

Feed the CAT 5 cable through the cable gland on the Barrier Unit and connect it to the terminal block as shown in Figure 2. Ensure there are 2 strands of wire connected to each terminal. Each of the 4 white wires, has a colour on it, these must be paired to the relevant coloured wire. Ensure cable gland is tightened after cable has been connected.



Terminal	+	-	MD	RX
Wire	Orange	Green	Brown	Blue

Figure 2: Oil Interceptor II Barrier Unit Terminal Block

Oil Interceptor II Display

Choose a position for the Oil Interceptor II display where it can easily be seen, the reset button can be accessed and there is a convenient power source. Loosen the four screws on the front of the display, which secure the cover onto the display and remove the cover.

Feed the CAT 5 cable through the cable gland on the display unit and connect it to the terminal block as shown in Figure 3. Ensure there are 2 strands of wire connected to each terminal. Each of the 4 white wires has a colour on it, these must be paired to the relevant coloured wire.

Holding the display against the intended mounting surface in the correct position, mark the position of the four mounting points on the surface, through the apertures provided. Where the surface requires it, drill and insert rawl plugs where the surface is suitable for screwing to i.e. wood or similar, then suitable self-taping screws can be used. Use screws and rawl plugs provided.

Re-attach front of display. Ensure cable gland is tightened after cable has been connected.

Note: Only plug the transformers power cable into the socket provided in the base of the display and the transformer in to the power socket once the CAT 5 cable has been connected to the Oil Interceptor II Barrier Unit and the cover has been replaced.

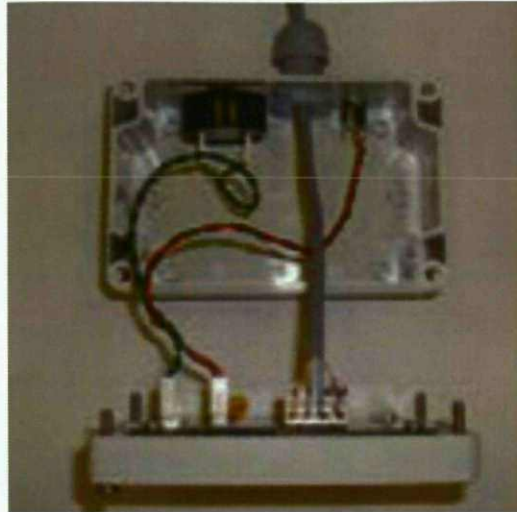


Figure 3: Oil Interceptor II Display Hard Wire Terminal Block

All lights should illuminate on the display, until it receives a signal. Once a good signal is received from the Oil Interceptor II Signal Unit, the power light and H.W. Link light will remain illuminated.

Operation

During normal operation the probe monitors the interceptor's contents every 6 seconds. Should there be a change in the condition – i.e. an Alarm or back to normal then this will be relayed to the display. Once an Alarm signal is received the Alarm light and the Sounder will sound. The operator should press the reset button to register the fact that the Alarm has been noted. The Alarm light will remain on until a new signal is received with the sensor back in the water.

Displays

Power	This light indicates that power is being received by the display – this must be illuminated for the system to be operating satisfactorily.
H.W. Link	This light indicates that the Oil Interceptor II is in hard wired mode. If this light is not illuminated, it indicates there is a connection fault between the signal unit and the display.
Alarm	This light means that the Oil Interceptor II probe has changed to no longer being surrounded by water. This can be because sufficient waste oil has been collected in the interceptor requiring it to be emptied or that the probe has not been correctly positioned in the water in the interceptor. Where accompanied by the No Signal or Connection fault then this indicates the cause of the alarm.
No Signal	The Display has not received a signal from the tank signal unit. During normal operation a signal is received once every hour. If no signal has been received in 24 hours the No Signal and Alarm lights will illuminate.
Connection fault	The Display has received a signal indicating that there is a connection fault between the probe and the tank signal unit.

Technical Specification

Oil Interceptor II Display Unit	
Dimensions	120mm (w) x 80mm (h) x 55mm (d)
Material	Polycarbonate
Ambient temperature	-25°C to +70°C
Supply Voltage (Class II mains adaptor)	9V dc, 100mA
Cable (to Barrier Unit)	CAT5E (Not Supplied)
Signal Unit Interface	RS232
Signal Unit Supply	8V dc, 30mA, voltage and current limited
Monitor Interface	RS232

Oil Interceptor II Barrier Unit, Signal Unit and Probe	
Dimensions:	
Barrier Unit	82mm (w) x 80mm (h) x 55mm (d)
Signal Unit	112mm (w) x 62mm (h) x 31mm (d)
Probe	50mm (l) x 24mm (dia.)
Material:	
Barrier Unit	Polycarbonate
Signal Unit	Diecast Aluminium alloy (<6% magnesium) finished in grey hammertone
Probe	High Density Polyethylene
Ambient Temperature	-25°C to +70°C
Electrical Parameters	Um = 253V ac
Cable (From Signal Unit, prefabricated)	PVC, 2 core screened, Type B EN60079-14 3m length between Signal Unit and Probe (maximum length permitted). 5m length between Signal Unit and Barrier Unit (maximum cable length permitted).
Insulation Level	500VAC
Ex Classification:	 II [1] G
Barrier Unit	[Ex ia] IIB Baseefa02ATEX0043 [Ex ia] IIB IECEX BAS05.0016
Ex Classification:	 II 1 G
Signal Unit & Probe	Ex ia IIB T4 Baseefa02ATEX0043 Ex ia IIB T4 IECEX BAS05.0016



EC - Declaration of Conformity

In accordance with Directive 94/9/EC

Manufacturer:

Kingspan Environmental Ltd.
180 Gifford Road, Portadown, Co. Armagh,
N. Ireland. BT63 5LF

We, Kingspan Environmental Ltd, declare that the following equipment complies with Directive 94/9/EC (ATEX):

Oil Interceptor II

And have been tested and certified by:

Baseefa Ltd (Notified Body Number 1180)
Rockhead Business Park
Staden Lane
Buxton
Derbyshire
SK17 9RZ

And issued with the following certificates:

EC-Type Examination Certificate - Baseefa02ATEX0043
IECEX Certificate of Conformity - IECEX BAS 05.0018

Equipment Markings:

