Open front screen

EXCAVATOR LOADER

From Machine Serial No. 290000

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 such personnel have at least a sound knowledge of workshop practice, safety procedures and general techniques associated with the maintenance and repair of hydraulic earthmoving equipment. Details of such are therefore generally omitted from this manual, the intention being to convey only the more specialised information concerning particular aspects of the machine or component in question.

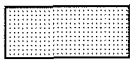
For example, renewal of oil seals, gaskets etc. and any component showing obvious wear or damage is expected as a matter of course and information on these matters is therefore only included where a specialised procedure or range of wear tolerances is required. Similarly, it is expected that components will be thoroughly cleaned and lubricated where appropriate, also that any opened hose or pipe connections will be blanked to prevent entry of dirt and excessive loss of hydraulic fluid.

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.

Illustrations showing a dismantled component are numbered as a guide to the dismantling sequence which can generally be reversed for assembly.

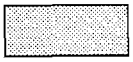
Torque settings quoted are given as 'mean' figures which may be varied by ± 3%. 'Left Hand' and 'Right Hand' are as viewed from the rear of the machine.

* Unless colour is used, the following coding is used on hydraulic circuit illustrations to denote various conditions of oil pressure and flow.

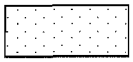


1. Neutral Circuit Pressure.

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.

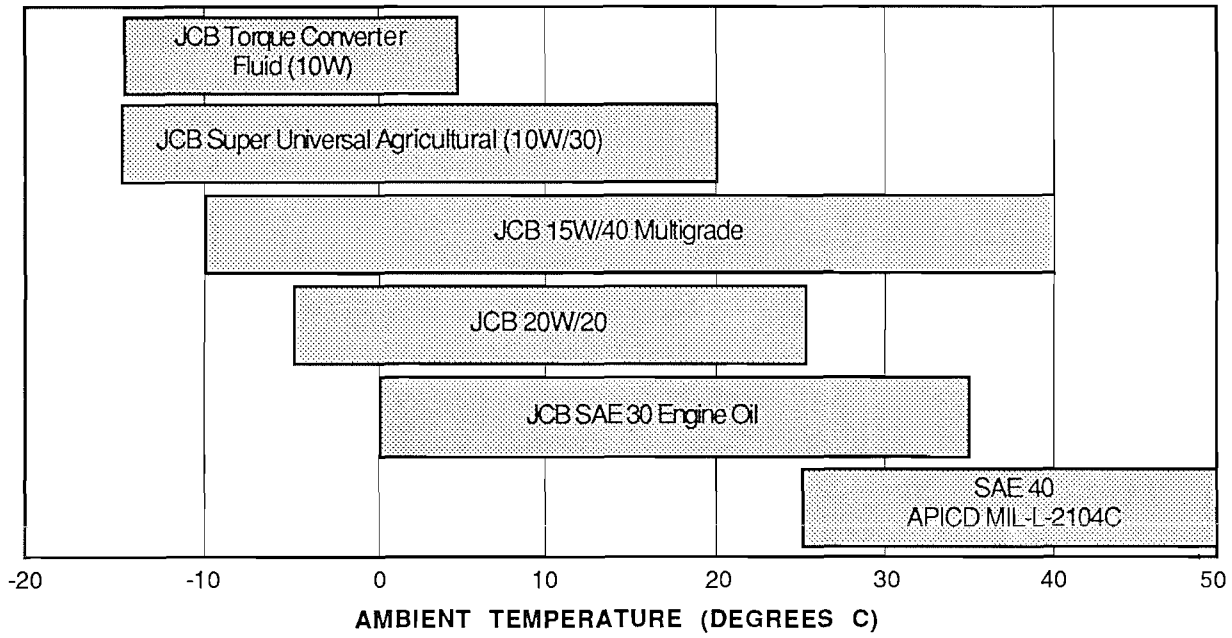


4. Exhaust.

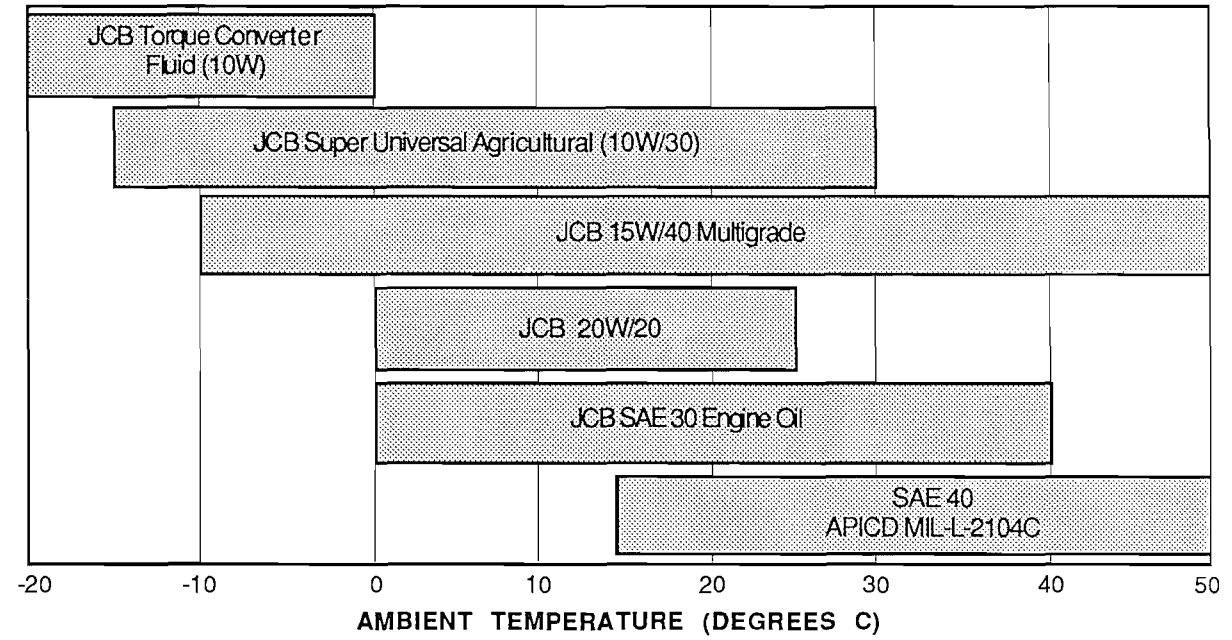
LUBRICANTS AND CAPACITIES

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 to the machine. Alternatively, where a new or reconditioned engine requires protection against corrosion during prolonged storage, Mobilarma 524 may be used during the storage period and during the first 100 hours operation. It is essential that both these oils are replaced by the recommended lubricant after the first 100 hours operation

LEYLAND 4/98 ENGINE



PERKINS 4.236 & T4236 ENGINES



LUBRICANTS & CAPACITIES (continued)

ITEM	LUBRICANT	CAPACITY	Litres	UK gal	US gal
ENGINE					
		4/98 Engine:	9.7	2.1	2.5
	Refer to charts on Page 1-1	4.236 Engine: †	11	2.4	2.9
		† *Increased capacity for engine with hot climate oil cooler:*	11.8	2.6	3.1
SHUTTLE REVERSER Up to machine no. 319999	† JCB Torque Converter Fluid	From dry:	11	2.4	2.9
GEARBOX Up to machine no. 319999	† JCB 15W/40 Multigrade		2.6	0.6	0.7
JCB TRANSMISSION From machine no. 320000	JCB Special Transmission Fluid	From dry: 2WD	17.25	3.8	4.5
		4WD	18.25	4.0	4.8
DRIVE AXLE (REAR)	JCB Special Gear Oil		28	6.2	7.4
DRIVE AXLE (FRONT)					
To m/c no. 297207	††JCB HD90 Gear Oil	Differential	7.0	1.5	1.8
		Hubs (each)	1.5	0.3	0.4
From m/c no. 297208	††JCB HD90 Gear Oil	Differential	15.0	3.3	4.0
		Hubs (each)	1.3	0.3	0.3
SLEW ACTUATOR	††JCB HD90 Gear Oil		4.3	0.9	1.1
HYDRAULIC SYSTEM (including tank) Below 38 deg C Above 38 deg C	JCB Special Hydraulic Fluid JCB High Performance Hydraulic Fluid		130 Note: The capacity quoted is approximate and will vary with attachments fitted.	29	34
BRAKE SYSTEM	JCB Light Hydraulic Fluid CAUTION: Do not use any other hydraulic fluid.		1.2	0.2	0.3

LUBRICANTS & CAPACITIES (continued)

ITEM	LUBRICANT	CAPACITY	Litres	UK Gal	US Gal
EXTENDING DIPPER	JCB Extradig Dipper Lubricant		(See WARNING below)		
ALL OTHER GREASE POINTS	†††JCB Special MPL Grease				
FUEL			90	20	24
COOLANT					
–4/98NT			13.6	3	3.6
–4/98TT			15.1	3.3	4.0
–4.236 to m/c no. 306000			17.0	3.7	4.5
–4.236 from m/c no. 306001			17.8	3.9	4.7

***WARNING** JCB Extradig Dipper Lubricant contains 1.53% lead. Contaminated rags, containers, etc., should only be disposed of in accordance with local regulations governing disposal of toxic waste.

† Oils marked with this symbol meet the following specifications:– API CD
MIL–L–2104C and MIL–L–2104D
MIL–L 46152

††JCB HD90 Gear Oil meets specifications API–GL–5 & MIL–L–2105C

†††JCB Special MPL is a lithium based no. 2 consistency grease

*ELECTRICAL CONNECTIONS As a corrosion and moisture inhibitor all exposed connections should be coated liberally with petroleum jelly.

