UnwiredTools, LLC
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UnwiredTools ACCII-DIY™

Installation Guide and Owner's Manual

The ACCII-DIY™ upgrades the ACCII system in Mercedes 116, 107, and 123 chassis vehicles. This product is intended for the do-it-yourself owner who wishes to upgrade and repair their own vehicle. This product is less expensive, simpler, easier to install, and is limited in function compared to the UnwiredTools ACCII Upgrade Kit™. The features compared to the ACCII™ are as follows:

	Diagnostics	**Leg Vent**	**Center Vent**	**Temperature control**	**Fan Speeds**
ACCII-DIY™	No	Manual	Manual	Yes	Yes
ACCII Upgrade Kit™	Yes	Automatic	Automatic	Yes	Yes

When the ACCII-DIY™ is installed the opening of the air vents inside the vehicle are set manually as part of the installation. The vent setting may be occasionally changed, for example seasonally. The opening and closing of the vents is **not automatic** as is the case with the ACCII Upgrade Kit™. The ACCII-DIY™ also does not have the diagnostic function of the ACCII Upgrade Kit™. The control of fan speeds and the temperature regulation of the ACCII-DIY™ are fully automatic.

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NOTICE REGARDING WARRANTIES

The *UnwiredTools* ACCII-DIY™ comes with a Limited Warranty, a copy of which appears on the back of this Manual. With regard to this Manual and the information in it (the "Manual"), please note that, although UnwiredTools has endeavored to make it as accurate and informative as possible, the variability of vehicles, the circumstances of installation, changes from year to year, and other factors make it impossible for UnwiredTools to guarantee that this information is accurate and/or directly applicable for your vehicle and your particular circumstances. The information in this Manual therefore is provided as a general guide or illustration. It is your responsibility and not that of UnwiredTools to ensure that this Product is suitable for your vehicle and that it meets your needs or requirements. This Manual is provided "as is" and without any warranties of any kind. UnwiredTools makes no representations or warranties with respect to this Manual, e.g., as to its accuracy, completeness or appropriateness to any particular vehicle or situation. UNWIREDTOOLS HEREBY DISCLAIMS ANY AND ALL WARRANTIES AS TO THIS MANUAL, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. UNWIREDTOOLS ALSO DISCLAIMS ANY LIABILITY FOR YOUR USE OF THE MANUAL. PLEASE USE IT AT YOUR OWN RISK. This Manual may be updated from time to time. Users are encouraged to visit our Web site at www.unwiredtools.com to obtain the latest version, to obtain information about the Product, and to obtain other support information.

NOTICE REGARDING TRADEMARKS

UnwiredTools™ and UnwiredTools ACCII-DIY™ are trademarks of UnwiredTools, LLC. All other trademarks referred to herein are the marks of their respective companies, and not of UnwiredTools.

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WARNING: READ BEFORE BEGINNING INSTALLATION

The *UnwiredTools* ACCII-DIY™ installs into vehicles for which it is designed, and couples into hot water lines, electrical systems, and vacuum lines. Please be aware that improper handling, installation or use can cause damage to your vehicle, other property, and even injury, grave harm or worse to you and others. Please follow the instructions set out in this Manual where they are applicable to your vehicle. If you are in doubt or have questions, contact a qualified service representative.

1. Read this entire Manual before beginning installation.
2. Check all kit components to make sure that all appear undamaged.
3. Make sure your vehicle is off, and is cool. Ensure that it is immobilized, e.g., in park with the emergency brake engaged.
4. Ensure that your work area is free of any circumstances that could result in electrical shock. All power tools and electrical cables should be properly grounded. Keep floors and other areas dry if electrical equipment is being used.
5. Ensure that there is nothing loose or unconnected before the vehicle is started

Important Note:

Note: If professional installation is preferred for this product then please consult the UnwiredTools website. A professional installer familiar with this product may be found under the Support section of www.unwiredtools.com .

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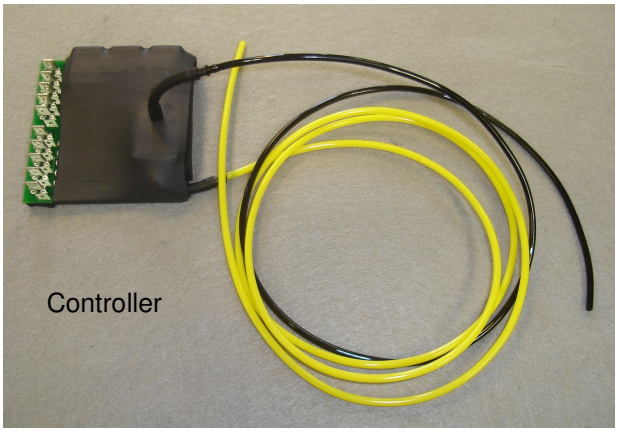
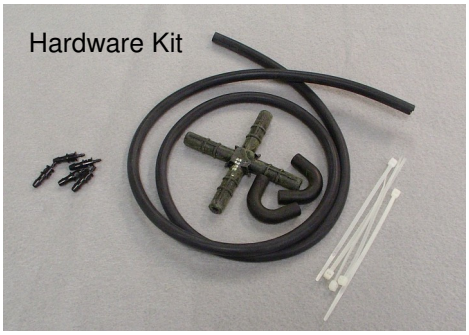
Contents of the UnwiredTools ACCII-DIY™
Please check the contents of this package to make sure it is complete. Your kit should include the following:

A. 1 ea Digital controller
B. 1 ea Hot water valve, with 90° hose and copper return tube
C. 1 ea Servo Amp Jumpers
D. 1 ea Hardware Kit



Recommended Tools
- Phillips screwdriver (long and short profile)
- Multi-meter
- Needle Nose Pliers
- Utility Knife
- Wire Cutters
- Socket Set
- Vacuum Gauge

Hardware kit contents
- Various plastic wire ties
- 1/8” vacuum tubing
- Various vacuum connectors
- Vacuum connection tubing



