

Portable Particle Counter

LaserCM

Fluid Condition Monitoring



LaserCM

Features & Benefits

Test time:	2 minutes
Particle counts:	2+, 5+, 15+, 25+, 50+ and 100+ microns 4+, 6+, 14+, 21+, 38+ and 70+ microns(c)
International codes:	ISO 7-22, NAS 0-12
Data retrieval:	Memory access gives test search facility
Max. working pressure:	420 bar
Max. flow rate:	400 l/min when used with system 20 Sensors. Higher with single point sampler (consult Parker)
Working conditions:	LaserCM will operate with the system working normally
Computer compatibility:	Interface via RS232 connection @ 9600 baud rate.

- Special 'diagnostics' are incorporated into the LaserCM microprocessor control to ensure effective testing.
- Routine contamination monitoring of oil systems with LaserCM saves time and saves money.
- Contamination monitoring is now possible while machinery is working - LaserCM saves on production downtime.

- Data entry allows individual equipment test log details to be recorded.
- Data retrieval of test results from memory via hand set display.
- Automatic test cycle logging of up to 300 tests can be selected via hand set display.
- Totally portable, can be used as easily in the field as in the laboratory.
- Automatic calibration reminder.
- Instant, accurate results achieved with a 2 minute test cycle.
- Data entry allows individual equipment footprint record.
- Data graphing selectable via the integral printer.
- Auto 300-test cycle logging via LCD handset input.
- RS232 serial port computer interface.
- Limit level output to control peripheral equipment such as off-line filtration via internal relay limit switches.
- Auto-testing allows for the conducting of automatic sequencing tests on flushing systems for example.
- Optional bar code swipe wand to allow handset data loading.
- Worldwide service and technical support.

Typical Applications

- Construction machinery
- Industrial plant
- Hydraulic equipment & system manufacturers
- Research & testing institutes
- Offshore & power generation
- Marine
- Military equipment applications

Parker LaserCM Portable Particle Counter.

With 15 years experience in manufacturing the world's best selling 'white light' portable particle counter – CM20, the progression to the LaserCM with its opto-mechanical, continuous wave single point source laser (SPSL) is both a natural and customer driven development.



Specification

Automatic Particle Counters (APC's), have been widely used for many years in condition monitoring of hydraulic fluids. However, it is only recently that APC's have become flexible enough to enable the instruments to be taken out of the laboratory and used on-line in order to obtain the most credible form of results.

Unusually, the move from fixed laboratory use, to portable field use has not been at the expense of accuracy or user flexibility, but has actually enabled the instruments to be used over a wider range of applications and situations.

The most common monitoring technique used in APC's is that of light obscuration or light blockage. Here, a focused light source is projected through a moving column of oil, (in which the contaminants being measured are contained), causing an image of the contaminant to be projected on to a photo diode cell, (changing light intensity to an electrical output).

The electrical output of the photo diode cell will vary in accordance with the size of the particles contained in the column of oil; the larger the particle, the bigger the change in the photo diode electrical output.

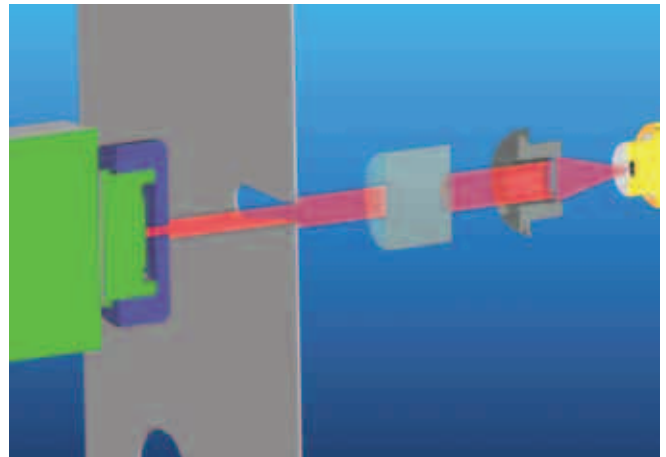
On-line APC's must be able to test the oil sample at whatever cleanliness it is delivered to the machine. Parker therefore had to develop technology to ensure the on-line APC was able to test a sample without the conventional laboratory technique which requires dilution - a practice that would have been simply impossible with a portable unit.

