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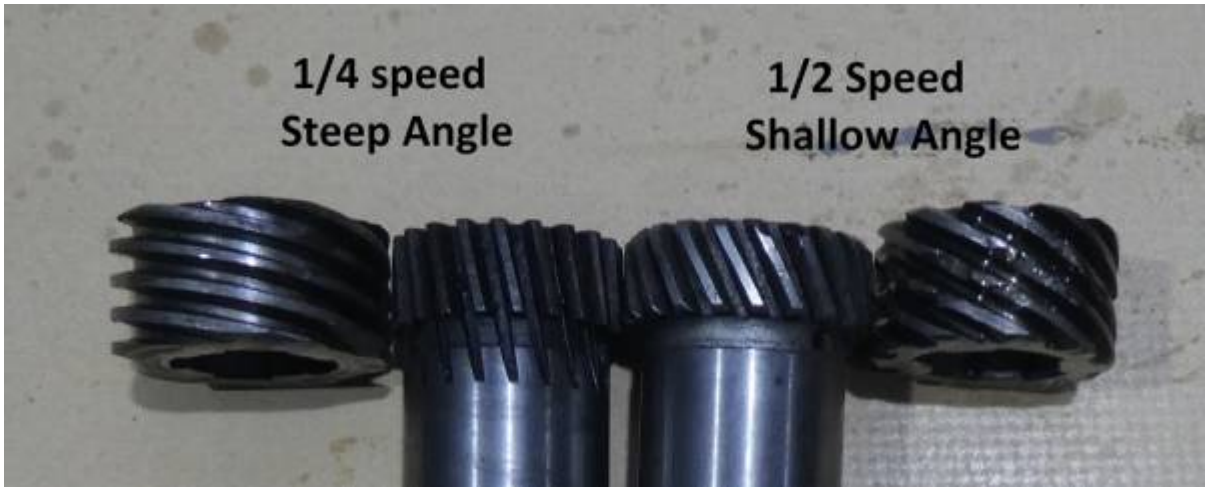
IH: Oiling & Lubrication - Sub-03U

XR-750 Oil Pump - Parts Lists and Information

1970-1987 racing pumps ran 1/4 speed of engine RPM.
The 1/4 speed gears on the both the breather shaft and pinion shaft were cut at a taller angle than on street motors.
Below is a pic showing the difference in teeth angles.



[1)]

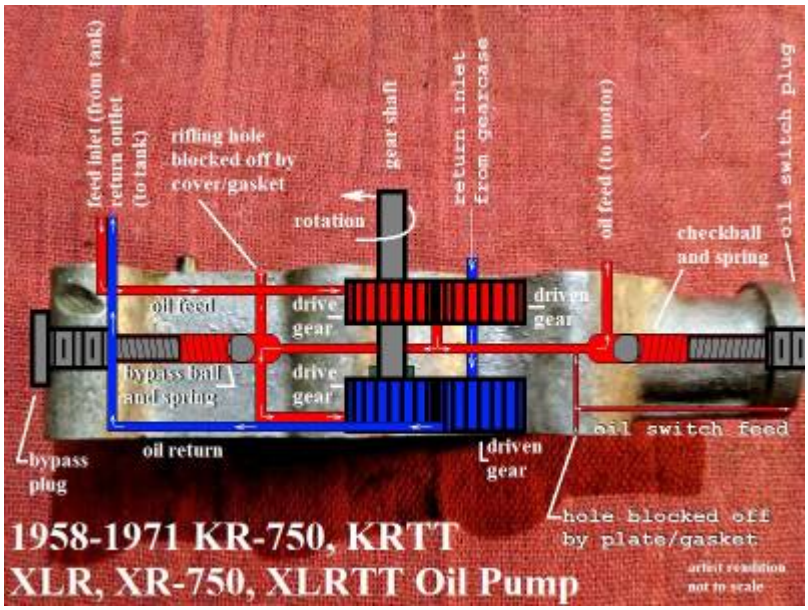
1970 XR-750 Oil Pump

Also used on 1958-1968 KR-750, KRTT,XLR 900 and XLRTT engines.