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

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

SERVICE SCHEDULE

Check		Every 10 Hours	Every 50 Hours	Every 100 Hours	Every 250 Hours	Every 500 Hours	Every 1000 Hours	Every 2000 Hours
Hydraulic fluid level	1	●	●	○ ●	●	●	●	
–System for leaks	2	●	●	○ ●	●	●	●	●
–Operation of all services	3	●	●	○ ●	●	●	●	●
Condition of ram piston rods	4			○ ●	●	●	●	●
Pump drive	5			○ ●	●	●	●	●
M.R.V. pressure	6					●	●	●
A.R.V. pressure	7					●	●	●
Steering relief valve pressure	8					●	●	●
Hoses/pipes for chafing or damage	9			○ ●	●	●	●	●
Engine - Cylinder head torque settings - 4/98TT and 4.236 LD and LH builds - T4.236 upto Eng. No. LJ-UO27773M	14			○				
- Oil level and condition	15	●	●	○ ●	●	●	●	●
–Coolant/anti-freeze	16	●	●	○ ●	●	●	●	●
–Leaks	17	●	●	○ ●	●	●	●	●
–Idling Speed	18			○		●	●	●
–Max. governed speed	19			○		●	●	●
–Pulled down speed	20			○		●	●	●
–Exhaust (excessive smoke)	22	●	●	○ ●	●	●	●	●
–Fuel system for leaks/contamination	23			○	●	●	●	●
–Fan belt tension	24		●	○ ●	●	●	●	●
–Compression	25						●	●
–Exhaust system security	26			○		●	●	●
–Valve clearances–4/98	27			○		●	●	●
–4.236				○				●
–Mounting bolts tightness	28			○		●	●	●
–Radiator and hoses condition	29		●	○ ●	●	●	●	●
–Air cleaner hose security	30			○ ●	●	●	●	●
Wiring for chafing	34			○ ●	●	●	●	●
Operation of electrical equipment	35	●	●	○ ●	●	●	●	●
Battery electrolyte level	36							●
Instrument readings	38	●	●	○ ●	●	●	●	●
Windscreen washer bottle water	39	●	●	○ ●	●	●	●	●
*Hydraclamp adjustment	40			○ ●	●	●	●	●

○ First 100 hours or one month whichever occurs sooner

● Routine service

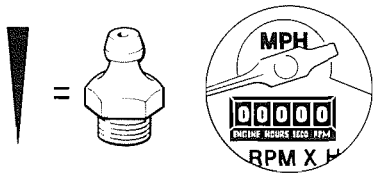
SERVICE SCHEDULE

		Every 10 Hours	Every 50 Hours	Every 100 Hours	Every 250 Hours	Every 500 Hours	Every 1000 Hours	Every 2000 Hours *
Check								
Operation of transmission	42	●	●	○ ●	●	●	●	●
Clutch oil pressures	43			○		●	●	●
Torque converter main line pressure	44			○		●	●	●
Shuttle reverser/transmission oil level	45	●	●	○ ●	●	●	●	●
—Oil cooler	46		●	○ ●	●	●	●	●
Gearbox oil level (not JCB trans.)	47		●	○ ●	●	●	●	●
Axle oil level/leaks	48		●	○ ●	●	●	●	●
Slewing actuator oil	49		●	○ ●	●	●	●	●
Pivot pins and bushes	50					●	●	●
Steering	51	●	●	○ ●	●	●	●	●
Tyre pressures and condition	52	●	●	○ ●	●	●	●	●
Tightness of wheel nuts	53	●	●	○ ●	●	●	●	●
Wheel hub bearings (front)	54			○		●	●	●
King pins and bushes	55			○		●	●	●
Brake fluid level	56	●	●	○ ●	●	●	●	●
Parking brake adjustment	57					●	●	●
—operation	58	●	●	○ ●	●	●	●	●
Footbrake operation	59	●	●	○ ●	●	●	●	●
Operation of hose-burst check valves (if fitted)	60			○		●	●	●
Change								
Engine oil	65			○	●	●	●	●
—Oil filter element	66			○	●	●	●	●
—Fuel filter element	67			○		●	●	●
Air cleaner element—Outer	68						●	●
—Inner	69							●
Hydraulic filter element	70			○		●	●	●
Hydraulic fluid & clean suction strainer	71							●
Brake system fluid	72							●
Shuttle reverser oil and clean strainer (not JCB transmission)	73						●	●
Transmission oil filter (if fitted)	74			○		●	●	●
Gearbox oil (not JCB transmission)	75						●	●
JCB transmission oil and clean strainer	76			○			●	●
Drive axle oil — rear	77						●	●
Drive axle oil — front (4WD)	78						●	●

SERVICE SCHEDULE

		Every 10 Hours	Every 50 Hours	Every 100 Hours	Every 250 Hours	Every 500 Hours	Every 1000 Hours	Every 2000 Hours *
Clean								
Battery terminals	82			○●	●	●	●	●
Air filter dust valve	83						●	●
Air filter pre-cleaner (optional)	84	●	●	○●	●	●	●	●
Fuel lift pump	85			○		●	●	●
Engine injectors and test –4/98	86					●	●	●
–4.236								●
Fuel sediment trap and drain	87		●	○●	●	●	●	●
Drain fuel filter	88		●	○●	●	●	●	●
Cab heater filter	89			○●	●	●	●	●
Drain water from slew actuator	90				●	●	●	●
Grease								
Steer axle – Yoke pivot	93	●	●	○●	●	●	●	●
–King pins and bushes	94	●	●	○●	●	●	●	●
–Hubs (2WD only)	95	●	●	○●	●	●	●	●
–Track rod ends	96	●	●	○●	●	●	●	●
–Universal joints (4WD only)	97	●	●	○●	●	●	●	●
Steer ram grease nipples	98	●	●	○●	●	●	●	●
All pivot pins	99	●	●	○●	●	●	●	●
Pump drive shaft (if nipples fitted)	100			○●	●	●	●	●
Propshaft–gearbox to rear axle	101		●	○●	●	●	●	●
Propshaft–4WD	102		●	○●	●	●	●	●
Kingpost and carriage	103	●	●	○●	●	●	●	●
All linkage points (oil)	104			○●	●	●	●	●
Extending dipper	105		●	○●	●	●	●	●

* Applies to both L.H. and R.H. pivots.
* S'applique aux pivots droits et gauches.
* Gilt sowohl fur linke als auch rechte Drehzapfen
* See refiere tanto al pivote izguierdo como al derecho



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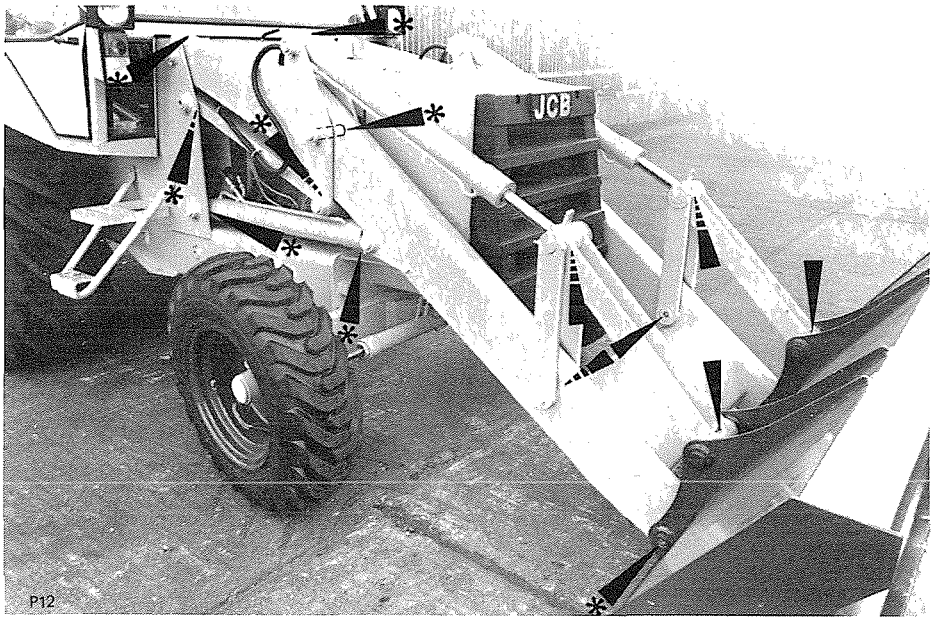

