

# A/C Diagnostic Tool

(Patent Pending)

User's Instruction Manual

Manual Part No. 5-06-7000-55-0  
Manual Document No. MN-A-0011

## Quick Start Guide

For installing the Handspring Visor (PDA) into the A/C diagnostic tool

- ❖ From the PDA box, remove only the Handspring Visor (hereafter referred to as PDA) and AAA batteries. The accessories included in the box will not be needed at this time.
- ❖ Install the two AAA batteries to the PDA's battery compartment. You may refer to the Handspring quick reference guide for explicit battery installation directions. Follow the prompts on the PDA's screen to set up the PDA.
- ❖ Remove the expansion slot protective cover from the back of the PDA and install the included A/C Diagnostic Tool software module. You may refer to the Handspring quick reference guide for explicit directions.
- ❖ Remove the 2.5" by .75" Velcro strip from the PDA well of the A/C Diagnostic tool and remove the Velcro strip's adhesive backing protector. Apply the adhesive back of the Velcro to the center of the PDA's back. Take care not to cover the reset button or the battery compartment catch.
- ❖ Connect the A/C Diagnostic Tool's charger cable to the A/C Diagnostic Tool's DC input. Plug the charger into a 115-volt AC receptacle to power up the A/C Diagnostic Tool. This is only required until the unit is fully charged.
- ❖ Place the PDA in the PDA well and press the PDA's power button.
- ❖ Tap the ACDT icon and follow the onscreen instructions to begin AC diagnosis.



## **Table of Contents**

<b>I. DISCLAIMER, CAUTIONS AND WARNINGS.....</b>	<b>3</b>
<b>II. FUNCTIONAL DESCRIPTION.....</b>	<b>4</b>
<b>III. HARDWARE DESCRIPTION .....</b>	<b>5</b>
A. <i>Portable Case</i> .....	5
B. <i>PDA (optional)</i> .....	5
C. <i>R134a Sample Hoses</i> .....	6
D. <i>Temperature Probe</i> .....	6
E. <i>Target Tape</i> .....	7
F. <i>Battery Charger</i> .....	7
G. <i>Ambient Humidity Sensor</i> .....	7
H. <i>Printer Port</i> .....	8
I. <i>PDA Well and Infra Red (I/R) Port</i> .....	8
J. <i>Battery Charger Port</i> .....	8
K. <i>High and Low Side Pressure Port Connections</i> .....	8
L. <i>Storage Pocket</i> .....	8
M. <i>Component Locator Reference Guide</i> .....	8
N. <i>Software Module</i> .....	9
O. <i>Power Switch</i> .....	9
<b>IV. OPERATIONAL PROCEDURES.....</b>	<b>9</b>
A. <i>Pre-Operational Procedure</i> .....	9
B. <i>Operational Procedure</i> .....	9
C. <i>Post-Operational Procedure</i> .....	11
D. <i>Printing Results</i> .....	11
E. <i>Battery Charging</i> .....	12
<b>V. MAINTENANCE PROCEDURES .....</b>	<b>13</b>
A. <i>Service Contact</i> .....	13
B. <i>Common Problems and Suggested Resolutions</i> .....	<b>Error! Bookmark not defined.</b>
C. <i>Maintenance Procedures</i> .....	13
D. <i>Spare Parts Listing</i> .....	14
<b>VI. SPECIFICATION AND PATENT LISTING.....</b>	<b>15</b>
<b>VII. WARRANTY .....</b>	<b>16</b>

## **I. Disclaimer, Cautions and Warnings**

### **Product Disclaimer**

The use of this tool is intended to teach and aid the technician in troubleshooting A/C system problems. The diagnosis provided by the tool should be used as guidance for determining the potential problem, ***not as an absolute indicator of the problem***. Neutronics Automotive accepts no liability for costs incurred due to incorrect or misunderstood diagnoses.

### **General Cautions**

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

Always inspect the sample hoses (2) before each use. Replace the hose if it appears cracked, frayed or obstructed.

ALWAYS turn the automobile engine off before connecting the instrument to an air conditioning system.

ALWAYS ensure that the engine is off when using the Refrigerant Identifier function.

