



**NEW!**

**OIL CHECK 500** - The monitoring system for permanent highly precise measurement of the vaporous residual oil content compressed air, nitrogen and gases



### **„Forced Pressure Variation“ for long-term stable measurement results - Auto-calibration**

Thanks to the innovative „Forced Pressure Variation“ measuring method, the OIL CHECK 500 generates reference gas internally in different mass concentrations. With the help of this process, which is intellectually protected by CS INSTRUMENTS, components in the measurement signal caused by ageing or contamination, in particular long-term drifts, can be compensated.

No wearing parts such as activated carbon filters are necessary for the generation of zero air. The result is a low-maintenance and long-term stable measurement

### **Service friendly, no downtime**

The sensor unit can be replaced by the customer on site. This eliminates the need to return the entire unit for recalibration.

### **Process safety**

All functions / components are monitored internally. A complete function test report can be printed out via the service software.

### **On-site calibration**

Calibration can be carried out in the field using test gas cylinders. With the service software, a verification report (as-found data) and a calibration report (as-left data) can be generated.

### **Ideal for mobile measurement**

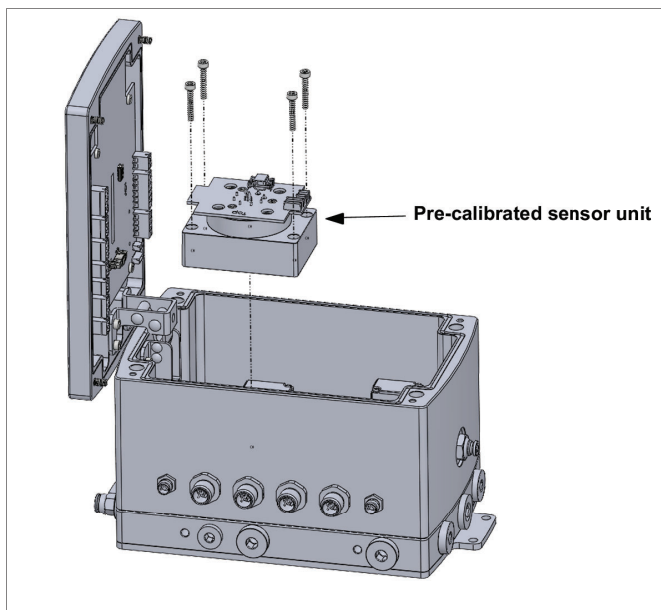
Compact device, easy sampling and quickly ready for measurement



## Easy installation

Air inlet / air outlet - sampling via PTFE hose or stainless steel pipe.

Digital and analog interfaces as a standard. Connection via M12 plug



## Service friendly – no downtime

Loosen four screws - replace sensor unit. A complete function test is carried out at the push of a button. This means that the measurement can be continued almost without interruption.

### TECHNICAL DATA OIL CHECK 500

<b>Measured medium:</b>	Compressed air, nitrogen, (free from aggressive, corrosive, acid, toxic, flammable and oxidising components). Further gases on request
<b>Measuring unit:</b>	Residual oil content in mg oil/norm m <sup>3</sup> referred to 1.0 bar [abs], +20 °C, 0% relative humidity, in accordance with ISO 8573-1
<b>Identifiable substances:</b>	Hydrocarbons, functional hydrocarbons, aromatic hydrocarbons
<b>Field of application:</b>	After activated carbon filter, after activated carbon adsorber, after oil-free compressor, always with connected upstream filtration and dryer
<b>Ambient temperature:</b>	+20 °C... +45 °C, rel. humidity <= 75% without condensation
<b>Compressed air temperature:</b>	+20 °C... +50 °C
<b>Operational overpressure:</b>	3...9 bar, optional pressure reducer connected upstream for up to 300 bar
<b>Humidity of measured gas:</b>	<= 40% rel. humidity, pressure dew point max. +10 °C, non-condensable humidity
<b>Compressed air connection:</b>	G 1/4" female thread according to ISO 228-1
<b>Measured values:</b>	mg/norm m <sup>3</sup> , pressure and temperature compensated residual oil vapour content
<b>Measuring range:</b>	0,001...5 mg/m <sup>3</sup> (higher measuring ranges on request)
<b>Detection limit (residual oil):</b>	0,001 mg/m <sup>3</sup>
<b>Flow of measuring gas:</b>	approx. 0,5 norm litres/minute, referred to to 1.0 bar [abs] and + 20 °C, (atmospheric conditions)
<b>Plug-in power supply</b>	100...240 VAC / 1 Ph. / PE / 50...60 Hz / ± 10%
<b>Outputs</b>	<b>Digital output:</b> RS 485 interface (Modbus RTU), Ethernet via DS 400 / 500 <b>Analogue output:</b> 4...20 mA (electrically isolated) <b>Optional:</b> 2x 4...20 mA analogue output (electrically isolated), 2 alarm relays for external alarm unit, alarm values freely adjustable
<b>Operating hours counter:</b>	integrated
<b>Dimensions (mm):</b>	200 x 130 x 120 (W x H x D)
<b>Weight:</b>	approx. 7 kg



