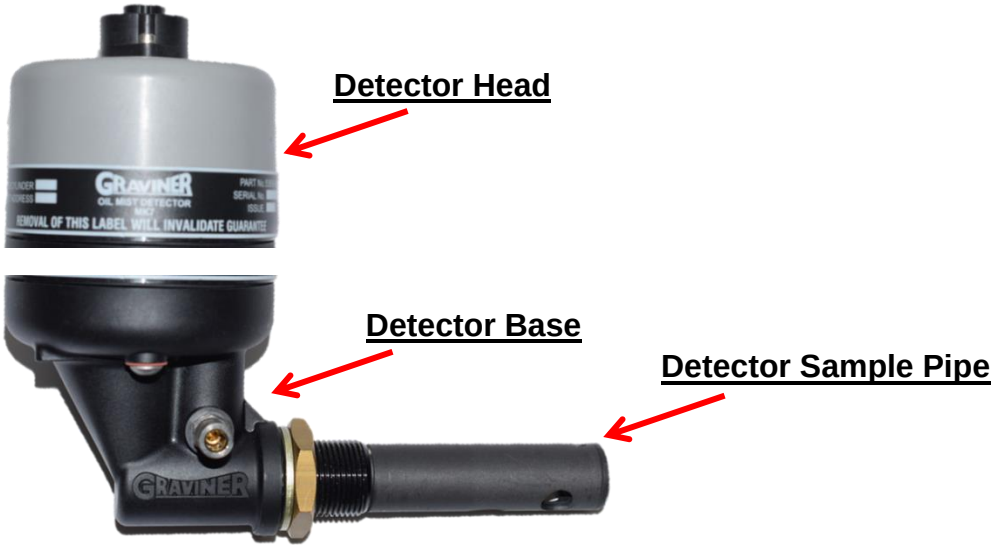
OMD Technical Note TN18001

Graviner Mk7 Oil Mist System Detector Head Inspection & Cleaning Process

Introduction

The Graviner OMD Detector is made of 2 assemblies, the Detector Head and the Detector Base. The Detector Head is attached to the Detector Base with 2 Allen bolts.



The oil mist detection chamber in each Detector Head must be inspected at regular intervals and cleaned to remove any buildup of oil splash or carbon deposits created by the operation of the engine.

Our experience indicates that the cleaning interval will be unique to each engine and dependant upon many factors such as the way the vessel engine is operated, the engine temperature, the condition of the engine oil and the engine service intervals.

This Technical Note describes the tools required and the cleaning procedure to be used to inspect and clean the Mk7 Detector.

As required by IACS M67 Graviner Mk7 OMD systems will automatically warn the Users when the detection window becomes partially obscured and must be cleaned. Graviner recommend establishing a cleaning and maintenance regime to minimise any Fault message warnings of this type and maximise the service life of each Detector Head.

As a guide, the Detector Head should be cleaned and inspected every 6 months and the sample pipe in the Detector Base cleaned and inspected every 12 months.

Graviner recommend that the Detector Base and sample pipe are blown through with Clean Air to remove any potential blockages as shown in the image below.

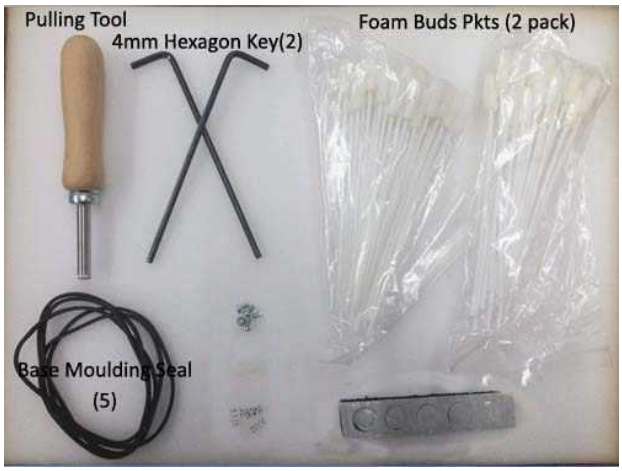
Clean Air at a working pressure of up to 90 PSI should be used.

