STATUS SCIENTIFIC CONTROLS

• Refrigerant Identifiers •
• Fixed Gas Detectors • Gas Detection Control Units •

Mentor Refrigerant Identifier Communications Manual for Mentor Portable and Fixed Identifiers

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1 DESCRIPTION

This manual is to be used in conjunction with TD20/002 Fixed Refrigerant Identifier manual and TD20/001 Portable Refrigerant Identifier manual. It describes the protocol required for communicating with Automotive Air Conditioning equipment and using the Automotive Refrigerant Configurator Pro PC application which simulates the communications with Automotive Air Conditioning equipment.

The Mentor **Automotive Refrigerant Configurator Pro** PC application can be used with both the Portable and Fixed Automotive Refrigerant Identifiers manufactured by Status Scientific Controls Ltd.

It is a bespoke comprehensive PC software application that allows Service Unit manufacturers (and other suitably trained users) to test, calibrate and configure the identifiers during the production process.

This manual also covers the protocol required for communications between SAE J2843, SAE J2851 or SAE J3030 Automotive Air Conditioning Service equipment.

2 INSTALLATION OF THE PC APPLICATION

This is a Windows compatible application.

A copy of the application is available to approved customers.

The file is in .zip format.

Extract the files to a suitable folder on your PC and then run the **Setup.msi** file. This will install the application on your PC and place a shortcut icon on the desktop as shown below.

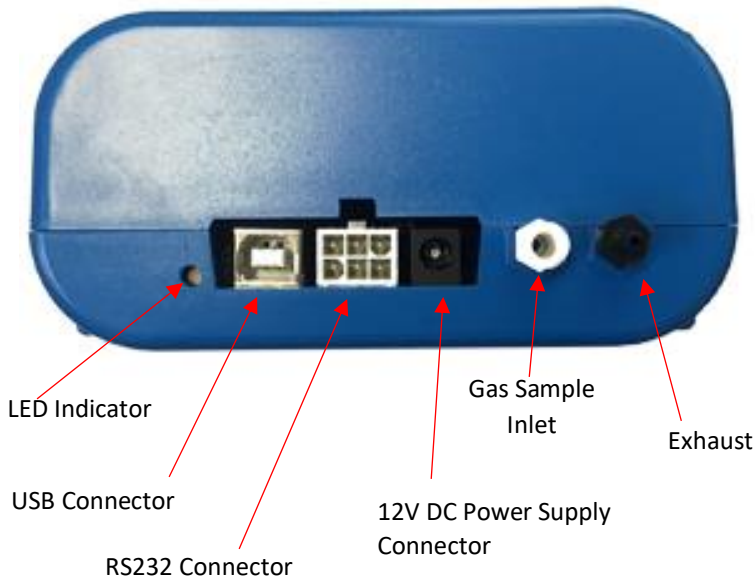
3 CONNECTING TO A FIXED IDENTIFIER

Either the USB or RS232 output of the fixed Mentor Refrigerant Identifier can be connected to the PC on which the application is installed.

If the RS232 connection is to be used, the PC will require to be fitted with an appropriate interface card such as PCI or PCI Express. Alternatively, an RS232 to USB adaptor can be used to allow connection to a USB port on the PC.

The Identifier will require to be powered from a 12V DC power supply.

Fixed Identifier Module Rear View



3.1 LED Indicator

The LED illuminates or flashes Red or Green indicating the state or process the identifier is in. See manuals TD20/001 and TD20/002 for more information.

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3.2 USB Connector

The USB connector is a standard Type B socket.

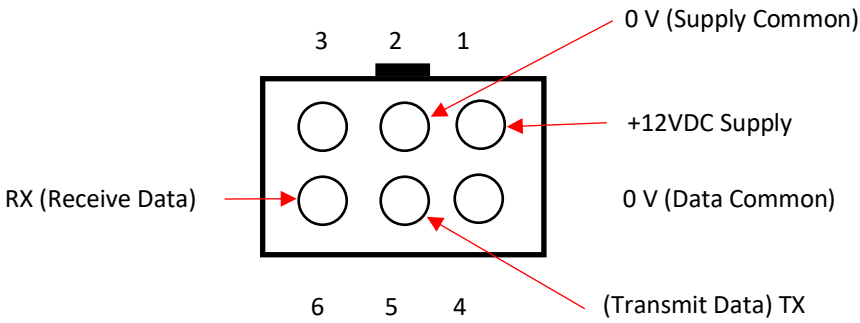
3.3 RS232 Connector

The module is fitted with a 6-way plug from the "TE Connectivity" Mini-Universal MATE-N-LOK series mounted onto the internal circuit board.

