Laser Particle Counter ▪ Type LasPaC-II

Fluid analysis is a crucial component of any oil management program. Early detection of potential problems can prevent costly repairs and downtime. The LasPaC-II makes it possible to detect the ISO Cleanness levels of the hydraulic media.

Characteristics

The LasPaC-II devices feature a twin laser system and eight channels for different particle sizes in order to gurantee high accuracy and repeatability. These compact unit are easy to handle for mobile and inline applications for systems with pressures up to 400 bar / 5801 PSI.
The LasPaC-II is available in three different versions:

LasPaC-II-P: Portable Laser Particle Counter
The LasPaC-II-P is a fully equipped portable laser particle counter.
The LasPaC-II-P features a complete QWERTY keyboard, an integrated thermal printer, an internal rechargeable battery and a large LCD display.

LasPaC-II-M: Mobile Laser Particle Counter
The LasPaC-II-M is a highly accurate laser particle counter. With a competitive price, the LasPaC-II-M is the best compromise between lower cost and briliant accuracy/reliability.

All LasPaC-II devices have an internal data memory and are available within the accompanying Windows® based software package for reports and data downloads.

Overview

					
Options	**LasPaC-II-P (Portable)**	**LasPaC-II-M (Mobile)**	**Bottle Sampler 110**	**Bottle Sampler 500**	**LPM-II**
Laser Type	Twin-Laser	Twin-Laser	-	-	LED Laser
Analysis Range	8 channels (4,6,14,21,25,38,50,68 µm$_{(c)}$)	8 channels (4,6,14,21,25,38,50,68 µm$_{(c)}$)	-	-	8 channels (4,6,14,21,25,38,50,68 µm$_{(c)}$)
Power Supply	External	External	-	-	External
Battery Option	Internal	Internal (optional)	-	-	-
Display	Integrated (large)	Integrated (small)	-	-	Internal / External
Keyboard	Integrated	-	-	-	-
Printer	Integrated	-	-	-	-
Data Storage	Internal (for approximately 600 tests)	Internal (for approximately 600 tests)	-	-	Internal (for approximately 4000 tests)
PC Interface	RS-232	RS-232	-	-	RS485, RS232, Modbus, CAN Bus
Fluid Preparation	-	-	Integrated vacuum/pressure pump	Integrated vacuum/pressure pump	-
Maximal Bottle Size	-	-	110 ml	500 ml	-
Compatible with	Mineral oil and petroleum based fluids, Specific Water Glycol fluids or phosphate ester	Mineral oil and petroleum based fluids, Specific Water Glycol fluids or phosphate ester	Mineral oil and petroleum based fluids	Mineral oil, petroleum based fluids and Specific Water Glycol fluids or phosphate ester	Mineral oil and Specific Water Glycol fluids or phosphate ester

Laser Particle Counter ▪ Type LasPaC-II

Features & Options: LasPaC-II (General)

Mobile - Compact and Convenient
The LasPaC-II-P (Portable), the LasPaC-II-M (Mobile) and all its accessories are supplied in a light-weight rugged industrial case.

This user-friendly portable case is waterproof and resistant against all common fluids.

Accuracy - Twin-laser, 100% Coverage
In all STAUFF laser particle counting devices, the fluid passes through the measuring cell and through a laser beam. The light from the laser is evaluated by a photo diode.

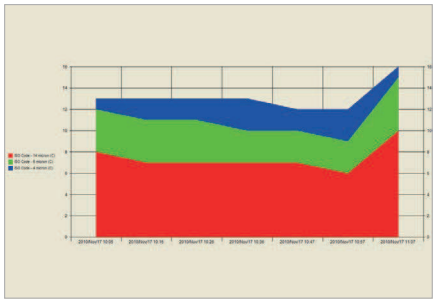
As the fluid passes through the laser beam the amount of light changes. These changes are directly proportional to size of the particles, and the total volume of particles. In many other particle counters only part of the measuring cell is lighted by the laser, thus only a part of the total amount of particles are registered, and the result is projected.

In contrast, the measuring cell of the LasPaC-II is completely examined, and all particles are registered. In addition to this, a second laser is used to analyze all particles sizes smaller than 6 $\mu m_{(c)}$.