By careful design and window sizing, gravimetric levels as high as 310mg of dirt per litre, (equivalent to up to 4 million particles >5 micron per 100 ml), can be achieved without making the instrument susceptible to counter saturation.

These high saturation point on-line APC's, whilst losing none of the accuracy of their laboratory counterparts, enable particle counting to be carried out quickly and accurately.



A focused light source is projected through a moving column of oil.



Laser Optical Sensing

Core technology that proves itself in LaserCM

The LaserCM portable particle counter features microprocessor controlled optical scanning for accurate contaminant measurement with a calibration range from ISO 7 to ISO 22 with no counter saturation.

How does LaserCM work?

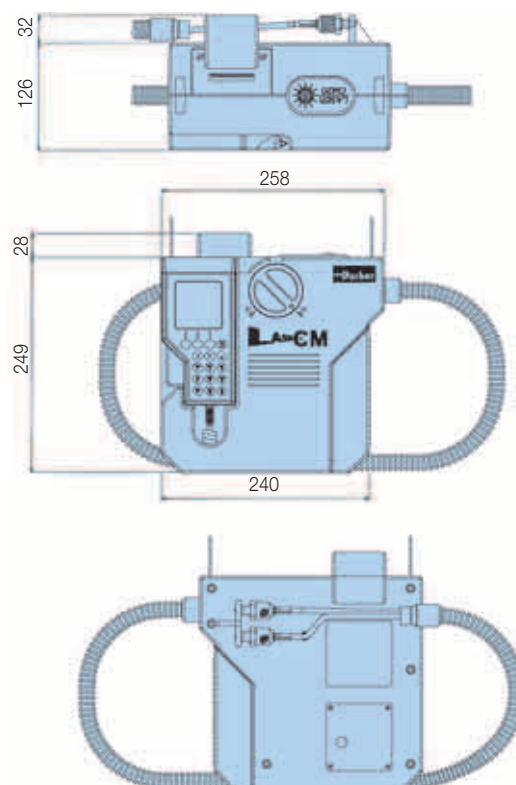
- The particles are measured by a photo diode that converts light intensity to a voltage output which is recorded against time.
- As the particle moves across the window the amount of light lost is proportional to the size of the particle. This reduction in voltage is measured and recorded.
- This “voltage” lost relates directly to the area of the particle measured, is changed into a “positive” voltage and then in turn changed into a capacitance value.
- This value is counted and stored in the LaserCM computer in one of 6 channels, >2, >5, >15, >25, >50 and >100µ according to particle size.
- Readouts are displayed on the hand-held LCD in the accepted ISO and NAS standards ready for hard copy printing or RS232 computer download.
- The on-board computer allows storage of up to 300 test results.

