



Global Filtration Technology

PLC-3000

Portable Fluid Analysis

Why on-site fluid analysis?

- Certification of fluid cleanliness levels
- Immediate and accurate results
- Early warning tool to help prevent catastrophic failures in critical fluid systems
- To comply with customer cleanliness requirements and specifications
- Equipment warranty compliance
- New oil cleanliness testing
- Fluid viscosity and temperature verification

The Parker PLC-3000 Portable Laser Particle Counter is a sampler (both on-line and bottle) sensor and counter, packaged together to form a highly advanced portable field instrument utilizing laboratory analysis technology. The PLC-3000 is a fully solid state device using state-of-the-art technology from the Hydraulic, Electronic, Pneumatic, and Laser industries.

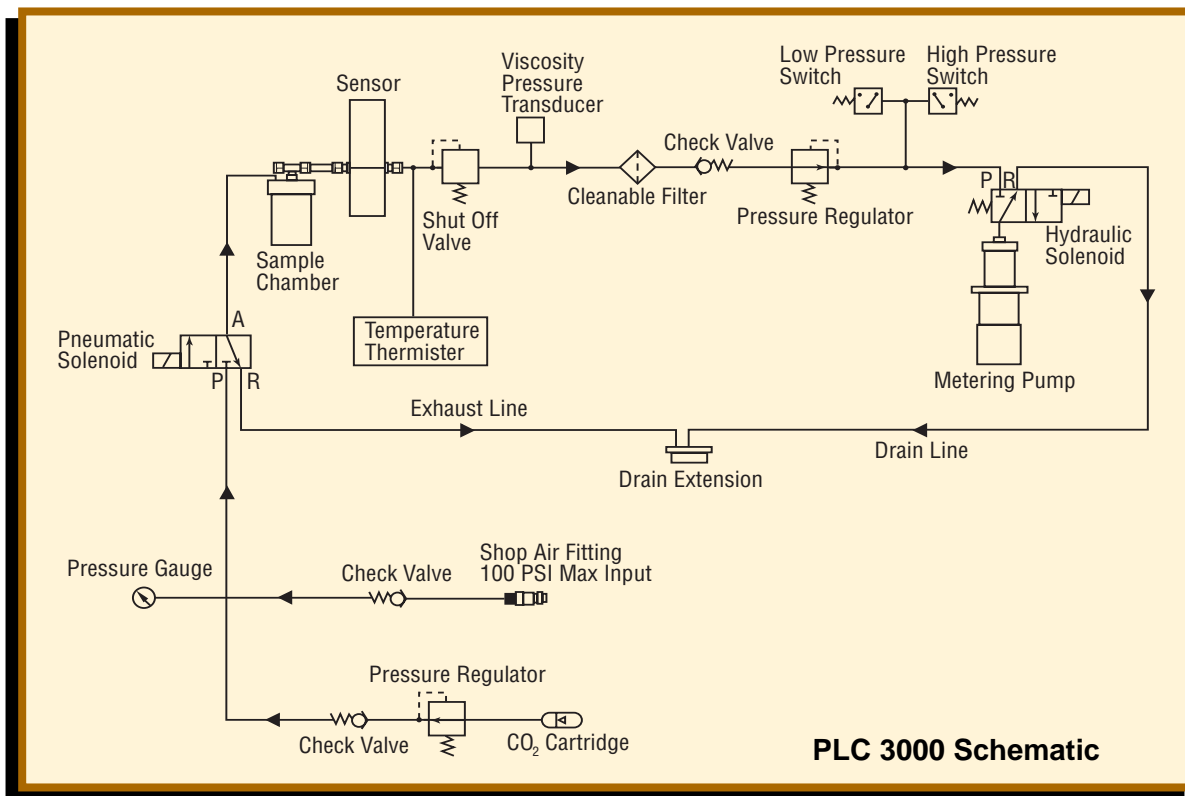
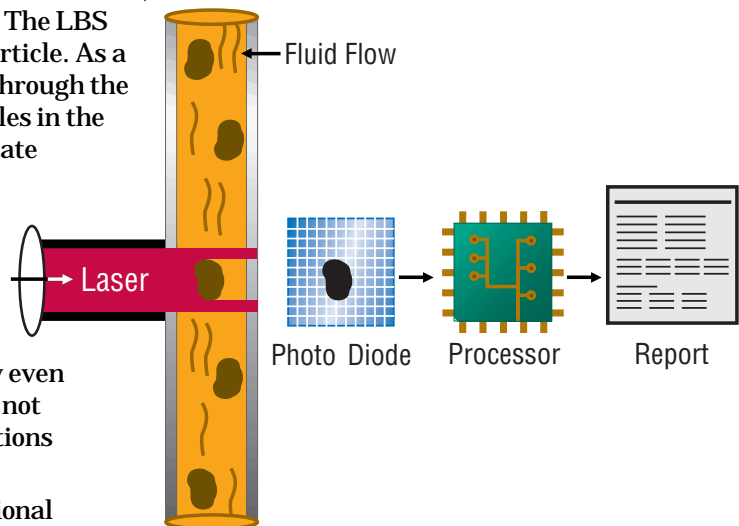
The PLC-3000 also incorporates fluid viscosity and temperature technology which further enhances the information available in one compact package.



