

# PSDesigns

## Bespoke Velocity Stack S54 Installation Guide.

Thank you for your purchase. Please take the time to read this guide prior to installation.

Please note, some existing OEM pipes, connectors and fittings are required for installation. This guide will instruct how to modify these parts from your car for use in this installation process.

If you have any questions please email us at [info@psdesigns.global](mailto:info@psdesigns.global) and a member of our team will be happy to assist you.

Kit contents:

- 6 Bespoke Velocity Stacks
- Modified Intake Air Duct
- Oil Catch tank
- Oil Pipes and fittings
- Velocity Stack ITG Filters x6
- Idle Control Air Filter
- IAT (intake air temperature) Sensor and wiring harness
- Carbon Fibre Heat shield (IAT location)
- Intake Boots x6
- Air Feed Pipe
- Jubilee Clamps x12
- Silicon Vacuum Line Blank
- Billet Oil Return Feed Blank and Pipe
- Cable ties, fixings and connectors
- Instructions.



*Necessary preliminary tasks:*

Disconnect negative battery lead at the battery.

•

Remove Strut Brace if fitted.

•

Disconnect MAF Sensor from Intake and remove

•

Remove intake filter housing.

•

Remove Intake Elbow from Inlet manifold (airbox) and Air filter housing.

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Remove nearside radiator cowl as this improves the flow of air to the Stacks once installed

*Note:*

**Vehicles with SMG transmissions only: A replacement SMG reservoir will be required, as per the BMW E46 CSL.**

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Open electronics box cover

•

Detach relay (1) of hydraulic pump

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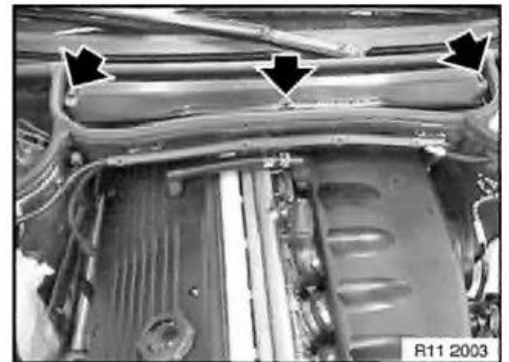
Disconnect line between expansion tank and hydraulic unit from intake manifold

**Important!**

Reinstall relay (1) of hydraulic pump only after connecting line between expansion tank and hydraulic unit.

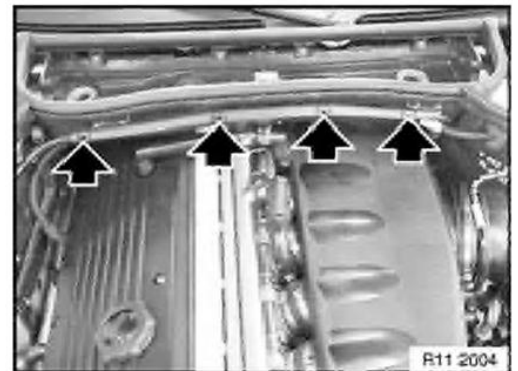
E46 only:

Remove microfilter.



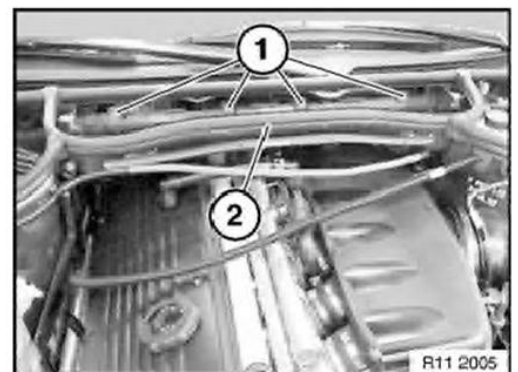
E46 only:

Open cable duct on lower section of microfilter housing and feed out cable(s).

