



38-47 Cast Iron

Tech

Note: The oil pump is like the heart in your body, without it operating properly oil will not adequately be delivered to all points of the engine nor will it be returned. We highly recommend paying close attention to every part of this assembly and if you have any doubts, our service dept will gladly take care of it. As a final test it will be run up on our oil pump dyno for final quality control.

Increasing oil feed flow: We have designed a method of dramatically increasing the feed oil flow to the engine by hardchroming (and regrinding) the pump feed plunger and custom sizing the pump bore. This is a precision operation in which we have achieved up to twice the volume of the best of the factory NOS pumps. This is also an ideal way to reclaim worn pump plunger bores which causes the crankcase to fill with oil while the motorcycle sits for a while.



Timing (fitting) pump to cover: The oil pump must be timed to the engine in order for the distributor to be in the correct location. Turn the engine over until the cylinder being used (usually the front) is at its firing point (not TDC). The distributor drive slot should be as near to 90 degrees to the m/c as possible. The rotor will point to the front of the m/c (if the front is being used to time, or point to

the rear of the m/c if the rear cylinder is being used to time). The distributor cap lead sockets will be in line with the m/c and the grease cup will point forward when in the fully advanced position.

Wet sumping: This is a term used to describe when excess oil builds up in the crankcase while the engine is running and the oil does not return back to the tank. When the level becomes too high, the flywheels dip into the oil and cause excessive oil to be thrown onto the cylinder walls causing excessive oil consumption and engine over heating and in extreme cases it can bubble the paint on the tank. Some things to check for are : 1/ Oil lines and fittings are sealed properly. 2/ If using a sump valve (pre 47) make sure sump screen is clean and sump disc is flat and free of grooves and the spring has the correct tension. 3/ Make sure sump valve pick up tube is between 1/8 and 3/16 off bottom of crankcase. 4/ Make sure sump pick up tube is still welded to sump plate (not cracked). 5/ Make sure sump elbow (48-53) screen is clean. 6/ Make sure tank breather line is not blocked.

Note: Most of the time we see wet sumping problems related to the return gears in the pump or excessive clearance between the gears and the end plate. Pay particular attention to even the smallest of details.

Crankcase fills with oil: If your bike sits for a while and oil drains from the tank and into the crankcase the most likely cause is a worn oil pump plunger in its bore. If it happens only randomly (once in a while) it maybe because the plunger has stopped in its "open" position causing the port in the plunger to line up with the port in the pump to create a free flowing or open situation which allows oil from the tank to free flow into the crankcase. If this happens it maybe necessary to remove the pump and index the plunger into another position in the cam shaft worm. However before starting this process, remove the plunger cap and mark what position the plunger is in so as you do not replicate its current position. I Do NOT start the motorcycle if the engine has wet sumped as it will most likely cause spark plug fouling due to the excessive oil being thrown up onto the cylinder walls and the rings not able to control it. Most of this oil will end up in the combustion chamber and pass through and cake your nice exhaust pipes. It is highly recommended before starting the motorcycle to drain the crankcase of all oil. If you have already started the bike, stop it and drain the crankcase. If you are in a situation and draining the oil is not possible, start the bike up but do NOT rev the engine as this will only throw more oil up onto the cylinder walls. Allow engine to idle so as the least amount of oil will be thrown up onto the cylinder walls however be aware of the consequences..

Engine smokes: Or consumes oil and if wet sumping is ruled out, check that the oil tank breather and cam case breather lines are not blocked.

Priming the pump & start up: For the very 1st fire up it is advisable to prime the pump to avoid any chances of an air lock. Loosen the feed line nut (large 3/8 diameter line) at the oil pump and tighten once oil starts to flow out. Then loosen 41367 plunger cap until oil starts to flow then retighten. This pretty much guarantees the engine will not be starved of oil. Always check oil is returning out of the return tube in the tank at the beginning of each days ride and at each gas stop. After an oil change it may take a little time to return due oil having to build

up in the crankcase again. Upon initial start up from a previous days ride, oil should promptly return to the tank. If using the Kiwi in tank oil filter you will see bubbling around the filter itself. This shows that oil is returning. This filter does not restrict the flow of oil even in weak pumps. If oil does not promptly return see "Wet sumping" paragraph. If engine or oil pump work has been performed, we recommend putting about 4 oz of oil directly into the crankcase prior to starting as this gives the pump a ready supply of oil and allows oil to be thrown around the insides of the engine for immediate and necessary lubrication. .

