

Komatsu Crawler Loader D31q 16 Shop Manual

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FOREWORD

Only through correct operation, maintenance, trouble shooting, and repairs, can the effective performance, prevention of breakdowns and a long useful life of a machine be sustained.

The object of this "Shop Manual" is to furnish the information needed by the serviceman to perform his work well, by giving him the essential details precisely but in an easily understood format.

In performing his work, the serviceman should study the pertinent section of this manual carefully, and work systematically and scientifically by following the outlined work sequence.

This Shop Manual has been prepared with the above in mind, so that each basic part of the machine is dealt with under the headings: "Structure and Function", "Testing and Adjustments", "Trouble shooting", "Specifications" and "Disassembly and Assembly".

Also a section on General Technical Procedures is provided to furnish details on basic operations and procedures common to the serviceman's work on the different parts of the machine.

1. General Instructions

This section presents under one heading the basic information and procedures common to the sections on "Disassembly and Assembly", "Testing and Adjustments", "Trouble shooting", and "Removal and Installation". It is essential for the serviceman to thoroughly understand and know this section till it becomes a part of his common sense.

2. Structure and Function.

This section gives a detailed explanation of the "Structure" with details and drawings of the "Constituent Parts" and "block" or "circuit" diagrams, arranged for the serviceman, but also useful as a textbook for training service personnel. However, in the latter case Training Aids should be used to cover the basic theory not included in this manual.

3. Testing and Adjustments.

Procedures of all the necessary "Tests" and "Adjustments" are described with photographs showing the necessary measuring equipment and the location for making the measurements. This should aid the serviceman in his trouble shooting, checking and adjusting work.

4. Trouble Shooting

Typical common troubles are listed and systematically described; with their causes and the procedures for finding and diagnosing the symptoms.

As it is impossible to list all of the possible troubles, the serviceman should study the sections covering the "Structure and Function" and "Testing and Adjustments" and apply this knowledge to diagnose any non-listed troubles.


5. Specifications

In this section, all standard dimensions and tolerances that are necessary to perform Testing and Adjustments are presented; with drawings together with, appropriate procedures for disassembly and assembly, performing repairs, or trouble shooting. However, basic dimensions and tolerances, for repairs or rebuilding, are limited to those machine parts most commonly worked on.

PRECAUTIONS, WHEN PERFORMING THE SERVICE WORK.

Always pay attention to, Safety, before starting any work – this is important.


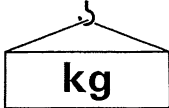

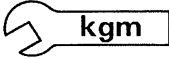
Never attempt any work where danger to yourself or to other persons.

Whenever work requiring safety precautions are described in this manual, a flag mark  in inserted, always make double sure that safety measures are taken.

Other unmarked work, should always be performed after studying and using your common sense to prevent accidents.

DESCRIPTION OF THE SYMBOLS

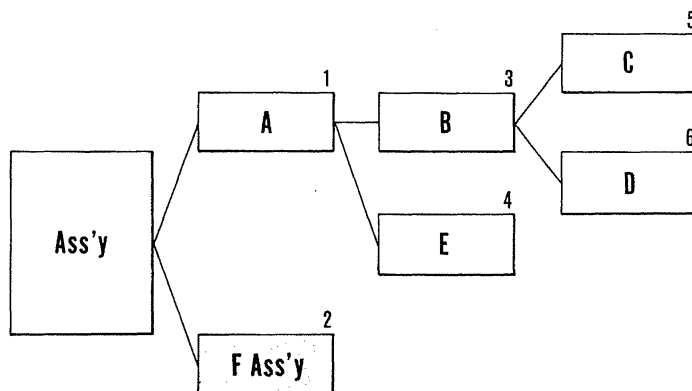
The symbols described below are used in this manual for convenience and better understanding.

Symbol	Item	Description
	Safety	Special safety precautions are needed to perform the work.
	Weight	The hoisting wire and equipment must be properly selected to safely bear the designated weight.
	Note	Special technical precautions are needed to perform the work.
	Tightening Torque	Fastening parts that require specified tightening force when assembling.

NETWORK DIAGRAMS

The standard procedures for disassembly and assembly are described and shown in photographs, according to each part of the machine.

The sequence or steps employed in disassembly and assembly are shown in network diagrams as depicted below.



In the network, the sequence of the procedural steps are given in arabic numbers on the right top of each block. For example, when it is necessary to remove part D from the assembly, the steps for removal should be A → B → D. Or, to remove part E the step is A → E. **F Ass'y** This is an assembly of which the disassembling procedure is described separately. For assembly, the sequence is presented in the same manner, under each section, as for disassembly.

