ISUZU

SERVICE STANDARDS

for

GASOLINE ENGINES

ELF · ELFIN · WASP · BELLEL

BELLETT & LIGHT BUSES

ISUZU MOTORS LIMITED

TOKYO, JAPAN

Article 1. The standards contained herein define service standards for Isuzu gasolin engines (Models G 130, G 150, GL 150 and GL 201)

rticle 2. These service standards consist of items to be inspected, nominal dimensions values requiring service, standard values as assembled, limits for use and manners of service.

1. The nominal dimensions are standard values as manufactured.
2. The values requiring service are values above which service is required in performance.
3. The standard values as assembled are values to be stanards dafter the service and may be more or less different from the assembled dimensions of new vehicles.
4. The limits for use are limits above which the parts such as are worn should not be used and must be replaced.
5. The manners of service are manners of general service.

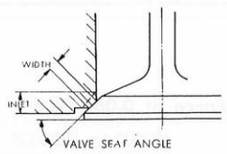
Article 3. Definitions of the terms in the table :

1. The "wear" is the difference (in the dimension of the worn part) between the dimension in the position which is not worn (or the nominal dimension in case there is no such position) and the dimension in the most worn position.
2. The "partial wear" is the difference between the largest value and the smallest value of the wear.

Article 4. When the service of the whole engine is requested, the parts needing any service should be first confirmed by the bench test or the like and the necessary minimum overhaul should be made. When the service of a part of the engine is requested, the corresponding items should be serviced in accordance with these service standards.

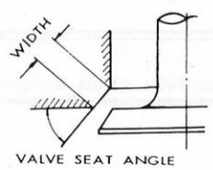
ENGINE

Items to be Inspected			Nominal Dimensions	Values Requiring Service	Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
Time for making the engine overhaul service								
Compression pressure of the cylinder (kg/cm²)	G 130	.....	11.0 kg/cm² (156) PSI	..... Less than7.7kg/cm² (109.5) PSI			Overhaul and service the engine.	Measure it at the water temperature of 75°C and Engine spees is about 300 r.p.m under the fully-open throttle valve.
	G 150 (Comp ratio 7.5 : 1)	.....	11.0	..... Less than 7.7				
	G 150 (Comp ratio 8.5 : 1)	.....	12.0 (170.7)	..... Less than 8.4 (119.5)				
	GL 150	.....	10.2 (145)	..... Less than 7.2 (102)				
	GL 201KA (Comp ratio 8.0 : 1)	.....	13.2 (188)	..... Less than 9.3 (132)				
	GL 201KB (Camp ratio 8.5 : 1)	.....	14.0 (199)	..... Less than 9.8 (139)				
Fuel consumption rate (km/l)		.....	100%	..... Less than 60%			Ditto.	Actual figure at time of new car shall be regarded as 100 %.
Engine oil consumption rate (km/l)		.....	100%	..... Less than 50%				
Engine body (Cylinder block)								
Wear of the inside diameter of the cylinder measurement position B : 7.5 mm (G130, G150) B : 10mm (GL150, GL201)	G 130	.....	75 ϕ mm (2.9550) in	More than 0.2 (0.0079)			Rebore it.	When it is not rebored, remove the step of upper part.
	G 150	.....	79 ϕ (3.1126)					
	GL 150	.....	78 ϕ (3.0732)					
	GL 201	.....	83 ϕ (3.2702)					
Reboring	G 130	.....	75 ϕ (2.9550)		0.25 mm (0.0099) in 0.50 (0.0197) 0.75 (0.0296) 1.00 (0.0394) 1.25 (0.0493) 1.50 (0.0591)	1. When it has been rebored, hone it. 2. Keep the inside diameters of the respective cylinders to be of the same nominal dimension. 3. Keep the inside diameter difference among the respective cylinders to be less than 0.03 mm after honing. (0.0012 in)		
	G 150	.....	79 ϕ (3.1126)					
	GL 150	.....	78 ϕ (3.0732)					
	GL 201	.....	83 ϕ (3.2702)					
Inside diameter difference in each part of the cylinder after honing					Less than 0.02 (0.0008) in			
Maximum measure in the inside diameter of the cylinder	G 130	.....	75 ϕ (2.9550)		76.7 ϕ mm (3.0220) in		Insert the liner.	Force fit 0.06～0.08 (0.0024～0.0032)
	G 150	.....	79 ϕ (3.1126)		80.7 ϕ (3.1796)			
	GL 150	.....	78 ϕ (3.0732)		79.7 ϕ (3.1402)			
	GL 201	.....	83 ϕ (3.2702)		84.7 ϕ (3.3372)			

Items to be Inspected		Nominal Dimensions	Values Requiring Service
Outside diameter of the liner			
Maximum measure in the diameter of the base hole of the cylinder	G 130	75 ϕ mm (2.9550) in	
	G 150	79 ϕ (3.1126)	
	GL 150	78 ϕ (3.0732)	
	GL 201	83 ϕ (3.2702)	
Deformation of the upper surface of the cylinder			More than 0.2 mm (0.0079) in
Hydraulic pressure test for 3 minutes (kg/cm^2)			
Engine body (Cylinder head)			
Sinking of valve seat	In case insert is not provided — for the inlet and exhaust valves	1 mm (0.0394) in	2.0 mm (0.0788) in
	In case insert is provided — for the inlet valve	1	2.0
	In case insert is provided — for the exhaust valve	1.5 (0.0591)	2.0

Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
78.750~78.725 (3.103 ~3.102) in 79.000~78.975 (3.1 13 ~2.7033)	for G 130	When it is rebored using the inserted liner, the oversize should be under 1 mm. (0.0394 in)	
82.750~82.975 (3.112~ 3.270) 83.000~82.725 (3.27 ~ 3.26)	for G 150		
	78.8 ϕ mm (3.1047) in	Replace the cylinder block.	
	82.8 ϕ (3.2623)		
	79.7 ϕ (3.1402)		
	84.7 ϕ (3.3372)		
Less than 0.05 mm (0.0020) in		Correct it by grinder	Maximum correction 0.4 (0.1576)
5 kg/cm^2 (71) PSI		When there is any water leakage, correct or replace the rubber packing.	
		Insert the washer of a thickness equivalent to the sinking beneath the valve spring.	Valve seat angle : 45°

Items to be Inspected			Nominal Dimensions	Values Requiring Service	Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
Sinking of valve seat	In case insert is not provided	for the inlet and exhaust valve	·····	1 mm (0.0394) in ····· 2.5 mm (0.0985) in				
	In case insert is provided	for the inlet valve	·····	1 ····· 2.5			Change the insert ····· Valve seat angle : 45°	
		for the exhaust valve	·····	1.5 (0.0591) ····· 3.0 (0.1182)				
Valve seat width	without insert	for the inlet and exhaust valves	G 130, G 150, GL 150, GL 201	1.4 (0.0552) — More than 2.0 (0.0788)	1.2～1.5 mm (0.04728～0.0591) in			
	with insert	for the inlet valve	G 130, G 150, GL 150, GL 201	More than 2.0	1.2～1.5		Correct it by valve seat cutter. ····· Valve seat angle : 45°	
		for the exhaust valve	G 130, G 150, GL 150, GL 201	More than 3.0 (0.1182)	2.0～2.2 (0.0788～0.0867)			
Deformation of the fitting surface				More than 0.2		Less than 0.05 (0.0020)	Correct it by grinder. ····· Maximum correction : 0.5	
Deformation of the fitting surface for the manifold				More than 0.4 (0.0158)		Less than 0.05	Correct it.	
Female screw of the spark plug			14 ϕ (0.5516)	Pitch : 1.25 (0.0493)				
Hydraulic pressure test for 3 minutes (kg/cm^2)					5 kg/cm^2 (71) PSI		When water leaks, correct or replace the cylinder head.	
Fastening torque of the cylinder head bolts (m-kg)			G 130, G 150, GL 150, GL 201		6～7 m-kg (43～51) ft-lb, 6～7, 6～7, 11～12 (79.57～87)		Fasten at same torque.	