LaserCM

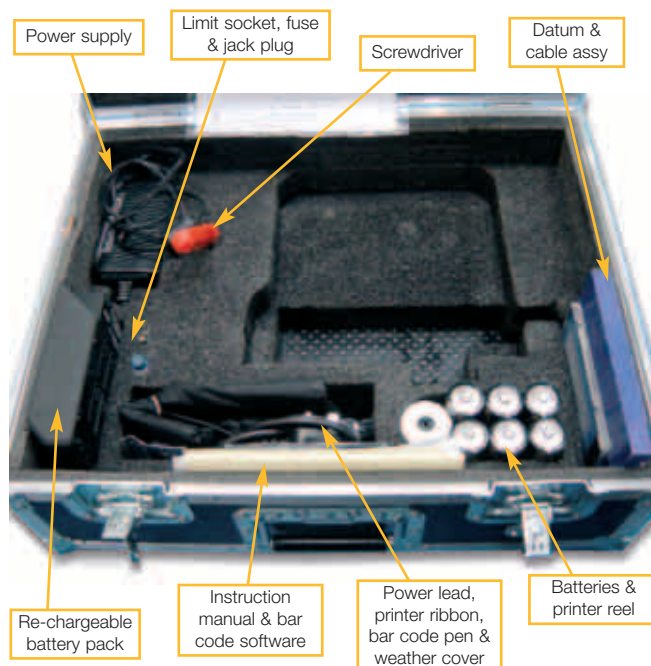
Specification

Description	LaserCM (LCM20.2021)	LaserCM (LCM20.2061)
A) Lexan, structural foam and ABS case		
B) Parylene coated	A	B
ABS handheld display	●	●
Mechanical composition – Brass, plated steel, stainless steel and aluminium	●	●
Fluorocarbon seals	●	
Perfluoroelastomer seals		●
Nylon hoses (kevlar braided microbore)	●	●
Stainless steel armoured hose ends	●	●
1.2m fluid connection hose	●	●
System 20 sensors. Higher with single point sampler	●	●
Rechargeable battery pack	●	●
12Vdc power supply	●	●
Fast blow fuse	●	●
Unique optical scanning system	●	●
Bonded glass optical window enclosed in SS plate	●	●
Micron channels analysis (2+,5+,15+,25+,50+ & 100+)	●	●
Analysis range ISO 7 to 22 incl. (NAS 0 to 12)	●	●
32 character dot matrix LCD. Alpha numeric keypad	●	●
Data retrieval	●	●
Calibration to ISO standards*	●	●
Viscosity range 2 to 100 cSt. 500 cSt.with SPS	●	●
Operating temp.+5 to +80°C	●	●
Ambient temp.+5 to +40°C	●	●
2 minute test completion time	●	●
Memory store – 300 test memory	●	●
12Vdc regulated power supply input	●	●
Battery operated 6 x 1.5 D cells	●	●
Phosphate Ester group compatibility		●
Mineral oil & petroleum based fluid compatibility	●	●
Up to 420 bar (6000 psi)	●	●
Integral 16 column printer	●	●
RS232 computer interface	●	●
Astra board case weight – (Kg)	5	5
Unit weight – (Kg)	8	8
DATUM software and cable link pack	●	●
Weather protector cover	●	
CE certified	●	●
Auto logging	●	●

*Note: In compliance with international standards, all Parker portable particle counters can meet the ISO Medium test dust standards. The LaserCM's, in addition to the complete range of Condition Monitoring products, are capable of achieving certification to ISO 4406:1999 and with traceability to ISO 11171 for SRM 2806, via ISO 11943.



Commissioning Kit



Operation

Switch On



Operating the Parker LaserCM is as simple as pressing the start button and turning the dial. The test procedure is automatic and in the case of the LaserCM takes no more than 2 minutes to complete.

LaserCM makes the difference in industry

Fully accredited to BS EN 60825:1992 and IEC 60825-1 (safety of laser products) Standards, accredited to USA Standards and achieving full ISO certification. LaserCM offers users advanced laser technology, a fast, dynamic and on-line 2 minute system test cycle. A LaserCM Aggressive Fluids model is also available, suitable for monitoring corrosive fluids such as phosphate ester based lubricants used in commercial aviation.

MTD calibration

Laser CM20 MTD Calibration variants are certified via a primary ISO 11171 calibrated automatic particle counter. All MTD Laser CM20's achieve ISO 4406:1999 criteria, via ISO 11943.

LCM20 Using SPS



Start Test



Understanding MTD

ACFTD (Air Cleaner Fine Test Dust) was formatted in the 1960's, but is no longer being produced. The obsolescence of this dust has led to the adoption of a new dust MTD.

MTD (Medium Test Dust) having a particle size distribution close to ACFTD was selected as a replacement. However, MTD produced results somewhat different to ACFTD, so the NIST (National Institute of Standards & Technology) undertook a project to certify the particle size distribution of ISO MTD.

The result was particle sizes below 10µm were greater than previously measured.

Particles sizes reported based on NIST would be represented as µm (c), with "c" referring to "certified". Therefore the CM20 reported sizes are as follows:

ACFTD	MTD
2µ	4µ (c)
5µ	6µ (c)
15µ	14µ (c)
25µ	21µ (c)
50µ	38µ (c)
100µ	70µ (c)

MTD offers true traceability, improved particle size accuracy and better batch to batch reproduction.

