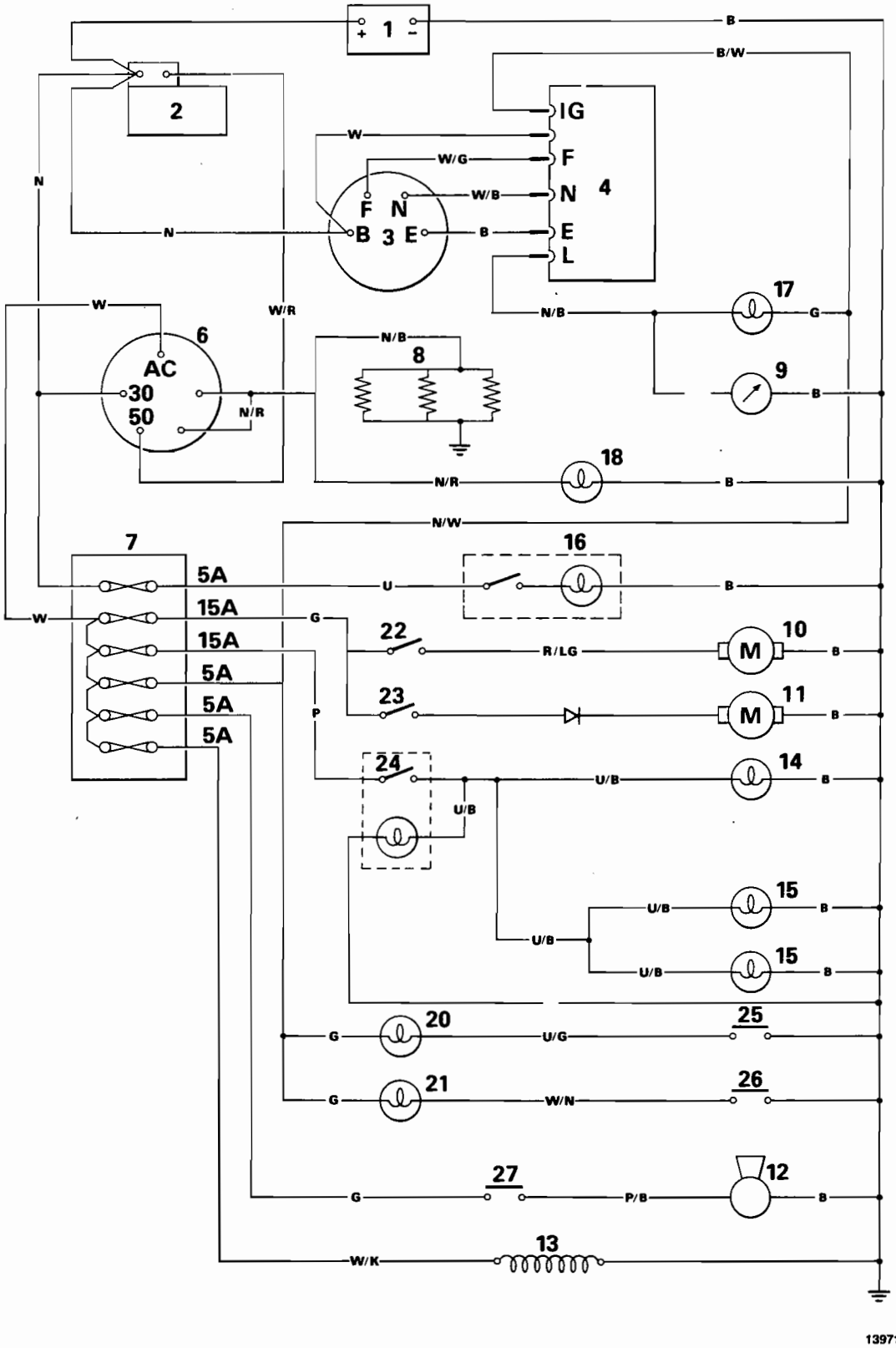

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