**ALWAYS take special caution when using the temperature probe with the engine running. The probe is designed to be flexible so that it can be molded for hard to reach components while leaving your hand outside the engine area.**

Always wear eye and skin protection when working with refrigerants. Escaping refrigerant vapors will present a freezing danger.

DO NOT direct refrigerant vapors venting from hoses towards the skin.

To reduce the risk of electrical shock, do not remove the top panel of the instrument, do not utilize the instrument in wet or damp areas, and minimize the length and use of extension cords.

DO NOT remove the top panel of the instrument. There are no serviceable components internal to the instrument and removal of the top panel will void the warranty.

ALWAYS place the tool 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 can be dangerous and may damage the unit and will void the warranty.

NEVER expose the instrument to pressures in excess of 500 psig.

DO NOT utilize the low-side coupler supplied on the service end of the R134a Sample Hose for any application other than with the A/C diagnostic tool. The coupler supplied is a modified version that does not contain a check valve and is not suitable for any other refrigerant application. This is why the coupler is BLACK color coded rather than the standard color of blue.

## **II. Functional Description**

The tool provides a simple and specific methodology for troubleshooting automotive air conditioning systems. Refrigerant purity, temperature and pressure measurements for the A/C system as well as ambient relative humidity, ambient temperature and clutch cycling rate are all used to determine the cause of the performance problem of the system. This tool can also be used to objectively determine if A/C system repairs have been effective.

A technician with many years of experience in diagnosing and working on car A/C systems can sometimes recognize patterns of temperature, pressure, and clutch cycling rates, as being related to a particular A/C system fault. However, that expertise can be hard to come by and can take a long time to acquire. The A/C Diagnostic Tool operates as the shop's "Master A/C Tech" immediately. We have logged thousands of pieces of data from many different failure modes over many makes and models of cars. The A/C Diagnostic Tool compares the data taken from the car being tested and automatically determines which A/C system failures are most likely.

As data is gathered the A/C Diagnostic Tool will eliminate some tests if the problem is discovered early in the data acquisition process just as an experienced technician will focus in on the portion of the system that appears abnormal. This can save a great deal of diagnosing time. In the event that contaminated refrigerant is found during the full system test, the program will provide guidance to remove the contaminated refrigerant and prohibit the test from continuing.

This tool utilizes the very latest in high technology...starting with a PDA (Personal Digital Assistant) platform that provides for an exceptional user interface via the large PDA display and the use of "conversational" language for simple to understand technician instructions. The PDA platform also provides for superior portability of test data that can easily be carried around the shop for other techs opinions or to show the customer.

Temperature across components is an important test element of the A/C diagnostic tool. The A/C diagnostic tool includes an Infra-Red (IR) temperature probe. This is an all-new, highly accurate and completely flexible IR temperature attainment system (patent pending). The system utilizes a flexible probe that can have several bends and turns allowing the technician to form the probe into a shape that will place the probe head (where the IR sensing device is located) directly on the component to be measured. The probe is long enough to ensure that the technician's hand and arm remain outside the engine compartment.

