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REF: General-MSR 03

TROUBLESHOOTING - Engine Issues

Basic Troubleshooting

Troubleshooting can be very difficult sometimes to the person that has to physically do it.
You're there. You hear it or see it and sometimes the hardest thing to do is to tell it to someone else.
Another hard thing to do is to detach yourself from what you (think or believe so strongly in) to strictly what you can prove.
It all boils down to your specific belief system.
You filled it full of oil last week so it couldn't have been too low, so you didn't check that.

I.E., previously unknown to you, your friend on the back burnt their leg or foot on the exhaust on a long trip.
Then they went berserk and not realizing that they kicked the oil line damaging or kinking it on a long trip.

When you believe that anything could have happened to it, you stand a better chance of diagnosing the problem.
Below are some easy fixes and some very difficult ones as well as cheap and expensive ones.
Keep in mind an unhealthy bike doesn't care if you can't afford it or know anything about it. [1)]

All engine noises aren't good noises but it is a Harley and it's gonna be loud and it's gonna shake.
The front forks may appear to want to leave each other and your hands may feel a little numb after riding.
It's OK, it's suppose to do that.

See also Hunting Down Sportster Noises for help in diagnosing noises.

Troubleshooting Oil Related Problems

Engine oil is like blood in the veins. Running a bike too low or without will ultimately lead to engine seizure.

- High Oil Consumption

    - Worn/damaged piston rings [2)]
    - Worn valve guides [3)]
    - Improper chain oiler adjustment (if equipped) [4)]
- Excessive oil leaks
    - Clogged up air cleaner breather hose [5)]
    - Damaged gasket mating surfaces [6)]
    - Gaskets loose from non-torque/ loss of torque [7)]
- Excessive oil at crankcase breather
    - Damaged/ restricted oil lines/ fittings [8)]
    - Leaking gearcase cover gasket [9)]
    - Oil isn't returning to the oil tank [10)]
- OIL PUKING OUT ENGINE BREATHER
    - WET SUMPING,
      This is simply oil from the tank draining slowly back down into the crankcase while the bike is parked for any length of time.
      When you start the engine, the excess oil in the crankcase is fired out the breather, onto the floor, (or into your air-filter on post-79 models).
      The oil should stop puking after the engine runs a few minutes and pumps the excess oil back up into the tank.
    - OVER-FILLED OIL TANK,
      If the puking starts after you top your oil tank, this is probably the problem.
      If you fill the oil tank to the Full mark while some oil has wet-sumped down into the engine, you have too much oil in the system.
      The oil from the sump will be pumped back up to the tank, dribble down the vent tube to the timing cover, from where it is fired out the engine breather.
      This puking will continue after initial start up until all the excess oil has been fired out, which can take a while.
      The cure is to drain a quart or so out of the oil tank, run the engine for five minutes til the puking stops, then top up the oil tank to the full mark.
      DO NOT be tempted to drain oil out of the sump by taking out the threaded drain plug under the front of the engine (if equipped).
      These are notorious for stripping the threads and are very difficult to repair properly.
      In most cases the plug is factory installed and is not intended to ever be removed.
    - WORN ENGINE,
      If your engine breather continues to puke oil or blow smoke after the above two things have been eliminated,
      Your problem is most likely wear in the cylinders and heads.
      Worn rings and even valve guides, can allow blowby of combustion gasses into the crankcase area, which then comes out the breather.
      Usually this will be accompanied by smoke or oil coming out the exhaust pipes too.
      A compression test will give some indication of top-end condition.
      Anything below 120psi is suspect, according to the factory manual.
      These bikes will still run ok at even 100psi, but they will be down on power and consume oil, and blow fog out the breather pipe. [11)]
- Oil isn't returning to the oil tank
    - Damaged/ restricted oil lines/ fittings [12)]
    - Oil pump not working properly [13)]

