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IH: Transmission & Final Drive

Click here for tips on:

[4 Speed Transmission Removal / Inspection / Installation](#)

1971 - 1985 Sportster Four-Speed Constant Mesh Wet Clutch Transmission & Specifications

Transmission Changes by Year

Transmission Changes in 1979

* Changes were made in early 1979 production engines to improve the engagement of the clutch teeth between the mainshaft 2nd gear and the clutch gear. ¹⁾

- On September 21, 1978 starting with crank case (# 779-26 4- 021), the mainshaft clutch gear thrust washer thickness was decreased .020" from .232" to .212" (nominal). The transmission drive sprocket hub width was increased .020" to compensate for the clutch gear change. ²⁾
- This upgrade was recommended as a replacement for earlier transmissions, especially those with severe shifting service where rounding of the gear teeth is likely to occur. ³⁾
- A new [drive sprocket](#) (35205-79) must be used in conjunction with the new clutch gear, (with the new thinner thrust washer), to retain the proper drive sprocket position. Either install a new washer (35216-79) in the old clutch gear (37448-71) or use a new clutch gear (37448-79) which comes with the new washer already installed. ⁴⁾
- To convert an old clutch gear to this new one: ⁵⁾
- Remove the thrust washer and needle bearing using a puller, with a 3/4" collet, pressing out with a rod inserted from the opposite end of gear. If you can't get your hands on the tool, these parts can also be drifted with a hammer and punch, (Caution should be used since this method can damage the bushing). ⁶⁾
- Press in new needle bearing (35961-52) and new thrust washer (35216-79). When pressing in needle bearing, press on the printed side of the bearing cage. The outer face of the bearing cage should be flush with the washer seating face (do not bottom out the bearing in the hole when pressing it in).
- After assembling sprocket on mainshaft, be sure to check mainshaft endplay with pre-load

(.003" - .009"). Adjust if necessary using variable thickness mainshaft thrust washer in accordance with the FSM.

Transmission Access Cover (Trapdoor)

Oil Transfer Hole

- During the 1975 season, the MoCo received several reports of XL & XLCH transmissions with a blocked oil transfer hole in the trapdoor (resulting in little to no oil supply to the transmission). So, they recommended that the dealers remove the transmission oil drain plug & measure how much oil dropped out. If less than 1.5 pints of oil ran out, the transfer hole was to be checked for blockage. This can be remedied by tapping the casting with a hammer and a punch at the hole location (1/2" hole directly below the countershaft hole). Done carefully to prevent chips from getting into the transmission, loose chips may still fall into the hole which will require flushing out the drain hole. ⁷⁾

Trapdoor

Sub Documents

* . . . [1957-1985 Transmission Trapdoor Pics and Information](#)

Model Years	Part #	Casting#	Retrofit to Years
1957-1974	34844-57	34845-54	- ⁸⁾
1975-1976	34844-57A	34845-54A	1957-1976 ^{9) 10)}
1977-E1979	34844-57B	34845-54B	- ^{11) 12)}
L1979-E1984	34847-79	34846-76F	- ¹³⁾
L1984-1985	34847-84		- ¹⁴⁾

Click on a pic to enlarge:

1977 4 Speed Transmission ¹⁵⁾1977 4 Speed Trap Door ¹⁶⁾1983 4 Speed ¹⁷⁾1978 4 Speed transmission ¹⁸⁾

Clutch

Sub-Documents

* . . . ["The Harton Fix" - Late 84-90 clutch shell magnet fix](#)