HOW TO READ THE TROUBLE SHOOTING CHART

As shown below, the symptoms related to the particular trouble are described in the line designated "Test results". The cause for the diagnosed trouble is then correlated on the cause column and is shown marked.

Problem No. 1 Decreasing of the tractive power or slow travel speed.

Test results	Problem cause		
	Oil leaks in torqueconverter	Air suction of the hydraulic pump	
Torqueconverter oil pressure gauge shows lower than normal pressure. (normal 2 ~ 6.3 kg/cm ²)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transmission oil pressure gauge shows lower than normal pressure. (normal 20 ~ 23 kg/cm ²)		<input type="radio"/>	
	<input type="radio"/>		

SERVICE STANDARDS

A sectional drawing of the machine part is prepared and each pertinent part requiring service standards is described by the number in the drawing and in the Table.

No.	Check Item	Criteria				Remedy	
		Basic Size	Tolerance		Standard Clearance		Service Limit
			Shaft	Hole			

MEANING OF SPECIAL WORDS

Standard Clearance	This is range of clearance specified for two new parts assembled together. When a machine has been reconditioned, every clearance must be adjusted to its standard clearance.
Service Limit	This is a limit of the size of a part restricting use of the worn or distorted part in excess of this limit. All parts exceeding the service limit must be replaced or repaired, whichever is specified.
Clearance Limit	This is a limit of clearance between parts restricting use of the worn parts in excess of this limit. All parts exceeding the clearance limit must be replaced or repaired, whichever is specified.
Turning Limit	This limit is applied only to the track link pitches. As long as any link remains within the turning limit, the link can be reconditioned by turning over its bushing and pin.

0. GENERAL DESCRIPTION

01 SPECIFICATIONS

02 GENERAL INSTRUCTIONS

GENERAL
DESCRIPTION

I. ENGINE

14 DISASSEMBLY AND ASSEMBLY
STRUCTURE AND FUNCTION, TESTING
AND ADJUSTMENTS, TROUBLE SHOOTING,
MAINTENANCE STANDARD

(Refer to Shop Manual Komatsu Engine 105-3 Series)

ENGINE

II. POWER TRAIN

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AND ADJUSTMENTS, TROUBLE SHOOTING

22 DISASSEMBLY AND ASSEMBLY

23 MAINTENANCE STANDARD

POWER TRAIN

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AND ADJUSTMENTS, TROUBLE SHOOTING

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UNDERCARRIAGE

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AND ADJUSTMENTS, TROUBLE SHOOTING

