

INSTALLATION INSTRUCTIONS

FUEL PUMP HANGER

BMW E46



radium
ENGINEERING

Document: 19-0369

Support: info@radiumauto.com

COLOR LEGEND FOR EACH STEP

DUAL PUMP APPLICATIONS:

Follow **BLUE** areas

FUEL HANGER PLUMBING KIT:

Follow **YELLOW** areas

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.

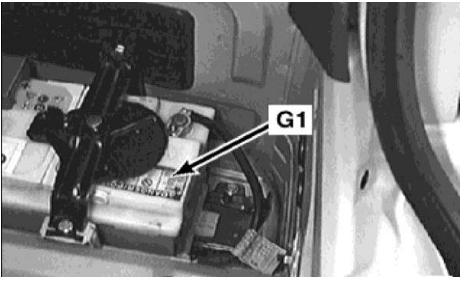
WARNING

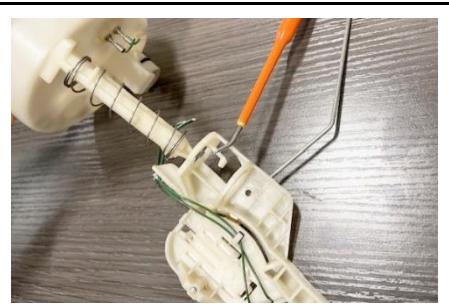
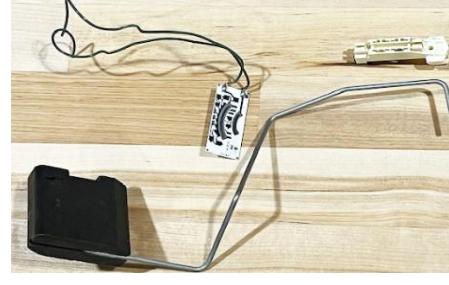
The fuel system is under pressure! Do not loosen any connections until relieving the fuel system pressure.

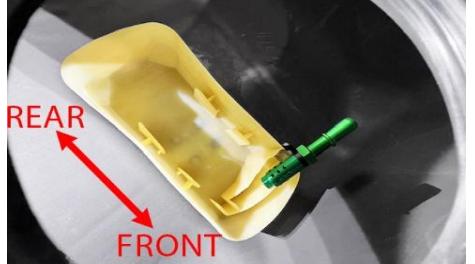
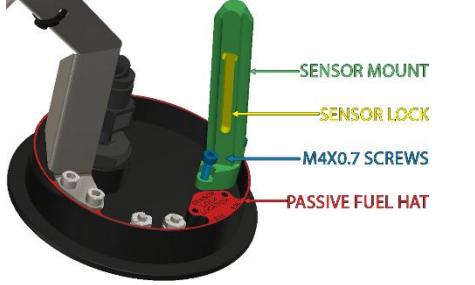
Consult a service manual for instructions on relieving fuel pressure safely. This product is designed for off-highway and racing use only.

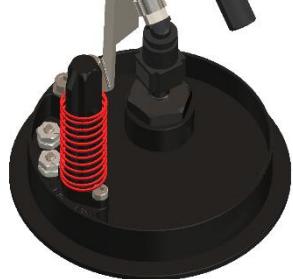
Fuel system components may not be legal for sale or use on emissions controlled motor vehicles. Consult local, state, and federal laws.

STEP	TOOLS NEEDED	INSTRUCTIONS	PHOTO
1		The terms "driver-side" and "passenger-side" will NOT be referenced. As depicted, these instructions will always reference "LH" and "RH" areas of the vehicle.	
		The terms "active-side" refers to the (RH) fuel tank where the fuel pump resides. The term "passive-side" refers to the (LH) fuel tank where there is only a level sensor and jet pump.	
		Prior to beginning, be sure not to work on a full fuel tank.	
2		If the vehicle still has a Schrader bleed valve found on the factory fuel pressure regulator (shown) or on the fuel rail, relieve fuel pressure.	
		If the car does NOT have a Schrader bleed valve, see the following steps.	
3	10mm Socket Wrench	From inside, pull up to unclip the rear bench seat. Remove from vehicle. Pull the carpet over the metal seat tabs.	
		Underneath the bench, first pull out the rubber boots that seal the electrical wires. Next, fold the rubber insulation mats back carefully to expose both fuel tank access covers.	
		Remove the M6x1mm nuts (shown) to uninstall the covers.	
4		Disconnect the electrical connectors on both RH and LH units. It is a good idea to clean these areas as they will be dirty.	
		Start the vehicle and allow the engine to stall. Continue to crank the engine over for a few more seconds to release all of the pressure from the fuel lines.	