- Type
 - Wet - Multiple disc

- **1971-1978** ¹⁹⁾
- 8 Drive plates (37985-71), 8 Driven Plates (37992-71A), with an outer drive plate (37987-71) and retaining ring (11053).
- Back to Front : Backing Plate-F-S-F-S-F-S-F-S-F-S-F-S-F-S-F-S-Outer Drive Plate with retaining ring.
- Capacity: 1900 in-lbs (158.33 ft lbs.)
- Set up Spring Pressure
 - 1971: 234 lbs. ²⁰⁾
 - 1972: 257 lbs. ²¹⁾
- Spring adjustment
 - 1971 - 1973: 11/32 in. from outer surface of outer drive plate to outer surface of releasing disc ²²⁾
 - Late 1974 & later:
 - Clutch changes include a new pressure plate (38005-71B) and six spacers (5995) over the studs between the pressure plate and the releasing disc allowing the spring set-up pressure to be set at a controlled amount. A conversion kit (38005-71B), which contained the new pressure plate and spacers, was available to convert 71-E73 models to the new 74 style set-up. The stud holes in the clutch unlined plates (37992-71) were modified to fit loosely over six spacers. New plates have larger oblong holes and round stud holes. ²³⁾
 - Standard Spacers: (5995) - 1.530" long. ²⁴⁾
 - Shorter spacers to increase the spring tension due to disc lining wear:
 - (5996) - 1.490" long. ²⁵⁾
 - (5997) - 1.450" long. ²⁶⁾

Note: The six spring tension nut adjusters (7686) and retainers (37499-71) are no longer used since the clutch spring set-up pressure is adjusted differently with this change. ²⁷⁾
- Clutch bearing: .0005 - .002 in. loose ²⁸⁾
- Periodic adjustment of the clutch is required every 2,000 miles to compensate for lining wear. ²⁹⁾
- Adjustment may also be necessary with the clutch slipping under load or dragging in the released position. ³⁰⁾
- **1979- Early 1984** ³¹⁾
- Capacity: 174 ft lbs.
- Spring Adjustment- Fixed spacers standard length 1.530 in.
 - Free Length- inner- 2-25/64 in.
 - Wear limit: 2 - 11/32 in.
 - Free Length- outer- 2-25/64 in.
 - Wear limit: 2 - 11/32 in.
- Clutch Shell Bearing on clutch gear: .0000 - .0010 in. loose
- Clutch Plate max. warp-age: .010 in.
- **Late 1984-1985** ³²⁾
- Capacity:174 ft lbs.
- Spring Force (engaged): 304 lbs.
- Spring Force (dis-engaged):260 lbs.
- Clutch Shell Bearing on clutch gear: .0000 in. - .0010 in. loose

Adjusting Clutch Release Mechanism

Clutch adjustment is recommended every 2,000 miles to compensate for lining wear or during clutch slippage under load, or when clutch is dragging in released position. ³³⁾

- Loosen adjuster locknut at primary case and turn adjuster inward until there is a large amount of free play at hand lever. ³⁴⁾
- Remove access plug from primary cover to view adjusting screw. ³⁵⁾
- Loosen adjusting screw lock nut and turn adjusting screw inward until it becomes harder to turn (starts to release the clutch) and continue turning (app 2 more turns) to be sure clutch is disengaged. ³⁶⁾
- Adjust all free play out of control cable by turning adjuster outward. Do not put any tension on cable. With all slack in cable taken out (no play at hand lever) tighten the adjuster locknut. ³⁷⁾
- Ready for final clutch release adjustment: Loosen the locknut and back off the adjusting screw until the clutch is engaged (pressure is off the screw) then turn screw inward until the point of no free play. Then turn the adjusting screw outward 1/4 - 1/2 turn to establish the correct amount of free play and tighten the lock nut. Check free play at hand lever. you should have 1/8 in. free play. If not, adjust sleeve and tighten lock nut. ³⁸⁾
- If clutch slips or drags after these adjustments, it may be necessary to inspect / adjust the clutch springs and / or clutch release mechanism for defects. ³⁹⁾

