FOREWORD

This service manual contains information on the construction, principles of operation and instructions for checking, adjusting and maintaining the engine, body, and electrical system of Suzuki's four wheel drive vehicle Model LJ20 and its panel van conversion Model LJ20V, and truck Models L50, L51 and L50V (panel van).

All of the said models are powered by the same model of engine; water cooling system adopted for the model provides not only a stable high speed performance continuously but helps to improve the low speed engine torque considerably with the use of a reed valve incooporated into its mixture intake system. Consequently the present models can now be used for a wide ranging purposes thus increasing their versatility.

Appropriate maintenances are vital to make a maximum use of superior performance of the vehicles maintaining the original level of performance at all times. We hope that this manual be helpful for your technical service activities.

It is noted that this service manual is based on Models LJ20, L50. Accordingly, keep in your mind that some pictures, illustrations and some of the information provided in this manual may not be applicable to other models, and further that inconformity may arise in future products because of change in design.

March, 1973

SUZUKI MOTOR CO.,LTD.

Export Service Section

LJ20

Fig. 1–1

LJ20V

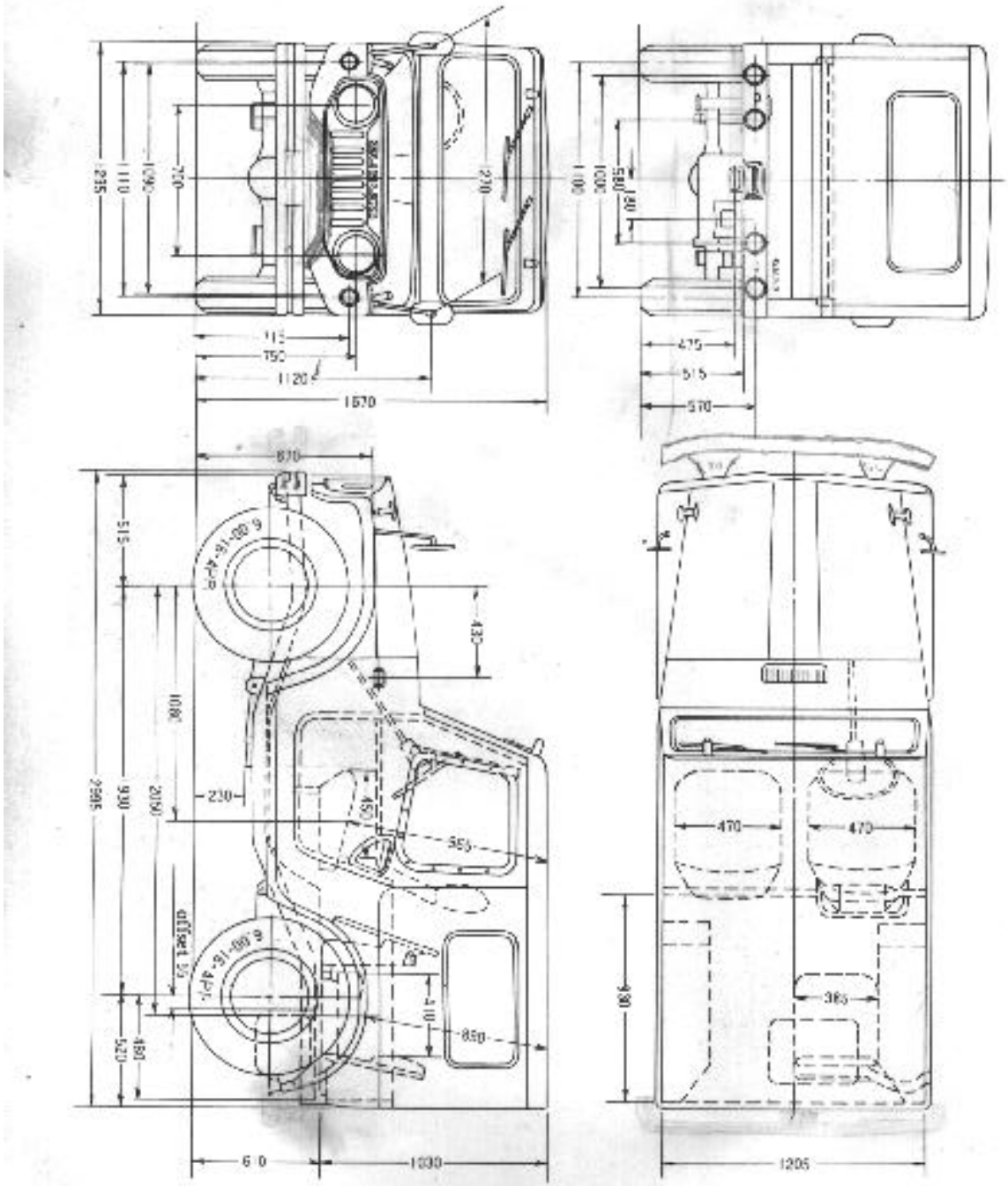
Fig. 1–2

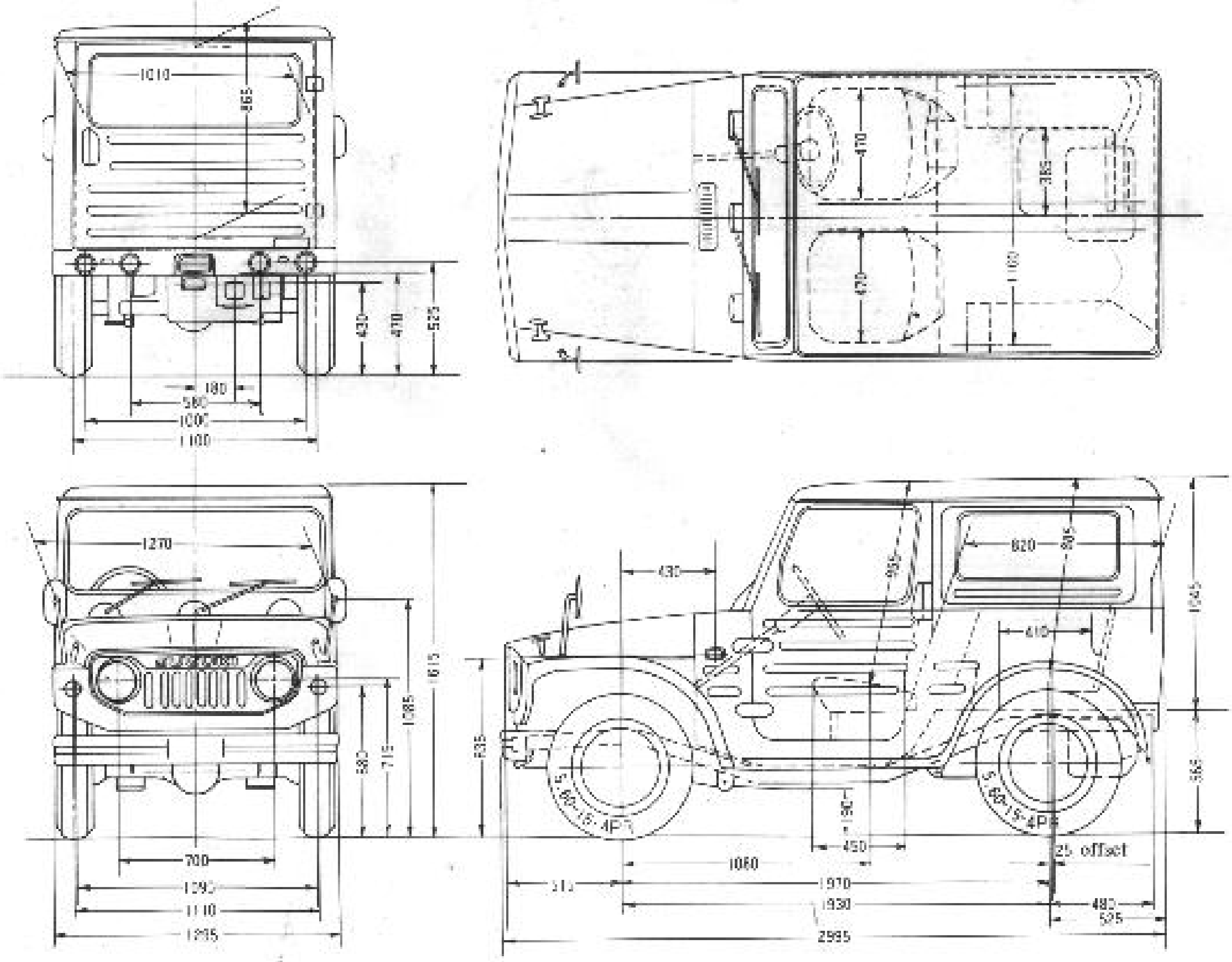
L50

Fig. 1–3

1–2. Dimensions

1–2–1. LJ20




1010
865
420
470
525
180
580
1000
1100
470
385
1160
470
1270
1615
1585
715
580
700
1090
1110
1295
430
955
820
805
1625
410
535
190
450
1060
515
1970
1930
25 offset
480
525
2995
565
5.60-15-4PR
5.60-15-4PR

1-2-2, LJ20V

1–3. Engine Performance Curves

Max. Horse Power	28 hp/5500 r.p.m.
Max. Torque	3.8 kg-m/5000 r.p.m.

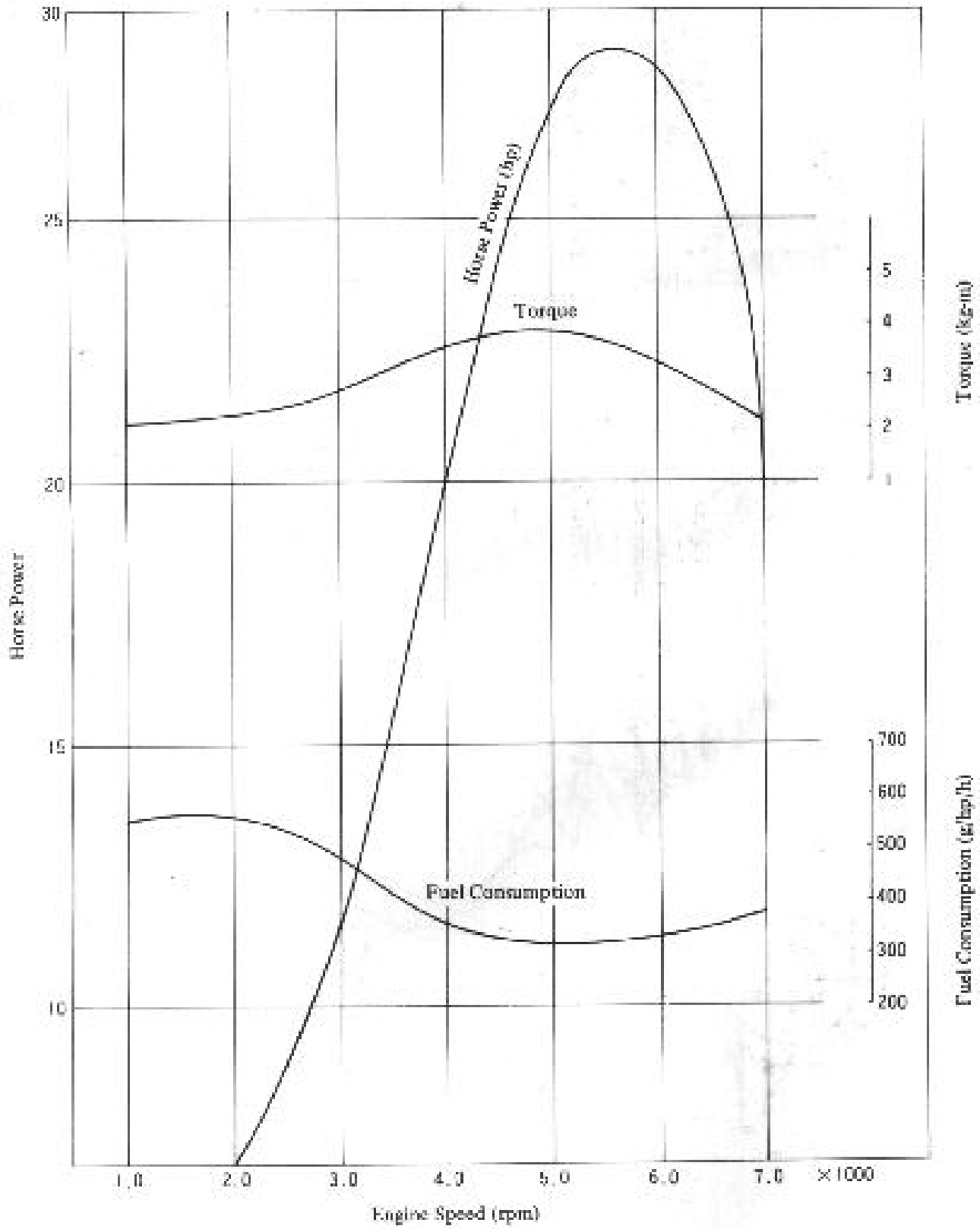


Fig. 1–11

1–4. Running Performance Curves

1–4–1. LJ20

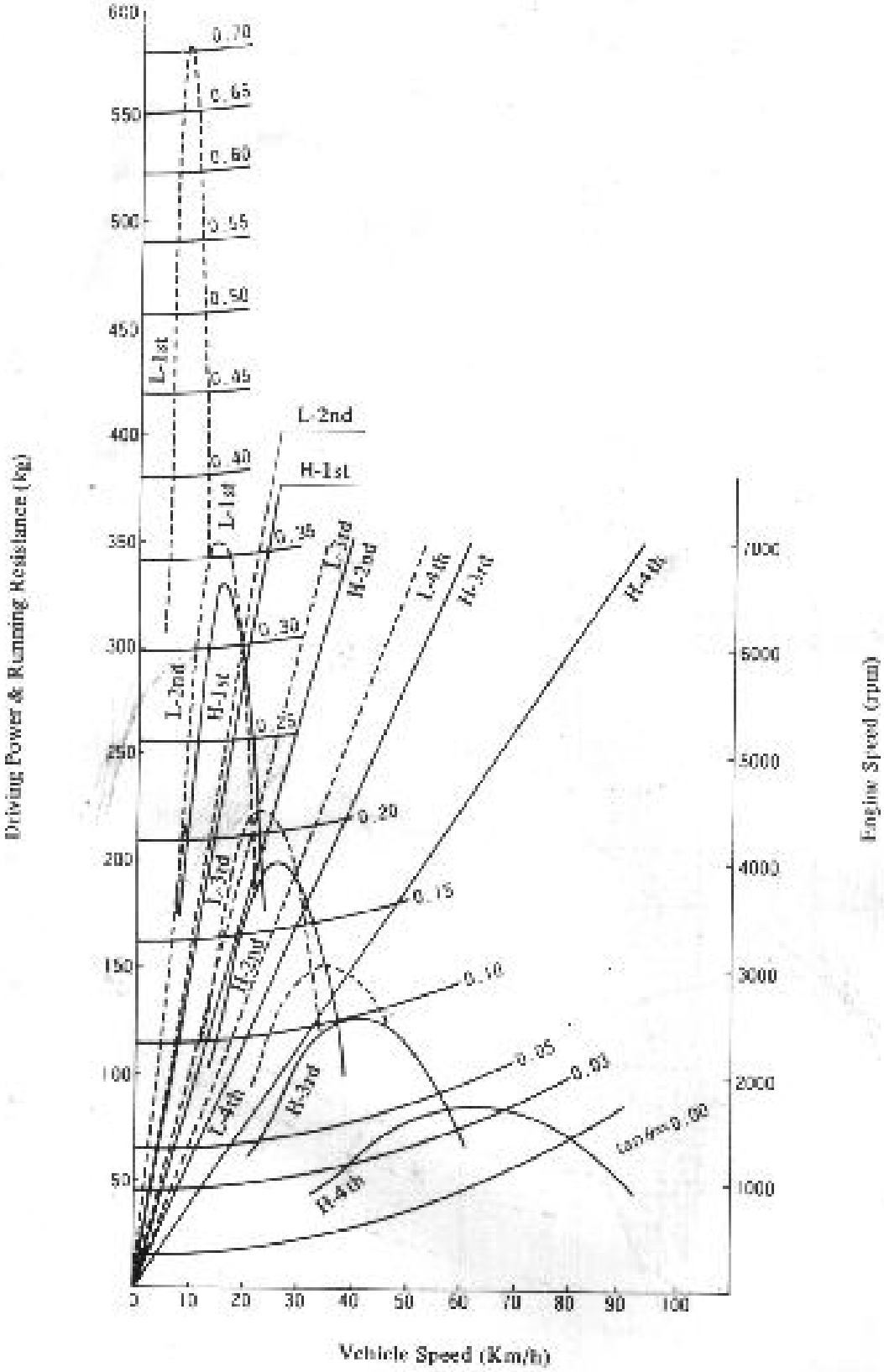


Fig. 1–12

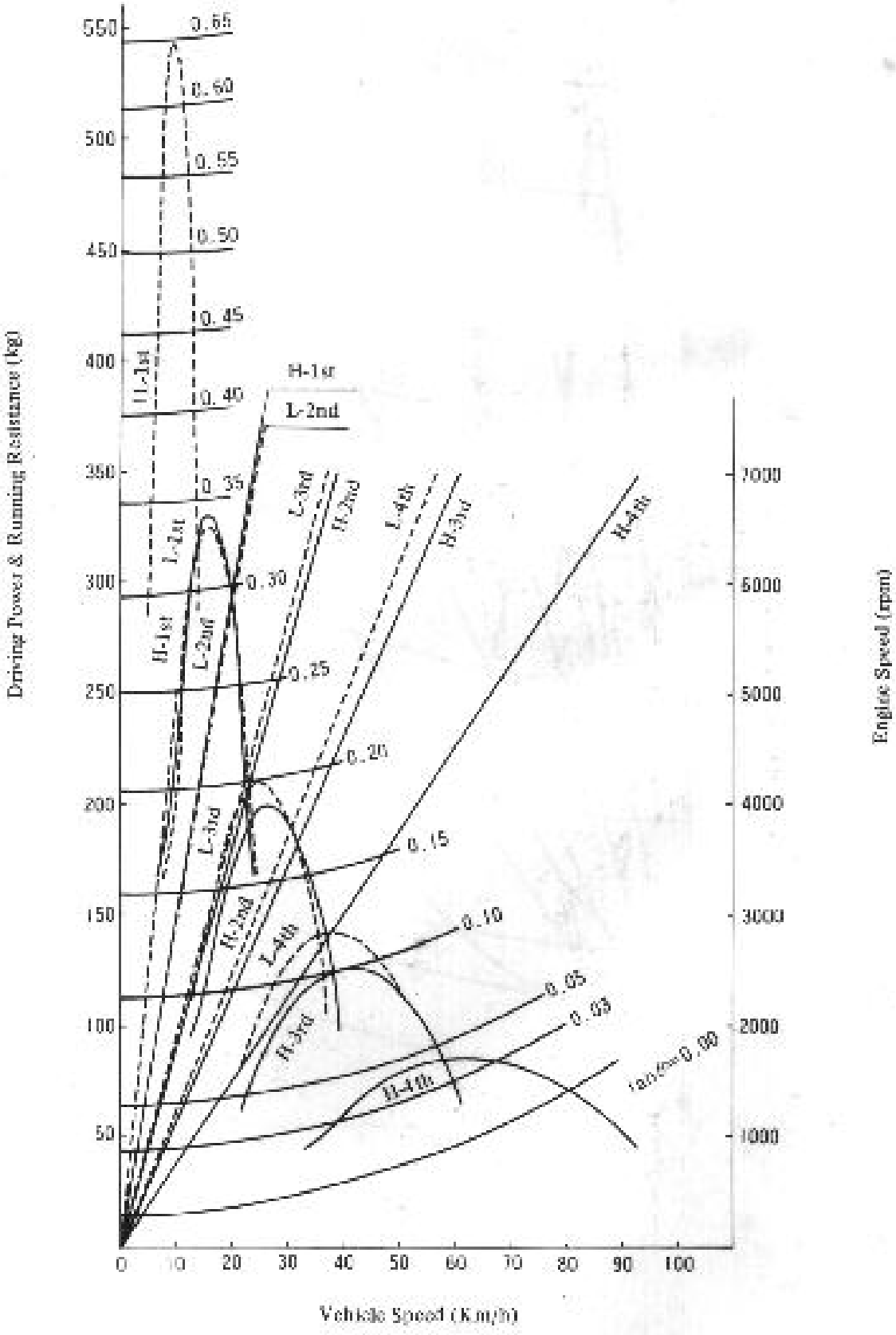

Driving Power & Running Resistance (kg)
Engine Speed (rpm)
Vehicle Speed (Km/h)
550
500
450
400
350
300
250
200
150
100
50
0
10
20
30
40
50
60
70
80
90
100
7000
6000
5000
4000
3000
2000
1000
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.03
H-1st
L-2nd
L-1st
L-2nd
L-3rd
H-2nd
L-4th
H-3rd
H-4th
H-1st
L-2nd
L-3rd
H-2nd
L-4th
H-3rd
H-4th
1st/fin=0.88

Fig. 1-13

1–5. Specifications

Item \ Models	LJ20	LJ20V	L50	L51	L50V
Dimmensions					
Overall length	3,195 mm (125.8 in)	3,025 mm (119.1 in)	2,995 mm (117.9 in)	2,995 mm (117.9 in)	2,995 mm (117.9 in)
Overall width	1,295 mm (51.0 in)	1,295 mm (51.0 in)	1,295 mm (51.0 in)	1,295 mm (51.0 in)	1,295 mm (51.0 in)
Overall height	1,670 mm (65.7 in)	1,615 mm (63.6 in)	1,600 mm (63.0 in)	1,600 mm (63.0 in)	1,600 mm (63.0 in)
Wheel base	1,930 mm (76.0 in)	1,930 mm (76.0 in)	1,745 mm (68.7 in)	1,745 mm (68.7 in)	1,745 mm (68.7 in)
Ground clearance	230 mm (9.05 in)	190 mm (7.48 in)	150 mm (5.9 in)	150 mm (5.9 in)	150 mm (5.9 in)
Cargo deck space (L x W x H)	930×1,205×1,030mm (36.6×47.4×40.5 in)	820×1,160×1,045mm (32.2×45.6×41.1 in)	1,865×1,215×260mm (73.4×47.8×10.2 in)	1,865×1,210×290mm (73.4×47.6×11.4 in)	1,630×1,150×1,035mm (64.1×45.2×40.7 in)
Curb weight	625 kg (1,378 lbs) with top	660 kg (1,455 lbs)	530 kg (1,168 lbs)	530 kg (1,168 lbs)	585 kg (1,287 lbs)
Weight distribution, front	340 kg (748 lbs)	345 kg (760 lbs)	290 kg (639 lbs)	290 kg (639 lbs)	300 kg (660 lbs)
Weight distribution, rear	285 kg (627 lbs)	315 kg (695 lbs)	240 kg (529 lbs)	240 kg (529 lbs)	285 kg (627 lbs)
Seating capacity	2 persons	2 persons	2 persons	2 persons	4 persons
Maximum pay load	250 kg (550 lbs)	200 kg (440 lbs)	350 kg (770 lbs)	350 kg (770 lbs)	350 kg (770 lbs)
Performance					
Maximum speed	80 kph (50 mph)	80 kph (50 mph)	90 kph (56 mph)	90 kph (56 mph)	90 kph (56 mph)
Climbing ability	35° (Tan θ = 0.70)	32.5° (Tan θ = 0.64)	21° (Tan θ = 0.38)	21° (Tan θ = 0.38)	19° (Tan θ = 0.34)
Turning radius	4.4 m (14.4 ft)	4.4 m (14.4 ft)	3.8 m (12.5 ft)	3.8 m (12.5 ft)	3.8 m (12.5 ft)
Braking distance	14 m (45.9 ft) at 50 kph (31 mph)	14 m (45.9 ft) at 50 kph (31 mph)	14 m (45.9 ft) at 50 kph (31 mph)	14 m (45.9 ft) at 50 kph (31 mph)	14 m (45.9 ft) at 50 kph (31 mph)
Engine					
Type	2-stroke, water cooled	2-stroke, water cooled	2-stroke, water cooled	2-stroke, water cooled	2-stroke, water cooled
Number of cylinder	Two	Two	Two	Two	Two
Bore x Stroke	61.0 x 61.5 mm (2.40 x 2.42 in)	61.0 x 61.5 mm (2.40 x 2.42 in)	61.0 x 61.5 mm (2.40 x 2.42 in)	61.0 x 61.5 mm (2.40 x 2.42 in)	61.0 x 61.5 mm (2.40 x 2.42 in)
Piston displacement	359 cc (21.9 cu-in)	359 cc (21.9 cu-in)	359 cc (21.9 cu-in)	359 cc (21.9 cu-in)	359 cc (21.9 cu-in)
Compression ratio	7.0	7.0	7.0	7.0	7.0
Compression pressure	8.5 kg/cm^2 at 1,000 rpm	8.5 kg/cm^2 at 1,000 rpm	8.5 kg /cm^2 at 1,000 rpm	8.5 kg/cm^2 at 1,000 rpm	8.5 kg/cm^2 at 1,000 rpm
Maximum horse power	28 HP at 5,500 rpm	28 HP at 5,500 rpm	28 HP at 5,500 rpm	28 HP at 5,500 rpm	28 HP at 5,500 rpm
Maximum torque	3.8 kg-cm (27.5 lb-ft) at 5,000 rpm	3.8 kg-cm (27.5 lb-ft) at 5,000 rpm	3.8 kg-cm (27.5 lb-ft) at 5,000 rpm	3.8 kg-cm (27.5 lb-ft) at 5,000 rpm	3.8 kg-cm (27.5 lb-ft) at 5,000 rpm

Item \ Models	LJ20	LJ20V	L50	L51	L50V
Weight	43 kg (94.6 lbs)	43 kg (94.6 lbs)	43 kg (94.6 lbs)	43 kg (94.6 lbs)	43 kg (94.6 lbs)
Dimensions (L x W x H)	506 x 440 x 368 mm (19.9 x 17.3 x 14.4 in)	506 x 440 x 368 mm (19.9 x 17.3 x 14.4 in)	503 x 501 x 327 mm (19.8 x 19.7 x 12.8 in)	503 x 501 x 327 mm (19.8 x 19.7 x 12.8 in)	503 x 501 x 327 mm (19.8 x 19.7 x 12.8 in)
Number of piston ring	Three	Three	Three	Three	Three
Inlet system	Reed valve	Reed valve	Reed valve	Reed valve	Reed valve
Exhaust system	Piston valve	Piston valve	Piston valve	Piston valve	Piston valve
Starting system	Self	Self	Self	Self	Self

Cooling System

Type	Water cooled direct	Water cooled direct	Water cooled direct	Water cooled direct	Water cooled direct
Radiator type	Corrugated fin and tube pressure	Corrugated fin and tube pressure	Corrugated fin and tube pressure	Corrugated fin and tube pressure	Corrugated fin and tube pressure
Water pump	Centrifugal type, V-belt drive	Centrifugal type, V-belt drive	Centrifugal type, V-belt drive	Centrifugal type, V-belt drive	Centrifugal type, V-belt drive
Thermostat	Wax pellet element type	Wax pellet element type	Wax pellet element type	Wax pellet element type	Wax pellet element type
Cooling solution capacity	3.0 ltr (1.7/1.4 US/Imp. pt)	3.0 ltr (1.7/1.4 US/Imp. pt)	3.0 ltr (1.7/1.4 US/Imp. pt)	3.0 ltr (1.7/1.4 US/Imp. pt)	3.0 ltr (1.7/1.4 US/Imp. pt)

Ignition System

Ignition system	Battery	Battery	Battery	Battery	Battery
Ignition timing	8° below 1,400 rpm B.T.D.C.	8° below 1,400 rpm B.T.D.C.	8° below 1,400 rpm B.T.D.C.	8° below 1,400 rpm B.T.D.C.	8° below 1,400 rpm B.T.D.C.
Spark plug	NGK BP-6HS, Nippon Denso W22FP	NGK BP-6HS, Nippon Denso W22FP	NGK BP-6HS, Nippon Denso W22FP	NGK BP-6HS, Nippon Denso W22FP	NGK BP-6HS, Nippon Denso W22FP
Spark plug thread size (D x L)	14 x 12.7 mm (0.55 x 0.5 in)	14 x 12.7 mm (0.55 x 0.5 in)	14 x 12.7 mm (0.55 x 0.5 in)	14 x 12.7 mm (0.55 x 0.5 in)	14 x 12.7 mm (0.55 x 0.5 in)
Spark gap	0.6–0.7 mm (0.024–0.028 in)	0.6–0.7 mm (0.024–0.028 in)	0.6–0.7 mm (0.024–0.028 in)	0.6–0.7 mm (0.024–0.028 in)	0.6–0.7 mm (0.024–0.028 in)
Distributor point gap	0.4–0.5 mm (0.015–0.019 in)	0.4–0.5 mm (0.015–0.019 in)	0.4–0.5 mm (0.015–0.019 in)	0.4–0.5 mm (0.015–0.019 in)	0.4–0.5 mm (0.015–0.019 in)
Condenser capacity	0.25 μF	0.25 μF	0.25 μF	0.25 μF	0.25 μF

Fuel System

Number & type of carburetor	Single, VC1 30	Single, VC1 30	Single, Solex	Single, Solex	Single, Solex
Venturi diameter	25 mm (0.98 in)	25 mm (0.98 in)	24 mm (0.94 in)	24 mm (0.94 in)	24 mm (0.94 in)
Type of air cleaner	Resin processed fibrous tissue	Resin processed fibrous tissue	Resin processed fibrous tissue	Resin processed fibrous tissue	Resin processed fibrous tissue
Type of fuel pump	Diaphragm	Diaphragm	Diaphragm	Diaphragm	Diaphragm

Item \ Models	LJ20	LJ20V	L50	L51	L50V
Fuel tank capacity	26 ltr. (6.9/5.7 US/Imp. gal)	26 ltr. (6.9/5.7 US/Imp. gal)	27 ltr. (7.1/5.9 US/Imp. gal)	27 ltr. (7.1/5.9 US/Imp. gal)	27 ltr. (7.1/5.9 US/Imp. gal)

Lubrication System

Engine lubrication system	CCI lubrication	CCI lubrication	CCI lubrication	CCI lubrication	CCI lubrication
Type of oil pump	Plunger	Plunger	Plunger	Plunger	Plunger
Engine oil tank capacity	2.8 ltr. (5.9/4.9 US/Imp. pt)	2.8 ltr. (5.9/4.9 US/Imp. pt)	2.8 ltr. (5.9/4.9 US/Imp. pt)	2.8 ltr. (5.9/4.9 US/Imp. pt)	2.8 ltr. (5.9/4.9 US/Imp. pt)
Transmission oil	1,200 cc (2.5/2.1 US/Imp. pt)	1,200 cc (2.5/2.1 US/Imp. pt)	1,200 cc (2.5/2.1 US/Imp. pt)	1,200 cc (2.5/2.1 US/Imp. pt)	1,200 cc (2.5/2.1 US/Imp. pt)
Differential gear box oil	800 cc (1.7/1.4 US/Imp. pt)	800 cc (1.7/1.4 US/Imp. pt)	800 cc (1.7/1.4 US/Imp. pt)	800 cc (1.7/1.4 US/Imp. pt)	800 cc (1.7/1.4 US/Imp. pt)

Electrical System

Battery type & voltage	12N 24-3, 12V	12N 24-3, 12V	12N 24-3, 12V	12N 24-3, 12V	12N 24-3, 12V
Battery capacity	24 AH	24 AH	24 AH	24 AH	24 AH
Starter	Starter generator, 0.3 KW	Starter generator, 0.3 KW	Starter generator, 0.3 KW	Starter generator, 0.3 KW	Starter generator, 0.3 KW
Generator	Starter generator, 175 W	Starter generator, 175 W	Starter generator, 175 W	Starter generator, 175 W	Starter generator, 175 W
Head lamp	12V 50/40W	12V 50/40W	12V 50/40W	12V 50/40W	12V 50/40W
Turn signal, tail, parking lamp	12V 23/8/3.4W	12V 23/8/3.4W	12V 23/8/3.4W	12V 23/8/3.4W	12V 23/8/3.4W
Brake lamp	12V 23W	12V 23W	12V 23W	12V 23W	12V 23W
Side turn signal lamp	12V 6W	12V 6W	12V 6W	12V 6W	12V 6W
License plate lamp	12V 10W	12V 10W	12V 10W	12V 10W	12V 10W
Back up lamp	12V 10W	12V 10W	12V 10W	12V 10W	12V 10W
Room lamp	12V 5W	12V 5W	12V 5W	12V 5W	12V 5W
Combination meter pilot lamp	12V 3.4W	12V 3.4W	12V 3.4W	12V 3.4W	12V 3.4W
Main fuse	30A	30A	30A	30A	30A
Fuse box	15, 10, 5A	15, 10, 5A	15, 10, 5A	15, 10, 5A	15, 10, 5A

Clutch, Power Transmission

Clutch type	Dry, single disc	Dry, single disc	Dry, single disc	Dry, single disc	Dry, single disc
Clutch plate size (O.D. × I.D.)	160 × 110 mm (6.30 × 4.33 in)	160 × 110 mm (6.30 × 4.33 in)	160 × 110 mm (6.30 × 4.33 in)	160 × 110 mm (6.30 × 4.33 in)	160 × 110 mm (6.30 × 4.33 in)
Friction area	106 sq. cm(16.4 sq. in)	106 sq. cm(16.4 sq. in)	106 sq. cm(16.4 sq. in)	106 sq. cm(16.4 sq. in)	106 sq. cm(16.4 sq. in)

Item \ Models	LJ20	LJ20V	L50	L51	L50V
Transmission gear	4 forward all synchro-mesh, 1 reverse	4 forward all synchro-mesh, 1 reverse	4 forward all synchro-mesh, 1 reverse	4 forward all synchro-mesh, 1 reverse	4 forward all synchro-mesh, 1 reverse
Gear shift control	Floor	Floor	Floor	Floor	Floor
Gear ratio, low	3.967	3.967	3.967	3.967	3.967
2nd	2.388	2.388	2.388	2.388	2.388
3rd	1.527	1.527	1.527	1.527	1.527
top	1.000	1.000	1.000	1.000	1.000
reverse	3.967	3.967	3.967	3.967	3.967

Differential

Type	Spiral bevel gear	Spiral bevel gear	Spiral bevel gear	Spiral bevel gear	Spiral bevel gear
Final ratio	5.667	5.667	6.833	6.833	6.833
Universal Joint type	Cross joint	Cross joint	Cross joint	Cross joint	Cross joint

Wheel & Suspension

Tire size	6.00–16 in, 4PR	5.60–15 in, 4PR	5.00–10 in, 4PR	5.00–10 in, 4PR	5.00–10 in, 4PR
Tire pressure	1.1 sq. kg (15.7 sq. lb)	1.2 sq. kg (17.1 sq.lb)	2.2 sq. kg (31.3 sq. lb)	2.2 sq. kg (31.3 sq. lb)	2.2 sq. kg (31.3 sq. lb)
Wheel rim size, front and rear	4.50E × 16 in	4.50F × 15 in	3.50D × 10	3.50D × 10	3.50D × 10
Shock absorber, front	Cylindrical single action	Cylindrical single action	Cylindrical double action	Cylindrical double action	Cylindrical double action
rear	Cylindrical single action	Cylindrical single action	Cylindrical single action	Cylindrical single action	Cylindrical single action

Steering System

Steering gear box	Ball screw nut	Ball screw nut	Ball screw nut	Ball screw nut	Ball screw nut
Steering ratio	15.4	15.4	15.4	15.4	15.4
Steering angle, out	28°	28°	28°	28°	28°
in	33°	33°	36°	36°	36°
Steering wheel diameter	380 mm (15 in)	380 mm (15 in)	380 mm (15 in)	380 mm (15 in)	380 mm (15 in)

Drive System

Toe-in	5 mm (0.19 in)	5 mm (0.19 in)	6 mm (0.23 in)	6 mm (0.23 in)	6 mm (0.23 in)
Camber angle	1°	1°	1° 30'	1° 30'	1° 30'
Caster angle	30°	30°	1° 30'	1° 30'	1° 30'
Trail	24 mm (0.94 in)	24 mm (0.94 in)	6 mm (0.23 in)	6 mm (0.23 in)	6 mm (0.23 in)
King pin angle	9°	9°	12°30'	12°30	12°30'
Front axle type	Semi floating	Semi floating	Ball joint type	Ball joint type	Ball joint type

Item \ Models	LJ20	LJ20V	L50	L51	L50V
Rear axle type	Semi floating	Semi floating	Semi floating	Semi floating	Semi floating

Braking System

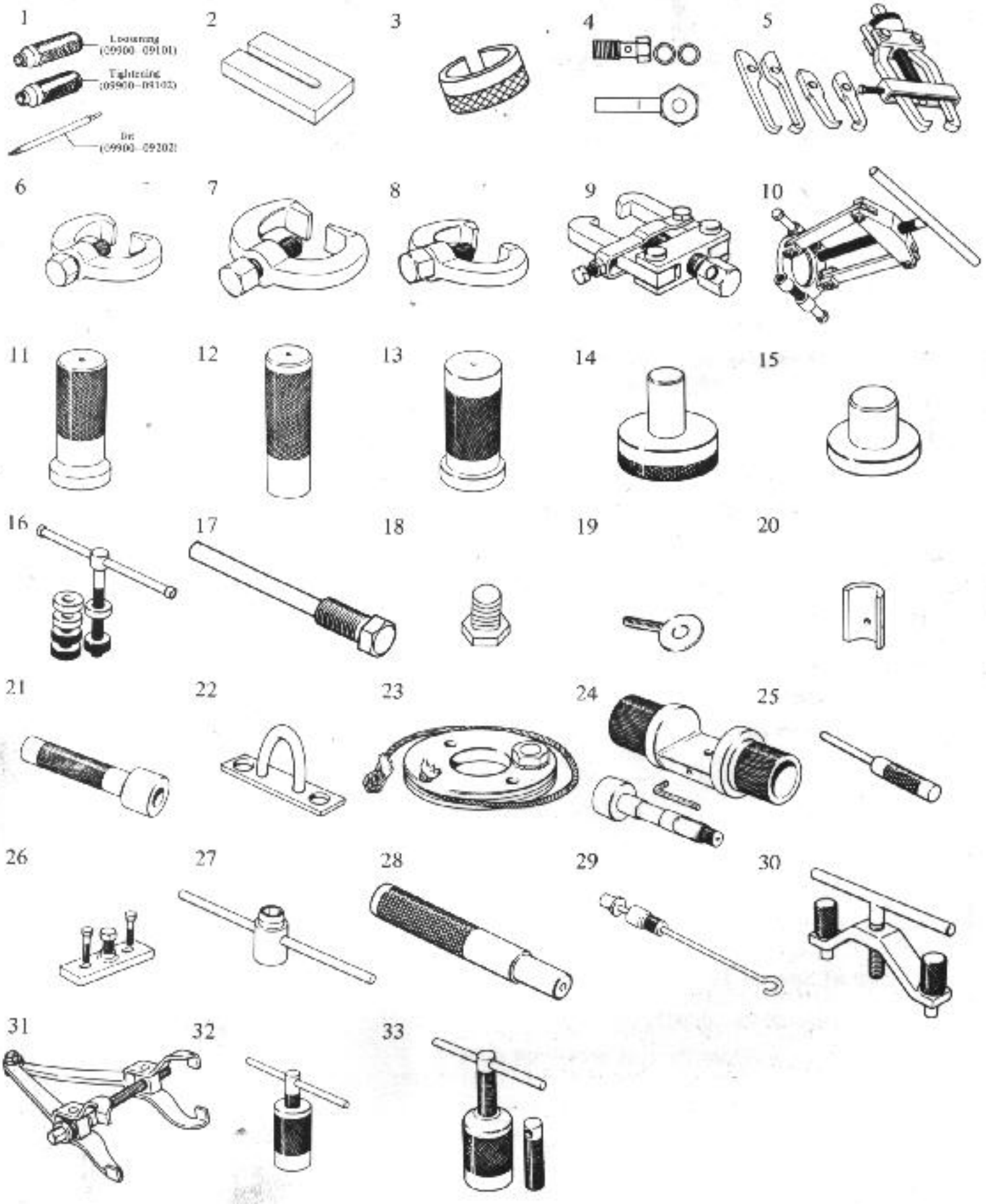
Brake type	4 wheel, hydraulic	4 wheel, hydraulic	4 wheel, hydraulic	4 wheel, hydraulic	4 wheel, hydraulic
Wheel brake, front	2 leading shoes	2 leading shoes	2 leading shoes	2 leading shoes	2 leading shoes
Wheel brake, rear	Leading and trailing	Leading and trailing	Leading and trailing	Leading and trailing	Leading and trailing
Brake lining dimension (L × W × T)	195 × 35 × 4 mm (7.68 × 1.38 × 0.16 in)	195 × 35 × 4 mm (7.68 × 1.38 × 0.16 in)	170 × 30 × 4 mm (6.69 × 1.18 × 0.16 in)	170 × 30 × 4 mm (6.69 × 1.18 × 0.16 in)	170 × 30 × 4 mm (6.69 × 1.18 × 0.16 in)
Brake diameter, front & rear	210 mm (8.27 in)	210 mm (8.27 in)	180 mm (7.09 in)	180 mm (7.09 in)	180 mm (7.09 in)
Master cylinder diameter	19.05 mm (0.75 in)	19.05 mm (0.75 in)	19.05 mm (0.75 in)	19.05 mm (0.75 in)	19.05 mm (0.75 in)
Parking brake	On Propeller shaft, mechanical	On Propeller shaft, mechanical	2 rear wheels, mechanical	2 rear wheels, mechanical	2 rear wheels, mechanical

1–6. General Precautions

1. Always use clean tools in maintenance works.
2. Keep the dismantled parts in good order to prevent them from being mixed up in disassembling engine and other mechanisms.
3. Do not work on electric components or wirings unless possitive terminal of battery is disconnected.
4. Use specified bolts and nuts in right places, and tighten them to specified torques using a torque wrench as necessary.
5. Replace gaskets and O-rings with new ones whenever disassembled.
6. Be sure to use SUZUKI genuine parts for replacement in repair. Use of imitation parts may results in malfunction, and is detrimental to safe drive.
7. While a car is jacked up, never fail to use support stands under the car. It is very dangerous to work under vehicles supported with a jack only.
8. SUZUKI special tools should be used where available to perform efficient and correct maintenance of a vehicle.

2–1. Special Tools

Ref. No.	Tool No.	Description
1	09900–09002	Shock driver set
2	09910–25110	Piston holder
3	09911–06710	Piston ring compressor
4	09913–16010	Carburetor fuel level gauge
5	09913–65131	Bearing puller
6	09913–65210	Ball joint puller (Only for L50, L51, L50V)
7	09913–65220	Tie-rod end puller (Only for L50, L51, L50V)
8	09913–65230	Drag link end puller (Only for L50, L51, L50V)
9	09913–65520	Pitman arm puller (Only for L50, L51, L50V)
10	09913–65810	Crankshaft bearing puller
11	09913–76010	Drive pinion front bearing outer-race installer
12	09913–80111	Drive pinion bearing inner-race installer
13	09913–85210	Drive pinion rear bearing outer-race installer
14	09913–85220	Differential side bearing installing jig
15	09913–85230	Differential side bearing removing jig
16	09913–95210	Differential bearing installer
17	09914–15211	Armature remover
18	09914–15221	Pulley remover
19	09920–31110	Clutch shaft bearing retainer remover
20	09922–45810	Clutch release shaft bush remover
21	09922–55130	Countershaft remover
22	09922–66010	Rear axle remover
23	09922–75220	Differential pre-load adjusting tool
24	09922–76010	Bevel pinion adjusting tool
25	09922–85811	Spring pin remover
26	09923–05110	Flywheel remover
27	09923–15110	Flywheel nut wrench
28	09923–35110	Clutch disc center guide
29	09942–15510	Sliding hammer
30	09942–25210	Brake drum remover
31	09943–25810	Front shock absorber coil spring remover (Only for L50, L51, L50V)
32	09922–55210	Rear shaft puller (Only for LJ20, LJ20V)
33	09922–65122	Transfer input shaft puller (Only for LJ20, LJ20V)


1
Loosening
(09900-09101)
Tightening
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(09900-09202)
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2–2. Testers

1. Electro-tester (09900–28102)

   An all-around tester for inspection and adjustment of various parts of the electric circuits.
   This device can be utilized for tests of conduction, condenser, ignition coil, generator output, starter and also for the inspection of ignition timing in addition to the measurement of both direct and alternating voltage, direct current, resistance, insulation resistance and condenser capacity.

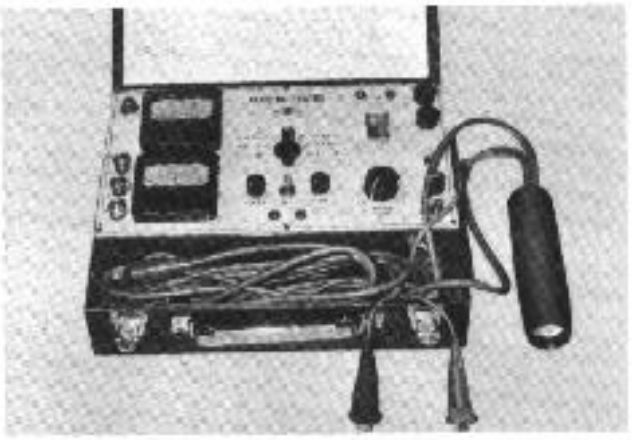


Fig. 2–2

2. Pocket tester (09900–25001)

   DC and AC voltage, DC current and its resistance can be measured with this handy electric circuit tester.

Fig. 2–3

3. Timing tester (09900–27002)

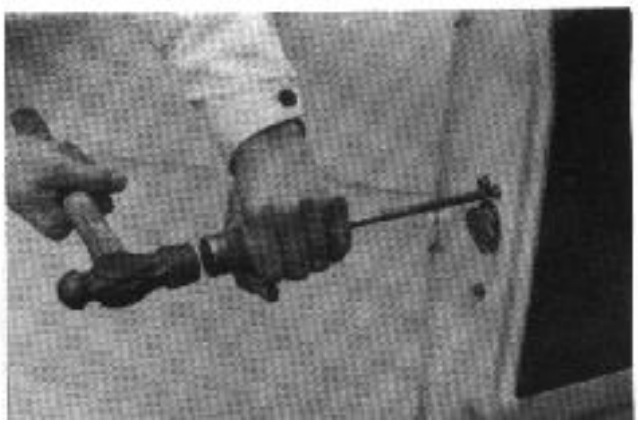
   This timing tester can be used to check the distributor contact points and adjust ignition timing correctly. Ignition can easily be timed with the variation of its buzzer sound.

Fig. 2–4

2–3. Use of Special Tool

1. Shock driver set (09900–09002)

   Used to loosen and tighten the closs head screw along with hammer.



2. Piston holder (09910–25110)

When overhauling the fan, armature and flywheel, this piston holder is placed under the piston skirt to lock crankshaft so that it will not turn.

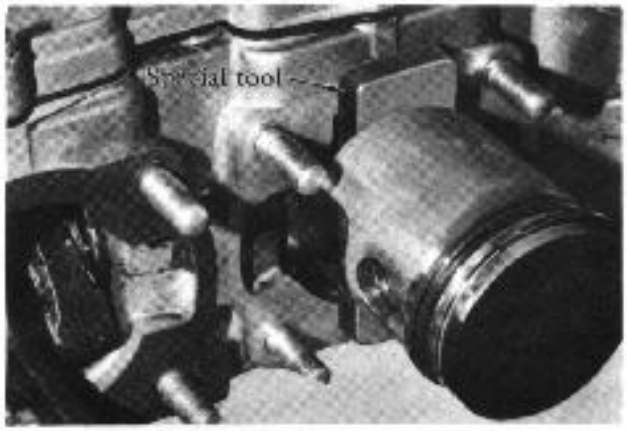


Fig. 2–6

3. Piston ring compressor (09911–06710)

To install cylinder over piston, use this tool to hug piston rings.

Fig. 2–7

4. Carburetor fuel level gauge (09913–16010)

To measure carburetor fuel level, install this tool to float chamber and measure fuel level during engine running.

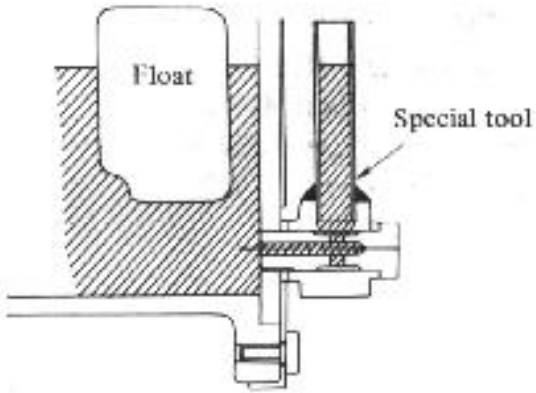


Fig. 2–8

5. Bearing Puller (09913–65131)

This special tool is used when removing the transmission bearings and other bearings, from the shaft. If the hook fails to hold the bearing race, slightly shift out the bearing so as to make a clearance to hook side part of outer race. Take care not to damage the end of the shaft.

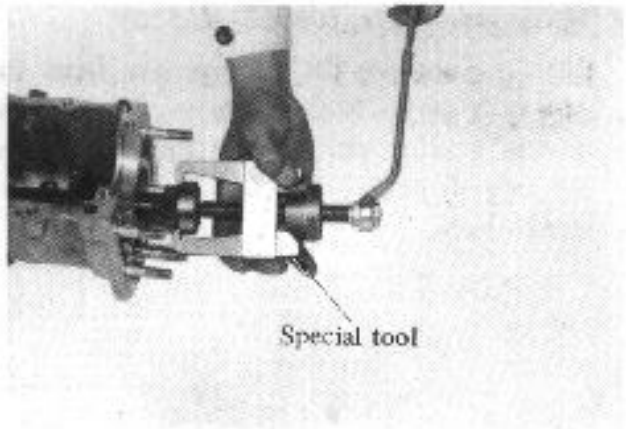


Fig. 2–9

6. Ball joint puller (09913–65210)

Used for disconnecting the taper fitting between the front suspension arm and ball-stud. This tool should be used in the same manner as the tie-rod end puller.

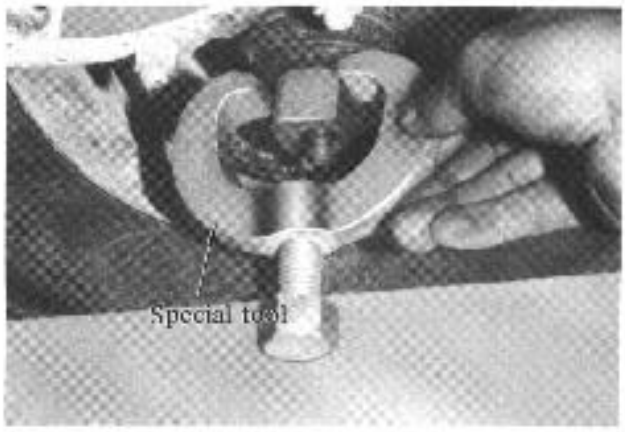


Fig. 2–10

7. Tie-rod end puller (09913–65220)

Use to separate the tie rod ball stud from the intermediate arm or nuckle-arm.

When using this tool, compress rubber boot. If not compressed, the boot may be damaged. On the other hand, when the taper fitting too tight, tap the intermediate arm or knuckle arm with a hammer. They can be easily separated.

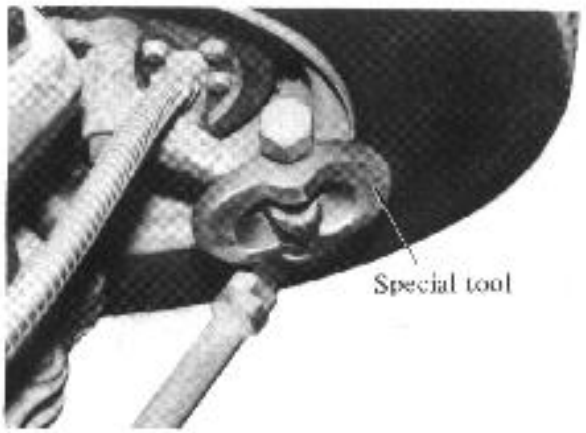


Fig. 2–11

8. Drag link end puller (09913–65230)

Used for disconnecting the taper fitting between ball-stud and pitman arm or intermediate arm. This tool should be used in the same manner as the tie-rod end puller.

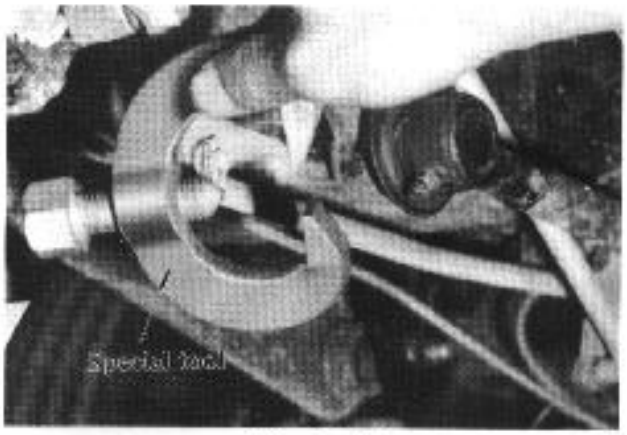


Fig. 2–12

9. Pitman arm puller (09913–65520)

Used to remove the pitman arm from the steering gear box shaft. It should be used in the same manner as the bearing puller. To prevent the puller from slipping off position, be sure to fully tighten the hook holder bolt.

Fig. 2–13

10. Crankshaft bearing puller (09913–65810)

To remove the crankshaft bearings, follow the procedures described below:

1) Drive out the bearing by use of a flat chiesel and make a clearance in between the crank wheel and the bearing outer race.
2) Insert claws of this puller into the clearance, and pull the bearings out.

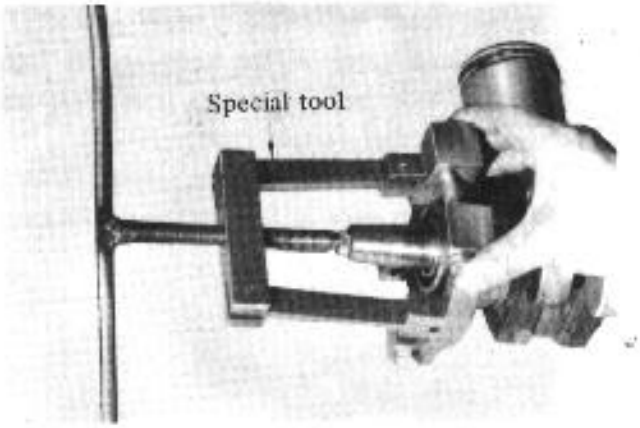


Fig. 2–14

11. Drive pinion front bearing outer-race installer (09913–76010)

When press-fitting the front bearing outer-race into the differential carrier, this tool should be used.
Make sure that the bearing is snugly press-fitted in, otherwise, noise or fast wear will result.

Fig. 2–15

12. Drive pinion bearing inner-race installer (09913–80111)

Used to press-fit the front and rear bearing inner race in the same manner as in the case of outer race press-fitting.

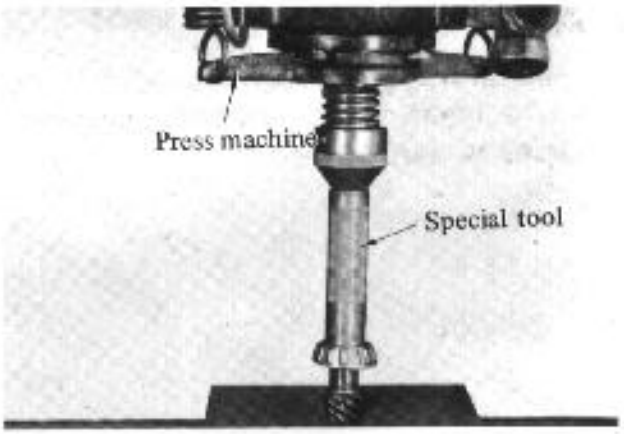


Fig. 2–16

13. Drive pinion rear bearing outer-race installer (09913–85210)

This tool is used in the manner same as the front bearing outer-race installer.

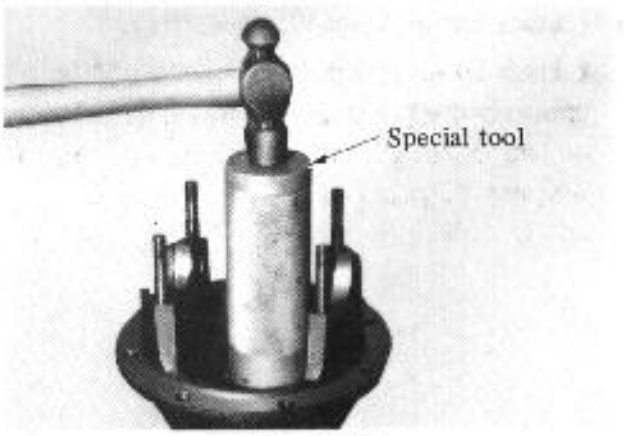


Fig. 2–17

14. Differential side bearing installing jig (09913–85220)

This special tool is for keeping the balance of differential side bearing when it is press-fitted into the boss of the differential case.

