L20B ENGINE

Group 2 / Group 4

CONTENTS

L20B ENGINE TUNE-UP SPECIFICATIONS

Specification / Item		L20B (S.O.H.C.) G-2	L20B (D.O.H.C.) G-4
Engine nomenclature		*LR20B; in-line, 4-cylinder-S.O.H.C.	*LZ20B, in-line 4-cylinder-D.O.H.C.-4V
Total displacement cm^3 (cu in)		1,952 (119.11)	←
Bore × stroke mm (in)		85.0 × 86.0 (3.346 × 3.386)	←
Compression ratio		10.8 to 11.0	←
Maximum output		195 PS/7,200 rpm (A/Horn)	230 PS/7,500 rpm (A/Horn)
Maximum torque		206 N·m (21 kg-m, 152 ft-lb)/ 5,600 rpm	216 N·m (22 kg-m, 159 ft-lb)/ 6,000 rpm (A/Horn)
Maximum speed		7,500 rpm	8,000 rpm
Cylinder block		Modification to standard Z20B unit L20B	← (Details of modification differ from those of G-2.)
Cylinder head		L18 optional unit is utilized.	Unit for D.O.H.C.-4 valve is newly developed.
Piston		Forge-strengthened aluminum unit is newly developed.	← (The shape differs from that of G-2.)
Connecting rod		Unit using CM40 strengthened material is newly developed.	←
Crankshaft		CM40 tufftride-processed unit is newly developed.	←
Flywheel		L24 optional unit is utilized.	←
Clutch	Disc	L24 optional unit is utilized.	←
	Cover	C225S type, 5,394N (550 kg, 1,213 lb) or 7,846N (800 kg, 1,764 lb)	←
Gear train			Gears: L14 (4V) optional units are utilized.

Specification / Item	L20B (S.O.H.C.) G-2	L20B (D.O.H.C.) G-4
Camshaft	L18 rally optional unit is utilized.	L18 (4V) rally optional unit is utilized.
Valve mm (in)	2/1 cyl. [Intake: 44 (1.73) dia., Exhaust: 36 (1.42) dia.]	4/1 cyl. [Intake: 33 (1.30) dia., Exhaust: 29.5 (1.161) dia.]
Intake manifold	Newly developed	L18 (4V) rally optional unit is utilized.
Exhaust manifold	Stainless steel pipe 4-2-1 type is newly developed.	← (The shape is different from that of G2.)
Carburetor	SOLEX 50 PHH x twin	←
Air cleaner	L24 optional unit is utilized.	←
Distributor	MITSUBISHI CDI optional unit is utilized.	←
Alternator	Rally spec. 80A or 60A	←
Oil sump system	Wet sump	Dry sump
Radiator	Newly developed as A10 rally unit.	←
Oil cooler	HS30 optional unit is utilized.	Horizontal type is newly developed.
Exhaust system	Newly developed as A10 rally unit.	←

*: Nomenclature used in Nissan

BLIND PLUG AND OTHER ADDITIONAL PARTS OF CYLINDER BLOCK

1. G2 specification (wet sump)

Install blind plugs in the same manner as L20B standard. Listed below are the different points.

(1) Oil jet on the top surface of block (11047 21000) ..... Not needed.
(2) Oil filter mounting stud (15213 21001) ..... Not needed
(3) Oil filter relief valve mounting hole ..... Install blind plug (11022 69800).
(4) Breather baffle plate (11038 U6000) ..... Not needed
(5) Breather steel net (11037 21001) ..... Not needed
(6) Breather pipe connector ..... Install optional plug 11830 A8720.
- Install with the outlet facing toward front side.

2. G4 specification (dry sump)

Install blind plugs in the same manner as L20B standard. Listed below are the different points.

(1) Oil jet on the top surface of block ..... Install the plug for L-series 6-cylinder engine (11047 E3000)
(2) Oil filter mounting stud (15213 21001) ..... Not needed
(3) Oil filter relief valve mounting hole ..... Install blind plug (11022 69800)
(4) Breather baffle plate (11038 U6000) ..... Not needed
(5) Breather steel net (11037 21001) ..... Not needed
(6) Breather pipe connector ..... Install optional part (11830 A8720).
- Install with the outlet facing front.
(7) Oil level guide hole ..... Install blind plug (11022 U6700).
(8) Chain tensioner oil hole ..... Install blind plug (11024 24000)
(9) Timing chain oil jet hole ..... Install blind plug (16-47 00011)
(10) Front cover mounting dowel (with G/T plate) ..... Install optional part 13506 H5820.

OIL PAN

The oil pan is available for the L20B G2 and G4 as an optional part. G2 uses a wet sump system, and G4 uses a dry sump system.

When installing the oil pan, be sure to check for oil leakage, and thoroughly clean the inside of pan, removing casting sand and cutting chip completely.

OIL PAN SPECIFICATIONS

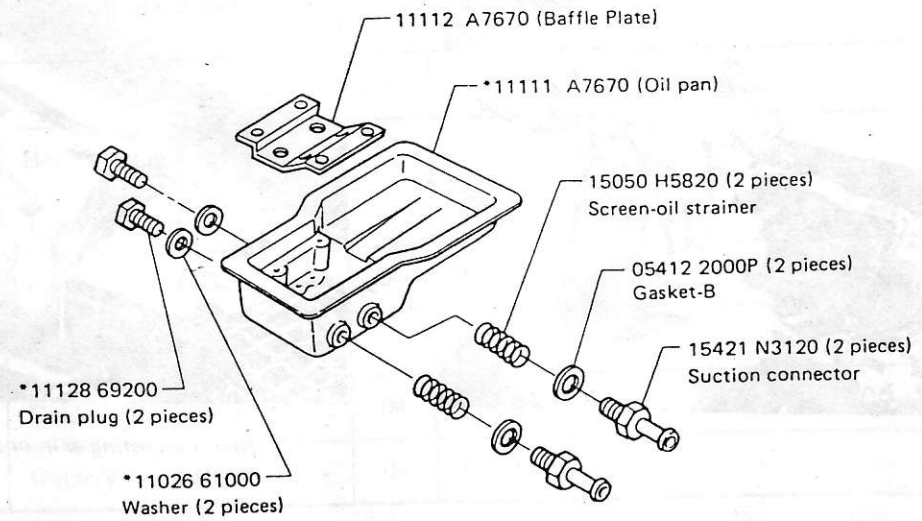
Engine specification	G2	G4
Part number	11110 A7660	11110 A7670

① G2 specification

Utilize the L20B standard unit. In order to prevent unbalanced movement of oil, baffle plates are welded in two stages in the pan.

② G4 specification

The oil pan for dry sump is of aluminum casting, and has a double suction structure. The baffle plate should be installed by using both plain and spring washers.



Note: The parts indicated by the mark "*" are assembled in 11110 A7670.

PARTS CONFIGURATION AND DETAILS OF TUNE-UP

CYLINDER BLOCK

The cylinder blocks are available as optional units for the L20B G2 and G4 engines, respectively. The following modification is provided on the Z20B and L20B standard units.

Item \ Engine	G2	G4
Part Number	11010 A7660	11010 A7670
Details of modification	① Grinding of top surface by 0.5 mm (0.020 in). • Machined together with front cover ② Machining of valve recess at the top portion of bore • Four places for exhaust valve ③ Enlarged breather pipe driving hole diameter.	① Enlarged screw size for front portion • M6 → M8 (4 places) • Gear train mounting bolts ② Enlarged breather pipe driving hole diameter

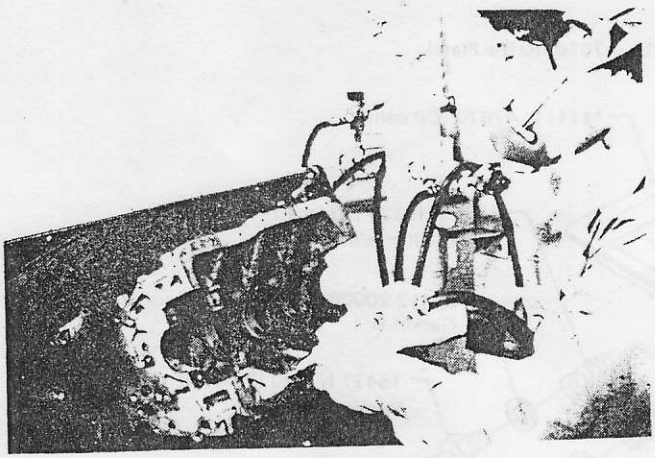
CLEANING OF THE INSIDE OF CYLINDER BLOCK AND MODIFICATION OF MAIN BEARING CAP

① Remove casting sand completely from the inside surface of the crank case. (See picture.)

② Be sure to clean the inside of oil hole.

③ Modification of main bearing cap bolt seating surface cut-out portion. (See picture.)

- In order to improve strength against fatigue, modify the shape of the cut-out portion manually using a grinder, being careful not to damage the bolt seating surface.



Remove casting skin only; do not cut metal.

OIL PAN GASKET

The oil pan gasket is provided as optional part for the G2 and G4 for improved durability and prevention of oil leakage.

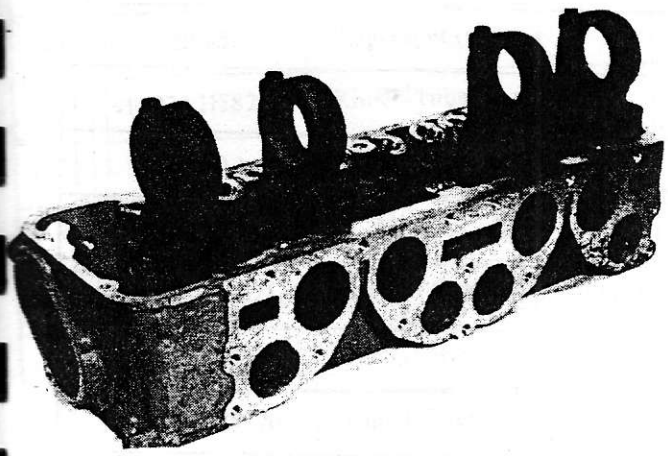
OIL PAN GASKET

Engine specification	G2	G4
Part number	11121 N7120	11121 H5820

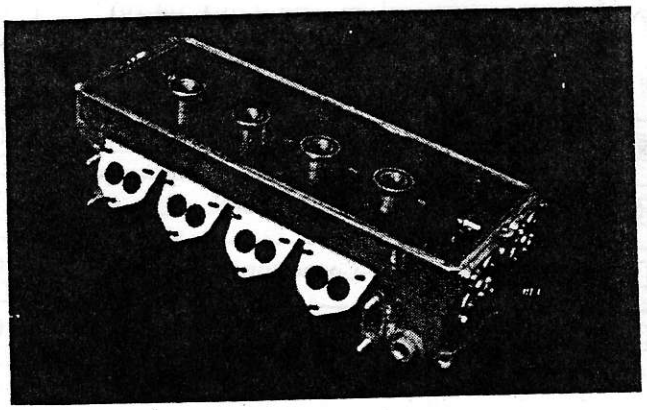
CYLINDER HEAD

The cylinder head assembly is provided as an optional unit for the L20B G2 and G4 engines. G2 features the same S.O.H.C. system as does the standard version, with enlarged exhaust port diameter. G4 utilizes the D.O.H.C. system in which the intake and exhaust ports are crossed, and uses 4 valves per cylinder.

① External view of G2 specification cylinder head



② External view of G4 specification cylinder head



COMPONENT PARTS OF CYLINDER HEAD

The assembling procedure drawings are omitted. The G2 cylinder head resembles the standard 4-cylinder-use head, and the G4 resembles the optional unit L14 (4V). Refer to the appropriate manuals.

(1) Component parts for G2 cylinder head

Key No.	Part Number	Part Name	Q'ty	Remarks
	11041 N7120	Head Assembly-Cylinder	01	
①	11042 N7120	Head-Cylinder	02	AC4A-T6
②	11098 N7120	Insert-Valve, Intake	04	ABB-3
③	11099 N7120	Insert-Valve, Exhaust	04	ABB-3
④	13212 N3120	Guide-Valve, Intake	04	FC25
⑤	13213 N3120	Guide-Valve, Exhaust	04	PBC2B

Key No.	Part Number	Part Name	Q'ty	Remarks
⑥	9-33212	Plug-Taper	02	Oil Gallery
⑦	11051 73403	Plug-Blind (P/T 3/8-19)	03	
⑧	11048 73403	Plug-Blind (P/T 3/4-14)	02	
⑨	12205 21000	Plug-Taper (6)	01	
⑩	82-24835-1	Stud-Manifold	16	
⑪	27070 H5000	Connector-Heater	01	
⑫	11022 20100	Collar-Camshaft Bracket	08	
⑬	13051 21000	Bracket-Camshaft, Front	01	
⑭	13053 21000	Bracket-Camshaft, Intake	02	
⑮	13055 21000	Bracket-Camshaft, Rear	01	
⑯	13058 21000	Bolt-Camshaft Bracket	04	
⑰	13059 21000	Bolt-Camshaft Bracket	04	
⑱	13215 A8600	Bush-Rocker Pivot	08	
⑲	11046 A4600	Cover-Head, Front	01	
⑳	11049 E3000	Gasket-Head, Front	01	
㉑	81-10614-62	Bolt-Hex (M6)	03	
㉒	81-10816-62	Bolt-Hex (M6)	02	Head to Front Cover
㉓	10005 N5800	Slinger-Engine, Front	01	
㉔	81-10816-62	Bolt-Hex (M8)	01	
㉕	10006 A7660	Slinger-Engine, Rear	01	
㉖	11056 P3000	Bolt-Cylinder Head, Short	06	L = 127 mm (5.00 in.)
㉗	11059 P3000	Bolt-Cylinder Head, Long	04	L = 153 mm (6.02 in.)
㉘	11058 21001	Washer-Plain	10	
㉙	11044 A7650	Gasket-Cylinder Head	01	T = 1.5 mm (0.059 in.) Plain Type

(2) Component parts for G4 cylinder head

Key No.	Part Number	Part Name	Q'ty	Remarks
	11041 A7670	Head Assembly-Cylinder	01	
①	11042 A7670	Head-Cylinder	01	AC4A-T6
②	11098 A7670	Insert-Valve, Intake	08	Super Tarkalloy
③	11099 A7670	Insert-Valve, Exhaust	08	FMS 220
④	13212 A7670	Guide-Valve	16	ABB-3
⑤	11048 73403	Plug-Taper (3/4)	01	
⑥	9-31208-1	Plug-Taper (1/2)	03	
⑦	9-33206-1	Plug-Taper (6)	01	
⑧	9-33122	Plug-Welch (22)	03	
	13050 H5820	Bracket Assembly-Camshaft (Exhaust)	01	
⑨	13051 H5820	Bracket-Camshaft	01	
⑩	9-33206-5	Plug-Taper (6)	01	
⑪	11022 H5820	Knock-Tube	10	
⑫	82-24840-1	Stud	05	
	13050 H5821	Bracket Assembly-Camshaft (Intake)	01	
⑬	13051 H5821	Bracket-Camshaft	01	
⑩	9-33206-5	Plug-Taper (6)	01	
⑪	11022 H5820	Knock-Tube	10	
⑫	82-24840-1	Stud	05	
⑭	13052 H5820	Cap-Camshaft Front	02	
⑮	13052 H5821	Cap-Camshaft	08	
⑪	11022 H5820	Knock-Tube	10	
⑯	81-20865-1	Bolt-Hex (M8)	10	
⑰	81-20875-1	Bolt-Hex (M8)	04	
⑱	11063 H5820	Bolt-Cylinder Head Cover	06	
⑲	89-11208-1	Nut-Hex	10	
⑳	09340 0010P	Washer-Bent	30	

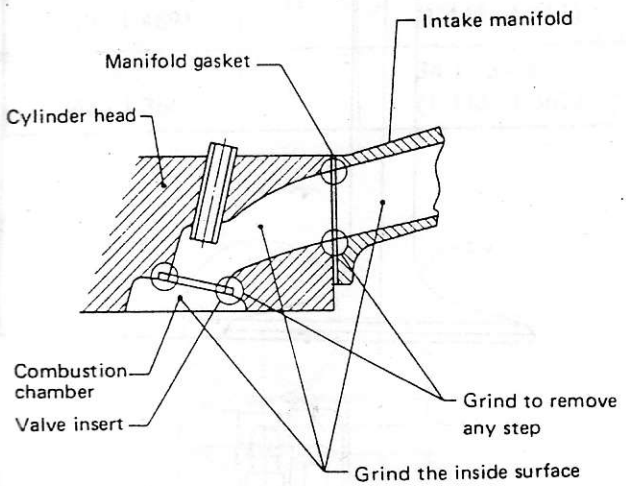
Key No.	Part Number	Part Name	Q'ty	Remarks
㉑	11051 H5820	Tube-Spark Plug	04	Install after coating with screw locking agent.
㉒	82-28618-4	Stud (M6)	36	
㉓	82-14818-4	Stud (M8)	04	
㉔	11065 N7170	Plate-Blind	04	
㉕	11062 H5820	Gasket-Water Outlet, A	04	
㉖	89-15136-1	Washer-Spring	08	
㉗	89-11206-1	Nut-Hex (M6)	08	
㉘	13094 A0200	Shaft-Tensioner	01	
㉙	00511 0017P	O-Ring	01	
㉚	89-15138-1	Washer-Spring	01	
㉛	13099 A0201	Bolt-Tensioner Arm	01	
㉜	05412 1400P	Gasket-B	01	
㉝	13083 29900	Nut-Lock	01	
㉞	13073 A0200	Screw-Chain Adjust	01	
㉟	13085 29900	Wire-Clamp	01	
㊱	13084 2990C	Cap-Chain Adjust	01	
㊲	11044 A7671	Gasket-Cylinder Head	01	T = 1.5 mm (0.059 in.) Plain Type
㊳	11056 H5820	Bolt-Cylinder Head	08	L = 92 mm (3.62 in.)
㊴	11056 H2301	Bolt-Cylinder Head	02	L = 97 mm (3.82 in.)
㊵	11058 H1000	Washer-Head Bolt	10	

GRINDING OF PORTS

In order to improve intake and exhaust efficiency, the intake and exhaust ports should be ground. In this case, remove any step at the valve insert and at the intake manifold, using care not to cause any swell on the finished surface.

① G2 specification

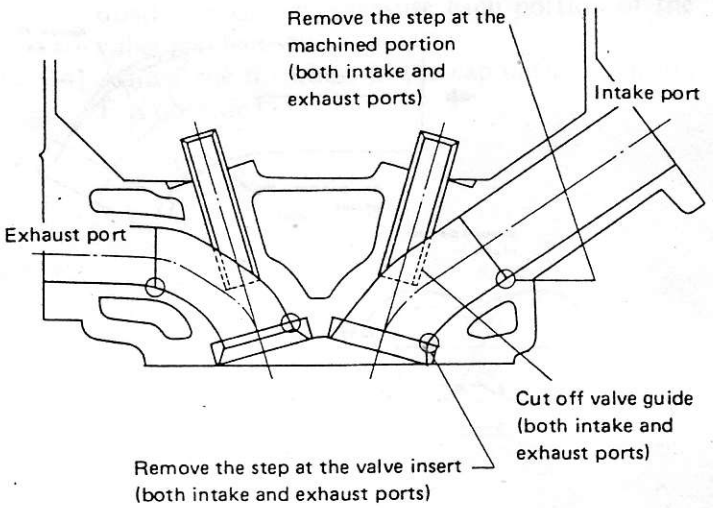
(1) The size of this port is larger than the standard one. Grind off the casting skin of the port, while removing step at the valve insert. (Grinding for increasing the port diameter is not needed.)
(2) Grind the manifold mounting port together with the manifold gasket (14035 N7120).
(3) In the case of the G2 engine, do not cut off the valve guide that is protruding the inside of port.



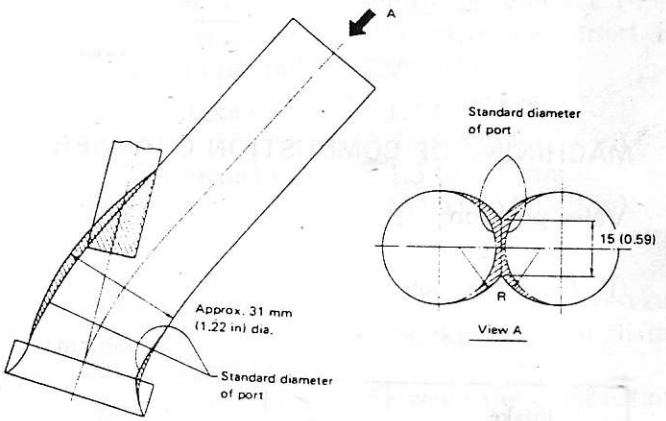
② G4 specification

(1) In this cylinder head, machining of 28 mm (1.10 in) dia. hole has been made halfway on both the intake and exhaust ports. Grind the valve insert portion, 28 mm (1.10 in) dia. machined portion and the portion having casting skin to remove steps.
(2) Unlike the unit for G2, the valve guide pressing length has certain allowance. Cut off the end of valve guide protruding into the port, along the contour of the port.
(3) The number of ports in this G4 specification engine is greater than for G2. Care should be taken when grinding the ports not to cause any significant differences in shape among them.