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HYDRAULIC
SYSTEM

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72 DISASSEMBLY AND ASSEMBLY

73 MAINTENANCE STANDARD

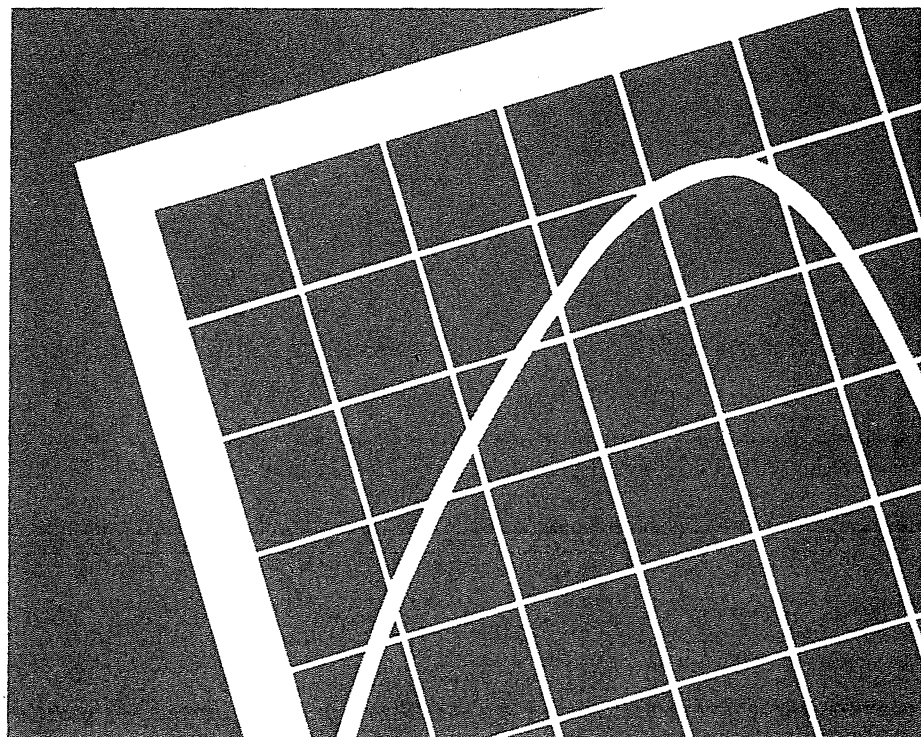
WORK
EQUIPMENT

SHOP MANUAL

D31-16

SERIAL D31S-16 25001~
NUMBERS D31Q-16 25001~

01 SPECIFICATIONS

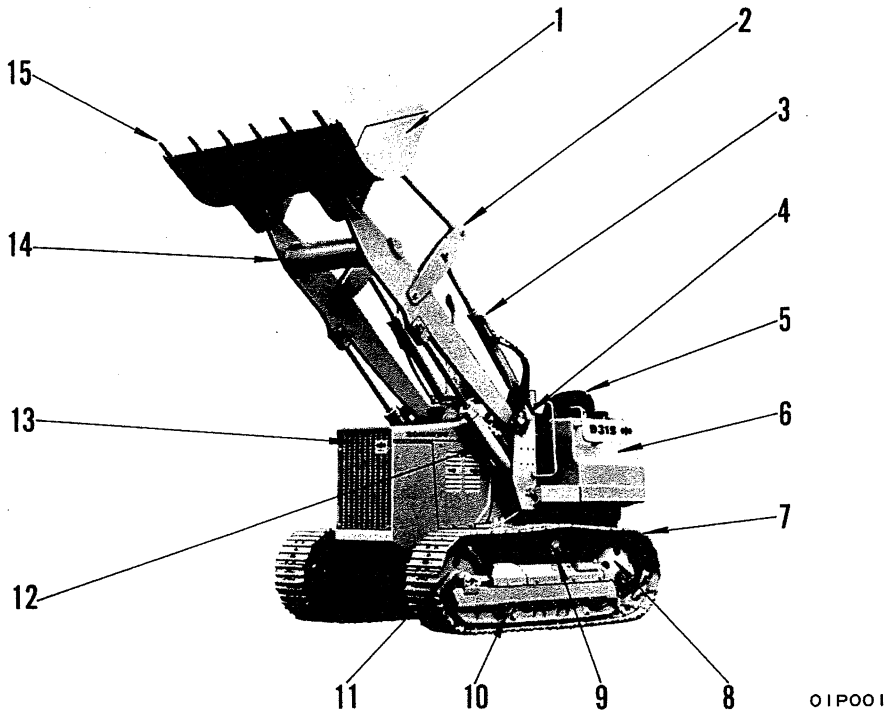


SPECIFICATIONS

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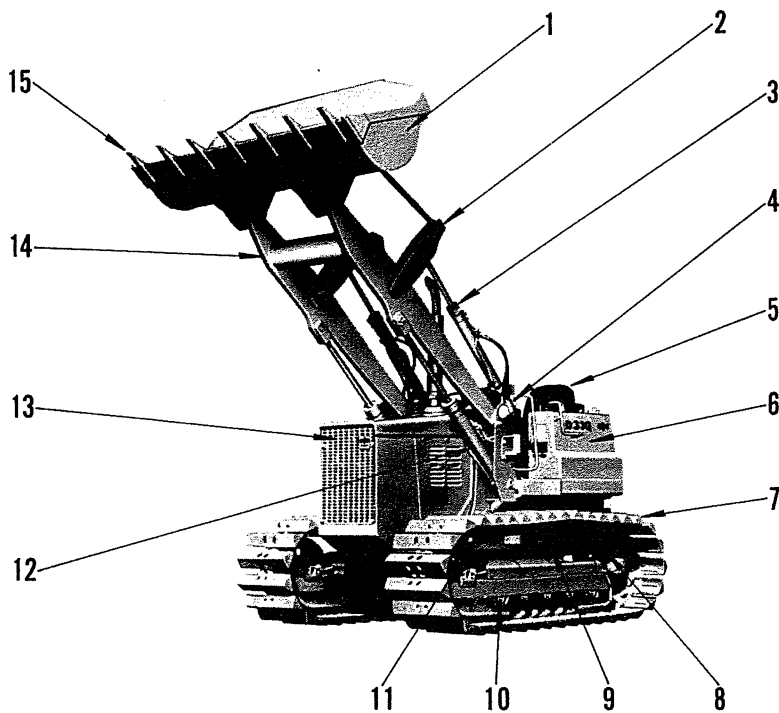
OUTLINES