<u>WARNING</u> - Do NOT remove the Detector Base from the engine crankcase whilst the engine is in operation.
This action should be carried out whilst the engine is stopped to avoid the possibility of hot oil coming out of the Detector Base.

Please Note

Graviner Detector Heads should only be cleaned with the recommended cleaning fluid and cleaning buds.

Many cleaning fluids have been evaluated by Graviner but only the Electrolube ASC fluid is recommended by Graviner as our tests have shown it offers the best cleaning ability and leaves no residue on the glass chamber.



(Note: Do not use any third-party electronic contact cleaners, isopropyl alcohols, flux removers, any harsh chemical cleaners, etc., as these will affect the Detector performance.
Only use the official Graviner Cleaning products).

These items are included in the Graviner Service Kit (D9221-027), see contents list below :-
The items are also available from Graviner as individual parts.

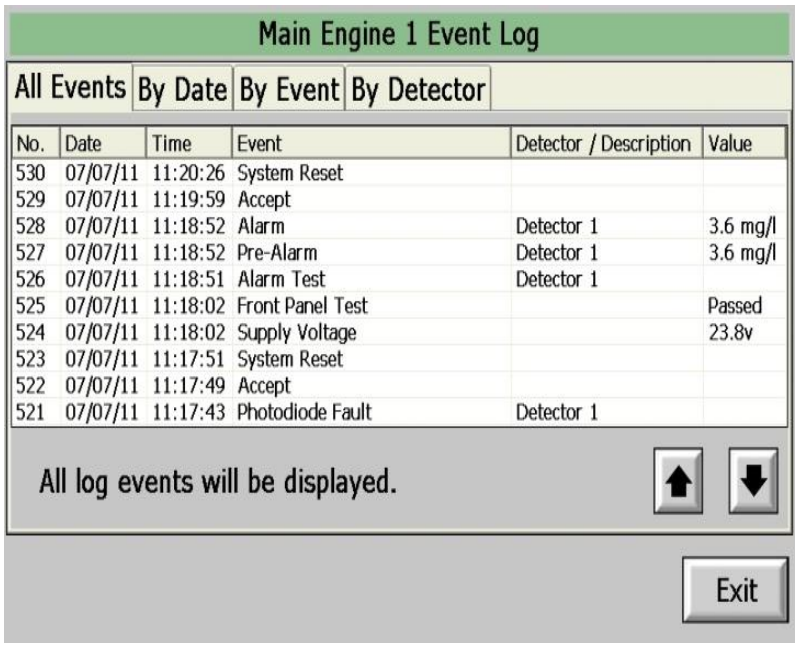
Service Kit (part number) D9221-027 consists of:			
Description	**Part No**	**Qty**	**Category**
Fan Retainer	1-B3741-902	5	Spares
Compression Spring	1-B3721-006	5	Spares
Base Moulding Seal	1-C1513-802	5	Spares
Fan Connector Seal (1 Screw)	1-C1413-801	5	Spares
Fan Connector Seal (2 Screw)	1-35134-K037	5	Spares
M3 Screw	1-21833-H01	5	Spares
Glass Cleaner 250ml	1-A7311-002	1	Consumables
Foam Buds Pkts – Packet of 25pcs	1-B6910-217	2	Consumables
4mm Hexagon Key	1-B691 0-219	2	Tools
Pulling Tool	1-D9131-002	1	Tools
Materials Safety Data Sheet	-	2	Information

Cleaning the Detector

1. Inspect the contents of the Mk7 Event log.

   It is important to check the contents of the Mk7 Event log as it may show Fault messages which indicate the condition of a defined Detector.