Shifter Cam Assembly

- Shifting problems after considerable mileage could be caused by a loose shifter cam assembly which results in trouble shifting the lever into various gears. It can also cause the transmission to suddenly drop out of gear.
- The shifter cam assembly is secured to the access cover with a bolt, a lockwasher and 2 dowel pins registering in the access cover. If the assembly becomes loose, the (press fitted) dowel pins can work loose from the assembly and into the access cover holes. When the dowel pins have successfully worked their way out of the assembly support, the shifter cam will tip causing a bind in the mechanism. ⁴⁰⁾
- If you're having shifting problems and you're sure it's not because of a dragging clutch (before doing exploratory surgery on the internal tranny parts), try removing the chain cover and check for a loose shift assembly bolt. The bolt may appear tight, but it has been known to bottom out in the hole from being slightly too long which allows it to get tight before full clamping force on the assembly. ⁴¹⁾
- To properly tighten up the assembly, you can remove the clutch and access cover to check and make sure the dowel pins are properly press fit into the support holes and are a snug fit into the access cover. If the dowels are loose in the cover holes (slight wear), try replacing the standard dowel pins with an oversized pair (+0.001), (+0.002) or (+0.003). ⁴²⁾ If the holes are out of round in the access door, the door may have to be replaced. A good machinist could probably re-drill the holes straight to accept bigger pins also. ⁴³⁾
- When re-assembling the shifter assembly to the access cover, be sure the bolt and lockwasher secure it tight to the door. If necessary, you can shorten the bolt by 1/16" (or one thread) with a Dremil tool with a metal cutting blade or a hacksaw. If the bolt still bottoms out, the threaded hole

is too shallow and the pawl carrier support may have to be replaced. ⁴⁴⁾

- Click here for pics and identification of shifter assemblies: [Pics of Pawl Carriers and Pawl Carrier Supports](#)

Primary Drive (engine to transmission)

Year Model(s)	Engine Sprocket	Clutch Sprocket
1971-1978 all models ⁴⁵⁾	34 Teeth	59 Teeth

Clutch Sprocket Assembly

1971-1978 XLH 1979 XL 1979-1980 XLS	(37716-71A) ⁴⁶⁾⁴⁷⁾
1971-1978 XLCH 1979 XL, XLS	(37717-79) ⁴⁸⁾⁴⁹⁾
Early 1979 XLCH	37701-71A ⁵⁰⁾
1981-Early 1984 XL, XLS, XLX	37716-81 ⁵¹⁾
Late 1984-1985 all models Clutch Shell & Sprocket w starter gear	36791-84 ⁵²⁾

Primary Chain

- Type primary: 3/8 in. pitch triple chain ⁵³⁾
- Looseness: 5/8 to 7/8 in. slack (cold engine) - 3/8 to 5/8 in. slack (hot engine) ⁵⁴⁾

Kick Starter

On the XLCH, the kick starter provides a means of starting the engine by manual power. When the pedal is moved in a downward stroke, ratchet teeth of the starter clutch gear and the starter clutch are engaged, transmitting force to the clutch sprocket, primary drive chain and to the engine sprocket. ⁵⁵⁾

- Minimum clearance between clutch teeth on starter clutch gear and clutch with starter in up position: .040 in. ⁵⁶⁾⁵⁷⁾
- Crankshaft endplay: .001 - .007 in. ⁵⁸⁾⁵⁹⁾
- 1979 was the last year you can outfit a Sportster with a kickstarter ⁶⁰⁾

Electric Start

On the XLH, an electric starter motor and Bendix type drive unit engage the ring gear on the clutch to crank the engine. ⁶¹⁾

Gear Shifter

1971-1974

- The shifter is located on the right side of the engine and is foot operated transmitting force through the gear shift shaft, actuating pawl carrier, pawls and gear shifter cam. ⁶²⁾
- The shifter cam moves shifter forks which slide a series of gear clutches on the mainshaft and countershaft into mesh with the various gears to obtain the desired ratios. ⁶³⁾

1975-1976

- To convert shifting from right side to left side, the shifter pedal was moved to the left side of the motorcycle and connected through a cross shaft linkage system to the shifter mechanism on the right side. ⁶⁴⁾

1977-1985

- The shifter shaft was redesigned again (34628-75) for 1977 and up models but still leaving it on the left side of the bike. ^{65) 66)}



