

# **AVISTART 4001**

Keyless Entry and  
Remote Engine Starter System

## **Installation Manual**



**AVITAL**

**A DIVISION OF  CLIFFORD ELECTRONICS**

## **WARNING**

- !** Always exercise caution and common sense when operating your AviStart system.
- !** This product is intended for vehicles with fuel-injection and automatic transmissions only. NEVER attempt to remote start a vehicle with a manual (stick shift) transmission. Serious injury may occur with improper use.
- !** NEVER attempt to remote start the engine while anyone (including pets) is in the vehicle.
- !** NEVER attempt to remote start the engine while the vehicle is in an enclosed area without sufficient ventilation.
- !** NEVER attempt to remote start the engine while the keys are in the ignition.
- !** Always be sure the gearshift selector is in "Park" and the emergency brake is on before attempting to remote start the vehicle.
- !** Keep your AviStart remote controls out of the reach of children.
- !** Whenever the vehicle is being serviced or valet parked, place the system in Protected Valet Mode to prevent accidental or unauthorized remote starting.

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## ***Important Information***

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### **Recommended Installation Tools**

Voltmeter  
Wire Strippers  
Electrical Drill & Bits  
Phillips Screwdriver  
Convuluted Tubing \*  
Solder Gun \*  
Wire Crimpers  
Shrink Tube or Electrical Tape

