor: precise, insensitive against dewing, quick adaptation time
- Optionally available: 2 further sensor inputs for external sensors
- Optionally available: Integrated data logger

Technical data:

Display:	3.5" Touch screen
Measuring range:	-80...+50°Ctd -20...+70°C 0...100 % RH 0...16 bar ± 0.5 %
Accuracy:	± 1°C at 20...-20°Ctd ± 2°C at -20...-50°Ctd ± 3°C at -50...-80°Ctd
Humidity parameters:	g/m ³ , mg/m ³ , ppm V/V, g/kg, °Ctdatm, % RH
Interface:	USB interface
Option Data logger:	4 GB SD memory card (100 million values)
Voltage supply for external sensors:	Output voltage: 24 VDC ± 10% Output current: 120 mA in long-term use
Current supply:	Internally loadable Li-Ion batteries approx. 12 h continuous operation, 4 h charging time
Connection:	6 mm plug connections
Ambient temperature:	0...+50°C
EMV:	DIN EN 61326

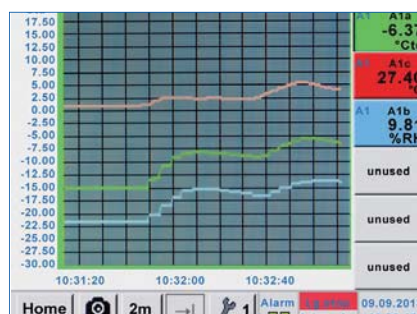


Easy operation via touch screen



Actual measured values

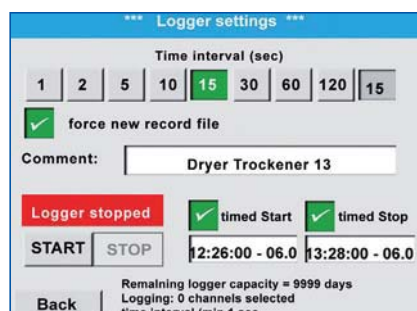
All measured values are visible at a glance. Exceedance of limit value is indicated in red. Due to the integrated pressure sensor DP 400 mobile is able to calculate the atmospheric dew point.



Graphic view

In the graphic view all measured values are indicated as curves.

It is possible to browse back on the time axis by a slide of the finger (without data logger maximum 24 h, with data logger back to the start of the measurement).



Data logger

Measured values are stored in DP 400 by means of the option „integrated data logger“.

The time interval can be freely set. Furthermore there is the possibility to fix the starting time and the end time of the data recording.

Read-out of the measured data via USB interface or via the optional Ethernet interface.

Description	Order No.
DP 400 mobile - Portable dew point meter with integrated pressure measurement, incl. transportation bag for teflon hose and power supply	0500 4505
Option: Integrated data logger for 100 million measured values	Z500 4002
Option: Integrated Ethernet and RS 485 interface	Z500 4004
Option: Integrated webserver	Z500 4005
Option: „Mathematics calculation function“ for 4 freely selectable channels, (virtual channels): addition, subtraction, division, multiplication	Z500 4007
Option: 2 additional sensor inputs for external sensors (1 x digital sensor Modbus, 1 x analogue sensor)	Z500 4001
CS Soft Basic - data evaluation in graphic and table form - reading out of the measured data via USB stick (Software please see on page 54)	0554 7040
Connection cable for VA/FA series on mobile instruments, ODU / M12, 5m	0553 1503
Connection cable for pressure, temperature or external sensors on mobile instruments, 5 m	0553 0501
Connection cable for pressure, temperature or external sensors on mobile instruments, 10 m	0553 0502
Extension cable for mobile instruments ODU/ODU, 10m	0553 0504



FA 510 / FA 515

New dew point sensors with sophisticated service concept

In addition to the previously common 4...20 mA analogue output the new generation of dew point sensors have a digital RS 485 interface (Modbus-RTU). All values like e. g. dew point, temperature, absolute humidity ... which are measured and calculated by the dew point sensor can be retrieved via the Modbus protocol.

Compared with the previous models the sensor technology and evaluation electronics have been improved once again, especially the integrated temperature compensation. This means: Increased accuracy at different ambient temperatures and an improved resolution of the sensor signal. Like the previous models the new dew point sensors have an excellent long-term stability and show reliable measured values. The sensor element is insensitive against condensation and due to the serial sintered cap made of stainless steel it is protected against direct contact with soiled particles.

The service concept:

One-point-calibration on site

FA 510/515 can be calibrated on site, i. e. during the measuring process, by means of the hand-held instrument DP 510 (reference instrument).



Sensor diagnosis on site

A sensor diagnosis can be carried out on site, i. e. during the measuring process, via the digital RS 485 interface (Modbus-RTU). The measured data can be read out either by means of the portable instruments DP 510, PI 500, DS 400 mobile, DS 500 mobile or by means of a laptop with CS Service Software. The status of the residual humidity sensor element is read-out as well as the status of the temperature sensor element and the date of the last calibration.



Changing the sensor settings on site

In addition to the sensor diagnosis also the following sensor settings can be done on site by means of a laptop or portable instrument:

- Scaling of the 4...20 mA analogue output
- Allocation of the parameter to the analogue output (e. g. 4...20 mA = 0...10 g/m³)



CS Service Software

The dew point sensors FA 510/ FA 515/ FA 500 can be configured by means of the CS Service Software incl. USB - Modbus interface adapter via the laptop/computer. The following settings can be done by means of the CS Service Software:

- Scaling of the 4...20 mA analogue output
- Allocation of the parameter to the analogue output (z.B. 4...20 mA = 0...10 g/m³)
- Selectable units/parameters: °Ctd, °Ftd, g/m³, mg/m³, ppm_{v/v}, g/kg
- Reading out of the firmware version, serial no., date of last calibration
- One-point-calibration (adjustment) of the sensors during the measuring process. For this purpose a reference instrument is required.
- Update of the software inside the sensor (firmware)
- Setting of the Modbus settings like Modbus-ID, baud rate, stop bit, parity



FA5xx Configuration

Connect ☐ PowerOnReset

Connection Status: disconnected

Connected Device

Type:		Dew Point:	0,00 °Ctd
Serial-Number:		Temperature:	20,00 °C
Software-Version:		Rel. Humidity:	0,0000 % rH
Hardware-Version:			
Calibration Date:	01.01.1970		

Unit for Temperature: ☒ °C ☐ °F

Settings

XML File:

Sensor Settings | **Interface Settings** | Actual Values | Raw Values | Production Settings

Modbus Settings

Enable: ☒

ID: Baud: Stop: Par:

Analog 4-20mA Settings

4-20mA Value:

Scaling 4mA:

Scaling 20mA:

Error Behaviour: ☒ Stay at limits (Upper Limit = 22mA, Lower Limit = 3,8mA)
☐ Error = 22mA
☐ Error = 2mA



Dew point sensor FA 510/515 from -80 to 20° Ctd

FA 510/515 - the new generation of dew point sensors for residual moisture measurement in compressed air and gases

Typical applications:

- Dew point measurement in the compressed air after desiccant driers/membrane driers
- Residual moisture/ dew point measurement in gases like oxygen, nitrogen, argon ...
- Residual moisture/ dew point measurement after granulate driers in plastics industry



Recommendation:

Mounting with standard measuring chamber for compressed air up to 16 bar

Advantage: Easy installation via quick coupling



Special features:

- Measuring range -80...20°Ctd
- Extremely long-term stable
- Analogue output 4...20 mA
- Condensation insensitive
- Quick response time
- Pressure-tight up to 350 bar (special version)
- **NEW:** Modbus-RTU interface
- **NEW:** Higher resolution of the sensor signal due to improved evaluation electronics
- **NEW:** Sensor diagnosis on site by means of hand-held instrument or CS Service Software