Additionally, the integrated booster cylinder allows very precisely dosage of the test fluids. This ensures a very high accuracy with excellent repeatability.

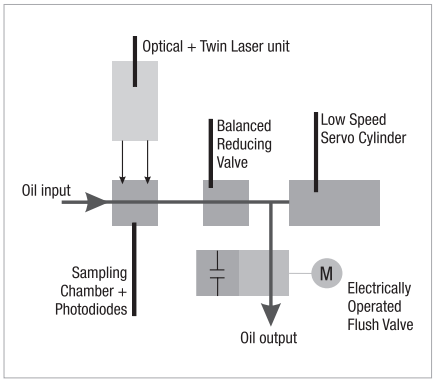
Functional - Calibration to ISO 11 171
The LasPaC-II devices are calibrated with ISO Medium Test Dust (MTD) based on the ISO 11 171:1999 calibration standard.

STAUFF particle counters meet the new ISO 4406 cleanliness classification codes and provide results in the NAS 1638 and the SAE 4059 codes.



For any Type of Application - Large Pressure Range
A big advantage of the LasPaC-II devices is the wide pressure range: Low pressure measurements starting with 2 bar / 29 PSI and high pressure tests up to 400 bar / 5801 PSI result in reliable readings. Many other products available today require special add-on devices or pressure cartridges which need to be recharged for this.

The test hoses, which are provided with the device, allow an easy connection to common test couplings M16 x 2 (STAUFF TEST 20 or comparable).



Global Use - Variable Voltage Supply
The external power supply unit provides most variable voltage ranges of 110 ... 240 V AC. European, UK and US plug adaptors ensure a worldwide applicability of the LasPaC-II.

Always Secure - External Alarms
The LasPaC-II-P devices offer the opportunity to define different alarm levels.

It is possible to configure two separate contamination alarm levels (e.g. clean alarm level and dirt alarm level). When set, an alarm indicator is given to external devices (e.g. indicator light, offline-filter) if the alarm level is reached.

Making the Connection - Downloading with RS-232 Interface and USB Adaptor
The measured data can be downloaded onto any PC or laptop computer via the RS-232 interface or alternativley via a USB adaptor.

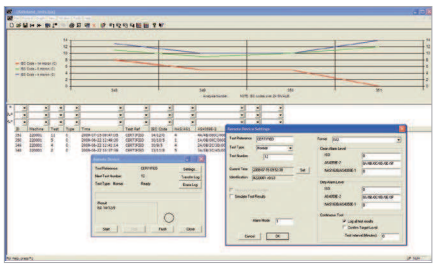
The LasPaC-II software supports an easy download for data processing of the recorded measurements.

Several diagrams are available and are automatically generated to offer a very clear arrangement of all data for analysis. Data can also be easily exported to Microsoft Excel®.

Always up-to-date - Integrated Clock
An integrated rechargeable battery-operated clock provides the exact date and time which are shown on every printout.

In addition, every download of measured data is marked with date and time as well. The precise time of measurement is documented on all printouts and for all data stored.

Adaptable - Software Updates
The RS-232 (or USB) interface ensures flexibility for future developments in terms of calibration, evaluation and output. Software updates can easily be installed onto the LasPaC-II devices.



Cleanliness - High-Speed Flush Valve
To ensure an accurate measurement is taken, the sensor must be cleaned before each test.

The LasPaC-II achieves this by means of an electric operated flush valve. This valve can be opened on demand and between tests by simply depressing the flushing valve push button. The optimized design of the flush valve reduces the rinsing process to the minimum requirement, and ensures a quick restart of the next measurement.

For all Applications - High Compatibility
The LasPaC-II units are compatible with all Mineral Oil and Petroleum based fluids.
Phosphate Ester (e.g. Skydrol®) and Water Glycol compatible devices are available upon request.
Please contact STAUFF for details.

More Oil Information - The Moisture/ Temperature Sensor
The LasPaC-II also offers the option of adding an integral moisture / temperature sensor.

This sensor measures the moisture content of the test fluids (displayed as relative humidity in RH %) and also indicates the current fluid temperature (in °C).

