



# Model B4 / B4A Three-Way Exhaust Bypass Valve Controller Installation Instructions

These Instructions are Available on our Web Site

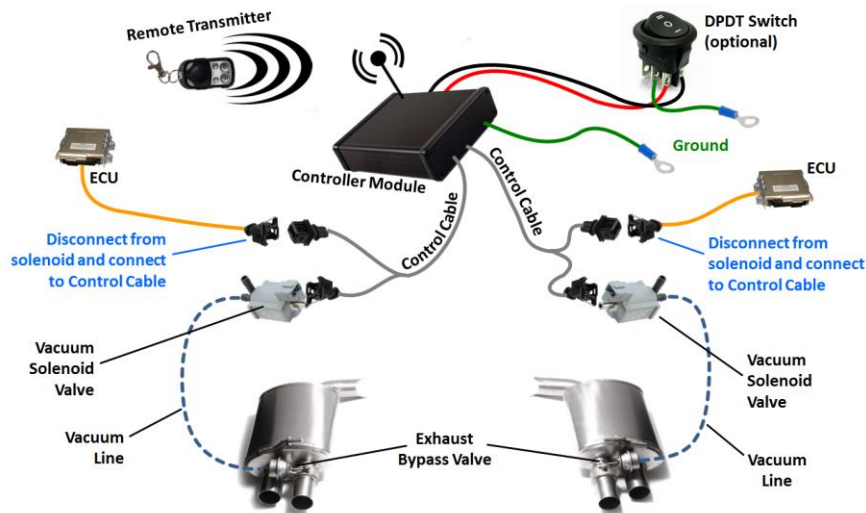
<http://www.forzacomponenti.com/documents.html>



For vehicle specific instructions, go to <http://forzacomponenti.com/support.html>

## The Exhaust Bypass Valve Controller

Illustrations in this document depict the Model B4 which includes two control cables. The Model B4A has only a single control cable / connector. Otherwise, the installation is the same.



## Disclaimers and Warranty

### Warranty

Forza Componenti warrants the Exhaust Bypass Valve Controller for 12 months after receipt of the unit. During the warranty period, the company will repair or replace the unit. User is responsible for return shipping costs.

The Exhaust Bypass Valve Controller Module and Cables are designed to withstand high temperatures; however, the user must install the controller in a location that is shielded from direct heat of the exhaust system. The ambient temperature of the controller installation location should not exceed 105° C (221° F).

### Disclaimers

Every effort has been made to assure that the Exhaust Bypass Valve Controller will be compatible with the vehicle that the unit is to be installed. The user is responsible for assuring that installation and use of the Exhaust Bypass Valve Controller is compatible with the vehicle exhaust and engine management system. Forza Componenti shall not be responsible for any damages to the host vehicle arising out of the use of, or otherwise related to, the Exhaust Bypass Valve Controller.

Users are responsible for ensuring their own compliance with legal requirements concerning noise abatement in their area. Forza Componenti assumes no responsibility should your vehicle become out of compliance with any relevant laws and regulatory requirements due to installation of the Exhaust Bypass Valve Controller.



### Caution on Usage

Usage on vehicles such as the Ferrari F355 may have exhaust system design characteristics where the use of the exhaust bypass controller could cause damage to the vehicle exhaust system. Review guidelines on the Forza Componenti web site for additional details.

## Exhaust Bypass Valve Controller Kit Contents

### Included in the kit

- Controller module
- Antenna
- The Model B4 includes two short (120cm) connection cables and one (120cm) extension cable
- The Model B4A includes one short (120cm) connection cable and may include one (120cm) extension cable depending on vehicle application
- One Remote control transmitter (extra transmitters available)
- 3M Dual Lock Mounting Tape

### Not included in the kit

A manual SPST, 2-position switch or a manual SPDT 3-position switch if you plan to use a manual switch instead of the remote control transmitter. See *Manual Switch Options* on page 9.

## Installation Steps

Follow these steps in the order presented.