Transmitter Unit

 II 1 G Ex ia IIB T4

Barrier Unit

 II [1] G [Ex ia] IIB

Harmonised Standards applied:

EN 60079-0: 2006

Electrical apparatus for explosive gas atmospheres.
General requirements

EN 60079-11: 2007

Explosive atmospheres. Equipment protection by
intrinsic safety 'I'

Signature of Authorised Person

Name: Dean Forde
Position: Engineering Manager
Date: 19th May 2009

TABLE OF CONTENTS

1	GENERAL.....	3
2	INSTALLATION	4
2.1	OilSET-1000 control unit.....	4
2.2	SET DM/3 probe	5
2.3	Cable joint	5
3	OPERATION AND SETTINGS.....	6
3.1	Operation	6
3.2	Factory settings.....	7
4	TROUBLE-SHOOTING	8
5	REPAIR AND SERVICE	9
6	SAFETY INSTRUCTIONS.....	9
7	TECHNICAL DATA.....	10

SYMBOLS



Warning / Attention



Pay special attention to installations at explosive atmospheres



Device is protected by double or reinforced insulation

1 GENERAL

OilSET-1000 is an alarm device for monitoring the thickness of the oil layer accumulating in an oil separator. Depending on the order, the delivery consists of OilSET-1000 control unit, SET DM/3 probe and a cable joint.

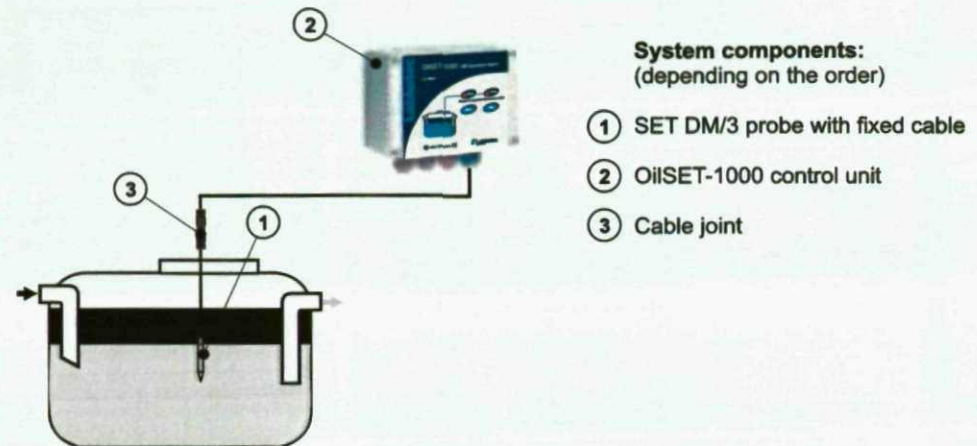


Figure 1. Oil separator alarm system

SET DM/3 probe is installed into the light liquid storage chamber and gives an alarm when the chamber is filled to a pre-determined degree. The probe is normally immersed in water.

The function is based on the measurement of the electrical conductivity of the surrounding liquid – water conducts electricity much better than oil.

Oil separator is regarded as potentially explosive (Ex) area. SET DM/3 probe can be installed in a zone 0, 1 or 2 potentially explosive area but the control unit must be mounted in a safe area.

The LED indicators, push buttons and interfaces of the OilSET-1000 control unit are described in figure 2.



Figure 2. OilSET-1000 control unit - features

2 INSTALLATION

2.1 OilSET-1000 control unit

OilSET-1000 control unit can be wall-mounted. The mounting holes are located in the base plate of the enclosure, beneath the mounting holes of the front cover.

The connectors of the external conductors are isolated by separating plates. The plates must not be removed. The plate covering the connectors must be installed back after executing cable connections.

The cover of the enclosure must be tightened so, that the edges touch the base frame. Only then do the push buttons function properly and the enclosure is tight.

Before installation, please read the safety instructions in chapter 6 !