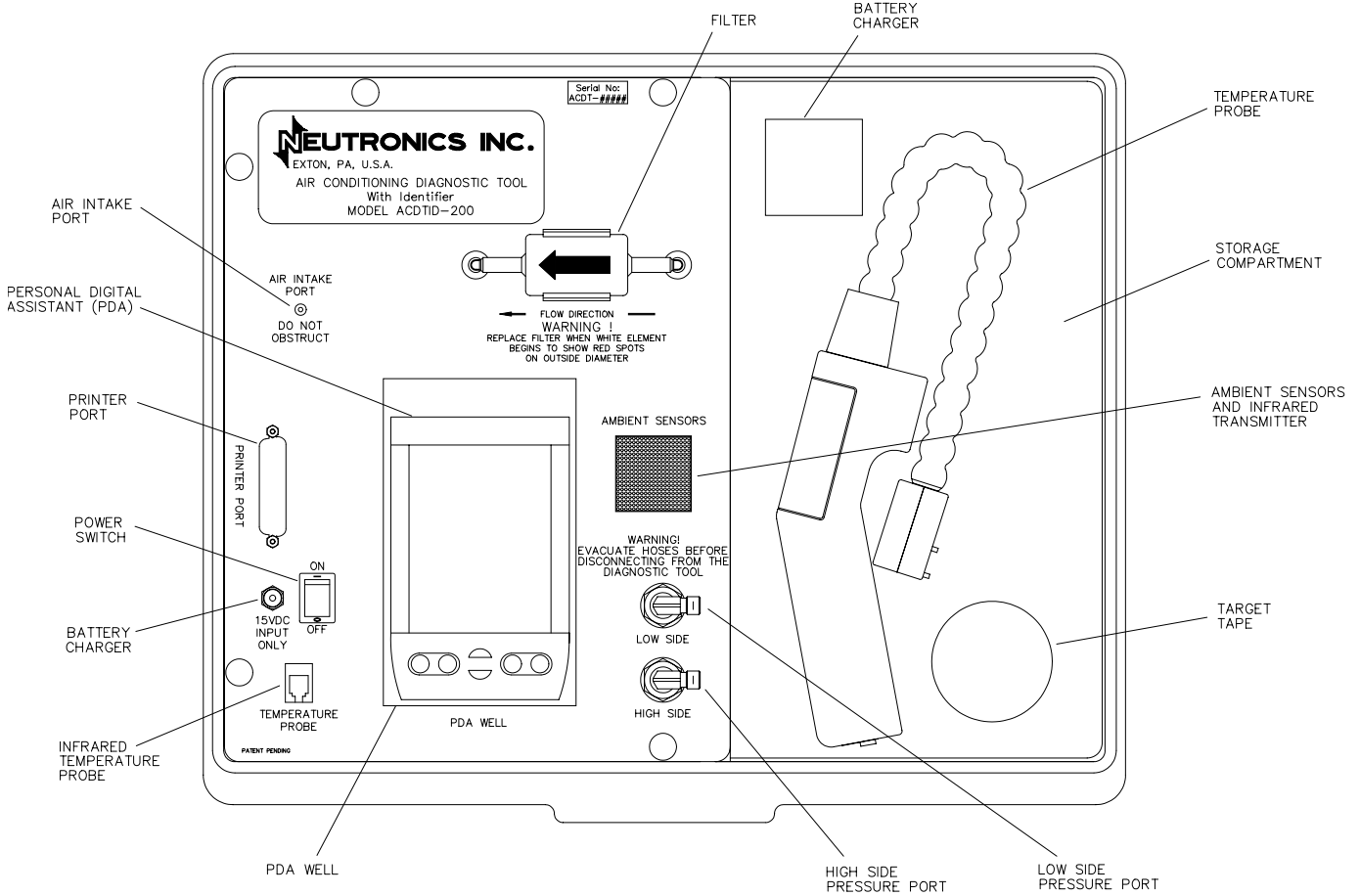
Overview of Features and Benefits:

<b>FEATURE</b>	<b>BENEFIT</b>
PDA Platform	Convenient, portable, simple user interface via a large display, lots of computing power and memory, easily upgradeable, commonly used in everyday life
IR Temperature Probe	Highly accurate, completely flexible, FAST!
Digital Gauge set	Provides for continuous readings of high and low side A/C system pressures including min/max readings
Identify Refrigerant	Determines the purity of the refrigerant within the system to prevent accidental contamination of bulk supplies.
Print out Capability	Printer port for storing and tracking test data and to include it with faulty components returned under warranty
Easily Upgradeable Software	As future A/C systems develop, the tool can easily be upgraded without a PC to accommodate the data needed to diagnose them. Just plug in a new cartridge!

### III. Hardware Description

#### A. Portable Case

The instrument is housed in a rugged portable high-density polyethylene case. The case will store the base instrument electronics and hardware as well as required hose assemblies, target tape and charging



power pack.

#### B. PDA

This tool utilizes the very latest in high technology...starting with a PDA (Personal Digital Assistant) platform that provides for an exceptional user interface via the large PDA display and the use of “conversational” language for simple to understand technician instructions. The PDA platform also provides for superior portability of test data that can easily be carried around the shop for other techs opinions or to show the customer.



**NOTES:**

This product may have come with a Personal Digital Assistant (PDA). If not, you will have to purchase a “Handspring™” Visor, Visor Deluxe or Visor Neo brand PDA in order for the tool to be used. Even if your tool did not include a PDA, it did include the software cartridge. Simply plug this into the Handspring PDA to immediately start using the A/C diagnostic tool.