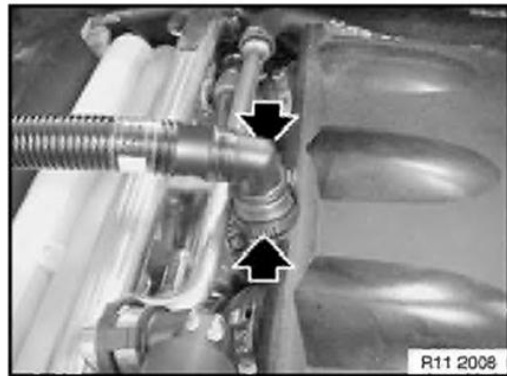


E46 only:

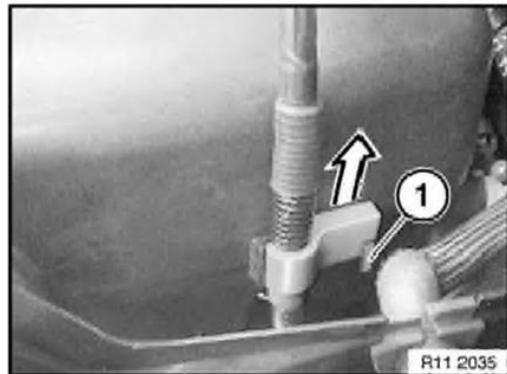
Release screws (1) and remove lower section of microfilter housing (2).



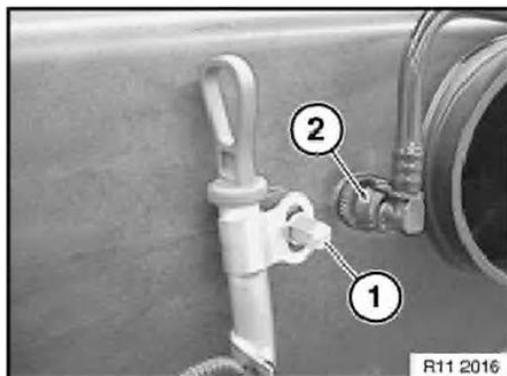
Press locks.  
Remove hose for engine vent. This Vent hose will be modified later in the installation.



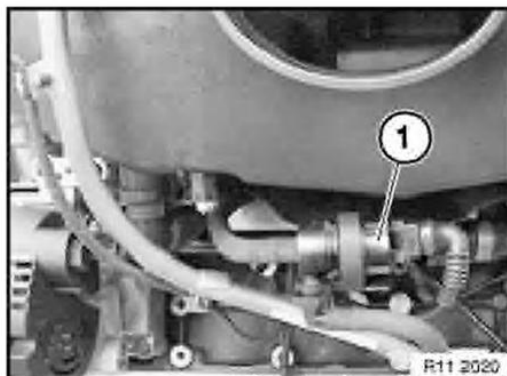
Gently raise lug (1) and slide holder upwards.  
Feed out battery positive lead.



Detach guide tube (1) for oil dipstick from intake air manifold.  
Press locks on vacuum hose (2) and detach. This vacuum hose will also be modified later in the installation.



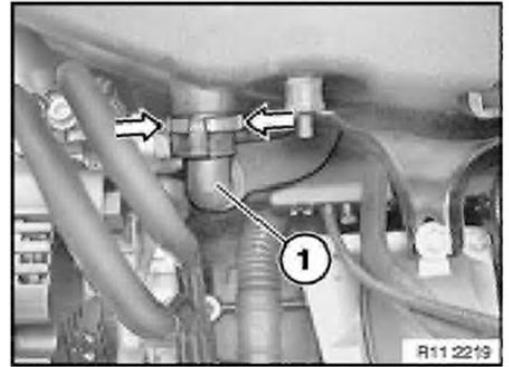
Detach tank venting valve (1) from holder on intake air manifold.



Release support bracket at front and rear from intake air manifold. These mounts will be required later. Remove them from the airbox and keep to hand.

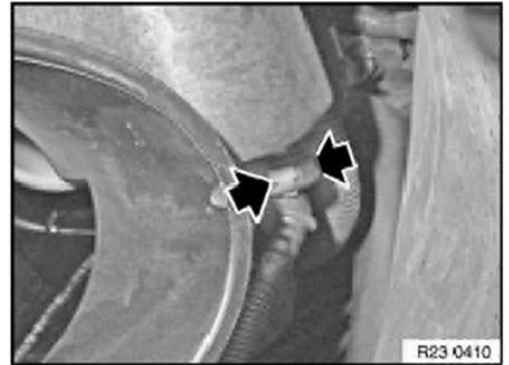


Press lock. Detach hose (1) from intake air manifold. This is the air feed to the Idle Control valve and will be filtered later in the installation.