1. **Check the vehicle's exhaust bypass valves function and type** (*Do not skip this step*)
2. Decide if using either the included remote transmitter or a manual switch.
3. Configure the Bypass Controller Module and attach the antenna
4. Determine mounting position for the Control Module
5. Install the electrical control cables and connect to the Control Module. Install and connect the manual control switch if you choose to use this option.
6. Verify operation of Controller
7. Complete the installation

## Check the Vehicle's Current Exhaust Bypass Valve Functionality **DO NOT SKIP THIS STEP!**

**Do not skip this step.** *Ensure that you vehicle's exhaust bypass valves are functional. We have seen occurrences where the vehicle's exhaust bypass valves had been removed or the exhaust bypass valves were not functional. If the exhaust bypass valves are not functioning on your vehicle, find out now before you go through the effort of installing the controller.*

### Ensure that the exhaust bypass valve(s) are functioning.

- Find the exhaust bypass valve(s) on your vehicle.
- With the engine off and no vacuum available to the exhaust valves, observe the default position – Open or Closed. Most vehicles the default position is open, but some cars (e.g., Ferrari F355 and 575M) the default position is closed.
- Start the car. The valves should close once the engine has achieved a steady idle. This may take a few seconds. Note: The controller will only function with bypass valves that close at engine idle. Some vehicles (e.g., Chevy Camaro), the valves remain open at engine idle and close when the vehicle is placed in gear and moving off from a stand still.
- If the valve(s) do not perform as designed, you will have to determine the cause. It may be a faulty vacuum line, a faulty valve or vacuum solenoid or an electrical connection to the vacuum solenoid that may be at fault. Correct the situation before proceeding.

### Which Type of Exhaust Bypass Valves Do You Have

When you observed the exhaust bypass valves, with the engine off and no vacuum present, note if ...

- If they were open ... we call this type a Mode 1 or M1 valve (the most common)
- If they were closed ... we call this type a Mode 2 or M2 valve



### Check for Specific Vehicle Installation Tips

Check the Forza Componenti website for specific vehicle installation tips. As data is accumulated, information is updated. <http://forzacomponenti.com/vehicles.html>

### Decide on Remote Transmitter or Manual Switch Operation

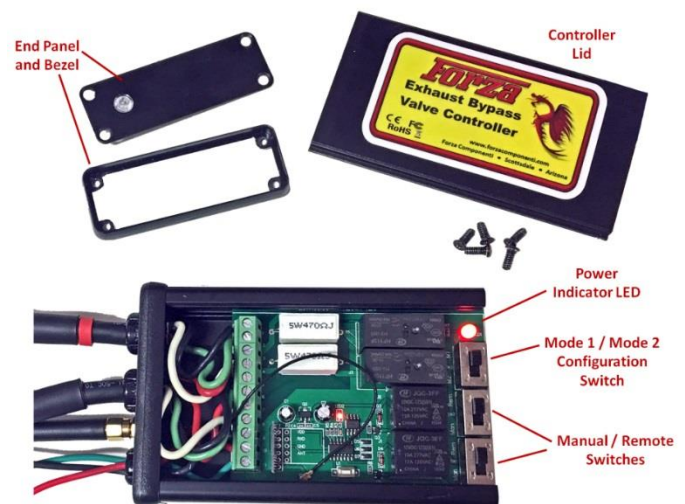
The controller can be used with either the included remote transmitter or with a manual switch that you would provide. There are pros and cons to both.

Device	Advantages	Disadvantages
Remote Control Transmitter	<ul style="list-style-type: none"> <li>• Installation is easier as no additional wire to route to passenger compartment</li> <li>• Valve operation defaults to vehicle ECU in the event of power disruption (e.g., turning the ignition off)</li> </ul>	<ul style="list-style-type: none"> <li>• Potential loss of remote transmitter</li> <li>• Battery replacement from time to time</li> </ul>
Manual On/Off Switch	<ul style="list-style-type: none"> <li>• Long term reliability as fewer components to fail</li> <li>• Ability to operate the valves is always at hand ... separate transmitter not required.</li> </ul>	<ul style="list-style-type: none"> <li>• Requires routing a control wire into the passenger compartment to the switch intended for use.</li> </ul>

If you plan to use a manual switch, refer to Manual Switch Options on page 9 for switch wiring instructions.