5	10mm Socket Wrench	Remove the negative battery terminal.	
		CAUTION: Disconnecting the battery may cancel fault memories of some control units. Consequently, always cross examine any faults prior to disconnecting.	
6	Rag	BMW E46 M3 ONLY There is an SAE quick connection for the fuel pump outlet on the active side of the fuel tank. To release, first push the connector further on. Next, simultaneously squeeze the 2 tabs and gently pull the feed hose away from the mating tube.	
		CAUTION: fuel will spill from this connection.	
7	Screwdriver	For all other fuel line connections, carefully pry off the pinch clamps, as shown. This will take a little bit of work. Be careful as the plastic can be very brittle.	
	Pick		
	Rag	Gently, pull all fuel lines off both OEM fuel hats.	
		CAUTION: fuel will spill from these connections.	
8		The metal lock rings have a small dab of glue to prevent the ring from unscrewing. When spinning the lock ring counterclockwise, this glue will break free. However slicing it with a knife first is suggested.	
		A mallet and punch will suffice. If the ring is stubborn, find a second person to hit the opposing side simultaneously.	
9	Rag	To remove the pump in the active-side tank, first pull up.	
		Then, pivot the assembly to get the filter sock out of the tank.	
		Next, pivot back to the get the level float out.	
		Finally, lift out and transport the assembly to a workbench.	
10	Rag	To remove the passive-side assembly, first pull up. Next, pivot back and forth to first get the level sensor float out.	
		On the underside of the OEM hat, there is a connection that secures the OEM jet pump and level sensor. Squeeze the thumb tab and release it.	

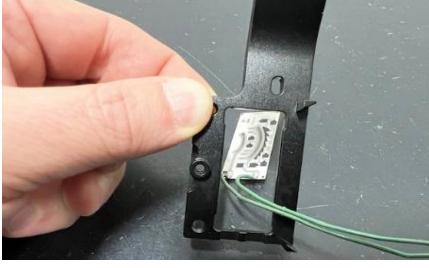
11	<p>Reach into the active-side tank opening and carefully pull the crossover tube free from the collector bowl, as shown.</p> <p>Temporarily, move the OEM crossover tube and jet pump assembly towards the active-side of the tank. Now pull the jet pump out of the passive-side tank.</p> <p>Lastly, pull the crossover assembly out of the passive-side opening.</p>	
12	<p>Remove and inspect the large fuel tank gaskets. Replace if necessary.</p> <p>BMW E46, P/N: 16-11-1-184-084</p>	
13	<p>Pick</p> <p>Cutter</p> <p>WARNING: These old plastic parts are brittle.</p> <p>Both OEM fuel level sensors will be reused. To remove the sensor that came from the passive-side tank, simply pry the locking tab up (shown). NOTE: the spring will also be reused.</p> <p>Cut the 2 fuel level sensor wires leaving as much slack as possible with the level sensor itself.</p>	
14	<p>Pick</p> <p>WARNING: These old plastic parts are brittle.</p> <p>To remove the fuel level sensor from the pump assembly, first carefully prior up on the steel arm, as shown. This will release the arm from the plastic armature wiper.</p>	
15	<p>Next, pull the steel arm straight out of the assembly.</p> <p>Now pull out the plastic armature wiper (shown).</p>	
16	<p>Cutter</p> <p>Dislodge the level sensor wires from the retainers. Now push and slide the fuel level circuit board up and out of the assembly. Finally, cut the 2 fuel level sensor wires leaving as much slack as possible with the sensor itself. Shown are the parts to be reused for the active-side fuel level sensor.</p> <p>CAUTION: Be careful not to put any excessive stress onto the 2-wire solder joints.</p>	