**C. Refrigerant Identifier**

The refrigerant identifier is located inside the case below the sample filter. The identifier uses optical sensors to determine refrigerant purity and is very important to the diagnostic accuracy. The unit will identify R12, R134a, R22 and Hydrocarbons. Refrigerant contamination of greater than 2% will cause the unit to fail the identification test. Air concentrations readings are independent of the refrigerant purity and therefore the total percentages may add up to greater than 100%. Air concentrations greater than 3% cause higher than normal pressure readings the unit will request additional actions be taken before the diagnostics can continue. Results of the refrigerant identification test can be printed separately.

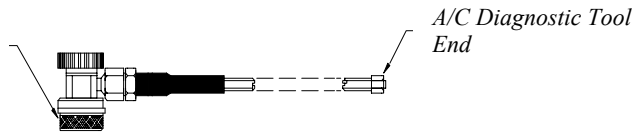
**NOTE:**

Hydrocarbon readings greater than 4% can cause the refrigerant mixture to be explosive. Use extreme caution when handling Hydrocarbon contaminated refrigerants.

**D. R134a Sample Hoses**

Two hoses are provided with the tool and should *never* be replaced with any other type of hose. The “high side” hose has a red band on the hose and a RED R134a quick connect coupler for attachment to the high side of the A/C system. The “low side” hose has a blue band on the hose and a BLACK R134a quick connect coupler for attachment to the low side of the A/C system. These hoses are rated for use up to 500psi. The hoses should be evacuated using a refrigerant recycling machine to prevent refrigerant cross-contamination when moving the Tool from one vehicle to another. If you use a refrigerant identifier and have validated that the car definitely has 100% R134a, then there is no need to evacuate the hoses between tests on the same vehicle.

Service End (high & low)  
R134a Coupler



#### E. Temperature Probe

The A/C diagnostic tool includes an Infra-Red (IR) temperature probe. This is a highly accurate and completely flexible IR temperature attainment system (patent pending). The system utilizes a flexible probe that can have several bends and turns allowing the technician to form the probe into a shape that will place the probe head (where the IR sensing device is located) directly on the component to be measured. The probe is long enough to ensure that the technician's hand and arm remain outside the engine compartment. The probe can be configured in two ways: one for measuring ambient and vent air temperatures "AIR MODE" (slide switch position GREEN) and the other for measuring A/C component temperatures "SURFACE MODE" (slide switch position RED).

#### **NOTE:**

Because the I/R temperature sensor is an optical device, it is essential that the probe tip be kept clean and dry.

#### F. Target Tape

Utilizing an IR temperature probe requires that the probe tip be placed against a surface that provides proper "emissivity," or temperature radiation to the I/R sensor. This can be difficult, if not impossible with silver colored piping. Special infrared emitting tape is used to prepare the surface of the tube leading into and out of each air-conditioning component. This special tape assures the full accuracy of the probe. When encountering silver piping where I/R temperature measurements are required, simply place a piece of the RED Target Tape around the pipe and use that as the touch point for your temperature measurement. While proper measurements with the tool's temperature probe are expected with black and other painted color piping/tubing, it is still recommended that Target Tape be placed on all required temperature measurement points. This will provide the tool with the most accurate temperature measurements and thus, better ultimate diagnostics.

#### **NOTES:**

For greatest accuracy, keep the target tape to ONE layer with a minimum of overlap.

Please reference the MACS Component ID pamphlet included with this tool for help in locating the A/C system components that need to be taped. Additionally, there are two (2) A/C system schematic diagrams located at the back of this manual for reference in locating the components.

***Take your time*** during this important preparation step for use of this tool. Once the car is properly taped, the entire diagnosis will take between 10 and 15 minutes. Let all the technicians in your shop take turns taping the cars. This process teaches the technician where A/C system components are located under the hood of all makes and models of cars that come to your shop. With time, this knowledge, along with the information received from the PDA in the tool, will help you build a shop full of qualified A/C technicians.

