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IH: Engine Mechanicals - Sub-09A

Sequence of Installing IH Motor Mounts

From the Service Manuals

The ironhead factory service manuals lay out the procedure for 'stripping the motorcycle for repair'. This covers the procedure for removing / installing the motor and also includes the motor mounts. However, the whole story is not in the manual.

You can induce added vibration and potential for cracks in the mounts or cases if the mounts aren't installed properly.

Below is the procedure from the manuals for removing and installing the mounts. [1\)](#) [2\)](#) [3\)](#)

To remove the motor (given all other particulars have been removed as this is strictly regarding the mounts themselves);

1. 57-78:
Remove top engine support bolt located between the cylinders.
Be sure to note how many shim washers are between the head bracket and the frame lug so they can be re-installed with the engine.
79-85:
Remove the rear top engine support bracket and then the front top engine support bracket.
On 83-up engines, remove the VOES and then the rear top mount.
2. Remove the right crash bar bolt (if equipped).
3. Loosen but do not remove the top front bolt from the lower left plate.
4. Remove the three remaining bolts and left crash bar bolt (if equipped).
5. Remove the two top bracket support bolts (1 from each head) along with the bracket assembly.
6. Remove the two top rear engine mounting bolts and regulator ground strap.
7. Remove the stoplight switch (66 and earlier), rear brake lever and spring (74 and earlier) and gear shift foot lever (75-up).
8. Remove left footrest 78<.
9. Remove the two bottom rear engine mounting bolts.
10. Remove the top left bolt from the lower mounting plate.
(The 79-85 FSM simply states to remove the hardware that attaches the front and rear of the engine to the frame).

To install the motor (Again, this is strictly regarding the mounts themselves and all other parts will need to be addressed that were removed);

The 79-85 FSM doesn't give instructions on putting everything back together.

1. Install the right crash bar bolt (if equipped).
2. Install the two bottom rear engine mounting bolts
3. Install the two top rear engine mounting bolts and regulator ground strap.
4. Install the top left bolt from the lower mounting plate.
5. Install the three remaining bolts and left crash bar bolt (if equipped).
6. (It's assumed to tighten) the top front bolt from the lower left plate.
7. Install the stoplight switch (66 and earlier), rear brake lever and spring (74 and earlier) and gear shift foot lever (75-up).
8. Install the two top rear engine mounting bolts and regulator ground strap.
9. 57-78:
Install the 2 top bracket support bolts (one on each head) along with the bracket assembly and the top engine support bolt located between the cylinders.
(Be sure reinstall the correct amount of shim washers as removed).

Further Explanation on Installing Motor Mounts from XLForum Members

When following the manual procedures, it's possible and actually common to tighten everything up only to find the motor position has cracked the rear mount.

Your motor needs to be "cradled" in the frame. ⁴⁾

If it's just put in and tightened up it could be out of alignment and stress one area more than others. That can set up a harmonic that gets worse at a specific rpm range. The way the rear mount is designed, it determines the motor location. ^{5) 6)}

The rear mount has to be tightened first, then the other mounts.

It's possible to probable that most rear mount breakage can be attributed to improper assembly techniques, broken frames or loose / missing mounts.

You cannot "pull" the rear mount into place against the other mounts as it will break the mount due to the high amount of leverage from the other mounts.

The front frame tubes may spring sideways slightly but that is the only allowable "pulling".

All mounts should fit nicely and naturally before tightening.

1. The rear mount is fixed (as in not adjustable).
It has to be tightened first to the motor (snug the top 2 bolts, tighten the 3 lower nuts / bolts then tighten the top 2).
Then tighten the 4 frame to mount bolts before even installing the other mounts.
See [Rear Mounts](#) on the main IH Motor Mount Page for more details.
2. After the rear mount is tightened, then install the front mounts.
Take care to keep the motor in it's natural position after rear mount is tightened. Do not pull or wedge the motor against the rear mount.
If things don't fit right, perhaps the frame is bent or the rear mount position on the motor needs to be adjusted (which is difficult if not impossible).
Keep in mind that all bolts must go through all of the parts without any binding AFTER the rear mount is tight.
Work on any front bolt holes with a rat tail file to slot any holes in the plates that do not line up perfectly.

