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REF: Oiling & Lubrication

Sportster Oil Pressure (57 to Present)

All Sportsters have oil pressure, even Ironheads. It's also been said that putting an oil gauge on an ironhead is useless due to the low oil pressure they operate on. However, most Sportsters operate off low oil pressure especially during hot idle.

The first answer is just to rely on the oil light. But also checking oil pressure will tell you more about the health of the oiling system. An oil gauge can be fitted to any Sportster to accurately measure the pressure against the specs in the respective FSM and then removed if desired.

When checking oil pressure, it's important to note that you are not testing pressure at a dead stop standpoint (as in a dead end of pipe). The oil is flowing into the engine at the same time you are testing from the test site. And the resulting pressure reading is a reflection of current pressure near the source WHILE oil flows downstream and out from there. Oil pressure will be lower downstream of the oil pump depending on the restrictions in the oil path and how big the outlet holes in the top end as well as the pinion to flywheel path.

Rocker box oil pressure (Evo).
Evo Oil pump pressure does feed up into the rocker arms via the lifters but is heavily restricted by the path through each lifter and slightly restricted further by elevation.

- On a cold startup, the pressure is higher due to the thicker oil present which is also flowing slower (hence the higher pressure).
  As the engine warms up, the oil thins out, pressure is reduced since the oil can flow faster.
- A PSI gauge tapped into any EVO Sportster rocker box will most likely measure crankcase air pressure instead of oil pressure.
  It's not possible to accurately measure engine oil pressure from the rocker boxes.
  Oil pump pressure is relieved once oil is sprayed / leaks out the rocker arms. And you can't actually attached a gauge to the rocker arms.

Cam cover oil pressure (All).
Oil pump pressure is always present internally in the cam cover with the engine running.
That is also a deceiving statement. Pump pressure runs through internal cavities in the cover to get from the top to the bottom of the cover and to the pinion shaft.
However, oil pump pressure is confined internally in the cover and does not pressurize the cam chest.

Checking Oil Pressure

Click Here to view “Installing an Oil Pressure Gauge” in the REF section of the Sportsterpedia.

ALL PRESSURE SPECS IN THE FSM ARE FOR HOT OIL (at operating temp).
For an accurate reading, run the engine until the oil reaches normal operating temperature (ride at least 20 miles at or above 50mph first).
Compare pressure reading against the expected figures in your respective FSM as in below:

Expected Oil Pressure Readings

As tested with hot oil and a gauge mounted off the oil pressure switch location at the oil pump;
The oil pressure switch has to be removed for the gauge to be installed.
Oil filter is on the return side of the oil pump and should not hinder pressure reading.

Year Model	Minimum	Normal Riding Conditions	Max Riding Conditions
1957-1969 Sportsters [1]	3-7 psi (idle, with spark retarded)	10-14 psi (6 psi at 20 mph)	
1970-1978 Sportsters [2]	3-7 psi (idle)	4-15 psi	15 psi (60 mph in high gear)
1979-1985 Sportsters [3]	4-7 psi (idle)	4-15 psi	10-20 psi (3500 rpm)

As tested with hot oil and a gauge mounted;
1. Off the plug hole on the engine case between the tappets;
2. Off the oil pressure switch location at the oil filter pad.
Oil filter is on the feed side of the pump giving higher pressure on the pressure gauge.
Note: Oil pressure will be lower when checked between the tappets but the FSM specs use this hole for testing.

Year Model	Minimum	Normal Riding Conditions	Notes
1986-1990 Sportsters [4] [5] [6]	1-7 psi	5-30 psi (2500 rpm)	tested from plug hole between tappets.
	7-17 psi	not specified	tested from oil pressure switch location at the oil filter pad

As tested off the oil pressure switch location at the oil filter pad.
Oil filter is on the feed side of the pump giving higher pressure on the gauge.

Year Model	Minimum	Normal Riding Conditions
1991 Sportsters [7]	7-12 psi	12-17 psi (2500 rpm)
1992-2004 Sportsters [8]	7-12 psi	10-17 psi (2500 rpm)
2013 XR1200X [9]	16-20 psi	40-44 psi
	Has oil pressure relief set at 50 psi. [10] Includes an oil cooler w/ thermostat opens at 190ºF (88ºC).	

Gauge installed at the rocker box on Ironheads

Installing a gauge at the rocker box is basically useless in diagnosing from the FSM.
There are no specs in the manuals to support any readings taken from the rockers.
Oil pressure will most likely be measurable on startup but low to nil when the oil gets to operating temp.
However, below are some noted pressure readings from XLFORUM members.

A 0-15 psi gauge (although it will max out with a cold motor) will give you the most accurate readings with hot oil. [11)]
A 0-30 psi gauge is only useful at cold temps.
A 0-60 psi gauge is useless when testing from the rocker box.
All of this depends on the oil you are running also.

