



SERVICE MANUAL

Wheeled Loader

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Wheeled Loader Manual	14 th Set	Publication No. 9803/4100
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These pages should be inserted immediately in their correct positions and pages of a lower issue no. removed and destroyed. The total contents of this publication can be checked using the index below. Retain index at front of book. Replacement pages issued in this set are indicated by an asterisk (*).

Page No	Issue	Page No	Issue	Page No	Issue	Page No	Issue
Contents	2	5-24	1	2-6	1	3-6B	1
Introduction	4	5-25	1	2-7	1	3-6C	1
		5-26	1	2-8	1	3-6D	1
Section 1		5-27	1	2-9	1	3-7	1
		5-28	1	2-10	1	3-8	1
1-1	8	5-29	1	2-11	1	3-9	1
1-1A	3	5-30	1	2-12	1	3-10	1
1-2	8*	6-1	1	2-13	1	3-11	1
1-3	2	6-2	2	2-14	1	3-12	1
2-1	10	6-3	3	2-15	1	3-13	1
2-2	10	6-4	3	2-16	1	3-14	1
2-3	10	6-5	2	3-1	2	3-15	1
3-1	6	7-1	1	3-2	1	3-16	1
3-2	5	7-2	5	4-1	3	3-17	1
		7-2A	2	4-2	3	3-18	1
Section 2		7-3	2	4-3	1	3-19	1
		7-4	4	5-1	1*	3-20	1
1-1	8	7-5	1			3-21	1
1-1A	6	7-6	1	Section 5		3-22	1
1-1B	3	7-7	1			4-1	4
1-2	4	7-8	1	1-1	8	5-1	1
1-2A	3	7-9	1	1-1A	3	5-2	1
1-3	5	7-10	1	1-1B	3*	5-3	1
2-1	4	7-11	1	1-2	7	5-4	1
2-2	5	7-12	1	1-3	5	5-5	1
2-2A	3	7-13	2	2-1	10	5-6	2
2-3	5	7-14	1	2-2	4	5-7	2
3-1	3	7-15	2	2-3	3	5-8	2
3-2	2	7-16	1	3-1	6	5-9	2
3-3	4	8-1	1	3-2	6	5-10	2
3-4	1	8-2	1	4-1	3	5-11	1
3-5	2	9-1	3	4-2	3	5-12	2
4-1	2	10-1	10	4-3	2	5-13	2
4-2	1	10-1A	2	4-4	2	5-14	2
4-3	1	10-1B	1	5-1	4	5-15	2
5-1	3	10-1C	1	5-1A	3	5-16	2
5-2	3	10-1D	1	5-2	4	5-17	2
5-3	3	10-2	1	5-3	3	5-18	2
5-4	3	10-3	2	5-4	1	5-19	2
5-5	3	11-1	2	6-1	7	5-20	2
5-6	3	11-2	4	6-2	2	5-21	2
5-7	3	11-3	1	7-1	4	5-22	2
5-8	3	11-4	1	8-1	1	5-23	3
5-9	4	12-1	3	8-2	3	5-24	1
5-10	2	12-2	1	8-3	2	5-25	2
5-11	1	12-3	1			5-26	2
5-12	1			Section 6		5-27	2
5-13	2	Section 4				5-28	2
5-14	2			1-1	10*	5-29	2
5-15	1	1-1	2	1-2	4*	5-30	2
5-16	1	1-2	1	2-1	5	5-31	2
5-17	1	1-3	2	3-1	2	5-32	2
5-18	1	1-4	2	3-2	1	5-33	2
5-19	1	2-1	4	3-3	1	5-34	2
5-20	1	2-2	1	3-4	2	5-35	2
5-21	1	2-3	2	3-5	2	5-36	2
5-22	1	2-4	1	3-6	2	5-37	2
5-23	1	2-5	1	3-6A	1	5-38	2