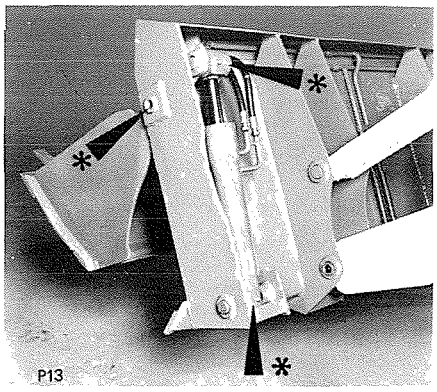

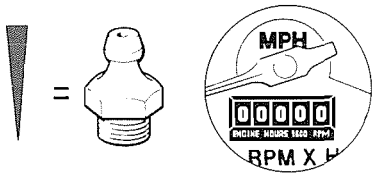

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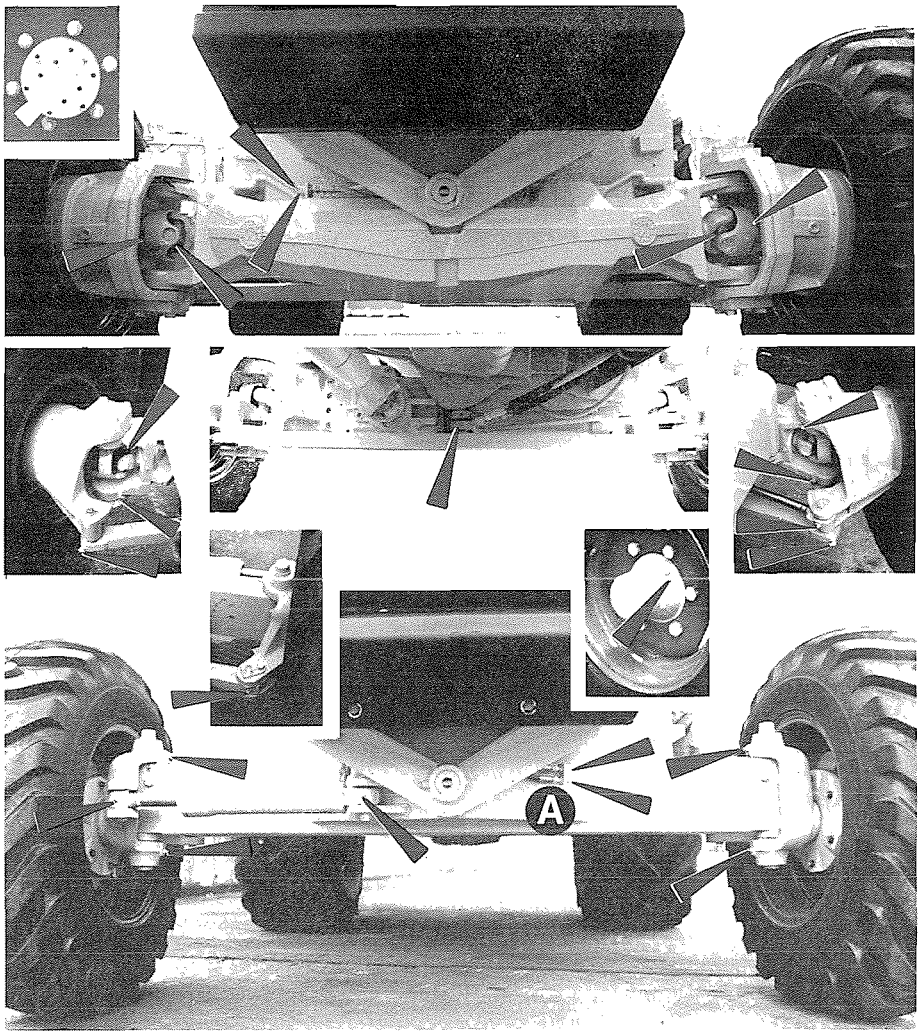
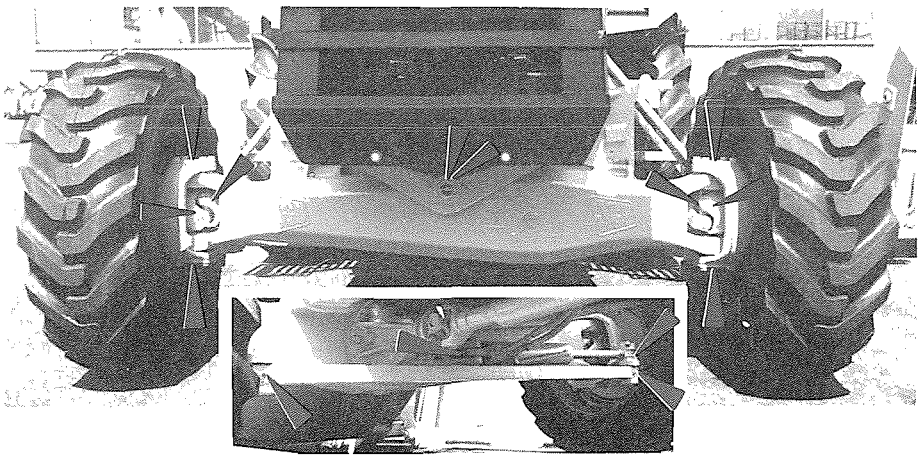
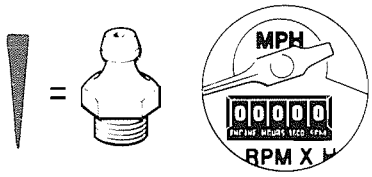
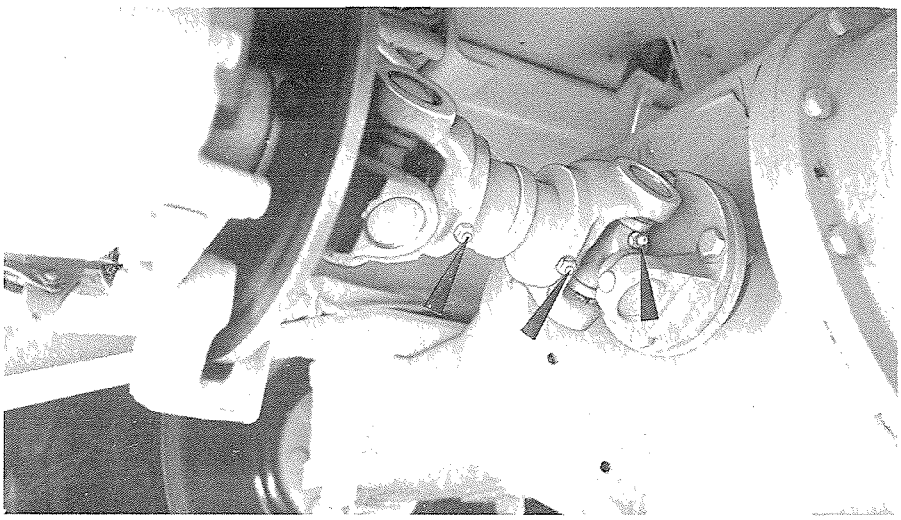
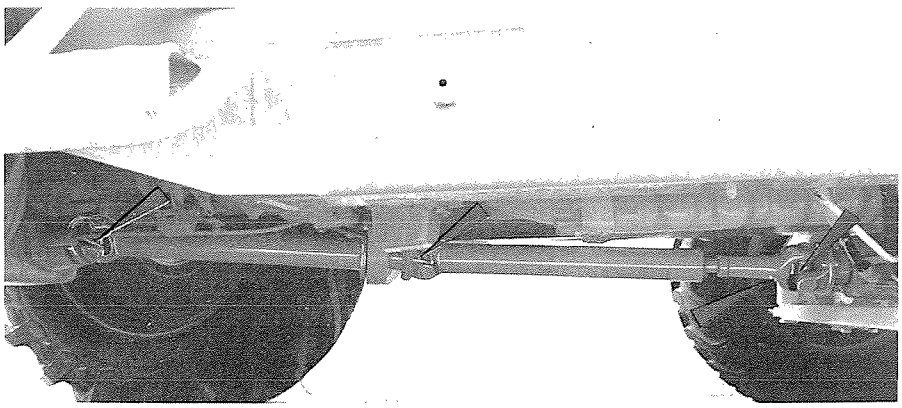


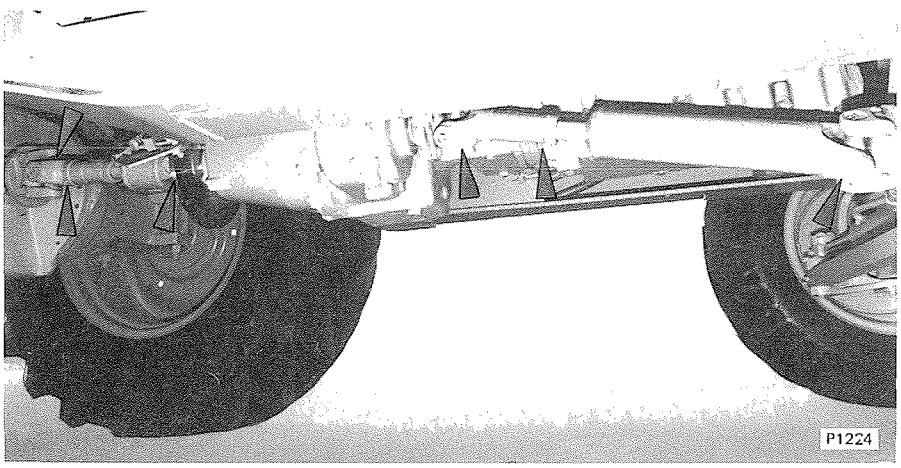


* Note: Grease hoses A are fitted up to machine no. 300583. Later machines have grease nipples on the axle housing.
However remote greasing continues to be available as an optional extra.


MPH
RPM X H
50



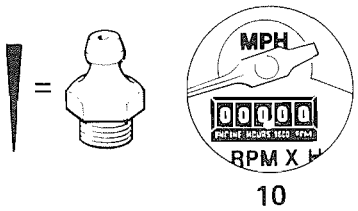



P1224

EXCAVATOR

Grease **Every 10 hours**

Do not grease cross-rails.



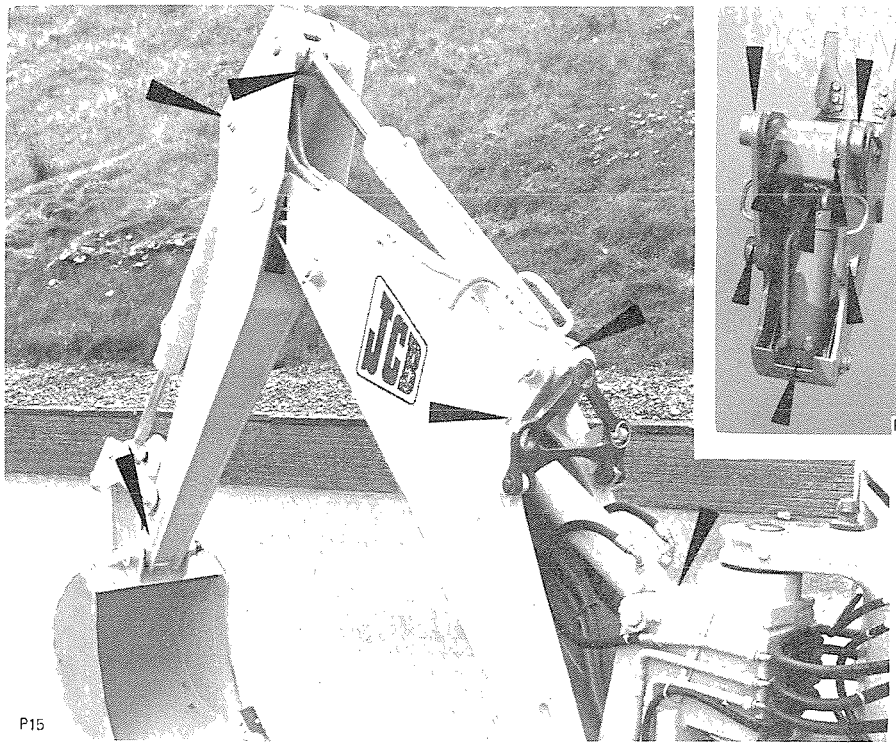
SLEW ACTUATOR

Check Oil Level at A. **Every 50 hours**

Drain water at B and re-check oil level. * **Every 250 hours**

Drain more frequently in cold climates to prevent damage due to water freezing.

Ensure breather does not become blocked.