Please note that the moisture/ temperature sensor is not compatible with Phosphate Ester (e.g. Skydrol®) and Water Glycol fluids.
For further information please see on page 67.

Optional - Bottle Sampling Unit
Highly aerated fluids may lead to inaccurate results.

Therefore a de-aeration facility has been incorporated into the optional bottle sampling units.

Both sizes (110 ml and 500 ml) of the bottle sampling unit are delivered with an external power supply, and allow the user to properly condition the sample fluid prior to any measurements taken. For further information please see on page 66.

Please note that the moisture/ temperature sensor as mentioned above does not work in conjunction with the bottle sampling unit.

Scope of Delivery

Each kit of a laser particle counter STAUFF LasPaC-II includes:

- 1x Laser particle counter STAUFF LasPaC-II
- 1x LasPaC-II-M / LasPaC-II-P: Waste hose 2 m / 3.65 ft
- 1x Pressure hose: 1,5 m / 2.67 ft
- 1x Waste bottle
- 1x External power supply including cable with European, UK and USA plug adaptors
- 1x RS-232 connecting cable, 1 m / 1.78 ft including RS-232 to USB converter
- 1x Software CD "LasPaC-II View"
- 1x User guide LasPaC-II
- 1x User guide LasPaC-II View
- 3x Thermal printer paper (only with LasPaC-II-P)

C

Laser Particle Counter ▪ Type LasPaC-II-P (Portable)

Light-Weight Rugged Industrial Case

Integrated Printer

Product Description

The LasPaC-II-P (Portable) is the most complete way to measure the contamination level of your system.
With the LasPaC-II-P you have the ability to measure, analyze and document your results immediately without the need of any additional equipment.

Features

Quick Results - Fast Results and Easy Operation
The integrated complete QWERTY keyboard, a large LCD display and intuitive handling all lead to the easy and quick operation of the LasPaC-II Portable.
The optimized flushing process of the LasPaC-II-P is quick and effective, and allows for continuously accurate measurements.

Black and White - Integrated Printer
The integrated printer in the LasPaC-II-P supports print-outs in the field, thus providing immediate documentation. Every printout confirms date and time of your measurement.

Independent Use - Rechargeable Battery Mode
The integrated rechargeable battery of the LasPaC-II-P allows the use of on site measurements, even in the event where access of an external power source is not available. The measurement data is stored in the internal memory of the unit and can be transferred to a computer when required.

Once charged the LasPaC-II-P can run approximately 100 tests before recharging is needed again.

Options

- Moisture / Temperature Sensor
  This sensor measures the moisture content of the test fluids (displayed as relative humidity in RH %) and also indicates the current fluid temperature (in °C).
  For further information please see on page 67.

- Phosphate Ester (e.g. Skydrol®) or specific Water Glycol fluids units on request

Order Codes

LasPaC-II - P - M - O
① ② ③ ④

① Series and Types

Laser Particle Counter	**LasPaC-II**

② Version

Portable	**P**

③ Fluid Compatibility

Mineral Oil, Petroleum based fluids (standard option)	**M**
Phosphate Ester (e.g. Skydrol®)	**E**
Specific Water Glycol fluids	**G**

④ Moisture/ Temperature Sensor

Without moisture/ temperature sensor	**O**
With moisture/ temperature sensor	**W**

Please note: The moisture/ temperature sensor is not suitable for Phosphate Ester (e.g. Skydrol®) and Water Glycol fluids.

Laser Particle Counter ▪ Type LasPaC-II-P (Portable)

Highspeed Flush Valve


Computer Interfaces of the LasPaC-II-P


Easy Connection to common Test Couplings

Technical Data

Dimensions and Weight
- L/W/H: 551 x 358 x 226 mm / 21.69 x 14.09 x 8.90 in
- Weight: 13 kg / 28.66 lbs

Keyboard / Printer
- Keyboard: QWERTY keyboard
- Printer: Integrated thermal printer (384 dots per line)

Power Supply
- Voltage range: 110 ... 240 V AC 12 ... 24 V DC
- European, UK and US power plug adaptors included
- Number of tests before recharging is required: 100