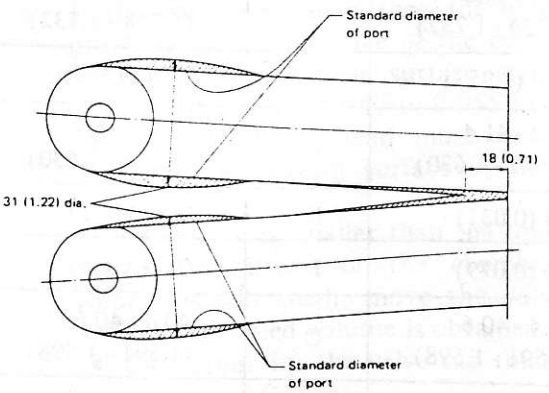
Note: When grinding, use care not to damage the valve insert or the inside of the valve guide.



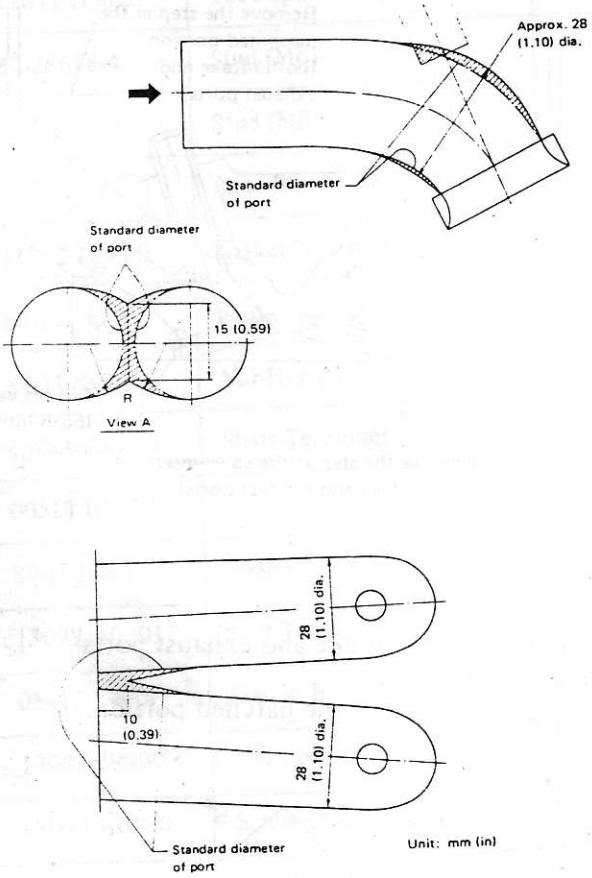
(4) Enlarging intake and exhaust ports
a. Intake port
- Grind off the hatched portion.

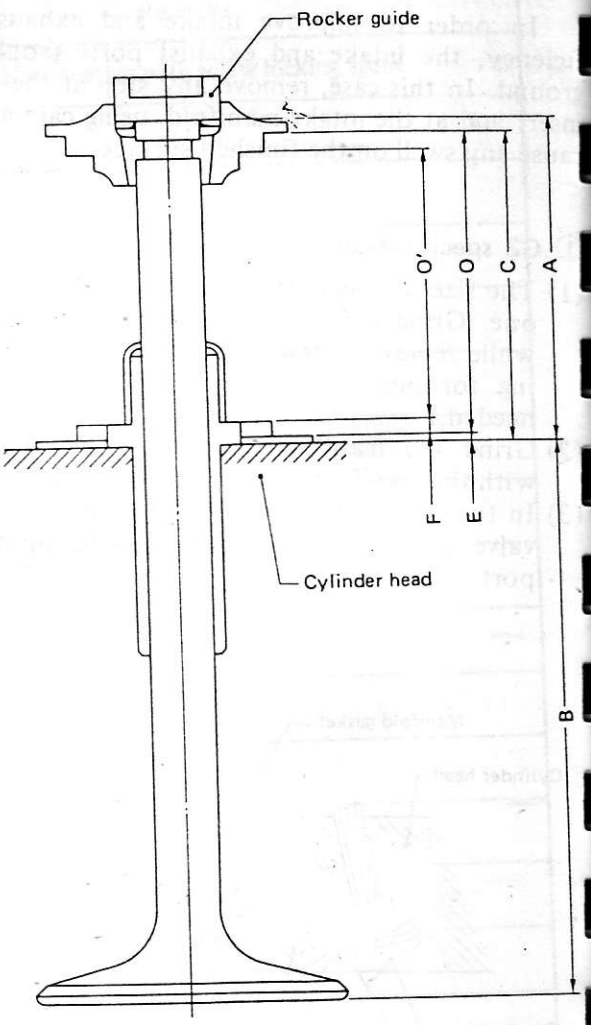


Unit: mm (in)



b. Exhaust port
- Grind off the hatched portion.





MACHINING OF COMBUSTION CHAMBER

Valve position

① G2 specification

Unit: mm (in)

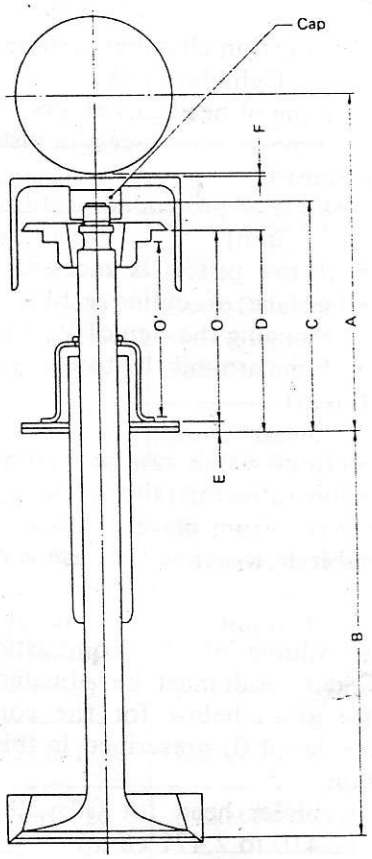
Intake		Exhaust
43.8 - 44.0 (1.724 - 1.732)	A	43.8 - 44.0 (1.724 - 1.732)
75.0 (2.953)	B	75.4 (2.968)
41.2 - 41.4 (1.622 - 1.630)	C	41.2 - 41.4 (1.622 - 1.630)
0.8 (0.031)	E	0.8 (0.031)
2.0 (0.079)	F	2.0 (0.079)
40.4 - 40.6 (1.591 - 1.598)	O	40.4 - 40.6 (1.591 - 1.598)
37.0 - 37.2 (1.457 - 1.465)	O'	37.0 - 37.2 (1.457 - 1.465)

(1) The table shown lists the basic dimensions f the intake and exhaust valves.
(2) Machine the valve insert so that dimension C is obtained. (Use a seat cutter.)
(3) After completing the machining of combustio chamber, measure each portion of the valve mechanism.

② G4 specification

Unit: mm (in)

Intake		Exhaust
63.38 (2.4953)	A	63.32 (2.4929)
———	B	———
42.9 - 43.1 (1.689 - 1.697)	C	42.8 - 43.0 (1.685 - 1.693)
37.8 - 38.0 (1.488 - 1.496)	D	37.7 - 37.9 (1.484 - 1.492)
1.0 (0.039)	E	1.0 (0.039)
0.28 - 0.32 (0.0110 - 0.0126)	F	0.33 - 0.37 (0.0130 - 0.0146)
2.2 (0.087)	Cap thickness	2.2 (0.087)
36.8 - 37.3 (1.449 - 1.469)	O	36.7 - 37.2 (1.445 - 1.465)
34.2 - 34.7 (1.346 - 1.366)	O'	34.1 - 34.6 (1.343 - 1.362)



(1) The table shown lists the basic dimensions for the intake and exhaust valves.
(2) Machine the valve insert so that dimension C is obtained. (Use a seat cutter.)
(3) After completing the machining of the combustion chamber, measure each portion of the valve mechanism.
(4) Adjust the thickness of the cap until dimension F is obtained.

Adjustment of the volume of combustion chamber

① Perform lapping of seating surface after the valve is positioned as specified in "Valve position".
- Grind the valve seat insert using a 75° cutter until the width of contact (45° portion) between the valve and insert is within the range shown below:

Intake valve	1.1 to 1.3 mm (0.043 to 0.051 in)
Exhaust valve	1.3 to 1.5 mm (0.051 to 0.059 in)

② Before measuring the volume of combustion chamber, grind the casting skin inside of chamber until smooth.
- Smooth any step between the combustion chamber wall and insert.

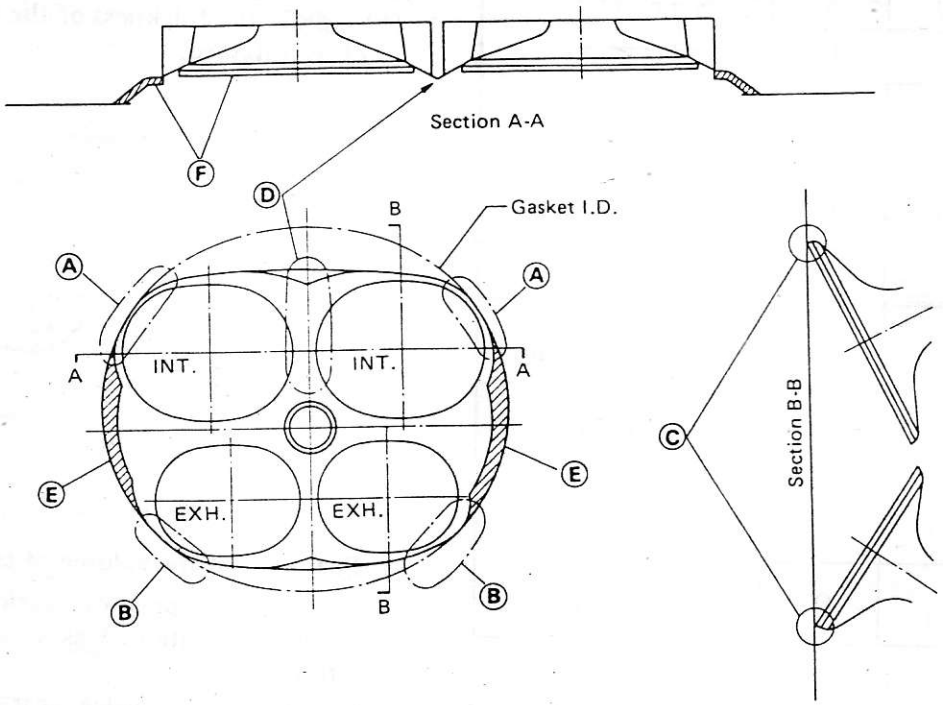
③ Measure the combustion chamber volume.

a. If the volume is larger than the object value, grind the bottom surface of the cylinder head.
- G2: Allowance for surface grinding ..... 1.2 to 1.4 mm (0.047 to 0.055 in)
- G4: The valve head must not protrude from the bottom surface of the cylinder head.

b. If the volume is smaller than the object value, expand the inside of the chamber. If the volume is still small, move the valve inward until the specified volume is obtained.
- G4: Limit for the valve cap thickness ..... 1.2 mm (0.047 in)

Machining details for combustion chamber

The G4 cylinder head requires very high accuracy in machining which must be performed as shown below.



① Pay particular attention at the portions Ⓐ and Ⓑ as the metal thickness from the head gasket I.D. is especially small at these points.
② The portion Ⓒ must not protrude from the bottom surface of cylinder head.
③ The portion Ⓓ should be machined somewhat higher.
④ The portion Ⓔ must be machined by aligning with the head gasket I.D.
⑤ Area Ⓕ must be machined so that the valve surface is flush with the combustion chamber wall surface, or is protruding about 0.3 to 0.5 mm (0.012 to 0.020 in).
⑥ Any steps and burs must be removed.
⑦ The surface quality of this machining should be ▽▽

CALCULATION OF COMPRESSION RATIO

For detailed calculation, use the following formula.

$$\rho = \frac{V}{V_1 + V_2 + V_3 + V_5 - V_4} + 1$$

ρ ; Compression ratio
V ; Displacement per cylinder cm³ (cu in)
V_1 ; Combustion chamber volume cm³ (cu in) ..... Cylinder head
V_2 ; Volume of head gasket cm³ (cu in)
V_3 ; Volume of valve recess in piston cm³ (cu in)
V_4 ; Volume of protruded portion of piston cm³ (cu in)
- If the piston is recessed from the top surface of cylinder block, calculate by changing the sign of V_4 to "+".

V_5 ; Volume around the top land of piston cm³ (cu in)

No definite value can be recommended as the compression ratio for rally, as the octane value of gasoline varies from place to place in the world. It is preferable however not to use a value exceeding 11.

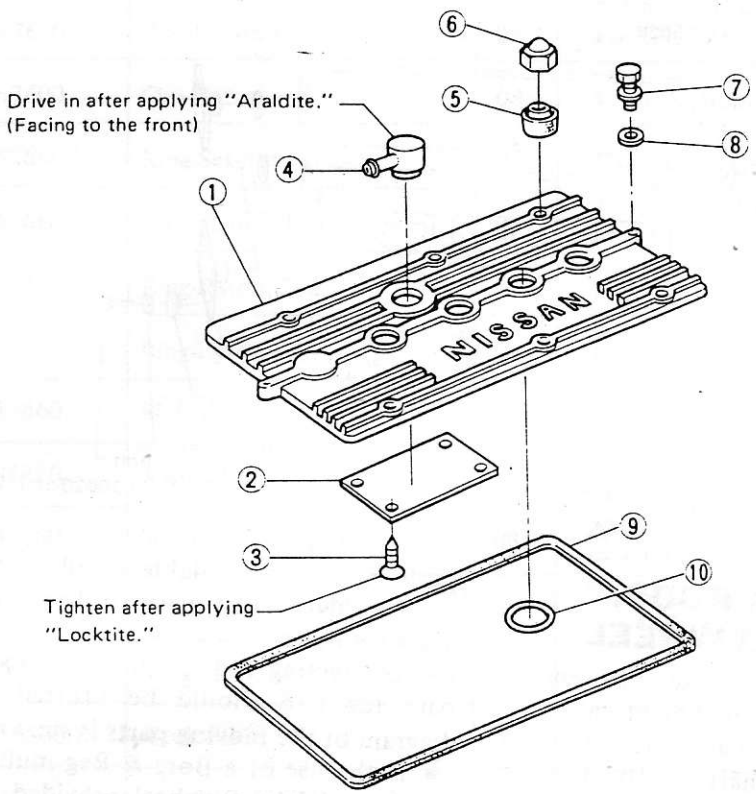
① The volume of the combustion chamber in cylinder head must be adjusted to within the range given below for the compression ratio (10.8 to 11.0) prescribed in this engine specification.
a. Cylinder head for G2: 39.5 to 40.5 cm³ (2.410 to 2.471 cu in)
b. Cylinder head for G4: 25.0 to 26.0 cm³ (1.526 to 1.587 cu in)

*Difference in volume between cylinders must be within 0.5 cm³ (0.031 cu in).

CYLINDER HEAD COVER

The cylinder head cover for G2 specification utilizes the L20B standard unit (or unit for L-series 4-cylinder engine) without change, and description of the cylinder head cover is therefore omitted in this book.

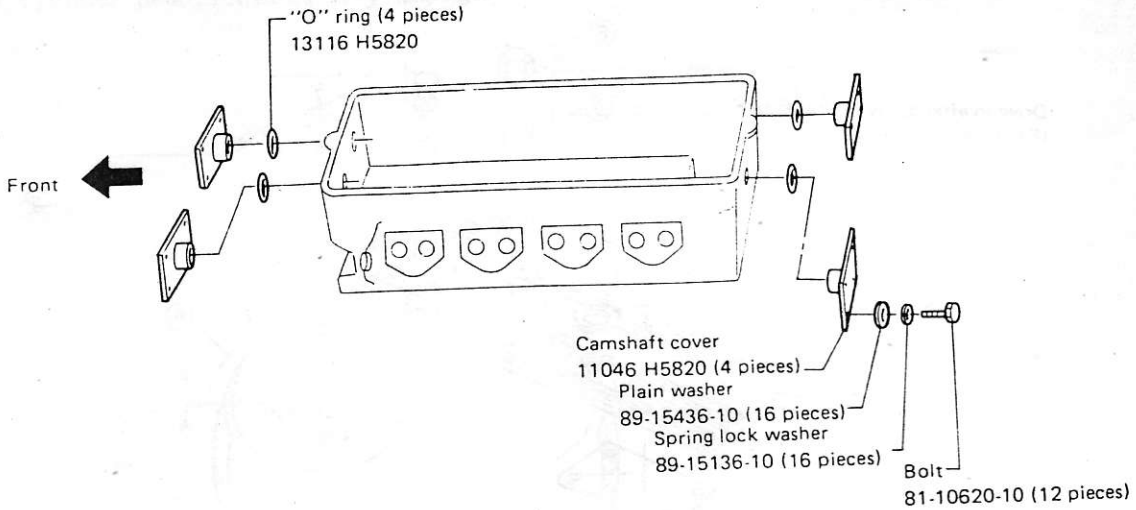
The cylinder head cover for G4 specification is available as an optional unit. (See the following figure.)



Key No.	Part Number	Part Name	Q'ty	Remarks
	13264 H5820	Cover Assembly-Cylinder Head	01	
①	13265 H5820	Cover-Cylinder Head	01	
②	13266 H5820	Plate-Baffle	01	
③	83-20306-9	Screw-Machine	04	
④	11860 H5820	Breather-Gas	01	
⑤	13228 A0200	Washer-Rocker Cover	06	
⑥	13274 18810	Nut-Rocker Cover	06	
⑦	81-10635-62	Bolt-Hex (M6)	02	
⑧	89-15436-1	Washer-Plain	02	
⑨	13270 H5820	Gasket-Rocker Cover, A	01	
⑩	13271 H5820	Gasket-Rocker Cover, B	04	

CAM COVER

This chapter applies to the G4 specification only. The parts configuration diagram is shown below.



PISTON, CONNECTING RODS, CRANKSHAFT AND FLYWHEEL

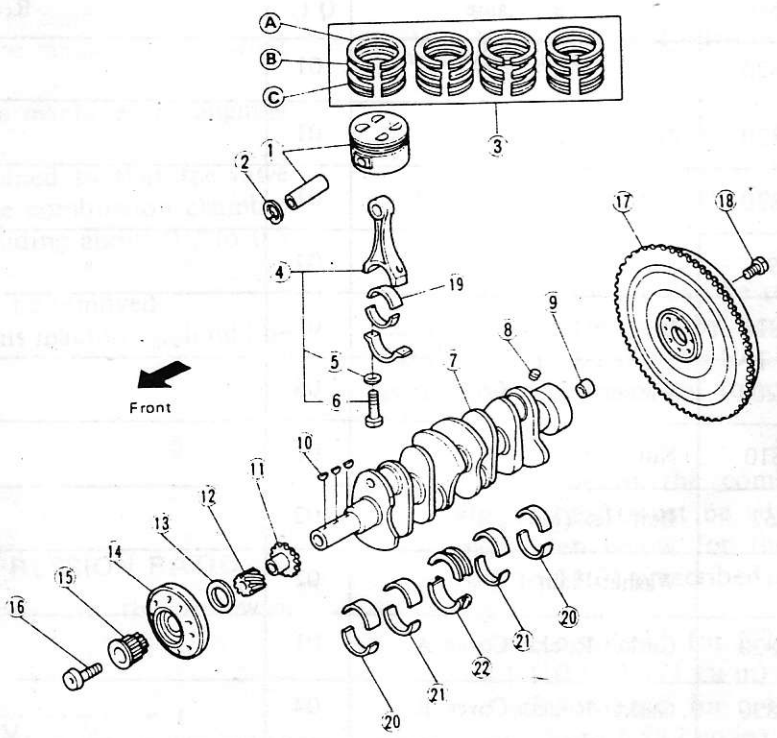
The G2 engine and G4 engine use different cylinder heads (that is, different number of valves and valve layout), so the piston shapes are different. The connecting rods, crank shaft and flywheel are however identical.

For each of these, optional parts designed specifically for high speed operation and high performance are available as rally options.

The high load type main bearings for exclusive use with L20B are newly available as options. As to the connecting rod bushing, the existing optional part for L16 should be utilized. Configuration diagram of the moving parts is shown below.

- If the use of a Borg & Beg multi-disc clutch is desired, the flywheel provided as special part must be used.

