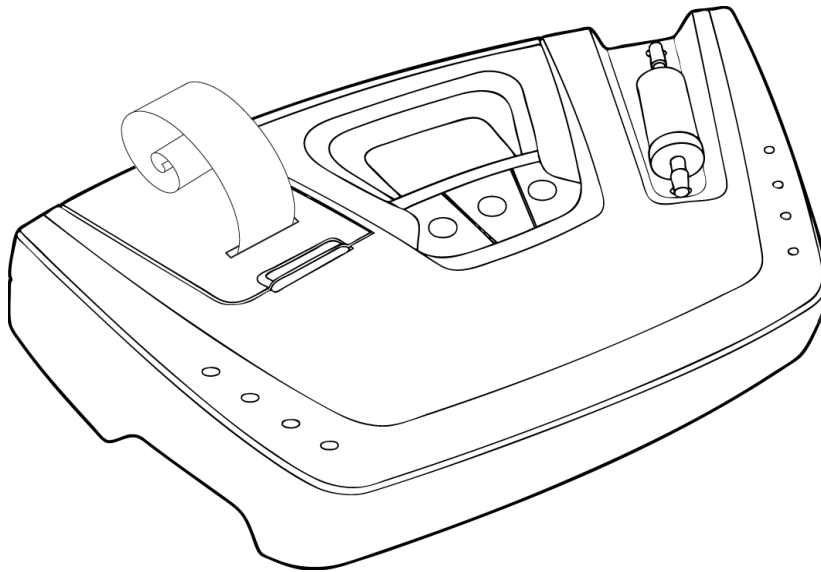


PUR-CHEK™
HVAC Refrigerant Analyzer **PRO**

Operation and Maintenance

Instruction Manual 2100-9001

Rev. 2 – October 2011



[Bacharach 2100-8003 Pur-Chek Refrigerant Analyzer](#)

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1. Introduction

1.1. How to Use This Manual

This manual provides important information on how to operate and maintain Bacharach's Pur•Chek™ Pro HVAC Diagnostic Refrigerant Analyzer. To assure operator safety and proper use of the Pur•Chek™ Pro, please read, understand, and follow the contents of this manual.

1.2. Conventions Used in This Manual

When used in this manual or as labeled on the Pur•Chek™ Pro, the following hazard symbols and/or associated words are defined as follows.



WARNING: This symbol and/or the use of the word **WARNING** indicates a potential hazard associated with the use of this equipment. It calls attention to a procedure, practice, condition, or the like, which if not correctly performed or adhered to, could result in death or serious injury.



WARNING: This symbol and/or the use of the word **WARNING** indicates a potential hazard from electrical shock. It calls attention to a procedure, practice, condition, or the like, which if not correctly performed or adhered to, could result in death or serious injury.



CAUTION: This symbol and/or the use of the word **CAUTION** indicates a potential hazard associated with the use of this equipment. It calls attention to a procedure, practice, condition, or the like, which if not correctly performed or adhered to, could result in minor or moderate injury.



IMPORTANT: The use of the word **IMPORTANT** in this manual calls attention to a procedure, practice, or condition which if not correctly performed or adhered to, could result in incorrect performance of or damage to the equipment and may void the warranty.



NOTE: The use of the word **NOTE** in this manual is used to emphasize a procedure, practice, or condition.

1.3. Analyzer-Specific Warnings



Refrigerant Blend Warning: The HVAC industry is continually introducing new refrigerants. Many of these new blends can be profiled using the Pur•Chek™ Pro.



Sample Filter Warning: Replace the sample filter of the instrument AS SOON AS RED SPOTS OR DISCOLORATION BEGINS 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 sampling options. One for High Side Liquid sampling and one for Low Side Vapor Sampling. Failure to use the correct hose configuration 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 configuration.

Damage caused to the instrument due to the use of the wrong hose configuration on the wrong port will void the warranty.



Battery Charger Warning: When charging the optional battery with the 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.

1.4. General Warnings and 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 Identifier 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.



DO NOT expose unit or external components to rain or moisture. Protect the unit by keeping it in the storage case when not in use.

1.5. Features and Capabilities

The Pur•Chek™ Pro HVAC Diagnostic Refrigerant Analyzer is the most advanced portable instrument ever manufactured for determining the purity of gaseous refrigerants for the HVAC-R market. Features of the Pur•Chek™ Pro include the following:

- Identification of more than 12 refrigerants with a single IR detector
- Advanced ergonomic design
- Rugged rubberized hand grips
- Large graphic display with on-screen instructions
- Fast test time
- Built-in printer for instant analysis report
- Vapor or liquid sampling ability
- Internal, rechargeable battery option for cordless operation in any location
- Hard shell carry/storage case
- Remote software update port.



1.6. Kit Contents and Reorder Part Numbers

The Pur•Chek™ Pro kit contains the individual parts listed below.

