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1957 - 1970 Sportster Four-Speed Constant Mesh Dry Clutch Transmission Specifications

Clutch

- Type:
  - Dry - Multiple disc
    - Worth noting is the MoCo had an optional wet clutch kit for 1954-up KH, XL, XLH, XLCH models. Kit # (37984-57) [1)]
  - 7 friction plates, 7 steel plates between a steel backing plate and a front releasing disc
  - Back to front: Backing plate-S-F-S-F-S-F-S-F-S-F-S-F-S-F-Releasing disc
- Capacity: 1900 in-lbs. (158.33 ft lbs.)
- Set up Spring Pressure: 150 lbs.
  - Spring adjustment: 3/16 in. from inner surface of spring tension adjusting plate to outer surface of spring cup flange
- Clutch bearing: .0005 - .002 in. loose
- (1970) - .0005 - .0029 in. loose
- Clutch cover: Must be leak proof. No gasket sealer
- Clutch release rod movement: .095 - .115 in.

Adjusting Clutch Release Mechanism

- Loosen clutch release rod adjusting screw lock nut and rod adjusting screw. Clutch release worm (inside the sprocket cover) should seat against it's stop when clutch handle is fully extended. If lever doesn't fully seat, check for cable binding in housing.
- Adjust cable length by turning the adjusting sleeve (at hand lever) so the clutch release worm does not quite return against it's stop. This will hold the hand lever in it's fully extended position at all times.
- Tighten clutch release rod adjusting screw until hand lever has 1/8 in. free play before clutch starts to release (slight tension).
- Tighten locknut without disturbing the current cable setting.

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 (7/16”x14x1-1/8”), 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. [2)]
- 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. [3)]
- 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 (9220A) with an oversized pair (+0.001 - 9225A), (+0.002 - 9227A) or (+0.003 - 9229A). [4)] 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. [5)]
- 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 (34514-52) may have to be replaced. [6)]
- 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
Standard	1966 & Earlier XLCH 1967 & later XLH, XLCH	34 Teeth	59 Teeth
Optional	1966 and Earlier XL, XLH 1967 XLH, XLCH	34 Teeth	59 Teeth

Clutch Sprocket Assembly

- Late 1957-1966 XL, XLH, XLCH (37702-57) [7)]
- 1967-1969 XLCH (37702-57) [8)]
- 1967-1970 XLH (37700-67) [9)]
- 1970 XLCH (37701-70)[10)]

Primary Chain

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

Kick Starter

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.

- Minimum clearance between clutch teeth on starter clutch gear and clutch with starter in up position: .040 in.
- Crankshaft endplay: .001 - .007 in.

Electric Start

On 1967 and later model XLH, an electric starter motor and Bendix type drive unit engage the ring gear on the clutch to crank the engine.

Gear Shifter

- 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.
- 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.

Transmission

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

		Overall Gear Ratios			
	Year Models	1st	2nd	3rd	4th
Standard	1966 & Earlier XLCH 1967 & Later XLH, XLCH	11.16:1	8.08:1	6.11:1	4.42:1
Optional	1966 & Earlier XL, XLH 1967 XLH, XLCH	10.63:1	7.69:1	5.82:1	4.21:1

Transmission Oil Capacity [11) 12)]: **1.5 pints / (24 oz) / (710 ml)**

Final Drive (Trans to Wheel)

Standard Year Model [13) 14) 15) 16) 17) 18) 19)]	Part #	Transmission Sprocket: (All with a 51 Tooth Rear Wheel Sprocket)
XL		
E1957	35205-52	21 Tooth
L1957-1959	35205-52A	
XLC		
1958	35205-52A	21 Tooth
XLH		
1958 - E1967	35205-52A	21 Tooth
L1967-1973	35198-52	20 Tooth [20) 21)]
1973-E1979	35205-52A	21 Tooth [22)]
XLCH		
1958	35205-52A	21 Tooth
1959-E1969 XLCH	35198-52	20 Teeth
L1969-1971 [23)] (Engine # 69XLCH 5921 →) [24)]	35197-52	19 Tooth
1972-1973	35198-52	20 Tooth [25)]
1973-E1979 [26) 27) 28)]	35205-52A [29)]	21 Tooth [30)]
L1979	35208-79A	21 Tooth
XL/XLS/XLX		
L1979-E1984	35208-79A	21 Tooth
L1984-1990	35208-84	21 Tooth

- By the time the 1976 parts catalog came out, all three early transmission sprocket versions were available for replacement of the original no matter which bike you had and from 1954 to then current. It stayed that way until Late 1979 in the parts catalogs. However, 1973 and up Sportsters all came factory with a 21T sprocket, according to the FSM. There is also an overlap in 1973 in that the FSM(s) states a 21T and a 20T for 1973 [31)]. Maybe a mid year change?