Alternatively, the user can construct additional cable sockets using the following "TE Connectivity" parts: -

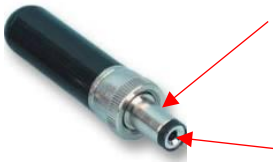
Quantity 1 - Housing Part No. 172168-1.
Quantity 6 – Solder Socket Part No. 770902-1.

Rear view of module RS232 Connector



3.4 12V DC Power Supply Connector

The nominal 12V DC power supply for the identifier can either be provided as part of the RS232 cable using the connections shown above or separately supplied via a 2.5 mm power jack plug connected as shown below.



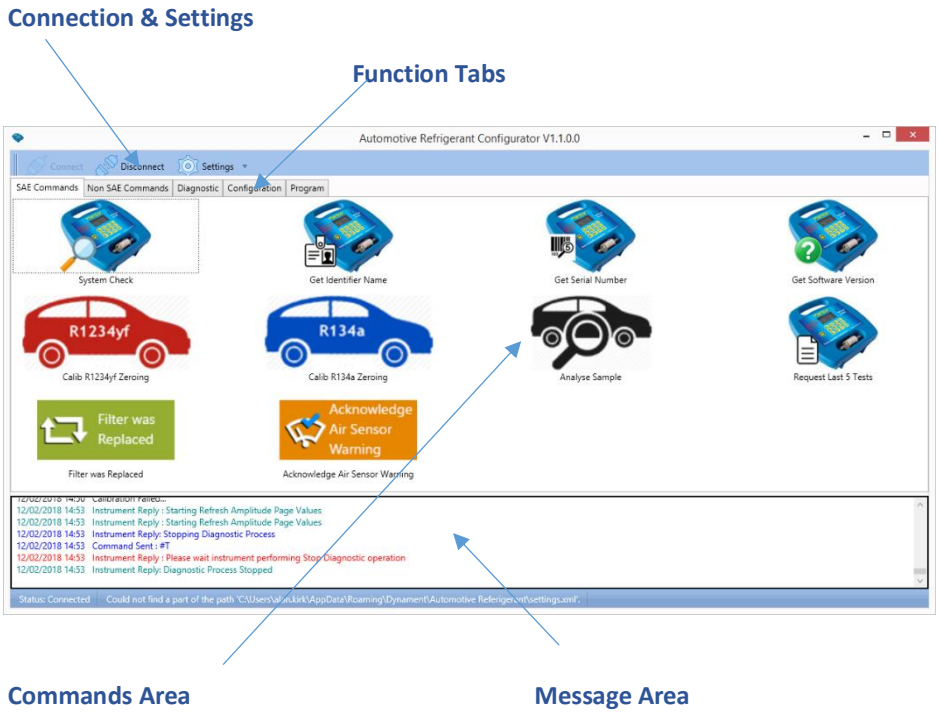
4 CONNECTING TO A PORTABLE IDENTIFIER

Connect a USB cable between the USB port of the computer and the USB Type A connector situated on the left-hand side of the Identifier (as viewed from the front).

5 RUNNING THE PC APPLICATION

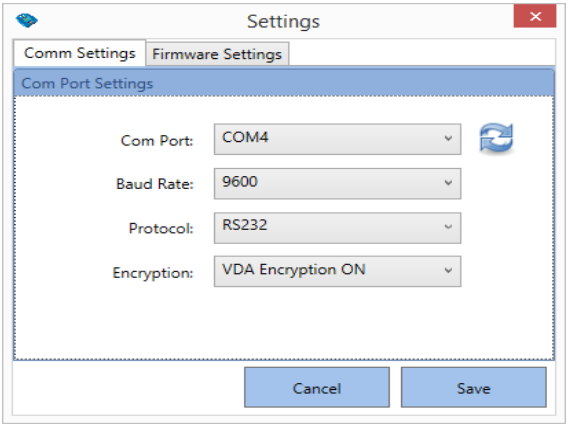
1. Connect the Identifier to the PC using either a USB or RS232 connection as described in sections 3 and 4.
2. Switch on the Identifier.
3. Run the application by clicking on the desktop shortcut. The screen will appear as shown.