- Pur•Chek™ Pro (available only through kit 2100-8003)
- Hard shell storage/carrying case
- 1/4" flare vapor sampling hose
- 1/4" flare liquid sampling assembly
- AC adapter
- Printer paper (1 roll)
- Instruction manual
- Spare sample hose filter

The Pur•Chek™ Pro kit is contained in a hard shell storage/carrying case. Note that some kit components are available for individual reorders.

Table 1-1. Pur•Chek™ Pro Kit Part Number

Part Number	Description
2100-8003	Pur•Chek™ Pro Kit

Table 1-2. Pur•Chek™ Pro Kit Replacement Part Numbers

Part Number	Contents of Pur•Chek™ Pro Kit (P/N: 2100-8003)
N/A	Pur•Chek™ Pro (available only through kit 2100-8003)
N/A	Hard shell storage/carrying case (available only through kit 2100-8003)
2100-9001	Instruction manual
2100-0003	Printer paper (1 roll)
2100-0004	AC power adapter
2100-0006	White plastic sample filter
2100-0007	Rechargeable battery kit with battery and charger (optional)
2100-0008	1/4" flare low-pressure vapor sampling hose
2100-0009	1/4" flare high-pressure liquid sampling hose assembly
2100-0010	Spare low pressure sample hose filter/restrictor
2100-0012	Spare rechargeable battery (optional)

1.7. Functional Overview

Contamination of refrigerants either in storage cylinders or air conditioning systems can lead to component corrosion, elevated head pressures, and system failures when used 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 use temperature-pressure relationships. The development of various substitute refrigerants further complicates the ability of a technician to identify refrigerant purity based on 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 Bacharach Pur•Chek™ Pro HVAC diagnostic 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 of multiple refrigerant types. Refrigerant purity is displayed on the LCD screen. The user must determine acceptable levels of purity based on his use or recovery standards.

Sample gas is admitted into the instrument through one of the two supplied sampling hose configurations and presented to the sensing device. The instrument provides the user with direct percent-by-weight concentrations.



NOTE: The instrument does not consider air to be a contaminant.

The instrument interface to the user consists of an LCD graphic display, status indicator lamps, push-button communication switches, and an alarm horn. Alarm indicators provide alerts of instrument fault conditions. Direct percent-by-weight concentrations of the sample refrigerant are provided on the display, which also provides user directions and prompts. A built-in printer is provided to print an on-the-spot analysis report.

The Bacharach Pur•Chek™ Pro provides the refrigerant technician with:

- refrigerant type
- refrigerant purity
- refrigerant contamination information
- potential flammability information.

2. Specifications

Table 2-1. Specifications

Category	Description	
Sample Parameters	Vapor only, oil-free, 500 psig maximum	
Identified Refrigerants	R12, R408A, R409A, R417A, R421A, R421B, R422A, R422B, R422C, R427A, R600a (Due to similar formulas, R417A and R421A may be identified as either R417A or R421A)	
Identified and 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	100-240 V~, 50/60 Hz, 0.6 A
	Optional External Battery Charger	100-240 V~, 50/60 Hz, 1.95 A
	DC Supply Requirements	9-15 VDC, 2 Amps minimum
Environmental Conditions	Humidity: 0 to 95% RH non-condensing. Protect the unit by keeping it in the storage case when not in use. Do not expose unit or external components to rain or moisture.	
Operational Temperature	50-110° F	

3. Components

3.1. Base Unit

The Pur•Chek™ Pro base unit (shown in Figure 3-1) houses the graphic display, infrared bench, electrical connections, and printer module. These components require no maintenance.



IMPORTANT: There are no serviceable components internal to the instrument, and disassembly will void the warranty.

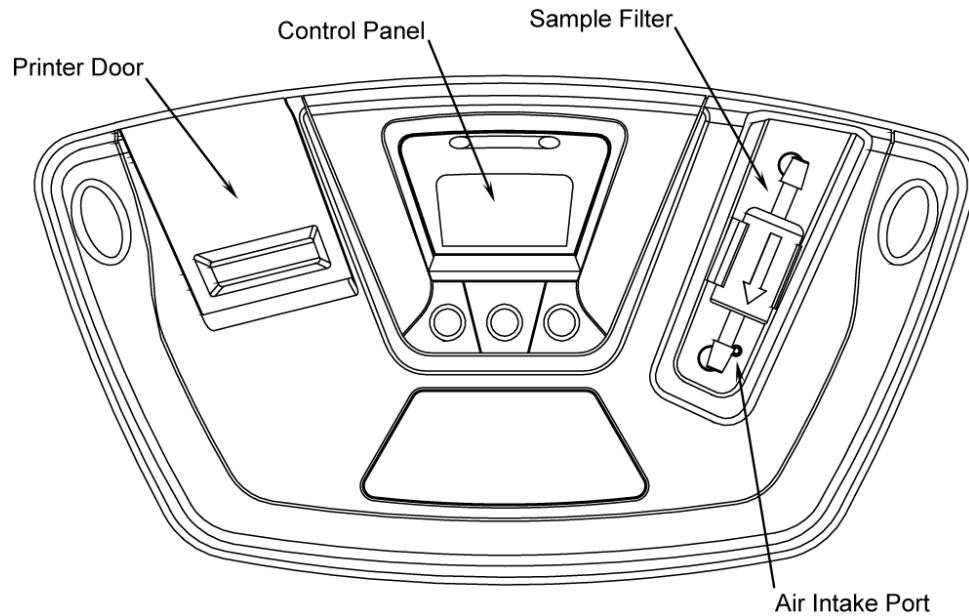


Figure 3-1. Base Unit Showing Key Components

3.2. Low Side Vapor Sample Hose

The 8.5 foot (2.5 meter) low side vapor sample hose configuration is constructed of a polyurethane tube. See Figure 3-2. 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 1/4" SAE female flare coupling nut on the service end.

