

# STATUS SCIENTIFIC CONTROLS

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



## Mentor Fixed Refrigerant Identifiers For Automotive Applications For R-1234yf & R-134a



### Status Scientific Controls Ltd

Hermitage Lane Industrial Estate  
Mansfield, Nottinghamshire NG18 5ER  
United Kingdom

Tel: +44 (0) 1623 651381

[www.status-scientific.com](http://www.status-scientific.com)

email: [sales@status-scientific.com](mailto:sales@status-scientific.com)



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## 1 DESCRIPTION

This manual is to be used in conjunction with TD20/003 Mentor Refrigerant Identifier Communications manual.

The Mentor Fixed Refrigerant Identifier is intended for use with certified SAE J2843 or SAE J2851 Automotive Air Conditioning Service equipment to provide accurate identification of the refrigerant purity of R-1234yf and R-134a either within storage cylinders or vehicle air conditioning units.

The unit is supported by a comprehensive PC software application that allows Service Unit manufacturers to test and configure the identifiers during the production process.

The units are designed to be compatible with existing equipment and are available in either Bezel Mount or Direct Mount versions as shown below.



**Bezel Mount Version**

**Stock No. SS981**



**Direct Mount Version Stock No. SS982**

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## 2 SCOPE OF THE MANUAL

This manual provides details on the correct and safe use of the **Mentor Fixed Refrigerant Identifier** when used in automotive air system conditioning applications.

## 3 CONFORMITY

CE, ROHS and ISO 9001:2015

Certified to meet the SAE J2927 standard for R-1234yf.

Designed and manufactured to comply with the SAE J2912 standard for R134a.

## 4 SAFETY PRECAUTIONS



Working with refrigerants and mixtures of refrigerants can be dangerous if the correct safety precautions are not adhered to. Please ensure anyone using the Mentor Refrigerant Identifier has read and understands the following precautions.

- Suitable safety glasses and gloves need to be worn when working with refrigerants as these can cause frostbite or loss of sight.
- R1234yf and Hydrocarbon refrigerants are flammable. Make sure you are working in a well-ventilated area with no naked flames.
- R134a and/or mixtures of other refrigerants may also be flammable.
- Ensure the vehicle engine is turned off and/or the keys are removed from the ignition before carrying out any sample tests.
- Avoid breathing refrigerant and oil vapour.

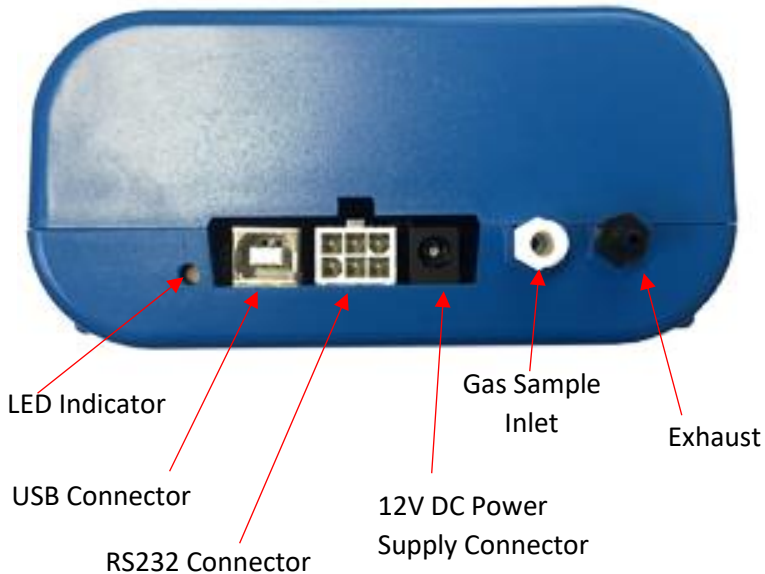
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## 5 CONNECTIONS & INDICATOR

### Module Rear View



### 5.1 LED Indicator

The LED illuminates or flashes Red or Green indicating the state or process the identifier is in.

- During the warmup period the red LED is on constantly.
- After the warmup period the LED is flashing.
- When the N command is issued, and all is healthy, the green LED continues to flash. If any kind of fault exists (low oxygen sensor output, filter requires replacement, IR amplitudes too low, calibration due) then the red LED is flashing.
- When the C or W command is issued, the green LED is on constantly.
- If the zeroing fails, the red led is flashing, otherwise the green LED is back to flashing.
- When the A command is issued, the green LED is on constantly.