Items to be Inspected		Nominal Dimension	Values Requiring Service	Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
Main moving parts (Piston)							
Clearance between the cylinder and the piston in the skirt part				0.004 mm (0.0002) in			Perform measurement at normal temperature.
Oversize of the piston	G 130	75 ϕ mm (2.9550) in			0.125 (0.0050) in (for G130, G150)		
	G 150	79 ϕ (3.1126)			0.25 (0.0099) in		
					0.50 (0.0197) in		
					0.75 (0.0296) in		
					1.00 (0.0394) in		
					1.25 (0.0493) in		
	GL 150	78 ϕ (3.0732)			1.50 (0.05910) in		
	GL 201	83 ϕ (3.2702)					
Main moving parts (Piston pin)							
Wear of the pin	G 130	22 ϕ mm (0.8668) in		21.97 ϕ mm (0.8656) in		Replace the pin.	
	G 150	22 ϕ		21.97 ϕ			
	GL 150	22 ϕ		21.97 ϕ			
	GL 201	25 ϕ (0.9850)		24.97 ϕ (0.9832)			
Dimensional allowance between the piston pin and the piston	G 130			0.004 mm (0.000158) in	When engine knockings is remarkable, either the part should be corrected or replaced.	So that pin may be strongly forced in when piston is warmed to 70~100°C.	
	G 150			0.004			
	GL 150			0.007 (0.0003)			
	GL 201			0.004			
Main moving parts (Piston ring)							
Clearance between the opposed ends of the piston ring (in the gauge)	1st compression ring	G 130		0.2~0.4 mm (0.0079~0.0158) in	1.5 mm (0.0591) in		
	2nd compression ring			0.2~0.4	1.5		
	Oil scraper ring			0.2~0.4	1.0 (0.0394)		

Items to be Inspected		Nominal Dimensions ..... Values Requiring Service	Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
Clearance between the opposed ends of the piston ring (in the gauge)	1st Compression ring	G 150	0.3～0.5 mm (0.0118～0.0197) in	1.5 mm (0.0591) in	Replace it. In case the engine is overhauled, replace the ring.	Gauge inside diameter :
	2nd compression ring		0.2～0.4 (0.0079～0.0158)	1.5		G 130 75.00 ϕ mm (2.9527) in
	Oil scraper ring		0.2～0.4	1.0 (0.0394)		G 150 79.00 ϕ (3.1102)
	1st compression ring	GL 150	0.2～0.4	1.5		GL 150 78.00 ϕ (3.0709)
	2nd compression ring		0.1～0.3 (0.0039～0.0118)	1.5		GL 201 83.00 ϕ (3.2677)
	3rd, 4th oil scraper rings		0.1～0.3	1.0		
	1st compression ring	GL 201	0.2～0.4	1.5		
	2nd, 3rd compression rings		0.1～0.3	1.5		
	4th oil scraper ring		0.1～0.3	1.0		
Clearance between the opposed ends of the piston ring (free)	1st, 2nd compression rings	G 130	9 mm (0.3543) in			..... Reference Value.
	Oil scraper ring		9			
	1st, 2nd compression rings	G 150	9			
	Oil scraper ring		12 (0.4724)			
	1st, 2nd compression rings	GL 150	12			
	3rd, 4th compression rings		10 (0.3940)			
	1st, 2nd, 3rd compression rings	GL 201	9.5～12.5 (0.3740～0.4921)			
	4th oil scraper ring		9.0～12.0 (0.3543～0.4724)			
			9.5～12.5			
			8.0～11.0 (0.3150～0.4331)			
Tension (kg)	Compression ring	G 130	0.70～1.10 kg (1.54～2.42) lb	0.5 kg (1.10) lb	Replace it	
		G 150	0.84～1.26 1.85～2.78)			
		GL 150	0.8 ～1.2 (1.76～2.65)			
		GL 201	1.0 ～1.4 (2.20～3.09)			
	Oil ring	G 130	0.88～1.32 (1.94～2.91)	0.6 (1.32)		
		G 150	0.84～1.26 (1.85～2.78)			
		GL 150	1.0 ～1.45 (2.20～3.20)			
		GL 201	1.2 ～1.65 (2.65～3.64)			

Items to be Inspected		Nominal Dimensions	Values Requiring Service	Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
Clearance between the ring groove width and the compression ring	G 130 GL 150 GL 201 G 150			0.05 mm (0.0020) in 0.06 (for G 150) (0.0024)	0.3 mm (0.0118) in	Replace the ring or the piston.	Fit with marked surface above.
Clearance between the ring groove width and the oil scraper ring	G 130 GL 150 GL 201 G 150			0.04 (0.0016) 0.07 (for G 150) (0.0028)	0.15 (0.0059)		
Oversize of the ring	G 130 G 150 GL 150 GL 201	75 ϕ mm (2.953) in 79 ϕ (3.110) 78 ϕ (3.071) 83 ϕ (3.268)		0.125 (0.0049) 0.25 (0.0090) 0.50 (0.0197) 0.75 (0.0296) 1.00 (0.0394) 1.25 (0.0492) 1.50 (0.0591)			
Setting position of the opposed ends of each ring						Alternately at 180° Alternately at 120° (for GL 201)	
Main moving part (Connecting rod)							
Clearance between the small end bush and piston pin	G 130 G 150 GL 150 GL 201		More than 0.05 mm (0.0020) in	Less than 0.016 mm (0.0006) in Less than 0.016 Less than 0.011 (0.0004) Less than 0.013 (0.0005)		Replace the pin or bush.	As the rod is lightly revolved with the big end held.
Play in the forward and rearward direction between the small end and piston boss (on one side)	G 130 G 150 GL 150 GL 201			1.7 mm (0.0670) in 1.7 1.4 (0.0551) 1.0 (0.0394)			Referance values.
Projecting of the connecting rod bearing						In case the connecting rod bearings are inserted into the connectings rod and cap, use the bearings projecting more than the crush and the close contact of the back surface.	