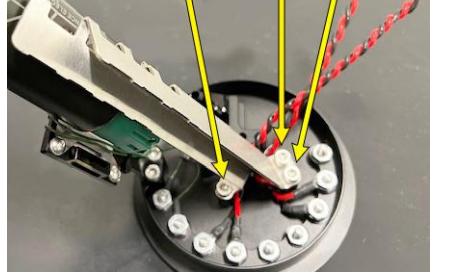
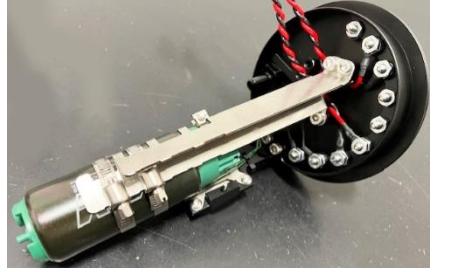
17	<p>The Radium Engineering fuel pump hanger will use a new robust internal crossover system.</p> <p>To prep the fuel tank, first find the parts shown in the kit:</p> <ul style="list-style-type: none"> -SAE quick connect fitting -6AN deflector nut -Crossover mount -M5x.8mm screws (x2) 	
18	<p>10mm Wrench</p> <p>12mm Socket</p> <p>To setup, first insert the SAE quick connect fitting through the crossover mount in the direction shown. Secure the SAE quick connect fitting using the 6AN deflector nut, as shown.</p> <p>Next, thread the M5x.8mm screws to the crossover mount one turn each. NOTE: Make sure the screws do make their way into the crossover mount slot.</p>	
19	<p>NOTES:</p> <ol style="list-style-type: none"> 1. The OEM collector bowl is found in the active-side tank. 2. There is a hole in the bowl from the OEM crossover tube. <p>Using the slot, slide the crossover mount to the side of the OEM collector bowl, as shown. This will be a nice press-fit.</p>	
20	<p>4mm Allen Wrench</p> <p>4mm Allen Wrench</p> <p>To secure the crossover mount, tighten the screws using a small 4mm hex key.</p> <p>NOTE: If the crossover mount is lined up to the collector bowl hole, the screws with thread thru the hole and into the opposing side of the crossover mount.</p>	
21	<p>Locate the passive-side assembly (shown) from the kit.</p>	
22	<p>3mm Allen Wrench</p> <p>3mm Allen Wrench</p> <p>Find the loose fuel level "sensor mount" in the kit. This will need to be secured to the underside of the "passive fuel hat". In the depiction, the "sensor lock" is in the E46 position. NOTE: If it were for an E36, the sensor lock would need to be spun around 180 degrees.</p> <p>Secure using the "M4x0.7mm" screws.</p>	

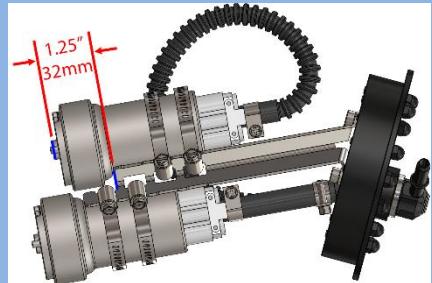
23	<p>Wire Stripper Wire Crimper Heat Gun</p> <p>Be careful not to add excessive stress to the wires as they can be brittle. This could result in a solder failure.</p> <p>Strip 3/16" (5mm) of insulation off the 2 wires. Slide a short piece of small heat shrink over each wire. Crimp 2 small ring terminals to the wires. Slide the heat shrink over the crimped area. Heat the tubing until they fully shrink.</p>	
24	<p>As depicted, insert the OEM fuel level spring (shown red) over the sensor mount.</p>	
25	<p>Looking at the OEM fuel level sensor, find the lock.</p> <p>Lineup the OEM fuel level sensor lock with the mating lock slotted into the Radium fuel level mount.</p>	
24	<p>3/8" Socket</p> <p>Secure the ring terminals to the "FUEL LEVEL SENSOR" studs underneath the fuel hat.</p> <p>NOTES:</p> <ol style="list-style-type: none"> 1. There is no polarity (it cannot be wired backwards). 2. If applicable, use the slightly longer wire for the stud furthest away. <p>Push the sensor down onto the spring until it locks in place.</p>	
25	<p>Do not install the large OEM gasket under the passive-side fuel hat. Instead, install the gasket to the fuel tank opening, as shown.</p>	
26	<p>Oil Lubrication</p> <p>Find the large diameter black "crossover" tubing in the kit. Each SAE quick connector has 2 internal O-rings, as shown. Lubricate these O-rings.</p> <p>Also, lubricate the mating male adapters.</p>	

