PLEASE NOTE : The following pages have been omitted from this manual as they were originally blank. This has been done to ensure its continuity.
Pages omitted are:
1-14, 2-34, 2-52, 3-16, 3-68, 4-16, 4-20, 5-2, 5-16, 5-20, 5-22, 5-36, 5-38, 5-48, 5-52 & 5-56.

Our personal recommendation is to take this CD to your local office supply store and have a paper copy printed out for use on your dirty work bench. Then save a format copy on your computer & store the original CD in a safe place. I have found that this is also a nice way to carry your manuals on road trips….just so they wont be needed (kind of like taking an umbrella so it wont rain). You can even put them on a jump-drive.

Keep the shiny side up and the rubber side down !

1970-78 SPORTSTER

XL/XLH/ XLCH/XLT-1000

SERVICE MANUAL

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PRODUCT 1

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SPECIFICATIONS

DIMENSIONS

		XL, XLH	XLCH
Wheel Base		58-1/2"	58-1/2"
Overall Length	1970-76	87-1/4"	87-1/4"
	1977 & later	87-3/4"	87-3/4"
Overall Width	1970-76	33"	32"
	1977 & later	35"	35"
Overall Height	1970-76	40-1/2"	42"
	1977 & later	48"	48"
Road Clearance	1970-72	6-3/4"	6-1/2"
	1973-77	7-1/4"	7-1/4"

CAPACITIES

	XL, XLH	XLCH
Gasoline Tank (U.S. Gallons)	4.0 or 2.2	4.0 or 2.2
Reserve	.25	.25
Oil Tank (Quarts)	3	3
Transmission (Pints)	1-1/2	1-1/2

ENGINE

Model Designation Letters	XL, XLH, XLCH
Type of Engine	4 Cycle OHV
Number of Cylinders	2
Placement of Cylinders	45 Degree, V Type
Horsepower: 1970-71	58 hp at 6800 rpm
1972-77	61 hp at 6200 rpm
1978	59.5 hp at 6400 rpm
Taxable Horsepower	7.2
Bore: 1970-71	3.00 in. (76.2 mm)
1972 & later	3.188 in. (81 mm)
Stroke	3.8125 in. (96.8 mm)
Piston Displacement:	
1970-71	53.9 cu. in. (883 cc)
1972 & later	60.9 cu. in. (997.5 cc)
Torque	52 lb-ft at 3800 rpm
Compression Ratio	9.0 to 1
Spark Plugs (for break-in period)	No. 4

After break-in period, No. 5 plug is recommended for average and hard service.

The Vehicle Identification Number (V.I.N.) is stamped on the right side of the engine crankcase and on the frame steering head. It consists of a model code, a serial number, a manufacturer's identification and model year as shown in the table.

Letters	Model No.	Serial No.	Mfgr.	Year
XL or XLH XLCH XLA XLT	3A 4A 4D 2G	10,000 and up (5 digits)	H Harley-Davidson	8 (1978)

Always give this number when ordering parts or making an inquiry.

TRANSMISSION

Type ..... Constant Mesh – Foot Shift
Speeds ..... 4 Forward

Number of Sprocket Teeth:	XL, XLH, XLCH 1973 & Later	XL, XLH, XLCH 1970-73	1970-71 XLCH Only
Engine	34	34	34
Clutch	59	59	59
Transmission	21	20	19
Rear Wheel	51	51	51
Gear Ratios:			
First (Low) Gear	10.63	11.16	11.74
Second Gear	7.70	8.08	8.50
Third Gear	5.82	6.11	6.43
Fourth (High) Gear	4.22	4.42	4.66

TIRE DATA

SPORTSTER TIRE CHART

Wheel	Wheel Description	Tire Size
19 Inch	Laced	3.75-19T
XLH/XLCH/XLT Front	Cast, 7 Spoke Cast, 9 Spoke	MJ90-19
18 Inch	Laced	4.25-18T
XLH/XLCH/XLT Rear	Cast, 7 Spoke Cast, 9 Spoke	MN90-18
16 Inch XLH/XLCH Rear (Accessory)	Cast, 7 Spoke	MT90-16T 5.00-16T 5.10-16T

WARNING — These tires have been specified to provide maximum handling stability and must be used exclusively for replacement.

Tire Size ..... Front – MM90-19T (3.75 x 19T)
Rear – 4.25 x 18T
Pressure ..... Front – 24 lbs.
Rear – 30 lbs.

WARNING — Maximum pressure of either tire is 32 lbs.

IMPORTANT

Either Goodyear or Yokohama tires are supplied as original equipment and are identified according to the chart on page 1-1. Innertubes are identified with manufacturers corresponding size numbers. These tires were specially designed to provide maximum roadability. These special tires must be used exclusively for replacement. Tires will fit only taper base rims. On the XLT model, use only Yokohoma's Y-980 for the front and Y-622 for the rear tire.

The tire inflation pressures given are based on a rider weighing approximately 150 lbs. When this load is exceeded by 50 lbs. or more, increase tire pressure as follows: for each 50 lbs. of overload, increase pressure of rear tire 2 lbs. and front tire 1 lb.

SERVICE

SERVICING A NEW MOTORCYCLE

PRE-DELIVERY

Service operations to be performed before delivery to customer are specified in the Setting Up Instructions and Important Instructions included with new vehicle.

CHECK AT FIRST 500 MILES

1. Drain oil tank through drain plug, flush with kerosene and refill with fresh oil.
2. If motorcycle is equipped with oil filter, service the filter.
3. Drain transmission and front chain compartments, clean transmission magnetic drain plug, and refill with fresh oil. Use same grade oil used in engine. Reinstall plug. If an oil leak is noted, reinstall plug along with Seal Washer, Part No. 6370.
4. Lubricate all points indicated for 2000 mile servicing as described in the Regular Service Intervals Chart.
5. Inspect and service air cleaner if needed.
6. Check and adjust chains.
7. Check lubrication and condition of rear chain and adjust rear chain oiler if necessary.
8. Check all nuts, bolts and screws, and tighten any found loose to specified torque.
9. Check wheel mounting bolts which secure rear wheel to brake assembly. These bolts must be kept very tight. See torque chart.
10. Check battery solution level and add distilled water if needed. Make sure terminals are clean and connections tight.
11. Check tightness of all cylinder head bolts and all cylinder base nuts. See torque chart.
12. Check tappet adjustment and readjust if necessary.
13. Check spark plug electrodes, clean and regap if necessary.
14. Check ignition timing and circuit breaker point condition and gap.
15. Check wheel spokes and tighten if necessary.
16. Check front fork and rear fork bearing adjustment.
17. Check clutch adjustment.
18. Check brake adjustment.
19. Aim headlight.
20. Oil all control joints and parts as indicated in 2000 mile regular service intervals.
21. Check gasoline supply valve, lines, and fittings to be sure there are no leaks.
22. Check tire pressure and inspect tread.
23. Change front fork oil.
24. Check fluid level in master cylinder reservoir. Check brake lines and brake caliper for leaks.
25. Check carburetor controls and adjustment.
26. Inspect brake pad linings and brake discs for wear.
27. Check oil lines and fittings for leaks.
28. Road test.

CHECK AT FIRST 1000 MILES

1. Drain oil tank through drain plug and refill with fresh oil.
2. Clean oil filter (if applicable).
3. Check level of oil in transmission and front chain compartments and add oil if needed. Use same grade of oil used in engine.
4. Service air cleaner.
5. Check and adjust chains.
6. Check lubrication and condition of rear chain and adjust rear chain oiler if necessary.
7. Check battery solution level and add distilled water if needed. Make sure terminals are clean and connections tight.
8. Check tappet adjustment and readjust if necessary.
9. Check circuit breaker points and adjust if needed.
10. Check clutch adjustment.
11. Check brake adjustment.
12. Check tire pressure and inspect tread.
13. Check gasoline supply valve, lines, and fittings to be sure there are no leaks.
14. Check fluid level in master cylinder reservoir.
15. Check and tighten spokes.
16. Check carburetor controls and adjustment.
17. Lubricate all controls and fittings.
18. Inspect brake linings and discs.
19. Check all lines and brake system for leaks.
20. Check all fasteners (nuts, bolts, screws) and make sure they are tight. See torque chart.
21. Check tightness of cylinder base nuts and cylinder head bolts. See torque chart.
22. Road test.

All operations are fully described in subsequent sections.

REGULAR SERVICE INTERVALS

(Figures 1-1 through 1-7)

SUGGESTED OPERATIONS FOLLOWING THE INITIAL BREAK-IN PERIOD

Regular Service Interval	Index No.	Grease	Index No.	Oil	Index No.	Service
300 Miles			7	Rear Chain (Manual) (1977 & later)		
Every 1000 miles	31	Rear brake foot lever shaft	7	Rear chain (with oiler) (1976 & earlier)		Inspect tires
	16	Kick starter shaft	21	Clutch hand lever		Check spokes
	19	Rear brake lever at drum	1	Brake hand lever		Check oil lines and brake system for leaks
	11	Speedometer drive	22	Clutch control cable	4	Air cleaner
	12	Circuit breaker cam-shaft	37	Rear brake cable	25	Battery
			28	Throttle control cable	7	Rear chain adjust-ment
			17	Rear brake rod clevis	36	Gasoline valve, lines and fittings
						Check fastener tightness
					15	Clutch adjustment
					2,17	Brake adjustment
					30	Front chain adjust-ment
Every 2000 miles	8	Front brake shaft	9	Front brake cable clevis	13	Tappet adjustment
	31	Rear brake crossover shaft (1974 & earlier)	2	Front brake cable	5	Oil filter
	15	Clutch release worm (1970)	26	Seat post (saddle only)		Check carburetor controls
	14	Foot shift lever			20	Rear chain oiler (1976 & earlier)
	6	Seat bar roller and bolt			12	Circuit breaker points
	32	Rear wheel hub			35	Check brake fluid
	31	Foot shift crossover shaft (1975-76)			24	Inspect, clean and gap spark plugs
						Check fastener tightness
Every 5000 miles or 1 year (whichever comes first)	3	Throttle control spiral			10	Check front and rear fork bearing adjustment
	34	Speedometer and tachometer cables				Replace:
					24	Spark plugs
					5	Oil filter element
						Inspect tires
					12	Time ignition
						Clean gas tank strainer
					29	Check generator brushes
					33	Check shock rubber bushings
					23	Change front fork oil (1973 & later)
						Change brake fluid
Every 10,000 miles	18	Repack rear fork pivot bearings				
	27	Repack wheel bearings				
Weekly						Check tires
						Check battery

SERVICE INTERVAL ENGINE AND TRANSMISSION

	300 Miles	1000 Miles	2000 Miles	5000 Miles or 1 Year	Spring and Fall
Engine Oil	Check	Check	Change		Change
Transmission Oil		Check		Change	

LUBRICANTS TO USE

Use proper grade of oil for the lowest temperature expected before next oil change period as follows:

USE Harley-Davidson Oil	Use Grade	Air Temperature (Cold Engine Starting Conditions)
Medium Heavy	75	Above 40°F
Special Light	58	Below 40°F
Regular Heavy	105	Severe operating condition at high air temperatures above 90°F

HARLEY-DAVIDSON GREASE-ALL GREASE

Use for all bearings on motorcycles.

HARLEY-DAVISON CHAIN GREASE, CHAIN SAVER AND CHAIN SPRAY

Designed especially as chain lubricant. Penetrates inner bearings for long chain life.

GASOLINE

Use a good quality leaded "premium grade" gasoline (94 pump octane or higher). "Pump octane" is the octane number usually shown on the pump.

If leaded premium is not available, unleaded premium grade gasoline (94 pump octane or higher) is satisfactory, provided there is an occasional fill (every 3 or 4 tankfuls) with leaded premium.

Leaded or unleaded regular grade gasoline (lower than 94 pump octane) is not recommended.

BRAKE FLUID

Use D.O.T. 5 brake fluid only.

