



TCC

Particle counter

The TCC particle counter with LDS 45/50 laser sensor is used as an online monitoring system for hydraulic oils and diesel fuels. The system can evaluate three freely adjustable particle sizes. Three ISO classes may be shown on the display. For each channel limit values can be set which monitor the degree of contamination. The devices can be connected to a central evaluation unit via the RS 232 or the 4-20mA interfaces respectively. Optional: Accessories for flow regulation (riser pipe, DPS or DHV). By setting the measuring time at the TCC the particle numbers can be measured in relation to the volume.

Software:

The SW-TCC software is especially suitable for monitoring several TCCs (networked via RS486) or for measurements with 1 TCC only. Then PC controlled measurements can be carried out. They are displayed, printed out and exported to Excel for further processing. The program is suitable for defined-time as well as manual measurements. It is also possible to perform measurements running continuously or in fixed cycles.

Areas of application:

Continuous and/or periodic monitoring of oil tanks and power units, flushing mechanical units, fuel filling/dispensing

Technical specifications:

- **Channels:** max. 3 freely selectable channels, alternatively 3 ISO classes
- **Measuring value display:** Display / current 0-20 mA/4-20 mA / RS 232
- **Power supply:** 18-36 VDC, max. 10 W
- **Option:** freely selectable measuring, flushing, cycle periods
- **Dimensions (H x W x D):** 185 x 245 x 120 mm



PCSS-fluid

Particle measuring system

The **PCSS-fluid** transmits the ISO classes via two current interfaces. The double piston pump and the laser sensor ensure precise measurement results.

Alternatively, the device can be operated without pump (CSS fluid, see liquid brochure). In this case the user must provide a constant flow.

All parameters (measuring time, particle size and limit values) are set via a PC. The particle number is transmitted via the current interface 4-20 mA to an evaluation system. Exceeding limit values can activate two potential-free contacts on the box to provide an alarm signal.

Areas of application:

Filtration check, online monitoring of hydraulic oils, cleaning facilities, wear and tear monitoring during operation and/or start-up of units, monitoring during filling/dispensing liquids.

Technical specifications:

- **Channels:** 2 measuring channels, alternatively 2 ISO classes (freely selectable) or 2 NAS classes respectively
- **Measuring value display:** 4-20 mA, resolution 10bit / RS 232 (download)
- **Power supply:** 230 VAC +/- 10%, max. 250W
- **Option:** freely selectable interval time (max. 4 hours)
- **Dimensions (HxWxD):** 160 x 160 x 320 mm

Syringe®

Syringe® for the determination of residual contamination

The lab system Syringe® (see liquid brochure) may be equipped with an additional funnel to determine the residual contamination in a flushing liquid. In this case the device is equipped with a LDS 1/1 sensor, measuring range 5-500µm (alternatively LDS 45/50, measuring range 1.5-100µm for oil).

As an option the syringe can also be equipped with a housing for pressurising sample bottles.



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Particle Measuring Systems for Oils

Labsystem PZG 4, Particle Counting System Abakus® mobil fluid, Particle Counter TCC, Particle Measuring System PCSS-fluid (CSS-fluid)



Particle Measuring Systems for Oils

Since 1992 the Klotz Company's main activities have been in the development and manufacture of particle counters for **measuring contamination in hydraulic oils**, diesel and kerosene.

A further major application is the **determination of residual contamination** of complete mechanical units and components in flushing and cleaning machinery. The logging of residual contamination may be determined online or in the lab.

For the validation of filter elements there are special sensors available as well as software packages for the evaluation of 2 sensors. Through the use of special opto-electronic components – especially in the area of laser technology – the LDS laser sensor can also be applied for the most demanding measuring tasks.

The double piston pump system (DPS) in the portable system Abakus® mobil fluid (Amf) as well as in the **lab system PZG 4** provides the best feeding system for the medium. Klotz Company developed the pump system specifically for use in particle counting instruments.

For **online measurements**, during which up to 256 size classes are determined simultaneously, there is a PC insert board available in connection with the PSS (pump sensor system) or with an individual sensor. For **multi-pass applications** and/or for the measuring of two sensors there are also software packages available. (SW-MP, SW-DS, SW-KS).



Contamination control in hydraulic – keeping your system in motion!