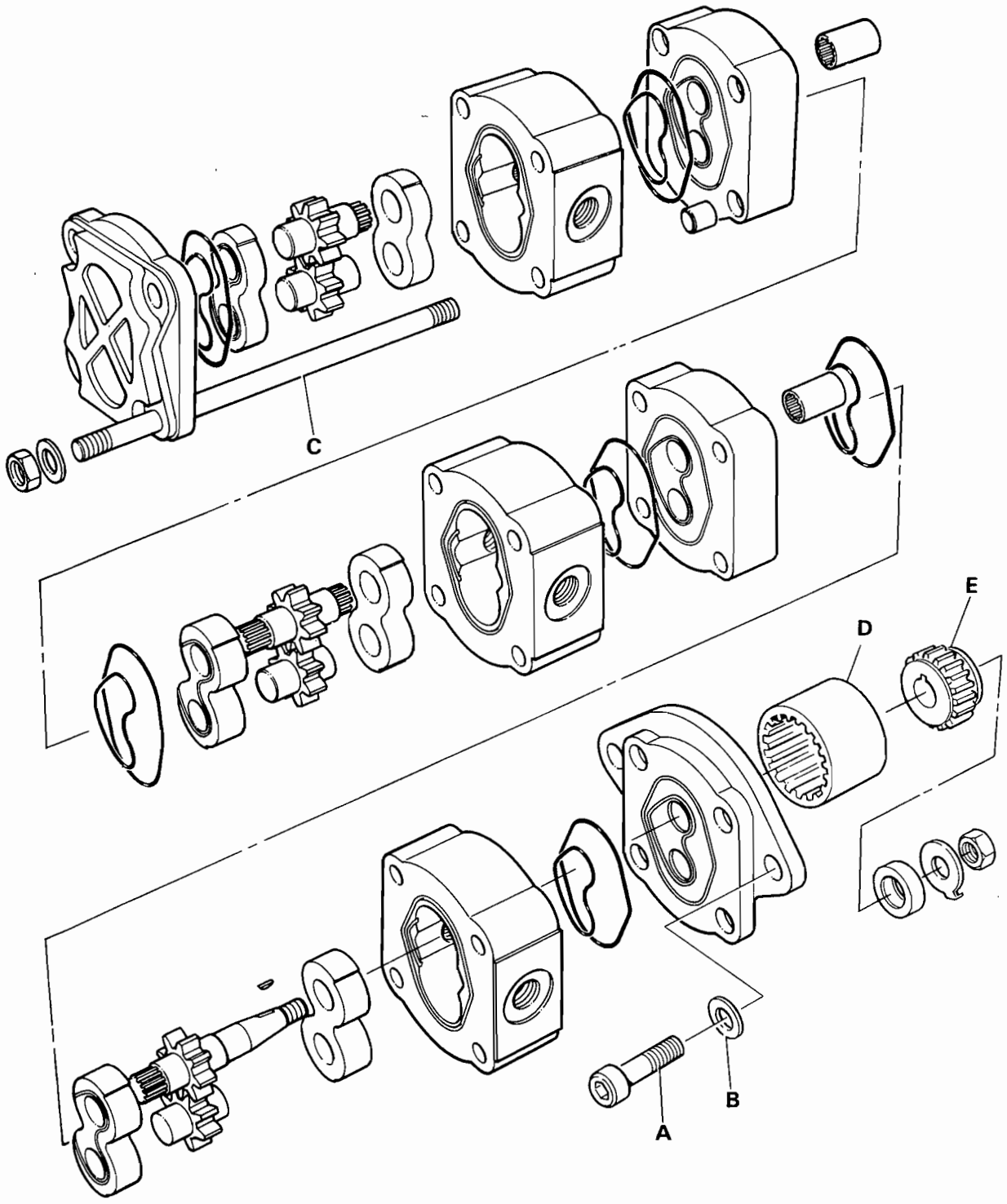
HYDRAULIC CIRCUIT