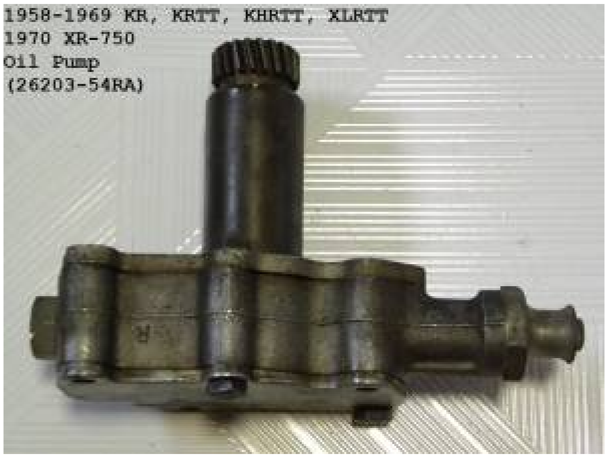
- Pump Speed is 1/4 of the engine RPM.
- Oil Pump Pressure as measured hot (140°F) at 5000 RPM, Max 10 PSI [2)]
- Gear Dims:
  - Number of Teeth: (16T)
  - Feed Gears: O.D. (1.115“) - Width (.185”) - I.D. (.422“)
  - Return Gears: O.D. (1.115”) - Width (.343“)- I.D. (.422”)
- Markings/Stampings: 26215-52 cast into the oil switch pad on the return side and the letter “R” stamped into the body, right rear outer side.
- Breather Timing: Timed off front cylinder. Opens 16°-20° (ATDC) and Closes at 80°-85° (BDC). [3)]
- No oil pump pressure switch was used and the switch hole was blocked off by a 1/8” NPT x socket head pipe plug.

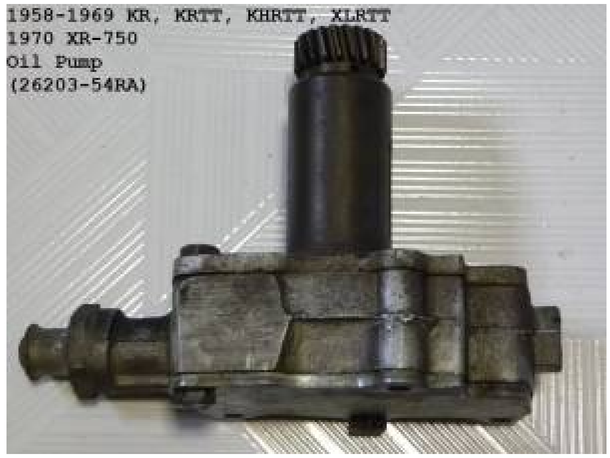
Special thanks to the The French Owl for providing period specific parts catalogs.
Parts List:[4) 5)]

Oil Pump Assembly	Oil Pump Body	Upper Cover / Breather Tower	Lower Cover Plate	Oil Pump Drive Gear	Feed Gear (driver)	Feed Gear (idler)	Return Gear (driver)	Return Gear (idler)	Idler Gear Shaft
26203-54RA	26217-58R	26241-54R	26250-56	26318-54R	26323-52	26322-52	26320-56R	26326-52	26327-52
Breather Gear	Feed Gear Lock Pin	Return Gear Woodruff Key	Breather Shaft Ret Ring	Oil Pump Check Ball (3/8“)	Oil Pump Check Spring	Oil Pump Switch Nipple	Oil Switch Nipple Plug		
26331-56R	603	26347-15	11002	8866	26364-57	26420-57	45830-48		
Feed Bypass Ball (3/8”)	Feed Bypass Spring	Feed Bypass Plug Rear Fitting	Pump Gasket Lower	Pump Gasket Upper	Pump Gasket Mounting				
8866	26374-53R	26423-52R	26258-52	26259-52	26256-52				



Pics: click on any pic to enlarge. [6)]


1958-1969 KR, KRTT, KHRTT, XLRTT
1970 XR-750
Oil Pump
(26203-54RA)


1958-1969 KR, KRTT, KHRTT, XLRTT
1970 XR-750
Oil Pump
(26203-54RA)