27	<p>Insert the tubing into (either) fuel tank opening and route it towards the opposite side of the fuel tank.</p> <p>Rotate the tube so the natural bend goes over the center fuel tank hump.</p> <p>Move the tube just until you can still reach the SAE quick connector from the passive-side opening, as shown.</p>	
28	<p>From the active-side tank opening, mate the crossover SAE quick connector to the green SAE male quick connector (installed in the earlier step). Simply push the connectors together to lock into place, as shown. A "click" will be felt.</p>	
29	<p>Lower the passive-side assembly into the fuel tank being careful not to damage the fuel level float.</p> <p>Secure the crossover tube, as shown.</p>	
30	<p>Oil Lubrication</p> <p>9/32" Nut Driver</p> <p>Prior to installing the OEM fuel tank locking ring, be sure the "FRONT" fuel hat label is towards the front of the vehicle and the "REAR" fuel hat label is towards the rear of the vehicle. There are indication marks on the fuel tank.</p> <p>To secure the OEM return line, use the provided #14 (13-15mm) EFI clamp.</p>	
31	<p>If installing a fuel pump with a small outlet barb (Walbro GSS342, AEM 50-1200, etc.), find the 8.5mm barb adapter in the kit. If installing a fuel pump with a large outlet barb (Walbro F90000267/274/285, Ti Automotive E5LM, Deatschwerks DW440/810, Fuelab 49614, Protec 11928, etc.), find the 10mm barb adapter in the kit.</p> <p>NOTE: If the pump does not feature a check valve, there are check valve variations of these fittings at radiumauto.com.</p>	
32	<p>Oil Lubrication</p> <p>19mm Wrench</p> <p>For fuel pump 1 (P1), install the appropriate barbed fitting into the port shown.</p>	

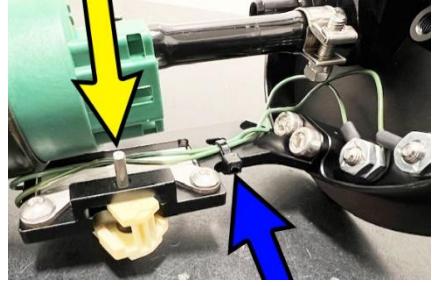
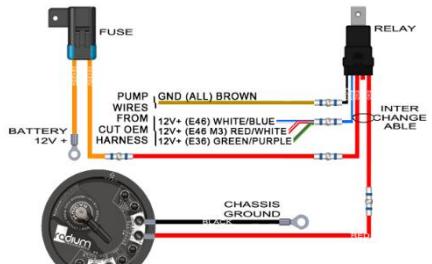
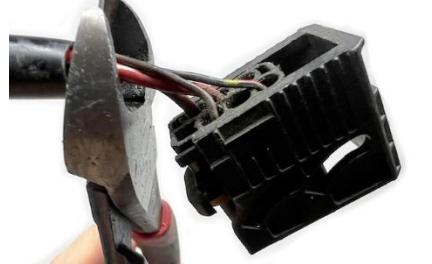
33	Oil Lubrication 1/4" Allen Wrench	If not installing a second fuel pump, install the provided 6AN ORB plug into the port shown.	
34	Oil Lubrication 19mm Wrench	If installing a second fuel pump (P2), install the appropriate barbed fitting into the port shown.	
35	3/8" Socket Wrench 3/8" Wrench	For 2-wire pumps, install the extra harness to the underside of the fuel hat. Reference the fuel hat labeling. NOTES: 1. Connect the red wire to the "+" stud. 2. Connect the black wire to the "-" stud.	
36	Wire Stripper Wire Crimper Heat Gun	For brushless fuel pumps, flying lead harness(es) are not included. These come from the pump manufacturer. Colors vary. Install the included ring terminals and heat shrink as shown. When securing, reference the fuel hat labeling. Blue or Green Wire = "BRUSHLESS-B" White Wire = "BRUSHLESS-W" Orange or Red Wire = "BRUSHLESS-O" Black Wire = "GND" (<-shared with PUMP2)	
37		To permit additional flexibility, it is recommended to carefully twist the fuel pump wires. NOTE: Be careful to not add any excessive stress to the end of the wires. This could result in crimp failures.	
38		There are 2 different diameter fuel pump outlet tubes included. One is for small barbed pumps and one is for large barbed pumps. In the following step, these tubes (shown) must be cut to an exact length for "PUMP1" depending on the specific fuel pump installed.	