Page No	Issue	Page No	Issue	Page No	Issue	Page No	Issue
Section 6 (Cont'd)		6-5A	1	Section 10		1-3	2
5-39	2	6-6	1			1-4	4
5-40	2	6-7	1	1-1	10	1-4A	1
5-41	2	6-8	2	1-2	2	1-4B	1
5-42	2	6-9	3	1-3	1	1-5	2
5-43	3	6-10	1	2-1	3	1-6	5
5-44	2	6-11	2*	3-1	1	1-7	3
5-45	3	6-12	2	3-2	3	1-8	2
5-46	2	6-13	1	4-1	4	2-1	2
5-47	2	6-14	2*	4-1A	1	Index	
6-1	3	6-15	1	4-1B	1	i	14*
6-2	2	6-16	1	4-2	1	ii	14*
6-3	2	7-1	1*	4-3	2	iii	14*
7-1	3	7-2	1*	4-4	1	iv	14*
8-1	1	Section 8		4-5	1	v	14*
8-2	1			4-6	1	vi	14*
8-3	1	1-1	9	4-7	1		
8-4	1	1-2	2	4-8	1		
8-5	1	2-1	3	4-9	1		
8-6	1	2-2	2	4-10	1		
8-7	1	2-3	1	4-11	2		
8-8	1	2-4	1	4-12	1		
8-9	2	2-5	2	4-13	2		
9-1	2	2-6	3	4-14	2		
9-2	2	2-7	1	5-1	4		
9-3	1	3-1	6	5-2	1		
9-4	1	4-1	6	6-1	1		
9-5	1	5-1	3	6-2	3		
9-6	1	5-1A	2	6-3	2		
9-7	1	5-1B	1	6-4	3		
9-8	1	5-2	4	6-5	2		
9-8A	2	5-3	2	6-6	1		
9-9	4	Section 9		6-7	1		
9-9A	1			6-8	1		
9-10	1	1-1	7	7-1	4		
9-11	1	2-1	5	7-2	3		
9-12	1	2-2	4	7-3	2		
9-13	1	2-3	5	7-4	1		
9-14	1	3-1	6	7-5	4		
9-15	2	3-2	9	7-6	5		
9-16	2	4-1	2	7-7	4		
10-1	3	4-2	2	7-8	5		
10-2	2	4-3	2	7-9	1		
11-1	4	4-4	2	7-10	1		
11-2	1	4-5	2	7-11	2		
Section 7		4-6	2	7-12	2		
1-1	10	5-1	1	7-13	2		
2-1	5	5-2	4	7-14	2		
2-2	2	5-3	1	8-1	1		
3-1	5	5-4	1	8-2	2		
3-2	2	6-1	3	9-1	1		
4-1	8	7-1	1	9-2	1		
4-2	8	7-2	1	9-3	1		
4-3	2	7-3	2	9-4	1		
4-4	2	7-4	2	9-5	1		
5-1	1	7-5	1	9-6	1		
5-2	2	7-6	1	10-1	1		
5-3	4	7-7	1	10-2	1		
5-4	1	7-8	1	10-3	1		
5-5	2	8-1	1	10-4	1		
5-6	7	8-2	1	10-5	1		
5-7	1	8-3	1	10-6	1		
6-1	2	8-4	1	10-7	1		
6-2	2	8-5	1	10-8	1		
6-3	2	9-1	1	10-9	1		
6-4	4	10-1	1	10-10	1		
6-4A	1	Section 11					
6-5	2			1-1	7		
				1-2	4		

Contents

General	1
Hydraulics	2
Body & Framework	4
Engine	5
Transmission	6
Axles	7
Brakes	8
Hydraulic Steering	9
Electrics	10
*Service Tools	11
Index	

Introduction

This publication is designed for the benefit of JCB Distributor Service Engineers who are receiving or have received training by the JCB Technical Training Department.

It is assumed that these personnel have a sound knowledge of good workshop practice, safety procedures and general techniques associated with the maintenance and repair of hydraulic earthmoving equipment. Therefore these basic subjects are omitted from this manual, the intention being to convey only more specialised information concerning particular aspects of the machine or component.

For example, renewal of oil seals, gaskets, etc. and any component showing obvious wear or damage is expected as a matter of course, and therefore information of this nature is included in the context of specialised procedures or where a range of wear tolerances is required. Similarly it is expected that components will be cleaned and lubricated where appropriate, also that any opened hose or pipe connections will be blanked to prevent excessive loss of hydraulic fluid and ingress of dirt.