1958-1969 KR, KRTT, KHRTT, XLRTT
1970 XR-750
Oil Pump
(26203-54RA)


1958-1969 KR, KRTT, KHRTT, XLRTT
1970 XR-750
Oil Pump
(26203-54RA)


1958-1969 KR, KRTT, KHRTT, XLRTT
1970 XR-750
Oil Pump
(26203-54RA)


958-1969 KR, KRTT, KHRTT, XLRTT
1970 XR-750
Oil Pump
(26203-54RA)

1972-1974 XR-750 Oil Pump

- Pump speed is 1/4 of the engine speed.
- Return gears operate at a 2:1 ratio of the feed gears.
- Gear Dims:
  - Number of Teeth: (16T)
  - Feed Gears: O.D. (1.115“) - Width (.185”) - I.D. (.422“)
  - Return Gears: O.D. (1.115”) - Width (.370)- I.D. (.422“)
- The crankcase breathing system was used to return oil from the crankcase into the cam / gear cover using the timed breather valve gear.
  From there, the oil drained directly onto the return gears of the oil pump. [7)]
  - Breather Timing (standard): Valve opens at (14°-16° ATDC) front cylinder. Valve closes at (85°-90° ABDC) front cylinder.
    Adjust breather timing by adding shims behind oil pump drive gear (on pinion shaft) and by increasing slot width in breather.
  - Breather Timing (improved): Valve opens at (5° ATDC) front cylinder. Valve closes at (105° ABDC) front cylinder.
    Slot in upper cover must be widened to app .340” to make this possible.
- The motor is no longer fed only a portion of the pump's full capacity of oil as the bypass system of previous year pumps has been deleted.
  Coincidently, the return gears are bigger to allow more oil to be scavenged from the motor.

There is a desceprency between the 1972 and 1975 parts books in where the upper and pump mounting gaskets are switched between the 2 catalogs.
Special thanks to the The French Owl for providing period specific parts catalogs.
Parts List is for XR and XRTT models: [8) 9) 10)]

Oil Pump Assembly	Oil Pump Body	Upper Cover / Breather Tower	Lower Cover Plate	Oil Pump Drive Gear	Feed Gear (driver)	Feed Gear (idler)	Return Gear (driver)	Return Gear (idler)	Idler Gear Shaft
26203-54RB	26217-72R	26241-54R	26250-56	26318-54R	26323-52 26323-52A*	26322-52 26322-52A*	26320-72R	26317-72 26317-72A*	26327-52
Breather Gear	Feed Gear Lock Pin	Return Gear Woodruff Key	Breather Shaft Split Ret Washer	Oil Pump Check Ball (3/8“)	Oil Pump Check Spring	Oil Pump Switch Nipple	Oil Switch Nipple Plug		
26331-72R	603	26347-15 26340-36*	26341-37	8866	26364-57	26420-57	45830-48		
Pump Gasket Lower	Pump Gasket Upper	Pump Gasket Mounting	Oil Seal						
26258-52	26256-72R	26259-72R	26227-58						

* Parts updated through the 1975 XR-750 Parts Catalog.