Component Key

P1	Pump Section 1
P2	Pump Section 2
P3	Pump Section 3
T	Tank
S	Suction Line
1A	Neutral Circuit Lines
1B	Neutral Circuit Lines
1C	Neutral Circuit Lines
1D	Neutral Circuit Lines
2	Control Valve
2A	Dipper Spool
2B	L.H. Track Motor Spool
***2C**	Auxiliary Spool
***2D**	Auxiliary Spool
2E	R.H. Track Motor Spool
2F	Boom Spool
2G	Bucket Spool
2H	Swing Spool
2J	Slew Motor Spool
***2K**	Dozer Spool (standard)
***2K(F)**	Dozer Spool with float (optional)
2L	Main Relief Valves
2M	Auxiliary relief Valves
***2N**	Load Hold Check Valve
2P	Anti-cavitation Valve
3	Rotary Coupling
4	L.H. Track Motor
4A	Counterbalance Valve
5	R.H.Track Motor
5A	Counterbalance Valve
6	Slew Motor
6A	Counterbalance Valve
6B	Brake Valve
7A/7R	Service Lines
8	Dipper Ram
9	Boom Ram
10	Bucket Ram
11	Swing Ram
12	Dozer Ram
13	Return Line
14	Return Filter
15	Suction Strainer

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C
E
D
A
B

TORQUE SETTINGS

Only use following when no setting is specified in text of manual.

CAUTION: All bolts used on JCB equipment are high tensile and must not under any circumstances be replaced with bolts of a lesser tensile specification.

Metric Grade 8.8 Bolts

Bolt Size	(mm)	Hexagon (A/F) mm	Torque Settings 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

TABLE OF IMPORTANT TIGHTENING TORQUES

Tightening Points	Tightening Torque Nm	kgf m	lbf ft
Sprocket retaining cap	60.8 - 70.6	6.2 - 7.2	44.8 - 52.1
Track roller	77.5 - 90.2	7.9 - 9.2	57.1 - 66.5
Idler/yoke	77.5 - 90.2	7.9 - 9.2	57.1 - 66.5
Rotary coupling mounting	23.5 - 27.5	2.4 - 2.8	17.4 - 20.3
Rotary coupling reaction plate	23.5 - 27.5	2.4 - 2.8	17.4 - 20.3
Slew ring	77.5 - 90.2	7.9 - 9.2	57.1 - 66.5
Slew gearbox case	123.6 - 147.1	12.6 - 15.0	91.1 - 108.5
Oil tank	77.5 - 90.2	7.9 - 9.2	57.1 - 66.5
Fuel tank	77.5 - 90.2	7.9 - 9.2	57.1 - 66.5
Hydraulic filter cap	Max. 30	Max. 3.1	Max. 22
Piping clamp	27.5 - 29.4	2.8 - 3.0	20.3 - 21.7
Rod end - controls	39.2 - 45.1	4.0 - 4.6	28.9 - 33.3
Operating control support plate	48.1 - 55.9	4.9 - 5.7	35.4 - 41.2
Slew interlever pivot	48.1 - 55.9	4.9 - 5.7	35.4 - 41.2
Silencer band	6.8	0.7	5.1
Exhaust tail pipe	4.9	0.5	3.6
Engine shock absorber	48.1 - 55.9	4.9 - 5.7	35.4 - 41.2
Engine bracket	48.1 - 55.9	4.9 - 5.7	35.4 - 41.2
Engine support	48.1 - 55.9	4.9 - 5.7	35.4 - 41.2
Rear counterweight	77.5 - 90.2	7.9 - 9.2	57.1 - 66.5
Oil tank cover	15.7 - 17.7	1.6 - 1.8	11.6 - 13.0
*Track Gearbox Cover (Capscrews)	77	7.9	57
Rams			
Head nut (all except dozer)	314	32.0	232
Head nut (dozer)	345	35.2	255
End cap (all except dozer)	610	62.2	450
End cap (dozer)	400	40.8	295