   A Contamination Low Fault or Photodiode Fault message is typically an indication that the Detector is contaminated by oil and should be cleaned.



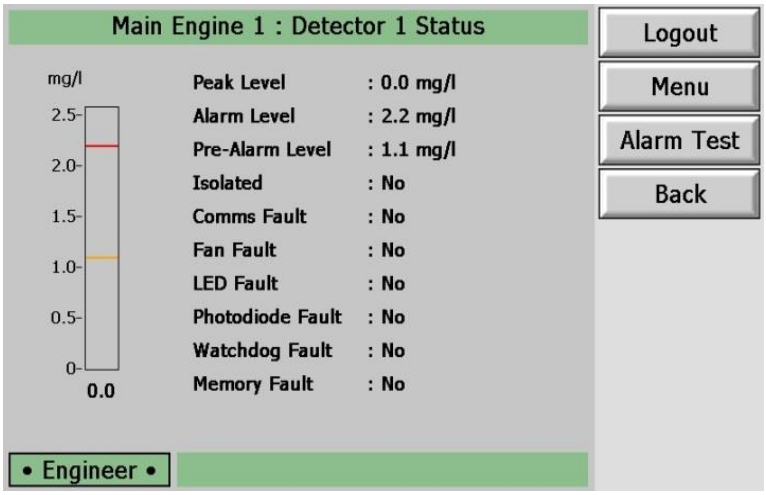
   Photograph and document the Event Log screens on the Remote Display Unit.

   Alternatively, if available, use the Mk7 Oil Mist Engine Manager Tool and USB cable to download the Event Log. The event log should be saved to the PC for future records.

   At this time the System Test Log should also be saved for future records.
   On the engine screen select Logs > View System Test Log

2. Check the Status of each Detector prior to any cleaning taking place.

   Using the Remote Display Unit access the Detector Status Screen for each Detector.



Ensure:-

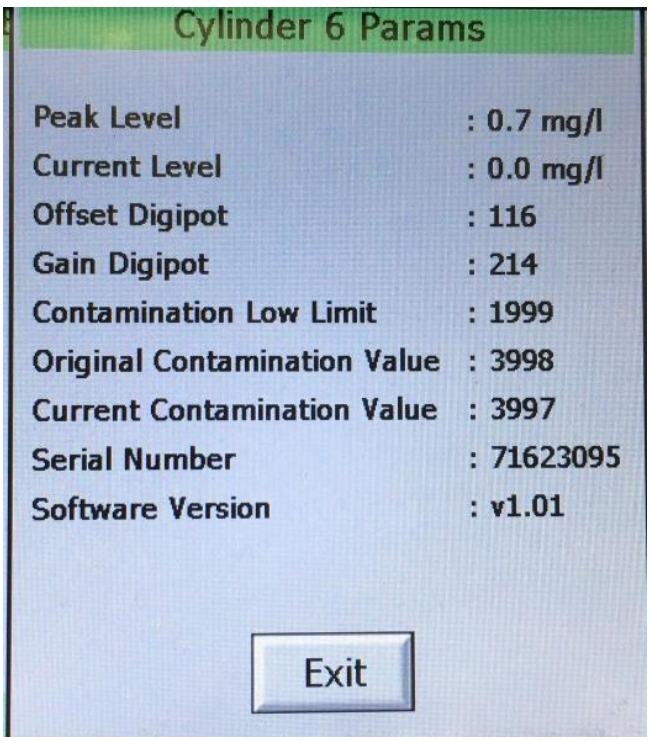
The Alarm and Pre-Alarm level settings are correct,

The Detector is NOT Isolated,

There are NO active Faults shown.

If any Faults are indicated, please take appropriate actions to clear the indication(s).

3. Carry out Parameter readings of each Mk7 Detector prior to any cleaning taking place.



This will show the current status of the selected Detector and should be used to advise the end customer of the expected service life of the Detector.