## Measure compressed air quality according to ISO 8573

### Residual oil - particles - residual moisture



#### Residual oil content measurement – OIL CHECK 500

For permanent and highly precise measurement of the vaporous oil content from 0.001 mg/m³ to 5 mg/m³. Due to the low detection limit of 0.001 mg/m³, the compressed air quality class 1 (ISO 8573) can be monitored.

#### Particle counter PC 400

The highly precise, optical particle counter PC 400 measures particles from a size of 0.1 µm and is therefore suitable for monitoring the compressed air quality class 1 (ISO 8573).

#### Moisture – dew point sensor FA 510

FA 510 measures the pressure dew point down to -80 °Ctd. Also in this case the continuous measurement takes care that alert is triggered immediately if the compressed air dryer breaks down.

#### DS 500 - the intelligent chart recorder of the next generation

The centerpiece of compressed air quality measurement is the chart recorder DS 500. It measures and documents the measured data of the sensors for residual oil content, particles and moisture. The measured values are indicated on a 7" color screen.

The curve progressions from the beginning of the measurement can be viewed by an easy slide of the finger. The integrated data logger stores the measured values safely and reliably.

The threshold value can be freely entered for each measured parameter. 4 alarm relays are available for automatic alarm in case of threshold value exceedance.

Optionally DS 500 can be upgraded with up to 12 sensor inputs. For connection to a PLC DS 500 has an Ethernet interface as well as a RS 485 interface.

The communication is done via the Modbus protocol.

ISO 8573-1:2010 Class	Solid particles			Humidity	Oil
	Number of particles per m³			Pressure dew point	
	0.1 - 0.5 µm	0.5 - 1 µm	1 - 5 µm		Total share of oil (liquid aerosol and vaporous) mg/ m³
0	In accordance with specification by the device user, stricter requirements than class 1				
1	≤ 20,000	≤ 400	≤ 10	≤ -70 °C	≤ 0.01
2	≤ 400,000	≤ 6,000	≤ 100	≤ -40 °C	≤ 0.1
3	--	≤ 90,000	≤ 1,000	≤ -20 °C	≤ 1
4	--	--	≤ 10,000	≤ +3 °C	≤ 5
5	--	--	≤ 100,000	≤ +7 °C	--
6	--	--	--	≤ +10 °C	--
7	--	--	--	--	--
8	--	--	--	--	--
9	--	--	--	--	--
X	--	--	--	--	--



## Stationary solution

DESCRIPTION	ORDER NO.
<b>DS 500</b> – intelligent chart recorder in basic version (4 sensor inputs)	0500 5000
<b>CS Basic</b> - data evaluation in graphic and table form - readout of the measured data via USB or Ethernet. License for 2 working places	0554 8040
<b>Residual oil measurement:</b> <b>OIL CHECK 500</b> – residual oil measurement of the vaporous oil content from 0,001...5 mg/m <sup>3</sup> , 3...9 bar. High-precision PID-Sensor, innovative „Forced Pressure Variation“ measuring method, with integrated display, with 4...20 mA analog output and digital Modbus RTU interface, incl. calibration certificate	0699 0080
<b>Options:</b> Integrated heating element for the stationary Oil Check 500. Keeps the gas temperature constantly above 20°C. Recommended for installations where the room temperature may fall below 20°C.	Z699 0078
2x 4...20 mA analogue output (electrically isolated)	Z699 0178
<b>Sampling system OIL CHECK 500:</b> Sampling system consisting of 1/2" ball valve (oil- and grease-free), 1 m stainless steel tube 6x1 mm (oil- and grease-free), clamp screwing (oil- and grease-free)	Z699 0175
<b>Alternative:</b> Portable sampling system consisting of 2 m PTFE hose, quick coupling (oil- and grease-free)	Z699 0074
<b>Options for systems &gt; 9 bar:</b> Pressure reducer (oil- and grease-free), input pressure max. 300 bar, output pressure up to 9 bar	Z699 0076
Connection cable for probes 5 m with open ends	0553 0104
<b>PC 400 particle counter</b> up to 0.1 µm for compressed air and gases, incl. pressure reducer/sampling hose, calibration certificate, Modbus-RTU interface	0699 0040
Connection cable for probes, 5 m with open ends	0553 0104
<b>FA 510 dew point sensor</b> for adsorption dryers -80 °...20 °Ctd incl. factory certificate, 4...20 mA analogue output (3-wire connection) and Modbus-RTU interface	0699 0510
Standard measuring chamber up to 16 bar	0699 3390
Connection cable for VA/FA series, 5 m with open ends	0553 0104