Technology

Laser technology was designed into the PLC-3000 based on its high degree of accuracy, precision and repeatability. In liquid particle counting, there is no equal to a laser system. With the PLC-3000, the laser is part of the Light Blocking Sensor (LBS). The LBS operates by detecting the “shadow” created by a particle. As a sample of fluid flows through the sensor, it passes through the “view volume”, an area of intense laser light. Particles in the sample momentarily block the laser light. A solid-state photo diode detects the momentary decrease in light and creates a corresponding electrical pulse that is proportional to the particle size. The particles are then individually sized and counted with the totals displayed and converted into ISO and NAS classifications. The laser technology enables a high degree of accuracy and repeatability even down at the 2 micron range. This same precision is not obtainable using other competing technology variations such as “white light” or “mesh obscuration”.

Fluid temperature and viscosity sensing is an additional technology incorporated into the new PLC-3000. By using a transducer to measure pressure differential across a fixed restriction at a known flow rate, a fluid’s viscosity can be calculated. The lower the viscosity, the lower the pressure differential. For temperature accuracy, a thermistor is placed directly into the fluid flow path.



PLC 3000 Schematic

PLC-3000

Portable Fluid Analysis

Features

- Completely automatic "one touch" testing procedure takes about 60 seconds
- Compressed air and CO₂ connection for bottle sampling flexibility
- LCD and hard copy printout of results
- Internal thermal printer
- RS-232 computer communication interface port
- ISO and NAS report formats
- AC operation with universal power supply or DC operation with internal NiCd battery
- On-line and bottle sampling in one compact package
- ISO reporting in the 2/5/15 format
- Fluid viscosity and temperature read-out
- Skydrol® and petroleum based fluid compatibility with the same unit
- Windows based software included for data analysis and trending
- Lightweight, rugged and portable for easy on-site analysis

