



Thank you for purchasing the *Ultima ID Pro*.™

Proper registration will enable us to send you periodic notification of product updates and other important announcements. Registering your product will also allow us to contact you in the unlikely event that it will need adjustment or modification. Please take the time to register your new product at our web site:

<http://www.neutronicsinc.com/productregistration>

You will find the product serial number inside of the battery cover of the main unit and on the outside of the carton box.

If you would like to register by phone, have any operational questions regarding your new purchase, find the location of the distributor in your area, or for any other questions, please call 800-378-2287 (in PA: 610-524-8800).

Thank You.



456 Creamery Way, Exton, PA 19341
Phone: 610.524.8800 • Fax: 610.524.8807 • Email: info@neutronicsinc.com
www.neutronicsinc.com



ULTIMA ID PRO™

Model RI-700H HVAC/R REFRIGERANT ANALYZER OPERATION MANUAL

Manual Part Number: 5-06-7000-70-0

Manual File MN-A-0190 Rev. D

Revised: December 8, 2010



Table of Contents

TABLE OF CONTENTS	V
FOR YOUR SAFETY:	VI
ANALYZER WARNINGS	VI
WELCOME	VIII
1 INTRODUCTION AND OVERVIEW	1-9
1.1 GENERAL	1-9
1.2 FEATURES	1-10
1.3 ULTIMA ID PRO COMPONENTS	1-11
Ultima ID Pro Base Unit.....	1-11
Low Side Vapor Sample Hose	1-11
AC Power Adapter.....	1-12
Control Panel.....	1-13
Back Panel Connections.....	1-13
Hard Shell Storage/Carrying Case	1-14
2 ULTIMA ID PRO OPERATION	2-1
2.1 FIRST USE	2-1
Battery Installation (Optional)	2-1
2.2 TURNING ON THE UNIT	2-2
2.3 CALIBRATION	2-2
2.4 VAPOR SAMPLING.....	2-3
2.5 LIQUID SAMPLING.....	2-3
2.6 VIEWING THE TEST RESULTS	2-4
2.7 CONTAMINATED BLEND REFRIGERANTS	2-4
2.8 PURE BLEND REFRIGERANTS	2-4
2.9 BLENDS WITH INCORRECT COMPONENT RATIOS	2-5
2.10 PRINTING THE TEST RESULTS	2-5
3 MAINTENANCE & TROUBLESHOOTING	3-6
3.1 SETTING THE LCD CONTRAST	3-6
3.2 CHANGING THE WHITE PLASTIC SAMPLE FILTER	3-6
3.3 REPLACING THE SAMPLE HOSE	3-7
3.4 CHANGING THE PRINTER PAPER	3-7
3.5 SOFTWARE UPDATES	3-8
3.6 ERROR MESSAGES	3-8
APPENDICES	3-9
3.7 SPARE PARTS LIST	3-9
3.8 APPENDIX B - SPECIFICATIONS.....	3-9
3.9 APPENDIX E – WARRANTY	3-10



For Your Safety:

PLEASE READ THIS MANUAL IN ITS ENTIRETY BEFORE ATTEMPTING INSTALLATION OR OPERATION! Attempting to operate the Ultima ID Pro without fully understanding its features and functions may result in unsafe conditions

- Always use protective eye wear and observe proper safety procedures when working with pressurized gases.

Read and understand the entire manual BEFORE attempting to operate the instrument.

Analyzer Warnings

- **Refrigerant Blend Warning:** The HVAC industry is ever evolving new refrigerants. Many of these new blends can be identified and/or profiled using the Ultima ID Pro. A list of tested refrigerants and their characteristics is provided in the appendix of this manual.
- **Sample Filter Warning:** Replace the sample filter of the instrument AS SOON AS RED SPOTS OR DISCOLORATION BEGIN TO APPEAR ON THE OUTSIDE DIAMETER OF THE WHITE ELEMENT. Failure to properly maintain and replace the sample filter will result in severe damage.
- **Sample Input Warning:** The instrument includes two hose assemblies. One for High Side Liquid sampling and one for Low Side Vapor Sampling. Failure to use the correct hose on the proper sample port may result in incorrect readings and/or damage to the instrument. DO NOT attempt to introduce liquid or samples heavily laden with oil into the Low Side sampling hose.
- Damage caused to the instrument due to the use of the wrong hose on the wrong port will void the warranty!
- **Battery Charger Warning:** When charging the optional battery with the 1000mA charger, the charger will become warm. If the charger becomes hot, unplug the charger immediately! When charging multiple battery packs, allow the charger to cool between each battery.

General Cautions

- Always inspect the sample hose before each use. Replace the hose if it appears cracked, frayed, obstructed or fouled with oil.
- ALWAYS turn the compressor off before connecting the instrument to an air conditioning system.
- Always wear eye and skin protection when working with refrigerants. Escaping refrigerant vapors will present a freezing danger.
- To reduce the risk of electrical shock, do not disassemble the instrument; do not use the instrument in wet or damp areas.
- DO NOT direct refrigerant vapors venting from hoses towards the skin.
- DO NOT disassemble the instrument. There are no serviceable components internal to the instrument and disassembly will void the warranty.
- ALWAYS place the Analyzer on a flat and sturdy surface.
- DO NOT utilize any other hose other than those supplied with the instrument. The use of other hose types will introduce errors into the refrigerant analysis and instrument calibration.
- ALWAYS verify that the refrigerant to be tested from the Low Side does not contain or will not emit heavy loads of oil or liquid.
- NEVER admit any sample into the instrument at pressures in excess of 500 psig.
- NEVER obstruct the air intake, sample exhaust or case vent ports of the instrument during use.

WELCOME

Thank you for purchasing the ULTIMA ID PRO Refrigerant Analyzer.