### Configure the Exhaust Bypass Valve Controller

The controller is shipped with the remote transmitter enabled. If you wish to use a manual On/Off Switch, you will need to provide the switch and then change the controller configuration. The controller module should be pre-set to use the remote transmitter option. And the mode should also be pre-set to your specific vehicle, if known at time of sale. If the mode for your vehicle is not known, it should be set to M1. Any changes to the configuration will require that you access the configuration switches located inside the controller module.



### Set the Operation and Mode Switches

If you need to set the operation or mode switches, remove the end panel with the LED window from the controller module and the top two screws from the opposite end panel. The lid will then slide off.

- There are three switches. Two switches are labeled REM and MAN. This sets up the controller for either **Manual Switch** or **Remote Transmitter Operation**. Set **both switches** for the same setting. To use the controller for remote fob operation set these two switches to REM. To use the controller with a manual switch, set these two switches to MAN.
- Set the Mode switch to either **M1** or **M2** ... refer to: *Which Type of Exhaust Bypass Valves Do You Have* on page 2. This switch is set to M1 except Ferrari F355, 550 and 575M.

### Set the Jumper for Default at Start-up

The controller can be configured for Valves Always Open or Normal Mode (ECU Control) when you start the car. The controller is shipped with the Jumper in the ECU Control position. Using a tweezer or small needle-nosed pliers, position the jumper as indicated:

- Normal Mode at start-up – jumper on left
- Always Open at start-up – jumper on right

### Jumper Position

ECU Control at Start Up



Always Open at Start Up



Once you configured the controller, re-install the end panel on the controller module.



### Temporarily Position the Control Module

Find a suitable location for the Controller Module. On rear engine cars, we suggest you locate a place in the engine bay as cool as possible away from the exhaust system components. Find a space where you can secure the control module without interfering with any vehicle panels that may have been removed to access your proposed installation location. Temporarily locate the control module in this location.

### Guidelines for Installation

- Although precautions have been made in the assembly of the Control Module to withstand the elevated temperatures in the engine bay, you should position it as far from heat sources as possible (e.g., exhaust manifold, catalytic converters, silencer) and route the wiring harness away from direct sources.
- Protect the control module from water as much as possible. If you believe that excessive water is likely to be splashed onto the control module, we suggest that you apply some silicone sealant around the cable grips to minimize the possibility of water getting inside the control module.
- Check our website for vehicle specific installation tips ... <http://www.forzacomponenti.com/vehicles.html>

### Connect the Wiring Harness(es)

#### Locate the Exhaust Bypass Vacuum Solenoid Valve(s)

Follow the vacuum line(s) from the exhaust bypass valves back and you will find the Exhaust Bypass Vacuum Solenoid Valve(s). Disconnect the electrical connector from each solenoid.



#### Connect the Vacuum Solenoid(s) to Control Module and Verify Electrical Polarity

- Connect the new JPT male connectors to the female JPT cable end you disconnected. Connect the new female JPT connectors to the solenoid(s).
- Route the wiring harness(es) to the control module and secure with cable ties.
- Plug in the connector(s) to those on the control module. **Note: If your vehicle has only a single vacuum solenoid valve, connect that solenoid valve to the red marked connector.**
- Connect the green ground wire on the control module to any nearby ground location. Note, not all screws are good grounds. Verify you have a good ground.
- Turn on the ignition. Check that the LED visible through the clear window in the end panel is illuminated indicating correct electrical polarity. If the LED is not illuminated, you could have a bad ground. Also, refer to Electrical Polarity on page 7 to correct polarity.
- Turn off the ignition.