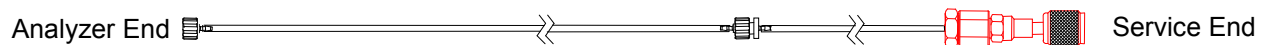


Figure 3-2. Low Side Vapor Sample Hose

3.3. High Side Liquid Sample Hose

The 8.5 foot (2.5 meter) high side sample hose configuration 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 syringe is provided with a magnet for attaching it to the tank. It also is provided with an instrument inlet port mating connector on one end and a 1/4" SAE female flare coupling nut on the service end. Refer to Figure 3-3.

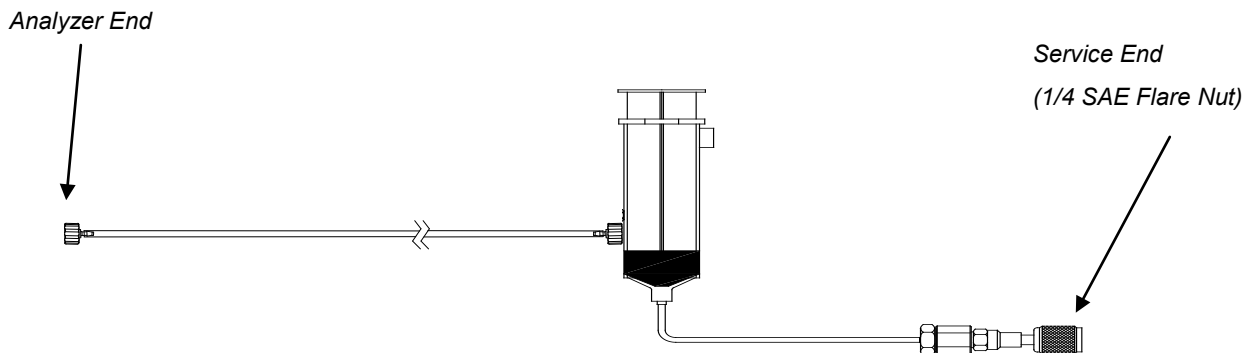


Figure 3-3. High Side Sample Hose Configuration

3.4. 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 LEDs at the top of the control panel are used for visual status indications. Refer to Figure 3-4.

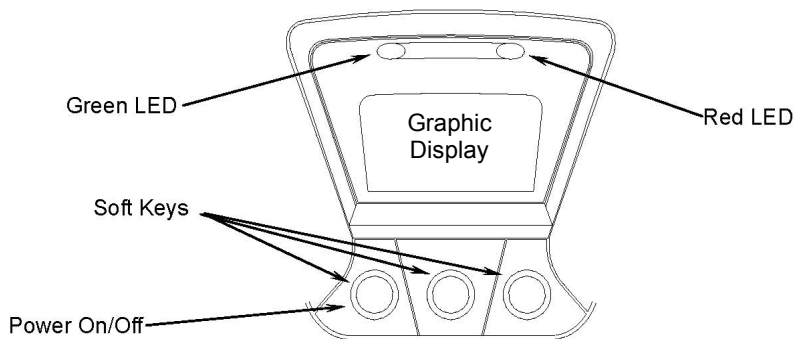


Figure 3-4. Control Panel Showing Key Components

3.5. AC Power Adapter

The Pur•Chek™ Pro is powered via a 110/240 VAC, 50/60 Hz power transformer. This transformer is included with each unit and converts a standard 110/240 VAC, 50/60 Hz wall outlet to 12 VDC 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.

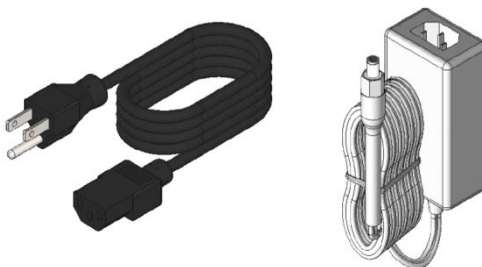


Figure 3-5. AC Power Adapter

3.6. Back Panel Connections

The connections located on the back panel are illustrated below in Figure 3-6.



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.