For convenience the manual is compiled in sections, e.g. "Hydraulics", "Electrics" etc., but to find details of a specific component, reference should be made to the alphabetical index at the back of the book.

Illustration which show a dismantled component are numbered as a guide to the dismantling sequence, which generally can be reversed for assembly.

Torque settings are given as a 'mean' figure which may be varied by + or - 3%. Torque figures indicated are for dry threads, hence for lubricated threads may be reduced by one third. Where no figure is quoted in the text, refer to page 1/1 - 3.

'Left Hand' and 'Right Hand' are as viewed from the rear of the machine looking forward.

Tone Coding

The following coding is used on hydraulic circuit illustrations with no colour, to denote various conditions of oil pressure and flow.



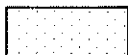
1. Neutral Circuit Pressure.



2. Pressure generated by the operation of a service. Depending on application, this may be anything between neutral Circuit Pressure and MRV Operating Pressure.



3. Pressure that is above neutral pressure but lower than that denoted by 2.



4. Exhaust.



WARNING

Asbestos

Asbestos dust can damage your lungs. Some engine joints and gaskets may contain asbestos. Take the following precautions when working on them.

- 1 Wear a face mask and gloves.
- 2 Work in a well ventilated area and do not smoke.
- 3 Do not use a rotary wire brush, use a hand scraper.
- 4 Make sure the material to be removed is wet with oil or water to contain loose particles.
- 5 Place all material into plastic bags and dispose of in accordance with local regulations.

GEN-1-8



WARNING

Fluoroelastomeric Materials

Certain seals and gaskets (e.g. crankshaft oil seal) on JCB machines contain fluoroelastomeric materials such as Viton, Fluorel and Technoflon. Fluoroelastomeric materials subjected to high temperatures can produce highly corrosive hydrofluoric acid. THIS ACID CAN SEVERELY BURN.

New fluoroelastomeric components at ambient temperature require no special safety precautions.

Used fluoroelastomeric components whose temperatures have not exceeded 300°C require no special safety precautions. If evidence of decomposition (e.g. charring) is found, refer to the next paragraph for safety instructions DO NOT TOUCH COMPONENT OR SURROUNDING AREA.

Used fluoroelastomeric components subjected to temperatures greater than 300°C (e.g. engine fire) must be treated using the following safety procedure. Make sure that heavy duty gloves and special safety glasses are worn:

- 1 Ensure that components have cooled then remove and place material into plastic bags.
- 2 Thoroughly wash contaminated area with 10% calcium hydroxide or other suitable alkali solution, if necessary use wire wool to remove burnt remains.
- 3 Thoroughly wash contaminated area with detergent and water.
- 4 Contain all removed material, gloves etc used in this operation in sealed plastic bags and dispose of in accordance with Local Authority Regulations.

DO NOT BURN FLUOROELASTOMERIC MATERIALS.

If contamination of skin or eyes occurs, wash the affected area with a continuous supply of clean water or with calcium hydroxide solution for 15-60 minutes. Get medical attention immediately.

INT - 3 - 3 - 5/1

Colour Coding

The following colour coding, used on illustrations to denote various conditions of oil pressure and flow, is standardised throughout JCB Service Publications.



Blue: Neutral Circuit Pressure.



Light Green: Oil subjected to a partial vacuum due to a drop in pressure (cavitation).



Red: Pressure generated by the operation of a service. Depending on application this may be anything between Neutral Circuit Pressure and M.R.V. Operating Pressure.



Yellow: Oil trapped within a chamber or line, preventing movement of components (lock-up).



Pink: Pressure that is above Neutral Circuit Pressure but lower than that denoted by Red.



Orange: Oil pressure used in a controlling device (servo).



Green: Exhaust.