D31S-16



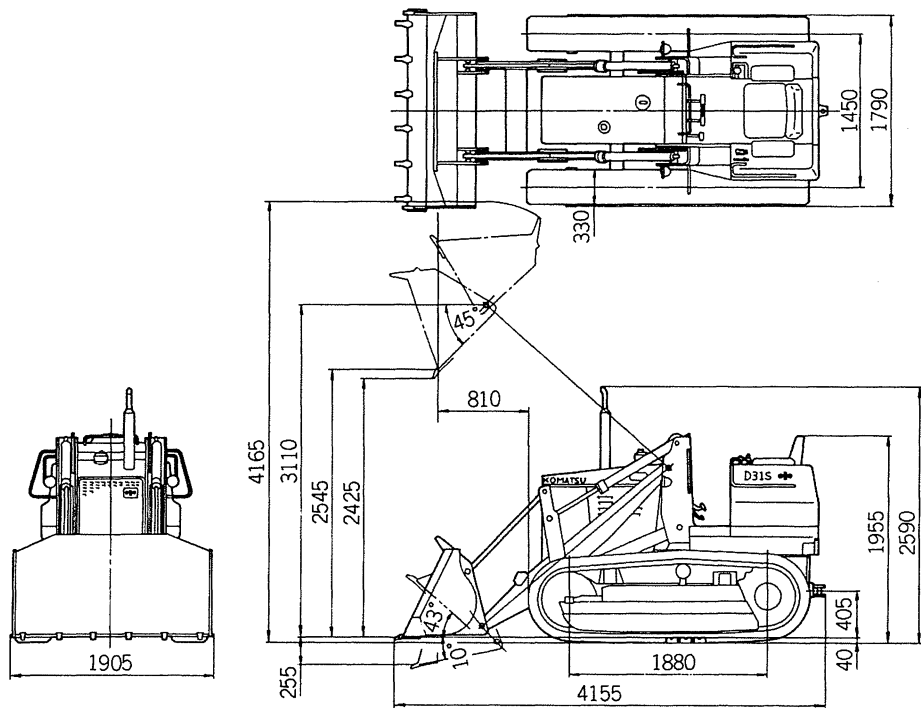
OIP001

D31Q-16

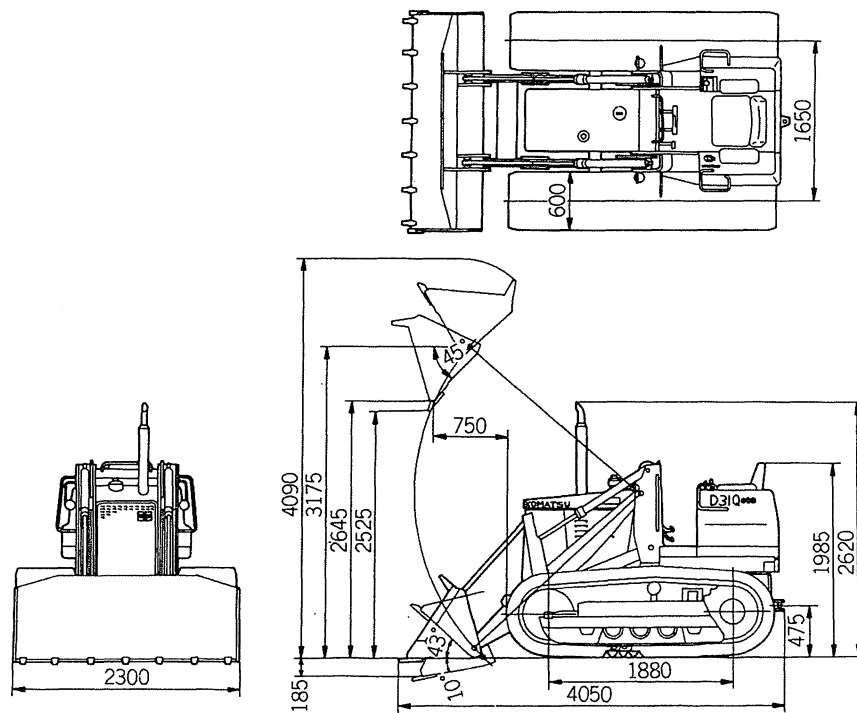


OIP002

- 1. Bucket
- 2. Tilt lever
- 3. Dump cylinder
- 4. Head lamp
- 5. Operator's seat
- 6. Fuel tank
- 7. Track
- 8. Sprocket
- 9. Carrier roller
- 10. Track roller
- 11. Idler
- 12. Lift cylinder
- 13. Radiator
- 14. Lift arm
- 15. Bucket tooth