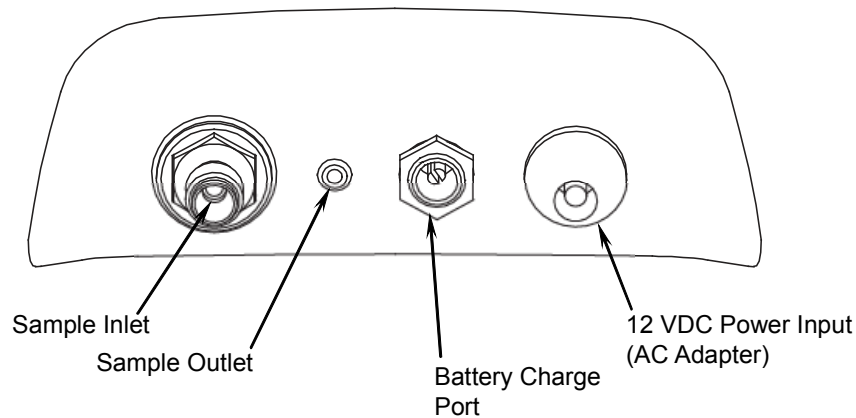


Figure 3-6. Back Panel Connectors

3.7. Hard Shell Storage/Carrying Case

The hard shell storage/carrying case is custom fit to the Pur•Chek™ Pro. It provides rugged protection for the instrument as well as convenient storage for all components. See Figure 3-7. The enclosure is general purpose and is not watertight.

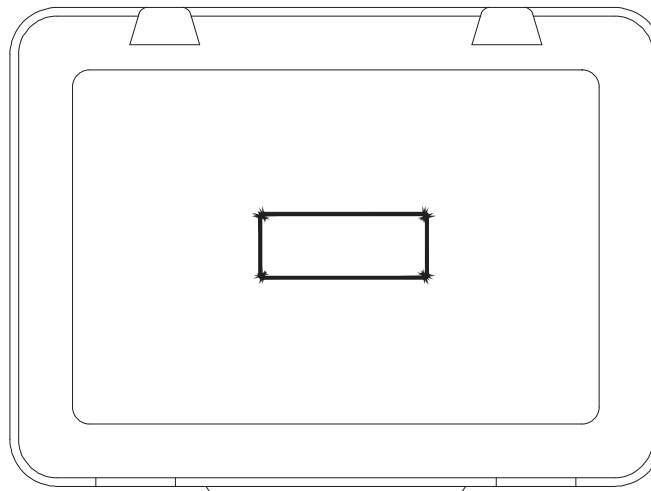


Figure 3-7. Hard Shell Storage/Carrying Case

4. Operation

4.1. Battery Installation

The Pur•Chek™ Pro has an optional internal rechargeable battery. If your Pur•Chek™ Pro is equipped with the optional rechargeable battery, you must first install and charge the battery prior to use.



NOTE: The Pur•Chek™ Pro can be operated with or without the battery using the supplied AC adapter.

To install the optional battery, remove the battery cover from the back of the unit by unscrewing the two Phillips head screws as shown in Figure 4-1.

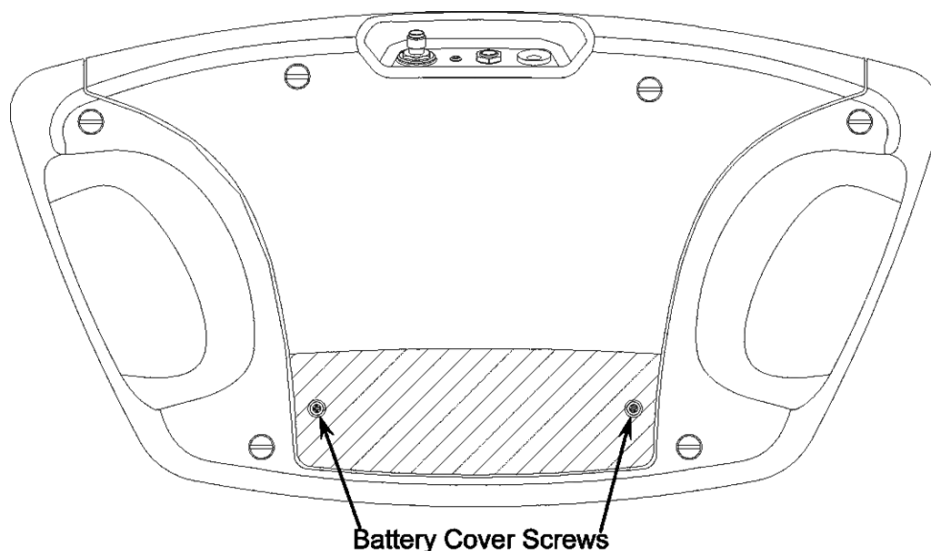


Figure 4-1. Location of Battery Compartment Screws

Inside the Pur•Chek™ 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.

4.2. Turning On the Unit

Connect the included AC power supply to the 12 VDC power input jack on the back of the unit (refer to Figure 3-6 on page 7). Plug in the AC power supply to a 110-240 VAC outlet.



NOTE: If the optional battery module is installed and charged, the AC power supply is not required.