ACCII-DIY™

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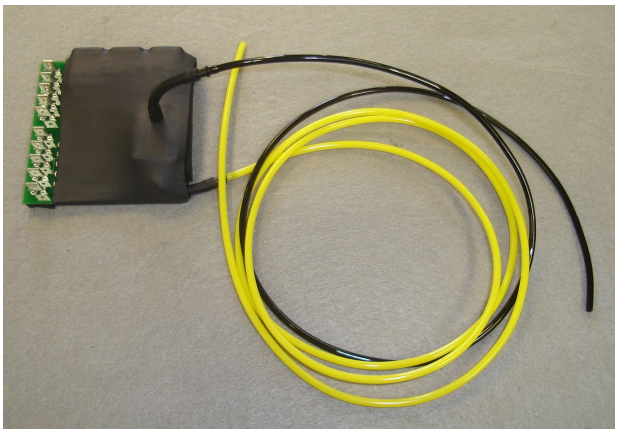
The UnwiredTools ACCII-DIY™ upgrades the unreliable analog and mechanical ACCII Climate Control System to modern digital microprocessor technology. This upgrade replaces both the OEM servo and the OEM amplifier with rugged, industrial strength solenoid valves and a proprietary Controller module.



The features of this product include the following:

- For all Mercedes 107, 116, and 123 chassis models with ACCII Climate Control
- Eliminates expensive and unreliable mechanical servo
- Eliminates analog amplifier module, no more overheating of module
- Keeps OEM controls and the “factory” look
- No more running down the battery due to a stuck servo
- Integrates into existing A/C vacuum and electrical system
- 30 minute installation time*
- Less expensive and more reliable than rebuilt servos
- No Core Exchange Required
- Five year limited warranty

*Time does not include repairing faulty vehicle vacuum systems. If you suspect your vehicle has a vacuum leak, it is recommended that you have a professional install this kit in your vehicle.

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Theory of Operation

The OEM Servo and Amplifier work in conjunction with three sensors to regulate the temperature in your ACCII Climate Control System. The three sensors are the thumb wheel in the console, the cabin temperature, and the outside air temperature. These values act as inputs to the Servo, which then selectively: controls fan speeds, opens and closes flaps, and meters the flow of hot water into the heater core. The OEM Servo and Amplifier is a complex collection of electrical, mechanical and vacuum connections and controls. The temperature value on the console thumbwheel is known as the "set-point". The job of the Climate Control System is to regulate the temperature to maintain the cabin pressure as close as possible to the set-point. Unless explicitly turned off, the Air Conditioning compressor is always running. When the set-point is higher then the current cabin temperature, hot water is passed into the heater core, to raise the temperature, easily over-powering the air conditioning and delivering the desired set-point temperature.

The UnwiredTools ACCII-DIY™ (KIT) provides the same regulated climate control functionality as delivered by the OEM system, but uses reliable, modern technology and also has an enhanced regulation control algorithm.

When the inside temperature differs from the set-point, the KIT opens or closes the vacuum-actuated hot water valve. This difference sets the fan speed. When the difference is large, the fan speeds up. As the temperature approaches the set-point, the fan speed slows, creating a comfortable climate control environment in the vehicle.

The OEM look and feel is retained but with vastly improved performance over the OEM Servo.

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Installation Overview

Installing the UnwiredTools ACCII-DIY™ (KIT) includes the following steps:

1. Take inventory of any current problems with the vehicle's vacuum system. If there are any known vacuum leaks (outside of the Servo itself), they should be repaired prior to installation.
2. Identify mounting location in your vehicle for the Controller, and Hot Water Valve.
3. Removal of the glove box liner.
4. Removal of OEM Servo Amplifier.
5. Make electrical connections behind the glove box.
6. Test thumbwheel sensor connection.
7. Removal of OEM Servo & Installation of Hot Water Valve and Return Tube. These replace the coolant connections that previously passed through the OEM Servo.
8. Mount the Controller.
9. Install Vacuum & Electrical Connections
10. Tidying Up

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1. A Quick Word on Vacuum Leaks

The best practice is to find and fix any vacuum leaks before proceeding. Leaks generally are easy to find if you have a vacuum diagram and know where to find the vacuum actuators and switches. **Access to some actuators is time consuming. A difficult to reach actuator may be better capped and left in place than replaced. Call UnwiredTools for troubleshooting assistance.**

We have developed a number of detailed, color coded, vacuum diagrams which are available free of charge. These diagrams were created from careful study of the OEM diagrams as well as experience and feedback from professional technicians. Additional vacuum and electrical diagrams for your ACCII equipped vehicle are available from our website:

http://unwiredtools.com/accii.html

The next steps of the installation walk you through removing the glove box liner where you gain access to the vacuum bundle, as shown here. If you need to test or patch around individual vacuum circuits, this is a handy place to cut, test and re-join with a piece of tubing if needed. The next photo shows a leg vent actuator on a 123 chassis. You should be comfortable with working with the vacuum system. If this is beyond your skill set or comfort level, we highly recommend that you take your KIT and vehicle to an experienced professional mechanic. If you need assistance locating a mechanic in your area, we can help. Our website has a database of shops familiar with our product line. You can find this list here:

http://unwiredtools.com/shops.asp

If your system has leaks there will be no vacuum source when the ACCII system is turned on. A minimum of vacuum of 300mmHg is needed to operate the system. A common troubleshooting practice is to use a known good vacuum source until the vacuum leak is repaired. Shown here is temporarily tapping into a vacuum hose in the engine bay.

Vacuum diagrams for your vehicle are available for download at:

http://unwiredtools.com/vacuum

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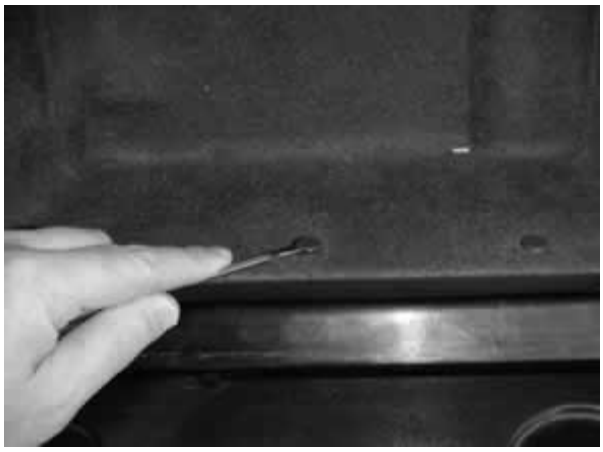
3. Removal of the glove box liner



The installation of the UnwiredTools™ ACCII-DIY begins inside the car by removing the liner for the glove box. The liner is held in place by 2-piece expanding plastic plug fasteners. Depending on your model vehicle, there are up to seven of these fasteners. Remove the fasteners by inserting a small, thin flat-blade screwdriver under the upper head of the plug. Gently pry the head up then pull it out. When the upper piece is pulled out the expanding plug can be removed. Work slowly and gently. These fasteners get brittle with age.