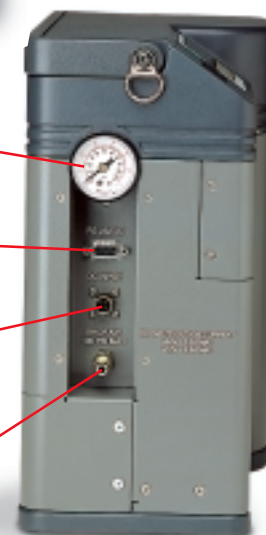


Pressure gauge

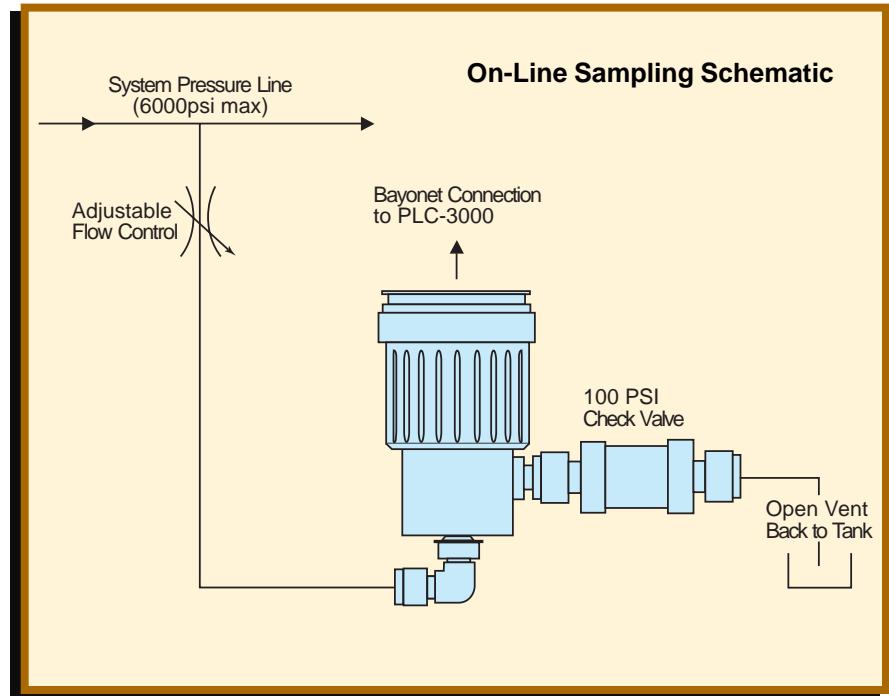
RS-232 port

Power supply connection

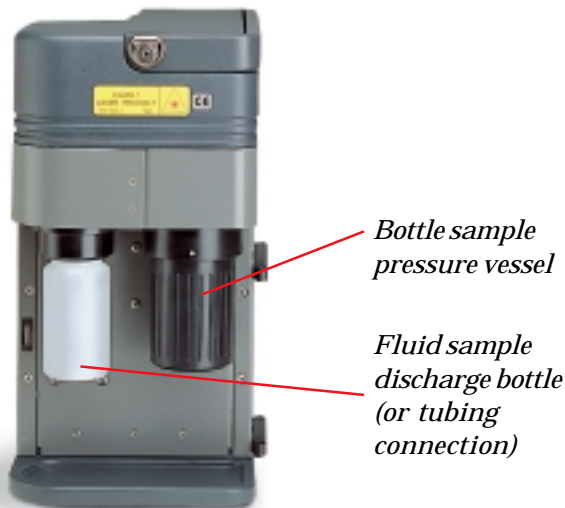
Compressed air connection



The on-line adapter incorporates a pressure reducing system which utilizes a 100 psi check valve to create back pressure. The on-line adapter and check valve are provided with the PLC-3000. System pressure is limited to the on-line adapter; never actually “seeing” the internal hardware and electronics of the PLC-3000. There are some benefits of on-line sampling. The most important is the increase in accuracy due to the elimination of fluid handling. Additionally, on-line sampling provides a much easier mechanism for repeated sampling in a given system.

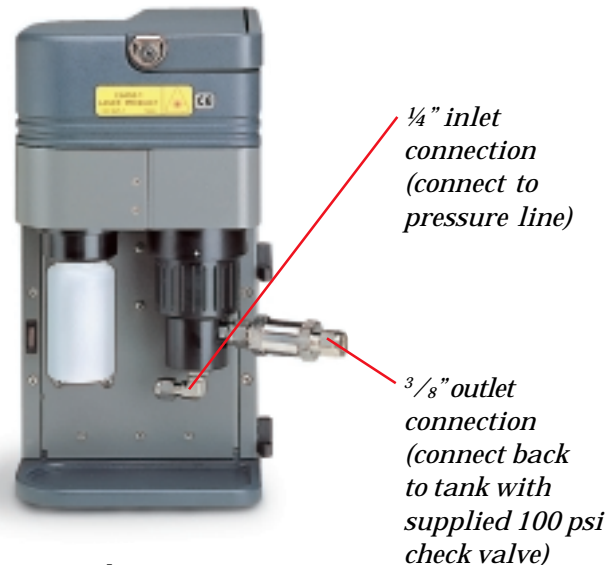


Bottle Sampling



Portable flexibility for in-field use.

On-line Sampling



Pressure line access using standard hardware. No special connections are necessary.

PLC-3000

Portable Fluid Analysis

Specifications

Bottle Sampling Flow Method

Compressed air or CO₂ cartridge.

Computer Interface

RS-232 communication port and 9-pin to 9-pin standard serial cable.

Data Storage

100 tests, scrolling memory.

Displays

LCD readout, integral thermal printer.

Flexibility

On-line and bottle sampling as one package.
No special connections or equipment needed.

Flow Rate

Adjustable from 20-100 ml per minute.