Press the left soft key (the power on/off button) and the splash screen shown in Figure 4-2A will appear for approximately three seconds, followed immediately by the screen in Figure 4-2B and then by the warm up screen (Figure 4-2C) for approximately 110 seconds. After the warm up, the calibration screen may be shown if it is required (see Figure 4-2D, and Figure 4-2E).

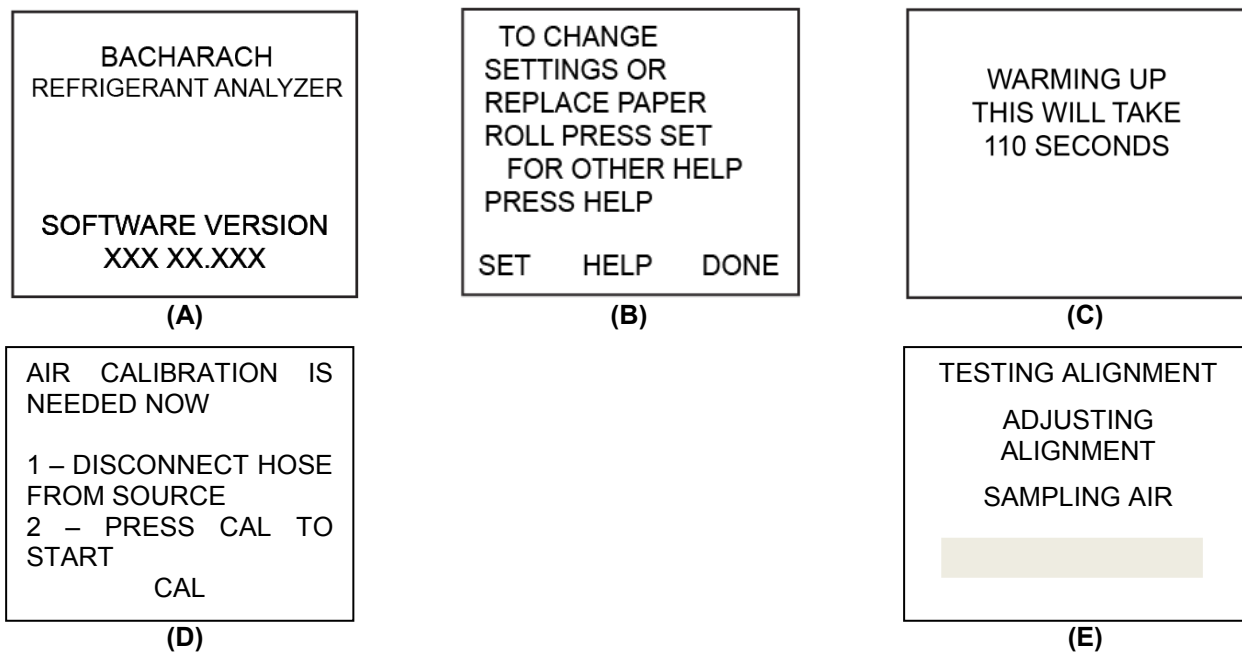


Figure 4-2. Sample Screens Showing Start-up Sequence

4.3. Calibration

Air calibrations are only required periodically. A reminder to perform air calibrate will appear when needed. Refer to Figure 4-2D and Figure 4-2E.

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 and remain connected to the instrument.

When the unit is ready for gas testing, the unit will display the screen shown in Figure 4-3A. Connect the hose to the tank and press test. The Pur•Chek™ Pro will display the screen shown in Figure 4-3B. If you wish to change any of the factory default settings, refer to Section 5: Maintenance and Troubleshooting on page 13.

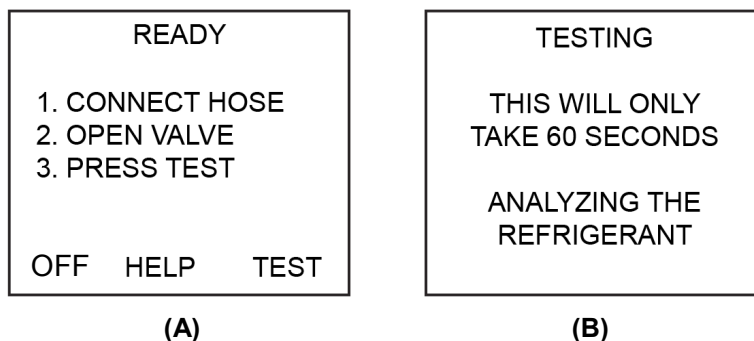


Figure 4-3. Sample Screens Showing Calibration Testing

4.4. Vapor Sampling

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

1. Connect the vapor sampling hose to the 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. When the test is complete, disconnect the hose from the cylinder.
4. Disconnect the hose from the Pur•Chek™ Pro for storage.

4.5. Liquid Sampling

Liquid sampling is an option that is exclusive to the Pur•Chek™ Pro. It permits the user to flash liquid into vapor for introduction into the analyzer. To use the liquid sampling assembly, follow the steps below.

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 vapor 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 brass hose restrictor if necessary.
8. Disconnect the hose from the Pur•Chek™ Pro.