## Mobile solution with DS 500, OIL CHECK 500, PC 400, FA 510



DESCRIPTION	ORDER NO.
<b>DS 500</b> – intelligent chart recorder in basic version (4 sensor inputs)	0500 5000
<b>CS Basic</b> - data evaluation in graphic and table form - readout of the measured data via USB or Ethernet. License for 2 working places	0554 8040
<b>Residual oil measurement:</b> <b>OIL CHECK 500</b> – residual oil measurement of the vaporous oil content from 0,001...5 mg/m <sup>3</sup> , 3...9 bar. High-precision PID-Sensor, innovative „Forced Pressure Variation“ measuring method, with integrated display, with 4...20 mA analog output and digital Modbus RTU interface, incl. calibration certificate	0699 0080
Mobile transport trolley including roles (outer dimensions: 0,68 x 1,06 x 0,41 m) (W x H x D) with firmly mounted components of OIL-Check 400, PC 400, FA 510	0554 6017
<b>Options:</b> Integrated heating element for the stationary Oil Check 500. Keeps the gas temperature constantly above 20°C. Recommended for installations where the room temperature may fall below 20°C.	Z699 0078
Mobile sampling system consisting of 2 m PTFE hose, quick coupling (oil- and grease-free)	Z699 7774
Connection cable for probes, 5 m with open ends	0553 0104
<b>PC 400 particle counter</b> up to 0.1 µm for compressed air and gases, incl. pressure reducer/sampling hose, calibration certificate, Modbus-RTU interface	0699 0040
Connection cable for probes, 5 m with open ends	0553 0104
<b>FA 510 Dew point sensor</b> , -80°...+20 °Ctd	0699 0510
Standard measuring chamber	0699 3390
Connection cable for VA/FA series, 5 m with open ends	0553 0104



## OIL CHECK 500 - Stationary solution



DESCRIPTION	ORDER-NO.
<b>Residual oil measurement:</b> <b>OIL CHECK 500</b> – residual oil measurement of the vaporous oil content from 0,001...5 mg/m³, 3...9 bar. High-precision PID-Sensor, innovative „Forced Pressure Variation“ measuring method, with integrated display, with 4...20 mA analog output and digital Modbus RTU interface, incl. calibration certificate	0699 0080
<b>Options:</b> Integrated heating element for the stationary Oil Check 500. Keeps the gas temperature constantly above 20°C. Recommended for installations where the room temperature may fall below 20°C  2x 4...20 mA analogue output (electrically isolated)  External alarm unit, wired ready to plug in, for direct connection to the OIL CHECK 500 with 5 m cable (buzzer and continuous red light)	Z699 0078  Z699 0178 Z699 0077
<b>Sampling system OIL-Check 500:</b> Sampling system consisting of ½" ball valve (oil- and grease-free), 1 m stainless steel tube 6x1 mm (oil- and grease-free), clamp screwing (oil- and grease-free)  Portable sampling system consisting of 2 m PTFE hose, quick coupling (oil- and grease-free)  For systems > 9 bar: Pressure reducer (oil- and grease-free), input pressure max. 300 bar, output pressure up to 9 bar	Z699 0175  Z699 0174  Z699 0076
<b>DS 500</b> – intelligent chart recorder in basic version (4 sensor inputs)  Connection cable for probes, 5 m with open ends	0500 5000 0553 0104
<b>CS Basic</b> - data evaluation in graphic and table form - readout of the measured data via USB or Ethernet. License for 2 working places	0554 8040