    - Engine too low of oil
    - Oil pump Scavenger gear woodruff key sheared off/ broken [14)]
    - Stopped up oil filter
    - Faulty check ball at filter housing
    - Faulty oil pressure regulator
- Engine Overheating from excessive load
    - Engine oil level too high.
      Adding too much oil to the oil tank/ engine causes undue pressure in the crankcase which degrades engine performance and increases heat [15)]
    - Oil viscosity too high.
      Using heavier than recommended oil can damage the oil pump, oiling system and cause engine to drag and overheat [16)]
- Engine Overheating from poor lubrication
    - Engine oil level too low which increases friction
    - Wrong oil viscosity/ degraded oil viscosity
- Change in Engine Vibration due to degraded oil
    - Vibration analysis can pick up subtle vibration changes.
      You also may be able to identify lubricant starvation before the extreme heat from friction is discovered. [17)]
- Engine running poorly on acceleration
    - Oil viscosity too high.
      Using heavier than recommended oil can cause engine drag
- Engine running poorly with continuous high revs
    - Wet sumping occurs when the crankcase fills up with oil.
      The crank has to turn in an oil bath when it's really designed to run in open air.
      The crank running thru the oil heats it up and adds lots of bubbles.
      It also really cuts down on the available power.
      The scavenge pump picks up the oil and sends it to the oil tank.
      The hotter the oil, and the more air bubbles in the oil, the harder it is for the scavenge pump to move the oil.
      So, the oil collects in the crankcase even more. [18)]

Engine Overheating

Engine Noises

The tables below have 2 separate but equally important columns; Possible causes and Possible affects. It is just as is important to know what happened as it is to know why it happened. I.E., a broken piston ring can be fixed but if the cause was low oil pressure and that was not addressed, it'll happen again or worse.

Noises coming from the top end	**Possible Causes**	**Possible Affects**	**Possible Remedies**
Valve Noise	Lack of Lubrication at high RPM	Worn or seized lifter(s)	Check oiling system, Inspect/Replace damaged parts
*	*	Broken or weak Valve Springs	Check oiling system, Inspect/Replace damaged parts
*	*	Worn Cam Lobe(s) / Rocker Arm(s)	Check oiling system, Inspect/Replace damaged parts
*	Bent pushrod(s)		
*	Mal-adjusted pushrod(s)		
*	Valve sticking in valve guide		
*	Damaged rocker arm/ binding rocker arm shaft		
*	Worn cam gears/lobes/bushings/bearings		
Knocking or Pinging During Accelleration	Carbon buildup in combustion chamber		Use a fuel additive to dissolve carbon particles/ Remove heads and de-carbonize chamber, pistons, valve components
*	Too low octane/ Poor quality gas leading to detonation	Pistons rattle against cylinder walls	Drain old gas, replace with recommended grade of gas
*	Wrong spark plug- Uncontrolled detonation indicates the spark plug heat range is too hot	Excessive heat buildup in the cylinders can lead to catastrophic failure of engine parts	Install the proper heat rated spark plug and recheck
*	Air/Fuel mixture not set properly	Heat buildup leading to detonation	Tune the air/ fuel mixture setting for proper operation
Pulsing On/Off/On/Off Squeal	Head gasket leak	Poor engine compression	Replace head gasket(s)

Noises coming from the top end	Possible Causes	Possible Affects	Possible Remedies
Piston Slap/ Rattling Sound	Cylinder to piston clearance out of service limit		Remove pistons, clean pistons and cylinder bores. Measure ea. piston and it's corresponding cylinder bore. Subtract the piston dia. from the bore dia. and this is the 'piston clearance'. Check that clearance against the specs in the FSM. Replace piston/ Bore out cylinders as required
*	Over-revving, trying to start a badly flooded engine, ingesting a foreign object into the combustion chamber	Bent connecting rod, cracked piston	Inspect/ Replace parts as needed
*	Worn/ lack of lubrication of piston rings	Piston rings worn, broken or sticking	Inspect/ Replace parts as needed
*	Piston wrist pin/ connecting rod/ top bushing worn, out of round, warped or seized	Seizure of piston movement, piston not positioned properly, scratched or worn cylinder or rod	
*	Improper lubrication	Piston/ring seizure or damage	Inspect/ Replace parts as needed
Piston Slap/ Tapping Sound	Improper piston to valve clearance due to mis-matched installation, weak valve spring(s), dropped/ bent valve	Cracked piston, head, bent/broken valves	Check piston/ valve clearance/ Replace parts as needed/ Consider thicker head gaskets if needed