4.6. Viewing the Test Results

Upon completion of the test, the Pur•Chek™ Pro will display a screen similar to that shown in Figure 4-4A. Pressing the MORE button will display the screen shown in Figure 4-4B.

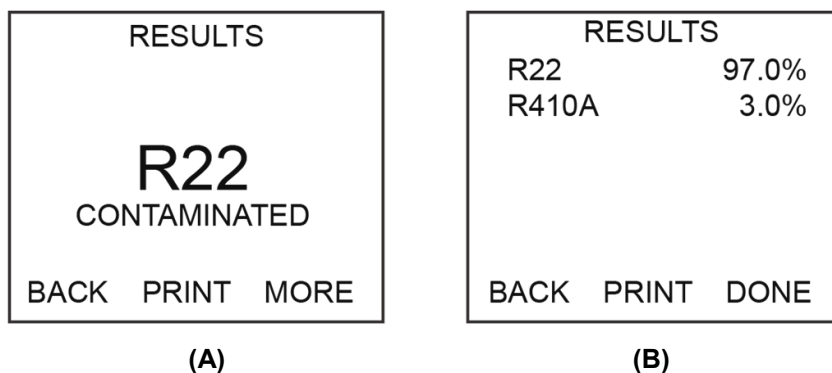


Figure 4-4. Screens Showing Sample Test Results

4.7. Contaminated Blend Refrigerants

The Pur•Chek™ 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 Pur•Chek™ Pro determines that the primary refrigerant in the system or cylinder is one of the recognized measurable refrigerants, a results screen similar to Figure 4-5A will be displayed. Pressing the MORE button will display a detail screen similar to Figure 4-5B. If the blend or refrigerant mixture is not recognized, Figure 4-5C will be displayed.

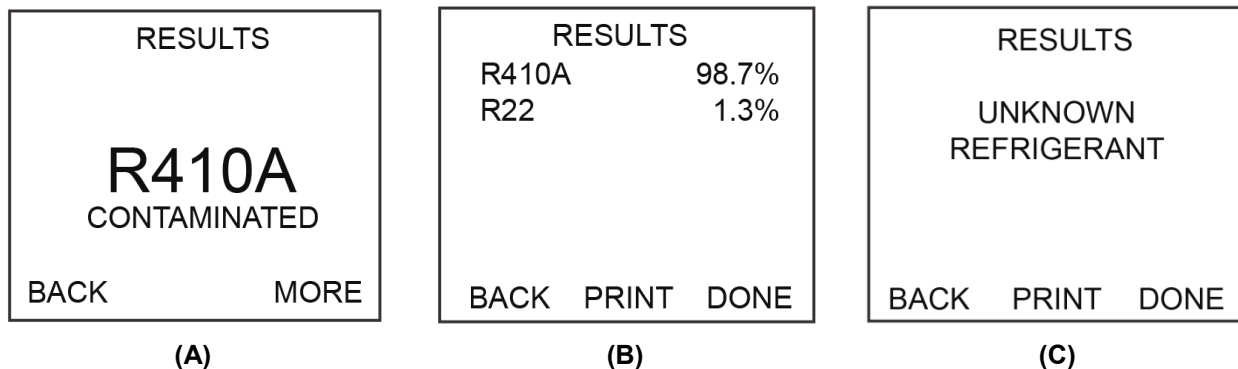


Figure 4-5. Test Results for Contaminated Blend Refrigerants

4.8. Pure Blend Refrigerants

The Pur•Chek™ 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 Pur•Chek™ Pro will display the blend refrigerant type as shown in Figure 4-6A. Pressing the MORE button will display the detail screen shown in Figure 4-6B.

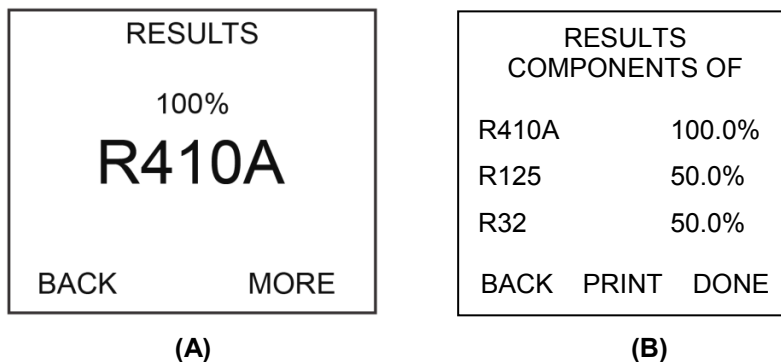


Figure 4-6. Test Results for Pure Blend Refrigerants

4.9. Blends with Incorrect Component Ratios

The Pur•Chek™ 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 has incorrect component ratios, it will be displayed as shown below in Figure 4-7A. To see the component concentrations (similar to Figure 4-7B) press MORE.