1977-1985 shift lever shaft ⁶⁷⁾

Transmission

- Overall Gear Ratios are the number of engine revolutions to drive rear wheel one revolution. ⁶⁸⁾

1971- 1985 model(s) Overall Gear Ratios				
	1st	2nd	3rd	4th
1970-1971 XLCH ⁶⁹⁾	11.74	8.50	6.43	4.66
1970-1973 XL, XLH 1972-1973 XLCH ⁷⁰⁾	11.16	8.08	6.11	4.42
1973-1981 all models ⁷¹⁾⁷²⁾	10.63	7.70	5.82	4.22
1982- Early 1984 all models ⁷³⁾	10.02	7.25	5.49	3.97
Late 1984-1985 all models ⁷⁴⁾	10.01	7.25	5.49	3.97

Transmission/ Primary Oil Capacity ^{75) 76)}: **1.5 pints (24 oz) (710 ml)**

Final Drive (Trans to Wheel)

Year Model(s)	Transmission Sprocket	Rear Wheel Sprocket
1970-1971 XLCH ⁷⁷⁾	19 Teeth	51 Teeth
1970-1973 XL, XLH ⁷⁸⁾ 1972-1973 XLCH ⁷⁹⁾	20 Teeth	51 Teeth
1973-1981 all models ⁸⁰⁾	21 Teeth	51 Teeth
Early 1979 XL, XLCH ⁸¹⁾	19 Teeth 20 Teeth 21 Teeth	51 Teeth
Late 1979-1981 XL, XLS, XLX ⁸²⁾	21 Teeth	51 Teeth
1982-1985 XL, XLS, XLX ⁸³⁾	21 Teeth	48 teeth

1971-1985 Torque Specs

1971 - 1978, FSM Lists No Torque Specs Related to the Transmission

1979 - Late 1984 Torque Specs

Clutch Hub Nut ⁸⁴⁾	110 - 150 ft lbs
Mainshaft Nut ⁸⁵⁾	35 - 65 ft lbs
Access Cover Screws ⁸⁶⁾	13 - 15 ft lbs
Drain Plug ⁸⁷⁾	14 - 21 ft lbs
Primary Cover Screws ⁸⁸⁾	80 - 110 in. lbs
Chain Tensioner Stud Nut ⁸⁹⁾	8 - 12 ft lbs

Late 1984 - 1985 Torque Specs

Mainshaft Nut Locking Screw ⁹⁰⁾	50 - 60 in. lbs
Mainshaft Nut ⁹¹⁾	35-65 ft lbs
Access Cover Screws ⁹²⁾	13 - 15 ft lbs

Drain Plug ⁹³⁾	14-21 ft lbs
Primary Cover Screws ⁹⁴⁾	80 - 110 in. lbs
Chain Tensioner Stud Nut ⁹⁵⁾	8 - 12 ft lbs
Stator Screws (4 slotted) ⁹⁶⁾	20 - 35 in lbs
Stator Mounting (4 hex socket) ⁹⁷⁾	20 - 35 in lbs
Stator Mounting Torx fasteners ⁹⁸⁾	30 - 40 in. lbs