Noises coming from the bottom end	Possible Causes	Possible affects	Possible Remedies
Knocking or Tapping during deceleration	Excessive rod bearing clearance	Catastrophic breakdown	Inspect/ Replace parts as needed
Constant Knocking and Vibration	Worn out main bearings	Catastrophic breakdown	Inspect/ Replace parts as needed
From Primary Cover Side	Engine hub nut coming loose		Pull primary cover, check hub nut for proper torque

Engine Diagnostics

Transmission

Transmission noises are usually not what you want to hear but there is a natural symphony that happens sometimes when changing gears. The harder the push is on gear shifter, the harder the shift forks smack the gears around and the noise is more audible than if shifting easier with a quick smooth motion which sometimes sounds like a light hollow clinking as in two plastic parts shaken in a sandwich bag.

Noises coming from the transmission	**Possible Causes**	**Possible Remedies**	**Possible Side Affects**
Ka-Chunk while shifting	Shifter pawl mal-adjusted \Bent shifter shaft \Bent, worn shift pawl	Adjust pawl, inspect/ replace any defective parts	Metal shavings in primary oil from pawl contact on clutch gear
Screech- Clickety	Clutch is about to explode	Check/ replace clutch [19)]	
	Loose or damaged clutch pressure plate and/or bolts, gear teeth		
	Loose or damaged primary chain/ chain adjuster, gear teeth		Pieces of nylon in oil/ passeges
	Loose rivets/ broken friction plates in clutch pack		
	Clutch or flywheel nut loose		
	Loose or damaged shifter components		

Transmission Condition	**Possible Cause**	**Possible Remedies**
Clutch Slipping	Clutch cable may have stretched or may not be adjusted properly	Re-adjust clutch cable and retry, replace if frayed/ kinked
*	Friction plates/ metal plates worn/ warped	Overhaul clutch assembly. Look into possible clutch upgrade
*	Improper clutch pack height	Count/ measure friction and steel plates against factory/ after market known numbers/ dimemsions. Replace as needed. Best to replace all while your in there
*	Clutch Diaphragm Spring broken or weakened from use or from heat	Replace with a new one. Look into possible clutch upgrade
*	Clutch pushrod bent	Inspect/ replace if needed
*	Wrong transmission oil used	Drain, wipe clean and install HD tranny oil or aftermarket oil (rated JASO MA,MA1 or MA2)

Transmission Condition	Possible Cause	Possible Remedies
*	Glazed build-up on friction/steel plates	Can sometimes be cleaned but most often have to be replaced. The use of a thermally stable oil along with proper operating techniques/ adjustment will minimize the potential for glazing to occur [20]
Frequent clutch failure	Improper rider operation	Don't ride the clutch or downshift with too many RPMs
Clutch center or housing unevenly worn	causing improper engagement of the plates	Inspect/ replace if needed

Chassis Noises

Vibration Tech

A Sportster is gonna rumble and vibrate due to the engine configuration. New or distinct vibration can be a sign of problems however.

Vibration at certain times	Possible Causes	Possible Remedies	Possible side affects
While letting go of the clutch	Clutch discs slipping	Replace clutch discs	metal in primary case/ oil
	Rivets coming loose on clutch steel insert	replace clutch discs	Check for disc/ metal fragments in primary case
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