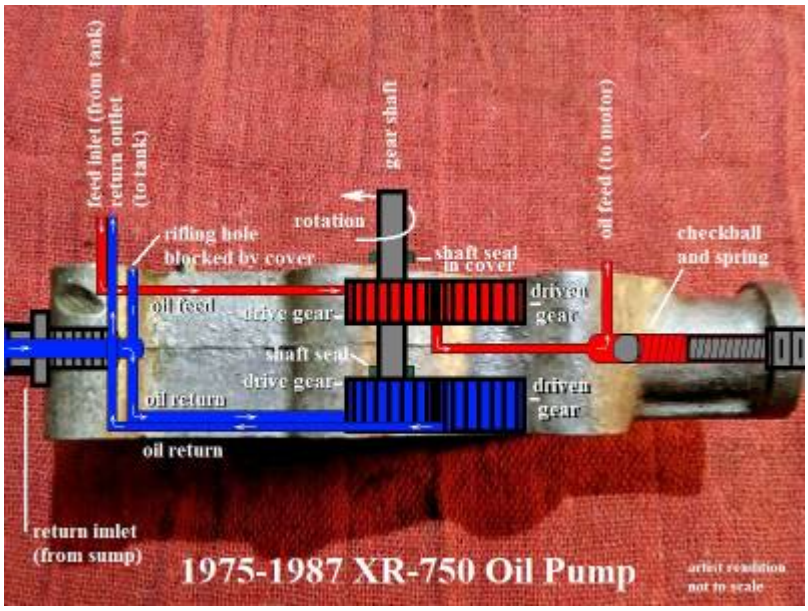
1975-1987 XR-750 Oil Pump

- Pump speed is 1/4 of the engine speed.
- Return gears operate at a 2:1 ratio of the feed gears.
- Gear Dims:
  - Number of Teeth: (16T)
  - Feed Gears: O.D. (1.115”) - Width (.185“) - I.D. (.422”)
  - Return Gears: O.D. (1.115“) - Width (.370)- I.D. (.422”)
- Markings/Stampings: 26215-72 cast into the oil switch pad on the return side. No “R” stamped into the body.
- Breather valve has been undercut and is not equipped with a timing mark nor the tower with a timing slot. 1975 right case was designed with 2 holes in the cam wall to the gearcase. The crankcase breathes out to and in from the gearcase through those 2 holes as well as the breather gear. Breather gear is not used for primary air and oil removal as in previous years but as a way to add oil / oil mist to the cam gears. [11)]
  - Timing: Breather timing cannot be set on these engines.
- Engine got a bolt-on oil sump and windage tray. The additional sump has oil line fittings to accomodate incoming head drains / cam chest drain and outgoing sump oil to pump hoses.
- Return gears scavenge crankcase oil from the sump through an external oil line in the rear of the pump. [12)] The internal scavenge hole from the pump to the cam chest reservoir was deleted. This allows full return pump vacuum to pull from the sump outlet through the oil nipple on the rear of the pump into a machined slot from there to the return inlet side of the gears.

Special thanks to the The French Owl for providing period specific parts catalogs.
Parts List: [13) 14) 15) 16) 17)]

Oil Pump Assembly	Oil Pump Body	Upper Cover / Breather Tower	Lower Cover Plate	Oil Pump Drive Gear	Feed Gear (driver)	Feed Gear (idler)	Return Gear (driver)	Return Gear (idler)	Idler Gear Shaft
26203-74R	26217-74R	26241-74R	26250-56	26318-54R	26323-52A	26322-52A	26320-72R	26317-72A	26327-52
Breather Gear	Feed Gear Lock Pin	Return Gear Woodruff Key	Breather Shaft Split Ret Washer	Oil Pump Check Ball (3/8“)	Oil Pump Check Spring	Oil Pump Switch Nipple Plug	Steel Oil Hose Fitting (3/8”)		
26331-74R	603	26340-36	26341-37	8866 8873*	26364-57	26420-74r	63533-41		
Pump Gasket Lower	Pump Gasket Upper	Pump Gasket Mounting	Oil Seal (2)						
26258-52	26256-72R	26259-72R	26227-58						

* Part updated through the 1972-1989 XR-750 Parts catalog.



18)

19)

20)

21)

1988-up XR-750 Oil Pump

- Pump speed is 1/2 of engine speed.
- Return to feed ratio is 4:1.
- Oil pump drive gear was re-activated as a breather only. Design same as 1975-1980 but with a more efficient gear design and improved oil routing.
    - Breather timing: Turn rear piston to T.D.C. and line up 0.12“ dia. hole in gear shaft with notch in breather sleeve.