The parameters displayed also include the Serial Number of the Detector (which is sometimes no longer visible on the external label due to exposure to oil) and the software version.

Note the readings for each Detector

4. If safe to do so power down the OMD system or Isolate the Detector as described in the Mk7 OMD system Installation, Operation & Maintenance (IOM) Manual.

5. Disconnect the cable connector fitted to the top of the Detector Head.

6. Using a 4mm hexagonal key, loosen the two fixing screws in the Detector Base unit. The screws are self-retaining.

7. Remove and invert the top part of the Detector Head so the Fan is visible.

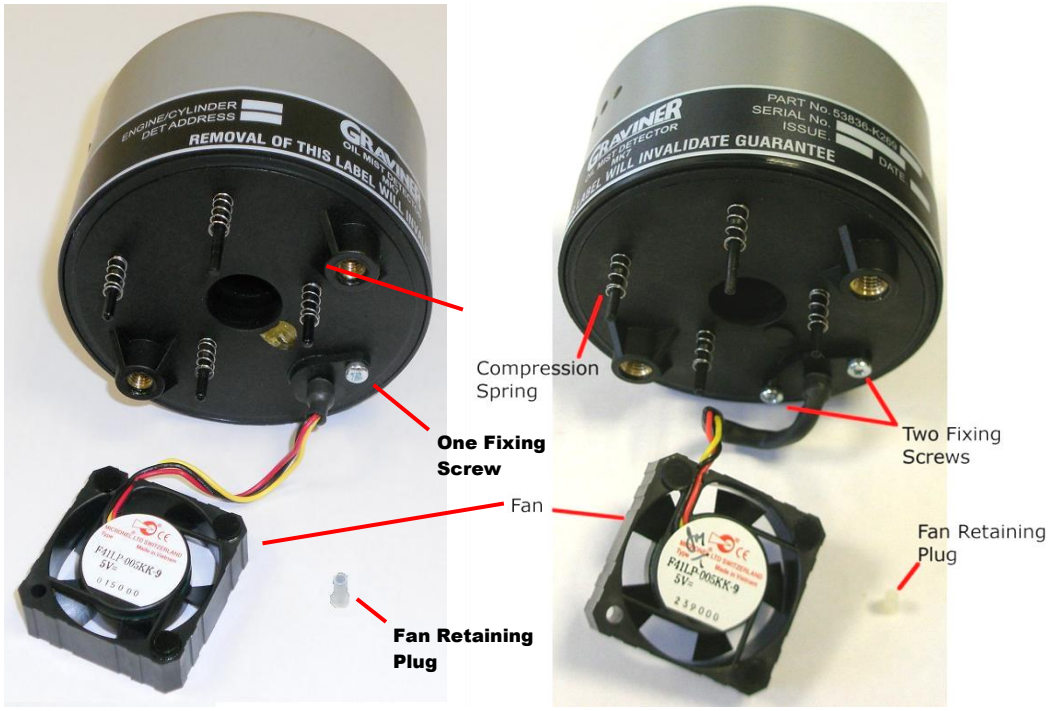
8. Wipe off any excess oil from the surface of the base and fan.

9. Examine the Detector Base unit seal and replace if damaged or perished or not seated firmly in its channel.

CAUTION: - Do NOT press the fan label, handle only the fan outer housing.

10. Using the Pulling Tool (see below), slowly remove the Fan Retaining Plug by capturing the shoulder and pulling. Carefully remove the Fan from its mountings.

BEWARE: - Please take extreme care NOT to lose any of the Compression Springs or the Fan Retaining Plug.