Mainshaft Group

- **1971 - 1978** ⁹⁹⁾
 - Clutch gear ball bearing in case: .0001 - .0012 in loose
 - Ball bearing on clutch gear: .0001 in. loose - .0009 in. tight
 - Clutch gear on mainshaft: .001 - .002 in. loose
 - Mainshaft right side roller bearing: .0006 - .0014 in. loose
 - Mainshaft roller bearings: ¹⁰⁰⁾
 - (9095) Standard = .1562"
 - (9096) + .0004" = .1566"
 - (9097) + .0008" = .1570"
 - Mainshaft end play: .003 - .009 in. with all axial play removed
 - Third gear
 - On shaft: .002 - .003 in. loose
 - End play: .012 - .030 in. loose
- **1979 - Early 1984** ¹⁰¹⁾
 - Clutch gear ball bearing in case: .0001 - .0012 in loose
 - Ball bearing on clutch gear: .0009 in. tight
 - Clutch gear on mainshaft: .001 - .002 in. loose
 - Mainshaft right side roller bearing: .001 - .0034 in. loose
 - Mainshaft end play:
 - No axial play (minimum)- .003 in.
 - With axial play - .020 in.
 - Clearance between clutch faces:
 - Mainshaft fourth gear and second gear: .028 - .058 in.
 - Mainshaft third gear and second gear: .028 - .058 in.
- **Late 1984 - 1985** ¹⁰²⁾
 - Clutch gear ball bearing in case: .0001 - .0012 in loose
 - Ball bearing on clutch gear: .0009 in. tight
 - Clutch gear on mainshaft: .001 - .002 in. loose
 - Mainshaft right side roller bearing: .001 - .0034 in. loose
 - Mainshaft end play:
 - Minimum - .009 in.
 - Maximum - .015 in.
 - Clearance between clutch faces:
 - Mainshaft fourth gear and second gear: .028 - .058 in.
 - Mainshaft third gear and second gear: .028 - .058 in.

Clutch Gear, Clutch Gear Washer, Needle Bearings & Bushing, Drive Sprocket

1971-E1979 XLH/XLCH ¹⁰³⁾¹⁰⁴⁾	Clutch Gear 17T	37448-71 replaced in E1979 by 37448-79
	Clutch Gear Washer (.232")	35361-56 replaced in E1979 by 35216-79 (.020" thinner)
	Needle Bearings (2)	35961-52
	Clutch Gear Bushing	37458-52
	Drive Sprocket 21T	35205-52A replaced in E1979 by 35205-79 (hub width was increased .020")
	Drive Sprocket 20T	35198-52
	Drive Sprocket 19T	35197-52
L1979 XLCH L1979-E1984 XLH/XLS ^{105) 106)} 1983-1984 XLX ¹⁰⁷⁾	Clutch Gear 17T	37448-79
	Clutch Gear Washer (.212")	35216-79
	Needle Bearings (2)	35961-52
	Clutch Gear Bushing	37458-52
	Drive Sprocket 21T	37448-79
	Drive Sprocket 20T	35198-52
	Drive Sprocket 19T	35197-52
L1984-1985 XL/XLS/XLX ¹⁰⁸⁾	Clutch Gear 17T	37448-84A
	Clutch Gear Washer (.212")	35216-79
	Needle Bearings (2)	35961-52
	Clutch Gear Bushing	37458-52
	Drive Sprocket 21T	35208-84
	Drive Sprocket 20T	35198-52
	Drive Sprocket 19T	35197-52

Transmission Mainshaft Shims

1979 and Earlier.

By October of 1982, the number of mainshaft (R) shims for parts order increased to a total of 10 sizes. These parts will retrofit Sportster transmissions back to 1954 K Models ¹⁰⁹⁾

Thrust Washer (Right)	Size		Thrust Washer (Right)	Size
35343-73	.030"		35352-52	0.65"
35344-73	.040"		35353-52	0.70"
35349-52	.050"		35354-52	0.75"
35350-52	.055"		35326-73	0.80"
35351-52	.060"		35355-72	0.85"

