

8061

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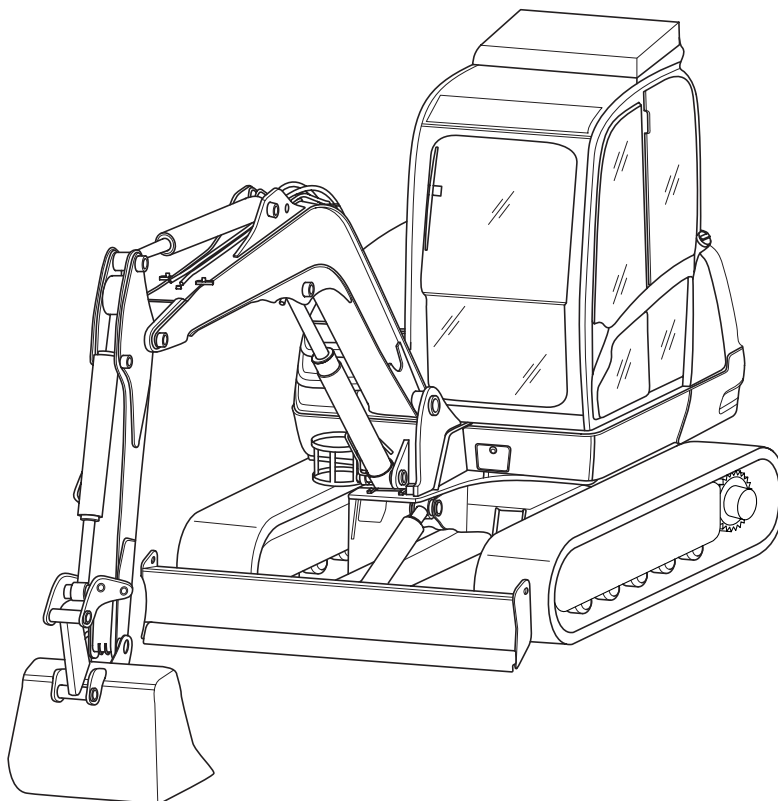
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Section 1 - General Information Standard Torque Settings

Zinc Plated Fasteners and Dacromet Fasteners

Table 2. Torque Settings - UNF Grade 'S' Fasteners

Bolt Size		Hexagon (A/F)	Condition 1			Condition 2		
in.	mm	in.	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft
1/4	6.3	7/16	11.2	1.1	8.3	10.0	1.0	7.4
5/16	7.9	1/2	22.3	2.3	16.4	20.0	2.0	14.7
3/8	9.5	9/16	40.0	4.1	29.5	36.0	3.7	26.5
7/16	11.1	5/8	64.0	6.5	47.2	57.0	5.8	42.0
1/2	12.7	3/4	98.0	10.0	72.3	88.0	9.0	64.9
9/16	14.3	13/16	140.0	14.3	103.2	126.0	12.8	92.9
5/8	15.9	15/16	196.0	20.0	144.6	177.0	18.0	130.5
3/4	19.0	1 1/8	343.0	35.0	253.0	309.0	31.5	227.9
7/8	22.2	1 15/16	547.0	55.8	403.4	492.0	50.2	362.9
1	25.4	1 1/2	814.0	83.0	600.4	732.0	74.6	539.9
1 1/8	31.7	1 7/8	1181.0	120.4	871.1	1063.0	108.4	784.0
1 1/4	38.1	2 1/4	1646.0	167.8	1214.0	1481.0	151.0	1092.3

Table 3. Torque Settings - Metric Grade 8.8 Fasteners

Bolt Size		Hexagon (A/F)	Condition 1			Condition 2		
ISO Metric Thread	mm	mm	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft
M5	5	8	5.8	0.6	4.3	5.2	0.5	3.8
M6	6	10	9.9	1.0	7.3	9.0	0.9	6.6
M8	8	13	24.0	2.4	17.7	22.0	2.2	16.2
M10	10	17	47.0	4.8	34.7	43.0	4.4	31.7
M12	12	19	83.0	8.5	61.2	74.0	7.5	54.6
M16	16	24	205.0	20.9	151.2	184.0	18.8	135.7
M20	20	30	400.0	40.8	295.0	360.0	36.7	265.5
M24	24	36	690.0	70.4	508.9	621.0	63.3	458.0
M30	30	46	1372.0	139.9	1011.9	1235.0	125.9	910.9
M36	36	55	2399.0	244.6	1769.4	2159.0	220.0	1592.4

Tool Detail Reference

Section B - Frame and Bodywork

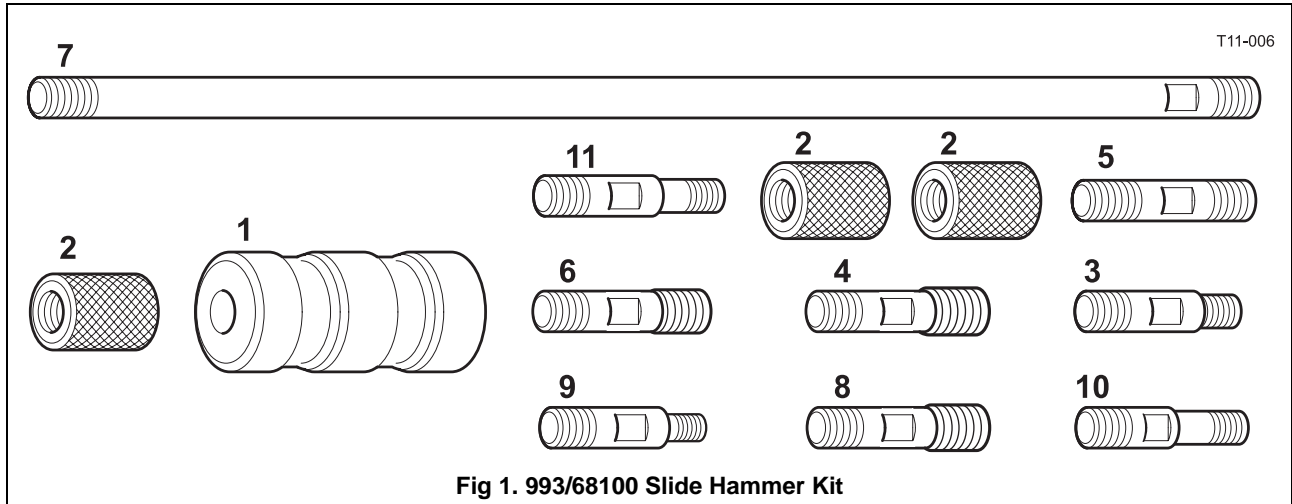


Fig 1. 993/68100 Slide Hammer Kit

1	993/68101	Slide Hammer	7	993/68107	Bar - M20 x M20 X 800 mm
2	993/68102	End Stops	8	993/68108	Adaptor - M20 x 7/8" UNF
3	993/68103	Adaptor - M20 x 5/8" UNF	9	993/68109	Adaptor - M20 x M12
4	993/68104	Adaptor - M20 x 1" UNF	10	993/68110	Adaptor - M20 x 5/8" UNF (Shoulder)
5	993/68105	Adaptor - M20 x M20	11	993/68111	Adaptor - M20 x 1/2" UNF
6	993/68106	Adaptor - M20 x M24			

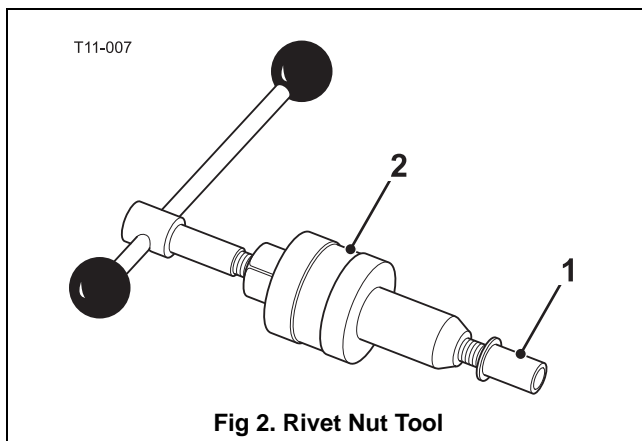
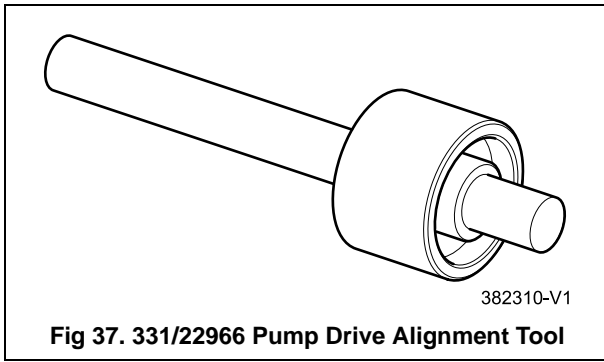


Fig 2. Rivet Nut Tool

1	826/01099	M6 x 16 mm Rivet Nut
	826/01101	M6 x 19 mm Rivet Nut
	826/01102	M8 x 18 mm Rivet Nut
	826/01103	M8 x 21 mm Rivet Nut
	826/01104	M10 x 23 mm Rivet Nut
	826/01105A	M10 x 26 mm Rivet Nut
2	-	Installation Tool available from: Bollhoff Fastenings Ltd (www.bollhoff.com)



WARNING

Alcohol and Drugs

It is extremely dangerous to operate machinery when under the influence of alcohol or drugs. Do not consume alcoholic drinks or take drugs before or while operating the machine or attachments. Be aware of medicines which can cause drowsiness.