TRACK AND SLEW MOTORS

FAULT FINDING

Fault		Probable Cause	Action
1	Motor fails to rotate.	1 Abnormal wear or seizure of sliding parts.	Replace worn parts. Repair sliding surfaces or replace rotating parts sub-assembly.
		2 Damage to internal parts.	Replace rotating parts sub-assembly or motor assembly.
		3 Plunger of counterbalance valve sticking.	
		3.1 Overtightening.	Apply correct torque.
		3.2 Dirt in clearances.	Clean, repair scratching as necessary.
		4 Relief valve pressure too low.	
		4.1 Dirt in poppet seat or orifice.	Clean and/or replace relief valve sub-assembly.
		5 Check valve sticking.	
		5.1 Dirt in valve seat, clearances or orifice.	Clean and/or replace plunger sub-assembly.
2	Low or uneven speed of rotation.	1 Wear of sliding parts.	Repair sliding surfaces or replace rotating parts as necessary.
		2 Wear of bearings and/or splined parts.	Replace bearings and/or shaft. Replace rotating parts sub-assembly.
3	Creep speed high.	1 Increase of clearance between piston and bores.	Strip, check clearances, replace rotating parts sub-assembly as necessary.
		2 Damage to sliding surfaces.	Repair sliding surfaces or replace valve plate and/or rotating parts sub-assembly.
		3 Increase of clearance between:	Replace parts as necessary.
		3.1 Valve body and plunger.	
		3.2 Valve body and shockless piston.	

.....cont'd

LUBRICANTS & CAPACITIES

Note: New engines DO NOT require a running-in period. The engine/machine should be used in a normal work cycle immediately; glazing of the piston cylinder bores, resulting in excessive oil consumption, could occur if the engine is gently run-in. Under no circumstances should the engine be allowed to idle for extended periods; (e.g. warming up without load). Engines of new machines are filled at the factory with JCB 10W/30 Multigrade oil. This oil should be drained after the first 50 hours operation and the engine filled with the appropriate recommended grade as shown in the lubrication chart. JCB 10W/30 Multigrade should also be used for the first 50 hours operation whenever a new or reconditioned engine is fitted to the machine. After the first 50 hours operation, it is essential that the 10W/30 oil is replaced by the lubricant recommended below.

FLUIDS, LUBRICANTS, CAPACITIES AND SPECIFICATIONS

ITEM	CAPACITY	FLUID/LUBRICANT Litres (Gal)	INTERNATIONAL SPECIFICATION
Fuel Tank	17.0 (3.75)	Diesel Oil (See **Types of Fuel**)	ASTM D975-66T Nos. 1D, 2D
Engine (Oil)			
First 50 hours only	3.5 (0.77)	**JCB 10W/30 Multigrade** above - 15 °C (5 °F)	MIL-L-46152, API CC/SF
		5W/20 - 15 °C to - 25 °C (5 °F to -13 °F)	API CC/SE (recommended)
After first 50 hours		**JCB 15W/40 Multigrade** above - 10 °C (14 °F)	SAE15W/40, MIL-L-46152B, API CD/SE MIL-L-2104D
		5W/20 - 10 °C to - 25 °C (14 °F to -13 °F)	API CC/SE or API CD/SE
Engine (Coolant)			
Canopy	4.5 (1.0)	**JCB Universal Antifreeze**/water	ASTM D3306-74
Cab		5.0 (1.1)	(See **Coolant Mixtures**)
***Track Gearbox (each)**			
to m/c no. 649729	1.6 (0.35)	**JCB HD90 Gear Oil**	API-GL-5, MIL-L-2105C
from m/c no. 649730	0.33 (0.07)	**JCB SAE 30 Engine Oil**	API-CD/SF, MIL-L-46152B, MIL-L-2104B
Slew Gearbox	0.6 (0.13)	**JCB HD90 Gear Oil**	API-GL-5, MIL-L-2105C
***Track Idler Wheels**	Sealed Unit	**JCB HD90 Gear Oil**	API-GL-5, MIL-L-2105C
***Track Rollers (bottom)**	Sealed Unit	**JCB HD90 Gear Oil**	API-GL-5, MIL-L-2105C
***Hydraulic System**	30 (6.6)	**JCB Hydraulic Fluid 46** (Below -10°C; 14°F) **JCB Special Hydraulic Fluid** (-10°C to 40°C; 14°F to 104°F) **JCB Hydraulic Fluid 46** (Over 40°C;104°F)	
Slew Ring			
Bearings		**JCB MPL Grease**	Lithium based, No. 2 consistency.
Gear Teeth		**JCB Slew Pinion Grease †**	
All OtherGrease Points		**JCB MPL Grease**	Lithium based, No. 2 consistency.

† WARNING: JCB Slew Pinion Grease is harmful as it contains bitumen compounds 2811. Excessive contact may lead to dermatitis or skin cancer. Always use a barrier cream or wear gloves; wash contaminated skin thoroughly with soap and water. In the event of eye contact, immediately wash with plenty of water and seek medical advice.