Torque Specs

Clutch Hub Nut	150 ft lbs

Mainshaft Group

- 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: [32)]
    - (9095) Standard = .1562“

    - (9096) + .0004” = .1566“
    - (9097) + .0008” = .1570“
- Mainshaft end play: .004 - .009 in.
- (1970) .003 - .009 in. with all axial play removed
- Third gear
    - On shaft: .002 - .003 in. loose
    - End play: .015 - .025 in. loose
    - (1970) .012 - .030 in

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

1956-1966 KH (engine #1465 →) **XL/XLH/XLCH** **1967-1969 XLCH** [33]	Clutch Gear	37450-56 replaced by 37449-56
	Clutch Gear Washer	35361-56
	Needle Bearings (2)	35960-54 (closed end) replaced by 35961-52 (open end)
	Clutch Gear Bushing	37458-52
	Drive Sprocket 21T [34] 1952-1953 K/KK 1954-1955 KH (engine #1689 →) [35] 1957-1959 XL 1958-E1967 XLH 1958-1971 XLCH (except 1959)	35205-52 replaced by 35205-52A
	Drive Sprocket 20T [36] [37] [38] [39] [40] 1959-1971 XLCH L1967-1971 XLH	35198-52
	Drive Sprocket 19T [41] [42] 1953-1956 K/KH L1969 XLCH (engine #69XLCH-5921 →)	35197-52
1967-1970 XLH **1970 XLCH**	Clutch Gear	37448-67
	Clutch Gear Washer	35361-56
	Needle Bearings (2)	35961-52
	Clutch Gear Bushing	37458-52
	Drive Sprocket 21T [43] XLH/XLCH	35205-52A
	Drive Sprocket 20T [44] XLH/XLCH	35198-52
	Drive Sprocket 19T [45] XLH/XLCH	35197-52

Mainshaft and Gears

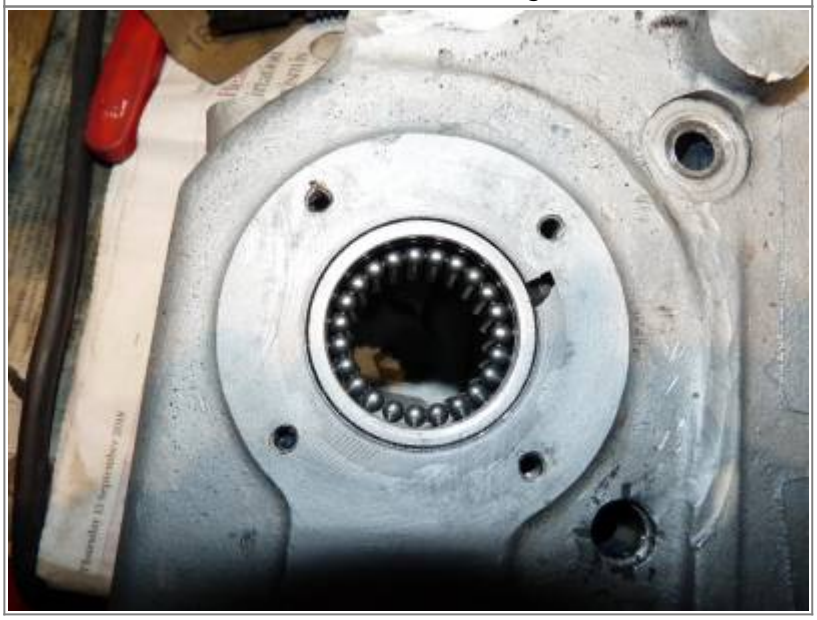
Mainshaft	**Part #**	**Change Year**	**Notes** [46) 47) 48) 49) 50) 51) 52) 53) 54) 55) 56) 57) 58) 59) 60)]
L1956 KH (engine # 1465 →) **1957-1966 XL/XLH/XLCH** **1967-1969 XLCH**	35044-56	1957	
1967-1970 XLH **1970 XLCH**	35046-67	1967 1970	
Mainshaft Low Gear		**Change Year**	**Notes**
1956 KH **1957-1985** **XL/XLH/XLCH/XLS/XLX**	35277-52A (27T)	1957	
Mainshaft 2nd Gear		**Change Year**	**Notes**
1956 KH **1957-1965** **XL/XLH/XLCH**	35269-56 (23T)	1957	
1956 KH **1957-1985** **XL/XLH/XLCH/XLS**	35296-56 (23T)	1966	O.D. - 2.648”-2.657“ [61)]
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. [62)]
Mainshaft 3rd Gear		**Change Year**	**Notes**
1956 KH **1957-1985** **XL/XLH/XLCH/XLS**	35305-56 (20T)	1957	O.D. - 2.448”-2.452“. [63)]
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. [64)]