INT-1-3-9_2

WARNING

Feeling Unwell

Do not attempt to operate the machine if you are feeling unwell. By doing so you could be a danger to yourself and those you work with.

8-1-2-4

WARNING

Mobile Phones

Switch off your mobile phone before entering an area with a potentially explosive atmosphere. Sparks in such an area could cause an explosion or fire resulting in death or serious injury.

Switch off and do not use your mobile phone when refuelling the machine.

INT-3-3-9

WARNING

Lifting Equipment

You can be injured if you use incorrect or faulty lifting equipment. You must identify the weight of the item to be lifted then choose lifting equipment that is strong enough and suitable for the job. Make sure that lifting equipment is in good condition and complies with all local regulations.

INT-1-3-7_2

WARNING

Raised Equipment

Never walk or work under raised equipment unless it is supported by a mechanical device. Equipment which is supported only by a hydraulic device can drop and injure you if the hydraulic system fails or if the control is operated (even with the engine stopped).

Make sure that no-one goes near the machine while you install or remove the mechanical device.

13-2-3-7_3

WARNING

Raised Machine

NEVER position yourself or any part of your body under a raised machine which is not properly supported. If the machine moves unexpectedly you could become trapped and suffer serious injury or be killed.

INT-3-3-7_1

DANGER

Lightning

Lightning can kill you. Do not use the machine if there is lightning in your area.

5-1-1-2

WARNING

Machine Modifications

This machine is manufactured in compliance with legislative and other requirements. It should not be altered in any way which could affect or invalidate any of these requirements. For advice consult your JCB Distributor.

INT-1-3-10_2



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Warning Symbols

The following warning symbols may be found on the battery.

Symbol	Meaning
 A289230-1	Keep away from children.
 A289280	No smoking, no naked flames, no sparks.
 A289250	Explosive Gas.
 A289240	Battery acid.
 A289270	Note operating instructions.



First Aid - Electrolyte

Do the following if electrolyte:

Gets into your eyes

Immediately flush with water for 15 minutes, always get medical help.

Is swallowed

Do not induce vomiting. Drink large quantities of water or milk. Then drink milk of magnesia, beaten egg or vegetable oil. Get medical help.

Gets onto your skin

Flush with water, remove affected clothing. Cover burns with a sterile dressing then get medical help.

Sulphur Content

T3-032

High sulphur content can cause engine wear. (High sulphur fuel is not normally found in North America, Europe or Australia.) If you have to use high sulphur fuel you must change the engine oil more frequently.
⇒ [Table 3. Sulphur Content \(3-16\)](#).

Low sulphur fuels must have the appropriate fuel lubricity additives, these lubricity improvers must not create residual deposits that block the fuel system, e.g. injectors, filters etc. Contact your fuel Supplier.

CAUTION

A combination of water and sulphur will have a corrosive chemical effect on fuel injection equipment. It is essential that water is eradicated from the fuel system when high sulphur fuels are used.

ENG-3-2

Table 3. Sulphur Content

Percentage of sulphur in the fuel (%)	Oil Change Interval
Less than 0.5	Normal
0.5 to 1.0	0.75 of normal
More than 1.0	0.50 of normal

Effects of Fuel Contaminates

T3-033

The effect of dirt, water and other contaminants in diesel can be disastrous for injection equipment:

- Dirt - A severely damaging contaminant. Finely machined and mated surfaces such as delivery valves and distributor rotors are susceptible to the abrasive nature of dirt particles - increased wear will almost inevitably lead to greater leakage, uneven running and poor fuel delivery.
- Water - Water can enter fuel through poor storage or careless handling, and will almost inevitably condense in fuel tanks. The smallest amounts of water can result in effects that are just as disastrous to the fuel injection pump as dirt, causing rapid wear, corrosion and in severe cases, even seizure. It is vitally important that water is prevented from reaching the fuel injection equipment. The filter/water trap must be drained regularly.
- Wax - Wax is precipitated from diesel when the ambient temperature falls below that of the fuel's cloud point, causing a restriction in fuel flow resulting in rough engine running. Special winter fuels may be available for engine operation at temperatures below 0°C (32°F). These fuels have a lower viscosity and limit wax formation.

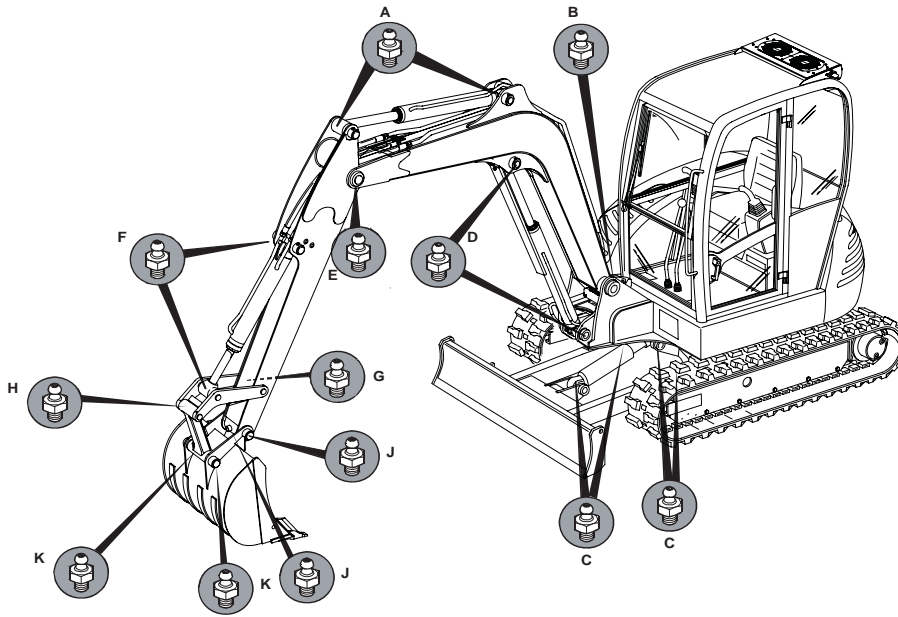


Fig 2.

Primary Fuses

⚠ CAUTION

Fuses

Always replace fuses with ones of correct ampere rating to avoid electrical system damage.

8-3-3-5

The electrical circuits are protected by three primary fuses.

The primary fuse box **A** is located under the rear hydraulic cover → [Fig 10.](#) (□ 3-36). If a fuse blows, find out why before fitting a new one.

Fuse	Circuit	Rating
PF1	Ignition I, Glow Plugs, Ignition III	50A
PF2	Condenser Fan Relay	30A
PF3	Blower, A/C, Boom Light	50A

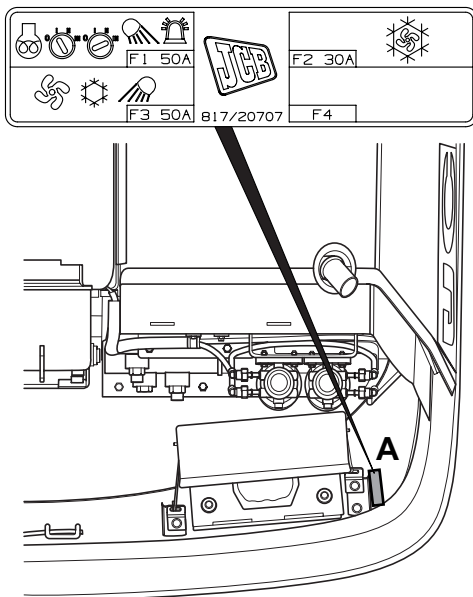


Fig 10.

T063330-1

Draining the Fuel Filters/Sedimenters

- 1 Locate the dual sedimenter under the rear hydraulic cover.
- 2 Look in the bowls **A**. If there is any sediment in the bowls replace the fuel filter element. → [Replacing the Fuel Filter Elements \(3-47\)](#). If there is water but no sediment, drain off the water by opening tap **B**.