To perform this operation, insert this jig into the bearing inner-race and insert it in the case, then force it in with a press.

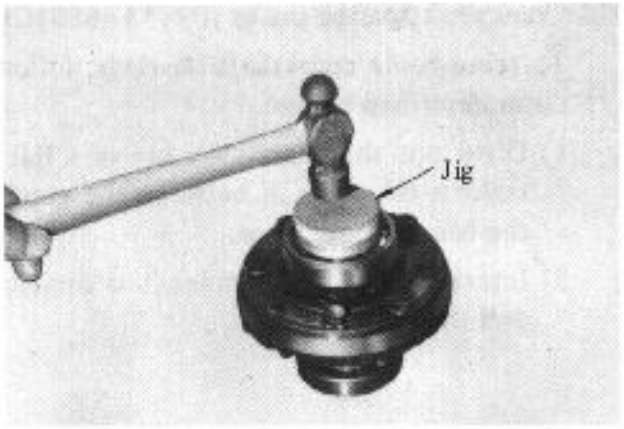


Fig. 2–18

15. Differential side bearing removing jig (09913–85230)

As mentioned earlier, the bearing puller is used for the removal of differential side bearings, but the puller is not allowed to be forced directly against the differential case. For this reason, the jig is placed on the differential case.

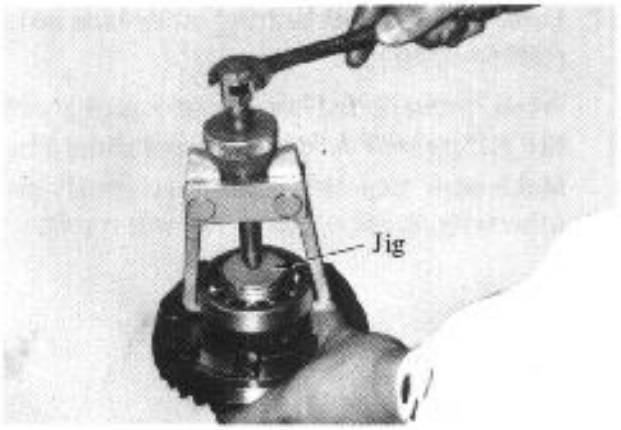


Fig. 2–19

16. Differential bearing installer (09913–95210)

This tool is used for fitting the outer-races of drive bevel pinion front and rear bearings as well as differential side bearing.

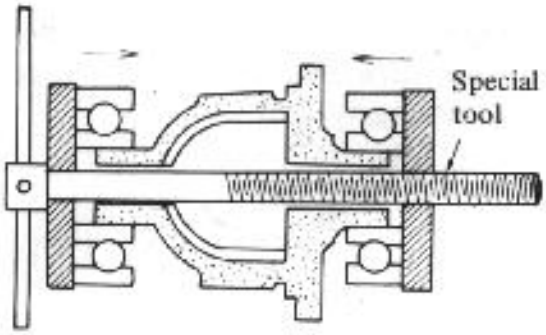


Fig. 2–20

17. Armature remover (09914–15211)

After locking the crankshaft with the piston holder, this remover is used to remove the armature.

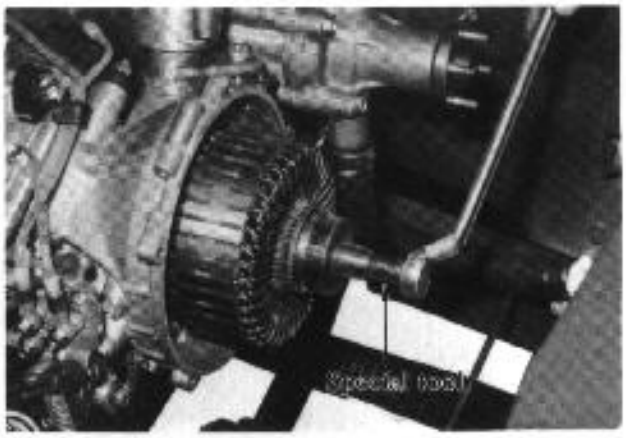


Fig. 2–21

18. Pulley remover (09914–15221)

Used in the same manner that the armature remover is used.

Fig. 2–22

19. Clutch shaft bearing retainer remover (09920–31110)

To remove the clutch shaft bearing retainer, screw special tools in each 6 mm thread of the retainer.

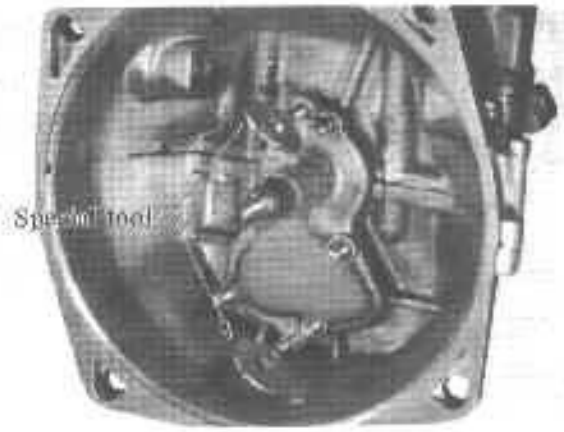


Fig. 2–23

20. Clutch release shaft bush remover (09922–45810)

This remover is used to remove the clutch release shaft bushing press-fitted in the clutch housing.

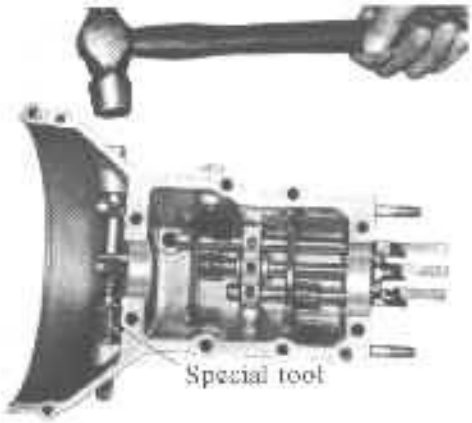


Fig. 2–24

21. Countershaft remover (09922–55130)

Place this remover on the outer race of countershaft bearings, and drive it out with a hammer. The work should be done after removing the main shaft.

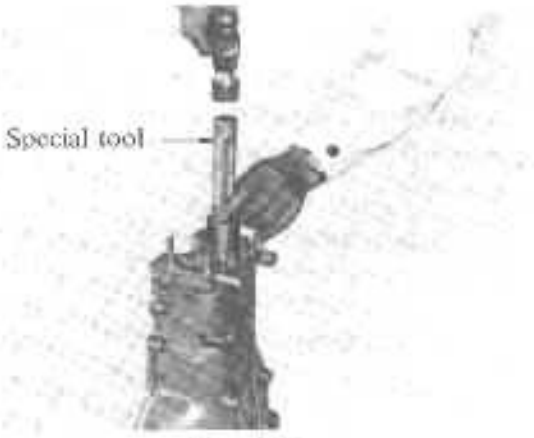


Fig. 2–25

22. Rear Axle remover (09922–66010)

This special tool is used for pulling out the rear axle and this time sliding hammer should be used.

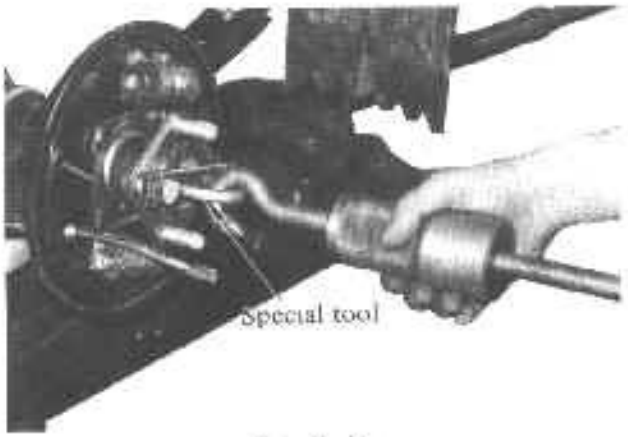


Fig. 2–26

23. Differential pre-load adjusting tool (09922–75220)

Used for measuring the starting torque of drive bevel pinion shaft and also for the removal of the cross joint york fitting nut.

Fig. 2–27

24. Bevel pinion adjusting tool (09922–76010)

Used to adjust the backlash between the drive bevel pinion and bevel gear. Further details on adjustments, refer to this service manual. (Page 127)

Fig. 2–28

25. Spring pin remover (09922–85811)

This tool is used to remove the fitting pin out of the gear shifting fork.

Place this remover over the pin, and drive it out with a hammer.

Take care not to damage other parts.

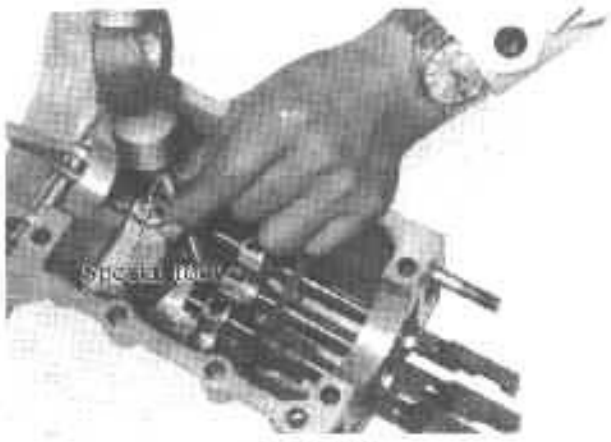


Fig. 2–29

26. Flywheel remover (09923–05110)

Flywheel can be removed by the use of flywheel remover and two bolts at the same time.
For using these tools, two bolts having a 6 mm thread dia, and a 50 mm length are required. When removing the flywheel, lock the crankshaft.

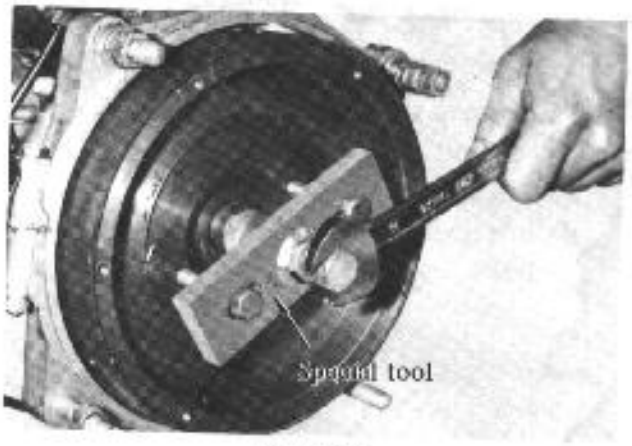


Fig. 2–30

27. Flywheel nut wrench (09923–15110)

This wrench is used to remove and tighten the flywheel fitting nut. Before using this tool, lock the crankshaft with the piston holder.

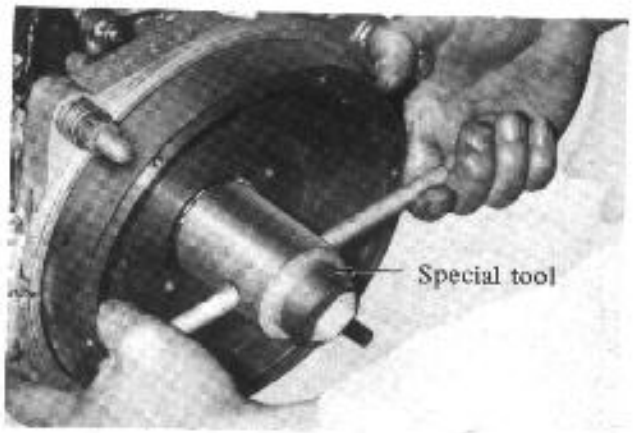


Fig. 2–31

28. Clutch disc center guide (09923–35110)

When tightening the clutch cover, make sure that the clutch disc is positioned correctly in the center of the crankshaft otherwise, transmission input shaft can not be inserted into the crankshaft. To keep the clutch in position, use this center guide.

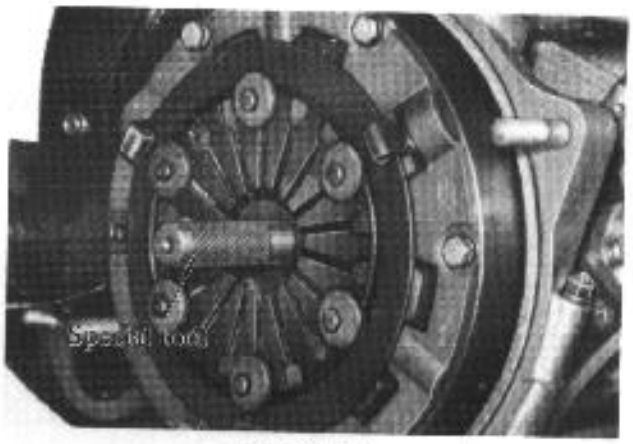


Fig. 2–32

29. Sliding hammer (09942–15510)

How to use this tool, refer to rear axle remover of No. 22.

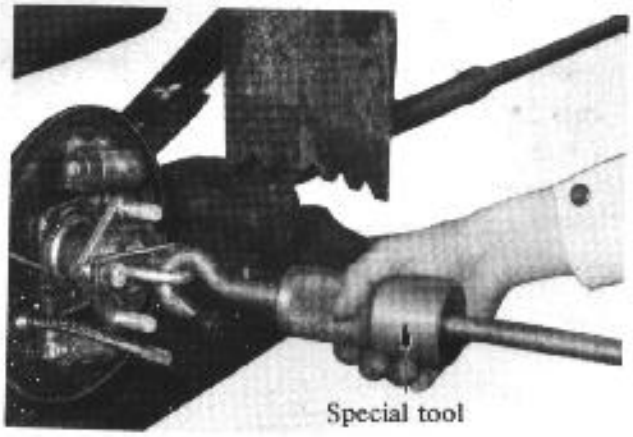


Fig. 2–33

30. Brake drum remover (09942–25210)

Used to remove the front brake drum.

1. Remove the front axle cap.
2. Pull out the axle nut cotter pin.
3. Take out the axle nut.
4. Install the two holding nuts onto the wheel hub bolts, and remove the drum.

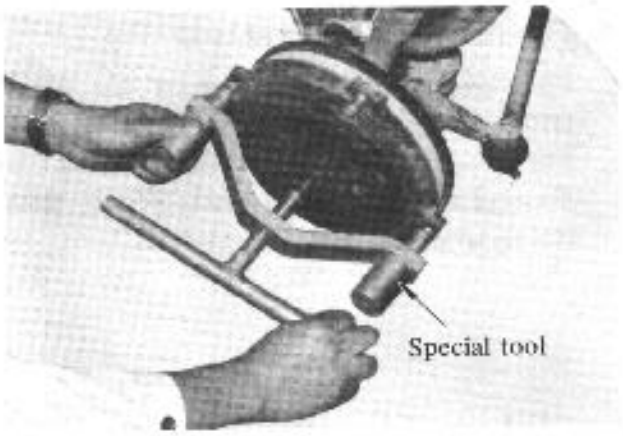


Fig. 2–34

31. Front coil spring tool (09943–25810)

To remove and install fork coil spring, shorten the coil spring with this tool.

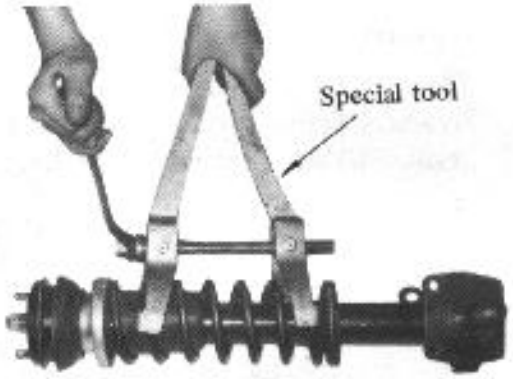


Fig. 2–35

32. Axle shaft puller (09922–55210)

When installing the front axle shaft to steering knuckle, pull the axle shaft inward by using this tool.

Fig. 2–36

33. Transfer input shaft puller (09922–65122)

To remove the transfer input shaft, use this tool.

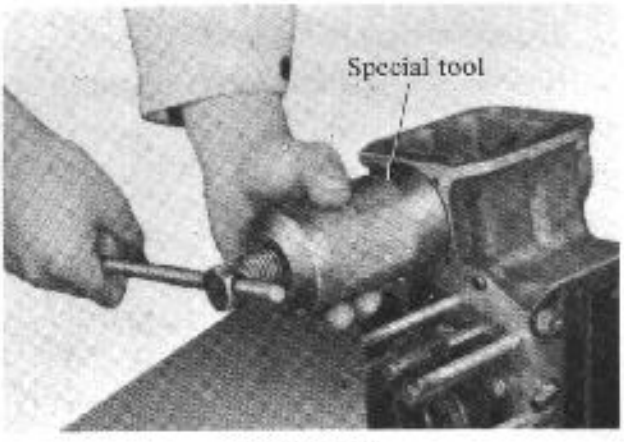


Fig. 2–37

3–1. General

The engine used for these models is a 2-stroke, 2-cylinder, water-cooled engine, and a reed valve is provided in mixture intake system. In order to characterize the engine by its easy operation and durability under severe operating condition considering the intended use of the vehicle, the engine is designed to be powerful at medium and low speed range and cooling capacity has been improved by adoption of water-cooled system, and consequently the high speed durability has also been secured.
In addition to these features, newly provided SRIS (Suzuki Recycle Injection System), which sucks up engine oil collected at the bottom of crankcase through scavenging port, contributes to reduce white smoke in exhaust liable to occur when engine is cold.

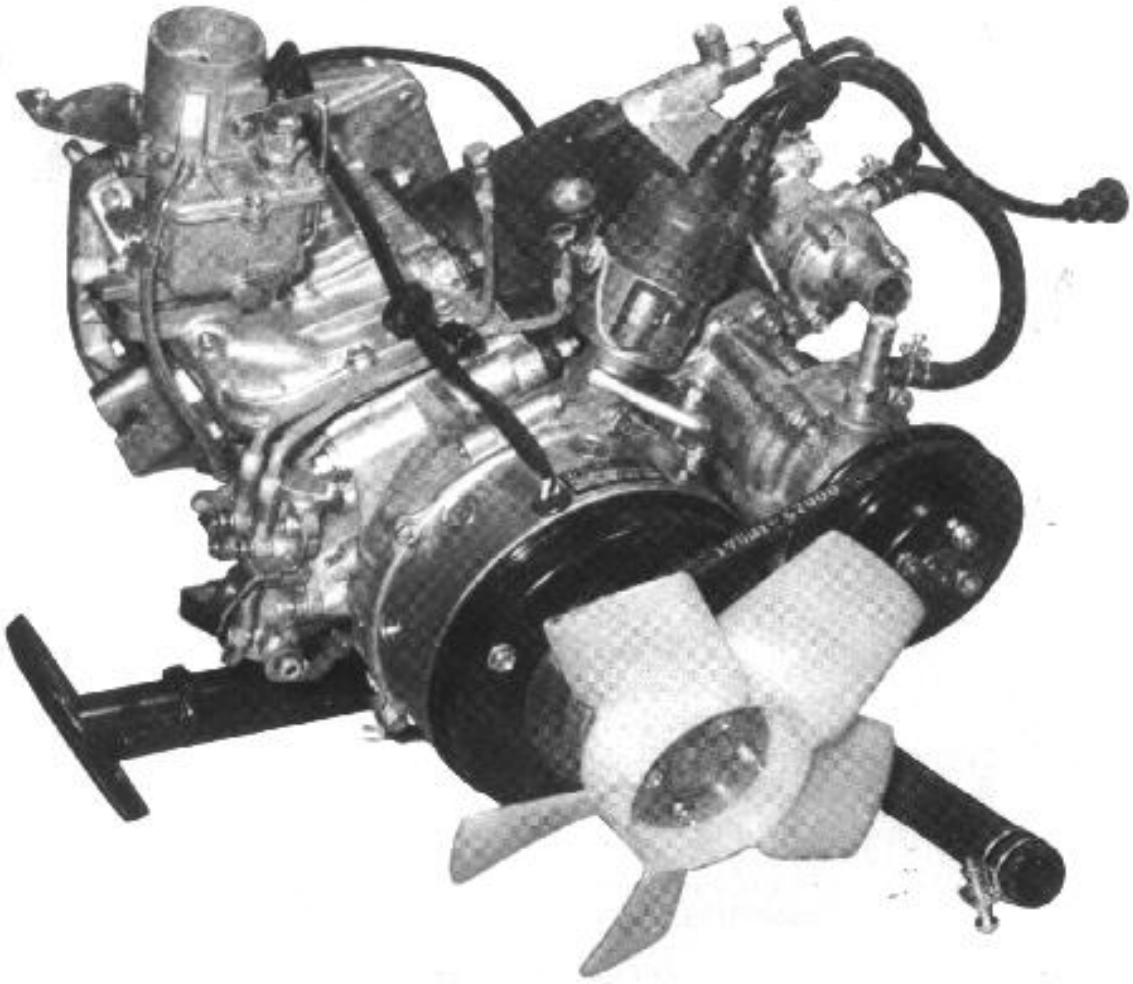


Fig. 3–1

3–2. Carburetor

3–2–1. Specifications

Item \ Models	LJ20, LJ20V	L50, L51, L50V
Venturi Diameter	25 mm (0.984 in)	24 mm (0.945 in)
Main Jet	# 123	# 117.5
Main Air Jet	# 140	# 150
Slow Jet	# 51	# 57.5
Slow Air Jet	# 140	# 1.1 ϕ
Idle Adjusting Screw	1-7/8 Turns back	1-1/2 Turns back
Starter Jet	Choke type	#130 (Up to I NO. L50-146811 L50V-707597), #110
Power Jet	# 50	Valve type

3–2–2. Function and construction

1. Float chamber

The float chamber keeps a constant level of fuel pressure-fed from the fuel pump. The fuel from the fuel pump is carried to the float chamber through the fuel strainer and float needle valve, and the float moves up and down, thereby closing and opening the needle valve.

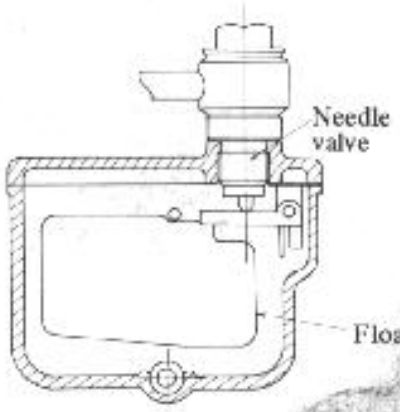


Fig. 3–2

2. Slow speed mixture

The fuel from the float chamber flows upward, and metered by the slow jet. The metered fuel is mixed with the air streaming through the slow air jet and atomized. The atomized fuel-air mixture is sprayed through the by-pass holes and pilot outlet hole located near the throttle valve.
While the engine idles, the fuel-air mixture is sprayed through the pilot outlet, and its quantity is adjusted by the idle adjusting screw. Turning in the adjusting screw decreases the quantity of air-fuel mixture.

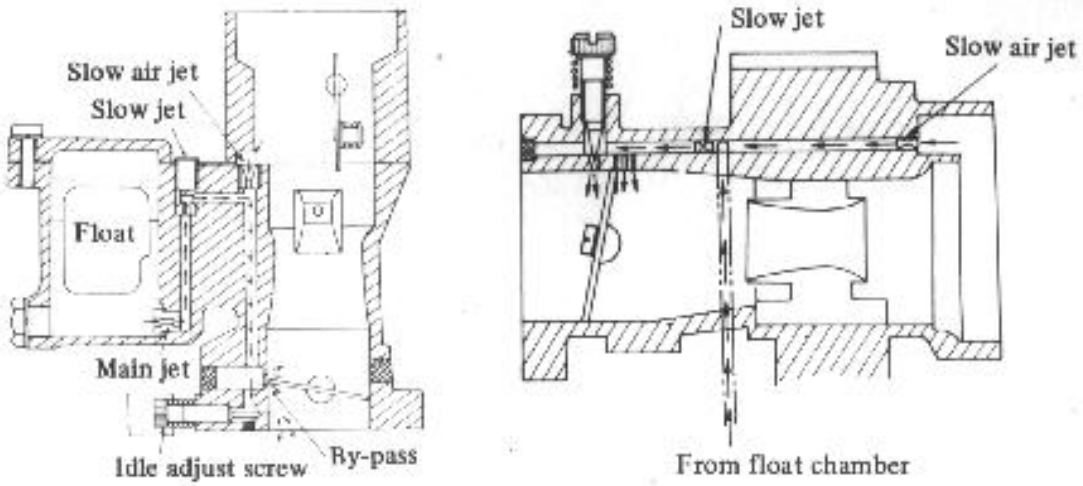
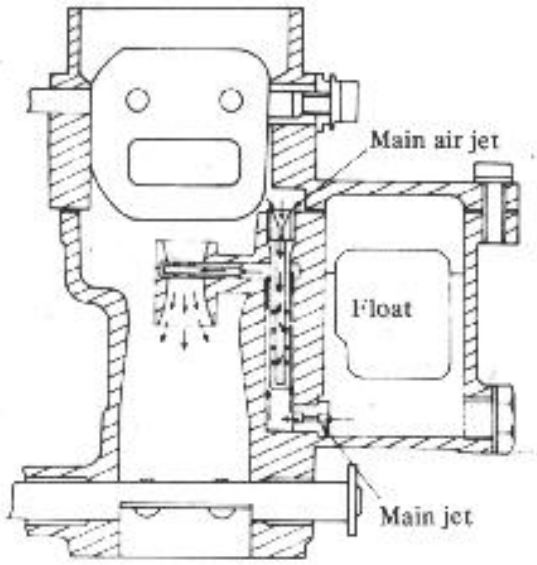


Fig. 3–3

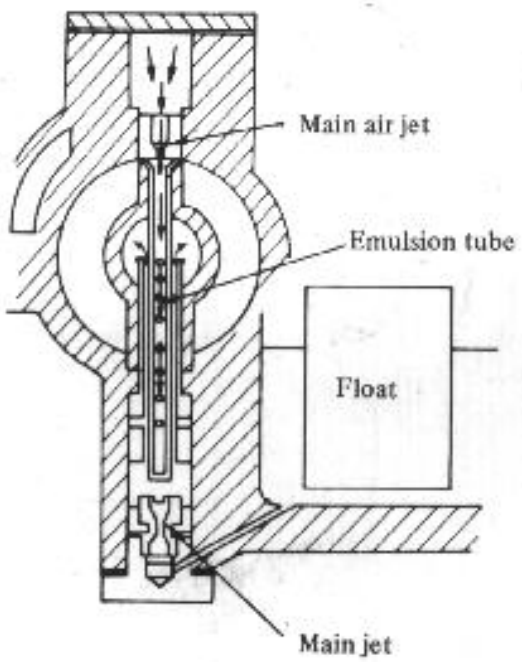
3. High speed mixture

The fuel from the float chamber is metered by the main jet and mixed with the air stream from the main air jet, then being atomized in the emulsion tube. The atomized fuel-air mixture is sprayed into the venturi through the nozzle.

The carburetor consists of these system, and carburetion is performed through a well-coordinated combination of various components. Carburetor failures should be corrected as follows: If slow speed or idle speed performance is poor, check the slow speed circuit. If high speed performance is poor, check the main jet circuit. In most cases, carburetor failures result from clogged jets. Disassemble the carburetor and blow it with compressed air so that dust or dirt will be removed.



LJ20, LJ20V



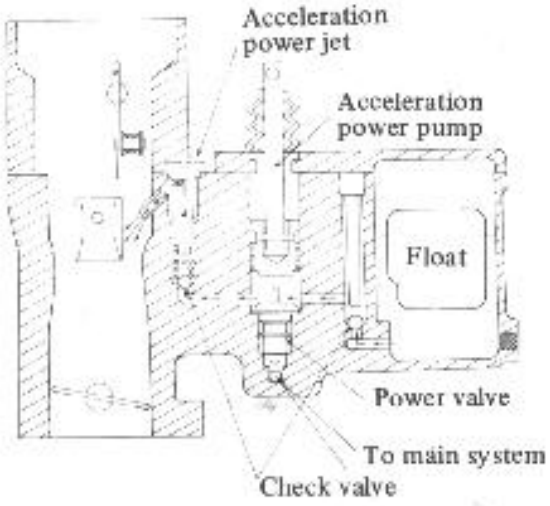
L50, L51, L50V

Fig. 3–4

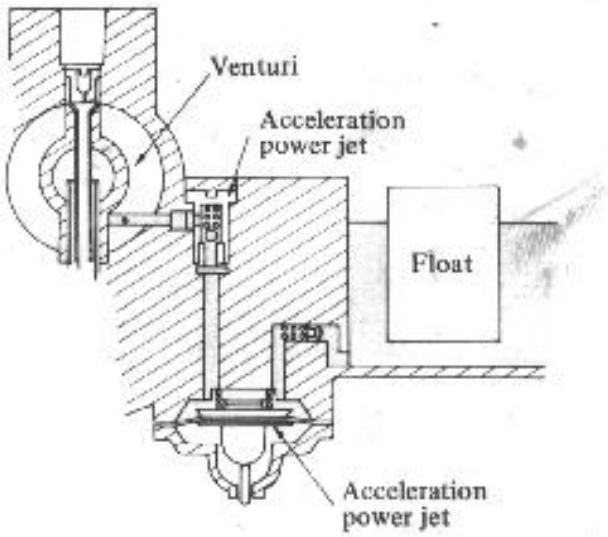
4. Acceleration power system

In order to compensate the short fuel supply when the throttle valve is opened by sudden depression of the accelerator pedal during low speed running, acceleration pump functions to supply required quantity of fuel.

The throttle lever is connected to the acceleration pump lever. When the depressions of the accelerator pedal opens the throttle value by half or more, the pump lever opens the check valve and fuel in the acceleration pump is injected into the main bore through the injector nozzles. Power valve system supplies rich mixture to compensate the shortage in fuel flow through the main jet when the maximum power is required under full load. To perform this function, further depression of the accelerator pedal opens the throttle valve, and acceleration pump piston presses the power valve to open allowing more fuel to be discharged into the main bore at main nozzle through the main metering system.



LJ20, LJ20V



L50, L51, L50V

Fig. 3–5

5. Starting System and Auto Dilution Mechanism (For L50, L51, L50V)

1) Starting system

Starting system is used only in starting engine. In addition to the slow and main metering system, it can further provide a rich mixture independently which is required in starting and warming up engine especially in cold climate. Its function is to mix, in starter valve, the fuel metered by the jet in float chamber with air taken through air passage on top of the carburetor and deliver the mixture through mixture passage into inlet manifold. Fuel delivery port of starter valve assumes a widest opening position when the starter knob is pulled to its extreme position and with rich mixture being supplied, and the discharge port becomes smaller at its half pulled position providing a leaner mixture accordingly.

2) Auto dilution mechanism in starting system

To prevent spark plugs from being fouled while starter is operative, an air valve is built in starting system to obtain an optimum air-fuel ratio during engine idling.

Since a trouble may result from rich mixture due to the use of the starter, an air valve is operated by vacuum of an intake manifold of the engine, which is located in starting circuit as shown in Fig. 3–7 and a rubber hose connected to the carburetor supplies ambient air to the starter passage, thus diluting the mixture.

The opening area of air valve increases as the vacuum of engine intake manifold due to higher engine speed increases, and consequently more air is fed in. Thus, the mixture is kept at an optimum even if the starter knob fails to return.

However, it is better to drive with starter knob in the original position under normal conditions.

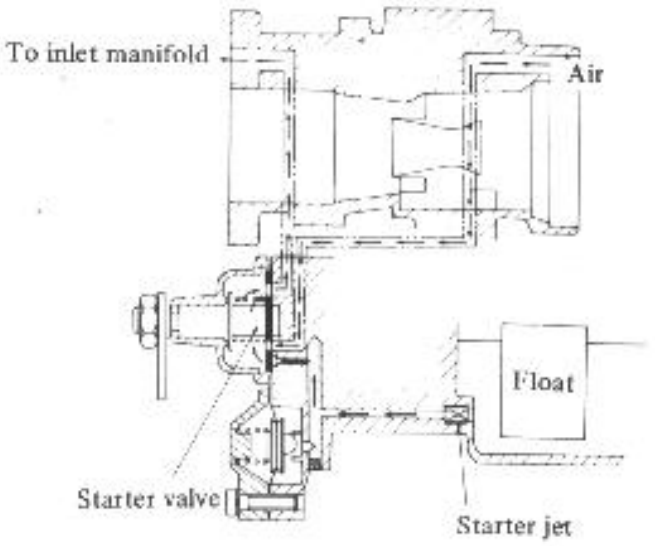


Fig. 3–6

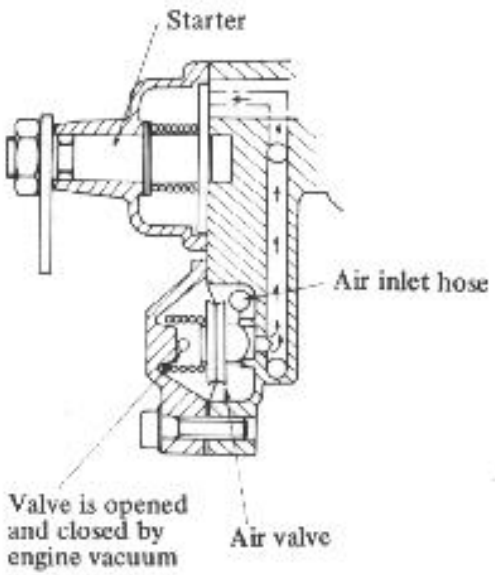


Fig. 3–7

3–2–3. Inspecting and adjusting

1. Inspecting jets

Mainly inspect jets for clogging. Wash them with gasoline, and blow them with compressed air. In most cases, poor slow speed performance is due to a clogged slow jet. On the other hand, poor acceleration and high speed performance often result from a clogged main air jet or main jet.

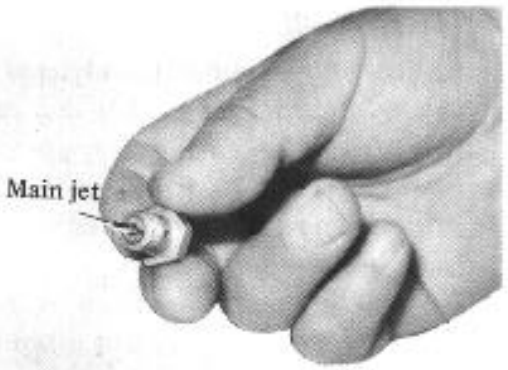


Fig. 3–8

2. Inspecting the needle valve

As shown in the Fig. 3–9, the needle valve is pushed up to close the valve. Any worn needle valve causes fuel overflow or sharp fluctuations in the fuel level. Replace it. Any dust on the needle valve also results in poor performance. Remove the valve, and wash it.

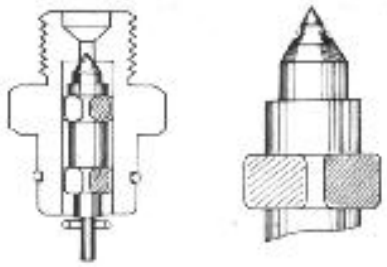


Fig. 3–9

3. Measurement and adjustment of fuel level

Install carburetor fuel level measuring tool (special tool 09913–16010) to float chamber, and measure fuel level during engine running at approx. 950 rpm. Normal fuel level is as specified below from the center of banjo bolt.

Fuel level can be adjusted after disassembly of float chamber, by bending upward or downward the adjusting tongue, which is in contact with needle valve, attached to float.

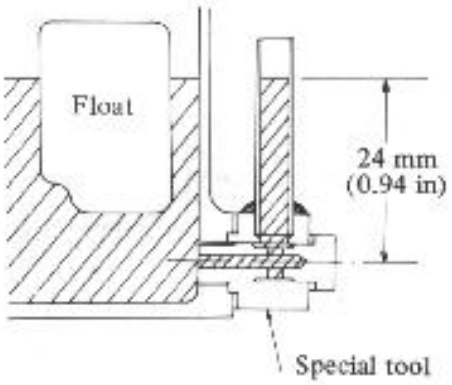


Fig. 3–10

Fuel Level	LJ20, LJ20V	L50, L51, L50V
	24 mm (0.94 in)	16 mm (0.63 in)

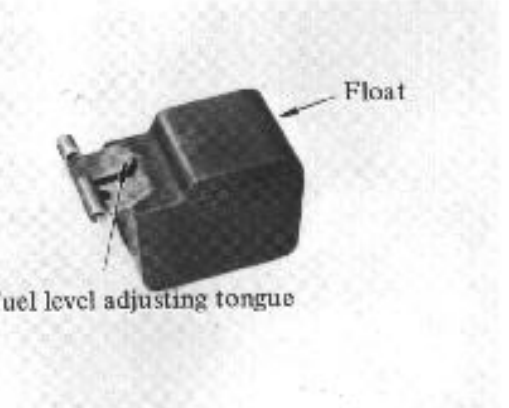


Fig. 3–11

4. Idle speed adjustment

Engine idling should be adjusted after warming up engine to about 80°C (176°F), and make sure that the starter knob is back completely to normal position.

Adjust engine speed to about 950 rpm by turning the throttle stop screw.

Since idling adjusting screw is pre-set to a proper mixture level, re-adjustment is not required.

Fig. 3–12

3–3. Fuel Pump

The fuel pump is of the diaphragm type, and the fuel is fed by pressure variations in the crank chamber which is phenomenon peculiar to 2-cycle engines. This pump has simple construction, featuring trouble-free operation.

Item	Specifications
Discharge Pressure	0.20–0.30 kg/cm^2 (2.8–4.3 lb/in^2)
Suction Capacity	200 mm Hg (7.87 in Hg)
Discharge Quantity	More than 0.5 ltr (1.1/0.9 US/Imp. pt) per minute at 6,000 rpm

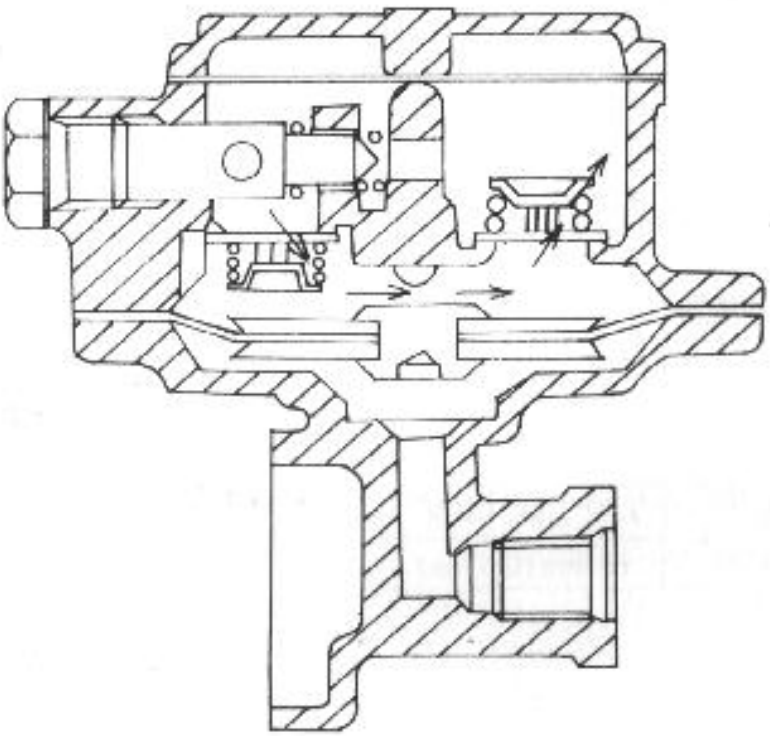


Fig. 3–13

3–3–1. Disassembling and reassembling

The bolt holes in the diaphragm are of the same size and arranged at even intervals of distance. When disassembling the fuel pump, be sure to put the match marks on the mating components so that they can be correctly assembled. Incorrect assembling may cause faulty fuel line connection.

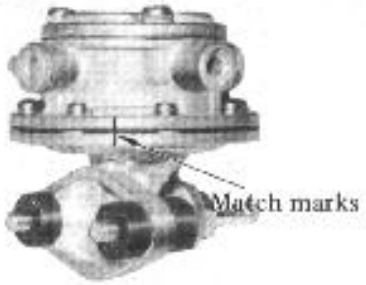


Fig. 3–14

The valve complete is constructed not to be disassembled. If the valve is installed in a wrong direction, the pump will be inoperative. Make sure that the pump is assembled as in the Fig. 3 15.

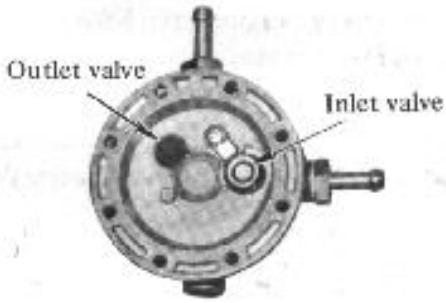


Fig. 3–15

Make sure that the diaphragm is installed not upside down.

Fig. 3–16

3–3–2. Inspecting

In case of fuel leak at fuel pump or air leak into fuel line, check the following items:

1. Broken diaphragm
2. Malfunction of check valve
3. Loose screws on fuel pump

3–3–3. Fuel hose

To ensure the safety, fuel hose should be replaced periodically. The hose from fuel tank to carburetor should be replaced every two years in spite of its condition.

Replacement of Fuel Hose	Every two years

3–4. Air Cleaner

3–4–1. Inspecting and servicing

1. Warm air selector

   Change warm air selector valve attached to air intake port of air cleaner from winter to summer position and vice versa according to the atmospheric temperature being higher or lower than 20°C (68°F). Particular attention should be paid not to set warm air selector valve at summer position at temperature lower than 20°C (68°F), otherwise engine trouble such as rough idling or bad acceleration will result.

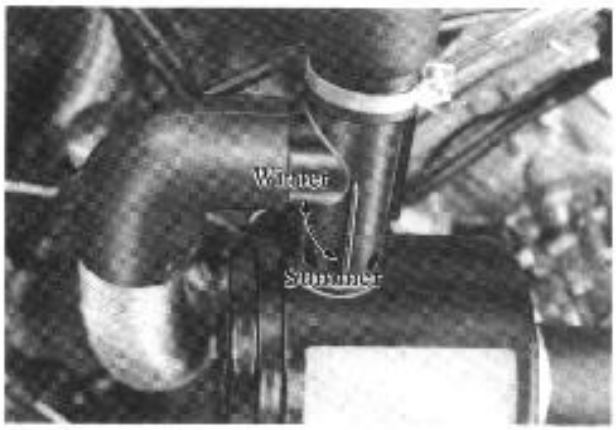


Fig. 3–17

2. Air Cleaner Element

   Clogging in the air-cleaner results in excessive exhaust smoke, excessive fuel consumption, and poor acceleration, adversely affecting the performance and service life of the engine. Clean the air cleaner element with compressed air or wash it with a neutral detergent and throughly dry it up.

Cleaning of Element	Every 2,000 km (1,250 mile)
Replacement of Element	Every 10,000 km (6,000 mile)

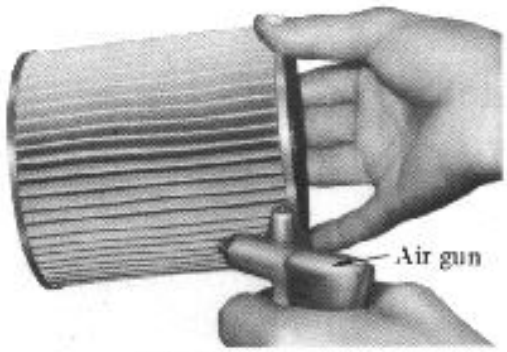


Fig. 3–18

3–5. Fuel Filter

The fuel filter is of the cartridge type (can not be disassembled). This type of fuel filter is superior in filtering efficiency, not requiring frequent inspection or cleaning work.

* Remember that this filter has its intake on the bottom and outlet on the upper part of the body.

Replacement of Fuel Filter	Every 40,000 km (25,000 mile)

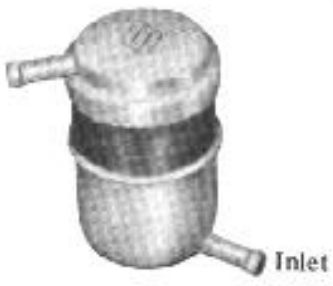


Fig. 3–19

3–6. Reed Valve

The reed valve is as shown in the Fig. 3–20, and installed between the inlet manifold and crank case to prevent the reverse flow of the fuel-air-mixture, thereby improving intake efficiency. Therefore, as compared with the piston valve type, the engine displays steady performance throughout the entire speed range from low to high. Torque at low speed is greatly improved.

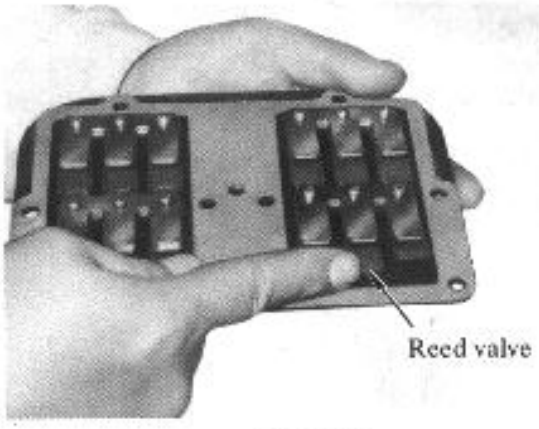


Fig. 3–20

3–6–1. Inspecting

The function of reed valve is to prevent blow-back of mixture at low engine speed, and consequently it has an important effect on the engine performance.
Whenever reed valve assembly is removed, check it for proper operation of each reed, and especially for tight contact of a reed with valve seat.

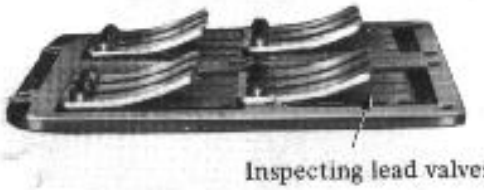


Fig. 3–21

3–6–2. Installing

1. When installing the reed valves, throughly remove the old gaskets. Be sure to always use new gaskets. When old gaskets are left over, the air will enter through the sealing surface, causing engine trouble.
2. Tighten the inlet manifold fitting nuts in the order as shown in the Fig. 3–22.
   Tightening torque is as follows:

Tightening Torque for Inlet Manifold Nut	60–100 kg-cm (4.3–7.2 lb-ft)

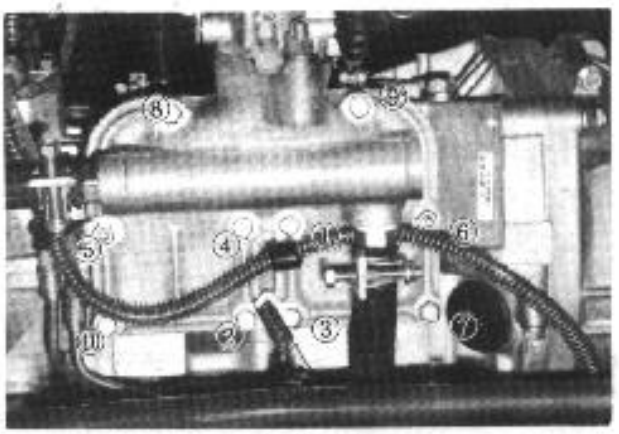


Fig. 3–22

3–7. Exhaust System

Exhaust system consists of exhaust manifold, exhaust flexible pipe, first and second mufflers. Particularly, the first muffler serves as a silencer and also an expansion chamber, and therefore, the condition of the first muffler greatly affects engine output. Make sure that the joints are not leaky.

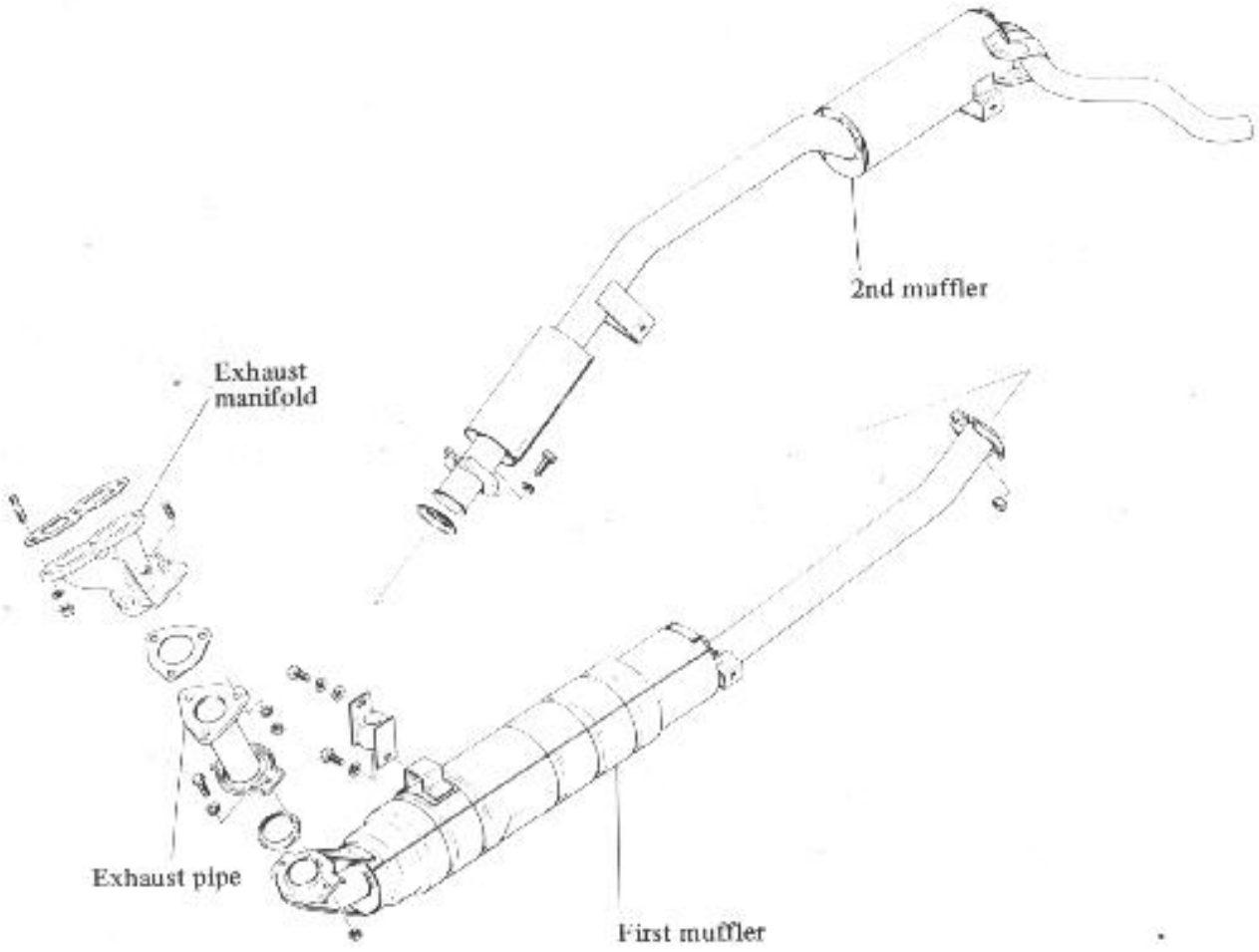


Fig. 3–23

3–7–1. Installing muffler

1. Install four muffler mountings to muffler temporarily. (elongated holes portion to chassis side.)
2. Connect exhaust pipe to manifold.
3. Install first and second mufflers to chassis temporarily.
4. Insert copper gaskets in each joint between exhaust pipe and first muffler, and between first muffler and second muffler, then tighten bolts loosely enough to allow adjustment of their relative position.
5. Adjust relative position by means of elongated holes on the mountings and joints, so that the mounting rubbers will not be deformed.
6. Tighten mountings and joints to specified torque.

3–7–2. Caution in installation of exhaust pipe

As exhaust pipe is bent, pay attention to its peripheral position in installing. Position exhaust pipe to mate with first muffler with placing the bent portion downward. (an erroneous installation of exhaust pipe will make the connection with first muffler impossible).

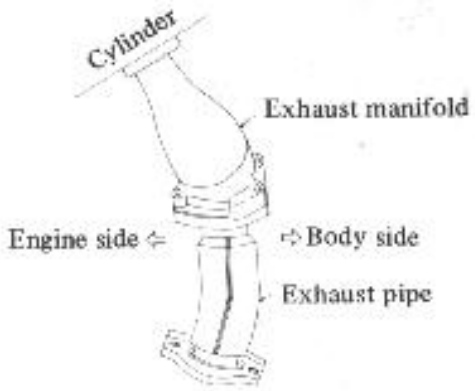


Fig. 3–24

3–7–3. Tightening procedure of joint

Joints between exhaust pipe and first muffler and second muffler are constructed so that a slight misalignment may be allowed, vibrations may be absorbed, and exhaust leak may be prevented. In tightening the joints, insert copper gaskets properly, tighten left and right bolt equally and gradually, and finally apply the torque specified below:

Exhaust Pipe and Muffler Joint Bolt Tightening Torque
100–120 kg-cm (7.3–8.6 lb-ft)

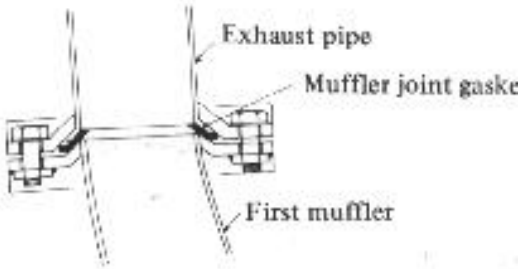


Fig. 3–25

3–8. Procedures of Engine Overhaul

When removing the engine from body and overhauling engine, conduct according to following procedures.

3–8–1. Removing engine from body

1. Disconnect two lead wires from battery.
2. Drain cooling water. (be sure heater valve is opened).
3. Disconnect air cleaner case and warm air hose.
4. Disconnect wires for choke, throttle, oil pump, and clutch.
5. Disconnect fuel hose, oil inlet pipe, and vacuum hose.
6. Disconnect starter generator wiring.
7. Disconnect wiring for thermostat, distributor, and horn.
8. Disconnect water hoses and heater hoses.
9. Remove radiator.
10. Disconnect exhaust pipe at manifold.
11. Remove front engine mounting bolts, L/H and R/H, after removing horn.
12. Remove nuts securing transmission and engine.
13. Disconnect engine from transmission by moving engine forward, then lift up and remove engine.

3–8–2. Disassembly of engine

1. Remove carburetor with inlet manifold.
2. Remove oil pump and SRIS pipes.
3. Remove distributor and high tension cords.
4. Remove cylinder head.
5. Remove exhaust manifold.
6. Remove cylinder with water pump attached.
7. Remove fan, pulley and belt. (use special tool).
8. Remove generator assembly and armature. (use special tool).
9. Remove clutch and flywheel. (use special tool).
10. Disassemble crankcase.

3–8–3. Tightening torque of engine parts

Item No.	Description	Tightening torque
1	Cylinder Head Bolts	400–500 kg-cm (28.9–36.1 lb-ft)
2	Cylinder Nuts	180–240 kg-cm (13.0–17.4 lb-ft)
3	Flywheel Nut	1,300–1,500 kg-cm (94.0–108.5 lb-ft)
4	Crankcase Fitting Bolts (10 ϕ)	200–300 kg-cm (14.5–21.7 lb-ft)
5	Crankcase Fitting Bolts (8 ϕ)	110–160 kg-cm (8.0–11.5 lb-ft)
6	Crankcase Fitting Bolts (6 ϕ)	60–100 kg-cm (4.4–7.2 lb-ft)
7	Transmission Case Fitting Nut	350–480 kg-cm (25.4–34.7 lb-ft)
8	Crankcase Pulley Fitting Bolt	350–480 kg-cm (25.4–34.7 lb-ft)
9	Cylinder Nozzles	150–180 kg-cm (10.8–13.0 lb-ft)
10	Oil Pump Union Bolts	45–50 kg-cm (3.3–3.6 lb-ft)

3–9. Cylinder Head

3–9–1. Removing and installing

1. Loosen cylinder head set bolts in reverse order of numbers indicated as shown in the Fig. 3–26 gradually to prevent cylinder head from being distorted. In installing cylinder head, tighten the bolts in order of numbers in the figure, and tighten finally to torque below:

Tightening Torque of Cylinder Head Nut	400–500 kg-cm (28.9–36.1 lb-ft)

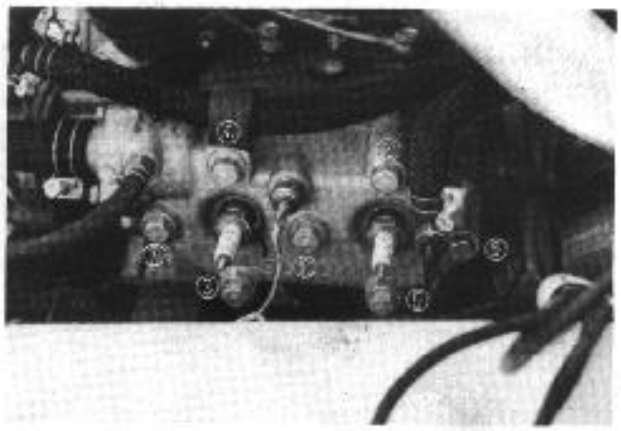


Fig. 3–26

2. Cylinder head can be removed by tapping the sides of head lightly with a wooden hammer. If you failed to remove by this procedure, remove cylinder stud bolt, and then give a blow to the sides with a wooden hammer.