Next remove the 2 screws which hold the glove box latch in place. These screws are oriented vertically and there is little clearance. A very short screwdriver or a 1/4" ratchet drive screwdriver will be needed.

You can also remove the glove box door to gain additional space to maneuver. This is done by removing the Philips head screws attached to the hinges and the screws attached to the sides of the door. Be sure to keep track of all these pieces for reassembly!

The glove box light can be removed by inserting a thin screwdriver edge at the front then gently prying down and toward the rear. When the light is removed from its hole the glove-box liner may be removed.

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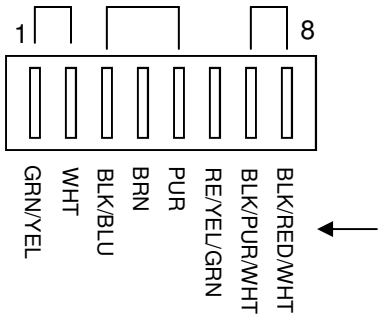
4. Removal of the Servo Amplifier

When the glove box liner is removed, the servo control amplifier can be accessed and removed. The amplifier is held in place by two Philips-head screws. **Note:** On 107 chassis models, the servo amp is located on the transmission tunnel side, not the passenger door side.

With the Servo Amplifier removed, our next task is to install jumpers across terminals of the Amplifier connector. The connector is keyed so you can determine which side is position 1. There are a total of eight positions on the connector. Obtain the 3 jumpers found in the Electrical Hardware Kit. Install jumpers across positions 1 to 2, 3 to 5, and 7 to 8 as shown below.

Servo Amplifier Jumpers:

Jumper pins 1-2, 3-5, and 7-8



These wire colors are for the wires in the car. These colors are shown for orientation.

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5. Testing Thumbwheel Sensor

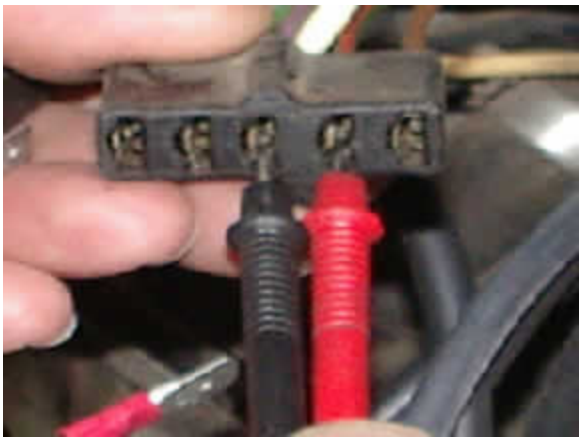
The next step is to verify that the thumbwheel sensor connection is OK and that your thumbwheel is in proper operating condition. The thumbwheel sensor is a variable resistor, so we will test by checking the resistance read with a multi-meter set to Ohms. Probe pins 2 and 3 of the OEM Servo electrical connector as shown. These are the PUR and RED/GRN wires leading into the connector as shown.

Measure the resistance when the thumbwheel is at 85. Then measure the resistance at 65. **The difference between the 2 readings should be at least 1200 Ohms.**

If the resistance reads ∞ or open then there's an open connection is the sensor chain.

If the cabin temperature regulates too high or too low after the installation is complete then the then the thumbwheel can easily be calibrated. Remove the fascia plate and the front panel from the ACCII control panel as shown below. The front panel is held by a hooked plastic clip on the right and left side. Gently push these clips aside with a small screwdriver. Be careful, these clips are fragile. On the right side of the thumbwheel is a toothed or square plate. Use a small screwdriver to hold the plate while you turn the thumbwheel.

Calibrating the thumbwheel, 107 chassis



Note: on 116 chassis vehicles the thumbwheel assembly is held onto the front wood panel with wooden blocks. The glue holding these wooden blocks falls apart with age so you'll have to re-glue the blocks to the wooden fascia with epoxy before re-assembly.

If you are having trouble with your thumbwheel, it can easily be repaired with the UnwiredTools Thumb Wheel Repair Kit. Contact UnwiredTools or visit http://unwiredtools.com for more information.

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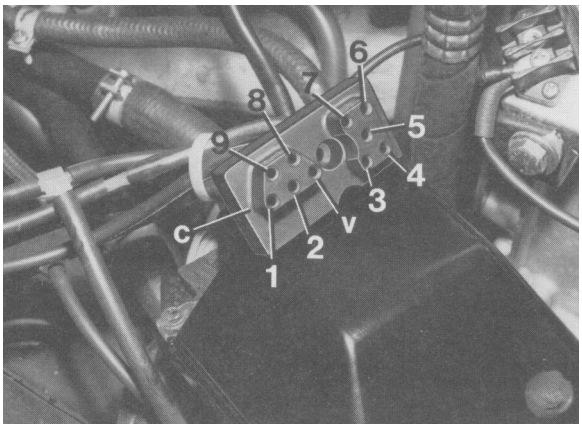
7. Identifying OEM Vacuum Connections