39	<p>Tube Cutter</p> <p>Small ID Tube: 2.8" (71mm) AEM 50-1200</p> <p>Large ID Tube: 3.7" (93mm) Deatschwerks DW440</p> <p>Large ID Tube: 2.9" (75mm) Deatschwerks DW810</p> <p>Large ID Tube: 3.7" (95mm) Protec 11928 / Fuelab 49614</p> <p>Large ID Tube: 1.7" (43mm) Ti Automotive E5LM</p> <p>Small ID Tube: 2.8" (74mm) Walbro GSS342</p> <p>Large ID Tube: 2.7" (69mm) Walbro F90000267/274/285/295</p>	
40	<p>Oil Lubrication</p> <p>Heat Gun</p> <p>Push the pump barb into the end of the tubing, as shown.</p>	
41	<p>Note that there are 2 different sets of EFI clamps included for the pump connections, #10 (9-11mm) and #12 (11-13mm). These will match with the respective fuel pump barb and tubing diameter.</p>	
42	<p>9/32" Nut Driver</p> <p>Secure the tubing, as shown.</p> <p>NOTE: If using a large barbed pump, use the large #12 EFI clamp. If using a small barbed pump, use the small #10 EFI clamp.</p>	
43	<p>Oil Lubrication</p> <p>Heat Gun</p> <p>9/32" Nut Driver</p> <p>Push the tubing over the barb, as shown.</p> <p>NOTES:</p> <ol style="list-style-type: none"> 1. Rotate and orient the fuel pump as shown. 2. Secure the tubing using the appropriately sized EFI clamp. 	
44	<p>Insert the OEM level sensor wire, through the fuel level sensor mount exactly as shown. Be careful as these wires can be brittle.</p> <p>NOTE: When installed, the 2 wires will be located on one side of the fuel level mount and the circuit board will be mounted on the other side of the fuel level mount.</p>	

45	<p>Insert the circuit board into the recessed area.</p> <p>Make sure the wires are on the opposing side of the fuel level mount, as shown.</p>	
46	<p>2.5mm Allen Wrench</p> <p>Using the supplied M4x0.7mm button head screws, secure the 2-bolt stainless steel "stay" bracket, as shown. It should be pushing the circuit board into the recess area of the fuel level mount.</p>	
47	<p>4mm Allen Wrench</p> <p>Using the provided M5x0.8mm socket head cap screws, install the fuel level sensor mount to the fuel hat, as shown.</p>	
48	<p>4mm Allen Wrench</p> <p>Install the fuel pump bracket using 3 of the M5x0.8mm socket head cap screws.</p>	
49	<p>Screwdriver</p> <p>Using the large provided stainless steel clamps, secure the "PUMP1" to the bracket, as shown.</p>	
50	<p>DUAL PUMP APPLICATIONS ONLY</p> <p>There are 2 different diameter convoluted tubes included for the (optional) second pump. One for small barbed pumps and one for large barbed pumps.</p> <p>Unlike the "PUMP1" tubing, these convoluted tubes will bend around and do NOT need to be cut.</p>	

51	<p>DUAL PUMP APPLICATIONS ONLY</p> <p>Note that there are 2 different sets of EFI clamps included for the pump connections, #10 (9-11mm) and #12 (11-13mm). These will match with the respective fuel pump barb and tubing diameter.</p>	
52	<p>Oil Lubrication</p> <p>Heat Gun</p> <p>9/32" Nut Driver</p> <p></p> <p></p> <p></p> <p></p> <p>DUAL PUMP APPLICATIONS ONLY</p> <p>Lubricate the pump outlet barb. Lubricate the inside of the tube. To temporarily loosen the tubing, either run the tube under extremely hot water or carefully use a heat gun.</p> <p>Push the pump barb into the end of the tubing and secure the tubing, as shown.</p>	
53	<p>Oil Lubrication</p> <p>Heat Gun</p> <p>9/32" Nut Driver</p> <p></p> <p></p> <p></p> <p></p> <p>DUAL PUMP APPLICATIONS ONLY</p> <p>Lubricate the fuel hat barb and the inside of the convoluted tube. Heat the tube and push over the barb, as shown.</p> <p>NOTES:</p> <ol style="list-style-type: none"> 1. Rotate and orient the fuel pump as shown. 2. Secure the tubing using the appropriately sized EFI clamp. 	
54	<p></p> <p>DUAL PUMP APPLICATIONS ONLY</p> <p>For proper fuel pickup height, "PUMP2" needs to be strategically located on the pump bracket. The end of the bracket (on the "PUMP2" side), should be 1.25" (32mm) from the bottom of the pump inlet.</p>	
55	<p>Screwdriver</p> <p></p> <p></p> <p></p> <p></p> <p>DUAL PUMP APPLICATIONS ONLY</p> <p>Allow the convoluted tubing to bend. Duplicate the connector orientation to "PUMP1".</p> <p>Using the large provided stainless steel clamps, secure "PUMP2" to the bracket, as shown.</p>	
56	<p></p> <p></p> <p></p> <p></p> <p></p> <p>Plug in the electrical fuel pump connector(s) and tuck the wires away.</p>	