There are four main areas of the page as shown below: -



5.1 Com Port Settings

Click on the Settings tab; the following box appears: -



Using the drop-down menus, choose the appropriate settings detailed below and then select **Save**.

Com Port: Select appropriate COM port (e.g. COM1 or COM3).

Baud Rate: Select 9600 or 115200 (USB only).

Protocol: Select USB or RS232.

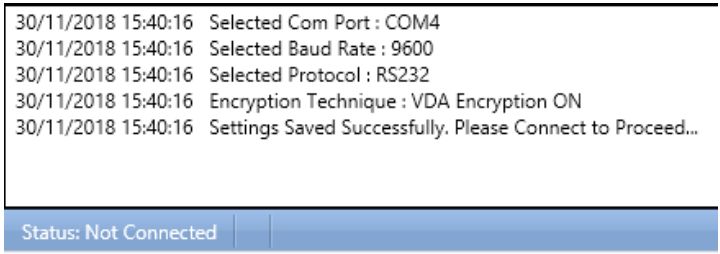
Encryption: Choose one of the following: -

SAE Encryption OFF	SAE output provides individual gas readings as per SAE
SAE Encryption ON	J2912. Note that SAE J2912 specifies use of encryption.
VDA Encryption OFF	VDA output provides PASS/FAIL only.
VDA Encryption ON	(Fails if purity is below 95%)

(**Note** – it may be necessary to try various combinations **Port** and **Baud Rate** settings until you are able to successfully connect your PC to the Identifier).

If Data Encryption is selected, the output will be encrypted (using AES-256 algorithm) by the Refrigerant Identifier prior to transmission to the Service Unit. The Service Unit will therefore need to have the capability to de-encrypt the data.

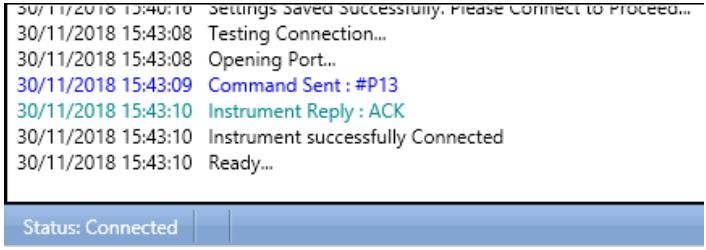
If the settings have been successfully saved, the following typical messages are displayed.



5.2 Connection

Click on **Connect.**

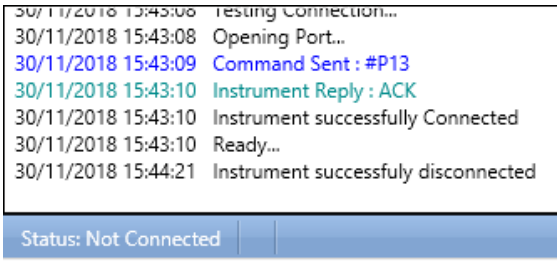
If the connection to the Identifier is successful, the following typical messages are displayed.



5.3 Disconnecting

Click on **Disconnect.**

If the Identifier is disconnected, the message “Instrument successfully disconnected” is displayed as shown in the last line of the message window.



6 SAE COMMANDS

The **SAE Commands** states the communications protocol required for the Refrigerant Identifier to communicate with a recovery/recycle/recharge machine and the PC application. The SAE Commands tab allows the PC application to simulate the commands sent from a A/C Recharge Station in accordance with SAE Surface Vehicle Standard J2912.

This facility enables Refrigerant Identifier units to be tested both before and during service e.g. to assist in fault finding.