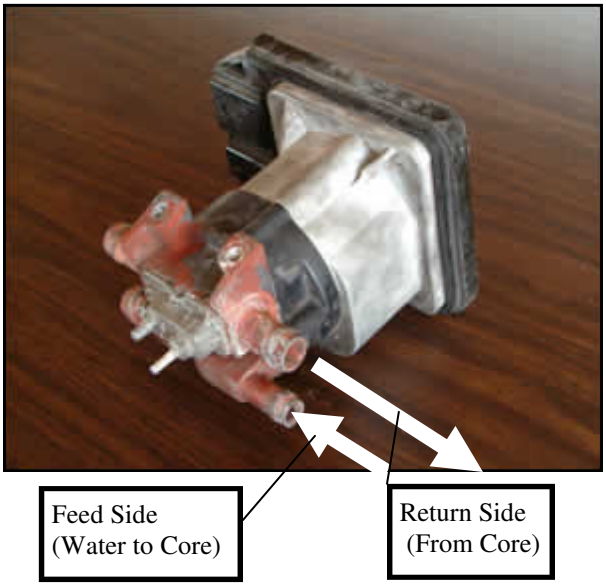
The purpose of this step is to prepare for the vacuum connections which will take place after the OEM Servo is removed and the Controller Box is mounted. Remove the vacuum connector from the OEM Servo. Note that the rubber connector for the vacuum lines is secured to the OEM Servo with one screw. Remove the screw and pull out the connector.

Numbers shown for orientation only—the ACCII-DIY connects directly to the OEM vacuum connection.



8. Removing the OEM Servo & Installing Hot Water Valve

In this step, the OEM Servo is removed from your vehicle. The four water (coolant) lines at the bottom of the Servo can be plugged with corks as the lines are removed. If you plug these lines as you remove them, then coolant loss will be minimal and the heater system should not have to be bled. Use the reference picture to the right to identify the feed and return sides of the OEM Servo. You may want to tag those lines prior to removing them from the OEM Servo. This will assist you in the next step after the OEM Servo is removed. Be sure to keep the hose clamps, as these are re-used in most circumstances. Once the coolant lines are identified, remove the OEM Servo by removing the 2 bolts holding it to the bracket.



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8. Removing the OEM Servo & Installing Hot Water Valve, Continued

After the OEM Servo is removed, the Hot Water Valve supplied in the KIT is installed on the feed side pair of hoses. Carefully note the orientation of the water valve. The **black** side of the new Hot Water Valve connects to the aux water pump. This installation step varies by chassis types:

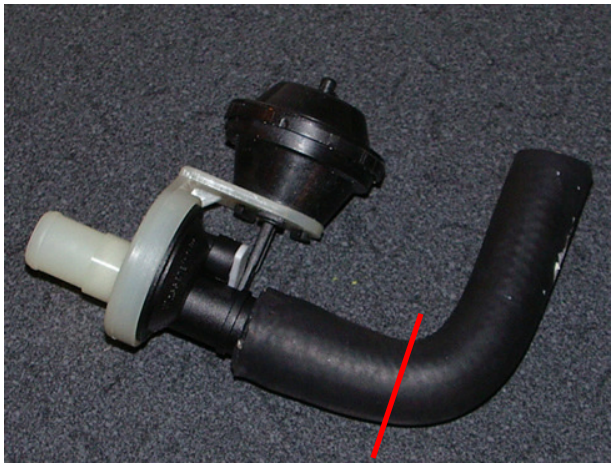
107 Chassis Installations: Use the 90° bend hose as shown in the top picture. The 90° bend hose attaches to the black side of the Hot Water Valve and the aux water pump.

116/123 Chassis Installations: A straight hose is needed, not the 90° bend hose supplied in this kit. The 90° bend hose can be trimmed with a razor blade as shown.

Regardless of the chassis type, the **black** side of the Hot Water Valve installs towards the aux water pump.

The return tube supplied in the KIT is connected between the hoses on the return side. Again, use the reference picture on the previous page to properly identify the return side hose connections.

Make sure the hose clamps are secure.



Trim hose here for 116/123 chassis

This side connects to heater core

107 installation

Water Valve
This side connects to aux water pump

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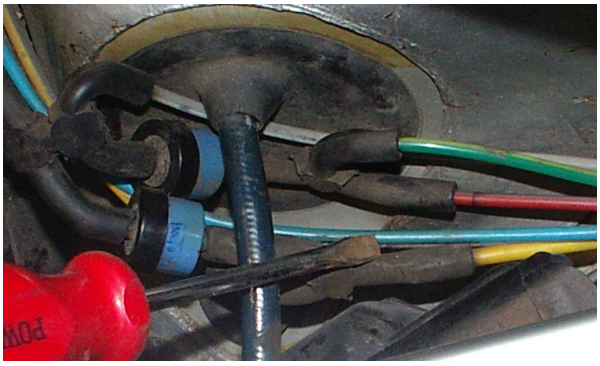
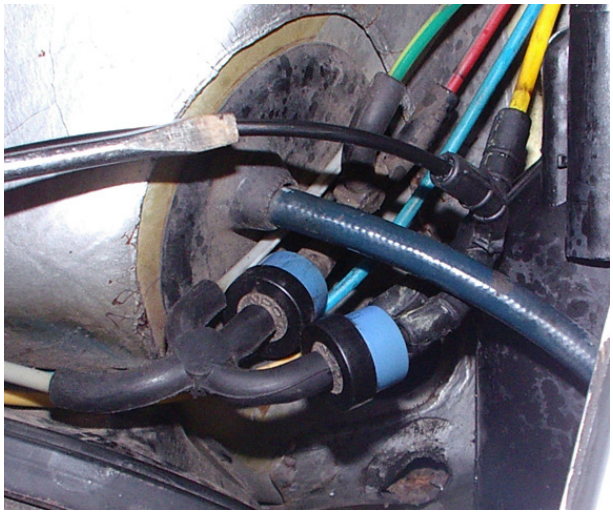
8. Installing Hot Water Valve, Continued

The vacuum source for the hot water valve is the Yellow line to the Controller. This line must be connected to a constant vacuum source, like the vacuum reservoir. This is important because the source of vacuum in most gas engine cars is the intake manifold. The intake manifold vacuum goes low when the engine is under load. Under these conditions the intake manifold vacuum alone may not be enough to keep the hot water valve closed.

