

The Inspector

Automotive Refrigerant Identifier
Part Number: 7-08-1000-13-0



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I. Unpacking

The *Inspector* Automotive Refrigerant Identifier comes complete with an operation manual and all components required for its proper use and attachment to a Robinair refrigerant recovery/recycling machine.

Inspect the shipping carton for signs of damage. Immediately notify the carrier should damage be evident. Carefully open the shipping carton and remove and inventory the contents. You should receive:

- (1) Refrigerant Identifier Instrument
- (1) R134a Sample Hose Assembly
- (1) R12 Sample Hose Assembly
- (1) R134a Tank Adapter Fitting
- (1) Mounting Bracket
- (1) Operation Manual

Should any of the above components be missing, contact the local Neutronics distributor. Should any of the above components appear damaged, immediately contact the carrier and request an inspection.

II. Safety and Use Messages

The following will provide the user with safety and use messages which will aid in the use and life of the instrument.

A. Safety Messages

- Read and understand the entire manual **BEFORE** attempting to operate or service the instrument.
- **ALWAYS** wear eye and skin protection when working with refrigerants and compressed gasses.
- **ALWAYS** turn the vehicle engine off before connecting the instrument sample hose to the vehicle.
- To reduce the risk of electrical shock, **ALWAYS** use a grounded 3 prong receptacle to supply the instrument with 110/220 VAC, 50/60 Hz power.
- **ALWAYS** inspect the sample hose before using to insure that the hose is not cracked, frayed or shows signs of any other damage. Poorly maintained hoses or hoses in poor condition may result in rupture.
- **ALWAYS** direct the end of the hose away from eyes and skin when disconnecting from a refrigerant source. Venting refrigerant will have the potential to freeze tissue upon contact.
- The instrument will warn the user should hydrocarbon concentrations equal or exceed 2% by weight. Should the instrument go into a high hydrocarbon alarm, **DO NOT PROCESS THE REFRIGERANT!** The refrigerant presents a combustion hazard and should be dealt with according to suggestions stated in the operation section of this manual.

B. Use Messages

- Read and understand the entire manual **BEFORE** attempting to operate or service the instrument.
- **BEFORE** and **AFTER** each use of the instrument, inspect the top sample filter for signs of red spots appearing on the outside diameter of the white filter element. If red spots are beginning to appear, **perform sample filter maintenance before using the instrument**, as directed in the maintenance section of this manual. Failure to properly maintain the sample filter will result in non-warranty instrument failure.
- The instrument is designed for connection of the sample hose to the **low side or vapor** port of vehicle air conditioning systems or refrigerant storage cylinders. **DO NOT CONNECT THE SAMPLE HOSE TO THE HIGH SIDE OR LIQUID PORT!** The introduction of liquid into the instrument will cause non-warranty damage and failure.
- **ALWAYS** inspect the sample hoses for evidence of obstruction, fraying, cracking or other signs of damage. **If oil is present in the sample hose**, clean the hose as per maintenance procedures provided in this manual before using.
- **NEVER** obstruct the air intake or sample exhaust ports of the instrument during use.
- **ALWAYS** disconnect the sample hose from the refrigerant source when the instrument signals that the sampling period has ended. There is no shut off of sample flow in the instrument; therefore, prolonged connection of the sample hose to the refrigerant source will result in constant and unnecessary venting of refrigerant.
- **ALWAYS** use Neutronics approved spare parts.
- **ALWAYS** place the instrument on a flat and sturdy surface during use.

- **Use only the sample hoses supplied with the instrument and DO NOT substitute other hoses.** The instrument is calibrated to the volume of the hoses supplied and the use of any other hoses, except those approved by Neutronics, will result in instrument errors.
- As of December 1996 nine EPA SNAP approved refrigerants are available as R12 substitutes. It is very likely that the user will eventually encounter one or more of these blends and it is import to understand how the *Inspector* will react.

Each of the nine EPA approved R12 substitute refrigerant blends have been tested in the *Inspector* and **none** have been identified as either pure R12 or R134a.