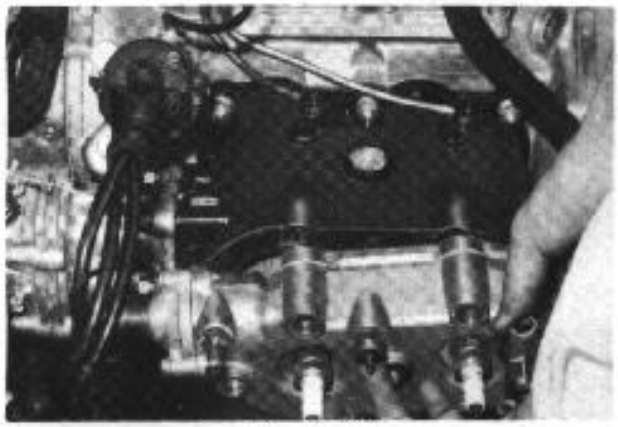


Fig. 3–27

3–9–2. Inspecting and servicing

1. Remove carbon from combustion chamber, and clean.
2. Remove water scale from water jacket.
3. Inspection of cylinder head gasket surface for warp.

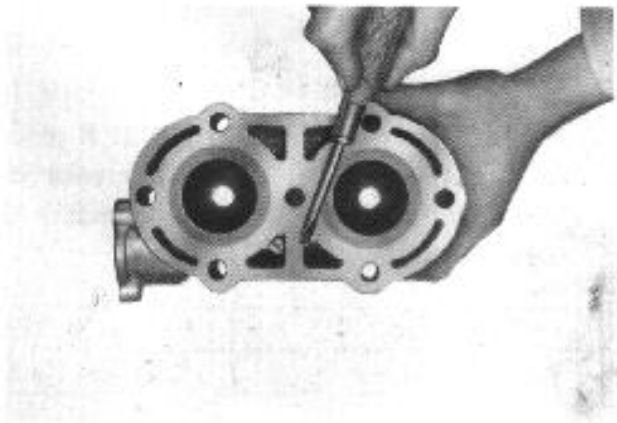
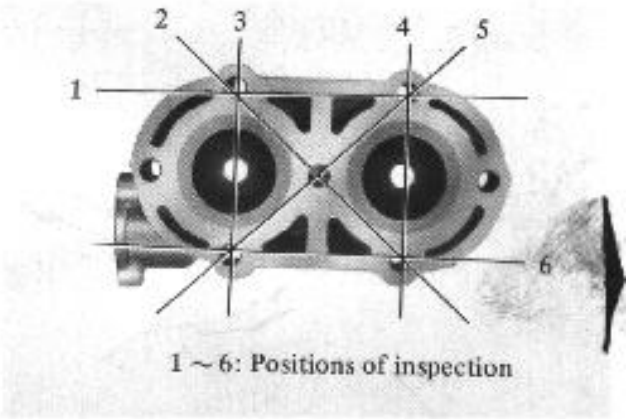


Fig. 3–28

Inspect cylinder head for flatness using a straight edge and a feeler gage at six points indicated as shown in the Fig. 3–29.

If warp exceeds 0.03 mm (0.012 in), the cylinder head must be corrected by lapping on a surface plate with No. 200 abrasive paper and finishing with No. 400 abrasive paper. Replace cylinder head where the gasket surface is so warped that grinding by 0.15 mm (0.006 in) or more is required to correct the warp. Excessive grinding affects the compression ratio and may result in deterioration of engine performance.

Limit of Cylinder Head Warp	Over 0.03 mm (0.012 in)



1 ~ 6: Positions of inspection

Fig. 3–29

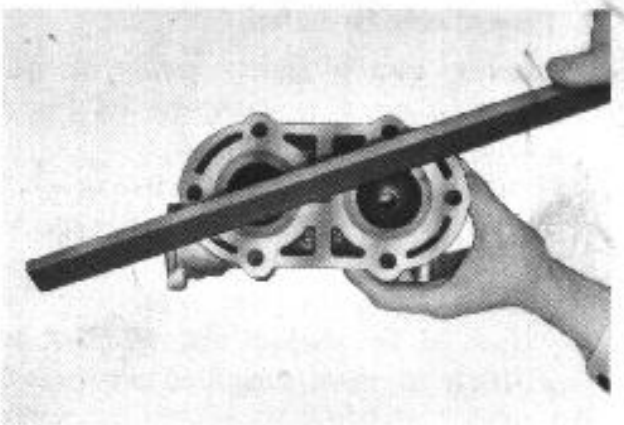


Fig. 3–30

3–10. Cylinder

3–10–1. Removing

After removing two cylinder nozzles and loosening cylinder tightening nuts diagonally remove cylinder.

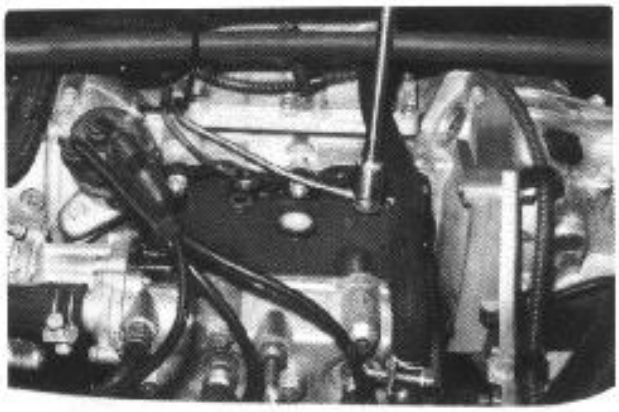


Fig. 3–31

3–10–2. Servicing

1. Remove carbon from exhaust port.

Carbon Must Be Removed	Every 5,000–10,000 km (3,000–6,000 mile)

2. Remove scale deposited on inside of the water jacket.

3–10–3. Inspecting

1. Measuring cylinder wear

   Measure the cylinder diameter at 8 places as shown in the Fig. 3–32. The difference between the maximum and the minimum diameters is considered to be the amount of wear.

Cylinder Bore	61 mm (2.40 in)
Wear Allowance	0.05 mm (0.002 in)

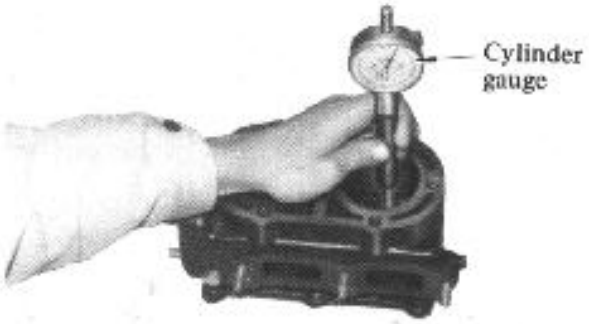


Fig. 3–32

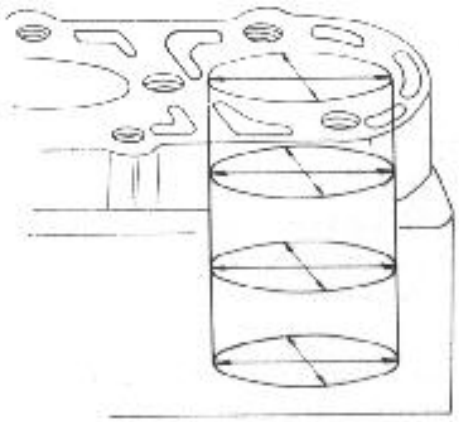
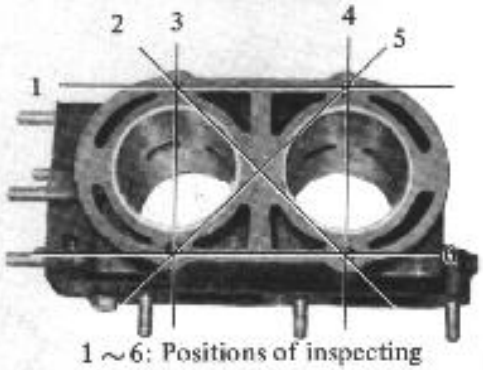


Fig. 3–33

2. Warp of cylinder surface

   Measure warp of gasket surface of cylinder at six points indicated as shown in the Fig. 3–34, using a straight edge and a feeler gage.

   If warp exceeds 0.03 mm (0.006 in), the cylinder must be corrected by lapping on a surface plate with No. 200 abrasive paper and finishing with No. 400 abrasive paper. Replace cylinder where the gasket surface is so warped that grinding by 0.15 mm (0.012 in) or more is required to correct the warp.



1 ~ 6: Positions of inspecting

Fig. 3–34

3-10-4. Installing

To install cylinder on the piston, use a piston ring compressor (09911-06710), and start with 2nd piston and then procede to 1st piston.

Cylinder Nuts Tightening Torque	180-240 kg-cm (13.0-17.3 lb-ft)

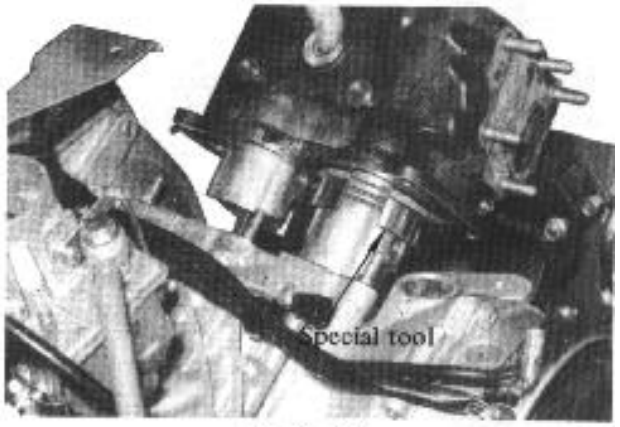


Fig. 3-35

3-11. Piston Rings

3-11-1. Inspecting

Worn piston rings due to long service cause decrease in engine output. Place a piston ring in cylinder, and measure the ring end gap with a feeler gage. If gap exceeds the limit, replace the ring with new one.

	Original	Limit
Piston Ring End Gap	0.3mm(0.012 in)	0.7mm(0.027 in)

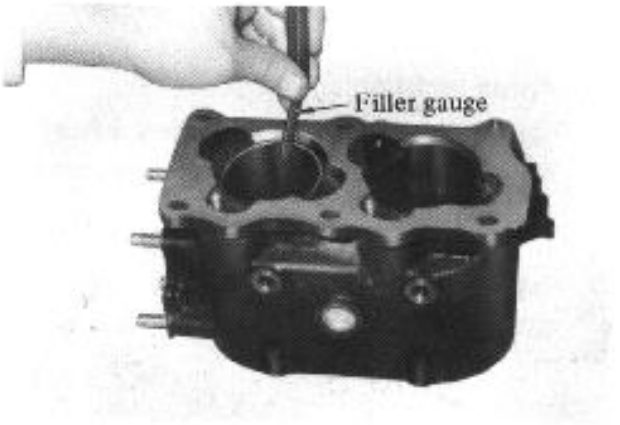


Fig. 3-36

3-11-2. Installing

Since keystone type ring is used as a top ring and flat rings are used as 2nd and 3rd ring, these rings are not interchangeable with top ring. Install piston rings on piston with T marked side of piston ring toward piston top.

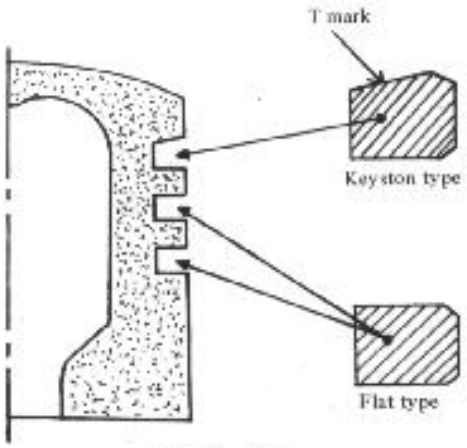


Fig. 3-37

3–12. Piston

Note that pistons for these models are not interchangeable with pistons for LJ10 and L40 Series of previous models. Pistons can be identified by shape of cut-off portion on piston skirt for scavenging.

Fig. 3–38

3–12–1. Inspecting

1. Piston surface

Check the piston for scratches, seizing-up, burns and ring sticks. If the scratch is slight, repair, and if deep, replace the piston.
If "blow-by" is excessive, the piston rings may be faulty, or the piston-to-cylinder clearance is too large, or the lubrication system may be defective.

Fig. 3–39

2. Piston clearance

The amount of the piston clearance greatly affects the engine performance as in the case of the piston ring condition. Measure the clearance at the skirt as shown in the Fig. 3–40. When it is necessary to measure it more accurately, measure the cylinder inside diameter by a cylinder gauge, and the piston outside diameter with a micrometer as shown in the Fig. 3–41. Place the micrometer at right angles to the piston pin and 38 mm (1.49 in) above the bottom edge of its skirt.

Piston Clearance	0.09–0.10 mm (0.035–0.0039 in)
Piston Outside Diameter	65.910–65.935 mm (2.5948–2.5958 in)

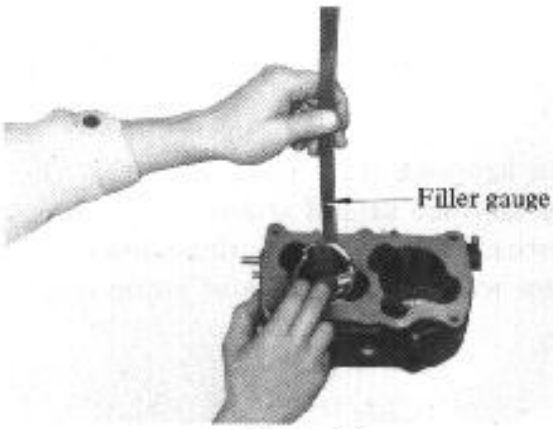


Fig. 3–40

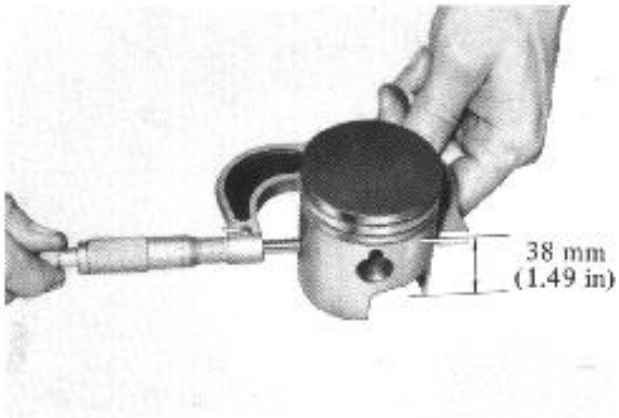


Fig. 3–41

3–13. Piston pin

A needle roller is used for the small end of the connecting rod, and may be worn due to continuous stress while the engine runs. In this case, a rattling from piston or the needle roller breakage will occur, and therefore any worn needle roller, piston pin and connecting rod should be replaced.

The wear of these parts can be checked in assembly. To check these, hold the piston and pull it up and down as shown in the Fig. 3–42. If play is felt, replace worn parts.

Fig. 3–42

Piston Pin Outside Diameter	15.995–16.000 mm (0.6297–0.6299 in)

3–14. Crankshaft

3–14–1. Inspecting

1. Play of connecting rod

The wear of connecting rod large end can be judged from the shake of connecting rod small end. In this way, the wear of the large end can be roughly measured. Replace rod, bearing and crank pin or crankshaft assembly when its shake is more than specified, since such excessive wear causes a clattering sound.

Maximum Shake of Connecting Rod Small End	5 mm (0.2 in)

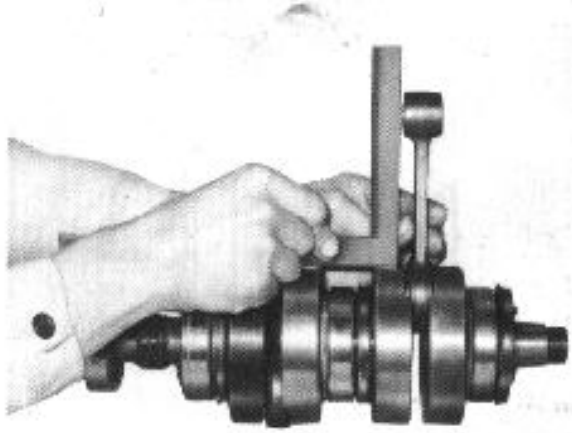


Fig. 3–43

2. Inspecting crankshaft for misalignment

Since the misalignment of crankshaft causes the engine to vibrate and shorten engine life, inspect it by turning the crankshaft. When the misalignment is excessive, replace it.

Maximum Limit of Runout Crankshaft	0.05 mm (0.002 in)

* The runout of crankshaft is 1/2 of the swing of dial gauge needle.

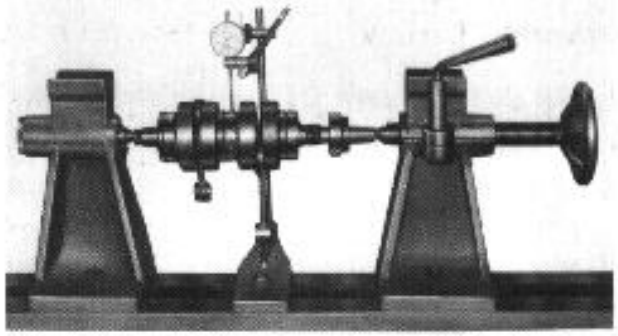


Fig. 3–44

3. Inspection of bearing

When bearing is defective, it produces abnormal noise while the engine runs.

1) Remove it and inspect for lubrication.
2) While turning bearing, check it for noise and scratches. If it is found dry and produces noise, replace it.

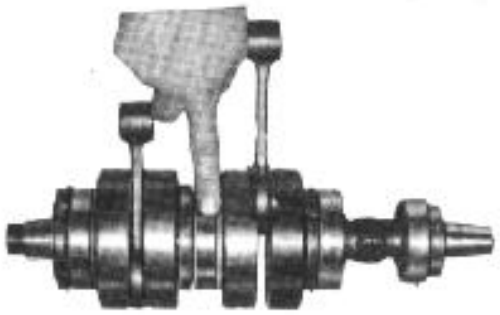


Fig. 3–45

3–14–2. Installing

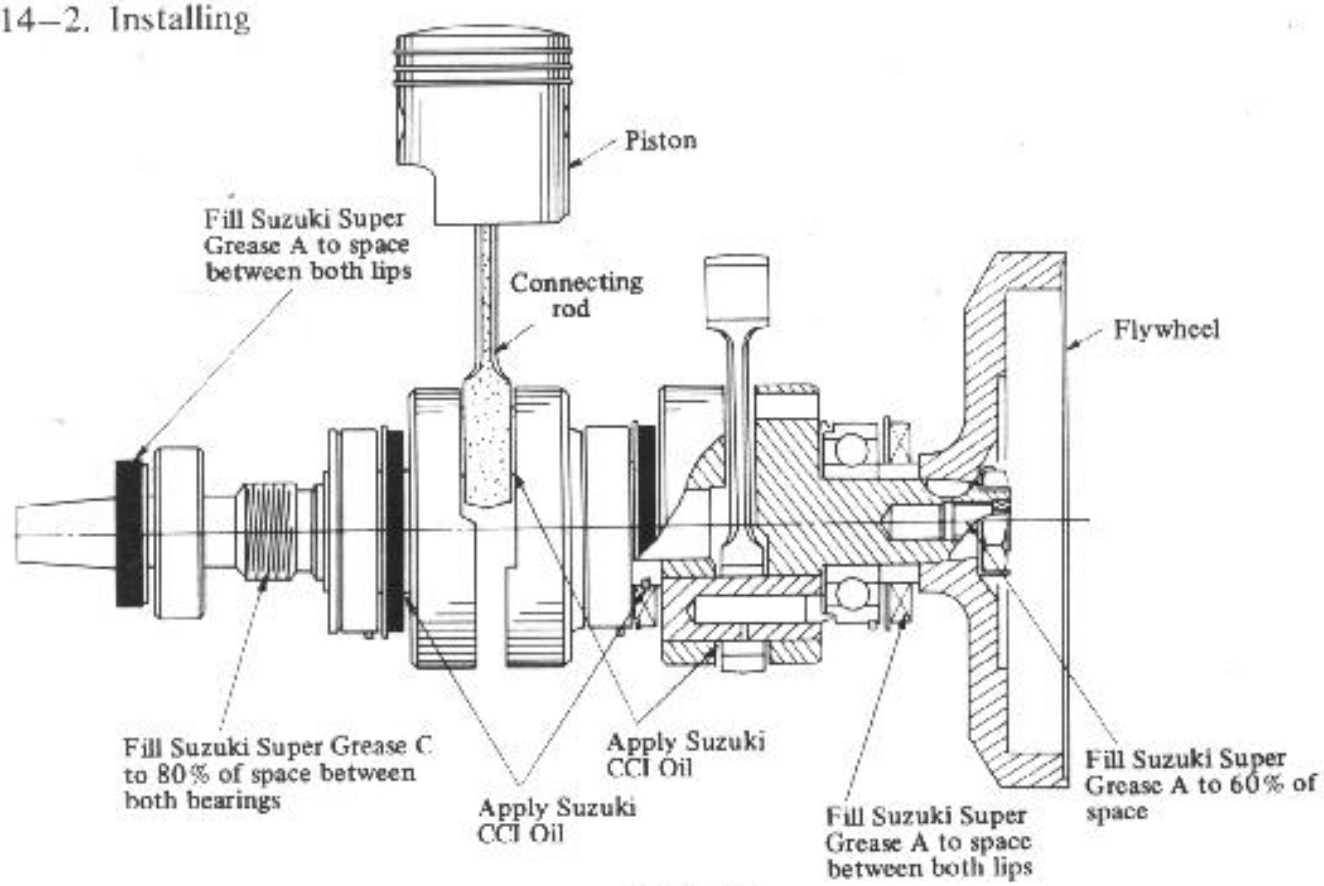


Fig. 3–46

1. Use clean kerosene for cleaning crankshaft. Never use gasoline.
2. Lubricate big end of connecting rod with engine oil prior to installation of crankshaft in crankcase. Make sure lock pins of all bearings, rings and oil seals are properly installed.
3. Apply the oil and grease to revolution parts as shown in Fig. 3–46.

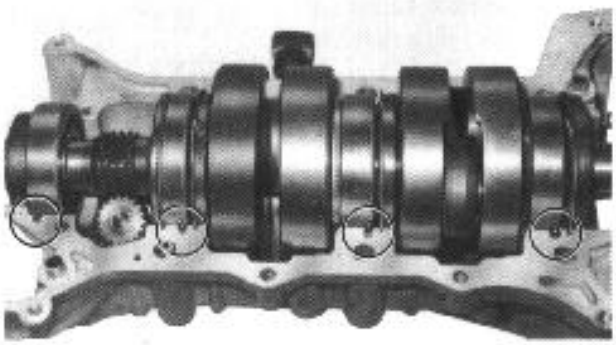


Fig. 3–47

3–15. Crankcase

3–15–1. Installing

1. Apply liquid gasket (Suzuki Seal 99000–31010) on joining surface of upper case, then assemble crankcase.
2. When tightening crankcase bolts, tighten 14 mm bolts first diagonally, then tighten 12 mm and 10 mm bolts in a similar way.

3–16. Lubrication System

Suzuki CCI system, which has been used in Suzuki's products and whose excellent performance has been already proven, is incorporated into the lubricating system.

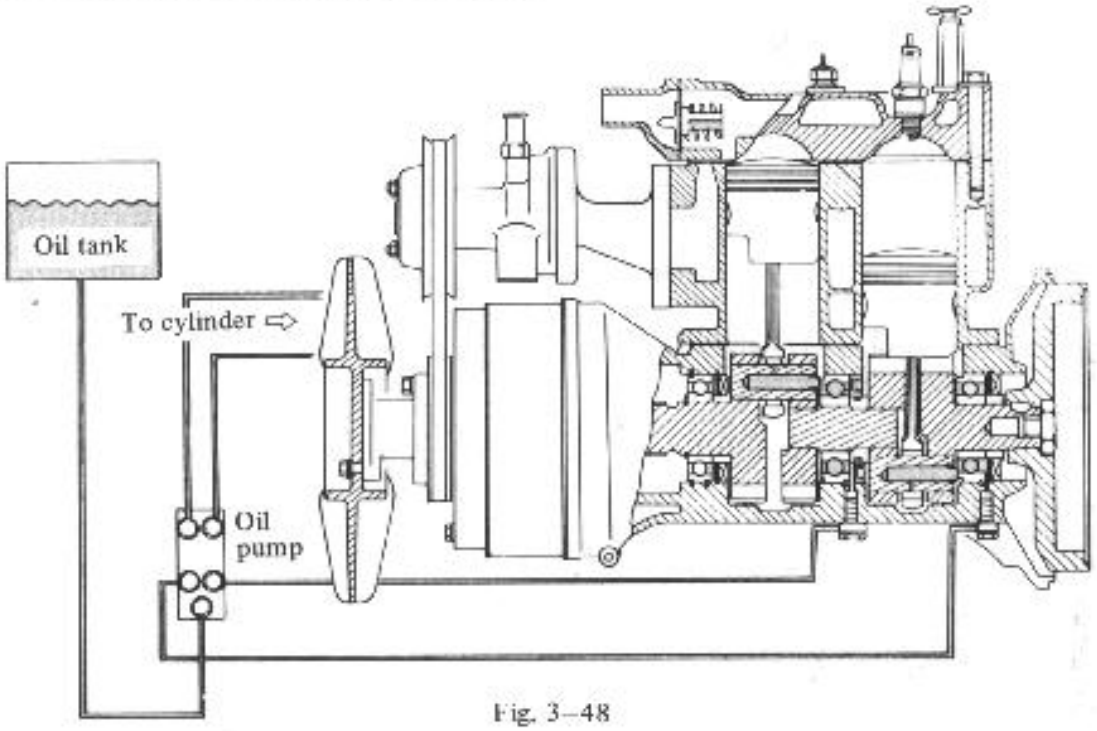


Fig. 3–48

3–17. Oil pump

3–17–1. Construction and characteristics

The oil is delivered to the cylinder through two outlets, and to the crankshaft through the other two outlets. The oil which are delivered to the cylinders is 4 times for LJ20 and 5 times for L50 greater in quantity than to the crankshaft.

The diagram 3–49 shows the performance curves of the oil pump. The discharging capacity differs between LJ20 and L50 and therefore, any pump for other model should not be used.

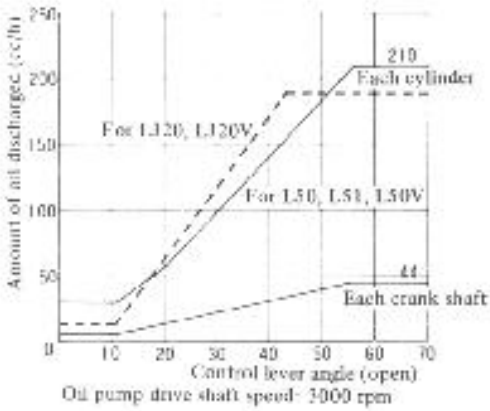


Fig. 3–49

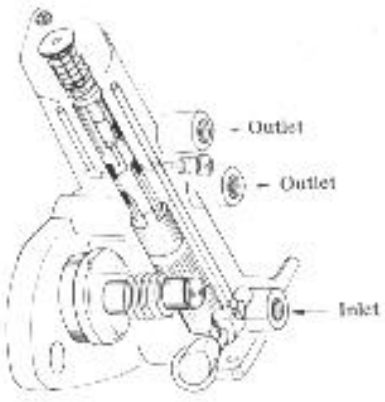


Fig. 3–50

3–17–2. Inspecting and adjusting

The oil pump is a precision-machined, because it serves not only as pump but as micromeasuring instrument. Do not attempt to disassemble it by yourself; otherwise, trouble may result. If the delivery quantity seems inaccurate, check the pump thoroughly, and measure the discharge quantity with a measuring instrument.

1. Measuring oil consumption

   To measure oil consumption, fully warm up the engine, and take the following steps:

   1) Install the measuring instrument on the oil pump inlet side.
   2) Disconnect carburetor-oil pump connecting rod.
   3) Set the engine speed at 1,000 rpm ± 100.
   4) Fully pull up the oil pump lever and start measuring.
   5) After two minutes of measurement, if it shows a reduction of only 2.9 cc to 3.7 cc, the oil pump works properly and consumption rate is normal.

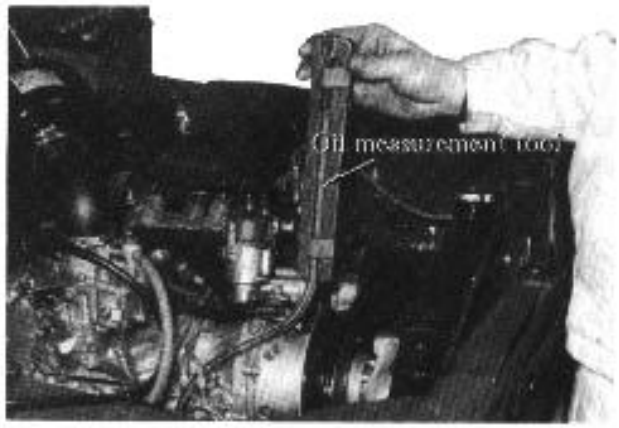


Fig. 3–51

If the reduction is measured at 1 cc more or less than the above range, adjustment is necessary. Fully release the accelerator pedal, and adjust the oil pump rod so that the clearance between the control lever and stopper pin is zero.

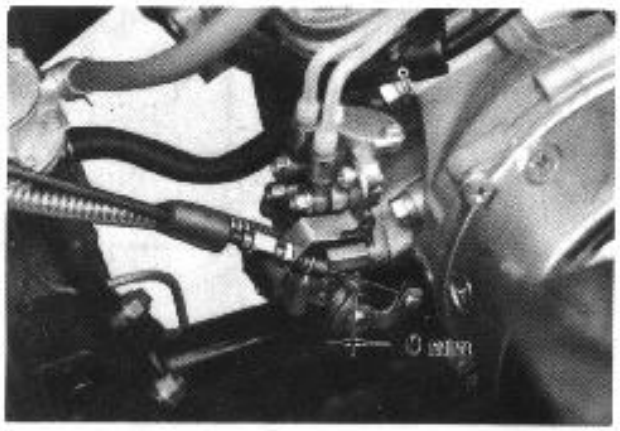


Fig. 3–52

2. Oil Pump

1) Check the oil pump for leakage, and check gaskets. If necessary, replace them.
2) Check the plunger guide pin and lever stopper pin for wear and looseness.
3) Check each blind plug, upper and lower caps for leakage and distortion.

Notes :

a) Do not disassemble the pump body.
b) After assembling oil system, completely bleed the air from the pump and pipes.
c) Check other parts for leakage and air drawn in.

3. Oil Lines

1) Replace any cracked, leaky, aged or distorted oil lines.
2) Replace oil line connector gaskets whenever oil lines removed.
3) Whenever residue is found in pipes, disconnect them for cleaning.
4) To prevent oil leakage, apply a bond to the oil tank outlet.

Notes :

a) Make sure that no air is in the oil lines.
b) When installing oil lines, take care not to tighten the joints too hard. (not more than specified tightening torque)
c) Check the oil tank breather pipe for clogging, and make sure that it is firmly installed.

Cylinder Oil Nozzle Tightening Torque	150–180 kg-cm (10.8–13.0 lb-ft)
Oil Line Connecting Bolt Tightening Torque	45–50 kg-cm (3.25–3.60 lb-ft)

3–18. SRIS (Suzuki Recycle Injection System)

The new SRIS, independent of the lubricating system, is used, and contributes to reduction of the smoke in exhaust produced during acceleration.
Engine oil collected at the bottom of crankcase is sucked up to scavenging ports through pipes connecting crankcase at its bottom to scavenging ports, and will be burnt with mixture after lubricating cylinders and pistons. Thus, smoky exhaust which may be caused by engine oil collected at the bottom of crankcase when engine is started or accelerated is reduced.

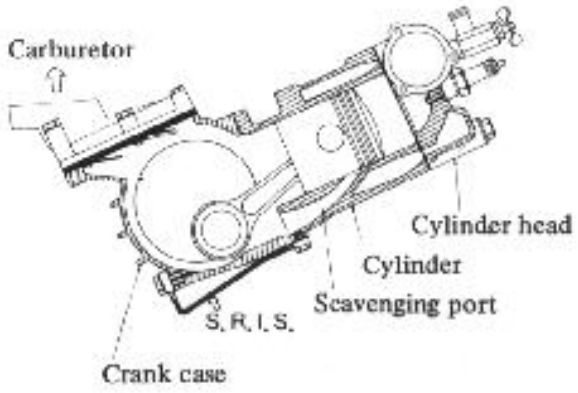


Fig. 3–53

3–18–1. Inspecting

1. Make sure SRIS oil passage

In case of excessive smoke in exhaust gas, check components in oil passage such as check valves, union bolts, and pipes for cloggage.

4–1. General

Cooling system of this engine is pressurized forced-circulation cooling type, and consists of centrifugal pump of high delivery, corrugated-fin type radiator of high radiation capacity, and reliable wax pellet type thermostat which controls the flow of cooling water to keep proper engine temperature.

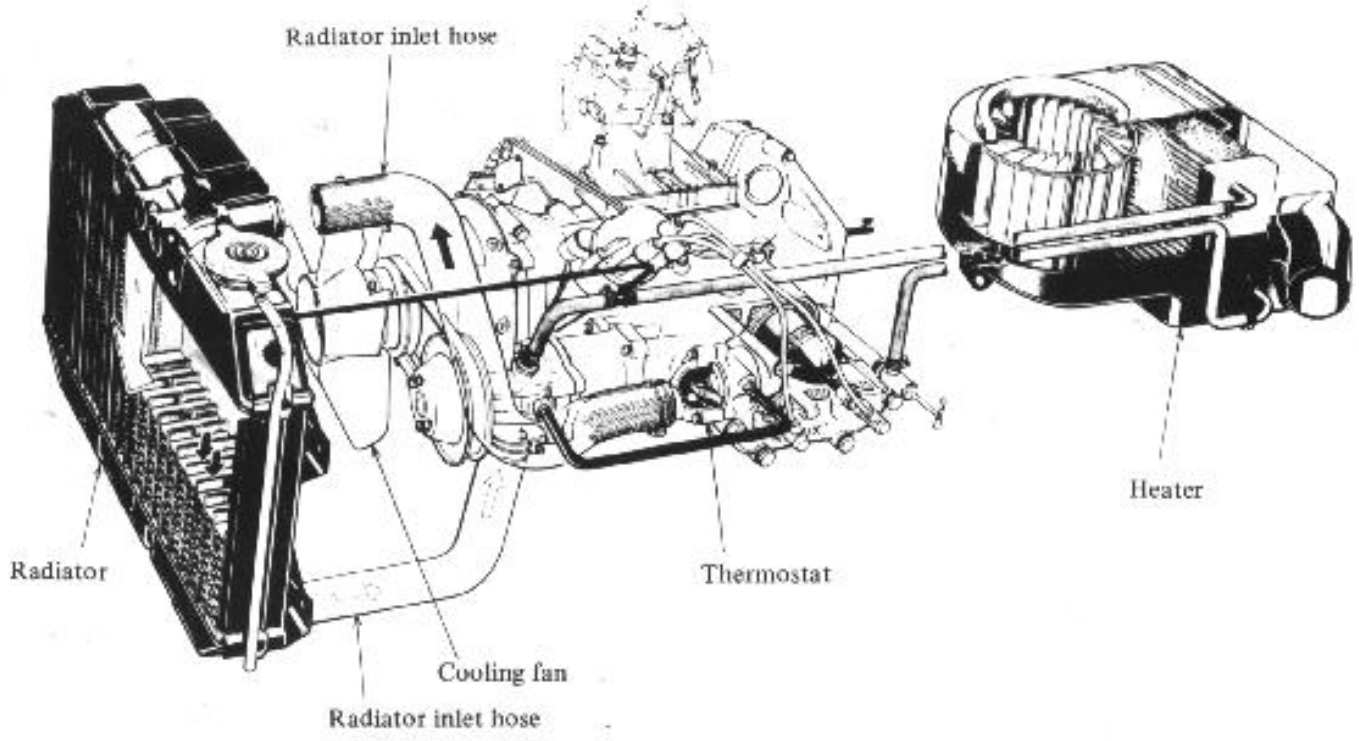


Fig. 4–1

4–2. Function of Cooling System

4–2–1. When engine is cold

Thermostat is closed when engine is cold, and cooling water circulates through cylinder head, bypass hose, water pump, and cylinder, thus the engine is warmed up in a short time.

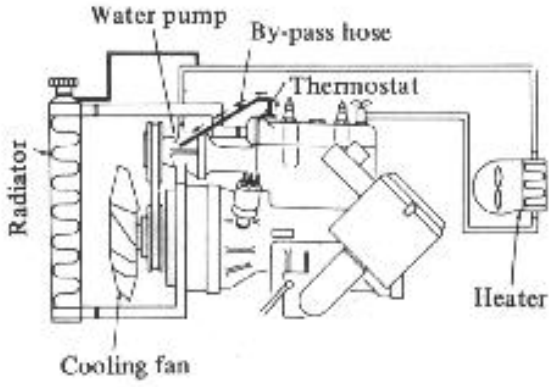


Fig. 4–2

4–2–2. When water temperature is 82° –95°C (179° –203°F)

Thermostat begins to open at 82°C (179°F), and opens fully at 92°C (197°F). Therefore, part of cooling water flows through bypass hose to cylinder as described above, and other part of cooling water flows through radiator inlet hose to radiator and returns to water pump, according to degree of thermostat opening.
The higher the water temperature rises, the more quantity of water flows through radiator.

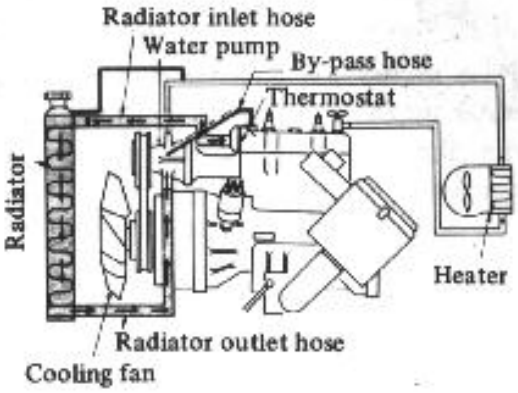


Fig. 4–3

4–2–3. When water temperature is higher than 95°C (203°F)

When water temperature rises over 95°C (203°F), thermostat is opened fully, thus the port to radiator is opened fully. Cooling water circulates from cylinder head, through radiator inlet hose, radiator, radiator outlet hose, water pump, to cylinder.

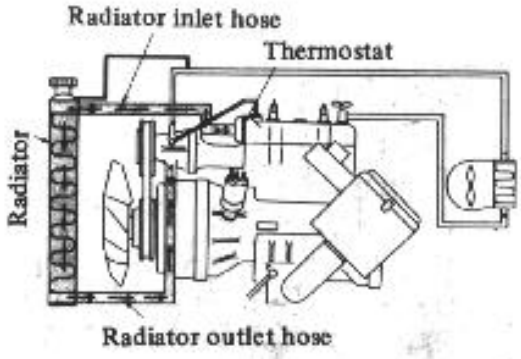


Fig. 4–4

4–3. Servicing of Cooling System

4–3–1. Check of cooling water

Check cooling water level placing the car on flat level ground. It should be within 15 – 20 mm (0.59–0.78 in) from the filler port. Cooling water capacity is 3.0 ltr. (0.78/0.63 gal, US/Imp).

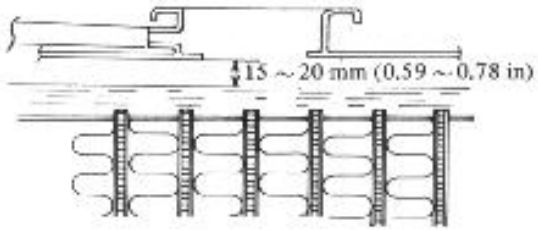


Fig. 4–5

4–3–2. Draining cooling water

Loosen drain plug located at the bottom of radiator and position knotch on the plug downward, and loosen radiator cap, then cooling water is drained. Further in the engine by removing the plug located on the cylinder as shown in Fig. 4–6. (make sure that the heater valve is open while draining off and or filling up water.)
Since Anti-freeze and Summer Coolant is used in cooling system, dilute the cooling water to 0.3% of coolant density when discarded in order to prevent any harm caused by the chemical composition.

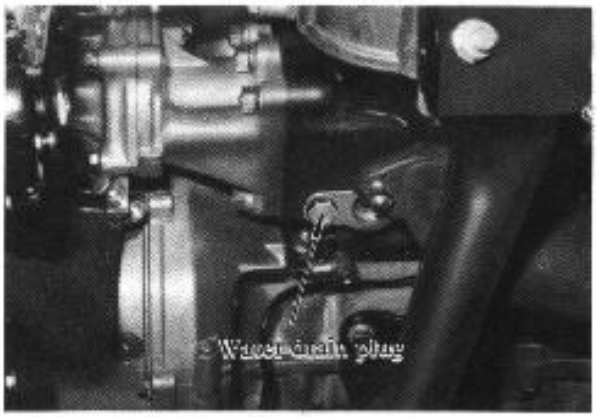


Fig. 4–6

4–3–3. Filling cooling water

Place the vehicle on level surface, fill up radiator with water up to the top of the filling port, cap the port, and run the engine for a few minutes to bleed off air remaining in heater system due to its higher position than radiator, and then replenish the radiator with water. Since air tends to be locked up within water passage after replacing heater hoses and vehicle heater, drive the vehicle for about five minutes first before replenishing water.

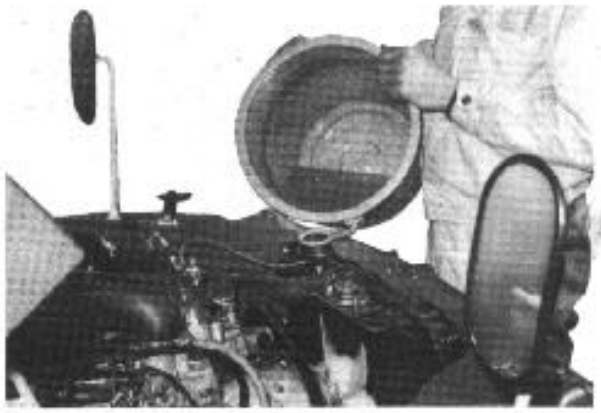


Fig. 4–7

4–4. Cooling water

Cooling capacity and durability of cooling system are greatly affected by proper quality of cooling water being used. There are soft water and hard water, as you know. The harder water is, the more ferrous materials are contained in solution, and harder water causes more deposition of rust or scale on inside of the water passage, resulting in clogged water passage and deterioration of cooling capacity. Hence, it must be kept in mind to use soft water. However, in practice, it is not practical to check water for being soft or hard. Therefore, do not use rain water, sea water and river water, but use tap water or distilled water, whenever possible.

Even when tap water is used, there still remains various limitations. So it is required to mix proper quantity of Anti-freeze and Summer Coolant in water so that cooling capacity may be maintained for a long period of time. As an Anti-freeze and Summer Coolant, use of GOLDEN CRUISER 1200 which is available as SUZUKI genuine spares is highly recommended.

Brand new vehicles have been serviced with 30% solution of GOLDEN CRUISER 1200, which protects against freezing above −15°C (5°F) atmospheric temperature.

Note :

Mixing of 2 brands of Coolant in the radiator should definitely be avoided.

4–4–1. Features of GOLDEN CRUISER 1200 Anti-freeze and Summer Coolant and its method of use

Features of GOLDEN CRUISER 1200 Coolant are as follows:

1. Anti-freeze property
2. Rust presentive property, Anti-corrosion property
3. Nonfoaming property (improves cooling capacity in summer)
4. Long life type

Fig. 4–8

GOLDEN CRUISER 1200 Coolant may be used not only in winter as anti-freeze coolant, but may be used regardless of seasons for two years. Even when it is used in seasons other than winter or in region of a hot climate, 30% or thicker solution should be used to take advantage of features other than anti-freeze property.

Relationship between its concentration and freezing temperature is shown in the table below. However, the temperature lower than expected minimum temperature by 5°C (41°F) should be refered to for safety. For example, in region where expected lowest temperature is −20°C (−4°F), 40% solution should be used for safety.

Temperature	°C	−9	−12	−15	−20	−24	−29	−36
	°F	16	10	5	−4	−11	−20	−33
Mixing Ratio of Anti-Freeze	%	20	25	30	35	40	45	50
Amount of Anti-Freeze/Water	ltr.	0.6/2.4	0.8/2.2	1.0/2.0	1.1/1.9	1.3/1.7	1.4/1.6	1.7/1.3
	US.pt	1.26/5.06	1.68/4.68	2.11/4.22	2.32/4.00	2.74/3.58	2.95/3.37	3.58/2.74
	Imp.pt	1.05/4.20	1.40/3.85	1.75/3.50	1.92/3.32	2.27/2.97	2.45/2.80	2.97/2.27

Note : This table applies to the use of GOLDEN CRUISER 1200 Coolant only.

4–5. Inspecting

4–5–1. Excessive temperature rise (overheating)

If water temperature rises beyond 100°C (212°F) during running, check cooling water level, pump belt and function of thermostat. If water temperature rises in a short time during warming up of engine, check cooling water level and every connection and part for water leakage.

Fig. 4–9

4–5–2. Poor temperature rise (overcooling)

If it takes long time to reach normal temperature, or water temperature does not rise over 50°C (122°F), remove thermostat and check.

If cooling water is contaminated by foreign particles which may be caught in thermostat valve, causing improper warming up, replace cooling water.

Fig. 4–10

4–5–3. Gage indication and water temperature

Temperature vs. gage indication chart, which is the most important in checking of cooling system, is shown in the Fig. 4–11.

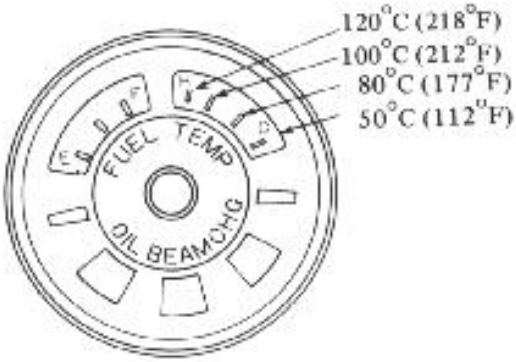


Fig. 4–11

4–5–4. Check of water pump belt

To prevent engine overheating due to loose or broken water pump belt, check belt and adjust as follows:
The belt tension may be adjusted by adding or removing the adjusting shims located between water pump and pulley to allow 10 mm (3.9 in) deflection when belt is pressed at its middle point by approximately 5 kg force. Belt should be replaced every two years despite no damage. In replacing belt, tighten bolts gradually by turning pulley, taking care not to have belt jammed by the pulley.

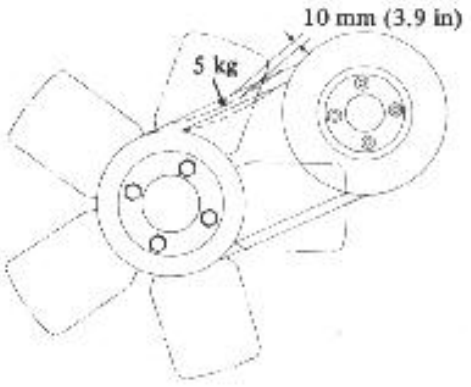


Fig. 4–12

Water Pump Belt Tension	10 mm (3.9 in)

Replacement of Water Pump Belt	Every two years

4–6. Check and Maintenance of Related Components

4–6–1. Water pump

Water pump is of centrifugal type, and prelubricated bearing and special seal of high durability are assembled in it. Consequently, water pump can not be disassembled so that leaky water pump should be replaced with new assembly.

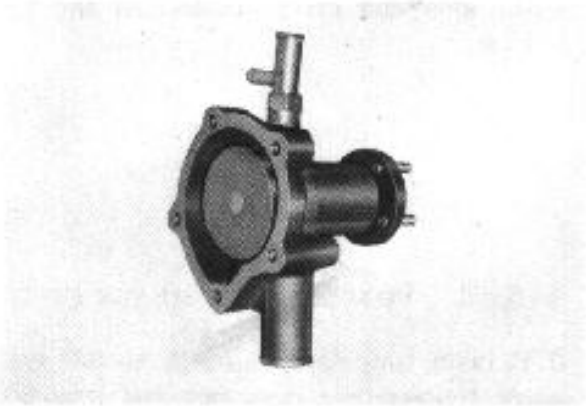


Fig. 4–13

4 6 2. Thermostat

Thermostat is of wax pellet type, and valve begins to open at 82°C (197°F) and opens fully at 95°C (203°F), and its lift is 8 mm (0.31 in). The trouble of thermostat is caused by malfunction of thermostat itself or foreign particles in valve. Check valve for jammed foreign particles, and then perform functional test by heating the vessel gradually in which the thermostat and a thermometer are immersed in the water as shown in the Fig. 4–14.

Fig. 4–14

Thermostat begins to open at	82°C (179°F)
Thermostat opens fully at	95°C (203°F)
Valve Lift	8 mm (0.31 in)

Further, check the function of air breather valve. If valve sticks at closed position, overheating will result head. If it does not close completely, engine will not be warmed up properly.

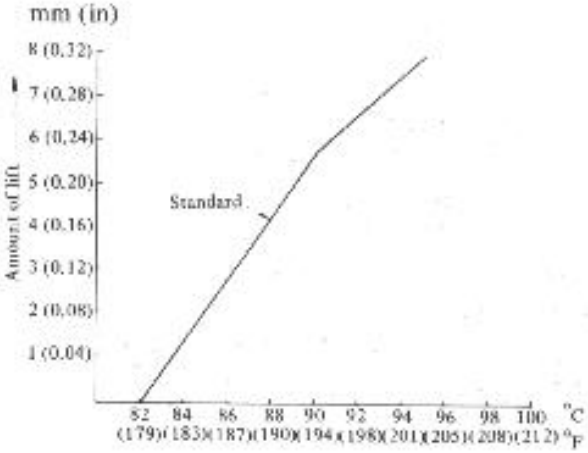


Fig. 4–15

✱ Caution in measuring thermostat

Since there is a fair difference in temperature between upper and lower portion of the water in the vessel, stir throughly to make the temperature of the water uniform. Otherwise measuring error may be produced by shape of the vessel, measuring point and the location of the thermostat in the vessel, and therefore two or three times of measurement under different condition are required.

4–6–3. Radiator

Since scale and rust may deposit on inside of the radiator after long service, and will cause decrease in cooling capacity, clean radiator assembly with radiator cleaner every two years.

Deformed radiator fins caused by spattered pebbles will clog the air pass and decrease the radiating efficiency, hence deformed fins must be fixed and mud on radiator exterior surface must be cleaned.

Fig. 4–16

When refitting the radiator, be sure to keep the clearance between the fan and shroud over 15 mm (0.59 in) for L50, L51, L50V.

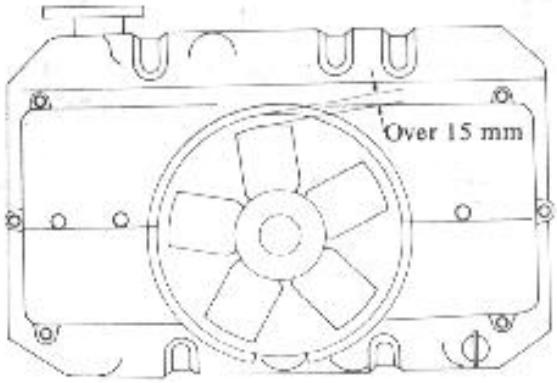


Fig. 4–17

4–6–4. Radiator cap

Radiator cap is so designed that the valve opens when 0.5 kg/cm^2 of gauge pressure or more is applied. The function of radiator cap is as follows. When the temperature of cooling water rises, it pressurizes the system to increase the boiling point of cooling water, thus decrease in cooling capacity due to bubbles which may be produced by boiling and circulated in the cooling system if it is not pressurized will be prevented. When the cooling water is cooled, air is allowed to enter through the cap and the pressure of the cooling system is equalized with atmospheric pressure, thus the radiator and hoses are prevented from damage which may be caused, in extreme case, by negative pressure of cooling system. To perform this function, two valves are incorporated in radiator as illustrated. If the springs are deteriorated or the gasket fails to function, replace radiator cap assembly. Though many kinds of caps are on the market, Suzuki's genuine part should be used, because those ones on the market may have problems in their performance even if they fit in the radiator.

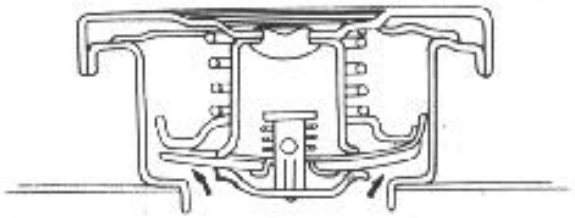


Fig. 4–18

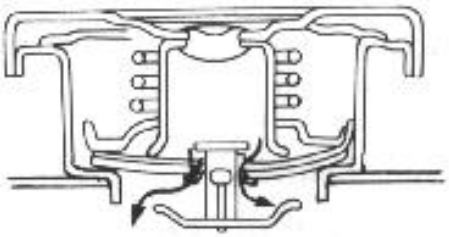


Fig. 4–19

The figure "0.5" on the top of cap indicates that the valve opens at pressure of 0.5 kg/cm^2.

Radiator Cap Valve Opening Pressure	Normal	Limit
	0.5kg/cm^2	0.25kg/cm^2

Fig. 4–20

4–6–5. Water temperature gage

Water temperature gage consists of water temperature gage assembly and lamp meter assembly with wiring as shown in the Fig. 4–21.
As water temperature increases, resistance of thermistor in thermo-unit decreases, accordingly electric current to temperature gage increases, thus the pointer of the gage is moved by function of bimetal in the gage.

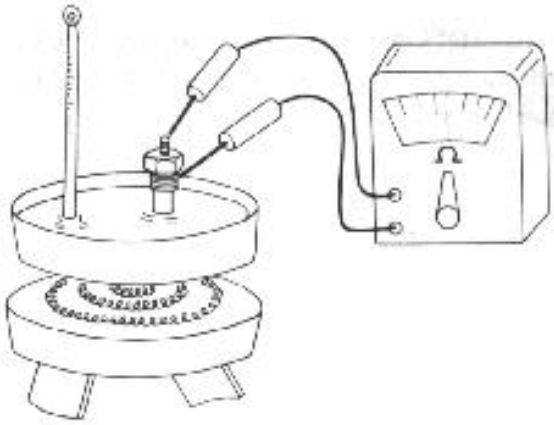


Fig. 4–21

4–6–6. Heater valve

The heater valve opens and closes simultaneously hot water flow to heater and to hot water manifold. The valve is opened or closed at atmospheric temperature of 20°C (68°F). Pay attention not to drive vehicle with heater valve opened at atmospheric of 20°C (68°F) or higher, otherwise troubles such as decrease of engine power may be caused.
When heater is not in use, close heater valve located on cylinder head to shut hot water flow to heater.
Do not remove heater hoses.

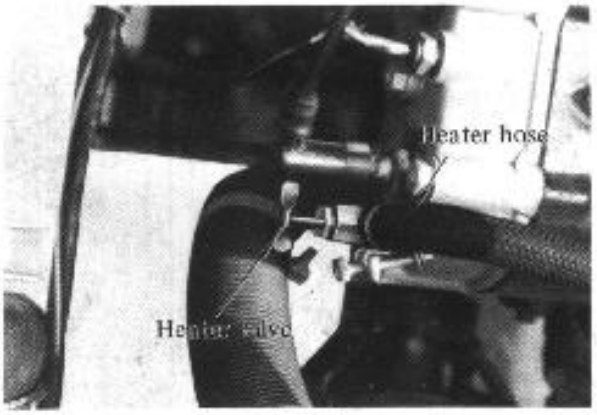


Fig. 4–22

Temperature Above 20°C (68°F)	Tighten (close) Heater Valve
Temperature Below 20°C (68°F)	Loosen (open) Heater Valve

4–7. Water Hoses and Clamps

Circulating passage of cooling system consists of radiator inlet hose, outlet hose and bypass hose; in addition to these hoses, heater hoses No. 1, No. 2 and No. 3 are installed. Five hose clamps are used to connect the hoses.
When installing hoses and clamps, exercise care not to install wrong parts, and to tighten securely.