### Connect the Manual Switch Control Wires if Applicable

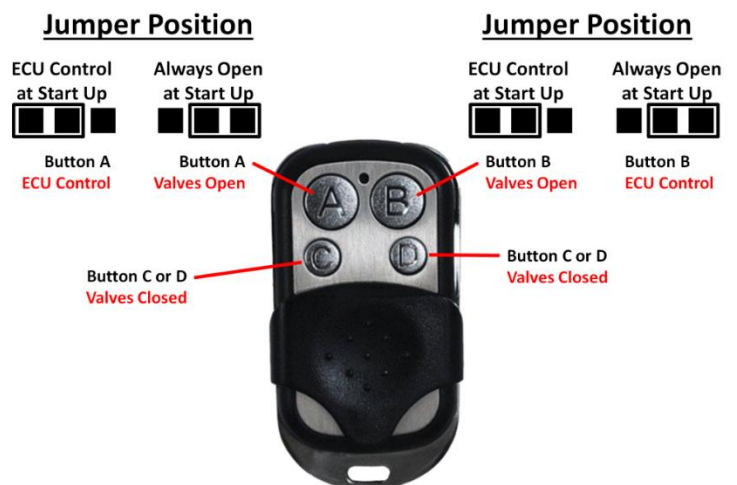
If you intend to use the Manual Switch instead of the remote transmitter, you must provide it. You will need to find a location to mount the switch and route wires to it from the controller module. Refer to Manual Switch Options on page 9 for wiring diagrams for the manual switch. You do not need to fuse protect the wires for the manual switch as the circuit to the switch is merely a path for ground. There is no danger of a short circuit. Splice the two wires into the red and black wire at the controller module.

### Check the Operation of the Controller

Once you have determined that you have correct polarity

...

- With ignition off, the exhaust valves should be in the same initial position you noted earlier.
- If using a manual switch, verify the switch is in the open (off) position.
- Start the car.





- If using a remote, the valves should assume either closed or open, depending on the jumper position ... refer to illustration on right.
- Buttons A and B on the remote are for the Always Open mode and Normal Mode (ECU control). Button C or Button D is for the Always Closed option.
- If using a manual switch ... Closing the switch (on position) should open the valves and opening the switch (off) should close them. If you have a three position switch, then the third position is for the Always Closed mode.

Start the engine and check operation of the bypass valves. If valves do not open when you use the remote or the manual switch, proceed with Troubleshooting on the page 6.

## What is the “Always Closed” Option?

In normal conditions, leaving the vehicle under ECU control and maintaining lower engine RPM will generally close the exhaust bypass valves. However, there may be situations when you may want to completely disable the ECU from opening the valves. For example, if you track the vehicle and there are noise limitations in place at the track. **The Always Closed option has usage limitations. It is only available for vehicles that use the Mode 1 operation (Refer to Which Type of Exhaust Bypass Valves Do You Have on page 2).**

**Note:** When tracking the vehicle, the source of the vacuum (engine manifold) will likely have periods when low or no vacuum is produced to keep the bypass valves closed. This occurs when the throttle position is wide open. If you find that under wide open throttle positions your exhaust valves are opening, even though you have set the mode to Always Closed, you should diagnose the following:

- Check for any vacuum leaks. Check that if you pull a vacuum on the bypass valve actuators that they stay in the closed position until you release the vacuum.
- Is your car equipped with a vacuum accumulator tank? It should be. If not, install one.
- Is there a one-way check valve or other device such as a solenoid valve on the upstream side of the vacuum accumulator tank? There should be to prevent vacuum loss from the accumulator tank when wide open throttle. An in-line one-way check valve is simple and inexpensive to install. If a solenoid valve is upstream of the vacuum tank, ensure it is operating correctly.