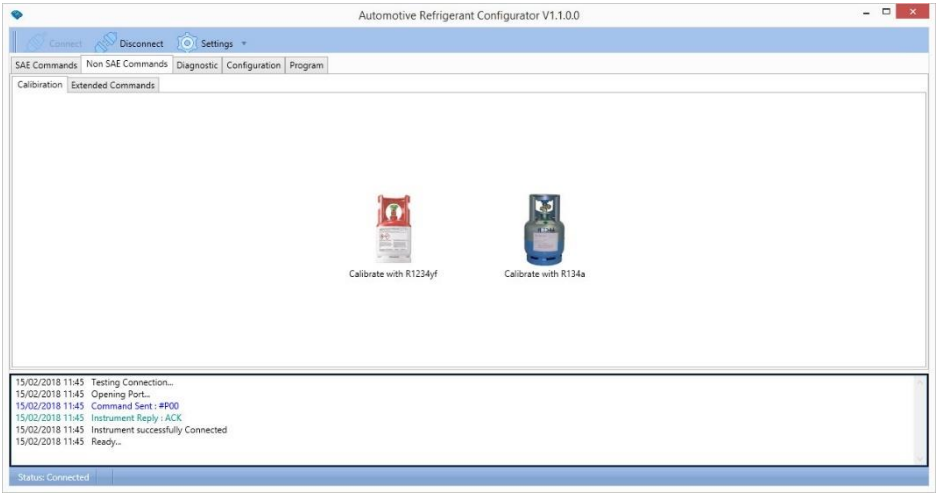
The message area of the window displays the command issued when clicking on an icon. A corresponding reply from the Identifier should then appear in the message area as detailed in the following table. Please note that after powering the identifier, it ignores the first SAE command sent.

Icon Name	Command	Reply	Remark
System Check	N	ACK	System OK
		Q	Request Calibration (Zero the gas sensors in ambient air)
		F	Replace Oil Filter
		O	The Air sensor will expire soon
		NAK	in warm up period or fault condition
Get Device (Identifier) Name	D	d#### (C/R)	e.g. d0353
Get Serial Number	B	b######## (C/R)	e.g. b0012345
Get Software Version	G	g#### (C/R)	e.g. Version 1.0 = g0100
Calibrate R1234yf	C	c ACK NAK	Zero the gas sensors in ambient air in preparation for a R1234yf analysis. Acknowledge when zeroing is complete or

Icon Name	Command	Reply	Remark
			NAK for not ready or fault.
Calibrate R134a	W	c ACK NAK	Zero the gas sensors in ambient air in preparation for a R134a analysis. Acknowledge when zeroing is complete or NAK for not ready or fault.
Analyse Sample	A	NAK	Not ready or fault – see troubleshooting.
		a	Analysing
		A data stream is received when analysis is completed followed by C/R. This will either be encrypted or non-encrypted according to the setting chosen in section 5.1.	
Request Last 5 Tests	L	l Followed by the data	Analysis data from the last 5 tests will be sent out separated by a Carriage Return.
Filter was Replaced	R	r	Reset the Filter Counter
Acknowledge Air Sensor Warning	O	o	Air sensor warnings are suppressed for 5 readings.
Acknowledge		ACK	Reset the Filter Counter
Negative (not ready)		NAK	
CUSTOM COMMAND			
Restore Backup	#X	ACK NAK	ACK if function successful or NAK if unsuccessful.

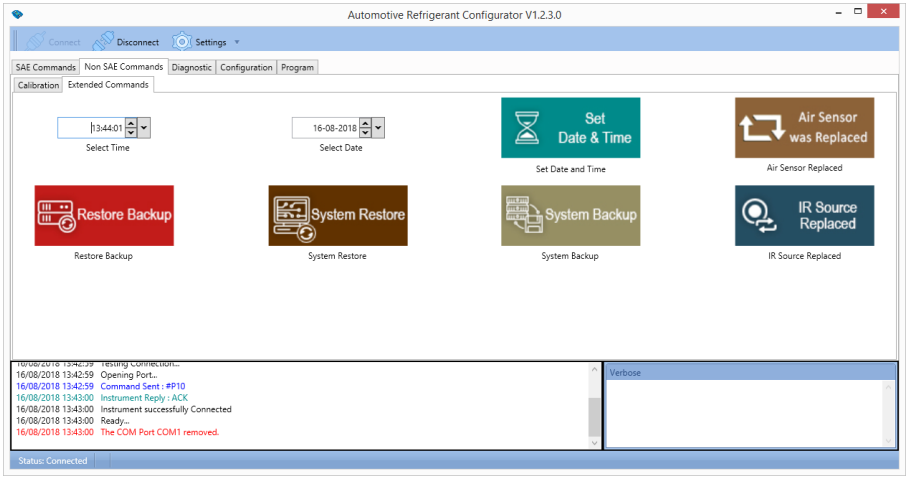
7 NON-SAE COMMANDS

7.1 Calibration



This facility is for use by Status Scientific Controls personnel only.

7.2 Extended Commands



The **Extended Commands** tab provides six functions: -

Set Date & Time – clicking on the icon sends the date and time selected in the drop-down menus to the Identifier. The time and date can be adjusted using the 'Select Time' and 'Select Date' boxes.