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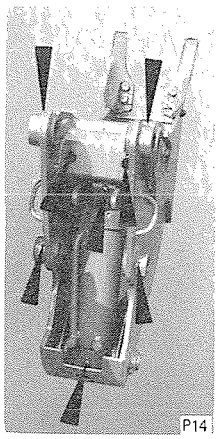
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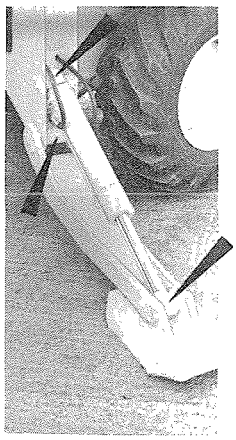

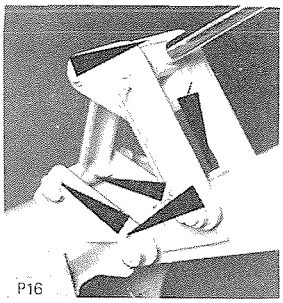
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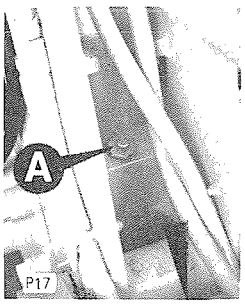

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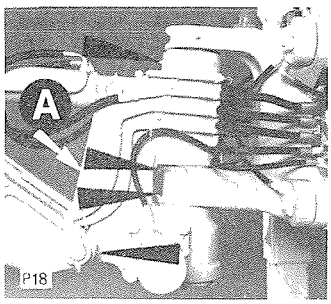

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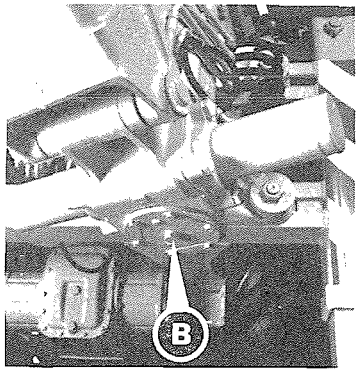


EXCAVATOR from machine no. 306117

Grease	**Every 10 hours**

Do not grease cross-rails.

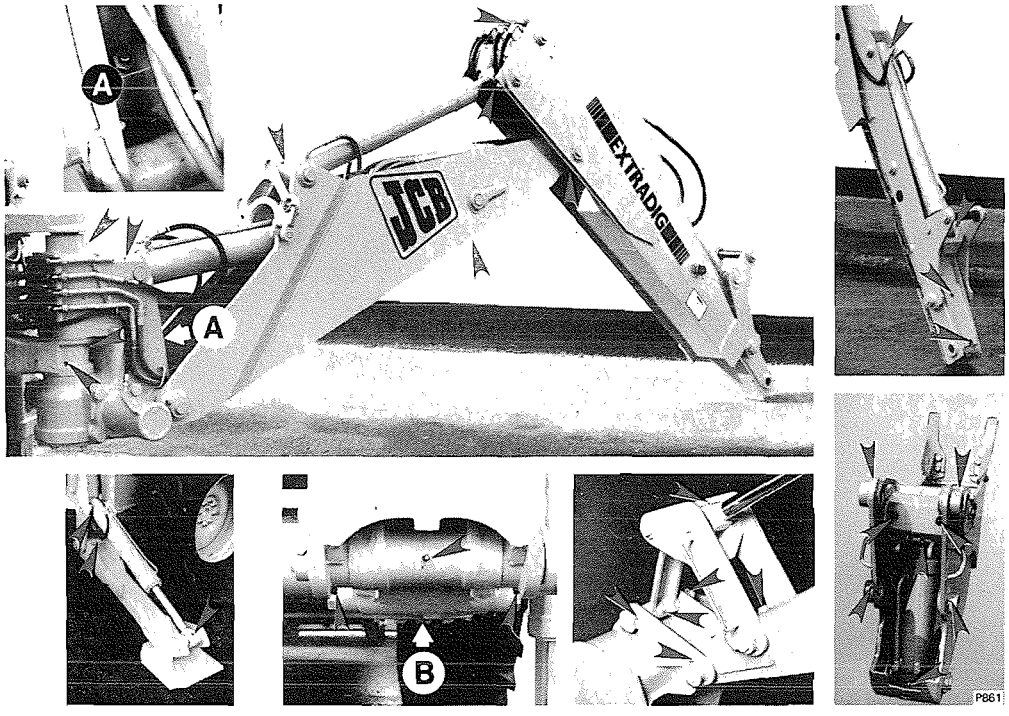
Note: The new narrow boom was fitted intermittently from machine no. 306001 to 306117.

SLEW ACTUATOR

Check oil level at A	**Every 50 hours**
Drain water at B and re-check oil level	***Every 250 hours**

Drain more frequently in cold climates to prevent damage due to water freezing.

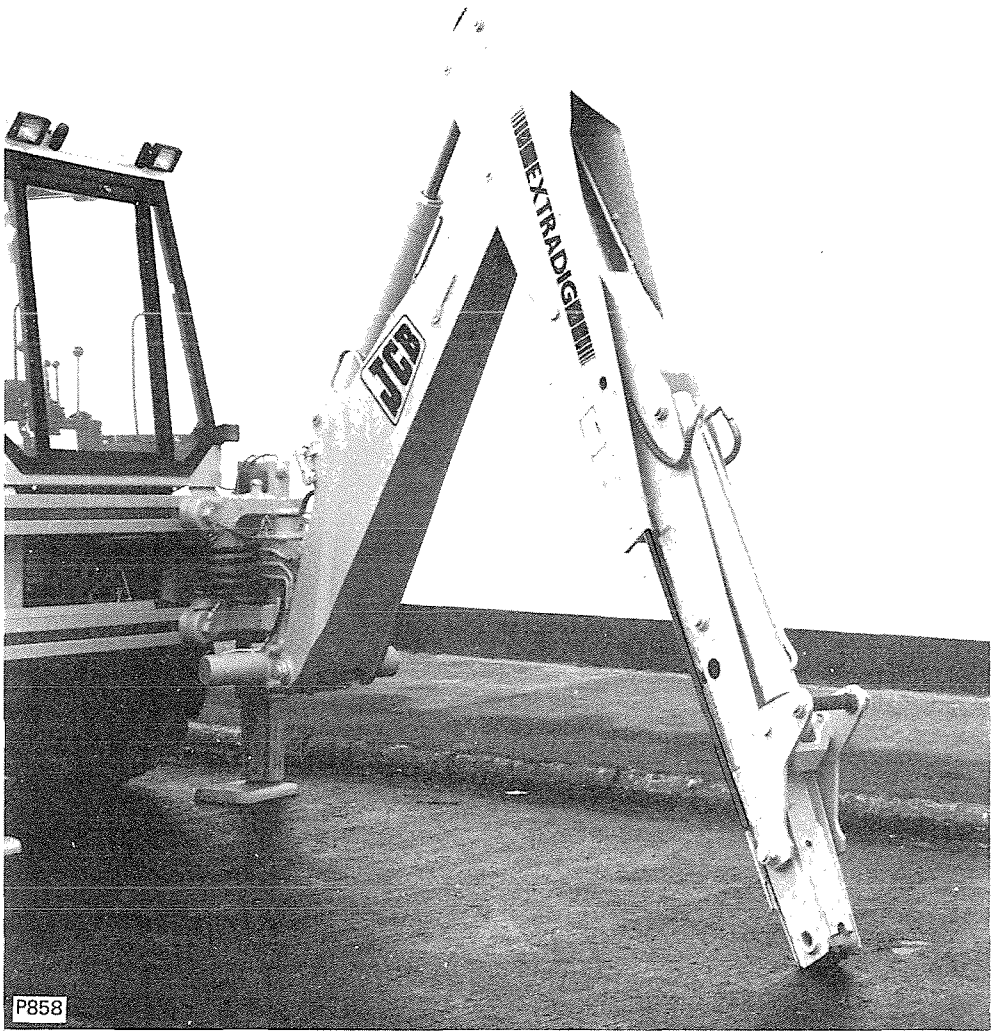
Ensure breather does not become blocked.



EXTENDING DIPPER

* Grease using
JCB Extradig Dipper Lubricant **Every 50 Hours**

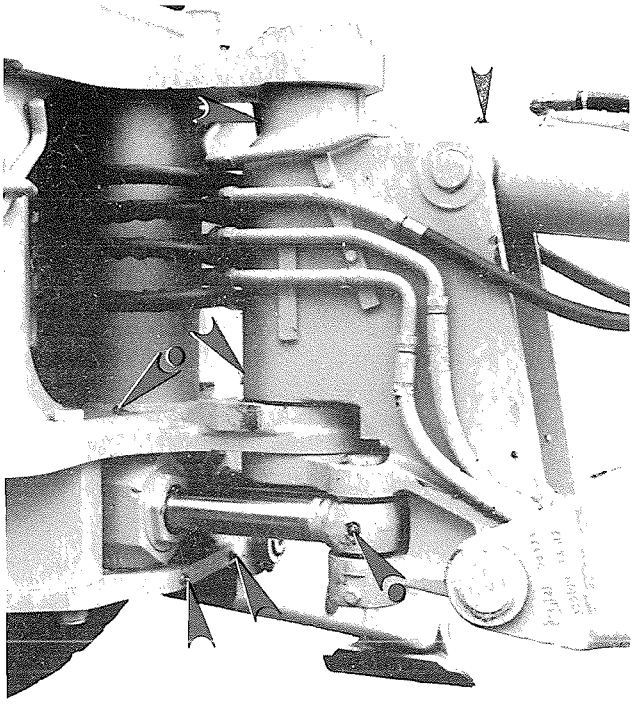
CAUTION: JCB Extradig Dipper Lubricant has a lead content of 1.53%. Contaminated materials, e.g. rags, containers etc., should be disposed of in accordance with local regulations covering the disposal of toxic waste.