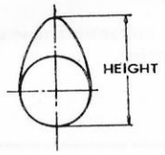
Items to be Inspected		Nominal Dimensions	Values Requiring Service
Clearance between the connecting rod bearing and crankpin	G 130 G 150 GL 150 GL 201		More than 0.12 mm (0.0047) in
Contact of the connecting rod bearing with the crankpin			
Play in the forward and rearward direction of the big end	G 130 G 150 GL 150 GL 201		More than 0.35 (0.0138)
Connecting rod length, center to center of bearings	G 130 G 150 GL 150 GL 201	..... 128 mm (5.0394) in ..... 128 ..... 146 (5.7480) 155 (6.1024)	
Twist of the rod (per 100 mm) (Per 3.9400 in)	G 130 G 150 GL 150 GL 201		More than 0.2 (0.0079)
Parallelism of the piston-pin to the crankpin (Per 100 mm) (Per 3.9400 in)	G 130 G 150 GL 150 GL 201		More than 0.15 (0.0059)
Weight difference after the assembly of the piston (g)	G 130 G 150 GL 150 GL 201		

Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
0.05 mm (0.0020) in 0.05 0.04 (0.0016) 0.06 (0.0024)		Replace the bearing.	
		Correct the bearing in case the contact is bad.	
0.27 (0.0106) 0.27 0.20～0.32 (0.0079～0.0126) 0.20～0.25 (0.0079～0.0098)		Replace the connecting rod.	
			Reference value.
Less than 0.1 (0.0039) Less than 0.1 Less than 0.08 (0.0032) Less than 0.08		Correct it or replace the connecting rod.	
Less than 0.1 Less than 0.1 Less than 0.05 (0.0020) Less than 0.05		Ditto.	
Less than 14 g (0.494) oz Less than 14 Less than 20 (0.705) Less than 20			Take care of the grade in weight of the connecting rod.

Items to be Inspected		Nominal Dimensions ····· Values Requiring Service	Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
Tightening torque of the connecting rod bolt (m-kg)	G 130		2.9～3.4 m-kg (21～24.6) ft-lb		Fasten the bolt through painting it with oil.	
	G 150		2.9～3.4			
	GL 150		2.4～2.9 (17.6～21)			
	GL 201		6.5～7.0 (47～51)			
Undersize of the connecting rod bearing			0.125 mm (0.0049) in 0.25 (0.0098) 0.50 (0.0020) 0.75 (0.0197) 1.00 (0.0394) 1.25 (0.0492)			
Main moving part (Crankshaft)						
Partial wear of the main journal and pin		More than 0.05 mm (0.0020) in			Correct it by crank grinder.	
Finishing precision of the main journal and pin (taper and ovality)	G 130		Less than 0.01 mm (0.0004) in			
	G 150		Less than 0.01			
	GL 150		Less than 0.01			
	GL 201		Less than 0.02 (0.0008)			
Projection of the main bearing metal					Use the main bearing metal having the proper crush and projecting. See that the back surface is in close contact.	
Main bearing clearance with the journal	G 130	More than 0.12 (0.0047)	0.05 (0.0020)	0.05	Replace the main journal bearing.	
	G 150		0.05			
	GL 150		0.06 (0.0024)	0.06		
	GL 201		0.06			
Wear of the main journal	G 130	56 ϕ (2.2047)	54.75 ϕ mm (2.1555) in		Replace the crankshaft.	
	G 150	56 ϕ	54.75 ϕ			
	GL 150	57.5 ϕ (2.2638)	56.50 ϕ (2.2244)			
	GL 201	65.0 ϕ (2.5590)	63.68 ϕ (2.5071)			

Items to be Inspected		Nominal Dimensions	Values Requiring Service
Wear of the pin	G 130	49 ϕ mm (1.9291) in	
	G 150	49 ϕ	
	GL 150	48.0 ϕ (1.8898)	
	GL 201	53.0 ϕ (2.0866)	
Undersize of the journal bearing	G 130		
	G 150		
	GL 150		
	GL 201		
Play in the forward and rearward direction of the crankshaft	G 130		More than 0.3 mm (0.0118) in
	G 150		
	GL 150		
	GL 201		
Deflection of the crankshaft			More than 0.1 (0.0039)
Starting ring gear			
Balancing (g-cm)			
Torque loading of the crank journal bearing bolt (m-kg)			
Valve system (Camshaft)			
Partial wear of the journal	G 130	45 ϕ mm (1.7716) in	More than 0.05 mm (0.0020) in
	G 150	45 ϕ	
	GL 150	44.39 ϕ (1.7476)	
	GL 201	45 ϕ	

Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
	47.75 ϕ mm (1.8799) in	Replace the crankshaft.	
	47.75 ϕ		
	47.00 ϕ (1.8504)		
	51.68 ϕ (2.0347)		
0.125 mm (0.0049) in			
0.25 (0.0098)			
0.50 (0.0197)			
0.75 (0.0295)			
1.00 (0.0394)			
1.25 (0.0492)			
0.15 (0.0059)		Replace the thrust bearing.	
0.15			
0.10 (0.0039)			
0.10			
Less than 0.05 (0.0020)		Correct the deflection.	····· Do not heat.
		In case edges of the cog are warped, plane them off, and in case there is any remarkable damage, change the gear position or replace it.	
Less than 36 g-cm (0.50) oz-in		See that it is statically and dynamically balanced.	
9～10 m-kg (65～72) ft-lb			
Less than 0.015 mm (0.0006) in		Correct it.	

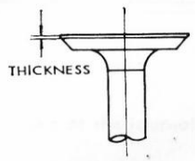
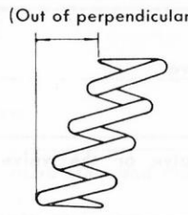
Items to be Inspected		Nominal Dimensions	Values Requiring Service
Bearing clearance with the journal	G 130 G 150 GL 150 GL 201		More than 0.15 mm (0.0059) in
Wear of the journal	G 130	45 ϕ mm (1.7717) in	
	G 150	45 ϕ	
	GL 150	44.39 ϕ (1.7476)	
	GL 201	45 ϕ	
Undersize of bearing			
Height of the cam 	G 130	35.49 ϕ (1.3972)	
	G 150	36.06 ϕ (1.4197)	
	GL 150	35.49 ϕ	
	GL 201	35.49 ϕ	
Driving gear of the oil pump			
Deflection of the camshaft			More than 0.1 (0.0039)
Play in the forward and rearward direction of the camshaft.			More than 0.2 (0.0079)

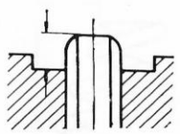
Valve system (Valve)

Wear of the inlet valve stem	8.0 ϕ mm (0.3150) in	
Wear of the exhaust valve stem	8.0 ϕ	
Clearance between the inlet valve stem and the valve guide		More than 0.2 mm (0.0079) in

Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
0.06 mm (0.0024) in 0.06 0.05 (0.0020) 0.05		Replace the Bearing.	
	44.60 ϕ mm (1.7559) in 44.60 ϕ (1.7559) 44.00 ϕ (1.7323) 44.60 ϕ (1.7559)	Replace the camshaft.	
0.25 (0.0098)			
35.00 (1.3780) 35.56 (1.4000) 35.00 35.00		Replace the camshaft	Correct the slightly stepped and worn part of the cam.
		In case there is any remarkable damage, replace the camshaft.	
Less than 0.05 (0.0020)			
0.08 (0.0032)		Replace the thrust plate.	

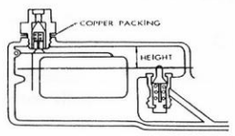
	7.88 ϕ mm (0.3102) in	Replace the valve.	
	7.85 ϕ (0.3091)		
0.05 mm (0.0020) in		Replace the valve or the valve guide.	