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- If the analysis has completed successfully, the green LED is flashing. If the analysis does not complete or the sample gas is not pure, then the red LED is flashing.
- After the next N command is issued and all is healthy, the green LED continues to flash. If any kind of fault exists (low oxygen sensor output, filter requires replacement, IR amplitudes too low, calibration due) then the red LED is flashing.

Connection is made to the Recovery/Recycle/Recharge via the following methods.

## 5.2 USB Connector

The USB connector is a standard Type B socket.

## 5.3 RS232 Connector

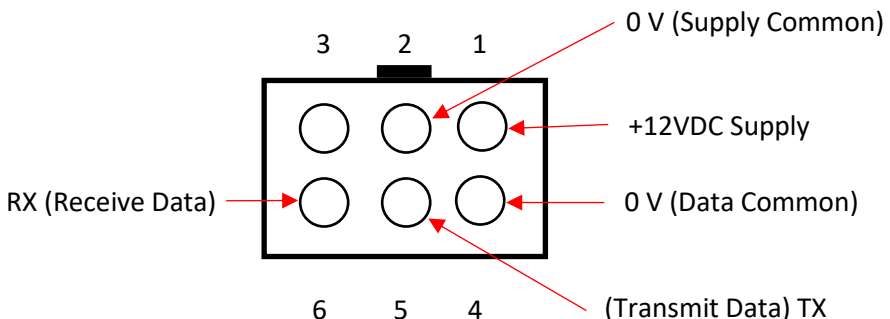
The module is fitted with a 6-way plug from the “TE Connectivity” Mini-Universal MATE-N-LOK series mounted onto the internal circuit board. If requested, the module can be supplied with a cable assembly. Status Scientific Stock No. SS993.

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





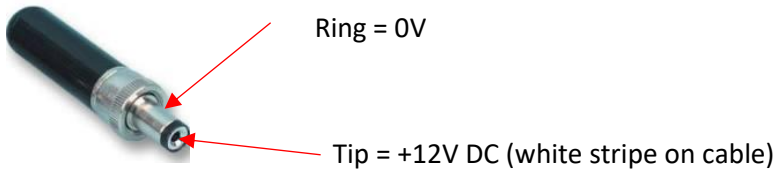
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## 5.4 12V DC Power Supply Connector

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.



**Important – After applying the 12V DC supply, wait 2 minutes before using the Identifier to allow the gas sensors to stabilize.**

## 5.5 Gas Sample Inlet

The sample inlet is a Female Bulkhead Leur 1/4-28 UNF Thread, 1/8" Barbed connector.

**Note – The Identifier requires a stable flow rate for a minimum of 60 seconds to produce a successful analysis.**

## 5.6 Exhausts

. The exhaust outlets will contain small amounts of refrigerant and so the identifier must be positioned so that the exhaust port is at a lower point than the air inlet.

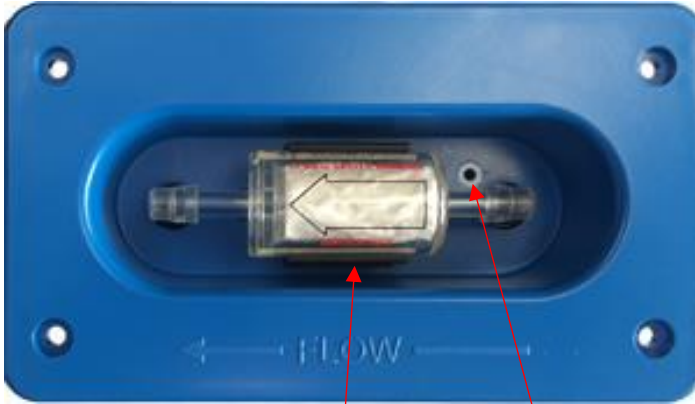
Please note, do not connect anything to the exhaust outlets.

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## 6 OIL FILTER & AIR INLET



Oil Filter  
Stock No. 210098

Air Inlet

**Module Front View – Bezel Mount Version**

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Oil Filter  
Stock No. 210098



Air Inlet

## Module Front View – Direct Mount Version

### 6.1 Oil Filter

If oil is allowed into the Identifier gas sensing chamber, then this will cause damage and failure of the Identifier thereby invalidating the warranty.

A replaceable white in-line oil filter is provided to minimise the risk of damage in the event of oil entering the sampling hose. Periodic examination of the filter and sample hose is vital and, if oil contamination is observed, then further testing must cease until the filter and/or hose have been replaced.

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The white filter has an activated dye medium that turns red when exposed to oil in the system. The **Bezel Mount** version has the filter accessible from the outside of the Automotive Air Conditioning Service unit so that it can be easily replaced.