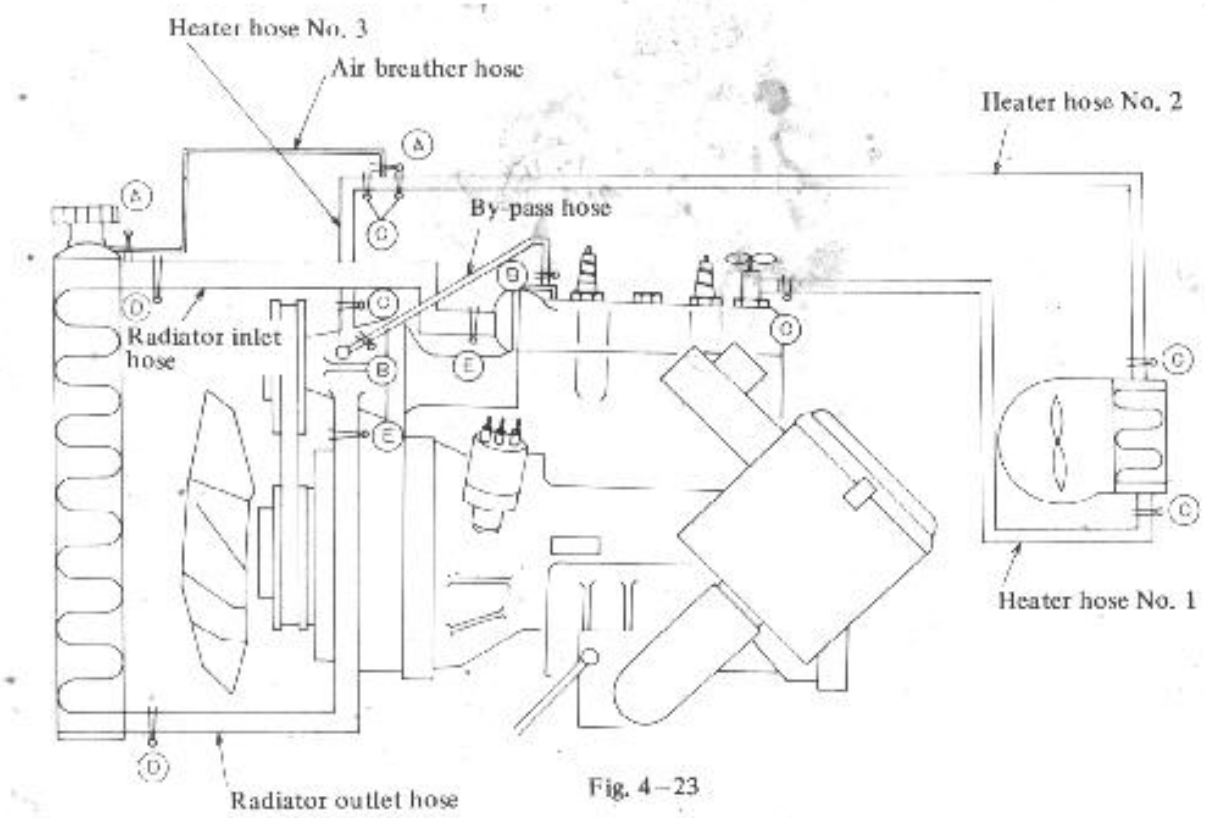


Fig. 4–23

4–7–1. Water hose clamp specifications

Index	To be Installed on	Inside Diam.	Q'ty	Width of Clamps
A	Air breather pipe	9.6 mm (0.37 in)	2	6 mm (0.23 in)
B	Bypass hose	13.0 mm (0.51 in)	2	6 mm (0.23 in)
C	Heater hose Nos. 1, 2, 3	21.0 mm (0.82 in)	6	13 mm (0.51 in)
D	Radiator	30.0 mm (1.18 in)	2	10.5 mm (0.41 in)
E	Water pump thermostat	36.0 mm (1.41 in)	2	10.5 mm (0.41 in)

4–7–2. Hose specifications and installing method

Name	Used for	I.D. mm(in)	Remarks
Radiator outlet hose	Radiator to pump	21 (0.82) 25 (0.98)	Large end toward pump
Radiator inlet hose	Thermostat to radiator	21 (0.82) 25 (0.98)	Large end toward thermostat
Bypass hose	Head to pump	7 (0.27)	
Heater hose No. 1	Heater valve to heater	13 (0.51)	
Heater hose No. 2	Heater to joint	13 (0.51)	
Heater hose No. 3	Joint to pump	13 (0.51)	
Air breather hose	Joint to radiator	1.8 (0.07)	

4–8. Vehicle Heater

This vehicle is equiped with hot water type heater, which has improved discharge capacity of heat generated by the engine and is of low noise and effective even in a cold climate and during low speed running owing to forced discharge being made by a blower in the vehicle heater.
This heater is also available as a fan for forced ventilation in summer season by closing heater valve down.

4–8–1. Wiring circuit

Electric circuit related to vehicle heater is shown in the Fig. 4–24. When fan switch is pulled to its first position, blower motor is energized through fan resistor and the heater works in "low". When the switch is pulled further to its second position, the blower motor is energized directly and works in "high" with higher rpm.
To prevent overcooling of the engine, a thermoswitch which is located at the moddle of cylinder inlet side switches on at the water temperature of 65°C (149°F) or above and switches off at 65°C (149°F) or below. Accordingly, the blower motor does not operate even when switched on unless the water temperature is 65°C (149°F) or above.
When the water temperature drops below 60°C (140°F) while driving the vehicle with the fan on, the thermoswitch functions to cut the electric circuit off and blower motor stops.

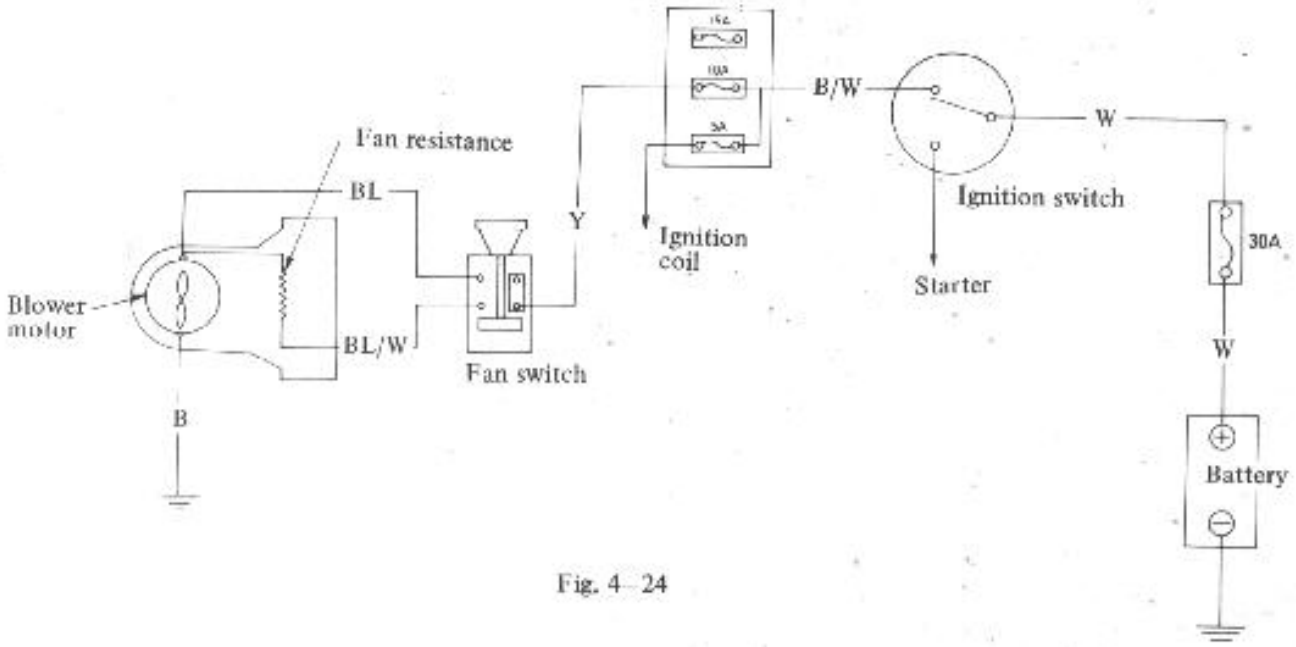


Fig. 4–24

4–8–2. Inspecting

1. Fan resistor

   In case of motor being inoperative, check fan resistor installed on heater case for proper resistance.. Resistance of 4.3 ohm is normal.

   Resistance of Fan Resistor 4.3 ohm

Fig. 4–25

2. Fan switch

   Check fan switch wires for continuity.

   1) Knob in first position - To be continuous between yellow and blue/white

   2) Knob in second position - To be continuous between yellow and blue

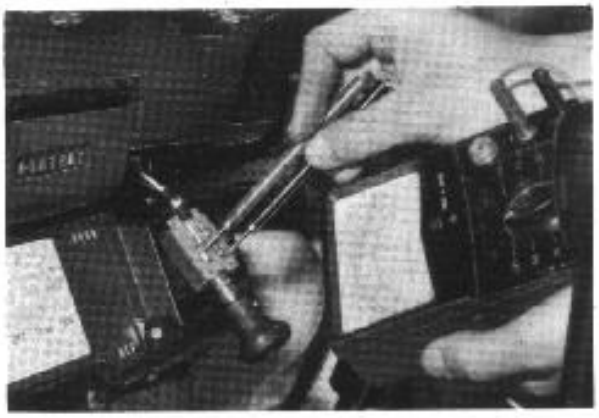


Fig. 4–26

5–1. General

The wiring of the ignition system is as shown in the below diagram, consisting of a battery, ignition coil, distributor and spark plugs. The ignition system is a device which generates sparks by boosting the battery voltage. The ignition system service requires full knowledge of each component as well as an overall knowledge of the entire construction of the ignition system.

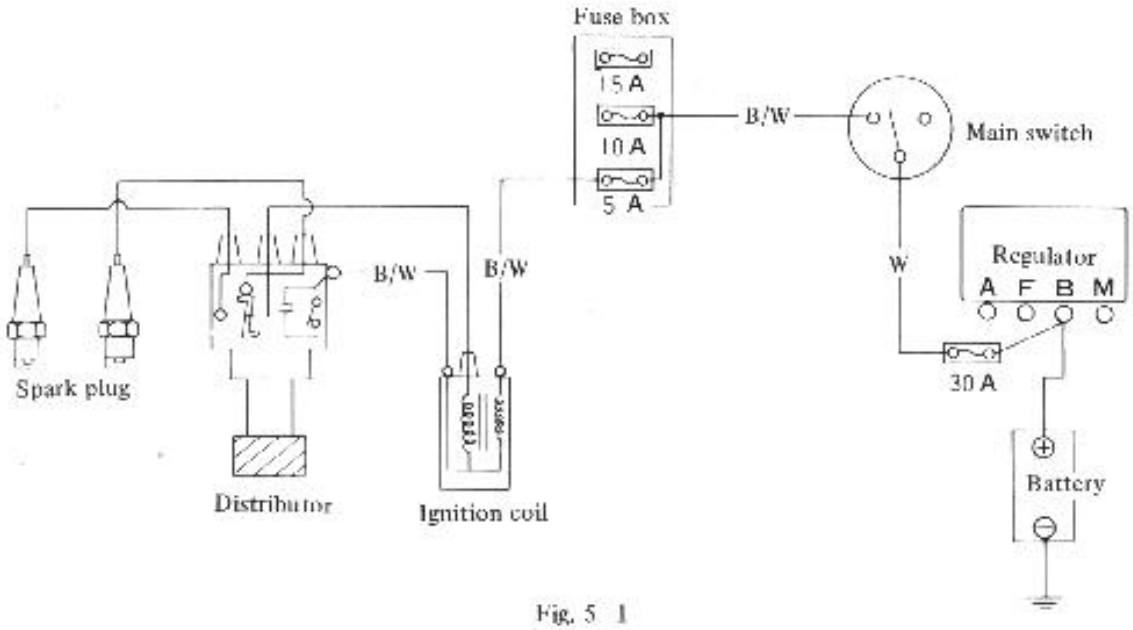


Fig. 5–1

5–2. Ignition Timing

5–2–1. Inspecting

1. Checking by spark
   1) Remove the spark plug from first cylinder head and connect it with high tension cord. Then turn on the switch so that sparks can easily be observed.

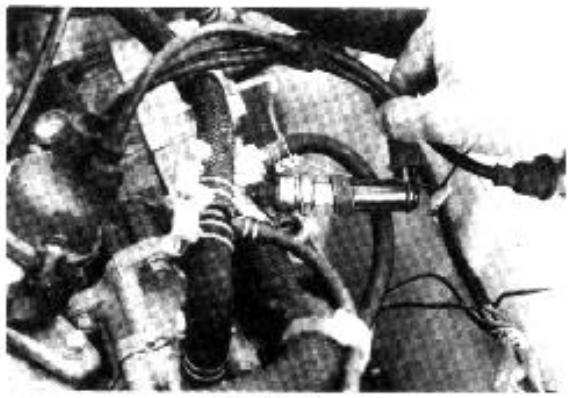


Fig. 5–2

   2) Remove the timing inspection hole plug.
   3) While turning the cooling fan clockwise, (see the front side of motor vehicle) find the position where the sparks are produced.
   4) Check to see the mark on the flywheel is at aligning mark of the inspection hole.

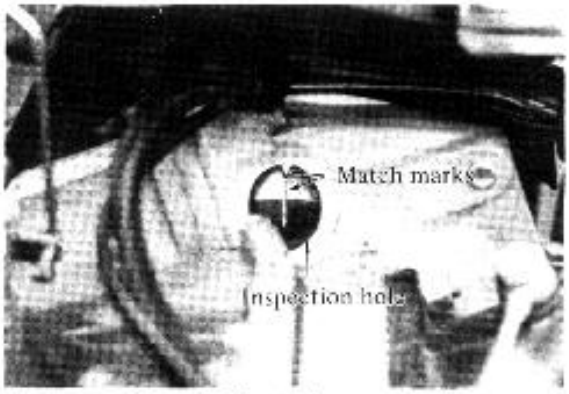


Fig. 5–3

Ignition Timing (Piston Stroke)	B.T.D.C. 8° at below engine, 1,400 rpm (0.38 mm)
Ignition Timing Order	1—2

2. Checking with timing tester

1) Remove the spark plugs from cylinder heads and use the timing tester to find the moment for contact points to begin opening.
2) To check the timing with the tester, connect one end of lead wire to distributor terminal and ground the other one.
3) While turning the cooling fan clockwise, find the position where the tone of the tester buzzer is changed and check to see the marks.

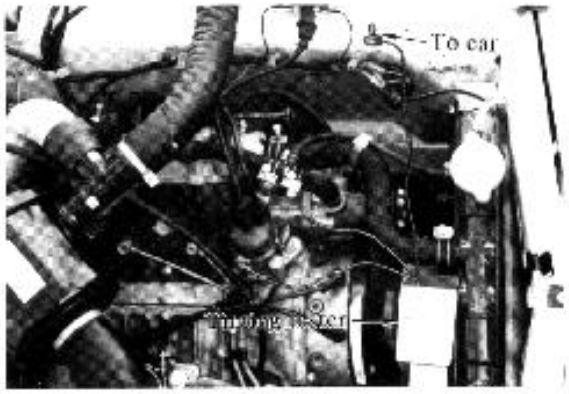


Fig. 5–4

3. Checking with timing lamp

It be easy to check the ignition timing using timing lamp. If the lamp is thrown on the ignition timing marks with the engine running, the timing marks appear to stop at the position where the spark jumps in the spark plug and check to see the mark is at the aligning mark of the inspection hole. Should be engine speed at 1,400 rpm or less. Because, employed timing advancer for these models.

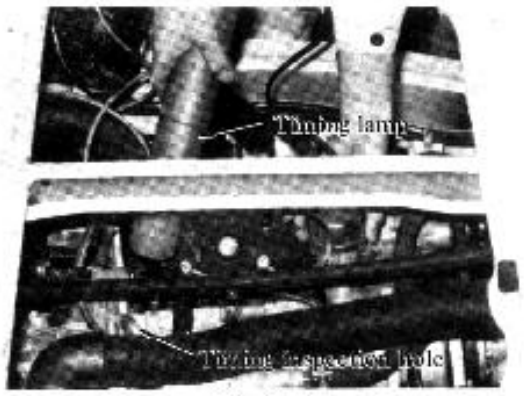


Fig. 5–5

5–2–2. Adjusting

1. First, loosen distributor fitting bolt.
2. Remove the distributor cap and rotor, and adjust the point gap. For this adjustment, loosen the screw (A) and insert a screw driver into the slit (B) and adjust the point gap as follows.

Point Gap	0.4–0.5 mm (0.0157–0.0196 in)

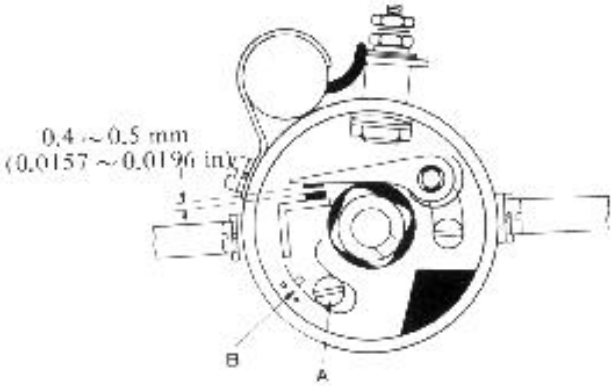


Fig. 5–6

3. Install the rotor and distributor cap. Align center line of the rotor (the side of the ND mark) with the mark provided on the distributor housing as shown in the Fig. 5–7.

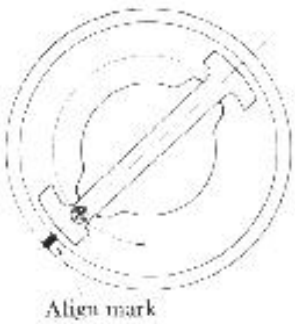


Fig. 5–7

4. Set the ignition timing marks align.
5. Fully turn the distributor body counter-clockwise and then return clockwise slowly. When the spark plug produce sparks or contact point gap just open, stop turning the distributor. The rotor turning way is counter-clockwise when engine running as showin Fig. 5-8.
6. Tighten distributor fitting bolt firmly.

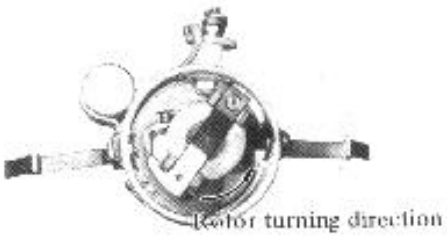


Fig. 5-8

5-3. Distributor

The distributor is constructed as shown in the Fig. 5-9 and driven by the drive gear of the crankshaft. The distributor cap is connected to the high tension cables extending from the ignition coil and from the spark plugs. The high voltage generated in the ignition coil is distributed to each spark plug by turning of the rotor. The condenser attached to the distributor body absorbs electric energy when the points open, thereby preventing sparks jumping over the point gap. The following is the description on the distributor and related parts.

Specifications

Cam Dowel Angle	47°
Ignition Angle	90°
Condenser Capacity	0.25 μF
Number of Gear Teeth	18
Timing Advancer	6°

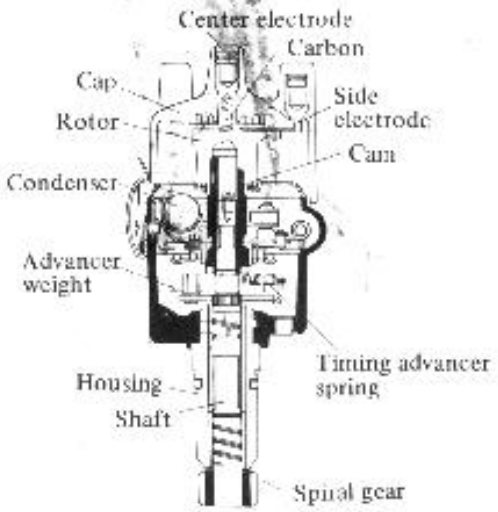


Fig. 5-9

5-3-1. Distributor cap

The distributor cap and rotor carry a high voltage and often cause misfiring due to leakage. Check the inner parts for dust or scratches. Wipe the inner parts with a clean dry cloth, and replace any scratched parts.
Leakage of the high voltage circuit may also result from an excessive plug gap. This is a case often seen with a vehicle used for a long period, and such leakage is caused when the spark plug gap becomes fouled. Thus, whenever leakage is found, check the distributor and high tension cable as well as the plug gap.

Fig. 5-10

5-3-2. Timing advancer

As timing advancer is incorporated in the distributor so as to obtain a proper ignition timing in all the range of the engine speed. The ignition timing begins to be advanced at 1,400 engine rpm and is fully advanced at 2,000 rpm as shown in the Fig. 5–11.

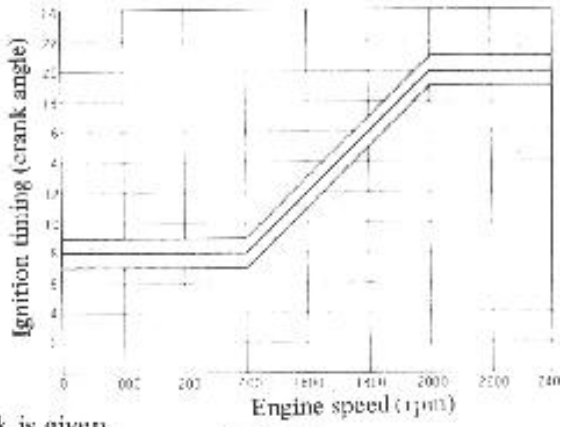


Fig. 5–11

5-3-3. Servicing

1. Cam

   Apply a small amount of point grease when periodical check is given.

2. Distributor driven gear

   Fill Suzuki supper grease C or specified grease on every 10,000 km (6,000 mile).

5-3-4. Installing

When installing the distributor to the engine, first, align the rotor end with a slot on the distributor body as shown in the Fig. 5–12, 5–13 and push the distributor in the hole on the engine positioning a supposed line which connect one spring for fitting the distributor cup to the other opposed in the direction explained below.

LJ20 type:
The line should be parallel with the engine center line as shown in the Fig. 5–12.

LS0 type:
The line should be 40–55 degrees against the engine center line as shown in the Fig. 5–13.

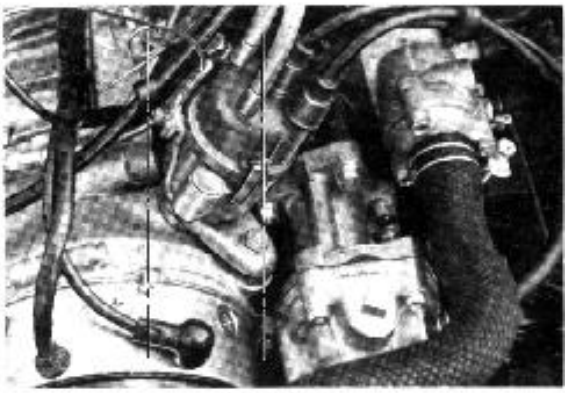


Fig. 5–12

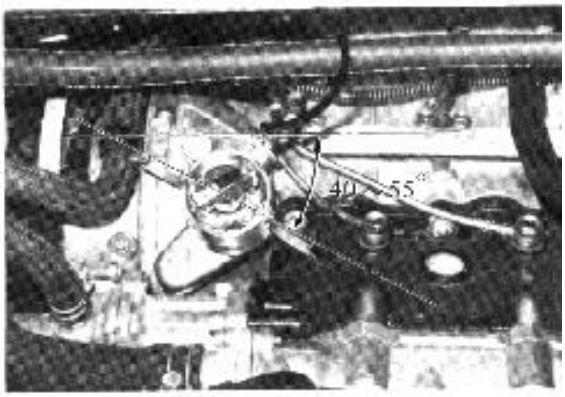


Fig. 5–13

5–4. Contact Point

5–4–1. Adjusting point gap

The point gap must be correctly adjusted; otherwise, the engine often misfires due to sparks jumping over the point gap at high speed. As shown in the Fig. 5–14, turn the cam so that the point gap becomes widest and then adjust the point gap by moving the contact base.

Point Gap	0.4–0.5 mm (0.0157–0.0196 in)

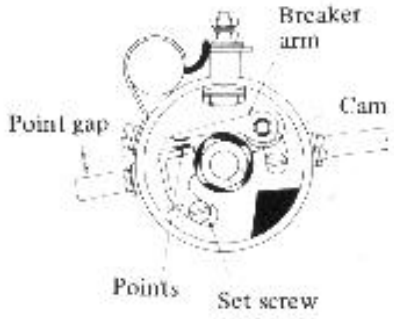


Fig. 5–14

5–4–2. Inspecting points surfaces

Open the points and check their surfaces. If oily or slightly roughened, clean or smooth out the surface. If the points are worn or burnt excessively, replace them or smooth them out with a file or oil stone. Points should be installed with special care so that they are aligned correctly; otherwise, the points will fast wear or burn.

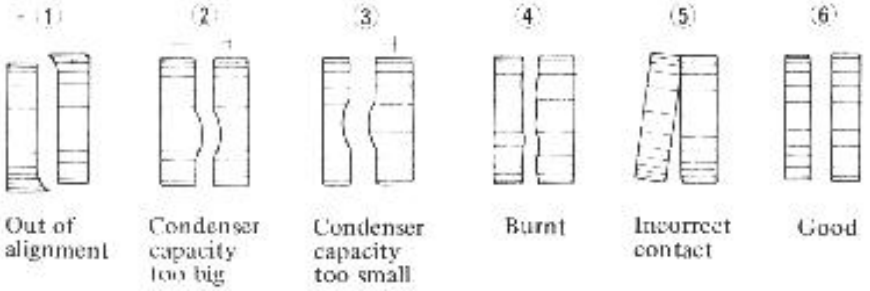


Fig. 5–15

5–5. Spark Plug

Protrudent electrode type (P-type) spark plugs BP-6HS are used on these models. Since plug of this type sparks near the center of combustion chamber owing to protrudent electrode, after installation, P-type plug is excellent in ignitionability and the electrode is burned easily, preventing the electrode from being made dirty.

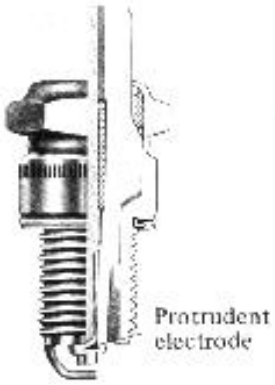


Fig. 5–16

5–5–1. Inspecting and adjusting

1. Check the spark plug for burnt condition and carbon built-up. If the spark plug is sooty or oily, the temperature of the electrodes is low. Replace the spark plug with a hotter type. On the contrary, if the spark plug is white and the electrodes show fast wear, replace the plug with a colder type referring to the following chart.
2. Adjust the plug gap by using a gap gauge.

Plug Gap	0.7–0.8 mm (0.028–0.031 in)

3. If the original spark plug is unavailable in the market, the following spark plugs may be used, however, use of NGK or DENSO brand is strongly recommended.

* Do not confuse brands or heat ranges in a vehicle.

HEAT RANGE	NGK	DENSO	CHAMPION	AC	AUTO-LITE	BOSHE	KLG	LODGE
HOT	BP-4H	W14FP	UL15Y L95Y	46FFS 45FFS	AE62 AE52	W145T7	F55P	BNY CNY
ORIGINAL	BP-6HS	W20FP	UL12Y L12Y	44FFS 43FFS	AE42 AE32	W175T35 W200T35	F65P	HNY
COLD	BP-7HS	W22FP	UL82Y L82Y L61Y	42FS	AE22	W225T35	F85P	2HNY

5–6. Inspecting Ignition System

5–6–1. Primary circuit

No defective parts are found visually, but the engine misfires. In this case, check for the primary circuit. (perform tests on the distributor removed from the vehicle).

1. As shown in the Fig. 5–17, connect an electric tester to the primary terminal of the distributor and make a conductivity test (keep the points open). When the red lamp lights up in this test, the primary circuit is considered to be grounded and rectification is required.

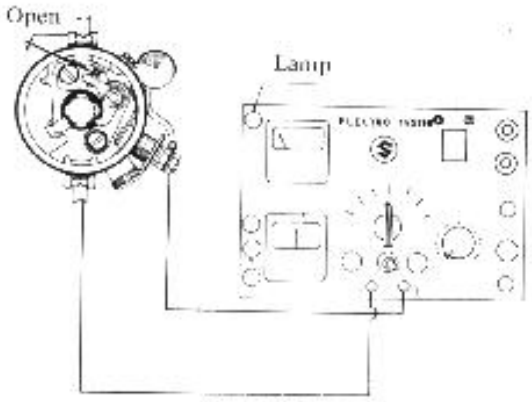


Fig. 5–17

2. When the lamp will not light up, set the tester for insulation test range (keep the points open).
   In this case, the tester pointer swings up to the point B and then swings back to the point A (∞).
   But if the pointer will not return to its home position after it has swung to the point B or pointer swings over to the point C or stops in the middle, insulation is faulty.
   Stop the test and check each terminal for insulation, and also inspect the condenser.

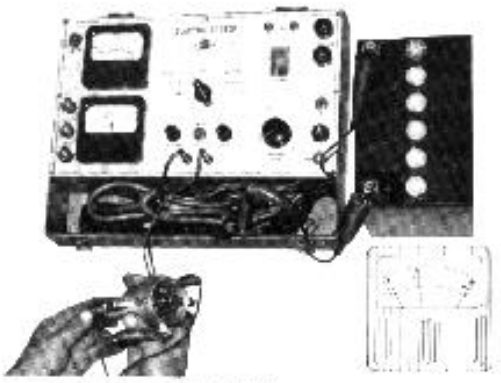


Fig. 5–18

5–6–2. Condenser

Disconnect the condenser lead wire, and test in the same manner as above on conductivity and insulation, and then check the condenser capacity. If found faulty, replace it.

Condenser Capacity	0.25 μF

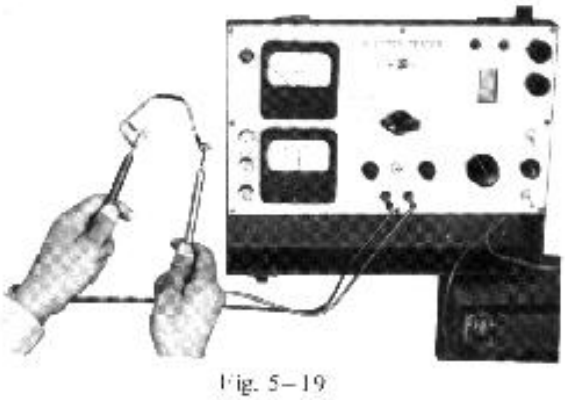


Fig. 5–19

5-6-3. Ignition coil

If the sparks are found irregular, weak or not produced, check the spark plugs and distributor. If they are good, check the ignition coil.

1) Primary winding test

Measure the resistance between the positive and negative terminals of the primary winding.

Primary Winding Resistance	3–5 Ω

2) Secondary winding

The secondary winding has greater resistance, and the condition of insulation affects the performance of the ignition system to a large extent. Accordingly, the test of the secondary winding must be performed in the manner as shown in the Fig. 5–20.

Spark Gap	7 mm (0.28 in) or more

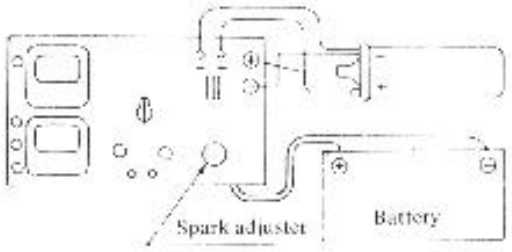


Fig. 5–20

As the temperature rises, the ignition coil becomes inferior in its performance. If ignition failures occur while travelling, it is considered to result from a rise in temperature of the coil. Immediately check the coil or perform tests by heating the coil up to 80°C (176°F). If sparks jumps 7 mm (0.28 in) or so, the ignition coil is in good condition. Therefore, check for the distributor.

As noted already, the ignition coil is adversely affected by high temperature. At the same time, the coil is a component of the high voltage circuit, and therefore, it is greatly affected by the amount of the plug gap or by a fouled spark plug. If the plug gap is too wide, it will also adversely affect the ignition coil or result in leakage. Checking of the ignition coil should be made in relation to the spark plug.

6–1. General

The starting and charging systems are designed to allow easy handling and easy access to service. The circuit consists of the starter generator, regulator and battery.

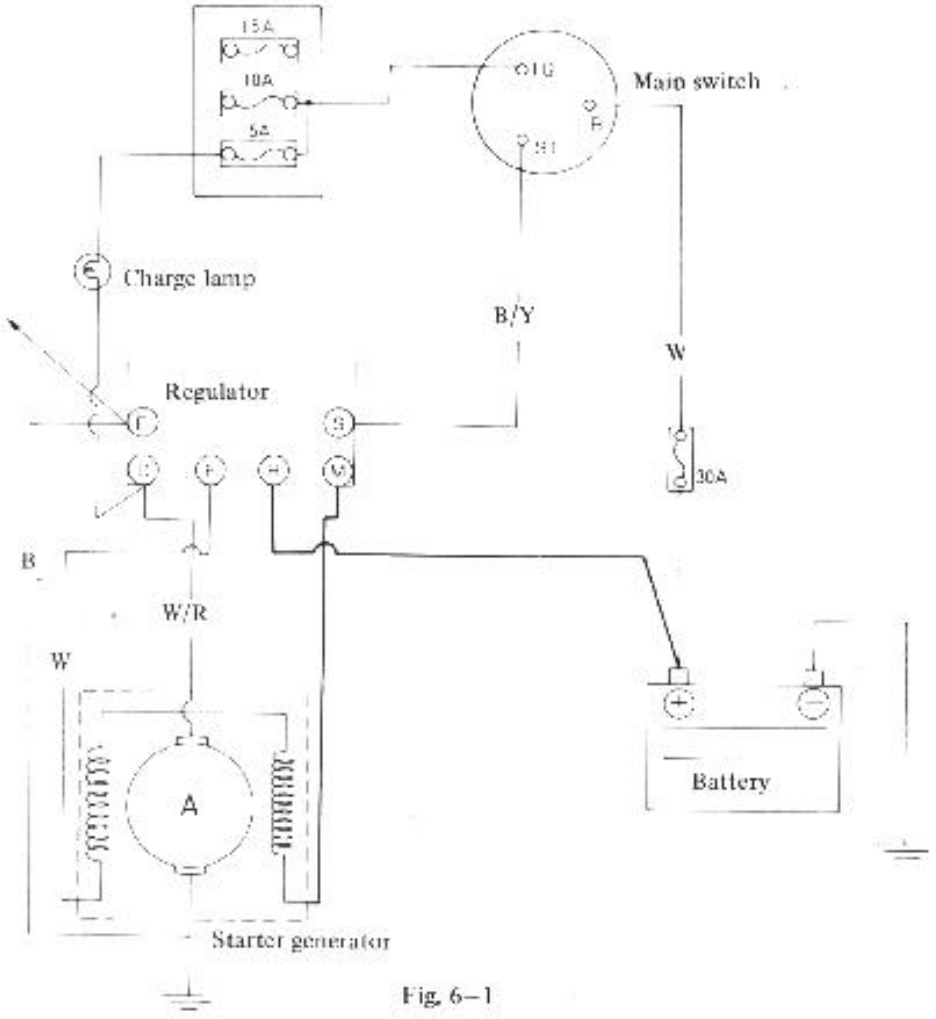


Fig. 6–1

6–2. Starter Generator

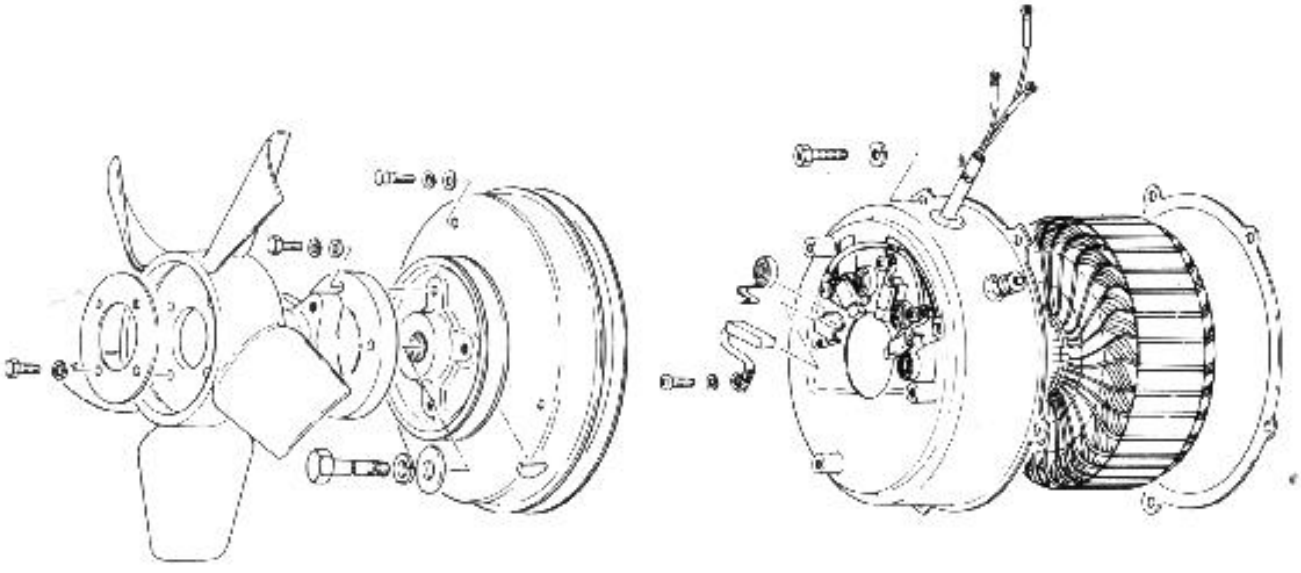


Fig. 6–2

6–2–1. Specifications

Number of Poles		8
Speed		800 6,000 r.p.m.
Commutator Diameter		46 mm (1.811 in)
Brush Size (thickness x width x length)		5 x 10 x 20 mm (0.197 x 0.394 x 0.787 in)
Nominal Output	Starter	0.3 KW
	Generator	0.17 KW
Starter Characteristics	Locked	2.1 kg-m or more at 8V, 150A
	Under standard load	0.35 kg-m at 10.9V, 40A at 400 rpm
Generator Characteristics	Under no-load	13.5V at 1,200 rpm or less
	Under load	13A or more at 13.5V & 1,450 rpm

6–2–2. Removing

1. Disconnect wiring from generator.
2. Remove fan and fanshaft, then remove water pump pulley and its belt.
3. Remove pulley set bolt, and remove pulley using special tool (09914–15221).
4. Remove generator cover, and then remove stator ass'y with carbon brushes lifted up.
5. Remove armature using special tool (09914–15211).

Tightening Torque for Armature Bolt	400–500 kg-cm (28.9–36.1 lb-ft)

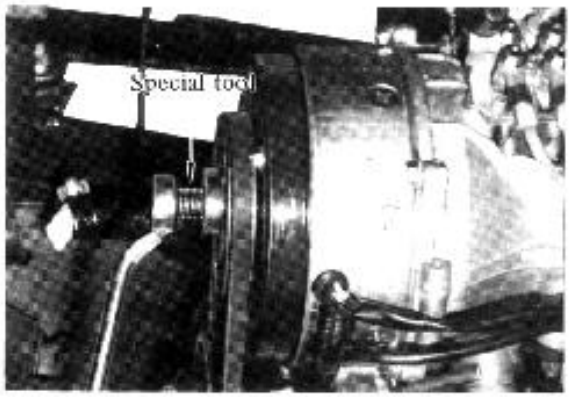


Fig. 6–3

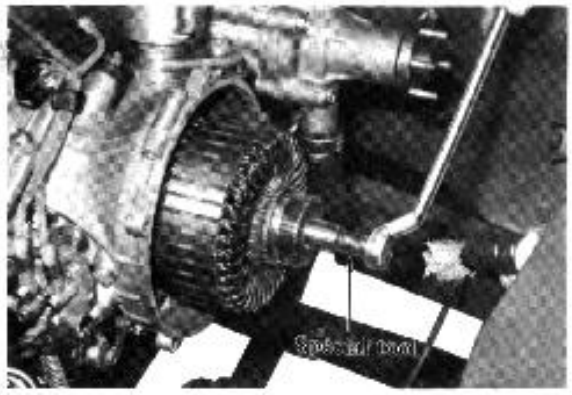


Fig. 6–4

6–2–3. Inspecting and adjusting

1. Replace the brushes if the length is less than 12 mm (0.5 in).
2. Visually inspect the damage from burning of the coil, and measure the resistance between the lead wire of the regulator F terminal and brushes. If the resistance is more than specified value, the coil is burnt or broken. If less than the standard, short circuit is conceivable.

Field Coil Resistance	3 5 Ω

3. After the stator is removed, if the resistance between the stator body and lead wires is found less than 1 MΩ, the insulation is faulty.

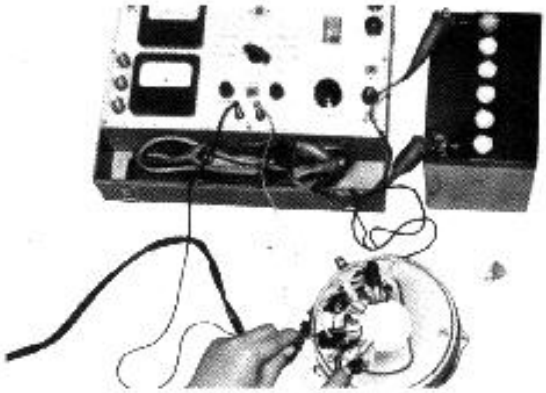


Fig. 6–5

6–2–4. Armature

1. Ground test

   Using an armature tester, check continuity between commutator and core of armature coil. Replace armature, if pilot lamp lights, because it is an indication of grounded armature.

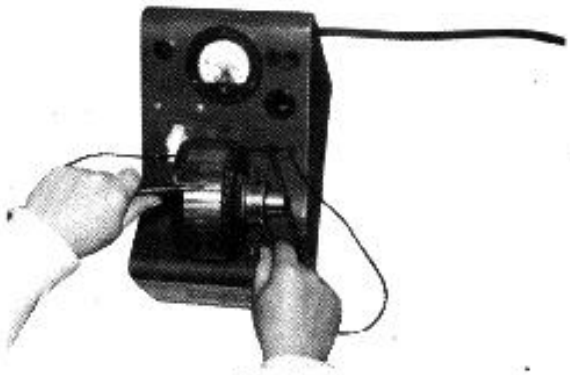


Fig. 6 6

2. Shortcircuit test

   Using a tester, put a piece of iron on core of armature, and rotate the armature. Replace armature, if the piece of iron is attracted or vibrates, because it is an indication of shortcircuit in the armature.

Fig. 6 7

3. Continuity test

   Using a tester, test continuity between each segment. Replace armature, if pilot lamp does not light at any position, because it is an indication of discontinuity.

Fig. 6–8

4. Inspecting and servicing

The defects of the armature are mainly due to the wear of the commutator and damage from burning of the winding.

1) The wear of the commutator will result from a long period of use or damage from burning, which results from short-circuit caused by the carbon accumulation on the under-cut of the commutator.

2) The damage from burning is caused by short-circuit or excessive electrical load.

3) Servicing procedures

a) Use extra fine sandpaper if the wear of the commutator is slight. When the wear is excessive, correct it to the correction limit by using a lathe.

b) After correction was made, remove carbon, copper powder or oil.

c) When the correction is difficult, replace the armature assembly.

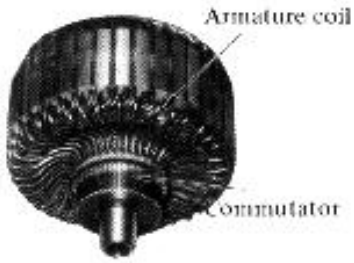


Fig. 6–9

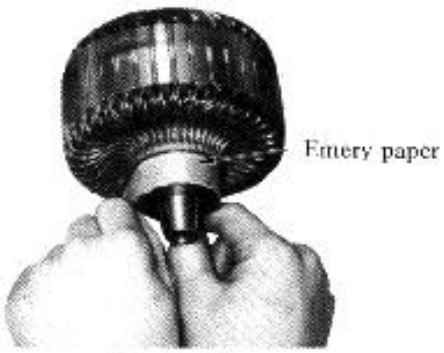


Fig. 6–10

5. Notes on servicing the starter-generator

1) Worn brushes reduces the output of the generator and starter, and quickens the wear of the commutator. It is advisable that worn brushes be replaced as soon as possible.

2) The uneven wear of the commutator results in "high mica," making charging inefficient and wiring burn. Complete repair or replacement is required.

3) Do not touch the commutator surface with a hand when installing it. (oiliness causes fast wear.)

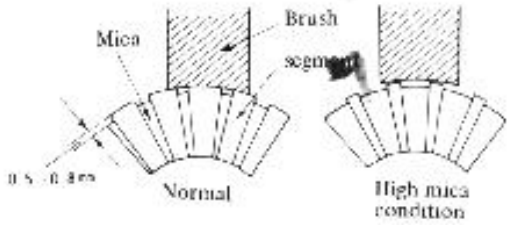


Fig. 6–11

Brush Length	Standard	24 mm (0.94 in)
	Limit	12 mm (0.47 in)
Commutator Diameter	Standard	46 mm (1.811 in)
	Limit	44 mm (1.732 in)
Commutator Diameter Accuracy	Standard	0.1 mm (0.0039 in) or less
	Limit	0.5 mm (0.0197 in)
Mica Depth (under-cut)	Standard	0.5–0.8 mm (0.02–0.03 in)
	Limit	0.2 mm (0.008 in)

6–3. Regulator

The charging system is separated into the generator and regulator, but inspection and tests must be performed for both components at the same time, because they are in close electrical relation.

6–3–1. Inspecting charging system

1. If the charge lamp fails to light up:
   (No electricity is generated)
   In this case, it is necessary to find which is faulty, the generator or the regulator. Disconnect the lead wire of the regulator F terminal, and ground it. Then, raise the engine speed:
   1) The lamp goes off . . . The voltage regulator is faulty.
   2) The lamp keeps on . . . The generator is faulty.

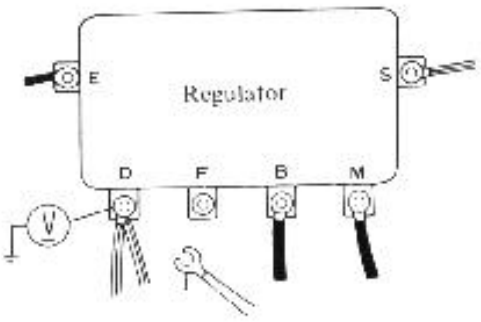


Fig. 6–12

Note : When grounding the F terminal lead wire, do not raise the engine speed more than 2,000 rpm. Do not perform this test continuously for more than 10 seconds. Be sure to disconnect the wire from the F terminal, and ground it.
If you fails to do so, the regulator contact points and generator may be subject to burning and become inoperative.

2. When the engine speed is raised, the charge lamp once goes off and again turns on. Connect a voltmeter in between regulator's D terminal and ⊖ terminal. Disconnect the B terminal wire, and increase the engine speed, and measure variations in voltage.

   1) If the voltage goes down to 14.9 volts or less, the generator is faulty (worn brushes and commutator).
   2) If the voltage is stable at 15.0–16.0 volts, both generator and voltage regulators are in good condition. Instead, the cutout relay or cutout points are faulty. Or the D and B terminals are not in good contact.

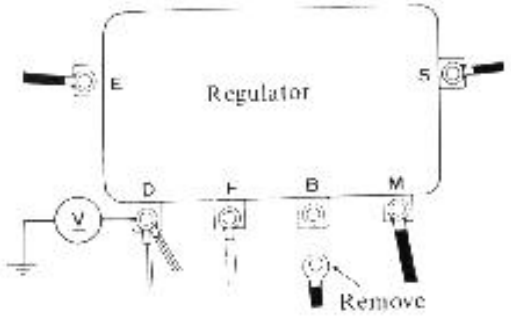


Fig. 6–13

3. The charge lamp turns off, but the battery quickly goes to a discharged state, or the electrolyte level goes down quickly due to overcharging.
   As in the case of 2 above, connect a voltmeter to the D terminal, and disconnect the lead wire from the B terminal. Then take the following steps.

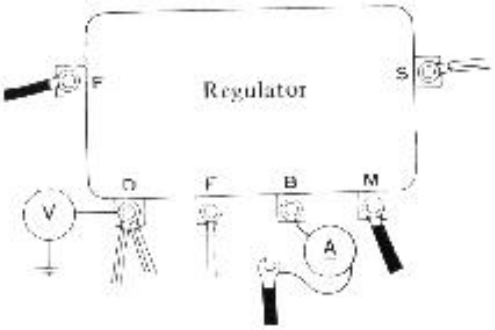


Fig. 6–14

1) Slowly increase the engine speed. Make sure that the voltage at the D terminal stops increasing at 15.0–16.0 volts. Then increase the engine speed again, and make sure that the voltage stays in between 15 and 16 volts and will not tend to rise. In this case, the voltage regulator is in good condition.
2) As the next step, connect the ammeter between the terminal **B** and the lead wire, and gradually increase the engine speed while watching the ammeter. Then, the ammeter needle starts swinging suddenly. If the voltage reading is 13.5 volts, the regulator is in good condition. (cut-in voltage)
3) Gradually decreasing the engine speed, the ammeter needle starts to minus and turns back to zero. When the reverse current is below 10A, the regulator is in good condition. (reverse current value)
4) If the voltage is higher than 16.0 volts in the test described in a above, the electrolyte tends to decrease. If the voltage is excessively high, the battery may be deformed. When it is lower than the specified rate, the battery may be discharged.
5) If the cut-in voltage is low or if the engine speed is too high, the battery may be discharged.

6–3–2. Adjusting voltage and current

When the regulator is used for a long time or required to be adjusted, it can be adjusted in the following manner. Other defects than specified below can not be corrected or are difficult to be corrected, and therefore, the regulator should be replaced.
When adjusting the regulator, be sure to disconnect the lead wire from the terminal B. Otherwise, the generator lead wire may be burnt.

1. Adjusting voltage regulator

When the battery is in a discharged condition, measure the no-load voltage. If the value is beyond the specified range, the voltage regulator should be adjusted.

1) Remove the regulator cover and check the points and coil with your eyes.
2) If the points are stuck or the coil is damaged or burnt, replace it, because repairs are difficult.
3) If the point surface is slightly burnt or roughened, smooth it out with extra fine sandpaper. Then clean it of oil and dust with clean paper or cloth.

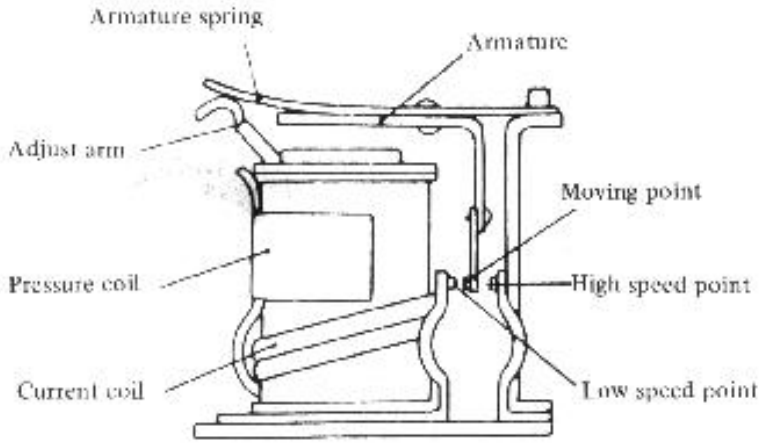


Fig. 6–15

4) Measure the no-load voltage, and if the voltage is not normal, adjust the armature spring tension bending with the adjusting arm slightly. (Fig. 6–16)
Bending adjusting arm up . . . . Increasing voltage
Bending adjusting arm down . . Decreasing voltage

Standard Voltage Value	15.6–16.6 volts

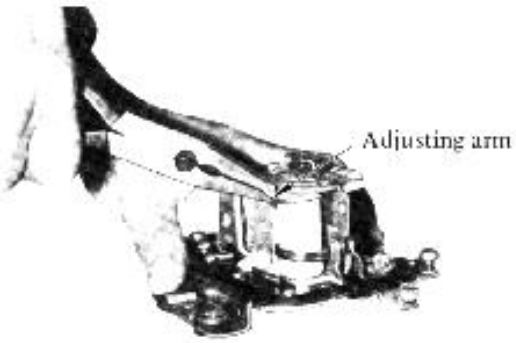


Fig. 6–16

5) If the no-load voltage can not be adjusted with the adjusting arm, then check and adjust point gaps and air gap.
6) For the adjustment of the gap, first adjust the air gap as shown in the Fig. 6–17 and 6–18. Set the thickness gauge to the specified air gap value and insert it between armature and core. Depress the armature and bend the arm of the low speed contact point so that the low speed point contacts well with the moving point. Then, in the static condition, bend the arm of the high speed contact point so that the point gap between moving point and high speed point becomes the specified value.

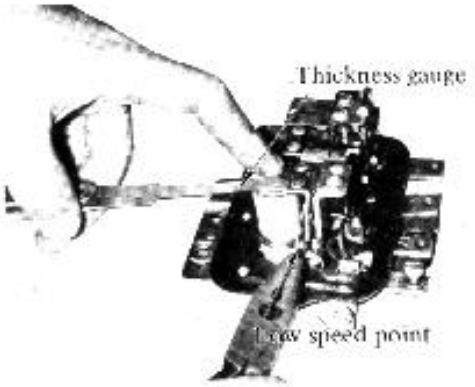


Fig. 6–17

Air Gap	0.8–1.3 mm (0.0315–0.0512 in)
Point Gap	0.25–0.45 mm (0.0098–0.0177 in)

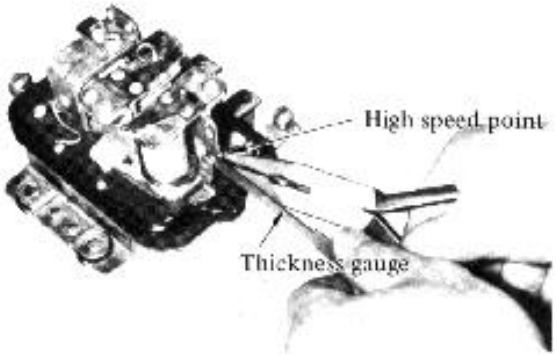


Fig. 6–18

2. Adjusting cut-out relay

Adjust both the cut-in voltage and cut-out current (reverse current) to the standard value by adjusting the cut-out relay.

1) Remove lead wire from the regulator B terminal.
2) Follow procedures 1), 2) and 3) of the voltage regulator adjustment.
3) Connect volt-meter to the D terminal and to the ⊖ terminal.
4) Increase the engine speed gradually and check it if the volt-meter leading shows 12.0 to 13.5 volts when cut-out relay is switched on.
5) Connect ammeter in between the regulator B terminal and the battery cable, and then decrease the engine speed.

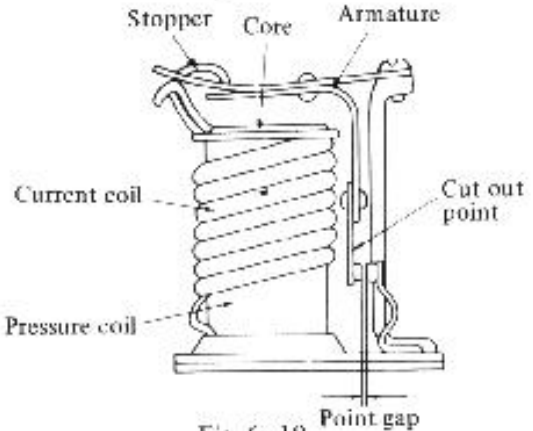


Fig. 6–19

6) If the reverse current is less than 10 amperes, the cut-out current is normal.

7) Adjust the armature spring tension for adjusting cut-in voltage and cut-out current.

Bending adjusting arm up . . . . . Increasing cut-in voltage and decreasing cut-out current.
Bending adjusting arm down . . . . Decreasing cut-in voltage and increasing cut-out current.

Cut-in Voltage	12.0–13.5 V
Cut-out Current (Reverse Current)	10 amps. or less

8) If the cut-in voltage and the cut-out current can not be adjusted by adjusting arm, then check and adjust the gaps.

Air Gap	0.8–1.3 mm (0.0315–0.0512 in)
Point Gap	0.4–1.2 mm (0.0157–0.0472 in)

3. Adjusting the starting relay

The starting relay is installed in the regulator, but it has no relation with the regulator. When the starter system is found defective, check and adjustments should be made as follows:

1) Turn the ignition switch to "start." If the starter motor fails to turn and no defect is found with the battery and wiring, perform a test by directly connecting the terminal B and terminal M on the regulator.
If the engine starts under such conditions, it is considered that the starting relay is defective. Thus, the following inspection and adjustment should be carried out.