Air Sensor was Replaced – clicking on the icon sends a command to the identifier to register that a new air sensor has been fitted. This action changes the date fitted information within the Identifier and causes it to automatically turn on its internal pump and carry out a zero-air calibration. A management password is required.

Restore Backup – This function restores the Identifier to its factory configuration and is for use by Status Scientific personnel only. A management password is required.

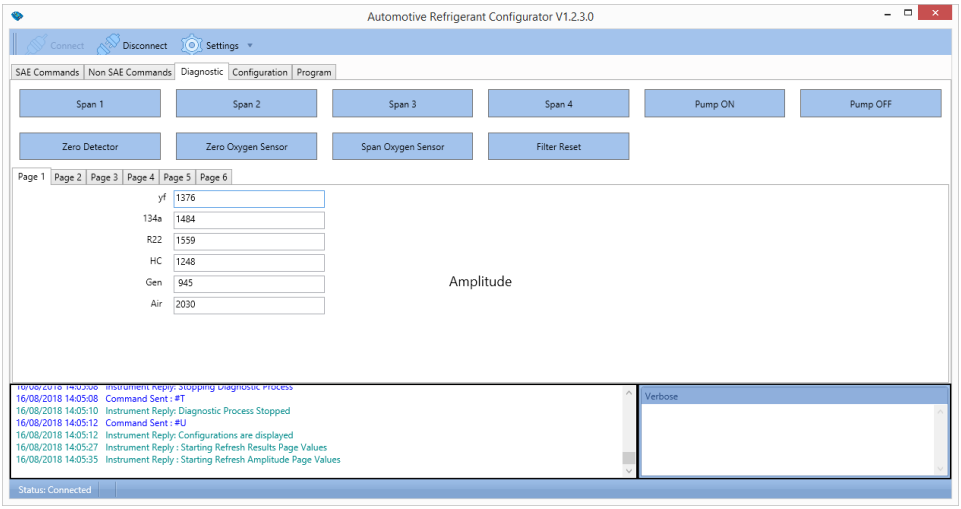
System Restore – This function is password protected and removes all data from the Identifier and is for use by Status Scientific personnel only.

System Backup – This function is password protected and is for use by Status Scientific personnel only.

IR Source Replaced – This function is password protected and is for use by Status Scientific personnel only.

8 DIAGNOSTICS

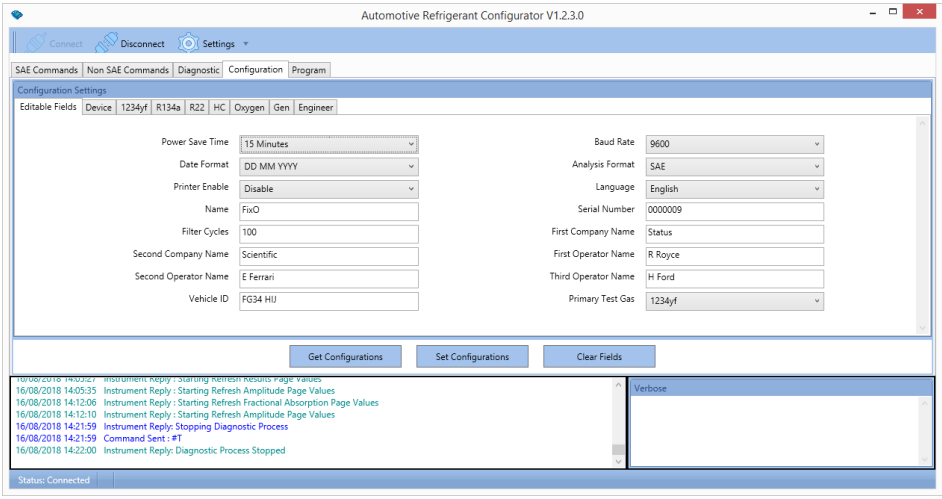
The **Diagnostics** tab provides live technical information about the operational performance of the various sensors inside the Identifier and can be used by trained staff or members of the Status Scientific support team to diagnose performance issues with the instrument and provide recommendation upon the course of action to be taken if a fault develops.



This facility is for use by Status Scientific Controls personnel only.