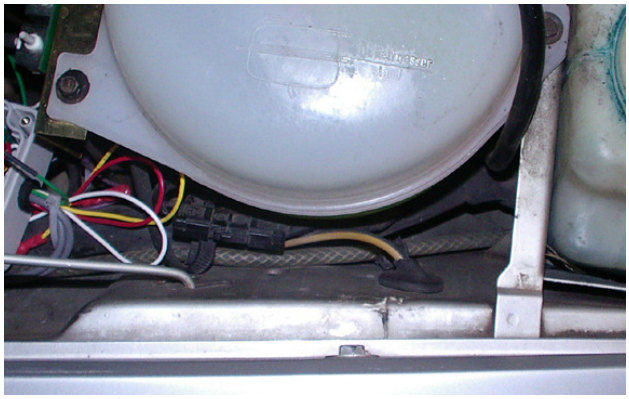


The photo at right shows the 3-way connector which joins the YEL and YEL/GRY vacuum lines together. This junction is connected to the vacuum reservoir. Connect the vacuum source of the hot water valve to this junction



The photo here was taken behind the brake booster on the Driver's side. This is a handy place to tap into the vacuum reservoir in a 116 or 123 chassis. Shown here is a 4-way connected in place of the OEM 3-way connector. The black tube shown here was installed to carry the constant vacuum of the reservoir to the other side of the car where the Controller Box is located. Don't confuse the black line shown in the photo with the black line to the controller. The black line in this photo is only there to connect the controller to the constant vacuum source. The Black line shown in this photo will be connected to the Yellow line of the Controller Box.

In 107 chassis cars the vacuum reservoir is located inside the passenger front fender. The photo here shows the YEL/GRY vacuum line penetrating the fender next to the coolant tank. This vacuum line may be yellow, yellow with a grey stripe, or grey with a yellow stripe. This location is much closer to the controller so it is a much more convenient place to tap into the vacuum reservoir for this vehicle.



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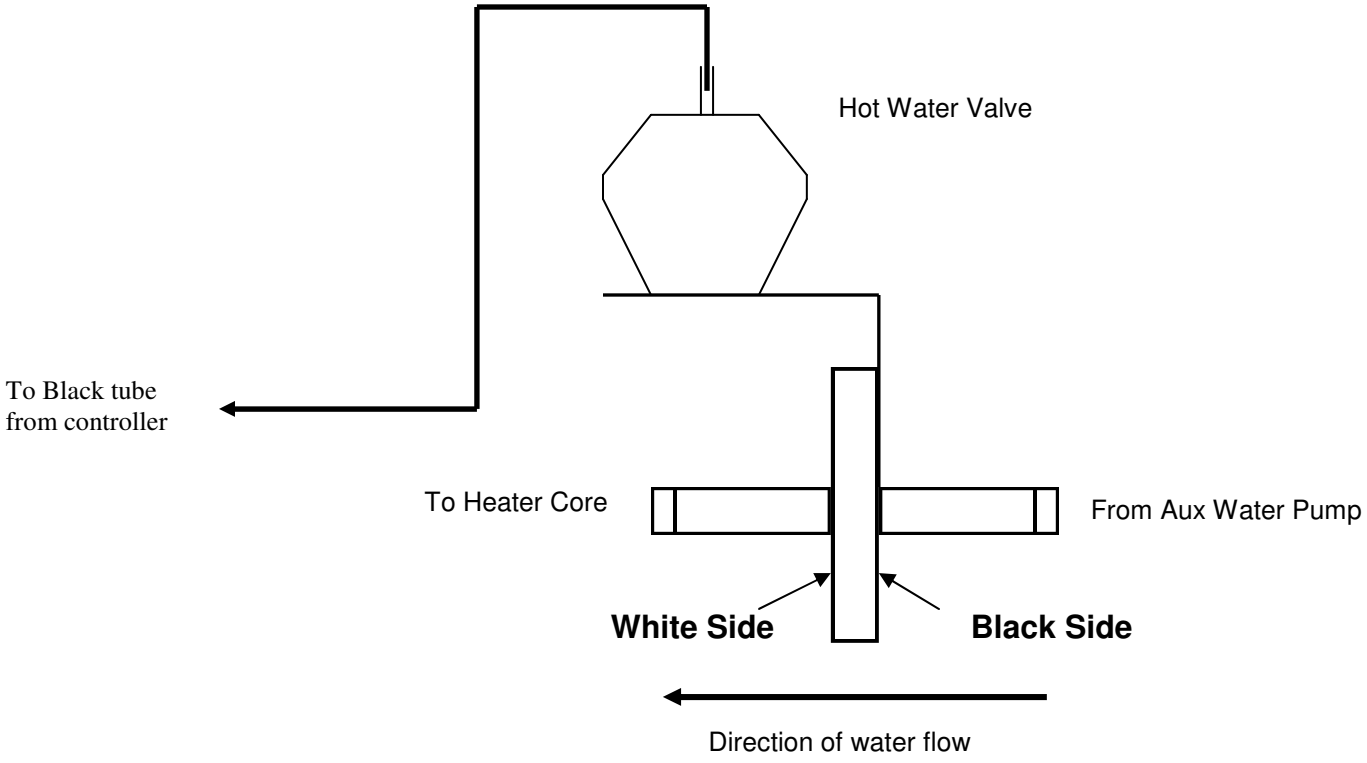
Hot Water Controls



Note: The Black side MUST face toward the auxiliary water pump. If this valve is installed backward it will not turn completely off!

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9. Vacuum Connections

At this point you're ready to connect to the vacuum system The vacuum connections are shown in diagram form and in photos in the following pages. The order of the vacuum connections should be as follows:

1. The Yellow line should already be connected from the Controller to a constant vacuum source, preferably the vacuum reservoir. This step was detailed on page 15.
2. Connect the Black line from the Controller to the Hot Water Valve.
3. When you removed the OEM Servo, there were two vacuum lines, yellow and black, which connected to the Thermo Switch located beneath the Servo. Connect these two lines together with a "U".
4. Connect the vent and other vacuum a connections as shown in the following pages.

When the vacuum connections are complete, start the car and run the system on Auto-Lo. Verify that at least 300mm Hg of vacuum is present at the vacuum "X" connector. If not then call UnwiredTools for assistance.