## OIL CHECK 500 - Portable solution



Flight case

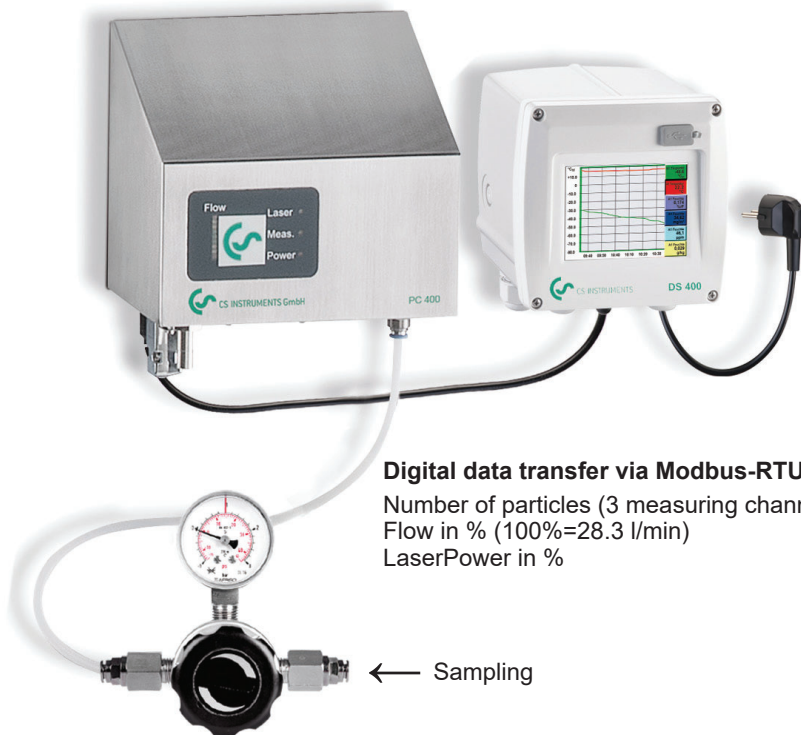
DESCRIPTION	ORDER-NO.
<b>OIL CHECK 500 portable-</b> Residual oil measurement of the vaporous oil content from 0.001...5 mg/m³, 3...9 bar. High-precision PID sensor, innovative „Forced Pressure Variation“ measuring method, with integrated display, with 4...20 mA analog output and digital Modbus RTU interface, incl. calibration certificate, in a robust flight case. Connection cable ODU/ODU 5m	0699 0081
Portable sampling system consisting of 2 m PTFE hose, quick coupling (oil- and grease-free)	Z699 0074
<b>DS 500 mobile</b> - intelligent chart recorder with 4 sensor inputs	0500 5012
<b>CS Basic</b> - data evaluation in graphic and table form - readout of the measured data via USB or Ethernet. License for 2 working places	0554 8040



DESCRIPTION	ORDER-NO.
Replacement OIL CHECK 500 for the period of re-calibration	0699 3930
Pre-calibrated sensor unit for the OIL CHECK 500, incl. certificate	0699 8080
Re-calibration OIL CHECK 500 incl. certificate	0699 3405
As-Found-Data OIL CHECK 500 with certificate	9999 3501




## Particle counter PC 400 and DS 400



**The DS 400 shows all 3 measuring channels according to ISO 8573-1**

Particle size 0.1...0.5  $\mu\text{m}$ : Number of particles per  $\text{m}^3$   
 Particle size 0.5...1.0  $\mu\text{m}$ : Number of particles per  $\text{m}^3$   
 Particle size 1.0...5.0  $\mu\text{m}$ : Number of particles per  $\text{m}^3$

A1a	PC 400	0.1-0.5 $\mu$	1458 cts/ $\text{m}^3$
A1b	PC 400	0.5-1.0 $\mu$	246 cts/ $\text{m}^3$
A1c	PC 400	1.0-5.0 $\mu$	8 cts/ $\text{m}^3$
Home  Setup Alarm Lg.stop 10.01.2012 1 days, ... 22:34:33			

**Digital data transfer via Modbus-RTU:**  
 Number of particles (3 measuring channels)  
 Flow in % (100%=28.3 l/min)  
 LaserPower in %

← Sampling

### Advantages at a glance:

- Highly precise, optical laser particle counter for use in compressed air and technical gases
- Highly precise optics for detecting the smallest particles up to 0.1  $\mu\text{m}$  and therefore suitable for monitoring the compressed air class 1 according to ISO 8573-1
- The flow rate of 28.3 l/min (1 cfm) is 10 times higher than that of the particle counters generally available on the market (usually 2.83 l/min). Advantage: Counts the smallest particles with high counting accuracy at the same time
- Due to the digital data transfer (Modbus-RTU) to the chart recorders DS 400 or DS 500, 3 measuring channels can be transferred at the same time (without any faults due to check sum)
- The class 1 filter which is included in the scope of delivery can be used for on-site calibration at any time. Contaminations on the optics can therefore be quickly detected or eliminated.