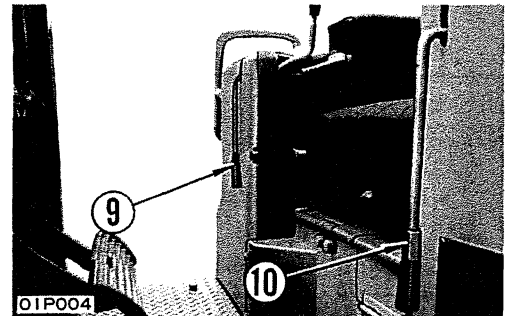
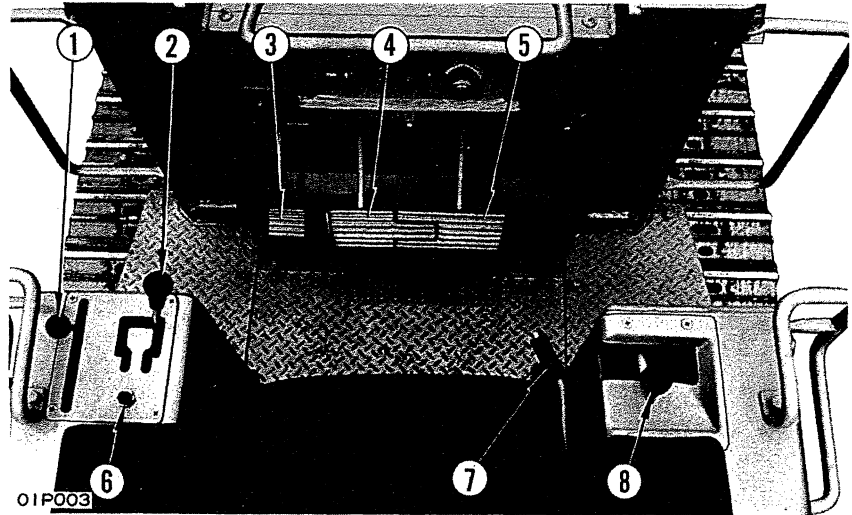
O1F001



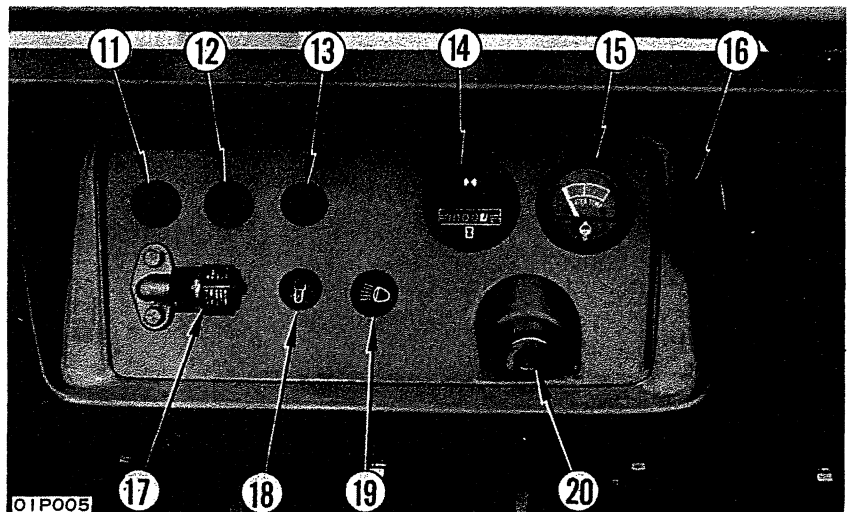
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SPECIFICATIONS

1. Fuel control lever
2. Gear shift lever
3. Inching pedal
4. Steering pedal (left)
5. Steering pedal (right)
6. Horn button
7. Parking brake lever
8. Bucket control lever
9. Safety lever (For bucket control lever)
10. Safety lever (For gear shift lever)



11. Charge lamp
12. Caution lamp
13. Heater signal
14. Service meter
15. Water temperature gauge
16. Panel lamp
17. Dust indicator
18. Heater switch
19. Lamp switch
20. Starting switch



SPECIFICATIONS

• BODY

Machine model		D31S-16	D31Q-16
Serial number		25001~	25001~
Weight	Operating weight (kg) (Prescribed quantity of fuel, lubricant and water)	6750	7100
	Overall length		
	Overall length of machine (mm)	—	—
	Overall length with bucket (mm)	4155	4050
Overall width	Overall width of machine (mm)	1790	2250
	Overall width with bucket (mm)	1905	2300
Overall height	Overall height to the top of exhaust pipe (mm)	2590	2620
	Overall height at the top of operator's seat (mm)	1955	1985
	Minimum ground clearance (mm)	315	385
Undercarriage	Distance between center of tracks (mm)	1450	1650
	Ground contacting length (mm)	1880	1880
	Ground contacting pressure (kg/cm ²)	0.54	0.31
	Track width (standard) (mm)	330	600
Travelling speed	Forward 1st speed (km/h)	2.2	
	Forward 2nd speed (km/h)	3.9	
	Forward 3rd speed (km/h)	6.5	
	Reverse 1st speed (km/h)	2.4	
	Reverse 2nd speed (km/h)	4.3	
	Reverse 3rd speed (km/h)	7.1	
	Minimum turning radius (m)	2.2	2.4
Gradeability (Degrees)	30		
Water · Oil capacity	Fuel tank (ℓ)	115	
	Cooling water (ℓ)	22	
	Engine lubricating oil (ℓ)	13	
	Damper (ℓ)	1	
	Hydroshift transmission (ℓ)	13	
	Bevel gear shaft · Steering device (ℓ)	15	
	Final drive (each side) (ℓ)	8.5	11
	Idler (each) (cc)	150	
	Track roller (each) (cc)	150	
	Carrier roller (each) (cc)	115	
Hydraulic equipment (ℓ)	52		