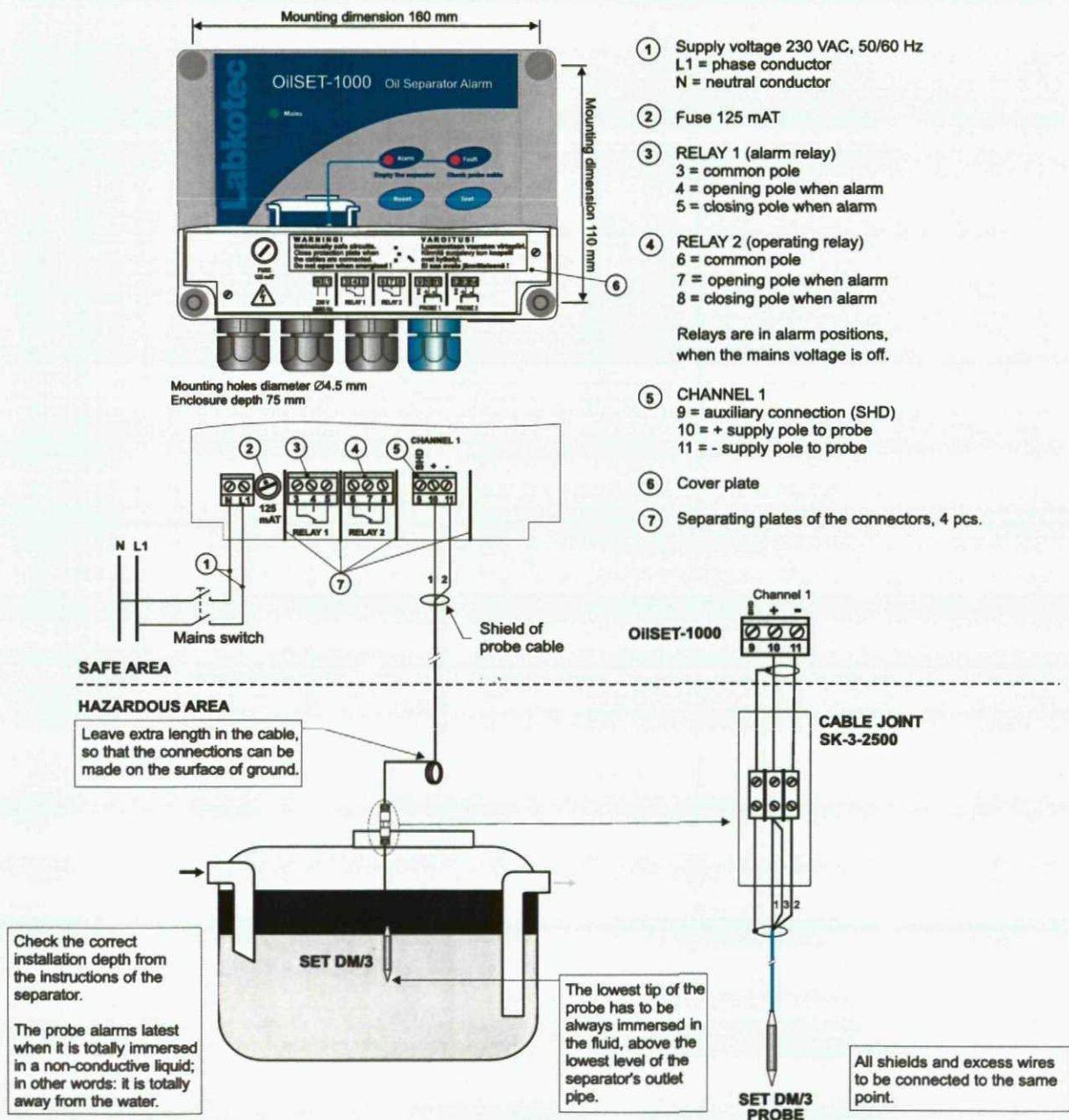


Figure 3. OilSET-1000 alarm device installation.

2.2 SET DM/3 probe

SET DM/3 probe should be installed as described in figure 3.

The probe gives an alarm earliest when the upper electrode is in oil and latest when the probe is totally immersed in a non-conductive liquid - in other words, it is totally away from the water.

Please check the correct installation depth also from the instructions of the oil separator.

2.3 Cable joint



Fig. 4 Cable joint SK-3-2500

Connections of the probe cable inside the cable joint are explained in figure 3. Cable shields and possible excess wires need to be connected to the same point in galvanic contact.

Please make sure, that the probe and cable between OilSET-1000 control unit and the probe do not exceed the maximum allowed electrical parameters – see chapter 7 Technical data.

IP rating of the cable joint is IP 67. Make sure, that the cable joint is closed properly.

If the probe cable must be extended and there is a need for equipotential grounding, it should be done with the junction box LJB2. The cabling between the OilSET-1000 control unit and the junction box should be done with a shielded twisted pair instrument cable e.g. SY or CY Screened 2 Core 0.5 mm².



Fig. 5. Cable installation example

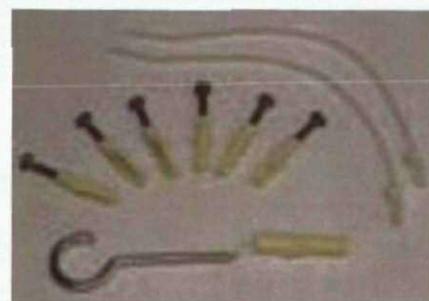


Fig. 6. Installation accessories

3 OPERATION AND SETTINGS

The OilSET-1000 alarm device is initialized at the factory.

The operation of the alarm device should be checked always after the installation.

Functionality test

1. Immerse the probe into water. The device should be in normal mode.
2. Lift the probe up in air or oil. An Oil alarm should be generated (see chapter 3.1 for more detailed description).
3. Immerse the probe back into water. The alarm should go off after a delay of 5 sec. Clean up the probe if necessary before placing it back into the oil separator.

A more detailed description of the operation is provided in chapter 3.1. If the operation is not as described here, check the factory settings (chapter 3.2.) or contact a representative of the manufacturer.

3.1 Operation

The operation of a factory-initialized OilSET-1000 is described in this chapter.

Normal mode – no alarms

SET DM/3 probe is totally immersed in water.
Mains LED indicator is on.
Other LED indicators are off.
Relays 1 and 2 are energized.

Oil alarm

SET DM/3 probe is immersed in oil. (The probe gives an alarm earliest when the upper electrode is in oil and latest when the probe is totally immersed in a non-conductive liquid, in other words it is totally away from the water.)
Mains LED indicator is on.
Oil Alarm LED indicator is on.
Buzzer on after 5 sec delay.
Relays de-energize after 5 sec delay.
(Note. The same alarm takes place when SET DM/3 probe is in the air.)

After removal of an alarm, the Oil Alarm LED indicator and buzzer will be off, and relays will be energized after a fixed delay of 5 sec.

Fault alarm

Probe cable break, short circuit or a broken probe, i.e. too low or too high probe signal current.
Mains LED indicator is on.
Probe circuit Fault LED indicator is on after 5 sec delay.
Buzzer is on after 5 sec delay.
The relays de-energize after 5 sec delay.

Reset of an alarm

When pressing the Reset push button.
Buzzer will go off.
Relay 1 energizes.
Relay 2 will stay de-energized until the actual alarm or fault is off.

TEST FUNCTION

Test function provides an artificial alarm, which can be used to test the function of the OilSET-1000 alarm device and the function of other equipment, which are connected to OilSET-1000 via its relays.



Attention! Before pressing the Test button, make sure that the change of relay status does not cause hazards elsewhere!

Normal situation

When pressing the Test push button:
Oil Alarm and Fault LED indicators are immediately on.
Buzzer is immediately on.
Relays de-energize after 2 sec of continuous pressing.

When the Test push button is released:
LED indicators and buzzer go immediately off.
Relays energize immediately.

Alarm on

When pressing the Test push button:
Fault LED indicator is immediately on.
Oil Alarm LED indicator remains on.
Buzzer remains on. If it has been reset earlier, it will return to be on.
If relay 1 was already reset, it will de-energize again after 2 sec. of continuous pressing.
Test will not affect relay 2, because it is already in alarm status.

When the Test push button is released:
The device returns without delay to the preceding status.

Fault alarm on

When pressing the Test push button:
The device does not react to the test at all.

3.2 Factory settings

If the operation of OilSET-1000 is not as described in the previous chapter, check that the device settings are as in figure 7. Change the settings according to the following instructions if needed.



The following tasks must only be executed by a person with proper education and knowledge of Ex-i devices.