Priming the engine

Upon initial start up and if the engine does not return oil to the tank it will be necessary to "prime" the pump. The cause is generally worn oil pump gears however it could be a number of possible problems. The following can be done with either the engine running or off. It is recommend (with the engine off) force oil down the return tube (tall 5/16 diameter tube) with an oil can until about 6 or so squirts has been achieved. Start engine and see if oil returns. If not repeat this procedure but try 10 squirts. If no oil is returned and while the engine is idling, force as many times as possible oil down the return tube. Eventually oil will be picked up and be returned to the tank. A word of caution: When oil is eventually returned to the tank, it will come gushing out of the return tube and most likely flow outside of the tank. Keep a rag handy and be prepared to re-angle the return tube to it's former position.

Note: Even though the engine is not returning oil, almost every time the other side of the pump is delivering oil to the engine so it is not being starved of oil.

Checking oil flow: To check for oil flow to the engine if you have any doubts, fill a separate can with oil and attach it with a clear plastic tube to the feed line and kick engine over with the ignition off. You should see the oil level drop in the can which shows oil is being delivered to the engine.

Pump dismantling caution: When dismantling the pump do not press (or tap) the 41369 drive shaft out with the gear and key still on it as the key will broach a groove in the shaft bore causing the pump to bypass oil from it return chamber and render it useless (as well as most likely bending the shaft). The gear and key must be removed before the shaft can be removed. Exercise caution so as not to create burrs or damage the inside of the gear body.

Fitting gears to pump: Before fitting gears to pump lightly sand the top and bottom faces of the gears on a surface plate to ensure there are no burrs caused during handling as this will affect end clearance. Make sure pump end plate is flat. Ensure all burrs are removed from within the gear body. Fit .004 thick gasket for starters between end plate and body and rotate gear drive shaft. If it rotates freely drop down to a .002 thin gasket. If gears bind up with a .002 gasket then a .004 gasket. is your choice. If a .004 gasket binds up fit a .006 gasket. When pump seems to accept a .006 gasket it is recommended to remove the gears and inspect the pump gear body area for any damage (burrs, high spots, bent shaft, nut too proud, etc) as there maybe something ever so small causing the gears not to sit fully down. If at anytime when the shaft is rotated and it goes from tight and loose it is most likely a bent shaft. The aim is to have the minimum amount

of end clearance between the gear and cover as possible. End float should be .002 or less.

Used return pump gears: Do NOT use old gears in your pump. Even though your old gears may look ok they usually are not and they WILL cause problems usually sooner than later. Bad return pump gears are usually the number 1 cause of problems with Indians and should be replaced at the time of overhaul.

Plunger: 38-40 pumps have a 1/2" bore while 41-47 pumps have a 5/8" bore. It is advisable to upgrade to a 5/8" bore pump.

Plunger guide screw: Check this closely for wear as a little wear on the guide screw translates into loosing a lot of stroke which decreases the oil flow.

Distributor sleeve: If you notice your distributor wobbling around when the engine is running it means the distributor sleeve (in the oil pump) or distributor snout is worn. Replacing the sleeve usually makes a big improvement.

Sealing: The best product to use for sealing threads is Loctite 567 (it takes the place of Teflon tape). This is a Teflon paste and does not harden so it is very user friendly when it comes time to pull things apart. Do not use on gaskets.

Sealant warning: Do NOT use silicone sealant around oil pumps or oil ways. We have seen far too many failures due to people using excessive amounts and beads end up blocking passage ways.

Breather disc location: The original parts manual shows a disc in the oil pump itself between pump and cam cover. This is only used on Scout models. Chief models have a disc on the cam case breather and NOT inside the oil pump. Do NOT use 2 discs.

Oil pump interchangeability: Pumps must be mated up to the correct cam cover and front camshaft. 38-47 pumps can be fitted to 48-53 engines (and vice versa) providing the correct year cam cover and camshaft is used.