### Advantages of the DS 400

- Data logger for long-term monitoring
- Display shows trend curves (online and history curves available)
- Zoom function directly on the touch screen
- Integrated Ethernet interface (Modbus/TCP) and RS 485 interface (Modbus-RTU) for data transfer to superordinate controls
- 2 alarm relays (changeover contact 230 VAC, 3A) – threshold values freely adjustable
- Easy operation via 3.5" touchscreen

### TECHNICAL DATA PC 400

<b>Measured medium:</b>	Compressed air (free from aggressive, corrosive, acid, toxic, flammable and oxidising components) as well as gas types like N <sub>2</sub> , O <sub>2</sub> , CO <sub>2</sub> . Further gas types on request
<b>Field of application:</b>	In case of compressed air after filtration In case of gases / pure gases also without filtration
<b>Parameter:</b>	Number of particles per $\text{m}^3$ (relative to expanded air: 20 °C, 1000 hPa)  Size channels for the PC 400 0.1 $\mu\text{m}$ : Particle size 0.1...0.5 $\mu\text{m}$ : Number of particles per $\text{m}^3$ Particle size 0.5...1.0 $\mu\text{m}$ : Number of particles per $\text{m}^3$ Particle size 1.0...5.0 $\mu\text{m}$ : Number of particles per $\text{m}^3$  Size channels for the PC 400 0.3 $\mu\text{m}$ : Particle size 0.3...0.5 $\mu\text{m}$ : Number of particles per $\text{m}^3$ Particle size 0.5...1.0 $\mu\text{m}$ : Number of particles per $\text{m}^3$ Particle size 1.0...5.0 $\mu\text{m}$ : Number of particles per $\text{m}^3$
<b>Operating pressure:</b>	Max. input pressure on the pressure reducer: 40 bar
<b>Humidity of measured gas:</b>	<= 90% rel. humidity, pressure dew point max. 10 °C, non-condensable humidity
<b>Ambient temperature:</b>	5...40 °C
<b>Temperature of the measured medium:</b>	0...40 °C
<b>Compressed air connection:</b>	6 mm PTFE-hose incl. quick coupling
<b>Flow rate:</b>	28.3 l/min (1 cfm)
<b>Interface:</b>	RS 485 (Modbus-RTU)
<b>Light source:</b>	Laser diode
<b>Power supply:</b>	24 VDC, 300 mA
<b>Dimensions:</b>	150 x 200 x 300 mm
<b>Weight:</b>	8 kg
<b>Housing:</b>	Stainless steel



## Stationary solution with particle counter PC 400 and DS 400



DESCRIPTION	ORDER NO.
PC 400 particle counter up to 0.1 µm for compressed air and gases, incl. pressure reducer and calibration certificate	0699 0040
Connection cable for probes 5 m, with open ends	0553 0108
DS 400 chart recorder with graphic display and touch screen operation	0500 4000 D
<b>Option:</b>	
Integrated data logger for 100 million measured values	Z500 4002
Integrated Ethernet and RS 485 interface	Z500 4004
CS Basic - data evaluation in graphic and table form - readout of the measured data via USB or Ethernet. License for 2 working places	0554 8040
<b>As an alternative to PC 400 up to 0.1 µm:</b> PC 400 particle counter up to 0.3 µm for compressed air and gases, incl. pressure reducer and calibration certificate	0699 0041

## Mobile solution with particle counter PC 400 in a service case and DS 500 mobile



DESCRIPTION	ORDER NO.
PC 400 particle counter up to 0.1 µm for compressed air and gases incl. pressure reducer and calibration certificate in a service case	0699 0042
Connection cable to portable devices, ODU/ M12, 5 m	0553 1503
Chart recorder DS 500 mobile, 4 sensor inputs	0500 5012
CS Basic - data evaluation in graphic and table form - readout of the measured data via USB or Ethernet. License for 2 working places	0554 8040
<b>As an alternative to PC 400 up to 0.1 µm:</b> PC 400 particle counter up to 0.3 µm for compressed air and gases incl. pressure reducer and calibration certificate in a service case	0699 0043

## Re-calibration and accessories particle counter PC 400



DESCRIPTION	ORDER NO.
Re-calibration particle counter PC 400 incl. certificate	0699 3304
CS Service Software incl. PC connection set for PC 400	0554 2009

## Notice

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