NOTE: The Controller does not have the ability to turn off the Blower nor does it control the A/C Compressor Clutch. If the Blower or the A/C compressor are not operating normally then there's a vacuum leak. Call UnwiredTools if you have any questions about troubleshooting the vacuum system.

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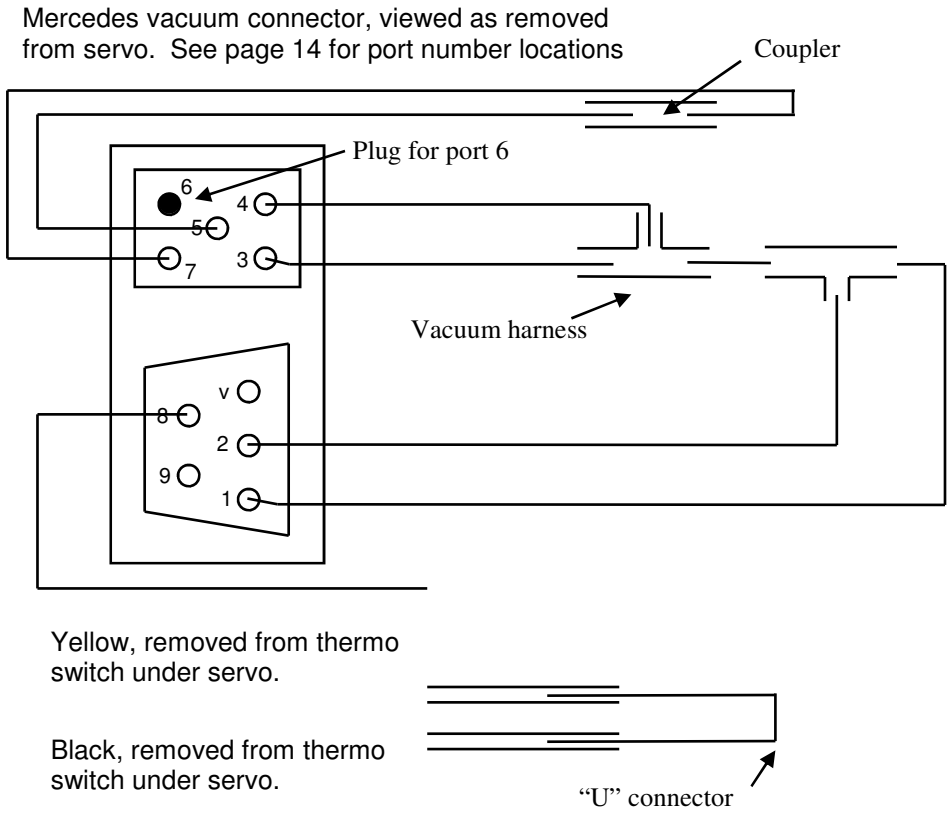
9. Vacuum Connections

The following vacuum connections need to be made using the vacuum parts supplied:



This configuration connects port 7 with port 5 to open the Center Vent. Leave port 8 open to close the leg vent.

Connect port 7 with port 8 to open the leg vent. Leave port 5 open to close the center vent.

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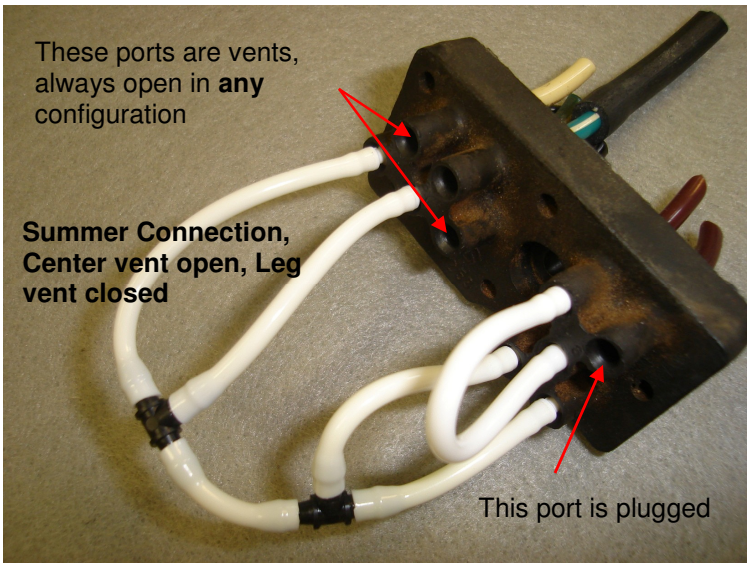
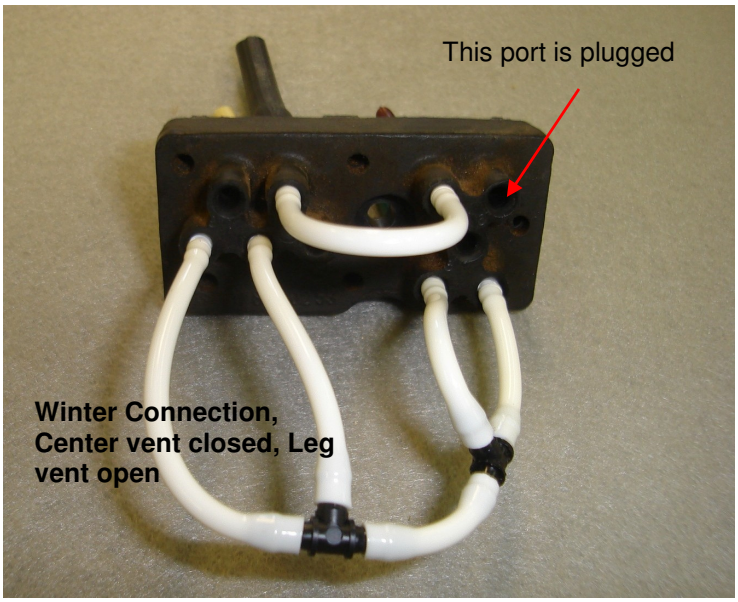
9. Vacuum Connections Continued

These photos show the vacuum connections using the diagram from the previous page. This is the "summer" configuration for maximum cooling.