The **Direct Mount** version should be mounted with the arrow pointing up to minimize the risk of oil entering the sample hose.

Please note, small red spots at the ends of the entry and exit tubes are not necessarily an indication of oil contamination, this may just be powder ink / dust due to the production processes of the filter.

To replace, firstly obtain a replacement filter. Make a note of the direction of flow shown on the identifier or existing filter. Pull the existing filter forwards out of the retaining clip. Carefully uncouple the black rubber tubing from both sides of the filter. Do not allow the tubing to slip back into the unit. Inspect the hose assemblies for signs of oil contamination.

Making sure the new filter is installed in the correct direction of flow, install the tube ends onto the barbs of the new filter. Carefully slide the filter and tubing back in place until the new filter is correctly seated into the retaining clip, checking there are no kinks in the tubing.

Dispose of the old filter in an environmentally friendly manner. Replacement of the sample filter usually requires replacement of the sample hose with oil restrictor.

## 6.2 Air Inlet

The identifier draws ambient air through the inlet during the purging (zeroing) cycle that precedes the gas analysis. In the **Bezel Mount** version, the air inlet is located on the outside of the Automotive Air Conditioning Service unit so that the possibility of intake of refrigerant during the purging (zeroing) cycle is minimised.

The air inlet on the **Direct Mount** version is a barbed connector for use with 2.5mm internal diameter tubing. The tubing connected to the air inlet must port to a high position on the outside of the Automotive Air Conditioning Service unit to reduce the risk of accidental intake of refrigerant during the purging (zeroing) cycle and minimise water and dust ingress.

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## 7 COMMUNICATIONS FORMATS

The protocol used to communicate with the Automotive Air Conditioning Service unit can either be specified at the time of ordering or configured by the user by means of our dedicated PC Application 'Automotive Refrigerant Config Pro'. This application will also simulate a service unit to allow operation of the identifier to be fully tested.

The communications protocol options are as follows:

| Protocol | Data Encryption | Output Format Options |
|----------|-----------------|-----------------------|
| USB      | On or Off       | SAE or VDA Pass/Fail  |
| RS232    | On or Off       | SAE or VDA Pass/Fail  |

**Please refer to the 'Mentor Automotive Refrigerant Identifier Communications' manual TD22/003 for details.**

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.

### 7.1 SAE Gas Analysis Output – R134a Mode

If the SAE output format has been set, the gas analysis data output comprises 7 fields separated by a single space as shown below. (For clarity, the spacing below has been expanded).

|         |         |       |       |       |        |        |
|---------|---------|-------|-------|-------|--------|--------|
| 095.0   | 003.2   | 001.8 | 000.0 | 003.0 | 00000  | 00055  |
| % R134a | %R12/YF | %R22  | %HC   | % Air | Status | Test # |

In this example (Test # 55) the sample contains 95% R134a, 3.2% R12, 1.8% R22 and 3% Air.

The status value '00000' signifies that no errors have occurred.

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## 7.2 SAE Gas Analysis Output – R1234yf Mode

If the SAE output format has been set, the gas analysis data output comprises 7 fields separated by a single space as shown below. (For clarity, the spacing below has been expanded).

|         |          |       |       |       |        |        |
|---------|----------|-------|-------|-------|--------|--------|
| 008.0   | 090.0    | 000.0 | 002.0 | 002.0 | 00000  | 00056  |
| % R134a | %R1234yf | %R22  | %HC   | % Air | Status | Test # |

In this example (Test # 56) the sample contains 8% R134a, 90% R1234yf, 2% HC and 2% Air.

The status value '00000' signifies that no errors have occurred.

## 7.3 VDA Gas Analysis Output

If the VDA output format has been set, the gas analysis data output simply comprises two 5-digit strings representing PASS or FAIL, and the test number as follows: -

#####

The first 5 digits are the test result where 00000 = PASS, 99999 = FAIL.

The second 5 digits are the test number e.g. 00057.

The operation of the Fixed Identifier is controlled automatically by the recovery/recycle/recharge machine using the protocol outlined in TD20/003 Mentor Refrigerant Identifier Communications manual.

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The percent refrigerant purity indicated by this equipment includes the amount of air that may be in the refrigerant being tested, but the percentage of non-condensable gases (such as air) is an independent number.

If the refrigerant being tested is identified as contaminated (as an example, less than 98% pure R-1234yf), any visual percentages being displayed of HFO-1234yf (R-1234yf) or HFC-134a (R-134a), outside the design certified value is informational and may not be accurate.