Machine model		D31S-16	D31Q-16
Serial number		25001~	25001~
Power transmission	Damper	Wet spring cushion type	
	Hydroshift transmission	Planetary gear, Hydraulic operation, Lubrication oil pressure pumping type	
	Bevel gear	Spiral bevel gear	
	Steering clutch	Dry multi-disk, spring compression type, foot operated hydraulic booster type	
	Steering brake	Dry band type Foot operated interconnected with steering clutch	
	Final drive	Spur gear single stage reduction	
Undercarriage	Suspension	Rigid type	
	Carrier roller	One for each side	
	Track roller	Five for each side	
	Shoe	Assembly type semidouble 37 pieces for each side Pitch 154mm Width 330mm	Assembled arch type shoe 37 pieces for each side Pitch 154mm Width 600mm
Hydraulic system	Link type	Single type	
	Bucket	Full, with teeth 0.8m ³	
	Maximum	175kg/cm ²	
	Discharge	87 ℓ/min	
	Lift cylinder	Dump cylinder	
	Dump cylinder	Reciprocating piston	
	Hydraulic tank	External operation valve	

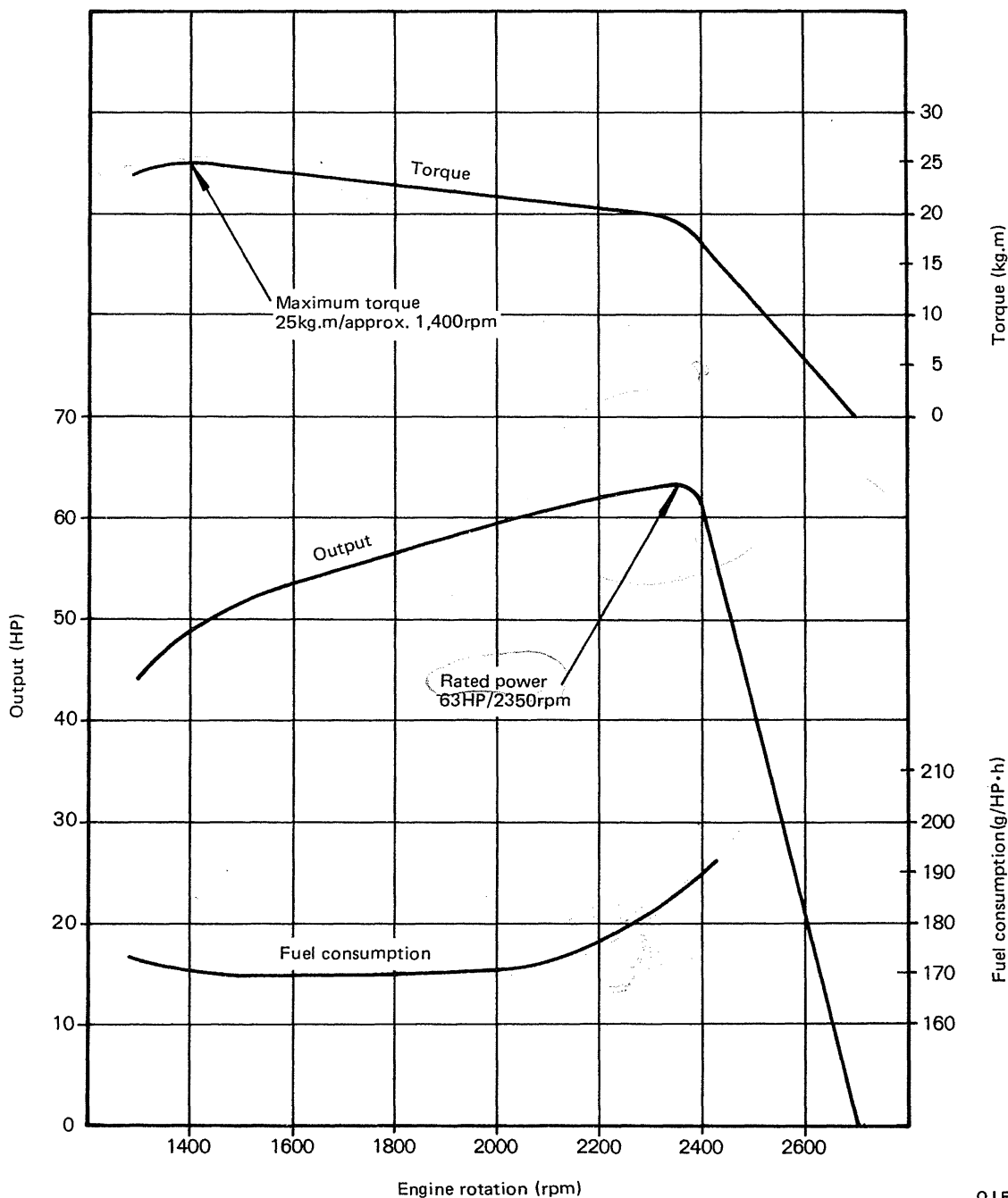
SPECIFICATIONS

• ENGINE

Engine name		4D105-3
Machines using this engine		D31A·P·S·Q-16
No. of cylinders — bore x stroke	(mm)	4—105x125
Displacement	(cc)	4330
Ignition sequence		1—2—4—3
Dimensions	Total length (Fan ~ Rear end)	(mm) 955
	Total width	(mm) 614
	Total height (Exhaust pipe ~ Oil pan)	(mm) 1197
Performance	Power rating	(HP/rpm) 63/2350
	Maximum torque (kg·m/rpm)	25/Approx. 1400
	Maximum unloaded rotation (rpm)	2700±50
	Minimum unloaded rotation (rpm)	700~750
	Minimum fuel consumption (g/HP·h)	170
Dry weight	(kg)	500
Fuel oil		ASTM D975 No.1 or 2
Fuel pump		Bosh type A
Governor		Centrifugal all speed type
Lubricant volume	(ℓ)	13
Cooling water volume	(ℓ)	22
Alternator		24V 0.6kw 25A
Starting motor		24V 5.2kw