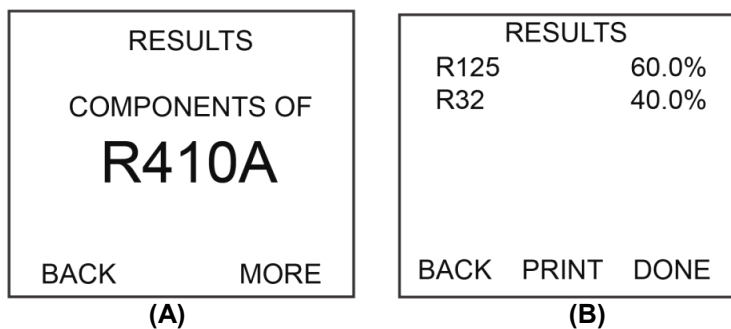


Figure 4-7. Test Results for Blends with Incorrect Component Ratios

4.10. 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. Figure 4-8A, Figure 4-8B, and Figure 4-8C show sample printouts for various test results.



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

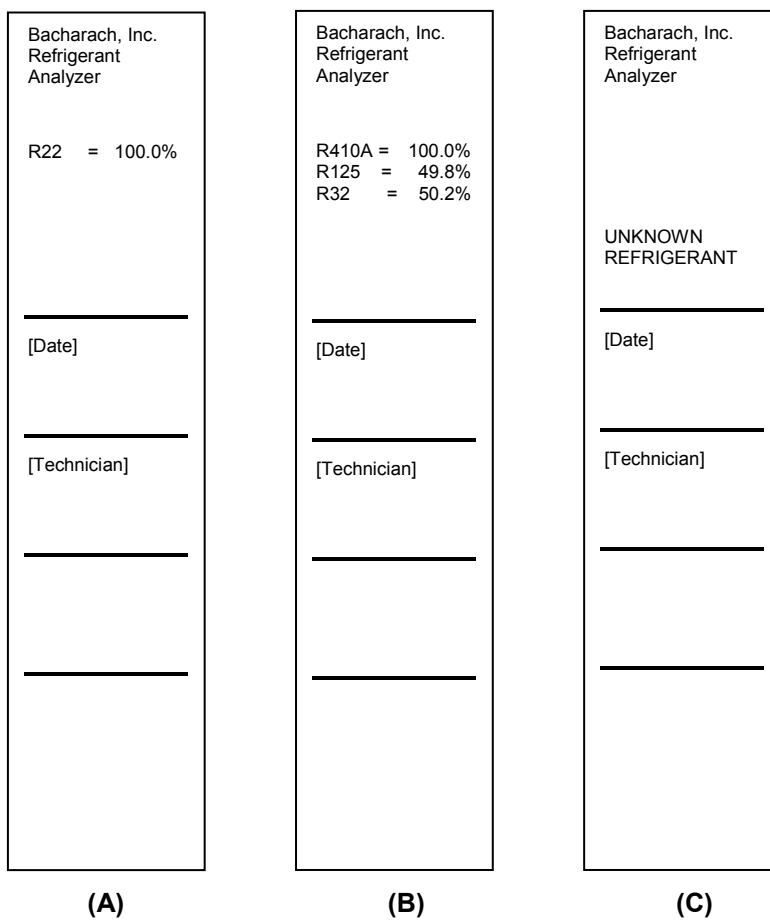


Figure 4-8. Samples of Printed Test Results

5. Maintenance and Troubleshooting

5.1. Setting the LCD Contrast

The Pur•Chek™ Pro features an adjustable LCD contrast for use in varying light conditions. To adjust the contrast, press the HELP button when prompted by the start-up screen shown in Figure 4-2B on page 9 (the screen will display several options as shown in Figure 5-1A). Pressing the SET button will display the options in Figure 5-1B.

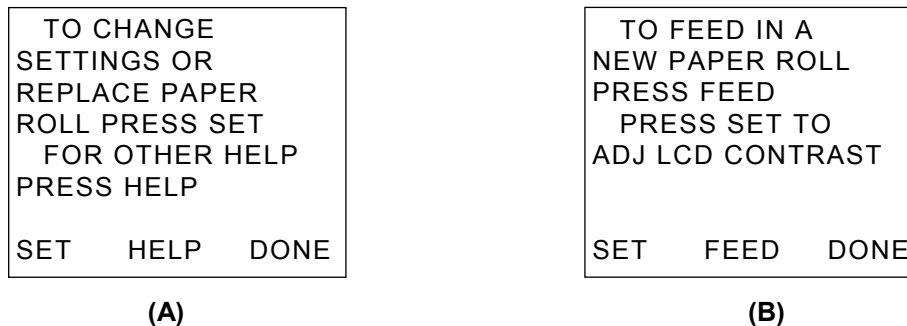


Figure 5-1. Sample Screens Used in Setting LCD Contrast

5.2. 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.

To replace the white plastic sample filter, follow the instructions below.

- 1) Obtain replacement filter P/N 2100-0006 (see Table 1-2 on page 3).
- 2) Remove the existing filter from the retaining clip of the instrument by pulling straight up and out.
- 3) CAREFULLY remove the flexible, black rubber tubing connections from both ends of the existing filter.