57	Install the fuel pump filter sock(s).	
58	Insert the plastic armature wiper into the slot of the fuel level sensor mount exactly as shown.	
59	Insert the float's steel arm in the following sequence: plastic armature wiper -> fuel level mount -> plastic armature wiper -> fuel level mount To secure, clip the steel arm into the plastic armature wiper.	
60	Wire Stripper Strip the end of the OEM fuel level sensor wires. Be careful as these wires can be brittle. Slide the small diameter heat shrink tubes over the wires.	
61	Wire Crimper Heat Gun Crimp the provided small ring terminals to the wires. Cover the crimped area with shrink tubing and apply heat.	
62	3/8" Socket Secure the ring terminals to the "FUEL LEVEL SENSOR" studs using the provided lock nuts. NOTE: Fuel level sensors do not have polarity (they cannot be wired backwards).	

63	Cutter	<p>Using the small cable zip tie, secure the 2 fuel level wires to the fuel level mount, as shown (blue arrow).</p> <p>To test for any fuel level float interference, rotate the float arm through its entire range of motion. Also confirm there is no fuel pump interference with the protruding steel float arm (yellow arrow).</p>	
64		<p>Do not install the large OEM gasket under the active-side fuel hat. Instead, install the gasket to the fuel tank opening, as shown.</p> <p>When lowering the pump(s) into the active-side tank, allow the float to enter the tank first, then readjust the assembly and drop the pumps down into the collector bowl.</p>	
65		<p>Prior to installing the OEM fuel tank locking ring, be sure the "FRONT" fuel hat label is towards the front of the vehicle and the "REAR" fuel hat label is towards the rear of the vehicle. There are indication marks on the fuel tank.</p> <p>This will make sure the pump(s) are properly located and the fuel level float is free from obstruction.</p>	
66	Oil Lubrication 9/32" Nut Driver	<p>The outlet port has 7/8"-14 threads (10AN ORB). The preinstalled SAE quick connect male fitting is a direct connection for the E46 M3 feed line. Push-on to connect.</p> <p>For all other models/trims, the provided female SAE quick connector (shown red) will be required. Be sure to lubricate the O-rings prior to installing. To secure the OEM fuel hose, use one of the provided #15 (14-16mm) EFI hose clamps.</p>	
67		<p>WARNING: The OEM wiring is designed for 15A. Depending on fuel pressure and the fuel pump installed, the factory BMW wiring may become vulnerable. Use an independent relay and fuse with larger AWG wire to get the most out of the pump(s).</p> <p>This wiring schematic is using RADIUM P/N: 17-0031 (sold separately). NOTE: For brushless fuel pump controllers, use the manufacturer's suggested wiring diagram.</p>	
68	Cutter	<p>Low Current Single Fuel Pump Applications ONLY</p> <p>Cut off the OEM connectors keeping as much slack as possible (active-side shown).</p>	

69	Wire Stripper	Low Current Single Fuel Pump Applications ONLY As shown, strip 3/16" of insulation off the end of the wires (active side wires shown).	
	Wire Crimper	Low Current Single Fuel Pump Applications ONLY	
	Heat Gun	Excluding E46 M3, all models/trims will use the small heat shrink and small ring terminals for both pump and sensors.	
	Cutter		
		The E46 M3 (only) will use the large ring terminals and the large heat shrink for the OEM pump wires. NOTE: Cut the large heat shrink in half to make 2 useable pieces.	
		Active-side wires shown.	
70	8mm Socket	Low Current Single Fuel Pump Applications ONLY Secure the ring terminals with the included acorn nuts.	
		E46 Non M3 PUMP POSITIVE (White/Blue Wire) -> P1+	
		E46 M3 PUMP POSITIVE (Red/White Wire) -----> P1+	
		ALL OEM PUMP NEGATIVE (Brown Wire) -----> P1-	
71		DUAL PUMP APPLICATIONS ONLY	
		An independent relay and fuse MUST be used. This wiring schematic is using RADIUM P/N: 17-0031 (sold separately). It may apply unless the second pump will be staged by an adjustable pressure switch (Radium P/N: 20-0236) or an ECU trigger. Neither scenarios are detailed here.	
		NOTE: For brushless fuel pump controllers, use the manufacturer's suggested wiring diagram.	
72	8mm Socket	Secure the ring terminals for the passive-side fuel hat with the included acorn nuts, as shown.	
		NOTE: There is no polarity (it cannot be wired backwards).	
73			
74	10mm Socket Wrench	Connect the battery and turn the key to the ON position. Listen for the new fuel pump to confirm the electrical was performed properly and check for fuel leaks. If no leaks are found, start the vehicle. The engine may run rough for a few seconds until the air is bled from the system. Lastly, reinstall the metal cover and pop-in the carpet and seat.	
		INSTALLATION COMPLETE	
		NOTE: There will be unused leftover parts from the kit.	