Crankcase oil level: To check the oil level, remove the lower plug in the left case and drain into a measuring container. Generally only a couple of ounces of oil should come out. The best time to do this is after a ride at a constant engine RPM. Exercise caution as everything will be hot and burns may result

Oil pumping out through or around distributor: This is most likely caused by the pinion shaft felt or felt retainer not being installed correctly or not at all on the pinion shaft. We highly recommend our Kiwi upgraded 337551R pinion shaft seal for positive sealing. If you have a very worn engine that has tons of blow by or a wet sumping problem, this too can also cause oil to come out of strange places.

Oil gauge: Don't bother fitting one as there is no oil pressure on the feed side. Indian engines have a roller bearing lower end which does not allow pressure to be created.

Sump scraper upgrade: We advise upgrading to the 47 style scraper. It does require a little crankcase rework but it is well worth it as it does a better job of cleaning the oil from the crankcase. See engine "Lower end" tech for how to upgrade.

Chroming of oil pumps: Once oil pumps are chrome plated they usually become very difficult to reseal properly. Do not allow chrome plating to enter the inner surfaces of the pump.

Pinion shaft oil seal upgrade: Before fitting the oil pump to the cam cover, fit our upgraded pinion shaft seal (p/n 37551R) that replaces the felt and retainer as this provides a positive seal.

48-53 Aluminum oil pump

Tech

Warning: The Aluminum pump should be treated with caution as it does not take much for this pump to not operate effectively. Every pump should be checked on an oil pump dyno after it has been apart. In many cases just reassembling the pump will greatly effect the output of the pump. Do not just change out parts and assume your pump will work to its fullest capacity because it will not. To simplify and add a level of safety to your pump, we strongly recommend replacing the complete gear box unit however small things must not be overlooked as an undetectable airleak will short change this pumps operation.

Timing (fitting) pump to cover: The oil pump must be timed to the engine in order for the distributor to be in the correct location. Turn the engine over until the cylinder being used (usually the front) is at its firing point (not TDC). The distributor drive slot should be as near to 90 degrees to the m/c as possible. The rotor will point to the front of the m/c (if the front is being used to time, or point to the rear of the m/c if the rear cylinder is being used to time). The distributor cap lead sockets will be in line with the m/c and the grease cup will point forward when in the fully advanced position.

Gear end clearance: Within .002

Factory modification: Do not install the check ball and spring on the feed side to the engine from the tank (this is the one inside the pump). Only fit the check ball and spring between the pump housing and cam cover. Failure to remove the feed side check ball and spring could result in a seized engine.

Crankcase fills with oil: If your bike sits for a while and the crankcase fills with oil it is due to the check ball not seating properly on its seat in the pump body. It will be necessary to reseal the ball. Inspect seat for any pitting. If it looks ok fit ball and give it a solid tap with a brass drift and a hammer to ensure a good seal. If pitting is present the seat will require re-machining. Always replace the spring at time of overhaul.

IDo NOT start the motorcycle if the engine has wet sumped as it will most likely cause spark plug fouling due to the excessive oil being thrown up onto the cylinder walls and the rings not able to control it. Most of this oil will end up in the combustion chamber and pass through and cake your nice exhaust pipes. It is highly recommended before starting the motorcycle to drain the crankcase of all oil. If you have already started the bike, stop it and drain the crankcase. If you are in a situation and draining the oil is not possible, start the bike up but do NOT rev the engine as this will only throw more oil up onto the cylinder walls. Allow engine to idle so as the least amount of oil will be thrown up onto the cylinder walls however be aware of the consequences..

Engine smokes: Or consumes oil and if wet sumping is ruled out, check that the oil tank breather and cam case breather lines for blockage.

Priming pump: Before fitting the oil pump to the engine, rotate pump and run some oil through in order to prime it. Oil should flow through. Once oil pump is fitted to the engine and BEFORE fitting the cylinders to the cases rotate the flywheels in the correct direction of rotation by holding onto the connecting rods and slowly and delicately turn the engine. What you are feeling is any possible chance of binding from the oil pump to cam shaft fit. Also squirt some oil into the oil pump feed fitting as this will prime the engine. Once primed pour about 4 oz of oil into the crankcase and once again rotate the engine and make sure oil comes out of the return pump fitting.