Technical data

FA 510/515

Measuring range:	-80...20°Ctd
Accuracy:	± 1°C at 20...-20°Ctd ± 2°C at -20...-50°Ctd ± 3°C at -50...-80°Ctd
Pressure range:	-1...50 bar special version up to 350 bar
Power supply:	24 VDC (16...30 VDC)
Protection class:	IP 65
EMV:	according to DIN EN 61326
Operating temp.:	-20...70 °C
Connection:	M12, 5-pole
PC connection:	Modbus-RTU interface (RS 485)
Analogue output:	4...20 mA = -80...20°Ctd FA 510: 4...20 mA (3-wire) FA 515: 4...20 mA (2-wire)
Burden for analogue output:	< 500 Ω
Screw-in thread:	G 1/2" optional: UNF 5/8" NPT 1/2"
Dimensions:	Ø 30 mm, length approx. 130 mm
Via service software:	
Choose units:	% RH, °Ctd, g/m³, mg/m³, ppm V/V
Scaling:	change 4...20 mA

Description	Order No.
FA 510 dew point sensor for desiccant driers -80...20°Ctd incl. inspection certificate, 4...20 mA output signal (3-wire connection) and Modbus-RTU interface	0699 0510
FA 515 dew point sensor for desiccant driers -80...20°Ctd incl. inspection certificate, 4...20 mA output signal (2-wire connection) or Modbus-RTU interface	0699 0515
Connection cables:	
Connection cable for VA/FA sensors, 5 m	0553 0104
Connection cable for VA/FA sensors, 10 m	0553 0105
Options for FA 510:	
Option analogue output FA510, Special version 2...10 Volt	Z699 0510
Options for FA 510/515:	
Option max. pressure FA5xx 350 bar	Z699 0515
Option max. pressure FA5xx 500 bar	Z699 0516
Option special scaling FA5xx 4...20 mA= ___ ... ___ g/m³, ppm etc.	Z699 0514
Option connection thread FA5xx, 5/8" UNF	Z699 0511
Option connection thread FA5xx, 1/2" NPT	Z699 0512
Option surface condition FA5xx, free of oil & grease	Z699 0517
Additional accessories:	
Standard measuring chamber up to 16 bar	0699 3390
High pressure measuring chamber up to 350 bar	0699 3590
Measuring chamber, stainless steel 1.4305	0699 3290
CS Service Software for dew point sensors incl. PC connection set (Modbus to USB Interface)	0554 2007
Mains unit in wall housing for maximum 2 sensors of the series VA/FA 5xx, 100-240 V, 23 VA, 50-60 Hz / 24 VDC, 0.35 A	0554 0110
Transformer 100-240 V AC/24 V DC , 0,35 A on top-hat rail	0699 3340
Calibration and adjustment:	
Precision calibration at -40°Ctd or 3° Ctd including ISO certificate	0699 3396
Precision calibration in the range of -80 to 20° Ctd, one additional point, freely selectable	0700 7710



Dew point monitoring DS 52 for desiccant driers

Consisting of:

- Digital process meter DS 52 (0500 0009)



- Standard measuring chamber



- Option alarm
unit (buzzer and
continuous red
light)
(Z500 0003)

- Dew point sensor FA 510 (0699 0510)

The measuring range of -80...20°Ctd makes the dew point set DS 52 with alarm the ideal dew point monitor with analogue output 4...20 mA.

The dew point sensor FA 510 is extremely long-term stable and can be installed and removed quickly and easily under pressure by means of the screw able measuring chamber including quick coupling. The dew point set is supplied ready for plug-in, i.e. everything is completely wired. The alarm values can be freely adjusted.

Special features:

- System ready for plug-in: Everything completely wired
- No time-consuming studying of the instruction manual
- 2 alarm contacts (230 VAC, 3 A) pre- and main alarm freely adjustable
- 4...20 mA analogue output
- Option alarm unit: Buzzer and continuous red light

Technical data display DS 52:

Dimensions:	118 x 92 x 93 mm
Display:	LED red, 7 segments, height: 13 mm, 5 digits, 2 LED for alarm relay
Keypad:	4 keys
Input:	4...20 mA
Power supply:	230 VAC, 50/60 Hz; Option: 24 VDC or 110 VAC 50/60 Hz
Alarm outputs:	2 x relay output, changeover contact, 250 VAC, max. 3 A
Operating temperature:	-10...+60 °C (storage temp. -20°C...+80°C)
Alarm thresholds:	freely adjustable
Hysteresis:	2 °Ctd
Analogue output:	4...20 mA = -80...20 °Ctd

Technical data dew point sensor FA 510

Measuring range:	-80...20°Ctd
Accuracy:	± 1°C bei 20...-20°Ctd ± 2°C bei -20...-50°Ctd ± 3°C bei -50...-80°Ctd
Pressure range:	-1...50 bar special version up to 350 bar
Protection class:	IP 65
EMV:	according DIN EN 61326
Operating temp.:	-20...70 °C
Connection:	M12, 5-pole
PC connection:	Modbus-RTU interface (RS 485)
Burden for analogue output:	< 500 Ω
Screw-in thread:	G 1/2"

Description	Order No.
Dew point monitoring DS 52 for desiccant driers consisting of:	0600 5100
DS 52 LED display in wall housing	0500 0009
FA 510 dew point sensor for desiccant driers -80...20°Ctd incl. inspection certificate, 4...20 mA output signal (3-wire connection) and Modbus-RTU interface	0699 0510
Standard measuring chamber up to 16 bar	0699 3390
Connection cable for VA/FA sensors, 5 m	0553 0104
Options:	
Power supply 24 VDC (instead of 230 VAC)	Z500 0001
Power supply 110 VAC (instead of 230 VAC)	Z500 0002
Alarm unit mounted at wall housing	Z500 0003
Alarm unit for external mounting with 5 m cable	Z500 0004
Additional accessories:	
Precision calibration at -40°Ctd including ISO certificate	0699 3396
Precision calibration in the range of -80 to 20° Ctd, one additional point, freely selectable	0700 7710



Dew point sensor FA 510/515 from -20 to 50°Ctd

The dew point sensor FA 510/515 for the typical use in refrigeration driers

The ideal dew point sensor for the monitoring of refrigeration driers with analogue output 4...20 mA

Special features:

- Analogue output 4...20 mA
- Precise, long-term stability
- Quick response time
- Measuring range -20...50°Ctd
- **NEW:** Modbus-RTU interface
- Sensor diagnosis on site by means of hand-held instrument or CS Service Software



Recommendation:



Mounting with standard measuring chamber for compressed air up to 16 bar

Advantage: Easy installation via quick coupling

Description	Order No.
FA 510 dew point sensor for refrigeration driers -20...50°Ctd incl. inspection certificate, 4...20 mA output signal (3-wire connection), and Modbus-RTU interface	0699 0512
FA 515 dew point sensor for refrigeration driers -20...50°Ctd incl. inspection certificate, 4...20 mA output signal (2-wire connection), or Modbus-RTU interface	0699 0517
Connection cables:	
Connection cable for VA/FA sensors, 5 m	0553 0104
Connection cable for VA/FA sensors, 10 m	0553 0105
Options for FA 510:	
Option analogue output FA510, Special version 2...20 Volt	Z699 0510
Options for FA 510/515:	
Option max. pressure FA5xx 350 bar	Z699 0515
Option max. pressure FA5xx 500 bar	Z699 0516
Option special scaling FA5xx 4...20 mA= ___ ... ___ g/m ³ , ppm etc.	Z699 0514
Option connection thread FA5xx, 5/8" UNF	Z699 0511
Option connection thread FA5xx, 1/2" NPT	Z699 0512
Option surface condition FA5xx, free of oil & grease	Z699 0517
Additional accessories:	
Standard measuring chamber up to 16 bar	0699 3390
High pressure measuring chamber up to 350 bar	0699 3590
Measuring chamber, stainless steel 1.4305	0699 3290
CS Service Software for FA/VA sensors incl. PC connection set, USB connection and interface adapter to the sensor	0554 2007
Mains unit in wall housing for maximum 2 sensors of the series VA/FA 5xx, 100-240 V, 23 VA, 50-60 Hz / 24 VDC, 0.35 A	0554 0110
Transformer 100-240 V AC/24 V DC , 0,35 A on top-hat rail	0699 3340
Calibration and adjustment:	
Precision calibration at 3° Ctd including ISO certificate	0699 3396
Precision calibration in the range of -20 to 50° Ctd, one additional point, freely selectable	0700 7710