8-1-1-7

SERVICE SCHEDULES

EVERY 10 OPERATING HOURS OR DAILY whichever occurs first

Clean

1 Machine generally

Check and adjust where necessary (engine stopped)

2 Generally for damage
3 Hydraulic oil level
4 Engine oil level
5 Engine coolant
6 Fuel system for leaks
7 Engine air filter pre-cleaner
8 Track adjustment

Check and adjust where necessary (engine running)

9 Operation of horn
10 Operation of all other electrical equipment
11 Exhaust (excessive smoke)
12 Dozer operation
13 Excavator operation
14 Track and running gear operation
15 Hourmeter operation

EVERY 50 OPERATING HOURS OR WEEKLY whichever occurs first

Do the daily jobs plus:

Clean

1 Drain and clean fuel filter
2 Drain fuel sediment bow
3 Radiator matrix

Check and adjust where necessary (engine stopped)

4 Fan belt adjustment

* **Note**: Failure to maintain correct fan belt adjustment can result in damage to timing case cover.

FIRST 50 HOURS ONLY

Do the jobs listed in 50 hours (above) plus:

Change

1 Engine oil and filter canister

Check

2 Track tension (rubber tracks only)

* **Alternator**	Dismantling & Assembly	8/3 - 2
	Removal and Replacement	5/8 - 1
	Voltage Regulator Operation	8/4 - 1
	Charging Circuit Testing	8/4 - 3
Battery	Testing	8/2 - 1
Body and Framework	General Description	4/1 - 1
	Technical Data	4/1 - 1
Boom	Dismantling & Assembly	4/5 - 1
Bucket	Dismantling & Assembly	4/2 - 1
	Ram Pivot Linkage	4/3 - 1
Circuits		
Electrical		8/6 - 1
Hydraulic		2/2 - 3
Hydraulic Schematic		2/2 - 1
Machine Neutral		2/4 - 1
Control Valves (See Hydraulics)		—
Dipper	Dismantling & Assembly	4/4 - 1
Engine	Removal & Replacement	5/9 - 1
	Technical Data	5/1 - 1
Air Filter		5/6 - 1
Camshaft	Removal and Replacement	5/14 - 1
Coolant		5/7 - 1
Crankshaft	Removal & Replacement	5/15 - 1
Cylinder Head	Removal & Replacement	5/10 - 1
Fan Belt	Removal & Replacement	5/7 - 3
Fuel Filter	Removal & Replacement	5/5 - 1
Fuel Injection Pump	Removal & Replacement	5/5 - 3
	Timing	5/5 - 4
Fuel Injectors and Pipes	Removal & Replacement	5/5 - 5
Fuel Lift Pump	Removal & Replacement	5/5 - 2
Fuel System	Bleeding	5/5 - 7
Oil	Draining/Filling	5/2 - 1
	Filter	5/2 - 2
Oil Pressure Relief Valve	Removal & Replacement	5/3 - 1
Oil Pump & Idler Gear	Removal & Replacement	5/13 - 1
Pistons & Connecting Rods	Removal & Replacement	5/11 - 1
Sump/Suction Pipe/Strainer	Removal & Replacement	5/4 - 1
Tachometer Drive	Removal & Replacement	5/14 - 1
Timing Gear Case	Removal & Replacement	5/12 - 1
Valve Clearances	Adjustment	5/10 - 5
Water Pump	Removal & Replacement	5/7 - 2
Filters		
Air		5/6 - 1
Engine Oil		5/2 - 2
Fuel		5/5 - 1
Hydraulic		2/3 - 1
Fuel System (See Engine)		—

Introduction

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

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

For example, renewal of oil seals, gaskets, etc., and any component showing obvious signs of wear or damage is expected as a matter of course, and therefore information of this nature is included only 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.