Important Note: The OEM Servo closes the center vents when cooling if the inside temperature gets close to the set temperature. This was done because the side vents are connected to warming air from the heater. The center vents are not heated. To maintain regulation the ACCII system is designed to run the heater and the A/C compressor at the same time. If the center vents are left open then **the air from the side vents will be 8 to 10 degrees warmer than the center vents**. This is normal. The center vents can be manually closed on 123 and 116 chassis models but not on 107 chassis models.



This is a photo of what the vacuum connections should look like for "winter" (heating).



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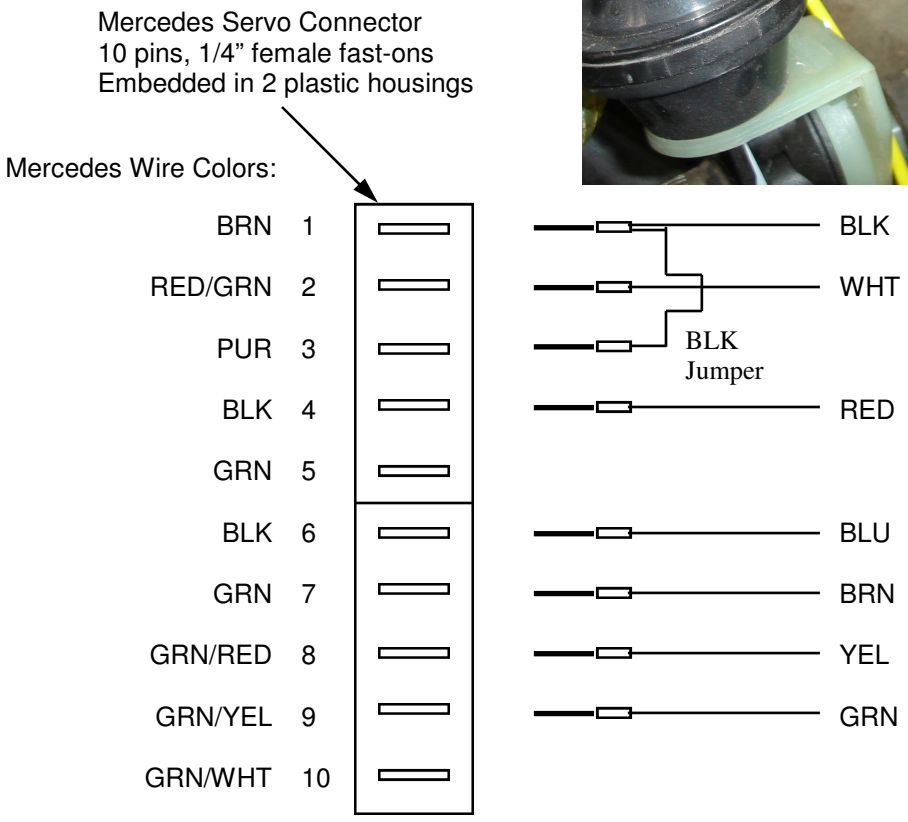
10. Electrical Connections

Plug in the electrical connector of the to the OEM connector on the vehicle wiring harness. The Controller should be tie-wrapped to the bracket which was used to support the OEM Servo. Note the location and wire colors of the OEM electrical connectors. You can see in the photo that the electrical connector is horizontal, facing toward the front of the car.



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12. Tidying Up

Your UnwiredTools ACCII-DIY™ contains plastic wire-ties in the Vacuum Hardware Kit. These are useful for cleaning up the installation by securing the vacuum and electrical connections into tidy bundles. Be careful not to tighten the wire ties too much around the vacuum lines, otherwise you might impact the vacuum flow. Check your coolant level, replace your glove box liner and enjoy your new ACCII-DIY!

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Troubleshooting Guide

The UnwiredTools™ ACCII-DIY Controller is fully tested at the factory. Although failures may occur, they are infrequent and generally easy to spot. The installation of the UnwiredTools™ ACCII-DIY is much easier if the ACCII system on the vehicle was working before the OEM servo failed. If the ACCII system was out of service for some time before installation of this kit then be prepared to track down vacuum leaks. **Call us if you are having trouble with a vacuum leak.** UnwiredTools publishes a full set of color vacuum diagrams. These diagrams are much easier to read and have much more detail than the OEM diagrams. **They are available to you at no charge as a download from http://unwiredtools.com/vacuum.**

As you step through these troubleshooting steps, you may need to refer to the vacuum and wiring diagram on page 21.

Q. When I press "Auto Lo" or "Auto Hi" nothing happens, the fan does not turn on.
A. The Controller and fan circuits are powered when vacuum appears at the main vacuum switch on port 3 of the vacuum connector. Check for vacuum here. When you press "Auto Lo" or "Auto Hi" , port 1 becomes the vacuum source for the system. Check that there is vacuum on port 1. If the vacuum is OK, then check the wiring connections and the fuse. ***Make sure power is getting to the controller***.

Q. **When I press "Auto-Lo" or "Auto-Hi" the fuse blows.**
A. This indicates a possible defect in the wiring harness. Check to make sure that the connectors are tight and none of the wires are pinched.

Q. **The temperature is constant but its stays too hot or too cold.**
A. The temperature wheel may be out of adjustment. If the temperature wheel is set for 65 degrees, the resistance should be 300 Ohms. Refer to the test procedure on page 12. If you find that the wheel is not in the correct position, you may need to remove it and adjust it's position.

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ACCII Manual Revision History

Date	Revision	Description
7/12/08	A0	Initial Release

Support:
Please visit **http://unwiredtools.com** for the latest product and support information.
You can join the UnwiredTools support forum and view the latest manuals and tech notes as well as find an installer in your area.