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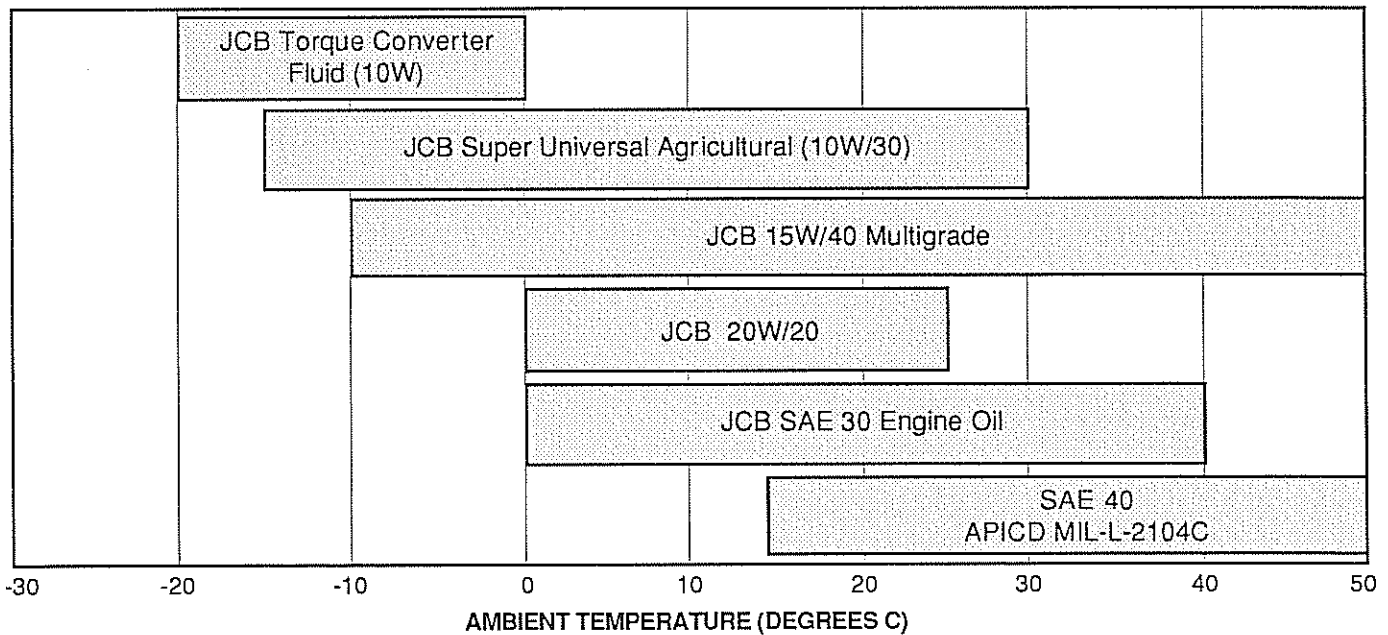
Green: Exhaust.

ENGINE LUBRICANTS and CAPACITIES.

Note: To promote thorough running-in, engines of new machines are filled at the factory with JCB 10W/30 Multigrade oil. This oil should be drained after the first 100 hours operation and the engine filled with the recommended grade as shown in the engine lubrication chart. JCB 10W/30 Multigrade should also be used for the first 100 hours operation whenever a new or reconditioned engine is fitted into the machine. Alternatively, where a new or reconditioned engine requires protection against corrosion during prolonged storage, Mobilaroma 524 may be used during the storage period and for the first 100 hours operation. It is essential that both these oils are replaced by the recommended lubricant after the first 100 hours operation.

Model	Lubricant	Engine	Capacity	
410	See chart below	4.98	9.7 litres	17 UK Pints
		4.236	10.8 litres	19 UK Pints
		1004 - 4HR	10.8 litres	19 UK Pints
412	See chart below	T4.236	10.8 litres	19 UK Pints
		1004 - 4THR	10.8 litres	19 UK Pints
415	See chart below	T4.236	10.8 litres	19 UK Pints
		1004-4THR	10.8 litres	19 UK Pints
420	See chart below	6.3544	14.5 litres	24 UK Pints
425	See chart below	1006 - 6H	14.5 litres	24 UK Pints
430	See chart below	T6.3544	15.6 litres	27 UK Pints

ENGINE LUBRICATION CHART



TRANSMISSION LUBRICANTS and CAPACITIES.