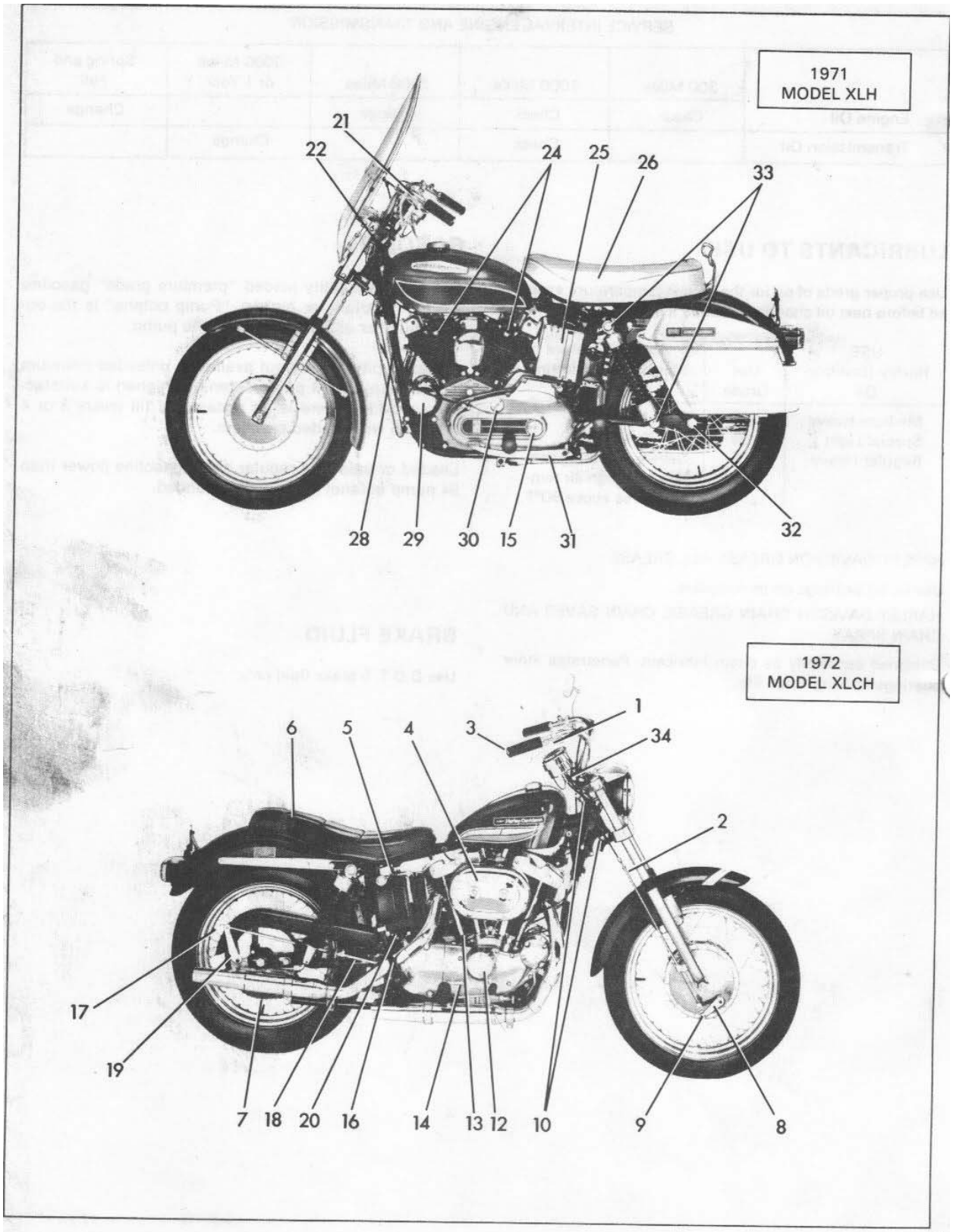

Figure 1-1. Service Chart

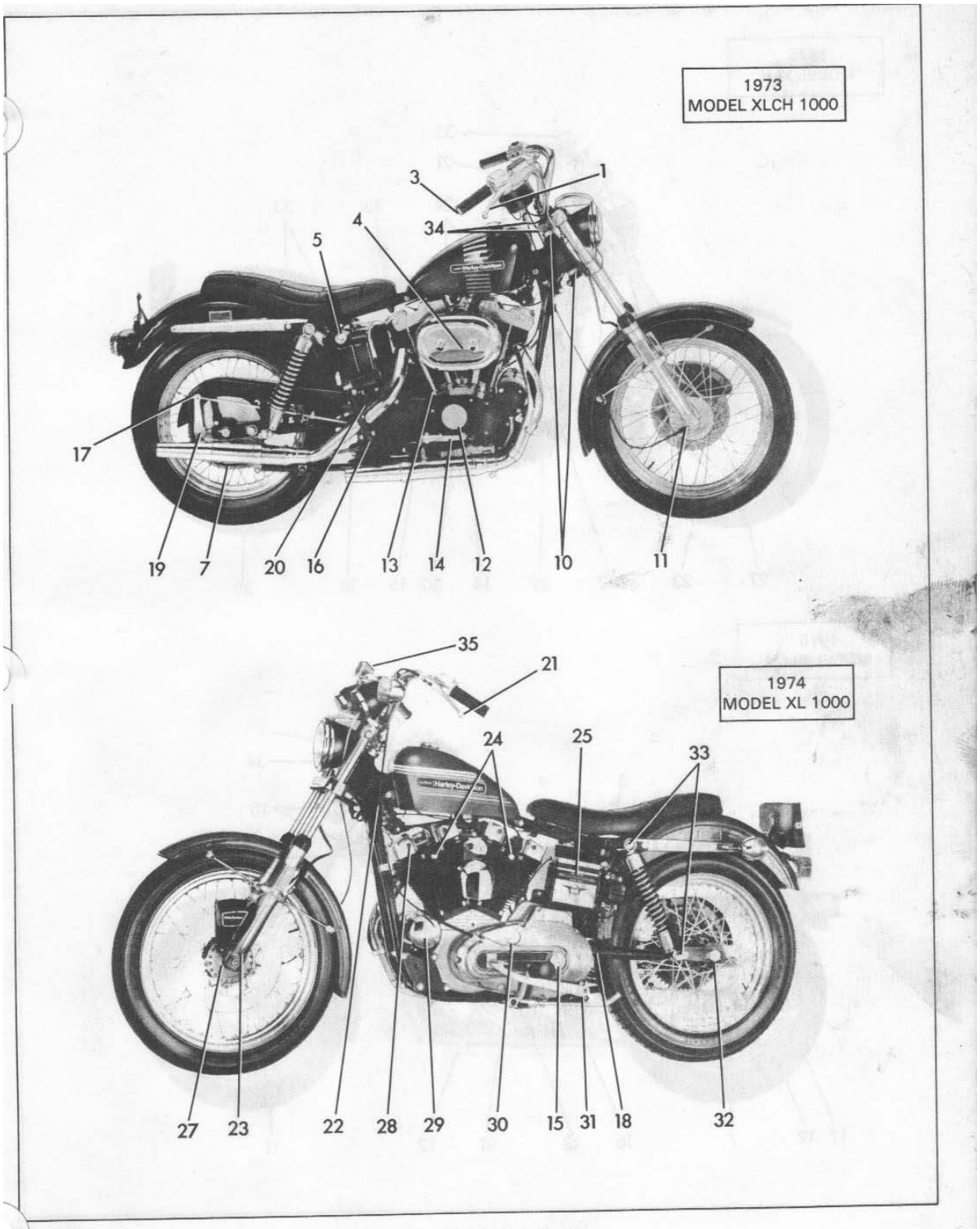

Figure 1-2. Service Chart

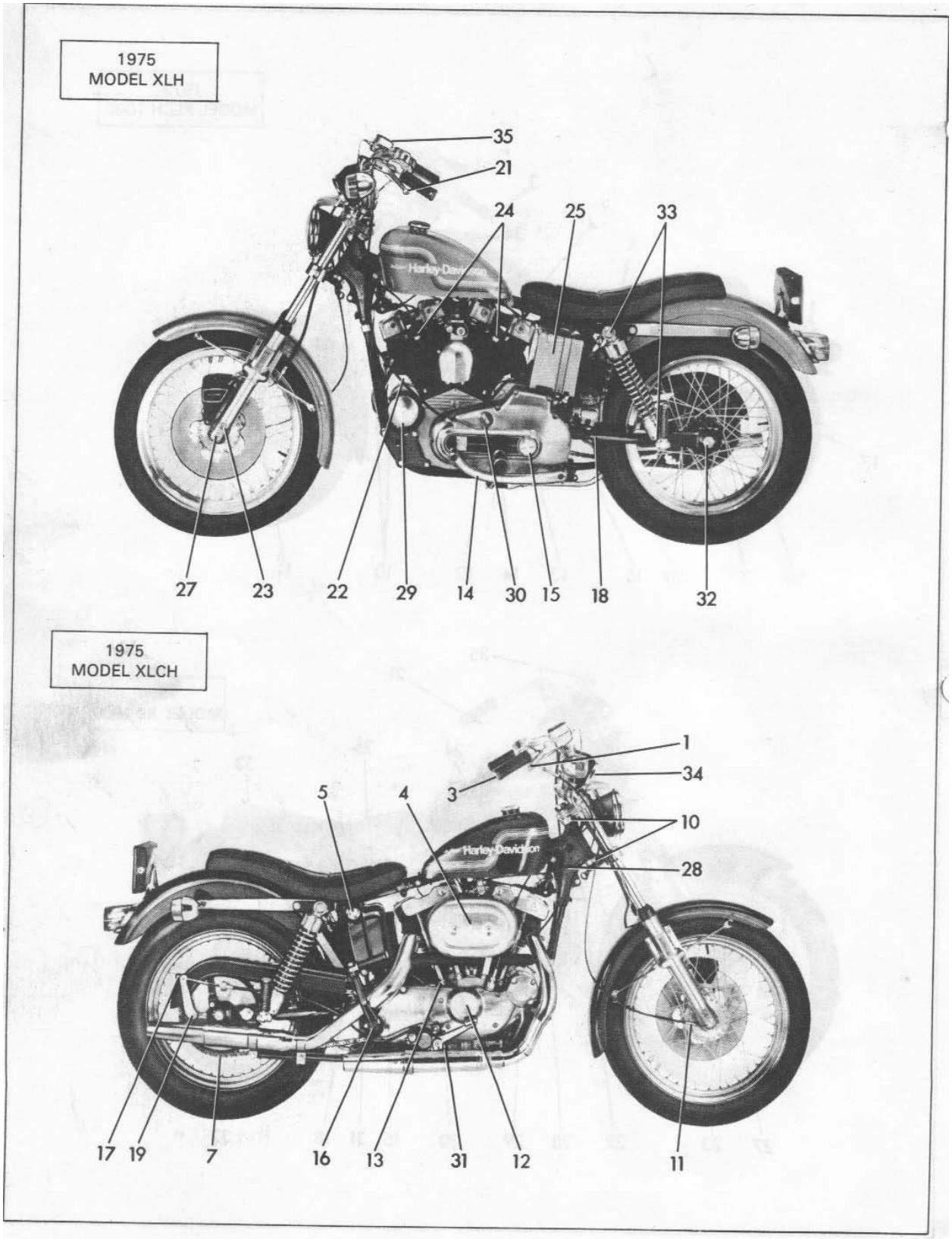

Figure 1-3. Service Chart

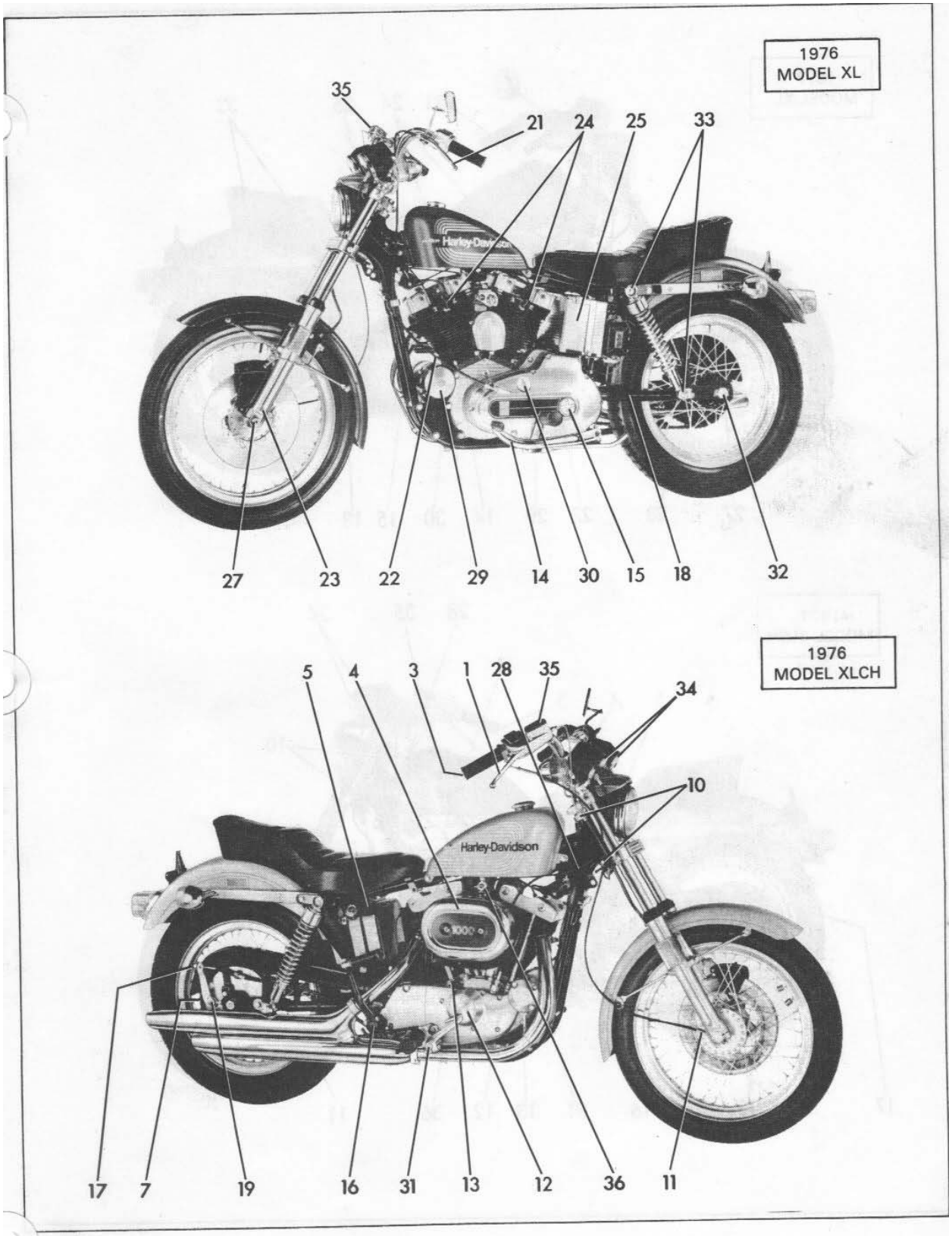

Figure 1-4. Service Chart

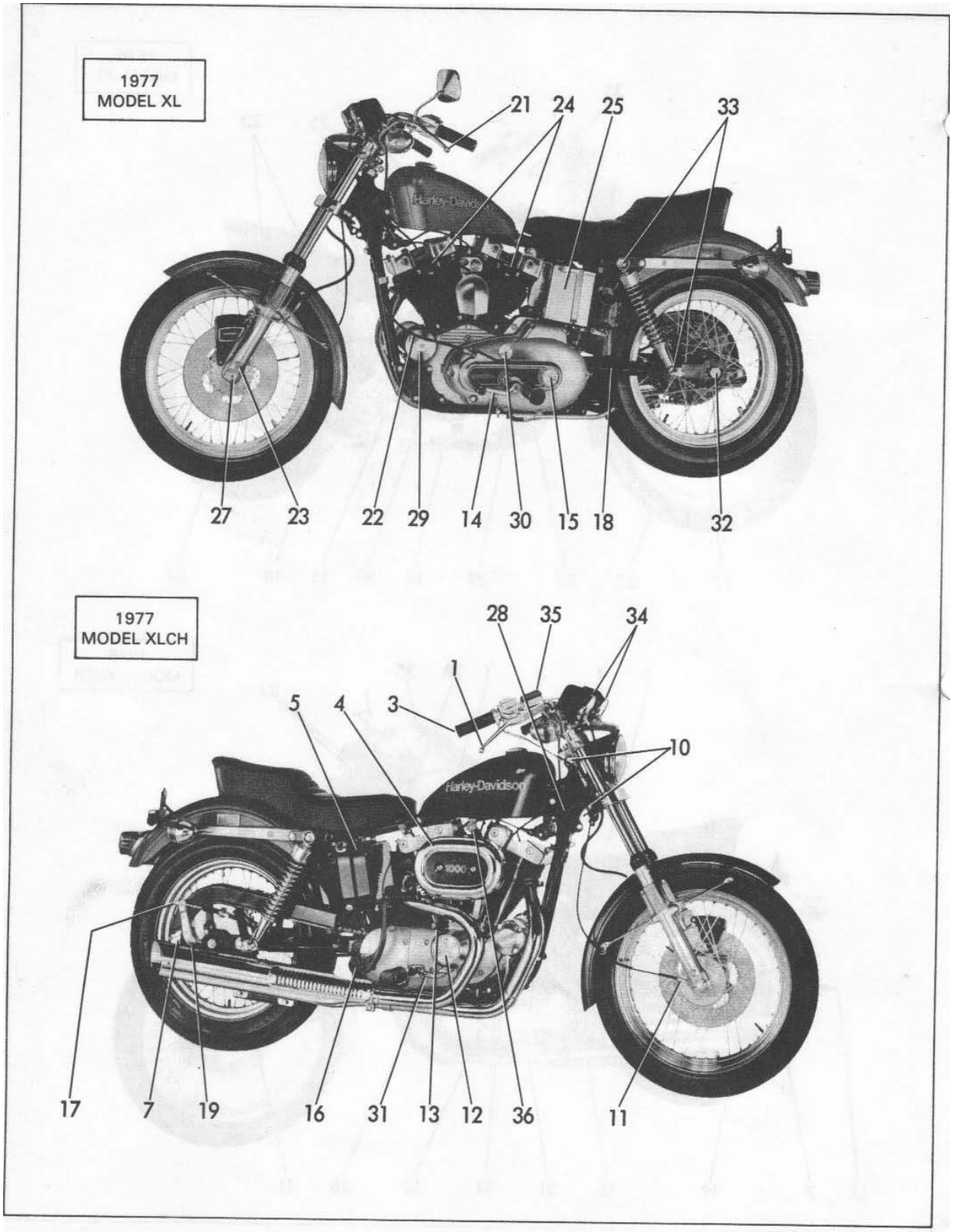

Figure 1-5. Service Chart

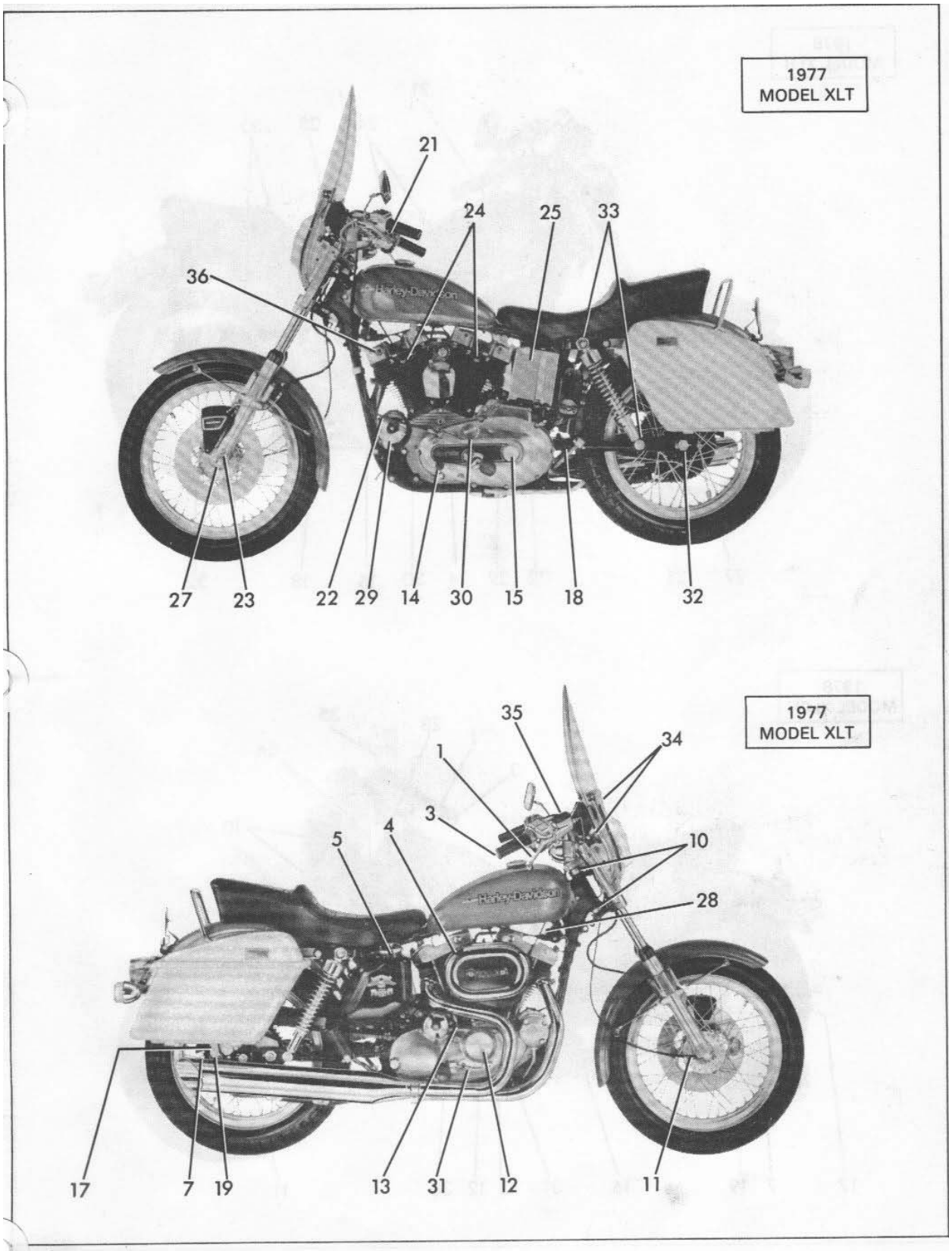

Figure 1-6. Service Chart

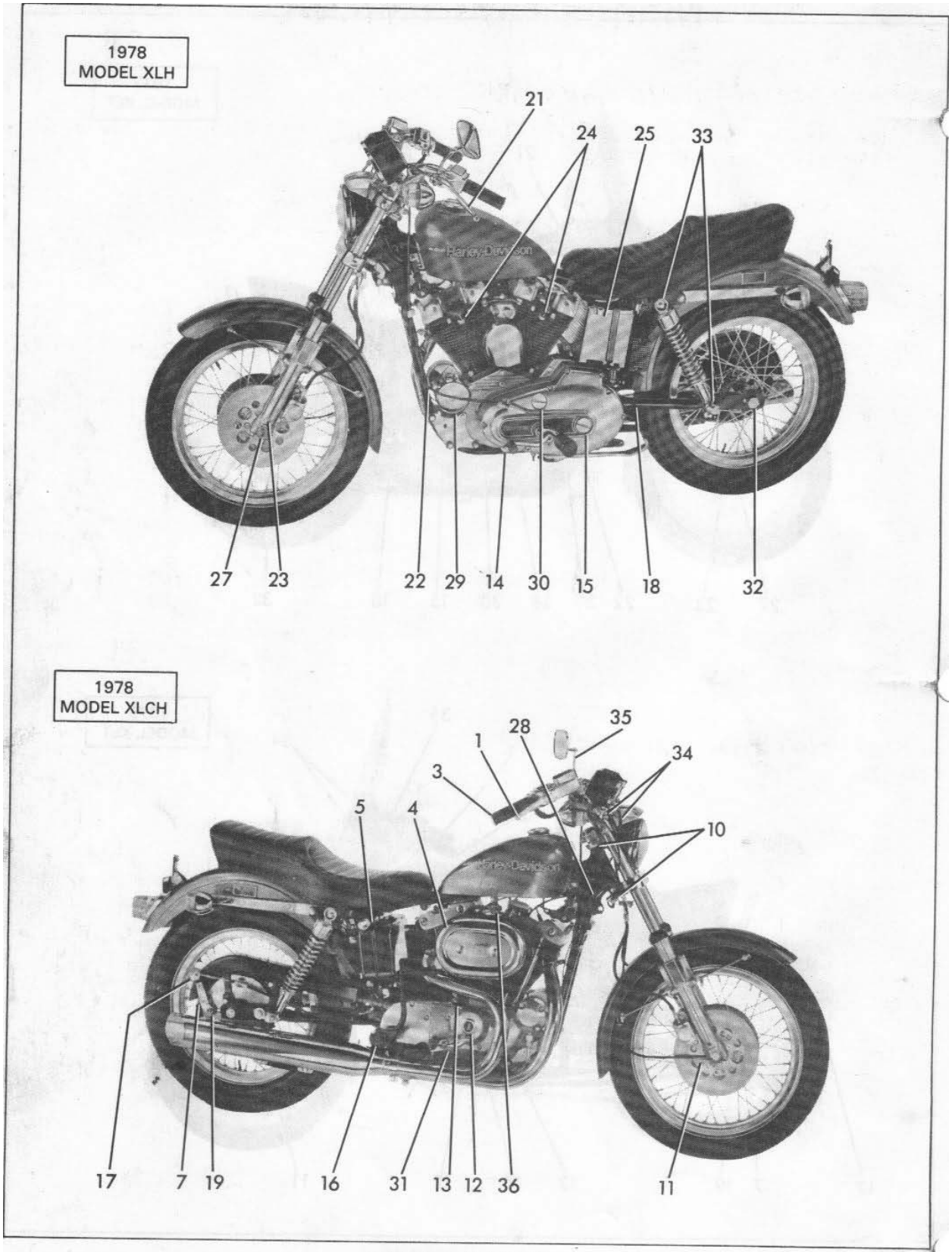

Figure 1-7. Service Chart

TORQUE REQUIREMENTS

GENERAL FASTENER TIGHTENING SPECIFICATIONS

Torque to the values given in this table unless specified otherwise below. Torque figures are in ft-lbs except those marked with an asterisk (*) which are in-lbs.

FASTENER	TYPE	MINIMUM TENSILE STRENGTH	MATERIAL	Body Size or Outside Diameter																
				2	3	4	5	6	8	10	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1
	SAE 2 STEEL	74,000 PSI	LOW CARBON								6	12	20	32	47	69	96	155	206	310
	SAE 5 STEEL	120,000 PSI	MEDIUM CARBON HEAT TREAT						14*	22*	10	19	33	54	78	114	154	257	382	587
	SAE 7 STEEL	133,000 PSI	MEDIUM CARBON ALLOY								13	25	44	71	110	154	215	360	570	840
	SAE 8 STEEL	150,000 PSI	MEDIUM CARBON ALLOY								14	29	47	78	119	169	230	380	600	700
	SOCKET HEAD CAP SCREW	160,000 PSI	HIGH CARBON QUENCHED TEMPERED								16	33	54	84	125	180	250	400	640	970
	SOCKET SET SCREW	212,000 PSI	HIGH CARBON QUENCHED TEMPERED					9*	16*	30*	70*	140*	18	29	43	63	100	146		
	STUDS	Use SAE 2, 5 and 8 values when grade is known, with nut of sufficient strength.																		

SPECIFIC FASTENER TIGHTENING SPECIFICATIONS

CHASSIS COMPONENTS

Axle nut ..... 50 ft-lbs
Brake disc mounting screw (1973) ..... 35 ft-lbs
Brake disc mounting screw (1974 and later) .... 10 ft-lbs
Fork stem pinch bolt ..... 20 to 25 ft-lbs
Handlebar clamping bolt ..... 20 ft-lbs
Caliper (front brake) bolt ..... 35 ft-lbs
Brake disc (front brake) bolt ..... 35 ft-lbs

ENGINE COMPONENTS

Pinion gear nut (1977 & 1978) ..... 50 ft-lbs
Gear shaft nut ..... 100-120 ft-lbs
Sprocket shaft nut ..... 100-120 ft-lbs
Crank pin nut ..... 150 ft-lbs
Rocker arm cover screw ..... 20 ft-lbs
Cylinder head bolt ..... 65 ft-lbs
Carb. (Tillotson) inlet seat assy. ..... 40-45 in-lbs
Carb. (Tillotson) accel.-pump channel plug ..... 23-28 in-lbs
Clutch (1971 & later) hub nut ..... 150 ft-lbs
Cylinder base nut ..... 30 ft-lbs
Gear cover screws, chain cover screws, and oil pump ..... 100 in-lbs

ELECTRICAL COMPONENTS

Spark plug ..... 20 ft-lbs
Starter motor (Prestolite) thru bolt ..... 20-25 in-lbs
Starter motor (Hitachi) thru bolt ..... 20-25 in-lbs

LOCATING TROUBLES

The following check list will be helpful in locating most operating troubles:

ENGINE

STARTS HARD

1. Spark plugs in bad condition, partially fouled or have improper gap.
2. Spark plug cables in bad condition and "leaking."
3. Circuit breaker points out of adjustment or in poor condition.
4. Battery nearly discharged.
5. Loose wire connection at one of battery terminals, or at coil or circuit breaker.
6. Carburetor fuel mixture too rich or too lean.
7. Defective ignition coil.
8. Defective condenser.
9. Engine and transmission oil too heavy. (Winter operation.)
10. Engine ignition spark not timed properly.
11. Circuit breaker cam sticking in advance position.

STARTS BUT RUNS IRREGULARLY OR MISSES

1. Spark plugs in bad condition, or partially fouled.
2. Spark plug cables in bad condition and "leaking."
3. Spark plug gap too close or too wide.
4. Circuit breaker points out of adjustment or in need of cleaning.
5. Condenser connections loose.
6. Defective ignition coil.
7. Defective condenser.
8. Battery nearly discharged.
9. Loose wire connection at one of battery terminals, or at coil or circuit breaker.
10. Intermittent short circuit due to damaged wiring insulation.
11. Water or dirt in fuel system and carburetor.
12. Gasoline tank cap vent plugged or carburetor vent line closed off restricting fuel flow.
13. Carburetor fuel mixture too rich or too lean.
14. Weak or broken valve springs.

CRANKING MOTOR DOES NOT OPERATE OR DOES NOT TURN ENGINE OVER

1. Ignition switch or handlebar stop switch is not on.
2. Discharged battery, or loose or corroded connections.
3. Starter control circuit or solenoid defective.
4. Clutch slipping.
5. Electric starter shaft pinion gear not engaging.

ENGINE TURNS OVER BUT DOES NOT START

1. Gasoline tank empty.
2. Gasoline valve shut off.
3. Gasoline line clogged.
4. Discharged battery or loose or broken battery terminal connection. Check by turning light switch "ON."
5. Fouled spark plugs.
6. Spark plug cables in bad condition and "leaking."
7. Badly oxidized ignition circuit breaker points.
8. Circuit breaker and/or ignition timing points badly out of adjustment.
9. Loose wire connection at one of battery terminals, or at coil or circuit breaker.
10. Clutch slipping and starter not turning engine over.
11. Engine flooded with gasoline as a result of overchoking.
12. Engine and transmission oil too heavy (winter operation).

A SPARK PLUG FOULS REPEATEDLY

1. Too cold a plug for the kind of service.
2. Piston rings badly worn or in bad condition.

PRE-IGNITION