Mainshaft and Gears

Mainshaft	Part #	Change Year	Notes ^{110) 111) 112) 113) 114) 115) 116) 117) 118) 119)} ^{120) 121) 122) 123) 124)}
1971-1975 XLH/XLCH	35046-71	1971	
1971-1983 XLH/XLCH/XLS/XLX	35046-71A	1976	
L1984-1985 XLH/XLS/XLX	35036-84A	L1984	
Mainshaft Low Gear		Change Year	Notes
1956 KH 1957-1985 XL/XLH/XLCH/XLS/XLX	35277-52A (27T)	1957	
Mainshaft 2nd Gear		Change Year	Notes
1956 KH 1957-1985 XL/XLH/XLCH/XLS	35296-56 (23T)	1966	O.D. - 2.648"-2.657" ¹²⁵⁾
1957-1986 XL/XLH/XLCH/XLS/XLX	35296-56A (23T)	Early 1986	O.D. - 2.622"-2.627". This was a running change in current 883 transmissions when the early style gear stock was depleted. This new gear can be installed in all Sportsters back to 1957 except 1986 → 1100 transmissions which must use this late style gear. ¹²⁶⁾
Mainshaft 3rd Gear		Change Year	Notes
1956 KH 1957-1985 XL/XLH/XLCH/XLS	35305-56 (20T)	1957	O.D. - 2.448"-2.452" ¹²⁷⁾
1957-1986 XL/XLH/XLCH/XLS/XLX	35305-56A (20T)	Early 1986	O.D. - 2.423"-2.428". This was a running change in current 883 transmissions when the early style gear stock was depleted. This new gear can be installed in all Sportsters back to 1957 except 1986 → 1100 transmissions which must use this late style gear. ¹²⁸⁾

Countershaft Group

- **1971 - Early 1978** ¹²⁹⁾
- Countershaft end bearings: Retained needle roller bearing
- Bearing fit on shaft ends: .0005 - .0029 in. loose
- Bearing fit in case: press fit
 - End play: .004 - .009 in.
- Second gear
 - On shaft: .001 - .0025 in. loose

- Low gear
 - On shaft: .0005 - .0016 in. loose
 - End play: .004 - .009 in. (1971-1978)
- Drive gear
 - On shaft: .0005 - .0030 in. loose
 - End play: .004 - .009 in. (1971-1978)
- Clearance between clutch faces
 - Countershaft low an third gear: .038 - .058 in.
 - Countershaft second and third gear: .038 - .058 in.
 - Mainshaft clutch gear and second gear: .043 - .083 in.
 - Mainshaft third gear and second gear: .043 - .083 in.
- Shifter end play (1971-1976): .010 - .030 in.

- **1979-Early 1984** ¹³⁰⁾
- Countershaft end bearings: Retained needle roller bearing
- Bearing fit on shaft ends: .0005 - .0030 in. loose
- Bearing fit in case: press fit
 - End play: .004 - .009 in.
- Second gear
 - On shaft: .001 - .0025 in. loose
- Low gear
 - On shaft: .0005 - .0016 in. loose
- Drive gear
 - On shaft: .0005 - .0030 in. loose
- Clearance between faces
 - Countershaft low an third gear: .028 - .058 in.
 - Countershaft second and third gear: .028 - .058 in.
- Countershaft end play: .004 - .015 in.

- **Late 1984 - 1985** ¹³¹⁾
- Countershaft end bearings: Retained needle roller bearing
- Bearing fit on shaft ends: .0005 - .0030 in. loose
- Bearing fit in case: press fit
- Second gear
 - On shaft: .001 - .0025 in. loose
- Low gear
 - On shaft: .0005 - .0016 in. loose
- Drive gear
 - On shaft: .0005 - .0030 in. loose
- Clearance between faces
 - Countershaft low an third gear: .028 - .058 in.
 - Countershaft second and third gear: .028 - .058 in.
- Countershaft end play: .004 - .015 in.