#### G. Battery Charger

The battery charger is used to charge the internal nickel-metal hydride batteries. If the batteries are low, the charger can also be used to power the unit. Note that when the charger is plugged in, the

internal battery is charging regardless of the position of the power switch or whether the PDA is installed. The lighted power switch will flash when the internal battery is getting low and requires charging. Only use the provided charger. The use of any other charger may damage the unit and void the warranty. It is better to charge the batteries between uses, rather than run them all the way down before recharging.

#### H. Ambient Humidity Sensor

The A/C diagnostic tool includes an on-board sensor to measure ambient humidity, which will be used by the tool as a variable to consider when determining a system diagnosis. It is a maintenance free sensor and requires no user calibration for proper operation.

#### I. Printer Port

The Printer Port is a 25-pin connector utilized for printing the results of the diagnosis on a user-supplied printer and cable. The port will support most parallel port printers. The temperatures, pressures and diagnosis can be printed multiple times so that a copy can be given to the customer.

#### J. PDA Well and Infrared (I/R) Port

During use, the PDA is to be placed in the PDA well located on the top panel. It is important that the PDA be located in the PDA well during data collection as the data is transferred to the PDA from the base unit via I/R communication. The I/R port on the PDA is aligned with the base unit I/R port when the unit is installed into the PDA well. The PDA may be removed during use, but no data transfer will occur until the unit is returned into the PDA well. When the PDA is removed during a diagnosis, the unit will freeze in its current state and display a communication error. When the PDA is returned to the PDA well, the diagnostic process will continue.

#### **NOTE:**

It is important that the Handspring PDA infrared port match up with the infrared window in the PDA well. If you receive a "communication error" message on the PDA, it means the PDA is too far from the base unit to receive data. Simply return the PDA to the PDA well to resume normal communication.

#### K. Battery Charger Port

The diagnostic tool comes with an AC to DC power wall adapter. This is to be stored in the storage compartment within the storage case. When ready to charge the A/C diagnostic tool, simply plug the power adapter into the wall and connect the other end to the Battery Charger Port located on the top panel of the tool. Charging takes 6-8 hours for a fully discharged battery.

**NOTE:** The unit can be operated during the charging process. Charge is complete if power light remains on for longer than one minute while charger is plugged in.

#### L. High and Low Side Pressure Port Connections

The A/C diagnostic tool is provided with two, custom R134a Service hoses (high and low side) for the purpose of obtaining system pressures. Always connect the service hoses to the tool BEFORE connecting the service port ends to the car. **It is important to tighten the HIGH SIDE hose connection with a wrench until the fitting is snugly tightened. Be careful not to over tighten as this may break the fitting.** The low side end may be hand tightened and should not leak.

*Connect this end second!*



*Connect this side first!*

#### **M. Storage Compartment**

All of the accessories for the A/C diagnostic tool are designed to fit neatly into the on-board storage compartment. The storage flap is secured to the instrument top panel via Velcro®.

#### **N. MACS Component Locator Reference Guide**

To help guide the technician in identifying the various A/C system components, the tool includes drawings with component layouts at the end of this manual and a separate reference guide. This pamphlet depicts the two major types of A/C systems and shows what each of the major system components look like. Additional system diagrams are available in the “Getting Started” menu of the PDA software.

#### **O. Software Module**

The A/C diagnostic tool software is located in the Software Module. To use the A/C diagnostic tool, simply plug the Module into the back of the Handspring PDA. The A/C diagnostic tool program can now be launched by tapping the “N” symbol labeled ACDT on the PDA screen.

#### **P. Power Switch**

Turns the A/C diagnostic tool on and off. It is important to note that the PDA has its own power source (2 AAA batteries) that are not rechargeable and must be replaced when depleted.

**NOTES:** The PDA will go into sleep mode automatically to conserve batteries. If this occurs, simply press the PDA power switch and you will resume right where you left off.

When the PDA is used in “Real Time Display” mode, the auto off function of the PDA is disabled and the unit must be manually turned off to avoid depleting the batteries.