We recommend, that when altering the settings the mains voltage is off or the device is initialized before the installation is executed.

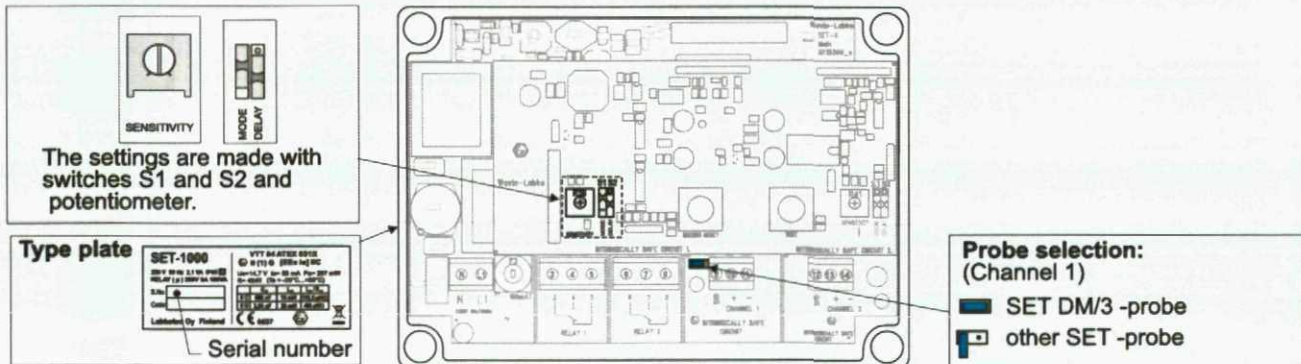
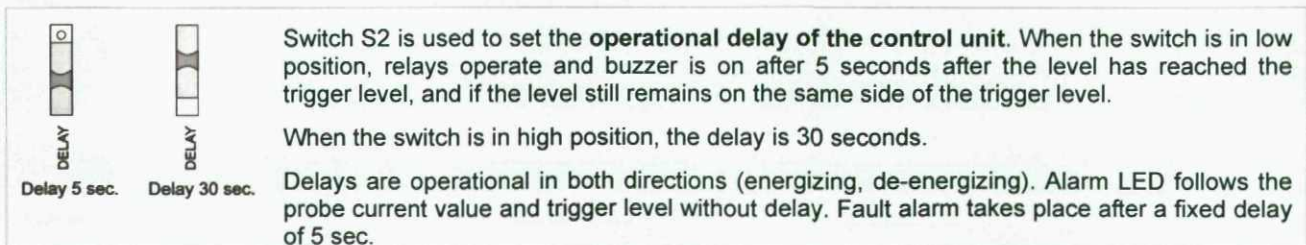


Figure 7. Factory settings

The settings are made with switches (MODE and DELAY) and potentiometer (SENSITIVITY) located in the upper printed circuit board, and the jumper located in the lower board (figure 7). In figure 7, the switches are as set in the factory.



4 TROUBLE-SHOOTING

Problem: MAINS LED indicator is off

Possible reason: Supply voltage is too low or the fuse is blown. Transformer or MAINS LED indicator is faulty.

- To do:**
1. Check if the two pole mains switch is off.
 2. Check the fuse.
 3. Measure the voltage between poles N and L1. It should be $230 \text{ VAC} \pm 10 \%$.

Problem: No alarm when probe in oil or air, or the alarm will not go off

Possible reason: The SENSITIVITY setting is wrong in the control unit (see figure 7), or probe is dirty.

- To do:**
1. Clean-up the probe and lift it up in the air or immerse it into oil.
 2. Turn the SENSITIVITY potentiometer slowly anticlockwise until the probe gives an alarm.
 3. Immerse the probe into water and wait until the alarm goes off. If the alarm does not go off, turn the potentiometer slowly clockwise until the alarm goes off.
 4. Lift the probe up in the air or oil. The probe should give an alarm again.

Problem: FAULT LED indicator is on

Possible reason: Current in probe circuit too low (cable break) or too high (cable in short circuit). The probe might also be broken.

- To do:**
1. Make sure, that the probe cable has been connected correctly to the OilSET-1000 control unit. See probe specific instructions.
 2. Measure the voltage separately between the poles 10 and 11. The voltages should be between 10,3....11,8 V.
 3. If the voltage is correct, measure the probe current. Do as follows:
 - 3.1 Disconnect probe's [+] wire from probe connector (pole 10).
 - 3.2 Measure short circuit current between [+] and [-] poles.
 - 3.3 Connect mA-meter as in figure 8.

Make a comparison to the values in Table 1.
 - 3.4 Connect the wire back to the connector.

If the problem can not be solved with the above instructions, please contact Labkotec Oy's local distributor or Labkotec Oy's service.



Attention! If the probe is located in an explosive atmosphere, the multimeter must be Exi-approved!

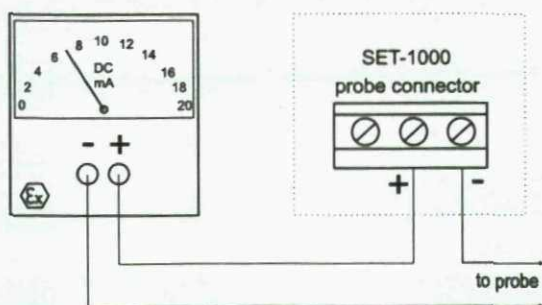


Figure 8. Probe current measurement

	SET DM/3, channel 1 Poles 10 [+] ja 11 [-]
Shortcircuit	20 mA – 24 mA
Probe in the air	9 – 10 mA
Probe in oil ($\epsilon_r \approx 2$)	9 – 10 mA
Probe in the water	2 – 3 mA
Factory setting for alarm point	approx. 6.5 mA

Table 1. Probe currents

5 REPAIR AND SERVICE

The probe should be cleaned and the operation should also be tested when emptying the oil storage chamber or at least once every six months. The easiest way to check the operation is to lift the probe up in the air and to put it back to the separator. The operation is described in chapter 3.

For cleaning, a mild detergent (e.g. washing-up liquid) and a scrubbing brush can be used.

The mains fuse (marked 125 mA) can be changed to another glass tube fuse 5 x 20 mm / 125 mA complying EN 60127-2/3. Any other repair and service works on the device may be carried out only by a person who has received training in Ex-i devices and is authorized by the manufacturer.