The Ultima ID Pro is the most advanced refrigerant analyzer ever designed for determining the purity of common gaseous refrigerants. It has many features to offer the user, which will be described in this manual. We recommend that all personnel who use this instrument read this manual to become more familiar with its proper operation.

For further information regarding the application, operation or spare parts, please contact the Neutronics Inc. Customer Service Department. If you have questions or comments, we would like to hear from you.

Neutronics Inc.
456 Creamery Way
Exton, PA 19341
Tel: 610) 524-8800
Toll Free: (800) 378-2287 (US only)
Fax: (610) 524-8807

EMAIL: info@neutronicsinc.com
Visit us at www.neutronicsinc.com

Copyright ©2010 Neutronics Inc.

This work is protected under Title 17 of the US Code and is the sole property of Neutronics Inc. No part of this document may be copied or otherwise reproduced, or stored in any electronic information retrieval system, except as specifically permitted under US copyright law, without the prior written consent of Neutronics Inc.

1

INTRODUCTION AND OVERVIEW

1.1 General

Contamination and mislabelling of refrigerants either in storage cylinders or air conditioning systems can lead to component corrosion, elevated head pressures and system failures when utilized by unsuspecting technicians. The ability of the technician to determine refrigerant type and purity is severely hampered by the presence of air when attempting to utilize temperature-pressure relations. The development of various substitute refrigerants further complicates the ability of a technician to identify refrigerant purity based upon temperature-pressure relationships. The substitute refrigerant blends can also introduce a flammability hazard to the technician and the ultimate end user of the air conditioning system.

The Neutronics Ultima ID Pro Refrigerant Analyzer provides a fast, easy and accurate means to determine refrigerant purity in refrigerant storage cylinders or directly in air conditioning systems. The instrument utilizes non-dispersive infrared (NDIR) technology to determine the weight concentrations multiple of refrigerant types. Refrigerant purity is displayed on the LCD Screen. The user must determine acceptable levels of purity based on their recovery or use standards.

The instrument is supplied complete with a ¼" Flare Vapor sampling hose, a ¼" Flare Liquid sampling assembly, a 100/240 VAC power transformer, built in printer, and all required plumbing housed within a rugged, portable, storage case.

Sample gas is admitted into the instrument through one of the two supplied sampling hoses and presented to the sensing device. The instrument provides the user with direct percent by weight concentrations. Note that the instrument does not consider air to be a contaminant.

The instrument interfaces with the user with an LCD graphic display, status indicator lamps, push button communication switches and an alarm horn. Alarm indications are provided to alert of instrument fault conditions. Direct percent by weight concentrations of the sample refrigerant is provided on the display as well as user directions and prompts. An on-board printer is provided to print an on-the-spot analysis report.

The Neutronics Ultima ID Pro Refrigerant Analyzer provides the refrigerant technician with excellent knowledge of refrigerant type and purity as well as protection against refrigerant contamination and potential flammability.

1.2 Features

The Ultima ID Pro Refrigerant Analyzer is the most advanced portable instrument ever manufactured for determining the purity of gaseous refrigerants for the HVAC-R market.

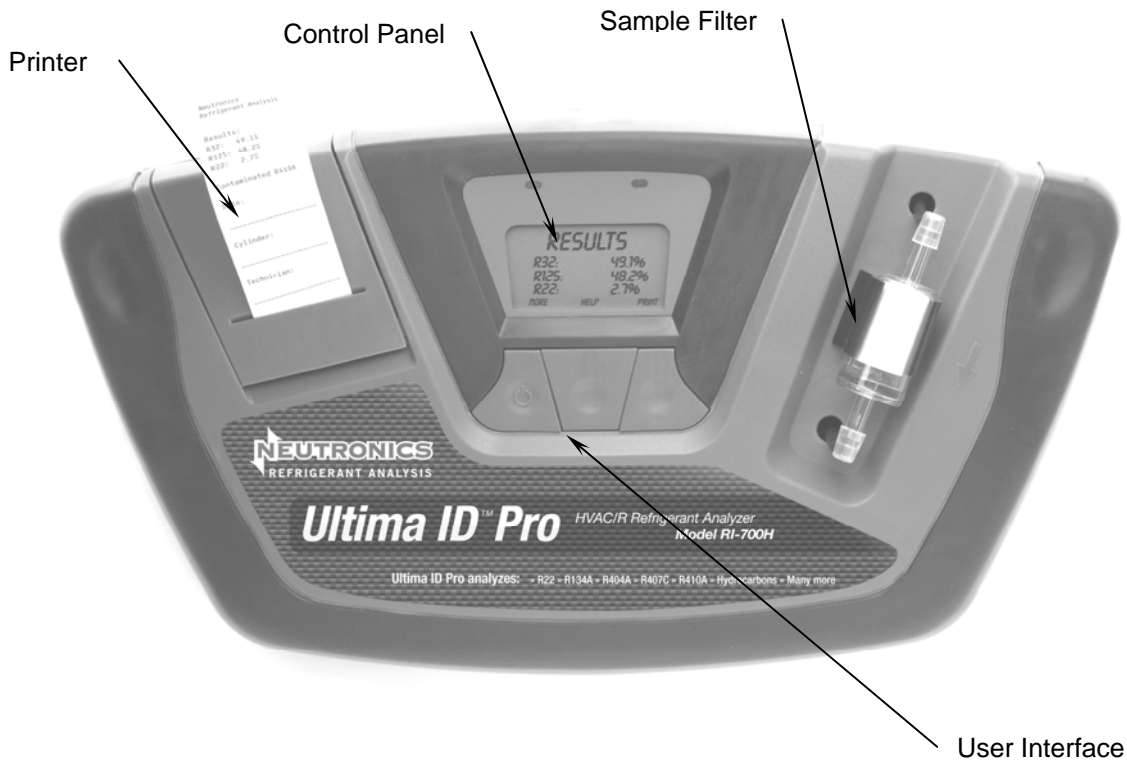
Features Include:

- Advanced ergonomic design
- Rugged rubberized hand grips
- Large graphic display with on-screen instructions
- Fast 60 second test time
- Built in printer for instant analysis report
- Vapor or Liquid Sampling ability
- Internal, rechargeable battery (optional) for cordless operation in any location
- Hard shell carry/storage case
- Remote Software Update port

1.3 Ultima ID Pro Components

Ultima ID Pro Base Unit

The Ultima ID Pro base unit houses the Graphic Display, Infrared Bench, Electrical Connections, and Optional Printer Module. These components require no maintenance, therefore **there are no serviceable components internal to the instrument, and disassembly will void the warranty.**

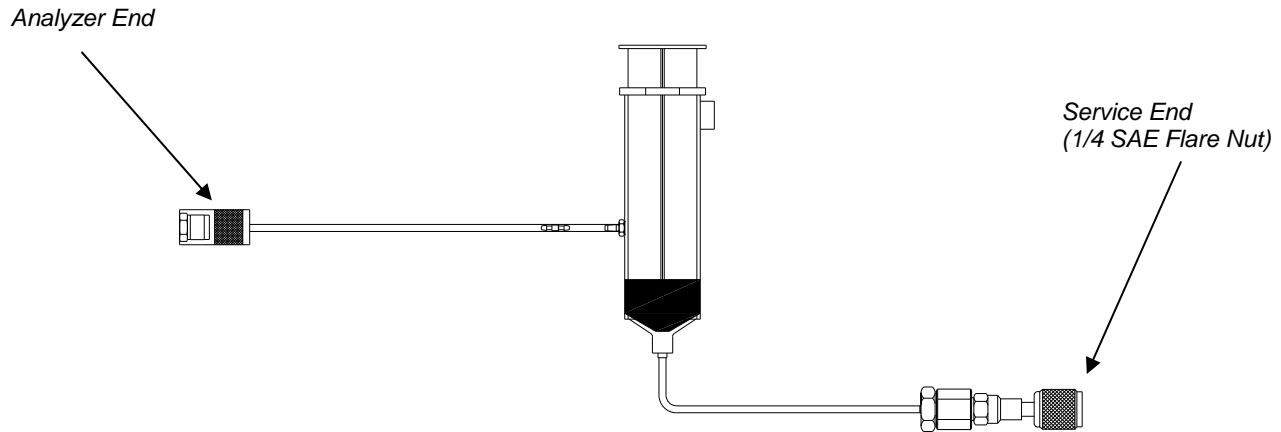


Low Side Vapor Sample Hose

The 6-foot (1.8 meter) Low Side Vapor Sample Hose is constructed of a polyurethane tube. A Brass flow restrictor acts to reduce pressure at the sample connection point and reduce the introduction of harmful oil into the machine. The maximum inlet pressure is 500 psig. The hose is provided with an instrument inlet port mating connector on one end and a ¼" SAE female flare coupling nut on the service end.



High Side Liquid Sample Hose



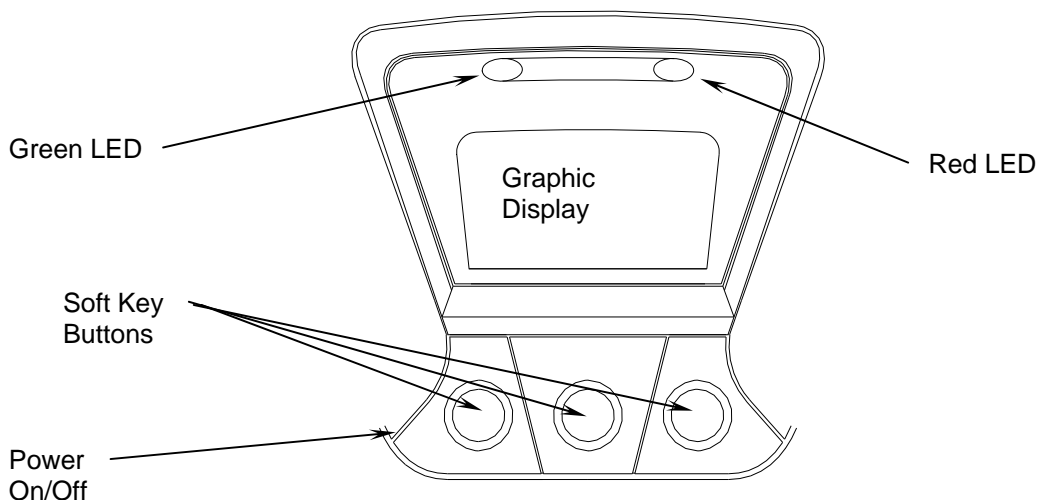
The 6-foot (1.8 meter) High Side Sample Hose is constructed of a polyurethane tube with an oil reservoir. A Brass flow restrictor acts to transform Liquid refrigerant to Vapor at the sample connection point while the Oil Trap Syringe collects oil and provides a means of expulsion after the test is complete. The maximum pressure is 500 psig. The hose is provided with magnet for attaching it to the tank and an instrument inlet port mating connector on one end and a 1/4" SAE female flare coupling nut on the service end.

AC Power Adapter

The Ultima ID Pro is powered via a 100/240 VAC 50/60 Hz power transformer. This transformer is included with each unit and converts a standard 100/240 VAC 50/60 Hz wall outlet to 12VDC to power the device. An optional internal and rechargeable battery kit is available separately. Note: Use of any other power source may cause damage to the unit and void the warranty.