(The bolts must pass through with no interference).

Pay special attention to the use and correct positioning of front mount spacers and grippy washers (OEM recommended).

NOTE:

There are many aftermarket front mount bolts that are longer to facilitate installing forward footpeg mounting brackets that get sandwiched with the mount plates.

Do not install a long bolt in the front mount upper rear position (you'll break the cases!).

See [Lower Front Mounts](#) on the main IH Motor Mount Page for more details.

3. After the front mount bolts are tightened, install the top mounting bracket(s).

Shim any gaps in the upper mount(s) or slot bolt holes as needed with large diameter washers.

[Click Here](#) to read more on shims in the Sportsterpedia.

See [Top Mounts](#) on the main IH Motor Mount Page for links to more details per year model.

All Else Fails

There is sometimes some wiggle room on the rear mount. ⁷⁾

Loosen all the bolts slightly and give it a yank in the direction you need hold and tighten.

DO NOT pull things into position or jam bolts in under pressure!

The bolt holes must line up naturally or the rear mount will break in use.

Don't get in a rush, it will be costly later (regrets if nothing else).

You don't have time to NOT do it right. It will NOT get done later and will leave you beside the road when it breaks.

Put it together right the first time, or you will be forever breaking down.

Another way to do that is to hang the motor by the center (head mount) on the frame. ⁸⁾

Use no washers, leave the front mount bolts out and the front mounts loose at the engine.

Start all of your rear mount bolts but don't tighten them up yet. Start all of your front mount bolts but leave them loose.

Now tighten up the rear mount bolts evenly until the rear mount is seated and torque the bolts.

Snug up the front mounts but not tight. Remove the top mount and add washers until you have about 1/32" play at the top mount.

Tighten front mount bolts, frame and engine. Tighten top mount and you are done.

And a Little Sage

Please note that a well tuned IronHead does not make any noise. Rather it is a symphony of sounds and, when well set up, you can hear all of them - the valve train, the intake, the exhaust. ⁹⁾

A few decades back, I rode with a bunch of established riders that gathered at an indy shop on Sunday mornings. One day a young longhair showed up on an XL Roadster and asked if he could tag along. I was usually up front as the "Road Captain" and he was catching dust in the back. He gathered respect soon enough and I paid some more attention to him and his lovely wife. I noticed how long he had to crank the starter before it would run and then sometimes pop, spit and stall. I had my '76 CH with an extensively modified Super B, 10.5 Wiseco's, Morris Mag and 2>1 Jardine header. We would all wait for him to get

running and then start ours. Mine would lite right up and do the symphony. His would shake, rattle and roll. It was that way for most of that season and he seemed to think that's how it was supposed to be. I finally felt comfortable enough with this person to ask if I could tune up his bike and he agreed. We did a top to bottom adjustment/tune up while I instructed him on how to keep it running right. It ran smooth, started easily and did the potato potato. He called me as soon as he got home and couldn't believe the new power and how much better it sounded at stop lights. He had the symphony. ¹⁰⁾

The next Sunday I was on route to the shop/ride, rounding a curve on a highway and saw 2 riders on the shoulder. One in a full out leather suit with a sport bike and the other my longhair pal. He was accelerating off a ramp, digging on the power and the symphony as never before. He hit third and his big end rod bearings grenaded. His motor had run so bad for so long it just could no longer take the power it was actually designed to produce. The sport bike rider had stopped to help. For all you guys that are new to the righteous world of Ironheads and their various peculiarities... Noises, as unpleasant as they may be, need to be diagnosed and addressed as soon as possible. Damage is being done anytime a motor isn't running correctly. Don't just assume it's an old design and supposed to be noisy. If you don't have the symphony, find someone who can help you get it. ¹¹⁾

Installing your Iron Head Engine.

Let's break the mount install into two procedures. ¹²⁾

1. **Mount to Frame.** You see that the mount has a machined surf that sets an a machined shelf on frame. That interface is what sets the mount 'square' to frame.
2. **Mount to motor** interface sets motor square to mount. Add the two together and the motor sits square to frame. That's important as it sets the motor's center of gravity over the frame centerline . = a light feel on the road.