Priming the engine

Upon initial start up and if the engine does not return oil to the tank it will be necessary to “prime” the pump. The cause is generally worn oil pump gears however it could be a number of possible problems. The following can be done with either the engine running or off. It is recommend (with the engine off) force oil down the return tube (tall 5/16 diameter tube) with an oil can until about 6 or so squirts has been achieved. Start engine and see if oil returns. If not repeat this procedure but try 10 squirts. If no oil is returned and while the engine is idling, force as many times as possible oil down the return tube. Eventually oil will be picked up and be returned to the tank. A word of caution: When oil is eventually returned to the tank, it will come gushing out of the return tube and most likely flow outside of the tank. Keep a rag handy and be prepared to re-angle the return tube to it's former position.

Note: The aluminum pump has 2 separate gear chambers which can directly affect each others performance. While 1 side (return) can be operating perfectly, the other side (feed) may very well not be operating adequately. If there is a regular oil return or feed problem we consistently see it is with regards to this type of pump.

Checking oil flow: To check for oil flow to the engine if you have any doubts, fill a separate can with oil and attach it with a clear plastic tube to the feed line and kick engine over with the ignition off. You should see the oil level drop in the can which shows oil is being delivered to the engine.

Gearbox assembly: While the pump is apart, re-tap the 10/24 screw holes that hold the gear box body into the housing with a modified bottoming tap. Sometimes crud will be in these blind holes and prevent the gear box from being tightened properly causing an air leak which leads to airated oil and very poor pump performance. Fit gearbox to housing by tightening screws evenly a little bit at a time until tight while turning the shaft so as the gears settle into place. Gears should continue to turn freely when screws are tight (no binding). Use a good sealant to seal all surfaces. Do NOT use silicone sealant.

Gear thickness: 1 gear is .017 thinner than the rest and must fit into its own shallower gear housing. Pay attention.

Oil fitting tightening: Do NOT over tighten oil fittings into the pump otherwise cracking will occur in the aluminum housing.

Return nipple: 52-53 pumps have a 90 deg elbow return nipple vs the straight fitting used on the 48-51. This is necessary to gain clearance when using the 52-53 distributor cowl.

New gear caution: Some new gears on the market do not perform well. Just because you have new gears does not mean that you have good gears or a good operating pump.

Distributor sleeve: If you notice your distributor wobbling around when the engine is running it means the distributor sleeve (in the oil pump) or distributor snout is worn. Replacing the sleeve usually makes a big improvement.

Sealing: The best product to use for sealing threads is Loctite 567 (it takes the place of Teflon tape). This is a Teflon paste and does not harden so it is very user friendly when it comes time to pull things apart. Do not use on gaskets.

Sealant warning: Do NOT use silicone sealant around oil pumps or oil ways. We have seen far too many failures due to people using excessive amounts and beads end up blocking passage ways. Apply sealant to KI-10008 screw threads and ensure the use of 751317K sealing washers under KI-10008 screw heads.

Pinion shaft oil seal upgrade: Before fitting the oil pump to the cam cover, fit our upgraded pinion shaft seal (p/n 37551R) that replaces the felt and retainer as this provides a positive seal.

Overhauling caution: This pump may seem like a very basic and easy pump to overhaul however it is a very particular pump. Even though you have fitted new gears or gear box assembly, the chances of this pump pumping adequately are rare. Sometimes the drive shaft fit into the end cover or body can be excessive which allows oil to bypass each side of the pumps chambers. This can only be identified with an oil pump dyno tester. We strongly suggest leaving this pump to an expert. We have a specially designed oil pump tester that pumps must meet stringent pre determined capacities.

Additional tech: Also read the “38-47 oil pump tech” for many more general helpful hints.

Sump Valve Tech

Early sump valve: Early models did not have a sump pick up tube attached to the sump body plate which created an oil return problem when the bike was placed on the side stand. Since the sump pick up was on the right side of the engine and the bike leaned to the left, oil would build up excessively in the bottom of the crankcase. The flywheels would then dip into the high oil level causing a wet sumping situation. A tube was added around 1941 so it could reach to the left side of the engine and keep the oil level to a minimum. If your bike does not have a tube attached to it, it is highly recommended to upgrade and add one.