If the refrigerant in the sample contains less than 70% of the primary refrigerant, this may be displayed as zeroes in all the analysis categories, indicating that the analysis has completed but the primary gas is less than 70% pure.

With the SAE gas analysis output, any hydrocarbons and/or R152a levels identified will display in the HC category.

## 7.4 Calibration

To ensure optimum accuracy and sensitivity of the Identifier it is advisable to periodically re-calibrate the instrument against **reference cylinders of 100% R1234yf and 100% R134a**.

It is recommended that re-calibration is carried out at least every 5 years. The identifier must be returned to your local distributor to carry this out.

<https://refrigerantidentifier.com/distributors/>

Alternatively, contact us, the manufacturer Status Scientific Controls Limited, contact details provided on the cover page.

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## 8 SPECIFICATION

|  |   |
|--|---|
| <b>Refrigerants and other vapours identified</b> | R1234yf and R134a   |
| <b>Design Standard</b>                           | SAE J2927 and J2912   |
| <b>Operating Pressure</b>                        | 22 psi / 1.5 Bar - 174psi / 12 Bar  |
| <b>Sample type</b>                               | Vapour only   |
| <b>Sample volume</b>                             | 5 grams per test  |
| <b>Operating temperature range</b>               | +10°C to +49°C  |
| <b>Sensor type</b>                               | NDIR – Non-Dispersive Infrared  |
| <b>Power Rating</b>                              | 12 Volts / 1 Amp DC nominal   |
| <b>Air sensor lifetime</b>                       | 5 + years   |
| <b>Warm-up time</b>                              | 2 minutes   |
| <b>Test and purge time</b>                       | 2 minutes 20 seconds  |
| <b>USB Communications</b>                        | USB 3.0   |
| <b>Serial Port Communications</b>                | RS232   |
| <b>Stored test results capability</b>            | 5 tests maximum   |
| <b>Weights</b>                                   | Direct Mount Version – 470 grams<br>Bezel Mount Version – 625 grams<br>Boxed Weight – 1Kg |
| <b>Approvals</b>                                 | SAE J2927, CE, EMC, UL 61010  |



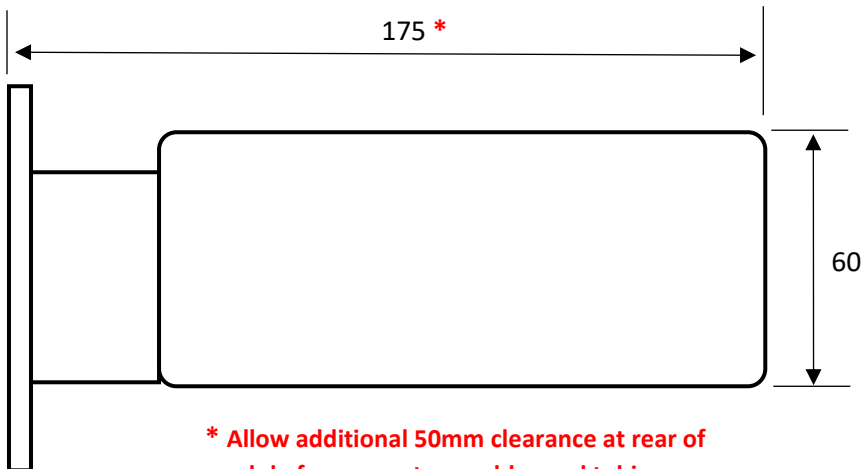
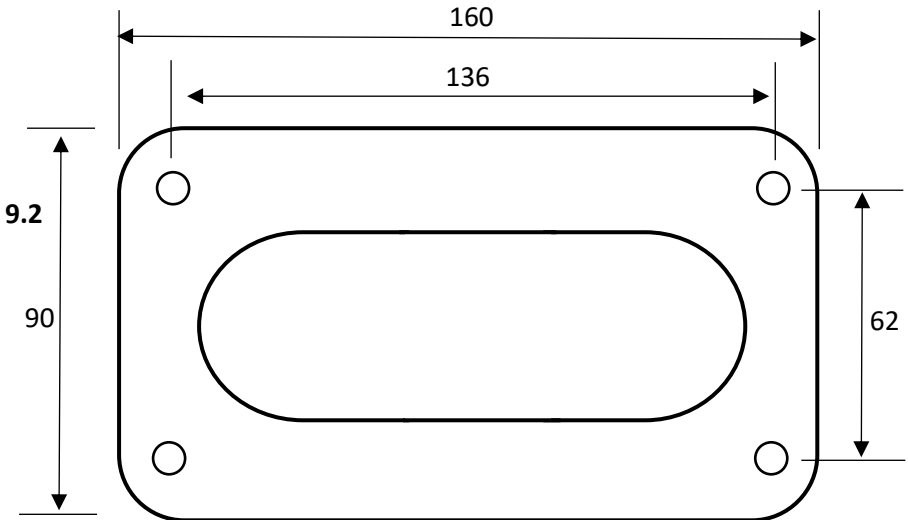
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## 9 DIMENSIONAL DATA