IMPORTANT: DO NOT allow the tubes to slip back into the internal portion of the case.

- 4) Discard the existing filter in an environmentally friendly manner.
- 5) 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.
- 6) CAREFULLY slide the tubing back into the internal portion of the instrument and seat the new filter into the retaining clip.
- 7) Inspect the sample hoses for signs of oil entrapment.
- 8) Replacement of the sample filter usually requires cleaning or replacement of the sample hoses.

5.3. 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 brass oil restrictor. If oil is visible in the low pressure vapor hose, replace the hose and brass restrictor with P/N 2100-0010 (refer to Table 1-2 on page 3).

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 2100-0010 (see Table 1-2 on page 3).

To replace the Restrictor Assembly, follow the instructions below.

- 1) Disconnect the sample hose from the Identifier.
- 2) Remove the brass restrictor (with hose attached) from the coupler and discard. Be sure to use a backing wrench to avoid damaging the coupler.
- 3) Check for signs of oil and debris in the coupler.
- 4) Using a cleaner which ONLY contains tetrachloroethylene and carbon dioxide (e.g., "CRC Brakleen" or similar), follow safety instructions on the can and spray all parts of the coupler with the cleaner to remove the oil.



IMPORTANT: 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 brass restrictor (P/N 2100-0010) into the coupler and lightly tighten. Usually finger tight is sufficient.

5.4. Changing the Printer Paper

Pur•Chek™ 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 Figure 4-2B (on page 9). The screen will display several options as shown in Figure 5-2A. Press the SET button to advance to the screen shown in Figure 5-2B. Press FEED to display the Load Paper screen (Figure 5-2C).

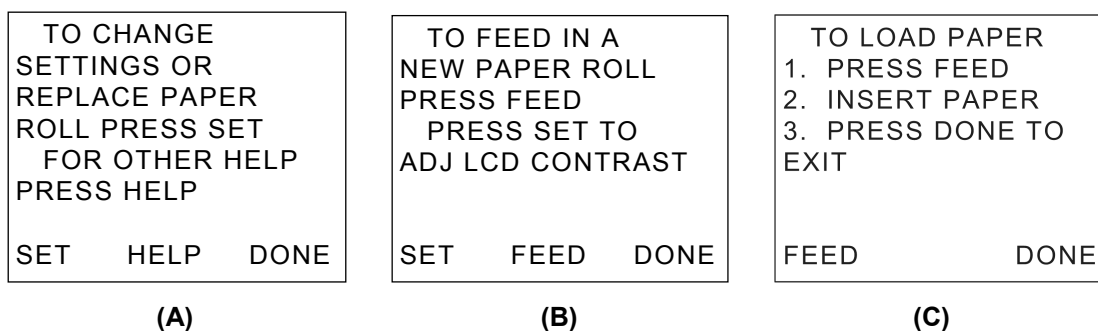


Figure 5-2. Screens Used in Changing Printer Paper

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 5-2C until the old roll exits the printer completely. Insert the new paper roll from the underside as shown in Figure 5-3.

Press the FEED button (shown in Figure 5-2C) to automatically advance the paper through the printer. Allow at least 3 in (7cm) of paper to exit the top of the printer. Press 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.

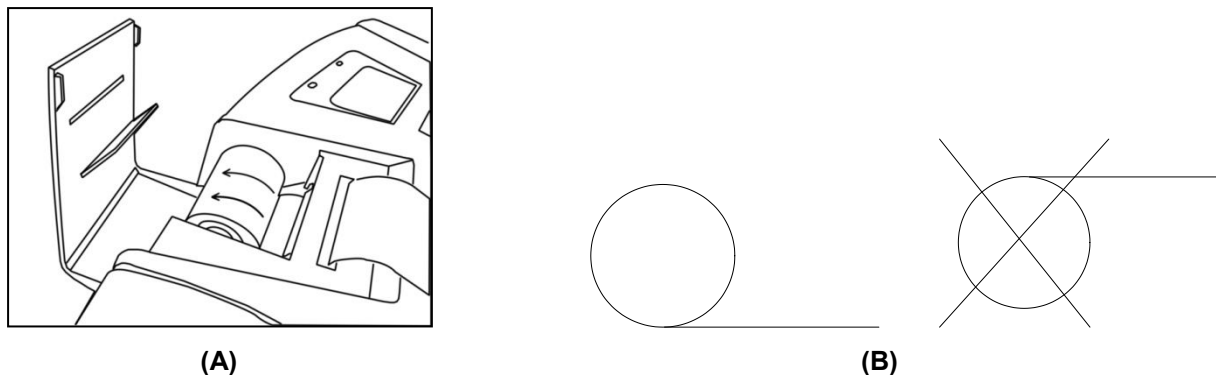


Figure 5-3. How to Change Printer Paper

5.5. 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 Pur•Chek™ 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 Bacharach factory USB drive.

5.6. 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.

6. Service Centers

Service and replacement parts can be found by contacting any of the following Bacharach Service Centers.