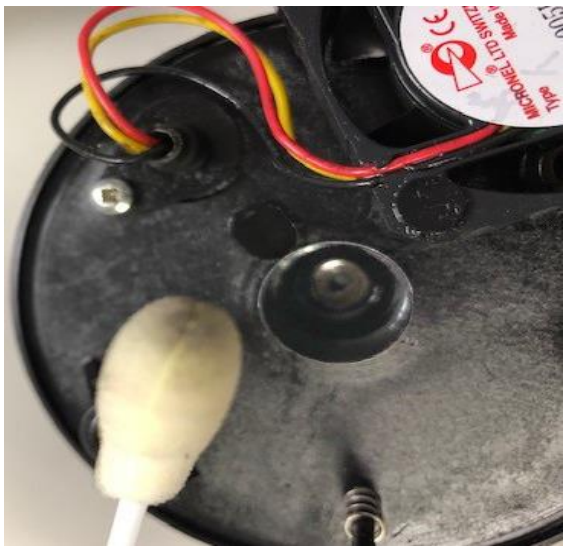
11. Examine the 4 Compression Springs and the Fan Retaining Plug; replace any damaged items. Spares for these items are included in the Service Kit (part number) D9221-027.

12. Ensure the Fan is free running and not clogged by oil residues.

13. If Fan damage is suspected refer to the section on Fan Replacement, in the Mk7 IOM Manual.

14. Using the following images on this page as a guide, apply the Graviner recommended glass cleaning fluid to a foam bud and wipe carefully around the inside of the oil mist detection opening in the Detector Head.

    (Note: Do not use any electronic contact cleaners, isopropyl alcohols, flux removers, any harsh chemical cleaners, etc., as these will affect the Detector performance.)



15. Ensure that the glass ring around the side of the Detector Head and the small aperture shown in the image above are thoroughly cleaned with the foam cleaning buds.

16. To ensure thorough cleaning Graviner recommend that steps 14 and 15 are repeated with cleaning fluid applied to another foam bud.

17. Examine the Detector base body and sample tube and wipe clean where necessary.

18. Reassemble the Fan to the Detector Head using the Fan Retaining Plug.

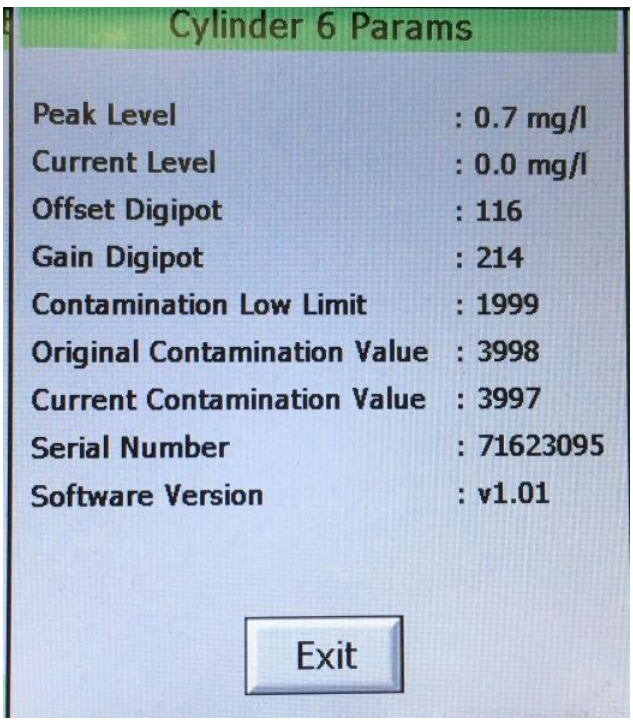
CAUTION: Do not press the centre label of the fan, only handle the fan by the outer housing.

19. Reattach the Detector head to base and re-tighten the fixing screws. Attach the cable to the Detector Head.

20. If the OMD system was powered off, switch the power back on and allow the system to initialise.

21. Otherwise De-Isolate the Detector, Press OK on the Mk7 Remote Display Unit and ensure the display returns to normal.

22. Using the Mk7 OMD Remote Display Unit or Mk7 Oil Mist Engine Manager tool measure and note the Contamination Level of the Detector being cleaned.