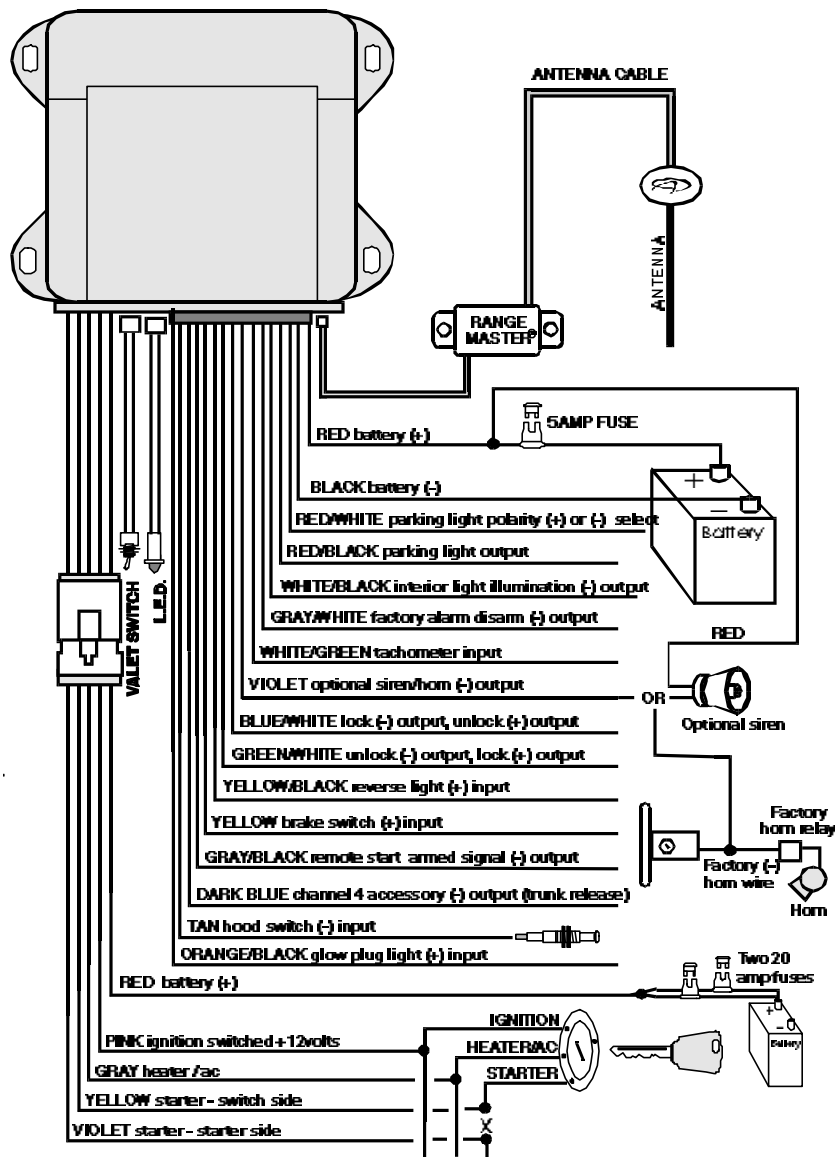
*\* Optional*

### **Recommended Procedures**

1. Test all circuits with a voltmeter.
2. Make all wiring connections with the supplied solderless crimp connectors. DO NOT twist wires or use scotch-lok connectors.
3. Route the small and large **RED, RED/WHITE** and **BLACK** wires from the control unit directly to the battery.
4. Keep extensions as short as possible. Use same gauge wires for short extensions and larger gauge wires for longer extensions.
5. Before installing, discuss the placement of the LED indicator and valet switch with the vehicle owner.
6. DO NOT disconnect the battery cables. Make all connections by removing the bolts from the cable clamps without detaching the clamp.
7. Turn off dome light or remove dome light fuse to prevent battery drain.

***This device complies with Part 15 of the FCC rules. Any changes or modifications made to the system without the express approval of Avital Technologies, Inc. could void the user's authority to operate this equipment.***

## Main Wiring Diagram



### 16 Pin Connector

Pin Number	Wire Color	Description
1	GRAY/BLACK	Remote Start Armed Signal (-) Output
2	GRAY/WHITE	Factory Alarm Disarm (-) Output
3	DARK BLUE	Channel 4 (-) Output (Trunk Release)
4	WHITE/BLACK	Dome Light Supervision (-) Output
5	YELLOW	Brake Switch (+) Input
6	YELLOW/BLACK	Reverse Light (+) Input
7	TAN	Hood Switch (-) Input
8	ORANGE/BLACK	Glow Plug Light (+) Input
9	RED/WHITE	Parking Light Polarity Input, (+) or (-) Select
10	RED/BLACK	Parking Light Output
11	RED	Battery (+)
12	VIOLET	Siren/Horn Output
13	BLUE/WHITE	Lock (-) or Unlock (+) Output
14	GREEN/WHITE	Unlock (-) or (+) Lock Output
15	BLACK	Battery (-)
16	WHITE/LIGHT GREEN	Tachometer Input

### 6 Pin Connector

Pin Number	Wire Color	Description
1	YELLOW	Starter Interrupt Switch Side
2	GRAY	Heater/AC Output
3	VIOLET	Starter Interrupt Starter Side
4	PINK	Ignition Output
5	RED	Battery (+)
6	BLANK	Not Used

## ***Installation Procedures***

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### **Control Unit**

1. Select a location under the dash that will allow you to use the tie wraps to securely fasten the control unit.
2. Mount the control unit as high as possible to ensure maximum security.
3. Do not mount the control unit near moving parts.
4. Avoid areas that are in the direct path of air blowing from the vents.
5. Route wires from this point, leaving slack for ease of service.

### **RangeMaster™ Super Heterodyne Receiver Module**

1. Plug the receiver module **WHITE** connector into the control unit **WHITE** plug.
2. Use tie wraps to fasten the receiver module as far from the control unit as possible.
3. Route the antenna cable up through the driver side windshield pillar, behind the headliner and behind the rear view mirror.
4. Fasten the antenna to the windshield with the double stick tape supplied with the antenna mast facing down.

***NOTE: Be sure to clean the windshield before fastening the antenna.***

### **Wireloom**

1. Plug the wireloom securely into the control unit.
2. Route wires from the control module directly to each connection point.
3. Separate the small and large **RED**, **RED/WHITE**, **BLACK**, **TAN**, and **WHITE/GREEN** wires.
4. Sleeve these wires with vinyl tubing or electrical tape and route them through an existing rubber grommet into the engine compartment.
5. If an existing grommet is not available, drill a hole and install a snap grommet.

### LED Indicator

1. Discuss placement with the owner.
2. Choose a location that is visible from both sides of the vehicle.
3. Drill a ¼" hole.
4. Route the LED wires through the hole and press LED into place.
5. Route the LED wires to the control unit.
6. Plug the **RED** LED connector into the control unit **WHITE** plug.

### Valet Switch

1. Discuss placement with the owner.
2. Choose a location for the valet switch that is hidden, but convenient for the owner to access.
3. Drill a ¼" hole and mount the switch.
4. Route the valet switch wires to the control unit.
5. Plug the valet switch **WHITE** connector into the control unit **WHITE** plug.