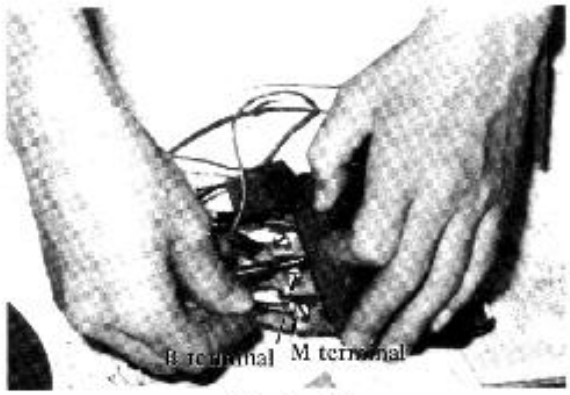


Fig. 6–20

2) When a checking sound is heard upon connecting the battery lead wire (B) with the terminal (S), the relay coil is in good condition. If not, the coil is defective, and the regulator should be replaced.
3) Inspect the burnt condition on the point surface, and if necessary, smooth it out. If the contact points are stuck or burnt badly, the regulator assembly should be replaced. Since a current of 150 amperes at maximum runs through the contact points, take special caution while making adjustment.
4) The adjustment to be performed with adjusting the starting relay point gap to 1.0 mm (0.04 in).
5) When the ignition switch is turned to the "start" Position, the relay may vibrate. This may be due to the battery being discharged. Therefore, the relay is not faulty.

6–4. Battery

6–4–1. Specifications

Model	12N24-3
Voltage	12 volts
Capacity	24 A.h./10 hr. rate
Electrolyte Capacity	1.8 litters (1.9/1.6 US/Imp pt.)
Specific Gravity	1.280 at 20°C (68°F)

6–4–2. Maintenance and judgement of defective condition

Battery life depends largely upon the way of maintenance. If it is not used in a correct manner, the service life will be reduced extremely. Particularly, the maintenance on the part of the customer is highly important. So that it is necessary to instruct the customer on how to perform daily check as well as periodical inspection and maintenance.

1. Capacity reduction due to decrease in electrolyte

   The decrease in electrolyte is caused by avapolation, and it varies according to the atmospheric temperature and the charging current. Check the electrolyte level every week in summer and every 2–3 weeks in other seasons, and add distilled water if necessary. If the electrolyte shows a quick decrease, measure the charging voltage, and adjust it.

2. Decrease in electrolyte and deformation of the case due to overcharging

   Fast decreases in electrolyte will result from overcharging due to incorrect charging voltage. If the charging voltage is extremely high, the battery temperature tends to rise, causing the pitch to melt and the case to deform.

3. Capacity reduction due to undercharge or over-load

   Low charging voltage (undercharging) will cause the battery to discharge quickly, but over-load will cause the battery discharging and quickly wear of the armature, commutator and brushes.
   The battery capacity is determined by taking into consideration the standard load and allowance for the vehicle. When installing optional parts, care should be taken so that over-load will not result. If necessary, replace the battery with a larger capacity.

4. Capacity reduction due to falling of chemicals from plates

   After a long period of use, brown dust may be seen on the bottom of the battery cells. This is considered to be natural phenomenon due to chemical reactions. However, if the falling of chemicals is too fast, it may be due to over-load or overcharging of the battery or due to the result of quick-charging.
   If this condition advances, short-circuit will occur inside the battery, and the battery must be scrapped.

5. Sulfation

   If a battery is left unused for a long time in a store room or on a vehicle, the plates turn into white, and as a result, it can not be used any longer. This is called "sulfation", resulting from the change of active lead into non-reducible lead.
   When the battery is stored, it must be fully charged, and stored in a dry place. Do not expose it to the direct rays of the sun. Re-charge it every 15 days.

6. Resistance increase at terminals due to corrosion

   The battery terminals (particularly ⊕ terminal) tend to corrode after a long time of use, obstructing the smooth flow of current. Thus, hard starting and hard charging will result. This is caused by the oxidation of lead. To prevent this, clean and grease the terminals at the time of periodical inspection.

7. Specific gravity and temperature of the electrolyte

The charged condition of the battery is found by electrolyte specific gravity. And the specific gravity also varies depending on the temperature of the electrolyte. Therefore, the relationship between the gravity and temperature must be studied. The diagram Fig. 6 21 shows relation between the specific gravity and temperature of the electrolyte. When checking the charged condition, refer to the table for accurate check.

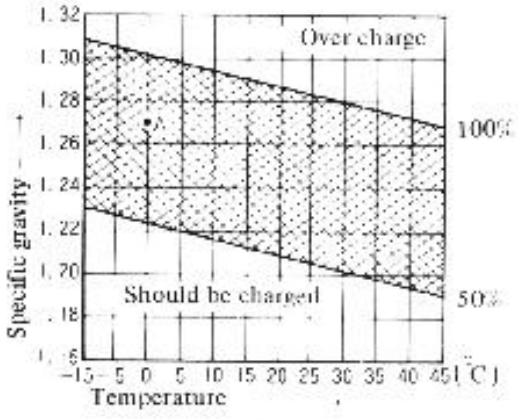


Fig. 6–21

Note : 1) If the measured specific gravity value is in excess of 100% of specified gravity at respective temperature the quantity of sulfuric acid contained in the electrolyte is too much. Add distilled water, and adjust the specific gravity to 1.28 at 20°C when battery is fully charged.

2) If the charging amount is considered 50% or less, the battery should be charged immediately using with the battery charger.

Example : If the specific gravity is 1.28 at a temperature of 5°C (23°F). Judging from the point A, which is intersection of the lines passing 5°C (23°F) and 1.28, the charged condition is estimated at about 85% but if the gravity is the same 1.28 at 20°C, the battery is considered to be charged nearly 100%.

6 4–3. Charging battery

The battery should be charged at a rate of 10% of the battery capacity for 10 to 20 hours. Quick charging at a large rate of current will adversely affect the life of the battery, and therefore, it should be avoided.
All new batteries are dry-charged, and can be charged 50% simply by filling it with electrolyte, provided that it is just filled with electrolyte within six months from the date of manufacture. Accordingly, a new battery should be charged for 10 to 20 hours, if it is within 6 months, and for 30 hours if it is beyond 6 months. Without charging it, do not use a new battery.

7–1. General

The clutch installed for this model is of the dry single disc type employing diaphragm springs, and the clutch disc is connected with the transmission input shaft by means of serration, and designed to slide along the shaft. The clutch cover is attached to the engine flywheel, and the clutch disc is pressured by the flywheel and the pressure plate inside the clutch cover. Being simple in construction, the clutch requires no adjustments. It is also highly durable and sturdily built to withstand heavy loads.

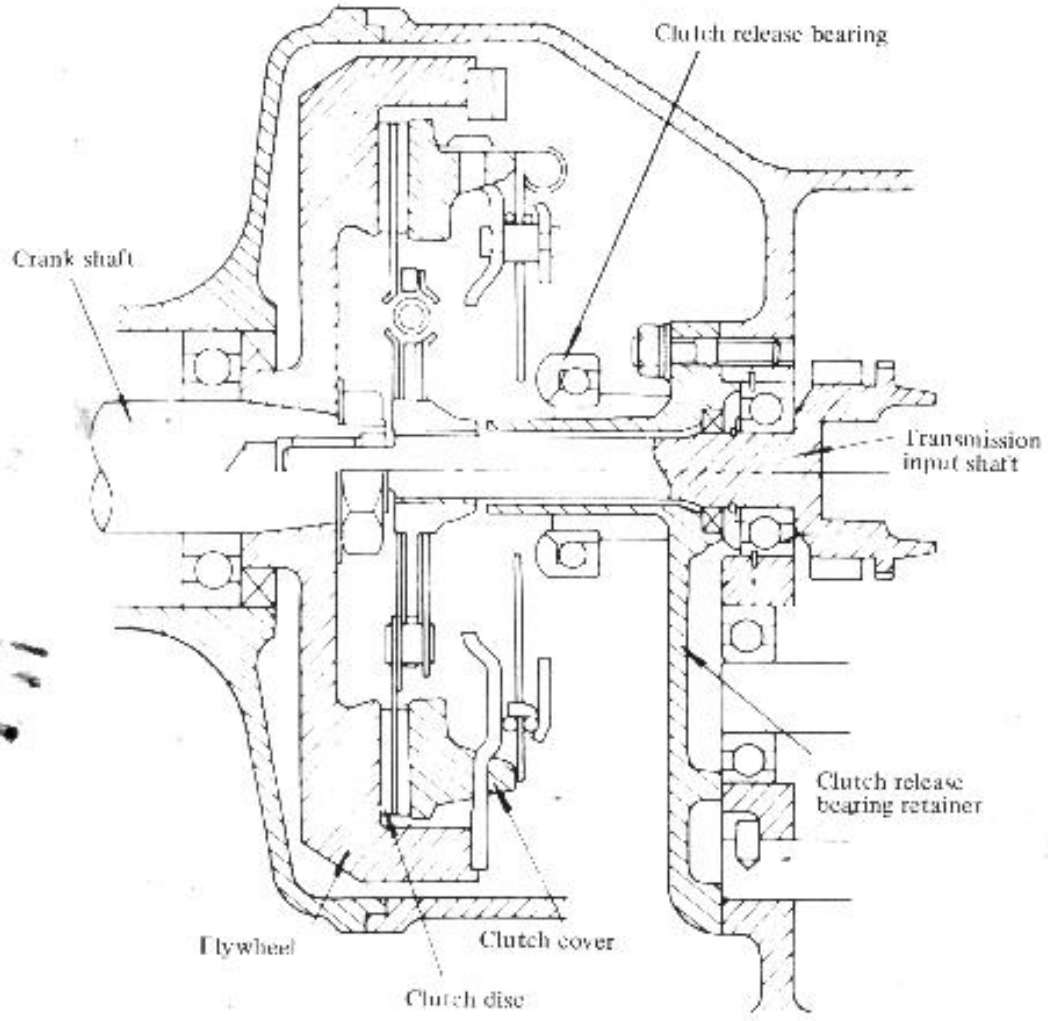


Fig. 7 1

7–2. Removing and Installing of Clutch

7–2–1. Removing

Remove clutch and perform maintenance separately from engine.

1) Remove drain plug and drain transmission oil.
2) Disconnect clutch cable from clutch release arm.
3) Disconnect back-up lamp switch wiring.
4) Jack up front wheels and put safety stands.
5) Remove propeller shaft No. 1 and front propeller shaft.
6) Remove gear shift control shaft from gear shift lever shaft.
7) Remove nuts attaching transmission to engine, remove transmission mounting rubbers, and remove transmission.

7 2 2. Installing

1. When installing clutch cover, align the center of clutch disc with the center of flywheel, using clutch disc center guide (09923–35110).
2. When installing transmission assembly to body, fix mounting rubber to body.

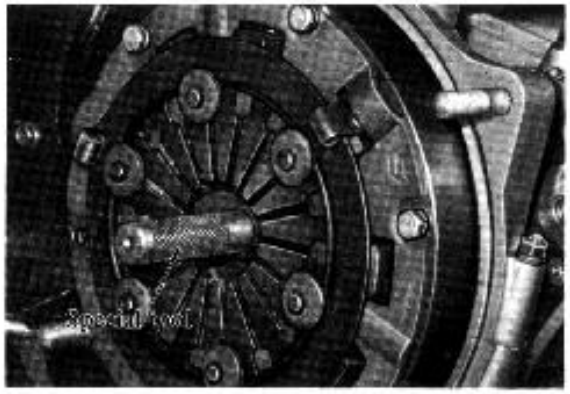


Fig. 7–2

3. The installation of the clutch release arm will be difficult after the transmission is mounted, and therefore, before mounting the transmission, install the arm so that the punched mark on the arm is off the mark on the shaft by two notches for LJ20, LJ20V and on the mark on the shaft for L50, L51 L50V as shown in the Fig. 7–3.

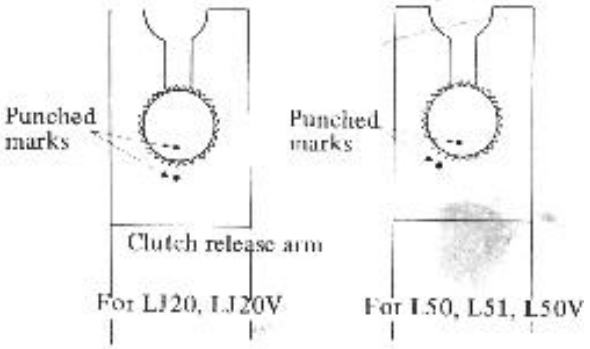


Fig. 7–3

7 3. Clutch Release Shaft

7–3–1. Removing

1. Remove the clutch release bearing.
2. Slip out the clutch release shaft return spring from the case stopper.
3. Remove the clutch release arm.
4. Use the clutch release shaft bush remover (09922–45810) to remove the bushing on the opposite side of the return spring and drive it out with a hammer from the serration side. Be careful, however, not to strike the shaft without using the special tool, the bushing may be broken.
5. Place the special tool on the side of the return spring, and tap the shaft with a hammer.

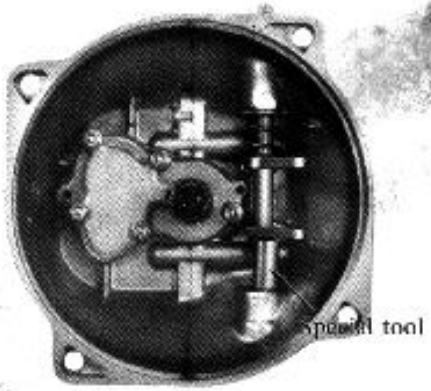


Fig. 7–4

7–3–2. Installing

Installation can be done in the reverse order of disassembling, but as the oil seal is pressed into the side of serration, push the bushing 5 mm (0.2 in) deep into the clutch housing. Press in the clutch release shaft oil seal so that it is on a level with the edge. Coat the grease lightly inside the bushing when they are installed.

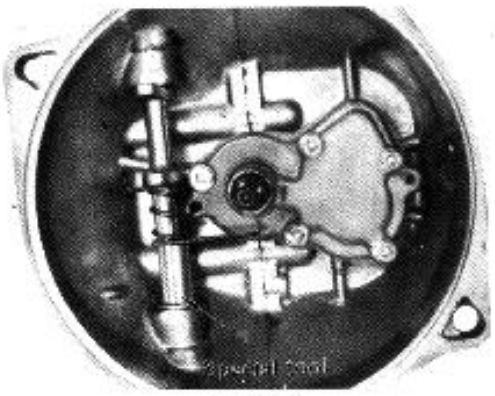


Fig. 7–5

7 3 3. Inspecting release bearing

Rotate the bearing with a hand by pushing it in the axial direction, and check if any resistance or dragging is felt. If it is found faulty, replace it. If bearing makes noise when depressing the clutch pedal, remove and check the bearing as a same manner described on the above.

Fig. 7–6

7–4. Inspecting and Servicing Clutch Assembly

7 4 1. Clutch disc

The amount of the wear on the clutch disc can be determined by measuring the recession of the rivet as shown in the Fig. 7 7. If the rivet is found recessed less than the limit, replace the clutch disc.

Depth, Standard	0.8 mm (0.031 in)
Depth, Limit	0.3 mm (0.012 in)
Clutch Disc Free Thickness	7.7 ± 0.41 mm (0.303 ± 0.016 in)

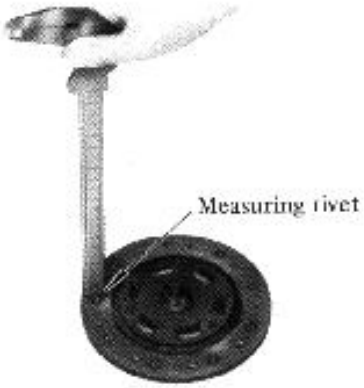


Fig. 7 7

7 4–2. Clutch disc serration

As shown in the Fig. 7–8, install the clutch disc on the input shaft end (serrated), and check for radial play. If the play is excessive, the clutch produces noises and shocks. If the play is more than the limit shown below, replace the disc.

Radial Play Limit	0.5 mm (0.02 in)

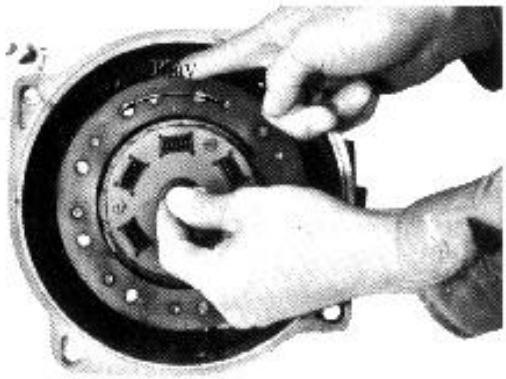


Fig. 7 8

7–4–3. Clutch disc surface

The surface of the clutch disc will become slippery in part after a long time of use, but it will not adversely affects its function. However, if the slippery part become wider, clutch will become slippery. In this case, use sandpaper (# 120–200) to roughen the surface. If the surface is found oily, the same procedures should be taken, or the clutch disc should preferably be replaced.

7–4–4. Clutch cover assembly

1. Depress the clutch pedal, and if noise is heard, check the caulked area A in the Fig. 7 9.
2. If the spring is found excessively worm, it should be replaced as a cover assembly.

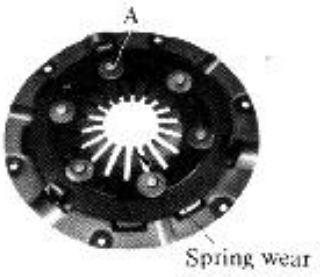


Fig. 7 9

7–5. Clutch Pedal

Adjust clutch pedal to the same hight as brake pedal by means of clutch cable adjusting nut located on right side of crankcase under carburetor, and inner cable adjusting nut attached to the end of clutch release lever. Make the adjustment to the following values:

Free Travel of Clutch Pedal	20–30 mm (0.9–1.2 in)
Play of Clutch Cable	3–4 mm (0.12–0.16 in)

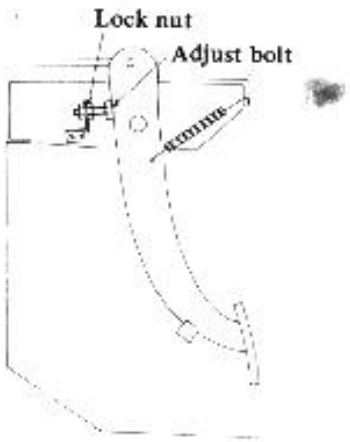


Fig. 7–10

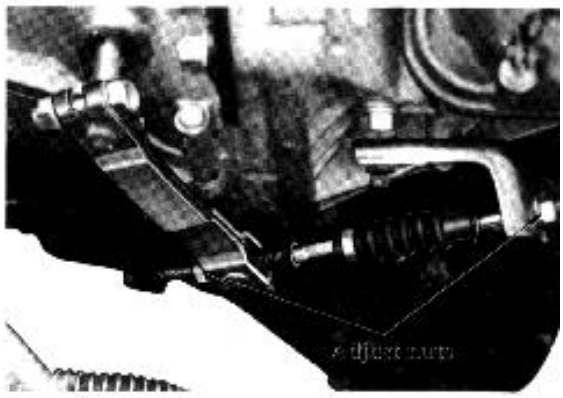


Fig. 7–11

8–1. General

The transmission has four forward speeds and one reverse, and is provided with a synchromesh mechanism. The transmission case is designed to be splitted into the upper and lower halves. Since the synchro-mesh mechanism is attached to the main shaft, service will be easy. With the gears in low, second, and third, the engine speed is reduced by the input shaft and counter shaft driven gear, and then reduced by the respective gear. The reduced speed is transmitted to the propeller shaft. On the other hand, in the case of the top gear, the input shaft is directly connected to the main shaft, through which the engine power is transmitted to the propeller shaft.

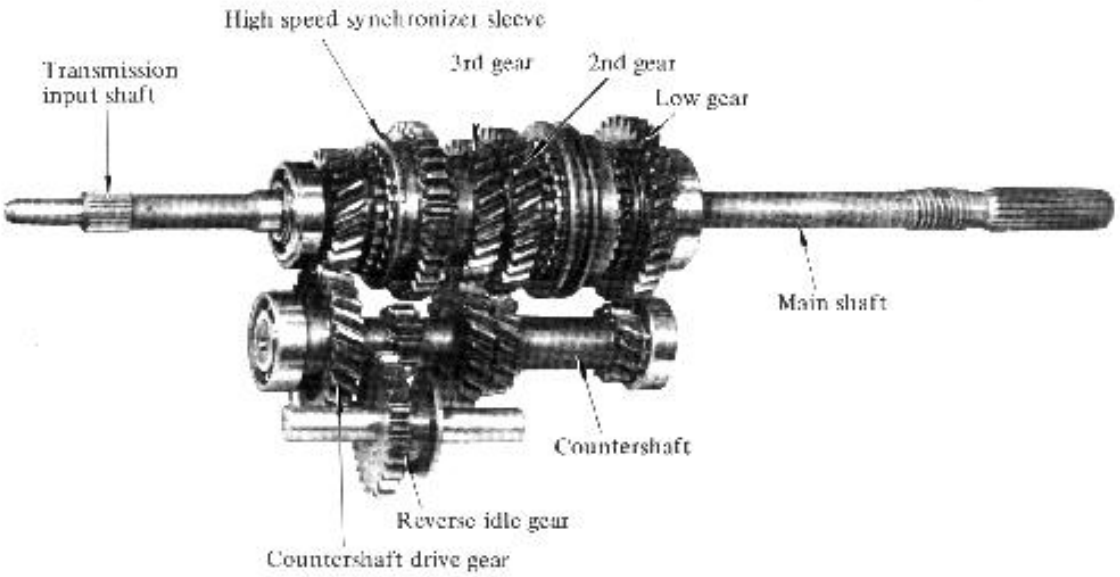


Fig. 8–1

8–2. Specifications

Item	Gear Ratio		Reduction Ratio		Overall Reduction Ratio	
	LJ20, LJ20V	L50, L51, L50V	LJ20, LJ20V	L50, L51, L50V	LJ20, LJ20V	L50, L51, L50V
Low	34/12x28/20	34/12x28/20	3.967	3.967	22.486	27.106
Second	29/17x28/20	29/17x28/20	2.388	2.388	13.532	16.317
Third	24/22x28/20	24/22x28/20	1.527	1.527	8.653	10.433
Top	Direct	Direct	1.000	1.000	5.667	6.833
Revers	34/12x28/20	34/12x28/20	3.967	3.967	22.480	27.106
Primary	28/20	28/20	1.400	1.400		
Final	34/6	41/6	5.667	6.833		

8–3. Removing Transmission

1. To drain transmission oil, remove the drain plug.
2. Remove the clutch cable from the release arm.
3. Disconnect the back-up lamp lead wire connector.
4. Jake up the front wheel and support it with safety stands.
5. Remove the plopeller shaft.
6. Remove the gear shifting lever.
7. Remove the transmission mounting bolts.
8. Jack up the engine so that it will not move down, the transmission is removed.
9. Remove the nuts for the crankcase and transmission case connection.
10. Remove the transmission by moving it down.

8–4. Disassembling Transmission

8–4–1. Dividing transmission case

1. Remove the input shaft retainer as shown in the Fig. 8–2, by using the special tool (09920–31110).
2. Remove the extension case.

Extension Case Nut Tightening Torque	150–200 kg-cm (10.8–14.5 lb-ft)

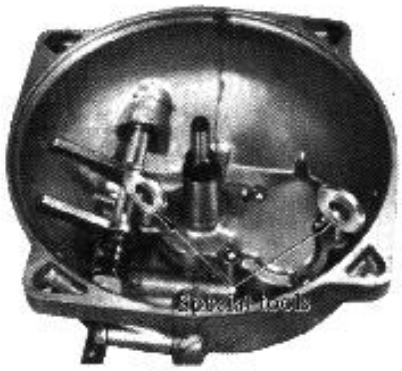


Fig. 8–2

3. Divide transmission case

Transmission Case Bolt (8mm thread) Tightening Torque	150–200 kg-cm (10.8–14.5 lb-ft)
Transmission Case Bolt (6mm thread) Tightening Torque	60–100 kg-cm (4.3–7.2 lb-ft)
Sealing Surface Gasket	Suzuki Seal (Liquid gasket)

4. Remove input shaft and main shaft.

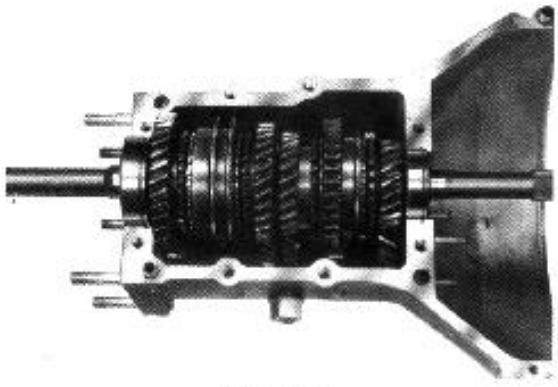


Fig. 8–3

8-4-2. Disassembling lower case

1. Remove the countershaft bearing circlip in such a manner as shown in the Fig. 8-4 and drive out the shaft backward (toward the low gear). Remove the bearing from the countershaft, and move the shaft forward so that it can be pulled out from the transmission case.
2. Remove the reverse gear shaft and gear.

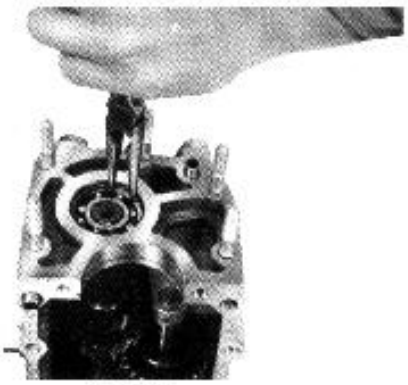


Fig. 8-4

8-5. Countershaft and Reverse Gear

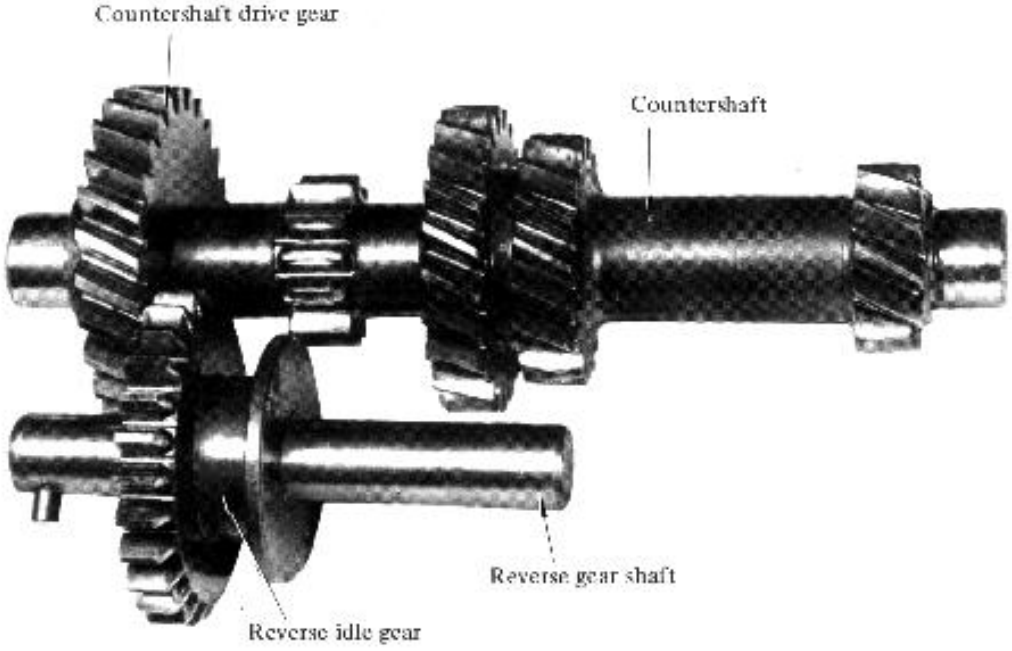


Fig. 8-5

8-5-1. Inspecting and adjusting

1. Reverse and idler gear chamfer

   Excessive wear of chamfered portion of the reverse gear, reverse idler gear and the countershaft gear causes an abnormal gear noise or the gears to come out of meshing while driving.
   Replace excessively worn parts.

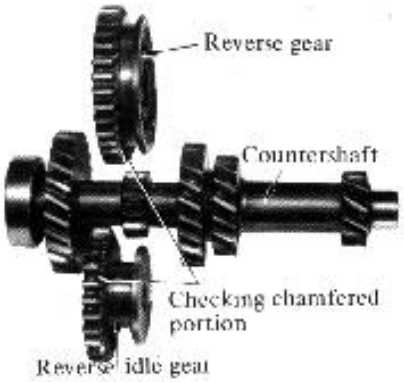


Fig. 8-6

2. Bearings

Wash the bearings on both sides of the countershaft and lubricate them, and check them for looseness, wear and rotation. If found faulty, replace them. Be careful not to give excessive pressure onto the bearing race when assembling.

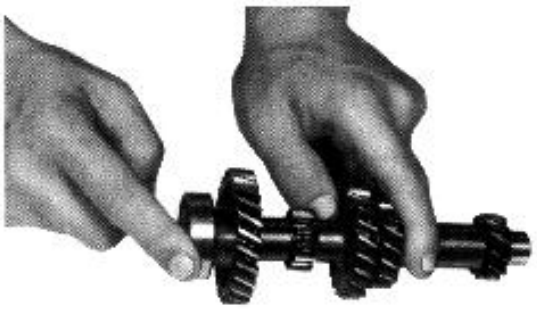


Fig. 8-7

8-6. Extension Case

8-6-1. Inspecting and adjusting

1. Extension case oil seal

Extension case oil seal is pressed onto extension case, and prevents oil leak through clearance between sliding yoke and extension case.
Replace oil seal when oil leaks. When installing oil seal, do not fail to coat the lip of seal with grease.
Also, coat splined portion of sliding yoke sufficiently with grease.

2. Play between yoke and extension bushing

Extension bushing is force fitted into extension case. When the bushing is worn out to cause play between the bushing and yoke, replace complete extension case, otherwise the play may cause vibrations of propeller shaft.

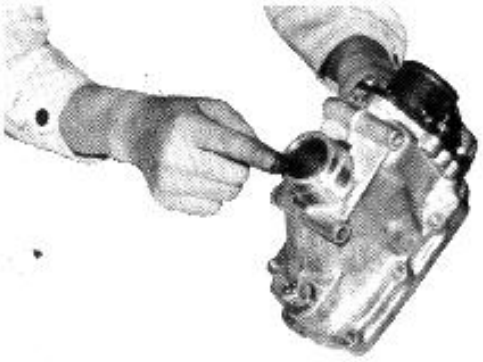


Fig. 8-8

8-7. Input Shaft and Main Shaft

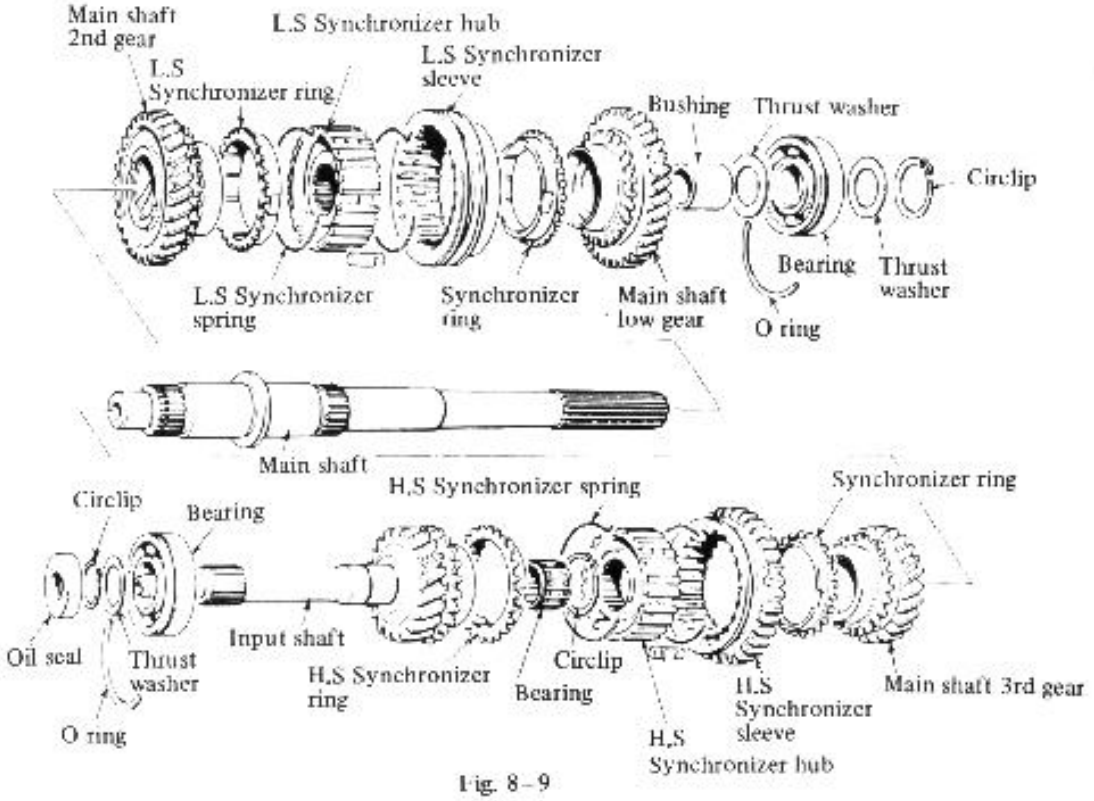


Fig. 8-9

8–7–1. Inspecting and adjusting

1. Gear and synchronizer ring

Bring the synchronizer ring in mesh with the gear as shown in the Fig. 8–10, and measure the clearance. If the clearance is found smaller than the limit, replace the synchronizer ring. If the clearance is still smaller than the limit, replace both gear and ring.

Fig. 8–10

When the synchronizing mesh is found faulty, the contact between the ring inner surface and the gear cone may be improper, even if the clearance is more than the limit. Check these parts for contact. There may be glossy and dull spots on both ring inner surface and cone outer surface. If so, the contact is not made evenly.

If the above-mentioned checking method is found not practicable due to some reason, use red lead. Sometimes, the cone has wavy wear, and therefore, check should be made with special care.


Checking contacting surface

Fig. 8–11

Clearance Between Gear and Ring	Standard	Limit
	1.5 mm (0.059 in)	0.5 mm (0.020 in)

2. Meshing between the chamfered portions

Meshing between the chamfered portions of the synchronizer ring and the sleeve is greately affected by the clearance between the key and the key way of the synchronizer ring as well as between the key and the key groove of the synchronizer hub. Therefore, the clearance should be checked in the following manner.

First, turn the synchronizer ring, and when it stops, lightly push the ring toward the synchronizer hub.

Measure the contacting surfaces of the chamfered portion, and if the contact area is made indicating one-third of each chamfered portion, the clearance between the key and the key way is proper.

If the clearance is too large due to the excessive wear of the key way, the chamfered edges may tend to clash, thereby causing hard shifting. In worst case, gear shifting becomes impossible.

Accordingly, if the meshing is improper, check the key, synchronizer ring and synchronizer hub key grooves for wear. If any of these parts show excessive wear, replace it. If all these parts are found worn and a total amount of wear is considered to cause excessive wear, replace all.

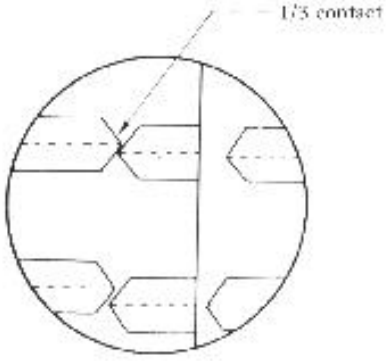


Fig. 8–12

3. Synchronizer ring

Check the synchronizer ring for deformation resulting from careless handling, and check for damage or wear of key ways and chamfered portions. Also check for wear on the cone surface.

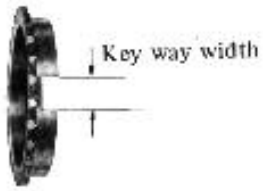


Fig. 8-13

Inspection Item	Standard	Limit
Low Speed Synchronizer Ring Key Way Width	9.6 mm (0.378 in)	10.0 mm (0.394 in)
High Speed Synchronizer Ring Key Way Width	9.4 mm (0.370 in)	9.8 mm (0.386 in)

4. Synchronizer spring

When installing the springs be sure to set them so that the open portion of both springs are not positioned face to face in the synchronizer hub.

Inspection Item	Standard	Limit
Low Speed Synchronizer Spring Outside Dia.	55 mm (2.17 in)	52 mm (2.05 in)
High Speed Synchronizer Spring Outside Dia.	54 mm (2.13 in)	51 mm (2.01 in)

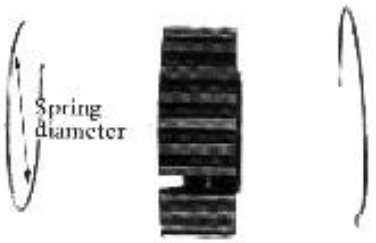


Fig. 8-14

8-8. Assembling

8-8-1. Notes on main shaft installation

1. Make sure that the high speed synchronizer hub is installed with its boss facing toward the top gear, and that the low speed synchronizer hub is facing toward the low gear.
2. Make sure that the high speed and low speed synchronizer sleeve are installed with their shift fork grooves facing toward the higher speed gears (top or second) as shown in the Fig. 8-15.

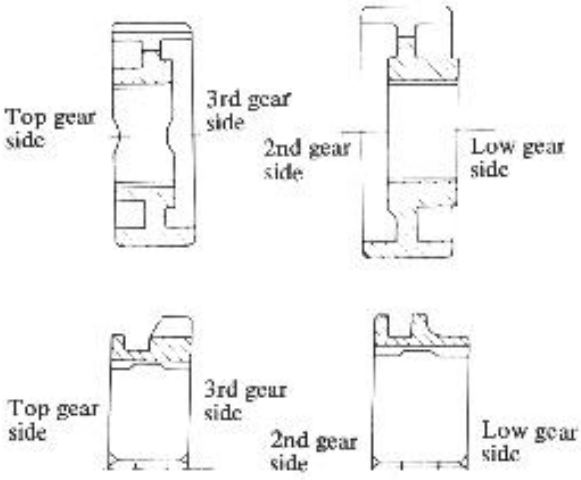


Fig. 8-15

3. Both synchronizer rings and keys are different in type between those for high and low speeds. Do not confuse one with another.
   The synchronizer rings for low and second gears are larger in diameter. When the gears and synchronizer rings are disassembled, they should be handled as a unit in order to maintain the same contacting condition as before.

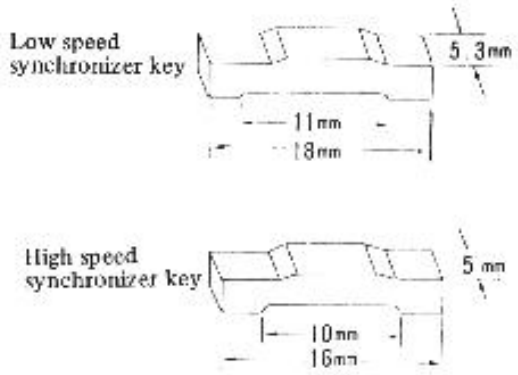


Fig. 8–16

4. The synchronizer springs for high speed are different in shape as compared with that for low speed.

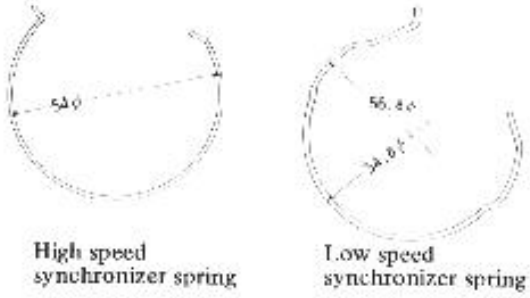


Fig. 8–17

5. Thoroughly wash the input shaft and main shaft bearings, and oil them. Then check for smooth rotation.
   If any of these is found faulty, replace it. When installing them, be sure to position them so that their ring grooves are facing toward the clutch.

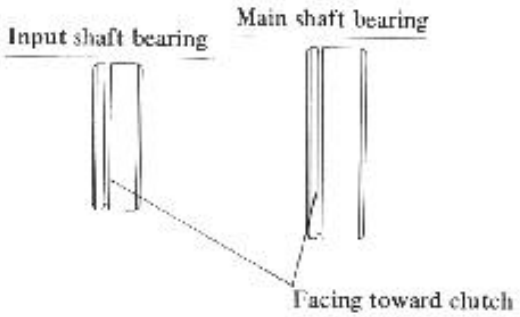


Fig. 8–18

8–8–2. Notes on transmission assembling

1. When replacing the input shaft bearing retainer stud bolts, use the thread lock cement for preventing the oil leakage.
2. Be sure to replace every oil seal and apply oil or grease to the lip prior to installation.
3. After installing the main shaft and input shaft in the lower case, check both countershaft gears and reverse gear for meshing condition. Next, make sure that each synchronizer ring is free from the gear.

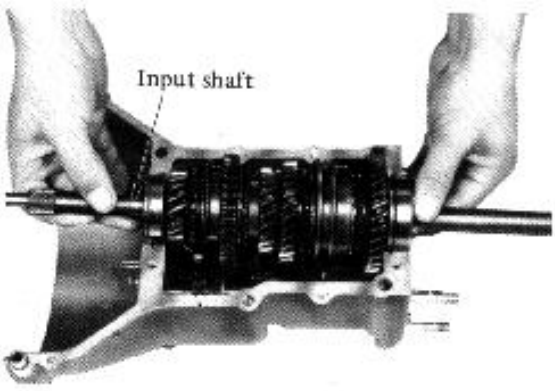


Fig. 8–19

4. When installing the upper case on the lower case, take care so that the reverse gear shift lever fits sungly into the reverse idler gear groove. For this installation, check the neutral position of each shifting fork, and allow a clearance of about 2 mm (0.08 in) between the idler gear and the countershaft drive gear as shown in the Fig. 8–20.

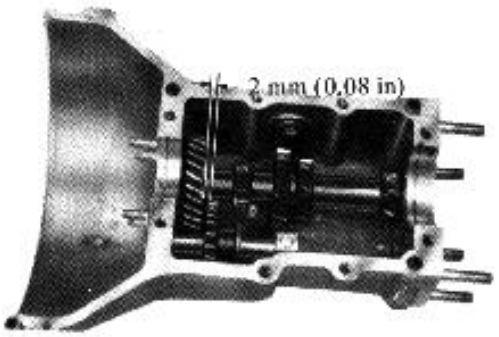


Fig. 8–20

5. When installing the input shaft bearing retainer, be sure to put the reverse gear shaft dowel pin into the groove. If the pin is fitted incorrectly, the case may be damaged.

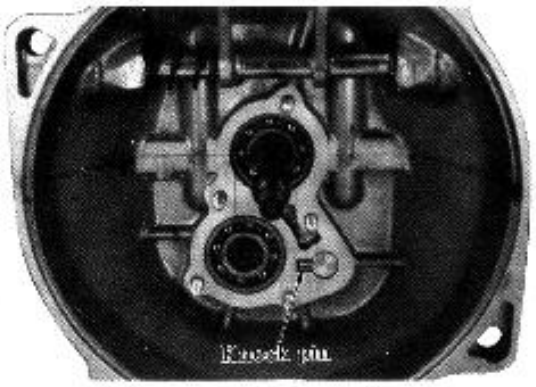


Fig. 8–21

8–9. Shifting Fork Shaft

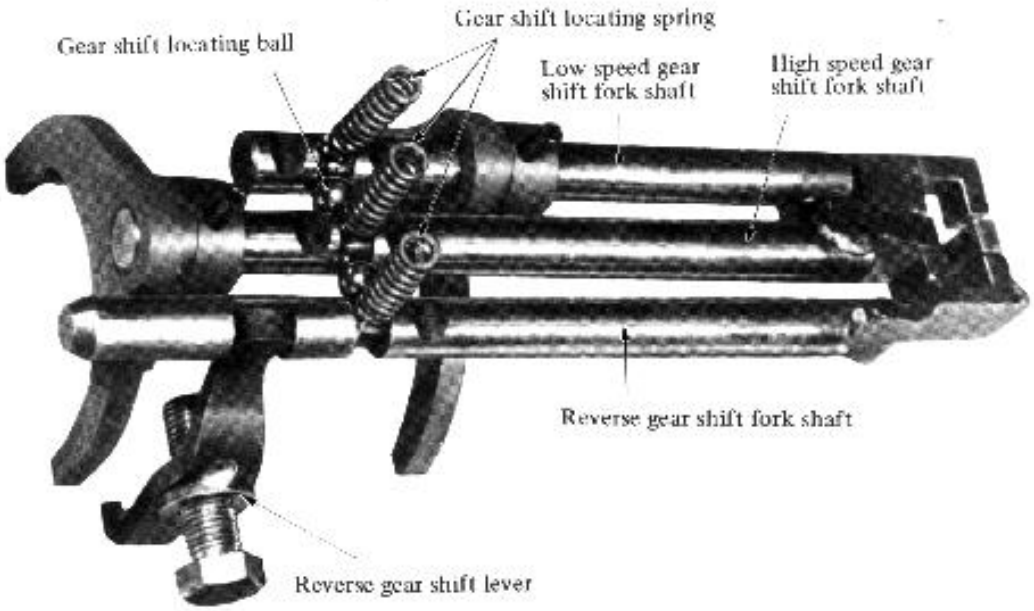


Fig. 8–22

8–9–1. Disassembling shifting fork shaft

1. Remove the reverse gear shifting lever bolt (outside of the transmission case), and remove the shifting lever.
2. Remove the gear shifting fork shaft stop plate.
3. Make sure that each shifting fork shaft is in Neutral position.
4. First, remove the reverse gear shifting fork shaft and then other shafts in order. As for the reverse shaft, it should be pulled out in such a manner that the slotted portion for reverse gear shifting lever will not be aligned with the locating ball and spring positions. As shown in the Fig. 8–24, turn the shaft before pulling it out, and then remove it. (take care not to allow the balls to spring out.)
5. Shift the high speed shifting fork shaft to the third gear, and pull out the spring pin thorugh the hole in the same manner as above.
6. Shift the low speed shifting fork shaft to the second gear, and pull out the shaft in the same way as above.

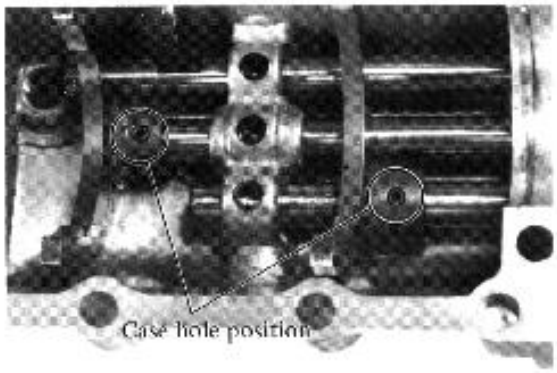


Fig. 8–23

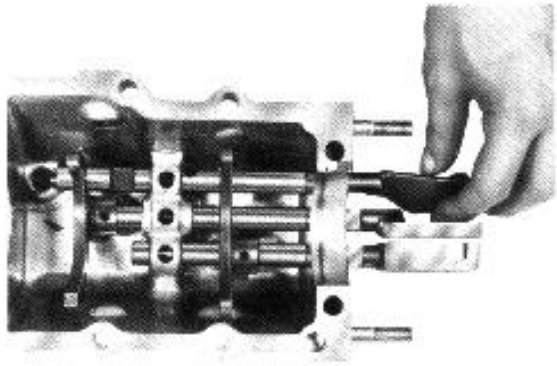


Fig. 8–24

8–9–2. Inspecting and servicing

1. The shifting fork shaft tends to bend due mainly to careless handling when installing or removing the spring pin. If the shaft is bent, hard shifting will result. Take care not to bend the shaft while removing the spring pin. If it is found bent, correct or replace it.
2. Special care should be exercised when installing the locating springs, balls and roller, because any of these is faulty, hard shifting and gear demeshing while running will result. In addition, the transmission assembly may be damaged by shifting two shafts at the same time if the locating balls or roller are not installed. If the gears tend to demesh while driving, check the springs for free lenght. If found faulty, replace it. (it may be allowed to install washers in the case.)

	Standard	Limit
Locating Spring	19.5 mm (0.767 in)	17 mm (0.669 in)

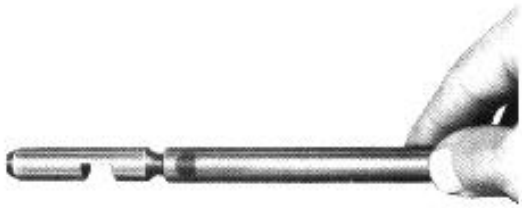


Fig. 8–25

Fig. 8–26

3. The reverse shifting lever is bolted to the case with a small clearance between the lever and case, and accordingly, the lever has a relatively large play. But if the play is excessive, hard shifting will reualt.

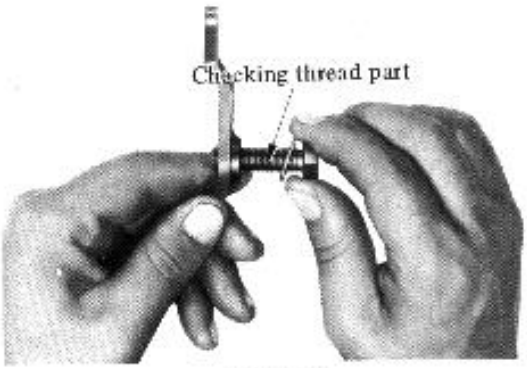


Fig. 8–27

8–9–3. Installing

1. Each gear shifting fork should be installed with the spring pin hole side facing toward the extension case.

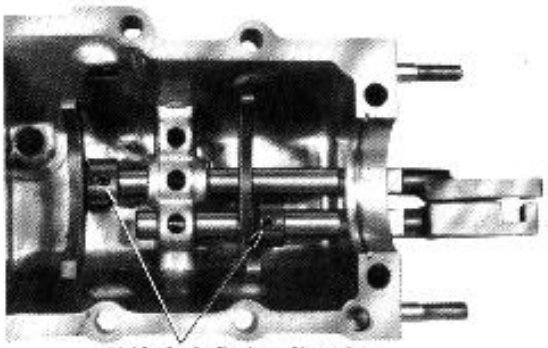


Fig. 8–28

2. The shifting fork shafts, as a rule, should be installed beginning with the low speed shaft. Be sure that the shaft should be placed in the neutral position. Otherwise, other shaft can not be installed.

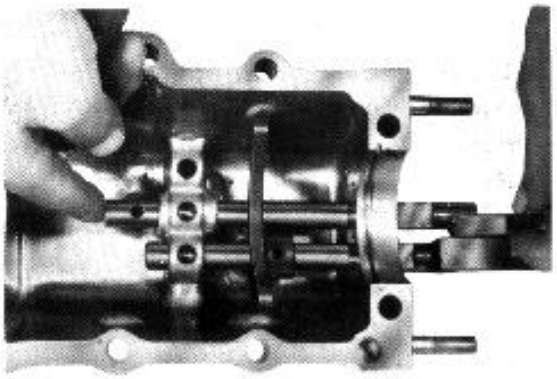


Fig. 8–29

3. If the reverse gear shifting fork shaft is turned even a little, the select lever position will be improper, thereby making the gear shifting hard.
   Accordingly, when installing the shafts, keep the stop plate being forced against the shafts, and lock it with bolts, thereby minimizing the radial play of each shaft. However, if too tight, the shaft will not move smoothly.

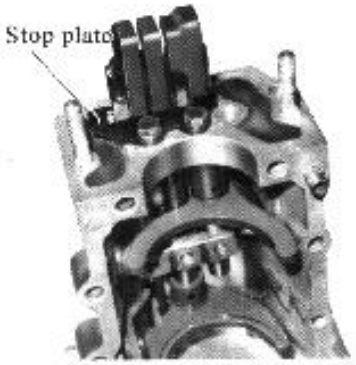


Fig. 8–30

4. In order to prevent oil leakage, coat the under head portion of the reverse gear shifting lever bolt with a thread lock cement, and tighten the bolt with specified torque.

Shifting Lever Bolt Tightening Torque	250–300 kg-cm (18.0 21.7 lb-ft)

Fig. 8 31

5. Reverse gear shift lever boss has threaded bushing. When installing the shift lever, mate bolt and bushing and adjust clearance at A as shown in the Fig. 8 32 to 0.2–1.5 mm (0.008–0.059 in). This is made by adjusting clearance at C by changing the mating of reverse gear shift lever bolt with threaded bushing of reverse gear shift lever complete. Make sure that the lever end "B" does not come into contact with the bottom of gear groove and keep clearance at C about 1 mm (0.04 in).

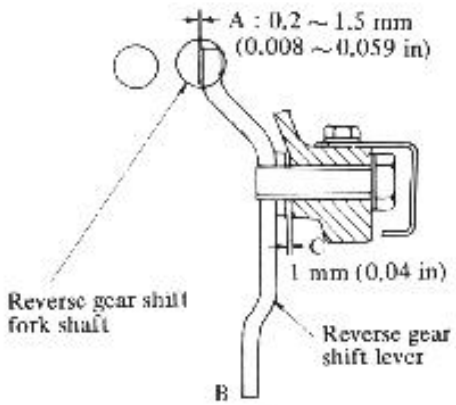


Fig. 8–32

6. Filling transmission oil

Transmission oil filling hole is located on right side of transmission case, and also works as oil-level plug. Fill transmission with 1,200 cc of oil SAE #80 GEAR oil.

Transmission Oil	Gear Oil SAE #80	1.2 litter (2.5/2.1 US/Imp.pt)

Fig. 8–33

Notes :

1. The level plug is also used as an oil feeling hole. Accordingly, when adding or replacing the oil, keep the vehicle in a horizontal position. (otherwise, the oil level will not be correct.)
2. To prevent oil leakage, coat each plug for draining and filling with a liquid gasket.
3. Tightening torque for each plug is: 1,000–1,500 kg-cm. (72 108 lb-ft)

8–10. Gear Shift Control System For LJ20, LJ20V

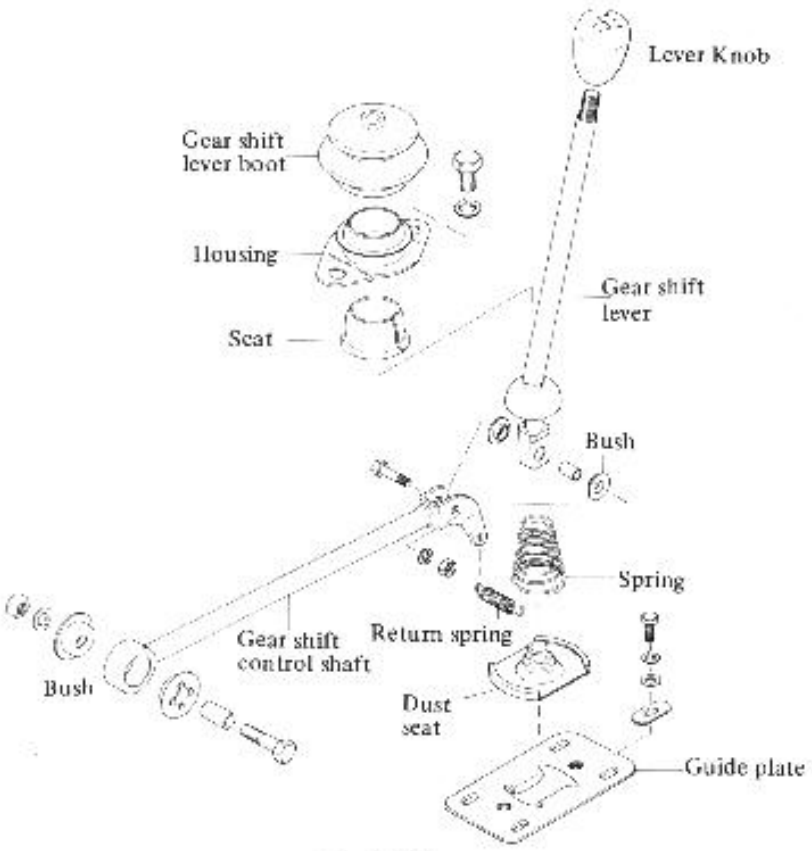


Fig. 8–34

8–10–1. Installing position of gear shifting lever

Adjust gear shifting lever by elongated holes in guide plate so that when the lever is thrown into "low" or "third" the lever becomes perpendicular to the flow.

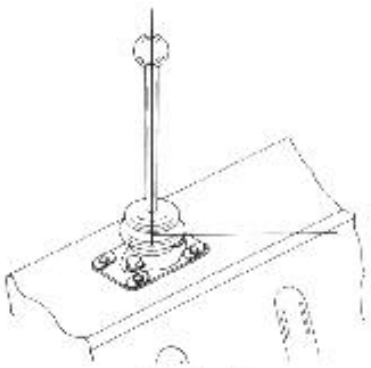


Fig. 8–35

8–10–2. Adjusting

1. If to shift gear into "low" or "third" position is difficult, or gear is prone to shift out, move guide plate backward.
2. If to shift gear into "second" or "top" position is difficult, or gear is prone to shift out, move guide plate forward.
3. If to shift gear into "reverse" position is difficult, move control lever housing to the right.

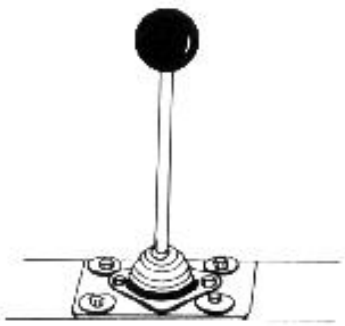


Fig. 8–36

4. If gear is prone to shift to "reverse" when intended to shift it to "top", move control lever housing to the left.
5. After adjustment is completed, position guide plate washers to allow no movement of control lever housing by thrusting against housing with their ends, and secure.