LaserCM

Why On-Site Fluid Contamination Monitoring

- Certification of fluid cleanliness levels.
- Early warning instrument to help prevent catastrophic failure in critical systems.
- Immediate results with laboratory accuracy.
- To comply with customer cleanliness requirements and specifications.
- New equipment warranty compliance.
- New oil cleanliness testing.



Datum Data Management



Datum, dedicated software, provides the link between a Laser CM20, System 20 EM20 or the H₂Oil - Water in Oil and your computer management system.

Features:

- Windows based, Icon driven program
- Full graphic output
- Tables/results download
- Trend analysis and predictive maintenance
- Auto test communication allows Datum to control particle counter testing and water in oil monitoring
- Certification creator using downloaded data
- Customer customised fields



16-column printer for hard copy data. A feature of the LaserCM is the on-board printout data graphing option developed to support predictive maintenance procedures.

Laser CM Test	
ON LINE TEST	
TEST NUMBER 022	
D M Y	
Date	04-03-06
Time	15-52
ISO:	20/15/09
Count / 100ml	
>2µ	820721
>5µ	31564
>15µ	314
>25µ	64
>50µ	14
>100µ	0
NOTES	

ISO 4406 - 1996
(MTD calibration comes under
ISO 4406 - 1999 revised
standards)

Laser CM Test	
ON LINE TEST	
TEST NUMBER 022	
D M Y	
Date	04-03-06
Time	15-52
NAS CLASS:	7
Count / 100ml	
2/5µ	789157
5/15µ	31250
NAS CLASS	7
15/25µ	250
NAS CLASS	3
25/50µ	50
NAS CLASS	3
50/100µ	14
NAS CLASS	4
>100µ	0
NAS CLASS	0
NOTES	

Correlation to NAS 1638

Introducing the new LCM 'Classic'

There is a new addition to the proven range – the LCM 'Classic'. Only available from Parker, the 'Classic' retains all the technology that made the LaserCM one of the most accurate, reliable and popular portable particle counters available.

Our design engineers have re-configured the LaserCM specification in a way that has reduced our manufacturing costs. These savings have been passed onto LCM 'Classic' customers.

How have we done this?

First we talked to our existing customers and then to the engineers and maintenance operatives to find out the features that make the LaserCM a unique predictive maintenance instrument.

Then, we removed peripheral items such as the aluminium case and all the accessories, so a customer receives the monitor, with a CD user guide, professionally and securely boxed. One thing that has not altered is laser accuracy and laser reliability. Our in-house software engineers have re-configured the EPROM, removing Data programming, User ID, Automatic Testing, Data retrieval, Alarm level settings, the barcode pen and Graph printing functions to reduce costs still further without in any way reducing the efficiency of the monitor. The LCM 'Classic' is an instrument to be proud of.



Ordering Information (LaserCM and 'Classic' LaserCM)

Standard products table

Part number	Supersedes	Description
LCM202022	N/A	MTD calibrated
LCM202026	N/A	Classic unit - MTD calibrated
B84702	B.84.702	Printer paper (5 rolls)
P843702	N/A	Printer ribbon
B84729	B.84.729	12Vdc power supply
B84609	B.84.609	Re-chargeable battery pack
P849613	N/A	Weather protector cover
B84779	B.84.779	Datum software pack
B84708	B.84.708	Cable and adaptor

Note 1: Part numbers featured with bold highlighted codes will ensure a 'standard' product selection.

Note 2: Alternate displayed part number selection will require you to contact Parker Filtration for availability.

Product configurator

Model	Fluid type		Options	
LCM2020	2	Hydraulic mineral	1	ACFTD calibrated
LCM2020	6	Skydrol	2	MTD calibrated
			3	ACFTD calibrated + bar code pen
			4	MTD calibrated + bar code pen
			5	Classic unit - ACFTD calibrated
			6	Classic unit - MTD calibrated

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Note 2: Alternate displayed part number selection will require you to contact Parker Filtration for availability.