Forza Componenti cannot guarantee that the Always Closed option will function under extreme conditions such as extended periods of time with wide open throttle as loss of vacuum is a physical characteristic of engine dynamics under these conditions. The loss of vacuum at the exhaust bypass valves will result in the valves opening.

## Use Discretion When Engaging Always Closed

When the exhaust bypass valves are closed, the backpressure in the exhaust system will likely be greater. This is not a problem under most normal conditions. It will, however, limit the engine power at higher RPMs. With normally aspirated engines, it is quite likely that you may experience less power at high engine RPM. We recommend you limit the use of this option to short time periods if the engine is running at high RPM (for example, passing another vehicle on the highway or engage when running through noise monitoring points at tracks with sound limitations).

With turbo charged cars, at high engine RPM, the increased back pressure may have adverse consequences on the efficiency and operation of the turbo charger and its ability to scavenge exhaust gases. As a precautionary measure, Forza recommends that if you have a turbo charged vehicle, that you do not engage the Always Closed option at high engine RPM.

Keep in mind, when you have the controller in Normal mode, the vehicle’s ECU will manage the bypass valves and at lower speeds and engine RPM (e.g., urban driving and highway cruising) the valves will typically be closed anyway. Engaging the Always Closed is not necessary in these conditions.



Always Closed Usage	Normally Aspirated Vehicles	Turbo Charged Vehicles
Low speed, low engine RPM	OK to use	OK to use
Highway cruising	OK to use	OK to use
Wide open throttle / High engine RPM for short duration (e.g., passing another vehicle on highway, go through noise monitoring points when tracking vehicle)	OK to use	Not recommended
Wide open throttle / High engine RPM for long durations	Not recommended	Do not use
<u>Turbo Charged</u> Vehicles with "RACE" mode selector.	Do Not Use in Race Mode	Do Not Use in Race Mode

*Note: The Always Closed Option is disabled on controllers for Alfa Romeo Giulia / Stelvio*

## Complete the Installation

Secure the controller module using cable ties, screws or adhesive strips, secure the cables, ensure cables are directly exposed to high sources and replace any panel or other parts you may have removed.

## Troubleshooting

Indication	Possible Causes	Solution
Pressing remote button has no effect.  While pressing the button (or moving the manual switch) you should be able hear the relays opening or closing inside the controller module.	<ul style="list-style-type: none"> <li>Vehicle engine should be running to assure that power is available to the controller</li> <li>Ground wire not attached to good vehicle ground.</li> <li>The controller module is configured to use the manual switch option.</li> <li>Vehicle's connector polarity is reversed with respect to the controller module. LEDs not illuminated.</li> <li>The remote transmitter is not programmed to the controller module.</li> <li>If you have only one solenoid valve, you must connect the cable to the red marked connector</li> </ul>	<ul style="list-style-type: none"> <li>Start the vehicle's engine.</li> <li>Disconnect ground wire from current location and connect to a ground point that you are sure provides continuity.</li> <li>Check the operation switch. If necessary, change the configuration on the controller module to use Remote option.</li> <li>Reverse connector polarity inside the controller module. Refer to <i>Electrical Polarity</i> on page 7.</li> <li>Perform the steps to program the transmitter to the controller module receiver.</li> <li>Make sure the single cable is connected to the connector with the red marking on the boot.</li> </ul>
The relays appear to be functioning within the controller module (you can hear them opening and closing), however, the valves do not open.	<ul style="list-style-type: none"> <li>Your vehicle may require the application of +12V to open the valves (e.g., Ferrari F355).</li> <li>The controller module is configured for Mode #2 operation, but the vehicle requires Mode #1.</li> <li>One of the cable connections is not secure.</li> <li>The Always Closed switch is turned on.</li> <li>Vacuum lines may be disconnected to the exhaust bypass valves</li> </ul>	<ul style="list-style-type: none"> <li>If the controller is set to Mode #1, change it to Mode #2.</li> <li>If the controller is set to Mode #2, change it to Mode #1.</li> <li>Check the cable connections. Make sure a good connection is made.</li> <li>If you have installed an Always Closed option, check that it is turned disabled.</li> <li>Check that vacuum lines are all connected. Check that the exhaust bypass valves are functioning.</li> </ul>