Control Panel

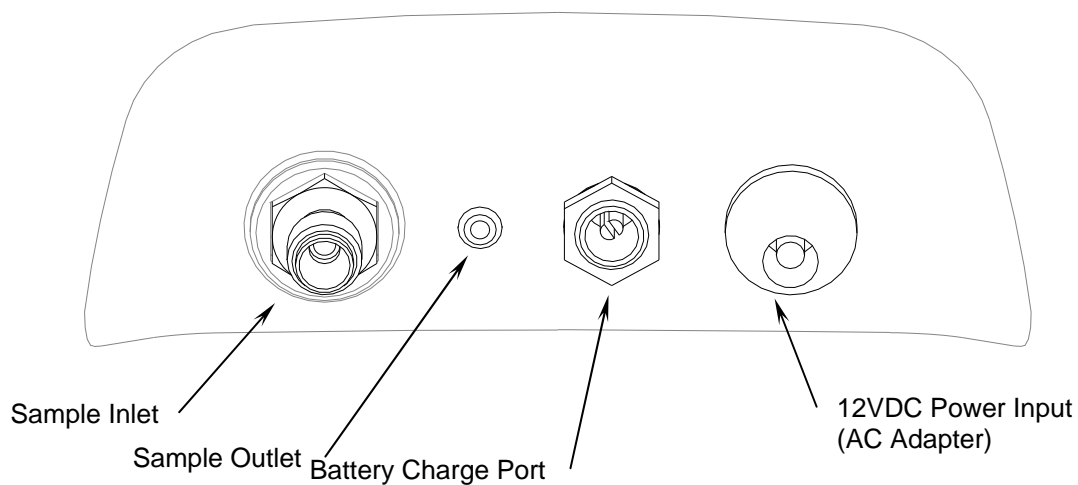
The Control Panel serves as the main user interface. The Control Panel features three soft key buttons that change their function as the instrument changes modes. The current function for each button is displayed by the soft key label at the bottom of the graphic display. Red and Green LED's at the top of the Control Panel are used for visual status indications.



Back Panel Connections

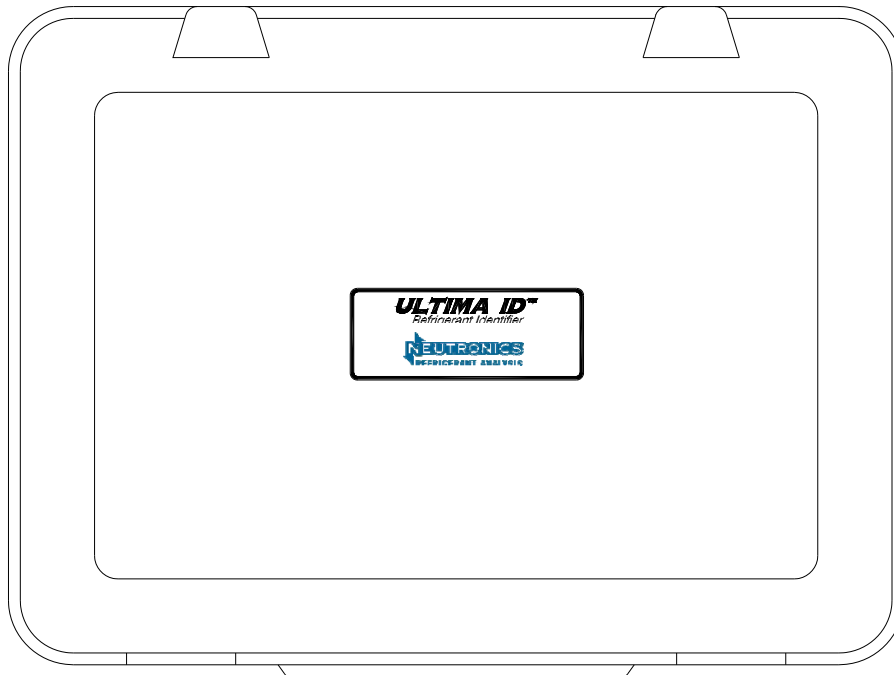
The connections located on the back panel are illustrated below.

CAUTION: The sample outlet port should never be obstructed. Keep the sample outlet port free and clear at all times. Do not operate near open flame.



Hard Shell Storage/Carrying Case

The hard shell storage/carrying case is custom fit to the Ultima ID Pro. It provides rugged protection for the instrument as well as convenient storage for all components. The enclosure is general purpose and is not watertight.