Calibration
- Calibration: ISO Medium Test Dust (MTD) according to ISO 11 171:1999
- Analysis range: ISO 8-24, ISO 4406 Code, NAS 1638 Code 2-12, SAE AS 4059 Code 2-12

Pressure / Viscosity
- Pressure range: 2 ... 400 bar / 29 ... 5801 PSI
- Viscosity range: 1 ... 400 cSt

Laser Sensors
- High accuracy laser: 4 ... 6 $\mu m_{(c)}$
- Standard accuracy laser: 6 ... 68 $\mu m_{(c)}$
- Measured channels: 4, 6, 14, 21, 25, 38, 50, 68 $\mu m_{(c)}$
- The orifice of the sensor has a cross section of 0,9 x 0,9 mm / .04 x .04 in
- The maximum concentration is ISO 4406 Code 24 (160.000 p/ml)

Accessories
- Bottle Sampling Unit 110 ml (for Mineral Oil and Petroleum based fluids)
- Bottle Sampling Unit 500 ml (for Mineral Oil and Petroleum based fluids)
- Bottle Sampling Unit 500 ml (Version E) (for Phosphate Ester (e.g. Skydrol®) available on request) For further information please see on page 66.
- Screen filter: 500 µm (see on page 67)

Hose Connections
- Test coupling STAUFF Test 20 or comparable (M16 x 2)

Sample Volume
- 8 ml (short)
- 15 ml (normal)
- 30 ml (dynamic)
- 24 ml (bottle sampler)
- 15 ml (continuous)

Permissible Temperature
- Operating: +5 °C ... +80 °C / +41 °F ...+176 °F

Data Output
- Cumulative particle counts, as well as cleanliness classes according to ISO 4406 (1999) / SAE AS 4059 Rev.D (2001) and ISO 4406 (1191) / NAS 1638 (1964)

Max. Concentration
- ISO 24

Accumulator
- Internal rechargeable battery

Data Storage
- 600 tests

Fluid Compatibility
- Mineral Oil, Petroleum based fluids
- Phosphate Ester and Water Glycol compatible devices on request

Computer Interface
- RS-232 communication port as standard
- USB adaptors included

External Alarm
- External alarm socket with switching outputs max. 24 V DC/AC, 1 A

Software
- Downloading and storage of the data with included “LasPaC-II View” software. Further processing with Microsoft Excel® possible.

C

Laser Particle Counter ▪ Type LasPaC-II-M (Mobile)

LasPaC-II-M with integrated battery (standard option)

LasPaC-II-M also available without integrated battery

Product Description

The LasPaC-II-M is a highly accurate laser particle counter. With a competitive price, the LasPaC-II-M is the best compromise between lower cost and briliant accuracy/reliability.

Features

Versatile - Lightweight and Convenient
The LasPaC-II-M (Mobile) is designed for applications where it is necessary to have a small, light and robust service unit.

Low Cost - Same Functions for a Budget Price
Without losing the quality in measurement accuracy, reliability and repeatability the LasPaC-II-M is a cost effective alternative to the fully equipped LasPaC-II-P.

Options

- Moisture / Temperature Sensor
  This sensor measures the moisture content of the test fluids (displayed as relative humidity in RH %) and also indicates the current fluid temperature (in °C).
  For further information please see on page 67.
- Phosphate Ester (e.g. Skydrol®) or specific Water Glycol fluids units on request
- LasPaC-II-M also available without integrated battery

Order Codes

LasPaC-II - M - M - O - B
① ② ③ ④ ⑤

① Type and Series

Laser Particle Counter	**LasPaC-II**

② Version

Mobile	**M**

③ Fluid Compatibility

Mineral Oil, Petroleum based fluids (standard option)	**M**
Phosphate Ester (e.g. Skydrol®)	**E**
Specific Water Glycol fluids	**G**

④ Moisture/ Temperature Sensor

Without moisture/ temperature sensor	**O**
With moisture/ temperature sensor	**W**

Please note: The moisture/ temperature sensor is not suitable for Phosphate Ester (e.g. Skydrol®) and Water Glycol fluids.

