

Ok, It's hard to tell, but here's what I come up with after looking at pics and reading the net. (kudos to srcinc.net)

The XR has two oil pumps, mounted on the same shaft, driven directly off the end of the crank with no reduction. The pumps volume will always be directly related to the cranks rpm, not the gear you're in. The first one, we'll call it "A", is the one that you can see when you change the filter. Behind it, is one with a larger volume. We'll call it pump "B". There is no direct flow connection between the two.

Pump "A" gets it's oil from the bottom of the oil reservoir, via the downtube screen, and oil filter. Pump "A" supplies the volume and pressure necessary to lube the engine and transmission. It feeds galleries that go to the valve train, crank bearings and rod, transmission bearings, and is splooped into the base via a jet for skirt and small end lubrication. The base (area around the crank for this subject) is separated from the transmission. A one- way reed valve in the base allows the used oil to be forced out with the pressure created by each downward piston stroke. This eliminates "windage", which robs and engine of horsepower. Ever try running in deep water? That's what oil does to the crank while it tries to spin around. This oil is fed back into a sump to be reused.

Pump "B" is more than twice the thickness than "A". The reason for this is simple. Remember that both pumps are on the same shaft. All of the oil that has exited the crank area, and dropped down from the tranny, is collected into a sump at the lowest point in the cases, you can see the spot from outside the bike . It's the point where frogs get wedged between the engine and skid plate, and a few days later an odd smell, vaguely reminding you of KFC, begins emanating from the garage. Any way, pump "B", with it's high volume, draws all this oil through the second screen in the engine, a bigger flat one that can only be accessed by removing the RH crankcase cover (not the clutch cover, but the big one behind it). The pump then fires the oil up the long metal tube up the side of the frame, dumping it into the reservoir. Pretty simple huh? We've already followed the oil through one use.

There is a second one way valve located in the cases, labeled as a check valve, located behind the oil pump, that appears to allow oil to be blow into the sump if there is excess pressure. Possibly it is there to prevent pump damage for us freaks in the north that have to start our bikes in below zero temps.

Anyway, here's the short story. Oil looks to be gravity and suction fed from the reservoir, through the downtube screen, the filter, and then into the "A" pump. "A" pump sends it to the engines vitals. All the oil eventually finds it's way through the internals to the catch basin at the engines lowest point, where it is sucked through another screen into "B" pump which dumps it back to the starting point in the reservoir. Because "B" pump has a much higher volume than "A", it cleans the sump of oil faster than it is supplied. This is what makes the BRP engine a "Dry Sump" engine. Remember trying to run in the swimming pool? That oil that would slow the crank, also will slow the transmission. It's all part of what makes this powerplant the beast that it is. The two screens safe guard the pumps from ever getting something it can swallow, or debris from clogging it's supply or exit. I have even found goldenrod in the downtube screen, which shows the screen suits it's purpose. That also tell the guys who believe the crankcase vent doesn't have to be filtered that they may want to rethink their ideas, but that's another thread.

The dry sump is the reason for checking the oil after the bike has been run. You've all seen the newbies who don't read their manuals that have had to ask why they are pumping oil from the CS seal and airbox. When the bike sits, all the oil eventually drains from the reservoir back into the cases. It does so slowly, as the only exit is through the tight tolerances of the "A" pump. These tolerances are less than .10mm at the smallest point. It gives you more than enough time to shut down the bike and check the oil. No lightning speeds needed here.

Now that you understand how it works (I hope) I'll point out three things.

The First Point concerns the bleeding procedure brought up by Lloyd. This only my opinion, so don't hold me to it. I'm anxious for when he gets the whole story from his service manager. As I mentioned before, and you've all seen yourselves, the oil in the reservoir seeps down to the engine when it is not running. The ONLY path is through the "A" pump and into the oil galleries. This means that the most important pump in the system will always have oil, unless the bike is

upside down. That's a point that is only relevant for you Edelbrock guys where the bike will run in negative g environment. :-) OR, if the accumulated oil in the sump is lower than both of the pumps. Is the oil capacity enough to make it to the required height?

I would have two questions at this point. If it was equal or higher, would not the oil make it to the pump no matter what? All of the oil at some point would be only in the sump, as it can't collect in the actual crank base. Remember the reed valve? I may be wrong here, as I have no way of knowing how tight this valve is without suction behind it.

The second question, only valid if the accumulated oil in the sump was lower than the pump, would actually be more of a point. If the pump was not being primed on it's own, pulling a bolt would not make a difference. You'd be dumping oil from a passage before it was even getting to the pump. There is no back pressure on the pump because of air, as the outlet from the pump has a free shot (vent at this point) to the reservoir above, thus negating the need to bleed anything from a bolt on the outlet side. If you just changed the oil, you know that "A" pump has juice getting to it. Again, these are just my opinion, and the service managers explanation may change all.

There are three plugs that I see that would be relevant. They are all a shiny allen head cap bolt located in the pump area. My opinion would be that they are more to block holes required in the machining process than anything else. Though they may be handy to drain water from low points for those of you who, like me, have discovered pigs don't float.

The second point was mentioned by Alan and Bruce earlier. You can't splice clear tubing into the metal inlet tube, as the only time oil is present in the mentioned area is when the bike is running, then it would be full and flowing into the reservoir. When the bike is shut down, the oil will seep back down the tube, through the pump, and collect in the cases. It would never hit a point of equilibrium with the level in the reservoir and show an accurate reading.

The third point is for Joss B (Congratulations if you've read this far!). You mentioned cracks and dents between the crank and cases. If I were you, I'd take a Dremel with a abrasive bit and clean the cracks. Just V them out a little and give the surrounding area a rough surface. Two reasons, it makes a sticky surface, and the grinding kind of rolls the metal onto itself, helping plug small cracks. Degrease the area with contact cleaner and then put a thin film of some sort of sealant on them. I was going to suggest an epoxy, like JB Weld, but I wouldn't trust it on a surface application like that. If it came free, those large chunks would wreak havoc before they were caught, where a little silicone floating around would be a lot easier on the innards.

If they are just small cracks, it may be no worry, I'm sure the oil seeping in from the tranny would be a lot lower volume than what was being forced out. Just the grinding alone may stop a slow seepage. The next thing would be sure that the cracks are only cracks, and there is no structural weakness there. Chunks of case would probably be hell on bearings and gears.

Thanks again to the group for giving me excuse to pass a few minutes (Actually more than an two hours this time) and keep my sanity a little longer. This has got to be the longest, oil related post, I have ever seen that didn't start with "What oil do I use?".

The Haymaker