Indication	Possible Causes	Solution
The manual switch does not open the valves.	<ul style="list-style-type: none"> <li>The controller module is configured to use the Remote option.</li> <li>The manual switch is not connected properly.</li> <li>Vehicle's connector polarity is reversed with respect to the controller module.</li> </ul>	<ul style="list-style-type: none"> <li>Change the configuration of the controller module to use Manual option.</li> <li>Check continuity of the wiring to the manual switch. Make sure the ground side of the switch is connected to a good ground point on the car.</li> <li>Reverse connector polarity inside the controller module. Refer to <i>Electrical Polarity</i> on page 7.</li> </ul>
The always closed option does not close the valves.	<ul style="list-style-type: none"> <li>Your car requires Mode 2 operation and the mode switch is set for this position. The always closed option functions only with Mode 1</li> <li>The manual switch for the Always Closed option is not connected properly.</li> <li>Loss of vacuum at the exhaust bypass valves</li> </ul>	<ul style="list-style-type: none"> <li>You cannot use the Always Closed option in Mode 2</li> <li>Check continuity of the wiring to the Always Closed circuit. Make sure the ground wire is connected to a good ground point on the car.</li> <li>Check vehicle vacuum connections. Refer to <i>What is the "Always Closed" Option?</i> on page 5.</li> </ul>

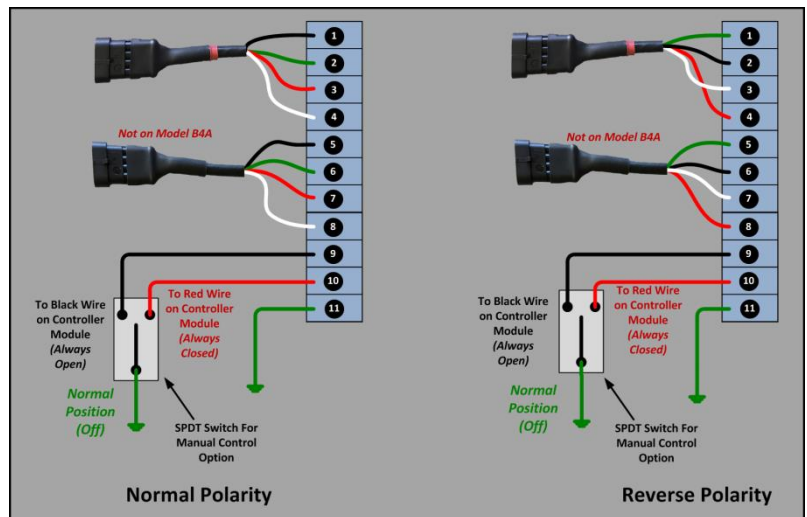
### Electrical Polarity

The electrical polarity at the connector to the vacuum solenoid is not standardized. For the sake of discussion, we refer to the two possibilities as "Normal" and "Reverse" polarity.

#### Changing Electrical Polarity

With the vehicle ignition on and the engine running, the LEDs on the flat panel plate should be illuminated. If not, you may need to reverse the incoming wires on the control cables.

- Disconnect power from the controller module
- Remove the lid from the controller by removing the end panel with the clear LED window and then remove top two screws of the opposite end panel
- Using a small screwdriver, loosen the terminals securing the wires. Terminals # 1 – 8 (Model B4) or Terminals # 1 – 4 (Model B4A)
- Reverse the black & green and the red & white wires as shown in the illustration in accordance with the tables below.
- Replace the lid of the controller and reconnect the Controller Module and verify LEDs are on with ignition on.