Fluids

Compatible with standard mineral and petroleum based fluids. Also compatible with phosphate ester (Skydrol®) fluids.

Light Source

5mV infrared laser diode. 300,000 hours typical life.

Limitations

Light blockage technology will not accurately work with some high water content fluids. High water contamination or excessive aeration will also result in invalid data.

Power Source

12 VDC rechargeable NiCd battery and 90-250 VAC universal power supply. Detachable power cord.

Size

Height 13 in. (330 mm); Depth 7 in. (178 mm);
Width 13 in. (330 mm)

Pressure (On-Line Mode)

6000 psi (414 bar) maximum.

Report

ISO 4406 modified 2/5/15 format. NAS 1638 format.

Sensitivity

2+, 5+, 15+, 25+, 50+, 100+ micron ranges.

Software

Windows based, menu driven. Data compilation and trending.

Technology

Automatic optical particle counting. Light blockage.

Temperature

Fluid, 165°F (74°C) maximum.

Ambient, 35° F (2° C) to 120° F (49° C)

Temperature Reporting

Fluid temperature in °F or °C, ±1%

Testing

15 ml flush followed by (3) 10 ml runs averaged to give the cleanliness classifications. Particle counts are reported per ml (ISO4406) and 100 ml (NAS 1638).

Testing Time

60 seconds at 50 ml/flow rate.

Viscosity

To 2000 SUS (430 centistokes).

Weight

22 pounds (10 kilograms), 55 pounds (25 kilograms) with case.

Viscosity Reporting

Fluid viscosity in SUS or cSt.

±10% accuracy 200-2,000 SUS (43-430 cSt)

Report Formats

Each of the report formats shown below are available as standard with the PLC-3000

Sample: 00004 Parker PLC-3000				
Date: 01/13/98 Time: 01:43:06				
Sample Volume: 10ML/RUN				
Flow Rate: 50ML/MIN				
Reported Values: COUNTS/ML				
SIZE	RUN1	RUN2	RUN 3	SMPL AVG
2u:	296	294	309	299.8
5u:	67	72	71	70.4
15u:	3	3	2	3.1
25u:	0	0	0	0.3
50u:	0	0	0	0.0
100u:	0	0	0	0.0
ISO:	15/13/09			
NAS:	5			
TEMP:	67.1 F			
VISC:	180 SUS SP GR: 0.88			

Standard

Sample: 00004 Parker PLC-3000				
Date: 01/13/98 Time: 01:43:06				
Sample Volume: 10ML/RUN				
Flow Rate: 50ML/MIN				
Reported Values: COUNTS/ML				
SIZE	RUN1	RUN2	RUN 3	SMPL AVG
2u:	296	294	309	299.8
5u:	67	72	71	70.4
15u:	3	3	2	3.1
ISO:	15/13/09			
TEMP:	67.1 F			
VISC:	180 SUS SP GR: 0.88			

ISO 4406

Sample: 00004 Parker PLC-3000			
Date: 01/13/98 Time: 01:43:06			
Sample Volume: 10ML/RUN			
Flow Rate: 50ML/MIN			
Reported Values: COUNTS/100ML			
SIZE RANGE	RUN1	RUN2	RUN 3
5-15u:	6380	6930	6870
15-25u:	320	310	220
25-50u:	20	10	50
50-100u:	0	0	0
+100u:	0	0	0
SAMPLE AVERAGE			
5-15u:	6726.7	NAS: 5	
15-25u:	283.3	TEMP: 67.1 F	
25-50u:	26.7	VISC: 180 SUS	
50-100u:	0.0	SP GR: 0.88	
+100u:	0.0		

NAS 1638

Ordering

PLC-3000 is the complete model number for ordering.

Standard PLC-3000 Components

Quantity	Description
1	Heavy duty portable travel case with protective foam insert, tilt wheels and retractable handle
1	Universal power supply/battery charger with power cord
2	68 gram CO ₂ cartridges
2	Rolls thermal printing paper
3	120 cc pre-cleaned sample bottles
1	On-line sampling adapter
1	RS-232 communication cable
1	Software disk
1	Operations manual



Replacements/Accessories

Description	P/N
10-pack of 68 gram CO ₂ cartridges	601895
25-pack of pre-cleaned 120cc sample bottles	601896
Thermal printing paper	601897
Verification fluid (.5 liter bottle)	932935
50 micron replacement element	Kit - 902208