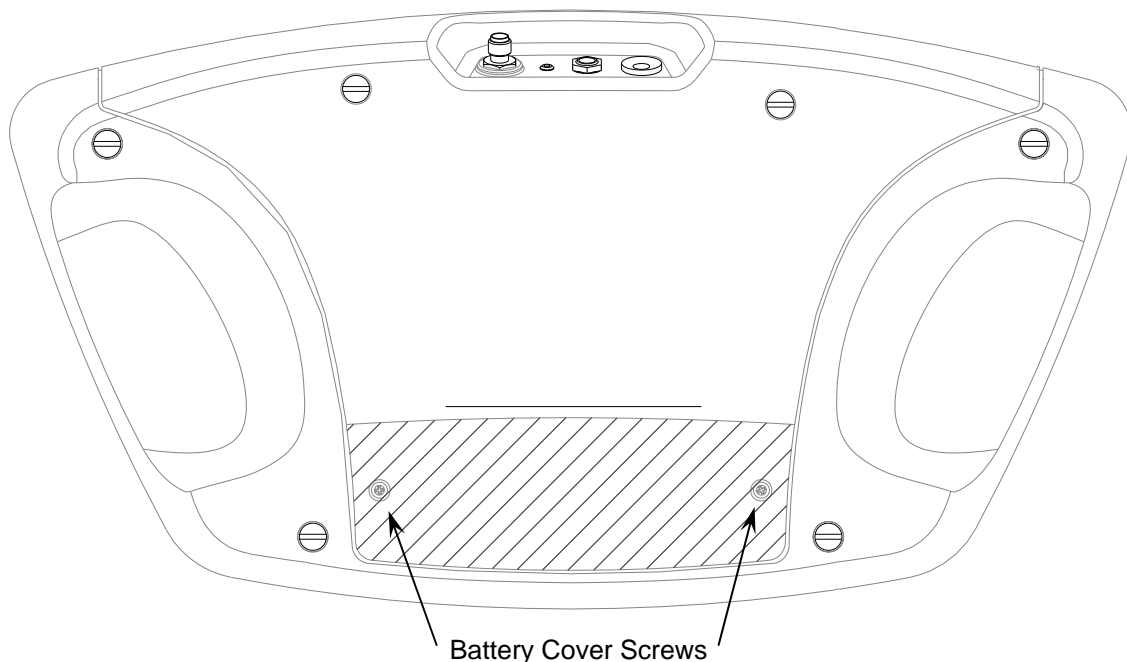
2 ULTIMA ID PRO OPERATION

2.1 First Use

Battery Installation (Optional)

The Ultima ID Pro has, as an option, an internal rechargeable battery. If your Ultima ID Pro is equipped with the optional rechargeable battery, you must first install and charge the battery prior to use. NOTE: The Ultima ID Pro can be operated with or without the battery using the supplied AC adapter. Refer to Section 2.2 for instructions.

To install the optional battery, remove the battery cover from the back of the unit by unscrewing the two screws as shown below.



Inside of the Ultima ID Pro battery compartment, locate the male plug on the left side. Slide the nylon strap around the battery. Insert the battery module into the compartment aligning the female connector of the battery module with the male plug in the battery compartment. Replace the cover and snug the screws.

Note: Charge the battery for a minimum of 4 hours with the supplied charger prior to first use. The Battery cannot be charged with the standard power adapter.

To remove the battery, simply tug gently on the nylon strap, being sure to pull straight up, until the battery is dislodged. The battery may be charged either inside of the unit or independent of the unit.

2.2 Turning On the Unit

Connect the included AC power supply to the 12VDC power input jack on the back of the unit. Plug in the AC power supply to a 100 – 240 VAC outlet. (Note: If the optional battery module is installed and charged, the AC power supply is not required.) Press the left, soft key, power button and the splash screen shown in **(Figure 1)** will appear for approximately three seconds followed immediately by the screen in **(Figure 1A)** and then by the warm up screen for 3.5 minutes **(Figure 2)**. After the warm up, the calibration screen may be shown if it is required **(Figures 3 and 4)**.

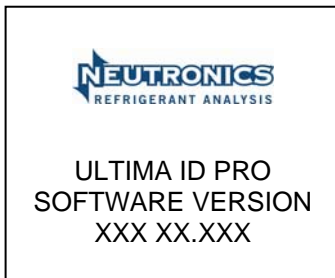


Figure 1

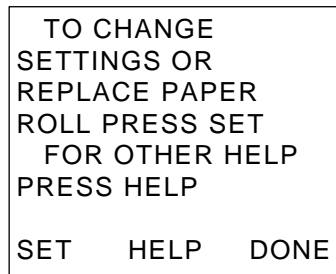


Figure 1A

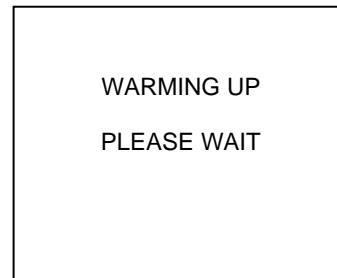


Figure 2

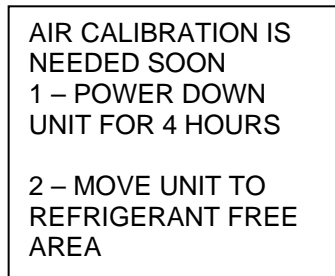


Figure 3

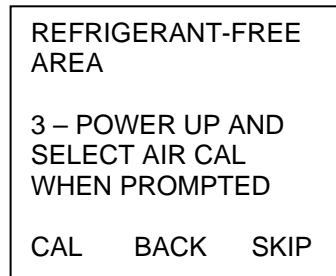


Figure 4

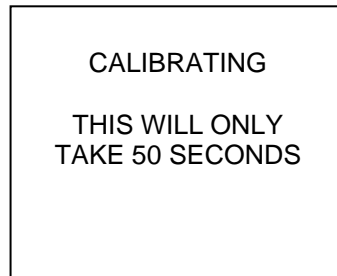


Figure 5

2.3 Calibration

Air calibrations are only required periodically. A reminder to perform air calibrate will appear after the unit has been powered up 30 times after the last air calibration. The air calibration can be delayed (skipped) until it is convenient to allow the unit to cool down for at least 4 hours and be placed in a refrigerant-free environment. **(Figures 3 and 4)**. When calibrating, the unit will bring fresh air into the unit via an internal pump. This fresh air purges any excess refrigerant and ensures accurate test results. Calibration requires that the hose be disconnected from the refrigerant cylinder or air conditioning system. **(Figure 5)**.

When the unit is ready for gas testing, the unit will display the screen shown in **(Figure 6)**. Connect the hose to the tank and press test. The Ultima ID Pro will display the screen shown in **(Figure 7)**. If you wish to change any of the factory default settings, refer to section 3.