In case of queries, on site commissioning and service contract details, please contact Labkotec Oy's service:

labkotec.service@labkotec.fi.

Environment-Agency Pollution Prevention Guidelines (PPG3):

"Any electrical device used within a separator or used to monitor sensors placed within a separator must be intrinsically safe and certified to a suitable explosion protection standard. The location of the monitoring device, such as the alarm or 'separator management system' control panel, must be located within a safe area and conform to the requirements of BS EN 60079-10. For this reason it is important to always use qualified technicians who are familiar with the installation, calibration and servicing of intrinsically safe equipment. Regular maintenance and testing of equipment is essential."

6 SAFETY INSTRUCTIONS



OilSET-1000 control unit must not be installed in potentially explosive atmosphere. Probes connected to it may be installed in zone 0, 1 or 2 potentially explosive atmospheres.

In case of installations in explosive atmospheres the national requirements and relevant standards as *EN 50039 and/or EN 60079-14* must be taken into account.



If electrostatic discharges can cause hazards in the operating environment, the device must be connected into equipotential ground according to requirements with regards to explosive atmospheres. Equipotential grounding is made by connecting all conductive parts into same potential e.g. at the cable junction box. Equipotential ground must be earthed.



The device does not include a mains switch. A two pole mains switch (250 VAC 1 A), which isolates both lines (L1, N) must be installed in the main power supply lines in the vicinity of the unit. This switch facilitates maintenance and service operations and it has to be marked to identify the unit.



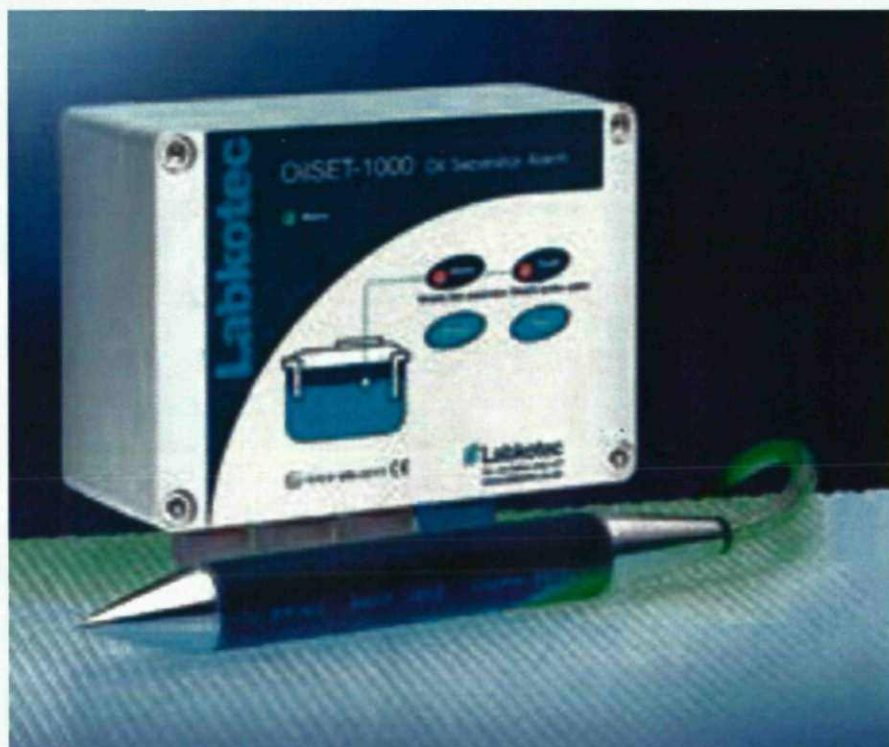
When executing service, inspection and repair in explosive atmosphere, the rules in standards EN 60079-1 and EN 60079-19 about instructions of Ex-devices must be obeyed.

OilSET-1000

Oil Separator Alarm Device



Installation and Operating Instructions



7 TECHNICAL DATA

OilSET-1000 control unit	
Dimensions	175 mm x 125 mm x 75 mm (L x H x D)
Enclosure	IP 65, material polycarbonate
Ambient temperature	-25 °C...+50 °C
Supply voltage	230 VAC $\pm$ 10 %, 50/60 Hz Fuse 5 x 20 mm 125 mA (EN 60127-2/3) The device is not equipped with a mains switch
Power consumption	2 VA
Probes	One SET probe (SET DM/3)
Max. impedance of the current loop between the control unit and a probe	75 Ω
Relay outputs	Two potential-free relay outputs 250 V, 5 A, 100 VA Operational delay 5 sec or 30 sec. Relays de-energize at trigger point. Operation mode selectable for increasing or decreasing level.
Electrical safety	EN 61010-1, Class II  , CAT II / III
Insulation level Probe / Mains supply voltage	375V (EN 50020)
EMC	Emission Immunity
	EN 61000-6-3 EN 61000-6-2
Ex-classification	 II (1) G [EEx ia] IIC VTT 04 ATEX 031X (Ta = -25 °C...+50 °C)
Special conditions (X)	
Electrical parameters	$U_o = 14,7 \text{ V}$ $I_o = 55 \text{ mA}$ $P_o = 297 \text{ mW}$ $R = 404 \Omega$
Characteristic curve of the output voltage is trapezoidal	
See table 2.	

Due to non-linear characteristics of the probe voltage, the interaction of both, capacitance and inductance, must be taken into account. The table below indicates the connecting values in explosion groups IIC and IIB. In explosion group IIA the values of the group IIB can be applied.