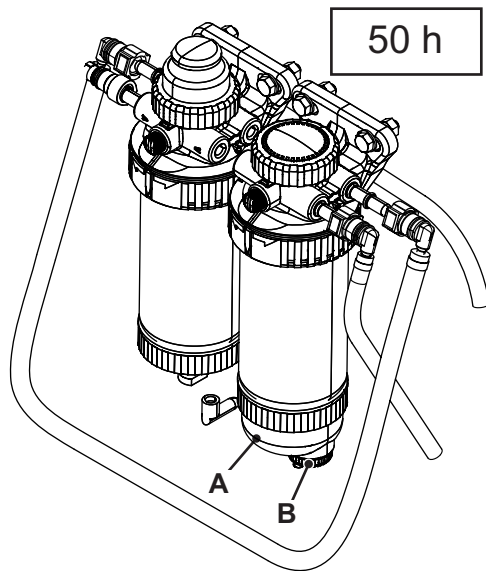


Fig 20.



Section 3 - Maintenance Routine Maintenance

Tracks and Running Gear

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Connecting/Disconnecting Hydraulic Hoses

Quick Release Couplings

WARNING

The external surfaces of the couplings must be clean before connecting or disconnecting. Ingress of dirt will cause fluid leaks and difficulty in connecting or disconnecting. You could be killed or seriously injured by faulty Quick Release Couplings.

2-4-1-15

Flat face quick release couplings allow the operator to remove and install attachments swiftly and efficiently. Generally, your machine pipework will be fitted with a female coupling **A** and a male coupling **B**. The optional attachment hoses will also be fitted with a female coupling **A** and a male coupling **B**. → [Fig 5. \(□ A-7\)](#).

The quick release couplings should be trouble free and relatively easy to connect and disconnect, provided they are kept clean and used correctly. The recommendations listed below should always apply when using flat face quick release couplings.

Finally, please read the correct fitting and releasing procedures before you install or remove any optional attachment fitted with quick release couplings.

Essential Do's

- Before connecting or removing any hydraulic hose, residual hydraulic pressure trapped in the service hose line must be vented. Make sure the hose service line has been vented before connecting or removing hoses.
- Always wipe the two mating faces clean before connecting.
- Use caps and plugs when the couplings are disconnected.
- Always align the external locking ball (if used) with the notch in the locking sleeve and then pull the locking sleeve back fully to disconnect.
- If a coupling sticks, first check that pressure has been released. Ensure the locking ball and notch in the locking sleeve are aligned, pull back the sleeve and twist the couplings apart. Sticking is normally caused

by dirt in the coupling or physical damage due to abuse.

- Connect and disconnect new couplings two or three times to work the PTFE seals. Sometimes a new coupling will stick if the seal has not been worked.
- When fitting couplings, only apply the spanner or grips to the hexagon and nowhere else.
- Avoid damage to the coupling faces. Burrs and scratches cause damage to the seals and cause leaks. They can also impede connection and disconnection of the couplings.
- Periodically lubricate the internal locking balls on the female half of the coupling with silicone grease.

Essential Don'ts

- Never attempt to reconnect using a damaged half coupling as this will destroy the seals in the mating half and necessitate replacement of both halves.
- Do not leave the coupling where it may be run over by a vehicle or otherwise crushed - this will distort the sleeve and prevent connection and disconnection.
- Never try to turn the sleeve when the coupling is disconnected since this will cause the locking ball to jam under the locking sleeve and damage the coupling.
- Never try to strip the coupling down, there are no user serviceable parts. If the coupling is damaged it should be replaced with a new one. See coupling guides for a reference.
- Never hit the centre poppet of the coupling to try and release locked in pressure. This can cause irreparable damage to the coupling and serious injury.
- When fitting couplings, never clamp on the sleeve of the female or nose of the male - this will cause distortion and/or damage.
- Never subject the couplings to external forces, especially side load. This can reduce the life of the coupling or cause failure.
- Never allow the torsional forces transmitted from hoses to unscrew/screw together couplings.
- Never use a coupling as a plug.
- Do not connect and disconnect with pressure in the line unless the coupling type is specifically designed to do so.

Quickhitch Rockbreaker

Introduction

The standard machine has a single-acting hydraulic circuit for use with the applicable single-acting hydraulic attachments. The attachments that need double-acting hydraulics for example the JCB Augers must have additional (optional) pipework installed, for more information contact your JCB Distributor.

For details of the installation of the attachments refer to the Attachment Handbook, for more information contact your JCB Distributor.

Removing a Quickhitch Breaker

CAUTION

When the Quick-Hitch is installed and its attachment fitted, there is a danger of the attachment hitting the underside of the boom. Operate the boom and dipper carefully when the Quick-Hitch and its attachment are fitted.

2-4-4-2

Note: When possible, put the Quickhitch attachments on hard, level ground to make the installation procedure safe and easier.

- 1 Park the machine on firm level ground.

CAUTION

The rockbreaker must be positioned correctly before attempting to release it from the Quickhitch. if incorrectly positioned, the rockbreaker could swing or fall suddenly from the machine when releasing the Quickhitch latch hook.

8-2-9-36

- 2 Position the breaker just clear of the ground and at an angle such that the breaker does not detach from the front pivot pin when the Quickhitch is unlatched. Typically shown at V. [⇒ Fig 13. \(□ A-17\)](#)

WARNING

Hydraulic Hoses

Damaged hoses can cause fatal accidents. Inspect the hoses regularly. Do not use the machine if a hose or hose fitting is damaged.

INT-3-3-2_4

WARNING

Fluid Under Pressure

Fine jets of fluid at high pressure can penetrate the skin. Keep face and hands well clear of fluid under pressure and wear protective glasses and gloves. Hold a piece of cardboard close to suspected leaks and then inspect the cardboard for signs of fluid. If fluid penetrates your skin, get medical help immediately.

INT-3-1-10_3

- 3 Stop the engine.
- 4 Turn the starter key to the 'I' position.
- 5 Operate the auxiliary attachment control pedal, this will release any hydraulic pressure trapped in the system.
- 6 Disconnect the hydraulic hoses.

WARNING

The attachment will roll forward when released. Stand clear and to one side when releasing the attachment.

2-4-4-1

- 7 Remove lynch pin H, and locking pin F.
- 8 Insert the tommy bar J into the hole K of the latch hook.
- 9 Apply a downward pressure on the bar to release the breakers rear pivot pin from the latch hook, allowing the breaker to swing forward as shown at Z. Remove the tommy bar from the Quickhitch.
- 10 Refit the locking pin F and lynch pin H. Failure to refit the pin will result in the breaker re-latching as it is lowered to the ground. Make sure that the hydraulic hoses do not become trapped under the breaker.

General Description

The Excavator body and framework is of fabricated steel construction and comprises the upper structure and front attachment. The upper structure comprises a fabricated steel base that provides housing and mounting for the machine controls and services. The machine cab is mounted on the floorplate. The engine is mounted behind the cab. The front attachment comprises a bucket, dipper and boom assembly attached to the front of the upper structure through a fixed kingpost. The bucket dipper and boom are connected through pivots enabling a full range of bucket, or other attachment operations



System Diagnosis

Normal gauge readings will depend on system components and ambient conditions, make sure that the valves are closed and the readings are stable and that the system has a full charge.

The pressures on the manifold at 25 °C, with the engine a 1500 rev/min, the blower on maximum and the thermostat set to maximum, should be approximately:

Contact JCB Service for the correct pressure settings.

Typically, the high pressure is 6 - 8 times the low pressure

Normally Functioning A/C System

Gauge Readings:

Low Side Gauge Normal

High Side Gauge Normal

Other Symptoms:

Sight Glass Clear

Discharge Air Cold

Normal Recharge Weight: 1575 grammes

Low R-134a Charge

Gauge Readings:

Low Side Gauge Low

High Side Gauge Low

Other Symptoms:

Sight Glass Bubbles Continuously Visible

Diagnosis

System slightly low on R-134a, due to leak or incorrect charge.

Correction:

1. Leak test system.
2. Evacuate A/C system.
3. Repair system Leaks.
4. Charge system with R-134a.
5. Operate system and check performance.

Poor Refrigerant Circulation

Gauge Readings:

Low Side Gauge Zero to negative

High Side Gauge Low

Other Symptoms:

Receiver-drier Frost on tubes from receiver-drier to evaporator

Diagnosis

Refrigerant flow obstructed by dirt, receiver-drier clogged

Correction:

1. Evacuate A/C System.
2. Replace receiver-drier.
3. Charge System with R-134a.
4. Operate System and Check Performance.

