



# INSTALLATION INSTRUCTIONS

## FUEL SURGE TANK KIT

BMW E46 3-Series, Excl Convertible

Document: 19-0356  
Support: info@radiumauto.com

### CAUTION

Only a qualified technician following applicable safety procedures should perform the installation of this product. One must have knowledge in repair and modification of fuel systems and general vehicle modifications to install this product.

**Gasoline and other fuels are flammable and can be explosive.**


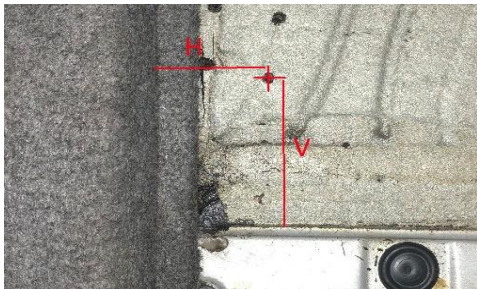


Only install in a well-ventilated location to minimize buildup of fuel vapors.






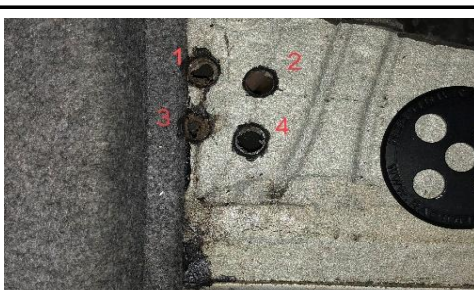
No sparks, open flames, smoking or other ignition sources are to be present. Draining and removal of all fuel from the fuel system is recommended. Proper eye and personal protection is required at all times during installation.

### WARNING







The fuel system is under pressure! Do not loosen any connections until relieving the fuel system pressure. Consult a service manual for instructions on relieving fuel pressure safely. This product is designed for off-highway and racing use only. Fuel system components may not be legal for sale or use on emissions controlled motor vehicles. Consult local, state, and federal laws.







Relieve fuel pressure in vehicle before beginning the installation. **Disconnect the negative battery cable.** Access to the underside of the vehicle is required for this installation. It is recommended to perform this installation with minimal fuel in tank.

STEP	TOOLS NEEDED	INSTRUCTIONS	PHOTO
1		Remove the carpet in the trunk to gain access to the floor between the rear wheel wells.	
		Pull up the carpet to expose the trunk floor.	
		The fuel line pass-through bulkhead will be installed on the left side of the trunk.	
2	Permanent Marker	Use a tape measure to locate the first of the 4 required drilled holes.	
	Measuring Tape	The first hole is located according to "H" and "V" measurements as shown. H is measured from the sheet-metal wall (under the carpet). V is measured from the edge of the sound deadening material.	
		H = 2-1/2"	
		V = 3-1/4"	
3		NOTE: It is not necessary to remove the carpeted wheel well cover, but it will be necessary to hold it out of the way for access.	
	Permanent Marker	After the first hole is located, place the bulkhead plate down and use it as a template. Mark the centers of the remaining holes. The plate should be angled slightly to create the hole pattern shown.	
	1/4" Drill		
	5/8" Drill		
4		After marking the hole centers, drill each with a 1/4" drill bit. Next, follow up with a second drill and enlarge the holes to 5/8".	
	8mm Socket		
	16mm Socket		

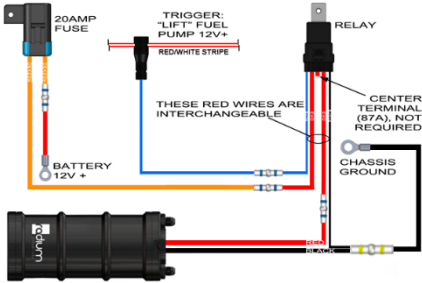
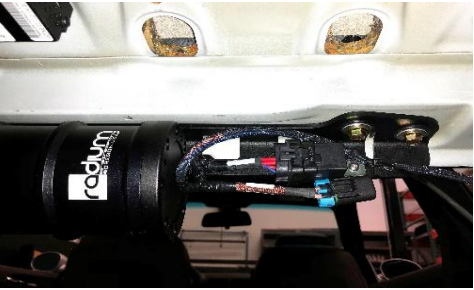