### **IV. Operational Procedures**

#### **A. Pre-Operational Procedure**

1. Install the AAA batteries into the Handspring PDA and power it on. Follow the on-screen prompts for setting the date and time.
2. Install the A/C diagnostic tool Software Module by plugging it into the back of the Handspring PDA. If your PDA is brand new, there will be a blank cartridge that was factory installed that will be need to removed first.
3. Place the tool on a mobile cart and locate it near the front of the vehicle to be diagnosed. Avoid locating the tool on or near the engine, as this will affect the ambient temperature and humidity readings. Avoid exposing the unit and temperature probe to direct sunlight.
4. Open the storage case and remove the two R134a system pressure hoses. Attach the hoses to the high and low side hoses to the A/C diagnostic tool top panel port connections (RED to the High side and Black to the low side). Use a small wrench to “snugly” tighten the hoses to the base tool.
5. Attach the IR temperature probe connector to the A/C diagnostic tool top panel connector (looks like a telephone jack).
6. Place the PDA in the PDA well. The PDA can be secured to the PDA well via the Velcro® that is supplied in the PDA well.
7. Power up the Tool and the PDA (if not already on)
8. Tap the ACDT icon on the PDA screen to launch the program.
9. To setup for use with a printer, select, “Printer Set-up”. This only needs to be done once or until a different printer is selected.

#### **B. Operational Procedure (Full System Test)**

All the necessary user prompts will be displayed on the PDA to guide the operator through each step. The user should not do anything to the car unless prompted by the instructions displayed on the PDA. There are

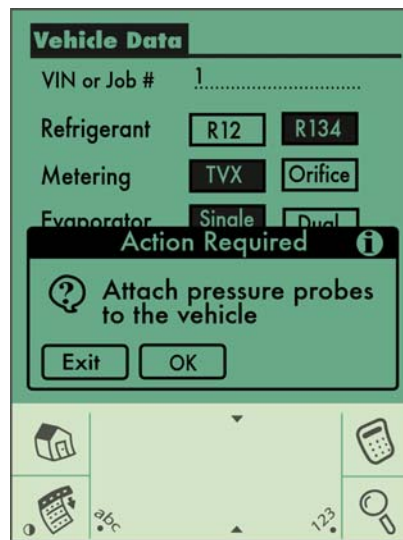
vehicle specific prompts and tests that have been tailored for the exact vehicle being tested. Therefore the procedure may change slightly from vehicle to vehicle. In general, the procedure will follow:

1. Ensure the vehicle is off
2. Setup the vehicle (attach target tape and high and low side sample hoses)
3. Select **Full System Test**
4. Follow the on screen prompts to start the Refrigerant Identification
5. Select Vehicle Year Make and Model
6. Follow step-by-step instructions on PDA
7. Allow the vehicle to stabilize (5 minutes)
8. Take temperatures as directed by PDA
9. Print results (they are automatically saved internally)
10. Repair problem specified in diagnosis
11. Retest vehicle to confirm that there was only one problem

**NOTE:** When in the Full System test mode you may get a message that says, “Data Insufficient to provide diagnosis.” This could be caused by many factors including, no refrigerant in the system, bad temperature measurements, etc. If this occurs, repeat the test procedure. If you still get this message please contact Neutronics Automotive for technical support.

**NOTE:** *Real Time Display and Identify Refrigerant* are also available from the main menu and operate as independent features.

A typical **instructional** screen will look like the following:



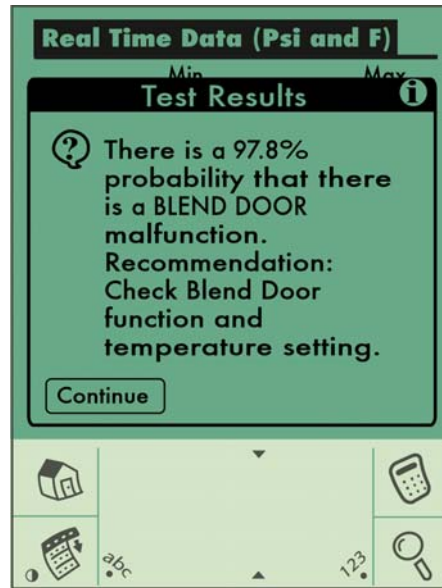
**NOTE:**

If you tap the “i” next to the words “Action Required”, additional information about this step will be displayed.

**NOTE!**

It is possible that the display screens shown on your PDA are slightly different than depicted here. There is nothing wrong with your tool.