No Refrigerant Circulation

Gauge Readings:

Low Side Gauge Zero to negative

High Side Gauge Low

Other Symptoms:

Receiver-drier Frost or moisture on tubes before and after receiver-drier

Diagnosis

Refrigerant flow obstructed by dirt, moisture or gas leakage from expansion valve heat sensing tube.

Correction:

1. Evacuate A/C system.
2. Check heat sensing tube at expansion valve. Replace expansion valve if necessary.
3. Remove expansion valve and attempt removal of dirt. If dirt cannot be removed, replace expansion valve.
4. Replace receiver drier.
5. Charge system with R-134a.
6. Operate system and check performance.

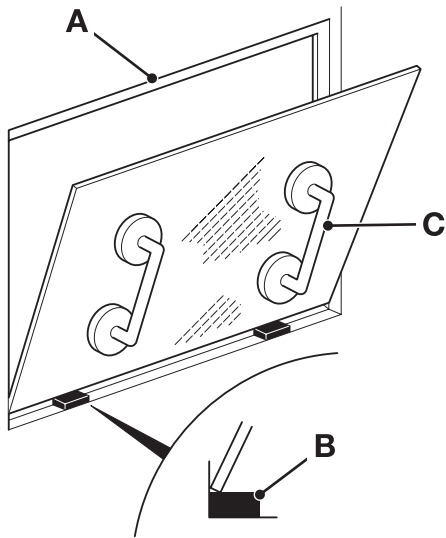


Fig 10.

- 2 After checking for size, remove the new glass and place it on a purpose made glass stand. → [Fig 11.](#) (□ B-24).

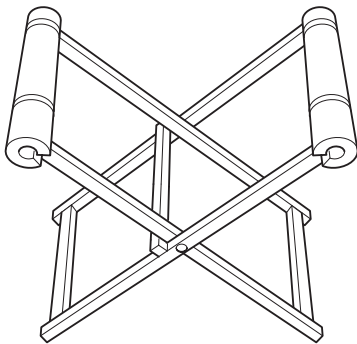


Fig 11. Glass Stand

Small panes of glass will need locating on a 600 x 700 mm x 15 to 19 mm thick plywood board **12-A**, sourced locally to fit the glass stand. It is recommended that an access hole is cut in the board to accommodate the glass lifter, making it easier and safer to handle small panes of glass. The board should be covered with felt or carpet to give an anti-scratch surface. Resting the glass on four spacer blocks will ensure clearance of the cartridge nozzle tip during application of the polyurethane sealant.

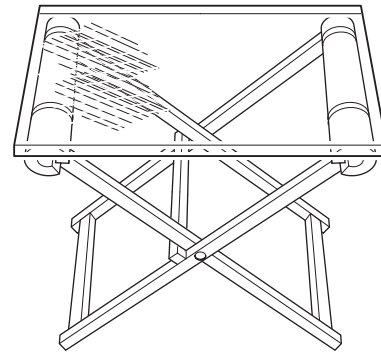


Fig 12.

- 3 Make sure the glass is positioned on the stand the correct way up (i.e. with the black ceramic ink band upwards) ready for application of primer etc.
- 4 Clean the glass
 - a Use 'Active Wipe 205' to thoroughly clean and 'prime' the black ceramic ink band printed on the glass (see **Note**). Use a lint free cloth to apply the 'Active Wipe 205', allow 5 minutes flash off (drying) time.

Note: Do not touch the glass after cleaning with the 'Active Wipe 205'.

- b If the glass does not have a black ceramic ink band, paint a band on the glass using 'Black Primer 206J'. The band should be approximately 25mm (1in) wide, and the edge should be a neat straight line. → [Fig 13.](#) (□ B-24).



Fig 13.

- 5 Install the Ultra Fast Adhesive cartridge (see **Sealing and Retaining Compounds**, Section 1 and **Note**) into a suitable applicator gun:

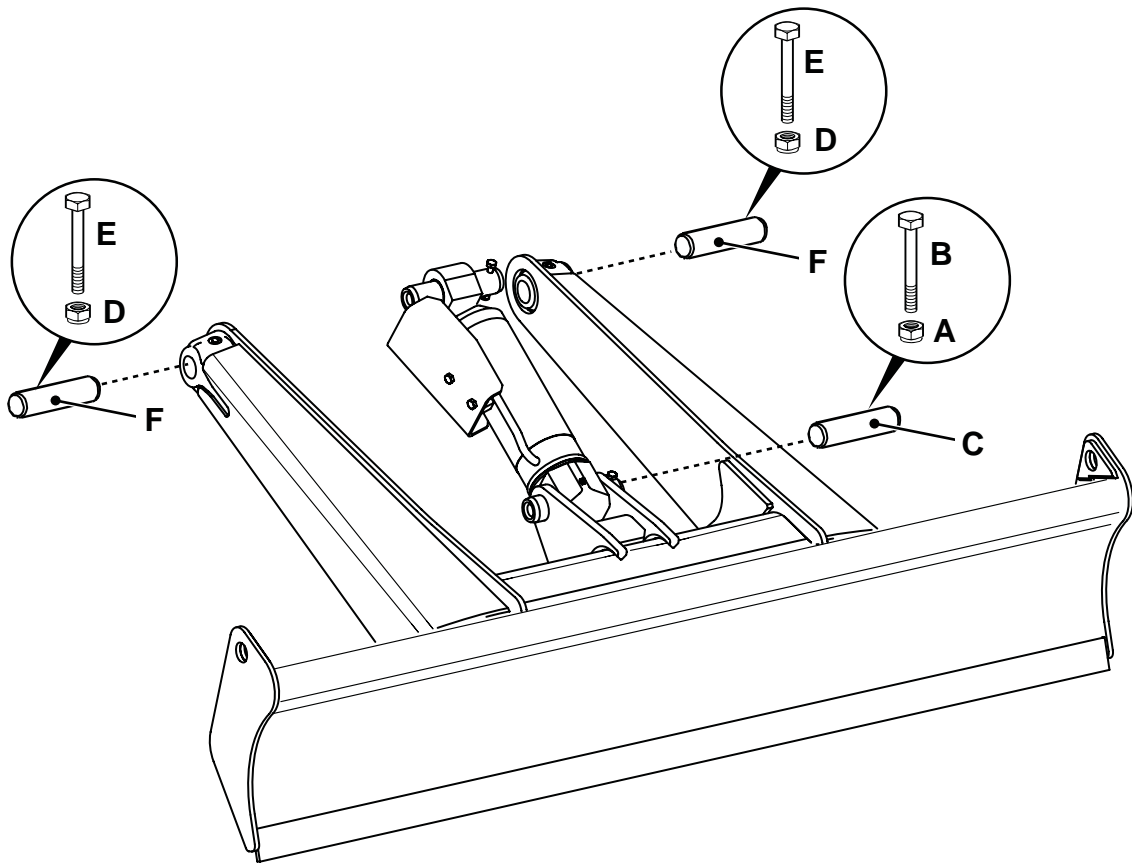


Fig 1.



Section C - Electrics

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Starter Motor

TC-005

Starting Circuit Test

Before carrying out the voltmeter tests, check the battery condition and ensure that all connections are clean and tight.

To prevent the engine starting during the tests ensure that the engine stop fuse is removed, (refer to **Fuse Identification** page).

Check the readings in the following sequence using a voltmeter. Unless otherwise stated, the readings must be taken with the starter switch held in the 'start' position ('HS') and the transmission forward/reverse selector in neutral.

Note: Do not operate the starter motor for more than 20 seconds at one time. Let the starter motor cool for at least two minutes between starts.

- 1 Connect the voltmeter across the battery terminals. → [Fig 7.](#) ([C-10](#)). Reading in 'start' position: 10.0V approximately. Minimum permissible reading in 'start' position 9.5V.

A low reading probably indicates a fault in the starter motor.

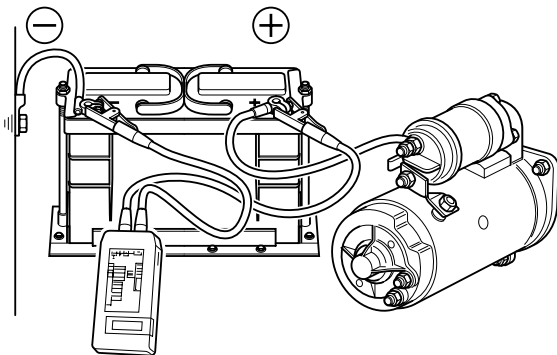


Fig 7.

- 2 Connect the voltmeter between the starter main terminal **8-A** and the commutator end bracket **8-B**. In the 'start' position, the reading should not be more

than 0.5V below the reading obtained in Step 1. Minimum permissible reading in 'start' position 9.0V.