1. Excessive carbon deposit on piston head or in combustion chamber.
2. Too hot a spark plug for the kind of service or for type of engine.
3. Defective spark plugs.
4. Ignition timing too advanced.

OVERHEATING

1. Insufficient oil supply, or oil not circulating.
2. Carburetor fuel mixture too lean.
3. Ignition timing too late.

DETONATION

1. Unsuitable fuel (octane rating too low).
2. Heavy deposit of carbon on piston head and in combustion chamber.
3. Defective spark plug or wrong heat range.
4. Ignition timing too early.

EXCESSIVE VIBRATION

1. Cylinder head bracket loose or broken.
2. Engine mounting bolts loose.
3. Broken frame.
4. Tires or wheels defective.

LUBRICATION SYSTEM

OIL DOES NOT RETURN TO OIL TANK

1. Oil tank empty.
2. Scavenger pump gear key sheared.
3. Oil feed pump not functioning.

HIGH OIL CONSUMPTION

1. Breather valve incorrectly timed.
2. Piston rings badly worn or in bad condition otherwise.
3. Chain oiler adjusting screw adjusted for an excessive amount of oil.
4. Oil leak to outside.

ELECTRICAL SYSTEM

GENERATOR DOES NOT CHARGE

1. Brushes badly worn.
2. Brushes sticking in holders.
3. Voltage regulator not grounded.
4. Voltage regulator incorrectly adjusted.
5. Defective voltage regulator.
6. Commutator dirty or oily.
7. Positive brush holder grounded.
8. Generator "A" terminal grounded.
9. Loose or broken wire in generator-battery circuit.
10. Broken field coil wire or loose terminal (both coils).
11. Commutator shorted.
12. Defective armature.

CHARGING RATE IS BELOW NORMAL

1. Voltage regulator incorrectly adjusted.
2. Broken field coil wire or loose terminal (one coil).
3. Commutator worn and not turning true with shaft – throws brushes at high speed.
4. Commutator dirty or oily.
5. Brushes gummy and sluggish in holders.
6. Defective armature.

CARBURETOR

FLOODS

1. Inlet valve sticking.
2. Inlet valve and/or valve seat worn or damaged.
3. Dirt or other foreign matter between valve and its seat
4. Carburetor inlet lever not set correctly.
5. Excessive pumping of hand throttle grip.

TRANSMISSION

SHIFTS HARD

1. Bent shifter rod.
2. Clutch dragging slightly.
3. Transmission oil too heavy (winter operation).
4. Shifter forks (inside transmission) sprung as a result of using too much force when shifting.

JUMPS OUT OF GEAR

1. Shifter rod improperly adjusted.
2. Shifter forks (inside transmission) improperly adjusted.
3. Corners worn off shifter clutch dogs (inside transmission) – makes engagement difficult.

CLUTCH

SLIPS

1. Clutch controls improperly adjusted.
2. Insufficient clutch spring tension.
3. Worn and/or oil soaked friction discs (1970).
4. Worn friction discs (1971 & later).

DRAGS OR DOES NOT RELEASE

1. Clutch controls improperly adjusted.
2. Clutch spring tension too tight.
3. Friction discs gummy.
4. Clutch sprocket keys badly worn.
5. Clutch discs warped.
6. Transmission oil too heavy.

BRAKE

DOES NOT HOLD NORMALLY

1. Brake shoe improperly adjusted.
2. Brake controls binding.
3. Brake linings impregnated with grease as a result of over-lubrication.
4. Brake linings badly worn.
5. Brake drum badly worn or scored.
6. Brake shoes not centered.

(HYDRAULIC BRAKE ONLY)

1. Master cylinder low on fluid.
2. Brake line contains air bubbles.
3. Master or wheel cylinder piston worn or parts defe tive.

CHASSIS 2

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FRONT CHAIN

GENERAL

The front chain should be checked every 2000 miles for correct adjustment. Check chain adjustment through oil filler opening located near the top of the chain cover. A correctly adjusted front chain should have free up-and-down movement in the upper stand midway between engine and clutch sprockets as follows: Front chain adjustment: 5/8 to 7/8 in. chain slack with cold engine; 3/8 to 5/8 in. chain slack with hot engine. Check adjustment at tightest point on sprockets, found by rotating sprockets.

WARNING — To prevent accidental starter operation, disconnect positive or negative battery lead before doing any work on the engine, drive or electrical systems.

ADJUSTMENT (1976 AND EARLIER) (Figure 2-1)

To adjust chain, remove left footrest, and rear brake foot lever. Place an oil drain pan under clutch and remove front chain cover screws, chain cover and gasket.

The front chain is adjusted by means of a shoe underneath the chain which can be raised to tighten or lowered to loosen the chain. The chain adjuster is secured to the inner surface of the chain compartment by 3 bolts. Simply loosen bolts and raise or lower chain adjuster. When chain is correctly adjusted tighten bolts securely and reassemble remaining parts.

Fill transmission with correct amount and type of lubricant as described in "GEAR BOX," Section 4.

ADJUSTMENT (1977 AND LATER) (Figure 2-2)

Adjusting Chain Tension

The front chain can be adjusted without removing the chain cover. Adjustment is made by loosening locknut (6), Figure 2-2, and turning the slotted adjusting screw (5) IN for tightening or OUT for loosening.

Screw (5) raises or lowers an adjuster assembly which contacts the lower strand of the front chain and applies pressure to make the chain operate with the right amount of free play.