Battery		12V 120Ah x 2

ENGINE PERFORMANCE CURVE

D31A·P·S·Q-16 4D105-3 engine
Power rating 63HP/2350rpm
 Maximum torque 25kg·m/Approx. 1,400rpm
 Minimum fuel consumption rate 170g/HP·h



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WEIGHT TABLE

UNIT: kg

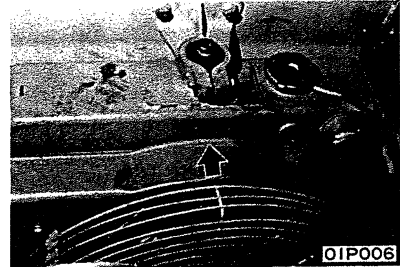
Machine model	D31S-16	D31Q-16
Serial No.	25001~	25001~
Engine • Damper Ass'y	510	
• Engine Ass'y	480	
• Damper cover Ass'y	16.5	
• Hydraulic pump Ass'y	8	
Radiator guard Ass'y	516	
• Radiator Ass'y	437	
Fuel tank	106	
Universal joint Ass'y	4.7	
Hydroshift transmission Ass'y	207	
• Modulating relief valve Ass'y	5.5	
• Control valve Ass'y	4	
• Pump Ass'y	8.6	
• Pinion transfer Ass'y	39	
Steering clutch Ass'y (each side)	41	
Bevel gear shaft unit	8	
Bevel gear unit	14	
Bevel gear shaft hub • Steering clutch yoke Ass'y (each side)	10.5	
Final drive case • Sprocket Ass'y (each side)	194	
• Sprocket (each side)		45
• Final drive case	43.3	
• Sprocket shaft • Gear Ass'y (each side)	58	
• Pinion		21
Bevel gear case • Main frame unit Ass'y	620	
Track frame Ass'y (each side)	528	
• Idler Ass'y (each side)	100	
• Carrier roller Ass'y (one set)	24	
• Track roller Ass'y (one set)	26.5	
• Recoil spring Ass'y (each side)	80	
• Track frame unit (each side)	125	
Track Ass'y (each side)	492	
• Link Ass'y (each side)		247
Engine underguard	42	
Transmission underguard	38	

Machine model	D31S-16	D31Q-16
Serial No.	25001~	25001~
Dushboard Ass'y (side frame)	430	
• Steering valve Ass'y	3	
Operator's seat Ass'y	25	
Hydraulic tank Ass'y	244	
• Battery (1 unit)	37.5	
• Control valve Ass'y	22	
Lift cylinder Ass'y (each side)	45	
Tilt cylinder Ass'y (each side)	35	
Bucket	360.5	
Lift arm	490	