TWIN RAM SLEW

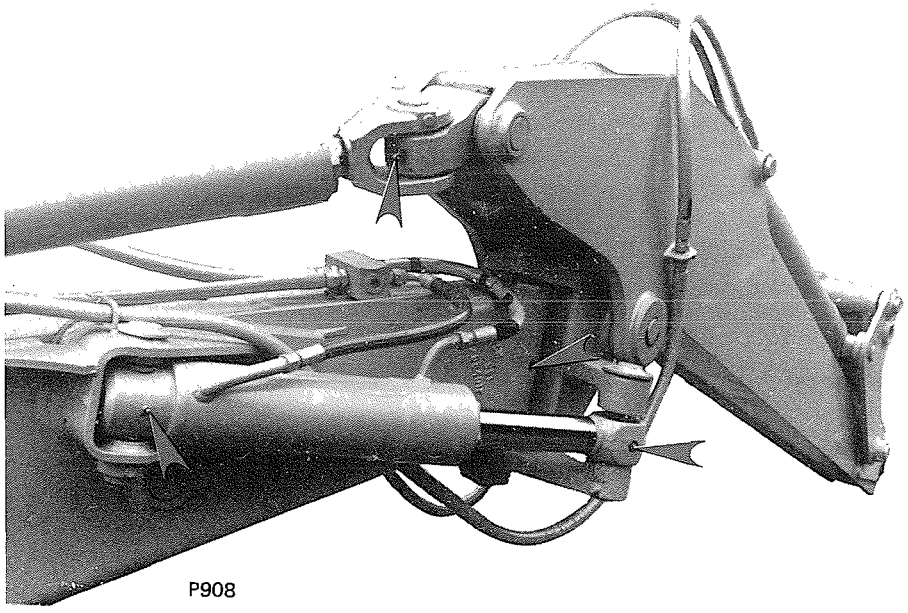
Grease **Every 10 hours**

Grease points marked ● are applicable to both left and right hand pivots.



KNUCKLE BOOM

Grease **Every 10 hours**



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TECHNICAL DATA

Pump

Type - Single		PA2207G2831A	
Flow at 2000 rev/min and 207 bar (3000 lbf/in²)	91 litres/min	24 US gal/min	20 UK gal/min
Type - Double		PAJ2207/1906	
Main flow at 2000 rev/min and 207 bar (3000 lbf/in²)	91 litres/min	24 US gal/min	20 UK gal/min
Attachment flow at 2000 rev/min and 138 bar (2000 lbf/in²)	45 litres/min	12 US gal/min	10 UK gal/min
* Type - Double (1700B, N. America only, from m/c no. 330631)		PAJ1909/06	
Main flow at 2200 rev/min and 207 bar (3000 lbf/in²)	81 litres/min	21 US gal/min	18 UK gal/min
Attachment flow at 2000 rev/min and 207 bar (3000 lbf/in²)	53 litres/min	14 US gal/min	12 UK gal/min

Main Relief Valve Pressures to machine no. 306000

	bar	kgf/cm²	lbf/in²
Loader and Excavator			
3D 1700 (N. America) & 4C Turbo	228	232	3300
Other Machines	207	210	3000

Main Relief Valve Pressures from machine no. 306001 to 310999

Loader			
3D 1700 (N. America) & 4C Turbo	193	197	2800
Other Machines	180	183	2600
Excavator			
3D 1700 (N. America) & 4C Turbo	228	232	3300
Other Machines	207	210	3000

Main Relief Valve Pressures from machine no. 311000

Loader				
3C, 3CX & 3D	Except N.America	180	183	2600
3CX Turbo Sitemaster	Except N.America	217	222	3150
4C Turbo & 4CN	Except N.America	217	222	3150
3C 1400B & 3CX	N.America Only	207	210	3000
3C 1550B, 3D 1700B & 4CN	N.America Only	217	222	3150
Excavator				
3C, 3CX & 3D	Except N.America	207	210	3000
3CX Turbo Sitemaster	Except N.America	217	222	3150
4C Turbo & 4CN	Except N.America	228	232	3300
3C 1400B & 3CX	N.America Only	207	210	3000
3C 1550B, 3D 1700B & 4CN	N.America Only	228	232	3300

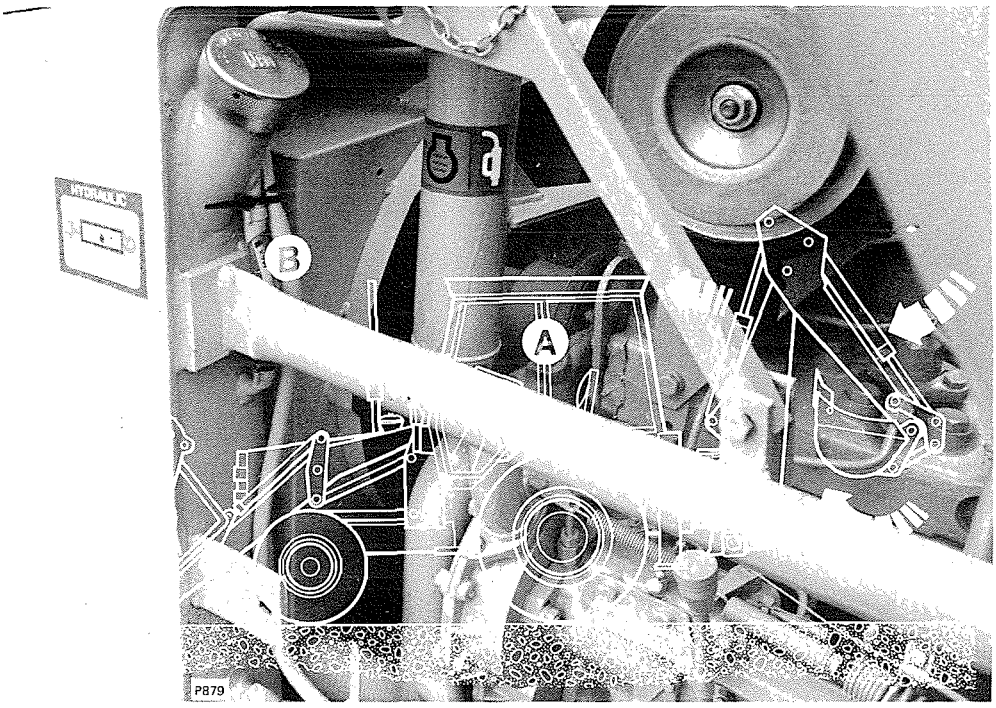
HYDRAULIC FLUID LEVEL

CHECK LEVEL **10 Hours**

DRAIN & REFILL **2000 Hours**

Before checking level, position machine as shown at **A.** The correct level is between the two indicator marks as at **B.**

CAUTION: Do not run engine with filler cap removed.



(From m/c no. 330200)

* **Note:** A modified tank has been introduced featuring a new breather/pressure relief facility separate from the filler cap, a sealed filler cap, an additional hydraulic oil return line diffuser tube, and a re-sited level gauge resulting in a reduction of approximately 9 litres (16 UK pints) in hydraulic oil capacity.

HYDRAULIC FILTER

RENEW ELEMENT *** 500 Hours**

1. Position machine as at **A** with rams extended to prevent syphoning when filter body is removed.

2. Unscrew drain plug **B** and allow filter body to drain, (about 5 litres – 1 UK gal).

3. Unscrew nut **C.**

4. Remove bolt **D** and filter body, discard element and seals.

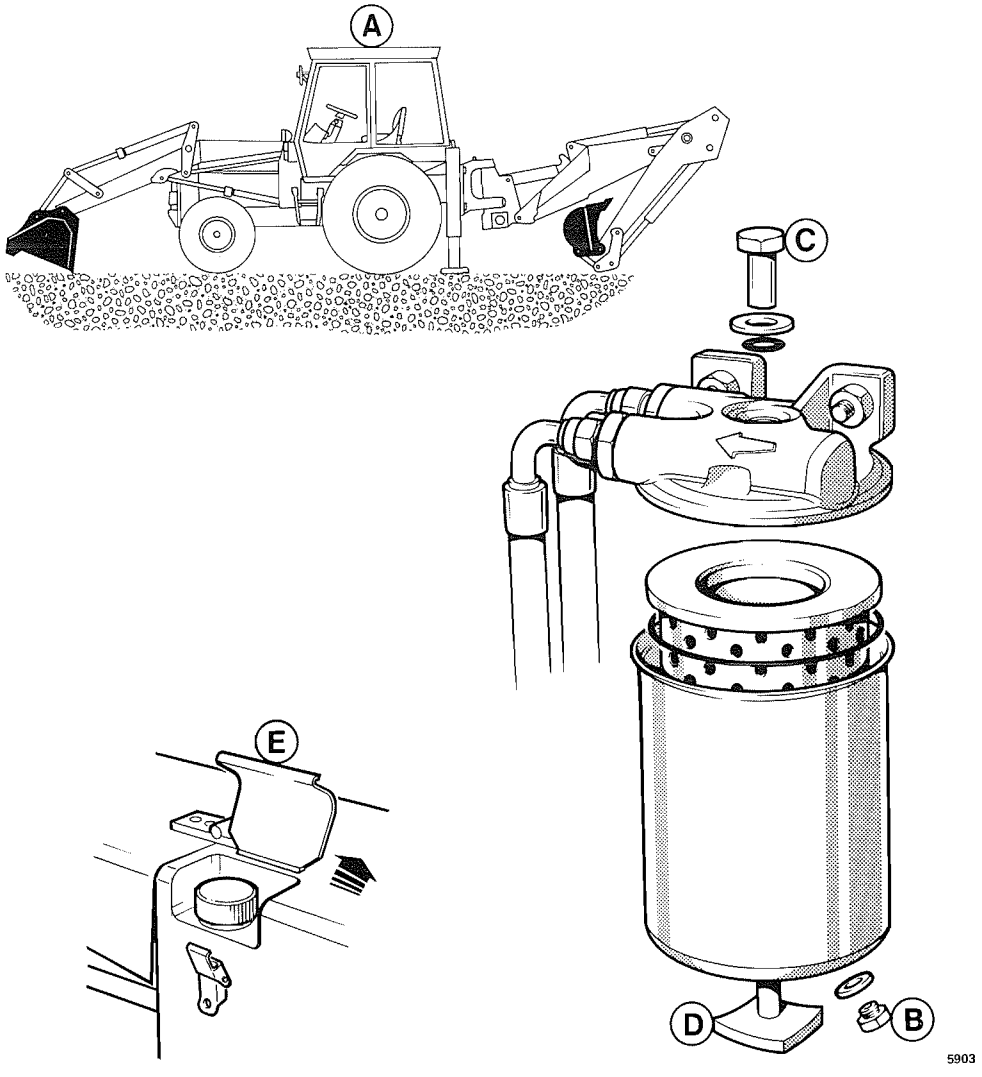
5. Wash all metal parts in clean JCB 'Special' Hydraulic Fluid.