### Brake Lights (Mandatory)



**CAUTION:** As a safety feature, the unit monitors the brake light to prevent an unauthorized driver from driving the car and to switch to normal engine operating condition. For this reason, the **YELLOW** brake light input wire must be connected and the brake light must be in working condition or the remote start will not operate properly.

1. Turn the ignition key to the "ON" position, then press the brake pedal and make sure the brake light illuminates.
2. Use a voltmeter to find the one wire at the brake light switch (usually located on the upper brake pedal arm) that shows +12 volts when you press the brake pedal and 0 volts when the brake pedal is not pressed.
3. Connect the **YELLOW** wire to the vehicle brake light switch wire.

### Parking Lights

1. If the parking lights are positive trigger, connect the **RED/WHITE** wire to the battery positive (+) terminal through the 20 amp fuse assembly.  
**NOTE: Do not connect the RED/WHITE wire to the control unit RED wire.**
2. If the parking lights are negative (-) trigger, connect the **RED/WHITE** wire to control unit **BLACK** wire.
3. Connect the **RED/BLACK** wire to the vehicle parking light wire.



## Reverse Light





**CAUTION:** Some vehicles allow you to remove the gear shift selector from "Park" even while the ignition key is not on. As a safety feature, the system will monitor the reverse wire. If the vehicle is removed from "Park" while in the remote start mode, the system will shut down immediately.

1. Set the parking brake.
2. Turn the ignition key to the "ON" position and adjust the gear shift selector to "Reverse."
3. Use a voltmeter to find the wire that will show +12 volts in "Reverse" and 0 volts in "Park."
4. Connect the **YELLOW/BLACK** wire to the vehicle's reverse light wire.

## Interior Light Illumination Output

1. Connect the alarm **WHITE/BLACK** wire to relay terminal 85.
2. Connect relay terminal 86 to a fused constant +12 volt source.
3. Connect relay terminal 30 to the vehicle door trigger wire(s).
4. If the vehicle door trigger is positive (+) trigger, connect relay terminal 87 to a fused +12 volt source.
5. If the vehicle door trigger is negative (-) trigger, connect relay terminal 87 to ground (-).


## Trunk Release

The **DARK BLUE** wire provides a 0.75 second ground output when the  button is pressed for 1-2 seconds. If the  button is continually pressed, the output will stay at ground as long as the button is held. Most factory trunk releases are positive trigger and require an optional relay.


## Remote Start Armed Signal (-) Output

The **GRAY/BLACK** wire will provide a continual ground output for as long as the vehicle is in the remote start mode. This output can be used for additional ignition, starter or heater/AC relays.

### Remote Panic Capability

The **VIOLET** wire will provide (-) output when the  button is pressed for 3-4 seconds. The (-) output can be programmed for a continual output when adding an optional siren or a pulsed output when tapping into the vehicle (-) horn wire. See the "Programming Table for System Features" on page 20.

### Factory Alarm Disarm (-) Output

The **GRAY/WHITE** wire will provide a 0.75 second ground output when the  button is pressed.

1. Arm the vehicle factory alarm system.
2. Use a volt/ohmmeter to locate the one wire that will show ground only when the driver door key cylinder is held in the unlock position.

**NOTE: Most factory alarm/disarm wires will show 8-12 volts while armed. A few vehicle disarm wires will rest at a neutral state while armed. Regardless of type, both types will change to ground when the key cylinder is turned to unlock.**

3. Connect the **GRAY/WHITE** wire to the factory alarm disarm wire.

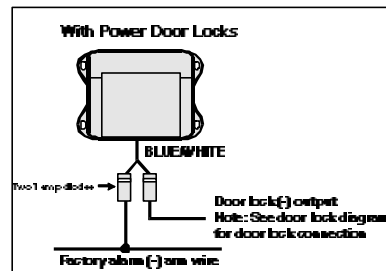
### Factory Alarm Rearm

There are two types of factory alarm systems that the AviStart can rearm.

#### System #1

This type of system has a designated alarm arm wire that requires a (-) pulse to arm the alarm.

1. Use a volt/ohmmeter to find the factory arm wire that will show (-) ground while the driver door key cylinder is turned to the "LOCK" position. If you are interfacing with the vehicle power door locks, use the diagram at right. If not, proceed to step #2.
2. If you are not interfacing with the vehicle power door locks, connect the AviStart **BLUE/WHITE** wire to the vehicle arm wire. The **BLUE/WHITE** wire will provide a single 2-second (-) output five seconds after the engine is shut off with the remote control or timed out. (Some vehicles may require 2 pulses. See "Programming Table for System Features" on page 19.)



