## FEATURES

- Øil cleanliness codes: ISO 4406, NAS 1638, & SAE AS4059
- Particles are grouped by micron size in seven categories 4, 6, 14, 21, 38 & 70
- / The SI20 identifies air and gas bubbles, and eliminates them from the counts
- / The shape recognition software is able to categorise particulate into sliding, cutting & fatigue wear
- A highly accurate sensor
- Compatible with SCADA/PC/PLC communication protocols

### **SI20 LCD** - DIGITAL IMAGING PARTICLE COUNTER

### TECHNICAL INFORMATION

Accuracy	+/- I ISO code
Power Display	24 VDC
Ports	I/8" BSP
Max.Pressure	160 Bar
Flow Rate	0.1 - 1.0 L/min
Viscosity Limit	2,400 cSt
IP Rating	IP65
Fluid Compatibility	Mineral oils, synthetic oils, diesel, Skydrol (on request), water glycols and other fluids possible - please contact us for more information.
Weight	0.5 Kg
Dimensions	80 x 45 x 45mm
Temperature Range	-20°C 70°C
Output Options	Modbus RTU (RS485) Modbus TCP/IP







The SI20 sensor is built in to both models of the Particle Pal Pro & Plus series.

#### Model variations:

- I. Particulate
- 2. Particulate and water
- 3. Particulate, water and oil life option
- 4. Particulate + water + density + viscosity

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## SI20 LCD - DIGITAL IMAGING PARTICLE COUNTER

PROVIDING A DEEPER INSIGHT INTO OIL HEALTH

# GET A CLEAR PICTURE OF YOUR OIL

The SI20 LCD digital imaging particle counter is a revolutionary sensor capable of counting a broad spectrum of particles. Now with an integrated LCD display, the particle counter recognises shapes and eliminates air bubbles from the counts. Digital imaging particle counting provides engineers with a deeper insight into their oils. The sensor has the ability to measure a broad spectrum from 4 to > $70\mu$ , recognising different shapes of particles, which can be grouped into fatigue wear, sliding wear and cutting wear as well as fibres. We refer to this as RCA (root cause analysis.)

The S120 LCD is designed for permanent online monitoring of oil cleanliness. Alternatively, Filtertechnik offer a range of portable oil testers with the S120 integrated.



The image above is 4mm x 3mm and shows particulate that the human eye cannot see Images available via Modbus connection.

## **KEY PRODUCT FEATURES:**

- Reports in: ISO, NAS and SAE standards
- Air & Gas bubble counts are eliminated
- Max pressure 160bar
- Size catagories: 4, 6, 14, 21, 38 & 70µ
- Particulate shape recognition:
- Sliding wear
- Fatigue wear
- Cutting wear
- Fibres

## SENSOR OPERATION

Filtertechnik's OilWear® SI20 is an online sensor that detects particles and bubbles larger than 4 microns in the machine fluids and classifies them into 6 size ranges. Designed to work installed in-line, it provides real-time information about the machine's condition through the contamination of its fluids.

OilWear® \$120 is the best ally for predictive maintenance strategy based on oil cleanliness. The measurement of an abnormal amount of particles allows the early detection of machine failures and thus the initiation of corrective actions.

## **RCA (Root Cause Analysis)**

The SI 20 determines the shape of particles over  $20\mu$ . The embedded software, developed in conjunction with the IK4-TEKNIKER oil analysis laboratory, categorises particles into 4 known shape groupings.

Root cause analysis (RCA) is the process of discovering the root causes of problems in order to identify appropriate solutions. A root cause analysis identifies the underlying or systemic, rather than the generalized or immediate, causes of a problem.

### Examples of shape recognition from sensor via connection (not to scale):



### **Causes of particle types:**

### Fibre

4:38:46

5120-LCD

When fibres are found within an Cutting wear is the result of hard Sliding wear is caused by relative oil sample, these are typically the result of contaminants remaining from component manufacture, such as the braiding found in hoses, or entry of external foreign contaminants. While fibres may not be a serious cause of wear, they do contribute to a potential problem.

### Cutting

contaminants penetrating the softer surface of components and solid surfaces in contact under removing material, also known as load. This will typically result in abrasive wear. These fragments can then oxidise to produce much harder oxide particles.





### Sliding

motion between two smooth the removal of material in the form of debris and ploughing of one or both surfaces.

#### Fatigue

Fatigue wear involves a repeated number of cycles, where surface crack formation along grain boundaries can develop and the resulting debris gradually builds up within a system. While the initial surface crack may appear small, this can propagate deep within the subsurface and fracture.