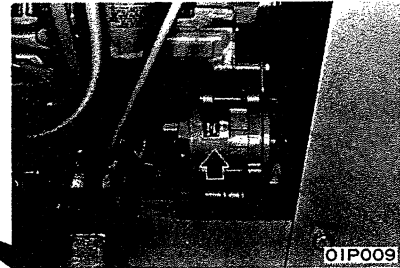
SERIAL NUMBER POSITIONS

- ENGINE

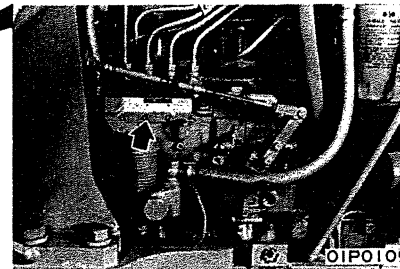
- Radiator No.



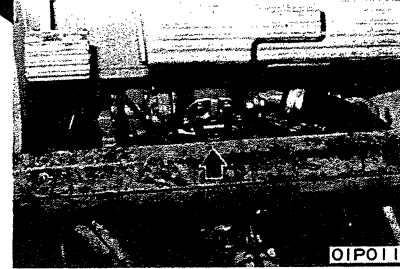
- Alternator No.



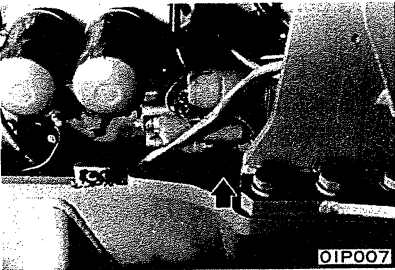
- Injection pump No.



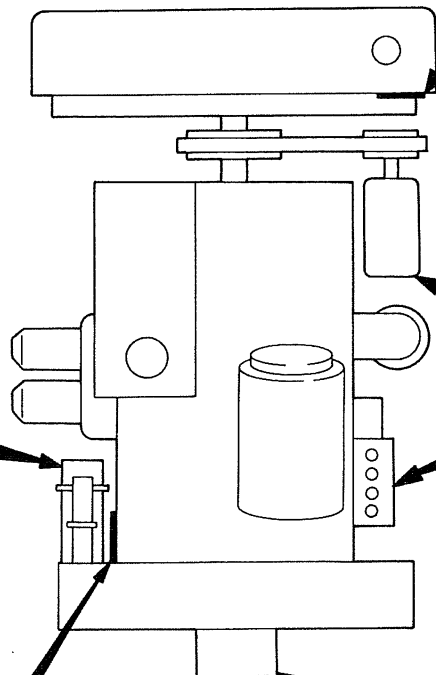
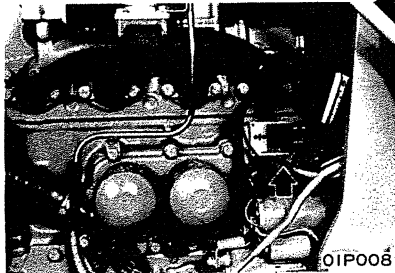
- Hydraulic pump No.



- Starting motor No.



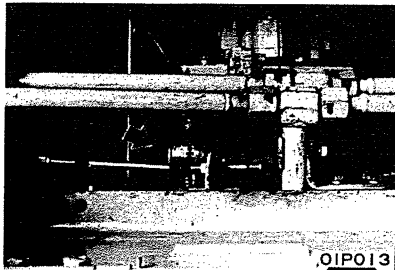
- Engine No.



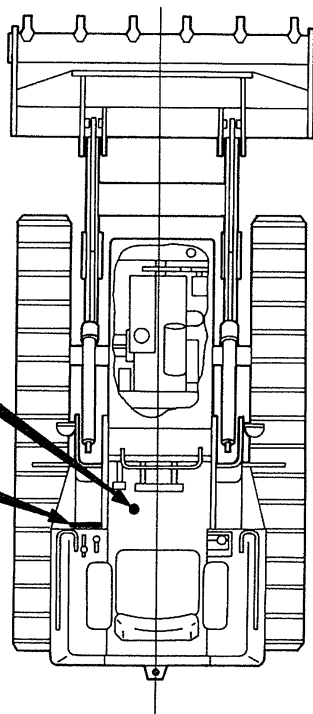
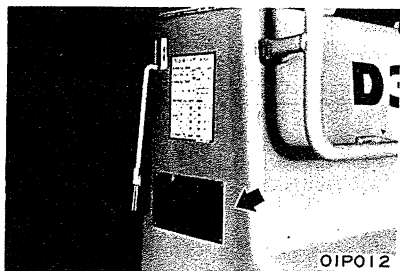
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• **MACHINE BODY**

• **Hydroshift Transmission No.**



• **Machine serial No.**



O1F005