### ***System #2***

This type of system does not have a designated "arm" wire. To arm the alarm, you must lock the doors while the interior lights are on.

1. Simply connect to the interior lights and door locks as indicated in the manual.

### ***Glow Plug Light Monitoring***

The glow plug light (+) input wire will monitor the glow plug light in the dashboard. When a remote start is attempted, the ignition will turn on and when the glow plug light turns "OFF" the engine will start

1. Locate the glow plug light wire that will show (+) 12 volts while the ignition key is on and the glow plug light wire is illuminated.
2. Connect the AviStart **ORANGE/BLACK** wire to the vehicle glow plug light wire.

***NOTE: Do not use both "pre-ignition" and "glow plug light monitoring" at the same time (use one or the other).***

### **Ignition Switch Connections**

***NOTE: Because these wires can draw high current, we recommend that they be soldered and shrink tubed or taped.***

#### ***Ignition***

Most vehicles have only one ignition wire. If an additional ignition wire is required to remote start the vehicle, a 30/40 amp relay must be added. Do not use the **PINK** wire to power more than one ignition wire.

1. Use a voltmeter to locate the wire(s) that show +12 volts while the ignition key is in the "ON," "CRANK" and "RUN" positions and 0 volts when the ignition key is in the "OFF" position.
2. Connect the **PINK** wire to the vehicle ignition wire.

### **Heater/AC**

Most vehicles have only one heater/AC wire. If additional heater/AC wires are required to activate the vehicle's heater/AC system, an additional 30-amp relay must be added. Do not use the **GRAY** wire to power more than one heater/AC wire.

1. Use a voltmeter to find the wire(s) that show +12 volts when the ignition key is in the "ON" position, 0 volts while the starter is cranking and +12 volts while running.
2. Cut this wire in half. Start the vehicle and turn the blower switch on. The blower should not turn on.
3. Connect the **GRAY** wire to the heater/AC wire.

### **Starter**



**WARNING:** Review the "Safety Bulletin" and diagrams on pages 11-13 prior to installing the starter system.

1. Use a voltmeter to find the wire that shows +12 volts while the ignition key is in the "CRANK" position **only** and 0 volts while the key is in the "OFF," "ON" and "RUN" positions.
2. Cut the wire in half. Test by trying to crank the starter with the ignition key. If it will not crank, you have the correct wire.
3. Connect the **YELLOW** wire to the ignition switch side of the starter wire.
4. Connect the **VIOLET** wire to the starter solenoid side of the starter wire.

### **Door Lock/Unlock**



**CAUTION:** Be sure to verify the type of door lock system you are working with. Some types of door lock systems require optional relays, for example, reverse polarity type door locks. Refer to the diagrams on pages 14 - 16.

The system can operate both negative and positive door locks. When the alarm is remotely armed, the **BLUE/WHITE** wire provides a negative output. At the same time, the **GREEN/WHITE** wire provides a 300 MA positive output. When the alarm is remotely disarmed, the **GREEN/WHITE** wire provides a negative output. At the same time the **BLUE/WHITE** wire provides a 300 MA positive output.

## **Remote Engine Start Neutral Safety Switch Bulletin**

A neutral safety switch is a mechanism on almost every vehicle equipped with an automatic transmission. The neutral safety switch prevents the vehicle from starting while the gear shift selector is in "Reverse" or "Forward" gear positions.

There are basically two types of neutral safety switches. The most common is the mechanical (separate) neutral safety switch. A small group of vehicles use a combined neutral safety switch.

### **Type "A" (separate)**

The mechanical neutral safety switch is located between the ignition switch and the starter solenoid. The starter wire runs directly from the back of the ignition switch to the neutral safety switch and then to the starter solenoid. When adding a remote engine starter, make starter wire connections as close to the ignition switch as possible to ensure your connections are between the ignition switch and the neutral safety switch.

### **Type "B" (combined)**

Some vehicles combine the neutral safety switch and the steering column shift mechanism together. The starter wires run from the combined switch directly to the starter solenoid. The remote start wire connection cannot be made between the ignition switch and the neutral safety switch. As a result, if the vehicle was left in gear with the key in the ignition and not in the locked position, the vehicle could move forward or backward if a remote start attempt was made.