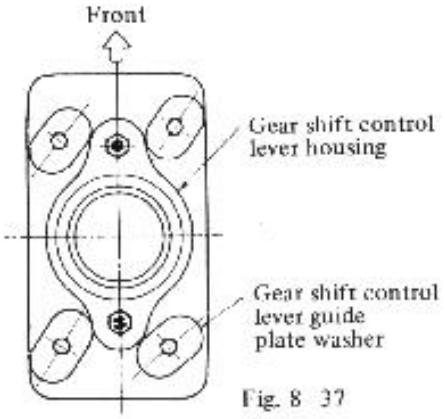


Fig. 8 37

8–11. Gear Shift Control System For L50, L51, L50V

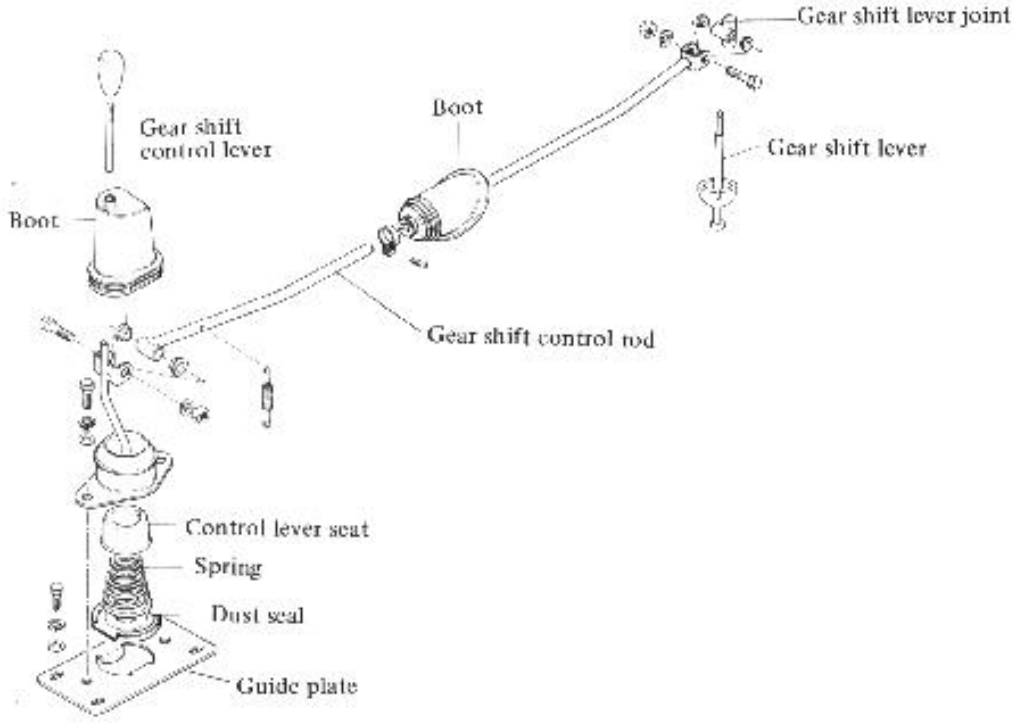


Fig. 8 38

8–11–1. Adjusting

1. In case of difficulty in shifting gear to "low" and "second" position. Move gear shift control lever housing to left and shift the gear shifting lever to "third" position, and then adjust "A" in the Fig. 8–40, to about 10 mm (0.4 in), and "B" to allow more play than "A".

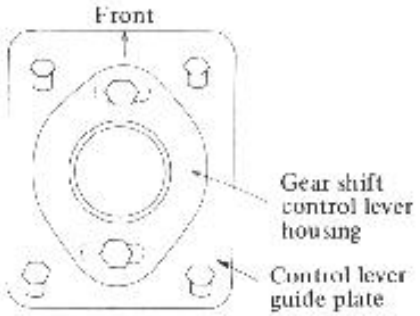


Fig. 8–39

2. In case of difficulty in shifting gear to "third" position, adjust by moving gear shift control lever housing to right.

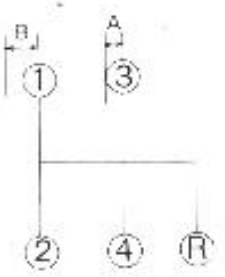


Fig. 8–40

3. Space between gear shift lever and driver's seat. If gear shift lever comes in contact with driver's seat in its "reverse" position, shift the lever to "neutral" position and adjust the space between the lever and the seat to about 60 mm (2.4 in) by moving lever guide plate.

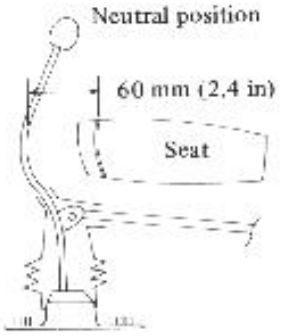


Fig. 8–41

8 11 2. Inspecting

1. Guide plate

   Check guide plate for wear at A and B, and replace if worn excessively.
   Excessive wear at A results in no click when the lever shifts to "reverse", and wear at B results in changed shift lever position at "neutral". In assembling the guide plate, place with arrow mark on the plate forward.

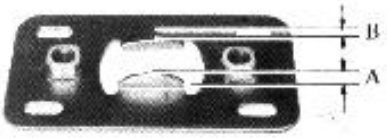


Fig. 8–42

2. Gear shift lever seat

   Check lever seat for wear and apply grease on the lever seat.

3. Gear shift lever

   Check play between gear shift lever joint and gear shift lever. Since excessive play causes vibration or unusual noise, replace upper and lower bushing with new parts.
   In assembling a wave washer, put convex side upward.

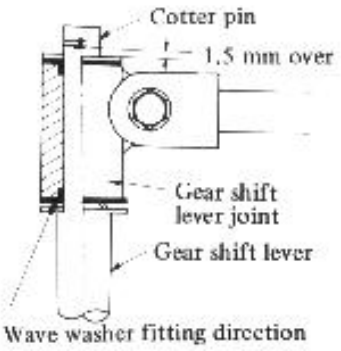


Fig. 8–43

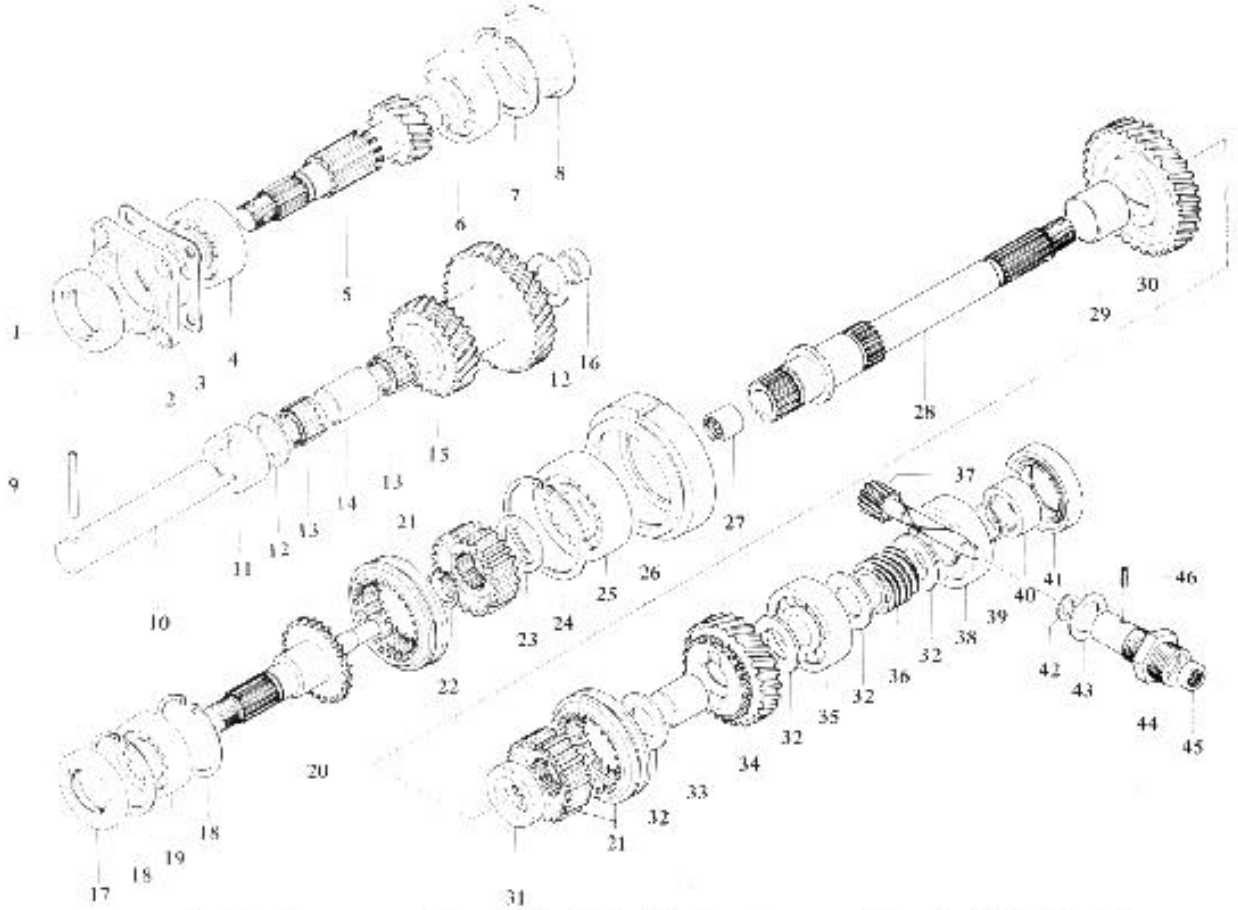
9–1. General

The "Transfer gearing" is a term given to the auxiliary transmission adapted for carrying the drive torque to all the drive wheels.

The transfer gear assembly installed on the Suzuki LJ20 and LJ20V consists of the 2-speed gear box and all-wheel drive system including 3-shaft parallel constant mesh gears. The 2-speed gear box permits selection of high and low speeds while the all-wheel drive system permits switching of rear wheel drive and all wheel drive.

Both the 2-speed gear box and all wheel drive system are controlled by means of single transfer gear control lever positioned near the floor tunnel in the cabin.

The transfer gear assembly has the constant-mesh gear arrangement just as in the case of the synchronized gear transmission unit with the synchronizer rings removed. For this reason, the transfer gear assembly can be serviced by following the conventional transmission service procedures.



1. Oil seal (28 x 47 x 8 mm)
2. Retainer
3. Gasket
4. Bearing
5. Transfer input shaft
6. Bearing
7. Circlip
8. Bearing plug
9. Stopper pin
10. Transfer counter gear shaft
11. Bush (20 x 35 x 15.2 mm)
12. Thrust washer (20 x 34 x 3.8 mm)
13. Bearing (20 x 26 x 19.8 mm)
14. Spacer (20.1 x 24.2 x 29.8 mm)
15. Transfer counter gear
16. Plug
17. Oil seal (28 x 47x 8 mm)
18. Circlip
19. Bearing
20. Transfer output front shaft
21. Rear shaft hub set
22. Circlip
23. Spacer
24. Circlip
25. Bearing
26. Retainer
27. Bearing
28. Transfer output rear shaft
29. Bush (25 x 30 x 24 mm)
30. Output shaft low gear
31. Spacer (25.2 x 38 x 8.3 mm)
32. Thrust washer
33. Bush (20 x 25 x 23 mm)
34. Output shaft high gear
35. Bearing
36. Speedometer drive gear
37. Speedometer driven gear
38. Bearing
39. O ring
40. Spacer (20 x 32 x 16 mm)
41. Oil seal (32 x 52 x 10 mm)
42. Thrust washer
43. Gasket
44. Speedometer gear case
45. Oil seal
46. Drive gear pin

Fig. 9–1

9–2. Specifications

Item	Gear Ratio	Reduction Ratio	Overall Reduction Ratio (in H range)	Overall Reduction Ratio (in L range)
Low	34/12	2.833	38.525 (35.112)	67.722 (57.795)
2nd	29/17	1.706	23.199 (21.136)	40.781 (34.791)
3rd	24/22	1.091	14.836 (13.515)	26.080 (22.246)
Top		1.000	9.713 (8.851)	17.075 (14.569)
Reverse	34/12	2.833	38.525 (35.112)	67.722 (57.795)
Primary reduction	28/20	1.400		
Secondary reduction	34/6	5.667		
Transfer gearbox H	29/14 x 24/29	1.714		
	(27/16 x 25/27)	(1.562)		
Transfer gearbox L	29/14 x 32/22	3.013		
	(27/16 x 32/21)	(2.571)		

Figures in ( ) are these for the LJ20V

9–3. Operation of Transfer Gearing

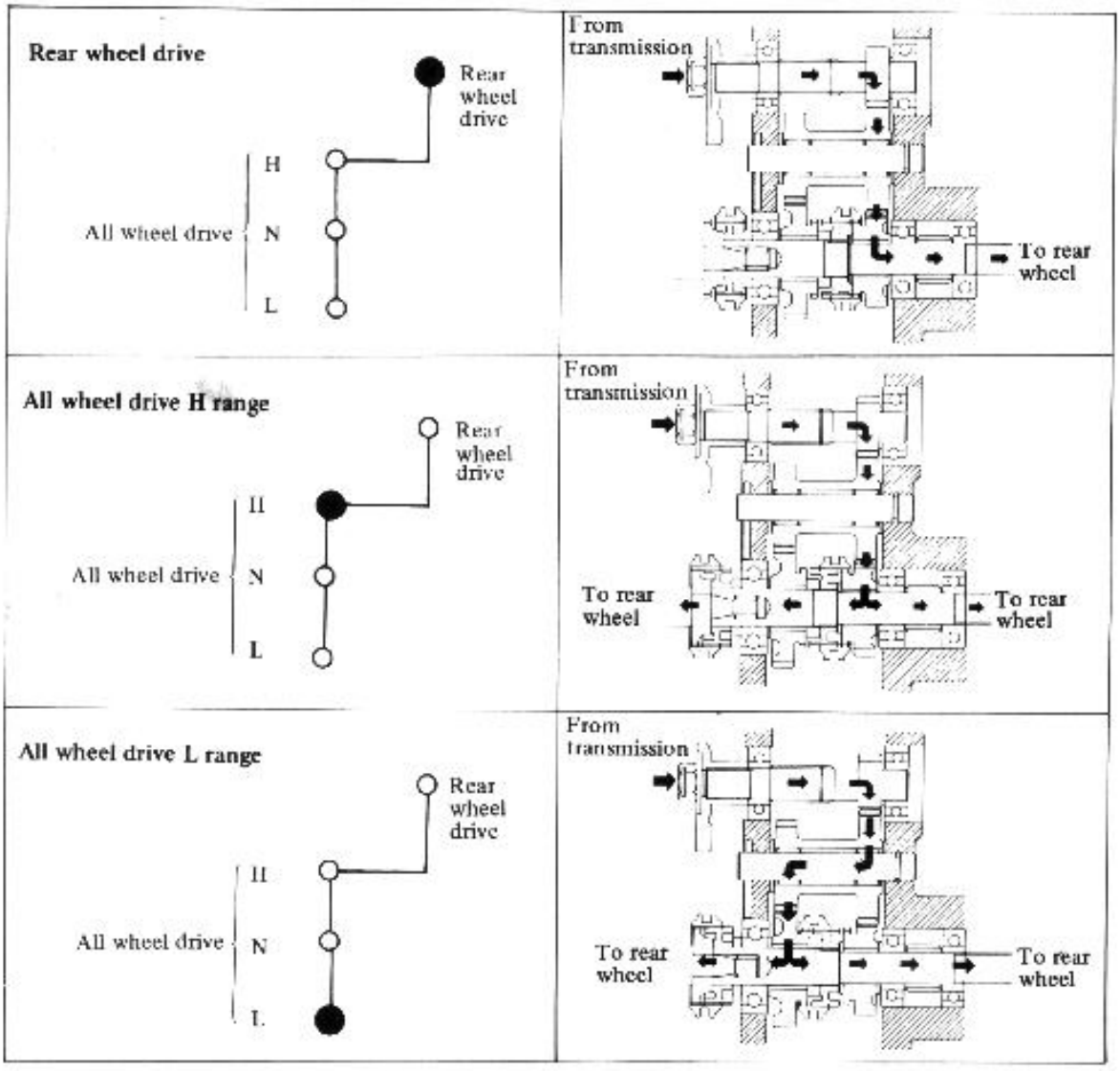


Fig. 9–2

9–4. Removing of Transfer Gearbox

1. Remove the transfer gear control lever knob. The knob can be screwed out by turning it counter-clockwise.
2. Take out the cross-head screws and remove the transfer gear box service hole cover.
3. Disconnect the three propeller shafts at the universal joint flange by removing the bolts and nuts with the parking brake firmly applied to prevent turning of the propeller shaft.
4. Disconnect the parking brake cable and wire at the parking brake lever.
5. Disconnect the speedometer drive cable. (this is positioned at the rear of the parking brake back plate.)
6. Take out the four bracket bolts attaching the transfer case to the chassis frame crossmember and remove the transfer case.

Universal Joint Flange Yoke Bolt Tightening Torque	150 250 kg-cm (10.8 – 18.1 lb-ft)

9–5. Disassembly of Transfer Gearbox

The disassembly operation of the transfer gear box can be split into two distinct groups which include gear shifting mechanism, counter shaft and output shaft disassembly operations, and the general disassembly procedure is dealt with in the following as disassembly of either of the counter shaft or the output shaft involves disassembly of the entire transfer case assembly.

1. Drain the transfer case.
2. Hold the propeller shaft from turning by pulling the parking brake inner cable or by using a vise and disconnect the propeller shaft at the universal joint flange yoke.
3. Hold the parking brake drum from turning with the aid of the special tool preload adjuster (09922 75220) and take out the parking brake setting nut as shown in the Fig. 9–3.

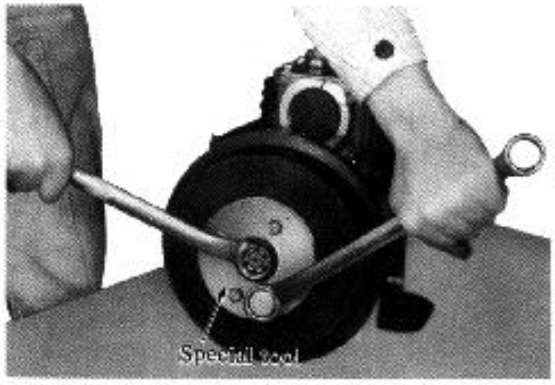


Fig. 9–3

4. Remove the parking brake drum with the aid of the special tool flywheel puller (09923–05110) as shown in the Fig. 9–4.

Parking Brake Drum Set Nut Tightening Torque	900 – 1500 kg-cm (65.1 – 108.5 lb-ft)

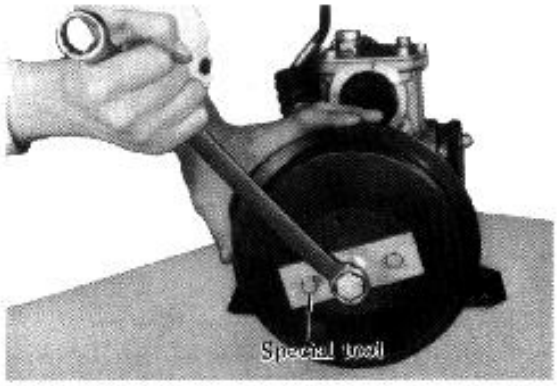


Fig. 9–4

5. Take out the four bolts fixing the parking brake back plate and remove the back plate assembly.

Parking Brake Back Plate Set Bolt Tightening Torque	180 – 280 kg-cm (13.0 – 20.3 lb-ft)

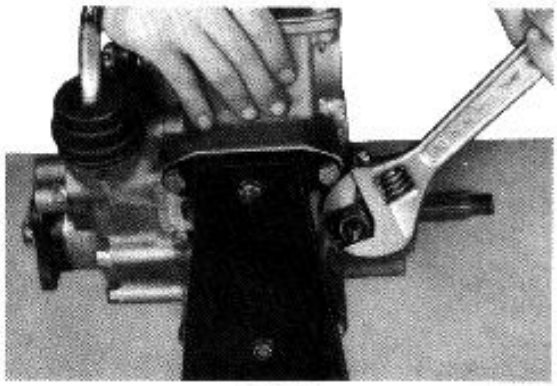


Fig. 9–5

6. Remove the speedometer driven gear as shown in the Fig. 9–5.
7. Remove the upper and lower transfer case covers.
8. Remove the transfer gear control lever assembly from the transfer gear front case in the following manner: Turn the gear control lever guide to the left while pushing it down as shown in the Fig. 9–6.
9. Take out the eight 8 mm nuts attaching the transfer gear front case and lightly tap the case with a wooden hammer.
   The transfer gear output front shaft comp. comes out with the transfer gear front case. Drive out the transfer gear output shaft from the outside, using a wooden hammer.

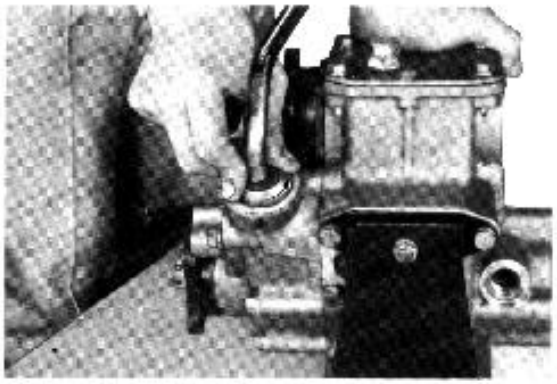


Fig. 9–6

Removal of transfer gear input shaft

10. Take out the four cross-head screws as shown in the Fig. 9–7 and remove the input shaft bearing retainer together with the oil seal.

Removal of counter gear shaft

12. Drive out the shift fork spring pin with the special tool spring pin puller (09922–85810) as shown in the Fig. 9–9 and remove the front drive shift fork, reduction clutch hub and reduction clutch sleeve.
13. Take out the two bolts and remove the gearshift fork shaft stop plate.

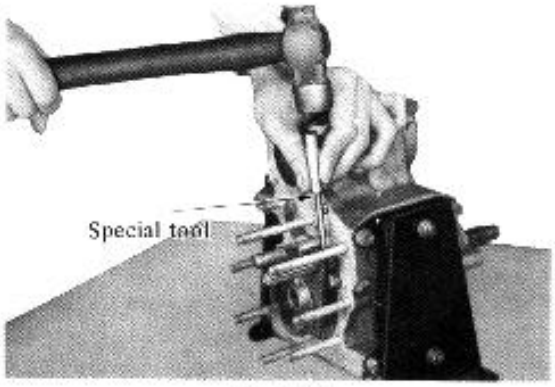


Fig. 9–9

14. Drive out of position the counter gear shaft by lightly tapping from the parking brake side (the end of the shaft not fitted with the stopper pin) and remove the shaft completely by turning it with hand as shown in the Fig. 9–10. When removing the shaft, use reasonable care to prevent damaging the "O" ring fitted to the end of the counter gear shaft.
15. With the shaft removed, the transfer counter gears can be removed from the transfer case. When removing the counter gear, carefully note the position of the two needle roller bearings, spacer and thrust washers of different thickness fitted to both sides of the gear. (the thrust washer in thickness of 3.8 mm (0.15 mm) should be positioned at the low speed side)

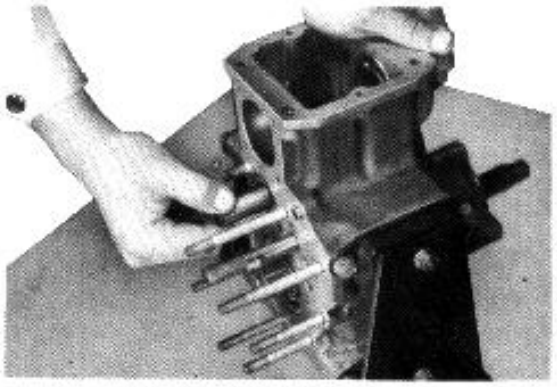


Fig. 9–10

Removal of shift fork shaft

16. Removal of the gear shift locating plug fitted to the side face of the transfer case permits removal of the gear shift locating spring and gear shift locating ball.
17. Pull out the front drive shift shaft and remove the gear shift locating ball.

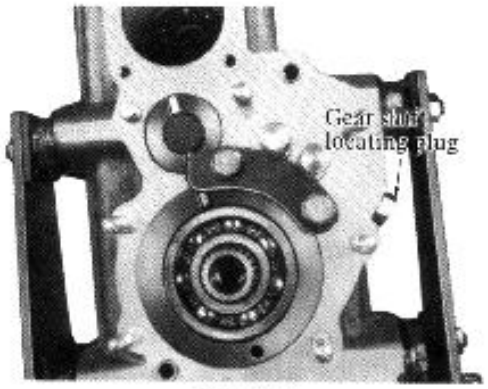


Fig. 9–11

18. Drive out the reduction shift fork spring pin from inside of the transfer case with the special tool spring pin puller (09922–85810) and withdraw the reduction shift shaft as shown in the Fig. 9–12. When removing the reduction shift shaft, NEVER turn it, or the gear shift locating ball will be rolled into the slot in the reduction shift shaft wedging the shaft in position.

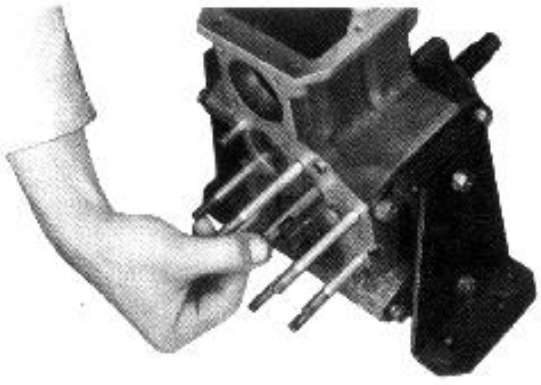


Fig. 9–12

Removal of transfer output rear shaft

19. With a wooden hammer drive out the transfer output rear shaft toward the transfer front case by lightly tapping from the parking brake side. The output rear bearing bush and output shaft gears can be removed together with the output rear shaft as shown in the Fig. 9–13.

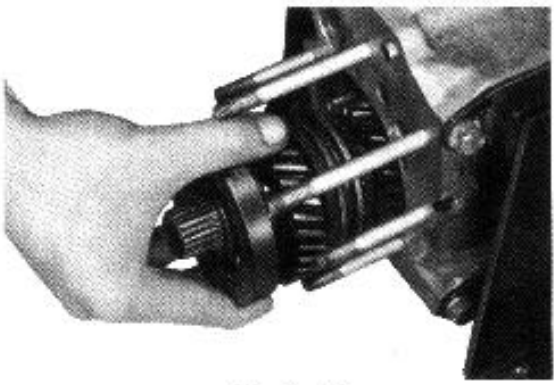


Fig. 9–13

9–6. Inspecting and Adjusting

9–6–1. Gears

The transfer gear box is essentially a synchronized constant-mesh gear type transmission only with the synchronizer rings removed.
Therefore, the transmission inspection and adjustment procedures are directly applicable to the transfer case.
In the course of inspection, check the gear teeth for abnormal condition, reduction clutch sleeve teeth and gear dog teeth for wear and damage.

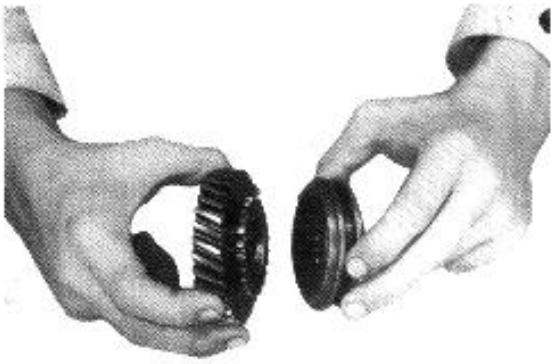


Fig. 9–14

9–6–2. Parking brake

The parking brake is identical in design to the rear brakes of the model L50 but with the wheel cylinder removed.
Accordingly, the parking brake lever travel can be adjusted by inserting a screwdriver into the adjuster hole in the brake drum and turning the brake shoes sub-anchor adjust sleeve.

Fig. 9–15

* Turns of adjust sleeve.

Leading Side	Release from lock by 3 – 7 notches
Trailing Side	Release from lock by 4 – 8 notches

The adjust sleeve should be turned as little as possible to minimize the clearance without causing brake dragging.

Fig. 9–16

* Service data

Inspection Item	Standard	Limit
Thickness of Brake Shoes	6 mm (0.24 in)	3 mm (0.12 in)
Brake Drum Inside Diameter	180 mm (7.08 in)	182 mm (7.16 in)
Deformation of Brake Drum	–	0.5 mm (0.02 in)
Radius of Curvature of Brake Lining Friction Face	90–91 mm (3.54 – 3.58 in)	
Parking Brake Lever Standard Travel	Less than 7 teeth	
Parking Brake Lever Free Travel	Around 2 teeth	

9–7. Reassembling

9 7 1. Out put rear shaft hub

Install the transfer output rear shaft hub so that the face with the boss is turned toward the high speed gear side.
Install the transfer output front shaft hub so that the face of the hub (the hub on the outer face of the transfer case) with the boss is turned toward the transfer case side.

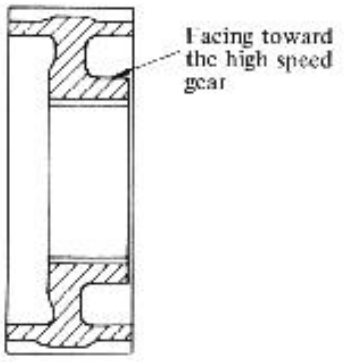


Fig. 9 17

9 7 2. Counter gear thrust washer

The thrust washer are fitted to both sides of the transfer counter gear.

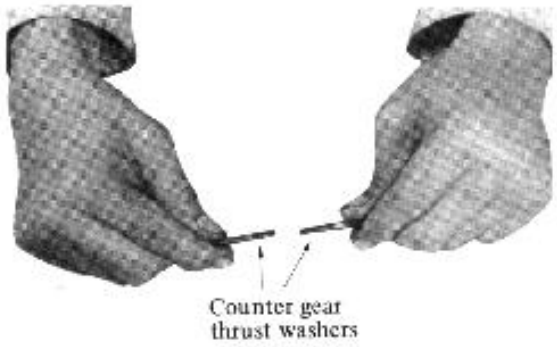


Fig. 9–18

9–7–3. Oil seal

Carefully check the oil seal lip for damage and apply thin coat of grease before installation.

Fig. 9–19

9 7 4. Gear shift locating spring

The gear shift locating spring and gear shift locating balls are fitted to the position as shown in the Fig. 9–20 to provide positive gear shift action and to prevent gears from slipping out of engagement. If the gears tend to slip out of engagement, check the free length of the gear shift locating spring and discard and install new one if it is beyond the following service limit.

	Free Length	Limit
Gear Shift Locating Spring	23 mm (0.91 in)	21 mm (0.83 in)

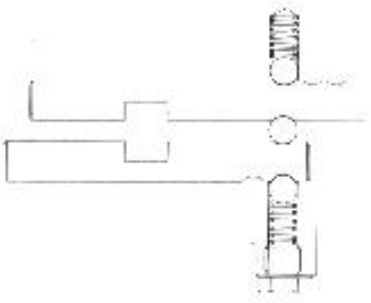


Fig. 9–20

9–7–5. Reduction shift shaft

Reassemble the reduction shift shaft (longer in length) with the shift fork and then fit the front drive shift shaft (shorter in length) in position after setting the gears to high speed position. The reduction shift shaft should not be installed in position with the gears in neutral condition, or the double gear mesh inhibitor comes into function making it impossible to reassemble the front drive shift shaft into position.

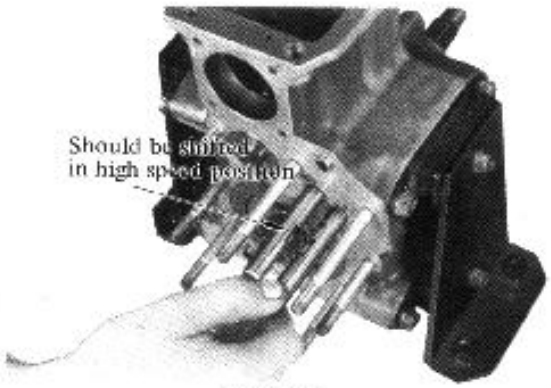


Fig. 9–21

9–7–6. Reduction shift fork, front drive shift fork

Install the reduction shift fork so that the face with the longer boss is turned toward the low speed side. Also install the front drive shift fork so that the face with the longer boss is turned toward the transfer case side.

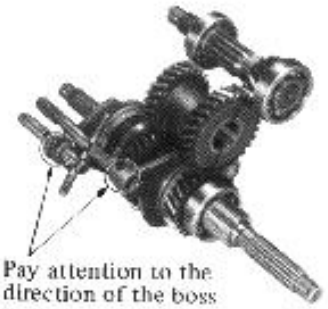


Fig. 9–22

9–7–7. Output rear bearing

Make sure to have the output rear bearing bush stopper groove correctly aligned with the groove in the transfer case when installing the transfer output rear shaft as shown in the Fig. 9–23.

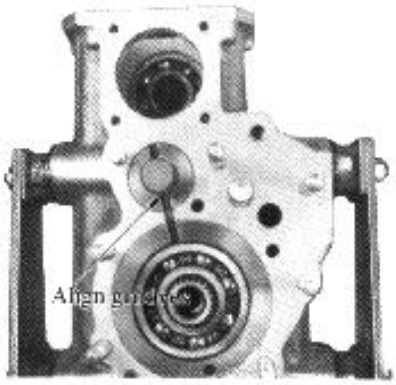


Fig. 9–23

9–7–8. Gear shift fork shaft stop plate

The gear shift fork shaft stop plate should be pressed hard against the shaft side before being fixed in position as it also serves to hold the output rear bearing bush, counter gear shaft and shift fork shaft from turning.

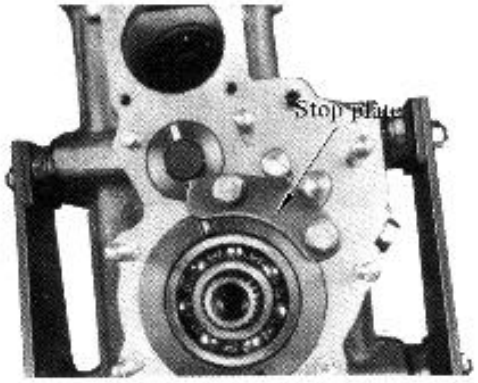


Fig. 9–24

9–7–9. Transfer cover

When installing the transfer case cover, make sure to tighten the bolts and nuts to the specified torques in the sequence as shown in the Fig. 9–25 and 9–26.

Transfer Case Cover Set Nut Tightening Torque: (6 ϕ)	60 – 100 kg-cm (4.3 – 7.2 lb-ft)
Transfer Case Cover Set Bolt Tightening Torque: (6 ϕ)	60 – 100 kg-cm (4.3 – 7.2 lb-ft)
Transfer Case Cover Set Bolt Tightening Torque: (8 ϕ)	150 – 200 kg-cm (10.8 – 14.5 lb-ft)

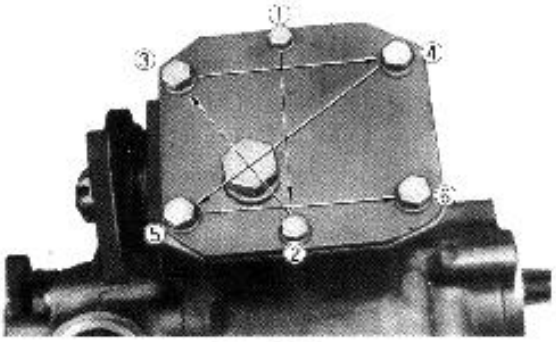


Fig. 9–25

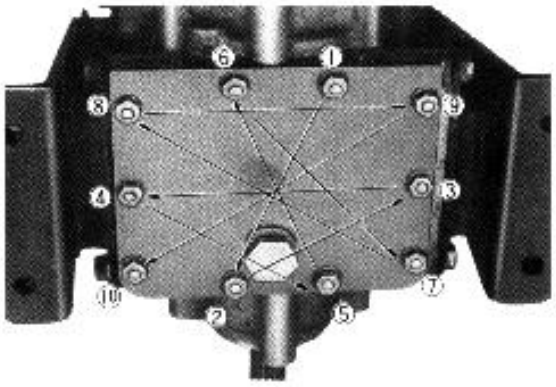


Fig. 9–26

Remove the transfer case filler plug to fill the transfer case with gear oil.

Transfer case Gear Oil Capacity	SAE # 80, 0.7 liter (1.48/1.23 US/Imp. pt)

10–1. General

Propeller shafts transmit engine power to front wheels and rear wheels through transmission and transfer, and there are propeller shaft No. 1 (between transmission and transfer), propeller shaft No. 2 (between transfer and front differential), and propeller shaft No. 3 (between transfer and rear differential). The differential unit of the models LJ20 and LJ20V have the hypoid bevel gear arrangement with the center of the drive pinion offset below the center line of the bevel gear by 18 mm (0.709 inch). The differential unit employs four each of side pinion to withstand severe operating conditions for which the vehicle is built. The differential gearbox consists of six gears including two side gears. The mounting distance measuring procedure, bearing preload adjustment and backlash adjustment procedures for the differential unit on model L50 are directly applicable to this differential unit. The differential assembly on the front axle and on the rear are exactly identical in design and construction.

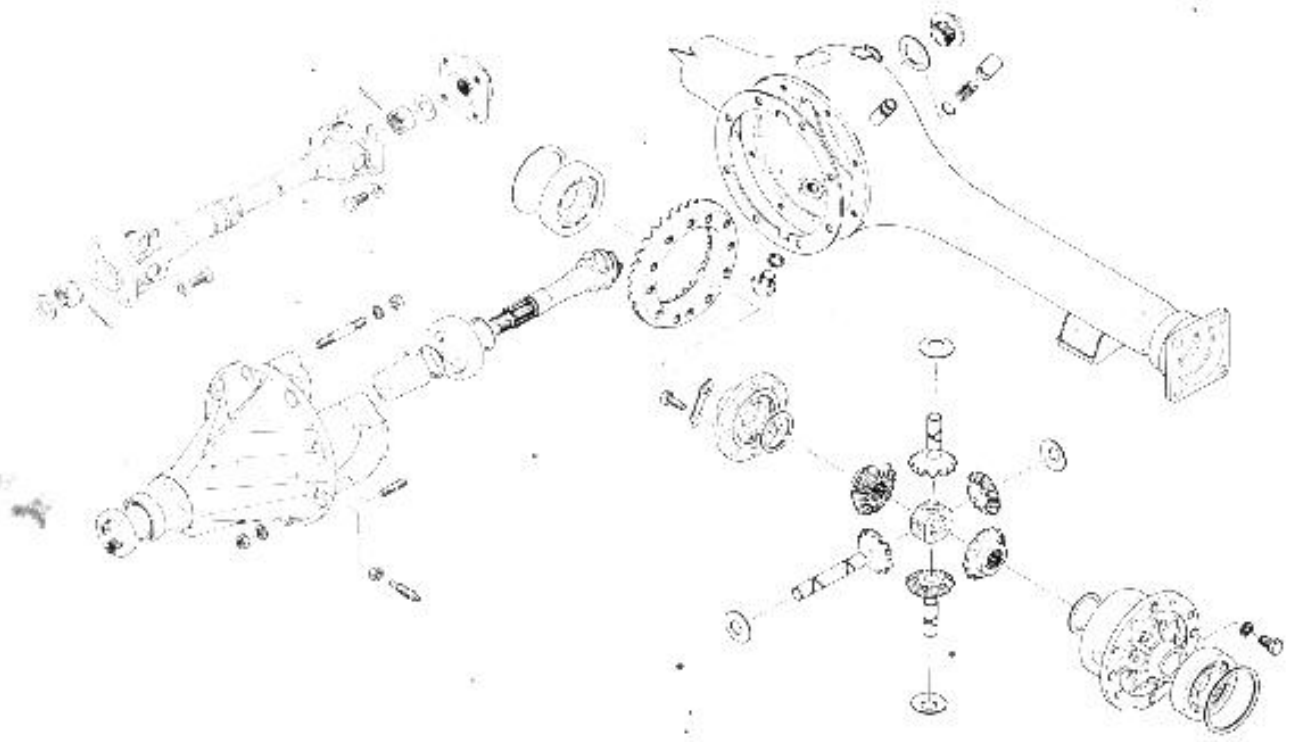


Fig. 10–1

10–2. Propeller Shaft and Cross Joint

10–2–1. Removing

1. Jack up vehicle, and support it with safety stands.
2. Remove four bolts attaching universal joint flange and cross joint flange yoke.
3. Pull out and remove propeller shaft No. 1. The end of the propeller shaft is connected with transmission by spline.

Fig. 10–2

10–2–2. Inspecting and servicing

1. Trouble in propeller shaft may be caused by wear of joints, and noticed by rattling during running, especially when the vehicle starts to move or accellerator pedal is returned or gears are shifted. If abnormal noise develops, check propeller shaft splines and cross joints for play. If the play is found, replace defective parts.

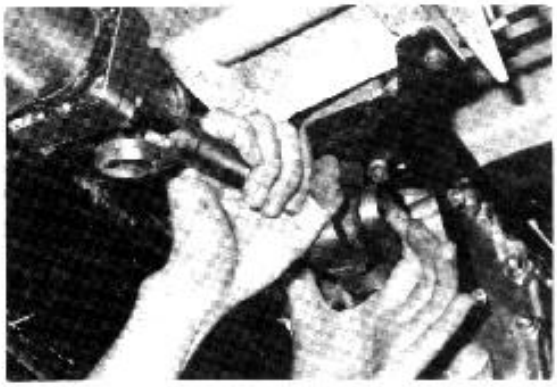


Fig. 10–3

2. Service cross joint with Suzuki Super Grease C through grease nipple.

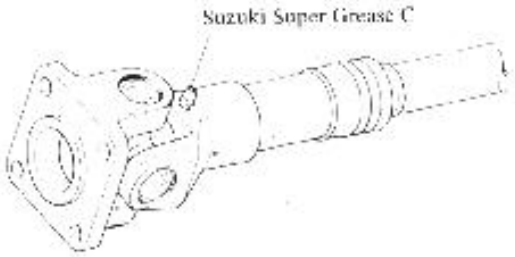


Fig. 10–4

10–2–3. Installing

1. When installing propeller shaft, coat sliding surface and cavity of the splines thoroughly with chassis grease, and align punched marks. Misalignment of the marks may cause vibration or noise.
2. Tighten universal joint flange yoke bolt to torque below.

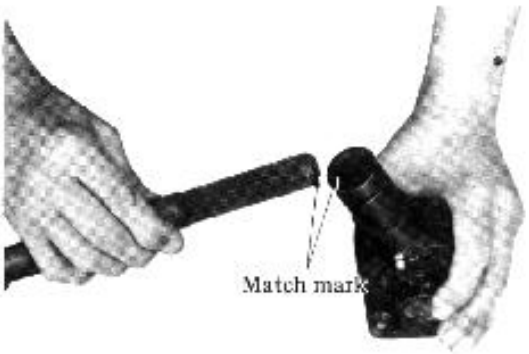


Fig. 10–5

Universal Joint Flange Bolt Tightening Torque	150 – 200 kg-cm (10.8 – 18.1 lb-ft)

10–3. Differential Gear Box

10–3–1. Removing

1. Jack up the vehicle and disconnect the propeller shaft at the cross joint flange yoke.
2. Take out the wheel nuts and remove the wheel.
3. Disconnect the brake pipe.
4. Take out the four each of bolts on the upper and lower parts of the king pin.
5. Take off the tie rod end from the steering knuckle by removing the cotter pin & bolt.

6. Take out the eight joint seal bolts and pull out the front axle shaft as shown in the Fig. 10–6.
7. Remove the brake drum.
8. Take out the four bolts retaining the back plate.

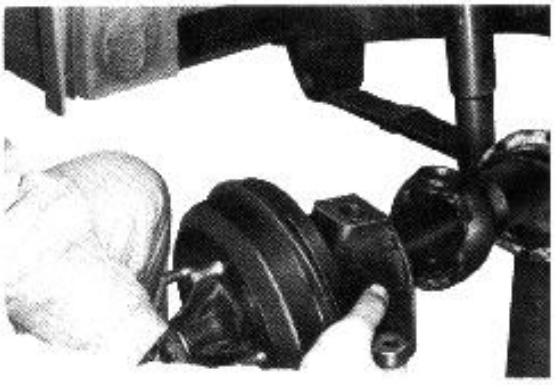


Fig. 10–6

9. Install the special tool rear axle shaft puller (09922 66010) in position as shown in the Fig. 10–7 and drive out the shaft with the aid of a sliding hammer.
10. Withdraw the right and left axle shafts and then remove the differential carrier assembly.

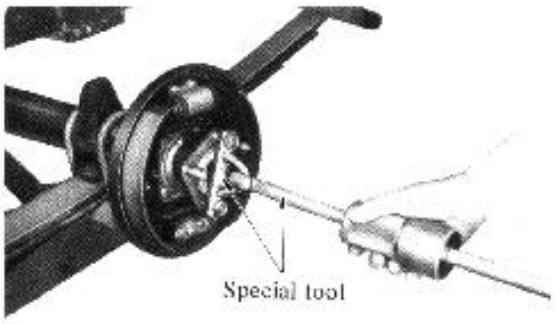


Fig. 10–7

10–3–2. Drive bevel pinions

Check the drive bevel pinions for a sign of abnormal tooth contact. Also check the face of the pinions in contact with the front and rear bearings for wear and other abnormal conditions and replace the parts as necessary.

1. Installation of the front and rear bearing inner races necessitates the use of the special tool bearing installer (09913–80111) as shown in the Fig. 10–8.

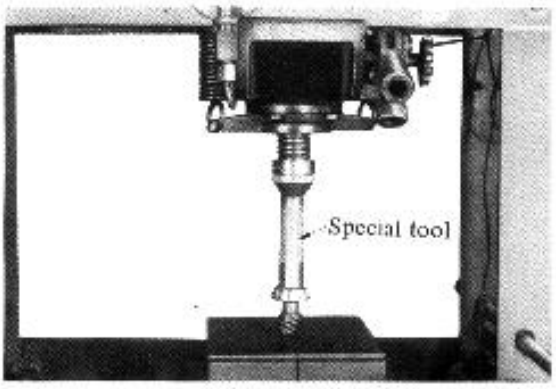


Fig. 10–8

2. Reassembly of the front and rear bearing outer races into the differential carrier necessitates the use of the special tools respectively as shown in the Fig. 10–9. (for front bearing 09913–76010, for rear bearing 09913–85210). When reassembling the outer race into the differential carrier, exercise care to avoid inclination of the outer race in position, or bearing seizure, abnormal noise and abnormal wear will result.

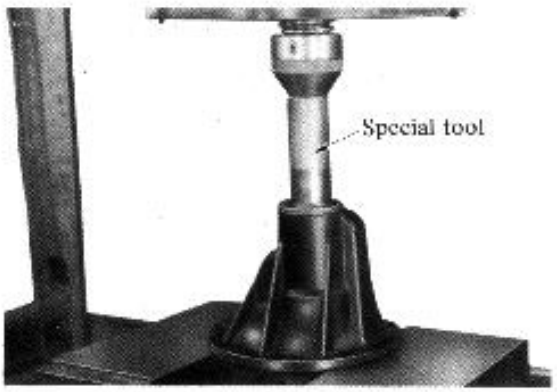


Fig. 10–9

10–3–3. Inspecting and Adjusting

1. Differential side gear backlash
   Adjust the differential side gear backlash with the side gear thrust washers so that the backlash becomes 0.1 – 0.2 mm (0.004 – 0.008 in) when the differential case R is installed and bolts tightened to 140 – 160 kg-cm (10.1 – 11.6 lb-ft) torque.

Differential Side Gear Backlash	0.1 – 0.2 mm (0.004 – 0.008 in)
Differential Side Gear Thrust Washers	0.5 – 0.8 mm (0.02 – 0.03 in)
Differential Case R Tightening Torque	140 – 160 kg-cm (10.1 – 11.6 lb-ft)

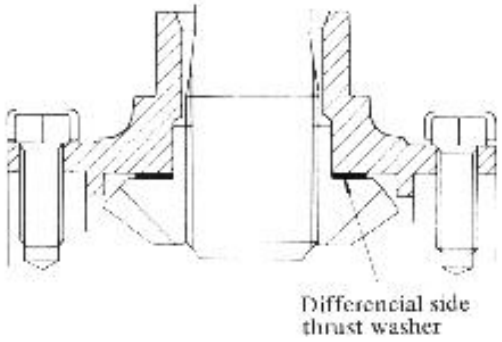


Fig. 10–10

2. Mounting distance
   1) Position the special tool bevel pinion shim adjuster (09922–76010) on the surface plate and calibrate the dial indicator reading to zero.

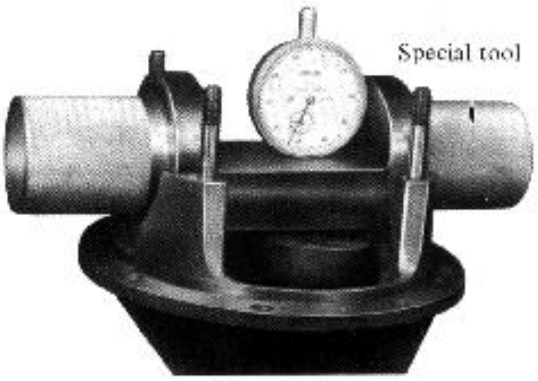


Fig. 10–11

   2) Set the special tool in position as illustrated in the Fig. 10–12. Tighten the nut to the 50 – 70 kg-cm (3.6–5.1 lb-ft) torque.
   3) Thickness of shims
      (a + b + c) - bevel gear stamped figure = thickness of shims
      a + c: special tool figure = 75.926 mm (2.9644 in)
      b: reading of dial gauge
      Accordingly
      75.926 (2.9644 in) + reading of dial gauge - bevel gear stamped figure = thickness of shims.
   4) Adjusting shims are available in five different thicknesses to permit fine adjustment. Carefully select the shims of the right thickness so that the mounting distance is closely adjusted to the value obtained through calculation of the measured data.

Drive Bevel Pinion	0.03, 0.05, 0.1 mm (0.001, 0.002, 0.004 in) 0.3, 0.5 mm (0.01, 0.02 in)

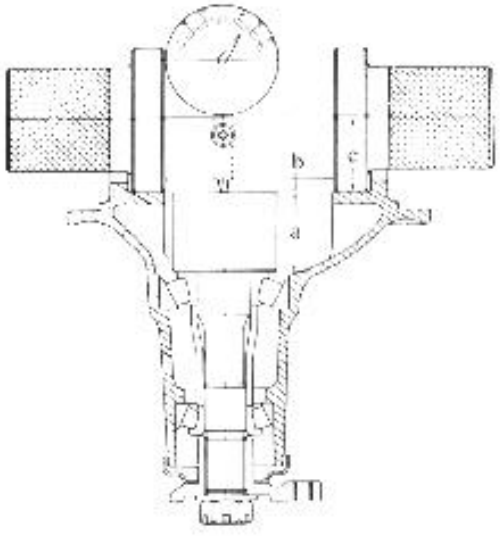


Fig. 10–12

3. Preload adjustment

Fit a shim of an adequate thickness about 1 mm (0.04 in) and adjusting collar to the drive pinion and then reassemble the front bearing inner race and drive joint yoke into position and tighten the drive bevel pinion nut to the standard torque.

Drive Bevel Pinion Nut Tightening Torque	900 – 1,500 kg-cm (65.1 – 108.5 lb-ft)

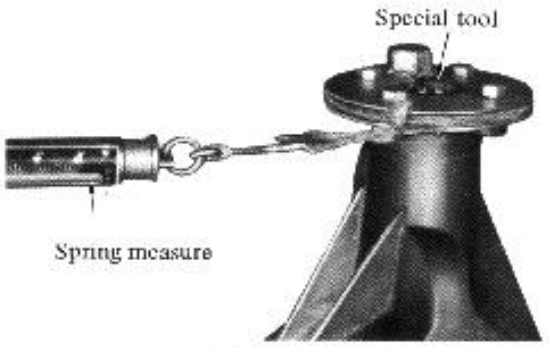


Fig. 10–13

Measure the starting torque by using a pull scale and special tool preload adjuster (09922–75220) as shown in the Fig. 10–13 and make necessary adjustment with the shims so that the starting torque is set within the specified range.

The preload adjust shims are in common to the drive bevel pinion adjust shims.

Starting Torque	0.6 – 1.4 kg, (1.3 – 3.1 lb), in use of special tool	3.0 – 7.0 kg-cm (0.22 – 0.51 lb-ft)

✱ The starting torque should be measured without installing the drive bevel pinion oil seal in position and with the bearing lightly lubricated with gear oil.

4. Side gear and pinion backlash

To measure the backlash between the side gear and side pinion, place a fuse between these gears as shown in the Fig. 10–14. Then measure the thickness of the fuse. The backlash is normally 0.1 – 0.15 mm and can be adjusted by means of side gear thrust washers.

Side Gear Backlash	0.1 – 0.15 mm (0.0039 – 0.0059 in)
Thickness of Side Gear Thrust Washer	0.8, 1.0 and 1.2 mm

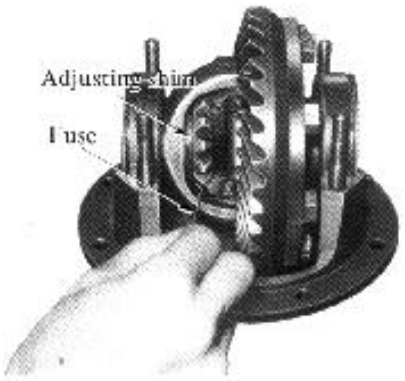


Fig. 10–14

5. Drive bevel gear backlash adjustment

Reassemble the differential case assembly into the differential carrier and measure the clearance between the side bearing and differential carrier using a feeler gauge. The measured value corresponds to total thickness of the shims to be inserted into the right and left side positions. When checking the clearance, take measurement at 2 – 3 portions to minimize reading error.

Divide the measured value into two parts and install the shims equal in thickness to the value in both sides of the bearing to obtain correct backlash. To measure the backlash, proceed as follows: Set the dial indicator to the bevel gear at right angle to the gear tooth as shown in Fig. 10–15 and turn the bevel gear while holding the drive bevel pinion.

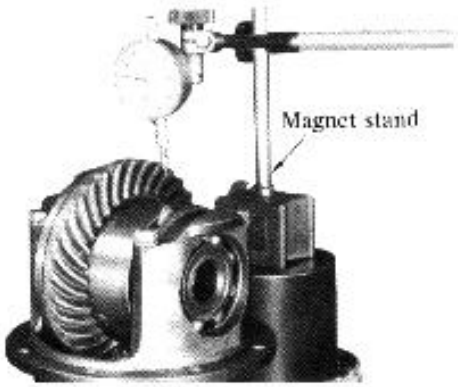


Fig. 10–15

Drive Bevel Gear Backlash	0.03 – 0.10 mm (0.001 – 0.004 in)
Differential Side Bearing Adjust Shims	0.1, 0.15, 0.3, 0.5 mm (0.004, 0.006, 0.01, 0.02 in)

10–3–4. Installing

1. Drive Bevel gear bolts
   Drive bevel gear bolts are directly subjected to driving force, and so 12 special bolts of chromium steel are used; never replace with other kind of bolts. Clean mating surfaces of differential bevel gear, threadeds of drive bevel gear bolts and mating surface of differential case bevel gear using gasoline to remove oil or grease thoroughly. Then apply "thread lock" to mating surfaces, and tighten bolts to specified torque.

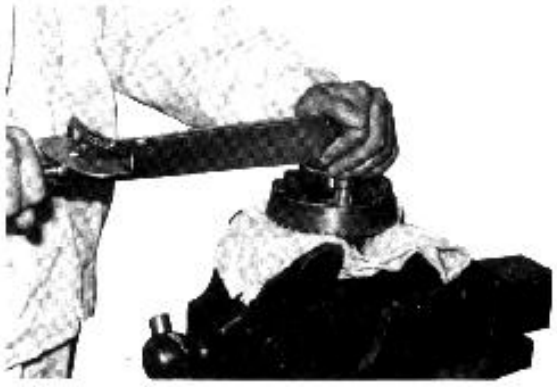


Fig. 10–16

Drive Bevel Gear Bolt Tightening Torque	450 – 550 kg-cm (32.5 – 39.7 lb-ft)

2. Differential gear thrust bolts
   Install differential gear thrust bolts to obtain clearance of 0.375 mm (0.015 in) following the procedure below.
   1) Tighten differential gear thrust bolt until it comes in contact with face of drive bevel gear.
   2) Loosen differential thrust bolt by a quarter turn, and tighten locking nut to 700–900 kg-cm. (50.6 –65.0 lb-in)

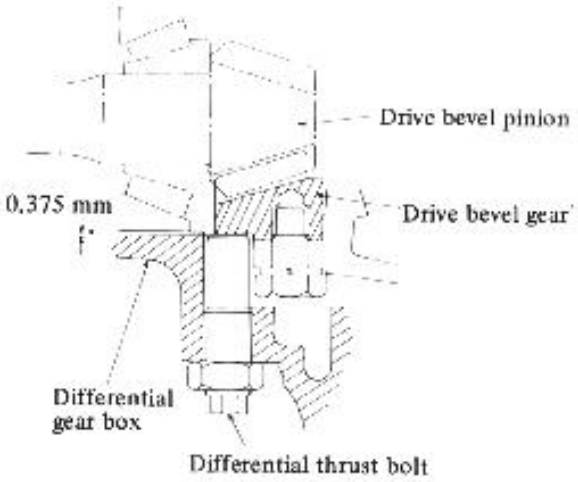


Fig. 10–17

3. Differential gear oil
   0.8 ltr of gear oil is required to fill each of the front and rear differential case to the specified level.