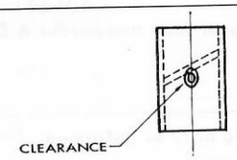
Items to be Inspected			Nominal Dimensions	Values Requiring Service	Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
Clearance between the exhaust valve stem and the valve guide				More than 0.25 mm (0.0098) in	0.08 mm (0.0012) in		Replace the valve or the valve guide.	
Valve thickness	Inlet and exhaust valves	G 130 G 150	1.3 ϕ mm (0.0512) in			1.0 ϕ mm (0.0394) in	Replace the valve.	
	Inlet valve	GL 150	1.3 ϕ			1.0 ϕ		
	Exhaust valve	GL 150	1.3 ϕ			1.0 ϕ		
	Inlet valve	GL 201	1.5 ϕ (0.0591)			1.2 ϕ (0.0472)		
	Exhaust valve	GL 201	1.3 ϕ			1.0 ϕ		
Outer valve spring								
Spring force in kg, as compressed to the fitted length of :	40 mm (1.5760) in, G 130		26.00 kg (57.3) lb		22.1 kg (48.7) lb			
	40 mm, G 150		26.00		22.1			
	38 mm (1.4972) in, GL 150-101 ('61 & previous year models)		15.65 (34.5)		13.3 (29.3)			
	40 mm, GL 150-103 ('62 & subsequent year models)		26.00		22.1			
	40 mm, GL 201		28.00 (61.7)		24.0 (52.9)			
Free height	G 130		53.0 mm (2.0866) in		51.1 mm (2.0118) in			
	G 150 Low compression		53.0		51.1			
	G 150 High compression		54.3 (2.1378)		52.1 (2.0512)		Replace the valve spring.	
	GL 150-101 ('61 & previous year models)		42.47 (1.6720)		41.2 (1.6220)			
	GL 150-103 ('62 & subsequent year models)		53.0		51.4 (2.0236)			
	GL 201		59.7 (2.3504)		57.0 (2.2441)			
Tolerance of being right angle		G 130			2.0 (0.0787)			
		G 150			2.0			
		GL 150			1.0 (0.0394)			
		GL 201			1.0			

Items to be Inspected		Nominal Dimensions	Values Requiring Service	Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
Inner valve spring							
Spring force in kg, as compressed to the fitted length of :	38 mm, (1.50 in) G 130	.....	10.80 kg (23.81) lb		9.20 kg (20.3) lb	Replace the valve spring.	
	38 mm, G 150 Low compression	.....	10.80		9.20		
	38 mm, G 150 High compression	.....	12.90 (28.4)		11.0 (24.3)		
	35 mm, (1.38 in) GL 150-101 ('61 & previous year models)	.....	8.41 (18.5)		7.15 (15.8)		
	38 mm, GL 150-103 ('62 & subsequent year models)	.....	10.80		9.20		
	38 mm, GL 201	.....	15.00 (33.1)		13.30 (29.3)		
Free height	G 130	.....	48.4 mm (1.9055) in		46.5 mm (1.831) in		
	G 150 Low compression	.....	48.4		46.5		
	G 150 High compression	.....	52.5 (2.0669)		50.4 (1.9842)		
	GL 150-101 ('61 & previous year models)	.....	40.73 (1.6035)		39.5 (1.5551)		
	GL 150-103 ('62 & prev.ous year models)	.....	48.40		47.0 (1.8504)		
	GL 201	.....	52.60 (2.0709)		50.5 (1.9882)		
Tolerance of being right angle	G 130				2.0 (0.0788)		
	G 150				2.0		
	GL 150				1.0 (0.0394)		
	GL 201				1.0		
Dimensional allowance between the valve guide and the cylinder head				0.02 mm (0.0008) in			Paint the valve guide with oil and press it in.
Height of the valve guide above the cylinder head			12 (0.4724)				Reference value.

Items to be Inspected		Nominal Dimensions	Values Requiring Service	Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
Clearance between the valve and the rocker arm (while cold)	Inlet valve						
	G 130			0.30 mm (0.0118) in	0.30	Adjust the clearance.	
	G 150						
	GL 150			0.35 (0.0138)	0.35		
	GL 201						
	Exhaust valve						
	G 130						
	G 150						
	GL 150			0.35			
	GL 201						
Contact surface between the valve and the rocker arm						In case there is any deformation or wear, make the correction.	
Valve system (Rocker arm)							
Clearnce between the rocker arm and the shaft	G 130		More than 0.2 mm (0.0079) in	0.03 mm (0.0012) in	0.03	Replace the rocker arm or the shaft.	
	G 150						
	GL 150			0.04 (0.0016)	0.04		
	GL 201						
Wear of the rocker arm shaft	G 130	..... 19 ϕ mm (0.7480) in			18.85 ϕ mm (0.7421) in	Replace it.	
	G 150	..... 19 ϕ			18.85 ϕ		
	GL 150	..... 17 ϕ (0.6693)			16.85 ϕ (0.6634)		
	GL 201	..... 17 ϕ			16.85 ϕ		
Valve system (Tappet)							
Clearance between the tappet and the cylinder body			More than 0.1 mm (0.0039) in	0.03 mm (0.0012) in			
Wear of the tappet	G 130	22 ϕ mm (0.8661) in			21.95 ϕ mm (0.8642) in	Replace the tappet.	
	G 150				21.95 ϕ		
	GL 150				22.17 ϕ (0.8728)		
	GL 201				21.95 ϕ (0.8642)		
Contact surface between the tappet and the cam						In case of the deformation or wear, make the correction.	

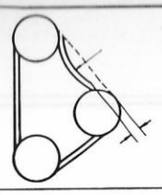
Items to be Inspected		Nominal Dimensions ..... Values Requiring Service	Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
Valve system (Push rod)						
Contact surface of the both ends of push rod					In case of damage or wear, make correction or replace the push rod.	
Bend		More than 0.3 mm (0.0118) in			Replace the push rod.	
Lubricating system (Oil pressure)						
Lubricating oil pressure of 14,000 r.p.m. (kg/cm^2)	G 130	Less than 2.0 kg/cm^2 (28) PSI	3～3.5 kg/cm^2 (42.7～49.8) PSI		Eliminate the oil leakage and clogging in any part.	
	G 150		3～3.5			
	GL 150-103 ('62 & previous year models)		3～3.5			
	GL 150-104 ('63 & subsequent year models)		4～4.5 (56.9～64)			
	GL 201		4～4.5			
Oil pump and oil pressure regulator						
Clearance between the rotor, vane and cover.	G 130	More than 0.15 mm (0.0059) in	0.02～0.06 mm (0.0008～0.0024) in		Replace the vane or the rotor or the cover.	
	G 150		0.02～0.06			
	GL 150		0.02～0.07 (0.0008～0.0028)			
	GL 201		0.02～0.07			
Clearance between the tip of rotor and the vane.	G 130		Less than 0.15 (0.0059)		Make the correction or the replacement.	
	G 150		Less than 0.15			
	GL 150		0.02～0.14 (0.0008～0.0055)			
	GL 201		0.02～0.14			
Delivery in l/min (Pump revolutions : 1,400 r.p.m. / Oil pressure : 4 kg/cm^2 / Oil temperature : 50°C)	G 130		More than 8.25 l/min (2.18) US gal/min		Correct it or replace it.	
	G 150		More than 8.25			
	GL 150		More than 8.25			
	GL 201		Less than 10.16 (2.68)			
Clearance between the pump-rotor shaft and the pump body.		More than 0.2 (0.0079)	0.04 (0.0016)			