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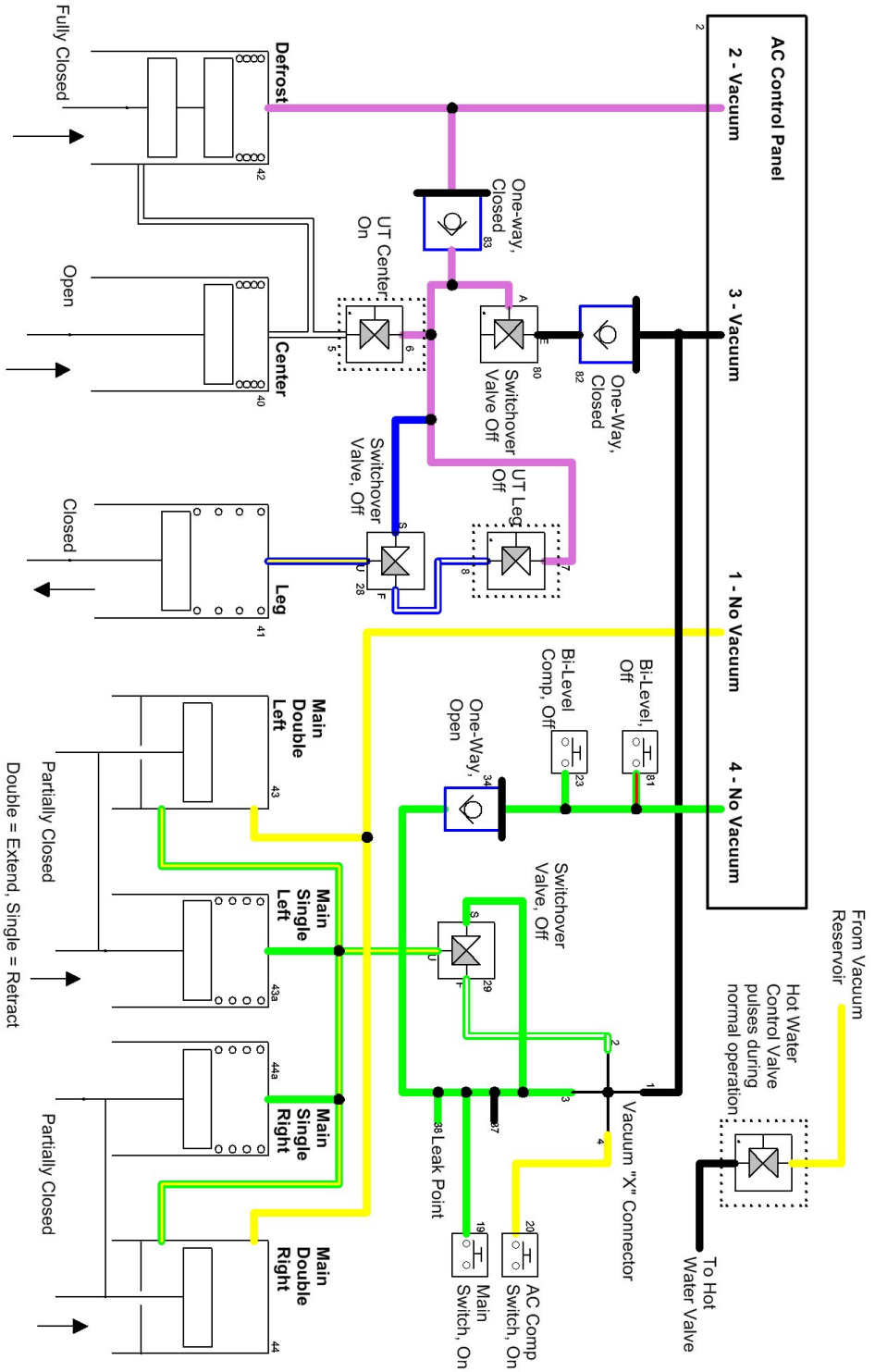
ACCII Vacuum Diagram, After Kit Installation



ACCII-DIY™

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***UNWIREDTOOLS* Limited Warranty**

UNWIREDTOOLS, LLC ("UT") warrants that your new UnwiredTools™ ACCII-DIY ("Product") is free from defects in materials and workmanship at the time of manufacture. This warranty extends for a period of FIVE YEARS from the date of purchase of the original Product. If there is a defect in or malfunction of this Product that is covered by this warranty, UT will repair the Product free of charge as follows: PARTS: New or comparable rebuilt parts will be provided in exchange for defective parts. LABOR: You will not be charged for labor required by UT to make the necessary repairs under this warranty. UT is not responsible, however, for any other labor charges, for example, such as those attributable to removing the Product from your vehicle or reinstalling it in your vehicle. This warranty does not include normal wear and tear, tubing, wiring connector, or other parts which may wear or fail as a result of normal use. This warranty also does not include any defect or failure of any kind arising from improper installation, improper use, neglect, abuse, accident, or any cause other than defects in materials and workmanship at the time of manufacture. This warranty applies only to the original purchaser of the Product from UT or an authorized distributor or reseller. It does not apply to persons who purchased this Product second hand or used.

TO OBTAIN SERVICE UNDER THIS WARRANTY, the Product must be delivered to a UT Authorized Service Center nearest to your location; or the Product must be shipped postage prepaid, insured and via a traceable shipping method to a UT Authorized Service Center or to the UT Corporate Service Center at 2200 East Cedar Avenue, Suite 1, Flagstaff, Arizona 86004. You must:

- Pack your Product in the original carton or equivalent.
- Enclose a copy of the bill of sale or invoice showing original purchase date and seller. (Please note that you should retain the original proof of purchase for your records to establish date of original purchase. Your warranty starts with the date of original purchase.)
- Enclose a card or note describing in detail the difficulty you are experiencing with the Product.
- Be sure to include your complete name, address and daytime telephone number. In addition, please include your e-mail address if you agree to permit UT to contact you through it.
- Bring or ship, prepaid and insured, via a traceable shipping method, the above Product to the nearest UT Authorized Service Center location or to the UT Corporate Service Center.

Please note that UT will NOT pay return postage, shipping or insurance, so you will need to make arrangements for this. Products repaired or replaced pursuant to this warranty will be returned to the address identified as the sender unless another address is provided. The UT and/or the Service Center cannot be held responsible for any loss or damage that occurs while in transit or outside our control.

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To find the nearest Authorized Service Centers within your local area, see our Web site at www.unwiredtools.com , or you may call the UT Corporate Service Center directly at 928-773-0469.

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