If the reading is within this limit, continue to Step 3. If the reading is outside the limit, proceed to Step 4 and Step 5.

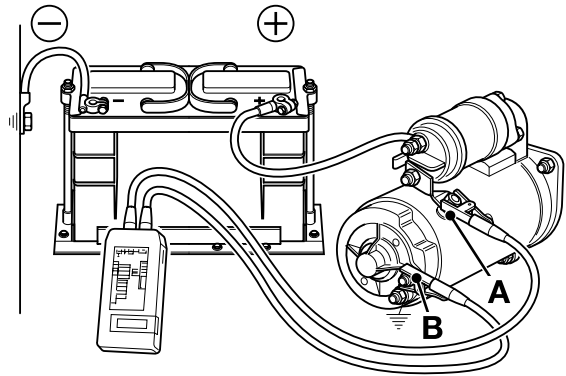


Fig 8.

- 3 Connect the voltmeter between the solenoid terminal **9-C** and a good earth. Minimum permissible reading in 'start' position: 8.0V.

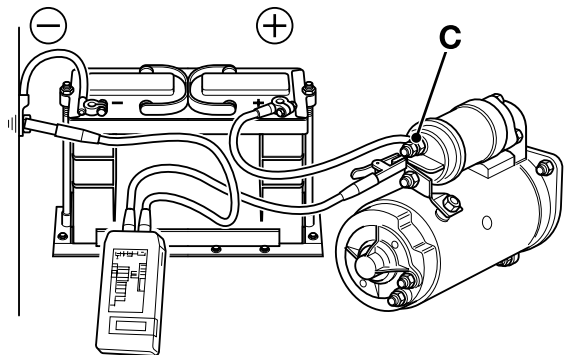


Fig 9.

- a If the reading is less than specified, connect the voltmeter between the neutral start relay terminal **10-D** and earth. An increase in reading to 8.0V indicates a fault in the wiring from the start relay to the solenoid.



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Turn

To turn the machine when travelling, move the lever back towards the central position on the side towards which you want to go e.g. move the left lever back to turn left. This causes one of the tracks to move slower than the other. The faster moving track will push the machine around. Release the lever to stop.

Spin

To spin the machine around through 360°, without moving it, operate one lever, in a forward position and the other in a reverse position. This will cause the tracks to drive in opposite directions and hence push the machine around.



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Servo Circuit

Refer → [Fig 1. \(E-12\)](#).

The servo pressure maintenance valve **4** is fitted with a single pressure reducing valve **5** and a solenoid valve **6** for servo isolation. A second solenoid valve **7** is fitted for a servo pressure selected high speed tracking operation. The servo system is supplied from a signal line tapped into the main hydraulic pump feed to the valve block **13**.

The pressure reducing valve **5** controls incoming pump pressure, this screw pressure adjustable valve reduces

and maintains servo pressure by opening and allowing excess pressure to escape to tank.

Down stream of the pressure reducing valve are located the servo accumulator **10** with its non return valve. The accumulator traps and stores servo pressure to enable the excavator spools to be operated for a limited period with a stopped engine. This allows the excavator end to be lowered safely to the ground should the engine stop.

The servo isolator solenoid **7** is energised by a microswitch located under the LH arm rest. When the arm rest is raised, the micro switch opens and solenoid **7** is spring returned to the closed position. With the arm rest down, micro switch closes and energises the isolator solenoid, allowing servo pressure to become available at the excavator controllers **11** and **12**.

A selector switch mounted in the control knob of the dozer lever energises the two speed tracking solenoid **7**. When selected the energised solenoid opens a route for servo pressure to operate the high speed selector **48** in the track motors **43** and **44** via the rotary coupling **42**.

Load Sensing - Maximum Flow

When a service is operated, the load sensing signal pressure from the valve block **13** increases. This increase in pressure combined with the force of springs **6** moves spool **4** up allowing oil in control piston **7** to drain back to tank via gallery **10**.

The force of spring **1** on swash plate **2** is now sufficient to increase the angle. The increased angle of the swashplate increases the output of the pump.

As the pump output pressure continues to rise, it will eventually lift flow-regulating spool **4** against the force of springs **6**. Pump output pressure is now sensed via spools **4** and **3** through port **A** to control piston **7**. This in turn overcomes return spring force **1** causing the swashplate angle to reduce and decrease pump output. Eventually the pressure in the load sense line **LS** and the force of springs **6** moves spool **4** down and the 'metering' cycle starts again.

This up and down movement of the spool **4** keeps the pressure sensed at both ends of the spool equal. Spring **6** is equivalent to 15 bar (220 lbf/in²), therefore the pump pressure should be this amount greater than the signal pressure (except when at maximum system pressure).
See Maximum Pressure (No Flow).

RED	Pressure Generated by Operation of a Service
GREEN	Exhaust
PINK	Sensing Pressure

Flow/Pressure Controller Adjustment

Item	Part Number	Description	Qty
A	611/22100	Hose	2
B	816/50043	Tee piece	1
C	1604/2051	Adapter	1
D	892/00055A	Blanking plug 1/4"	1

- 1 Connect the hose **A** (1/4 inch bore only approximately 500 mm long), to the return hose **1** using the Tee piece **B**. Connect the other end of the hose to the control valve at port **M** using adapter **C**.

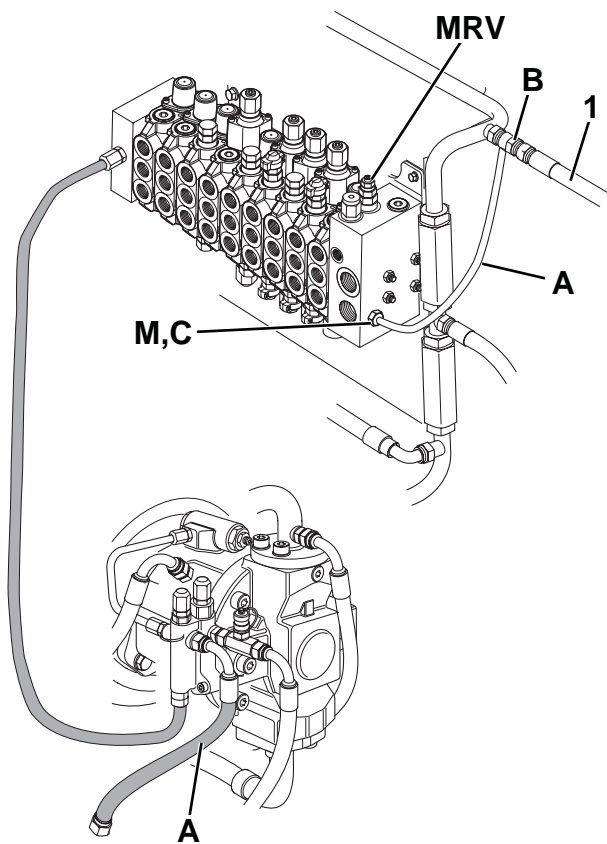


Fig 6.

- 2 Remove the load sense hose **2** from **FR2** and cap the hose with a blanking plug. Leave the port open to atmosphere. No oil should be discharged.
- 3 Remove blanking plug **D** from the front of port **FR1**.

- 4 Using the adapter from **FR2** connect a second hose **A** to the front of port **FR1**, leave the other end free to atmosphere. Use a container to collect the discharged oil.

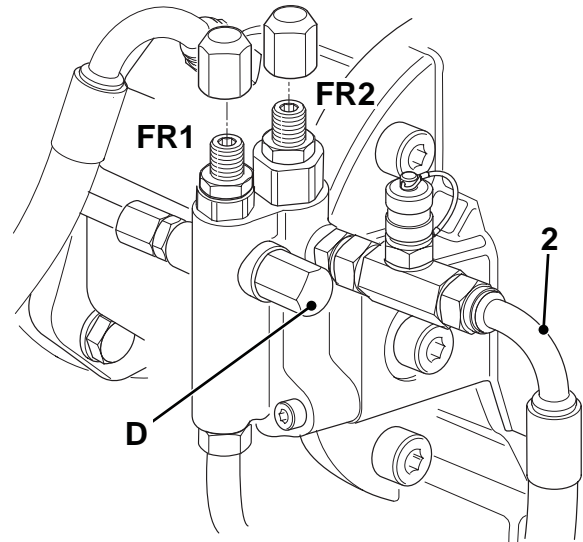


Fig 7.