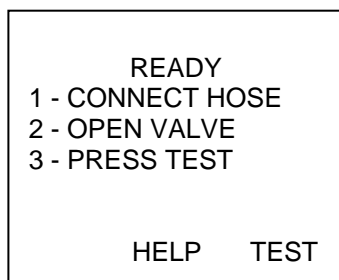


Figure 6

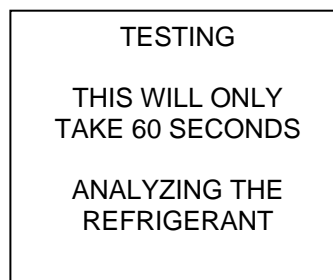


Figure 7

2.4 Vapor Sampling

Vapor sampling is the most common process used for identifying refrigerants using the Ultima ID Pro. It is a simple process requiring the operator to take these 4 steps:

- 1) Connect the vapor sampling hose to instrument and then to the Low Side Vapor port of the system or cylinder.
- 2) Open the low side valve of the cylinder and press test.
- 3) Disconnect the hose from the cylinder.
- 4) Disconnect the hose from the Ultima ID Pro for storage.

2.5 Liquid Sampling

Liquid sampling is an option that is exclusive to the Ultima ID Pro. It permits the user to flash liquid into vapour for introduction into the analyzer. To use the liquid sampling assembly, follow these seven steps:

- 1) Inspect the liquid sampling assembly and ensure that the plunger on the oil trap syringe is completely depressed.
- 2) Connect the appropriate end of the hose to the instrument and the opposite end of the liquid sampling assembly to the High Side Liquid port of the system or cylinder. Affix the oil trap syringe vertically to the tank with the magnet.
- 3) Open the high side valve of the cylinder. The liquid sample will exit the tank and be flashed to vapour by the hose assembly. As the liquid is flashed, the plunger on the oil trap syringe will begin to rise and the flashed refrigerant sample will travel into the analyzer.
- 4) Wait for the plunger on the oil trap syringe to expand past the outlet port.
- 5) Press test on the Analyzer.
- 6) Upon completion of the test, close the valve on the cylinder, disconnect the hose from the inlet of the oil trap syringe, depress the plunger on the oil trap syringe to expel the trapped oil.
- 7) Inspect the hose for signs of oil and replace the hose restrictor if necessary.
- 8) Disconnect the hose from the Ultima ID Pro

2.6 Viewing the Test Results

Upon completion of the test, the Ultima ID Pro will display a screen similar to that shown in (Figure 8). Pressing the “More” button will display the screen shown in (Figure 9).

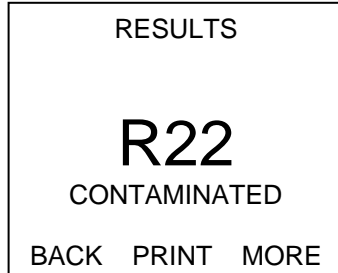


Figure 8

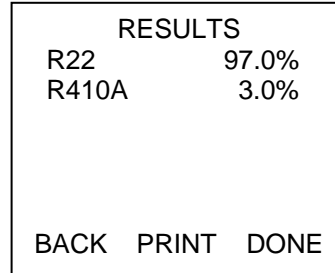


Figure 9

2.7 Contaminated Blend Refrigerants

The Ultima ID Pro includes the ability to detect and analyze the composition of many common R400 Series refrigerants in addition to R134a, R22 and Hydrocarbons. In the event that the Ultima ID Pro determines that the primary refrigerant in the system or cylinder is one of the measured refrigerants, the results will display as follows in (Figure 10). Pressing the “MORE” button will display the detail screen shown in (Figure 11). If the blend or refrigerant mixture is not recognized, the screen shown in (Figure 12) will be displayed.

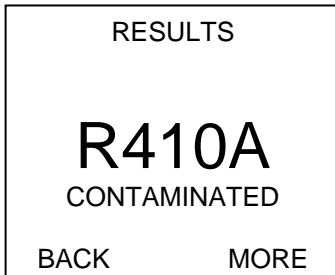


Figure 10

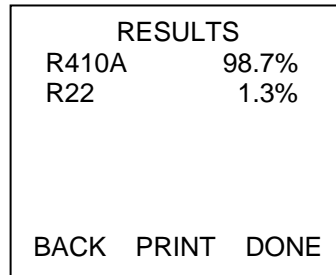


Figure 11

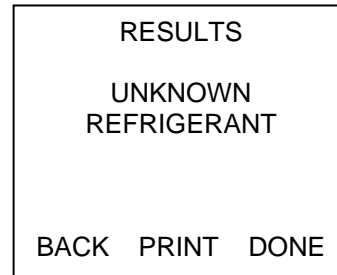


Figure 12

2.8 Pure Blend Refrigerants

The Ultima ID Pro has the ability to **Identify** the following refrigerants: R408A, R409A, R417A, R421A, R421B, R422A, R422B, R422C and R427A. In addition, the instrument can both, **Identify and Analyze** the component content of pure R134a, R22, R404A, R407C and R410A. Analysis of analyzed pure blend refrigerants will yield additional data regarding the composition of the refrigerant sample. The Ultima ID Pro will display the blend refrigerant type as shown in (Figure 13). Pressing the “MORE” button will display the detail screen shown in (Figure 14).

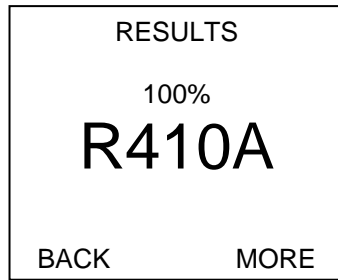


Figure 13

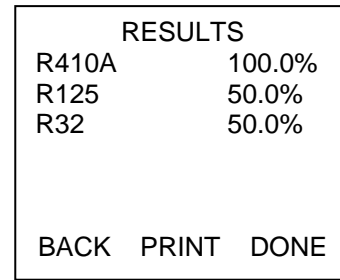


Figure 14

2.9 Blends with Incorrect Component Ratios

The Ultima ID Pro has the ability to detect blend ratios that have been altered by contamination. As stated above, the blends that can be identified and analyzed are R404A, R407C and R410A. If one of these refrigerant blends have incorrect component ratios, it will be displayed as shown below: (Figure 15). To see the component concentrations press "MORE." (Figure 16).