Technical data

FA 510/515

Measuring range:	-20...50°Ctd resp. 0...100% rF
Accuracy:	± 1°C at 0...20°Ctd ± 2°C remaining range
Pressure range:	-1...50 bar special version up to 350 bar
Power supply:	24 VDC (10...30 VDC)
Protection class:	IP 65
EMV:	according to DIN EN 61326
Operating temp.:	-20...70 °C
Connection:	M12, 5-pole
PC connection:	Modbus-RTU interface (RS 485)
Analogue output:	FA 510: 4...20 mA (3-wire) FA 515: 4...20 mA (2-wire)
Burden for analogue output:	< 500 Ω
Screw-in thread:	G 1/2" optional: UNF 5/8" NPT 1/2"
Dimensions:	Ø 30 mm, length approx. 130 mm
Via service software:	Choose units: % RH, °Ctd, g/m ³ , mg/m ³ , ppm V/V
Scaling:	change 4...20 mA



Dew point monitoring DS 52 for refrigeration driers

Consisting of:

- Digital process meter DS 52 (0500 0009)



- Standard measuring chamber



- Option alarm unit (buzzer and continuous red light) (Z500 0003)

- Dew point sensor FA 510 (0699 0512)

The measuring range of -20...50°Ctd makes the dew point set DS 52 with alarm the ideal dew point monitor with analogue output 4...20 mA.

The dew point sensor FA 510 is extremely long-term stable and can be installed and removed quickly and easily under pressure by means of the screwable measuring chamber including quick coupling. The dew point set is supplied ready for plug-in, i.e. everything is completely wired. The alarm values can be freely adjusted.

Special features:

- System ready for plug-in: Everything completely wired
- No time-consuming studying of the instruction manual
- 2 alarm contacts (230 VAC, 3 A) pre- and main alarm freely adjustable
- 4...20 mA analogue output
- Option alarm unit: Buzzer and continuous red light

Technical data display DS 52:

Dimensions:	118 x 92 x 93 mm
Display:	LED red, 7 segments, height: 13 mm, 5 digits, 2 LED for alarm relay
Keypad:	4 keys
Input:	4...20 mA
Power supply:	230 VAC, 50/60 Hz; Option: 24 VDC or 110 VAC 50/60 Hz
Alarm outputs:	2 x relay output, changeover contact, 250 VAC, max. 3 A
Operating temperature:	-10...+60 °C (storage temp. -20°C...+80°C)
Alarm thresholds:	freely adjustable
Hysteresis:	2 °Ctd
Analogue output:	4...20 mA = -20...50 °Ctd

Technical data dew point sensor FA 510

Measuring range:	-20...50°Ctd
Accuracy:	± 1°C at 0...20°Ctd ± 2°C remaining range
Pressure range:	-1...50 bar special version up to 350 bar
Protection class:	IP 65
EMV:	according DIN EN 61326
Operating temp.:	-20...70 °C
Connection:	M12, 5-pole
PC connection:	Modbus-RTU interface (RS 485)
Burden for analogue output:	< 500 Ω
Screw-in thread:	G 1/2"

Description	Order No.
Dew point monitoring DS 52 for refrigeration driers consisting of:	0600 5120
DS 52 LED display in wall housing	0500 0009
FA 510 dew point sensor for refrigeration driers -20...50°Ctd incl. inspection certificate, 4...20 mA output signal (3-wire connection), and Modbus-RTU interface	0699 0512
Standard measuring chamber up to 16 bar	0699 3390
Connection cable for VA/FA sensors, 5 m	0553 0104
Options:	
Power supply 24 VDC (instead of 230 VAC)	Z500 0001
Power supply 110 VAC (instead of 230 VAC)	Z500 0002
Alarm unit mounted at wall housing	Z500 0003
Alarm unit for external mounting with 5 m cable	Z500 0004
Additional accessories:	
Precision calibration at 3° Ctd including ISO certificate	0699 3396

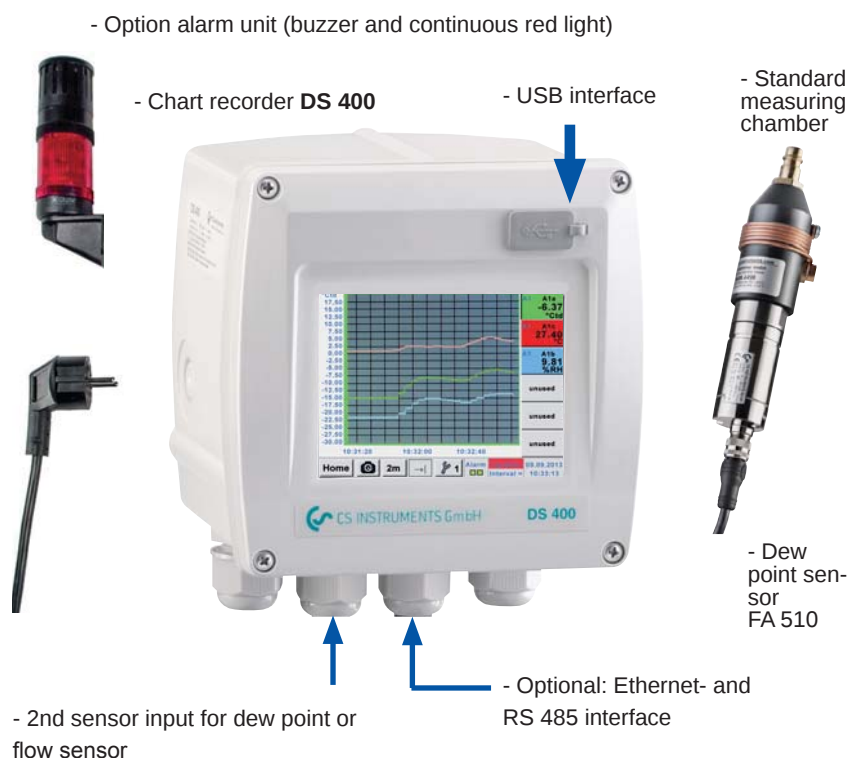


Dew point monitoring DS 400

for stationary dew point monitoring of refrigeration or desiccant driers. The touch screen graphic display enables an intuitive operation and shows the progress of the measured values. 2 alarm relays are available for monitoring of threshold values. Available either with a classic analogue output 4...20 mA or optionally with digital interfaces like Ethernet and RS 485 (Modbus protocol). As a stand-alone solution the measured data stored in the optional data logger can be read-out via USB stick and evaluated by means of the software CS Soft Basic.