⑤ Battery

With internal rechargeable battery (standard option)	**B**
Without internal rechargeable battery	**O**

Laser Particle Counter ▪ Type LasPaC-II-M (Mobile)

LasPaC-II-M with small Bottle Sampler

Display and Buttons

C

Technical Data

Dimensions and Weight
- L/W/H: 340 x 295 x 152 mm / 13.40 x 11.61 x 5.98 in
- Weight: 4,75 kg / 10.47 lbs

Power Supply
- Voltage range: 110 ... 240 V AC, 12 ... 24 V DC
- European, UK and US power plug adaptors included
- Number of tests before recharging is required: 60

Calibration
- Calibration: ISO Medium Test Dust (MTD) according to ISO 11 171:1999
- Analysis range: ISO 8-24, ISO 4406 Code, NAS 1638 Code 2-12, SAE AS 4059 Code 2-12

Pressure / Viscosity
- Pressure range: 2 ... 400 bar / 29 ... 5801 PSI
- Viscosity range: 1 ... 400 cSt

Laser Sensors
- High accuracy laser: 4 ... 6 $\mu m_{(c)}$
- Standard accuracy laser: 6 ... 68 $\mu m_{(c)}$
- Measured channels: 4, 6, 14, 21, 25, 38, 50, 68 $\mu m_{(c)}$
- The orifice of the sensor has a cross section of 0,9 x 0,9 mm / .04 x .04 in
- The maximum concentration is ISO 4406 Code 24 (160.000 p/ml)

Accessories
- Bottle Sampling Unit 110 ml (for Mineral Oil and Petroleum based fluids)
- Bottle Sampling Unit 500 ml (for Mineral Oil and Petroleum based fluids)
- Bottle Sampling Unit 500 ml (Version E) (for Phosphate Ester (e.g. Skydrol®) available on request) For further information please see on page 66.
- Screen filter: 500 µm (see on page 67)

Hose Connections
- Test coupling STAUFF Test 20 or comparable (M16 x 2)

Sample Volume
- 8 ml (short)
- 15 ml (normal)
- 30 ml (dynamic)
- 24 ml (bottle sampler)
- 15 ml (continuous)

Permissible Temperature
- Operating: +5 °C ... +80 °C / +41 °F ...+176 °F

Data Output
- Cumulative particle counts, as well as cleanliness classes according to ISO 4406 (1999) / SAE AS 4059 Rev.D (2001) and ISO 4406 (1191) / NAS 1638 (1964)

Max. Concentration
- ISO 24

Data Storage
- 600 tests

Fluid Compatibility
- Mineral Oil, Petroleum based fluids
- Phosphate Ester and Water Glycol compatible devices on request

Computer Interface
- RS-232 communication port as standard
- USB adaptors included

Software
- Downloading and storage of the data with included “LasPaC-II View” software. Further processing with Microsoft Excel® possible.

Internal Rechargeable Battery
- Standard option with internal rechargeable battery

C

Bottle Sampling Unit ▪ Typ Bottle-Sampler-LasPaC-II

Bottle Sampling Unit 110 ml and Accessories

Bottle Sampling Unit 110 ml

Bottle Sampling Unit 500 ml

Product Description

Analysis Everywhere - Bottle Sampling Unit
If a direct particle count on your system is not possible, the LasPaC-II bottle sampler units allow you to take measurement samples for analysis at a later time.

Conditioning - The De-aeration Facility
A highly aerated fluid may lead to inaccurate results; therefore a de-aeration process has been incorporated into the bottle sampling units.
By evacuating the air from the sampling chamber, aeration within the fluid is removed, and the fluid is properly conditioned prior to sampling.

Your Choice - 110 ml or 500 ml Size
STAUFF offers two sizes of bottle sampling units for the LasPaC-II devices: the 110 ml and the 500 ml units.

The 110 ml unit is supplied in an extra case including various accessories such as power supply, sampling hoses, pressure hoses, bottles (sample and waste) and adaptors. It is designed for mobile applications and is only compatible with Mineral Oil and Petroleum based fluids.

The standard version of the 500 ml unit is compatible with Mineral Oil and Petroleum based fluids; a Phosphate Ester (e.g. Skydrol®) compatible version of the 500 ml unit is available on request. Please contact STAUFF for details.

The 500 ml bottle sampling unit is delivered with the required power supply.