Max. permissible value		Combined Co and Lo	
	Co	Lo	
II C	608 nF	10 mH	568 nF
			458 nF
			388 nF
			328 nF
			258 nF
II B	3,84 μ F	30 mH	3,5 μ F
			3,1 μ F
			2,4 μ F
			1,9 μ F
			1,6 μ F

$L_o/R_o = 116,5 \mu\text{H}/\Omega$ (IIC) and $466 \mu\text{H}/\Omega$ (IIB)

Table 2. OilSET-1000 electrical parameters

SET DM/3 probe	
Principle of operation	Measurement of conductivity
Enclosure	IP68, materials: AISI 316 and PVC
Ambient temperature	-20 °C...+70 °C
Supply voltage	Approx. 12 VDC from SET control unit
Cable	Fixed oil resistant PVC cable 3 x 0,5 mm ² , standard length 5 m.
EMC	Emission Immunity
	EN 50081-1 EN 50082-1
Ex-classification	 II 1 G EEx ia IIA T4 VTT 02 ATEX 012X
Electrical parameters	$U_i = 16,5 \text{ V}$ $I_i = 80 \text{ mA}$ $P_i = 330 \text{ mW}$ $C_i = 700 \text{ pF}$ $L_i = 10 \mu\text{H}$

Special conditions concerning Ex-classification (X):

- Ambient temperature -20 °C...+70 °C
- Shielded probe cable shall be connected to equipotential ground
- If probe cable have to be extended, please use LJB2-78-83 junction box. The junction box shall also be connected to equipotential ground.



Figure 9. Dimensional drawing of SET DM/3 probe

Declaration of conformity

This declaration certifies that the below mentioned apparatus conforms to the essential requirements of the EMC directive 2004/108/EC, Low Voltage directive 73/23/EEC and ATEX directive 94/9/EC

Description of the apparatus: Level switch

Type: SET-1000 and SET-2000 series

Manufacturer:
Labkotec Oy
Labkote 1
30240 Kangasala
FINLAND

The construction of the apparatus is in accordance with the following harmonized standards:

EMC	
EN 55005-2 (2001)	Electromagnetic compatibility: General immunity standard class Industrial environments
EN 55005-3 (2001)	Electromagnetic compatibility: Generic emission standard, class Residential, commercial and light industry
EN 55007-2 (2001)	Electromagnetic compatibility: Product family standard: Harmonic current emissions
EN 55003-2 (1995)	Electromagnetic compatibility: Product family standard: Voltage fluctuations and flicker emission

The apparatus has been tested according to these standards by the SGS Finland. Test report 231170-1. All requirements are fulfilled.

LVD	
EN 61010-1 (1993)	Safety requirements for electrical equipment for measurement, control and laboratory use: Part 1: General requirements, Amendment A2
A2 (1995)	

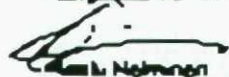
ATEX	
EN 50014 (1997): A1 & A2	Electrical apparatus for potentially explosive atmospheres: General requirements
EN 50079 (2002)	Electrical apparatus for potentially explosive atmospheres: Intrinsic safety 'i'

EC type examination certificate	VT 01 ATEX 0011
Production quality management	VT 01 ATEX 001
notification	

The product is CE-marked since 2004

Signature:
The authorized signatory to this declaration on behalf of the manufacturer and the Responsible Person based within the E.U. is identified below:

Kangasala 08.10.2007


Jukka Nieminen
Managing Director
Labkotec Oy

Declaration of conformity

This declaration confirms that the below mentioned apparatus conforms with the essential requirements of the EMC Directive 89/336/EEC as amended by 92/24/EEC and 93/68/EEC, and ATEX Directive 94/9/EC

Description of the apparatus:
Sensor of vital switch device for liquids

Type: SET DM3 SET DM3L

Manufacturer: Labkotec Oy
Labkotec
36240 Kangasala
FINLAND

The construction of the appliance is in accordance with the following standards:

EMC
EN 50081-1:1992; Electromagnetic compatibility. Guidance for harmonized standards class Residential, commercial and light industry
EN 50082-1:1992; Electromagnetic compatibility. Guidance for harmonized standards class Residential, commercial and light industry

ATEX:
EN 50014:1997; ATEX General requirements
EN 50020:1998; Electrical apparatus for potentially explosive atmospheres
EN 50284:1999; Specific requirements for construction, test and marking of electrical apparatus of equipment group II Category 1G

LC type examination certificate

VTT 02 ATEX 012X

Notified body
Address of the notified body

VTT Technical Systems notified body, number 0337
2001001001 N-2004 VI

Production quality assessment notification VTT 01 ATEX 0001

Signature

The authorized signatory in this declaration on behalf of the manufacturer, and the Responsible Person (with the EU) is identified below

Kangasala 02.01.2007


Jarmo Hamminen
CEO
Labkotec Oy

Our Ref: AB G B Cullet

Date: 14th October 2012

Report on the potential noise aspects
of a glass recycling plant at G B Cullet,
Mitchells Industrial Park, Wombwell, Barnsley.

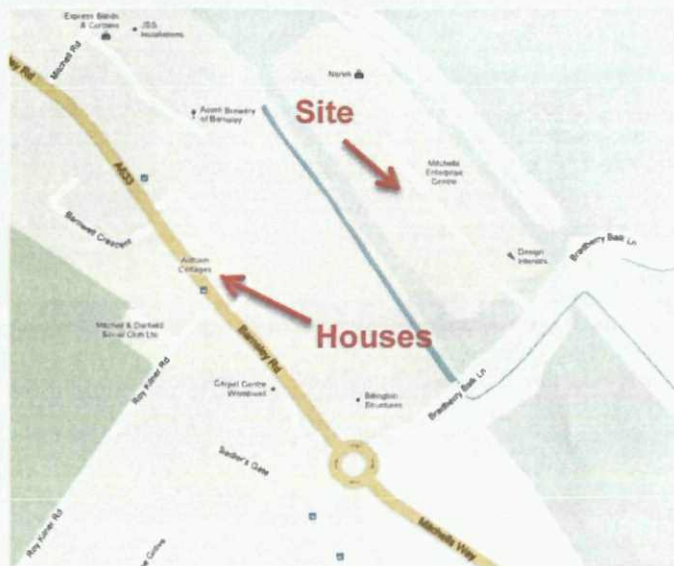
Prepared for:
Roger Leach - AB Acoustics.
on behalf of:
Gary Hopkins
G B Cullet Ltd
Acorn House
Mitchells Industrial Park
Wombwell, Barnsley
S73 8HR

Introduction:

There is a proposal to operate the laminated glass recycling plant at G B Cullett Ltd through the night time. The site is located at the northern end of the Mitchells Industrial Park off Bradbury Balk Lane in Wombwell off the A633 road and is at a low elevation relative to the road and other surrounding industrial buildings. There are no houses in the immediate vicinity but there is a terrace of dwellings, referred to as Aldham Cottages, located about 150m to the west on the A633 (see inset map and aerial photograph on Page 2 below).