Dew point monitoring DS 400

consisting of:



Special features:

- 3.5" graphic display - easy operation with touch screen
- System ready for plug-in: Everything completely wired
- 2 alarm contacts (230 VAC, 3 A) pre- and main alarm freely adjustable
- **NEW:** An alarm delay can be set for each alarm relay
- 4...20 mA analogue output
- Option: Ethernet and RS 485 interface (Modbus protocol)
- Option: webserver



Option: Integrated data logger

- Recording of the dew point progression of up to 100 million measuring values
- CS Soft Basic for evaluation in graphic and table form. Read-out of the data either via USB stick or via Ethernet

Technical data DS 400

Dimensions:	118 x 115 x 98 mm IP 54 (wall housing) 92 x 92 x 75 mm (panel mounting)
Inputs:	2 digital inputs for FA sensors
Interface:	USB
Power supply:	100...240 VAC, 50-60 Hz
Accuracy:	please see FA 510
Alarm outputs:	2 relays, (pot.-free)
Options:	
Data logger:	100 million measuring values start/stop time, measuring rate freely adjustable

2 additional sensor inputs:	for connection of pressure sensors, temperature sensors, clamp-on ammeters, third-party sensors with 4...20 mA 0 to 10 V, Pt 100, Pt 1000
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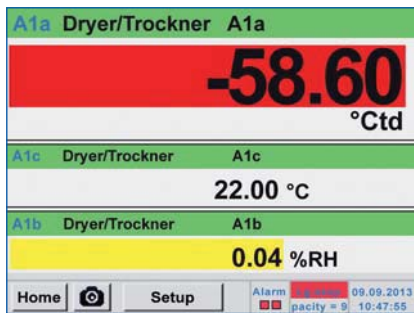
Technical data FA 510

Measuring range:	-80...20 °Ctd resp. -20...50 °Ctd
Accuracy:	± 1 °C at 20...-20 °Ctd ± 2 °C at -20...-50 °Ctd ± 3 °C at -50...-80 °Ctd
Pressure range:	-1...50 bar, special version up to 350 bar

Description	Order No.
Dew point monitoring DS400 for desiccant driers (-80...20° Ctd.)	0601 0510
Dew point monitoring DS400 for refrigeration driers (-20...+50°Ctd)	0601 0512
Options	
Option: Integrated data logger for 100 million measured values	Z500 4002
Option: Integrated Ethernet and RS 485 interface	Z500 4004
Option: Integrated webserver	Z500 4005
Option: 2 additional sensor inputs for analogue sensors (pressure sensor, temperature sensor and so on)	Z500 4001
Further accessories	
CS Soft Basic - data evaluation in graphic and table form - reading out of the measured data via USB or Ethernet	0554 7040
Alarm unit mounted at wall housing	Z500 0003
Alarm unit for external mounting with 5 m cable	Z500 0004
Calibration	
Precision calibration at -40 °Ctd or +3 °Ctd including ISO certificate	0699 3396



Easy operation via touch screen



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Actual measured values

All measured values can be seen at a glance.

Threshold exceeding are indicated in red color.

A „measuring site name“ can be allocated to each sensor.

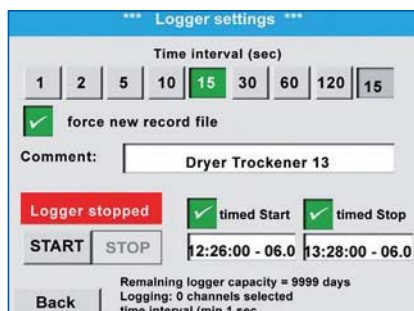


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Graphic view

In the graphic view all measured values are indicated as curves.

It is possible to brows back on the time axis by a slide of the finger (without data logger maximum 24 h, with data logger back to the start of the measurement).



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Data logger

Measured values are stored in DS 400 by means of the option „integrated data logger“.

The time interval can be freely set. Furthermore there is the possibility to fix the starting time and the end time of the data recording.

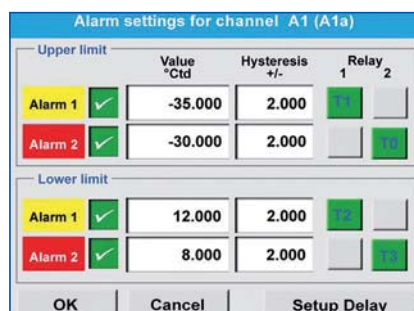
Read-out of the measured data via USB interface or via the optional Ethernet interface.



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Selection of the language

DS 400 „speaks“ several languages. The required language can be selected by means of the select button.



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Adjustment of the alarm relays

Each one of the 2 alarm relays can be allocated individually to a connected sensor. The alarm thresholds and the hysteresis can be freely adjusted.

NEW: It is possible to set an alarm delay for each alarm relay so that the relay is just triggered after that period of time.



DS 400 - Chart recorder

for all relevant parameters of compressed air

Software options:

- Integrated webserver
- Mathematics calculation function
- Totalizer function

Hardware options:

- Integrated data logger
- Ethernet / RS 485 interface
- additional sensor inputs (digital or analogue) selectable



Standard equipment:

- USB interface
- 3.5" graphic display with touch screen
- Integrated mains unit for supply of the sensors
- 4...20 mA output of all connected active sensors
- Pulse output (for total consumption) in case of flow sensors
- 2 alarm relays (pot.-free switch-over contacts, max. 230 V, 3 A)

The 2 sensor inputs board 1 and 2 can be selected according to the required sensors:

Digital	Digital	Digital	Digital	Analogue	Analogue	Analogue	Analogue
m ³ /h, m ³	°Ctd	A, kW/h	optional	bar	A	°C	°C



4...20 mA
0...20 mA
0...10 V
Pulse
Pt 100
Pt 1000

Flow sensor	Dew point sensor	Current/effective power meter	Third-party sensors with RS 485	Pressure sensor	Clamp-on ammeter	Temperature sensor	Third-party sensors analogue output
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Description			Order No.
DS 400 - Mobile chart recorder with graphic display and touch screen	2 sensor inputs board 1	2 sensor inputs board 2	
	Digital (Z500 4003)	-----	0500 4000 D
	Digital (Z500 4003)	Digital (Z500 4003)	0500 4000 DD
	Digital (Z500 4003)	Analogue (Z500 4001)	0500 4000 DA
	Analogue (Z500 4001)	-----	0500 4000 A
	Analogue (Z500 4001)	Analogue (Z500 4001)	0500 4000 AA
Options			
Option: Integrated data logger for 100 million measured values			Z500 4002
Option: Integrated Ethernet and RS 485 interface			Z500 4004
Option: Integrated webserver			Z500 4005
Option: „Mathematics calculation function“ for 4 freely selectable channels, (virtual channels): addition, subtraction, division, multiplication			Z500 4007
Option: „Totalizer function for analogue signals“			Z500 4006
External Gateway PROFIBUS for RS 485 interface connection			Z500 3008
Further accessories			
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 400) - database (MySQL) to Server - data evaluation via Client-Software			0554 7041
CS Soft Network - Database Client/Server Solution (up to 10 DS 400) - database (MySQL) to Server - data evaluation via Client-Software			0554 7042
CS Soft Network - Database Client/Server Solution (up to 20 DS 400) - database (MySQL) to Server - data evaluation via Client-Software			0554 7043
CS Soft Network - Database Client/Server Solution (>20 DS 400) - database (MySQL) to Server - data evaluation via Client-Software			0554 7044

Technical data DS 400

Dimensions:	118 x 115 x 98 mm IP 54 (wall housing) 92 x 92 x 75 mm (panel mounting)
Inputs:	2 digital inputs for FA 510 resp. VA 500/520
Interface:	USB
Power supply:	100...240 VAC, 50-60 Hz
Accuracy:	please see FA 510
Alarm outputs:	2 relays, (pot.-free)
Options:	
Data logger:	100 million measuring values start/stop time, measuring rate freely adjustable
2 additional sensor inputs:	for connection of pressure sensors, temperature sensors, clamp-on ammeters, third-party sensors with 4...20 mA 0 to 10 V, Pt 100, Pt 1000

Input signals

Current signal	(0...20mA/4...20mA)
internal or external power supply	
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	1 MΩ
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
Accuracy	± 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	
Measuring range	min pulse length 500 µs frequency 0...1 kHz max. 30 VDC