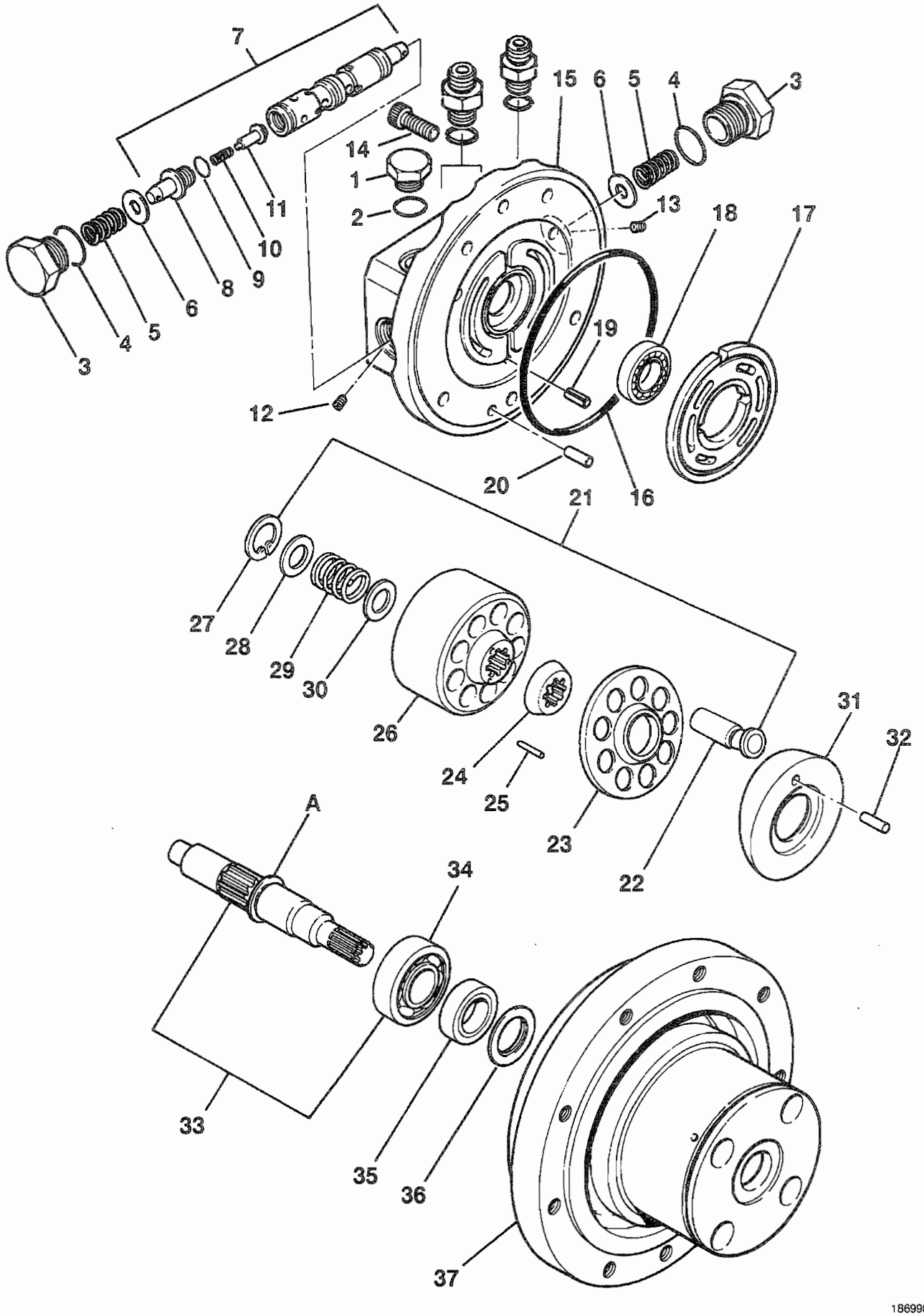
For convenience this manual is compiled in sections, e.g. "Hydraulics", "Electrics", etc. but, to find details of a specific component, reference should be made to the alphabetical index at the back of the book.

Illustrations 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 plus or minus 3%. Torque figures indicated are for dry threads, hence for lubricated threads may be reduced by one third.

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

References to alternative servicing intervals are to be treated on a "whichever occurs first" basis.


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BOOM

Removal and Replacement

When Dismantling

1 Remove the bucket, bucket link and dipper, see pages 4/2-1, 4/3-1 and 4/4-1 respectively.

2 Remove the dipper and boom rams, see page 2/23-1.

*3 Disconnect the hydraulic hoses from the stub pipes at the base of the boom. Blank off the open ends of hoses and pipes.