6. Re-assemble using new element and seals. Tighten nut **C** to:–

88 Nm (65 lbf ft) – Original filter to m/c no. 296220

136Nm (100 lbf ft)– Ribbed Head filter from m/c no. 296221

7. Top up hydraulic system at **E.**



HYDRAULIC FILTER
from machine no. 315000

RENEW ELEMENT *** 500 Hours**

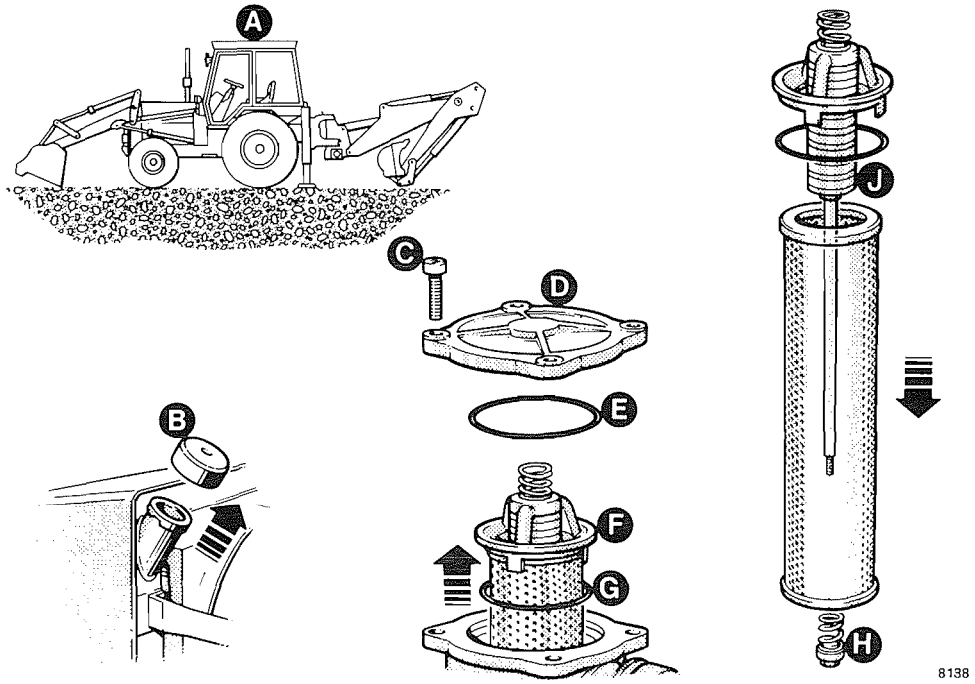
1. Position machine as at **A**, remove bonnet and hydraulic tank cap **B.**

2. Remove screws **C,** cover plate **D**and seal **E.**

3. Remove complete element assembly **F** and seal **G.**

4. Remove nut and spring **H.** Remove element from spindle. Clean magnets **J.**

5. Fit new element and seals. Refit cap **D** and tighten screws **C** to 7 Nm (5 lbf ft). Top up oil as required and refit cap **B.**

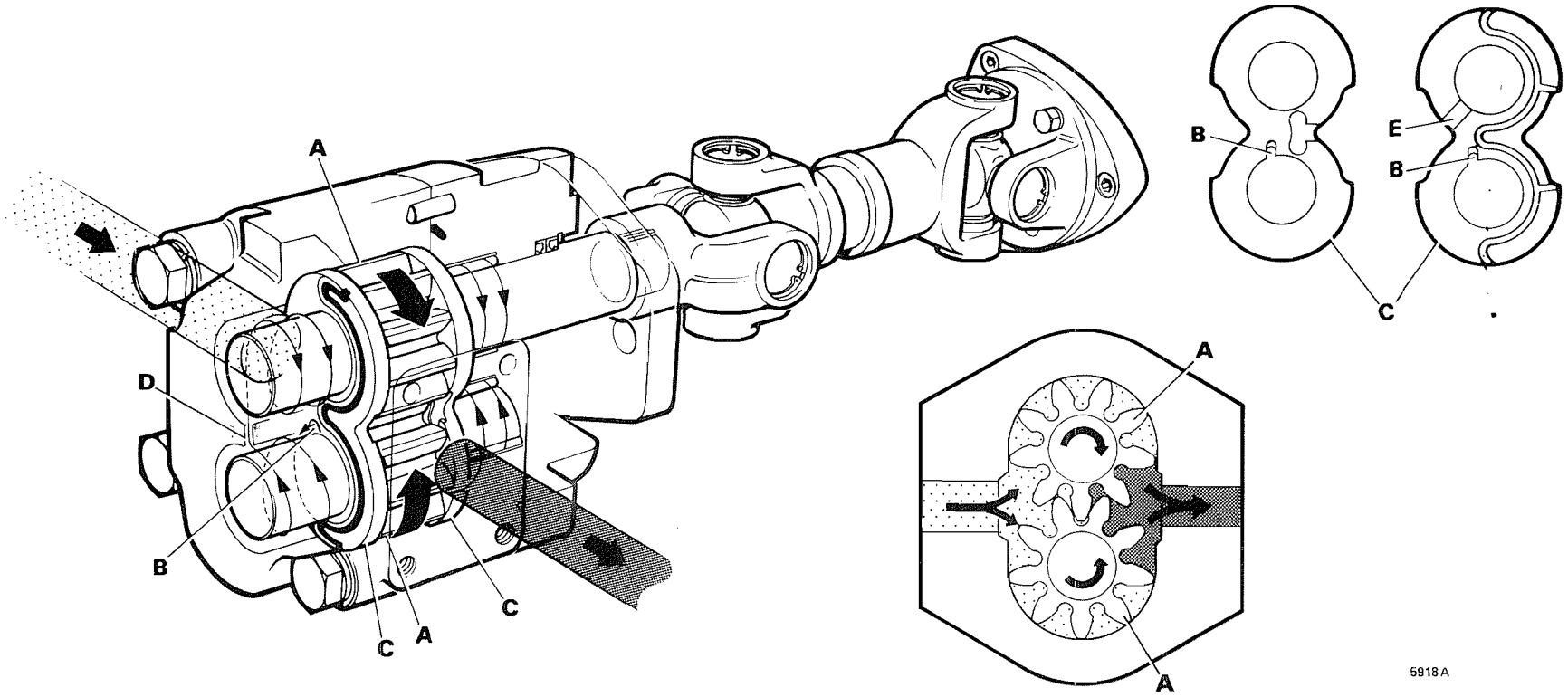


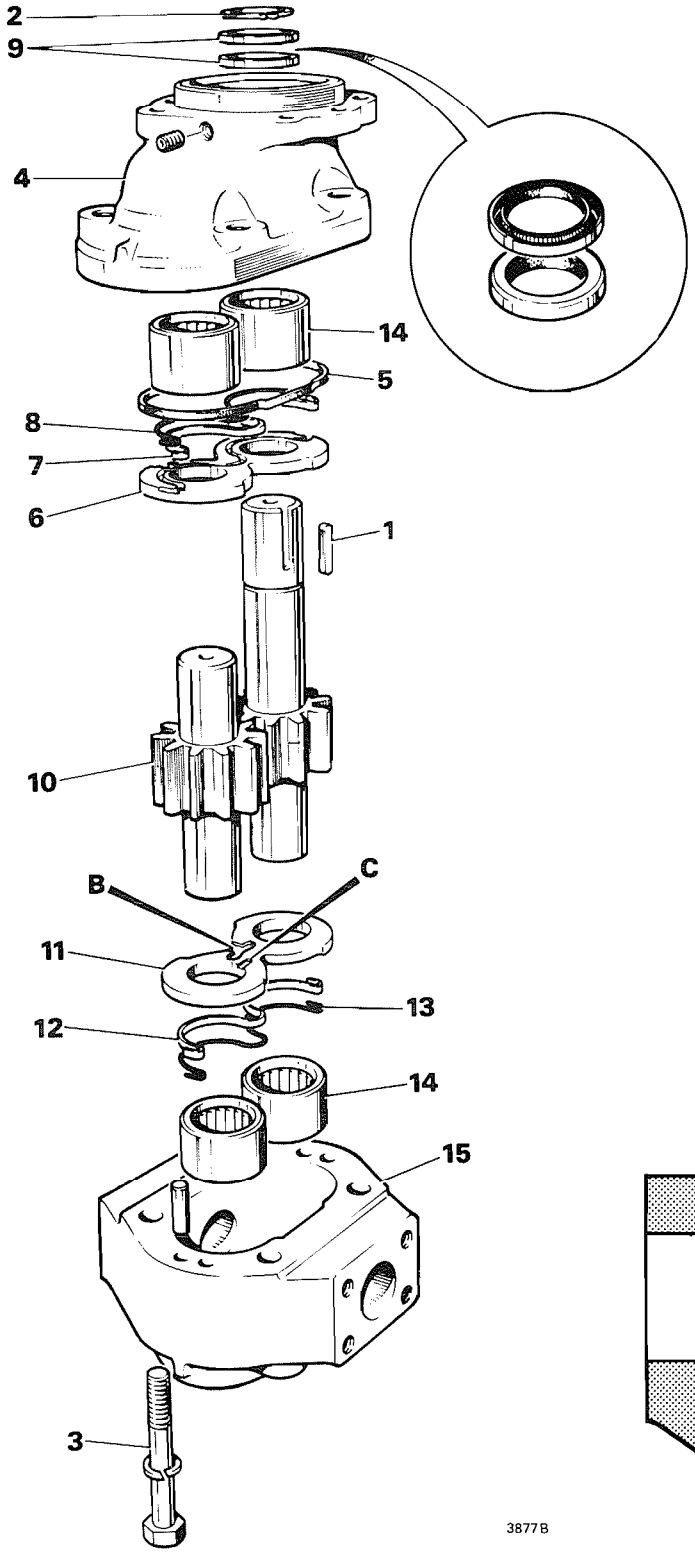
PUMP OPERATION

The basic principle of the gear pump depends on the meshing of two spur gear wheels **A** one of which is engine driven the other being an idler.