The substitute blends include some refrigerants that are not designed to be directly detected by the *Inspector* and they will cause cross sensitivity signals on the NDIR sensor bench. Therefore, although the instrument will not be fooled by the refrigerant blends the actual displayed refrigerant concentrations **will not be accurate.**

The user can comfortably rely upon the *Inspector* to detect pure R12 and R134a refrigerant samples and protect expensive refrigerant recycling equipment from contamination. The user will be alerted to the presence of one of the substitute blends when the *Inspector* indicates failed refrigerant which contains excessive concentrations of R22 and/or hydrocarbons.

III. Functional Description

The *Inspector* Refrigerant Identifier is used to identify the type and weight concentration of vapor refrigerant samples taken directly from automotive air conditioning systems or refrigerant storage cylinders; and, determine if the refrigerant sample is pure R12 or R134a (pure refrigerant is defined as being 98% by weight concentration of either R12 or R134a).

The *Inspector* will identify the weight percentage of R12, R134a, R22 and hydrocarbons (HC) which may be contained in the refrigerant sample. An alpha-numeric display and LED indications will convey the percentages to the user along with an indication of whether the refrigerant sample is deemed pure (equal to or greater than 98% R12 or R134a). Additionally, the instrument will convey the weight concentration of air contained within the refrigerant sample whenever the sample has been deemed pure R12 or R134a. A hydrocarbon alarm state is provided which will alert the user if the refrigerant sample is found to contain a weight concentration equal to or greater than 2%, which may pose a combustion hazard.

The *Inspector* utilizes multiple sensor non-dispersive infrared (NDIR) technology to perform refrigerant sample analysis. This technology has proven itself in thousands of Refrigerant Identifiers throughout the world.

Refrigerant vapor samples under their own pressure are introduced into the instrument through the instrument sample hose. The instrument is provided with both a R12 and R134a sample hose. Each hose is complete with service end couplers for the respective refrigerant type and a mating connector to connect the instrument sample inlet port. The sample gas is regulated in pressure for presentation into the instrument sampling system. Sample pressure is monitored by the instrument to verify that proper refrigerant vapor pressure is present and also to signal the instrument to begin the sampling process. Regulated sample vapor is cleansed of particulate and oil mists and presented to the NDIR sensor bench. The NDIR sensor bench provides the analysis of the sample and supplies concentration signals to the instrument microprocessor. The instrument microprocessor will use the NDIR signals to determine the type and weight concentrations of R12, R134a, R22, hydrocarbons and air. Note that the presence of air in a refrigerant sample will not effect the concentration determination of the refrigerant components. It is possible to have refrigerant components add up to 100% with additional percentages of air indicated. The instrument does not count air as an integral component of the sample since it can be easily removed using standard recycling machines common in the market today.

When the sampling and analysis process has completed, the instrument will convey the results to the user through an alpha-numeric LCD and status LED's. Once the user disconnects the sample hose from the refrigerant source, the instrument will automatically purge itself of residue sample vapor and calibrate for the next sample run. The instrument is self calibrating and requires no calibration by the user.

The instrument provides the ability to output the analysis results to an external, user supplied, printer through the instrument printer port. The printer port output of the instrument will support most parallel ported printers. The printout will appear as shown below.

Neutronics Inc.
Refrigerant Identifier
Refrigerant Analysis
Refrigerant R134a = 100.0%
Refrigerant R12 = 0.0%
Refrigerant R22 = 0.0%
Hydrocarbons = 0.0%
Conclusion: R134a - PASS
Air Content = 3.0%

Date: _____

Technician: _____

Model: _____

VIN: _____

IV. Hardware Description

The *Inspector* Refrigerant Identifier is housed in a rugged epoxy coated sheet metal housing. The power cable, printer port, sample filter and all interface components are all housed externally on the housing for ease of user access. The instrument is also supplied with a mounting bracket, for hard mounting to a Robinair recovery/recycling machine, two sample hose assemblies, one for R12 and another for R134a, and a R134a tank adapter fitting to permit sampling from 1/2" ACME ported cylinders.

The following will detail the features of the hardware.