### 9.1 Bezel Mount Version



**\* Allow additional 50mm clearance at rear of module for connectors, cables and tubing**

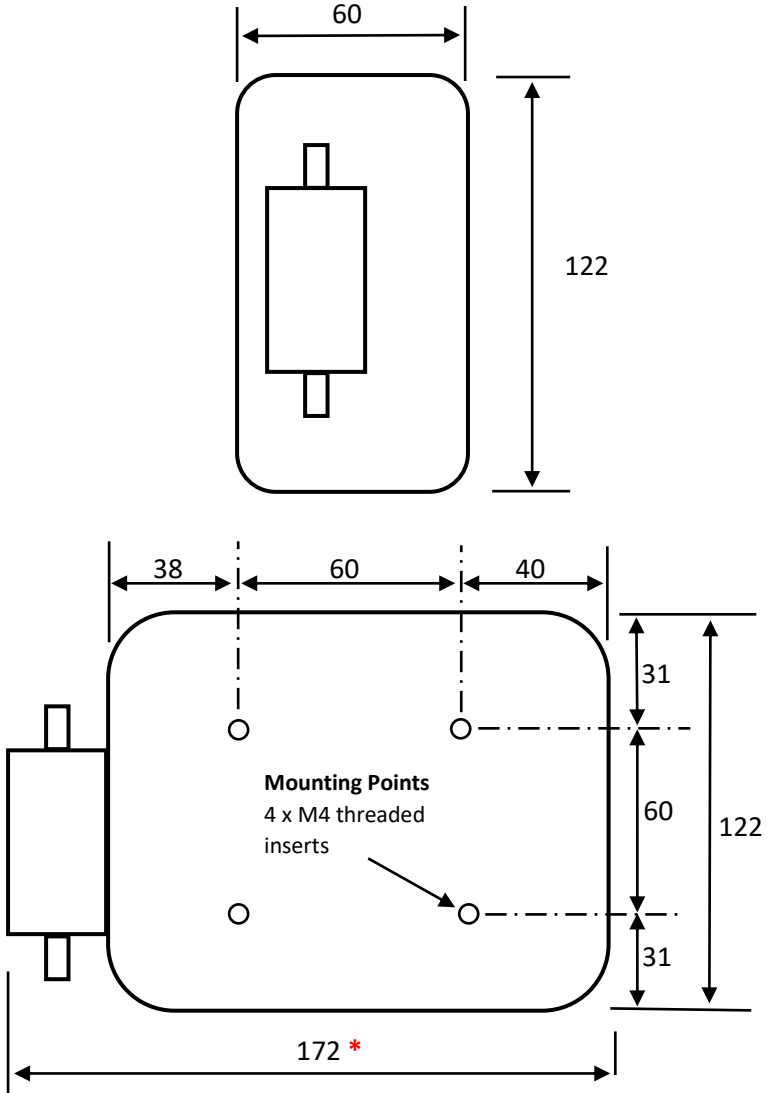
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## 9.3 Direct Mount Version

9.4



**\* Allow additional 50mm clearance at rear of module for connectors, cables and tubing**

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## 10 SPARE PARTS & ACCESSORIES

| Part No | Description                                 |
|---------|---|
| SS991   | Sample hose with oil restrictor             |
| SS993   | RS232 Computer cable                        |
| SS994   | RS232 Output cable                          |
| SS995   | 12V DC Power cable                          |
| 170339  | USB cable A plug to B plug                  |
| SS997   | Oil filter                                  |
| 250004  | Type 2032 3Volt Lithium Battery             |
| 270155  | Oxygen (Air) sensor c/w cable and connector |

Please contact your local distributor for service, repair and spare parts.

<https://refrigerantidentifier.com/distributors/>

Alternatively, contact us, the manufacturer Status Scientific Controls Limited, contact details provided on the cover page.

## 11 WARRANTY

The Mentor Refrigerant Identifier is warrantied for 2 year against failure of parts.