Please note that the moisture / temperature sensor does not work in combination with bottle sampler devices.

Order Codes

Bottle-Sampler - **LasPaC-II** - **110-M**
① ② ③

① Bottle Sampling Unit

Bottle Sampling Unit	**Bottle-Sampler**

② Type and Series

Laser Particle Counter	**LasPaC-II**

③ Unit

110 ml Bottle Sampling Unit suitable for Mineral Oil and Petroleum based fluids only	**110-M**
500 ml Bottle Sampling Unit suitable for Mineral Oil and Specific Water Glycol fluids, Petroleum based fluids only	**500-M/G**
500 ml Bottle Sampling Unit suitable Phosphate Ester (e.g. Skydrol®)	**500-E**

Moisture / Temperature Sensor

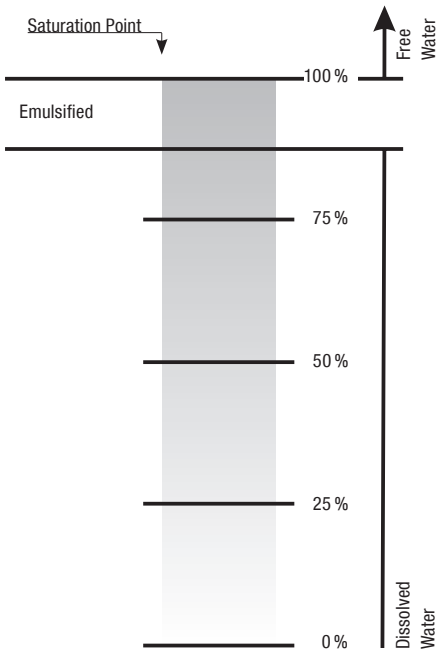
Saturation Levels
Since the effects of free (also emulsified) water are more harmful than those of dissolved water, water levels should remain always well below the saturation point.

However, even water in solution can cause damage, and therefore every reasonable effort should be made to keep saturation levels as low as possible.

There is no such thing as too little water.
As a guideline, we recommend maintaining saturation levels below 50 % in all equipment.

Different oils have different saturation levels, and % saturation is the best and most practical measurement.

These results can be converted to ppm (parts per million), if the oil type saturation / temperature characteristic is known.



Product Description

More Oil Analysis - Oil Saturation and Temperature
In Mineral Oils and non-aqueous fire resistant fluids, water is undesirable. Once the water exceeds a saturation level (about 500 ppm for Mineral Oils) the fluid starts to appear hazy. Above this level there is a danger of free water accumulating in the system. This can lead to corrosion and accelerated wear.

As an option, all LasPaC-II devices provide accurate and repeatable measurement of the saturation level of water in oil with the moisture / temperature sensor. The sensor is located internally in a specially designed housing and is positioned in the low pressure constant flow line.

Additional Information - Oil Temperature Readings
Beside the saturation level the optional moisture / temperature sensor of the LasPaC-II units has the ability to measure the fluid temperature. This allows to provide a reference temperature for the RH (relative humidity / % saturation of water in oil) readings.

Both results, RH % and °C, are displayed on the main / test progress screen and on the printed analysis.

Please note: Due to the temperature gradient existing between the system tapping point and the RH / temperature module, the temperature reading can be 5° to 10° less than the actual system temperature, depending on operating conditions.
The moisture / temperature sensor is not suitable for bottle sampling.

Laser Particle Counter ▪ Accessories

Order Codes

Accessories / Spare Parts

①

① Type of Accessories / Spare Parts

Waste hose 2 m / 6.56 ft	**Hose-LasPaC-II-Waste-2m**
Pressure hose 1,5 m / 4.92 ft	**SMS-20-1500-A-W3**
110 ml certified clean bottle (5 pieces)	**Set-Bottle-LasPaC-II-110-C**
250 ml certified clean bottle (5 pieces)	**Set-Bottle-LasPaC-II-250-C**
110 ml glass sample bottle (5 pieces)	**Set-Bottle-LasPaC-II-110**
250 ml glass sample bottle (5 pieces)	**Set-Bottle-LasPaC-II-250**
500 ml glass sample bottle (5 pieces)	**Set-Bottle-LasPaC-II-500**
Printer paper LasPaC-II-P (5 pieces)	**Set-Paper-LasPaC-II-Printer**
RS 232 to USB converter	**Adaptor-PPC-04/12-RS232-to-USB-CAB**
Screen filter	**Screen-Filter-LasPaC-II**

Product Description: Screen Filter

An optional Screen Filter is available for heavily contaminated systems. The filter device is assembled directly to the supply line and allows particle counts in ambient conditions where normally the contamination is too high for a reliable test.