Sump valve pick up tube: Should be between 1/8 and 3/16 off the bottom of the crankcase.

Disc & spring: Disc surface must be flat and free of defects. Replace spring.

Assembling valve plate: Make sure valve plate pick up is at its lowest point when fitting it to its housing.

Sump valve upgrade: As an upgrade it is advisable to eliminate the sump valve assembly and fit the 1947 scraper. Scrapers were introduced in 1947 and eliminated a host of problems associated with sump pick ups plus they do a far better job of oil scavenging.. In order to upgrade, the crankcases must be notched internally which ideally should be done at time of engine overhaul however if it is done when the engine is assembled, cleaning is very important. Use the scraper as a template and the rest is pretty basic. Scraper to flywheel gap is 1/32.

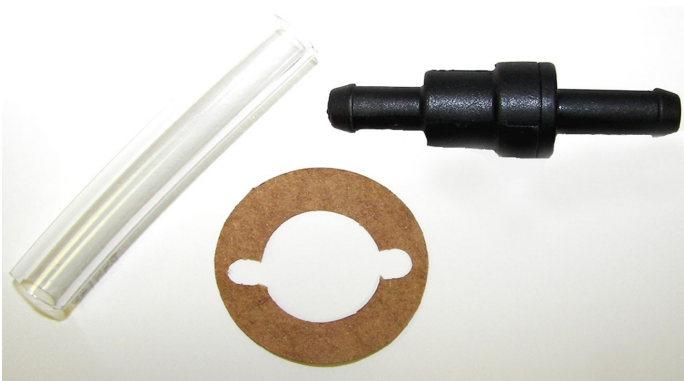
1947 Scraper

Scraper Tech

Scraper Year: The Scraper was introduced in 1947 and were also carried over into the very early production of the 1948 models.

Scraper clearance: Scraper to flywheel clearance is 1/32.

Cam case breather



Tech

Breather disc theory: The breather disc with a hole in it was initially created for police departments as they generally did a lot around town low speed riding which did not allow adequate oil to flow (or mist) to certain parts of the engine, namely valve guides. While this hole allowed adequate oil to migrate to the valve area during low speed riding operating conditions, it had the opposite effect at high speed riding (which is most of today's riding). Generally a breather disc without a hole is the way to go today but each engine can vary especially when strokes are increased beyond 74". For this reason it is best to upgrade to the 42843P PCV valve which automatically solves all of these issues no matter what the engine size or worn condition of the engine is in. Keep in mind that if you have a worn top end and combustion blow by is present, no breather system will solve oil blowing/leaking problems from gasket joints or valve covers.

Breather disc general: Breather discs come either with a hole or w/o a hole. Some engines prefer 1 type over the other. If your engine uses excessive oil, smokes, blows oil, etc try using the other type of disc. Check the fit of the disc into the housing as the outside tabs should have just a little clearance in order to

float back and forth easily. If clearance needs to be added, sand outside ears of disc.

Fitting breather gasket: Make sure breather casting is flat. Apply a light dab of grease to hold disc in place while fitting the breather tube to the case. Ensure gasket sealant does not hinder its operation.

Check disc operation: To make sure disc is operating properly after fitting to the cam cover, fit a piece of rubber or plastic tube over the end of the breather tube and blow and suck on it. You should hear a metal clicking sound which will be the disc moving from side to side. Keep in mind this will not be the case if you have applied a dab of grease to the disc to hold it in place. If grease is used it can be tested this way after a few miles of riding. A blocked breather tube can cause your engine to blow smoke or blow oil out of sealing surfaces fooling you into thinking it is a top end problem.

PCV breather valve upgrade: This simple operating PCV valve eliminates the problems that can be associated with the antiquated breather disc system. This allows for Positive Crankcase Ventilating and generally eliminates common oil weepage found around valve covers and gasket sealing surfaces due to the old style disc pressurizing the crankcase especially at higher RPM's

Breather safety modification: We strongly suggest aiming the outlet end of the breather tube away from the chain and adding a piece of rubber/plastic tube so it points towards the ground. This will eliminate oil from getting onto the rear tire which becomes a safety issue especially during hard right hand cornering. This also keeps the rear tire looking clean. Apply modern chain lube to the chain as it has a high tack point and will not fling off.