COMPONENT PARTS



Unit: mm (in)

Key No.	Part Number	Part Name	Q'ty	Remarks
①	12010 A7660	Piston with Pin	04	For G2, 85 (3.35) dia. bore, A4032FD-T7 (forging)
①	12010 A7670	Piston with Pin	04	For G4, 85 (3.35) dia. bore, A4032FD-T7 (forging)
②	12032 A7600	Clip-Piston	08	L14 (4V) option part Common to G2 and G4
③	12033 A7660	Ring Set-Piston	01	Common to G2 and G4, for 85 (3.35) dia. bore
Ⓐ	12041 A7660	Ring-Piston, Top	04	T = 1.5 (0.059) End gap 0.2 – 0.4 (0.008 – 0.016)
Ⓑ	12043 A7660	Ring-Piston, 2nd	04	T = 1.5 (0.059) End gap 0.2 – 0.4 (0.008 – 0.016)
Ⓒ	12046 A8700	Ring-Piston, Oil	04	RIK VENT End gap 0.30 – 0.90 (0.0118 – 0.0354)
④	12100 A7660	Rod Assembly-Connecting	04	CM40, L = 148.6 (5.850) Common to G2 and G4
⑤	12113 H5820	Washer-Connecting Rod Bolt	08	L14 (4V) option part SK5, T = 0.5 (0.020)
⑥	12109 A7660	Bolt-Connecting Rod	08	AMS6304C, M10 x 1, L = 49.0 (1.929) Torque [Bolt extends 0.13 – 0.14 (0.0051 – 0.0055) by tightening]
⑦	12201 A7660	Shaft Assembly-Crank	01	Common to G2 and G4, CM40 tufftride, stroke 86 (3.39), tightened with 8 bolts
⑧	9-31202-1	Plug-(1/8-28)	04	
⑨	32202 30000	Bush-Pilot	01	
⑩	9-26516	Key-Woodruff (5 x 16)	03	
⑪	13021 U0100	Sprocket-Crank	01	G2 only
⑪	13021 H5820	Gear-Crank	01	G4 only L14 (4V) option
⑫	15043 21000	Gear-Oil Pump Drive	01	Common to G2 and G4
⑬	12302 A3500	Oil Thrower-Crank	01	〃
⑭	12303 N7120	Pulley-Crank	01	G2 only, L18 option
⑭	12303 N7171	〃	01	G4 only, L18 (4V) option
⑮	(15451 N7171) 15451 N7170	Pulley Oil Pump Drive Pulley Oil Pump Drive	(01)	G4 only, manufactured by TSUBAKIMOTO G4 only, manufactured by UNITTA
⑮	12308 65000	Washer-Pulley Bolt	01	G2 only
⑯	12309 21000	Bolt-Crank Pulley	01	G2 only, tightening torque 118 N·m (12 kg-m, 87 ft-lb) (Molycote)
⑯	12309 H5820	〃	01	G4 only, L14 (4V) option, tightening torque 177 N·m (18 kg-m, 130 ft-lb) (Molycote)
⑰	12310 E4621	Flywheel	01	Common to G2 and G4, option for L24 FCA light-weight specification
⑱	12315 U6000	Bolt-Flywheel	08	SNCM3
⑲	12111 22010	Bushing-Connecting Rod	08	Common to G2 and G4, F77 material, oil clearance 0.044 - 0.096 (0.0017 - 0.0038)
⑲	12111 22011	〃	(08)	Common to G2 and G4, F77 material oil clearance 0.024 - 0.076 (0.0009 - 0.0030)

Key No.	Part Number	Part Name	Q'ty	Remarks
⑲	12111 22012	Bushing-Connecting Rod	(08)	Common to G2 and G4, F77 material oil clearance 0.004 - 0.056 (0.0002 - 0.0022)
⑲	12111 22013	"	(08)	Common to G2 and G4, F77 material oil clearance 0.064 - 0.116 (0.0025 - 0.0046)
⑲	12111 22014	"	(08)	Common to G2 and G4, F77 material oil clearance 0.084 - 0.136 (0.0033 - 0.0054)
⑳	12215 A7660	Bushing-Main, Front	04	Common to G2 and G4, F77 material oil clearance 0.005 - 0.055 (0.0002 - 0.0022)
⑳	12215 A7661	"	(04)	Common to G2 and G4, F77 material oil clearance 0.015 - 0.065 (0.0006 - 0.0026)
⑳	12215 A7662	"	(04)	Common to G2 and G4, F77 material oil clearance 0.025 - 0.075 (0.0010 - 0.0030)
⑳	12215 A7663	"	(04)	Common to G2 and G4, F77 material oil clearance 0.035 - 0.085 (0.0014 - 0.0033)
⑳	12215 A7664	"	(04)	Common to G2 and G4, F77 material oil clearance 0.045 - 0.095 (0.0018 - 0.0037)
㉑	12231 A7660	Bushing-Main, Intake	04	Common to G2 and G4, F77 material oil clearance 0.005 - 0.055 (0.0002 - 0.0022)
㉑	12231 A7661	"	(04)	Common to G2 and G4, F77 material oil clearance 0.015 - 0.065 (0.0006 - 0.0026)
㉑	12231 A7662	"	(04)	Common to G2 and G4, F77 material oil clearance 0.025 - 0.075 (0.0010 - 0.0030)
㉑	12231 A7663	"	(04)	Common to G2 and G4, F77 material oil clearance 0.035 - 0.085 (0.0014 - 0.0033)
㉑	12231 A7664	"	(04)	Common to G2 and G4, F77 material oil clearance 0.045 - 0.095 (0.0018 - 0.0037)
㉒	12247 A7660	Bushing-Main, Center	02	Common to G2 and G4, F77 material oil clearance 0.005 - 0.055 (0.0002 - 0.0022)
㉒	12247 A7661	"	(02)	Common to G2 and G4, F77 material oil clearance 0.015 - 0.065 (0.0006 - 0.0026)
㉒	12247 A7662	"	(02)	Common to G2 and G4, F77 material oil clearance 0.025 - 0.075 (0.0010 - 0.0030)
㉒	12247 A7663	"	(02)	Common to G2 and G4, F77 material oil clearance 0.035 - 0.085 (0.0014 - 0.0033)
㉒	12247 A7664	"	(02)	Common to G2 and G4, F77 material oil clearance 0.045 - 0.095 (0.0018 - 0.0037)

ASSEMBLING PRECAUTIONS

Piston

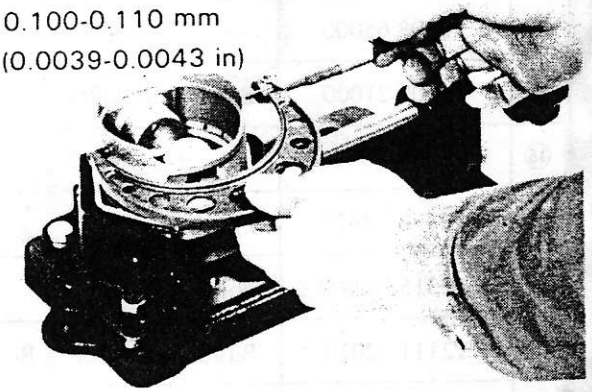
① Piston clearance

- Measure the maximum diameter of the piston, and check whether piston-to-bore clearance is normal.
- Pistons are available from grades 1 through 4. If the clearance is less than specified, correction by honing is needed.

Oil clearance between cylinder wall and piston:

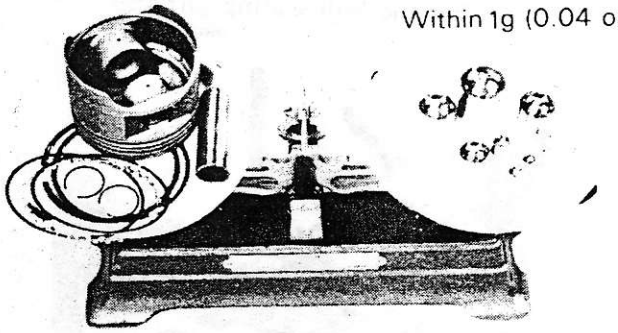
0.100-0.110 mm

(0.0039-0.0043 in)



② Sharp edges inside of piston: Chamfer to 0.2 - 0.3 mm (0.008 - 0.012 in)
③ Difference in weight among cylinders: The difference must be less than 1g (0.04 oz). (Piston, piston pin, piston rings and clips)

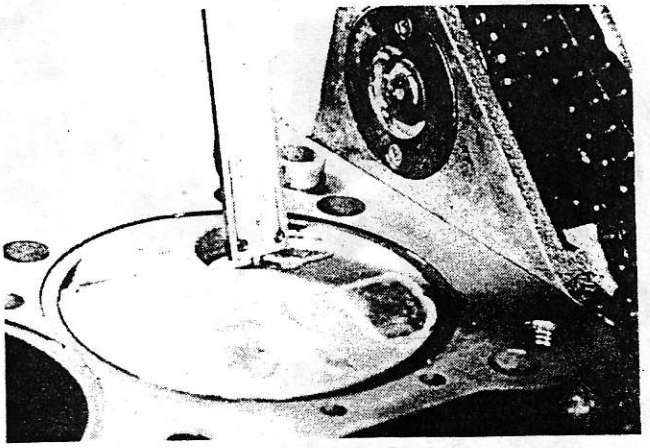
Difference in weight among cylinders:
Within 1g (0.04 oz)



④ Measure the piston ring end gap: Make corrections until the gap meets specifications.

⑤ Precautions in assembling piston pin
Before installing the pin, use an oil heater to heat the piston to 40 - 50°C (104 - 122°F).
⑥ Check clearance at the valve recess on the top of piston.
Place clay on the valve recess before installing the cylinder head, and correctly adjust the valve timing, then turn the crankshaft one complete turn. Check depression of the clay, to determine clearance. If abnormal resistance is felt when turning the crankshaft, it is an indication of interference between piston and valve; cease rotation of crankshaft, and correct the valve recess.

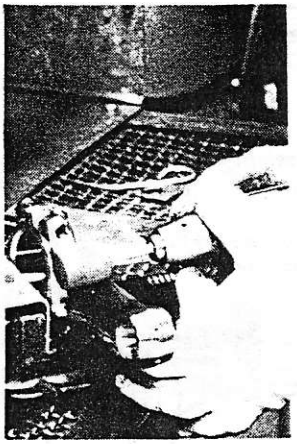
- Number of valve recesses
  G2 engine ..... One each for intake and exhaust valves
  G4 engine ..... Two each for intake and exhaust valves



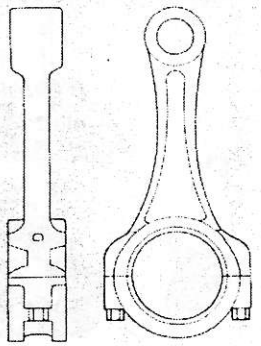
This picture shows a G4 piston.

Connecting rod

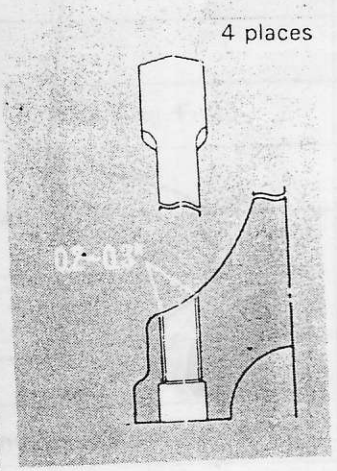
① Grinding of connecting rod
(a) Grind the entire forged surface, except for the machined surface.
The portion indicated by — in the figure below must be superfinished.



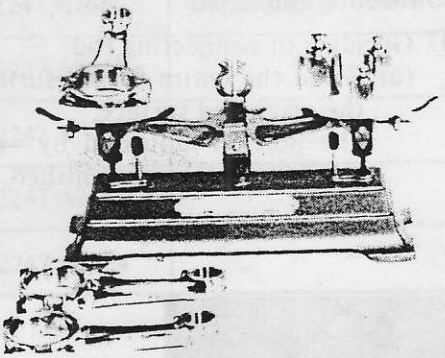
---- :Superfinish



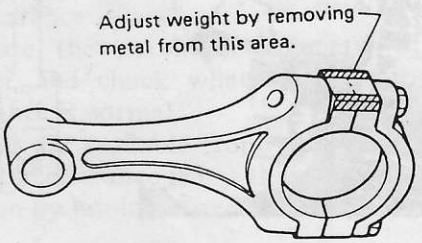
(b) Chamfer the bolt hole portion and small end portion.



② Weight adjustment



Difference in weight between cylinders must be less than 0.5 g (0.02 oz).

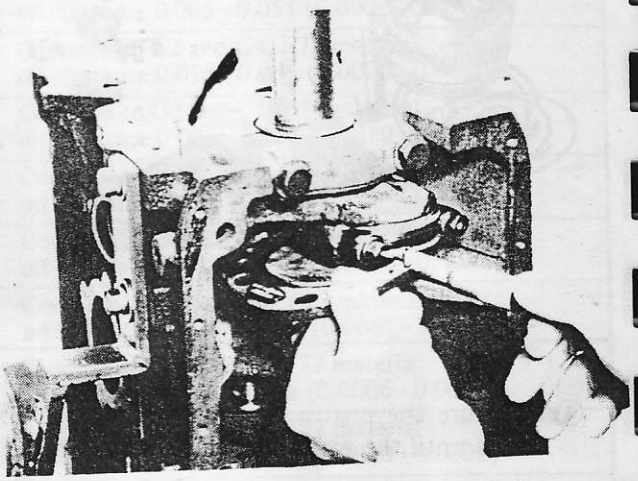


③ Tightening of connecting rod bolt

(a) Measure elongation of bolt to determine whether the bolt is tightened correctly.

- Elongation ..... 0.13 - 0.14 mm (0.0051 - 0.0055 in)

(b) Before tightening bolt, apply Molycote to the threaded portion, and engine oil to the washer and bolt seating surface.



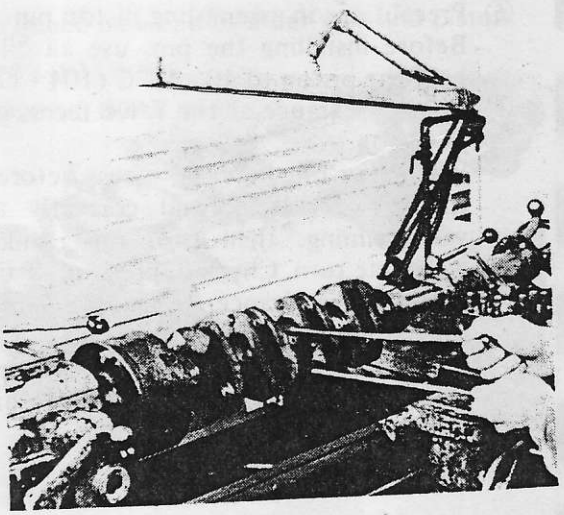
(c) If abnormal torque is detected through the measurement of bolt elongation, change bolt and connecting rod combination, or replace the bolt with a new one.

(d) Replace the bolt with a new one every 10,000 km (6,000 miles) of operation in rally.

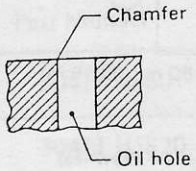
Crankshaft and flywheel

① Lapping of pins and journals

- The optional crankshaft is tufftride-processed. If any sludge is found on its surface, remove by grinding with chrome oxide.
- Grind mainly the radius portions, taking care not to grind excessively.
- Modify the oil hole as shown below.



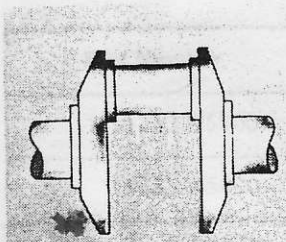
② When installing a taper plug, be sure to apply "Araldite" to the plug.



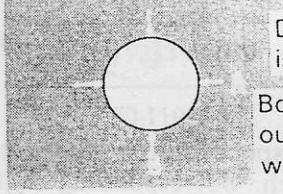
① *Chamfer the sharp edge using an oil stone.*

② *Finish with emery paper (#1000).*

③ Check the out-of-roundness and taper of pins and journals.



Difference between 1 and 2 is the amount of taper.

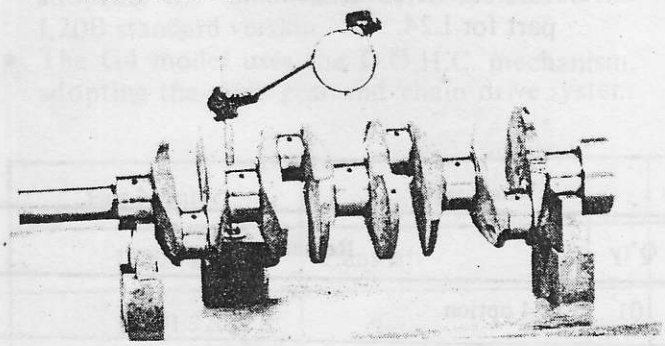


Difference between A and B is the out-of-roundness.

Both the taper and out-of-roundness must be within 0.005 mm (0.0002 in).

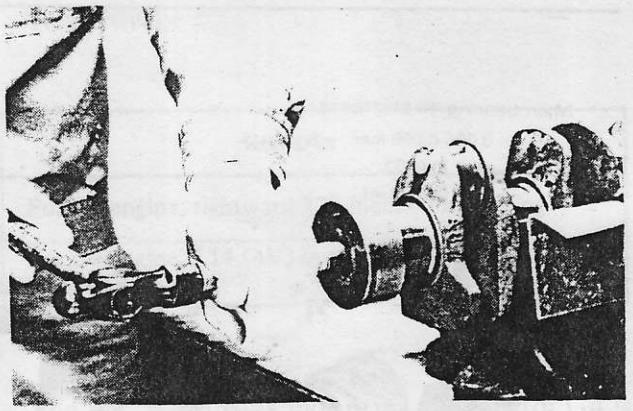
④ Measure crankshaft bend.

Crankshaft bend : Less than 0.02 mm (0.0008 in)

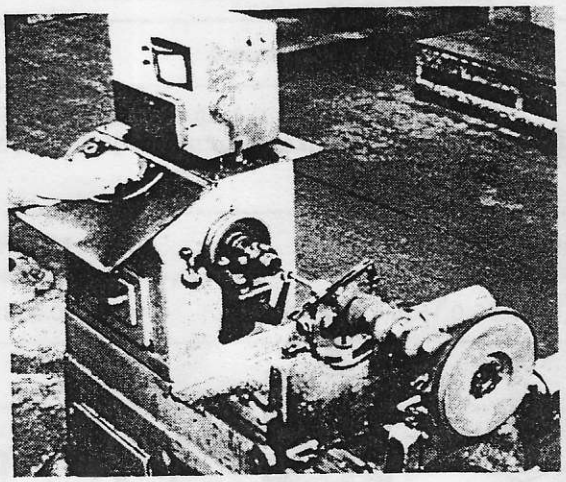


Measure the bend in #3 journal with the journals #1 and #5 supported on Vee-blocks.
The bend measured on the dial gauge is half the value.

⑤ Drive in the pilot bushing.



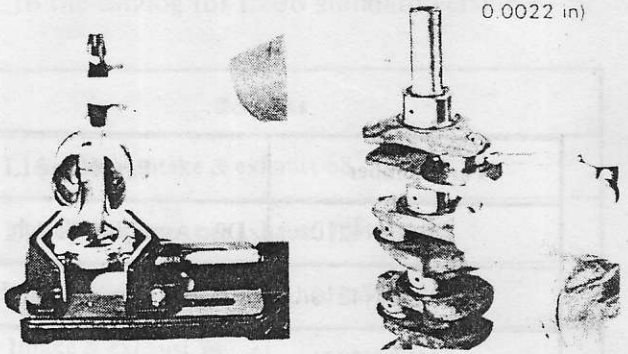
⑥ Correction of balance



If possible, correct the balance of the crankshaft with the clutch disc and clutch cover installed.
Allowable unbalance: within 10 gr-cm (0.14 oz-in)/1,400 rpm

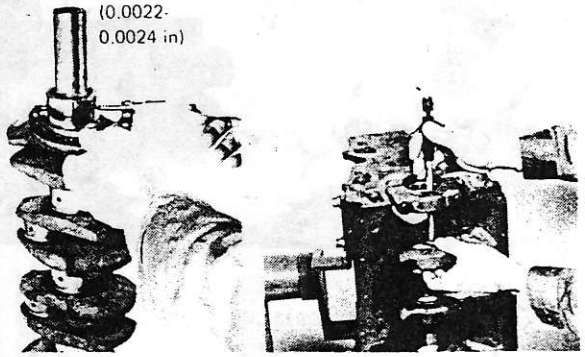
⑦ Measuring bearing clearances

Crank pin oil clearance: 0.050-0.055 mm (0.0020-0.0022 in)



Measure using dial gauge, and determine oil clearance.
The clearance can be changed by varying the bearing thickness.

