



Compressed air quality meas. according to ISO 8573

Residual oil content - particles - moisture



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

The centerpiece of compressed air quality measurement is the chart recorder DS 500. It measure 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 an exceeding of

Residual oil content measurement – OIL-Check 400

For permanent and highly precise measurement of the vaporous residual oil content from 0.001 mg/m³ to 2.5 mg/m³. Due to the deep 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 of 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.

the threshold values. 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.

Extract from ISO 8573-1 - threshold values

ISO 8573-1:2010 Class	Solids			Water	Oil
	Maximum number of particles per m ³			Pressure dew point vapor	Totalshare in oil (liquid aerosol and mist) mg/ m ³
	0.1 - 0.5 µm	0.5 - 1 µm	1 - 5 µm		
0	According to determination by the instruments user, more severe 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.
DS 500 – intelligent chart recorder in basic version (4 sensor inputs)	0500 5000
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
Residual oil measurement: OIL-Check 400 – residual oil content measurement of the vaporous residual oil content from 0.001...2,5 mg/m ³ , 3...16 bar. Highly precise PID sensor, integrated mini catalyst for zero point calibration, without integrated display, with analogue output 0...10 Volt for connection to an external chart recorder.	0699 0070
Sampling system OIL-Check 400: 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)	Z699 0075
Alternative: Portable sampling system consisting of 2 m PTFE hose, quick-lock coupling (oil- and grease-free)	Z699 0074
Options for systems > 16 bar: Pressure reducer (oil- and grease-free), input pressure max. 300 bar, output pressure up to 10 bar	Z699 0076
Connection cable for probes, 5 m with open ends	0553 0108
PC 400 particle counter 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 0108
FA 510 dew point sensor for adsorption driers -80°...+20°Ctd incl. inspection certificate, 4...20 mA analogue output (3-wire technology) and Modbus-RTU interface	0699 0510
Standard measuring chamber up to 16 bar	0699 3390
Connection cable for VA/FA Series, 5 m	0553 0104

Mobile solution with DS 500 mobile, OIL-Check 400, PC 400, FA 510



Description	Order no.
DS 500 mobile - intelligent chart recorder with 4 sensors 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
Residual oil measurement: OIL-Check 400 – residual oil measurement of the vaporous residual oil content from 0.001...2.5 mg/m ³ , 3...16 bar. Highly precise PID sensor, integrated mini catalyst for zero point calibration, without integrated display, with analogue output 0...10 Volt for connection to external chart recorders	0699 0070
Mobile transport trolley including roles (outer dimensions: 1.0 x 0.7 x 0.35 m (W x H x D) with firmly mounted components of OIL-Check 400, PC 400, FA 510	0554 6017
Mobile sampling system consisting of 2 m PTFE hose, quick lock coupling (oil- and grease-free)	Z699 0074
Connection cable for pressure, temperature, third party sensors to portable devices, ODU / open ends, 5 m	0553 0501
PC 400 particle counter 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 0501
FA 510 dew point sensor, -80°...+20°Ctd, incl. mobile measuring chamber and 5 m connection cable to portable devices	0699 1510



OIL-Check 400

The monitoring system for permanent highly precise measurement of the vaporous residual oil content in compressed air



The advantages at a glance:

- Permanent, highly precise residual oil measurement (oil vapour) with PID sensor (photo-ionic-detector)
- Ideal for mobile measurement: The PID sensor is ready for measurement within about 30 minutes
- Long-term stable measuring results due to automatic zero-point calibration. The integrated mini catalyst reliably generates a defined reference gas for zero-point calibration
- Contrary to measuring systems which generate the "zero air" resp. reference gas by means of active carbon filters and which are therefore depending on the ageing and the saturation of the active carbon filters, the mini catalyst generates the "zero air" without ageing or wear. There is no change of active carbon filters necessary
- Easy sampling via PTFE hose or stainless steel pipe

Integrated chart recorder DS 400:

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

Technical data OIL-Check 400

Measuring medium:	Compressed air, free from aggressive, corrosive, acid, toxic, flammable and oxidizing components.
Measuring unit:	Residual oil content in mg oil/norm m ³ referred to 1.0 bar [abs], +20° C, 0% relative humidity, according to ISO 8573-1
Identifiable substances:	Hydrocarbons, functional hydrocarbons, aromatic hydrocarbons
Application points:	After activated carbon filter, after activated carbon adsorber, after oil-free compressor, always with connected upstream filtration and dryer
Ambient temperature:	+5 °C... +45 °C, rel. humidity <= 75% without condensation
Pressure dew point:	max. +10 °Ctd.
Compressed air temp.:	+5 °C.... +50 °C,
Operational overpressure:	3...16 bar [g] optionally pressure reducer connected upstream for up to 300 bar [g]
Setting operational pressure:	By means of integrated pressure reducer with display
Humidity of measured gas:	<= 40% rel. humidity, pressure dew point max. +10 °C, non-condensable humidity
Compressed air connection:	G 1/8" inner thread according to ISO 228-1
Measured values:	mg/Norm m ³ , pressure and temperature compensated, residual oil vapor content
Measuring range:	<= 0.001 ... 2.5 mg/m ³
Detection limit (residual oil):	0,001 mg/m ³
Measuring range and accuracy:	≤ 0.01 ... 0.5 mg/m ³ ± 0,003 ≤ 0.5 ... 1.0 mg/m ³ ± 0,10 ≤ 1.0 ... 2.5 mg/m ³ ± 0,10
Flow of measuring gas:	~ 1.20 norm liters/minute, referred to 1.0 bar [abs] and + 20 °C, in ambient condition
Reference gas generation:	By means of integrated mini catalyst
Power supply:	100...240 VAC / 1 Ph. / PE / 50...60 Hz / ± 10%
Outputs:	Ethernet interface (Modbus/TCP) RS 485 interface (Modbus-RTU) 2 alarm relays (change 230 VAC 3A) 4...20 mA (on request)
Operation hours counter:	integrated
Dimensions (mm):	410 x 440 x 163 (W x H x D)
Weight:	approx. 16.3 kg