Vehicle	Mode Switch Position	Wiring Polarity
Ferrari F355	M2	Reverse
Ferrari 360 / F430	M1	Normal
Ferrari 550 / 575M	M2	Reverse
Ferrari – All others	M1	Reverse

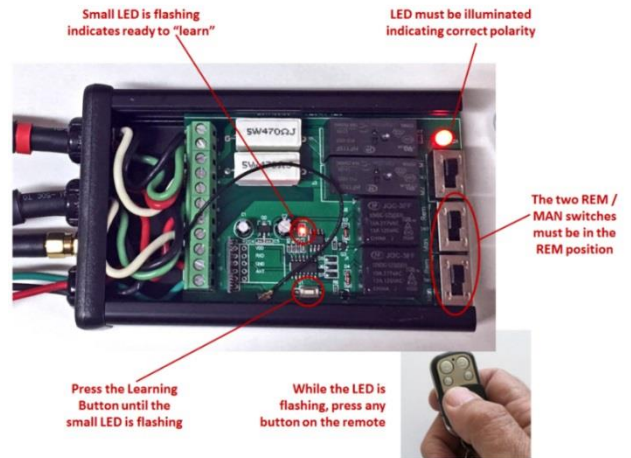
Vehicle	Mode Switch Position	Wiring Polarity
Alfa Giulia / Stelvio	M1	Normal
Audi	M1	Reverse
Maserati GT or GC	M1	Reverse
Lamborghini	M1	Reverse



### Adding or Replacing a Remote Transmitter

If you are adding or changing the key fob remote, you must program the control module receiver unit to recognize the new remote transmitter.

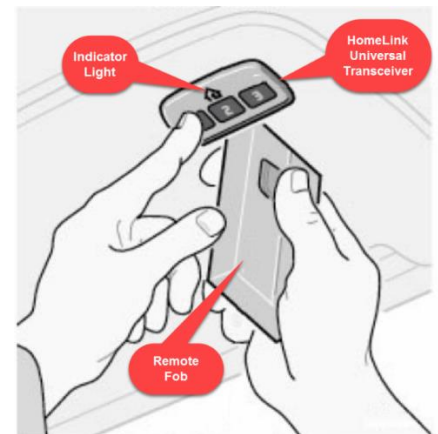
- Remove the lid from the control unit.
- Find the program button on on the printed circuit board.
- Turn on the vehicle ignition and verify the red LED is illuminated.
- While holding the remote transmitter, momentarily press the "learn button" on the circuit board. The LED should start flashing.
  - If you press and hold the learn button for a few seconds, you will erase all memory of any transmitters. If this occurs, then you must re-program all transmitters.
- Immediately after pressing the learn button, while the LED is flashing, press any button on the remote transmitter. The LED on the control should stop flashing indicating that your transmitter is now programmed to the control module.
- Repeat for additional transmitters.
- Verify operation of all transmitters and replace the control unit cover and end panel.



### Using the Controller with Homelink Systems

The Homelink installed in the vehicle must support 433MHz. Some Homelink systems do not support this frequency (e.g., prior to 2014 in North America). For specific instructions, refer to your vehicle's owner manual for specific instructions on setting up the system.

In general, to program Homelink, press and hold the Homelink button you wish to program and hold until an indicator light slowly flashes. While the Homelink light is slowly flashing, hold the remote fob within a few inches of the Homelink. Press the transmit button on the fob for 3 to 5 seconds, then release and immediately press again. The sequence of pressing and releasing the fob button will prevent the fob transmitter from timing out before the Homelink can successfully clone the signal. Continue pressing and releasing the fob button until the Homelink indicator lamp goes solid or flashes rapidly. You will need to program one button on the Homelink for each function button on the transmitter fob.

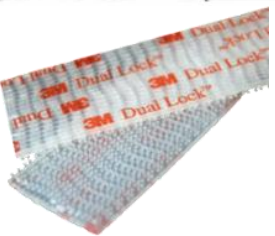
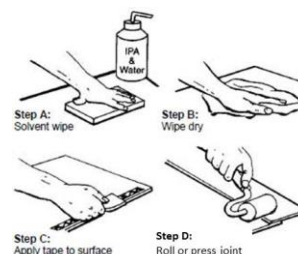


### 3M Dual Lock Fastening Tape

Included in your kit are two strips of 3M Dual Lock fastener.