After adjusting is completed, retighten locknut (6).

REPLACING ADJUSTER ASSEMBLY (Figure 2-2)

If screw (5) is screwed in all the way and chain is still loose, the adjuster assembly or chain probably is worn excessively and should be replaced.

To replace chain adjuster (2) remove drain plug and drain oil from chain case. Remove gear shifter pedal, footrest, chain case cover and gasket. Chain adjuster (2) must be replaced as an assembly when slider material is excessively worn or damaged. To replace, relax chain tension by unscrewing chain adjuster screw (5, Figure 2-2), and remove adjuster. Remove spring from old adjuster and assemble to new adjuster.

Remove foreign material from magnetic drain plug. Replace and securely tighten drain plug. Replace case cover and gasket. Install shifter pedal and footrest on shafts.

Fill gearbox with correct amount of lubricant as described in "TRANSMISSION," Section 4. Readjust chain for correct tension as described previously.

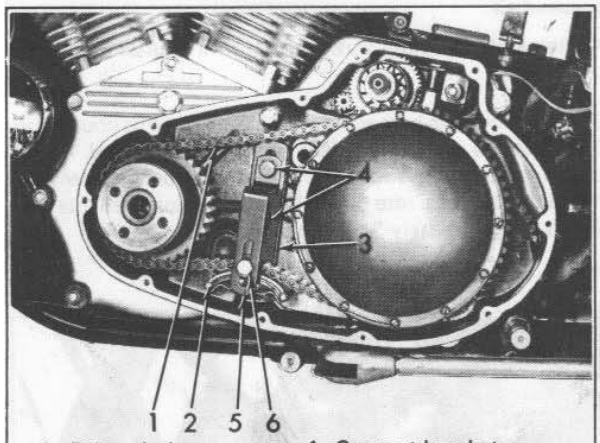


Figure 2-1. Front Chain Tensioner Adjustment (1976 and Earlier)

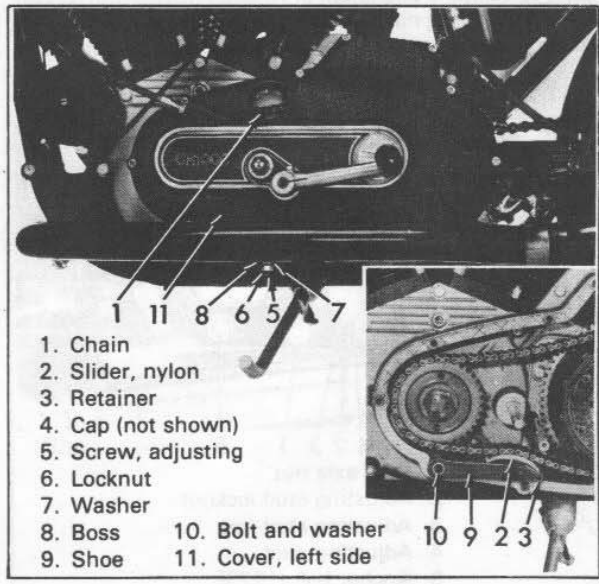


Figure 2-2. Front Chain Adjuster (1977 and Later)

LUBRICATION

There is an opening between the front chain and transmission compartments, and the same oil supply automatically lubricates moving parts in both compartments. For complete lubrication service on the front chain see "TRANSMISSION," Section 4.

REPLACING

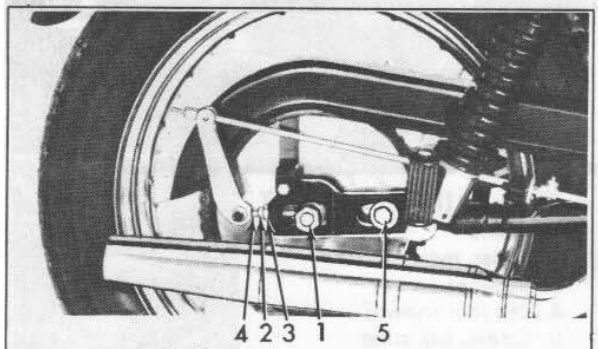
Since the front chain is automatically lubricated by running in oil, little service will be required other than checking chain adjustment every 2000 miles. However, if through hard usage the front chain does become worn, it is essential to replace chain rather than trying to repair it. This will avert chain breakage and possible damage to the crankcases. To remove front chain, see "DISASSEMBLING CLUTCH," Section 4.

REAR CHAIN

ADJUSTMENT (Figure 2-3)

The rear chain should be checked every 1000 miles for correct adjustment. A correctly adjusted rear chain should have 1/2 in. free up-and-down movement midway between mainshaft and rear wheel sprocket with weight of motorcycle and rider on wheels. As chains stretch and wear in service, they will run tighter at one point on the sprockets than another; therefore always rotate rear wheel and check adjustment at tightest point of chain.

To adjust rear chain, loosen axle nut (1) on right side of motorcycle. Loosen locknut (2) from adjusting nut (3), on both sides of motorcycle. On 1973 to 1978 models also loosen anchor bolt (5). Turn adjusting nut (3) clockwise to move rear wheel back, tightening chain; turn adjusting nut (3) counterclockwise, and at the same time, tap each end of the axle to move the wheel forward, loosening the chain. Turn adjusting nut (3) on either side exactly the same number of turns to maintain alignment of wheel. With locknut (2) tight against adjusting nut (3), the distance from locknut to outer end of adjusting stud (4) should be the same on both sides.



1. Rear axle nut
2. Adjusting stud locknut
3. Adjusting stud nut
4. Adjusting stud
5. Anchor bolt (1973)

Figure 2-3. Right Side Rear Wheel

Center brake shoes. Check correct alignment of wheel by observing that tire runs about midway between rear frame tubes and rear wheel sprocket runs centrally in the chain. When readjustment is completed, be sure to securely retighten rear axle nut (1), rear wheel adjusting stud locknut (2) and anchor bolt (5) where applicable. After adjusting rear chain, the rear brake may be too tight. Readjust brake linkage, if necessary, as described in "ADJUSTING REAR WHEEL BRAKE," Section 2.

REAR CHAIN OILER (1976 AND EARLIER) (Figure 2-4)

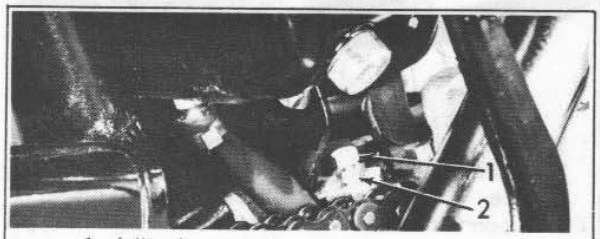
At regular service intervals (1000 miles) make a close inspection of rear chain. If it does not appear to be getting sufficient lubrication, or if there is evidence of an oversupply of oil, adjust rear chain oiler.

To adjust rear chain oiler, proceed as follows. Loosen locknut (2), if used, and turn screw (1) outward for more oil, and inward for less oil. Turn screw only a fraction of a turn at a time; lock adjusting screw in place if locknut is used.

The quantity of oil needed to lubricate the rear chain is very small. The size of the opening (orifice) through which oil bleeds to the chain is regulated by the adjusting screw. Sediment and gummy matter, accumulating in the oil supply, deposit in and around this orifice and gradually decrease the oil supply to the chain. A chain that has been lubricated perfectly the first 2000 miles may run short of oil the second 2000 miles. For this reason, even though inspection indicates the chain is amply lubricated, it is advisable to blow away accumulated sediment and restore the orifice to its original size at intervals of approximately 2000 miles.

To clean rear chain oiler, proceed as follows:

1. If locknut is used, back it out as far as possible.
2. Turn adjusting screw in until it bottoms on its seat. Count the number of turns needed to turn the screw in.
3. Remove adjusting screw and blow out orifice with compressed air.
4. Reinstall adjusting screw and turn it in until it bottoms on its seat.
5. Turn adjusting screw out the number of turns counted in Step 2 above and lock in place with locknut if used. This is the original setting. The rear chain oiler should be set to permit oil to flow at a rate of 2 to 3 drops per minute. This setting is approximately 3/4 of a turn.



1. Adjusting screw
2. Adjusting screw locknut (early 1970)

Figure 2-4. Rear Chain Oiler (1976 and Earlier)

REAR CHAIN LUBRICATION (1977 AND LATER)

The 1977 and later motorcycle is not equipped with a rear chain oiler. Therefore, the rear chain should be checked and lubricated at regular intervals.

Under normal operating conditions, brush off the dirt and lubricate chain at least every 300 miles. Use Harley-Davidson grade 75 or 105 (SAE 40 or 60) or "Chain Spray," "Chain Saver," or "Chain Grease." Apply at room temperature to both chain side plates and rollers. Apply with a brush or squirt can to thoroughly cover chain. Wipe off surplus lubricant.

SERVICING REAR CHAIN

At regular service intervals of 1000 miles, examine the rear chain for adequate lubrication and worn chain links. If additional chain lubrication is needed for 1976 and earlier models, adjust chain oiler according to the procedure described in "REAR CHAIN OILER (1976 AND EARLIER)"; for 1977 and later models, refer to paragraph titled, "REAR CHAIN LUBRICATION (1977 AND LATER)."

If the motorcycle is operated under extremely dirty, wet, or high speed conditions, extra cleaning and lubrication of the rear chain may be advisable from time to time.

Free chain from motorcycle by removing spring-locked connecting link. Connecting link pins which have press fitted side plates can be pressed apart with Chain Repair Tool, Part No. 95020-38 which is supplied in accessory rider tool kit. A shop tool is available for this purpose under Part No. 95021-29. Lay clean chain out flat and contract chain by taking up all slack in its links. Measure the chain length. Then stretch chain out to its full length and again measure chain length. If the difference between the two measurements exceeds 1 in., the chain should be replaced. In addition, if the chain has any stiff links and is visibly worn or damaged, it should be replaced. If a new chain is not available and it is necessary to repair the old chain, remove damaged links by pressing out riveted link pins with Chain Repair Tool.

Soak and wash thoroughly in a pan of solvent such as kerosene. After removing chain from kerosene, allow kerosene to drain off or blow off with air hose. After chain is completely dry, apply Harley-Davidson grade 75 or 105 (SAE 40 or 60) oil or "Chain Spray," "Chain Saver," or "Chain Grease." Apply at room temperature to both chain side plates and rollers. Wipe all surplus lubricant from surface of chain.

Install chain on motorcycle. Inspect connecting link and spring clip closely for bad condition. Replace if at all questionable. To install new press fitted connecting link, use Rear Chain Assembling Tool, Part No. 95020-66. Be sure spring clip is securely locked on pin ends, open end of clip on outside, trailing direction of chain travel, as positioned on motorcycle.

WHEELS

GENERAL

Maximum tire mileage and good handling qualities are directly related to care given wheels and tires. A front tire kept in continuous service will wear irregularly and peaked and may affect handling, especially if over-inflated. Therefore, it is extremely important that correct tire pressure be maintained at all times.

At regular intervals of 5000 miles, or at any time handling irregularities are experienced, see the chart below for recommended service.

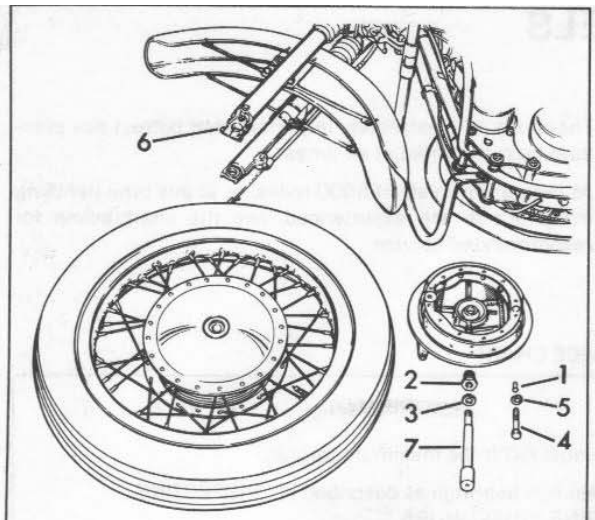
WHEEL SERVICE CHART

CHECK FOR	REMEDY
1. Loose axle nuts.	Tighten axle nuts (50 ft-lbs maximum torque).
2. Excessive side-play or radial (up and down) play in wheel hubs.	Replace wheel hub bearings as described in "INSPECTING AND REPAIRING WHEEL HUBS."
3. Loose spokes.	Tighten or replace spokes as described under "TRUING WHEELS" and "SPOKING WHEELS."
4. Alignment of rear wheel in frame and with front wheel.	Check wheel alignment as described in this section, or inspect and straighten frame as described in "FRAME," or repair rear fork as described in "REAR FORK."
5. Rims and tires out-of-true sideways, (should not be more than 3/64 in.).	True wheels, replace rims or replace spokes as described under, "SPOKING WHEELS" and "TRUING WHEELS."
6. Rims and tires out-of-round or eccentric with hub (should not be more than 3/32 in.).	See Item 5, above.
7. Irregular or peaked front tire wear.	Replace as described in "REMOVING AND INSTALLING FRONT AND REAR WHEEL," and "REMOVING AND INSTALLING TIRE AND TUBE."
8. Correct tire inflation.	Inflate tires as described in "SPECIFICATIONS," General.
9. Correct tire and wheel balance.	Static balance may be satisfactory if dynamic balancing facilities are not available, however, dynamic balancing is also recommended.
10. Steering head bearings.	Correct adjustment and replace pitted or worn bearings. See "FORKS."
11. Shock absorbers.	Check damping action and mounting stud rubbers. See "FORKS."
12. Rear fork bearings.	Check for looseness. See "FORKS."

REMOVING AND INSTALLING FRONT WHEEL (1972 AND EARLIER) (Figure 2-5)

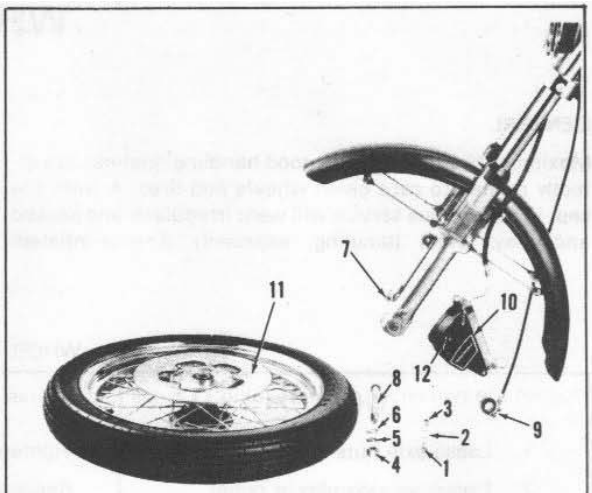
Raise front end of motorcycle high enough to permit removing wheel; support motorcycle by suitable blocking underneath frame. Disconnect brake control by removing brake clevis pin (1). Remove axle nut (2), and axle nut lockwasher (3). Remove brake anchor and shoe centering bolt (4), and lockwasher (5). Loosen axle pinch bolt (6). With a soft hammer loosen axle (7) and remove from hub and fork assembly. Remove front wheel and brake assembly complete.

To reinstall front wheel and brake assembly, reverse the disassembly procedure. Center brake shoes as described in "ADJUSTING FRONT WHEEL BRAKE." Inject one ounce of "Grease-All" grease into the wheel hub. Tighten axle nut to 50 ft-lbs torque. Tighten pinch bolts (6) to 11 ft-lbs torque. Spin wheel, to make sure it turns freely.