A. Sample Hoses

Two six foot sample hoses are provided with the instrument for connection of the instrument to the automobile air conditioning system or a refrigerant storage cylinder. Each hose is rated for a maximum sample pressure of 300 psig. Each hose will have the mating connector on one end for connection to the instrument sample inlet port. The R12 sample hose has a 1/4" SAE female flare coupler on its service end while the R134a sample hose has a R134a low side coupler on its service end. The instrument contains hose storage stubs on the rear of the housing to store the hoses during non-use periods.

B. Mounting Bracket

A mounting bracket is supplied which will secure the instrument to a Robinair refrigerant recovery/recycling machine. The bracket will secure the instrument to the machine and prevent accidental dropping and possible damage to the instrument during use. Details of installation are provided in this manual.

C. Control Panel

The control panel is located on the face of the instrument and contains an alpha-numeric display, two green LED status indicators and two user interface push buttons. The alpha-numeric display will convey analysis results, system status and operational prompts to the user. The LED status indicators are green LED lamps which will light when analysis determines that the refrigerant sample is either pure R12 or R134a. The user interface push buttons are utilized by the user to place the instrument into different operational modes, initiate printing or inform the instrument of various operating conditions.

D. Sample Filter

The sample filter is located on the top of the instrument housing and will cleanse the refrigerant sample vapor of entrained particulate and oil mists. The filter contains a red indicating dye which will begin to appear on the white outside diameter of the filter element when the filter requires replacement.

E. Power Components

An eight foot power cord, a power switch and a power fuse are located on the left side of the instrument housing. The power cord has a NEMA three prong, grounded male plug and is suitable for 110/220 VAC, 50/60 Hz operation. The power switch supplies simple on/off control of the instrument supply power with a standard rocker switch. The power fuse is contained in a fuse holder which is easily accessed for replacement by the user.

F. Air Intake Port and Sample Exhaust Port

The air intake port is located on the left side of the instrument housing and will draw in fresh ambient air during calibration. The sample exhaust port is located on the bottom of the instrument housing and will vent spent refrigerant sample vapor. Both of these ports must remain free from obstructions for proper instrument function.

G. Printer Port

The printer port is located on the front edge of the instrument housing. The port will provide a means to printout the results of a refrigerant sample analysis through connection of a user supplied parallel printer cable to a user supplied parallel ported printer.

H. Tank Adapter Fitting

The tank adapter fitting is stowed on the R134a hose storage stub on the rear of the instrument. This fitting will permit sampling of the refrigerants from R134a storage cylinders which are fitted with 1/2" male ACME threaded ports. The fitting will thread onto the male ACME thread and provide the required R134a low side coupling stub for R134a hose connection.

V. Operation Instructions

The following discussion will detail the initial setup and installation of the *Inspector* and the operation of the instrument.

A. Initial Setup and Installation

1. To install the instrument onto a Robinair machine, complete the following:
 - a) Remove the screws located on the rear of the Robinair machine which secure the top edge of the front cover to the frame. If the Robinair machine has an oil bottle storage rack installed onto the upper rear of the machine remove it also.
 - b) Position the instrument mounting bracket onto the rear of the Robinair machine and secure using the screws removed in step a. The screws should pass through the slots of the bracket and fasten back into their original locations on the Robinair machine.
 - c) Remove the two hex washer heads from the bottom surface of the *Inspector* on save. Remove the two self tapping screws from the front edge of the *Inspector* and save.
 - d) Position the *Inspector* onto the top surface of the mounting bracket and secure with the screws saved in step c. It may be necessary to loosen the screws securing the mounting bracket to the Robinair machine to achieve optimal fit of the *Inspector* onto the machine.
 - e) If an oil bottle storage rack is supplied with the Robinair machine, install it onto the rear of the *Inspector* using two or three of the self tapping screws supplied with the instrument.
 - f) The instrument is now installed and ready for use.
2. Install the R12 and R134a sample hose assemblies onto the hose storage stubs located on the rear of the instrument housing as labeled.