#### Directions for use

- Thoroughly clean both surfaces of dirt and oil using a solvent that does not leave residue such as isopropyl alcohol.
- Apply Dual Lock to both substrate surfaces.
- Mount the strip along the length of the controller. An easy way to align the piece on the controller with the piece on the mounting surface is to position the Dual Lock on the control unit, gently press the mating piece on and then position the controller in place and gently apply pressure to stick the mating piece in place on the mounting surface. This will assure proper alignment of the



#### Dual Lock Fasteners Attachment



Press until you hear or feel a "click"





two Dual Lock pieces. Once positioned, you can take the controller off and then press the piece on the mounting surface in place to assure a firm hold.

- Press each mounting piece on to the substrate and allow it to rest for 30 to 60 minutes.
- Press the controller in place until you hear or feel a click.

### Manual Switch Options

Before the controller can be used with a manual switch, you must set the two switches on the internal circuit board to the MAN position. Refer to *Configure the Exhaust Bypass Valve Controller* on page 3.

#### Using a SPST On-Off Switch to Control the Always Open Option ONLY

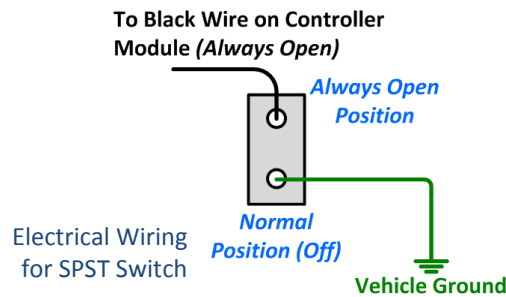
A SPST switch can be used, but for the Always Open option only. Several switch options are available to you. Ensure that the switch you select is NOT a momentary-On type. Examples of suitable SPST switches includes Ferrari On/Off switch (e.g., Sport switch), a miniature toggle or rocker switch installed in dash, center console or in ash tray, or other simple On/Off switch.



Miniature Toggle Switch mounted in ash tray



Pushbutton Switch



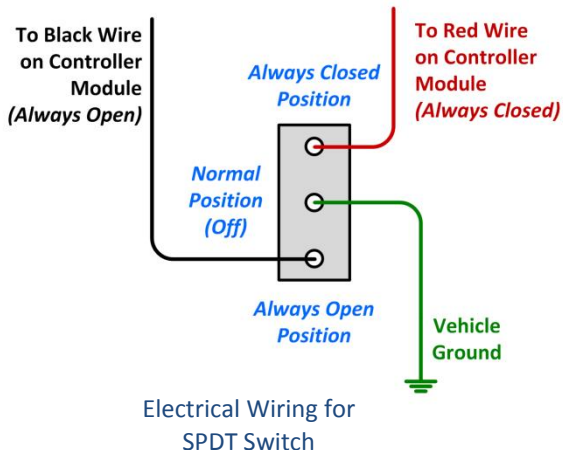
Miniature On/Off Toggle Switch



Ferrari Sport Switch

#### Using a Double-Throw On-Off-On Switch to Control both the Always Closed and the Always Open options.

If you intend to use a switch for both the Always Open and Always Closed options, use a Double-Throw, On-Off-On switch. You can use either a SPDT or a DPDT switch. Connection for the switch to manage both Always Closed and Always Open should be wired as shown in below.



DPDT On-Off-On Rocker Switch



SPDT On-Off-On Toggle Switch



DPDT On-Off-On Toggle Switch

The NKK switch (below) is an exact fit for panel switch cut-outs in many Ferrari's. Here is the NKK switch installed in the center console of a 360 Modena



NKK LW3123-F2CF-A DPDT On-Off-On Rocker Switch w/ Black Bezel