Mainshaft roller bearings

Standard rollers should measure .15625”-.15610“. [65)]
Fit to shaft may not be determined by race size.
In order to fit 23 new std rollers in the race, it needs to be big enough to accept 23 rollers with out the rollers binding in the race.
When sized to the min. dia. that accepts 23 rollers with out bind, the shaft (.991” dia) will be will be about .002 running clearance.

This is because there is no roller cage. The rollers touch each other.
Because of the zero% roller to roller space trying to fit 23 o.s. rollers means the race needs to a lot bigger than the roller amount of roller o.s.
This results in a looser running fit than used in the standard rollers.
To use the os rollers and get a tighter fit than 23 standards, you can only use 22 o.s rollers.
Rigid hone / line lap race to take 23 standards.
Then let clearance be whatever it is.

Mainshaft roller bearings [66)]



Countershaft Group

- Countershaft end bearings: Retained needle roller bearing
- Bearing fit on shaft ends: .0005 - .002 in. loose
- Bearing fit in case: press
- 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.
- Drive gear
  - On shaft: .001 - .0025 in. loose
  - (1970) .0005 - .0030 in. loose
  - End play: .004 - .009 in.
- Clearance between clutch faces
  - Countershaft low an third gear: .038 - .058 in.
  - Countershaft second and third gear: .038 - .058 in.
  - 1970
    - Mainshaft clutch gear and second gear: .043 - .083 in.
    - Mainshaft third gear and second gear: .043 - .083 in.

- Shifter end play: .010 - .030 in

Countershaft and Gears

Countershaft	**Part No.**	**Notes** [67) 68) 69) 70) 71) 72) 73) 74) 75) 76) 77) 78) 79) 80)]	
1954-1956 KH **1957 XL**	35613-54	More information about countershafts and the oiler plug	
1958-E1984 **All**	35613-58		
Countershaft Drive Gear	**Part No.**	**Change Year**	**Notes**
1952-1956 K (all) **1957 XL**	35695-52 (29T)	-	
1952-1956 K (all) **1957 XL**	35695-52A (27T)	-	
1958-1985 **XL/XLC/XLH/XLCH/XLS**	35695-58 (27T)	1958	
Countershaft 2nd Gear	**Part No.**	**Change Year**	**Notes**
1954-1956 KH	35750-54B (21T)	-	
1954-1956 KH **1957 XL** (replacement part)	35750-54C (21T)	1957	
1958-1985 **XL/XLC/XLH/XLCH/XLS**	35750-58 (20T)	1958	O.D. - 2.448“-2.452” [81)]
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. [82)]
Countershaft 3rd Gear	**Part No.**	**Change Year**	**Notes**
1954-1956 KH	35709-54 (24T) [83)]	-	
1954-1956 KH **1957-1985 XL/XLC/XLH/XLCH/XLS** (replacement part)	35709-54A (23T)	1957	O.D. - 2.648“-2.657” [84)]
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. [85)]

Countershaft	Part No.	Notes [67] [68] [69] [70] [71] [72] [73] [74] [75] [76] [77] [78] [79] [80]	
Countershaft Low Gear	**Part No.**	**Change Year**	**Notes**
1954-1956 KH	35759-54 (17T)	-	
1957-Early 1966 XL/XLC/XLH/XLCH	35760-54 (17T)	1957	Single counter-bore (case side) allowing gear to slip over the right case casting boss. Cannot be used on Late '66 and later right case with added fillet at the base of the gear boss.
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)

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