- 5 Remove the 400 bar gauge and replace with a 40 bar (600 lbf/in²) pressure gauge to the pump pressure port on the servo pressure maintenance valve (PMV).
- 6 Unscrew the valve **FR1** out to avoid the gauge being damaged and screw **FR2** in fully.
- 7 Run the engine at 1500 rev/min
- 8 Adjust **FR1** in until 20 bar (290 lbf/in²) is achieved.
- 9 Adjust **FR2** until 15 bar (218 lbf/in²) is achieved
- 10 If the pressure will not adjust, remove the spool in **FR1** or **FR2** by removing the plug on the bottom and check for contamination.
- 11 Refit the adapter from **FR1** to **FR2** and replace the blanking cap and refit hose **2** to **FR2** ⇒ Fig 6. (□ E-34).



Section E - Hydraulics Hydraulic Pump

Dismantling and Assembly

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Adjustment

- 1 Park the machine safely on a level surface with the bucket resting on the ground. Relieve the pressure from the hydraulic system by operating the excavator controls.
- 2 Install a 400 bar (6000 lbf/in²) pressure gauge on the pump test port **PT**. This is located on the servo pressure maintenance valve which is next to the pump.
- 3 Run the engine at full throttle and dead end a service (i.e. bucket open) to raise MRV pressure.
- 4 Check the MRV pressure is 230 bar. If the value is not correct unscrew the relief valve **A** on the valve block, one turn, then screw it back in to obtain 230 bar.

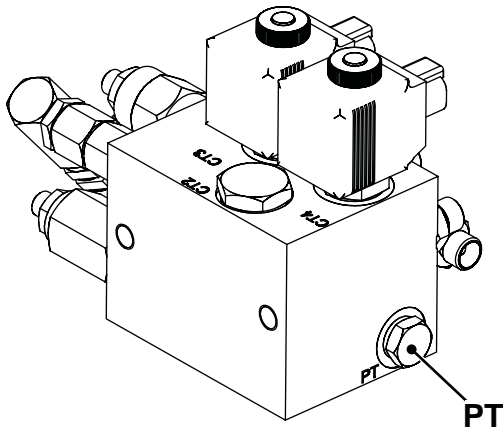


Fig 2.

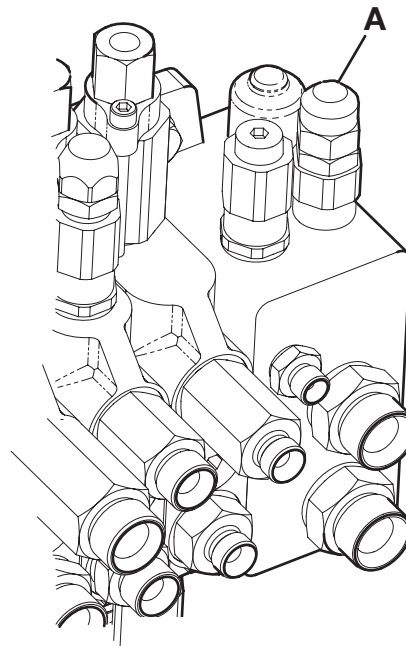


Fig 3.

Epicyclic Reduction

The reduction gearbox converts the high speed rotary input from the hydraulic motor to low speed high torque rotation of the case. A sun gear drives two sets of planet gears, these reduce the input speed in two stages and transmit drive to the ring gear which rotates the gearbox case and track drive sprocket.

Hydraulic Motor

The hydraulic motor **A** is an axial piston type and converts the pump supplied hydraulic energy to rotary movement. This rotary movement is achieved by incoming pressure from the pump acting on the crowns of the pistons **B** pushing them down the barrel **C**. The sliding shoe **D** on the opposite end of the piston slides down the angled face of the swash plate **E** rotating the barrel and hence the connecting shaft **F** from motor to gearbox.

The swash plate angle is supported on an eccentric trunnion **J** consisting of a pair of ball bearings mounted above the centre line of the motor shaft. This ensures the motor is set to full capacity for maximum torque, which translates into powerful machine tracking performance.

With high-speed tracking selected, servo pressure fills chamber **K** between stopper ring **L** and cylinder barrel **M**. The swash plate rocks on its trunnion to a shallower angle reducing the hydraulic capacity of the motor. The same volume of oil from the pump now turns the motor faster increasing the tracking speed of the machine.

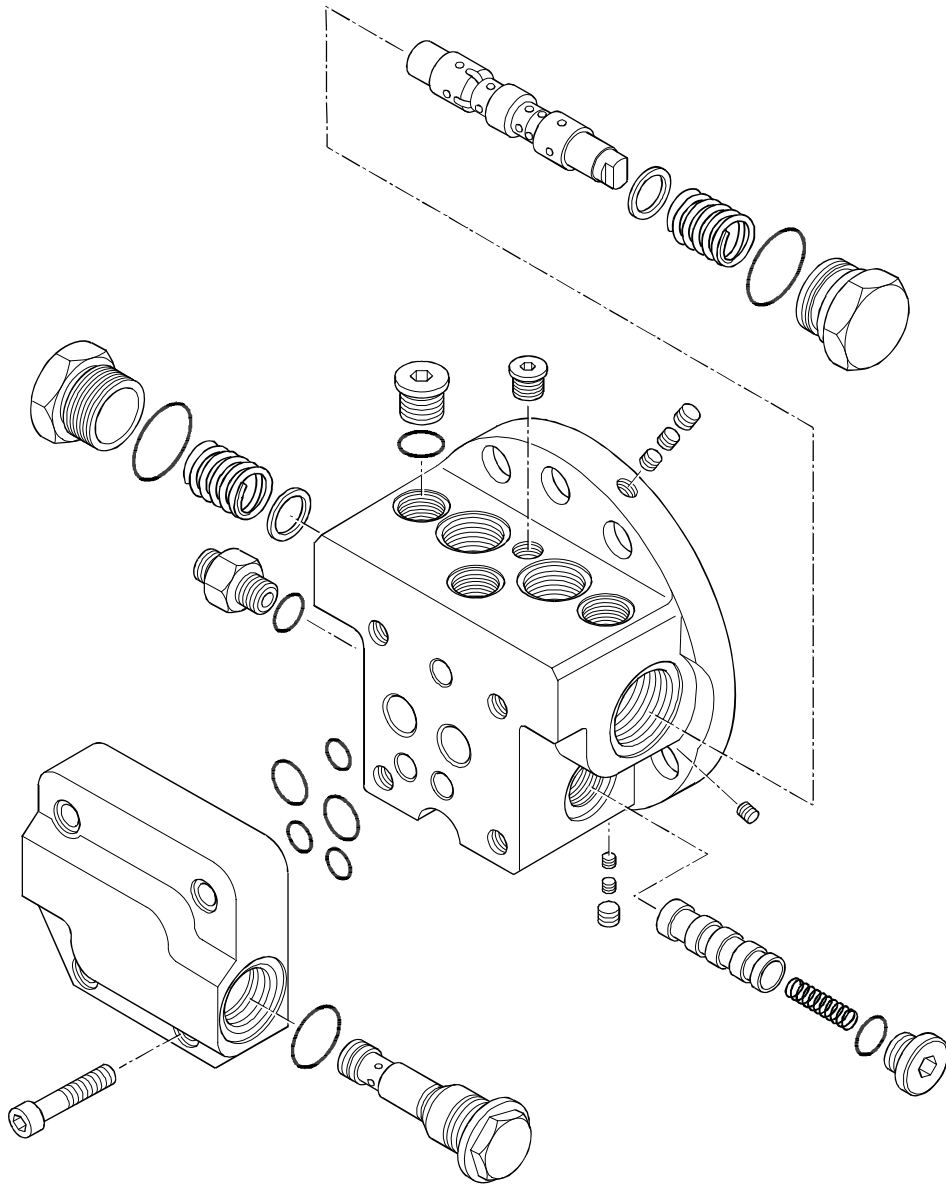


Fig 10.