ABAKUS® MOBIL FLUID

Particle counter

The Abakus® mobil fluid particle counting system with tank (Amf) is used for counting particles from pressure lines and bottles. The particle number can be displayed for up to 16 freely definable size classes, printed out, saved and transmitted to the interface. The representation of the particle number can also be carried out in the effective standards (ISO 4406, NAS).

The LDS 45/50 laser sensor and the double piston pump are well suited for the contamination control of oils. The pump works independently of the inlet pressure and the oil's viscosity. Since no idle stroke is required it is possible to very quickly measure large quantities of liquid. The Amf particle counter can work from lab bottles, tank systems and pressure lines without any problems.

The LDS 45/50 sensor for the Amf and PZG can be employed for high particle concentrations of up to 60,000 particles/ml. Furthermore, the sensor is distinguished by its high reproducibility and high resolution.

For monitoring flushing equipment the LDS 1/1 laser sensor is used. The sensor can be operated with a high flow rate.

Software:

With the "Log and Show" evaluation software the measuring results can be exported and further processed via the built-in interface to the PC in various programs (MS Excel, Lotus 1-2-3 etc.). Direct measuring and saving via the software is also possible. Optional: memory card (compact flash CF).

Areas of application:

Contamination control of hydraulic oils (bottle samples or samples from pressure lines), testing diesel fuels, contamination control of transmission oils. The measuring device is suitable for on-line measurements, for measurements in the lab and due to its compact construction also for on-site mobile applications. Optional: battery operation.

Technical specifications:

• Size classes:

4, 6, 14, 25, 50, 100/2/5/15
According to ISO 4406 (91/99), NAS 1638, SAE-AS4059E, SAE-A6D, SAE749D, GOST 17216-71, GJB 420A-96, GJB 420-87, GB 5930-86

• **Measuring value display:** PC, display, printer, limit value display, CF Card

• **Software:** LAS 3.3

• **Power supply:** 230 / 115 VAC, 24 VDC, battery

• **Connection:** Minimes (M16x3; 6 mm Ermeto (L))

• **Dimensions (HxWxD):** 220 x 490 x 250 mm

• **Accessories:** PZG for the pressurization of sample bottles

Accessories



Abakus® mobil fluid with protection hood



Wall support Abakus® mobil fluid



Evaluation software for Abakus® mobil fluid



PCI insert board for PZG 4



Laser diode sensor LDS, the original - also for OEM



Abakus® mobil fluid - classical version



PZG 4

Particle counting system for lab applications

The sample feeder **PZG 4** with the PC insert board PCI and the evaluation software SW-OI and the double piston pump system (DPS) are employed for measuring oils and liquids from containers. The representation and storage of measured data is carried out on the PC according to the selected standard.

By using the pressure container (pressure dome) with the special Klotz sealing system sample bottles can be very simply degassed by applying vacuum and can then be fed, pressurized, through the sensor. The DPS ensures the accurate feed of the medium.

For oils with viscosities of up to 350 mm²/s the LDS 45/50 laser sensor (particle concentrations max. 60.000 particles/ml [$\geq 4\mu\text{m}$]) is employed. For low viscosity liquids measurements can be carried out alternatively with the LDS 30/30 sensor (particle concentrations max. 130.000 particles/ml [$\geq 4\mu\text{m}$]; resolutions $<5\%$).

Software:

The SW-OI program allows you to carry out measurements with the sample feeder PZG4. It was specifically designed for measurements of oils. It can carry out evaluations according to ISO 4406, ISO (NIST) and NAS. Average determination, protocol printouts as well as tabular representations are possible. The measuring and flushing volumes can be given in multitudes of 10ml since with every pump stroke exactly 10ml liquid is fed.

A flexible export to Excel for further evaluations and representations is also possible.

Areas of application:

Contamination control of hydraulic oils, transmission oils, diesel, washing liquids

Technical specifications:

• **Size classes:** 4, 6, 14, 25, 50, 100; According to ISO 4406 (91/99), NAS 1638, GJB-420A-96, SAE-A6D, GOST-17216-71 Optional: SW-PE 256 size classes

• **Pressure/vacuum:** 5 bar (special model 12 bar) 0-0.8 bar depending on compressor

• **Software:** SW-OI

• **Power supply:** 230 VAC, 50/60 Hz, 20W

• **Option:** Magnetic stirrer

• **Abmessungen (HxBxT):** 700 x 230 x 440 mm



Particle counters for more safety