The combined type neutral safety switch requires an additional relay to prevent the vehicle from remote starting while the key is in the ignition. Use the attached test procedure and relay wiring diagrams. Install the complete remote start unit and test all safety features before conducting the test procedure.

Currently, the only vehicles with the combined neutral safety switch that Avital is aware of are General Motors trucks, GM sport utility vehicles, GM column shift passenger cars and Dodge Dakota pickup trucks. There may be additional vehicles with the combined neutral safety switch that require the additional relay.

***NOTE: Use the following test procedure upon completion of every remote start regardless of the make and model of the vehicle.***

#### Test Procedure



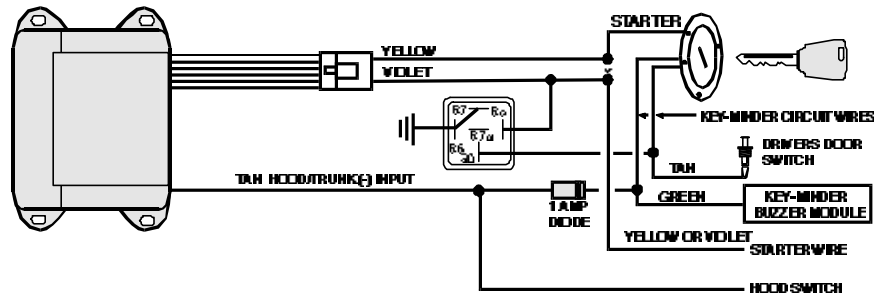
**CAUTION:** Be sure there is at least 5 feet of unobstructed clearance at the front and rear of the vehicle. Make sure to alert anyone near the vehicle you are testing that the vehicle may move forward slightly.

1. Apply the parking brake.
2. Turn the ignition key to the "ON" position and place the vehicle in "DRIVE."
3. Turn the ignition as close to the "OFF" position as possible. (Most vehicles will not allow the key to turn off completely.)
4. Place your foot over the brake pedal without touching it. Be prepared to step on the brake if the starter engages.
5. Activate the remote engine starter.
6. If the vehicle starter engages, immediately press the brake pedal to disengage (shut down) the remote start. You have a combined type neutral safety switch and you will have to add an additional relay as shown in the diagram.
7. If the vehicle starter does not engage, no additional relays are required.

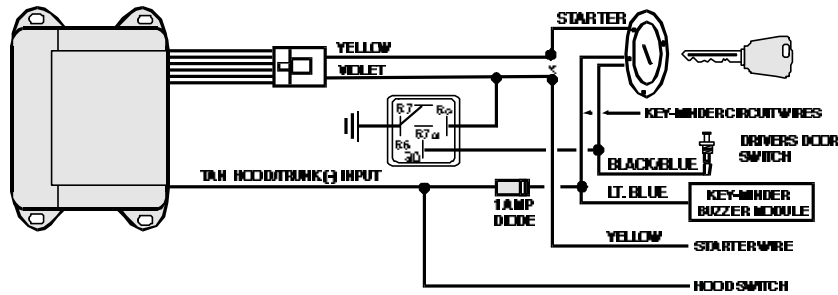
All vehicles have a "key in the ignition" reminder circuit (key minder) that will sound a chime or buzzer while the key is in the ignition and the driver's door is open. The following diagrams will illustrate how to interface the key-minder wires and a relay to prevent the vehicle from remote starting while the key is in the ignition.

The wire color codes are subject to change. Check all wires with a volt/ohmmeter. If you have any questions, please contact the Technical Support Department.

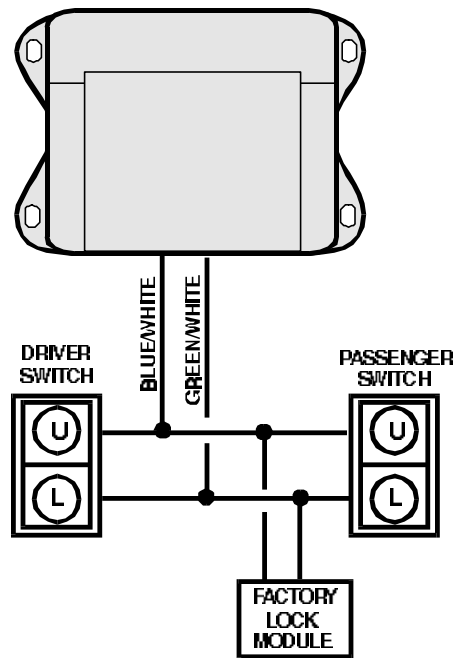
*General Motors Sport Utility Vehicles, Trucks and  
Column Shift Passenger Vehicles*