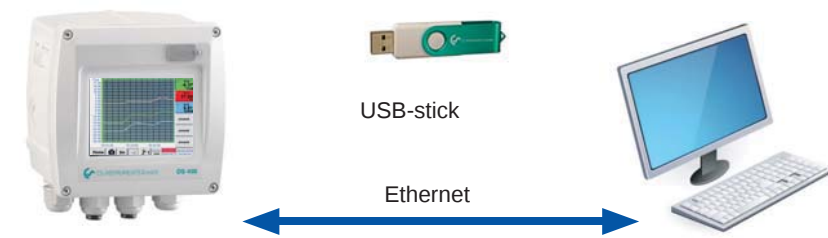
Suitable sensors for DS 400

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
Options for VA 500: (see page 81)	
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: (further pressure sensors on page 9)	
Standard pressure sensor CS 16 from 0...16 bar, $\pm 1\%$ accuracy of full scale	0694 1886
Standard pressure sensor CS 40 from 0...40 bar, $\pm 1\%$ accuracy of full scale	0694 0356
Temperature sensors:	
Screw-in temperature probe PT 100 class A, length: 300 mm, d=6mm, with integrated transducer 4...20 mA = -50°C...+500°C (2-wire)	0604 0201
Outdoor temperature probe, PT 100 class B (2-wire) in wall housing (82x55x33 mm), temperature range: -50°C to +80°C	0604 0203
Indoor temperature probe, PT 100 class B (2-wire) in wall housing (82x55x33 mm), temperature range: -50°C to +80°C	0604 0204
Temperature probe PT 100 class A (4-wire) with cable, length: 300 mm, d=6 mm, -70°C to +260°C, 5 m connection cable (PFA) with open ends	0604 0205
Temperature probe PT 100 class A (4-wire) with cable, length: 100 mm, d=6 -70°C to +260°C, 5 m connection cable (PFA) with open ends	0604 0206
Temperature probe PT 100 class A (4-wire) with cable, length: 200 mm, d=6 -70°C to +260°C, 5 m connection cable (PFA) with open ends	0604 0207
Surface temperature probe, magnetic, magnet dimensions 39x26x25 mm, PT 100 class B (2-wire), -30 to +180°C, 5 m connection cable (PFA) with open ends	0604 0208
Clamp screwing 6mm; G 1/2" PTFE clamp ring pressure tight up to 10 bar material: stainless steel, temperature range: max. +260°C	0554 0200
Clamp screwing 6mm; G 1/2" stainless steel clamp ring pressure tight up to 16 bar, material: stainless steel, temperature range: max. +260°C	0554 0201
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
Current / effective power meter (further current transformer please see on page 10)	
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 cables up to Ø 21 mm)	0554 5344
Current transformer 500/5 A connectable to current/effective power meter for panel mounting (for cables up to Ø 21 mm)	0554 5347
Connection cable to DS 400, 5 m, with open ends	0553 0108
Connection cable to DS 400, 10 m, with open ends	0553 0109



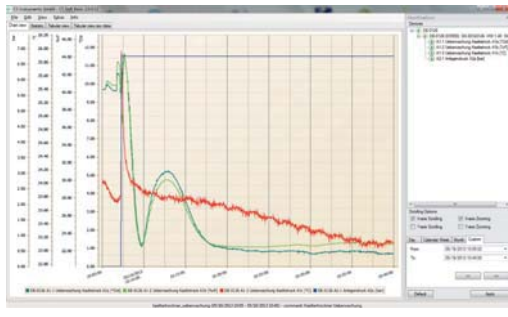


CS Soft Basic - evaluation of measured data for single computers



The measured data stored in the data logger integrated in DS 400 can be read-out via USB stick.

If DS 400 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 colors. All necessary functions like free zoom, selection/deselection of single measured curves, free selection of time periods, scaling of the axis, selection of colors 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.

Statistic Report

Timeperiod: 05/14/2013 10:05 - 05/14/2013 10:40

DE-0126

Channel	Min	Max	Mean	Std	Min	Max	Mean	Std
1	1.000	1.000	1.000	0.000	1.000	1.000	1.000	0.000
2	1.000	1.000	1.000	0.000	1.000	1.000	1.000	0.000
3	1.000	1.000	1.000	0.000	1.000	1.000	1.000	0.000
4	1.000	1.000	1.000	0.000	1.000	1.000	1.000	0.000

Statistics

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

CS-COMP (DS500)

Channel	Min	Max	Mean	Std	Min	Max	Mean	Std
1	1.000	1.000	1.000	0.000	1.000	1.000	1.000	0.000
2	1.000	1.000	1.000	0.000	1.000	1.000	1.000	0.000
3	1.000	1.000	1.000	0.000	1.000	1.000	1.000	0.000
4	1.000	1.000	1.000	0.000	1.000	1.000	1.000	0.000

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.



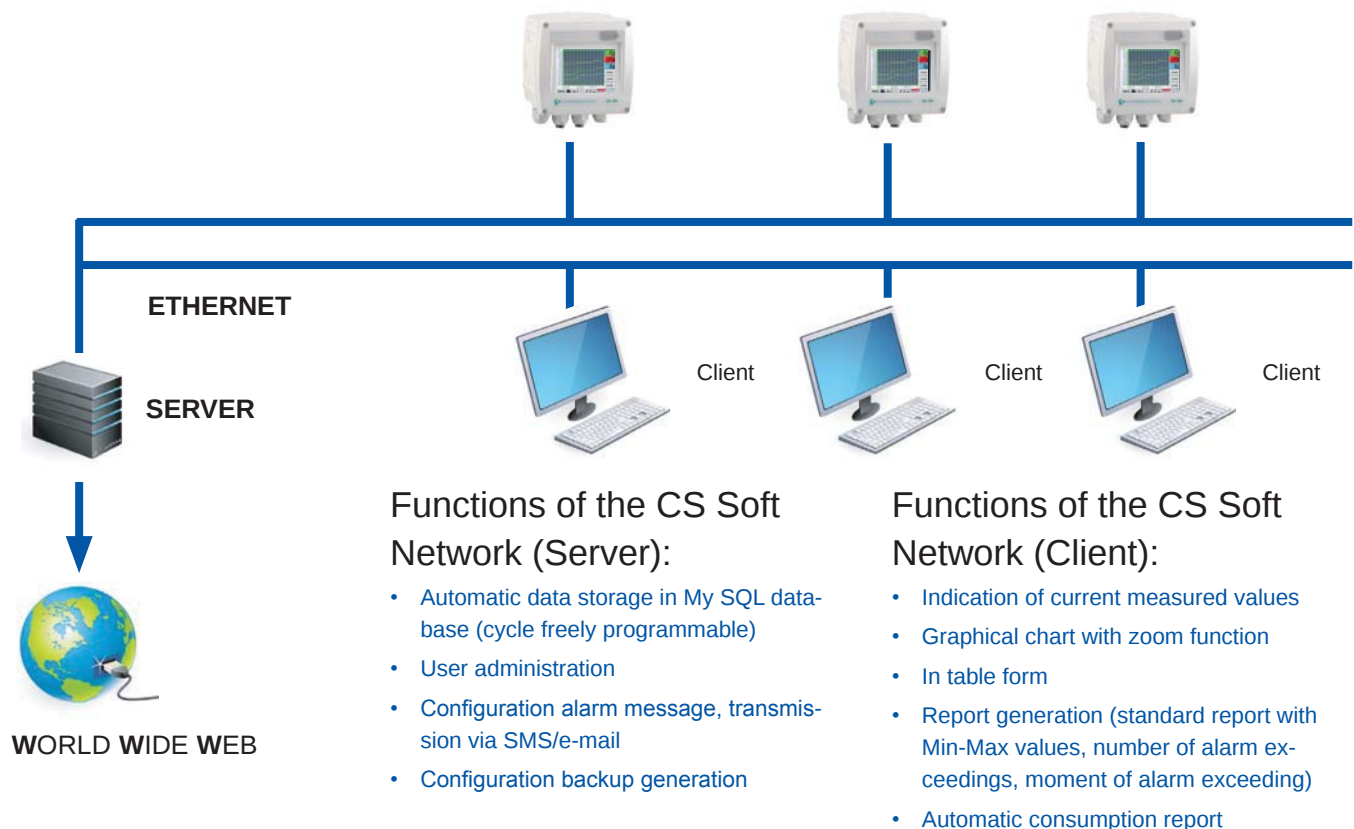
CS Soft Network - evaluation of the measured data for several computers in the network

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.