Differential gear oil capacity	SAE #80, 0.8 liter (1.7/1.4 US/Imp.qt)

11–1. General (Front Suspension)

As the Suzuki LJ20, LJ20V are four-wheel drive vehicle, the front wheels are not only made to steer the vehicle but also to carry traction power to the ground. Accordingly, the front axle shafts with the conventional cross-shaft universal joint will fail to carry the drive torque to the wheels smoothly. For this reason, the front axle shafts are fitted with a Bir-field constant velocity joint which is adaptable to greater angular variations and gives longer service life.

The steering knuckle encases the joint to provide maximum protection against dirt, grit and other foreign matters. The end of each knuckle is sealed with the oil seal and felt gasket.

The steering knuckle and front axle housing are connected with the king pins of the conventional design and the taper roller bearings.

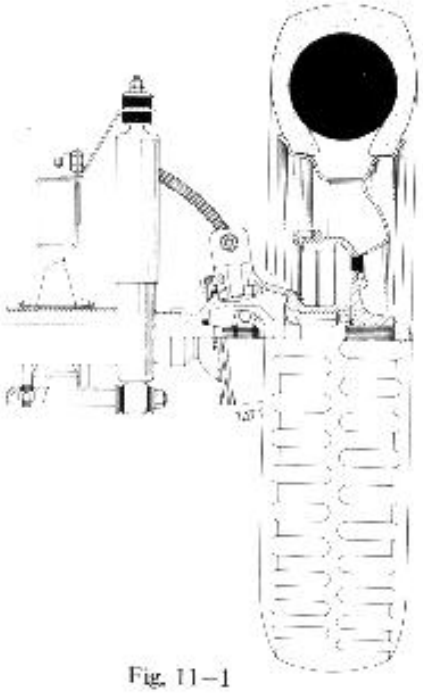


Fig. 11–1

11–2. Front Axle Shaft

11–2–1. Construction and function

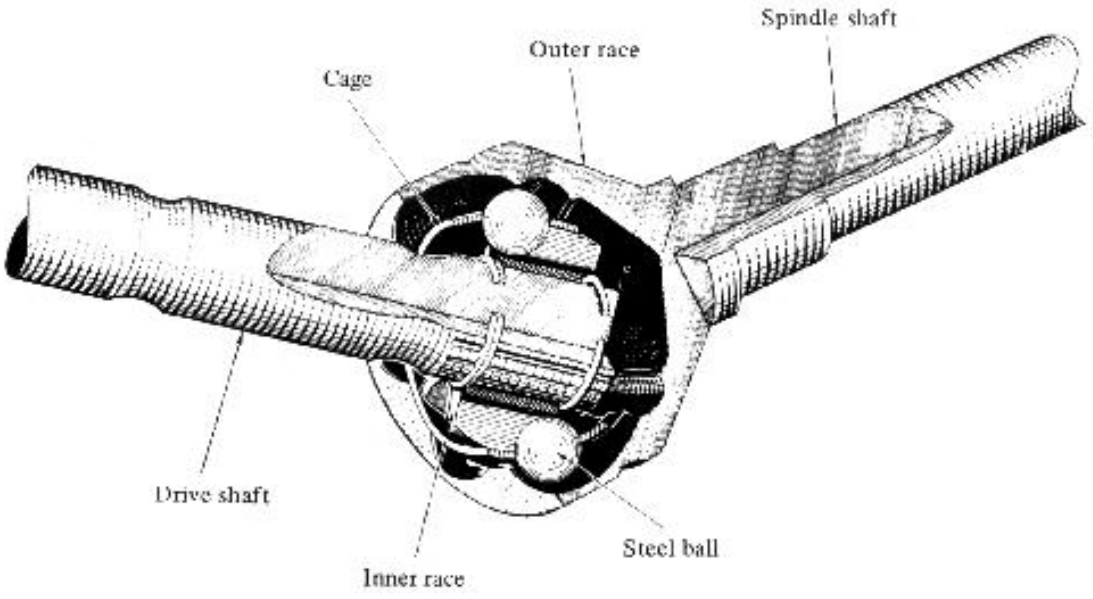


Fig. 11–2

The joint consists principally of the outer race, inner race, cage and balls as illustrated in the Fig. 11–2. When the joint angle varies, the inner race moves just as the ball bearing, ensuring smooth transmission of the drive torque. When the joint rotates, the six balls become locked in position, carrying the drive torque from the drive shaft, inner race and balls to the outer race. The advantage of the constant velocity joint is such that when the joint angle varies, the balls roll along the shaft, due to geometrical relationship between the inner race and outer race, in the distance corresponding to a half of the varying angle, thereby maintaining constant velocity characteristic. The constant velocity joint features small mechanical loss and excellent durability.

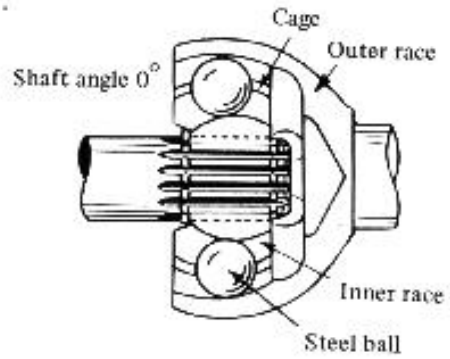


Fig. 11–3

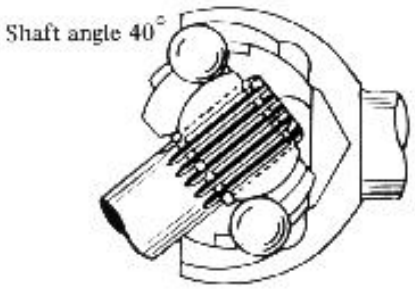


Fig. 11–4

11–2–2. Removing

1. Turn loose the wheel nuts and jack up the front end of the vehicle and remove the wheel.
2. Disconnect the brake pipe and tie-rod end. The tie-rod end can be removed by tapping the knuckle arm with a copper hammer.
3. Take out the cotter pin from the front hub nut and remove the hub nut and then pull out the brake drum with the aid of the special tool wheel hub puller (09943–35511) as shown in the Fig. 11–5 and sliding hammer.
4. Take out the eight 6 mm joint seal bolts and remove the oil seal cover, felt gasket and oil seal carefully.
5. Take out the four king pin bolts and remove the upper and lower king pins as shown in the Fig. 11–6. When removing the king pins, note the thickness and number of adjusting shims fitted behind the king pins.

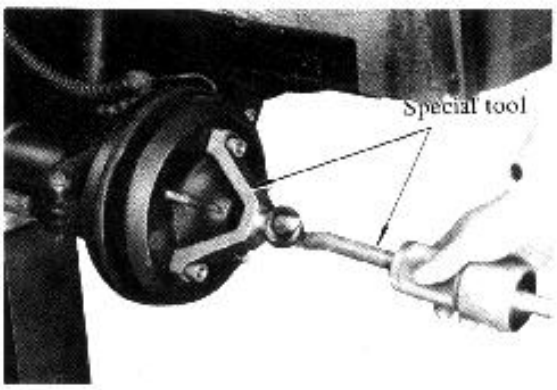


Fig. 11–5

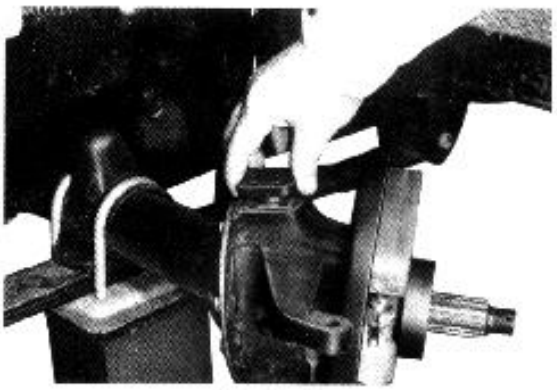


Fig. 11–6

6. Withdraw the front axle shaft together with the associated parts as shown in the Fig. 11–7.

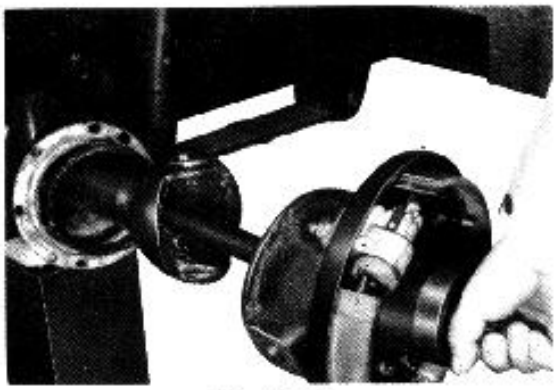


Fig. 11–7

11–2–3. Disassembly and reassembly

The front axle shaft can be removed in the manner as shown in the Fig. 11–8 using a press machine. To install, pull the front axle shaft inward using a special tool rear shaft puller (09922–55210) as shown in the Fig. 11–9. When installing the front axle shaft the use of the special tool is essential-for if the shaft is driven into position with a hammer, the Birfield constant velocity joint will be shock-loaded causing troubles.

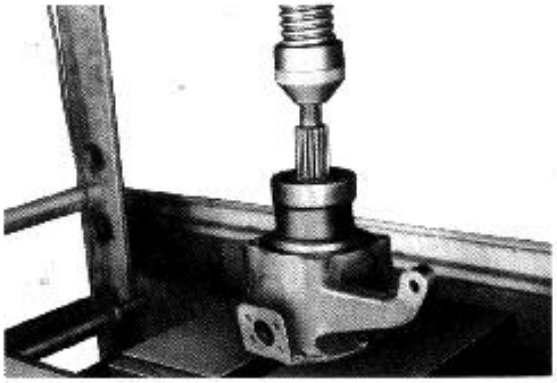


Fig. 11–8

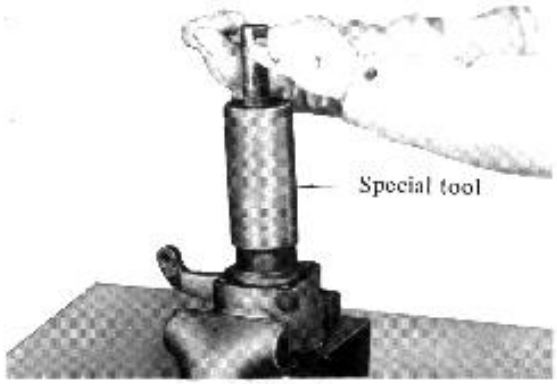


Fig. 11–9

11–2–4. Inspecting and Servicing

1. Inspection front axle shaft end play
   When inspecting the Bir-field constant velocity joint, check the front axle shaft for end play as shown in the Fig. 11–10. Turn the shaft and check to be sure it rotates smoothly without binding. Do not spin the joint by holding the front axle shaft.

	Standard	Limit
Front Axle End Play	0 mm	1.5 mm (0.06 in)

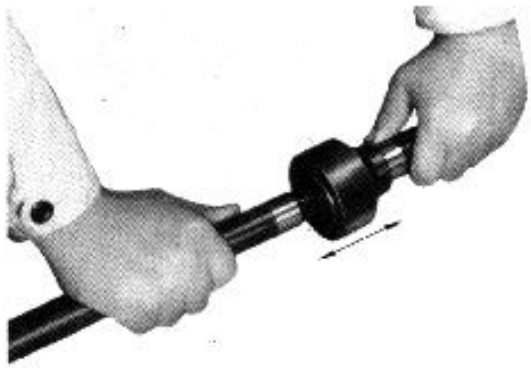


Fig. 11–10

2. Lubrication

Make sure to lubricate the front axle shaft only with sulphuric molybdenum grease. This is a special-purpose lubricant and use of grease of other kinds for lubricating the front axle shafts will result in considerable reduction in the service life of the vital parts. Fill about thirty percent of the space withun the knuckle case with sulphuric molybdenum grease as shown in the Fig. 11 11.

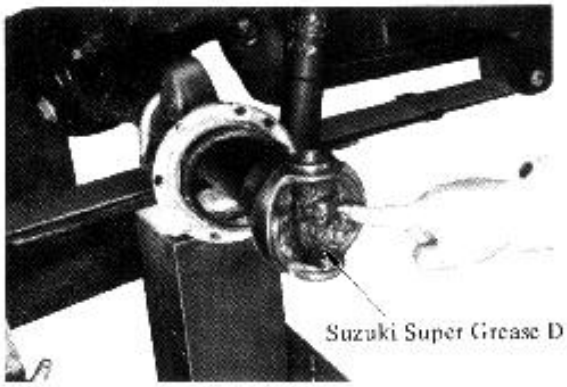


Fig. 11–11

3. Inspection of front axle shaft splines

Check the splines for bending, cracks, corrosion and other abnormal conditions. To check for rotational play, jack up the front end of the vehicle with the wheels in position and move the wheels back and forth carefully and hand-feel the play.

	Standard	Limit
Rotational Play in Drive Shaft Splines	0 mm	0.5 mm (0.02 in)

Fig. 11–12

4. Inspection of king pins and adjustment with king pin shims

Check the king pins for bending, cracks and other damages. Slight scores may be removed with an oil stone but it is strongly advisable to discard and install new one if any abnormal condition is noted.

To check for king pin play, tighten the king pin bolts to the standard torques and move the wheel in and out as shown in the Fig. 11 14. King pin play can be removed by reducing the thickness of adjusting shims. However, this method is applicable only to the skillful service men, and the following method is recommended to ensure correct adjustment is obtained: Jack up the front end of the vehicle and measure the starting torque by pulling the knuckle arm with a pull scale as shown in the Fig. 11–15. Make necessary adjustment by adding or removing the shims to or from the king pins so that the starting torque becomes 1.0 – 1.8 kg when measured with the dust seal removed. Increasing the total thickness of the shims decreases the starting torque. Similarly, a reduction of the total thickness of the shims increases the starting torque.

Checking for scratch, bend, scratch

Fig. 11–13

Fig. 11–14

When making adjustment, do not measure the starting torque with the adjusting shims removed (leave the shims in position and remove as necessary) or the tapered bearing will be stressed and be injured. The adjusting shims are available in two different thickness: 0.1 mm and 0.5 mm.

King Pin Bolt Tightening Torque	200 – 300 kg-cm (14.5 – 21.7 lb-ft)
King Pin Shims (thickness)	0.1 mm, 0.5 mm (0.004, 0.02 in)

If correct adjustment can not be obtained even with all the shims removed (if king pin play still exists with all the shims removed), it is an indication that the taper roller bearing and king pin are worn out and must be replaced as a set.

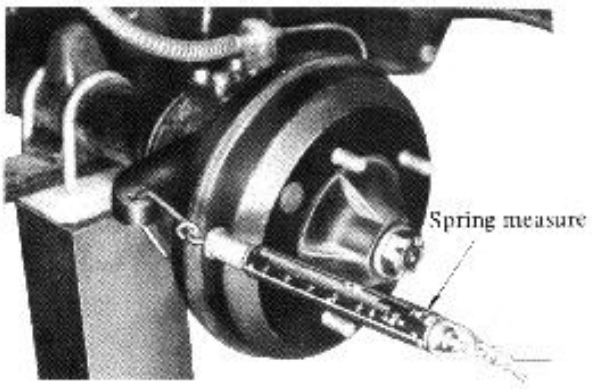


Fig. 11–15

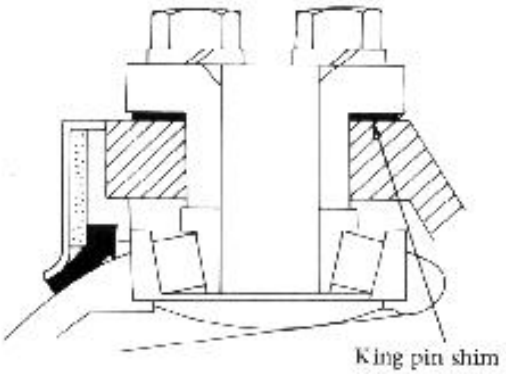


Fig. 11–16

11–2–5. Installing

To prevent water from entering into steering knuckle case, take the following measures:

1. Coat inside of king pin and king pin shim with "Cemedine".
2. Coat threaded portion of king pin with "thread lock" prior to tightening.

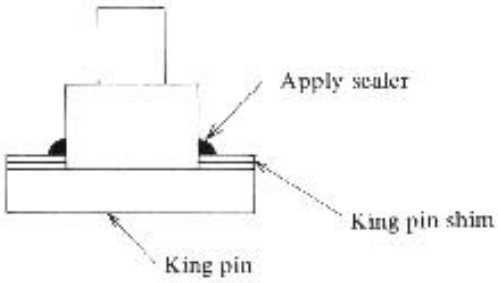


Fig. 11–17

11 2 6. Replacement front axle shaft oil seal

Front axle shaft oil seal functions not only as a dust seal, but also as a damper in steering. Accordingly, worn oil seal reduces its damping effect, and shimmy motion of wheels is apt to occur. Check oil seals for wear during every inspection, and replace worn oil seals with new ones as follows:

Fig. 11–18

1. Remove eight joint seal bolts.
2. Move oil seal covers and pads (made of felt) inward.
3. Cut worn oil seals with scissors, and remove.
4. Cut new oil seal at one place with scissors or a razor.
5. Install oil seal in oil seal retainer placing the cut place upward and about 30^{0} apart from joining surface of the retainer.
6. Apply "Cemedine" to joining surface of oil seal retainer shown in the Fig. 11–20 to prevent entrance of water, and install oil seal covers and pads.

Note: Since play of king pin in bearing which can be corrected by adjusting shims and unbalance of wheel assembly are also probable causes of shimmy motion during low speed running in addition to worn oil seals described above, check these conditions at the same time.

Fig. 11–19

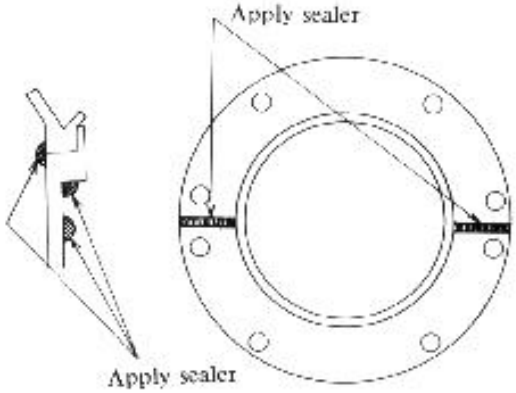


Fig. 11–20

11–3. Front and Rear Shock Absorber

11–3–1. Specification

	Front	Rear
Damping Force	80 kg	100 kg
Stroke	150 mm	160 mm

The damping force is measured with a piston speed of 0.3 m/sec.

11–3–2. Inspecting

1. Check for the roadability of the vehicle and rattling sound while driving on rough roads.
2. Push the body hard, and if it jolts 3–4 times, the damping force of the shock absorber is considered to have decreased.
3. Check the absorber for oil leakage.
   If the absorber is found faulty, replace it as a assembling unit, because it can not be disassembled.

11–3–3. Installing

When installing the front shock absorber, note the lower washers fitting direction as shown in the Fig. 11–21. If the lower washers fitted wrong will be broken the shock absorber.

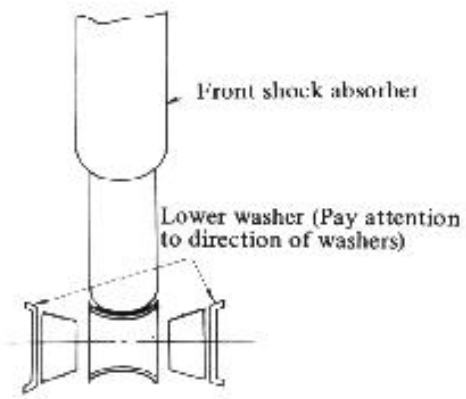


Fig. 11–21

11–4. Leaf Spring

11–4–1. Inspecting

If the chassis is found lower than the normal position owing to the excessive fatigue of the leaf spring, check the height of the spring from the center bolt. If the fatigue of the spring is excessive, replace the spring.

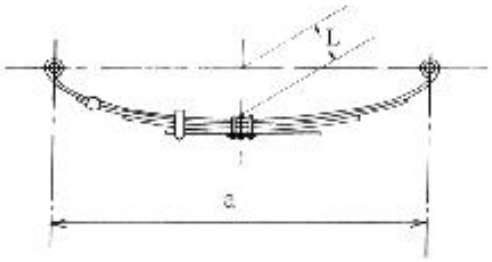
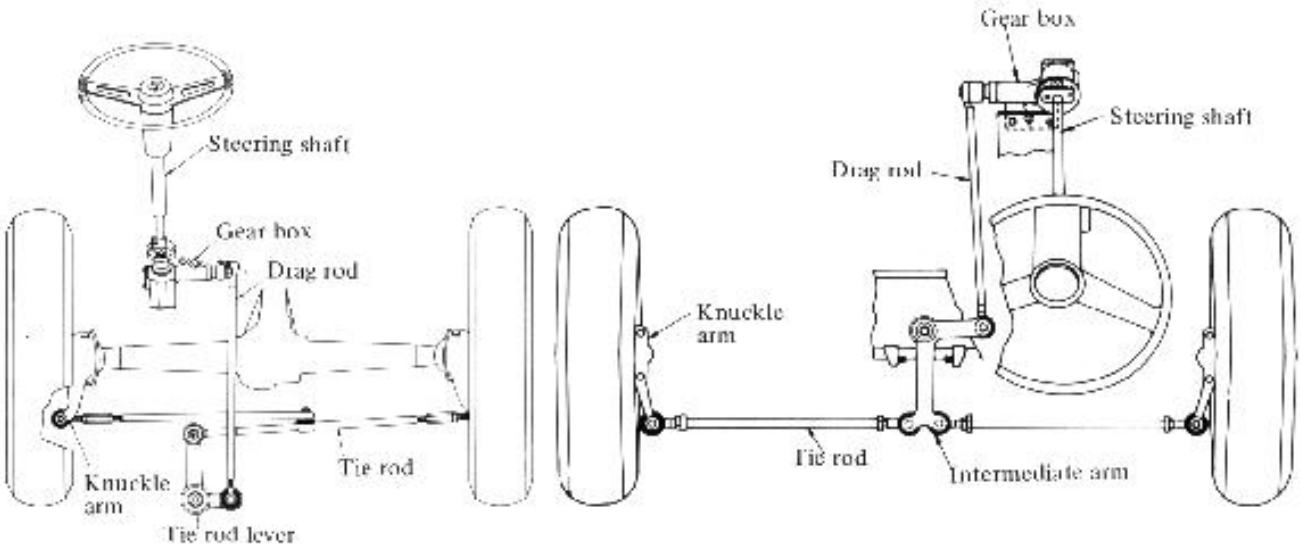


Fig. 11–22

Item	Front	Rear
Camber (Standard)	L = 130 mm (5.12 in)	L = 123 mm (4.84 in)
Camber (Limit)	L = 115 mm (4.53 in)	L = 110 mm (4.33 in)
Length of leaf	a = 940 mm (37.00 in)	a = 1,000 mm (39.37 in)
Spring constant	K – 3.17 kg/cmm	K – 2.50 kg/mm

13–1. General

The ball screw type steering is employed, because it is easy to operate, superior in durability, stability and controllability. The steering power is transmitted in the following route:
Steering wheel, steering shaft, rubber joint, steering gear box, pitman arm, drag link, intermediate arm (steering tie rod lever) tie rod, knuckle arm and front wheels.
And tilt mechanism is employed for adjustment of handle position on the L50, L51 and L50V.



LJ20, LJ20V L50, L51, L50V

Fig. 13–1

13–2. Specifications

Item \ Models	LJ20, LJ20V	L50, L51, L50V
Steering Gear Box Type	Ball screw	Ball screw
Gear Ratio	15.4 : 1	15.4 : 1
Steering Angle, Inside	33°	36°
Steering Angle, Outside	28°	30°
Steering Wheel Diameter	380 mm (15.0 in)	380 mm (15.0 in)
Minimum Turning Radius	4.4 m (14.4 ft)	3.8 m (12.1 ft)

13–3. Steering Wheel

13–3–1. Removing

1. While depressing the horn button, turn it counter-clockwise. The horn button can be removed.
2. Remove the steering wheel nut by using a ring wrench as shown in the Fig. 13–2.
3. The steering shaft is splined to the steering wheel. Pull the wheel upward, and it can be removed.

Fig. 13–2

13–3–2. Inspecting and adjusting

1. Steering column bushing
   If the steering column squeaks at the steering cover, or has excessive play, grease the bushing or replace it.

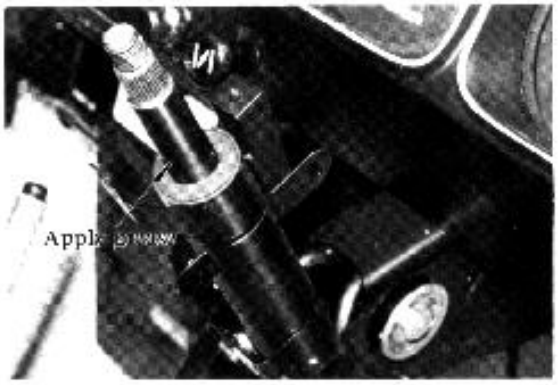


Fig. 13–3

2. Steering rubber joint
   The steering rubber joint should be checked for deterioration and checks of the rubber. If necessary, replace it.

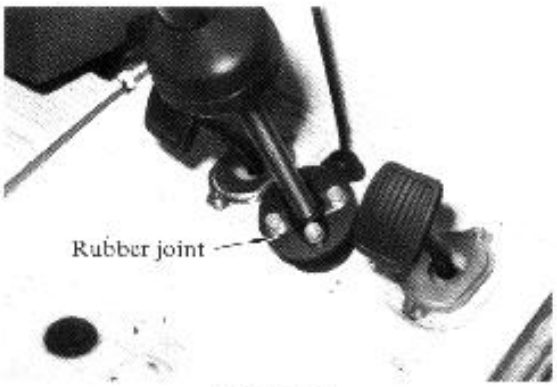


Fig. 13–4

3. Steering wheel play
   The steering wheel play should be adjusted to 35 mm (1.37 in) or less on perimeter. If the play is found out of this range, it should be adjusted by turning the adjusting screw attached to the steering gear box.

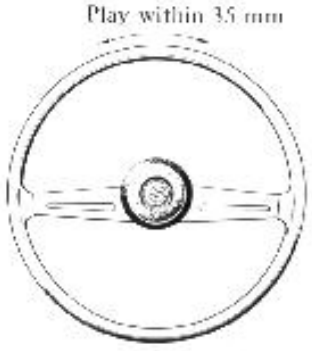


Fig. 13–5

13-3-3. Installing

1. Steering wheel
   The steering wheel should be installed so that the steering wheel arm forms an angle of 6^{o} or less with a horizontal line when the vehicle is moving straight ahead. The adjustment can be done with the serration.

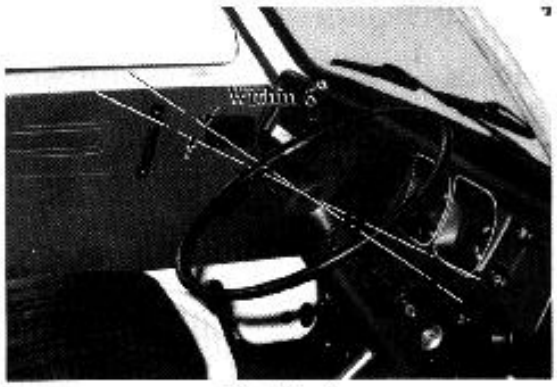


Fig. 13-6

2. Steering Cover
   Installation of steering cover, steering wheel, and steering column support bushing. Adjust gap between steering cover and steering wheel, "A" in the Fig. 13-7, to 2 – 4 mm (0.07 0.15 in).

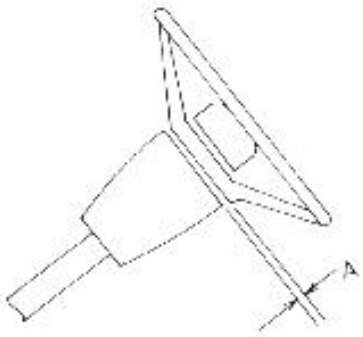


Fig. 13-7

3. Wiring harness (For L50, L51, L50V)
   Route wire harness for a turn signal switch, dimmer switch, and ignition switch through steering bracket and in the column support.

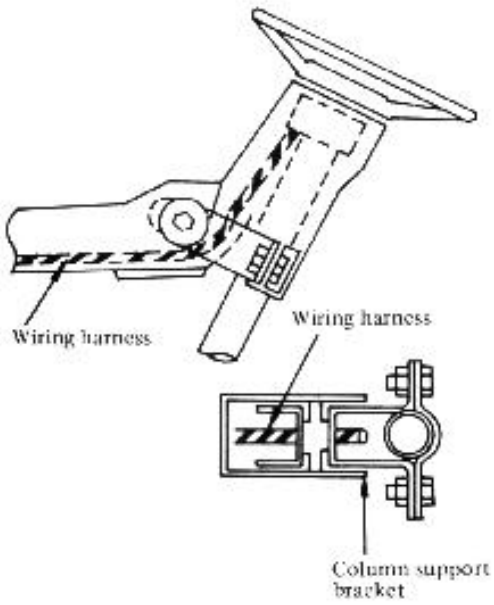


Fig. 13-8

4. Tightening torque

Steering Wheel Nut	250 – 400 kg-cm (18.1 – 28.9 lb-ft)
Steering Rubber Joint Nut	300 – 400 kg-cm (21.7 – 28.9 lb-ft)
Steering Rubber Joint Bolt	150 – 250 kg-cm (10.84 – 18.1 lb-ft)

13–4. Steering Tilt Mechanism (For L50, L51, L50V)

The tilting device is incorporated in the steering mechanism for an optimum driving position.
Since steering bracket has elongated bolt holes, the steering wheel can be moved back and forth for about 35 mm (1.8 in) by loosening the steering tilting nuts, and therefore, it can be set to the position of driver's choice.

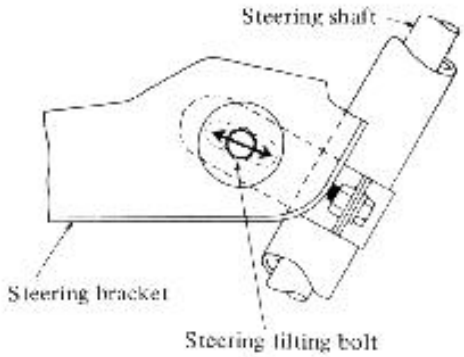


Fig. 13–9

13–5. Steering Gear Box

Steering gear is recirculating ball type featuring light steering operation, and its construction is shown in the Fig. 13–10.
Check for play between sector shaft and worm shaft, and operation of worm shaft. Replace gear box assembly, if any discrepancy is found.


Fig. 13–10

13–5–1. Steering gear oil

If oil leakage is found, make sure that the quantity of oil is correct. If the oil level is low, the oil should be added. The oil level can be checked through the oil plug hole. The correct oil level is about 6 mm (0.24 in) below the plug position.

Steering Gear Box Oil	Gear Oil SAE #90	190 cc (6.4/6.7 US/Imp. oz)

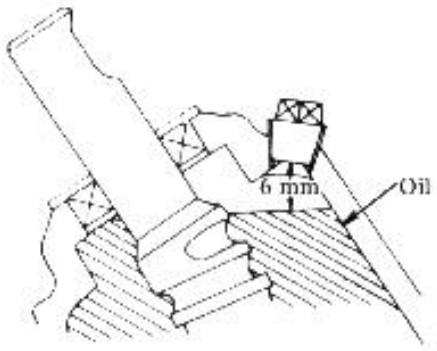


Fig. 13–11

13 6. Steering Linkage

The linkage system from the steering gear box to the wheels should be checked for worn tie rod end, drag link end and intermediate arm bushing. If any of these is faulty, the wheel alignment will become incorrect, and thereby the tires will quickly wear or the steering wheel will become shaky.

13–6–1. Inspecting and servicing (For LJ20, LJ20V)

1. Installation of steering tie-rod lever bushing
   Press the steering tie-rod lever bushing into the tie-rod lever boss so that the upper and lower projections are set equally to 5 mm (0.2 in) as shown in the Fig. 13–12.

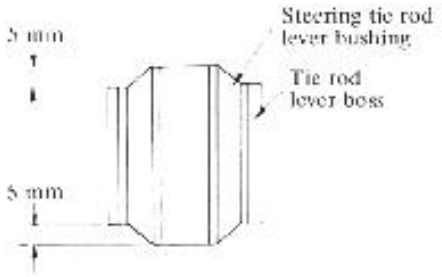


Fig. 13–12

2. Installation of steering tie-rod lever
   Install the steering tie-rod lever so that misalignment between the straight line in line with the center of the chassis frame and the center line of the steering tie-rod lever is held within 1° as shown in the Fig. 13–13.

Steering Tie-Rod Lever Nut Tightening Torque	500 900 kg-cm (36.2 – 65.1 lb-ft)

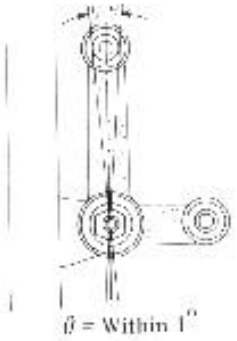


Fig. 13–13

3. Installation of left side tie-rod assembly
   Tighten the tie-rod end lock nut so that the faces A and B of the sockets at the tie-rod ends are in parallel as illustrated in the Fig. 13–14. When securely tightened, the lock nuts should be well centered leaving the threaded portion of 5 mm (0.2 in) at each side.

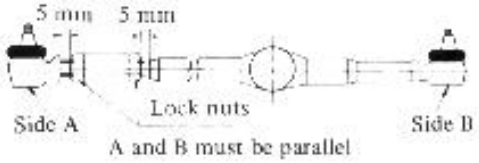


Fig. 13–14

4. Installation of right side tie-rod assembly
   Tighten the tie-rod end lock nut so that the faces A and B of the sockets at the tie-rod ends are in perpendicular as illustrated in the Fig. 13–15. When securely tightened, the lock nuts should be well centered leaving the threaded portion of 5 mm (0.2 in) at each side.

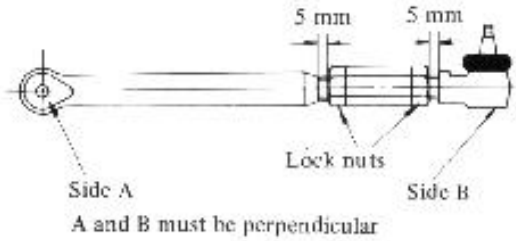


Fig. 13–15

13 6 2. Inspecting and servicing (For L50, L51, L50V)

1. Steering intermediate arm

When press-fitting the steering intermediate arm bushing, it is necessary to be inserted in the direction of the arrow. The clearance A between the bushing and the pipe end should be adjusted to 0 – 0.5 mm (0 – 0.02 in), and B should be to 3.8 – 4.6 mm (0.15 – 0.18 in). To facilitate the work, it is advisable to use the water or water containing 5% of soap by weight.

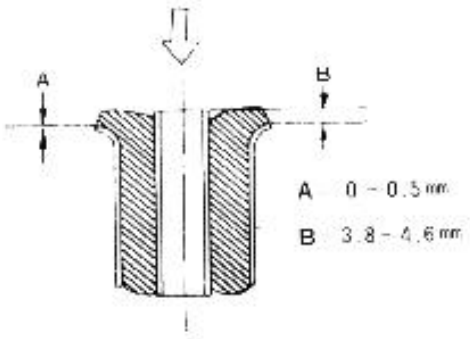


Fig. 13 16

When the intermediate arm nut is tightened with specified torque, the intermediate arm center line must form an angle of 1° or less with the vehicle center line.

Intermediate Arm Nut Tightening Torque	800 1,500 kg-cm (86.8 144 lb-ft)

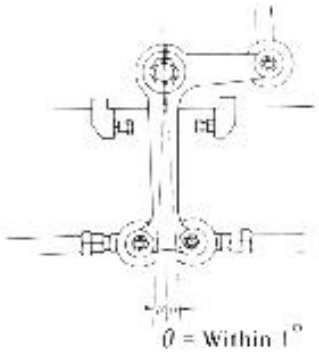


Fig. 13–17

2. Tie Rod

The tie rod should be checked for bent pipe and worn tie rod end. To remove the tie rod, loosen the lock nuts at both ends of the tie rod, and turn the recessed portion at the center of the pipe.

When installing it, it is necessary to turn in the screws at the tie rod ends simultaneously. Otherwise, the amount of turn-in will differ between the two screws, and the adjustment of toe-in will become impossible.

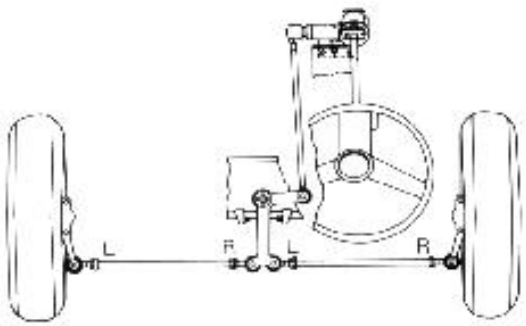


Fig. 13 18

Difference in Length Between Right and Left Tie Rods	2 mm (0.08 in) or less

The tie rods should be installed so that the mark R (right-hand thread) on the tie rod and the mark L (left-hand thread) are positioned as shown in the Fig. 13–18.

Accordingly, when the tie rods are turned counterclockwise as viewed from the left side of the vehicle, the toe-in becomes greater.

3. Adjusting the minimum turning radius
   The minimum turning radius should be adjusted with the intermediate arm stopper bolts attached to the suspension frame so that it is 3.8 m(12.5 ft). The stopper bolts distance L are 16 mm (0.63 in) as standard.

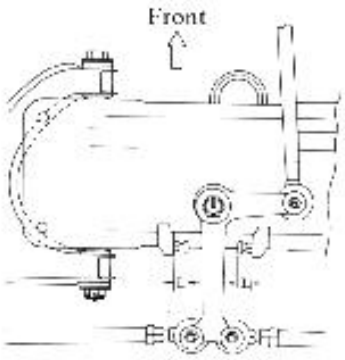


Fig. 13 19

13–7. Front Wheel Alignment

Only the toe-in is adjustable and camber and caster can not be adjusted as they are so designed and built into the vehicle.

The following points should be checked before inspecting the front wheel alignment.

1. Check to be sure the vehicle is parked on a level ground.
2. Check to be sure the vehicle is not loaded.
3. Check and adjust tire pressure.
4. Check tread on tires for a sign of abnormal wear.
5. Check to see if the body is inclined.

   Failure to check the above points will result in poor adjustment of front wheel alignment.

13 7–1. Alignment service data

	LJ20	LJ20V	L50, L51, L50V
Toe-in	2–8 mm (0.08–0.31 in)	1–7 mm (0.04–0.27 in)	5–6 mm (0.19–0.23 in)
Side slip (with one passenger)	in 3-out 1	in 3 out 1	in 3-out 1
Camber	1°	1°	1° 30'
Difference between Right & Left	———	———	45'
Caster	30'	30'	1° 30'
Difference between Right & Left	———	———	45'

13–8. Tires (For L50, L51 and L50V)

Yellow balance mark is put on tire as shown in the Fig. 13 20 for dynamic balancing. Align tube valve with balancing mark on the tire when tube is assembled as in repairing punctured tubes, etc.

Fig. 13–20

14 1. General

Two-leading brakes and leading-trailing brake are equipped in front wheels and rear wheels respectively, and braking is applied to all wheels by hydraulic pressure generated by depressing brake pedal by foot.
Parking brake device is installed on rear propeller shaft for LJ20 and LJ20V, and this brake provides enough braking force even when wheel brakes become ineffective due to driving on puddles or fording streams.

14–2. Brake Pedal.

14–2 1. Inspecting

Normal free travel of brake pedal is 15–20 mm (0.59 0.78 in) at the top of pedal. If free travel of pedal is excessively large or small, check push rod installation. Clearance between floor and pedal at its utmost of travel should be 30–40 mm (1.18 1.57 in) or more. Excessive travel of pedal is caused by wear of brake shoe linings, or defective master cylinder or wheel cylinders, but first, adjust clearances between shoe linings and brake drums.

Free Travel of Brake Pedal	15–20 mm (0.59–0.78 in)
Clearance Between Floor and Pedal at the Utmost	30–40 mm (1.18–1.57 in)

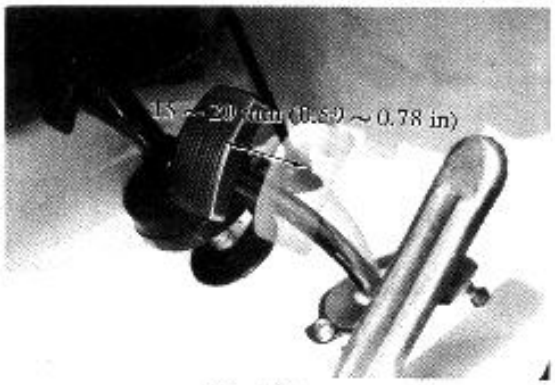


Fig. 14 1

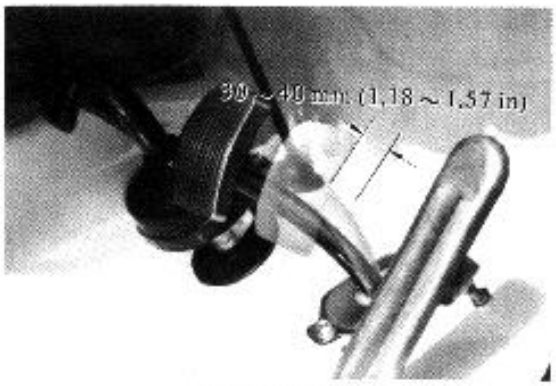


Fig. 14–2

14 2 2. Installing (For L50, L51 and L50V)

In installing brake pedal, adjust the height of pedal A in the Fig. 14–3 to 1–4 mm (0.04–0.16 in) by brake pedal adjusting shims at flange of master cylinder.

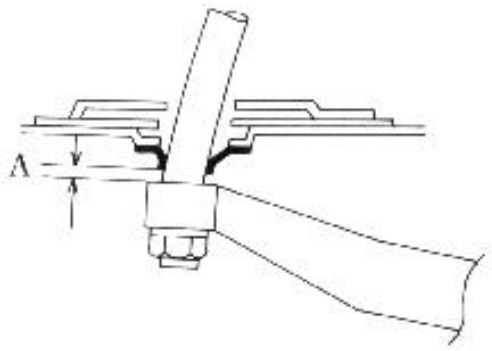


Fig. 14 3

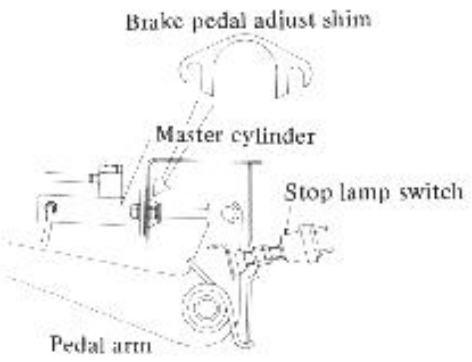


Fig. 14–4

14 3. Stop Lamp Switch

A mechanical type stop lamp switch is attached to brake pedal bracket. Adjust the positioning of switch at A in the Fig. 14-5 so that it is switched off when the brake pedal resumes its normal position and on when the brake pedal is depressed, and tighten the lock nuts after completion of adjustment. In this adjustment, brake pedal should be stopped by the brake master cylinder push rod when returned. Be careful not stop by the stop light switch.

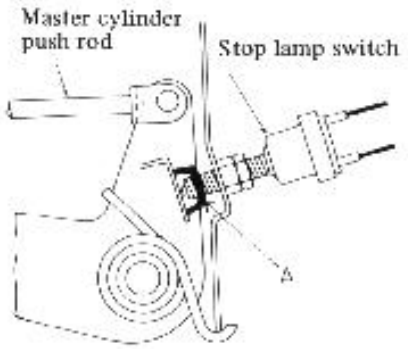


Fig. 14-5

14-4. Master Cylinder

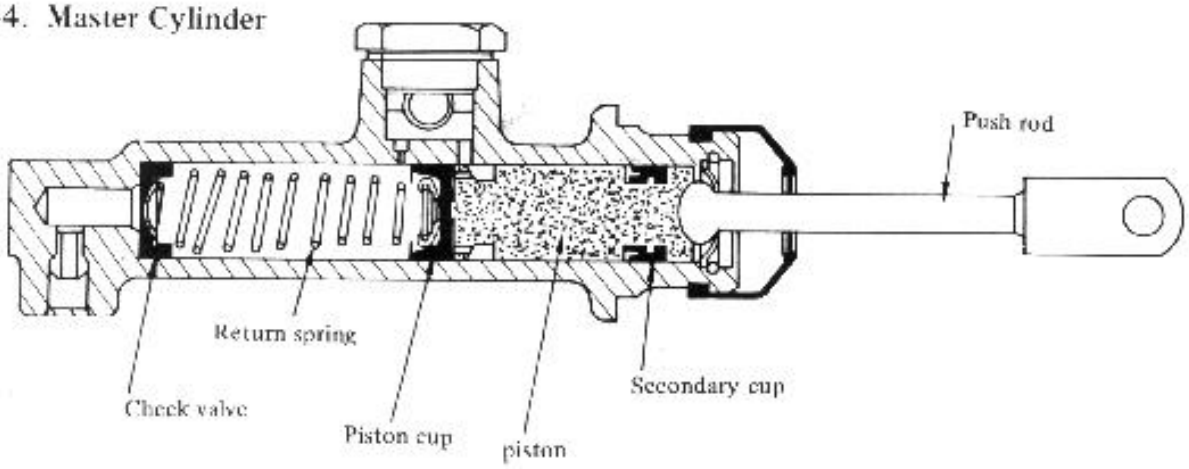


Fig. 14-6

14-4-1. Notes of installing and servicing

The master cylinder trouble, in most cases, may result from foreign matter or air in the brake fluid, or worn or deformed check valve or piston cup. These parts must be disassembled for inspection. If the rubber-made parts are found faulty, they should be replaced with kit parts.

1. Check for foreign particles in master cylinder, and check the check valve, piston cup and secondary cup for wear and deformation. Defective parts should be replaced with set of piston cup and secondary cup.
2. Avoid washing any rubber-made parts with gasoline or kerosene. It may swell or be deformed. For cleaning, the brake fluid should be used.
3. All parts, particularly rubber-made parts, should be coated with the brake fluid and then installed.
4. Be sure that the valve seat, piston cup, etc. are installed in order.
5. After the assembling, the air should be bled.

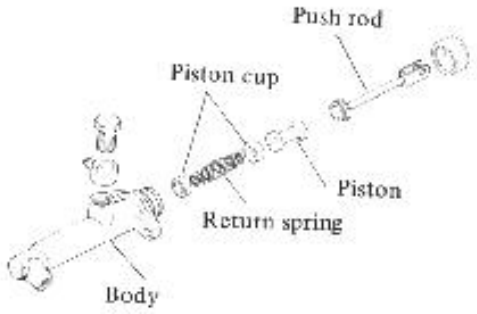


Fig. 14-7

Replacement Piston Cup and Secondary Cup	Every two years

14–5. Brake tubing

14–5–1. Inspecting

Bandy tube (double steel tube) whose surface is plated for corrosion prevention is used for brake tubing. To check brake tubing every six months is recommended. Check the following items.

Check Item	Criterion
Damage	No nicks, nor crashed. Pay particular attention to nicks and deformation of flared end
Oil leakage	No oil leakage and seepage
Condition of clamps	Securely clamped
Corrosion and rust	No corrosion and rust on tubing

14–5–2. Installing

1. Four way joint
   Four way joint is used for distribution of brake oil forced from master cylinder to front right hose, front left hose, and rear hose.
   Install the joint with tube from master cylinder facing backward (downward) as shown in Fig. 14–8.

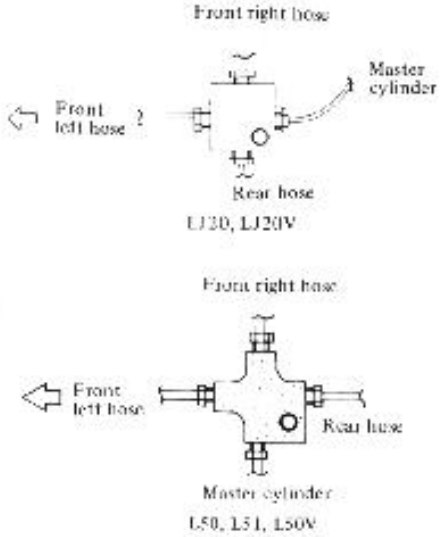


Fig. 14–8

2. Tubing in rear axle casing area
   In installing rear wheel brake tubing, put tubing from rear flexible hose to right wheel cylinder under and put tubing from right wheel cylinder to left wheel cylinder.

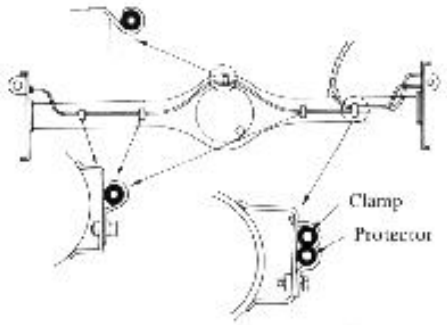


Fig. 14–9

3. Clamping of tubing No.1 and No.6
   (For L50, L51, L50V)
   Clamp brake tubing No.1 (from master cylinder to four-way joint) and No.2 (four-way joint to rear flexible hose) to the frame at the four places as shown in the Fig. 14–10.

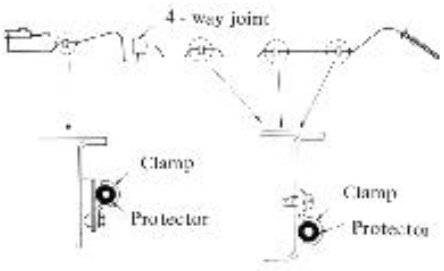
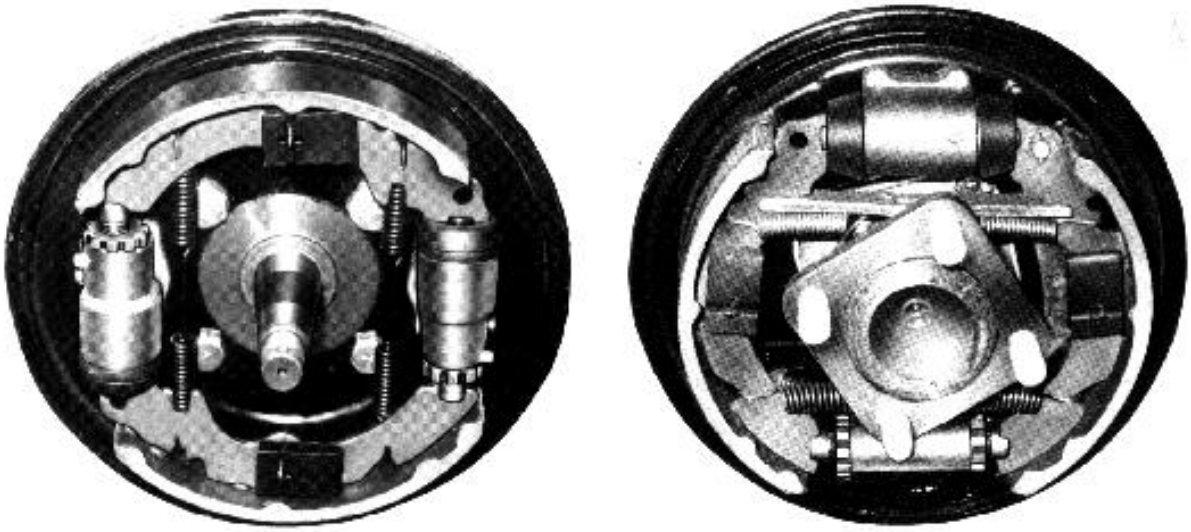


Fig. 14–10

14–6. Wheel Brake



Front Rear

Fig. 14–11

14–6–1. Point of service

The wheel brake should be checked for leakage, contact between brake shoe and brake drum, distortion of back plate, fatigue of shoe return spring, etc.
When servicing the wheel brake, the following points should be noted.

1. Take care not to cling oil to the brake shoe and drum.
2. Lightly coat the grease to moving parts. Do not feed the grease too much; otherwise, the grease tends to cling the brake shoe, thereby impairing the braking efficiency.
3. The brake adjusting screw should be installed so that when it is turned outward, the brake shoes expand outwards. If the screw is installed incorrectly, it must be turned inversely for adjustment of shoes clearance.

14–6–2. Brake drum

The brake drum should be checked for cracks, scratches and deformation on surface contacting the brake lining, and oil clung to the surface. If the drum is found excessively worn or scratched, it should be corrected or replaced.

Inspection Item	Models	Standard	Limit
Brake Drum Inside Diameter	LJ20, LJ20V	210 mm (8.267 in)	212 mm (8.346 in)
	LJ50, LJ51, LJ50V	180 mm (7.087 in)	182 mm (7.165 in)
Brake Drum Distorsion in Diameter		0	0.5 mm (0.019 in)

14–6–3. Brake shoe

Check the brake lining for aging, wear and oil. The brake lining is molded with the shoe and can not be removed, therefore, if the brake lining worn out or aged, replace the shoe.

Brake Lining Thickness	Standard	Limit
	6 mm (0.236 in)	3 mm (0.118 in)

14 –6–4. Wheel cylinder

1. When disassembled, rubber-made parts such as piston cup should be replaced with kit parts.
2. Wash the parts with the brake fluid, and apply it to the parts before installation.
3. Grease the adjust screw slightly to prevent it from rusting.

Replacement Rubber Parts	Every two years

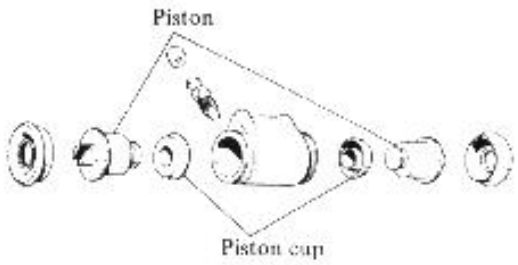


Fig. 14–12

14–6–5. Tightening torque

Components of the brake system should be serviced with special care, and therefore, tightening torque must be corrected.

Brake Tubes	120 – 160 kg-cm (8.7 – 11.5 lb-ft)
Front Wheel Cylinder Fitting Nuts	140 – 180 kg-cm (10.1 – 13.0 lb-ft)
Rear Wheel Cylinder Fitting Nuts	70 – 110 kg-cm (5.1 – 8.0 lb-ft)
Back Plate Fitting Bolts	180 – 280 kg-cm (13.0 – 20.3 lb-ft)
Rear Brake Anchor Fitting Nuts	130 – 230 kg-cm (9.4 – 16.6 lb-ft)

14–6–6. Adjusting

1. Release the parking brake.
2. Turn the adjusting screw outwards by inserting screw driver through the adjusting hole, and expand the brake shoes so that they will come to contact the drum tightly.
3. Return the adjusting screw inwards to specified amount.

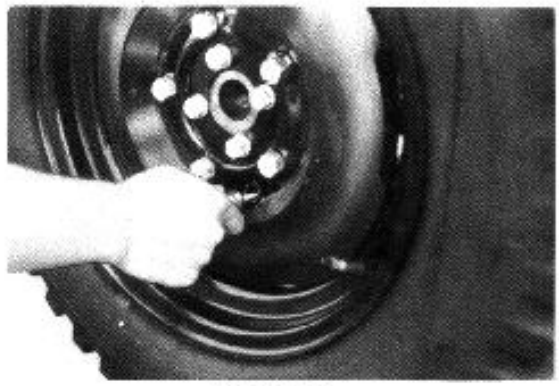


Fig. 14–13

Specified adjusting screw-amount of turning

Front Wheel	Back out 3 to 6 teeth
Rear Wheel (leading side)	Back out 3 to 7 teeth
Rear Wheel (trailing side)	Back out 4 to 8 teeth

Note: Back out the screw the minimum number of teeth, as far as the brake will not drag.

14–7. Air Bleeding

When air is found in the brake cylinder and pipe, it should be expelled. Air bleeding should be performed by two mechanics.