75	Screwdriver	FUEL HANGER PLUMBING KIT	
	4mm Allen Wrench	Remove the 10AN ORB to barbed banjo fitting from the LH passive side tank inlet port.	
		Install the provided 10AN ORB to 6AN male banjo fitting into the inlet port, as shown.	
76	Screwdriver	Remove the 10AN ORB to SAE quick connect fitting from the RH active side tank outlet port.	
	5mm Allen Wrench		
		Install the provided 10AN ORB to 8AN male banjo fitting into the outlet port, as shown.	
77	13mm Socket	The fuel tank will need to be lowered slightly. If there is fuel inside, the tank will need to be supported.	
		First, remove the center screw near the drive shaft. Next, remove the 2 (RH and LH) fuel tank strap screws. These are at the rear of the tank.	
78	10mm Socket	Remove the steel fuel filter bracket under the vehicle. Disconnect the fuel and return lines and remove the fuel filter from the vehicle.	
	Screwdriver		
	Rag		
		NOTE: For late model vehicles, disconnect and remove the fuel pressure regulator and vacuum line.	
79	13mm Socket	Unscrew the 2 rearward fuel and brake line retainers.	
80		Pry all lines from the fuel and brake line retainers.	

81	<p>For the BMW E46, only the 2 plastic mounting nuts, shown in the picture, will be reused.</p> <p>NOTE: For BMW E36, nothing shown would be reused.</p>	
82	<p>Screwdriver</p> <p>To remove the fuel feed and return lines from the vehicle, first get into the interior of the vehicle. The OEM feed line is clipped onto the top of fuel tank in the center (under the sheet metal). Reach your hands into the RH and LH access hole openings one at a time. Feel for the fuel feed line and pull upwards to release.</p> <p>NOTE: For late model vehicles, remove the vacuum line.</p>	
83	<p>Oil Lubrication</p> <p>8mm Allen Wrench</p> <p>Thread Locker</p> <p>NOTE: Use a wicking thread lock, such as green Loctite.</p>	 <p>3AN Adapter For specially-made 3AN hoses</p> <p>1/4" Push-To-Connect For 1/4" OD semi-rigid tubing</p> <p>3/16" Hose Barb For 5/32" ID rubber hose</p>
84	<p>Oil Lubrication</p> <p>8mm Allen Wrench</p> <p>Temporarily spin the FPR onto the front LH fuel rail port.</p>	
85	<p>PTFE Paste</p> <p>15mm Wrench</p> <p>NOTE: This should be properly clocked quickly in a later step.</p>	
86	<p>PTFE Paste</p> <p>11mm or 7/16" Wrench</p> <p>NOTE: This should be properly clocked quickly in a later step.</p>	