The proposed development will require the continuous operation of a large generator set outside the building that contains the recycling equipment. Hence, the Planning Department of the Barnsley Council have requested a noise assessment.

The purpose of this report is to measure the normal noise of the generator and the existing night background noise in the area of the nearest noise sensitive receptors (NSR). This data will then be used for comparison against current national guidance on noise to determine if there are any issues to be addressed. If necessary, the report will propose remedial measures to reduce any possible noise impact.



Site Location Photograph:



Measuring Equipment:

Measurements were taken using a Bruel & Kjaer Type 2260 "Investigator" Precision Sound Level Analyser to store overall noise and spectrum levels. The Meter was fitted with a wind-muff. The noise measurements were taken on the evening of Monday 8th October when the weather was cool but dry and with very little wind.

The equipment was calibrated before and after the tests using a Bruel & Kjaer Type 4231 Class 1 Acoustic Calibrator with no deviation recorded. The equipment accuracy is traceable to UKAS. The data was transferred to the Bruel & Kjaer Type 7820 Evaluator software program for calculation and graph presentation. All the data in this report is copied directly from the Evaluator software with the exception of the Generator spectrum which was initially transferred to MS Excel to create the A-weighted octave version. This spectrum was needed for determination of barrier noise reduction effects.

Assessment Method:

1. The normal Local Authority preferred approach when new noise sources are to be introduced to an area is to consider a relative assessment. The suggested guidance is that of BS4142:1997. *Method for rating industrial noise affecting mixed industrial and residential areas*. Discussions with Lucy Allen at Barnsley Council Environmental Services Department confirmed that a BS4142 assessment was required.
2. Lucy Allen advised that the recycling equipment inside the factory building was not considered to be an issue and her main concern was about noise from the external generator and any other relevant equipment.
3. BS4142 requires several parameters to be determined:
 - a) Specific Noise, LAeq (Equivalent Continuous Level). This is the energy average of the expected noise of the proposed equipment at the NSR.
 - b) Background Noise, LAF90. (Level exceeded for 90% of the time). This is the statistical 90% level of the existing ambient noise without the Specific Noise.
 - c) An assessment of the character of the noise.
4. The Background Noise is subtracted from the Specific Noise, after a correction if the Specific Noise is within 10dB of the existing ambient noise. If the result is around +10dB, then complaints are very likely. If the result is around +5dB, complaints are deemed to be marginally likely. If the result is around -10dB, then complaints are very unlikely. There is a +5dB penalty for any distinctive character of the Specific noise.
5. For night time noise, BS4142 requires an assessment of the effect of the Specific noise over a 5 minute period to accommodate any variation in the noise profile and the increased susceptibility of local residents at night.
6. The noise level at a distance can be calculated using the formula:
$$\text{Noise (at x metres)} = \text{Noise (at y metres)} - 20\log(x / y) \dots\dots\text{in dB}$$

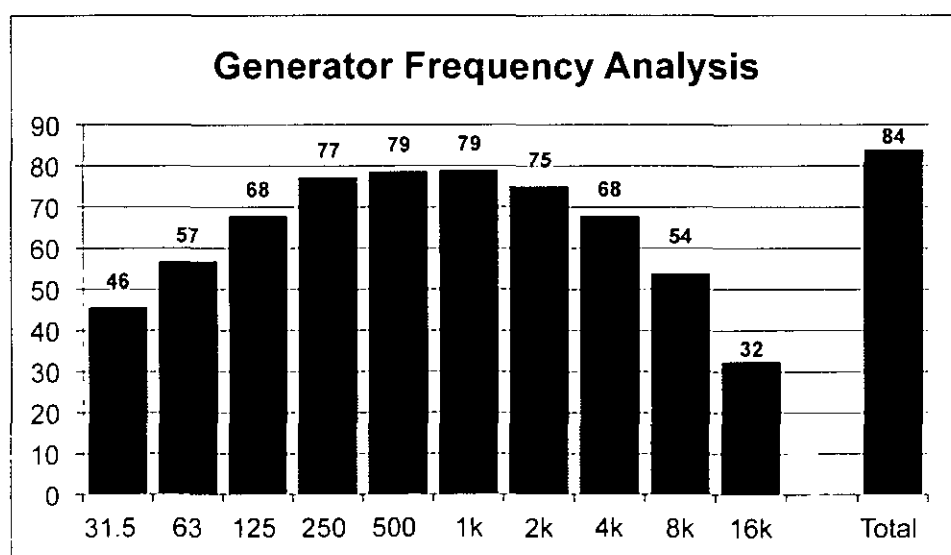
Results:

Subjective assessment:

1. The noise of the generator on site was assessed during normal operation of the plant on Tuesday 9th October. This noise dominates the site and completely swamps the noise of the recycling plant in the factory building. There was no change in the overall noise level at the site perimeter even when the factory doors were opened.
2. The background noise at the nearest dwellings was affected by the passing traffic on the A633 road in the period around midnight on Monday 8th October when the measurements were taken. However, there were times with no immediate traffic present and the noise levels at these times were very quiet and have been taken as typical of the likely noise when traffic has ceased in the middle of the night.
3. The daytime ambient noise situation was assessed at the rear of the houses during normal daytime operation of the generator. It was not possible to distinguish the noise of the generator at all. This was largely due to the fact that there is a large industrial building associated with the Billington company that is positioned directly between the G B Cullet site and the houses. This building acts as a very significant noise barrier.

Measured data: All values used in calculations are rounded to the nearest dB in line with standard procedure.

1. The noise of the generator was measured at a distance of about 1m and at the perimeter of the site. The overall level and octave frequency analysis of the measurement at 1m is shown below. The frequency spectrum of the noise shows a general wideband noise centred around 500/1kHz with no particular tonal effects. The overall level was 84dB(A). The perimeter level dropped to 76dB(A).