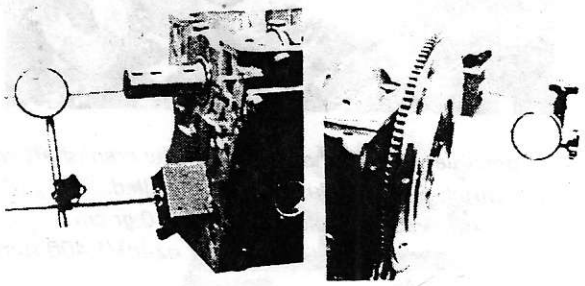
Main bearing oil clearance:
0.055-0.060 mm
(0.0022-
0.0024 in)



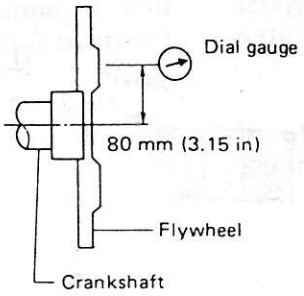
⑧ Measure the crankshaft end play and flywheel runout.

End play: Within
0.05-0.15 mm (0.0020-
0.0059 in)

Flywheel runout: Less than
0.10 mm (0.0039 in)



Dial gauge position when measuring flywheel runout.



*Tightening torque 108 N·m (11.0 kg-m , 80 ft-lb)
Apply "Molycote" to the threaded portion.

CLUTCH

- The L20B standard specification model use the C200S type clutch. Corresponding to th enhanced engine performance, the rally model uses the C225S clutch as well as the carbon bearing cover. The clutch pressing force available in two types [5,394N (550kg, 1,21 lb) and 7,846N (800kg, 1,764 lb)]. Choose the one most suitable according to engine tune-u conditions.
- The clutch cover utilizes the existing optional part for L24.

Part Number	Part Name	Q'ty	Remarks
30100 N4210	Disc Assembly-Clutch	01	L24 option
30210 N4210	Cover Assembly-Clutch	01	C225S-5,394N (550 kg, 1,213 lb) L28 standard
30210 N3221	"	01	C225S-7,846N (800 kg, 1,764 lb) LY26 race option
30210 A7670	"	01	C225S-5,394N (550 kg, 1,213 lb) For carbon bearing
30210 A7671	"	01	C225S-7,846N (800 kg, 1,764 lb) For carbon bearing
30223 E4100	Screw-Clutch Cover	06	

ENGINE REAR PLATE

- Engine mounting conditions differ between G2 and G4, and the following parts must be used respectively.

Part Number	Part Name	Q'ty	Remarks
30411 A8601	Plate-Engine, Rear	01	For G2 engine; rightward 12° inclined mounting.
30411 H5820	"	01	For G4 engine; L14 (4V) option; leftward 12° inclined mounting.

ENGINE MOUNTING BRACKET

- The mounting conditions differ between G2 and G4. The engine mounting bracket for G4 is available as an option.

Part Number	Part Name	Q'ty	Remarks
11232 W5800	Bracket Engine Mounting Front R.H.	01	For G2, L20B standard
11233 W5800	Bracket Engine Mounting Front L.H.	01	"
11230 A7670	Bracket Engine Mounting Front R.H.	01	For G4, option
11233 A7670	Bracket Engine Mounting Front L.H.	01	"
80-11035-1	Bolt-Hex, Bracket	04	
89-15140-1	Washer-Spring	04	

CAMSHAFT DRIVE, VALVE MECHANISM

- The G2 model uses the S.O.H.C. mechanism, adopting the same chain drive system as the L20B standard version.
- The G4 model uses the D.O.H.C. mechanism, adopting the same gear and chain drive system as the L14(4V) optional version. Surface grinding of the cylinder head is allowed.

COMPONENT PARTS

① G2 specification

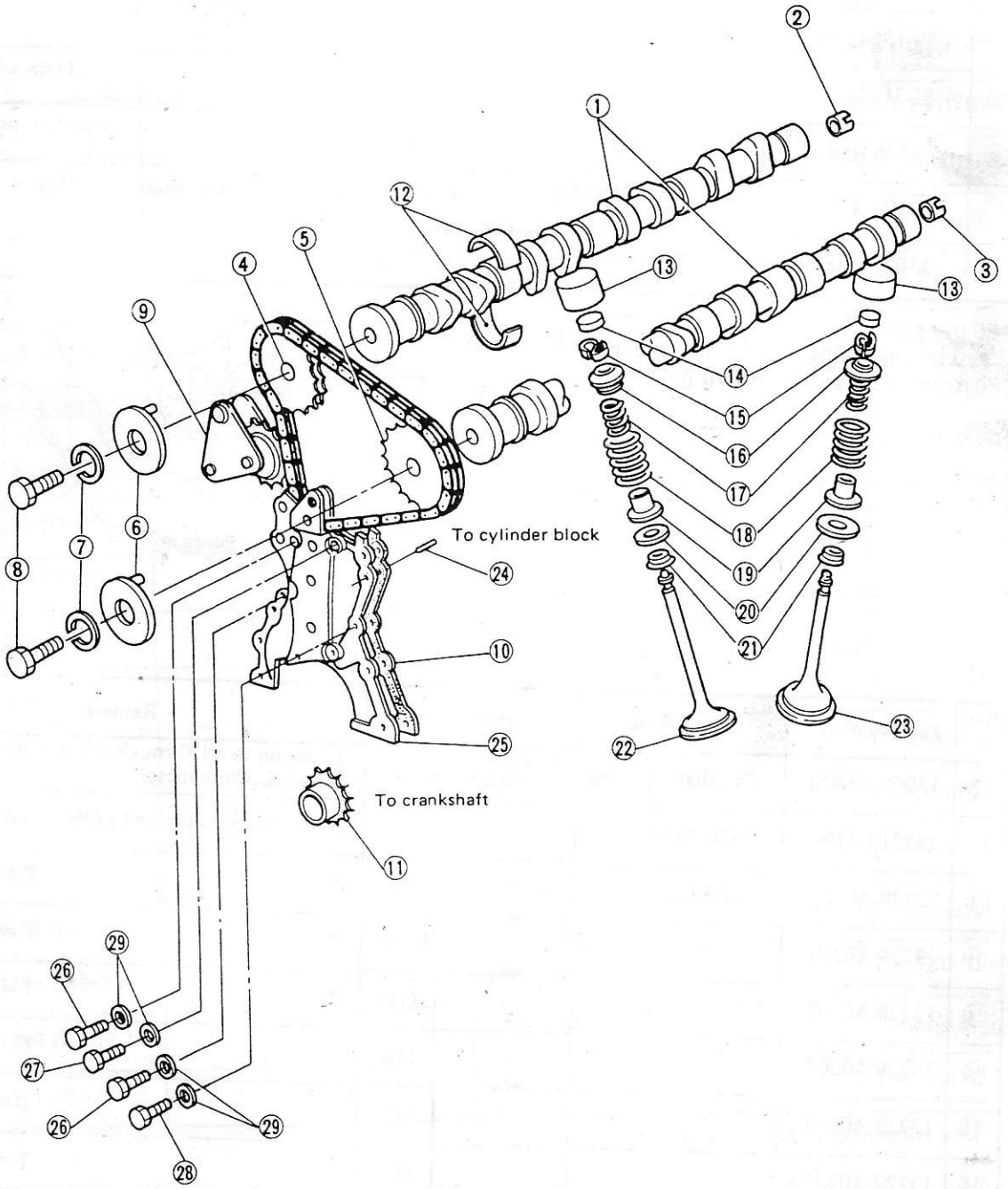
- The configuration drawing is omitted. (Refer to the catalog for L20B standard version.)

Part Number	Part Name	Q'ty	Remarks
13001 22021	Camshaft	01	L16 option, intake & exhaust 68°
13001 22022	"	(01)	L16 option, intake & exhaust 75°
13001 22023	"	(01)	L16 option, intake 70° - exhaust 72°
13001 A7660	"	(01)	Intake & exhaust 74°
13001 A7661	"	(01)	Intake & exhaust 76°
13032 18000	Dowel-Camshaft	01	
11024 K0100	Plug-Taper	01	

Part Number	Part Name	Q'ty	Remarks
13010 21000	Plate-Cam Locating	01	
81-20616-62	Bolt-Hex (M6)	02	
13024 E4621	Sprocket-Camshaft	01	L24 option, with valve timing adjusting hole
13015 N3120	Washer-Camshaft	01	LY26 option
89-15146-1	Washer-Spring	01	
13012 21002	Bolt-Camshaft	01	
13028 U6000	Chain-Camshaft	01	L20B standard
13070 N7120	Tensioner-Chain	01	L18 option, with shoe retainer
81-20635-62	Bolt-Hex (M6)	02	
13085 U6000	Guide-Chain, Tension	01	L20B standard
13091 A3500	Guide-Chain, Slack	01	
81-20616-62	Bolt-Hex (M6)	02	
81-20614-62	"	02	
89-15436-1	Washer-Plain	02	
13201 A7660	Valve-Intake	04	Option, tufftride-processed, valve head diameter 44 mm (1.73 in), stem diameter 8 mm (0.31 in), hollowed
(13201 E4621)	"	(04)	L24 option, chrome-plated, valve head diameter 44 m (1.73 in), stem diameter 8 mm (0.31 in), hollowed
13202 A7660	Valve-Exhaust	04	Option, tufftride-processed, valve head diameter 36 mm (1.42 in), stem diameter 8 mm (0.31 in), hollowe
(13202 E4621)	"	(04)	L24 option, chrome-plated, valve head diameter 36 m (1.42 in), stem diameter 8 mm (0.31 in), hollowed
13203 22010	Spring-Valve, Outer	08	L16 option
13204 22010	Spring-Valve, Inner	08	L16 option
13205 N3120	Seat-Valve Spring, Outer	08	LY26 option, T = 0.8 mm (0.031 in)
13206 N7120	Seat-Valve Spring, Inner	08	L18 option, T = 2.0 mm (0.079 in)
13207 A7660	Seal-Oil, Valve	08	Option
13209 N7120	Retainer-Valve	08	L18 option
13210 N7120	Collet-Valve	16	L18 option
13218 A7660	Guide-Rocker	08	Option
13234 21000	Pivot-Valve Rocker	08	
13235 U0100	Lock Nut-Pivot	08	

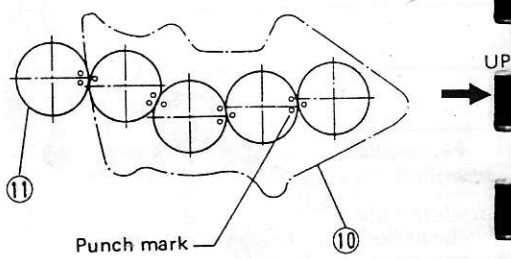
Part Number	Part Name	Q'ty	Remarks
13255 A8600	Retainer-Rocker Spring	08	
13256 21003	Spring-Valve Rocker	08	
13257 21000	Rocker Assembly-Valve	08	
(13257 W0300)	"	(08)	For L-series LPG engine

② G4 specification
- The configuration drawing is shown below.



	Part Number	Part Name	Q'ty	Remarks
①	13020 N7170	Camshaft	02	L18 (4V) option, working angle 70°, valve lift 10.5 mm (0.413 in)
①	13001 N7171	"	(02)	L18 (4V) option, working angle 72°, valve lift 10.5 mm (0.413 in)
②	13552 H5820	Plug-Camshaft	02	L14 (4V) option, common to intake and exhaust
④	13024 H5820	Sprocket-Camshaft	01	Common to intake and exhaust, option for camshaft
⑤	13025 H5820	"	01	
⑥	13015 H5820	Washer-With Pin	02	L14 (4V) option, common to intake and exhaust
⑦	89-15142-1	Washer-Camshaft	02	
⑧	81-31230-1	Bolt-Camshaft	02	
⑨	13090 H5820	Tensioner Assembly-Chain	01	Option
⑩	13100 A7670	Gear Train Assembly-Engine Front	01	Gears: L14 (4V) option
⑪	13021 H5820	Gear-Crank	01	

- The matching marks for the gear train and crank gear are as shown below.



Unit: mm (in)

Key No.	Part Number	Part Name	Engine	Q'ty	Remarks
⑫	13005 H5820	Camshaft Bushing	L14(4V) L18·R(4V)	20	Common to #1 through #5 journals Material: white metal
⑬	13231 E4200	Valve Lifter	"	16	Common to intake and exhaust, for S20 engine
⑭	13229 A0200	Valve Cap	"	16	* " T = 1.25 (0.0492)
⑭	13229 A0201	"	"	(16)	* " T = 1.30 (0.0512)
⑭	13229 A0202	"	"	(16)	* " T = 1.35 (0.0531)
⑭	13229 A0203	"	"	(16)	* " T = 1.40 (0.0551)
⑭	13229 A0204	"	"	(16)	* " T = 1.45 (0.0571)
⑭	13229 A0205	"	"	(16)	* " T = 1.50 (0.0591)

The mark "*" indicates selective-use.

Unit: mm (in)

Key No.	Part Number	Part Name	Engine	Q'ty	Remarks
⑭	13229 A0206	Valve Cap	L14 (4V) L18·R (4V)	(16)	*Common to intake and exhaust, T = 1.55 (0.0610)
⑭	13229 A0207	"	"	(16)	* " T = 1.60 (0.0630)
⑭	13229 A0208	"	"	(16)	* " T = 1.65 (0.0650)
⑭	13229 A0209	"	"	(16)	* " T = 1.70 (0.0669)
⑭	13229 A0210	"	"	(16)	* " T = 1.75 (0.0689)
⑭	13229 A0211	"	"	(16)	* " T = 1.80 (0.0709)
⑭	13229 A0212	"	"	(16)	* " T = 1.85 (0.0728)
⑭	13229 A0213	"	"	(16)	* " T = 1.90 (0.0748)
⑭	13229 A0214	"	"	(16)	* " T = 1.95 (0.0768)
⑭	13229 A0215	"	"	(16)	* " T = 2.00 (0.0787)
⑭	13229 A0216	"	"	(16)	* " T = 2.05 (0.0807)
⑭	13229 A0217	"	"	(16)	* " T = 2.10 (0.0827)
⑭	13229 A0218	"	"	(16)	* " T = 2.15 (0.0846)
⑭	13229 A0219	"	"	(16)	* " T = 2.20 (0.0866)
⑭	13229 A0220	"	"	(16)	* " T = 2.25 (0.0886)
⑭	13229 H5860	"	"	(16)	* " T = 2.30 (0.0906)
⑭	13229 H5861	"	"	(16)	* " T = 2.35 (0.0925)
⑭	13229 H5862	"	"	(16)	* " T = 2.40 (0.0945)
⑭	13229 H5863	"	"	(16)	* " T = 2.45 (0.0965)
⑭	13229 H5864	"	"	(16)	* " T = 2.50 (0.0984)
⑭	13229 H5865	"	"	(16)	* " T = 2.55 (0.1004)
⑭	13229 H5866	"	"	(16)	* " T = 2.60 (0.1024)
⑭	13229 H5867	"	"	(16)	* " T = 2.65 (0.1043)
⑭	13229 H5868	"	"	(16)	* " T = 2.70 (0.1063)
⑭	13229 H5869	"	"	(16)	* " T = 2.75 (0.1083)
⑭	13229 H5870	"	"	(16)	* " T = 2.80 (0.1102)

The mark "*" indicates selective-use.

Unit: mm (in)

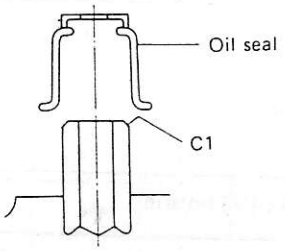
Key No.	Part Number	Part Name	Engine	Q'ty	Remarks
⑭	13229 A7600	Valve Cap	L14 (4V) L18·R (4V)	(16)	* Common to intake and exhaust T = 2.85 (0.1122)
⑭	13229 A7601	"	"	(16)	* " T = 2.90 (0.1142)
⑭	13229 A7602	"	"	(16)	* " T = 2.95 (0.1161)
⑭	13229 A7603	"	"	(16)	* " T = 3.00 (0.1181)
⑭	13229 A7604	"	"	(16)	* " T = 3.05 (0.1201)
⑭	13229 A7605	"	"	(16)	* " T = 3.10 (0.1220)
⑭	13229 A7606	"	"	(16)	* " T = 3.15 (0.1240)
⑭	13229 A7607	"	"	(16)	* " T = 3.20 (0.1260)
⑭	13229 A7608	"	"	(16)	* " T = 3.25 (0.1280)
⑭	13229 A7609	"	"	(16)	* " T = 3.30 (0.1299)
⑭	13229 A7610	"	"	(16)	* " T = 3.35 (0.1319)
⑭	13229 A7611	"	"	(16)	* " T = 3.40 (0.1339)
⑭	13229 A7612	"	"	(16)	* " T = 3.45 (0.1358)
⑭	13229 A7613	"	"	(16)	* " T = 3.50 (0.1378)
⑭	13229 A7614	"	"	(16)	* " T = 3.55 (0.1398)
⑭	13229 A7615	"	"	(16)	* " T = 3.60 (0.1417)
⑮	13210 H5820	Cotter-Valve		32	L14 (4V) option, common to intake and exhaust
⑯	13209 H5820	Retainer-Valve		16	"
⑰	13204 H5820	Spring-Valve, Inner		16	"
⑱	13203 H5820	Spring-Valve, Outer		16	"
⑲	13207 A7600	Seal-Oil, Valve		16	"
⑳	13205 H5820	Seat-Valve Spring		16	"
㉒	13201 A7671	Valve-Intake		08	Valve head diameter 33 (1.30 in), stem diameter 7 (0.28 in)
㉓	13202 A7671	Valve-Exhaust		08	Valve head diameter 29.5 (1.161 in), stem diameter 7 (0.28 in)
㉔	13506 H5820	Dowel		02	L14 (4V) option
㉕	13105 A7670	Gasket-Front Cover, R.H.		01	L14 (4V) option

The mark "*" indicates selective-use

Key No.	Part Number	Part Name	Q'ty	Remarks
㉕	13106 A7670	Gasket-Front Cover, L.H.	01	L14 (4V) option
㉖	81-30850-62	Bolt-Hex (M8)	02	
㉗	81-30840-62	"	01	
㉘	81-30830-62	"	01	
㉙	89-15438-1	Washer-Plain		

③ When using the valve oil seal 13207 A7600 (G4 specification), pay particular attention to the following items:

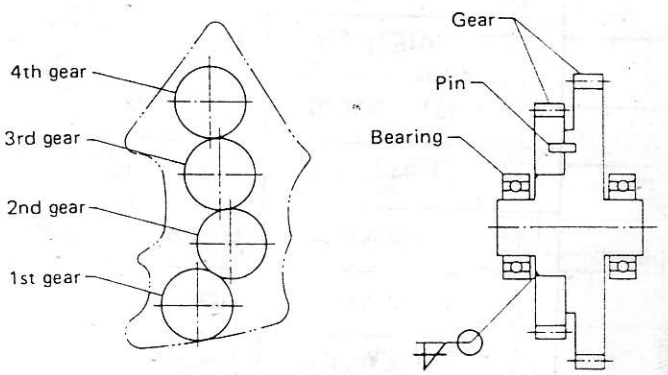
1) Chamfer the valve guide (upper portion).



2) Warm the oil seal to approx. 60°C (140°F) in oil.
3) Press the oil seal into the valve guide using a pressing tool.

GEAR TRAIN ASSEMBLY (13100 A7670)

- This unit is available as an optional unit for the gear drive portion of the G4 camshaft drive system. The 1st through 4th gears are the same as the optional parts L14(4V).



- The gears are welded into an integral unit, and replacement should therefore be made as a unit.
- The component parts of this assembly are listed below.