A typical **diagnosis** screen will look like the following:



#### C. Post-Operational Procedure:

1. Turn off the vehicle and disconnect the high and low side 134a couplers from the vehicle being diagnosed. Be sure to remove the car side couplers and evacuate the hoses BEFORE removing the hoses from the base A/C diagnostic tool unit. Failure to do so may cause discharge of oil and liquid refrigerant on to the top panel of the tool.
2. Disconnect the sample hoses from the inlet ports of the instrument. Inspect the hose for signs of wear such as cracking, fraying or kinks. Verify that the hose is not obstructed. If the hose shows signs of wear or obstruction IT MUST BE REPLACED BEFORE USING THE INSTRUMENT! Return the inspected hoses to the storage compartment.
3. Turn off the PDA and return it to the Storage Compartment if not affixed to the PDA well via Velcro®.
4. Clean the instrument of accumulated dirt, oil, grime, etc. with a moist cloth. Close the enclosure lid and latch. DO NOT USE ANY SOLVENTS OR LIQUIDS TO CLEAN THE INSTRUMENT.

#### D. Printing Results:

1. From the main menu, select "printer set-up" to configure the tool to work with your printer. This only has to be done once or until a different printer is used.
2. Attach a parallel printer to the printer port on the top panel of the tool. The tool is designed to work on most parallel port printers. No additional software is required to make it work. The user must supply the printer and printer interface cable as they are not supplied with the A/C diagnostic tool.
3. Power up the printer and make sure paper is loaded.
4. In the "Diagnosis Screen" on the PDA tap the button "Print Results." This will send the results to the printer along with logged pressures and temperatures. See "example print out" below.
5. When printing is complete, the PDA display will return to the diagnosis screen where the user has the option to print another copy of the results or exiting by tapping "Done."

**Instrument Printout Example:**

VIN or Job #: FAFP13  
Date: 3/4/02  
Make: Buick  
Model: Century  
Year: 1996  
Qual:  
Comp: Harrison V5 5-Cyl.  
Metering: VOT  
Clutch Cycles: 5  
Min Hi Pressure: 98.8 psi  
Max Hi Pressure: 102.3 psi  
Min Lo Pressure: 28.2 psi  
Max Lo Pressure: 30.1 psi  
Air Vent Inlet temp: 69.7F  
Air Vent Outlet Temp: 51.2F  
Condenser Inlet Temp: 104.5F  
Condenser Outlet Temp: 74.7F  
Metering Inlet Temp: 74.7F  
Metering Outlet Temp: 45.1F  
Evap. Inlet Temp: 52.0F  
Evap. Outlet Temp: 52.3F  
Acc/Rec Inlet Temp: 49.2F  
Acc/Rec Outlet Temp: 48.2F  
Ambient Temp: 77.7F  
Evap 2 Inlet Temp: N/A  
Evap 2 Outlet temp: N/A  
Relative Hum: 10.7F

Diagnosis:  
Low charge

**E. Battery Charging:**

Remove the battery charger power cube from the storage compartment and plug it into a 110-120 VAC 60Hz wall outlet. Connect the other end of the charging assembly to the power charging port located on the top panel. The "On/Off" power switch will intermittently blink to indicate charging is taking place. The unit will need to charge for 6-8 hours to provide a full charge.

## **V. Maintenance Procedures**

**WARNING: DO NOT remove the top panel of the instrument. There are no serviceable parts internal to the instrument and removal of the top panel will void warranty.**

### **A. Service Contact**

In the unlikely event that the instrument requires factory service assistance, the user can contact the Neutronics Automotive Service Department at (610) 524-8800. Monday through Friday, 9AM to 4PM EST. Please have warranty information, user instruction manual, serial number and a description of the problem ready when calling.

**Should the instrument require factory service, contact the Neutronics Incorporated Service Department to request a Return Material Authorization Number.** This number will aid in expediting the repair and return of the instrument. Have the instrument model number, serial number, the specific problem and the date of purchase ready when calling the Service Department. When shipping the instrument back to the factory, record Customer Name, Customer Address and the Return Material Authorization Number on the outside of the shipping carton. Include a description of the problem and a copy of proof of purchase (for warranty repairs) in the package. Ship the instrument to the address stated below:

**Neutronics Incorporated  
456 Creamery Way  
Exton, PA 19341 U.S.A.**

### **B. Troubleshooting and Maintenance Procedures**

#### **Sample Hose Inspection**

1. **Inspection Frequency:** Inspect the sample hoses before and after each use of the instrument.
2. **What to Look for:** Inspect the inside diameter of the inner tube for signs of oil build up, dirt, obstructions, kinks, cuts, fraying, or any other signs of wear. Oil contamination can be cleaned out of sample hoses as directed below. Hoses that show signs of wear should be replaced immediately to avoid dangers of rupture or bursting.