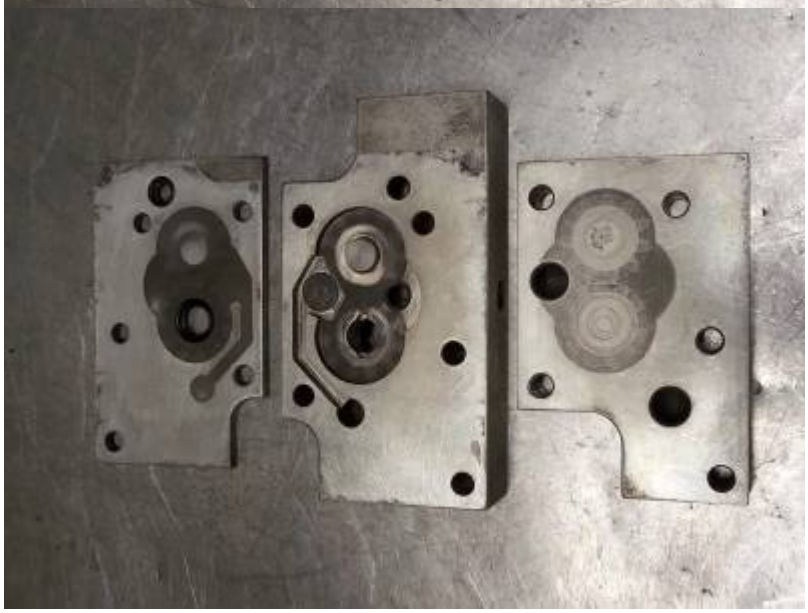
- Interchangability: To fit this oil pump to older engines (1975-1980 XR);
  Modify sleeve (PN 26229-88R) by machining a 45° angle on lower shoulder to fit crankcase chamfer.
  OR, machine a counterbore in crankcase to accept shoulder.
  Depending on what type of frame is used, modification of lower right frame tube might be required.
  This pump operates at 1/2 engine speed and requires drive gear (26213-83R) to be mounted on pinion shaft.

Parts List: [22) 23)]

Oil Pump Assembly	Oil Pump Body	Upper Cover / Breather Tower	Lower Cover Plate	Oil Pump Drive Gear	Feed Gear (driver)	Feed Gear (idler)	Return Gear (driver)	Return Gear (idler)	Idler Gear Shaft
26203-88R	26217-88R	26228-88R	26250-88R	26316-83R	26323-88R	26322-88R	26320-88R	26317-88R	26327-88R
Breather Gear Shaft	Breather Sleeve	Feed Gear Lock Pin	Return Gear Woodruff Key	Breather Shaft Split Ret Washer	Oil Pump Check Ball (3/8”)	Oil Pump Check Spring	Check Ball Plug	Lower Cover Pipe Plug (2) 1/4“	Return Inlet Fitting (3/8”)
26331-88R	26229-88R	637R	26340-36	26341-37	8873	26364-72	26420-74R	721	32463-88R
Pipe Plug (1/8“)	Return Outlet Fitting (1/4”) 1988	Return Outlet Fitting (1/4“) 1989-up	Feed Inlet Fitting (1/8”)	Oil Seal (2)	Upper Cover O-ring (2)				
45830-48	62570-83	25259-93A	63541-74R	26227-58	11159				

Pump Body 26217-88R
This is just the body without upper and lower covers. [24)]

This is a used pump showing the covers and gears. [25)]
The left side of this pump has 5/8“ dia. fitting for scavenging the sump and the 3/8” dia. for oil supply from the tank. The right side of the pump has ball/spring check valve and 3/8“ dia. oil return line to tank. The front side of the pump body has NPT plugs to block off passages from manufacturing/machining oil galleys. Can't make this pump any smaller and no reason to make it bigger, adding weight. Also the pump sits very close to the right side lower frame tube with very little clearance.



Feed Bypass System

1958-1968 KR, KRTT, KHRTT, XLR, XLRTT and 1970 Iron XR-750 Pump

All these models use oil pump body (26217-58R) which is machined with an internal feed bypass system to lower oil flow to the motor.
The bypass returns a portion of feed oil internally to the return gears.