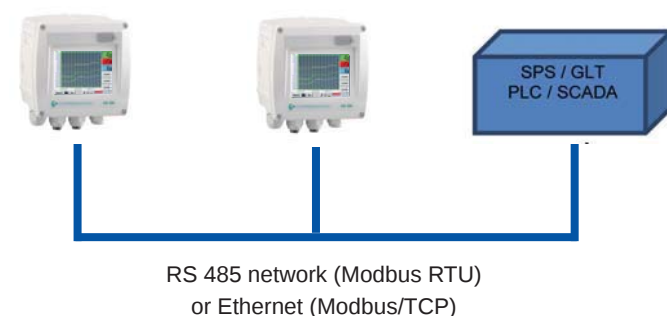
Access to the measured values via the webserver



With the option „Webserver“ (order no. Z500 4005) DS 400 can be contacted without any special software from each web browser (eg. Mozilla Firefox®, Microsoft Internet Explorer®).

The access can also be done via the World Wide Web. The webserver indicates the actual measured values of all sensors as well as the status of the alarm relays and the logger status in the web browser.

Connection to Bus system



With the option „Ethernet / RS 485 - interface“ (order no. Z500 4004) DS 400 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 400 instrument. When using the Ethernet interface the IP address at DS 400 can be freely adjusted. As an alternative DS 400 waits for the address allocation by a DHCP server.



Dew point sensor FA 500 from -80 to 20°Ctd

FA 500 is the ideal dew point measuring instrument with integrated display and alarm relay for refrigeration, membrane and desiccant driers.



Special features:

- Integrated display
- Threshold value adjustable via keypad alarm relay (max. 60 VDC, 0.5 A)
- Pressure-tight up to 350 bar (special version)
- Extreme long-term stability
- Quick response time
- 4...20 mA analogue output
- 2 versions: Refrigeration driers and desiccant driers
- **NEW: Modbus-RTU interface**
- **NEW: Higher resolution of sensor signal caused by the improved evaluation electronics**
- **NEW: Sensor diagnosis on site with a portable device or CS Service Software**

The integrated keys enable an easy menu-driven operation



Upper connection:

Power supply
4...20 mA output
Modbus-RTU output

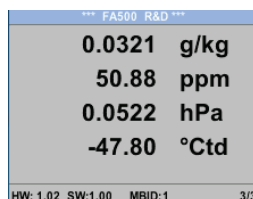
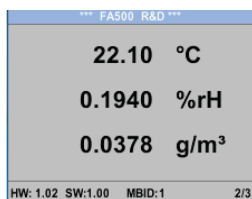
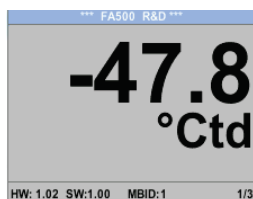
Lower connection:

Alarm relay

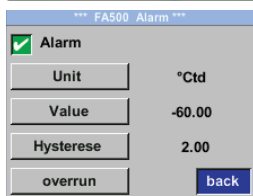




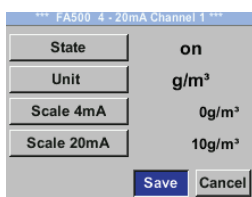
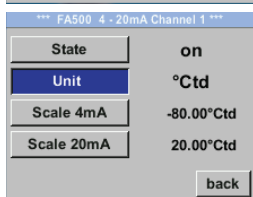
FA 500 – easy operation via keys at the display



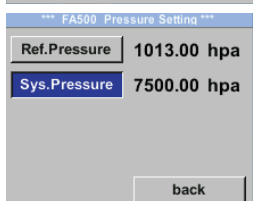
The integrated display shows the dew point in big figures as well as further humidity parameters on two more display pages. By means of the arrow key it can be browsed between the display pages.



The alarm threshold value for the integrated relay can be entered via the keys. Apart from the alarm threshold it is also possible to enter the hysteresis freely.



The 4...20 mA analogue output can be scaled freely resp. also allocated to one further parameter, e. g. g/m³.



If requested the sensor can also reckon back from the measured pressure dew point to the atmospheric dew point upon entering the system pressure of the compressed air plant and the reference pressure (atmospheric pressure).

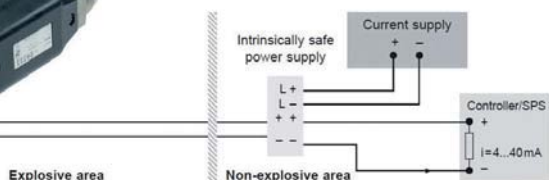
Description	Order No.
FA 500 dew point sensor for refrigeration driers, -20...50 °Ctd	0699 0501
FA 500 dew point sensor for desiccant driers, -80...20 °Ctd	0699 0502
FA 500 dew point sensor for desiccant driers, -60...30 °Ctd	0699 0503
Connection cables:	
Connection cable, 5 m	0553 0104
Connection cable, 10 m	0553 0105
Alarm cable, length: 5 m	0553 0106
Alarm cable, length: 10 m	0553 0107
Options for FA 500:	
Option max. pressure FA5xx 350 bar	Z699 0515
Option max. pressure FA5xx 500 bar	Z699 0516
Option special scaling FA5xx 4...20 mA= __ ... __ g/m³, ppm etc.	Z699 0514
Option connection thread FA5xx, 5/8" UNF	Z699 0511
Option connection thread FA5xx, 1/2" NPT	Z699 0512
Option surface condition FA5xx, free of oil & grease	Z699 0517
M-Bus board for VA500/520 and FA500	Z695 5004
Additional accessories:	
Standard measuring chamber up to 16 bar	0699 3390
High pressure measuring chamber up to 350 bar	0699 3590
CS Service Software for FA/VA sensors incl. PC connection set, USB connection and interface adapter to the sensor	0554 2007
Mains unit in wall housing for maximum 2 sensors of the series VA/FA 5xx, 100-240 V, 23 VA, 50-60 Hz / 24 VDC, 0.35 A	0554 0110
AC adapter plug 100-240 V AC/ 24 V for VA/FA 500/520	0554 0109
Calibration:	
Precision calibration at -40°Ctd or +3°Ctd including ISO certificate	0699 3396

Technical data FA 500

Measuring range:	-80...20 °Ctd, -60...30 °Ctd, -20...50 °Ctd, resp. 0...100% RH
Accuracy:	± 1°C bei +50...-20°Ctd ± 2°C bei -20...-50°Ctd ± 3°C bei -50...-80°Ctd
Pressure range:	-1...50 bar special version up to 350 bar
Power supply:	24 VDC (18...30 VDC) smoothed
Protection class:	IP 65
EMV:	according to DIN EN 61326
Operating temp:	-20...50 °C
Connection:	2 x M12, 5-pole for analogue output, Modbus-RTU and alarm output
PC connection:	Modbus-RTU interface (RS 485)
Output: (3-wire)	4...20 mA = -80...20°Ctd 4...20 mA = -60...30°Ctd 4...20 mA = -20...50°Ctd
Burden for analogue output:	< 500 Ω
Alarm relay:	NC, max.60 VDC, 0.5 A
Screw-in thread:	G 1/2"
Dimensions of housing	76,5 x 85 x 75 (WxHxD)



Dew point sensor FA 300-2 Ex from -80 to 20°Ctd



Special features:

- Robust design
- Pressure-tight up to 300 bar
- Long-term stable humidity sensor, approved for years
- 4...20 mA analogue output in 2-wire system
- Further parameters adjustable via software: % RH, g/m³, mg/m³, ppm V/V, g/kg
- CS Service Software for data storage and calibration (no approval for explosive areas)

Technical data

FA 300-2 Ex

Measuring range: Pressure dew point in °Ctd

FA 300-2 Ex: -80...20 °Ctd = 4...20 mA

Power supply: 24 VDC (10...30 VDC)

Accuracy: ± 0,5 °C at -10...50 °Ctd
typical ± 2 °C at -40 °Ctd

Output: 4...20 mA in 2-wire technology

Protection class: IP 65

EMV: according to DIN EN 61326

Operating temp.: -20...70 °C

Storage temp.: -40...80 °C

Burden for analogue output:
< 500 Ω

Screw-in thread:
G 1/2" stainless steel

Housing material:
polycarbonate

Sensor protection:
Sintered filter 50 µm stainless steel

FA 300-2 Ex measures the dew point resp. the pressure dew point in explosive areas of Zone 1. Protection class: FA 300-2 Ex: II 2 G Ex ia IIC T4.