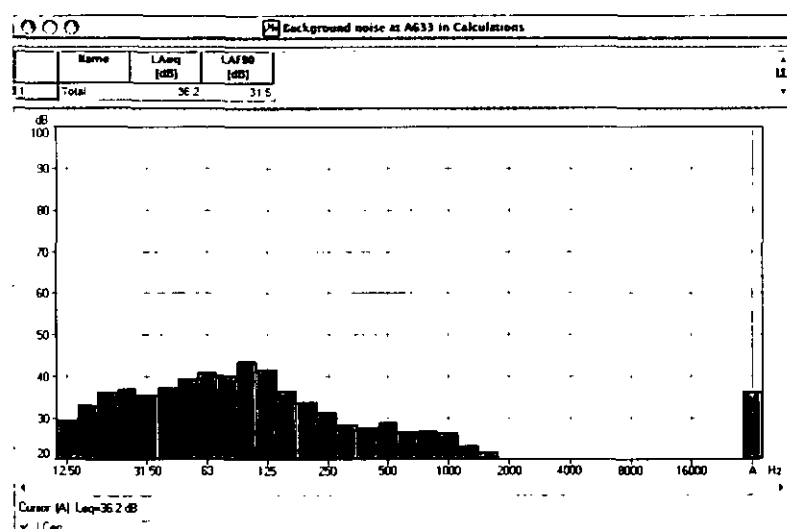
Results (continued):

- The Specific noise effect at the NSR for a BS4142 calculation is given by taking the LAeq value of 84dB at 1m and translating that to a distance of 150m using the formula from the Assessment Method section above.

ie: $20\log 150 = \text{reduction of } 43\text{dB}$.

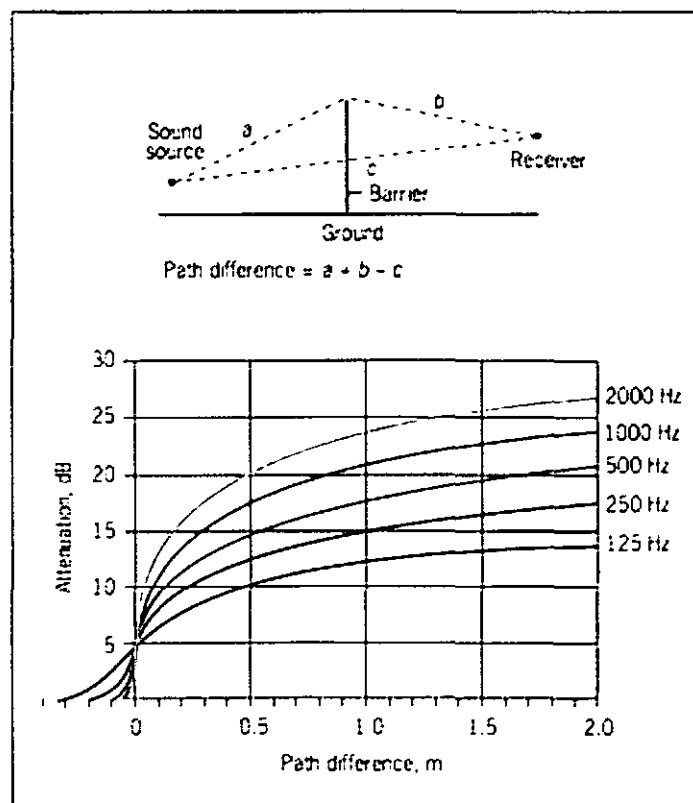
Thus, the expected noise level at the nearest dwellings would be around 41dB(A) if there were no intervening barriers or other noise reducing effects.

- The frequency spectrum and overall level of the night time background noise at the rear of the houses is shown below. The difference between the LAeq and LAF90 values demonstrates that there must have been some distant traffic noise causing variation in the noise level although this was not subjectively noticeable during the measurement. However, the value of 31dB(A) for LAF90 is entirely sensible for this type of location.



Calculations:

1. The Specific Level of the generator at the houses was estimated as likely to be about 41dB LAeq. The night time average of Background Noise was measured as around 31dB LAF90. According to BS4142, this indicates a Noise Rating Level of **10dB**.
2. However, the above calculation takes no account of the intervening Billington's building and the fact that the G B Cullet site is also at a considerably lower height than the NSR position. The Billington's building is approximately 7m in height and the ground level is estimated as around 3m (possibly more) above the Generator position. Since the Billington's building runs the length of the G B Cullet site and considerably longer, these factors create the effect of a 10m high noise barrier between the G B Cullet generator and the top of the Billington's building. The effect on the NSR side is not as significant for the same ground level reasons and the height is effectively reduced from 7m to about 5m differential.
3. The effect of a noise barrier is determined by the path difference between the direct sound and the refracted sound. The amount of noise reduction is frequency dependant. A good graphical representation of the barrier attenuation effect is given in *Building Bulletin 93, Section 2: Noise Control*, which is part of the UK Building Regulations 2000 and is shown below.



Calculations (continued):

4. The ridge of the Billington's building is about 80m from the G B Cullet generator site and 70m from the rear windows of the nearest houses. A simple use of Pythagoras's Theorem gives an effective path difference of around 0.79m. The graph above in paragraph 3. shows that the noise reduction would be between 17 and 20dB at the main frequencies of the generator noise.
5. This suggests that the actual residual noise likely at the NSR position due to the G B Cullet generator would be around 21 to 24dB(A). This level is considerably **BELOW** the existing Background noise level of 31dB LAF90 and indicates according to BS4142 that complaints would be unlikely.

Conclusions and Recommendations:

1. According to the BS4142 based assessment above, the planned night use of the generator at the G B Cullet location is unlikely to present any meaningful level of noise nuisance. It is very likely that at most times the noise of the machinery would actually be inaudible due to the A633 traffic noise.
2. However, as an added safety factor, it would be prudent to construct a noise barrier on site around the generator itself. A solid barrier positioned at about 1m and with a height of 1m above the generator should reduce the noise emission at source by a further 10dB.
3. Also, any fork-lift trucks or other material handling vehicles should be fitted with "hush" reversing alarms instead of the conventional tonal "beeping" versions. Although it is understood that this kind of vehicle might only be used about once an hour, this improvement would avoid any potential short-term intrusion effects of this kind of tonal noise.
4. If the above matters are addressed, then there would appear to be no valid reason from a noise aspect that would prevent this application for night operation being approved.

J M Houldsworth

John M Houldsworth. B.Sc. MIOA. **Sound Advice** 14th October 2012

Sound Advice 11, Wellington Street, Lytham, Lancashire FY8 5BZ Tel/Fax: 01253 796267 (24hrs ans)