23. If the Contamination Level reading does NOT return to within 20% of the original Contamination Level reading the Detector Head should be replaced as it is approaching the end of its operational service life.

24. Repeat the above procedure for all Detectors to be cleaned.

12 Month Service

At 12-month intervals it is recommended that the Detector sample pipe is removed so it can be cleaned and inspected.

Please ensure that the vessel engine is not rotating when the sample pipe is removed from the engine to prevent against hot oil being sprayed from the opening.

Graviner recommend that the Detector Base and sample pipe are blown through with Clean Air to remove any potential blockages as shown in the image below.

Clean Air at a working pressure of up to 90 PSI should be used.

6 months

Perform a visual inspection

1. Externally inspect all Mk7 Control Unit(s) in the OMD system taking note of the condition of all Glands, External Wiring and LED indications displayed.

2. Highlight any holes that are either NOT or incorrectly blanked off as these will affect the IP65 and EMC rating.

3. Internally inspect all Mk7 Control Unit(s) in the OMD system.

4. All Detectors installed on the engine(s) plus any Detector Heads which are considered as usable spares by the vessel (external view), document the status of the LEDs on each Detector.

5. The Remote Display Unit is showing the correct number of Engines and Detectors on each Engine.

6. All other enclosures (external view) and wiring used to connect the OMD relay contacts to the vessel Alarm Monitoring & Engine Shutdown systems.

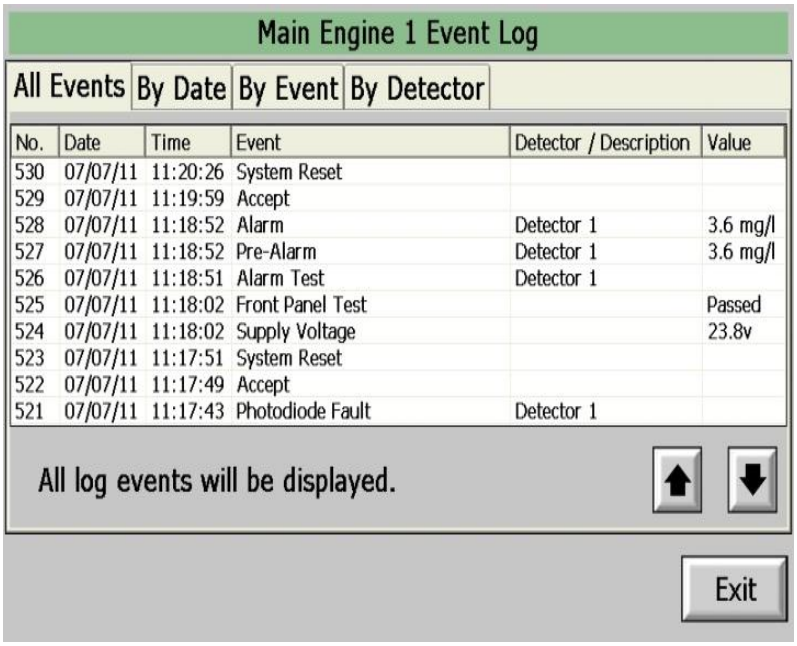
7. Document the software versions of all system components.

As part of this work document any concerns with:-

   a. Corrosion.
   b. Evidence of burnt components.
   c. Poor quality wiring or incorrectly specified cabling used for power and data communication.
   d. Missing or incorrect EMC glands.
   e. Missing or incorrect screening & earthing.
   f. Missing blanking plugs or caps.

8. Inspect the contents of the Mk7 Event log.

   It is important to understand the contents of the Mk7 Event log as diagnosing and removing the reason for these fault Messages will be part of the Service visit.



Photograph and document the Event Log screens on the Remote Display Unit.