5	13mm Socket	To make accessing the area of the new fuel lines easier, it is recommended to disconnect the exhaust mid-pipe from the muffler and let it hang down. For best access, remove the exhaust mid-pipe.	
6		Locate the holes drilled in step 3 and make sure there are no issues with any components on the underside of the car.	
		Remove any burrs left from drilling.	
7	Hose Cutter	Find the long 3/8" hose in the kit and cut it into pieces of the following lengths: 48"(x2), 44"(x1), 50"(x1)	
	Measuring Tape	Measure twice before cutting.	
		You will have four hoses after the cutting is complete.	
8	Oil	Find the four 90-degree hose ends in the kit. Install one hose end into one end of each hose. Lubricating the hose barbs will help with the hose assembly.	
	Tape	Label each hose (at each end) with tape according to the table below.	
	Marker		
		48" Hose - Label "#1"	
		48" Hose - Label "#3"	
		44" Hose - Label "#4"	
9	AN Wrenches	Install the bulkhead fittings into the ends of each hose, as shown. Tighten the fittings. Make sure they are oriented as shown.	
10	Permanent Marker	From inside the trunk, label each hole in the trunk floor as shown. These holes will correspond to the numbered labels on the hoses.	

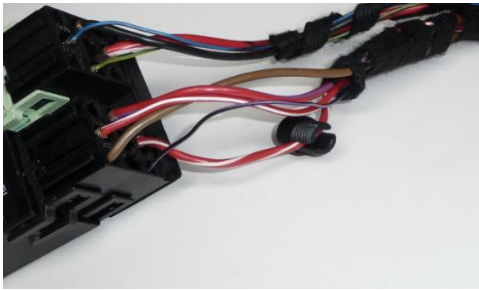
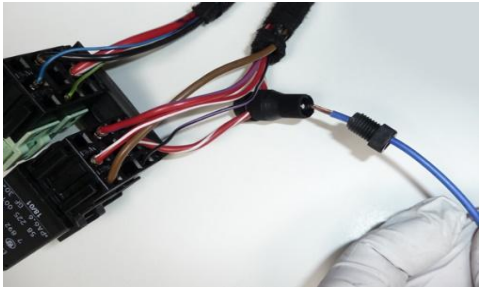






11		From the underneath, insert the bulkhead fittings for #1 and #3 hoses into the #1 and #3 holes in the floor. Be sure not to get mixed up when looking at the holes from the underside of the car.	
		The fittings should stay in place without the nuts on the opposite side. If they do not stay in place, loosely install the bulkhead nuts from inside the trunk.	
12		Route the #1 and #3 hoses around the rear of the fuel tank and toward the side of the car. Follow the shape of the fuel tank all the way around to the front of the tank.	
		When routing the lines, make sure they are clear of the moving suspension arms and make sure they are not kinked or pinched anywhere. Secure them to the adjacent brake lines using the included zip ties.	
13	Flat Head Screwdriver 9/32" Nut Driver	Route the lines completely around the tank until they reach the factory fuel line junction shown.	
		At the junction, disconnect and remove the small hose clamp holding the rubber hose on to the fuel return pipe. Pull the rubber hose off the pipe. Fuel may leak out.	
		Install the double-ended hose barb fitting into the BMW rubber hose and secure with one of the included EFI hose clamps. Slightly bend the fuel return pipe so that it angles as shown.	
14	9/32" Nut Driver	Connect the hoses routed from the previous steps to the OEM return line. The #1 hose connects to the rubber hose with the double-ended barbed adapter. The #3 hose attaches to the fuel return pipe. Cut to length if necessary. Secure both with the provided EFI hose clamps.	
		Go back and inspect the hoses to make sure everything is tied up properly and no hose is contacting suspension components. Check clearance with the suspension compressed if necessary.	
15		Insert the #2 and #4 bulkhead fittings into the corresponding holes in the trunk floor. Route these 2 hoses over the top of the differential and subframe.	
16	13mm Socket	On the opposite side of the differential, route the hoses down to the fuel tank next to the subframe mount (shown with red arrow).	
		Remove the fuel tank mounting strap bolt circled in blue and allow the tank to hang down.	
		Route the hoses between the top of the fuel tank and the unibody.	