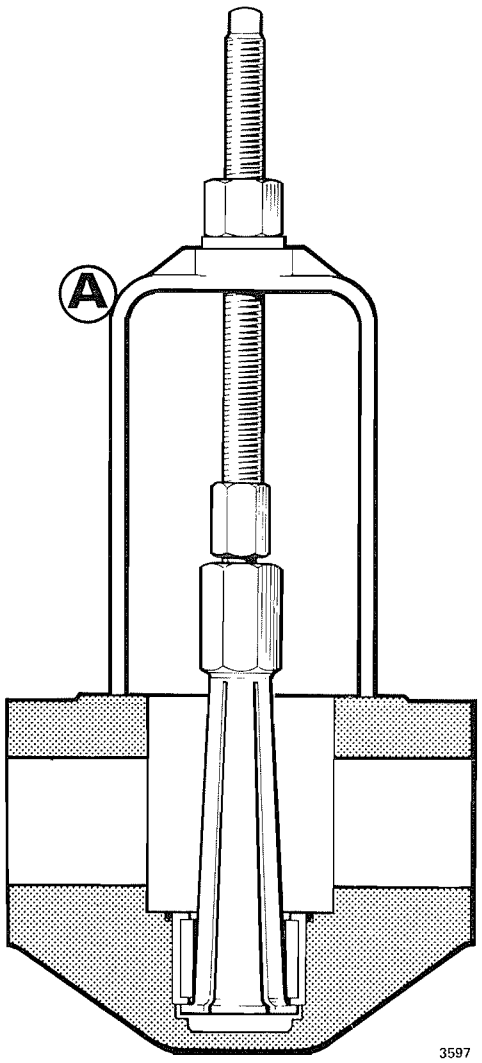
Oil is picked up by the gear teeth on the suction side of the pump and carried around between teeth and pump body. As the gears come into mesh, the space carrying the oil is filled by a gear tooth on the mating gear, forcing the oil out of the space and through the pump outlet.

The illustration also shows lubrication flow around the needle roller bearings supporting the gears. As the oil is picked up by the gears a small amount is forced out of the 'D' shaped recess **B** in the wear plates **C**. This circulates around the journals lubricating the rollers. It transfers to the mating gear bearing journal via an interconnecting gallery **D**, lubricates the bearing and flows back into the suction side of the pump via a slot **E** across the face of the wear plate.





3877B



3597

PUMP (Hamworthy)

Dismantling and Assembly

When Dismantling

Remove sharp edges and burrs from shaft to avoid seal damage.

Mark cover 4 and housing **15** to ensure correct replacement. Use a soft faced hammer to separate components. Do not use levers or machined surfaces may be damaged.

Mark adjacent teeth of gears with indelible ink before removal. Do not use a centre punch or similar tool.

* Remove bearings **14** only if requiring replacement, using service tool A, part no. 892/00176 together with collets 892/00178 .

* Note: All pumps have a 'gear track' in the suction side of the housing which is cut by the gears during initial testing by the manufacturer. This is not detrimental unless bearing wear or dirt has caused the track to be worn deeper than 0.1mm (0.004in).

When Assembling

Renew gears in pairs if:

a) Journal area of shaft is pitted or worn in excess of 0.025mm (0.001in).

b) Keyway or gears are badly worn or cracked.

Renew bearings if worn or if gears are renewed. Bearings must fit flush with or not more than 0.05mm (0.002in) below face of bearing bore.

* The seal kits supplied may have three single lip shaft seals included, only two of which should be used. Alternatively, the kits may include one double lip seal and one single lip seal. In this application fit the double lip seal only in place of the two single lip seals **9**.

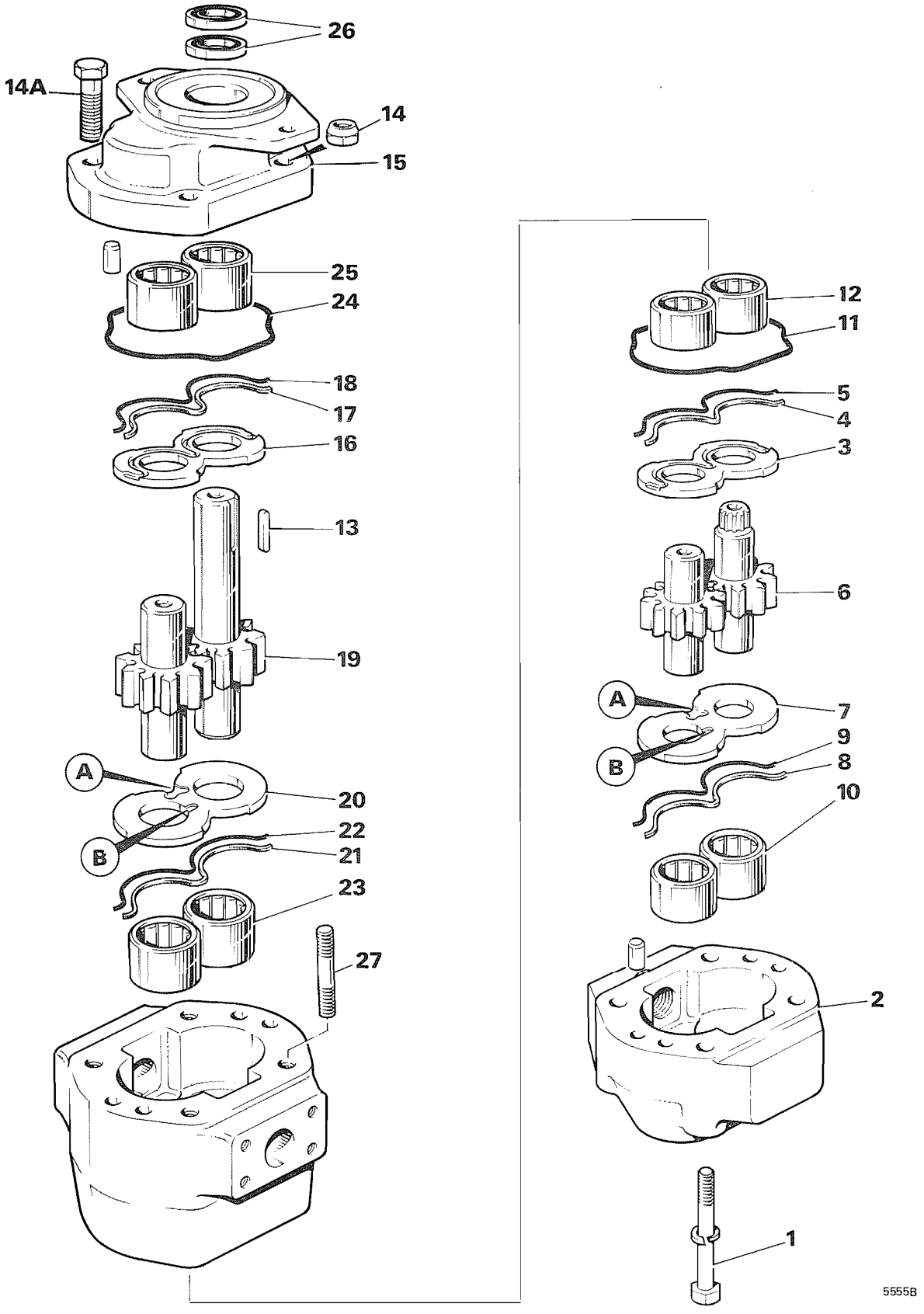
Renew wear plates **6** and **11** if scored or eroded. Trim to size seals **8** and **13** and supports **7** and **12**, using grease to retain them firmly in the wear plates.

Fit wear plates **6** and **11** with relief channel **B** facing the gears on the pressure side of the pump and slot **C** towards the inlet side of the idler gear. Ensure that seals and supports are not trapped between plate and bore, also that wear plate **11** is fully home in the bore and free to move.

Align gears, housings and covers using marks made when dismantling.

*** Torque Settings**

Item	Nm	kgf m	lbf ft
3	203	21	150


26
14A
14
15
25
24
18
17
16
13
19
A
20
B
22
21
23
27
12
11
5
4
3
6
A
7
B
9
8
10
2
1
5555B

DOUBLE PUMP

Dismantling and Assembly

When Dismantling

Remove sharp edges and burrs from shaft to avoid seal damage.

Mark covers and housings to ensure correct replacement. Use a soft faced hammer to separate components. Do not use levers or machined surfaces may be damaged.

Mark adjacent teeth of gears with indelible ink before removal. Do not use a centre punch or similar tool.

Remove bearings only if requiring replacement using service tool part no. 892/00176 together with collets 892/00177 for bearings **10** and **12** or 892/00178 for bearings **23** and **25.**

Note: All pumps have a 'gear track' in the suction side of the housing which is cut by the gears during initial testing by the manufacturer. This is not detrimental unless bearing wear or dirt has caused the track to be worn deeper than 0.1mm (0.004in).

When Assembling

Renew gears in pairs if:

a) Journal area of shaft is pitted or worn in excess of 0.025mm (0.001in).

b) Keyway or gears are badly worn or cracked.

Renew bearings if worn or if gears are renewed. Bearings must fit flush with or not more than 0.05mm (0.002in) below face of bearing bore.