Items to be Inspected		Nominal Dimensions	Values Requiring Service	Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
Clearance between the pump body and the vane				0.20～0.27 mm (0.0079～0.0106) in			
Diameter of the pump-rotor shaft	G 130 G 150 GL 150	13 ϕ mm (0.5118) in					Reference values.
	GL 201	13 ϕ					
Wear of the connecting parts of the pump-rotor shaft (to the pinion and the rotor through pins)						In case of the remarkable wear, correct it.	
Pressure at the beginning of the action of the oil pressure regulating valve (kg/cm^2)	G 130			4.5 kg/cm^2 (64) PSI			
	G 150			4.5			
	GL 150-103 ('62 & previous year models)			3.5 (49.8)			
	GL 150-104 ('63 & subsequent year models)			4.5			
	GL 201			4.5			
Clogging of oil filter element						In case of being dirty or deformed, replace the filter element.	
Fuel system (Piping and others)							
Clogging, cracking, loose Connection and faulty gasket of the fuel pipes						Correct any of them.	
Clogging, or damage of the fuel filtering screen						Clean or correct the screen.	
Dirt or damage in the fuel tank						Clean or correct the fuel tank.	
Air cleaner						Disassemble and clean it or renew the element.	
Fuel system (Carburetor)							
Height over the fuel level up to the ceiling of the float chamber (fuel pressure : about 0.2 kg/cm^2)	 G 130			23 mm (0.9055) in			
	G 150			19 (0.7480)			
	GL 150			16 (0.6299)			
	GL 201			15 (0.5905)			

Items to be Inspected		Nominal Dimension	Values Requiring Service
Power jet valve touch (suction pressure)	G 130		
	G 150		
Power jet valve touch open angle of the (primary throttle valve)	GL 150		
	GL 201		
At the beginning of opening the secondary throttle valve (open angle of the primary throttle valve)	G 130		
	G 150		
	GL 150		
	GL 201		
First starting opening	G 130		
	G 150		
	GL 150		
	GL 201		
Clearance between the carburetor and the throttle valve shaft 			More than 0.2 mm (0.0079) in
Nozzle jet idle needle valve			
Position of the idle needle valve (from full close)			
Delivery of the accelerating pump at 10 strokes (cc)	G 130		
	G 150		
	GL 150	2D-32AL	
	GL 201KA	2D-32AM	
	GL 201KB	2D-32AL	
	GL 201KB	2D-32AK	
Fuel system (Fuel pump)			
Contact surface of the rocker arm with the rocker ring			

Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
—60 mm Hg			
50°			(Reference value)
46°			
46°			
49°			
50°			(Reference value)
53°			
45°			
14.0°			
12.5°			
12.5°			
7.0°			
	Less than 0.06 mm (0.0024) in	Correct it or replace the valve shaft.	
		Disassemble and clean the carburetor. When it's damaged correct or replace it.	
	Turn it back by 1-1/2 to 1-3/4	Adjust it.	
2.5 cc (0.15) in^3 3 (0.18) 3.5 (0.21) 4.5 (0.28)			
0～2 (0～0.12) 2.8～5.6 (0.16～0.34) 4.2～7.8 (0.26～0.48)		Correct it.	
4 (0.24), 5 (0.31), 7 (0.43)			
2 (0.12), 4 6 (0.37)			
1 (0.06), 3 (0.18), 5			
1 3 5			
		Correct it.	

Items to be Inspected		Nominal Dimensions ..... Values Requiring Service	Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
Performance						
Revolution speed of the cam : 1,000 r.p.m. (G130, G150) 1,100 r.p.m. (GL150, GL201)	Delivery in cc/min	G 130	More than 300 cc/min (0.63) US Pints/min			
		G 150	More than 300			
		GL 150	More than 800 (1.7)			
		GL 201	More than 800			
Head of inhaling : 500 mm high (19.6850) in Head of delivering : 500 mm high (19.6850) in	Delivery pressure as closed up in kg/cm²	G 130	0.2～0.25 kg/cm² (2.8～3.6) PSI	Make correction or replacement of parts.		
		G 150	0.2～0.25			
		GL 150	0.13～0.18 (1.9～2.6)			
		GL 201	0.13～0.18			
Cooling system (Radiator)						
Corrosion, damage or incomplete connection of the radiator and water pump					Correct it.	
Leakage test at the air pressure (kg/cm²)			0.5 kg/cm² (7.1) PSI		Correct the radiator when bubbles come out.	
Core operating rate		Less than 80 %			Correct it.	
Pressure at the beginning of the action of the pressure valve (kg/cm²)			0.44～0.50 kg/cm² (6.3～7.1) PSI			Reference value.
Pressure at the beginning of the action of the negative pressure valve (kg/cm²)			0.04～0.05 (0.57～0.71)			Reference value.
Cooling system (Water pump)						
Stagger of the water pump ball bearing				0.2 mm (0.008) in	Replace it.	
Delivery at normal temperature in l/mim (Pump : 3,000 r.p.m. Head : above 2.5 m (8.2) ft)		G 130	50 l/min (13.2) U.S. gal/min			
		G 150	50			
		GL 150	60 (15.9)			
		GL 201	60			

Items to be Inspected		Nominal Dimensions ..... Values Requiring Service
Looseness of the fan belt		
Clearance between the water pump impeller blade and the cover	G 130 G 150 GL 150 GL 201	
Temperature at the beginning of the action of the thermostat (at the atmospheric pressure)		
Temperature at the full-opening of the thermostat (at the atmospheric pressure)		
Fastening space between fan center and bearing shaft	G 130 G 150 GL 150 GL 201	
Fastening space between blade and pump bearing shaft		
Fastening space between the bearing and water pump body		
Electric system (Pilot lamp indication)		
Pilot lamp showing		
Electric system (Wiring)		
Loose connection, cut or damaged coating of the electric wiring		
Electric system (Ignition system)		
Spark plug gap		
Breaker gap of the distributor contact points		
Electric capacity of the condenser		0.22 μF

Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
About 15 mm (0.59)in		Adjust it.	
0.7～1.1 mm (0.0276 ～0.043) in	0.7～1.1	In case the impeller blade is in contact with the pump body, replace the blade and the bearing.	
	1.2～1.3 (0.0433～0.0512)		
	1.2～1.3		
75°±2.5°C (76.5°±1.5°C)			Values in parenthesis are for the wax type.
80°±2.5°C (90°C)			
0.009～0.045 mm (0.0004～0.0018) in			
0.015～0.050 (0.0004～0.002)			
0.009～0.045			
0.009～0.025 (0.0004～0.001)			
		If it is abnormal at usual engine speed, correct the electric system.	
		Correct it.	
0.7～0.8 mm (0.0276～0.0315) in		Correct it.	
0.5 (0.0197)			
	0.18 μF	Renew it.	