How it's plumbed:

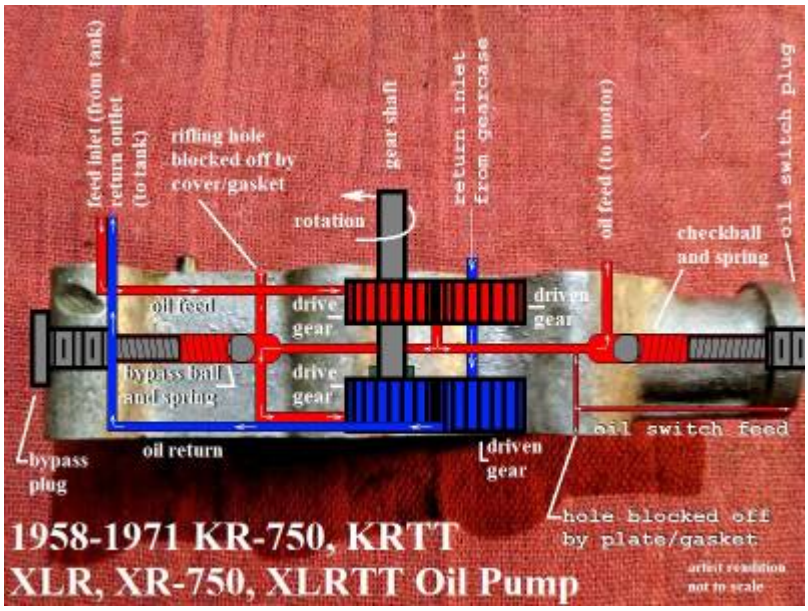
- The pump body has a vertical (bypass) hole drilled all the way through the pump body at app 11:00

from the rear outer mounting bolt looking at the feed side. On the return side of the pump, a “J” slot is milled from that hole around to the suction chamber in front of the return gears. A horizontal hole is drilled from the rear of the pump thru the vertical bypass hole and to the feed output passage in the pump. The horizontal hole is counter drilled in the rear for a ball stop near the vertical bypass hole. A spring and plug on the rear of the pump keeps the ball pressed against it's seat, closing off the vertical hole with spring pressure. The breather tower plate is not drilled for the bypass hole and closes off the top of that hole as assembled. So bypassed oil on these models gets sent to the bottom of that hole to the oil tank straight from the return pump's outgoing oil channel.

How it works:

- Feed oil is split where a portion of oil is fed to the engine and a portion of oil is internally sent to the return pump to be scavenged back to the oil tank from there. Oil that runs the horizontal bypass hole leaves the feed gears and pushes against the rear ball, pushing it backwards opening a path to the vertical hole. Lower oil pressure allows less oil to flow and higher pressure allows more oil to flow down the vertical bypass hole, through the milled “J” slot and into the suction chamber of the return gears. The gears send the oil to the return pressure side chamber, through the pump's return channel, into the engine return passage and out to the oil tank. The spring determines the output oil pressure to the feed side of the motor. The more oil that is bypassed, the lower the pressure of oil that enters the motor.

Rendering the bypass inoperable:
Since these pumps are for competition only, it is counter productive to block the bypass system.



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[1]
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https://www.xlforum.net/forum/sportster-motorcycle-forum/sportster-motorcycle-era-specific-and-model-specific/ironhead-sportster-motorcycle-talk-1957-1985/203311-nos-cases#post4542140
[2] [3]
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Documentation provided by needspeed of the XLFORUM
https://www.xlforum.net/forum/sportster-motorcycle-forum/sportster-motorcycle-era-specific-and-model-specific/ironhead-sportster-motorcycle-talk-1957-1985/4946239-breather-timing-with-engine-installed/page5#post4946707
4)

1970 XR-750 Parts Catalog
5)

1958-1968 Competition Sportster XLRTT and KR-KRTT Models
6)

photos courtesy of Robert Evans
7)

1972-2003 HD XR-750 Service Manual pg 27
8)

1972 XR-750 Parts Catalogs
9)

1973 XR-750 Parts Catalogs
10)

1975 XR-750 Parts Catalogs
11)

from mofosheee's XLForum thread
https://www.xlforum.net/forum/sportster-motorcycle-forum/sportster-motorcycle-era-specific-and-model-specific/ironhead-sportster-motorcycle-talk-1957-1985/4964069-1975-sportster-factory-shop-manual-basket-case-rebuild/page2
12)

-2003 HD XR-750 Service Manual pg 27
13) , 14) , 15) , 16) , 17)

XR-750 Parts Catalog
18) , 19)

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20) , 21)

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22)

1989 XR-750 Parts Catalog
23)

2008 XR-750 Parts Catalog
24)

photos courtesy of ROBERT EVANS
25)

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