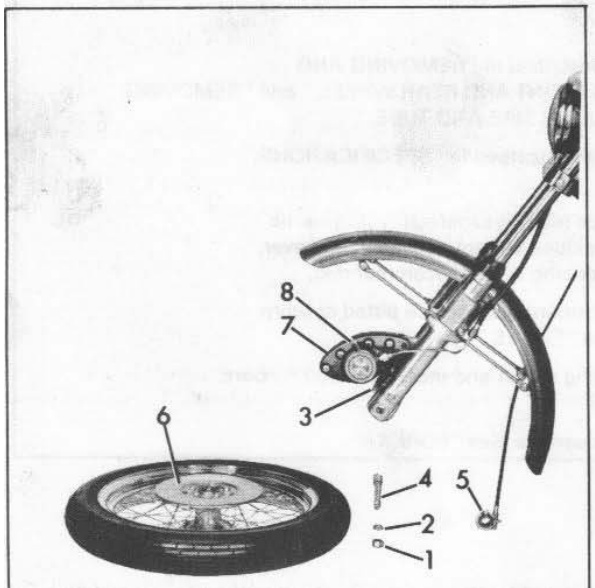
1. Brake clevis pin
2. Axle nut
3. Axle nut lockwasher
4. Brake anchor and centering bolt
5. Lockwasher
6. Front axle pinch bolt
7. Front wheel axle

Figure 2-5. Front Wheel Removal (1972 and Earlier)



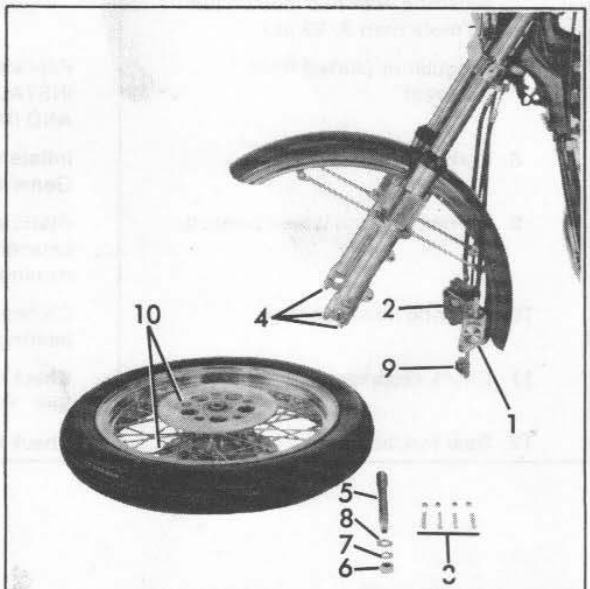
1. Caliper mounting bolt
2. Washer (2)
3. Locknut
4. Axle nut
5. Axle lockwasher
6. Axle washer
7. Slider cap nuts
8. Axle
9. Speedometer drive
10. Caliper
11. Brake disc
12. Bleeder fitting

Figure 2-7. Front Wheel Removal (1974 to 1977)



1. Axle nut
2. Axle nut lockwasher
3. Slider cap nuts
4. Front wheel axle
5. Speedometer drive
6. Brake disc
7. Brake caliper
8. Bleed fitting

Figure 2-6. Front Wheel Removal (1973)



1. Left side caliper
2. Right side caliper
3. Caliper mounting hardware (2 sets)
4. Slider cap hardware (2 sets)
5. Axle
6. Axle nut
7. Axle lockwasher
8. Axle washer
9. Speedometer drive
10. Brake discs

Figure 2-8. Front Wheel Removal (1978)

REMOVING AND INSTALLING FRONT WHEEL (1973) (Figure 2-6)

Support motorcycle underneath frame with front wheel raised. Remove axle nut (1), and axle nut lockwasher (2). Loosen slider cap nuts (3). With a soft hammer tap left end of axle (4) to loosen it and start it out. Pull axle out of fork assembly. Remove front wheel assembly and speedometer drive.

To reinstall, reverse above procedure. Align the brake pads while installing the wheel so that the brake disc goes between caliper (7) pads. Be sure speedometer drive (5) ear engages hole in wheel hub when installed. Securely tighten axle nut (1) to 50 ft-lbs maximum torque and then tighten the two slider cap nuts (3) to 11 ft-lbs torque. This ensures proper alignment of the fork sides.

REMOVING AND INSTALLING FRONT WHEEL (1974 TO 1977) (Figure 2-7)

Support motorcycle underneath frame with front wheel raised. Remove brake caliper mounting bolt (1), washers (2) and locknut (3). Remove axle nut (4), lockwasher (5) and washer (6). Loosen slider cap nuts (7). With a soft hammer tap left end of axle (8) to loosen it and start it out. Pull axle (8) out of fork assembly. Remove front wheel assembly and speedometer drive (9). To reinstall, reverse above procedure. Align the brake pads while installing the wheel so that the brake disc goes between caliper (10) pads. Be sure speedometer drive (9) ear engages hole in wheel hub when installed. Securely tighten axle nut (4) to 50 ft-lbs, exercising care not to overtighten, and then tighten the two slider cap nuts (7) to 11 ft-lbs torque. This will ensure correct alignment of the fork sides.

REMOVING AND INSTALLING FRONT WHEEL (1978) (Figure 2-8)

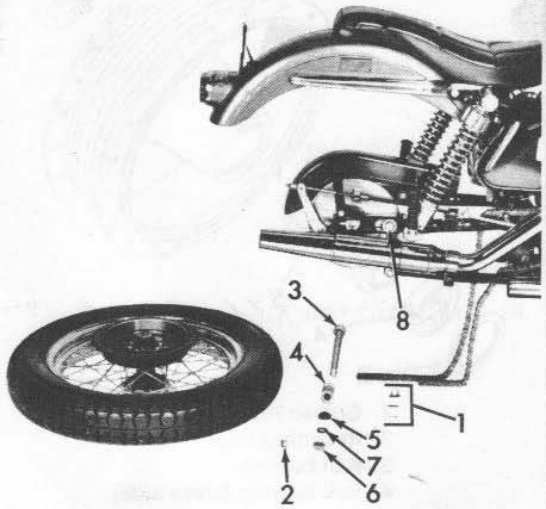
Support motorcycle underneath frame with front wheel raised. Detach both the right and left caliper assemblies from the fork sliders by removing mounting hardware (3). Let caliper assemblies hang down loose out of the way as shown in figure. Remove axle nut (6), lockwasher (7) and washer (8). Loosen slider cap hardware (4). With a soft hammer tap left end of axle (5) to loosen it and start it out. Pull axle (5) out of fork assembly. Remove front wheel assembly and speedometer drive (9).

CAUTION — Do not operate front brake lever when the front wheel is removed because the brake caliper piston may be forced out of the bore, requiring disassembly of the brake system to get it properly reseated.

To reinstall wheel, reverse above procedure. Be sure speedometer drive (9) ear engages hole in wheel hub when installed. Securely tighten axle nut (6) to 50 ft-lbs and then tighten slider cap hardware (4) to 11 ft-lbs torque. This will ensure correct alignment of the fork sides. Tighten caliper mounting bolts (3) to 11 ft-lbs torque.

REMOVING AND INSTALLING REAR WHEEL (Figure 2-9)

Raise rear end of motorcycle high enough to permit removing wheel; support motorcycle by suitable blocking underneath frame. Locate and remove chain connecting link (1) and disengage chain from rear sprocket. Remove brake adjusting nut (2) from brake rod. Remove axle nut (6), axle nut lockwasher (7) and centering collar (5). With a soft hammer tap right end of axle (3) to loosen from left side of frame. Remove axle from hub and frame assembly. Remove axle spacer (4) from left side. Slide wheel and brake assembly to extreme rear end of frame. Lift wheel up to pass brake drum over brake shoes. Remove wheel from motorcycle.



1. Chain connecting link
2. Rear brake rod adjusting nut
3. Rear axle
4. Axle spacer, left side
5. Axle centering collar, right side
6. Axle nut
7. Axle nut lockwasher
8. Anchor bolt

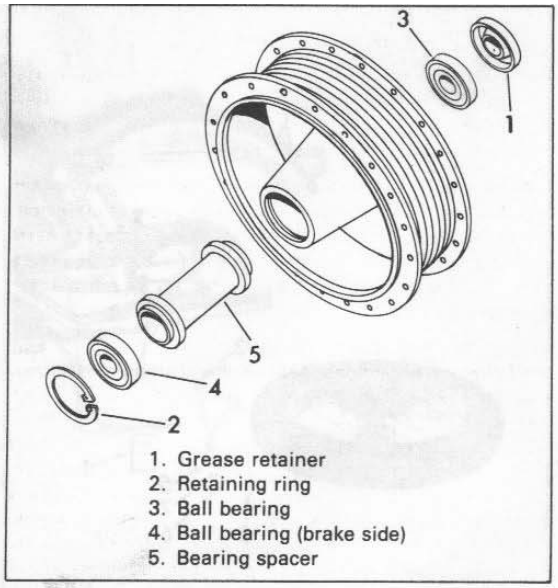
Figure 2-9. Rear Wheel Removal

To reinstall rear wheel, reverse the disassembly procedure. Center brake shoes as described in "ADJUSTING REAR WHEEL BRAKE."

HUBS

DISASSEMBLING AND ASSEMBLING FRONT WHEEL HUB (1972 AND EARLIER) (Figure 2-10)

Pry grease seal (1) from wheel hub. Remove retaining ring (2) with Tru-arc lock ring pliers. Tap ball bearing (3) inward all the way against its seat in hub. This will move bearing (4) out far enough so that spacer (5) can be moved away from bearing (4). Then use a drift to tap out bearing (4) from opposite end of hub. Bearing (3) can now be tapped out from opposite end.



1. Grease retainer
2. Retaining ring
3. Ball bearing
4. Ball bearing (brake side)
5. Bearing spacer

Figure 2-10. Front Wheel Hub (1972 and Earlier)

Clean and inspect all parts, paying particular attention to the wheel hub bearings. If bearings have excessive side play or radial (up and down) play in the wheel hubs, they should be replaced. If bearings have been removed from the hubs, carefully examine for visible wear, heat discoloration or damage to inner and outer races. Inspect brake shells or brake disc for scoring, grooving and worn running surfaces. Check spoke flanges for bent or damaged condition. Recommended hub repair is replacement of worn or damaged parts.

Clean and pack both ball bearings with fresh Grease-All grease. Press brake side ball bearing (4) against shoulder in hub, shielded side out. Install retaining ring (2) using Tru-arc lock ring pliers.

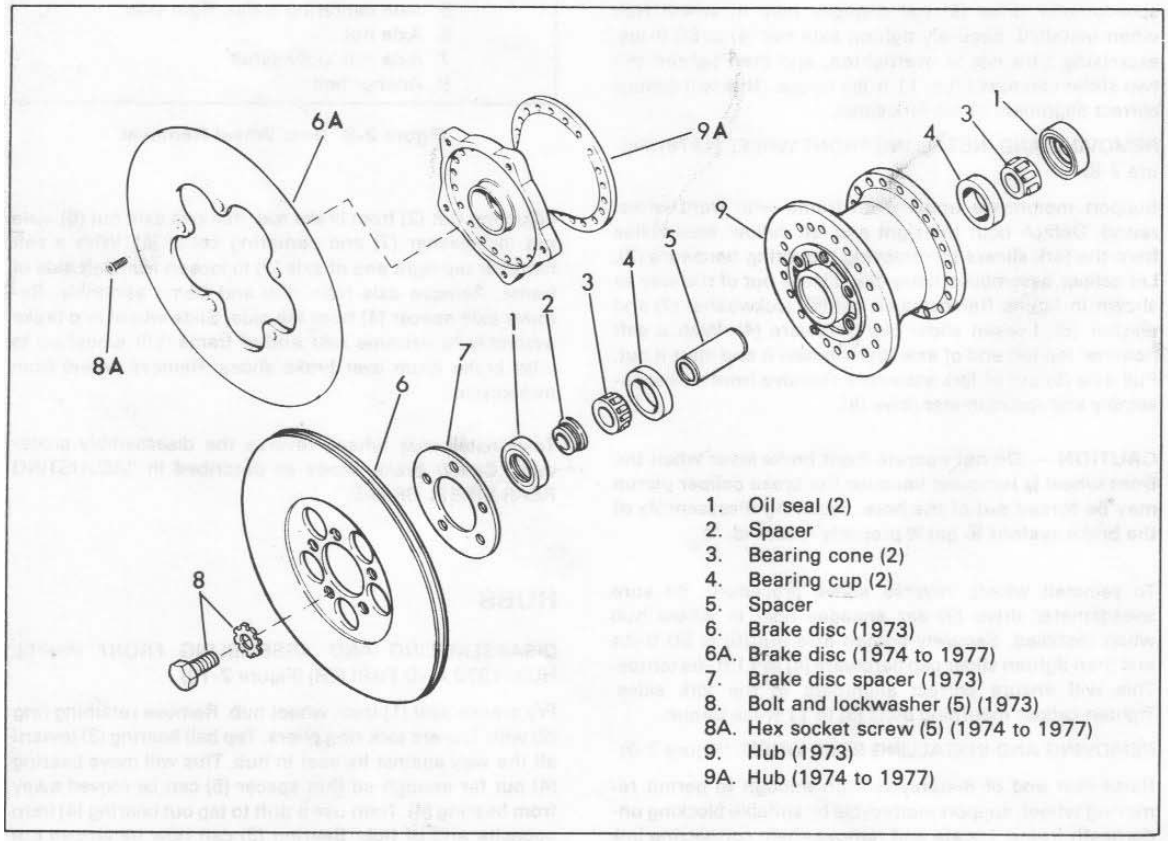
IMPORTANT

Flat side of retaining ring must be toward bearing.

Install bearing spacer (5). Press ball bearing (3) against shoulder in hub and tap grease retainer (1) in place.

DISASSEMBLING AND ASSEMBLING FRONT WHEEL HUB (1973 TO 1977) (Figure 2-11)

Remove oil seals (1), spacer (2), and bearing cones (3). Use a bearing puller to remove bearing cups (4). Spacer (5) may now be removed. Brake disc (6 or 6A) is secured to hub (9 or 9A) with 5 bolts and lockwashers (8) or screws (8A).



1. Oil seal (2)
2. Spacer
3. Bearing cone (2)
4. Bearing cup (2)
5. Spacer
6. Brake disc (1973)
6A. Brake disc (1974 to 1977)
7. Brake disc spacer (1973)
8. Bolt and lockwasher (5) (1973)
8A. Hex socket screw (5) (1974 to 1977)
9. Hub (1973)
9A. Hub (1974 to 1977)

Figure 2-11. Front Wheel Hub - Exploded View (1973 to 1977)

Clean and inspect all parts, paying particular attention to the wheel hub bearings. If bearings have excessive side play or radial (up and down) play in the wheel hubs, they should be replaced. If bearings have been removed from the hubs, carefully examine for visible wear, heat discoloration or damage to inner and outer races. Inspect brake shells or brake disc for scoring, grooving and worn running surfaces. Check spoke flanges for bent or damaged condition. Recommended hub repair is replacement of worn or damaged parts.

Reassembly is basically the reverse of disassembly with the following exceptions: Apply a liberal amount of Harley-Davidson Grease-All to bearing cones (3) before assembly. Press oil seals (1) into hub flush with outer surface. Lubricate lip of oil seal before inserting spacer (2). If brake disc (6 or 6A) and brake disc spacer (7) have been disassembled make sure all mating surfaces are clean and flat before assembly. Apply Harley-Davidson "Stud and Bearing Mount," Part No. 99626-77, to threads and tighten bolts (8) to 35 ft-lbs torque or screws (8A) to 16 ft-lbs torque. When wheel is assembled to motorcycle, bearing end play should be .0025 to .015 in. If end play is not correct, substitute a slightly longer or shorter spacer (5) as necessary.

DISASSEMBLING AND ASSEMBLING FRONT WHEEL HUBS (1978) (Figures 2-12, 2-13)

Remove oil seals (1), spacer (2) and bearing cones (3). Use a standard bearing puller to remove bearing cups (4). Spacer (5) may now be removed. Brake discs (6) are secured to hub or wheel (8) with screws (7).

Clean all parts in solvent and inspect for damage or wear. Replace parts as necessary. If bearing cones or cups need replacing, replace as a set. Inspect brake discs for warping, scoring or worn running surfaces. Replace as necessary. On spoked wheels, check spoke flanges for bent or damaged condition.

Reassembly is basically the reverse of disassembly with the following exceptions: Apply a liberal amount of Harley-Davidson Grease-All grease to bearing cones before assembly. Lubricate lip of oil seal (1) before assembly. Press oil seals (1) into hub flush with outer surface. If brake discs (6) have been disassembled, make sure all mating surfaces are clean and flat. Apply Harley-Davidson "Stud and Bearing Mount," Part No. 99626-77, to threads of screws (7) and tighten to 16 ft-lbs torque. When wheel is mounted to motorcycle and axle nut is tightened to 50 ft-lbs torque, bearing end play should be 0.004 to 0.018 in. If end play is not correct, substitute a slightly longer or shorter spacer (5) as necessary.