With the ATEX approval for Zone 1 the established dew point measuring instruments FA 300-2 can now be used in explosive areas of the industry as well.

FA 300-2 Ex may only be used in connection with approved Ex-rated power supplies or safety barriers or galvanic separating elements with max.:

U₀ = 30 V max.

I₀ = 100 mA max.

P₀ = 1 W max.

Description	Order No.
FA 300-2 Ex pressure dew point meter	0699 3070
Measuring chamber up to 350 bar	0699 3590
Special scaling Analogue output to other humidity parameters: % RH, g/m ³ , mg/m ³ , ppm V/V, g/kg	0699 4004
Intrinsically safe power supply, safety barriers	0554 3071

Mains units



Mains unit in wall housing



Mains unit in wall housing
(back view)



Mains unit on DIN rail



Power supply

Technical data for mains unit in wall housing

Dimensions:	118 x 115 x 98 mm (WxHxD)
Power supply:	100-240 VAC, 23 VA, 50-60 Hz
Output:	24 VDC, 0.35 A
Relay:	2 pieces, change-over contacts, 230 VAC, 3 A

Description	Order No.
Mains unit in wall housing for maximum 2 sensors of the series VA/FA 5xx, 100-240 V, 23 VA, 50-60 Hz / 24 VDC, 0.35 A	0554 0110
Mains unit in wall housing for maximum 4 sensors of the series VA 500/520 100-240 V, 23 VA, 50-60 Hz / 24 VDC, 0.35 A	0554 0111
Mains unit on DIN rail, 100-240 VAC / 24 VDC, 0.35 A	0699 3340
AC adapter plug 100-240 V AC / 24 V for VA/FA 5xx	0554 0109



CS Service Software for FA 5xx dew point sensors

For FA/VA sensors including PC connection set, USB adapter and interface adapter to the sensor.

The humidity sensors FA 500, FA 510, can be connected to the PC and the following adjustments can be carried out by means of the CS Service Software:

- Scaling of the 4...20 mA analogue output
- Selecting the units: % RH, °Ctd, g/m³, mg/m³, ppm V/V
- Reading out of: Version no., production date, serial no., date of last calibration
- Adjustment of the alarm limits
- Single-point calibration (adjustment) - for this purpose a reference measuring instrument is required



Description	Order No.
CS Service Software for FA/VA sensors incl. PC connection set, USB connection and interface adapter to the sensor	0554 2007

The right measuring chamber for each measuring task:



Standard measuring chamber
for compressed air up to 16 bar

Order no.: **0699 3390**



Measuring chamber for atmospheric dew point

Order no.: **0699 3690**



High-pressure measuring chamber
for compressed air up to 350 bar*

Order no.: **0699 3590**



Measuring chamber stainless steel 1.4305, for dew point measurement in gases/air up to 100 bar

Order no.: **0699 3290**



Measuring chamber for granulate driers

Order no.: **0699 3490**

Mounting recommendation

The dew point meters can be mounted directly into the air stream.

However, we recommend always to use a screw screw able able measuring chamber.



Screw able measuring chamber

Advantage: Easy installation via fast coupling

* In case of pressures higher than 50 bar please order special version of FA 500/ FA 510



Calibration of dew point sensors

The calibration range for dew point sensors is -80°... 20° Ctd

It is possible to calibrate our dew point sensors as well as of other manufacturers. High precision reference measuring instruments with DKD resp. BAM certificate grant an accuracy of up to 0.1 °C dew point.

Special feature

Due to the digital data transfer only the dew point sensor has to be calibrated, enabling the display unit to stay on-site at all times



Calibration range: from -80 to 20 °Ctd
Accuracy of the DKD reference: 0.1 °Ctd



Control and calibration set

Control and calibration sets guarantee a defined humidity by means of a saturated saline solution.

The control and calibration set is screwed onto the dew point sensor and therefore enables an easy and low-priced possibility for on-site control and calibration down to -20 °C dew point.

Description	Order No.
Recalibration and precision calibration at -40 °Ctd including ISO certificate	0699 3333
Precision calibration in the range -80...20 °Ctd, °Ctd points freely selectable	0700 7710
Control and calibration set 11.3 % RH	0554 0002
Control and calibration set 33 % RH	0554 0004
Control and calibration set 75.3 % RH	0554 0005
Precision calibration at -40 °Ctd or 3°Ctd including ISO certificate	0699 3396
Replacement unit for the period of re-calibration	0699 3900
Dew point sensor in exchange with calibration certificate at -40° Ctd	0699 3990



Dew point measurement in compressed air plants

Today, modern production processes cannot be imagined without compressed air as a versatile and reliable energy source.

Depending on the respective single case different demands are made on compressed air. Meeting a certain moisture degree or dew point/pressure dew point is the basis for a permanent failure-free plants operation.

We developed a pressure dew point multifunction measuring instrument DS 400 with lots of new advantages specially for moisture measurement resp. dew point/pressure dew point measurement in compressed air and gases.





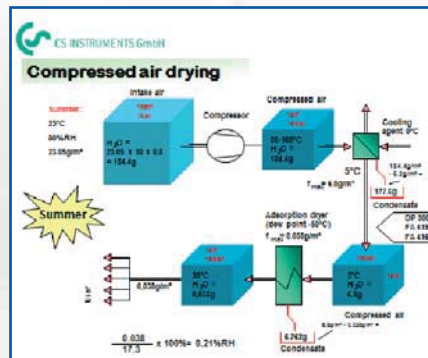
Dew point

Usually compressed air is made from ambient air by using piston or screw compressors and which then has to be dried more or less strongly.

The aim is to produce dry, oil-free and dust particle poor compressed air with the smallest possible efforts. Residual oil and dust particles can be removed by means of complex filter systems. However, moisture has to be reduced by means of driers (refrigeration driers, membrane driers, desiccant driers and so on) which ideally work independent from any load.

How does water get into compressed air?

Air is able to bind more water vapor if the temperature is higher and the volume is bigger. In contrary case it has only a poor capacity to bind water vapor if the air is compressed. A compressor compresses atmospheric ambient air into a fraction of its original volume. At a certain point of the compression process the water content of the air exceeds the decreasing ability of the air to bind water. The air is saturated and part of the water drops out as condensate. By means of an additional decrease of the temperature even more water will condensate. This means that the relative humidity at the end of a compressor will always be at 100 % and that there will be additional water drops in the exit air. The amount of liquid which drops out under pressure can be large. For example a 30 kW compressor releases approximately 20 liters into the compressed air line at a humidity of 60 % and an ambient temperature of 20 °C. In case of big compressors this value will be much higher.



Effects of the moisture content

Depending on the application different demands are made on the compressed air. For each process the observance of a certain moisture content is the condition for a durably failure-free functioning of the whole system. Most of the compressed air lines are made from steel or non zinc-coated steel. Since the corrosion speed strongly increases from a relative humidity of 50 % this value should be exceeded in no case. In the course of time, high moisture will lead to a corrosion in case of non zinc-coated lines. The rust gradually chips off and moves to the sampling points. This leads e. g. to blocked nozzles, defective control elements and production stops.

Expensive repairs and short maintenance intervals are inevitable.