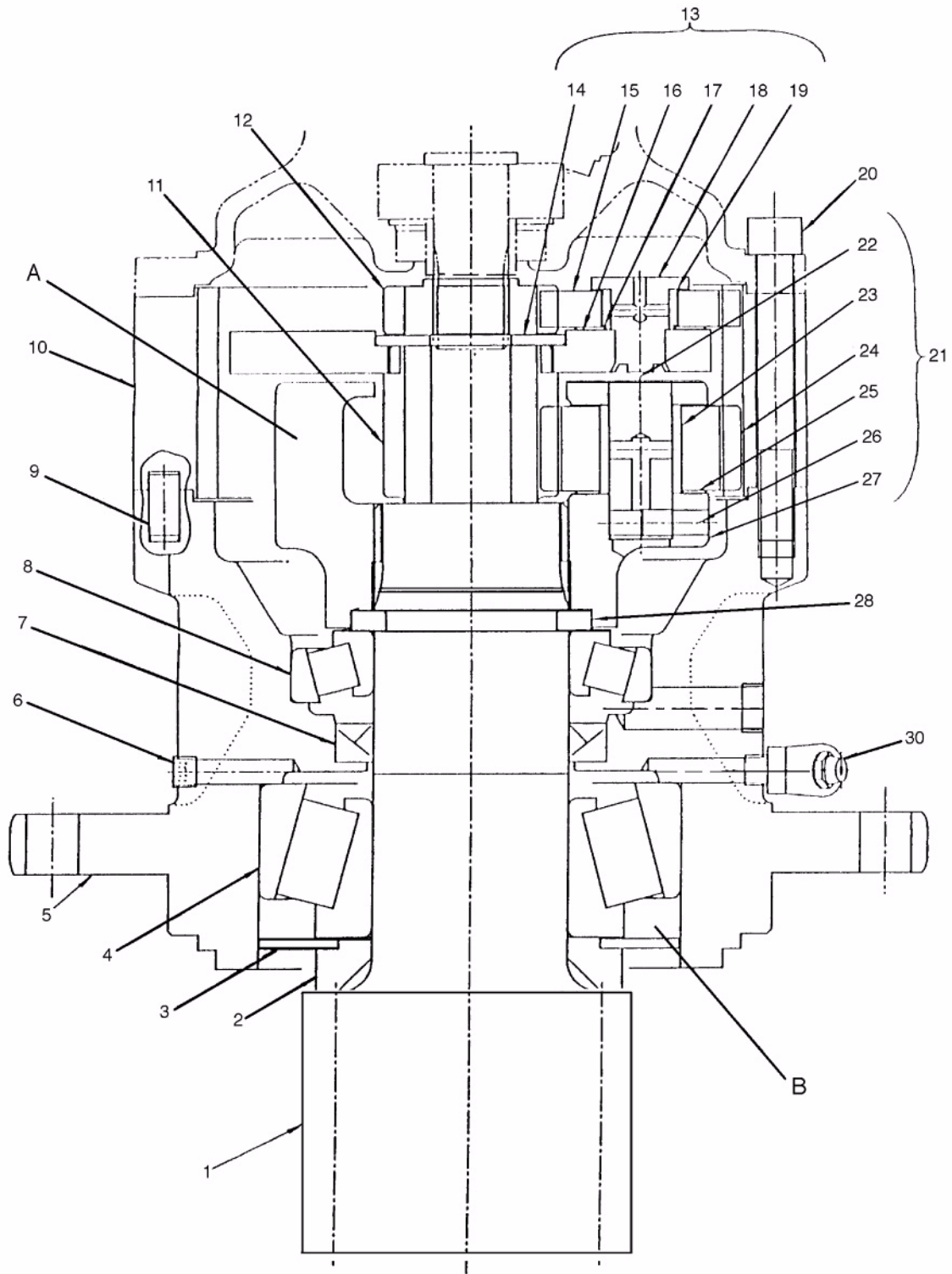


Fig 3.

Key ⇒ Fig 3. (□ E-84)	
A	A chamber
B	B chamber

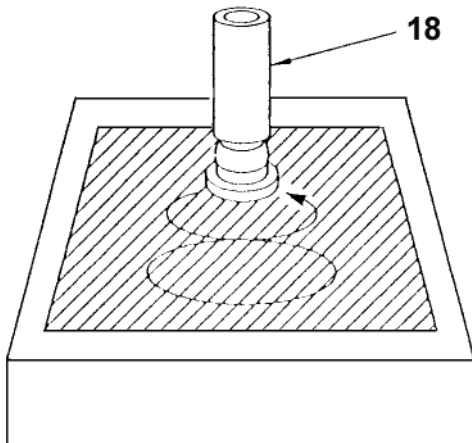


Fig 18.

- 2 Apply grease to the curved part of cylinder 16 (contact face with spring 17) and mount spring 17.

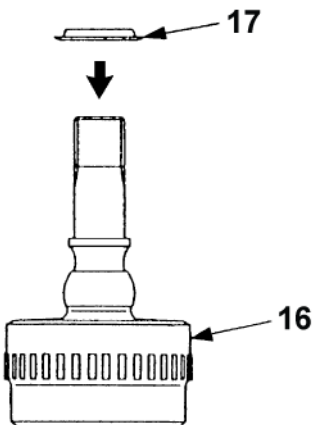


Fig 19.

- 3 Position the piston assemblies 18 into the holes of retainer 19.

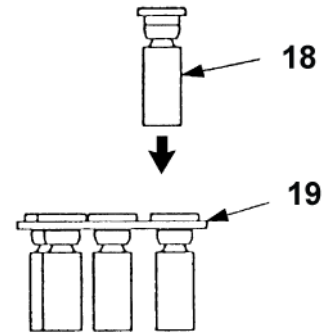


Fig 20.

- 4 Mount the piston assemblies 18 together with return plate 19 into cylinder 16.

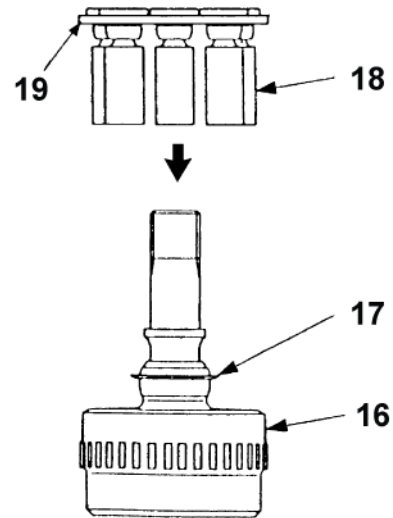


Fig 21.

Note: Insert the piston assemblies into the same bores from which they were removed. Apply clean hydraulic oil to all cylinder 16 bores before reassembling.

- 5 Apply clean hydraulic oil to piston assembly 18 shoe sliding surface and mount the cam plate 20.

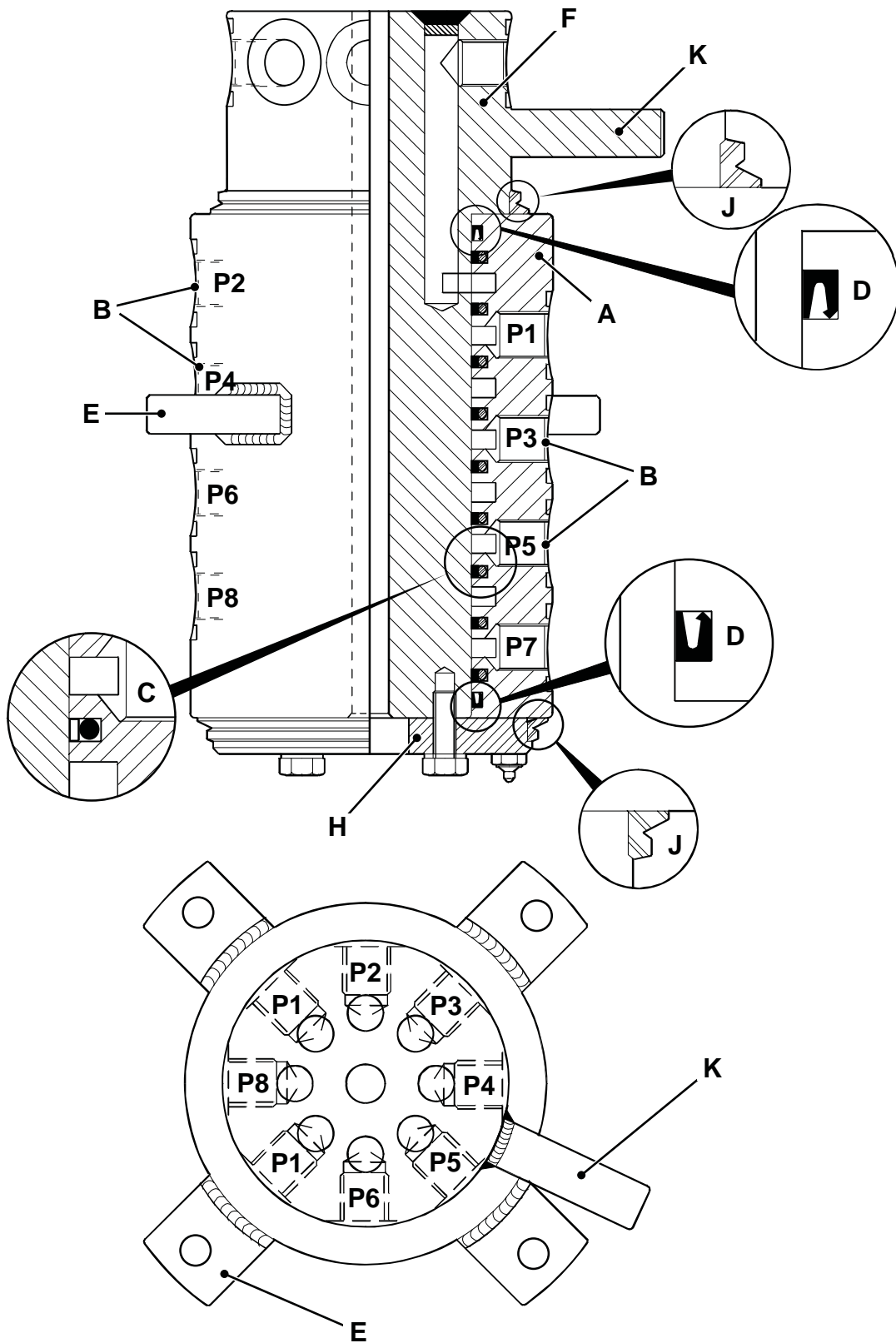


Fig 1.