Note: The boom weighs 45kg.

4 Attach suitable lifting equipment to the boom **D** and take up the slack.

*5 Remove the self-locking nut **A**. Drive out the bolt **B** and the pivot pin **C**. Remove the boom from the machine.

Inspection

*1 Check that the boom pivot bushes and the pivot pin are within permitted tolerances. Renew pivot pin and/or boom pivot bushes as necessary.

TOLERANCES - Pivot Pin/Pivot Bush

	Pin	Bush
Reference value	30 mm	30 mm I/D
Allowable limit	29 mm	29 mm I/D

*2 Examine the boom structure for wear, damage or corrosion. Renew as necessary.

When Assembling

Note: The boom weighs 45kg.

1 Using suitable lifting equipment locate the boom onto the kingpost.

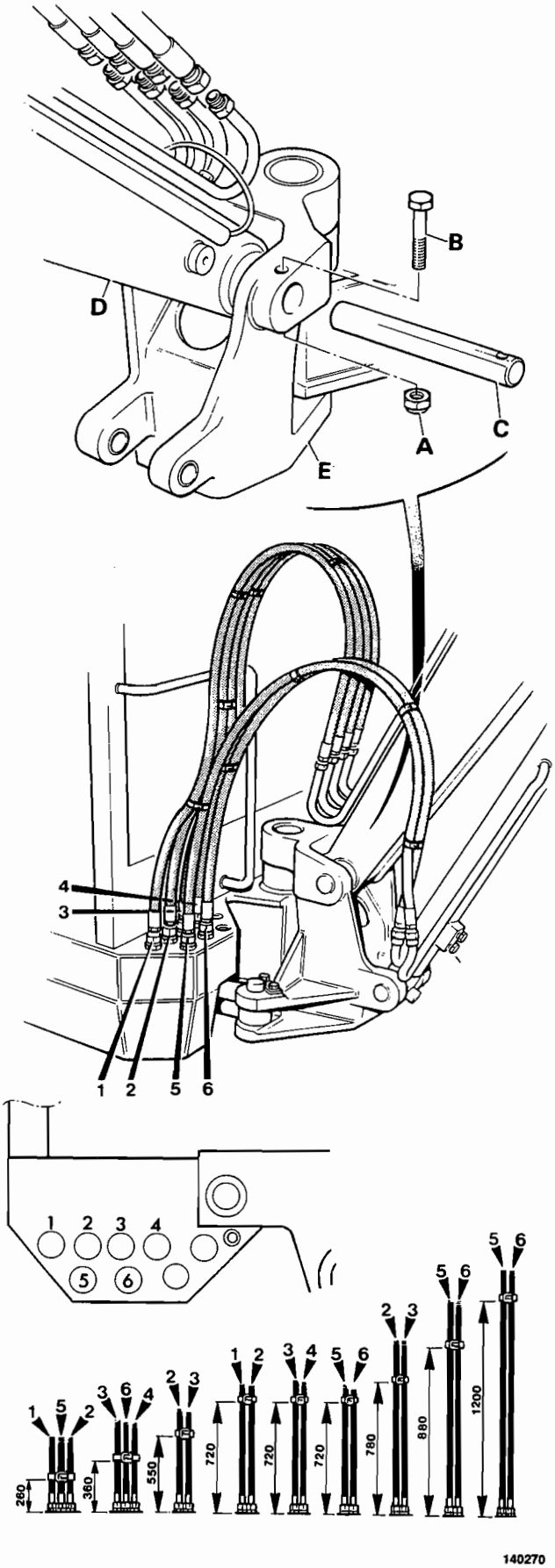
2 Fit the pivot pin **C** and secure with the bolt **B** and a new self-locking nut **A**.