B. Operation Instructions

1. Plug the power cord of the instrument into a 110/220 VAC, 50/60 Hz three prong grounded power receptacle.
2. Inspect the sample filter for signs of red spots appearing on the outside diameter of the white filter element. **If red spots are beginning to appear the filter MUST be replaced, as per the maintenance procedure in this manual, BEFORE continuing.**
3. Connect either the R12 or the R134a sample hose to the inlet port, located on the rear of the instrument, after first inspecting the hose for signs of damage, oil entrainment or obstructions. **If the sample hose shows signs of damage, oil entrainment or obstructions, it must be either replaced, cleansed of oil or cleared of obstructions, as per the maintenance procedure in this manual, BEFORE continuing.**
4. Should it be desired to print the results of an analysis run prior to the current power up, connect the printer cable and printer to the printer port of the instrument and power up the printer now. The instrument will prompt the user when a printout is available during the initial power up sequence.
5. **Initial Power Up or Power Up after moving instrument to a new location:** To assure the user of the greatest accuracy, the instrument is equipped to compensate for changes in elevation. The user will be prompted to enter the elevation of the location in which the instrument is being utilized during the power up sequence. The elevation only needs to be entered one time unless the instrument is moved to a new elevation. Elevation values are stored in the instrument memory and do not need to be entered at each power up sequence unless the elevation has changed. Elevation should be entered to the nearest 100 foot increment when so prompted by the instrument.

6. Place the power switch of the instrument in the ON position. The instrument display will indicate that the system is warming, it will prompt the user to check the sample filter, and it will also prompt the user to set elevation or print a prior analysis result.
 - a) **To Set Elevation:** Depress both the A and B push buttons at the same time when prompted by the instrument. Enter the elevation of the location to the nearest 100 foot increment by pressing the A button to increase the elevation by 100 feet or B to decrease the elevation 100 feet. The elevation setting can be made in a range of 0 to 9000 feet. When the proper elevation has been set allow the instrument to sit undisturbed for 30 seconds. After 30 seconds, the instrument will return to the warm up period.
 - b) **To Print a Prior Analysis Result:** Depress the B push button when prompted by the instrument. The results of the prior analysis results will be printed on the user connected printer.
7. When the instrument has warmed, approximately 90 seconds, an automatic calibration will be performed. Ambient air will be drawn in through the air intake port by an internal pump. The NDIR sensor bench will be calibrated in approximately 30 seconds.

Note: The *Inspector* is equipped with self diagnostic software to insure that calibration has completed successfully. If a fault occurs during calibration one of two actions is required by the user as follows: a) If the display indicates an error code and the alarm horn is beeping, refer to the troubleshooting section of this manual for further instructions. b) If the display reads "REMOVE PRESSURE IN SAMPLE HOSE", disconnect the sample hose service end from the refrigerant source. It may be necessary to restart the instrument if the sample hose was connected and admitting refrigerant to the instrument during calibration.

8. When calibration has completed, the instrument will be in standby mode. The user will be prompted by the display to connect the sample hose to the refrigerant source. When the user connects the sample hose service end to the refrigerant source and opens the source to the instrument, the instrument will automatically begin the sampling sequence.

Note: The *Inspector* is equipped with an internal timer to monitor periods of inactivity during the standby mode. If the instrument sits for a period of 2 minutes, during which no sample is admitted, the instrument will automatically return to the calibration mode. This feature will insure that the instrument will provide the most accurate analysis possible.

9. During the sampling mode, which will continue for approximately 40 seconds, refrigerant vapor from the sample hose will enter the instrument for analysis. The user should observe the sample filter during the sample period. **If the sample filter begins to turn red or if liquid refrigerant is observed in the filter, DISCONNECT THE SAMPLE HOSE from the refrigerant source IMMEDIATELY. THE SAMPLE HOSE SERVICE END IS MOST LIKELY CONNECTED TO THE HIGH SIDE OR LIQUID PORT. Continued operation of the instrument in this condition will result in instrument damage and failure!**

Note: Should the instrument display read "LOW SAMPLE FLOW, CHECK HOSE, RERUN", the instrument is not receiving a refrigerant sample. Check the hose service end connection and open any valves which may be on the refrigerant source connection to admit sample vapor to the instrument. The instrument requires a sample of at least 20 psig to initiate the sampling sequence.