The seal kits supplied may have three single lip shaft seals included, only two of which should be used. Alternatively, the kits may include one double lip seal and one single lip seal. In this application fit the double lip seal only in place of the two single lip seals **26.**

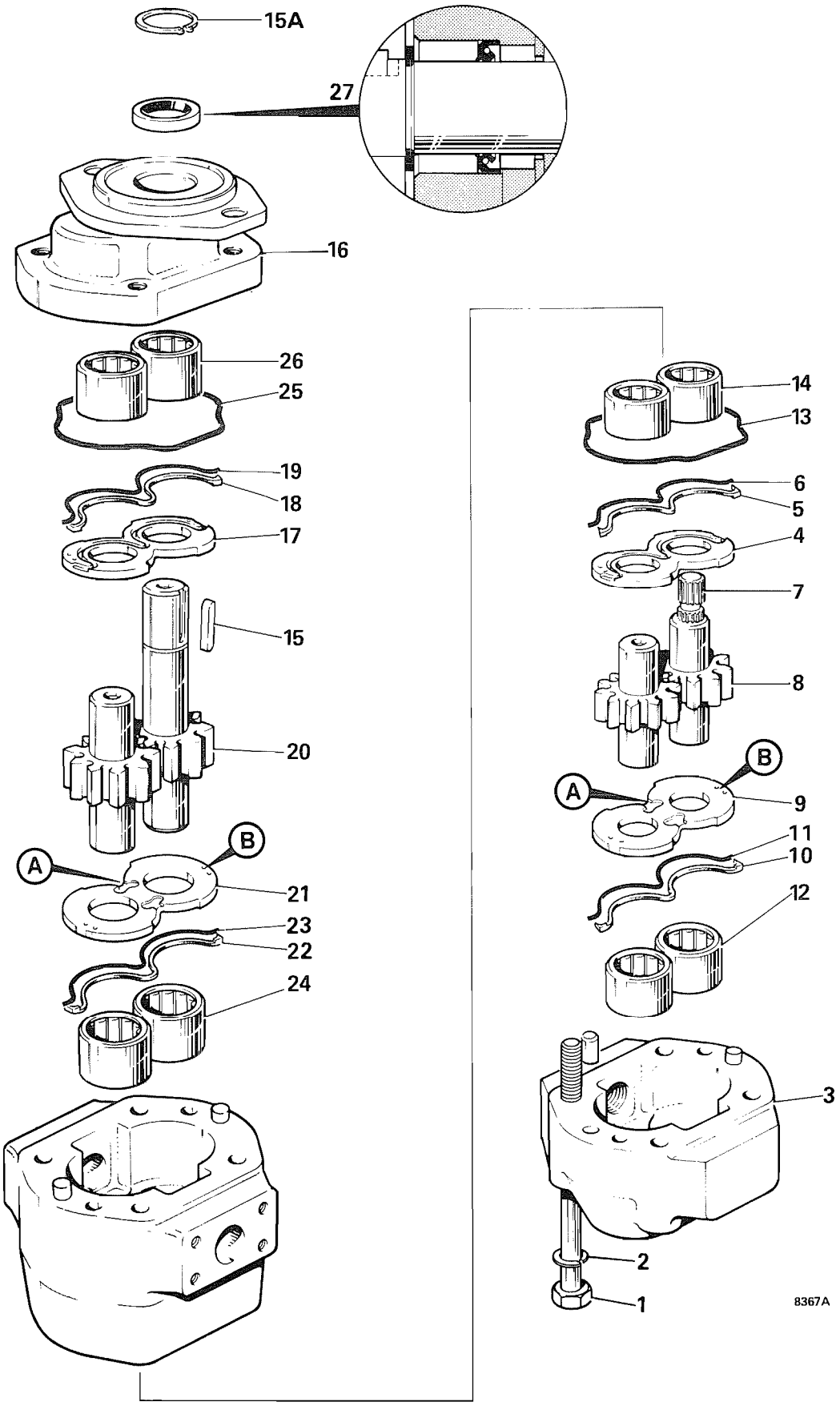
Renew wear plates if scored or eroded. Trim to size seals **5,9,18** and **22** and supports **4,8,17** and **21,** using grease to retain them firmly in the wear plate.

Fit wear plates **3,7,16** and **20** with relief channel **A** facing the gears on the pressure side of the pump and slot **B** towards the inlet side of the idler gear. Ensure that seals and supports are not trapped between plate and bore, also that wear plates **7** and **20** are fully home in the bore and free to move.

Align gears, housings and covers using marks made when dismantling.

Torque Settings

Item	Nm	Kgf m	lbf ft
1	170	17.3	125
14	203	21	150
14A	203	21	150


15A
27
16
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25
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18
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15
20
B
A
21
23
22
24
14
13
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5
4
7
8
B
A
9
11
10
12
3
2
1
8367A

DOUBLE PUMP
(1700B, N. America only, from m/c no. 330631)
Hamworthy type PAJ190906

Dismantling and Assembly

When Dismantling

Remove sharp edges and burrs from the shaft to avoid seal damage.

Mark covers and housings to ensure correct replacement. Use a soft-faced hammer to separate components. Do not use levers, or machined surfaces may be damaged.

Mark adjacent teeth of gears with indelible ink before removal. Do not use a centre punch or similar tool.

Remove bearings only if they require replacement, using service tool part no. 892/00176 together with collet 892/00177.

Note: All pumps have a 'gear track' in the suction side of the housing, which is cut by the gears during initial testing by the manufacturer. This is not detrimental unless bearing wear or dirt has caused the track to be worn deeper than 0.1 mm (0.004 in).

When Assembling

Renew gears in pairs. Gears should be renewed if:

a) The journal area of the shaft is pitted or worn in excess of 0.025 mm (0.001 in).

b) The keyway or gears are badly worn or cracked.

Renew bearings if worn or damaged or if gears are renewed. Bearings must fit flush with or not more than 0.05 mm (0.002 in) below the face of the bearing bore.

Renew wear plates **4**, **9**, **17** and **21** if scored or eroded, ensuring that oil holes **B** are clear.

Seals **6**, **11**, **19** and **23**, and back-ups **5**, **10**, **18** and **22** are to a new design and must be fitted as follows, using JCB 'MPL' Grease to retain them in the grooves:

First fit the seal into the wear plate with the flat side facing downwards.

Then fit the back-up on top of the seal with the shoulder at each end of the back-up facing downwards to seat on the base of the groove.

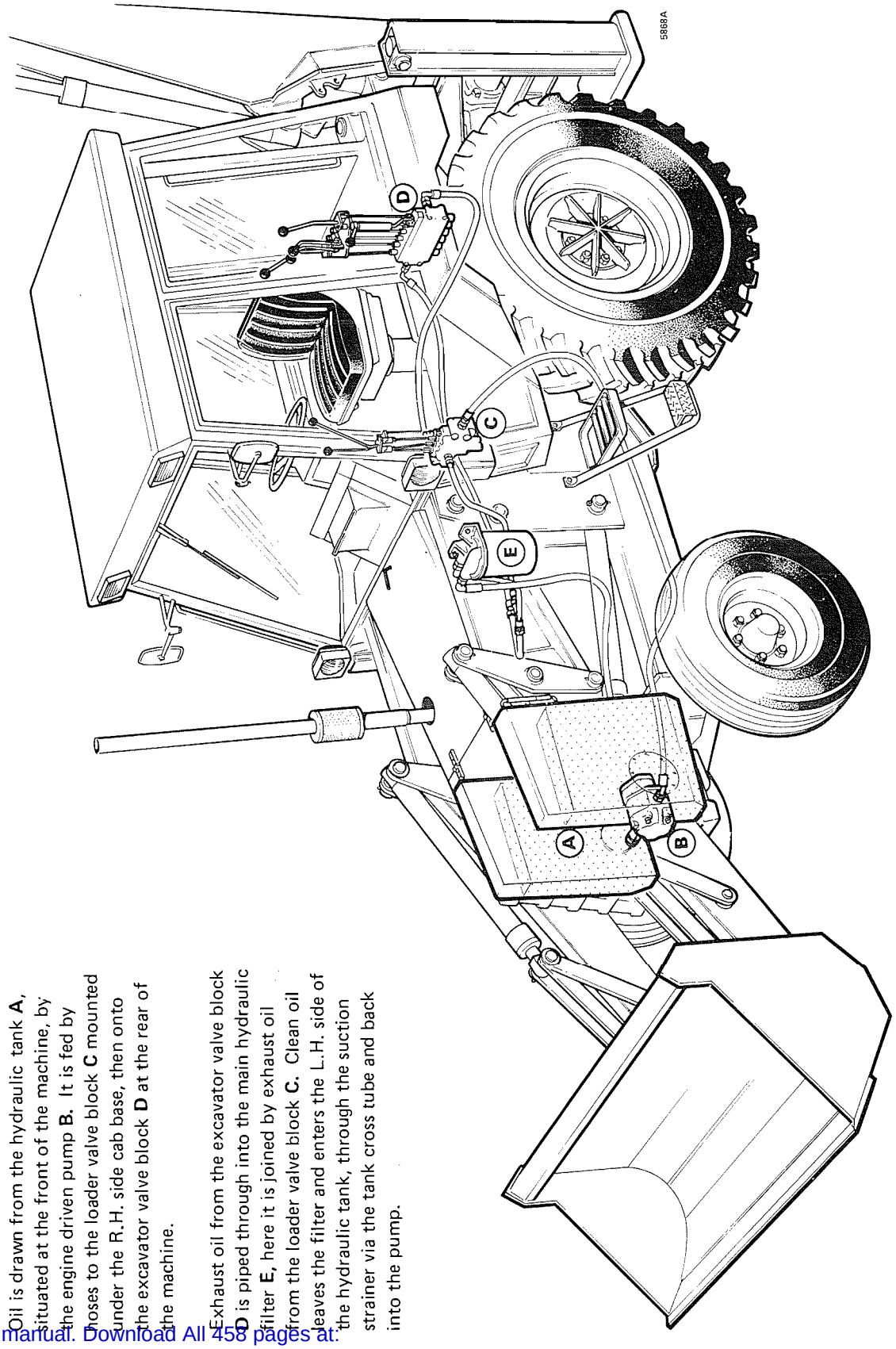
Fit wear plates with recesses **A** facing the gears and the seal and back-up towards the pressure side of the pump. Ensure that seal and back-up are not trapped between the plate and the bore. Check also that wear plates **9** and **21** are fully home in the bore and free to move.

Smear lips of new double-lip seal **27** with Mobilplex 47 or equivalent grease containing MoS_2. Apply JCB High Strength Gasketing to outside diameter of the seal and ensure that it enters the housing facing in the direction shown.

Align gears, housings and covers using the marks made when dismantling.

Torque Settings

Item	Nm	kgf m	lbf ft
1	170	17.3	125



MACHINE NEUTRAL CIRCUIT

Oil is drawn from the hydraulic tank **A**, situated at the front of the machine, by the engine driven pump **B**. It is fed by hoses to the loader valve block **C** mounted under the R.H. side cab base, then onto the excavator valve block **D** at the rear of the machine.

Exhaust oil from the excavator valve block **D** is piped through into the main hydraulic filter **E**, here it is joined by exhaust oil from the loader valve block **C**. Clean oil leaves the filter and enters the L.H. side of the hydraulic tank, through the suction strainer via the tank cross tube and back into the pump.