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REF: Engine Mechanicals - Sub-05D

Converting Head Breathers to Cam Chest Breather

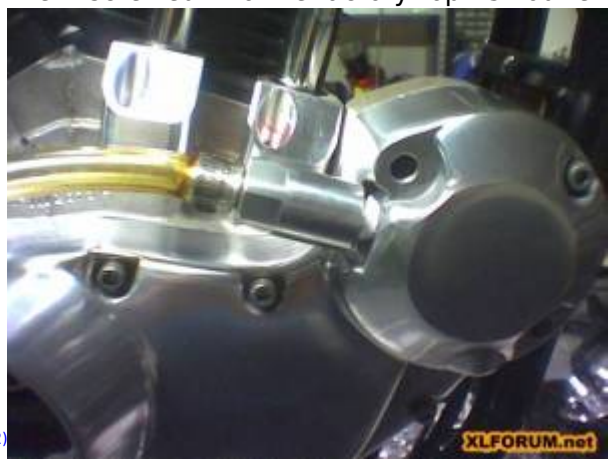
Also see Crankcase Ventilation in the Evo section of the Sportsterpedia for pics and info on the OEM breathing system.

Background:
There are a couple of threads about issues with oil consumption and crankcase breathing that contain the historical discussions that led up to this modification.
For reference, here are links to those two threads;

- Oil Usage 04s and up and oil use ;
- New Crankcase Vent Install new crankcase vent - 04+
  See this mod also in the Sportsterpedia: Adding a Vent Between the Oil Tank and the Cam Chest.

Pre-'91 XLs have the breather vent in the cam cover from the factory located on top of the cover. [1)]
So the 45° angle of the part is designed for those bikes.
L84-90 models have benefitted from adding a simple vent line to the small plug at the 6 o'clock position.
This mod is modeled on the pre 1991 breathing system and does for the post 1990 XLs what the kit from Krankvent does for the pre 1991 XLs.
The inline krankvent valve is used as the one way valve.

The pic on the left below shows the 1985 breather line coming out at the 10 o'clock position going up to the air cleaner.
The pic on the right is an 88 model with a Krankvent screwed into the factory top 45° outlet in the cover:


[2)]


[3)]

You can remove the plug and install a hose fitting there in addition to the the vent on the top.

It eliminates the “oil in the air cleaner” problem even with the original breather hose still installed.
A drop or two of oil that drips underneath when parked is the only downside that's been noticed.
In the first pic below, you can see the new hose coming out of the bottom of the circular part of the cam cover.
A hose bung was installed there with the line running under the engine.

83 model with an extra vent hose installed on the bottom of the cam cover:
The original vent on top is still piped to the air cleaner with no oil entering it.

4)

5)

Earlier models have more mechanics inside the cover to go along with those vents that shield it from the oil spray in that location.
91-up models don't have those breather mechanical parts in them.
The location of the breather vent in the front of the cam cover was chosen as the least oil laden area available there.
You can easily fabricate a shield to block the oil spray from the front cam.
The 90° Krankvent is used below.

Installing the Ultimate Crankcase Vent

See also Wet Sumping in the REF section of the Sportsterpedia.

The Deimus Mod:
This mod was an attempt at venting the newer motors better than the OEM setup. 6)
It was done to try and solve the problem of oil dripping out the vent hose.
When engine breathing has been compromised, oil gathers in the rocker box breather valves on it's way toward the breather vents.
Some believe this is responsible for swamping the valve seals and then getting high oil consumption.

This mod allows the head breathers to be blocked off by the introduction of a vent in the cam cover.
The cam chest vent is hidden by the exhaust for the most part.
It's also visually less impactful than the plumbing that most have attached to their heads today.

The performance of this vent has proven to work and last very well according to it's originator.
Some people may perform this mod purely for the aesthetic gains while others may do it for the performance gains.

Making changes like this to an engine isn't for everyone and some drilling and tapping is required.
This mod has proven NOT to stop condensate droplets (water vapor and oil) from coming out of the krankvent however. [7)]
The Krankvent does increase the noise level a bit. It sounds like a whistle (chirp, chirp, chirp, chirp). [8)]
Below is a 'how-to' for anyone that wants to install this crankcase breathing setup. [9)]

This is actually a pretty simple fix. [10)]
You don't need to touch the oil tank nor any oil lines.
One would only need to close off the head breather with solid 1/2“ bolts.
Then drill and tap the new vent hole in the cam cover.
Fashion a splash guard in the cover and install the fitting, hose, PCV valve, and final hose.