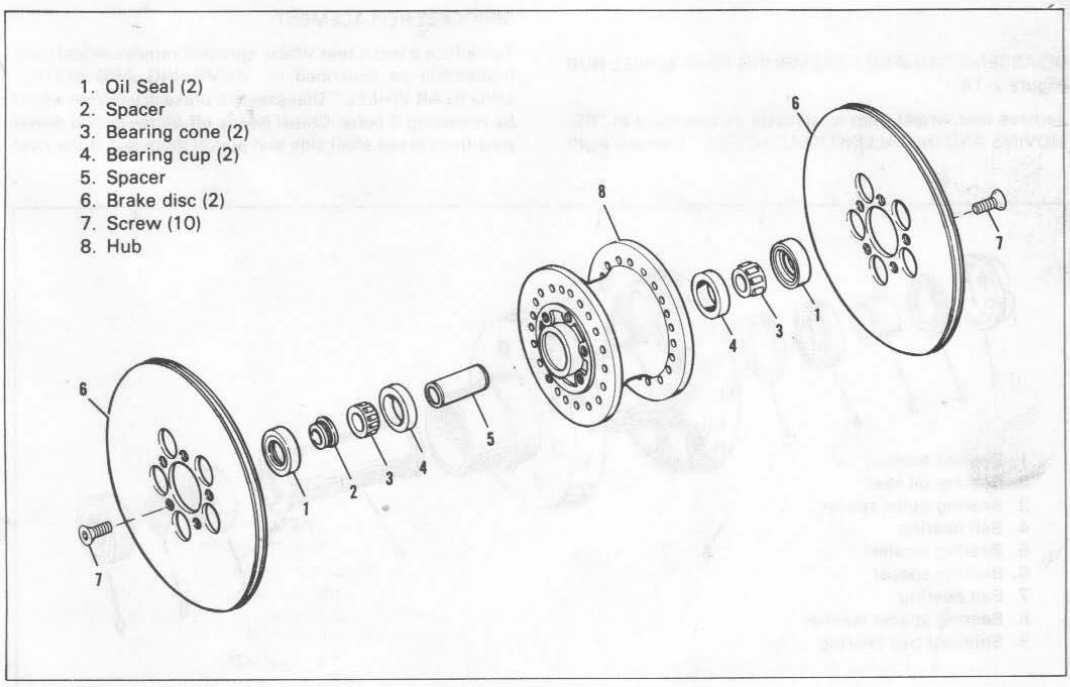


Figure 2-12. Front Wheel Hub (1978)

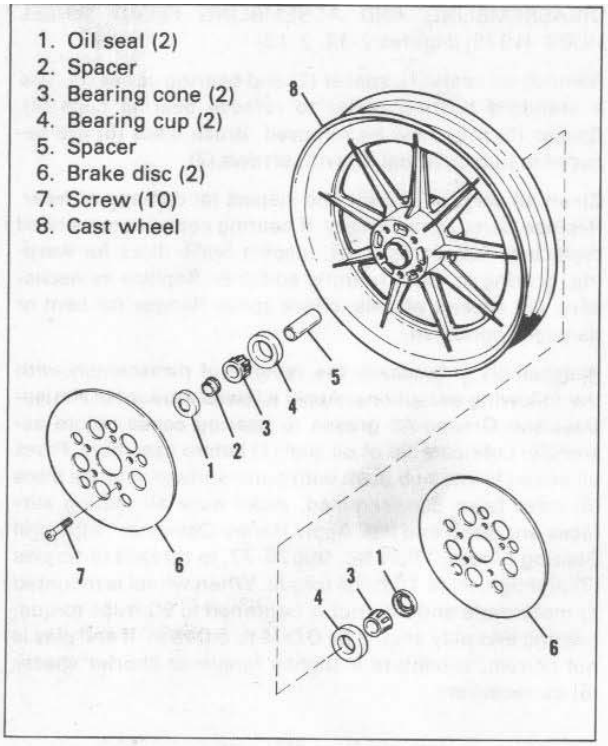


Figure 2-13. Front Cast Wheel Hub (1978)

DISASSEMBLING AND ASSEMBLING REAR WHEEL HUB (Figure 2-14)

Remove rear wheel from motorcycle as described in "REMOVING AND INSTALLING REAR WHEEL." Remove eight mounting bolts and brake drum from wheel. Using Tool, Part No. 94630-67, turn threaded bearing locknut (1) from hub, breaking stake locks as it is being removed. Drift out bearing oil seal (2) and outer spacer (3) from opposite side of hub. Repeat operation for ball bearing (4) and washer (5). Free bearing spacer (6). Drift out ball bearing (7), spacer (8) and ball bearing (9) from opposite side of hub.

Clean and inspect all parts, paying particular attention to the wheel hub bearings. If bearings have excessive side play or radial (up and down) play in the wheel hubs, they should be replaced. If ball bearings have been removed from the hubs, carefully examine for visible wear, heat discoloration or damage to inner and outer races. Inspect brake shells for scoring, grooving and worn running surfaces. Check spoke flanges for bent or damaged condition. Recommended hub repair is replacement of worn or damaged parts.

Press oil seal (2) into locknut (1) and insert outer spacer (3) in oil seal (2) and locknut (1). Install washer (5) and ball bearing (4). Assemble locknut (1), oil seal (2), and outer spacer (3) into hub as one unit. Peen locknut to hub in two places and insert bearing spacer (6).

Press unshielded bearing (7) against bearing spacer (6). Install bearing spacer washer (8) and shielded ball bearing (9) on outside. Inject one ounce of "Grease-All" grease into the wheel hub. Install brake drum on hub with eight mounting bolts. Tighten bolts to 16-19 ft-lbs torque. Spin wheel to make sure it turns freely.

SPROCKET REPLACEMENT

To replace a worn rear wheel sprocket remove wheel from motorcycle as described in "REMOVING AND INSTALLING REAR WHEEL." Disassemble brake drum from wheel by removing 8 bolts. Chisel heads off all rivets and dowel pins from brake shell side and punch them out. If the rivet

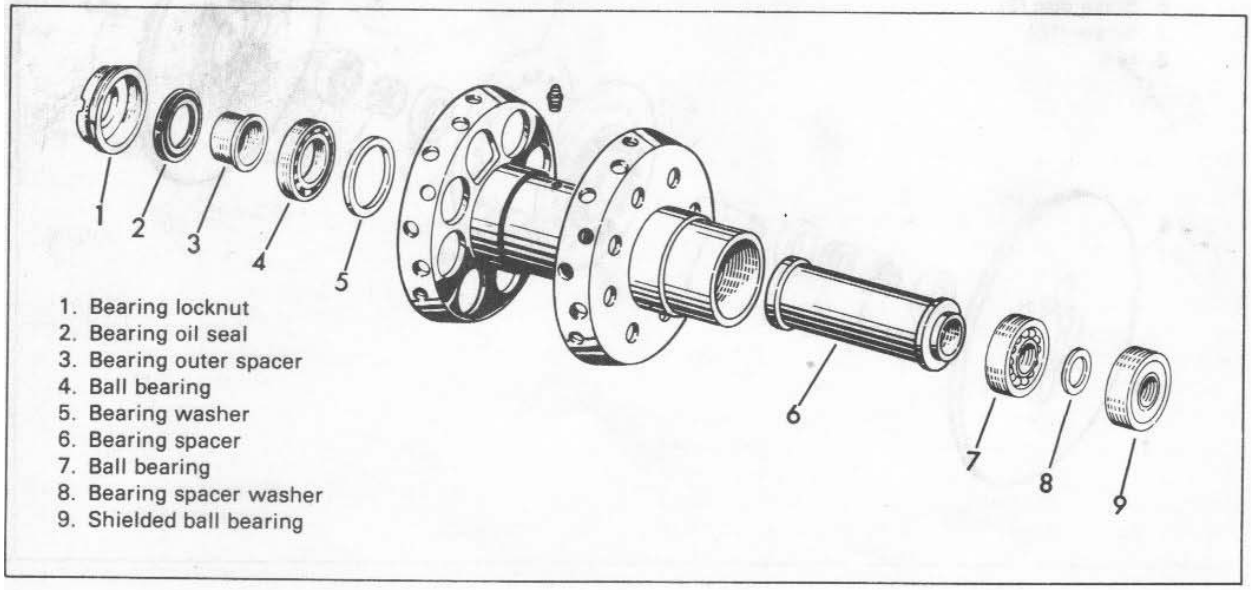


Figure 2-14. Rear Wheel Hub - Exploded View

holes are not worn, use the rivet holes again. If the rivet holes are found slightly worn or elongated and drum is in good condition, drill a new set of rivet holes in drum flange midway between original dowel and rivet holes.

To drill new rivet holes, proceed as follows using new sprocket as a template for locating holes.

1. Drill a 9/64 in. hole from the brake shell side.
2. Drill one hole and insert rivet (do not head rivet).
3. Drill a hole directly opposite first hole and insert rivet (do not head rivet).
4. Drill remaining 14 rivet holes.
5. Remove rivets and separate sprocket from drum.
6. Remove burrs from newly drilled holes.

Whenever a rear wheel sprocket is replaced it is very important to drill new dowel holes to ensure a press fit for the dowel pins. Use the new sprocket as a template and drill the four dowel pin holes 3/16 in. dia. for a press fit.

Position sprocket and drum on center support flange of Riveting Jig, Part No. 95600-33A. Proceed as follows, *inserting and seating dowel pins first, and then rivets.*

1. Insert dowel pin and rivet from brake shell side.
2. Use hollow driver and seat dowel pin and rivet at the same time driving sprocket and hub flange together.
3. Use concave punch and flare dowel pin end. Head rivet end until head extends 3/64 in. above sprocket face.
4. Repeat steps 1, 2 and 3 seating *opposite* dowel pins and rivets until all are in place.

This procedure will prevent distortion of sprocket.

Install brake drum on wheel. Tighten mounting bolts and nuts to 25 ft-lbs torque. Install wheel in motorcycle as described in "REMOVING AND INSTALLING REAR WHEEL."

SPOKING

FRONT WHEEL (Figures 2-15, 2-16)

Front wheel rim is identified by Part No. stamped in rim well as follows: 19 in. steel 43002-70, and 19 in. aluminum 43010-70 for 1972 and earlier, 43003-73 for 1973 to 1977, or steel 43341-78 and aluminum 43351-78 for 1978. Twenty spoke holes are equally spaced around each side flange of hub and twenty spoke holes are arranged in pairs on each side of rim well. Holes are spaced the same on each side of both rim and hub.

Note that there are two types of spokes: long and short. They are identified by the shape of the bent end as shown in Figure 2-15. One long and one short spoke are used in each pair. The long spoke (L) of each pair on rim crosses over to opposite side of hub while the short spoke (S) of each pair on rim connects to same side of hub. Spoke arrangement is shown in Figure 2-15 or 2-16.

1. Place hub on bench with brake side of hub up.
2. Insert 10 short spokes in every other hole from outside of brake side flange.
3. Insert 10 long spokes in remaining holes.
4. Turn hub over on bench with brake side of hub down.
5. Insert 10 short spokes in next holes to right (clockwise) from long spoke holes in opposite flange.
6. Insert 10 long spokes in remaining holes.
7. Swing short spokes counterclockwise and long spokes clockwise crossing underneath short spokes and forming pairs.
8. Place rim over hub (either side down).
9. Cross long spokes clockwise underneath short spokes and insert into right (clockwise hole) of each pair of holes that angles in same direction as spoke on opposite side of rim well. See L-1 in Figure 2-15 or 2-16.
10. Cross short spokes clockwise above long spokes and insert into right (counterclockwise hole) of each pair on near side of rim well that angles in same direction as spoke. See S-1 in Figure 2-15 or 2-16.

Spoke will enter 6th hole (1972 and earlier) or 14th hole (1973 and later) to left of clockwise long spoke hole in rim. Repeat for remaining spokes. Start nipples on spokes as they are inserted in rim until all spokes are secured.

11. Turn wheel over and repeat procedure for spokes on brake side.

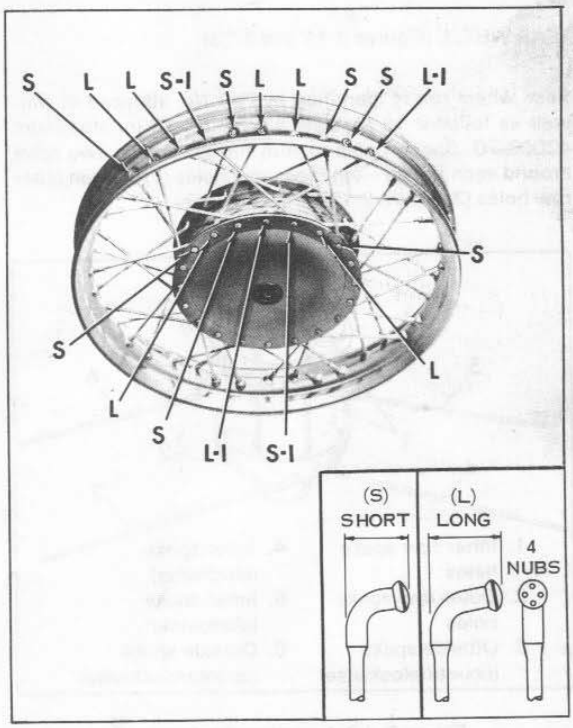


Figure 2-15. Front Wheel Lacing (1972 and Earlier)

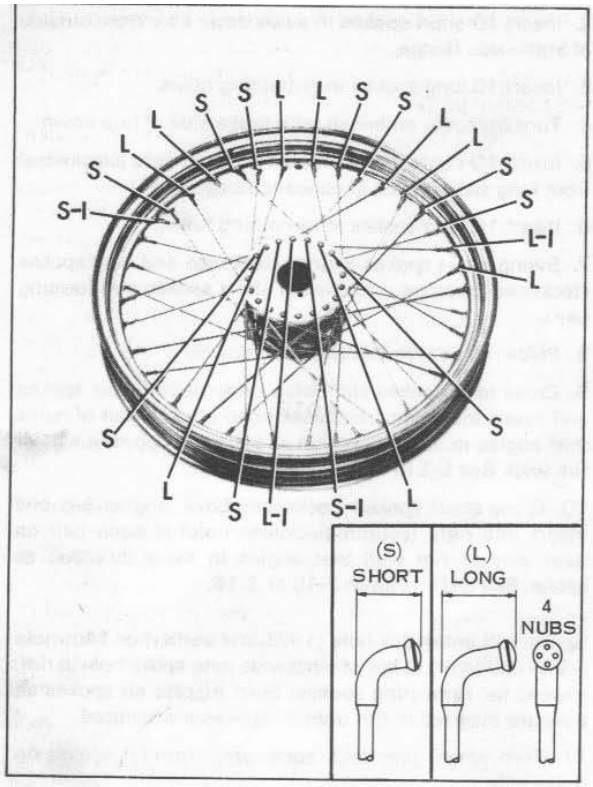


Figure 2-16. Front Wheel Lacing (1973 and Later)

REAR WHEEL (Figures 2-17 and 2-18)

Rear wheel rim is identified by Part No. stamped in rim-well as follows: 18 in. steel 43005-70, 18 in. aluminum 43008-70. Spoke holes in hub flanges are in two rows around each flange – ten inner row holes (1) and ten outer row holes (2, Figure 2-17) in each flange.