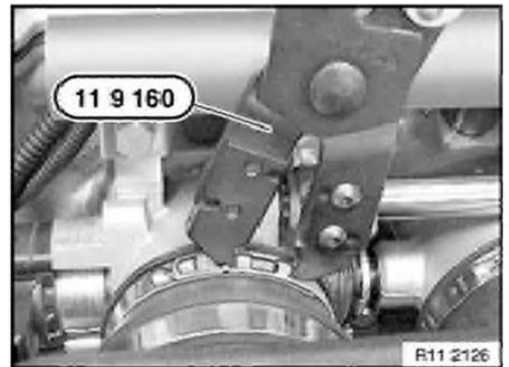


**(SMG ONLY)**

Disconnect hydraulic fluid connecting hose:  
Press locks.  
Detach connecting hose to hydraulic unit tank connection.



Place special tool 11 9 160 as shown in illustration on lugs of clamp. Alternatively, a flat bladed screw driver or pick can be used to pry the clamp apart.

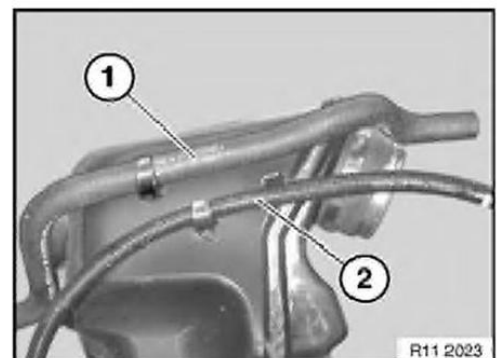


Press locks and detach oil return pipe (1) from Engine.  
Note:  
For purposes of clarity, shown on removed engine.  
This pipe will require modification later in the installation.



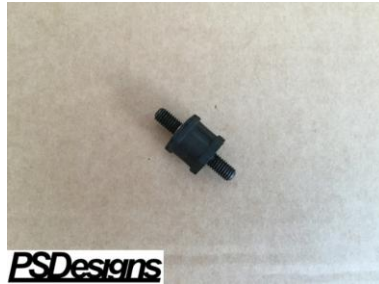
**Note:**

For purposes of clarity, shown removed from engine.  
A vacuum line (1) and a wiring harness (2) are clipped into place on the reverse side of the intake air manifold (airbox).  
Raise intake air manifold slightly and detach from throttle assembly.  
Feed out vacuum line (1) and wiring harness (2).  
Remove intake air manifold assembly and set aside.



Once the existing intake manifold has been removed as above, the Velocity Stack Conversion may begin.

Begin by installing the fittings for the IAT sensor bracket. These are removed from the underside of the airbox earlier in this guide, and can be seen in fig.1. These are replaced onto the airbox lower mounting bracket and secured using the M6 nuts and washers supplied. See fig. 2



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fig 1

Mounting fittings installed on lower airbox bracket



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fig 2.

The Ramair Idle Control Filter can now be slid over the Idle control valve inlet pipe. Push the pipe and connector inside the supplied filter as seen in fig.3. The tank vent valve can now be secured to the bracket with a cable tie. There is no need to secure the filter, it will not move and the IAT bracket/Carbon heat shield will help hold it in position. Now install the IAT bracket or optional heat shield and sensor (refer to the supplied Instructions for details.)



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Tank Vent Valve secured to bracket

Air feed for Idle Control Valve



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fig.3

The oil return pipe removed earlier now needs to be sealed as there is no return from the airbox (removed for installation). The billet blank, pipe and clamp used for this are shown in fig.4



fig.4.

The oil return pipe should be removed from the engine bay and disconnected from the airbox for modification. Once removed, trim to look like fig.5



fig.5.

Slide the supplied oil return blank over the pipe and tighten. see fig.6 refit to the engine.



fig.6.