9 CONFIGURATION

The **Configuration** tab show the current configuration of the Identifier. It contains 9 individual menu tabs of which only the **Editable Fields** tab is available for the user to carry out changes. It provides a convenient way in which to set up the various user defined fields for example when setting up a new Identifier for its first use.



Selecting **Get Configurations** retrieves the current settings from the Identifier.

By selecting **Set Configurations**, new data entered in the editable fields is programmed into the Identifier.

Clear Fields only removes the on-screen data within all fields, it **does not** clear the settings within the Identifier. The required field data must be entered before selecting **Set Configurations**.

Where data fields have a grey background, this indicates that they may not be relevant to the type of instrument connected to the PC, for example, the **Power Save Time** field would not be applicable to a fixed identifier built into and A/C Service Station that is continuously powered when in use.

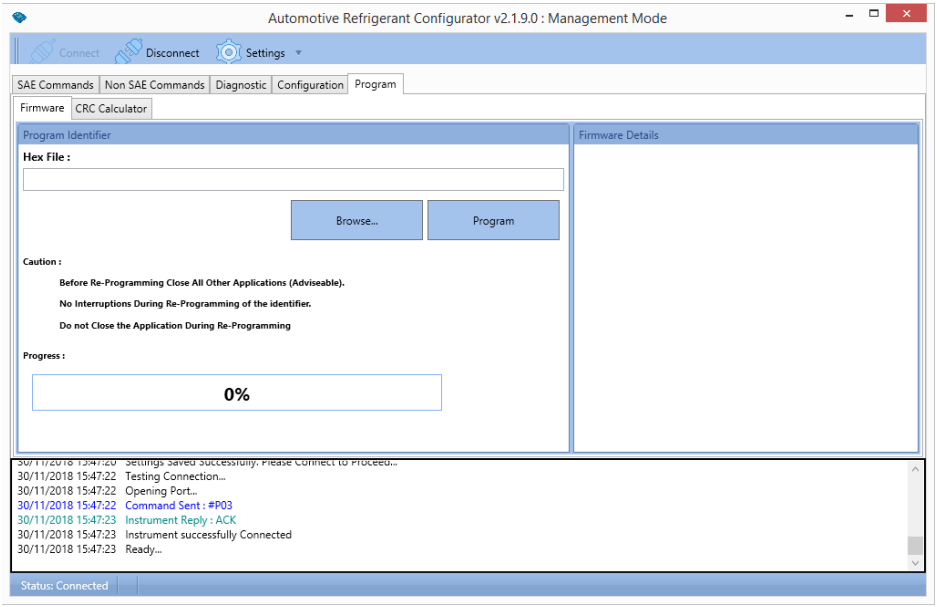
Data within the following menu tabs can be viewed but not changed: -

Device
1234yf
R134a
R22
HC
Oxygen
General

Access to the **Engineer** tab content requires user authentication via a password and is for use by Status Scientific personnel only.

10 PROGRAM

The Program tab will enable Identifiers to be re-programmed with the latest firmware provided on the Status Scientific website.



11 TROUBLE SHOOTING

11.1 Connection to an identifier

Problem / Error Message	Possible Cause	Remedy
Fail to connect instrument. Please check the port and connect again	Incorrect COM setting	Select correct COM port, Baud Rate, Protocol & Encryption status.
	Incorrect wiring configuration on RS232	Rectify connection faults.

11.2 SAE Commands

Problem / Error Message	Possible Cause	Remedy
After 'Calibrate R1234yf / R134a' is selected, identifier reply is NAK	1. Low flow rate 2. Sensor outputs too low	Blocked air inlet, defective pump. Refrigerant gas has been sucked into air inlet, inlet or sample has been applied too early, place identifier in clean air and retry. Arrange for recalibration of Identifier.
After 'Analyze Sample' is selected, Identifier reply is NAK Analyze Sample Failed or error code 00005	3. A healthy flow rate has not been detected for 60 second period. 4. A valid air calibration has not been performed within last 10 minutes. 5. Air sensor requires replacement. 6. Identifier requires recalibration. 7. Air calibration process has failed.	Investigate cause e.g. oil ingress, blocked sample line, sample pressure too high or low. Perform zero cycle. Replace air sensor. Arrange for recalibration of Identifier. Investigate cause e.g. oil ingress, blocked sample line. Contact Status Scientific or local distributor.

	8. Sensor outputs too low.	

If you find any of the above remedies do not resolve the issues, please contact either Status Scientific Controls Ltd or your Mentor distributor