Multiple viscosity oils will show low to no pressure at running hot or cold idle.
50 wt in the summer shows lower pressure while 60 wt.

- 3-5 psi at hot idle.
- 15 psi+ when cold.
- 7-10 psi during normal riding conditions.

Other XLF member results noted from the rocker box:

- Cold start, running 20/50, - pressure off the scale at startup. [12)]
  - Settled to 8-9 psi after a few minutes at fast idle.
  - After 2 miles, the pressure was steady at 12 psi.
  - After 5 miles, pressure dropped to 1-2 psi.
  - After 11 miles, pressure dropped to zero and stayed there.
  - When stopped at end of ride, it stayed at zero on idle.
  - Will see if the same thing happens at the weekend.

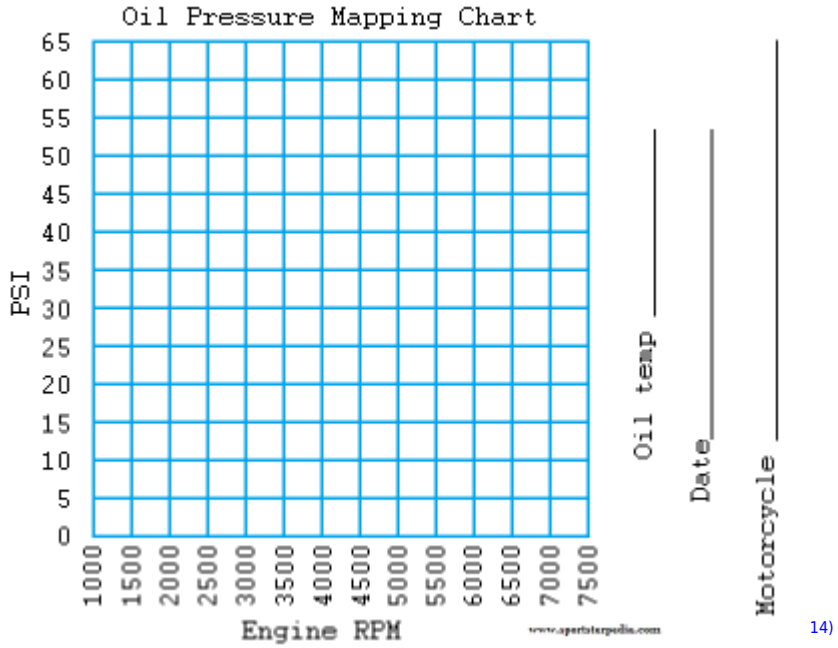
Mapping Oil Pressure

When a problem is suspected, it helps to have a reference graph against which to compare the results. [13)]
It is, therefore, advisable to map an engine shortly after it has been run in, and then use this baseline for comparison with later graphs.
Any change or drop-off in the graphs should be investigated.
First, check the pump (and pressure-relief valve if applicable).
If no fault is found with the pump, the engine itself should be inspected for excessive leakage.

1. Make sure the engine has reached full operating temperature.
   If possible, record the oil temperature when the pressure readings are taken.
   The oil temperature is important because the oil thins rapidly as the oil temperature increases, and thickens again when it cools down.
   The thickness of the oil (viscosity) affects the pressures obtained and may give inaccurately high readings if measured at too low of a temperature.

2. Connect an oil pressure gauge in place of the oil sending unit.
3. Connect a tachometer if required.
4. Measure oil pressure at 10 or more engine speed intervals equally spaced between idle and maximum engine speed.
5. Record the readings.
   It is helpful to record the readings on graph paper and then draw a straight line from the first (idle) reading to the last reading taken at max engine speed.

A chart similar to the one below can be used to keep up with successive pressure readings.



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1959-1969 HD FSM pgs 3A-11, 3A-15

2)

1970-1978 HD FSM pgs 3-1, 3-5

3)

1979-1985 HD FSM pgs 3-1, 3-10

4)

1986 HD FSM pgs 3-2

5)

1986-1990 HD FSM pgs 3-2, 3-10

6)

1986-1990 HD FSM pg 3-10

7)

1991 HD FSM pgs 3-2, 3-32

8)

respective FSMs

9) 10)

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shanneba from the XLFORUM- 2013 Factory Service Manual

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https://www.xlforum.net/forum/sportster-motorcycle-forum/sportster-motorcycle-era-specific-and-model-specific/ironhead-sportster-motorcycle-talk-1957-1985/54570-step-by-step-fitting-a-rocker-box-pressure-guage/page4?t=263589&highlight=lower+oil+pump&page=4
12)

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https://www.xlforum.net/forum/sportster-motorcycle-forum/sportster-motorcycle-era-specific-and-model-specific/ironhead-sportster-motorcycle-talk-1957-1985/158701-fitting-rocker-box-oil-pressure-gauge/page2?t=1698960&page=2
13)

https://www.machinerylubrication.com/Read/1772/oil-pressure-bearing-wear
14)

drawing by Hippysmack