The Stainless Steel Filter has a mesh of 500 µm and is cleanable.

C

Laser Particle Counter ▪ Technical Data

			
Type	**LasPaC-II-P (Portable)**	**LasPaC-II-M (Mobile)**	**LPM-II**
Dimensions ($^{mm}/_{in}$) (W x D x H)	551 x 358 x 226	340 x 295 x 152	141 x 116 x 63,5
	21.69 x 14.09 x 8.90	13.40 x 11.61 x 5.98	5.55 x 4.57 x 2.5
Weight ($^{kg}/_{lbs}$)	13	4,75	1,15
	28.66	10.47	2.53
Keyboard	QWERTY keyboard integrated	-	5 Button Display Settings
Printer	Thermal printer integrated (384 dots per line)	-	-
Viscosity Range	1 ... 400 cSt	1 ... 400 cSt	<= 1000 cSt
Calibration	MTD, ISO 11 171:1999	MTD, ISO 11 171:1999	MTD, ISO 11171:1999
Analysis Range	ISO 8-24, ISO 4406 Code, NAS 1638 Code 2-12, SAE AS 4059 Code 2-12	ISO 8-24, ISO 4406 Code, NAS 1638 Code 2-12, SAE AS 4059 Code 2-12	ISO 8-24, ISO 4406 Code, NAS 1638 Code 2-12, SAE AS 4059 Code 2-12
Sensitivity	4, 6, 14, 21, 25, 38, 50, 68 $\mu m_{(c)}$	4, 6, 14, 21, 25, 38, 50, 68 $\mu m_{(c)}$	4, 6, 14, 21, 25, 38, 50, 68 $\mu m_{(c)}$
Sample Volume	8 ml (short)	8 ml (short)	Adjustable by user
	15 ml (normal)	15 ml (normal)	
	30 ml (dynamic)	30 ml (dynamic)	
	24 ml (bottle sampler)	24 ml (bottle sampler)	
	15 ml (continuous)	15 ml (continuous)	
Pressure Range ($^{bar}/_{PSI}$)	2 ... 400	2 ... 400	Please refer differential pressure diagram
	29 ... 5801	29 ... 5801	
Operating Temperature ($^{°C}/_{°F}$)	+5 ... +80	+5 ... +80	-25 ... +80
	+41 ... +176	+41 ... +176	-13 ... +176
Max. Concentration	ISO 24	ISO 24	ISO 24
Power Supply	110 ... 240 V AC 12 ... 24 V DC	110 ... 240 V AC 12 ... 24 V DC	110 ... 240 V AC 9 ... 36 V DC, <2,2W
Battery	Internal rechargeable battery	Internal rechargeable battery	-
Data Storage	600 tests	600 tests	4000 tests
Fluid Compatibility	Mineral Oil / Petroleum based fluids; Phosphate Ester and water glycol compatible devices on request	Mineral Oil / Petroleum based fluids; Phosphate Ester and Water Glycol compatible devices on request	Mineral Oil / Petroleum based fluids; Phosphate Ester and Water Glycol compatible devices on request
PC Interface	RS-232	RS-232	RS-232
External Alarm	External alarm socket	-	External Alarm
Hose Connections	Test coupling STAUFF Test 20 or comparable (M16 x 2)	Test coupling STAUFF Test 20 or comparable (M16 x 2)	Test coupling STAUFF Test 20 or comparable (M16 x 2)
Accessories	Moisture/temperature sensor	Moisture/temperature sensor	Remote Display
	Bottle sampling unit (110 ml / 500 ml)	Bottle sampling unit (110 ml / 500 ml)	Interface Module
	Screen filter (500 µm)	Screen filter (500 µm)	Flow Control Valve