17	10mm Socket	From inside the cabin, remove the rear bottom seat cushion. Remove the access panel on the RH side of the vehicle (passenger side in US). This will expose the fuel pump module.	
		Disconnect the fuel feed line from the fuel pump module. This is done by pinching the two tabs on the black connector and first sliding it toward the fuel pump module to release the locks. Then slide it backward and off the blue fitting. Some fuel may spill out. Be prepared with a rag.	
18	5/64" Allen	Route the 3 hoses from step 16 to the fuel pump access area.	
	6AN Wrench	Locate the 6AN 180 degree hose-end in the kit and install it into Hose #2. Trim hose if necessary. Lubrication must be used.	
		Install the SAE adapter fitting into the 180 degree hose end and tighten. Slide the SAE adapter onto the fuel pump outlet as shown. Lock the fitting in place using the green lock and small screw.	
		Find the remaining 6AN straight hose end in the kit. Install it into Hose #4. Next, screw in the green 6AN male to SAE male green fitting and tighten. Connect the OEM feed line to this fitting, pushing until it "clicks".	
19	13mm Socket	Reinstall the bolt for the fuel tank strap. Make sure the fuel lines are not being pinched before tightening the bolt.	
20	13/16 Socket	In the trunk, trim the carpet that goes around bulkhead fittings, then install the bulkhead plate over the fittings.	
		Next, install and tighten all the bulkhead nuts using a socket and ratchet. It may be necessary to have someone under the car holding the bulkhead fittings straight while the bulkhead nuts are tightened.	
		It is important these nuts are tight, in order to keep the fittings from rotating when the hoses are attached and tightened later.	
21	13mm Socket	Remove the four M8 bolts that hold the seat latches from the trunk ceiling. Mount the FST bracket to the underside of the trunk ceiling using the included 8mm bolts and washers.	
22	4mm Allen Wrench	Locate the 4 short M6 Allen head screws. Use them to mount the surge tank to the bracket.	
	8mm Wrench		
		Make sure the surge tank is oriented so that the green "pump outlet" fitting is at the bottom. If not, remove the top cap of the surge tank and clock the top plate so that, when installed, the green fitting is at the lowest point.	



23	Wire Cutters	Assemble the components as shown in the wiring schematic (not to scale).	
	Wire Strippers	Cut all wires to length.	
	Wire Crimpers	NOTES:	
	Heat Gun	1. As shown, use the large heat shrink/solder butt connector for the ground connection.	
		2. For strain relief, always allow slack in the wire so it does not pull.	
24	3mm Allen Wrench	Secure the fuse and relay to the hole on the RH side of the bracket.	
	8mm Wrench	Tie the FST wiring harness up and out of the way using a zip tie.	
	Cutters		
25	13mm Socket	Remove the carpet covering the RH rear wheel well from inside the trunk.	
		Next, remove the plastic cover on the battery power cable master fuse.	
		Remove the lower nut from the fuse terminal and install the "BATTERY 12V" wire. Reinstall the nut and tighten.	
		Reinstall the plastic cover.	
26	10mm Socket	Route the "CHASSIS GROUND" wire to the stud located on the body just above the battery.	
	Sander	Remove some paint around the stud to ensure good electrical contact.	
		Install the ring terminal and tighten down using the M6x1mm nut included in the kit.	
27		In the trunk, just above the RH rear shock mount, locate the black OEM fuel pump relay. This is the common location for US market cars.	
		NOTE: The exact location of this relay may vary depending on the market for which the vehicle was originally manufactured. To be certain of the location of this relay, consult a factory service manual for your particular vehicle.	
28		Identify the switched fuel pump power wire by finding the heavy gauge red wire with white stripe coming from slot "55" on the relay connector. It is located next to the thin black wire. Mark this wire.	
		NOTE: Do not confuse with the other red/white wire near the brown wire.	

29		<p>Locate the Posi-tap connector in the kit and unscrew both ends. Put the slotted end around the red/white wire, as shown.</p>	
30	Wire Stripper	<p>Pull back the sheathing then strip about 3/8" of insulation off the end of the wire.</p> <p>Screw the main section of the Posi-Tap into the slotted piece, some force is required. Next, insert the Posi-Tap end on to the trigger wire.</p>	
31		<p>Push the trigger wire into the Posi-Tap connector. Tighten the plastic nut. The finished assembly should look as shown.</p>	
32		<p>This picture shows the finished product. Tuck and zip tie all wires.</p> <p>The carpet over the wheel well can now be reinstalled.</p>	
33		<p>For the next steps, refer to the hole designations.</p> <p>The four pre-fabricated PTFE hoses will now be installed to connect the fuel surge tank to the vehicle's fuel system.</p> <p>All 4 hoses are identical in length.</p>	
34	6AN Wrench	<p>Make sure the hoses are plumbed as follows:</p> <p>Bulkhead plate position #1: Top-most port on surge tank</p> <p>Bulkhead plate position #2: Rear-most port on surge tank</p> <p>Bulkhead plate position #3: Forward-most port on surge tank</p> <p>Bulkhead plate position #4: Green fitting on surge tank</p> <p>Tighten all hoses using an aluminum AN wrench.</p>	

35		Remove the fuse from the fuse holder. Reconnect the battery and key-ON the ignition. Cycle the ignition several times to allow the factory fuel pump to prime and fill the surge tank. Check for leaks.
		Reinstall the fuse and key ON again. Make sure the pump inside the fuel surge tank turns ON and is working. If not, check wiring.
		Check again for leaks at all connections points and fix any that may occur.
		Start the engine and let it idle. It may idle rough until all the air is bled out of the system.
		Reinstall all parts that were previously removed. <b>INSTALLATION COMPLETE</b>