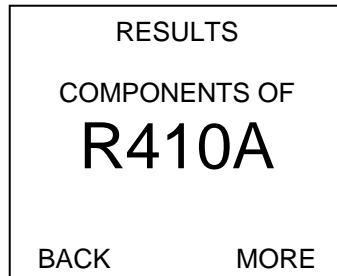


Figure 15

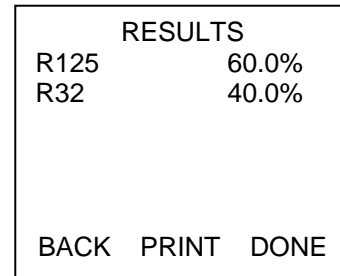


Figure 16

2.10 Printing the Test Results

The test results can be printed by selecting the "PRINT" button. After the print is complete, carefully tear off the printout and the unit will return to the previous screen. Additional printouts may be made following the same procedure. To exit the test, press the "EXIT" button. (Figures 17, 18, & 19,) show sample printouts for various test results.

(NOTE) Care must be taken when tearing off the printed results to leave a clean edge.

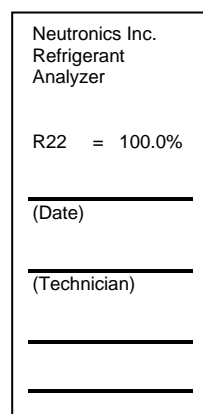


Figure 17

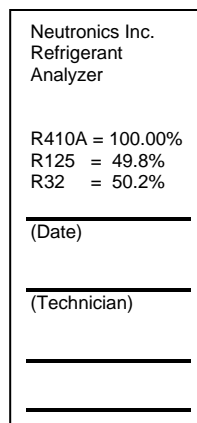


Figure 18

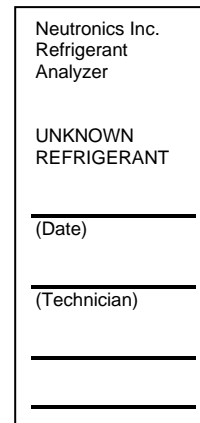


Figure 19

3 MAINTENANCE & TROUBLESHOOTING

3.1 Setting the LCD Contrast

The Ultima ID Pro features an adjustable LCD contrast for use in varying light conditions. To adjust the contrast, press the “HELP” button on the “Ready to Air Cal” screen as shown in **Section 2.2, (Figure 1A)**. The screen will display several options as shown in **(Figure 20)**. Pressing the “SET” button will display the options in **(Figure 21)**.

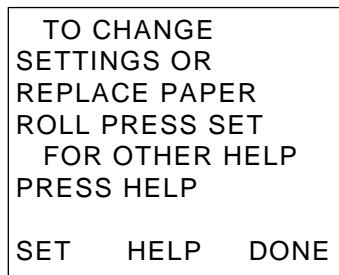


Figure 20

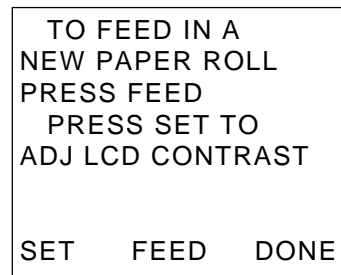


Figure 21

3.2 Changing the White Plastic Sample Filter

When inspecting the sample filter, look completely around the entire outside diameter of the white filter element located inside of the clear plastic housing. Look for red spots or the beginnings of discoloration on the white outside diameter of the element. Do not look into the round ends of the white element for red spots or discoloration. The round ends of the filter may always appear red. If red spots or discolorations are discovered on the outside diameter, the sample filter requires replacement to prevent the influx of particulate and oil mists into the instrument.

Obtain a replacement filter, part number 6-02-6000-08-0. Remove the existing filter from the retaining clip of the instrument by pulling straight up and out. CAREFULLY remove the flexible, black rubber tubing connections from both ends of the existing filter. DO NOT allow the tubes to slip back into the internal portion of the case. Discard the existing filter in an environmentally friendly manner.

Install the tube ends onto the barbs of the replacement filter, taking note to align the flow arrow of the filter with the flow arrow of the instrument top panel. CAREFULLY slide the tubing back into the internal portion of the instrument and seat the new filter into the retaining clip. Inspect the sample hoses for signs of oil entrapment. Replacement of the sample filter usually requires cleaning or replacement of the sample hoses.

3.3 Replacing the Sample Hose

Inspect the inside diameter of the tube for signs of oil build up, dirt, obstructions, kinks, cuts, fraying, or any other signs of wear. Oil contamination cannot be cleaned out of sample hoses due to the density of the oil restrictor. If oil is visible in the Low Pressure Vapor hose, replace the hose and restrictor with P/N 6-01-6001-23-1.

For the High Side Liquid Sampling Hose, inspect the inside diameter of the tube for signs of oil build up, dirt, obstructions, kinks, cuts, fraying, or any other signs of wear. Oil contamination cannot be cleaned out of sample hoses due to the density of the oil restrictor. If oil is visible in the High Pressure Liquid Trap Hose, replace the hose and restrictor with P/N 6-02-6001-23-1.

To replace the Restrictor Assembly, follow the instructions below:

- 1) Disconnect the sample hose from the Identifier
- 2) Remove the brass filter (with hose attached) from the coupler and discard. Be sure to use a backing wrench so as not to damage the coupler.
- 3) Check for signs of oil and debris in the coupler.
- 4) Using "CRC Brakleen" or similar cleaner which ONLY contains, Tetrachloroethylene and carbon dioxide, follow safety instructions on the can and spray all parts of the coupler with the cleaner to remove the oil. DO NOT soak the parts for more than 60 seconds.
- 5) Allow coupler parts to dry. Check coupler parts for oil once again. Failure to clean the oil out of the coupler will result in premature clogging of the new filter.
- 6) Install the new filter, part number 6-01-6001-23-1, into the coupler and lightly tighten, usually finger tight is sufficient.