Model	Lubricant	Capacity	
410	+ JCB Torque Converter Fluid (SAE 10W)	14.5 litres	26 UK Pints
412	+ JCB Torque Converter Fluid (SAE 10W)	14.5 litres	26 UK Pints
415 Standard Swedish	+ JCB Torque Converter Fluid (SAE 10W)	16 litres	28 UK Pints
	+ JCB Torque Converter Fluid (SAE 10W)	14.5 litres	26 UK Pints
420	+ JCB Torque Converter Fluid (SAE 10W)	17 litres	30 UK Pints
425	+ JCB Torque Converter Fluid (SAE 10W)	18 litres	32 UK Pints
430	+ JCB Torque Converter Fluid (SAE 10W)	17 litres	30 UK Pints

***HYDRAULIC FLUIDS and CAPACITIES**

Model	Lubricant		Capacity (see Note)	
410	A	JCB 'Special' Hydraulic Fluid	100 litres	22 UK gals
	B	JCB High Performance Hydraulic Fluid		
412	A	JCB 'Special' Hydraulic Fluid	100 litres	22 UK gals
	B	JCB High Performance Hydraulic Fluid		
415	A	JCB 'Special' Hydraulic Fluid	113 litres	25 UK gals
	B	JCB High Performance Hydraulic Fluid		
420	A	JCB 'Special' Hydraulic Fluid	113 litres	25 UK gals
	B	JCB High Performance Hydraulic Fluid		
425	A	JCB 'Special' Hydraulic Fluid	155 litres	34.1 UK gals
	B	JCB High Performance Hydraulic Fluid		
430	A	JCB 'Special' Hydraulic Fluid	128 litres	28 UK gals
	B	JCB High Performance Hydraulic Fluid		

A = up to 38 deg C (100 deg F) B = above 38 deg C (100 deg F)

+ These oils meet the following specifications: API CD

MIL- L-2104D

MIL- L- 46152

Note: Hydraulic capacities shown are approximate and depend on equipment specified.

ENGINE COOLANT

Model	Engine	Capacity	
410	4.98	18 litres	32 UK Pints
	4.236	23.5 litres	41 UK Pints
	1004 - 4HR	16.75 litres	29 UK Pints
412/415	T4.236	26.5 litres	46 UK Pints
	1004 - 4THR	23.5 litres	42 UK Pints
420	6.3544	28 litres	50 UK Pints
425	1006-6HR	26.5 litres	47 UK Pints
430	T6.3544	28 litres	50 UK Pints

LUBRICANTS and CAPACITIES

Item	Model	Lubricant	Capacity	
Front Axle	410/412/415	JCB 'Special' Gear Oil	29.5 litres	6.5 UK galls
	†† 410/412	JCB 'Special' Gear Oil	25.0 litres	5.5 UK galls
	420/425/430	JCB 'Special' Gear Oil	31.2 litres	6.9 UK galls
Rear Axle	410/412/415	JCB 'Special' Gear Oil	29.5 litres	6.5 UK galls
	†† 410/412	JCB 'Special' Gear Oil	25.0 litres	5.5 UK galls
	420/425/430	JCB 'Special' Gear Oil	31.2 litres	6.9 UK galls
Braking System	all models	JCB Light Hydraulic Fluid		
Grease Points	all models	† JCB 'Special' MPL Moly Grease		
* Fuel	410/412/415		95 litres	21 UK galls
	412 machines from 526177		§ 140 litres	31 UK Galls
	420		181 litres	40 UK galls
	425		149 litres	33 UK galls
	430		185 litres	40 UK galls

† denotes Multi-purpose Lithium grease with Molybdenum di-sulphide

†† denotes 410 and 412 machines built after September 1989

* § denotes 45 litre (10 UK galls) auxiliary fuel tank fitted.

1—3

1—3

TORQUE SETTINGS

Use only where no torque setting is specified in the text. Values are for Dry threads and may be within three per cent of the figures stated. For lubricated threads the values should be REDUCED by one third.