10. When the sampling sequence has completed, the instrument will prompt the user to disconnect the sample hose. **The user should disconnect the service end of the sample hose from the refrigerant source when prompted.** The instrument does not have the capability to stop the sample vapor flow. Refrigerant will continue to needlessly vent through the instrument after the sample sequence has completed as long as the service end of the sample hose is connected and pressurized. Press the A push button to access the results of the analysis. Results of the analysis will be conveyed to the user as described in steps 11, 12 or 13.
11. **Pass Mode**
 - a. The instrument will light either the R12 or R134a LED status indicator lamp to indicate that the refrigerant sample is either pure R12 or pure R134a. Pure refrigerant is defined as refrigerant which contains at least 98% by weight concentration of either R12 or R134a.
 - b. The instrument display will cycle between two screens. The first screen will indicate the percentage of the pure refrigerant, air content and indicate "PASS". The second screen will indicate contaminate levels of R22, hydrocarbons and either R12 or R134a.
 - c. The instrument will then prompt the user if a printout is desired. If the user wishes to printout the results, connect a user supplied parallel ported printer to the printer port of the instrument, power the printer and depress the B push button of the instrument. If no printout is desired, depress the A push button of the instrument when prompted.
 - d. After the printout has completed and the user has depressed the A push button, or if the user simply presses the A button to bypass a printout, the instrument will return to the calibration mode, step 7, to prepare for another sample run.
12. **HC Alarm Mode**
 - a. If the instrument senses a hydrocarbon level equal to or greater than 2% by weight, the instrument will go into the HC Alarm State. The instrument will display "DANGER! HIGH HYDROCARBONS, DO NOT PROCESS!, PUSH A TO CONT." and the alarm horn will beep continually. The instrument will remain in this condition until the user depresses the A push button. After depression of the A push button, the instrument will display the results of the analysis as described in the Fail Mode, step 13.

High Hydrocarbon Concentration Discussion:

Refrigerant samples detected to have hydrocarbon levels equal to or in excess of 2% by weight present the user with a flammability and combustion hazard. **UNDER NO CIRCUMSTANCES SHOULD THE REFRIGERANT FROM ANY SOURCE DETERMINED TO BE HIGH IN HYDROCARBON CONTENT BE PROCESSED THROUGH A RECOVERY/RECYCLING MACHINE WHICH CONTAINS AN ELECTRICAL COMPRESSOR OR WHICH IS NOT RATED FOR HYDROCARBON RECOVERY.** Hydrocarbon contamination typically involves propane or butane which may lead to combustion when they are placed in contact with hot surfaces or electrical sparks.

13. Fail Mode

Note: Refrigerant samples which have failed purity testing are not considered suitable for reuse or introduction into refrigerant recovery/recycling equipment. The user is cautioned against the further use of the refrigerant source which has failed purity testing by the *Inspector*.

- a. Should the instrument not detect a minimum 98% by weight percentage of either R12 or R134a it will enter the Fail Mode. The instrument alarm horn will beep a minimum of 5 times to alert the user of a refrigerant purity failure.
- b. The instrument display will cycle between two screens. The first screen will indicate the percentage of either R12 or R134a (which ever refrigerant is most prevalent in concentration) and indicate "REFRIGERANT FAIL". The second screen will indicate contaminate levels of R22, hydrocarbons and either R12 or R134a.
- c. The instrument will then prompt the user if a printout is desired. If the user wishes to printout the results, connect a user supplied parallel ported printer to the printer port of the instrument, power the printer and depress the B push button of the instrument. If no printout is desired, depress the A push button of the instrument when prompted.
- d. After the printout has completed and the user has depressed the A push button, or if the user simply presses the A button to bypass a printout, the instrument will return to the calibration mode, step 7, to prepare for another sample run.

VI. Troubleshooting Guide

The *Inspector* is designed for trouble free operation under normal operating conditions. The instrument is supplied with self diagnostic features which can aid the user in determining the cause of several non-standard operating conditions. The troubleshooting guide will direct the user to corrective action when problems are encountered.