*Dodge Dakota Pickup Trucks*

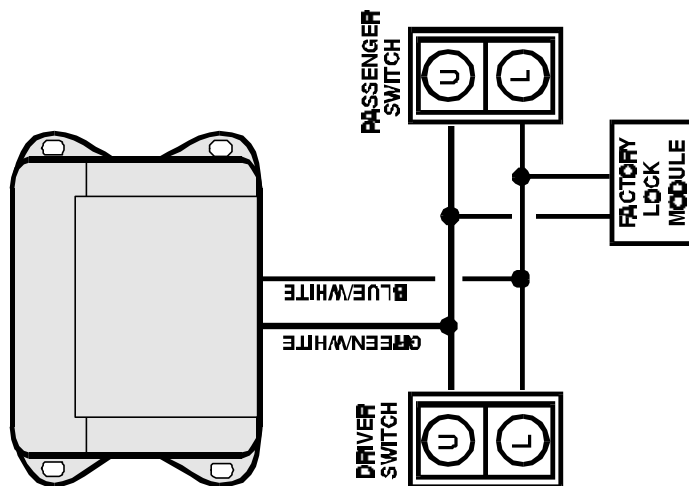


*Positive Trigger Door Locks*

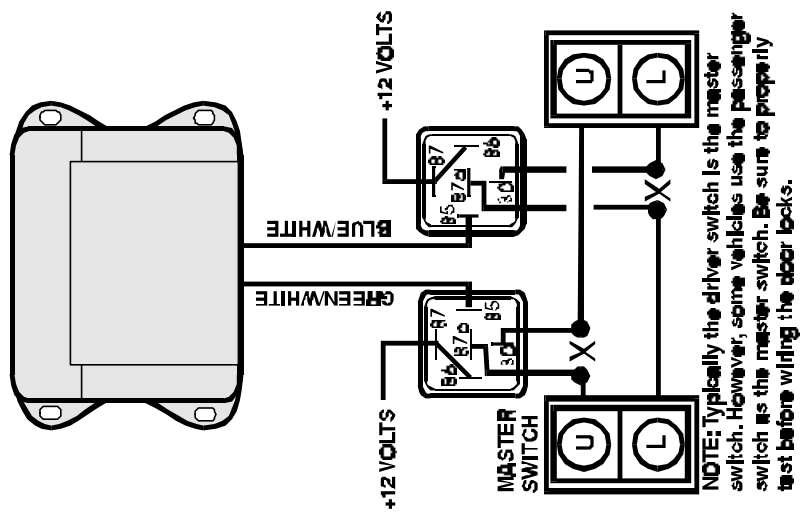




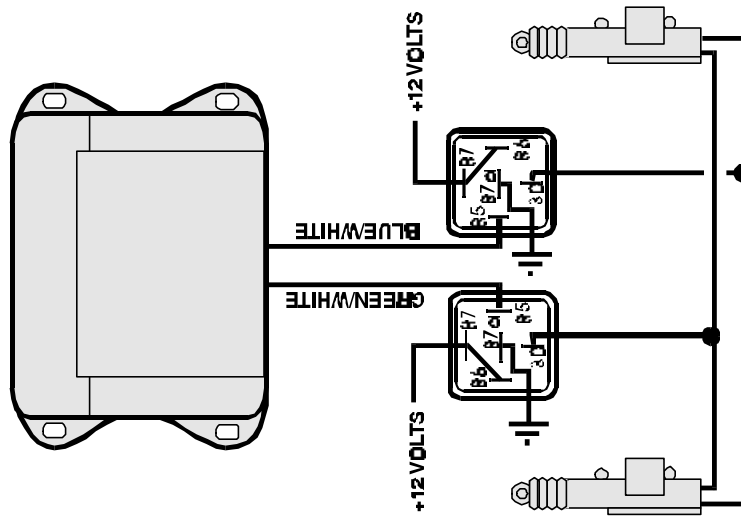
*Negative Trigger Door Locks*



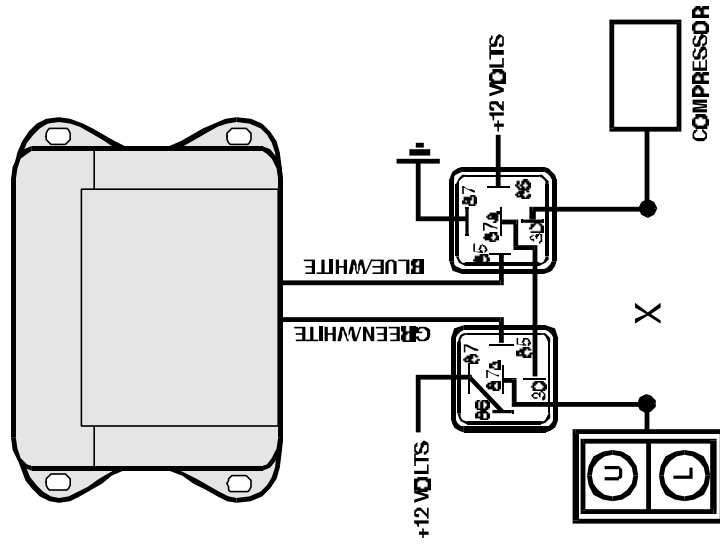
*Reverse Polarity Door Locks*



### Adding Door Lock Actuators



### One Wire Lock/Unlock Mercedes/Audi



### Tach Wire (RPM Monitoring)

The AviStart is designed to monitor the vehicle RPM by connecting directly to the vehicle tachometer wire which is usually located at the distributor, ignition coil or diagnostic plug. On most vehicles, the tach wire is easily accessible. If the tach wire is not accessible, there are several alternative choices. Contact Avital Technical Support Department for alternate choices.

The following procedure for testing the vehicle tach wire is not exact and may vary with different vehicle make, model and year. We recommend that you refer to your AviFax documents for tach color code and location information.

1. Set your voltmeter to the AC voltage scale.
2. Start the vehicle. Use the voltmeter to find a wire that will show 1 to 5 volts AC while the vehicle is idle and increase an additional 1 to 5 volts AC when the engine RPM is raised to 3000-4000 RPM.
3. Connect the **WHITE/GREEN** wire to the vehicle tach wire.

### Hood Switch (Mandatory)

As a safety precaution, the hood switch prevents the vehicle from starting when the hood is open. If the vehicle is in the remote start mode and the hood is opened, the remote start will immediately shut down.

1. Choose a location under the hood away from direct exposure to water or water drain areas.
2. Check for proper hood clearance.
3. Make sure the hood switch will make contact with a flat surface on the hood when closed.