UNF Grade 'S' Bolts

Bolt Size		Hexagon (A/F) in.	Torque Settings		
in.	(mm)		Nm.	kgf m	lbf ft
1/4	(6.3)	7/16	14	1.4	10
5/16	(7.9)	1/2	28	2.8	20
3/8	(9.5)	9/16	49	5.0	36
7/16	(11.1)	5/8	78	8.0	58
1/2	(12.7)	3/4	117	12.0	87
9/16	(14.3)	13/16	170	17.3	125
5/8	(15.9)	15/16	238	24.3	175
3/4	(19.0)	1.1/8	407	41.5	300
7/8	(22.2)	1.5/16	650	66.3	480
1	(25.4)	1.1/2	970	99.0	715
1.1/4	(31.7)	1.7/8	1940	198.0	1430
1.1/2	(38.1)	2.1/4	3390	345.0	2500

Metric Grade 8.8 Bolts

Bolt Size		Hexagon (A/F) mm	Torque Settings		
(mm)			Nm.	kgf m	lbf ft
M5	(5)	8	7	0.7	5
M6	(6)	10	12	1.2	9
M8	(8)	13	28	3.0	21
M10	(10)	17	56	5.7	42
M12	(12)	19	98	10	72
M16	(16)	24	244	25	180
M20	(20)	30	476	48	352
M24	(24)	36	822	84	607
M30	(30)	46	1633	166	1205
M36	(36)	55	2854	291	2105

*ZF Transmission (use only on ZF Transmission) — in Nm

Metric Coarse Thread**Metric Fine Thread**

Grade					Grade				
Size	6.9	8.8	10.9	12.9	Size	6.9	8.8	10.9	12.9
M6	8.5	10	14	17	M8 x 1	23	27	38	45
M8	21	25	35	41	M10 x 1,25	44	52	73	88
M10	41	49	69	83	M12 x 1,25	80	95	135	160
M12	72	86	120	145	M12 x 1,5	76	90	125	150
M14	115	135	190	230	M14 x 1,5	125	150	210	250
M16	180	210	295	355	M16 x 1,5	190	225	315	380
M18	245	290	400	485	M18 x 1,5	275	325	460	550
M20	345	419	580	690	M20 x 1,5	385	460	640	770
M22	465	550	780	930	M22 x 1,5	520	610	860	1050
M24	600	710	1000	1200	M24 x 2	650	780	1100	1300
M27	890	1050	1500	1800	M27 x 2	970	1150	1600	1950
M30	1200	1450	2000	2400	M30 x 2	1350	1600	2250	2700

Note: ALL bolts used on JCB machines are high tensile and must not be replaced by bolts of a lesser tensile specification.

SERVICE SCHEDULES**EVERY 10 OPERATING HOURS OR DAILY
whichever occurs first****CLEAN**

Machine generally
Engine air filter pre-cleaner

CHECK (engine stopped)

- Generally for damage
- * Engine Coolant level and condition
- Engine oil level and condition
- Hydraulic fluid level
- Tyre pressures and condition
- Tightness of wheel nuts
- * Parking brake operation
- * Service brake operation
- Windscreen washer level
- * All pivot pin grease seals
- * Air cleaner hose security
- * Seat belt condition and security (when fitted)

CHECK (engine running)

- Operation of all services
- * Hydraulic system for leaks
- * Transmission oil level
- Operation of all electrical equipment
- Exhaust (excessive smoke)
- * Fuel system for leaks
- * Engine generally for leaks
- * Instrument readings, warning lights and audible alarm

*** DRAIN**

Fuel Filter

GREASE

- * Bucket pivot pins (415 & 425)
- * Hydraulic Tow Hitch (410 & 412) (if fitted)

**EVERY 50 OPERATING HOURS OR WEEKLY
whichever occurs first**

Do the daily jobs plus:

CHECK (engine stopped)

- Fan belt/tension
- * Air conditioner compressor belt tension (if fitted)
- Radiator and hose condition
- * Electrolyte level
- Axle oil level
- * Brake fluid level
- * Condition of ram piston rod
- * Hoses and pipework for chafing/security

CLEAN

- * Fuel sediment bowl

GREASE

- * Bucket pivot pins (410 & 412 from m/c No. 524349)
- * Loader arm pivot pins (415 & 425)
- Lower centre pivot
- Steer ram pins

*** CHANGE**

Transmission oil filter (First 50 hours only)

- * **Note:** Initial transmission oil filter change at 50 hours and 100 hours on new and rebuilt transmissions.

*** OIL**

All linkages, hinges and cables



Our support email:

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