Should the user encounter problems which can not be solved using the guide, contact the appropriate service center or contact Neutronics directly for assistance.

1. Error Code #1 displayed by instrument:

An Error 1 Code signifies a system warm up failure or electrical noise interference.

If the error occurs during the calibration mode verify that the sample hose service end is not connected to anything, obstructed, or pressurized. Also verify that the service end of the sample hose is not directed towards the air intake port of the instrument.

If the error occurs during the sampling mode verify that there is no blockage of the sample hose and that the hose is pressurized by the refrigerant source.

Finally, verify that the instrument is not located near a source of electrical noise such as a running automobile.

The error code is cleared by turning the instrument off then on again.

2. Error Code #2 displayed by instrument:

An Error 2 Code signifies a NDIR sensor failure due to temperature extremes. This error can occur if the instrument is subjected to sudden temperature changes such as going outdoors into extreme cold or hot temperatures from room temperature.

Allow the instrument temperature to stabilize at the operating temperature before attempting use. Make sure that the operating temperature does not exceed the operating temperature range of the instrument which is +45°F to +100°F.

The error code is cleared by turning the instrument off then on again.

3. Error Code #3 displayed by instrument:

An Error 3 Code signifies a calibration error. This is most likely caused by refrigerant vapors entering the air intake during the calibration mode or by refrigerant entering the instrument through a still connected sample hose. The error code can also be caused by blocked air intake or sample exhaust ports.

Verify that the service end of the sample is not connected to a refrigerant source and that the sample hose is not pressurized.

If the instrument is located in an area prone to refrigerant vapor presence in the ambient air, relocate the instrument to a source of fresh air. Calibration of the instrument is performed in the absence of refrigerant; therefore, the ambient air which is being drawn into the air intake port must be free of refrigerant vapors.

Verify that the air intake and the sample exhaust port are free from obstruction and will permit the free flow of gas.

The error code is cleared by turning the instrument off then on again.

4. Instrument display reads “REMOVE PRESSURE IN SAMPLE HOSE” during calibration:

This message will appear should the user forget to disconnect the service end of the sample from the refrigerant source during calibration. Remove the service end of the hose from the refrigerant source and allow the hose to depressurize. The instrument will resume with normal calibration as soon as the hose has depressurized. Note that the instrument may go into an Error Code #3 after this condition has occurred.

5. Instrument display reads “LOW SAMPLE FLOW, CHECK HOSE” during sampling:

This message will appear should the sample hose lose pressure or the refrigerant source has run out during the sampling mode. The instrument requires a minimum of 20 psig sample pressure to initiate the sample run and a minimum of 10 psig to maintain sampling. Should this message appear verify that the sample hose is properly connected to the refrigerant source, that any valves which may be connected to the refrigerant source are fully open, that there is actually refrigerant in the sample source and that the sample hose is not kinked or obstructed. The user should rerun the test if this message appears. The interruption of sample flow to the instrument may cause high air readings and inaccurate refrigerant concentration analysis.

6. The instrument seems to always report excessive levels of air in the refrigerant:

Verify that the elevation of the instrument is proper set for the location in which the instrument is being utilized. Excessive air readings will result if the elevation is set too low. This problem is normally seen in high elevations such as the Rocky Mountain states.

7. The instrument seems to have residue refrigerant in the system which causes inaccurate analysis results:

This problem can be verified by running a sample known to be contaminated followed by a sample known to be pure. The most likely cause of this problem is removal of the sample hose from the instrument inlet port during calibration. During calibration the instrument will purge the sample hose of the previous sample to prevent such residue. Removal of the hose during calibration will leave refrigerant residue in the hose which may be sensed during the next sample run.

This problem will also occur should the user substitute other hoses for the sample hoses supplied with the instrument. The instrument is calibrated to purge the volume associated the sample hoses supplied and any substitution of hoses may lead to refrigerant residue carry over. Use only Neutronics supplied sample hoses with the instrument.