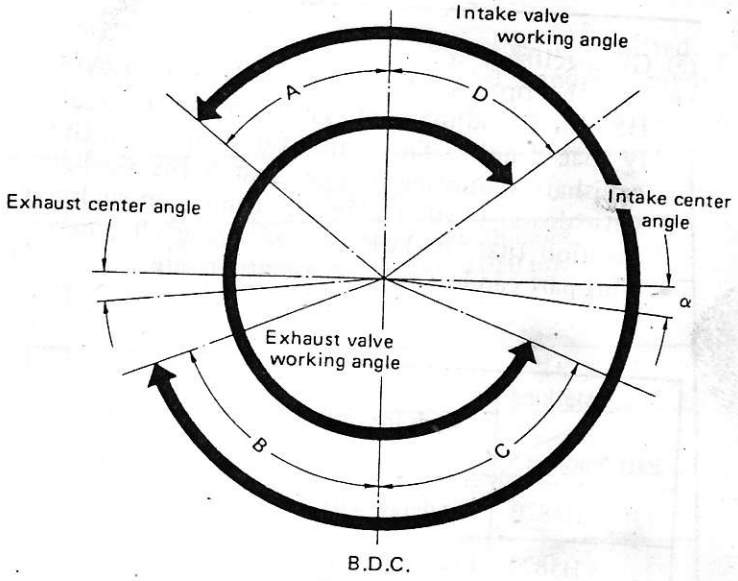
Part Number	Part Name	Q'ty	Remarks
13100 A7670	Gear Train Assembly-Engine Front	01	
13101 A7670	Plate-Gear	01	
13102 H5820	Cover-Gear	01	L14 (4V) option
13104 H5820	Spacer	01	L14 (4V) option
13103 H5820	Stopper Plate	04	L14 (4V) option
83-20306-9	Screw-Machine	08	

Part Number	Part Name	Q'ty	Remarks
13110 A7600	Gear Assembly - 1st Shaft	01	L14 (4V) option
13112 A7600	Gear-1st	01	40T
13113 A7600	"	01	32T
15046 H5720	Pin	02	
13114 H5820	Spacer-Gear	02	
13294 H5820	Ball Bearing	02	
13120 A7600	Gear Assembly - 2nd Shaft	01	L14 (4V) option
13122 A7600	Gear - 2nd	01	48T
13123 A7600	"	01	30T
15046 H5720	Pin	02	
13114 H5820	Spacer-Gear	02	
13294 H5820	Ball Bearing	02	
13130 A7630	Gear Assembly - 3rd	01	L14 (4V) option
13132 A7630	Gear- 3rd	01	31T
13114 H5820	Spacer-Gear	02	
13294 H5820	Ball Bearing	02	
13140 A7600	Gear Assembly - 4th Shaft	01	L14 (4V) option
13142 A7600	Gear - 4th	01	32T
13143 A7600	Sprocket-Chain Drive	01	20T
15046 H5720	Pin	02	
13114 H5820	Spacer-Gear	02	
13294 H5820	Ball Bearing	02	
81-10625-62	Bolt-Gear Cover	01	
81-10650-62	"	01	
11023 32200	Dowel-Gear Train Plate	02	
13028 A7670	Chain Assembly	01	68 links

- The timing chain tension adjusting procedure will be discussed later.

VALVE TIMING

Valve timing diagram



Part Number	A°	B°	C°	D°	α°	β°	Cam Lift	Remarks
13001 22021	31	61	61	31	15	15	7.50	G2; 68° cam 272
13001 22022	45	75	75	45	15	15	8.00	G2; 75° cam 300
13001 22023	35	65	74	34	15	20	8.25	G2; intake 70° -exhaust 72°cam 280 288
13001 A7661	47	77	82	42	15	20	8.50	G2; 76° cam 304
13001 A7660	43	73	78	38	15	20	8.25	G2; 74° cam 294
13001 N7170	40	60	60	40	10	10	10.50	G4; 70° cam 280
13001 N7171	44	64	64	44	10	10	10.50	G4; 72° cam 288

Valve timing adjustment

① In order to obtain the best performance with the rally option camshaft, it is necessary to adjust valve timing as specified in the above table.

② Valve timing will vary with the elongation of chain and the extent to which the bottom surface of cylinder head was ground. It is therefore necessary to measure the actual value (center angle) using a dial gauge, and adjust to the specified timing.

③ Valve timing adjustment can be done by selecting a proper dowel hole in the cam sprocket.

Cam sprocket

① G2 specification
Use the optional part (13024 E4621) for adjustment. This part has 8 dowel holes, and relationship between timing mark and hole is as shown below.

Mark	1	2	3	4	A	B	C	D
Angle	72°16′	70°46′	69°16′	67°46′	73°46′	75°16′	76°46′	78°16′
Difference from mark 1		3° advanced	6° advanced	9° advanced	3° delayed	6° delayed	9° delayed	12° delayed

② G4 specification

- Use the optional part (13024 H5820, 13025 H5820) for adjustment. This part has 10 equally spaced holes. There are also 10 holes in the camshaft mounting flange. Install the washer with dowel (13015 H5820), timing, in such a position that the holes are aligned each other.
- This part can be installed on either side.

Marking / Part Number	Mark for intake	Mark for exhaust
13024 H5820	For delay setting	For advance setting
13025 H5820	For advance setting	For delay setting

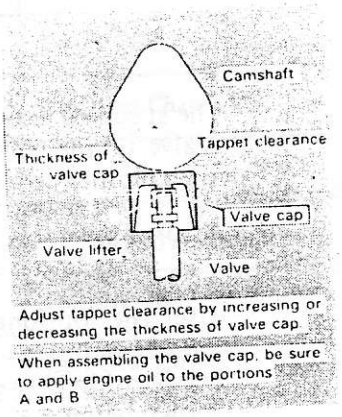
VALVE CLEARANCE

1 G2 specification

- Adjust valve clearance (hot engine) in the same manner as for the production L-series engine.
  Clearance (hot engine) ..... Intake 0.25 mm (0.010 in), Exhaust 0.30mm (0.012 in)

2 G4 specification

- Adjust valve clearance by changing the thickness of the valve cap shown in the figure below.

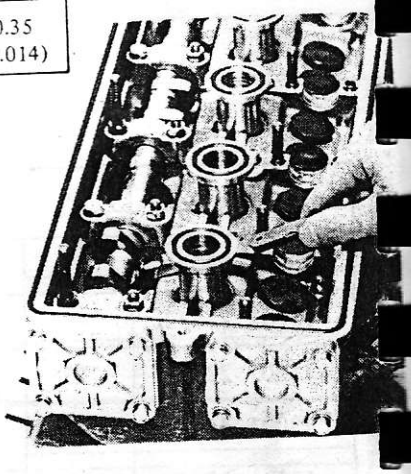


- When newly assembling, measure clearance on the single cylinder head to make a rough estimation of the valve cap thickness. In this case, install the camshaft and one intake or exhaust valve for measurement.

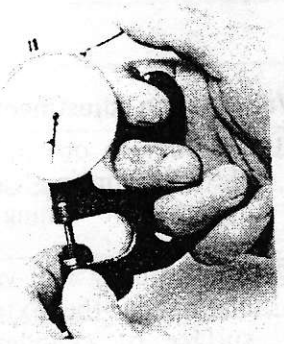
Valve clearance

Unit: mm (in)

	Intake	Exhaust
Cold engine	0.25 (0.010)	0.30 (0.012)
Hot engine	0.30 (0.012)	0.35 (0.014)



- Use the dial gauge, as shown when measuring the valve cap thickness.



FRONT COVER AND OIL SEAL

The G2 engine utilizes the L20B standard units.

The G4 engine, as it adopts the dry sump system, uses optional parts created by modification of the standard cover.

① **G2 specification**

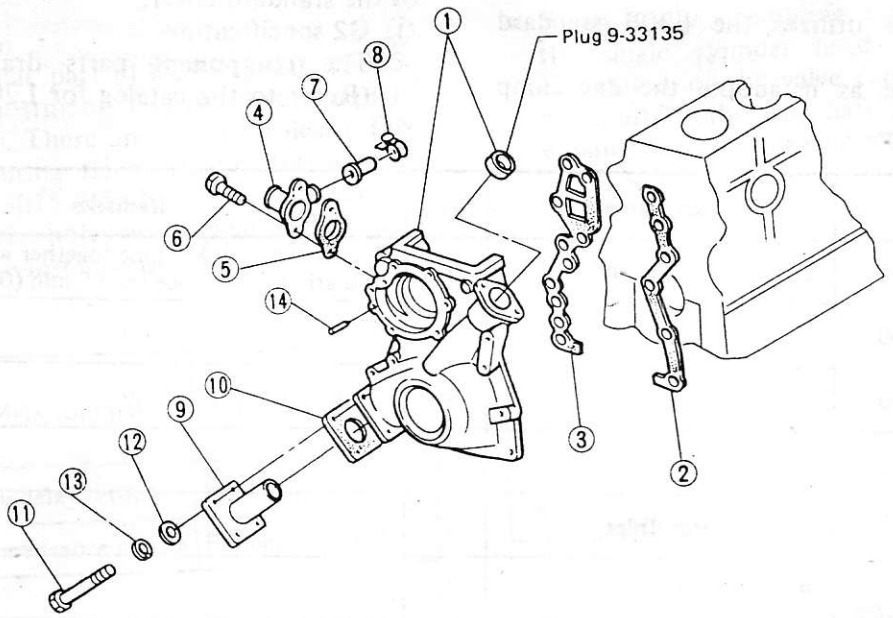
The component parts drawing is omitted. (Refer to the catalog for L20B standard unit.)

Part Number	Part Name	Q'ty	Remarks
13501 U6000	Cover-Engine, Front	01	L20B standard; Machine together with block, and grind the surface by 0.5 mm (0.020 in).
13520 U6000	Gasket-Front Cover, R.H.	01	"
13521 U6000	Gasket-Front Cover, L.H.	01	"
13049 U0100	Inlet-Water	01	"
13050 21000	Gasket-Water, Inlet	01	"
81-10828-62	Bolt-Water, Inlet	02	
11046 73402	Dowel	02	For mounting water pump
81-10620-62	Bolt-Hex (M6)	02	For mounting front cover
81-10645-62	"	03	"
13540 21001	Bolt-Hex (M8 x 78)	04	"
81-10845-1	Bolt-Hex (M8)	01	"
80-10875-1	"	01	"
89-15138-1	Washer-Spring	06	"
13502 A7660	Indicator-Timing	01	Option
81-10612-62	Bolt-Hex (M6)	01	

- Use the water inlet (13049 U0100) by making partial modification. Of the three pipes provided on this water inlet, the pipes for connecting the radiator hose and heater hose must be left unmodified; the pipe located on the upper portion is unnecessary, and must be closed with a blind plug to prevent water leakage.

② **G4 specification**

The G4 specification differs from G2, as it adopts the dry sump system. The component parts drawing shown on the next page is prepared on the basis of the L14(4V) optional unit, and therefore contains some parts unnecessary for the G4 specification. The component parts list given under the drawing provides the correct G4 parts.



Key No.	Part Number	Part Name	Q'ty	Remarks
①	13501 A7670	Cover Assembly-Engine Front	01	Option
②	13520 U6000	Gasket-Front Cover, R.H.	01	L20B standard
③	13521 U6000	Gasket-Front Cover, L.H.	01	L20B standard
④	13049 U0100	Inlet-Water	01	L20B standard, modify according to G2.
⑤	13050 21000	Gasket-Water, Inlet	01	L20B standard
⑥	81-10828-62	Bolt-Water, Inlet (M8)	02	
⑨	15045 N3120	Bracket-Idler Shaft	01	LY26 option
⑩	15066 21001	Gasket-Oil Pump	01	
⑪	81-10820-1	Bolt-Hex (M8)	04	
⑫	89-15438-1	Washer-Plain	04	
⑬	89-15138-1	Washer-Spring	04	
⑭	11046 73402	Dowel	02	For mounting water pump
	81-10630-62	Bolt-Hex (M6)	02	For mounting front cover
	81-10655-1	"	02	"
	80-10690-1	"	01	"
	81-10890-1	Bolt-Hex (M8)	03	"
	80-10890-1	"	02	"

Key No.	Part Number	Part Name	Q'ty	Remarks
	89-15136-1	Washer-Spring	03	For mounting front cover
	89-15138-1	"	05	"
	13502 21000	Indicator-Timing	01	
	81-10612-62	Bolt-Hex (M6)	01	

- The parts ⑦, ⑧, and plug (9-33135) are unnecessary.
- Use the standard part (15040 21001) for the spindle (distributor drive only).

③ Crank oil seal

- The oil seal is common to G2 and G4, and the L-series engine standard part must be used.

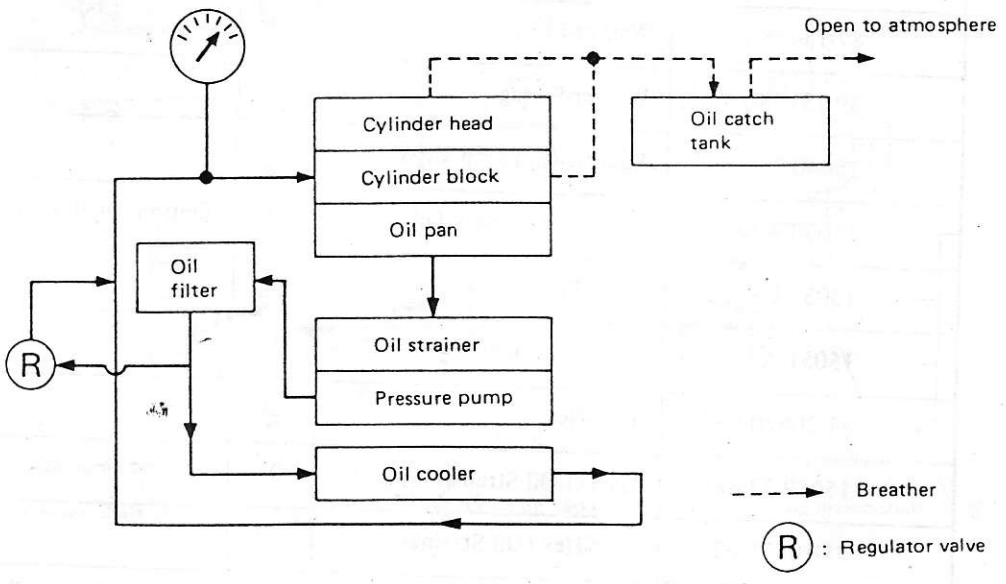
Part Number	Part Name	Q'ty	Remarks
12279 R4610	Seal-Oil, Crank Rear	01	Manufactured by NDK
(12279 R4600)	"	(01)	" NOK
13042 A8600	Seal-Oil, Crank Front	01	" NOK
(13042 A3510)	"	(01)	" NDK
12289 21003	Seal-Oil, Bearing Cap	02	

OIL PUMP

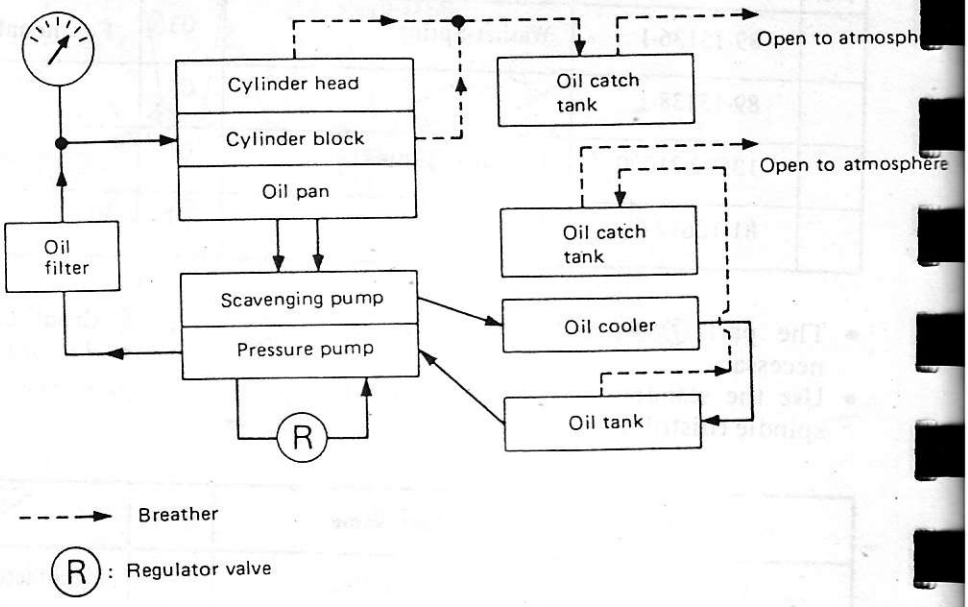
- The G2 specification uses the wet sump system, and the L-series engine production unit should be utilized.
- The G4 specification uses the dry sump system, and the L18(4V) optional unit is adopted.

OIL RECIRCULATING SYSTEM DIAGRAM

① G2 specification



② G4 specification



OIL PUMP

- The L-series engine standard unit is used.

① G2 specification

Part Number	Part Name	Q'ty	Remarks
15010 21001	Pump Assembly-Oil	01	Adjust oil pressure; On vehicle, 588 - 686 kPa (5.88 - 6.86 bar, 6.0 - 7.0 kg/cm², 85 - 100 psi)
15066 21001	Gasket-Oil Pump To Cover	01	
15036 21000	Bolt-Oil Pump	02	
15037 21000	"	02	
89-15438-1	Washer-Plain	04	
89-15138-1	Washer-Spring	04	
15040 21001	Spindle-Oil Pump Drive	01	
15050 A7660	Strainer Assembly-Oil	01	Option, small-sized, light-weight unit
15055 U8000	Tube-Suction	01	
15051 A7660	Screen-Strainer	01	
81-20620-62	Bolt-Hex	01	
15059 73400	Gasket-Oil Strainer	01	
81-10825-62	Bolt-Hex (Oil Strainer)	02	
15238 A7660	Bracket Assembly-Oil Filter	01	Option; for installation of oil cooler

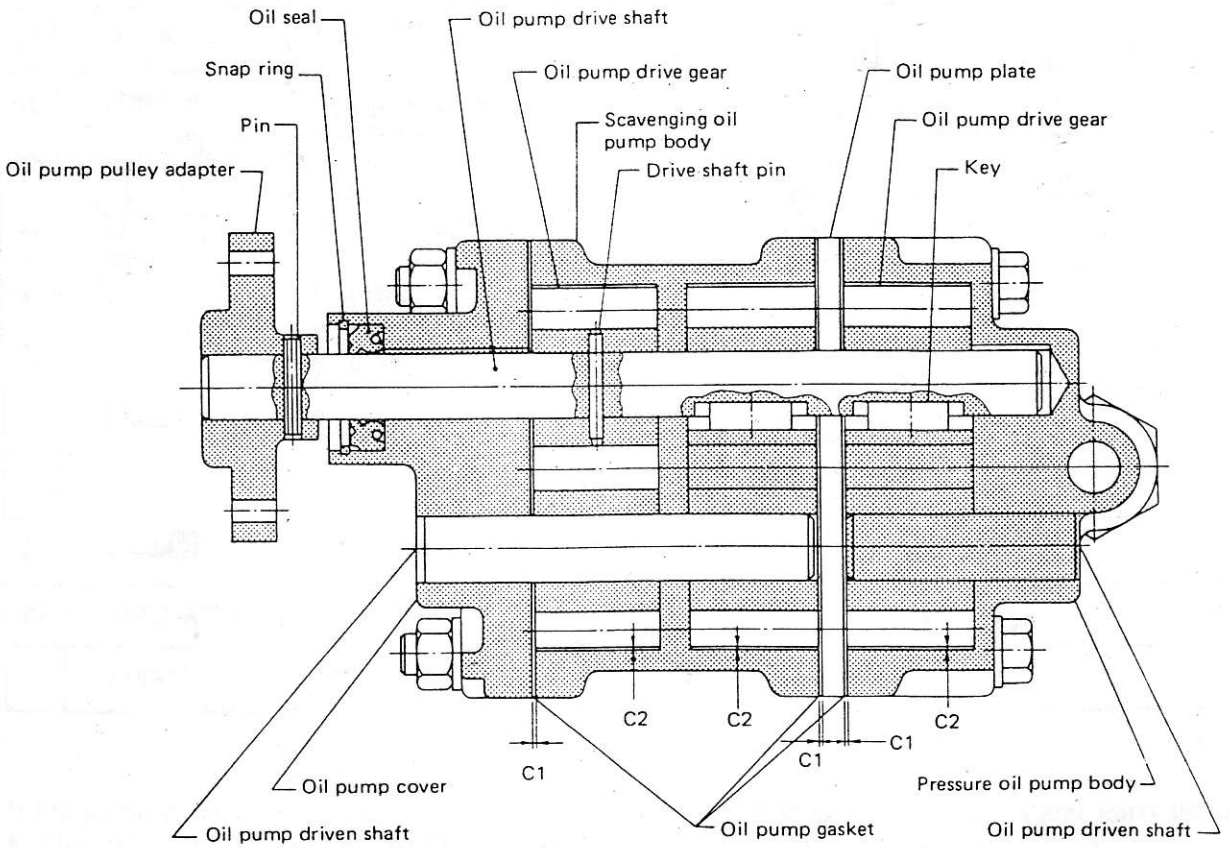
Part Number	Part Name	Q'ty	Remarks
15241 A7660	Connector-Oil	01	Assemble after applying "Araldite".
15236 N3120	O-Ring	01	LY 26 option
15237 A7660	"	01	Option
15214 69800	Washer-Stud	01	
15213 A7660	Stud-Oil Filter	01	Option
15208 65011	Element Assembly-Oil Filter	01	Unit for L-series engine is applicable.

- During high speed operation, the O/P drive spindle (15040 21001) and its mating drive gear (15043 21000) may be worn under certain conditions. In such a case, please contact Nissan Motor Co., Ltd. as a strengthened trial production unit of a different material is available.

② G4 specification

- The L18(4V) optional unit is used. This oil pump has an increased capacity to match the dry sump system.
- The oil pump incorporates the scavenging and pressurizing gear pumps on the same shaft.
- The oil pump is driven by the timing belt from the end of the crankshaft at 1/2 the crankshaft speed. (External driving system)
- When assembling the oil pump, the oil pump drive and driven pulley must be carefully aligned.

(1) Oil pump construction



- The oil pump gaskets are available in three types. Choose proper gaskets so that the following clearance (side clearance) can be obtained.