Kiwi crankcases: Kiwi cases have baffles in the cam chest area that eliminates the direct oil splash onto the breather. This assists in reducing oil blow by.

Up to date information: For the latest developments regarding the continuing improvement of the crankcase ventilating system please visit our website www.kiwiindian.com.

Note: See "Oil pump tech" for additional helpful information.

Kiwi internal oil filter: We developed this filter during the mid 90's in order to have a filtration system that was hidden so as to retain the clean unobstructed lines of the motorcycle.. While there are skeptics that say that they don't need one they would never think of eliminating it from their car or truck!!! The fact is Indian flathead engines do need a filter due to the combustion blow by that normally occurs with flathead engines. Have you ever noticed how quickly your oil goes black after an oil change? This is caused by combustion blowby (pollutants) entering the crankcase/oil system. Magnetic plugs only capture some metal particles and do NOT capture non magnetic particles like aluminum or carbon which is very damaging. Every Indian should be fitted with an oil filter. The Kiwi internal oil filter does NOT cause any restrictions upon your pump what so ever even in weak or under performing pumps.

Another side benefit is that you can cut the filter apart after each oil change and observe the contaminants or wearing parts caught within the filter media which may alert you to an internal parts failure. Indian engine oil DOES need filtering which leads to increased engine life.

Oil returning viewing: When the Kiwi filter is fitted, the returning oil is still clearly visible when viewed with the oil cap off. The returning oil will be clearly visible bubbling and around the outside of the filter.

Installing filter: Start out with a clean tank by removing it and flushing it out thoroughly. Remove return line inside tank. Sit filter next to oil filter and trim oil line to about 3/8" shorter than length of filter. Bevel end of tube which will allow the filter to easily slip on. Replace tube into tank (using a thread sealant) making sure it is clean. Slightly bend tube so as it is centered in the oil filler cap hole. Place a small amount of clean oil over the rubber seal of the filter as this will allow the filter to slide on easily. Push filter all the way down until it bottoms out. Add oil. Change filter with every oil change just like your other vehicles. To remove filter use a hooked piece of wire or pliers to grab the tab on top of filter. The Kiwi filter in no way restricts oil flow in or out of the tank. It's been well proven since the early 90's with 1000's of engines. A clean engine is a happy engine and a happy owner too.

External oil filters: Over the years many external oil filters have been developed utilizing automotive spin on filters. Exercise caution and be prepared for the unexpected as some filters cause too much strain on the return side of the pump which leads to unexpected wet sumping.

Magnetic plugs: These only catch metal particles. Many magnetic plugs are made of a low quality magnetic material and loose efficiency with heat. Magnetic plugs do not pick up non magnetic particles like aluminum or carbon. Only a filter filters all harmful particles from your oil.

Breather tube: Point the tube inside the tank away from the return tube (this is not necessary when using the Kiwi in tank oil filter) otherwise oil from the return tube can splash onto the tube and over some time the oil will be diminished resulting in a seized engine.

Engine smoking: A cause of engine smoking could be due to a blocked oil tank breather or cam case breather. Also see oil pump tech

Oil Type and Brand

Until the end of time it will always be a conversation piece with many opinions. We have done engine tear downs after using various oils in order to obtain 1st hand experience and to date we have found no benefit what so ever in running synthetic oils in Indian Flathead engines however with formulas and oils continually changing this could change. Synthetic oils and some multi viscosity oils do dramatically increase engine noise. At this current time we are still continually testing various oils including those found in heavy duty diesel engines. Synthetic oils in transmissions is definitely an advantage over their petroleum based counterparts. We will always continue to experiment with different oils therefore our latest findings will be posted on our website www.KiwiIndian.com

There is a very old saying “Any oil is good oil as long as you use some oil”, meaning one day you’ll be in the boonies, wop wops or sticks (no mans land) and you will need oil and there won’t be choices or what brand or type you like to use. Then you will use what ever oil you can get your hands on. Beats running with no oil at all right???