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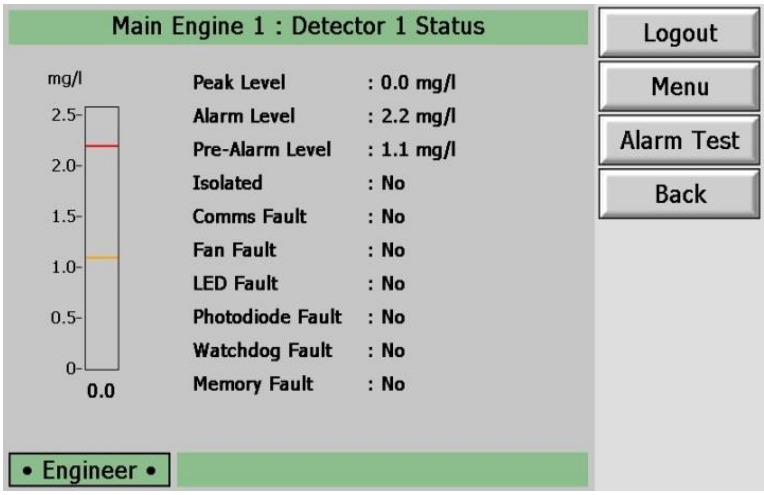
9. Check the Status of each Detector prior to any cleaning taking place.



Access the Detector Status Screen for each Detector.

Ensure:-

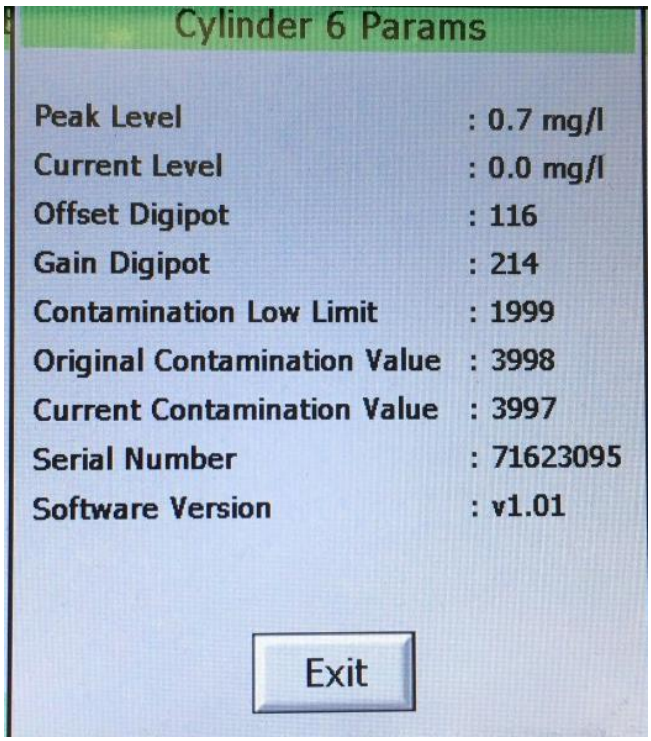
The Alarm and Pre-Alarm level settings are correct,

The Detector is NOT Isolated,

There are NO active Faults shown.

If any Faults are indicated, please take appropriate actions to clear the indication(s).

10. Carry out Parameter readings of each Mk7 Detector prior to any cleaning taking place.



This will show the current status of the selected Detector and should be used to advise the end customer of the expected service life of the Detector.

The parameters downloaded also include the Serial Number of the Detector (which is sometimes no longer visible on the external label due to exposure to oil) and the software version.

Note the readings for each Detector

Clean each Detector twice using the recommended cleaning buds and fluid and repeat the Parameter Reading process.

Again, note the readings for each Detector

Compare the **Current Contamination Value** with the **Original Contamination Value** after the Detector has been cleaned. Any Detector NOT within 20% of the Original Contamination Value after cleaning should be replaced as it is at the end of its Service Life.

For further information or technical questions please send your enquiry to our Technical Support Team at technical@emsgroup.co.uk