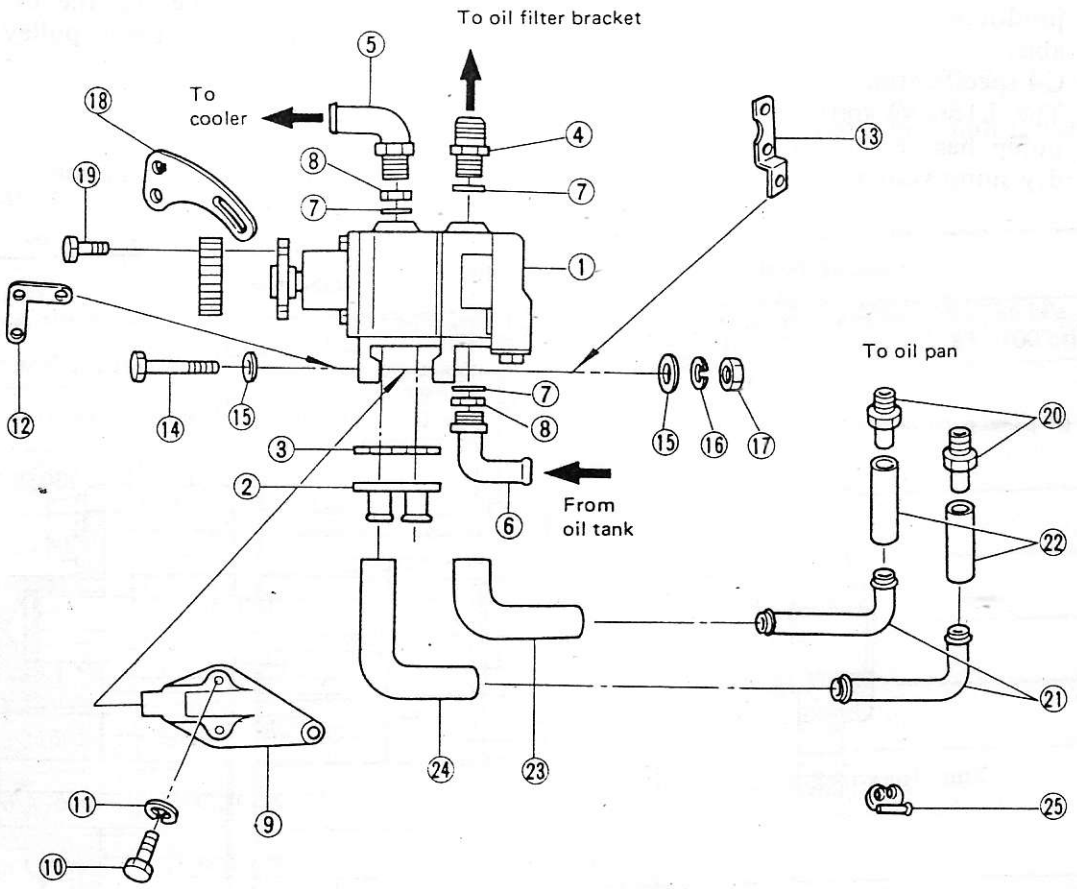
Part Name	Part Number	Thickness mm (in)
Oil pump gasket	15013 N7170	0.085 - 0.115 (0.0033 - 0.0045)
Oil pump gasket	15013 N7171	0.105 - 0.135 (0.0041 - 0.0053)
Oil pump gasket	15013 N7172	0.125 - 0.155 (0.0049 - 0.0061)

Clearances (Reference value)

	Clearance mm (in)
Side clearance (C1)	0.04 - 0.11 (0.0016 - 0.004
Tip clearance (C2)	Less than 0.12 (0.0047)

Check each clearance whenever the pump is overhaule

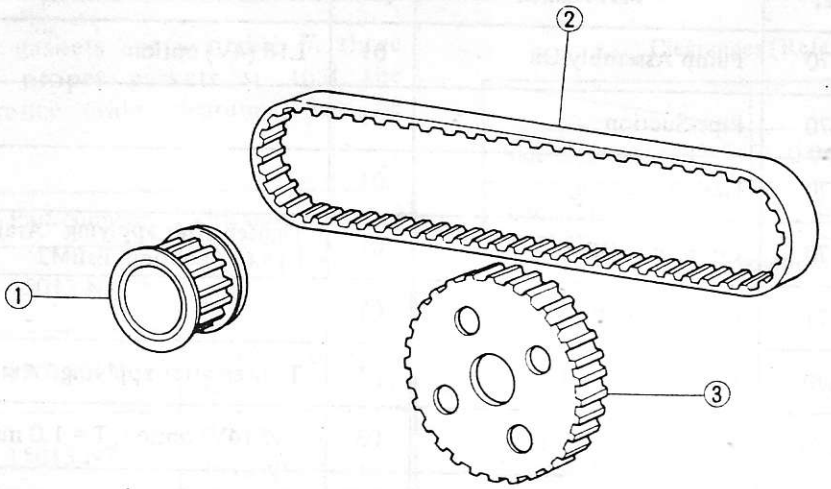
(2) **Oil pump fitting**



Key No.	Part Number	Part Name	Q'ty	Remarks
①	15010 N7170	Pump Assembly-Oil	01	L18 (4V) option
②	15011 N7170	Pipe-Suction	01	
③	15012 N7170	Gasket-Suction	01	
④	15412 N7170	Connector-Oil, I	01	Tighten after applying "Araldite". L18 (4V) option, BsBM2
⑤	15413 N7171	Connector-Oil, L	01	"
⑥	15413 A7670	Connector-Oil, L	01	Tighten after applying "Araldite". Option
⑦	15414 N7170	Washer-Connector	03	L18 (4V) option, T = 1.0 mm (0.04 in)
⑧	15417 N7170	Nut-Lock	02	L18 (4V) option
⑨	15415 N7170	Bracket-Oil Pump	01	"
⑩	80-11035-1	Bolt-Hex (M10)	03	
⑪	89-15140-1	Washer-Spring	03	
⑫	15020 A7670	Plate-Oil Pump, Front	01	Option
⑬	15021 A7670	Plate-Oil Pump, Rear	01	Option
⑭	80-30801-1	Bolt-Hex (M8)	01	
⑮	89-15438-1	Washer-Plain	02	
⑯	89-15138-1	Washer-Spring	01	
⑰	89-12608-1	Nut-Self Lock	01	
⑱	15416 A7600	Bar-Adjusting, Oil Pump	01	L14 (4V) option
⑲	81-20612-62	Bolt-Hex	04	
⑳	15421 N3120	Connector-Suction	02	LY 26 option
㉑	15422 A7670	Pipe-Suction	02	Option
㉒	15423 A7670	Hose-Suction, A	02	Option
㉓	15424 A7670	Hose-Suction, B	01	Option
㉔	15425-A7670	Hose-Suction, C	01	Option
㉕	15427 N3120	Clamp-Hose	08	LY 26 option

(3) Oil pump drive

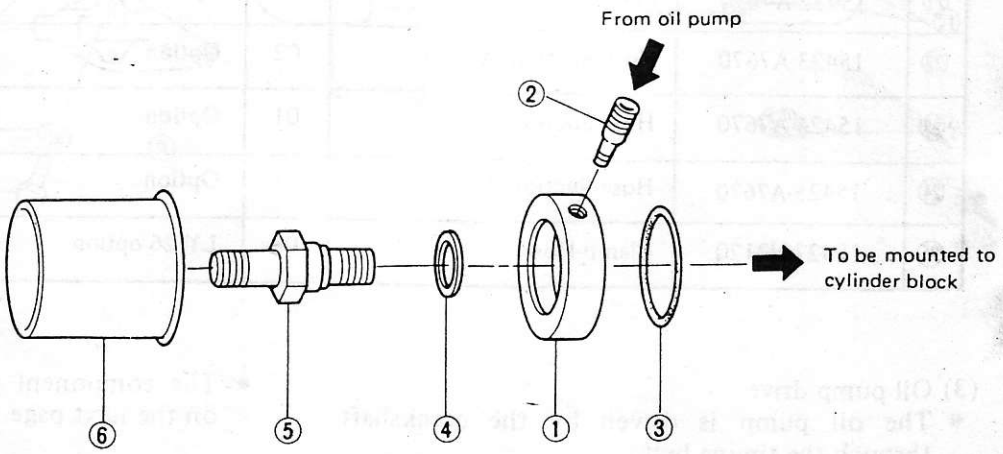
- The oil pump is driven by the crankshaft through the timing belt.
- The component parts and parts list are shown on the next page.



Key No.	Part Number	Part Name	Q'ty	Remarks
①	15451 N7170	Pulley-Oil Pump Drive	01	L18 (4V) option, manufactured by UNITTA
①	(15451 N7171)	"	(01)	L18 (4V) option, manufactured by TSUBAKIMOTO
②	15453 H5820	Belt-Oil Pump	01	L14 (4V) option, manufactured by UNITTA
②	(15453 H5821)	"	(01)	L14 (4V) option, manufactured by TSUBAKIMOT
③	15452 N3120	Pulley-Oil Pump	01	LY26 option, manufactured by UNITTA
③	(15452 N3121)	"	(01)	LY26 option, manufactured by TSUBAKIMOTO

* Do not use any combination of parts from different manufacturers.

(4) Oil filter



Key No.	Part Number	Part Name	Q'ty	Remarks
①	15238 N3120	Bracket-Oil Filter	01	LY26 option
②	15413 N3120	Connector-Oil, I	01	LY26 option; Tighten after applying "Araldite".
③	15236 N3120	O-Ring	01	LY26 option
④	15214 69800	Washer-Stud	01	
⑤	15213 N3120	Stud-Oil Filter	01	LY26 option
⑥	15208 65011	Element Assembly-Oil Filter	01	The part for L-series engine is applicable.

OIL COOLER

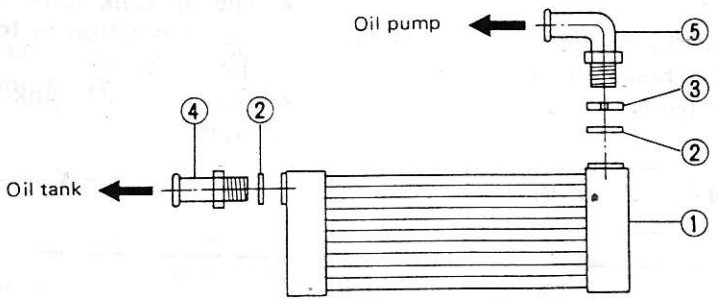
- Oil coolers are available as options for both G2 and G4 specifications.
- The oil cooler must be installed in front of the radiator.

OIL COOLER

- Both G2 and G4 adopt the air cooled type.

(1) G2 specification
- Utilize optional part (21305 E4220) for HS30 (former Fairlady 240Z).

(2) G4 specification
- The horizontal type is available as an option.



Key No.	Part Number	Part Name	Q'ty	Remarks
①	21305 A7670	Cooler-Oil	01	Option
②	15414 N7170	Washer-Connector	02	L18 (4V) option
③	15417 N7170	Nut-Lock	01	L18 (4V) option, for L type connector
④	15413 A7671	Connector-Oil, I	01	Option; Tighten after applying "Araldite".
⑤	15413 N7171	Connector-Oil, L	01	L18 (4V) option; Tighten after applying "Araldite".

OIL HOSE

① G2 specification

- Light-weight aviation hose manufactured by Aeroquip Corp. is adopted.

Part Number	Part Name	Q'ty	Remarks
21355 A7660	Hose-Oil Cooler [L=1,150mm (45.28in)]	01	With connector at each end
21356 A7660	Hose-Oil Cooler [L=950mm (37.40in)]	01	"

② G4 specification

Part Number	Part Name	Q'ty	Remarks
15430 A7670	Hose-Oil [L=700mm (27.56in)]	01	With connector at each end Oil Pump ~ Oil Filter Bracket
21355 A7670	Hose-Oil [L=550mm (21.65in)]	01	Oil Pump ~ Oil Cooler
21355 A7671	Hose-Oil [L=4,750mm (187,01in)]	01	Oil Cooler ~ Oil Tank
21355 A7672	Hose-Oil [L=4,100mm (161.42in)]	01	Oil Tank ~ Oil Pump

- User may choose proper oil hose from those presently on the market. In such a case, however, the hose must have a withstanding pressure of at least 1,961 kPa (19.61 bar, 20 kg/cm², 284 psi).
- The hose to the oil tank must be passed through the corner of body in the compartment, and led into the trunk.

OIL TANK

- The oil tank is available as an optional part designed especially for the dry sump system. However, user may obtain a proper tank [capacity being 10 liters (10-5/8 US qt, 8 Imp qt)] on the market.
- The oil tank must be installed in the trun such a position as to prevent interference the fuel tank.
- The optional tank mounting bracket is also available.

Part Number	Part Name	Q'ty	Remarks
15260 A7670	Tank Assembly-Oil	01	Option
15270 A7670	Cap-Oil Tank	01	Option
15413 N7171	Connector-Oil, L	01	Tighten after applying "Araldite" L18 (4V) option
15413 A7671	Connector-Oil, I	01	Tighten after applying "Araldite", option
15414 N7170	Washer-Connector	02	L18 (4V) option
15417 N7170	Nut-Lock	01	L18 (4V) option, for L-type connector
11128 69200	Plug-Drain	01	
11026 61000	Washer-Drain Plug	01	
13267 23000	Connector-Breather	01	
15271 A7670	Bracket-Oil Tank	01	

- Install an oil resistive vinyl hose to the oil tank to check oil level.

OIL CATCH TANK

- Use the existing tank. When installing another tank on the user side, be sure to choose a tank having capacity of greater than 2 liters (2-1/8 US qt, 1-3/4 Imp qt). (The tank capacity is prescribed by the applicable rules.)

① G2 specification
Install one oil catch tank in the engine compartment for the wet sump engine. Connect hoses according to the system diagram (breather →).

Part Number	Part Name	Q'ty	Remarks
11125 K0475	Tank Assembly-Oil Catch	01	710 (former Violet) optional part
11862 K0475	Tank-Oil Catch	01	
11864 K0475	Cap-Oil Catch	01	
13267 23000	Connector-Breather	01	
11871 K0475	Bracket-Oil Catch Tank	01	
17321 A8700	3 way Connector	01	Option

② G4 specification
Install one catch tank in the engine compartment for dry sump engine, and one catch tank in the rear trunk room for the oil tank. Connect hoses according to the system diagram.

Part Number	Part Name	Q'ty	Remarks
11125 K0475	Tank Assembly-Oil Catch	02	710 (former Violet) optional part
11862 K0475	Tank-Oil Catch	02	
11864 K0475	Cap-Oil Catch	02	
13267 23000	Connector-Breather	03	
11871 K0475	Bracket-Oil Catch Tank	02	
17321 A8700	3 way Connector	01	For piping in engine compartment only. Option

INTAKE SYSTEM

The intake manifold and linkage kit are also available as options for the SOLEX 50PHH twin carburetor which is already provided as an option for both G2 and G4 engines.

COMPONENT PARTS

① G2 specification

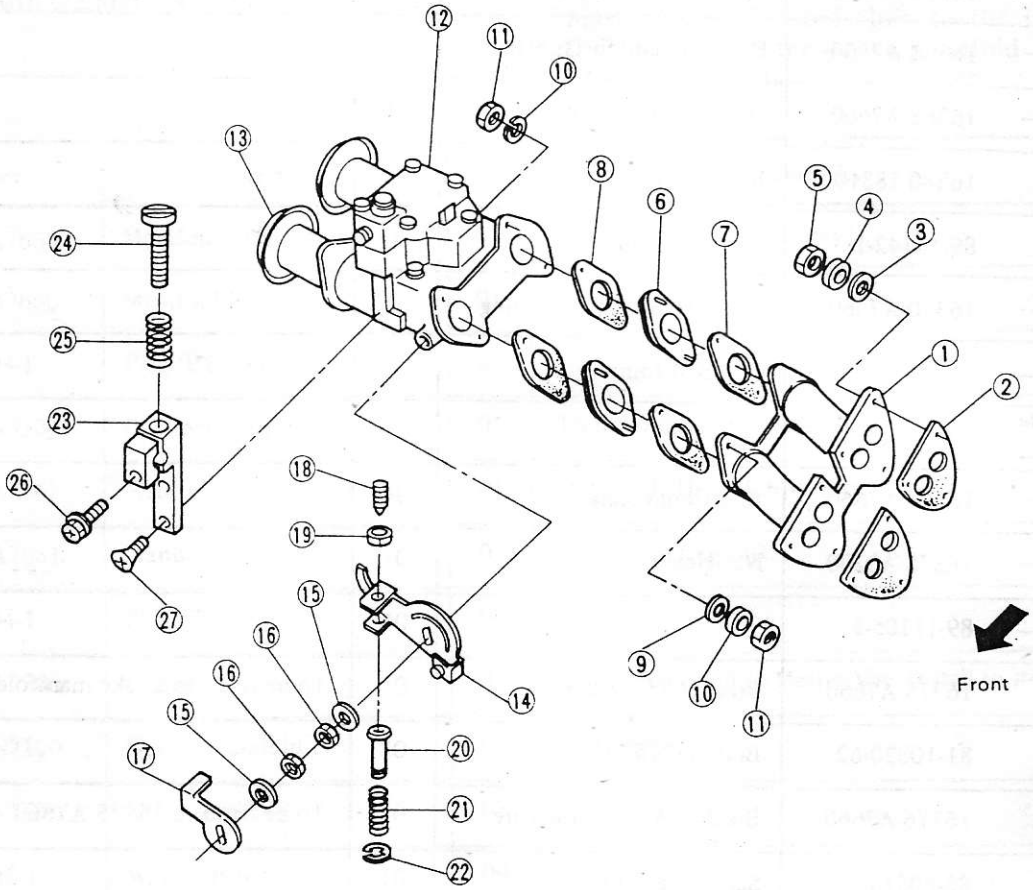
- The component parts diagram is omitted.
- The intake manifold length is available in two types. In the left-hand drive car, the br Master-Vac is located close to the intake s tem, so the shorter intake manifold [L=80mm (3.15in)] must be used.

Part Number	Part Name	Q'ty	Remarks
14002 A7660	Manifold Assembly-Intake	01	Option (R/H drive car only)
14003 A7660	Manifold-Intake	01	L = 110mm (4.33in)
89-31304-1	Plug (PT 1/4-19)	01	
47475 N3300	Connector-Pipe	01	To be connected to Master-Vac. Install to #4 port.
14002 A7661	Manifold Assembly-Intake	01	Option (R/H, L/H drive cars)
14003 A7661	Manifold-Intake	01	L = 85mm (3.35in)
89-31304-1	Plug (PT 1/4-19)	01	
47475 N3300	Connector-Pipe	01	To be connected to Master-Vac. Install to #4 port.
14035 N7120	Gasket-Manifold	01	L18 option
14037 N3600	Yoke-Manifold	07	
89-15438-1	Washer-Plain	09	
89-11108-1	Nut-Manifold	16	
16010 22010	Carburetor Assembly-Twin	01	L16 option (SOLEX 50 PHH)
16174 14610	Insulator-Carburetor	04	L16 option, for 14003 A7660 manifold.
16175 14610	Gasket-Insulator, Manifold	04	"
16176 14610	Gasket-Insulator, Carburetor	04	"
89-15138-1	Washer-Spring	16	"
89-11108-1	Nut-Hex (M8)	16	"
16174 A7660	Insulator-Carburetor	02	Option, for 14003 A7661 manifold.
16175 A7660	"	02	"
16176 A7660	Gasket-Insulator, Manifold	04	For Intake Manifold
89-15138-1	Washer-Spring	16	For 14003 A7661 manifold
81-10816-1	Bolt-Hex (M8)	08	"

Part Number	Part Name	Q'ty	Remarks
89-11108-1	Nut-Hex (M8)	08	For 14003 A7661 monifold
16360 A7660	Kit-Throttle Linkage	01	R/H drive car only
16361 A7660	Drum Assembly-Throttle	01	
16363 A7660	Drum-Throttle Shaft	01	
16380 18810	Bolt-Ball Joint	02	
89-15142-1	Washer-Spring	02	
16370 A7660	Rod Assembly-Connecting	01	
16371 A0202	Clip-Ball Joint	01	
16371 A0203	"	01	
16373 A7660	Rod-Connecting	01	
16375 A0200	Nut-Hex	01	
89-11105-1	"	01	
16375 A7660	Bracket-Throttle Shaft	01	To be fixed to intake manifold
81-10820-62	Bolt-Hex (M8)	03	
16376 A7660	Bracket-Accelerator Wire	01	To be fixed to 16375 A7660
83-60514-14	Screw-Machine	01	
81-10612-62	Bolt-Hex (M6)	04	
16360 H5875	Kit-Throttle Linkage	01	L/H drive car only, L14 (4V) option
16361 H5820	Drum Throttle	01	
16362 H5820	Lever-Throttle	01	
16376 H5820	Stopper-Throttle	01	
16378 14600	Spring-Adjust Screw	01	
16379 H5820	Screw-Throttle Adjust	01	
18100 A7660	Wire Assembly-Accelerator	01	Common to R/H and L/H drive cars.
18101 A7660	Wire-Accelerator	01	

* Be sure to install the heat shield plate under the carburetor. (This modification should be made on the user side.)