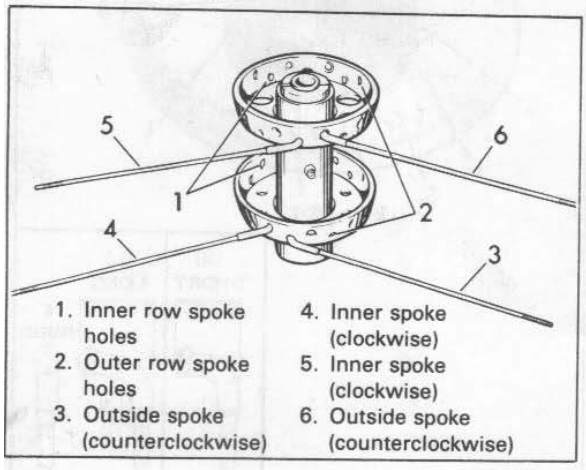


Figure 2-17. Inserting Spokes in Rear Wheel Hub

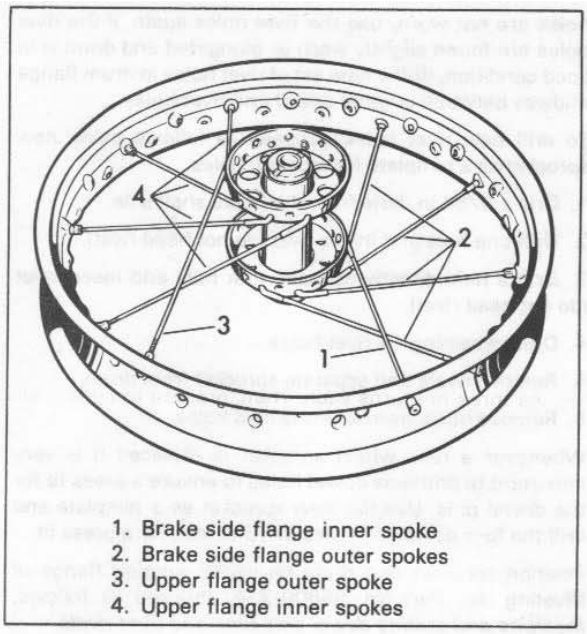


Figure 2-18. Lacing Rear Wheel

1. Place hub on bench with brake drum end of hub down as shown in Figure 2-17.

2. Insert spokes (3) in ten outer spoke holes of brake side flange and swing loose end of spokes counterclockwise, as far as hub will allow.

3. Place rim over hub (either side down) and insert spokes in lower row of holes in rim, that angle in same direction as spokes.

4. Just start nipples on spokes as they are inserted in rim.

5. Insert spokes (4) in ten inner spoke holes of brake side flange and swing loose end of spokes clockwise as far as hub will allow.

6. See Figure 2-18. Select any inner spoke (1), cross it over four outer spokes (2), and insert spokes in nearest lower rim holes. Start nipples.

7. Insert spokes (5, Figure 2-17) in ten inner spoke holes of opposite flange (upper flange as positioned on work-bench) and swing loose end of spokes clockwise as far as hub will allow. Then, insert inner spokes in nearest upper rim holes that angle in same direction as spokes and start nipples.

8. Insert spokes (6, Figure 2-17) in remaining ten outer spoke holes of upper flange and swing end of spokes counterclockwise as far as hub will allow.

9. See Figure 2-18. Select any outer spoke (3), cross it over four inner spokes (4), and insert spokes in nearest upper rim holes. Start nipples.

NOTE

Outer spokes on both sides should point in same direction.

TRUING WHEELS

TRUING RIM

See Figure 2-19 and proceed as follows. Insert arbor in wheel hub and place wheel in Truing Stand, Part No. 95500-29A.

2. Front Wheel: Starting at valve hole, tighten all nipples opposite brake flange side until end of spokes are approximately 1/16 in. from being flush with head of nipple. Use Nipple Wrench, Part No. 94681-39.

3. Rear Wheel: Turn each nipple on just far enough to cover spoke threads. Start at valve hole and tighten all nipples three full turns each. Then, proceed to tighten all nipples one full turn at a time until spokes are snug in wheel.

4. Front and Rear Wheel: Check rim for concentricity, centering sideways with hub and for running true sideways (Figures 2-19 and 2-20). Centering rim sideways must be done as one operation. Rim must be properly centered sideways in relation to hub for correct alignment and "tracking" of wheels. Figures 2-21, 2-22 and 2-23 show method of using a straightedge to determine correct sideways centering of wheel rim. If rim is too close to straightedge, loosen all nipples on brake side and tighten all nipples on opposite side same amount. If rim is too far from straightedge, reverse operations. Lay straightedge across brake side as shown and measure distance from straightedge to rim. When rim is correctly centered, this distance will be as shown for each wheel listed.

Adjust truing stand gauge (Figure 2-19), to side of rim well so rim at highest point will strike gauge as wheel is rotated slowly. Loosen nipples at highest point of rim on gauge side, and tighten nipples on opposite side the same number of turns. Repeat this operation until rim runs true sideways. Reverse loosening and tightening of nipples, as explained above, if rim moves too far away from gauge. After each loosening and tightening of spokes, check rim in relation to hub as shown in Figures 2-21 and 2-22. Rim should be trued sideways to within 1/32 in.

NOTE

A dial indicator is recommended in place of gauge rod for fine adjustment.

After rim has been centered sideways with wheel hub and runs true sideways, check for concentricity. Adjust truing stand gauge (Figure 2-20) to rim tire bead seat. If rim runs eccentric (radial runout) nipples must be loosened at points rim does not contact gauge, and nipples tightened at points rim contacts gauge. Amount nipples are to be loosened or tightened is determined by the amount rim is out of round. Rim should be trued concentrically to 1/32 in. or less radial runout.

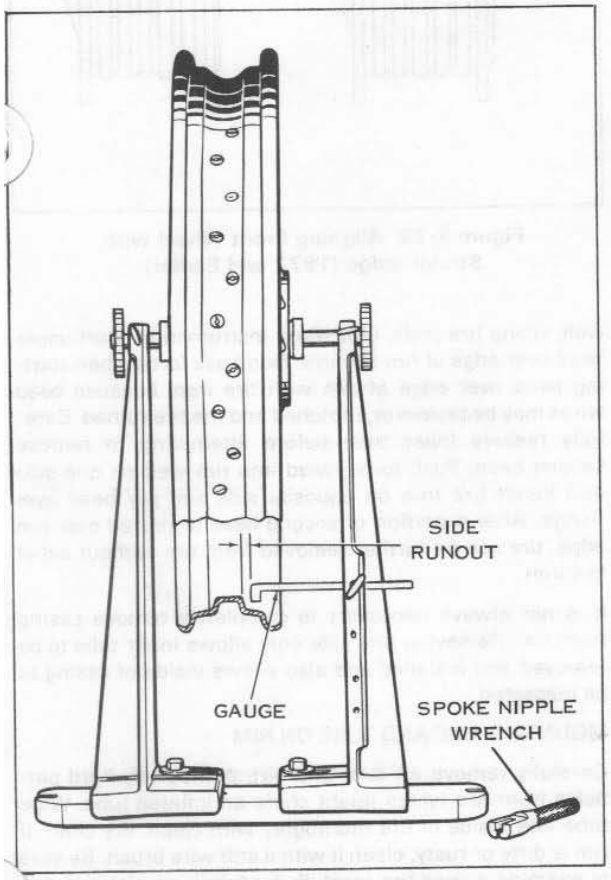


Figure 2-19. Truing Rim Sideways

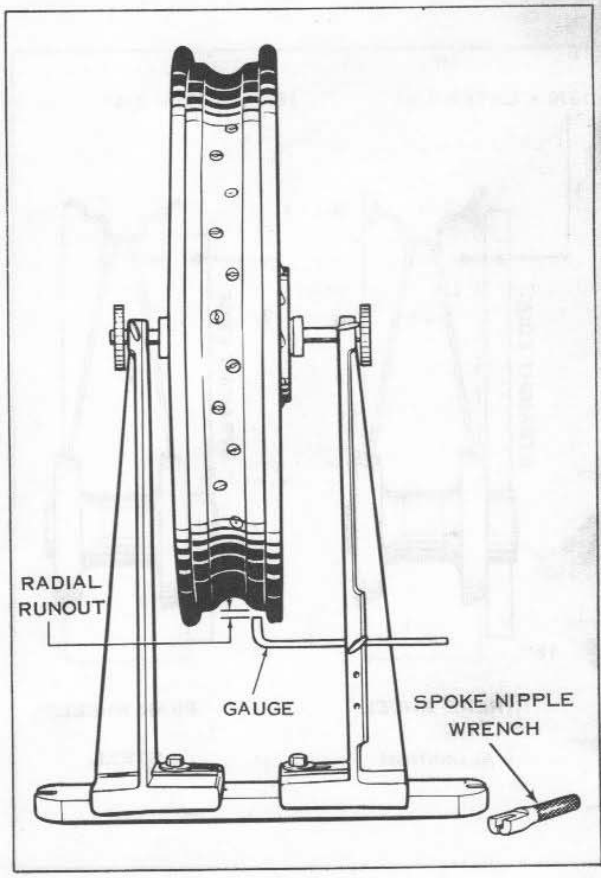


Figure 2-20. Truing Rim Concentric with Hub

5. After wheels have been checked and corrected as described in paragraph 4, start at valve hole and tighten nipples one turn at a time all the way around rim until spokes are normally tight. If possible compare with a new wheel. While tightening nipples, repeatedly check rim with gauge or dial indicator according to instructions under paragraph 4.

6. After all nipples have been pulled up, until spokes are normally tight and wheel is true, seat each spoke head into hub flange with a sharp blow, using a flat nose punch and hammer. Then retighten all nipples and finish truing wheel. This method allows spokes to be drawn tighter at the start and prevents possibility of spokes loosening after wheel is put into service as the result of spoke heads heating into the flange.

Do not tighten spokes too tight or nipples may draw through rim, or hub flanges may be distorted. If spokes are left too loose, they will continue to loosen when wheel is put in service.

7. File or grind off ends of any spokes protruding through nipples to prevent puncturing tube when tire is mounted.

REMOVING TIRE AND TUBE FROM RIM

Remove valve cap and valve core to free all air from tube. Remove valve stem nut. Loosen both beads from rim flanges by stepping on sides of tire or by using a tire tool. Stand or kneel on tire opposite valve to push bead into rim-

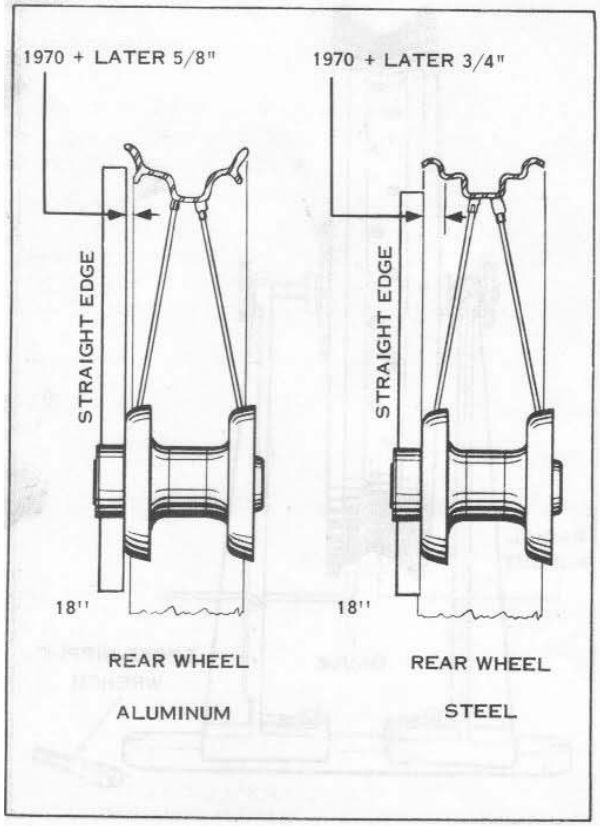


Figure 2-21. Aligning Rear Wheel with Straightedge

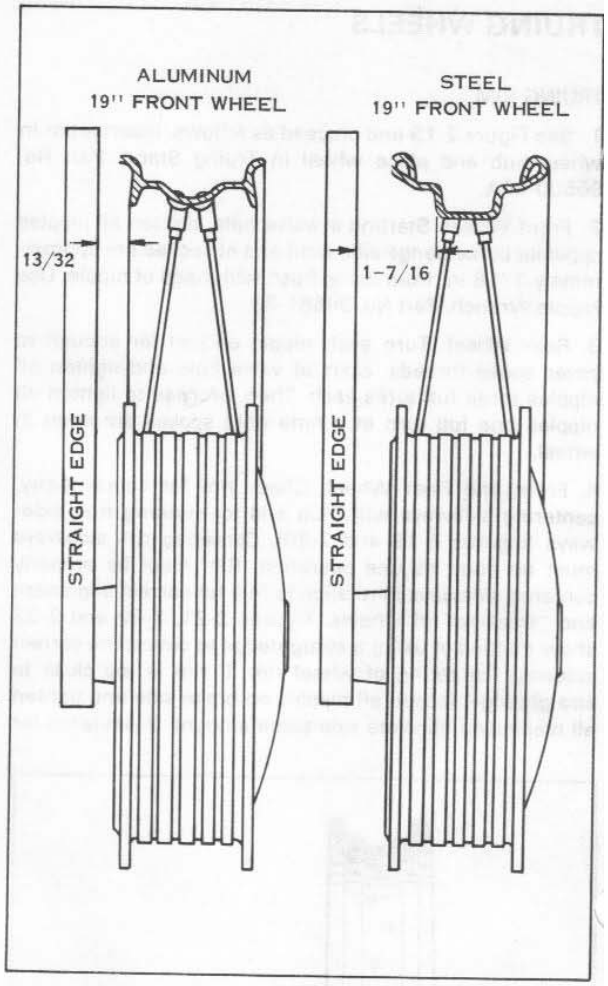


Figure 2-22. Aligning Front Wheel with Straightedge (1972 and Earlier)

well. Using tire tools, (not sharp instruments), start upper bead over edge of rim at valve. Don't use force when starting bead over edge of rim with tire iron, because bead wires may be broken or stretched and the tire ruined. Carefully remove inner tube before attempting to remove second bead. Push lower bead into rim-well on one side and insert tire iron on opposite side and pry bead over flange. After a portion of second bead is started over rim edge, tire can be further removed from rim without aid of tire iron.

It is not always necessary to completely remove casing from rim. Removing one side only allows inner tube to be removed and installed and also allows inside of casing to be inspected.

MOUNTING TIRE AND TUBE ON RIM

Carefully remove all dust and dirt, particularly hard particles from tire which might chafe an inflated tube. Wipe tube and inside of tire thoroughly with clean, dry cloth. If rim is dirty or rusty, clean it with a stiff wire brush. Be sure to examine a used tire carefully for fabric injuries which if neglected will damage tube.

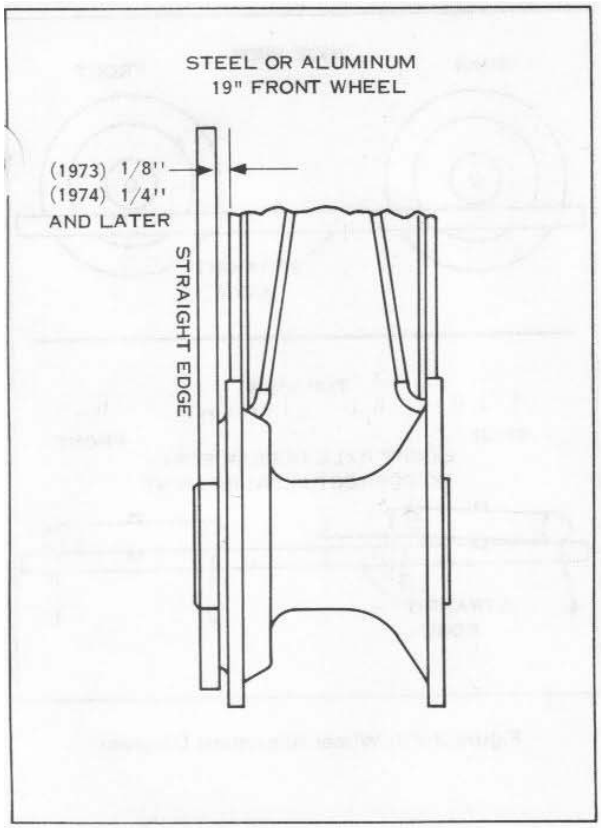


Figure 2-23. Aligning Front Wheel with Straightedge (1973 and Later)

Position rubber rim strip in rim-well with valve holes correctly registered. Swab thoroughly all around base of tube, between tube and side walls of tire with tire mounting compound. Place valve at tire balance mark, and inflate tube just enough to round it out. With wheel lying flat, place tire on rim with arrow on sidewall pointing in direction of forward tire rotation, and align valve with hole in rim. Push bottom bead into rim-well near valve, and hold in well while forcing remaining portion of bead over rim flange with a tire tool. Spread tire and insert valve through hole in rim. Force upper bead over rim flange and into well at point opposite valve. Stand or kneel at this point to hold bead in well and pry remaining portion of tire over rim flange. While forcing bead over rim flange, keep as much bead as possible in rim-well. Be careful not to damage beads or pinch tube.