The brake vacuum pipe requires modification. Remove the pipe from the engine bay. it will look like fig.7.



fig.7

The airbox side of the pipe needs to be trimmed as per figs.8 and 9. Take care when using knives.



fig.8



fig.9

The supplied vacuum blank now needs to be installed over the connector, (please note the green hose will most probably be black on your car and should be ignored if not removed from the car) reinstall in the engine bay. See figs. 10 and 11.with the blank in place (shown under the vacuum valve). reconnect the electrical connector. It should look like fig. 11.



fig.10



fig.11.

Vacuum Blank

The engine breather pipe (removed during the removal of the airbox) requires modification. The only part required is the connector. This is cut from the pipe work in a similar way shown in the steps for the brake vacuum pipe modification. Once complete you should have the same as shown in fig.12.



fig.12.

Using the pipe work supplied insert the connector into the silicone pipe connected to the oil breather pipe. see figs. 13. and 14.

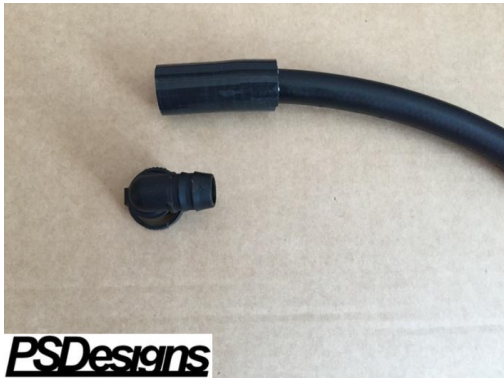


fig.13



fig.14.

Install the catch tank (fig.15) in a suitable location (refer to fig 17 for reference). My preferred location is in place of the secondary air pump, however that requires the pump to be deleted, coded out and a custom bracket. Alternatively locate the tank in a suitable location (preferably below the connector on the top of the engine), Suitable locations are on the vehicle bulk head, next to the cars electrical box or low down in the engine bay near the freshly installed IAT bracket. Connect the oil pipe to the catch tank (shown in fig. 15.) use the other pipe supplied to connect to the vent side of the tank. (it doesn't matter which connections are used for inlet or outlet) This will vent to atmosphere and doesn't require a filter. We suggest that the vent pipe is directed to the underside of the car to avoid fumes being ingested to the cabin.

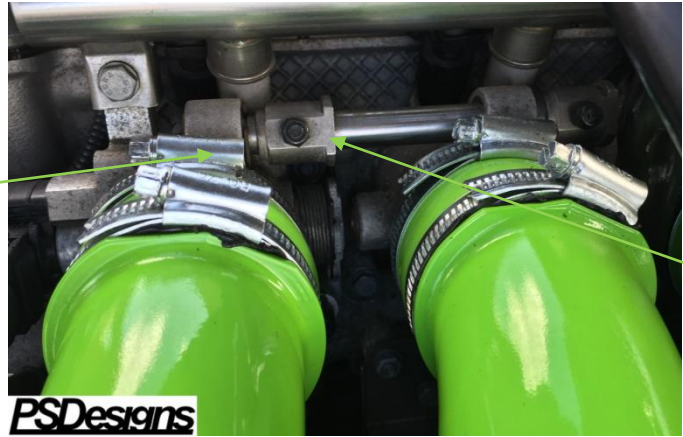


fig.15.



Next the trumpets can be installed. Working from the rear of the engine bay, slide the intake boot over the throttle body and tighten the clamp, taking care not to over tighten the clamps. Ensure the clamps do not foul the throttle rail. see fig. 16.

Clamp located away from throttle linkage.



Throttle linkage.

fig.16.

Once all 6 velocity stacks are installed and the clamps are tight, the strut brace, pollen filter housing and modified front air duct can be reinstalled. It should look similar to fig 17. This is a good time to install the supplied air feed pipe, this slides down into the front air duct and helps direct cool air into the path of the velocity stacks.

Possible Catch Tank Location

Brake Vacuum Blank installed



Relocated Dip Stick

Possible Catch Tank Location

fig.17

Modified front Air Duct

Air Feed Pipe

Installation is now complete. Please note the vehicle will run but will require an Alpha-N map to work efficiently and correct any engine warning lights displayed..

Thank you for your purchase, I hope you enjoy your new PSDesigns bespoke velocity stack conversion.