Countershaft and Gears

Countershaft	Part No.	Notes ¹³²⁾ ¹³³⁾ ¹³⁴⁾ ¹³⁵⁾ ¹³⁶⁾ ¹³⁷⁾ ¹³⁸⁾ ¹³⁹⁾ ¹⁴⁰⁾ ¹⁴¹⁾ ¹⁴²⁾ ¹⁴³⁾ ¹⁴⁴⁾ ¹⁴⁵⁾	
1958-E1984 All	35613-58		
L1984-1990 All	35613-84		
Countershaft Drive Gear	Part No.	Change Year	Notes
1958-1985 XL/XLC/XLH/XLCH/XLS	35695-58 (27T)	1958	
Countershaft 2nd Gear	Part No.	Change Year	Notes
1958-1985 XL/XLC/XLH/XLCH/XLS	35750-58 (20T)	1958	O.D. - 2.448"-2.452" ¹⁴⁶⁾
1957-1986 XL/XLC/XLH/XLCH/XLS/XLX (replacement part)	35750-58A (20T)	Early 1986	O.D. - 2.423"-2.428". This was a running change in current 883 transmissions when the early style gear stock was depleted. This new gear can be installed in all Sportsters back to 1957 except 1986 → 1100 transmissions which must use this late style gear. ¹⁴⁷⁾
Countershaft 3rd Gear	Part No.	Change Year	Notes
1954-1956 KH 1957-1985 XL/XLC/XLH/XLCH/XLS (replacement part)	35709-54A (23T)	1957	O.D. - 2.648"-2.657" ¹⁴⁸⁾
1957-1986 XL/XLC/XLH/XLCH/XLS/XLX (replacement part)	35709-54B (23T)	Early 1986	O.D. - 2.622"-2.627". This was a running change in current 883 transmissions when the early style gear stock was depleted. This new gear can be installed in all Sportsters back to 1957 except 1986 → 1100 transmissions which must use this late style gear. ¹⁴⁹⁾
Countershaft Low Gear	Part No.	Change Year	Notes
1957-1971 XL/XLC/XLH/XLCH (replacement part)	35760-54A (17T)	Late 1966	Replaced 35760-54 with an added counter-bore on case side to clear the added fillet in the new cases.
1957-1972 XL/XLH/XLCH (replacement part)	35760-54B (17T)	1972	(with speedometer drive gear)
1973-E1984 XLH/XLCH/XLS/XLX	35760-73 (17T)	1973	
L1984-1985 XLH/XLS/XLX	35760-84A (17T)	L1984	

Countershaft and Oiler Plug

- **There were two different countershafts made for the Sportster 4 speed tranny.** In the first picture below, the left one is used on both Ironhead and Evo models from late 1984 until 1990,¹⁵⁰⁾¹⁵¹⁾ the last year of the 4 speeds.
- The shaft to the right in the first pic shows an Andrews version of the earlier style ('58-early '84)¹⁵²⁾ countershaft with the oiler hole in a hollow shaft¹⁵⁴⁾.
- Dimensions are the same on both style countershafts with exception being the shoulder for first gear which measures 0.0875 in diameter.¹⁵⁵⁾
- **The oiler plug** in the trapdoor catches oil and gravity feeds it through the counter shaft to 1st gear. It will get some amount of splash lube without it, but not as good of a jet of oil as if coming from the plug.¹⁵⁶⁾ The oiler plug sticks outside of the case 7/16".¹⁵⁷⁾
- **Before installing the oiler plug**, set it off to the side until after you've set / checked your final countershaft endplay. otherwise it'll be in your way.¹⁵⁸⁾
- **The oiler plug should be a tight interference fit.** It should go in and stay in with the engine running and vibrating and carrying on. Upon dis-assembly, many are found to be loose or rather the hole has probably been worn from the aluminum being smashed in and out of a few times without heating the aluminum trapdoor to expand it. This is why you should ALWAYS heat aluminum engine and gearbox casings, wheel hubs etc, with a propane torch before removing or installing bearings. Doing it cold works once, maybe twice, then the hole is worn out.¹⁵⁹⁾
- **To fix a loose oiler plug**, you can take the plug to a machine shop and get them to knurl it. That will increase the diameter by a few thousandths. Then re-install it with Loctite. I would use the red, it is the strongest. But you will then need to use a propane torch to break the Loctite to get it back out.¹⁶⁰⁾
- You can also peen the hole to retain the oiler.¹⁶¹⁾
- **Late '84 and up trap door does not include a countershaft oiler plug.** When installed in this newer trapdoor in older applications, it may easily hit and scrubb the back of the stator due to being too long. It will either need to be machined down for your clearance measurements or the old style trapdoor must be used.¹⁶²⁾