87	<p>PTFE Paste</p> <p>3/16" Allen Wrench</p> <p>Oil Lubrication</p> <p>5/8" Wrench</p> <p></p> <p></p> <p></p> <p></p>	<p>Apply plumber's paste to the tapered 1/8" NPT plug threads. Hand tighten the plug to the FPR side port. Now add 1.5-3 turns with a wrench.</p> <p>Install the SAE quick connect the return port.</p> 
88	<p>Oil Lubrication</p> <p>7/8" or 22mm Wrench</p> <p></p> <p></p> <p></p> <p></p> <p></p>	<p>NOTE: Install the FPR to the rear fuel rail port.</p> 
89	<p>Oil Lubrication</p> <p>5mm Allen Wrench</p> <p></p> <p></p> <p></p> <p></p> <p></p>	<p>Install the 8AN ORB to 8AN male banjo fitting to the front fuel rail port.</p> 
90	<p></p> <p></p> <p></p> <p></p> <p></p> <p></p> <p></p>	<p>Install the fuel rail to the engine. Readjust all of the aforementioned fittings for optimal fitment.</p> 
91	<p>7/8" Wrench</p> <p></p> <p></p> <p></p> <p></p> <p></p> <p></p>	<p>Find the long PTFE hose (short PTFE hose will be used later). This will be routed in the same path as the OEM feed line.</p> <p>Starting from the RH active (RH) side opening, send the PTFE hose under the sheet metal towards the passive (LH) side. Now route the PTFE hose down (in front of the fuel tank) underneath the vehicle. Allow the hose to hang.</p> <p>Secure the PTFE hose to the active (RH) side outlet fitting.</p> 
92	<p>Oil Lubrication</p> <p></p> <p></p> <p></p> <p></p> <p></p> <p></p>	<p>Find the long rubber EFI hose in the kit. Starting from the passive (LH) side opening, route the rubber EFI hose down along the outer LH side of the PTFE fuel feed hose and underneath the vehicle. Allow the hose to hang.</p> <p>Lubricate the provided straight PushLok hose end barbs and fully seat into the hose, as shown. NOTE: PushLok hose ends do NOT require hose clamps.</p> 

93	11/16" Wrench	Secure the hose end to the active (RH) side return inlet port fitting, as shown.	
	13mm Socket Wrench	Reinstall the fuel tank hardware.	
94	13mm Socket	Route the new fuel lines along the OEM brake hard lines. Secure the hoses and lines with the 2 provided retainers.	
		NOTES:	
		1. For BMW E46, use the OEM plastic nuts, as shown.	
		2. The included stainless steel screws and bushings are specific to the BMW E36. These can NOT be used on the E46.	
95	Oil Lubrication	Lubricate the O-rings on the provided 10AN ORB to 8AN male fittings. Secure the fittings to the fuel filter ports.	
	Adjustable Wrench		
	1" Wrench		
96	Scissors	Remove the rubber sleeve from the OEM fuel filter and make a single cut down it's length as shown.	
		Slide the rubber sleeve over the Radium Engineering fuel filter body.	
97	10mm Socket Wrench	As shown, place the Radium Engineering filter inside the OEM fuel filter clamp.	
	1" Wrench		
	Adjustable Wrench	Attach the OEM clamp in the factory location and secure using the BMW nut.	
		Secure the PTFE hose (from the pump) to the fuel filter inlet.	
		Secure the other (shorter) PTFE hose in the kit to the fuel filter outlet.	
98	7/8" Wrench	When routing the (short) 8AN PTFE hose and the 6AN rubber return hose up in a LHD engine bay, be sure to keep away from the steering shaft. Looping them around the inside of the oil dipstick tube is recommended. NOTE: The return line can be clipped into the OEM feed line retaining loop.	
		Secure the feed line to the front fuel rail fitting, as shown.	

99	Hose Cutter	<p>Route the 6AN rubber return line up against the firewall and towards the fuel pressure regulator return.</p> <p>Cut the 6AN rubber return hose to length.</p>	
100	Oil Lubrication Screwdriver	<p>Lubricate the barbs on the provided SAE quick connect hose end. Fully insert the return hose and secure the SAE quick connect hose end using the included EFI clamp, as shown.</p>	
101	Hose Cutter	<p>Push the SAE quick connect hose end onto the FPR return fitting until in locks in place.</p> <p>Route the provided vacuum hose for best fitment.</p> <p>NOTE: Some BMW engines do NOT plumb the FPR to vacuum (intake manifold). Instead they route upstream of the throttle body to the intake pipe (not 1:1 fuel pressure).</p>	
102	10mm Socket Wrench	<p>Connect the battery and turn the key to the ON position.</p> <p>Check for fuel leaks. If no leaks are found, start the vehicle. The engine may run rough for a few seconds until the air is bled from the system.</p>	
103		<p>Turn the fuel pressure regulator knob (shown) clockwise to increase pressure and counterclockwise to decrease pressure.</p> <p>After the engine is fully warmed up, verify fuel pressure.</p>	
104	10mm Socket Wrench	<p>Use the cable zip ties to secure the hoses away from moving parts. Reinstall the metal fuel filter cover (shown).</p> <p>Reinstall the RH and LH metal covers. Pop-in the carpet and the rear bench seat. Reinstall the cabin filter tray.</p> <p>INSTALLATION COMPLETE</p> <p><i>NOTE: There will be unused leftover parts from the kit.</i></p>	