Items to be Inspected	Nominal Dimensions	Values Requiring Service
Spring force of the contact points (kg)	0.5～0.65 kg (1.1～1.43) lb	
Breaker gap of the spark from the primary ignition coil to the secondary (at normal temperature and in the atmosphere)		
Electric system **Angle advance unit (Vacuum type)**		
Degree of vacuum at the beginning of operation — G130, G150		
Degree of vacuum at the beginning of operation — GL150-101 ('61 & previous year models)		
Degree of vacuum at the beginning of operation — GL150-103 ('62 & subsequent year models)		
Degree of vacuum at the beginning of operation — GL201KA, GL201KB		
Advance angle at vacuum degree of 150 mmHg (5.9 in Hg) — G130, G150 (Hitachi D415～070)		
Advance angle at vacuum degree of 250 mmHg (9.8 in Hg) — G130, G150 (Hitachi D415～070)		
Advance angle at vacuum degree of 300 mmHg (11.8 in Hg) — GL150-101 ('61 & previous year models) Hitachi D413-01		
Advance angle at vacuum degree of 350 mmHg (13.8 in Hg) — GL150-103 ('62 & subsequent year models) Hitachi D415-06, Nippon Denso 29100-042-0		
Advance angle at vacuum degree of 280 mmHg (11.0 in Hg) — GL201KA, GL201KB		
Electric system **Angle advance unit (Centrifugal type)**		
Revolution number at the beginning of operation — G130, G150 (Hitachi D415～070)		
Revolution number at the beginning of operation — GL150-101 ('61 & previous year models) Hitachi D413-01		
Revolution number at the beginning of operation — GL150-103 ('62 & subsequent year models) Hitachi D415-06, Nippon Denso 29100-042-0		
Revolution number at the beginning of operation — GL201KA		
Revolution number at the beginning of operation — GL201KB		
Advance angle at 1000 r.p.m. G130, G150		
Advance angle at 1900 r.p.m. G130, G150		

Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
		Renew it	
6.0 mm (0.236) in			At the engine speed is 700 r.p.m.
50 mmHg (1.97) in Hg	20～80 mmHg (0.788～3.152) in Hg	Replace it.	
115 (4.531)	85～145 (3.349～5.713)		
120 (4.728)	95～145 (3.743～5.713)		
60 (2.364)	30～90 (1.182～3.546)		
4°	3°～5°		
8°	7°～9°		
6.5°	5.5°～7°		
9°	8°～10°		
8°	7°～9°		
7°	6°～8°		
400 r.p.m	300～550 r.p.m.	Replace it	
300	200～450		
460	320～600		
500	400～600		
8°	7°～ 9°		
15°	14°～16°		

Items to be Inspected	Nominal Dimensions	Values Requiring Service
Advance angle at 500 r.p.m. / Advance angle at 2000 r.p.m. — GL150-101 ('61 & previous year models)		
Advance angle at 1100 r.p.m. / Advance angle at 1900 r.p.m. — GL150-103 ('62 & subsequent year models)		
Advance angle at 1500 r.p.m. GL201KA		
Advance angle at 1500 r.p.m. GL201KB		
Stagger of the contact parts of the distributor shaft with its driving shaft		
Ignition timing (Crankshaft angle before top dead center) — G130 / G150 / GL150-101 ('61 & previous year models) / GL150-103 ('62 & subsequent year models) / GL201KA / GL201KB		

Electric system
Dynamo (Armature shaft)

Bend of shaft		More than 0.1 mm (0.0039) in
Stagger of the bearing		

Electric system
Dynamo (Commutator)

Wear of the diameter	G130 Hitachi (300W) GT123-08 G150 Hitachi (300W) GT123-08	45 ϕ mm (1.773) in	43 ϕ mm (1.6942) in
	GL150-103 ('62 & previous year models) Hitachi (200W) G115-08, GT115-01	37 ϕ (1.4578)	35 ϕ (1.379)
	GL150-103 ('63 & subsequent year models) Hitachi (300W) GT123-05	45 ϕ	43 ϕ
	GL150-103 ('63 & subsequent year models) Nippon Denso (300W) 27000-064	46 ϕ (1.8124)	43 ϕ

Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
5°	Upper limit 400r.p.m. 5.3° Lower limit 570 r.p.m. 4.4°	Replace it.	
13°	12°～14°		
9°	8°～10°		
15°	14°～16°		
13°	12°～14°		
8.5°	7.5°～9.5°		
		In case the stagger is severe, make the correction or the replacement.	
14° 14° 8° 14° 14° 16°		Correct it.	G130, G150 600～650 r.p.m. : Engine speed GL150, GL201 500 r.p.m. : Engine speed
		Correct it.	
	0.2 ϕ mm (0.0079) in	Renew the bearing.	
	43 ϕ mm (1.6942) in 35 ϕ (1.379) 43 ϕ 43 ϕ	Renew the commutator.	

Items to be Inspected		Nominal Dimensions ..... Values Requiring Service	Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
	GL201KA Hitachi (300W) GT123-05	45 ϕ mm (1.773) in		43 ϕ mm (1.6942) in		
	GL201KB Hitachi (300W) GT123-05					
Partial wear of the diameter	Hitachi	More than 0.3 mm (0.0118) in	Less than 0.05 mm (0.0020) in		Correct it.	
	Nippon Denso	More than 0.2 (0.0079)	Less than 0.05			
Depth from the commutator surface to the insulator of mica		Less than 0.2	Less thna 0.5～0.8 (0.020～0.032)		Ditto	
Commutator surface					In case it is stained or damaged, correct it with an emery cloth, etc.	
Electric system						
Dynamo (Brush)						
Brush and brush spring Length of brush	G130 Hitachi (300W) GT123-08	16 mm (0.6304) in		11 mm (0.4334) in		
	G150 Hitachi (300W) GT123-08	16		11		
	GL150-103 ('62 & previous year models) Hitachi (200W) G115-08, GT115-01	16		11		
	GL150-103 ('63 & subsequent year models) Nippon Denso (300W) 27000-064	22 (0.8668)		14 (0.5516)		
	GL150-103 ('63 & subsequent year models) Hitachi (300W) GT123-05	16		11	In case the contact surface of the bush with the commutator is not complete, in case the bush spring pressure is not uniform or the spring thrusting power is not proper, in case the brush is badly worn or damaged or in case the manner of the brush holder to support the brush is not proper, correct it.	
	GL201KA Hitachi (300W) GT123-05	16		11		
	GL201KB Hitachi (300W) GT123-05	16		11		
Brush and brush spring Brush spring force (g)	G130 Hitachi (300W) GT123-08	700 g (24.7) oz				
	G150 Hitachi (300W) GT123-08					
	GL150-103 ('62 & previous year models) Hitachi (200W) G115-08, GT115-01	600 (21.2)				
	GL150-103 ('63 & subsequent year models) Nippon Denso (300W) 27000-064	650 (22.9)				
	GL150-103 ('63 & subsequent year models) Hitachi (300W) GT123-05)	700				
	GL201KA Hitachi (300W) GT123-05					
	GL201KB Hitachi (300W) GT123-05					
Motering test (Standard voltage : 12V	G130 Hitachi (300W) GT123-08					
	G150 Hitachi (300W) GT123-08					
	GL150-103 ('62 & previous year models) Hitachi (200W) G115-08					
	4～6A					750～950 r.p.m.
	7～10A					700～900 r.p.m.