② G4 specification
- The intake manifold is of a split type, and attention should be payed to proper alignment of the carburetor shaft when assembling.
- The component parts are shown below.



Key No.	Part Number	Part Name	Q'ty	Remarks
①	14001 N7171	Manifold Assembly-Intake	01	L18 (4V) option
	14003 N7171	Manifold-Intake	02	
	89-31304-1	Plug-Blind (PT 1/4-19)	03	
	47475 E4101	Connector-Pipe	01	Apply "Araldite" to #4 port before installing.
②	14035 N7170	Gasket-Intake Manifold	04	L18 (4V) option
③	89-15436-1	Washer-Plain	12	
④	89-15136-1	Washer-Spring	12	
⑤	89-11206-1	Nut-Hex (M8)	12	
⑥	16174 14610	Insulator-Carburetor	04	L16 option
⑦	16175 14610	Gasket-Insulator, Manifild	04	"

Key No.	Part Number	Part Name	Q'ty	Remarks
⑧	16176 14610	Gasket-Insulator, Carburetor	04	L16 option
⑩	89-15138-1	Washer-Spring	16	
⑪	89-11108-1	Nut-Hex	16	
⑫	16010 22010	Carburetor Assembly-Twin	01	L16 option, SOLEX 50 PHH
	┌ 16360 H5875	Kit-Throttle, Linkage	01	L14 (4V) option, R/H drive car only
⑭	├ 16361 H5820	Drum-Throttle	01	
⑰	├ 16362 H5820	Lever-Throttle	01	
㉓	├ 16376 H5820	Stopper-Throttle	01	
㉔	├ 16379 H5820	Screw-Throttle Adjust	01	
㉕	└ 16378 14600	Spring-Adjust Screw	01	
⑮	16126 25520	Washer	02	Fitted to carburetor
⑯	16124 25520	Nut	02	Fitted to carburetor
⑱	16114 25520	Screw-Adjust	01	〃
⑲	16132 25520	Nut	01	〃
⑳	16184 25520	Push Rod	01	〃
㉑	16145 25520	Spring-Adjust	01	〃
㉒	16292 25520	Ring-Snap	01	〃
㉖	83-60525-65	Bolt (M5 x 0.8)	01	
㉗	16077 25521	Screw	02	Fitted to carburetor
	┌ 16360 A7670	Kit-Throttle, Linkage	01	L/H drive car only, option
	├ 16361 A7670	Drum Assembly-Throttle	01	
	├ 16362 A7670	Drum-Throttle	01	
	└ 16363 A7670	Lever-Throttle	01	
	├ 16362 H5820	〃	01	
	├ 16376 H5820	Stopper-Throttle	01	
	├ 16379 H5820	Screw-Throttle Adjust	01	
	├ 16378 14600	Spring-Adjust Screw	01	
	├ 16376 A7670	Bracket-Accelerator Wire	01	Install to intake manifold

Key No.	Part Number	Part Name	Q'ty	Remarks
	83-60514-14	Screw-Machine (M5 x 0.8)	01	
	18100 A7670	Wire Assembly-Accelerator	01	R/H drive car only, option
	18101 A7670	Wire-Accelerator	01	
	18100 A7660	Wire Assembly-Accelerator	01	L/H drive car only, option (G2)
	18101 A7660	Wire-Accelerator	01	

* Remove the existing throttle linkage from SOLEX 50PHH, and install the optional part.

MODIFICATION OF INSIDE SURFACE OF INTAKE MANIFOLD PORT

- The inside surface of the intake manifold port like the cylinder head port must be modified by grinding, for improved intake efficiency, while paying attention to the following items:

① Grind the portion to be installed to the cylinder head smoothly together with the manifold gasket without any step.

② Grind the inside surface of carburetor side smoothly without any step, and make the surface flush with the insulator diameter.

SOLEX 50PHH CARBURETOR SPECIFICATIONS

Unit:

Item \ Specification	G2	G
Throttle Bore Diameter	50 (1.97)	50 (1.97)
Outer Venturi Diameter	43 (1.69)	43 (
Air Horn Length	50 (1.97)	50 (1.97)
Main Jet	#180	#
Main Air Jet	#150	#150
Float Level	24 (0.94)	22

* Adjust the float level.

- This combination of jets recommende is based on the conditions existing at sea l [altitude 0m (0 ft)] in Japan, and may according to the actual field co Adjustment to the best carburetor se should be made by the user through actual run.
- The size and part numbers of availab jets and main air jets are listed below.

① Main jet

Size No.	Part Number
#120	16033 25924
#125	16033 25925
#130	16033 25926
#135	16033 25927
#140	16033 25928
#145	16034 25522
#150	16034 25521
#155	16034 25520

Size No.	Part Number
#160	16033 25528
#165	16033 25529
#170	16034 25523
#175	16034 25524
#180	16033 25520
#185	16034 25525
#190	16033 25521
#195	16034 25526

Size No.	Part Number
#200	16033 255
#210	16033 25523
#220	16033 255
#230	16033 25525
#240	16033 255
#250	16033 25527

② Main air jet

Size No.	Part Number
#120	16036 H0222
#130	16036 H0224
#140	16036 H0226
#150	16036 H0228
#160	16036 25720
#170	16036 25721
#180	16036 25722

Size No.	Part Number
#190	16036 25521
#200	16036 25723
#210	16036 25522
#220	16036 25524
#230	16036 25523
#240	16036 25527
#250	16036 25520

* Use the jet block having "OB" mark on it.

PRECAUTIONS IN CARBURETOR SETTING

① As the atmospheric pressure rises, increase the main jet size number (decrease the main air jet size number); as the atmospheric pressure drops, make the reverse adjustments.
② As the temperature drops, increase the main jet size number (decrease the main air jet size number); as the temperature rises, make the reverse adjustments.
③ When the weather is cloudy, increase the main jet size number (decrease the main air jet size number). When other than cloudy (fine or rain), make the reverse adjustments.
④ A thick mixture will lower the temperature of exhaust gas (and lean mixture will cause the temperature to rise). To lower exhaust gas temperature, increase the main jet size number properly (or, decrease the main air jet size number.)
⑤ Whether the main jet size and main air jet size are selected properly can be judged by observing the color of the center insulation of spark plug. If an excessively large difference is observed between the size numbers recommended above and those selected in the field, check whether the heat value of the spark plug has been properly selected.
⑥ When the outer venturi diameter is increased, the engine performance becomes a high-speed type; when decreased, the engine performance becomes a low-speed type.
⑦ The air horn length significantly affects engine performance. When shortened, the engine exhibits high-speed type performance (that is, torque characteristics). When extended, the engine exhibits a low-speed type.

[Reference] When setting the carburetor by test driving only

After warming up the engine, open the throttle valve fully beginning from approximately 1,000 rpm in any gear position, and raise engine speed to the level at which the maximum output can be obtained. In this case;

① If insufficient output is felt at high speed (though the low and middle speeds are normal);
   a. Reduce the main air jet size number by #10 to #20 so as to thicken the mixture in high speed range. If desired output is obtained, test also the adjacent size numbers to determine the optimum one.
   b. If desired output is not obtained, increase the main air jet size number to make the mixture in high speed range leaner.
② If the output is insufficient at low and middle speeds, though high speed operation is normal;
   a. Increase the main jet size number by #10 to #20 so as to thicken the mixture. If desired output is obtained, also test the adjacent size numbers to determine the optimum one.
   b. If desired output is not obtained (or the situation becomes worse), reduce the main jet size number and make the mixture leaner.
③ If the high speed range becomes worse while the middle and low speed ranges are improved;
   a. If the main jet size has been enlarged from the original one, enlarge the main air jet size.
   b. If the main jet size has been reduced from the original one, reduce the main air jet size.
④ If a slight sluggishness in engine response is felt upon sudden acceleration, it is an indication of excessive delivery of accelerating pump; if the engine is apt to stall, the pump delivery is insufficient. Adjust the pump delivery by changing the position of the accelerating pump

rod cotter pin in the carburetor.

* The nozzle hole is a very small hole, and can be easily clogged with dirt. To clean the hole, be sure to use compressed air; never use wire for cleaning.
* The Weber carburetor may be installed by the user.

AIR CLEANER

- If air cleaner is needed, use the L24 optional unit. The Mg casting strengthened version for L2R is available upon request.

Part Number	Part Name	Q'ty	Remarks
16500 E4621	Cleaner Assembly-Air	02	L24 option (split type)
16546 E4620	Element Assembly-Air	02	"
16500 E4620	Cleaner Assembly-Air	02	

- It is convenient to use a tire tube cut into a round slice as the band to retain the element.

EXHAUST MANIFOLD

- The stainless steel pipe exhaust manifold in 4-2-1 integral system is available as an op for both G2 and G4 engines.

① G2 specification

Part Number	Part Name	Q'ty	Remarks
14004 A7660	Manifold-Exhaust	01	Option, for R/H and L/H drive cars
14035 N7120	Gasket-Manifold	01	
20000 A9970	Tube Kit-Exhaust	01	

② G4 specification

Part Number	Part Name	Q'ty	Remarks
14004 A7670	Manifold-Exhaust	01	Option, for R/H and L/H drive cars
14036 H5820	Gasket-Manifold Exhaust	04	
89-15136-1	Washer-Spring	16	
89-11206-1	Nut-Hex (M6)	16	
20000 A9970	Tube Kit-Exhaust	01	

WATER PUMP, WATER OUTLET, FAN BLADE

- Both G2 and G4 engines use the L-series 6 cylinder engine-use a water pump with increased capacity. The fan blade that is available as an option is made of iron plate, an tufftride-treated to provide additional strengt against bending during high speed operatio
- Water manifold; The unit for G2 is cast integral part of the intake manifold. G4 us the L18(4V) optional unit.

① G2 specification

Unit: mm (in)

Part Number	Part Name	Q'ty	Remarks
21010 E3027	Pump Assembly-Water	01	Standard for L-series 6 cylinder engine
21014 21000	Gasket-Water Pump	01	
21078 21002	Bolt-Hex (M8)	02	
89-15138-1	Washer-Spring	02	
21079 21002	Bolt-Hex (M6)	01	
89-15136-1	Washer-Spring	01	
81-20622-62	Bolt-Hex (M6)	02	
21051 N7120	Pulley-Fan	01	L18-option
21061 N7120	Blade-Fan, Front	01	L18 option, 300 (11.81) dia. T = 1.6 (0.063)
21062 N7120	Blade-Fan, Rear	01	"
21064 N7170	Spacer-Fan	01	L18 (4V) option, T = 3.2 (0.126)
82-26622-1	Stud (M6)	04	
89-15136-1	Washer-Spring	04	
89-11206-1	Nut-Hex (M6)	04	
11720 N7120	Belt-Fan	01	L18 option, BAN FLEX 11M-825
21200 H7802	Thermostat Assembly	01	Valve opens 76.5°C (170°F)
11060 A7660	Outlet-Water	01	Option
11062 N7120	Gasket-Outlet Water	01	
81-10816-62	Bolt-Hex (M8)	03	
25080 89900	Gauge-Water Temperature	01	
25251 37700	Nut-Ground, Water Temperature Gauge	01	

② G4 specification

Unit: mm (in)

Part Number	Part Name	Q'ty	Remarks
21010 E3027	Pump Assembly-Water	01	Standard for L-series 6 cylinder engine
21014 21000	Gasket-Water Pump	01	
81-20800-1	Bolt-Hex (M8)	02	
89-15138-1	Washer-Spring	02	
21079 H5820	Bolt-Hex (M6)	01	L14 (4V) option
89-15136-1	Washer-Spring	01	
81-20622-62	Bolt-Hex (M6)	02	
21051 N7170	Pulley-Fan	01	L18 (4V) option
21061 N7120	Blade-Fan, Front	01	L18 option, 300 (11.81) dia, T = 1.6 (0.063)
21062 N7120	Blade-Fan, Rear	01	"
21064 N7170	Spacer-Fan	01	L18 (4V) option, T = 3.2 (0.126)
82-26622-1	Stud (M6)	04	
89-15136-1	Washer-Spring	04	
89-11206-1	Nut-Hex (M6)	04	
11720 N7120	Belt-Fan	01	L18 option, BAN FLEX 11M-825
21200 H7802	Thermostat Assembly	01	Valve opens 76.5°C (170°F)
11061 N7170	Manifold-Water	01	L18 (4V) option
11062 H5821	Gasket-Water Outlet, B	02	L14 (4V) option
89-15138-1	Washer-Spring	04	
89-11108-1	Nut-Hex (M8)	04	
11060 U0100	Outlet-Water	01	
11062 S0600	Gasket-Water Outlet	01	
81-10828-62	Bolt-Hex (M8)	02	
27070 H5000	Connector-Heater	01	
25080 89900	Gauge-Water Temperature	01	
25251 37700	Nut-Ground, Water Temperature Gauge	01	

* Thermostat is unnecessary in torrid zones.

RADIATOR

- The radiator proper is common to G2 and G4, only the hoses are different.
- The radiator is made of aluminum, with reduced weight and increased cooling capacity to meet rally requirements, and is available as an option.

① G2 specification

Part Number	Part Name	Q'ty	Remarks
21400 A7660	Radiator Assembly	01	Option, aluminum
21501 W5301	Hose-Radiator, Upper	01	
21503 K2405	Hose-Radiator, Lower	01	
87-23144	Clamp-Hose	04	

② G4 specification

Part Number	Part Name	Q'ty	Remarks
21400 A7660	Radiator Assembly	01	Option, aluminum
21501 A7670	Hose-Radiator, Upper	01	Option
21503 A7670	Hose-Radiator, Lower	01	Option
87-23144	Clamp-Hose	04	

ENGINE ELECTRICAL SYSTEM

IGNITION SYSTEM

- The competition proven MITSUBISHI CDI system is adopted as rally specification.
- The ignition coil and amp. utilize the E10 (Cherry) optional parts.
- The high tension cable and spark plug differ between G2 and G4 specifications.

① G2 specification

Part Number	Part Name	Q'ty	Remarks
22100 A7601	Distributor Assembly	01	L14 (4V) option, common to G2 and G4
22178 21000	Support-Distributor	01	Common to G2 and G4
83-60614-14	Machine-Screw	01	"
89-15436-1	Washer-Plain	01	"
81-10628-62	Bolt-Hex (M6)	02	"
22179 E3000	Packing-Support	01	"
22180 71200	O-Ring	01	"
22020 M0820	Amplifier-CDI	01	Common to G2 and G4, E10 option
22433 M0820	Coil-CDI	01	"

Part Number	Part Name	Q'ty	Remarks
22401 A4617	Plug-Spark	04	NGK BP 7ES
22450 U6700	Cable Assembly-High Tension Coil To Distributor	01	YAZAKI, L20B standard
(22450 U6710)	"	(01)	SUMITOMO, L20B standard
22451 U6000	Cable Assembly-High Tension No. 1	01	YAZAKI, L20B standard
22451 B8011	"	(01)	SUMITOMO, L20B standard
22452 N6001	Cable Assembly-High Tension No. 2	01	YAZAKI, L20B standard
(22452 N6011)	"	(01)	SUMITOMO, L20B standard
22453 N6001	Cable Assembly-High Tension No. 3	01	YAZAKI, L20B standard
(22453 N6011)	"	(01)	SUMITOMO, L20B standard
22454 21001	Cable Assembly-High Tension No. 4	01	YAZAKI, L20B standard
(22454 21010)	"	(01)	SUMITOMO, L20B standard
22472 21010	Clamp-High Tension Cable	01	
22472 65000	"	01	

② G4 specification

Part Number	Part Name	Q'ty	Remarks
(22401 N7171)	Plug-Spark	(04)	L18 (4V) option, NGK R018-7
22401 N7172	"	04	L18 (4V) option, NGK R018-8
22450 U6700	Cable Assembly-High Tension Coil To Distributor	01	L20B standard
22451 A7670	Cable Assembly-High Tension No. 1	01	Option
22452 A7670	Cable Assembly-High Tension No. 2	01	"
22453 A7670	Cable Assembly-High Tension No. 3	01	"
22454 A7670	Cable Assembly-High Tension No. 4	01	"
22472 21010	Clamp-High Tension Cable	01	"

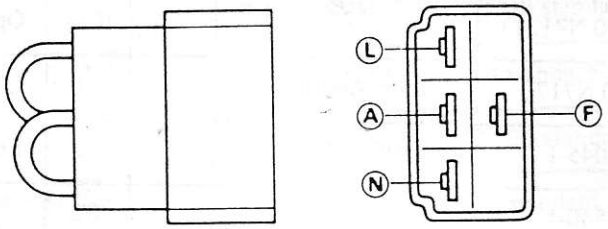
ALTERNATOR

- Two types of alternators, 60(A) and 80(A), are available as options. These alternators have increased capacity to meet rally requirements.
- When using the optional alternator, the optional fan belt (BAN FLEX belt) must also be used, as the groove in the pulley is different from that of the standard alternator.
- When installing the alternator to the block, alignment of pulleys (cranksh alternator) must be properly made.
- The through bolt is used to attach t nator to bracket.
- This alternator has an IC regulator built

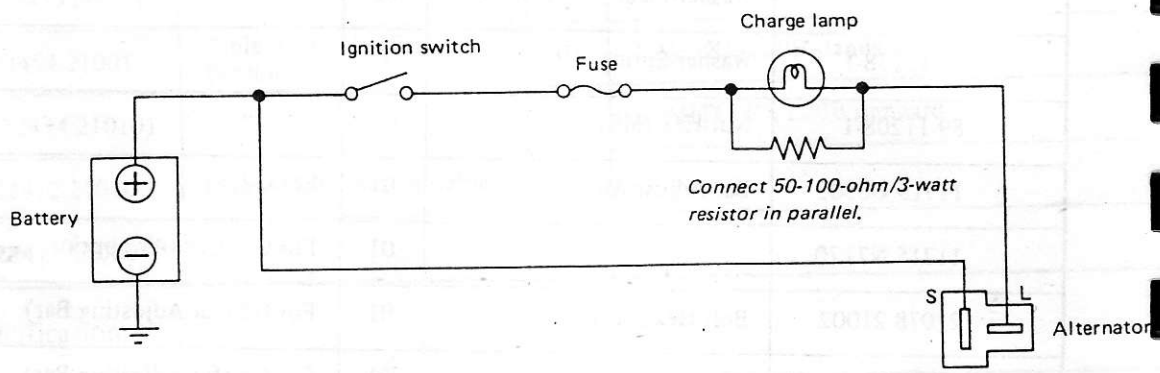
Part Number	Part Name	Q'ty	Remarks
23100 N7120	Alternator Assembly	01	Option, for G2, 80(A)
23100 N7170	"	01	Option, for G4, 80(A)
(23100 N7121)	"	(01)	Option, for G2 and G4, 60(A)
11710 N7170	Bracket-Alternator	01	L18 (4V) option, for G2 and G4
80-11045-1	Bolt-Hex (M10 x 1.5)	02	For G2 and G4
89-15540-1	Washer-Plain	02	"
89-15140-1	Washer-Spring	02	"
80-30804-1	Bolt-Alternator	01	"
89-15438-1	Washer-Plain	02	"
89-15138-1	Washer-Spring	01	"
89-11208-1	Nut-Hex (M8)	01	"
11715 U0500	Bar-Adjust Alternator	01	For G2
11715 N7170	"	01	For G4, L18 (4V) option
21078 21002	Bolt-Hex (M8)	01	For G2 (for Adjusting Bar)
81-20895-1	"	01	For G4 (for Adjusting Bar)
89-15138-1	Washer-Spring	01	For G2 and G4

* When changing the alternator with external regulator to the optional alternator with built-in IC regulator, remove the external regulator, and make the connection as shown on the next page, and use it in the bypass circuit.
* The alternator circuit diagrams (IC regulator built-in and external regulator type) are given for reference.