8. The instrument reports contamination in a sample taken from a “virgin” storage cylinder:

It is important to realize that a refrigerant storage cylinder should only be considered “virgin” when it is brand new and has never been opened. Improper charging and handling can introduce contaminants into storage cylinders which were “virgin”. Additionally, there have been field cases of R12 “virgin” refrigerant taken directly from “virgin” storage cylinders having R22 contamination.

9. The printer port will not printout the analysis result to the user supplied printer:

Verify the printer being utilized is a parallel interfaced printer and that the proper printer cable is being utilized. Verify that the connection to the printer port and the printer by the cable is secure on both ends and that the connectors of the cable and ports are clean. A general rule of thumb is that the instrument will print to any printer which functions on a parallel port of a personal computer.

VII. Maintenance Procedures

The *Inspector* is factory tuned and requires no adjustments in the field. To preserve the life of the instrument the following procedures should be performed on a timely basis or as required.

A. Sample Filter Replacement

- Inspect the sample filter before and after each sample run of the instrument.
 - As soon as red spots begin to appear on the outside diameter of the white filter element, the filter **MUST be immediately replaced.**
1. Obtain a replacement filter kit, Part No. 6-02-6000-08-4. The kit will contain all of the components and instructions for complete replacement of the filter. The replacement will require no longer than 5 minutes and requires no special tools.
 2. It is strongly suggested to inspect the sample hoses for signs of oil entrapment and clean if necessary.
 3. It is also strongly suggested to perform the front end purging of the sampling system as described on the instruction sheet of the replacement filter kit.

B. Sample Hose Inspection and Cleaning

- Inspect the sample hoses before each use of the instrument and replace any hose which shows signs of damage.
1. Inspect the sample hoses to verify the following:
 - a. Hose is not obstructed and allows the free flow of gas through it.
 - b. Exterior of hose is not severely abraded, cracked or otherwise damaged.
 - c. There is no accumulated oil trapped within the hose as evidence by brown deposits on the tubing wall, oil dripping from the hose ends or oil sprayed out of hose when pressurized.
 2. To clean the sample hoses of accumulated oil:
 - a. Disconnect the sample hose from the instrument.
 - b. Flush the hose with isopropyl alcohol or methanol until no evidence of oil remains. **When using alcohol or methanol to clean sample hoses, do so in an area which is well ventilated and away from sparks, flame or other ignition sources.**
 - c. Purge the hose with clean, dry, low pressure compressed air or nitrogen.
 - d. Allow the hose to dry completely before using.

C. Power Fuse Replacement

- If the instrument will not power up when the power switch is placed into the ON position, the power fuse may require replacement.
1. Verify that the instrument is unplugged.
 2. Obtain a replacement fuse Part No. 1-11-1220-00-0.
 3. Twist and depress the cap of the fuse holder in a counterclockwise rotation. Withdraw the cap and fuse and discard the blown fuse.
 4. Install a replacement fuse into the cap and reinsert it into fuse holder. Push and rotate the cap in clockwise rotation until it is fully locked into position.

VIII. Replacement Parts Listing

The listing below provides the user with all field replaceable components. The complex nature of the instrument does not warrant field repair of sensor or electrical components. For factory service, contact your local distributor or call Neutronics directly at (610) 524-8800 Monday through Friday from 9:00 AM to 4:00 PM EST. Please have the instrument serial number, error codes encountered and a description of the problem at hand when calling.

The supply of the below listed components can be obtained through your local distributor or direct from Neutronics at the above listed number.

Description	Order Number
Replacement Sample Filter Kit	6-02-6000-08-4
Replacement Power Fuse, Package of 5	1-11-1220-00-0
R12 Sample Hose Assembly	6-02-6000-02-0
R134a Sample Hose Assembly	6-02-6000-09-0
R134a Cylinder Adapter Fitting	4-03-5004-07-0
Mounting Bracket	2-02-1200-27-0
Operation Manual	5-06-7000-16-0

IX. Warranty

NEUTRONICS warrants, subject to the terms listed below, that the goods will be free from defects in design, materials, and workmanship for a period of (1) one year from the date that the goods are shipped to the buyer.