Items to be Inspected	Nominal Dimensions	.....	Values Requiring Service
GL150-103 ('62 & previous year madels) Hitachi (200W) GT115-01 GL150-103 ('63 & subsequent year models) Nippon Denso (300W) 27000-064 GL150-103 ('63 & subsequent year models) Hitachi (300W) GT123-05 GL201KA Hitachi (300W) GT123-05 GL201KB Hitachi (300W) GT123-05			

Electric system (Constant voltage type dynamo regulator)

Performance 〔Carbon pile type (12V 200W) Hitachi R115-03〕

Voltage regutator adjustmens (1700 r.p.m.)	No-load voltage	GL150 GL201	14～15V
	Rush voltage		8～10V
Cutout relay	Closed circuit speed		Less than 1300 r.p.m.
	Closed circuit voltage		12.7～13.4V
	Closed circuit reversal current		Less than 5A
Output power at 80 % load			Less than 1700 r.p.m.

Electric system (Constant voltage type dynamo regulator)

Performance 〔Tirrill type (12V 300W) Hitachi T123-07〕

Voltage regulator adiustment (1700 r.p.m.)	No-load voltage	G 130 G 150	14～15V

Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
4～6A			800～1100 r.p.m.
5～6A			
4～6A			750～950 r.p.m.

14～15V		Clearane of the contact points of the relay : 0.7～0.9 mm (0.0276～0.0355) in
8～10V		Clearance between the relay movable piece and the iron core : 0.7～0.8 mm (0.0276～0.0315) in
Less than 1300 r.p.m.	Correct the damage of the contac points of the cut out relay and the voltage regulator.	Clearance between the relay movable piece and the yoke : 0.4～0.5 mm (0.0158～0.0197) in
12.7～13.4V		
Less than 5A		
Less than 1700 r.p.m.		

14～15V	Correct the damage of the contact points of the voltage regulator.	Clearance of the contact points of the relay : 0.4～0.5 mm (0.0158～0.0197) in Clearance between the relay movable piece and the iron core : 0.9～1.0 mm (0.0354～0.0394) in Clearance between the relay movable piece and the yoke : 0.9～1.0 mm (0.0354～0.0394) in

Items to be Inspected		Nominal Dimension	.....	Values Requiring Service
Cutout relay	Closed circuit speed	G130		
	Closed circuit voltage	G150		
	Closed circuit reversal current			
Output power at 80 % load				

Electric system (Constant voltage type dynamo regulator)
Performance 〔Tirill type (12V 200W) Hitachi T115-01, (12V 300W) Hitachi T123-01〕

Voltage regulator adjustment (1700 r.p.m.)	No-load voltage	GL150		
		GL201		
Cutout relay	Closed circuit speed	GL150		
	Closed circuit voltage	GL201		
	Closed circuit reversal current			
Output power at 80 % load				

Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
Less than 1300 r.p.m.	12.7～13.4V	Correct the damage of thecontact points of the cutout relay.	Clearance of the contact points of the relay : 0.6～0.7 mm (0.0236～0.0276) in Clearance between the relay movable piece and the iron core : 0.9～1.0 mm (0.0355～0.0394) in
	Less than 8A		Clearance between the relay movable piece and the yoke : 0.2～0.3 mm (0.0079～0.0118) in
Less than 1,700 r.p.m.			

14～15V	Correct the damage of the contact points of the cutout relay or the voltage regulator.		Clearance of the contact points of the relay : 0.4～0.5 mm (0.0158～0.0197) in Clearance between the relay movable piece and the iron core : 0.6～0.7 mm (0.0236～0.0276) in Clearance between the relay movable piece and the yoke : 0.7～1.0 mm (0.0276～0.0394) in
Less than 1300 r.p.m.	12.7～13.7V	Ditto	Clearance of the contact points of the relay : 0.6～0.7 mm (0.0236～0.0276) in Clearance between the relay movable piece and the iron core : 0.9～1.0 mm (0.0355～0.0394) in
	Less than 8A		
Less than 1700 r.p.m.			

Items to be Inspected		Nominal Dimension ..... Values Requiring Service
Electric system (Constant voltage type dynamo regulator)		
Performance 〔Tirill type (12V 300W) Nippon Denso 2600-059〕		
Voltage regulator adjustment(2000r.p.m.)	No-load voltage	GL150 GL201
Cutout relay	Closed circuit speed	GL150 GL201
	Closed circuit voltage	
	Closed circuit reversal current	
Output power at 80 % load		
Electric system (AC Generator) 〔 (G130 / G150) 400W Hitachi LT 131-06 (GL150 / GL201) 400W Hitachi		
Rotor		
Bend of shaft		More than 0.1 mm (0.0039) in
Stagger of bearing	G 130 G 150	Front 6203Z Rear 6202Z
	GL 150	
	GL 201	
Stagger of shaft direction		More than 0.3 (0.0118)

Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
13.8～14.8 V		Correct the damage of the contact points of the cutout relay or the ..... voltage regulator	Clearance of the contact points of the relay : 0.2～0.4 mm (0.0079～0.0016) in Clearance between the relay movable piece and the iron core : 0.8～1.3 mm (0.0315～0.0512) in Clearance between the relay movable piece and the yoke : 0.2～0.4 mm (0.0079～0.0158) in
Less than 1,300 r.p.m.			Clearance of the contact points of the relay : 0.4～0.8 mm (0.0158～0.0315) in Clearance between the relay movable piece and the iron core : 0.8～1.3 mm (0.0315～0.0512) in Clearance between the relay movable piece and the yoke : 0.2～0.4 mm (0.0079～0.0158) in
12.7～13.4 V		Ditto	
Less than 8A			
Less than 1,700 r.p.m.			
L 131-02 〕			
	0.2 mm (0.00788)in	correct it.	
0.1 mm (0.0039) in			

Items to be Inspected		Nominal Dimensions	.....	Values Requiring Service
Slip ring				
Stain of slip ring surface				
Brush and Coil resistance				
Brush and brush spring	Length of the brush	14.5 mm (0.5713) in		
	Spring force (g)	300 g (10.6) oz		
Rotor coil resistance at 20°C (Ω)		5 Ω		
Stator coil resistance at 20°C (Ω)		0.2 Ω		
Eletric system (Regulator) (G130 / G150) **12V Hitachi TLIZ-08** (GL150 / GL201) **12V Hitachi TL 131-01**				
Voltage regulator adjustment (at 3,000 r.p.m.)	No-load voltage	G 130 G 150		

Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
		In case the surface is stained or damaged, correct it with an emery cloth or the like.	
	9.5 mm (0.3743) in	In case the contact surface of brush with slip ring is not complete, in case the pressure of the spring of brush is not uniform or the strength of the spring is not proper, in case the brush is badly worn or damaged or in case the manner of brush is not proper, correct it.	
13.5～14.5 V		Correct the damage of the contact points of the voltage regulator	Yoke gap : 0.9～1.0 mm (0.0355～0.0394) in Core gap : 0.9～1.0 Point gap : 0.4～0.5 (0.0158～0.0197)