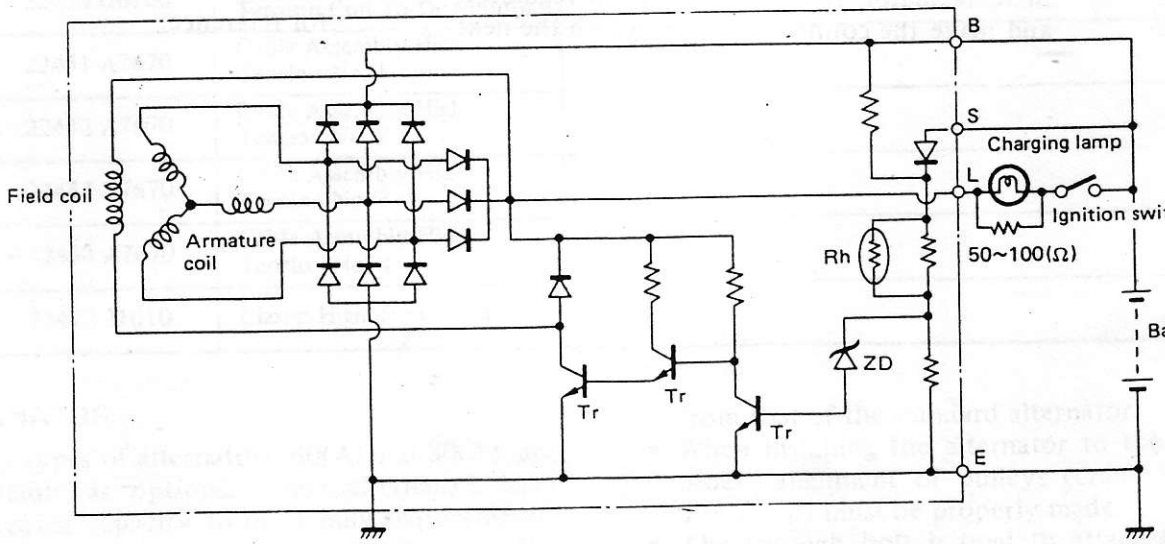
• When changing the external regulator type alternator to the IC regulator built-in type alternator, remove the external regulator, and connect in the bypass circuit using the connector as shown below. To provide prote in case of charging lamp burn out, con resistor of about 50-ohm 3-watt in parallel wit the lamp.



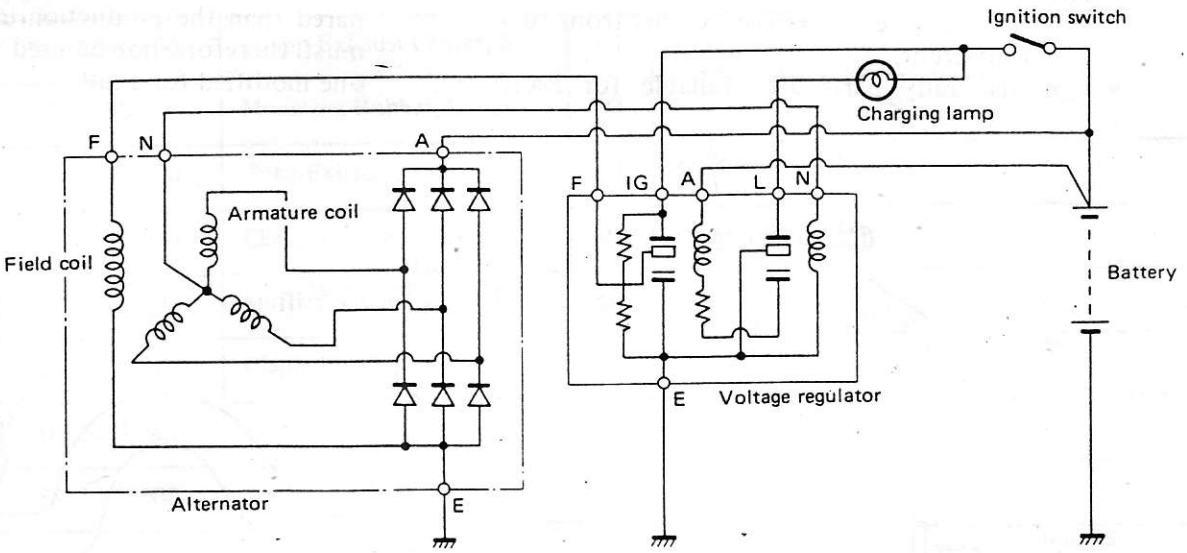
Connect Ⓐ and Ⓝ using 0.5 mm² (0.0008 sq in) wire
Connect Ⓛ and Ⓕ ——————— "



1. Circuit diagram of IC regulator built-in type alternator (HITACHI type)



2. Circuit diagram of alternator having external regulator



STARTER MOTOR

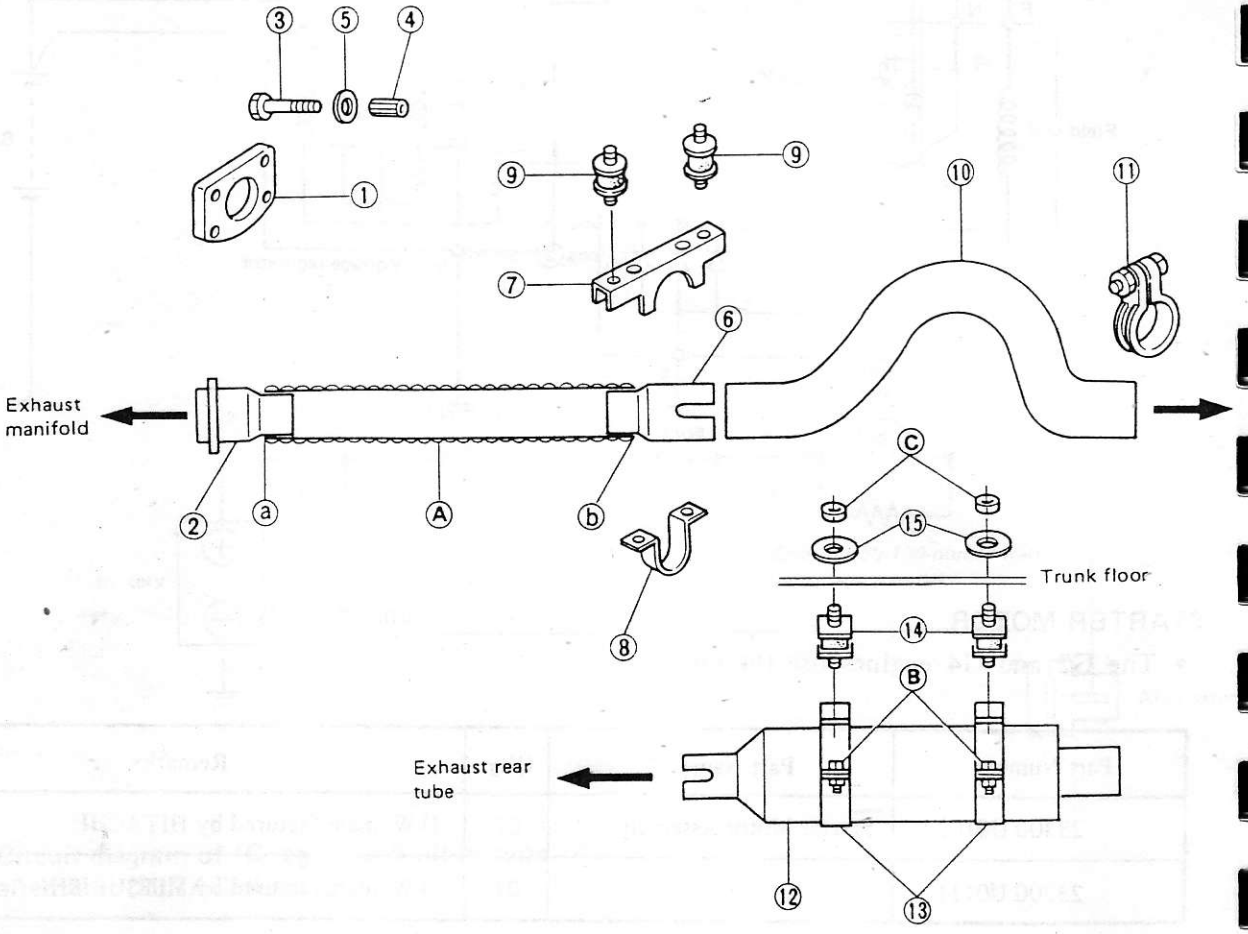
- The G2 and G4 engines use the same L-series standard units.

Part Number	Part Name	Q'ty	Remarks
23300 U0102	Starter Motor Assembly	01	1kW, manufactured by HITACHI
23300 U0111	"	01	1kW, manufactured by MITSUBISHI

- The part numbers given above are typical ones. Any starter motor, if it is for the L-series 4-cycle engine, can be used.

EXHAUST SYSTEM

- Although engine differs between G2 and G4, the exhaust system after the exhaust front tube is not different.
- Optional rally parts are available for PA10 model. User modification is necessary.
- The rally exhaust system has larger tube diameter and greater exhaust noise pared than the production unit. This rally must therefore not be used on any c one modified for a rally.



* Part Ⓐ is not included in the optional unit. Prepare a suitable pipe according to the actual dimensions of other parts. In this case, weld portions ⓐ and ⓑ rigidly.

* Stainless steel piping or bellows tube mended for part Ⓐ for higher durability.
* Properly install bolt Ⓑ and nut Ⓒ.

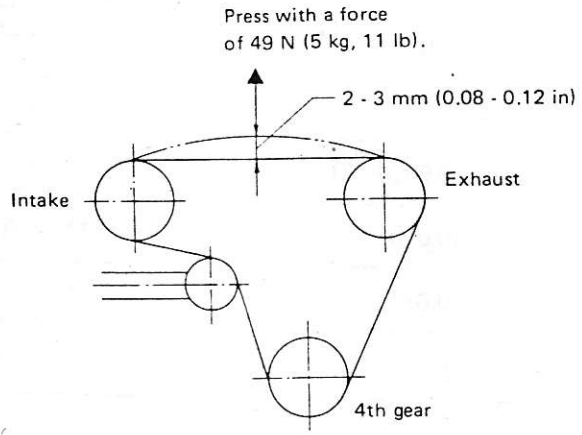
Key No.	Part Number	Part Name	Q'ty	Remarks
①	20601 A7660	Plate-Fixing Tube	01	Option
②	20604 N6320	Collar-Fixing Tube	01	710 option
③	81-30838-1	Bolt-Exhaust Flange	04	
④	20602 S0600	Nut-Exhaust	04	
⑤	89-15438-1	Washer-Plain	04	
⑥	20031 A7660	Adapter-Exhaust Center	01	Option

Key No.	Part Number	Part Name	Q'ty	Remarks
⑦	20621 A7660	Clamp-Exhaust Center, A	01	Option
⑧	20622 A7660	Clamp-Exhaust Center, B	01	"
⑨	20622 28501	Mounting Rubber, Exhaust	02	
⑩	20050 A7660	Tube-Exhaust, Rear	01	Option
⑪	20612 A7660	Clamp-Exhaust Tube	01	"
⑫	20040 A7660	Muffler Assembly	01	"
⑬	20134 A7660	Clamp-Muffler	02	"
⑭	56124 H1001	Bush-Rubber	02	
⑮	56113 73000	Washer	02	

TEST RUN PRECAUTIONS

① Adjustment of timing chain tension in G4 specification

- Apply a force of approximately 49 N (5 kg, 11 lb) as shown below; a depression of 2 - 3 mm (0.08 - 0.12 in) must result on the chain.
- An excessively tight chain may cause trouble in the 4th gear bearing of the gear train.
- After completing adjustment, be sure to tighten the lock nut.



② Ignition timing

G2 specification; B.T.D.C. 30°/4,000 rpm
G4 specification; B.T.D.C. 28°/4,000 rpm

- This setting, however, may be modified corresponding to the octane value of the gasoline which differs from place to place provided that no knocking is caused.

③ Valve clearance

G2 specification;
Intake 0.25 mm (0.010 in)
Exhaust 0.30 mm (0.012 in)
G4 specification;
Intake 0.30 mm (0.012 in)
Exhaust 0.35 mm (0.014 in)
} Adjust with engine warm.

④ Specified engine oil

Use mineral oil of SAE viscosity #30 or above in the SC, SD, SE, CC, or CD class of A.P.I. classification.

[Example]

Maker	
SHELL	X-100 (#40), MYRINA OIL (20W40), ROTELLA OIL (20W50), ROTELLA SX OIL (#30, #40)
MOBIL	MOBIL S.H.C. (10W50)
IDEMITSU	APOLLOIL FAST GT (#30, #40), APOLLOIL FAST 1000 (10W50)
CASTROL	CASTROL PRODUCT 351 (equiv. to #40), CASTROL GTX (#40)
TOTAL	ALTIGRADES GTS (20W50)

⑤ Proper oil temperature

G2 specification;
In oil pan, approx. 100°C (212°F).
Watch for temperatures above 130°C (266°F).
G4 specification;
In oil tank, approx. 80°C (176°F)

⑥ Oil level
G2 specification;
Same as L20B production engine, Max. 3.8 ℓ (4 US qt, 3-3/8 Imp qt). min. 2.8ℓ (3 US qt, 2-1/2 Imp qt).
Do not pour oil above the Max. line, or it may spout out during high speed operation.
G4 specification;
Oil should be at the middle level position in the oil tank. When checking oil level, oil temperature should exceed 50°C (122°F), and engine speed should be at 1,200 rpm.

⑦ Proper oil pressure
- Oil pressure should be 588 - 686 kPa (5.88 - 6.86 bar, 6 - 7 kg/cm², 85 - 100 psi) [at 110°C (230°F) or less] /4,000 rpm.
- The critical oil pressure is 294 kPa (2.94 kg/cm², 43 psi)/4,000 rpm. (While running)

⑧ Cooling water temperature
- The temperature should be 80 - 85°C (185°F) during actual running.

⑨ Warming up after starting the engine
- Avoid sudden engine speed increases. engine speed to a maximum of 4,000 rpm attention to the oil pressure immediately a starting.
- Do not race engine when oil and temperatures are low.

SERVICE DATA

Major clearances

Unit: mm

Item \ Engine		G2	G4
Piston-To-Cylinder Bore		0.08 - 0.09 (0.0031 - 0.0035)	←
Piston Ring End Gap	Top	0.2 - 0.4 (0.008 - 0.016)	←
	2nd	0.2 - 0.4 (0.008 - 0.016)	←
	Oil	0.3 - 0.9 (0.012 - 0.035)	←
Oil Clearance of Bearing	Main	0.055 - 0.060 (0.0022 - 0.0024)	←
	Connecting Rod	0.050 - 0.055 (0.0020 - 0.0022)	←
Valve Clearance	Intake	0.25 (0.010)	0.30 (0.012)
	Exhaust	0.30 (0.012)	0.35 (0.014)
Spark Plug Gap		0.7 - 0.8 (0.028 - 0.031)	←

Tightening torque

(1) Major tightening torque

Part \ Engine		G2			G4		
Part \ Unit		N·m	kg-m	ft-lb	N·m	kg-m	ft-lb
Cylinder Head Bolts (Tighten in three steps.)	1st time "O"	39	4.0	29	39	4.0	29
	2nd time	59	6.0	43	59	6.0	43
	Final	74	7.5	54	74	7.5	54
Connecting Rod Bolt "M" (Torque data is for reference.)		Elongation 0.13 - 0.14 mm (0.0051 - 0.0055 in) 59 - 69	6.0 - 7.0	43 - 51	← 59 - 69	6.0 - 7.0	43 - 51
Main Bearing Cap Bolt	1st time "M"	39	4.0	29	39	4.0	29
	Final	59	6.0	43	59	6.0	43
Flywheel Bolt	1st time "M"	59	6.0	43	59	6.0	43
	2nd time	88	9.0	65	88	9.0	65
	Final	118	12.0	87	118	12.0	87
Crank Pulley Bolt	"M"	118	12.0	87	177	18.0	130
Cam Sprocket Bolt	"M"	78	8.0	58	78	8.0	58
Cam Bracket Bolt	"O"	20	2.0	14	15	1.5	11
Clutch Cover Bolt		20	2.0	14	20	2.0	14
Alternator Bracket Bolt		34	3.5	25	34	3.5	25
Engine Mounting Bracket Bolt		34	3.5	25	34	3.5	25
Oil Pump Bracket Bolt		34	3.5	25	34	3.5	25

*"M": Apply "Molycote".
*"O": Apply engine oil to threaded portion.
For the connecting rod bolt, apply engine oil to the washer.

(2) Standard nuts and bolts tightening torque

Class	Nominal Diameter (mm)	Pitch (mm)	Standard Tightening Torque								
			Standard Value			Allowable Range			Max. Allowable Tightening Torque		
			N·m	kg-m	ft-lb	N·m	kg-m	ft-lb	N·m	kg-m	ft
4T	M6	1.0	3.7	0.38	2.7	3.2 - 4.3	0.33 - 0.44	2.4 - 3.2	5.0	0.51	3.7
	M8	1.25	9.1	0.93	6.7	7.8 - 10.8	0.80 - 1.1	5.8 - 8.0	12	1.2	9
		1.0	9.6	0.98	7.1	7.8 - 10.8	0.80 - 1.1	5.8 - 8.0	13	1.3	9
	M10	1.5	19	1.9	14	16 - 22	1.6 - 2.2	12 - 16	25	2.5	1
		1.25	19	1.9	14	16 - 22	1.6 - 2.2	12 - 16	25	2.6	19
	M12	1.75	31	3.2	23	26 - 36	2.7 - 3.7	20 - 27	42	4.3	3
		1.25	35	3.6	26	29 - 41	3.0 - 4.2	22 - 30	47	4.8	35
	M14	1.5	54	5.5	40	44 - 64	4.5 - 6.5	33 - 47	72	7.3	5
7T	M6	1.0	6.3	0.64	4.6	5.3 - 7.3	0.54 - 0.74	3.9 - 5.4	8.3	0.85	6.1
	M8	1.25	16	1.6	12	13 - 19	1.3 - 1.9	9 - 14	21	2.1	1
		1.0	16	1.6	12	13 - 19	1.3 - 1.9	9 - 14	22	2.2	16
	M10	1.5	30	3.1	22	25 - 35	2.6 - 3.6	19 - 26	40	4.1	3
		1.25	31	3.2	23	26 - 36	2.7 - 3.7	20 - 27	42	4.3	31
	M12	1.75	53	5.4	39	45 - 62	4.6 - 6.3	33 - 46	71	7.2	
		1.25	59	6.0	43	50 - 68	5.1 - 6.9	37 - 50	78	8.0	58
	M14	1.5	89	9.1	66	74 - 103	7.5 - 10.5	54 - 76	118	12.0	
9T	M6	1.0	9.0	0.92	6.7	7.7 - 10.4	0.78 - 1.06	5.6 - 7.7	12	1.2	9
	M8	1.25	22	2.2	16	18 - 25	1.8 - 2.6	13 - 19	29	3.0	
		1.0	24	2.4	17	20 - 27	2.0 - 2.8	14 - 20	30	3.1	22
	M10	1.5	43	4.4	32	36 - 50	3.7 - 5.1	27 - 37	58	5.9	
		1.25	45	4.6	33	38 - 52	3.9 - 5.3	28 - 38	60	6.1	44
	M12	1.75	76	7.8	56	65 - 88	6.6 - 9.0	48 - 65	98	10.0	
		1.25	84	8.6	62	72 - 97	7.3 - 9.9	53 - 72	108	11.0	80
	M14	1.5	127	13.0	94	108 - 147	11.0 - 15.0	80 - 108	177	18.0	

* The above data is applicable to the bolts having the following marks embossed on their head.

Embossed mark:

4T-4 (Material S20C or KMS)
7T-7 (Material S40C)
9T-9 (Material CR40)

BONDING AND SEALING AGENTS

Bonding and sealing agents to be used for engine assembly.

Bonding Agent or Sealing Agent	To be applied to:
Three bond No. 4	1. Front Cover ↔ Front Cover Gasket
	2. Rocker Cover ↔ Rocker Cover Gasket
	3. Oil Pan ↔ Oil Pan Gasket
	4. Both Sides of Carburetor Insulator Gasket
	5. Both Sides of Fuel Pump Blind Plate Gasket
	6. Fuel Pump Blind Plate Bolt Thread — Cylinder Head
	7. Water Temperature Gauge — Intake Manifold
	8. Blind Plug — Cylinder Head (Water)
Silicon Bond KE45	1. Crank Rear Oil Seal — Around Cylinder Block
	2. Side Oil Seal
	3. Front Cover Gasket ↔ Cylinder Block
	4. Cylinder Head Gasket — Both sides of the front portion of Cylinder Head
	5. Cylinder Head Gasket — Around the Rubber Oil Seal
	6. Oil Pan Gasket ↔ Cylinder Block
	7. Air Cleaner Body — Around the Carburetor Mounting
Araldite	1. Blind Plug — Crank
	2. Blind Plug — Oil Relief Valve
	3. Blind Plug — Oil Gallery
	4. Blind Plug — Cylinder Head (Oil)
	5. Heater Connector
	6. Pipe Connector
	7. Connector — Oil Filter Bracket (including Blind Plug)
	8. Guide — Oil Level Gauge
	9. Connector — Rocker Cover (Breather)
	10. Connector — Vacuum (Intake Manifold)
	11. Pressure Switch (Oil Filter Bracket)

Bonding Agent or Sealing Agent	To be applied to:
Screw-Lock	1. Bolt — Engine Mounting Bracket
	2. Bolt — Alterantor Bracket
	3. Nut — Air Cleaner
Retaining Compound	1. Flywheel ⟷ Rear surface of Crankshaft
	2. Alternator Bracket ⟷ Cylinder Block