- 1. **Mount to Frame.**

- When you install a motor in the frame, the first thing is to do is drop the mount on that shelf.
- Then you install the 2 upper bolts with their lockwashers. As you draw those bolts up the motor rises off the frame tubes.
- Once the top bolts have almost drawn the mount to kiss frame casting, you go for the lower bolts and lockwashers.
- That's where the issue (if there is one) will show in lower bolt misalignment.
- The dry fitting is to make sure the mount holes align with the frame holes and all 4 bolts catch thread. If they dont catch, now is the time to rectify.
- When the actual engine is installed, you will do the same - top bolts almost drawn and lowers started, then tighten top bolts.
- Motor is now registered correctly. Tighten lowers.

Make sense so far?

The below procedure get's done on the bench previous to motor install.

- 2. **Mount to motor**

- 7 fasteners, three studs/nuts, 2 bolts with lock washers, and two oil tank stand-off with lockwashers.
- Slip mount in place and reinstall the 3 studs then remove/loosen nuts so mount is free on studs.
- Install the two top bolts and lock washers. Tighten to crush lock washers 1/2 way. Do the

same with the standoffs.

- The 1/2 crushed lockwashers will keep the mount in contact with case.
- Now tighten stud nuts (don't forget the clip for chain oiler).
- Now tighten the 2 bolts, then the standoffs. be careful here too. Screw machine stock again the stand offs wont take as much torque as regular bolts. Following this assures the mount registers to cases correctly.
- Install kicker shaft and big gear. Tighten nut and bend lock tab.
- Kicker shaft oil seals have been obsolete. What do you have for this?
- Once kicker shaft is in, install motor in frame. Do top end re-assembly and primary assembly with motor in frame.

That's how to get motor in frame correctly. But, prior to motor install make sure kick stand and tab is up to the next 50yrs of service. Bent tabs allow bike to lean excessively. Bikes that lean too much are hard to start and can break crankcases if stand head flexes into case during kickstarting.

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1957-1969 Sportster XL/XLH/XLCH-900 FSM pg 70

2)

1970-1978 HD Sportster XL/XLH/XLCH/XLT-1000 FSM pg 3-8

3)

1979-1985 HD XL/XR-1000 FSM pgs 3-11, 3-60

4)

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<https://www.xlforum.net/forum/sportster-motorcycle-forum/sportster-motorcycle-era-specific-and-model-specific/ironhead-sportster-motorcycle-talk-1957-1985/154551-iron-vibrations/page3?t=1659782&page=3>

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<https://www.xlforum.net/forum/sportster-motorcycle-forum/sportster-motorcycle-era-specific-and-model-specific/ironhead-sportster-motorcycle-talk-1957-1985/130889-rolling-basket-case-saga-now-it-s-the-rear-motor-mount/page2?t=1384261&page=2>

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<https://www.xlforum.net/forum/sportster-motorcycle-forum/sportster-motorcycle-era-specific-and-model-specific/ironhead-sportster-motorcycle-talk-1957-1985/130889-rolling-basket-case-saga-now-it-s-the-rear-motor-mount/page4?t=1384261&page=4>

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<https://www.xlforum.net/forum/sportster-motorcycle-forum/sportster-motorcycle-era-specific-and-model-specific/ironhead-sportster-motorcycle-talk-1957-1985/187256-hard-to-get-engine-in-new-hardtail/page5?t=2000446&page=5>

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<https://www.xlforum.net/forum/sportster-motorcycle-forum/sportster-motorcycle-era-specific-and-model-specific/ironhead-sportster-motorcycle-talk-1957-1985/189431-ironhead-noise-i-know-i-know?t=2018764&highlight=Symphony>

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<https://www.xlforum.net/forum/sportster-motorcycle-forum/sportster-motorcycle-era-specific-and-model-specific/ironhead-sportster-motorcycle-talk-1957-1985/189499-noise-vs-symphony-long-post-from-an-old-fart?s=48f65af3f853cf3505d2ed16f702bb61&threadid=2020041>

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<https://www.xlforum.net/forum/sportster-motorcycle-forum/sportster-motorcycle-era-specific-and-model-specific/ironhead-sportster-motorcycle-talk-1957-1985/173827-crankcase-drain-plug/page4?t=1864035&highlight=Ironhead+Crankcase+Drain+Plug&page=4>

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