4 Speed Trans Countershaft comparison ¹⁶³⁾

Early style HD 4 Speed Trans Countershaft ¹⁶⁴⁾

Oiler Plug in '77 tranny ¹⁶⁵⁾



Oiler Plug & Countershaft Needle Roller Bearing ¹⁶⁶⁾

Pawl Carriers and Pawl Carrier Support

- There are 4 different versions of oem 'pawl carriers' and 5 oem versions of the 'pawl carrier

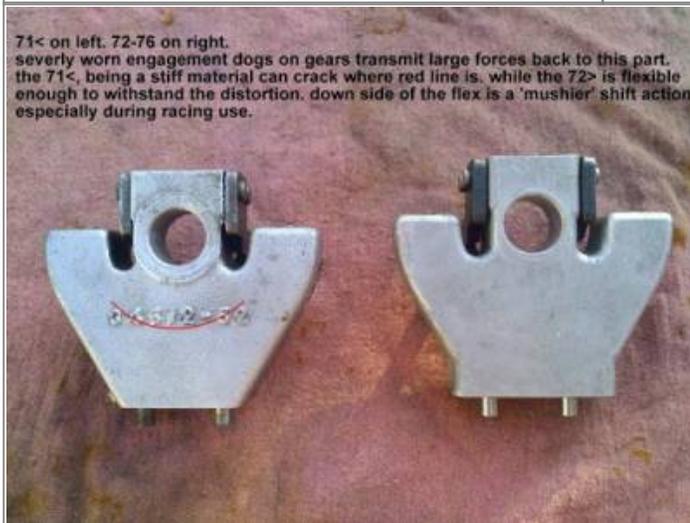
support' (shift tower).

- Here the towers are in order:



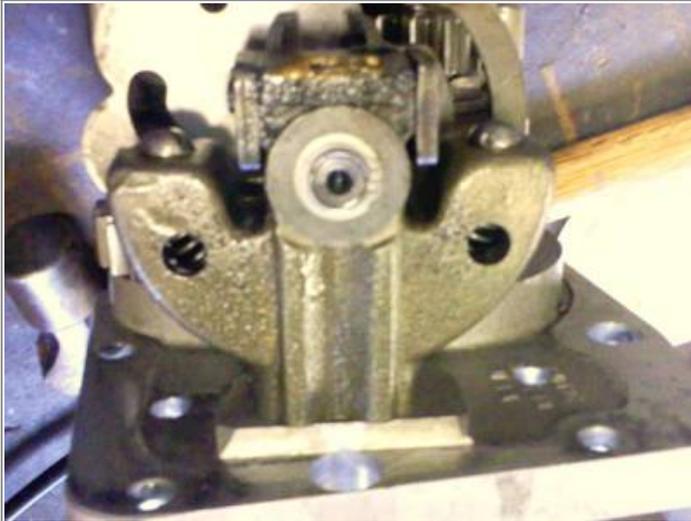
1) Used on k models¹⁶⁷⁾

#2/#3/#4) next 2 pics. No pic of #3 but the text should suffice.¹⁶⁸⁾



¹⁶⁹⁾

#5) changed for clearance of the '77-'90 shifter shaft coming in from the left¹⁷⁰⁾



Next is the old Trock cast iron tower. By far the best shift fork control
Never breaks, best of both worlds. ¹⁷¹⁾

Left '72-'76 Shift Tower
(taller shaft than on the right)

Right '77-'90 Shift Tower ¹⁷²⁾

Transmission Housing



4 Speed housing inside 1977 XLCH case ¹⁷³⁾

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HD Service Bulletin #M-744 dated April 3, 1979

7) 10)

HD Service Bulletin #686 dated April 8, 1975

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1952-1959 Spare Parts Catalog for Sportster and K Models pg 11

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1954-1976 HD Sportster Parts Catalog pg 13

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1977 HD Sportster Parts Catalog Supplement pg 1

12) 13) 14)

1979-1985 HD Sportster Parts Catalog pg 15

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1979-1985 HD Sportster Parts Catalog pg 55

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dave76

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HD Sportster Parts Catalog (99451-78B) pg 67

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doodah man

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