1. Refill the brake fluid reservoir with brake fluid.
2. Remove the wheel cylinder bleeder plug cap, and install the plastic tube to bleeder plug. The other end of the tube is put into the brake fluid in the container.
3. Fully depress the brake pedal several times.
4. With the brake pedal depressed, turn out the bleeder valve a ½ turn, and bleed the air together with the brake fluid. Before the oil pressure totally decrease, tighten the bleeder valve. The brake pedal should be gently released so that air will not flow in reverse direction.
5. Bleed the air until it disappear completely from the plastic tube.
6. The air bleeding should be done in the order of numbers in the figure 14–15.
7. With the pedal depressed, fully tighten the bleeder plug.
8. Place the bleeder plug cap, and add the brake fluid into the reservoir so that it reaches the specified level.
9. When fill the reservoir with brake fluid graded DOT 3 or DOT 4 in USA and equivalants in other countries. Since the brake system of this vehicle is filled with a glycol-based brake fluid by the manufacturer, do not use or mix different types of fluid for refilling the system, otherwise the serious damage will be caused. Do not use any brake fluid taken from old or used or unsealed containers.

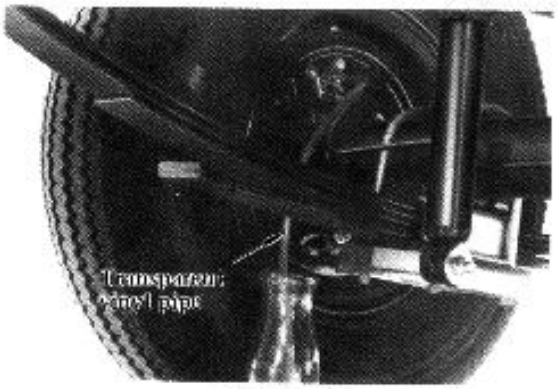
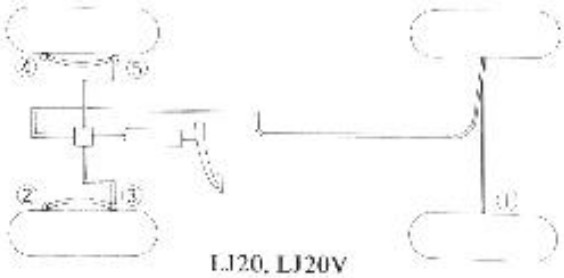


Fig. 14–14



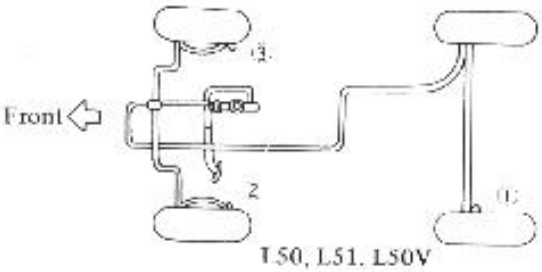


Fig. 14–15

Replacement Brake Fluid	Every two years

SCREWS GO DOWN

14–8. Parking Brake

Pull out the parking brake lever to its limit of travel, and check for ratchet and ratchet tooth position.

Tooth Position	7th tooth or below
Play	2 teeth or less

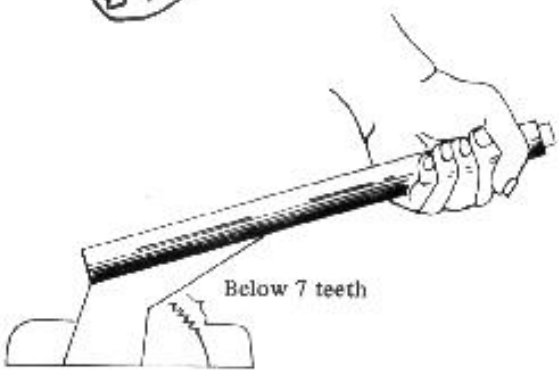


Fig. 14–16

15–1. General

L50, L51 cabins, rear body and chassis frame, which were built separate in previous products, are now assembled into an integral chassis-body construction by welding pressed steel sheets.
Ventilator window is not used to improve visibility.

15–2. LJ20V Doors

15–2–1. Removing

1. Door removal
   1) Remove door window regulator handle, door inside pull handle and door inside handle. With rubber boots turned inside out and pins removed, door window regulator handle and door inside handle can be removed.
   2) Remove two door-side screws for door open stopper.
   3) Prize off door trim board with plain screw driver, which is held in place by ten clips.

2. Door window glass removal
   4) Remove door window glass stopper and lower door glass.
   5) Prize off door window oscillate-proof with plain screw drive, which is held in place by six clips.
   6) Unscrew two screws attaching door window regulator arm and remove two lower rollers while turning door window regulator.
   7) Unscrew two screws fixing rail at back of door window glass and remove glass.

3. Door window regulator removal
   8) Carry out the above procedure 1) 5).
   9) Remove four screws securing foor window regulator bracket.
   10) Have door window glass raised.
   11) Drop door window regulator and take it out through service hole in door inner panel.


Fig. 15–1

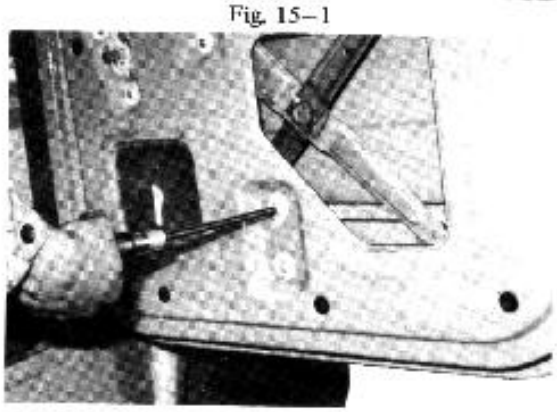


Fig. 15–2

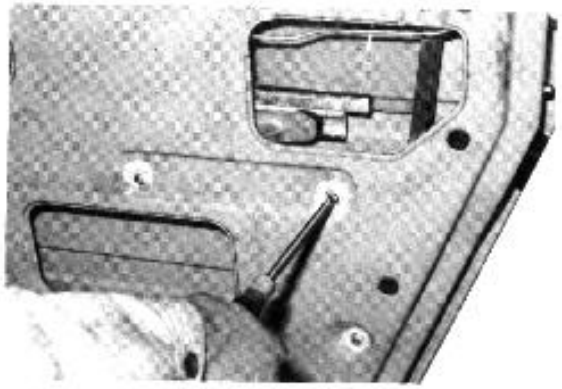


Fig. 15–3


Fig. 15–4

4. Door lock assembly removal

12) Remove clip connecting door open remote control rod.

13) Remove black blind plug at back of door and remove two 6 mm nuts attaching door outside handle.

14) Unscrew three screws attaching door lock assembly to door back end, disengage lower arm of door outside handle and remove assembly from inside the door.

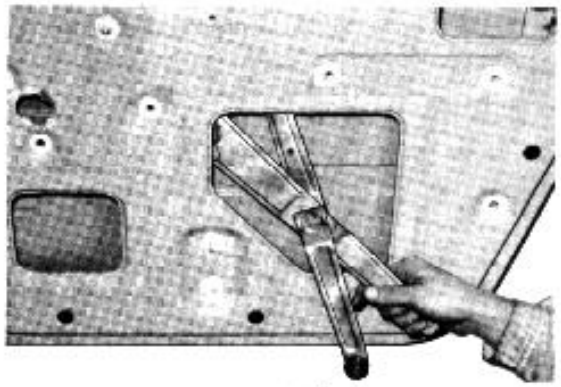


Fig. 15–5

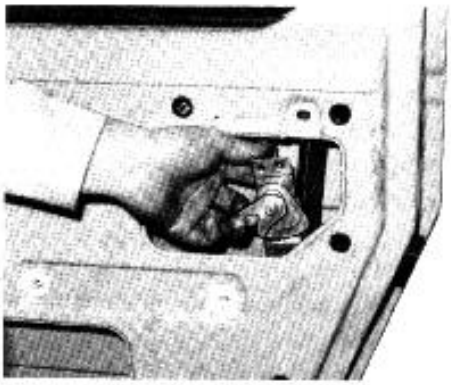


Fig. 15–6

15–3. L50, L51 Doors

15–3–1. Removing and Installing

1. Removing doors

1) Remove door window regulator handle, door inside pull handle, door inside handle and door inside lock knob.

2) Pry off door trim board which is attached by clips by using plane screw driver from the upper part of the board.

2. Removing door window glass

3) Lower door window glass fully, and pry door window oscillate proof off using a plane screw driver.

4) Remove two screws securing door regulator roller holder.

5) Remove door window regulator rollers from glass.

6) Remove glass from door, lifting up and turning into forward.

7) To remove door window regulator take off four screws on door inside panel.

3. Installing door window glass

1) Set door window regulator main arm rollers at 80 mm (3.15 in).

2) Tilt glass until the rear part of bottom channel comes in contact with scalp.

3) Assemble door window regulator main arm roller from front of roller guide No.1, shifting glass toward the direction of arrow mark.

4) Assemble door window regulator sub arm roller from front of roller guide No.2, shifting glass in the direction of arrow mark.

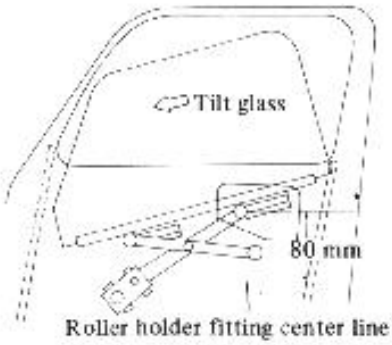


Fig. 15–7

15–4. Inspecting and Adjusting

15–4–1. Outside handle and door lock cam (For LJ20V)

Adjust the position of the door lock cam plate so that the door lock open lever can be installed as shown in the Fig. 15–8. In this case, the play of the outside handle is 3.5 mm (0.14 in). If the play is too small or too large, the door will not be perfectly locked, and it may be swing open while driving.

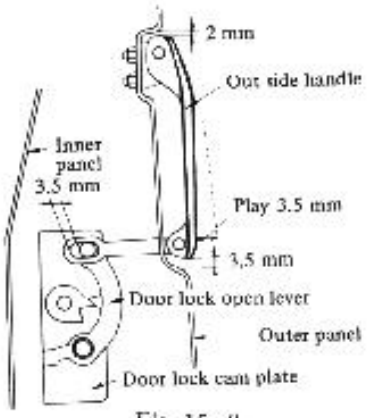


Fig. 15–8

15–4–2. Outside handle and door lock cam (For L50, L51)

The door cam holder arm pin should be aligned to the center of elongated hole of door outside handle link. In this condition a play of outside handle is normally 3.5 mm (0.14 in).
Pay attention to this play, because an excessive or too small a play results in imperfect door lock, thus causing door fling open unexpectedly during driving. When the door has a door lock remote control, adjust the clearance between link mechanism and door lock inside lever bushing to within 0–1 mm (0–0.04 in) by installing door lock remote control unit.

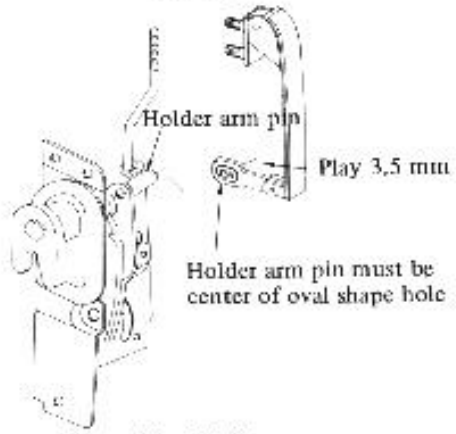


Fig. 15–9

15–4–3. Door lock striker

If the door lock is found faulty or the door will not snugly fit in the cabin, adjustments should be made on both door lock cam and door lock striker according to the Fig. 15–10. Loosen the door lock striker screw, and adjust it.
If the door has excessive play, check for wear of the door cam roller and door lock striker, and if necessary, adjust or replace it.

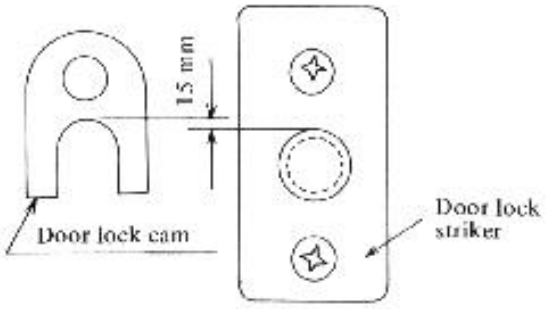


Fig. 15–10

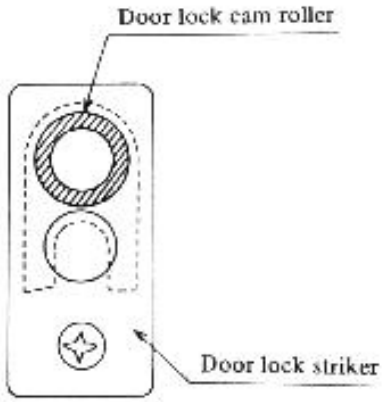


Fig. 15–11

15–4–4. Window regulator

If the window regulator is faulty, the window glass will not smoothly rise or it lowers from its position while the vehicle is running. This may be due to a fatigue of balance spring or broken pinion or lack of grease. If either of the balance spring and pinion is found faulty, they should be replaced as an assembly.

Fig. 15–12

15–4–5. Door window glass

When raising or lowering door window glass is abnormally heavy, door glass window is often fitted aslant into door frame and rail. Correct this trouble by moving up and down screws attaching door window regulator arm shown in the Fig. 15–13.

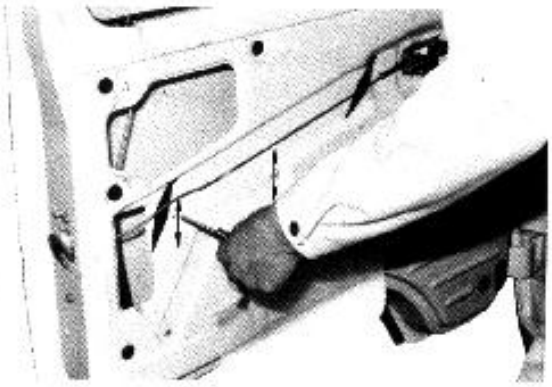


Fig. 15–13

15–5. Front Windshield and Rear Window

To install the front windshield glass, follow these procedures:

1. To facilitate the installation work, wet the weather strip with water.
2. Install the weather strip on the glass.
3. First, install the lower part of the glass in the frame. Be sure that the glass is in position.
4. While pushing the front windshield glass from outside, fit the inner part of the weather strip in the frame. It is advisable for easy operation that a string be placed under the weather strip and pulled toward inside.

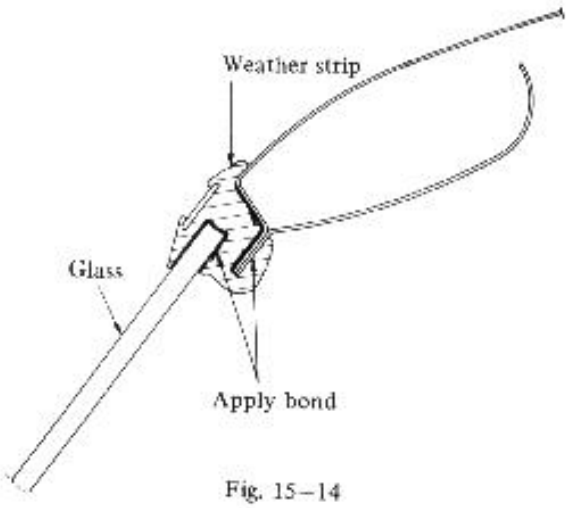


Fig. 15–14

5. Apply a bond all round of the glass edge and weather strip as shown in the Fig. 15–14. The same procedures are applicable to the installation work of the rear window glass.

15–6. LJ20 Hood Assembly

1. Remove front window stop band, erect front window and fix window with right and left window stoppers. (Fig. 15–15).
2. Fit door into lower door hinge, attach upper door hinge and fix door. Then attach door open stopper and right and left door hooks.

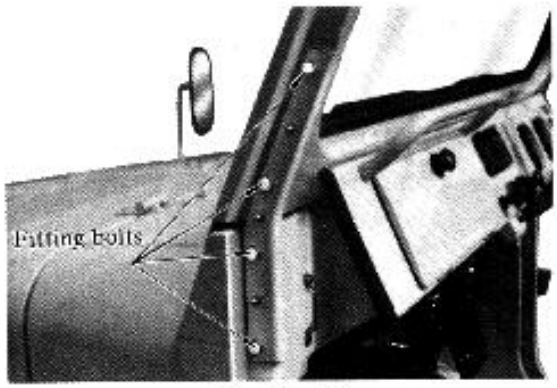


Fig. 15–15

3. Fit left and right center pipes and then right and left roof-side front rails. Push spring and insert rail into front window side as illustrated in the Fig. 15–16.
4. Fit front top bow.

Fig. 15–16

5. Slide the whole hood frame backward while lifting it up.

Fig. 15–17

6. Fit roof-side front rail into front cross top bow (Fig. 15–18) and tighten right and left top bow rail bolts.

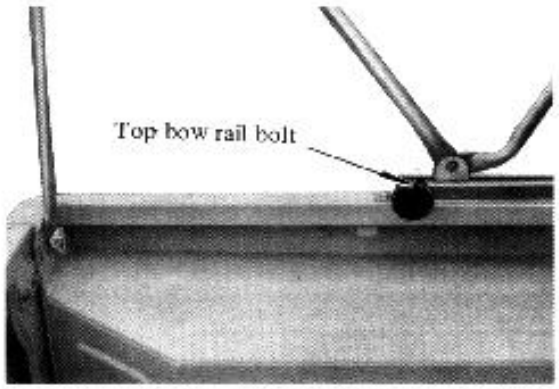


Fig. 15–18

7. Tighten butterfly nuts attaching right and left rear top bow cross holders to rear body.

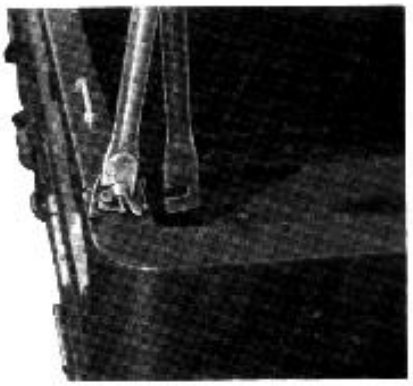


Fig. 15–19

8. Fitting door band on the body.

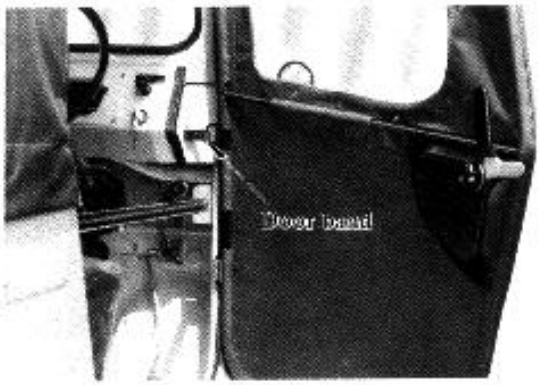


Fig. 15–20

9. Place hood and side door on hood frames and fix it.

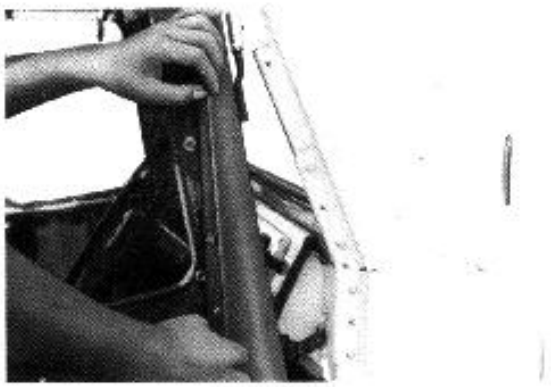


Fig. 15–21

10. Bind hood strips around hood frames at roof.

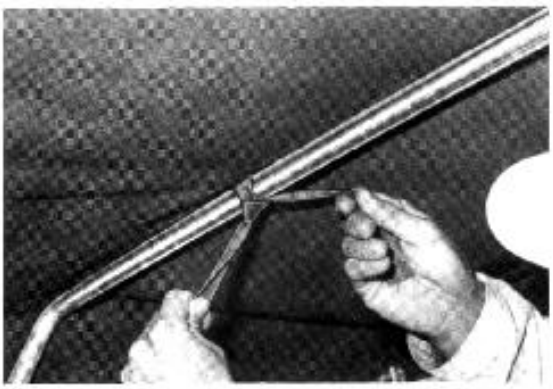
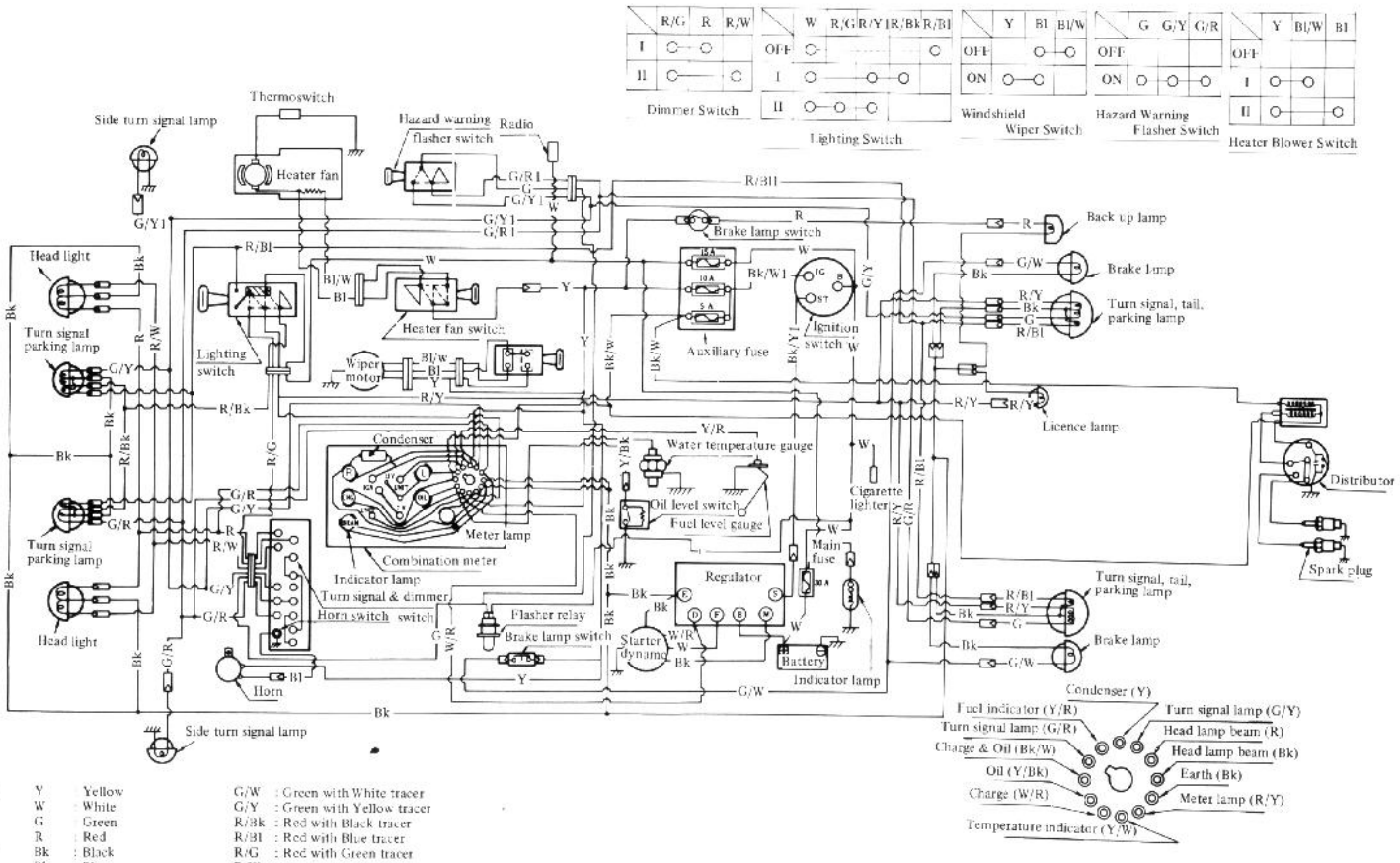


Fig. 15–22



Y	Yellow	G/W	: Green with White tracer
W	White	G/Y	: Green with Yellow tracer
G	Green	R/Bk	: Red with Black tracer
R	Red	R/Bl	: Red with Blue tracer
Bk	: Black	R/G	: Red with Green tracer
Bl	: Blue	R/W	: Red with White tracer
Bk/W	: Black with White tracer	R/Y	: Red with Yellow tracer
Bk/Y	: Black with Yellow tracer	W/R	: White with Red tracer
Bl/W	: Blue with White tracer	Y/Bk	: Yellow with Black tracer
G/Bl	: Green with Blue tracer	Y/R	: Yellow with Red tracer
G/R	: Green with Red tracer		

16–3. Head Lamp

16–3 1. Wiring Circuit

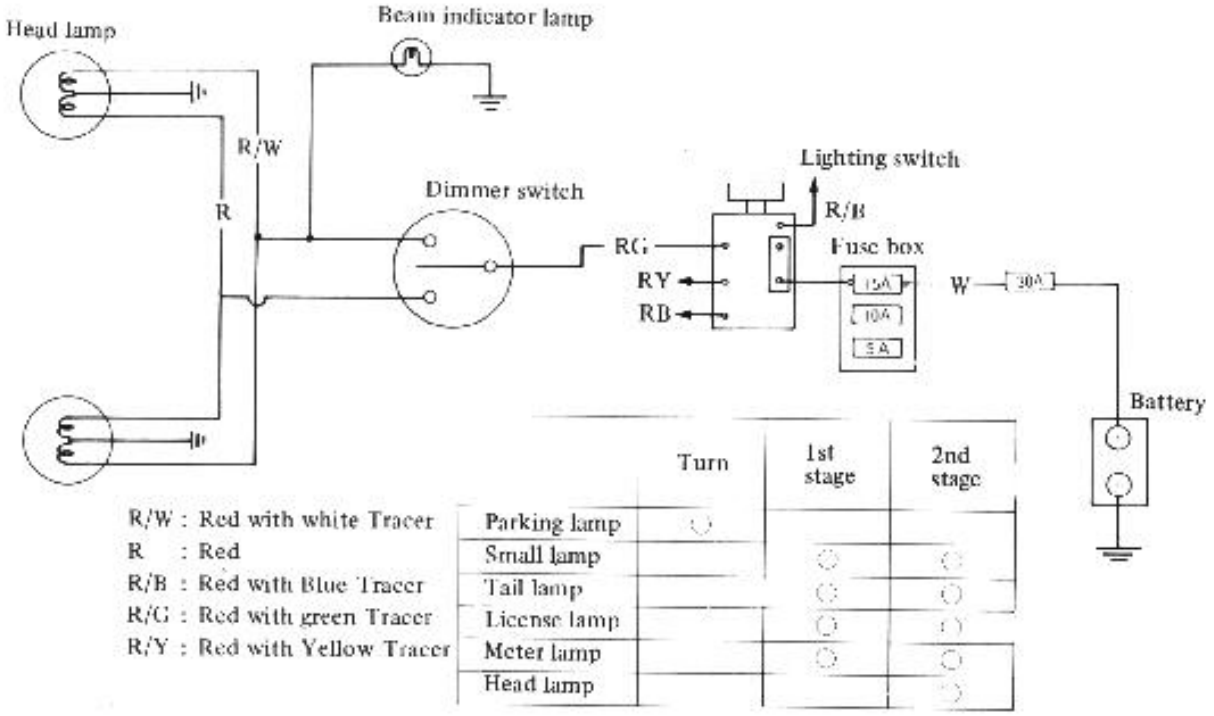


Fig. 16–1

16–3–2. Focus of head lamp (Standard)

1. Position of high beam

This position should be aligned to 10 m (32.8 ft) forward of but below the horizontal line of the head lamp from the ground.

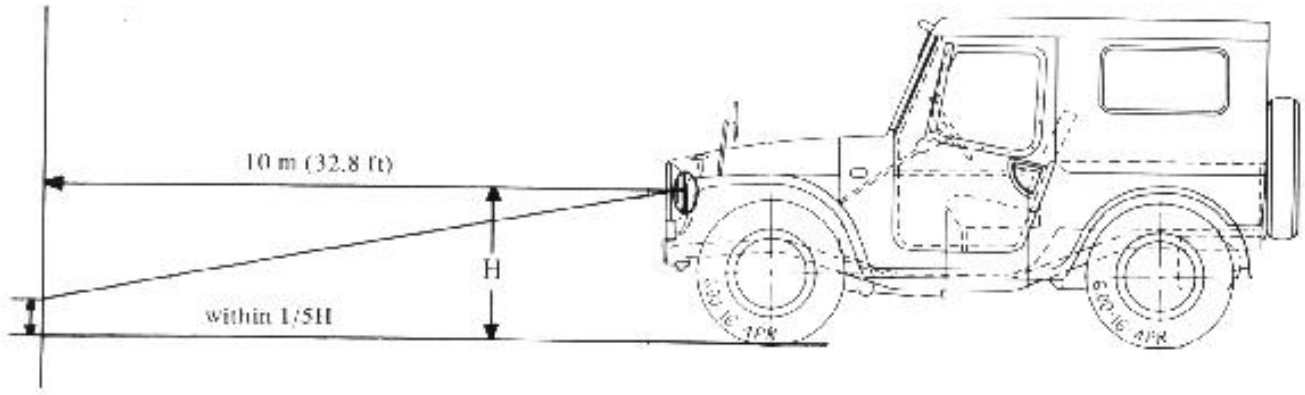


Fig. 16–2

2. Position of low beam for left-hand steering wheel (for right-hand steering wheel, the position is symmetrical).
Left-head lamp:
10 cm (0,29 in) to the left and 20 cm (0,78 in) to the right of direction of driving at 10 m (32,8 ft) ahead.

Right-head lamp:
20 cm (0,78 in) to the right and 20 cm (0,78 in) to the left of direction of driving at 10 m (0,39 in) ahead.

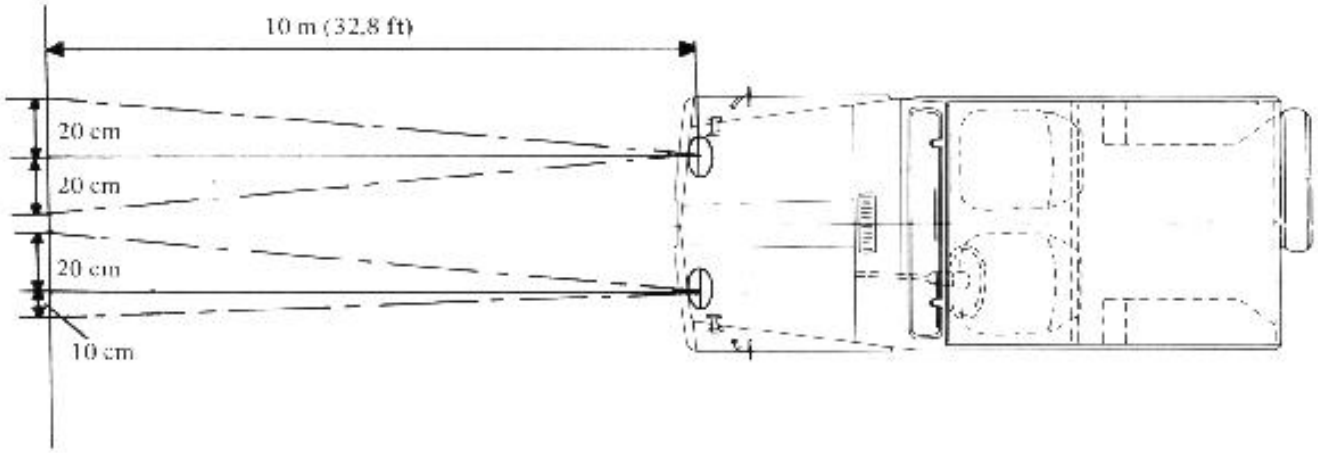


Fig. 16–3

16–3–3. Adjustment

When focus is not the standard value, adjust focus to right or left and up or down with adjusting screws A, B and C of head lamp as shown in the Fig. 16–4.

Fig. 16–4

16–4. Turn Signal and Hazard Warning Signal Lamp

16–4–1. Wiring circuit

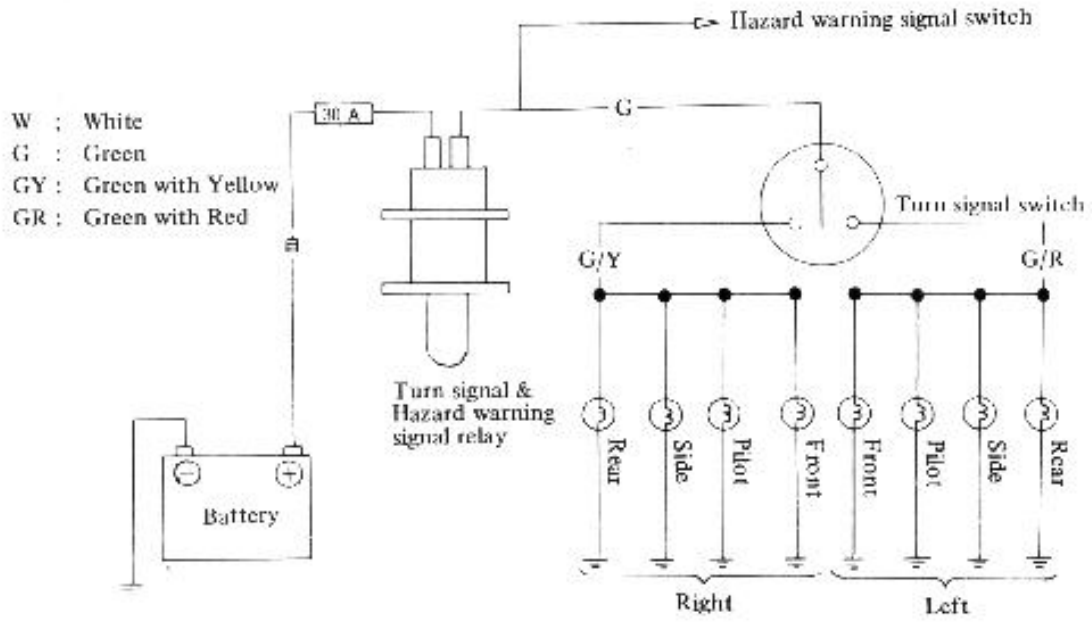


Fig. 16–5

16–4–2. Mercury relay

Mercury relay utilizing liquid-metal properties of mercury is used for signal relay unit, its construction being as follows.

1. When turn and dimmer switch is thrown in, current flows at terminal B. A circuit being already established between terminals B and L, current then flows through magnetic coil into lamp, lighting it up.
2. Then, operating cylinder is pulled up by magnetic force developed by current which flowed through magnetic coil. But mercury leaks downward through hole in cylinder bottom.
3. Mercury level in operating cylinder lowers and breaks circuit between terminals B and L, thereby turning off lamp.

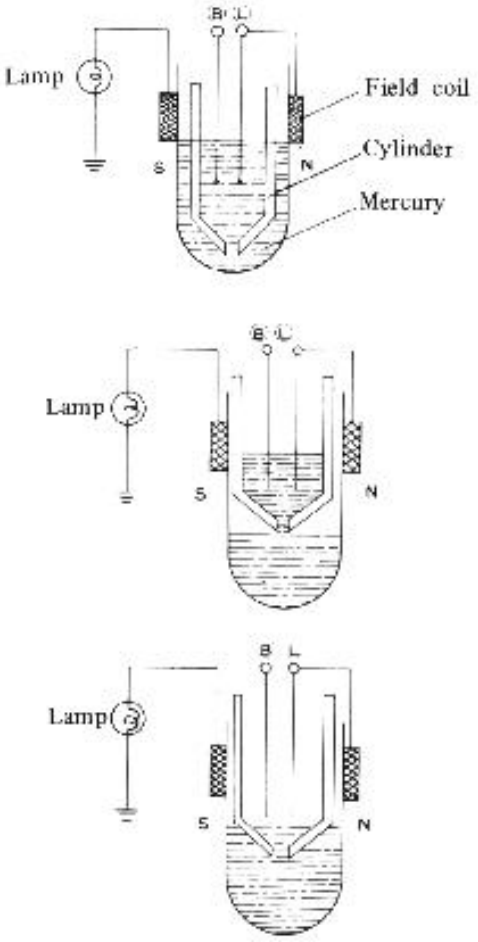


Fig. 16–6

16-4-3. Notes on handling of the relay

1. The installation position must not be changed. If the position is required to be changed, be sure that the relay is not leaned.
2. Never confuse the relay's terminal B (white) with the terminal L (green). It is also noted that the noise of the mercury type relay is a little higher than other type relay, but it is normal.

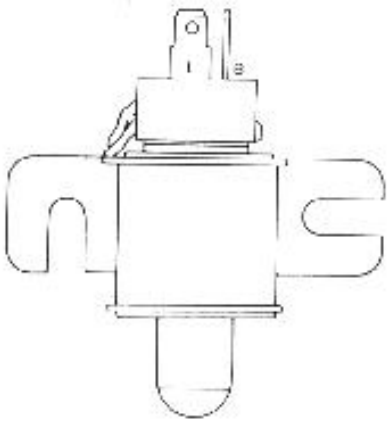


Fig. 16-7

16-4-4. Inspecting circuit

1. The signal lamps do not light up or lamp turn on but it will not flash. Inspect the mercury unit.
2. The hazard warning signal lamps operate but the turn signal lamps do not flash. Inspect the turn signal and dimar switch.
3. The hazard warning signal lamps do not flash. Inspect the hazard signal lamp switch.
4. Despite that the side signal lamp is burnt out, when the switch is turned on, the front and the rear lamp light up. But if either of these two lamps is burnt out, the relay will not operate.

16-5. Windshield Wiper

16-5-1. Wiring circuit

The motor has an automatic stopping device so that the wiper blades come to stop at the bottom of the windshield, irrespective of the timing of the switch off.

Specifications

Voltage	12V
No-Load Current	1.5A or less
Frequency under Normal Condition	51 ~ 63 cycles/minute
Lock Current	12A or less

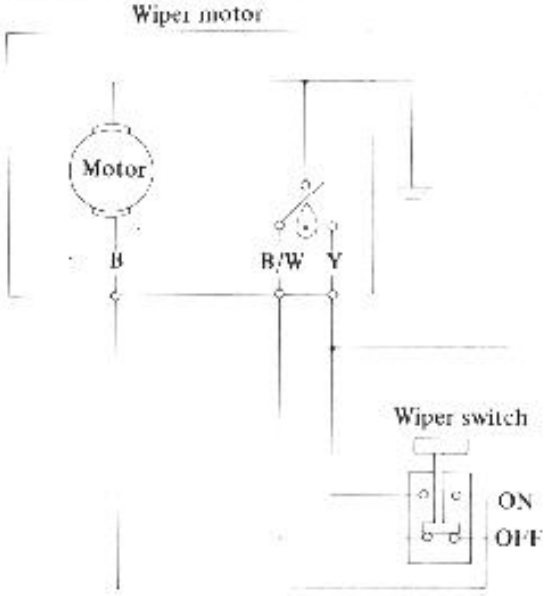


Fig. 16-8

16-5-2. Inspecting

1. Check the lead wires for faulty connections.
2. Make sure that the wiper link is correctly installed. If not, an excessive load will be exerted on the wiper motor.

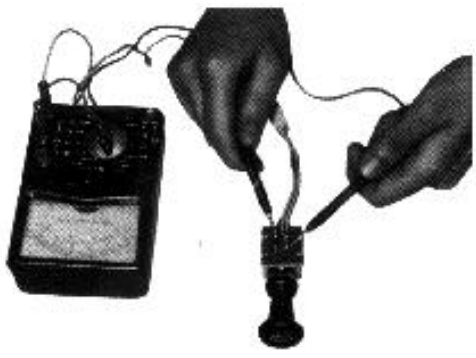


Fig. 16-9

3. The wiper will not operate with the switch on.

1) Check the 10-A fuse for burning out.

2) Disconnect the wire at the coupler, leading to the wiper motor. Turn on the switch, and check for voltage by connecting a tester between the blue lead wire from the wiper switch and the body. If the reading is below 12 volts, the wiper switch is faulty.

3) Check for the conduction between the blue lead wire from the motor and the motor body. If the pointer will not swing, the motor is considered to be defected.

Fig. 16 -10

4. Testing the motor (dismounted from the chassis)

As shown in the Fig. 16—10, connect a 12-V battery to the motor; that is, connect the motor's blue lead wire to the battery's positive terminal and the motor body to the battery's negative terminal. Check to see if the motor runs at 45-60 rpm. If so, the motor is in good condition.

Next, connect the battery's positive terminal to the yellow lead wire, and connect the blue/white lead wire to the blue lead wire, then connecting the motor body to the battery's negative terminal. Check to see if the motor stops when the wiper blades come to its stopping position, the motor is considered to be in good condition.

16–6. Fuel Meter

16–6–1. Wiring Circuit

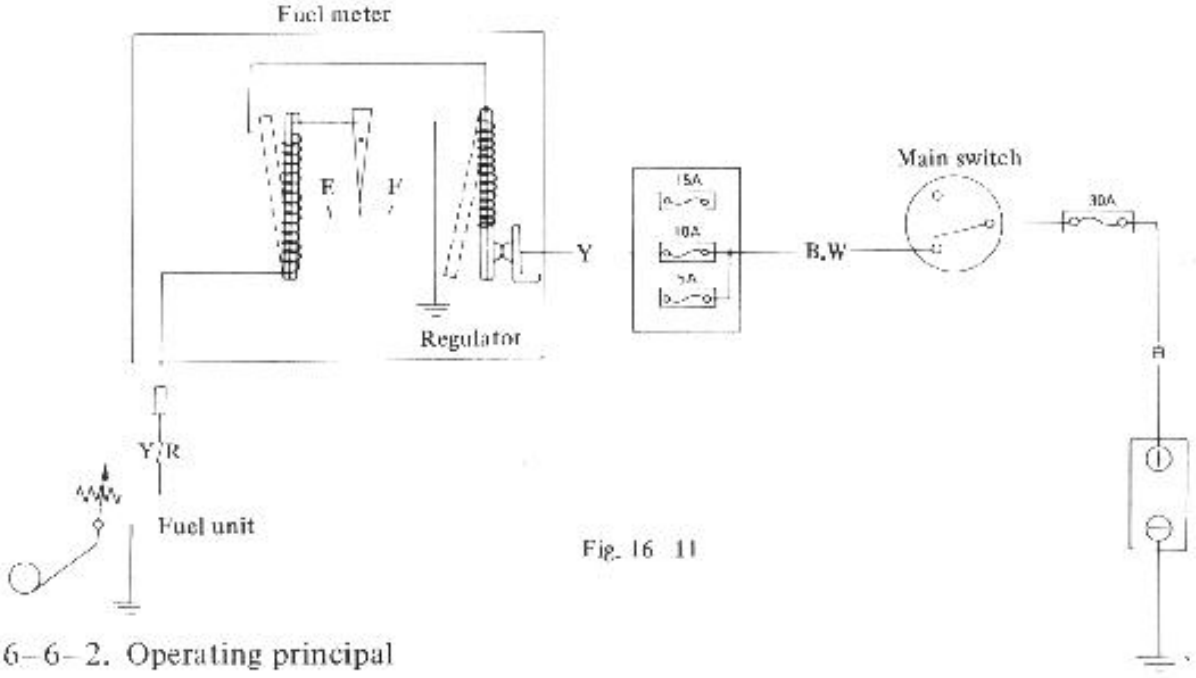


Fig. 16 11

16–6–2. Operating principal

Fuel meter uses bimetal on fuel gage side and resistor on fuel gage unit side. The resistance value of fuel gage unit varies with the amount of fuel in tank. In proportion to thie value, current flowing through heat coil on fuel gage side as well as the bend of bimetal change. With a little fuel, resistance value of gage unit increases, current decreases, bimetal in gage side bends little and needle swings a little. With much fuel, bimetal curls greatly and needle swings greatly.

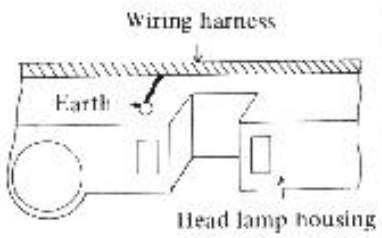
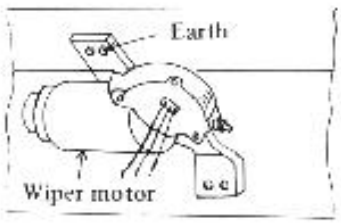
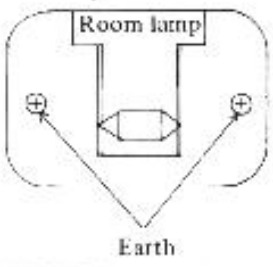
Since changes in battery voltage cause changes in current value and consequently in fuel gage indication, regulator is connected in series. Regulator opens and closes contact intermittently by passing a given current for a given time. Current value increases with increase in battery voltage but as the time contacts are closed becomes shorter, a constant amount of current flows. Therefore, a constant amount of current flows regardless of battery voltage.

16–6–3. Inspecting

1. Check fuel gage unit and fuel tank for grounding. When they are improperly grounded, current flows less and fuel gage give a small indication.
2. Check fuel meter (regulator) for grounding. When fuel meter is improperly grounded, no current flows into heat coil in bimetal, contacts remain closed and charged condition of battery directly afects gauge indication, that is, in most case, meter needle indicates values over position F (full).

16–7. Location of Grounding of Electrical System

Since imperfect grounding of electrical components causes a malfunction of the components, check for the grounding first in case of trouble. Location of grounding of the components and troubles due to imperfect grounding are given in the table below.

Component	Location of Grounding	Trouble
○ Head lamp ○ Side turn signal lamp ○ Speed meter lamp ○ Cigar lighter ○ Water temperature gauge and fuel gauge		○ Dim head lamp ○ Side turn signal lamp out ○ Speed meter lamp out ○ Cigar lighter has no glow ○ Out of the scale
○ Wiper motor		○ Wiper motor does not operate
○ Room lamp		○ Room lamp out

17–1. Important Functional Parts

For safety drising, it is highly requested to check up the important items in accordance with following check list taking opportunity of periodical inspection.

System	Items	Check for
Fuel	Carburetor	Smooth throttle valve operation
	Fuel filter	Fuel leakage
	Fuel pipe	Fuel leakage
	Fuel pump vacuum hose	Fuel leakage
	Fuel tank	Fuel leakage
Driving	Propeller shaft	Breakage, Tightness of serration part
	Gear shift control lever comp.	Breakage
Suspension	Front suspension strut assy	Rod breakage or bent
	Front strut support comp.	Bolt breakage, Rubber cracked
	Front suspension arm comp.	Bent
	Front suspension arm shaft	Breakage
	Ball joint stud	Bent, Cracked
	Lower ball joint socket	Cracked, Bent
	Leaf spring	Cracked, Breakage
	Leaf spring U bolt	Breakage
	Rear wheel bearing ring	Oil leakage
	Rear axle shaft	Breakage
	Rear axle housing comp.	Oil leakage, Breakage
	Front axle joint assy	Breakage
	King pin	Cracked
Steering	Steering knuckle arm	Cracked, Taper faulty
	Steering wheel	Cracked, Excessive wear of serration
	Steering shaft comp.	Breakage
	Steering joint rubber	Cracked
	Steering rubber joint flange	Breakage
	Steering gear box	Malfunction, Oil leakage, Adjust screw looseness
	Steering intermediate arm	Cracked
	Steering tie-rod end comp.	Ball stud looseness, Taper faulty
	Steering tie-rod comp.	Breakage, Excessive wear
	Steering drag rod	Ball stud looseness
Brake	Brake arm comp.	Cracked, Variant
	Brake pedal	Breakage
	Breke drum	Cracked
	Master cylinder assy	Oil leakage
	Brake oil tank	Oil leakage
	Brake oil hose & tube	Oil leakage, Breakage
	Brake tube 4-way joint	Oil leakage
	Brake assy	Oil leakage, Braking effect, shoe & rining peeled, Shoe holed pin abnomal, Adjuster sleeve thread faulty
	Brake cable	Cable end breakage
Body	Door lock assy	Locking lever spring cracked
	Door lock striker	Badness catching with cam

17–2. Lubrication

* Lubricant code;

A : Suzuki CCI Oil
Non-diluent (non-self mixing type) two strok oil

B : Gear oil SAE #80

C : Suzuki super grease A
Shell, Albania # 3
Mobil, Mobilux # 3
Esso, Andok C
Caltex, Regal starfak # 3

D : Suzuki super grease C

E : Shell, Albania # 2
Mobil, Mobilux # 2
Esso, Andok B
Caltex, Regal starfak # 2

F : Shell, Albania EP 1
Mobil, Mobilplex # 1
Esso, Nebula EP 1
Caltex, Multifak EP 1

G : Shell, Albania EP 2
Mobil, Mobilplex #2
Esso, Nebula EP 2
Caltex, Multifak EP 2

H : Cup grease

I : Chassis grease

Section		Lubricant code	Quantity or lubricating method
ENGINE	Engine oil tank	A	Capacity 2.8 ltr (5.9/4.9 US/Imp. pt)
	Crankshaft side bearing (Clutch side)	C or D	60% of the space between oil seals on both sides should be filled
	Crankshaft oil seal	C or D	Space between both lips should be filled
	Piston pin bearing	A	Apply oil to moving part of bearing upon assembling
	Crank pin bearing	A	Same as above
	Distributor and oil pump drive gear	C or D	80% of the space between both bearings should be filled. Give priority to inside of bearing and teeth of gear
CLUTCH & POWER TRANSMISSION	Clutch release bearing retainer	C or H	100% of the space inside retainer should be filled
	Clutch release shaft bushing	C or H	Inside of the bushing should be coated lightly
	Transmission case	B	1.2 ltr (2.5/2.1 US/Imp. pt)
	Transfer case	B	0.7 ltr (1.5/1.3 US/Imp. pt)
	Transmission gear and bearing	B	Apply oil on rotating parts upon assembling
	Transmission oil seal	C	Space between both lips should be filled
	Universal joint	G	3 grams (0.1 oz.)
	Universal joint sliding yoke	I	6 grams (0.2 oz.)
	Differential gear box	B	0.8 ltr (1.7/1.4 US/Imp. pt)
	Differential oil seal	C or H	Space between both lips should be filled
GEAR SHIFT & STEERING	Steering column	H	Coat inside
	Steering gear box	B	190 cc (6.4/6.7 US/Imp. oz)
	Drag link end grease nipple	I	Fill
	Tie-rod end grease nipple	I	Fill
	Gear shift control lever bushing and seat	H	Coat sliding area lightly
	Ball joint grease nipple	F	Fill
	Front wheel bearing	E	Apply
	Rear wheel bearing	E	Apply
OTHERS	Accelerator, choke, clutch cable	A	Apply to inner cable
	Parking brake cable	A	Same as above
	Accelerator, brake, clutch pedal	A	Apply to pivot parts
	Door window regulator	H	Apply to gear and rotating parts
	Door lock and hinge	A	Apply to pin
	Tail gate	A	Same as above

17–3. Tightening Torque

Figures in * are those for the LJ20, LJ20V and ● are those for the L50, L51, L50V.

System	Description	Tightening torque	
		kg-cm	lb-ft
Engine	Cylinder head bolt	400 – 500	28.9 – 36.1
	Cylinder nut	180 – 240	13.0 – 17.3
	Flywell nut	1300 – 1500	94.0 – 108.0
	Crankcase bolt (10 mmφ)	200 – 300	14.5 – 21.7
	Crankcase bolt (8 mmφ)	110 – 160	8.0 – 11.5
	Crankcase bolt (6 mmφ)	60 – 100	4.4 – 7.2
	Cylinder oil nozzle	150 – 180	10.8 – 13.0
	Oil line connecting union bolt	45 – 50	3.3 – 3.6
	Transmission case fitting bolt	350 – 480	25.4 – 34.7
	Pulley fitting bolt	350 – 480	25.4 – 34.7
	● Front mounting nut	180 – 280	13.0 – 20.2
	Mounting member nut	100 – 150	7.2 – 10.8
	Frame side nut	100 – 150	7.2 – 10.8
	Rear mounting nut	100 – 150	7.2 – 10.8
	Transfer case mounting bolt & nut	100 – 150	7.2 – 10.8
Fuel	Filter setting bolt	130 – 250	9.4 – 18.0
	Fuel pump banjo bolt	100 – 180	7.2 – 13.0
	Fuel pump union bolt	100 – 180	7.2 – 13.0
	Fuel pump plug	100 – 180	7.2 – 13.0
	Fuel drain plug	300 – 400	21.7 – 32.5
Driving	* Cross joint flange yoke	150 – 250	10.8 – 18.0
	Control shaft front nut	60 – 100	4.3 – 7.2
	Gear shift control shaft joint nut	100 – 150	7.2 – 10.8
	Control lever housing bolt	250 – 400	18.0 – 28.9
	Control lever guide plate bolt	60 – 100	4.3 – 7.2
	● Gear shift lever case bolt	40 – 70	2.9 – 5.0
Suspension	● Front strut suport nut	100 – 150	7.2 – 10.8
	● Front strut nut	100 – 500	7.2 – 36.1
	● Front strut lock nut	600 – 800	43.3 – 57.8
	● Spring shackle nut	250 – 600	18.0 – 43.4
	Reef spring nut	400 – 800	28.9 – 57.8
	Reef spring U bolt nut	300 – 450	21.7 – 32.5
	Wheel nut	500 – 800	36.2 – 57.8
	* Front wheel shaft nut	1500 – 2700	108.5 – 195.2
	Rear hub nut	500 – 800	36.2 – 57.8
	King pin upper & lower bolt	200 – 300	14.5 – 21.7
	Axle housing drain plug	400 – 700	28.9 – 50.6
	● Ball joint stud castle nut	250 – 550	18.0 – 39.7
	● Ball joint socket nut	300 – 550	21.7 – 39.7
	● Knuckle steering castle nut	800 – 1200	57.8 – 86.7
	● Front suspension arm shaft castle nut	800 – 1200	57.8 – 86.7
	● Hub nut	300 – 550	21.7 – 39.7
Steering	Steering shaft nut	250 – 400	18.0 – 28.9
	Steering rubber joint nut	150 – 250	10.8 – 18.0
	Rubber joint flange nut	200 – 300	14.5 – 21.7
	Steering gear box bolt	700 – 900	50.6 – 65.0
	* Gear box stay bolt	350 – 550	25.3 – 39.7
	* Steering tie-rod lever nut	500 – 800	36.2 – 57.8
	Tie-rod end ball stud nut	500 – 750	36.1 – 52.8
	● Steering intermediate arm nut	800 – 1500	57.8 – 108.4
	● Drag rod ball stud castle nut	250 – 550	18.0 – 39.7
	● Steering knuckle bolt	300 – 550	21.7 – 39.7
Brake	4-way joint bolt	60 – 100	4.3 – 7.2
	Brake backing plate bolt	180 – 280	13.0 – 20.2
	Brake master cylinder bolt	130 – 230	9.4 – 16.6
	Brake hose union nut	120 – 160	8.6 – 11.5
	Flexible hose nut	200 – 400	14.5 – 28.9
	Brake tube joint bolt	60 – 100	4.3 – 7.2
	Center brake backing plate bolt	180 – 280	13.0 – 30.2
	Brake pedal bolt	180 – 280	13.0 – 30.2
	Brake hose union bolt	150 – 250	10.8 – 18.0
	Brake shoe adjusting nut	60 – 90	4.3 – 6.5
	● Brake pedal nut	180 – 280	13.0 – 30.2
	● Brake pipe clamp bolt	40 – 70	2.9 – 5.0
Body	● Front suspension frame bolt	700 – 900	50.6 – 65.0

Item \ Interval	First 1,000 km (600 mi)	Every 2,000 km (1,200 mi)	Every 3,000 km (1,800 mi)	Every 5,000 km (3,000 mi)	Every 10,000 km (6,000 mi)	Every 40,000 km (25,000 mi)
Contact point & ignition timing	Adjust			Adjust	Adjust	
Spark plug	Check & clean		Check & clean	Replace every 6,000 km		
Carburetor	Adjust idling			Adjust idling & throttle cable	Adjust idling & throttle cable	
Oil pump & oil pipes	Retight union bolt Check leakage		Retight union bolt, Check leakage			
Fuel filter						Replace
Air cleaner element		Clean		Clean	Replace	
Wheel & hub nut	Retighten			Check loose	Check loose	
Tire				Rotato	Rotate	
Wheel alignment				Check & adjust	Check & adjust	
Brakes				Adjust shoe clearance		
Brake pipe	Check leakage			Check leakage	Check leakage	
Transmission oil	Change			Change	Change	
Differential oil	Change			Change	Change	
Transfer oil	Change			Change	Change	
Distributor gear					Lubricate	
Universal joint				Lubricate	Lubricate	
Propeller shaft sliding yoke				Lubricate	Lubricate	
Steering gear box					Check oil level	
Wheel bearing				Lubricate	Lubricate	
Tie-rod & drag rod ball joint				Lubricate	Lubricate	