#### **Sample Hose Cleaning Procedure:**

- a. If the hose has a significant build-up of oil and debris, remove the hose from the instrument and flush with isopropyl alcohol or methanol until the oil is thoroughly cleansed from the inner tube.

**Warning: Flush hoses away from people, sparks, open flames or other ignition sources and in an area that is well ventilated.**

- b. Dry the hose by blowing clean, dry nitrogen or filtered shop air through the inner hose or by allowing the hose to air-dry for several hours. Take care to not dry the hose with shop air that may contain compressor oil.
- c. When the hose is completely dry, re-inspect the hose for signs of wear, as described above, and replace if wear is evident.

#### **Sample Filter Replacement:**

- a. Replace the sample filter when the sample filter begins to turn red (indicating oil in the sample gas) or when any particulates or liquids are visible.
-

- b. If oil is detected in the filter, remove the sample hose assembly and clean it thoroughly. The disposable filter should be replaced at least once every 3 months or after every 25 systems are serviced, whichever comes first.
- c. When replacing the filter, simply slide the tubes off of the filter fittings and lift the filter from the clip. When installing the new filter, make sure the flow is in the proper direction as indicated on the panel, and then reinstall the tubing. Dispose of the used filter appropriately.

**Infrared Sensor Cleaning Procedure:**

- a. If the temperature probe head becomes dirty, infrared sensor located under the slide may be cleaned using a cotton swab and either alcohol or water.
- b. If the PDA displays excessive communication errors, the infrared windows on both the PDA and the base unit may be cleaned using a cotton swab and either alcohol or water.

**D. Spare Parts Listing**

Replacement parts are available directly from Neutronics Automotive distributors or the factory. To find your nearest distributor, visit the Neutronics Automotive website at [www.refrigerantid.com](http://www.refrigerantid.com) or call 1-800-378-2287.

PDA Software Module:	Contact Factory for Latest Version
I/R Temperature Probe:	6-02-6000-85-0
R134a Low Side Sample Hose Assembly:	6-02-6000-81-0
R134a High Side Sample Hose Assembly:	6-02-6000-82-0
User Instruction Manual:	5-06-7000-60-0
Handspring PDA:	1-19-0000-58-0
Target Tape:	5-02-6000-20-0
Battery Charger	1-12-2150-00-0
Refrigerant Identifier Filter (5 Pk)	6-02-6000-08-1

NOTE: The Low Side Coupler is a modified version of a standard coupler. This version does not contain a check valve and is not suitable for use applications other than for the Neutronics Refrigerant Diagnostic Tool.

## **VI. Specification and Patent Listing**

Weight:	8 pounds
Dimensions:	Approx.: 15.5"W x 13.5"L x 6.5"H
Operating Temperature:	50°F to 120°F
Operating Relative Humidity:	0-95% non-condensing
Warm-up time:	Instant on
Pressure range:	0-500PSI (+/- 3 PSI)
Battery Life:	Approx. 8 hours on a full charge
Battery Charge time:	6-8 hours
Battery Charger:	115 VAC 60 Hz input, 15VDC, 1 amp output
Temperature Probe measurement range:	0°F to +250°F
Required PDA:	Handspring Visor, Visor Deluxe or Visor Neo

### **One or more of the following patents covers this product:**

**U.S. Patents: 5,449,206 and 6,042,155**  
**Spanish Patent: 9502117**  
**Canadian Patent: 2,150,317**  
**Australian Patent: 687527**  
**German Utility Model: 29513180.2**

## **VII. Warranty**

**NOTE: If this unit was supplied with a Handspring PDA, the PDA warranty will be handled directly from Handspring. Please go to [www.handspring.com](http://www.handspring.com) to register your PDA for warranty. See below for the base tool 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 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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