3.4 Changing the Printer Paper

Ultima ID Pro Refrigerant Analyzers that are equipped with on-board printers use an inexpensive thermal paper for printing. The paper roll should be changed when a red stripe appears on the left side of the printout.

To change the paper roll, press the "HELP" button on the "Ready to Air Cal" screen as shown in **Section 2.2, (Figure 1A)**. The screen will display several options as shown in **(Figure 22)**. Press the "SET" button to advance to the screen shown in **(Figure 23)** and then press the "FEED" button.

TO CHANGE SETTINGS OR REPLACE PAPER ROLL PRESS SET FOR OTHER HELP PRESS HELP
SET HELP DONE

Figure 22

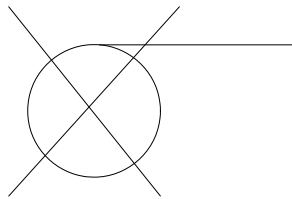
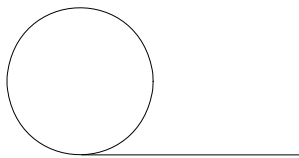
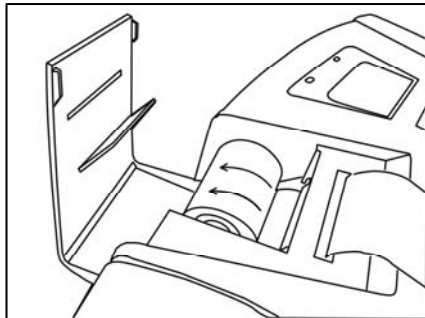
TO FEED IN A NEW PAPER ROLL PRESS FEED PRESS SET TO ADJ LCD CONTRAST
SET FEED DONE

Figure 23

TO LOAD PAPER
1. PRESS FEED
2. INSERT PAPER
3. PRESS DONE TO EXIT
FEED DONE

Figure 24

Open the printer door and remove the old roll by tearing the paper as it enters the printer then pressing the “FEED” button shown in **(Figure 24)** until the old roll exits the printer completely. Insert the new paper roll from the underside as shown below:



Press the “FEED” button shown in **(Figure 24)** to automatically advance the paper through the printer. Allow at least 3 in (7cm) of paper to exit the top of the printer. Press the “DONE” to stop the printer from advancing the paper and exit. Slide the paper through the slot in the printer door and close the door.

3.5 Software Updates

From time to time, software updates may be made available to improve operating performance or add additional features. Some updates will be provided at no charge to implement operating efficiencies while others will be optional, paid upgrades, to add new refrigerants etc. Many of the updates can be completed by the user however some will require the instrument to be returned to the factory for new gas calibrations.

The Ultima ID Pro has a USB update port located within the battery compartment. This port should not be used for any other purpose other than to install factory updates using the Neutronics factory USB drive.

3.6 Error Messages

In the unlikely event that an “Error” message is displayed on the screen, power off the unit, take it to a location outside of the shop environment where fresh air is available and turn the unit back on. If the “Error” message reappears, refer to the help screens on the instrument or contact our service department for assistance.

Neutronics Inc.
456 Creamery Way
Exton, PA 19341
Ph: 800-378-2287 or 610-524-8800
Fax: 610-524-8807

APPENDICES

3.7 Spare Parts List

PART NUMBER	DESCRIPTION
6-02-6001-11-0	Low Pressure Vapor Sample Hose
6-02-6001-17-0	High Pressure Liquid Sample Trap Assembly
6-01-6001-23-1	Spare Sample Hose Restrictor Assembly
6-02-6000-08-0	White Plastic Sample Filter
6-01-6001-13-0	AC Power Adapter
6-02-6001-04-1	Battery Kit (Optional)
6-02-6001-04-0	Spare Battery (Optional)
5-03-1000-08-0	Printer Paper Roll
5-06-7000-70-0	Operating Manual

3.8 Appendix B - Specifications

SAMPLE PARAMETERS:	Vapor only, oil-free, 500 psig Maximum
IDENTIFIED REFRIGERANTS:	R12, R408A, R409A, R417A, R421A, R421B, R422A, R422B, R422C, R427A, R600a
IDENTIFIED & ANALYZED REFRIGERANTS:	R134a, R22, R404A, R407C, R410A
SENSOR TECHNOLOGY:	Non-Dispersive Infrared (NDIR)
REFRIGERANT SAMPLE SIZE:	0.3 ounces (8.5 grams) per sample
POWER:	External Power Supply: 100-240V~, 50/60Hz, 0.6A Optional External Battery Charger: 100-240V~, 50/60Hz, 1.95A DC Supply Requirements: 9 – 15 VDC, 2 Amps Minimum
ENVIRONMENTAL CONDITIONS	Do not expose unit or external components to rain or moisture. Humidity: 0 to 95% RH non-condensing. Protect Unit from physical abuse by keeping the unit in the storage case when not in use.
OPERATIONAL TEMPERATURE:	50-110°F

3.9 APPENDIX E – 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.

EXCEPT AS SPECIFICALLY SET FORTH AND LIMITED IN THIS PARAGRAPH, NEUTRONICS, INC. MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES AS TO MERCHANTABILITY, OR AS TO THE FITNESS OF THE GOODS FOR ANY PARTICULAR USE OR PURPOSE, AND ANY WARRANTIES SET FORTH IN THIS PARAGRAPH ARE IN LIEU OF SUCH IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR USE OR PURPOSE.