Boom, Dipper and Bucket Rams

Removal

- 1 With the engine idling, set the machine with the bucket on the ground.
- 2 Support the excavator under the angle between the dipper and boom to ensure it will not move when the ram is removed.
- 3 On boom and bucket rams, remove the protection plate. Support the ram under the gland bearing and remove locknut **A** and bolt **B** from the pivot at the eye end of the ram. Drive out the pivot pin **C**.

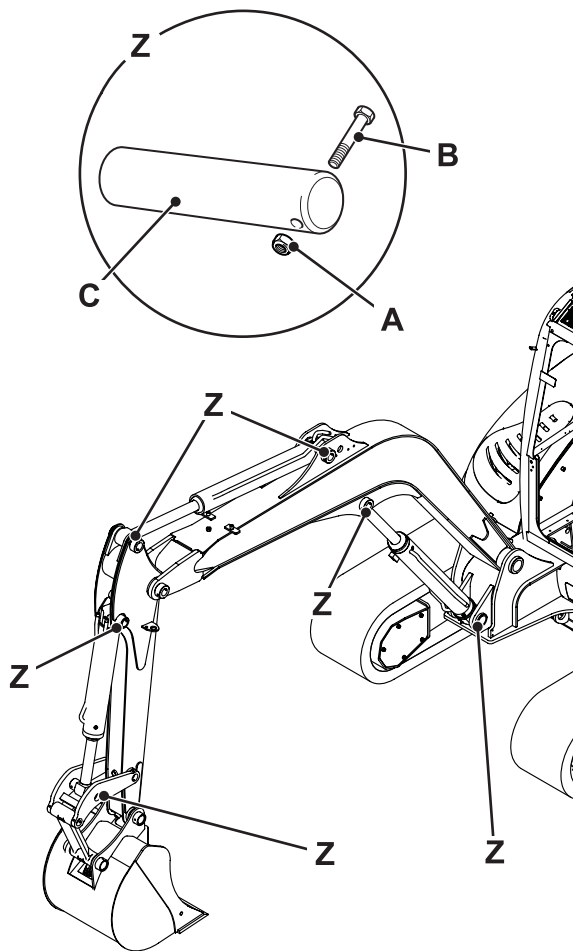


Fig 1.

- 4 With the engine idling, gently retract the ram rod into the cylinder by operating the relevant service.
- 5 Run the engine at idle and with the servo isolator lock in the operate position, move the control lever rapidly in both directions to vent any trapped pressure. Stop the engine.

⚠ WARNING

It is not possible to vent all residual pressure. Loosen the connection one full turn and allow the pressure to dissipate. Keep face and hands well clear of pressurised hydraulic oil and wear protective glasses.

HYD-4-3

- 6 Support the ram and remove the locknut **A** and the bolt **B** from the pivot at the base of the piston. Drive out the pivot pin **C**. Disconnect the hoses. Remove the ram from the machine.

Replacement

- 1 Locate the pivot point on the ram into the location on the machine structure. Fit the pivot pin **C** and secure using the bolt **B** and new locknut **A**.
- 2 Support the ram under the gland end of the cylinder, reconnect the hoses. With the engine idling, slowly extend the ram until the eye end locates correctly in the machine structure. Fit pin **C**. Secure using the bolt **B** and new locknut **A**.
- 3 Apply grease to the pivot points through the grease nipples. For grease specification → [Fluids, Lubricants and Capacities \(□ 3-12\)](#).
- 4 Connect the hoses to the cylinder, torque tighten.
- 5 On the bucket and boom rams, fit the protection plate and secure using the bolts.

Steel Track

Removal and Replacement

- 1 Position the machine so that the master pin **B** is at the front of the track, as shown.
- 2 Remove the fastener **A** and drive out the master pin **B**.

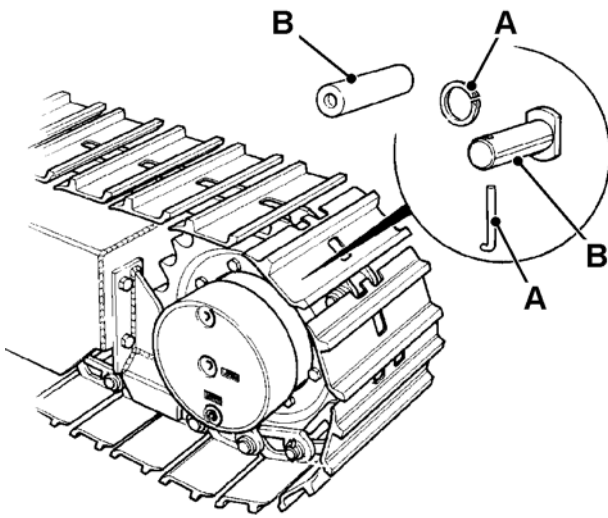


Fig 1.

WARNING

Ensure that all persons are clear of the track and especially of the driven sprocket during the following operations.

TRACK-1-6

- 3 Slowly reverse the machine until the track is laid on the ground.

WARNING

The following operations must only be undertaken by persons familiar with track changing operations and who are qualified to perform the operations. All persons must keep clear of the machine driven sprocket.

TRACK-1-7

- 4 Lay out the replacement track **C**, behind the machine. Drive the machine onto the new track, guiding the track over the idler wheel **D** and roller **E**, until the ends can be joined.

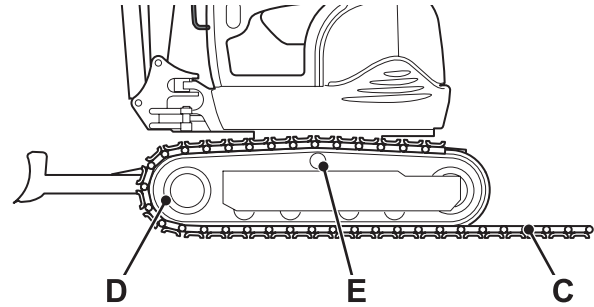


Fig 2.

- 5 Fit the master pin **B** and lock using a new fastener **A**.
- 6 Tension the track. Refer to *Track Tensioning, Section 3*.

Driven Sprocket

Removal and Replacement

Removal

- 1 Set up the machine and remove the track. Clean off all dirt and accumulated debris.
- 2 Remove the bolts **A**.
- 3 Remove driven sprocket **C** from the track gearbox **D**.

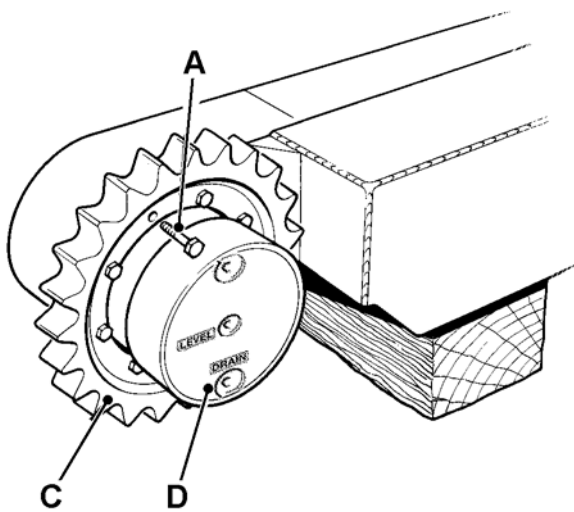


Fig 1.

Inspection

- 1 Check that the driven sprocket conforms to permitted tolerances.

Replacement

- 1 Install the driven sprocket **C** onto the track gearbox **D**.
- 2 Using locking fluid on the bolt threads, torque tighten the bolts **A** in a diagonal sequence ⇒ [Table 1. Torque Settings \(□ J-12\)](#).
- 3 Fit the track.

Table 1. Torque Settings

Item	Nm	lbf ft	kgf m
A	137	101	14

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