3 Fit the dipper and boom rams, see page 2/23 - 1.

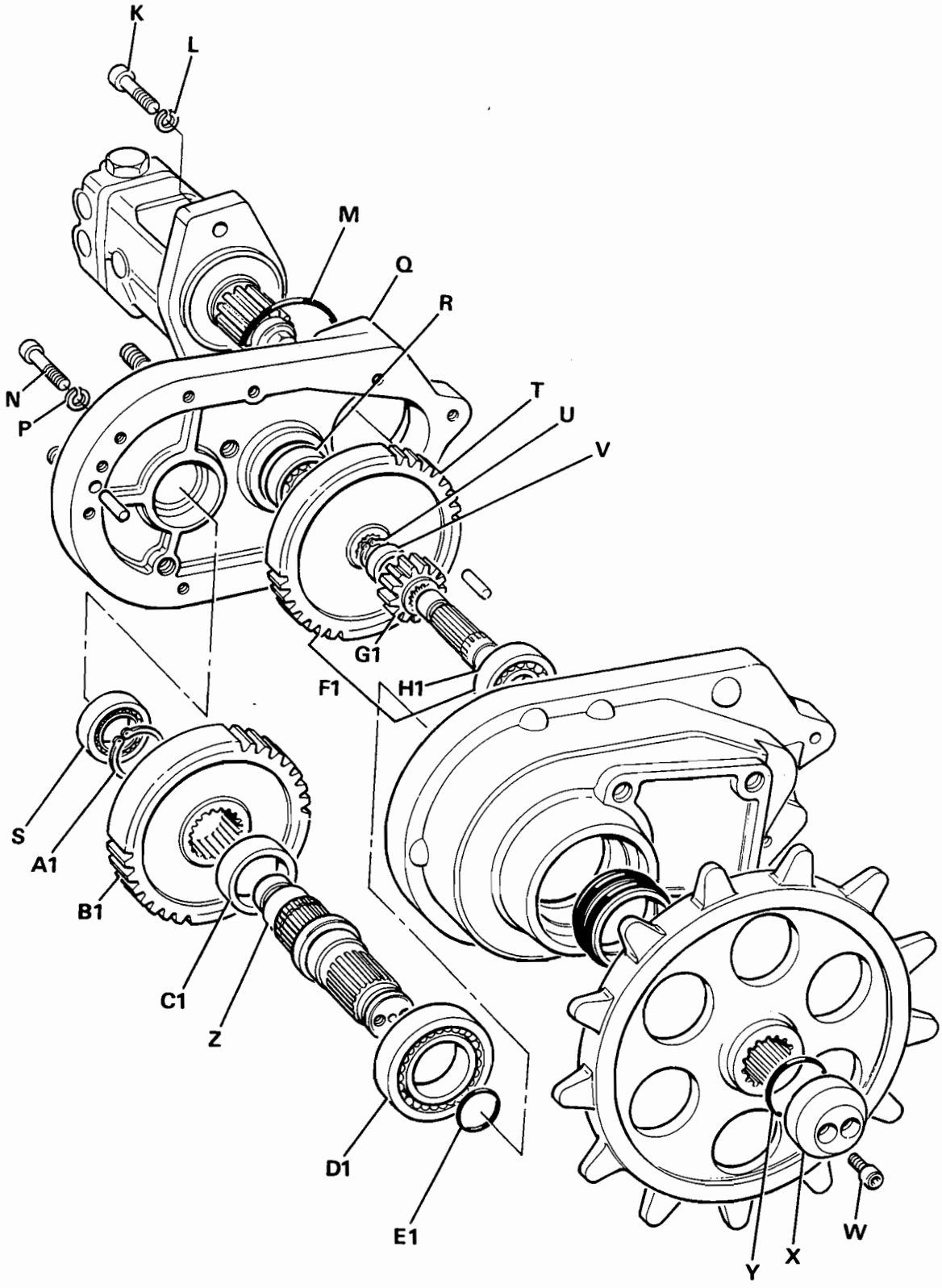
4 Fit the dipper, bucket link and bucket, see pages 4/4-1, 4/3-1 and 4/2-2 respectively.

*5 Connect the hydraulic hoses to the stub pipes at the base of the dipper. See page 1/1-5 for sealing and torque information. Fit hose ties in the exact positions shown around the hoses numbered on the diagram. With the boom at approximately 45° and the bucket on the ground, measure the tie positions along the hose length from the face of the mainframe.

6 Restore the hydraulic supply and set up the hydraulic circuit.



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