Items to be Inspected		Nominal Dimensions ..... Values Requiring Service	Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
Voltage regulator adjustment (at 3,000 r.p.m.) No-load voltage	GL 150		13.5～14.5 V			Clearance of the contact points of the relay : 0.4～0.5 mm (0.0158～0.0197) in Clearance between the relay movable piece and the iron core : 0.6～0.7 mm (0.0236～0.0276) in Yoke clearance between the movable iron piece and the contact iron : 0.9～1.0 mm (0.0355～0.0394) in
	GL 201					
Field relay — Release voltage (at A-terminal voltage)	G 130		10.5～11.5 V			Yoke gap : 0.2～0.35 mm (0.0079～0.0138) in Core gap : 0.5～0.6 (0.0197～0.0236) Point gap : 0.4～0.5 (0.0158～0.0197)
	G 150					

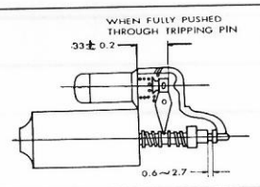
Electric system (Starting moter) { (G130 / G150) 12V Hitachi S 114-54 (GL150 / GL201) Hitachi S 114-05 / S 114-13 **Nippon Denso NI-EED** }

Armature shaft

Bearing gap with the shaft	Hitachi S 114-54 / S 114-05 / S 114-13		0.01～0.03 mm (0.000394～0.00118) in	Renew the bearing
	Nippon Denso	More than 0.1 (0.0039)	Less than 0.085 (0.0034)	
Wear of shaft		More than 0.1		Replace the armature.
Bend of shaft		More than 0.1		Correct it.

Commutator

Wear of the diameter	Hitachi S 114-54	33 ϕ (1.3002) in	31 ϕ (1.2214) in	Replace the commutator	
	Hitachi S 114-05 / S 114-13	34 ϕ (1.3396)	32 ϕ (1.2608)		
	Nippon Denso	36 ϕ (1.4184)	33 ϕ (1.3002)		
Partial wear of the diameter	Hitachi S 114-45 / S 114-05 / S 114-13	More than 0.4 mm (0.0158) in	Less than 0.05 mm (0.0020) im	Correct it.	
	Nippon Denso	Less than 0.3 (0.0118)	Less than 0.1 (0.0039)		
Depth from the commutator to mica		Less than 0.2 (0.0079)	0.5～0.8 (0.0197～0.0315)		

Items to be Inspected			Nominal Dimensions	Values Requiring Service
Commutator surface				
Brush, Pinion and performance				
Brush and brush spring	Length of brush	Hitachi S 114-54	14 mm (0.5516) in	
		Hitachi S 114-05 S 114-13		
		Nippon Denso	20 (0.7880)	
	Spring force (g)	Hitachi S 114-54	800 g (28.2) oz	
		Hitachi S 114-05 S 114-13	900 (31.7)	
		Nippon Denso	850 (30.0)	
Starting pinion				
Clearance between the starting pinion and the ring gear		Hitachi S 114-54		
		Hitachi S 114-05 S 114-13		
		Nippon Denso		
Distance adjusting magnetic switch		Hitachi S 114-05 S 114-13		
		Nippon Denso		
Clearance between pinion stopper and pinion		Hitachi S 114-05 S 114-13		
		Nippon Denso		
No-load revolution number	Less than 12V 40A	Hitachi S 114-54		
	Less than 11.6V 60A	Hitachi S 114-05 S 114-13		
	Less than 11V 50A	Nippon Denso		
Loading torque	Less than 170A	Hitachi S 114-54		
	Less than 10.5V 150A	Hitachi S 114-05 S 114-13		
	Less than 9.5V 230A	Nippon Denso		

Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
		In case the surface is stained or damaged, correct it with an emery cloth, etc.	
	9.5 mm (0.3743) in	In case the contact surface of the brush with the commutator is not complete, in case the brush spring pressure is not uniform or the spring thrusting power is not proper, in case the brush is badly worm or damaged or in case the manner of the brush holder to support the brush is not proper, correct it.	
	10 (0.394)		
	15 (0.591)		
		In case of its remarkable wear or damage, correct it or renew the pinion.	
3~5 mm (0.0197) in			
3~6 (0.1182~0.2364)			
33±0.2 mm (1.3002±0.0079) in		Measure the dimension when plunger gap is 0 by compressing plunger shaft.	
0.6~2.7 (0.0236~0.1064)			
More than 7,000 r.p.m.			
More than 7,000			
More than 3,000			
More than 0.35 m-kg (2.5) ft-lb			
More than 0.4 (2.9)			
More than 0.7 (5.1)			

Items to be Inspected		Nominal Dimensions ..... Values Requiring Service	Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
Loading revolution number	Less than 170A Hitachi S 114-54		More than 1,900 r.p.m.			
	Less than 10.5V 150A Hitachi S 114-05 S 114-13		More than 1,700			
	Less than 9.5V 230A Nippon Denso		More than 800			
Binding torque	Less than 410A Hitachi S 114-54		More than 1.15 m-kg (8.320) ft-lb			
	Less than 9.5V 500A Hitachi S 114-05 S 114-13		More than 0.9 (6.512)			
	Less than 7.7V 380A Nippon Denso		More than 1.0 (7.235)			
Loose fitting					Correct it	
Function of the magnetic switch					Correct any fault	
Electric system (Battery)						
Terminals of the battery					In cace any of them is rusted or corroded, correct it.	
Plates, separators, troughs, etc.					In case any of them is damaged, correct it.	
Contamination of the electrolyte					In case the contamination is remarkable, renew the electrolyte.	
Specific gravity of the electrolyte (20°C after charging)			1.26	1.20	Adjust it	The temperature conversion coefficient is 0.0007 per °C :
Capacity (at the rate of 20 hours)	G 130 G 150 GL 150		12V 40AH			
	GL 201		12V 50AH			
Terminal voltage (single trough)		Less than 1.8V	More than 2.1V		Recharge it	
Height of the level of electrolyte above plates			Electrolyte above of the standard level		When liquid surface is low replenish with distilled water	
Completion test						
Lapping operation of engine					Carry it on for more than 30 minutes	

Items to be Inspected		Nominal Dimensions ..... Values Requiring Service	Standard Values as Assembled	Limits for Use	Manners of Service	Remarks
Compression pressure of cylinder (kg/cm^2)	G 130		More than 9.9 kg/cm^2 (141) PSI		Correct it	About 300 r.p.m.
	G 150 (Low compression)		More than 9.9			
	G 150 (High compression)		More than 10.8 (154)			..... About 250
	GL 150		9.2 (131)			
	GL 201KA		11.9 (169)			About 300
	GL 201KB		12.6 (179)			
Difference between compression pressures in the respective cylinders	G 130		Less than ±5% to the mean value		Correct it	About 300
	G 150					..... About 250
	GL 150					..... About 300
	GL 201					
Pressure of lubricating oil (1,400 r.p.m.)	G 130		1		Adjust it	
	G 150		3～3.5 kg/cm^2 (43～50) PSI			
	GL 150-103 ('62 & previous year models)					
	GL 150-104 ('62 & subsequent year models)		4～4.5 (57～64)			
	GL 201					
Output test			More than 90%			
Fuel consumption rate test			Less than 110%			