OIL-Check 400 – stationary solution with DS 400



Description	Order no.
OIL-Check 400 – residual oil content measurement of the vaporous residual oil content from 0.001...2,5 mg/m ³ , 3...16 bar. Highly precise PID sensor, integrated mini catalyst for zero point calibration, without integrated display, with analogue output 0...10 Volt for connection to an external chart recorder	0699 0070
Option: DS 400 chart recorder integrated in the OIL-Check 400	Z699 0071
Sampling OIL-Check 400: 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)	Z699 0075
Alternative: Portable sampling system consisting of 2 m Teflon hose, quick-lock coupling (oil- and gas free)	Z699 0074
Options for systems > 16 bar: Pressure reducer (oil- and grease-free), input pressure max. 300 bar, output pressure up to 10 bar	Z699 0076
Options for DS 400:	
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 sensors, temperature sensors and so on)	Z500 4001
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

OIL-Check 400 portable solution with handle



Flight case

Description	Order no.
OIL-Check 400 – residual oil measurement of the vaporous residual oil content from 0.001...2.5 mg/m ³ , 3...16 bar. Highly precise PID sensor, integrated mini catalyst for zero point calibration. Without integrated display, with alarm output 0...10 Volt for connection to external chart recorder	0699 0070
Option: DS 400 chart recorder integrated in the OIL-Check 400	Z699 0071
Option: Handle and pedestal for mobile use of the OIL-Check 400	Z699 0072
Alternative:	
Option: Flight case for OIL-Check 400	Z699 0073
Option: Mobile sampling system consisting of 2 m PTFE hose, quick lock coupling (oil- and grease-free)	Z699 0074
Options for DS 400:	
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 sensors, temperature sensors and so on)	Z500 4001
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



Description	Order no.
Replacement unit OIL-Check for the period of re-calibration	0699 3910
Replacement unit OIL-Check incl. DS 400 for the period of re-calibration	0699 3920
Re-calibration OIL-Check incl. certificate	0699 3301
Re-calibration and maintenance OIL-Check incl. certificate, rate 1 for up to 8760 hours of operation	0699 3302
Re-calibration and maintenance OIL-Check incl. certificate, rate 2 for over 8760 hours of operation	0699 3303



Particle counter PC 400 and DS 400



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

DS 400 shows all 3 measuring channels according to ISO 8573-1
 Particle size 0.1...0.5 μm : Number of particles per m^3
 Particle size 0.5...1.0 μm : Number of particles per m^3
 Particle size 1.0...5.0 μm : Number of particles per m^3

A1a	PC 400	0.1-0.5 μ	0 cts/ m^3
A1b	PC 400	0.5-1.0 μ	459 cts/ m^3
A1c	PC 400	1.0-5.0 μ	388 cts/ m^3

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The advantages at a glance:

- Highly precise optical laser particle counter for the use in compressed air and technical gases
- Highly precise optics for detection of smallest particles up to 0.1 μm and therefore it is suitable for monitoring of 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 the one of the generally available particle counters (2,83 l/min). Advantage: It counts smallest particles at simultaneously high counting accuracy
- Due to the digital data transfer (Modbus-RTU) to the chart recorders DS 400 / 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. So pollutions at the optics can be recognized resp. excluded quickly

The advantages of DS 400

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

Technical data PC 400

Measuring medium: Compressed air, free from aggressive, corrosive, acid, toxic, flammable and oxidizing components as well as gas types like N_2 , O_2 , CO_2 Further gas types on request

Application points: In case of compressed air after filtration
 In case of gases / pure gases also without filtration

Measuring unit: Number of particles per m^3 (referred to ambient air: 20°C, 1000 hPa)

Size channels of PC 400 0.1 μm :

Particle size 0.1...0.5 μm : number of particles per m^3
 Particle size 0.5...1.0 μm : number of particles per m^3
 Particle size 1.0...5.0 μm : number of particles per m^3

Size channels of PC 400 0.3 μm :

Particle size 0.3...0.5 μm : number of particles per m^3
 Particle size 0.5...1.0 μm : number of particles per m^3
 Particle size 1.0...5.0 μm : number of particles per m^3

Operating pressure: Max. input pressure at pressure reducer: 40 bar

Humidity of meas. gas: $\leq 90\%$ rel. humidity, pressure dew point max. 10°Ctd, non-condensable humidity

Comp. air connection: 6 mm PTFE hose incl. quick-lock coupling

Flow rate: 28,3 l/min (1 cfm)

Interface: RS 485 (Modbus-RTU)

Light source: Laser diode

Power supply: 24 VDC, 300 mA

Dimensions: 150 x 200 x 300 mm

Weight: 8 kg

Housing: 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
Option: Integrated data logger for 100 million measured values	Z500 4002
Option: 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
As an alternative to PC 400 up to 0,1 µm: PC 400 particle 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 for up to 0.1 µm for compressed air and gases incl. pressure reducer and calibration certificate in a service case	0699 0042
Connection cable for third party sensors to portable devices, ODU/open ends, 5 m	0553 0501
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
As an alternative to PC 400 up to 0,1 µm: 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 of particle counter PC 400



Description	Order no.
Re-calibration of particle counter PC 400 incl. certificate	0699 3304