Inflate tire to recommended pressure, then completely deflate tire to smooth out any wrinkles in tube and allow tube to find its place, free from strain or stress. Again, inflate to recommended pressure and check valve for leak. See "SPECIFICATIONS," Section 1, for correct tire pressure.

CHECKING TIRE TRUENESS SIDEWAYS (LATERAL RUNOUT)

Check runout by truing wheel on axle, measuring amount of sideways displacement from a fixed point near the tire (see Figure 2-24).

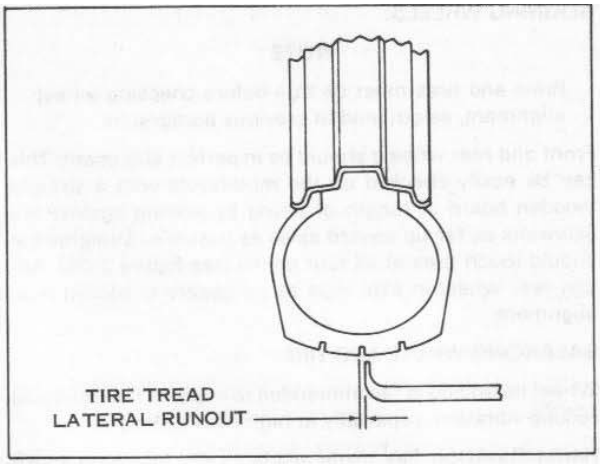


Figure 2-24. Checking Tire Lateral Runout

Tire tread runout should be no more than 3/64 in. If tire tread runout is more than 3/64 in., remove tire from rim and check rim bead side runout to see if rim is at fault (see "TRUING WHEEL").

If rim side runout is less than 1/32 in., tire is at fault and should be replaced. If rim side runout is more than 1/32 in., correct by tightening selected spoke nipples as outlined previously, reinstall old tire and recheck tire tread lateral runout.

CHECKING TIRE ROUNDNESS (RADIAL RUNOUT)

Check runout by turning wheel on axle, measuring tread runout (see Figure 2-25).

Tire tread runout should be no more than 3/32 in. If tire tread runout is more than 3/32 in., remove tire from rim and check rim bead runout to see if rim is at fault (see "TRUING WHEEL").

If rim bead runout is less than 1/32 in., tire is at fault and should be replaced. If rim bead runout is more than 1/32 in. correct by tightening selected spoke nipples as outlined previously, then reinstall tire and recheck tire tread runout.

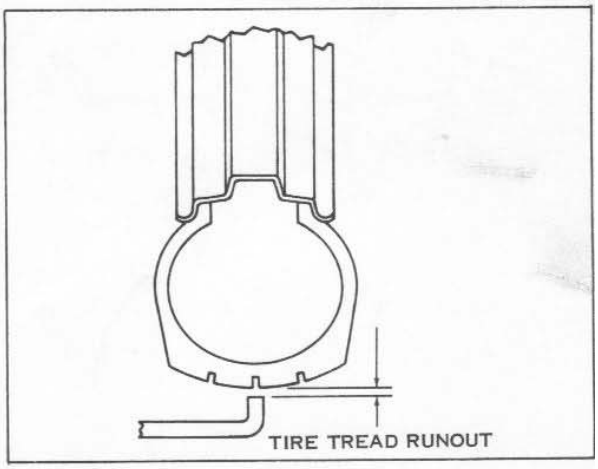


Figure 2-25. Checking Tire Radial Runout

ALIGNING WHEELS

NOTE

Rims and tires must be true before checking wheel alignment, as outlined in previous paragraphs.

Front and rear wheels should be in perfect alignment. This can be easily checked on the motorcycle with a straight wooden board or length of string by placing against tire sidewalls as far up toward axles as possible. Straightedge should touch tires at all four points (see Figure 2-26). Adjust rear wheel in axle clips as necessary to correct misalignment.

BALANCING WHEEL AND TIRE

Wheel balancing is recommended to improve handling and reduce vibration, especially at high road speeds.

Harley-Davidson has made available the following spoke balance weights which press over the spoke nipple.

1 oz. weight, Part No. 95582-47
3/4 oz. weight, Part No. 95581-47
1/2 oz. weight, Part No. 95578-41

Cast aluminum wheels require the special self-adhesive weights listed below:

Aluminum color
1 oz. weight, Part No. 95588-75
1/2 oz. weight, Part No. 95587-75

Black
1 oz. weight, Part No. 95591-77
1/2 oz. weight, Part No. 95590-77

Self adhesive wheel weights should be applied to the flat surface of the rim. Make sure that area of application is completely clean, dry and free of oil and grease. Remove paper backing from weight and press firmly in place so that arrow on weight points in the direction of wheel rotation. If 1 oz. or more of weight must be added at one location, split the amount so that half is applied to each side of the rim. Wheel should not be used for 48 hours to allow adhesive to cure completely.

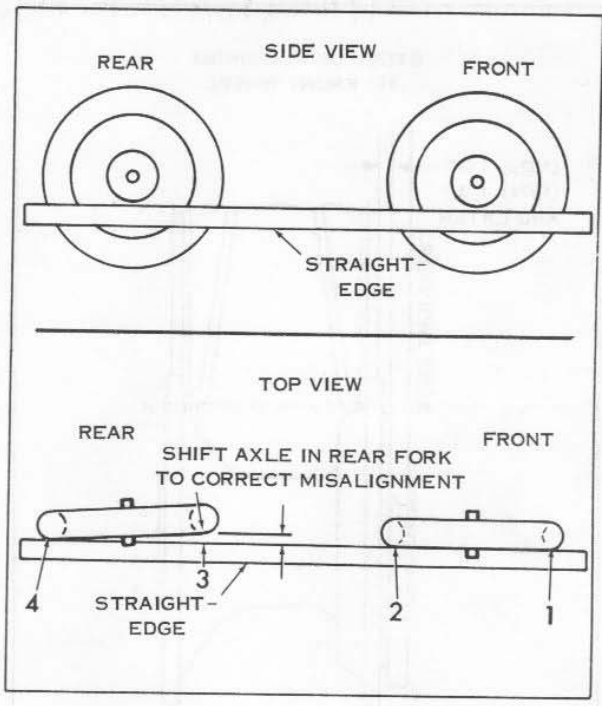


Figure 2-26. Wheel Alignment Diagram

In most cases, static balancing using Wheel Truing Stand, Part No. 95500-29A, will produce satisfactory results. However, dynamic balancing, utilizing a wheel spinner, can be used to produce finer tolerances for best high speed handling characteristics. Follow the instructions supplied with the balance machine you are using. The maximum weight permissible to accomplish balance is 3-1/2 oz. total weight applied to the rim. Wheels should be balanced to within 1/2 oz. at 60 mph.

HANDLEBAR THROTTLE CONTROL

SPIRAL TYPE

ENERAL

Handlebar throttle control must operate freely. If a control becomes stiff and hard to adjust, parts must be removed and cleaned of caked grease, gum and dirt. A kinked control wire or coil must be replaced.

DISASSEMBLING AND ASSEMBLING (Figure 2-27)

Disconnect control coil and wire at carburetor.

Remove handlebar end screw using a wrench and screwdriver. Sometimes this screw is difficult to remove. In this case, insert a punch in screw slot and loosen screw by striking punch several sharp blows.

After removing grip sleeve assembly (1, 2 and 3), working parts are accessible. Remove roller pin (4) and rollers (5). Pull plunger (6) with control wire (8) attached, from handlebar end. Wire is fastened into end of plunger by means of a set screw (7). If wire is broken, remove other half from coil at carburetor and circuit breaker connection end.

To free control coil (housing) from motorcycle, remove grip control parts as explained above. Then, remove the small set screws underneath each handlebar side to free coil end plugs (9). Loosen rear fork panels and handlebar clamp cover from the motorcycle. Remove control coil and end plug as a unit from handlebar end.

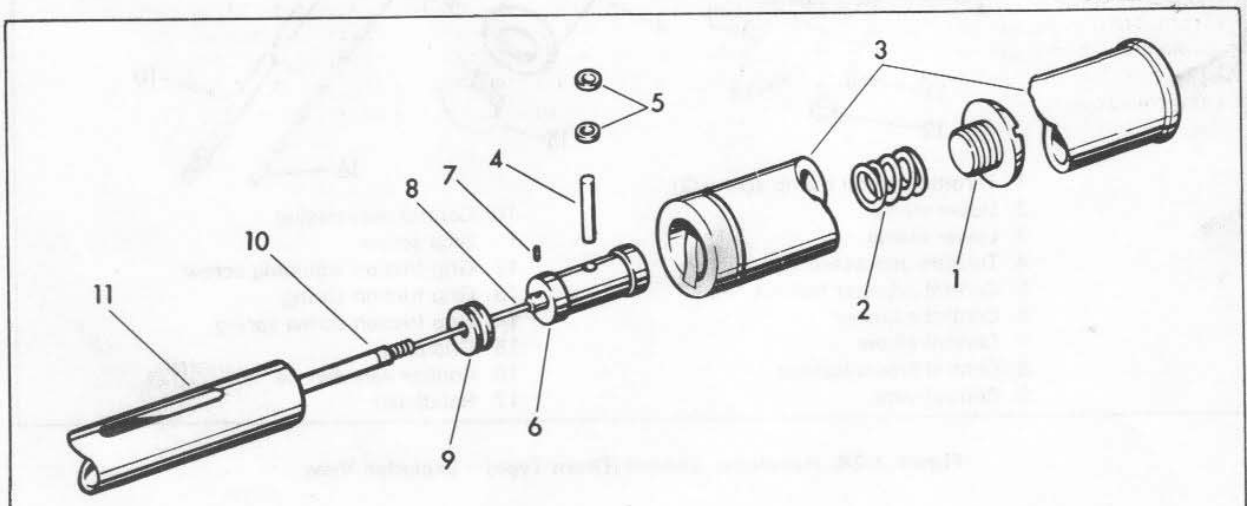
Clean all parts thoroughly removing all rust, dirt and gummy grease deposits, especially from plunger inside of grip and handlebar end. Inspect all parts. If any are worn or damaged, replace them.

Assembly is essentially the reverse order of disassembly. If control coil has been removed from motorcycle make sure coil end plug (9) is correctly positioned in handlebar end with set screw registered in groove of end plug.

Apply a light coat of graphite grease or oil to control wire as it is inserted into coil. Insert two rollers (5) over roller pin (4), round side of roller up as positioned on motorcycle. Lubricate handlebar spiral with grease. See "REGULAR SERVICE INTERVALS," Section 1.

To start end screw (9) in handlebar, grasp grip sleeve assembly and apply slight pressure against screw as it is being started in handlebar end. This squares screw with end of grip sleeve, aligning threads. Tighten screw securely.

After throttle control is completely assembled, connect control coil and wire at carburetor. Adjust throttle control so carburetor throttle lever closes and opens fully with grip movement. There should be about 1/4 in. between end of throttle control coil and carburetor control coil clip when throttle lever is in fully closed position against its stop.



1. Handlebar end screw
2. Handlebar end screw spring
3. Handlebar grip sleeve
4. Control coil plunger roller pin
5. Control coil plunger roller (2)
6. Control coil plunger
7. Control coil setscrew
8. Control wire
9. Control coil end plug
10. Control coil
11. Handlebar end

Figure 2-27. Handlebar Throttle Control (Spiral Type) - Exploded View

DRUM TYPE

GENERAL

Control must operate freely and carburetor throttle must return to closed (idle) position with friction adjusting screw (12, Figure 2-28) backed off. If control becomes stiff and does not return properly, it should be disassembled, cleaned and inspected.

DISASSEMBLING AND ASSEMBLING
(Figure 2-28)

Remove two control coil clamp screws (1), upper clamp (2), lower clamp (3). Unhook ferrule end of control wire (9) from grip assembly (4) which is free to come off handlebar end (17).

To remove cable (9), disconnect it at carburetor throttle lever, unsolder or cut off ferrule (16) and pull wire out of lower clamp (3). Parts 5, 6, 7, 8 and 10 are now removable. Replace a worn or bent control wire with a new one through parts 5, 6, 7 and 8 and install in casing (10) applying graphite grease to wire. Solder ferrule on wire flush with end of wire.

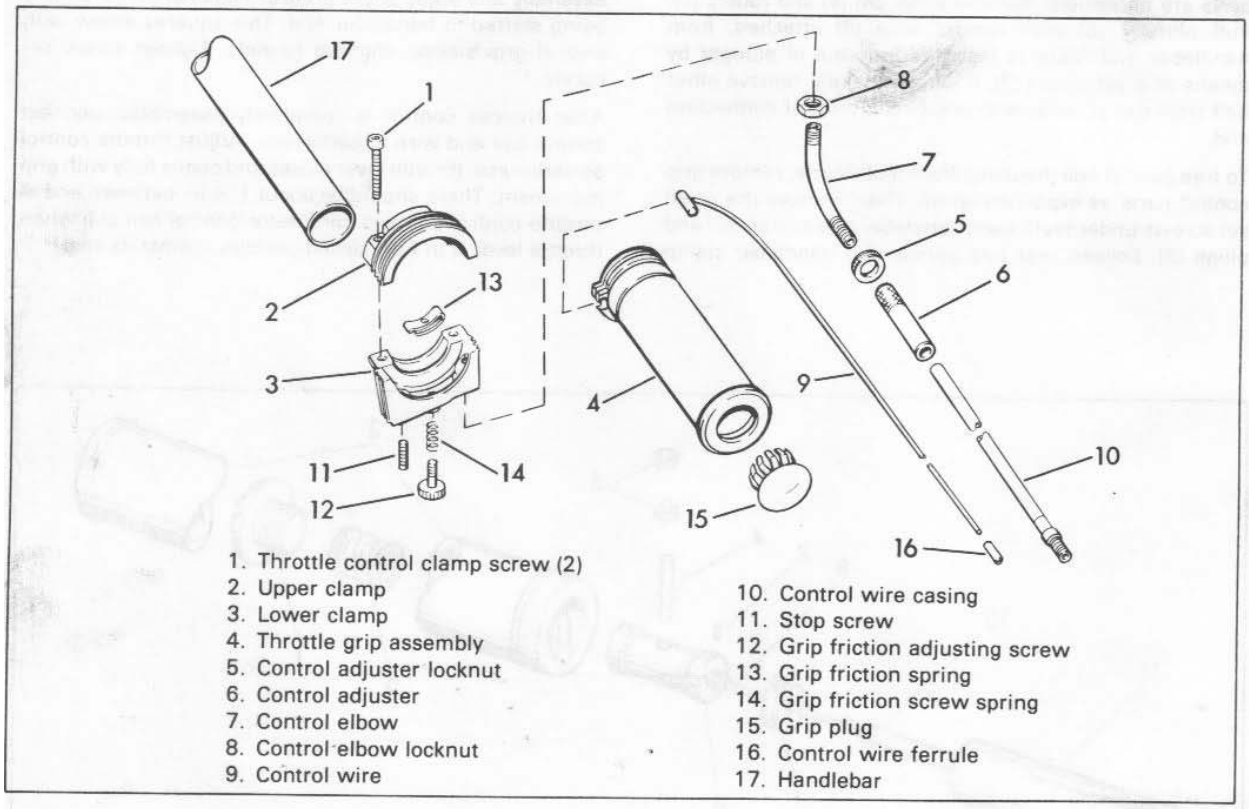
Apply a light coat of graphite grease to handlebar (17) end and inside surfaces of clamps (2 and 3). Connect ferrule end of wire to notch in drum and assemble grip (4) on handlebar between clamps. Be sure hole in friction spring (13) is in place on end of screw (12).

After assembling parts and connecting wire end to throttle lever, check for proper operation – that is, with friction screw (12) loosened, torsion spring on carburetor throttle shaft must return parts to closed throttle (idle) position.

With handgrip turned to throttle fully opened position adjust stop screw (11) using 2 MM hex (Allen) wrench to limit travel.

IMPORTANT

This should be done to prevent excessive pull, and possible wire ferrule breakage.



1. Throttle control clamp screw (2)
2. Upper clamp
3. Lower clamp
4. Throttle grip assembly
5. Control adjuster locknut
6. Control adjuster
7. Control elbow
8. Control elbow locknut
9. Control wire
10. Control wire casing
11. Stop screw
12. Grip friction adjusting screw
13. Grip friction spring
14. Grip friction screw spring
15. Grip plug
16. Control wire ferrule
17. Handlebar

Figure 2-28. Handlebar Control (Drum Type) - Exploded View

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