In addition to problems with corrosion and the described results the moisture content has direct influence on the quality of the final products. Which problems may arise in case of too high moisture? In the following please find some of the most occurring samples:

- Hygroscopic products (spices, sugar and so on) agglutinate during transportation through the pneumatic conveying system
- Bubbles occur during varnishing and coating processes
- Drilled holes may get blocked due to dust which is carried along
- In winter control valves freeze in unheated halls

Recommended compressed air qualities				
Application	Compressed air quality classes according to DIN ISO 8573-1			
	Particle Class	µm	Class	Residual flow Dew Point
Respiration air	1	0.1	1-3	-70/-20 °C
Spray guns	1	0.1	2	-40 °C
Medical technology	1	0.1	3-4	-20/+3 °C
Measurement and control techn.	1	0.1	4	+3 °C
Transportation of food and beverages	2	1	3	-20 °C
Sand blasting plants	—	—	4-3	+3/-20 °C
General factory air	3	5	4	+3 °C
Break-up hammer	4	15	5-4	+7/+3 °C

Tasks of driers

Differently types of driers are used in practice in order to control the problems of too high moisture. In compressed air technology the pressure dew point is the parameter for indicating the dryness of compressed air. The pressure dew point is the temperature at which the moisture which is contained in the compressed air condenses to liquid water (also saturation, 100 % relative humidity). The lower the pressure dew point temperature the smaller is the amount of water vapor contained in the compressed air.

Refrigeration driers for dew point values around + 2 °Ctd



There are different types of compressed air driers; refrigeration driers or desiccant driers are the most commonly used ones. Refrigeration driers cool down the compressed air to approximately 2 to 5 °C. In this case the pressure dew point is also 2 to 5 °C. The excess water vapor condenses and drops out.

After that the air is again heated up to room temperature.

In most cases the refrigeration driers are only monitored by an indication of the cooling temperature. Up to now stationary moisture monitoring systems are only installed in big plants resp. in case of particularly important applications.

However, it is not sufficient if only the cooling temperature is indicated. The following failures may lead to an exaggerated pressure dew point even if the cooling temperature seems to be alright:

- **Condensate in the refrigeration dryer is not drained off (condensate drain defective resp. soiled)**
- **Compressed air bypass in the refrigeration dryer (heat exchanger pipes worn out, corroded and so on)**
- **Compressed air bypass in the bypass line (wet compressed air passes the bypass instead of passing the dryer)**
- **Condensate overload of the refrigeration dryer due to poor condensate pre-separation**

If the refrigeration dryer fails this inevitably leads to considerable problems with condensate in the compressed air line. It is especially problematic (besides the already listed problems) if the condensate can concentrate in blind lines and does not drain automatically.

Condensate in blind lines can only be removed by means of considerable efforts or dried and drained off by means of an extremely large amount of compressed air. This often leads to increased dew point values at very low consumptions without any avoidable problems of the refrigeration dryer. In this case it is quite difficult for the person who is responsible for compressed air to find out in the long-term the reason for the increased dew point values or in the extreme case for the condensate

Desiccant driers for typical dew points around -30...-40°Ctd

The functioning of the desiccant dryer is based on the principle of the attraction between the two masses. Water vapor is bound (adsorbed) at the surface of a desiccant.

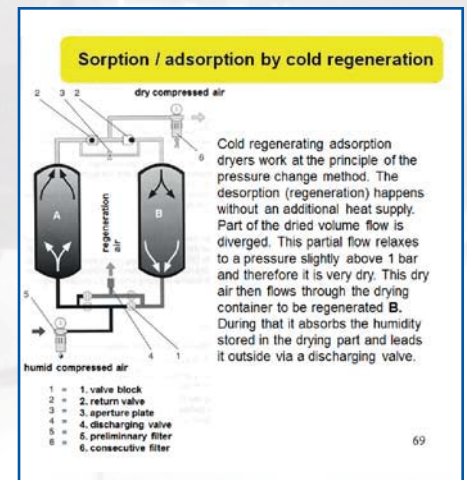
Effective desiccant driers are able to dry compressed air down to a dew point of -40°C and lower.

Regenerative desiccant driers exist of two tanks which are filled with

desiccant. In different procedures there is one tank regenerated cold resp. warm while the other one dries the operation air.

Depending on the procedure and the operating conditions the desiccant has to be exchanged in cycles of three to five years.

Certain operating conditions lead to a shortening of the life span of the desiccant:



- **Overload due to too big compressed air consumption**
- **Poor pre-separation of condensate**
- **Oily air**
- **Too long regeneration times of the single tanks**

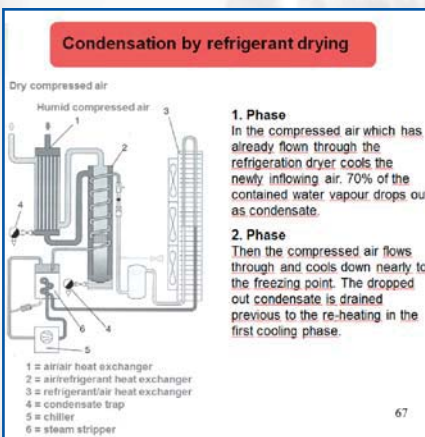
New: DS 400 dew point measurement with alarm grants process safety

For a safe process procedure it is necessary to monitor the demanded pressure dew points at any time and to get an alarm in case of exceeding of the threshold values.

3.5" graphic display - easy operation with touch screen

DS 400 dew point set

Worldwide unique with 3.5 inch graphic display with touch screen and print function





Dew point



With the new "ready for plug-in"

DS 400 dew point sets for refrigeration driers as well as for membrane/desiccant driers down to -80°C can be monitored easily and safely. The dew point sets will be supplied completely wired, therefore a time consuming studying of the instruction manual is not necessary.

Exceeding of threshold values can be reported optically and acoustically. 2 relays for pre- and main alarm are freely adjustable.

An alarm delay can be set for each relay. This grants that only really long-term exceeding of the threshold values are indicated. Additionally every alarm can be reset.

The dew point set DS 400 consists of the multifunction measuring instrument DS 400 and the dew point sensor FA 510 including measuring chamber for pressure dew point measurement of compressed air and gases up to 16/50/350 bar. For pressures of more than 16 bar please use the high-pressure measuring chamber.

The heart of the dew point sensor is the worldwide proven humidity sensor. In order to get quick and accurate measurements it is necessary that the humidity sensor is continuously flown by the gas (compressed air) to be measured. For this purpose a defined volume flow is blown out at a certain pressure via a capillary line.

The measuring chamber can be connected to the sampling point without any large installation efforts by means of the standard plug nipple for compressed air lines.

The big difference to customary paperless chart recorders is reflected in the simplicity of DS 400 on initiation and evaluation of the measured data.

The intuitive operation with the 3.5 inch touch screen graphic display with zoom function and print key is **worldwide unique in this price class.**

By means of the graphic display with zoom function the drying procedure resp. the dew point curve can be seen at a glance and stored in the data logger.

So the user can take a look at the stored measuring curves also without any computer at any time on site. This grants a quick and easy analysis of the drying behavior.

By means of the print key the actual screen can be stored as an image file to the internal SD card or to a USB stick and printed out at the computer without any additional software.

Ideal for documentation of the measured values/ curves on site. Colored measured curves can be sent by e-mail as image files or

integrated into a service report.

The internal data logger enables the storage of the measured data for several years. The measured data can be evaluated via a USB stick or via Ethernet by means of the comfortable software CS Soft Basic.

Special features:

- 3.5" graphic display, intuitive operation via touch screen
- Zoom function for accurate analysis of measured values
- Colored measured curves with names
- Mathematical calculation function for calculation of the dew
- point distance (condensate switch)
- Print key: Optional indications can be stored as image
- files directly on a USB stick and sent by e-mail
- without any software
- 2 alarm contacts for exceeding of threshold values
- Freely adjustable alarm delay for both alarm contacts with reset function
- Up to 4 sensor inputs for: Further flow sensors, dew point, pressure, temperature, consumption, active power meters, optional third-party sensors can be connected: Pt100/1000, 0/4...20 mA, 0-1/10 V, Modbus, pulse
- Integrated data logger 2 GB
- USB, Ethernet interface, RS 485
- Webserver