4. Drill a  $\frac{5}{16}$ " mounting hole.
5. Mount the hood switch.
6. Connect the **TAN** wire to the hood switch.
7. Make sure the hood makes contact with hood switch when closed and presses the hood switch straight down to prevent wear.

### Power and Ground Connections



**CAUTION:** Do not plug in the system fuses until the final step below.

1. Connect the 18 ga **RED** wire to one end of a supplied 20 amp fuse assembly.

*Continued on next page.*



2. If the vehicle parking lights are positive trigger, connect the **RED/WHITE** wire to one end of the other supplied 20 amp fuse assembly.
3. Connect the **BLACK** wire to the 10 mm ring terminal.
4. Connect the 10 ga **RED** wire to one end of both 30-amp fuse assemblies.
5. Connect the other ends of the 18 ga **RED** and **RED/WHITE** wire fuse assemblies to the 10 mm ring terminal.
6. Connect the other end of the 10 ga **RED** wire fuse assembly to the other 10 mm ring terminal.
7. Remove the (+) and (-) battery bolts. Do not disconnect the battery clamps.
8. Connect the empty fuse assemblies to the (+) battery terminal.
9. Connect the **BLACK** wire to the (-) battery terminal.
10. Inspect all wiring. Make sure all wires are connected correctly.
11. Install the 5 amp fuse in the 18 ga **RED** wire fuse assembly.
12. Install the 20 amp fuse in the **RED/WHITE** wire fuse assembly.
13. Install the two 20 amp fuses in the 10 ga **RED** wire fuse assemblies.

#### **Mandatory RPM Programming**

In order to remote start the vehicle engine and prevent over-grinding of the starter motor, the engine RPM must be programmed into the system memory. The AviStart has a built-in piezo beeper for audible programming confirmation.