THE SOLE LIABILITY OF NEUTRONICS FOR ALL PURPOSES SHALL BE TO REPAIR OR REPLACE, AT THE SOLE OPTION OF NEUTRONICS, DEFECTS APPEARING WITHIN THE (1) ONE YEAR PERIOD. NEUTRONICS SHALL HAVE NO OBLIGATION FOR REPAIR OR REPLACEMENT UNLESS NEUTRONICS HAS RECEIVED WRITTEN NOTICE OF THE ALLEGED DEFECT WITHIN THE (1) ONE YEAR PERIOD AND THE DEFECTIVE GOODS ARE PROMPTLY RETURNED BY THE BUYER, AT THEIR EXPENSE, TO NEUTRONICS AT: 456 CREAMERY WAY EXTON, PA 19341 USA, AND THE DEFECT OCCURS UNDER THE CIRCUMSTANCES OF PROPER USE IN ACCORDANCE WITH ALL INSTRUCTIONS AND MANUALS PROVIDED TO THE BUYER. NEUTRONICS WILL DELIVER THE REPAIRED OR NEW GOODS TO THE BUYER AT NEUTRONICS EXPENSE. IN NO EVENT WILL NEUTRONICS BE LIABLE FOR ANY LOSS OR DAMAGE DIRECTLY OR INDIRECTLY ARISING FROM THE DEFECTS OR FROM THE USE OF THE GOODS OR FROM CONSEQUENTIAL OR INCIDENTAL DAMAGES, WHETHER IN CONTRACT, TORT, OR OTHERWISE, FOR PERSONAL INJURY OR PROPERTY DAMAGE OR ANY FINANCIAL LOSS.

Buyer shall be responsible for insuring that the goods are functioning properly at all times and shall not use any goods which are not functioning properly. Buyer, therefore, agrees to indemnify NEUTRONICS from and against all losses and claims to or by any person or property caused in any manner by the goods or the use of the goods, including any expenses and attorney's fees in connection with all claims, demands, proceedings, or other expenses.

Any description of the goods contained in any documents to which these warranty provisions relate, including any quotations or purchase orders relating to the goods being delivered to the buyer, are for the sole purpose of identifying the goods, and any such description, as well as any sample or model which may have been displayed to or seen by the buyer at any time, have not

been made part of the basis of the bargain and have not created or amounted to any express warranty that the goods would conform to any such description or any such sample or model.

NEUTRONICS DOES NOT WARRANT THAT THE GOODS ARE FREE OF THE RIGHTFUL CLAIM OF ANY THIRD PERSON BY THE WAY OF INFRINGEMENT OF PATENT OR OTHER PROPRIETARY INFORMATION AND DISCLAIMS ANY WARRANTY AGAINST SUCH INFRINGEMENT.

It shall be the responsibility of the buyer to read carefully and abide by all instructions provided to the buyer in the instruction manual or elsewhere. If the buyer, or the employees of the buyer, did not abide by such instructions, then the alleged defect shall not be deemed to have arisen under circumstances of proper use.

The terms of these warranty provisions shall apply to all products sold by Neutronics, except filters which are considered "consumable items," and as such are not covered by the terms of these warranties. No waiver, alteration or modification of the terms of these provisions shall be valid unless in writing and signed by an executive officer of NEUTRONICS.

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X. Return Procedure

In the unlikely event that you experience problems with your unit please contact Neutronics at (610) 524-8800 during normal business hours. Please be sure to have the following information readily available:

Unit Model Number
Unit Serial Number
Specific Problem
Date of Purchase

If the technician cannot solve your problem over the phone you will be issued a Return Material Authorization Number and asked to ship your unit back to our factory location.

Simply complete the return shipping label below, tear it off, and attach it to the Identifier box. This will help us expedite your repair. Additionally, please enclose a note with the unit telling the technician the problem with the unit and where to return the unit when the repair has been completed. For warranty repairs, please enclose proof of purchase.

Customer Name:
Customer Address:

Contact Name:
NEUTRONICS, INCORPORATED
456 Creamery Way
Exton, PA 19341
Attn: Service Department

Return Material Authorization Number: _____