- **Things needed**:
  - Two 1/2” bolts (13 thread count) for closing off the head breathers (length of above bolts depend on how your air cleaner is mounted)
  - One 1/8” x 5/16” 90 degree NPT fitting (chrome one at JP Cycles)
  - Teflon thread seal tape
  - Approx 18” of 5/16” hose
  - PCV valve (I used the Krankvent ETSE valve)
  - Three small hose clamps
  - Piece of scrap aluminum bar thick enough for practicing on
  - Piece of sheet aluminum for making the oil baffle (I used .016” thick piece from the hardware store)
  - New cam cover gasket
  - 11/32” drill bit
  - 1/8” NPT tap (for cutting threads in hole)
  - Center punch
  - Factory service manual for reference

- Before beginning, I recommend that you drill and tap some practice holes in the scrap aluminum bar. Be sure you can drill a round hole and tap 1/8” NPT threads that hold your 1/8” x 5/16” fitting securely. I found that the best hole was achieved using a drill bit that had a center point and little cutting ears on the edges. When I used a traditional drill bit in my hand drill, the holes would come out with a “lobed” appearance.
- Remove your cam cover according to the procedures in your factory service manual.
- Using my photos as a reference, mark the place to drill the cam cover with the center punch. Then drill and tap the hole. Drill slowly and carefully to control the mess made by the drillings. Clean these thoroughly from the cam cover. I used brake cleaner to wash out the metal particles.
- Wrap the threads of the fitting with teflon thread tape, and install the fitting.
- Using my photos as a reference, cut a piece of the aluminum sheet and bend it into the shape of the oil baffle splash guard. This should fit tightly in place. Install this in the cam cover. This baffle will shield the fitting from any direct oil spray that might come off the front cylinder exhaust cam gear.
- Reinstall the cam cover using a new gasket according to the procedures in the factory service

manual.

- Cut a piece of 5/16” hose approximately 7 1/2” long and attach it to the fitting on one end and to the PCV valve on the other with clamps. Be sure that the flow direction of the PCV valve is allowing air to exit the crankcase.
- Attach a second piece of 5/16” hose to the PCV valve with a clamp that will serve as the final drain section. I used a piece about 10” long and ran it beside the lower frame tube and over the frame rail. I zip tied it to the frame tube so any moisture would drip out of the track of the tire.
- Secure the PCV valve to the oil feed line with a zip tie so it remains stationary.
- While I know this last step is “optional”, I recommend that you block off the breathers in the heads. To do this, replace the banjo bolts with the solid 1/2” bolt. With the crankcase breather you just installed you no longer need the head breathers. And since your umbrella valves are prone to failure, it is best just to have the head breather ports blocked off. As an added benefit, any gasses that might need to be vented from the rocker boxes will assist oil drainage as it travels down into the crankcase and out the new vent.

Caution: The rocker box should be loosened / removed before removing the cam cover to prevent damage to the cam bushings.
See Removing the Rocker Boxes in the Evo section of the Sportsterpedia.
See also Removing the Cam Cover.

Mark, drill and tap the hole in the cam cover for the 90° fitting. [11)]



Fabricate an oil baffle. [12)]

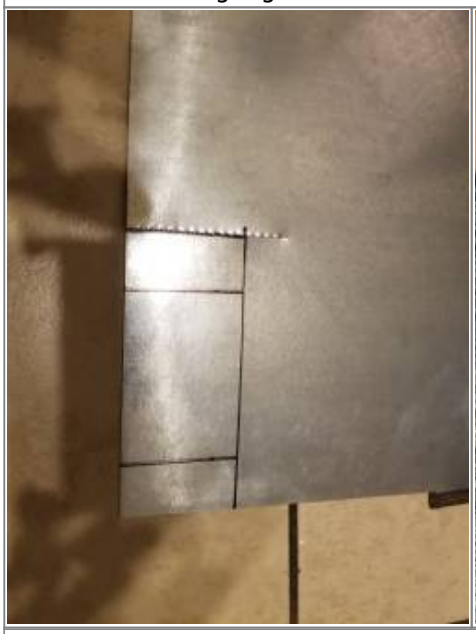


Alternate way of making the baffle: [13)]
The wings were initially 1” inward each before bending.

While fitting, they were cut back to 1/2“ each and the side with the fitting was cut again at about a 1/4” for clearance of the fitting.
This baffle started out with as piece 5“x2” cut sheet metal, bent an inch on each end for the wings.
5/8“ of the bottom of the flaps were cut off.
The cover tapers roughly 45° in and down at that point from there down to bottom.
A Dremel rotary tool was used to round all edges and the corners slightly.
It was tight to the bottom then another 1/8” was cut because it was just flush with the gasket surface (dropped it slightly).

The baffle should be pretty snug when installed. You should have to lift a little on one side then the other back and forth to remove it.
The sheet metal was bent with my a small hand brake then the flaps were trimmed to fit.

26 gauge sheet metal cut 2“ wider than the cover length and trimmed for a tight fit. [14)]



Route the hoses and install the Krankvent. [15)]



Other pics of this mod from XLF members

Baffle


16)


17)


18)


19)


20)


21)


22)

Line Routing


23)


24)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26)


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28)


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1)
Deimus of the XLFORUM
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2)
photo by spammer80 of the XLFORUM
3)
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6) , 9)

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8)

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10)

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11) , 12) , 15)

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[21], [22], [36], [37]

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[24], [25], [26]

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[27], [28], [29]

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