1. Start the engine with the ignition key. Let the engine warm up until it reaches a normal idle RPM (typically 700-900 RPM).
2. Turn the ignition key off.
3. Start the engine with the ignition key.
4. Within 10 seconds of starting the vehicle, begin flicking the valet switch on then off 11 times (counting the piezo beeps).

***NOTE: Stop on the 11th beep. See the "Programming Table for System Features" on page 20.***

5. Press and hold the remote  button.
6. The parking lights will flash two times to confirm the RPMs have been memorized.
7. Release the  button.

## ***Programmable Features***

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All AviStart system and remote control programmable features are accomplished by turning the ignition key to the "ON" position or starting the engine and flicking the valet switch on and off a preset number of times. The system has a built-in piezo beeper for audible programming confirmation.


The AviStart also allows the user to add new remote controls in one step, delete lost or stolen remote controls or rearrange the factory preset remote control functions.

1. Remove the system from Protected Valet Mode. Programming cannot be accessed while the system is in Protected Valet Mode indicated by the LED on solid red.
2. Select the feature you wish to program from the "Programming Table for System Features" or the "Programming Table for Remote Controls" on pages 20-21. Note the number of beeps associated with that feature.
3. Turn the ignition key to the "ON" position.
4. Within 10 seconds, begin flicking the valet switch on and off. The built-in piezo beeper will beep once each time you flick the switch on then off.
5. Continue flicking the switch on and off, counting the number of beeps.















***NOTE: Stop when you reach the number of beeps associated with your chosen feature.***

6. Follow the "Secondary Action." You will hear a number of beeps to confirm that you have changed the setting of that feature.
7. Turn the ignition key "OFF."
8. Repeat steps 1-7 for any other feature you wish to program.

**Programming Table for System Features**

Feature	Factory Setting	No. of Beeps	Secondary Action
Door Lock/Unlock Output Duration (1 or 3 Seconds)	1 Second	4	Wait 3 seconds, the system will beep once for 3 seconds, twice for 1 second.
1 Pulse/2 Pulse Lock	1 Pulse	5	Wait 3 seconds, the system will beep once for 2 pulse, twice for 1 pulse.
1 Pulse/2 Pulse Unlock	1 Pulse	6	Wait 3 seconds, the system will beep once for 2 pulse, twice for 1 pulse.
Ignition-Controlled Door Lock/Unlock	ON	7	Wait 3 seconds, the system will beep once for OFF, twice for ON.
Passive Starter Disable	OFF	8	Wait 3 seconds, the system will beep once for OFF, twice for ON.
Remote Lock Starter Disable	ON	9	Wait 3 seconds, the system will beep once for OFF, twice for ON.
Siren/Horn Output	Horn	10	Wait 3 seconds, the system will beep once for Siren, twice for Horn.
Mandatory RPM Programming	—	11	Press and hold the  button until parking lights flash twice to confirm the RPM's have been learned.
Remote Start Run Time 20 or 30 Minutes	20 Minutes	12	Wait 3 seconds, the system will beep once for 30 minutes, twice for 20 minutes.
Remote Start Pre-Ignition 2 or 15 Seconds	2 Seconds	13	Wait 3 seconds, the system will beep once for 15 seconds, twice for 2 seconds.
Temperature-Controlled Starting OFF or 5 °F (-15 °C)	OFF	14	Wait 3 seconds. The system will beep once for OFF, twice for 5 °F (-15 °C).
Temperature-Controlled Starting -7 °F (-20 °C) or -22°F (-30°C)	—	15	Wait 3 seconds. The system will beep once for -7 °F (-20°C), twice for -22°F (-30°C).

**Programming Table for Remote Controls**

Feature	Factory Setting	No. of Beeps	Secondary Action
Remote Door Lock/Panic	 Button Channel 1	16	Press the  button, the system will beep 1 time.
Remote Door Unlock	 Button	17	Press the  button, the system will beep 2 times.
Remote Engine Start	 Button	18	Press the  button, the system will beep 3 times.
Remote Trunk Release	 Button	19	Press the  button, the system will beep 4 times.
Temperature-Controlled Start Active/Inactive	 +  Buttons	20	Press the  +  buttons, the system will beep 5 times.
One Step Remote Control Code Learning	 Button	21	Press the  button, the system will beep 1 time.
Instant Remote Control Code Deletion	—	22	Wait 3 seconds, the system will beep twice, all codes are erased out of memory.

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Part Number: 32-4001/AviStart 4001IM/1099*

## **AviStart 4001 Installation Manual**